

TEST RESULT SUMMARY

FCC Part 15 Subpart C Section 15.247

FCC Part 15 Subpart C Section 15.207

Industry Canada RSS-210 Issue 8

Industry Canada RSS-Gen Issue 3

MANUFACTURER	Digi International 11001 Bren Road East Minnetonka MN 55343
DESCRIPTION OF EQUIPMENT	Serial to 802.11 b/g/n Module
NAME OF EQUIPMENT	Connect Wi-ME 9210
MODEL NUMBER(S) TESTED	Connect Wi-ME 9210
SERIAL NUMBER(S) TESTED	00001
TEST REPORT NUMBER	WC1102424 Rev A
TEST DATE(S)	17 January - 20 April 2011

TÜV SÜD America Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the applicable requirements of FCC Part 15, Subpart C, Sections 15.247 "Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz", and 15.207 "Conducted limits" and Industry Canada RSS-210 Issue 8 "Licence-exempt Radio Apparatus (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.

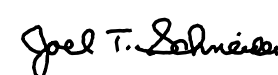
Date: 09 August 2011

Tested by:

Approved by:

Location: Taylors Falls MN
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Not Transferable

EMC TEST REPORT

Test Report No. WC1102424 Rev A Date of issue: 09 August 2011

Product Description Serial to 802.11 b/g/n Module

Product Name Connect Wi-ME 9210

Model No(s) Tested Connect Wi-ME 9210

Serial No(s) Tested 00001

Manufacturer Digi International

Address 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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REVISION RECORD

REVISION	TOTAL NUMBER OF PAGES	DATE	DESCRIPTION
	84	10 June 2011	Initial Release
A	84	09 Aug 2011	Revised power output test summary to include option 2. Revised PSD test summary and data per FCC guidelines, option 2.



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EMC TEST REGULATIONS:

The tests were performed according to the following regulations:

- FCC Part 15 Subpart C Section 15.247 Paragraphs (a)(2), (b)(3), (d), (e)
- FCC Part 15 Subpart C Section 15.207 Paragraphs (a)
- 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 Sections 4.6.1, 7.2.4

ENVIRONMENTAL CONDITIONS IN THE LAB

	<u>Actual</u>
Temperature:	: 21-23°C
Atmospheric pressure	: 98-99 kPa
Relative Humidity	: 13-35%

POWER SUPPLY UTILIZED

Power supply system : 3.3 VDC

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.

6 dB Bandwidth

FCC 15.247(a)(2), IC RSS-210 A8.2(a)

Test summary

The requirements are: ■ - MET □ - NOT MET

Testing was performed in accordance with the test procedure of FCC KDB Publication 558074

The minimum 6 dB bandwidth = 9.84 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
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	09-Aug-11

Test limit

500 kHz minimum

Test data

See following pages

6 dB Bandwidth
Channel 1, 11 Mbps

Agilent 09:24:57 Jan 17, 2011

▲ Mkr2 10.08 MHz
0.13 dB

Ref 116 dBμV

#Atten 30 dB

#Peak

Log

2

dB/

Offst

0.5

dB

DI

107.8

dBμV

LgAv

S1 S2

Center 2.412 00 GHz

Span 20 MHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 1.933 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.413 90 GHz	113.79 dBμV
2R	(3)	Freq	2.406 88 GHz	107.64 dBμV
2Δ	(3)	Freq	10.08 MHz	0.13 dB

6 dB Bandwidth
Channel 1, 54 Mbps

Agilent 08:33:28 Jan 27, 2011

▲ Mkr2 16.54 MHz
0.39 dB

Ref 112 dBμV

#Atten 30 dB

#Peak

Log

2

dB/

Offst

0.5

dB

DI

102.5

dBμV

LgAv

S1 S2

Center 2.412 00 GHz

Span 20 MHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 1.933 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.411 32 GHz	108.54 dBμV
2R	(3)	Freq	2.403 72 GHz	102.11 dBμV
2Δ	(3)	Freq	16.54 MHz	0.39 dB

6 dB Bandwidth
Channel 1, 65 Mbps

Agilent 09:05:22 Apr 7, 2011

▲ Mkr2 17.78 MHz
0.42 dB

Ref 110 dBμV

Atten 20 dB

#Peak

Log

2

dB/

Offst

0.5

dB

DI

101.2

dBμV

LgAv

S1 S2

Center 2.412 00 GHz

Span 20 MHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 1.933 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.416 98 GHz	107.15 dBμV
2R	(3)	Freq	2.403 10 GHz	100.82 dBμV
2Δ	(3)	Freq	17.78 MHz	0.42 dB

6 dB Bandwidth
Channel 6, 11 Mbps

Agilent 09:29:56 Jan 17, 2011

▲ Mkr2 10.14 MHz
-0.55 dB

Ref 116 dBμV

#Atten 30 dB

#Peak

Log

2

dB/

Offst

0.5

dB

DI

107.8

dBμV

LgAv

S1 S2

Center 2.437 00 GHz

Span 20 MHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 1.933 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.438 90 GHz	114.11 dBμV
2R	(3)	Freq	2.431 84 GHz	107.97 dBμV
2Δ	(3)	Freq	10.14 MHz	-0.55 dB

6 dB Bandwidth
Channel 6, 54 Mbps

Agilent 08:44:15 Jan 27, 2011

▲ Mkr2 16.54 MHz
0.41 dB

Ref 112 dBμV

#Atten 30 dB

#Peak

Log

2

dB/

Offst

0.5

dB

DI

101.9

dBμV

LgAv

S1 S2

Center 2.437 00 GHz

Span 20 MHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 1.933 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.442 00 GHz	107.95 dBμV
2R	(3)	Freq	2.428 72 GHz	101.41 dBμV
2Δ	(3)	Freq	16.54 MHz	0.41 dB

6 dB Bandwidth
Channel 6, 65 Mbps

Agilent 09:11:07 Apr 7, 2011

▲ Mkr2 17.76 MHz
0.81 dB

Ref 110 dB μ V

Atten 20 dB

#Peak

Log

2

dB/

Offst

0.5

dB

DI

101.0

dB μ V

LgAv

S1 S2

Center 2.437 00 GHz

Span 20 MHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 1.933 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.435 40 GHz	107.00 dB μ V
2R	(3)	Freq	2.428 12 GHz	100.62 dB μ V
2Δ	(3)	Freq	17.76 MHz	0.81 dB

6 dB Bandwidth
Channel 11, 11 Mbps

Agilent 09:37:48 Jan 17, 2011

▲ Mkr2 9.84 MHz
0.07 dB

Ref 116 dB μ V

#Atten 30 dB

#Peak

Log

2

dB/

Offst

0.5

dB

DI

108.2

dB μ V

LgAv

S1 S2

Center 2.462 00 GHz

Span 20 MHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 1.933 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.462 76 GHz	114.19 dB μ V
2R	(3)	Freq	2.457 02 GHz	107.85 dB μ V
2▲	(3)	Freq	9.84 MHz	0.07 dB

6 dB Bandwidth
Channel 11, 54 Mbps

Agilent 09:00:42 Jan 27, 2011

▲ Mkr2 16.52 MHz
-0.13 dB

Ref 112 dBμV

#Atten 30 dB

#Peak

Log

2

dB/

Offst

0.5

dB

DI

101.7

dBμV

LgAv

S1 S2

Center 2.462 00 GHz

Span 20 MHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 1.933 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.460 74 GHz	107.70 dBμV
2R	(3)	Freq	2.453 74 GHz	101.92 dBμV
2▲	(3)	Freq	16.52 MHz	-0.13 dB

6 dB Bandwidth
Channel 11, 65 Mbps

Agilent 09:13:28 Apr 7, 2011

▲ Mkr2 17.78 MHz
0.56 dB

Ref 110 dBμV

Atten 20 dB

#Peak

Log

2

dB/

Offst

0.5

dB

DI

101.1

dBμV

LgAv

S1 S2

Center 2.462 00 GHz

Span 20 MHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 1.933 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.462 98 GHz	107.06 dBμV
2R	(3)	Freq	2.453 10 GHz	100.43 dBμV
2Δ	(3)	Freq	17.78 MHz	0.56 dB

Power output

FCC 15.247(b)(3), IC RSS-210 A8.4(4)

Test summary

The requirements are: ■ - MET □ - NOT MET

Testing was performed in accordance with "Measurement of Digital Transmission Systems Operating under Section 15.247. March 23, 2005" Option 2, method 1

Conducted measurements were made at the antenna port

The power settings for the device are dependent on the data rate; power setting 62 for the 11MB data rate, power setting 55 for the 54MB & 65MB data rates.

The maximum power output measured is 42.15 mW

The antenna gain is 2.0 dBi.

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
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	09-Aug-11

Test limit

1 watt

Test Data

Channel	Data rate (Mbps)	Power output (mW)
1	11	42.15
6	11	40.94
11	11	39.95
1	54	19.36
6	54	19.11
11	54	17.62
1	65	18.52
6	65	18.15
11	65	17.54

See following pages

26 dB EBW
11 Mbps

Agilent 10:04:15 Jan 17, 2011

▲ Mkr2 14.80 MHz
1.27 dB

Ref 120 dB μ V

Atten 30 dB

#Peak

Log

10

dB/

DI

87.3
dB μ V

LgAv

S1 S2

Center 2.437 00 GHz

Span 50 MHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 4.8 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.438 45 GHz	113.28 dB μ V
2R	(3)	Freq	2.429 55 GHz	85.34 dB μ V
2Δ	(3)	Freq	14.80 MHz	1.27 dB

26 dB EBW
54 Mbps

* Agilent 09:05:21 Jan 27, 2011

▲ Mkr2 19.60 MHz
2.00 dB

Ref 120 dB μ V

#Atten 30 dB

#Peak

Log

10

dB/

Offst

0.5

dB

DI

81.5

dB μ V

LgAv

S1 S2

Center 2.437 00 GHz

Span 50 MHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 4.8 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.429 75 GHz	107.45 dB μ V
2R	(3)	Freq	2.427 15 GHz	80.90 dB μ V
2Δ	(3)	Freq	19.60 MHz	2.00 dB

26 dB EBW
65 Mbps

Agilent 09:18:34 Apr 7, 2011

▲ Mkr2 20.25 MHz
0.01 dB

Ref 120 dBμV

Atten 30 dB

#Peak

Log

10

dB/

Offst

0.5

dB

DI

80.7

dBμV

LgAv

S1 S2

Center 2.437 00 GHz

Span 50 MHz

#Res BW 100 kHz

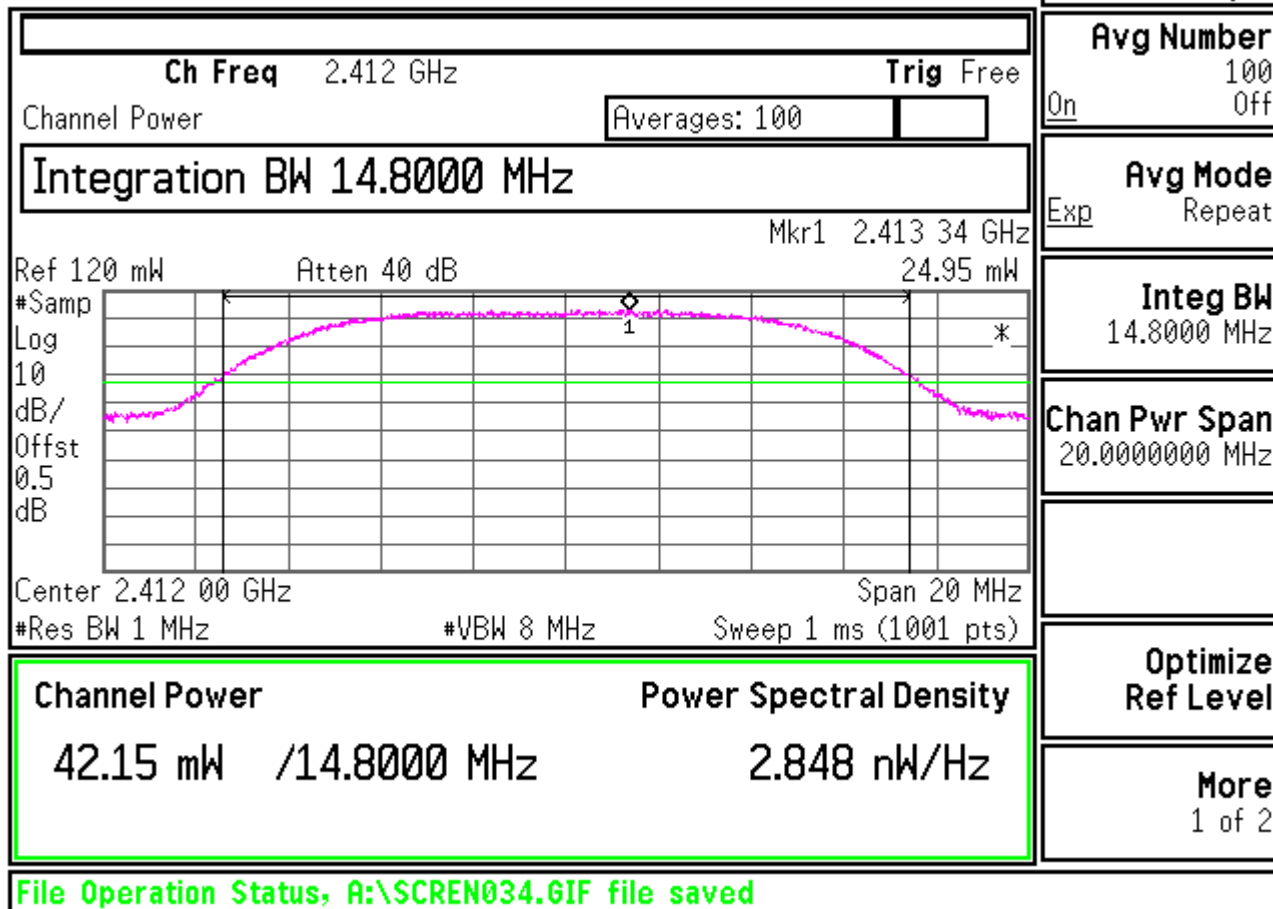
VBW 300 kHz

Sweep 4.8 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.438 60 GHz	106.71 dBμV
2R	(3)	Freq	2.426 90 GHz	80.70 dBμV
2Δ	(3)	Freq	20.25 MHz	0.01 dB

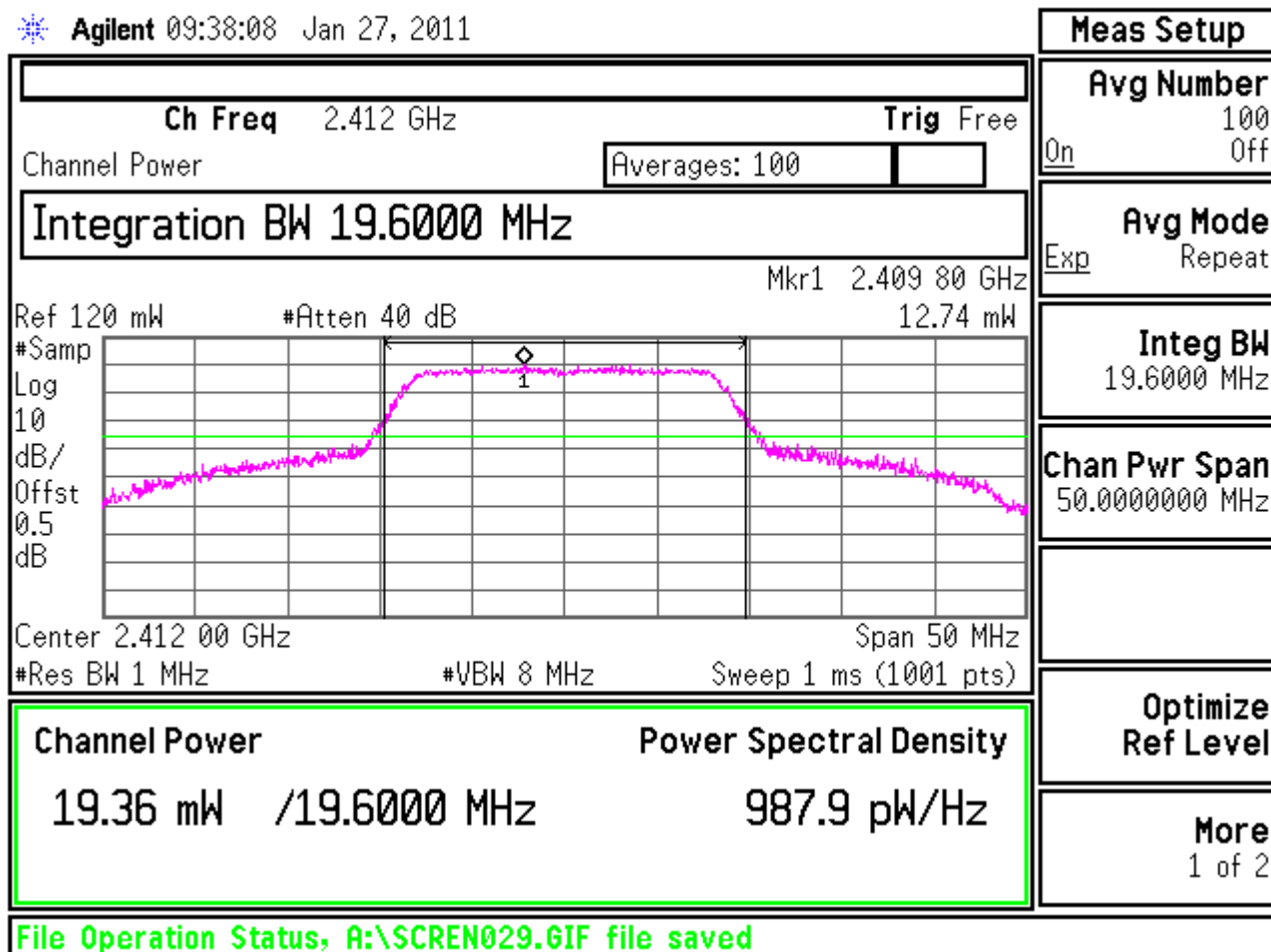
Power output
Channel 1, 11 Mbps

Agilent 11:03:11 Jan 17, 2011



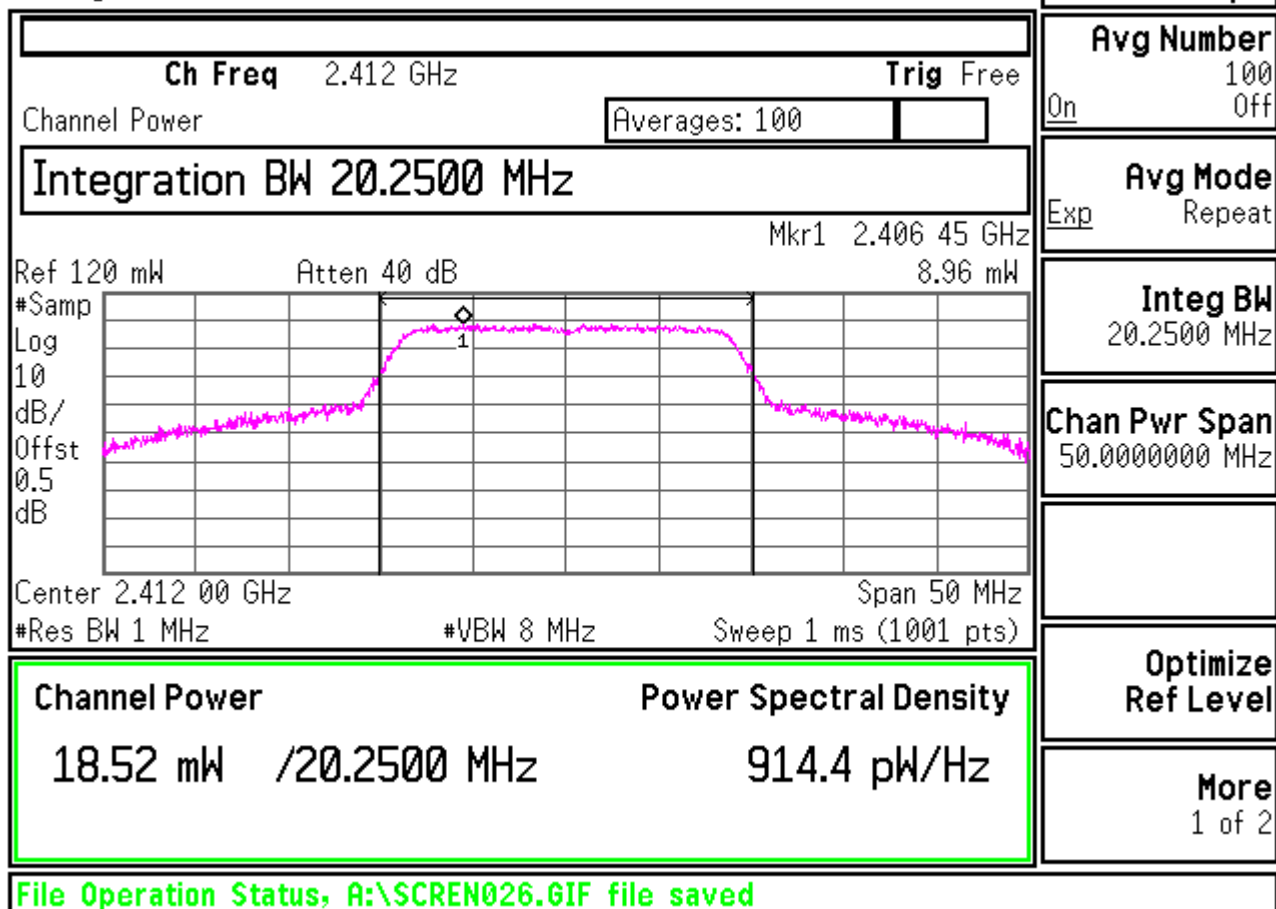
Power output
Channel 1, 54 Mbps

Agilent 09:38:08 Jan 27, 2011



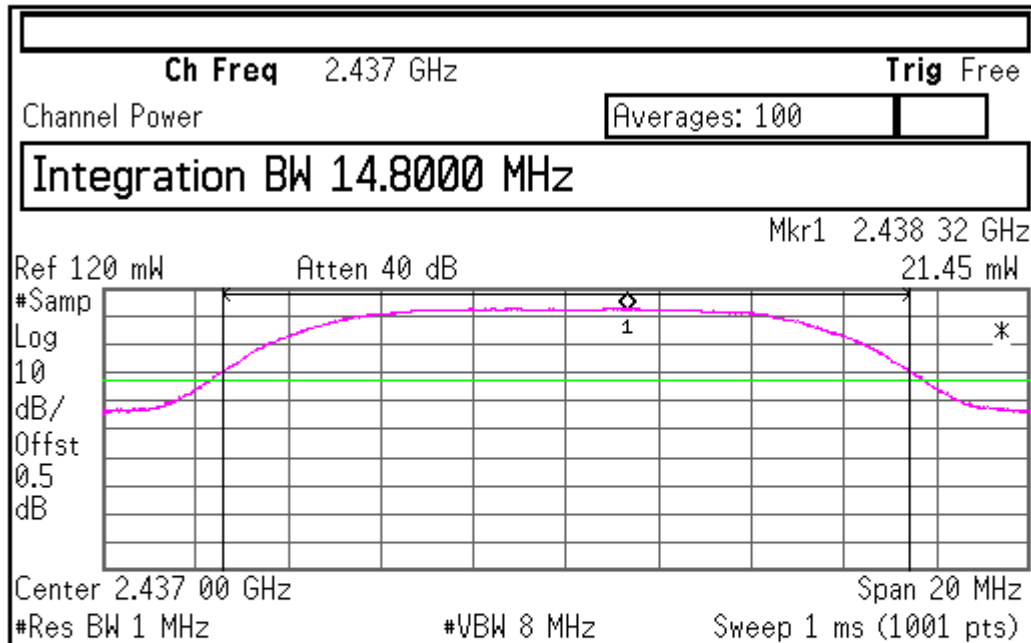
Power output
Channel 1, 65 Mbps

Agilent 09:34:34 Apr 7, 2011



Power output
Channel 6, 11 Mbps

Agilent 11:00:57 Jan 17, 2011



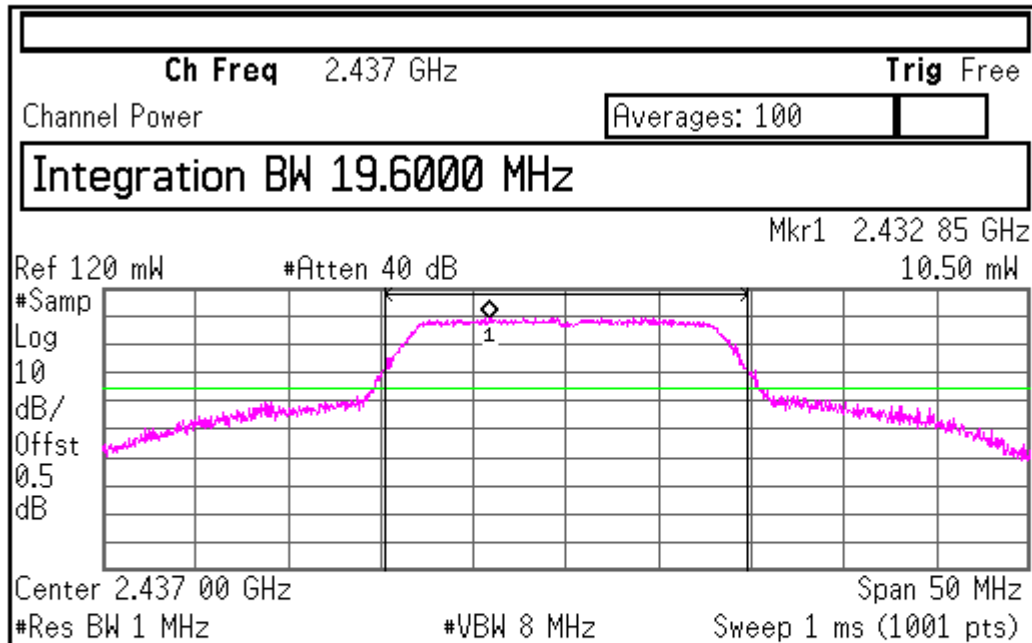
Meas Setup	
Avg Number	100
On	Off
Avg Mode	Repeat
Exp	
Integ BW	14.8000 MHz
Chan Pwr Span	20.0000000 MHz
Optimize Ref Level	
More	1 of 2

Channel Power	Power Spectral Density
40.94 mW /14.8000 MHz	2.766 nW/Hz

File Operation Status, A:\SCREN033.GIF file saved

Power output
Channel 6, 54 Mbps

Agilent 09:36:30 Jan 27, 2011

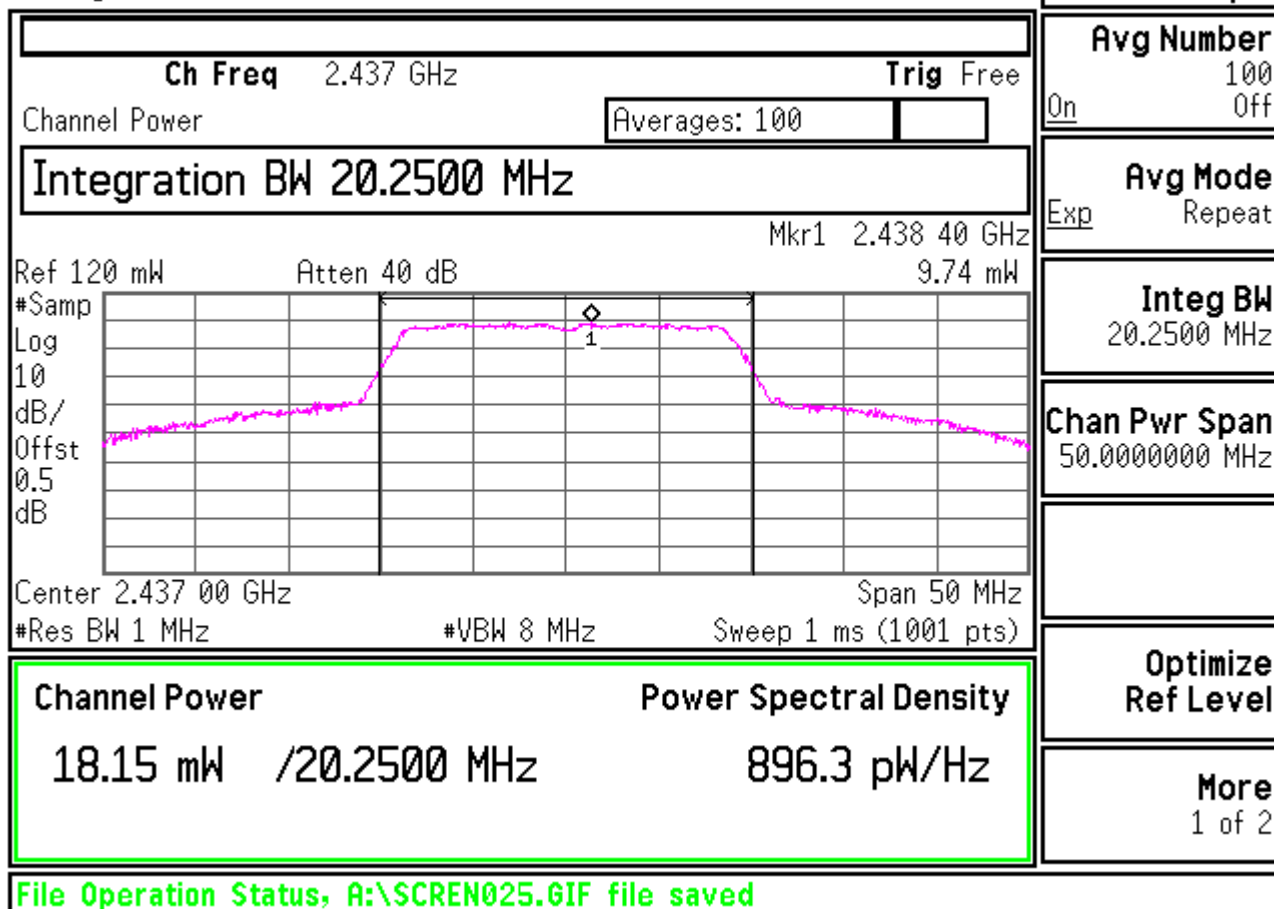


Meas Setup	
Avg Number	100
On	Off
Avg Mode	Repeat
Exp	
Integ BW	19.6000 MHz
Chan Pwr Span	50.0000000 MHz
Optimize	Ref Level
More	1 of 2

File Operation Status, A:\SCREN028.GIF file saved

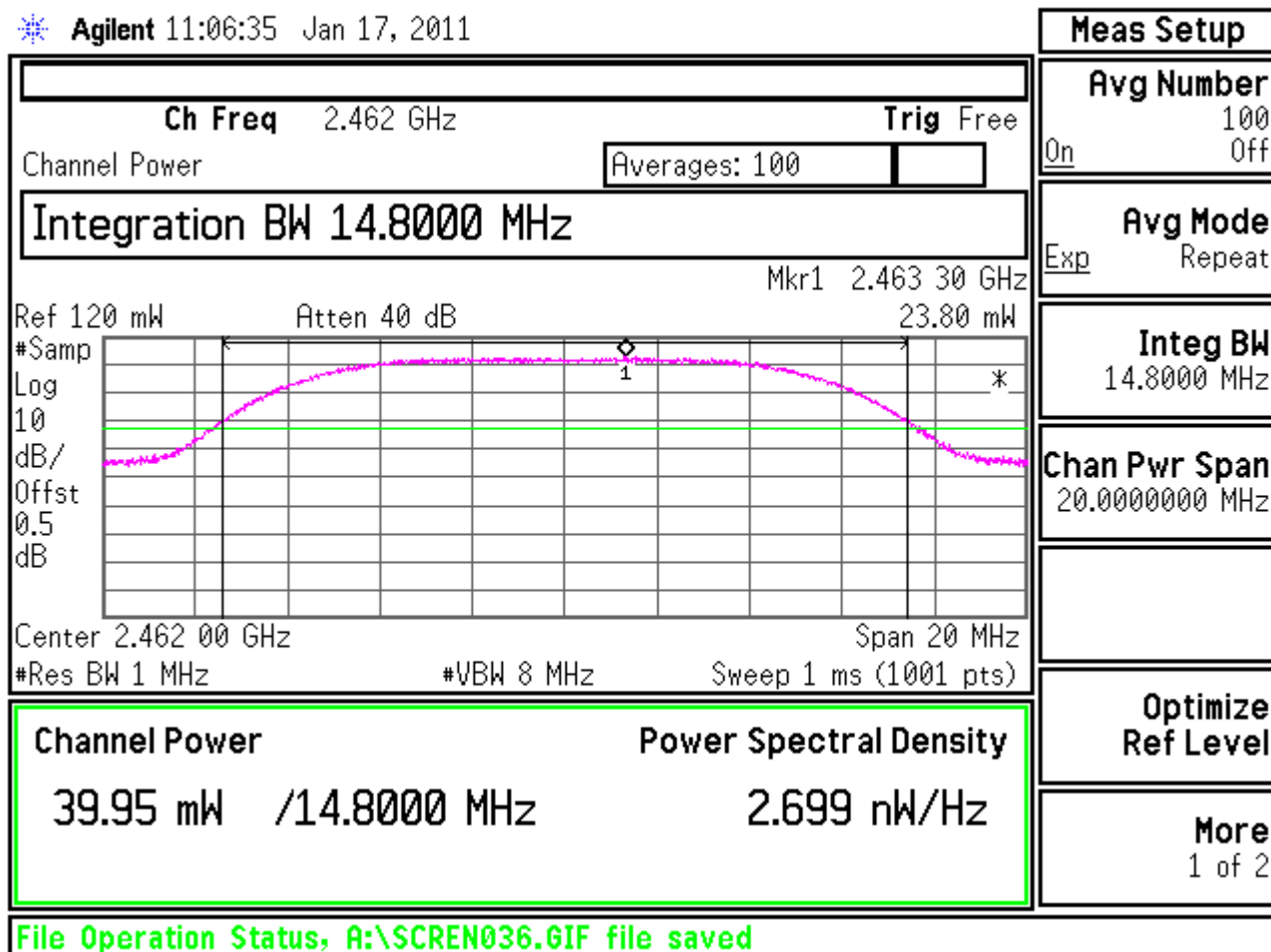
Power output
Channel 6, 65 Mbps

Agilent 09:31:04 Apr 7, 2011



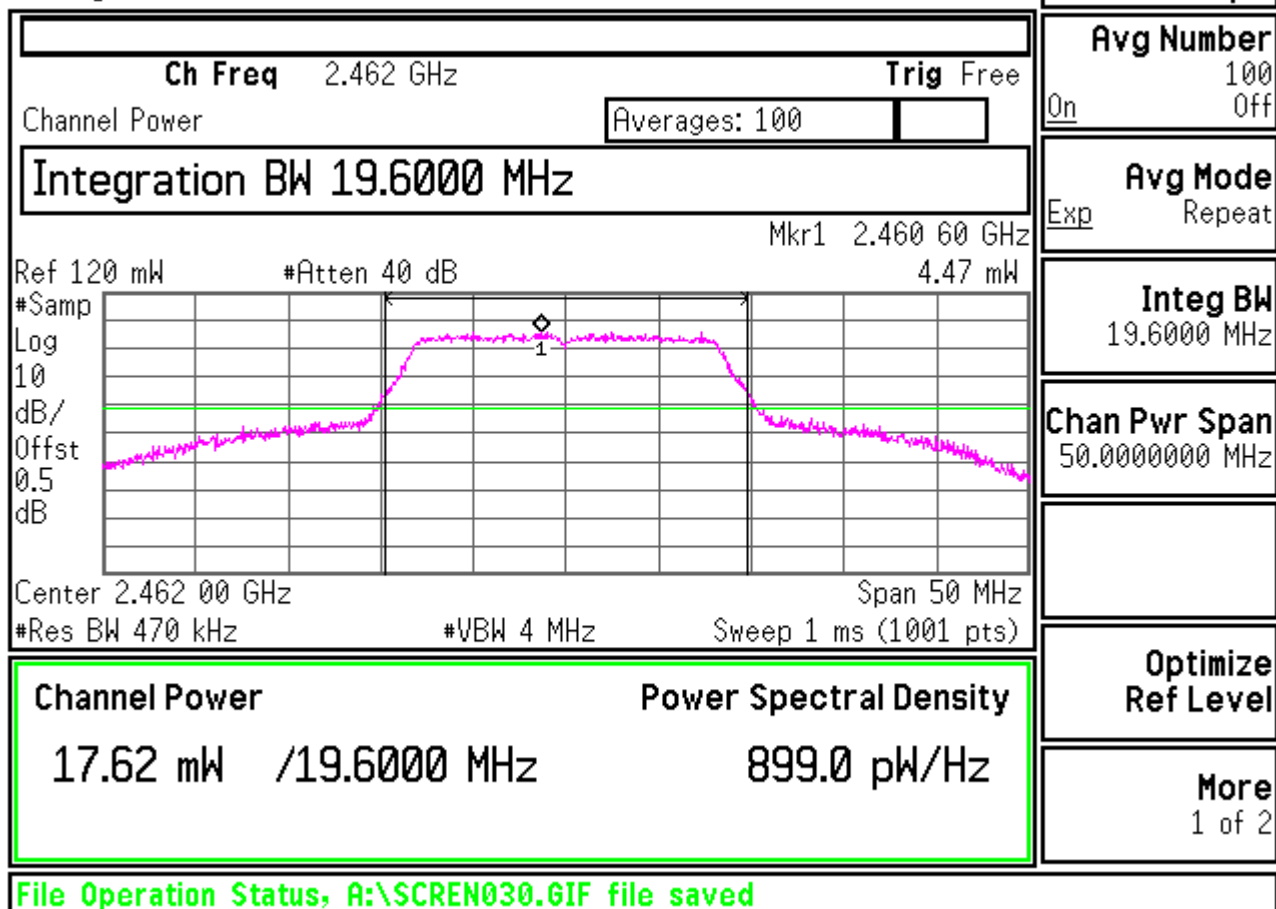
Power output
Channel 11, 11 Mbps

Agilent 11:06:35 Jan 17, 2011



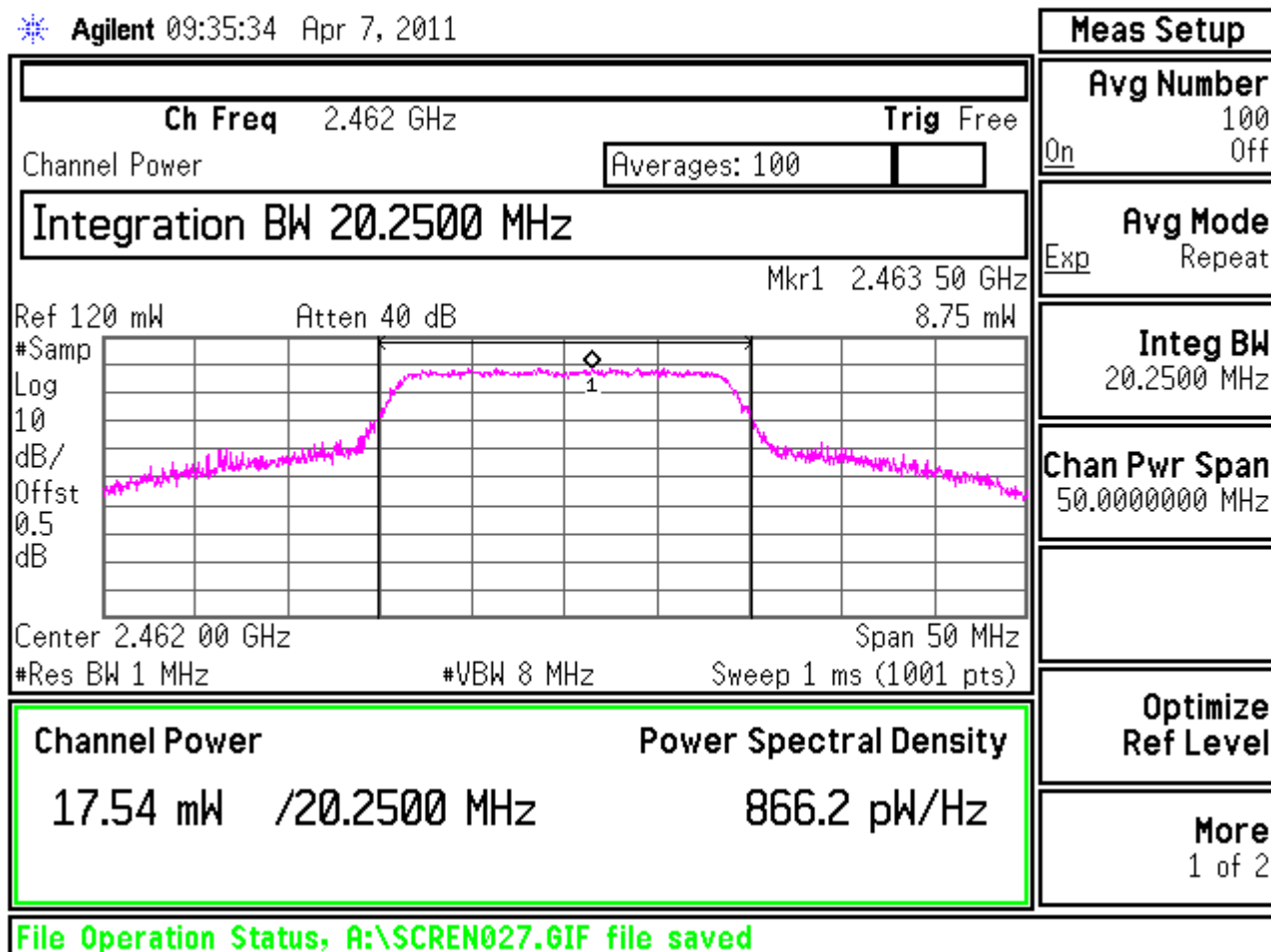
Power output
Channel 11, 54 Mbps

Agilent 09:40:56 Jan 27, 2011



Power output
Channel 11, 65 Mbps

Agilent 09:35:34 Apr 7, 2011



Spurious emissions

FCC 15.247(d), IC RSS-210 A8.5

Test summary

The requirements are: ■ - MET □ - NOT MET

Testing was performed in accordance with ANSI C63.4 2003, clause 8.3 and FCC KDB Publication 558074

Maximum conducted spurious emission is the lower bandedge, -30.5 dBc, channel 1, 65 MB

Maximum radiated spurious emission is 53.1 dBμV/m (452 μV/m) with average detection at 2.39 GHz

Minimum margin of compliance = 0.86 dB.

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 distance – radiated emissions

- - 0.3 meters
- - 1.0 meters
- - 3 meters
- - 10 meters

Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
NBLE03196	8566B	Hewlett-Packard	Spectrum Analyzer	2240A01856	19-Oct-11
NBLE03195	85662A	Hewlett-Packard	Analyzer Display	2648A13518	19-Oct-11
WRLE10527	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0001	Code B 05-Oct-11
WRLE03229	3115	EMCO	Ridge Guide Antenna	2483	30-Jul-11
WRLE03997	EWT-14-0066	EWT	2.4 GHz Notch filter	E2	Code B 12-May-12
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	09-Aug-11
WRLE03978	SL26-3010	Phase One Microwave	Amplifier 18-26.5 GHz	0005	Code B 23-Jul-11
WRLE06717	3116	EMCO	Ridge Guide Ant 18-40 GHz	2005	08-Jun-11
WRLE02003	F550B1	Acronetics	4 – 8 GHz Bandpass Filter	010	Code B 05-Oct-11
WRLE03933	F551B-1	Acronetics	8 – 12 GHz Bandpass Filter	010	Code B 05-Oct-11
WRLE03934	F549B-1	Acronetics	2 – 4 GHz Bandpass Filter	010	Code B 05-Oct-11
WRLE03935	F548B-1	Acronetics	1 – 2 GHz Bandpass Filter	010	Code B 05-Oct-11
OWLE03202	EM-6917B	Electro-Metrics	Biconicalog Periodic	101	28-May-11
WRLE10616	ZHL-1042J	Mini-Circuits	Preamplifier 10 - 3000 MHz	QA0746005	Code B 25-Oct-11
OWLE02682	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	17-Feb-12
OWLE02074	3115	Electro-Mechanics	Ridge Guide Antenna	2504	24-Feb-12
WRLE10617	ZHL-1042J	Mini-Circuits	Preamplifier 30 MHz-5 GHz	QA0746004	Code B 20-Oct-11
WRLE10536	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0002	Code B 25-Oct-11
WRLE03294	8566B	Hewlett-Packard	Spectrum Analyzer	2349A03098	08-Apr-12

Cal Code B = Calibration verification performed internally.

Test limit - conducted

-20 dBc

Test limit within restricted bands per 15.205 - radiated

Frequency (MHz)	Field strength (μV/meter)	Field strength (dBμV/meter)
30 - 88	100, QP	40.0
88 - 216	150, QP	43.5
216 - 960	200, QP	46.0
Above 960	500, QP	54.0
> 1000	500, AV 5000, PK	54.0 74.0

Radiated Emissions

The spectrum analyzer uses a quasi-peak detector for frequencies up to and including 1 GHz. For measurements above 1 GHz, peak and average detectors are used. The bandwidths used are equal to or greater than 100 Hz from 9 kHz to 150 kHz, 9 kHz from 150 kHz to 30 MHz, 100 kHz from 30 MHz to 1000 MHz, and 1 MHz from 1 GHz to 40 GHz. Video bandwidths are at least three times greater than the IF bandwidth. Average measurements above 1 GHz are also achieved using a peak detector with 1 MHz RBW and 10 Hz VBW.

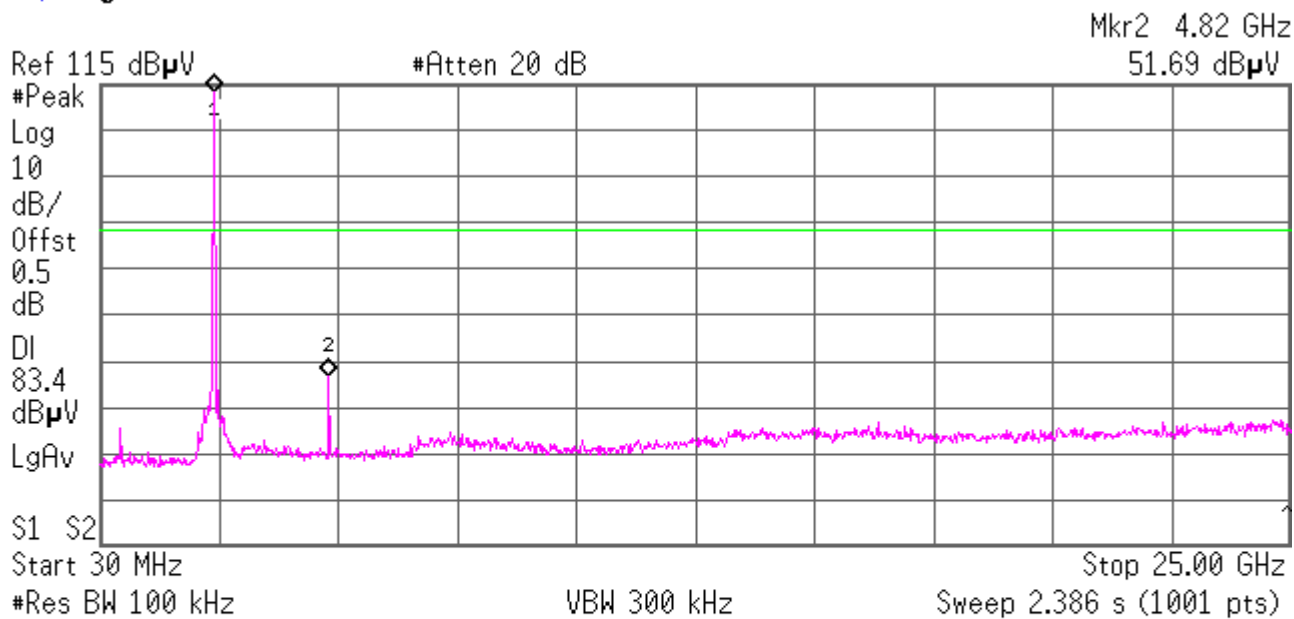
Test data

See following pages



Conducted spurious emissions
Channel 1, 11 Mbps

Agilent 11:32:17 Jan 27, 2011



Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.40 GHz	113.36 dB μ V
2	(3)	Freq	4.82 GHz	51.69 dB μ V

Conducted spurious emissions
Channel 1, 54 Mbps

Agilent 11:26:13 Jan 27, 2011

Mkr2 4.82 GHz
44.78 dB μ V

Ref 115 dB μ V

#Atten 20 dB

#Peak

Log

10

dB/

Offst

0.5

dB

DI

77.1

dB μ V

LgAv

S1 S2

Start 30 MHz

Stop 25.00 GHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 2.386 s (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.40 GHz	107.10 dB μ V
2	(3)	Freq	4.82 GHz	44.78 dB μ V

Conducted spurious emissions
Channel 1, 65 Mbps

Agilent 09:51:54 Apr 7, 2011

Mkr2 4.82 GHz
43.56 dB μ V



Start 30 MHz Stop 25.00 GHz
#Res BW 100 kHz VBW 300 kHz Sweep 2.386 s (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.40 GHz	106.49 dB μ V
2	(3)	Freq	4.82 GHz	43.56 dB μ V

Conducted spurious emissions
Channel 6, 11 Mbps

Agilent 11:36:36 Jan 27, 2011

Mkr2 4.87 GHz
48.28 dB μ V



Start 30 MHz

Stop 25.00 GHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 2.386 s (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.43 GHz	112.37 dB μ V
2	(3)	Freq	4.87 GHz	48.28 dB μ V

Conducted spurious emissions
Channel 6, 54 Mbps

Agilent 11:34:51 Jan 27, 2011

Mkr2 4.87 GHz
42.86 dB μ V



S1 S2 Start 30 MHz Stop 25.00 GHz
#Res BW 100 kHz VBW 300 kHz Sweep 2.386 s (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.43 GHz	106.22 dB μ V
2	(3)	Freq	4.87 GHz	42.86 dB μ V

Conducted spurious emissions
Channel 6, 65 Mbps

Agilent 09:53:13 Apr 7, 2011

Mkr2 4.87 GHz
44.61 dB μ V

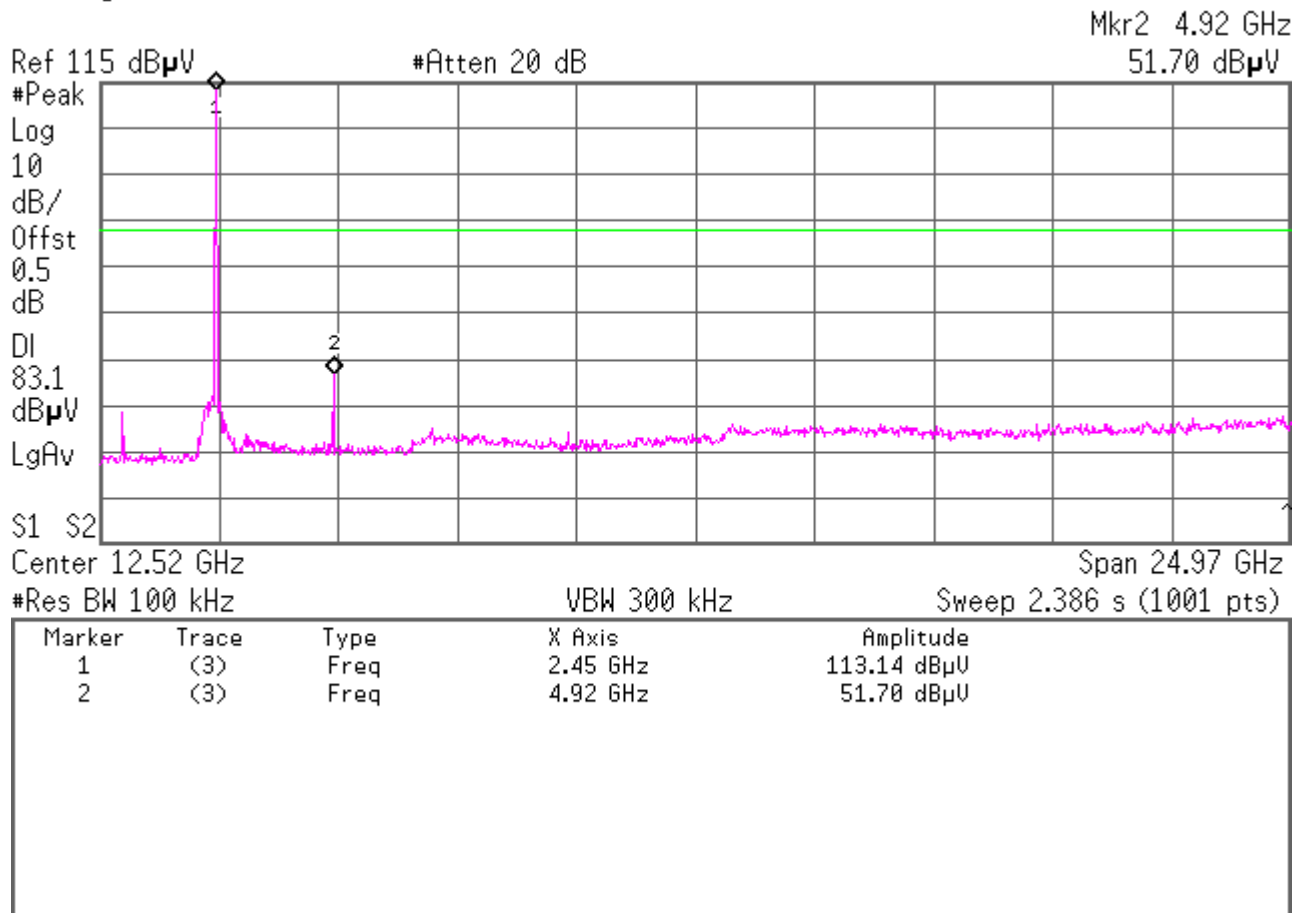


Start 30 MHz Stop 25.00 GHz
#Res BW 100 kHz VBW 300 kHz Sweep 2.386 s (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.43 GHz	106.78 dB μ V
2	(3)	Freq	4.87 GHz	44.61 dB μ V

Conducted spurious emissions
Channel 11, 11 Mbps

Agilent 11:41:09 Jan 27, 2011



Conducted spurious emissions
Channel 11, 54 Mbps

Agilent 11:39:06 Jan 27, 2011

Mkr2 4.92 GHz
45.00 dB μ V

Ref 115 dB μ V

#Atten 20 dB

#Peak

Log

10

dB/

Offst

0.5

dB

DI

75.0

dB μ V

LgAv

S1 S2

Center 12.52 GHz

Span 24.97 GHz

#Res BW 100 kHz

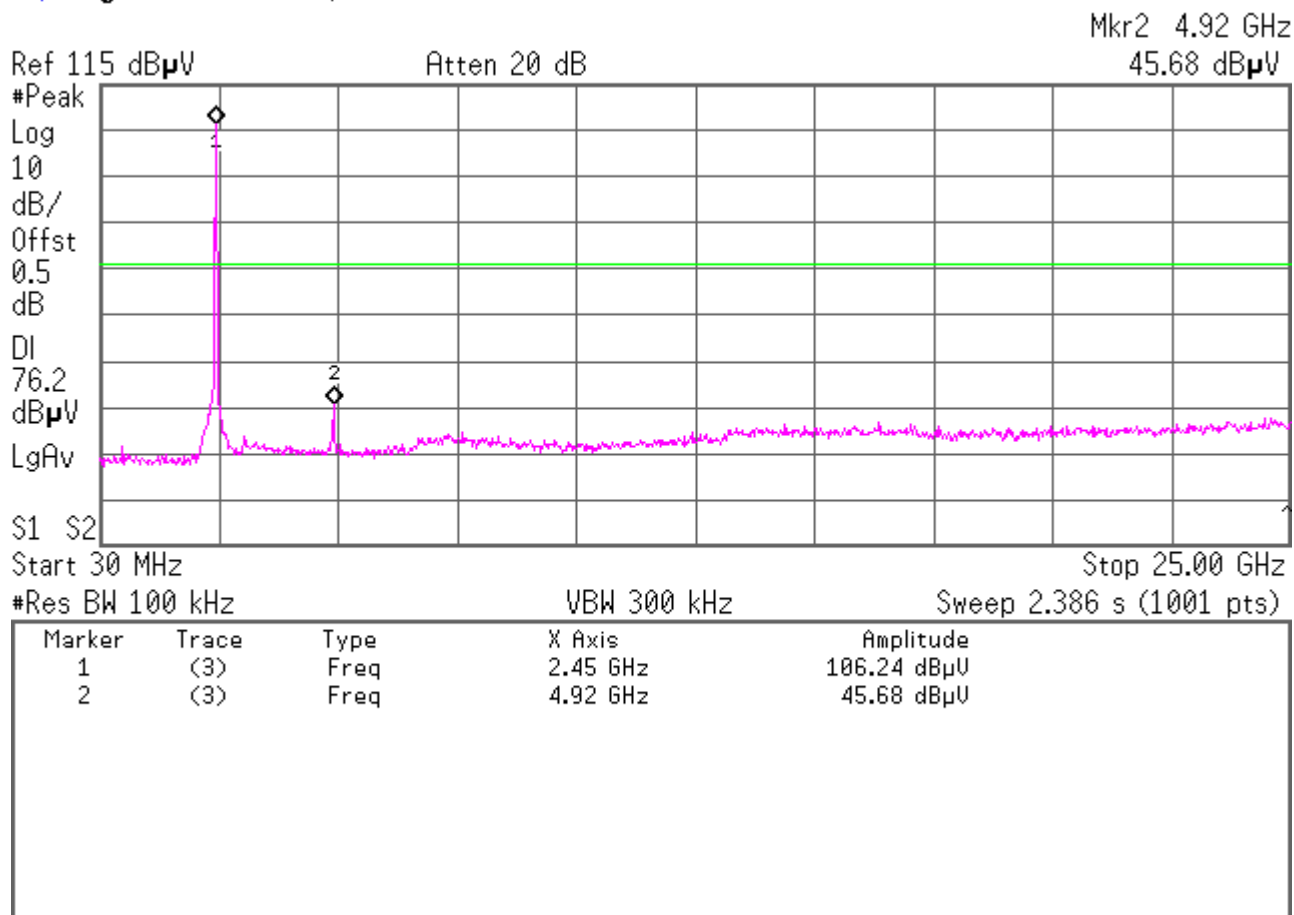
VBW 300 kHz

Sweep 2.386 s (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.48 GHz	104.98 dB μ V
2	(3)	Freq	4.92 GHz	45.00 dB μ V

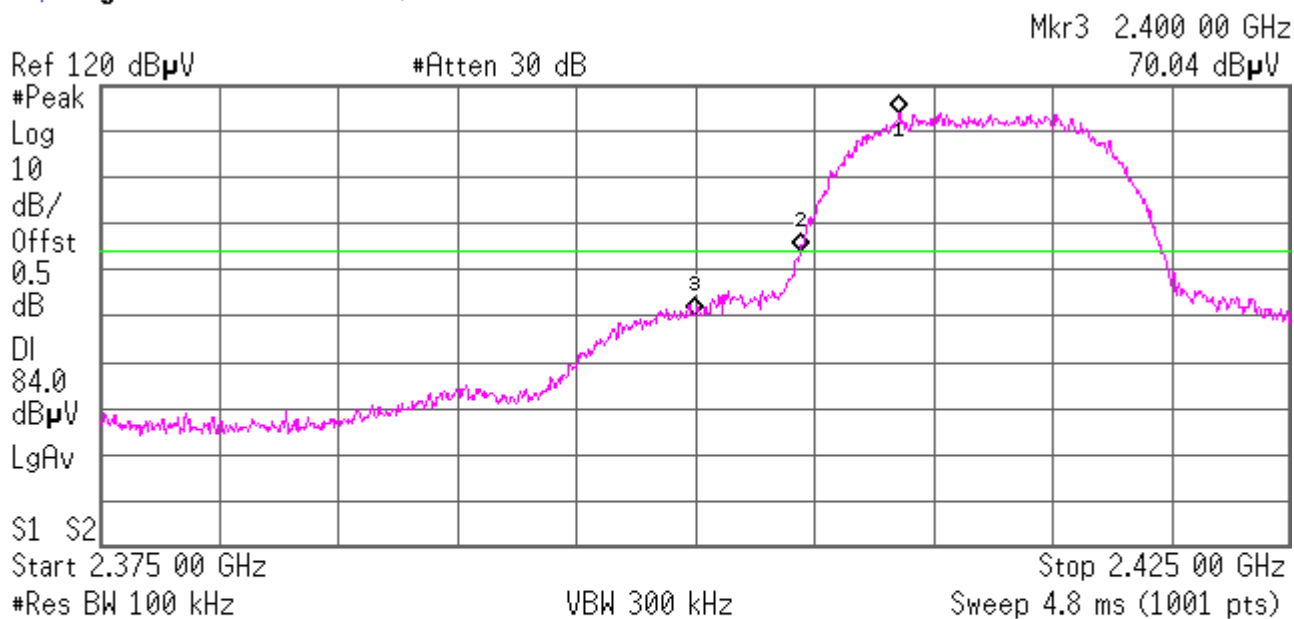
Conducted spurious emissions
Channel 11, 65 Mbps

Agilent 09:48:31 Apr 7, 2011



Conducted bandedge
Channel 1, 11 Mbps

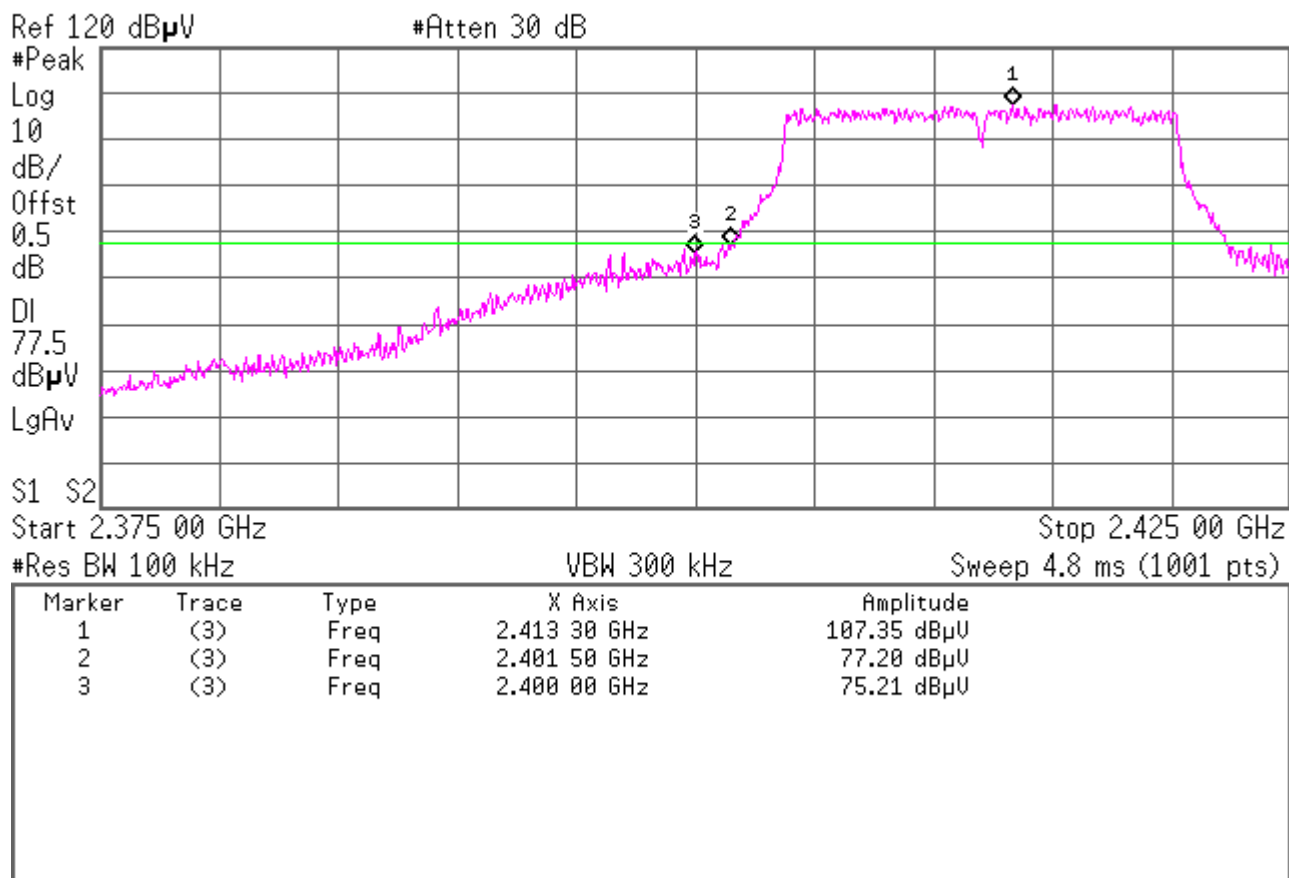
Agilent 11:57:51 Jan 27, 2011



Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.408 55 GHz	114.03 dB μ V
2	(3)	Freq	2.404 40 GHz	83.91 dB μ V
3	(3)	Freq	2.400 00 GHz	70.04 dB μ V

Conducted bandedge
Channel 1, 54 Mbps

Agilent 11:55:50 Jan 27, 2011



Conducted bandedge
Channel 1, 65 Mbps

Agilent 10:03:49 Apr 7, 2011

Mkr3 2.399 50 GHz
77.47 dB μ V

Ref 120 dB μ V

Atten 30 dB

#Peak

Log

10

dB/

Offst

0.5

dB

DI

78.0

dB μ V

LgAv

S1 S2

Start 2.375 00 GHz

Stop 2.425 00 GHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 4.8 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.411 30 GHz	108.02 dB μ V
2	(3)	Freq	2.401 55 GHz	77.36 dB μ V
3	(3)	Freq	2.399 50 GHz	77.47 dB μ V

Conducted bandedge
Channel 11, 11 Mbps

Agilent 11:46:04 Jan 27, 2011

Mkr3 2.483 50 GHz
53.19 dB μ V

Ref 120 dB μ V

#Atten 30 dB

#Peak

Log

10

dB/

Offst

0.5

dB

DI

84.1

dB μ V

LgAv

S1 S2

Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 4.8 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.460 95 GHz	114.07 dB μ V
2	(3)	Freq	2.469 55 GHz	83.99 dB μ V
3	(3)	Freq	2.483 50 GHz	53.19 dB μ V

Conducted bandedge
Channel 11, 54 Mbps

Agilent 11:49:52 Jan 27, 2011

Mkr3 2.488 35 GHz
51.49 dB μ V

Ref 120 dB μ V

#Atten 30 dB

#Peak

Log

10

dB/

Offst

0.5

dB

DI

77.5

dB μ V

LgAv

S1 S2

Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 4.8 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.457 90 GHz	107.50 dB μ V
2	(3)	Freq	2.472 15 GHz	77.04 dB μ V
3	(3)	Freq	2.488 35 GHz	51.49 dB μ V

Conducted bandedge
Channel 11, 65 Mbps

Agilent 10:08:32 Apr 7, 2011

Mkr3 2.483 50 GHz
64.29 dB μ V

Ref 120 dB μ V

Atten 30 dB

#Peak

Log

10

dB/

Offst

0.5

dB

DI

76.5

dB μ V

LgAv

S1 S2

Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 4.8 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.460 45 GHz	106.45 dB μ V
2	(3)	Freq	2.474 85 GHz	77.26 dB μ V
3	(3)	Freq	2.483 50 GHz	64.29 dB μ V

Radiated emissions within the restricted bands per 15.205

Measurement summary for limit1: FCC 15.247 <1GHz 3m (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.247 <1GHz 3m
325.006 MHz	43.63 Qp	1.68 / 13.93 / 29.47 / 0.0	29.8	V / 1.90 / 205	-16.2
74.17 MHz	43.79 Qp	0.69 / 8.33 / 29.65 / 0.0	23.2	V / 2.20 / 0	-16.8
250.0 MHz	43.96 Qp	1.45 / 12.01 / 29.56 / 0.0	27.9	V / 1.00 / 320	-18.1
164.174 MHz	37.48 Qp	1.22 / 8.77 / 27.31 / 0.01	20.2	V / 1.00 / 0	-23.3
149.923 MHz	32.3 Qp	1.17 / 9.69 / 27.34 / 0.01	15.8	H / 3.00 / 270	-27.7

Measurement summary for limit1: FCC 15.247 >1GHz 3m av (Av)

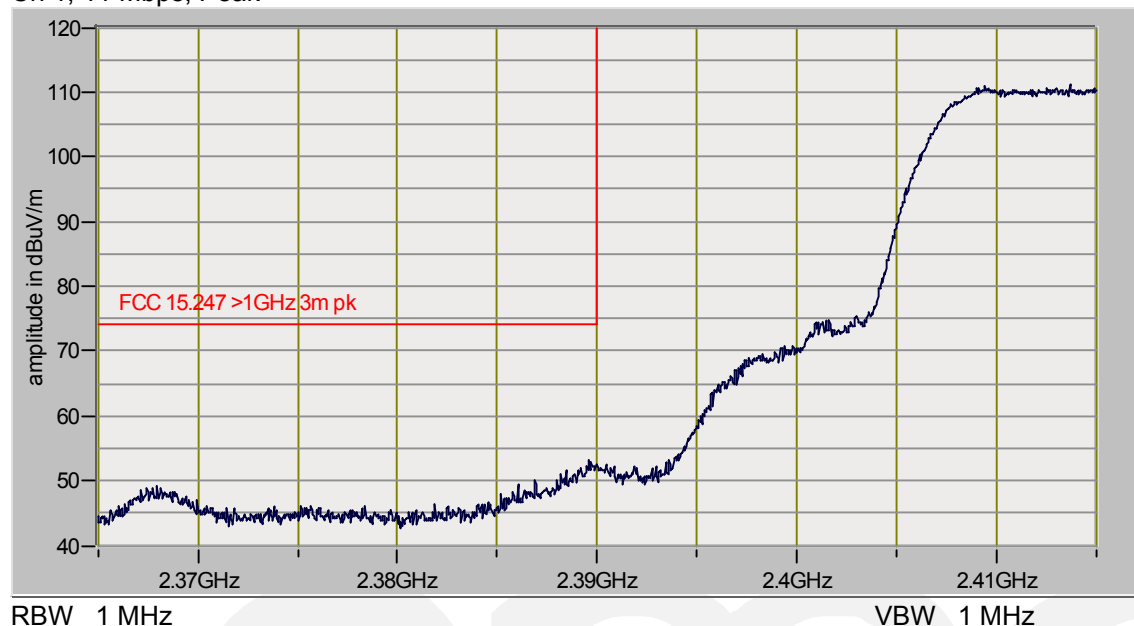
FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.247 >1GHz 3m av
2.39 GHz	42.42 Av	12.31 / 27.91 / 29.5 / 0.0	53.1	V / 1.14 / 352	-0.86
2.4835 GHz	39.66 Av	12.75 / 28.31 / 29.44 / 0.0	51.3	V / 1.15 / 351	-2.73
4.874 GHz	37.89 Av	22.16 / 32.9 / 42.95 / 0.24	50.2	V / 1.60 / 227	-3.76
4.824 GHz	37.84 Av	22.0 / 32.81 / 42.95 / 0.26	50	V / 1.60 / 227	-4.04
4.924 GHz	37.38 Av	22.31 / 33.0 / 42.94 / 0.21	50	V / 1.60 / 227	-4.04

Measurement summary for limit2: FCC 15.247 >1GHz 3m pk (Pk)

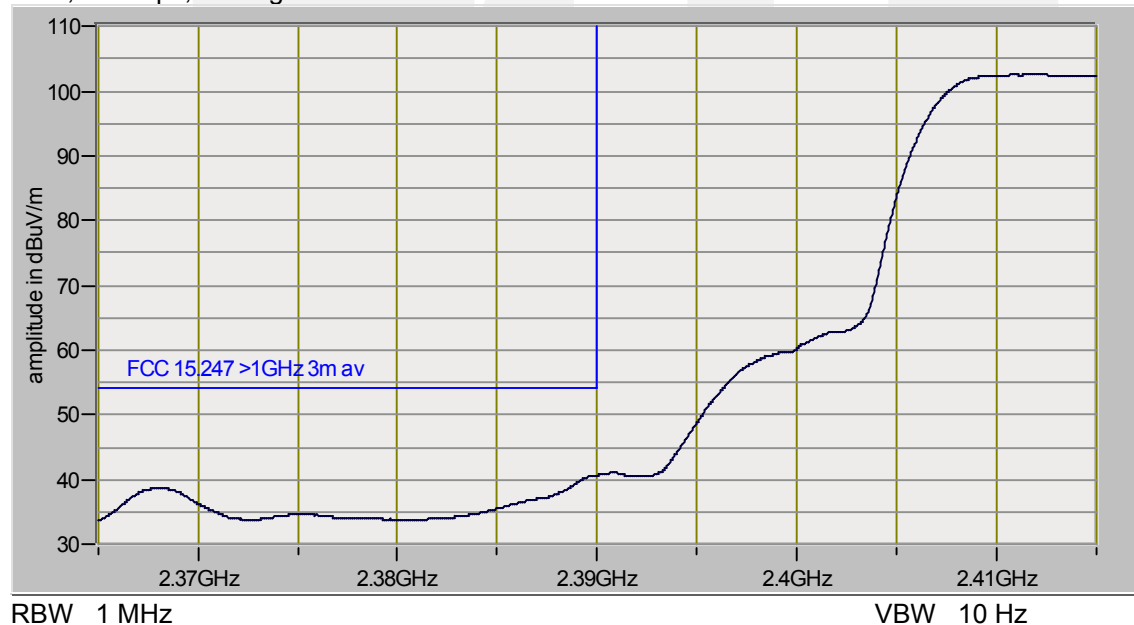
FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA2 FCC 15.247 >1GHz 3m pk
2.39 GHz	57.45 Pk	12.31 / 27.91 / 29.5 / 0.0	68.17	V / 1.14 / 352	-5.83
2.4835 GHz	56.0 Pk	12.75 / 28.31 / 29.44 / 0.0	67.61	V / 1.15 / 351	-6.39
4.874 GHz	47.0 Pk	22.16 / 32.9 / 42.95 / 0.24	59.35	V / 1.60 / 227	-14.65
4.824 GHz	46.8 Pk	22.0 / 32.81 / 42.95 / 0.26	58.92	V / 1.60 / 227	-15.08
4.924 GHz	45.0 Pk	22.31 / 33.0 / 42.94 / 0.21	57.58	V / 1.60 / 227	-16.42

Radiated bandedge

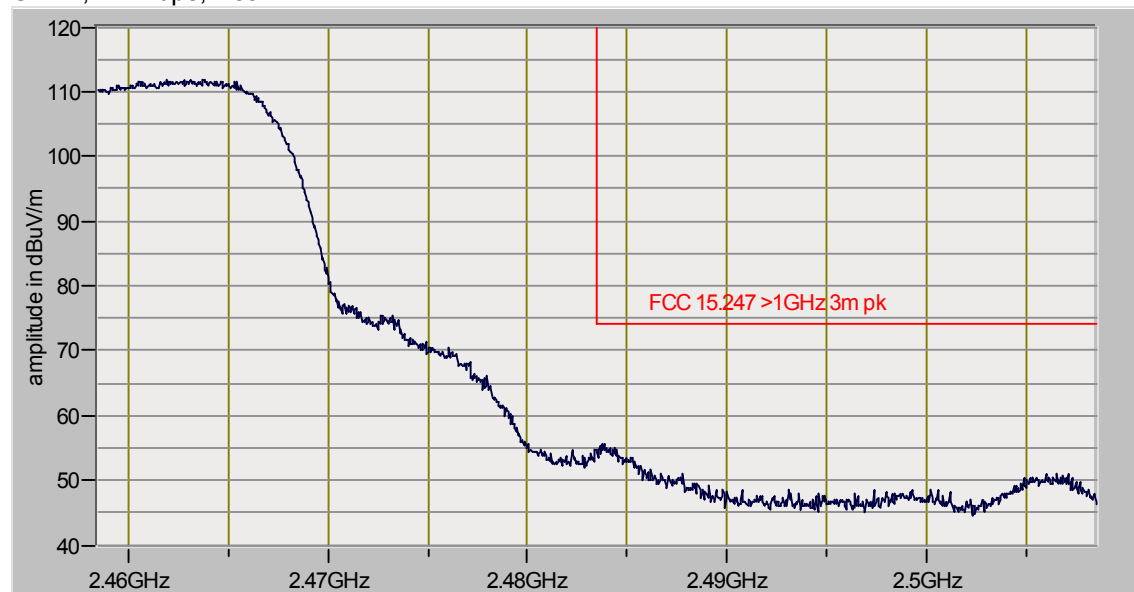
Ch 1, 11 Mbps, Peak



Ch 1, 11 Mbps, Average



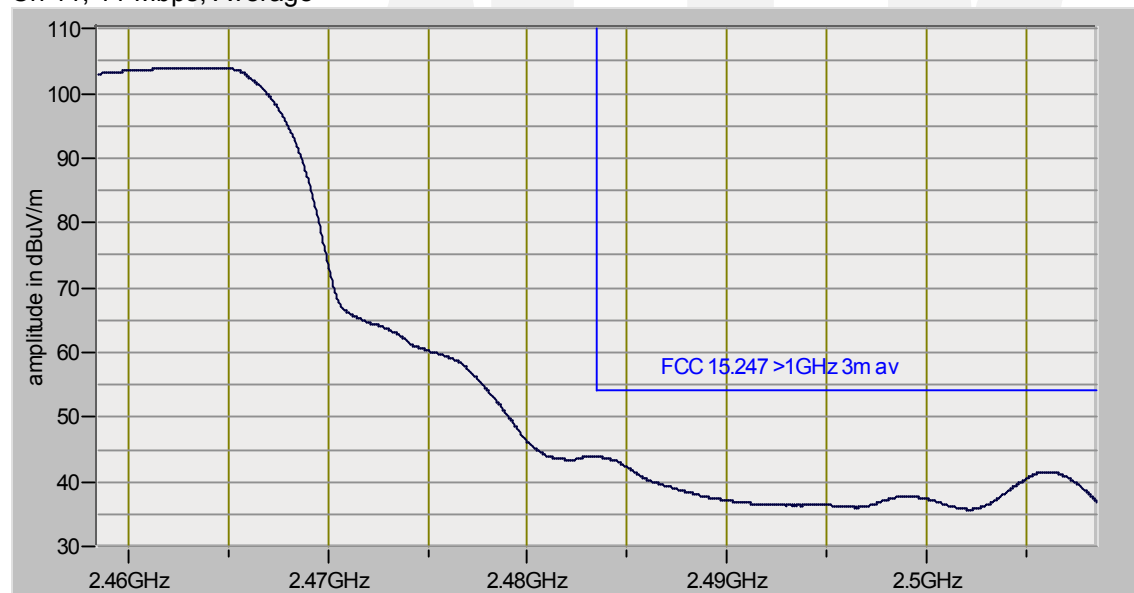
Ch 11, 11 Mbps, Peak



RBW 1 MHz

VBW 1 MHz

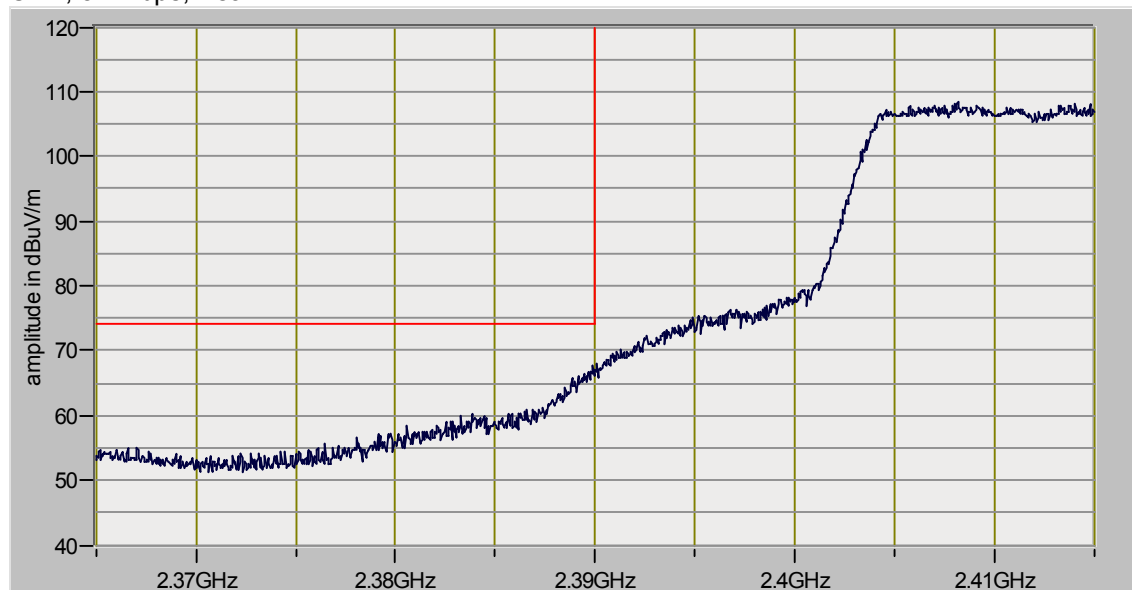
Ch 11, 11 Mbps, Average



RBW 1 MHz

VBW 10 Hz

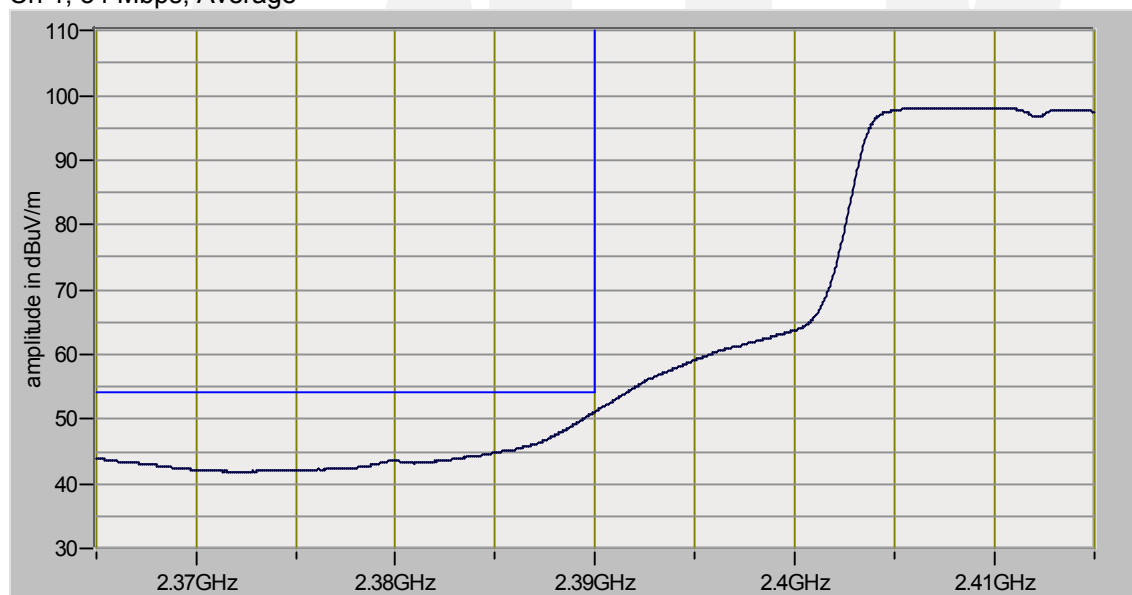
Ch 1, 54 Mbps, Peak



RBW 1 MHz

VBW 1 MHz

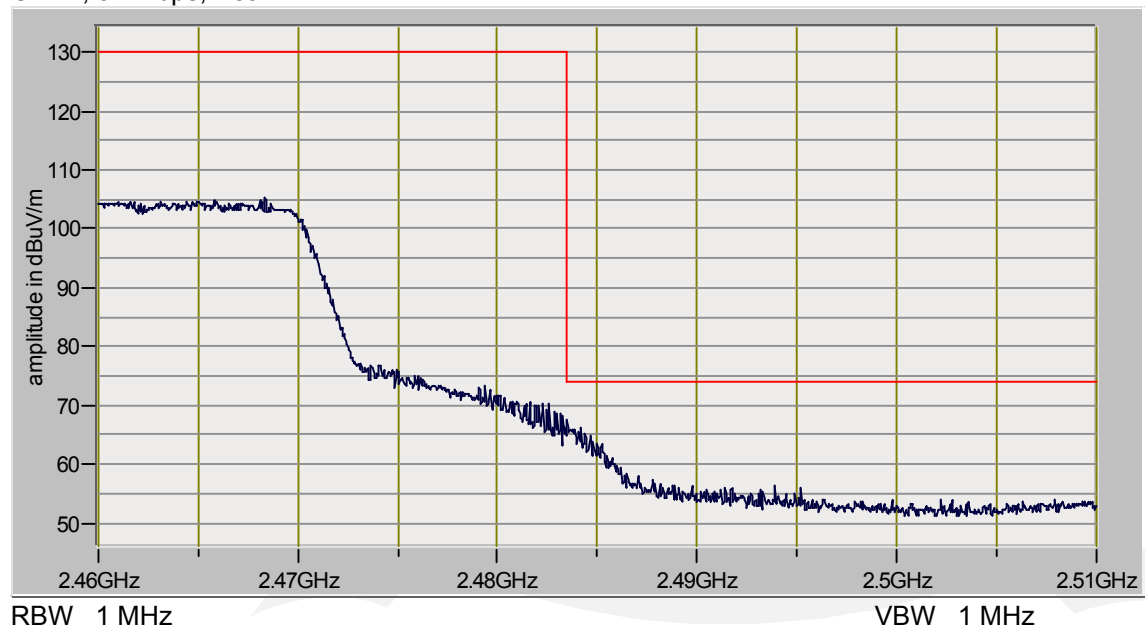
Ch 1, 54 Mbps, Average



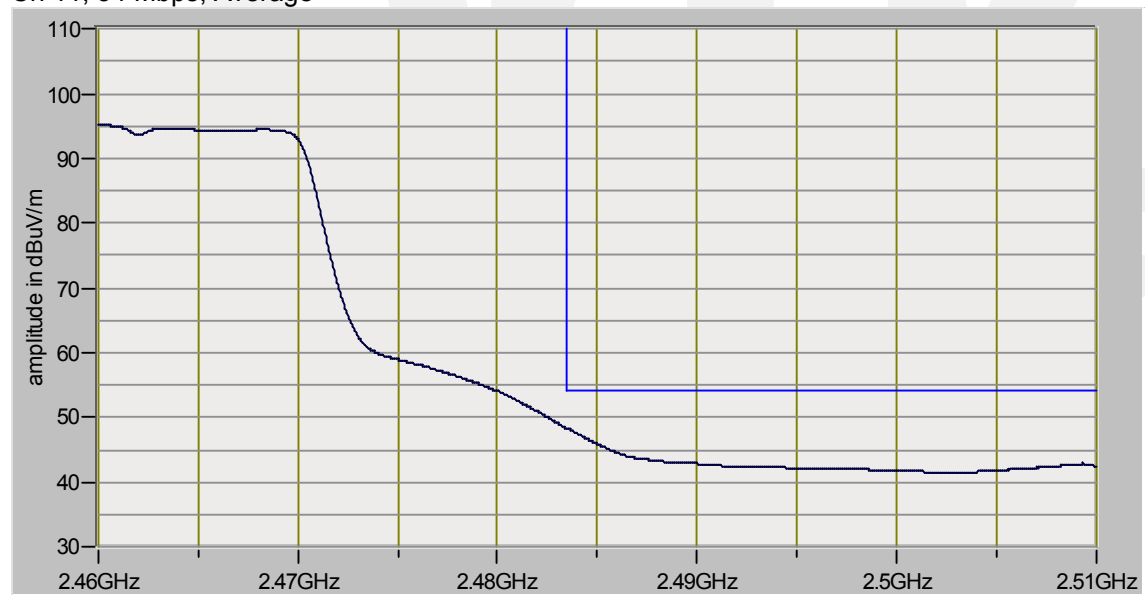
RBW 1 MHz

VBW 10 Hz

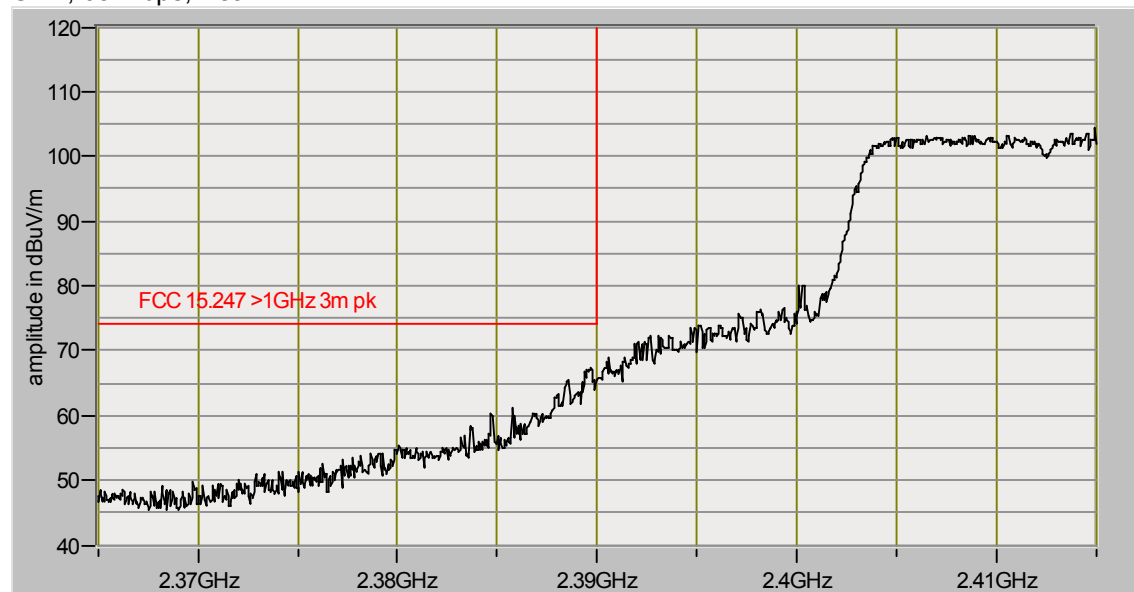
Ch 11, 54 Mbps, Peak



Ch 11, 54 Mbps, Average



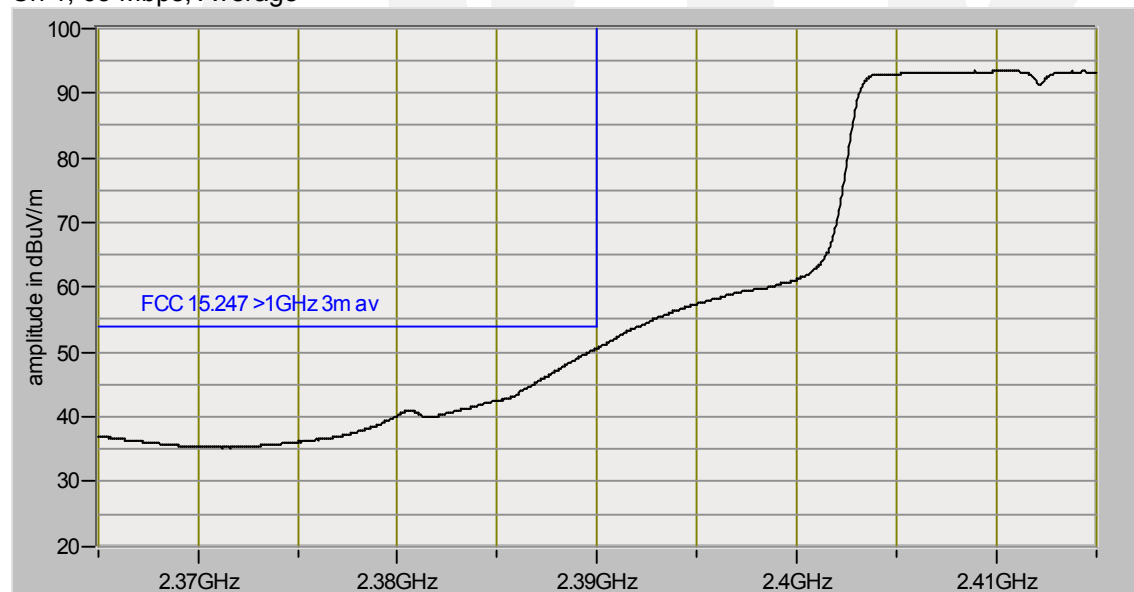
Ch 1, 65 Mbps, Peak



RBW 1 MHz

VBW 1 MHz

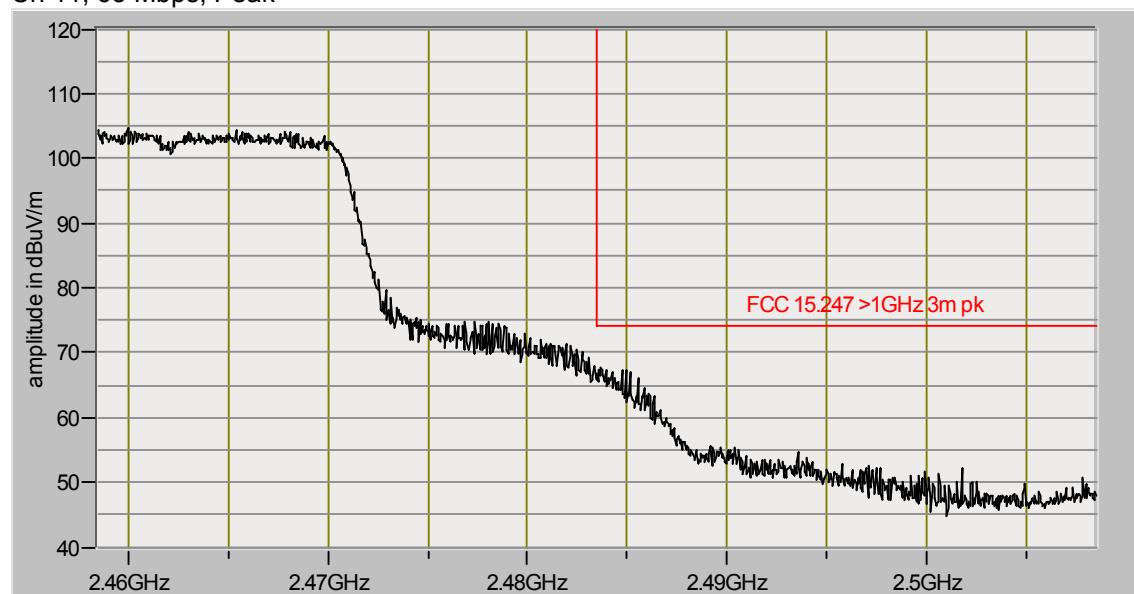
Ch 1, 65 Mbps, Average



RBW 1 MHz

VBW 10 Hz

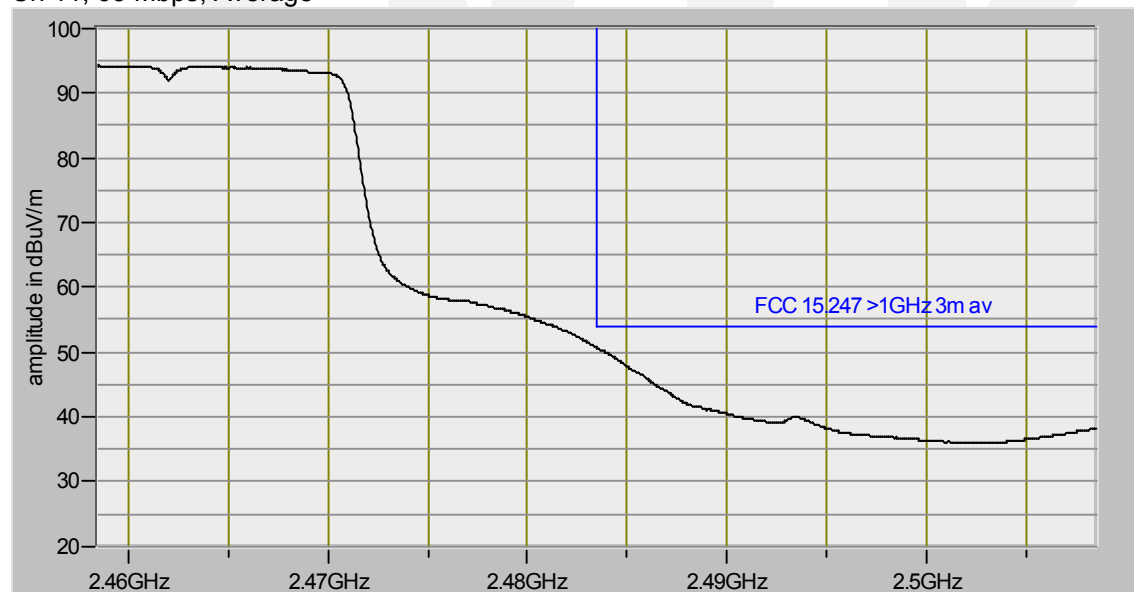
Ch 11, 65 Mbps, Peak



RBW 1 MHz

VBW 1 MHz

Ch 11, 65 Mbps, Average



RBW 1 MHz

VBW 10 Hz

Power spectral density

FCC 15.247(e), IC RSS-210 A8.2(b)

Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Test was performed in accordance with "Measurement of Digital Transmission Systems Operating under Section 15.247. March 23, 2005" Option 2

Maximum power spectral density is -4.729 dBm / 3 kHz

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
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	09-Aug-11

Test limit

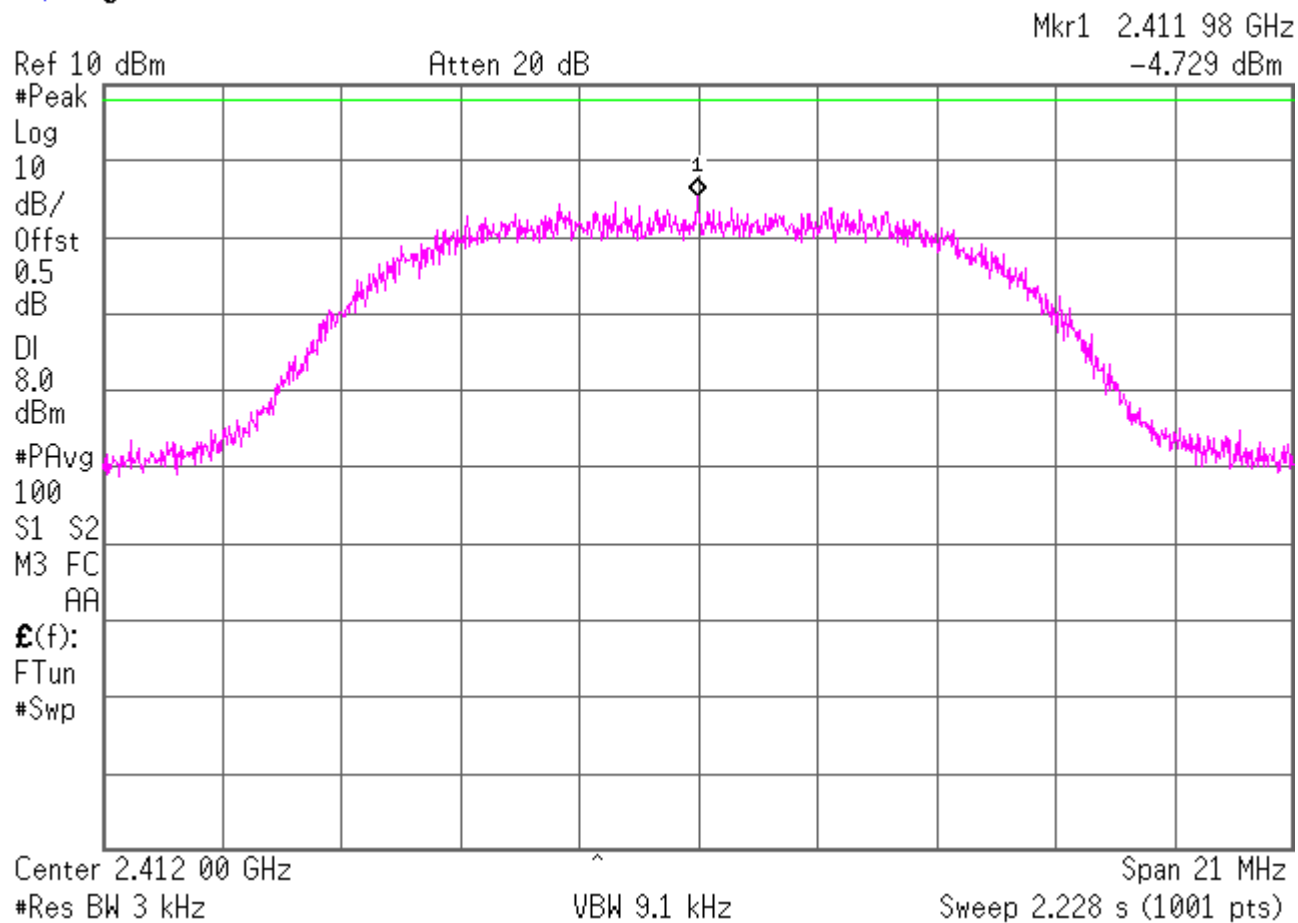
No greater than 8 dBm in any 3 kHz band

Test data

See following pages.

Power spectral density
Channel 1, 11 Mbps

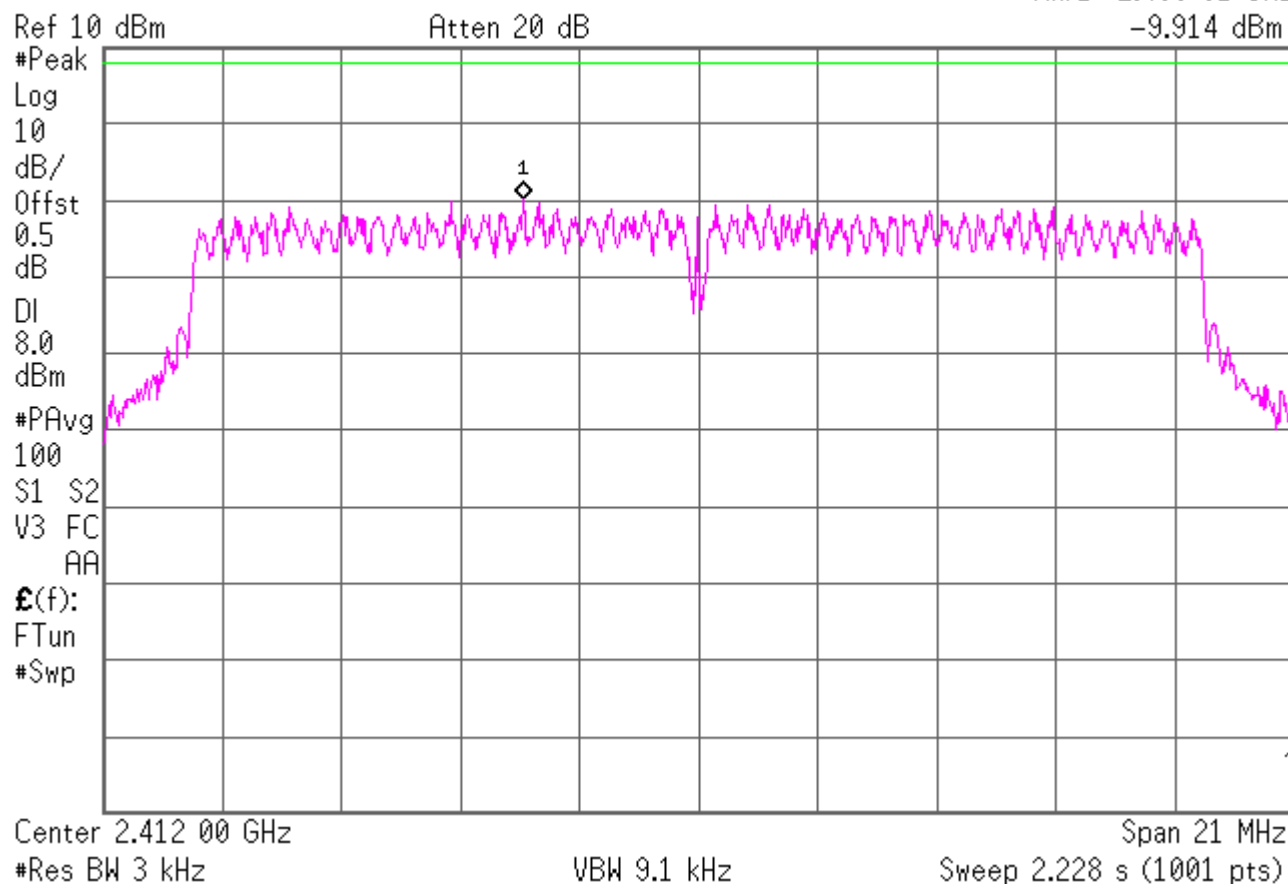
Agilent



Power spectral density
Channel 1, 54 Mbps

Agilent

Mkr1 2.408 91 GHz
-9.914 dBm



Power spectral density
Channel 1, 65 Mbps

 Agilent

Mkr1 2.419 50 GHz
-10.112 dBm

Ref 10 dBm

Atten 20 dB

#Peak

Log

10

dB/

Offst

0.5

dB

DI

8.0

dBm

#PAvg

100

S1 S2

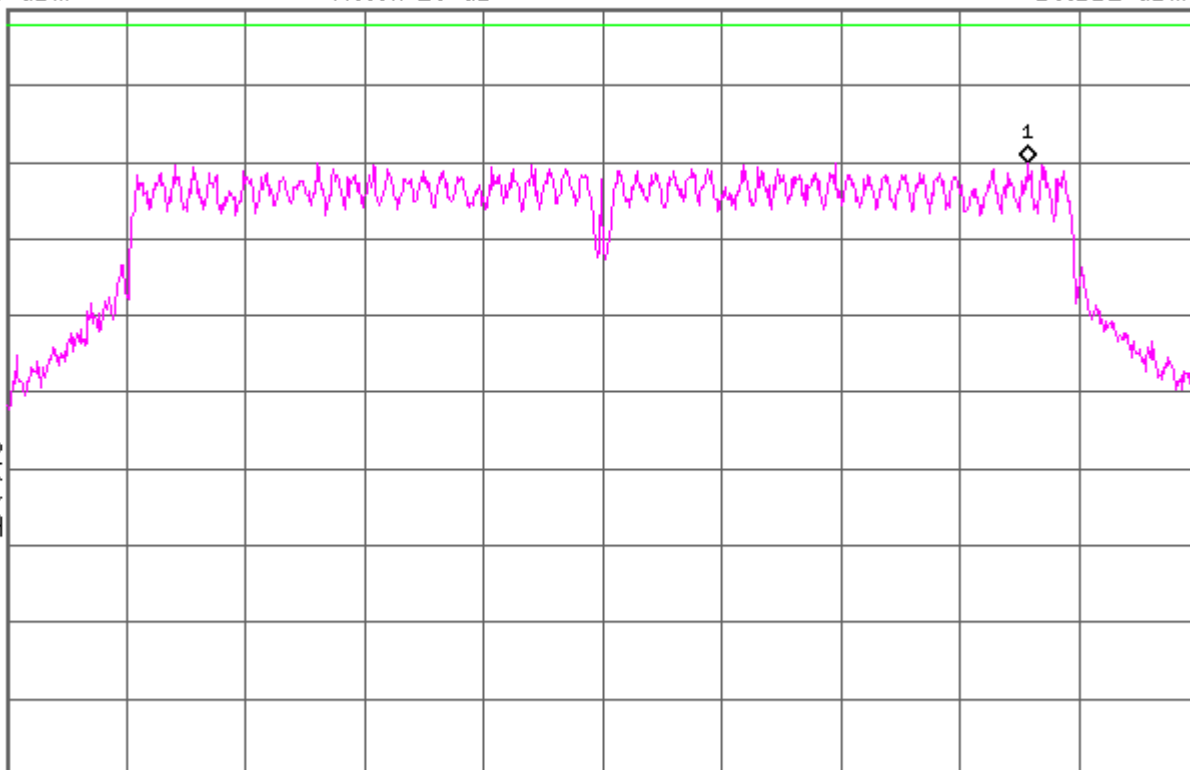
M3 FC

AA

$E(f)$:

FTun

#Swp



Center 2.412 00 GHz

VBW 9.1 kHz

Span 21 MHz
Sweep 2.228 s (1001 pts)

#Res BW 3 kHz

Power spectral density
Channel 6, 11 Mbps

 Agilent

Mkr1 2.440 07 GHz
-5.264 dBm

Ref 10 dBm

Atten 20 dB

#Peak

Log

10

dB/

Offst

0.5

dB

DI

8.0

dBm

#PAvg

100

S1 S2

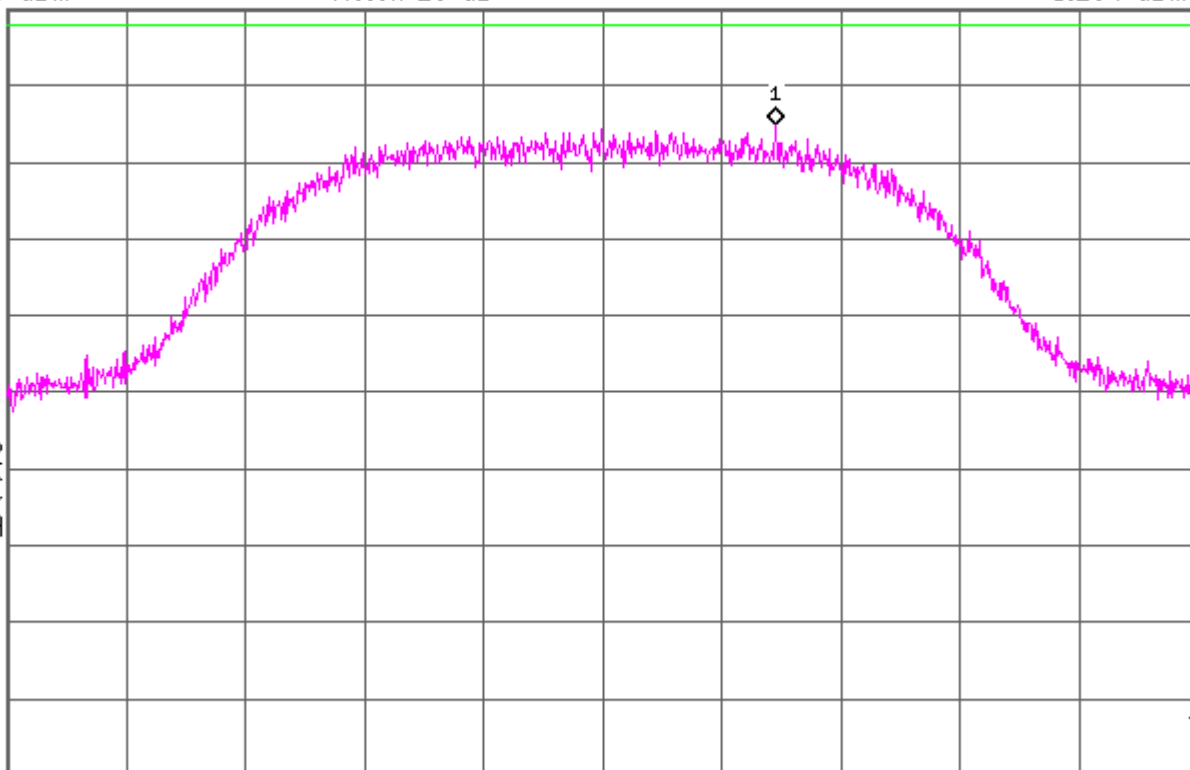
V3 FC

AA

$\mathcal{E}(f)$:

FTun

#Swp



Center 2.437 00 GHz

#Res BW 3 kHz

VBW 9.1 kHz

Sweep 2.228 s (1001 pts)

Span 21 MHz

Power spectral density
Channel 6, 54 Mbps

 Agilent

Mkr1 2.431 37 GHz
-9.348 dBm

Ref 10 dBm

Atten 20 dB

#Peak

Log

10

dB/

Offst

0.5

dB

DI

8.0

dBm

#PAvg

100

S1 S2

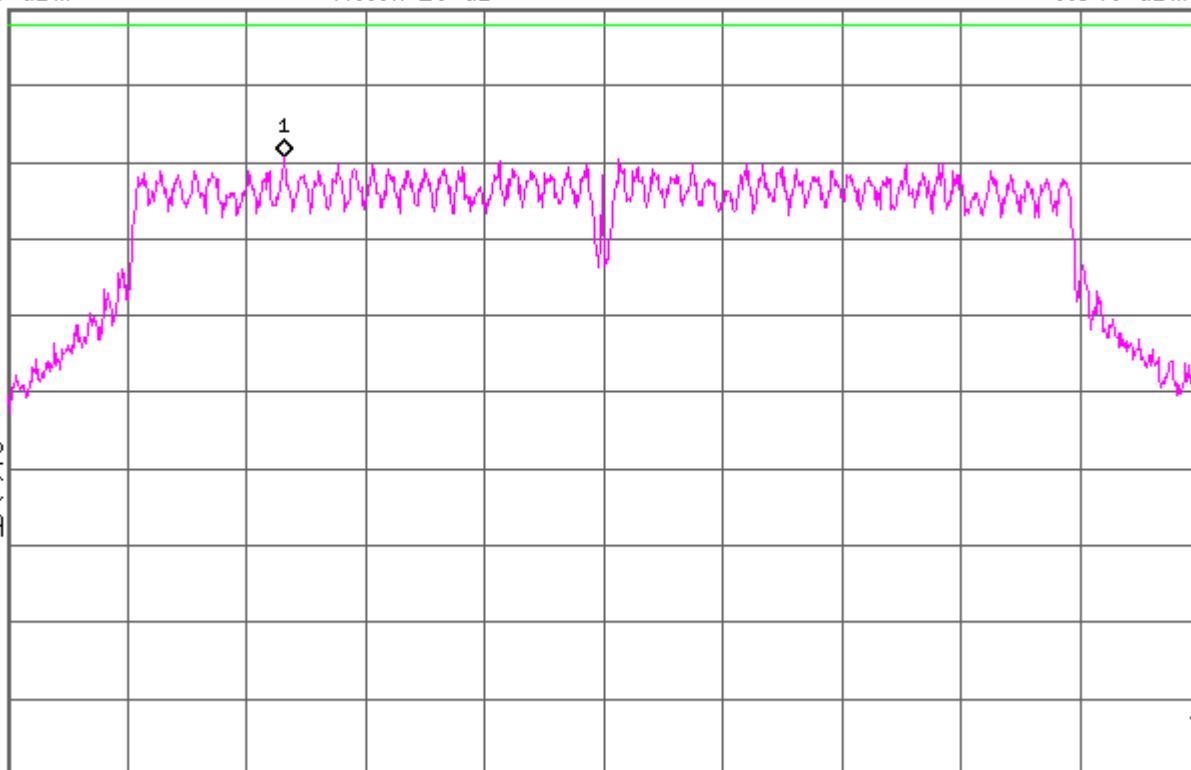
V3 FC

AA

$E(f)$:

FTun

#Swp



Center 2.437 00 GHz

#Res BW 3 kHz

VBW 9.1 kHz

Span 21 MHz
Sweep 2.228 s (1001 pts)

Power spectral density
Channel 6, 65 Mbps

 Agilent

Mkr1 2.433 85 GHz
-10.585 dBm

Ref 10 dBm

Atten 20 dB

#Peak

Log

10

dB/

Offst

0.5

dB

DI

8.0

dBm

#PAvg

100

S1 S2

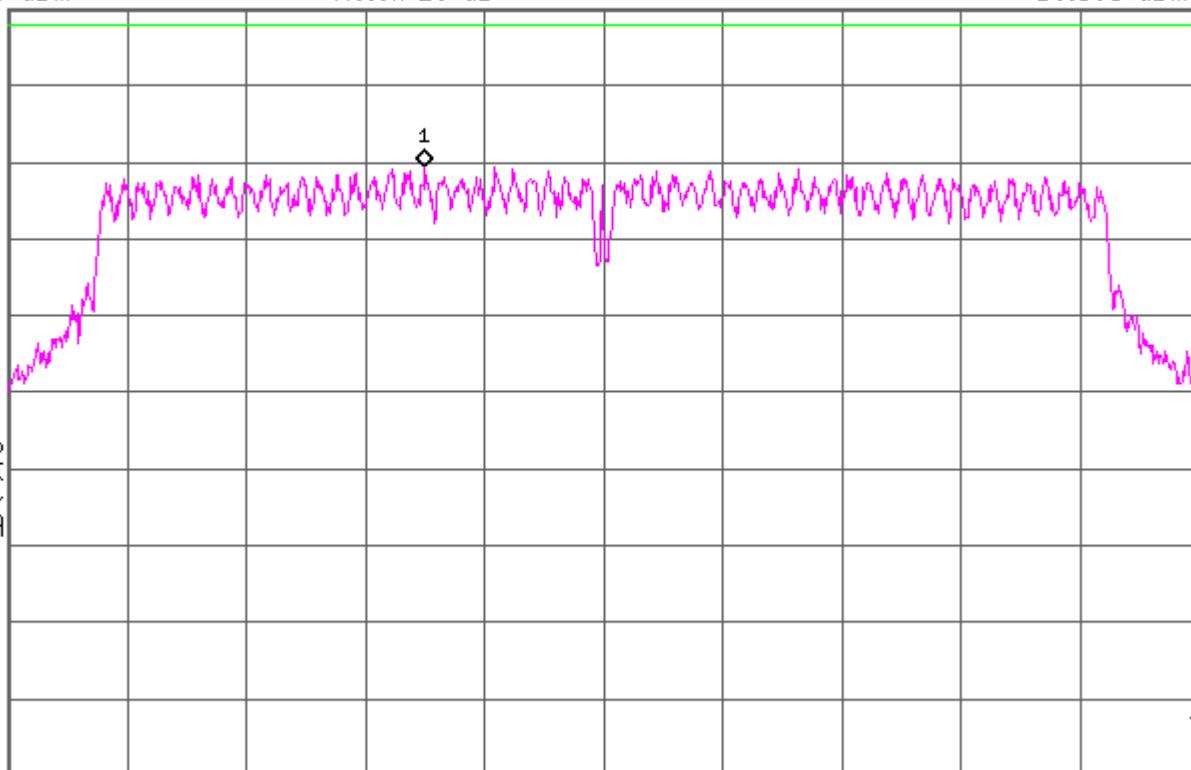
V3 FC

AA

$\mathcal{E}(f)$:

FTun

#Swp



Center 2.437 00 GHz

#Res BW 3 kHz

VBW 9.1 kHz

Span 21 MHz
Sweep 2.228 s (1001 pts)

Power spectral density
Channel 11, 11 Mbps

 Agilent

Mkr1 2.461 98 GHz
-5.102 dBm

Ref 10 dBm

Atten 20 dB

#Peak

Log

10

dB/

Offst

0.5

dB

DI

8.0

dBm

#PAvg

100

S1 S2

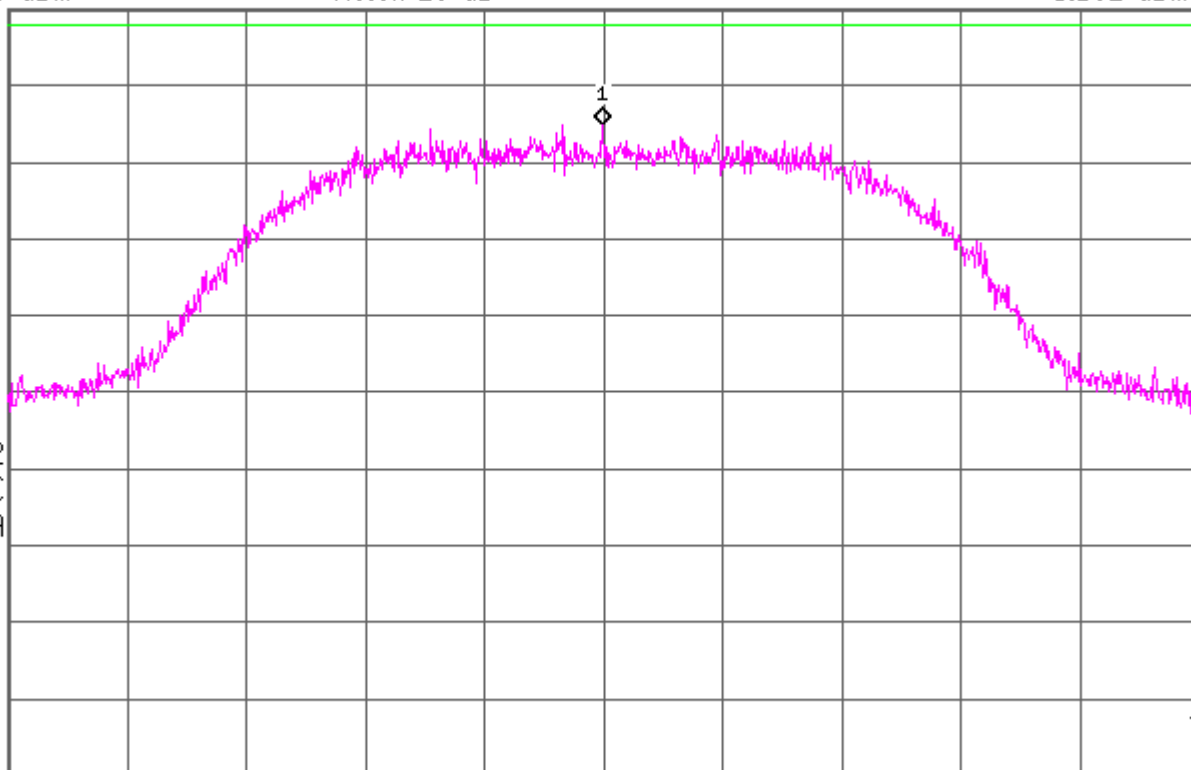
V3 FC

AA

$\mathcal{E}(f)$:

FTun

#Swp



Center 2.462 00 GHz

#Res BW 3 kHz

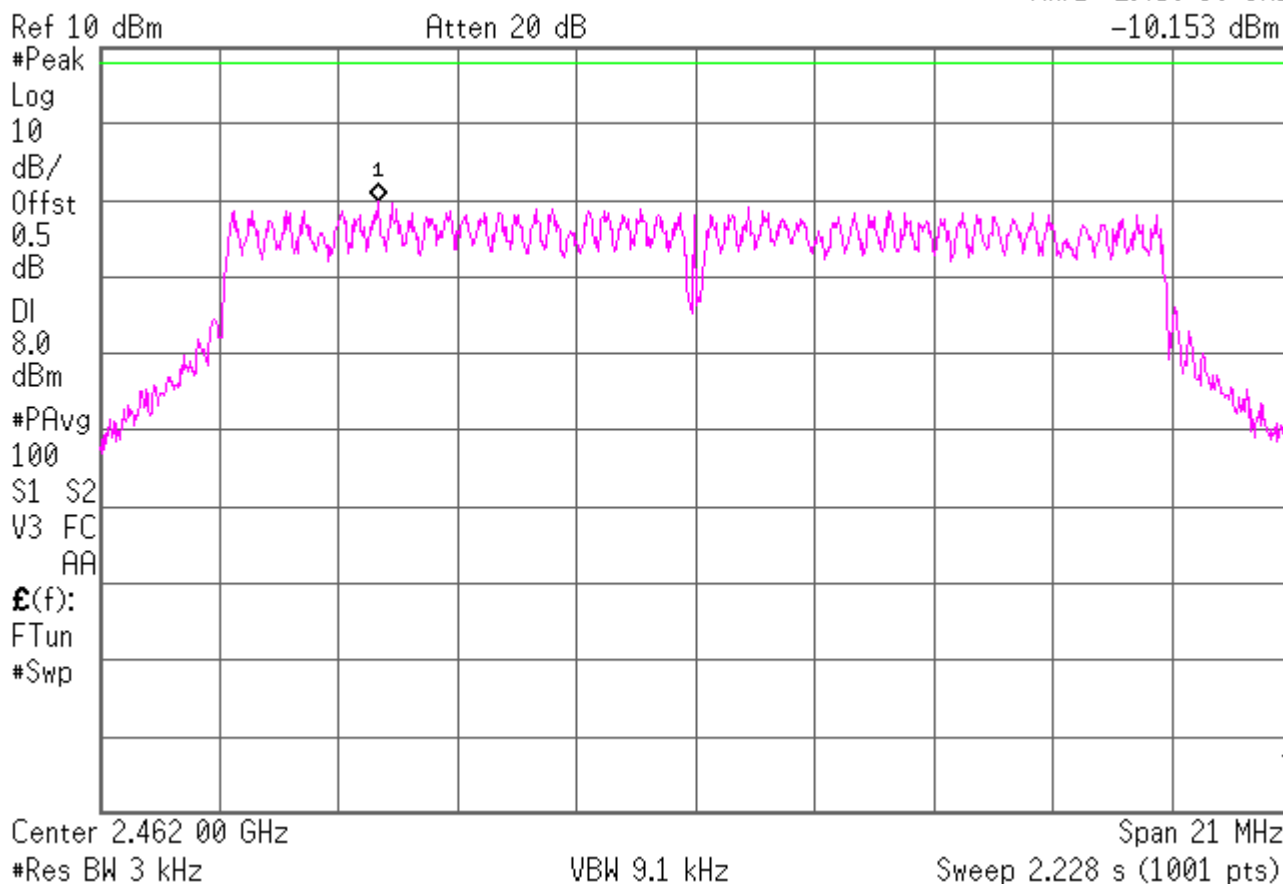
VBW 9.1 kHz

Span 21 MHz
Sweep 2.228 s (1001 pts)

Power spectral density
Channel 11, 54 Mbps

 Agilent

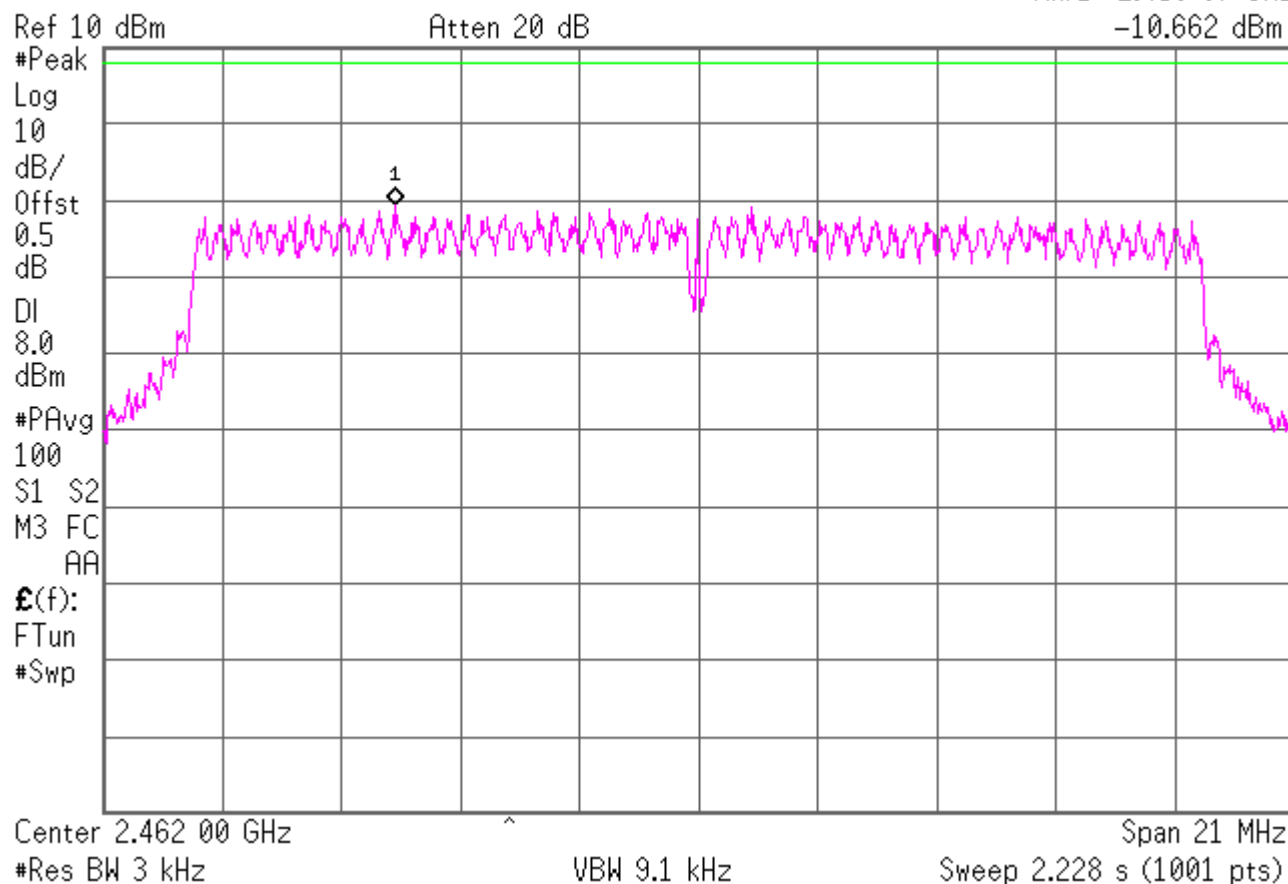
Mkr1 2.456 39 GHz
-10.153 dBm



Power spectral density
Channel 11, 65 Mbps

Agilent

Mkr1 2.456 67 GHz
-10.662 dBm



99% Bandwidth IC RSS-GEN 4.6

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

99% Occupied bandwidth range is from 9.1 MHz to 17.75 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
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	09-Aug-11

Test limit

Not applicable

Test data

See following pages

99% Occupied bandwidth
11 Mbps

Agilent 12:54:30 Jan 27, 2011

Ref lvl = Pk with max RBW

▲ Mkr1 9.10 MHz

Ref 22 dBm

#Atten 40 dB

0.18 dB

#Samp

Log

10

dB/

Offst

0.5

dB

DI

2.0

dBm

LgAv

S1 S2

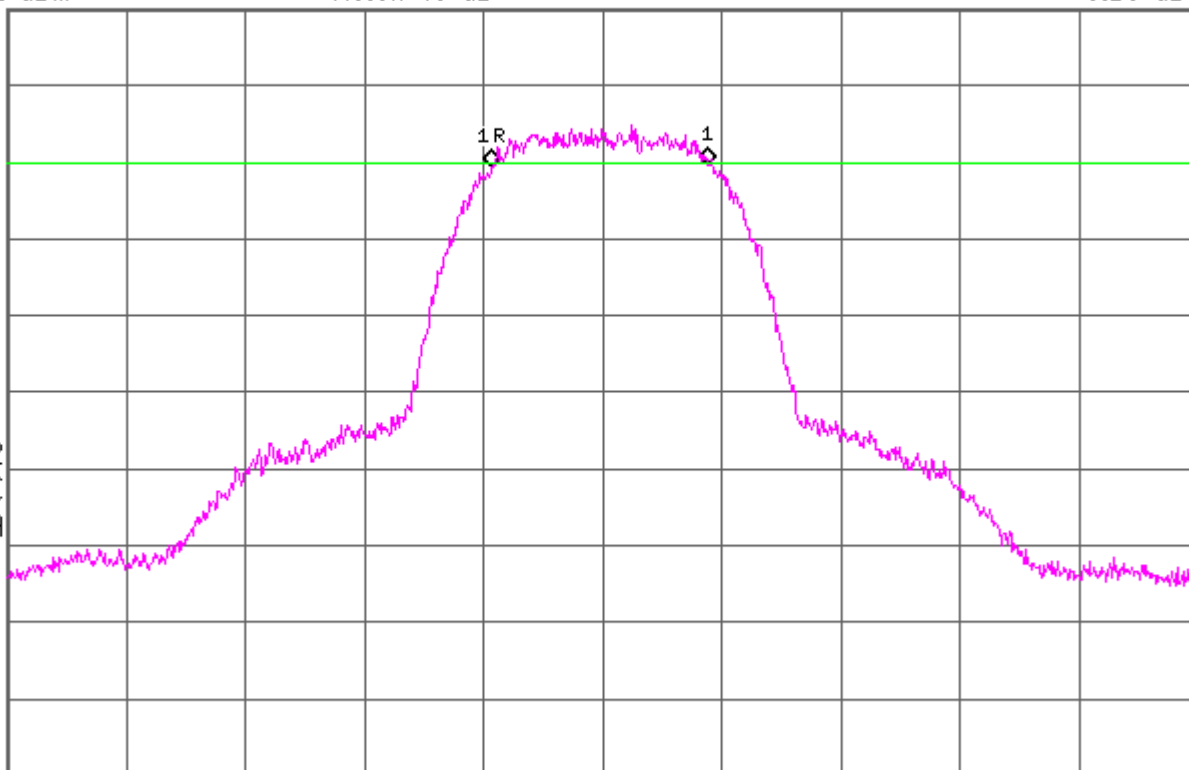
M3 FC

AA

$\mathcal{E}(f)$:

FTun

#Swp



Center 2.437 00 GHz

Span 50 MHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 15.13 ms (1001 pts)

99% Occupied bandwidth
54 Mbps

Agilent 12:57:49 Jan 27, 2011

Ref lvl = Pk with max RBW

▲ Mkr1 16.35 MHz

Ref 19 dBm

#Atten 40 dB

0.86 dB

#Samp

Log

10

dB/

Offst

0.5

dB

DI

-1.0

dBm

LgAv

S1 S2

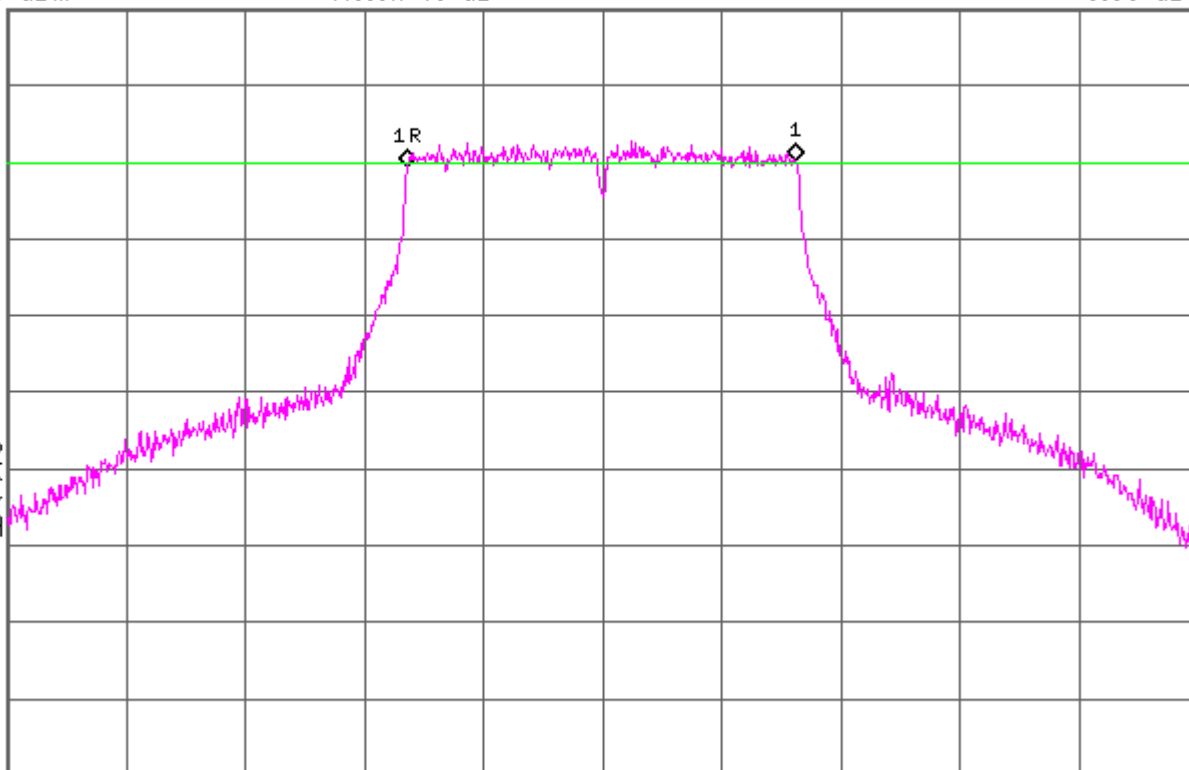
V3 FC

AA

$\mathcal{E}(f)$:

FTun

#Swp



Center 2.437 00 GHz

Span 50 MHz

#Res BW 160 kHz

VBW 470 kHz

Sweep 5.933 ms (1001 pts)

99% Occupied bandwidth
65 Mbps

* Agilent 10:37:18 Apr 7, 2011

Ref lvl = Pk with max RBW

▲ Mkr1 17.75 MHz

Ref 16 dBm

Atten 30 dB

1.17 dB

#Samp

Log

10

dB/

Offst

0.5

dB

DI

-4.0

dBm

LgAv

S1 S2

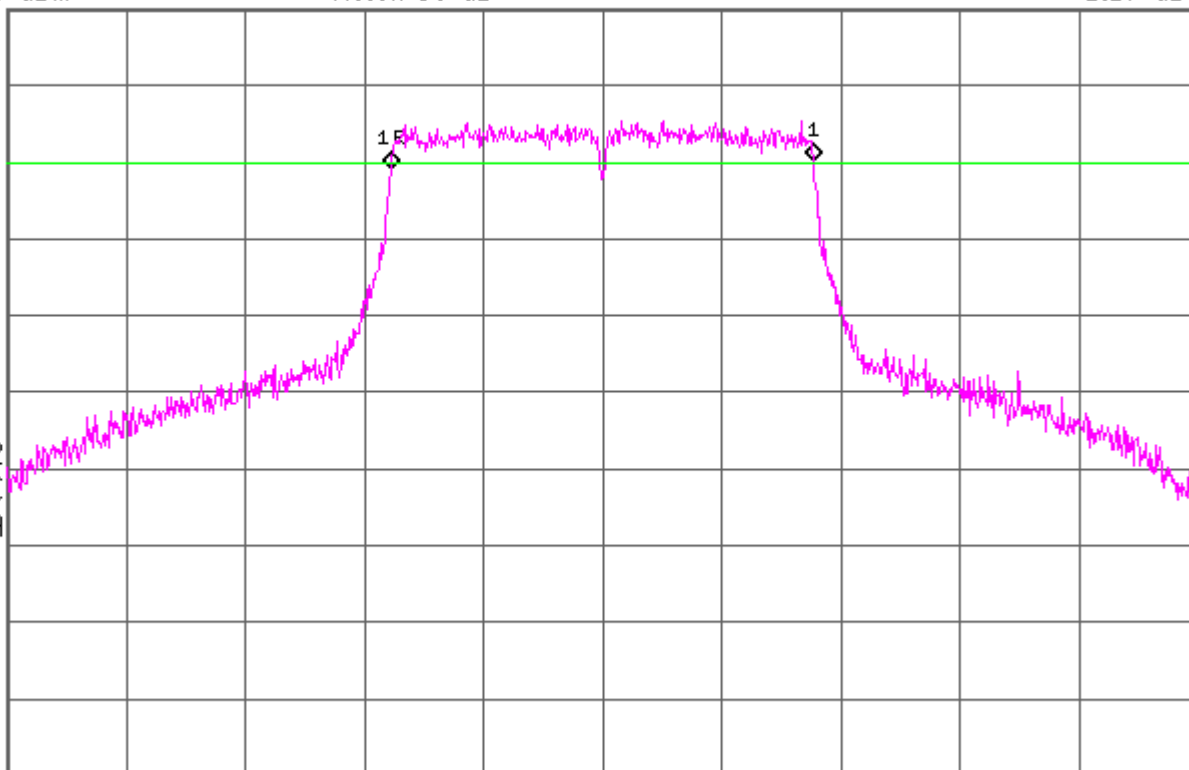
V3 FC

AA

$\mathcal{E}(f)$:

FTun

#Swp



Center 2.437 00 GHz

Span 50 MHz

#Res BW 180 kHz

VBW 560 kHz

Sweep 4.667 ms (1001 pts)

Conducted limits – AC lines

FCC 15.207(a), IC RSS-Gen 7.2.4

Test summary

The requirements are: ■ - MET □ - NOT MET

Testing was performed in accordance with the test procedure of ANSI C63.4-2003 7.2

Maximum conducted spurious emission, relative to the limit, is 37.65 dBμV average at 22.4 MHz

Minimum margin of compliance is 12.35 dB

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
- ☒ - Wild River Lab shield room 2

Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
OWLE02078	3825/2	Electro-Mechanics	50 Ω LISN	1326	Code B 30-Jun-11
WRLE02476	11947A	Hewlett Packard	Transient Limiter	3107A00780	Code B 11-Jan-12
OWLE02532	ESHS-10	Rohde & Schwarz	EMI Receiver	828178/006	06-Oct-11

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

Measurement summary for limit1: FCC 15.207 qp (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTN (dB)	FINAL (dBuV)	EUT Lead	DELTA1 FCC 15.207 qp
300.0 kHz	28.12 Qp	0.03 / 1.6 / 0.0 / 10.69	40.44	L1	-19.81
150.0 kHz	31.15 Qp	0.01 / 2.9 / 0.0 / 10.69	44.76	L1	-21.24
19.811 MHz	26.01 Qp	0.35 / 0.1 / 0.0 / 10.01	36.46	L1	-23.54
1.282 MHz	14.56 Qp	0.1 / 0.01 / 0.0 / 10.65	25.33	L1	-30.67
22.24 MHz	17.7 Qp	0.37 / 0.14 / 0.0 / 10.06	28.27	L1	-31.73
29.72 MHz	17.35 Qp	0.42 / 0.27 / 0.0 / 10.02	28.07	L2	-31.93
8.22 MHz	17.26 Qp	0.23 / 0.04 / 0.0 / 10.41	27.94	L2	-32.06

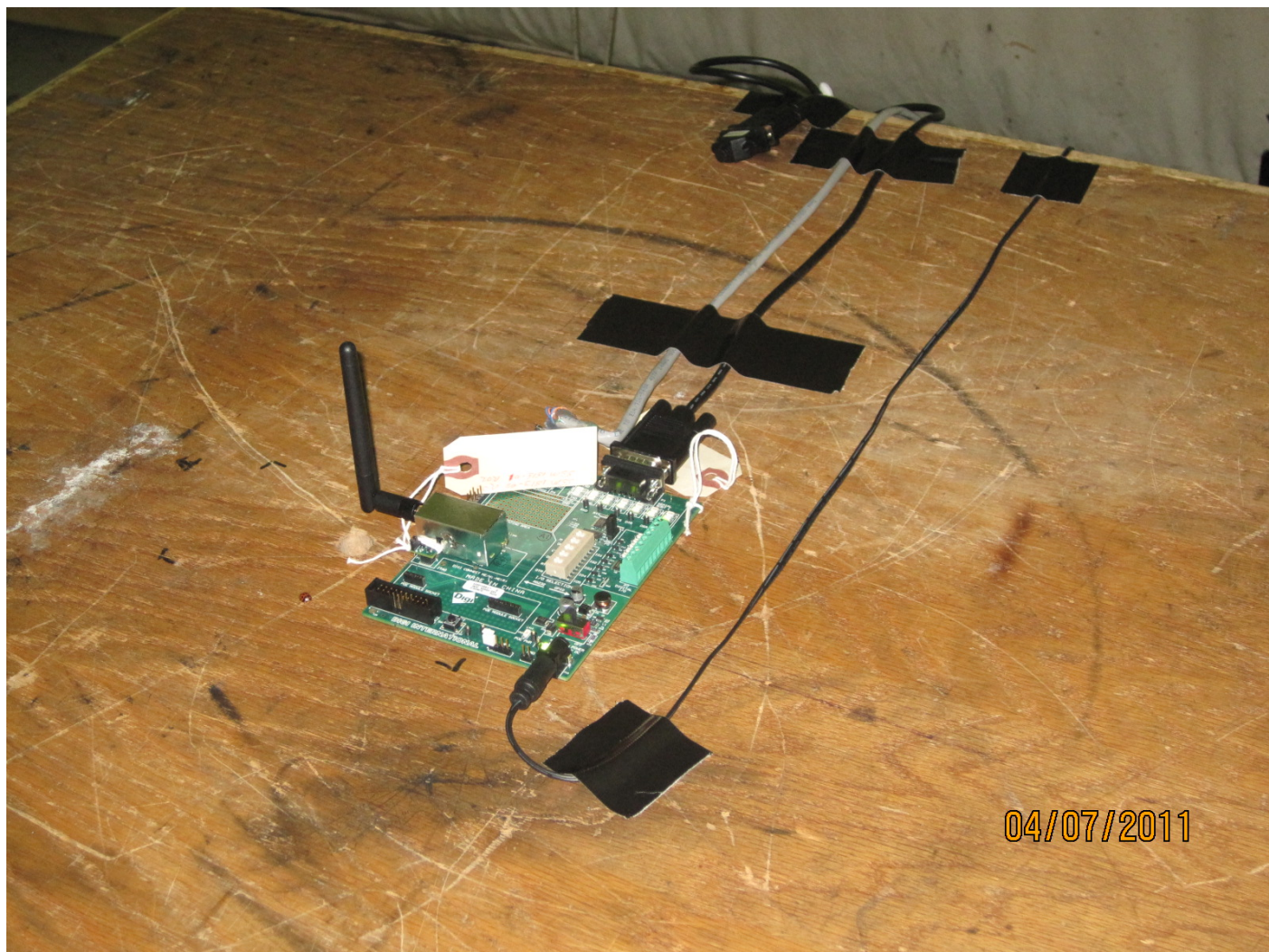
Measurement summary for limit2: FCC 15.207 av (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTN (dB)	FINAL (dBuV)	EUT Lead	DELTA2 FCC 15.207 av
22.24 MHz	27.08 Av	0.37 / 0.14 / 0.0 / 10.06	37.65	L1	-12.35
19.811 MHz	23.47 Av	0.35 / 0.1 / 0.0 / 10.01	33.92	L1	-16.08
29.72 MHz	15.26 Av	0.42 / 0.27 / 0.0 / 10.02	25.98	L2	-24.02
1.282 MHz	10.2 Av	0.1 / 0.01 / 0.0 / 10.65	20.97	L1	-25.03
8.22 MHz	12.24 Av	0.23 / 0.04 / 0.0 / 10.41	22.92	L1	-27.08
300.0 kHz	0.61 Av	0.03 / 1.6 / 0.0 / 10.69	12.93	L1	-37.32
150.0 kHz	2.97 Av	0.01 / 2.9 / 0.0 / 10.69	16.58	L1	-39.42

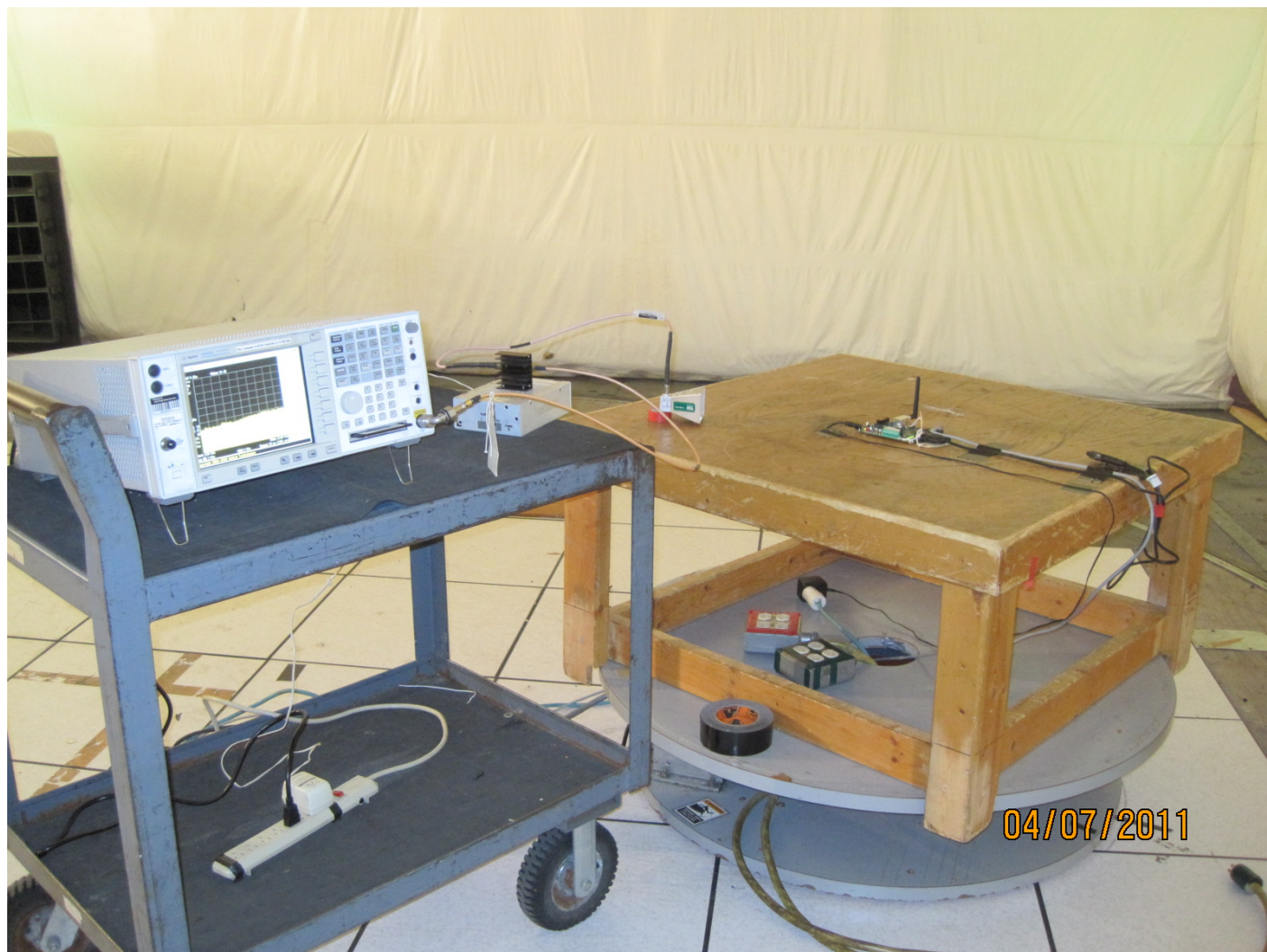
Test-setup photo(s):
Radiated measurements



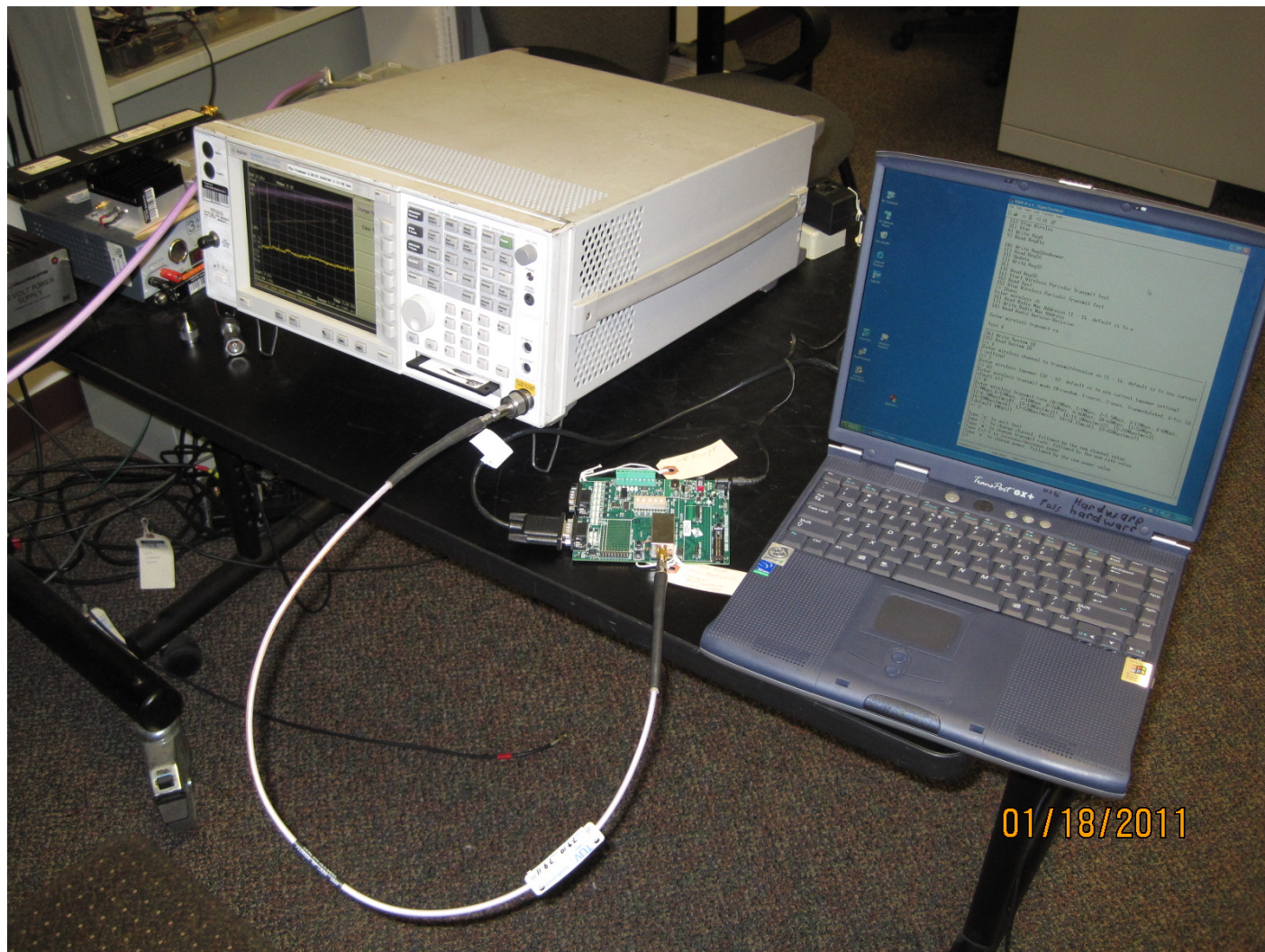
Test-setup photo(s):
Radiated measurements



Test-setup photo(s):
Radiated measurements



Test-setup photo(s):
Conducted measurements



Test-setup photo(s):
Conducted measurements – AC lines



Test-setup photo(s):
Conducted measurements – AC lines



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.
The power settings for the device are dependent on the data rate. Power setting 62 for the 11MB data rate,
power setting 55 for the 54MB & 65MB data rates.
-

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: 17 January 2011
Condition of EUT: Normal
Testing Start Date: 17 January 2011
Testing End Date: 20 April 2011

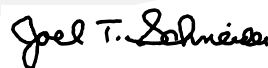
TÜV SÜD AMERICA INC

Tested by:



Greg S Jakubowski
Senior EMC Technician

Approved by:



Joel T Schneider
Senior EMC Engineer

Appendix A

Constructional Data Form





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 Rd. E.
Minnetonka, MN 55343
 Contact: Bill Kumpf Position: Engineer
 Phone: 952-912-3444 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 Serial to 802.11 b/g/n Module
 EUT Name Connect Wi-ME 9210
 Model No.: Connect Wi-ME 9210 Serial No.: 001
 Product Options: 2 memory sizes: 4MB flash/8MBsdram, 8MB flash/16MB sdram
 Configurations to be tested: 8MB flash/16MB sdram

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: na
 Modifications made during test: na

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

- | | |
|--|--|
| ☐ EMC Directive 2004/108/EC (EMC) | ☒ FCC: Class ☐ A ☒ B Part _____ |
| Std: _____ | ☒ VCCI: Class ☐ A ☐ B |
| ☐ Machinery Directive 89/392/EEC (EMC) | ☐ BSMI: Class ☐ A ☐ B (Separate Report) |
| Std: _____ | ☒ Canada: Class ☐ A ☒ B |
| ☐ Medical Device Directive 93/42/EEC (EMC) | ☒ Australia: Class ☐ A ☐ B |
| Std: _____ | ☒ Other: <u>C,RSS 210</u> |
| ☐ Vehicle Directive - 2004/104/EC (EMC) | ☐ Ag Directive *2009/64/EC (EMC) |
| ☐ Other Vehicle Std: _____ | |
| ☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC) | |

Third Party Certification (contact TÜV for quote), if applicable (*Signature on last page required).

- | | |
|---|--|
| ☐ Attestation of Compliance (AoC)* | ☐ EMC Certification (used with Octagon Mark)* |
| ☐ Statement of Compliance (SoC, previously CoC)* - All aspects of the essential requirements were assessed | |
| Protection Class (Req'd for AoC, SoC, EMC Cert. N/A for vehicles) ☐ Class I ☐ Class II ☐ Class III
<small>(Press F1 when field is selected to show additional information on Protection Class.)</small> | |
| ☒ FCC / TCB Certification | ☐ Taiwan Certification |
| ☒ Industry Canada / FCB Certification | ☐ Korean Certification |
| ☐ e-Mark Certification | |

**EMC Test Plan and Constructional Data Form****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 RequirementsLength: 1.445" Width: .720" Height: .71 Weight: 4oz**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: 3.3VDC (If battery powered, make sure battery life is sufficient to complete testing.)

of Phases: _____

Current (Amps/phase(max)): 0.55A Current (Amps/phase(nominal)): 0.400A

Other _____

Other Special Requirements

Run radiated and conducted immunity at 10V/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

EMC Test Plan and Constructional Data Form

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

**EMC Test Plan and Constructional Data Form****EUT Software.**

Revision Level: A

Description: software receives data over the air through the 802.11 b/g/n radio, loops the data through the serial port, checks the data for errors and reports the errors back over the air through the 802.11 b/g/n radio

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. software receives data over the air through the 802.11 b/g/n radio, loops the data through the serial port, checks the data for errors and reports the errors back over the air through the 802.11 b/g/n radio
- 2.
- 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 #



EMC Test Plan and Constructional Data Form

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 #
host pcb to power UUT	55001095 revb	001	na
Access point	CISCO AIRONET 1130ag		
laptop	Micron Transport GX+		

Oscillator Frequencies

Manufacturer	Frequency	Derived Frequency	Component # / Location	Description of Use
various	20MHz	2.4GHz	Y1/ RF pcb	timing ref for radio
various	29.4912MHz	75MHz	X1/controler pcb	processor timing

Power Supply

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

Power Line Filters

Manufacturer	Model #	Location in EUT

**EMC Test Plan and Constructional Data Form****Critical EMI Components (Capacitors, ferrites, etc.)**

<i>Description</i>	<i>Manufacturer</i>	<i>Part # or Value</i>	<i>Qty</i>	<i>Component # / Location</i>

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.

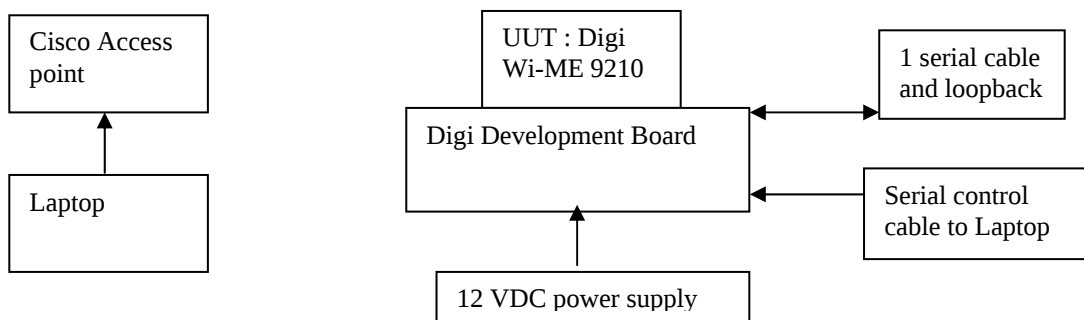
Date

Test Plan/CDF Prepared By (please print)

Date

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 Public Notice DA 02-2138.

Measurement Uncertainty

The test system for conducted emissions – AC lines 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

The spectrum analyzer uses a quasi-peak detector for frequencies up to and including 1 GHz. For measurements above 1 GHz, peak and average detectors are used. The bandwidths used are equal to or greater than 100 Hz from 9 kHz to 150 kHz, 9 kHz from 150 kHz to 30 MHz, 100 kHz from 30 MHz to 1000 MHz, and 1 MHz from 1 GHz to 40 GHz. Video bandwidths are at least three times greater than the IF bandwidth. Average measurements above 1 GHz are also achieved using a peak detector with 1 MHz RBW and 10 Hz VBW.

The final level, in dB μ V/m, equals the reading from the spectrum analyzer (Level dB μ V), 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 (dB μ V)	CABLE/ANT/PREAMP (dB) (dB/m) (dB)	FINAL (dB μ V/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.