TEST RESULT SUMMARY

FCC Part 15 Subpart E Section 15.407
Industry Canada RSS-210 Issue 8
Industry Canada RSS-Gen Issue 3

MANUFACTURER	Digi International 11001 Bren Road East Minnetonka MN 55343
PRODUCT NAME	Connect Wi-EM 9210 a/b/g
MODEL NUMBER(S) TESTED	50001558-01 with 29000147 antenna
PRODUCT DESCRIPTION	802.11 a/b/g embedded radio module (802.11 a/b/g to a serial port converter module) with PCB antenna
TEST REPORT NUMBER	WC1107626
TEST DATE(S)	16-30 September 2011

TÜV SÜD America Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the applicable requirements of parts of Subpart E, Section 15.407 "*General technical requirements*" and Industry Canada RSS-210 Issue 8 *"Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"* and RSS-Gen Issue 3 *"General Requirements and Information for the Certification of Radiocommunication Equipment"*

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

		Tested by:	Approved by:
Date:	09 November 2011		
Location:	Taylors Falls MN USA	Greg Jakubowski Senior EMC Technician	Joel T Schneider Senior EMC Engineer

Not Transferable

EMC TEST REPORT

Test Report No.	**WC1107626**	Date of issue: 09 November 2011
Product Name	Connect Wi-EM 9210 a/b/g	
Model / Serial No(s) Tested	50001558-01 with 29000147 antenna / 0000x	
Product Description	802.11 a/b/g embedded radio module (802.11 a/b/g to a serial port converter module) with PCB antenna	
Manufacturer	Digi International	
	11001 Bren Road East	
	Minnetonka MN 55343	

Test Result ■ **Positive** ☐ **Negative**

TÜV SÜD America Inc reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. TÜV SÜD America Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD America Inc issued reports.

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TÜV SÜD America Inc and its professional staff hold government and professional organization certifications and are members of AAMI, ACIL, AEA, ANSI, IEEE, NARTE, and VCCI.

REVISION RECORD

REVISION	TOTAL NUMBER OF PAGES	DATE	DESCRIPTION
	149	09 November 2011	Initial Release

TEST REPORT CONTENTS **Page(s)**

EMC TEST REGULATIONS:

The tests were performed according to the following regulations:

- FCC Part 15 Subpart E Section 15.407 Paragraphs (a), (b)
- Industry Canada RSS-210 Issue 8 Sections A8.2(a), A8.4(4), A8.5, A8.2(b), A9.2, A9.3
- Industry Canada RSS-Gen Issue 3 Section 4.6.1

ENVIRONMENTAL CONDITIONS IN THE LAB

	Actual
Temperature:	: 16°C
Atmospheric pressure	: 100kPa
Relative Humidity	: 42%

POWER SUPPLY UTILIZED

Power supply system	: 3.3VDC

TEST EQUIPMENT

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.

SIGN EXPLANATIONS

☐ - not applicable
■ - applicable

Maximum conducted output power
FCC 15.407(a), IC RSS-210 A9.2

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Testing was performed in accordance with the test procedure of FCC KDB 789033 method #SA-1.
Span > EBW, bin width < ½ RBW therefore sample detector, device operates continuously therefore trigger = free run, average 100 traces in power avg mode.
The power was computed by integrating the spectrum across the 26 dB EBW using the analyzer's band power measurement function.
Maximum conducted output power is 8.29 dBm or 6.76 mW, channel 64, 5.32 GHz

Test location
☐ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
■ - Wild River Lab Tech Area, conducted measurement

Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE10435	E4440A	Agilent	Spectrum Analyzer	MY44304483	01-Apr-12

Test limit

Frequency Band (GHz)	Limit (mW)	Limit (dBm)
5.15 – 5.25	50	17
5.25 – 5.35	250 or 11 dBm + 10log(EBW)	24
5.47 – 5.725	250 or 11 dBm + 10log(EBW)	24
5.725 – 5.825	1000 or 17 dBm + 10log(EBW)	30

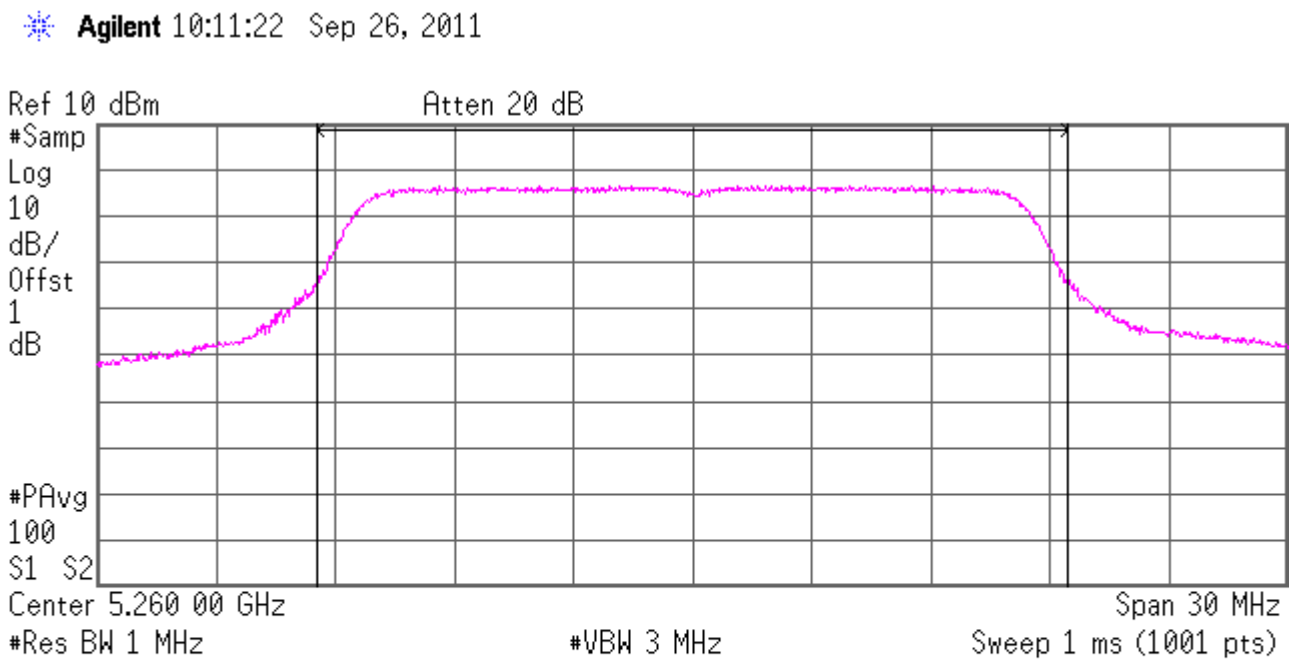
Antennas are < 6 dBi gain

see following pages

Test data

Ch	Freq (GHz)	Power (dBm)	Limit (dBm)	
52	5.26	7.77	23.7	6 MB
52	5.26	7.84	23.8	12 MB
52	5.26	7.79	23.9	54 MB
64	5.32	8.13	24	6 MB
64	5.32	8.18	23.9	12 MB
64	5.32	8.29	24	54 MB
100	5.5	7.63	23.8	6 MB
100	5.5	7.72	23.9	12 MB
100	5.5	7.84	23.9	54 MB
112	5.56	6.98	23.9	6 MB
112	5.56	7.08	23.8	12 MB
112	5.56	7.2	23.8	54 MB
132	5.66	5.77	23.7	6 MB
132	5.66	5.88	23.9	12 MB
132	5.66	6	23.9	54 MB
140	5.7	5.7	23.8	6 MB
140	5.7	5.79	23.7	12 MB
140	5.7	5.92	23.9	54 MB
165	5.825	4.44	30	6 MB
165	5.825	4.46	29.8	12 MB
165	5.825	4.58	29.9	54 MB

Conducted output power
Channel 52, 6 Mbps



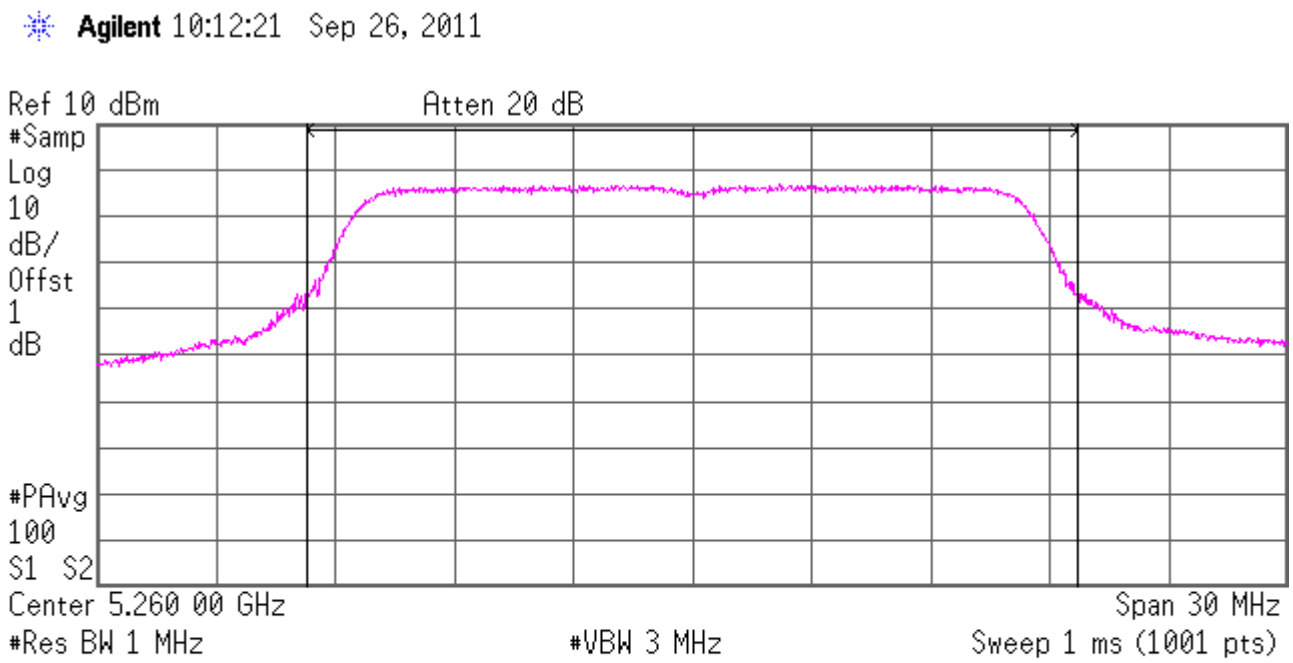
Channel Power

7.77 dBm /18.8700 MHz

Power Spectral Density

-64.99 dBm/Hz

Conducted output power
Channel 52, 12 Mbps



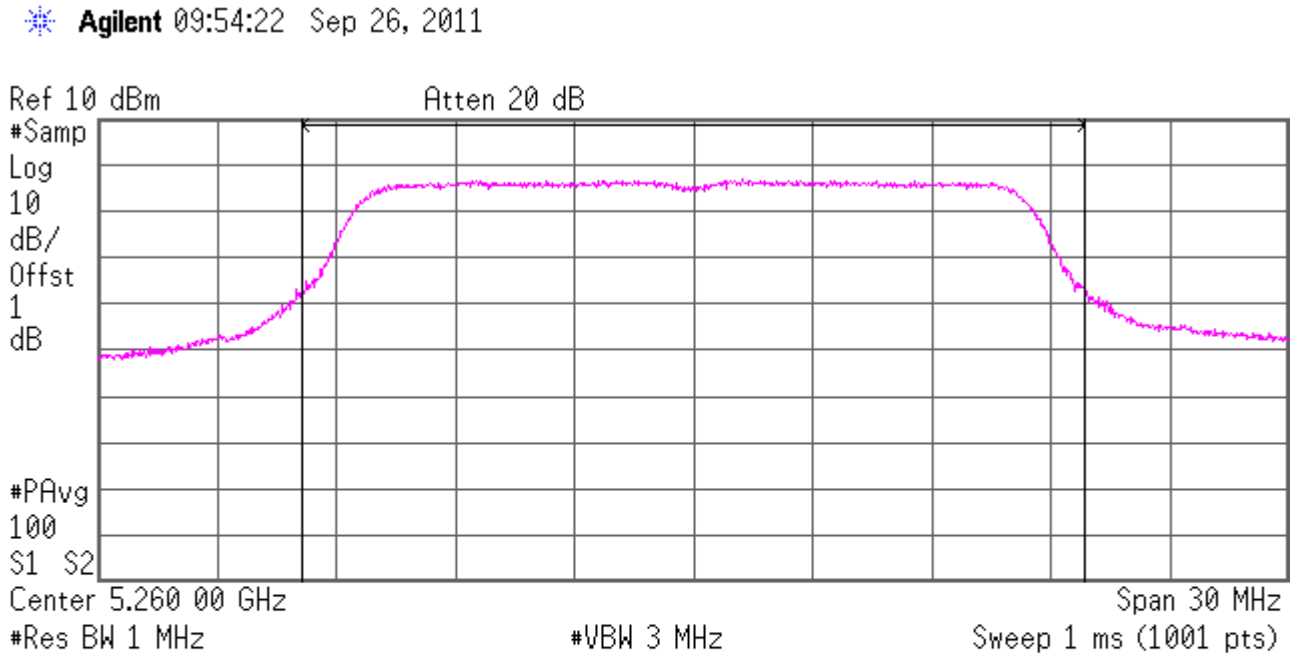
Channel Power

7.84 dBm /19.3500 MHz

Power Spectral Density

-65.03 dBm/Hz

Conducted output power
Channel 52, 54 Mbps



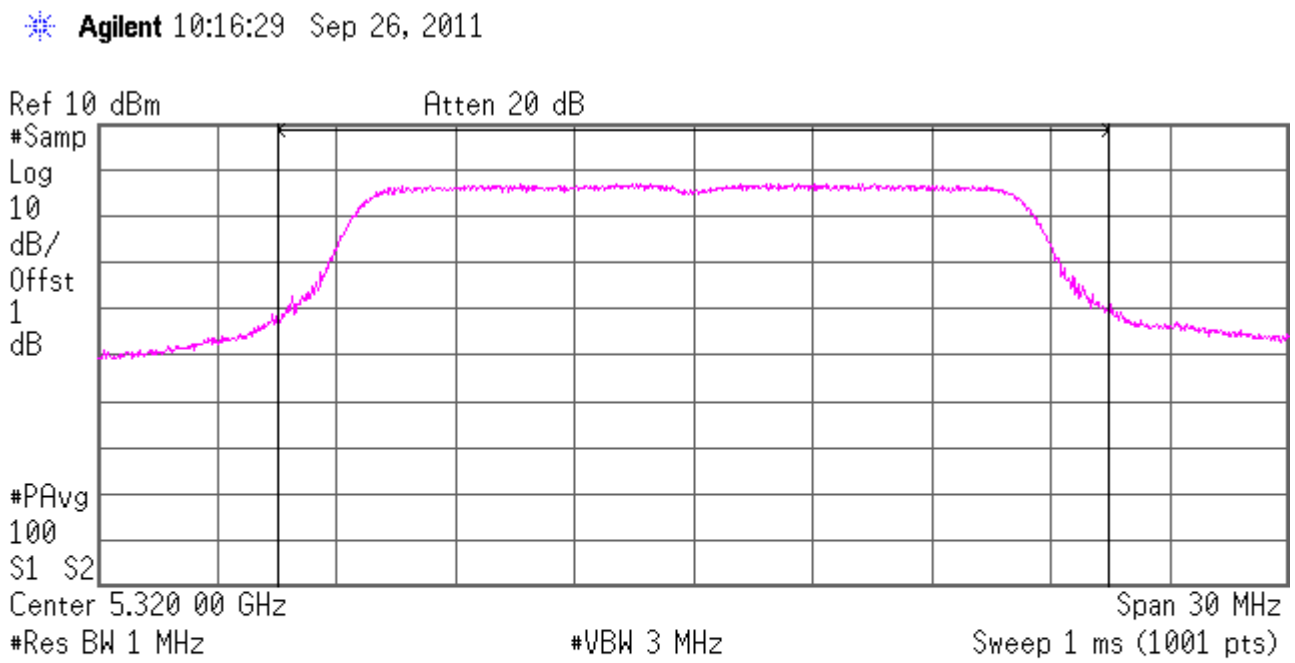
Channel Power

7.79 dBm /19.7100 MHz

Power Spectral Density

-65.16 dBm/Hz

Conducted output power
Channel 64, 6 Mbps



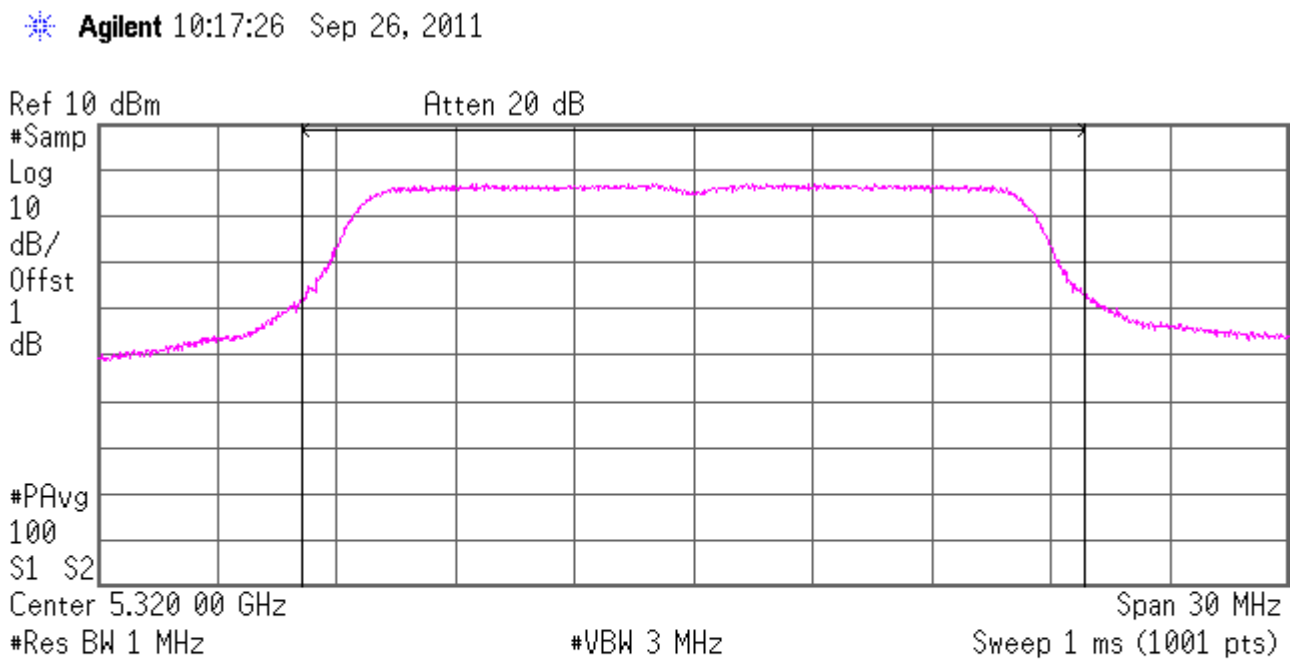
Channel Power

8.13 dBm /20.8500 MHz

Power Spectral Density

-65.06 dBm/Hz

Conducted output power
Channel 64, 12 Mbps



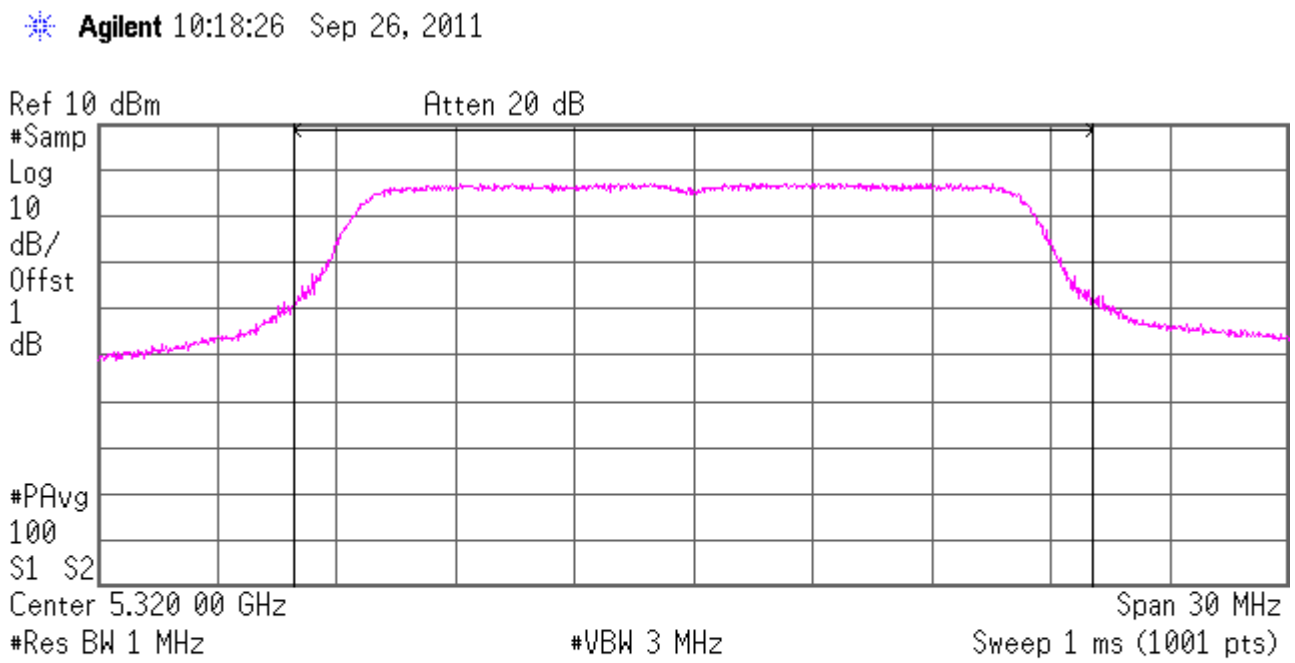
Channel Power

8.18 dBm /19.7100 MHz

Power Spectral Density

-64.77 dBm/Hz

Conducted output power
Channel 64, 54 Mbps



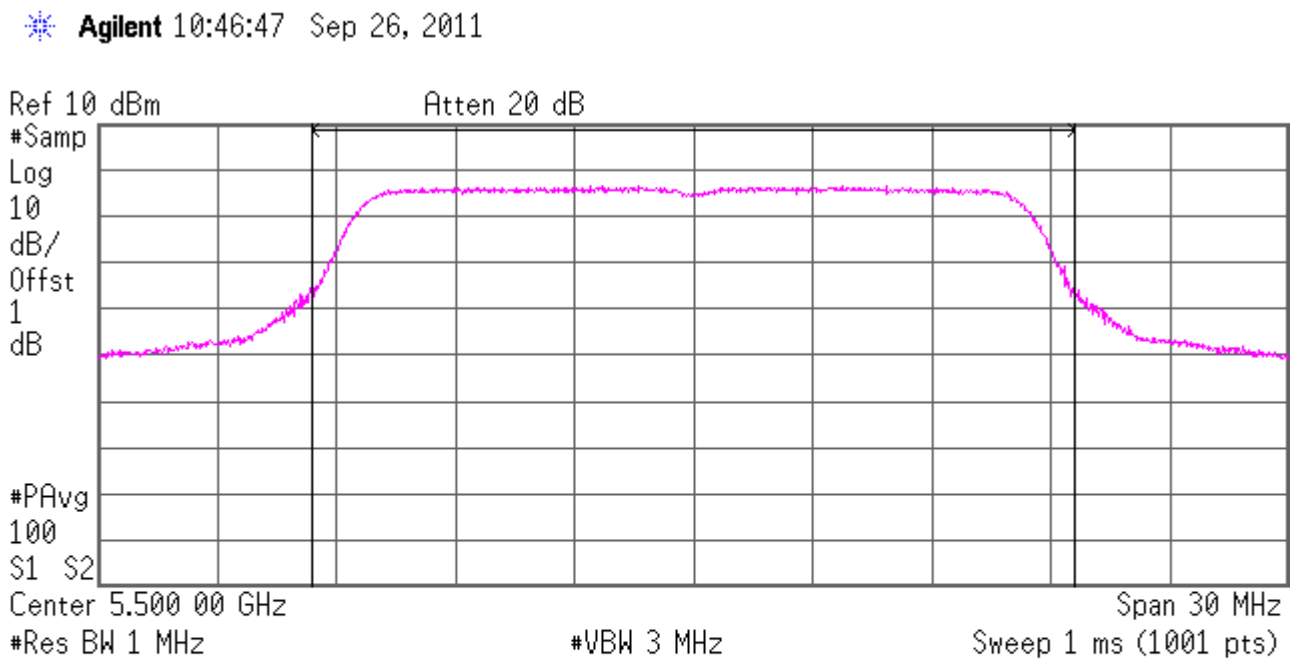
Channel Power

8.29 dBm /20.0700 MHz

Power Spectral Density

-64.74 dBm/Hz

Conducted output power
Channel 100, 6 Mbps



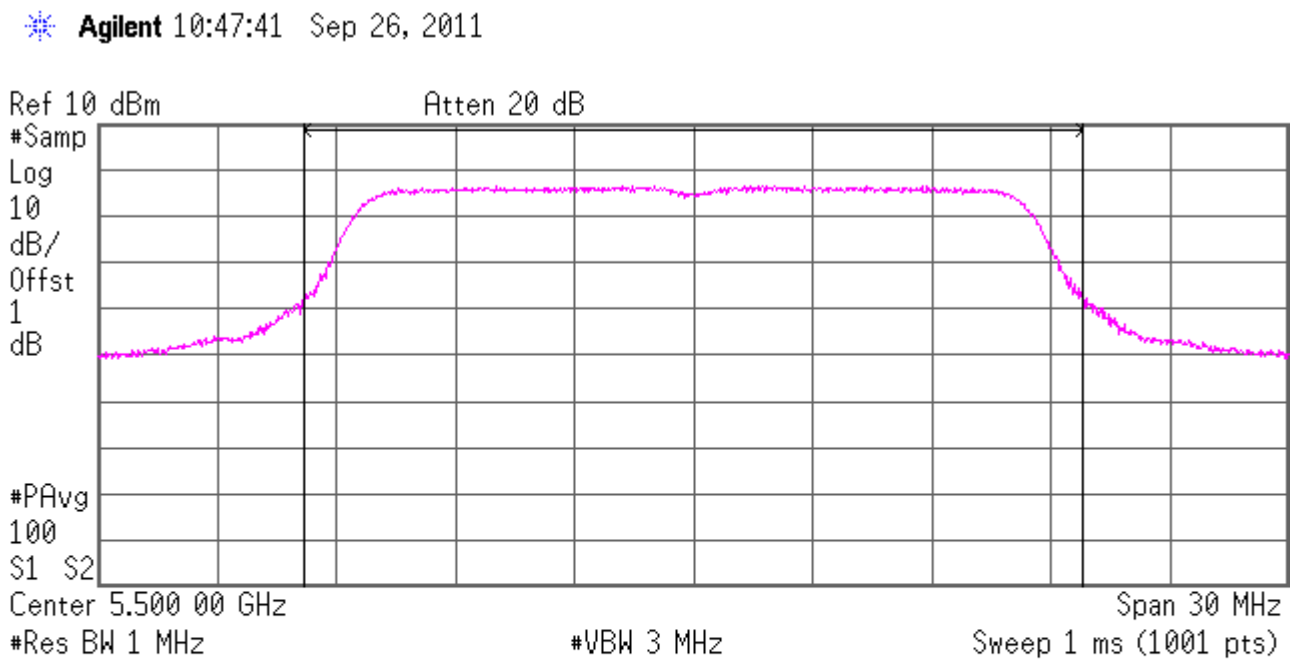
Channel Power

7.63 dBm /19.1400 MHz

Power Spectral Density

-65.19 dBm/Hz

Conducted output power
Channel 100, 12 Mbps



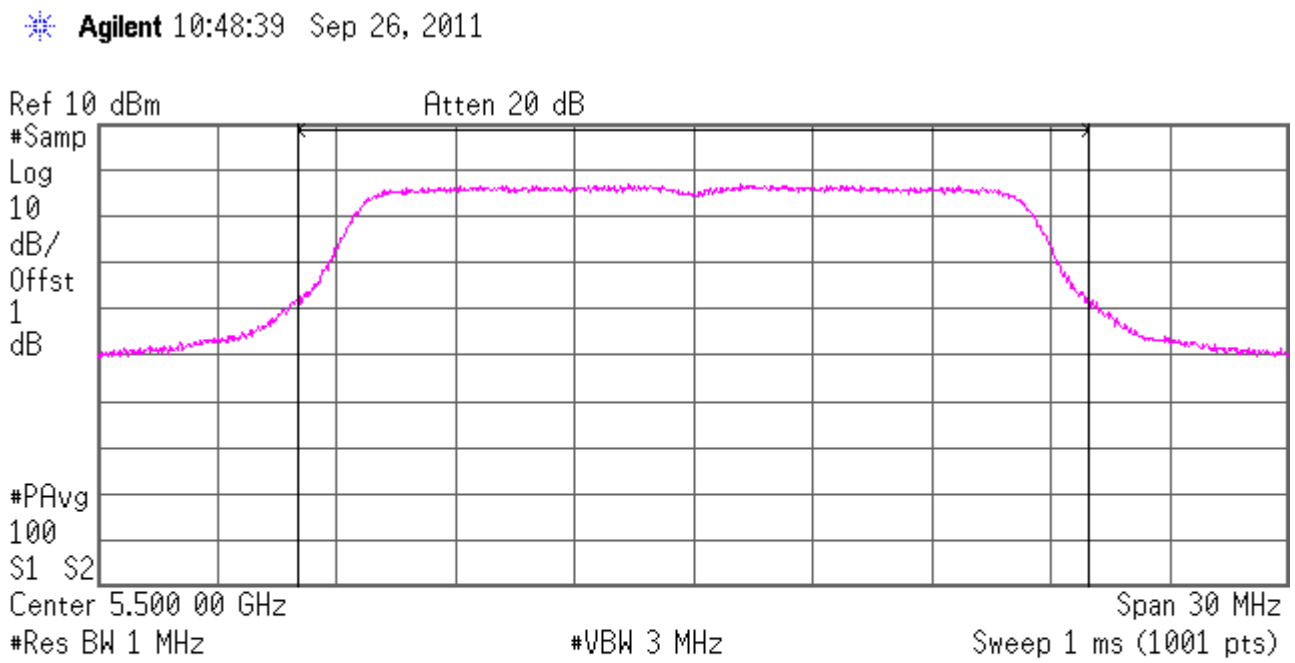
Channel Power

7.72 dBm /19.6200 MHz

Power Spectral Density

-65.20 dBm/Hz

Conducted output power
Channel 100, 54 Mbps



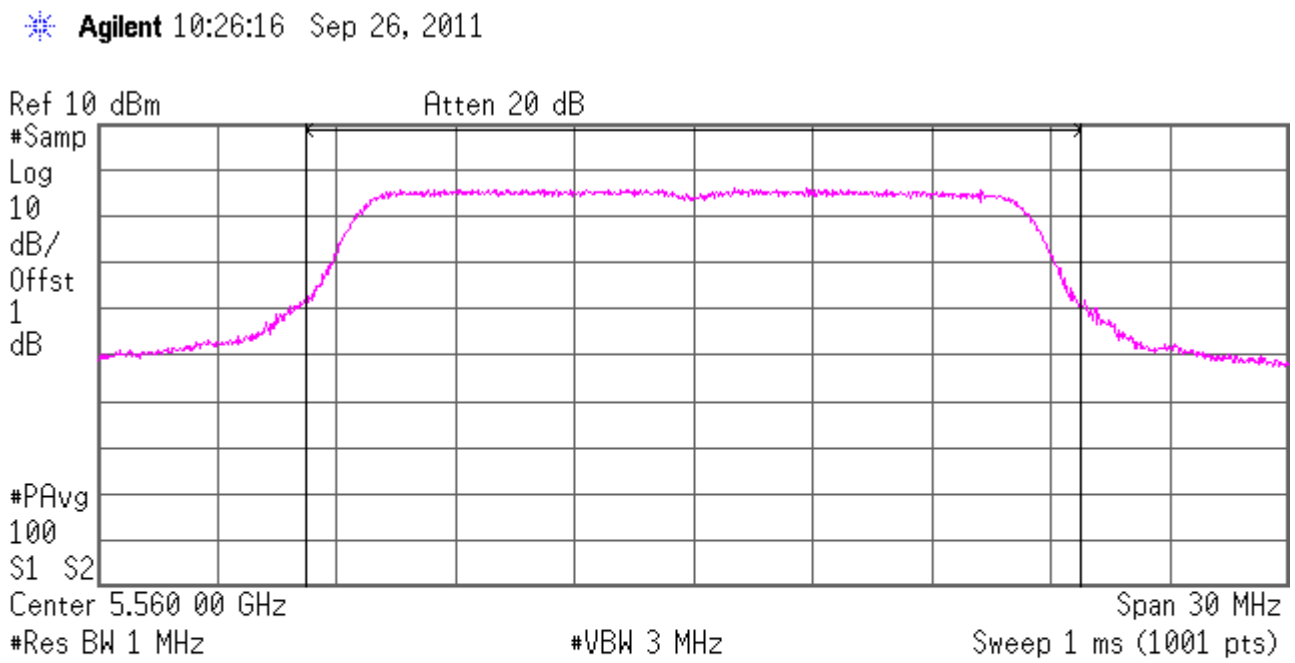
Channel Power

7.84 dBm /19.9200 MHz

Power Spectral Density

-65.15 dBm/Hz

Conducted output power
Channel 112, 6 Mbps



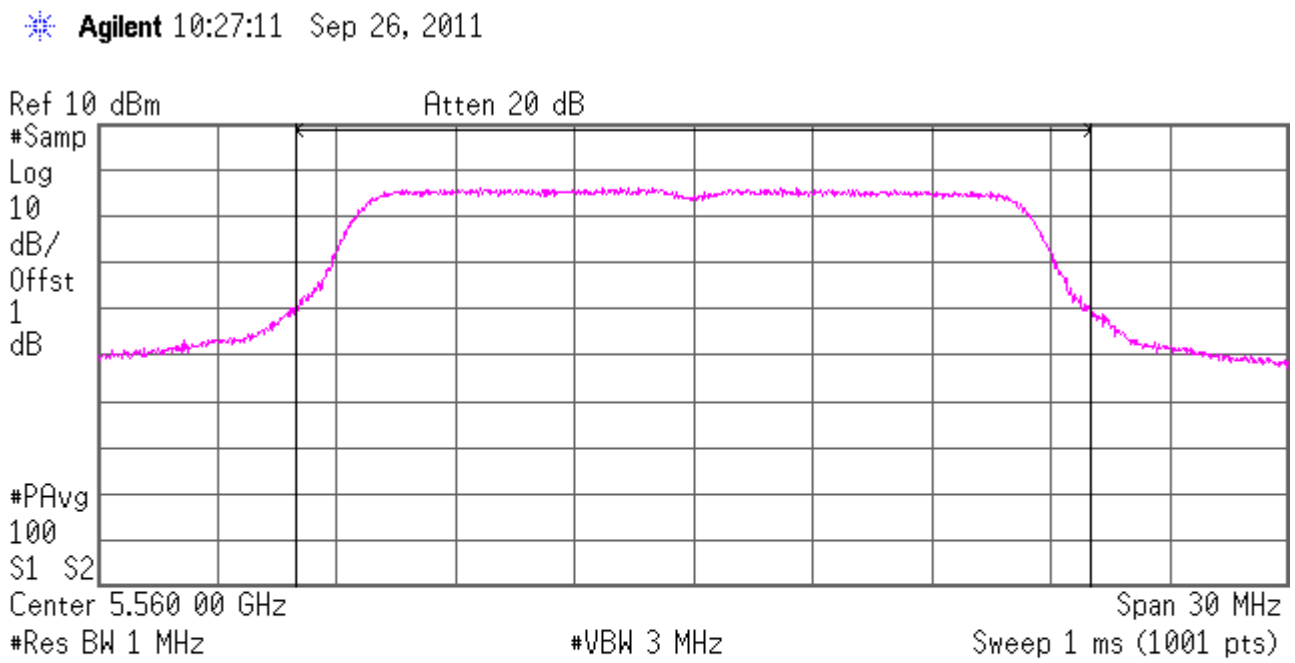
Channel Power

6.98 dBm /19.5000 MHz

Power Spectral Density

-65.92 dBm/Hz

Conducted output power
Channel 112, 12 Mbps



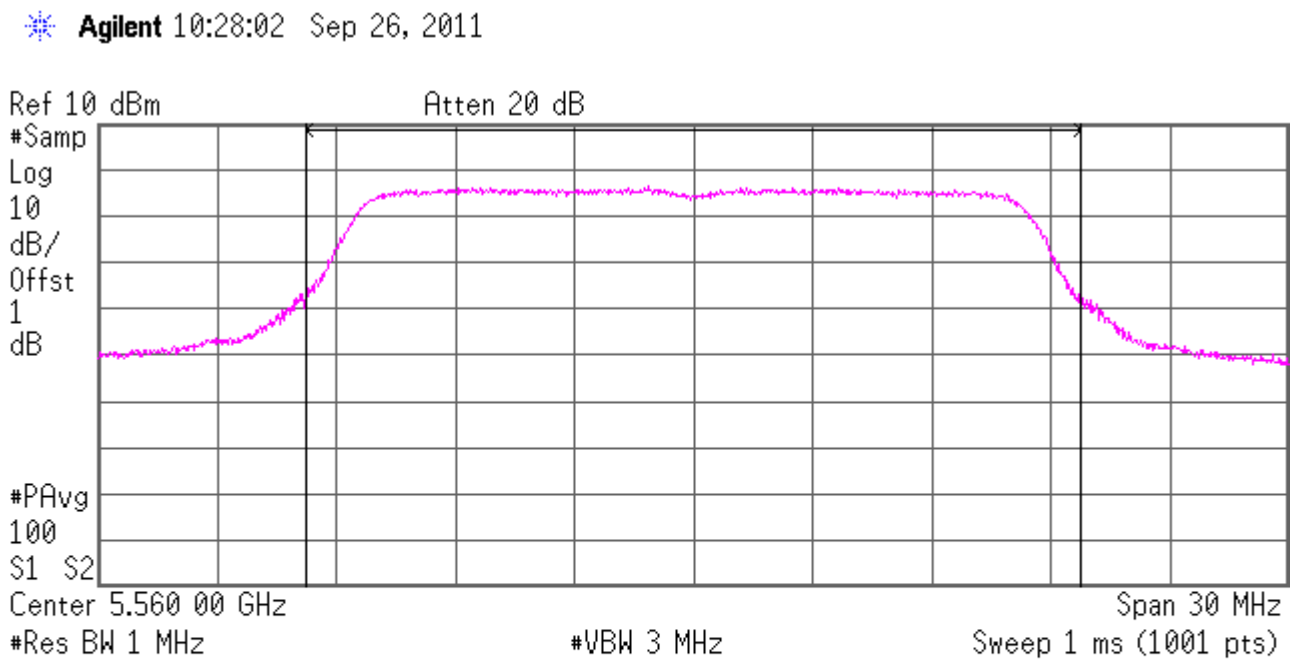
Channel Power

7.08 dBm /19.9500 MHz

Power Spectral Density

-65.92 dBm/Hz

Conducted output power
Channel 112, 54 Mbps



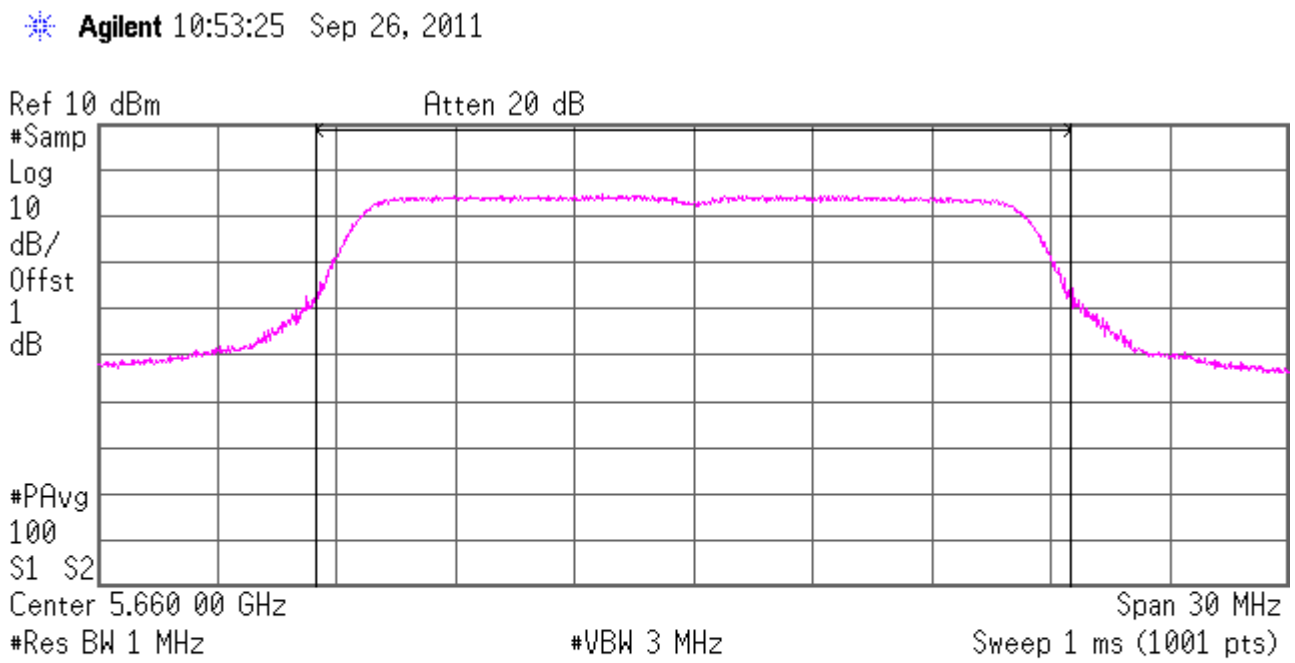
Channel Power

7.20 dBm /19.4700 MHz

Power Spectral Density

-65.69 dBm/Hz

Conducted output power
Channel 132, 6 Mbps



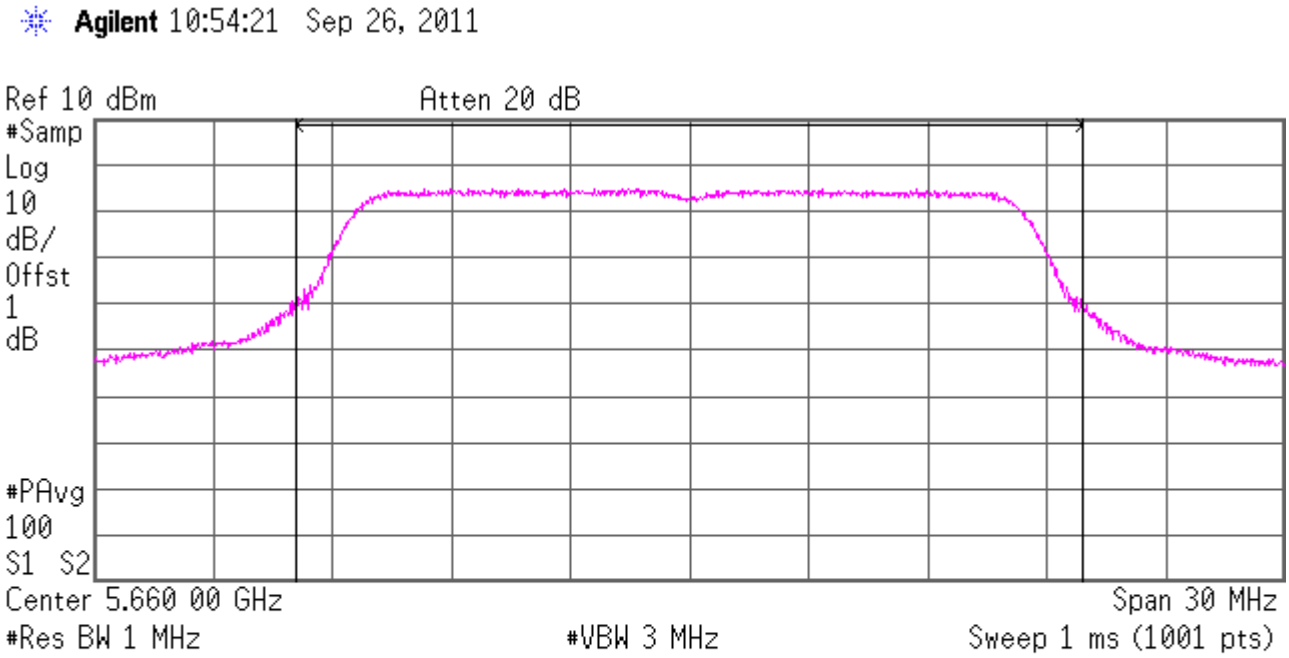
Channel Power

5.77 dBm /19.0200 MHz

Power Spectral Density

-67.02 dBm/Hz

Conducted output power
Channel 132, 12 Mbps



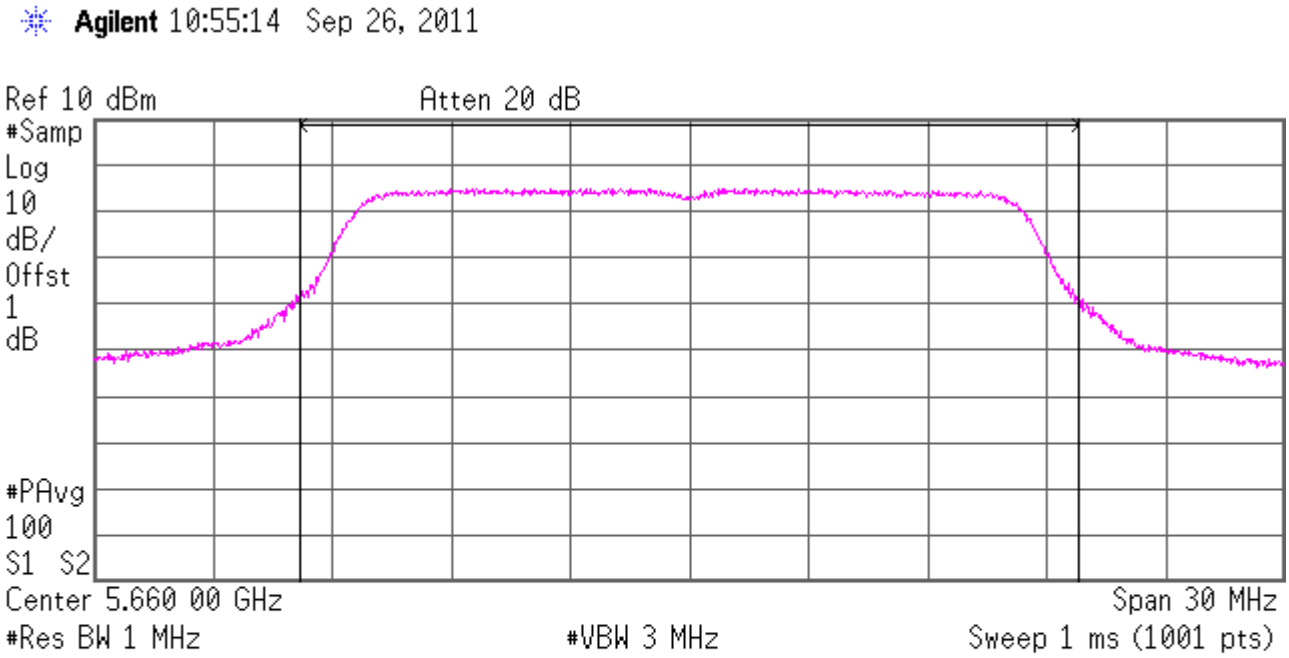
Channel Power

5.88 dBm /19.8300 MHz

Power Spectral Density

-67.09 dBm/Hz

Conducted output power
Channel 132, 54 Mbps



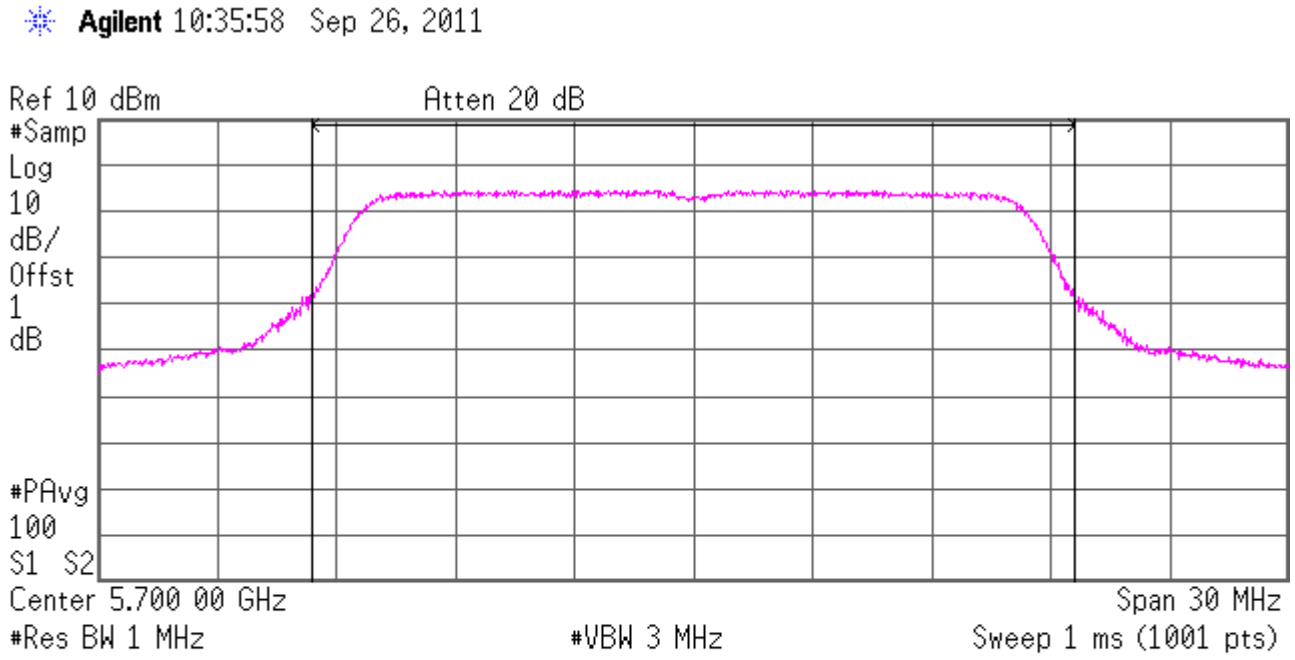
Channel Power

6.00 dBm /19.6200 MHz

Power Spectral Density

-66.93 dBm/Hz

Conducted output power
Channel 140, 6 Mbps



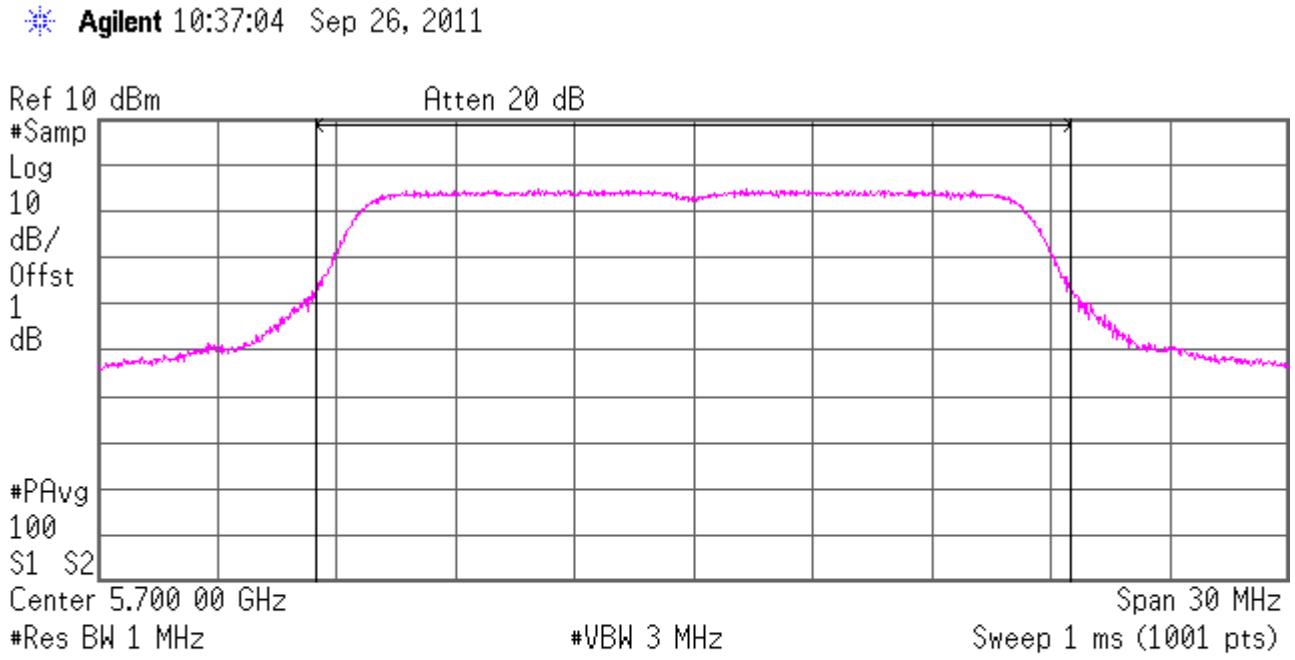
Channel Power

5.70 dBm /19.1700 MHz

Power Spectral Density

-67.13 dBm/Hz

Conducted output power
Channel 140, 12 Mbps



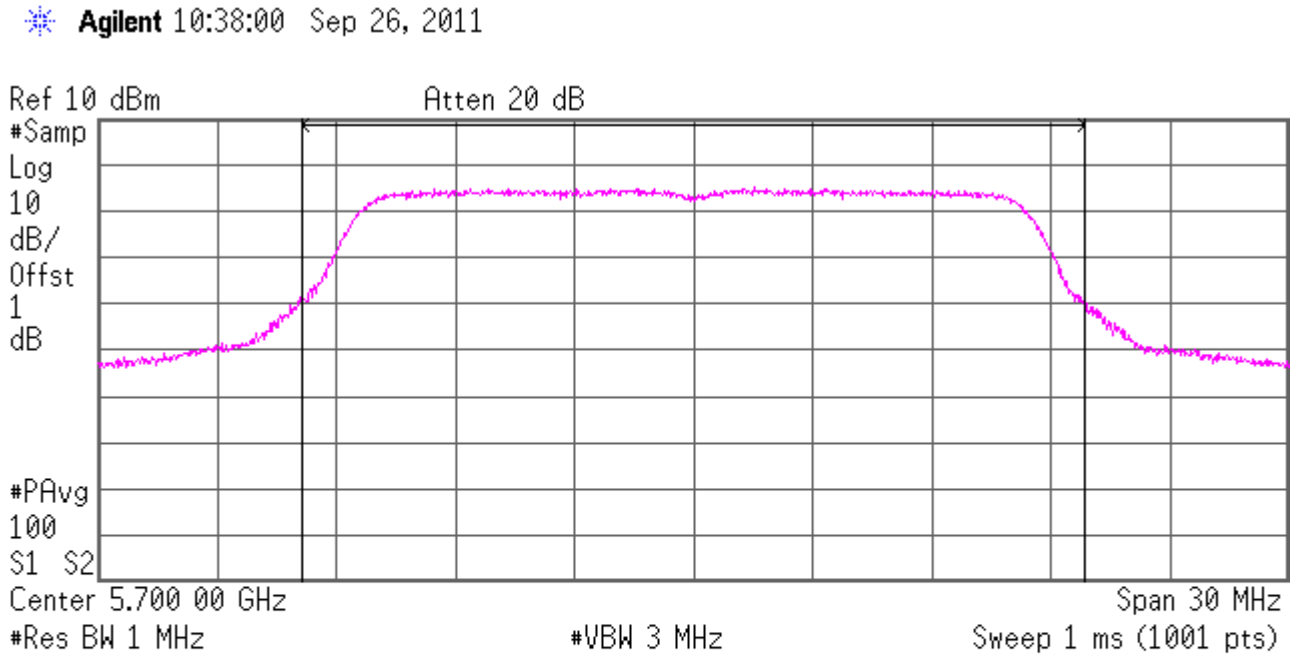
Channel Power

5.79 dBm /19.0200 MHz

Power Spectral Density

-67.00 dBm/Hz

Conducted output power
Channel 140, 54 Mbps



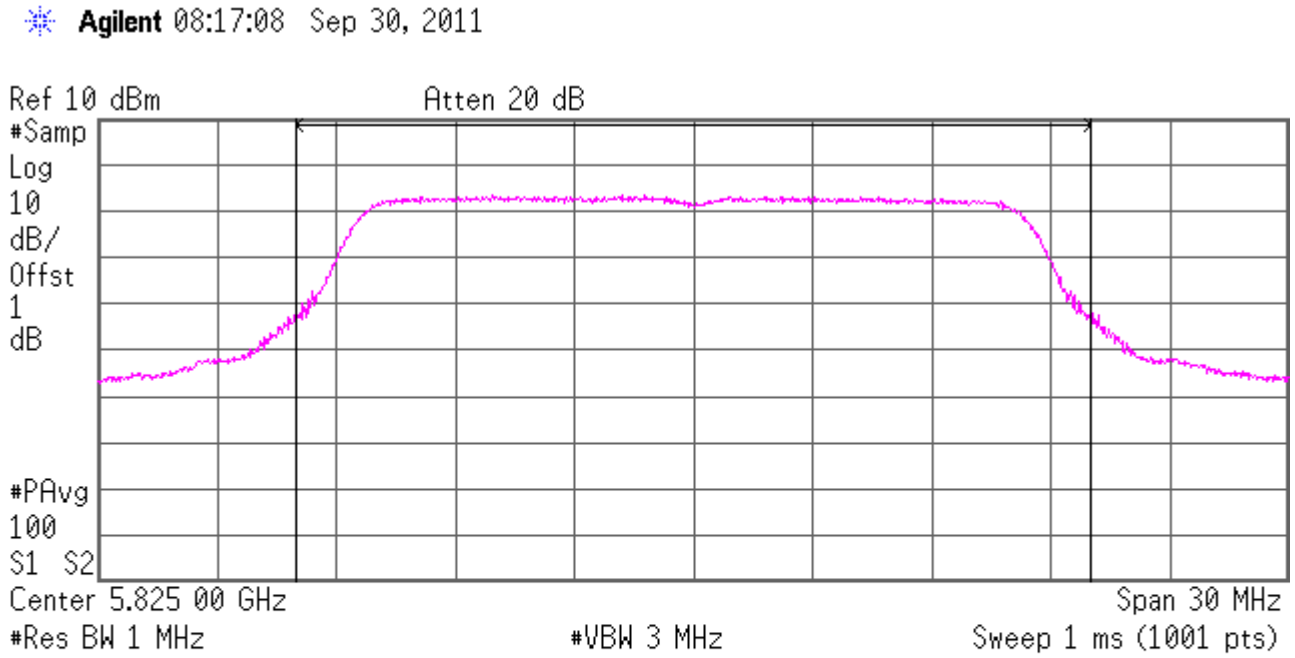
Channel Power

5.92 dBm /19.6800 MHz

Power Spectral Density

-67.02 dBm/Hz

Conducted output power
Channel 165, 6 Mbps



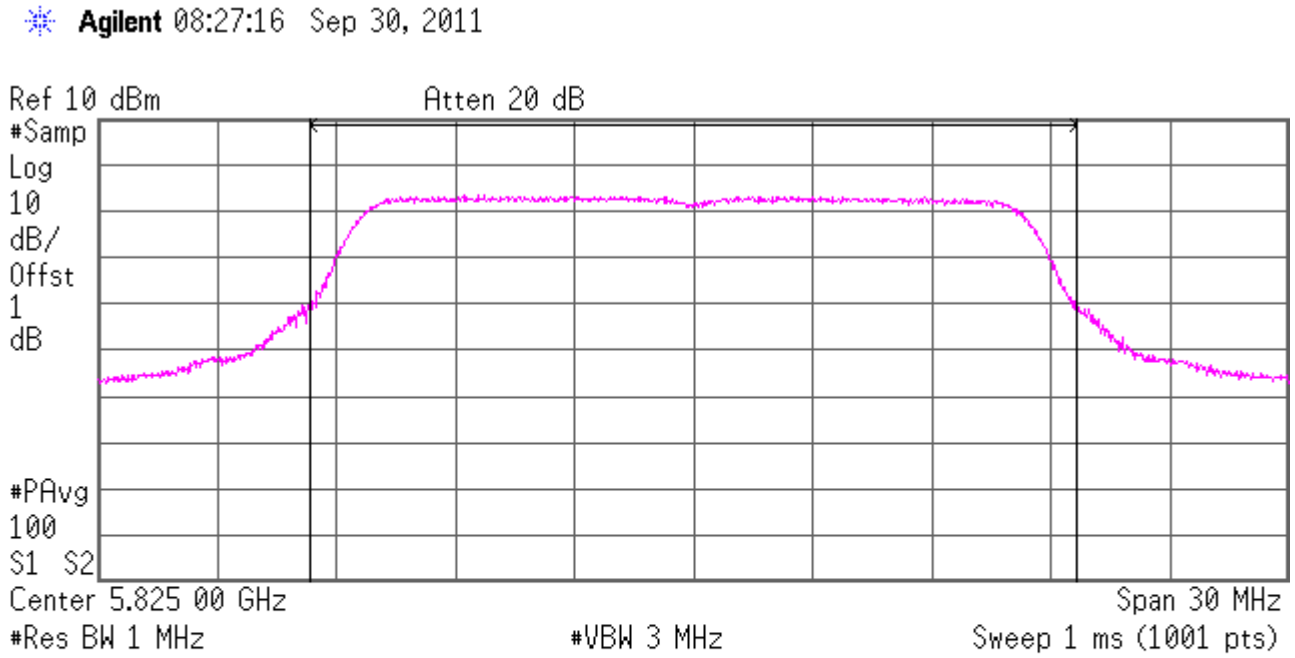
Channel Power

4.44 dBm /19.9800 MHz

Power Spectral Density

-68.57 dBm/Hz

Conducted output power
Channel 165, 12 Mbps



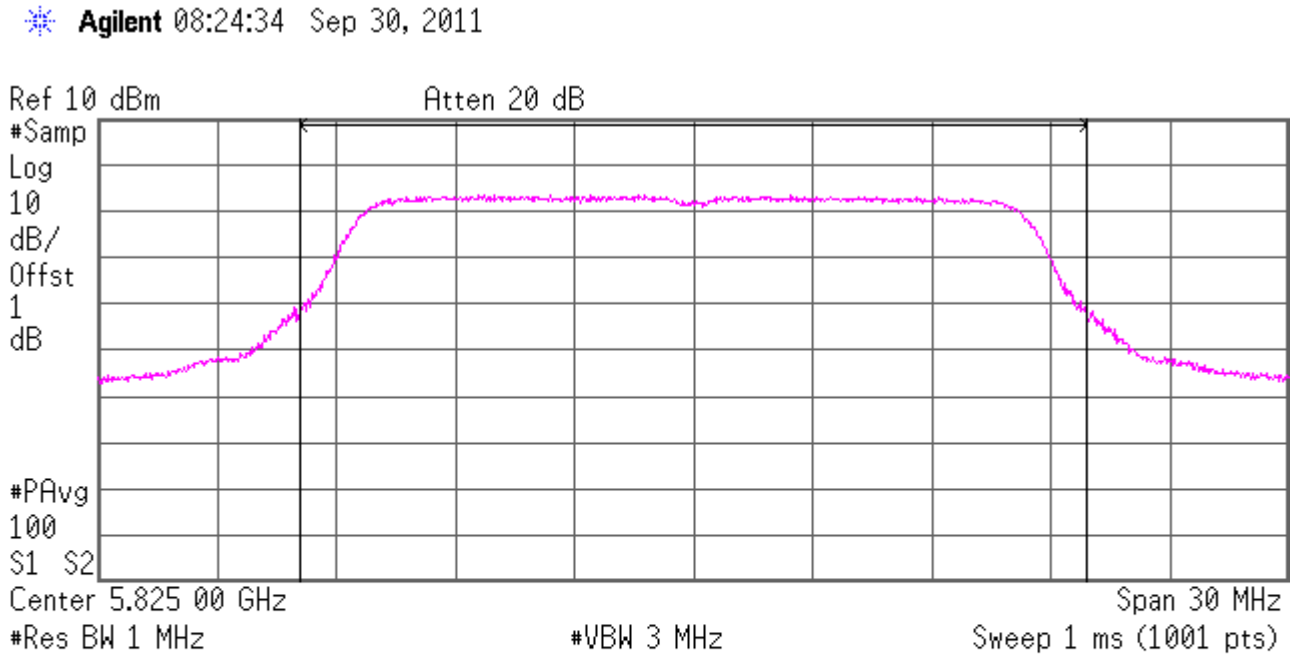
Channel Power

4.46 dBm /19.2600 MHz

Power Spectral Density

-68.38 dBm/Hz

Conducted output power
Channel 165, 54 Mbps



Channel Power

4.58 dBm /19.8300 MHz

Power Spectral Density

-68.40 dBm/Hz

Peak power spectral density
FCC 15.407(a), IC RSS-210 A9.2

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Testing was performed in accordance with the test procedure of FCC KDB 789033 method #SA-1.
Maximum PPSD is -2.23 dBm/MHz channel 52 5.26 GHz

Test location
■ - Wild River Lab Tech Area, conducted measurement

Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE10435	E4440A	Agilent	Spectrum Analyzer	MY44304483	01-Apr-12

Test limit

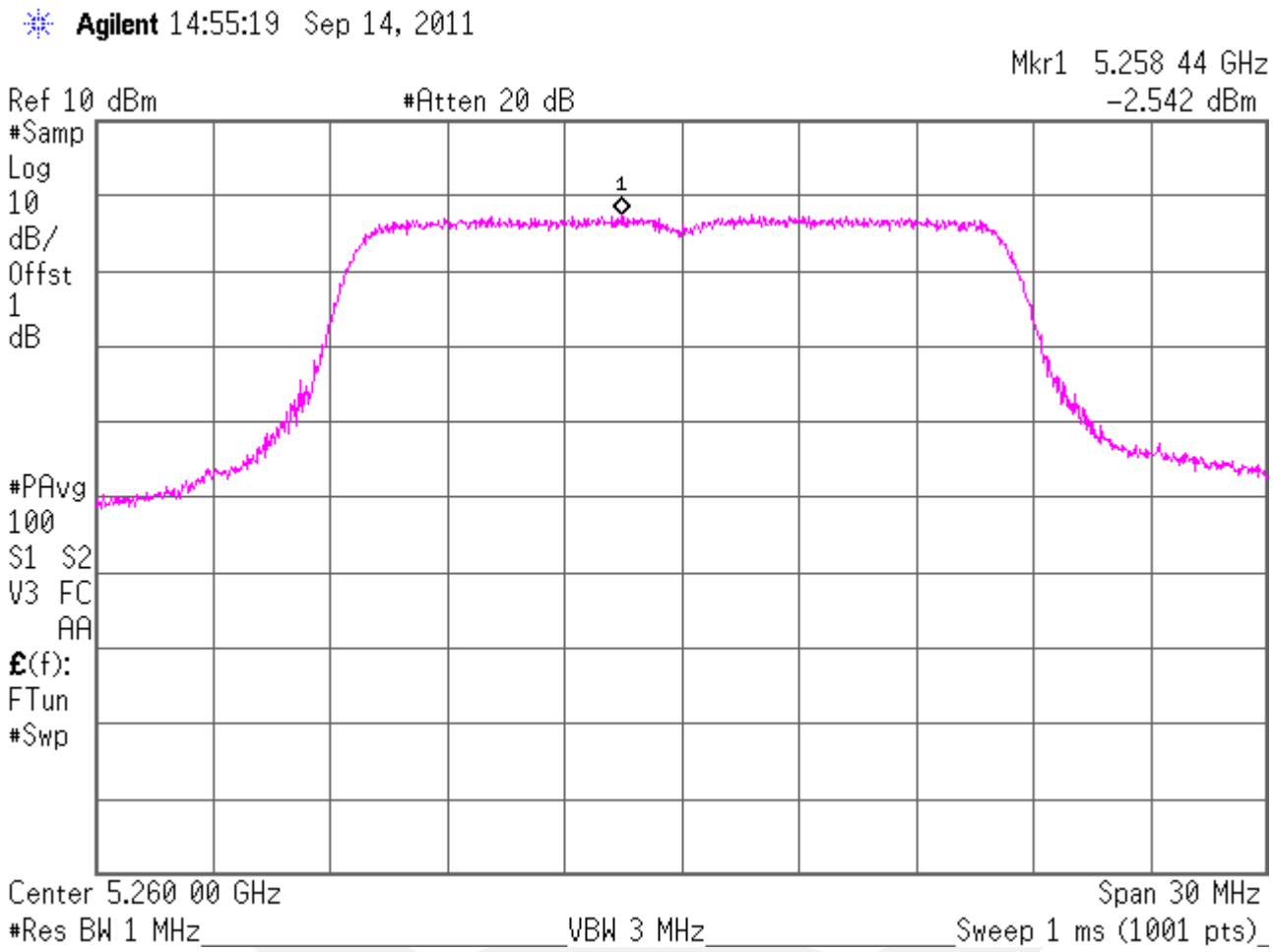
Frequency Band (GHz)	Limit (dBm/MHz)
5.15 – 5.25	4
5.25 – 5.35	11
5.47 – 5.725	11
5.725 – 5.825	17

Antenna is < 6 dBi gain

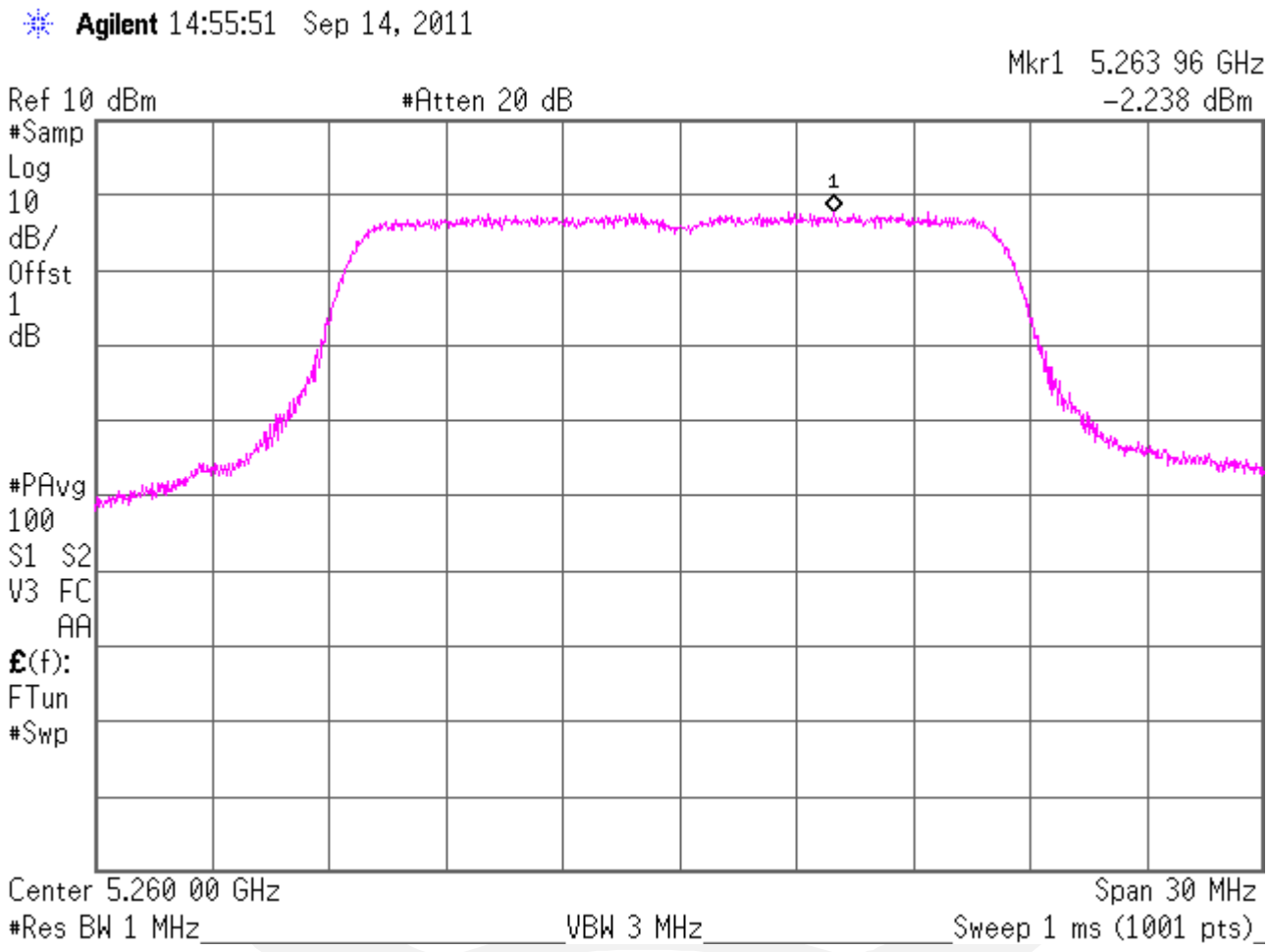
Test data

Ch	Freq (GHz)	Pk power spectral density (dBm/MHz)	Limit (dBm/Mhz)	
52	5.26	-2.54	11	6 MB
52	5.26	-2.23	11	12 MB
52	5.26	-2.38	11	54 MB
64	5.32	-2.93	11	6 MB
64	5.32	-2.47	11	12 MB
64	5.32	-2.61	11	54 MB
100	5.5	-3.02	11	6 MB
100	5.5	-2.60	11	12 MB
100	5.5	-2.38	11	54 MB
112	5.56	-3.61	11	6 MB
112	5.56	-3.55	11	12 MB
112	5.56	-2.93	11	54 MB
132	5.66	-4.68	11	6 MB
132	5.66	-4.29	11	12 MB
132	5.66	-4.22	11	54 MB
140	5.7	-5.03	11	6 MB
140	5.7	-4.85	11	12 MB
140	5.7	-4.37	11	54 MB
165	5.825	-6.99	17	6 MB
165	5.825	-6.58	17	12 MB
165	5.825	-6.39	17	54 MB

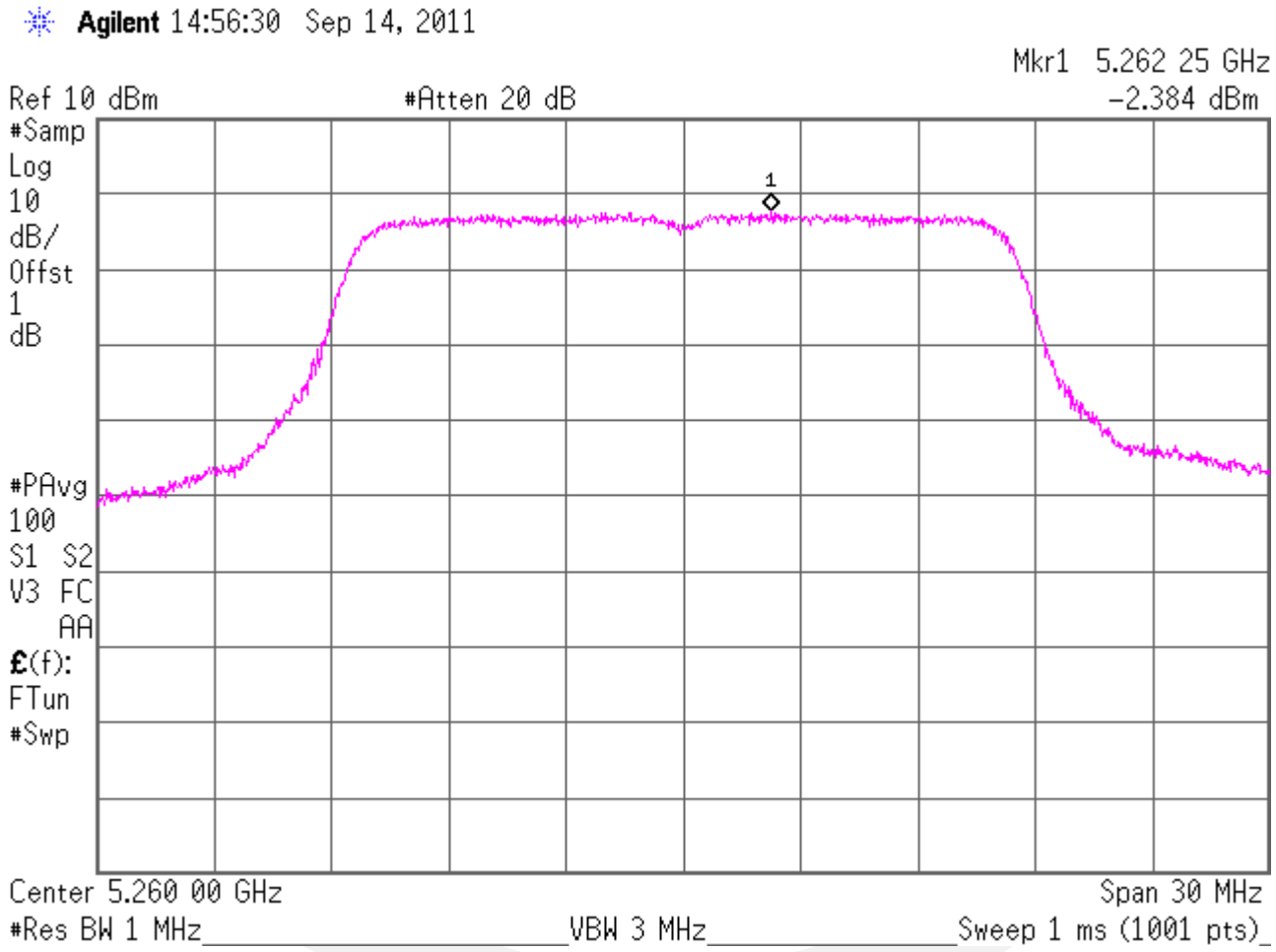
Peak power spectral density
Channel 52, 6 Mbps



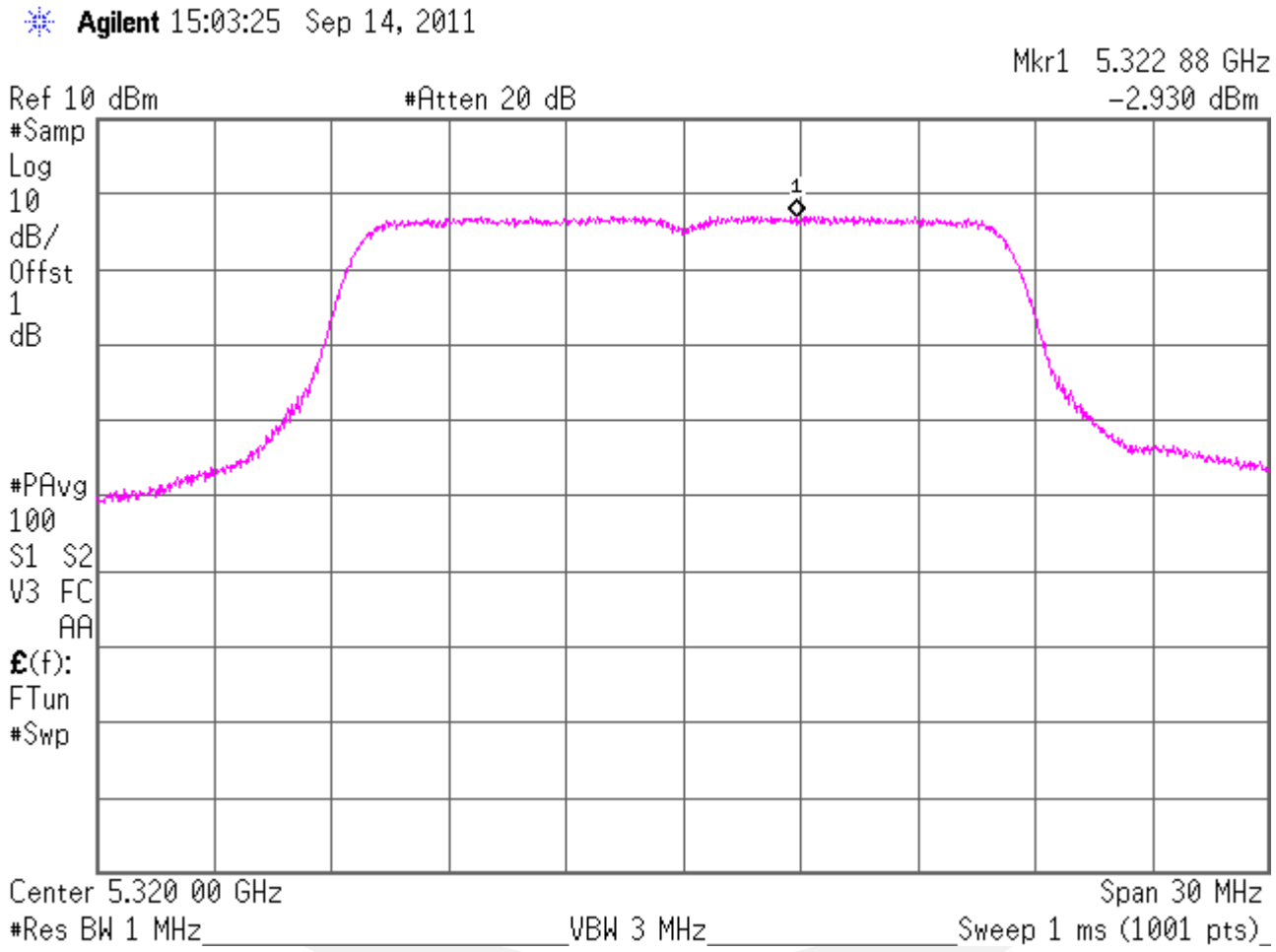
Peak power spectral density
Channel 52, 12 Mbps



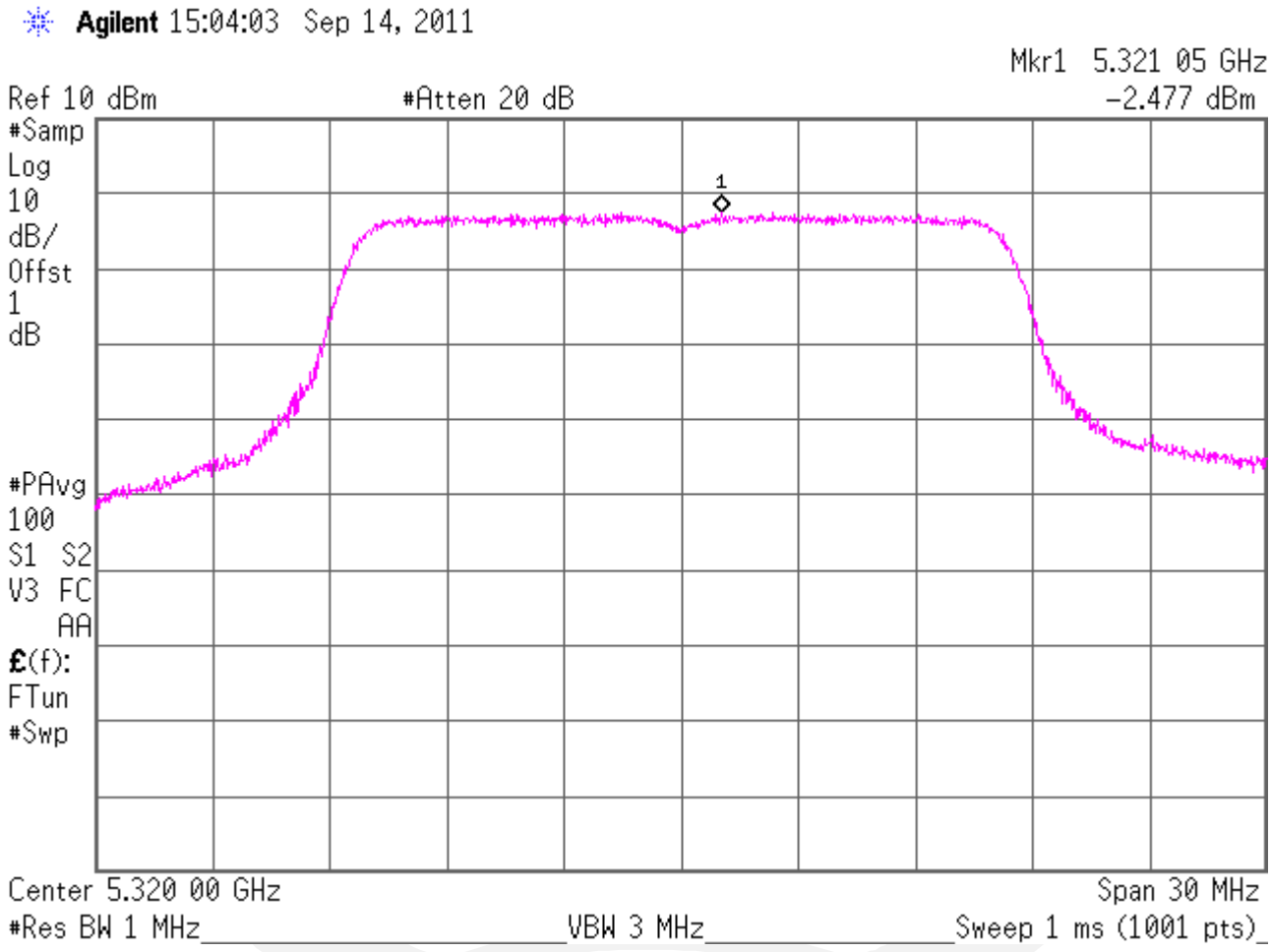
Peak power spectral density
Channel 52, 54 Mbps



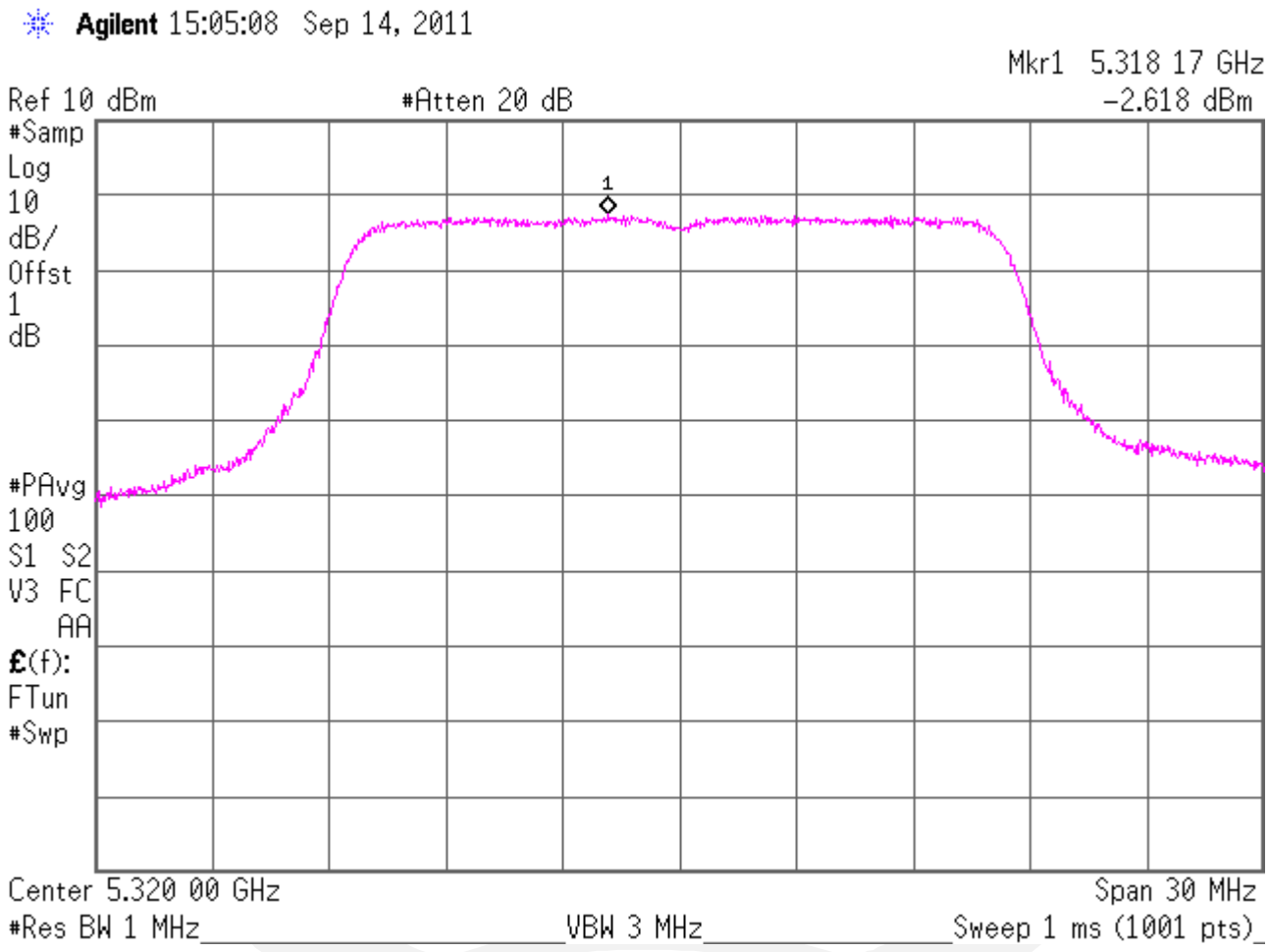
Peak power spectral density
Channel 64, 6 Mbps



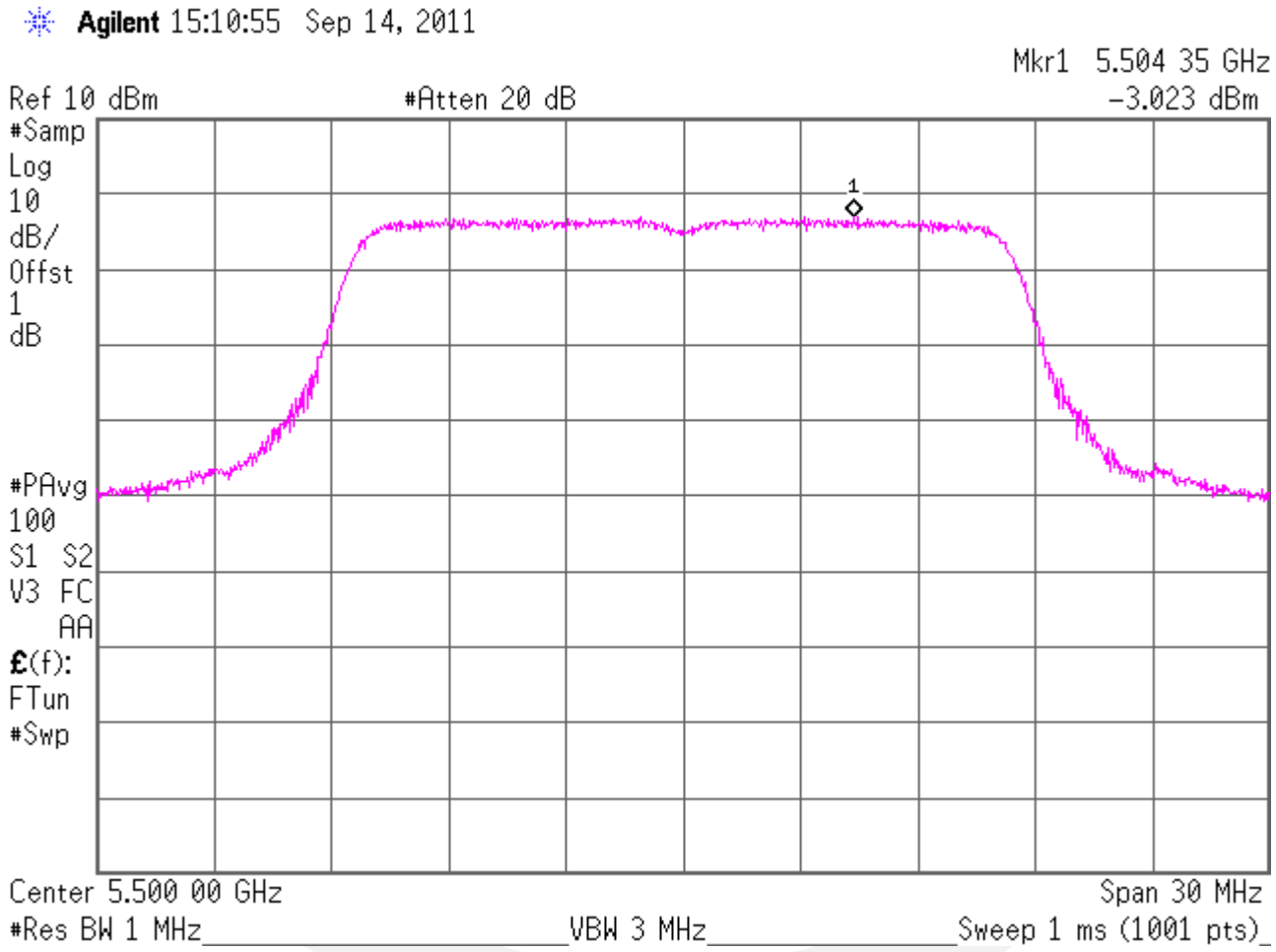
Peak power spectral density
Channel 64, 12 Mbps



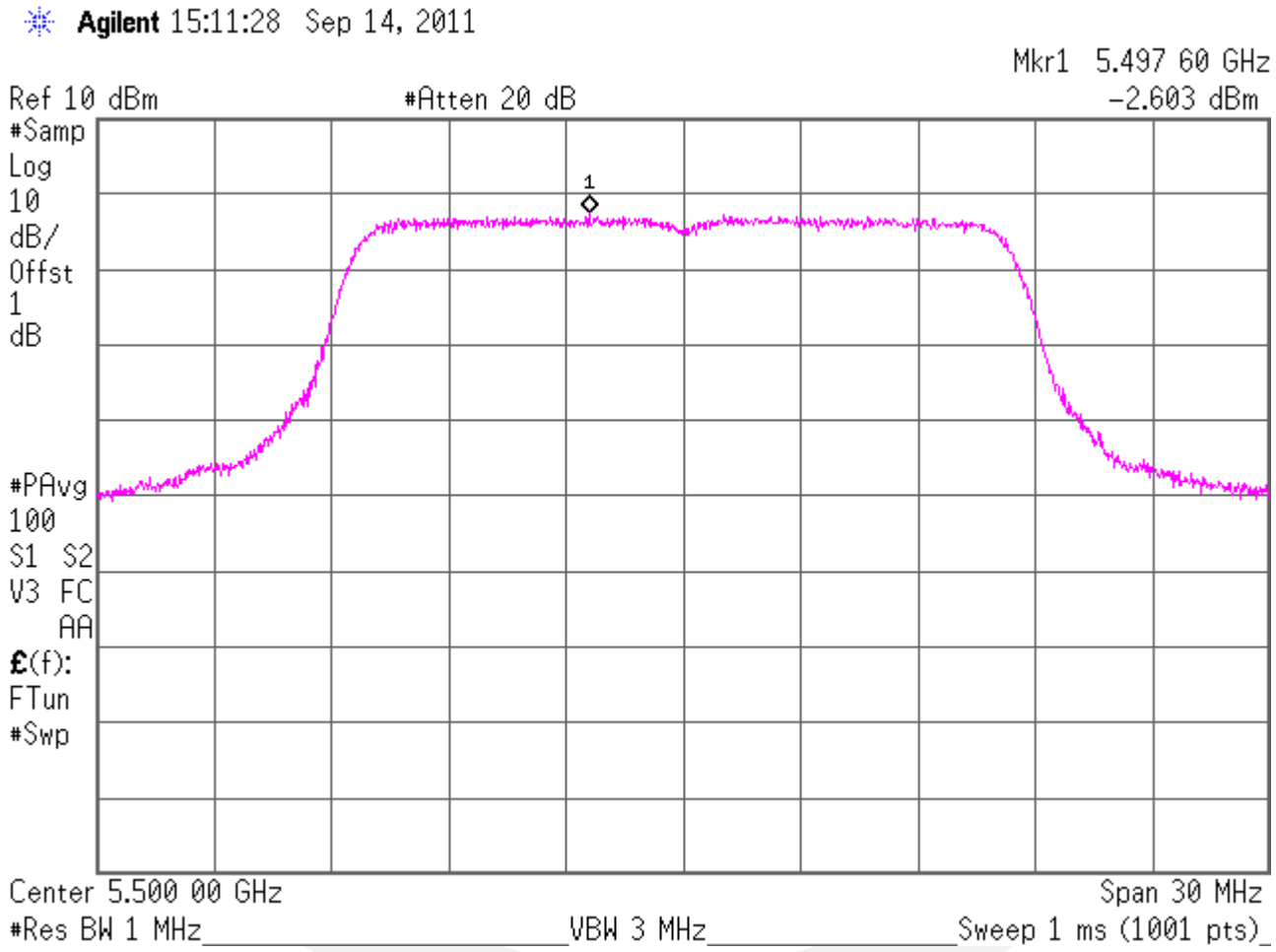
Peak power spectral density
Channel 64, 54 Mbps



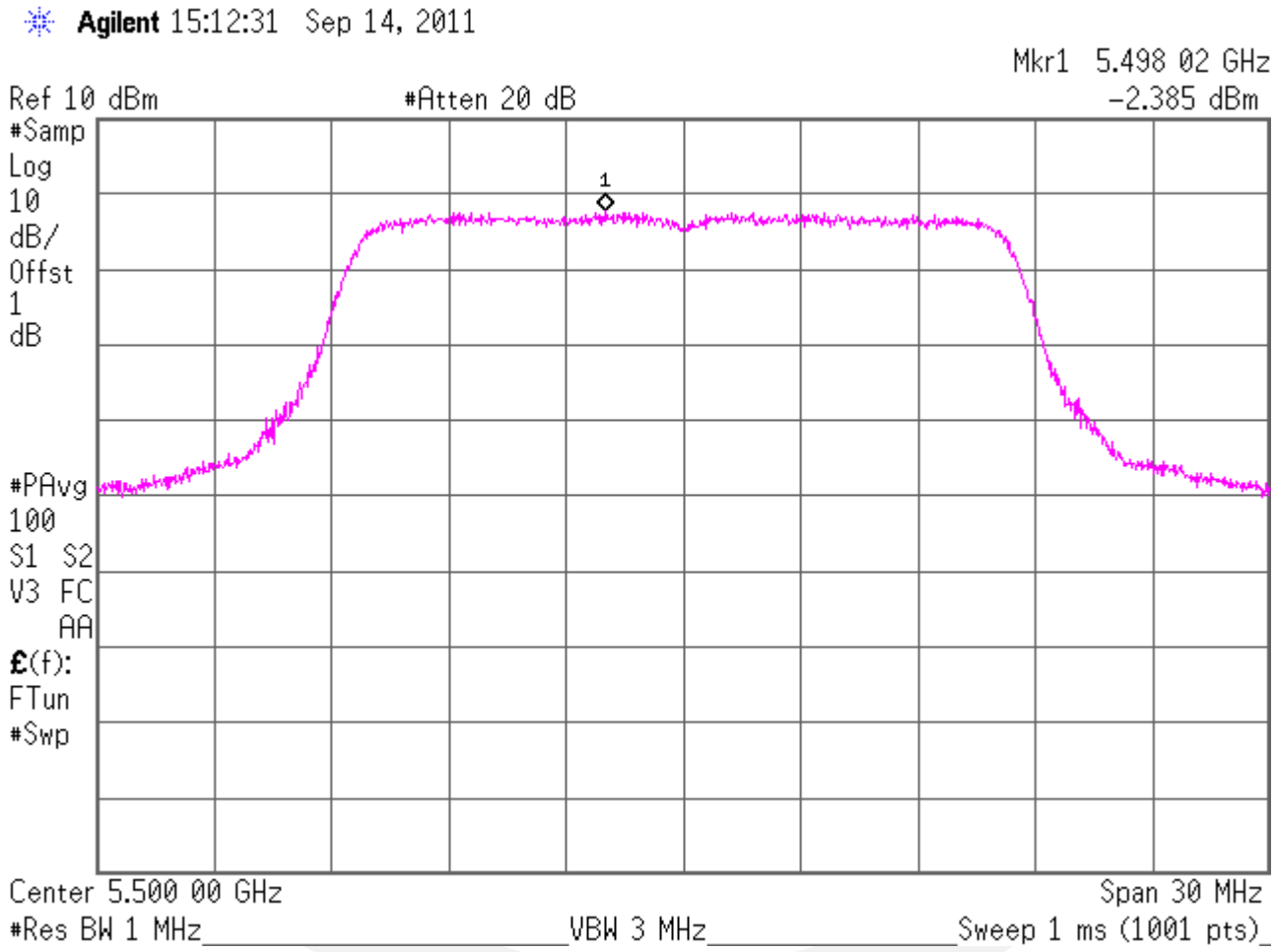
Peak power spectral density
Channel 100, 6 Mbps



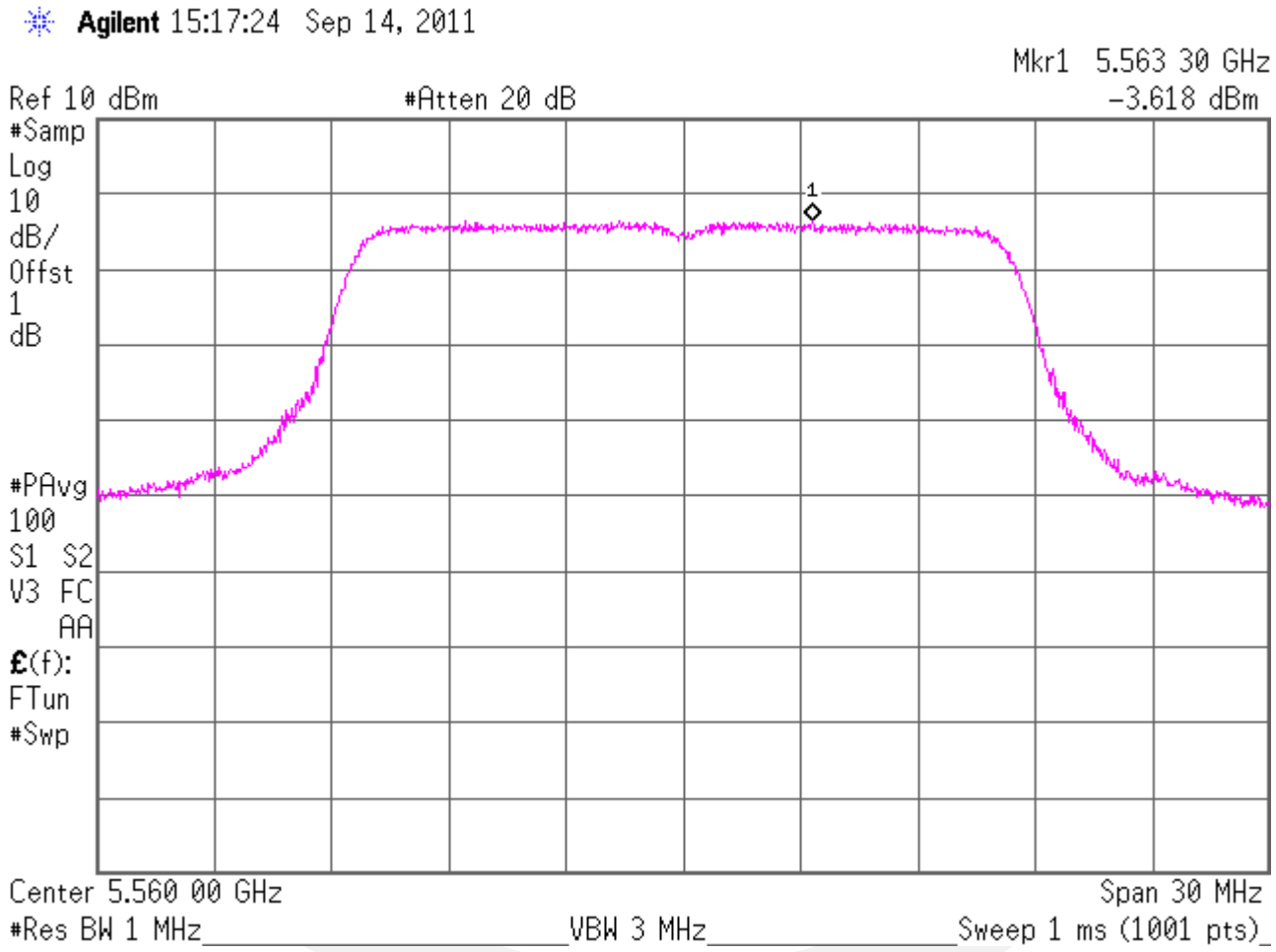
Peak power spectral density
Channel 100, 12 Mbps



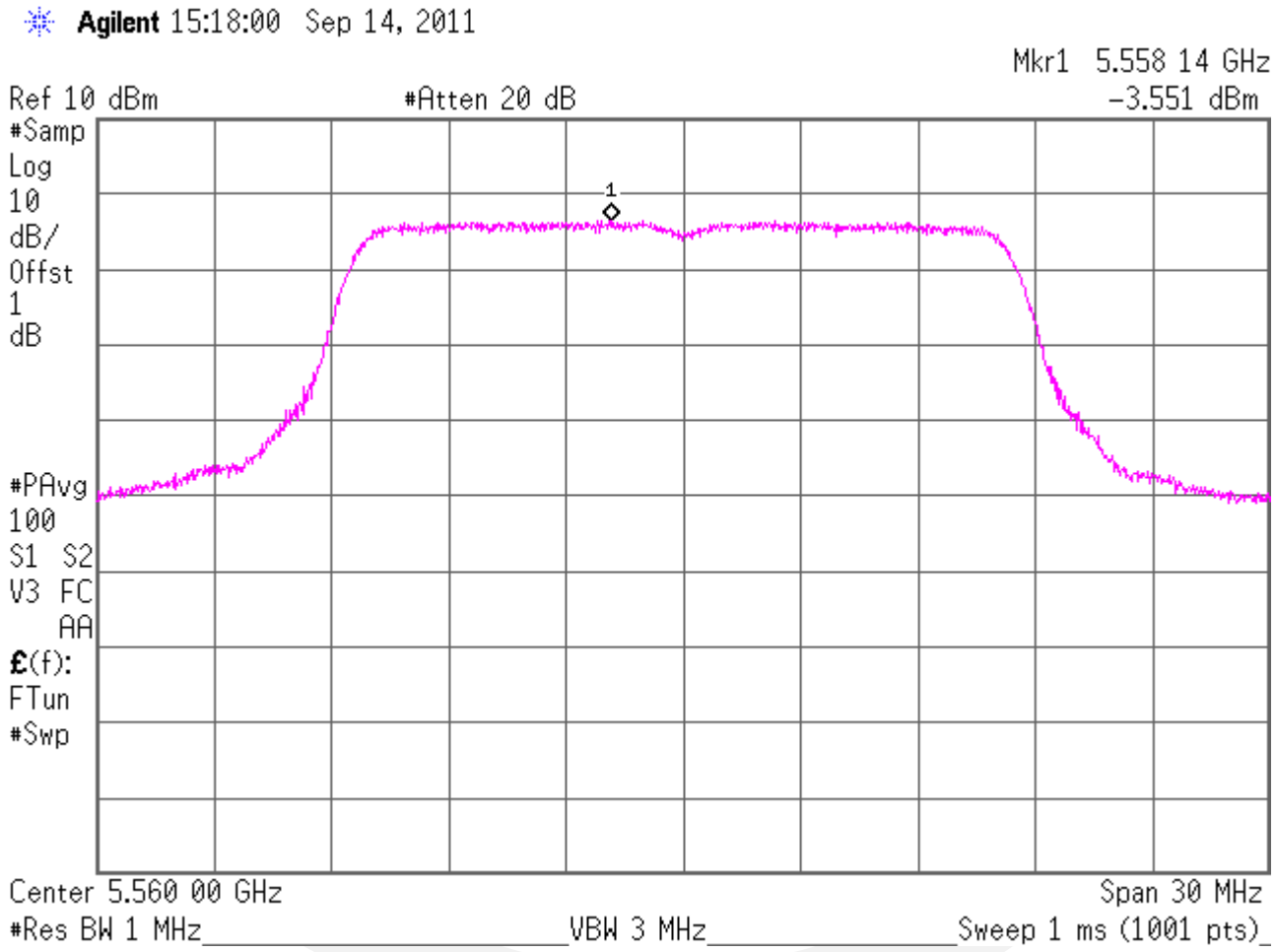
Peak power spectral density
Channel 100, 54 Mbps



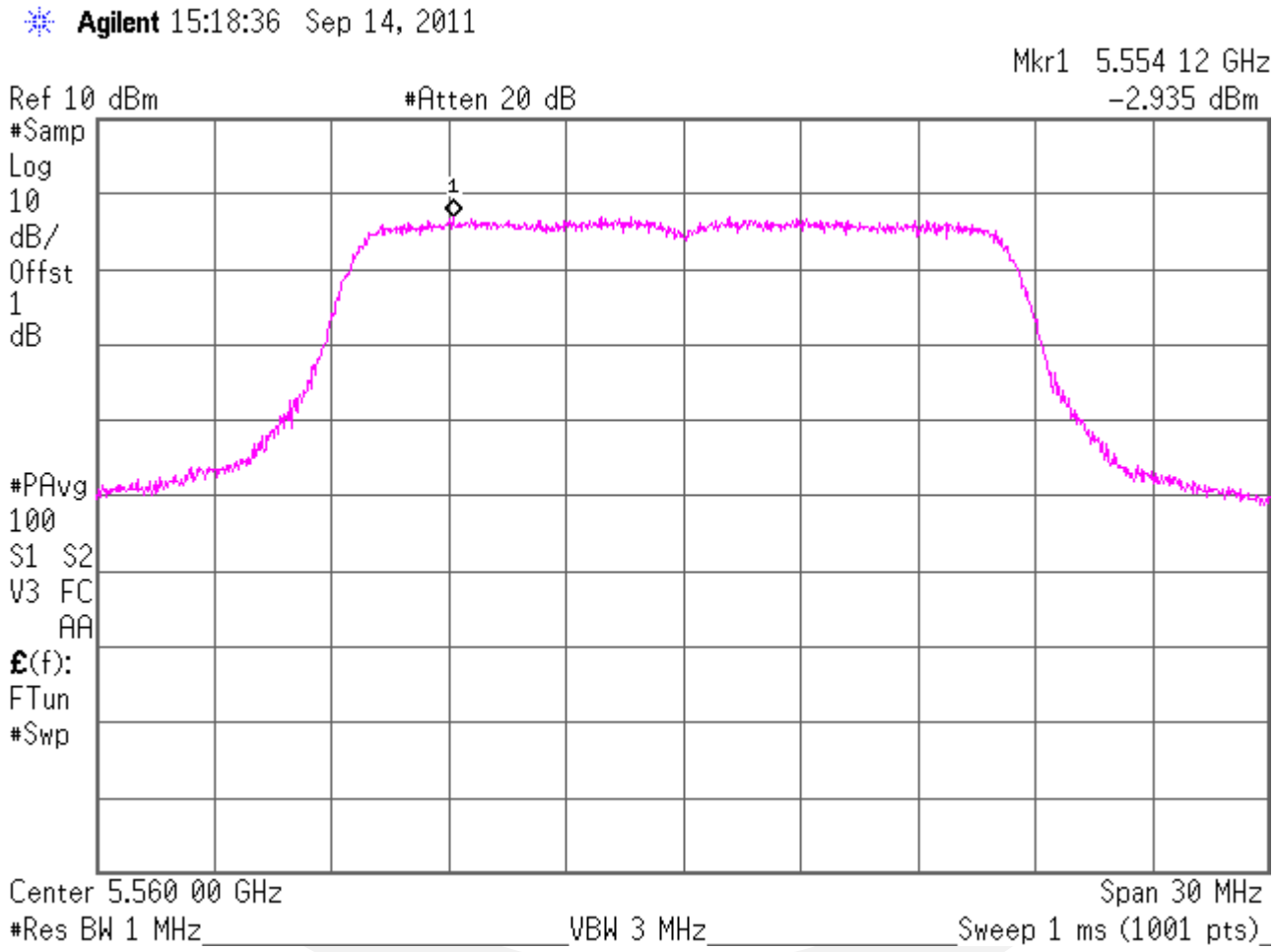
Peak power spectral density
Channel 112, 6 Mbps



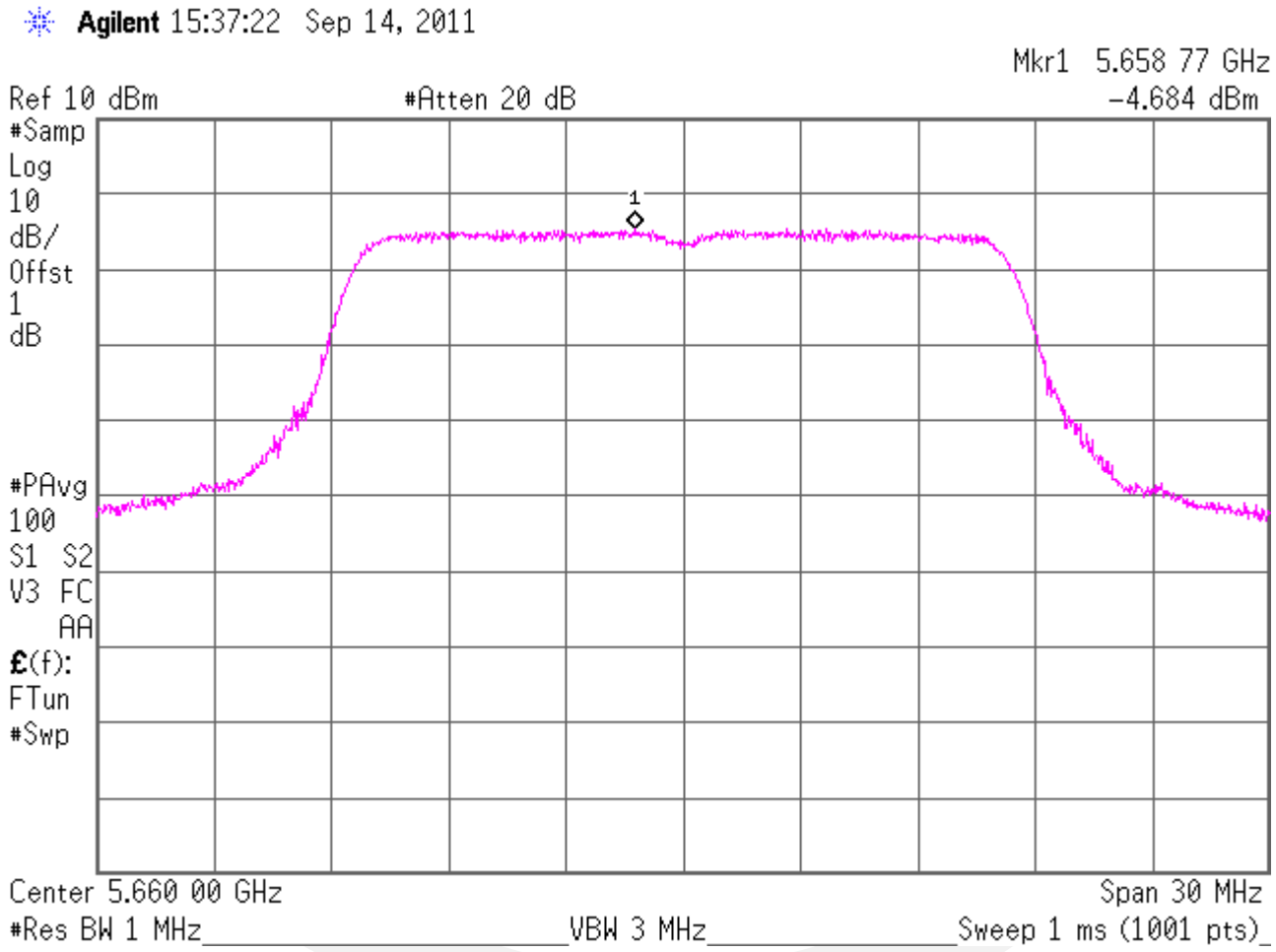
Peak power spectral density
Channel 112, 12 Mbps



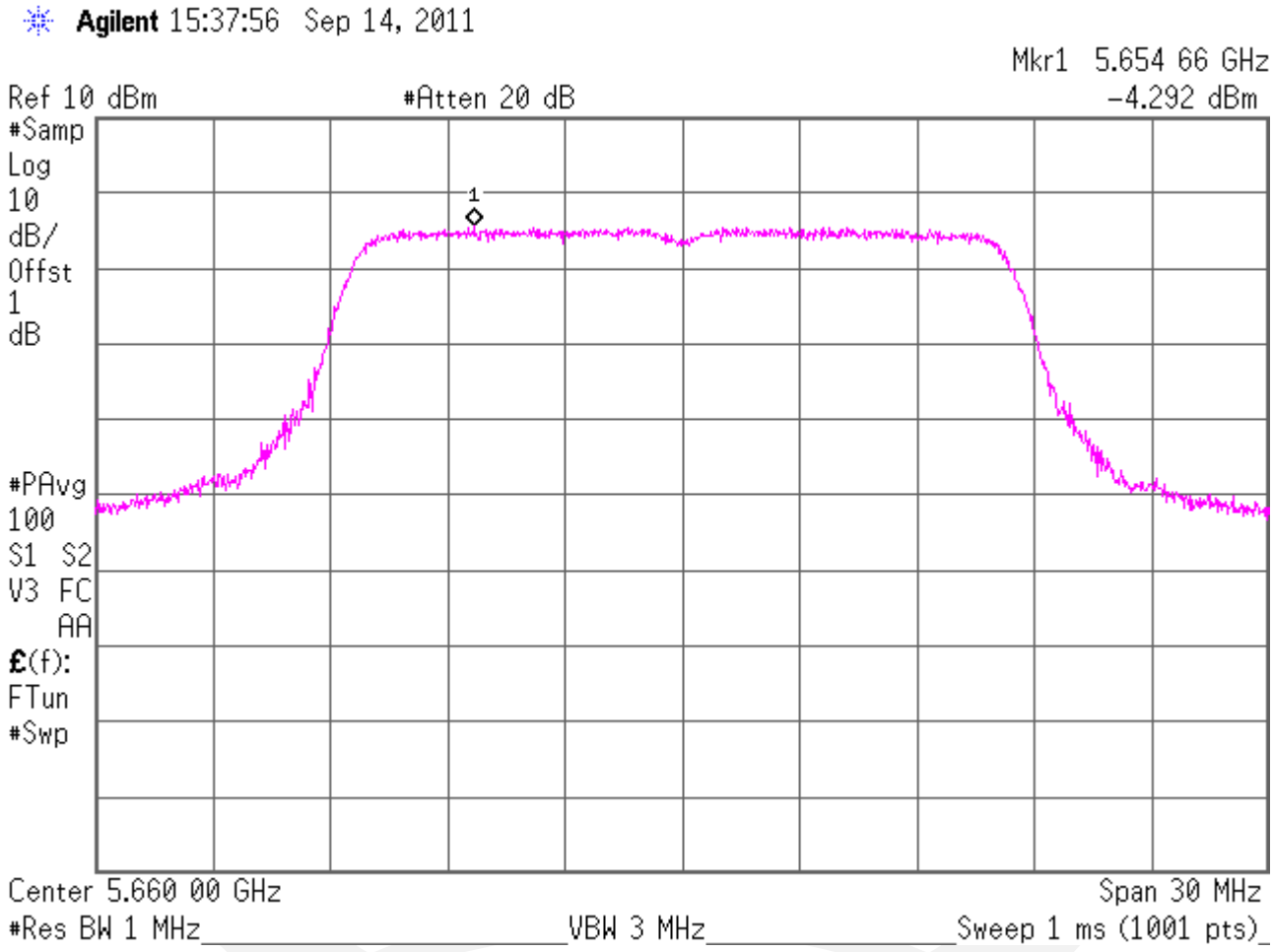
Peak power spectral density
Channel 112, 54 Mbps



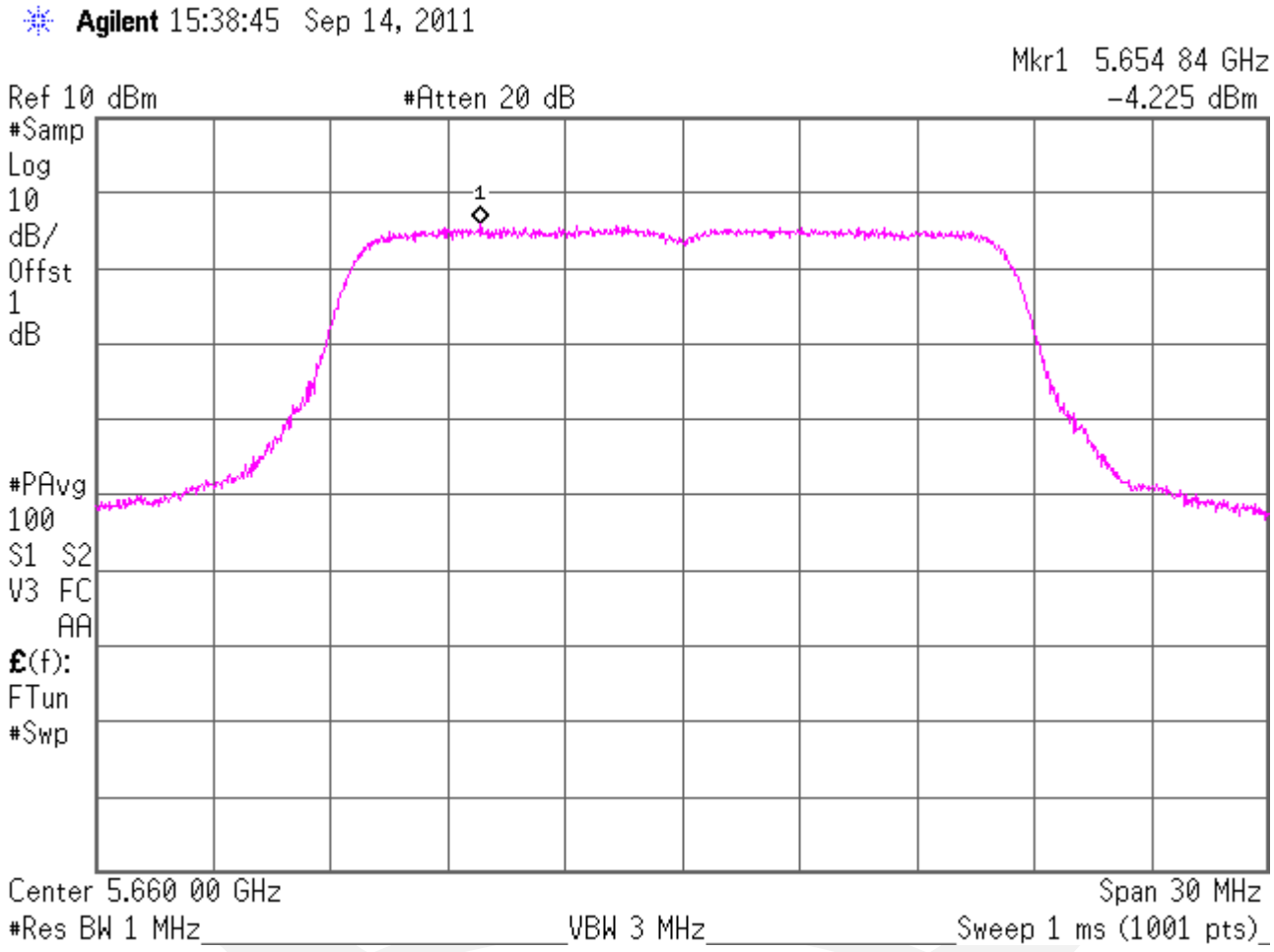
Peak power spectral density
Channel 132, 6 Mbps



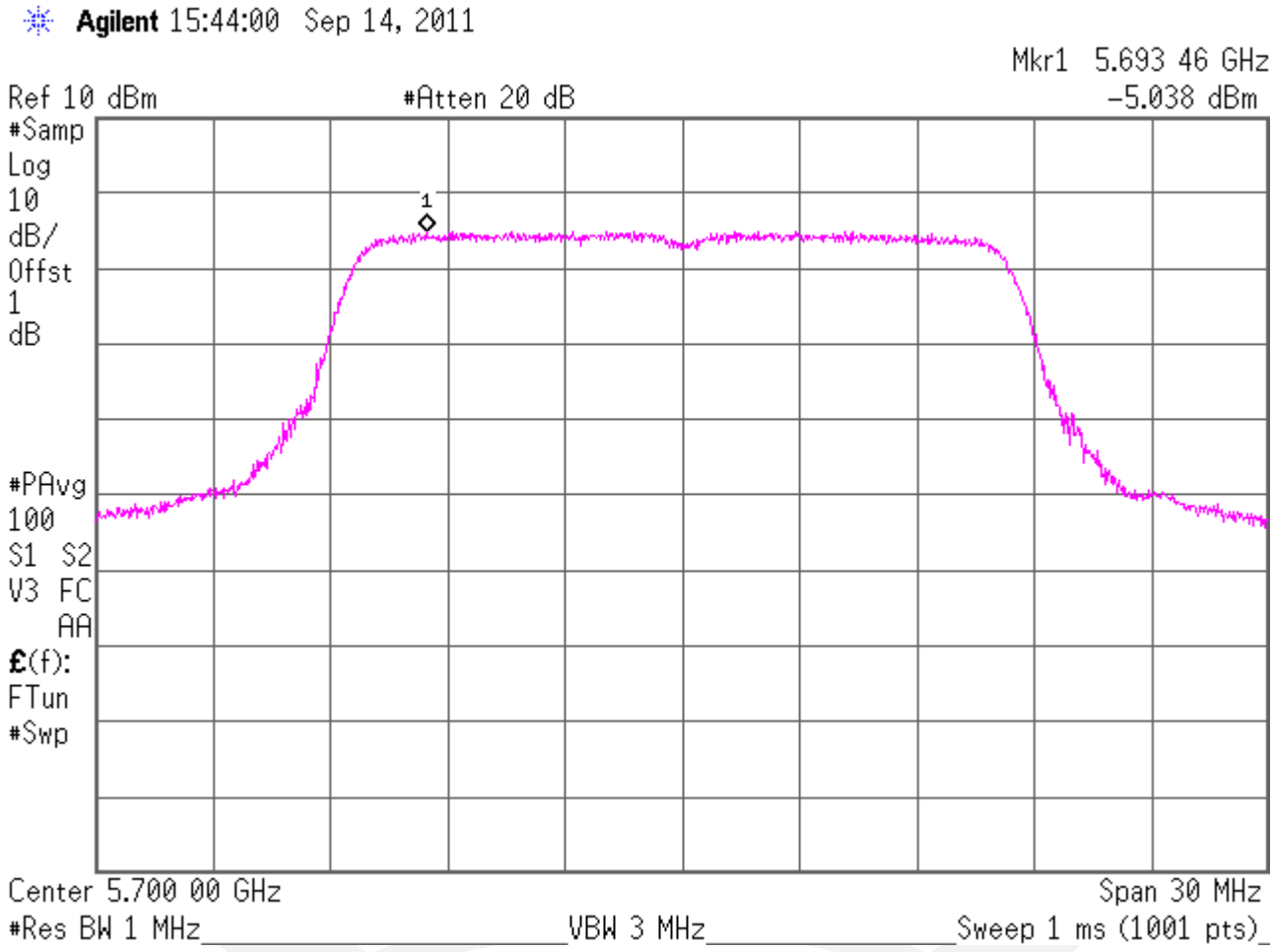
Peak power spectral density
Channel 132, 12 Mbps



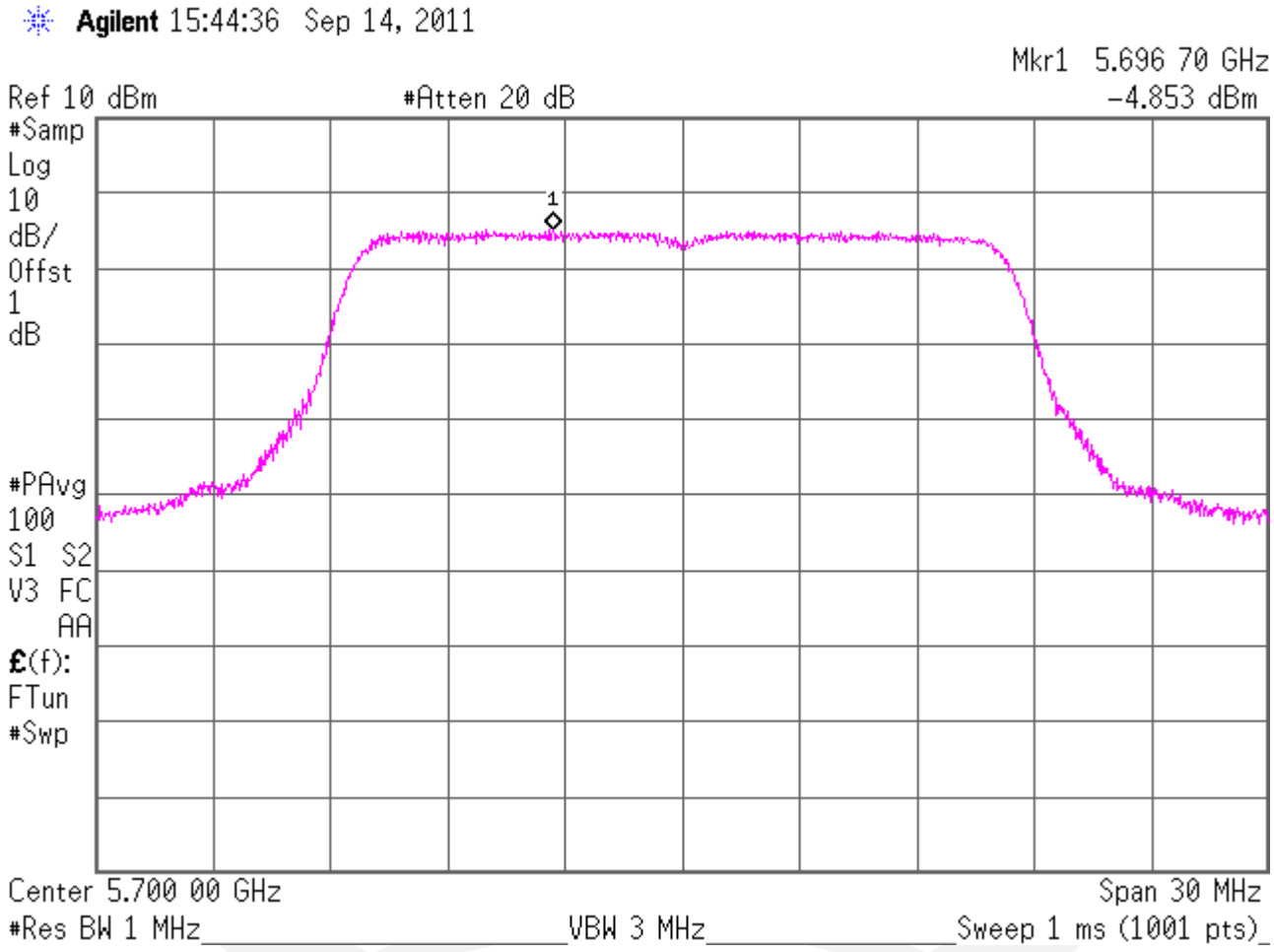
Peak power spectral density
Channel 132, 54 Mbps



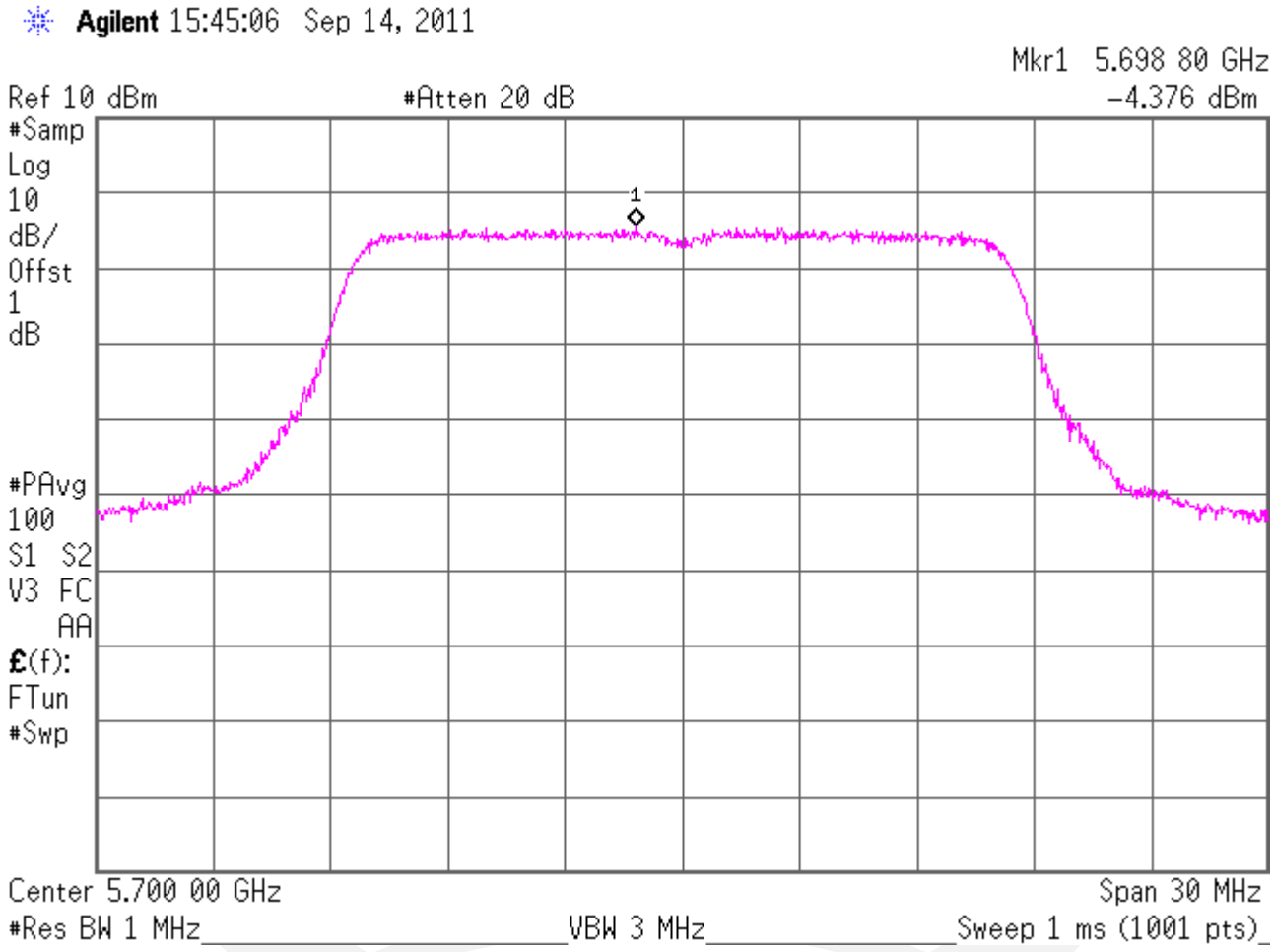
Peak power spectral density
Channel 140, 6 Mbps



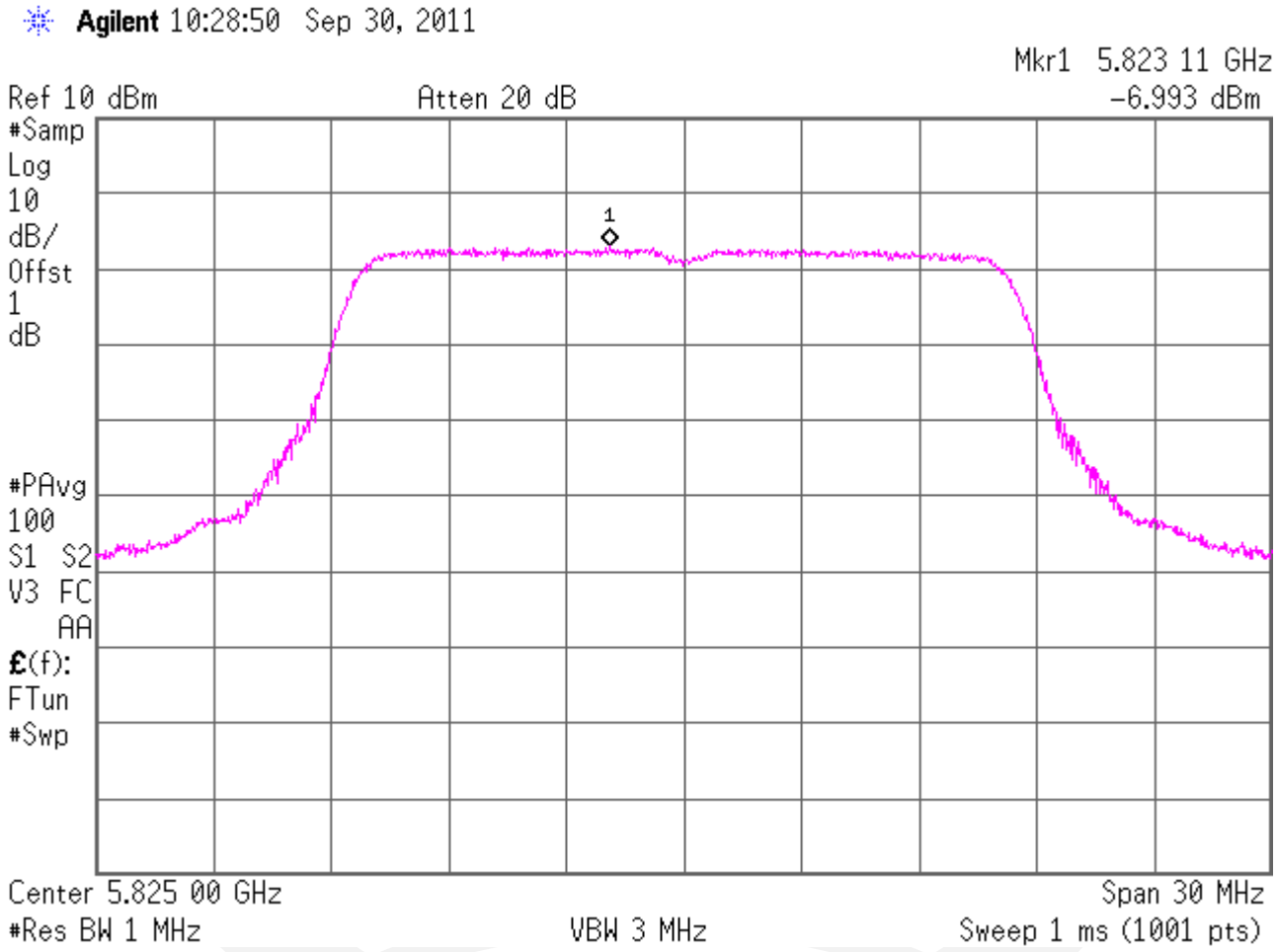
Peak power spectral density
Channel 140, 12 Mbps



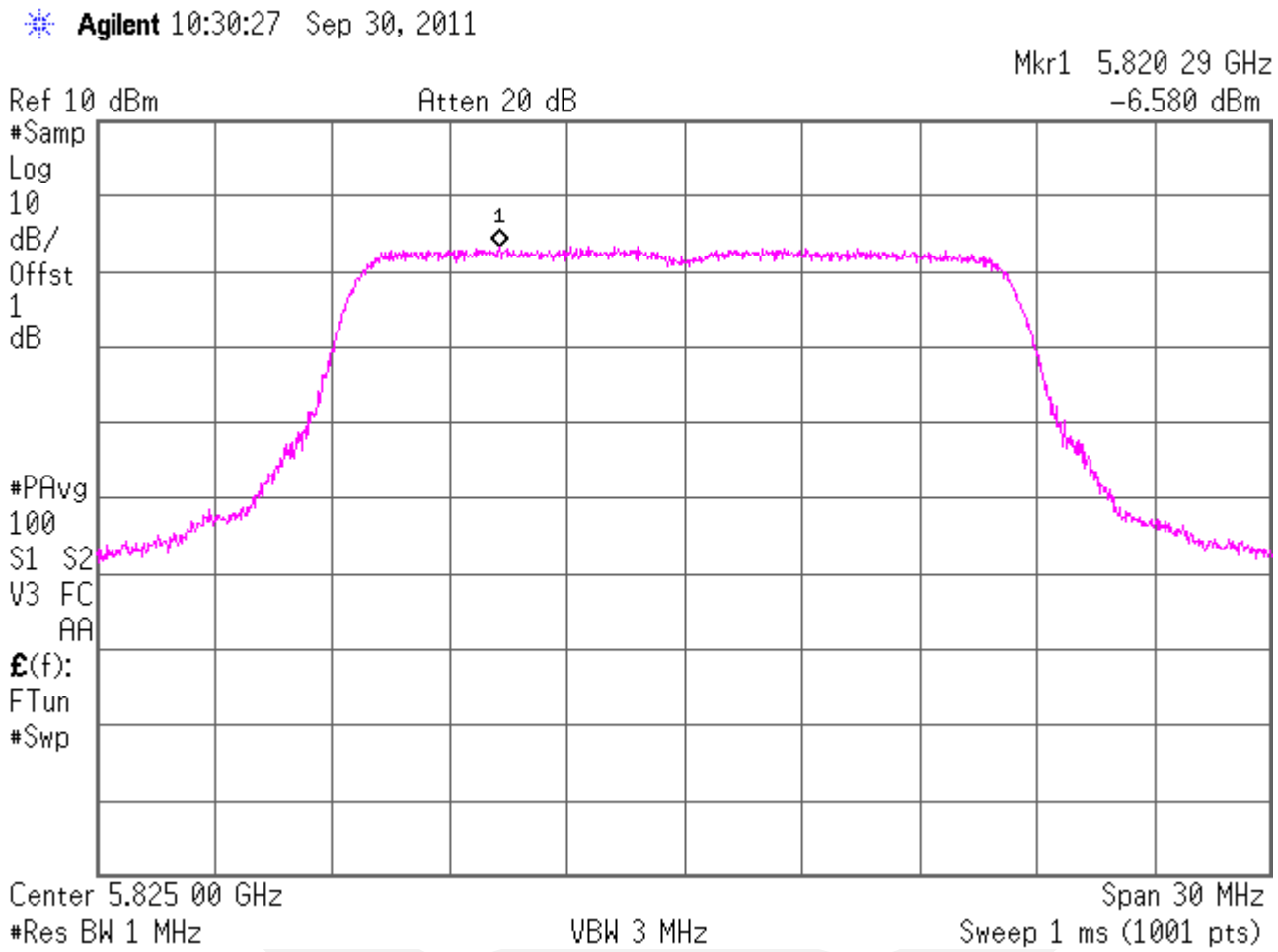
Peak power spectral density
Channel 140, 54 Mbps



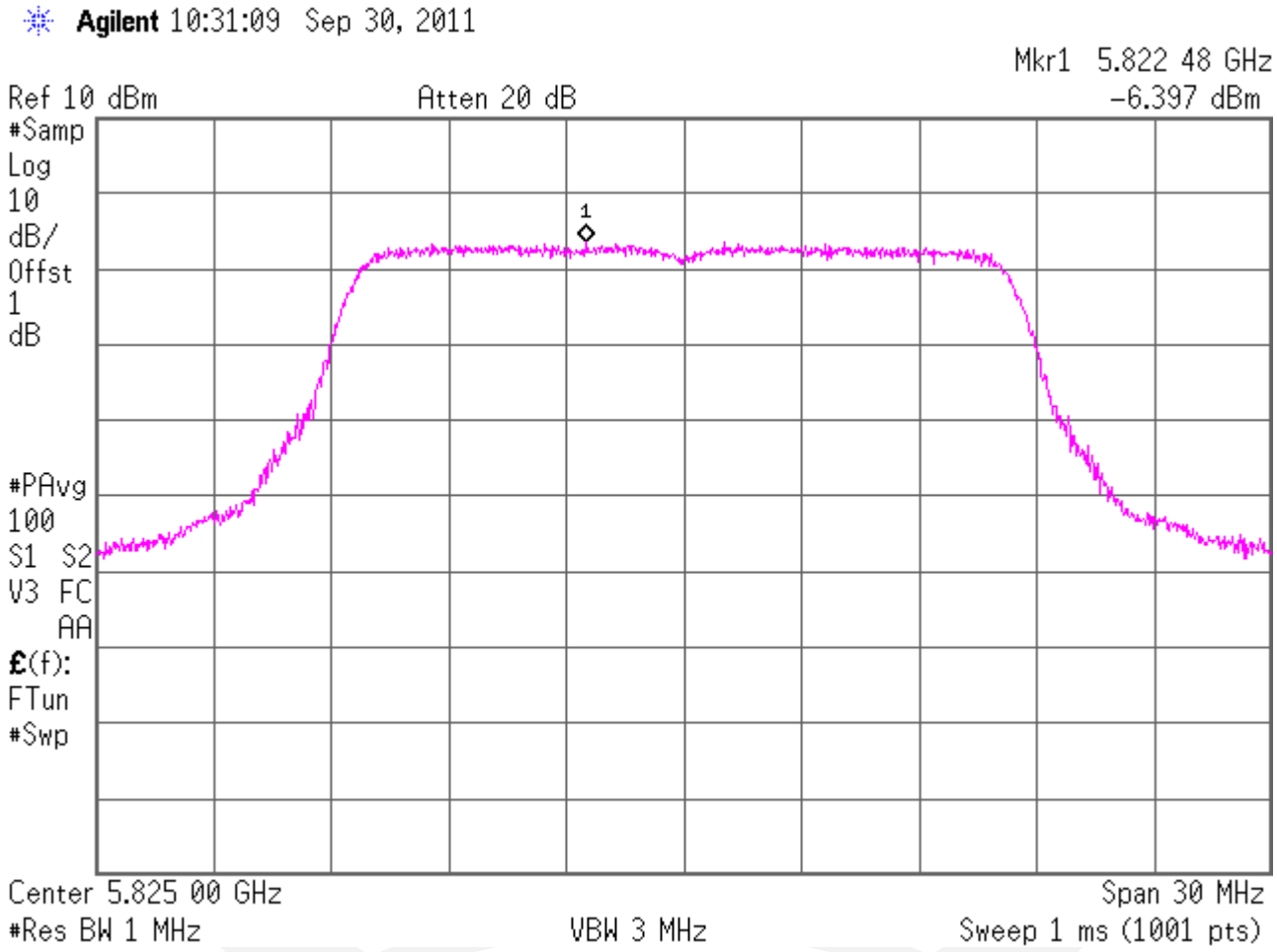
Peak power spectral density
Channel 165, 6 Mbps



Peak power spectral density
Channel 165, 12 Mbps



Peak power spectral density
Channel 165, 54 Mbps



Peak excursion

FCC 15.407(a)

Test summary

The requirements are: ■ - MET ☐ - NOT MET
Testing was performed in accordance with the test procedure of FCC KDB 789033.

Test location

☐ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
■ - Wild River Lab Tech Area, conducted measurement

Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE10435	E4440A	Agilent	Spectrum Analyzer	MY44304483	01-Apr-12

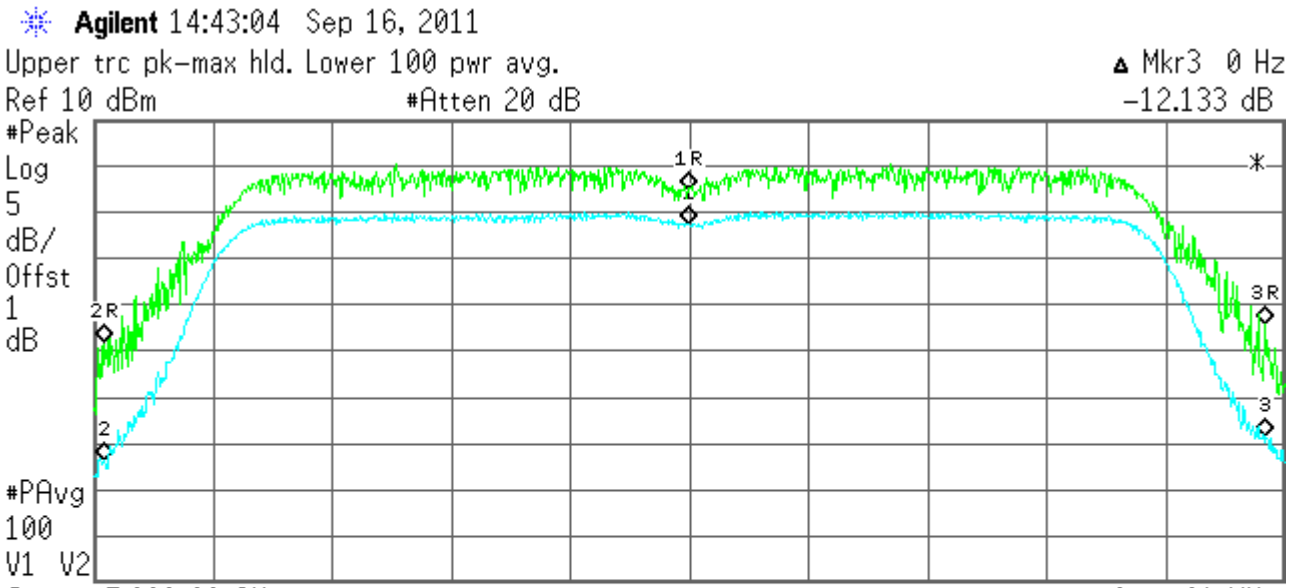
Test limit

Trace 1 & 2 delta ≤ 13 dB

Test data

See following pages – all meet the limit.

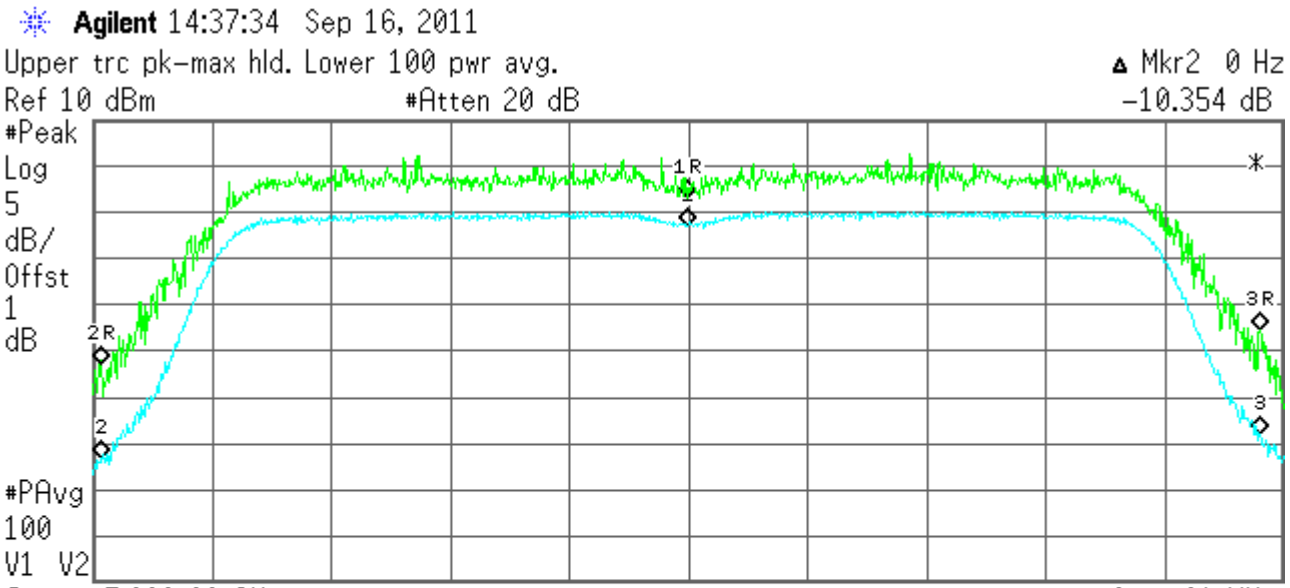
Peak excursion
Channel 52, 6 Mbps



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.260 00 GHz	2.47 dBm
1Δ	(2)	Freq	0 Hz	-3.69 dB
2R	(2)	Freq	5.249 69 GHz	-14.01 dBm
2Δ	(2)	Freq	0 Hz	-12.69 dB
3R	(2)	Freq	5.270 16 GHz	-12.10 dBm
3Δ	(2)	Freq	0 Hz	-12.13 dB

Trace 2 = sample detector, power average 100 traces = power measurement method 1

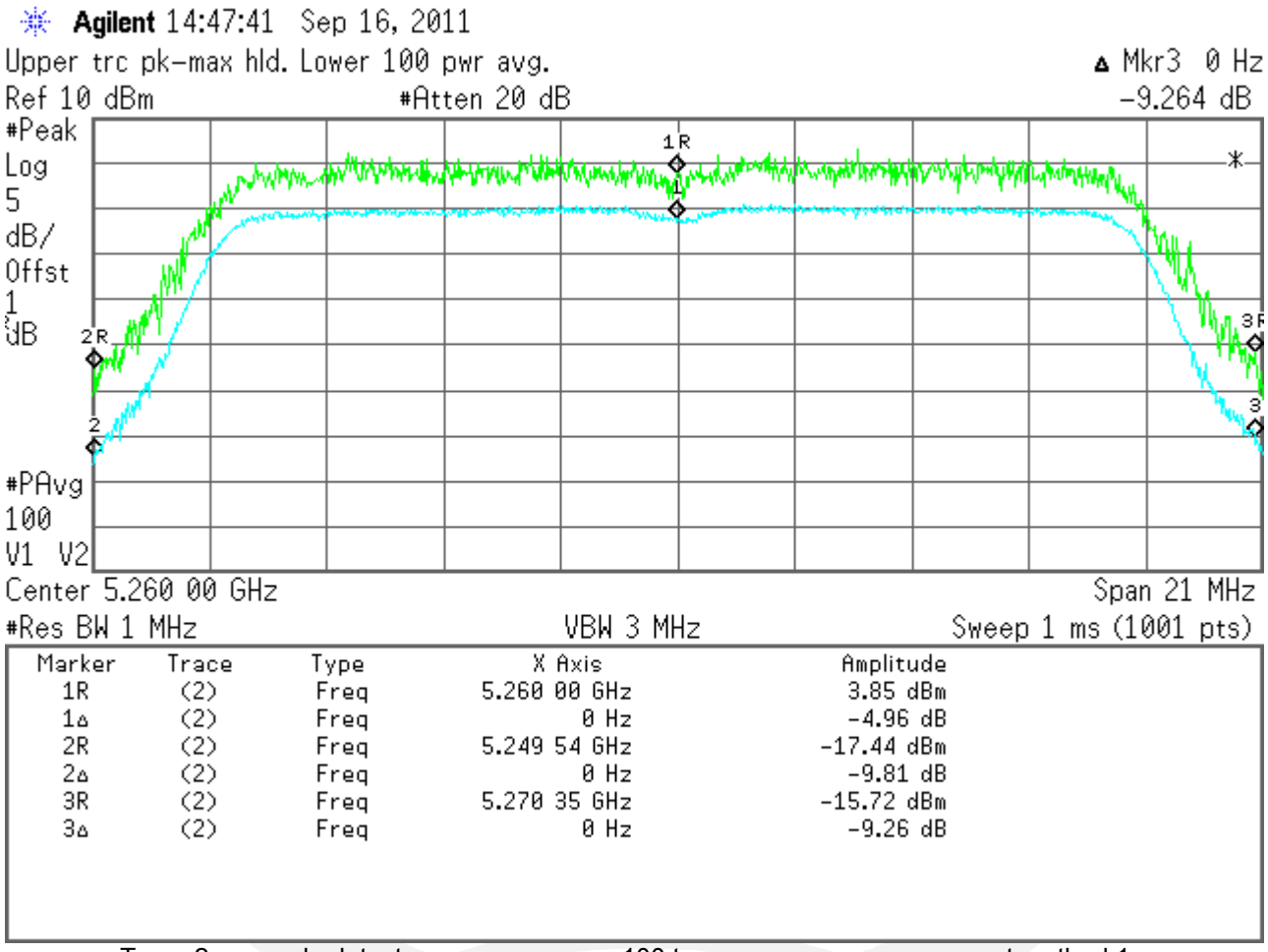
Peak excursion
Channel 52, 12 Mbps



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.260 00 GHz	1.64 dBm
1Δ	(2)	Freq	0 Hz	-3.17 dB
2R	(2)	Freq	5.249 63 GHz	-16.31 dBm
2Δ	(2)	Freq	0 Hz	-10.35 dB
3R	(2)	Freq	5.270 08 GHz	-12.67 dBm
3Δ	(2)	Freq	0 Hz	-11.40 dB

Trace 2 = sample detector, power average 100 traces = power measurement method 1

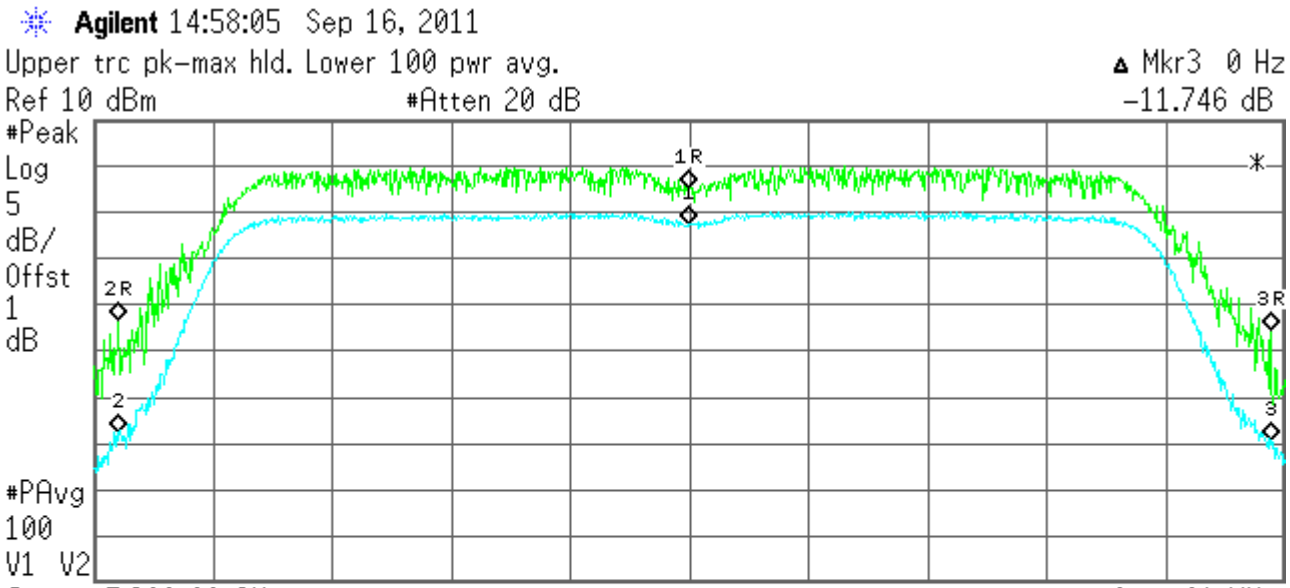
Peak excursion
Channel 52, 54 Mbps



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.260 00 GHz	3.85 dBm
1Δ	(2)	Freq	0 Hz	-4.96 dB
2R	(2)	Freq	5.249 54 GHz	-17.44 dBm
2Δ	(2)	Freq	0 Hz	-9.81 dB
3R	(2)	Freq	5.270 35 GHz	-15.72 dBm
3Δ	(2)	Freq	0 Hz	-9.26 dB

Trace 2 = sample detector, power average 100 traces = power measurement method 1

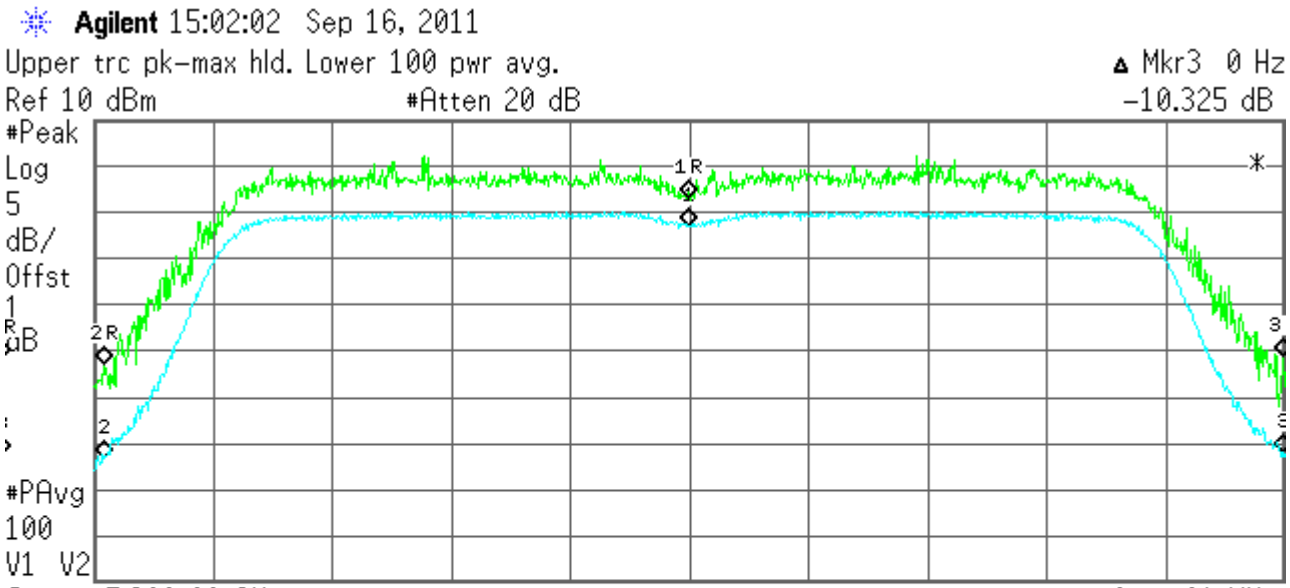
Peak excursion
Channel 64, 6 Mbps



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.320 00 GHz	2.67 dBm
1Δ	(2)	Freq	0 Hz	-3.90 dB
2R	(2)	Freq	5.309 94 GHz	-11.65 dBm
2Δ	(2)	Freq	0 Hz	-12.19 dB
3R	(2)	Freq	5.330 25 GHz	-12.79 dBm
3Δ	(2)	Freq	0 Hz	-11.75 dB

Trace 2 = sample detector, power average 100 traces = power measurement method 1

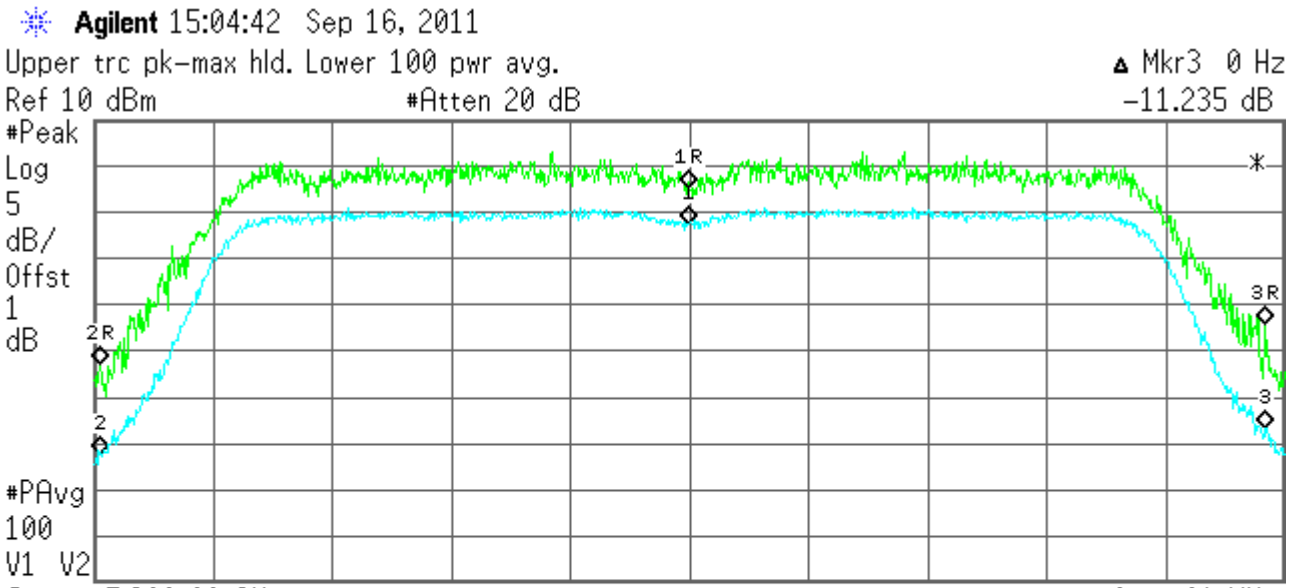
Peak excursion
Channel 64, 12 Mbps



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.320 00 GHz	1.62 dBm
1Δ	(2)	Freq	0 Hz	-3.03 dB
2R	(2)	Freq	5.309 69 GHz	-16.46 dBm
2Δ	(2)	Freq	0 Hz	-10.20 dB
3R	(2)	Freq	5.330 48 GHz	-15.60 dBm
3Δ	(2)	Freq	0 Hz	-10.32 dB

Trace 2 = sample detector, power average 100 traces = power measurement method 1

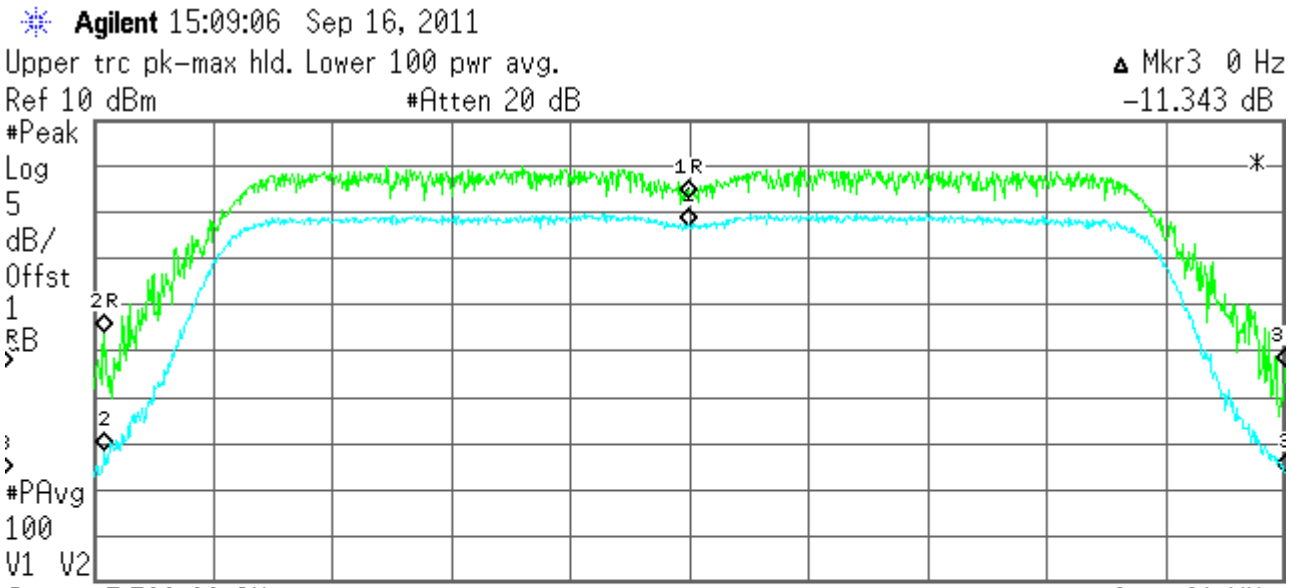
Peak excursion
Channel 64, 54 Mbps



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.320 00 GHz	2.61 dBm
1Δ	(2)	Freq	0 Hz	-3.85 dB
2R	(2)	Freq	5.309 60 GHz	-16.33 dBm
2Δ	(2)	Freq	0 Hz	-9.74 dB
3R	(2)	Freq	5.330 16 GHz	-12.05 dBm
3Δ	(2)	Freq	0 Hz	-11.23 dB

Trace 2 = sample detector, power average 100 traces = power measurement method 1

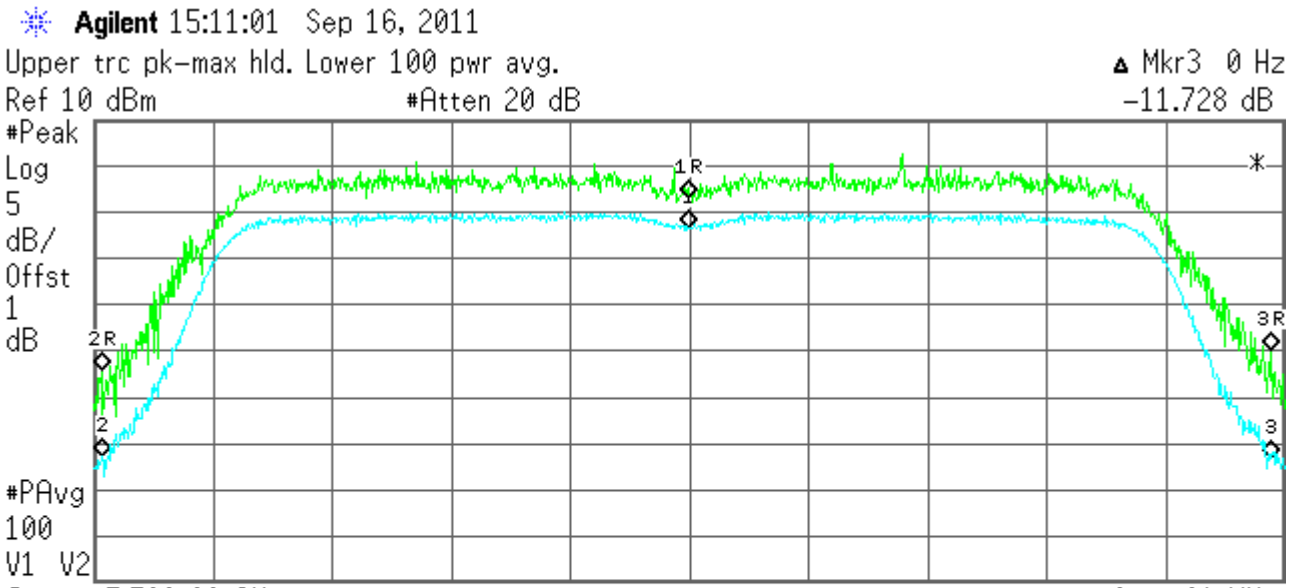
Peak excursion
Channel 100, 6 Mbps



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.500 00 GHz	1.63 dBm
1Δ	(2)	Freq	0 Hz	-3.14 dB
2R	(2)	Freq	5.489 69 GHz	-13.05 dBm
2Δ	(2)	Freq	0 Hz	-12.78 dB
3R	(2)	Freq	5.510 50 GHz	-16.72 dBm
3Δ	(2)	Freq	0 Hz	-11.34 dB

Trace 2 = sample detector, power average 100 traces = power measurement method 1

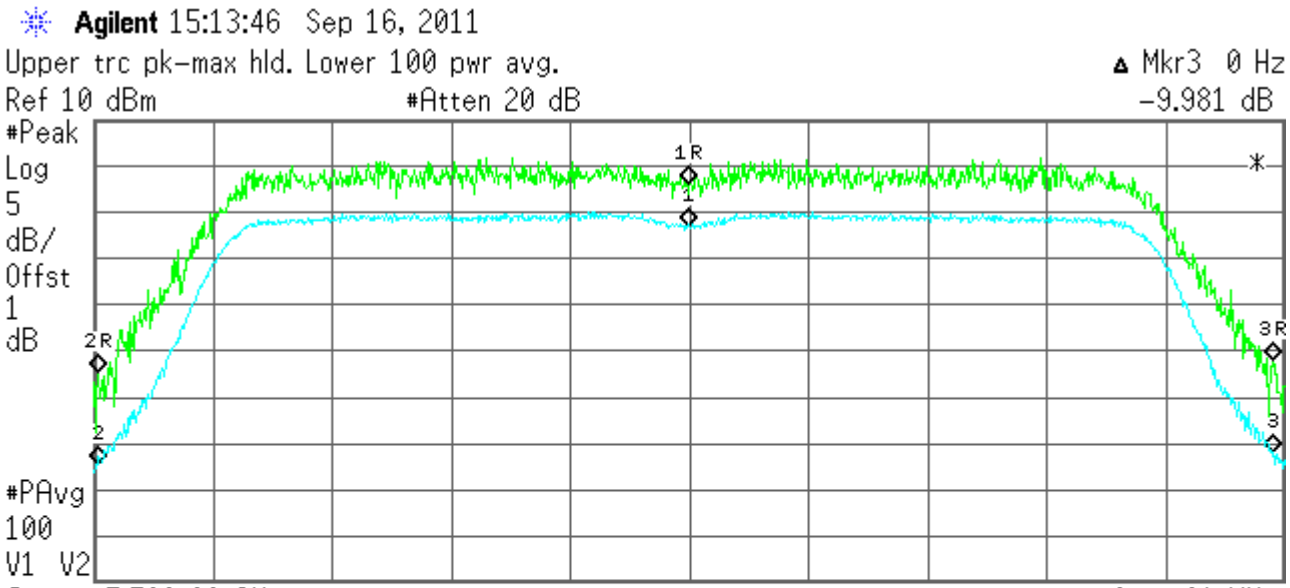
Peak excursion
Channel 100, 12 Mbps



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.500 00 GHz	1.56 dBm
1Δ	(2)	Freq	0 Hz	-3.24 dB
2R	(2)	Freq	5.489 63 GHz	-17.04 dBm
2Δ	(2)	Freq	0 Hz	-9.37 dB
3R	(2)	Freq	5.510 27 GHz	-14.95 dBm
3Δ	(2)	Freq	0 Hz	-11.73 dB

Trace 2 = sample detector, power average 100 traces = power measurement method 1

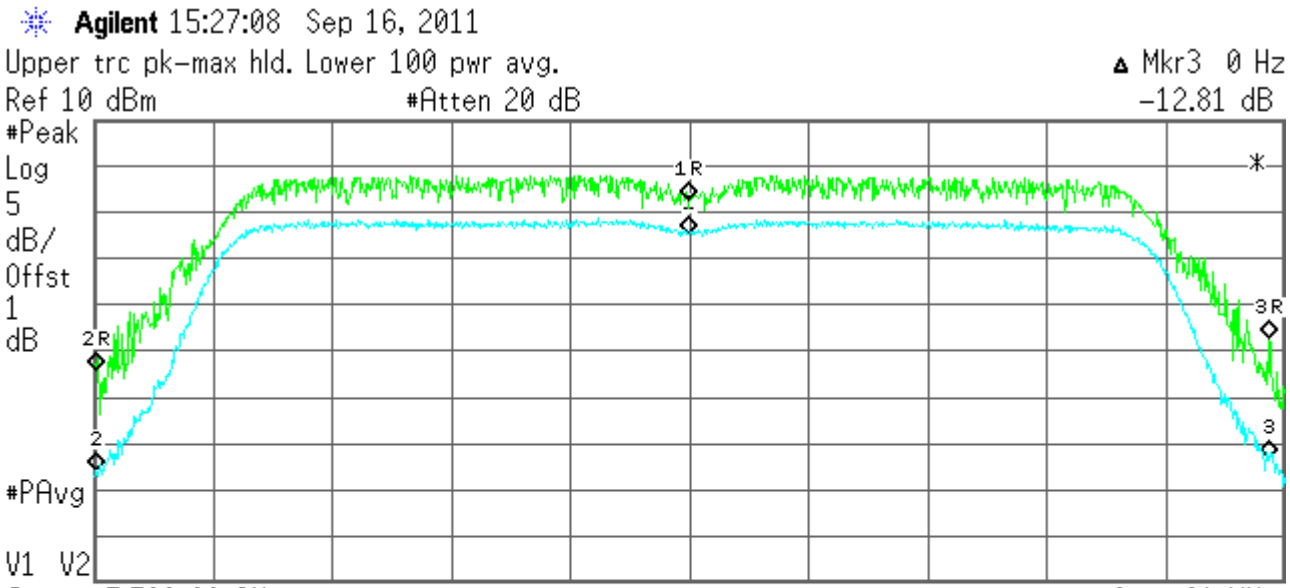
Peak excursion
Channel 100, 54 Mbps



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.500 00 GHz	3.03 dBm
1Δ	(2)	Freq	0 Hz	-4.42 dB
2R	(2)	Freq	5.489 56 GHz	-17.35 dBm
2Δ	(2)	Freq	0 Hz	-9.83 dB
3R	(2)	Freq	5.510 29 GHz	-15.95 dBm
3Δ	(2)	Freq	0 Hz	-9.98 dB

Trace 2 = sample detector, power average 100 traces = power measurement method 1

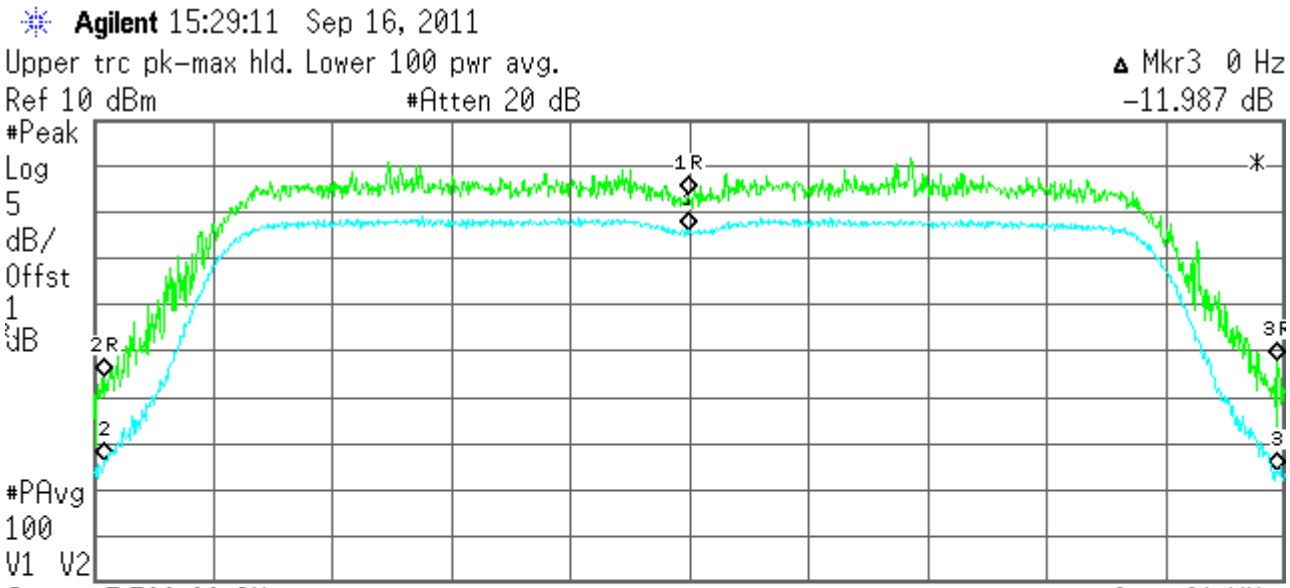
Peak excursion
Channel 112, 6 Mbps



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.560 00 GHz	1.26 dBm
1Δ	(2)	Freq	0 Hz	-3.69 dB
2R	(2)	Freq	5.549 54 GHz	-17.13 dBm
2Δ	(2)	Freq	0 Hz	-10.81 dB
3R	(2)	Freq	5.570 21 GHz	-13.67 dBm
3Δ	(2)	Freq	0 Hz	-12.81 dB

Trace 2 = sample detector, power average 100 traces = power measurement method 1

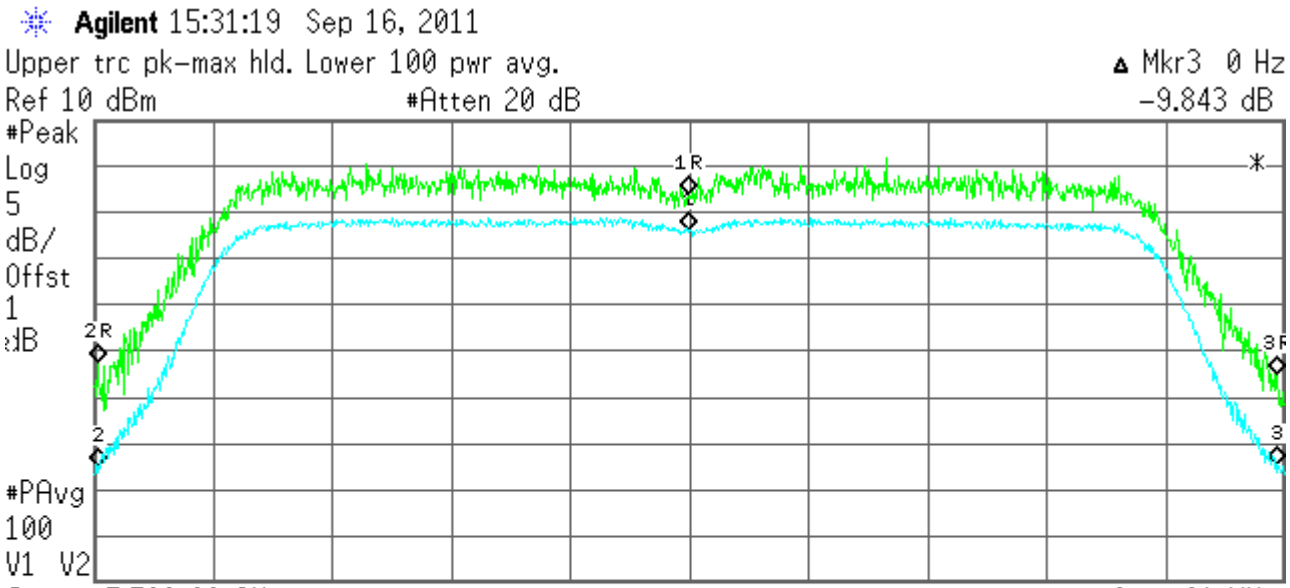
Peak excursion
Channel 112, 12 Mbps



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.560 00 GHz	1.98 dBm
1Δ	(2)	Freq	0 Hz	-3.94 dB
2R	(2)	Freq	5.549 69 GHz	-17.62 dBm
2Δ	(2)	Freq	0 Hz	-9.21 dB
3R	(2)	Freq	5.570 37 GHz	-15.95 dBm
3Δ	(2)	Freq	0 Hz	-11.99 dB

Trace 2 = sample detector, power average 100 traces = power measurement method 1

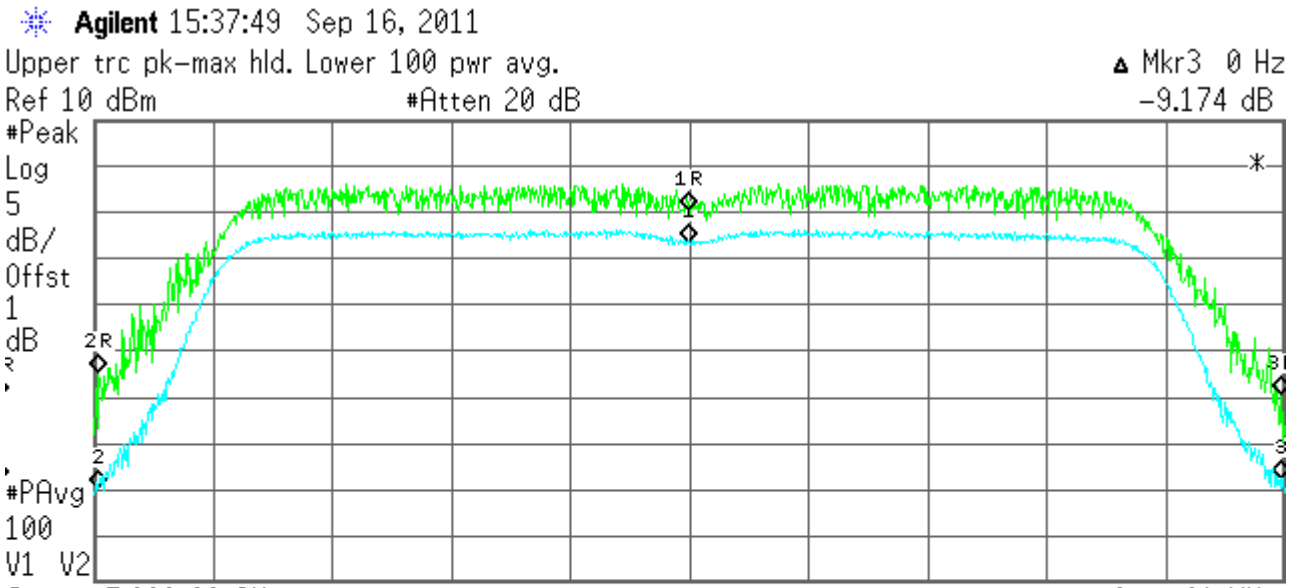
Peak excursion
Channel 112, 54 Mbps



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.560 00 GHz	2.09 dBm
1Δ	(2)	Freq	0 Hz	-4.07 dB
2R	(2)	Freq	5.549 56 GHz	-16.26 dBm
2Δ	(2)	Freq	0 Hz	-11.15 dB
3R	(2)	Freq	5.570 37 GHz	-17.45 dBm
3Δ	(2)	Freq	0 Hz	-9.84 dB

Trace 2 = sample detector, power average 100 traces = power measurement method 1

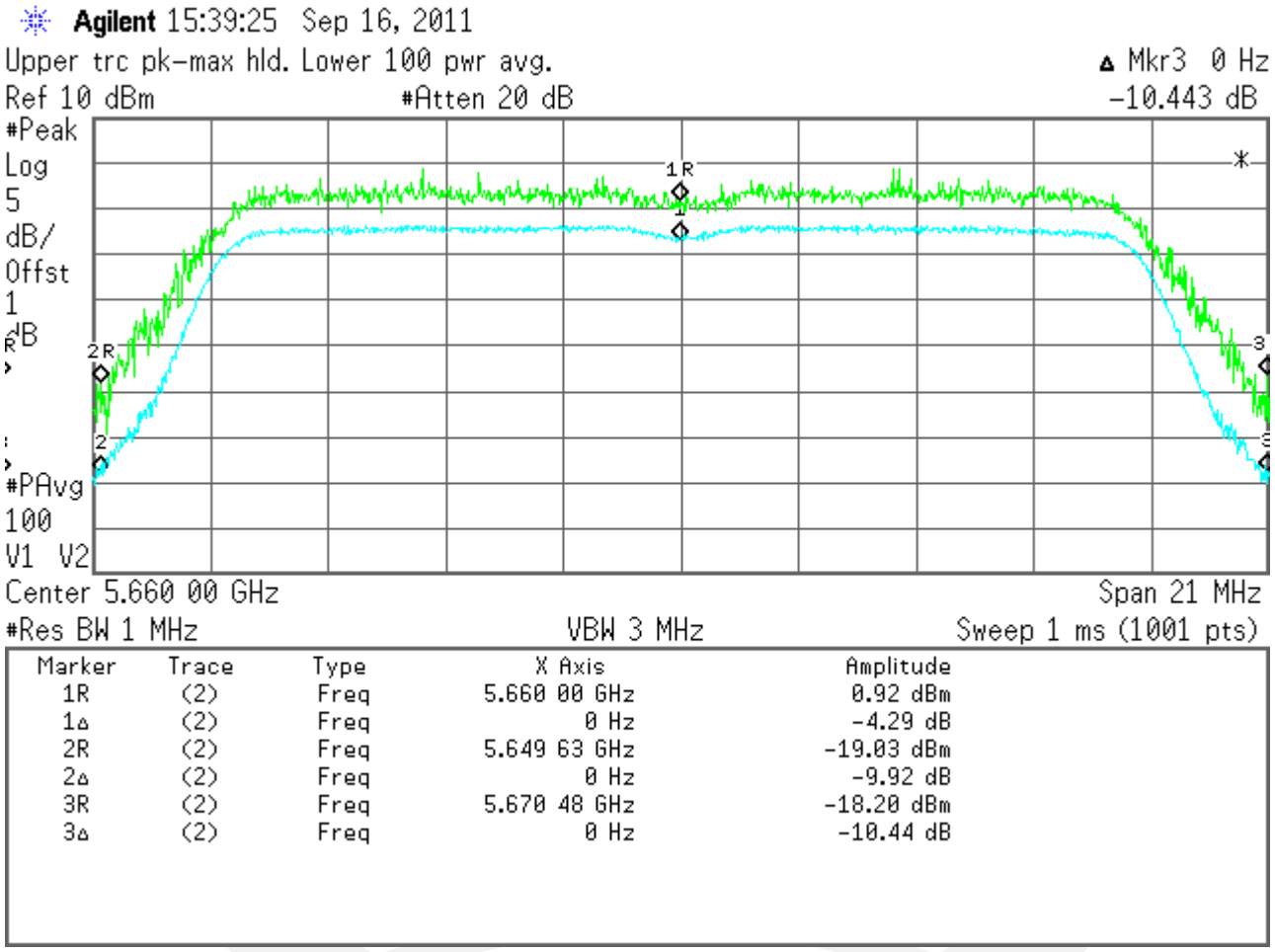
Peak excursion
Channel 132, 6 Mbps



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.660 00 GHz	0.23 dBm
1Δ	(2)	Freq	0 Hz	-3.50 dB
2R	(2)	Freq	5.649 58 GHz	-17.27 dBm
2Δ	(2)	Freq	0 Hz	-12.45 dB
3R	(2)	Freq	5.670 44 GHz	-19.66 dBm
3Δ	(2)	Freq	0 Hz	-9.17 dB

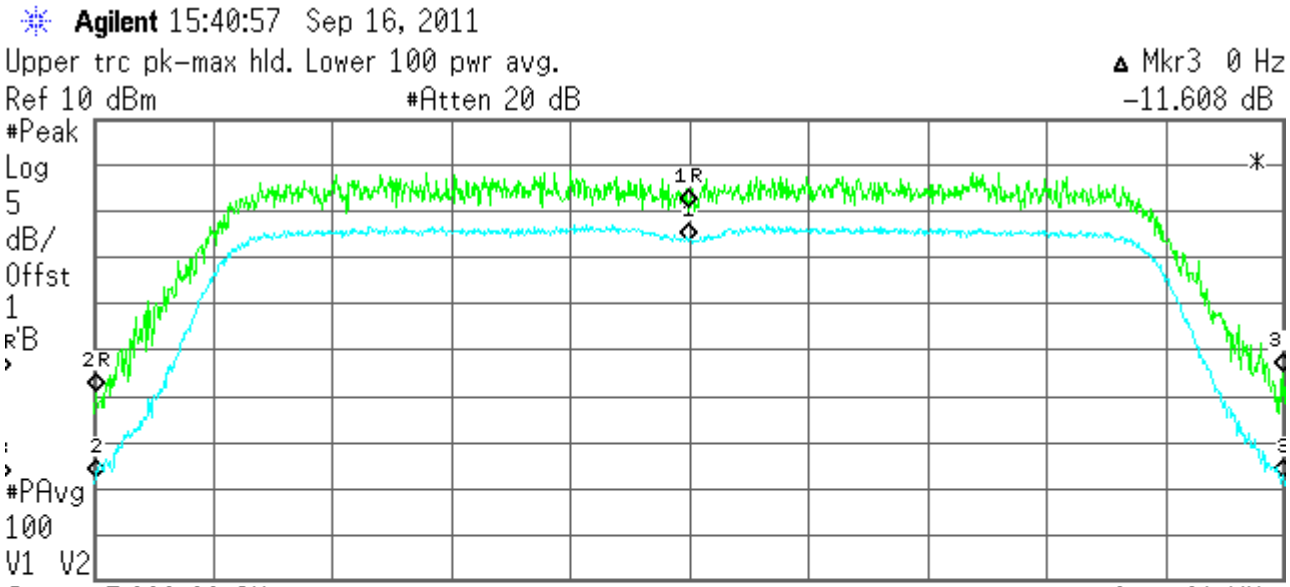
Trace 2 = sample detector, power average 100 traces = power measurement method 1

Peak excursion
Channel 132, 12 Mbps



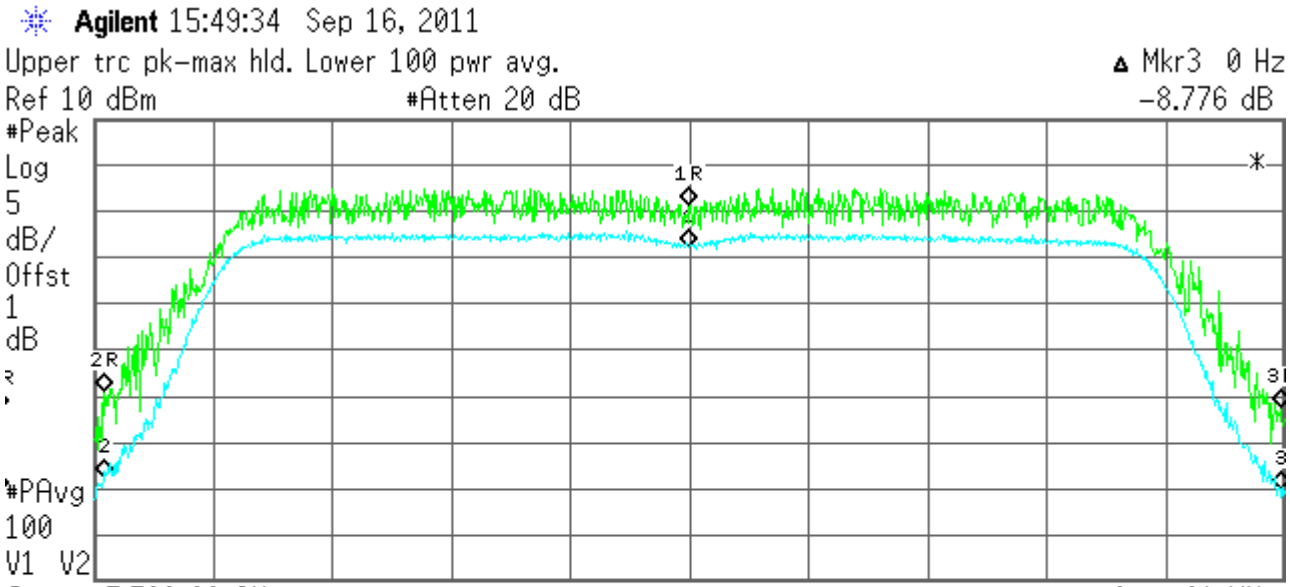
Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.660 00 GHz	0.92 dBm
1Δ	(2)	Freq	0 Hz	-4.29 dB
2R	(2)	Freq	5.649 63 GHz	-19.03 dBm
2Δ	(2)	Freq	0 Hz	-9.92 dB
3R	(2)	Freq	5.670 48 GHz	-18.20 dBm
3Δ	(2)	Freq	0 Hz	-10.44 dB

Peak excursion
Channel 132, 54 Mbps



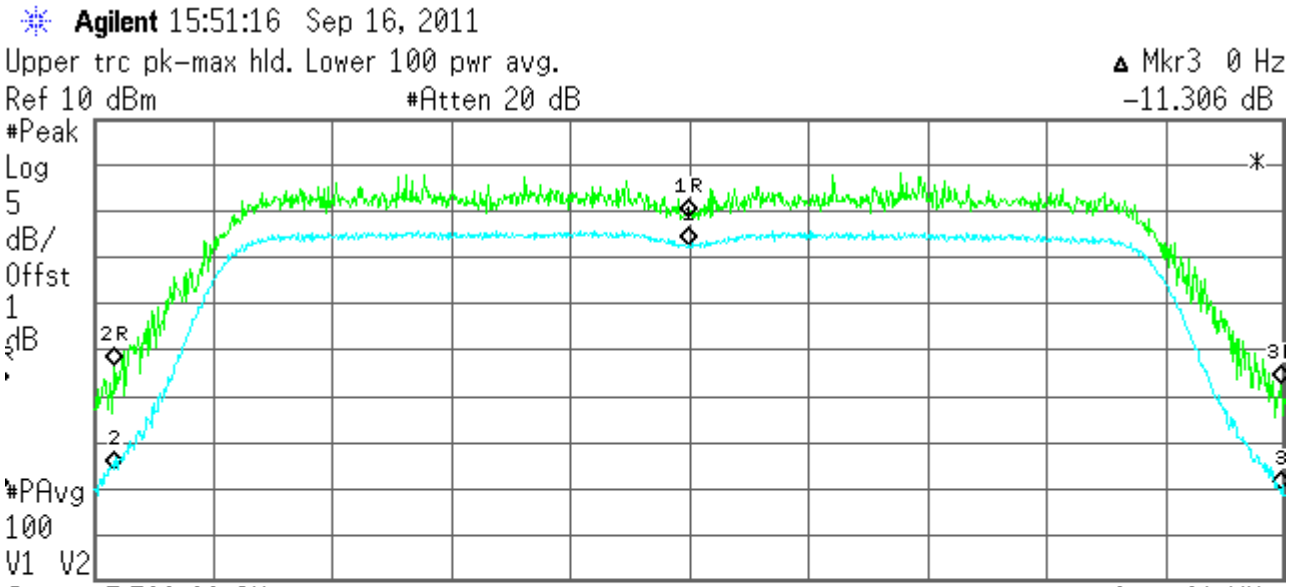
Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.660 00 GHz	0.56 dBm
1Δ	(2)	Freq	0 Hz	-3.80 dB
2R	(2)	Freq	5.649 52 GHz	-19.39 dBm
2Δ	(2)	Freq	0 Hz	-9.31 dB
3R	(2)	Freq	5.670 48 GHz	-17.23 dBm
3Δ	(2)	Freq	0 Hz	-11.61 dB

Peak excursion
Channel 140, 6 Mbps



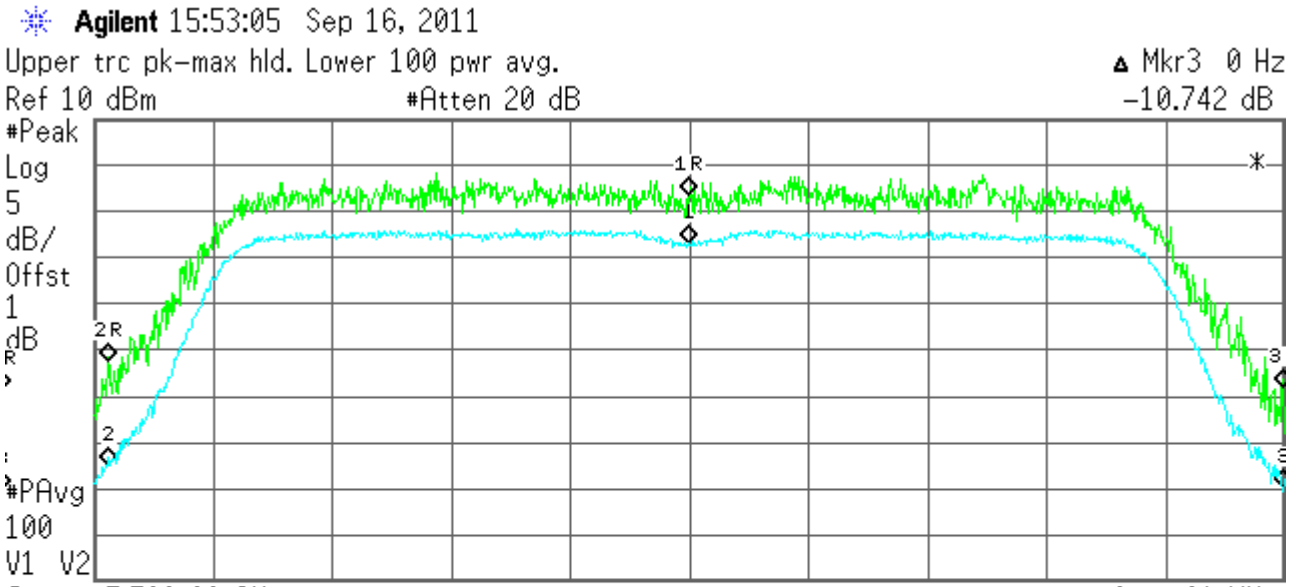
Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.700 00 GHz	0.64 dBm
1Δ	(2)	Freq	0 Hz	-4.51 dB
2R	(2)	Freq	5.689 67 GHz	-19.51 dBm
2Δ	(2)	Freq	0 Hz	-9.14 dB
3R	(2)	Freq	5.710 42 GHz	-21.19 dBm
3Δ	(2)	Freq	0 Hz	-8.78 dB

Peak excursion
Channel 140, 12 Mbps



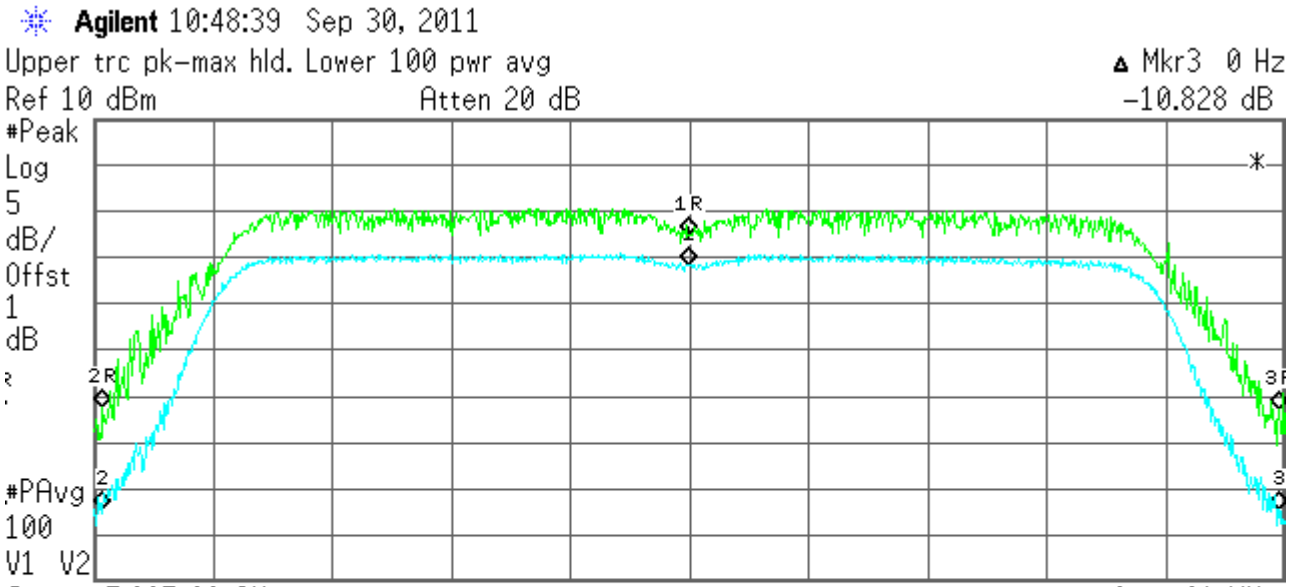
Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.700 00 GHz	-0.66 dBm
1Δ	(2)	Freq	0 Hz	-3.00 dB
2R	(2)	Freq	5.689 84 GHz	-16.56 dBm
2Δ	(2)	Freq	0 Hz	-11.39 dB
3R	(2)	Freq	5.710 44 GHz	-18.63 dBm
3Δ	(2)	Freq	0 Hz	-11.31 dB

Peak excursion
Channel 140, 54 Mbps



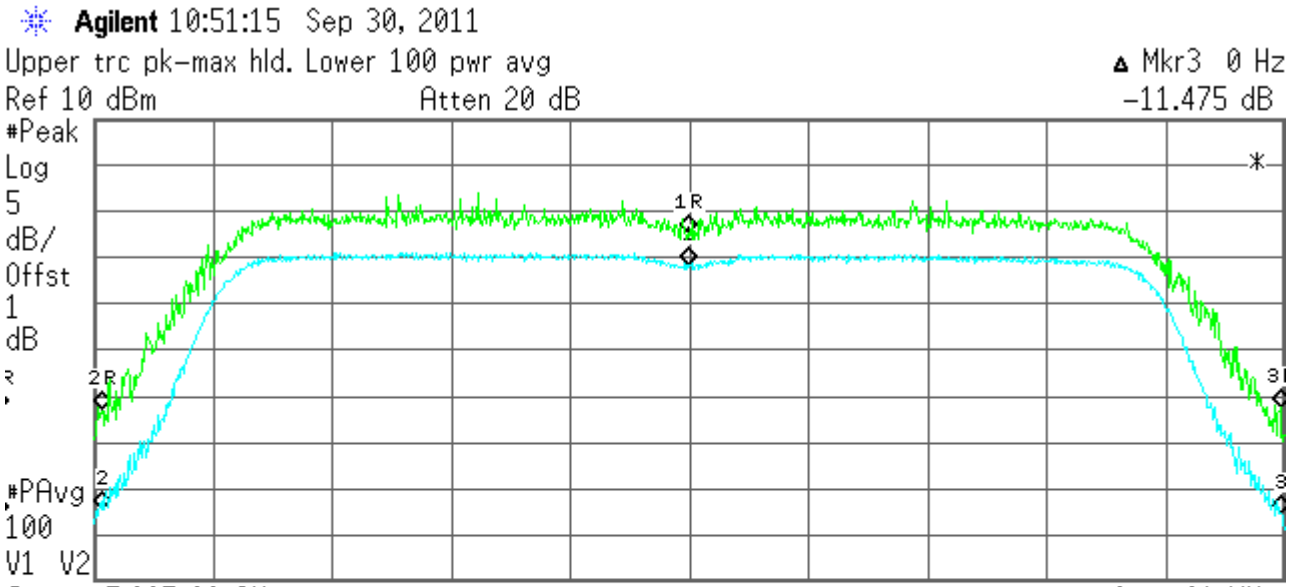
Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.700 00 GHz	1.71 dBm
1Δ	(2)	Freq	0 Hz	-5.09 dB
2R	(2)	Freq	5.689 73 GHz	-16.15 dBm
2Δ	(2)	Freq	0 Hz	-11.25 dB
3R	(2)	Freq	5.710 46 GHz	-19.08 dBm
3Δ	(2)	Freq	0 Hz	-10.74 dB

Peak excursion
Channel 165, 6 Mbps



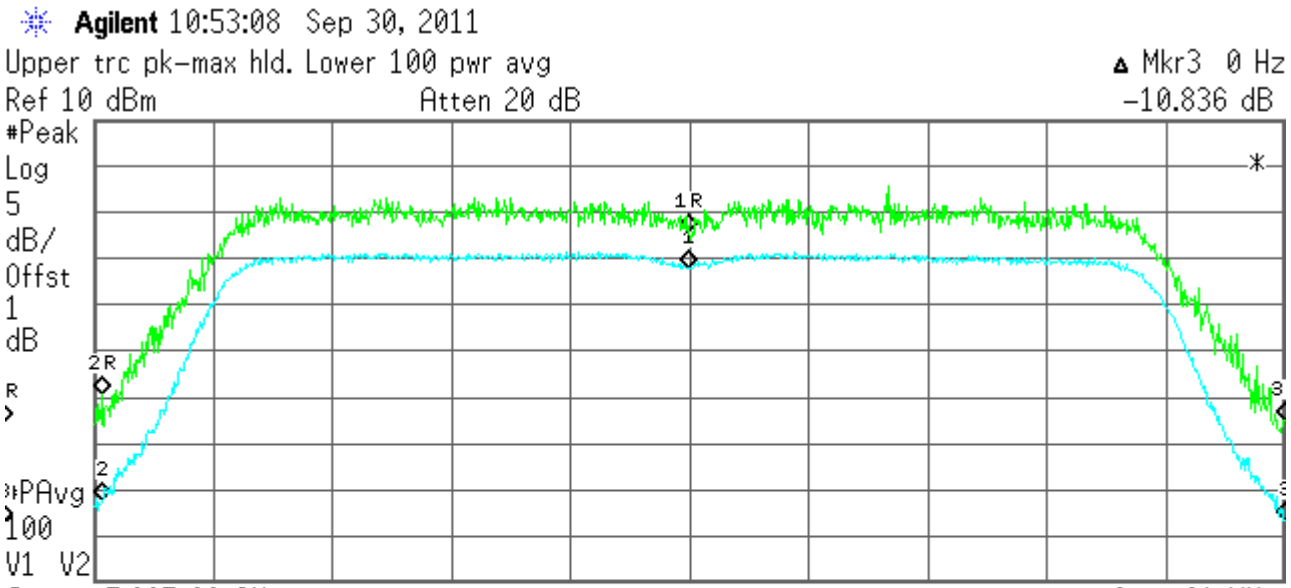
Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.825 00 GHz	-2.51 dBm
1Δ	(2)	Freq	0 Hz	-3.34 dB
2R	(2)	Freq	5.814 65 GHz	-21.15 dBm
2Δ	(2)	Freq	0 Hz	-11.06 dB
3R	(2)	Freq	5.835 40 GHz	-21.32 dBm
3Δ	(2)	Freq	0 Hz	-10.83 dB

Peak excursion
Channel 165, 12 Mbps



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.825 00 GHz	-2.34 dBm
1Δ	(2)	Freq	0 Hz	-3.37 dB
2R	(2)	Freq	5.814 65 GHz	-21.50 dBm
2Δ	(2)	Freq	0 Hz	-10.69 dB
3R	(2)	Freq	5.835 42 GHz	-21.26 dBm
3Δ	(2)	Freq	0 Hz	-11.47 dB

Peak excursion
Channel 165, 54 Mbps



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	5.825 00 GHz	-2.19 dBm
1Δ	(2)	Freq	0 Hz	-3.77 dB
2R	(2)	Freq	5.814 65 GHz	-19.56 dBm
2Δ	(2)	Freq	0 Hz	-11.65 dB
3R	(2)	Freq	5.835 50 GHz	-22.37 dBm
3Δ	(2)	Freq	0 Hz	-10.84 dB

Emission bandwidth
FCC 15.407(a)

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Testing was performed in accordance with the test procedure of FCC KDB 789033.
The emission bandwidth ranges from 18.27 to 20.37 MHz

Test location
☐ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
■ - Wild River Lab Tech Area, conducted measurement

Test equipment

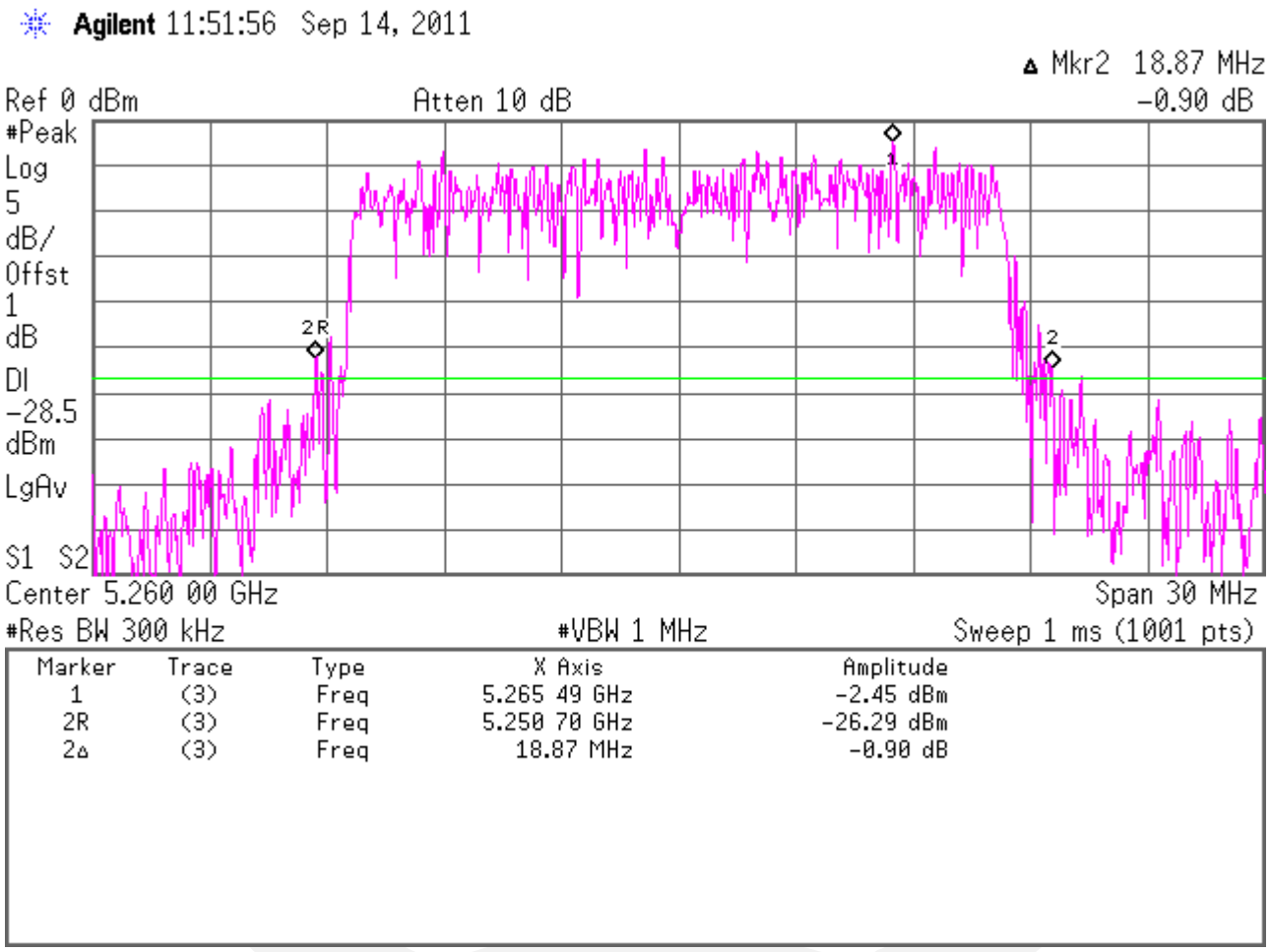
TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE10435	E4440A	Agilent	Spectrum Analyzer	MY44304483	01-Apr-12

Test limit
undefined

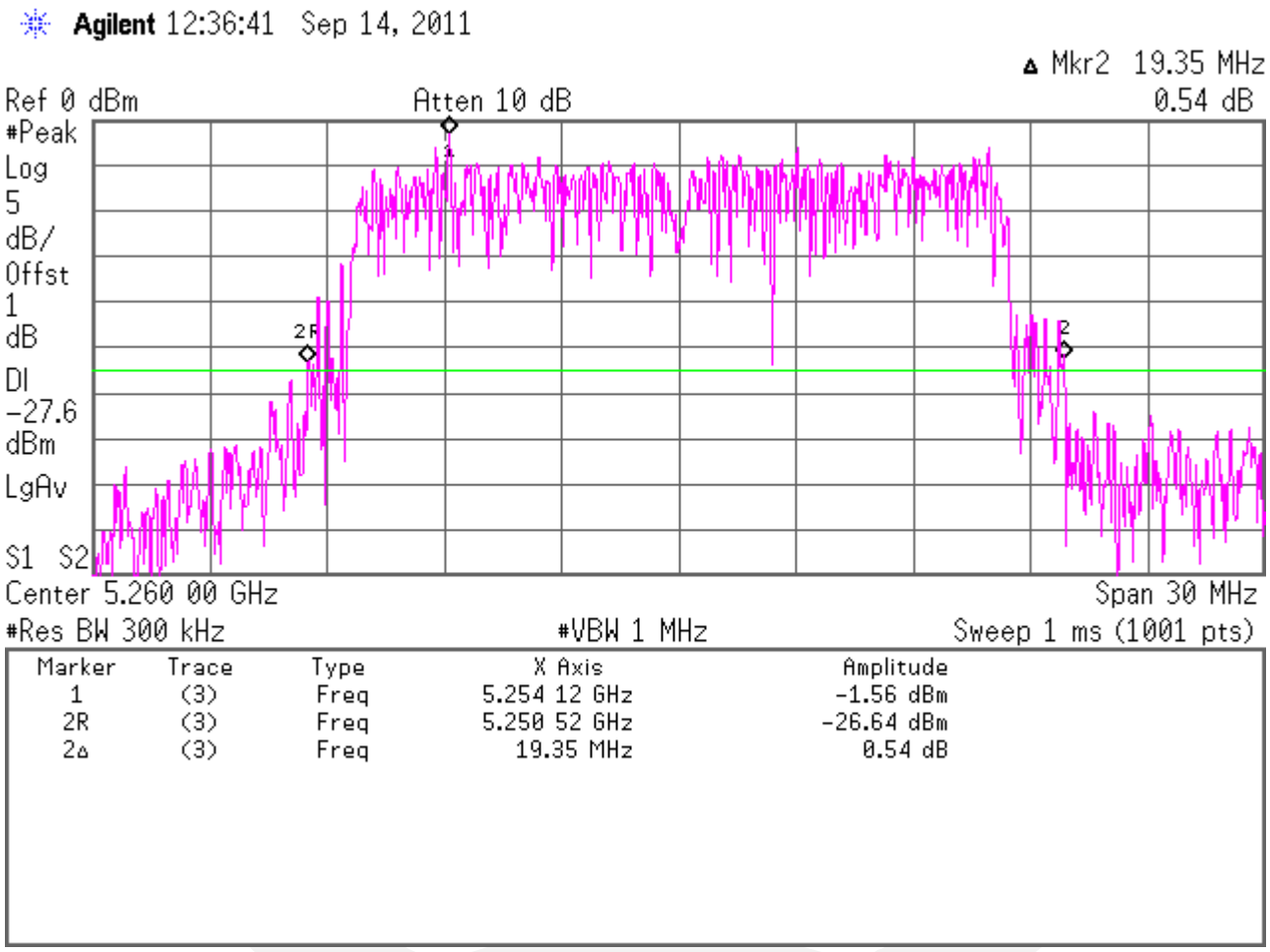
Test data
See following pages

Ch	Freq (GHz)	Emission BW (MHz)		
52	5.26	18.87		6 MB
52	5.26	19.35		12 MB
52	5.26	19.71		54 MB
64	5.32	20.85		6 MB
64	5.32	19.71		12 MB
64	5.32	20.07		54 MB
100	5.5	19.14		6 MB
100	5.5	19.62		12 MB
100	5.5	19.92		54 MB
112	5.56	19.50		6 MB
112	5.56	19.95		12 MB
112	5.56	19.47		54 MB
132	5.66	19.02		6 MB
132	5.66	19.83		12 MB
132	5.66	19.62		54 MB
140	5.7	19.17		6 MB
140	5.7	19.02		12 MB
140	5.7	19.68		54 MB
165	5.825	19.98		6 MB
165	5.825	19.26		12 MB
165	5.825	19.83		54 MB

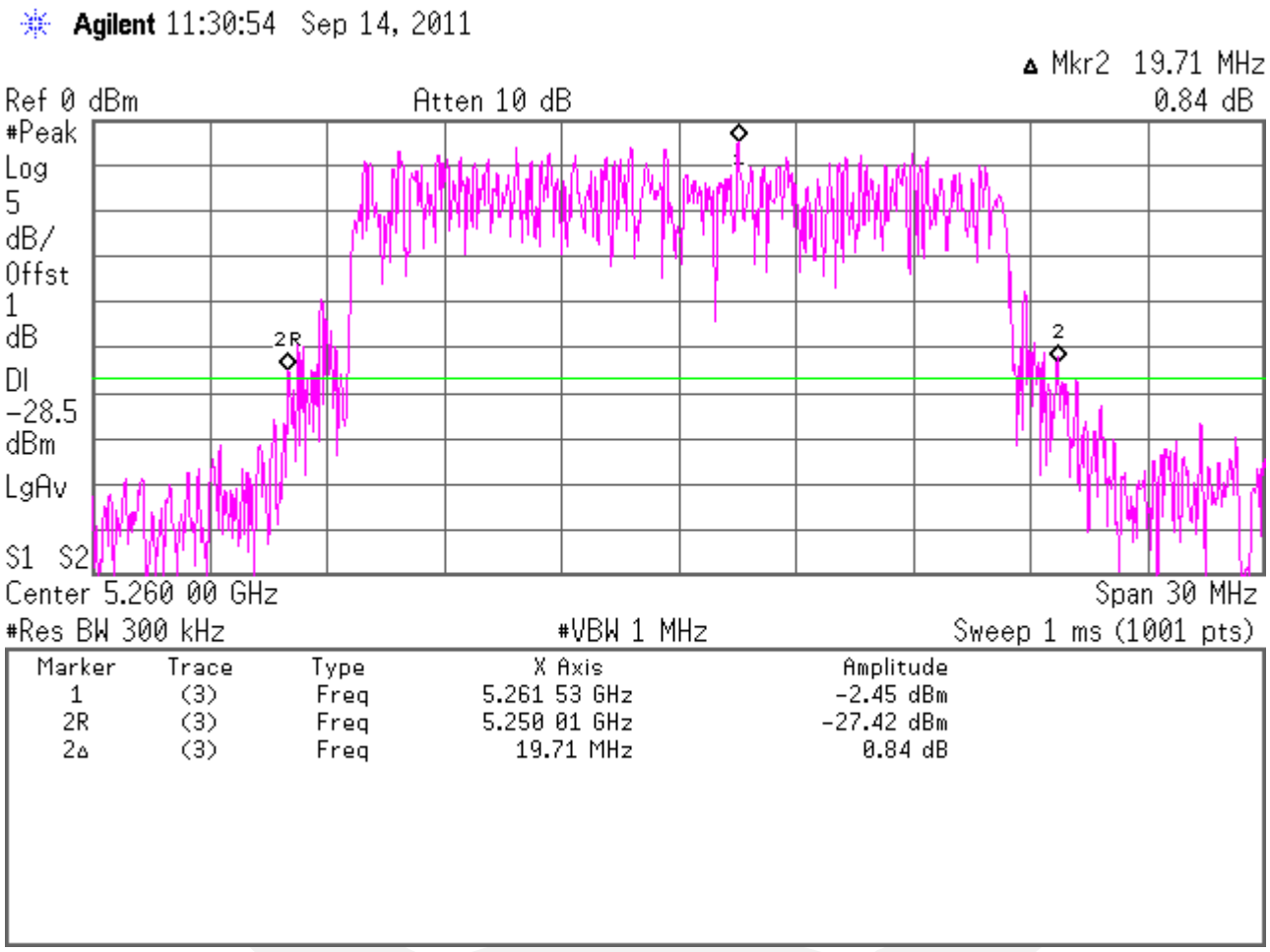
Emission bandwidth
Channel 52, 6 Mbps



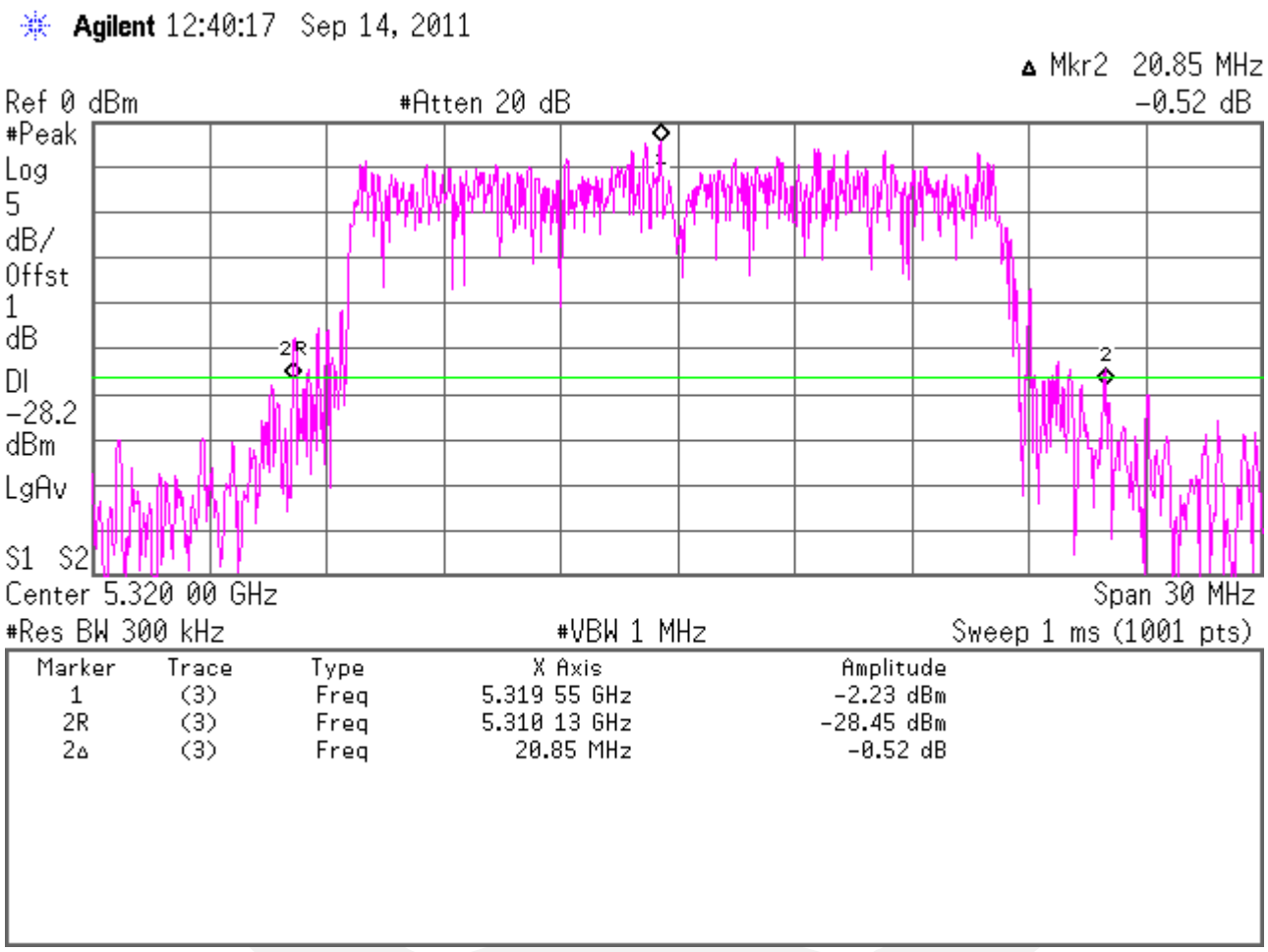
Emission bandwidth
Channel 52, 12 Mbps



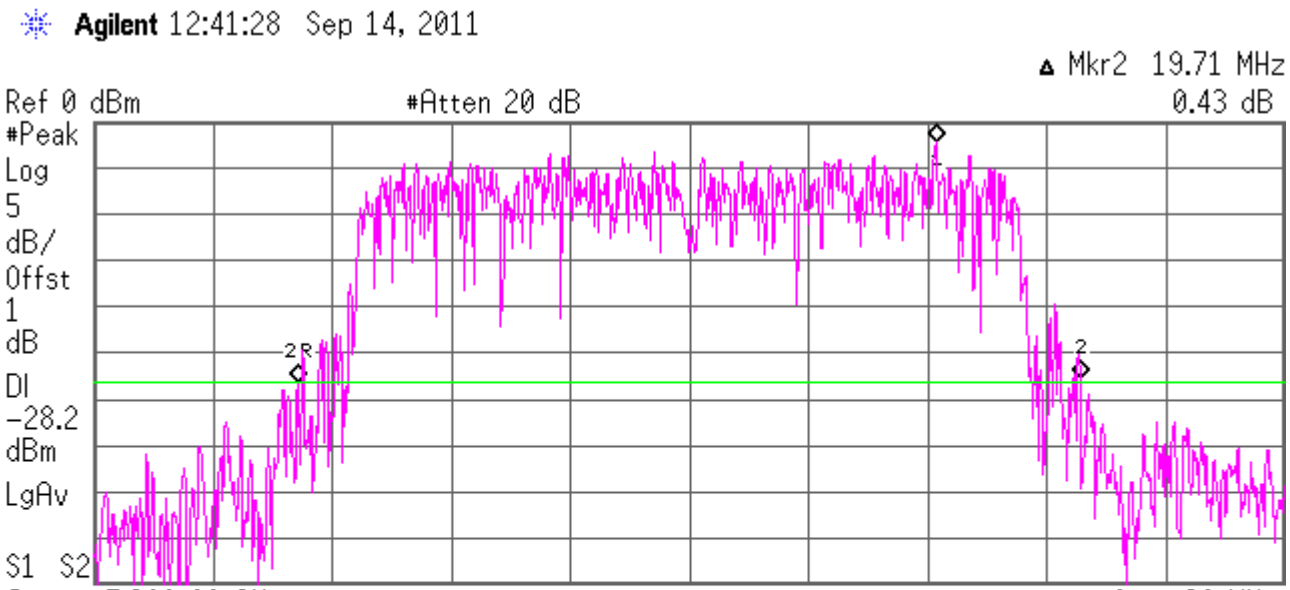
Emission bandwidth
Channel 52, 54 Mbps



Emission bandwidth
Channel 64, 6 Mbps

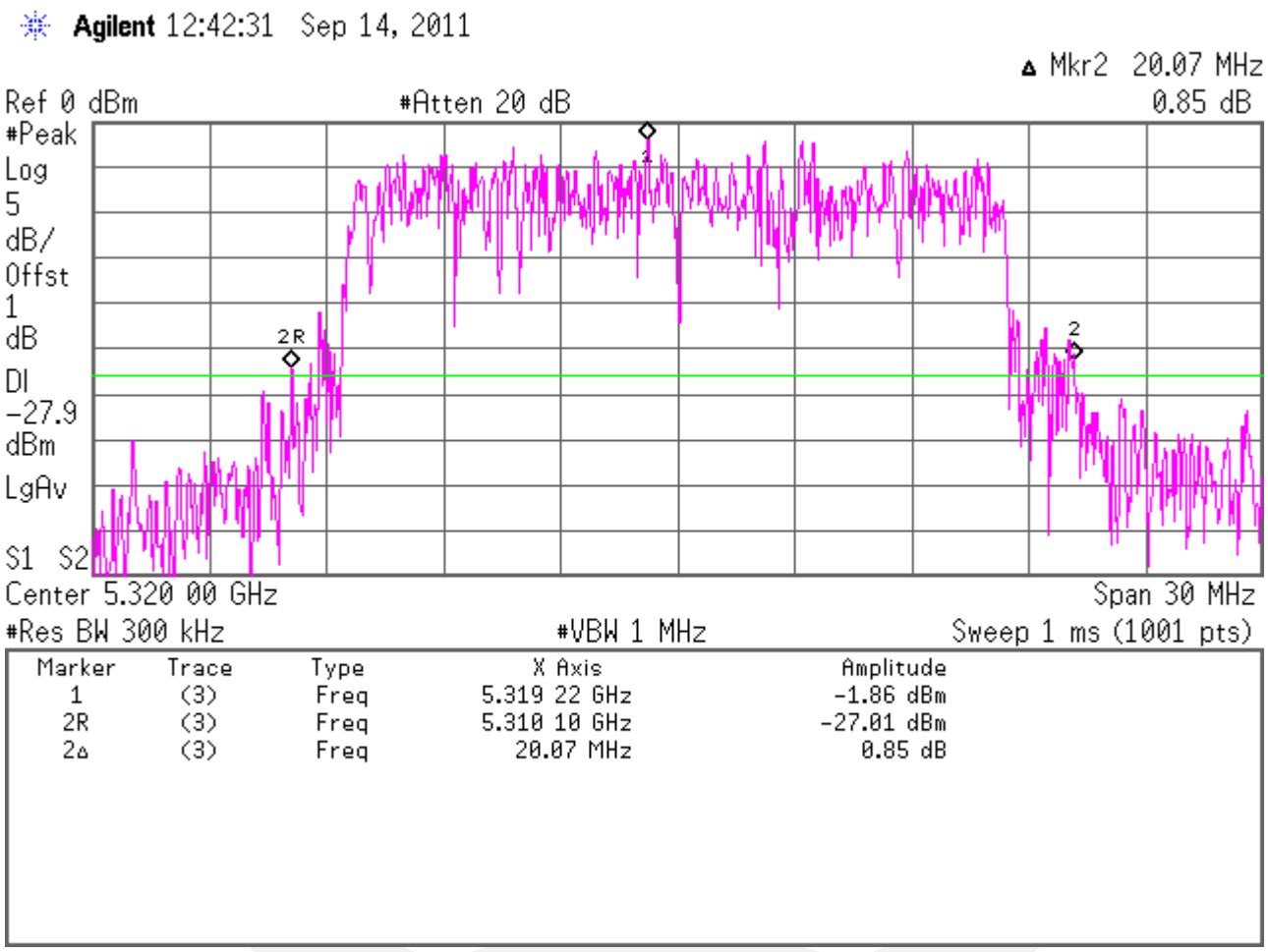


Emission bandwidth
Channel 64, 12 Mbps

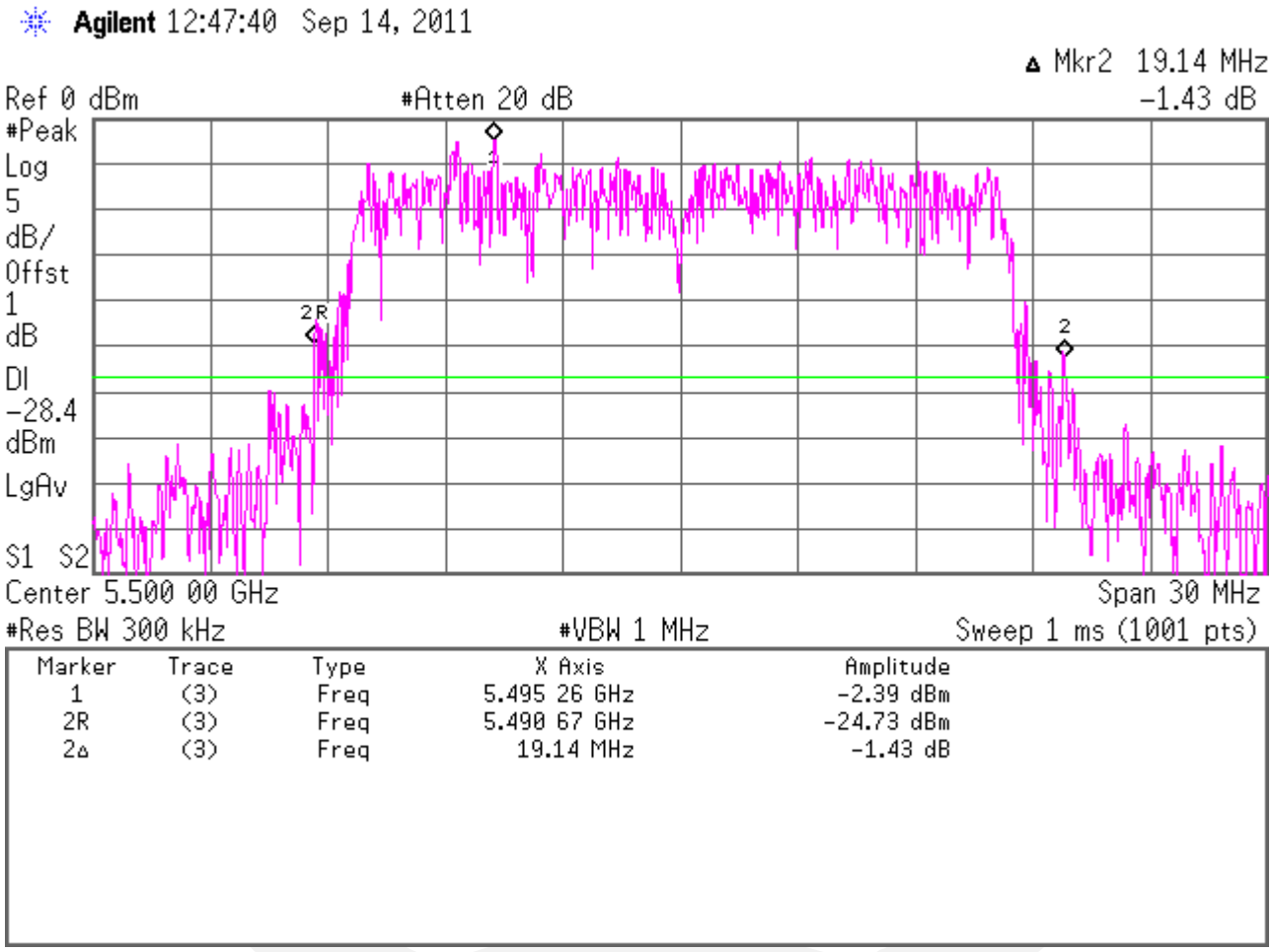


Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	5.326 21 GHz	-2.17 dBm
2R	(3)	Freq	5.310 13 GHz	-28.06 dBm
2Δ	(3)	Freq	19.71 MHz	0.43 dB

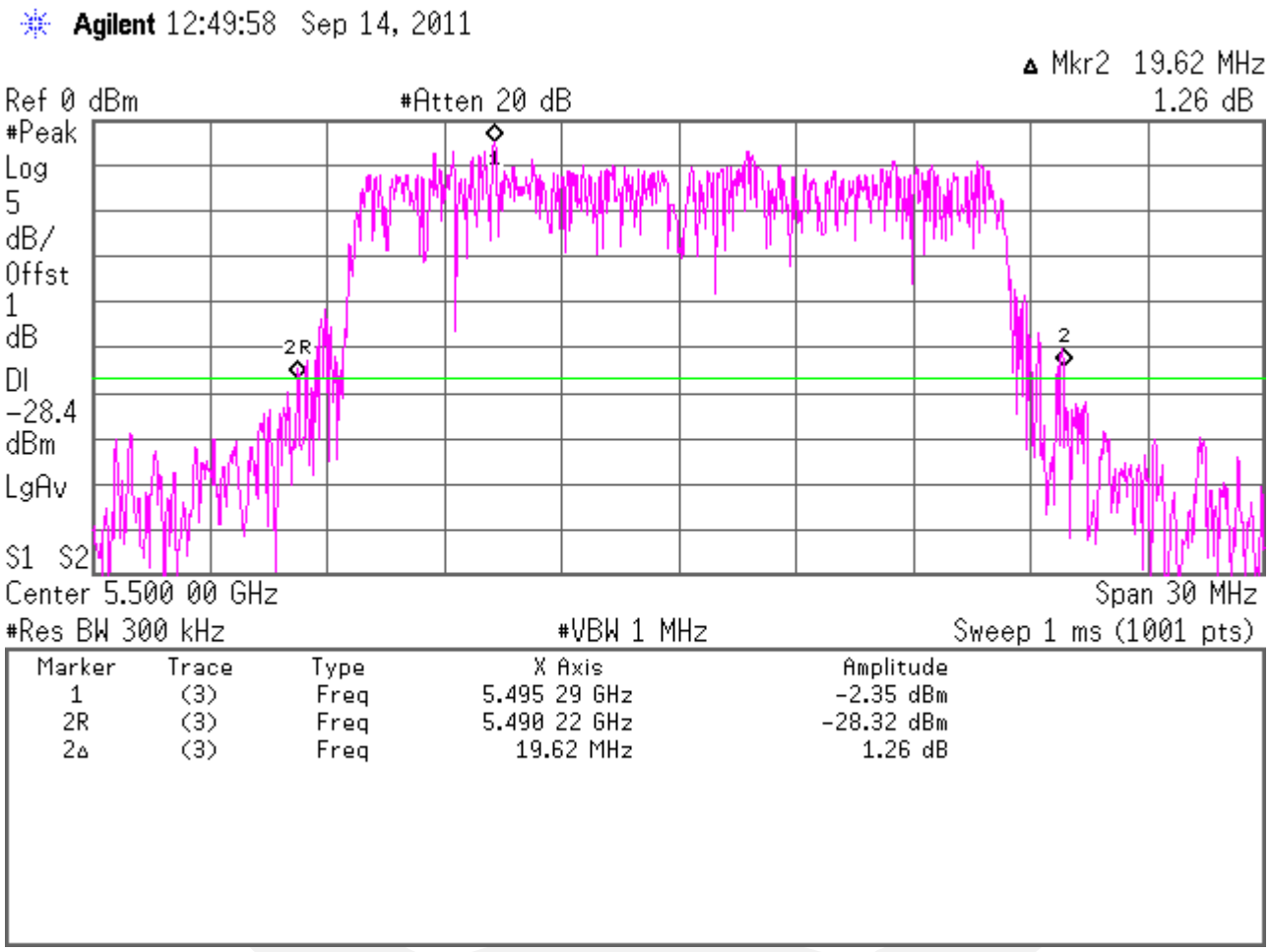
Emission bandwidth
Channel 64, 54 Mbps



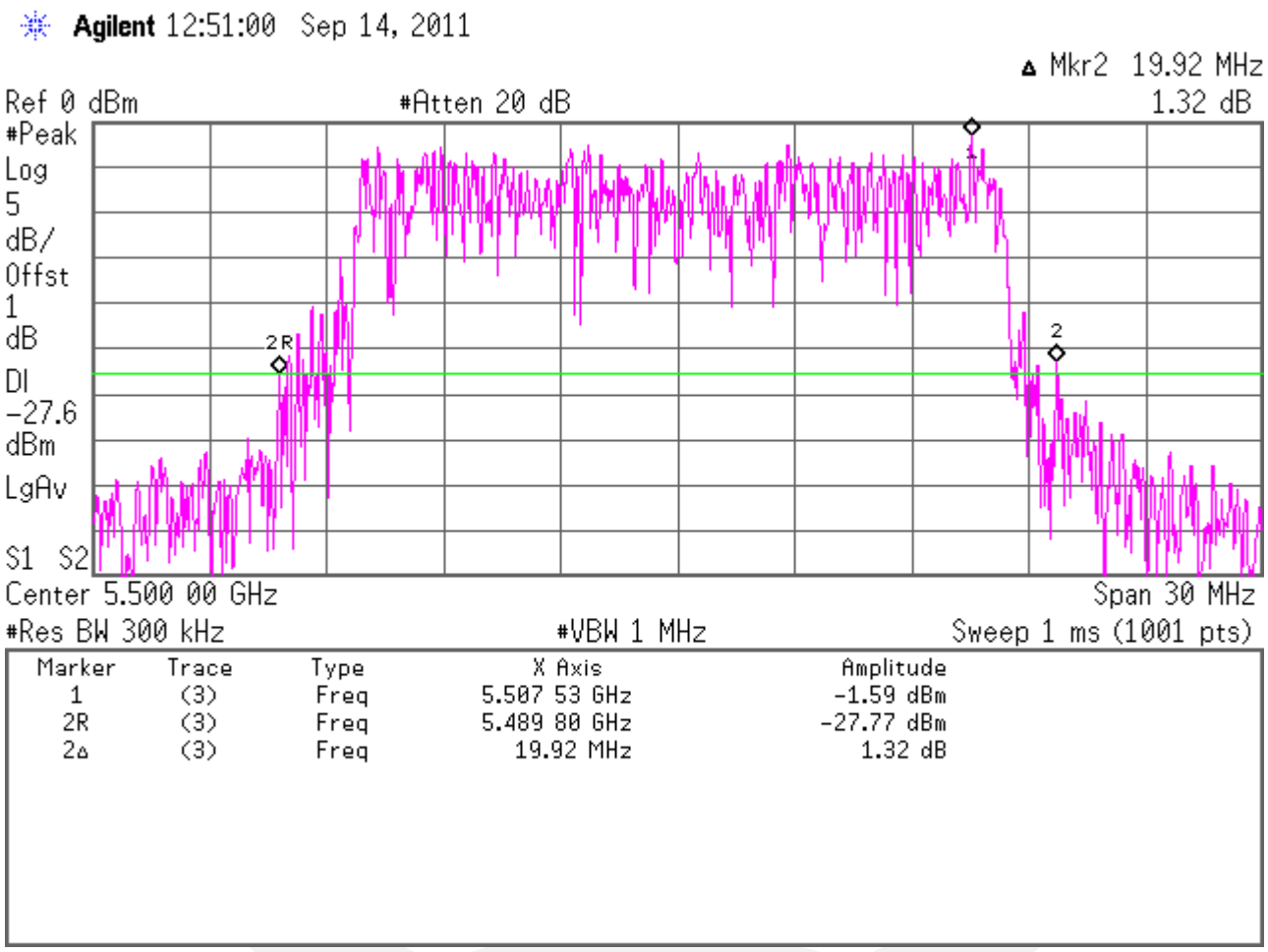
Emission bandwidth
Channel 100, 6 Mbps



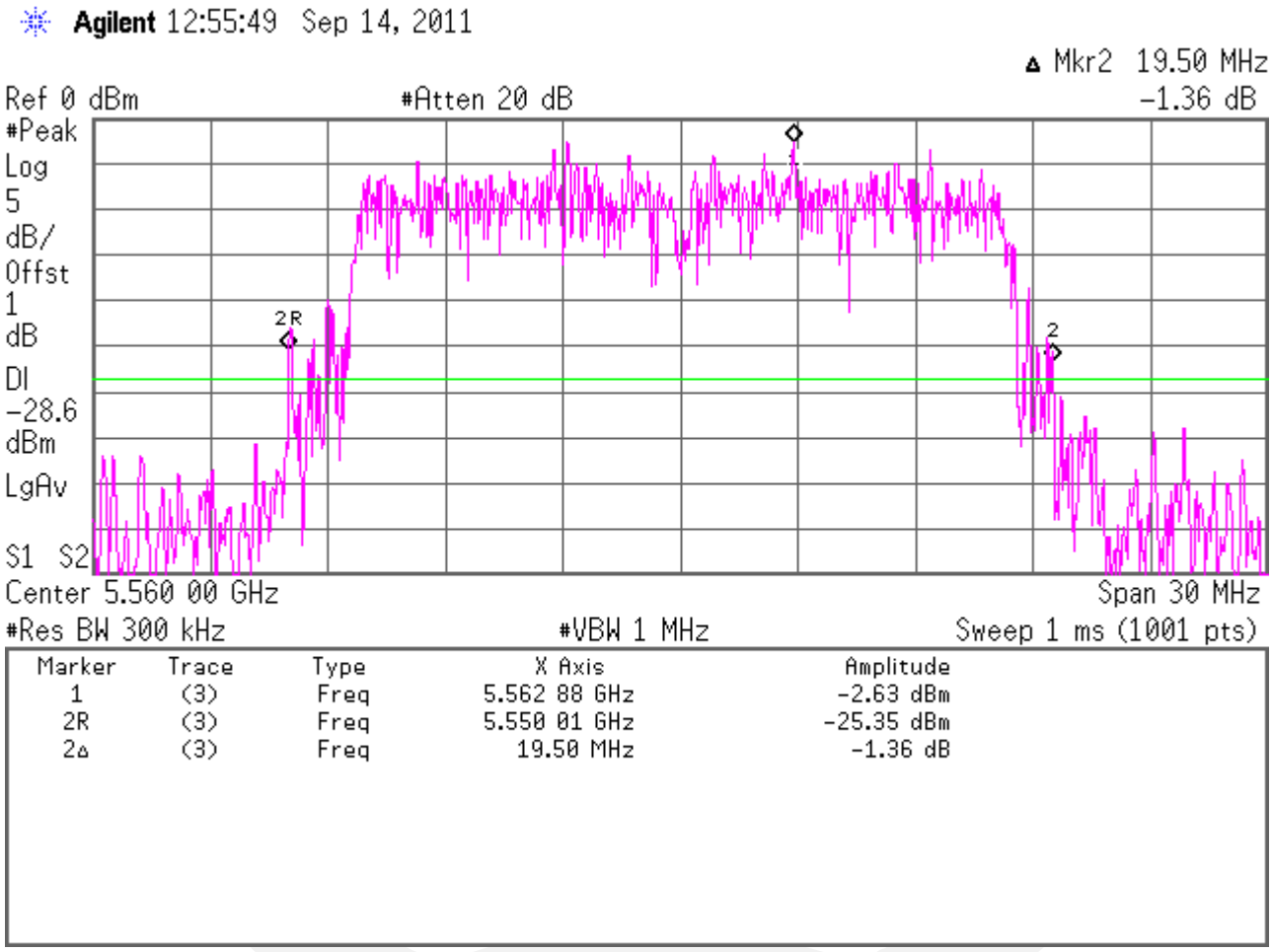
Emission bandwidth
Channel 100, 12 Mbps



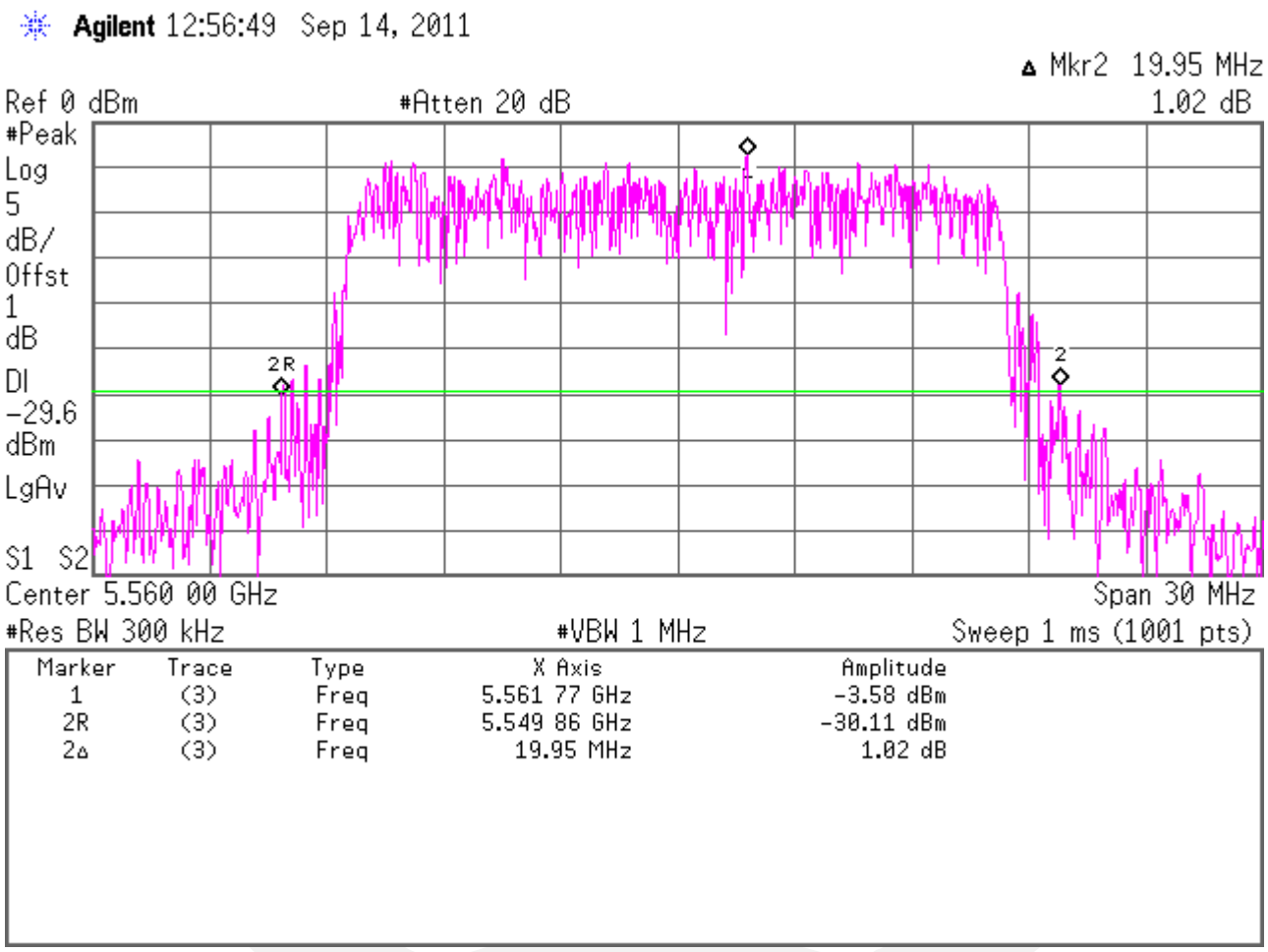
Emission bandwidth
Channel 100, 54 Mbps



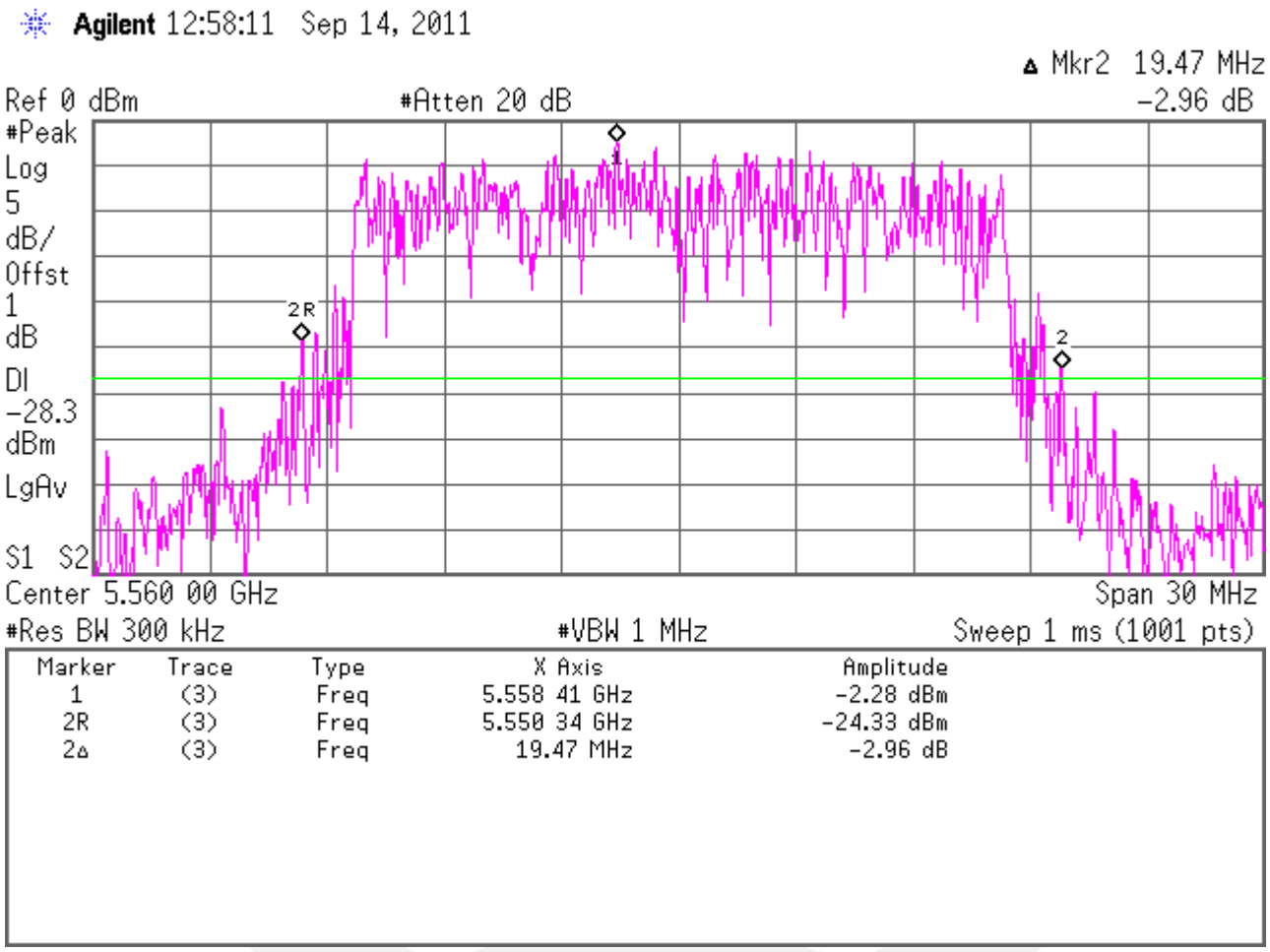
Emission bandwidth
Channel 112, 6 Mbps



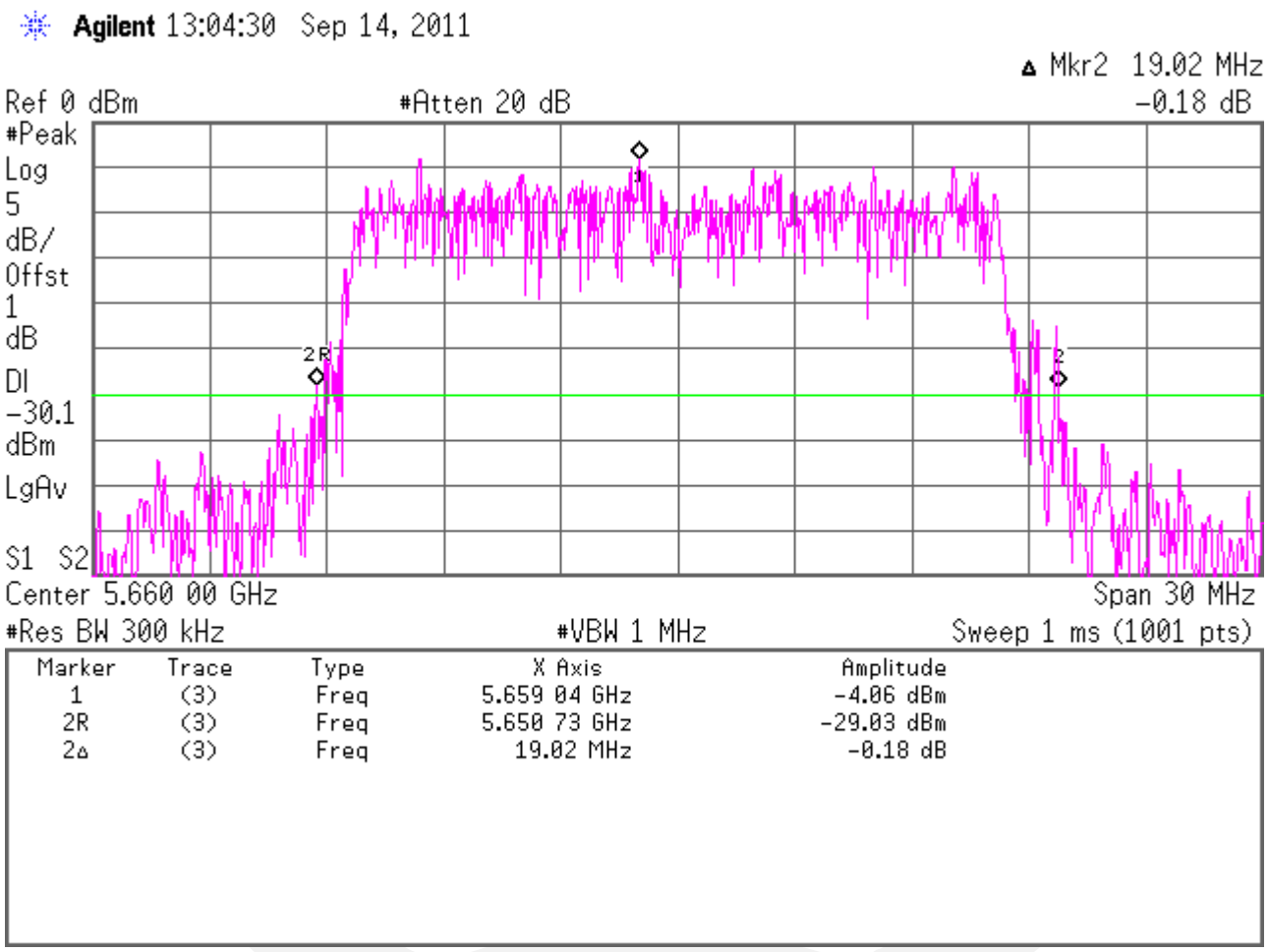
Emission bandwidth
Channel 112, 12 Mbps



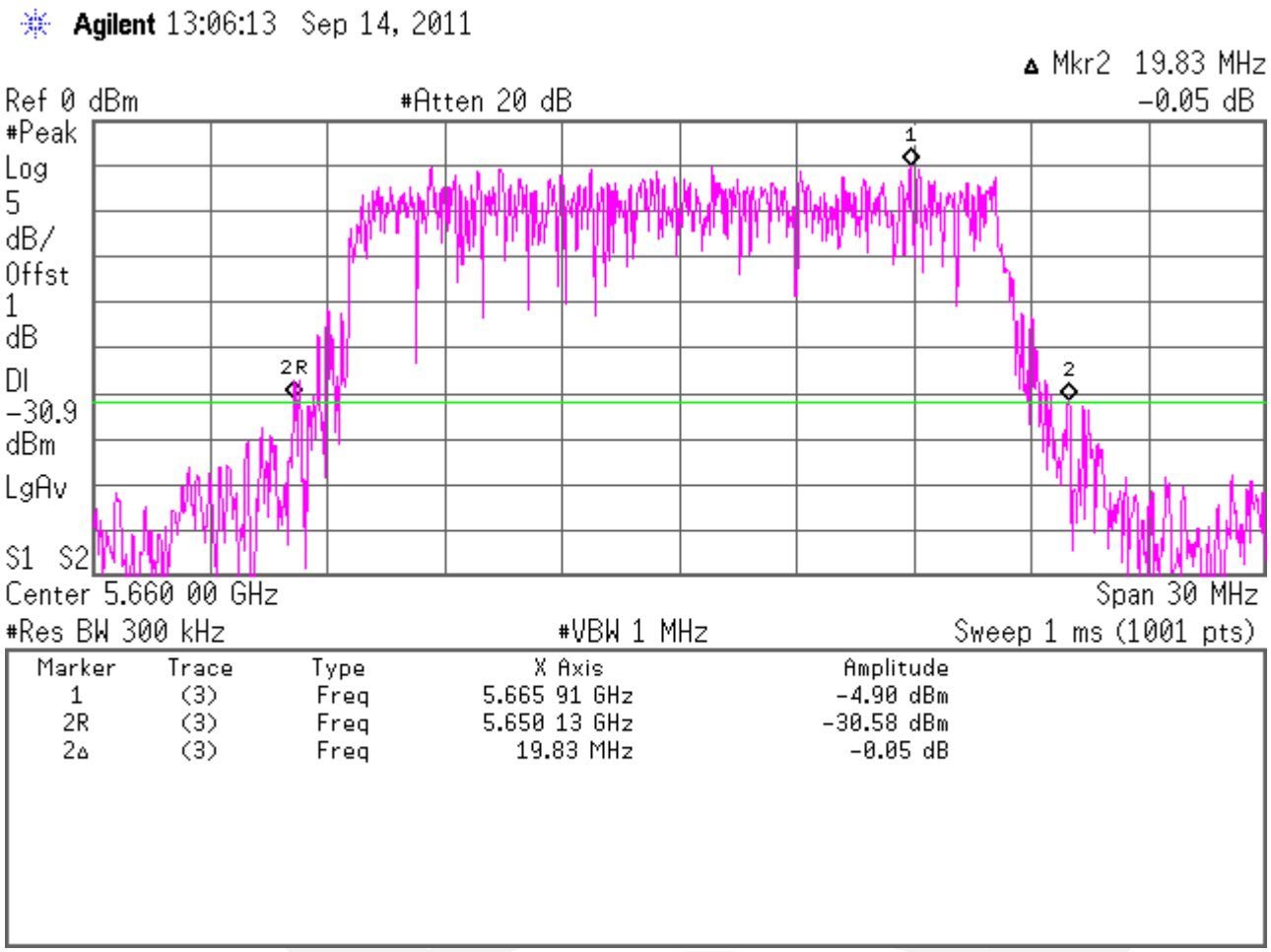
Emission bandwidth
Channel 112, 54 Mbps



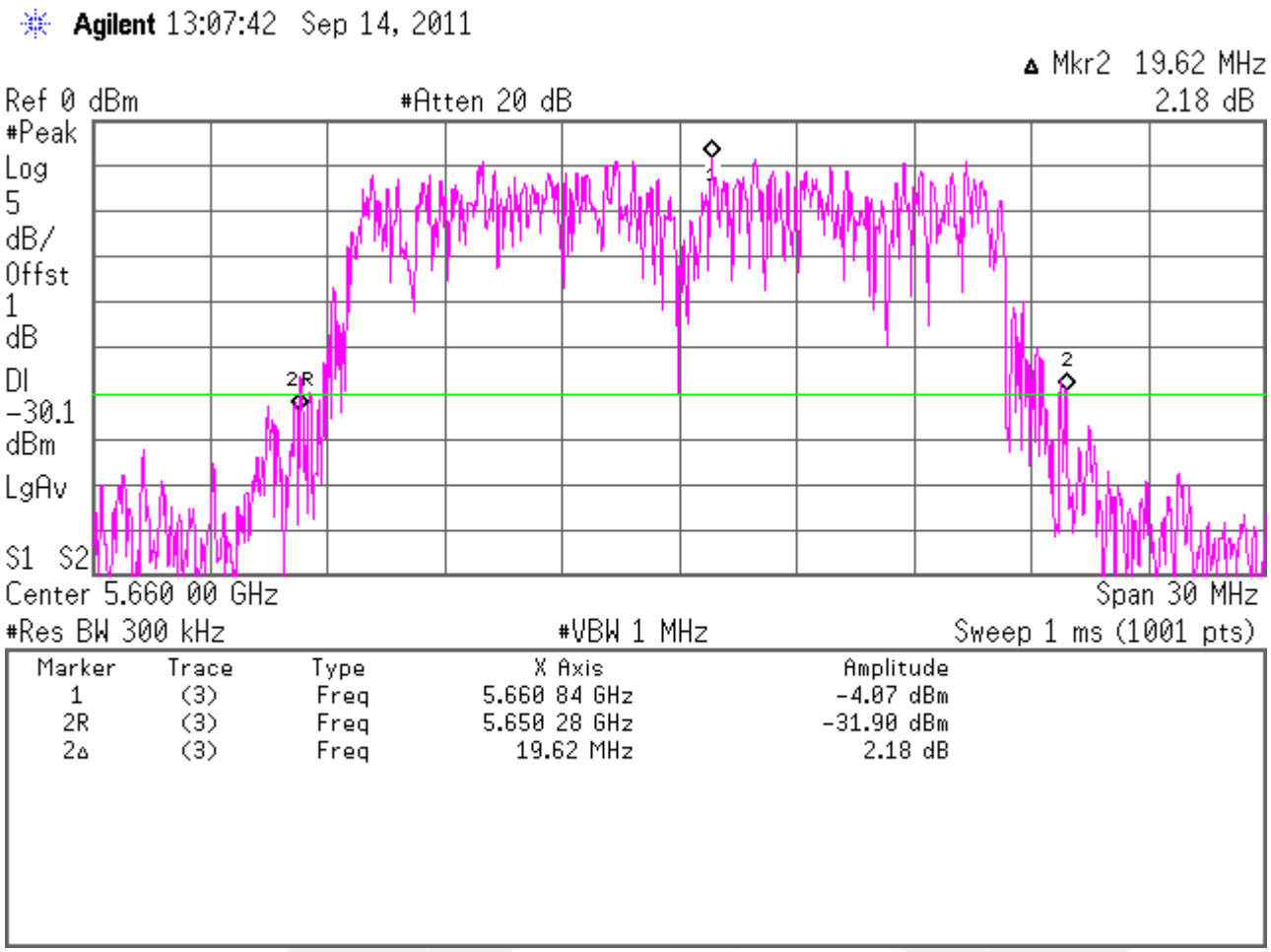
Emission bandwidth
Channel 132, 6 Mbps



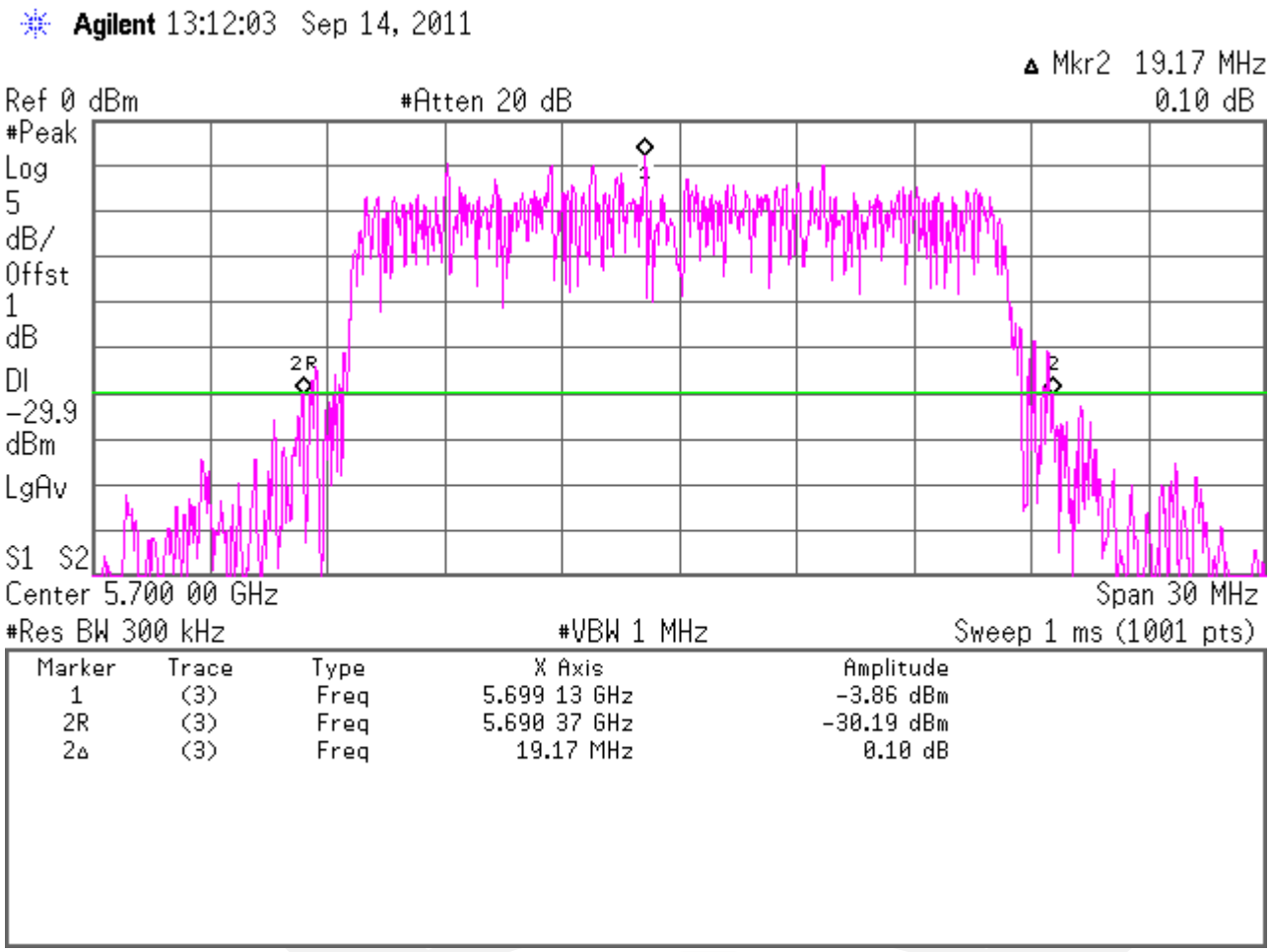
Emission bandwidth
Channel 132, 12 Mbps



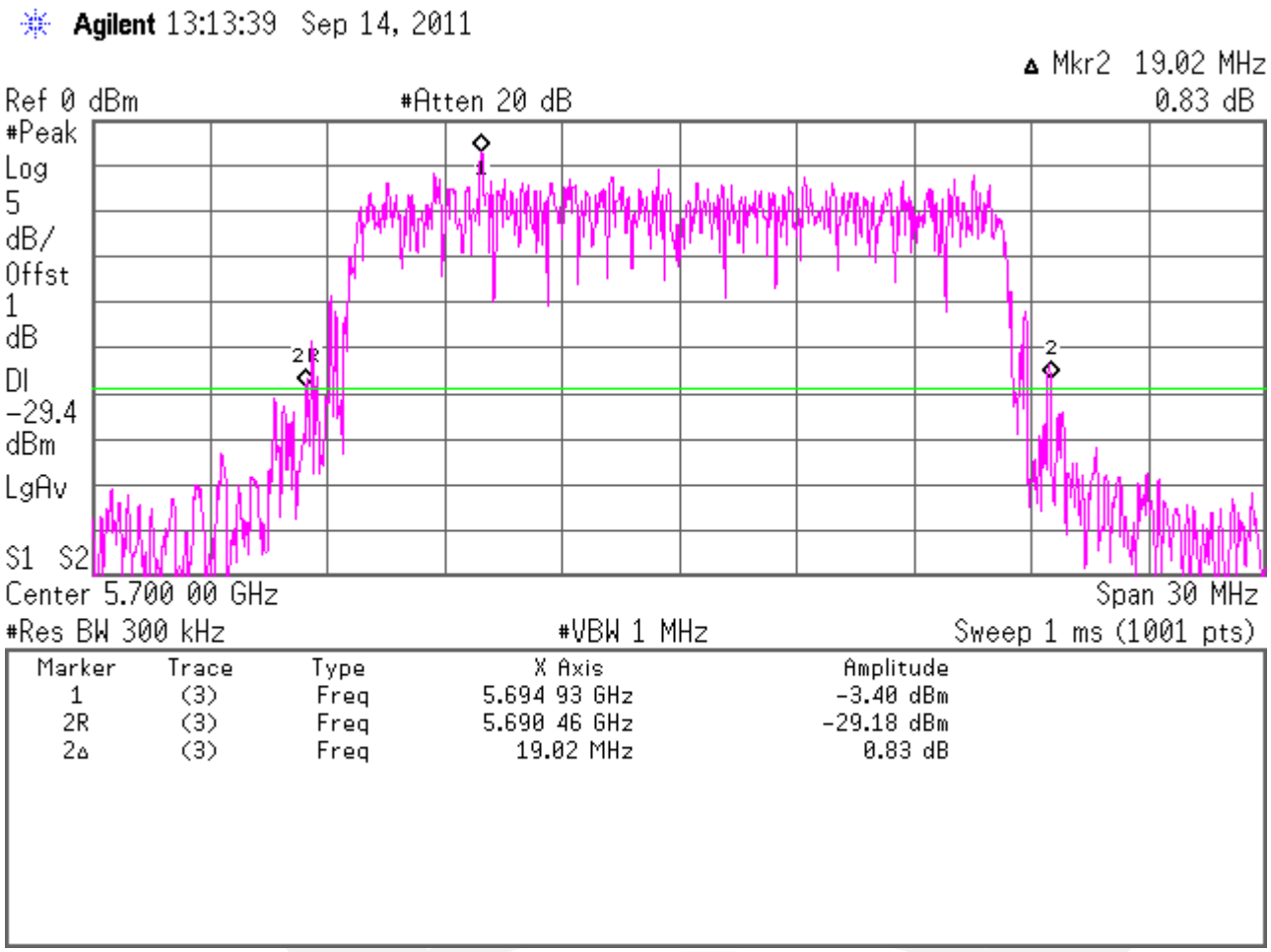
Emission bandwidth
Channel 132, 54 Mbps



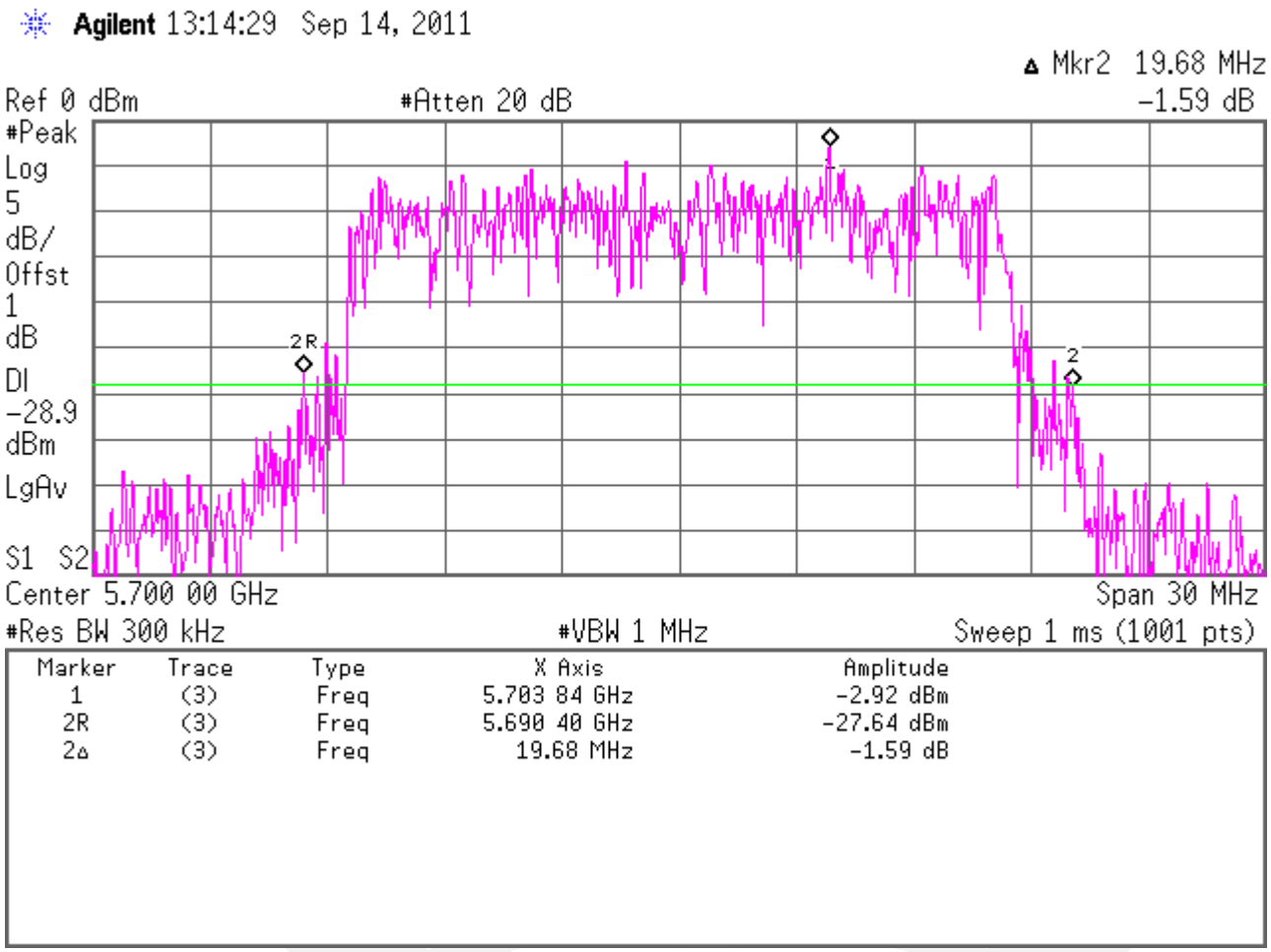
Emission bandwidth
Channel 140, 6 Mbps



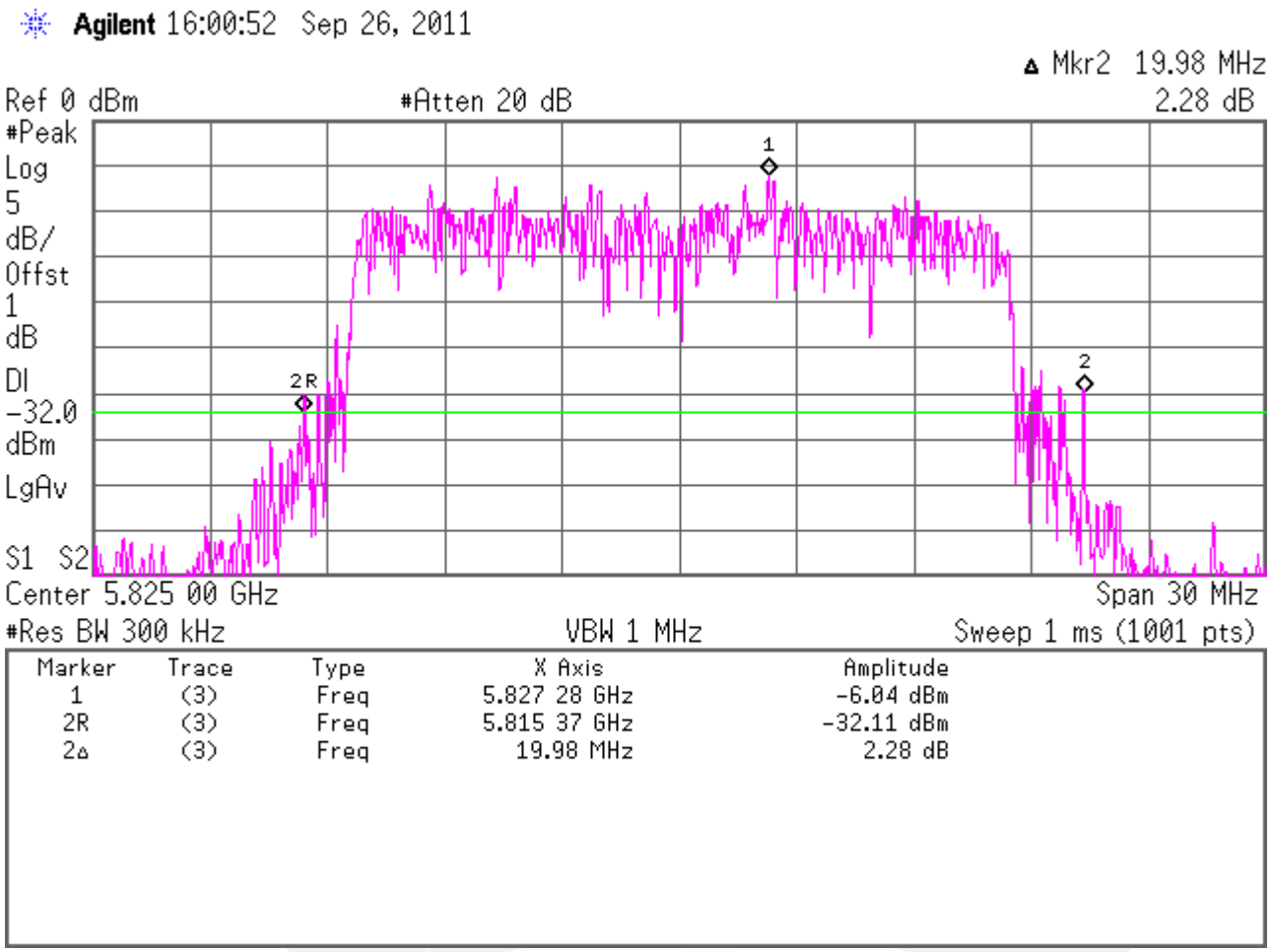
Emission bandwidth
Channel 140, 12 Mbps



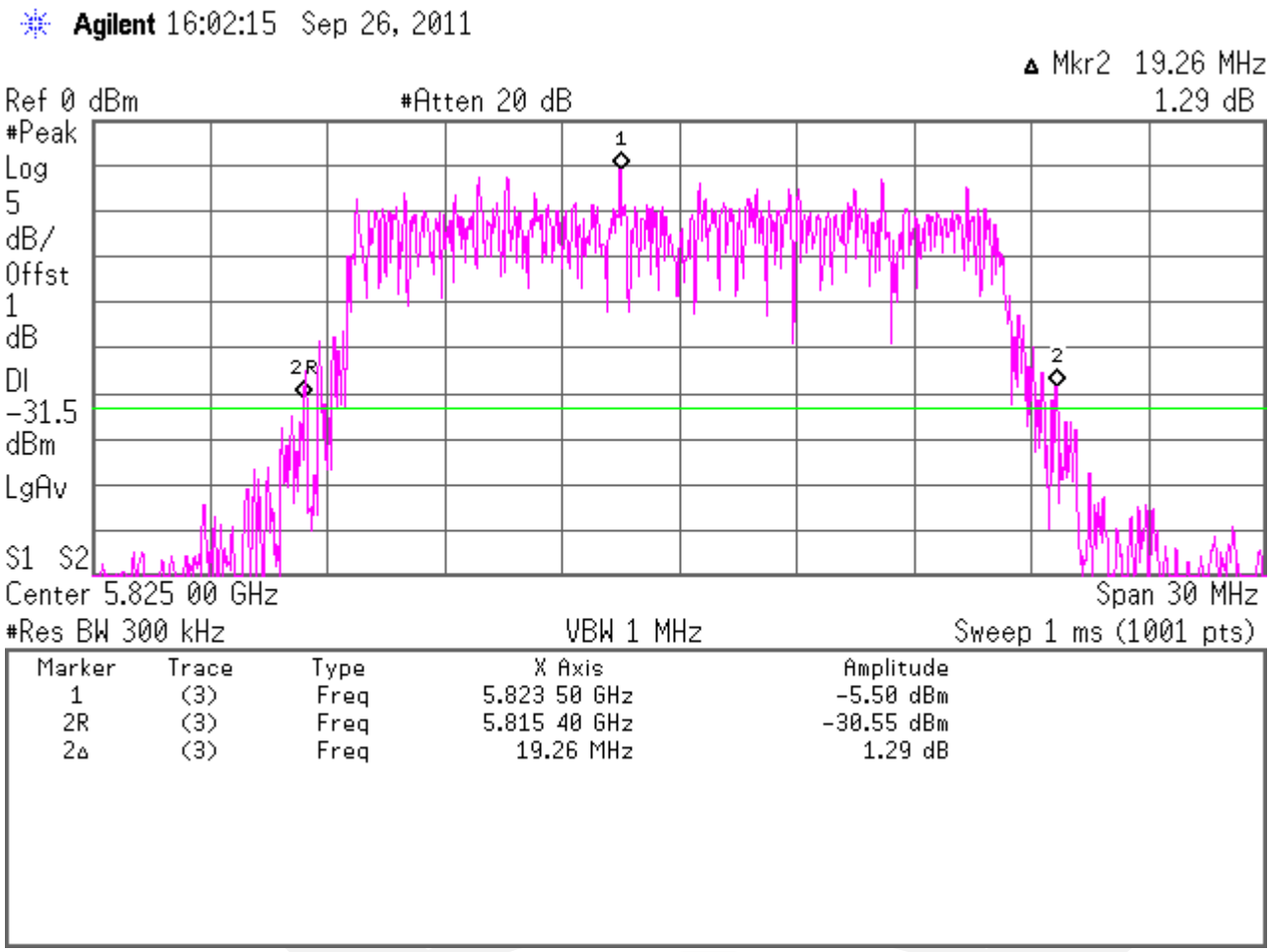
Emission bandwidth
Channel 140, 54 Mbps



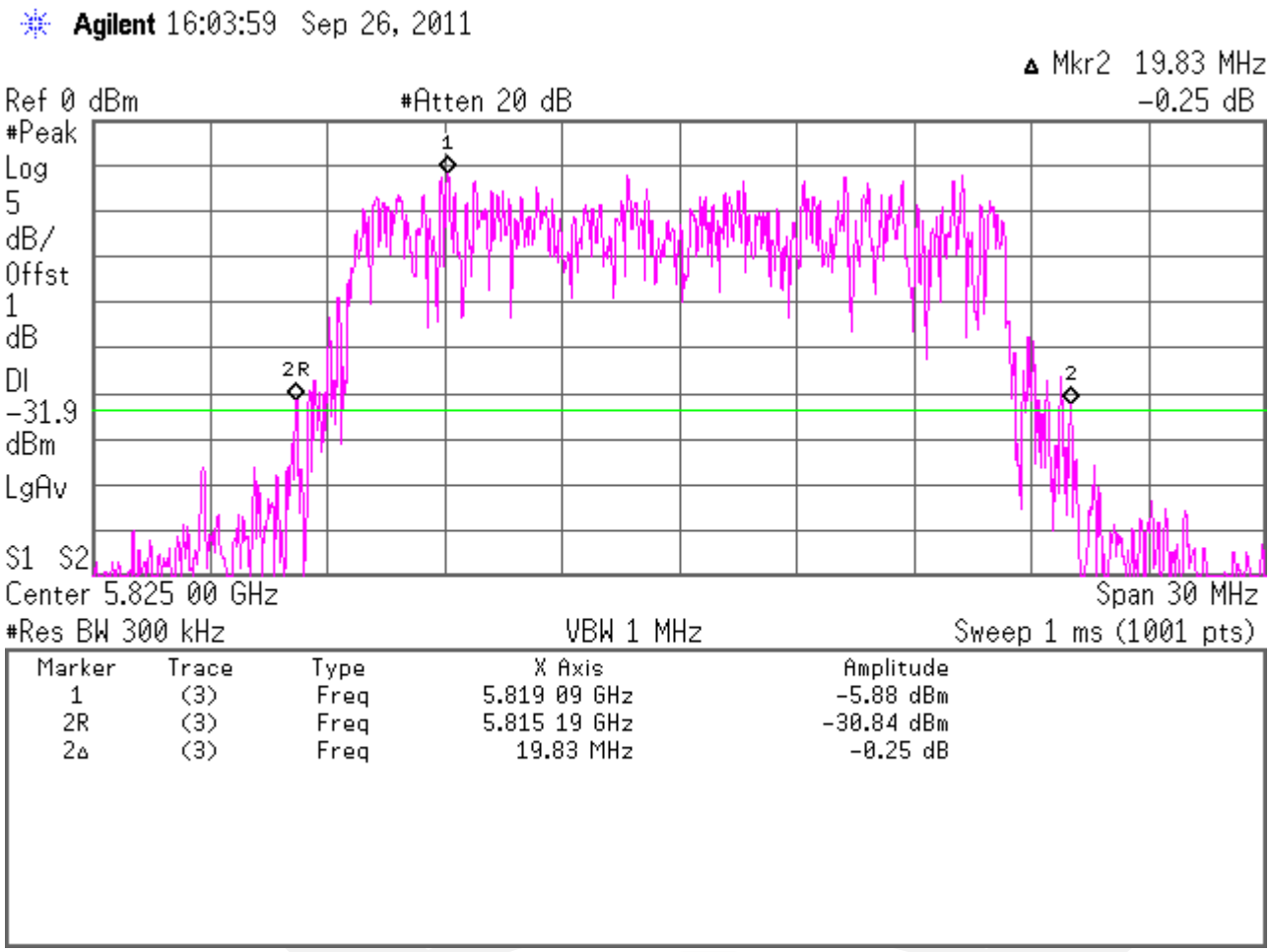
Emission bandwidth
Channel 165, 6 Mbps



Emission bandwidth
Channel 165, 12 Mbps



Emission bandwidth
Channel 165, 54 Mbps



Conducted Limits – AC power lines
FCC 15.407(b)(6)

Test summary
The requirements are: ☐ - MET ■ - NOT APPLICABLE
Testing was performed in accordance with the test procedure of ANSI C63.4-2003 7.2.1

Test location
☐ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Wild River Lab Shield Room 2

Test limit

Frequency (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

*Decreases with the logarithm of the frequency

Test data
The testing was performed during the original certification of this product. This testing is for permissive change to add frequencies to existing grant – retesting this parameter not necessary.

99% Emission bandwidth
IC RSS-Gen 4.6.1

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Test was performed in accordance with the article “The Measurement of Occupied Bandwidth” by Industry Canada’s certification bureau
The 99% emission bandwidth ranges between 16.30 MHz and 16.35 MHz

Test location
☐ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
■ - Wild River Lab Tech Area, conducted measurement

Test equipment

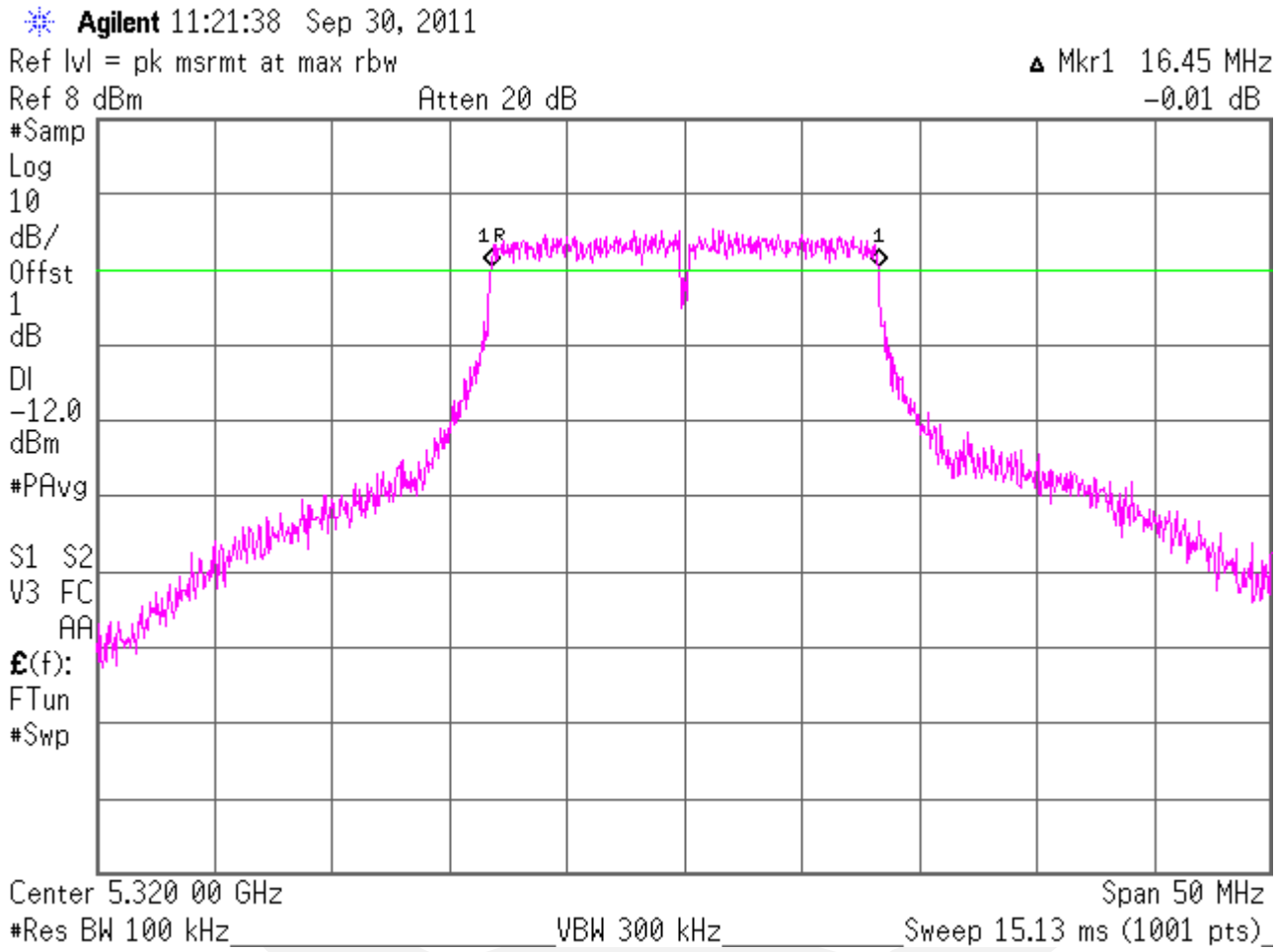
TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE10435	E4440A	Agilent	Spectrum Analyzer	MY44304483	01-Apr-12

Test limit
undefined

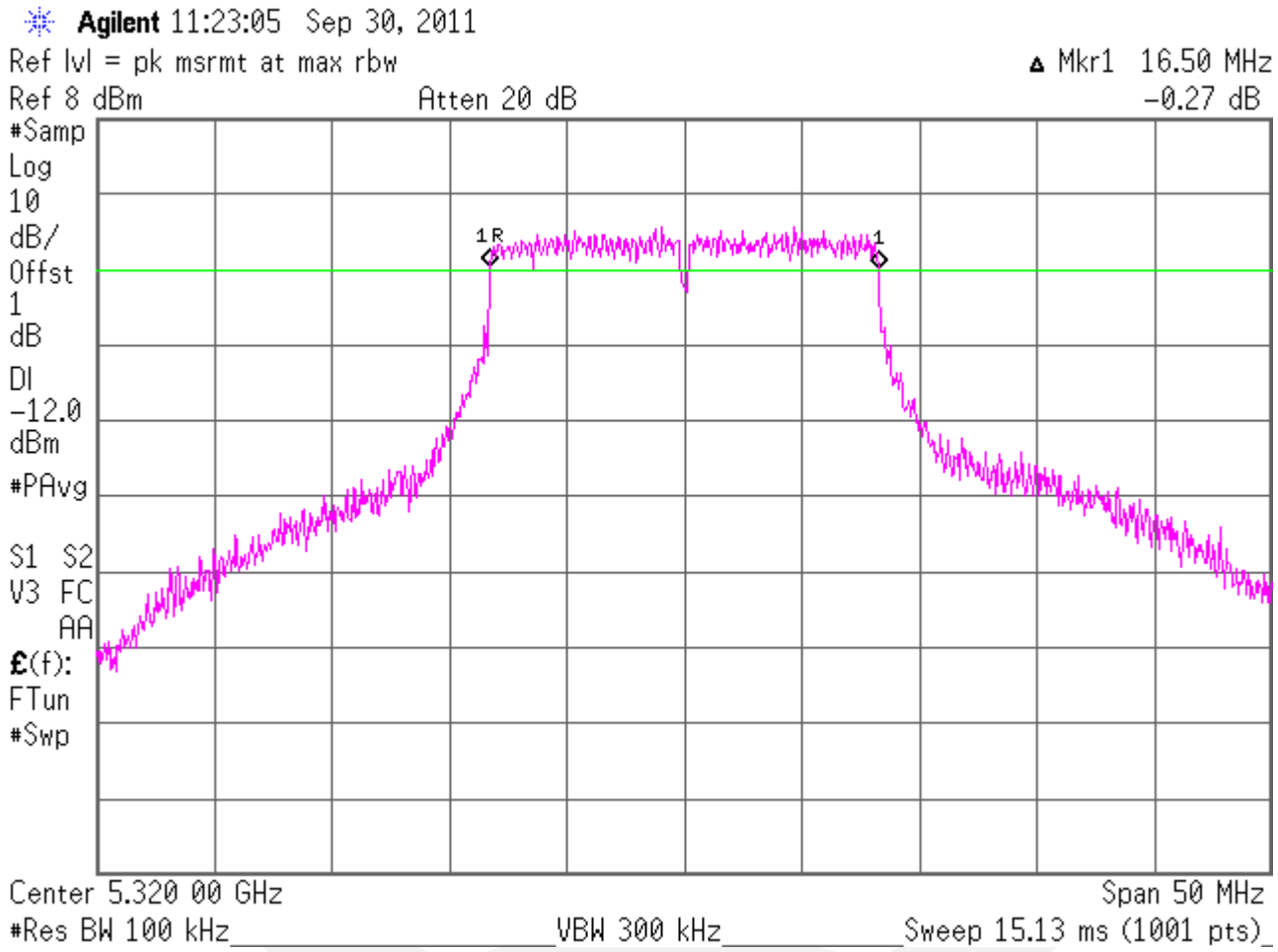
Test data
See following page

Ch	Freq (GHz)	99% BW (MHz)		
64	5.32	16.45		6 MB
64	5.32	16.50		12 MB
64	5.32	16.55		54 MB
140	5.7	16.45		6 MB
140	5.7	16.50		12 MB
140	5.7	16.50		54 MB
165	5.825	16.45		6 MB
165	5.825	16.50		12 MB
165	5.825	16.50		54 MB

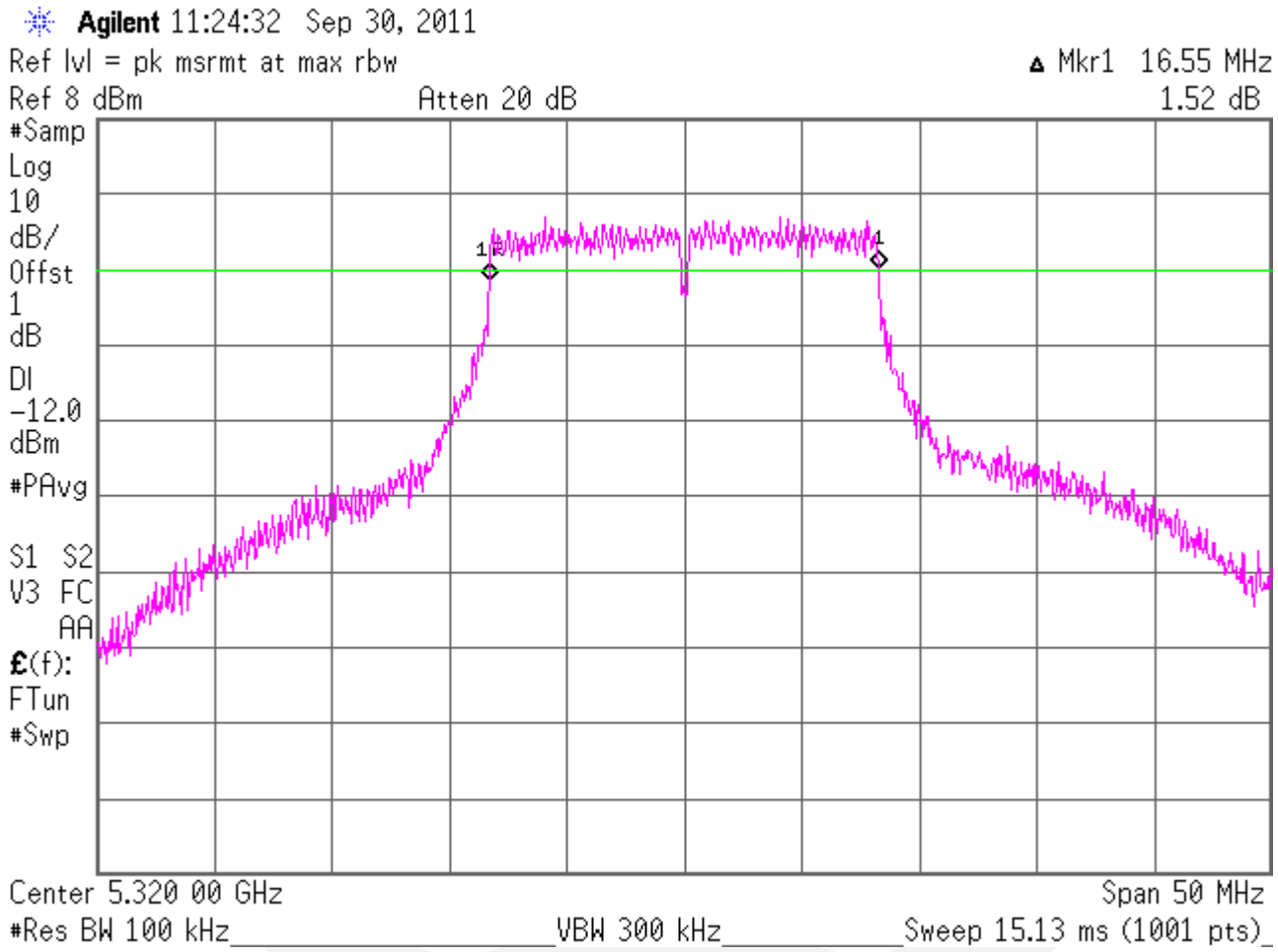
99% emission bandwidth
Channel 64, 6 Mb/s



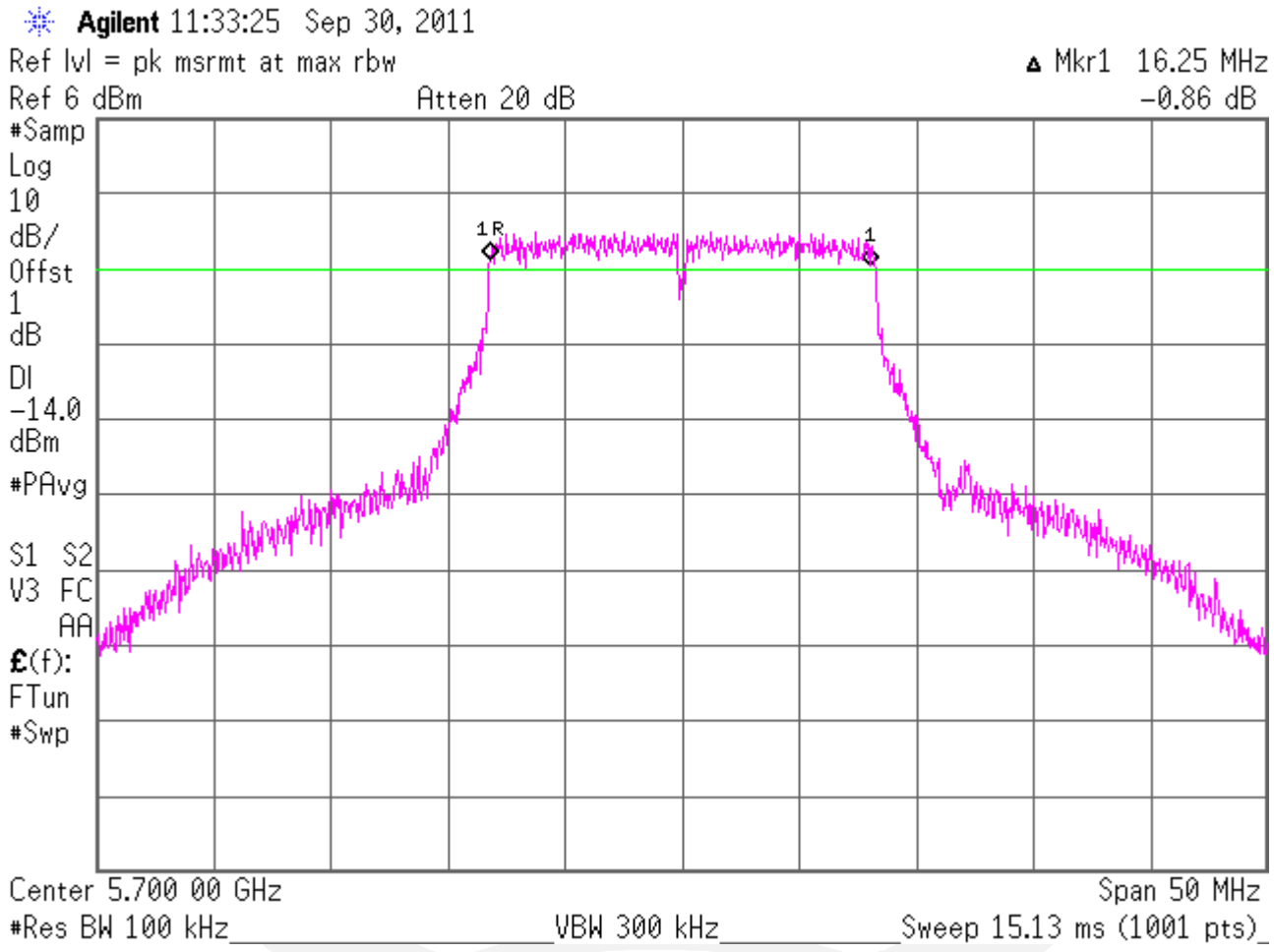
99% emission bandwidth
Channel 64, 12 Mb/s



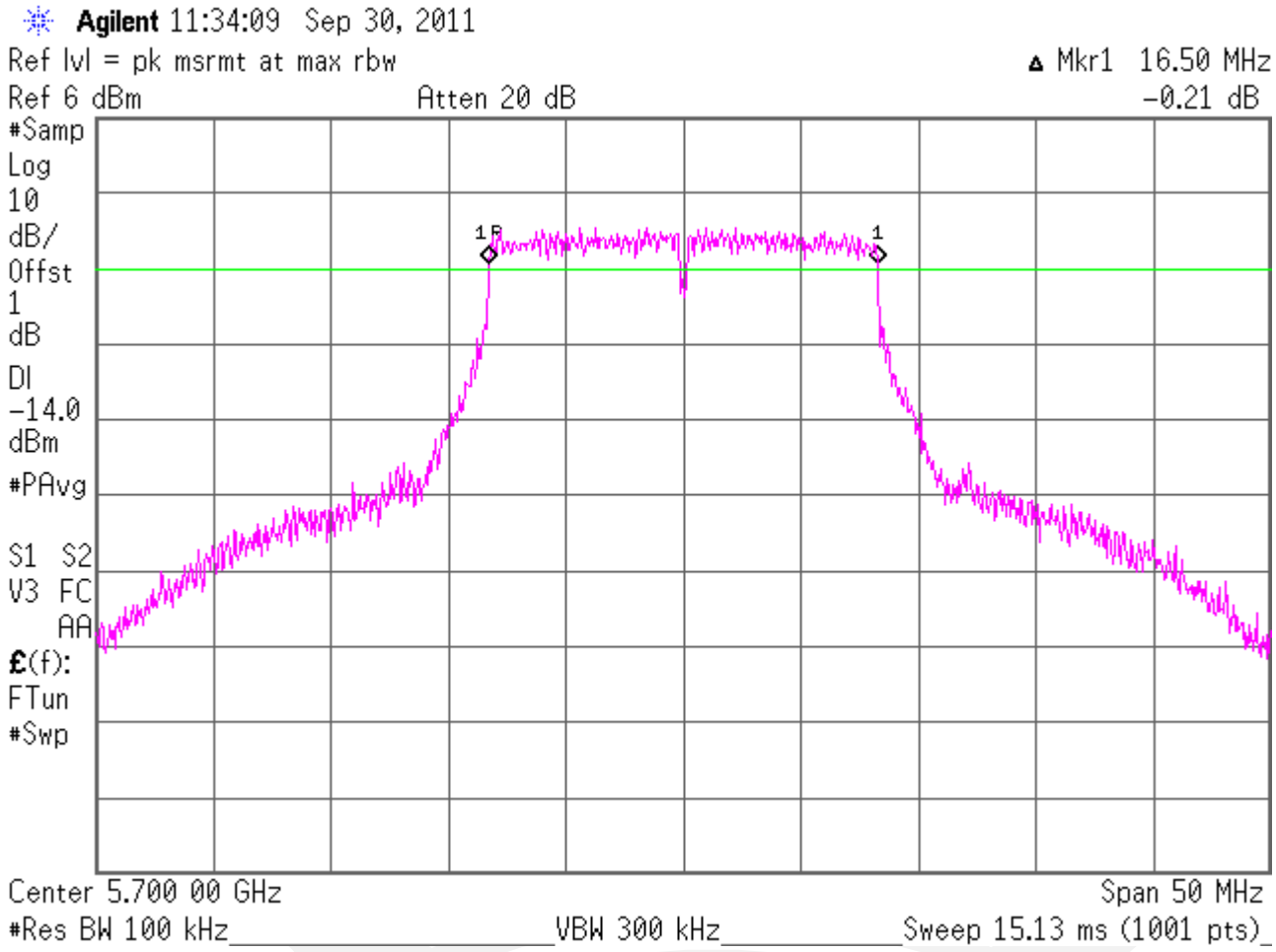
99% emission bandwidth
Channel 64, 54 Mb/s



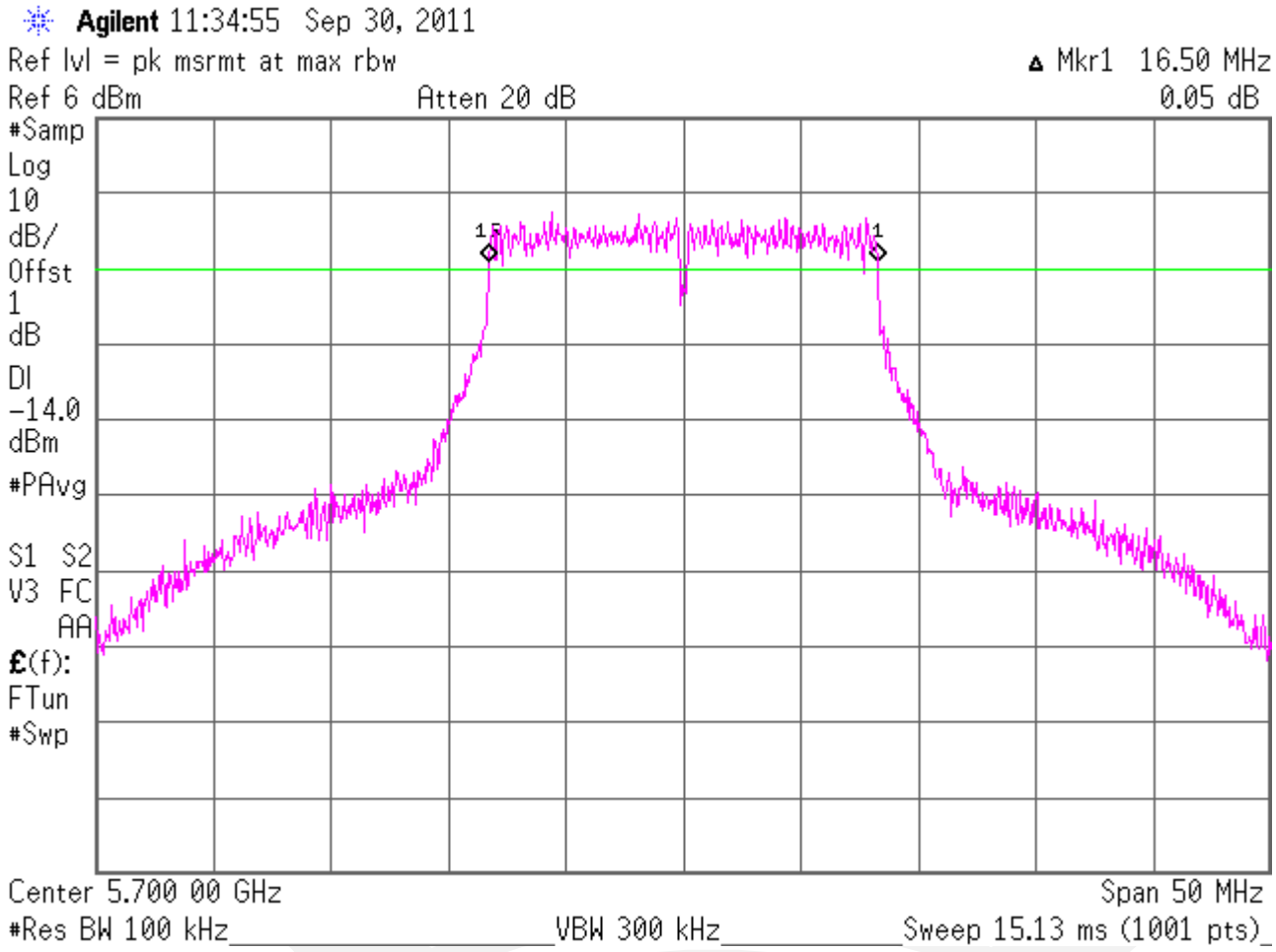
99% emission bandwidth
Channel 140, 6 Mb/s



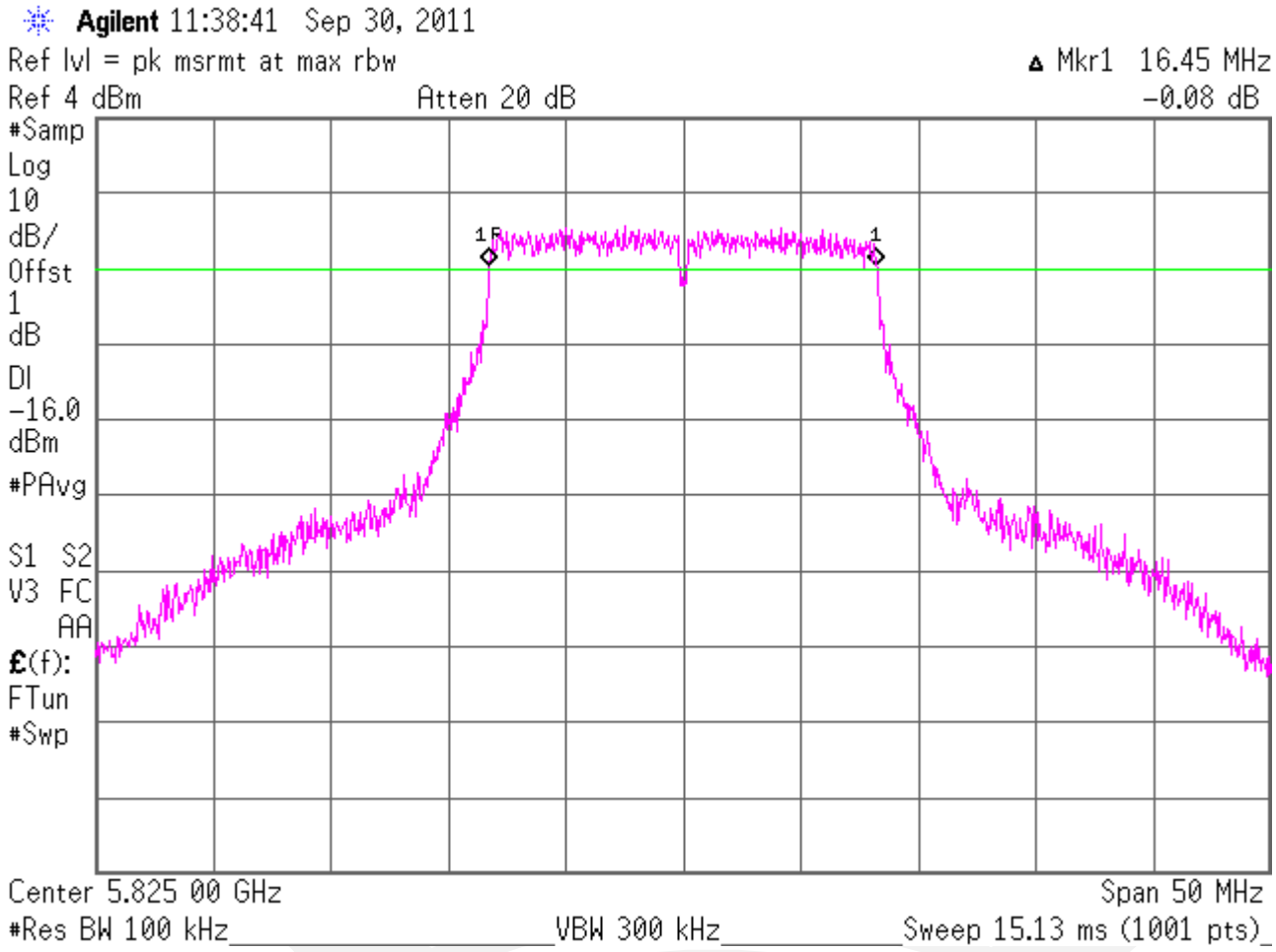
99% emission bandwidth
Channel 140, 12 Mb/s



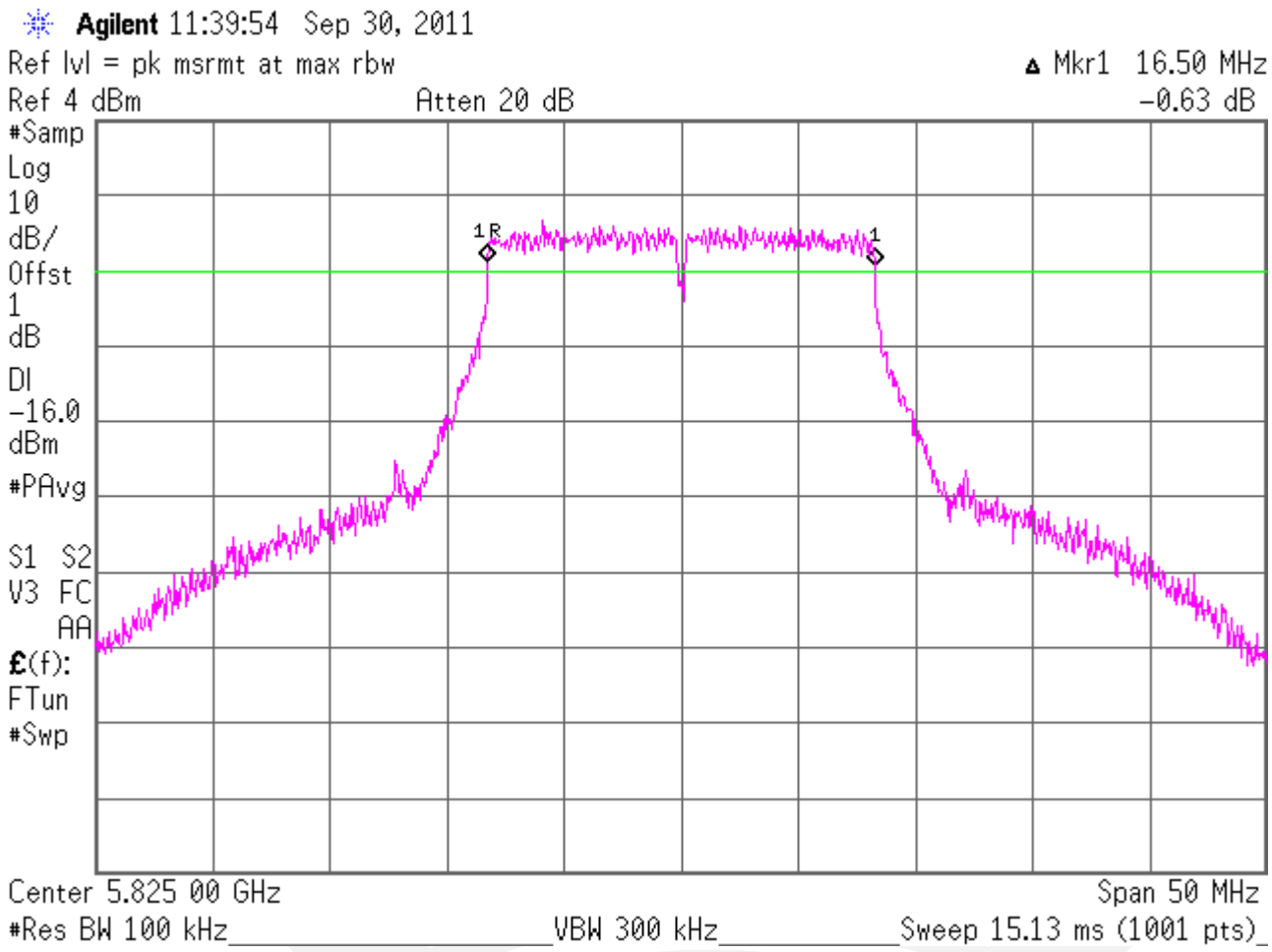
99% emission bandwidth
Channel 140, 54 Mb/s



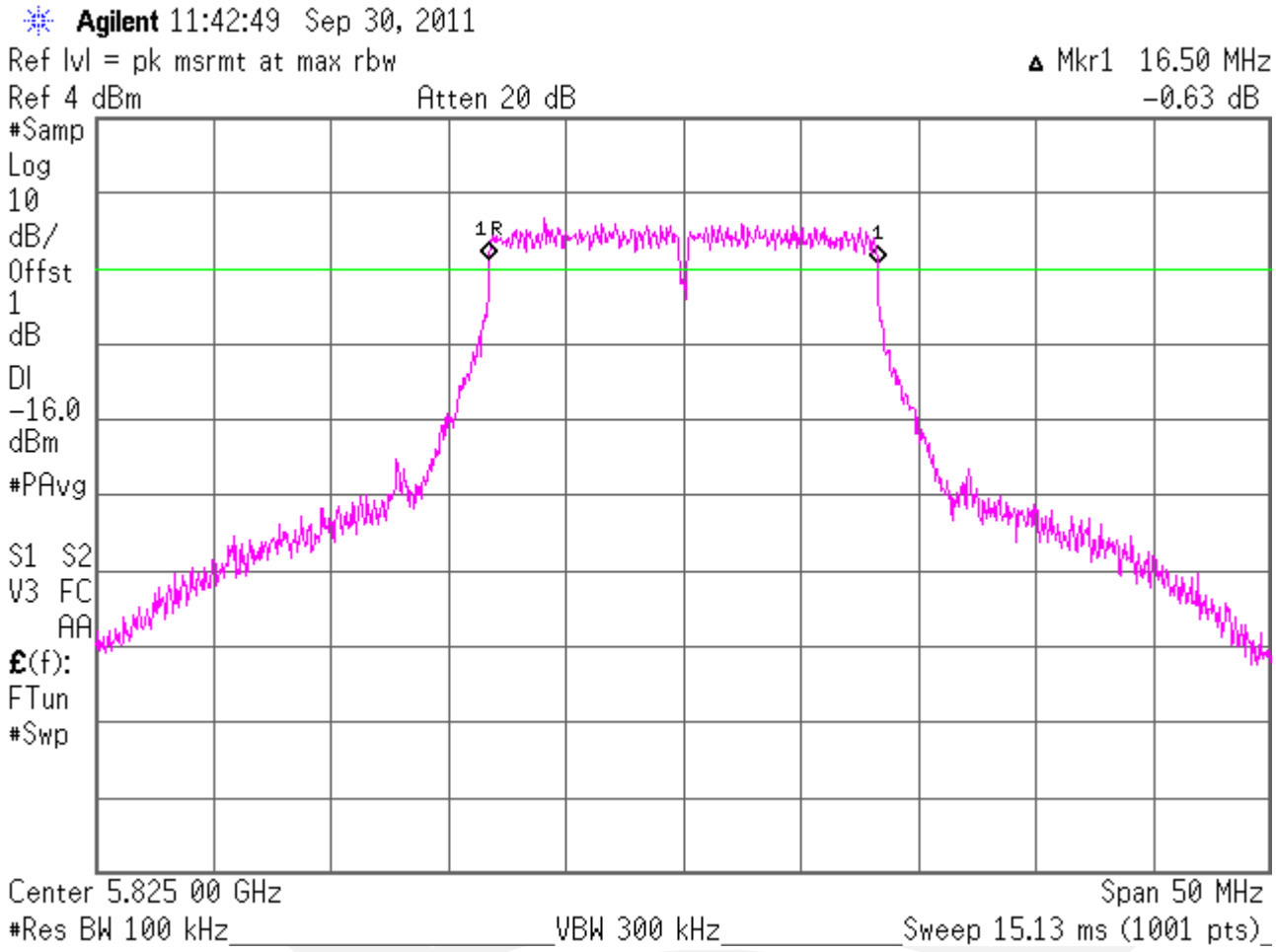
99% emission bandwidth
Channel 165, 6 Mb/s



99% emission bandwidth
Channel 165, 12 Mb/s



99% emission bandwidth
Channel 165, 54 Mb/s



Undesirable emissions
FCC 15.407(b), IC RSS-210 A9.3

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Testing was performed in accordance with the test procedure of ANSI C63.4 8.3, FCC KDB 789033
Maximum undesirable emission is 11.4 GHz, 45.23 dBuV/m at 3 meters
Manufacturer's Tx on time data shows 5.72% duty cycle. Using 10% as worst case scenario
Because radiated emissions measurements above 1 GHz are made using 1 MHz RBW, the -27 dBm/MHz eirp limit was converted to 68.2 dBμV/m at 3 meters with the following generic eirp to field strength conversion formula, solving for field strength.
EIRP = (FS x D)^2 / 30
where:
EIRP = equivalent isotropically radiated power in watts = -27dBm/MHz eirp limit = 2 uW
FS = field strength in volts/meter
D = measurement distance = 3 meters
therefore:
2uW = (FS x 3)^2 / 30
sqrt(2uW x 30) / 3 = FS
FS = 0.002582 V/m = 68.2 dBuV/m

Test location
■ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
■ - Wild River Lab Tech Area, conducted measurement

Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE10435	E4440A	Agilent	Spectrum Analyzer	MY44304483	01-Apr-12
WRLE03995	EM-6917B	Electro-Metrics	Biconicalog Periodic	151	06-May-12
WRLE02670	8447D	Hewlett-Packard	Preamplifier	2443A03954	Code B 17-Jan-12
WRLE02684	85650A	Hewlett-Packard	Quasi-Peak Adapter	2521A01006	10-Jun-12
NBLE03196	8566B	Hewlett-Packard	Spectrum Analyzer	2240A01856	19-Nov-11
NBLE03195	85662A	Hewlett-Packard	Analyzer Display	2648A13518	19-Nov-11
WRLE02127	11975A	Hewlett Packard	Amplifier 2- 8 GHz	2738A01200	Code B 25-Nov-11
NBLE02848	12A-26	Scientific Atlanta	Standard Gain Horn 26.5-40 GHz	492	Code Y
WRLE02847	12-18	Scientific Atlanta	Standard Gain Horn 18-26.5 GHz	80	Code Y
WRLE02661	11970A	Hewlett-Packard	Harm Mixer – 26.5-40 GHz	2332A01861	Code B 07-Jan-13
WRLE02662	11970K	Hewlett-Packard	Harm Mixer – 18-26.5 GHz	2332A01170	Code B 22-Sept-12

Test limit, FCC 15.407(b)(1-4)
Outside the band of operation, -27 dBm/MHz eirp

Test limit, FCC 15.407(b)(6-8)
Radiated field strength, 3 meter distance

Frequncy (MHz)	Average dBμV/m	μV/m	peak dBμV/m
30 – 88	40	100	
88 – 216	43.5	43.5	
216 – 960	46	150	
960 – 1000	54	200	
above 1000*	54	500	74

*within the restricted bands of 15.205

Test data
See following pages

Calculated average. Peak - 20 dB relaxation, 10% worst case duty cycle

Measurement summary for limit1: FCC 15.209 >1GHz 3m av (Av)					
FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN CORRECTION (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 >1GHz 3m av
11.4 GHz	55.2 Pk	11.58 / 38.74 / 41.11 / 0.82 / 20	45.23	H / 1.00 / 54	-8.77
11.32 GHz	55.1 Pk	11.54 / 38.67 / 41.19 / 0.71 / 20	44.82	H / 1.00 / 54	-9.18
11.0 GHz	52.75 Pk	11.35 / 38.38 / 41.36 / 0.48 / 20	41.6	H / 1.00 / 54	-12.4
11.12 GHz	51.35 Pk	11.42 / 38.49 / 41.3 / 0.43 / 20	40.38	H / 1.00 / 54	-13.62
10.52 GHz	51.05 Pk	11.06 / 38.11 / 41.61 / 0.56 / 20	39.17	H / 1.00 / 54	-14.83
10.64 GHz	50.2 Pk	11.13 / 38.17 / 41.54 / 0.77 / 20	38.72	H / 1.07 / 54	-15.28

FCC ID: MCQ-50M1558
IC: 1846A-50M1558

RADIATED EMISSIONS

Test Report #:	WC1107626 Run 2	Test Area:	LTS		
EUT Model #:	50001558-xx	Date:	9/16/2011		
EUT Serial #:	0000x	EUT Power:	3.3 VDC	Temperature:	15.0 °C
Test Method:	FCC 15.407			Air Pressure:	100.0 kPa
Customer:	Digi International			Rel. Humidity:	47.0 %
EUT Description:	Connect WiEM 9210 a/b/g, 802.11 a/b/g embedded radio module serial port converter				
Notes:					
Data File Name:	7626.dat			Page:	1 of 6

List of measurements for run #: 2

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 <1GHz 3m	DELTA2
Ch 52, 54MB						
56.224 MHz	42.67 Qp	0.7 / 11.51 / 28.08 / 0.0	26.8	V / 1.00 / 0	-13.2	n/a
125.01 MHz	44.51 Qp	1.07 / 7.52 / 27.8 / 0.0	25.31	V / 1.00 / 0	-18.19	n/a
129.198 MHz	40.2 Qp	1.1 / 7.25 / 27.82 / 0.0	20.73	V / 1.00 / 0	-22.77	n/a
132.726 MHz	38.89 Qp	1.11 / 7.4 / 27.84 / 0.0	19.57	V / 1.00 / 0	-23.93	n/a
160.0 MHz	34.1 Qp	1.2 / 8.1 / 27.8 / 0.0	15.6	V / 1.00 / 0	-27.9	n/a
168.656 MHz	39.92 Qp	1.22 / 8.53 / 27.74 / 0.0	21.93	V / 1.00 / 0	-21.57	n/a
180.0 MHz	32.15 Qp	1.25 / 9.1 / 27.67 / 0.0	14.83	V / 1.00 / 0	-28.67	n/a
221.202 MHz	32.65 Qp	1.42 / 10.35 / 27.81 / 0.0	16.62	V / 1.00 / 0	-29.38	n/a
244.116 MHz	32.17 Qp	1.47 / 11.08 / 27.8 / 0.0	16.92	V / 1.00 / 0	-29.08	n/a
249.174 MHz	29.7 Qp	1.48 / 11.24 / 27.75 / 0.0	14.67	V / 1.00 / 0	-31.33	n/a
259.998 MHz	31.3 Qp	1.5 / 11.58 / 27.63 / 0.0	16.75	V / 1.00 / 0	-29.25	n/a
265.434 MHz	35.15 Qp	1.51 / 11.76 / 27.58 / 0.0	20.84	V / 1.00 / 0	-25.16	n/a
276.384 MHz	27.2 Qp	1.54 / 12.16 / 27.46 / 0.0	13.44	V / 1.00 / 0	-32.56	n/a
281.094 MHz	34.15 Qp	1.55 / 12.27 / 27.41 / 0.0	20.57	V / 1.00 / 0	-25.43	n/a
340.002 MHz	31.3 Qp	1.75 / 13.71 / 27.23 / 0.0	19.54	V / 1.00 / 0	-26.46	n/a
380.005 MHz	32.1 Qp	1.86 / 14.8 / 27.39 / 0.0	21.37	V / 1.00 / 0	-24.63	n/a
383.401 MHz	25.25 Qp	1.87 / 15.0 / 27.39 / 0.0	14.73	V / 1.00 / 0	-31.27	n/a
393.535 MHz	28.95 Qp	1.9 / 15.61 / 27.36 / 0.0	19.1	V / 1.00 / 0	-26.9	n/a
440.005 MHz	26.35 Qp	2.0 / 16.43 / 27.21 / 0.0	17.58	V / 1.00 / 0	-28.42	n/a
449.757 MHz	30.9 Qp	2.02 / 16.11 / 27.25 / 0.0	21.78	V / 1.00 / 0	-24.22	n/a
460.005 MHz	29.0 Qp	2.05 / 16.2 / 27.3 / 0.0	19.95	V / 1.00 / 0	-26.05	n/a
480.003 MHz	26.85 Qp	2.09 / 16.94 / 27.39 / 0.0	18.49	V / 1.00 / 0	-27.51	n/a
500.007 MHz	28.05 Qp	2.14 / 17.4 / 27.48 / 0.0	20.11	V / 1.00 / 0	-25.89	n/a
501.369 MHz	26.2 Qp	2.15 / 17.5 / 27.49 / 0.0	18.36	V / 1.00 / 0	-27.64	n/a
505.971 MHz	32.0 Qp	2.16 / 17.85 / 27.49 / 0.0	24.52	V / 1.00 / 0	-21.48	n/a
540.003 MHz	25.85 Qp	2.25 / 17.3 / 27.33 / 0.0	18.07	V / 1.00 / 0	-27.93	n/a
552.423 MHz	24.35 Qp	2.29 / 18.05 / 27.28 / 0.0	17.41	V / 1.00 / 0	-28.59	n/a

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	WC1107626 Run 2	Test Area:	LTS		
EUT Model #:	50001558-xx	Date:	9/16/2011		
EUT Serial #:	0000x	EUT Power:	3.3 VDC	Temperature:	15.0 °C
Test Method:	FCC 15.407			Air Pressure:	100.0 kPa
Customer:	Digi International			Rel. Humidity:	47.0 %
EUT Description:	Connect WiEM 9210 a/b/g, 802.11 a/b/g embedded radio module serial port converter				
Notes:					
Data File Name:	7626.dat			Page:	2 of 6

List of measurements for run #: 2

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 <1GHz 3m	DELTA2
160.0 MHz	35.4 Qp	1.2 / 8.1 / 27.8 / 0.0	16.9	V / 1.00 / 90	-26.6	n/a
221.202 MHz	33.45 Qp	1.42 / 10.35 / 27.81 / 0.0	17.42	V / 1.00 / 90	-28.58	n/a
249.174 MHz	30.05 Qp	1.48 / 11.24 / 27.75 / 0.0	15.02	V / 1.00 / 90	-30.98	n/a
259.998 MHz	32.5 Qp	1.5 / 11.58 / 27.63 / 0.0	17.95	V / 1.00 / 90	-28.05	n/a
265.434 MHz	35.25 Qp	1.51 / 11.76 / 27.58 / 0.0	20.94	V / 1.00 / 90	-25.06	n/a
276.384 MHz	27.9 Qp	1.54 / 12.16 / 27.46 / 0.0	14.14	V / 1.00 / 90	-31.86	n/a
340.002 MHz	35.35 Qp	1.75 / 13.71 / 27.23 / 0.0	23.59	V / 1.00 / 90	-22.41	n/a
440.005 MHz	29.9 Qp	2.0 / 16.43 / 27.21 / 0.0	21.13	V / 1.00 / 90	-24.87	n/a
460.005 MHz	31.1 Qp	2.05 / 16.2 / 27.3 / 0.0	22.05	V / 1.00 / 90	-23.95	n/a
480.003 MHz	30.6 Qp	2.09 / 16.94 / 27.39 / 0.0	22.24	V / 1.00 / 90	-23.76	n/a
500.007 MHz	30.85 Qp	2.14 / 17.4 / 27.48 / 0.0	22.91	V / 1.00 / 90	-23.09	n/a
501.369 MHz	30.55 Qp	2.15 / 17.5 / 27.49 / 0.0	22.71	V / 1.00 / 90	-23.29	n/a
505.971 MHz	33.9 Qp	2.16 / 17.85 / 27.49 / 0.0	26.42	V / 1.00 / 90	-19.58	n/a
540.003 MHz	29.95 Qp	2.25 / 17.3 / 27.33 / 0.0	22.17	V / 1.00 / 90	-23.83	n/a
552.423 MHz	28.15 Qp	2.29 / 18.05 / 27.28 / 0.0	21.21	V / 1.00 / 90	-24.79	n/a
160.0 MHz	35.8 Qp	1.2 / 8.1 / 27.8 / 0.0	17.3	V / 1.00 / 180	-26.2	n/a
180.0 MHz	32.8 Qp	1.25 / 9.1 / 27.67 / 0.0	15.48	V / 1.00 / 180	-28.02	n/a
221.202 MHz	34.2 Qp	1.42 / 10.35 / 27.81 / 0.0	18.17	V / 1.00 / 180	-27.83	n/a
244.116 MHz	32.75 Qp	1.47 / 11.08 / 27.8 / 0.0	17.5	V / 1.00 / 180	-28.5	n/a
249.174 MHz	31.9 Qp	1.48 / 11.24 / 27.75 / 0.0	16.87	V / 1.00 / 180	-29.13	n/a
276.384 MHz	28.75 Qp	1.54 / 12.16 / 27.46 / 0.0	14.99	V / 1.00 / 180	-31.01	n/a
449.757 MHz	32.15 Qp	2.02 / 16.11 / 27.25 / 0.0	23.03	V / 1.00 / 180	-22.97	n/a
480.003 MHz	32.95 Qp	2.09 / 16.94 / 27.39 / 0.0	24.59	V / 1.00 / 180	-21.41	n/a
501.369 MHz	33.5 Qp	2.15 / 17.5 / 27.49 / 0.0	25.66	V / 1.00 / 180	-20.34	n/a
505.971 MHz	36.25 Qp	2.16 / 17.85 / 27.49 / 0.0	28.77	V / 1.00 / 180	-17.23	n/a
540.003 MHz	30.05 Qp	2.25 / 17.3 / 27.33 / 0.0	22.27	V / 1.00 / 180	-23.73	n/a
160.0 MHz	38.05 Qp	1.2 / 8.1 / 27.8 / 0.0	19.55	V / 1.00 / 270	-23.95	n/a
259.998 MHz	32.95 Qp	1.5 / 11.58 / 27.63 / 0.0	18.4	V / 1.00 / 270	-27.6	n/a

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	WC1107626 Run 2	Test Area:	LTS		
EUT Model #:	50001558-xx	Date:	9/16/2011		
EUT Serial #:	0000x	EUT Power:	3.3 VDC	Temperature:	15.0 °C
Test Method:	FCC 15.407			Air Pressure:	100.0 kPa
Customer:	Digi International			Rel. Humidity:	47.0 %
EUT Description:	Connect WiEM 9210 a/b/g, 802.11 a/b/g embedded radio module serial port converter				
Notes:					
Data File Name:	7626.dat			Page:	3 of 6

List of measurements for run #: 2

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 <1GHz 3m	DELTA2
265.434 MHz	37.35 Qp	1.51 / 11.76 / 27.58 / 0.0	23.04	V / 1.00 / 270	-22.96	n/a
340.002 MHz	38.05 Qp	1.75 / 13.71 / 27.23 / 0.0	26.29	V / 1.00 / 270	-19.71	n/a
380.005 MHz	33.3 Qp	1.86 / 14.8 / 27.39 / 0.0	22.57	V / 1.00 / 270	-23.43	n/a
383.401 MHz	30.05 Qp	1.87 / 15.0 / 27.39 / 0.0	19.53	V / 1.00 / 270	-26.47	n/a
393.535 MHz	29.95 Qp	1.9 / 15.61 / 27.36 / 0.0	20.1	V / 1.00 / 270	-25.9	n/a
259.998 MHz	37.15 Qp	1.5 / 11.58 / 27.63 / 0.0	22.6	H / 1.00 / 0	-23.4	n/a
276.384 MHz	29.7 Qp	1.54 / 12.16 / 27.46 / 0.0	15.94	H / 1.00 / 0	-30.06	n/a
281.094 MHz	36.8 Qp	1.55 / 12.27 / 27.41 / 0.0	23.22	H / 1.00 / 0	-22.78	n/a
380.005 MHz	34.9 Qp	1.86 / 14.8 / 27.39 / 0.0	24.17	H / 1.00 / 0	-21.83	n/a
480.003 MHz	33.4 Qp	2.09 / 16.94 / 27.39 / 0.0	25.04	H / 1.00 / 90	-20.96	n/a
500.007 MHz	31.85 Qp	2.14 / 17.4 / 27.48 / 0.0	23.91	H / 1.00 / 90	-22.09	n/a
265.434 MHz	38.75 Qp	1.51 / 11.76 / 27.58 / 0.0	24.44	H / 1.00 / 180	-21.56	n/a
276.384 MHz	31.35 Qp	1.54 / 12.16 / 27.46 / 0.0	17.59	H / 1.00 / 180	-28.41	n/a
281.094 MHz	38.15 Qp	1.55 / 12.27 / 27.41 / 0.0	24.57	H / 1.00 / 180	-21.43	n/a
340.002 MHz	40.35 Qp	1.75 / 13.71 / 27.23 / 0.0	28.59	H / 1.00 / 180	-17.41	n/a
420.006 MHz	32.05 Qp	1.96 / 16.12 / 27.26 / 0.0	22.86	H / 1.00 / 180	-23.14	n/a
340.002 MHz	41.2 Qp	1.75 / 13.71 / 27.23 / 0.0	29.44	H / 1.00 / 270	-16.56	n/a
383.401 MHz	32.9 Qp	1.87 / 15.0 / 27.39 / 0.0	22.38	H / 1.00 / 270	-23.62	n/a
393.535 MHz	31.8 Qp	1.9 / 15.61 / 27.36 / 0.0	21.95	H / 1.00 / 270	-24.05	n/a
420.006 MHz	35.6 Qp	1.96 / 16.12 / 27.26 / 0.0	26.41	H / 1.00 / 270	-19.59	n/a
500.007 MHz	32.8 Qp	2.14 / 17.4 / 27.48 / 0.0	24.86	H / 2.00 / 0	-21.14	n/a
540.003 MHz	30.75 Qp	2.25 / 17.3 / 27.33 / 0.0	22.97	H / 2.00 / 90	-23.03	n/a
249.174 MHz	32.75 Qp	1.48 / 11.24 / 27.75 / 0.0	17.72	H / 2.00 / 180	-28.28	n/a

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	WC1107626 Run 2	Test Area:	LTS		
EUT Model #:	50001558-xx	Date:	9/16/2011		
EUT Serial #:	0000x	EUT Power:	3.3 VDC	Temperature:	15.0 °C
Test Method:	FCC 15.407			Air Pressure:	100.0 kPa
Customer:	Digi International			Rel. Humidity:	47.0 %
EUT Description:	Connect WiEM 9210 a/b/g, 802.11 a/b/g embedded radio module serial port converter				
Notes:					
Data File Name:	7626.dat			Page:	4 of 6

List of measurements for run #: 2

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 <1GHz 3m	DELTA2
265.434 MHz	39.75 Qp	1.51 / 11.76 / 27.58 / 0.0	25.44	H / 2.00 / 180	-20.56	n/a
380.005 MHz	35.55 Qp	1.86 / 14.8 / 27.39 / 0.0	24.82	H / 2.00 / 180	-21.18	n/a
340.002 MHz	41.85 Qp	1.75 / 13.71 / 27.23 / 0.0	30.09	H / 2.00 / 270	-15.91	n/a
maximized						
56.224 MHz	42.51 Qp	0.7 / 11.51 / 28.08 / 0.0	26.64	V / 1.00 / 251	-13.36	n/a
Compared emissions with channels 62, 100, 112, 132, 140 and data rates 6MB & 12MB						
No new or higher emissions detected						
end scan 30 - 1000 MHz						

Tested by: Greg Jakubowski — Printed

G Jakubowski — Signature

Reviewed by: Joel T Schneider — Printed

Joel T. Schneider — Signature

RADIATED EMISSIONS

Test Report #:	WC1107626 Run 2	Test Area:	LTS		
EUT Model #:	50001558-xx	Date:	9/16/2011		
EUT Serial #:	0000x	EUT Power:	3.3 VDC	Temperature:	15.0 °C
Test Method:	FCC 15.407			Air Pressure:	100.0 kPa
Customer:	Digi International			Rel. Humidity:	47.0 %
EUT Description:	Connect WiEM 9210 a/b/g, 802.11 a/b/g embedded radio module serial port converter				
Notes:					
Data File Name:	7626.dat			Page:	5 of 6

Measurement summary for limit1: FCC 15.209 <1GHz 3m (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 <1GHz 3m
56.224 MHz	42.67 Qp	0.7 / 11.51 / 28.08 / 0.0	26.8	V / 1.00 / 0	-13.2
340.002 MHz	41.85 Qp	1.75 / 13.71 / 27.23 / 0.0	30.09	H / 2.00 / 270	-15.91
505.971 MHz	36.25 Qp	2.16 / 17.85 / 27.49 / 0.0	28.77	V / 1.00 / 180	-17.23
125.01 MHz	44.51 Qp	1.07 / 7.52 / 27.8 / 0.0	25.31	V / 1.00 / 0	-18.19
420.006 MHz	35.6 Qp	1.96 / 16.12 / 27.26 / 0.0	26.41	H / 1.00 / 270	-19.59
501.369 MHz	33.5 Qp	2.15 / 17.5 / 27.49 / 0.0	25.66	V / 1.00 / 180	-20.34
265.434 MHz	39.75 Qp	1.51 / 11.76 / 27.58 / 0.0	25.44	H / 2.00 / 180	-20.56
480.003 MHz	33.4 Qp	2.09 / 16.94 / 27.39 / 0.0	25.04	H / 1.00 / 90	-20.96
500.007 MHz	32.8 Qp	2.14 / 17.4 / 27.48 / 0.0	24.86	H / 2.00 / 0	-21.14
380.005 MHz	35.55 Qp	1.86 / 14.8 / 27.39 / 0.0	24.82	H / 2.00 / 180	-21.18
281.094 MHz	38.15 Qp	1.55 / 12.27 / 27.41 / 0.0	24.57	H / 1.00 / 180	-21.43
168.656 MHz	39.92 Qp	1.22 / 8.53 / 27.74 / 0.0	21.93	V / 1.00 / 0	-21.57
129.198 MHz	40.2 Qp	1.1 / 7.25 / 27.82 / 0.0	20.73	V / 1.00 / 0	-22.77
449.757 MHz	32.15 Qp	2.02 / 16.11 / 27.25 / 0.0	23.03	V / 1.00 / 180	-22.97
540.003 MHz	30.75 Qp	2.25 / 17.3 / 27.33 / 0.0	22.97	H / 2.00 / 90	-23.03
259.998 MHz	37.15 Qp	1.5 / 11.58 / 27.63 / 0.0	22.6	H / 1.00 / 0	-23.4
383.401 MHz	32.9 Qp	1.87 / 15.0 / 27.39 / 0.0	22.38	H / 1.00 / 270	-23.62
132.726 MHz	38.89 Qp	1.11 / 7.4 / 27.84 / 0.0	19.57	V / 1.00 / 0	-23.93
160.0 MHz	38.05 Qp	1.2 / 8.1 / 27.8 / 0.0	19.55	V / 1.00 / 270	-23.95
460.005 MHz	31.1 Qp	2.05 / 16.2 / 27.3 / 0.0	22.05	V / 1.00 / 90	-23.95
393.535 MHz	31.8 Qp	1.9 / 15.61 / 27.36 / 0.0	21.95	H / 1.00 / 270	-24.05
552.423 MHz	28.15 Qp	2.29 / 18.05 / 27.28 / 0.0	21.21	V / 1.00 / 90	-24.79
440.005 MHz	29.9 Qp	2.0 / 16.43 / 27.21 / 0.0	21.13	V / 1.00 / 90	-24.87
221.202 MHz	34.2 Qp	1.42 / 10.35 / 27.81 / 0.0	18.17	V / 1.00 / 180	-27.83
180.0 MHz	32.8 Qp	1.25 / 9.1 / 27.67 / 0.0	15.48	V / 1.00 / 180	-28.02
249.174 MHz	32.75 Qp	1.48 / 11.24 / 27.75 / 0.0	17.72	H / 2.00 / 180	-28.28
276.384 MHz	31.35 Qp	1.54 / 12.16 / 27.46 / 0.0	17.59	H / 1.00 / 180	-28.41
244.116 MHz	32.75 Qp	1.47 / 11.08 / 27.8 / 0.0	17.5	V / 1.00 / 180	-28.5

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

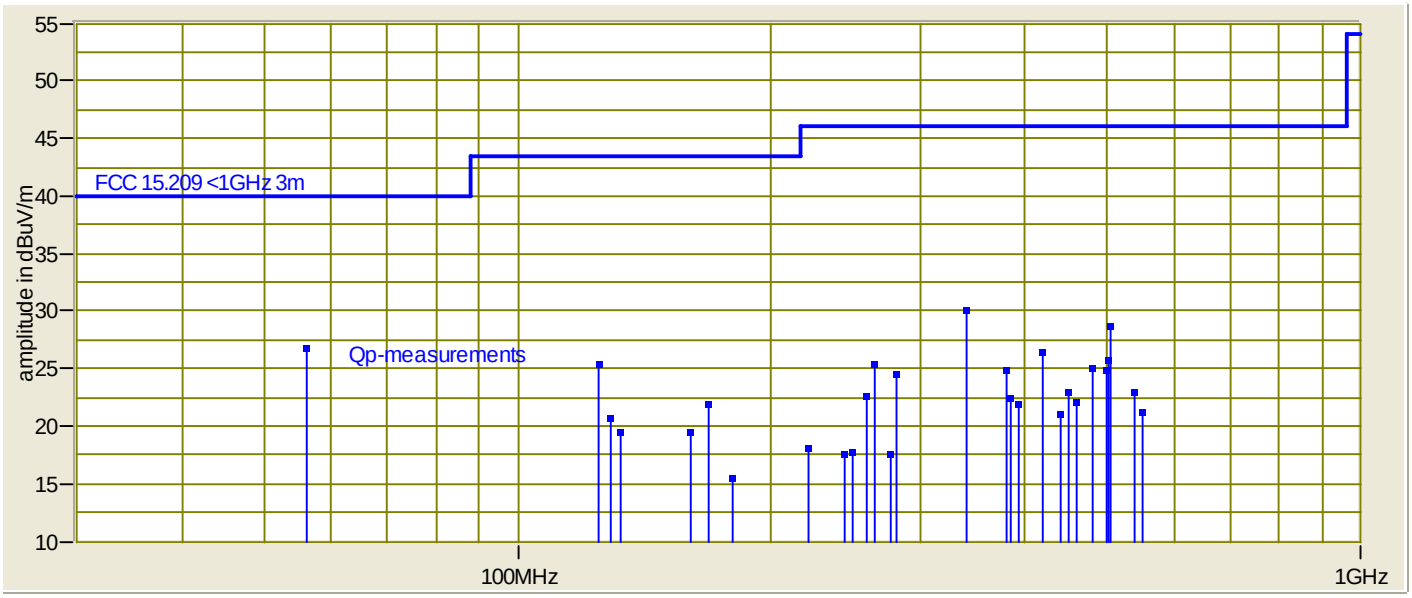
Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

FCC ID: MCQ-50M1558
IC: 1846A-50M1558

RADIATED EMISSIONS

Test Report #:	WC1107626 Run 2	Test Area:	LTS		
EUT Model #:	50001558-xx	Date:	9/16/2011		
EUT Serial #:	0000x	EUT Power:	3.3 VDC	Temperature:	15.0 °C
Test Method:	FCC 15.407			Air Pressure:	100.0 kPa
Customer:	Digi International			Rel. Humidity:	47.0 %
EUT Description:	Connect WiEM 9210 a/b/g, 802.11 a/b/g embedded radio module serial port converter				
Notes:					
Data File Name:	7626.dat			Page:	6 of 6

Graph:



Tested by:	Greg Jakubowski	G Jakubowski	
	Printed		Signature
Reviewed by:	Joel T Schneider	Joel T. Schneider	
	Printed		Signature

FCC ID: MCQ-50M1558
IC: 1846A-50M1558

RADIATED EMISSIONS

Test Report #:	WC1107626 Run 1	Test Area:	LTS		
EUT Model #:	50001558-xx	Date:	9/15/2011		
EUT Serial #:	0000x	EUT Power:	3.3 VDC	Temperature:	16.0 °C
Test Method:	FCC 15.407			Air Pressure:	100.0 kPa
Customer:	Digi International			Rel. Humidity:	42.0 %
EUT Description:	Connect WiEM 9210 a/b/g, 802.11 a/b/g embedded radio module serial port converter				
Notes:	With 2dbi dual band PCB antenna				
Data File Name:	7626.dat			Page:	1 of 8

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 >1GHz 3m av	DELTA2 FCC 15.407, 27dBm eirp 3m pk
Average limit per 15.209 for emissions in the restricted bands per 15.205						
-20 dB peak-average duty cycle relaxation can apply, 10% worst case duty cycle						
Peak limit per 15.407 (-27 dBm eirp = 68.2 dBuV/m @ 3m)						
Searching for the highest emission level of the 2nd harmonics						
Power setting 40 & data rate 54MB unless otherwise noted						
PCB antenna oriented perpendicular to radio can, typical of final configuration						
Orientation 1: Long dimension of PCB antenna vertical						
Antenna side of PCB facing measurement antenna when the turn table is at 0 degrees azimuth						
maximized						
Ch 52						
10.52 GHz	45.45 Pk	11.06 / 38.11 / 41.61 / 0.56	53.57	V / 1.83 / 278	n/a	-14.63
10.52 GHz is not in a restricted band						
Ch 64						
10.64 GHz	47.5 Pk	11.13 / 38.17 / 41.54 / 0.77	56.02	V / 1.49 / 244	n/a	-12.18
10.64 GHz	37.12 Av	11.13 / 38.17 / 41.54 / 0.77	45.64	V / 1.49 / 244	-8.36	n/a
Ch 100						
11.0 GHz	49.05 Pk	11.35 / 38.38 / 41.36 / 0.48	57.9	V / 1.44 / 251	n/a	-10.3
11.0 GHz	39.19 Av	11.35 / 38.38 / 41.36 / 0.48	48.04	V / 1.44 / 251	-5.96	n/a
Ch 112						
11.12 GHz	47.65 Pk	11.42 / 38.49 / 41.3 / 0.43	56.68	V / 1.49 / 255	n/a	-11.52
11.12 GHz	38.21 Av	11.42 / 38.49 / 41.3 / 0.43	47.24	V / 1.49 / 255	-6.76	n/a
Ch 132						
11.32 GHz	49.2 Pk	11.54 / 38.67 / 41.19 / 0.71	58.92	V / 1.42 / 256	n/a	-9.28
11.32 GHz	39.87 Av	11.54 / 38.67 / 41.19 / 0.71	49.59	V / 1.42 / 256	-4.41	n/a
Ch 140						
11.4 GHz	50.15 Pk	11.58 / 38.74 / 41.11 / 0.82	60.18	V / 1.38 / 254	n/a	-8.02
11.4 GHz	40.85 Av	11.58 / 38.74 / 41.11 / 0.82	50.88	V / 1.38 / 254	-3.12	n/a

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	WC1107626 Run 1	Test Area:	LTS		
EUT Model #:	50001558-xx	Date:	9/15/2011		
EUT Serial #:	0000x	EUT Power:	3.3 VDC	Temperature:	16.0 °C
Test Method:	FCC 15.407			Air Pressure:	100.0 kPa
Customer:	Digi International			Rel. Humidity:	42.0 %
EUT Description:	Connect WiEM 9210 a/b/g, 802.11 a/b/g embedded radio module serial port converter				
Notes:	With 2dbi dual band PCB antenna				
Data File Name:	7626.dat			Page:	2 of 8

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 >1GHz 3m av	DELTA2 FCC 15.407, 27dBm eirp 3m pk
Orientation 2: Long dimension of PCB antenna horizontal, width vertical						
Antenna side of PCB facing measurement antenna when the turn table is at 90 degrees azimuth						
maximized						
Ch 52						
10.52 GHz	51.05 Pk	11.06 / 38.11 / 41.61 / 0.56	59.17	H / 1.00 / 54	n/a	-9.03
Ch 64						
10.64 GHz	50.2 Pk	11.13 / 38.17 / 41.54 / 0.77	58.72	H / 1.07 / 54	n/a	-9.48
10.64 GHz	41.75 Av	11.13 / 38.17 / 41.54 / 0.77	50.27	H / 1.07 / 54	-3.73	n/a
Ch 100						
11.0 GHz	52.75 Pk	11.35 / 38.38 / 41.36 / 0.48	61.6	H / 1.00 / 54	n/a	-6.6
11.0 GHz	43.58 Av	11.35 / 38.38 / 41.36 / 0.48	52.43	H / 1.00 / 54	-1.57	n/a
Ch 112						
11.12 GHz	51.35 Pk	11.42 / 38.49 / 41.3 / 0.43	60.38	H / 1.00 / 54	n/a	-7.82
11.12 GHz	43.19 Av	11.42 / 38.49 / 41.3 / 0.43	52.22	H / 1.00 / 54	-1.78	n/a
Ch 132						
11.32 GHz	55.1 Pk	11.54 / 38.67 / 41.19 / 0.71	64.82	H / 1.00 / 54	n/a	-3.38
11.32 GHz	46.23 Av	11.54 / 38.67 / 41.19 / 0.71	55.95	H / 1.00 / 54	1.95	n/a
Ch 140						
11.4 GHz	55.2 Pk	11.58 / 38.74 / 41.11 / 0.82	65.23	H / 1.00 / 54	n/a	-2.97
11.4 GHz	46.82 Av	11.58 / 38.74 / 41.11 / 0.82	56.85	H / 1.00 / 54	2.85	n/a
Orientation 3: Long dimension of PCB antenna horizontal, PCB thickness vertical						
Antenna side of PCB facing down,						
end of PCB, opposite coax, is towards measurement antenna when the turn table is at 0 degrees azimuth						
maximized						
Ch 52						
10.52 GHz	48.3 Pk	11.06 / 38.11 / 41.61 / 0.56	56.42	H / 1.48 / 2	n/a	-11.78
Ch 64						

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	WC1107626 Run 1	Test Area:	LTS		
EUT Model #:	50001558-xx	Date:	9/15/2011		
EUT Serial #:	0000x	EUT Power:	3.3 VDC	Temperature:	16.0 °C
Test Method:	FCC 15.407			Air Pressure:	100.0 kPa
Customer:	Digi International			Rel. Humidity:	42.0 %
EUT Description:	Connect WiEM 9210 a/b/g, 802.11 a/b/g embedded radio module serial port converter				
Notes:	With 2dbi dual band PCB antenna				
Data File Name:	7626.dat			Page:	3 of 8

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 >1GHz 3m av	DELTA2 FCC 15.407, 27dBm eirp 3m pk
10.64 GHz	48.2 Pk	11.13 / 38.17 / 41.54 / 0.77	56.72	H / 1.46 / 4	n/a	-11.48
10.64 GHz	38.57 Av	11.13 / 38.17 / 41.54 / 0.77	47.09	H / 1.46 / 4	-6.91	n/a
Ch 100						
11.0 GHz	48.1 Pk	11.35 / 38.38 / 41.36 / 0.48	56.95	H / 1.57 / 9	n/a	-11.25
11.0 GHz	40.43 Av	11.35 / 38.38 / 41.36 / 0.48	49.28	H / 1.57 / 9	-4.72	n/a
Ch 112						
11.12 GHz	48.75 Pk	11.42 / 38.49 / 41.3 / 0.43	57.78	H / 1.50 / 8	n/a	-10.42
11.12 GHz	40.36 Av	11.42 / 38.49 / 41.3 / 0.43	49.39	H / 1.50 / 8	-4.61	n/a
Ch 132						
11.32 GHz	51.0 Pk	11.54 / 38.67 / 41.19 / 0.71	60.72	H / 1.46 / 8	n/a	-7.48
11.32 GHz	43.1 Av	11.54 / 38.67 / 41.19 / 0.71	52.82	H / 1.46 / 8	-1.18	n/a
Ch 140						
11.4 GHz	50.55 Pk	11.58 / 38.74 / 41.11 / 0.82	60.58	H / 1.43 / 9	n/a	-7.62
11.4 GHz	42.56 Av	11.58 / 38.74 / 41.11 / 0.82	52.59	H / 1.43 / 9	-1.41	n/a
Scanning for highest fundamental field strength over 3 orthogonal axis						
measurement preamp & BPF removed						
Ch 112 (mid channel)						
Orientation 3						
5.562 GHz	61.5 Pk	7.6 / 34.14 / 0.0 / 0.0	103.24	H / 1.42 / 35	n/a	35.04
orientation 2						
5.559 GHz	61.65 Pk	7.6 / 34.14 / 0.0 / 0.0	103.39	H / 1.00 / 298	n/a	35.19
orientation 1						
5.563 GHz	59.95 Pk	7.6 / 34.14 / 0.0 / 0.0	101.69	V / 1.82 / 68	n/a	33.49
Highest fundamental level at orientation 2						
Using orientation 2 for the remainder of radiated emissions testing						
Comparing fundamental emission levels with different data rates, ch 112						

Tested by: Greg Jakubowski — Printed — Signature

Reviewed by: Joel T Schneider — Printed — Signature

RADIATED EMISSIONS

Test Report #:	WC1107626 Run 1	Test Area:	LTS		
EUT Model #:	50001558-xx	Date:	9/15/2011		
EUT Serial #:	0000x	EUT Power:	3.3 VDC	Temperature:	16.0 °C
Test Method:	FCC 15.407			Air Pressure:	100.0 kPa
Customer:	Digi International			Rel. Humidity:	42.0 %
EUT Description:	Connect WiEM 9210 a/b/g, 802.11 a/b/g embedded radio module serial port converter				
Notes:	With 2dbi dual band PCB antenna				
Data File Name:	7626.dat			Page:	4 of 8

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 >1GHz 3m av	DELTA2 FCC 15.407, 27dBm eirp 3m pk
54MB						
5.559 GHz	61.65 Pk	7.6 / 34.14 / 0.0 / 0.0	103.39	H / 1.00 / 298	n/a	35.19
12MB						
5.555 GHz	61.3 Pk	7.59 / 34.15 / 0.0 / 0.0	103.04	V / 1.82 / 68	n/a	34.84
6MB						
5.556 GHz	61.2 Pk	7.59 / 34.14 / 0.0 / 0.0	102.94	V / 1.82 / 68	n/a	34.74
No significant difference, using 54MB for the remainder of testing						
Begin spurious emissions scan 1 - 18 GHz						
ch 112						
maximized						
3.707 GHz	57.1 Pk	5.98 / 31.75 / 43.26 / 0.0	51.58	H / 1.00 / 341	n/a	-16.62
3.707 GHz	54.87 Av	5.98 / 31.75 / 43.26 / 0.0	49.35	H / 1.00 / 341	-4.65	n/a
Emission remains when Tx is turned off						
Changes frequency when changing channels						
ch 52						
maximized						
3.507 GHz	66.85 Pk	5.81 / 31.31 / 43.74 / 0.0	60.23	H / 1.00 / 343	n/a	-7.97
ch 64						
maximized						
3.547 GHz	67.65 Pk	5.84 / 31.4 / 43.64 / 0.0	61.25	H / 1.00 / 347	n/a	-6.95
ch 100						
3.667 GHz	56.2 Pk	5.94 / 31.67 / 43.36 / 0.0	50.45	H / 1.00 / 348	n/a	-17.75
3.667 GHz	53.96 Av	5.94 / 31.67 / 43.36 / 0.0	48.21	H / 1.00 / 348	-5.79	n/a
ch 132						
3.773 GHz	59.8 Pk	6.05 / 31.9 / 43.34 / 0.0	54.41	H / 1.40 / 336	n/a	-13.79
3.773 GHz	56.85 Av	6.05 / 31.9 / 43.34 / 0.0	51.46	H / 1.40 / 336	-2.54	n/a
ch 140						
3.8 GHz	60.3 Pk	6.07 / 31.96 / 43.43 / 0.0	54.9	H / 1.39 / 337	n/a	-13.3

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	WC1107626 Run 1	Test Area:	LTS		
EUT Model #:	50001558-xx	Date:	9/15/2011		
EUT Serial #:	0000x	EUT Power:	3.3 VDC	Temperature:	16.0 °C
Test Method:	FCC 15.407			Air Pressure:	100.0 kPa
Customer:	Digi International			Rel. Humidity:	42.0 %
EUT Description:	Connect WiEM 9210 a/b/g, 802.11 a/b/g embedded radio module serial port converter				
Notes:	With 2dbi dual band PCB antenna				
Data File Name:	7626.dat			Page:	5 of 8

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 >1GHz 3m av	DELTA2 FCC 15.407, 27dBm eirp 3m pk
3.8 GHz	57.31 Av	6.07 / 31.96 / 43.43 / 0.0	51.91	H / 1.39 / 337	-2.09	n/a
ch 112						
No other significant emissions detected						
Channel 52, 64, 100, 132, & 140						
No other significant emissions detected						
end scan 1 - 18 GHz						
begin scan 18 - 40 GHz						
ch 112, 54MB						
Scanned all sides of device, 0.3 meter distance, vertical horizontal						
No significant emissions detected						
Channels 52, 64, 100, 132, 140 and data rates 6MB & 12MB						
No significant emissions detected						
end scan 1 - 40 GHz						

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	WC1107626 Run 1	Test Area:	LTS			
EUT Model #:	50001558-xx	Date:	9/15/2011			
EUT Serial #:	0000x	EUT Power:	3.3 VDC	Temperature:	16.0	°C
Test Method:	FCC 15.407			Air Pressure:	100.0	kPa
Customer:	Digi International			Rel. Humidity:	42.0	%
EUT Description:	Connect WiEM 9210 a/b/g, 802.11 a/b/g embedded radio module serial port converter					
Notes:	With 2dbi dual band PCB antenna					
Data File Name:	7626.dat			Page:	6 of 8	

Calculated average. Peak - 20 dB relaxation, 10% worst case duty cycle

Measurement summary for limit1: FCC 15.209 >1GHz 3m av (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN CORRECTION (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 >1GHz 3m av
11.4 GHz	55.2 Pk	11.58 / 38.74 / 41.11 / 0.82 / 20	45.23	H / 1.00 / 54	-8.77
11.32 GHz	55.1 Pk	11.54 / 38.67 / 41.19 / 0.71 / 20	44.82	H / 1.00 / 54	-9.18
11.0 GHz	52.75 Pk	11.35 / 38.38 / 41.36 / 0.48 / 20	41.6	H / 1.00 / 54	-12.4
11.12 GHz	51.35 Pk	11.42 / 38.49 / 41.3 / 0.43 / 20	40.38	H / 1.00 / 54	-13.62
10.52 GHz	51.05 Pk	11.06 / 38.11 / 41.61 / 0.56 / 20	39.17	H / 1.00 / 54	-14.83
10.64 GHz	50.2 Pk	11.13 / 38.17 / 41.54 / 0.77 / 20	38.72	H / 1.07 / 54	-15.28

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	WC1107626 Run 1	Test Area:	LTS		
EUT Model #:	50001558-xx	Date:	9/15/2011		
EUT Serial #:	0000x	EUT Power:	3.3 VDC	Temperature:	16.0 °C
Test Method:	FCC 15.407			Air Pressure:	100.0 kPa
Customer:	Digi International			Rel. Humidity:	42.0 %
EUT Description:	Connect WiEM 9210 a/b/g, 802.11 a/b/g embedded radio module serial port converter				
Notes:	With 2dbi dual band PCB antenna				
Data File Name:	7626.dat			Page:	7 of 8

Measurement summary for limit2: FCC 15.407, 27dBm eirp 3m pk (Pk)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA2 FCC 15.407, 27dBm eirp 3m pk
11.4 GHz	55.2 Pk	11.58 / 38.74 / 41.11 / 0.82	65.23	H / 1.00 / 54	-2.97
11.32 GHz	55.1 Pk	11.54 / 38.67 / 41.19 / 0.71	64.82	H / 1.00 / 54	-3.38
11.0 GHz	52.75 Pk	11.35 / 38.38 / 41.36 / 0.48	61.6	H / 1.00 / 54	-6.6
3.547 GHz	67.65 Pk	5.84 / 31.4 / 43.64 / 0.0	61.25	H / 1.00 / 347	-6.95
11.12 GHz	51.35 Pk	11.42 / 38.49 / 41.3 / 0.43	60.38	H / 1.00 / 54	-7.82
3.507 GHz	66.85 Pk	5.81 / 31.31 / 43.74 / 0.0	60.23	H / 1.00 / 343	-7.97
10.52 GHz	51.05 Pk	11.06 / 38.11 / 41.61 / 0.56	59.17	H / 1.00 / 54	-9.03
10.64 GHz	50.2 Pk	11.13 / 38.17 / 41.54 / 0.77	58.72	H / 1.07 / 54	-9.48
3.8 GHz	60.3 Pk	6.07 / 31.96 / 43.43 / 0.0	54.9	H / 1.39 / 337	-13.3
3.773 GHz	59.8 Pk	6.05 / 31.9 / 43.34 / 0.0	54.41	H / 1.40 / 336	-13.79
3.707 GHz	57.1 Pk	5.98 / 31.75 / 43.26 / 0.0	51.58	H / 1.00 / 341	-16.62
3.667 GHz	56.2 Pk	5.94 / 31.67 / 43.36 / 0.0	50.45	H / 1.00 / 348	-17.75

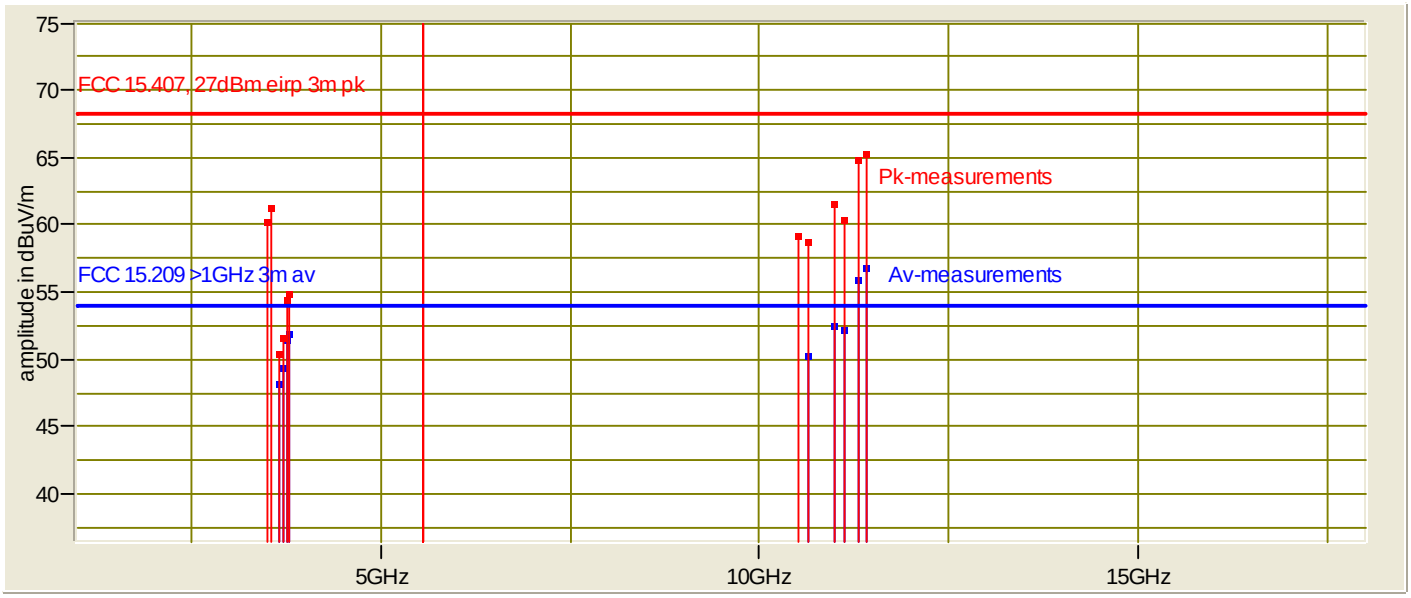
Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	WC1107626 Run 1	Test Area:	LTS		
EUT Model #:	50001558-xx	Date:	9/15/2011		
EUT Serial #:	0000x	EUT Power:	3.3 VDC	Temperature:	16.0 °C
Test Method:	FCC 15.407			Air Pressure:	100.0 kPa
Customer:	Digi International			Rel. Humidity:	42.0 %
EUT Description:	Connect WiEM 9210 a/b/g, 802.11 a/b/g embedded radio module serial port converter				
Notes:	With 2dbi dual band PCB antenna				
Data File Name:	7626.dat			Page:	8 of 8

Graph:

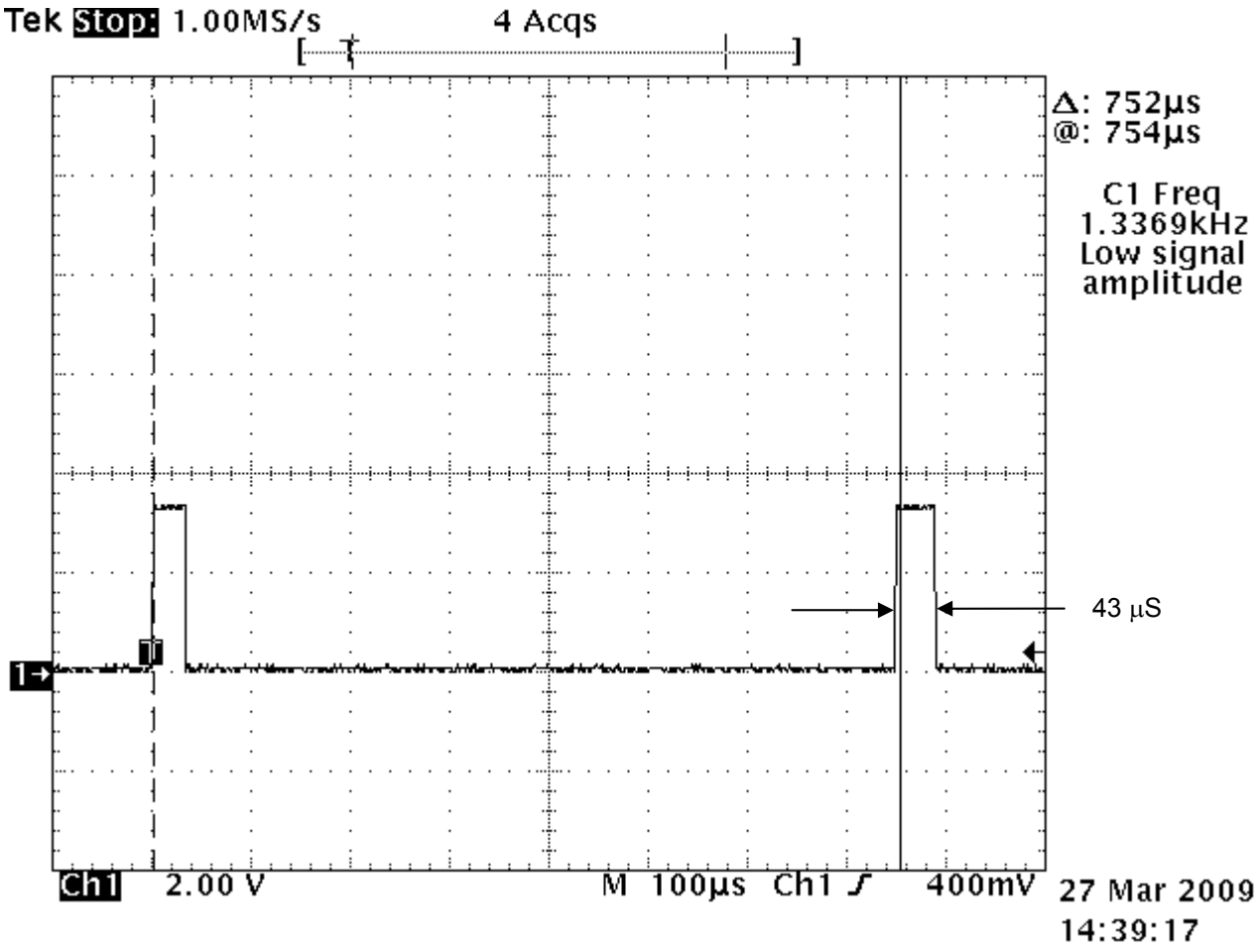


Tested by: Greg Jakubowski (Printed) _____ (Signature)

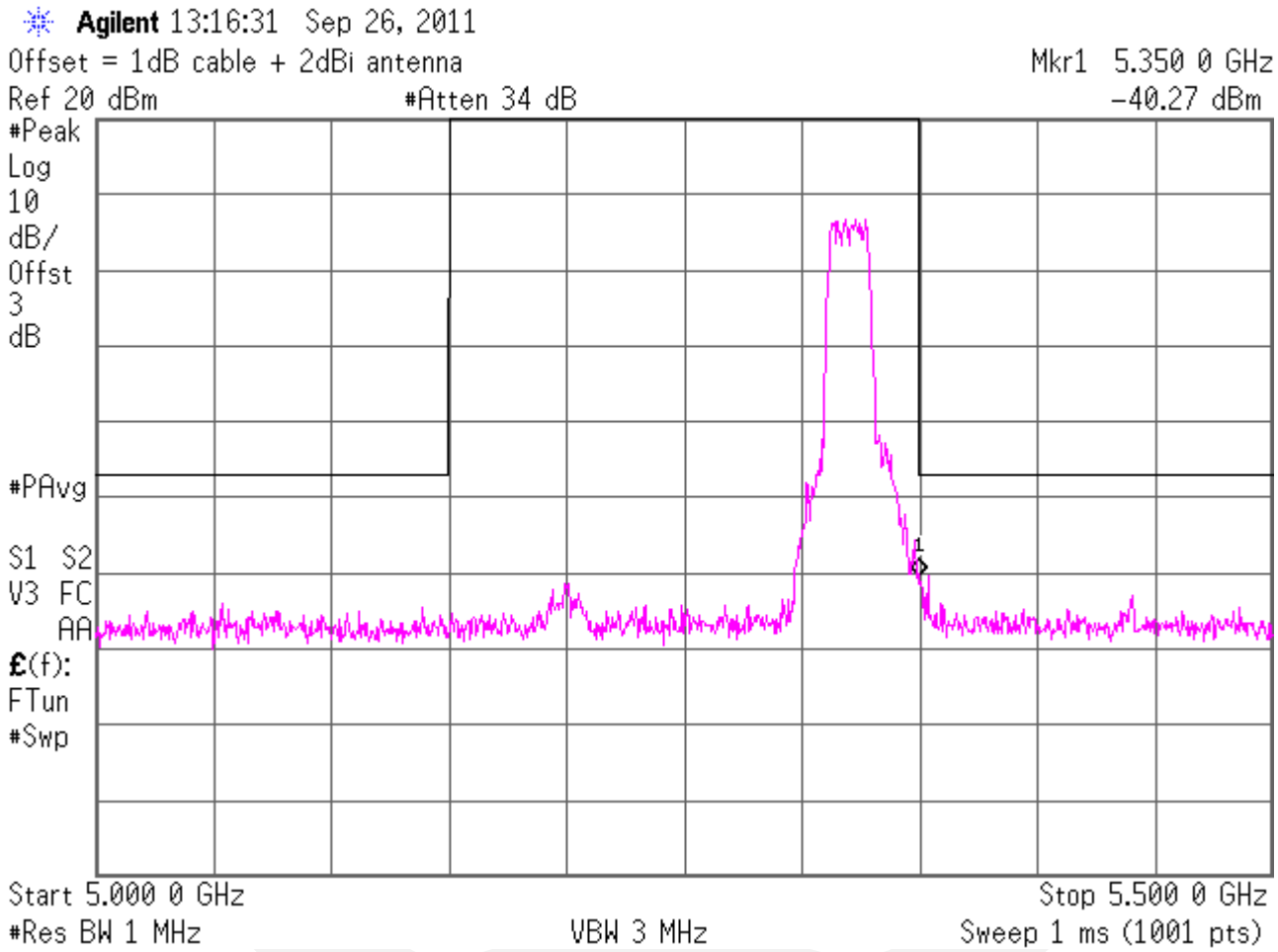
Reviewed by: Joel T Schneider (Printed) _____ (Signature)

Duty Cycle

Test summary
Manufacturer's data.
Pulses are 43 μS every 752 μS. 43/752 = 5.72 % duty cycle
Use 10% duty cycle as worst case scenario



Bandedge
Channel 64, 6 Mb/s



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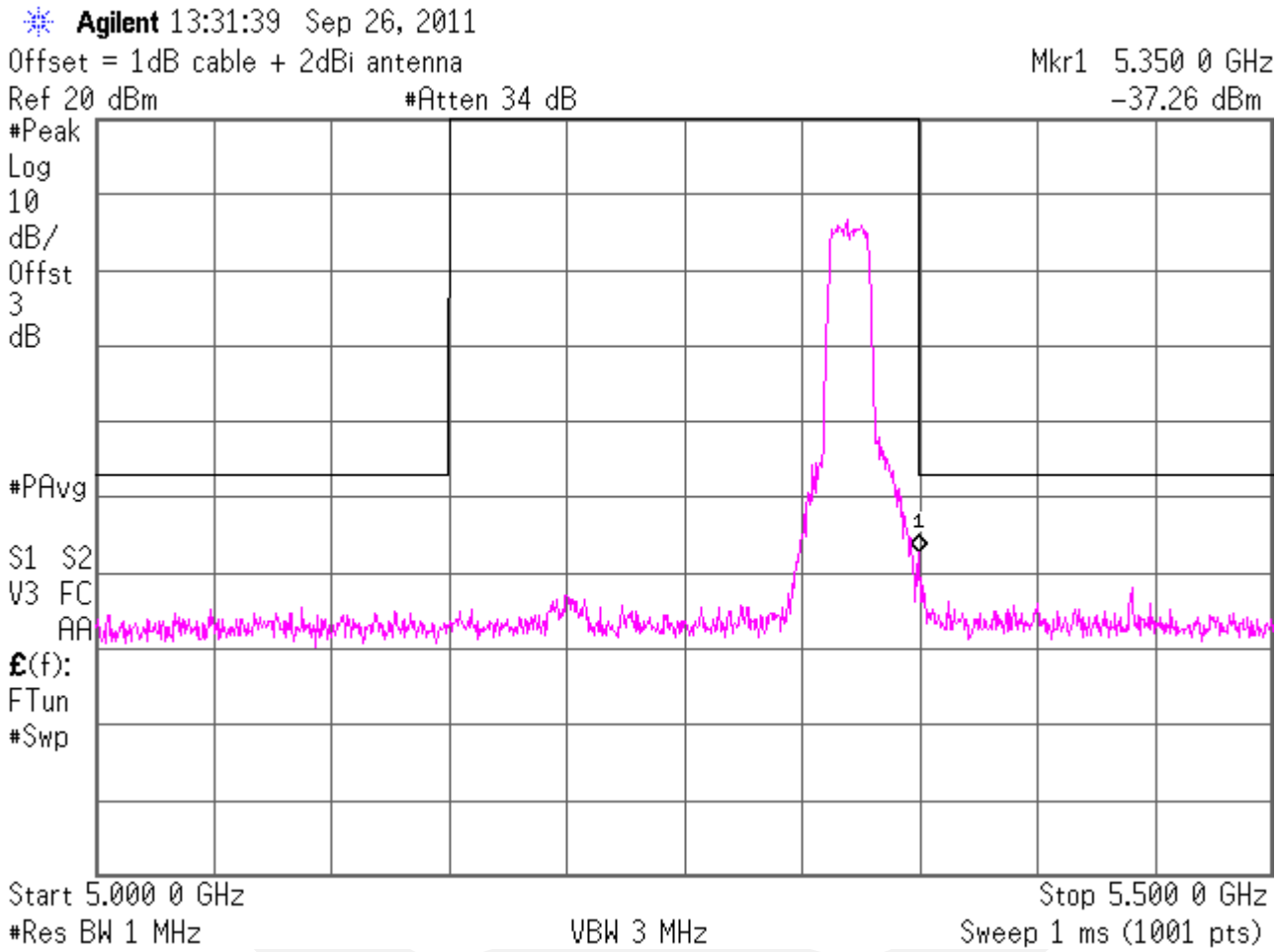

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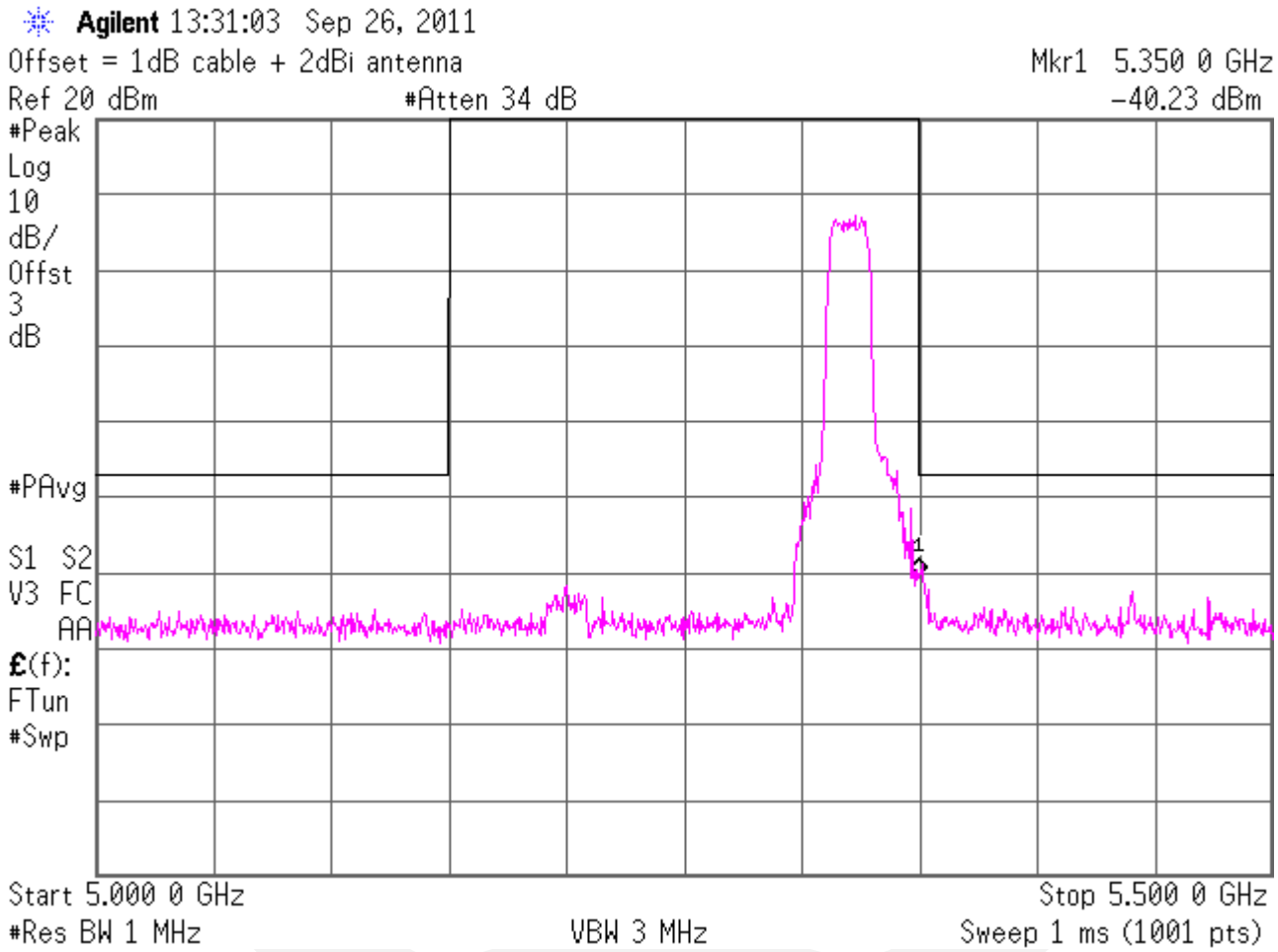

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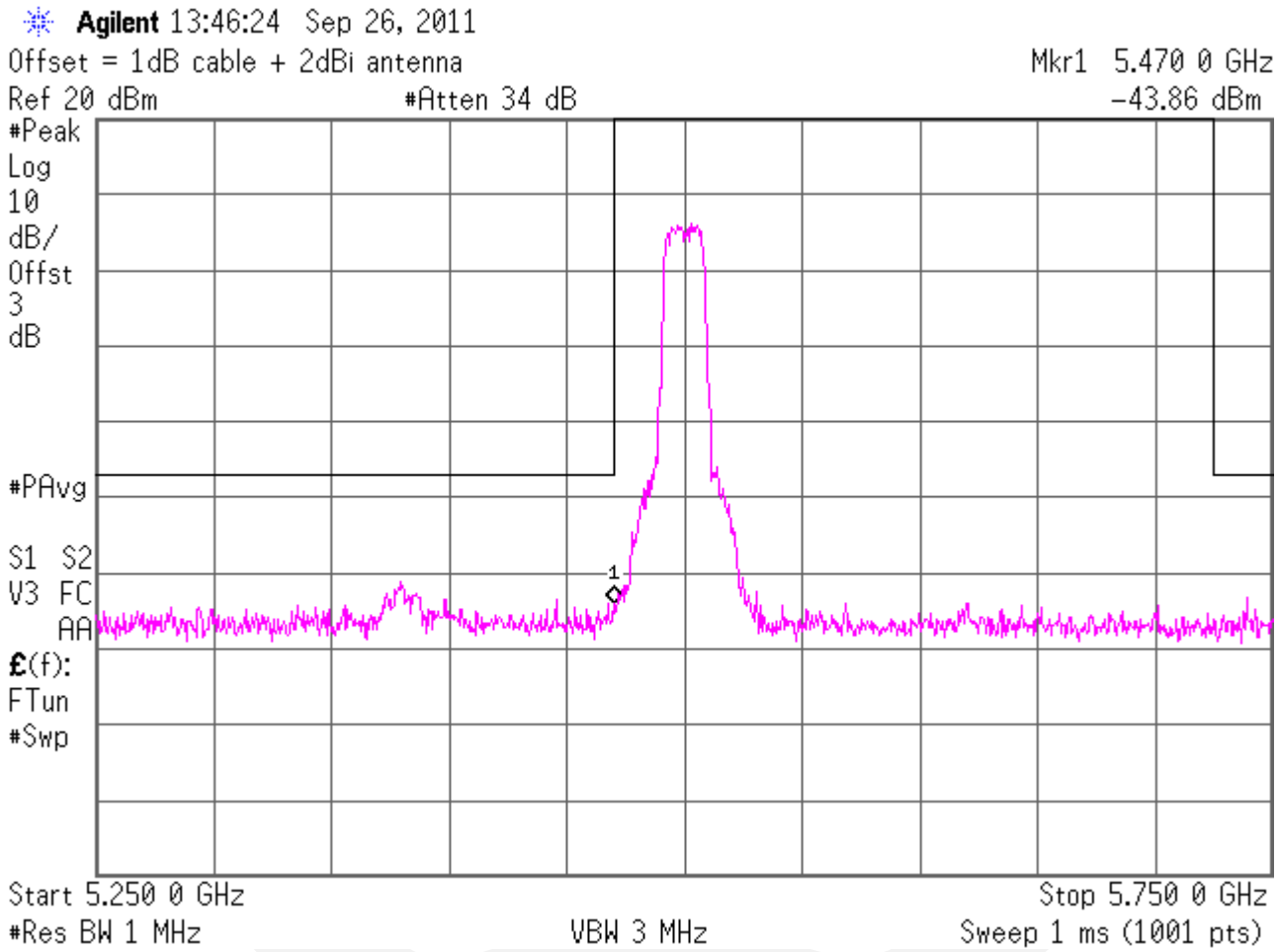
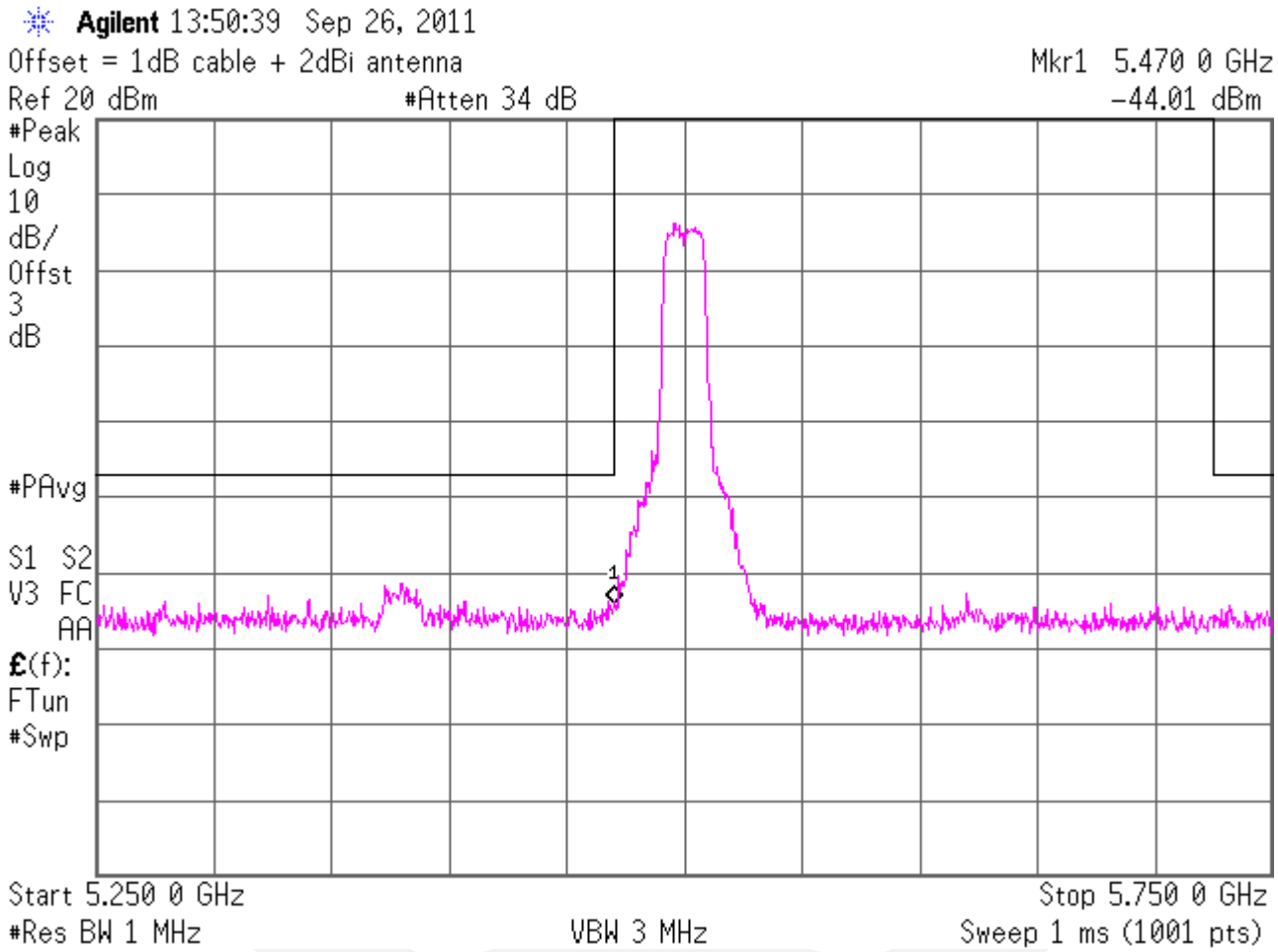
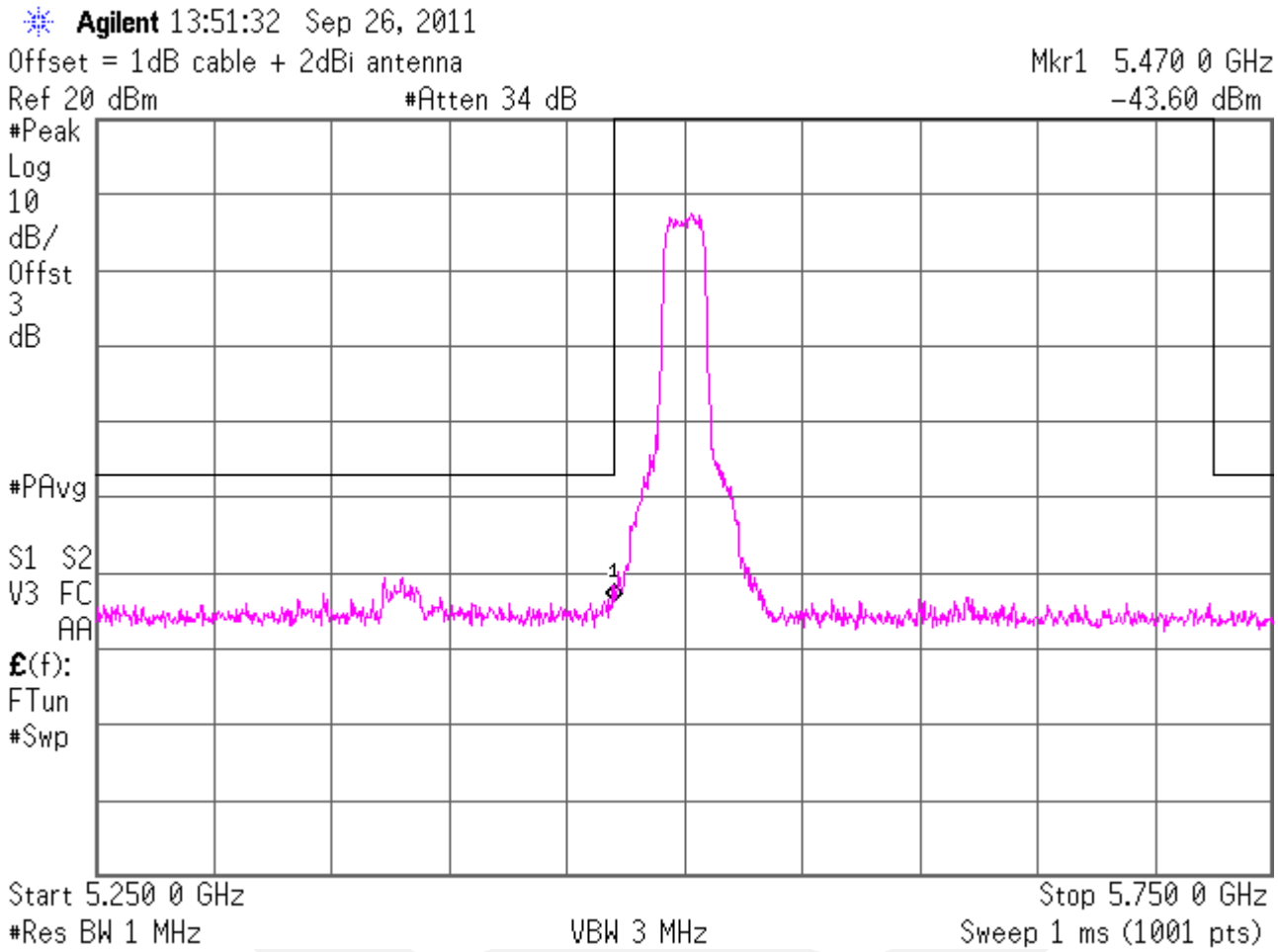
Channel 100, 6 Mb/s



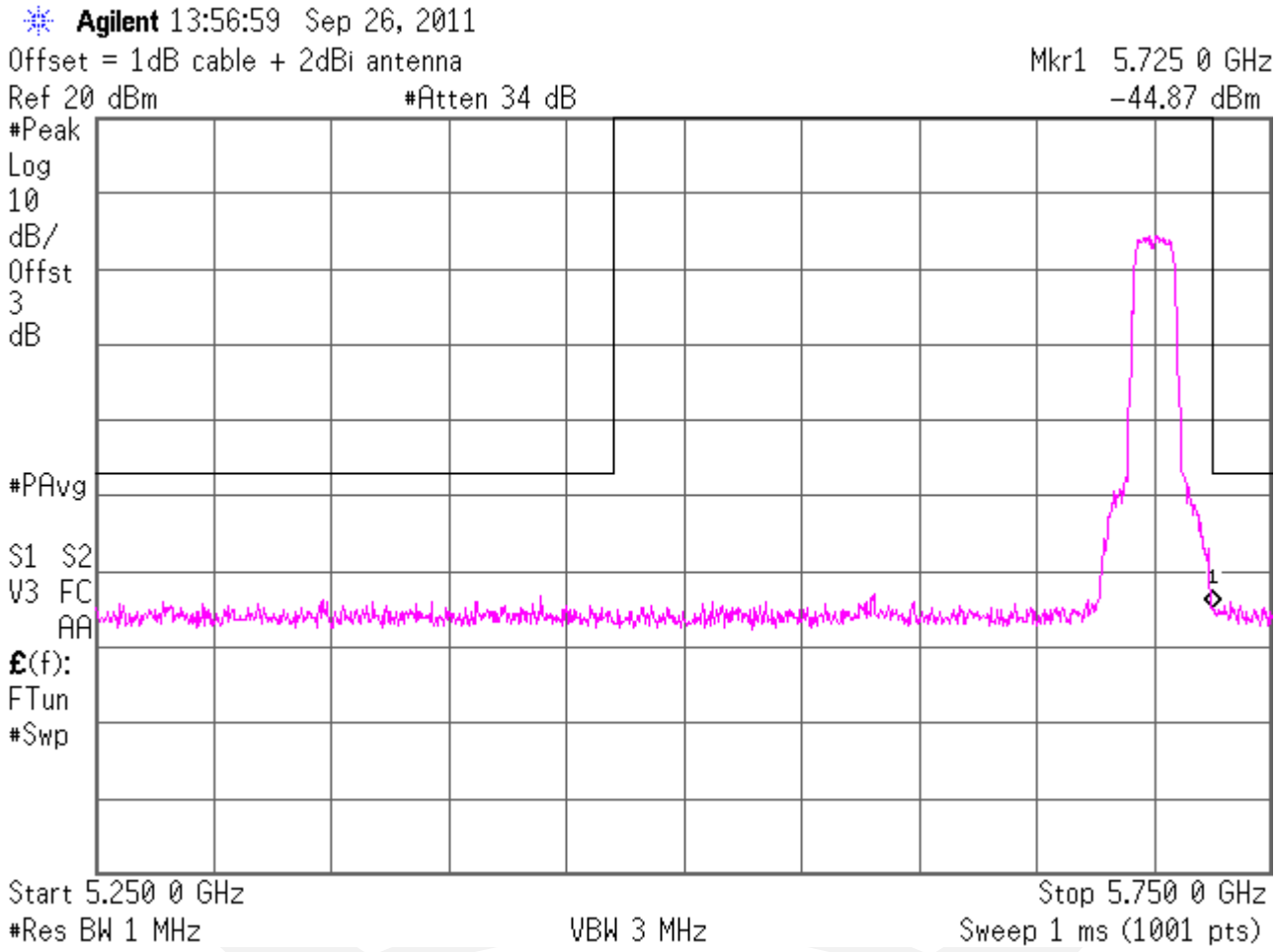
Bandedge
Channel 100, 12 Mb/s



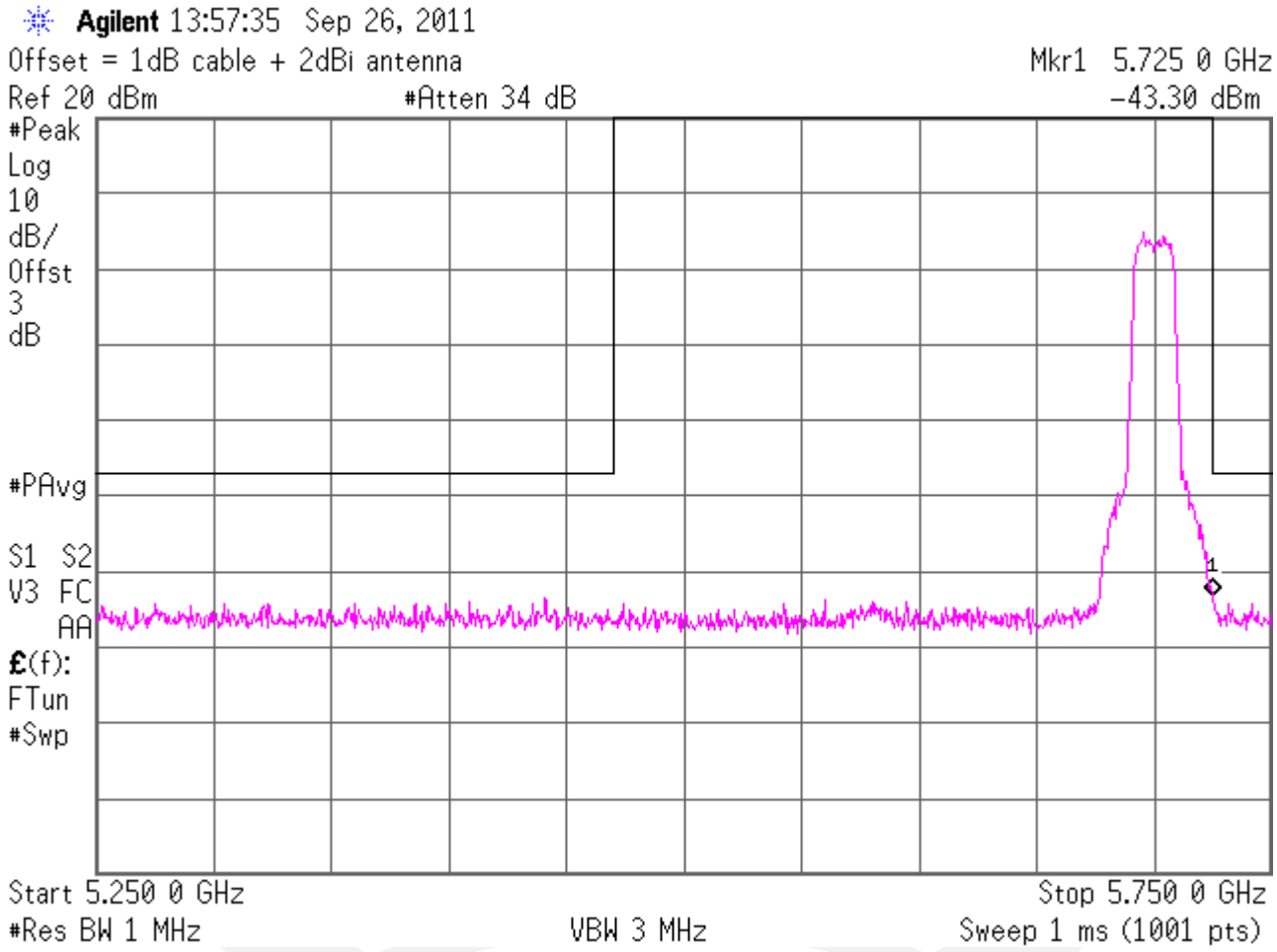
Bandedge
Channel 100, 54 Mb/s



Bandedge
Channel 140, 6 Mb/s



Bandedge
Channel 140, 12 Mb/s



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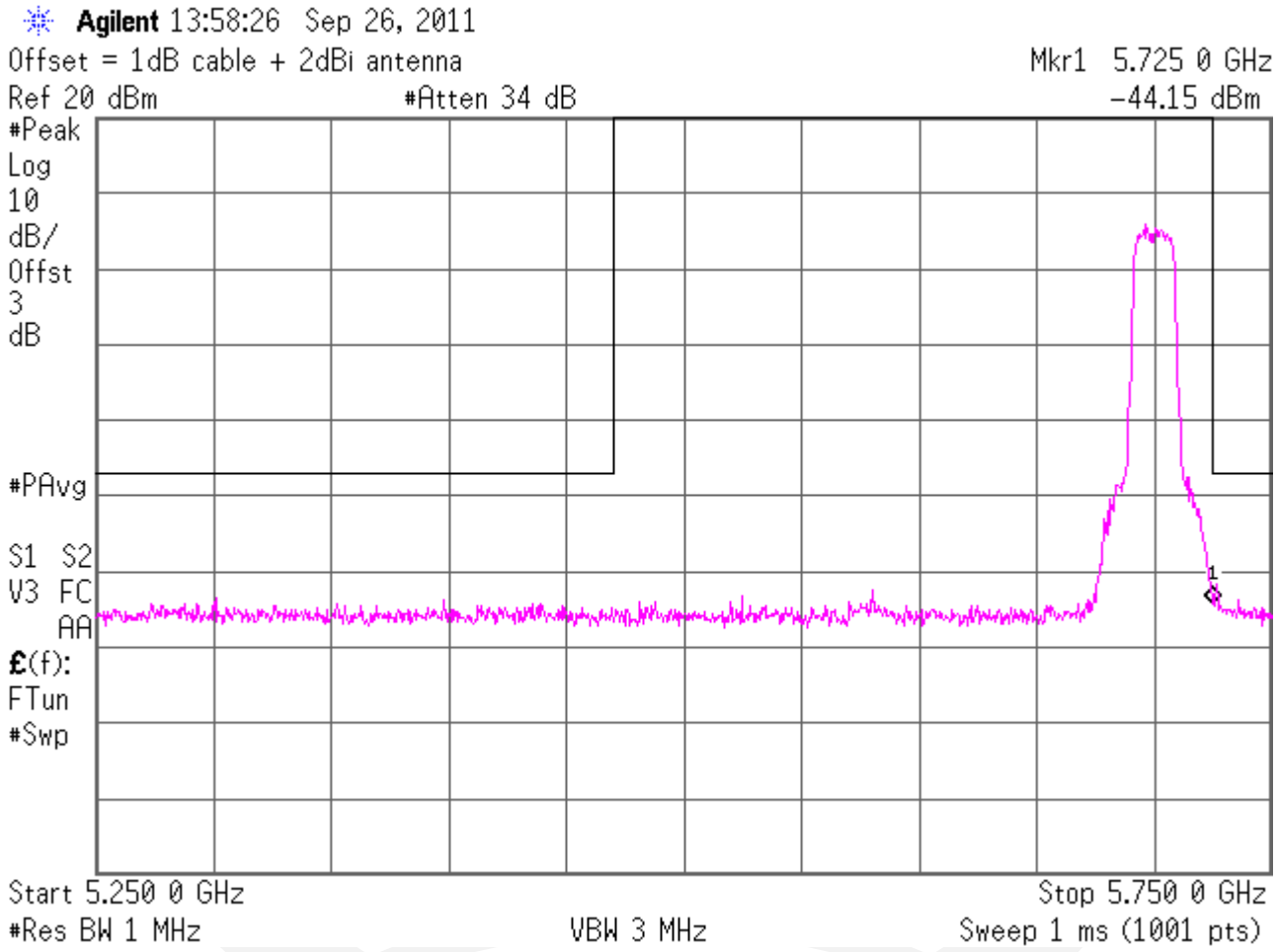
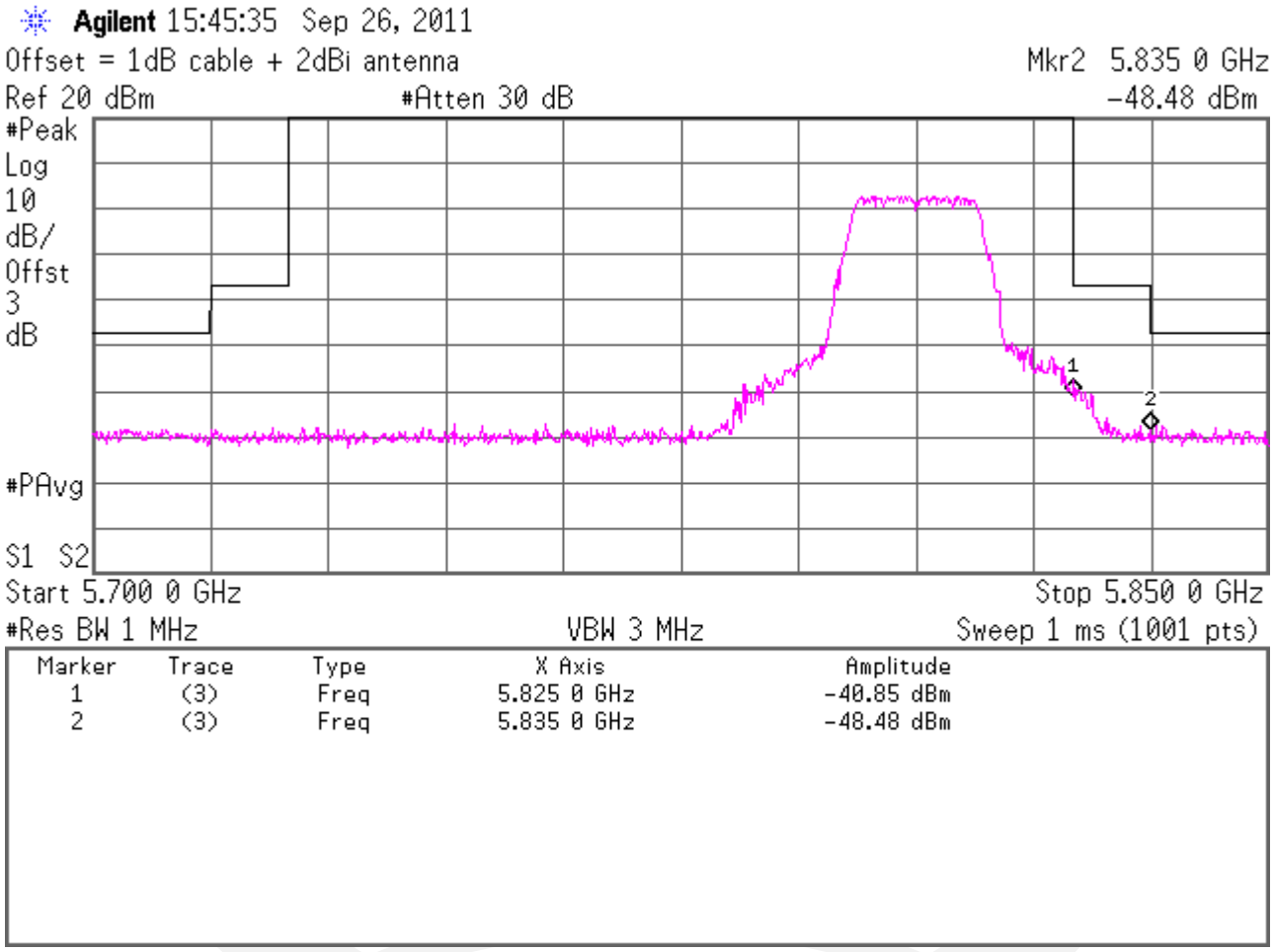
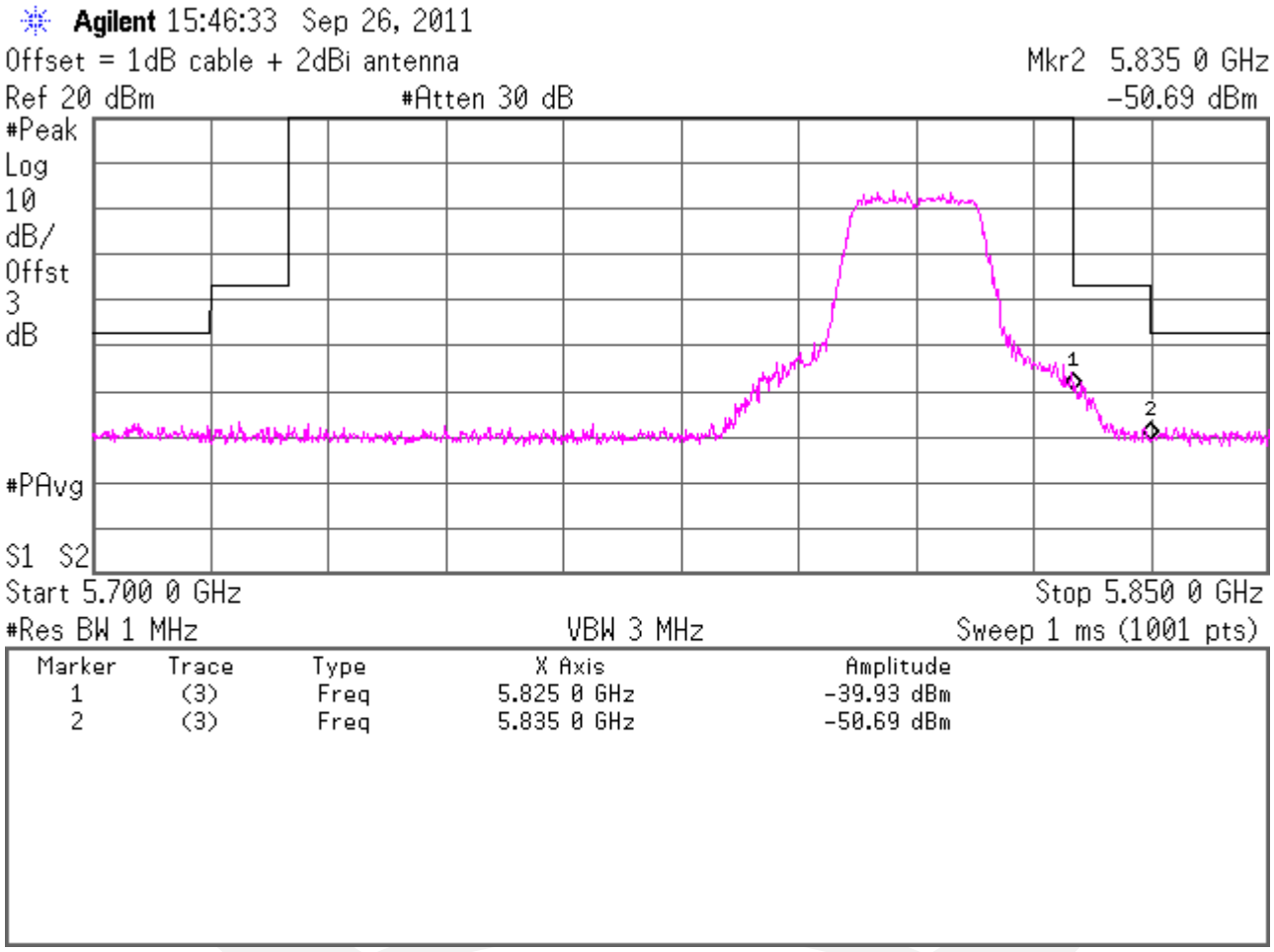


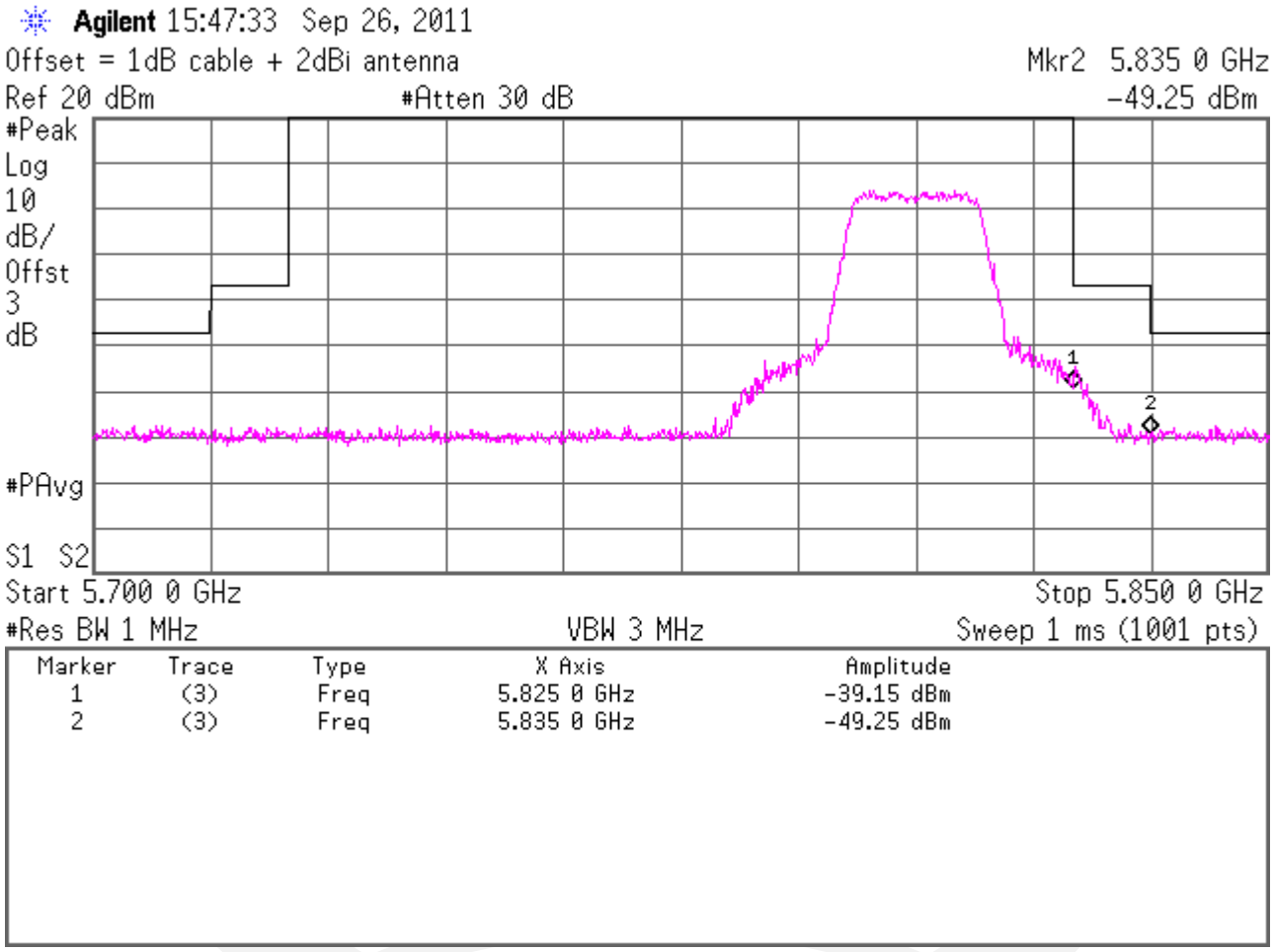
Bandedge
Channel 161, 6 Mb/s



Bandedge
Channel 161, 12 Mb/s

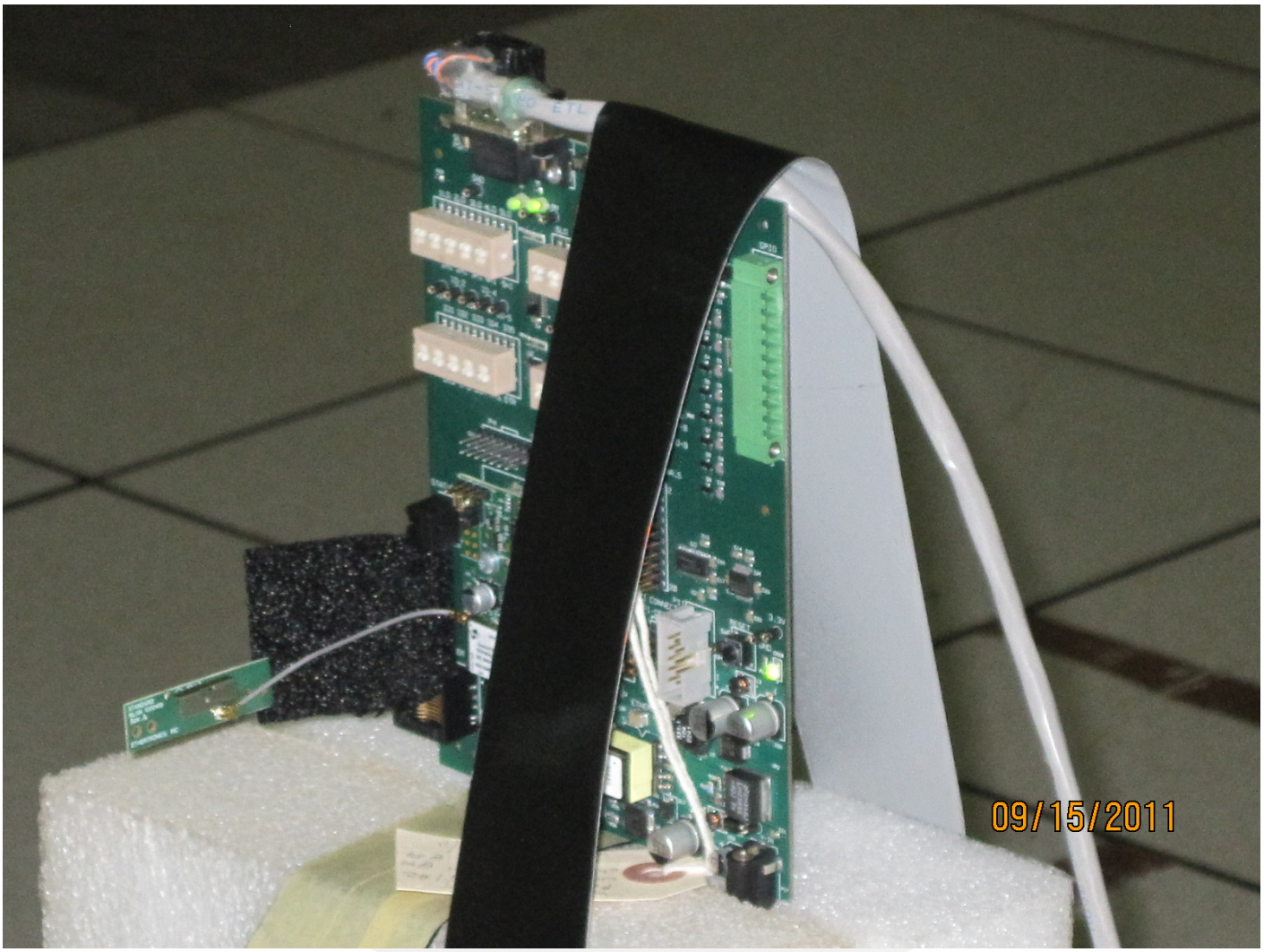


Bandedge
Channel 161, 54 Mb/s

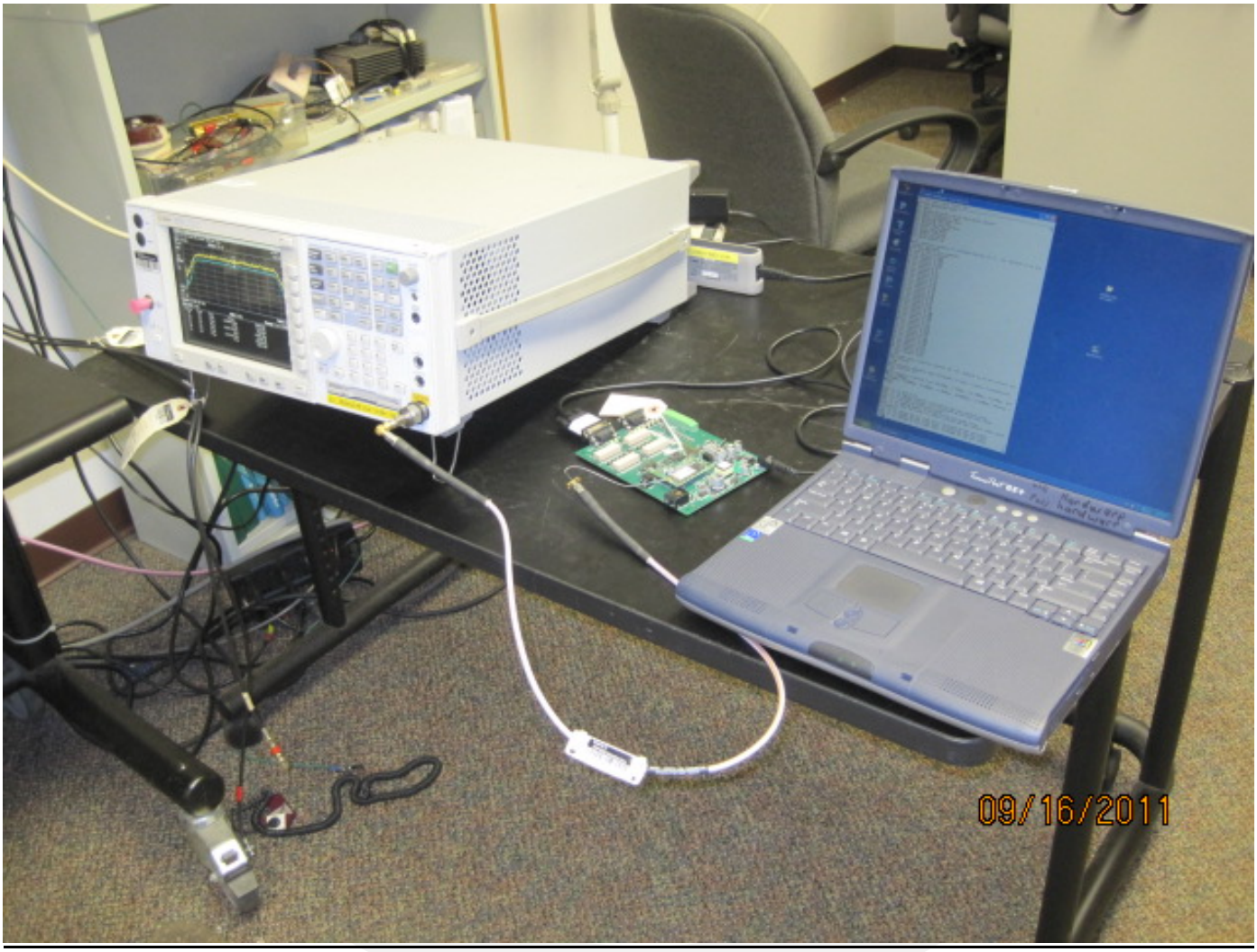


Test-setup photo(s):
Radiated measurements

Test-setup photo(s):
Radiated measurements



Test-setup photo(s):
Conducted measurements



Equipment Under Test (EUT) Test Operation Mode:

The device under test was operated under the following conditions during emissions testing:

☐ - Standby

☐ - Test program (H - Pattern)

☐ - Test program (color bar)

☐ - Test program (customer specific)

☐ - Practice operation

☐ - Normal Operating Mode

■ - See Software and/or Operating Modes in Appendix A

Configuration of the device under test:

■ - See Constructional Data Form and Block Diagram in Appendix A

☐ - See Product Information Form in Appendix B

GENERAL REMARKS:

None

Modifications required to pass:

■ None
☐ As indicated on the data sheet(s)

Test Specification Deviations: Additions to or Exclusions from:

■ None
☐ As indicated in the Test Plan
☐

SUMMARY:

The requirements according to the technical regulations are
■ - met and the equipment under test does fulfill the general approval requirements.
☐ - **not** met and the equipment under test does **not** fulfill the general approval requirements.

EUT Received Date:	16 September 2011
Condition of EUT:	Normal
Testing Start Date:	16 September 2011
Testing End Date:	30 September 2011

TÜV SÜD AMERICA INC

Tested by:

Greg S Jakubowski
Senior EMC Technician

Approved by:

Joel T Schneider
Senior EMC Engineer

Appendix A

Constructional Data Form

and

Block Diagram

Form

EMC Test Plan and Constructional Data Form

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE. IF TESTING RESULTS IN MODIFICATIONS TO THE EQUIPMENT, PLEASE SUBMIT A REVISED TP/CDF INDICATING THOSE MODIFICATIONS.
NOTE: This information will be input into your test report as shown below. Press the F1 key at any time to get HELP for the current field selected.

Company:	Digi International		
Address:	11001 Bren Road East		
	Minnetonka, MN 55343		
Contact:	Bill Kumpf	Position:	Hardware Engineer
Phone:	952-912-3245	Fax:	
E-mail Address:	bill_kumpf@digi.com		

General Equipment Description -- ***NOTE: This information will be input into your test report as shown below.***

EUT Description	802.11 a/b/g embedded radio module (802.11 a/b/g to a serial port converter module)
EUT Name	Connect WiEM 9210 a/b/g
Model No.:	Serial No.: 0000x
Product Options:	Antenna: 2dbi dual band PCB antenna
Configurations to be tested:	2dbi dual band PCB antenna

Equipment Modification (*If applicable, indicate modifications since EUT was last tested. If modifications are made during this testing, submit revised TP/CDF after testing is complete.)*

Modifications since last test:

Modifications made during test:

Test Objective(s): ***Please indicate the tests to be performed, entering the applicable standard(s) where noted.***

- ☒ EMC Directive 2004/108/EC (EMC) — Std:
- ☐ Machinery Directive 89/392/EEC (EMC) — Std:
- ☐ Medical Device Directive 93/42/EEC (EMC) — Std:
- ☐ Vehicle Directive: ☐ 2001/3/EC (EMC) ☐ 2004/104/EC (EMC) — ☐ Other Vehicle Std:
- ☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC)

- ☒ FCC: Class ☐ A ☒ B Part
- ☐ VCCI: Class ☐ A ☐ B
- ☐ BSMI: Class ☐ A ☐ B (Separate Report)
- ☐ Canada: Class ☐ A ☐ B
- ☐ Australia: Class ☐ A ☐ B
- ☐ Other:

Third Party Certification, if applicable (*Signature on Page 6 Required)

- ☐ Attestation of Conformity (AoC)*
- ☐ Certificate of Conformity (CoC)*
- Protection Class (N/A for vehicles) ☐ Class I ☐ Class II ☐ Class III
  (Press **F1** when field is selected to show additional information on Protection Class.)
- ☐ FCC / TCB Certification
- ☐ E-Mark Certification
- ☐ EMC Certification (used with Octagon Mark)*
- ☐ Compliance Document*
- ☐ Industry Canada / FCB Certification
- ☐ Taiwan Certification

Form

EMC Test Plan and Constructional Data Form

America

Attendance

Test will be: ☒ Attended by the customer ☐ Unattended by the customer

Failure - *Complete this section if testing will not be attended by the customer.*

If a failure occurs, TÜV SÜD America should:

☐ Call contact listed above, if not available then stop testing. (After hrs phone): _____
☐ Continue testing to complete test series.
☐ Continue testing to define corrective action.
☐ Stop testing.

EUT Specifications and Requirements

Length: 1.935" Width: 1.855" Height: 0.0653" Weight: _____

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 3.3V (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: 1

Current (Amps/phase(max)): 0.62 Current (Amps/phase(nominal)): 0.4

Other _____

Other Special Requirements

Run radiated and conducted immunity at 10 V/m.

Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)
Industrial and small business

EUT Power Cable

☐ Permanent OR ☐ Removable Length (in meters): _____
☐ Shielded OR ☐ Unshielded
☒ Not Applicable

Form

EMC Test Plan and Constructional Data Form

EUT Interface Ports and Cables														
			During Test			Shielding								
Type	Analog	Digital	Active	Passive	Qty	Yes	No	Type	Termination	Connector Type	Port Termination	Length tested (in meters)	Removable	Permanent
EXAMPLE: *RS232*	☐	☒	☒	☐	*2*	☒	☐	*Foil over braid*	*Coaxial*	*Metallized 9-pin D-Sub*	*Characteristic Impedance*	*6*	☒	☐
Serial Cable	☐	☒	☐	☒	2	☒	☐	Foil over braid	Connector Shell			1	☒	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☒	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐

Form

EMC Test Plan and Constructional Data Form

America

EUT Software.

Revision Level: A

Description: FCC Software - transmits data over wireless interface

Equipment Under Test (EUT) Operating Modes to be Tested -- list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV Product Service Representative if additional assistance is required.

1. Radiated emissions - UUT running code to transmit continuously over wireless interface.

2. Conducted emissions - UUT running FCC code to transmit continuously over wireless interface. Spectrum analyzer connected to primary antenna port.

3.

Equipment Under Test (EUT) System Components -- List and describe all components which are part of the EUT. For FCC & Taiwan testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc)

Description	Model #	Serial #	FCC ID #

Form

EMC Test Plan and Constructional Data Form

America

Support Equipment -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc) This information is required for FCC & Taiwan testing.

Description	*Model #*	*Serial #*	*FCC ID #*
Latptop	Micron Transport GX+		
Digi WiEM Development Board	55001095-01 Rev B		

Oscillator Frequencies

Manufacturer	*Frequency*	*Derived Frequency*	*Component # / Location*	*Description of Use*
	20.000 MHz		Y1	Baseband processor, RF transceiver
	29.4912 MHz		X1	Microprocessor
	2.4 GHz (PLL)			Radio frequency
	5.0 GHz (PLL)			Radio frequency

Power Supply

Manufacturer	*Model #*	*Serial #*	*Type*
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____

Power Line Filters

Manufacturer	*Model #*	*Location in EUT*

Form

EMC Test Plan and Constructional Data Form

America

Critical EMI Components (Capacitors, ferrites, etc.)				
Description	***Manufacturer***	***Part # or Value***	***Qty***	***Component # / Location***

EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.

PLEASE ENTER NAMES BELOW (INSERT ELECTRONIC SIGNATURE IF POSSIBLE)

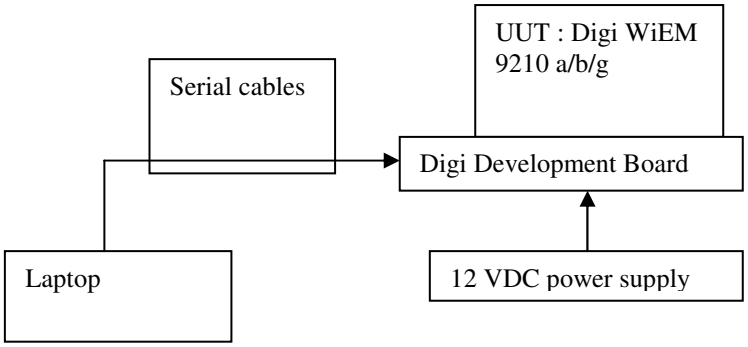
Authorization (Signature Required if a Third Party Certification is checked on pg 1)

Customer authorization to perform tests according to this test plan.	Date
Test Plan/CDF Prepared By (please print)	Date

Form

EMC Block Diagram Form

System Configuration Block Diagram -- Provide a line drawing identifying the EUT, simulators, support equipment, I/O cables, power cables, and any other pertinent components to be used during testing. Use a dashed line to separate the equipment in the testing field versus equipment outside testing field.



Authorization Signatures

Customer authorization to perform tests according to this test plan. — Date

Test Plan/CDF Prepared By (please print) — Date

Appendix B

Measurement Protocol

MEASUREMENT PROTOCOL

GENERAL INFORMATION

Test Methodology

Emissions testing is performed according to the procedures in ANSI C63.4-2003, FCC KDB Publication 558074, the article "The Measurement of Occupied Bandwidth" by Industry Canada's certification bureau, & FCC KDB 789033.

Measurement Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system has a measurement uncertainty of ±1.8 dB. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. The test system has a measurement uncertainty of ±4.8 dB. The equipment comprising the test systems is calibrated on an annual basis.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into its characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

Conducted Emissions

Final measurement levels are determined by connecting the antenna port of the DUT to a spectrum analyzer input via coaxial adapters, high frequency coax, and attenuators as necessary. The loss created by the interconnect apparatus is offset by settings within the analyzer. Specific analyzer settings are determined by the procedures throughout this report.

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 1000 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth, and peak and average detection. The antenna is positioned 3 meters horizontally from the EUT. The antenna height is positioned 1-4 meters above the ground plane. Measurement scans are made with both horizontal and vertical antenna polarizations. Average measurements above 1 GHz are achieved using a peak detector with 1 MHz RBW and 10 Hz VBW.

The final level, in dBμV/m, equals the reading from the spectrum analyzer (Level dBμV), adding the antenna correction factor and cable loss factor (Factor dB) to it, and subtracting the preamp gain (and duty cycle correction factor, if applicable). This result then has the limit subtracted from it to provide the Delta, which gives the tabular data as shown in the data. Intentional radiators are rotated through 3 orthogonal axes to determine the test position yielding the maximum emission levels.

Example:

FREQ (MHz)	LEVEL (dBuV)		CABLE/ANT/PREAMP (dB)	(dB/m)	(dB)	FINAL (dBuV/m)	POL/HGT/AZ	(m)	(deg)	DELTA1
60.80	42.5Qp	+	1.2	+ 10.9	- 25.5 =	29.1	V	1.0	0.0	-10.9

.

Test Equipment

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.