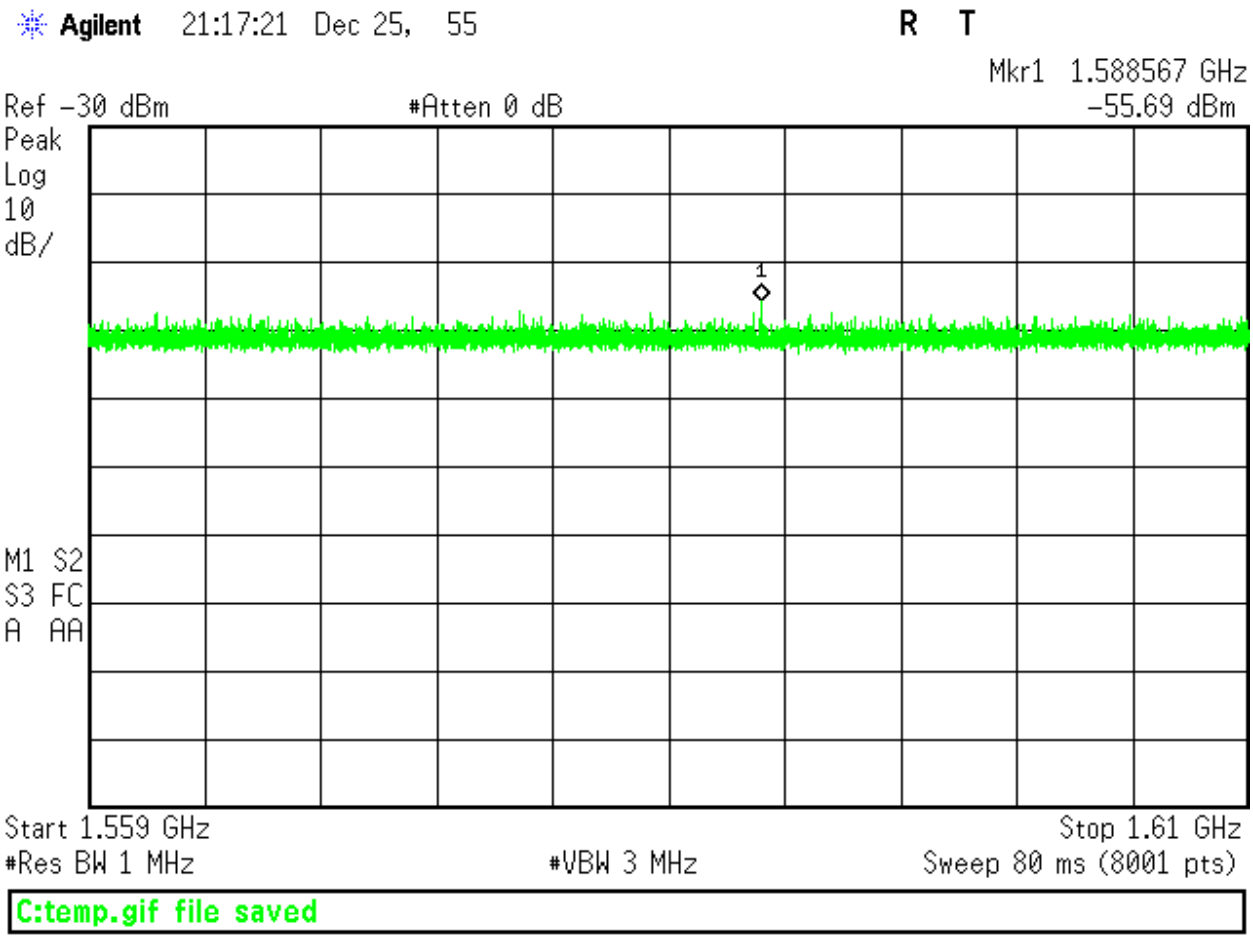
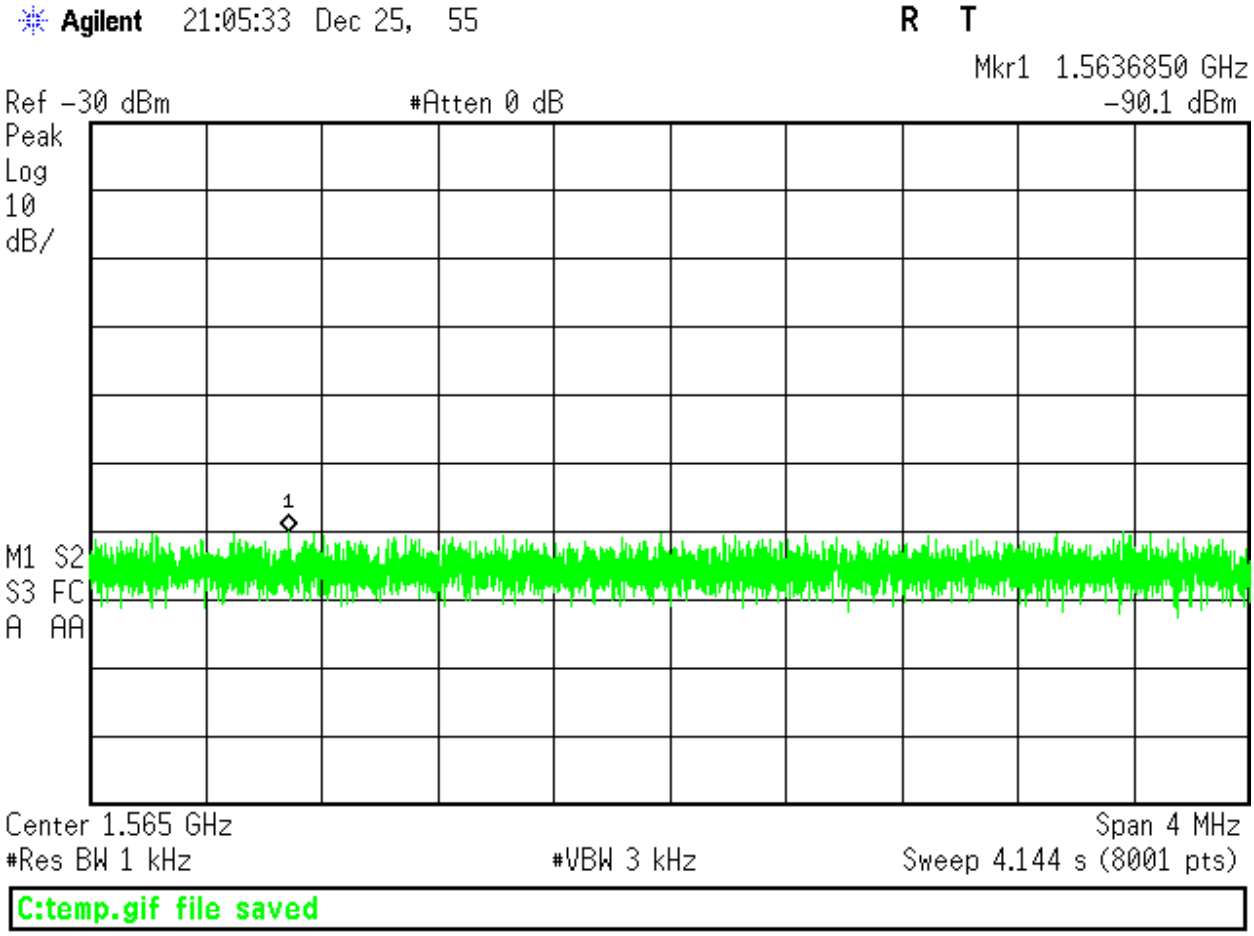
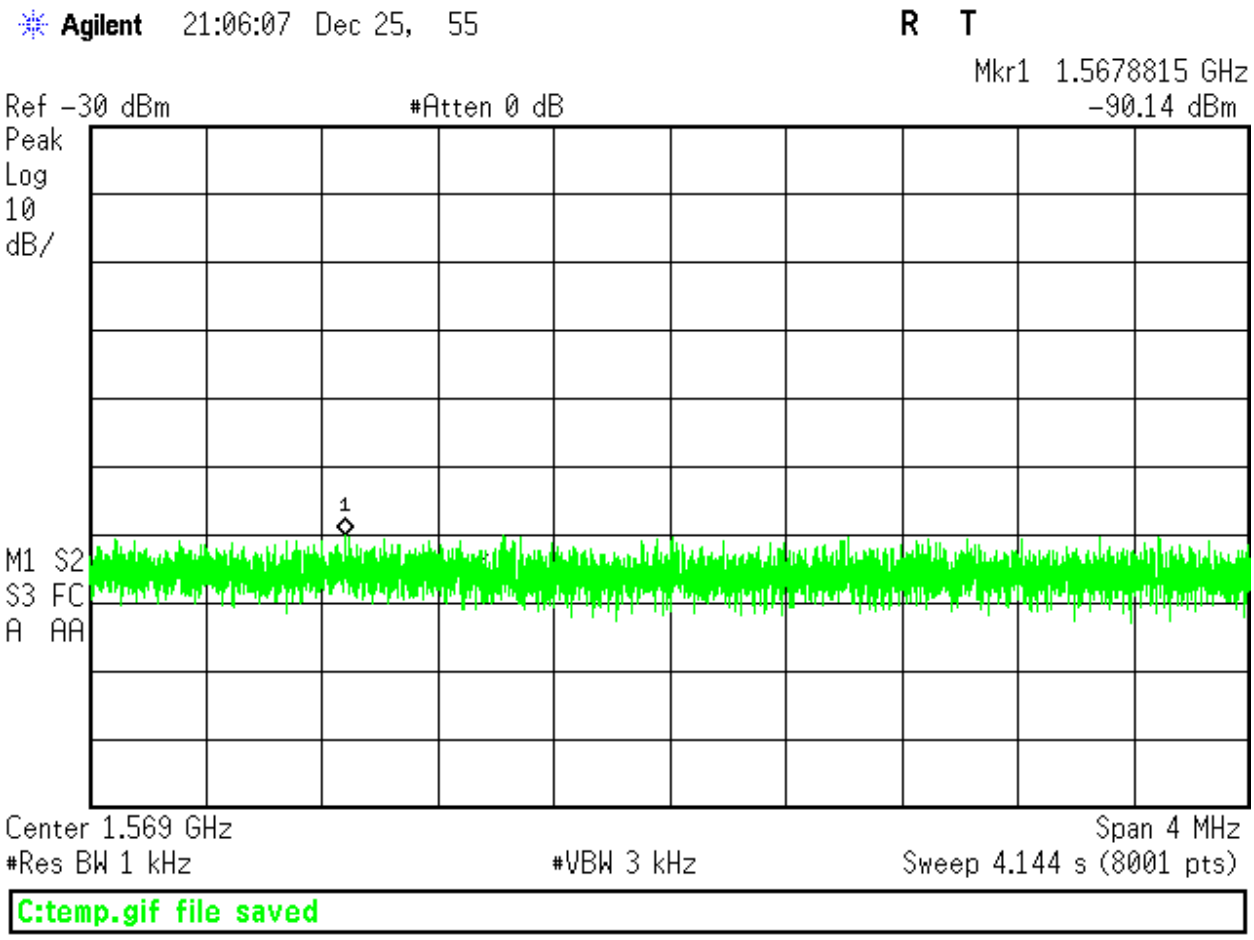
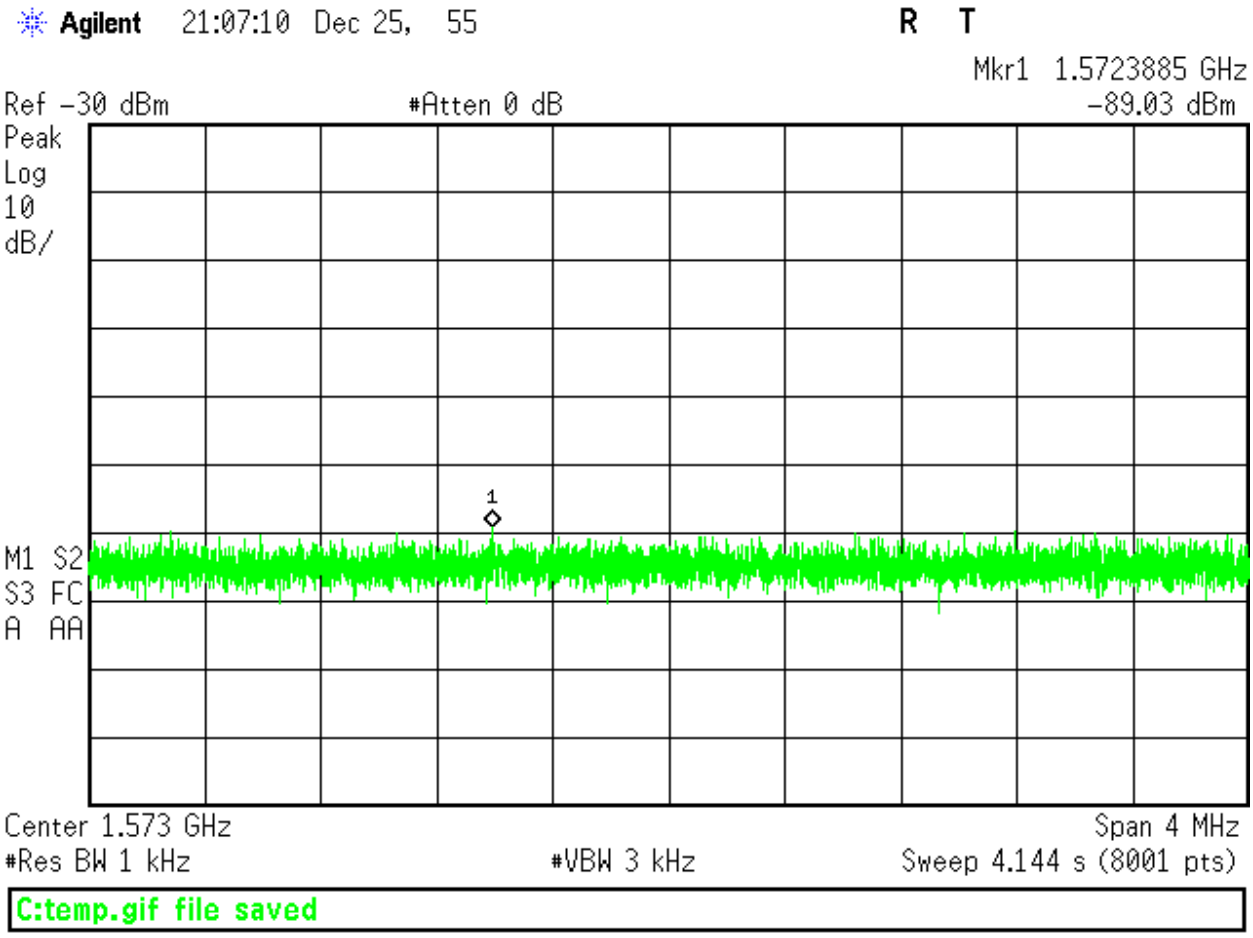


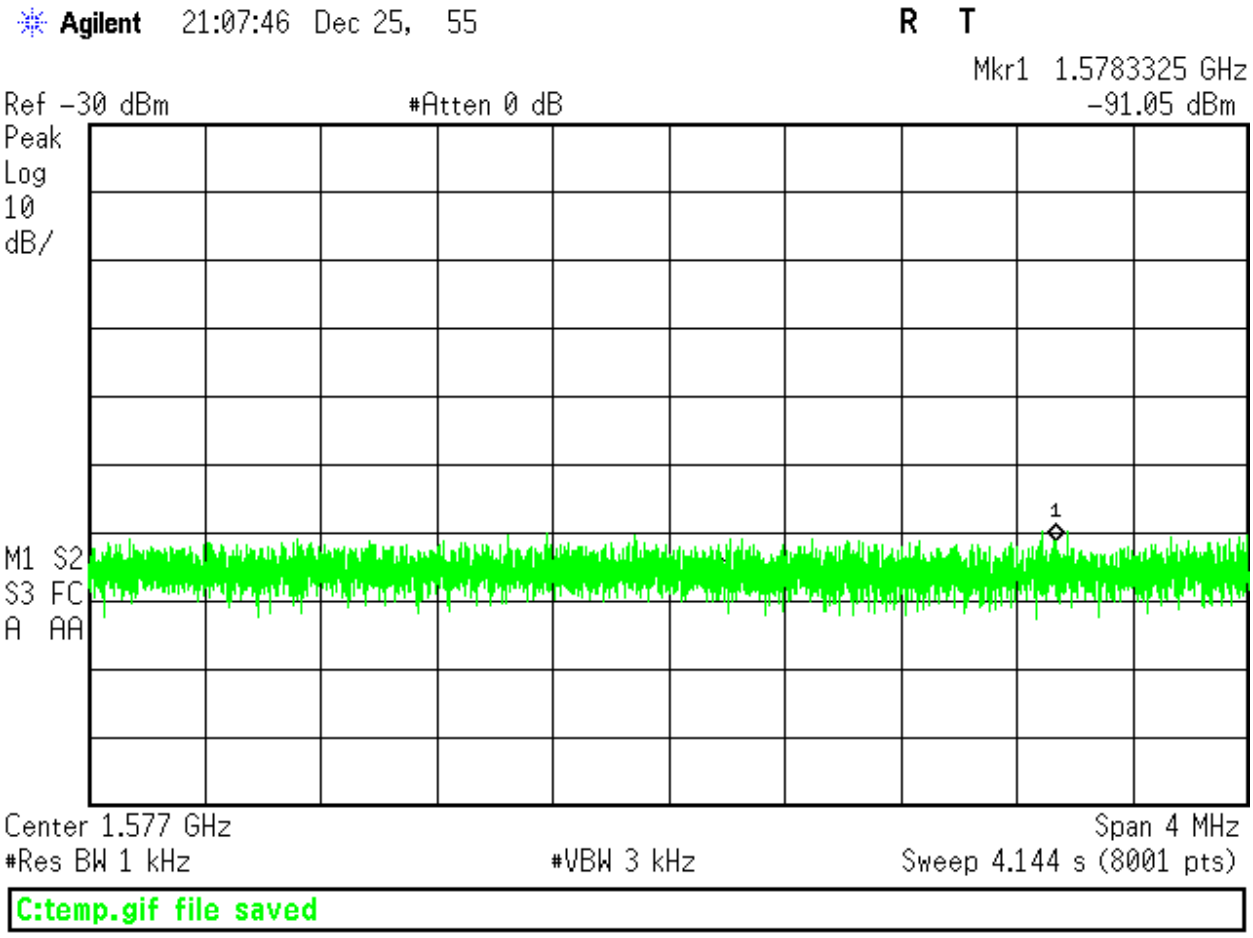
Port J2, 1559-1610MHz

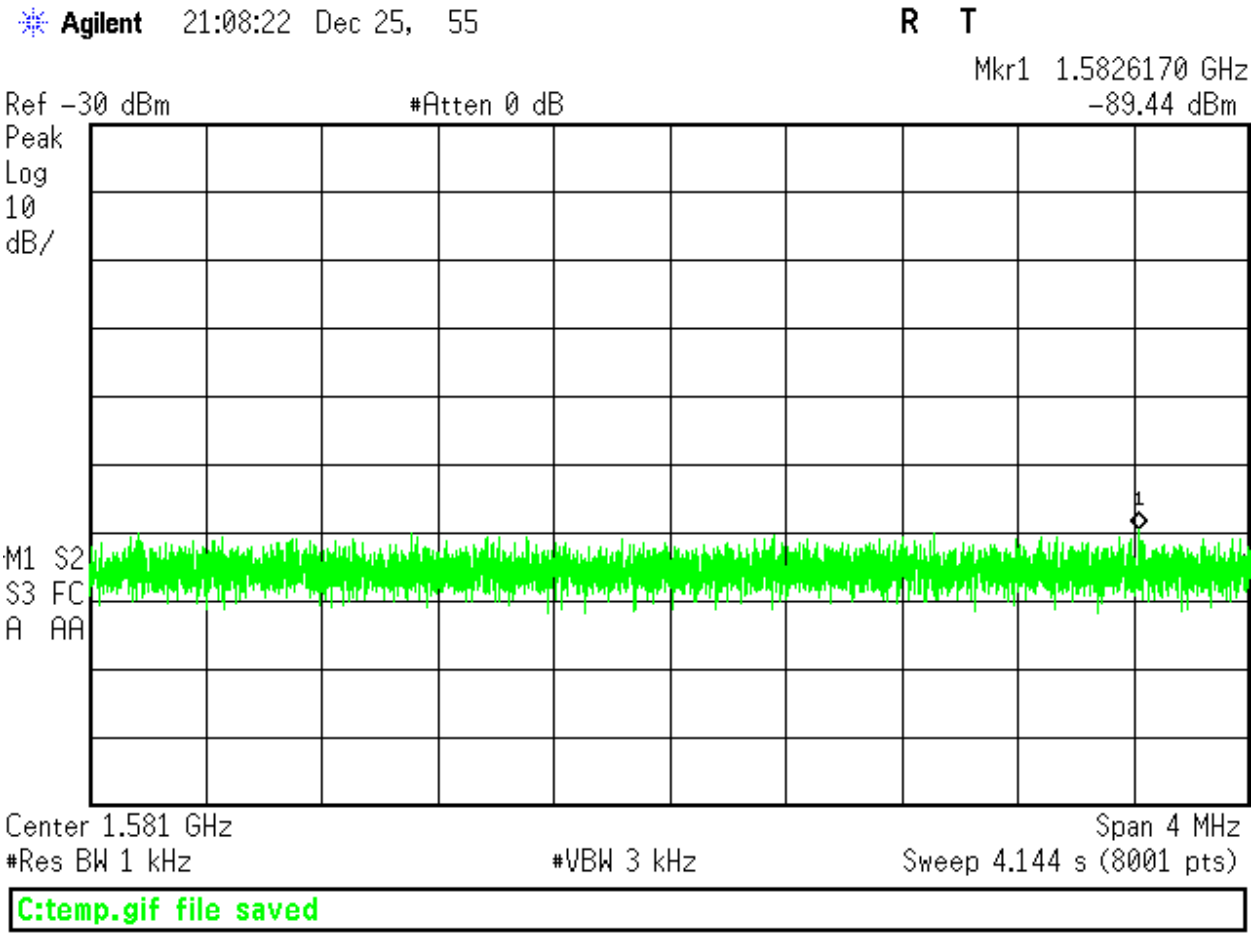
FCC 27.53(f) Discrete Emission Limit, Port J1:

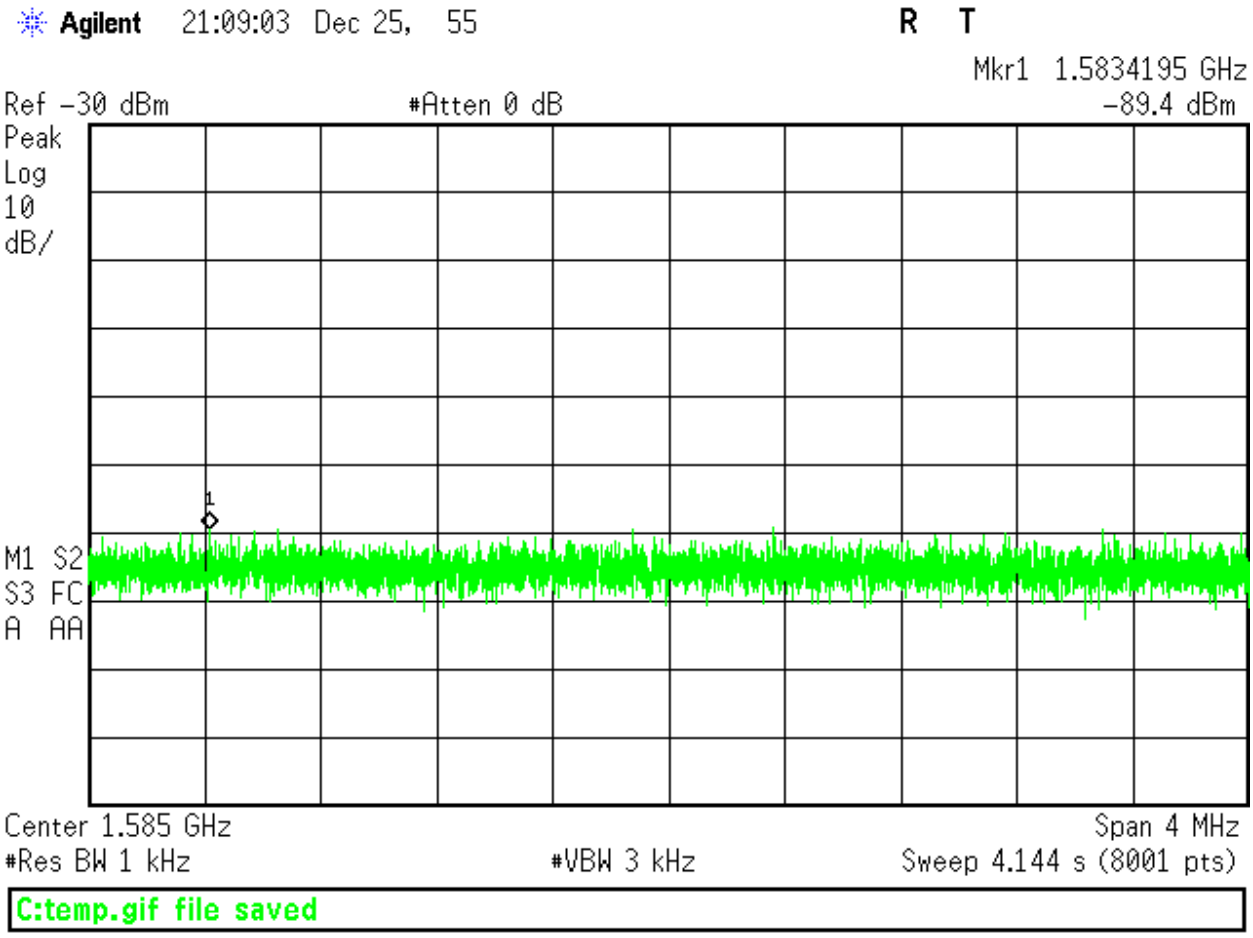


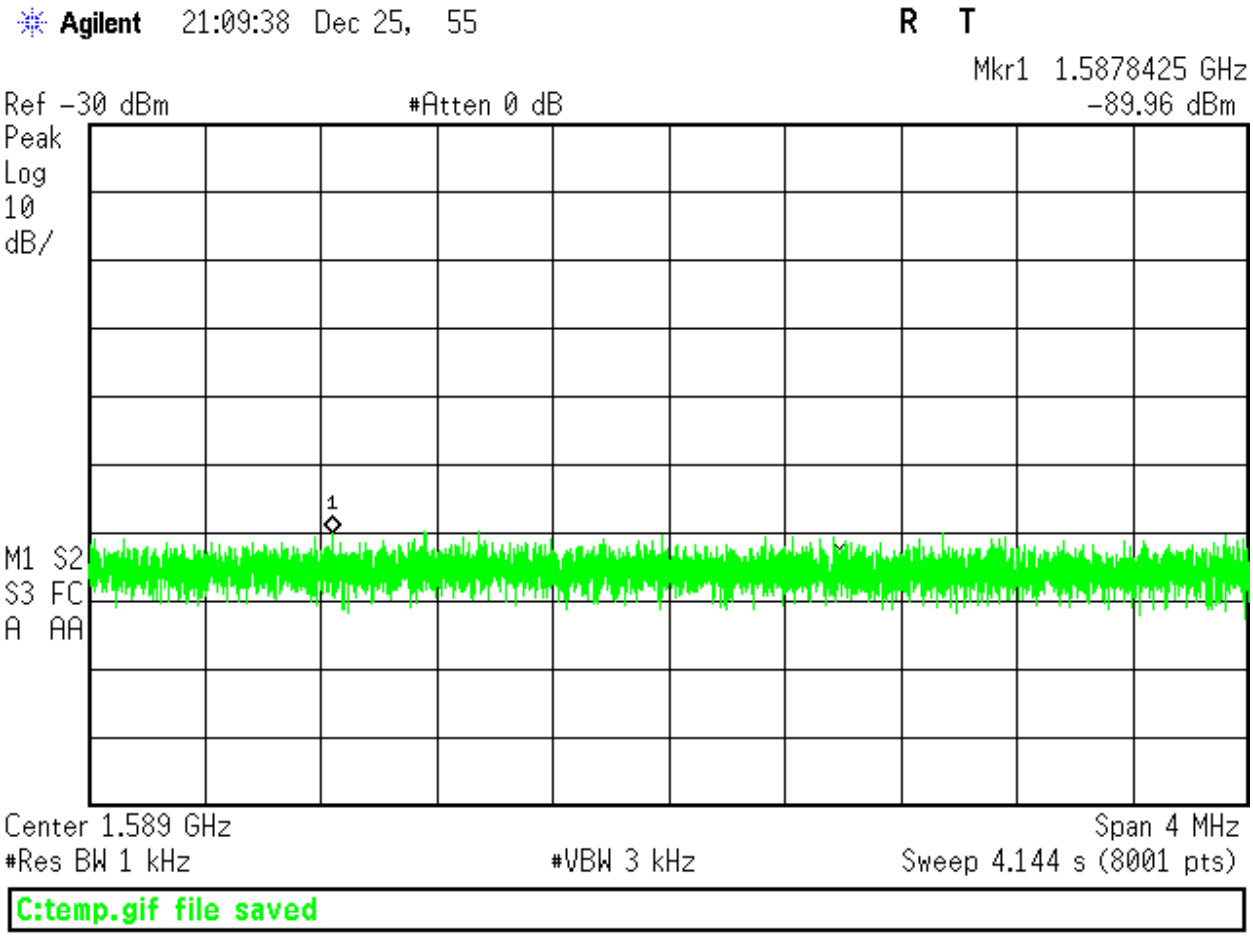

Agilent 21:06:07 Dec 25, 55
R T
Mkr1 1.5678815 GHz
-90.14 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.569 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

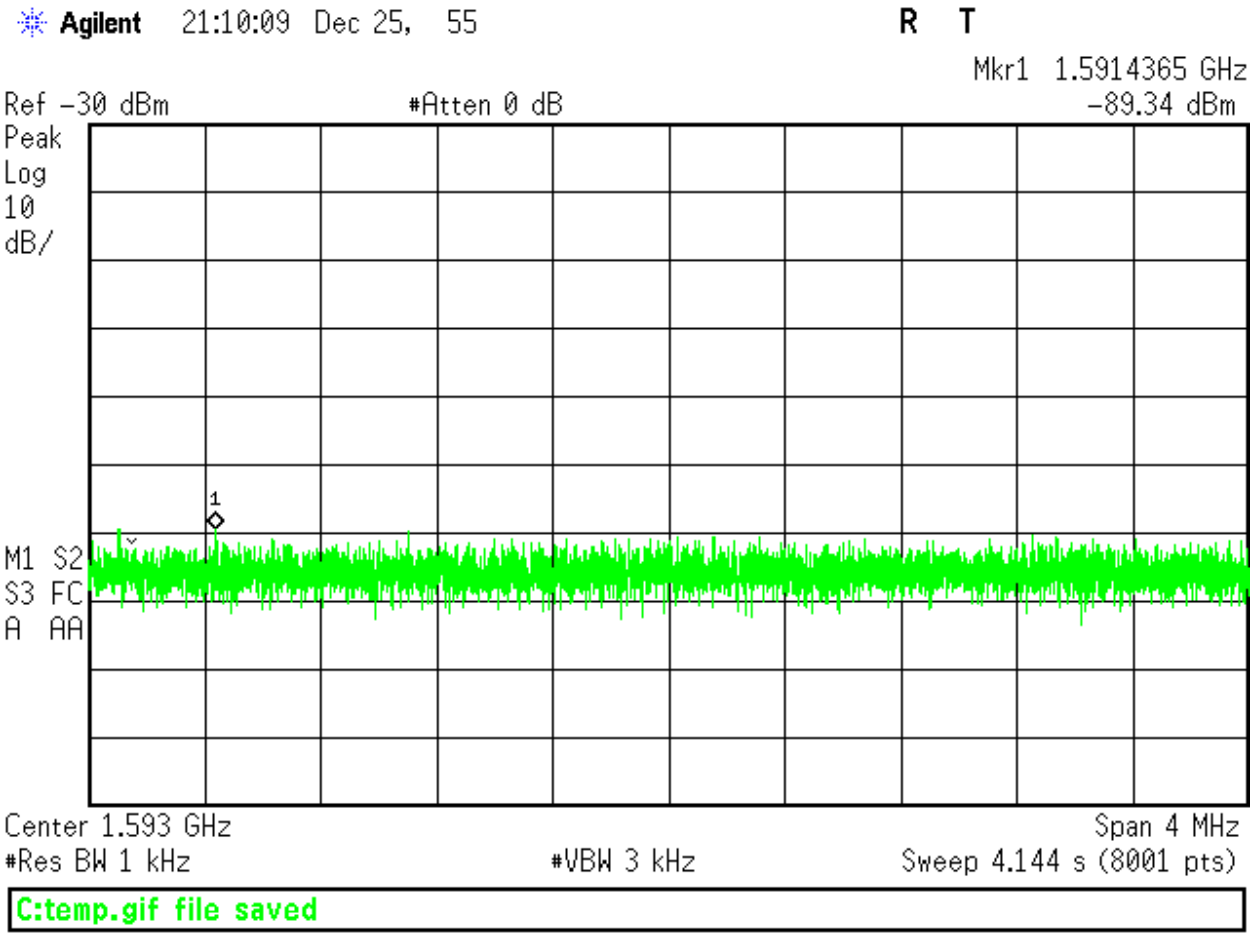

Agilent 21:07:10 Dec 25, 55
R T
Mkr1 1.5723885 GHz
-89.03 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.573 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

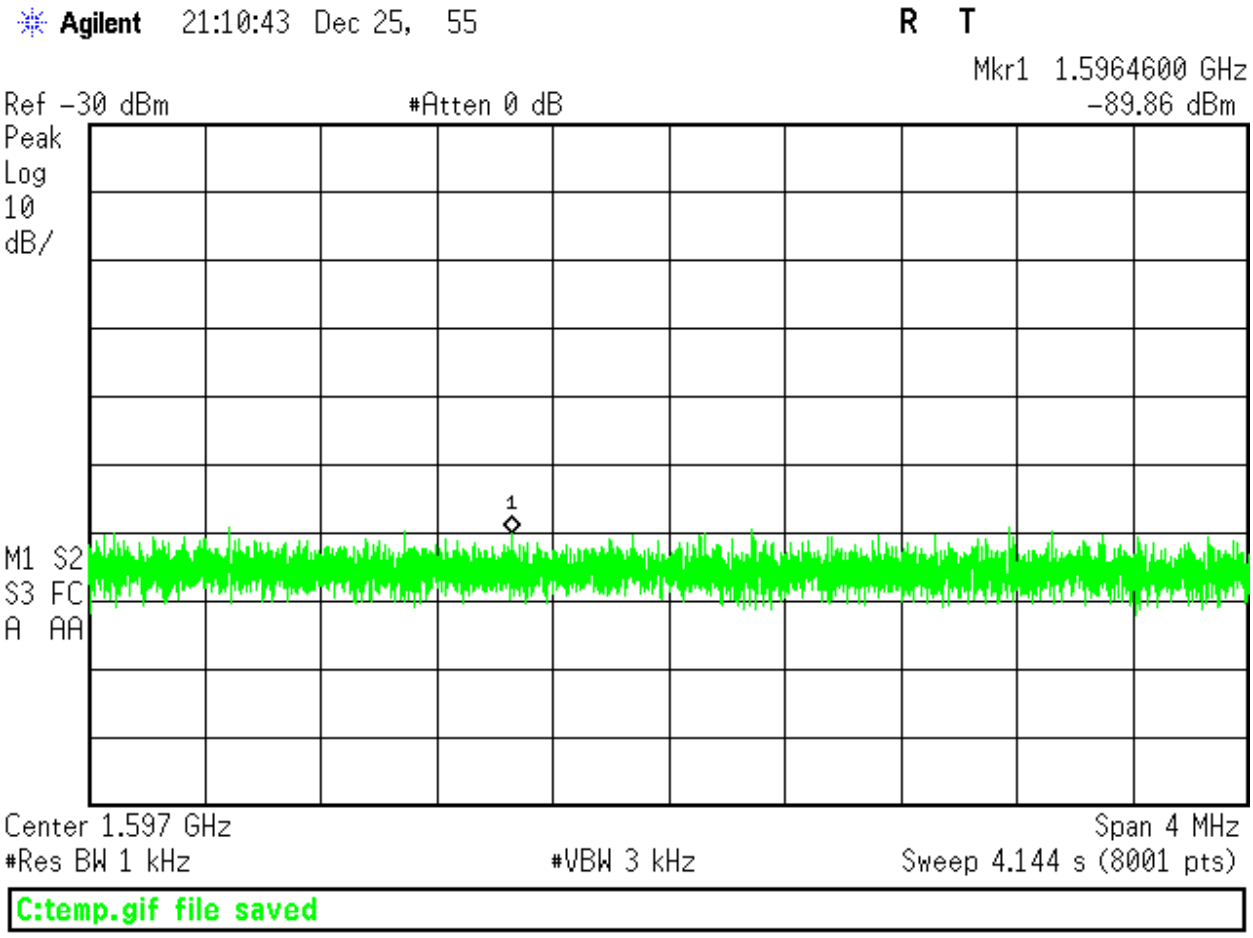

Agilent 21:07:46 Dec 25, 55
R T
Mkr1 1.5783325 GHz
-91.05 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.577 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

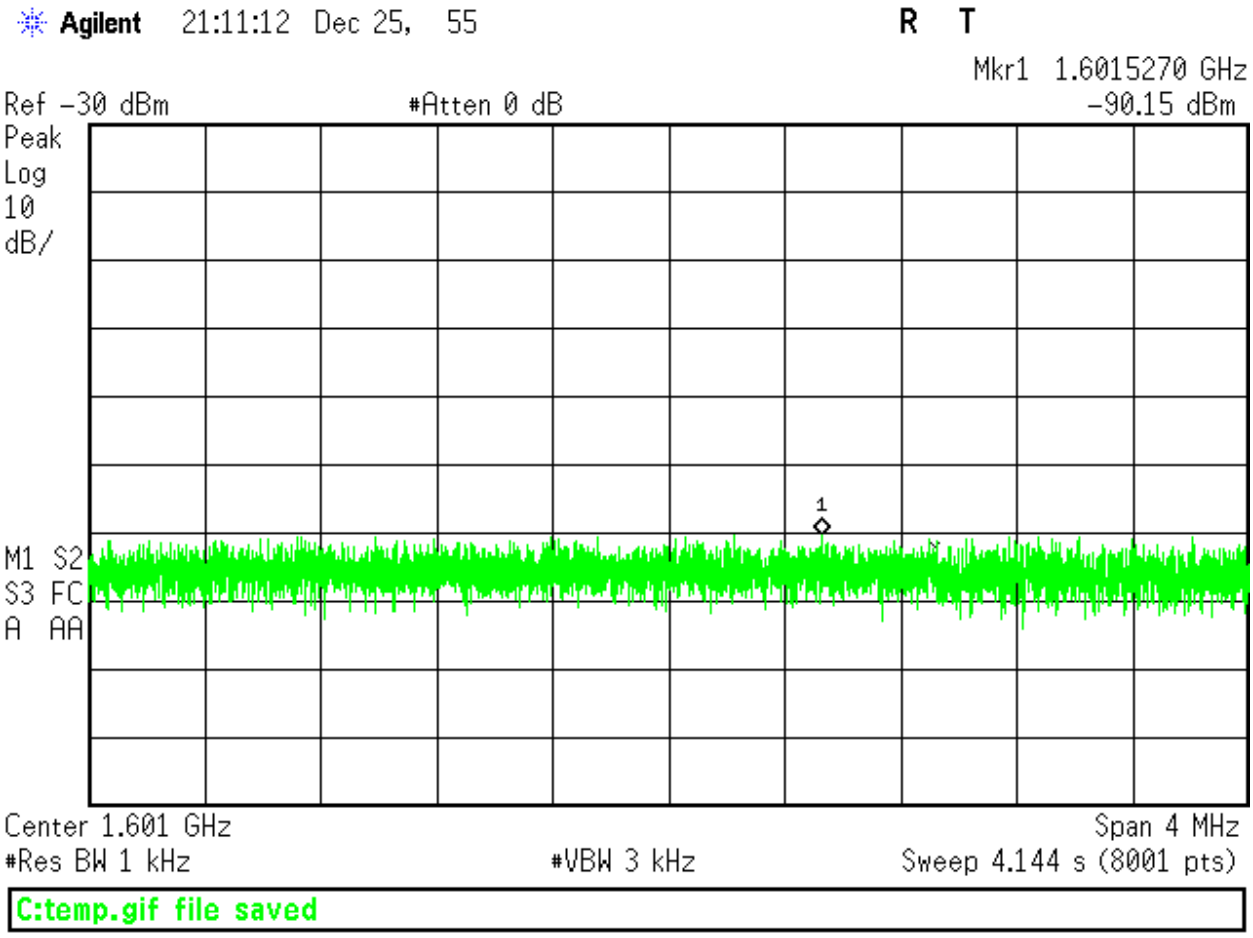

Agilent 21:08:22 Dec 25, 55
R T
Mkr1 1.5826170 GHz
-89.44 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Center 1.581 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

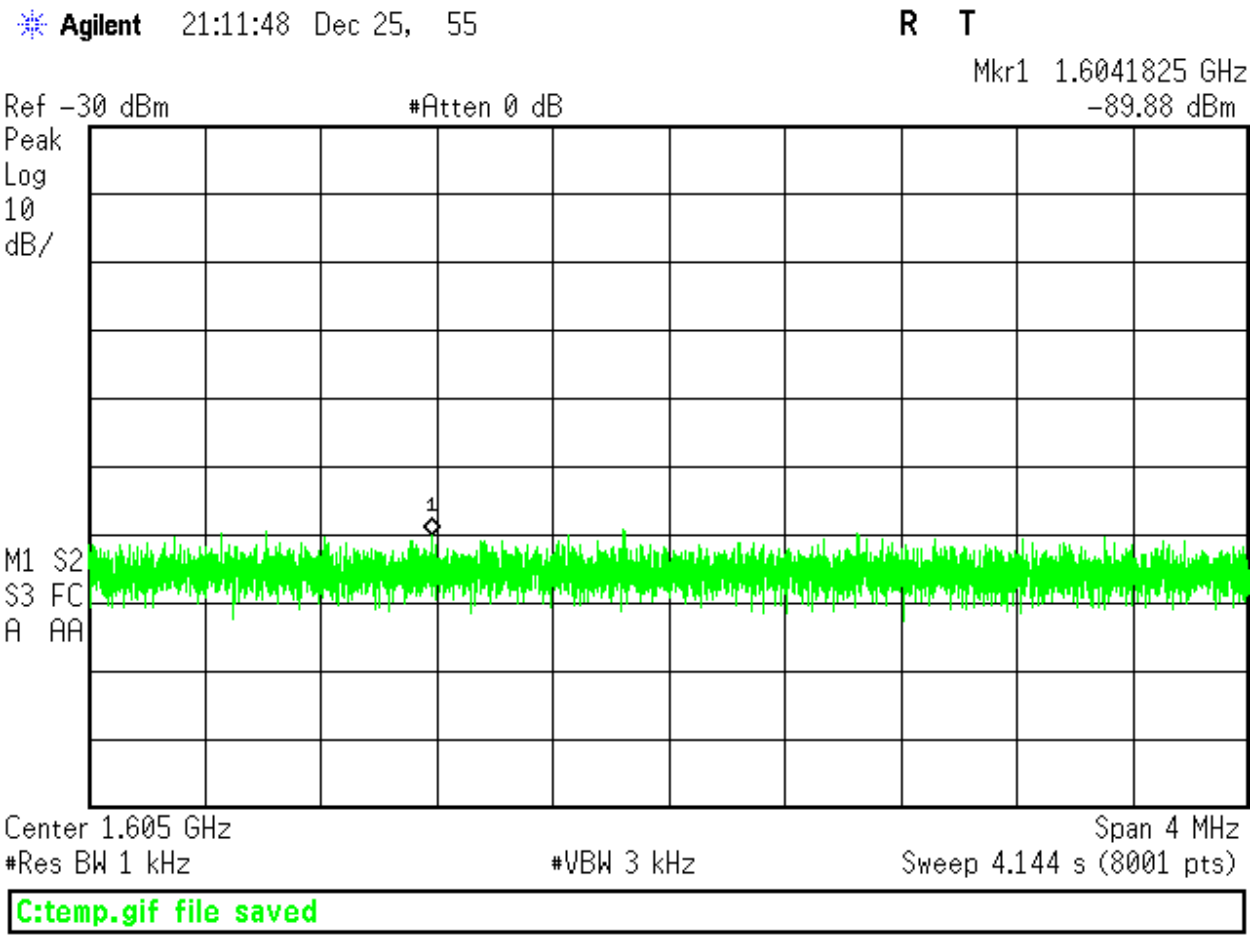

Agilent 21:09:03 Dec 25, 55
R T
Mkr1 1.5834195 GHz
-89.4 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Center 1.585 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

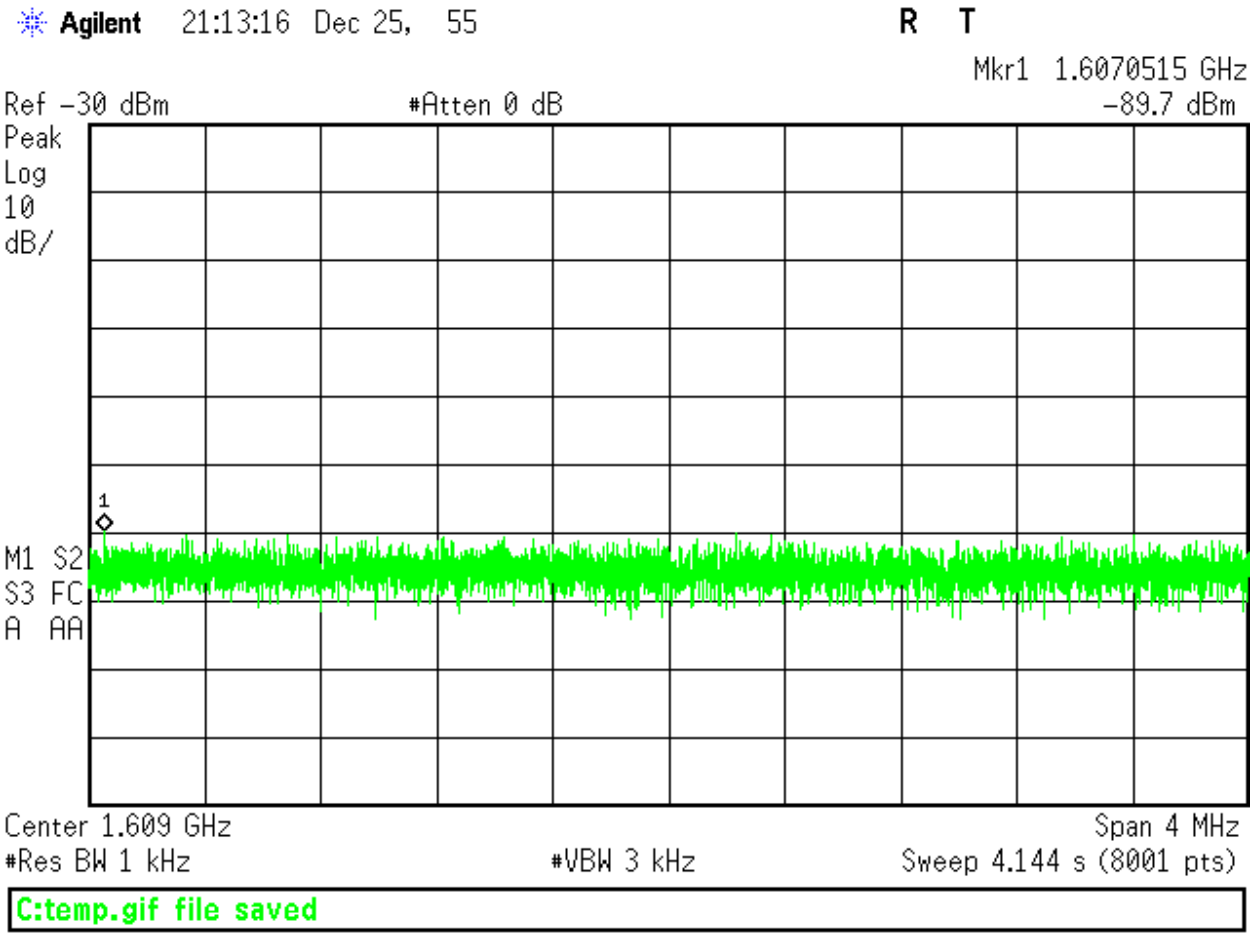

Agilent 21:09:38 Dec 25, 55
R T
Mkr1 1.5878425 GHz
Ref -30 dBm
#Atten 0 dB
-89.96 dBm
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.589 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved


Agilent 21:10:09 Dec 25, 55
R T
Mkr1 1.5914365 GHz
-89.34 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.593 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

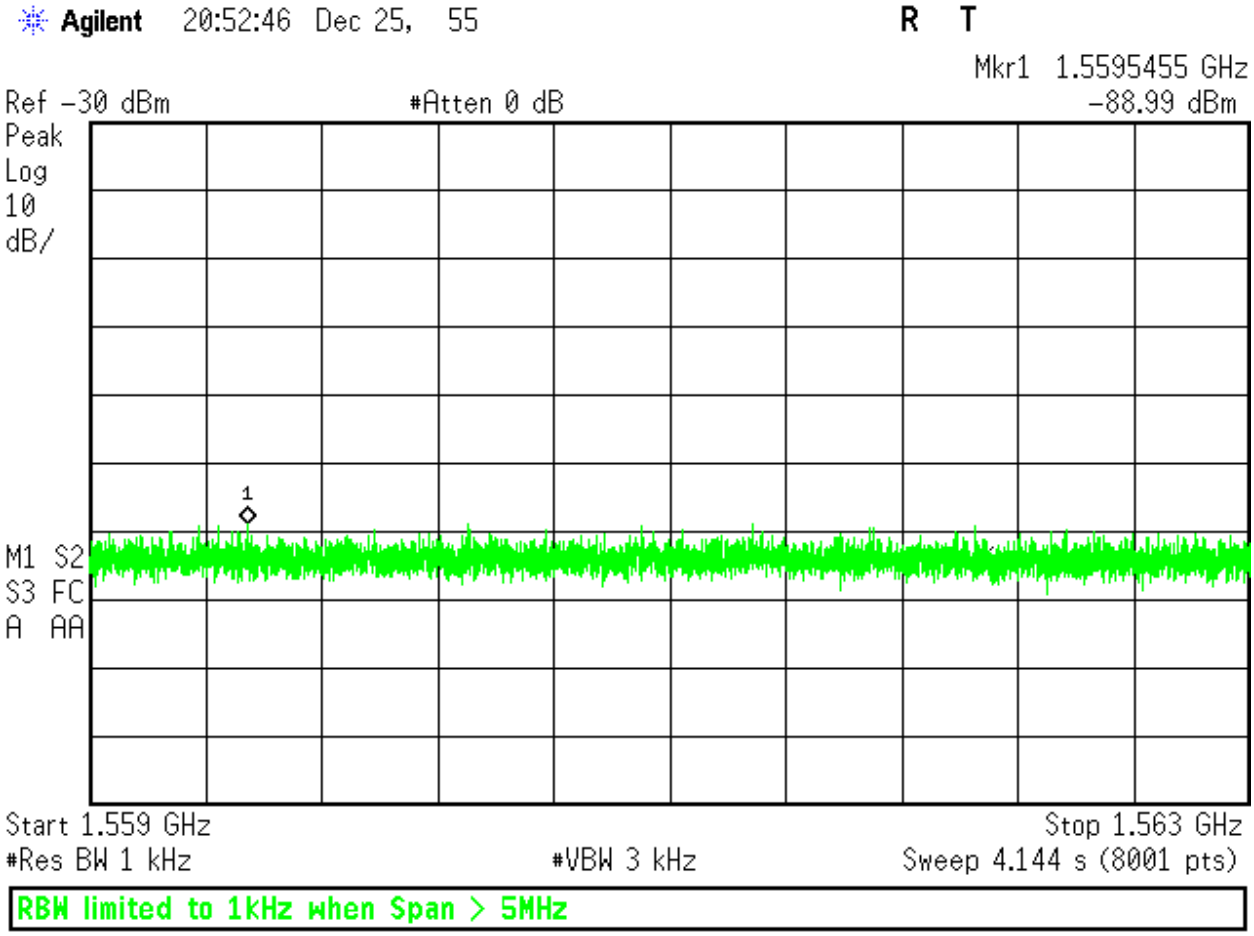

Agilent 21:10:43 Dec 25, 55
R T
Mkr1 1.5964600 GHz
-89.86 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.597 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

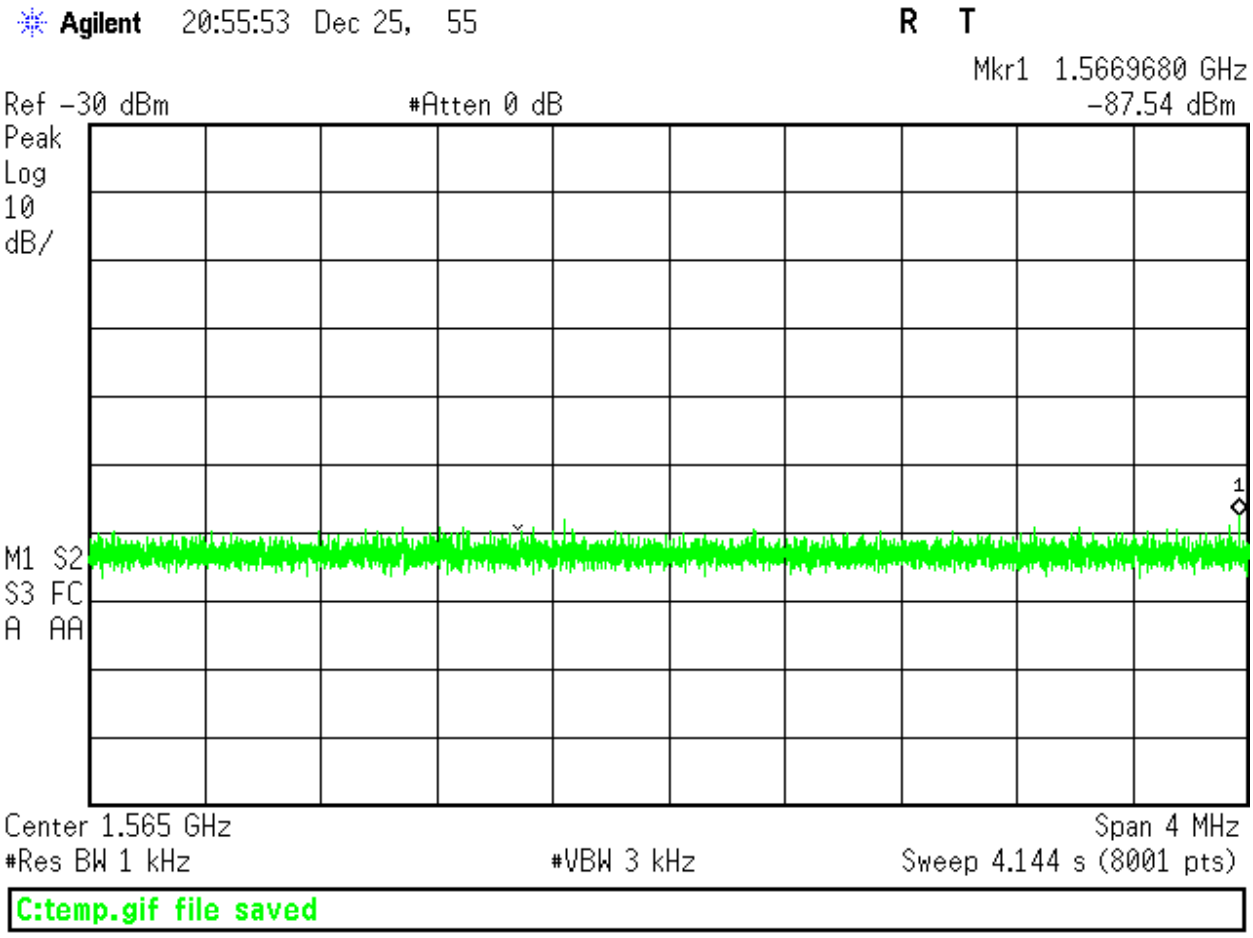

Agilent 21:11:12 Dec 25, 55
R T
Mkr1 1.6015270 GHz
-90.15 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.601 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

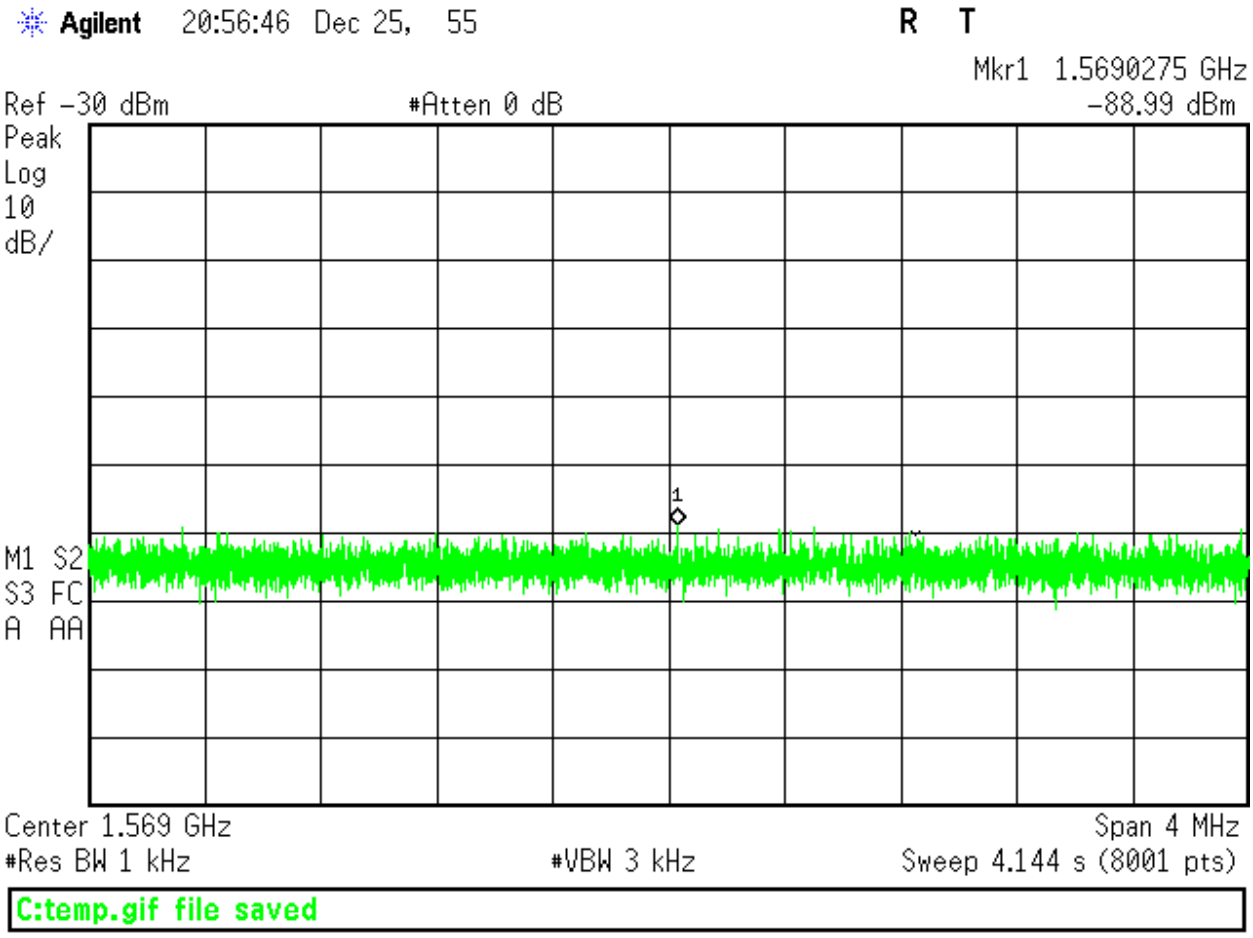

Agilent 21:11:48 Dec 25, 55
R T
Mkr1 1.6041825 GHz
-89.88 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Center 1.605 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

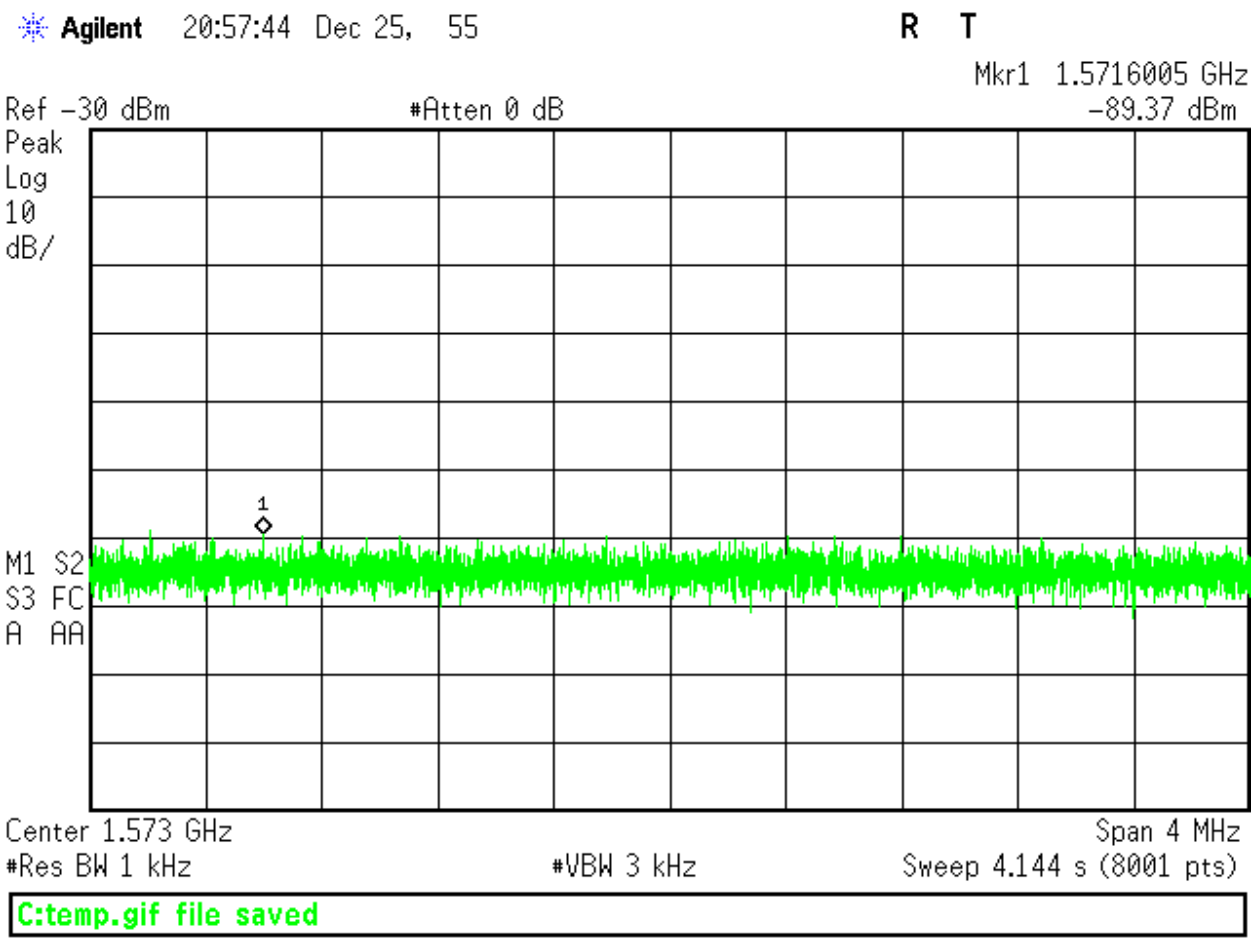

Agilent 21:13:16 Dec 25, 55
R T
Mkr1 1.6070515 GHz
-89.7 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.609 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

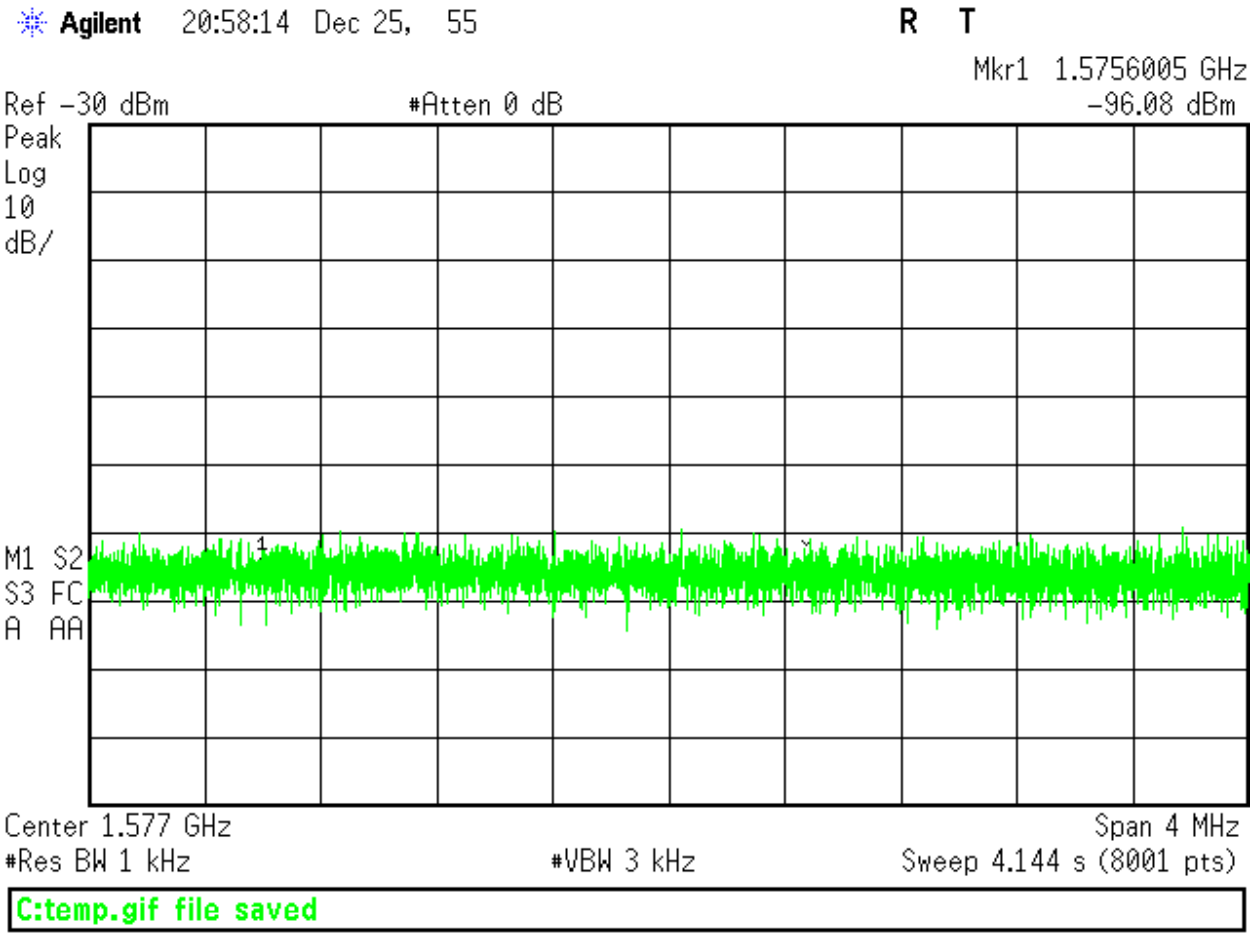
FCC 27.53(f) Discrete Emission Limit, Port J2:

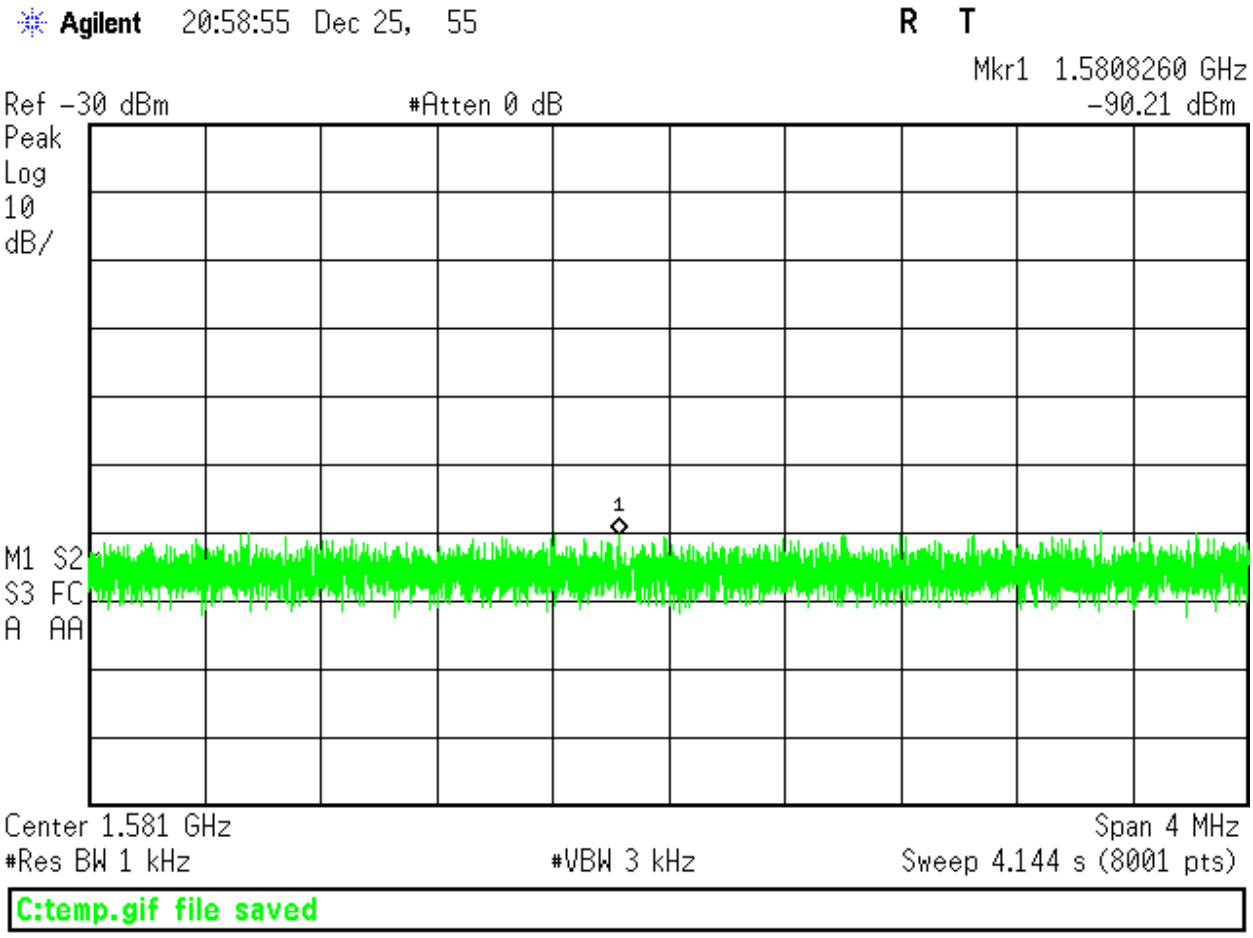


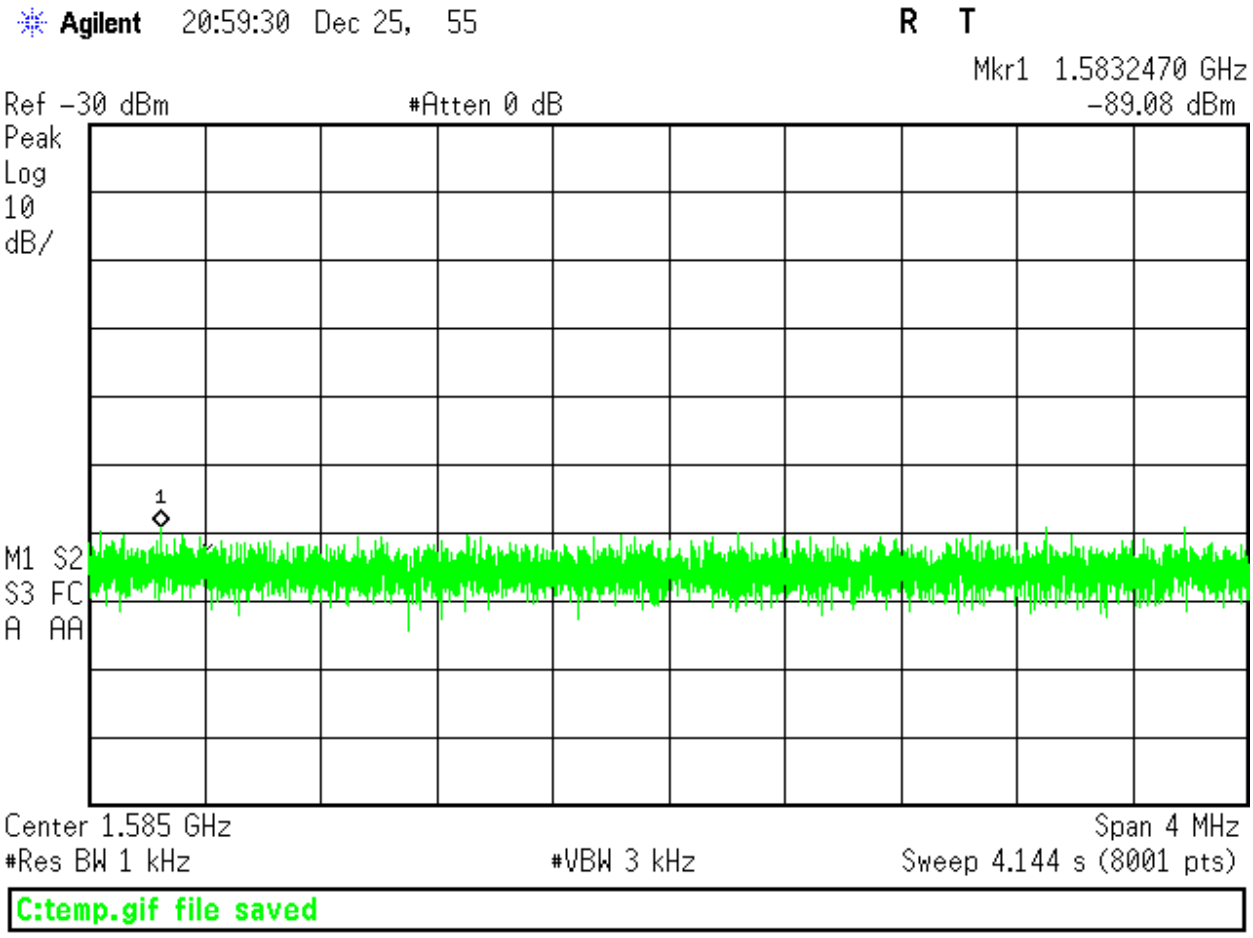

Agilent 20:55:53 Dec 25, 55
R T
Mkr1 1.5669680 GHz
Ref -30 dBm
#Atten 0 dB
-87.54 dBm
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Center 1.565 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

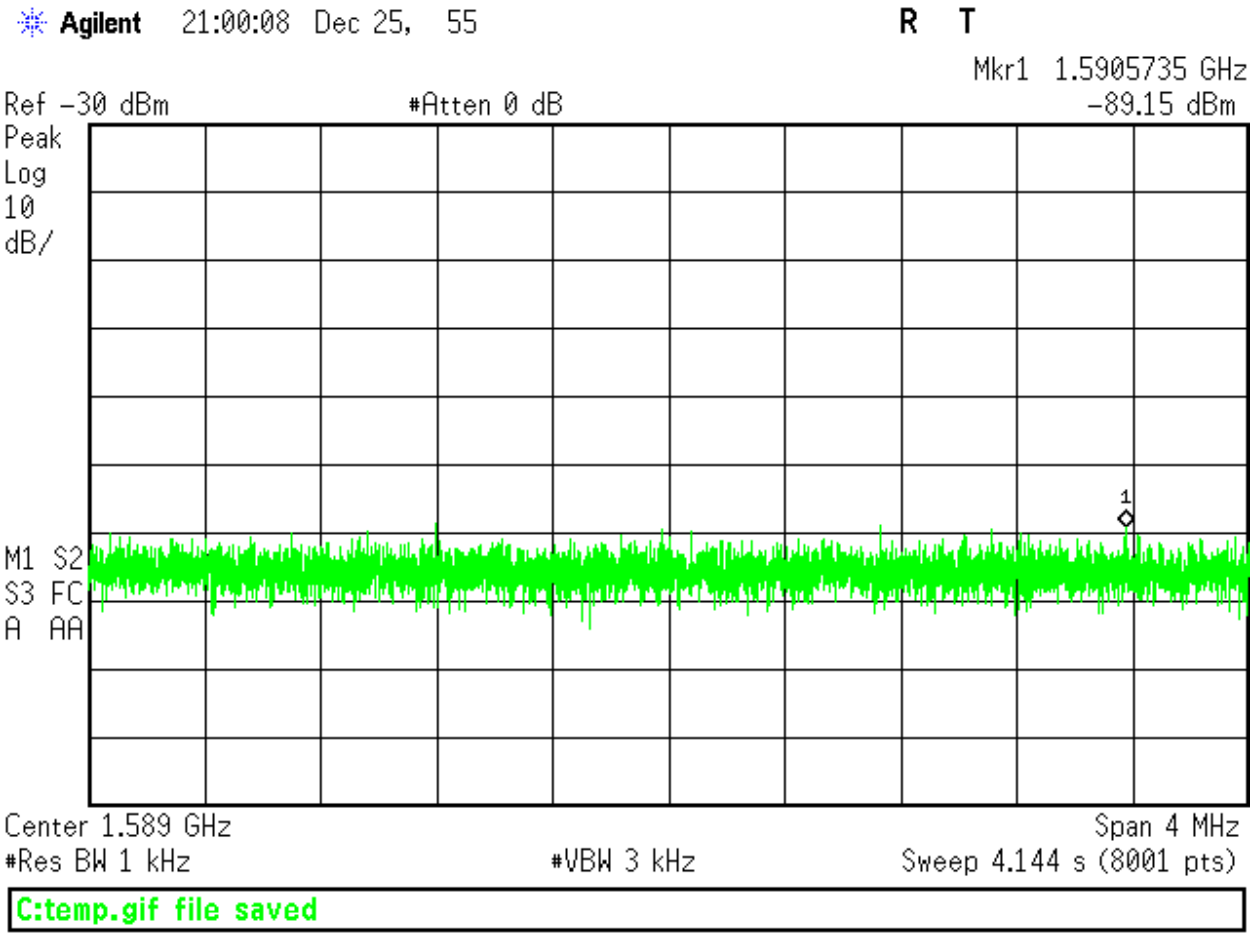

Agilent 20:56:46 Dec 25, 55
R T
Mkr1 1.5690275 GHz
-88.99 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.569 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

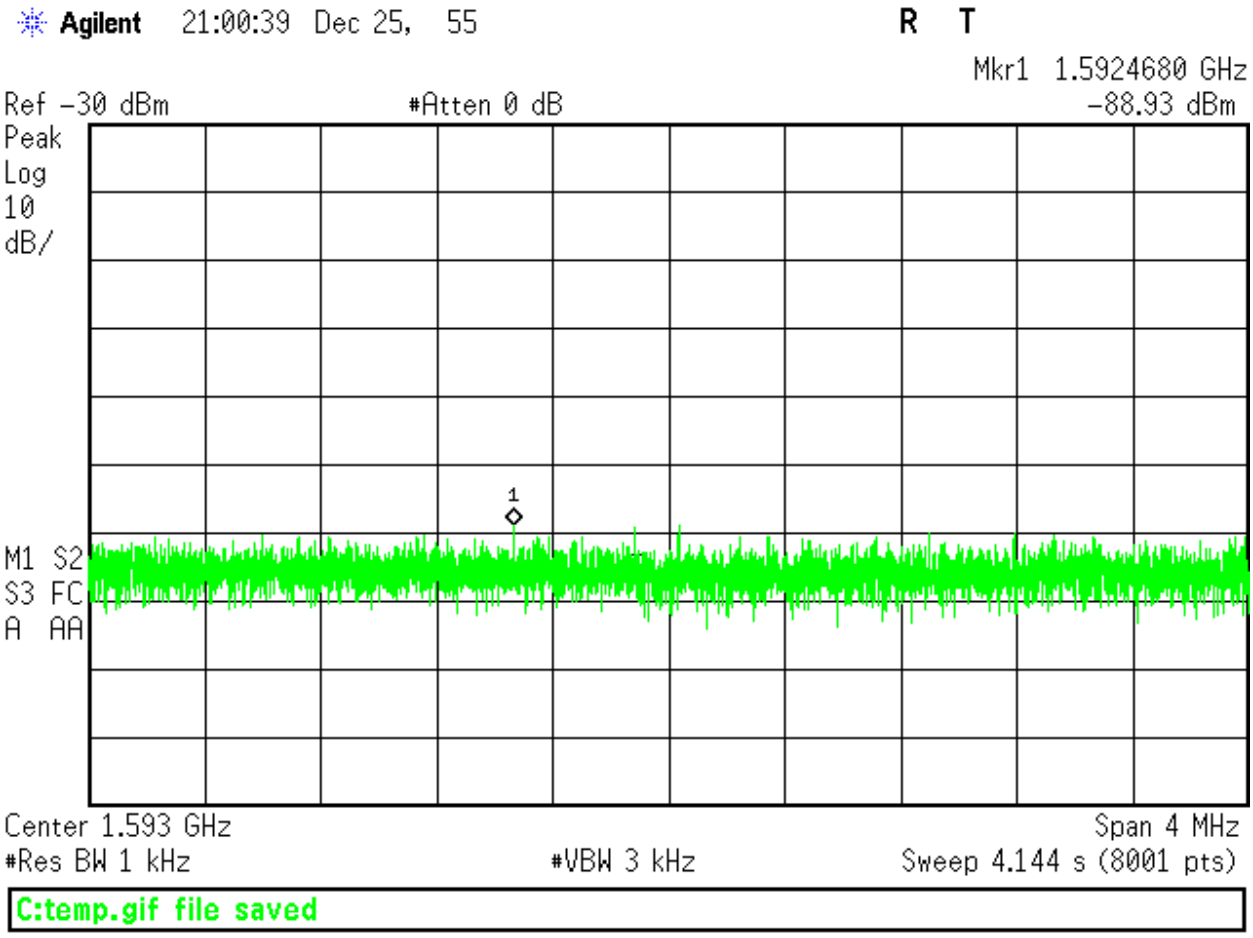

Agilent 20:57:44 Dec 25, 55
R T
Mkr1 1.5716005 GHz
-89.37 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.573 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

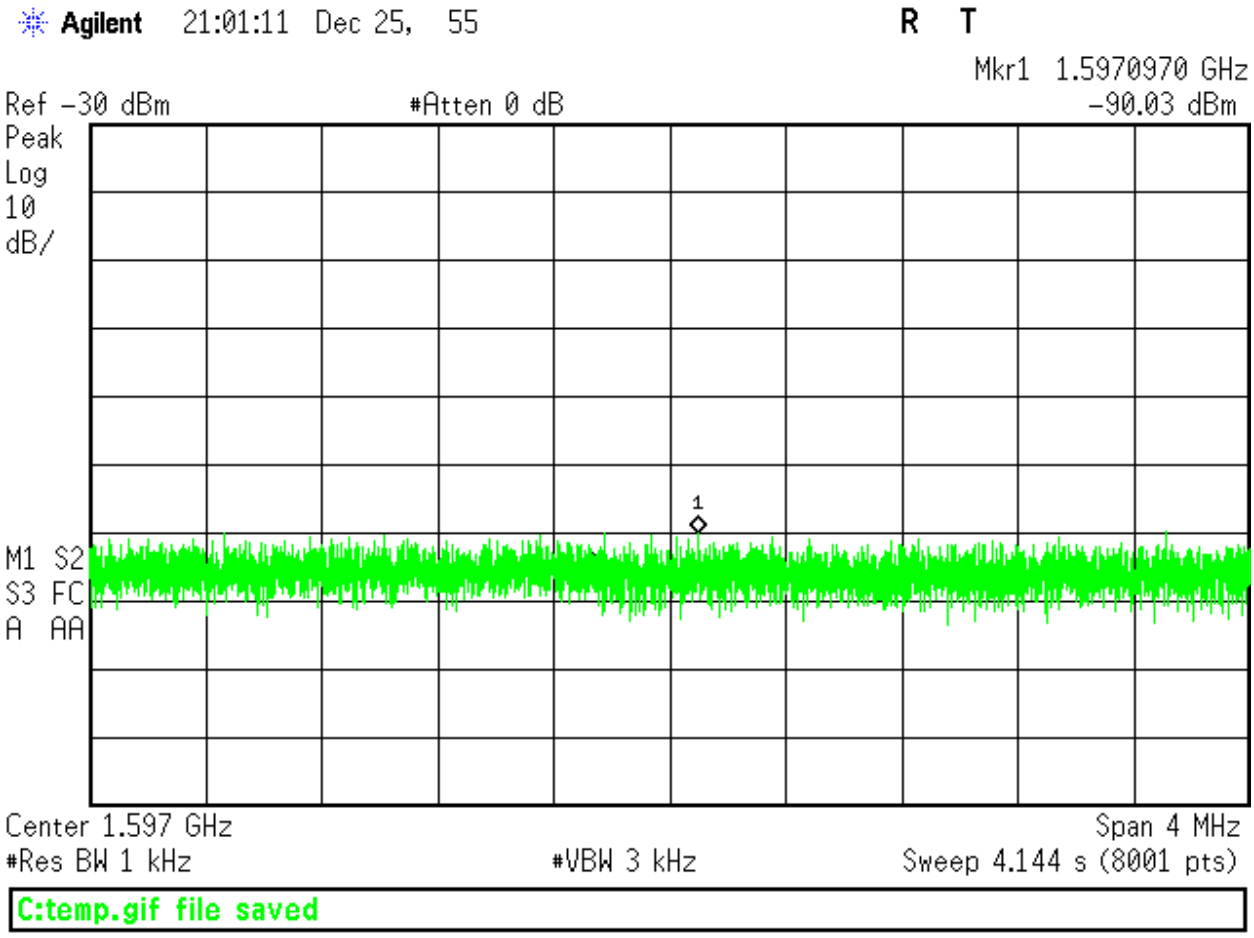

Agilent 20:58:14 Dec 25, 55
R T
Mkr1 1.5756005 GHz
-96.08 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Center 1.577 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

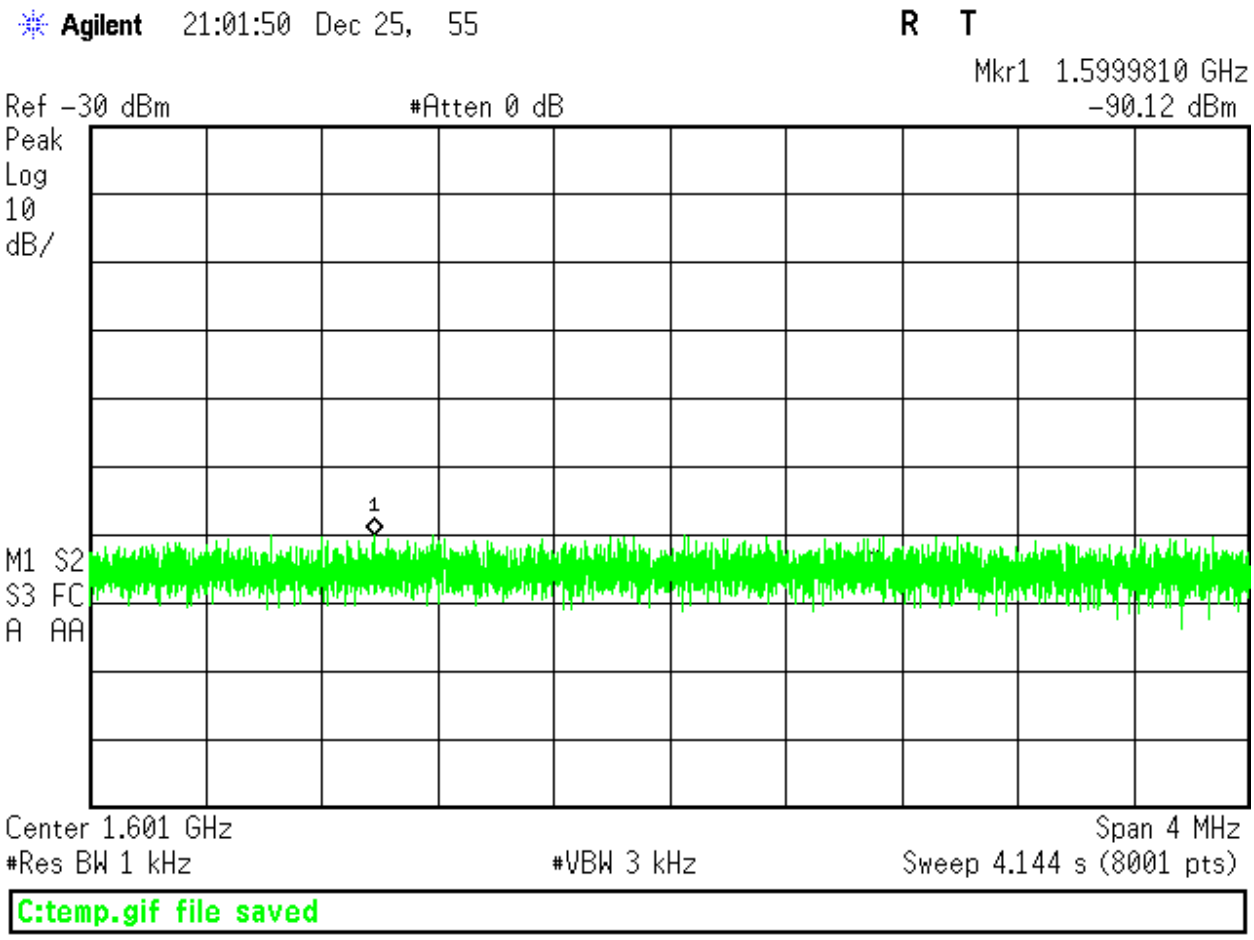

Agilent 20:58:55 Dec 25, 55
R T
Mkr1 1.5808260 GHz
-90.21 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.581 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

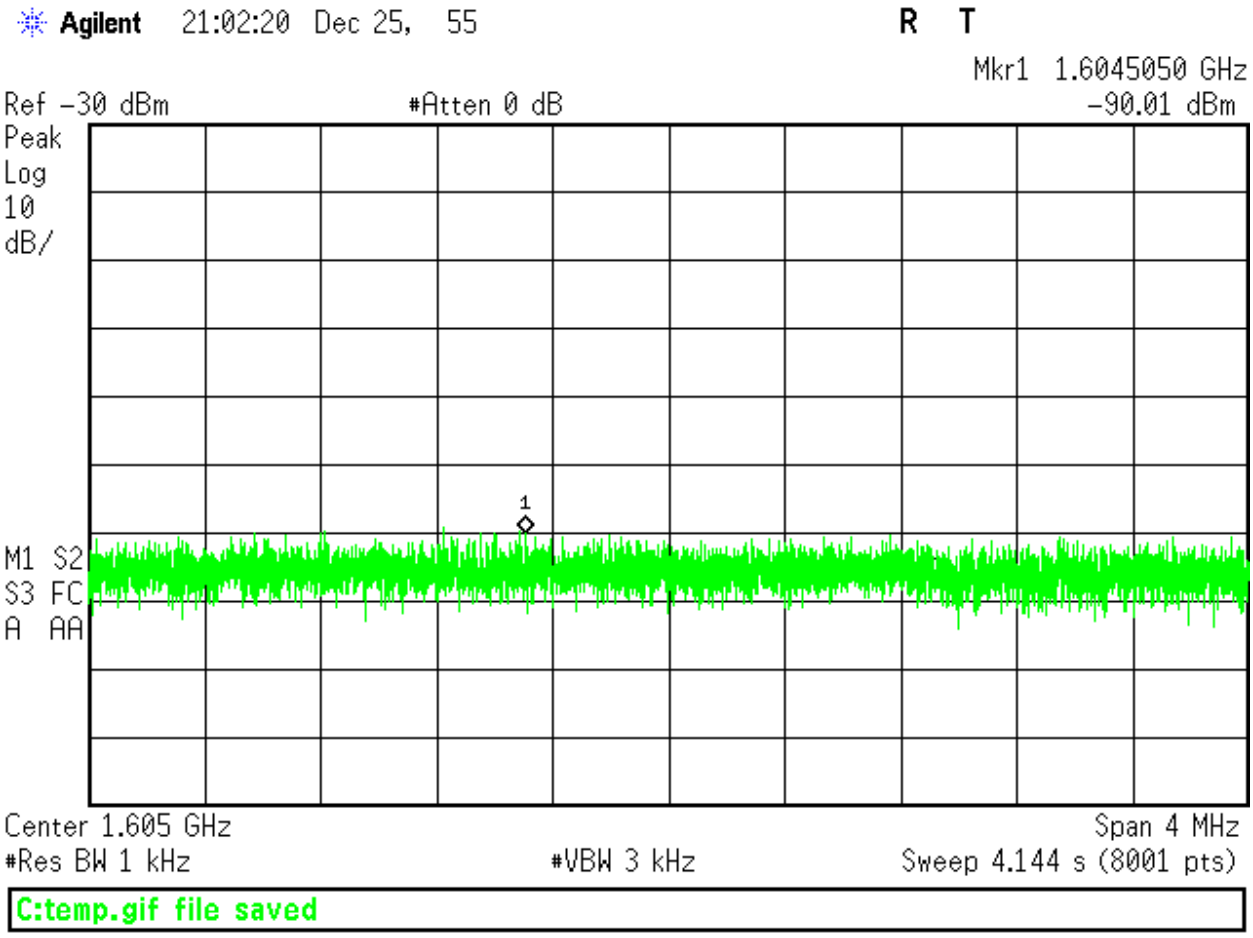

Agilent 20:59:30 Dec 25, 55
R T
Mkr1 1.5832470 GHz
-89.08 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.585 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

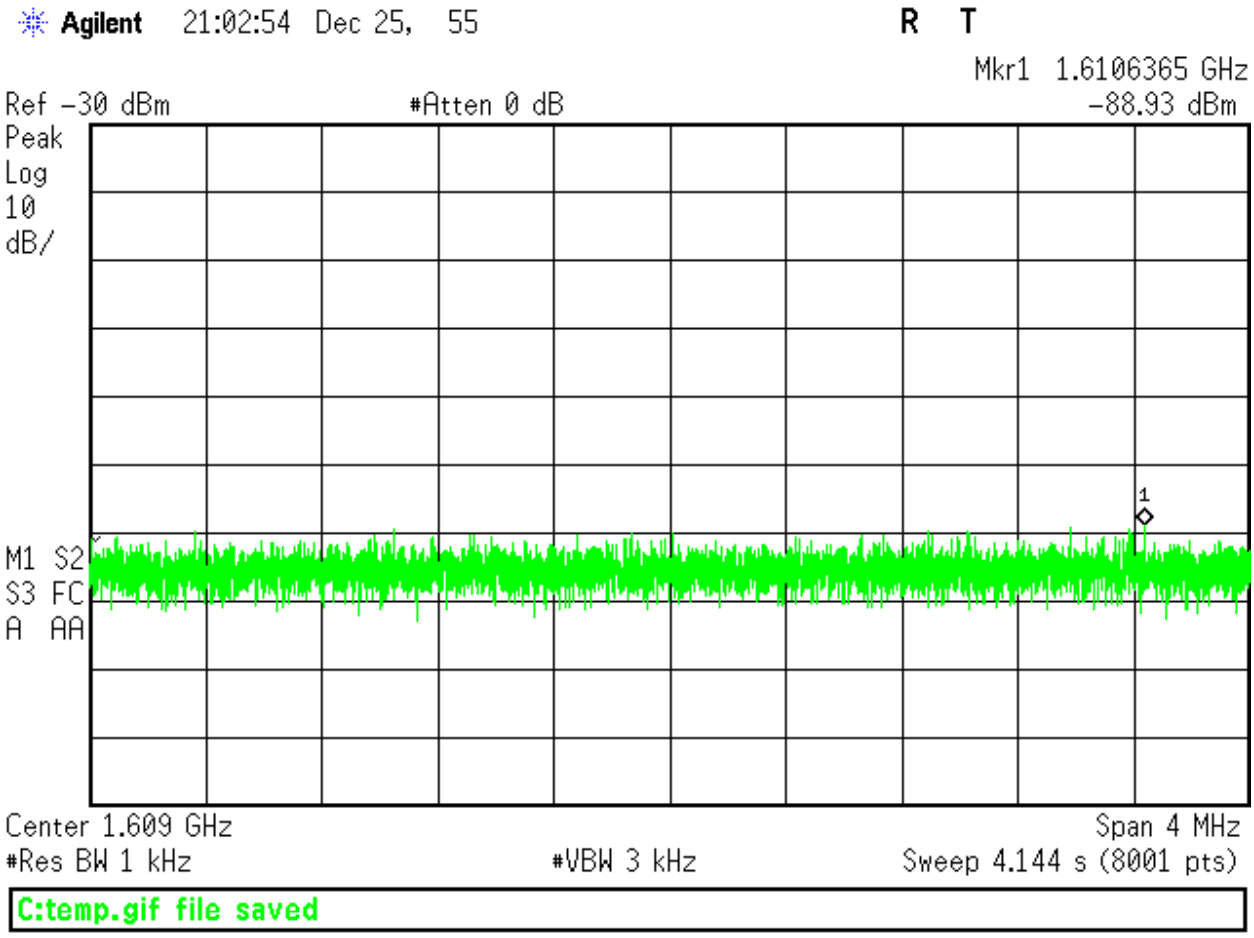

Agilent 21:00:08 Dec 25, 55
R T
Mkr1 1.5905735 GHz
-89.15 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Center 1.589 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved


Agilent 21:00:39 Dec 25, 55
R T
Mkr1 1.5924680 GHz
-88.93 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.593 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved


Agilent 21:01:11 Dec 25, 55
R T
Mkr1 1.5970970 GHz
-90.03 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.597 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved


Agilent 21:01:50 Dec 25, 55
R T
Mkr1 1.5999810 GHz
-90.12 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.601 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved


Agilent 21:02:20 Dec 25, 55
R T
Mkr1 1.6045050 GHz
-90.01 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.605 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved


Agilent 21:02:54 Dec 25, 55
R T
Mkr1 1.6106365 GHz
-88.93 dBm
Ref -30 dBm
#Atten 0 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
A AA
Center 1.609 GHz
Span 4 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.144 s (8001 pts)
C:temp.gif file saved

:

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: 19-Mar-15 **Company:** Airvana **Work Order:** P0152
Engineer: Tuyen Truong **EUT Desc:** Switched IQ Radio Point Domestic **EUT Operating Voltage/Frequency:** POE
Temp: 27°C **Humidity:** 2% **Pressure:** 1005 mBar
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 (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)				FCC Class B Limit (dBµV/m)	FCC Class B Margin (dB)	FCC Class B Result (Pass/Fail)
v	59.93	48.4	25.3	7.4	1.5	32.0				40.0	-8.0	Pass
v	60.4	49.6	25.3	7.4	1.5	33.2				40.0	-6.8	Pass
v	200.0	50.0	25.5	12.6	2.7	39.8				43.5	-3.7	Pass
h	200.0	44.7	25.5	12.6	2.7	34.5				43.5	-9.0	Pass
v	333.3	50.9	25.6	14.0	3.0	42.3				46.0	-3.7	Pass
h	333.3	51.5	25.6	14.0	3.0	42.9				46.0	-3.1	Pass
v	375.0	41.8	25.5	15.1	3.1	34.5				46.0	-11.5	Pass
v	466.6	39.2	25.8	17.3	3.7	34.4				46.0	-11.6	Pass
v	500.0	48.0	25.7	18.0	2.7	43.0				46.0	-3.0	Pass
h	500.0	48.8	25.7	18.0	2.7	43.8				46.0	-2.2	Pass
v	625.0	41.4	25.6	19.3	3.0	38.1				46.0	-7.9	Pass
v	875.0	35.9	25.9	22.1	3.5	35.6				46.0	-10.4	Pass

Table Result: Pass by -2.2 dB ***Worst Freq:*** 500.0 MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #2051 **Cable 2:** Asset #2053 **Cable 3:** ---
Analyzer: Rental SA#2 **Preamp:** Red-White **Antenna:** Red-Brown **Preselector:** Asset #1511

Radiated Emissions Table

Date: 19-Mar-15 **Company:** Airvana **Work Order:** P0152

Engineer: Tuyen Truong **EUT Desc:** Switched IQ Radio Point Domestic **EUT Operating Voltage/Frequency:** POE

Temp: 27°C **Humidity:** 2% **Pressure:** 1005 mBar

Frequency Range: 1-8GHz **Measurement Distance:** 3 m (1-6GHz) and 1m (6-8

Notes: BW = 5MHz, Band 13, 16QAM , Low Channel (748.5MHz) **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)				---	---	---	---	---	---	---	---	---	---	---
v	1500.0	34.9	22.7	20.8	25.4	2.4	41.9	29.7	74.0	-32.1	Pass	54.0	-24.3	Pass
v	1915.0	43.14	23.8	20.7	27.3	2.7	52.4	33.1	74.0	-21.6	Pass	54.0	-20.9	Pass
v	2260.0	45.3	32.9	21.6	27.7	3.1	54.5	42.1	74.0	-19.5	Pass	54.0	-11.9	Pass
v	2460.0	41.8	36.5	21.8	28.3	3.3	51.6	46.3	74.0	-22.4	Pass	54.0	-7.7	Pass
v	3000.0	49.42	34.7	21.4	30.2	3.7	61.9	47.2	74.0	-12.1	Pass	54.0	-6.8	Pass
v	3757.0	35.68	24.2	20.7	32.4	4.1	51.5	40.0	74.0	-22.5	Pass	54.0	-14.0	Pass
				---	---	---	---	---	---	---	---	---	---	---
BW = 10MHz, Band 13, 16QAM , Only Channel (751MHz)				---	---	---	---	---	---	---	---	---	---	---
v	3004.0	38.98	33.1	21.4	30.2	3.7	51.5	45.6	74.0	-22.5	Pass	54.0	-8.4	Pass
v	1500.0	30.39	22.0	20.8	25.4	2.4	37.4	29.0	74.0	-36.6	Pass	54.0	-25.0	Pass
v	2260.0	42.67	29.9	21.6	27.7	3.1	51.9	39.1	74.0	-22.1	Pass	54.0	-14.9	Pass
v	2465.0	43.22	36.2	21.8	28.3	3.3	53.0	46.0	74.0	-21.0	Pass	54.0	-8.0	Pass
BW = 5MHz, Band 13, 64QAM , Low Channel (748.5MHz)				---	---	---	---	---	---	---	---	---	---	---
v	2994.0	47.93	32.8	21.4	30.2	3.7	60.4	45.3	74.0	-13.6	Pass	54.0	-8.7	Pass
v	2242.0	42.0	30.8	21.5	27.7	3.1	51.3	40.1	74.0	-22.7	Pass	54.0	-13.9	Pass
v	1500.0	32.74	22.9	20.8	25.4	2.4	39.7	29.9	74.0	-34.3	Pass	54.0	-24.1	Pass
				---	---	---	---	---	---	---	---	---	---	---
BW = 5MHz, Band 13, QPSK , Low Channel (748.5MHz)				---	---	---	---	---	---	---	---	---	---	---
v	2995.0	43.66	34.9	21.4	30.2	3.7	56.2	47.4	74.0	-17.8	Pass	54.0	-6.6	Pass
v	2247.7	43.12	32.9	21.5	27.7	3.1	52.4	42.2	74.0	-21.6	Pass	54.0	-11.8	Pass
				---	---	---	---	---	---	---	---	---	---	---
BW = 5MHz, Band 13, 16QAM , Mid Channel (751MHz)				---	---	---	---	---	---	---	---	---	---	---
v	3006.0	46.0	33.6	21.4	30.2	3.7	58.5	46.1	74.0	-15.5	Pass	54.0	-7.9	Pass
v	2253.5	46.3	33.4	21.6	27.7	3.1	55.5	42.6	74.0	-18.5	Pass	54.0	-11.4	Pass
				---	---	---	---	---	---	---	---	---	---	---
BW = 5MHz, Band 13, 16QAM , High Channel (753.5MHz)				---	---	---	---	---	---	---	---	---	---	---
v	2265.0	47.6	34.6	21.6	27.7	3.1	56.8	43.8	74.0	-17.2	Pass	54.0	-10.2	Pass
v	3012.5	44.63	35.2	21.4	30.3	3.7	57.2	47.8	74.0	-16.8	Pass	54.0	-6.2	Pass

Table Result: Pass by -6.2 dB ***Worst Freq:*** 3012.5 MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #2051 **Cable 2:** Asset #2053 **Cable 3:** ---

Analyzer: Rental SA#2 **Preamp:** Asset #1517 **Antenna:** Yellow Horn **Preselector:** ---

Conducted Spurious Emissions on AC Mains

AC Conducted Emissions Data Table

Date: 06-Apr-15 | **Company:** Airvana | **Work Order:** P0152
Engineer: Tuyen Truong | **EUT Desc:** Switched IQ Radio Point Domestic
Temp: 21.0 ºC | **Humidity:** 27% | **Pressure:** 1019mBar
Notes: Tested AC side of DC Power Brick of support POE Linksys Switch (checked both power, 120Vac/60Hz and 230Vac/50Hz)
Peak readings.
Frequency Range: 0.15-30MHz | **EUT Input Voltage/Frequency:** POE

	Quasi-Peak Readings		Average Readings		LISN Factors				FCC/CISPR Class B			FCC/CISPR Class B		
Frequency (MHz)	QP1 (dBµV)	QP2 (dBµV)	AVG1 (dBµV)	AVG2 (dBµV)	L1 (dB)	L2 (dB)	Cable Factor (dB)	ATTN Factor (dB)	QP Limit (dBµV)	Margin (dB)	Result (Pass/Fail)	AVG Limit (dBµV)	Margin (dB)	Result (Pass/Fail)
BW = 5MHz, Band 13, 16QAM , Low Channel (748.5MHz)									---	---	---	---	---	---
0.22	11.6	11.7	11.6	11.7	-0.1	-0.1	0.0	-20.4	62.7	-30.6	Pass	52.7	-20.6	Pass
2.69	12.2	12.1	12.2	12.1	0.0	0.0	-0.1	-20.4	56.0	-23.4	Pass	46.0	-13.4	Pass
6.49	11.1	11.3	11.1	11.3	0.0	-0.1	-0.1	-20.4	60.0	-28.2	Pass	50.0	-18.2	Pass
11.12	12.0	13.3	12.0	13.3	-0.1	-0.1	-0.2	-20.3	60.0	-26.1	Pass	50.0	-16.1	Pass
16.42	11.7	12.3	11.7	12.3	-0.1	-0.1	-0.2	-20.4	60.0	-27.0	Pass	50.0	-17.0	Pass
22.61	10.6	9.7	10.6	9.7	-0.1	-0.1	-0.3	-20.4	60.0	-28.6	Pass	50.0	-18.6	Pass

Result: Pass | ***Worst Margin:*** -13.4 dB | ***Frequency:*** 2.690 MHz

Measurement Device: LISN ASSET 1726(Line 1) LISN ASSET 1727(Line 2) | **Cable:** CEMI-09 | **Attenuator:** 20dB Atten-4 | **Spectrum Analyzer:** SA EMI Chamber (1328) | **Site:** CEMI 3

Frequency Stability

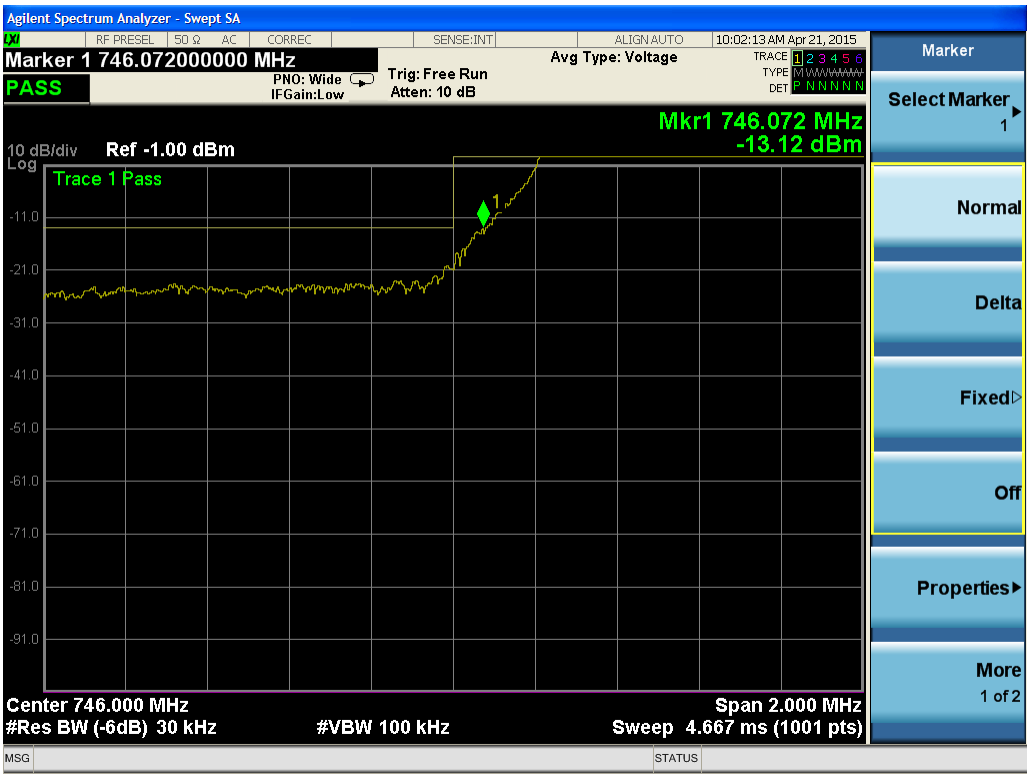
REQUIREMENTS

From FCC Part 27:

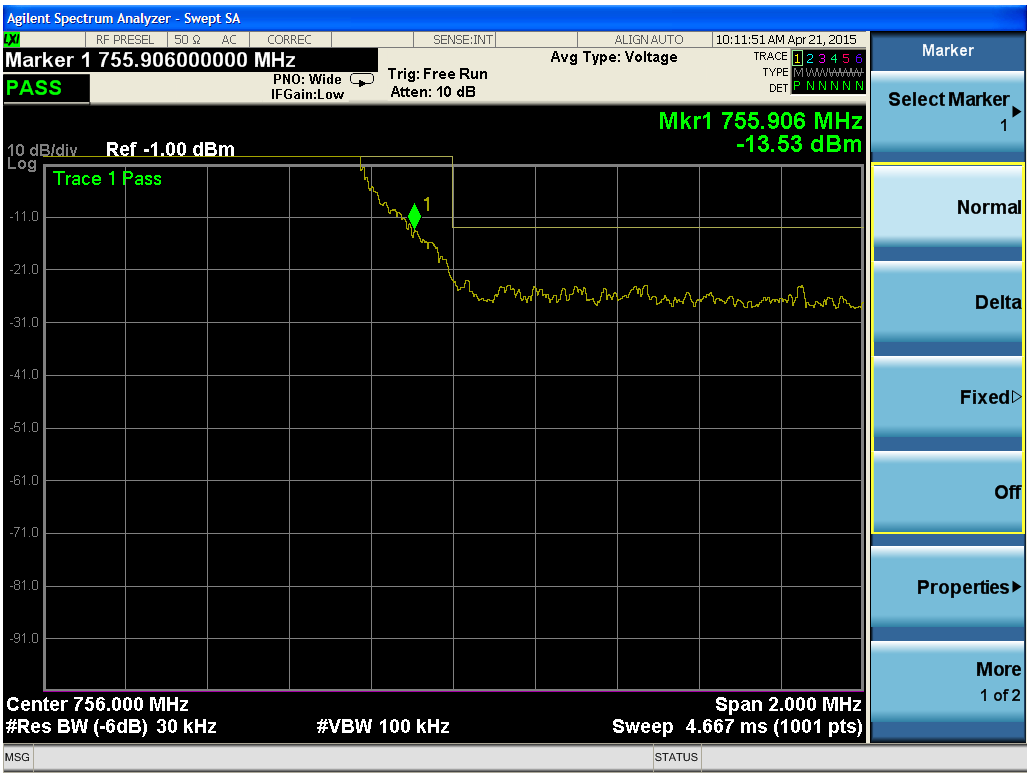
> *§27.54 Frequency stability.*
> *The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.*

MEASUREMENTS / RESULTS

Measurements were done on port J1, since the same frequency-generating circuit is used for J1 and J2.



-30°C, Low Frequency Edge



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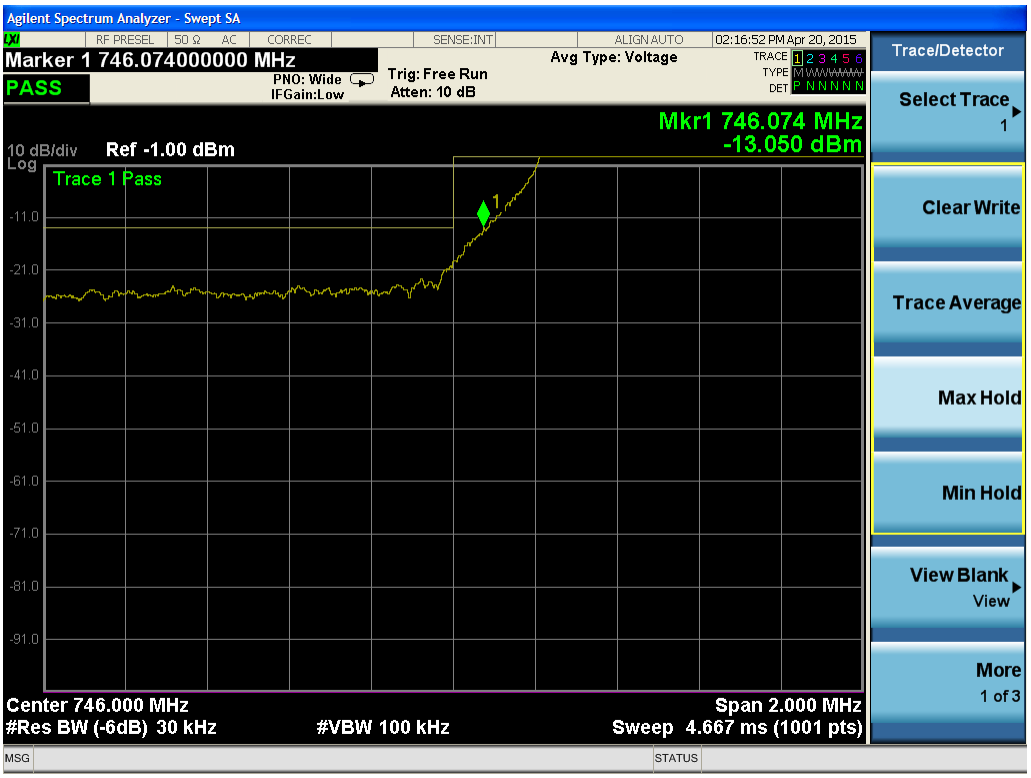
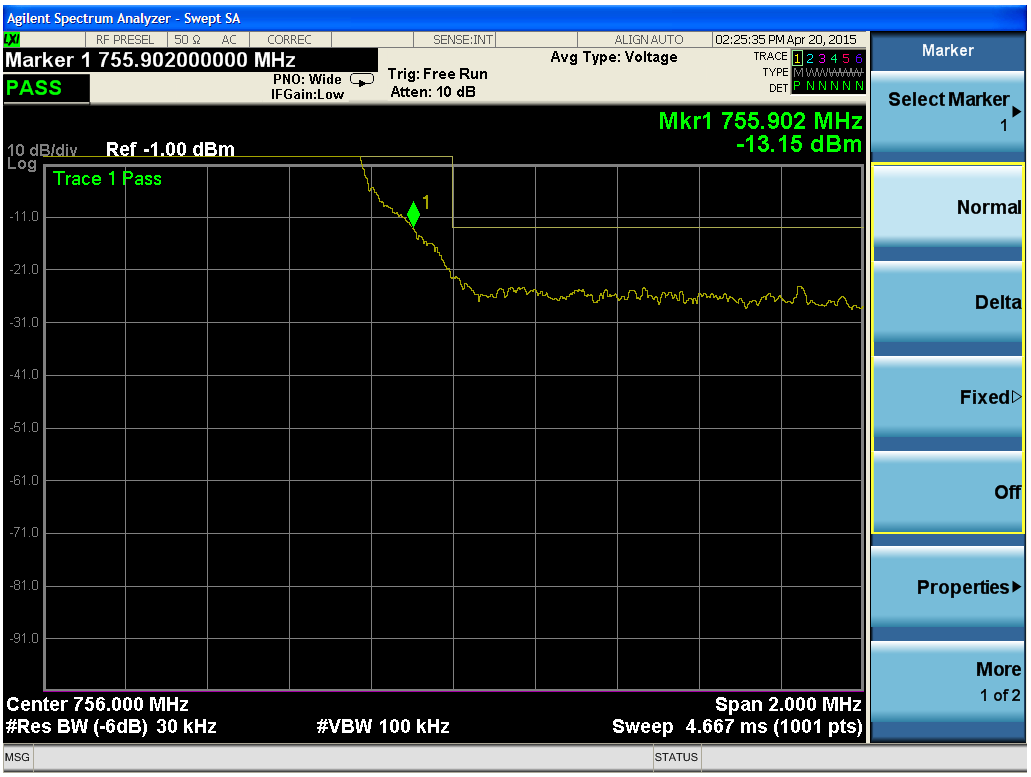
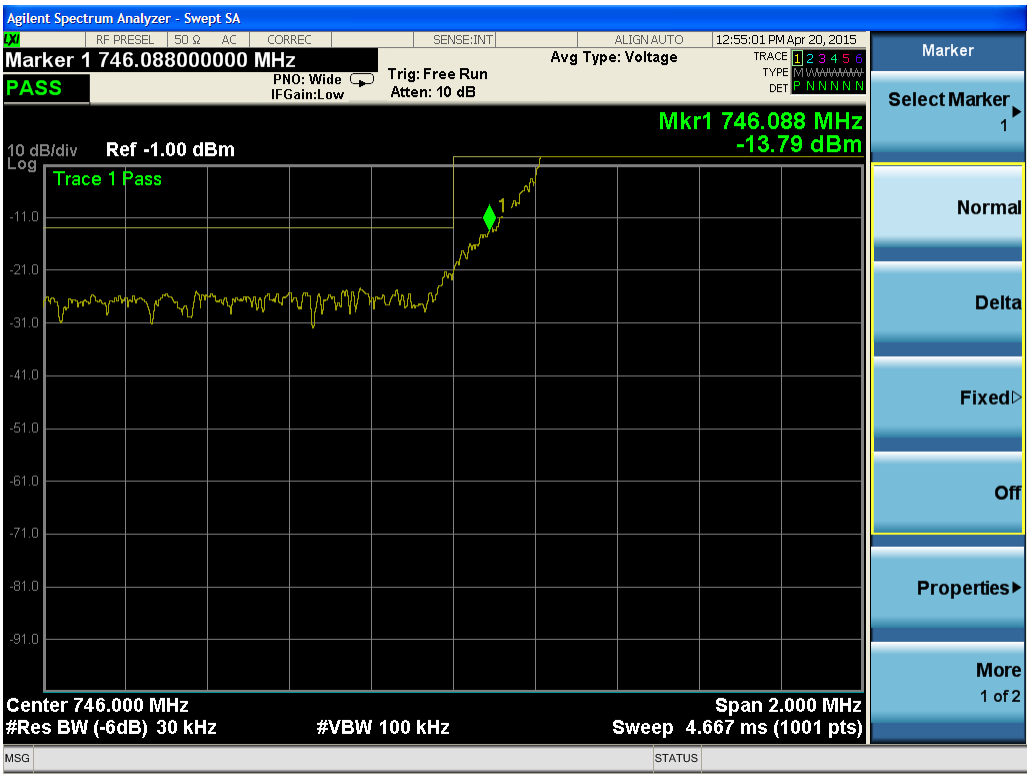


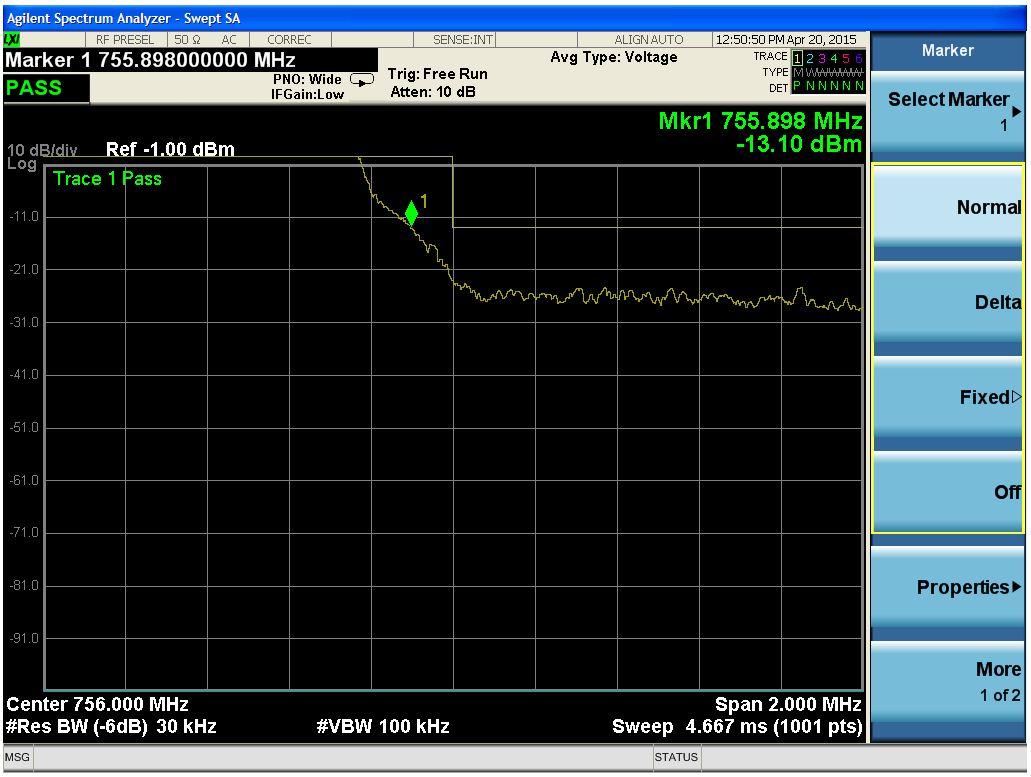
-20°C, Low Frequency Edge



-20°C, High Frequency Edge



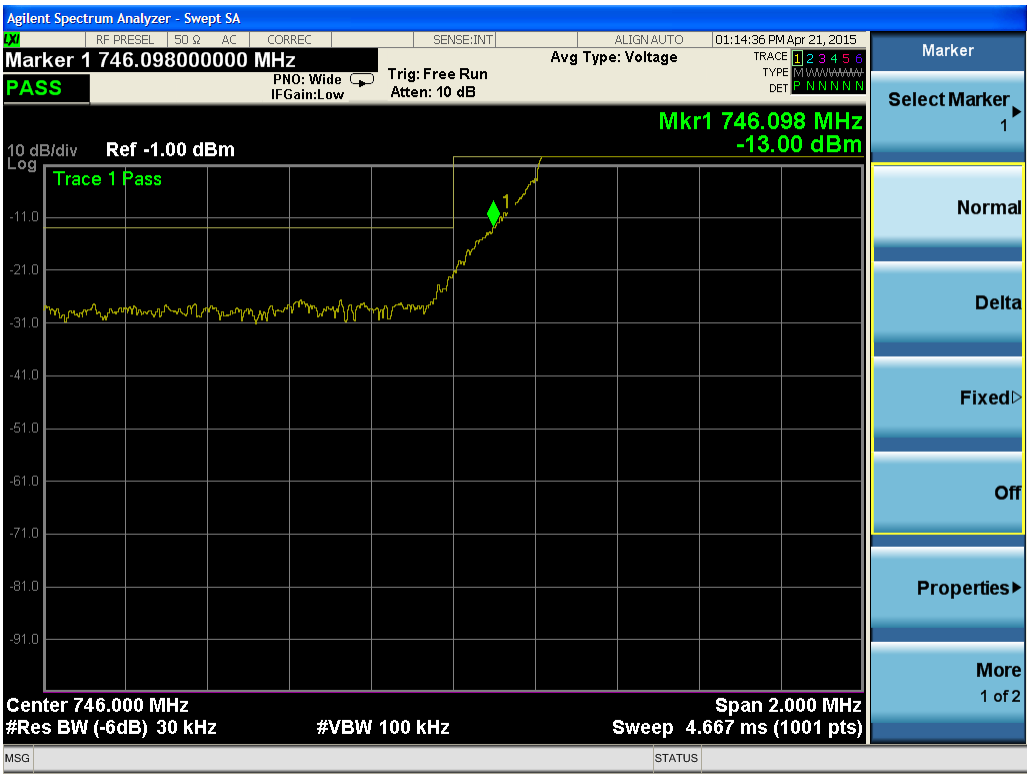
-10°C, Low Frequency Edge



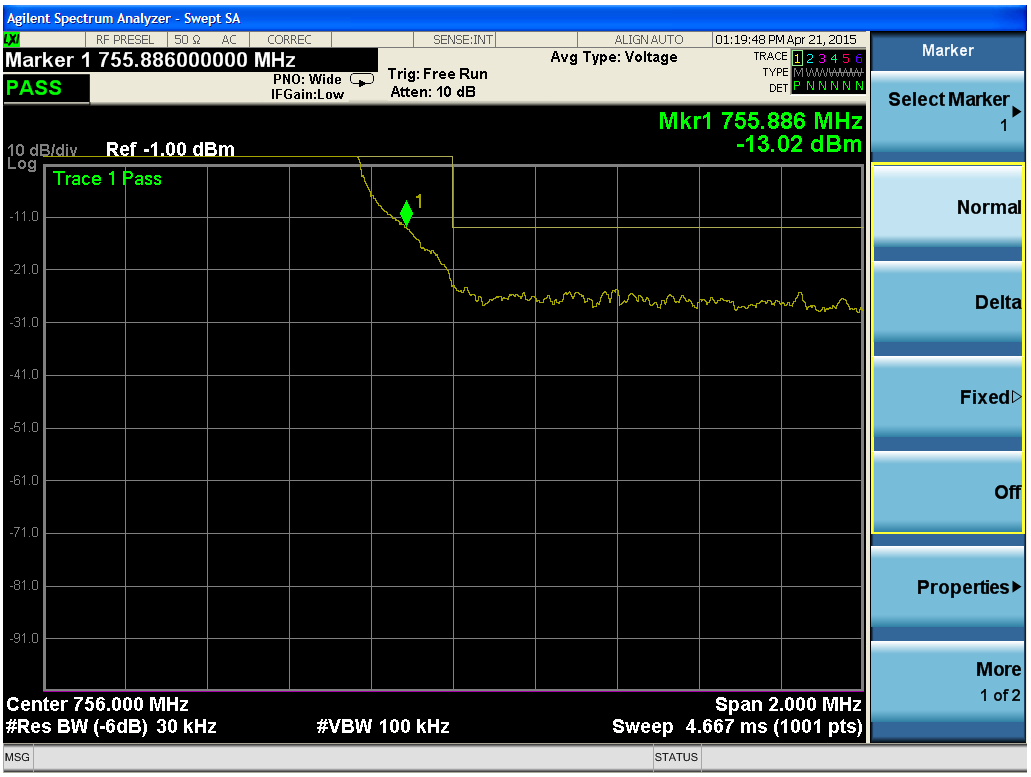
-10°C, High Frequency Edge

0°C, Low Frequency Edge

0°C, High Frequency Edge

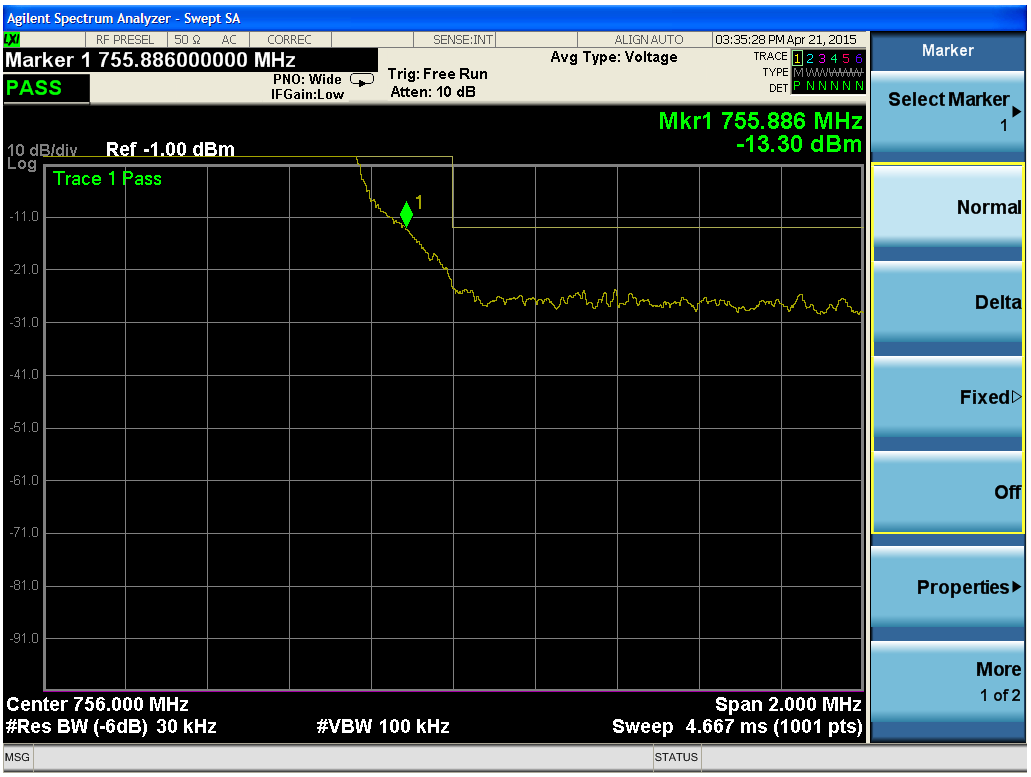


10°C, Low Frequency Edge

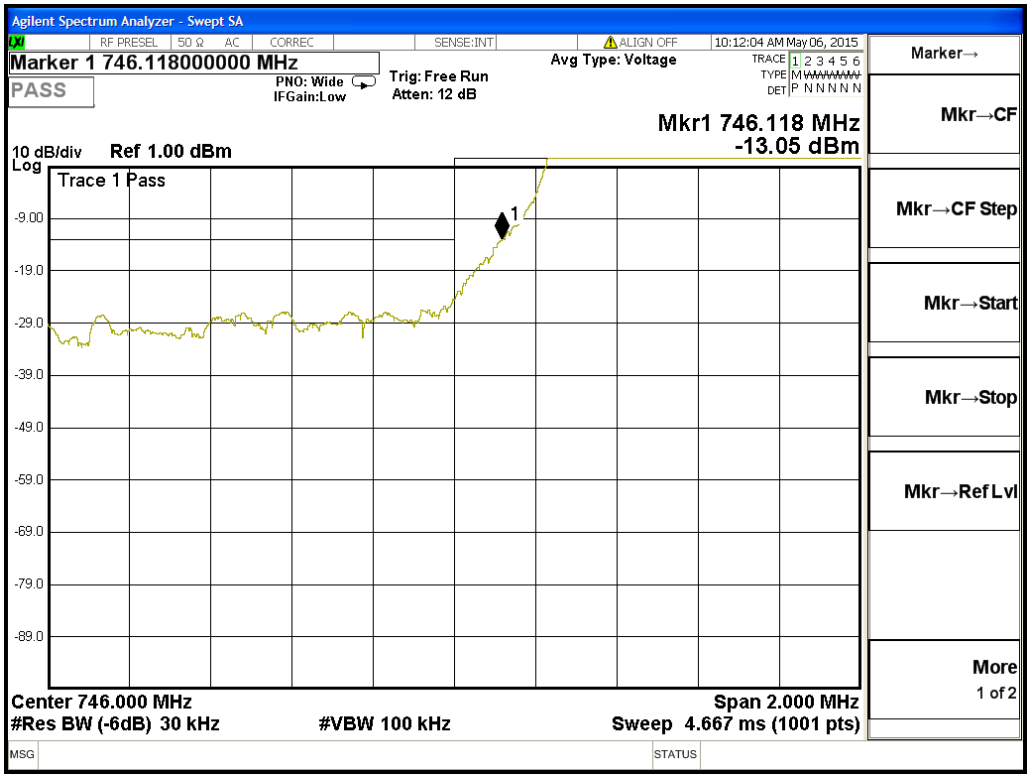


10°C, High Frequency Edge

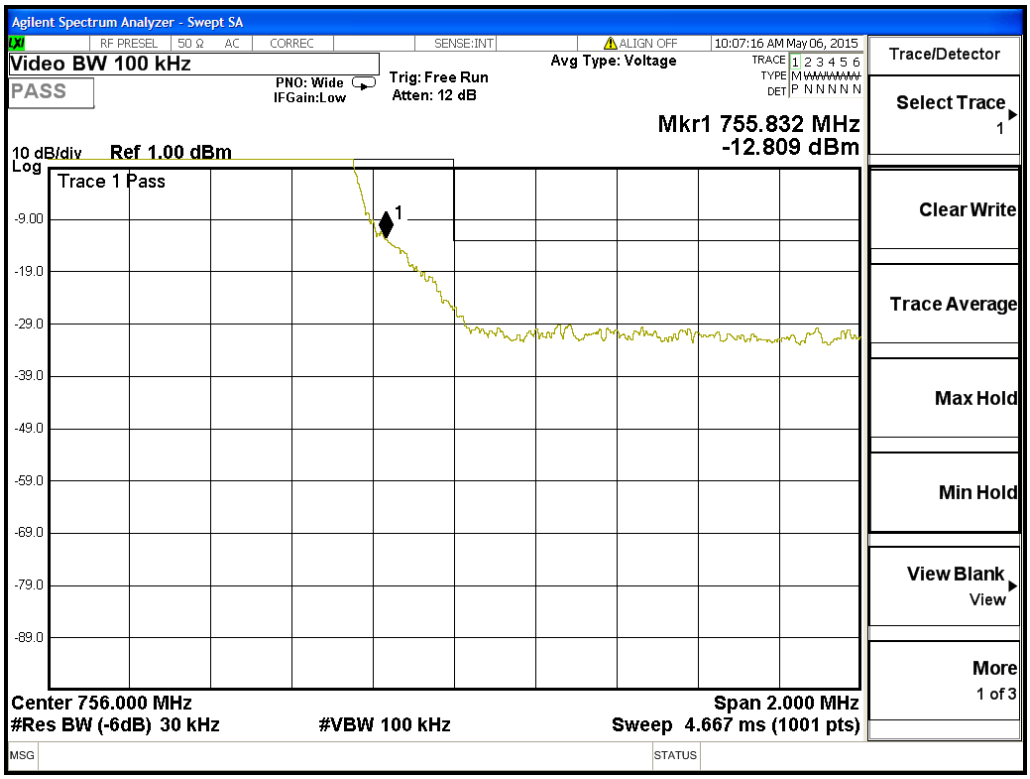
20°C, Low Frequency Edge, 120Vac



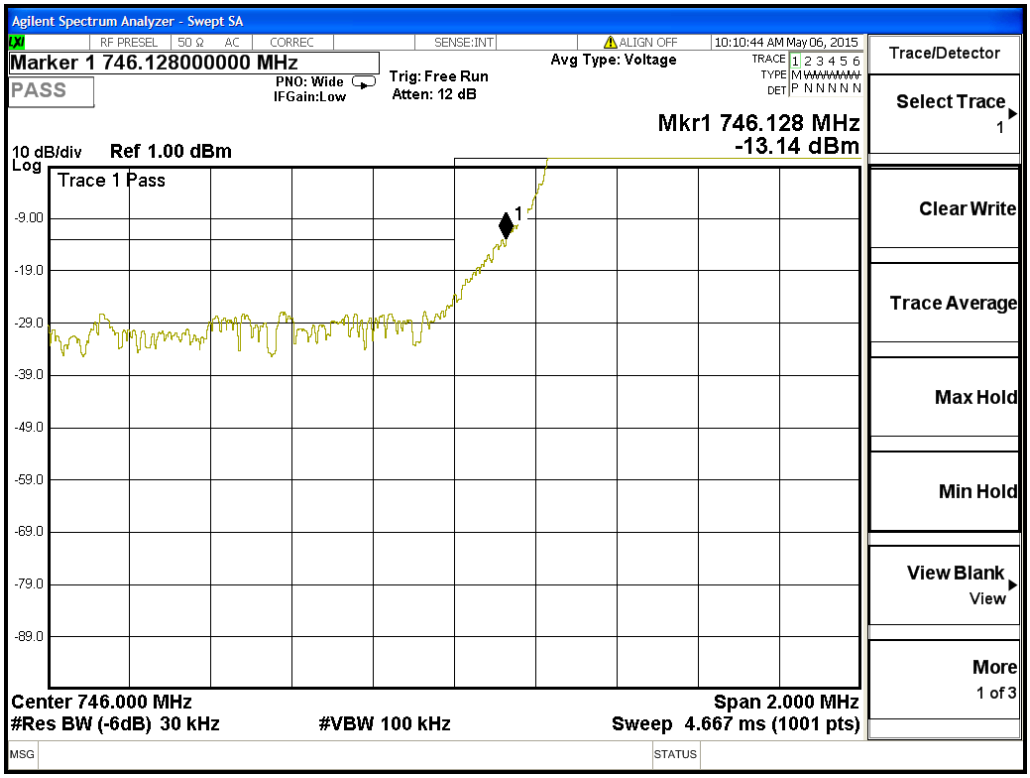
20°C, High Frequency Edge, 120Vac



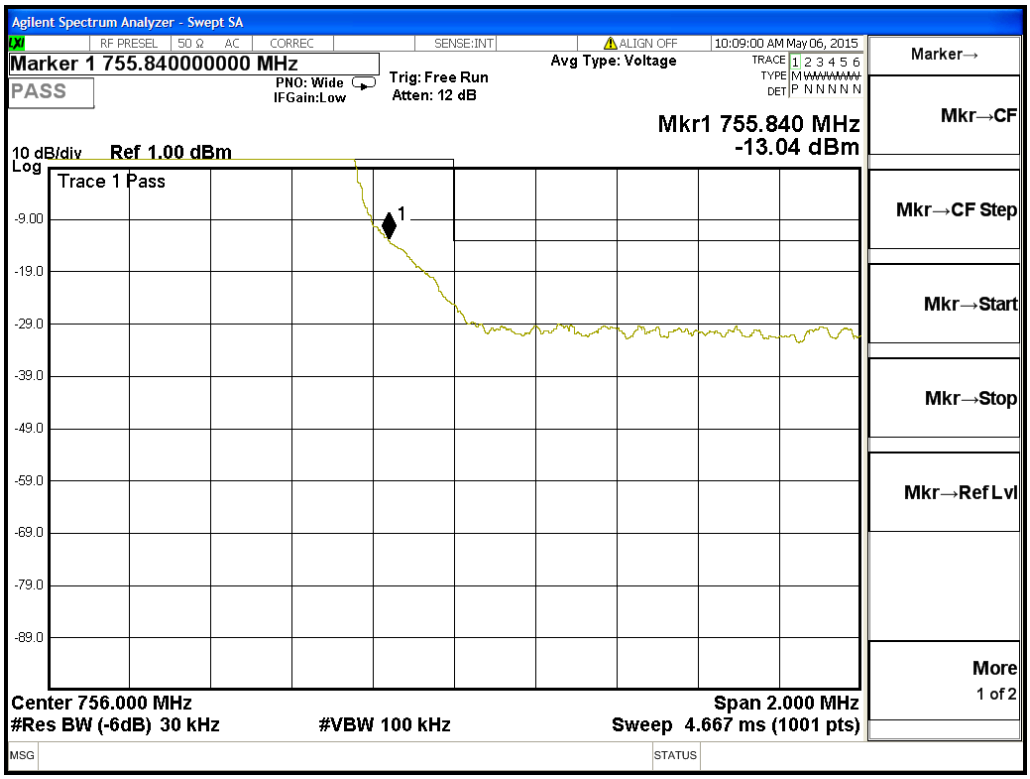
20°C, Low Frequency Edge, 102Vac (-15% from nominal)



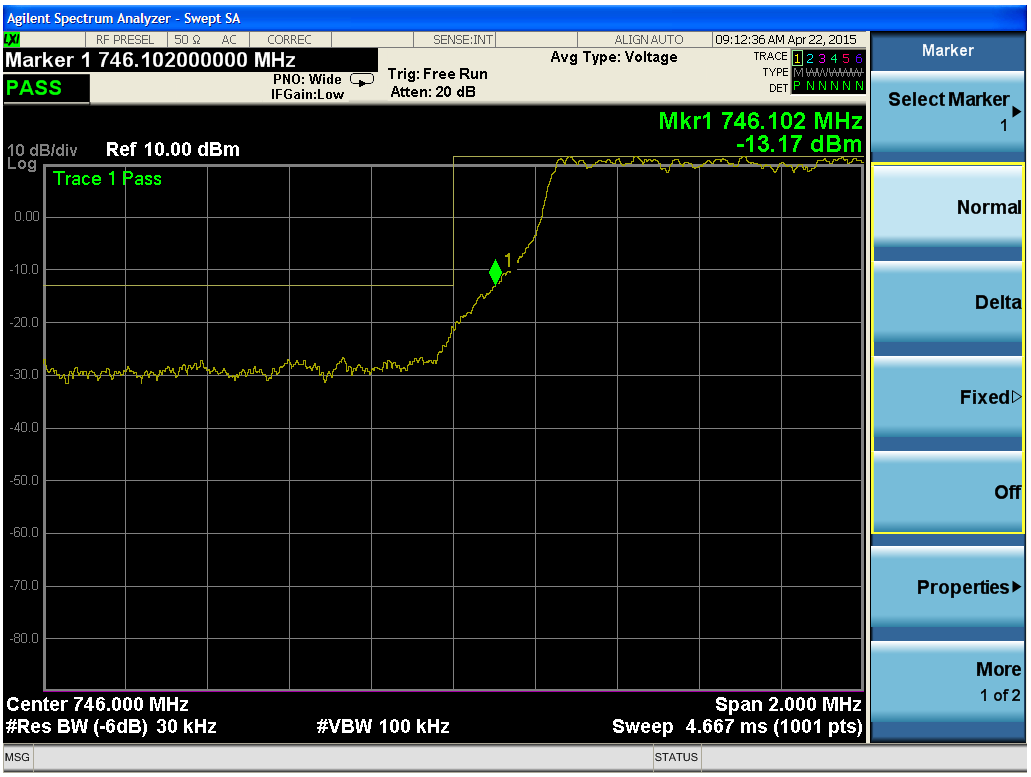
20°C, High Frequency Edge, 102Vac (-15% from nominal)



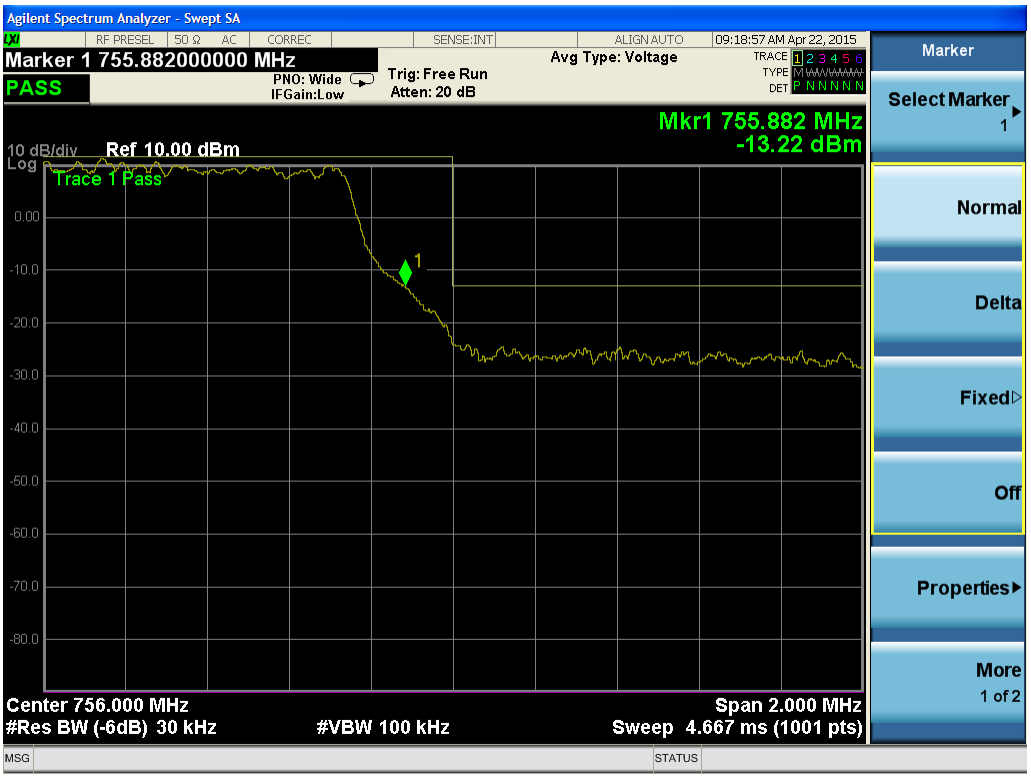
20°C, Low Frequency Edge, 138Vac (+15% from nominal)



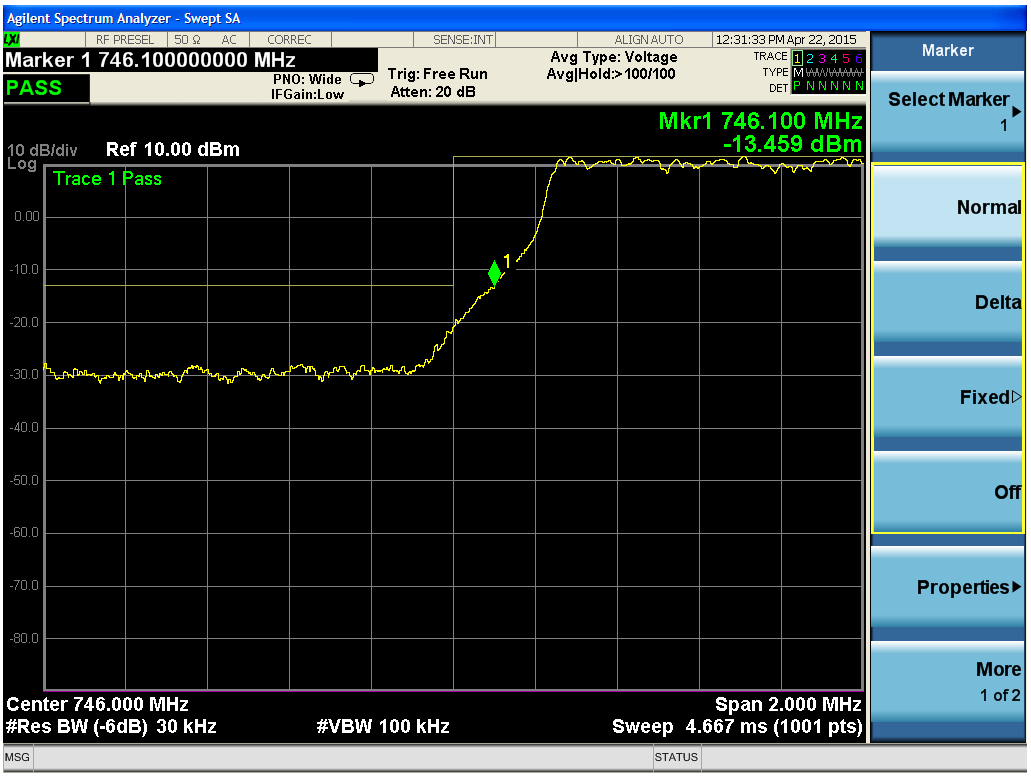
20°C, High Frequency Edge, 138Vac (+15% from nominal)



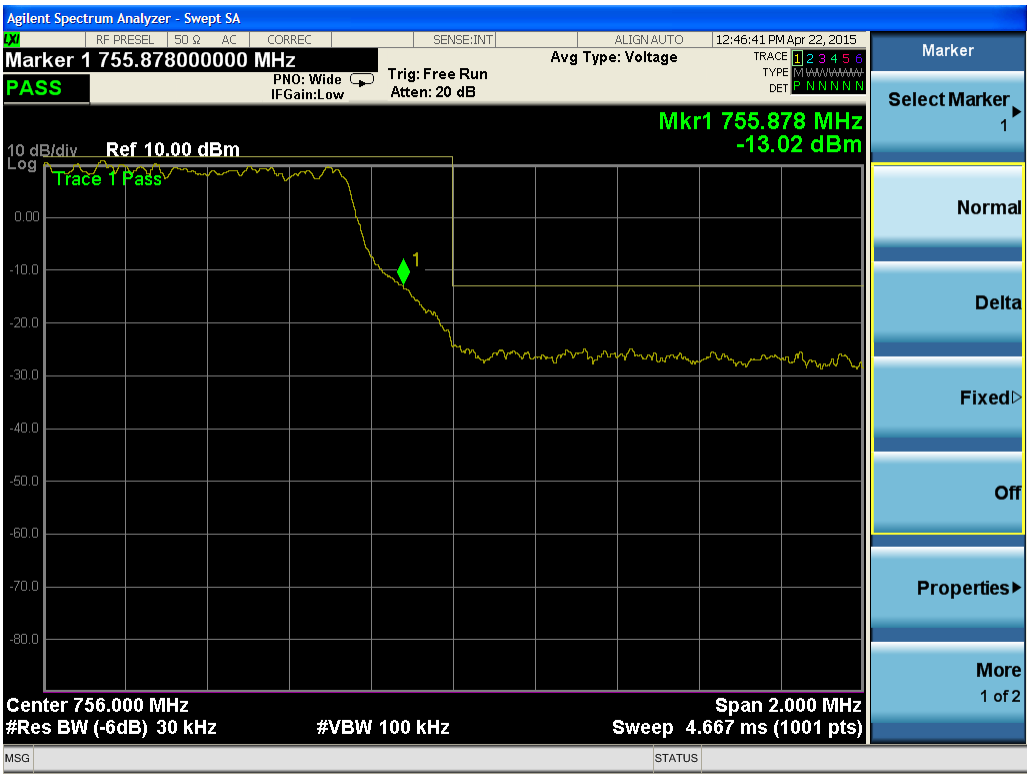
30°C, Low Frequency Edge



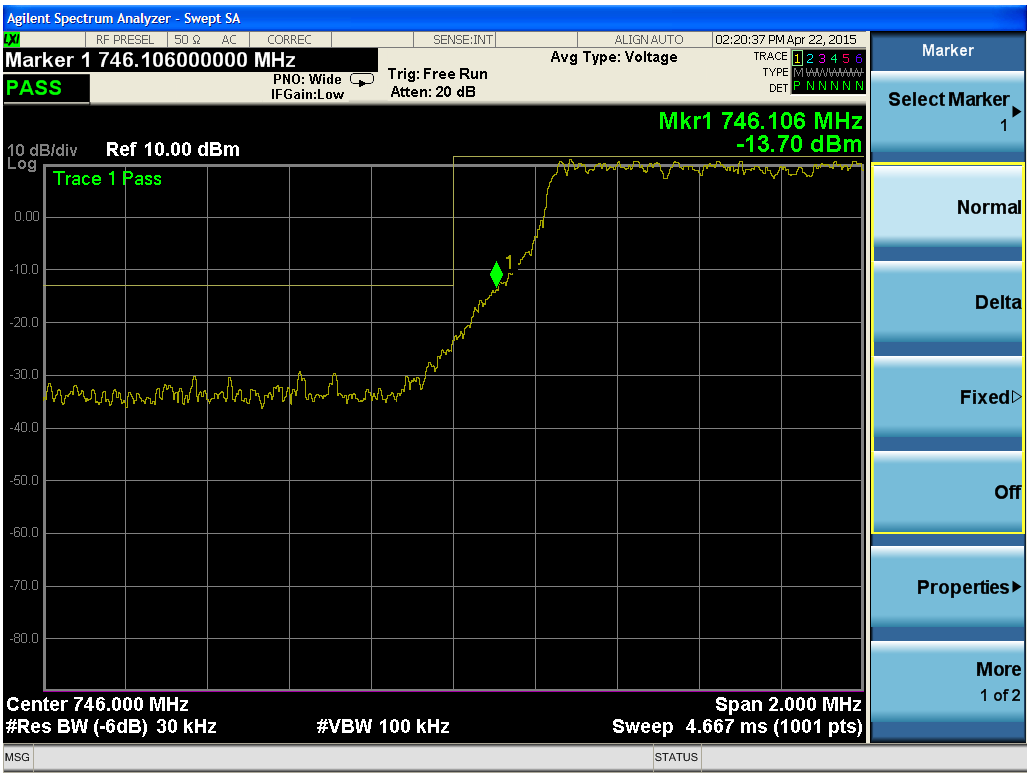
30°C, High Frequency Edge



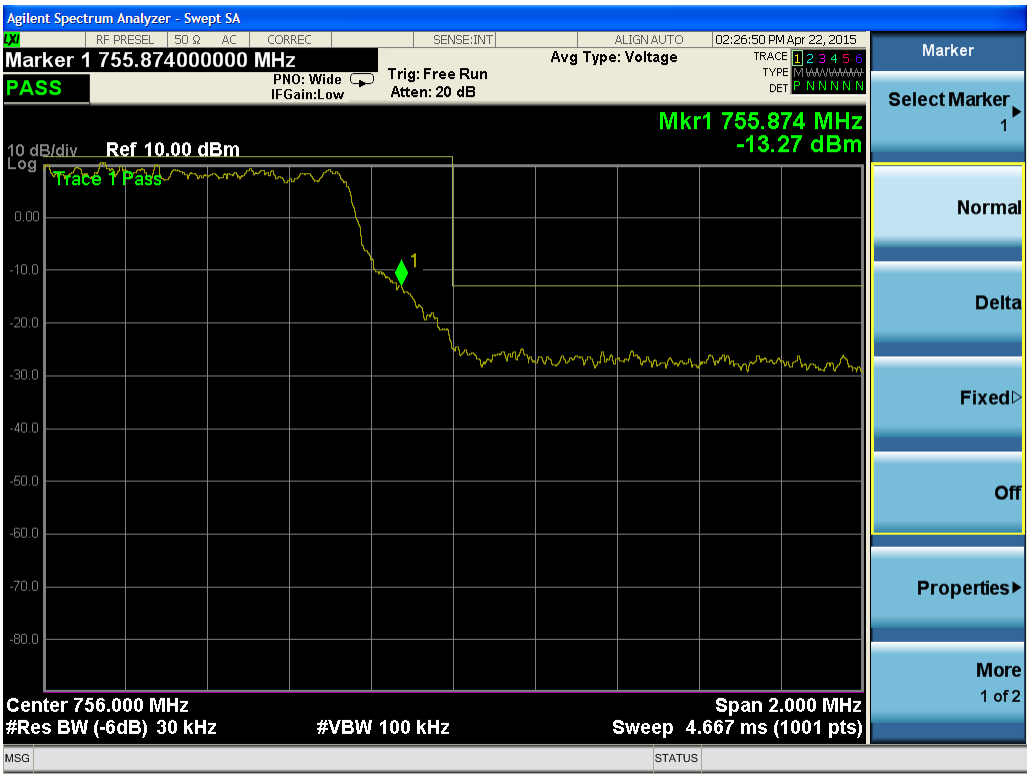
40°C, Low Frequency Edge



40°C, High Frequency Edge



50°C, Low Frequency Edge



50°C, High Frequency Edge

Occupied Bandwidth

LIMIT

"The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power." [27.53(a)(5)]

MEASUREMENTS / RESULTS

Occupied Bandwidth

Date: 17-Mar-15 **Company:** Airvana

Engineer: Tuyen Truong **EUT:** Switched IQ Radio Point Domestic (750748)

WO# P0152 **EUT Operating Voltage:** POE

Temp: 22°C **Humidity:** 33% **Pressure:** 1005mBar

Note: FCC part 27.53(a)(5)

Modulation	Bandwidth Setting (MHz)	Band	Channel	Frequency (MHz)	26 dB BW (MHz)
QPSK	5	10	Low	2112.5	4.959
QPSK	5	10	Mid	2140	5.011
QPSK	5	10	High	2167.5	4.948
16QAM	5	10	Low	2112.5	4.994
16QAM	5	10	Mid	2140	4.994
16QAM	5	10	High	2167.5	4.993
64QAM	5	10	Low	2112.5	4.867
64QAM	5	10	Mid	2140	4.865
64QAM	5	10	High	2167.5	4.85
QPSK	10	10	Low	2115	22.285
QPSK	10	10	Mid	2140	21.799
QPSK	10	10	High	2165	22.075
16QAM	10	10	Low	2115	20.143
16QAM	10	10	Mid	2140	20.564
16QAM	10	10	High	2165	17.129
64QAM	10	10	Low	2115	15.991
64QAM	10	10	Mid	2140	20.043
64QAM	10	10	High	2165	21.537
QPSK	5	4	Low	2112.5	See band 10
QPSK	5	4	Mid	2132.5	5.013
QPSK	5	4	High	2152.5	4.93
16QAM	5	4	Low	2112.5	See band 10
16QAM	5	4	Mid	2132.5	4.998
16QAM	5	4	High	2152.5	4.972
64QAM	5	4	Low	2112.5	See band 10
64QAM	5	4	Mid	2132.5	4.88
64QAM	5	4	High	2152.5	4.916
QPSK	10	4	Low	2112.5	See band 10
QPSK	10	4	Mid	2132.5	19.325
QPSK	10	4	High	2150	20.16
16QAM	10	4	Low	2112.5	See band 10
16QAM	10	4	Mid	2132.5	22.083
16QAM	10	4	High	2150	20.321
64QAM	10	4	Low	2112.5	See band 10
64QAM	10	4	Mid	2132.5	21.169
64QAM	10	4	High	2150	20.126

Power and PAPR: 5MHz Operating Bandwidth

FCC 27.50(d)(2):

The power of each fixed or base station transmitting in the 1995-2000 MHz, the 2110-2155 MHz 2155-2180 MHz band, or 2180-2200 MHz band and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to:
(i) An equivalent isotropically radiated power (EIRP) of 1640 watts when transmitting with an emission bandwidth of 1 MHz or less;
(ii) An EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

Output Power (E.I.R.P.)

Date: Mar 16-17, 2015 **Company:** Airvana **Work Order:** P0152
Engineer: Tuyen Truong **EUT Desc:** Switched IQ Radio Point Domestic **EUT Operating Voltage/Frequency:** POE
Temp: 22°C **Humidity:** 33% **Pressure:** 1005mBar

Frequency Range: Low, Mid and High Channels

Notes: The directional gain factor is added to the adjusted peak power reading, and this is divided by the operating bandwidth to calculate EIRP (dBm/MHz).
Two antennas each with gain 5.0dBi in this range are installed on the EUT. For MIMO calculations, N(ant.)=2 is used to calculated overall directional gain: 5.0dBi + 10log(N)dB = 5.0dBi + 3.0dB = 8.0dBi.

Band	Bandwidth (MHz)	Modulation	Channel (MHz)	Frequency (MHz)	Peak Power Reading (dBm)	Power Combiner (dB)	20dB Attenuator (dB)	Cable Factor dB)	Adjusted Peak Power Reading (dBm)	Directional Antenna Gain (dBi)	FCC 27.50(d)(2)(ii); Limit: 1640W/MHz = 62.1dBm/MHz			
											Limit (dBm/MHz)	EIRP (dBm/MHz)	Margin (dB)	Result (Pass/Fail)
Band 10	5	QPSK	Low	2112.5	12.0	4.66	19.83	1.1	37.59	8.0	62.1	39.2	-24.5	Pass
Band 10	5	QPSK	Mid	2140.0	11.0	4.66	19.83	1.1	36.59	8.0	62.1	38.2	-25.5	Pass
Band 10	5	QPSK	High	2167.5	8.9	4.66	19.83	1.1	34.49	8.0	62.1	36.1	-27.6	Pass
Band 10	5	16QAM	Low	2112.5	12.6	4.66	19.83	1.1	38.19	8.0	62.1	39.8	-23.9	Pass
Band 10	5	16QAM	Mid	2140.0	11.3	4.66	19.83	1.1	36.89	8.0	62.1	38.5	-25.2	Pass
Band 10	5	16QAM	High	2167.5	9.5	4.66	19.83	1.1	35.09	8.0	62.1	36.7	-27.0	Pass
Band 10	5	64QAM	Low	2112.5	11.7	4.66	19.83	1.1	37.29	8.0	62.1	38.9	-24.8	Pass
Band 10	5	64QAM	Mid	2140.0	10.6	4.66	19.83	1.1	36.19	8.0	62.1	37.8	-25.9	Pass
Band 10	5	64QAM	High	2167.5	8.4	4.66	19.83	1.1	33.99	8.0	62.1	35.6	-28.1	Pass
Band 4	5	QPSK	Low	2112.5	*See Band 10*									
Band 4	5	QPSK	Mid	2132.5	11.1	4.66	19.83	1.1	36.69	8.0	62.1	38.3	-25.4	Pass
Band 4	5	QPSK	High	2152.5	11.1	4.66	19.83	1.1	36.69	8.0	62.1	38.3	-25.4	Pass
Band 4	5	16QAM	Low	2112.5	*See Band 10*									
Band 4	5	16QAM	Mid	2132.5	11.4	4.66	19.83	1.1	36.99	8.0	62.1	38.6	-25.1	Pass
Band 4	5	16QAM	High	2152.5	11.3	4.66	19.83	1.1	36.89	8.0	62.1	38.5	-25.2	Pass
Band 4	5	64QAM	Low	2112.5	*See Band 10*									
Band 4	5	64QAM	Mid	2132.5	10.7	4.66	19.83	1.1	36.29	8.0	62.1	37.9	-25.8	Pass
Band 4	5	64QAM	High	2152.5	10.3	4.66	19.83	1.1	35.89	8.0	62.1	37.5	-26.2	Pass

Table Result: Pass

Test Site: EMI Chamber 1 **Cable:** Asset# 1787 **20dB Attenuator:** Asset #2053 **Asset#791**
Analyzer: Rental SA#2 **Power Combiner:** Asset# 1939

PEAK TO AVERAGE RATIO

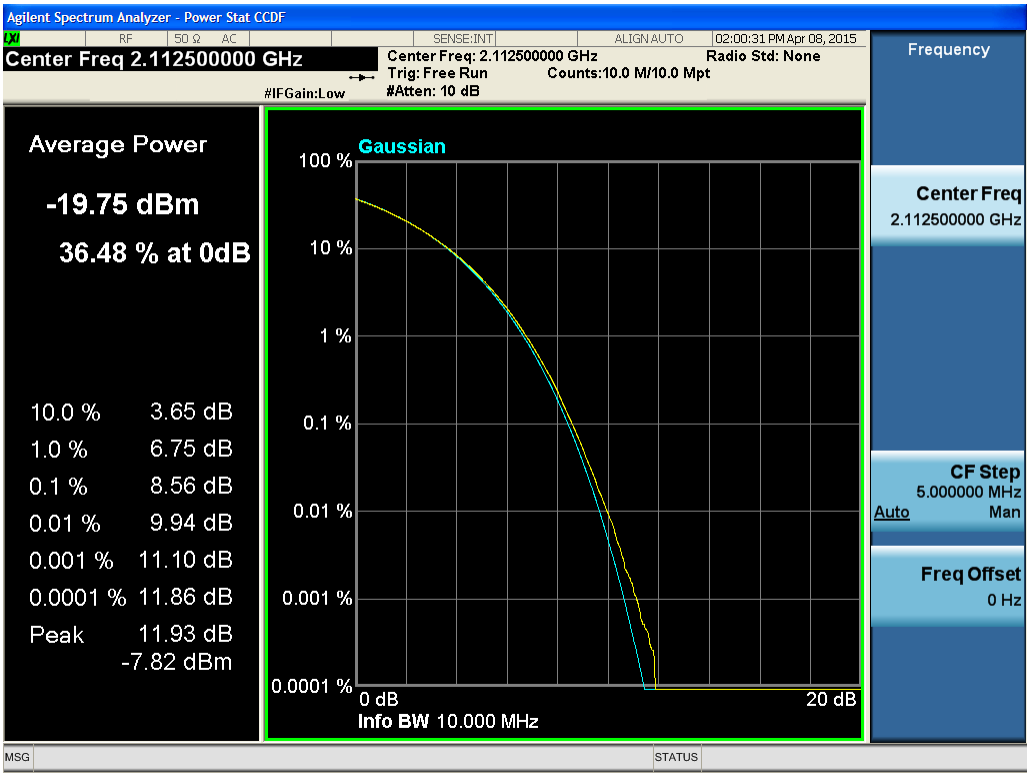
Date: March 20, 24, 2015 **Company:** Airvana **Work Order:** P0152
Engineer: Tuyen Truong / Ryan Brown **EUT Desc:** Switched IQ Radio Point Domestic **EUT Operating Voltage/Frequency:** POE
Temp: 22°C **Humidity:** 33% **Pressure:** 1005mBar
(March 24) Temp: 24°C **Humidity:** 10% **Pressure:** 1011mBar

Test Equipments: Brown SA, Cable (#1787), 20dB Attenuation (#791), Mini Circuit (#1939), 3m Indoor

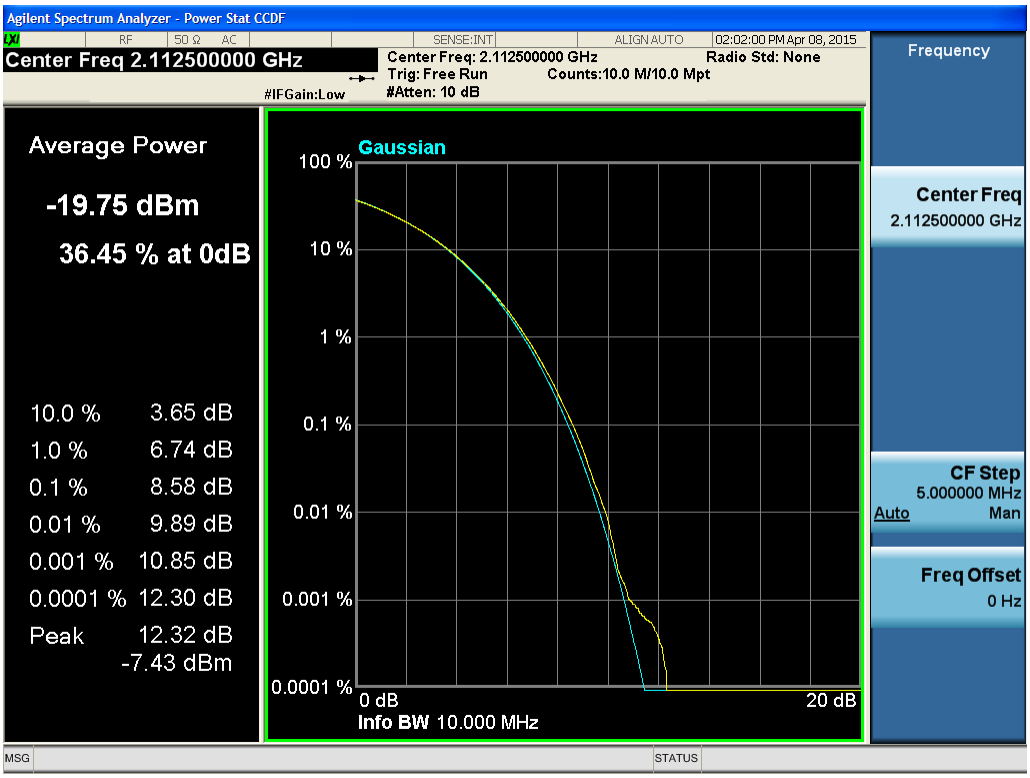
Note:

Band	BW (MHz)	Channel (MHz)	Frequency (MHz)	0.1% Peak to Average Ratio (dB)			Limit (dB)	Margin (dB)			Result Pass /
				QPSK	16QAM	64QAM		QPSK	16QAM	64QAM	
10	5	Low	2112.5	8.56	8.58	8.48	13	-4.44	-4.42	-4.52	Pass
10	5	Mid	2140	8.49	8.5	8.41	13	-4.51	-4.5	-4.59	Pass
10	5	High	2167.5	8.48	8.48	8.42	13	-4.52	-4.52	-4.58	Pass
4	5	Low	2112.5	na	na	na	13	na	na	na	Pass
4	5	Mid	2132.5	8.47	8.48	8.4	13	-4.53	-4.52	-4.6	Pass
4	5	High	2152.5	8.57	8.58	8.49	13	-4.43	-4.42	-4.51	Pass

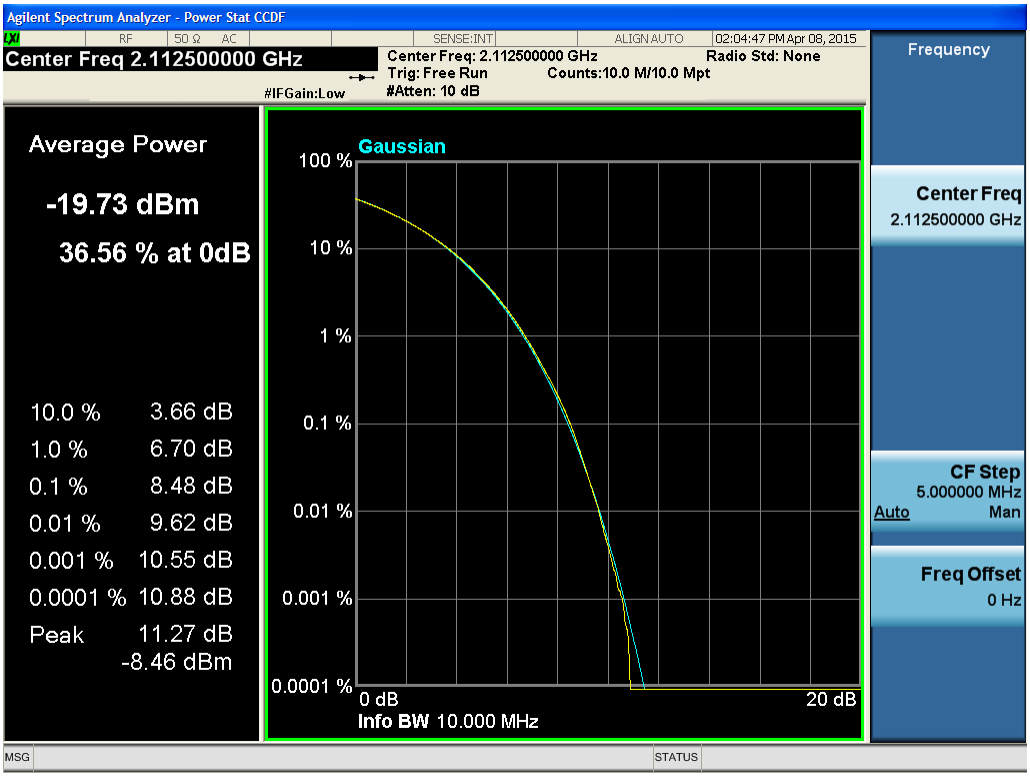
PLOTS



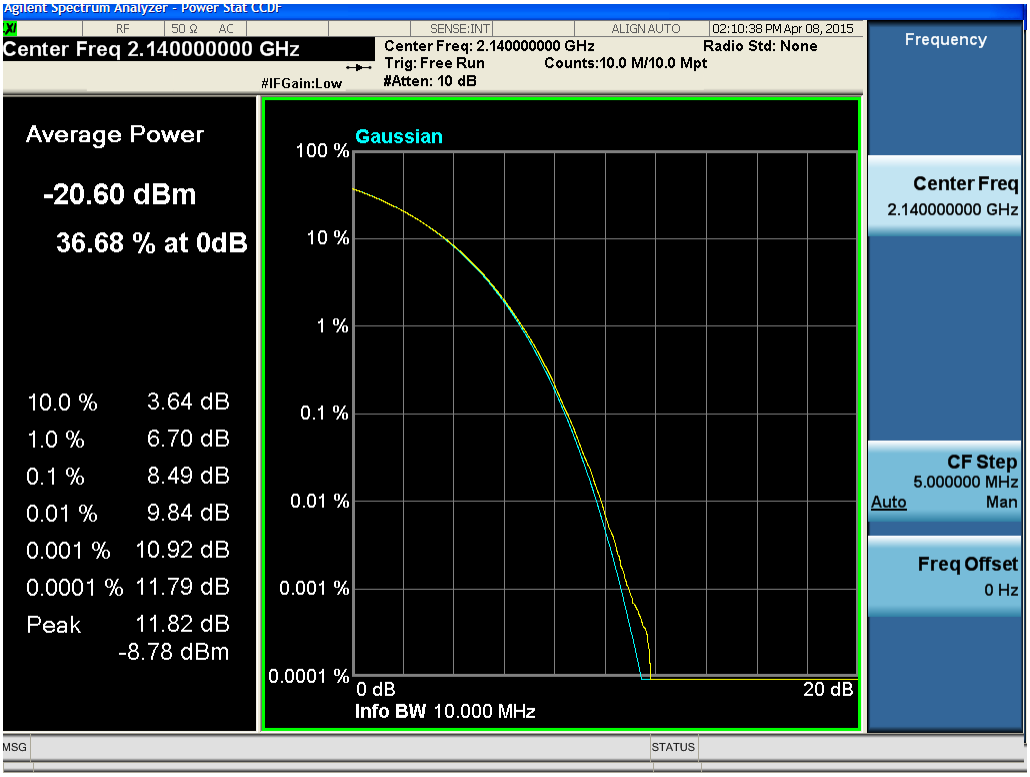
Band 10 - 5MHz BW – Low Channel – QPSK



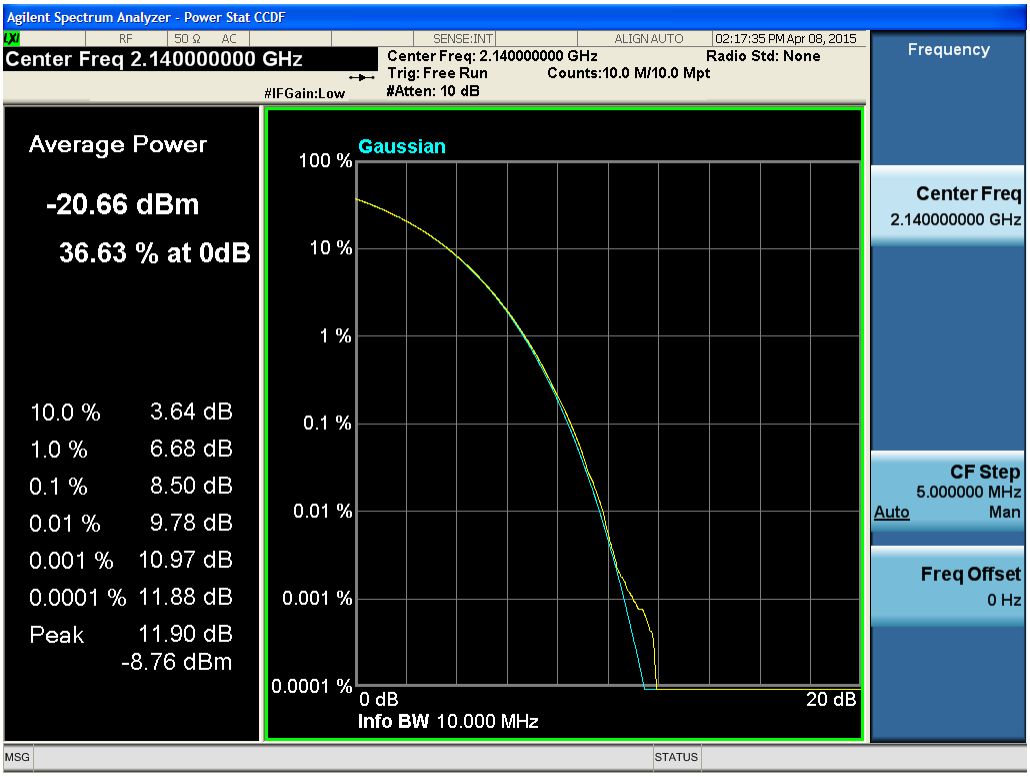
Band 10 - 5MHz BW – Low Channel – 16QAM



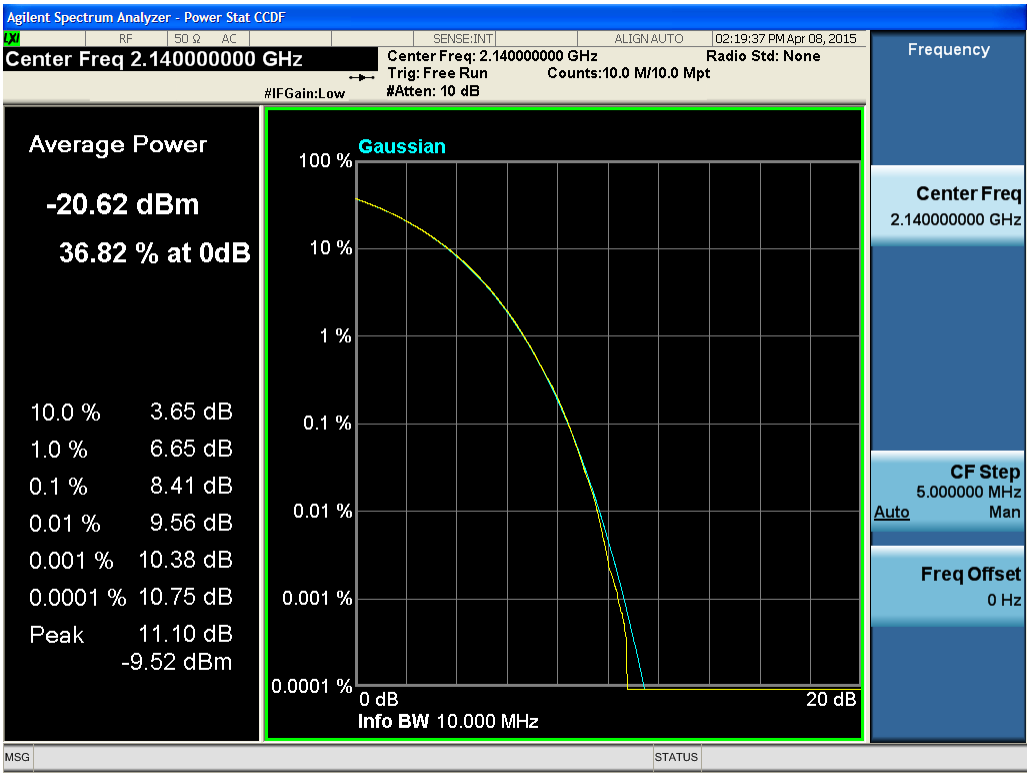
Band 10 - 5MHz BW – Low Channel – 64QAM



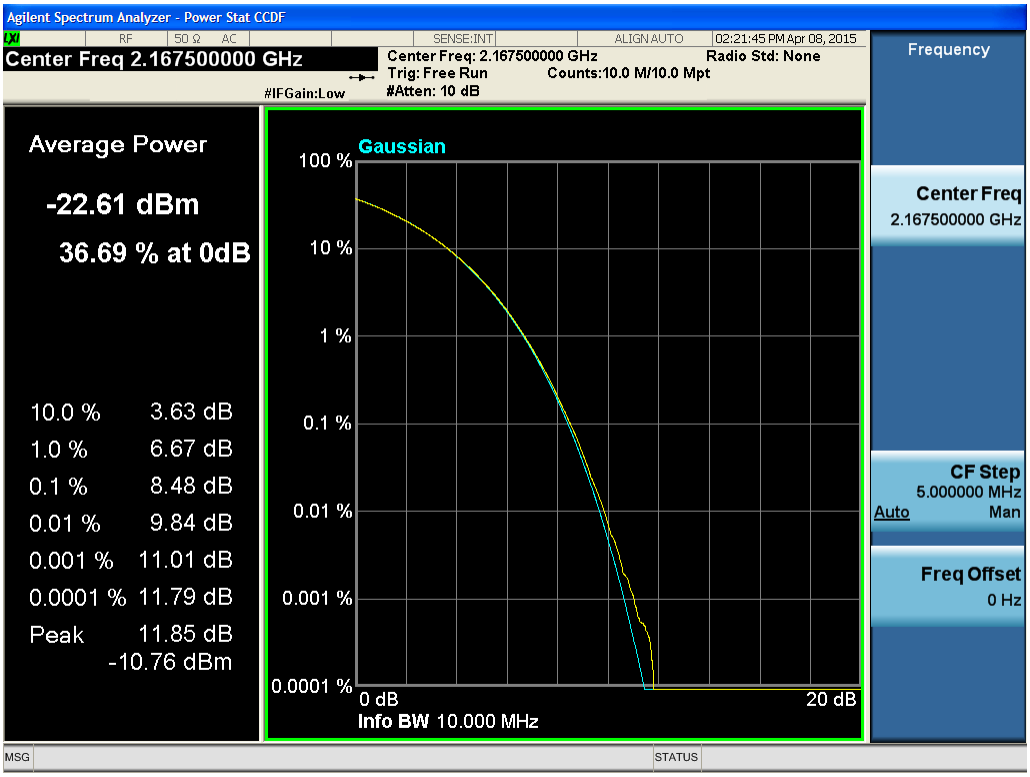
Band 10 - 5MHz BW – Mid Channel - QPSK



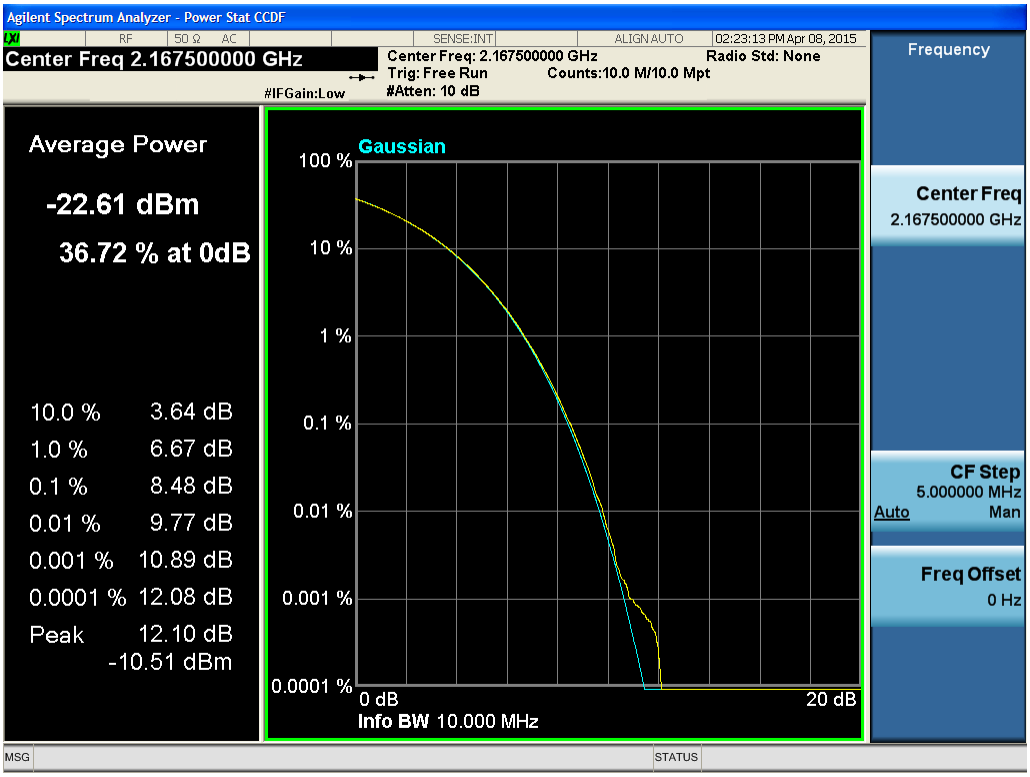
Band 10 - 5MHz BW – Mid Channel – 16QAM



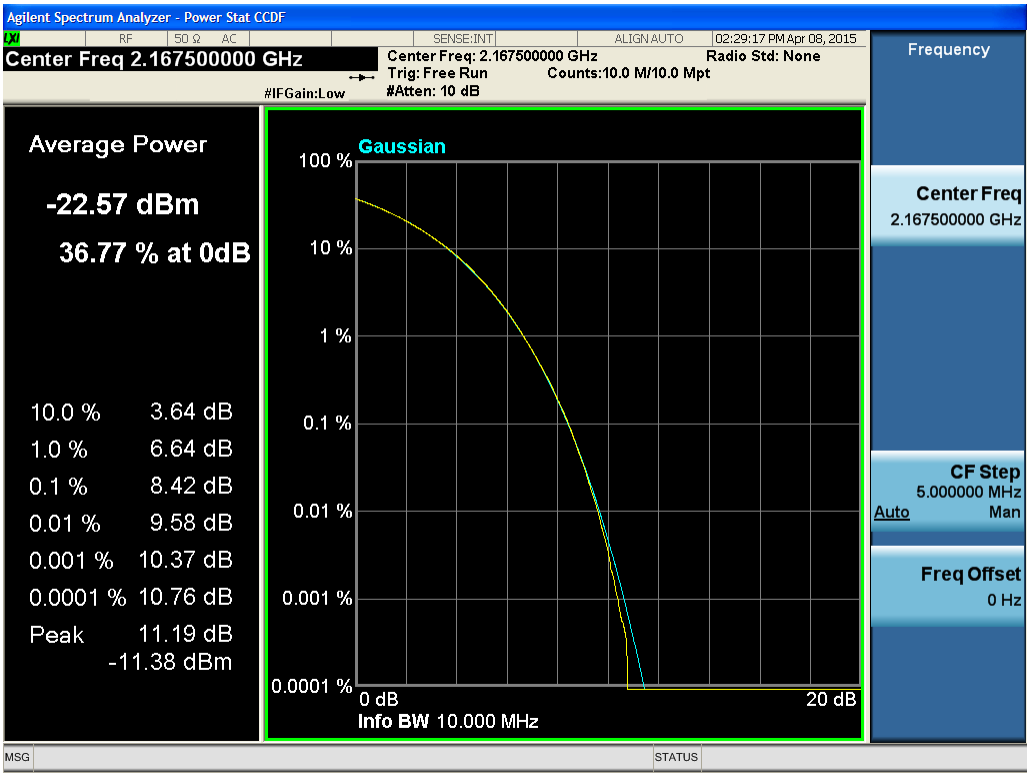
Band 10 - 5MHz BW – Mid Channel – 64QAM



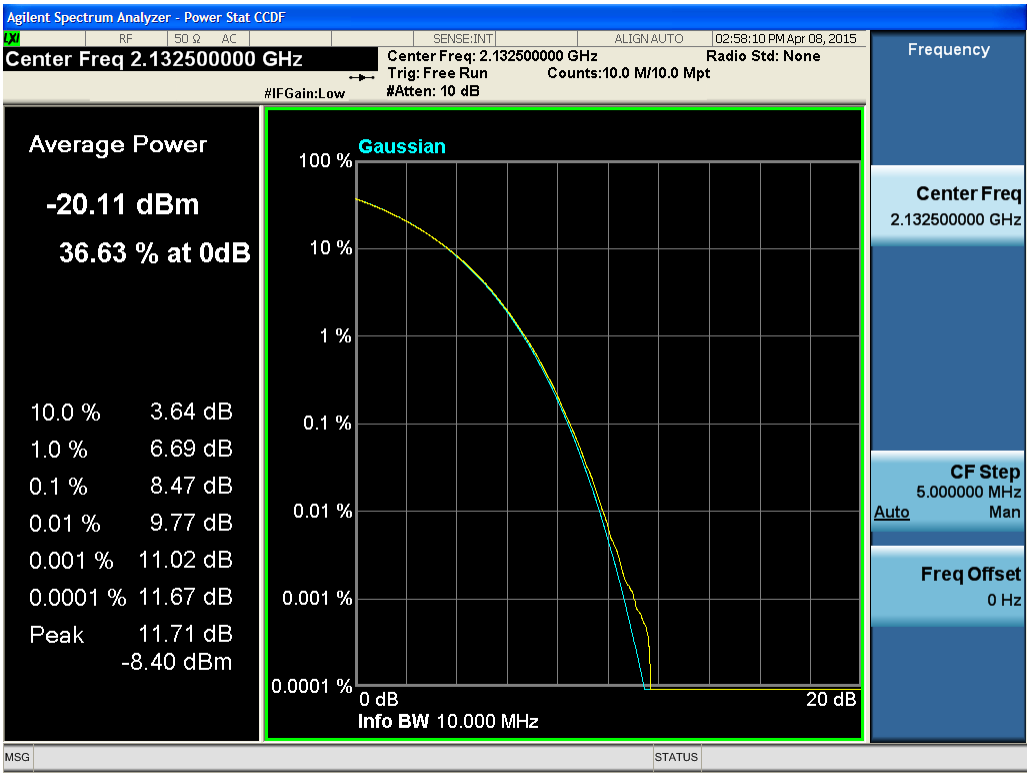
Band 10 - 5MHz BW – High Channel – QPSK



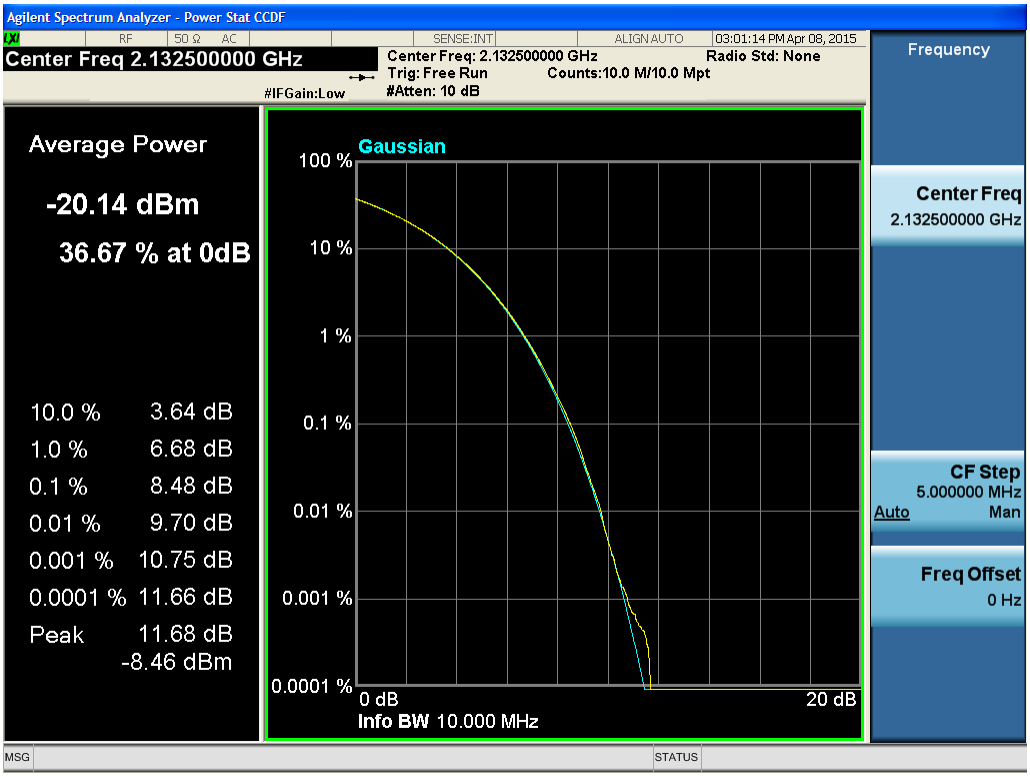
Band 10 - 5MHz BW – High Channel – 16QAM



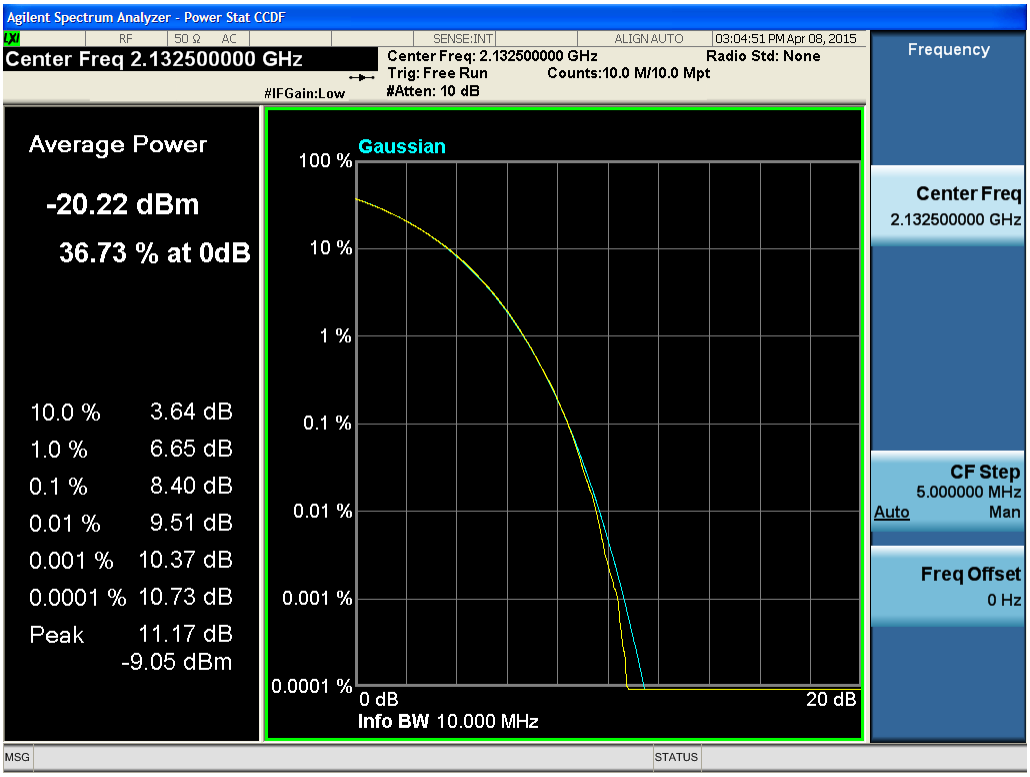
Band 10 - 5MHz BW – High Channel – 64QAM



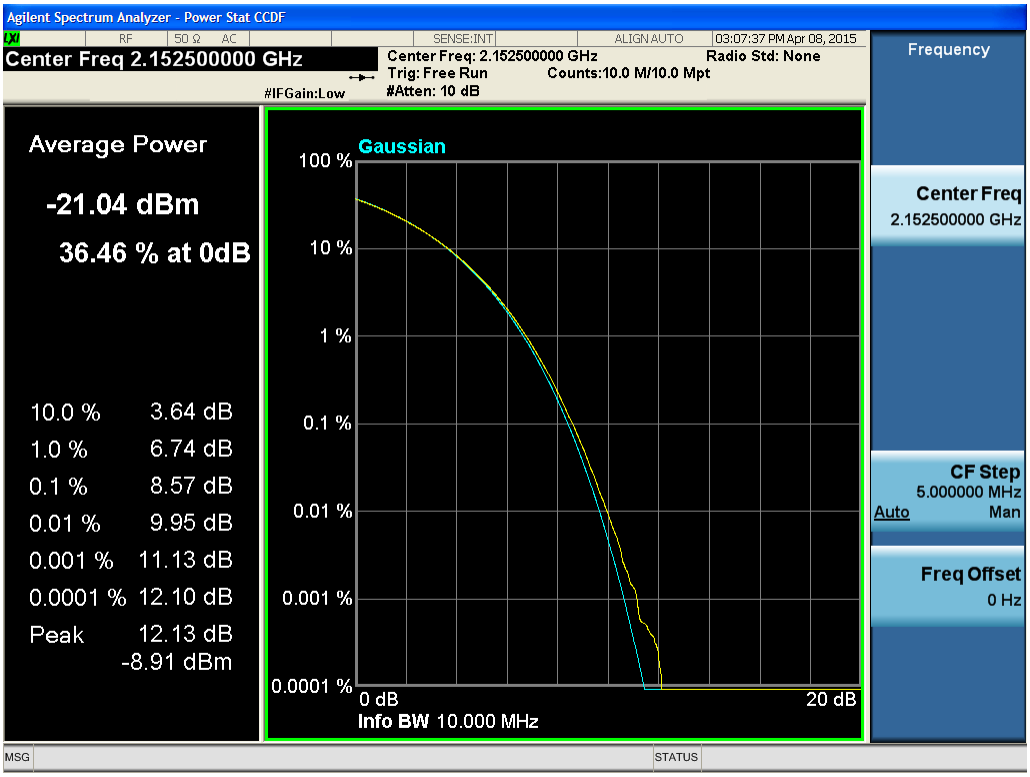
Band 4 - 5MHz BW – Mid Channel – QPSK



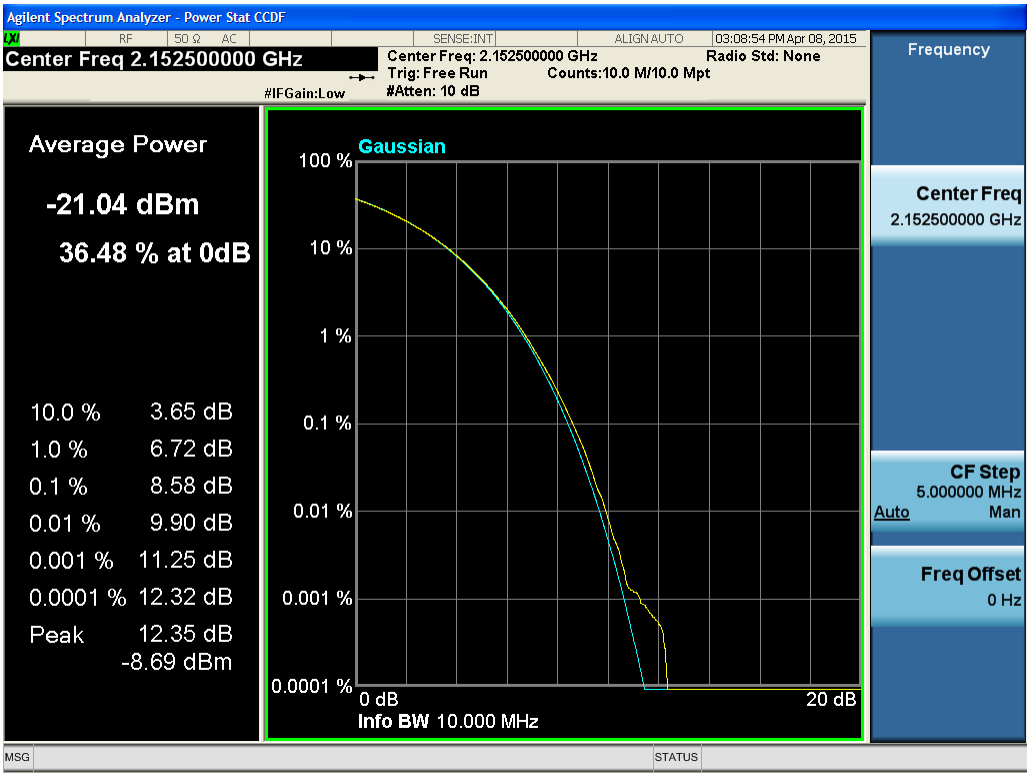
Band 4 - 5MHz BW – Mid Channel – 16QAM



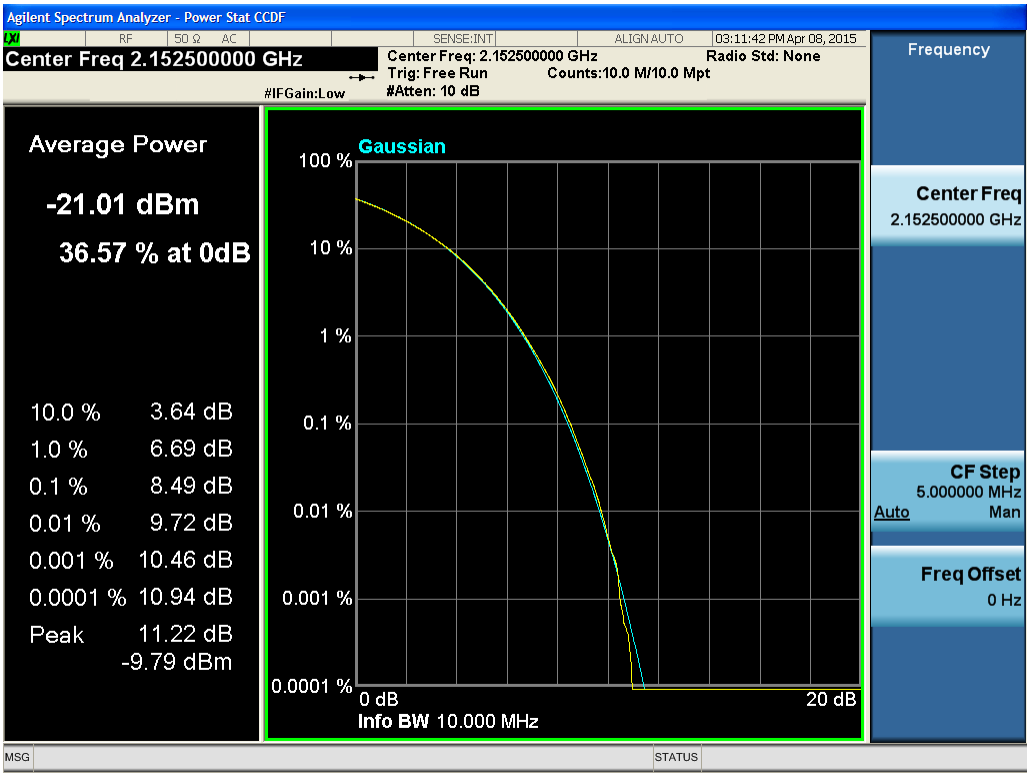
Band 4 - 5MHz BW – Mid Channel – 64QAM



Band 4 - 5MHz BW – High Channel – QPSK



Band 4 - 5MHz BW – High Channel – 16QAM



Band 4 - 5MHz BW – High Channel – 64QAM

Power and PAPR: 10MHz Operating Bandwidth

FCC 27.50(d)(2):

The power of each fixed or base station transmitting in the 1995-2000 MHz, the 2110-2155 MHz 2155-2180 MHz band, or 2180-2200 MHz band and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to:
(i) An equivalent isotropically radiated power (EIRP) of 1640 watts when transmitting with an emission bandwidth of 1 MHz or less;
(ii) An EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

Output Power (E.I.R.P.)

Date: 28-Jul-15 **Company:** Airvana **Work Order:** P0152
Engineer: Ryan Brown / Arik Zwirner **EUT Desc:** Switched IQ Radio Point Domestic **EUT Operating Voltage/Frequency:** POE
Temp: 24°C **Humidity:** 57% **Pressure:** 1005mBar

Frequency Range: Low, Mid and High Channels

Notes: The directional gain factor is added to the adjusted peak power reading, and this is divided by the operating bandwidth to calculate EIRP (dBm/MHz).
Two antennas each with gain 5.0dBi in this range are installed on the EUT. For MIMO calculations, N(ant.)=2 is used to calculated overall directional gain: 5.0dBi + 10log(N)dB = 5.0dBi + 3.0dB = 8.0dBi.

													FCC 27.50(d)(2)(ii); Limit: 1640W/MHz = 62.1dBm/MHz			
Band	Bandwidth (MHz)	Modulation	Channel (MHz)	Frequency (MHz)	Peak Power Reading (dBm)	Average Power Reading (dBm)	PAPR Limit: 13dB (dB)	Power Combiner (dB)	20dB Attenuator (dB)	Cable Factor dB)	Adjusted Peak Power Reading (dBm)	Directional Antenna Gain (dBi)	Limit (dBm/MHz)	EIRP (dBm/MHz)	Margin (dB)	Result (Pass/Fail)
Band 10	10	QPSK	Low	2115.0	6.4	-3.6	10.1	4.7	19.8	0.6	31.5	8.0	62.1	32.3	-30.6	Pass
Band 10	10	QPSK	Mid	2140.0	4.8	-4.7	9.5	4.7	19.8	0.6	29.9	8.0	62.1	30.7	-32.2	Pass
Band 10	10	QPSK	High	2165.0	4.2	-5.4	9.6	4.7	19.8	0.6	29.3	8.0	62.1	30.1	-32.8	Pass
Band 10	10	16QAM	Low	2115.0	6.1	-3.7	9.8	4.7	19.8	0.6	31.2	8.0	62.1	32.0	-30.9	Pass
Band 10	10	16QAM	Mid	2140.0	5.1	-4.7	9.9	4.7	19.8	0.6	30.2	8.0	62.1	31.0	-31.9	Pass
Band 10	10	16QAM	High	2165.0	4.3	-5.5	9.8	4.7	19.8	0.6	29.4	8.0	62.1	30.2	-32.7	Pass
Band 10	10	64QAM	Low	2115.0	6.4	-3.8	10.1	4.7	19.8	0.6	31.5	8.0	62.1	32.3	-30.6	Pass
Band 10	10	64QAM	Mid	2140.0	5.5	-4.8	10.2	4.7	19.8	0.6	30.6	8.0	62.1	31.4	-31.5	Pass
Band 10	10	64QAM	High	2165.0	5.0	-5.5	10.5	4.7	19.8	0.6	30.1	8.0	62.1	30.9	-32.0	Pass
Band 4	10	QPSK	Low	2115.0	*See Band 10*											
Band 4	10	QPSK	Mid	2132.5	5.4	-4.1	9.5	4.7	19.8	0.6	30.5	8.0	62.1	31.3	-31.6	Pass
Band 4	10	QPSK	High	2150.0	4.8	-4.6	9.5	4.7	19.8	0.6	29.9	8.0	62.1	30.7	-32.2	Pass
Band 4	10	16QAM	Low	2115.0	*See Band 10*											
Band 4	10	16QAM	Mid	2132.5	5.7	-4.0	9.7	4.7	19.8	0.6	30.8	8.0	62.1	31.6	-31.3	Pass
Band 4	10	16QAM	High	2150.0	5.3	-4.6	9.9	4.7	19.8	0.6	30.4	8.0	62.1	31.2	-31.7	Pass
Band 4	10	64QAM	Low	2115.0	*See Band 10*											
Band 4	10	64QAM	Mid	2132.5	6.1	-4.0	10.1	4.7	19.8	0.6	31.2	8.0	62.1	32.0	-30.9	Pass
Band 4	10	64QAM	High	2150.0	5.4	-4.6	10.0	4.7	19.8	0.6	30.5	8.0	62.1	31.3	-31.6	Pass

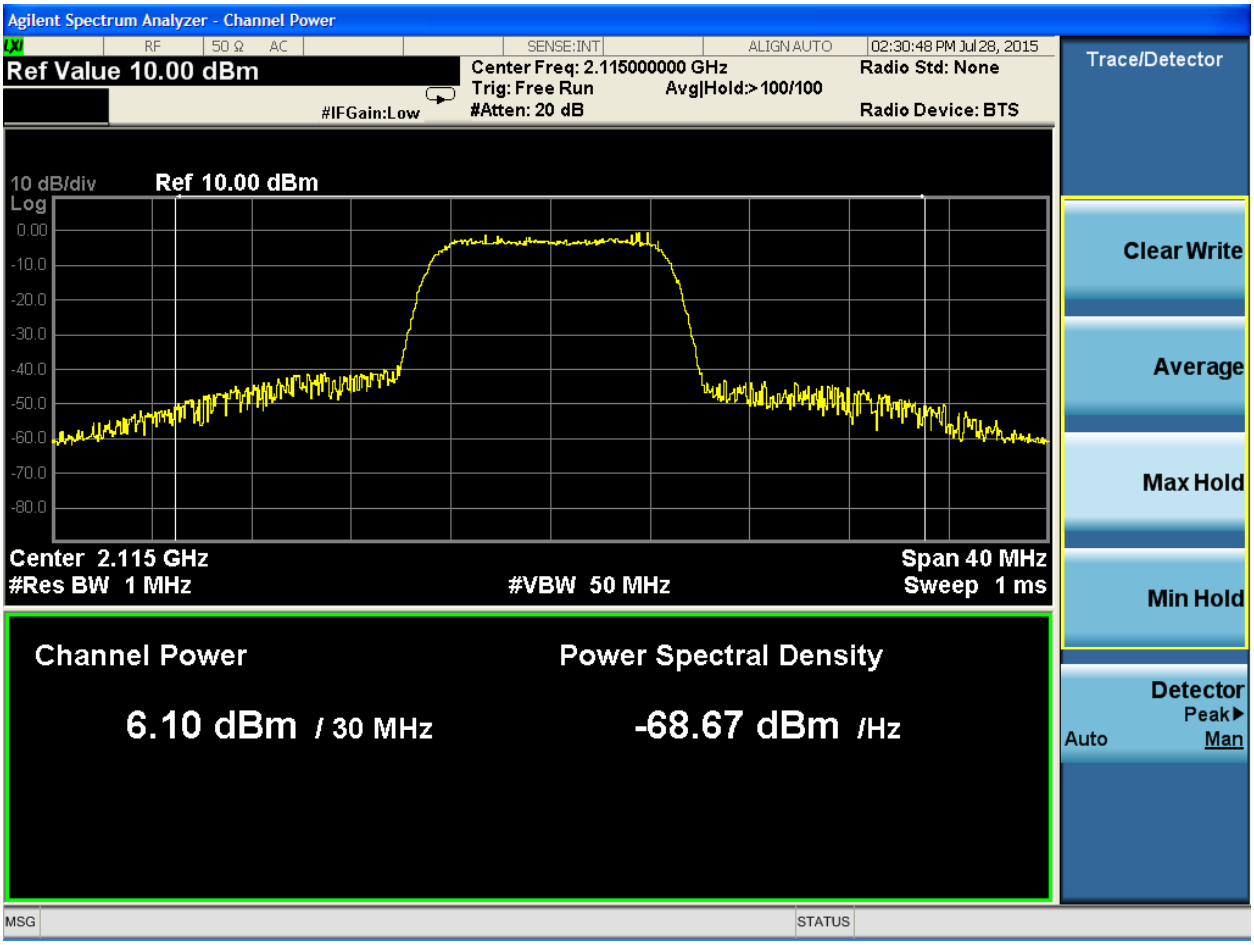
Table Result: Pass

Test Site: ESD-1 **Cable:** 1509 **20dB Attenuator:** Asset#791
Analyzer: MXE EMI Receiver **Power Combiner:** 1939

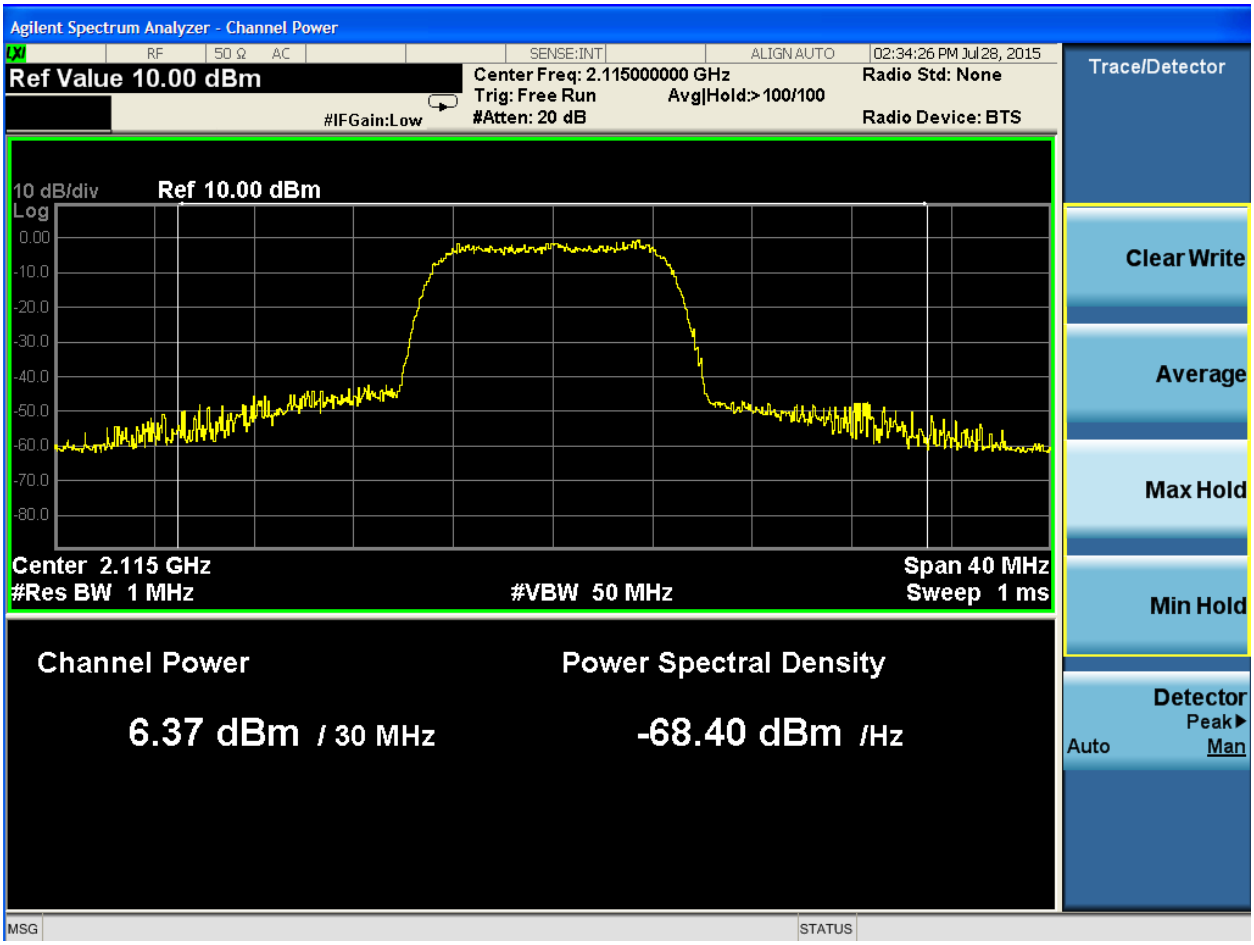
Spectrum analyzer plots for peak and average are on the following pages.

Band 10 Peak Readings:

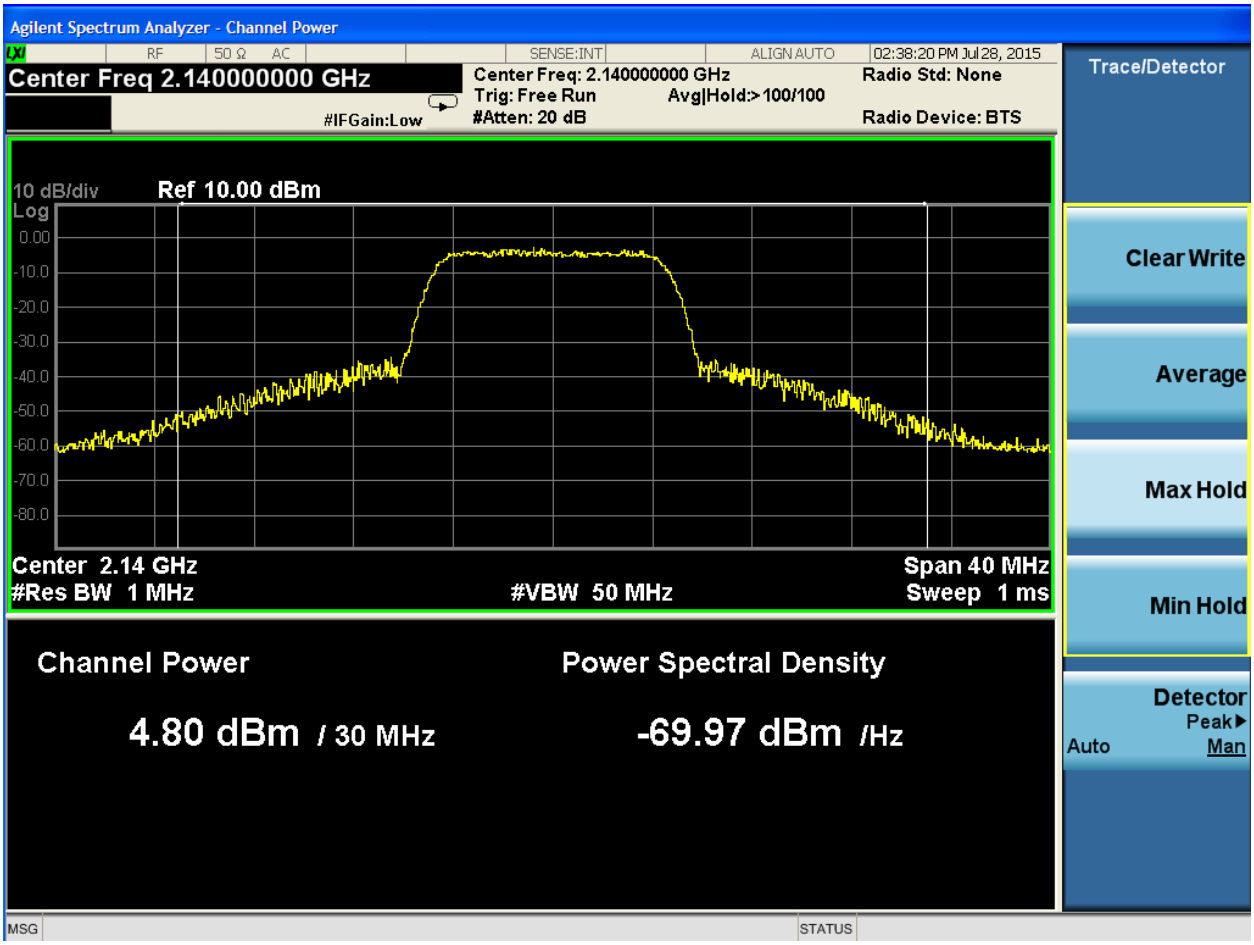
Band 10, Low Channel, QPSK



Band 10, Low Channel, 16QAM



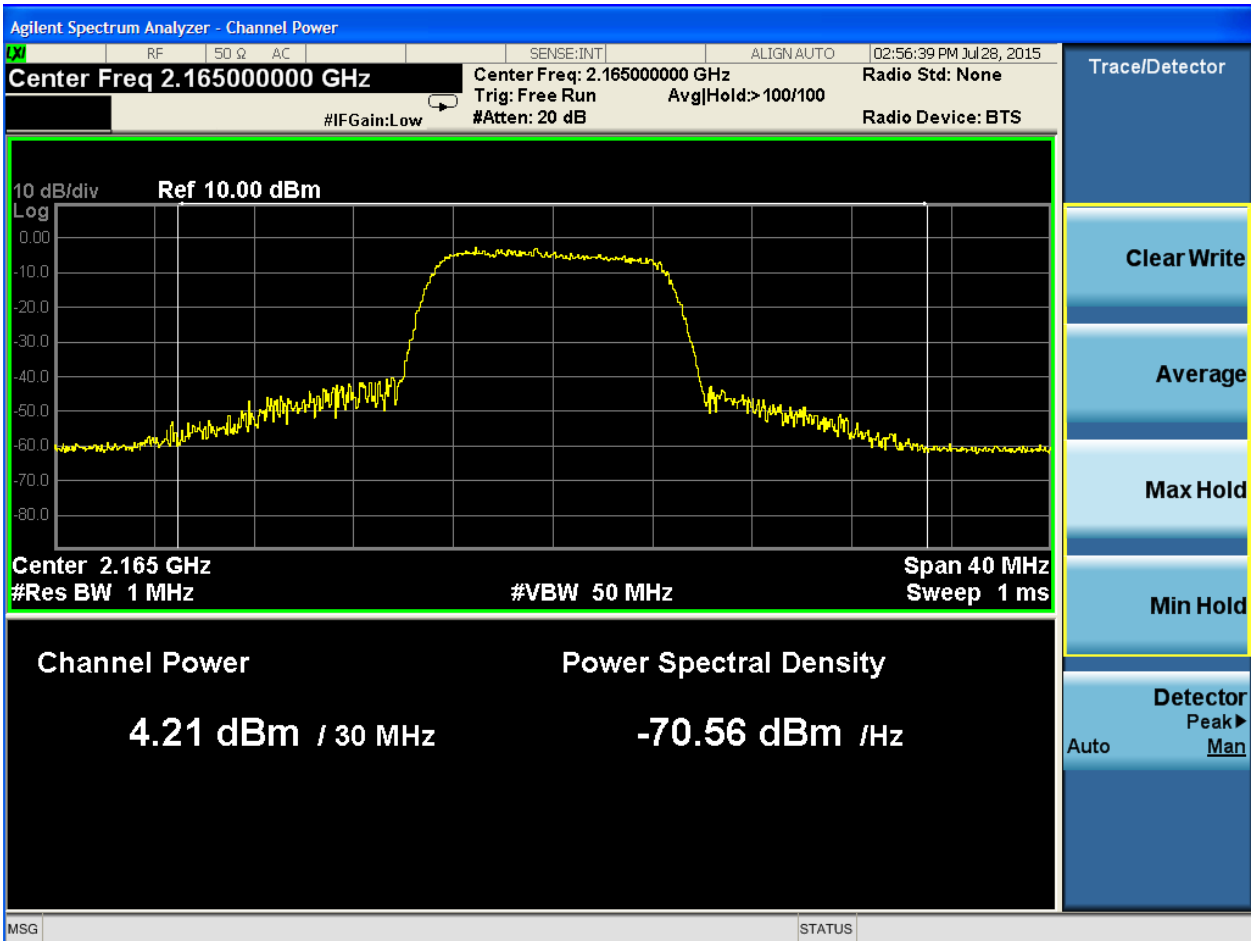
Band 10, Low Channel, 64QAM



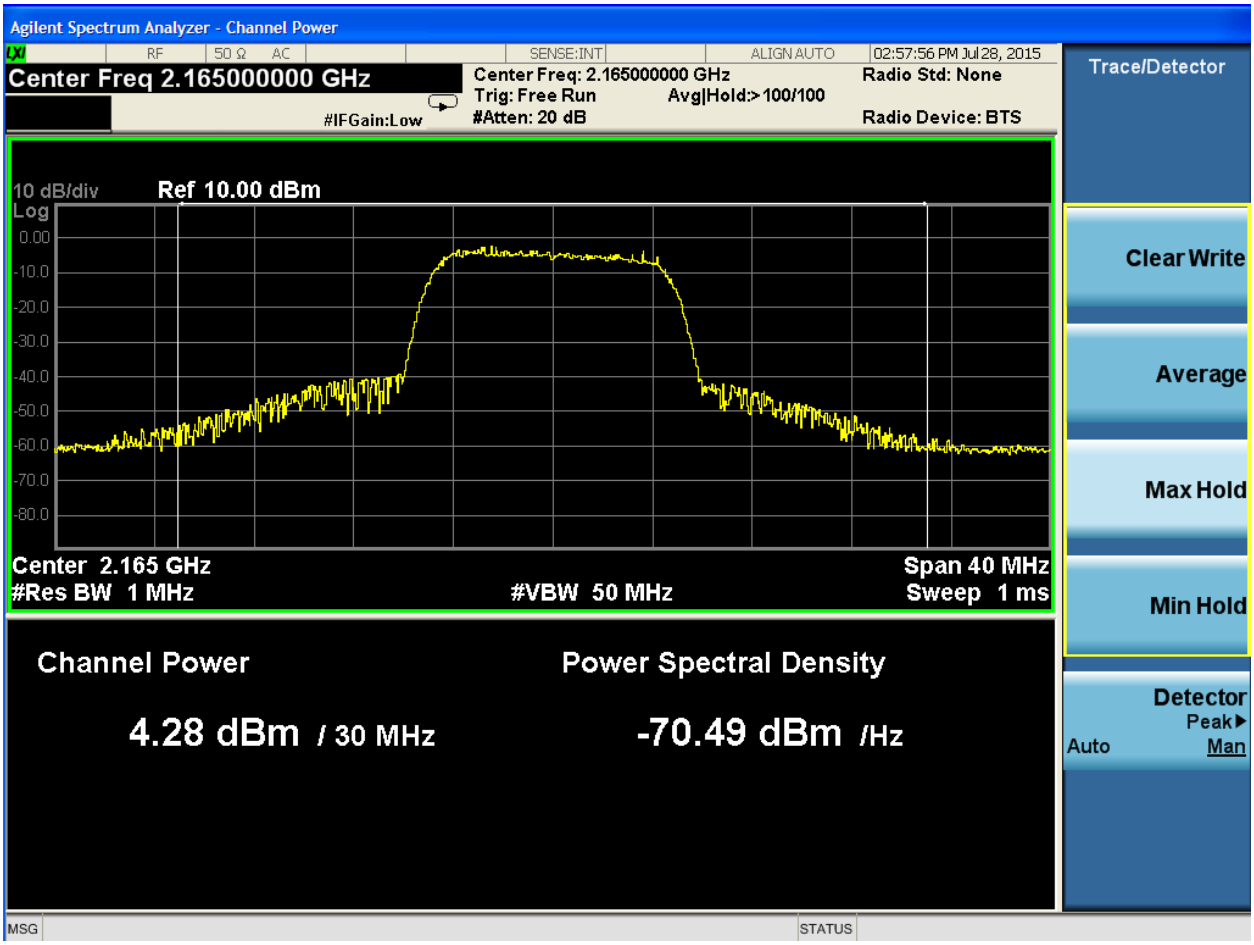
Band 10, Mid Channel, QPSK

Band 10, Mid Channel, 16QAM

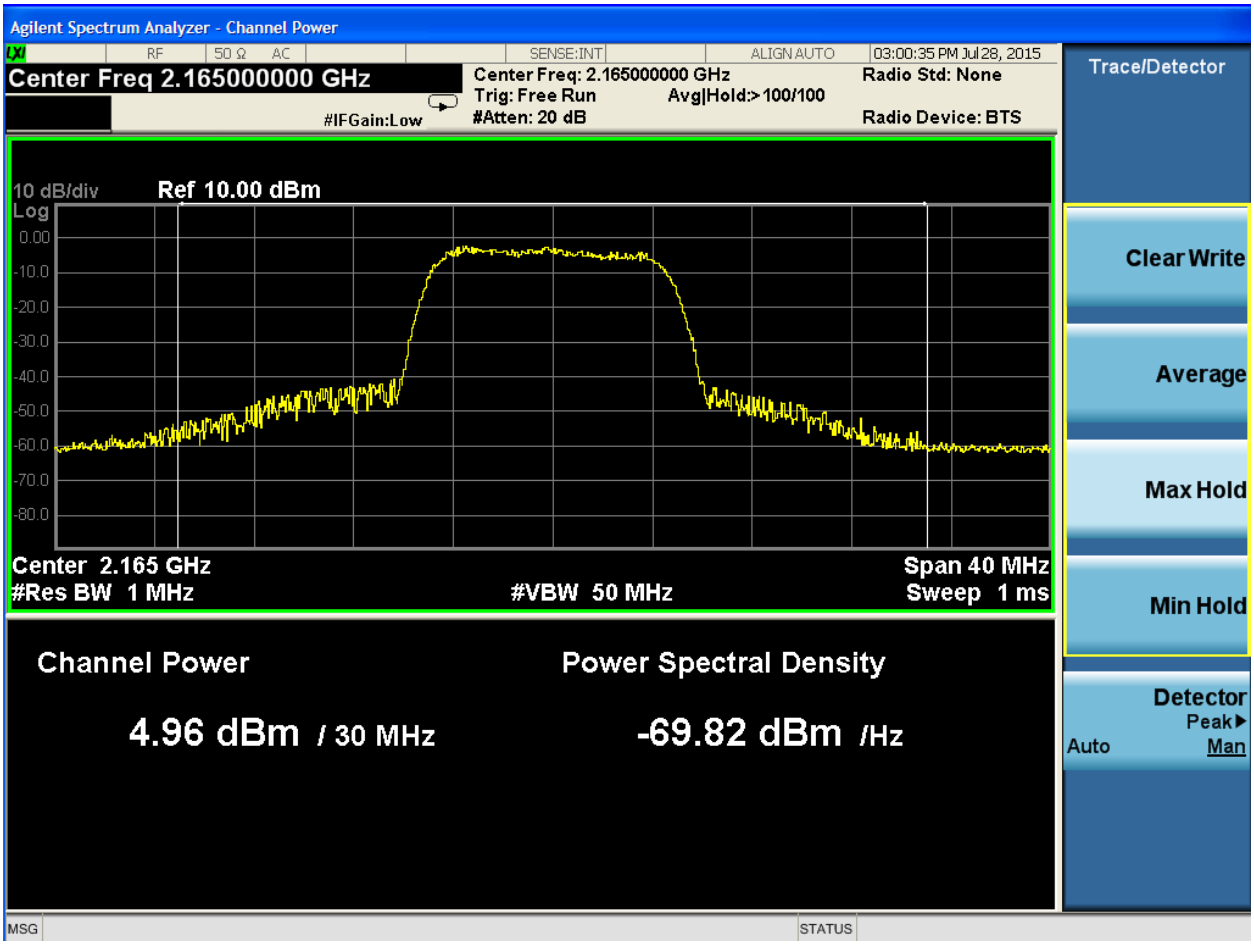
Band 10, Mid Channel, 64QAM



Band 10, High Channel, QPSK

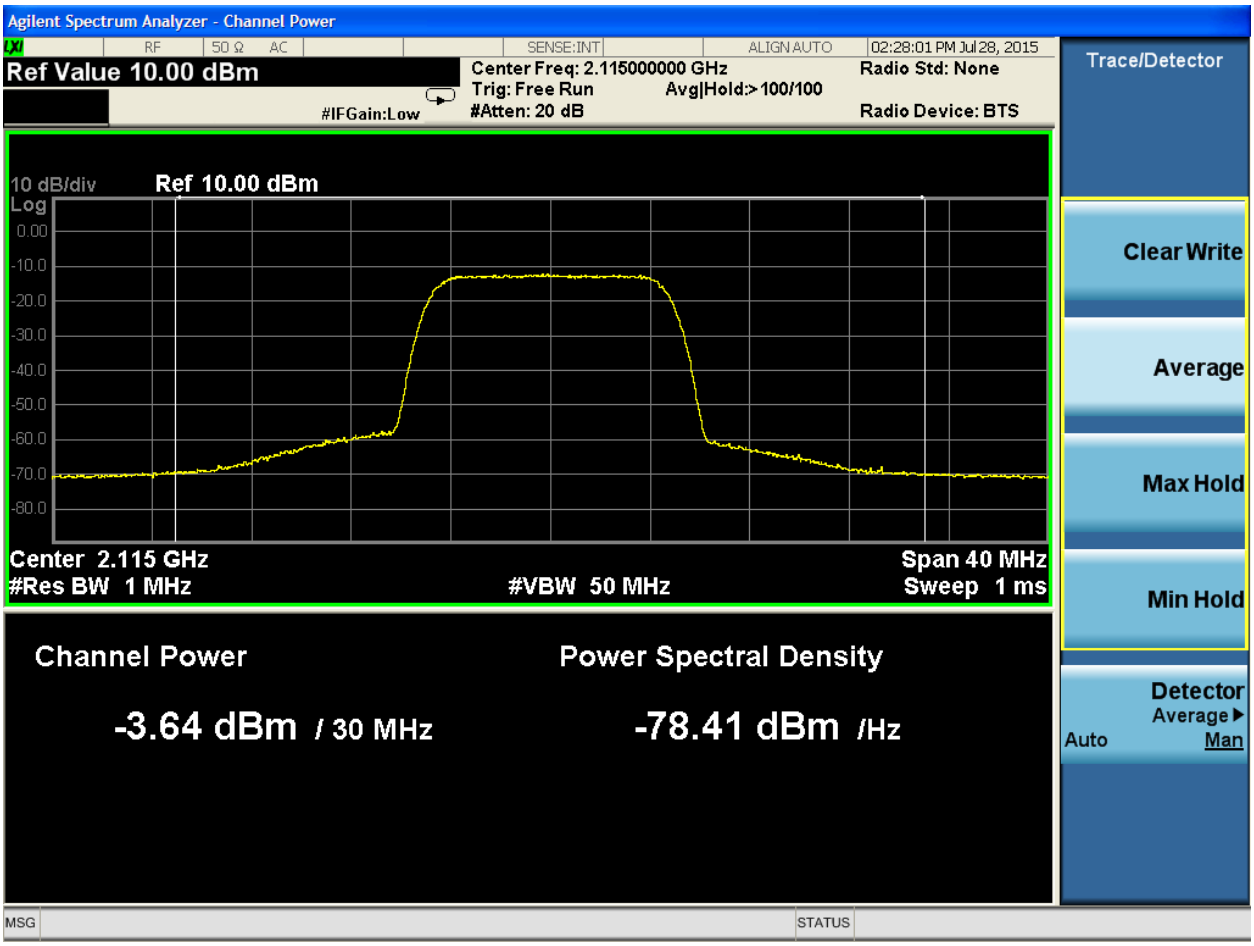


Band 10, High Channel, 16QAM

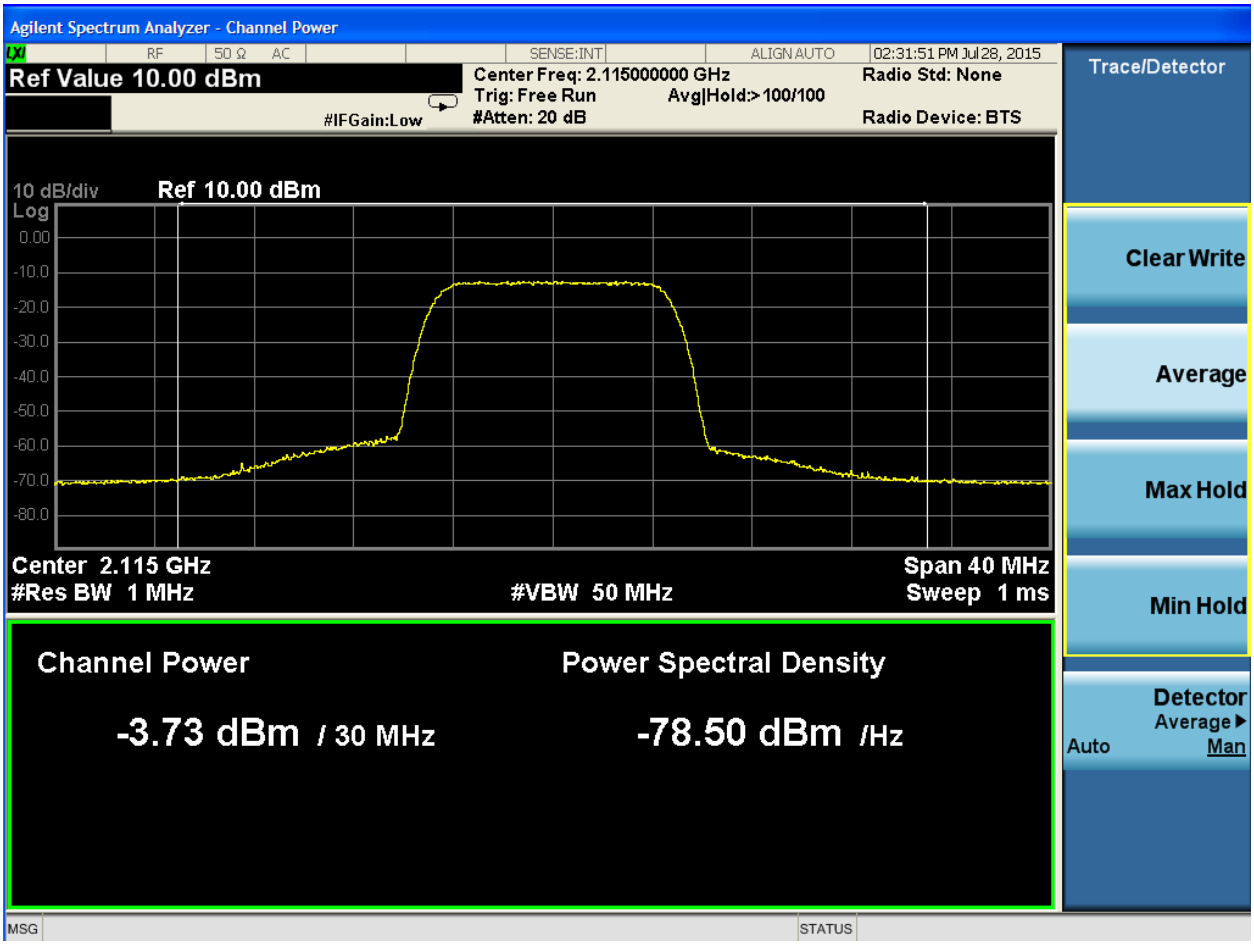


Band 10, High Channel, 64QAM

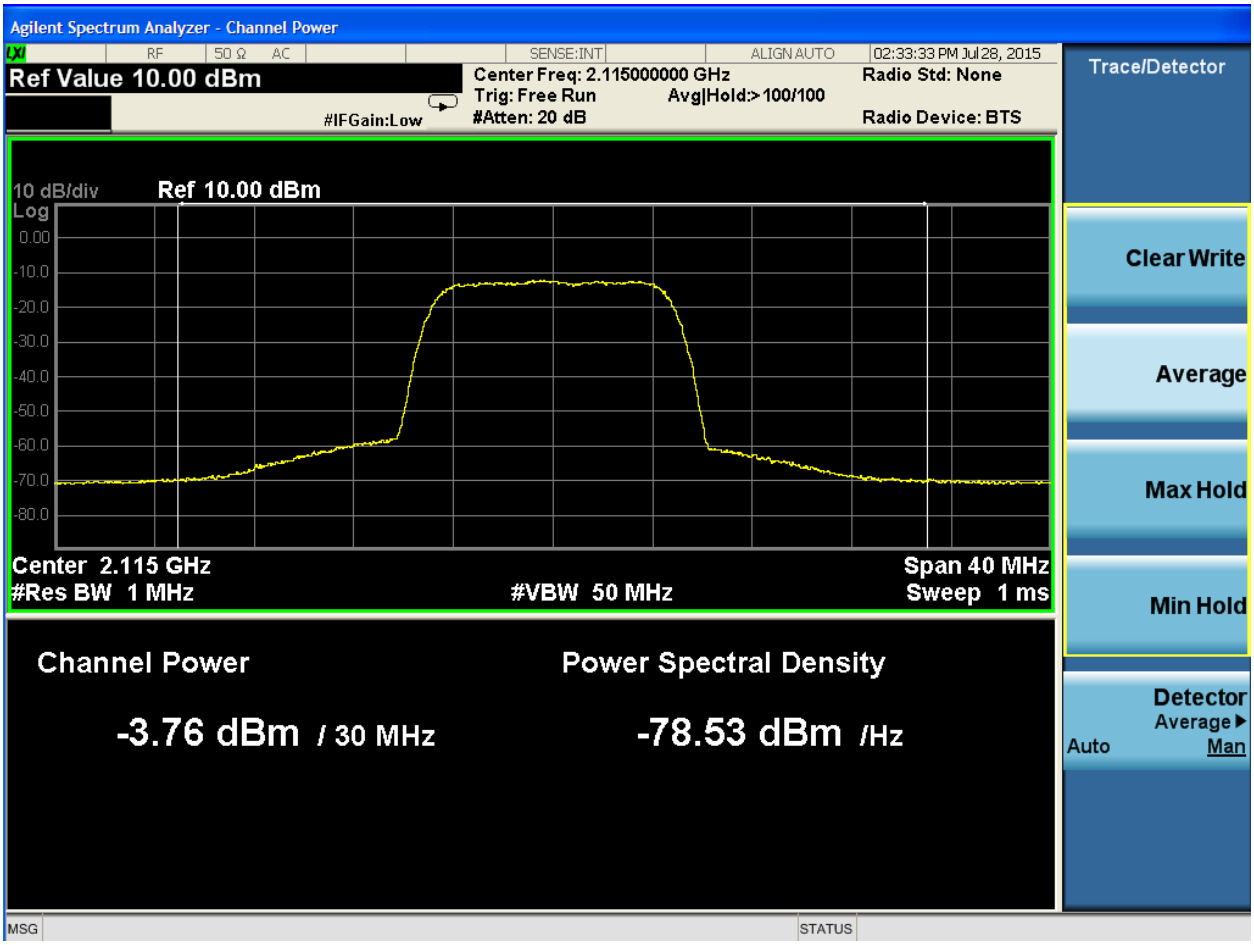
Band 10 Average Readings:



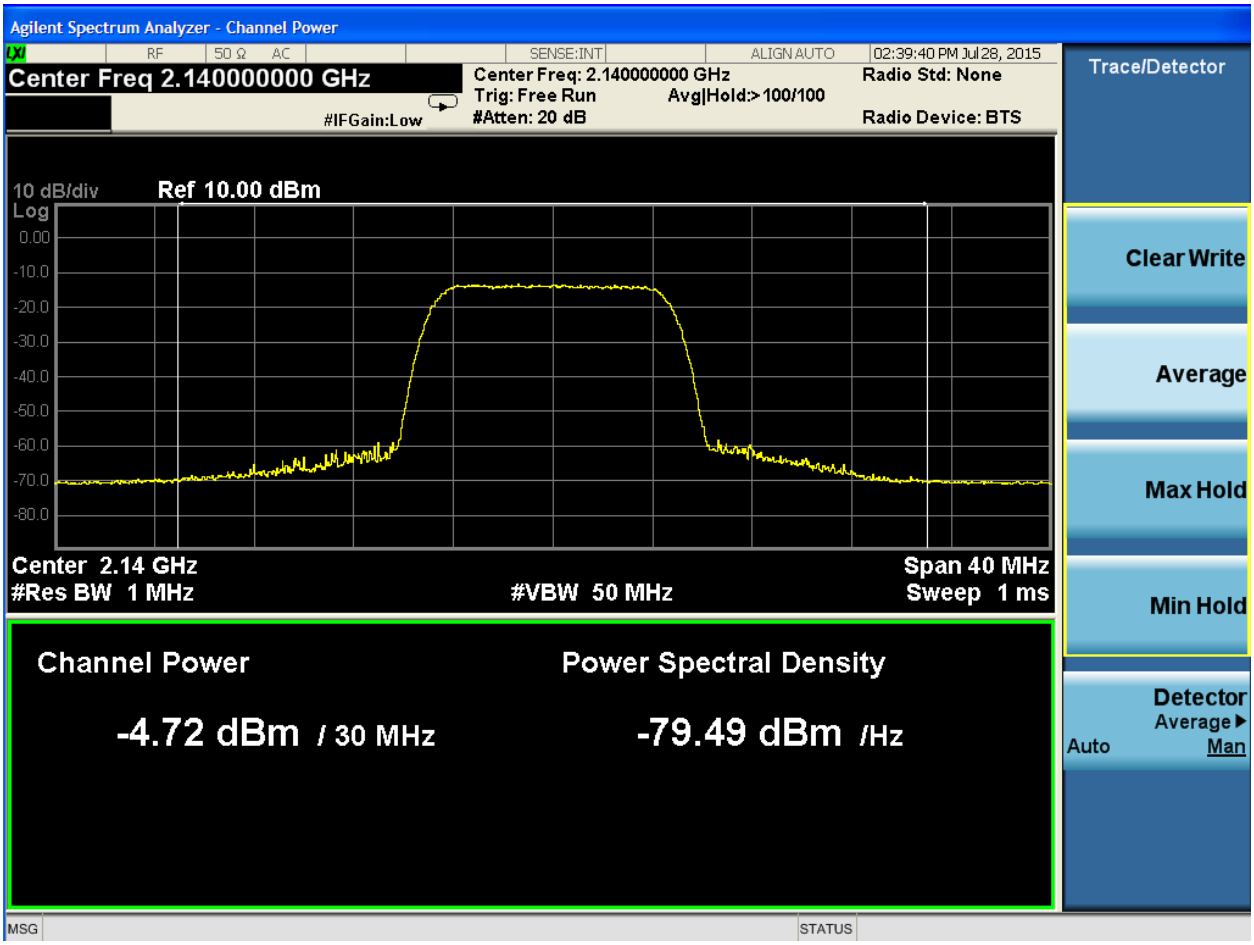
Band 10, Low Channel, QPSK



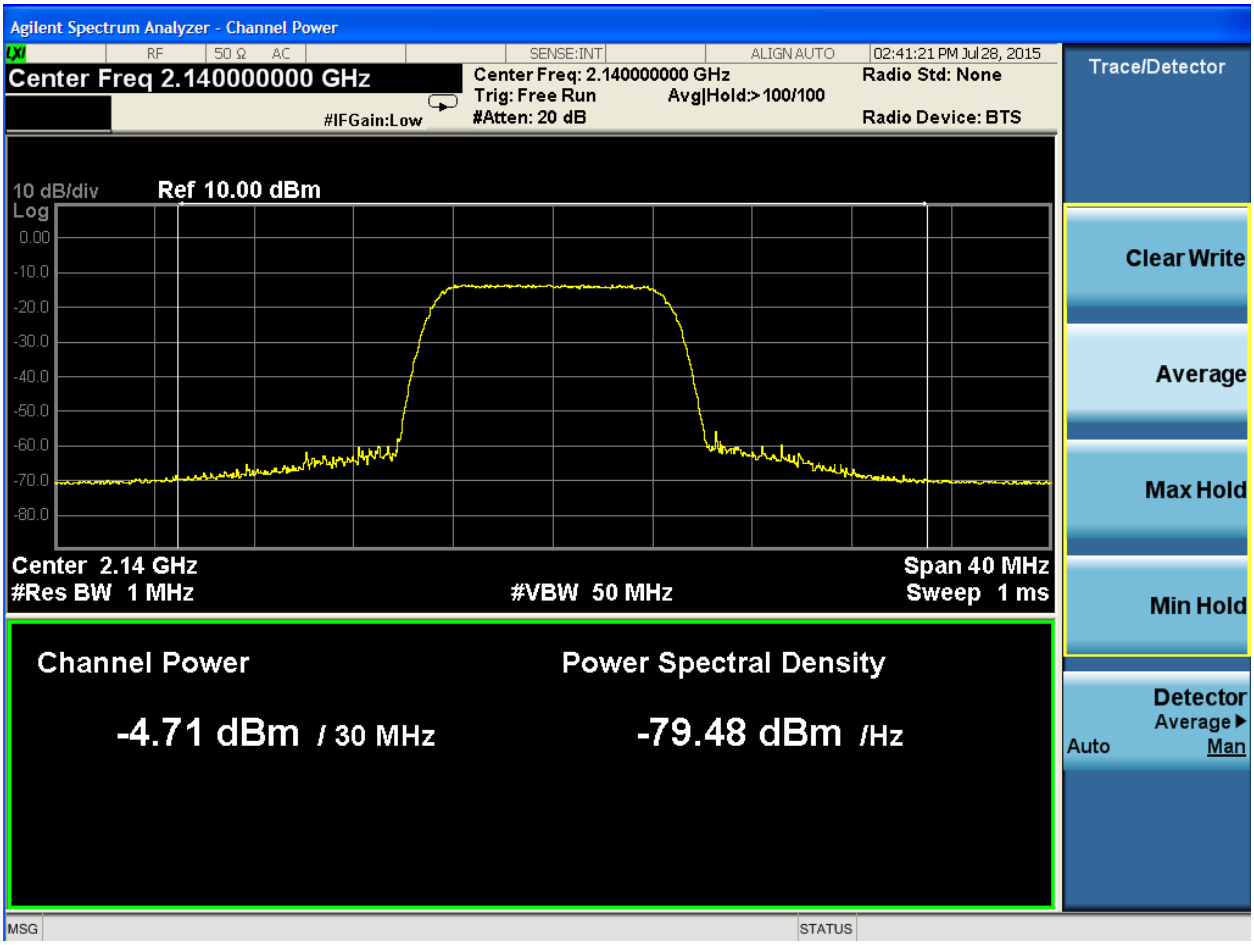
Band 10, Low Channel, 16QAM



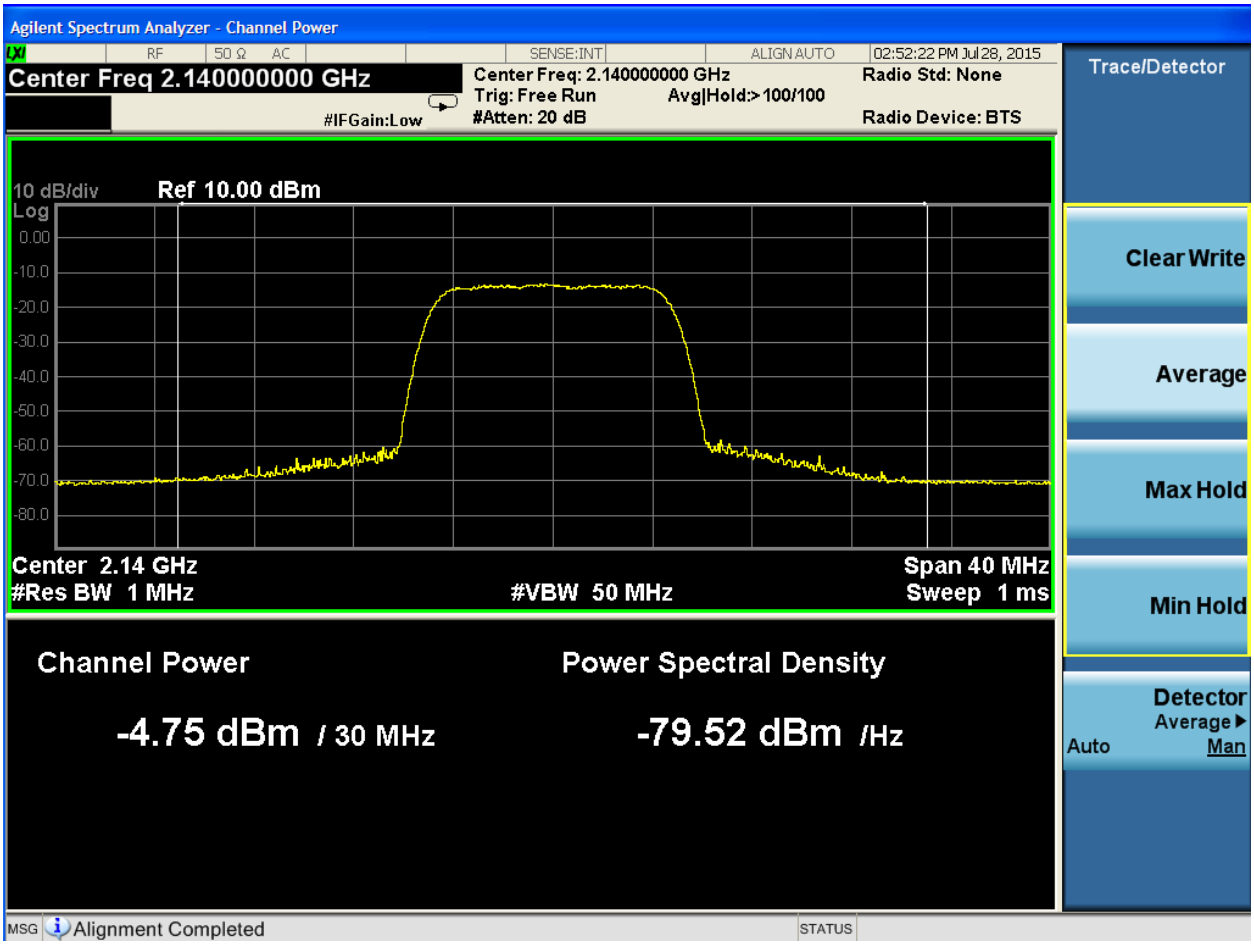
Band 10, Low Channel, 64QAM



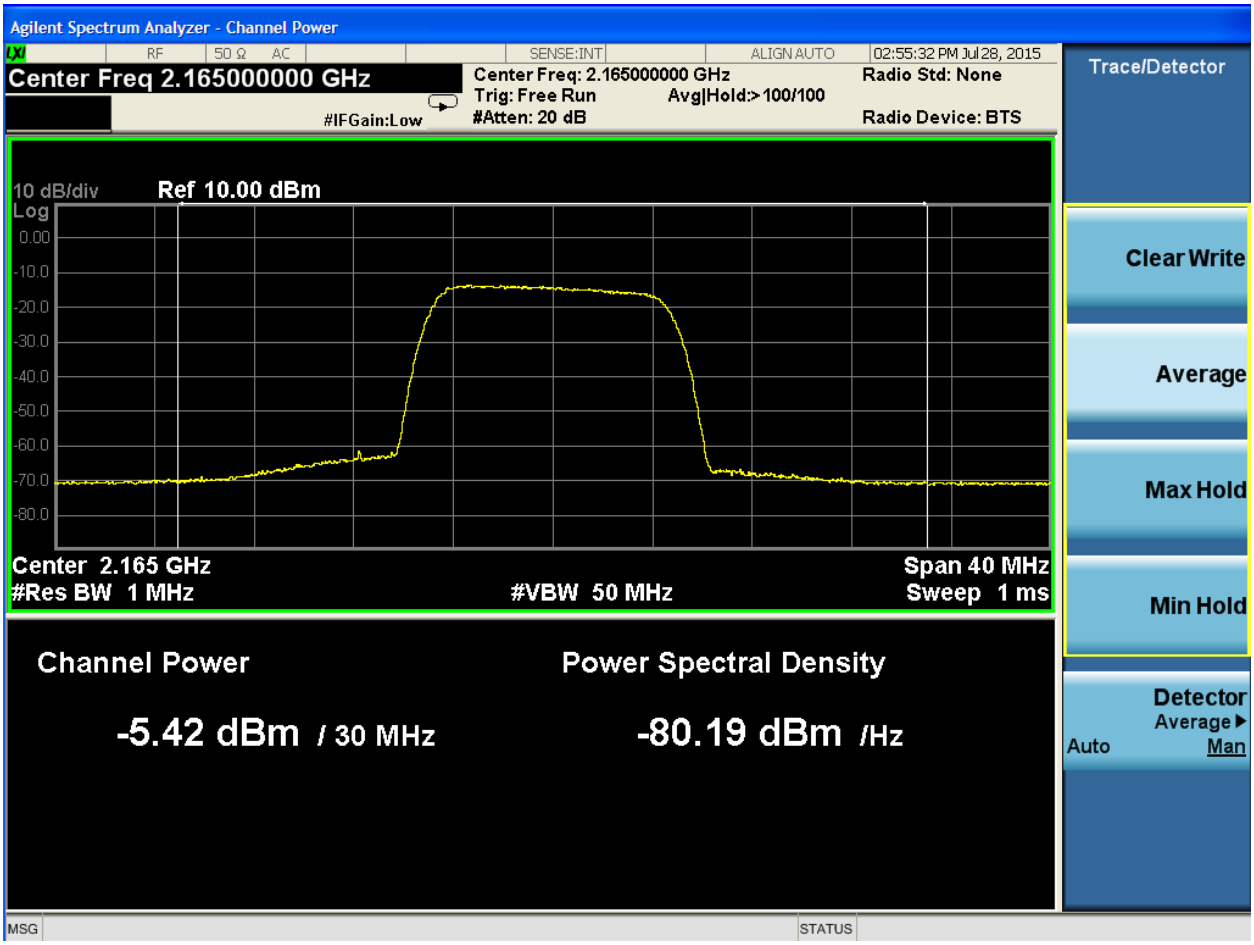
Band 10, Mid Channel, QPSK



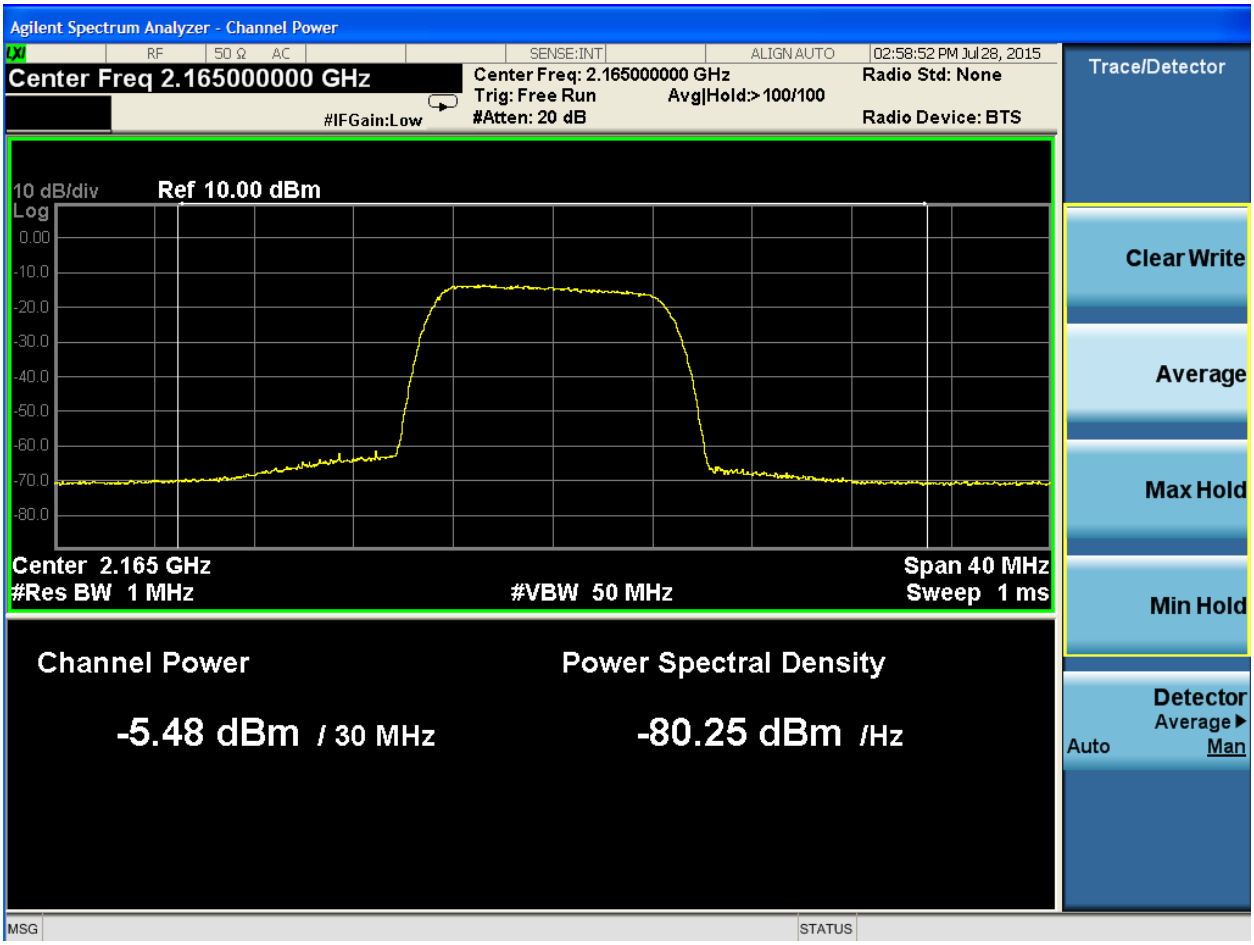
Band 10, Mid Channel, 16QAM



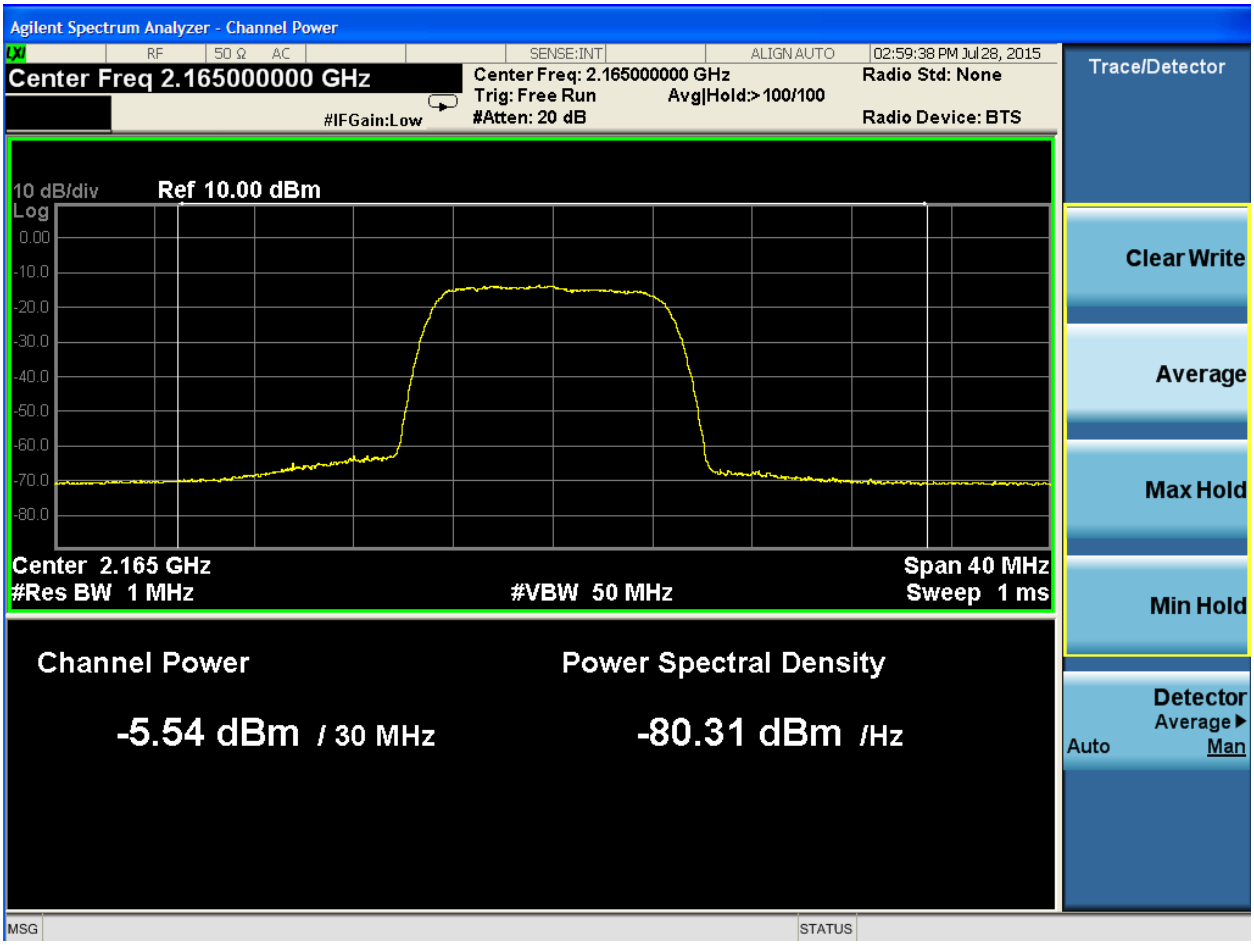
Band 10, Mid Channel, 64QAM



Band 10, High Channel, QPSK

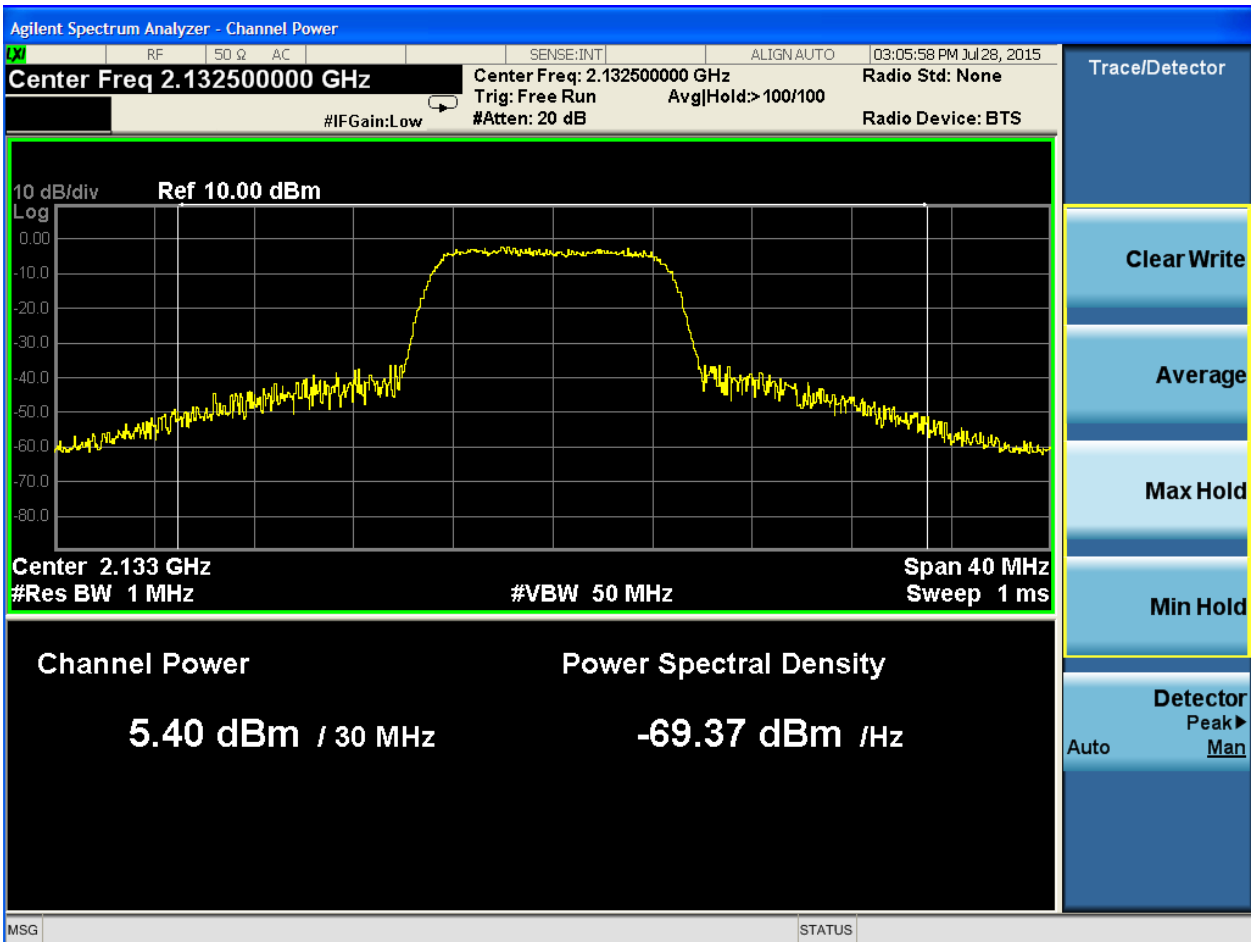


Band 10, High Channel, 16QAM

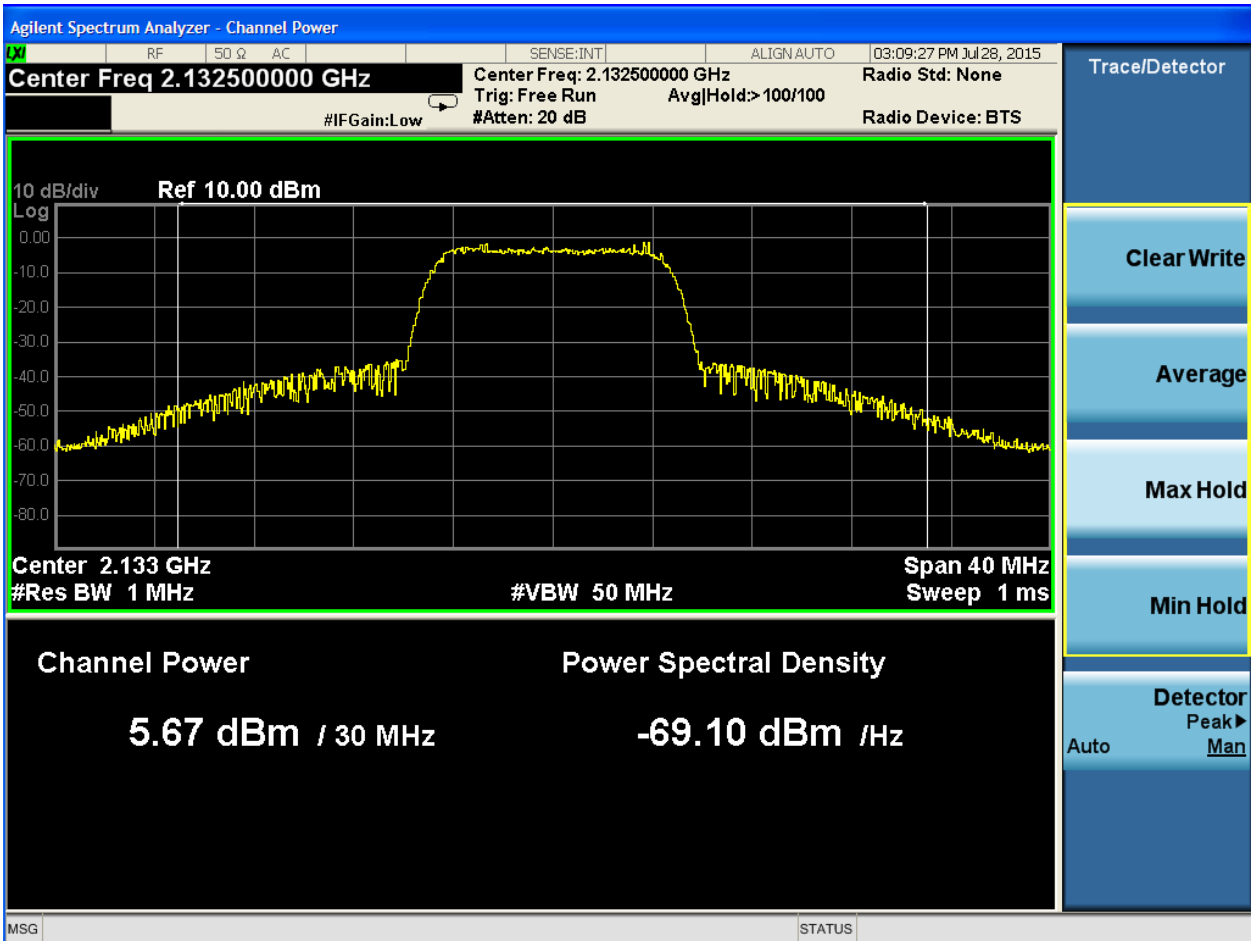


Band 10, High Channel, 64QAM

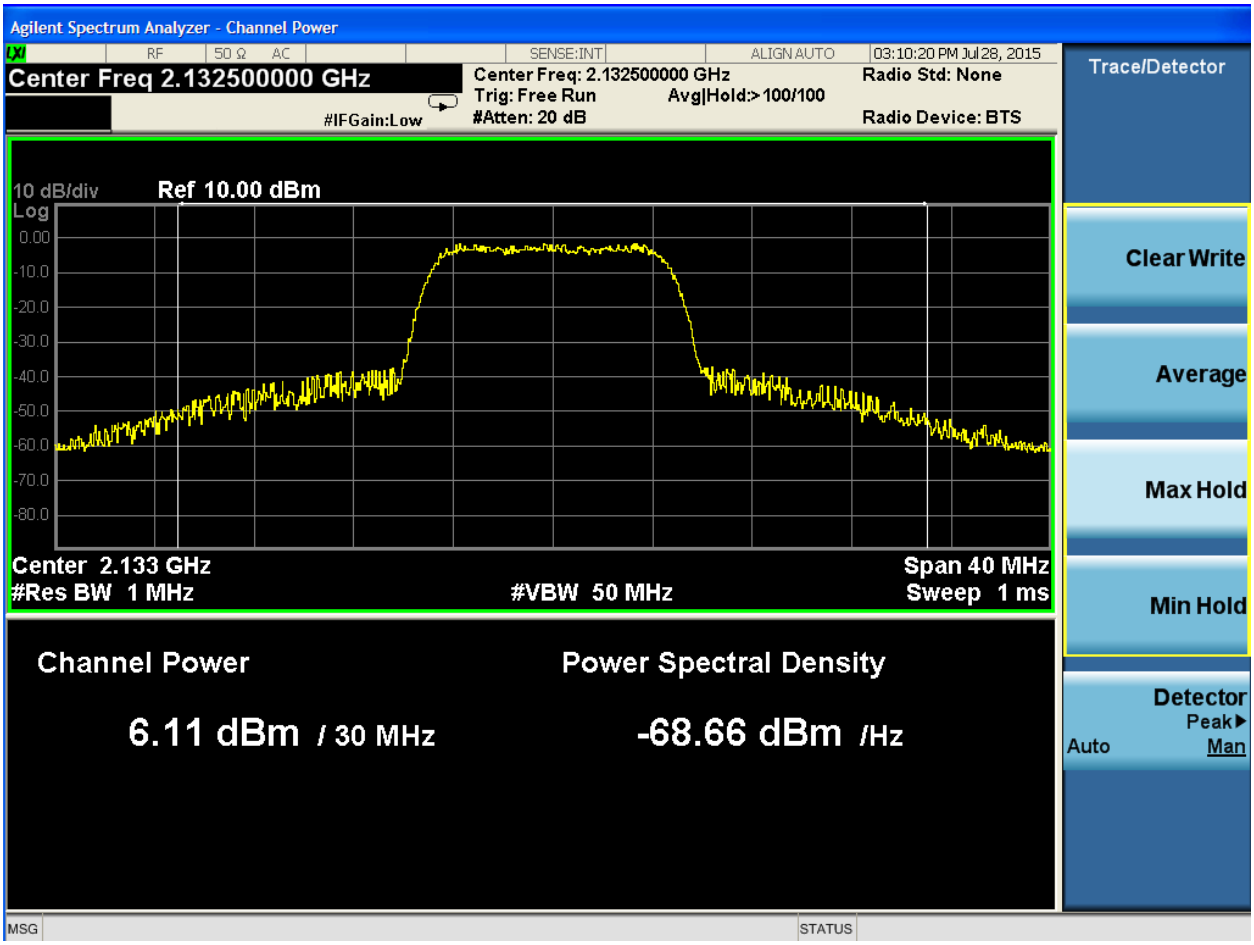
Band 4 Peak Readings:



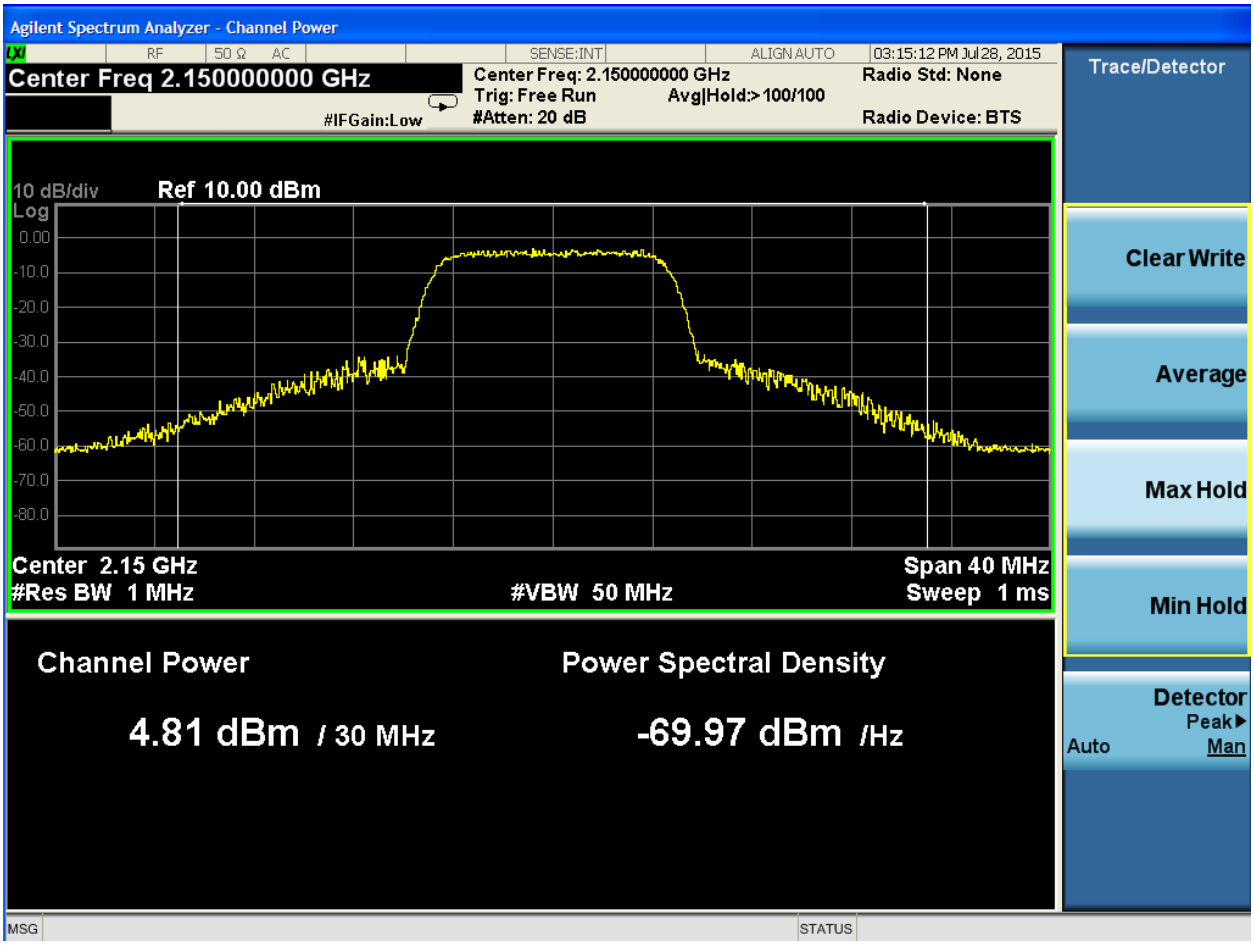
Band 4, Mid Channel, QPSK



Band 4, Mid Channel, 16QAM

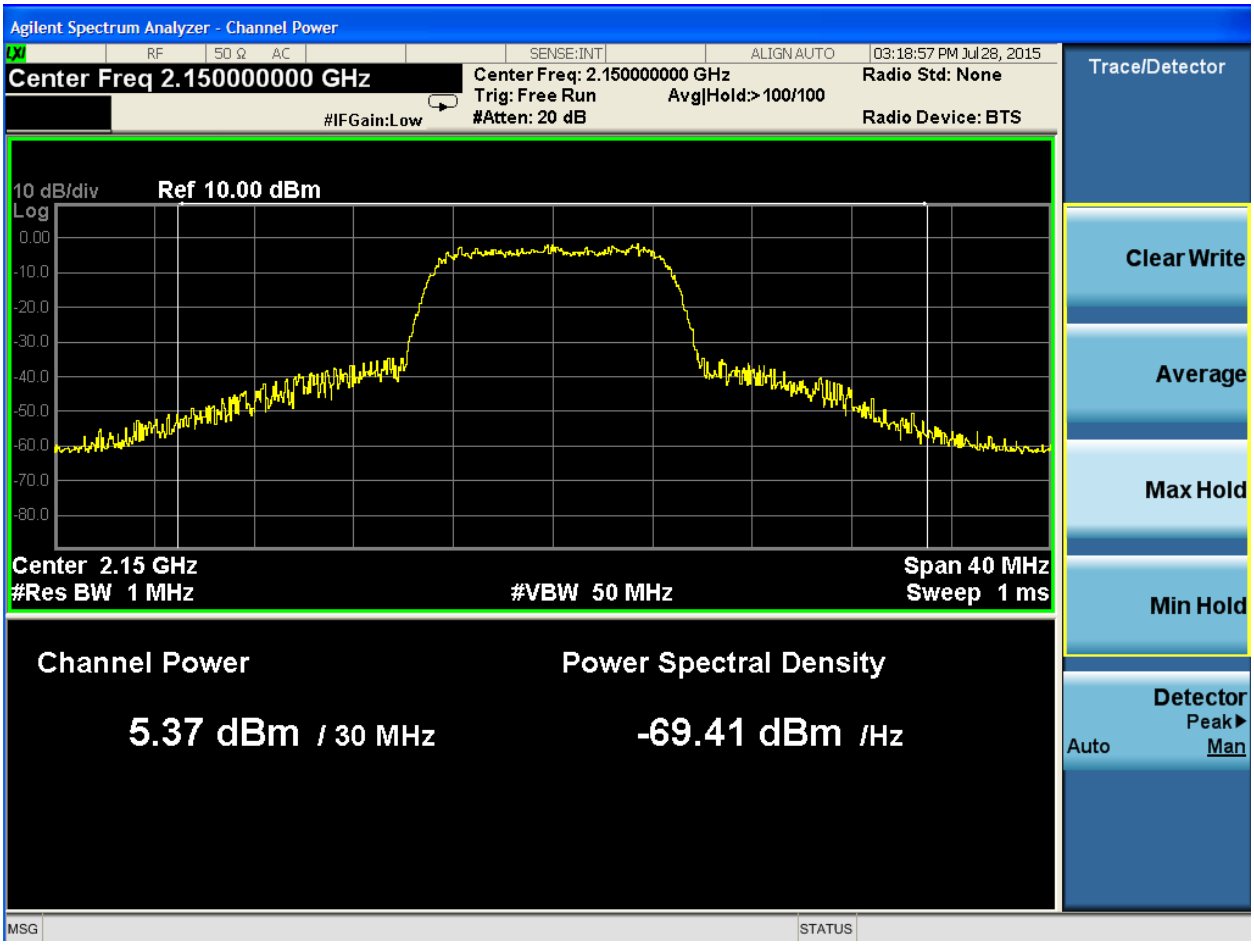


Band 4, Mid Channel, 64QAM



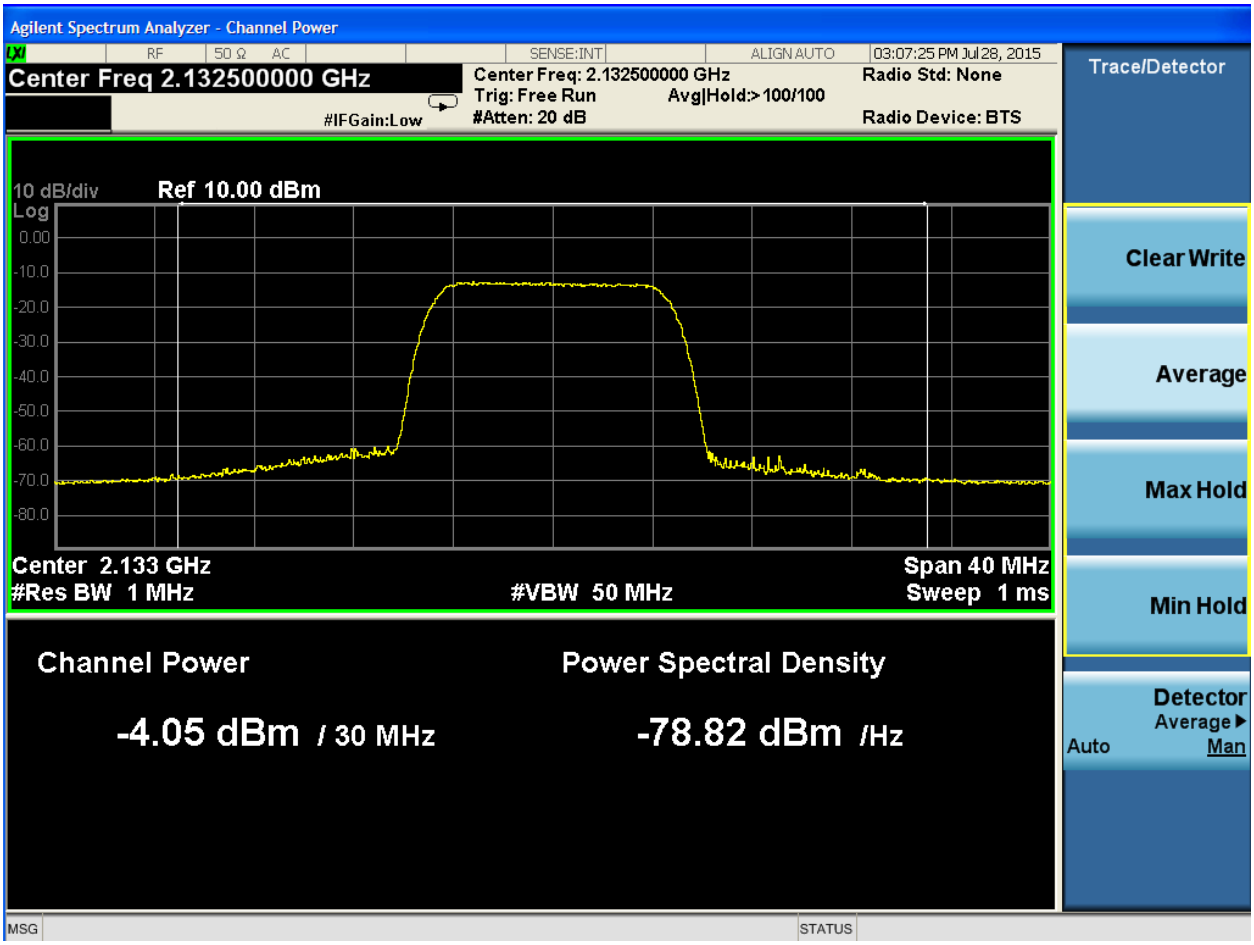
Band 4, High Channel, QPSK

Band 4, High Channel, 16QAM

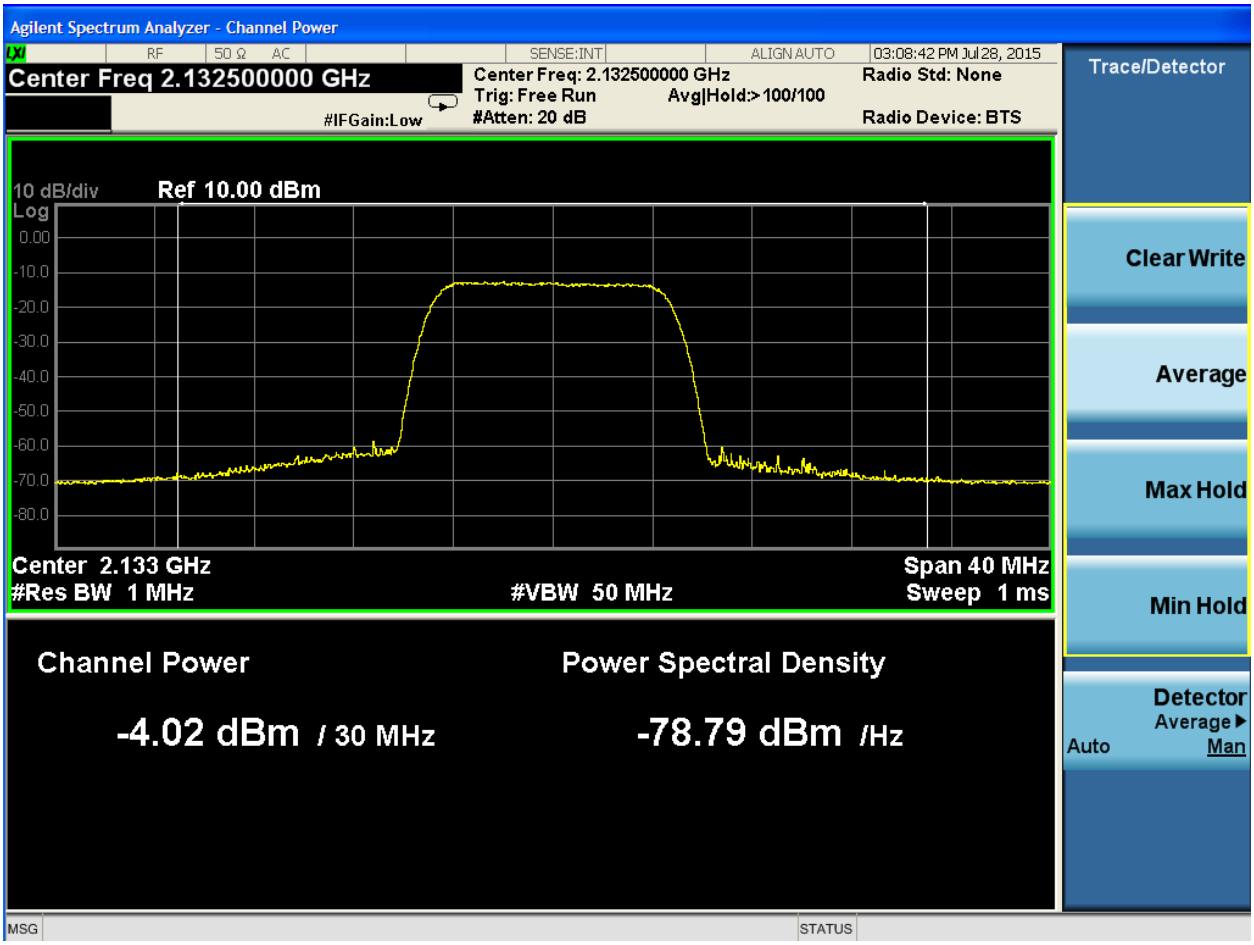


Band 4, High Channel, 64QAM

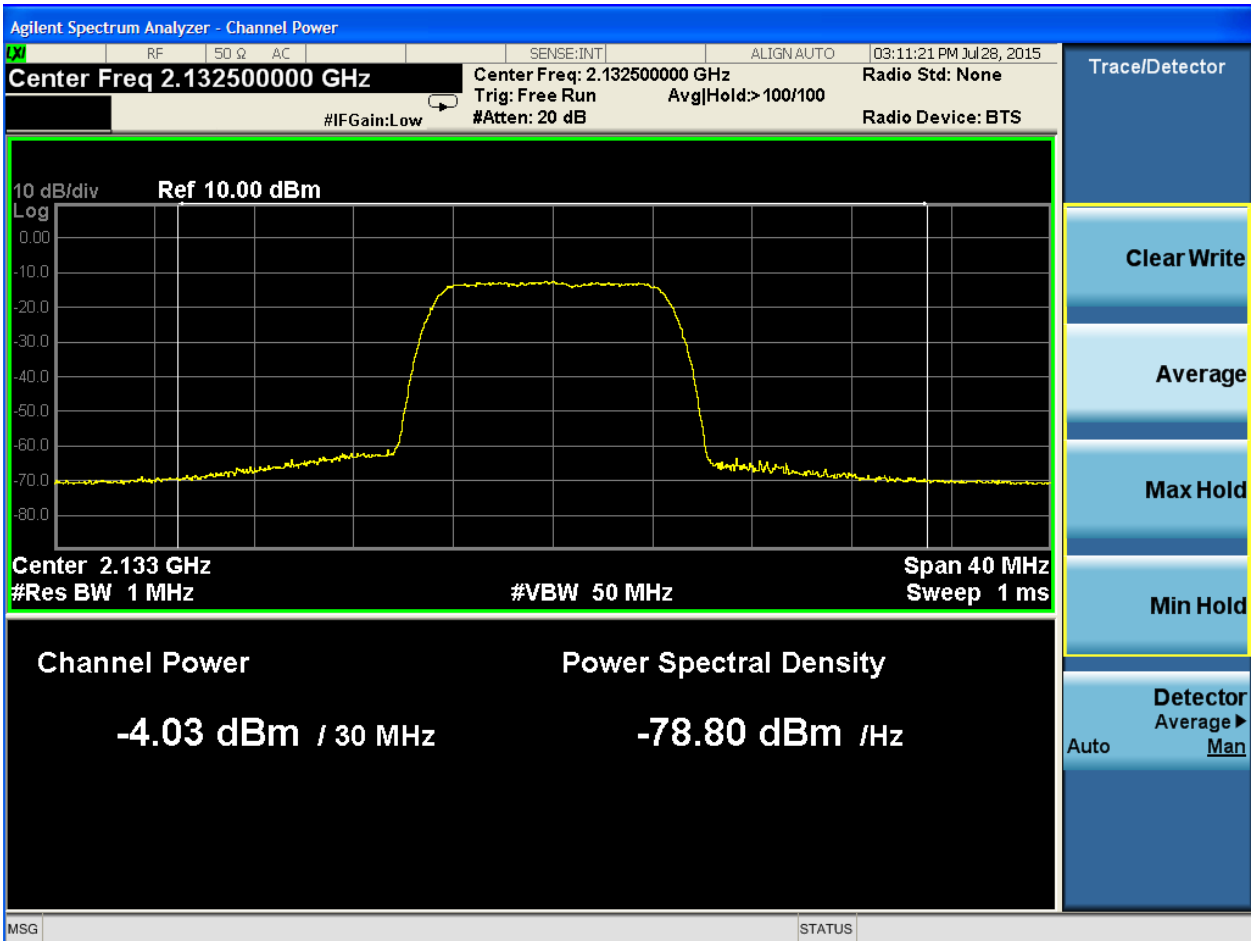
Band 4 Average Readings:



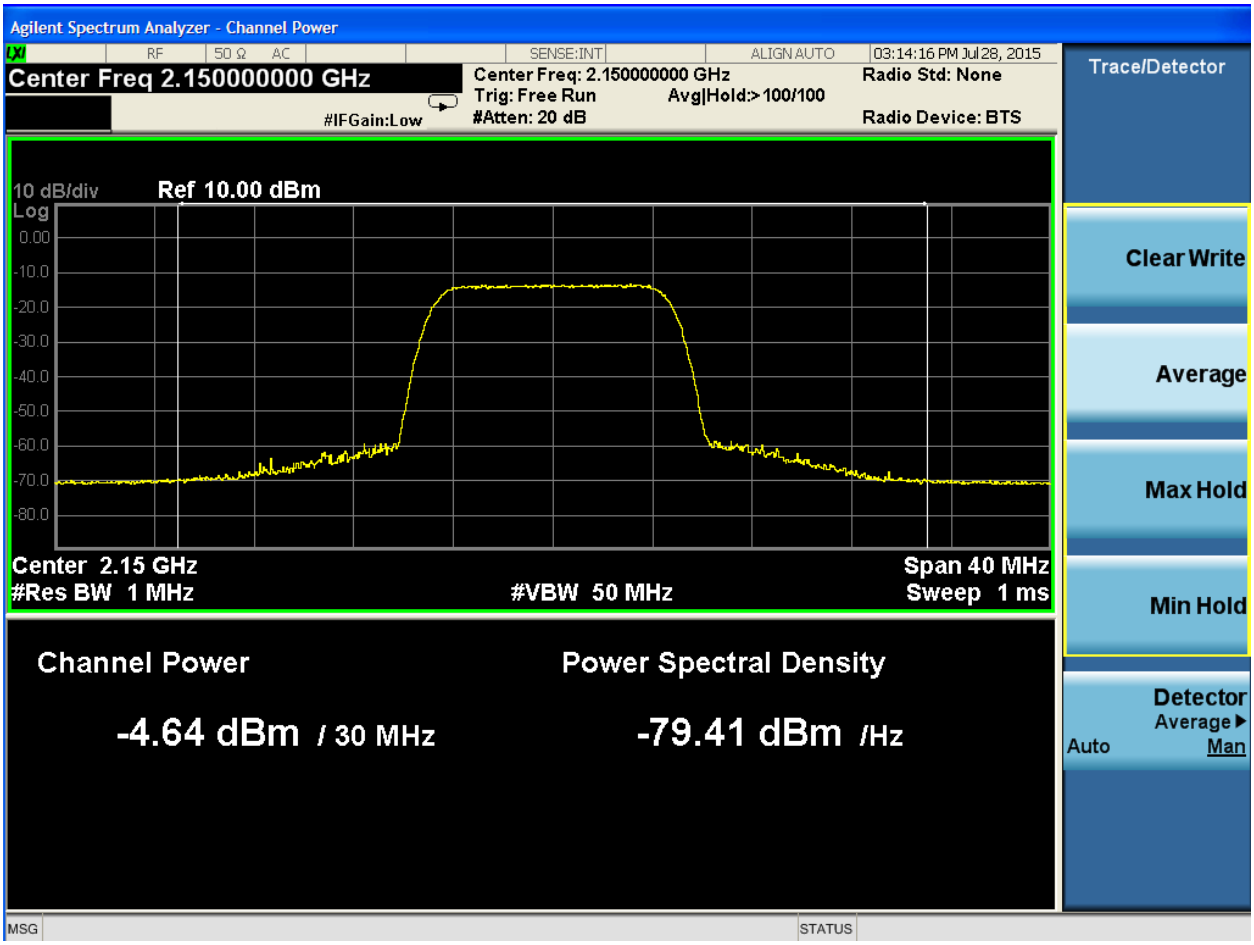
Band 4, Mid Channel, QPSK



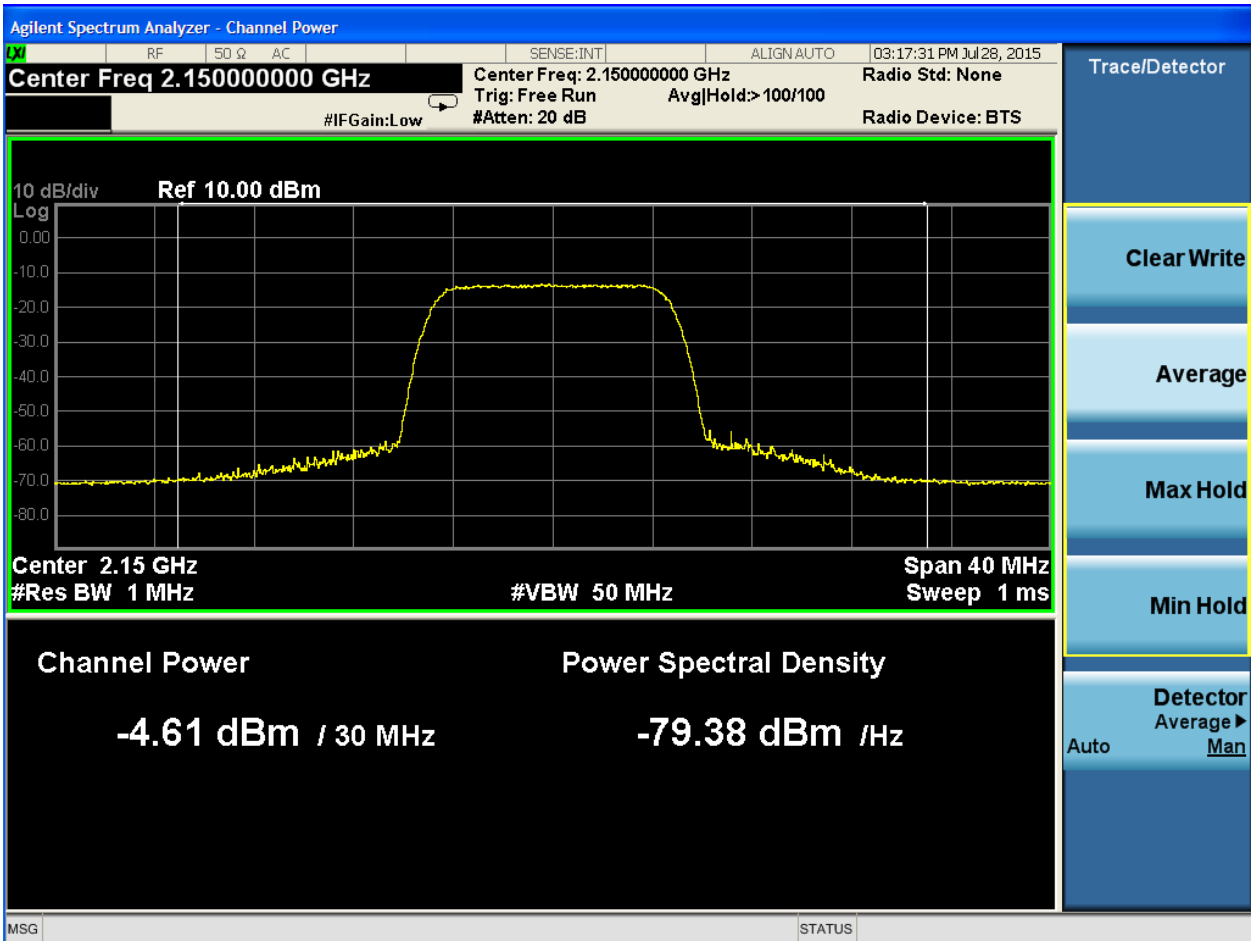
Band 4, Mid Channel, 16QAM



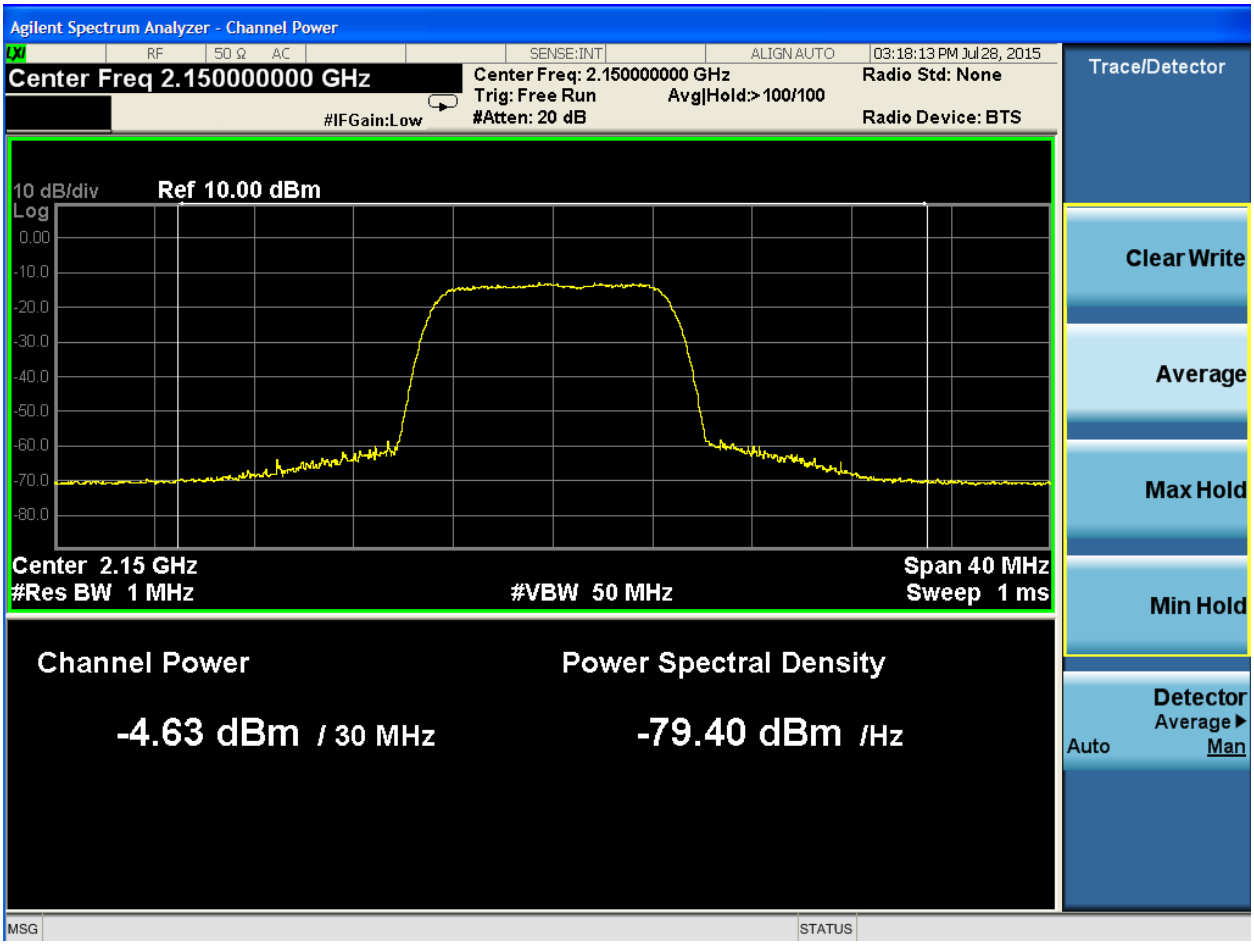
Band 4, Mid Channel, 64QAM



Band 4, High Channel, QPSK



Band 4, High Channel, 16QAM



Band 4, High Channel, 64QAM

Band Edge Measurements

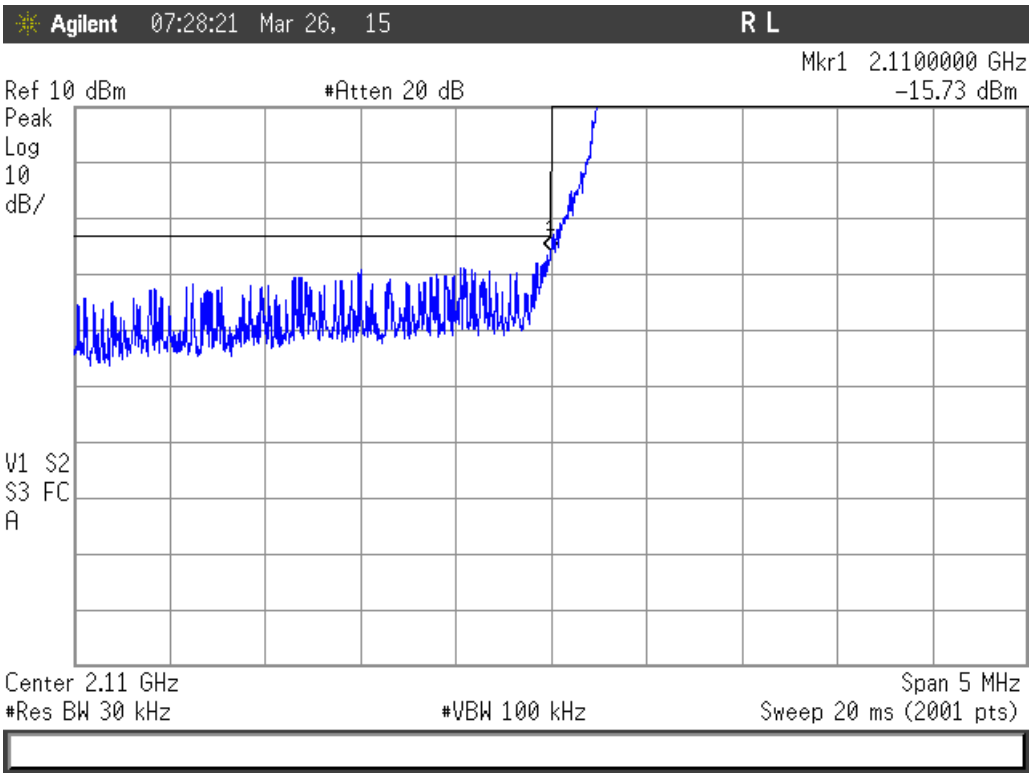
LIMITS

FCC 27.53(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

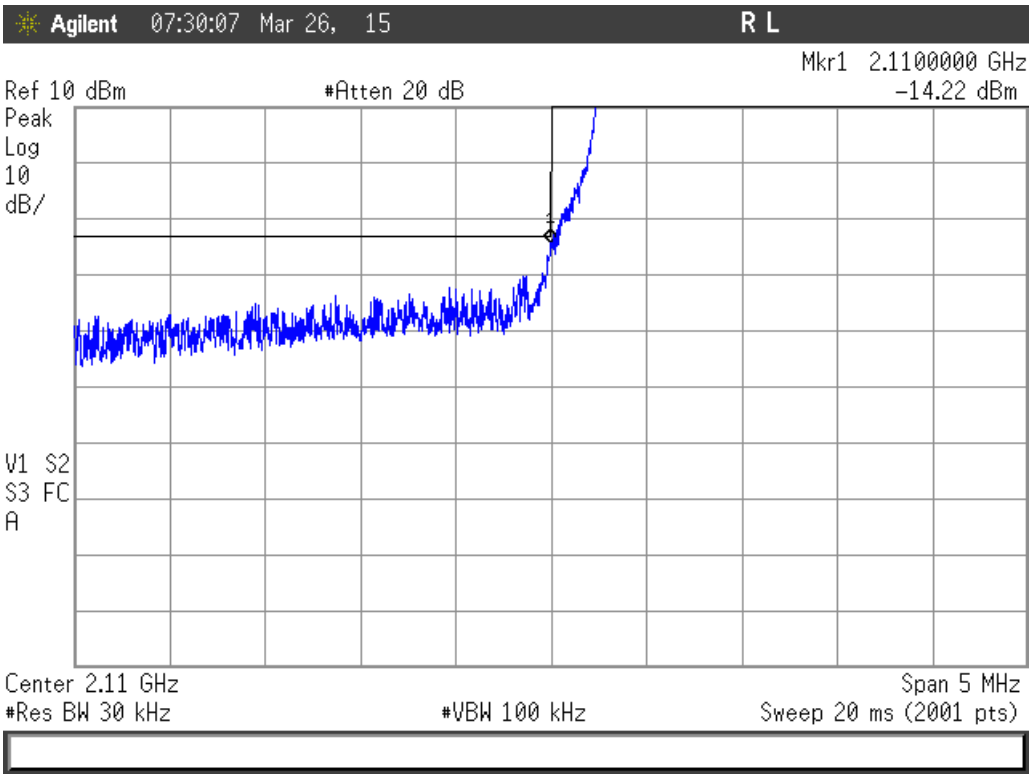
MEASUREMENTS / RESULTS

Note: Mask lines are set to -13dBm at 2100, 2155, and 2170MHz.

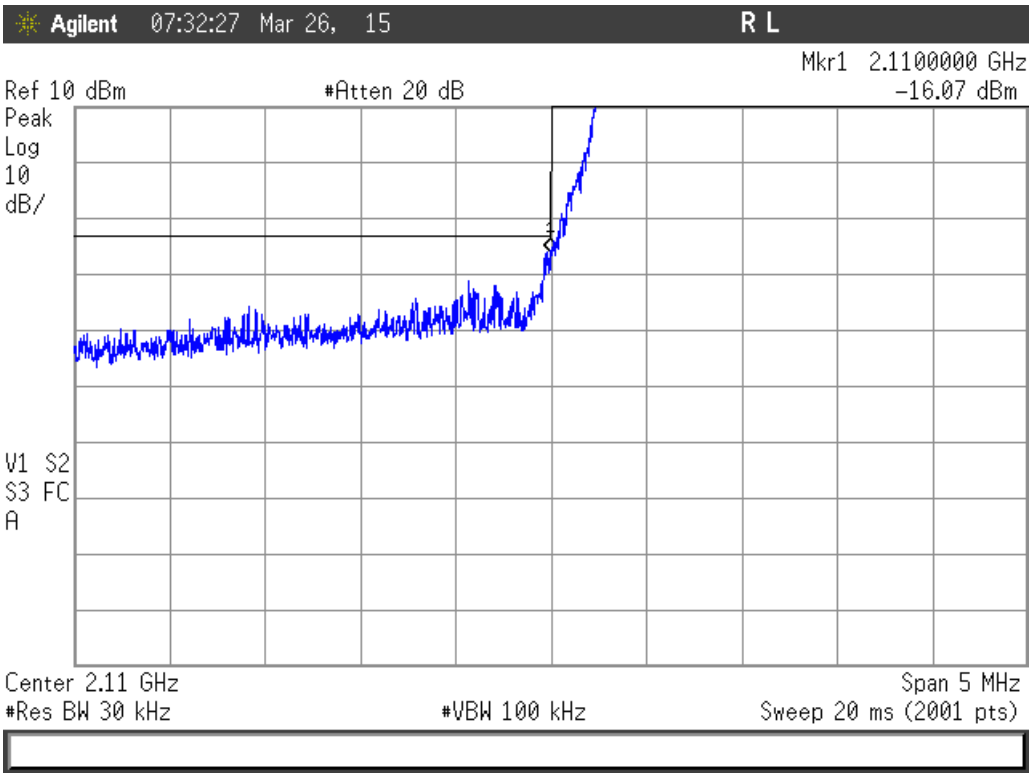
Spectrum analyzer screen plots are shown on the following pages.



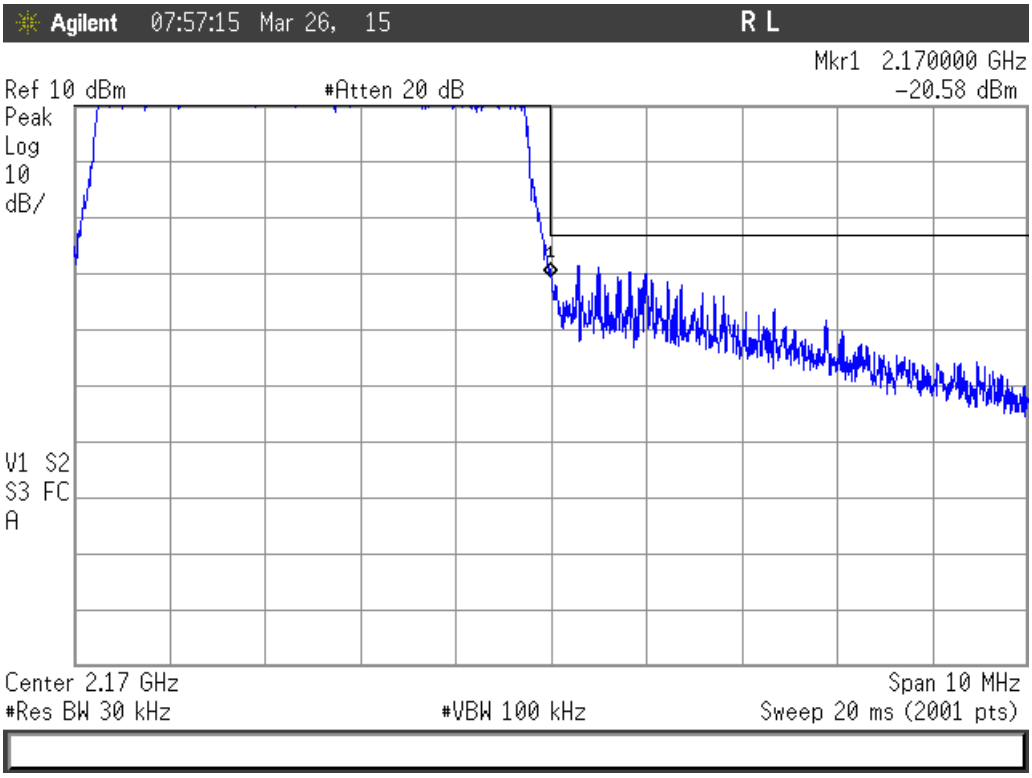
Lower Band Edge - Band 10 – 5MHz BW – QPSK –



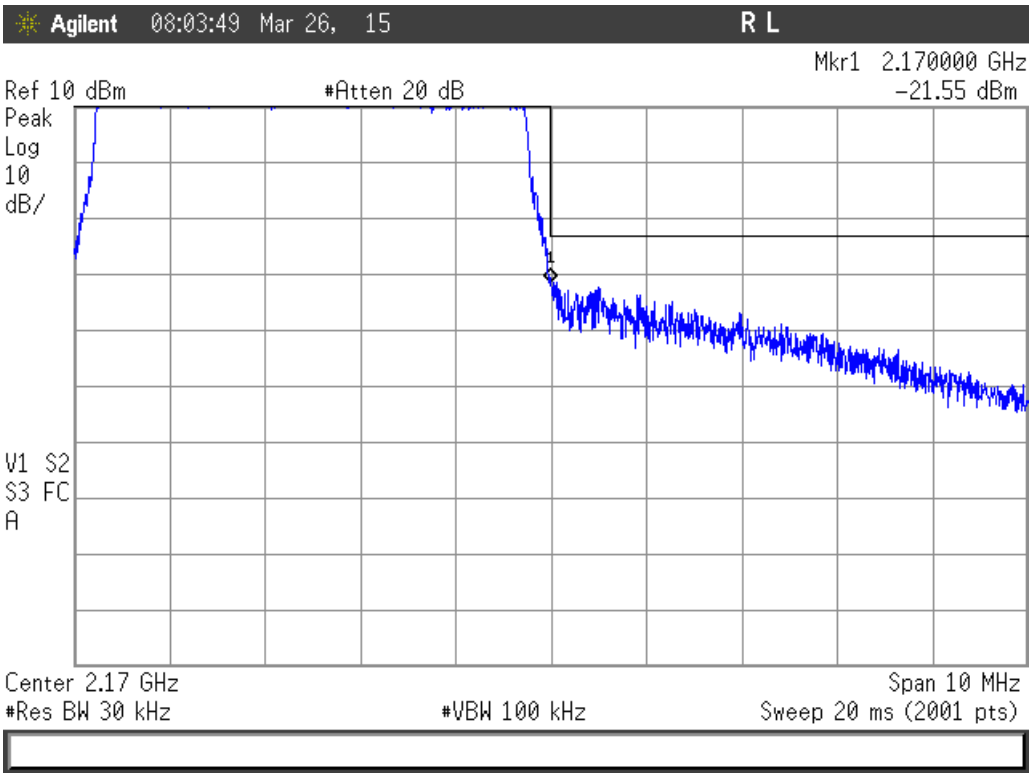
Lower Band Edge - Band 10 – 5MHz BW – 16QAM –



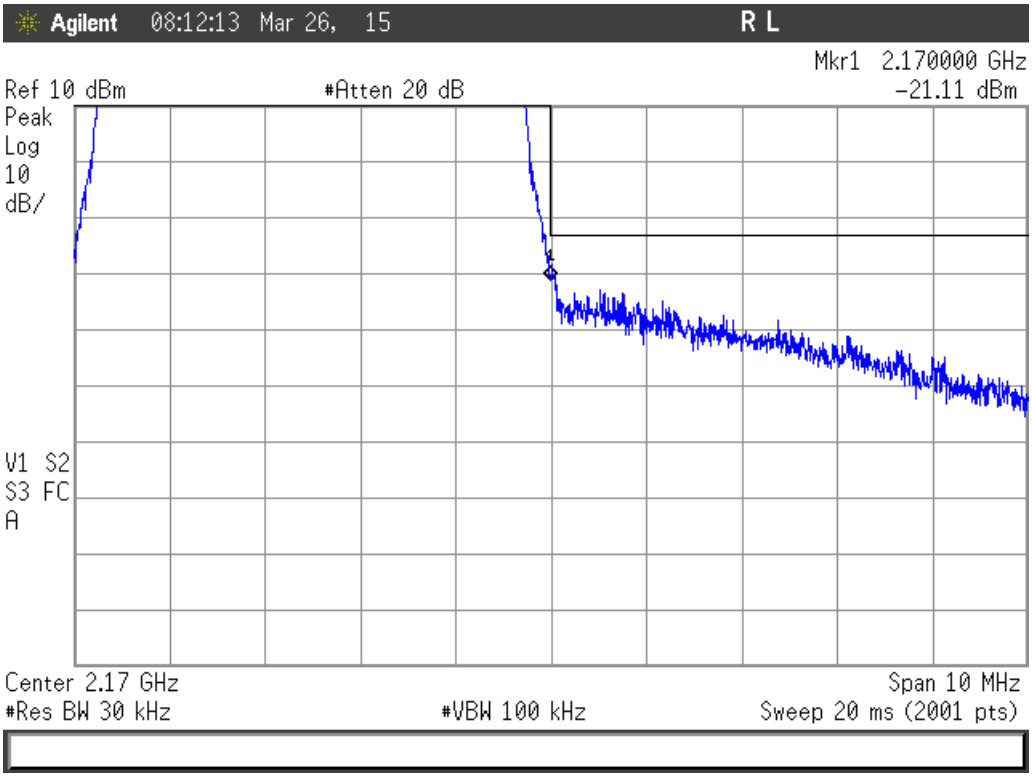
Lower Band Edge - Band 10 – 5MHz BW – 64QAM –



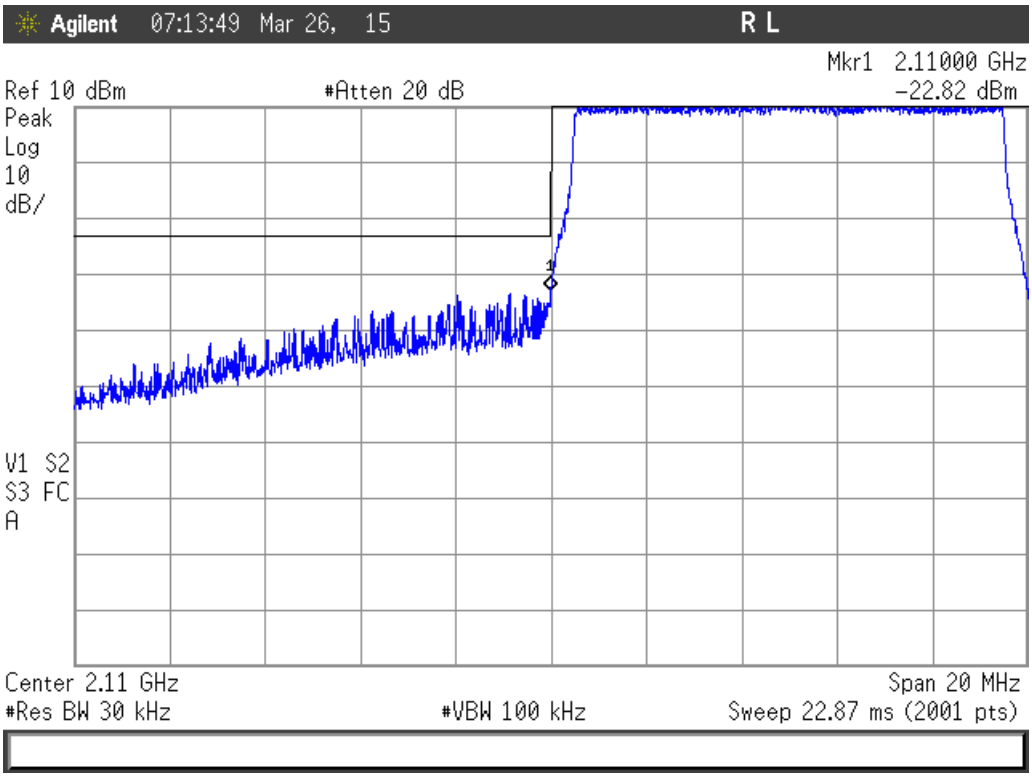
Upper Band Edge - Band 10 – 5MHz BW – QPSK –



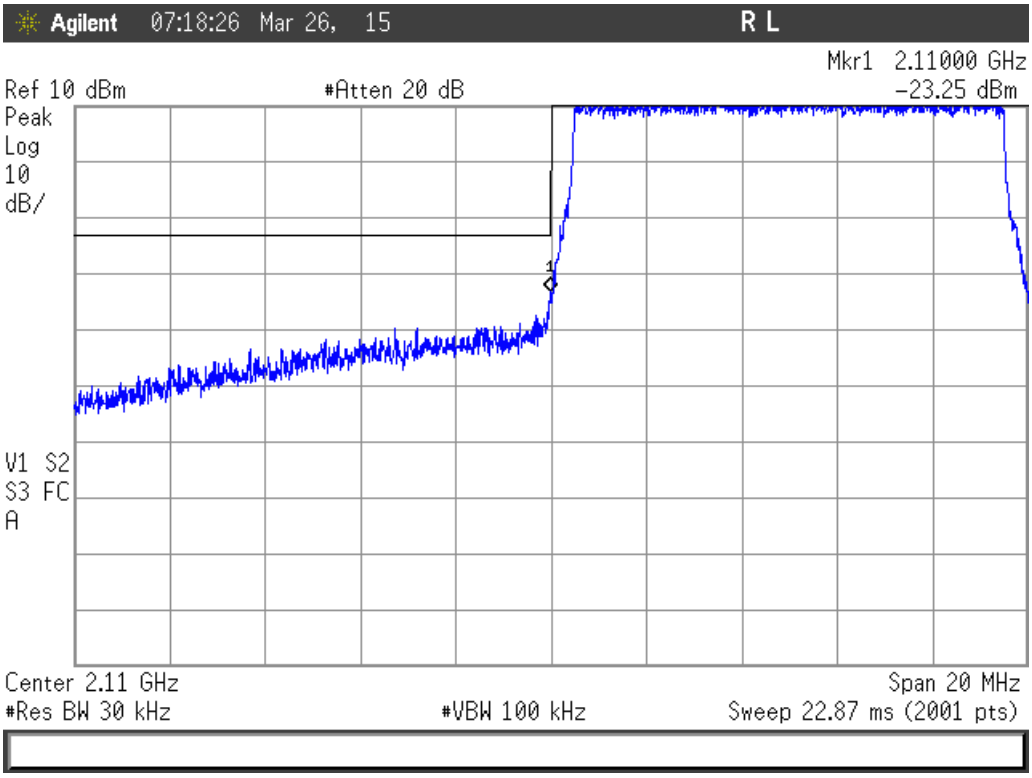
Upper Band Edge - Band 10 – 5MHz BW – 16QAM –



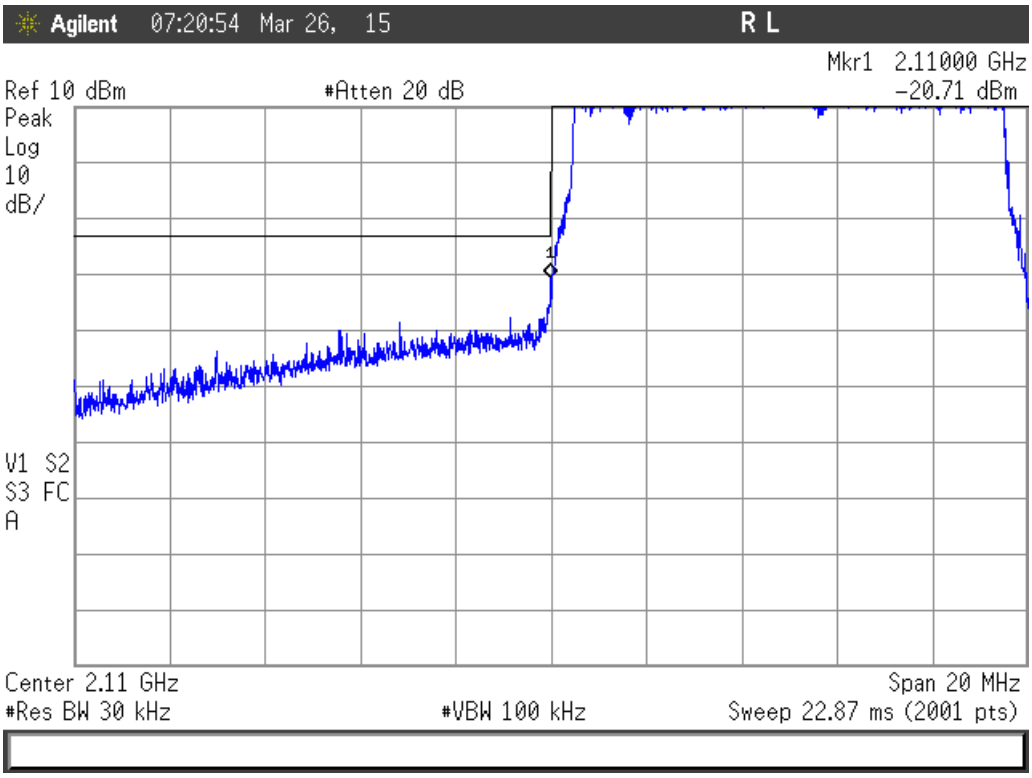
Upper Band Edge - Band 10 – 5MHz BW – 64QAM –



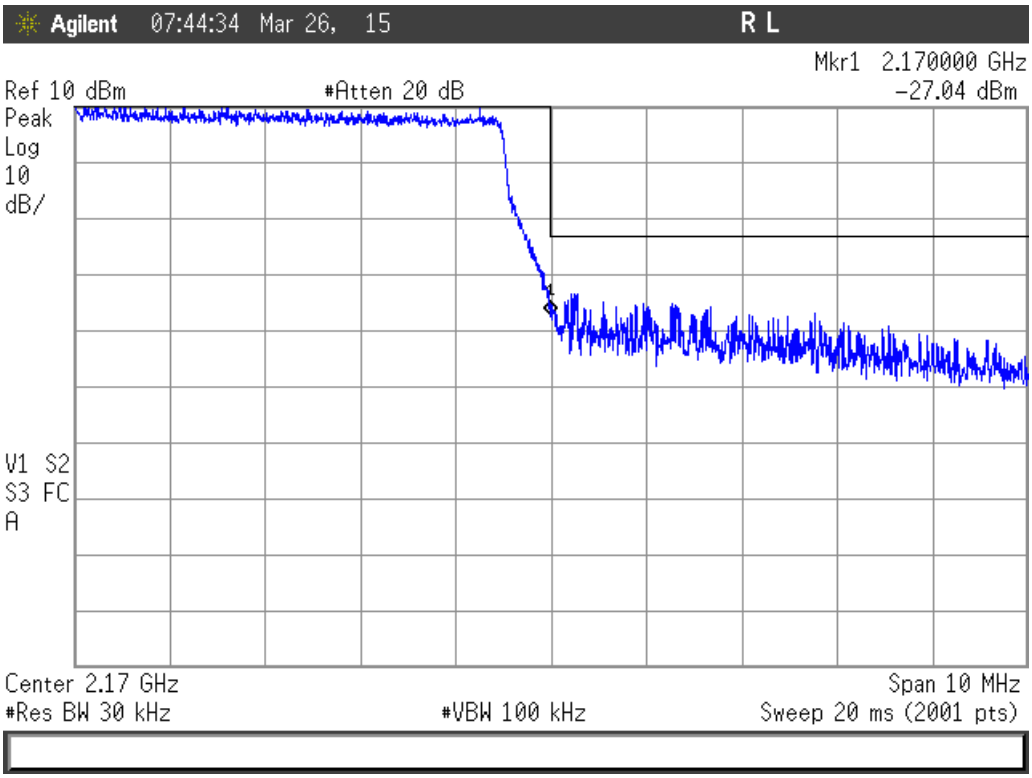
Lower Band Edge - Band 10 – 10MHz BW – QPSK –



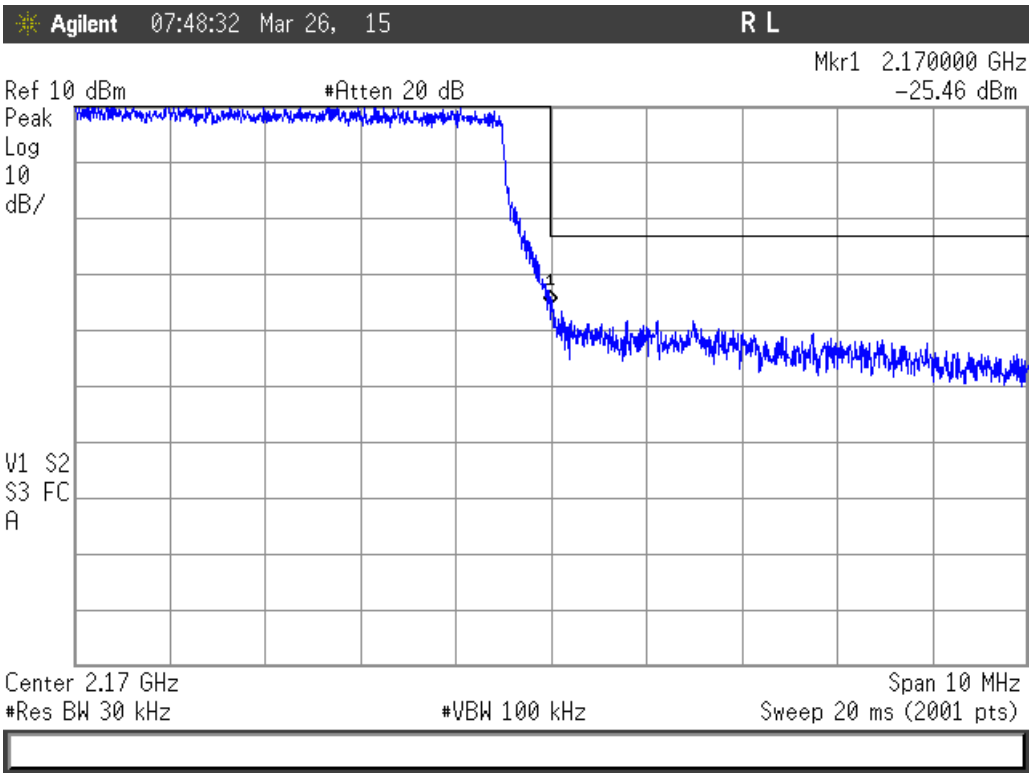
Lower Band Edge - Band 10 – 10MHz BW – 16QAM –



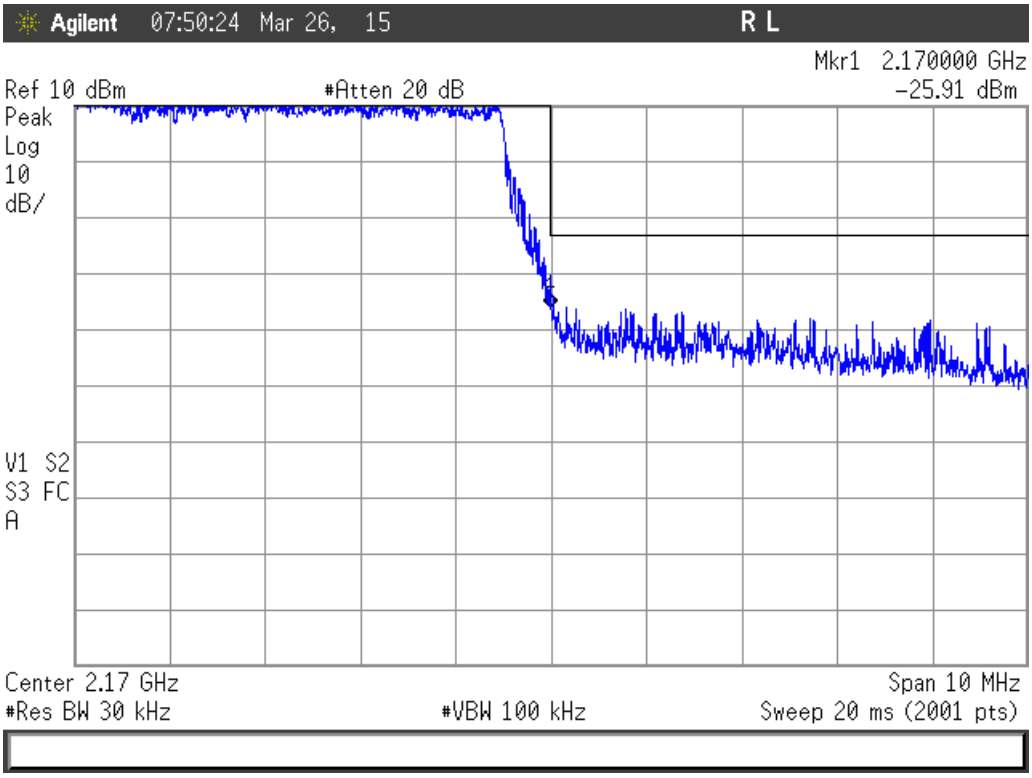
Lower Band Edge - Band 10 – 10MHz BW – 64QAM –



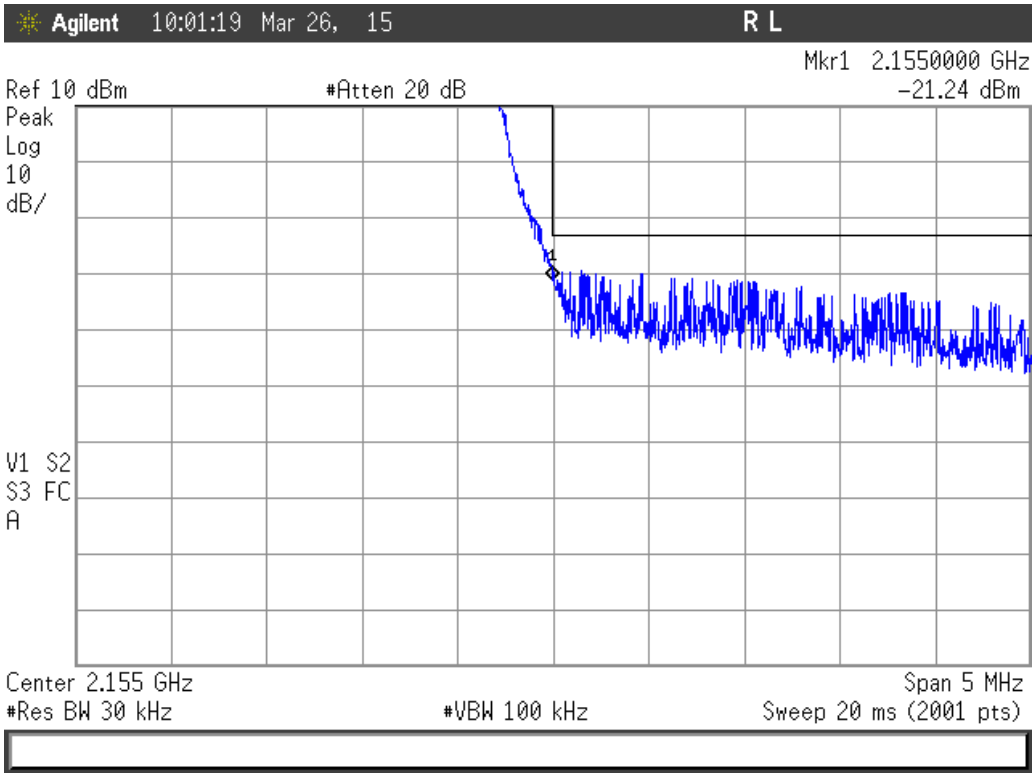
Upper Band Edge - Band 10 – 10MHz BW – QPSK –



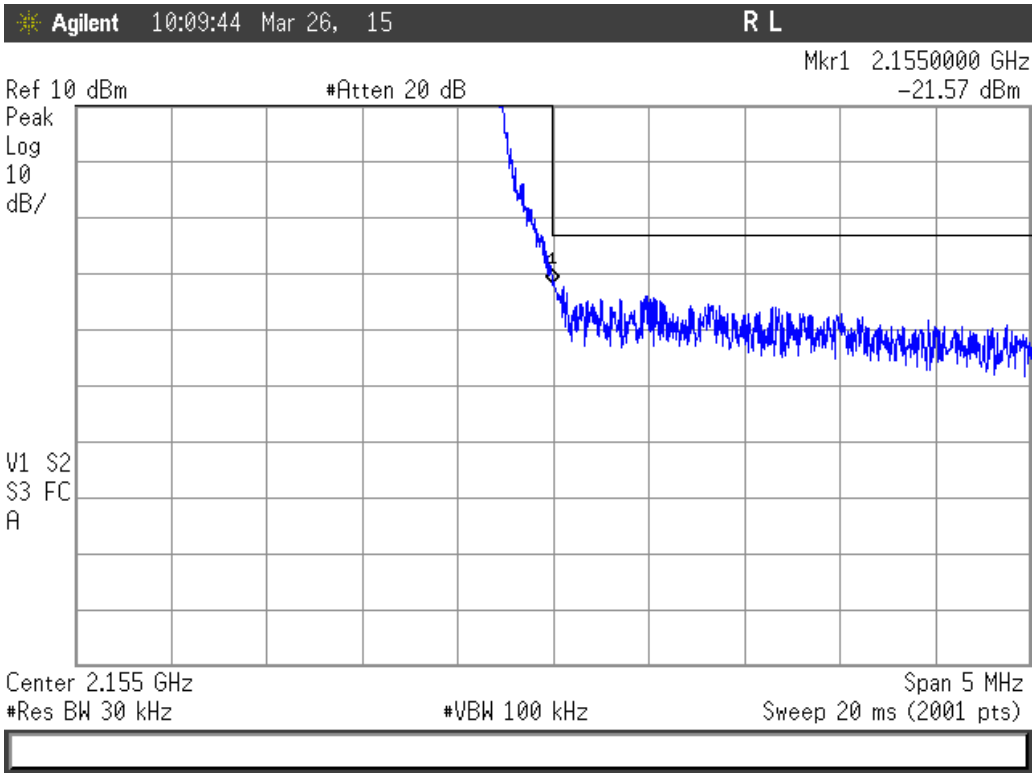
Upper Band Edge - Band 10 – 10MHz BW – 16QAM –



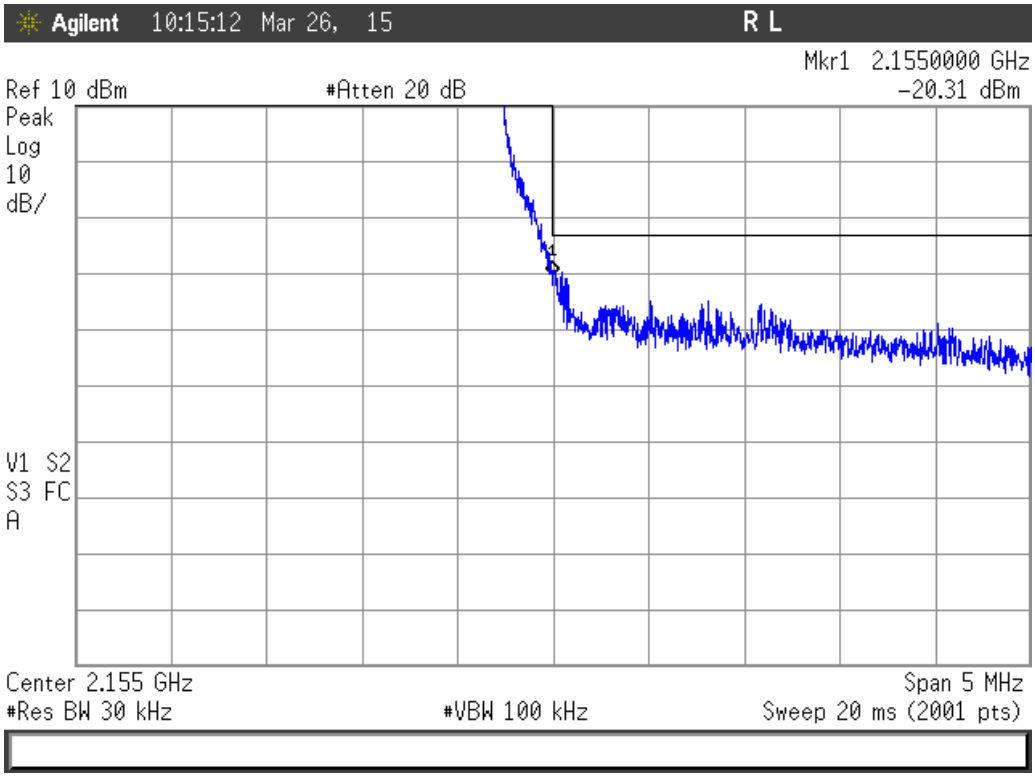
Upper Band Edge - Band 10 – 10MHz BW – 64QAM –



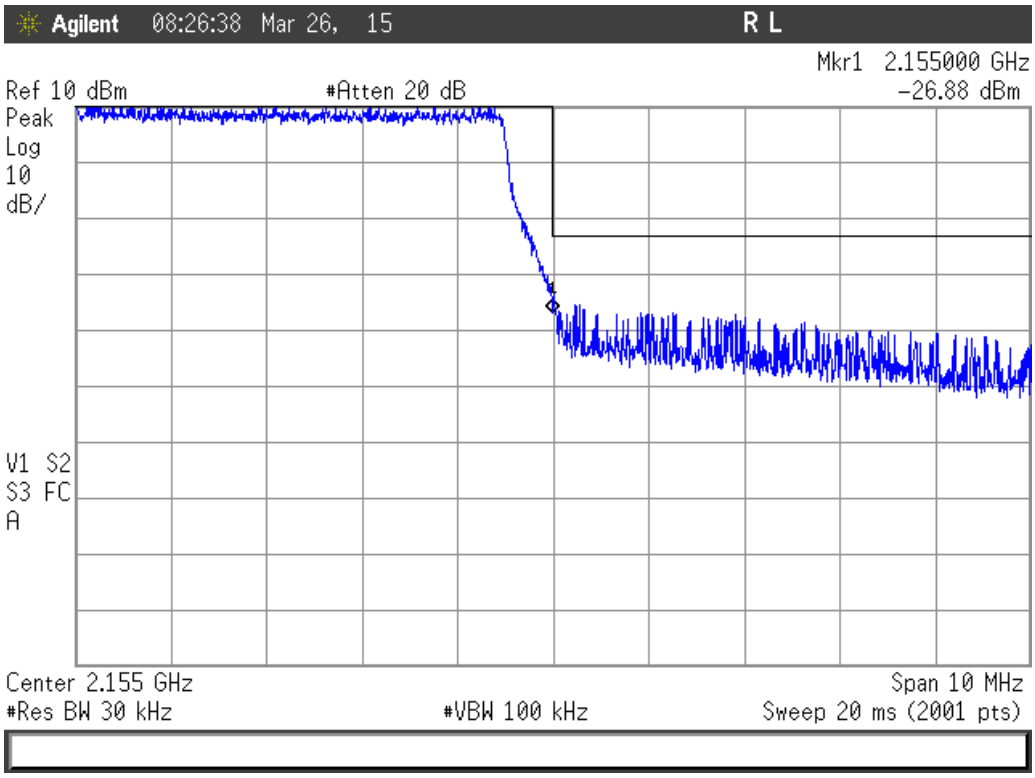
Upper Band Edge - Band 4 – 5MHz BW – QPSK –



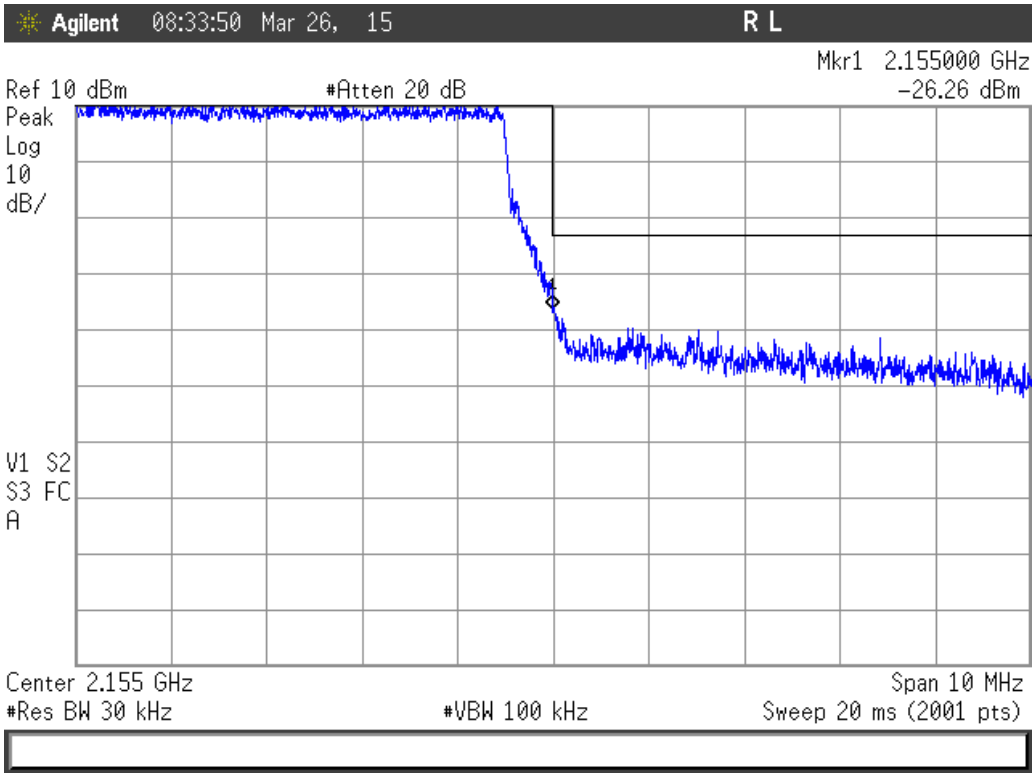
Upper Band Edge - Band 4 – 5MHz BW – 16QAM –



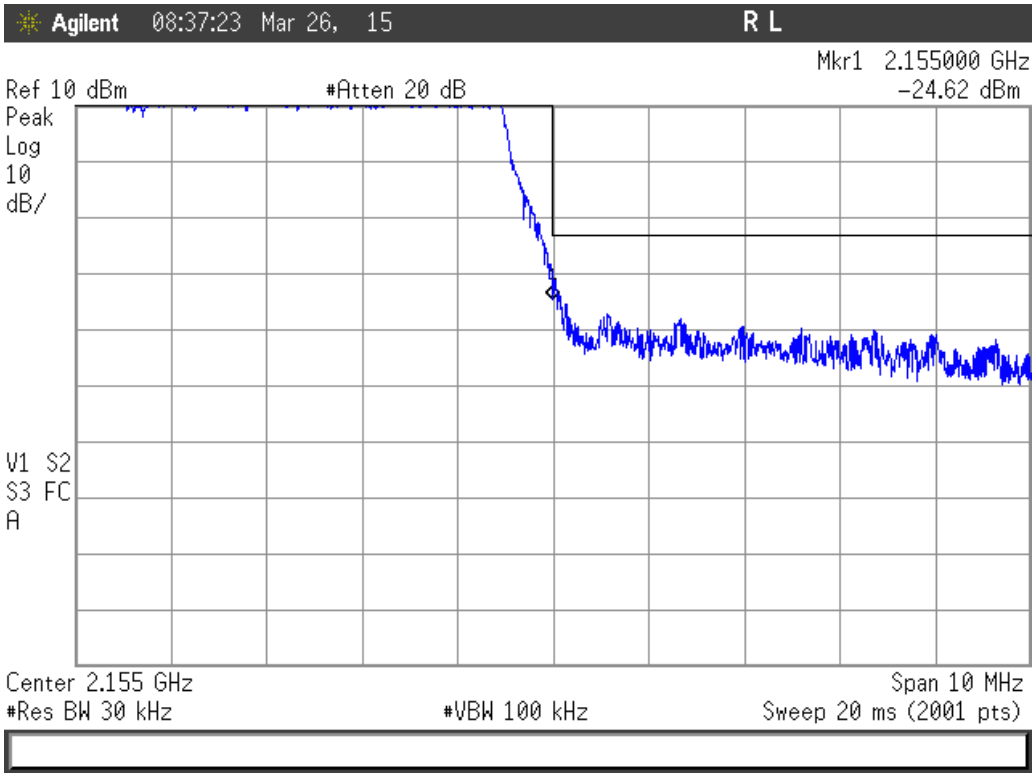
Upper Band Edge - Band 4 – 5MHz BW – 64QAM –



Upper Band Edge - Band 4 – 10MHz BW – QPSK –



Upper Band Edge - Band 4 – 10MHz BW – 16QAM –



Upper Band Edge - Band 4 – 10MHz BW – 64QAM –

Note: Only Upper Band Edge – Band 4 plots were taken. For Lower Band Edge see Band 10

Conducted Spurious Emissions at Antenna Port

LIMITS

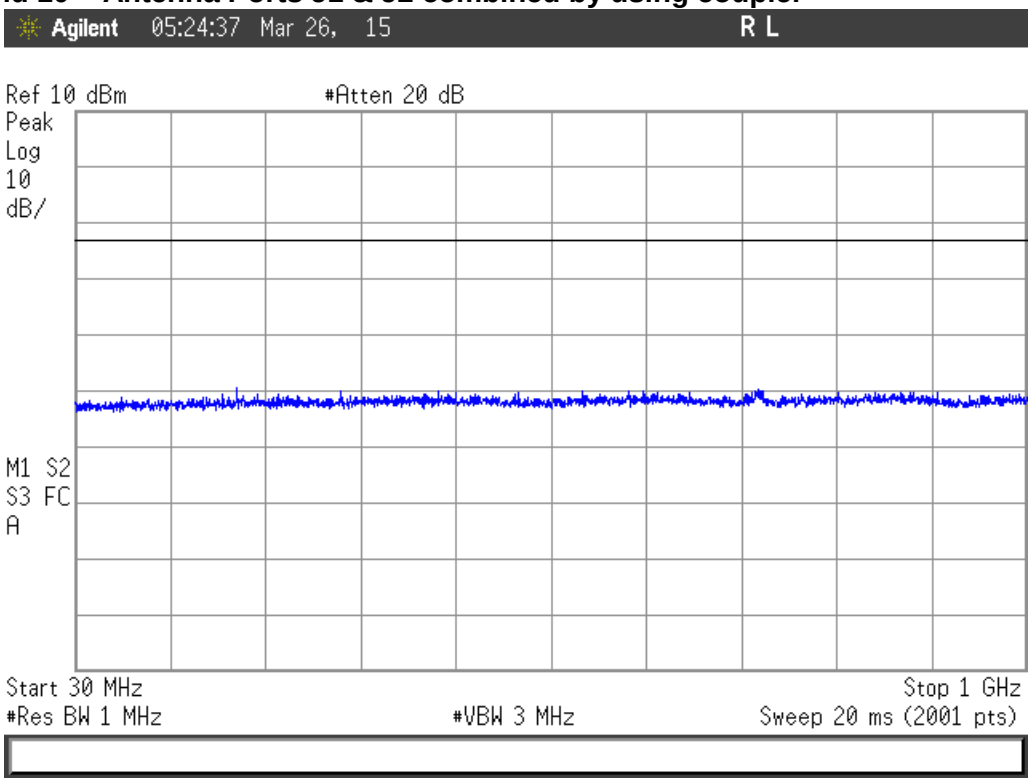
"The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB." [27.53(e)(8)]

Limit = 10*log(P[mW]) – (43 + 10*log(P[W])) = -13dBm

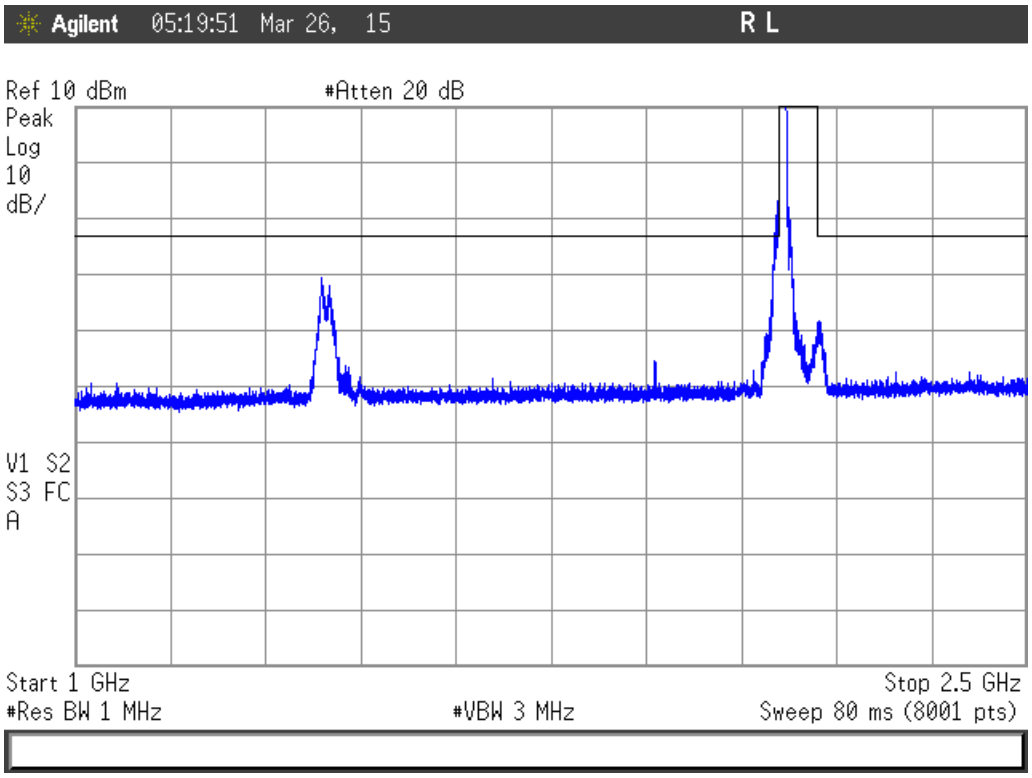
Spectrum analyzer screen plots for LTE Bands 10 & 4 are shown on the following pages. The operating frequency was 2115MHz, which was taken to represent both bands as Band 4 is a subset of Band 10.

PLOTS

LTE Band 10 – Antenna Ports J1 & J2 combined by using coupler



30MHz to 1GHz
[RBW 1MHz, VBW 3MHz, 2001 points, range 30-1000MHz]

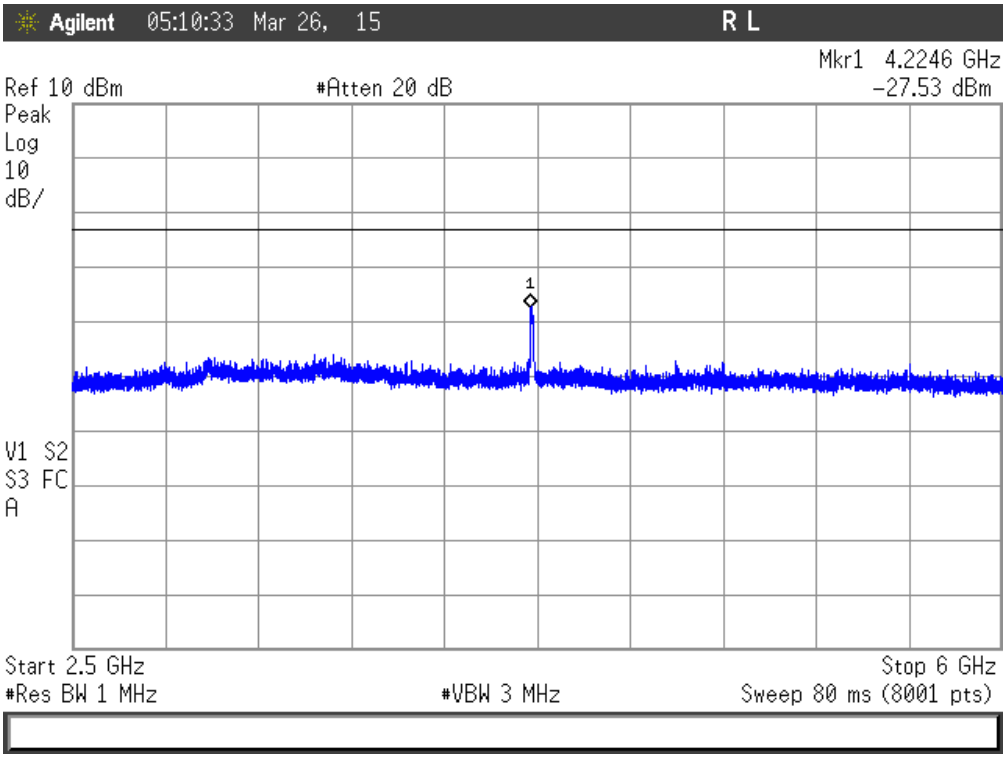


1-2.5GHz

[RBW 1MHz, VBW 3MHz, 8001 points, range 1-2.5GHz]

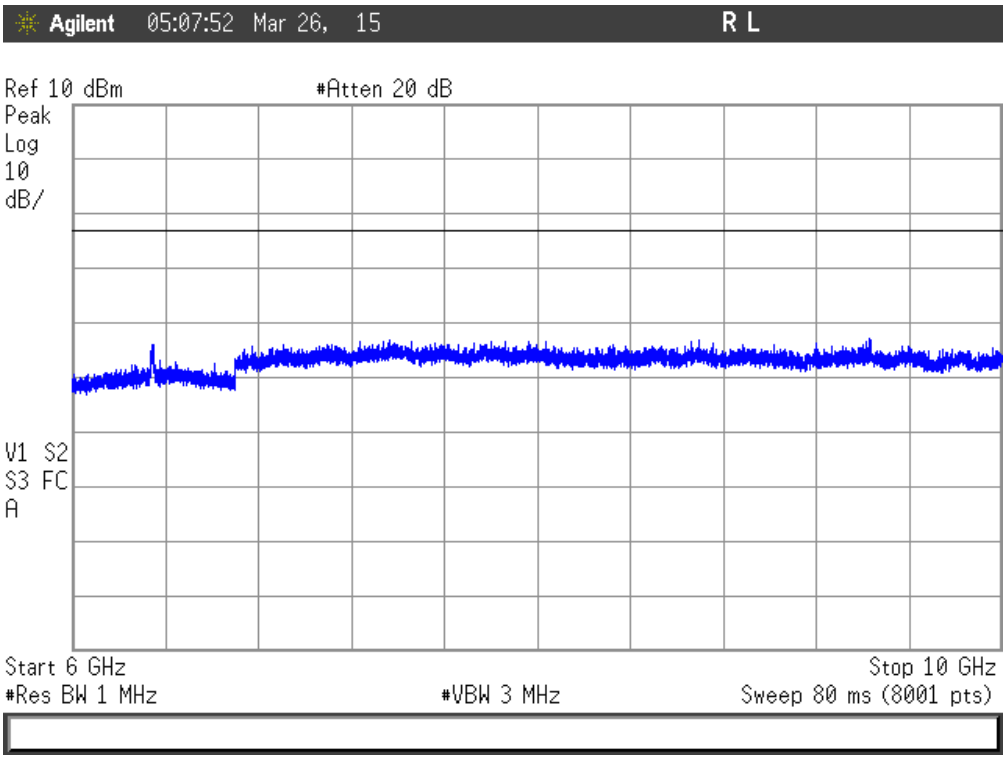
Note: *Correction factor was added to the plot (including the coupler, cable factor and 20dB attenuator.)*

LTE Band 10 – Antenna Port J1



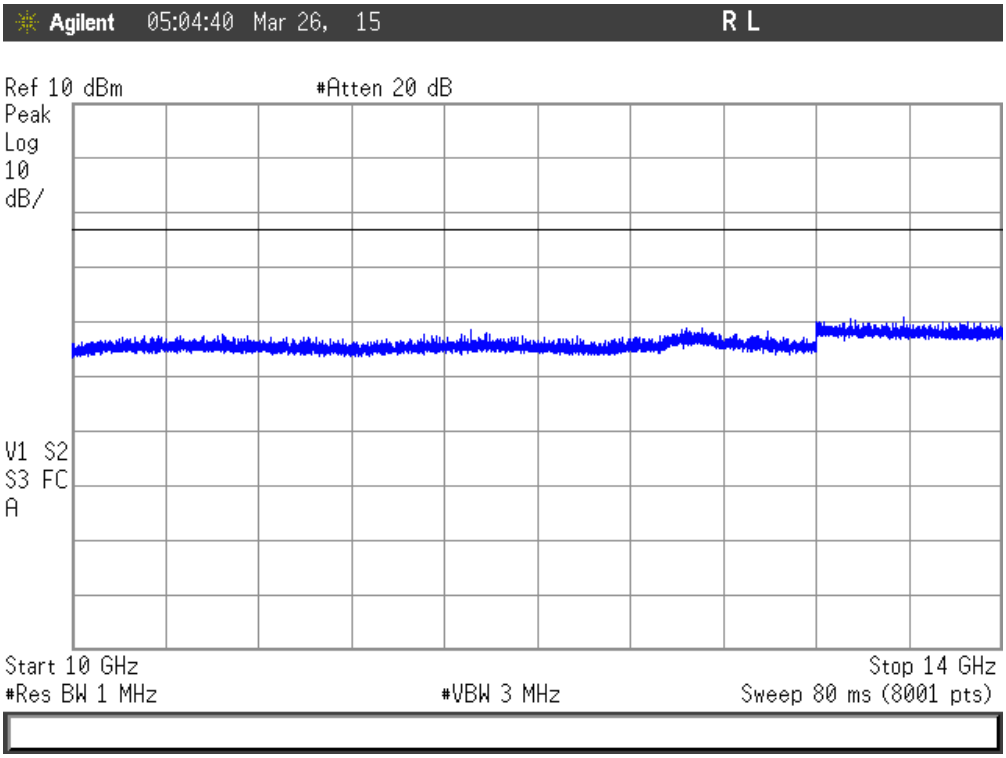
2.5-6GHz

[RBW 1MHz, VBW 3MHz, 8001 points, range 2.5-6GHz]



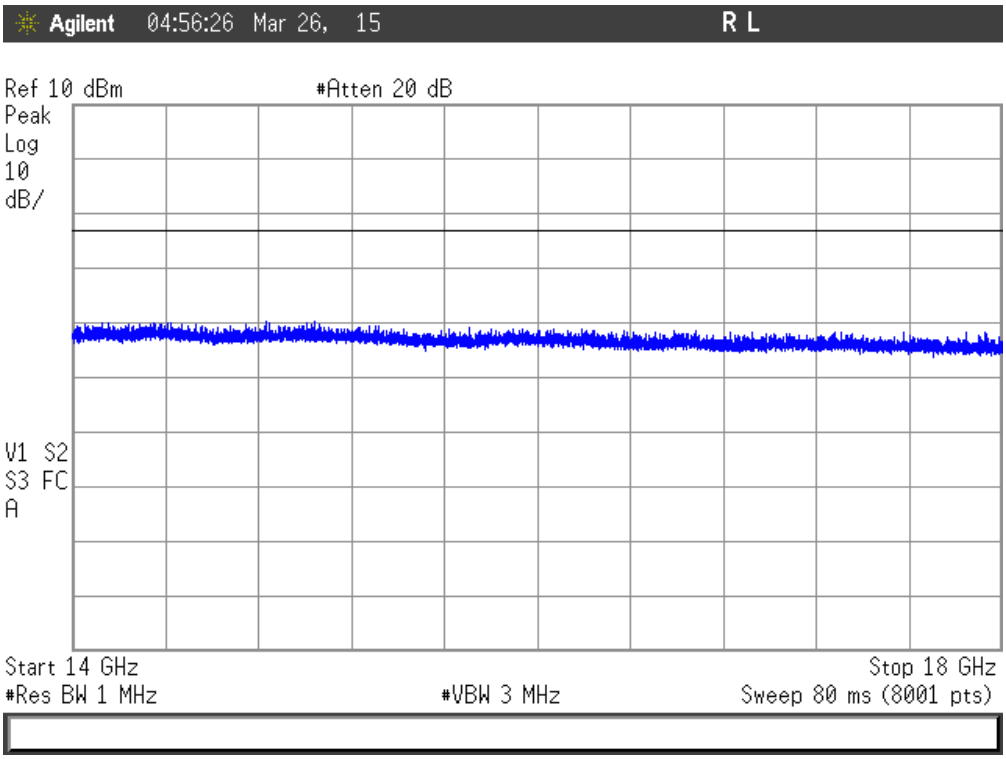
6-10GHz

[RBW 1MHz, VBW 3MHz, 8001 points, range 6-10GHz]



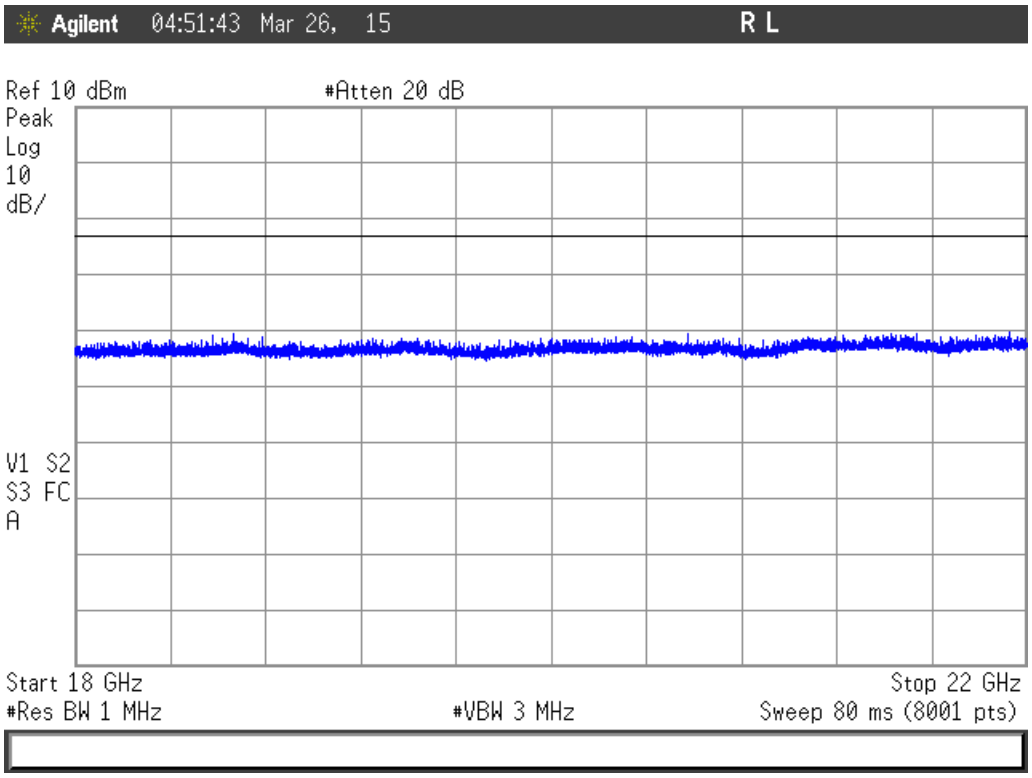
10-14GHz

[RBW 1MHz, VBW 3MHz, 8001 points, range 10-14GHz]



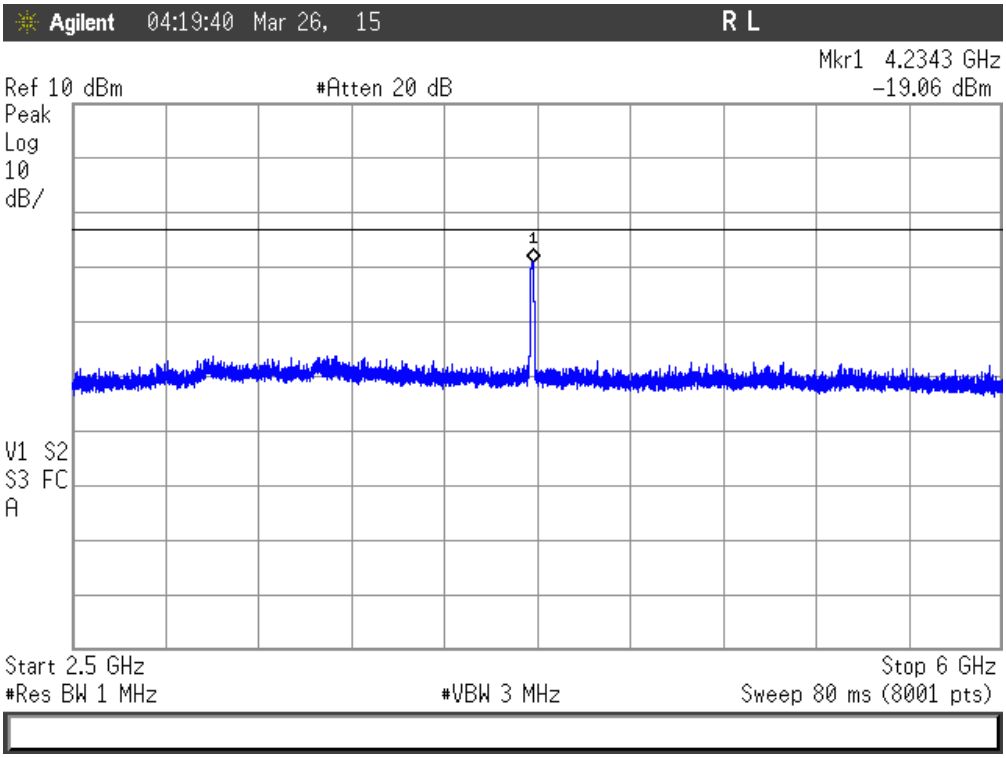
14-18GHz

[RBW 1MHz, VBW 3MHz, 8001 points, range 14-18GHz]



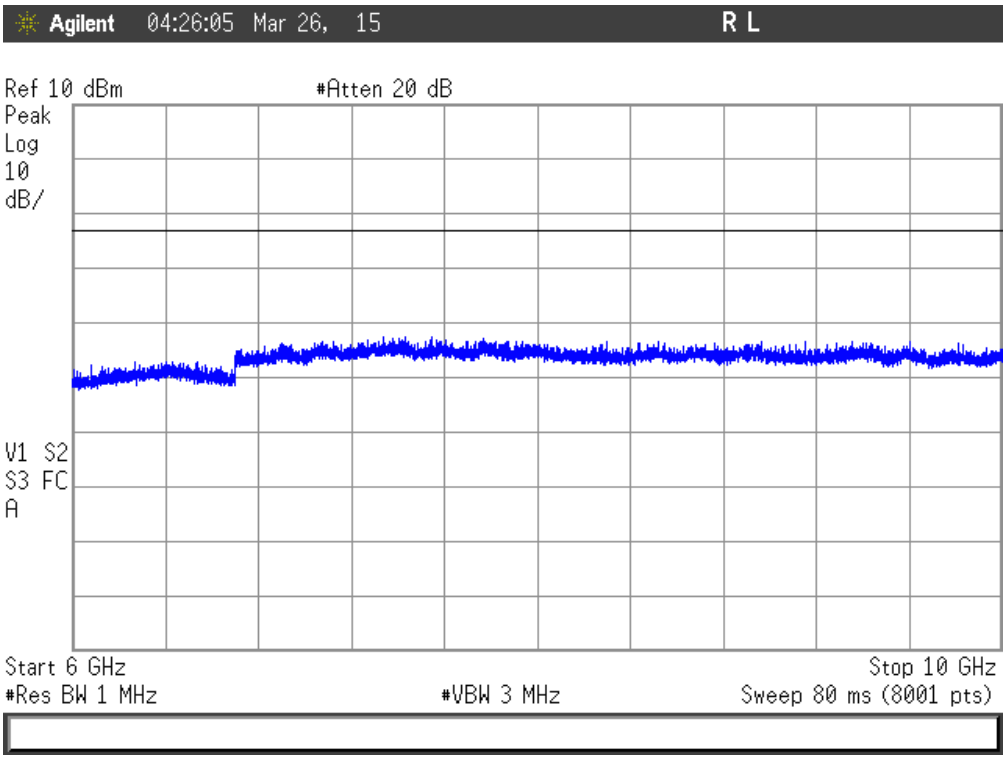
18-22GHz
[RBW 1MHz, VBW 3MHz, 8001 points, range 18-22GHz]

LTE Band 10 – Antenna Port J2



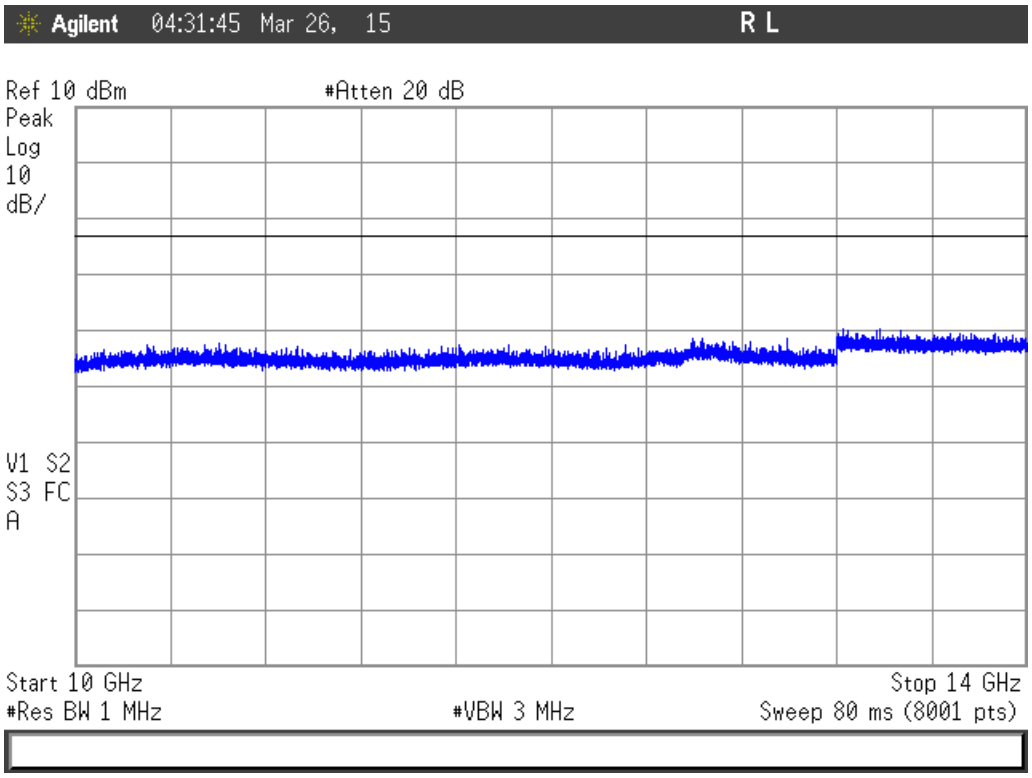
2.5-6GHz

[RBW 1MHz, VBW 3MHz, 8001 points, range 2.5-6GHz]



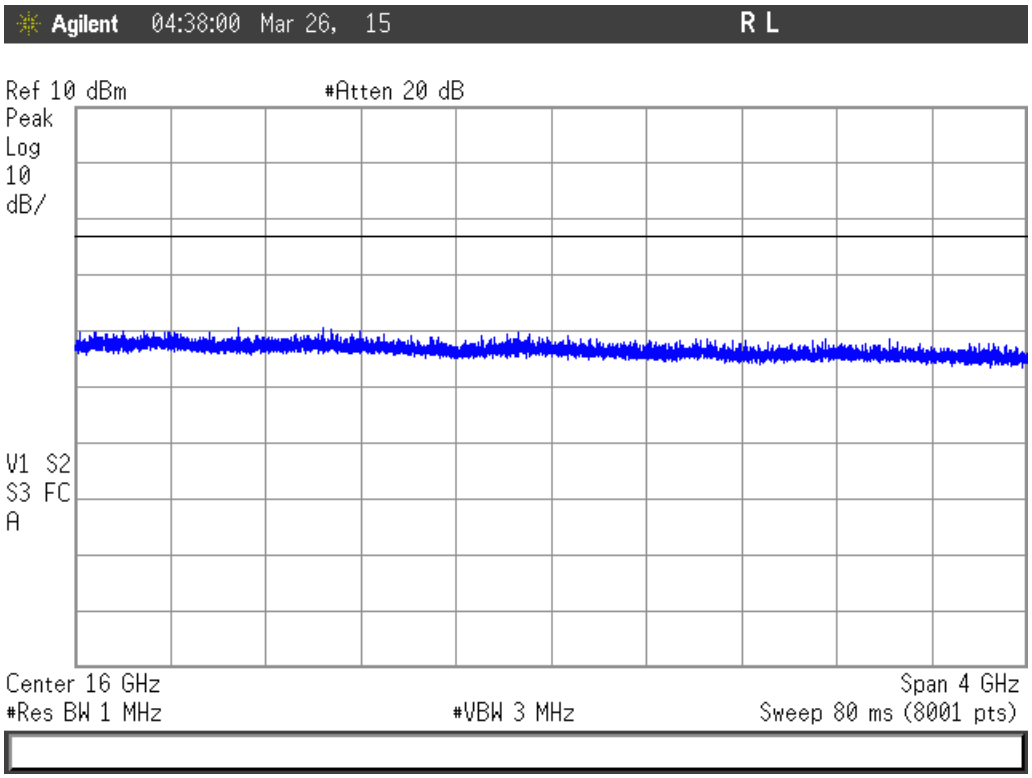
6-10GHz

[RBW 1MHz, VBW 3MHz, 8001 points, range 6-10GHz]



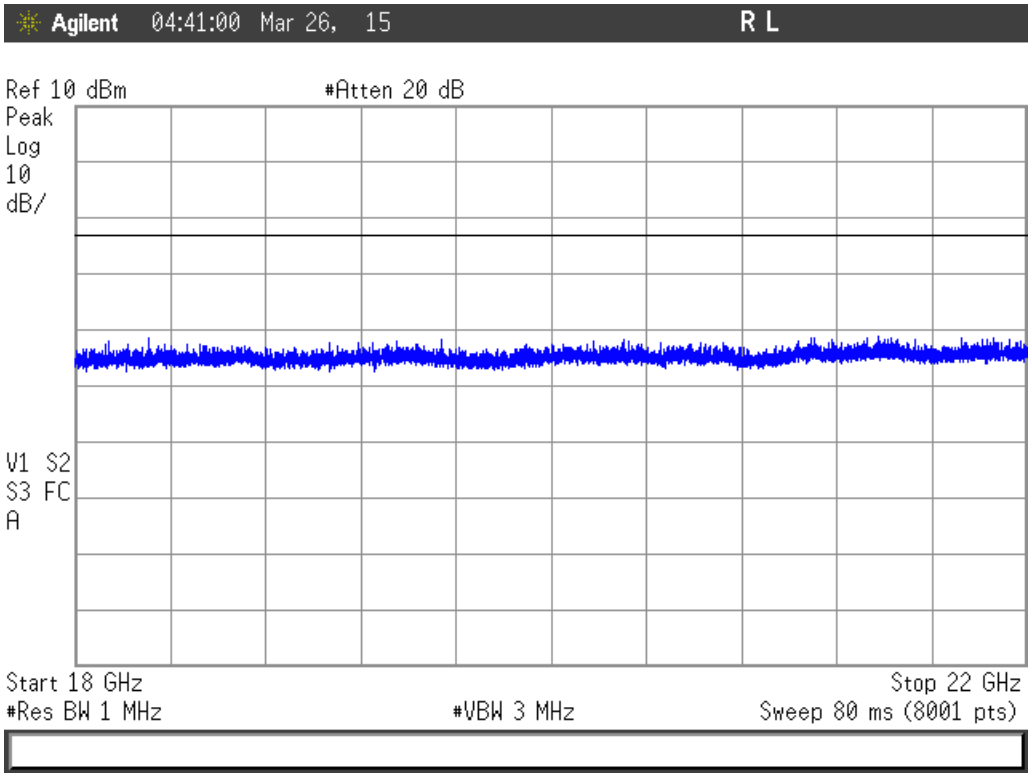
10-14GHz

[RBW 1MHz, VBW 3MHz, 8001 points, range 10-14GHz]



14-18GHz

[RBW 1MHz, VBW 3MHz, 8001 points, range 14-18GHz]



18-22GHz
[RBW 1MHz, VBW 3MHz, 8001 points, range 18-22GHz]

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: 01-Apr-15 **Company:** Airvana **Work Order:** P0152
Engineer: Ryan Brown **EUT Desc:** Switched IQ Radio Point Domestic **EUT Operating Voltage/Frequency:** POE
Temp: 25.2°C **Humidity:** 2% **Pressure:** mBar
Frequency Range: 30-1000MHz **Measurement Distance:** 3 m
Notes: Y-orientation 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)	FCC Class B Margin (dB)	FCC Class B Result (Pass/Fail)
V	51.8	52.6	25.5	7.8	0.4	35.3				40.0	-4.7	Pass
V	200.0	43.6	25.5	12.6	0.9	31.6				43.5	-11.9	Pass
V	300.0	44.3	25.7	13.4	0.9	32.9				46.0	-13.1	Pass
V	333.3	54.7	25.7	14.0	1.1	44.1				46.0	-1.9	Pass
V	375.0	43.0	25.7	15.1	1.1	33.5				46.0	-12.5	Pass
V	466.6	44.6	25.6	17.3	1.4	37.7				46.0	-8.3	Pass
V	500.0	48.0	25.8	18.0	1.1	41.3				46.0	-4.7	Pass
V	600.0	41.6	26.0	18.5	1.4	35.5				46.0	-10.5	Pass
V	625.0	42.2	25.8	19.3	1.4	37.1				46.0	-8.9	Pass
V	750.0	40.8	25.6	20.9	1.8	37.9				46.0	-8.1	Pass
H	333.3	46.5	25.7	14.0	1.1	35.9				46.0	-10.1	Pass
H	500.0	42.1	25.8	18.0	1.1	35.4				46.0	-10.6	Pass
H	750.0	41.1	25.6	20.9	1.8	38.2				46.0	-7.8	Pass
H	875.0	42.4	25.6	22.1	1.8	40.7				46.0	-5.3	Pass
H	466.6	38.6	25.6	17.3	1.4	31.7				46.0	-14.3	Pass
H	200.0	37.3	25.5	12.6	0.9	25.3				43.5	-18.2	Pass
H	625.0	37.7	25.8	19.3	1.4	32.6				46.0	-13.4	Pass
H	600.0	39.9	26.0	18.5	1.4	33.8				46.0	-12.2	Pass
H	50.8	37.7	25.5	8.0	0.4	20.6				40.0	-19.4	Pass
H	250.0	37.6	25.7	11.7	0.9	24.5				46.0	-21.5	Pass

Table Result: Pass by -1.9 dB ***Worst Freq:*** 333.3 MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #2053 **Cable 2:** Asset #2051 **Cable 3:** ---
Analyzer: Asset #1328 **Preamp:** Green **Antenna:** Red-Brown **Preselector:** ---

Radiated Emissions Table

Date: 4/17/2015 & 4/23/2015 **Company:** Airvana **Work Order:** P0152
Engineer: Tuyen Truong **EUT Desc:** Switched IQ Radio Point Domestic **EUT Operating Voltage/Frequency:** POE
Temp: 22°C **Humidity:** 24% **Pressure:** 1011mBar
(April 23) Temp: 23°C **Humidity:** 23% **Pressure:** 994mBar
Frequency Range: 1-18GHz **Measurement Distance:** 3m 91-6GHz) & 1m (6-18GHz)
Notes: Client brought EUT back with modification **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)														
v	4230.0	47.5	34.6	20.3	33.8	4.8	65.8	52.9	74.0	-8.2	Pass	54.0	-1.1	Pass
h	4230.0	40.32	25.9	20.3	33.8	4.8	58.6	44.2	74.0	-15.4	Pass	54.0	-9.8	Pass
v, nf	6345.0	32.77	21.2	19.3	35.8	6.2	55.5	43.9	83.5	-28.0	Pass	63.5	-19.6	Pass
h, nf	8460.0	35.03	23.5	19.1	36.1	7.9	59.9	48.4	83.5	-23.6	Pass	63.5	-15.1	Pass
BW = 5MHz, Band 10, 16QAM , Low Channel (2112.5MHz)				---	---	---	---	---	---	---	---	---	---	---
v	4225.0	48.13	32.7	20.3	33.8	4.3	65.9	50.5	74.0	-8.1	Pass	54.0	-3.5	Pass
h	4225.0	44.35	30.7	20.3	33.8	4.3	62.2	48.5	74.0	-11.8	Pass	54.0	-5.5	Pass
v, nf	6337.5	34.001	22.0	19.3	35.8	5.3	55.8	43.8	83.5	-27.7	Pass	63.5	-19.7	Pass
				---	---	---	---	---	---	---	---	---	---	---
BW = 10MHz, Band 10, 16QAM , Mid Channel (2140MHz)				---	---	---	---	---	---	---	---	---	---	---
v	4280.0	41.83	27.5	20.2	33.8	4.3	59.7	45.4	74.0	-14.3	Pass	54.0	-8.6	Pass
				---	---	---	---	---	---	---	---	---	---	---
BW = 10MHz, Band 10, 16QAM , High Channel (2165MHz)				---	---	---	---	---	---	---	---	---	---	---
v	4330.0	43.05	26.4	20.1	33.9	4.4	61.3	44.6	74.0	-12.7	Pass	54.0	-9.4	Pass
				---	---	---	---	---	---	---	---	---	---	---
BW = 10MHz, Band 10, QPSK , Low Channel (2115MHz)				---	---	---	---	---	---	---	---	---	---	---
v	4230.0	47.23	32.3	20.3	33.8	4.3	65.0	50.1	74.0	-9.0	Pass	54.0	-3.9	Pass
h	4230.0	41.65	27.2	20.3	33.8	4.3	59.5	45.0	74.0	-14.5	Pass	54.0	-9.0	Pass
				---	---	---	---	---	---	---	---	---	---	---
BW = 10MHz, Band 10, 64QAM , Low Channel (2115MHz)				---	---	---	---	---	---	---	---	---	---	---
v	4230.0	46.99	32.2	20.3	33.8	4.3	64.8	50.0	74.0	-9.2	Pass	54.0	-4.0	Pass
h	4230.0	40.3	26.4	20.3	33.8	4.3	58.1	44.2	74.0	-15.9	Pass	54.0	-9.8	Pass

Table Result: Pass by -1.1 dB ***Worst Freq:*** 4230.0 MHz

Test Site: 1DCC-OATS-3M-I **Cable 1:** EMIR-HIGH-22 **Cable 2:** --- **Cable 3:** ---
Analyzer: Rental SA#1 **Preamp:** Asset #1517 **Antenna:** Blue Horn **Preselector:** ---

Test Site: EMI Chamber 2 **Cable 1:** Asset #2052 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: Rental SA#1 **Preamp:** Asset #1517 **Antenna:** Blue Horn **Preselector:** ---

Radiated Emissions Table

Date: 23-Apr-15 **Company:** Airvana **Work Order:** P0152
Engineer: Tuyen Truong **EUT Desc:** Switched IQ Radio Point Domestic **EUT Operating Voltage/Frequency:** POE
Temp: 23°C **Humidity:** 23% **Pressure:** 994mBar
Frequency Range: 18-20GHz **Measurement Distance:** 0.1 m
Notes: BW = 10MHz, Band 2, 16QAM , Mid Channel (1960MHz) **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)
NO EMISSIONS FOUND WITHIN 10dB OF THE LIMIT														

Table Result: --- by --- dB ***Worst Freq:*** --- MHz

Test Site: EMI Chamber 2 **Cable 1:** Asset #1507 **Cable 2:** --- **Cable 3:** ---
Analyzer: Brown **Preamp:** Asset #1517 **Antenna:** 18-26.5GHz Horn **Preselector:** ---

Conducted Spurious Emissions on AC Mains

AC Conducted Emissions Data Table

Date: 06-Apr-15 **Company:** Airvana **Work Order:** P0152
Engineer: Tuyen Truong **EUT Desc:** Switched IQ Radio Point Domestic
Temp: 21.0 ºC **Humidity:** 27% **Pressure:** 1019mBar
Notes: Tested AC side of DC Power Brick of support POE Linksys Switch (checked both power, 120Vac/60Hz and 230Vac/50Hz)
Peak readings.

Frequency Range: 0.15-30MHz **EUT Input Voltage/Frequency:** POE

	Quasi-Peak Readings		Average Readings		LISN Factors				FCC/CISPR Class B			FCC/CISPR Class B		
Frequency (MHz)	QP1 (dBµV)	QP2 (dBµV)	AVG1 (dBµV)	AVG2 (dBµV)	L1 (dB)	L2 (dB)	Cable Factor (dB)	ATTN Factor (dB)	QP Limit (dBµV)	Margin (dB)	Result (Pass/Fail)	AVG Limit (dBµV)	Margin (dB)	Result (Pass/Fail)
BW = 10MHz, Band 10 16QAM, Low Channel (2115MHz)									---	---	---	---	---	---
0.86	11.1	11.9	11.1	11.9	0.0	0.0	0.0	-20.4	56.0	-23.6	Pass	46.0	-13.6	Pass
1.65	9.9	11.2	9.9	11.2	0.0	0.0	0.0	-20.4	56.0	-24.4	Pass	46.0	-14.4	Pass
6.29	10.3	10.8	10.3	10.8	0.0	-0.1	-0.1	-20.4	60.0	-28.7	Pass	50.0	-18.7	Pass
10.64	11.4	12.1	11.4	12.1	-0.1	-0.1	-0.2	-20.3	60.0	-27.3	Pass	50.0	-17.3	Pass
17.50	10.4	12.1	10.4	12.1	-0.1	-0.1	-0.2	-20.4	60.0	-27.2	Pass	50.0	-17.2	Pass
24.90	8.5	10.1	8.5	10.1	-0.1	-0.1	-0.3	-20.4	60.0	-29.0	Pass	50.0	-19.0	Pass

Result: Pass ***Worst Margin:*** -13.6 dB ***Frequency:*** 0.860 MHz

Measurement Device: LISN ASSET 1726(Line 1) LISN ASSET 1727(Line 2) **Cable:** CEMI-09 **Spectrum Analyzer:** SA EMI Chamber (1328)
Attenuator: 20dB Atten-4 **Site:** CEMI 3

Frequency Stability

REQUIREMENTS

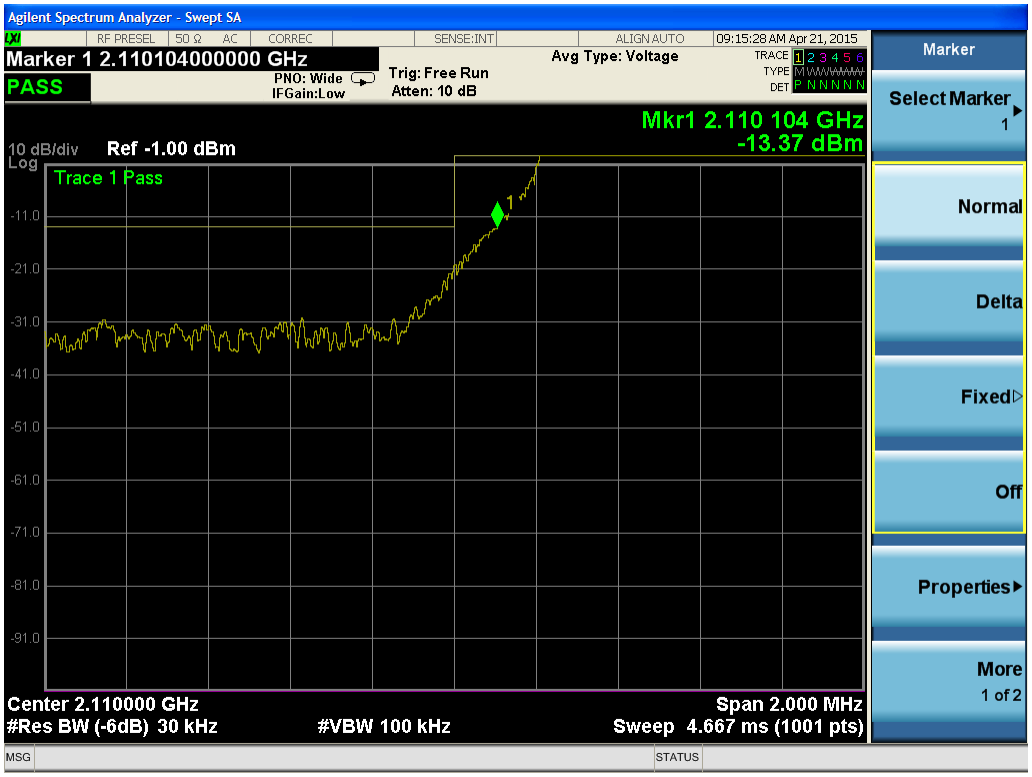
From FCC Part 27:

> *§27.54 Frequency stability.*
> *The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.*

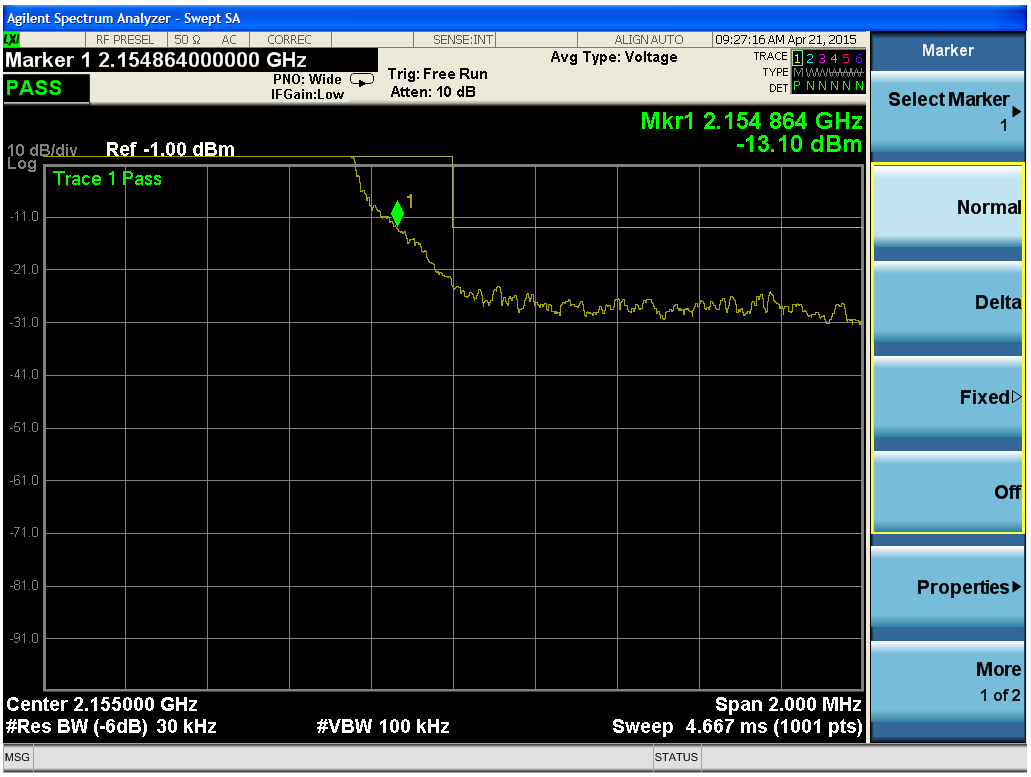
MEASUREMENTS / RESULTS

Measurements were done on port J1, since the same frequency-generating circuit is used for J1 and J2.

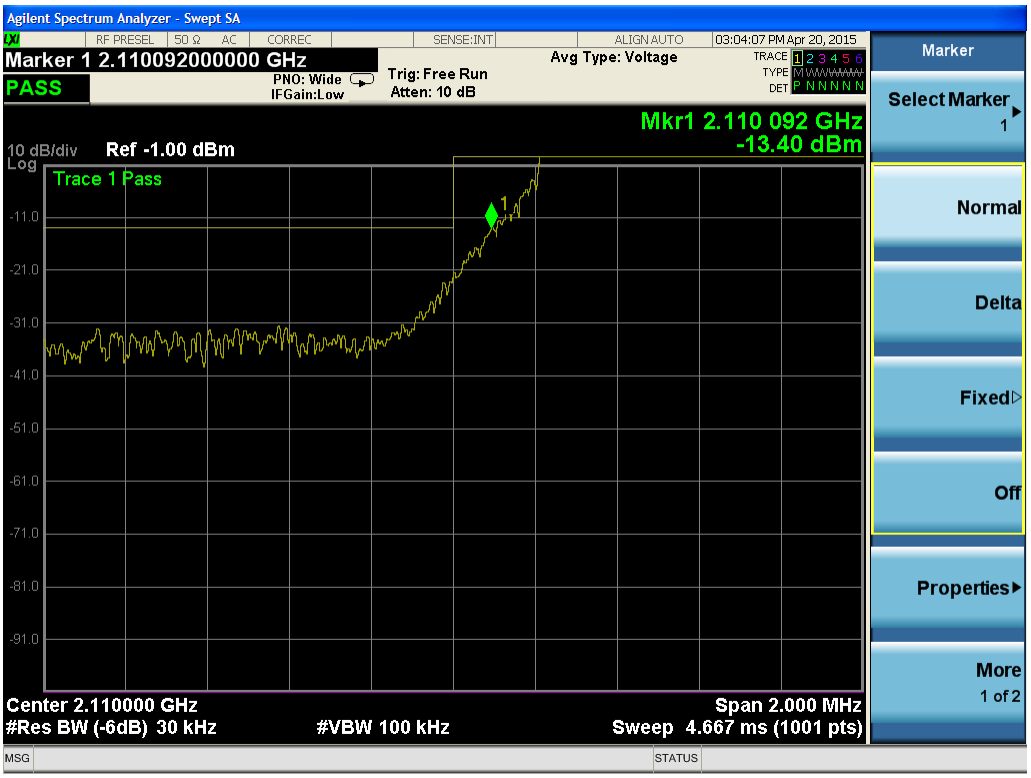
Band 4:



-30°C, Low Frequency Edge



-30°C, High Frequency Edge

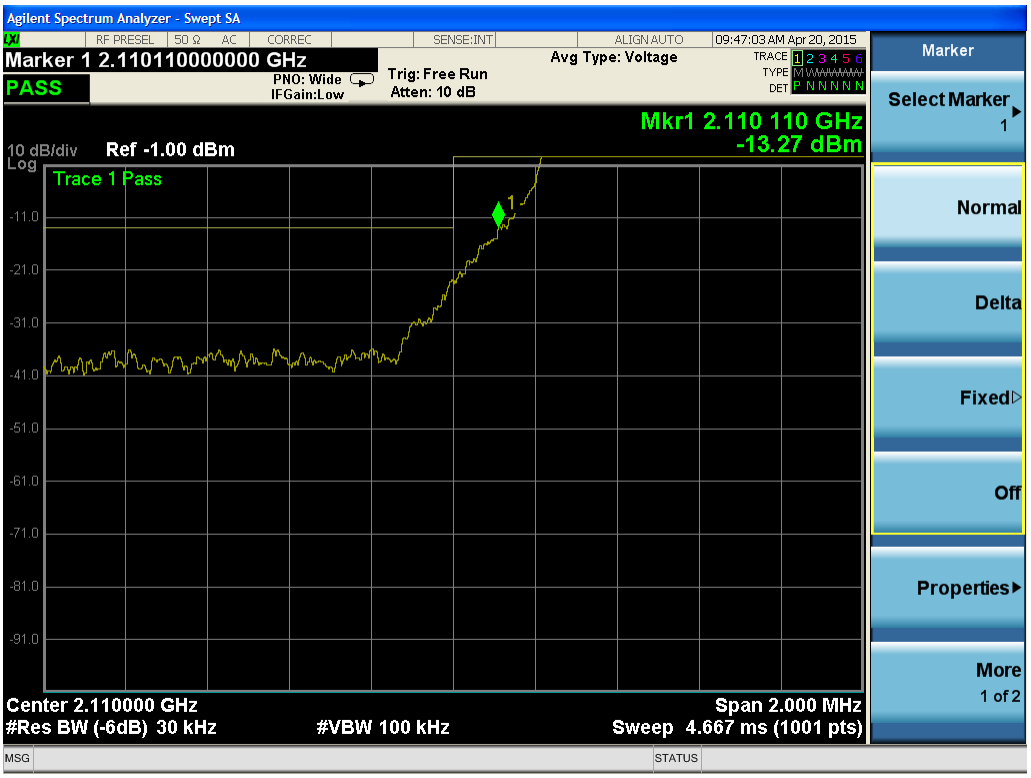


-20°C, Low Frequency Edge

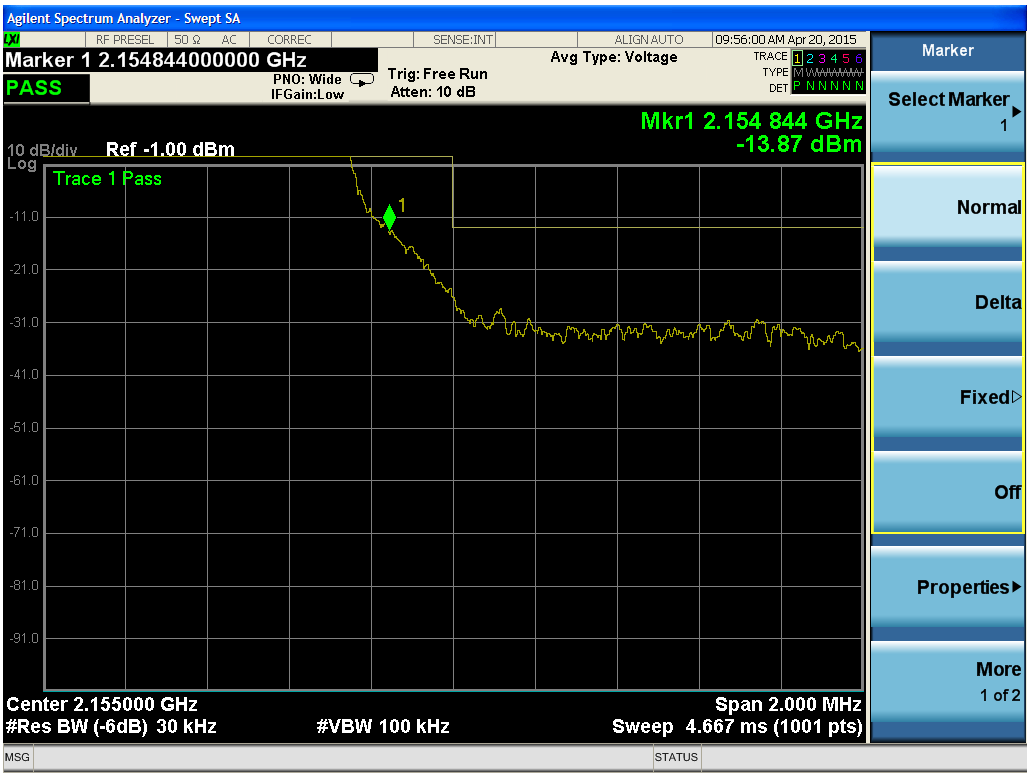
-20°C, High Frequency Edge

-10°C, Low Frequency Edge

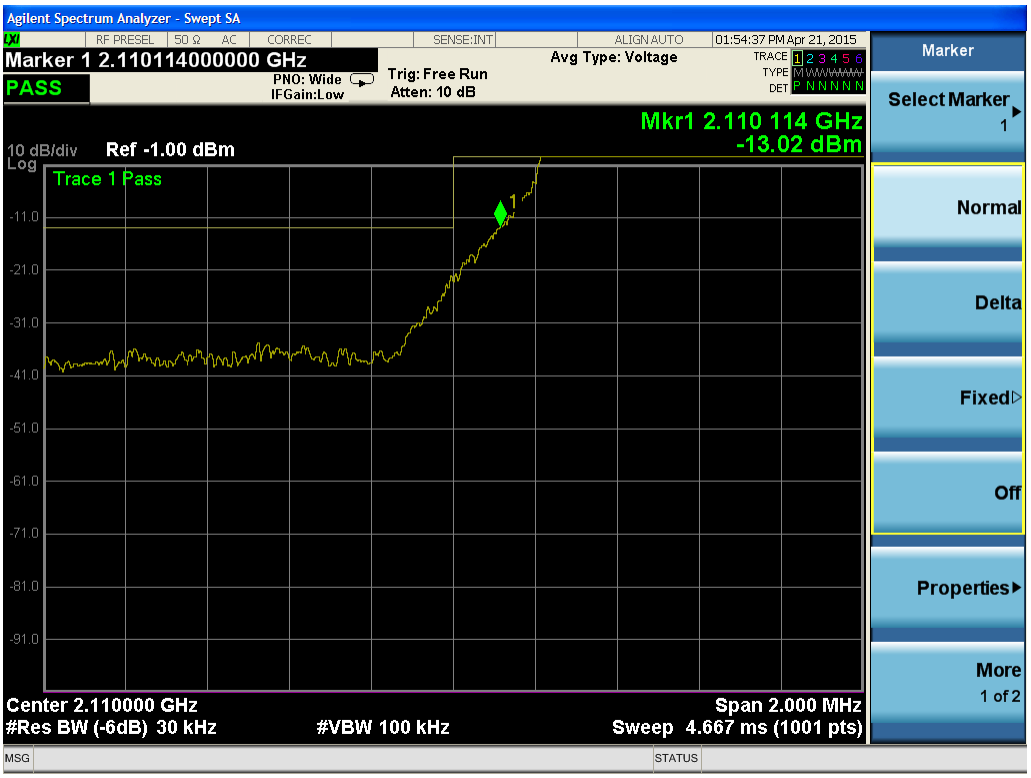
-10°C, High Frequency Edge



0°C, Low Frequency Edge



0°C, High Frequency Edge

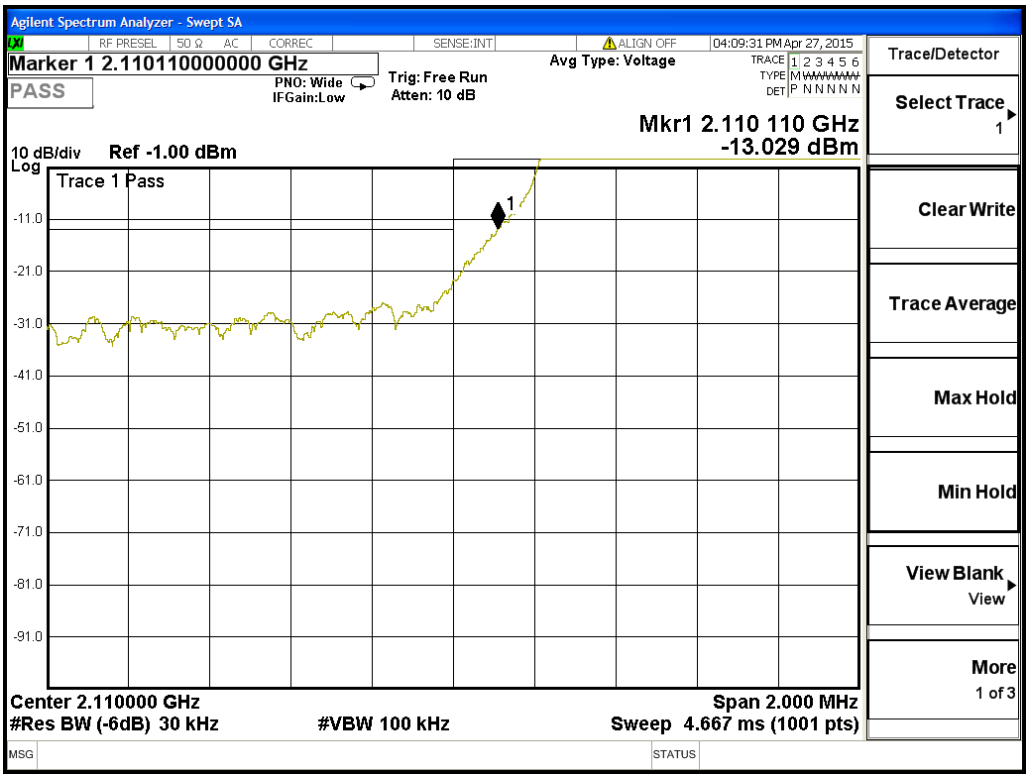


10°C, Low Frequency Edge

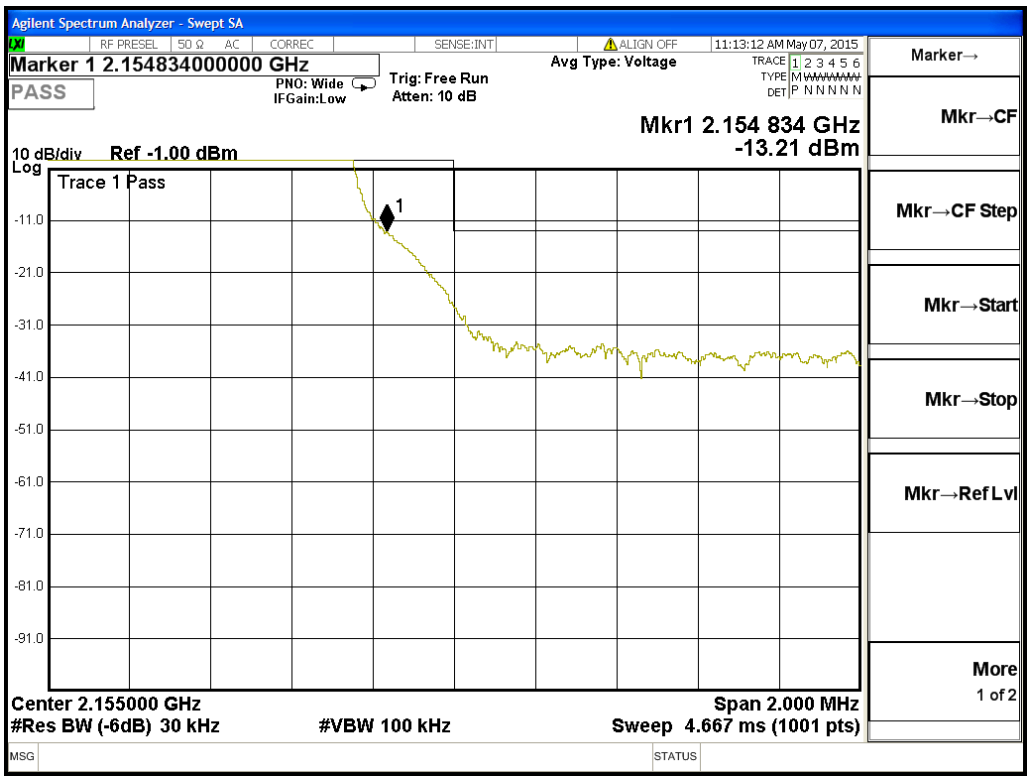
10°C, High Frequency Edge

20°C, Low Frequency Edge, 120Vac

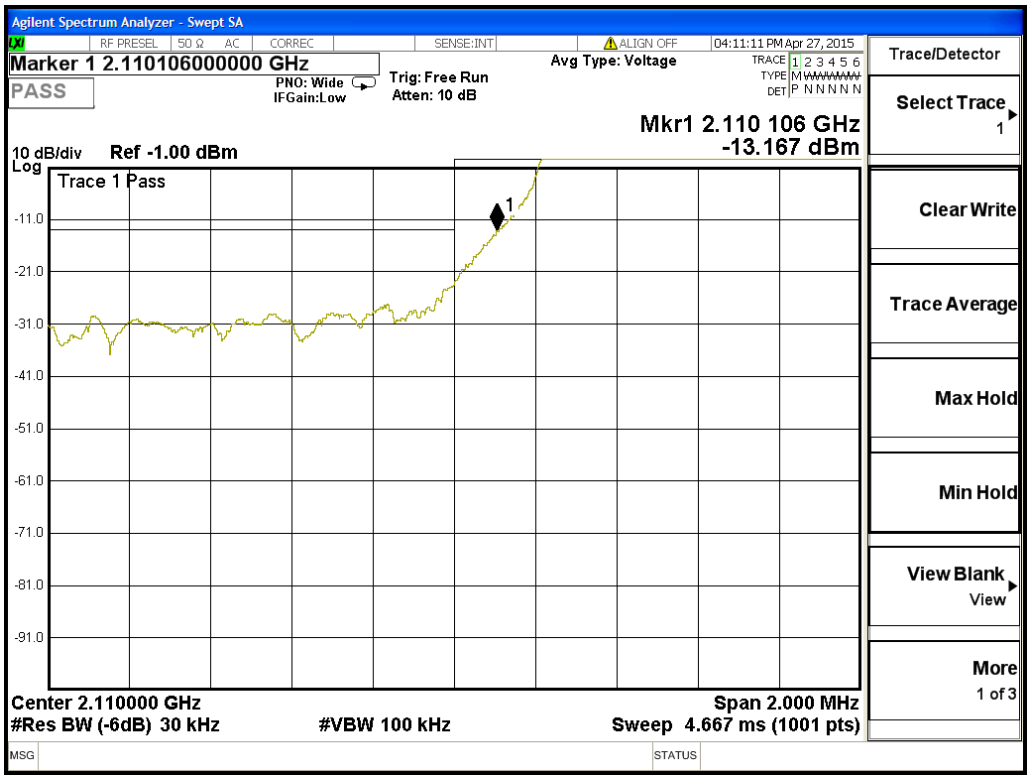
20°C, High Frequency Edge, 120Vac



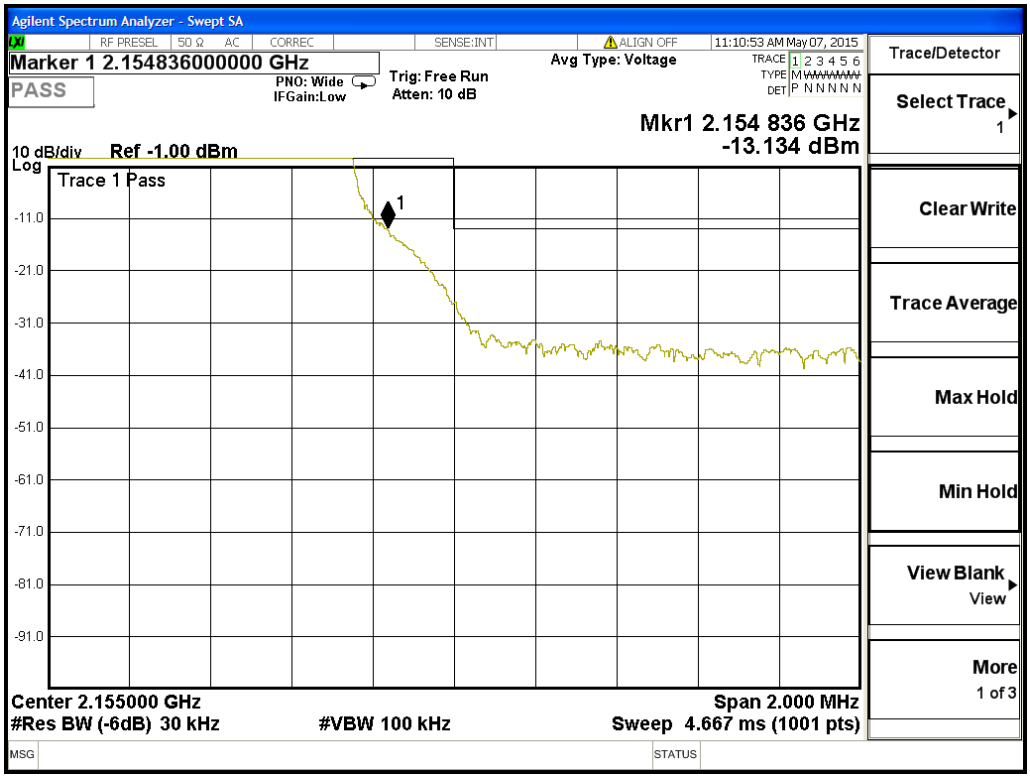
20°C, Low Frequency Edge, 102Vac (-15% from nominal)



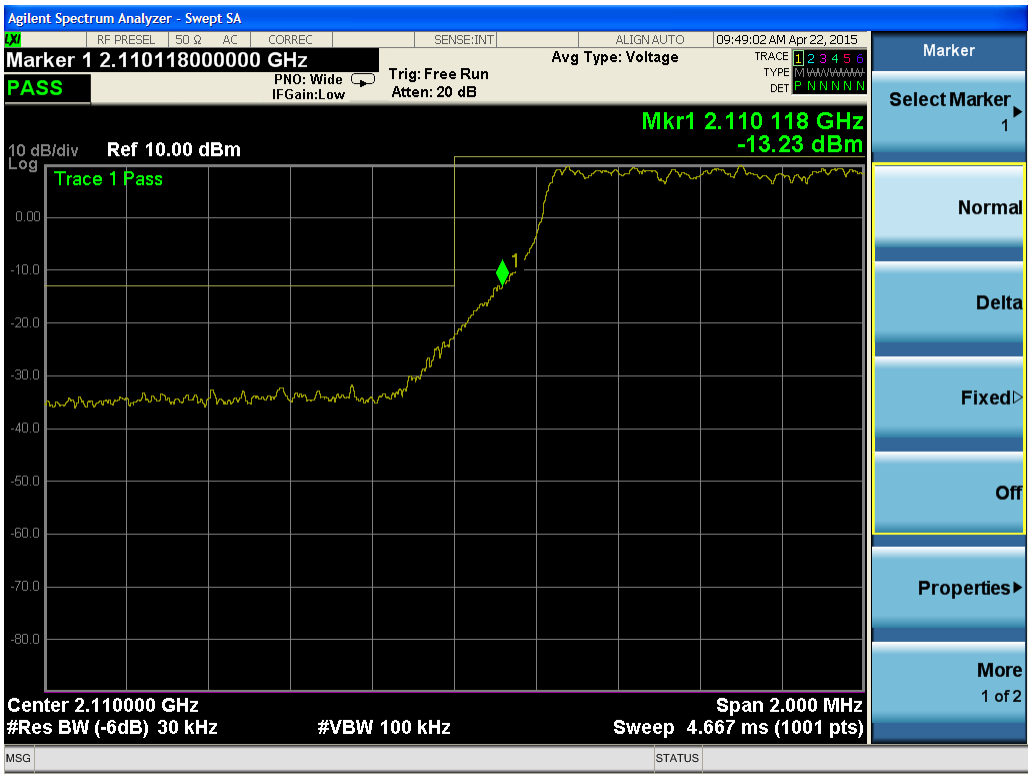
20°C, High Frequency Edge, 102Vac (-15% from nominal)



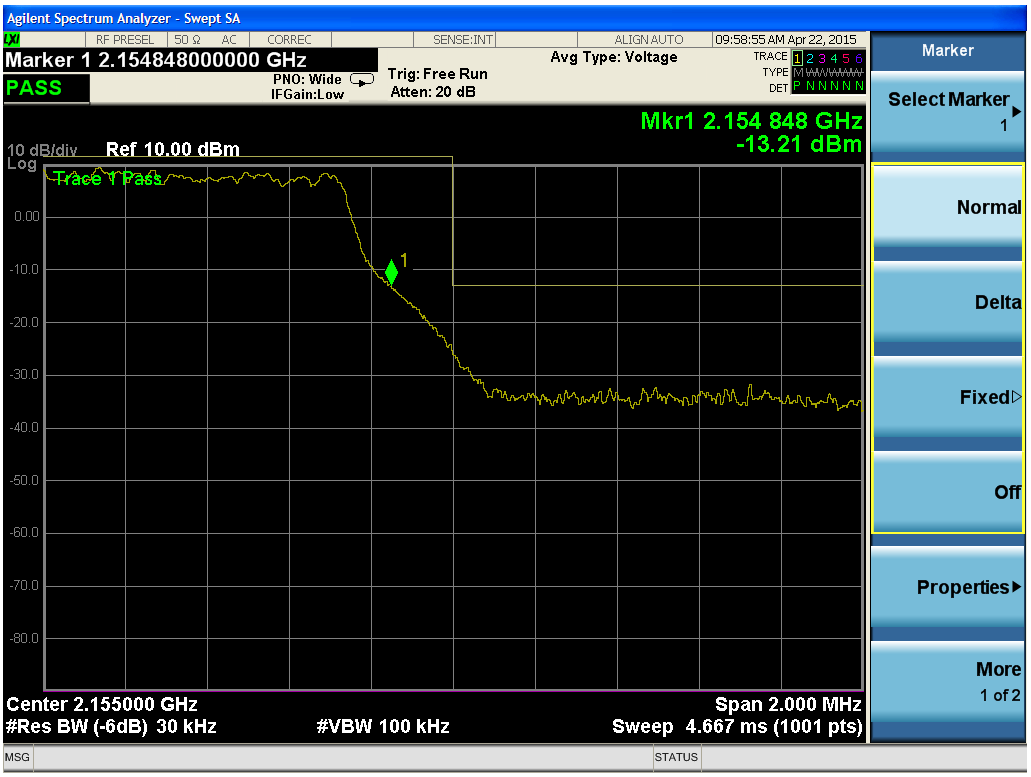
20°C, Low Frequency Edge, 138Vac (+15% from nominal)



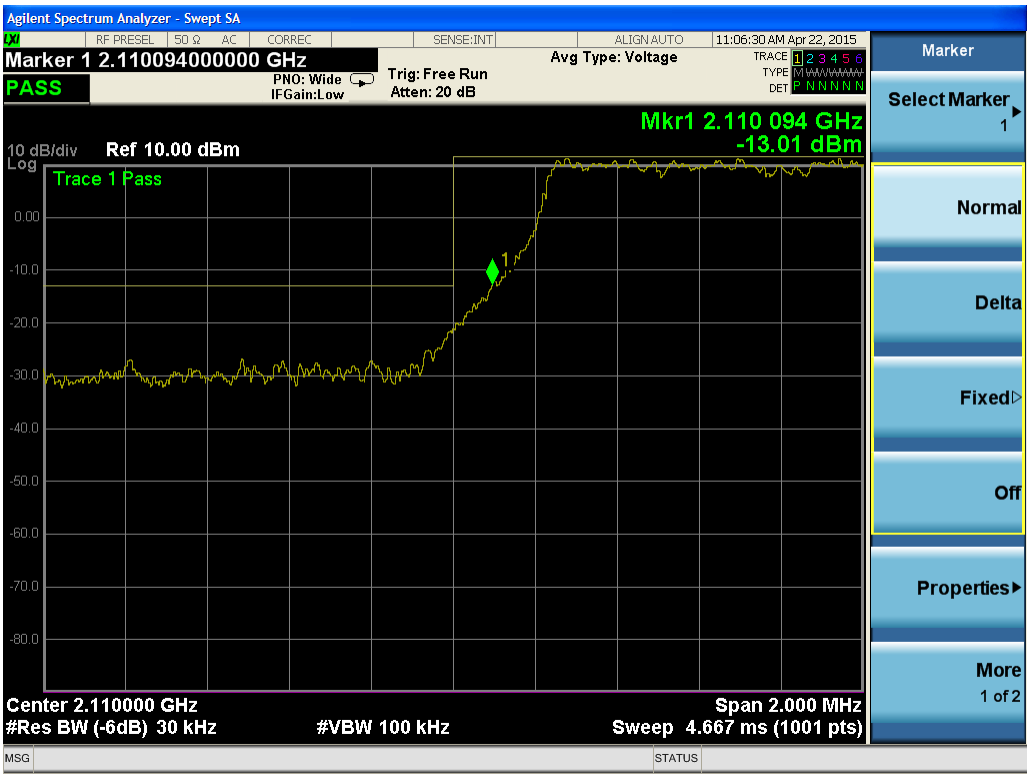
20°C, High Frequency Edge, 138Vac (+15% from nominal)



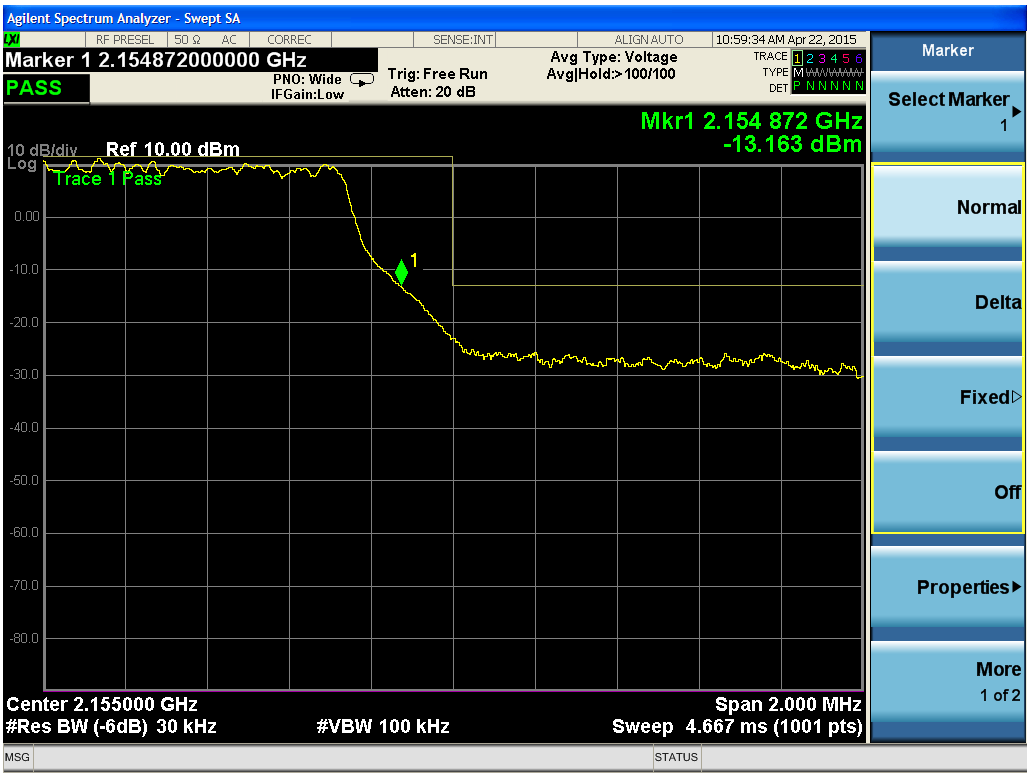
30°C, Low Frequency Edge



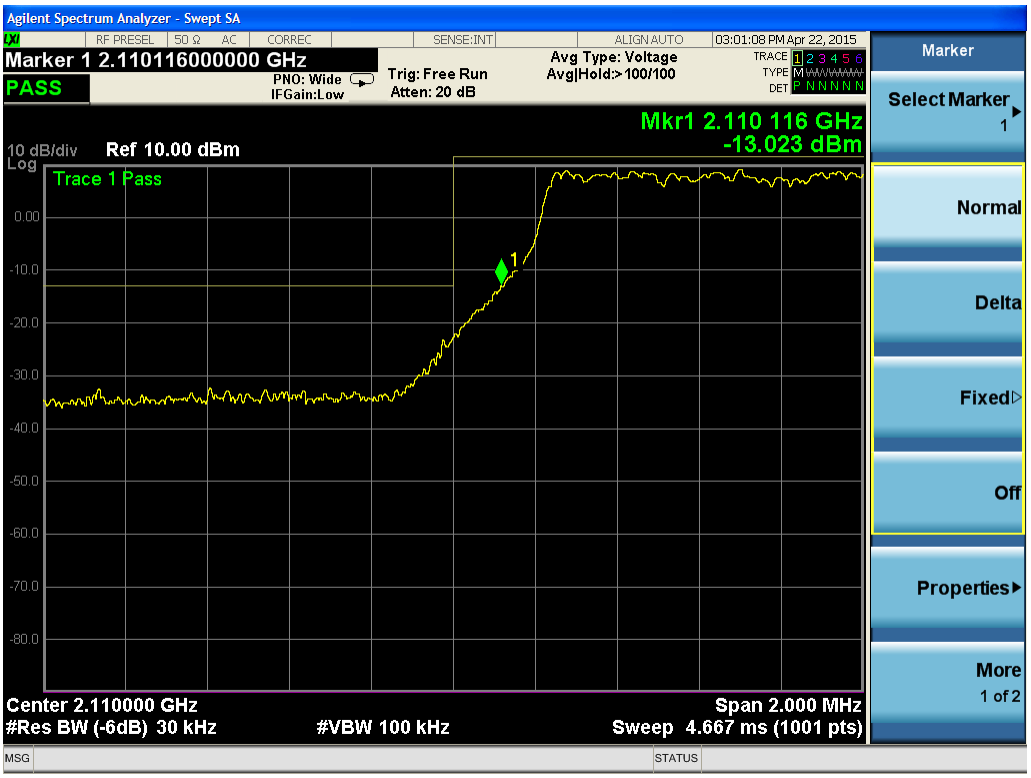
30°C, High Frequency Edge



40°C, Low Frequency Edge



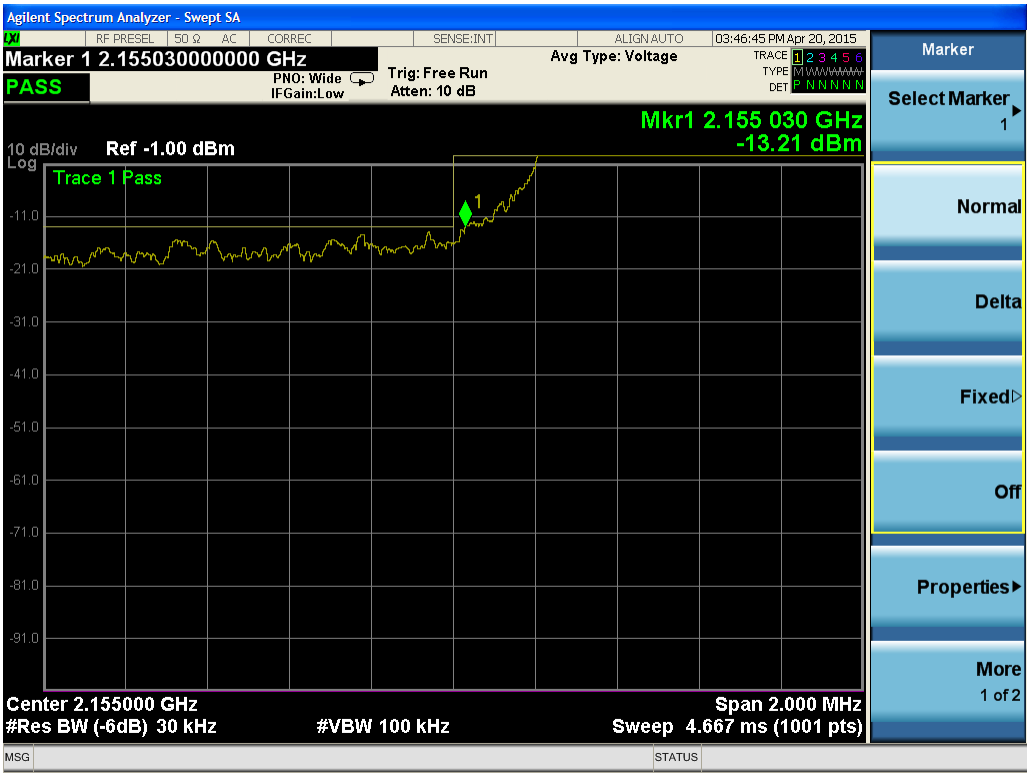
40°C, High Frequency Edge



50°C, Low Frequency Edge

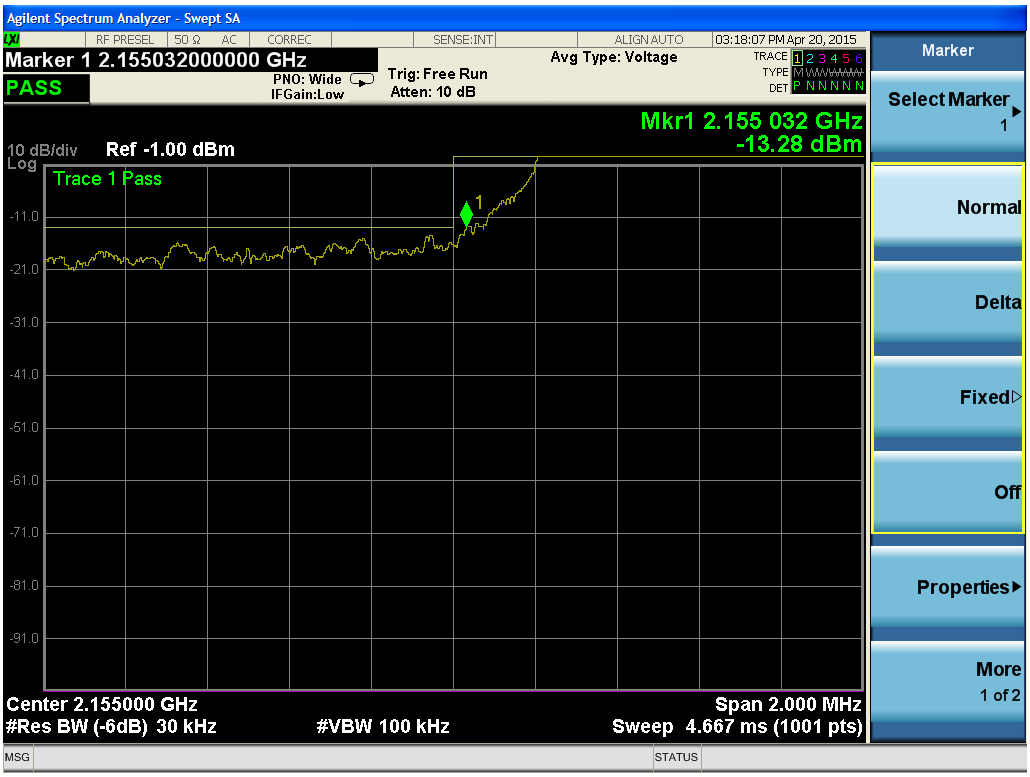
50°C, High Frequency Edge

Band 10:



-30°C, Low Frequency Edge

-30°C, High Frequency Edge



-20°C, Low Frequency Edge

-20°C, High Frequency Edge

-10°C, Low Frequency Edge

-10°C, High Frequency Edge

0°C, Low Frequency Edge

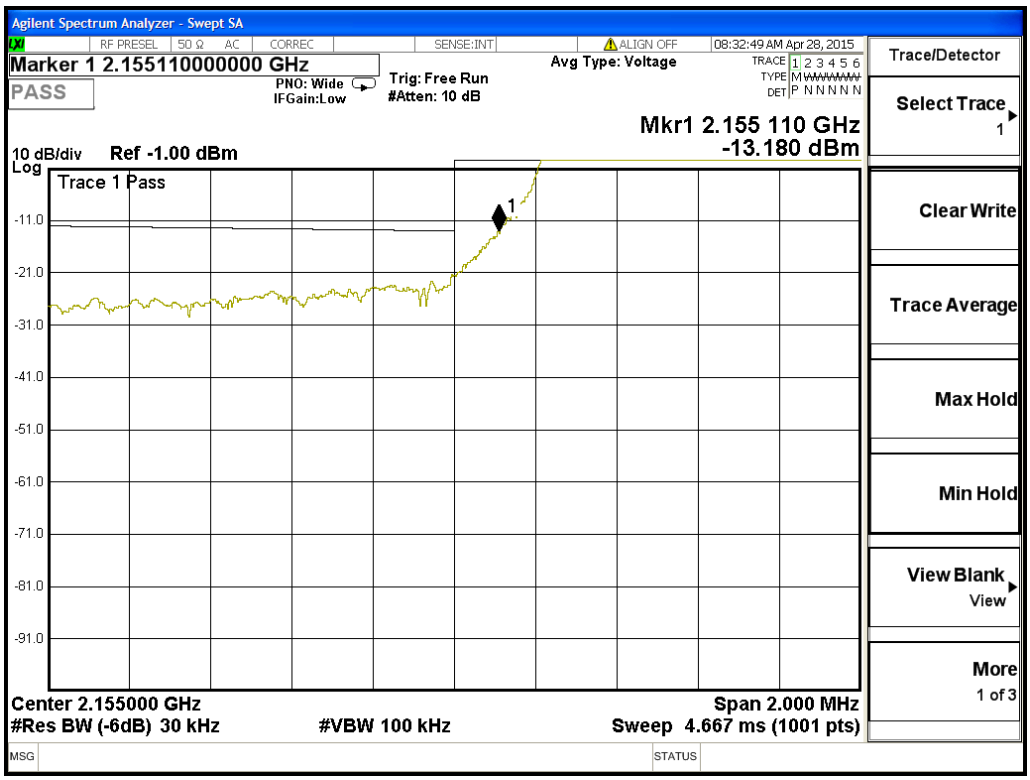
0°C, High Frequency Edge

10°C, Low Frequency Edge

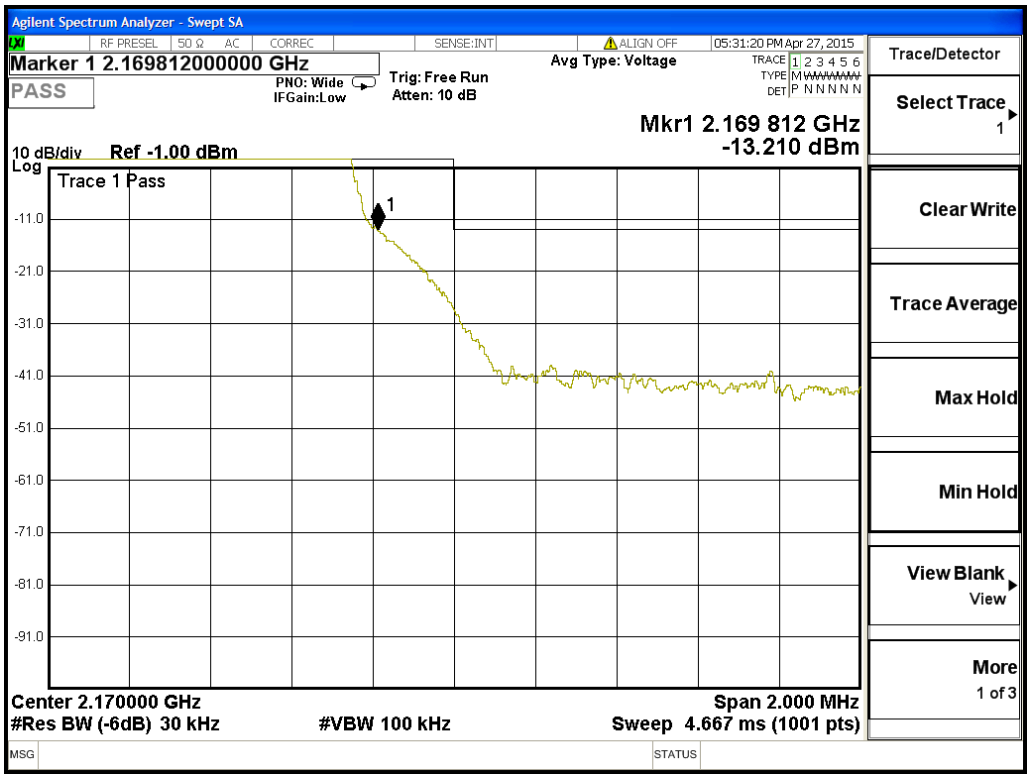
10°C, High Frequency Edge

20°C, Low Frequency Edge, 120Vac

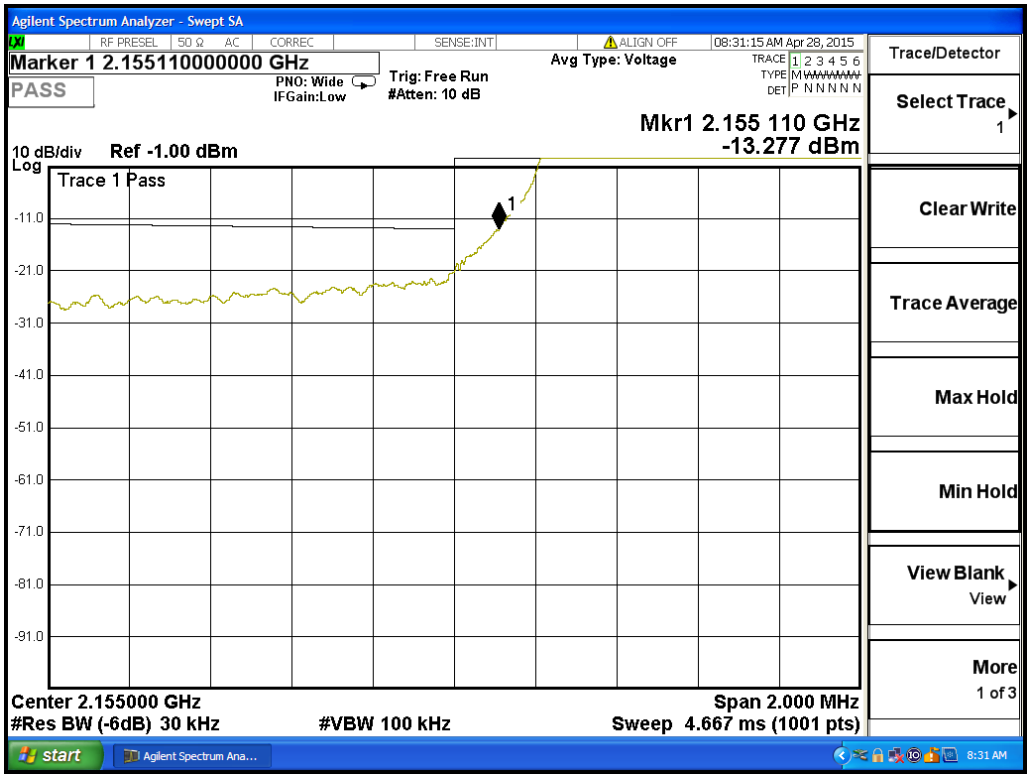
20°C, High Frequency Edge, 120Vac



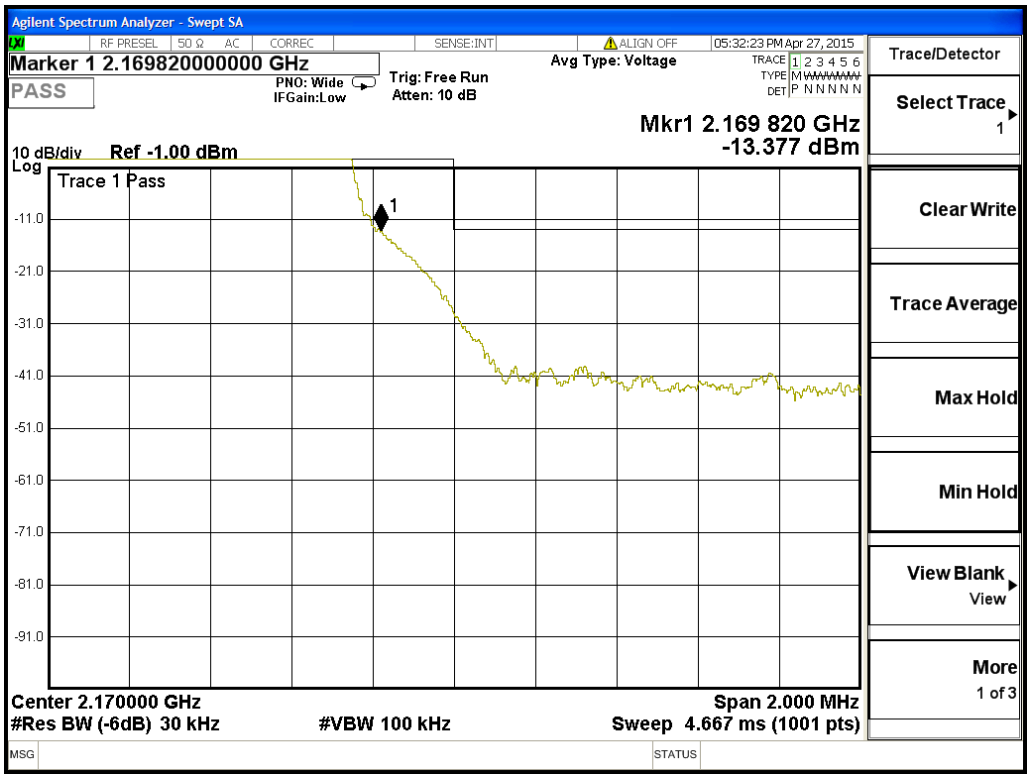
20°C, Low Frequency Edge, 102Vac (-15% from nominal)



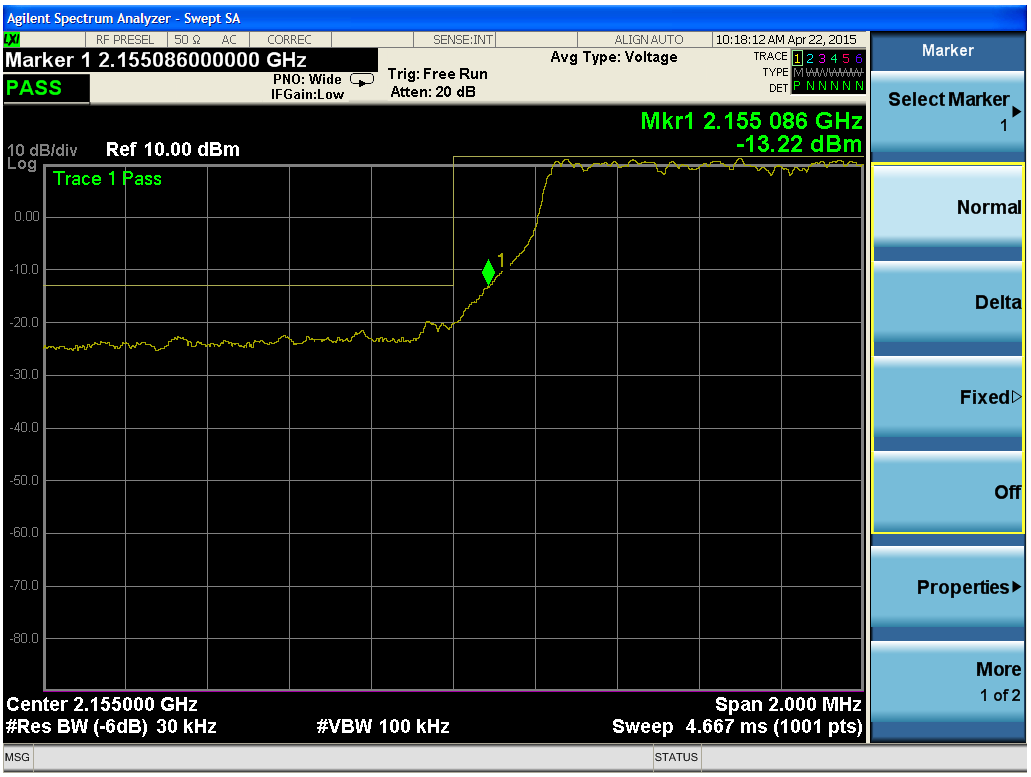
20°C, High Frequency Edge, 102Vac (-15% from nominal)



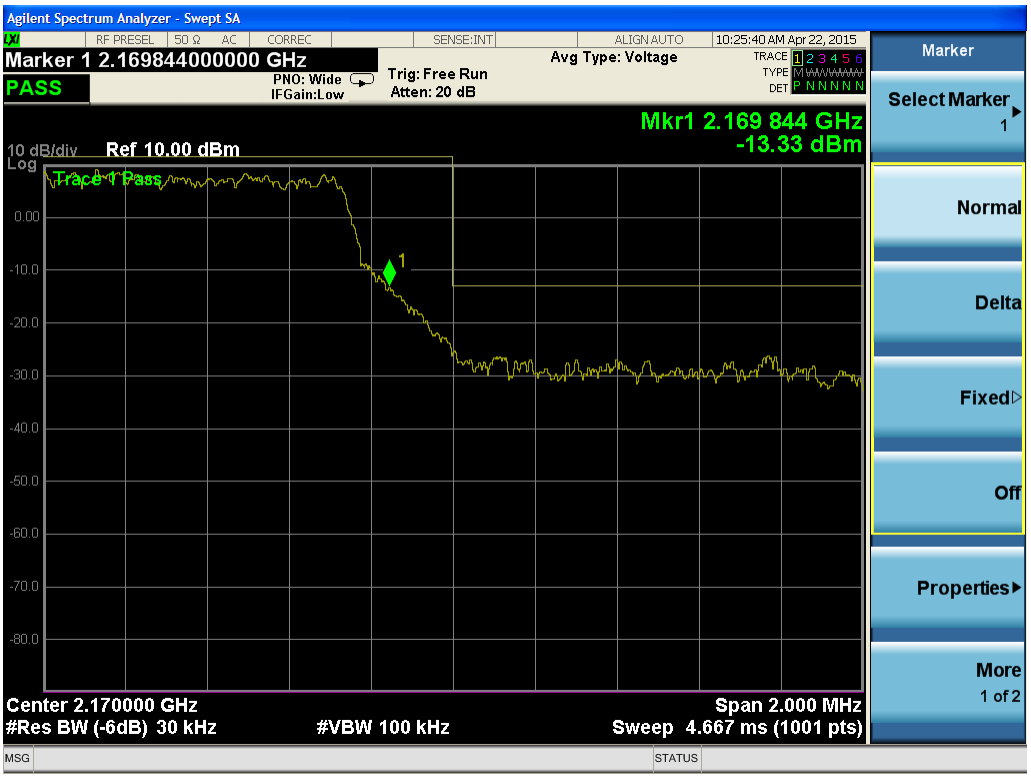
20°C, Low Frequency Edge, 138Vac (+15% from nominal)



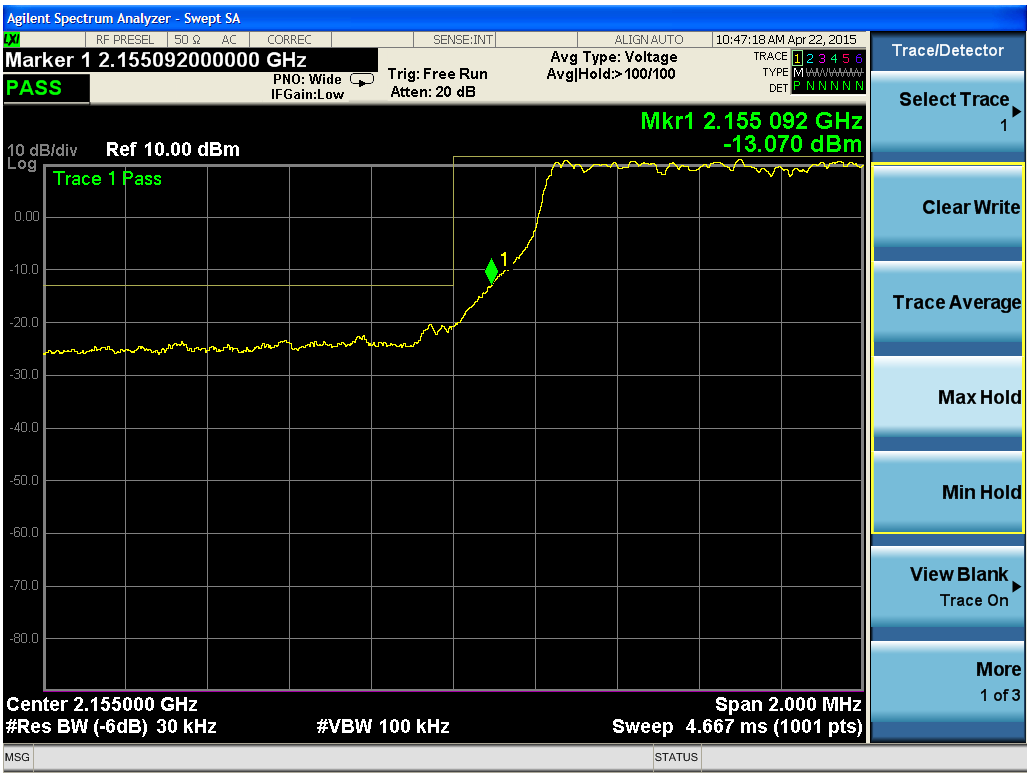
20°C, High Frequency Edge, 138Vac (+15% from nominal)



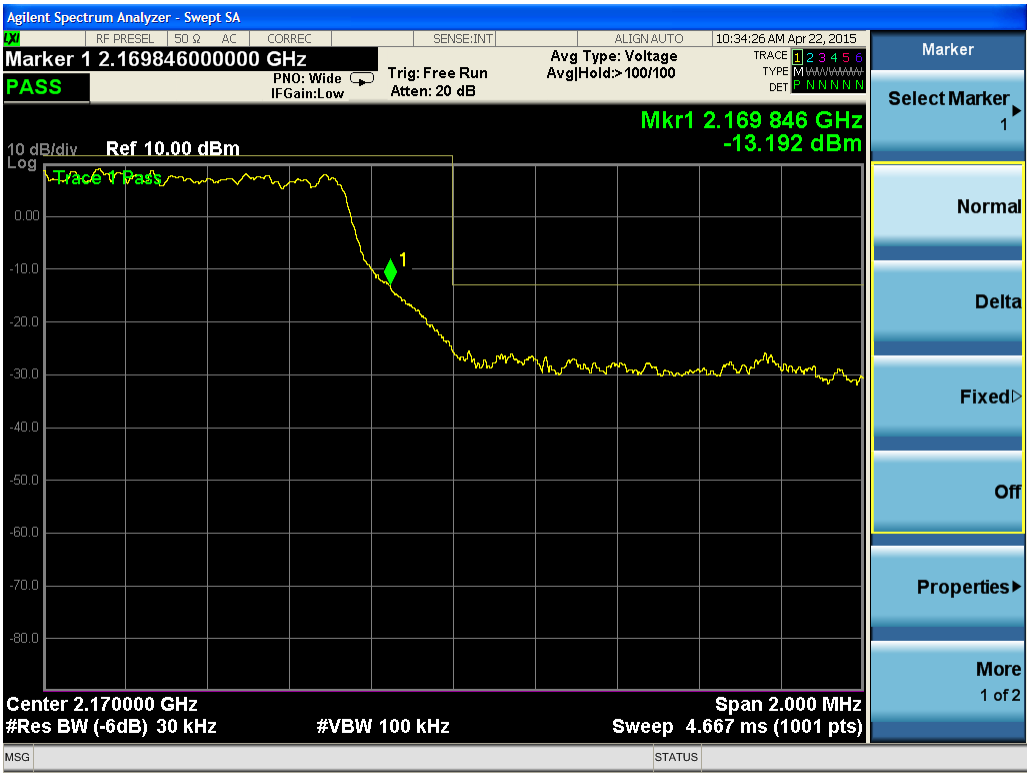
30°C, Low Frequency Edge



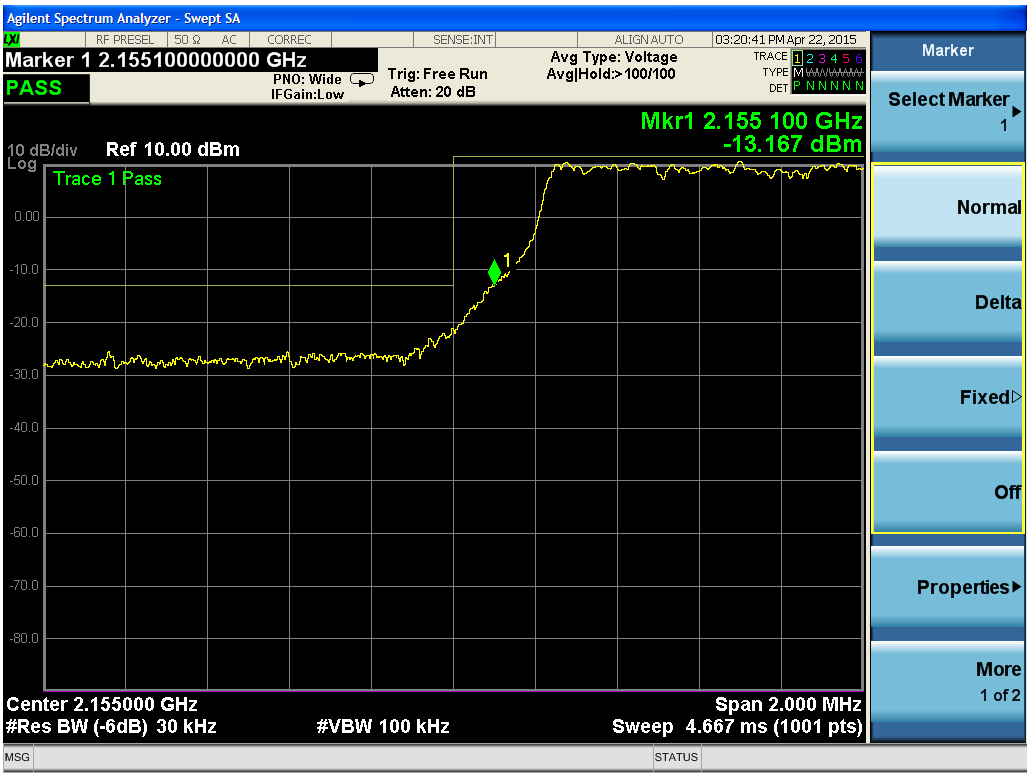
30°C, High Frequency Edge



40°C, Low Frequency Edge



40°C, High Frequency Edge



50°C, Low Frequency Edge

50°C, High Frequency Edge

Test Equipment

Rev. 3/16/2015

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Brown	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	5/12/2015	5/12/2014
SA #2 (1860)	9kHz-26.5 GHz	E7405A	Agilent	MY45104916	1860	I	6/4/2015	6/4/2014
EMI Chamber Preselector	9kHz-1.8GHz	EM-2701	Electro-Metrics	539	1511	II	7/29/2015	7/29/2014
SA EMI Chamber (1328)	9kHz-13.2 GHz	E4405B	Agilent	MY44210241	1328	I	2/20/2016	2/20/2015
Conducted Test Sites (Mains / Telco)	**FCC Code**		**VCCI Code**			**Cat**	**Calibration Due**	**Calibrated on**
CEMI 2	719150		A-0015			III	NA	N/A
Radiated Emissions Sites	**FCC Code**	**IC Code**	**VCCI Code**	**Range**		**Cat**	**Calibration Due**	**Calibrated on**
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz		II	4/15/2015	3/15/2014
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015
1DCC-OATS-3M-I	719150	2762A-8	A-0015	30-1000MHz		II	5/17/2015	5/17/2013
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Red-White	0.009-2000MHz	ZFL-1000-LN	CS	N/A	1258	II	12/26/2015	12/26/2014
1517 HF Preamp	1-20GHz	CS	CS	N/A	1517	II	9/9/2015	9/9/2014
High Pass Filter	0.03-6.5 GHz	11SH10-1000/T3000-0/0	K&L	1	1310	II	1/13/2016	1/13/2015
Blue-Black	0.009-2000MHz	ZFL-1000-LN	CS	N/A	800	II	12/26/2015	12/26/2014
High Pass Filter	0.03-14.5 GHz	11SH10-3000/T9000-0/0	K&L	1	1311	II	1/13/2016	1/13/2015
Green	0.009-2000MHz	ZFL-1000-LN	CS	N/A	802	II	9/14/2015	9/14/2014
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Red-Brown Bilog	30-2000MHz	JB1	Sunol	A0032406	1218	I	12/4/2016	12/4/2014
Yellow Horn	1-18GHz	3115	EMCO	9608-4898	37	I	7/28/2015	7/28/2014
Red-White Bilog	30-2000MHz	JB1	Sunol	A091604-1	1105	I	7/24/2015	7/24/2013
Blue Horn	1-18Ghz	3117	ETS	157647	1861	I	2/8/2017	2/8/2015
HF (White) Horn	18-26.5GHz	801-WLM	Waveline	758	758	III	Verify before Use	date of test
LISNs/Measurement Probes	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
LISN Asset 1726	150kHz-30MHz	LI-150A	Com-Power	201092	1726	I	1/23/2016	1/23/2015
LISN Asset 1727	150kHz-30MHz	LI-150A	Com-Power	201093	1727	I	1/23/2016	1/23/2015
Attenuators	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
20dB Attenuator-04	9kHz-2GHz			N/A		II	6/30/2015	6/30/2014
Conducted Test Sites (Mains / Telco)	**FCC Code**		**VCCI Code**			**Cat**	**Calibration Due**	**Calibrated on**
CEMI-03	9kHz - 2GHz		C-S			II	9/14/2015	9/14/2014
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
Asset #1787	9kHz - 18GHz		Florida RF			II	4/14/2015	3/14/2014
Asset #2051	9kHz - 18GHz		Florida RF			II	3/8/2016	3/8/2015
Asset #2053	9kHz - 18GHz		Florida RF			II	3/8/2016	3/8/2015
Asset #2052	9kHz - 18GHz		Florida RF			II	3/8/2016	3/8/2015
Asset #2054	9kHz - 18GHz		Florida RF			II	3/8/2016	3/8/2015
REMI-High-22	9kHz - 18GHz		C-S			II	2/7/2016	2/7/2015
Asset #1507	9kHz - 18GHz		Florida RF			II	2/15/2016	2/15/2015
CEMI-09	9kHz - 2GHz		C-S			II	5/3/2015	5/3/2014
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	3/19/2016	3/19/2014
TH A#1831		35519-044	Control Company	130319991	1831	II	6/13/2015	6/13/2013
TH A#1832		35519-044	Control Company	130318277	1832	II	6/13/2015	6/13/2013
TH A#1833		35519-044	Control Company	130318278	1833	II	6/13/2015	6/13/2013
TH A#2079		HTC-1	HDE		2079	II	4/2/2016	4/2/2015
TH A#1830		35519-044	Control Company	130320003	1830	II	6/13/2015	6/13/2013
TH A#2081		HTC-1	HDE		2081	II	4/2/2016	4/2/2015
TH A#1829		35519-044	Control Company	130320899	1829	II	6/13/2015	6/13/2015

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 were 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.

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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