
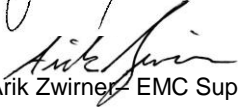




**BUREAU
VERITAS**

Curtis-Straus LLC, a wholly owned subsidiary of BV CPS

Test Report

Report No	EP2480-1
Client	Airvana
Address	250 Apollo Drive Chelmsford, MA 01824
Phone	978-250-2622
Item tested FCC ID	OneCell Radio Point QHYP-A2014
FRN	0024704082
Equipment Type Equipment Code	PCS Licensed Transmitter PCB
FCC Rule Parts	47 CFR 24 Subpart E 47 CFR 27 Subpart C
Test Dates	September 2-11, 2015
Results	As detailed within this report
Prepared by	 Jason Haley – EMC Engineer
Authorized by	 Arik Zwirner – EMC Supervisor
Issue Date	9/24/15

Curtis-Straus LLC is accredited by the American Association for Laboratory Accreditation for the specific scope of accreditation under Certificate Number 1627-01. This report may contain data which is not covered by the A2LA accreditation.



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Summary

This technical report supports an application for permissive change of a transmitter operating pursuant to 47 CFR 24 Subpart E, and 47 CFR 27 Subpart C. The product is OneCell Radio Point (m/n RP-A2014, p/n 800245-00-01) manufactured by Airvana.

Schematics and the Bill of Materials for the OneCell Radio Point, a Technical Description of Change document, and the FCC Class II Permissive Change Request Letter are provided with the exhibits that accompany this report under test report EP2480-1.

We found that the product met the above requirements. The test sample was received in good condition. Tests were performed starting on September 2, 2015 and ending on September 11, 2015.

Release Control Record

Issue No.	Reason for change	Date Issued
1	Original Release	September 24, 2015



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Test Methodology

The product can operate in the bands 728-746MHz (LTE band 12), 734-746MHz (LTE Band 17), 746-756MHz (LTE band 13), 2110-2155MHz (LTE Band 4), 2110-2170MHz (LTE Band 10), 1930-1995MHz (LTE Band 25), and 1930-1990MHz (LTE Band 2).

LTE Band 10 (2110-2170MHz) falls within the combined range 2110-2180MHz, which is treated as two distinct bands in FCC Part 27 (2110-2155MHz & 2155-2180MHz). Because the bands are separate in the Part 27 rules, the tests in this report treat LTE Band 10 as having two ranges partitioned at 2155MHz for band edge requirements.

The lowest and highest operating center frequencies are listed by LTE Band and transmit bandwidth in the table below:

LTE Band	Band Range	Tx bandwidth: 5MHz		Tx bandwidth: 10MHz	
		Channel	Center Freq.	Channel	Center Freq.
Band 12	728-746MHz	Low/Mid/High	MHz	Low/Mid/High	MHz
		Low	730.5	Low	733.0
		Mid	737.0	Mid	737.0
		High	743.5	High	741.0
Band 17	734-746MHz	Low/Mid/High	MHz	Low/Mid/High	MHz
		Low	736.5	Low	739.0
		Mid	740.0	Mid	740.0
		High	743.5	High	741.0
Band 13	746-756MHz	Low/Mid/High	MHz	Low/Mid/High	MHz
		Low	748.5	Low	N/A
		Mid	751.0	Mid	751.0
		High	753.5	High	N/A
Band 25	1930-1995MHz	Low/Mid/High	MHz	Low/Mid/High	MHz
		Low	1932.5	Low	1935.0
		Mid	1962.5	Mid	1962.5
		High	1992.5	High	1990.0
Band 2	1930-1990MHz	Low/Mid/High	MHz	Low/Mid/High	MHz
		Low	1932.5	Low	1935.0
		Mid	1960.0	Mid	1960.0
		High	1987.5	High	1985.0
Band 10	2110-2170MHz	Low/Mid/High	MHz	Low/Mid/High	MHz
		Low-1	2112.5	Low-1	2115.0
		Mid-1	2140.0	Mid-1	2140.0
	(1) 2110-2155MHz	High-1	2152.5	High-1	2150.0
		Low-2	2157.5	Low-2	2160.0
		High-2	2167.5	High-2	2165.0
Band 4	2110-2155MHz	Low/Mid/High	MHz	Low/Mid/High	MHz
		Low	2112.5	Low	2115.0
		Mid	2132.5	Mid	2132.5
		High	2152.5	High	2150.0

Per Airvana, the device under test prevents the operation of multiple transmit channels operating on the same frequency at the same time (see Operational Description document).



Modulation is one of QPSK, 16QAM, and 64QAM, for each of the different types of channels. Each type of modulation can operate at 5MHz or 10MHz transmit bandwidths.

Radiated emission testing was performed according to the procedures specified in ANSI C63.4 (2014) and TIA-603-C. Radiated Emissions were maximized by rotating the device as well as varying the test antenna's height and polarity. Radiated spurious emissions tests were done in the frequency range of 30MHz-22GHz.

EUT transmit modes for radiated emissions were selected as follows. Overlapping LTE frequency bands were treated together as one combined band with a sub-band. Specifically, Band 17 is a sub-band of Band 12, Band 2 is a sub-band of Band 25, and Band 4 is a sub-band of Band 10. Band 13 does not have a sub-band. For each of these four combined bands, a full emissions scan across the range 30MHz to ten times the transmitting frequency was performed in the highest power transmit mode (the combination of bandwidth, channel, and modulation). This mode is chosen as a worst-case operating state to represent the other possible modes. The mode to be tested was determined from the data in the original application prior to the permissive change request. In addition to the full scan, the harmonics of other transmit modes were measured by varying each of the parameters (bandwidth, channel, and modulation) from the highest power mode. Only one parameter was varied from the worst-case mode at any time.

Spectrum Analyzer settings for radiated emissions were as follows: 120kHz RBW, 1MHz VBW, quasi-peak or peak voltage for the range 30-1000MHz; 1MHz RBW, 3MHz VBW, peak and average voltage for the range above 1000MHz.

Conducted measurements at the antenna port were performed with the unit under test running in the same highest power transmit mode as for radiated emissions. The loss factors for the cable and attenuator were programmed as correction factors into the spectrum analyzer, and displayed values in the screen plots are corrected for these factors. For antenna port conducted spurious emissions testing 30MHz-22GHz range was measured.

Spectrum Analyzer settings for conducted emissions were as follows: 9kHz RBW, 30kHz VBW, quasi-peak and average readings.



Product Tested - Configuration Documentation

EUT Configuration											
<p>Work Order: P2480 Company: Airvana Company Address: 250 Apollo Drive Chelmsford MA USA 01824 Contact: Kevin Craig Person Present: Kevin Craig</p>											
EUT:			MN	PN	SN						
RP-A2014				800245-00-01	14509001726						
<p>EUT Description: Switched IQ Radio Point Domestic EUT Max Frequency: 200MHz EUT TX Frequency: 728-746MHz, 746-756MHz, 1930-1990MHz, 2110-2155MHz and 2155-2170MHz</p>											
Support Equipment:			MN	SN							
Dell Latitude			D630	20264182597							
Linksys POE			LGS308P	14810C964P4107							
Netgear Router			NETGEAR90	3113465001E94							
EUT Ports:											
Port Label	Port Type	No. of ports	No. Populated	Cable Type	Shielded	Ferrites	Length	Max Length	In/Out NEBS Type	Unpopulated Reason	
POE	RJ45	1	1	Cat.5e	No	No	10m	100m	Indoor		
Serial	4-pins	1	0							Service Only	
Antenna	Coaxial	2	2	Coaxial	N/A	No	NA	NA	Indoor		
Software / Operating Mode Description:											
<p>EUT is set to transmit on selected Band class (12, 17, 13, 10, 4, 25 and 2) on Low, Mid and High channels with 5 MHz bandwidth and 10 MHz bandwidth settings respectively. Telnet to EUT via IP address: 172.16.118.4</p>											



Statement of Conformity

For this Class II Permissive Change, the EUT has been found to conform to the following parts of 47 CFR 24 and 47 CFR 27.

Parts 2 & 15	Parts 24 & 27	Comments
2.1051	24.238(a)	Spurious emissions at antenna port below -13dBm
2.1053, 15.209	24.236, 24.238(a)	Radiated spurious emissions meet FCC Class B and are below -13dBm. Meets out of band emissions limits.
2.1051	27.53(c,f,g,h)	Spurious emissions at antenna port below -13dBm
2.1053, 15.209	27.53(c,f,g,h)	Radiated spurious emissions meet FCC Class B and are below -13dBm. Meets out of band emissions limits.



Test Data and Results

LTE Bands 25 & 2 (FCC Part 24)

Conducted Spurious Emissions at Antenna Port

LIMITS

“The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.”

[24.238(a)]

$$\text{Limit} = 10 \cdot \log(P[\text{mW}]) - (43 + 10 \cdot \log(P[\text{W}])) = -13\text{dBm}$$

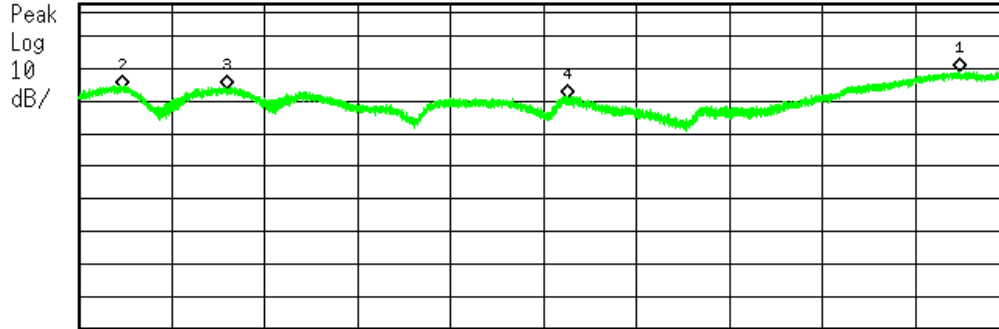
Spectrum analyzer screen plots for LTE Bands 25 & 2 are shown on the following pages. The operating frequencies were 1962.5MHz (Band 25) and 1960MHz (Band 2), which were taken to represent both bands as Band 2 is a subset of Band 25.



PLOTS

LTE Band 2 – Antenna port J1

Agilent 10:45:09 Sep 4, 2015 R L
 P2480 CSEMI BAND2 10MHZ BW 1960 16QAM J1 Mkr4 841.64 MHz
 Ref -10 dBm Atten 5 dB -39.06 dBm

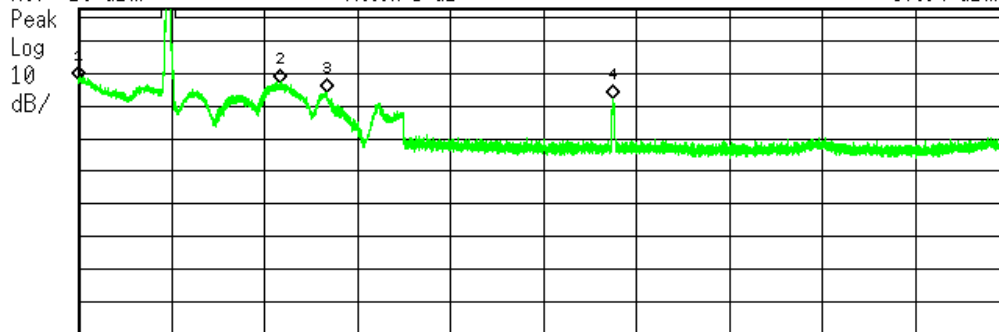


Start 30 MHz Stop 1.575 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.49427 GHz	-30.97 dBm
2	(1)	Freq	103.75 MHz	-36.43 dBm
3	(1)	Freq	276.91 MHz	-36.35 dBm
4	(1)	Freq	841.64 MHz	-39.06 dBm

30MHz to 1.575GHz

Agilent 10:51:13 Sep 4, 2015 R L
 P2480 CSEMI BAND2 10MHZ BW 1960 16QAM J1 Mkr4 3.9167 GHz
 Ref -10 dBm Atten 5 dB -37.94 dBm

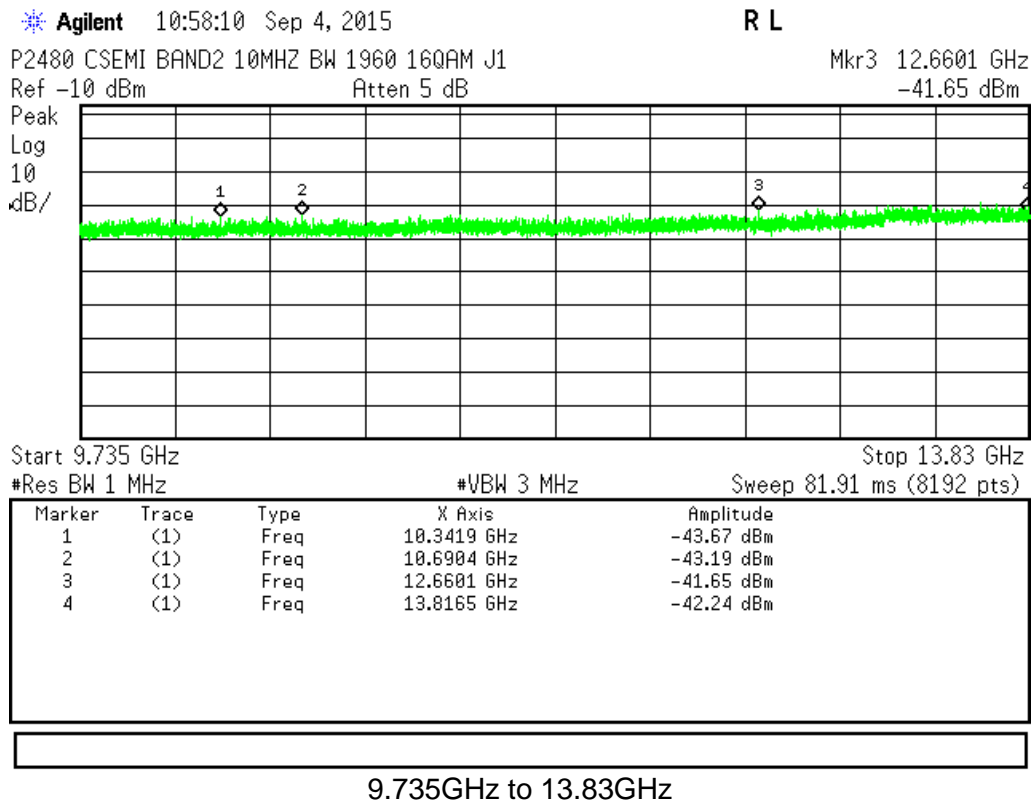
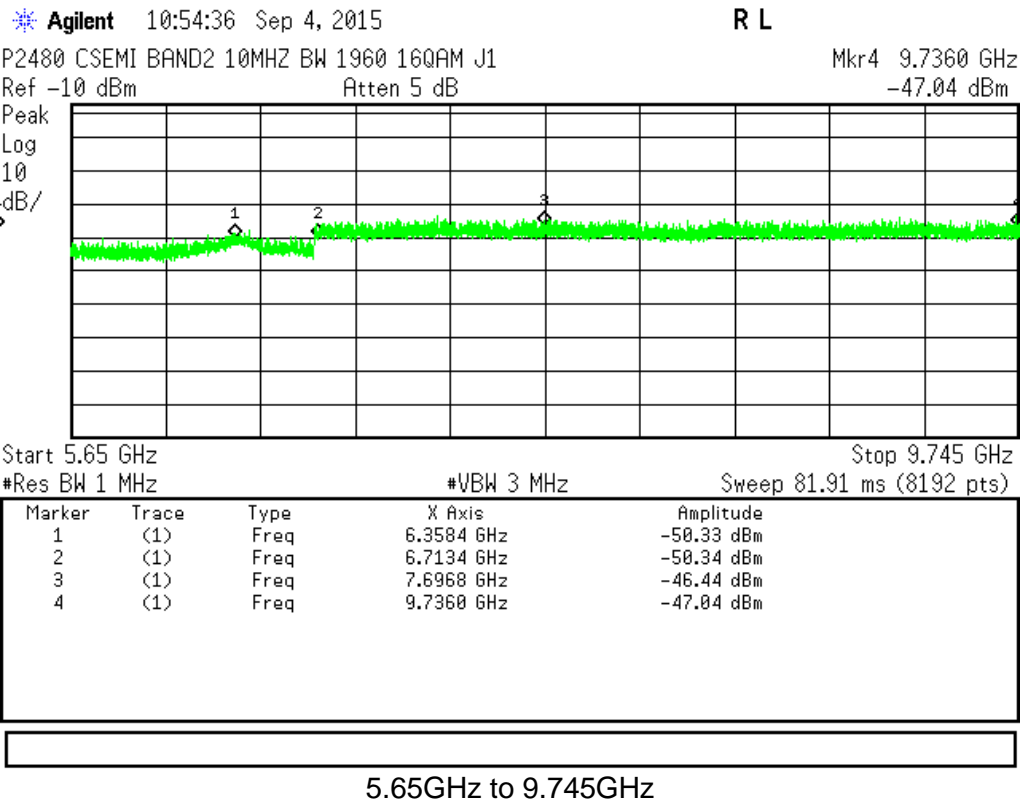


Start 1.565 GHz Stop 5.66 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

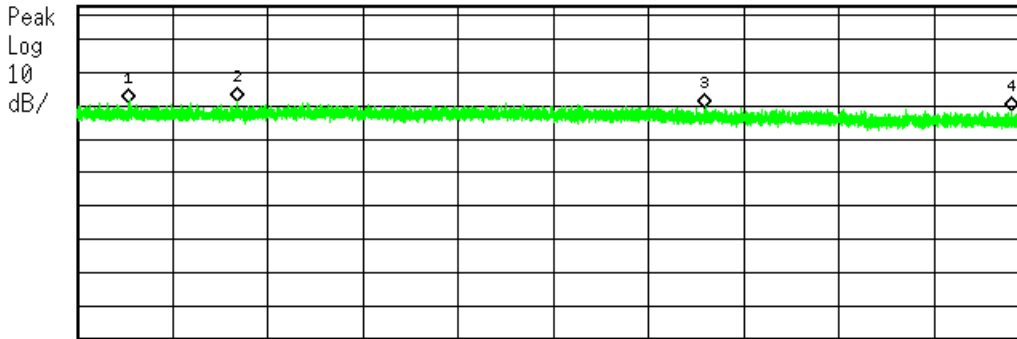
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.5680 GHz	-32.02 dBm
2	(1)	Freq	2.4549 GHz	-32.82 dBm
3	(1)	Freq	2.6579 GHz	-36.01 dBm
4	(1)	Freq	3.9167 GHz	-37.94 dBm

1.565GHz to 5.66GHz





Agilent 11:02:55 Sep 4, 2015 R L
 P2480 CSEMI BAND2 10MHZ BW 1960 16QAM J1 Mkr4 17.8405 GHz
 Ref -10 dBm Atten 5 dB -41.46 dBm



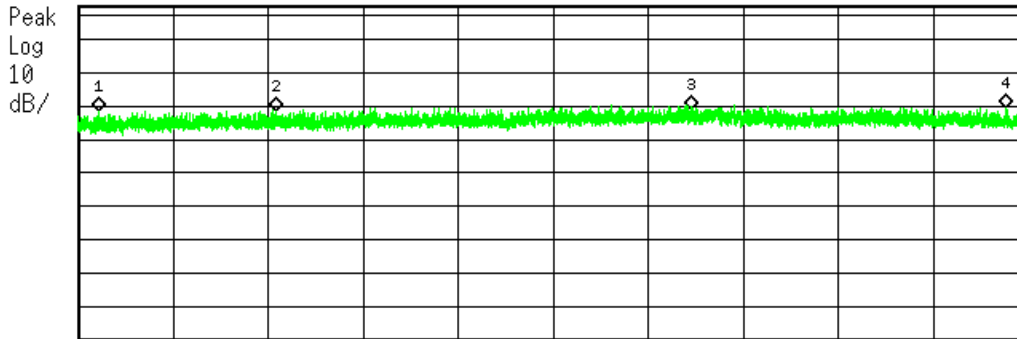
Start 13.82 GHz Stop 17.91 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	14.0405 GHz	-39.05 dBm
2	(1)	Freq	14.5114 GHz	-38.9 dBm
3	(1)	Freq	16.5212 GHz	-40.86 dBm
4	(1)	Freq	17.8405 GHz	-41.46 dBm



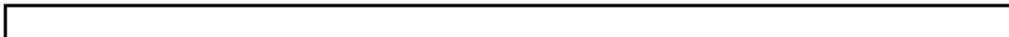
13.82GHz to 17.915GHz

Agilent 11:06:55 Sep 4, 2015 R L
 P2480 CSEMI BAND2 10MHZ BW 1960 16QAM J1 Mkr3 20.5472 GHz
 Ref -10 dBm Atten 5 dB -41.32 dBm



Start 17.91 GHz Stop 22 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	17.9945 GHz	-41.75 dBm
2	(1)	Freq	18.7589 GHz	-41.63 dBm
3	(1)	Freq	20.5472 GHz	-41.32 dBm
4	(1)	Freq	21.9035 GHz	-40.8 dBm



17.905GHz to 22GHz



LTE Band 2 – Antenna port J2

Agilent 11:17:07 Sep 4, 2015

R L

P2480 CSEMI BAND2 10MHZ BW 1960 16QAM J2

Mkr1 104.51 MHz

Ref -10 dBm

Atten 5 dB

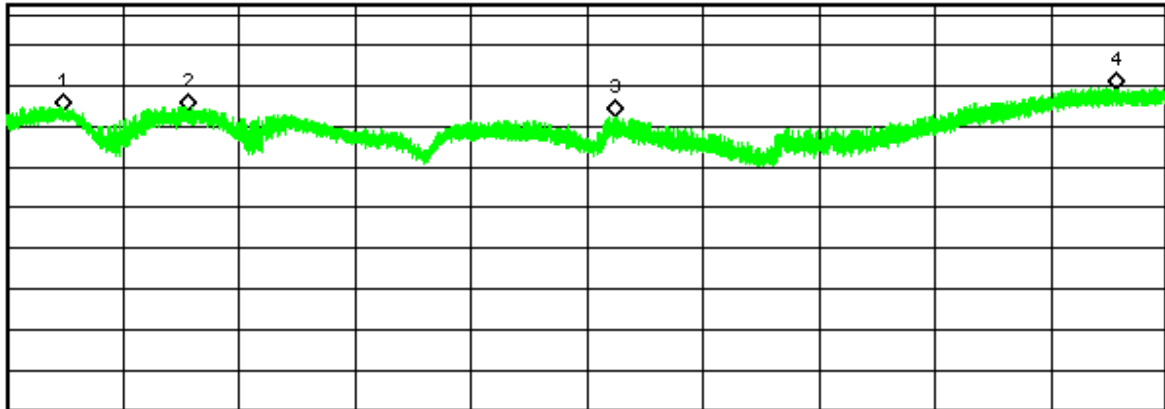
-36.2 dBm

Peak

Log

10

dB/



Start 30 MHz

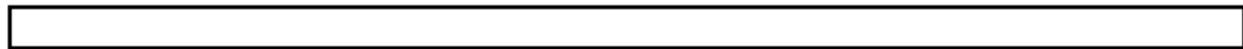
Stop 1.575 GHz

#Res BW 1 MHz

#VBW 3 MHz

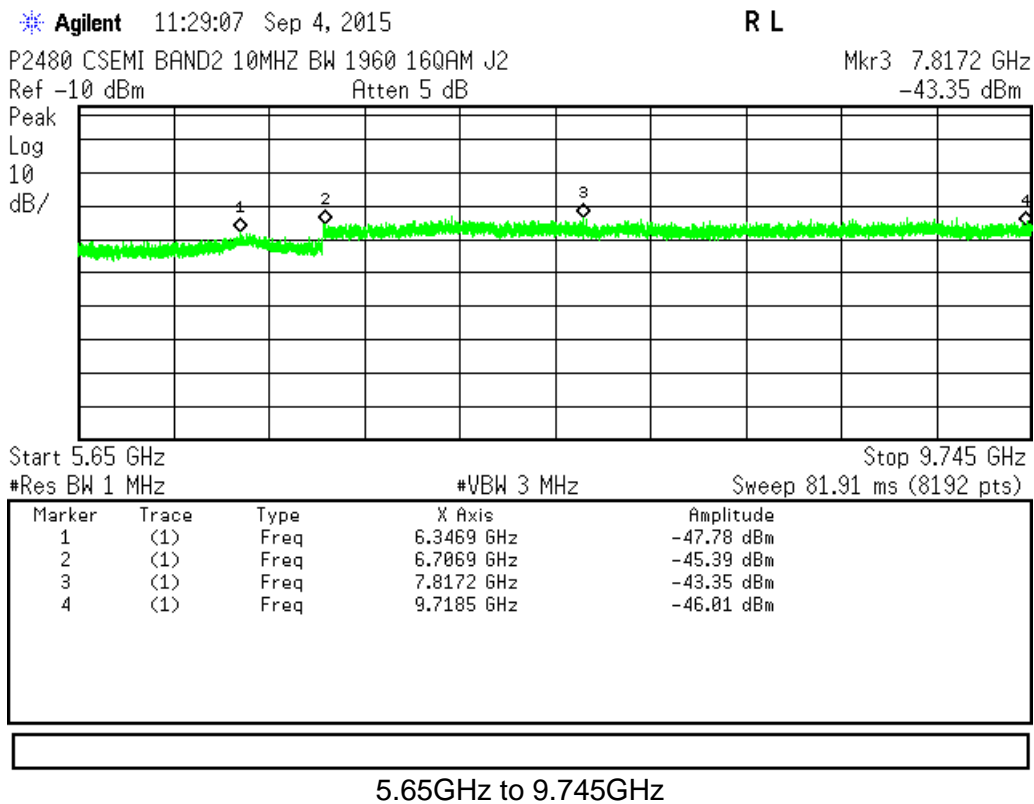
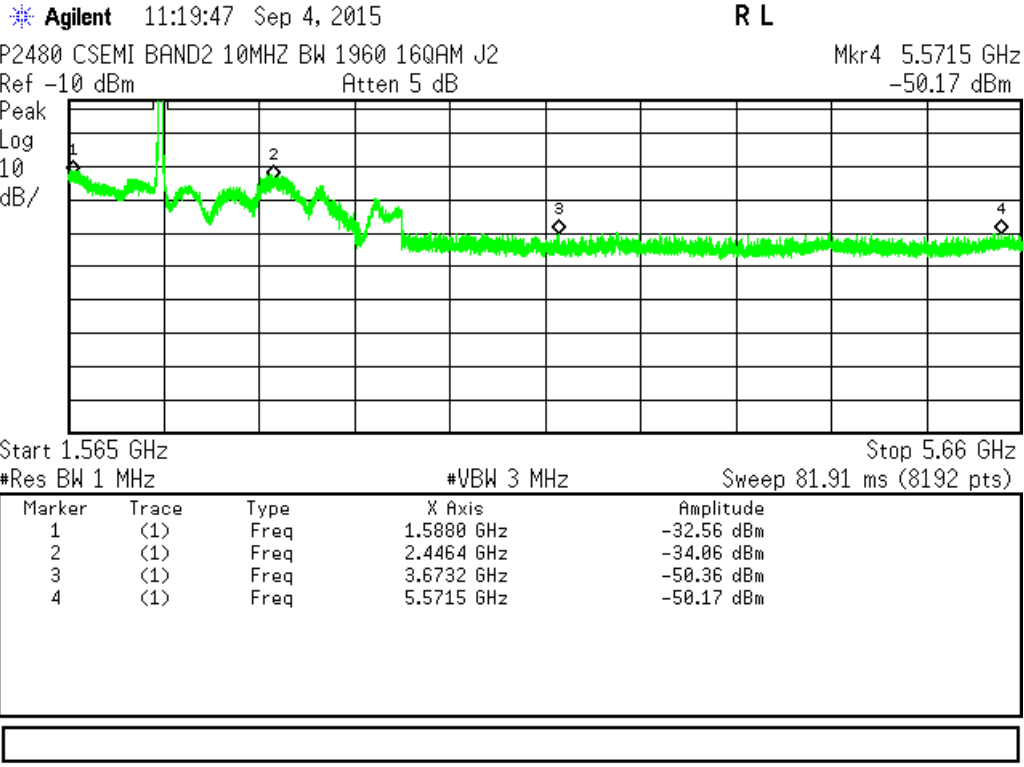
Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	104.51 MHz	-36.2 dBm
2	(1)	Freq	271.44 MHz	-36.23 dBm
3	(1)	Freq	839.75 MHz	-37.94 dBm
4	(1)	Freq	1.50634 GHz	-30.9 dBm

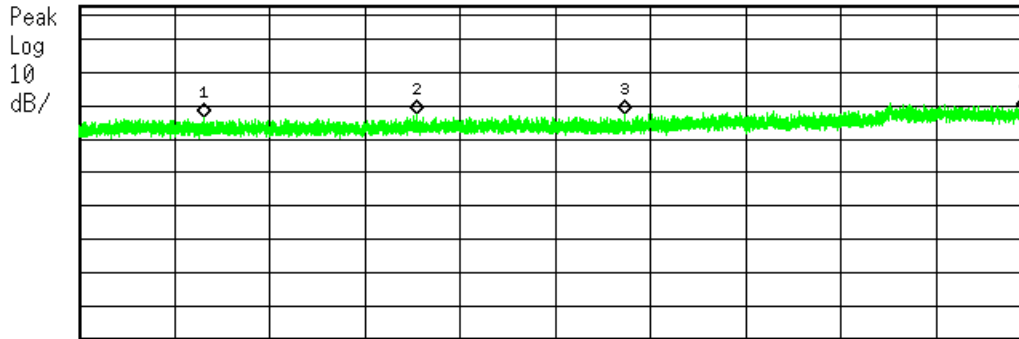


30MHz to 1.575GHz





Agilent 11:45:44 Sep 4, 2015 R L
 P2480 CSEMI BAND2 10MHZ BW 1960 16QAM J2 Mkr2 11.1868 GHz
 Ref -10 dBm Atten 5 dB -42.56 dBm



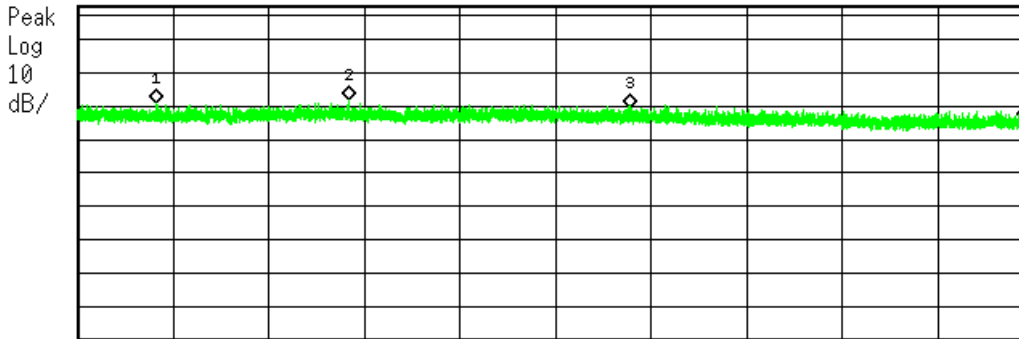
Start 9.735 GHz Stop 13.83 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	10.2744 GHz	-43.56 dBm
2	(1)	Freq	11.1868 GHz	-42.56 dBm
3	(1)	Freq	12.0832 GHz	-42.56 dBm
4	(1)	Freq	13.7935 GHz	-41.54 dBm



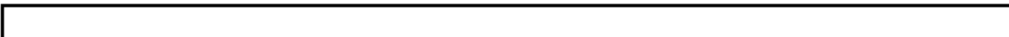
9.735GHz to 13.83GHz

Agilent 11:52:32 Sep 4, 2015 R L
 P2480 CSEMI BAND2 10MHZ BW 1960 16QAM J2 Mkr1 14.1585 GHz
 Ref -10 dBm Atten 5 dB -39.24 dBm



Start 13.82 GHz Stop 17.91 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

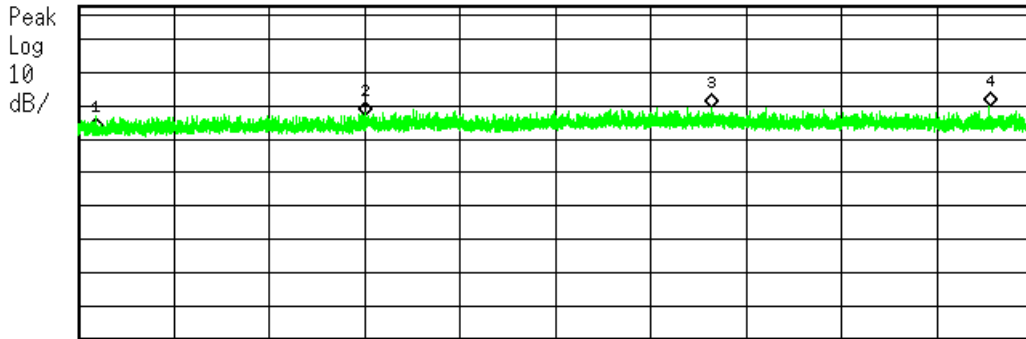
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	14.1585 GHz	-39.24 dBm
2	(1)	Freq	14.9839 GHz	-38.2 dBm
3	(1)	Freq	16.1862 GHz	-40.84 dBm
4	(1)	Freq	17.8750 GHz	-44.55 dBm



13.82GHz to 17.915GHz

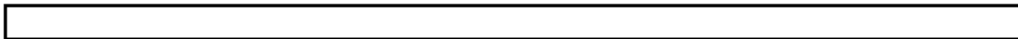


Agilent 11:14:31 Sep 4, 2015 R L
 P2480 CSEMI BAND2 10MHZ BW 1960 16QAM J2 Mkr2 19.1363 GHz
 Ref -10 dBm Atten 5 dB -43.09 dBm



Start 17.91 GHz Stop 22 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	17.9790 GHz	-47.61 dBm
2	(1)	Freq	19.1363 GHz	-43.09 dBm
3	(1)	Freq	20.6267 GHz	-40.57 dBm
4	(1)	Freq	21.8180 GHz	-39.95 dBm

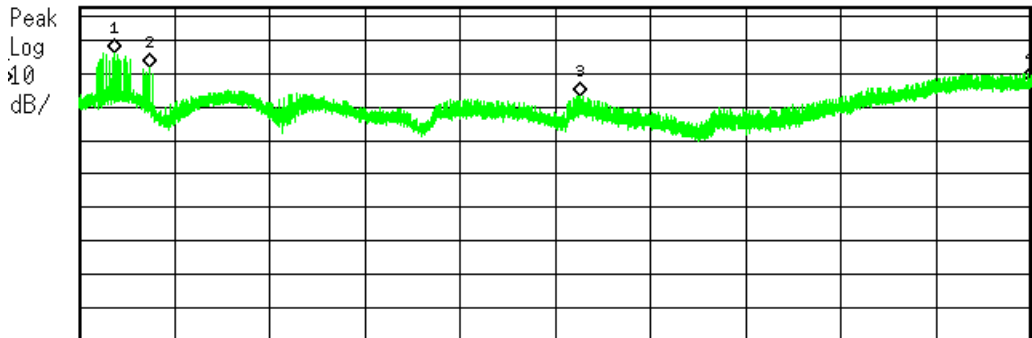


17.905GHz to 22GHz



LTE Band 25 – Antenna port J1

Agilent 13:44:04 Sep 4, 2015 R L
 P2480 CSEMI BAND25 5MHZ BW 1962 160AM J1 Mkr4 1.57217 GHz
 Ref -10 dBm Atten 5 dB -32.57 dBm

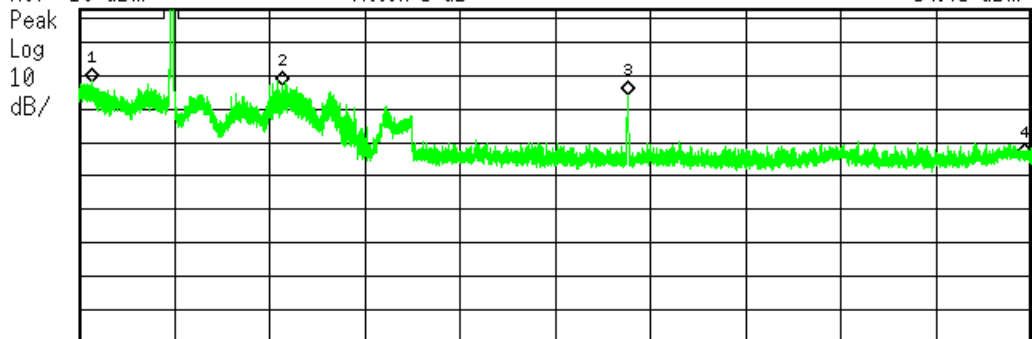


Start 30 MHz Stop 1.575 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	87.53 MHz	-24.03 dBm
2	(1)	Freq	144.12 MHz	-28.11 dBm
3	(1)	Freq	842.02 MHz	-36.7 dBm
4	(1)	Freq	1.57217 GHz	-32.57 dBm

30MHz to 1.575GHz

Agilent 13:47:42 Sep 4, 2015 R L
 P2480 CSEMI BAND25 5MHZ BW 1962 160AM J1 Mkr4 5.6320 GHz
 Ref -10 dBm Atten 5 dB -54.45 dBm



Start 1.565 GHz Stop 5.66 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.6220 GHz	-31.92 dBm
2	(1)	Freq	2.4374 GHz	-32.99 dBm
3	(1)	Freq	3.9267 GHz	-35.9 dBm
4	(1)	Freq	5.6320 GHz	-54.45 dBm

1.565GHz to 5.66GHz

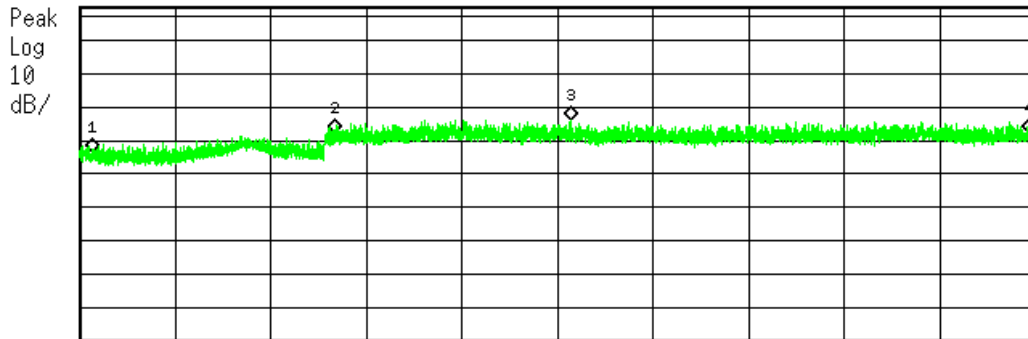


Agilent 13:51:02 Sep 4, 2015

R L

P2480 CSEMI BAND25 5MHZ BW 1962 16QAM J1
Ref -10 dBm Atten 5 dB

Mkr3 7.7557 GHz
-43.99 dBm



Start 5.65 GHz Stop 9.745 GHz
#Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	5.7030 GHz	-53.69 dBm
2	(1)	Freq	6.7469 GHz	-47.92 dBm
3	(1)	Freq	7.7557 GHz	-43.99 dBm
4	(1)	Freq	9.7170 GHz	-48.04 dBm

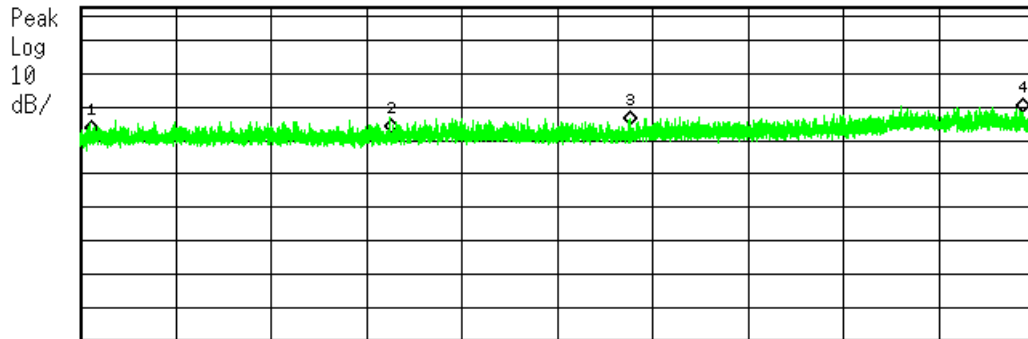
5.65GHz to 9.745GHz

Agilent 13:57:50 Sep 4, 2015

R L

P2480 CSEMI BAND25 5MHZ BW 1962 16QAM J1
Ref -10 dBm Atten 5 dB

Mkr1 9.7815 GHz
-48.37 dBm



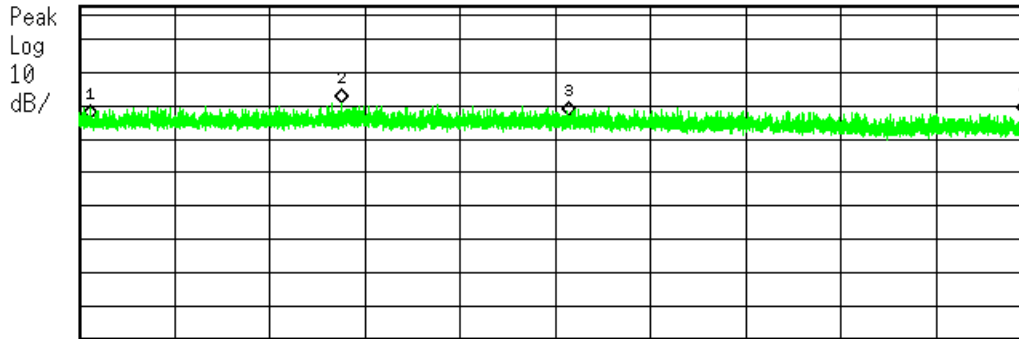
Start 9.735 GHz Stop 13.83 GHz
#Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	9.7815 GHz	-48.37 dBm
2	(1)	Freq	11.0703 GHz	-47.65 dBm
3	(1)	Freq	12.0972 GHz	-45.39 dBm
4	(1)	Freq	13.7830 GHz	-41.68 dBm

9.735GHz to 13.83GHz



Agilent 13:55:36 Sep 4, 2015 R L
 P2480 CSEMI BAND25 5MHZ BW 1962 16QAM J1 Mkr2 14.9474 GHz
 Ref -10 dBm Atten 5 dB -39.26 dBm



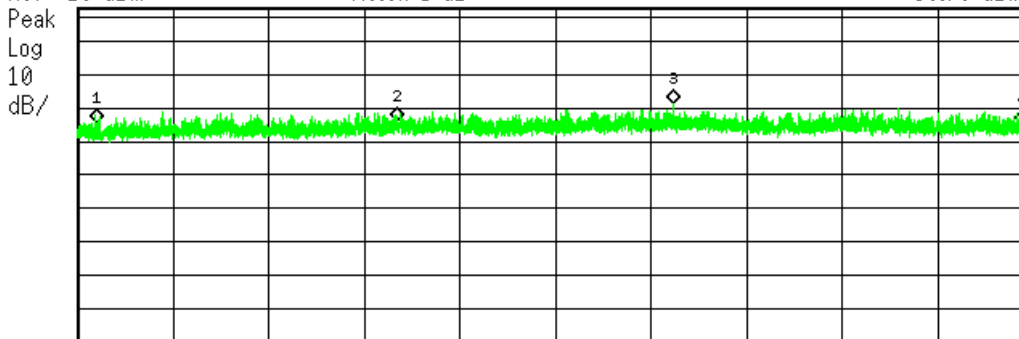
Start 13.82 GHz Stop 17.91 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	13.8700 GHz	-44.11 dBm
2	(1)	Freq	14.9474 GHz	-39.26 dBm
3	(1)	Freq	15.9257 GHz	-42.79 dBm
4	(1)	Freq	17.8820 GHz	-42.53 dBm



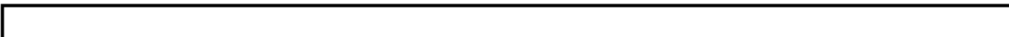
13.82GHz to 17.915GHz

Agilent 13:59:42 Sep 4, 2015 R L
 P2480 CSEMI BAND25 5MHZ BW 1962 16QAM J1 Mkr3 20.4572 GHz
 Ref -10 dBm Atten 5 dB -38.78 dBm



Start 17.91 GHz Stop 22 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	17.9870 GHz	-44.34 dBm
2	(1)	Freq	19.2758 GHz	-43.88 dBm
3	(1)	Freq	20.4572 GHz	-38.78 dBm
4	(1)	Freq	21.9530 GHz	-44.88 dBm



17.905GHz to 22GHz



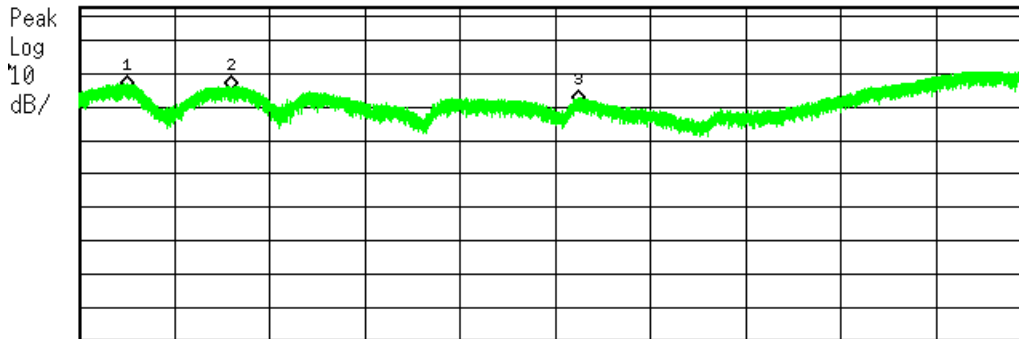
LTE Band 25 – Antenna port J2

Agilent 13:37:08 Sep 4, 2015

R L

P2480 CSEMI BAND25 5MHZ BW 1962 16QAM J2
 Ref -10 dBm Atten 5 dB

Mkr2 276.72 MHz
 -34.7 dBm



Start 30 MHz Stop 1.575 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	187.52 MHz	-34.96 dBm
2	(1)	Freq	276.72 MHz	-34.7 dBm
3	(1)	Freq	839.19 MHz	-39.19 dBm
4	(1)	Freq	1.56953 GHz	-29.85 dBm

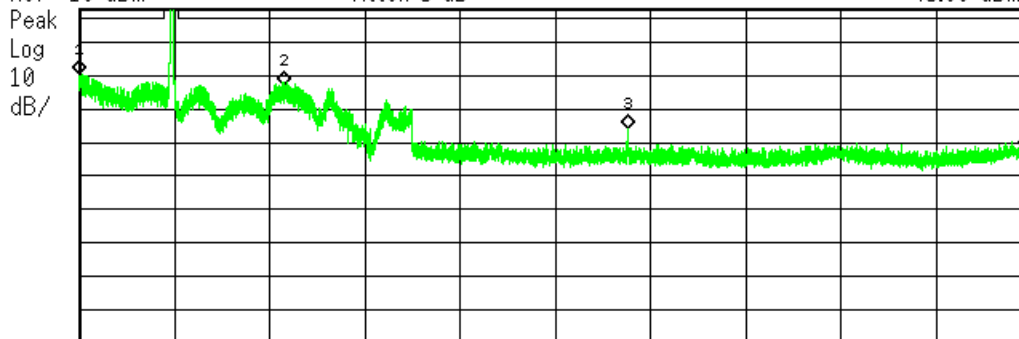
30MHz to 1.575GHz

Agilent 13:28:20 Sep 4, 2015

R L

P2480 CSEMI BAND25 5MHZ BW 1962 16QAM J2
 Ref -10 dBm Atten 5 dB

Mkr3 3.9242 GHz
 -45.96 dBm



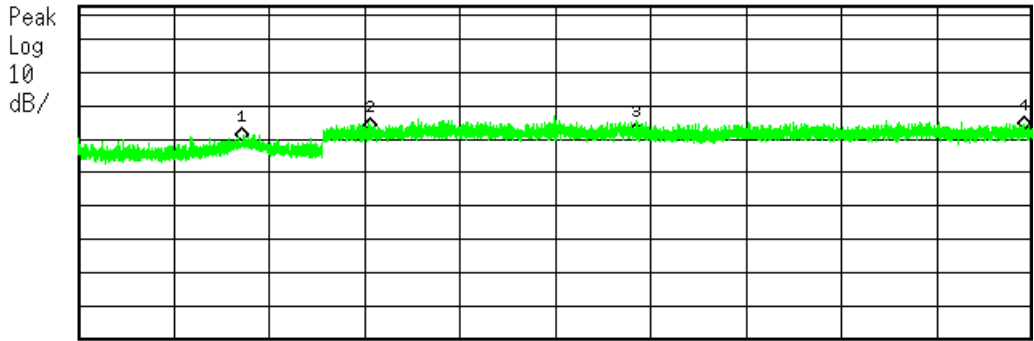
Start 1.565 GHz Stop 5.66 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.5650 GHz	-29.85 dBm
2	(1)	Freq	2.4479 GHz	-32.77 dBm
3	(1)	Freq	3.9242 GHz	-45.96 dBm
4	(1)	Freq	5.6355 GHz	-52.26 dBm

1.565GHz to 5.66GHz



Agilent 13:25:26 Sep 4, 2015 R L
 P2480 CSEMI BAND25 5MHZ BW 1962 16QAM J2 Mkr4 9.7075 GHz
 Ref -10 dBm Atten 5 dB -47.17 dBm

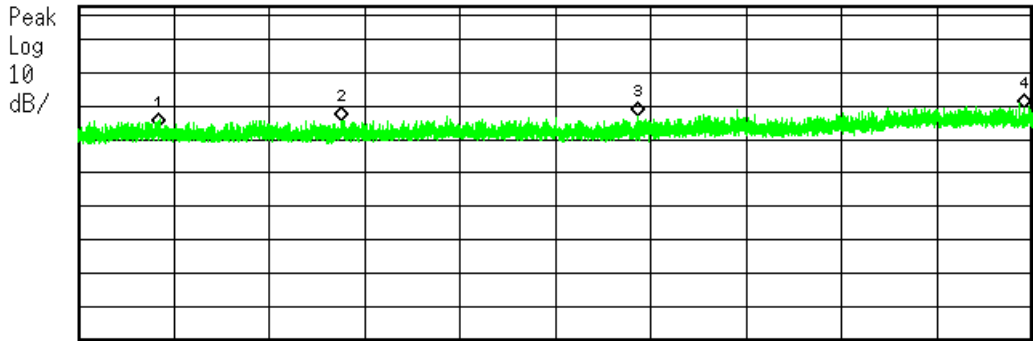


Start 5.65 GHz Stop 9.745 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	6.3554 GHz	-50.58 dBm
2	(1)	Freq	6.9008 GHz	-47.79 dBm
3	(1)	Freq	8.0472 GHz	-49.22 dBm
4	(1)	Freq	9.7075 GHz	-47.17 dBm

5.65GHz to 9.745GHz

Agilent 13:22:49 Sep 4, 2015 R L
 P2480 CSEMI BAND25 5MHZ BW 1962 16QAM J2 Mkr1 10.0815 GHz
 Ref -10 dBm Atten 5 dB -46.21 dBm



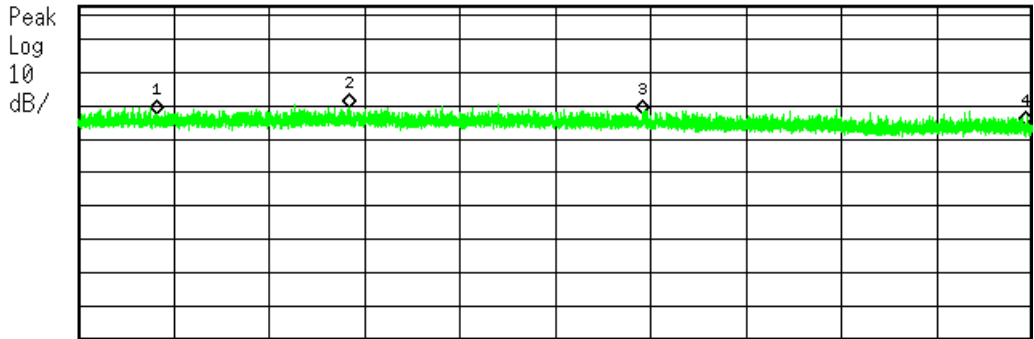
Start 9.735 GHz Stop 13.83 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	10.0815 GHz	-46.21 dBm
2	(1)	Freq	10.8644 GHz	-44.36 dBm
3	(1)	Freq	12.1377 GHz	-43.18 dBm
4	(1)	Freq	13.7975 GHz	-40.75 dBm

9.735GHz to 13.83GHz

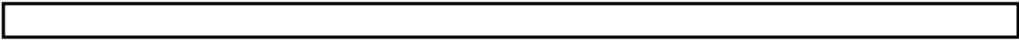


Agilent 13:16:41 Sep 4, 2015 R L
 P2480 CSEMI BAND25 5MHZ BW 1962 16QAM J2 Mkr4 17.8890 GHz
 Ref -10 dBm Atten 5 dB -45.93 dBm



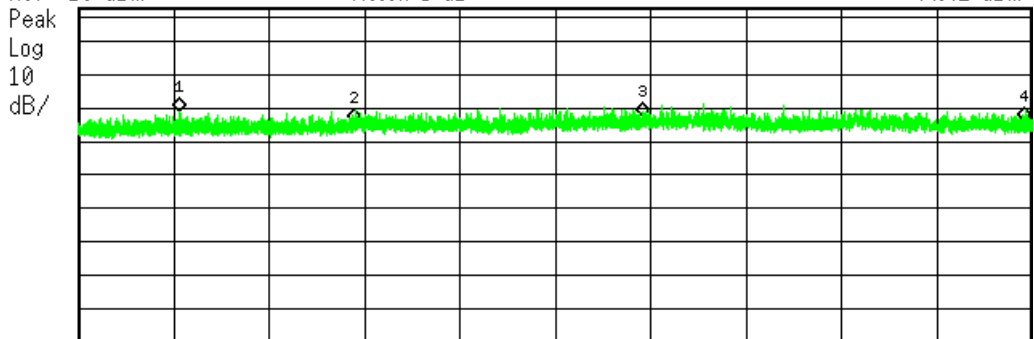
Start 13.82 GHz Stop 17.91 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	14.1585 GHz	-42.69 dBm
2	(1)	Freq	14.9839 GHz	-40.84 dBm
3	(1)	Freq	16.2422 GHz	-42.39 dBm
4	(1)	Freq	17.8890 GHz	-45.93 dBm



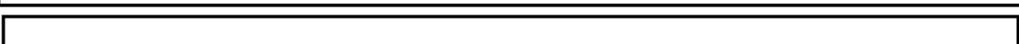
13.82GHz to 17.915GHz

Agilent 13:19:50 Sep 4, 2015 R L
 P2480 CSEMI BAND25 5MHZ BW 1962 16QAM J2 Mkr2 19.0864 GHz
 Ref -10 dBm Atten 5 dB -44.42 dBm



Start 17.91 GHz Stop 22 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	18.3354 GHz	-40.96 dBm
2	(1)	Freq	19.0864 GHz	-44.42 dBm
3	(1)	Freq	20.3272 GHz	-42.76 dBm
4	(1)	Freq	21.9690 GHz	-44.18 dBm



17.905GHz to 22GHz



Radiated Spurious Emissions Measurements

MEASUREMENTS / RESULTS

Note that the EUT passes the FCC Class B limit, which is much lower than the -13dBm limit for licensed transmitter spurious emissions.

The EIRP to field strength conversion at the 3 meter measurement distance results in a limit of 82.2dBµV/m, from the equation:

$$E_0(dB\mu V/m) = EIRP(dBm) - 20\log(\text{distance, meters}) + 104.77dB.$$

Only worst-case radiated spurious data is presented.

Radiated Emissions Table												
Date: 02-Sep-15			Company: Airvana				Work Order: P2480					
Engineer: Ryan Brown and Jason Hal			EUT Desc: Switched IQ Radio Point				EUT Operating Voltage/Frequency: 48V POE					
Temp: 23.8°C			Humidity: 50%				Pressure: 1006mBar					
Frequency Range: 30-1000MHz							Measurement Distance: 3 m					
Notes: BW = 10MHz, Band 2, 16QAM , Mid Channel (1960MHz)							EUT Max Freq: 200 MHz					
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	---			FCC Class B		
							Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
QP Vert	64.68	51.9	25.3	7.9	0.5	35.0	---	---	---	40.0	-5.0	Pass
Vertical	155.0	43.6	25.4	12.4	0.8	31.4	---	---	---	43.5	-12.1	Pass
Horizontal	155.0	47.4	25.4	12.4	0.8	35.2	---	---	---	43.5	-8.3	Pass
Vertical	156.0	44.1	25.4	12.4	0.8	31.9	---	---	---	43.5	-11.6	Pass
Horizontal	156.0	48.5	25.4	12.4	0.8	36.3	---	---	---	43.5	-7.2	Pass
Horizontal	158.0	49.0	25.4	12.3	0.8	36.7	---	---	---	43.5	-6.8	Pass
QP Horz	160.0	47.1	25.5	12.3	0.8	34.7	---	---	---	43.5	-8.8	Pass
Horizontal	161.0	49.7	25.5	12.2	0.8	37.2	---	---	---	43.5	-6.3	Pass
Vertical	162.0	44.8	25.5	12.2	0.8	32.3	---	---	---	43.5	-11.2	Pass
Horizontal	166.0	47.9	25.6	11.9	0.8	35.0	---	---	---	43.5	-8.5	Pass
QP Vert	200.0	47.8	25.5	12.6	0.9	35.8	---	---	---	43.5	-7.7	Pass
Vertical	250.0	46.2	25.6	11.7	0.9	33.2	---	---	---	46.0	-12.8	Pass
Vertical	375.0	46.1	25.5	15.1	1.1	36.8	---	---	---	46.0	-9.2	Pass
Horizontal	375.0	48.7	25.5	15.1	1.1	39.4	---	---	---	46.0	-6.6	Pass
QP Horz	375.0	49.0	25.5	15.1	1.1	39.7	---	---	---	46.0	-6.3	Pass
QP Vert	466.6	44.1	25.8	17.3	1.4	37.0	---	---	---	46.0	-9.0	Pass
QP Horz	466.6	46.5	25.8	17.3	1.4	39.4	---	---	---	46.0	-6.6	Pass
QP Vert	500.0	41.7	25.7	18.0	1.1	35.1	---	---	---	46.0	-10.9	Pass
QP Horz	549.01	33.1	26.1	18.1	1.5	26.6	---	---	---	46.0	-19.4	Pass
QP Vert	600.0	43.1	25.5	18.5	1.4	37.5	---	---	---	46.0	-8.5	Pass
QP Horz	625.0	40.6	25.6	19.3	1.5	35.8	---	---	---	46.0	-10.2	Pass
Table Result: Pass			by -5.0 dB				Worst Freq: 64.68 MHz					
Test Site: EMI Chamber 1			Cable 1: Asset #2051			Cable 2: Asset #2054			Cable 3: ---			
Analyzer: Rental SA#2			Preamp: Red-White			Antenna: Red-Brown			Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.146			Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor			Copyright Curtis-Straus LLC 2000						

Note: Quasi-peak measurements are indicated by QP in the left column; otherwise, peak readings were taken.



Radiated Emissions Table															
Date: 10-Sep-15				Company: Aivana				Work Order: P2231							
Engineer: Jason Haley				EUT Desc: Switched IQ Radio				EUT Operating Voltage/Frequency: 120Vac/60Hz							
Temp: 23.8°C				Humidity: 59%				Pressure: 1009mBar							
Frequency Range: 1-3 GHz								Measurement Distance: 3 m							
Notes: EUT Max Freq: 200MHz															
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	
BW = 10MHz, Band 2, 16QAM, Mid Channel (1960MHz)	V	2463.0	41.469	29.1	20.1	32.4	3.3	57.1	44.7	74.0	-16.9	Pass	54.0	-9.3	Pass
BW = 5MHz, Band 2, 16QAM, Mid Channel (1960MHz)	V	2463.0	40.11	29.2	20.1	32.4	3.3	55.7	44.8	74.0	-18.3	Pass	54.0	-9.2	Pass
BW = 10MHz, Band 2, 16QAM, High Channel (1985MHz)	V	2463.0	38.95	28.0	20.1	32.4	3.3	54.6	43.6	74.0	-19.4	Pass	54.0	-10.4	Pass
BW = 10MHz, Band 2, 16QAM, Low Channel (1935MHz)	V	2463.0	37.32	27.2	20.1	32.4	3.3	52.9	42.8	74.0	-21.1	Pass	54.0	-11.2	Pass
BW = 10MHz, Band 2, QPSK, Mid Channel (1960MHz)	V	2463.0	37.41	27.2	20.1	32.4	3.3	53.0	42.8	74.0	-21.0	Pass	54.0	-11.2	Pass
BW = 10MHz, Band 2, 64QAM, Mid Channel (1960MHz)	V	2463.0	43.53	29.0	20.1	32.4	3.3	59.1	44.6	74.0	-14.9	Pass	54.0	-9.4	Pass
Table Result: Pass by -9.2 dB Worst Freq: 2463.0 MHz															
Test Site: EMI Chamber 2				Cable 1: Asset #2052				Cable 2: Asset #2053				Cable 3: ---			
Analyzer: Rental SA#2				Preamp: Asset #1517				Antenna: Blue Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.146 Copyright Curtis-Straus LLC 2000															
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															

Radiated Emissions Table															
Date: 10-Sep-15				Company: Aivana				Work Order: P2231							
Engineer: Jason Haley				EUT Desc: Switched IQ Radio				EUT Operating Voltage/Frequency: 120Vac/60Hz							
Temp: 23.8°C				Humidity: 59%				Pressure: 1009mBar							
Frequency Range: 3-6 GHz								Measurement Distance: 3 m							
Notes: Used HPF 1311 EUT Max Freq: 200MHz															
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	
BW = 10MHz, Band 2, 16QAM, Mid Channel (1960MHz)	H	3924.0	33.62	21.2	19.2	33.6	4.3	52.3	39.9	74.0	-21.7	Pass	54.0	-14.1	Pass
BW = 10MHz, Band 2, 16QAM, Mid Channel (1960MHz)	V	3924.0	44.87	22.8	19.2	33.6	4.3	63.6	41.5	74.0	-10.4	Pass	54.0	-12.5	Pass
BW = 5MHz, Band 2, 16QAM, Mid Channel (1960MHz)	V	3924.0	36.88	21.6	19.2	33.6	4.3	55.6	40.3	74.0	-18.4	Pass	54.0	-13.7	Pass
BW = 10MHz, Band 2, 16QAM, High Channel (1985MHz)	V	3970.0	44.27	30.8	19.0	33.6	4.3	63.2	49.7	74.0	-10.8	Pass	54.0	-4.3	Pass
BW = 10MHz, Band 2, 16QAM, Low Channel (1935MHz)	V	3870.0	46.45	35.3	19.2	33.5	4.2	65.0	53.8	74.0	-9.0	Pass	54.0	-0.2	Pass
BW = 10MHz, Band 2, QPSK, Mid Channel (1960MHz)	H	3924.0	32.93	21.1	19.2	33.6	4.3	51.6	39.8	74.0	-22.4	Pass	54.0	-14.2	Pass
BW = 10MHz, Band 2, 64QAM, Mid Channel (1960MHz)	H	3924.0	32.73	21.7	19.2	33.6	4.3	51.4	40.4	74.0	-22.6	Pass	54.0	-13.6	Pass
Table Result: Pass by -0.2 dB Worst Freq: 3870.0 MHz															
Test Site: EMI Chamber 2				Cable 1: Asset #2052				Cable 2: Asset #2053				Cable 3: ---			
Analyzer: Rental SA#2				Preamp: Asset #1517				Antenna: Blue Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.146 Copyright Curtis-Straus LLC 2000															
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															



Radiated Emissions Table															
Date: 10-Sep-15				Company: Airvana				Work Order: P2231							
Engineer: Jason Haley				EUT Desc: Switched IQ Radio				EUT Operating Voltage/Frequency: 120Vac/60Hz							
Temp: 23.8°C				Humidity: 59%				Pressure: 1009mBar							
Frequency Range: 6-18 GHz								Measurement Distance: 1 m							
Notes: EUT Max Freq: 200MHz															
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	
BW = 10MHz, Band 2, 16QAM, Mid Channel (1960MHz)															
H	7839.0	38.63	24.6	16.5	36.2	5.7	64.0	50.0	83.5	-19.5	Pass	63.5	-13.5	Pass	
V (n.t.)	7839.0	31.0	22.3	16.5	36.2	5.7	56.4	47.7	83.5	-27.1	Pass	63.5	-15.8	Pass	
BW = 5MHz, Band 2, 16QAM, Mid Channel (1960MHz)															
H	7839.0	39.0	25.7	16.5	36.2	5.7	64.4	51.1	83.5	-19.1	Pass	63.5	-12.4	Pass	
BW = 10MHz, Band 2, 16QAM, High Channel (1985MHz)															
H	7938.0	46.82	25.7	16.5	36.1	5.7	72.1	51.0	83.5	-11.4	Pass	63.5	-12.5	Pass	
BW = 10MHz, Band 2, 16QAM, Low Channel (1935MHz)															
H	7737.0	47.93	25.8	16.6	36.2	5.7	73.2	51.1	83.5	-10.3	Pass	63.5	-12.4	Pass	
BW = 10MHz, Band 2, QPSK, Mid Channel (1960MHz)															
H	7839.0	36.96	25.4	16.5	36.2	5.7	62.4	50.8	83.5	-21.1	Pass	63.5	-12.7	Pass	
BW = 10MHz, Band 2, 64QAM, Mid Channel (1960MHz)															
H	7839.0	45.06	24.4	16.5	36.2	5.7	70.5	49.8	83.5	-13.0	Pass	63.5	-13.7	Pass	
Table Result: Pass by -10.3 dB Worst Freq: 7737.0 MHz															
Test Site: EMI Chamber 2				Cable 1: Asset #2052				Cable 2: Asset #2053				Cable 3: ---			
Analyzer: Rental SA#2				Preamp: Asset #1517				Antenna: Blue Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.146 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															

Radiated Emissions Table															
Date: 09-Sep-15				Company: Airvana				Work Order: P2480							
Engineer: Jason Haley and Ryan Brown				EUT Desc: Switch IQ Radio Point				EUT Operating Voltage/Frequency: POE							
Temp: 23.5°C				Humidity: 57%				Pressure: 1005mBar							
Frequency Range: 18-22GHz								Measurement Distance: 0.1 m							
Notes: No emissions found within 10dB of the limit EUT Max Freq: 200MHz															
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	
BW = 10MHz, Band 2, 16QAM, Mid Channel (1960MHz)															
BW = 5MHz, Band 2, 16QAM, Mid Channel (1960MHz)															
BW = 10MHz, Band 2, 16QAM, High Channel (1985MHz)															
BW = 10MHz, Band 2, 16QAM, Low Channel (1935MHz)															
BW = 10MHz, Band 2, QPSK, Mid Channel (1960MHz)															
BW = 10MHz, Band 2, 64QAM, Mid Channel (1960MHz)															
Table Result: --- by --- dB Worst Freq: --- MHz															
Test Site: EMI Chamber 2				Cable 1: EMIR-HIGH-06				Cable 2: ---				Cable 3: ---			
Analyzer: Rental SA#2				Preamp: 18-26.5GHz				Antenna: 18-26.5GHz Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.146 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															



LTE Bands 12 & 17 (FCC Part 27)

Conducted Spurious Emissions at Antenna Port

LIMITS

FCC 27.53(g):

For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

$$\text{Limit} = 10 \cdot \log(P[\text{mW}]) - (43 + 10 \cdot \log(P[\text{W}])) = -13\text{dBm}$$

Spectrum analyzer screen plots for LTE Bands 12 & 17 are shown on the following pages. The operating frequency was 733MHz, which was taken to represent both bands as Band 17 is a subset of Band 12. The two antenna ports, J1 & J2, were tested separately. The correction factors for the external attenuator, and cables were entered into the spectrum analyzer and are included in the displayed values.



PLOTS

LTE Band 12 – Antenna port J1

Agilent 14:16:59 Sep 4, 2015

R L

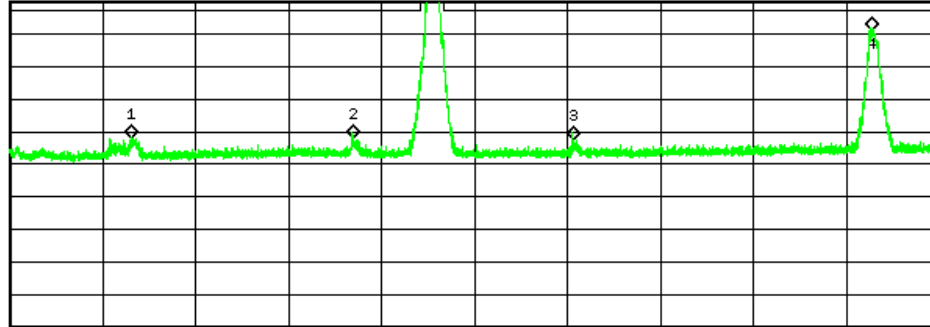
P2480 CSEMI BAND12 10M BW 733 QPSK J1

Mkr4 1.46315 GHz

Ref -10 dBm Atten 5 dB

-19.2 dBm

Peak
Log
10
dB/



Start 30 MHz

Stop 1.575 GHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	232.39 MHz	-51.95 dBm
2	(1)	Freq	600.39 MHz	-51.88 dBm
3	(1)	Freq	966.70 MHz	-52.8 dBm
4	(1)	Freq	1.46315 GHz	-19.2 dBm

30MHz to 1.575GHz

Agilent 14:23:58 Sep 4, 2015

R L

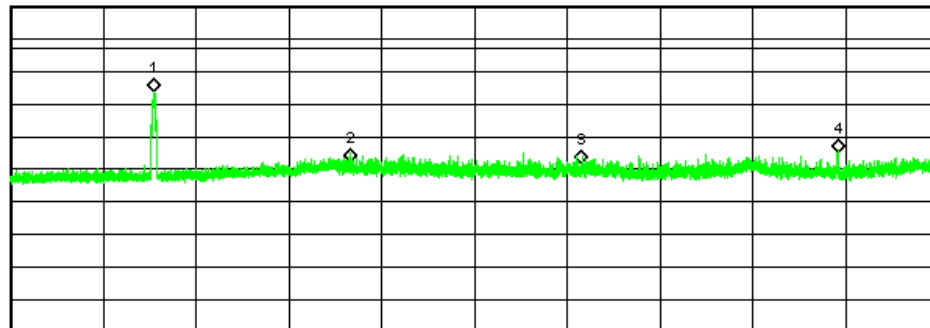
P2480 CSEMI BAND12 10M BW 733 QPSK J1

Mkr4 5.2176 GHz

Ref 0 dBm Atten 10 dB

-44.77 dBm

Peak
Log
10
dB/



Start 1.565 GHz

Stop 5.66 GHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.1969 GHz	-26.2 dBm
2	(1)	Freq	3.0663 GHz	-48.06 dBm
3	(1)	Freq	4.0852 GHz	-48.38 dBm
4	(1)	Freq	5.2176 GHz	-44.77 dBm

1.565GHz to 5.66GHz

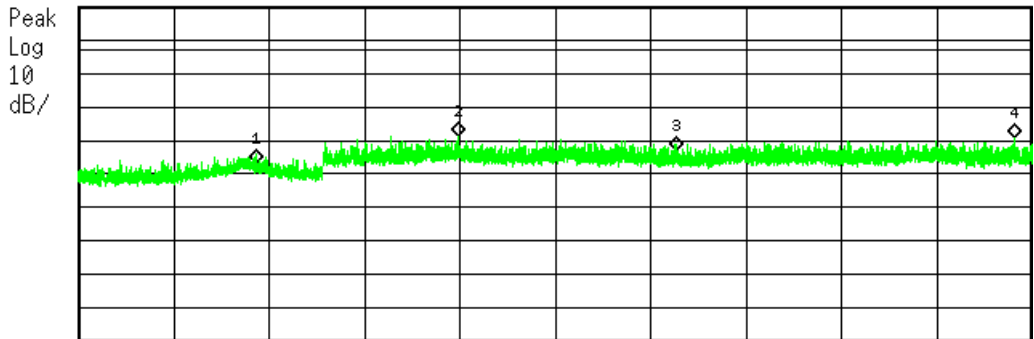


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Agilent 14:27:14 Sep 4, 2015 R L
 P2480 CSEMI BAND12 10M BW 733 QPSK J1 Mkr3 8.2192 GHz
 Ref 0 dBm Atten 10 dB -43.05 dBm

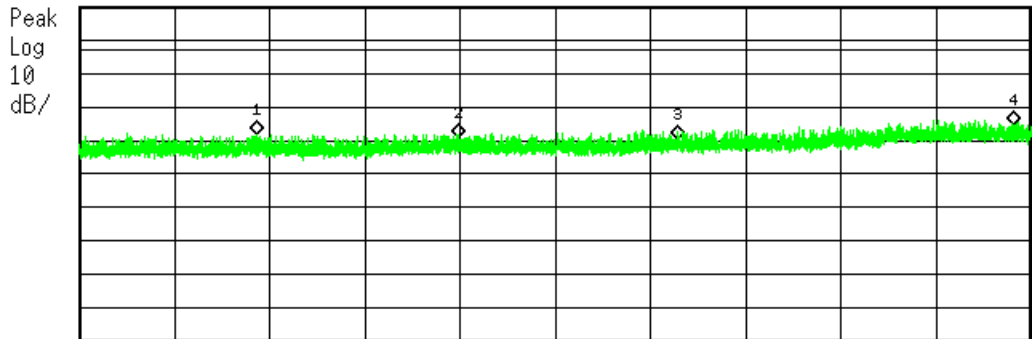


Start 5.65 GHz Stop 9.745 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	6.4139 GHz	-47.06 dBm
2	(1)	Freq	7.2813 GHz	-38.93 dBm
3	(1)	Freq	8.2192 GHz	-43.05 dBm
4	(1)	Freq	9.6675 GHz	-39.38 dBm

5.65GHz to 9.745GHz

Agilent 14:29:37 Sep 4, 2015 R L
 P2480 CSEMI BAND12 10M BW 733 QPSK J1 Mkr4 13.7560 GHz
 Ref 0 dBm Atten 10 dB -35.39 dBm



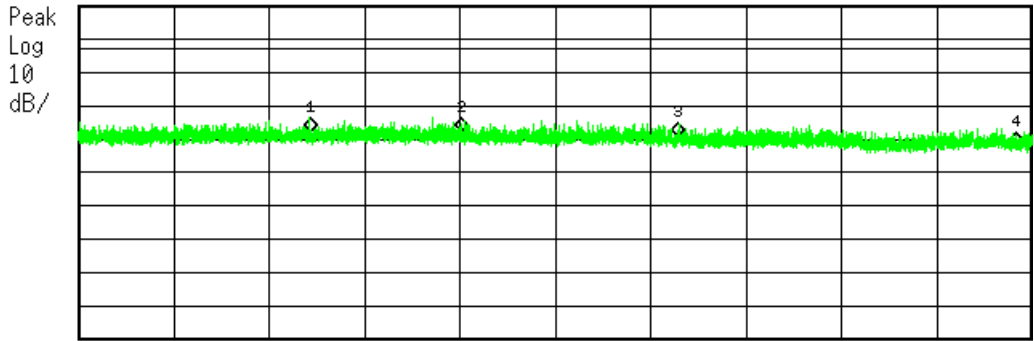
Start 9.735 GHz Stop 13.83 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	10.4989 GHz	-38.29 dBm
2	(1)	Freq	11.3663 GHz	-39.31 dBm
3	(1)	Freq	12.3057 GHz	-39.91 dBm
4	(1)	Freq	13.7560 GHz	-35.39 dBm

9.735GHz to 13.83GHz

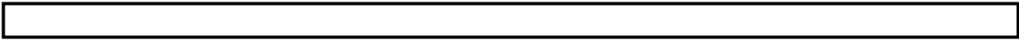


Agilent 14:31:51 Sep 4, 2015 R L
 P2480 CSEMI BAND12 10M BW 733 QPSK J1 Mkr2 15.4643 GHz
 Ref 0 dBm Atten 10 dB -37.76 dBm



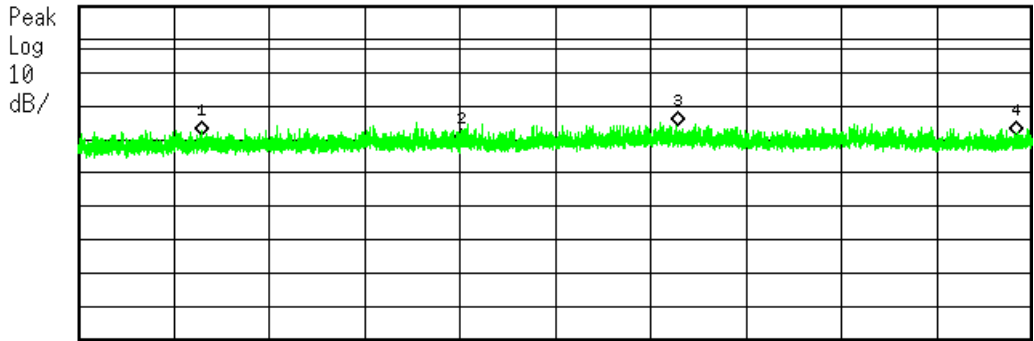
Start 13.82 GHz Stop 17.91 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	14.8149 GHz	-37.74 dBm
2	(1)	Freq	15.4643 GHz	-37.76 dBm
3	(1)	Freq	16.3987 GHz	-39.31 dBm
4	(1)	Freq	17.8455 GHz	-42.13 dBm



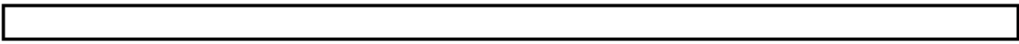
13.82GHz to 17.915GHz

Agilent 14:33:32 Sep 4, 2015 R L
 P2480 CSEMI BAND12 10M BW 733 QPSK J1 Mkr1 18.4374 GHz
 Ref 0 dBm Atten 10 dB -38.59 dBm



Start 17.91 GHz Stop 22 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	18.4374 GHz	-38.59 dBm
2	(1)	Freq	19.5493 GHz	-41.13 dBm
3	(1)	Freq	20.4757 GHz	-35.94 dBm
4	(1)	Freq	21.9385 GHz	-38.89 dBm



17.905GHz to 22GHz



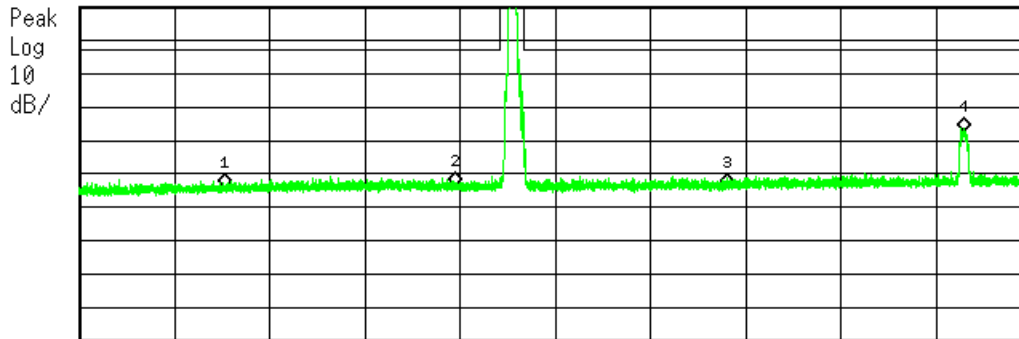
LTE Band 12 – Antenna port J2

Agilent 14:48:18 Sep 4, 2015

R L

P2480 CSEMI BAND12 10M BW 733 QPSK J2
 Ref 0 dBm Atten 10 dB

Mkr4 1.46579 GHz
 -37.11 dBm



Start 30 MHz Stop 1.575 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	266.72 MHz	-54.12 dBm
2	(1)	Freq	641.13 MHz	-53.71 dBm
3	(1)	Freq	1.08194 GHz	-53.97 dBm
4	(1)	Freq	1.46579 GHz	-37.11 dBm

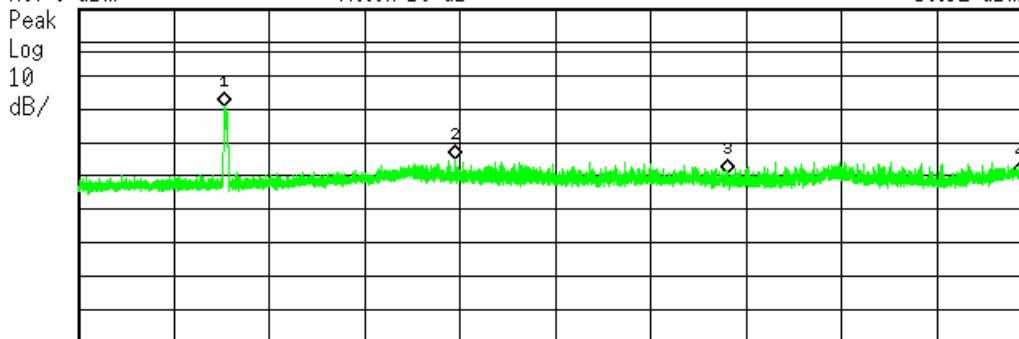
30MHz to 1.575GHz

Agilent 14:46:46 Sep 4, 2015

R L

P2480 CSEMI BAND12 10M BW 733 QPSK J2
 Ref 0 dBm Atten 10 dB

Mkr4 5.6030 GHz
 -50.32 dBm



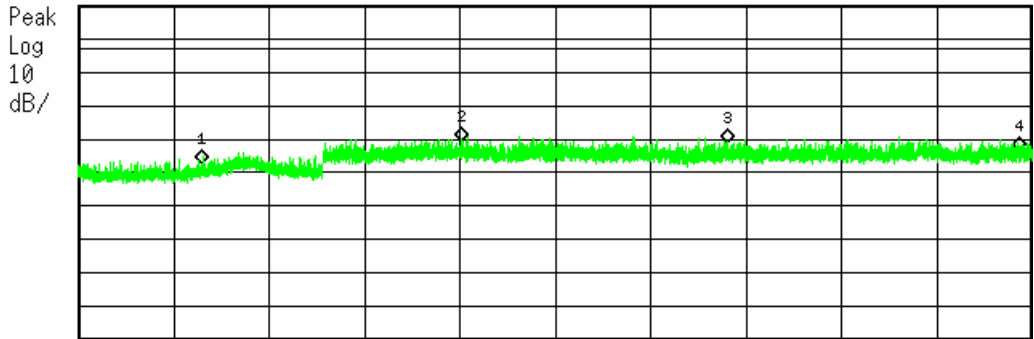
Start 1.565 GHz Stop 5.66 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.1924 GHz	-29.38 dBm
2	(1)	Freq	3.1848 GHz	-45.12 dBm
3	(1)	Freq	4.3532 GHz	-49.25 dBm
4	(1)	Freq	5.6030 GHz	-50.32 dBm

1.565GHz to 5.66GHz



Agilent 14:45:10 Sep 4, 2015 R L
 P2480 CSEMI BAND12 10M BW 733 QPSK J2 Mkr3 8.4382 GHz
 Ref 0 dBm Atten 10 dB -41.32 dBm

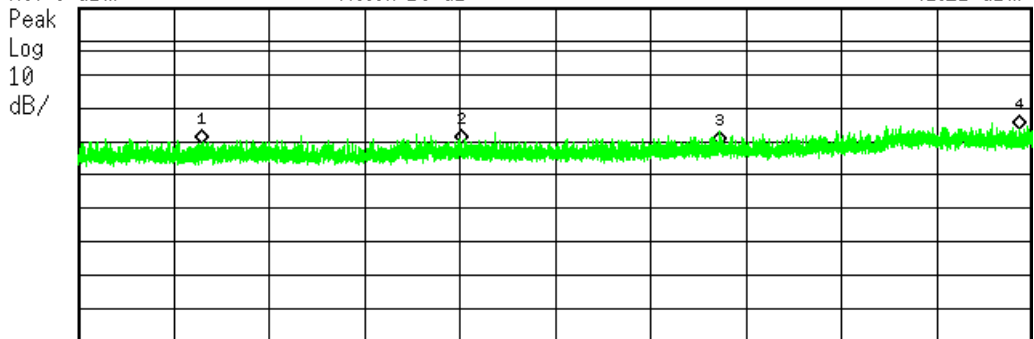


Start 5.65 GHz Stop 9.745 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	6.1784 GHz	-47.5 dBm
2	(1)	Freq	7.2943 GHz	-40.76 dBm
3	(1)	Freq	8.4382 GHz	-41.32 dBm
4	(1)	Freq	9.6880 GHz	-43.64 dBm

5.65GHz to 9.745GHz

Agilent 14:43:41 Sep 4, 2015 R L
 P2480 CSEMI BAND12 10M BW 733 QPSK J2 Mkr3 12.4887 GHz
 Ref 0 dBm Atten 10 dB -41.21 dBm



Start 9.735 GHz Stop 13.83 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	10.2634 GHz	-40.72 dBm
2	(1)	Freq	11.3793 GHz	-40.71 dBm
3	(1)	Freq	12.4887 GHz	-41.21 dBm
4	(1)	Freq	13.7730 GHz	-36.47 dBm

9.735GHz to 13.83GHz



Agilent 14:42:01 Sep 4, 2015

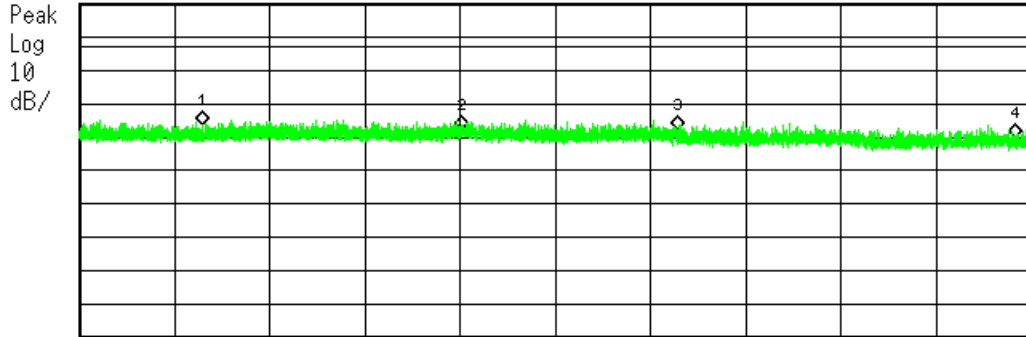
R L

P2480 CSEMI BAND12 10M BW 733 QPSK J2

Mkr4 17.8485 GHz

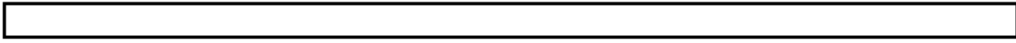
Ref 0 dBm Atten 10 dB

-40.19 dBm



Start 13.82 GHz Stop 17.91 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	14.3509 GHz	-36.15 dBm
2	(1)	Freq	15.4643 GHz	-37.71 dBm
3	(1)	Freq	16.3922 GHz	-37.73 dBm
4	(1)	Freq	17.8485 GHz	-40.19 dBm



13.82GHz to 17.915GHz

Agilent 14:40:33 Sep 4, 2015

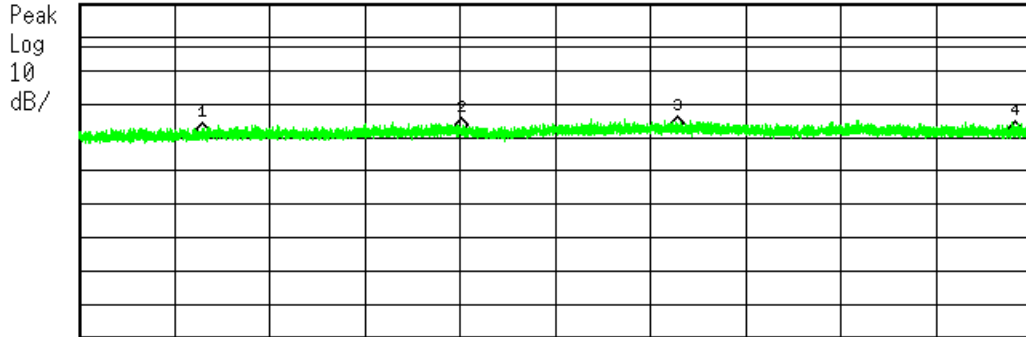
R L

P2480 CSEMI BAND12 10M BW 733 QPSK J2

Mkr1 18.4374 GHz

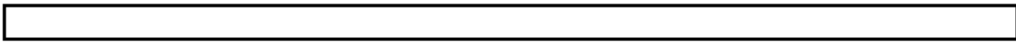
Ref 0 dBm Atten 10 dB

-39.72 dBm



Start 17.91 GHz Stop 22 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	18.4374 GHz	-39.72 dBm
2	(1)	Freq	19.5493 GHz	-38.5 dBm
3	(1)	Freq	20.4757 GHz	-37.75 dBm
4	(1)	Freq	21.9305 GHz	-39.04 dBm



17.905GHz to 22GHz



Radiated Spurious Emissions Measurements

MEASUREMENTS / RESULTS

Note that the EUT passes the FCC Class B limit, which is much lower than the -13dBm limit (82.2dBuV/m at 3 meters) for licensed transmitter spurious emissions. Only worst-case radiated spurious data is presented.

Radiated Emissions Table												
Date: 03-Sep-15			Company: Airvana				Work Order: P2480					
Engineer: Ryan Brown			EUT Desc: Switched IQ Radio Point				EUT Operating Voltage/Frequency: POE					
Temp: 23.5°C			Humidity: 56%				Pressure: 1002mBar					
Frequency Range: 30-1000MHz							Measurement Distance: 3 m					
Notes: BW = 10MHz, Band 12, QPSK, Low Channel (733MHz)							EUT Max Freq: 200MHz					
Moved Ethernet cable from port 2 to port 4 on the POE Router.												
Antenna Polarization (H/V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	---			FCC Class B		
							Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
V	30.0	19.1	25.0	21.4	1.4	16.9	---	---	---	40.0	-23.1	Pass
V	82.49	47.9	25.4	7.6	1.6	31.7	---	---	---	40.0	-8.3	Pass
V	49.0	35.3	25.2	8.6	1.3	20.0	---	---	---	40.0	-20.0	Pass
V	200.0	49.1	25.5	12.6	2.5	38.7	---	---	---	43.5	-4.8	Pass
V	179.1	46.3	25.5	11.1	2.5	34.4	---	---	---	43.5	-9.1	Pass
V	375.0	48.8	25.5	15.1	3.0	41.4	---	---	---	46.0	-4.6	Pass
V	466.6	42.0	25.8	17.3	3.6	37.1	---	---	---	46.0	-8.9	Pass
H	600.0	44.3	25.5	18.5	2.9	40.2	---	---	---	46.0	-5.8	Pass
Table Result: Pass							by -4.6 dB			Worst Freq: 375.0 MHz		
Test Site: EMI Chamber 1			Cable 1: Asset #2054				Cable 2: Asset #2051			Cable 3: ---		
Analyzer: Rental SA#2			Preamp: Red-White				Antenna: Red-Brown			Preselector: Asset #1511		
CSsoft Radiated Emissions Calculator v 1.017.146										Copyright Curtis-Straus LLC 2000		
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor												



Radiated Emissions Table															
Date: 03-Sep-15				Company: Airvana				Work Order: P2480							
Engineer: Ryan Brown				EUT Desc: Switched IQ Radio Point				EUT Operating Voltage/Frequency: POE							
Temp: 23.5°C				Humidity: 56%				Pressure: 1002mBar							
Frequency Range: 1-8GHz							Measurement Distance: 3 m (1-6GHz) 1m (6-8 GHz)								
Notes: HPF 1310 in line							EUT Max Freq: 200MHz								
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	
BW = 10MHz, Band 12, QPSK, Low Channel (733MHz)															
Vnf	1977.5	34.27	20.8	19.0	31.7	3.0	50.0	36.5	74.0	-24.0	Pass	54.0	-17.5	Pass	
Vnf	2937.0	35.45	21.3	20.0	33.0	3.7	52.2	38.0	74.0	-21.8	Pass	54.0	-16.0	Pass	
Vnf	3502.5	36.03	23.7	19.2	33.1	4.0	53.9	41.6	74.0	-20.1	Pass	54.0	-12.4	Pass	
Vnf	4035.0	34.58	22.0	18.8	33.6	4.3	53.7	41.1	74.0	-20.3	Pass	54.0	-12.9	Pass	
Vnf	5425.0	34.93	21.8	17.6	34.8	4.9	57.0	43.9	74.0	-17.0	Pass	54.0	-10.1	Pass	
Vnf	1110.0	34.18	21.1	20.2	28.6	6.4	49.0	35.9	74.0	-25.0	Pass	54.0	-18.1	Pass	
BW = 10MHz, Band 12, 16QAM, Low Channel (733MHz)															
Vnf	1910.0	34.06	20.7	18.9	31.2	2.9	49.3	35.9	74.0	-24.7	Pass	54.0	-18.1	Pass	
BW = 10MHz, Band 12, 64QAM, Low Channel (733MHz)															
Vnf	1980.0	33.75	20.7	19.0	31.7	3.0	49.5	36.4	74.0	-24.5	Pass	54.0	-17.6	Pass	
BW = 5MHz, Band 12, QPSK, Low Channel (733MHz)															
Vnf	1377.5	34.08	20.9	19.2	28.8	7.0	50.7	37.5	74.0	-23.3	Pass	54.0	-16.5	Pass	
BW = 10MHz, Band 12, QPSK, Mid Channel (737MHz)															
Vnf	1387.5	34.71	20.9	19.2	28.8	7.1	51.4	37.6	74.0	-22.6	Pass	54.0	-16.4	Pass	
BW = 10MHz, Band 12, QPSK, High Channel (741MHz)															
Vnf	1447.5	33.93	20.1	19.1	28.6	7.0	50.4	36.6	74.0	-23.6	Pass	54.0	-17.4	Pass	
Table Result:				Pass				by -10.1 dB				Worst Freq: 5425.0 MHz			
Test Site: EMI Chamber 1				Cable 1: Asset #2054				Cable 2: Asset #2051				Cable 3: ---			
Analyzer: Rental SA#2				Preamp: Asset #1517				Antenna: Blue Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.146				Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor				Copyright Curtis-Straus LLC 2000							



LTE Band 13 (FCC Part 27)**Conducted Spurious Emissions at Antenna Port****LIMITS:****FCC 27.53(c):**

(c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

FCC 27.53(f):

(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Test Methods:

Spectrum analyzer screen plots for LTE Band 13 are shown on the following pages. The operating frequency was 748.5MHz, which was taken to represent Band 13.

The range 30MHz-10GHz was tested for 27.53(c)(1) with a 1 MHz resolution bandwidth.

$$\text{Limit} = 10 \cdot \log(P[\text{mW}]) - (43 + 10 \cdot \log(P[\text{W}])) = -13\text{dBm}$$

The ranges 763-775MHz and 793-805MHz were tested for 27.53(c)(3) with a 9kHz resolution bandwidth.

$$\text{Limit} = 10 \cdot \log(P[\text{mW}]) - (76 + 10 \cdot \log(P[\text{W}])) = -46\text{dBm}$$

The range 1559-1610MHz was tested for 27.53(f) using a 1MHz resolution bandwidth for the -70dBW/Mhz limit and a 1kHz resolution bandwidth for the -80dBW limit.



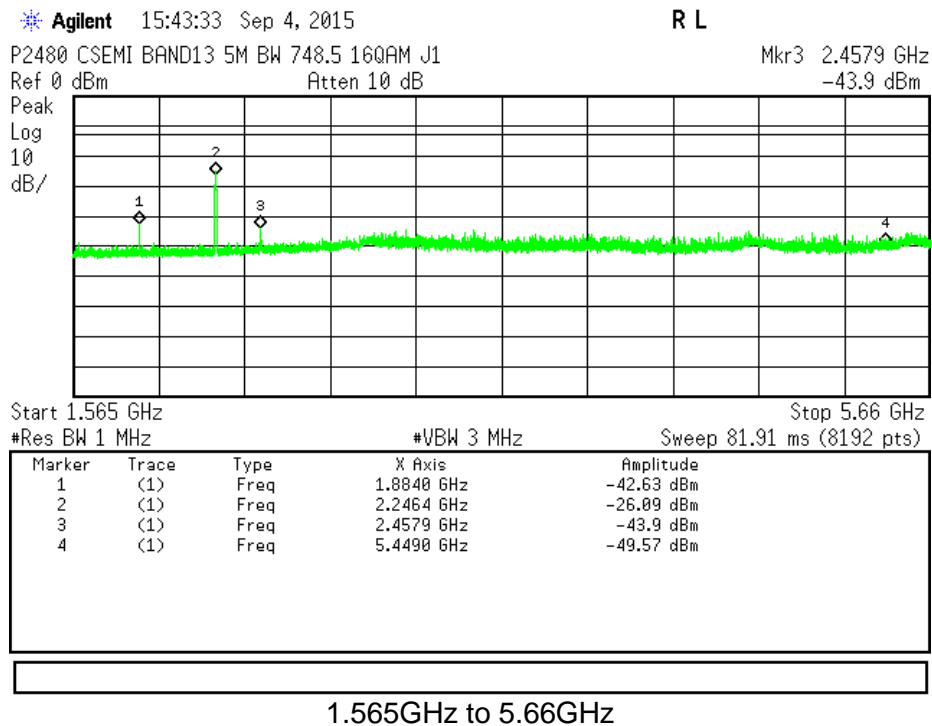
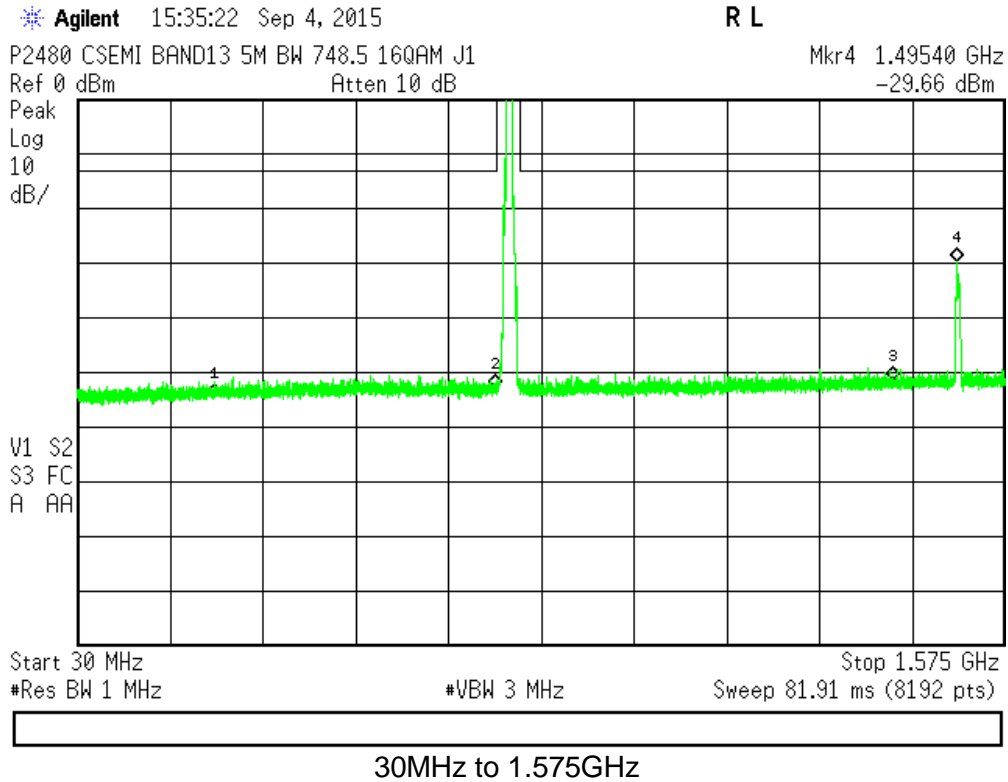
Wideband Limit = -70dBW/MHz = -40dBm/MHz, or at 1MHz RBW, a displayed limit of -40dBm
Discrete Limit = -80dBW = -50dBm



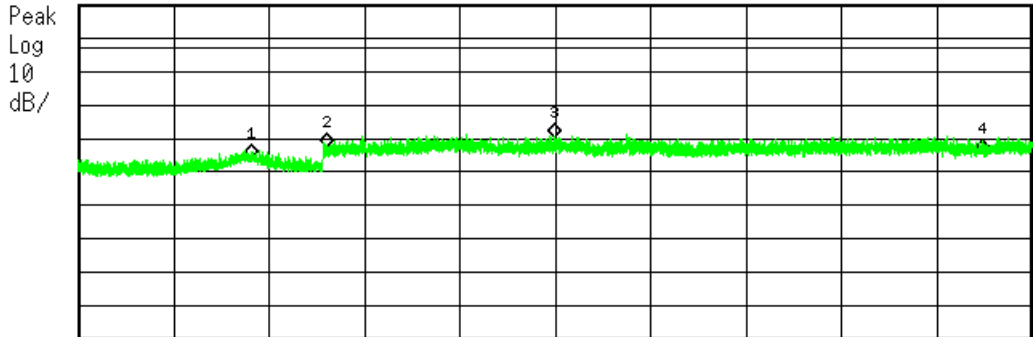
PLOTS

FCC 27.53(c)(1):

LTE Band 13 – Antenna Port J1



Agilent 15:48:27 Sep 4, 2015 R L
 P2480 CSEMI BAND13 5M BW 748.5 16QAM J1 Mkr2 6.7174 GHz
 Ref 0 dBm Atten 10 dB -42.76 dBm

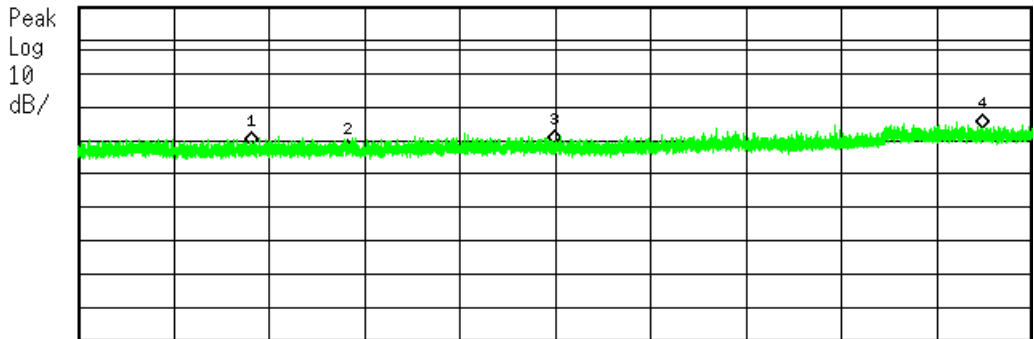


Start 5.65 GHz Stop 9.745 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	6.3919 GHz	-46.13 dBm
2	(1)	Freq	6.7174 GHz	-42.76 dBm
3	(1)	Freq	7.6953 GHz	-39.72 dBm
4	(1)	Freq	9.5348 GHz	-44.61 dBm

5.65GHz to 9.745GHz

Agilent 15:51:41 Sep 4, 2015 R L
 P2480 CSEMI BAND13 5M BW 748.5 16QAM J1 Mkr2 10.8899 GHz
 Ref 0 dBm Atten 10 dB -44.01 dBm



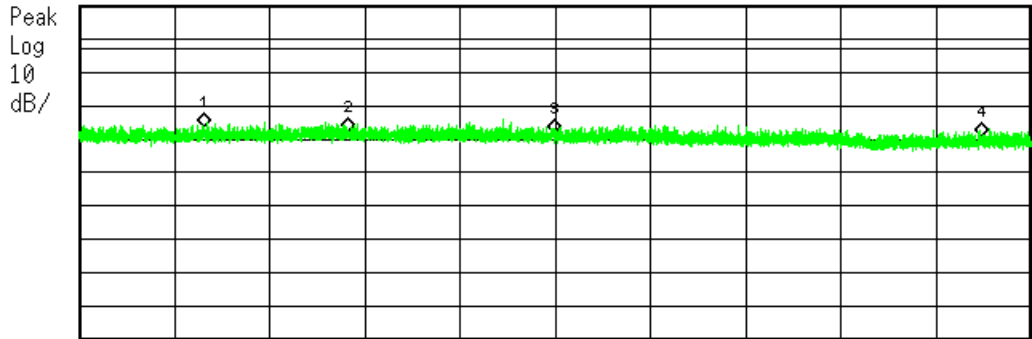
Start 9.735 GHz Stop 13.83 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	10.4769 GHz	-41.55 dBm
2	(1)	Freq	10.8899 GHz	-44.01 dBm
3	(1)	Freq	11.7803 GHz	-41.3 dBm
4	(1)	Freq	13.6190 GHz	-36.16 dBm

9.735GHz to 13.83GHz

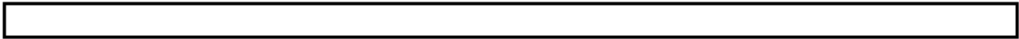


Agilent 15:54:13 Sep 4, 2015 R L
 P2480 CSEMI BAND13 5M BW 748.5 16QAM J1 Mkr1 14.3589 GHz
 Ref 0 dBm Atten 10 dB -36.56 dBm



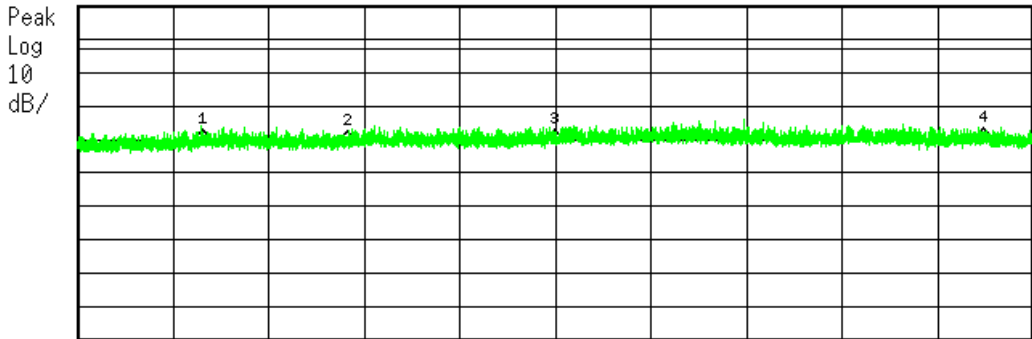
Start 13.82 GHz Stop 17.91 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	14.3589 GHz	-36.56 dBm
2	(1)	Freq	14.9749 GHz	-37.6 dBm
3	(1)	Freq	15.8653 GHz	-38.44 dBm
4	(1)	Freq	17.7848 GHz	-39.35 dBm



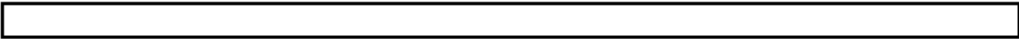
13.82GHz to 17.915GHz

Agilent 15:55:51 Sep 4, 2015 R L
 P2480 CSEMI BAND13 5M BW 748.5 16QAM J1 Mkr4 21.7890 GHz
 Ref 0 dBm Atten 10 dB -40.5 dBm



Start 17.91 GHz Stop 22 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	18.4439 GHz	-41.09 dBm
2	(1)	Freq	19.0599 GHz	-41.73 dBm
3	(1)	Freq	19.9503 GHz	-40.96 dBm
4	(1)	Freq	21.7890 GHz	-40.5 dBm



17.905GHz to 22GHz



LTE Band 13 – Antenna Port J2

Agilent 16:14:08 Sep 4, 2015

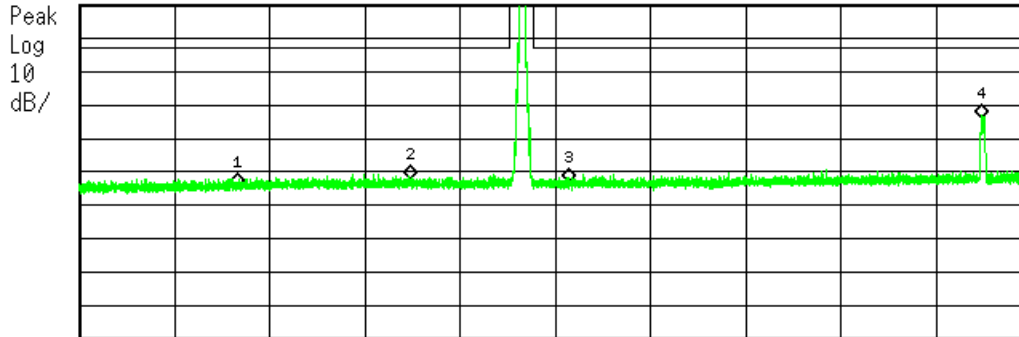
R L

P2480 CSEMI BAND13 5M BW 748.5 16QAM J2

Mkr4 1.49540 GHz

Ref 0 dBm Atten 10 dB

-33.96 dBm



Start 30 MHz Stop 1.575 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	286.53 MHz	-54.5 dBm
2	(1)	Freq	568.70 MHz	-52.33 dBm
3	(1)	Freq	824.29 MHz	-53.32 dBm
4	(1)	Freq	1.49540 GHz	-33.96 dBm

30MHz to 1.575GHz

Agilent 16:12:46 Sep 4, 2015

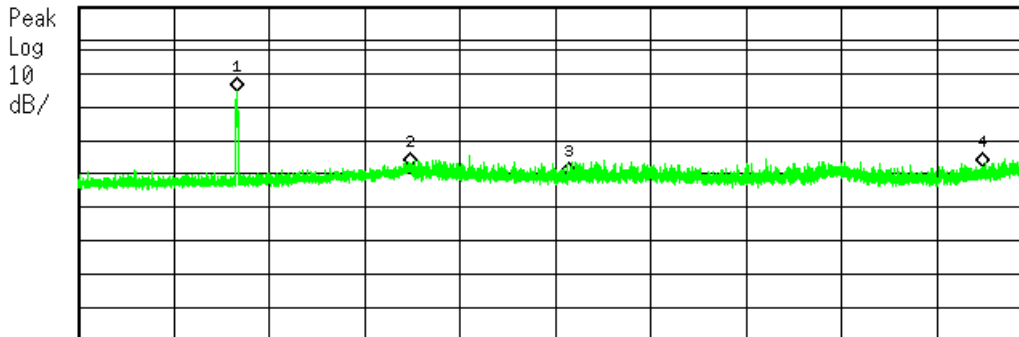
R L

P2480 CSEMI BAND13 5M BW 748.5 16QAM J2

Mkr1 2.2449 GHz

Ref 0 dBm Atten 10 dB

-25.35 dBm

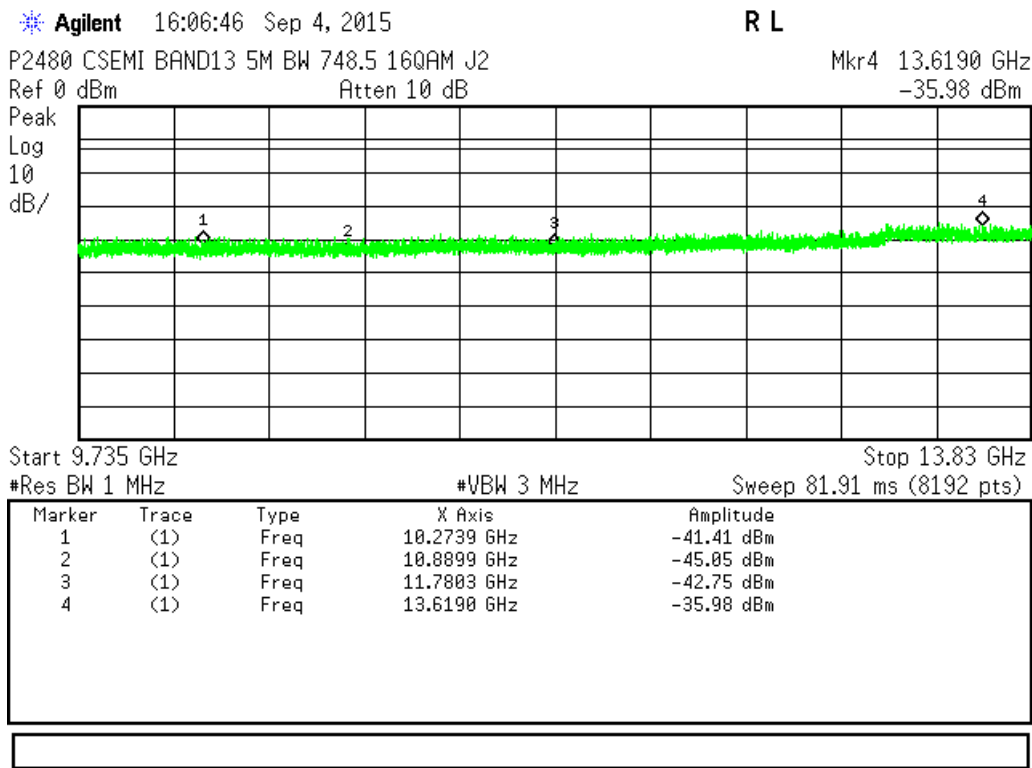
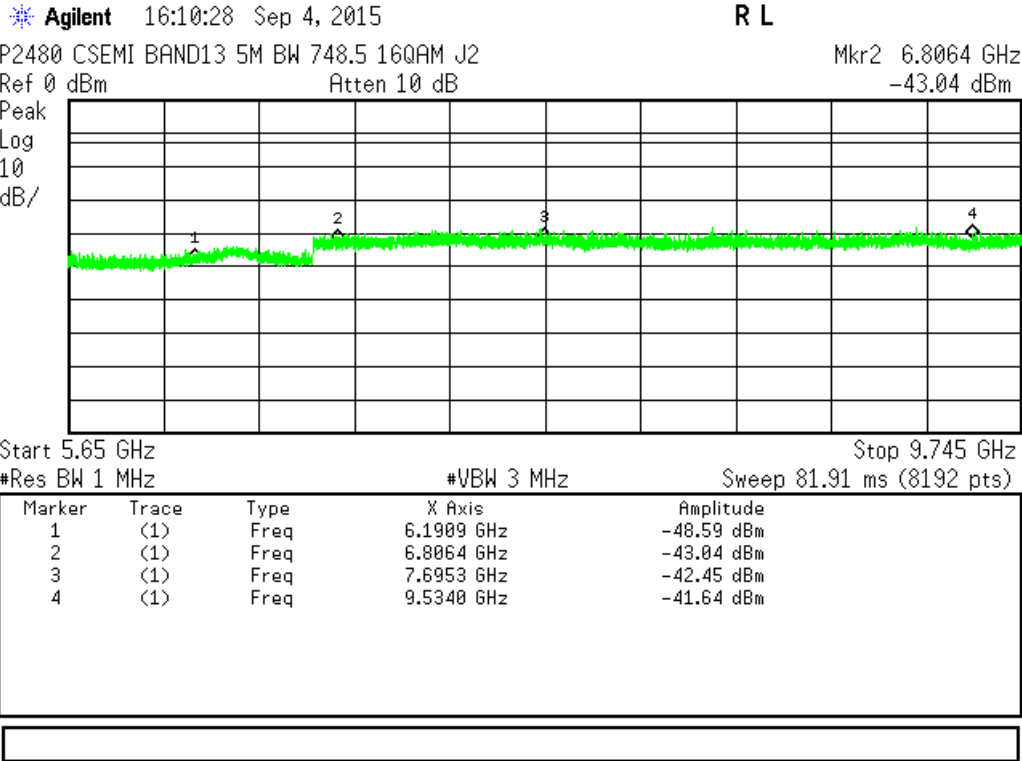


Start 1.565 GHz Stop 5.66 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

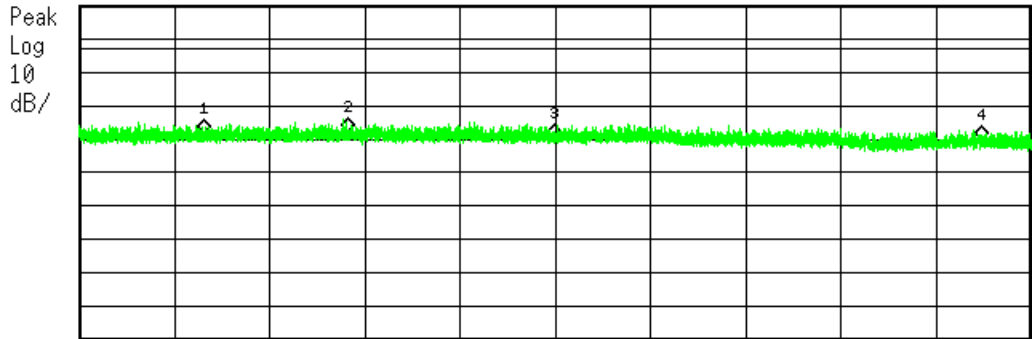
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.2449 GHz	-25.35 dBm
2	(1)	Freq	2.9928 GHz	-47.89 dBm
3	(1)	Freq	3.6702 GHz	-50.76 dBm
4	(1)	Freq	5.4490 GHz	-48.07 dBm

1.565GHz to 5.66GHz



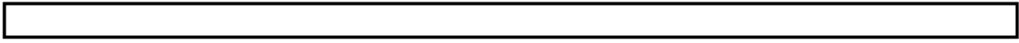


Agilent 16:04:03 Sep 4, 2015 R L
 P2480 CSEMI BAND13 5M BW 748.5 16QAM J2 Mkr4 17.7040 GHz
 Ref 0 dBm Atten 10 dB -40 dBm



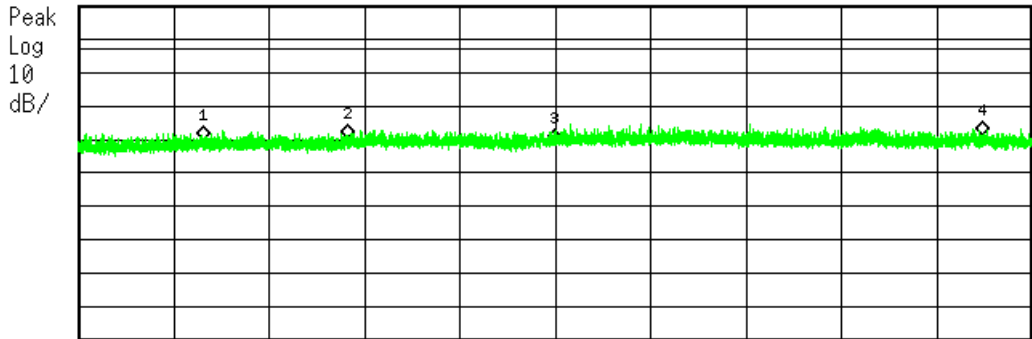
Start 13.82 GHz Stop 17.91 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	14.3589 GHz	-38.36 dBm
2	(1)	Freq	14.9749 GHz	-37.82 dBm
3	(1)	Freq	15.8653 GHz	-39.76 dBm
4	(1)	Freq	17.7040 GHz	-40 dBm



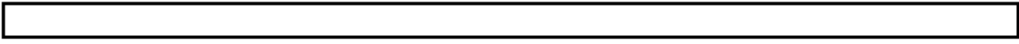
13.82GHz to 17.915GHz

Agilent 16:00:15 Sep 4, 2015 R L
 P2480 CSEMI BAND13 5M BW 748.5 16QAM J2 Mkr4 21.7890 GHz
 Ref 0 dBm Atten 10 dB -38.67 dBm



Start 17.91 GHz Stop 22 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

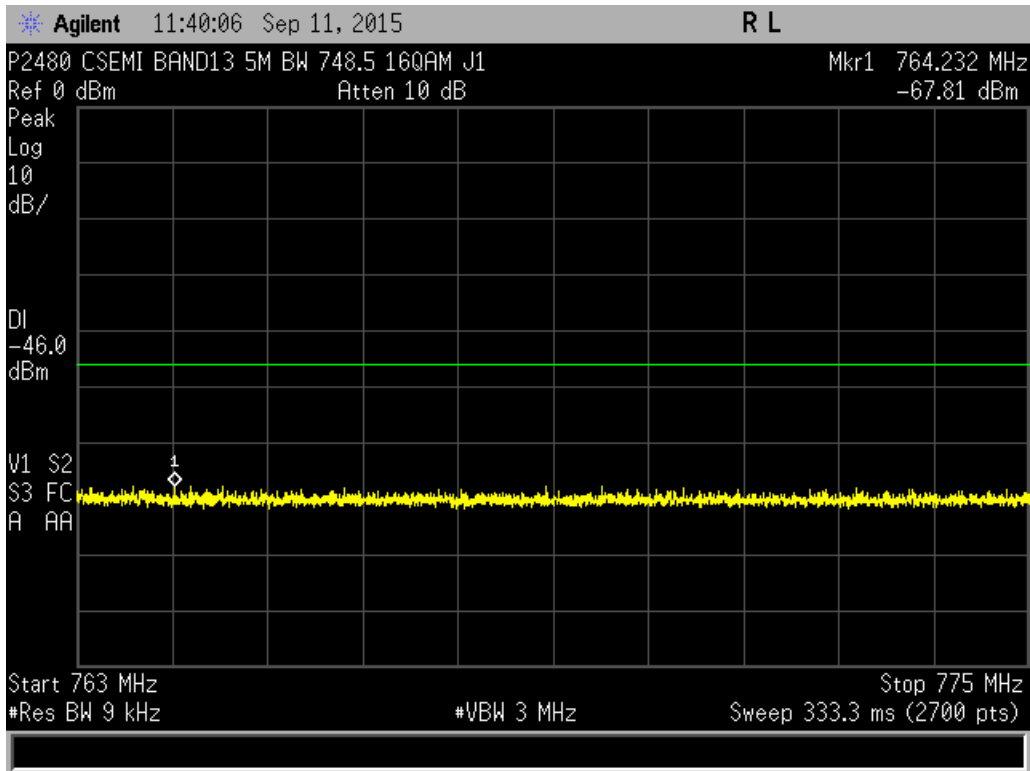
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	18.4439 GHz	-40.44 dBm
2	(1)	Freq	19.0599 GHz	-39.63 dBm
3	(1)	Freq	19.9503 GHz	-41.01 dBm
4	(1)	Freq	21.7890 GHz	-38.67 dBm



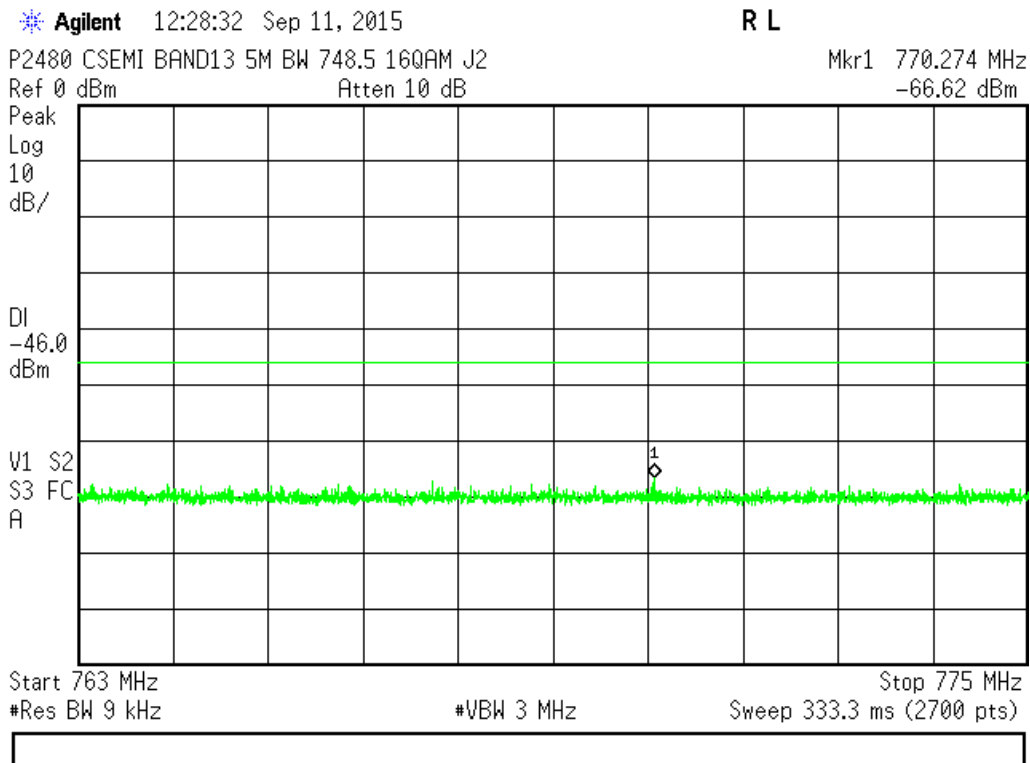
17.905GHz to 22GHz



FCC 27.53(c)(3):



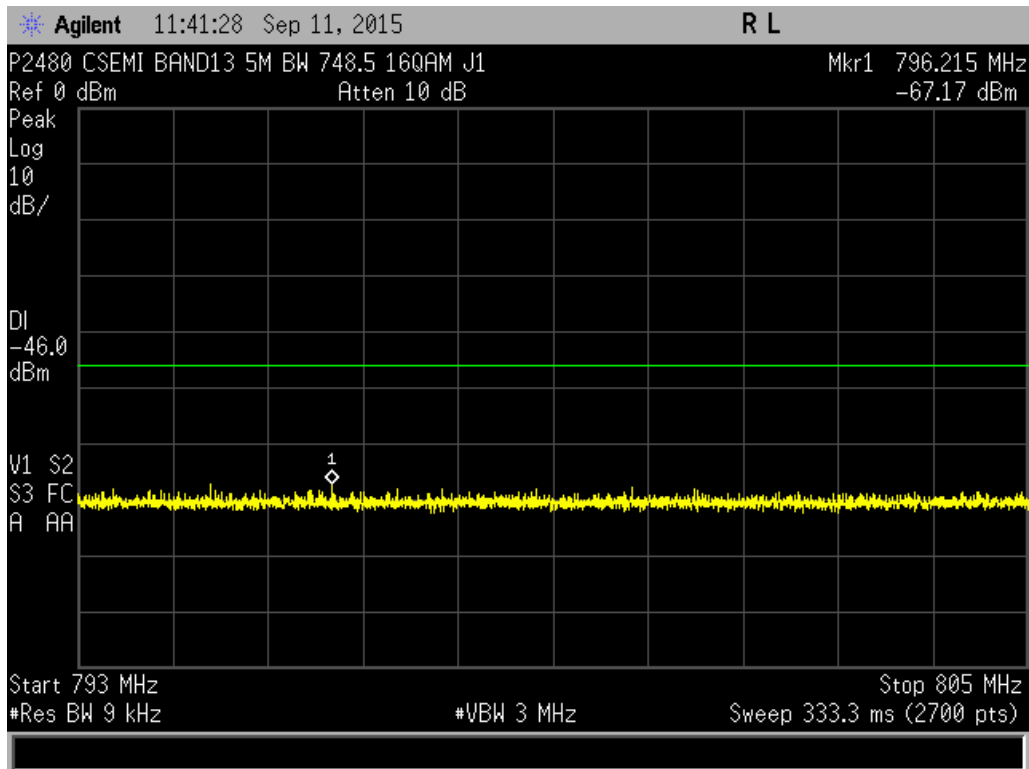
Port J1, 763-775MHz



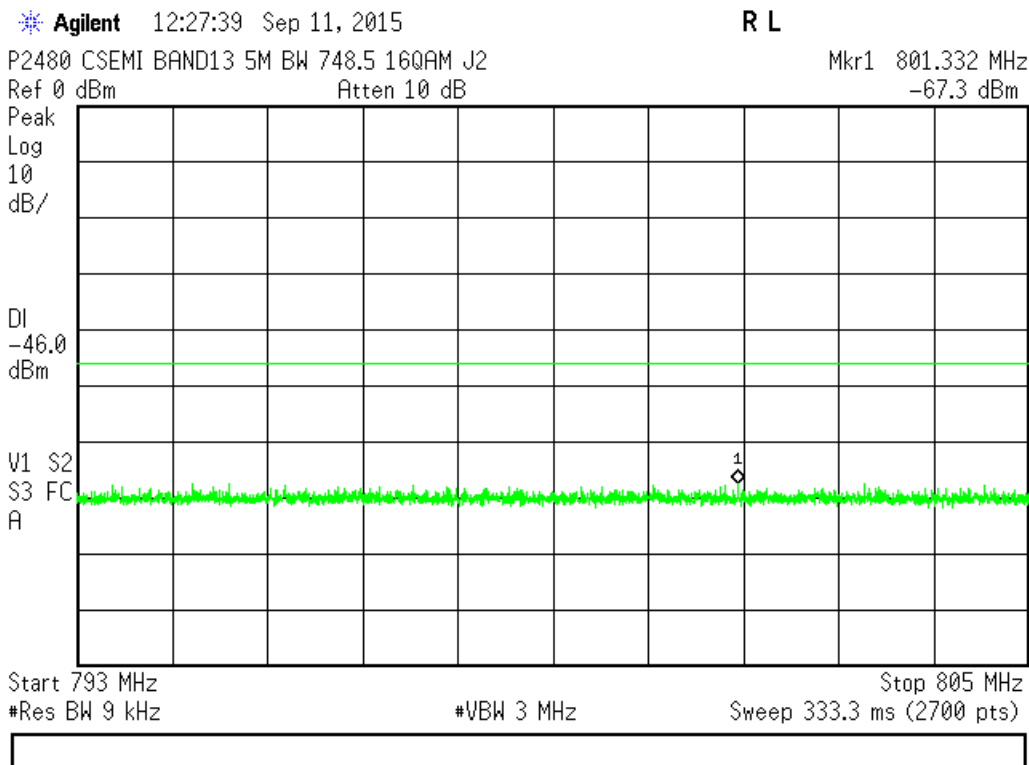
Curtis-Straus LLC, a wholly owned subsidiary of BV CPS
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Port J2, 763-775MHz



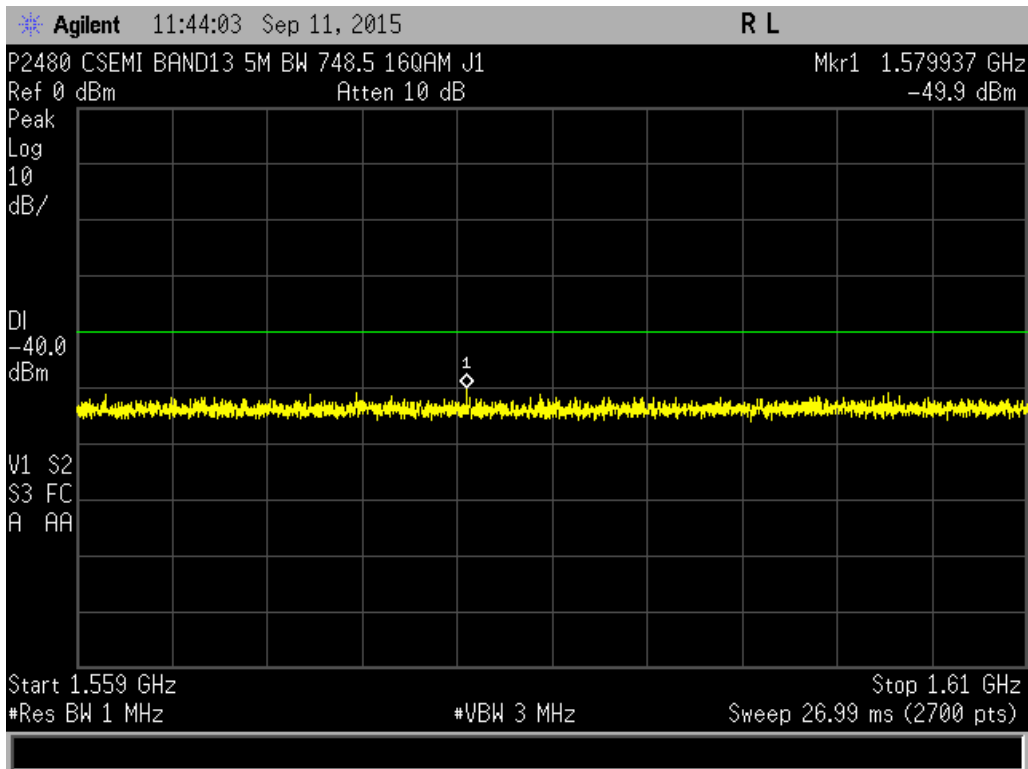
Port J1, 793-806MHz



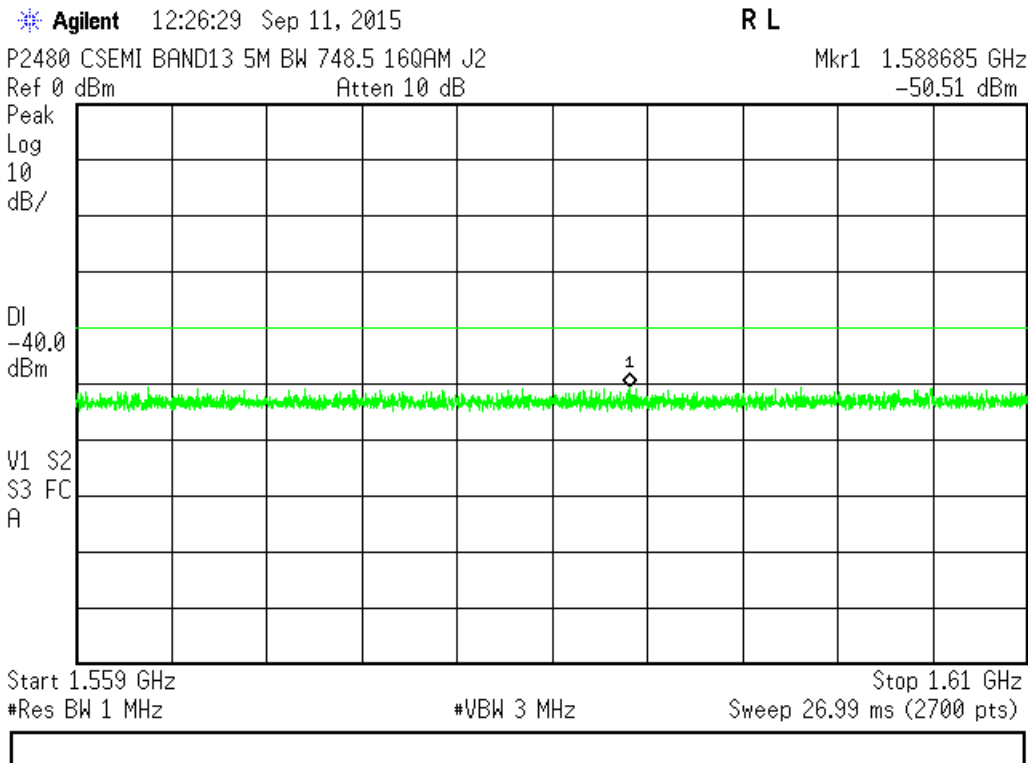
Port J2, 793-806MHz



FCC 27.53(f) Wideband Emission Limit:



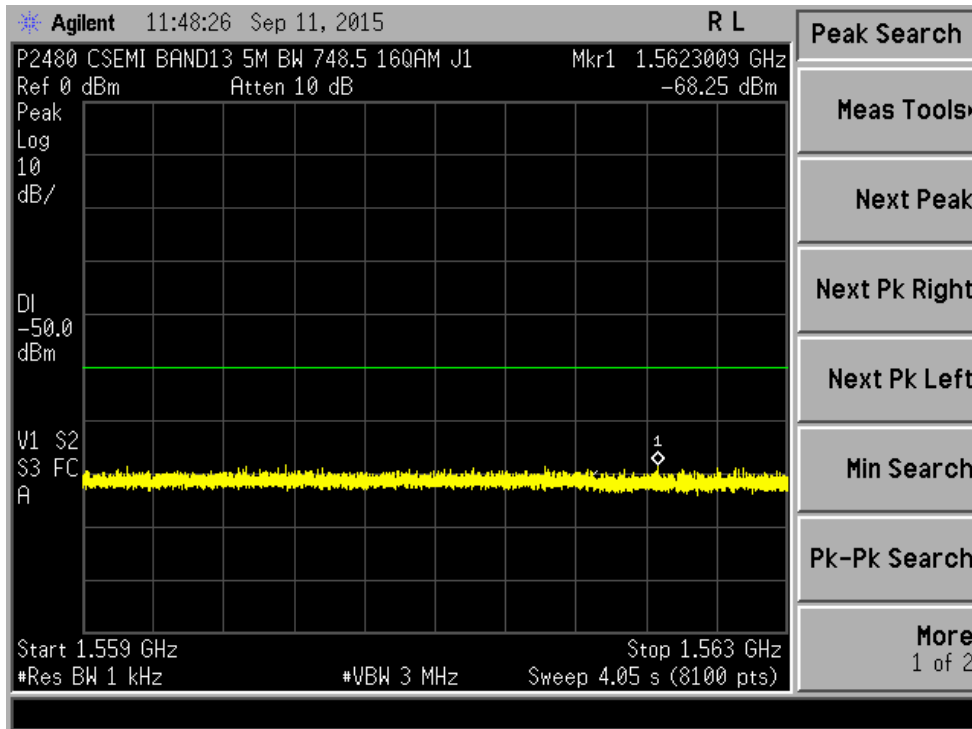
Port J1, 1559-1610MHz



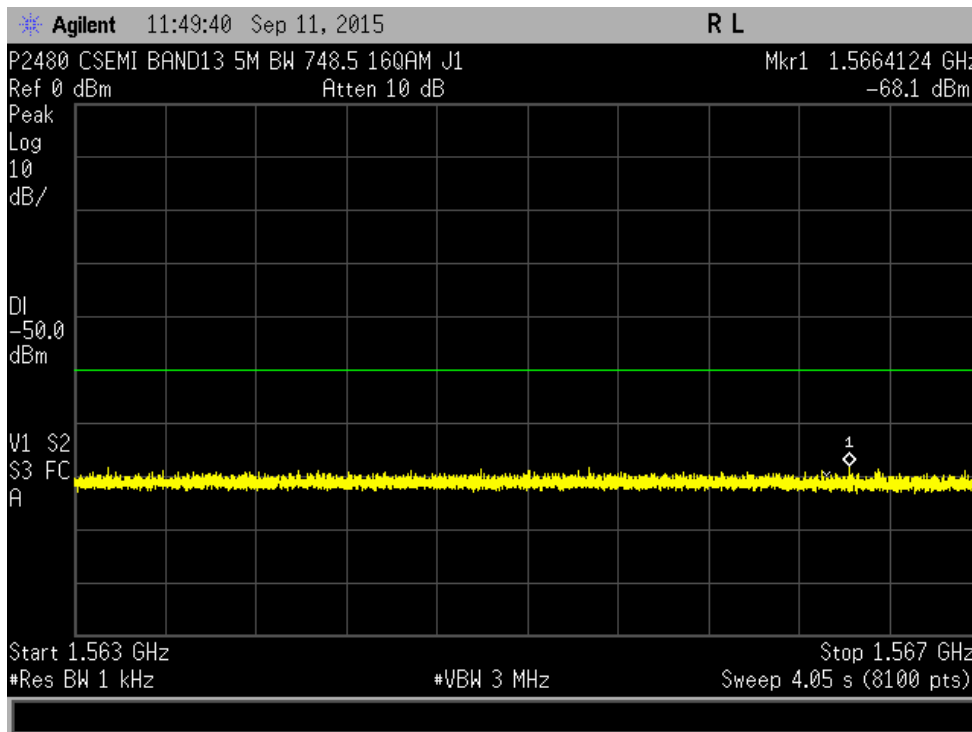
Port J2, 1559-1610MHz



FCC 27.53(f) Discrete Emission Limit:
Port J1

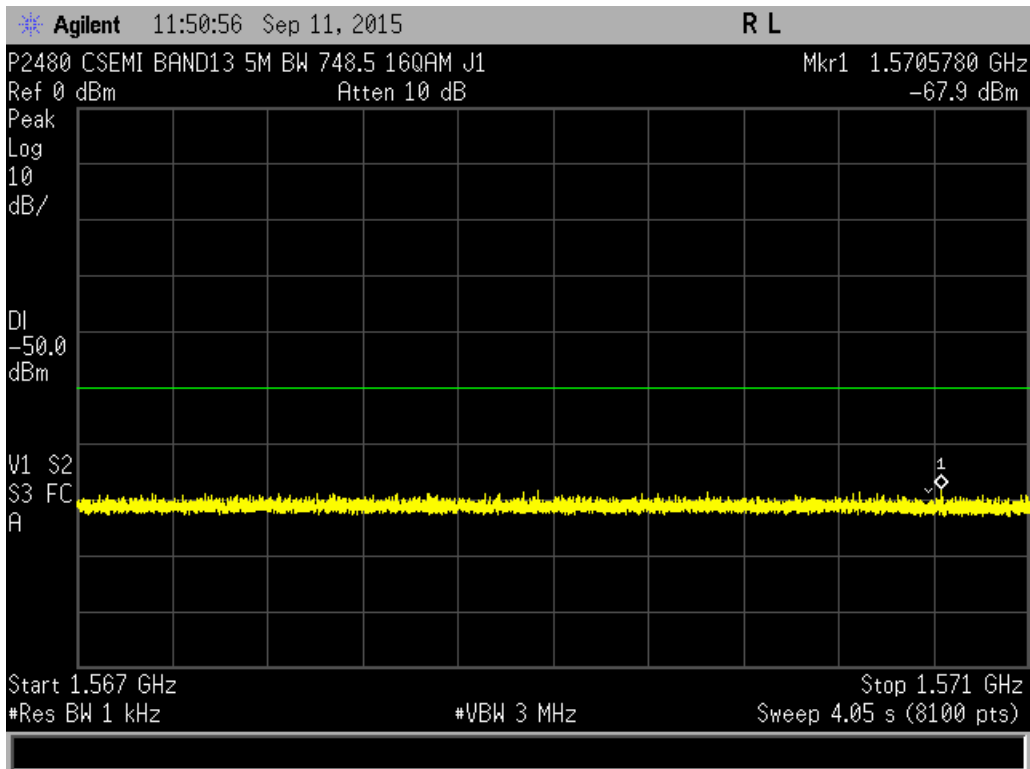


1559MHz to 1563.05MHz

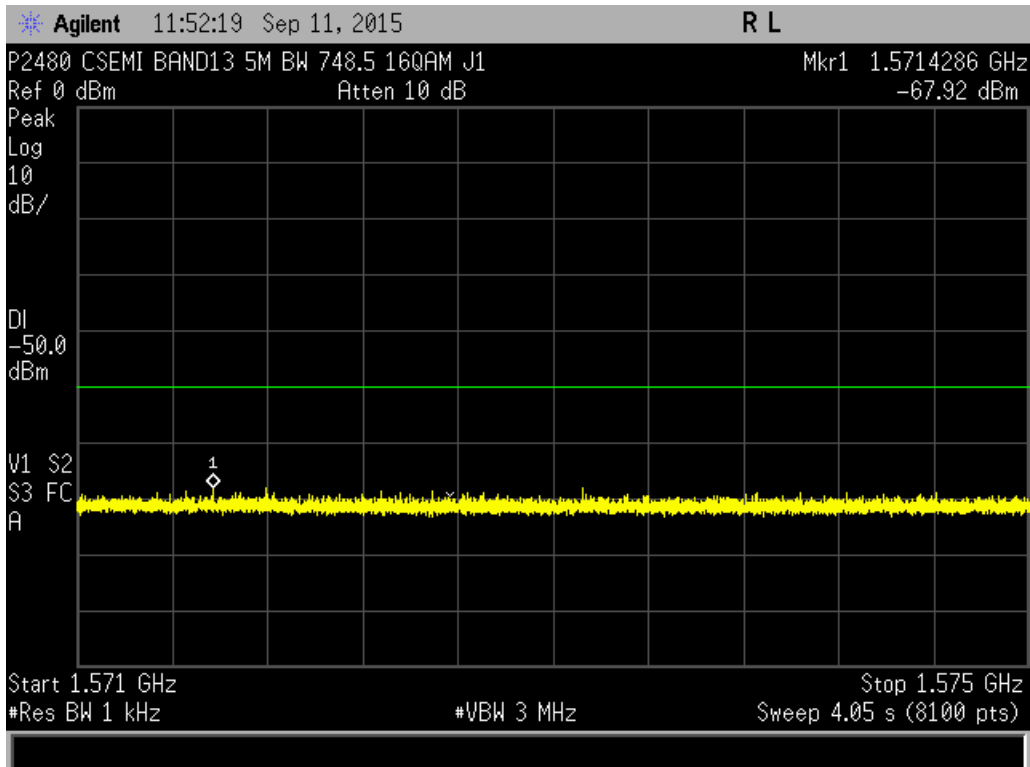


1562.95MHz to 1567MHz



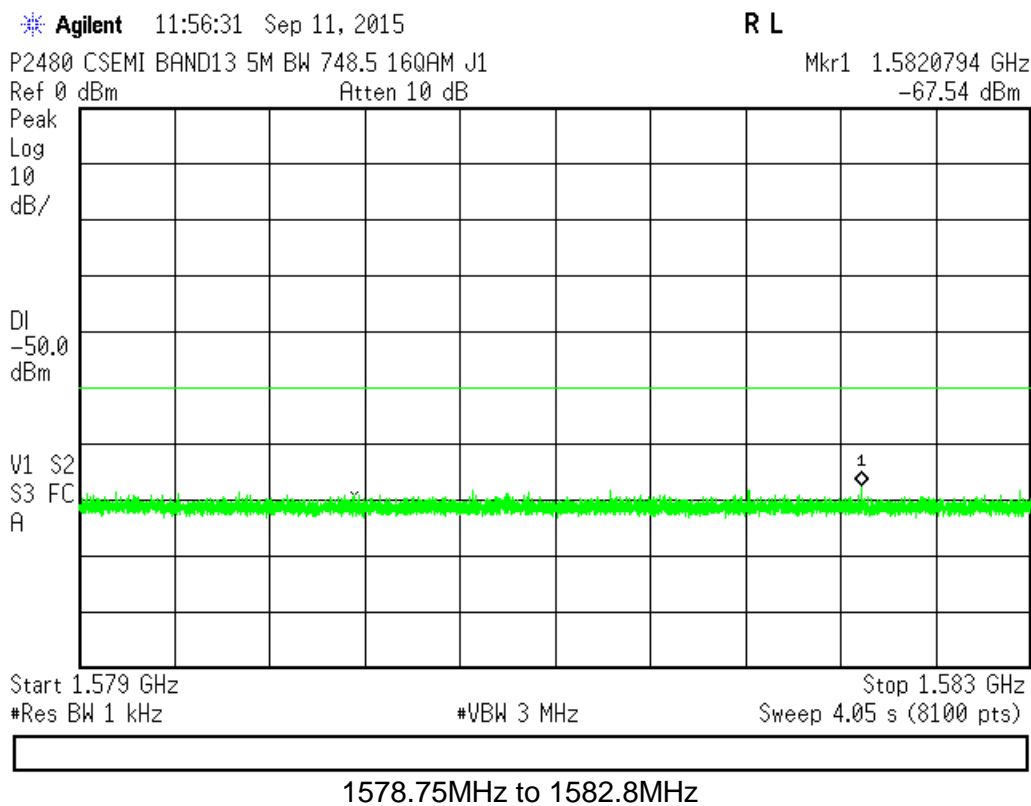
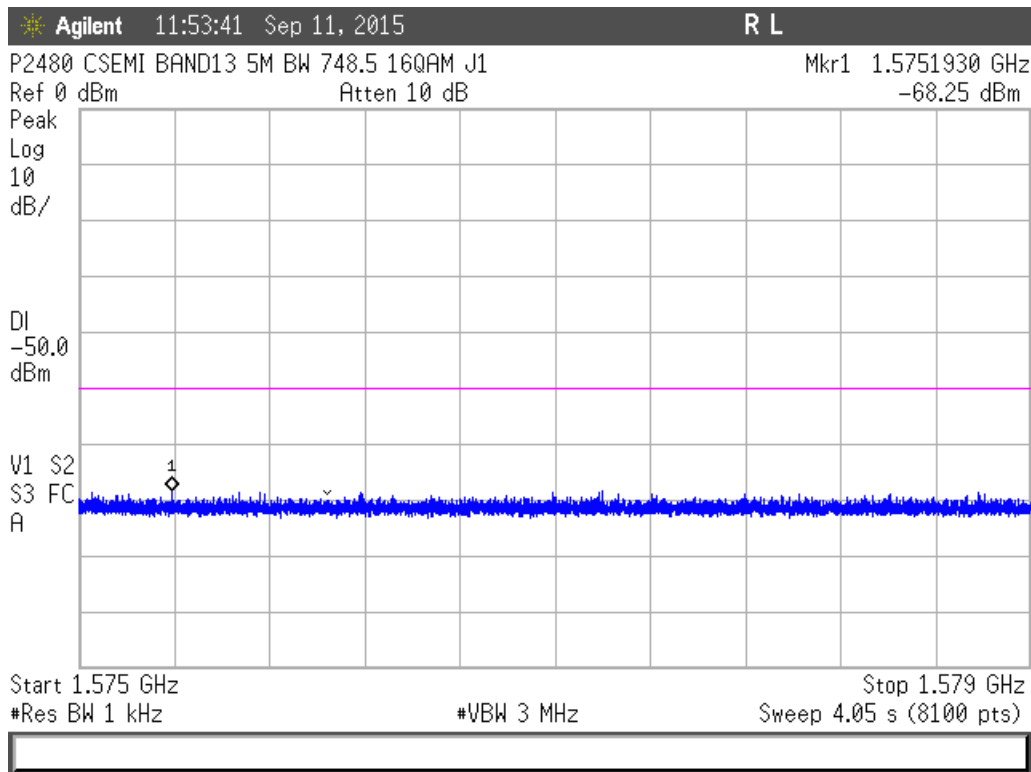


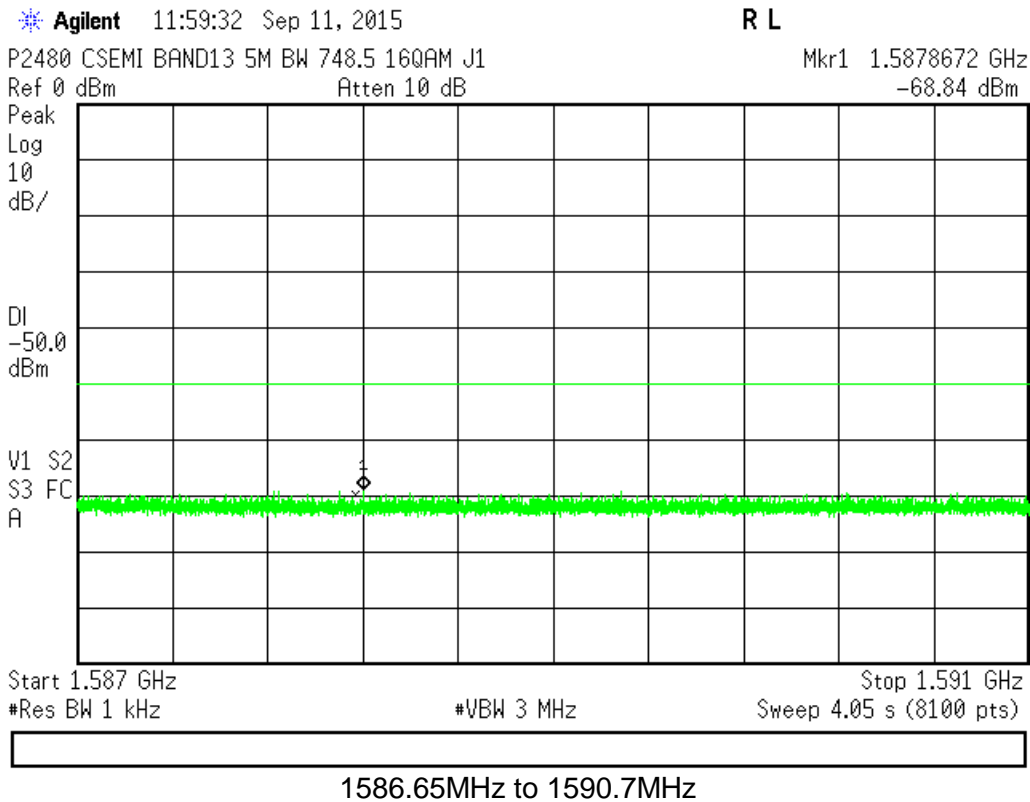
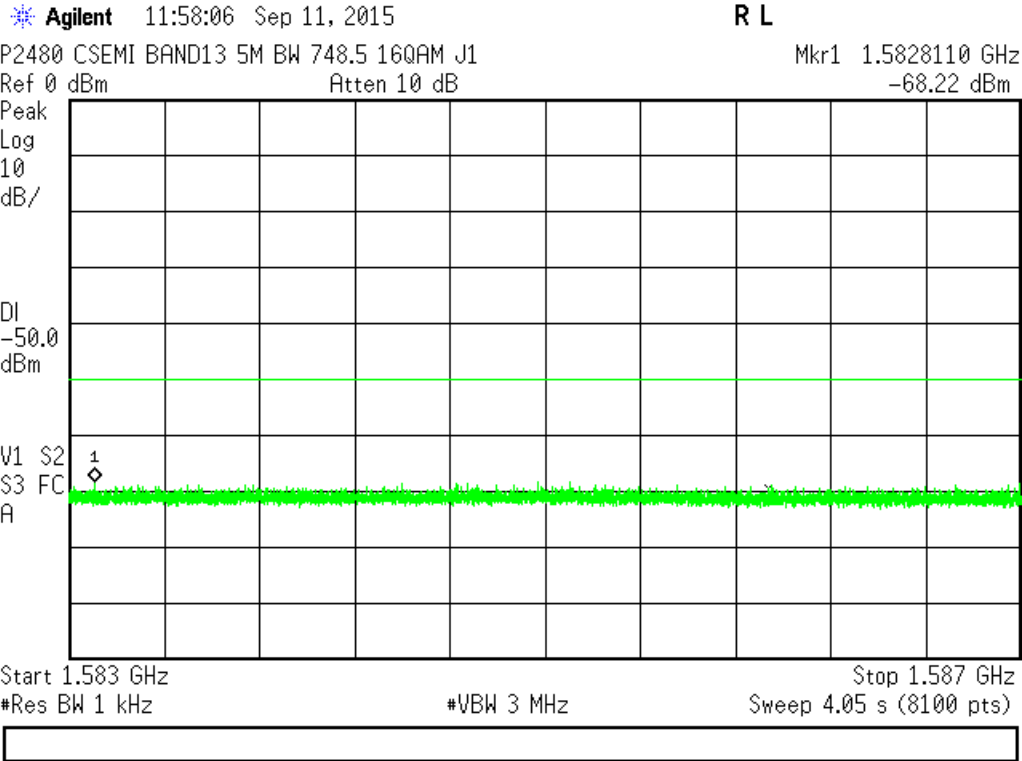
1566.9MHz to 1570.95MHz

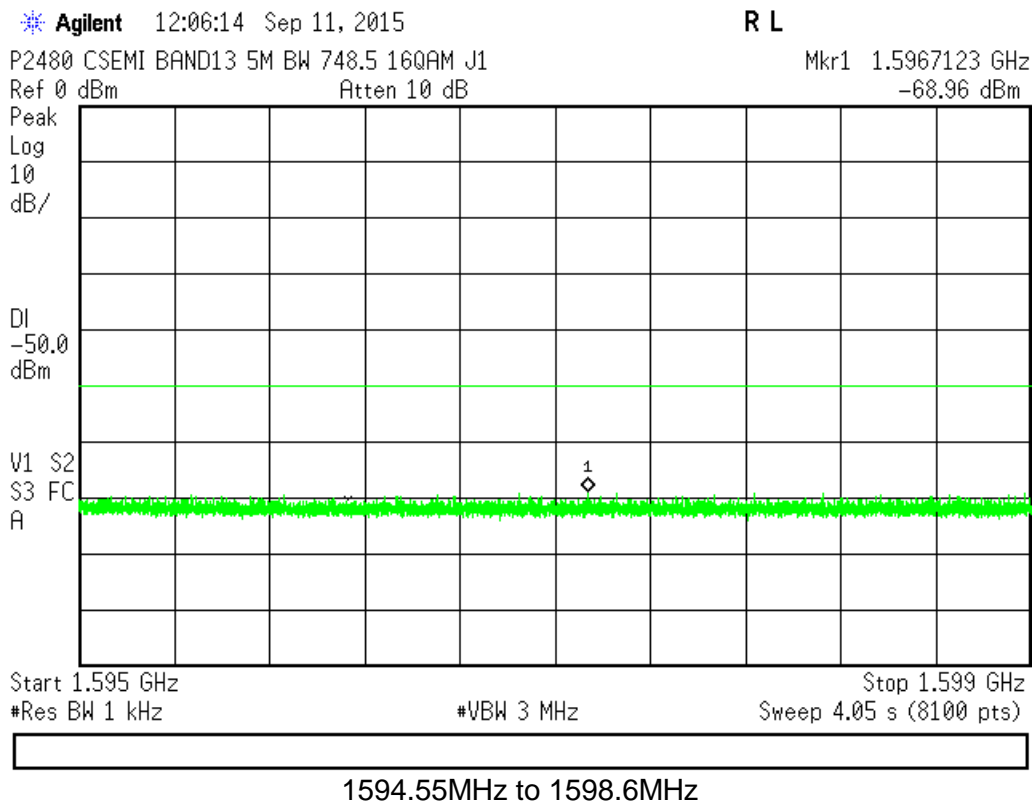
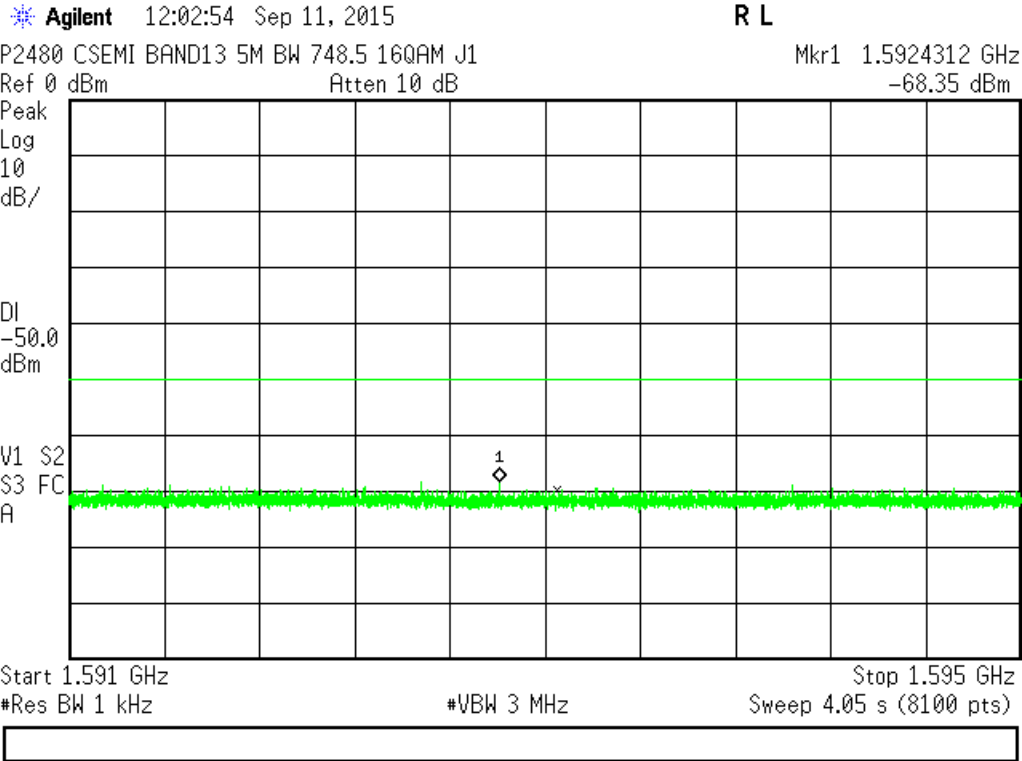


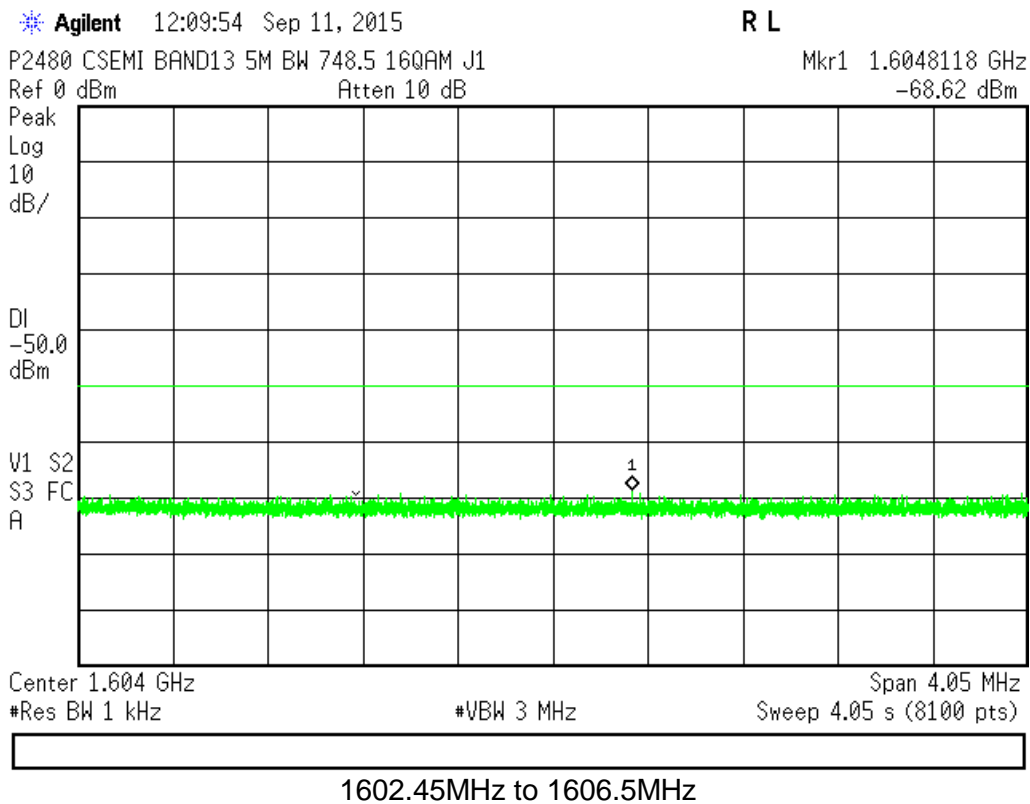
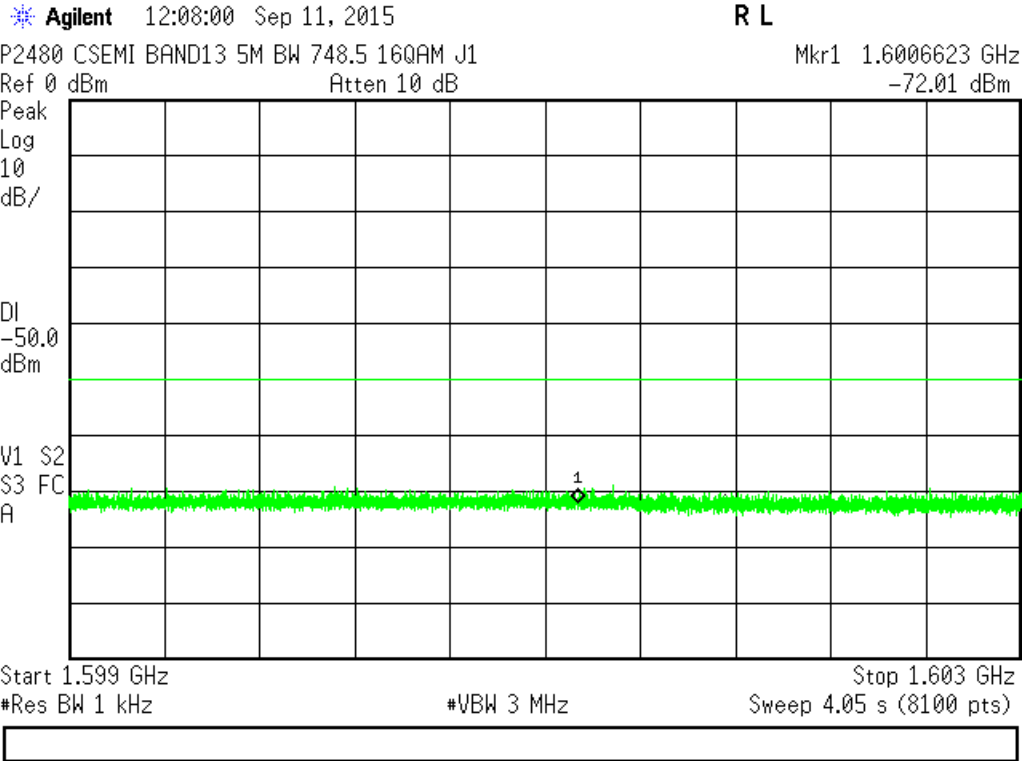
1570.85MHz to 1574.9MHz

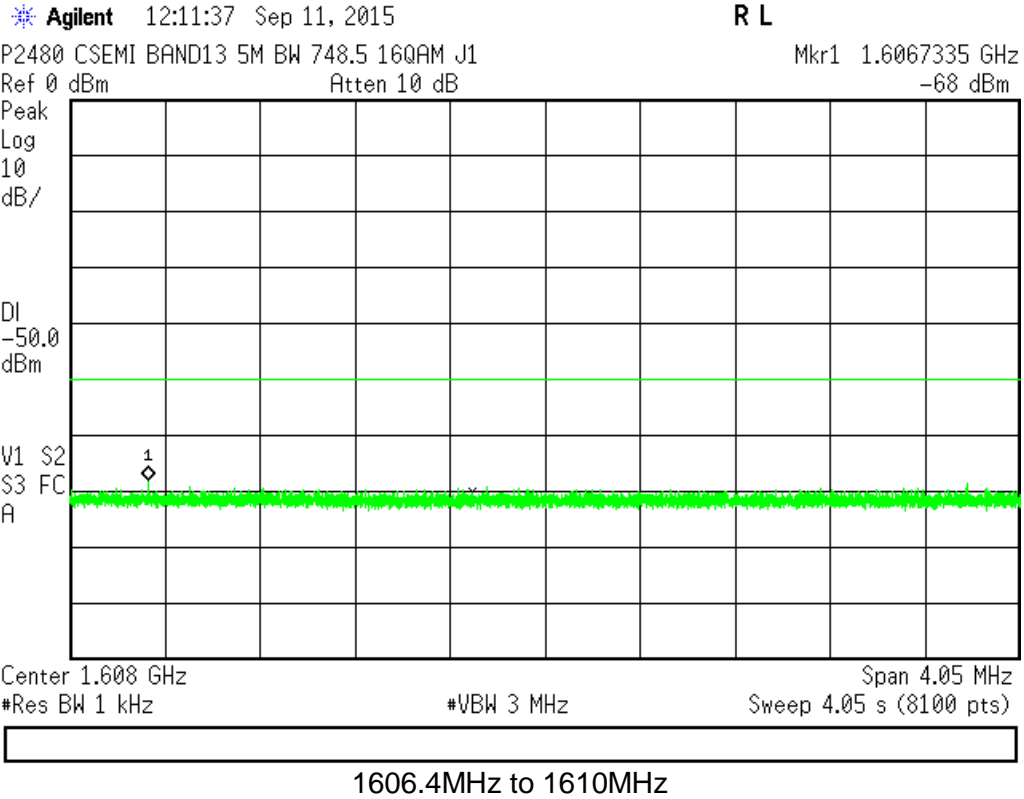




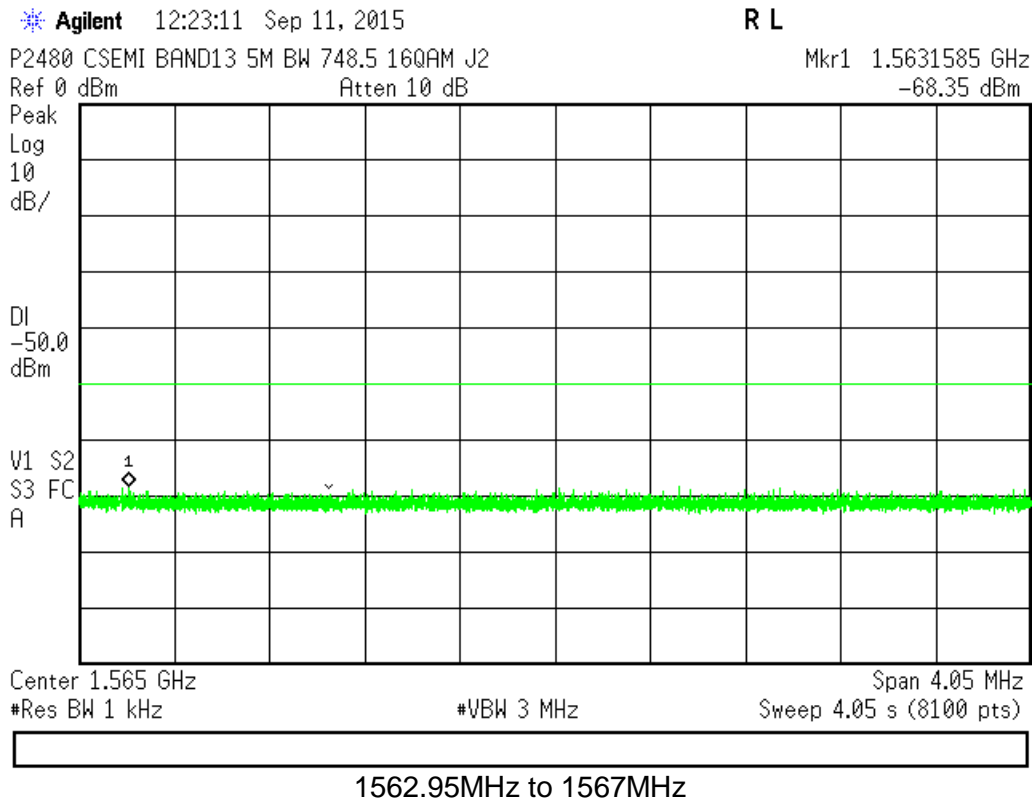
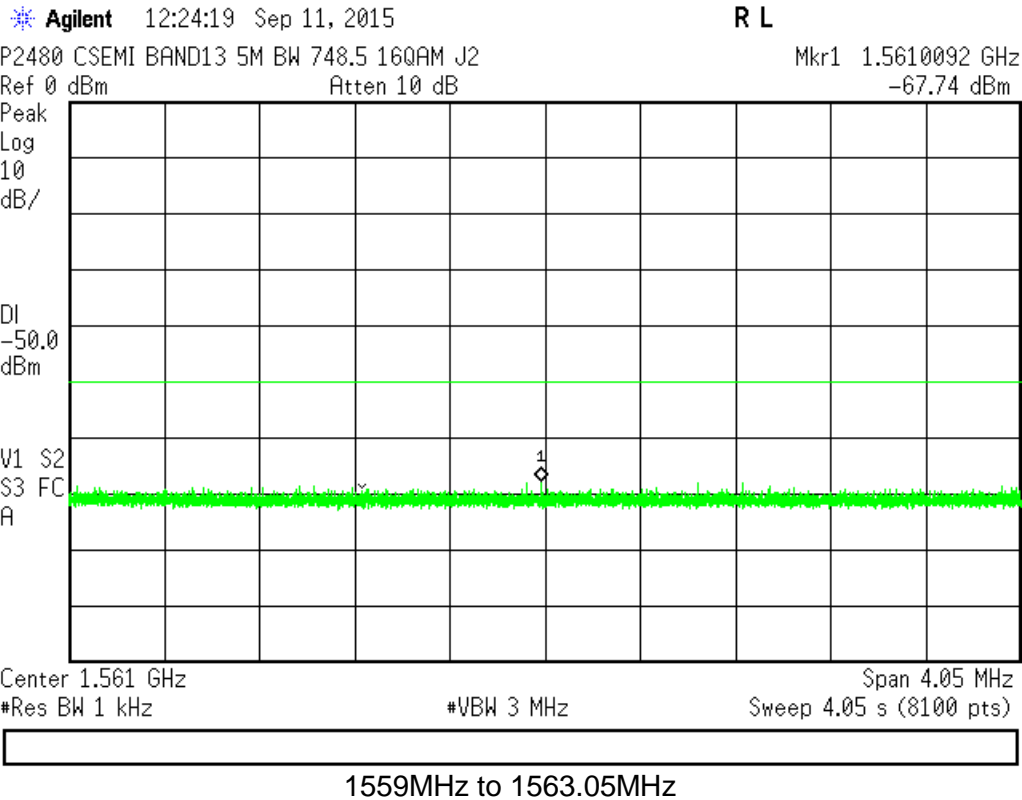


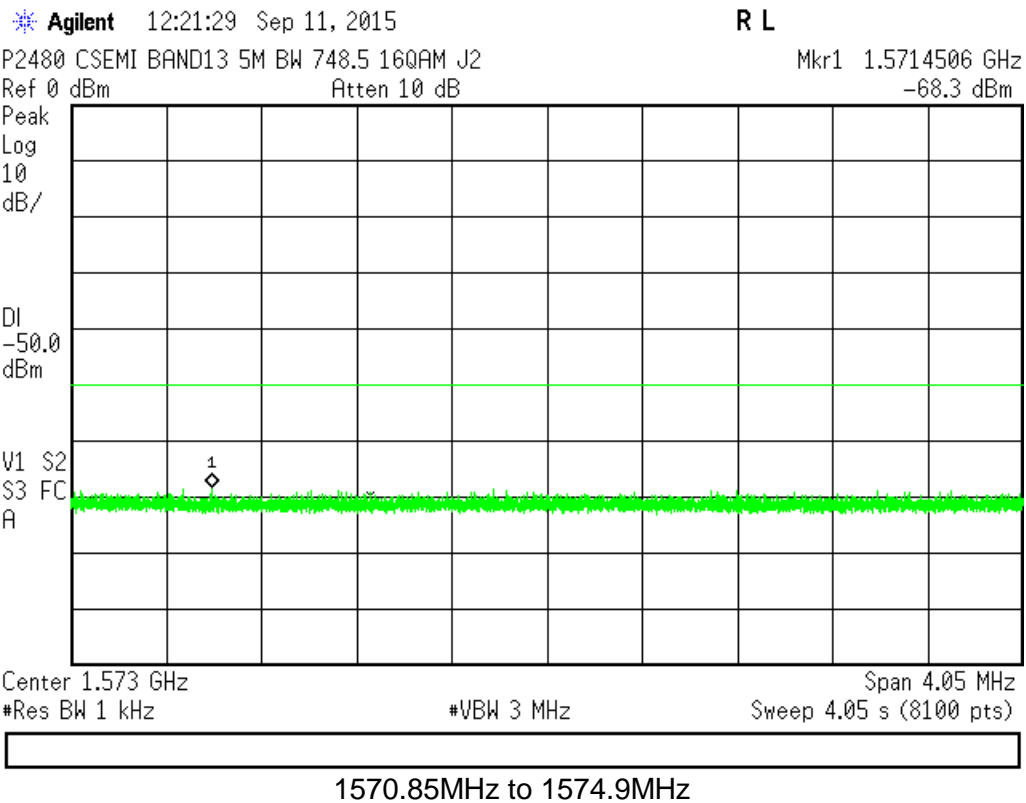
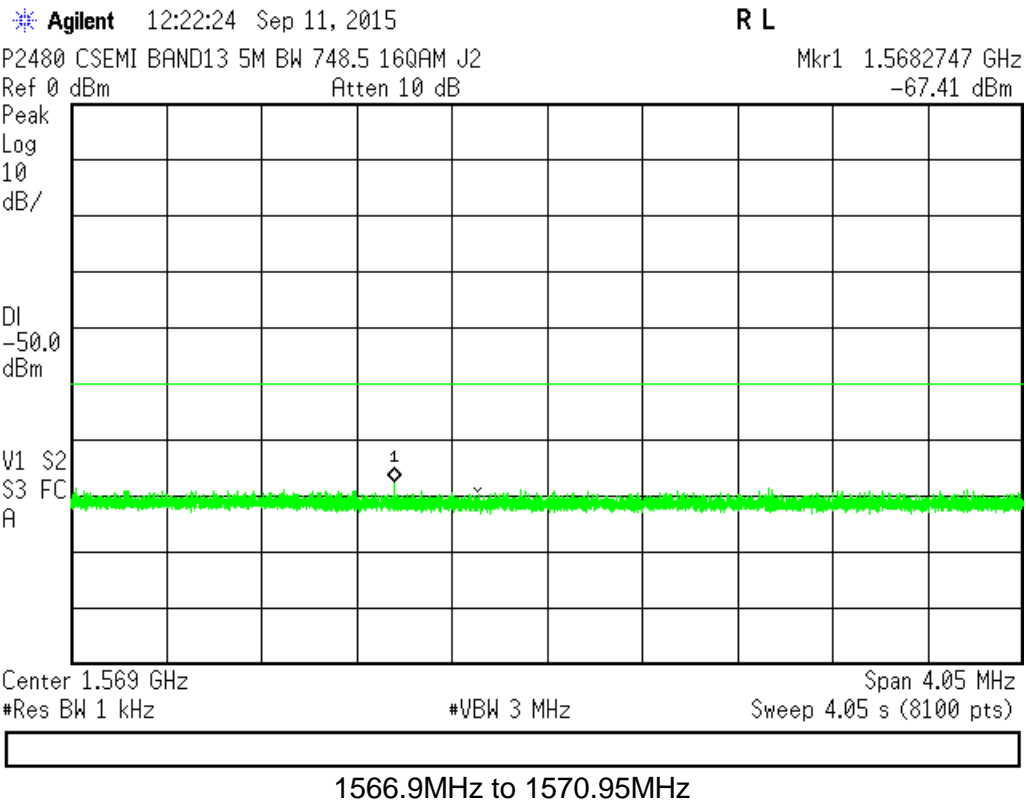


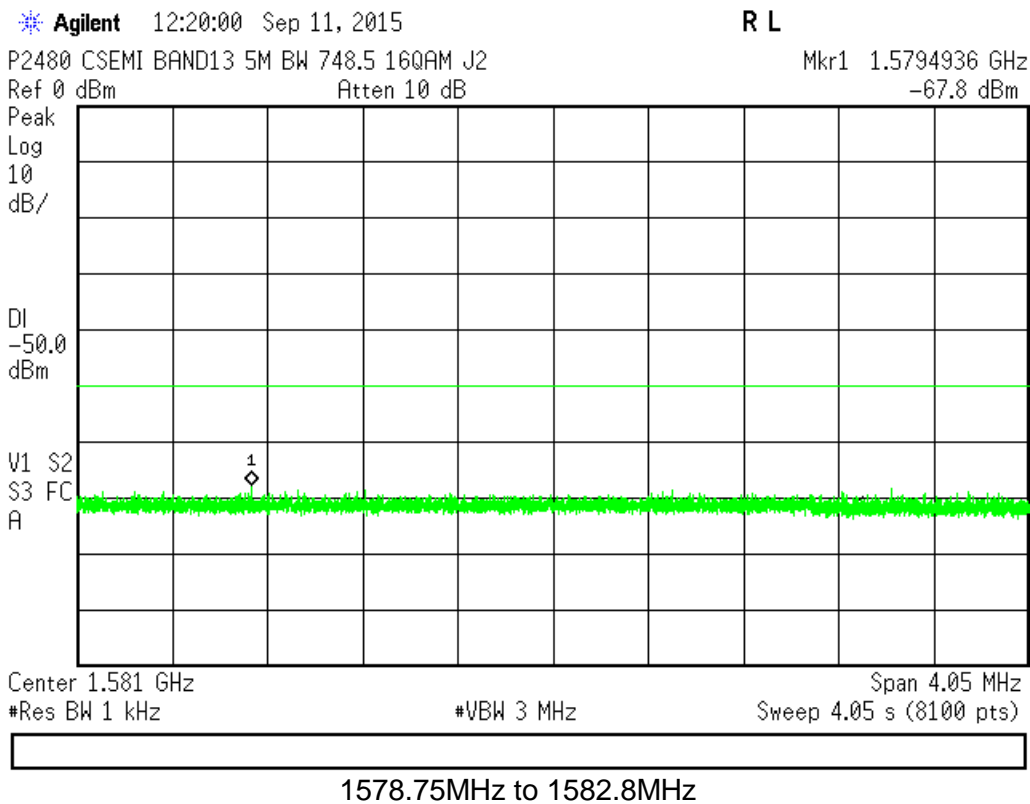
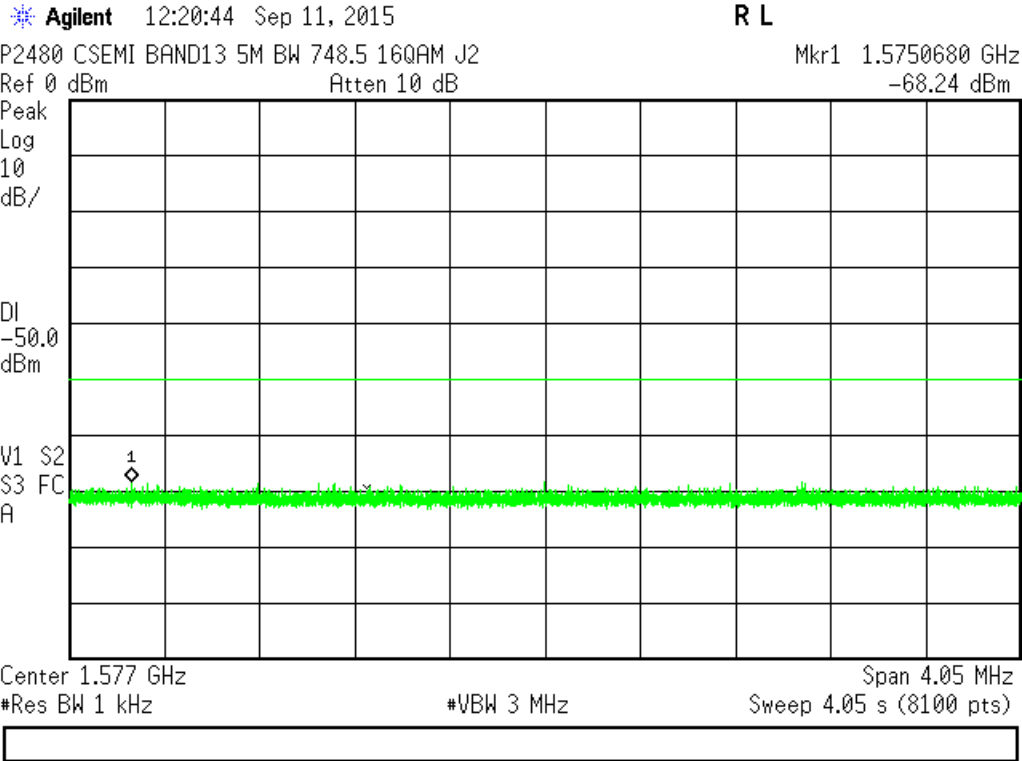


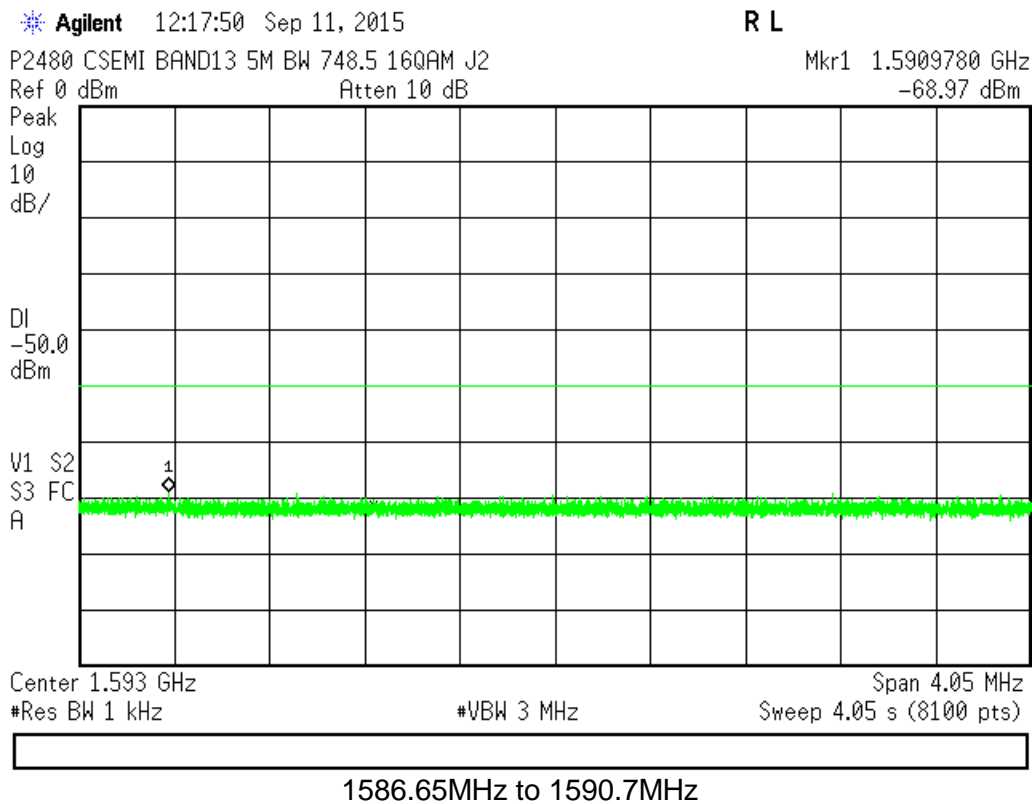
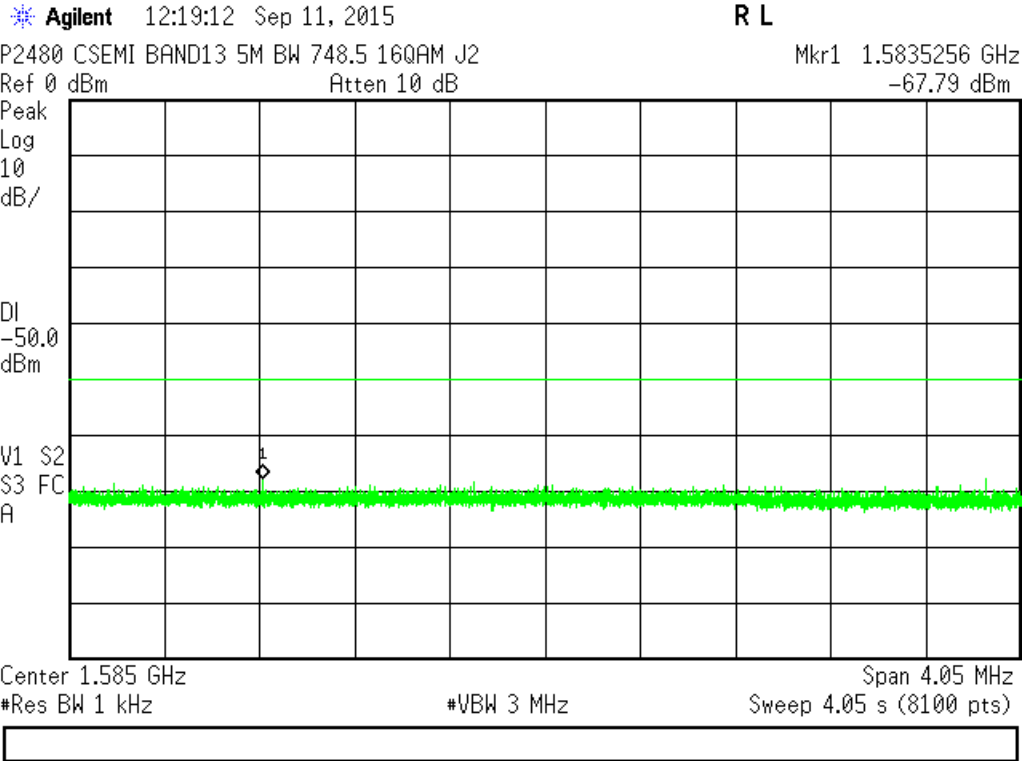


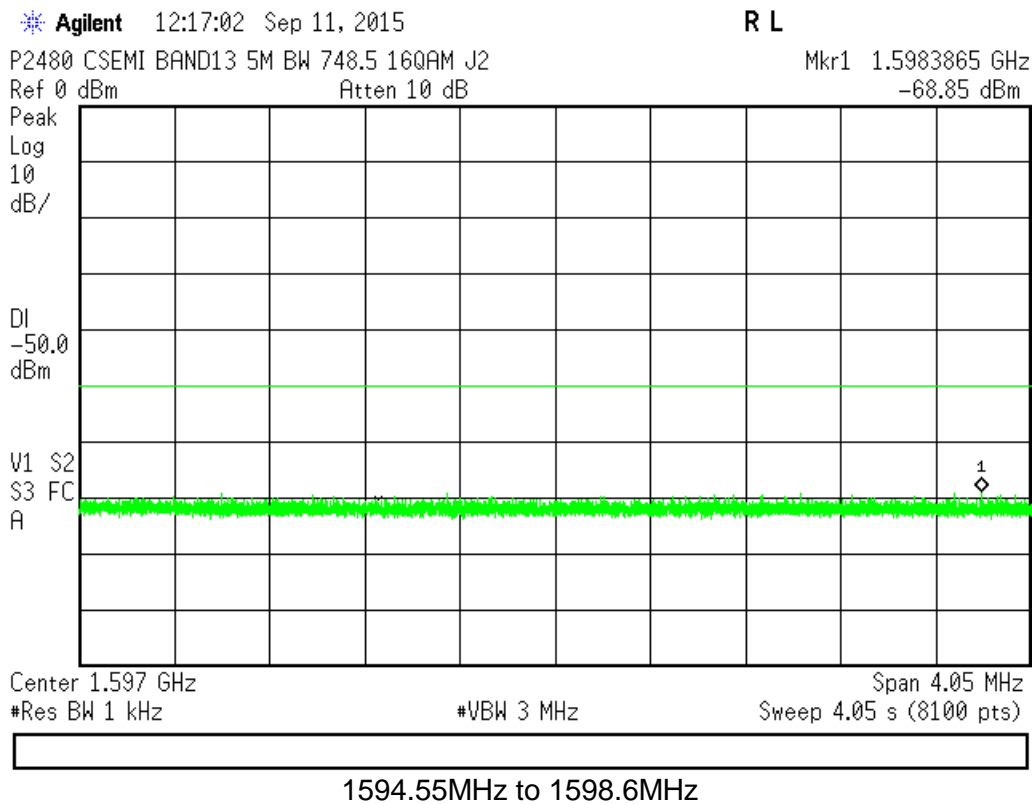
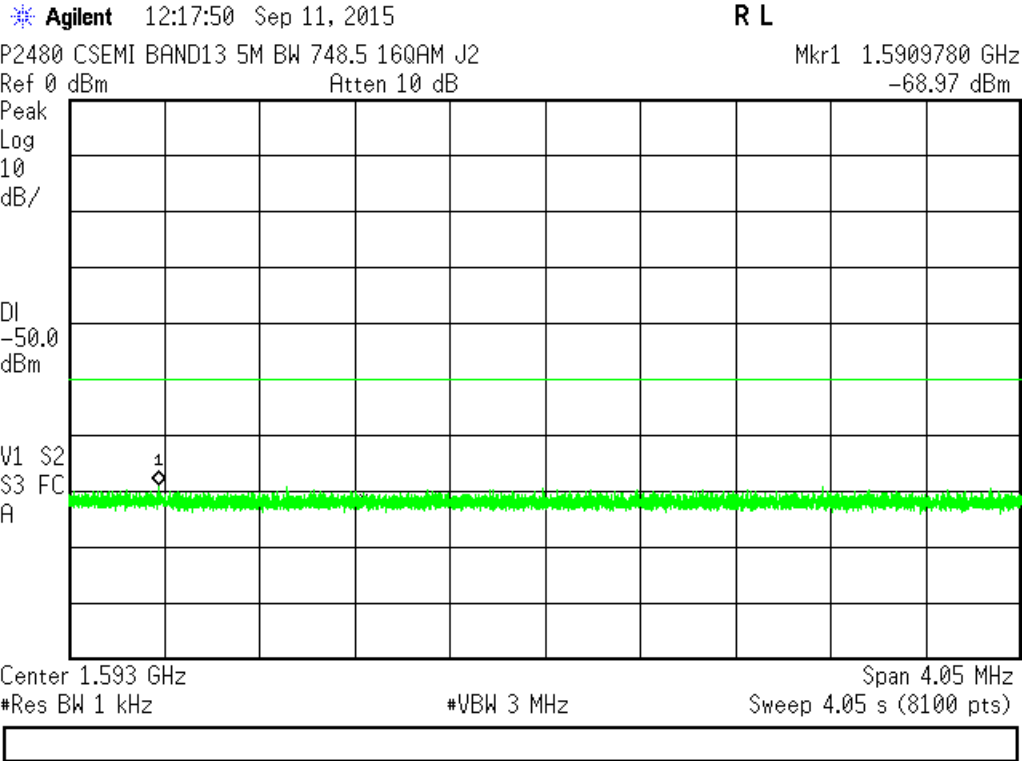
Port J2

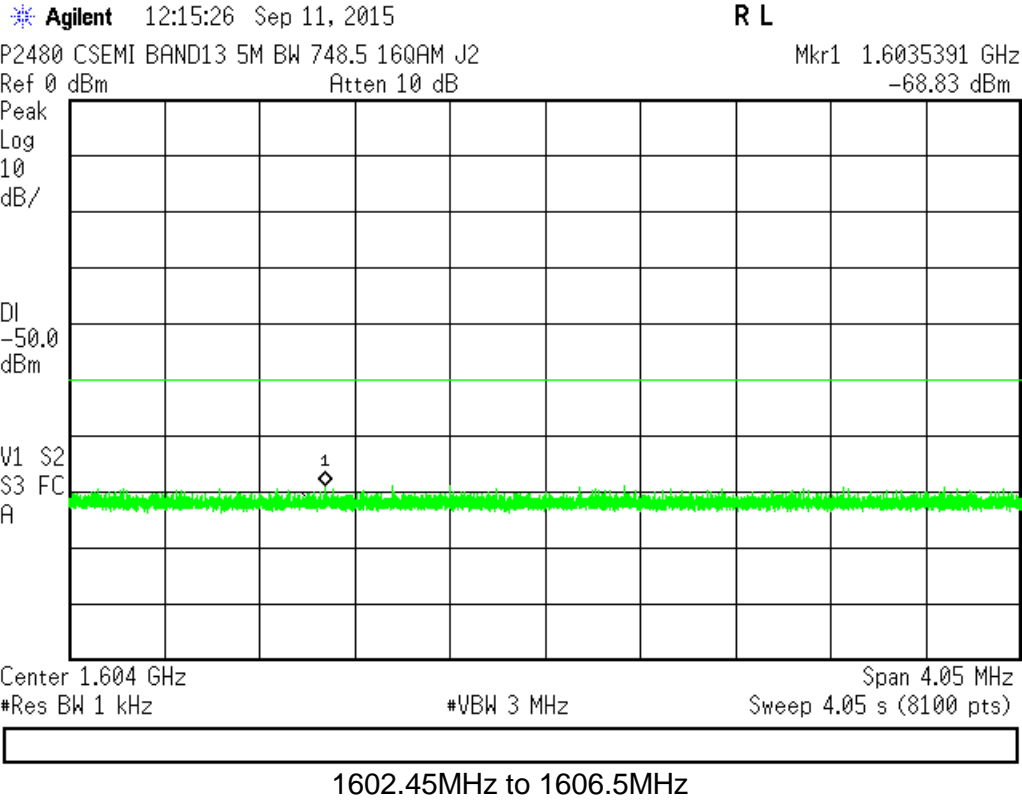
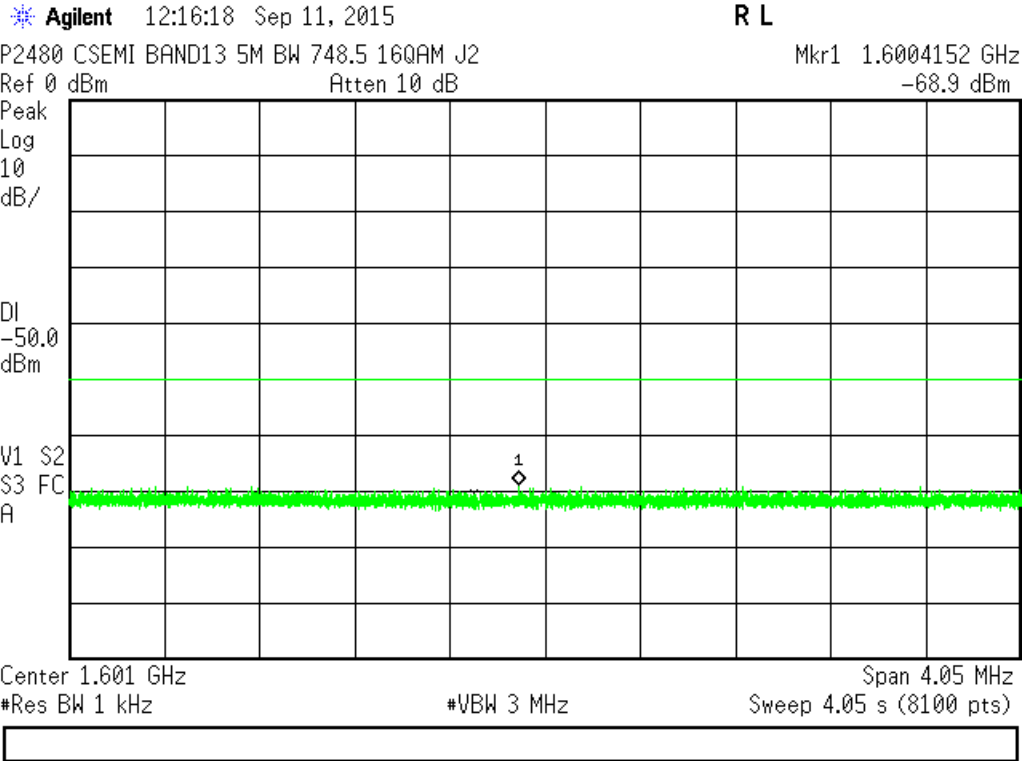


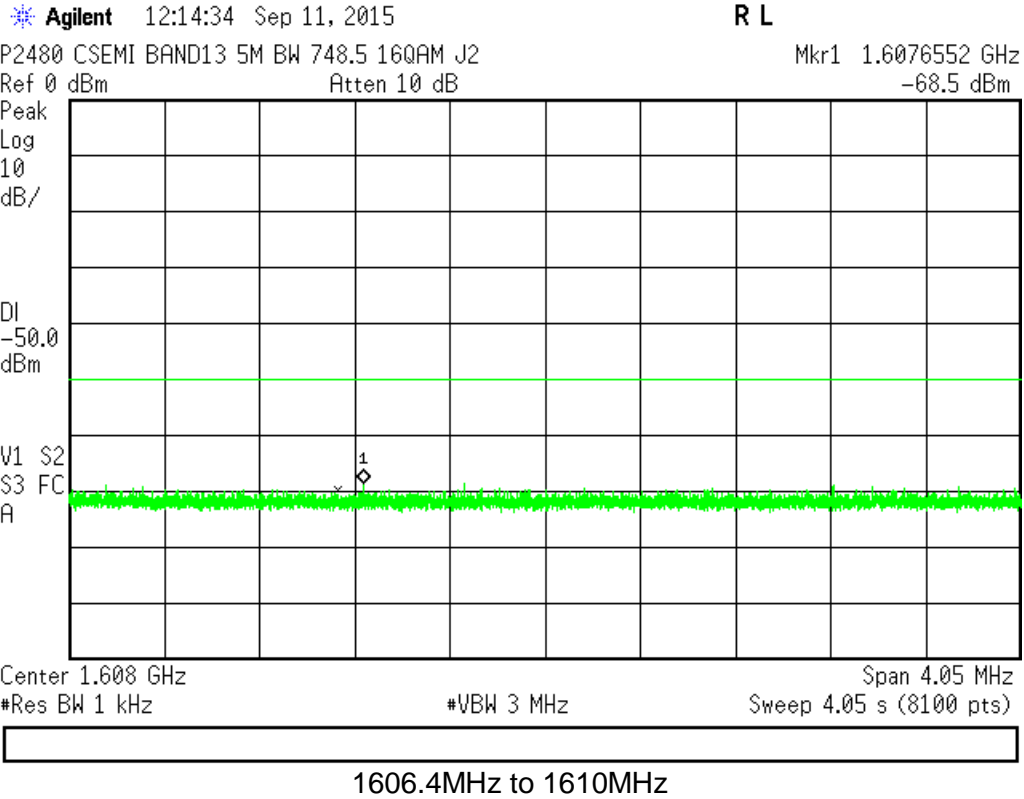












Radiated Spurious Emissions Measurements

MEASUREMENTS / RESULTS

Note that the EUT passes the FCC Class B limit, which is much lower than the -13dBm limit (82.158dBuV/m at 3 meters) for licensed transmitter spurious emissions. Only worst-case radiated spurious data is presented.

Radiated Emissions Table												
Date: 08-Sep-15			Company: Airvana				Work Order: P2480					
Engineer: Jason Haley and Ryan Bro			EUT Desc: Switched IQ Radio				EUT Operating Voltage/Frequency: POE					
Temp: 24.1°C			Humidity: 54%				Pressure: 1006mBar					
Frequency Range: 30-1000MHz						Measurement Distance: 3 m						
Notes: BW = 5MHz, Band 13, 16QAM , Low Channel (748.5MHz)						EUT Max Freq: 200MHz						
Antenna Polarization (H/V)	Frequency (MHz)	Reading (dBuV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBuV/m)	---			FCC Class B		
							Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)
V	200.0	46.2	25.5	12.6	2.5	35.8	---	---	---	43.5	-7.7	Pass
V	875.0	36.2	25.9	22.1	3.9	36.3	---	---	---	46.0	-9.7	Pass
V	799.0	34.5	25.9	21.4	4.0	34.0	---	---	---	46.0	-12.0	Pass
V	151.3	44.5	25.4	12.5	2.5	34.1	---	---	---	43.5	-9.4	Pass
V	38.0	41.4	25.1	15.4	1.5	33.2	---	---	---	40.0	-6.8	Pass
V	52.0	53.2	25.2	7.7	1.4	37.1	---	---	---	40.0	-2.9	Pass
H	875.0	40.5	25.9	22.1	3.9	40.6	---	---	---	46.0	-5.4	Pass
H	600.0	43.9	25.5	18.5	2.9	39.8	---	---	---	46.0	-6.2	Pass
H	39.0	32.5	25.1	14.6	1.4	23.4	---	---	---	40.0	-16.6	Pass
H	200.0	41.9	25.5	12.6	2.5	31.5	---	---	---	43.5	-12.0	Pass
H	150.0	44.0	25.4	12.5	2.5	33.6	---	---	---	43.5	-9.9	Pass
H	135.0	30.0	25.6	13.7	2.2	20.3	---	---	---	43.5	-23.2	Pass
H	466.6	42.0	25.8	17.3	3.6	37.1	---	---	---	46.0	-8.9	Pass
Table Result: Pass by -2.9 dB										Worst Freq: 52.0 MHz		
Test Site: EMI Chamber 1			Cable 1: Asset #2051			Cable 2: Asset #2054			Cable 3: ---			
Analyzer: Rental SA#2			Preamp: Red-White			Antenna: Red-Brown			Preselector: Asset #1511			
CSsoft Radiated Emissions Calculator v 1.017.146						Copyright Curtis-Straus LLC 2000						
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor												



Radiated Emissions Table															
Date: 09-Sep-15				Company: Airvana				Work Order: P2480							
Engineer: Jason Haley and Ryan Brown				EUT Desc: Switch IQ Radio Point				EUT Operating Voltage/Frequency: POE							
Temp: 23.5°C				Humidity: 57%				Pressure: 1005mBar							
Frequency Range: 1-6GHz								Measurement Distance: 3m							
Notes: Used HPF 1310, no emissions found above 2462MHz								EUT Max Freq: 200MHz							
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	
BW = 5MHz, Band 13, 16QAM, Low Channel (748.5MHz)															
H	2462.0	45.18	29.1	18.9	32.4	3.3	62.0	45.9	74.0	-12.0	Pass	54.0	-8.1	Pass	
V	2462.0	42.88	28.5	18.9	32.4	3.3	59.7	45.3	74.0	-14.3	Pass	54.0	-8.7	Pass	
BW = 5MHz, Band 13, 16QAM, Mid Channel (751MHz)															
V	2462.0	39.78	27.8	18.9	32.4	3.3	56.6	44.6	74.0	-17.4	Pass	54.0	-9.4	Pass	
H	2462.0	42.21	27.8	18.9	32.4	3.3	59.0	44.6	74.0	-15.0	Pass	54.0	-9.4	Pass	
BW = 5MHz, Band 13, 16QAM, High Channel (753.5MHz)															
H	2462.0	42.48	28.1	18.9	32.4	3.3	59.3	44.9	74.0	-14.7	Pass	54.0	-9.1	Pass	
V	2462.0	44.04	28.2	18.9	32.4	3.3	60.8	45.0	74.0	-13.2	Pass	54.0	-9.0	Pass	
BW = 5MHz, Band 13, 64QAM, Low Channel (748.5MHz)															
V	2462.0	41.6	28.5	18.9	32.4	3.3	58.4	45.3	74.0	-15.6	Pass	54.0	-8.7	Pass	
H	2462.0	42.97	29.0	18.9	32.4	3.3	59.8	45.8	74.0	-14.2	Pass	54.0	-8.2	Pass	
BW = 5MHz, Band 13, QPSK, Low Channel (748.5MHz)															
V	2462.0	43.58	28.8	18.9	32.4	3.3	60.4	45.6	74.0	-13.6	Pass	54.0	-8.4	Pass	
H	2462.0	41.58	28.8	18.9	32.4	3.3	58.4	45.6	74.0	-15.6	Pass	54.0	-8.4	Pass	
BW = 10MHz, Band 13, 16QAM, Only Channel (751MHz)															
V	2462.0	43.75	28.9	18.9	32.4	3.3	60.6	45.7	74.0	-13.4	Pass	54.0	-8.3	Pass	
H	2462.0	44.31	27.9	18.9	32.4	3.3	61.1	44.7	74.0	-12.9	Pass	54.0	-9.3	Pass	
Table Result: Pass by -8.1 dB Worst Freq: 2462.0 MHz															
Test Site: EMI Chamber 2				Cable 1: Asset #2053				Cable 2: Asset #2052				Cable 3: ---			
Analyzer: Rental SA#2				Preamp: Brown				Antenna: Blue Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.146 Copyright Curtis-Straus LLC 2000															
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															

Radiated Emissions Table															
Date: 09-Sep-15				Company: Airvana				Work Order: P2480							
Engineer: Jason Haley and Ryan Brown				EUT Desc: Switch IQ Radio Point				EUT Operating Voltage/Frequency: POE							
Temp: 23.5°C				Humidity: 57%				Pressure: 1005mBar							
Frequency Range: 6-8GHz								Measurement Distance: 1 m							
Notes:								EUT Max Freq: 200MHz							
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	
BW = 5MHz, Band 13, 16QAM, Low Channel (748.5MHz)															
No emissions found															
BW = 5MHz, Band 13, 16QAM, Mid Channel (751MHz)															
No emissions found															
BW = 5MHz, Band 13, 16QAM, High Channel (753.5MHz)															
no emissions found															
BW = 5MHz, Band 13, 64QAM, Low Channel (748.5MHz)															
No emissions found															
BW = 5MHz, Band 13, QPSK, Low Channel (748.5MHz)															
No emissions found															
BW = 10MHz, Band 13, 16QAM, Only Channel (751MHz)															
no emissions found															
Table Result: --- by --- dB Worst Freq: --- MHz															
Test Site: EMI Chamber 2				Cable 1: Asset #2053				Cable 2: Asset #2052				Cable 3: ---			
Analyzer: Rental SA#2				Preamp: Brown				Antenna: Blue Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.146 Copyright Curtis-Straus LLC 2000															
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															



LTE Bands 10 & 4 (FCC Part 27)**Conducted Spurious Emissions at Antenna Port****LIMITS**

“The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.”
[27.53(e)(8)]

$$\text{Limit} = 10 \cdot \log(P[\text{mW}]) - (43 + 10 \cdot \log(P[\text{W}])) = -13\text{dBm}$$

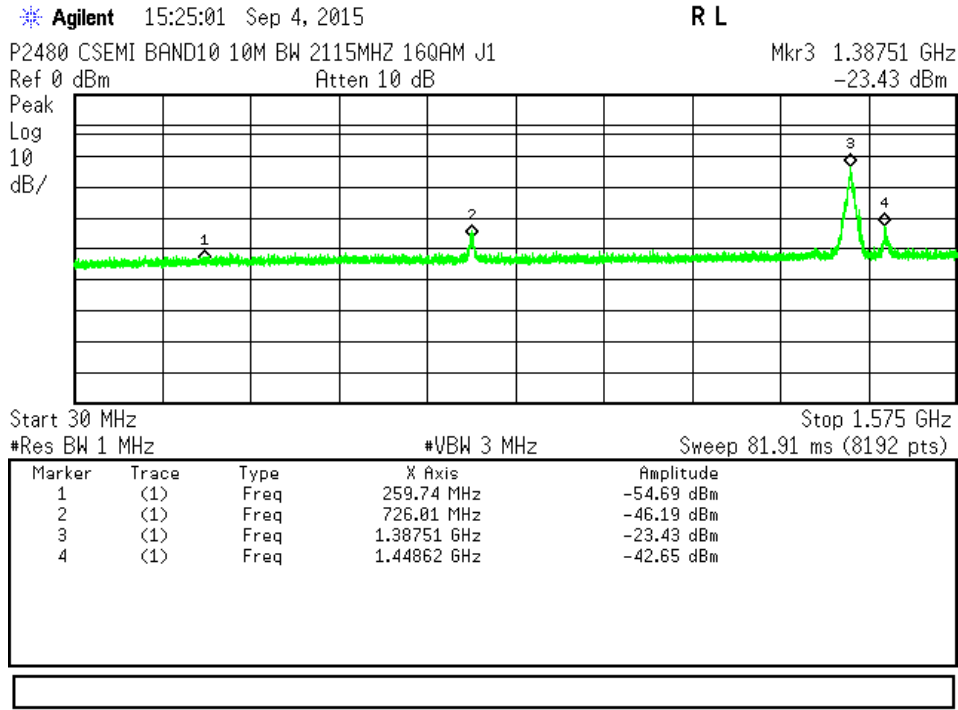
Spectrum analyzer screen plots for LTE Band 10 shown on the following pages. The operating frequency was 2115MHz, which was taken to represent both bands as Band 4 is a subset of Band 10. The correction factors were added to the plot, including the cable factor and 20dB attenuator.



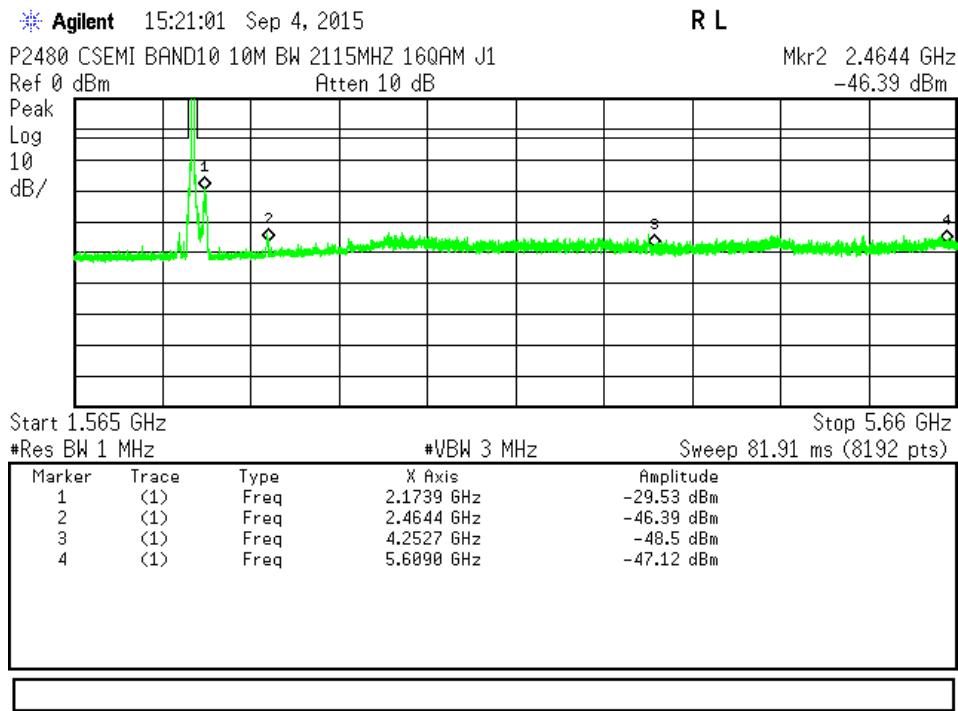
PLOTS

FCC 27.53(e)(8):

LTE Band 10 – Antenna Port J1



30MHz to 1.575GHz



1.565GHz to 5.66GHz

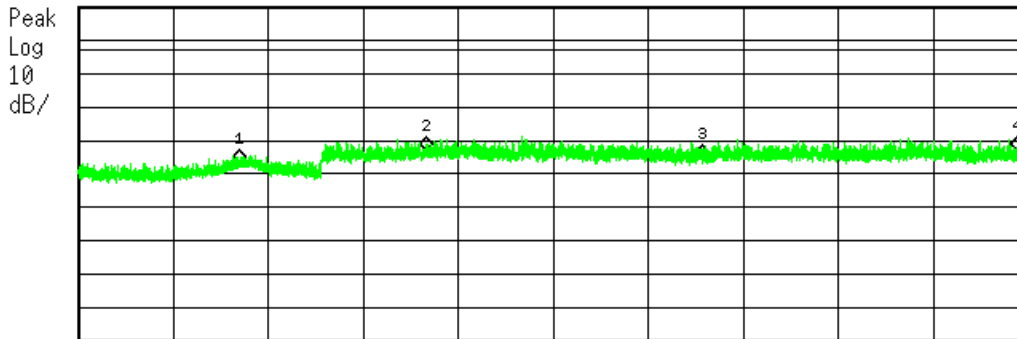


Agilent 15:16:20 Sep 4, 2015

R L

P2480 CSEMI BAND10 10M BW 2115MHZ 16QAM J1
Ref 0 dBm Atten 10 dB

Mkr1 6.3479 GHz
-46.77 dBm



Start 5.65 GHz Stop 9.745 GHz
#Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	6.3479 GHz	-46.77 dBm
2	(1)	Freq	7.1498 GHz	-43.24 dBm
3	(1)	Freq	8.3377 GHz	-45.67 dBm
4	(1)	Freq	9.6948 GHz	-43.3 dBm

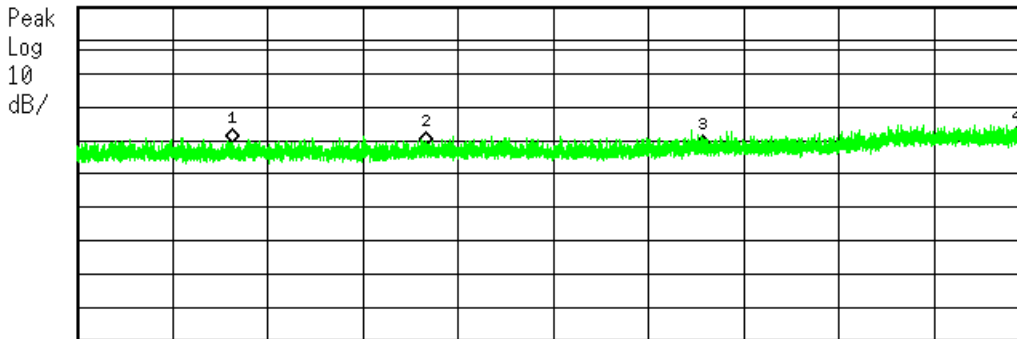
5.65GHz to 9.745GHz

Agilent 15:14:43 Sep 4, 2015

R L

P2480 CSEMI BAND10 10M BW 2115MHZ 16QAM J1
Ref 0 dBm Atten 10 dB

Mkr4 13.7780 GHz
-40.01 dBm



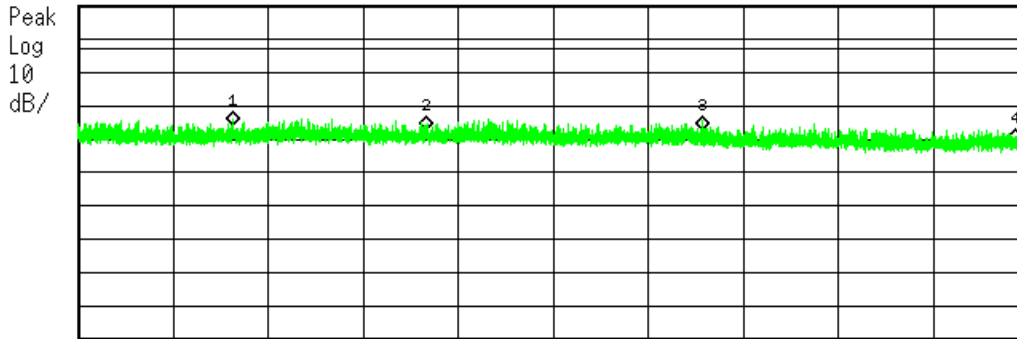
Start 9.735 GHz Stop 13.83 GHz
#Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	10.3994 GHz	-40.86 dBm
2	(1)	Freq	11.2348 GHz	-41.41 dBm
3	(1)	Freq	12.4227 GHz	-42.55 dBm
4	(1)	Freq	13.7780 GHz	-40.01 dBm

9.735GHz to 13.83GHz



Agilent 15:13:38 Sep 4, 2015 R L
 P2480 CSEMI BAND10 10M BW 2115MHZ 16QAM J1 Mkr4 17.8630 GHz
 Ref 0 dBm Atten 10 dB -41.25 dBm



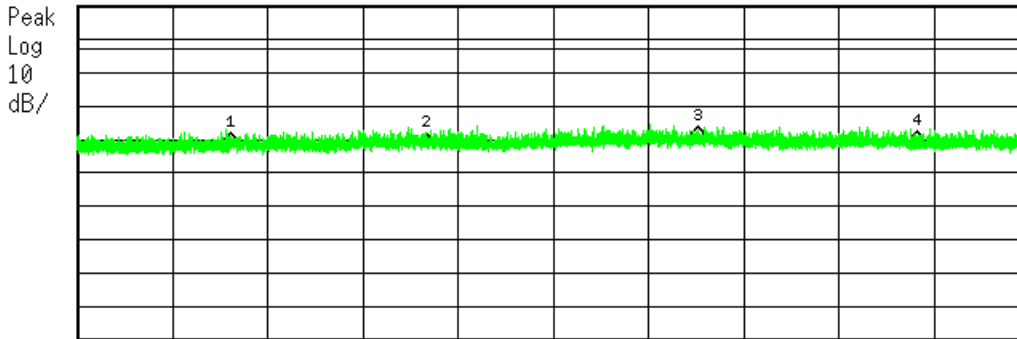
Start 13.82 GHz Stop 17.91 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	14.4844 GHz	-35.83 dBm
2	(1)	Freq	15.3198 GHz	-37.14 dBm
3	(1)	Freq	16.5077 GHz	-37.54 dBm
4	(1)	Freq	17.8630 GHz	-41.25 dBm



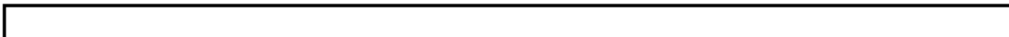
13.82GHz to 17.915GHz

Agilent 15:11:19 Sep 4, 2015 R L
 P2480 CSEMI BAND10 10M BW 2115MHZ 16QAM J1 Mkr1 18.5624 GHz
 Ref 0 dBm Atten 10 dB -42.06 dBm



Start 17.91 GHz Stop 22 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	18.5624 GHz	-42.06 dBm
2	(1)	Freq	19.4048 GHz	-41.94 dBm
3	(1)	Freq	20.5767 GHz	-40.38 dBm
4	(1)	Freq	21.5166 GHz	-41.67 dBm

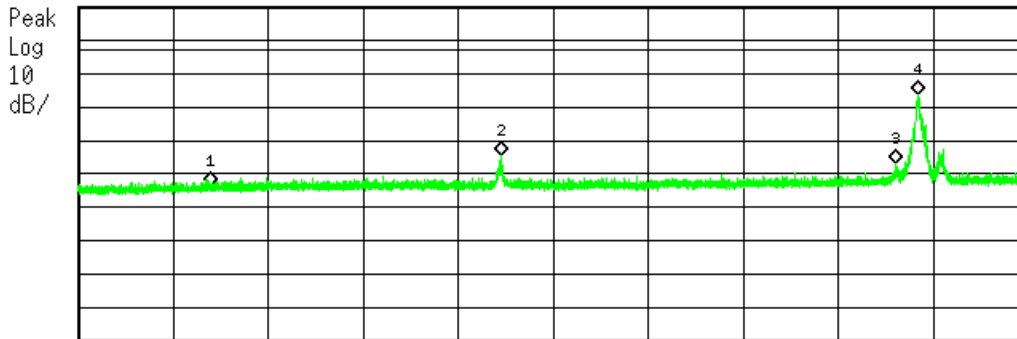


17.905GHz to 22GHz



LTE Band 13 – Antenna Port J2

Agilent 14:59:05 Sep 4, 2015 R L
 P2480 CSEMI BAND10 10M BW 2115MHZ 16QAM J2 Mkr3 1.35922 GHz
 Ref 0 dBm Atten 10 dB -47.08 dBm

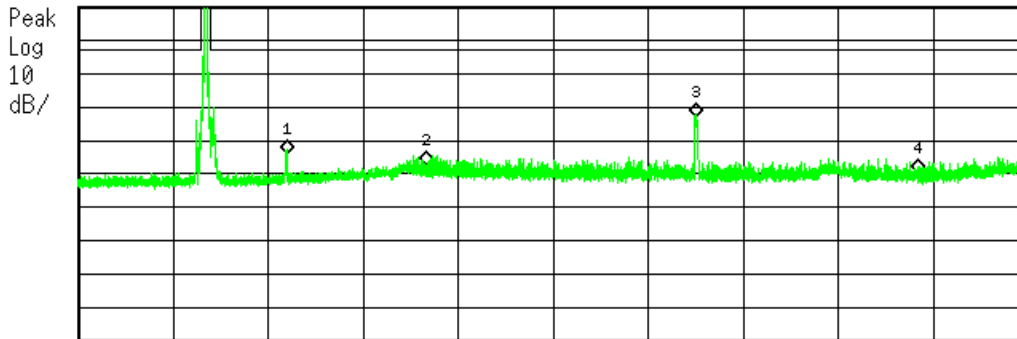


Start 30 MHz Stop 1.575 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	246.73 MHz	-53.74 dBm
2	(1)	Freq	717.90 MHz	-44.5 dBm
3	(1)	Freq	1.35922 GHz	-47.08 dBm
4	(1)	Freq	1.39562 GHz	-26.5 dBm

30MHz to 1.575GHz

Agilent 15:01:20 Sep 4, 2015 R L
 P2480 CSEMI BAND10 10M BW 2115MHZ 16QAM J2 Mkr2 3.0648 GHz
 Ref 0 dBm Atten 10 dB -47.25 dBm

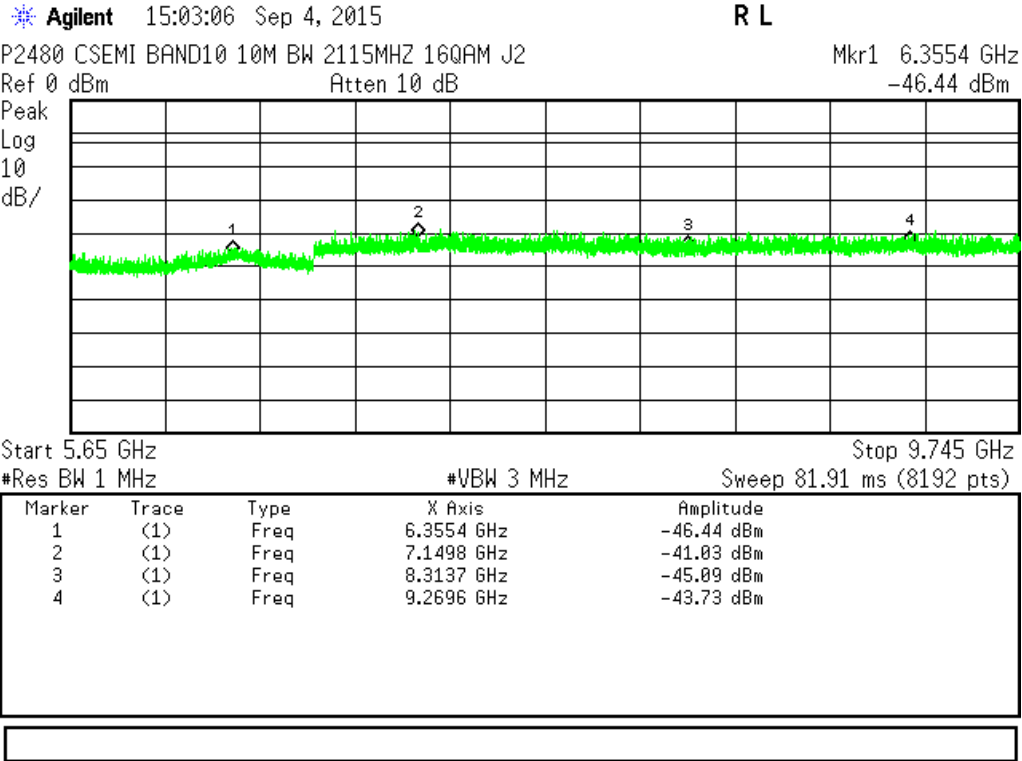


Start 1.565 GHz Stop 5.66 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

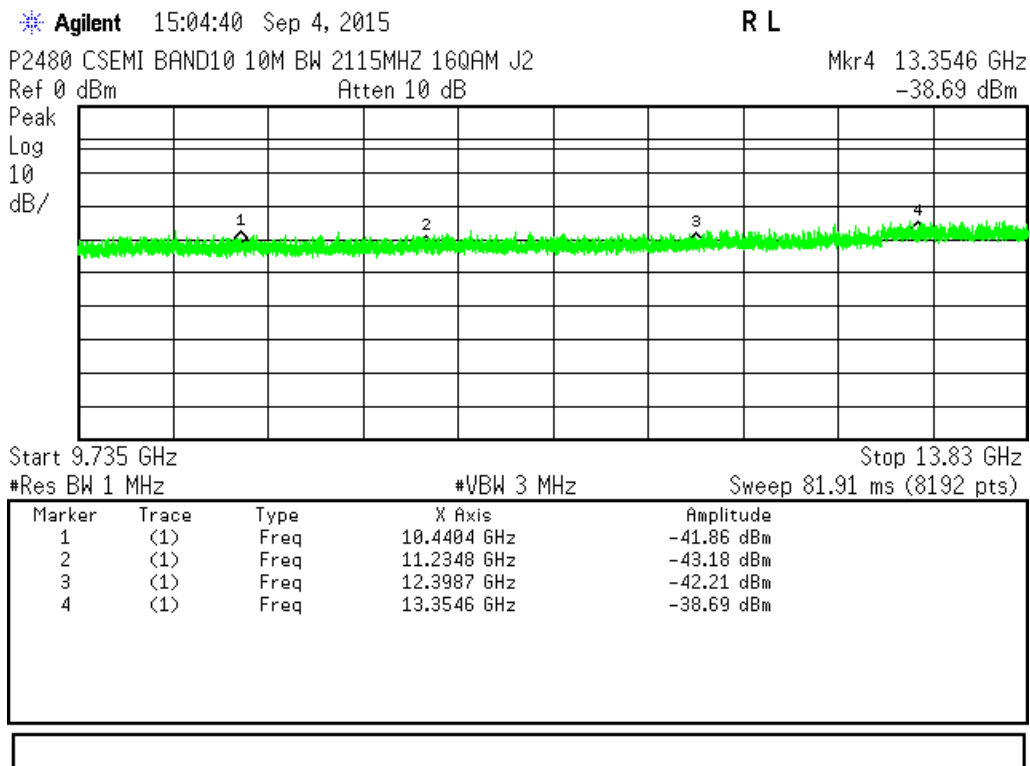
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.4649 GHz	-43.99 dBm
2	(1)	Freq	3.0648 GHz	-47.25 dBm
3	(1)	Freq	4.2287 GHz	-32.85 dBm
4	(1)	Freq	5.1846 GHz	-49.92 dBm

1.565GHz to 5.66GHz





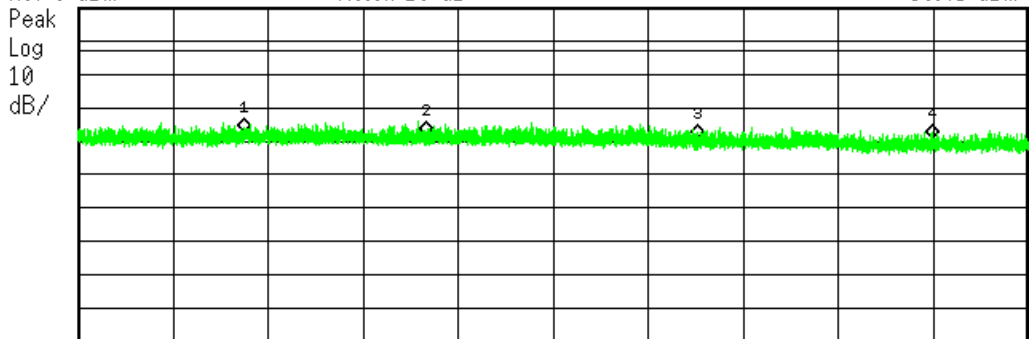
5.65GHz to 9.745GHz



9.735GHz to 13.83GHz

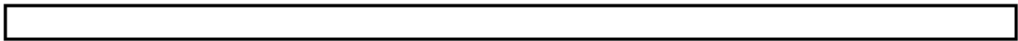


Agilent 15:06:14 Sep 4, 2015 R L
 P2480 CSEMI BAND10 10M BW 2115MHZ 16QAM J2 Mkr4 17.4991 GHz
 Ref 0 dBm Atten 10 dB -39.45 dBm



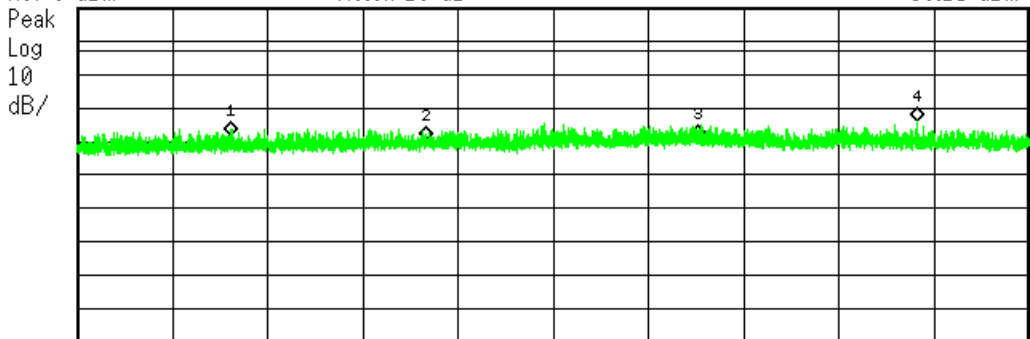
Start 13.82 GHz Stop 17.91 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	14.5359 GHz	-37.5 dBm
2	(1)	Freq	15.3198 GHz	-38.22 dBm
3	(1)	Freq	16.4917 GHz	-39.47 dBm
4	(1)	Freq	17.4991 GHz	-39.45 dBm



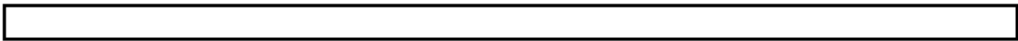
13.82GHz to 17.915GHz

Agilent 15:07:56 Sep 4, 2015 R L
 P2480 CSEMI BAND10 10M BW 2115MHZ 16QAM J2 Mkr1 18.5624 GHz
 Ref 0 dBm Atten 10 dB -38.15 dBm



Start 17.91 GHz Stop 22 GHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 81.91 ms (8192 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	18.5624 GHz	-38.15 dBm
2	(1)	Freq	19.4048 GHz	-39.96 dBm
3	(1)	Freq	20.5767 GHz	-39.3 dBm
4	(1)	Freq	21.5166 GHz	-34.08 dBm



17.905GHz to 22GHz



Radiated Spurious Emissions Measurements

MEASUREMENTS / RESULTS

Note that the EUT passes the FCC Class B limit, which is much lower than the -13dBm limit (82.158dBuV/m at 3 meters) for licensed transmitter spurious emissions. Only worst-case radiated spurious data is presented.

Radiated Emissions Table												
Date: 08-Sep-15			Company: Airvana				Work Order: P2480					
Engineer: Jason Haley and Ryan Bro			EUT Desc: Switched IQ Radio				EUT Operating Voltage/Frequency: POE					
Temp: 24.1°C			Humidity: 54%				Pressure: 1006mBar					
Frequency Range: 30-1000MHz						Measurement Distance: 3 m						
Notes: Band 10 BW:10MHz Low CH:2115MHz 16QAM						EUT Max Freq: 200MHz						
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	---			FCC Class B		
							Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
QP V	38.3	41.6	25.1	15.1	1.4	33.0	---	---	---	40.0	-7.0	Pass
QP V	52.5	54.3	25.2	7.6	1.4	38.1	---	---	---	40.0	-1.9	Pass
QP V	70.85	43.7	25.4	8.3	1.5	28.1	---	---	---	40.0	-11.9	Pass
QP H	151.25	43.1	25.4	12.5	2.5	32.7	---	---	---	43.5	-10.8	Pass
QP H	200.0	41.0	25.5	12.6	2.5	30.6	---	---	---	43.5	-12.9	Pass
QP V	466.6	40.9	25.8	17.3	3.6	36.0	---	---	---	46.0	-10.0	Pass
QP H	466.6	41.7	25.8	17.3	3.6	36.8	---	---	---	46.0	-9.2	Pass
QP V	600.0	39.1	25.5	18.5	2.9	35.0	---	---	---	46.0	-11.0	Pass
QP H	600.0	36.6	25.5	18.5	2.9	32.5	---	---	---	46.0	-13.5	Pass
QP V	875.0	37.8	25.9	22.1	3.9	37.9	---	---	---	46.0	-8.1	Pass
QP H	875.0	35.5	25.9	22.1	3.9	35.6	---	---	---	46.0	-10.4	Pass
Table Result: Pass			by -1.9 dB				Worst Freq: 52.5 MHz					
Test Site: EMI Chamber 1			Cable 1: Asset #2051			Cable 2: Asset #2054			Cable 3: ---			
Analyzer: Rental SA#2			Preamp: Red-White			Antenna: Red-Brown			Preselector: Asset #1511			
CSsoft Radiated Emissions Calculator v 1.017.146						Copyright Curtis-Straus LLC 2000						
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor												



Radiated Emissions Table															
Date: 09-Sep-15				Company: Airvana				Work Order: P2480							
Engineer: Jason Haley and Ryan Brown				EUT Desc: Switch IQ Radio Point				EUT Operating Voltage/Frequency: POE							
Temp: 23.5°C				Humidity: 57%				Pressure: 1005mBar							
Frequency Range: 1-6GHz								Measurement Distance: 3 m							
Notes: Used HPF 1311 to measure the 2nd harmonic								EUT Max Freq:							
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	
BW = 10MHz, Band 10, 16QAM, Low Channel (2115MHz)															
V	4230.0	31.21	20.2	18.7	33.8	4.4	50.7	39.7	74.0	-23.3	Pass	54.0	-14.3	Pass	
H	4230.0	32.96	22.5	18.7	33.8	4.4	52.5	42.0	74.0	-21.5	Pass	54.0	-12.0	Pass	
BW = 5MHz, Band 10, 16QAM, Low Channel (2112.5MHz)															
H	4225.0	50.82	25.0	18.7	33.8	4.4	70.3	44.5	74.0	-3.7	Pass	54.0	-9.5	Pass	
V	4225.0	39.86	25.1	18.7	33.8	4.4	59.4	44.6	74.0	-14.6	Pass	54.0	-9.4	Pass	
BW = 10MHz, Band 10, 16QAM, Mid Channel (2140MHz)															
V	4280.0	37.64	24.2	18.6	33.8	4.4	57.2	43.8	74.0	-16.8	Pass	54.0	-10.2	Pass	
H	4280.0	36.52	22.4	18.6	33.8	4.4	56.1	42.0	74.0	-17.9	Pass	54.0	-12.0	Pass	
BW = 10MHz, Band 10, 16QAM, High Channel (2165MHz)															
H	4330.0	37.77	24.2	18.5	33.9	4.4	57.6	44.0	74.0	-16.4	Pass	54.0	-10.0	Pass	
V	4330.0	36.43	24.0	18.5	33.9	4.4	56.2	43.8	74.0	-17.8	Pass	54.0	-10.2	Pass	
BW = 10MHz, Band 10, QPSK, Low Channel (2115MHz)															
V	4230.0	35.62	24.0	18.7	33.8	4.4	55.1	43.5	74.0	-18.9	Pass	54.0	-10.5	Pass	
H	4230.0	35.52	23.3	18.7	33.8	4.4	55.0	42.8	74.0	-19.0	Pass	54.0	-11.2	Pass	
BW = 10MHz, Band 10, 64QAM, Low Channel (2115MHz)															
H	4230.0	36.0	23.2	18.7	33.8	4.4	55.5	42.7	74.0	-18.5	Pass	54.0	-11.3	Pass	
V	4230.0	35.95	24.0	18.7	33.8	4.4	55.5	43.5	74.0	-18.5	Pass	54.0	-10.5	Pass	
Table Result: Pass by -3.7 dB Worst Freq: 4225.0 MHz															
Test Site: EMI Chamber 2				Cable 1: Asset #2053				Cable 2: Asset #2052				Cable 3: ---			
Analyzer: Rental SA#2				Preamp: Asset #1517				Antenna: Blue Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.146 Copyright Curtis-Straus LLC 2000															
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															

Radiated Emissions Table															
Date: 09-Sep-15				Company: Airvana				Work Order: P2480							
Engineer: Jason Haley and Ryan Brown				EUT Desc: Switch IQ Radio Point				EUT Operating Voltage/Frequency: POE							
Temp: 23.5°C				Humidity: 57%				Pressure: 1005mBar							
Frequency Range: 6-18GHz								Measurement Distance: 1 m							
Notes: Used HPF 1311								EUT Max Freq:							
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	
BW = 10MHz, Band 10, 16QAM, Low Channel (2115MHz)															
V (n.f.)	6345.0	31.12	19.0	17.2	35.8	5.8	55.5	43.4	83.5	-28.0	Pass	63.5	-20.1	Pass	
H (n.f.)	6345.0	30.8	18.9	17.2	35.8	5.8	55.2	43.3	83.5	-28.3	Pass	63.5	-20.2	Pass	
V (n.f.)	8460.0	31.13	19.1	17.5	36.1	5.9	55.6	43.6	83.5	-27.9	Pass	63.5	-19.9	Pass	
H (n.f.)	8460.0	30.95	19.2	17.5	36.1	5.9	55.5	43.7	83.5	-28.0	Pass	63.5	-19.8	Pass	
BW = 5MHz, Band 10, 16QAM, Low Channel (2112.5MHz)															
V (n.f.)	6337.5	30.5	19.0	17.2	35.8	5.8	54.9	43.4	83.5	-28.6	Pass	63.5	-20.1	Pass	
H (n.f.)	6337.5	30.58	19.1	17.2	35.8	5.8	55.0	43.5	83.5	-28.5	Pass	63.5	-20.0	Pass	
V (n.f.)	8450.0	31.25	19.2	17.5	36.1	5.9	55.8	43.7	83.5	-27.7	Pass	63.5	-19.8	Pass	
H (n.f.)	8450.0	31.14	19.1	17.5	36.1	5.9	55.6	43.6	83.5	-27.9	Pass	63.5	-19.9	Pass	
BW = 10MHz, Band 10, 16QAM, Mid Channel (2140MHz)															
V (n.f.)	6420.0	31.09	18.8	17.3	35.8	5.9	55.5	43.2	83.5	-28.0	Pass	63.5	-20.3	Pass	
H (n.f.)	6420.0	30.61	18.7	17.3	35.8	5.9	55.0	43.1	83.5	-28.5	Pass	63.5	-20.4	Pass	
V (n.f.)	8560.0	31.18	18.8	17.2	36.1	5.9	56.0	43.6	83.5	-27.5	Pass	63.5	-19.9	Pass	
H (n.f.)	8560.0	30.45	18.8	17.2	36.1	5.9	55.3	43.6	83.5	-28.2	Pass	63.5	-19.9	Pass	
BW = 10MHz, Band 10, 16QAM, High Channel (2165MHz)															
V (n.f.)	6495.0	30.54	18.4	17.4	35.8	5.9	54.8	42.7	83.5	-28.7	Pass	63.5	-20.8	Pass	
H (n.f.)	6495.0	29.76	18.4	17.4	35.8	5.9	54.1	42.7	83.5	-29.4	Pass	63.5	-20.8	Pass	
V (n.f.)	8660.0	30.19	18.7	16.9	36.2	6.0	55.5	44.0	83.5	-28.0	Pass	63.5	-19.5	Pass	
H (n.f.)	8660.0	30.78	18.7	16.9	36.2	6.0	56.1	44.0	83.5	-27.4	Pass	63.5	-19.5	Pass	
BW = 10MHz, Band 10, QPSK, Low Channel (2115MHz)															
V (n.f.)	6345.0	30.92	19.1	17.2	35.8	5.8	55.3	43.5	83.5	-28.2	Pass	63.5	-20.0	Pass	
H (n.f.)	6345.0	30.5	19.1	17.2	35.8	5.8	54.9	43.5	83.5	-28.6	Pass	63.5	-20.0	Pass	
V (n.f.)	8460.0	31.85	19.1	17.5	36.1	5.9	56.4	43.6	83.5	-27.1	Pass	63.5	-19.9	Pass	
H (n.f.)	8460.0	30.42	19.1	17.5	36.1	5.9	54.9	43.6	83.5	-28.6	Pass	63.5	-19.9	Pass	
BW = 10MHz, Band 10, 64QAM, Low Channel (2115MHz)															
V (n.f.)	6345.0	30.76	19.1	17.2	35.8	5.8	55.2	43.5	83.5	-28.3	Pass	63.5	-20.0	Pass	
H (n.f.)	6345.0	31.08	19.1	17.2	35.8	5.8	55.5	43.5	83.5	-28.0	Pass	63.5	-20.0	Pass	
V (n.f.)	8460.0	30.36	19.1	17.5	36.1	5.9	54.9	43.6	83.5	-28.6	Pass	63.5	-19.9	Pass	
H (n.f.)	8460.0	30.36	19.1	17.5	36.1	5.9	54.9	43.6	83.5	-28.6	Pass	63.5	-19.9	Pass	
Table Result: Pass by -19.5 dB Worst Freq: 8660.0 MHz															
Test Site: EMI Chamber 2				Cable 1: Asset #2053				Cable 2: Asset #2052				Cable 3: ---			
Analyzer: Rental SA#2				Preamp: Asset #1517				Antenna: Blue Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.146 Copyright Curtis-Straus LLC 2000															
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															



Radiated Emissions Table															
Date: 09-Sep-15				Company: Airvana				Work Order: P2480							
Engineer: Jason Haley and Ryan Brown				EUT Desc: Switch IQ Radio Point				EUT Operating Voltage/Frequency: POE							
Temp: 23.5°C				Humidity: 57%				Pressure: 1005mBar							
Frequency Range: 18-22GHz							Measurement Distance: 0.1 m								
Notes: No emissions found within 10dB of the limit							EUT Max Freq: 200MHz								
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	
	BW = 10MHz, Band 10, 16QAM, Low Channel (2115MHz)	---	---	---	---	---	---	---	---	---	---	---	---	---	
	BW = 5MHz, Band 10, 16QAM, Low Channel (2112.5MHz)	---	---	---	---	---	---	---	---	---	---	---	---	---	
	BW = 10MHz, Band 10, 16QAM, Mid Channel (2140MHz)	---	---	---	---	---	---	---	---	---	---	---	---	---	
	BW = 10MHz, Band 10, 16QAM, High Channel (2165MHz)	---	---	---	---	---	---	---	---	---	---	---	---	---	
	BW = 10MHz, Band 10, QPSK, Low Channel (2115MHz)	---	---	---	---	---	---	---	---	---	---	---	---	---	
	BW = 10MHz, Band 10, 64QAM, Low Channel (2115MHz)	---	---	---	---	---	---	---	---	---	---	---	---	---	
Table Result:			---	by	---	dB				Worst Freq:	---	MHz			
Test Site: EMI Chamber 2				Cable 1: EMIR-HIGH-06				Cable 2: ---				Cable 3: ---			
Analyzer: Rental SA#2				Preamp: 18-26.5GHz				Antenna: 18-26.5GHz Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.146												Copyright Curtis-Straus LLC 2000			
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															



Test Equipment

Rev.9/4/2015

Spectrum Analyzers / Receivers / Preselectors									
SA #2 (1860)	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
	9kHz-26.5 GHz	E7405A	Agilent	MY45104916	1860	I	7/30/2016		
Radiated Emissions Sites									
EMI Chamber 2	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on	
	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015	
Preamps / Couplers Attenuators / Filters									
1517 HF Preamp	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
	1-20GHz	CS	CS	N/A	1517	II	8/6/2016	8/6/2015	
Antennas									
Blue Horn	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
	1-18Ghz	3117	ETS	157647	1861	I	2/8/2017	2/8/2015	
Cables									
Asset #2053	Range		Mfr			Cat	Calibration Due	Calibrated on	
Asset #2052	9kHz - 18GHz		Florida RF			II	3/8/2016	3/8/2015	
	9kHz - 18GHz		Florida RF			II	3/8/2016	3/8/2015	
Meteorological Meters									
Weather Clock (Pressure Only)		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
		BA928	Oregon Scientific	C3166-1	831	I	3/19/2016	3/19/2014	

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Rev.9/4/2015

Spectrum Analyzers / Receivers / Preselectors									
SA #2 (1860)	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
	9kHz-26.5 GHz	E7405A	Agilent	MY45104916	1860	I	7/30/2016		
Radiated Emissions Sites									
EMI Chamber 2	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on	
	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015	
Preamps / Couplers Attenuators / Filters									
HF (Yellow)	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
	18-26.5GHz	AFS4-18002650-60-8P-4	CS	467559	1266	II	3/13/2016	3/13/2015	
Antennas									
HF (White) Horn	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
	18-26.5GHz	801-WLM	Waveline	758	758	III	Verify before Use	date of test	
Cables									
REMI-High-06	Range		Mfr			Cat	Calibration Due	Calibrated on	
	1 - 26.5GHz	TRU-21B0707-120	TRU			II	8/7/2016	8/7/2015	
							3/8/2015	3/8/2015	
Meteorological Meters									
Weather Clock (Pressure Only)		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
		BA928	Oregon Scientific	C3166-1	831	I	3/19/2016	3/19/2014	

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



Conditions Of Testing

[Bureau Veritas Consumer Products Services, Inc., a Massachusetts corporation], and/or its affiliates (collectively, the "Company") will conduct, at the request of the Submitter ("**Client**"), the tests specified on the submitted Test Request Form or equivalent in accordance with, and subject to, the following terms and conditions (collectively, "**Conditions**"):

1. All orders for tests are subject to acceptance by the Company, and no order will constitute a binding commitment of the Company unless and until such order is accepted by it, as evidenced by the issuance of a written report ("**Test Report**") by the Company. The Test Report is issued solely by the Company, is intended for the exclusive use of Client and shall not be published, used for advertising purposes, copied or replicated for distribution to any other person or entity or otherwise publicly disclosed without the prior written consent of the Company. By submitting a request for services to the Company, Client consents to the disclosure to accreditation bodies of those records of Client relevant to the accreditation body's assessment of the Company's competence and compliance with relevant accreditation criteria. The Company shall not be liable for any loss or damage whatsoever resulting from the failure of the Company to provide its services within any time period for completion estimated by the Company. If Client anticipates using the Test Report in any legal proceeding, arbitration, dispute resolution forum or other proceeding, it shall so notify the Company prior to submitting the Test Report in such proceeding. The Company has no obligation to provide a fact or expert witness at such proceeding unless the Company agrees in advance to do so for a separate and additional fee.
2. The Test Report will set forth the findings of the Company solely with respect to the test samples identified therein. Unless specifically and expressly indicated in the Test Report, the results set forth in such Test Report are not intended to be indicative or representative of the quality or characteristics of the lot from which a test sample is taken, and Client shall not rely upon the Test Report as being so indicative or representative of the lot or of the tested product in general. The Test Report will reflect the findings of the Company at the time of testing only, and the Company shall have no obligation to update the Test Report after its issuance. The Test Report will set forth the results of the tests performed by the Company based upon the written information provided to the Company. The Test Report will be based solely on the samples and written information submitted to the Company by Client, and the Company shall not be obligated to conduct any independent investigation or inquiry with respect thereto.
3. The Company may, in its sole discretion, destroy samples which have been furnished to the Company for testing and which have not been destroyed in the course of testing. The Company may delegate the performance of all or a portion of the services contemplated hereunder to an affiliate, agent or subcontractor of the Company, and Client consents to such delegation.
4. These Conditions and the Test Report represent the entire understanding of the parties hereto with respect to the subject matter hereof and of the Test Report, and no modification, variance or extrapolation with respect thereto shall be permitted without the prior written consent of the Company.
5. The names, service marks, trademarks and copyrights of the Company and its affiliates, including the names "**BUREAU VERITAS**," "**BUREAU VERITAS CONSUMER PRODUCTS SERVICES**," "**BVCPS**," "**MTL**," "**ACTS**," "**MTL-ACTS**" and "**CURTIS-STRAUS**" (collectively, the "**Marks**") are and shall remain the sole property of the Company or its affiliates and shall not be used by Client except solely to the extent that Client obtains the prior written approval of the Company and then only in the manner prescribed by the Company. Client shall not contest the validity of the Marks or take any action that might impair the value or goodwill associated with the Marks or the image or reputation of the Company or its affiliates.
6. Payment in full shall be due 30 days after the date of invoice. Interest shall be due on overdue amounts from the due date until paid at an interest rate of 1.5% per month or, if less, the maximum rate permitted by law. The Company reserves the right, at any time and from time to time, to revoke any credit extended to Client. Client shall reimburse the Company for any costs it incurs in collecting past due amounts, including court costs and fees and expenses of attorneys and collection agencies. The Test Report may not be used or relied upon by Client if and for so long as Client fails to pay when due any invoice issued by the Company or any affiliate of it to Client or any affiliate or subsidiary of Client together with interest and penalties, if any, accrued thereon.
7. The Company disclaims any and all responsibility or liability arising out of or in connection with e-mail transmissions of such information.
8. Client understands and agrees that the Company is neither an insurer nor a guarantor, that the Company does not take the place of Client or any designer, manufacturer, agent, buyer, distributor or transportation or shipping company, and that the Company disclaims all liability in such capacities. Client further understands that if it seeks assurance against loss or damage, it should obtain appropriate insurance.
9. Client agrees that the Company, by providing the services, does not take the place of Client nor any third party, nor does the Company release them from any of their obligations, nor does the Company otherwise assume, abridge, abrogate or undertake to discharge any duty of any third party to Client or any duty of Client or any third party to any other third party, and Client will not release any third party from its obligations and duties with respect to the tested goods.
10. Client shall, on a timely basis, (a) provide adequate instructions to the Company in order to enable the Company to perform properly its services, (b) provide, or cause Client's suppliers and contractors to provide, the Company with all documents necessary to enable the Company to perform its services, (c) furnish the Company with all relevant information regarding Client's intended use and purposes of the tested goods, (d) advise the Company of essential dates and deadlines relevant to the tested goods and (e) fully exercise all rights and remedies available to Client against third parties in respect of the tested goods.
11. The Company shall undertake due care and ordinary skill in the performance of its services to Client, and the Company shall accept responsibility only where such skill has not been exercised and, even in such event, only to the extent of the limitation of liability set forth herein.
12. If Client desires to assert a claim arising from or relating to (i) the performance, purported performance or non-performance of any services by the Company or (ii) the sale, resale, manufacture, distribution or use of any tested goods, it must submit that claim to the Company in a writing that sets forth with particularity the basis for such claim within 60 days from discovery of the potential claim and not more than six months after the date of issuance of the Test Report to Client. Client waives any and all such claims including, without limitation, claims that the Test Report is inaccurate, incomplete or misleading or that additional or different testing is required, unless and then only to the extent that Client submits a written claim to the Company within both such time periods.



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13. CLIENT SHALL, EXCEPT TO THE EXTENT OF COMPANY'S LIABILITY TO CLIENT HEREUNDER (WHICH IN NO EVENT SHALL EXCEED THE LIMITATION OF LIABILITY HEREIN), HOLD HARMLESS AND INDEMNIFY THE COMPANY, ITS AFFILIATES AND THEIR RESPECTIVE DIRECTORS, OFFICERS, EMPLOYEES, AGENTS AND SUBCONTRACTORS AGAINST ALL ACTUAL OR ALLEGED THIRD PARTY CLAIMS FOR LOSS, DAMAGE OR EXPENSE OF WHATSOEVER NATURE AND HOWSOEVER ARISING FROM OR RELATING TO (i) THE PERFORMANCE, PURPORTED PERFORMANCE OR NON-PERFORMANCE OF ANY SERVICES BY THE COMPANY OR (ii) THE SALE, RESALE, MANUFACTURE, DISTRIBUTION OR USE OF ANY TESTED GOODS.

14. EXCEPT AS MAY OTHERWISE BE EXPRESSLY AGREED TO IN WRITING BY THE COMPANY AND NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN OR IN ANY TEST REPORT, NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, IS MADE.

15. (A) IN NO EVENT WHATSOEVER SHALL THE COMPANY BE LIABLE FOR ANY CONSEQUENTIAL, SPECIAL, INCIDENTAL, EXEMPLARY OR PUNITIVE DAMAGES IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE TEST REPORT OR THE SERVICES PROVIDED BY THE COMPANY HEREUNDER, INCLUDING WITHOUT LIMITATION LOSS OF OR DAMAGE TO PROPERTY; LOSS OF INCOME, PROFIT OR USE; OR ANY CLAIMS OR DEMANDS MADE AGAINST CLIENT OR ANY OTHER PERSON BY ANY THIRD PARTY IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE SERVICES PROVIDED BY THE COMPANY HEREUNDER.

(B) NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN, AND IN RECOGNITION OF THE RELATIVE RISKS AND BENEFITS TO CLIENT AND THE COMPANY ASSOCIATED WITH THE TESTING SERVICES CONTEMPLATED HEREBY, THE RISKS HAVE BEEN ALLOCATED SUCH THAT UNDER NO CIRCUMSTANCES WHATSOEVER SHALL THE LIABILITY OF THE COMPANY TO CLIENT OR ANY THIRD PARTY IN RESPECT OF ANY CLAIM FOR LOSS, DAMAGE OR EXPENSE, OF WHATSOEVER NATURE OR MAGNITUDE, AND HOWSOEVER ARISING, EXCEED AN AMOUNT EQUAL TO FIVE (5) TIMES THE AMOUNT OF THE FEES PAID TO THE COMPANY FOR THE SPECIFIC SERVICES WHICH GAVE RISE TO SUCH CLAIM OR U.S.\$10,000, WHICHEVER IS THE LESSER AMOUNT.

16. The Company shall not be liable for any loss or damage resulting from any delay or failure in performance of its obligations hereunder resulting directly or indirectly from any event of force majeure or any event outside the control of the Company. If any such event occurs, the Company may immediately cancel or suspend its performance hereunder without incurring any liability whatsoever to Client.

17. Company's services, including these Conditions, shall be governed by, and construed in accordance with, the local laws of the country where the Company performs the tests or, in the case of tests performed in the United States of America, the laws of Massachusetts without regard to conflicts of laws principles. If any aspect(s) of these Conditions is found to be illegal or unenforceable, the validity, legality and enforceability of all remaining aspects of these Conditions shall not in any way be affected or impaired thereby. Any proceeding related to the subject matter hereof shall be brought, if at all, in the courts of the country where the Company performs the tests or, in the case of tests performed in the United States of America, in the courts of Massachusetts. Client waives the right to interpose any counterclaim or setoffs of any nature in any litigation arising hereunder.

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