TEST RESULT SUMMARY

FCC Part 15 Subpart E Section 15.407
Industry Canada RSS-210 Issue 7
Industry Canada RSS-Gen Issue 2

MANUFACTURER	Digi International 11001 Bren Road East Minnetonka MN 55343
DESCRIPTION OF EQUIPMENT	USB/Ethernet 10/100 Base T/WLAN Transceiver
NAME OF EQUIPMENT	Caterpillar 802.11 a/b/g Radio
MODEL NUMBER(S) TESTED	50001520-01
TEST REPORT NUMBER	WC903868.1 Rev A
TEST DATE(S)	07 April 09 – 06 July 2009

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, parts of Subpart E, Section 15.407 "*General technical requirements*" and Industry Canada RSS-210 Issue 7 *"Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"* and RSS-Gen Issue 2 *"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:	27 August 2009		
Location:	Taylors Falls MN USA	Greg S Jakubowski Senior EMC Technician	Joel T Schneider Senior EMC Engineer

Not Transferable

EMC TEST REPORT

Test Report No.	**WC903868.1 Rev A**	Date of issue:	27 August 2009
Product Description	USB/Ethernet 10/100 Base T/WLAN Transceiver		
Product Name	Caterpillar 802.11 a/b/g Radio		
Model / Serial No(s) Tested	50001520-01 / ---		
Manufacturer	Digi International		
Address	11001 Bren Road East		
	Minnetonka MN 55343		
Test Result	■ **Positive**	☐ **Negative**	
Total pages including Appendices	**105**		

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
	105	27 July 2009	Initial Release
A	69	25 August 2009	- Removed all reference to DFS bands

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 7 Sections A8.2(a), A8.4(4), A8.5, A8.2(b), A9.2, A9.3
- Industry Canada RSS-Gen Issue 2 Section 4.6.1

ENVIRONMENTAL CONDITIONS IN THE LAB

	Actual
Temperature:	: 21-26°C
Atmospheric pressure	: 98-99 kPa
Relative Humidity	: 30-35%

POWER SUPPLY UTILIZED

Power supply system	: 12 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

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 Public Notice DA 02-2138
The emission bandwidth ranges from 19.41 to 20.82 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

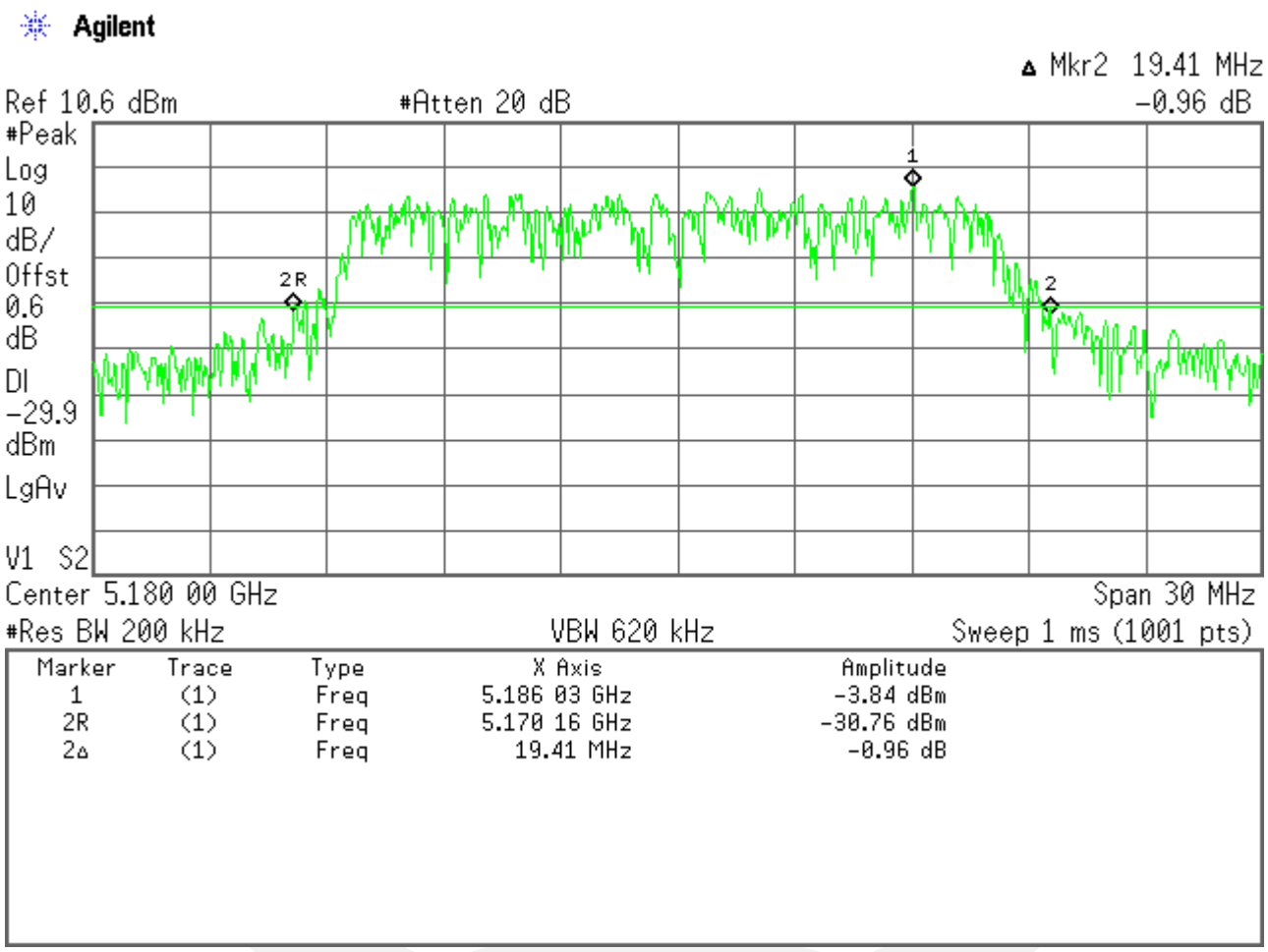
Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	14 Nov 09

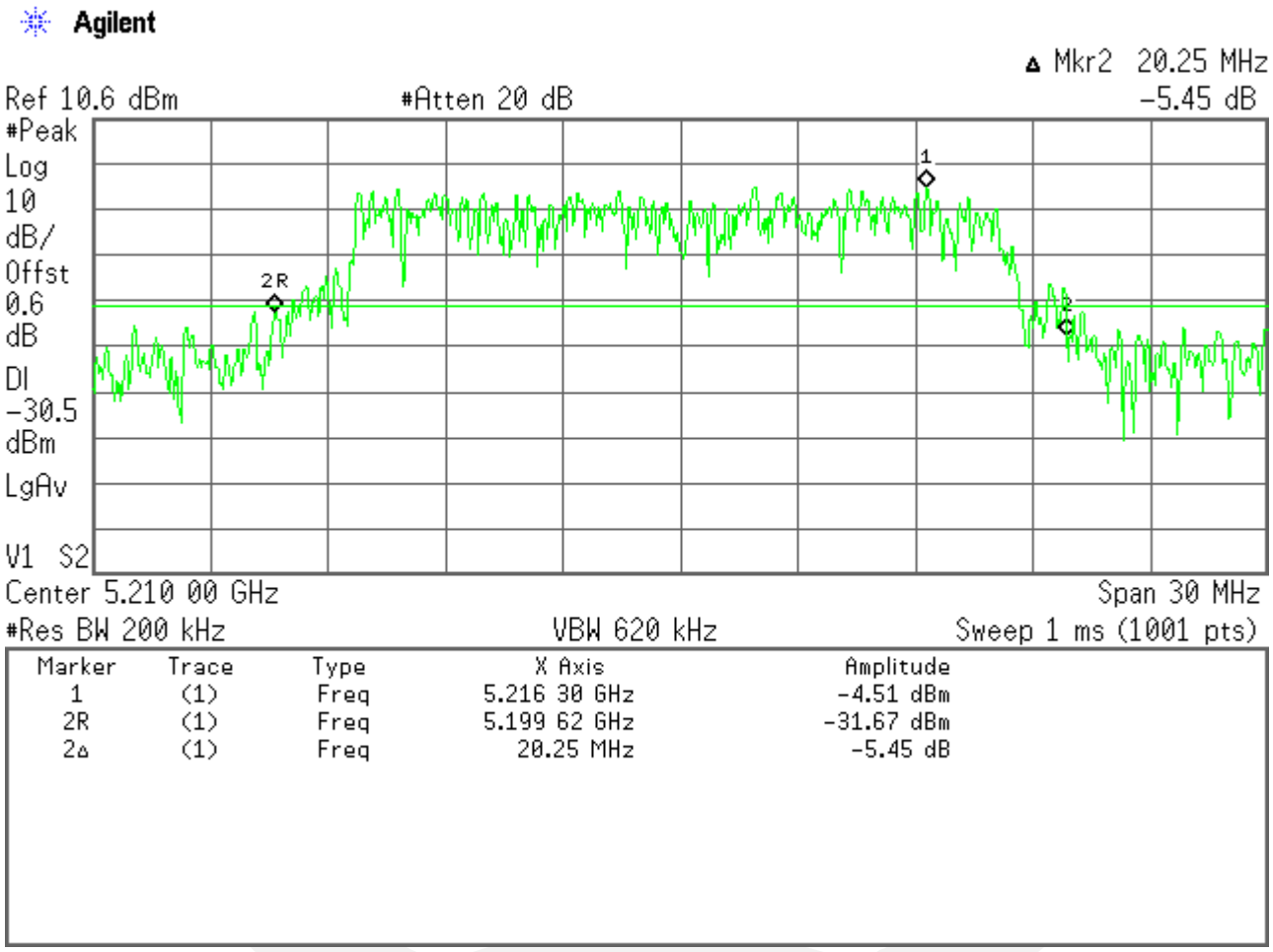
Test limit
n/a

Test data
See following pages

Emission bandwidth
Channel 36, 54 Mbps

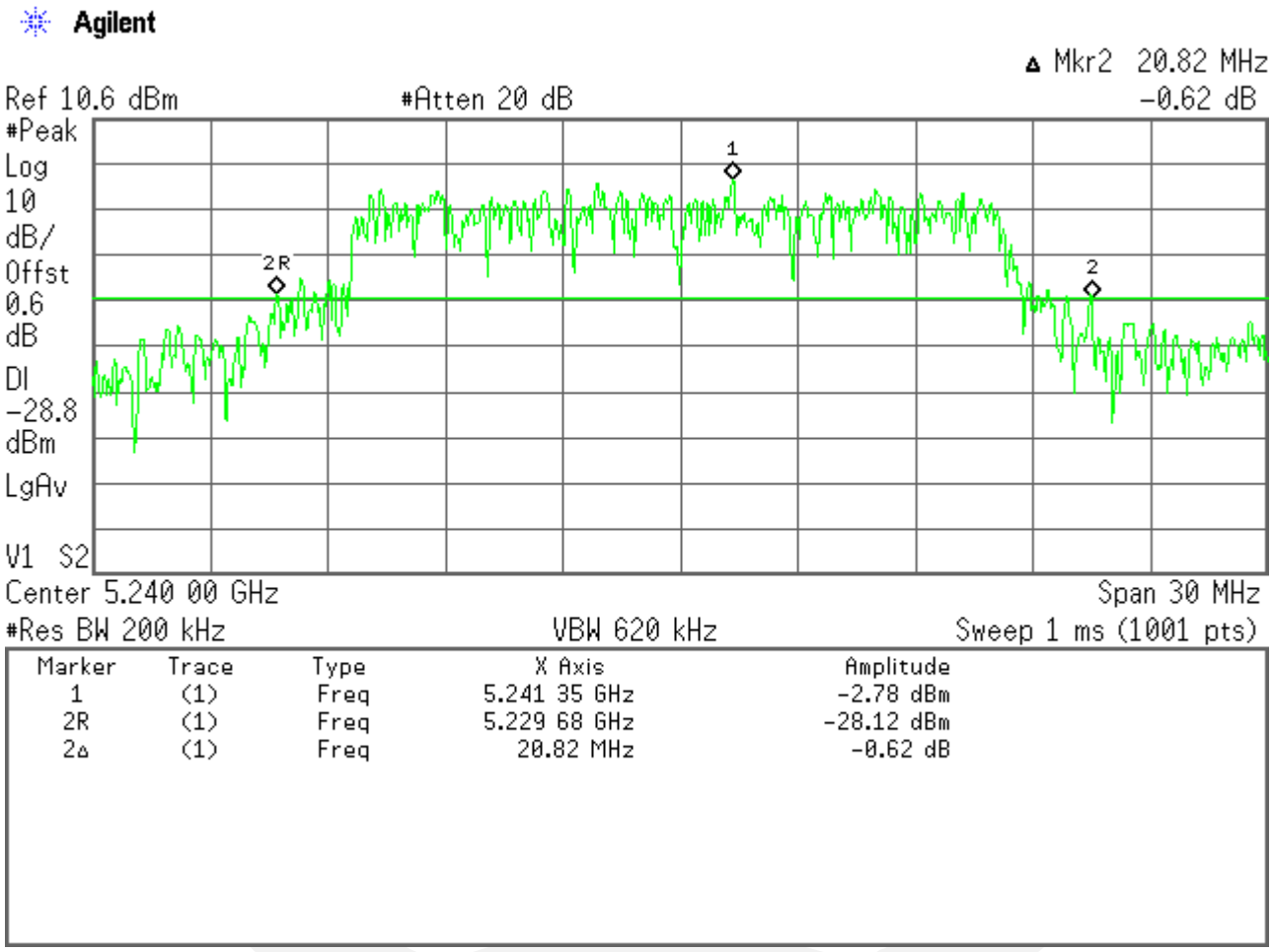


Emission bandwidth
Channel 42, 54 Mbps

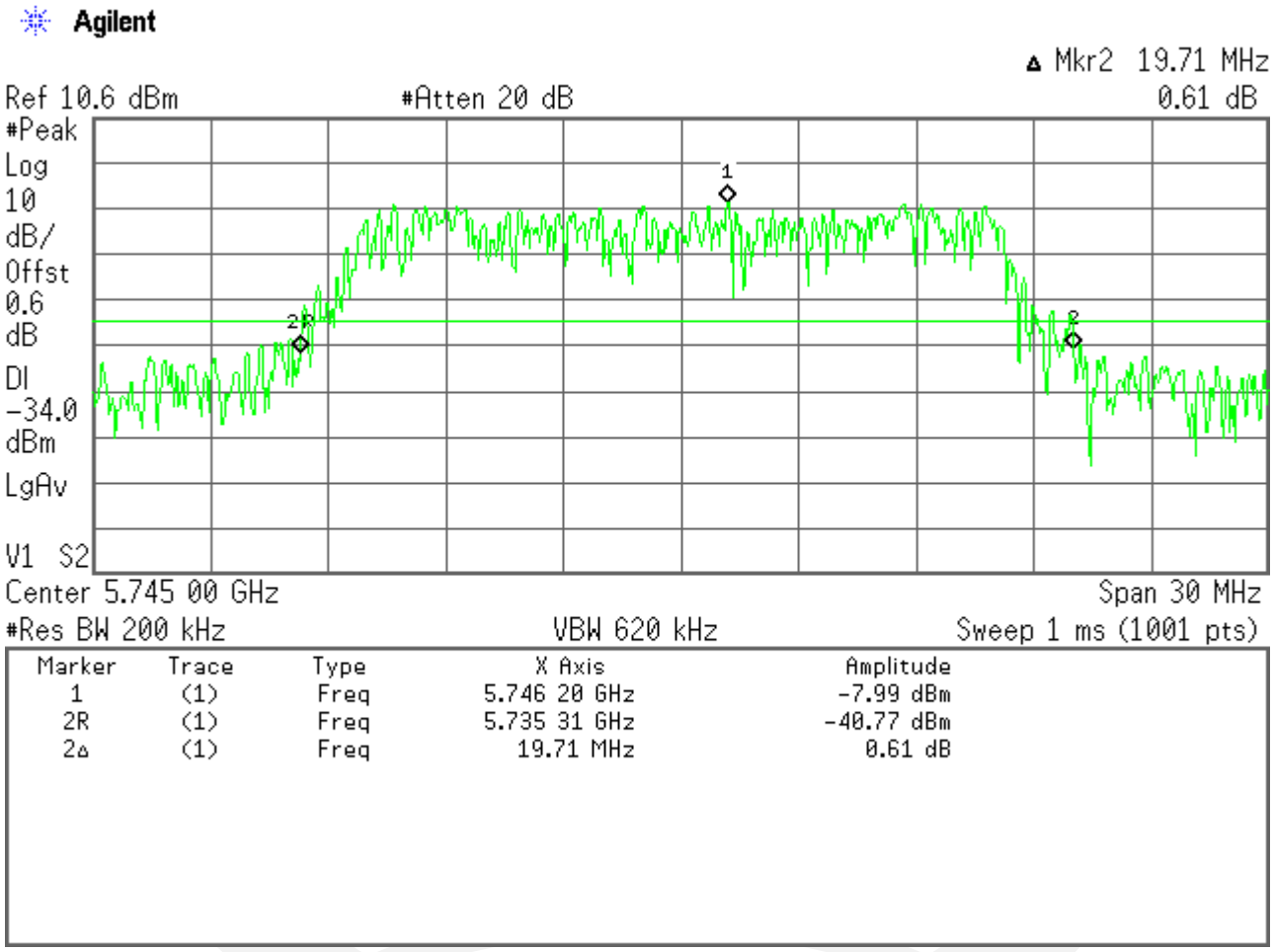


Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	5.216 30 GHz	-4.51 dBm
2R	(1)	Freq	5.199 62 GHz	-31.67 dBm
2Δ	(1)	Freq	20.25 MHz	-5.45 dB

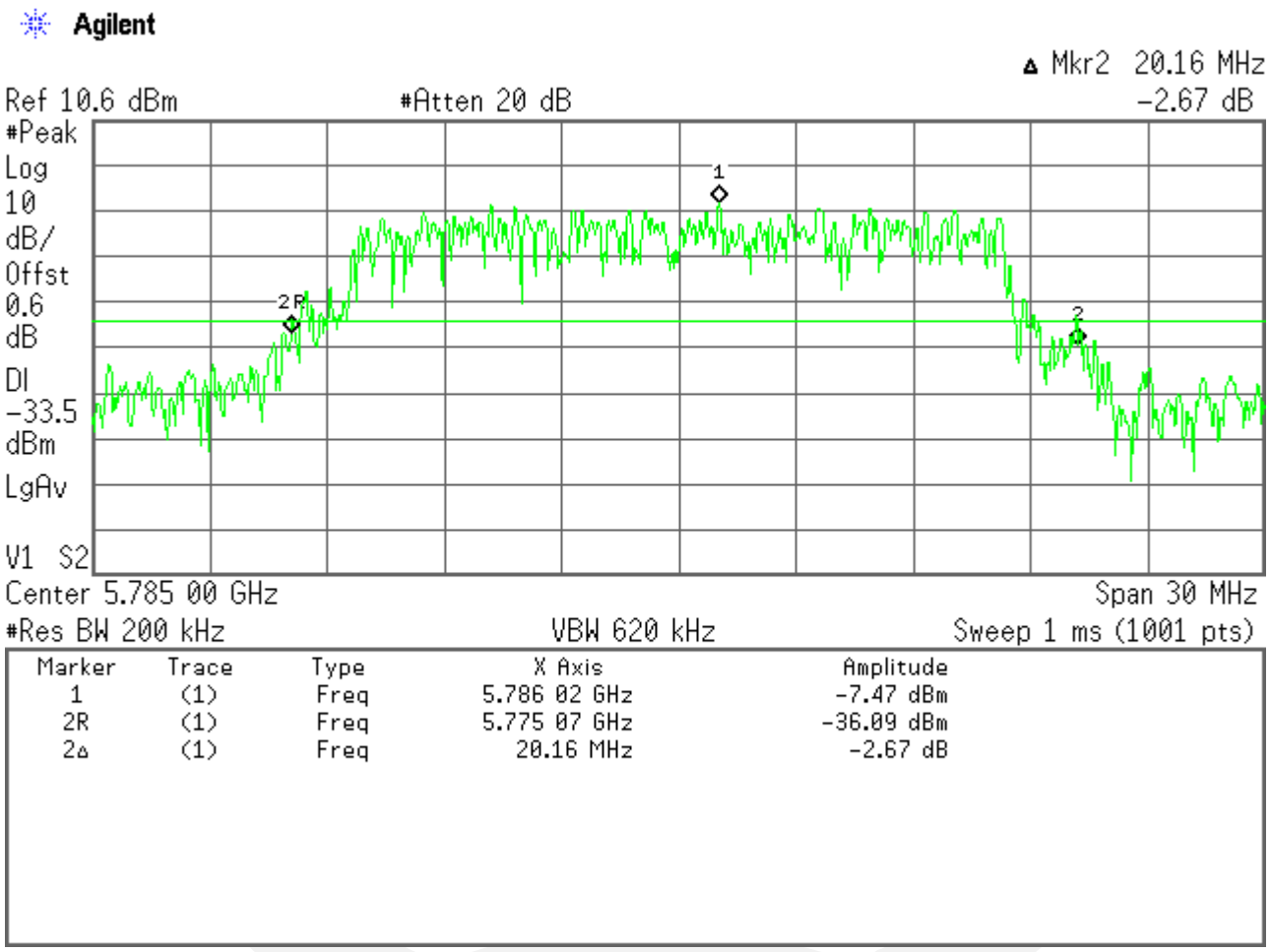
Emission bandwidth
Channel 48, 54 Mbps



Emission bandwidth
Channel 149, 54 Mbps

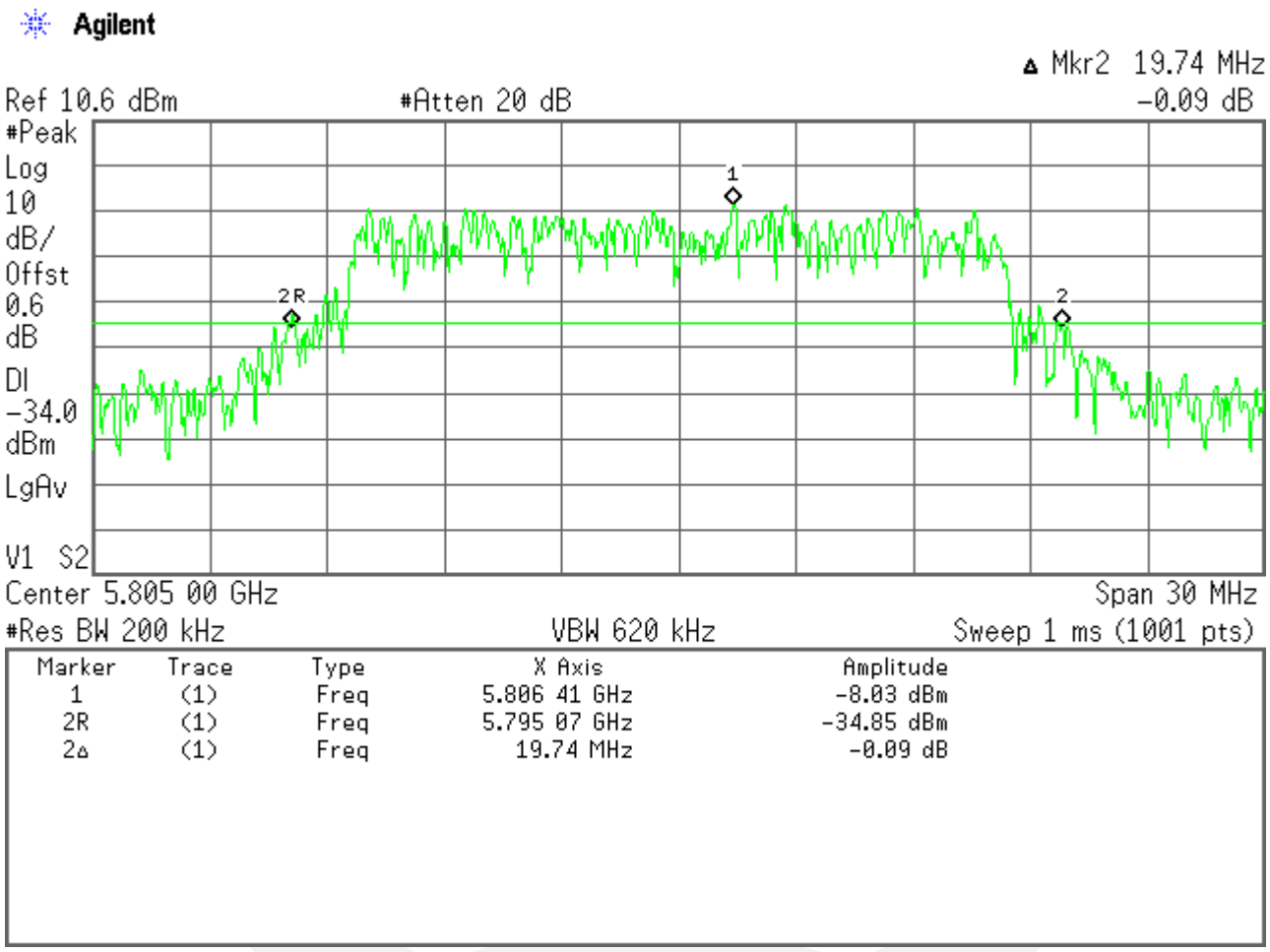


Emission bandwidth
Channel 157, 54 Mbps



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	5.786 02 GHz	-7.47 dBm
2R	(1)	Freq	5.775 07 GHz	-36.09 dBm
2Δ	(1)	Freq	20.16 MHz	-2.67 dB

Emission bandwidth
Channel 161, 54 Mbps



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 Public Notice DA 02-2138 method #1.
Span > EBW, bin width < ½ RBW therefore sample detector, device operates continuously therefore trigger = free run, average 100 traces in power avg mode.
Computed power by integrating the spectrum across the 26 dB EBW using the analyzer's band power measurement function.
Maximum conducted output power is 6.793 mW or 8.32 dBm, channel 48, 5.24 GHz
Minimum margin of compliance is 8.68 dB, channel 48, 5.24 GHz
Power setting 30

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	14 Nov 09

Test limit
5.15-5.25 GHz 50 mW (17 dBm), or 4 dBm + 10 log B, whichever is less
5.725-5.825 GHz 1 W (30 dBm), or 17 dBm + 10 log B, whichever is less

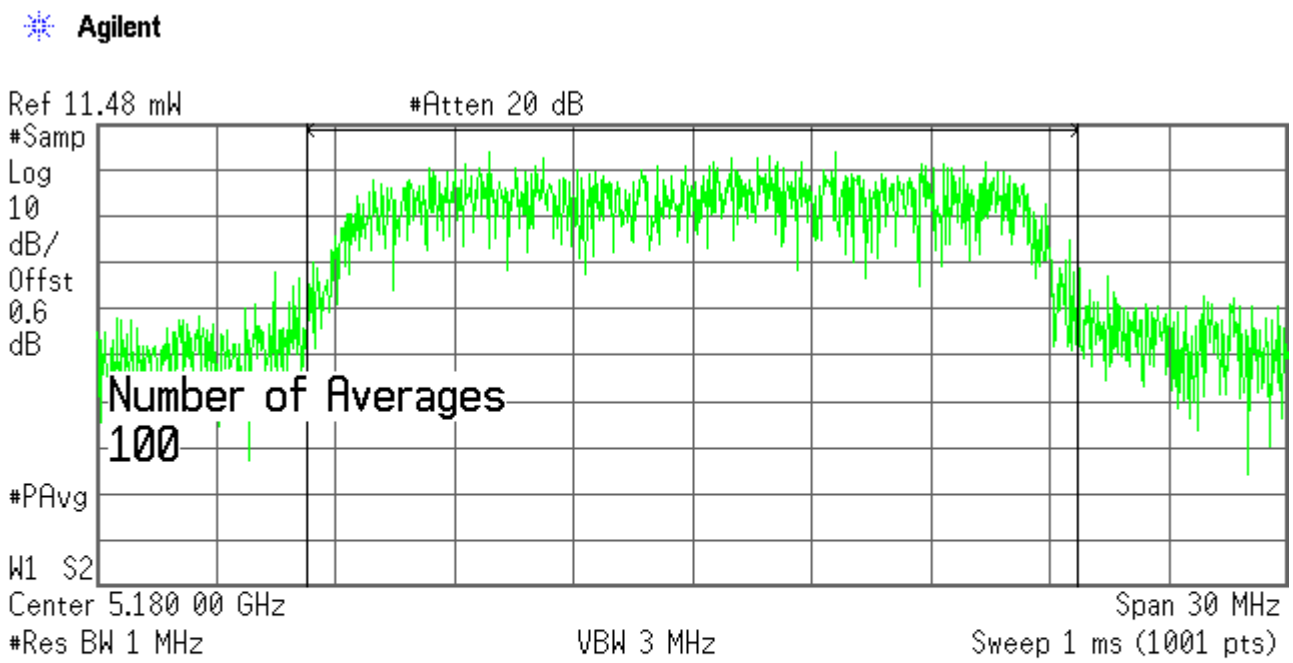
Antennas are < 6 dBi gain

Test data

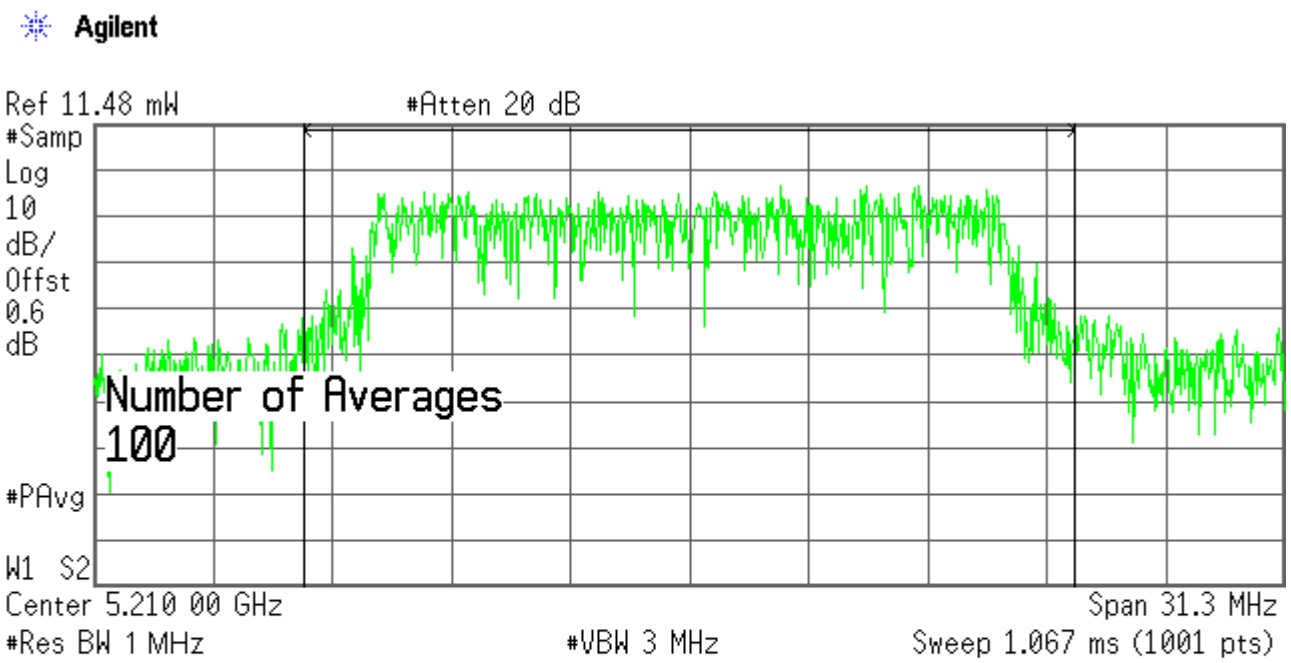
Ch	Freq (GHz)	Power (mW)	Power (dBm)	Limit (dBm)	Delta (dB)
36	5.18	6.29	7.98	16.8	-8.82
42	5.21	6.756	8.29	17	-8.71
48	5.24	6.793	8.32	17	-8.68
149	5.745	2.969	4.72	29.9	-25.18
157	5.785	2.889	4.6	30	-25.4
161	5.805	2.593	4.13	29.9	-25.77

See following pages

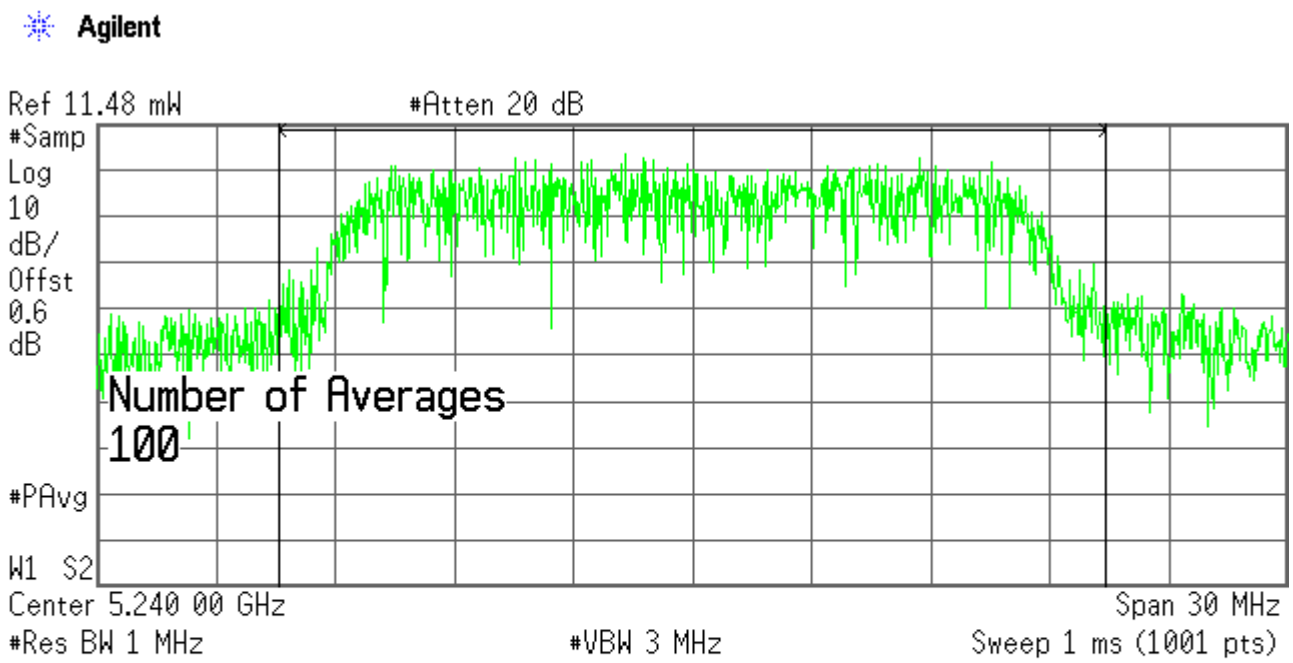
Conducted output power
Channel 36, 54 Mbps



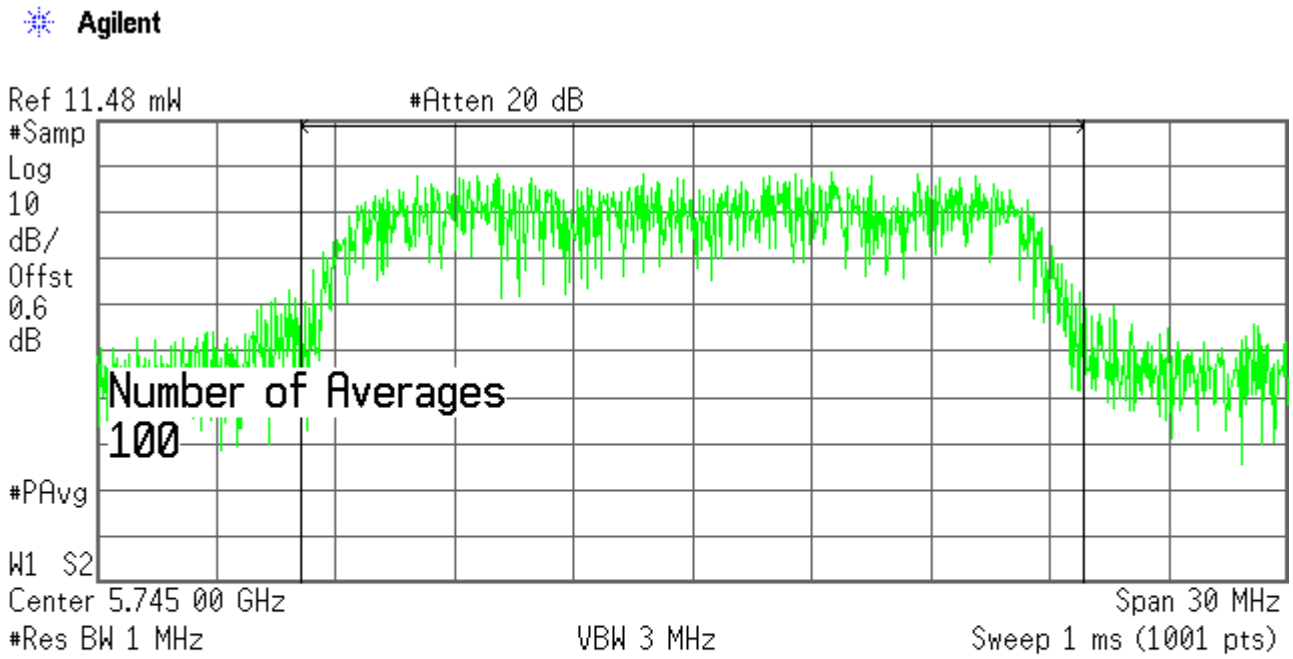
Conducted output power
Channel 42, 54 Mbps



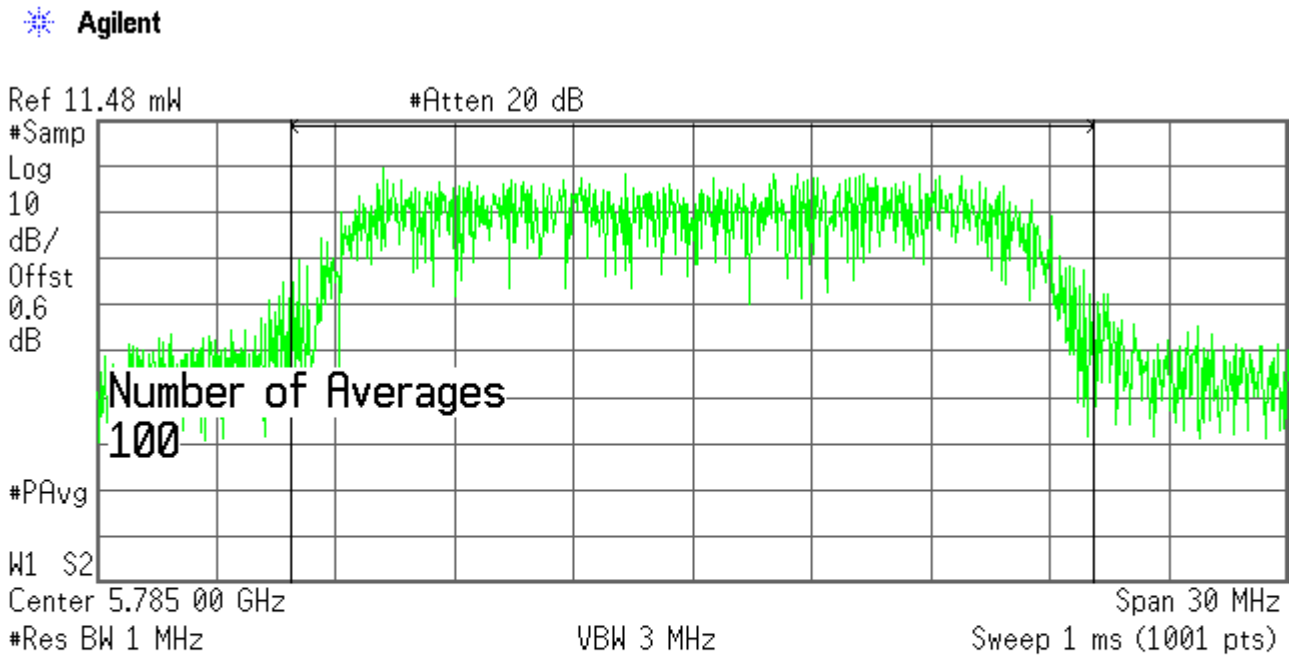
Conducted output power
Channel 48, 54 Mbps



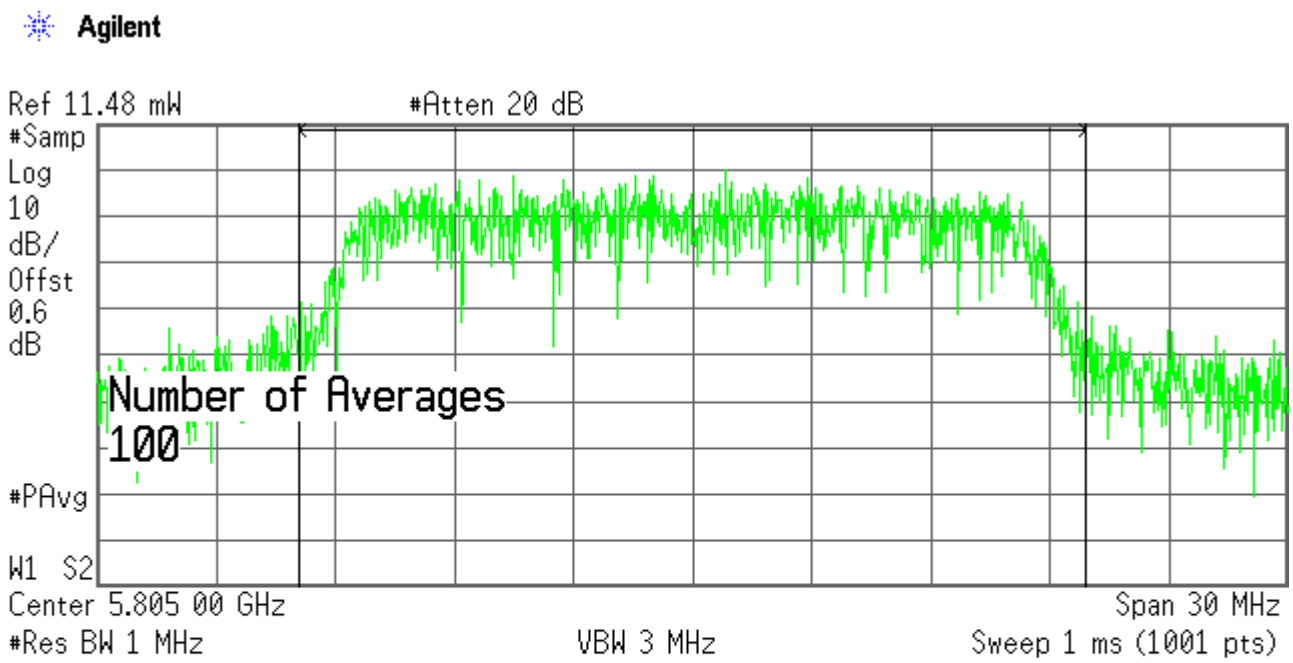
Conducted output power
Channel 149, 54 Mbps



Conducted output power
Channel 157, 54 Mbps



Conducted output power
Channel 161, 54 Mbps



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 Public Notice DA 02-2138, method #2.
Maximum PPSD is -4.76 dBm/MHz, channel 42, 5.21 GHz
Minimum margin of compliance is 8.76 dB

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

Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	14 Nov 09

Test limit

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

Antennas are < 6 dBi gain

Test data

Ch	Freq (GHz)	Pk power spectral density (μW/MHz)	(dBm/MHz)	Limit (dBm)	Delta (dB)
36	5.180	324.1	-4.89	4	-8.89
42	5.210	333.7	-4.76	4	-8.76
48	5.240	326.3	-4.86	4	-8.86
149	5.745	150.7	-8.21	17	-25.21
157	5.785	143.3	-8.43	17	-25.43
161	5.805	131.4	-8.81	17	-25.81

See previous 6 pages

RSS-210 A9.5(2)
The average value 10 log B = 12.1 dBm. None of the above levels exceed this.

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 Public Notice DA 02-2138
Maximum peak excursion is 9.28 dB, channel 157, 5.785 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

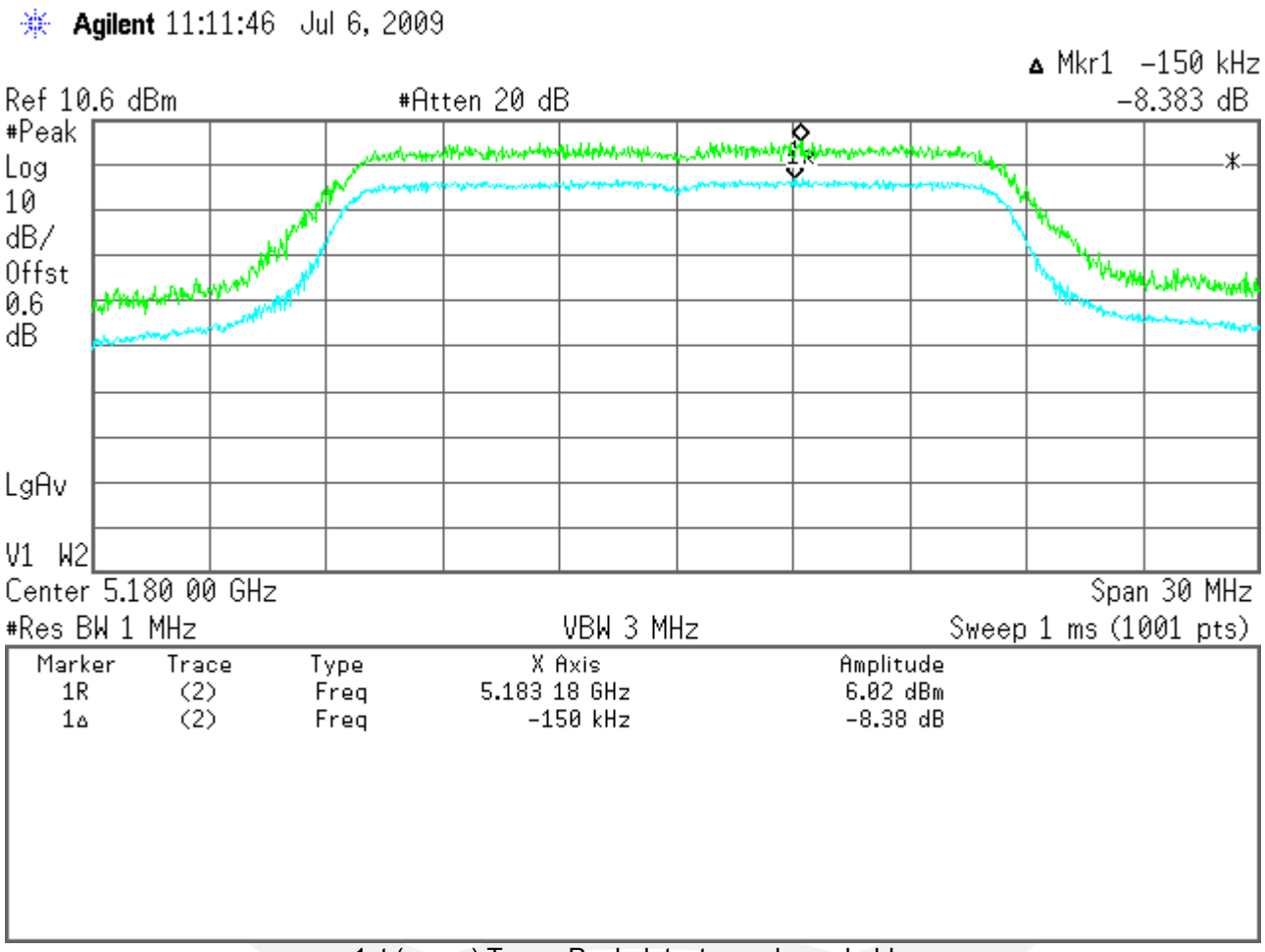
Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	14 Nov 09

Test limit
Trace 1 & 2 delta ≤ 13 dB

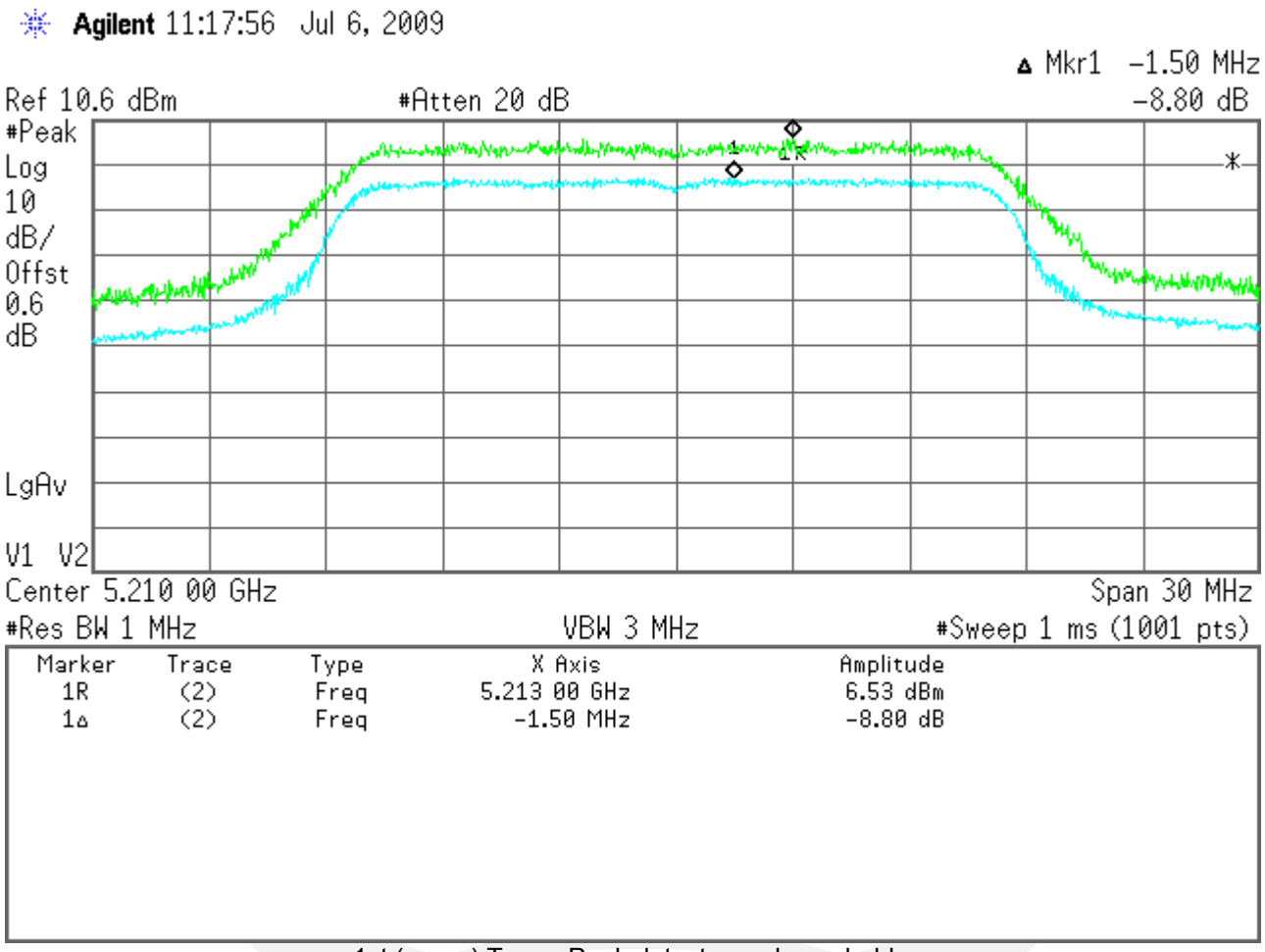
Test data
See following pages

Peak excursion
Channel 36, 54 Mbps



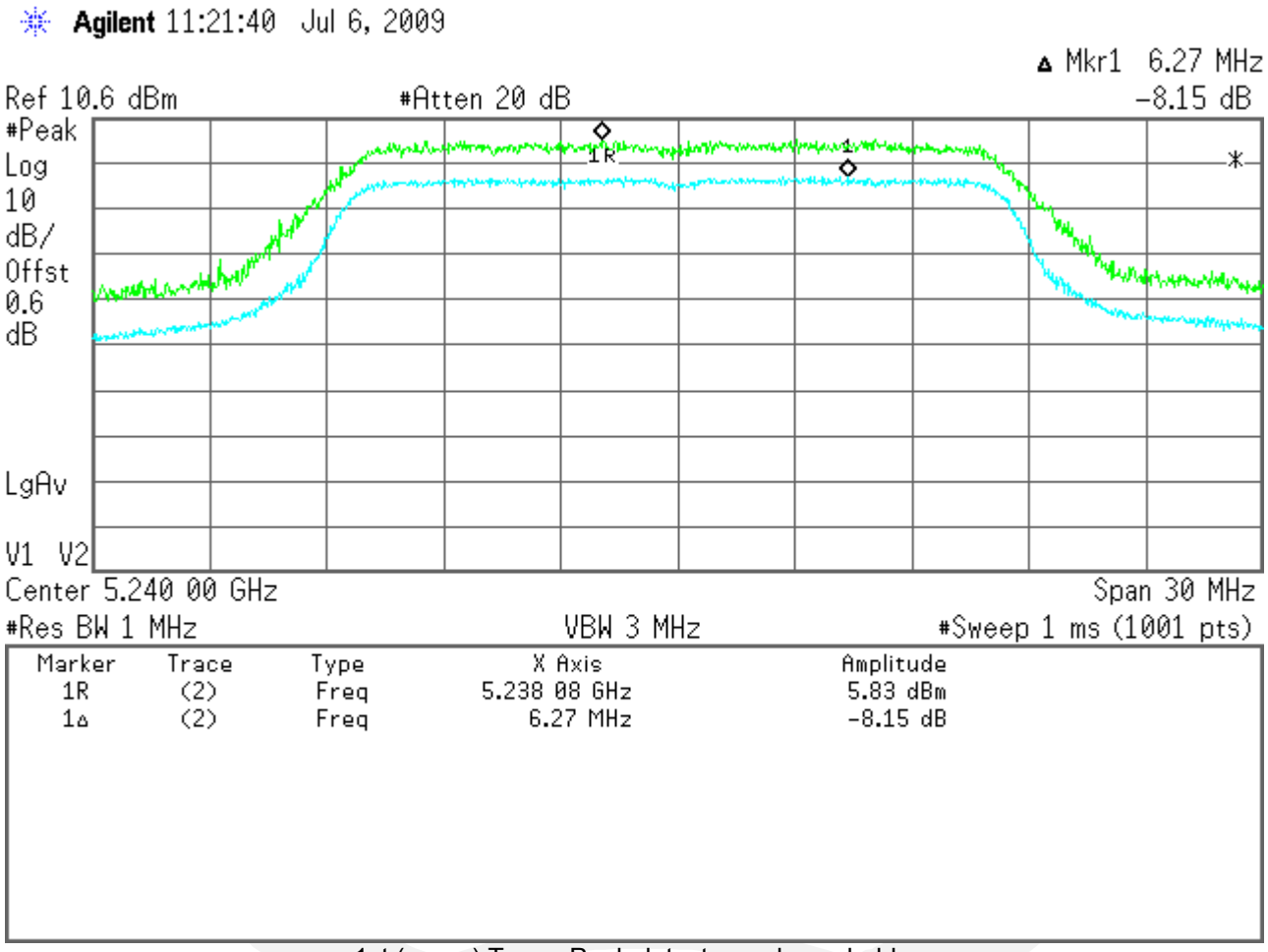
1st (upper) Trace: Peak detector and max hold
2nd (lower) Trace: Sample detector, power average 100 traces = power measurement method 1

Peak excursion
Channel 42, 54 Mbps



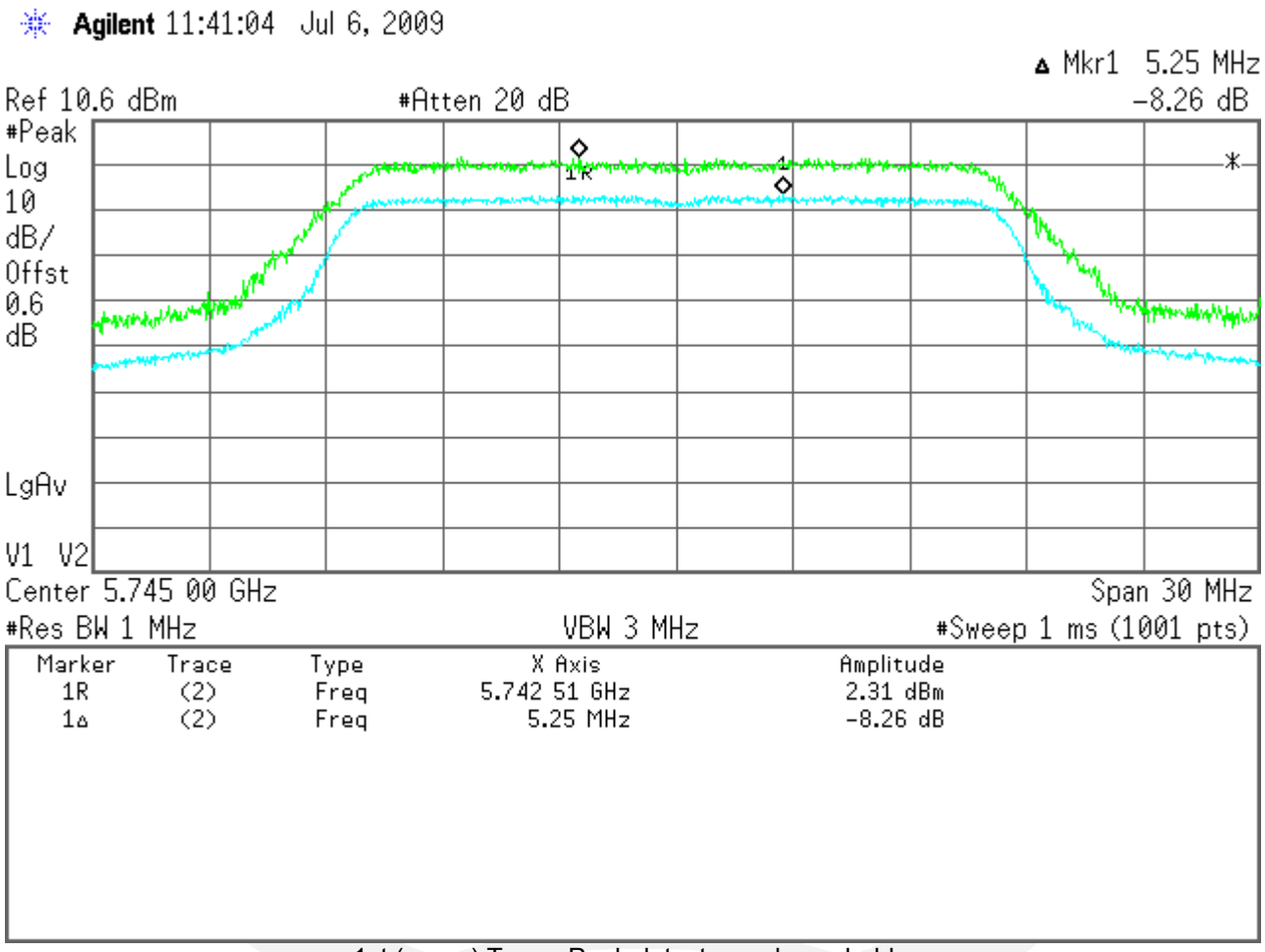
1st (upper) Trace: Peak detector and max hold
2nd (lower) Trace: Sample detector, power average 100 traces = power measurement method 1

Peak excursion
Channel 48, 54 Mbps



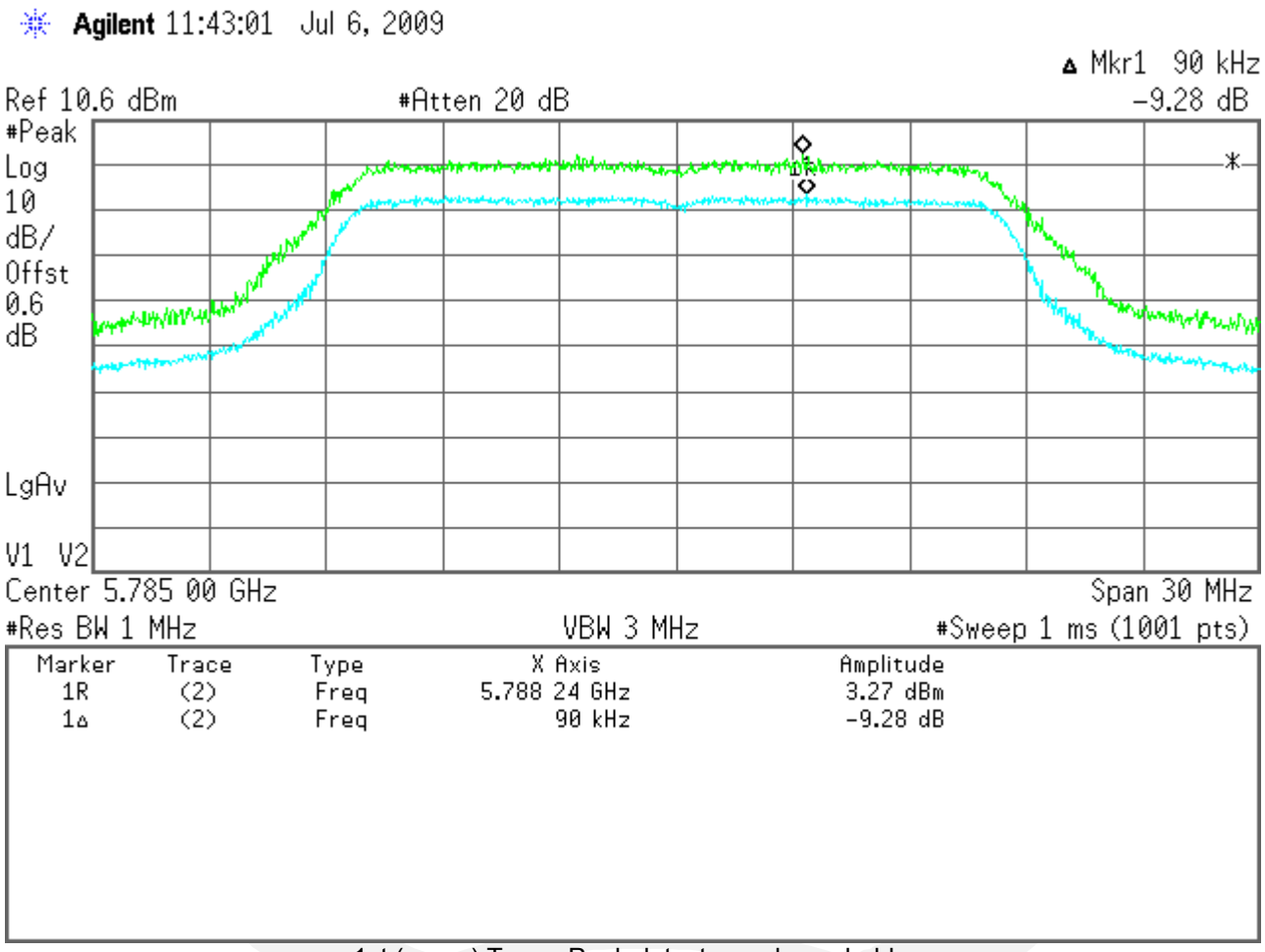
1st (upper) Trace: Peak detector and max hold
2nd (lower) Trace: Sample detector, power average 100 traces = power measurement method 1

Peak excursion
Channel 149, 54 Mbps



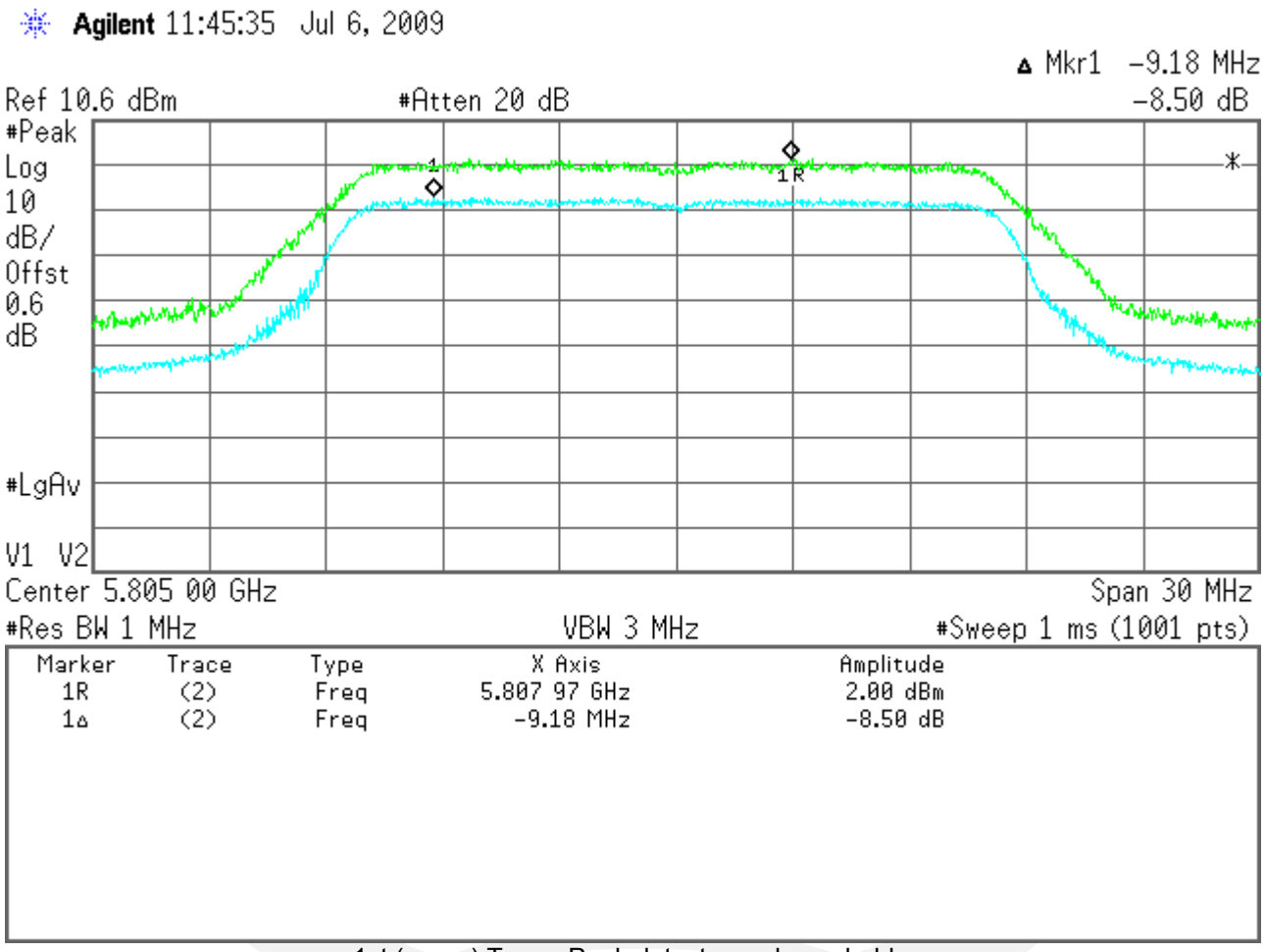
1st (upper) Trace: Peak detector and max hold
2nd (lower) Trace: Sample detector, power average 100 traces = power measurement method 1

Peak excursion
Channel 157, 54 Mbps



1st (upper) Trace: Peak detector and max hold
2nd (lower) Trace: Sample detector, power average 100 traces = power measurement method 1

Peak excursion
Channel 161, 54 Mbps



1st (upper) Trace: Peak detector and max hold
2nd (lower) Trace: Sample detector, power average 100 traces = power measurement method 1

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
Maximum undesirable average emission is 11.49 GHz, 47.25 dBuV/m (230 µV/m) at 3 meters (extrapolated)
Minimum margin of compliance is 6.75 dB
Maximum undesirable peak emission is 10.362 GHz, 55.18 dBuV/m (574 µV/m) at 3 meters (extrapolated) or -40 dBm/MHz eirp - Minimum margin of compliance is 13.02 dB

Test location
■ - Wild River Lab Large Test Site (Open Area Test Site)

Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
NBLE03367	E4440A	Agilent	Spectrum Analyzer	MY42510439	20-Nov-09
WRLE03978	SL26-3010	Phase One Microwave	Amplifier 18-26.5 GHz	0005	Code B 14-May-10
WRLE06717	3116	EMCO	Ridge Guide Ant 18-40 GHz	2005	03-Apr-10
NBLE02683	85650A	Hewlett-Packard	Quasi-peak Adapter	2430A00495	23-Feb-10
WRLE02675	85662A	Hewlett -Packard	Analyzer Display (C)	2542A11472	04-Aug-09
WRLE03294	8566B	Hewlett-Packard	Spectrum Analyzer	2349A03098	19-Mar-10
WRLE03847	ZHL-1042J	Mini-Circuits	Preamplifier 10 - 3000 MHz	0607	Code B 14-May-10
WRLE010527	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0001	Code B 10-Sep-09
WRLE03204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	17-Dec-09
WRLE02075	3115	EMCO	Ridge Guide Ant. 1-18 GHz	9001-3275	13-Jan-10
WRLE03997	EWT-14-0066	EWT	2.4 GHz Notch filter	E2	Code B 23-Jan-10
WRLE02003	F550B1	Acronetics	4 – 8 GHz Bandpass Filter	010	Code B 10-Sep-09
WRLE03933	F551B-1	Acronetics	8 – 12 GHz Bandpass Filter	010	Code B 10-Sep-09
WRLE03934	F549B-1	Acronetics	2 – 4 GHz Bandpass Filter	010	Code B 10-Sep-09
WRLE03935	F548B-1	Acronetics	1 – 2 GHz Bandpass Filter	010	Code B 10-Sep-09
WRLE02661	11970A	Hewlett-Packard	Harm Mixer – 26.5-40 GHz	2332A01861	04-Sep-09
WRLE06717	3116	EMCO	Ridge Guide Ant 18-40 GHz	2005	16-Oct-09

Cal Code B = Calibration verification performed internally.

Test limit, FCC 15.407(b)(1-4)
Outside the band of operation > 1 GHz, -27 dBm/MHz eirp.
Because measurements are made with 1 MHz RBW, converted limit of -27dBm/MHz to dBuV/m @ 3 m with the following OET Bulletin 63 formula:

$EIRP*G / 4\pi D^2 = E^2 / 120\pi$, assuming unity gain G = 1
EIRP = equivalent isotropically radiated power in watts = -27dBm/MHz eirp limit = 0.000002 W
D = measurement distance = 3 meters
FS = 68.2 dBuV/m (since this is lower than 74 dBuV/m peak limit below, used on data sheet)

Test limit, FCC 15.407(b)(6-8)
Radiated field strength 30-1000 MHz, 3 meter distance, within the restricted bands of 15.205

Frequency (MHz)	dBµV/m	µV/m
30 – 88	40 QP	100 QP
88 – 216	43.5 QP	150 QP
216 – 960	46 QP	200 QP
960 – 1000	54 QP	500 QP
above 1000*	54 AV – 74 PK	500 AV – 5000 PK

Test data, See following pages

RADIATED EMISSIONS

Test Report #:	WC903868 Run 4	Test Area:	LTS		
EUT Model #:	50001520-01	Date:	6/6/2009		
EUT Serial #:	N/A	EUT Power:	12vdc	Temperature:	21.0 °C
Test Method:	FCC 15.407			Air Pressure:	98.0 kPa
Customer:	Digi			Rel. Humidity:	35.0 %
EUT Description:	USB/Ethernet 10/100 BaseT/WLAN Transceiver				
Notes:					
Data File Name:	3868 june 6 [gj revs].dat			Page:	1 of 5

List of measurements for run #: 4

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2
Start of Scan 30 - 1000 MHz.						
ch 149 power setting 30						
5dBi Antenna						
73.883 MHz	41.2 Qp	0.55 / 8.8 / 29.7 / 0.0	20.86	V / 1.00 / 0	-19.14	n/a
111.598 MHz	36.4 Qp	0.82 / 8.7 / 29.7 / 0.01	16.22	V / 1.00 / 0	-27.28	n/a
119.998 MHz	41.15 Qp	0.84 / 8.58 / 29.7 / 0.01	20.87	V / 1.00 / 0	-22.63	n/a
132.948 MHz	40.75 Qp	0.87 / 7.73 / 29.7 / 0.01	19.66	V / 1.00 / 0	-23.84	n/a
149.932 MHz	39.45 Qp	0.92 / 8.51 / 29.8 / 0.01	19.08	V / 1.00 / 0	-24.42	n/a
164.524 MHz	35.1 Qp	0.95 / 8.65 / 29.8 / 0.01	14.91	V / 1.00 / 0	-28.59	n/a
167.987 MHz	33.8 Qp	0.96 / 8.85 / 29.8 / 0.01	13.82	V / 1.00 / 0	-29.68	n/a
244.089 MHz	33.05 Qp	1.16 / 11.55 / 29.72 / 0.01	16.05	V / 1.00 / 0	-29.95	n/a
244.109 MHz	33.75 Qp	1.16 / 11.55 / 29.72 / 0.01	16.75	V / 1.00 / 0	-29.25	n/a
240.012 MHz	31.7 Qp	1.15 / 11.4 / 29.7 / 0.01	14.56	V / 1.00 / 0	-31.44	n/a
269.942 MHz	32.35 Qp	1.21 / 12.51 / 29.8 / 0.02	16.29	V / 1.00 / 0	-29.71	n/a
399.992 MHz	39.15 Qp	1.36 / 15.95 / 30.0 / 0.02	26.48	V / 1.00 / 0	-19.52	n/a
960.004 MHz	30.7 Qp	2.82 / 22.6 / 29.7 / 0.06	26.48	V / 1.00 / 0	-27.52	n/a
240.012 MHz	38.2 Qp	1.15 / 11.4 / 29.7 / 0.01	21.06	V / 1.00 / 0	-24.94	n/a
960.004 MHz	35.8 Qp	2.82 / 22.6 / 29.7 / 0.06	31.58	V / 1.00 / 0	-22.42	n/a
132.948 MHz	42.85 Qp	0.87 / 7.73 / 29.7 / 0.01	21.76	V / 1.00 / 90	-21.74	n/a
149.932 MHz	41.85 Qp	0.92 / 8.51 / 29.8 / 0.01	21.48	V / 1.00 / 180	-22.02	n/a
399.992 MHz	40.35 Qp	1.36 / 15.95 / 30.0 / 0.02	27.68	V / 1.00 / 180	-18.32	n/a
121.776 MHz	38.55 Qp	0.84 / 8.46 / 29.7 / 0.01	18.16	V / 1.00 / 180	-25.34	n/a
137.751 MHz	41.2 Qp	0.88 / 7.96 / 29.7 / 0.01	20.35	V / 1.00 / 180	-23.15	n/a
280.002 MHz	40.3 Qp	1.22 / 12.47 / 29.82 / 0.02	24.18	V / 1.00 / 180	-21.82	n/a
999.99 MHz	29.6 Qp	3.01 / 22.81 / 29.76 / 0.06	25.73	V / 1.00 / 180	-28.27	n/a

Tested by: Robert J Behringer (Printed) _____ (Signature)

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

RADIATED EMISSIONS

Test Report #:	WC903868 Run 4	Test Area:	LTS		
EUT Model #:	50001520-01	Date:	6/6/2009		
EUT Serial #:	N/A	EUT Power:	12vdc	Temperature:	21.0 °C
Test Method:	FCC 15.407			Air Pressure:	98.0 kPa
Customer:	Digi			Rel. Humidity:	35.0 %
EUT Description:	USB/Ethernet 10/100 BaseT/WLAN Transceiver				
Notes:					
Data File Name:	3868 june 6 [gj revs].dat			Page:	2 of 5

List of measurements for run #: 4

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2
244.109 MHz	36.05 Qp	1.16 / 11.55 / 29.72 / 0.01	19.05	H / 3.00 / 0	-26.95	n/a
399.992 MHz	40.85 Qp	1.36 / 15.95 / 30.0 / 0.02	28.18	H / 3.00 / 0	-17.82	n/a
253.812 MHz	34.05 Qp	1.18 / 11.91 / 29.78 / 0.01	17.38	H / 3.00 / 0	-28.62	n/a
149.928 MHz	42.8 Qp	0.92 / 8.51 / 29.8 / 0.01	22.43	H / 3.00 / 270	-21.07	n/a
167.945 MHz	35.35 Qp	0.96 / 8.84 / 29.8 / 0.01	15.36	H / 3.00 / 270	-28.14	n/a
149.928 MHz	46.75 Qp	0.92 / 8.51 / 29.8 / 0.01	26.38	H / 3.00 / 90	-17.12	n/a
399.992 MHz	40.55 Qp	1.36 / 15.95 / 30.0 / 0.02	27.88	H / 3.00 / 0	-18.12	n/a
Maxed						
149.928 MHz	50.29 Qp	0.92 / 8.51 / 29.8 / 0.01	29.92	H / 2.40 / 62	-13.58	n/a
399.992 MHz	46.72 Qp	1.36 / 15.95 / 30.0 / 0.02	34.05	H / 1.00 / 10	-11.95	n/a
No new or higher emissions detected at channels 157, 165, 100, 116, 128, 140, 55 and 64.						
ch 36						
399.992 MHz	47.44 Qp	1.36 / 15.95 / 30.0 / 0.02	34.77	H / 1.00 / 10	-11.23	n/a
124.998 MHz	42.4 Qp	0.85 / 8.25 / 29.7 / 0.01	21.81	V / 1.00 / 0	-21.69	n/a
No new or higher emissions detected at channels 38 or 40						
ch 149 power setting 30						
2dBi Antenna						
73.189 MHz	42.05 Qp	0.54 / 8.91 / 29.69 / 0.0	21.82	V / 1.00 / 0	-18.18	n/a

Tested by: Robert J Behringer (Printed) _____ (Signature)

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

RADIATED EMISSIONS

Test Report #:	WC903868 Run 4	Test Area:	LTS		
EUT Model #:	50001520-01	Date:	6/6/2009		
EUT Serial #:	N/A	EUT Power:	12vdc	Temperature:	21.0 °C
Test Method:	FCC 15.407			Air Pressure:	98.0 kPa
Customer:	Digi			Rel. Humidity:	35.0 %
EUT Description:	USB/Ethernet 10/100 BaseT/WLAN Transceiver				
Notes:					
Data File Name:	3868 june 6 [gj revs].dat			Page:	3 of 5

List of measurements for run #: 4

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2
74.557 MHz	40.85 Qp	0.55 / 8.7 / 29.7 / 0.0	20.41	V / 1.00 / 0	-19.59	n/a
108.8 MHz	37.5 Qp	0.81 / 8.53 / 29.7 / 0.0	17.14	V / 1.00 / 0	-26.36	n/a
124.995 MHz	41.65 Qp	0.85 / 8.25 / 29.7 / 0.01	21.06	V / 1.00 / 0	-22.44	n/a
960.004 MHz	36.6 Qp	2.82 / 22.6 / 29.7 / 0.06	32.38	V / 1.00 / 90	-21.62	n/a
999.99 MHz	31.75 Qp	3.01 / 22.81 / 29.76 / 0.06	27.88	V / 1.00 / 90	-26.12	n/a
108.8 MHz	38.55 Qp	0.81 / 8.53 / 29.7 / 0.0	18.19	V / 1.00 / 180	-25.31	n/a
137.751 MHz	43.0 Qp	0.88 / 7.96 / 29.7 / 0.01	22.15	V / 1.00 / 180	-21.35	n/a
960.004 MHz	37.25 Qp	2.82 / 22.6 / 29.7 / 0.06	33.03	V / 1.00 / 180	-20.97	n/a
240.012 MHz	38.35 Qp	1.15 / 11.4 / 29.7 / 0.01	21.21	V / 1.00 / 270	-24.79	n/a
124.998 MHz	44.45 Qp	0.85 / 8.25 / 29.7 / 0.01	23.86	H / 3.00 / 90	-19.64	n/a
240.012 MHz	38.6 Qp	1.15 / 11.4 / 29.7 / 0.01	21.46	H / 3.00 / 90	-24.54	n/a
Maxed						
124.998 MHz	44.57 Qp	0.85 / 8.25 / 29.7 / 0.01	23.98	H / 2.79 / 84	-19.52	n/a
No new or higher emissions detected at channels 157, 165, 36, 48, and 40						
End of Scan 30 - 1000 MHz.						

Tested by: Robert J Behringer (Printed) _____ (Signature)

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

RADIATED EMISSIONS

Test Report #:	WC903868 Run 4	Test Area:	LTS		
EUT Model #:	50001520-01	Date:	6/6/2009		
EUT Serial #:	N/A	EUT Power:	12vdc	Temperature:	21.0 °C
Test Method:	FCC 15.407			Air Pressure:	98.0 kPa
Customer:	Digi			Rel. Humidity:	35.0 %
EUT Description:	USB/Ethernet 10/100 BaseT/WLAN Transceiver				
Notes:					
Data File Name:	3868 june 6 [gj revs].dat			Page:	4 of 5

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

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m
399.992 MHz	47.44 Qp	1.36 / 15.95 / 30.0 / 0.02	34.77	H / 1.00 / 10	-11.23
149.928 MHz	50.29 Qp	0.92 / 8.51 / 29.8 / 0.01	29.92	H / 2.40 / 62	-13.58
73.189 MHz	42.05 Qp	0.54 / 8.91 / 29.69 / 0.0	21.82	V / 1.00 / 0	-18.18
73.883 MHz	41.2 Qp	0.55 / 8.8 / 29.7 / 0.0	20.86	V / 1.00 / 0	-19.14
124.998 MHz	44.57 Qp	0.85 / 8.25 / 29.7 / 0.01	23.98	H / 2.79 / 84	-19.52
74.557 MHz	40.85 Qp	0.55 / 8.7 / 29.7 / 0.0	20.41	V / 1.00 / 0	-19.59
960.004 MHz	37.25 Qp	2.82 / 22.6 / 29.7 / 0.06	33.03	V / 1.00 / 180	-20.97
137.751 MHz	43.0 Qp	0.88 / 7.96 / 29.7 / 0.01	22.15	V / 1.00 / 180	-21.35
132.948 MHz	42.85 Qp	0.87 / 7.73 / 29.7 / 0.01	21.76	V / 1.00 / 90	-21.74
280.002 MHz	40.3 Qp	1.22 / 12.47 / 29.82 / 0.02	24.18	V / 1.00 / 180	-21.82
119.998 MHz	41.15 Qp	0.84 / 8.58 / 29.7 / 0.01	20.87	V / 1.00 / 0	-22.63
240.012 MHz	38.6 Qp	1.15 / 11.4 / 29.7 / 0.01	21.46	H / 3.00 / 90	-24.54
108.8 MHz	38.55 Qp	0.81 / 8.53 / 29.7 / 0.0	18.19	V / 1.00 / 180	-25.31
121.776 MHz	38.55 Qp	0.84 / 8.46 / 29.7 / 0.01	18.16	V / 1.00 / 180	-25.34
999.99 MHz	31.75 Qp	3.01 / 22.81 / 29.76 / 0.06	27.88	V / 1.00 / 90	-26.12
244.109 MHz	36.05 Qp	1.16 / 11.55 / 29.72 / 0.01	19.05	H / 3.00 / 0	-26.95
111.598 MHz	36.4 Qp	0.82 / 8.7 / 29.7 / 0.01	16.22	V / 1.00 / 0	-27.28
167.945 MHz	35.35 Qp	0.96 / 8.84 / 29.8 / 0.01	15.36	H / 3.00 / 270	-28.14
164.524 MHz	35.1 Qp	0.95 / 8.65 / 29.8 / 0.01	14.91	V / 1.00 / 0	-28.59
253.812 MHz	34.05 Qp	1.18 / 11.91 / 29.78 / 0.01	17.38	H / 3.00 / 0	-28.62
269.942 MHz	32.35 Qp	1.21 / 12.51 / 29.8 / 0.02	16.29	V / 1.00 / 0	-29.71

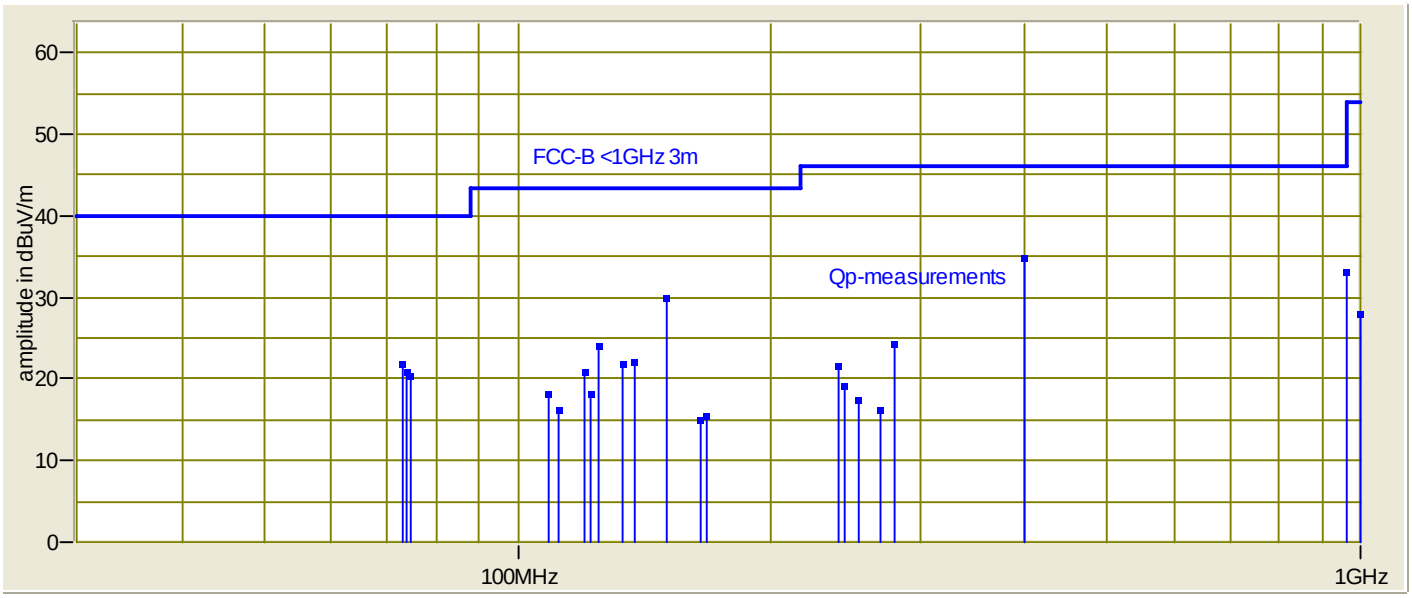
Tested by: Robert J Behringer (Printed) _____ (Signature)

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

RADIATED EMISSIONS

Test Report #:	WC903868 Run 4	Test Area:	LTS		
EUT Model #:	50001520-01	Date:	6/6/2009		
EUT Serial #:	N/A	EUT Power:	12vdc	Temperature:	21.0 °C
Test Method:	FCC 15.407			Air Pressure:	98.0 kPa
Customer:	Digi			Rel. Humidity:	35.0 %
EUT Description:	USB/Ethernet 10/100 BaseT/WLAN Transceiver				
Notes:					
Data File Name:	3868 june 6 [gj revs].dat			Page:	5 of 5

Graph:



Tested by: Robert J Behringer (Printed) _____ (Signature)

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

RADIATED EMISSIONS

Test Report #:	WC903868 Run 2	Test Area:	LTS		
EUT Model #:	50001520-01	Date:	6/3/2009		
EUT Serial #:	N/A	EUT Power:	12vdc/5vdc	Temperature:	26.0 °C
Test Method:	FCC 15.407			Air Pressure:	99.0 kPa
Customer:	Digi			Rel. Humidity:	30.0 %
EUT Description:	USB/Ethernet 10/100 BaseT/WLAN Transceiver				
Notes:					
Data File Name:	3868 june 6 [gj revs].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)		
54Mbps, power setting 30, emissions maximized						
Begin scan 1-18 GHz in restricted bands						
5dBi antenna						
ch 149 5.745 GHz.						
11.49 GHz	50.0 Pk	12.38 / 38.92 / 41.31 / 4.66	64.65	V / 1.25 / 7		
11.49 GHz	42.14 Av	12.38 / 38.92 / 41.31 / 4.66	56.79	V / 1.25 / 7		
11.49 GHz	45.95 Pk	12.38 / 38.92 / 41.31 / 4.66	60.6	H / 1.26 / 155		
11.49 GHz	38.28 Av	12.38 / 38.92 / 41.31 / 4.66	52.93	H / 1.26 / 155		
1.008 GHz	58.75 Pk	3.05 / 24.23 / 40.4 / 0.89	46.52	H / 1.00 / 205		
1.008 GHz	47.91 Av	3.05 / 24.23 / 40.4 / 0.89	35.68	H / 1.00 / 205		
ch 157 5.785 GHz						
11.57 GHz	47.5 Pk	12.45 / 39.0 / 41.29 / 4.58	62.23	V / 1.26 / 7		
11.57 GHz	40.74 Av	12.45 / 39.0 / 41.29 / 4.58	55.47	V / 1.26 / 7		
11.57 GHz	44.1 Pk	12.45 / 39.0 / 41.29 / 4.58	58.83	H / 1.46 / 142		
11.57 GHz	38.28 Av	12.45 / 39.0 / 41.29 / 4.58	53.01	H / 1.46 / 142		
ch 165 5.825 GHz.						
11.65 GHz	46.75 Pk	12.51 / 39.07 / 41.27 / 4.13	61.19	V / 1.22 / 5		
11.65 GHz	39.59 Av	12.51 / 39.07 / 41.27 / 4.13	54.03	V / 1.22 / 5		
11.65 GHz	45.4 Pk	12.51 / 39.07 / 41.27 / 4.13	59.84	H / 1.42 / 139		
11.65 GHz	38.08 Av	12.51 / 39.07 / 41.27 / 4.13	52.52	H / 1.42 / 139		
ch 36 5.18 GHz.						
10.362 GHz	55.45 Pk	11.41 / 38.11 / 41.63 / 1.38	64.72	V / 1.38 / 56		
10.362 GHz	48.7 Av	11.41 / 38.11 / 41.63 / 1.38	57.97	V / 1.38 / 56		

Tested by: Robert J Behringer (Printed) _____ (Signature)

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

RADIATED EMISSIONS

Test Report #:	WC903868 Run 2	Test Area:	LTS		
EUT Model #:	50001520-01	Date:	6/3/2009		
EUT Serial #:	N/A	EUT Power:	12vdc/5vdc	Temperature:	26.0 °C
Test Method:	FCC 15.407			Air Pressure:	99.0 kPa
Customer:	Digi			Rel. Humidity:	30.0 %
EUT Description:	USB/Ethernet 10/100 BaseT/WLAN Transceiver				
Notes:					
Data File Name:	3868 june 6 [gj revs].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)		
10.362 GHz	53.7 Pk	11.41 / 38.11 / 41.63 / 1.38	62.97	H / 1.23 / 153		
10.362 GHz	46.59 Av	11.41 / 38.11 / 41.63 / 1.38	55.86	H / 1.23 / 153		
ch 48 5.24GHz.						
10.48 GHz	54.85 Pk	11.51 / 38.02 / 41.58 / 1.16	63.95	V / 1.41 / 57		
10.48 GHz	47.66 Av	11.51 / 38.02 / 41.58 / 1.16	56.76	V / 1.41 / 57		
10.48 GHz	52.1 Pk	11.51 / 38.02 / 41.58 / 1.16	61.2	H / 1.31 / 150		
10.48 GHz	44.96 Av	11.51 / 38.02 / 41.58 / 1.16	54.06	H / 1.31 / 150		
ch 40 5.2 GHz.						
10.4 GHz	52.0 Pk	11.44 / 38.08 / 41.6 / 1.28	61.19	V / 1.44 / 66		
10.4 GHz	44.8 Av	11.44 / 38.08 / 41.6 / 1.28	53.99	V / 1.44 / 66		
10.4 GHz	50.2 Pk	11.44 / 38.08 / 41.6 / 1.28	59.39	H / 1.39 / 98		
10.4 GHz	42.6 Av	11.44 / 38.08 / 41.6 / 1.28	51.79	H / 1.39 / 98		
54Mbps, power setting 30, emissions maximized						
2dBi antenna						
ch 149 5.745 GHz.						
11.49 GHz	46.55 Pk	12.38 / 38.92 / 41.31 / 4.66	61.2	V / 1.25 / 4		
11.49 GHz	39.04 Av	12.38 / 38.92 / 41.31 / 4.66	53.69	V / 1.25 / 4		
11.49 GHz	43.25 Pk	12.38 / 38.92 / 41.31 / 4.66	57.9	H / 1.30 / 126		
11.49 GHz	36.49 Av	12.38 / 38.92 / 41.31 / 4.66	51.14	H / 1.30 / 126		
ch 157 5.785 GHz						
11.571 GHz	46.95 Pk	12.45 / 39.0 / 41.29 / 4.57	61.67	V / 1.28 / 7		
11.571 GHz	38.73 Av	12.45 / 39.0 / 41.29 / 4.57	53.45	V / 1.28 / 7		
11.571 GHz	43.9 Pk	12.45 / 39.0 / 41.29 / 4.57	58.62	H / 1.47 / 143		
11.571 GHz	36.95 Av	12.45 / 39.0 / 41.29 / 4.57	51.67	H / 1.47 / 143		

Tested by: Robert J Behringer (Printed) _____ (Signature)

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

RADIATED EMISSIONS

Test Report #:	WC903868 Run 2	Test Area:	LTS		
EUT Model #:	50001520-01	Date:	6/3/2009		
EUT Serial #:	N/A	EUT Power:	12vdc/5vdc	Temperature:	26.0 °C
Test Method:	FCC 15.407			Air Pressure:	99.0 kPa
Customer:	Digi			Rel. Humidity:	30.0 %
EUT Description:	USB/Ethernet 10/100 BaseT/WLAN Transceiver				
Notes:					
Data File Name:	3868 june 6 [gj revs].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)		
ch 165 5.825 GHz.						
11.65 GHz	46.15 Pk	12.52 / 39.07 / 41.27 / 4.13	60.59	V / 1.23 / 3		
11.65 GHz	39.14 Av	12.52 / 39.07 / 41.27 / 4.13	53.58	V / 1.23 / 3		
11.65 GHz	43.0 Pk	12.52 / 39.07 / 41.27 / 4.13	57.44	H / 1.30 / 134		
11.65 GHz	36.92 Av	12.52 / 39.07 / 41.27 / 4.13	51.36	H / 1.30 / 134		
ch 36 5.18 GHz.						
10.36 GHz	54.8 Pk	11.4 / 38.11 / 41.63 / 1.39	64.08	V / 1.19 / 169		
10.36 GHz	47.31 Av	11.4 / 38.11 / 41.63 / 1.39	56.59	V / 1.19 / 169		
10.36 GHz	53.0 Pk	11.4 / 38.11 / 41.63 / 1.39	62.28	H / 1.29 / 156		
10.36 GHz	44.8 Av	11.4 / 38.11 / 41.63 / 1.39	54.08	H / 1.29 / 156		
ch 48 5.24GHz.						
10.48 GHz	54.0 Pk	11.51 / 38.02 / 41.58 / 1.16	63.1	V / 1.23 / 167		
10.48 GHz	46.84 Av	11.51 / 38.02 / 41.58 / 1.16	55.94	V / 1.23 / 167		
10.48 GHz	51.1 Pk	11.51 / 38.02 / 41.58 / 1.16	60.2	H / 1.28 / 154		
10.48 GHz	44.4 Av	11.51 / 38.02 / 41.58 / 1.16	53.5	H / 1.28 / 154		
ch 40 5.2 GHz.						
10.4 GHz	54.25 Pk	11.44 / 38.08 / 41.6 / 1.28	63.44	V / 1.25 / 167		
10.4 GHz	46.59 Av	11.44 / 38.08 / 41.6 / 1.28	55.78	V / 1.25 / 167		
10.4 GHz	51.2 Pk	11.44 / 38.08 / 41.6 / 1.28	60.39	H / 1.26 / 163		
10.4 GHz	44.04 Av	11.44 / 38.08 / 41.6 / 1.28	53.23	H / 1.26 / 163		
End of Scan 1 - 18 GHz.						
Start of Scan 18-59 GHz.						

Tested by: Robert J Behringer (Printed) _____ (Signature)

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

RADIATED EMISSIONS

Test Report #:	WC903868 Run 2	Test Area:	LTS		
EUT Model #:	50001520-01	Date:	6/3/2009		
EUT Serial #:	N/A	EUT Power:	12vdc/5vdc	Temperature:	26.0 °C
Test Method:	FCC 15.407			Air Pressure:	99.0 kPa
Customer:	Digi			Rel. Humidity:	30.0 %
EUT Description:	USB/Ethernet 10/100 BaseT/WLAN Transceiver				
Notes:					
Data File Name:	3868 june 6 [gj revs].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)		
No significant Emissions Detected in the Vertical or Horizontal Polarization.						

Tested by: Robert J Behringer (Printed) _____ (Signature)

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

RADIATED EMISSIONS

Test Report #:	WC903868 Run 2	Test Area:	LTS		
EUT Model #:	50001520-01	Date:	6/3/2009		
EUT Serial #:	N/A	EUT Power:	12vdc/5vdc	Temperature:	26.0 °C
Test Method:	FCC 15.407			Air Pressure:	99.0 kPa
Customer:	Digi			Rel. Humidity:	30.0 %
EUT Description:	USB/Ethernet 10/100 BaseT/WLAN Transceiver				
Notes:					
Data File Name:	3868 june 6 [gj revs].dat			Page:	5 of 6

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

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m) 1 m	FINAL (dBuV / m) 3 m - extrapolated	POL / HGT / AZ (m)(DEG)	DELTA1 15.209 >1GHz 3m av
11.49 GHz	42.14 Av	12.38 / 38.92 / 41.31 / 4.66	56.79	47.25	V / 1.25 / 7	-6.75
11.57 GHz	40.74 Av	12.45 / 39.0 / 41.29 / 4.58	55.47	45.93	V / 1.26 / 7	-8.07
11.65 GHz	39.59 Av	12.51 / 39.07 / 41.27 / 4.13	54.03	44.49	V / 1.22 / 5	-9.51
11.65 GHz	39.14 Av	12.52 / 39.07 / 41.27 / 4.13	53.58	44.04	V / 1.23 / 3	-9.96
11.571 GHz	38.73 Av	12.45 / 39.0 / 41.29 / 4.57	53.45	43.91	V / 1.28 / 7	-10.09
1.008 GHz	47.91 Av	3.05 / 24.23 / 40.4 / 0.89	35.68	26.14	H / 1.00 / 205	-27.86

Tested by: Robert J Behringer (Printed) _____ (Signature)

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

RADIATED EMISSIONS

Test Report #:	WC903868 Run 2	Test Area:	LTS		
EUT Model #:	50001520-01	Date:	6/3/2009		
EUT Serial #:	N/A	EUT Power:	12vdc/5vdc	Temperature:	26.0 °C
Test Method:	FCC 15.407			Air Pressure:	99.0 kPa
Customer:	Digi			Rel. Humidity:	30.0 %
EUT Description:	USB/Ethernet 10/100 BaseT/WLAN Transceiver				
Notes:					
Data File Name:	3868 june 6 [gj revs].dat			Page:	6 of 6

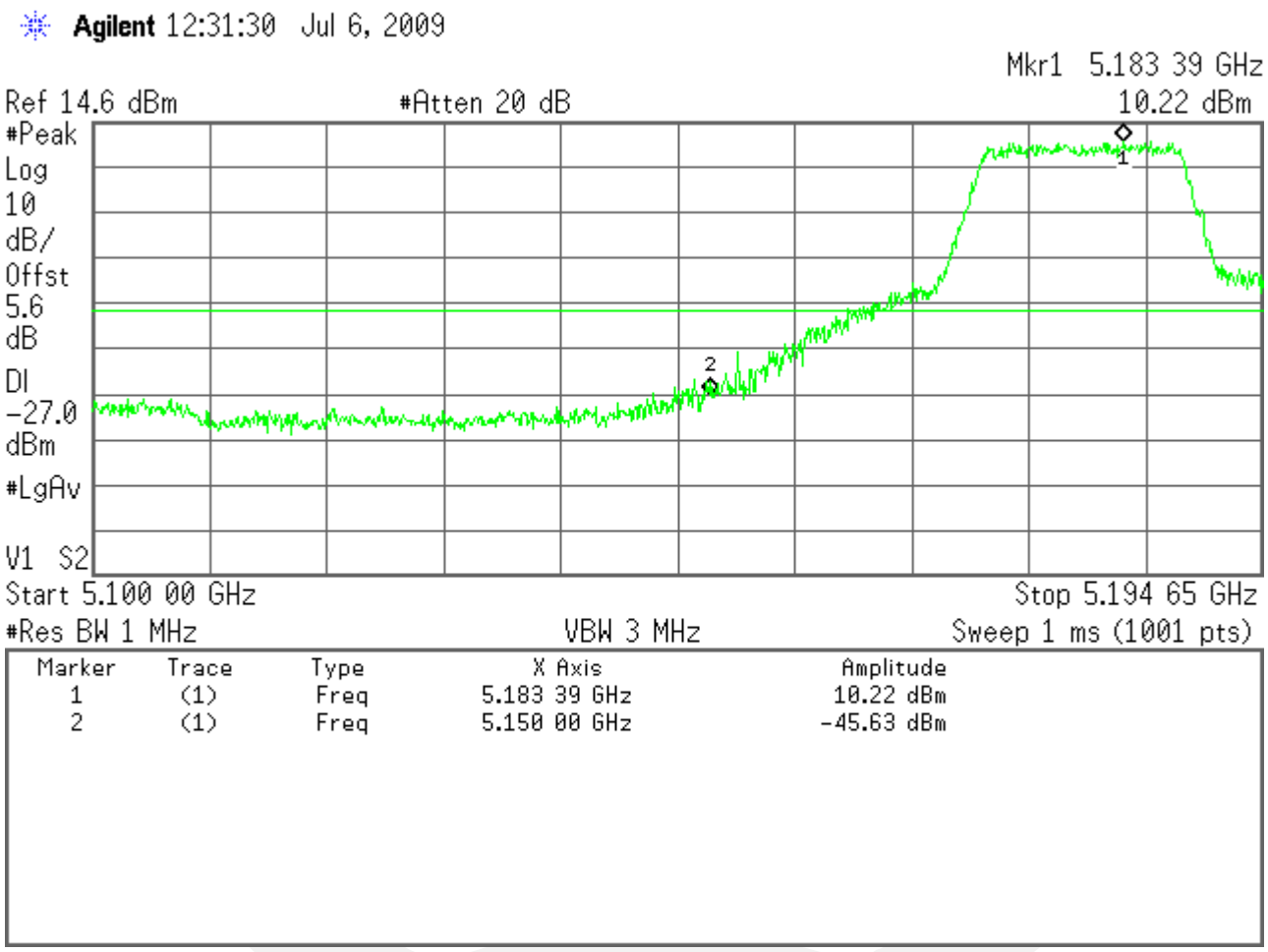
Measurement summary for limit2: 15.407 (b)1-4) >1G 3 M pk (Pk)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m) 1 m	FINAL (dBuV / m) 3 m extrapolated	POL / HGT / AZ (m)(DEG)	DELTA2 15.407 (b)1-4) >1G 3 M pk
10.362 GHz	55.45 Pk	11.41 / 38.11 / 41.63 / 1.38	64.72	55.18	V / 1.38 / 56	-13.02
11.49 GHz	50.0 Pk	12.38 / 38.92 / 41.31 / 4.66	64.65	55.11	V / 1.25 / 7	-13.09
10.36 GHz	54.8 Pk	11.4 / 38.11 / 41.63 / 1.39	64.08	54.54	V / 1.19 / 169	-13.66
10.48 GHz	54.85 Pk	11.51 / 38.02 / 41.58 / 1.16	63.95	54.41	V / 1.41 / 57	-13.79
10.4 GHz	54.25 Pk	11.44 / 38.08 / 41.6 / 1.28	63.44	53.90	V / 1.25 / 167	-14.30
11.57 GHz	47.5 Pk	12.45 / 39.0 / 41.29 / 4.58	62.23	52.69	V / 1.26 / 7	-15.51
11.571 GHz	46.95 Pk	12.45 / 39.0 / 41.29 / 4.57	61.67	52.13	V / 1.28 / 7	-16.07
11.65 GHz	46.75 Pk	12.51 / 39.07 / 41.27 / 4.13	61.19	51.65	V / 1.22 / 5	-16.55
11.65 GHz	46.15 Pk	12.52 / 39.07 / 41.27 / 4.13	60.59	51.05	V / 1.23 / 3	-17.15
1.008 GHz	58.75 Pk	3.05 / 24.23 / 40.4 / 0.89	46.52	36.98	H / 1.00 / 205	-31.22

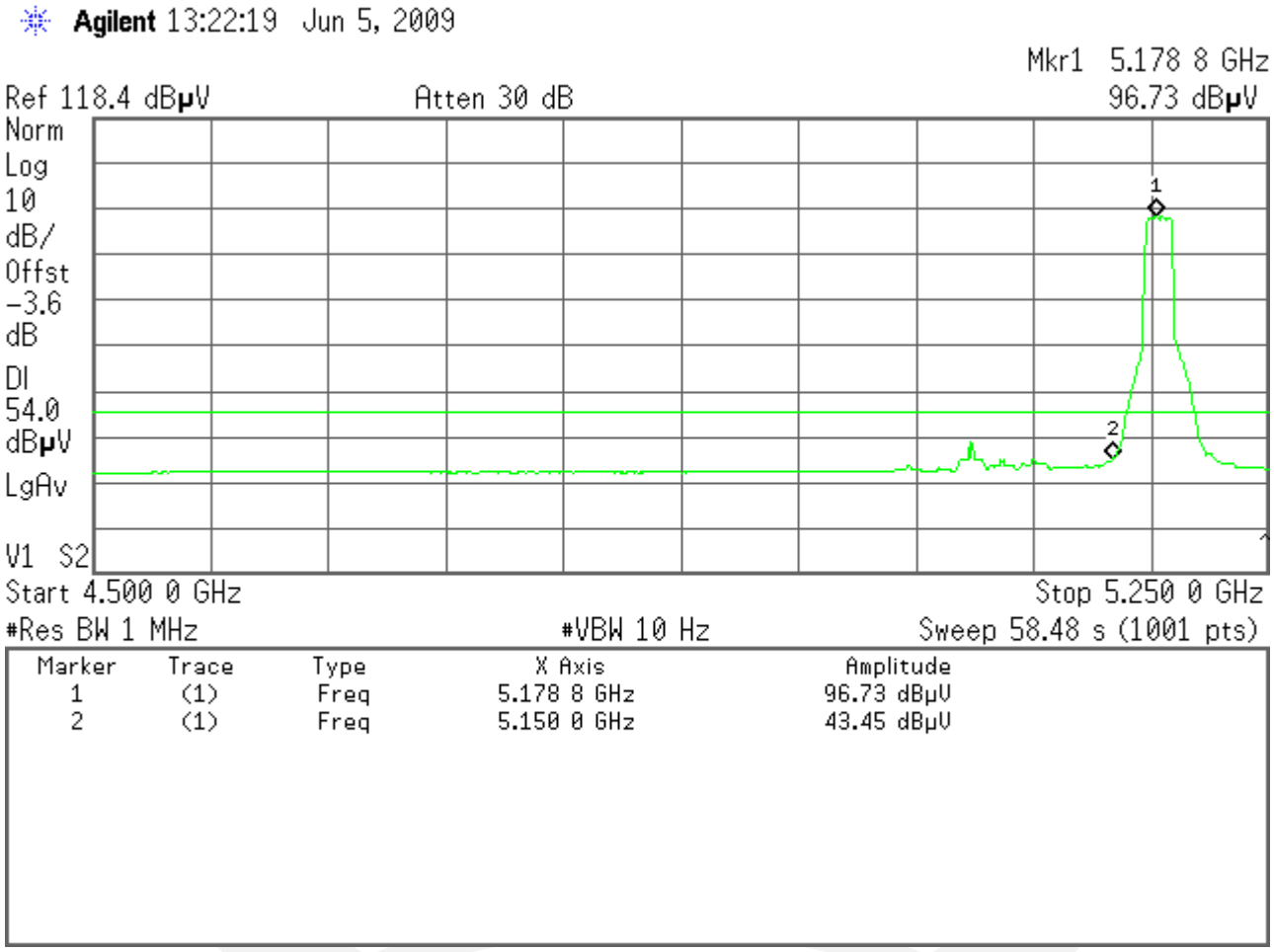
Tested by: Robert J Behringer (Printed) _____ (Signature)

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

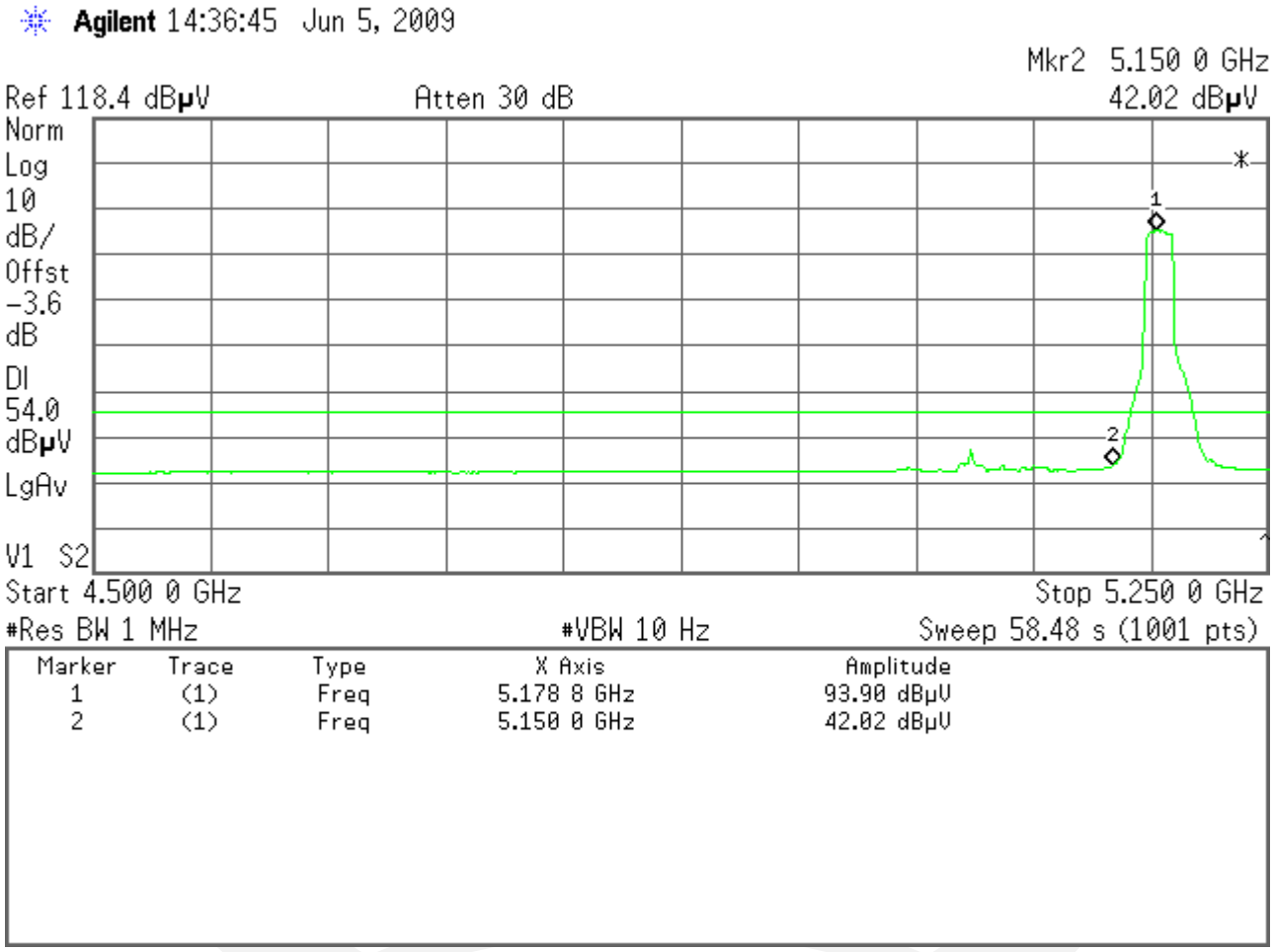
Bandedge (peak)
Channel 36, 54 Mbps



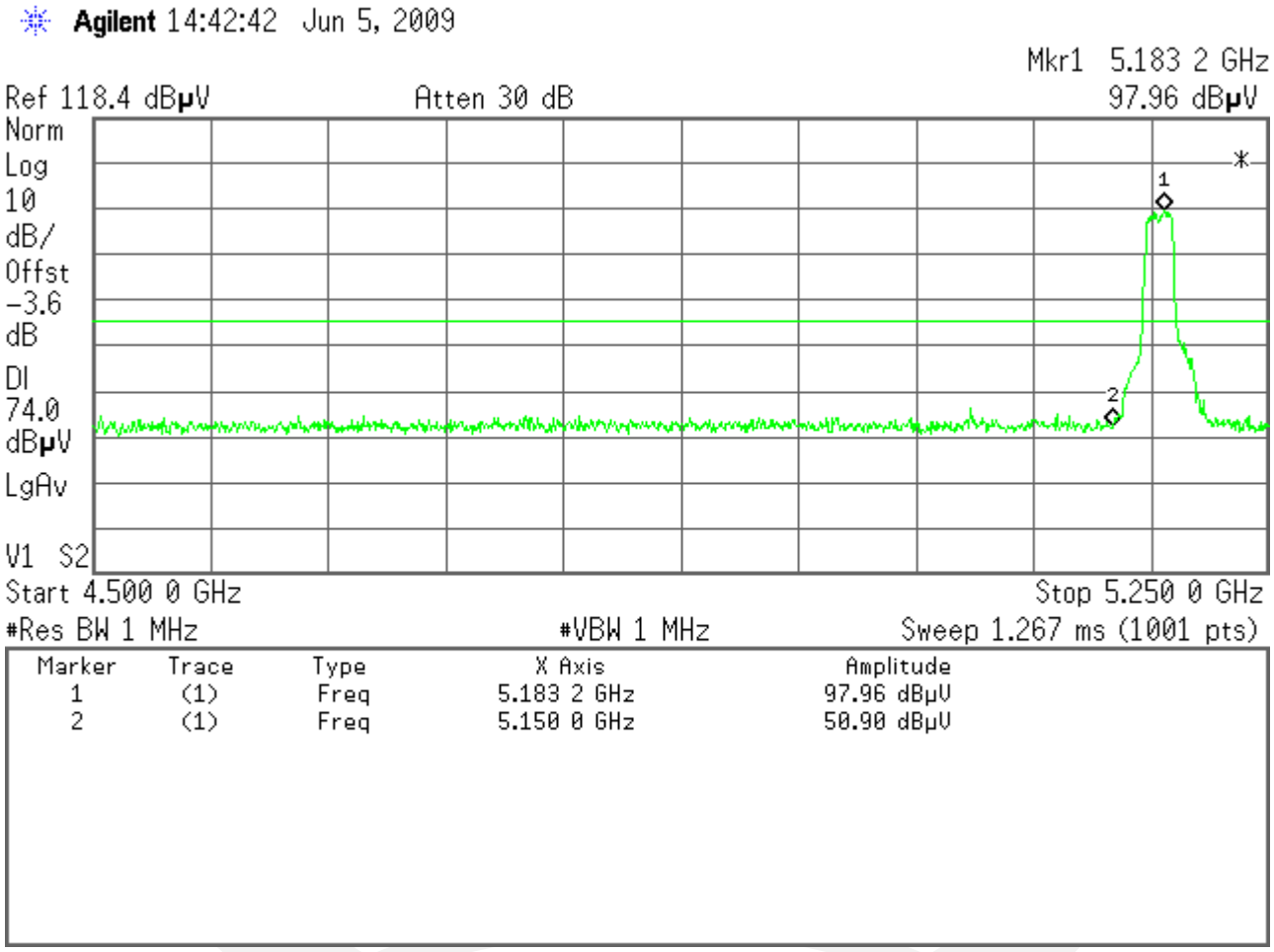
Radiated Bandedge (ave – 5 dBi antenna)
Channel 36, 54 Mbps



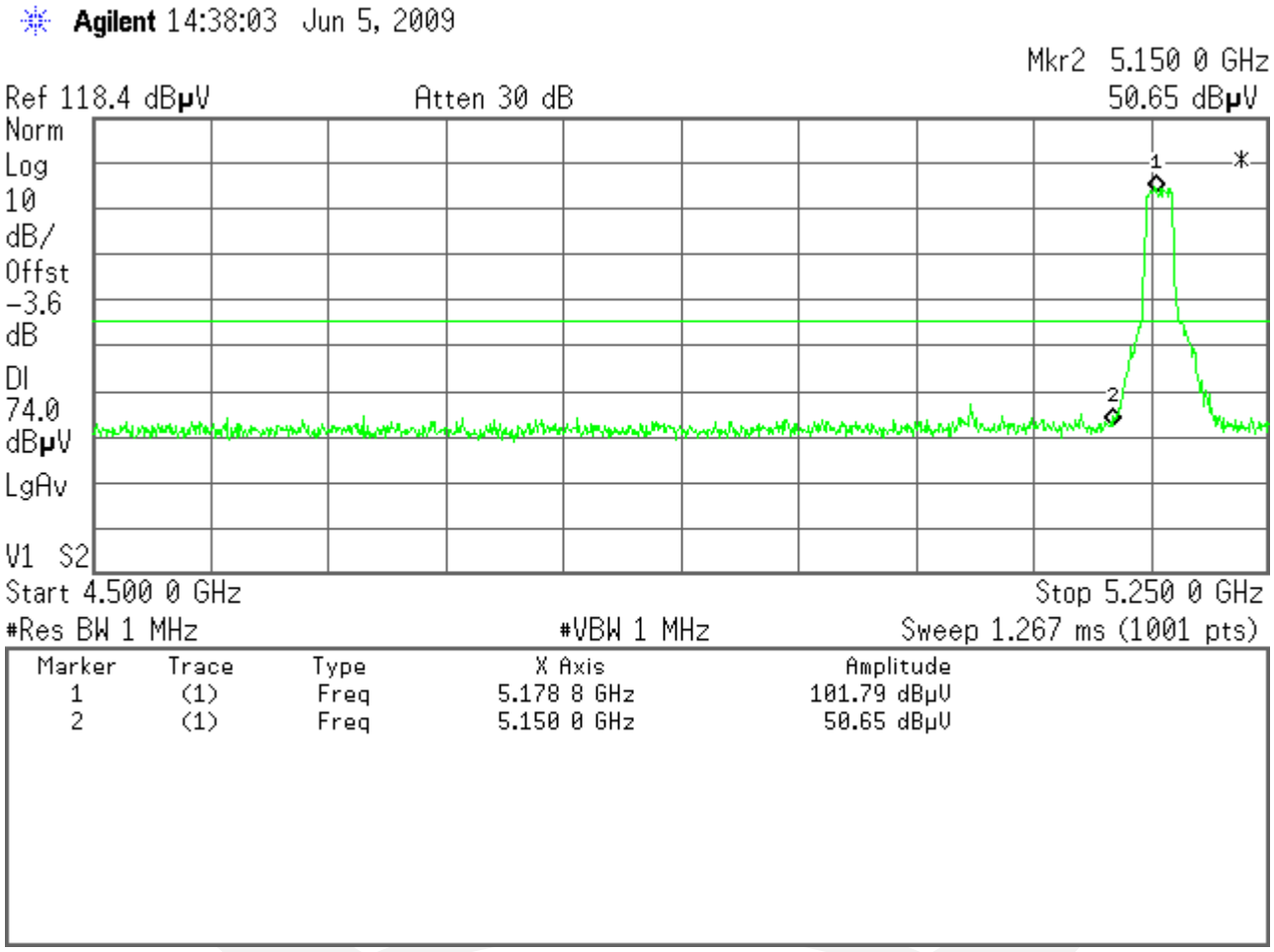
Radiated Bandedge (ave – 2 dBi antenna)
Channel 36, 54 Mbps



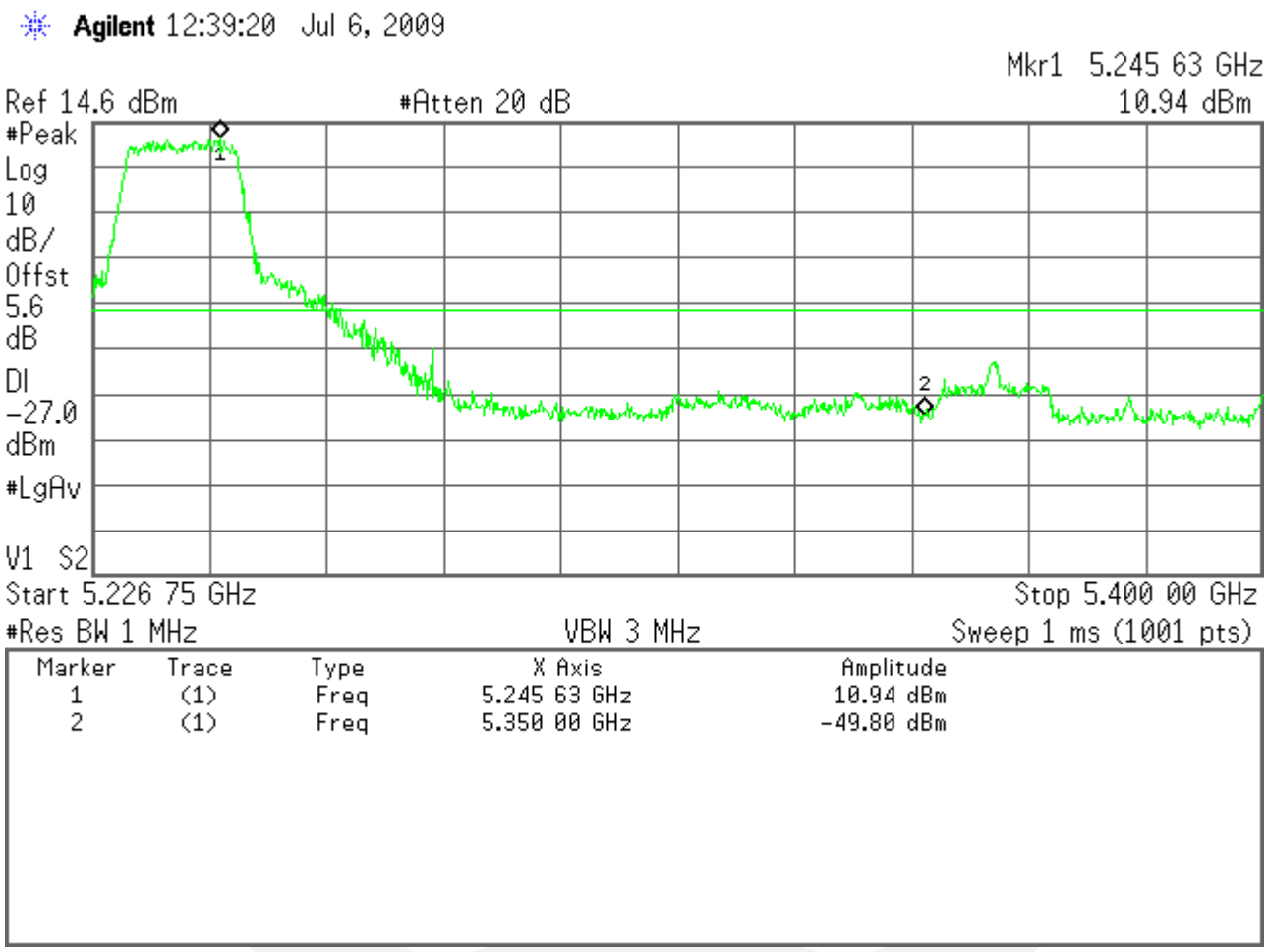
Radiated Bandedge (peak – 2 dBi antenna)
Channel 36, 54 Mbps



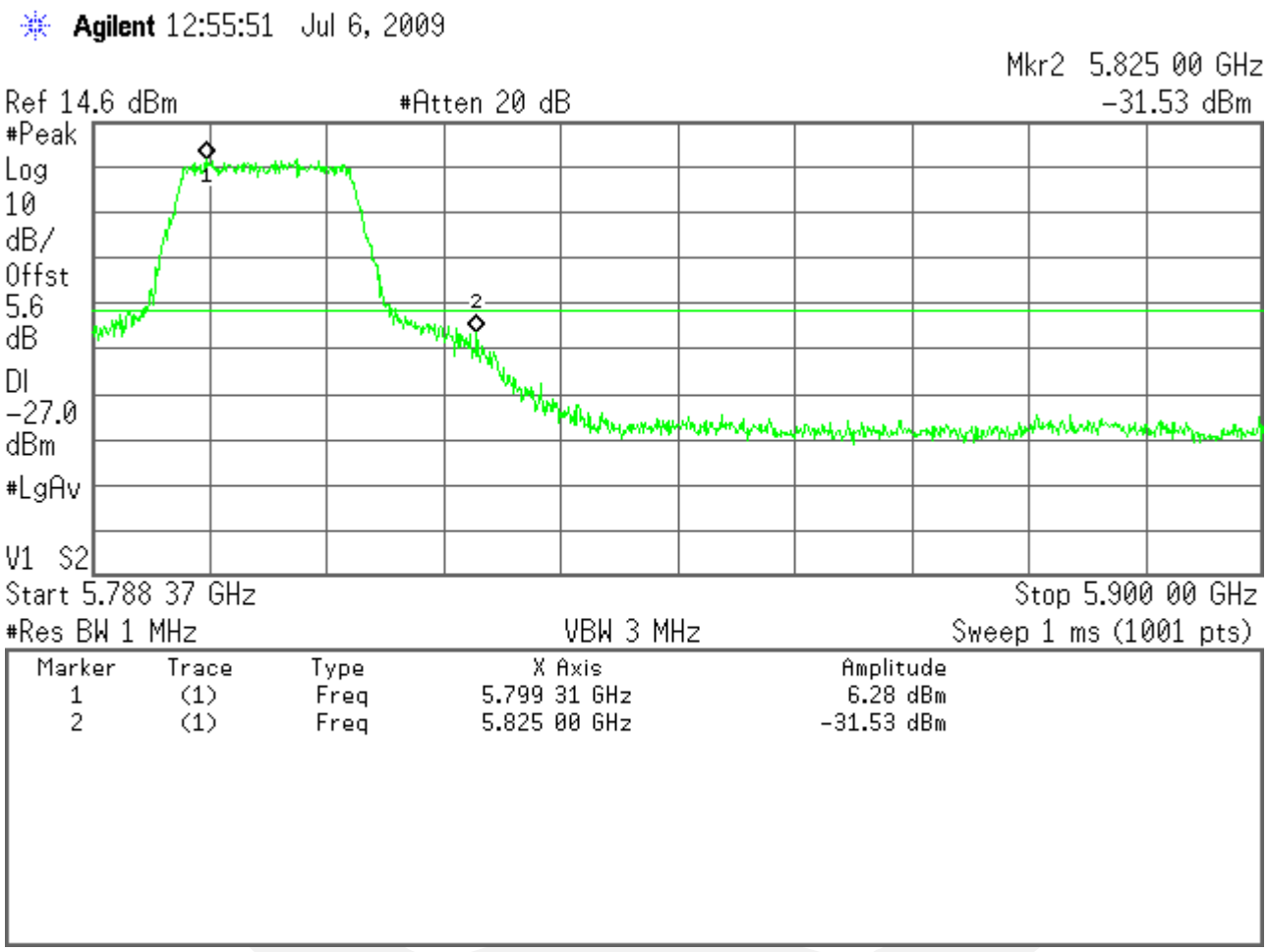
Radiated Bandedge (peak – 5 dBi antenna)
Channel 36, 54 Mbps



Bandedge
Channel 48, 54 Mbps



Bandedge
Channel 161, 54 Mbps



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

Test summary
The requirements are: ☐ - MET ☐ - NOT MET ■ - NOT APPLICABLE
The EUT will be powered by DC batteries

99% Emission bandwidth

IC RSS-210 A9.2

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
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	14 Nov 09

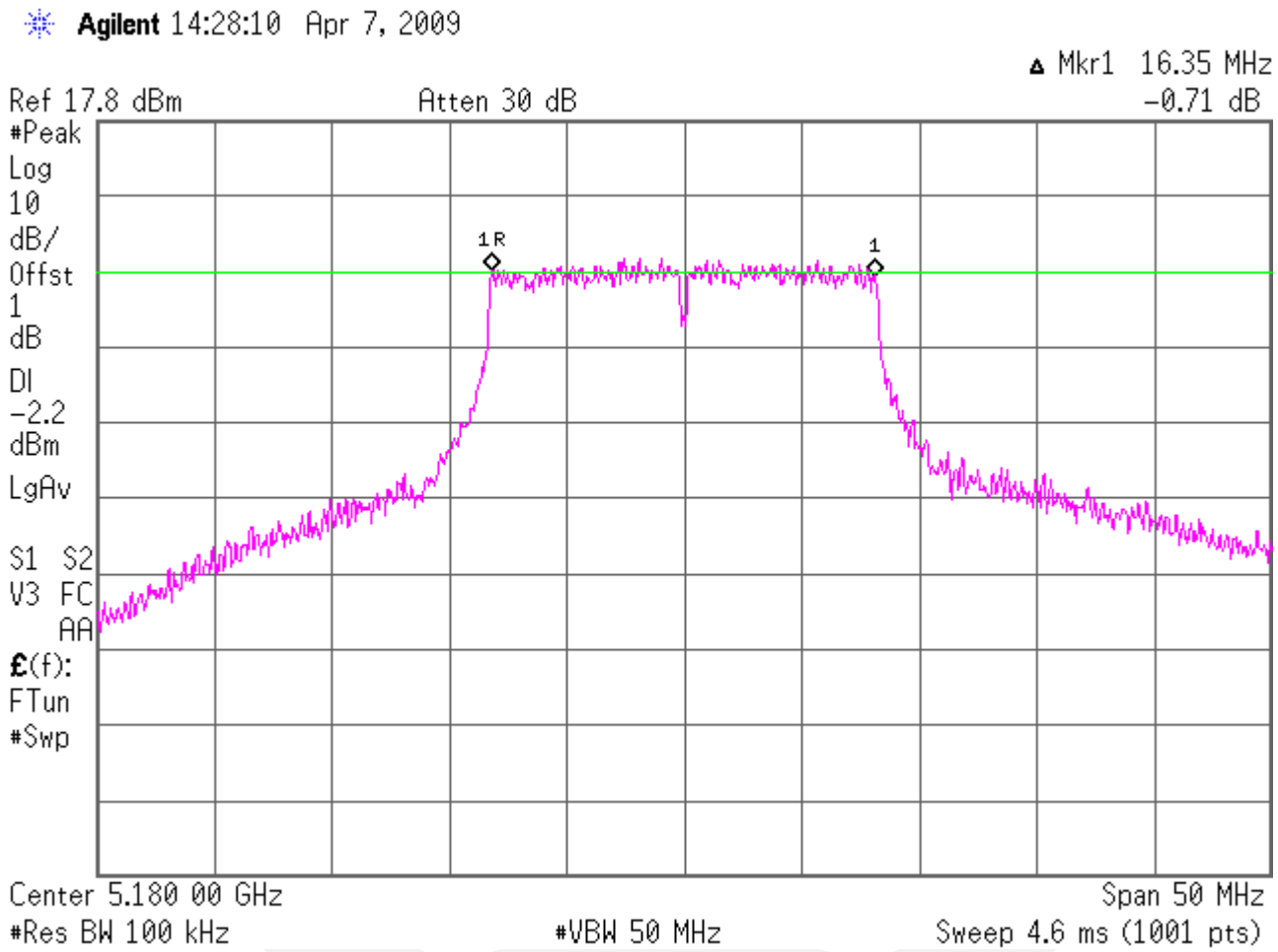
Test limit

undefined

Test data

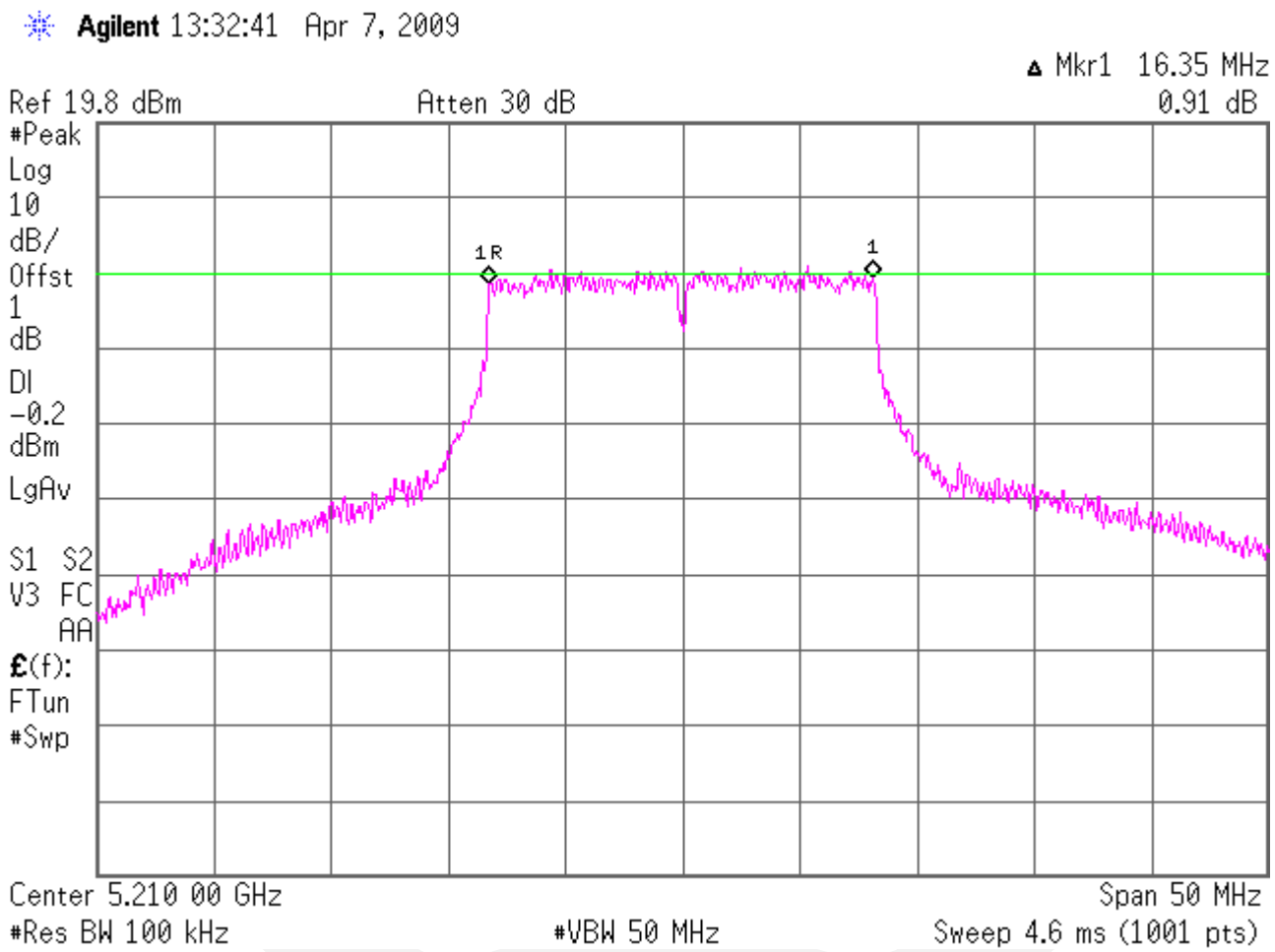
See following page

99% emission bandwidth
channel 36



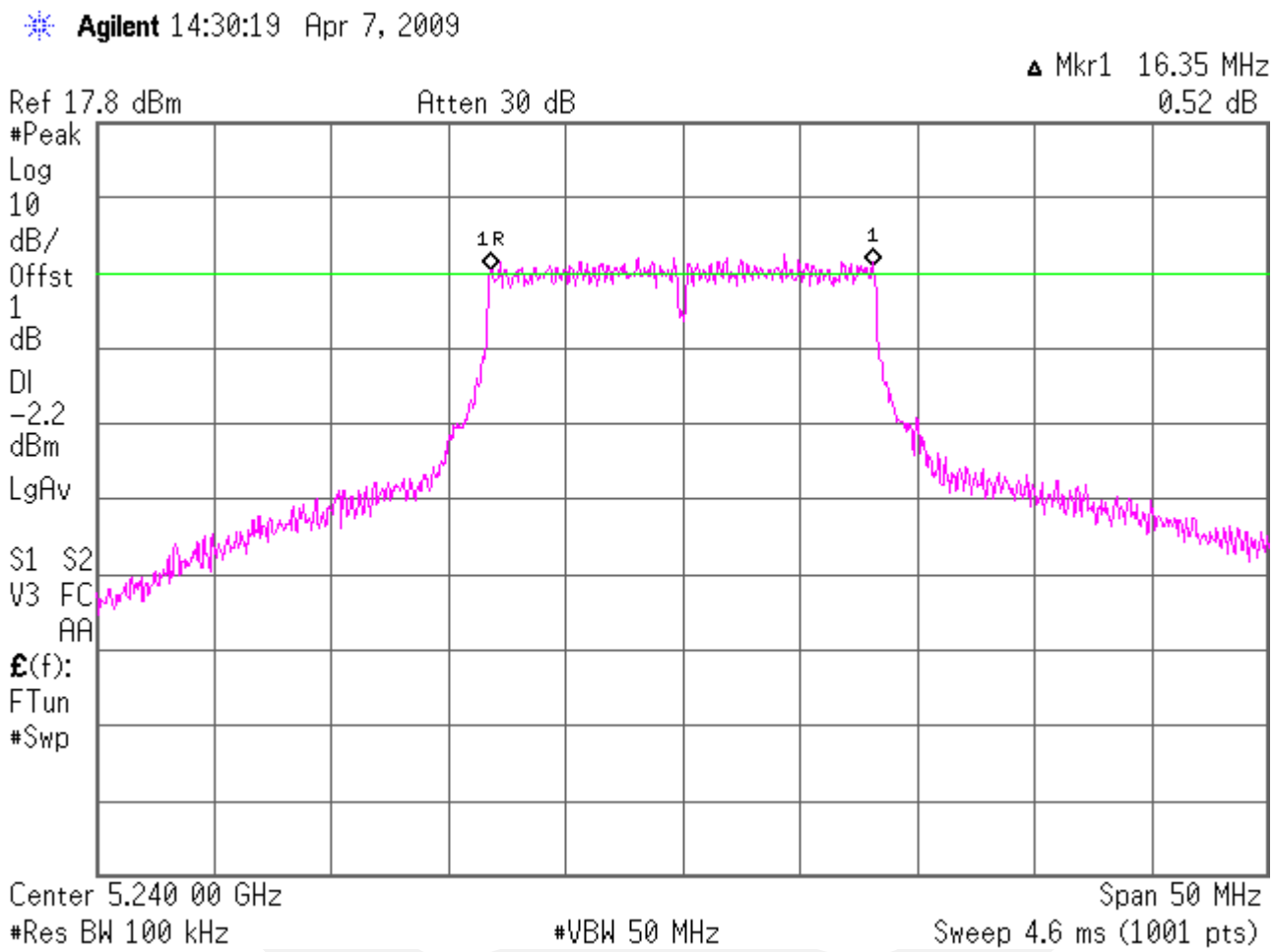
Ref level = peak measurement level when using max RBW

99% emission bandwidth
channel 42



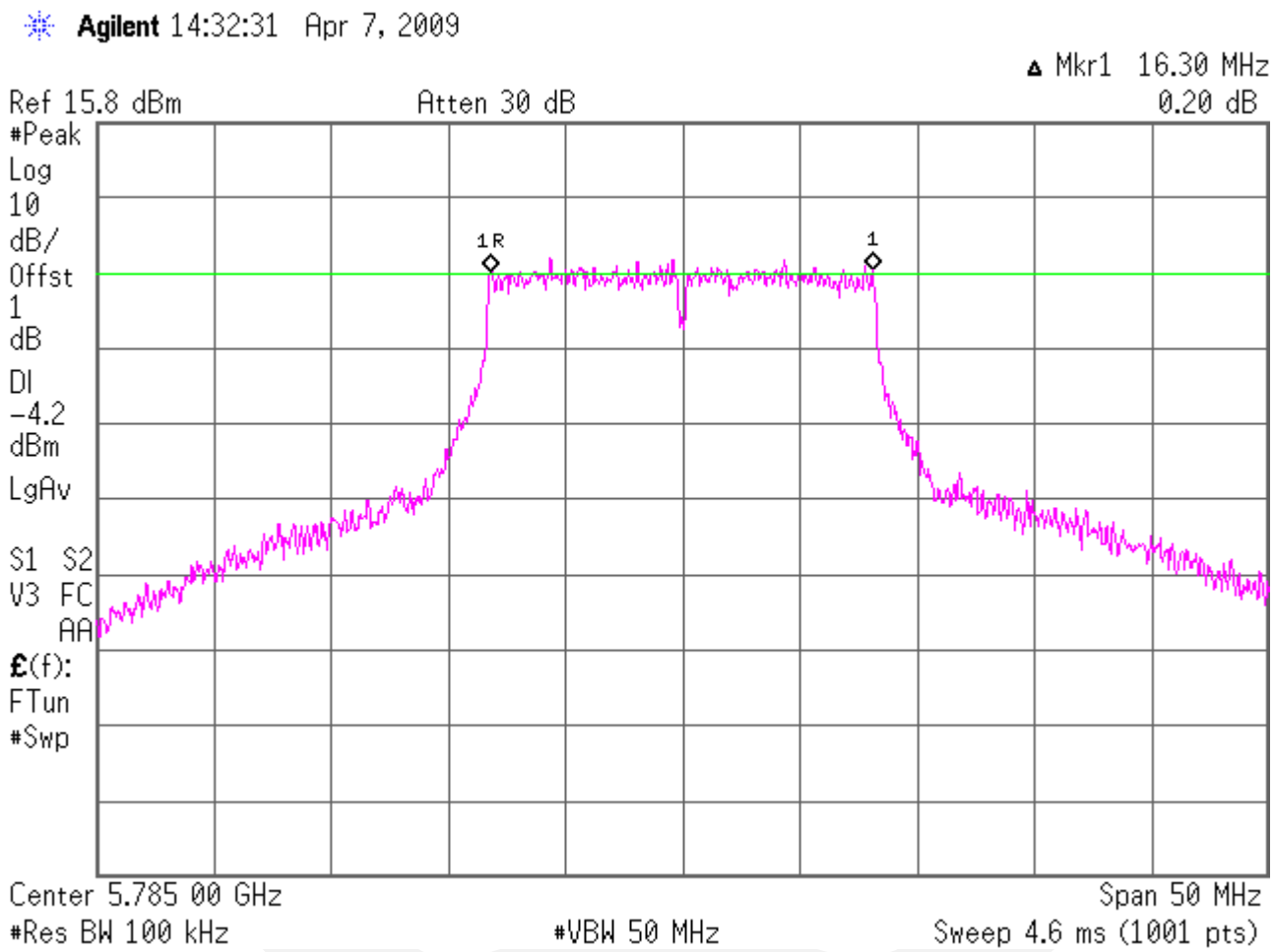
Ref level = peak measurement level when using max RBW

99% emission bandwidth
channel 48



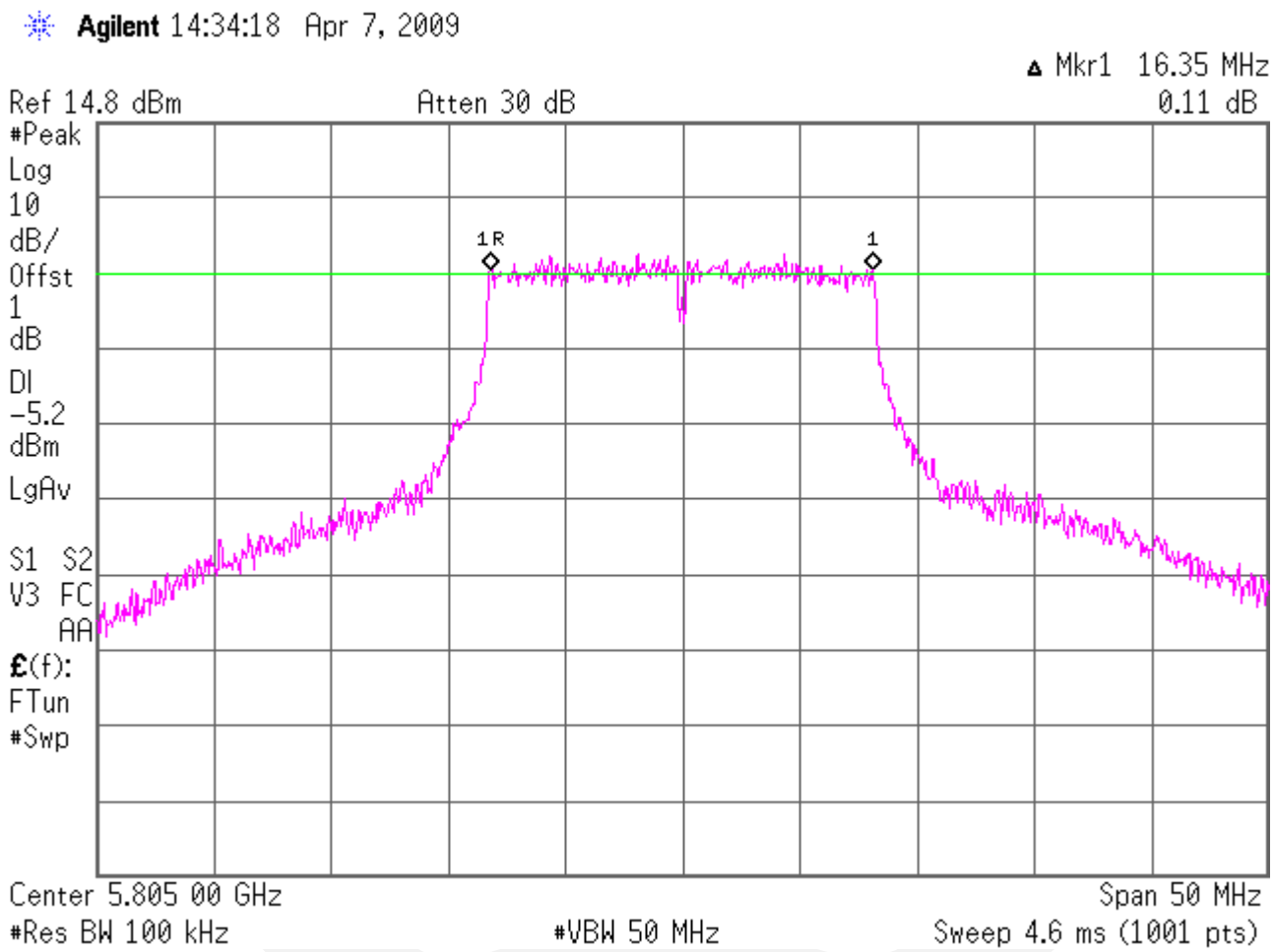
Ref level = peak measurement level when using max RBW

99% emission bandwidth
channel 157



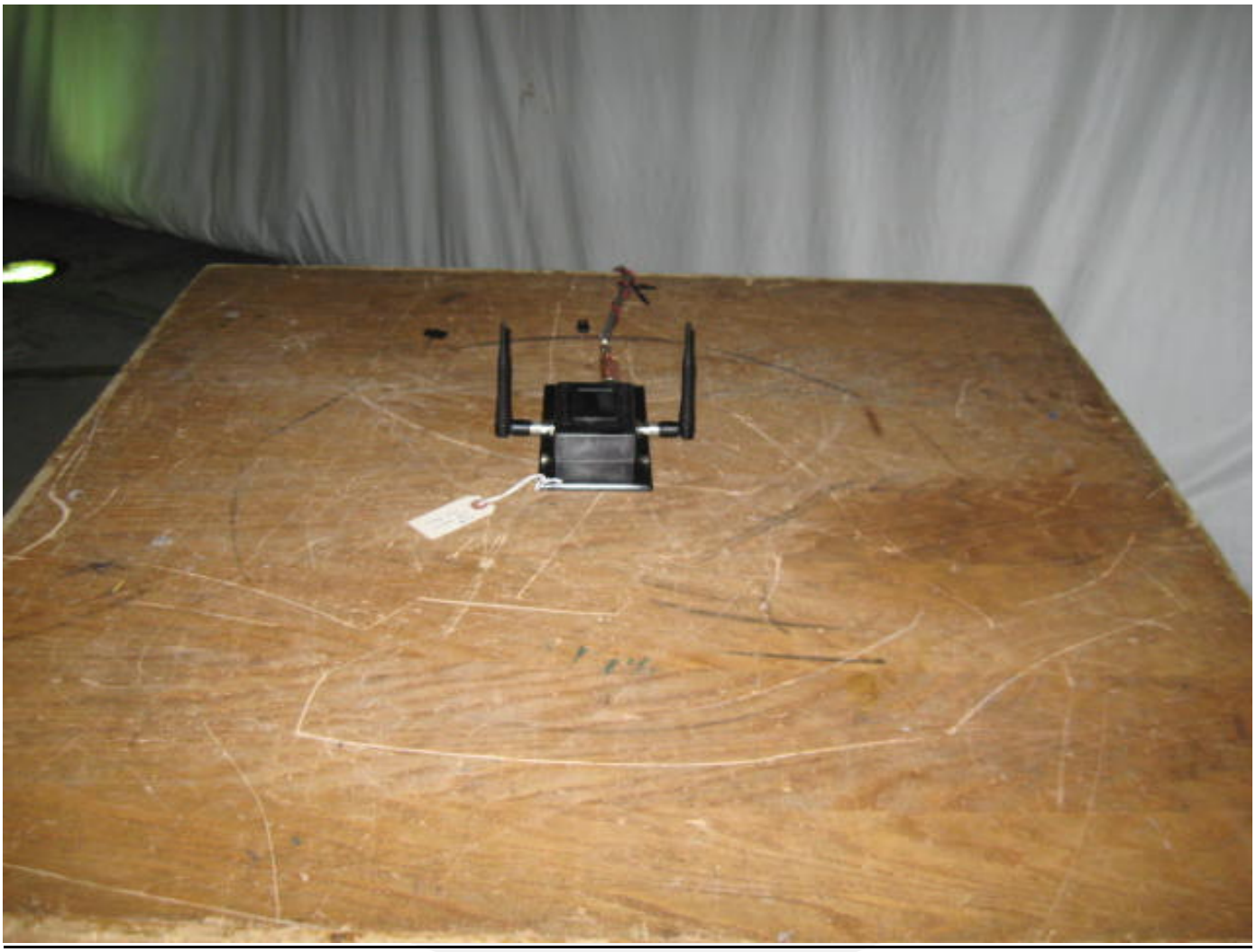
Ref level = peak measurement level when using max RBW

99% emission bandwidth
channel 161



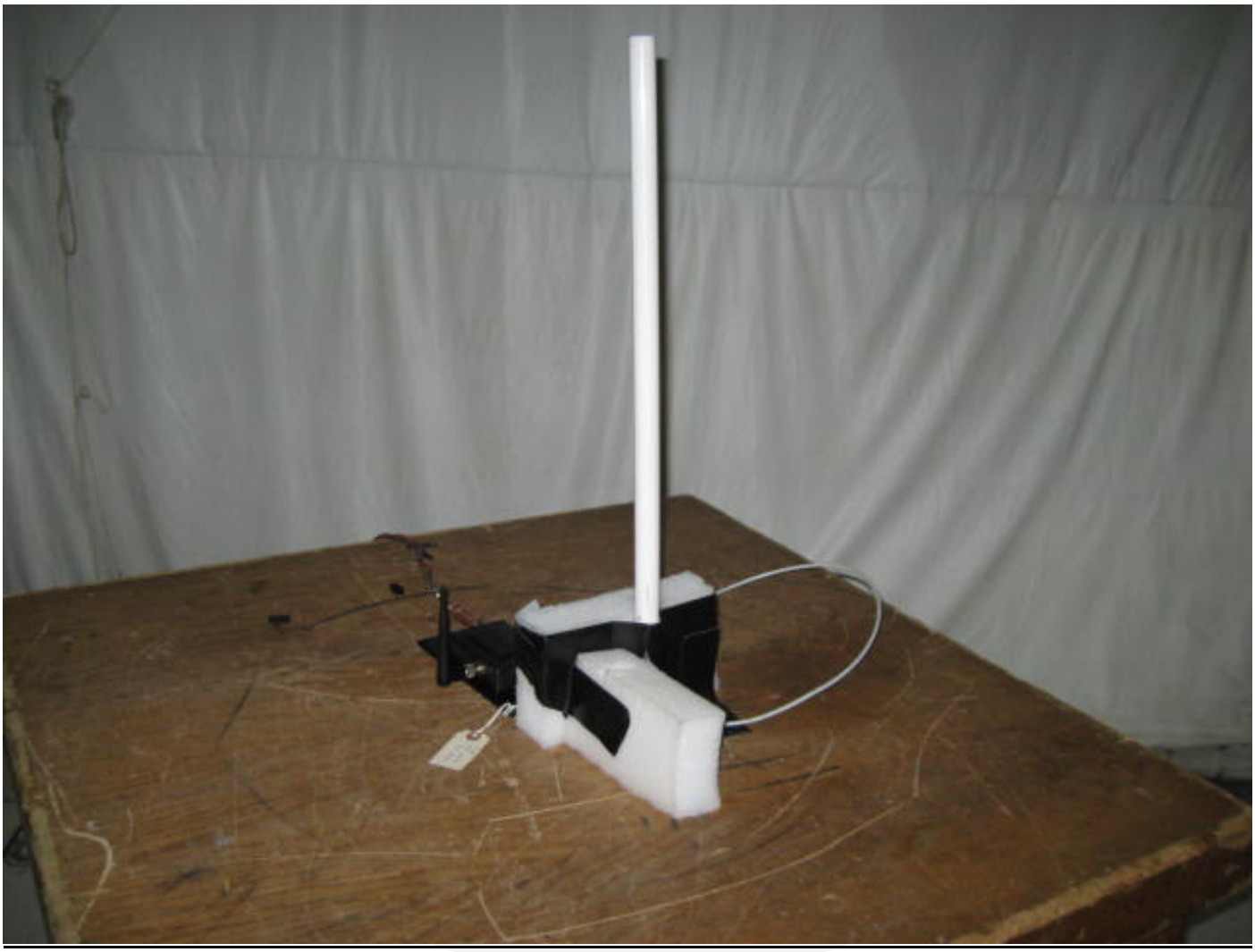
Ref level = peak measurement level when using max RBW

Test-setup photo(s):
Radiated measurements, 2 dBi antenna

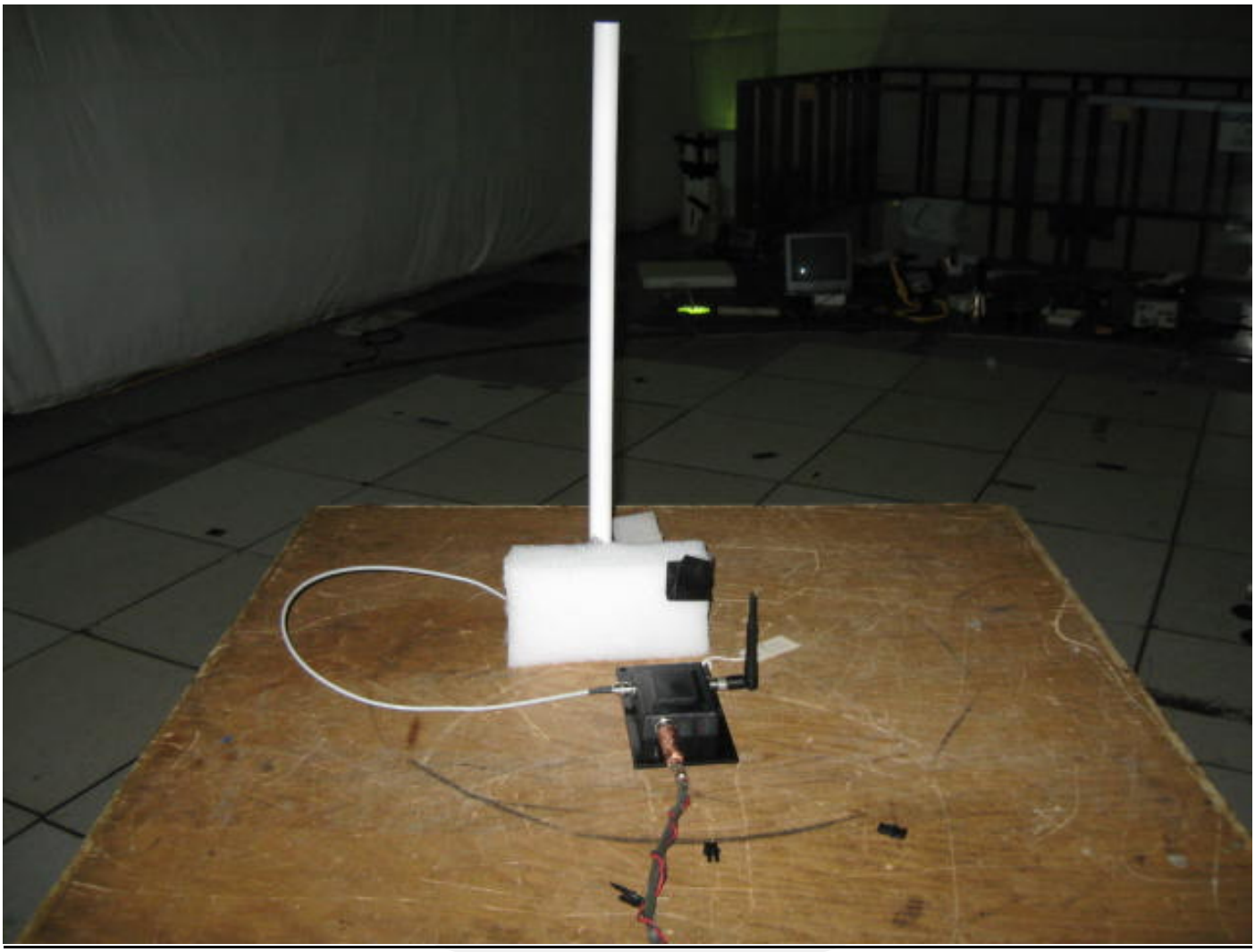


Test-setup photo(s):
Radiated measurements, 2 dBi antenna

Test-setup photo(s):
Radiated measurements, 5 dBi antenna



Test-setup photo(s):
Radiated measurements, 5 dBi antenna



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:	09 April 2009
Condition of EUT:	Normal
Testing Start Date:	09 April 2009
Testing End Date:	06 July 2009

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 E.		
	Minnetonka, MN 55343		
Contact:	Trinh Huynh	Position:	Engineering Services
Phone:	(515) 257-4120	Fax:	
E-mail Address:	trinh.huynh@digi.com		

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

EUT Description	USB/Ethernet 10/100 Base T/WLAN Transciever		
EUT Name	Caterpillar 802.11 a/b/g Radio		
Model No.:	50001520-01	Serial No.:	
Product Options:	-01 Ethernet -02 USB variant		
Configurations to be tested:			

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:	Addition of an external antenna option
Modifications made during test:	

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

- ☐ EMC Directive 89/336/EEC (EMC) Std:
- ☐ Machinery Directive 89/392/EEC (EMC Std:
- ☐ Medical Device Directive 93/42/EEC (EMC) Std:
- ☐ Vehicle Directive 72/245/EEC (EMC) Std:
- ☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC)

- ☐ FCC: Class ☐ A ☐ B Part
- ☐ VCCI: Class ☐ A ☐ B
- ☐ BSMI: Class ☐ A ☐ B
- ☐ Canada: Class ☐ A ☐ B
- ☐ Australia: Class ☐ A ☐ B
- ☒ Other: Please see Quote SD121214186260 for reference of standards

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

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 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: 8.00" Width: 4.00" Height: 1.50" Weight: 520g

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: 12Vdc/5.0Vdc (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: _____

Current (Amps/phase(max)): 280mA/700mA

Current (Amps/phase(nominal)): 220mA

Other _____

Other Special Requirements

Typical Installation and/or Operating Environment

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

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: Active	During Test: Passive	Qty	Shielding: Yes	Shielding: No	Shielding: 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*	☒	☐
Power/Comm	☐	☒	☒	☐	1	☒	☐	Foil		Metallized 8-pin DIN		4	☒	☐
WLAN RF	☒	☐	☒	☐	2	☒	☐	Antenna	Coaxial	RP-TNC	50 ohm	2	☒	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
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	☐	☐	☐	☐		☐	☐						☐	☐

EMC Test Plan and Constructional Data Form

EUT Software.

Revision Level: 20080619

Description: USB/Ethernet Immunity Test

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. Continous ping of active IP Address ports (Ethernet, USB, WLAN)
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 #
CAT WLAN 802.11 a/b/g			

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 #*
Micron Transport GX+	n870-00CLG-M1-750	293162-001	07JGL2411AP
Cisco Systems Aironet 1200	MP21/RM22	FTX1045E1F5	LDK102053

Oscillator Frequencies

Frequency	*Derived Frequency*	*Component # / Location*	*Description of Use*
48.000MHz		U24	USB Clock
29.4919MHz		X2	Main System Clock
25.000MHz		X1	Ethernet Clock
40.000MHz		U21	BaseBand Clock Input

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.)				
Description	***Manufacturer***	***Part # or Value***	***Qty***	***Component # / Location***

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

(PLEASE INSERT "**ELECTRONIC SIGNATURE**" BELOW IF POSSIBLE)

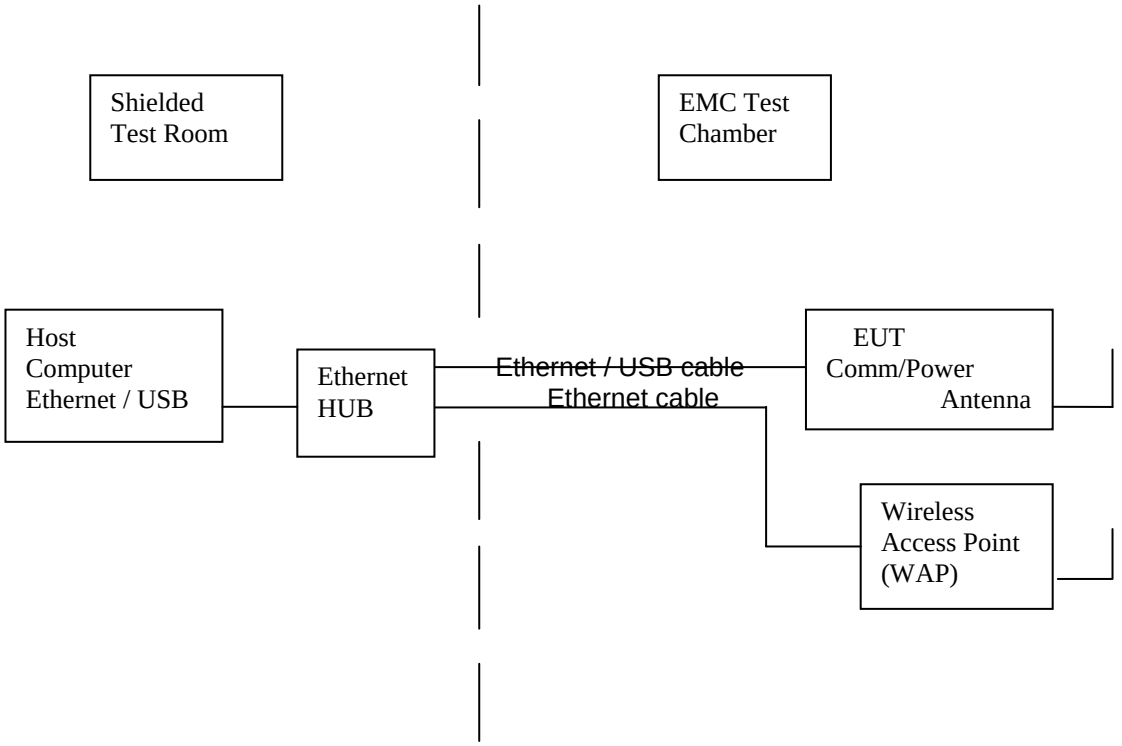
Authorization Signatures (Signature Required for Certifications checked on pg 1)

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 Public Notice DA 02-2138.

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.