

FCC Test Report

Equipment Name : Wireless .11ac Smart Ultra-Broadband Gateway
with Integrated Video Bridge

Trade Name : technicolor

Model Number. : C2100T

Product Code : BAC2100T

FCC ID : RSE-C2100T

Standard : 47 CFR FCC Part 15.247

Operating Band : 2400 MHz – 2483.5 MHz

FCC Classification : DTS

Applicant : Technicolor Delivery Technologies Belgium
Manufacturer : Prins Boudewijnlaan 47
B-2650 Edegem
Belgium

The product sample received on Dec. 5, 2014 and completely tested on Jan. 6, 2015. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:


Kevin Liang / Assistant Manager





CONTENTS

- 1 EQUIPMENT UNDER TEST5**
- 1.1 Application of standard.....5
- 1.2 Cabling Attached to the Equipment.....5
- 1.3 Panel Drawing5
- 2 GENERAL INFORMATION6**
- 2.1 Product Details6
- 2.2 Transmit Operating Modes.....7
- 2.3 Accessories8
- 2.4 Testing Location Information.....8
- 2.5 Antenna Requirements.....8
- 2.6 Table for Filed Antenna9
- 2.7 Table for the 2.4G Band Carrier Frequencies11
- 2.8 Table for the 2.4G Band Test Modes12
- 2.9 Table for the 2.4G Band Parameters of Test Software Setting.....13
- 3 THE 2.4G BAND TEST RESULT14**
- 3.1 AC Power Line Conducted Emissions Measurement14
- 3.2 Maximum Peak Output Power Measurement19
- 3.3 Power Spectral Density Measurement.....25
- 3.4 Emission Bandwidth Measurement.....38
- 3.5 Radiated Emissions Measurement50
- 3.6 Out of Band Emissions Measurement.....92
- 4 TEST EQUIPMENT AND CALIBRATION DATA200**
- 5 TEST COMMANDS.....201**

APPENDIX A. TEST PHOTOS

APPENDIX B. PHOTOGRAPHS OF EUT

Summary of the Test Result

Applied Standard: 47 CFR FCC Part 15 Subpart C					
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result
3.1	15.207	AC Power Line Conducted Emissions	1.22dB	-	Complies
3.2	15.247 (b)(3)	Maximum Peak Output Power Measurement	EIRP [dBm]: 29.36	30 dBm	Complies
3.3	15.247 (e)	Power Density	EIRP PSD [dBm/10kHz]: 0.18	8 dBm/10kHz	Complies
3.4	15.247 (a)(2)	Emission Bandwidth	Bandwidth [MHz] 20MHz: 8.58 40MHz: 36.04	≥500kHz	Complies
3.5	15.247(d)	Radiated Emissions	4824.000MHz 57.25dBm (Margin 16.75dB) - PK 53.86dBm (Margin 0.14dB) - AV	-	Complies

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Peak Conducted Output Power	±0.8dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
6dB Spectrum Bandwidth	±8.5×10 ⁻⁸	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7°C	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

1 Equipment under Test

Equipment Name: Wireless .11ac Smart Ultra-Broadband Gateway with Integrated Video Bridge

Model Number: C2100T

Trade Name: technicolor

Product Code: BAC2100T

Power Supply: Switching-Type, 12Vdc, 2.8A, Manufacturer: Ac Bel, Model: WAC011
P/N: DSL37288710

AC Power Cord: Wall-mount, 2pin

Hardware Version: LAB2

Interface Availability

Interface Model	DC 12Vdc 2.8A	HPNA	Ethernet 10/100/ 1000Mbps	LAN/WAN 10/100/ 1000Mbps	USB 2.0	FXS	DSL	WLAN IEEE 802.11a/b/g/n/ac (2.4GHz*2/5GHz 4*4)
C2100T	•	•	•(4 port)	•(1 port)	•(1 port)	•(2 port)	•(1 port)	•

• : Equipped

○ : Not Equipped

1.1 Application of standard

US Standard: 47 CFR FCC Part 15 Subpart C § 15.247

ANSI C63.4-2003

ANSI C63.10-2009

KDB662911 D01 Multiple Transmitter Output v02r01, 10/31/2013

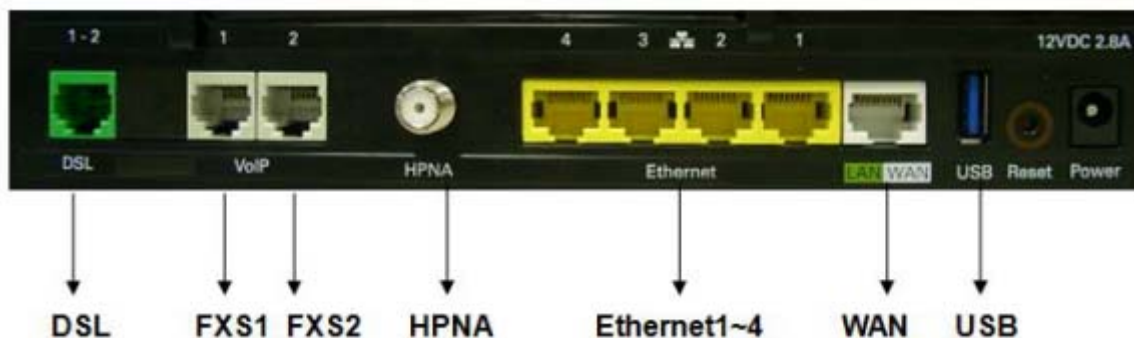
KDB558074 D01 DTS Meas Guidance v03r02, 06/05/2014

1.2 Cabling Attached to the Equipment

Table 1- Cable and Interconnection

Interface	Cable type	Cable length delivered with the modem	“Real life” Cable length that can be attached to this type of interface	Cable length to be used for testing	Internal/ external connection
DSL	UTP Cat 3	2 meter flat cable	> 10 meter	10 meter	External
Eth1, WAN	UTP Cat 5	2 meter	> 10 meter	Two 10 meter cables;	Internal
Line 1/2	UTP Cat 3	2 meter	> 10 meter	1 meter flat cable	Internal
USB	STP	1 meter	< 3 meter	1 meter	Internal
HPNA	coaxial	2 meter	> 10 meter	10 meter	Internal
AC power					External

1.3 Panel Drawing



2 GENERAL INFORMATION

2.1 Product Details

Items	Description			
PRODUCT	Stand alone			
MODEL NO.	C2100T			
FCC ID	RSE- C2100T			
Power Type	From power adapter			
EUT Stage	<input checked="" type="checkbox"/>	Product Unit	<input type="checkbox"/>	Pre-Sample
ANTENNA TYPE	Please see Section 2.4			
Operating Band, EIRP power	2400~2483.5MHz	<input checked="" type="checkbox"/>	IEEE 802.11b	
		<input checked="" type="checkbox"/>	IEEE 802.11g	
		<input checked="" type="checkbox"/>	IEEE 802.11n (20MHz)	
		<input checked="" type="checkbox"/>	IEEE 802.11n (40MHz)	
Product Type	For IEEE 802.11b: WLAN(2TX, 2RX) For IEEE 802.11g: WLAN(2TX, 2RX) For IEEE 802.11n: WLAN(2TX, 2RX)			
Nominal Chennel Bandwidth	20MHz / 40MHz			
Modulation	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g: OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11n: See the below table.			
Data Rate (Mbps)	11b mode :DSSS (1/2/5.5/11) 11g mode :OFDM (6/9/12/18/24/36/48/54) 11n(20MHz) mode(MCS0~MCS15); 11n(40MHz) mode(MCS0~MCS15)			
I/O Ports	LAN Port x 4 LAN/WAN Port x 1 USB Host Port x 1 FXS Port x 2 DSL Port x 1 HPNA Port x 1(Coaxial type)			
Software Version	5.100.138.2008.cpe4.12L06A.4			
Associated Devices	Switching-Type DC power supply			

802.11n Data Rate spec

Standard	INDEX	Data Rate (Mbps)		Standard	INDEX	Data Rate (Mbps)	
		LGI (800ns)	SFI (400ns)			LGI (800ns)	SFI (400ns)
11n 20MHz Nss=1	MCS0	6.5	7.2	11n 40MHz Nss=1	MCS0	13.5	15
	MCS1	13	14.4		MCS1	27	30
	MCS2	19.5	21.7		MCS2	40.5	45
	MCS3	26	28.9		MCS3	54	60
	MCS4	39	43.3		MCS4	81	90
	MCS5	52	57.8		MCS5	108	120
	MCS6	58.5	65		MCS6	121.5	135
	MCS7	65	72.2		MCS7	135	150
11n 20MHz Nss=2	MCS8	13	14.4	11n 40MHz Nss=2	MCS8	27	30
	MCS9	26	28.9		MCS9	54	60
	MCS10	39	43.3		MCS10	81	90
	MCS11	52	57.8		MCS11	108	120
	MCS12	78	86.7		MCS12	162	180
	MCS13	104	115.6		MCS13	216	240
	MCS14	117	130		MCS14	243	270
	MCS15	130	144.4		MCS15	270	300


2.2 Transmit Operating Modes

For 2400~2483.5MHz

Transmit Operating Mode						Transmit Multiple Antennas					
<input type="checkbox"/>	Operating mode 1 (single antenna)					<input checked="" type="checkbox"/>	1TX				
<input type="checkbox"/>	Operating mode 2 (multiple antenna, no beam forming)					<input checked="" type="checkbox"/>	2TX	<input type="checkbox"/>	3TX	<input type="checkbox"/>	4TX
<input type="checkbox"/>	Operating mode 3 (multiple antenna, with beam forming)					<input type="checkbox"/>	2TX	<input type="checkbox"/>	3TX	<input type="checkbox"/>	4TX
<input type="checkbox"/>	802.11b	Operating mode	<input checked="" type="checkbox"/>	1TX	<input type="checkbox"/>	2TX	<input type="checkbox"/>	3TX	<input type="checkbox"/>	Cyclic shift	
<input type="checkbox"/>	802.11g	Operating mode	<input checked="" type="checkbox"/>	1TX	<input checked="" type="checkbox"/>	2TX	<input type="checkbox"/>	3TX	<input type="checkbox"/>	Cyclic shift	
<input type="checkbox"/>	802.11n(HT20)	Operating mode	<input checked="" type="checkbox"/>	1TX	<input checked="" type="checkbox"/>	2TX	<input type="checkbox"/>	3TX	<input type="checkbox"/>	Cyclic shift	
<input type="checkbox"/>	802.11n(HT40)	Operating mode	<input checked="" type="checkbox"/>	1TX	<input checked="" type="checkbox"/>	2TX	<input type="checkbox"/>	3TX	<input type="checkbox"/>	Cyclic shift	

For IEEE802.11n, SISO (1Stream1TX) : MCS0~MCS7; CDD (1Stream2TX) : MCS0~MCS7; SDM (2Stream2TX) : MCS8~MCS15

2.3 Accessories

Power	Brand	Model	Rating
Adapter	Ac Bel	WAC011	I/P: 100-240V~50-60Hz 1A; O/P: 12V  2.8A

2.4 Testing Location Information

Testing Location			
<input checked="" type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.	
		TEL : 886-3-327-3456	FAX : 886-3-327-0973
Test Condition	Test Site No.	Test Engineer	Test Environment
AC Conduction	CO04-HY	Zeus Chen	24°C / 44%
RF Conducted	TH06-HY	Leo Cheng	22.9°C / 63%
Radiated Emission	03CH03-HY	Allen Lin	24.4°C / 61%

2.5 Antenna Requirements

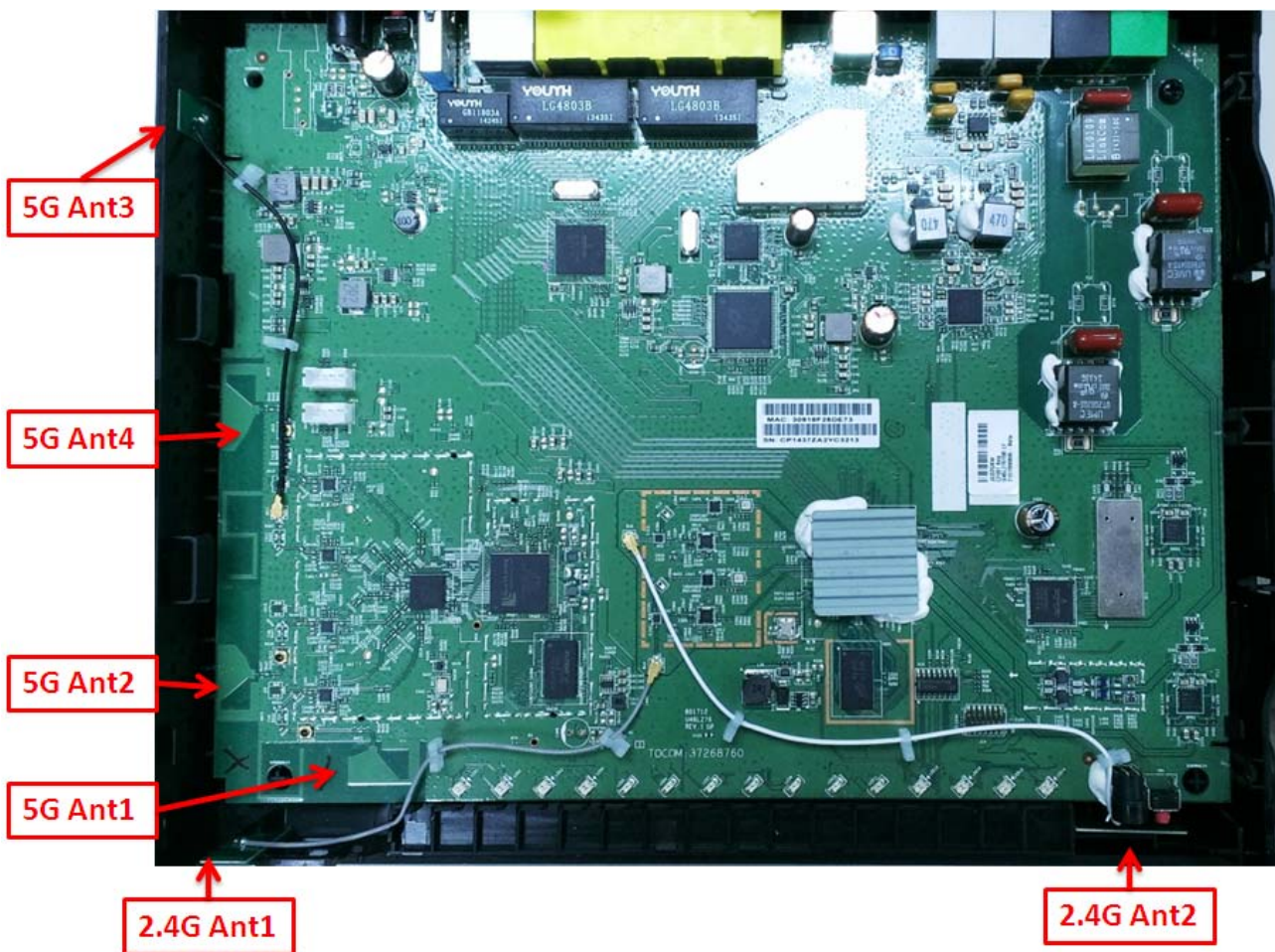
Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

2.6 Table for Filed Antenna

Antenna & Bandwidth for 2400~2483.5MHz

Ant.	Brand	Model Name	Antenna Type	Connector
1	M.gear	C107-511100-A	PCB Antenna	I-PEX
2	M.gear	C107-511101-A	PCB Antenna	I-PEX

Antenna	1st (TX)		2nd (TX)	
	20 MHz	40 MHz	20 MHz	40 MHz
802.11b	V	X	X	X
802.11g	V	X	X	X
802.11n	V	V	V	V





For 2400~2483.5MHz

Frequency	Antenna Gain (dBi)			
	Ant. 1 (WJ1)		Ant. 2 (WJ2)	
	20 MHz	40 MHz	20 MHz	40 MHz
2412MHz	1.82	-	2.19	-
2422MHz	-	2.90	-	2.52
2437MHz	2.99	2.99	2.12	2.12
2452MHz	-	3.06	-	2.20
2462MHz	3.02	-	2.38	-

Frequency	Maximum Gain (dBi) for CDD and SDM mode			
	CDD mode (1 Stream 2 TX) for Power & PSD Gain (KDB 662911 Option 2)		SDM mode (2 Stream 2 TX) for Power & PSD Gain (KDB 662911 Option 2)	
	20 MHz	40 MHz	20 MHz	40 MHz
2412MHz	2.81	-	0.21	-
2422MHz	-	3.45	-	0.86
2437MHz	3.15	3.15	0.72	0.72
2452MHz	-	3.14	-	0.58
2462MHz	3.31	-	0.37	-

Note: Please refer to Antenna report "C2100T antenna table_20141126.xls".

Maximum Correlated Directional Gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}]$ dBi

Maximum Uncorrelated Directional Gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / N_{ANT}]$ dBi

2.7 Table for the 2.4G Band Carrier Frequencies

11 channels are provided for 802.11b, 802.11g, 802.11n (20MHz):

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400MHz ~ 2483.5 MHz	1	2412 MHz	7	2442MHz
	2	2417MHz	8	2447MHz
	3	2422MHz	9	2452MHz
	4	2427MHz	10	2457MHz
	5	2432MHz	11	2462MHz
	6	2437MHz		

7 channels are provided for 802.11n (40MHz):

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400MHz ~ 2483.5 MHz	3	2422 MHz	7	2442MHz
	4	2427MHz	8	2447MHz
	5	2432MHz	9	2452MHz
	6	2437MHz		

2.8 Table for the 2.4G Band Test Modes

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Note	Channel	Data Rate	Antenna	
AC Power Line Conducted Emissions	11n	OFDM/BPSK	6	-	1+2	
Maximum Peak Output Power Maximum Average Output Power	11b	DSSS/DBPSK	1/6/11	1Mbps	1, 2	
				1Mbps	1+2(CDD)	
	11g	OFDM/BPSK	1/6/11	6Mbps	1, 2	
				6Mbps	1+2(CDD)	
			1/6/11	MCS0	1, 2	
				MCS0	1+2(CDD)	
11n(20MHz)	OFDM/BPSK	3/6/9	MCS0	1, 2		
			MCS0	1+2(CDD)		
Power Spectral Density	11b	DSSS/DBPSK	1/6/11	1Mbps	2	
				1Mbps	1+2(CDD)	
	11g	OFDM/BPSK	1/6/11	6Mbps	2	
				6Mbps	1+2(CDD)	
			1/6/11	MCS0	2	
				MCS0	1+2(CDD)	
	11n(20MHz)	OFDM/BPSK	3/6/9	MCS0	2	
				MCS0	1+2(CDD)	
	6dB Spectrum Bandwidth	11b	DSSS/DBPSK	1/6/11	1Mbps	2
					1Mbps	1+2(CDD)
		11g	OFDM/BPSK	1/6/11	6Mbps	2
					6Mbps	1+2(CDD)
1/6/11				MCS0	2	
				MCS0	1+2(CDD)	
11n(20MHz)	OFDM/BPSK	3/6/9	MCS0	2		
			MCS0	1+2(CDD)		
Band Edge Emissions (Radiated)	11b	DSSS/DBPSK	1/6/11	1Mbps	2	
				1Mbps	1+2(CDD)	
	11g	OFDM/BPSK	1/6/11	6Mbps	2	
				6Mbps	1+2(CDD)	
			1/6/11	MCS0	2	
				MCS0	1+2(CDD)	
11n(20MHz)	OFDM/BPSK	3/6/9	MCS0	2		
			MCS0	1+2(CDD)		
Radiated Emissions Above 1GHz(Radiated)	11b	DSSS/DBPSK	1/6/11	1Mbps	2	
				1Mbps	1+2(CDD)	
	11g	OFDM/BPSK	1/6/11	6Mbps	2	
				6Mbps	1+2(CDD)	
			1/6/11	MCS0	2	
				MCS0	1+2(CDD)	
11n(20MHz)	OFDM/BPSK	3/6/9	MCS0	2		
			MCS0	1+2(CDD)		
11n(40MHz)	OFDM/BPSK	3/6/9	MCS0	2		
			MCS0	1+2(CDD)		
Radiated Emissions Below 1GHz(Radiated)	11n	OFDM/BPSK	6	-	1+2	



2.9 Table for the 2.4G Band Parameters of Test Software Setting

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

The Power Setting Parameter						
Test Software Version		5.100.138.2008.cpe4.12L06A.4				
Worst Modulation Mode		Number of Transmit Chains (NTX)	Frequency (MHz)	Maximum Output Power (dBm)	Power Setting	Data Rate / MCS
Ant. 1	802.11b,	1	2412	22.81	87	1Mbps
Ant. 1	802.11b,	1	2437	22.07	84	1Mbps
Ant. 1	802.11b,	1	2462	22.32	86	1Mbps
Ant. 2	802.11b,	1	2412	23.95	90	1Mbps
Ant. 2	802.11b,	1	2437	24.23	92	1Mbps
Ant. 2	802.11b,	1	2462	24.58	94	1Mbps
Ant. 1	802.11g,	1	2412	20.77	82	6Mbps
Ant. 1	802.11g,	1	2437	25.77	106	6Mbps
Ant. 1	802.11g,	1	2462	19.39	76	6Mbps
Ant. 2	802.11g,	1	2412	21.29	82	6Mbps
Ant. 2	802.11g,	1	2437	27.03	109	6Mbps
Ant. 2	802.11g,	1	2462	20.32	79	6Mbps
Ant. 1+2(CDD)	802.11g,	2	2412	23.37	79	6Mbps
Ant. 1+2(CDD)	802.11g,	2	2437	28.58	105	6Mbps
Ant. 1+2(CDD)	802.11g,	2	2462	22.81	78	6Mbps
Ant. 1	802.11n 20MHz	1	2412	20.40	78	MCS0
Ant. 1	802.11n 20MHz	1	2437	25.52	104	MCS0
Ant. 1	802.11n 20MHz	1	2462	17.42	66	MCS0
Ant. 2	802.11n 20MHz	1	2412	20.90	79	MCS0
Ant. 2	802.11n 20MHz	1	2437	26.72	108	MCS0
Ant. 2	802.11n 20MHz	1	2462	18.45	70	MCS0
Ant. 1+2(CDD)	802.11n 20MHz	2	2412	23.32	78	MCS0
Ant. 1+2(CDD)	802.11n 20MHz	2	2437	29.36	108	MCS0
Ant. 1+2(CDD)	802.11n 20MHz	2	2462	21.20	70	MCS0
Ant. 1	802.11n 40MHz	1	2422	18.72	72	MCS0
Ant. 1	802.11n 40MHz	1	2437	20.31	80	MCS0
Ant. 1	802.11n 40MHz	1	2452	17.98	70	MCS0
Ant. 2	802.11n 40MHz	1	2422	19.94	76	MCS0
Ant. 2	802.11n 40MHz	1	2437	21.53	83	MCS0
Ant. 2	802.11n 40MHz	1	2452	18.69	71	MCS0
Ant. 1+2(CDD)	802.11n 40MHz	2	2422	21.91	70	MCS0
Ant. 1+2(CDD)	802.11n 40MHz	2	2437	23.43	78	MCS0
Ant. 1+2(CDD)	802.11n 40MHz	2	2452	20.70	66	MCS0

3 The 2.4G band TEST RESULT

3.1 AC Power Line Conducted Emissions Measurement

3.1.1 Limit

For this product which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

3.1.2 Measuring Instruments and Setting

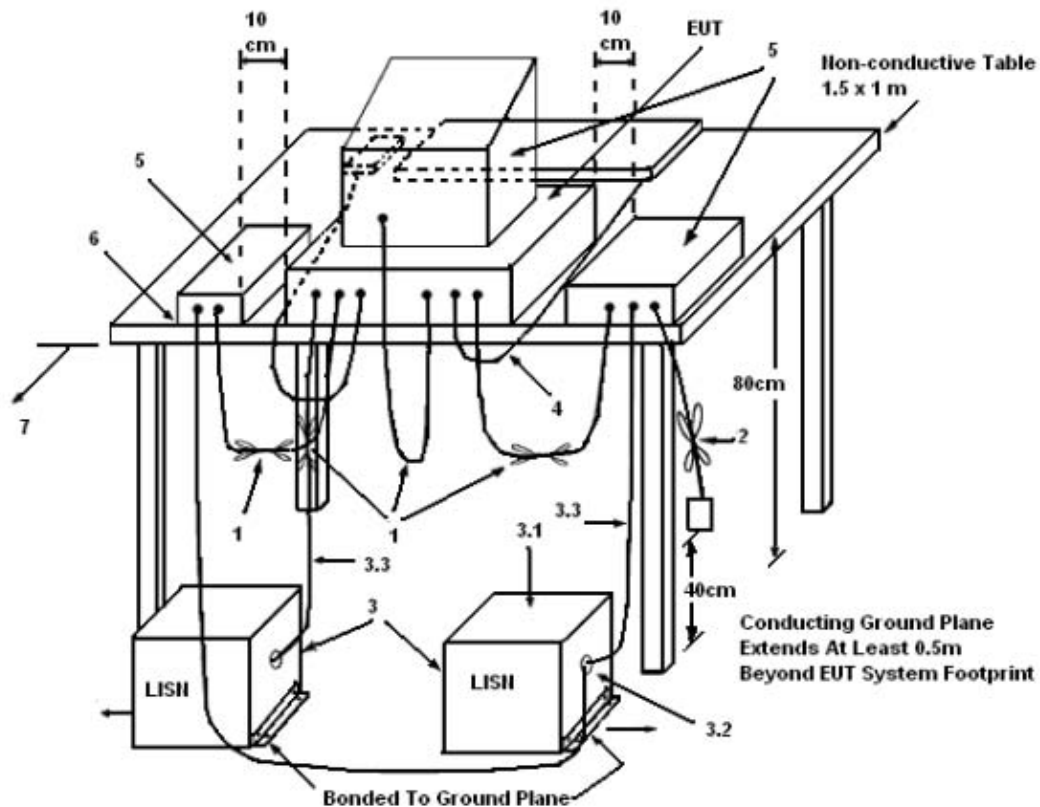
The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

3.1.3 Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 KHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

3.1.4 Test Setup Layout



LEGEND:

1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
2. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
3. EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω . LISN can be placed on top of, or immediately beneath, reference ground plane.
4. All other equipment powered from additional LISN(s).
5. Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
6. LISN at least 80 cm from nearest part of EUT chassis.
7. Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
8. Non-EUT components of EUT system being tested.
9. Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
10. Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.



3.1.5 Test Deviation

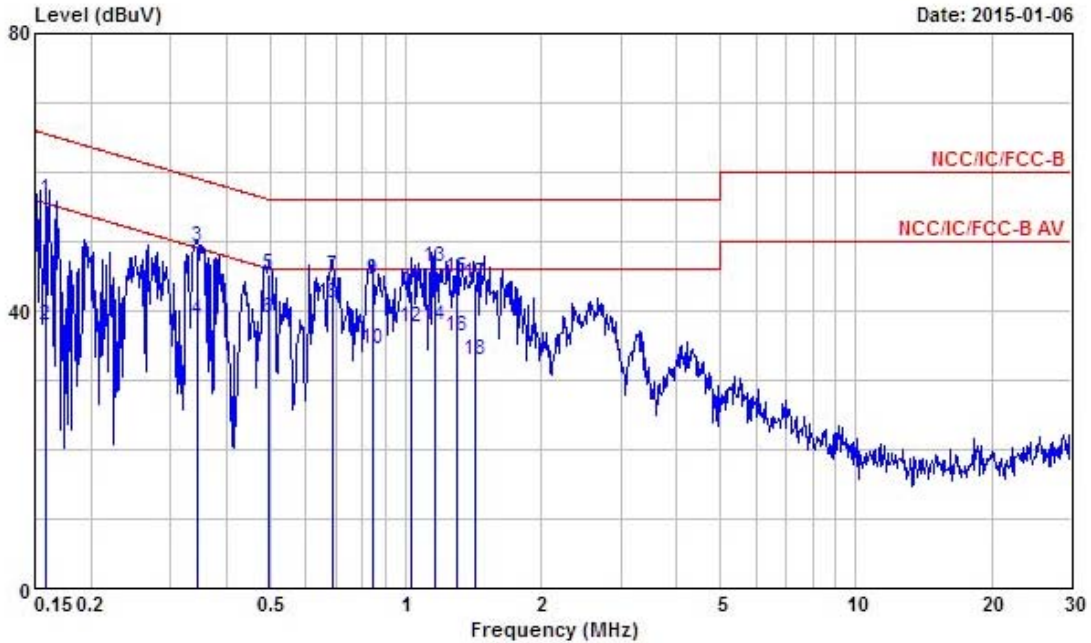
There is no deviation with the original standard.

3.1.6 EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

3.1.7 Results of AC Power Line Conducted Emissions Measurement

Configuration	802.11n 40MHz / Ch. 6 / Ant. 1+2	PHASE	Line(L)
----------------------	----------------------------------	--------------	---------

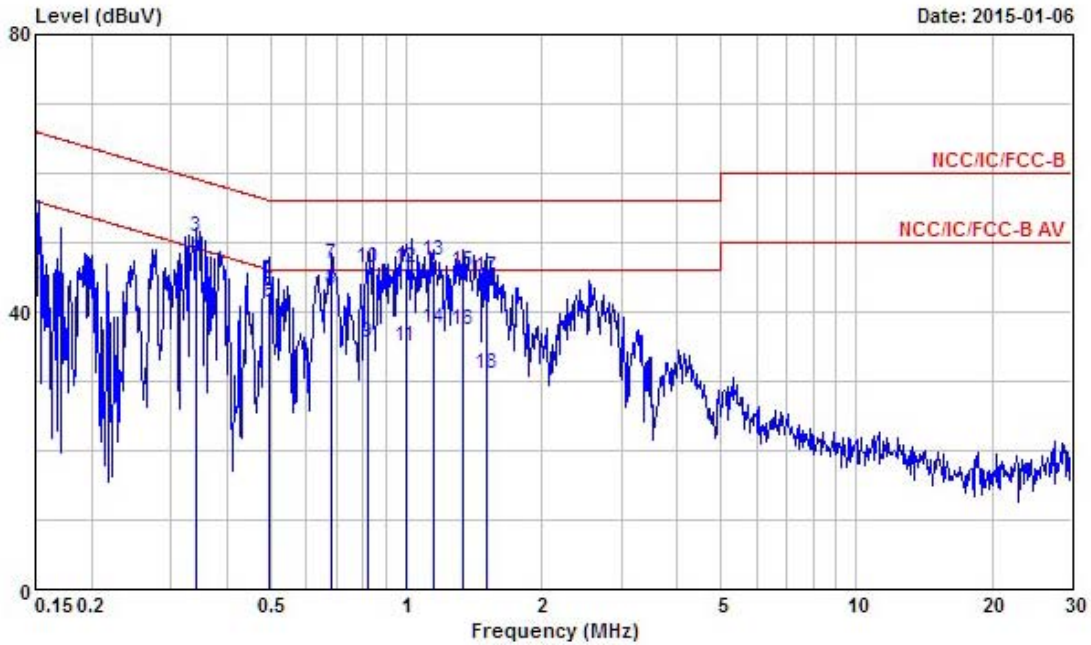


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1590020	55.96	-9.56	65.52	55.56	0.03	0.37	QP
2	0.1590020	37.96	-17.56	55.52	37.56	0.03	0.37	Average
3	0.3446300	49.30	-9.79	59.09	48.69	0.03	0.58	QP
4	0.3446300	38.81	-10.28	49.09	38.20	0.03	0.58	Average
5	0.4941090	45.17	-10.93	56.10	44.48	0.04	0.65	QP
6	0.4941090	38.93	-7.17	46.10	38.24	0.04	0.65	Average
7	0.6862570	44.88	-11.12	56.00	44.11	0.05	0.72	QP
8	0.6862570	40.97	-5.03	46.00	40.20	0.05	0.72	Average
9	0.8437760	44.39	-11.61	56.00	43.58	0.05	0.76	QP
10	0.8437760	34.40	-11.60	46.00	33.59	0.05	0.76	Average
11	1.030	42.92	-13.08	56.00	42.06	0.06	0.80	QP
12	1.030	37.73	-8.27	46.00	36.87	0.06	0.80	Average
13	1.160	46.27	-9.73	56.00	45.41	0.06	0.80	QP
14	1.160	37.89	-8.11	46.00	37.03	0.06	0.80	Average
15	1.300	44.69	-11.31	56.00	43.83	0.06	0.80	QP
16	1.300	36.32	-9.68	46.00	35.46	0.06	0.80	Average
17	1.420	43.95	-12.05	56.00	43.08	0.07	0.80	QP
18	1.420	33.01	-12.99	46.00	32.14	0.07	0.80	Average

Note 1: The test was passed at the minimum margin that marked by the frame in the following data
 Note 2: The emission levels of other frequencies were very low against the limit.
 Note 3: Q.P. and AV. are abbreviations of quasi-peak and average individually.
 Note 4: Corrected Reading (dBUV) = LISN Factor + Cable Loss + Read Level = Level
 Note 5: Over Limit value = level - Limit value



Configuration	802.11n 40MHz / Ch. 6 / Ant. 1+2	PHASE	Neutral (N)
----------------------	----------------------------------	--------------	-------------



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.1500000	53.51	-12.49	66.00	53.15	0.02	0.34	QP
2	0.1500000	44.06	-11.94	56.00	43.70	0.02	0.34	Average
3	0.3409970	50.69	-8.49	59.18	50.08	0.03	0.58	QP
4	0.3409970	47.96	-1.22	49.18	47.35	0.03	0.58	Average
5	0.4941090	43.01	-13.09	56.10	42.33	0.03	0.65	QP
6	0.4941090	41.43	-4.67	46.10	40.75	0.03	0.65	Average
7	0.6826310	46.76	-9.24	56.00	46.00	0.04	0.72	QP
8	0.6826310	43.03	-2.97	46.00	42.27	0.04	0.72	Average
9	0.8217160	35.61	-10.39	46.00	34.80	0.05	0.76	Average
10	0.8217160	46.33	-9.67	56.00	45.52	0.05	0.76	QP
11	0.9996780	35.00	-11.00	46.00	34.15	0.05	0.80	Average
12	0.9996780	46.41	-9.59	56.00	45.56	0.05	0.80	QP
13	1.150	47.31	-8.69	56.00	46.46	0.05	0.80	QP
14	1.150	37.67	-8.33	46.00	36.82	0.05	0.80	Average
15	1.330	45.78	-10.22	56.00	44.93	0.05	0.80	QP
16	1.330	37.25	-8.75	46.00	36.40	0.05	0.80	Average
17	1.510	45.13	-10.87	56.00	44.27	0.06	0.80	QP
18	1.510	31.01	-14.99	46.00	30.15	0.06	0.80	Average

Note 1: The test was passed at the minimum margin that marked by the frame in the following data
 Note 2: The emission levels of other frequencies were very low against the limit.
 Note 3: Q.P. and AV. are abbreviations of quasi-peak and average individually.
 Note 4: Corrected Reading (dBuV) = LISN Factor + Cable Loss + Read Level = Level
 Note 5: Over Limit value = level - Limit value

3.2 Maximum Peak Output Power Measurement

3.2.1 Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. The limited has to be reduced by the amount in dB that the gain of the antenna exceed 6dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

3.2.2 Measuring Instruments and Setting

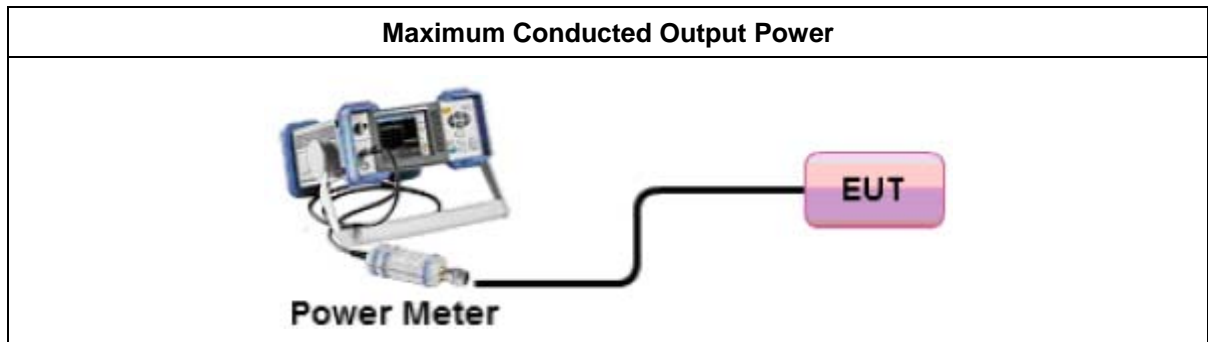
Please refer to section 4 of equipments list in this report. The following table is the setting of spectrum analyzer.

Power Meter Parameter	Setting
Filter No.	Auto
Measurement time	0.135 s ~ 26 s
Power Sensor	MA2411B

3.2.3 Test Procedures

1. Test was performed in accordance with Measurement of Digital Transmission Systems Operating under KDB558074 D01 DTS Meas Guidance v03r02, in section "Maximum conducted output power Method AVGPM", 06/05/2014
2. The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor to get the all on time transmission. Record the average power level.
3. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.
4. Adjust the measurement in dBm by adding $10 \log(1/x)$ where x is the duty cycle. Record the average power level.

3.2.4 Test Setup Layout



3.2.5 Test Deviation

There are no deviation with the original standard.

3.2.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



3.2.7 Test Result for Maximum Peak Output Power

Configuration IEEE 802.11b

<Ant. 1>

Channel	Frequency	Conducted Power (dBm)	Directional Gain	Max. Limit (dBm)	Result
1	2412 MHz	22.81	1.82	30.00	Complies
6	2437 MHz	22.07	2.99	30.00	Complies
11	2462 MHz	22.32	3.02	30.00	Complies

<Ant. 2>

Channel	Frequency	Conducted Power (dBm)	Directional Gain	Max. Limit (dBm)	Result
1	2412 MHz	23.95	2.19	30.00	Complies
6	2437 MHz	24.23	2.12	30.00	Complies
11	2462 MHz	24.58	2.38	30.00	Complies



Configuration IEEE 802.11g

<Ant. 1>

Channel	Frequency	Conducted Power (dBm)	Directional Gain	Max. Limit (dBm)	Result
1	2412 MHz	20.77	1.82	30.00	Complies
6	2437 MHz	25.77	2.99	30.00	Complies
11	2462 MHz	19.39	3.02	30.00	Complies

<Ant. 2>

Channel	Frequency	Conducted Power (dBm)	Directional Gain	Max. Limit (dBm)	Result
1	2412 MHz	21.29	2.19	30.00	Complies
6	2437 MHz	27.03	2.12	30.00	Complies
11	2462 MHz	20.32	2.38	30.00	Complies

<Ant. 1+2, CDD>

Channel	Frequency	Conducted Power (dBm)		Directional Gain	Max. Limit (dBm)	Total Conducted Power (dBm)	Result
		Ant1	Ant2				
1	2412 MHz	20.42	20.30	2.81	30.00	23.37	Complies
6	2437 MHz	25.54	25.59	3.15	30.00	28.58	Complies
11	2462 MHz	19.79	19.81	3.31	30.00	22.81	Complies



Configuration IEEE 802.11n 20MHz

<MCS0, Ant. 1>

Channel	Frequency	Conducted Power (dBm)	Directional Gain	Max. Limit (dBm)	Result
1	2412 MHz	20.40	1.82	30.00	Complies
6	2437 MHz	25.52	2.99	30.00	Complies
11	2462 MHz	17.42	3.02	30.00	Complies

<MCS0, Ant. 2>

Channel	Frequency	Conducted Power (dBm)	Directional Gain	Max. Limit (dBm)	Result
1	2412 MHz	20.90	2.19	30.00	Complies
6	2437 MHz	26.72	2.12	30.00	Complies
11	2462 MHz	18.45	2.38	30.00	Complies

<MCS0, Ant. 1+2, CDD>

Channel	Frequency	Conducted Power (dBm)		Directional Gain	Max. Limit (dBm)	Total Conducted Power (dBm)	Result
		Ant1	Ant2				
1	2412 MHz	20.44	20.17	2.81	30.00	23.32	Complies
6	2437 MHz	26.36	26.34	3.15	30.00	29.36	Complies
11	2462 MHz	18.23	18.15	3.31	30.00	21.20	Complies



Configuration IEEE 802.11n 40MHz

<MCS0, Ant. 1>

Channel	Frequency	Conducted Power (dBm)	Directional Gain	Max. Limit (dBm)	Result
3	2422 MHz	18.72	2.90	30.00	Complies
6	2437 MHz	20.31	2.99	30.00	Complies
9	2452 MHz	17.98	3.06	30.00	Complies

<MCS0, Ant. 2>

Channel	Frequency	Conducted Power (dBm)	Directional Gain	Max. Limit (dBm)	Result
3	2422 MHz	19.94	2.52	30.00	Complies
6	2437 MHz	21.53	2.12	30.00	Complies
9	2452 MHz	18.69	2.20	30.00	Complies

<MCS0, Ant. 1+2, CDD>

Channel	Frequency	Conducted Power (dBm)		Directional Gain	Max. Limit (dBm)	Total Conducted Power (dBm)	Result
		Ant1	Ant2				
3	2422 MHz	18.38	19.37	3.45	30.00	21.91	Complies
6	2437 MHz	19.76	20.99	3.15	30.00	23.43	Complies
9	2452 MHz	16.93	18.33	3.14	30.00	20.70	Complies

3.3 Power Spectral Density Measurement

3.3.1 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

3.3.2 Measuring Instruments and Setting

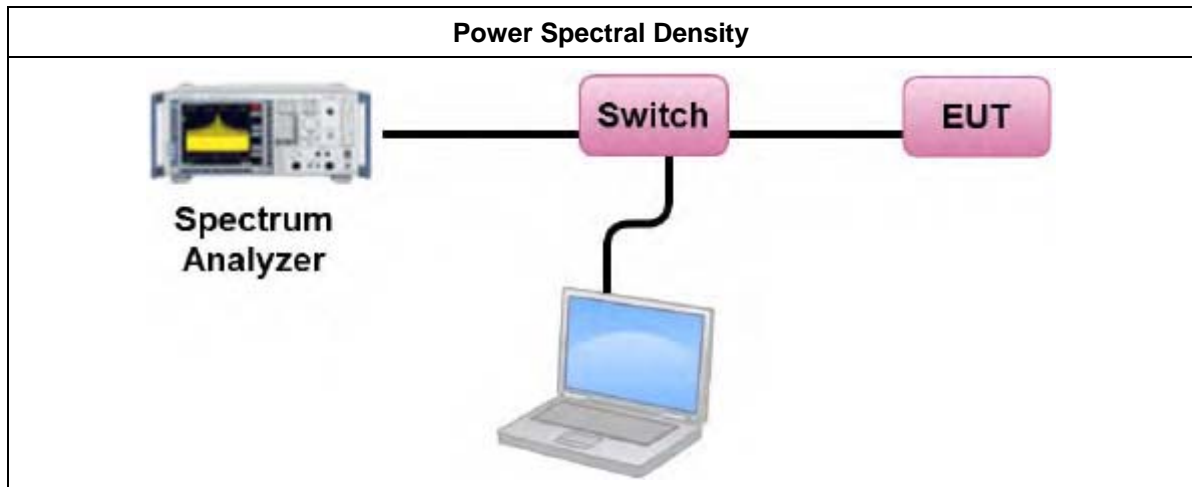
The following table is the setting of the spectrum analyzer.

Spectrum Parameter Setting	Setting
Attenuation	Auto
Span Frequency	Set the instrument span to 1.5 times the OBW
RB	10 kHz
VB	30 kHz
Detector	RMS
Trace	Average
Sweep Time	auto
Trace average	100 times

3.3.3 Test Procedures

1. The transmitter output (antenna port) was connected RF switch to the spectrum analyzer.
2. Test was performed in accordance with Measurement of Digital Transmission Systems Operating under 558074 D01 DTS Meas Guidance v03r02, in section "Maximum power spectral density level in the fundamental emission Method AVGPSD-1" , 06/05/2014.
3. Multiple antenna systems was performed in accordance KDB 662911 D01 v02 in-Band Power Spectral Density (PSD) Measurements (a) Measure and sum the spectra across the outputs (bin-by-bin summing).
4. This procedure may be used when the maximum (average) conducted output power was used to demonstrate compliance to the output power limit.. The EUT must be configured to transmit continuously (duty cycle $\geq 98\%$) to ensure that measurements are made only when the EUT is transmitting at its maximum power control level (no transmitter off time is to be considered)..
5. Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span/RBW}$ (use of a greater number of measurement points than this minimum requirement is recommended).
6. When measuring first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3 and so on up to the Nth output to obtain the value for the first
7. frequency bin of the summed spectrum. The summed spectrum value for each of the other frequency bins is computed in the same way.

3.3.4 Test Setup Layout



3.3.5 Test Deviation

There are no deviation with the original standard.

3.3.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



3.3.7 Test Result of Power Spectral Density

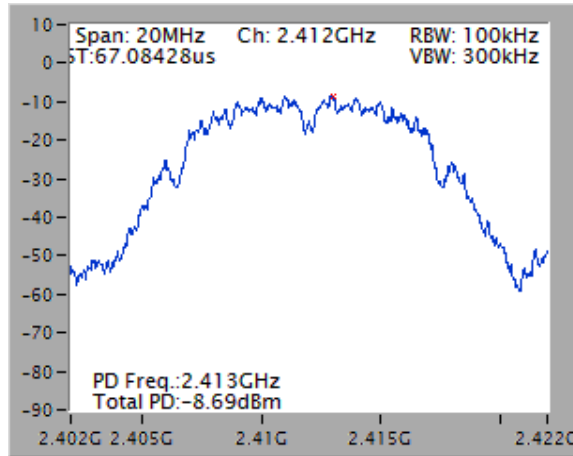
Configuration IEEE 802.11b

<Ant. 2>

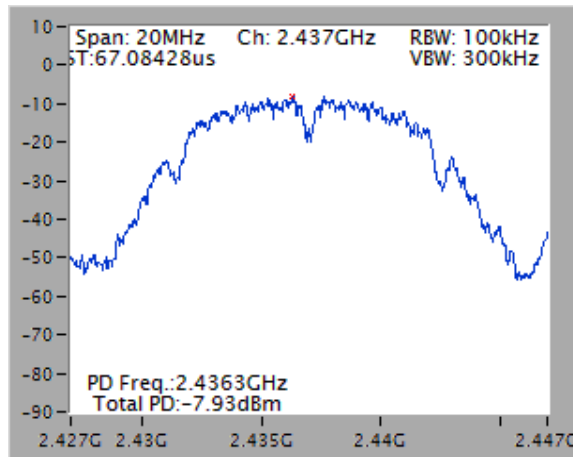
Channel	Frequency	PSD raw (dBm/100kHz)	Cable Loss	Directional Gain	Power Density (dBm/100kHz)	Max. Limit (dBm/100kHz)
1	2412 MHz	-8.69	-5.87	2.19	-2.82	8.00
6	2437 MHz	-7.93	-5.85	2.12	-2.08	8.00
11	2462 MHz	-9.04	-5.83	2.38	-3.21	8.00
Result	Complies					

Note: Power Density (dBm/100kHz) = PSD raw data - Cable Loss

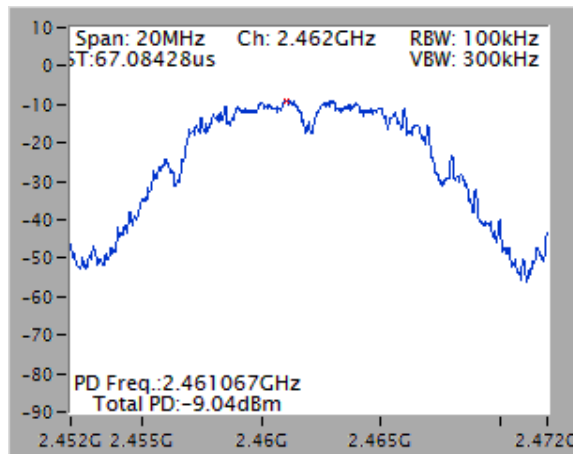
IEEE 802.11b / 2412 MHz / Ant. 2



IEEE 802.11b / 2437 MHz / Ant. 2



IEEE 802.11b / 2462 MHz / Ant. 2





Configuration IEEE 802.11g

<Ant. 2>

Channel	Frequency	PSD raw (dBm/100kHz)	Cable Loss	Directional Gain	Power Density (dBm/100kHz)	Max. Limit (dBm/100kHz)
1	2412 MHz	-12.28	-5.87	2.19	-6.41	8.00
6	2437 MHz	-8.89	-5.85	2.12	-3.04	8.00
11	2462 MHz	-15.94	-5.83	2.38	-10.11	8.00
Result	Complies					

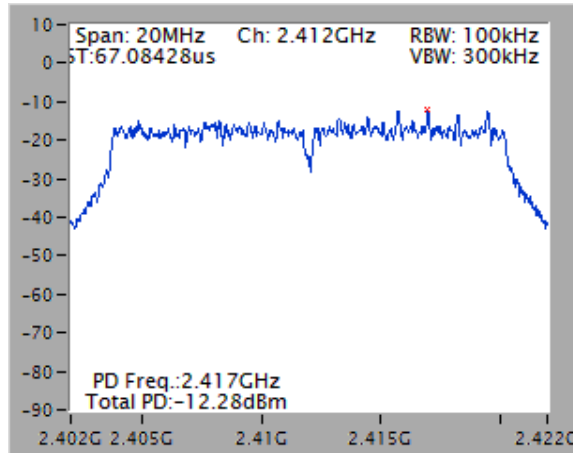
Note: Power Density (dBm/100kHz) = PSD raw data - Cable Loss

<Ant. 1+2, CDD>

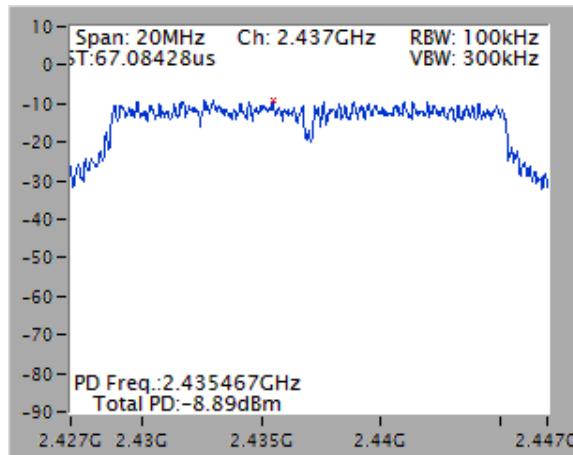
Channel	Frequency	PSD raw (dBm/100kHz)		Cable Loss (dB)		Power Density (dBm/100kHz)		Directional Gain	Total Power Density (dBm)	Max. Limit (dBm/100k Hz)
		Ant1	Ant2	Ant1	Ant2	Ant1	Ant2			
1	2412 MHz	-15.41	-14.68	-5.79	-5.87	-9.62	-8.81	2.81	-6.19	8.00
6	2437 MHz	-10.03	-9.7	-5.74	-5.85	-4.29	-3.85	3.15	-1.05	8.00
11	2462 MHz	-14.78	-15.72	-5.78	-5.83	-9.00	-9.89	3.31	-6.41	8.00
Result	Complies									

Note: Each Antenna Power Density (dBm/100kHz) = PSD raw data - Cable Loss

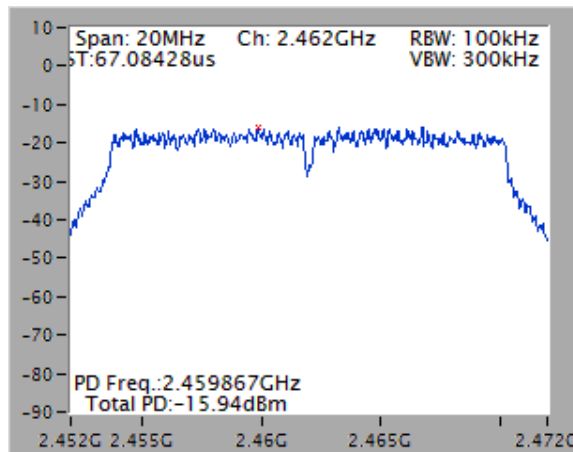
IEEE 802.11g / 2412 MHz / Ant. 2



IEEE 802.11g / 2437 MHz / Ant. 2

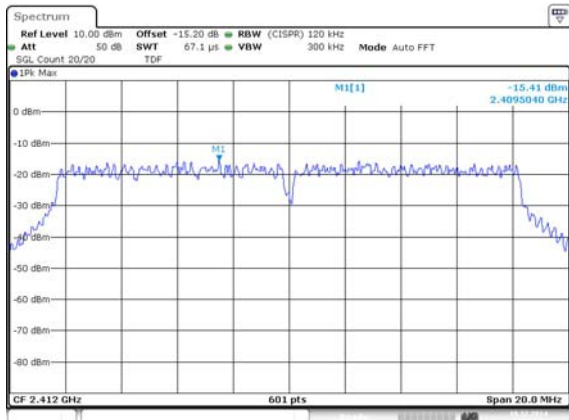


IEEE 802.11g / 2462 MHz / Ant. 2



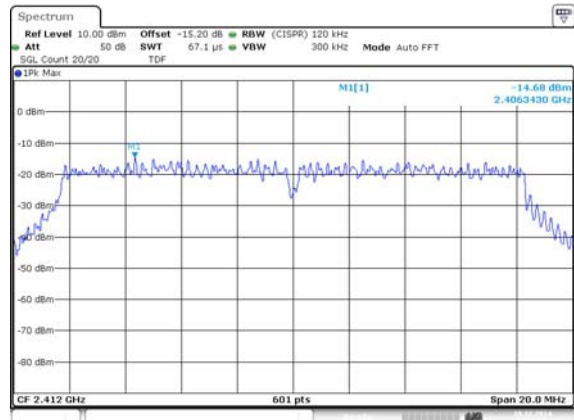
<Ant. 1+2, CDD>

2412 MHz / Ant. 1



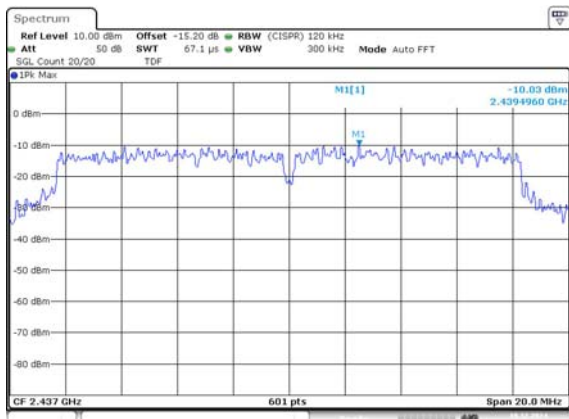
Date: 19.DEC.2014 15:31:54

2412 MHz / Ant. 2



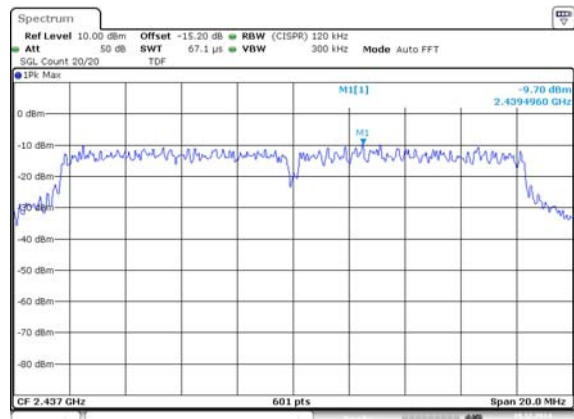
Date: 19.DEC.2014 15:31:56

2437 MHz / Ant. 1



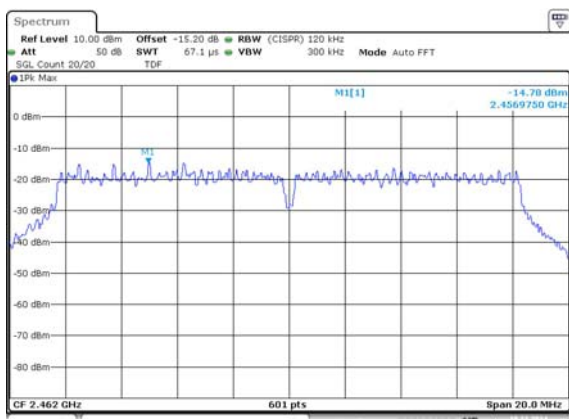
Date: 19.DEC.2014 15:35:27

2437 MHz / Ant. 2



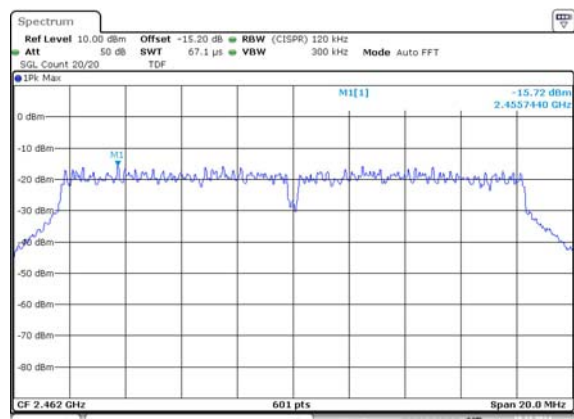
Date: 19.DEC.2014 15:35:29

2462 MHz / Ant. 1



Date: 19.DEC.2014 15:38:13

2462 MHz / Ant. 2



Date: 19.DEC.2014 15:38:15



Configuration IEEE 802.11n 20MHz

<MCS0, Ant. 2>

Channel	Frequency	PSD raw (dBm/100kHz)	Cable Loss	Directional Gain	Power Density (dBm/100kHz)	Max. Limit (dBm/100kHz)
1	2412 MHz	-14.56	-5.87	2.19	-8.69	8.00
6	2437 MHz	-9.08	-5.85	2.12	-3.23	8.00
11	2462 MHz	-17.75	-5.83	2.38	-11.92	8.00
Result	Complies					

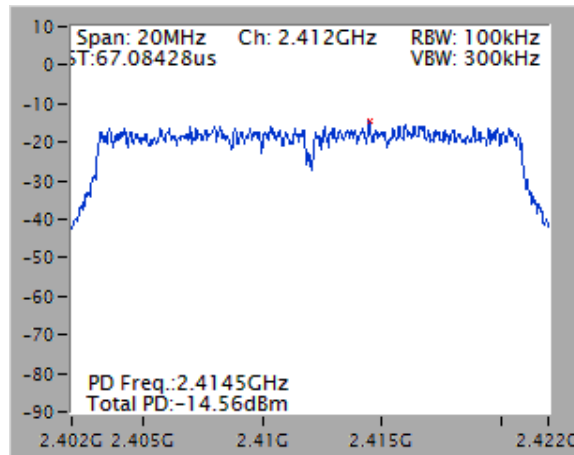
Note: Power Density (dBm/100kHz) = PSD raw data - Cable Loss

< MCS0, Ant. 1+2, CDD >

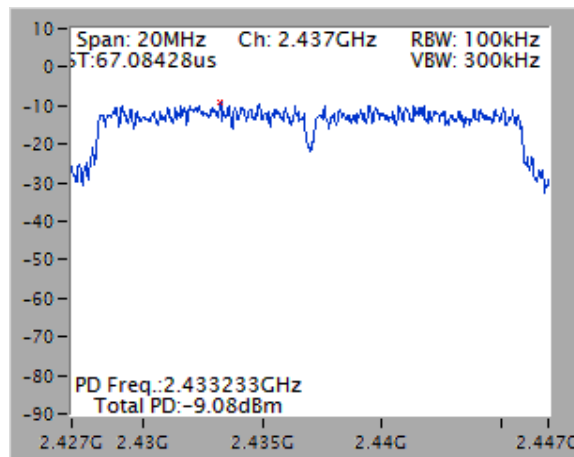
Channel	Frequency	PSD raw (dBm/100kHz)		Cable Loss (dB)		Power Density (dBm/100kHz)		Directional Gain	Total Power Density (dBm)	Max. Limit (dBm/100kHz)
		Ant1	Ant2	Ant1	Ant2	Ant1	Ant2			
1	2412 MHz	-12.93	-15.57	-5.79	-5.87	-7.14	-9.70	2.81	-5.22	8.00
6	2437 MHz	-8.03	-9.29	-5.74	-5.85	-2.29	-3.44	3.15	0.18	8.00
11	2462 MHz	-18.14	-16.05	-5.78	-5.83	-12.36	-10.22	3.31	-8.15	8.00
Result	Complies									

Note: Each Antenna Power Density (dBm/100kHz) = PSD raw data - Cable Loss

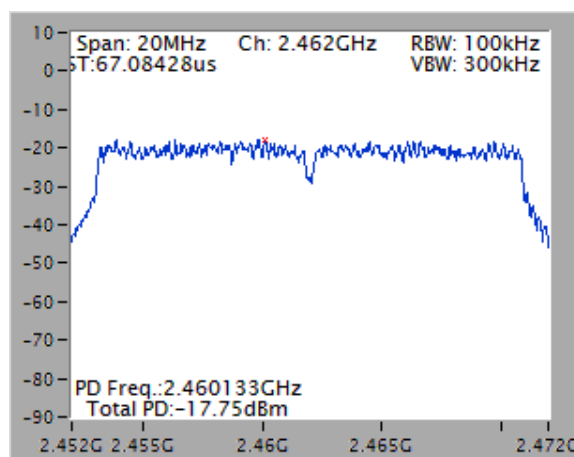
IEEE 802.11n 20MHz / 2412 MHz / MCS0, Ant. 2



IEEE 802.11n 20MHz / 2437 MHz / MCS0, Ant. 2

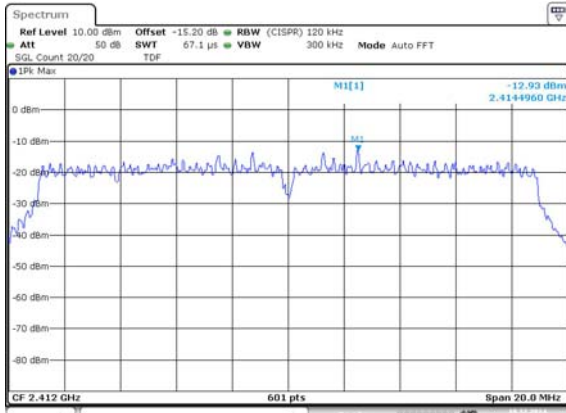


IEEE 802.11n 20MHz / 2462 MHz / MCS0, Ant. 2



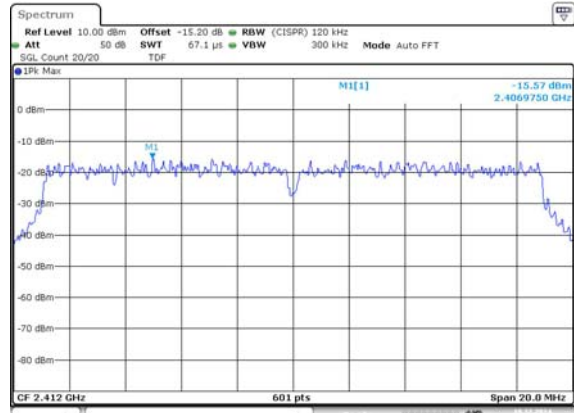
<Ant. 1+2, CDD>

2412 MHz / MCS0, Ant. 1



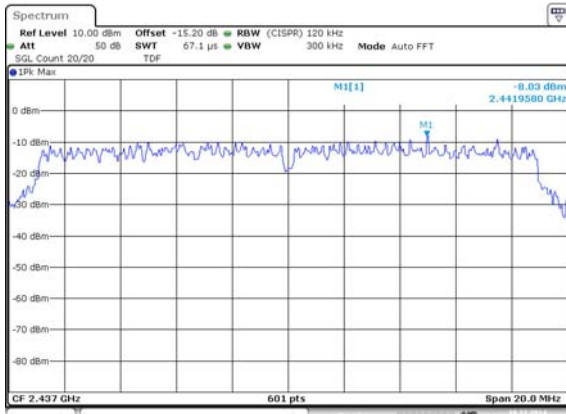
Date: 19.DEC.2014 15:50:20

2412 MHz / MCS0, Ant. 2



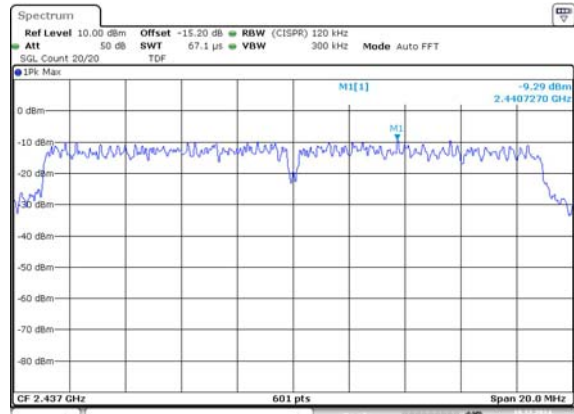
Date: 19.DEC.2014 15:50:22

2437 MHz / MCS0, Ant. 1



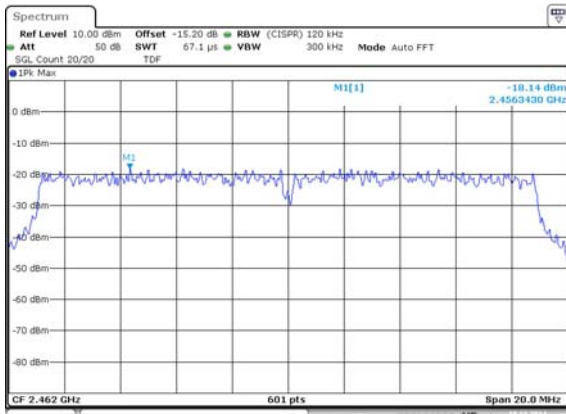
Date: 19.DEC.2014 15:52:39

2437 MHz / MCS0, Ant. 2



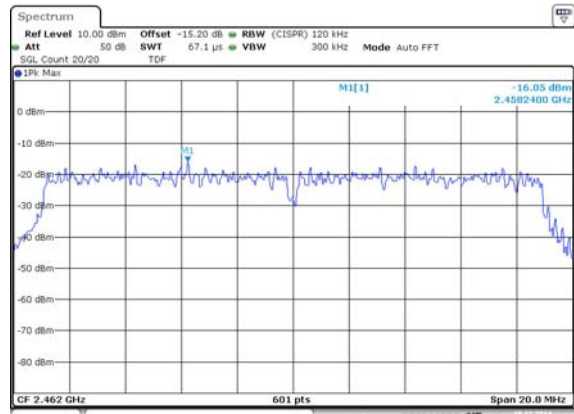
Date: 19.DEC.2014 15:52:41

2462 MHz / MCS0, Ant. 1



Date: 19.DEC.2014 15:55:37

2462 MHz / MCS0, Ant. 2



Date: 19.DEC.2014 15:55:39



Configuration IEEE 802.11n 40MHz

<MCS0, Ant. 2>

Channel	Frequency	PSD raw (dBm/100kHz)	Cable Loss	Directional Gain	Power Density (dBm/100kHz)	Max. Limit (dBm/100kHz)
3	2422 MHz	-18.56	-5.87	2.52	-12.69	8.00
6	2437 MHz	-16.15	-5.85	2.12	-10.30	8.00
9	2452 MHz	-19.45	-5.83	2.20	-13.62	8.00
Result	Complies					

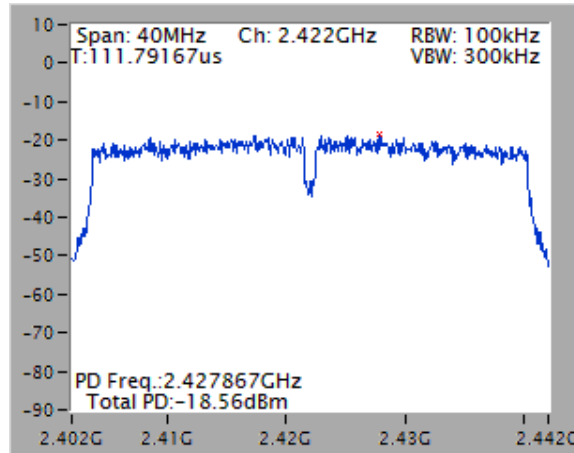
Note: Power Density (dBm/100kHz) = PSD raw data - Cable Loss

< MCS0, Ant. 1+2, CDD >

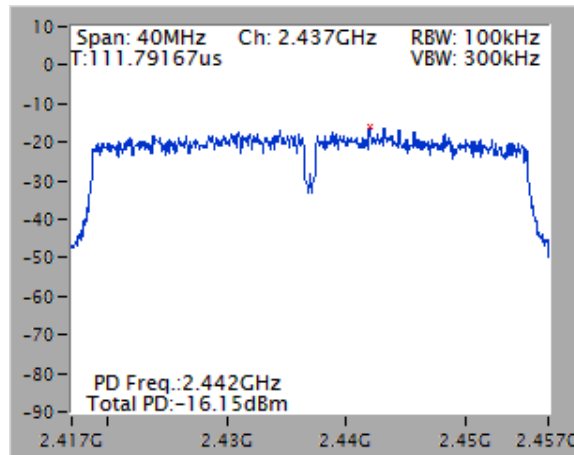
Channel	Frequency	PSD raw (dBm/100kHz)		Cable Loss (dB)		Power Density (dBm/100kHz)		Directional Gain	Total Power Density (dBm)	Max. Limit (dBm/100kHz)
		Ant1	Ant2	Ant1	Ant2	Ant1	Ant2			
3	2422 MHz	-17.59	-17	-5.79	-5.87	-11.80	-11.13	3.45	-8.44	8.00
6	2437 MHz	-17.24	-14.76	-5.74	-5.85	-11.50	-8.91	3.15	-7.00	8.00
9	2452 MHz	-21.31	-17.6	-5.78	-5.83	-15.53	-11.77	3.14	-10.24	8.00
Result	Complies									

Note: Each Antenna Power Density (dBm/100kHz) = PSD raw data - Cable Loss

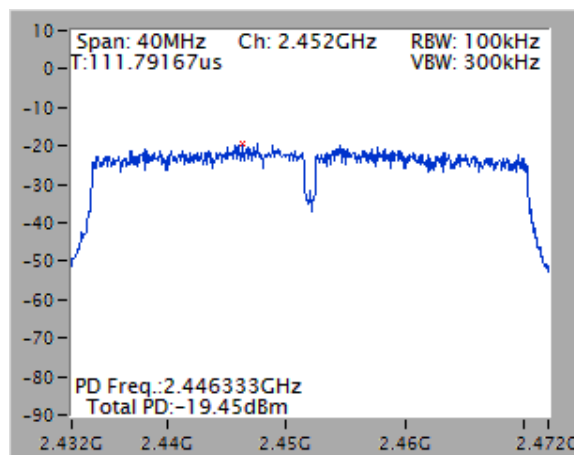
IEEE 802.11n 40MHz / 2422 MHz / MCS0, Ant. 2



IEEE 802.11n 40MHz / 2437 MHz / MCS0, Ant. 2

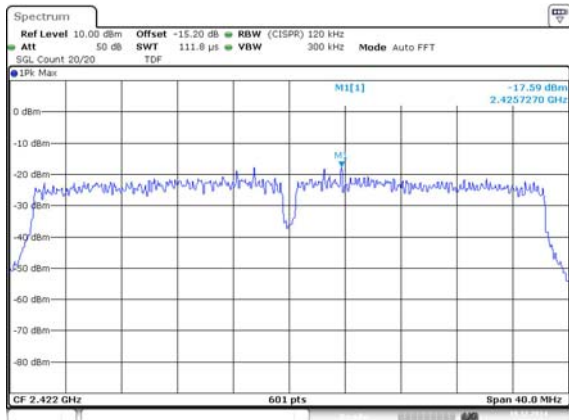


IEEE 802.11n 40MHz / 2452 MHz / MCS0, Ant. 2



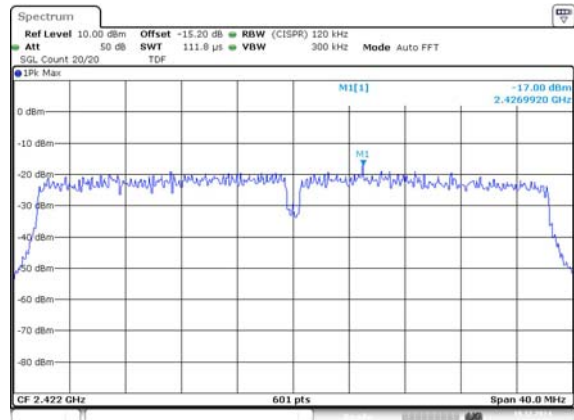
<Ant. 1+2, CDD>

2422 MHz / MCS0, Ant. 1



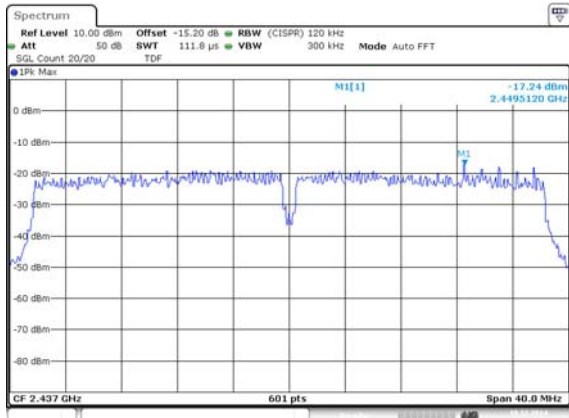
Date: 19.DEC.2014 16:25:23

2422 MHz / MCS0, Ant. 2



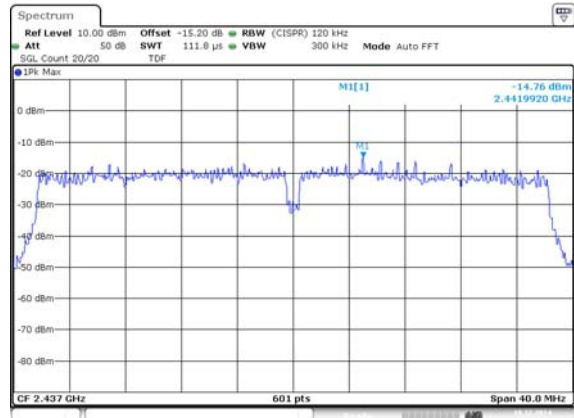
Date: 19.DEC.2014 16:25:25

2437 MHz / MCS0, Ant. 1



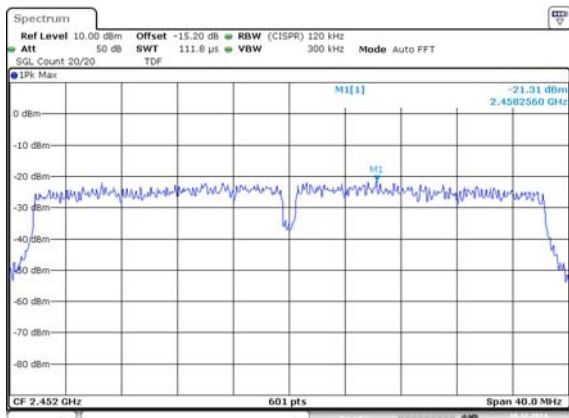
Date: 19.DEC.2014 16:28:48

2437 MHz / MCS0, Ant. 2



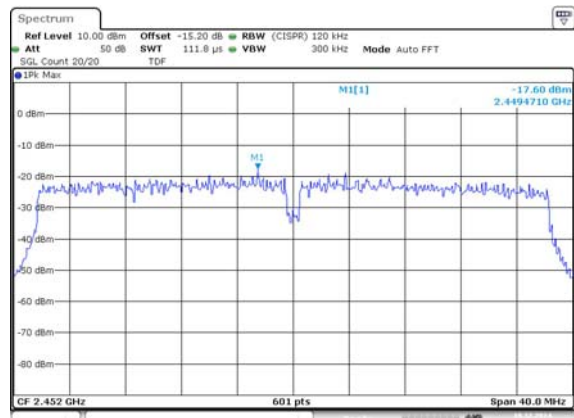
Date: 19.DEC.2014 16:28:50

2452 MHz / MCS0, Ant. 1



Date: 19.DEC.2014 16:32:46

2452 MHz / MCS0, Ant. 2



Date: 19.DEC.2014 16:32:48

3.4 Emission Bandwidth Measurement

3.4.1 Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

3.4.2 Measuring Instruments and Setting

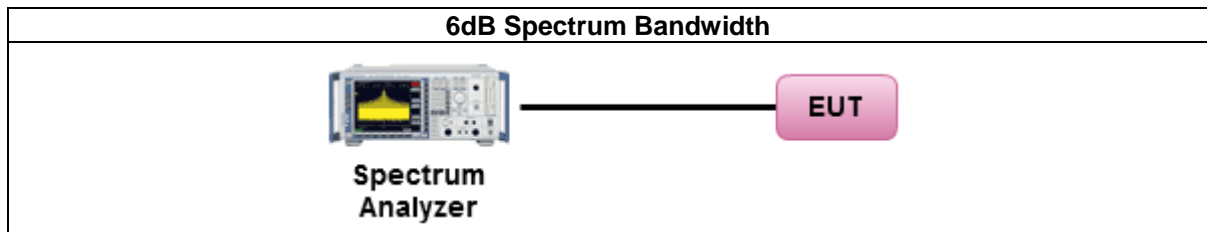
The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RB	1-5 % of the emission bandwidth (EBW)
VB	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.4.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. The resolution bandwidth of 1-5 % of the emission bandwidth (EBW) and the video bandwidth of $\geq 3 \times \text{RBW}$ were used.
3. Measured the spectrum width with power higher than 6dB account by this measurement.

3.4.4 Test Setup Layout



3.4.5 Test Deviation

There are no deviation with the original standard.

3.4.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



3.4.7 Test Result of Emission Bandwidth

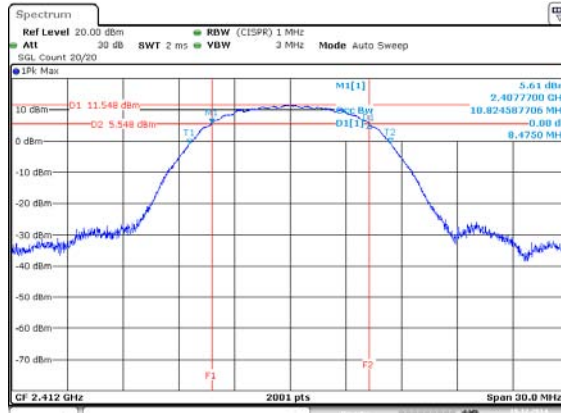
Configuration IEEE 802.11b

<Ant. 2>

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Max. Limit (kHz)	Result
1	2412 MHz	8.47	10.82	500	Complies
6	2437 MHz	8.50	10.92	500	Complies
11	2462 MHz	8.52	11.03	500	Complies

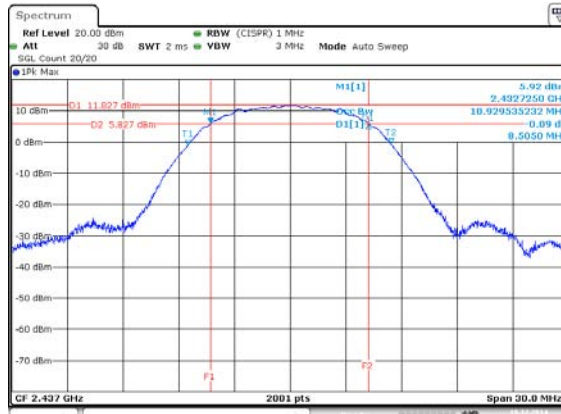


IEEE 802.11b / 2412 MHz / Ant. 2



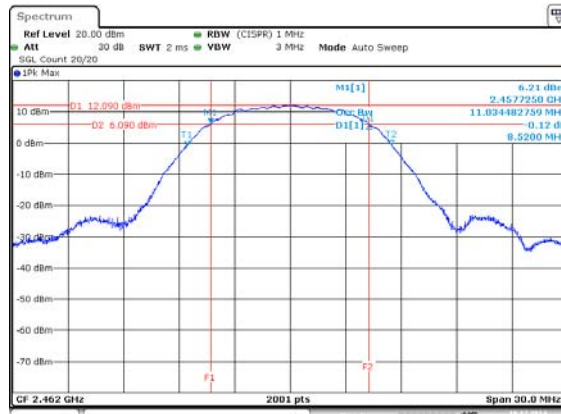
Date: 19.Dec.2014 13:53:38

IEEE 802.11b / 2437 MHz / Ant. 2



Date: 19.Dec.2014 13:55:31

IEEE 802.11b / 2462 MHz / Ant. 2



Date: 19.Dec.2014 13:58:23



Configuration IEEE 802.11g

<Ant. 2>

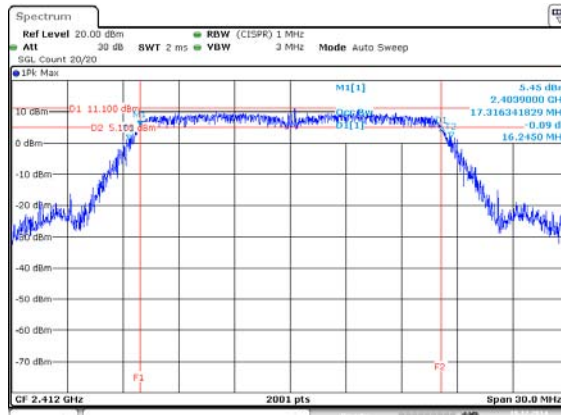
Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Max. Limit (kHz)	Result
1	2412 MHz	16.24	17.31	500	Complies
6	2437 MHz	16.56	18.90	500	Complies
11	2462 MHz	16.56	17.33	500	Complies

< ANT1+2, CDD>

Channel	Frequency	6dB Bandwidth (MHz)		99% Occupied Bandwidth (MHz)		Max. Limit (kHz)	Result
		Ant 1	Ant 2	Ant 1	Ant 2		
1	2412 MHz	16.53	16.51	17.34	17.19	500	Complies
6	2437 MHz	16.53	16.35	18.20	17.91	500	Complies
11	2462 MHz	16.47	16.69	17.43	17.25	500	Complies

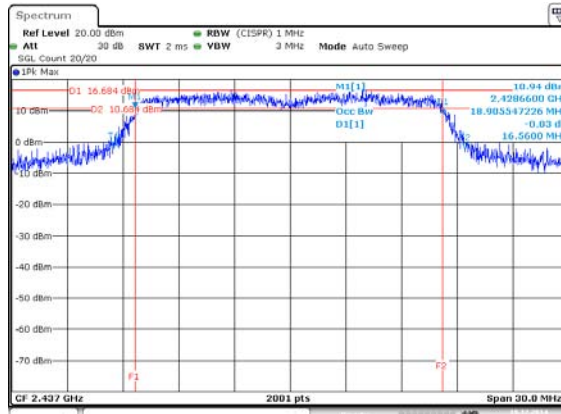


IEEE 802.11g / 2412 MHz / Ant. 2



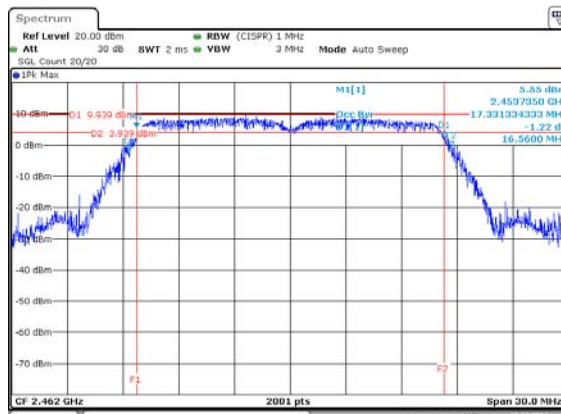
Date: 19.Dec.2014 14:02:17

IEEE 802.11g / 2437 MHz / Ant. 2



Date: 19.Dec.2014 14:04:58

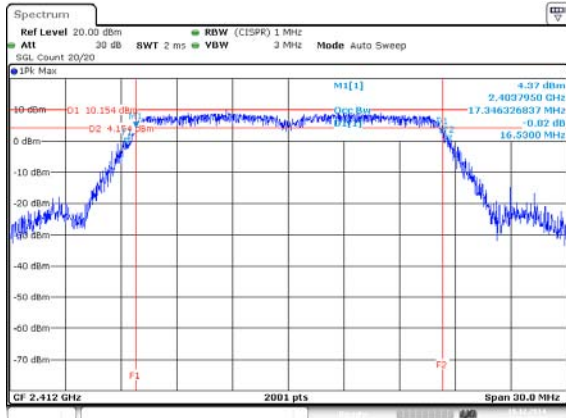
IEEE 802.11g / 2462 MHz / Ant. 2



Date: 19.Dec.2014 14:06:53

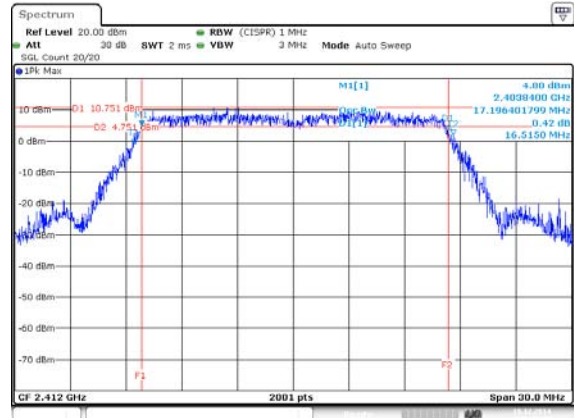
IEEE 802.11g / 2412 MHz / Ant. 1+2

IEEE 802.11g / 2412 MHz / Ant. 1



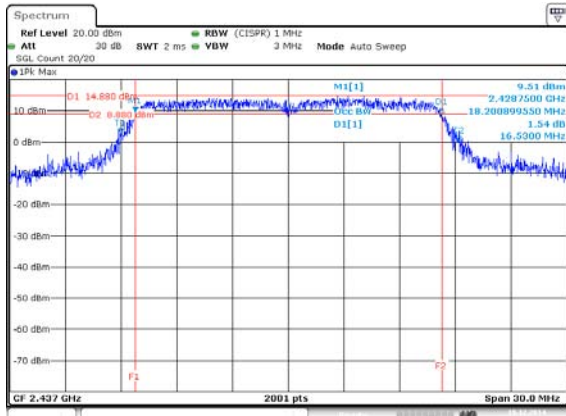
Date: 19. DEC. 2014 15:33:19

IEEE 802.11g / 2412 MHz / Ant. 2



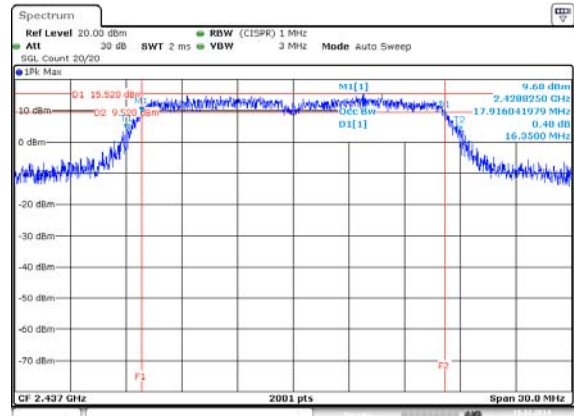
Date: 19. DEC. 2014 15:33:26

IEEE 802.11g / 2412 MHz / Ant. 1



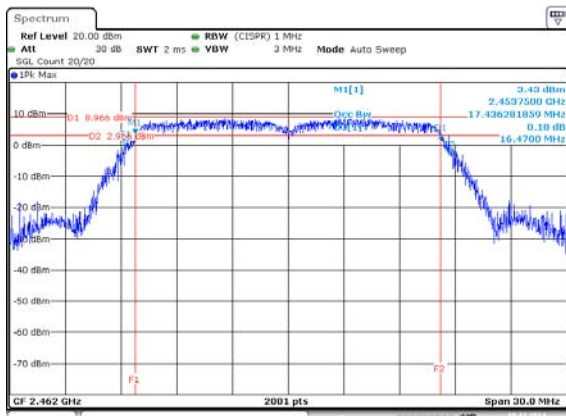
Date: 19. DEC. 2014 15:35:58

IEEE 802.11g / 2412 MHz / Ant. 2



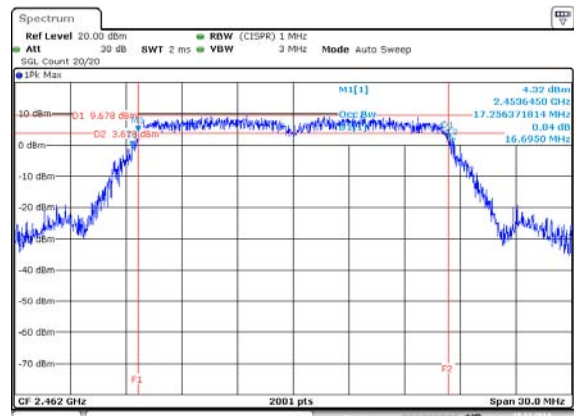
Date: 19. DEC. 2014 15:36:04

IEEE 802.11g / 2412 MHz / Ant. 1



Date: 19. DEC. 2014 15:38:50

IEEE 802.11g / 2412 MHz / Ant. 2



Date: 19. DEC. 2014 15:38:56



Configuration IEEE 802.11n 20MHz

<MCS0, Ant. 2>

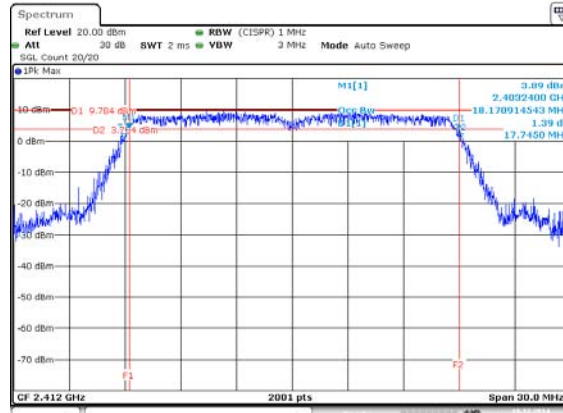
Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Max. Limit (kHz)	Result
1	2412 MHz	17.74	18.17	500	Complies
6	2437 MHz	17.74	19.02	500	Complies
11	2462 MHz	17.71	18.17	500	Complies

<MCS 0, ANT1+2, CDD>

Channel	Frequency	6dB Bandwidth (MHz)		99% Occupied Bandwidth (MHz)		Max. Limit (kHz)	Result
		Ant 1	Ant 2	Ant 1	Ant 2		
1	2412 MHz	17.58	17.97	18.14	18.09	500	Complies
6	2437 MHz	18.00	17.50	19.68	18.81	500	Complies
11	2462 MHz	17.85	17.76	18.11	18.09	500	Complies

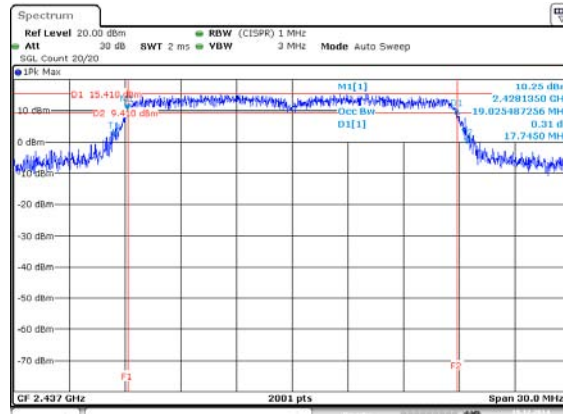


IEEE 802.11n 20MHz / 2412 MHz / MCS0, Ant. 2



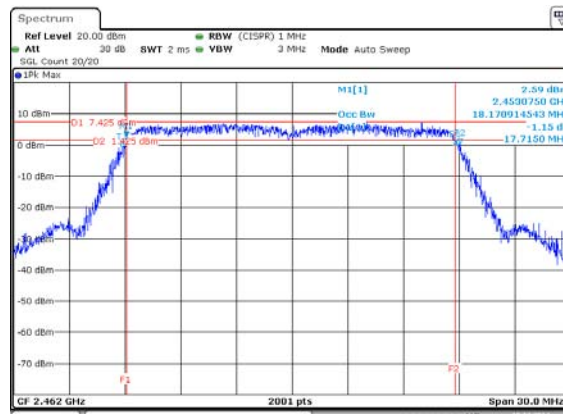
Date: 19.Dec.2014 14:28:17

IEEE 802.11n 20MHz / 2437 MHz / MCS0, Ant. 2



Date: 19.Dec.2014 14:30:59

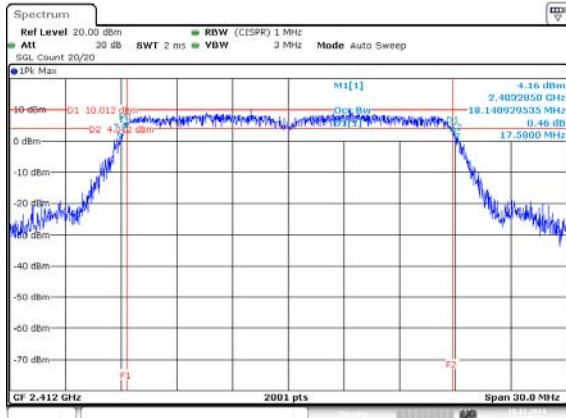
IEEE 802.11n 20MHz / 2462 MHz / MCS0, Ant. 2



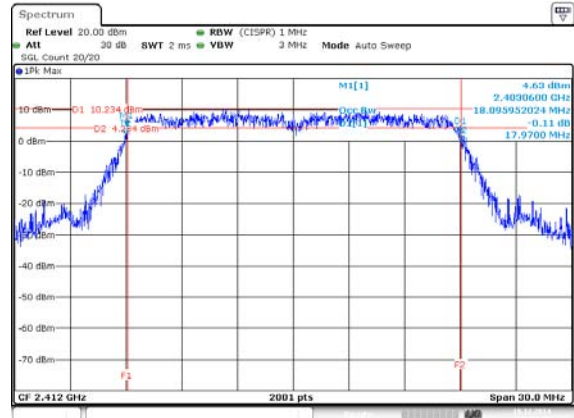
Date: 19.Dec.2014 14:32:37

IEEE 802.11n 20MHz / 2412 MHz / MCS0, Ant. 1+2

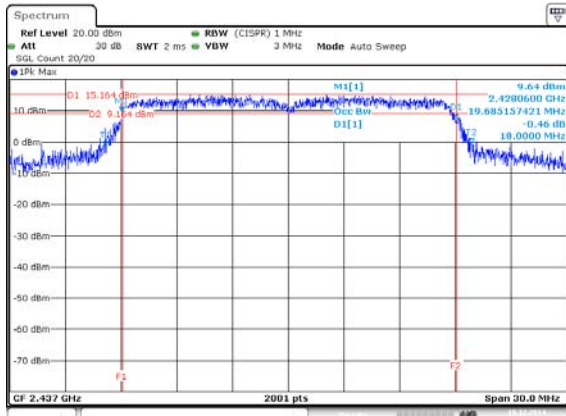
IEEE 802.11n 20MHz / 2412 MHz / MCS0, Ant. 1



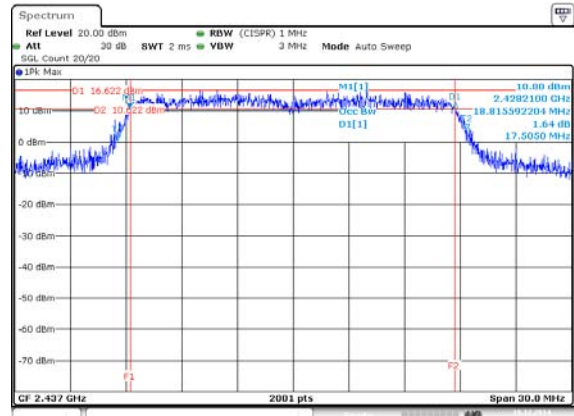
IEEE 802.11n 20MHz / 2412 MHz / MCS0, Ant. 2



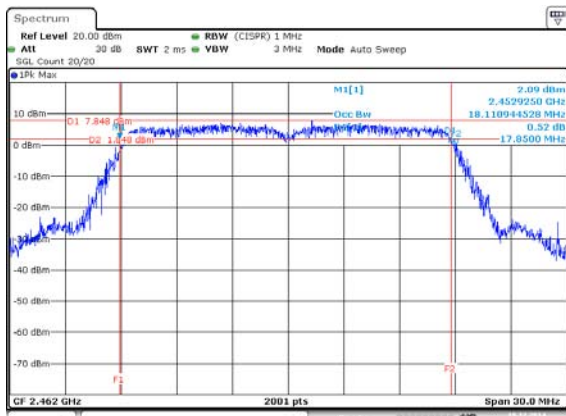
IEEE 802.11n 20MHz / 2437 MHz / MCS0, Ant. 1



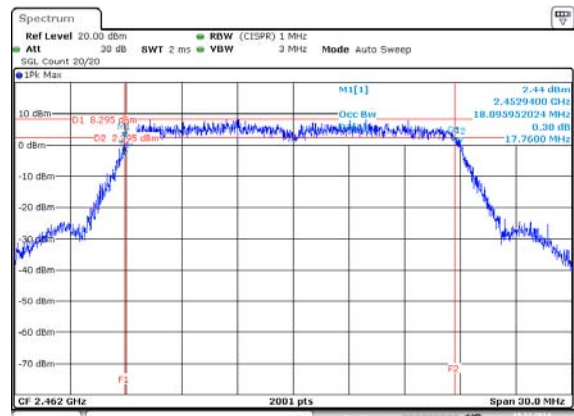
IEEE 802.11n 20MHz / 2437 MHz / MCS0, Ant. 2



IEEE 802.11n 20MHz / 2462 MHz / MCS0, Ant. 1



IEEE 802.11n 20MHz / 2462 MHz / MCS0, Ant. 2





Configuration IEEE 802.11n 40MHz

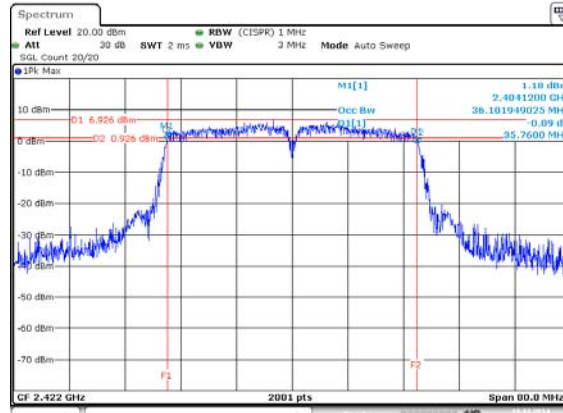
<MCS0, Ant. 2>

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Max. Limit (kHz)	Result
3	2422 MHz	35.76	36.10	500	Complies
6	2437 MHz	36.12	36.18	500	Complies
9	2452 MHz	35.88	36.06	500	Complies

<MCS 0, ANT1+2, CDD>

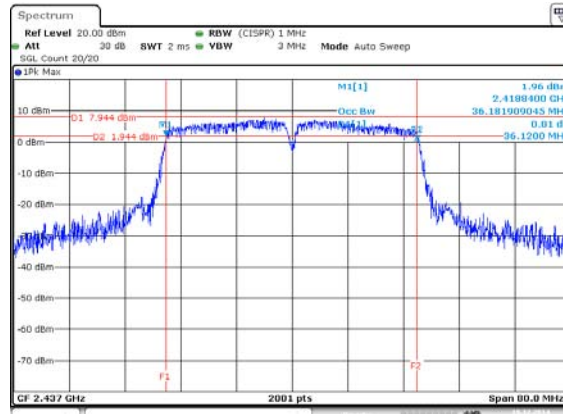
Channel	Frequency	6dB Bandwidth (MHz)		99% Occupied Bandwidth (MHz)		Max. Limit (kHz)	Result
		Ant 1	Ant 2	Ant 1	Ant 2		
3	2422 MHz	35.68	35.56	36.06	36.10	500	Complies
6	2437 MHz	36.04	35.76	36.10	36.14	500	Complies
9	2452 MHz	36.04	35.44	36.06	36.02	500	Complies

IEEE 802.11n 40MHz / 2422 MHz / MCS0, Ant. 2



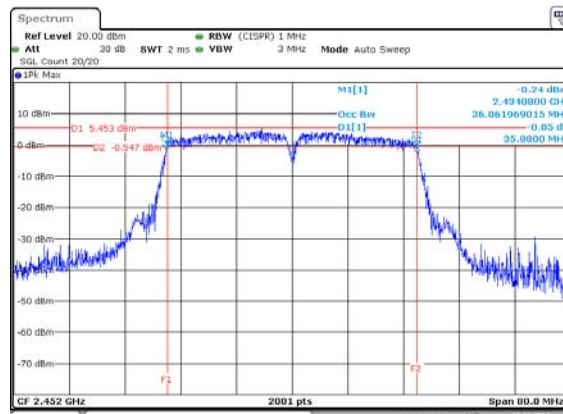
Date: 19, Dec. 2014 15:13:32

IEEE 802.11n 40MHz / 2437 MHz / MCS0, Ant. 2



Date: 19, Dec. 2014 15:16:45

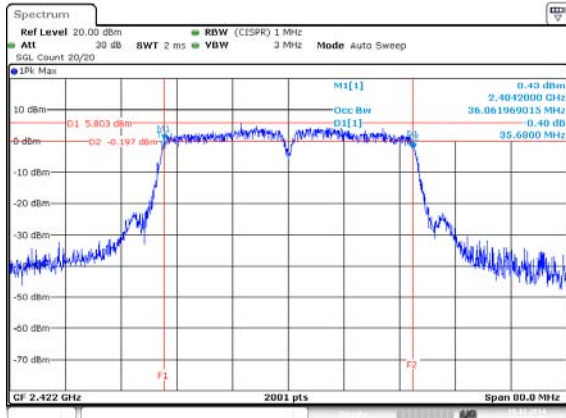
IEEE 802.11n 40MHz / 2452 MHz / MCS0, Ant. 2



Date: 19, Dec. 2014 15:18:53

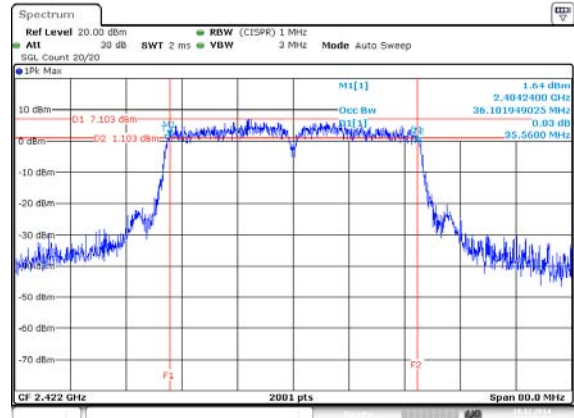
IEEE 802.11n 40MHz / 2422 MHz / MCS0, Ant. 1+2

IEEE 802.11n 40MHz / 2422 MHz / MCS0, Ant. 1



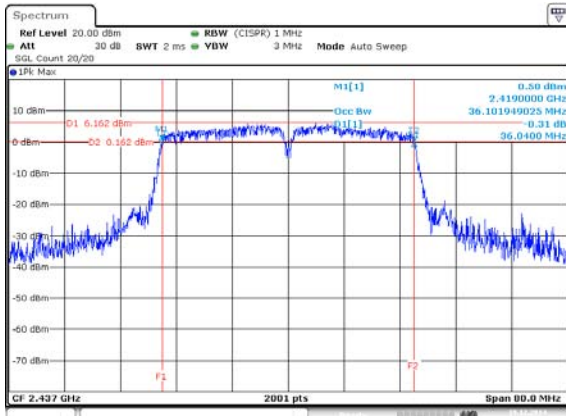
Date: 19. DEC. 2014 16:26:47

IEEE 802.11n 40MHz / 2422 MHz / MCS0, Ant. 2



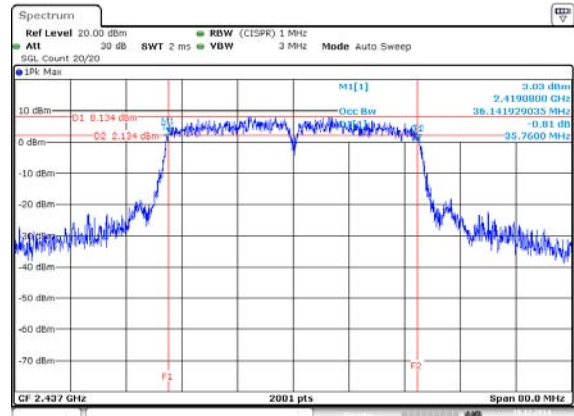
Date: 19. DEC. 2014 16:26:53

IEEE 802.11n 40MHz / 2437 MHz / MCS0, Ant. 1



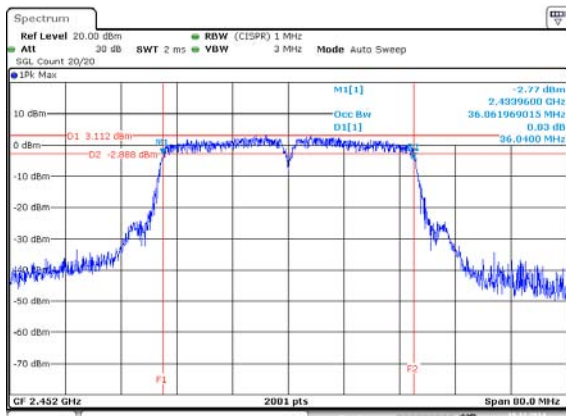
Date: 19. DEC. 2014 16:29:49

IEEE 802.11n 40MHz / 2437 MHz / MCS0, Ant. 2



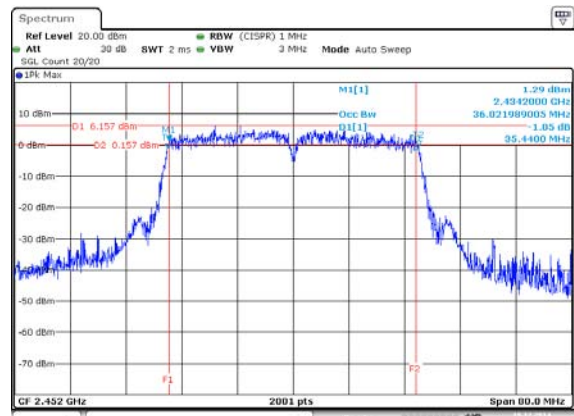
Date: 19. DEC. 2014 16:29:55

IEEE 802.11n 40MHz / 2452 MHz / MCS0, Ant. 1



Date: 19. DEC. 2014 16:33:13

IEEE 802.11n 40MHz / 2452 MHz / MCS0, Ant. 2



Date: 19. DEC. 2014 16:33:20

3.5 Radiated Emissions Measurement

3.5.1 Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed..

Frequency Range (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

3.5.2 Measuring Instruments and Setting

The following table is the setting of spectrum analyzer and receiver.

Spectrum Analyzer	Setting
Attenuation	Auto
Start Frequency	1GHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	100kHz / 300kHz for peak

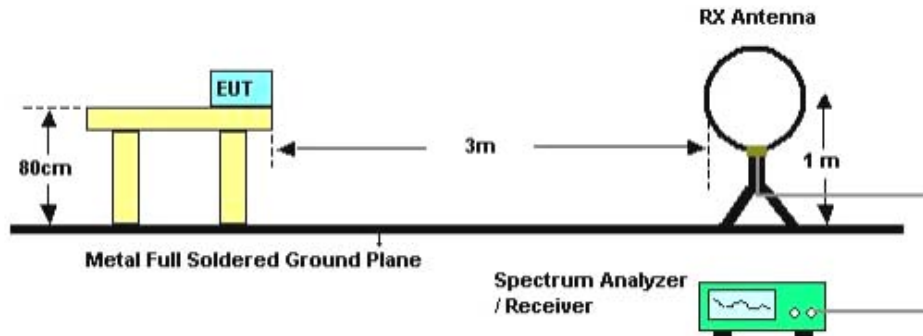
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1GHz / RB 120kHz for QP

3.5.3 Test Procedures

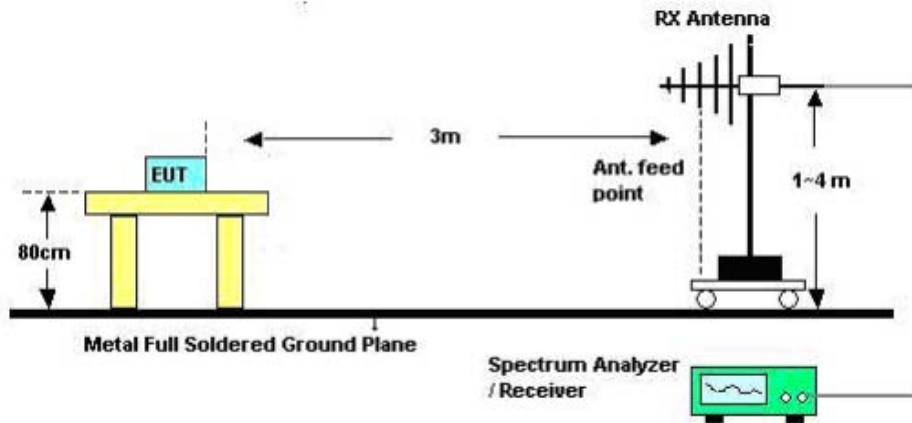
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 m to 4 m) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

3.5.4 Test Setup Layout

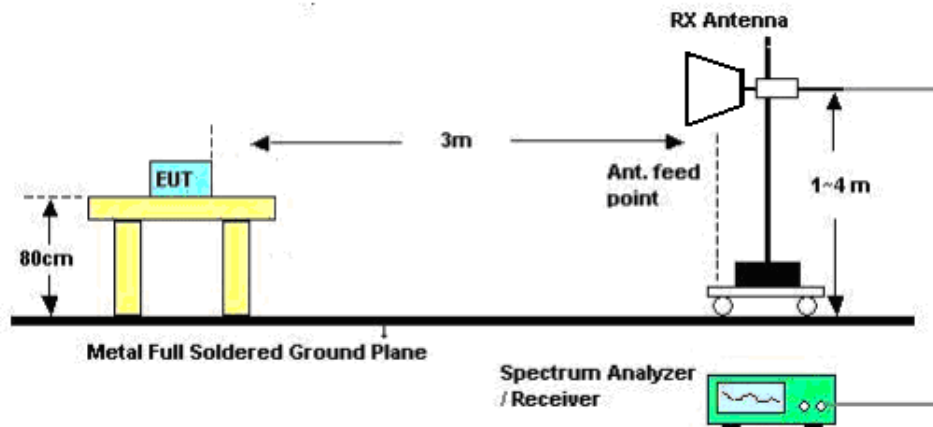
For Radiated Emissions below 1GHz (9kHz~30MHz)



For Radiated Emissions below 1GHz (30MHz~1GHz)



For Radiated Emissions above 1GHz



3.5.5 Test Deviation

There are no deviations with the original standard.

3.5.6 EUT Operation during Test

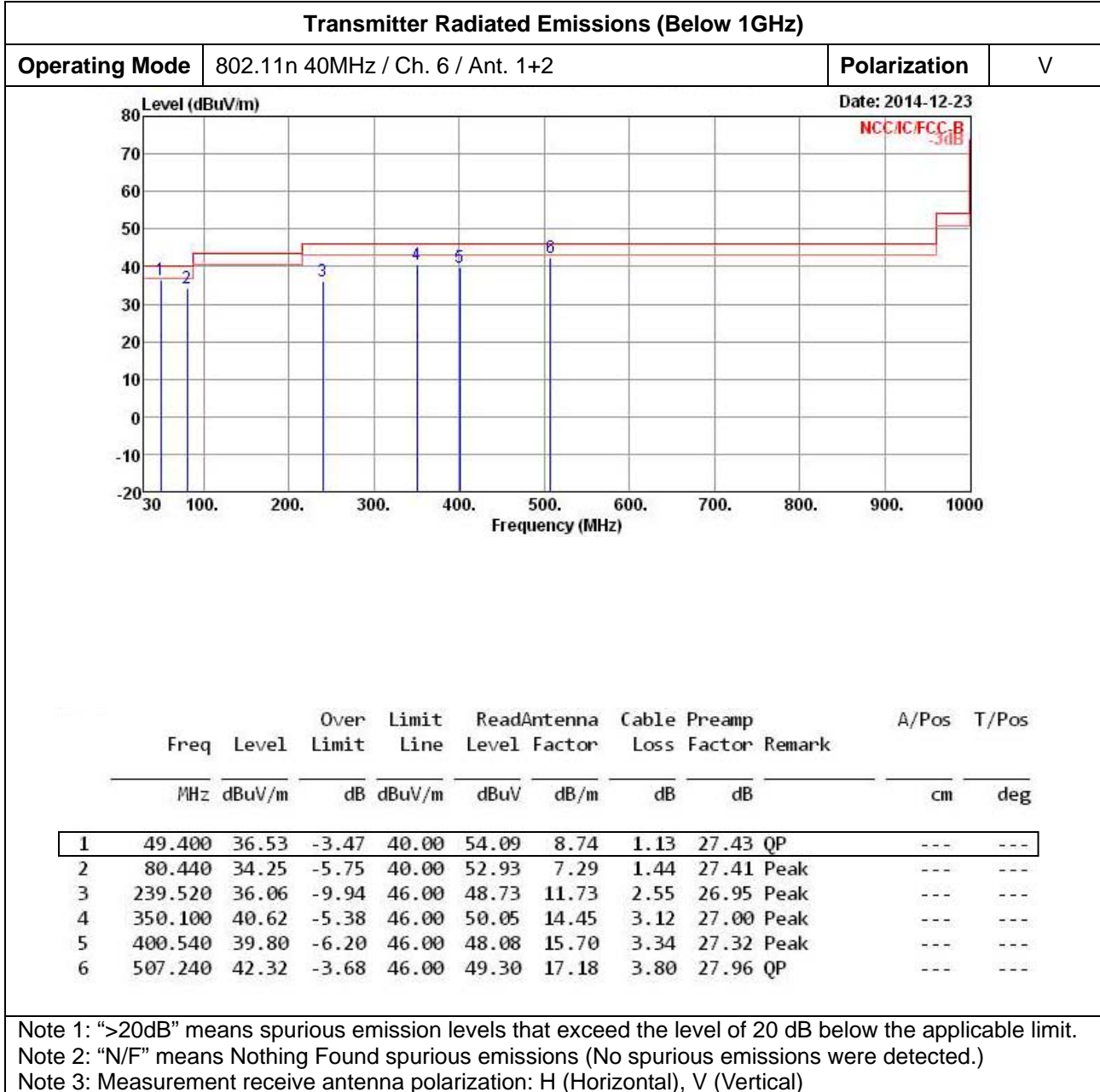
The EUT was programmed to be in continuously transmitting mode.

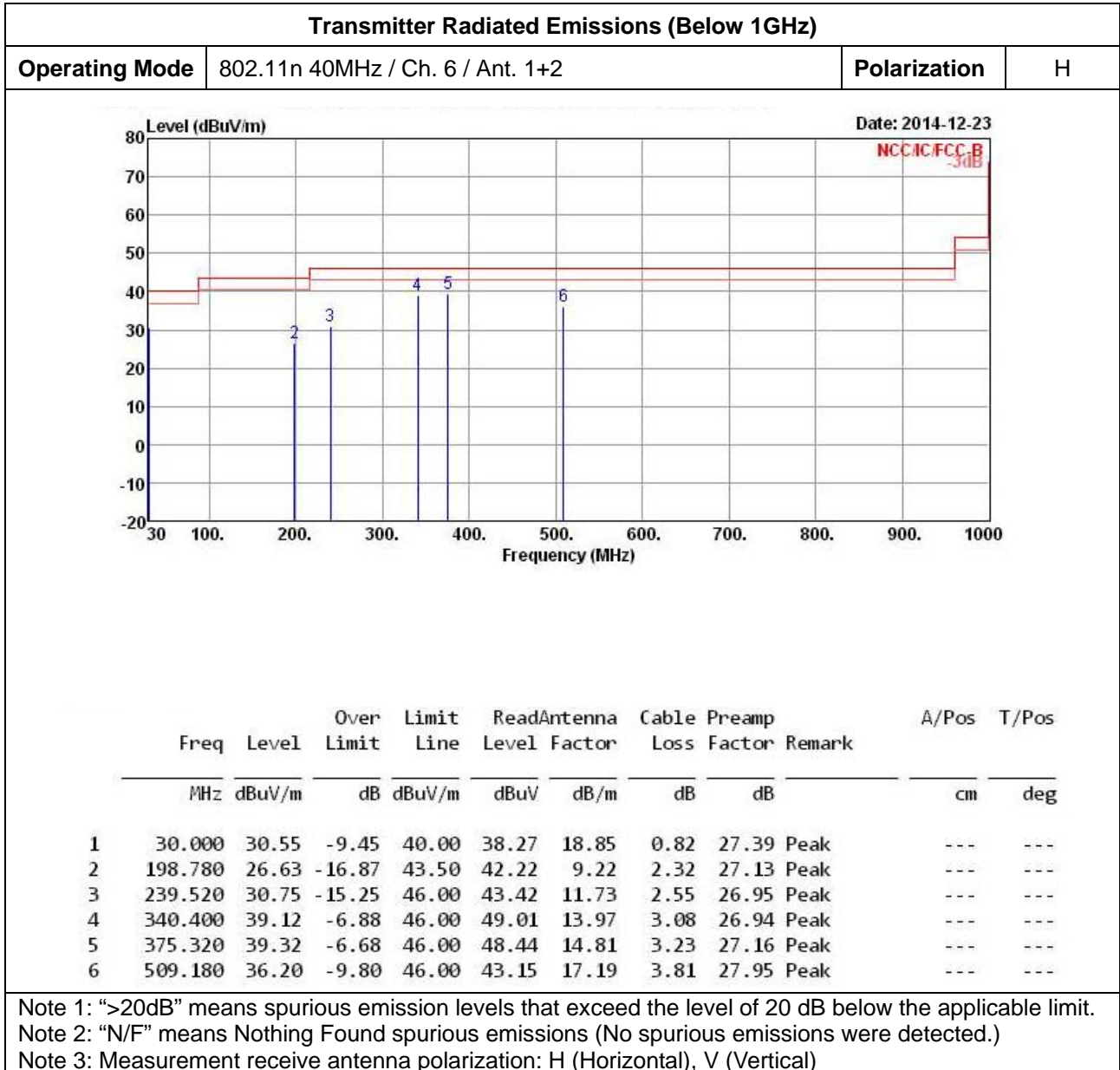


3.5.7 Transmitter Radiated Unwanted Emissions (Below 30MHz)

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.5.8 Results of Radiated Emissions (30MHz~1GHz)



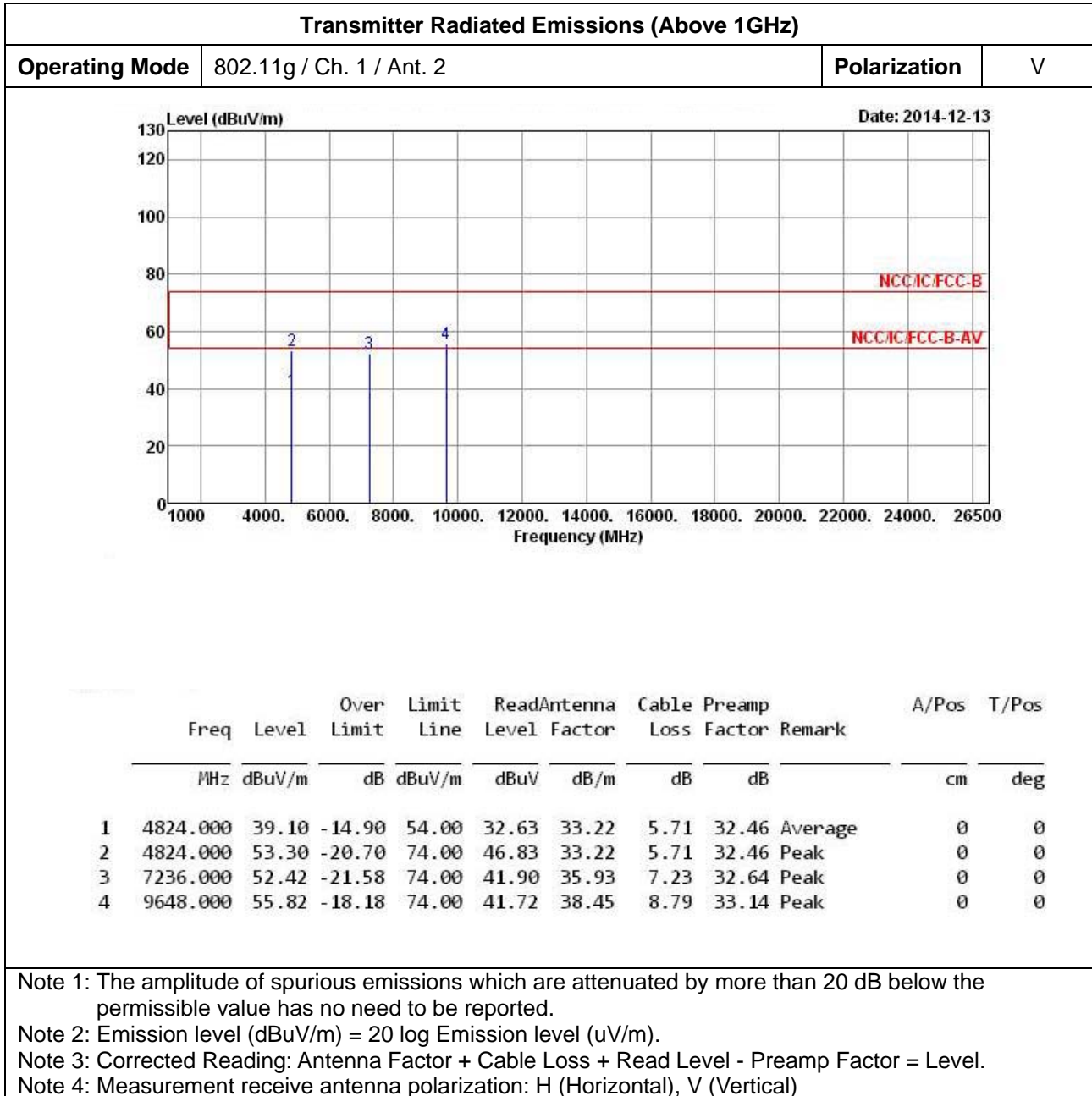


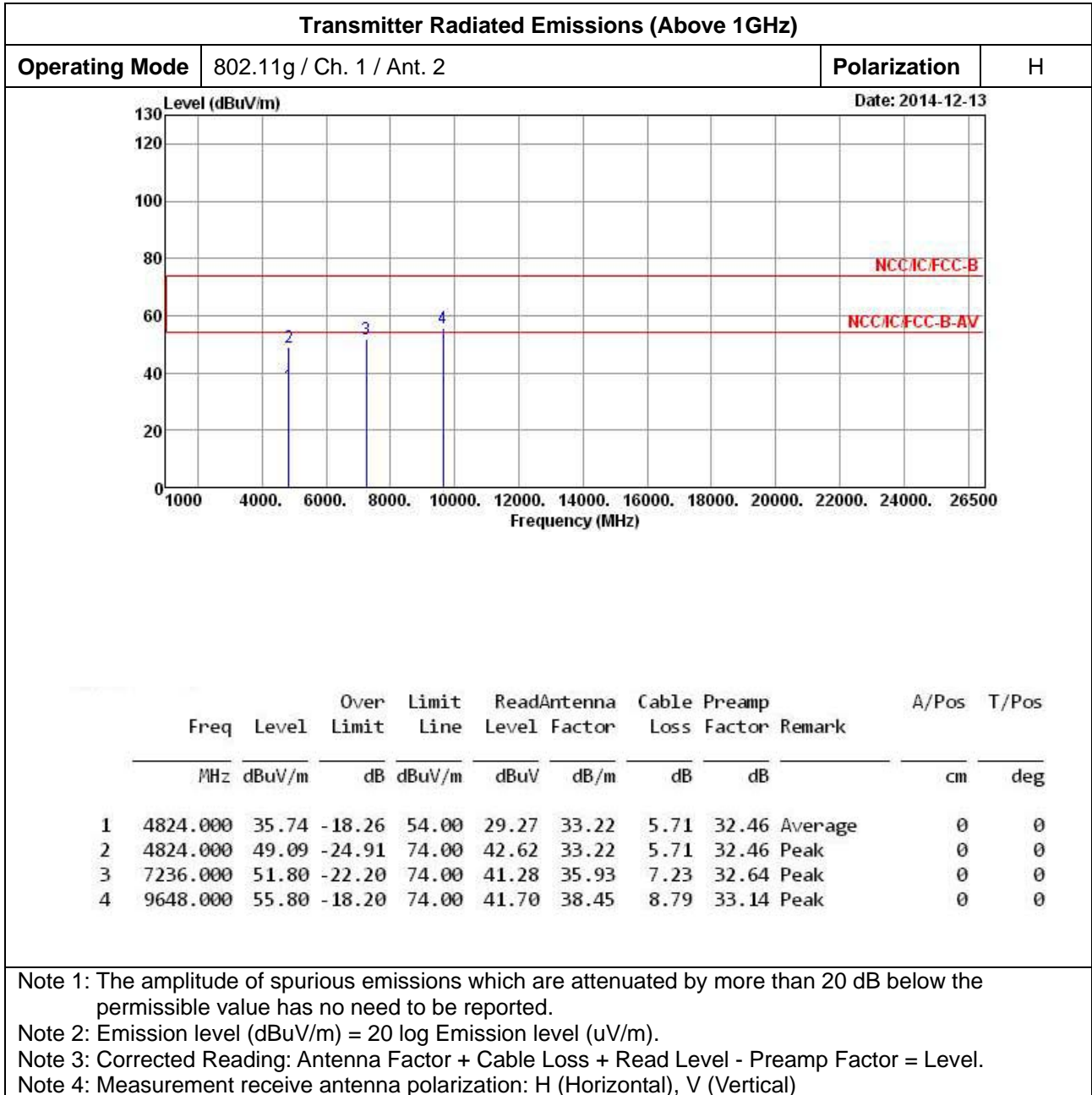


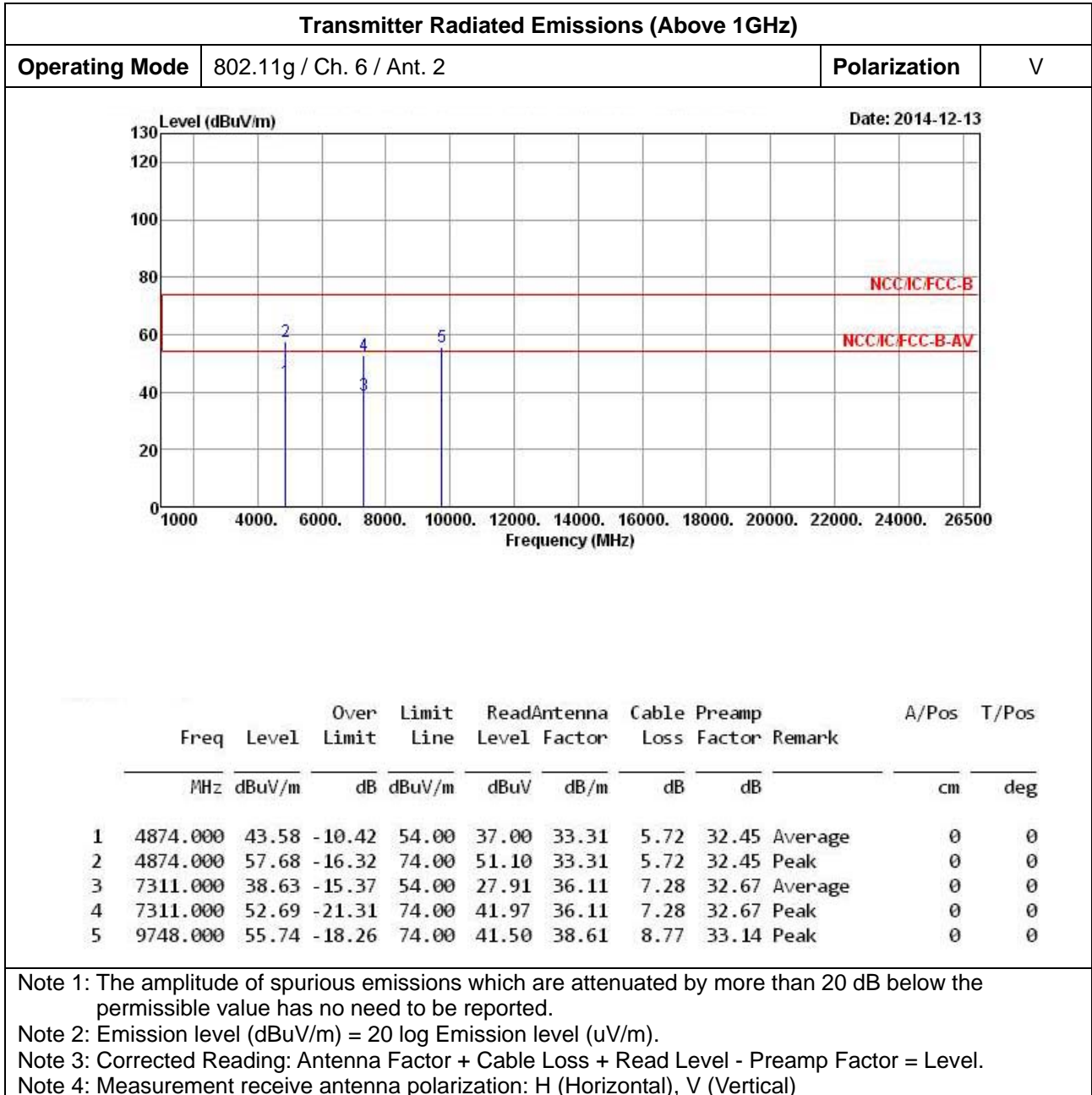
3.5.9 Results for Emission in Restricted Band (1GHz~10th Harmonic)

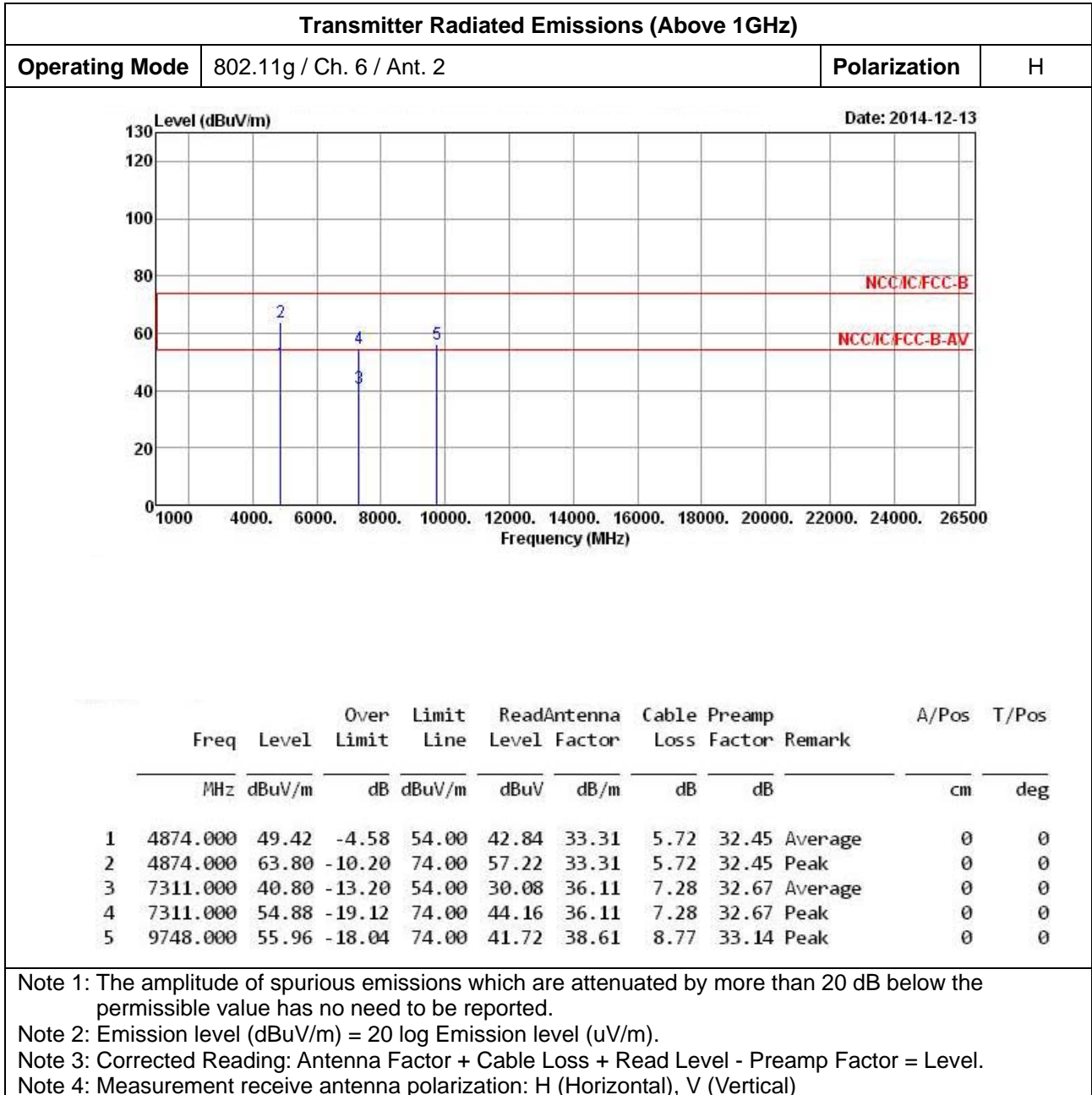
Following channel(s) was (were) selected for the final test as listed below.

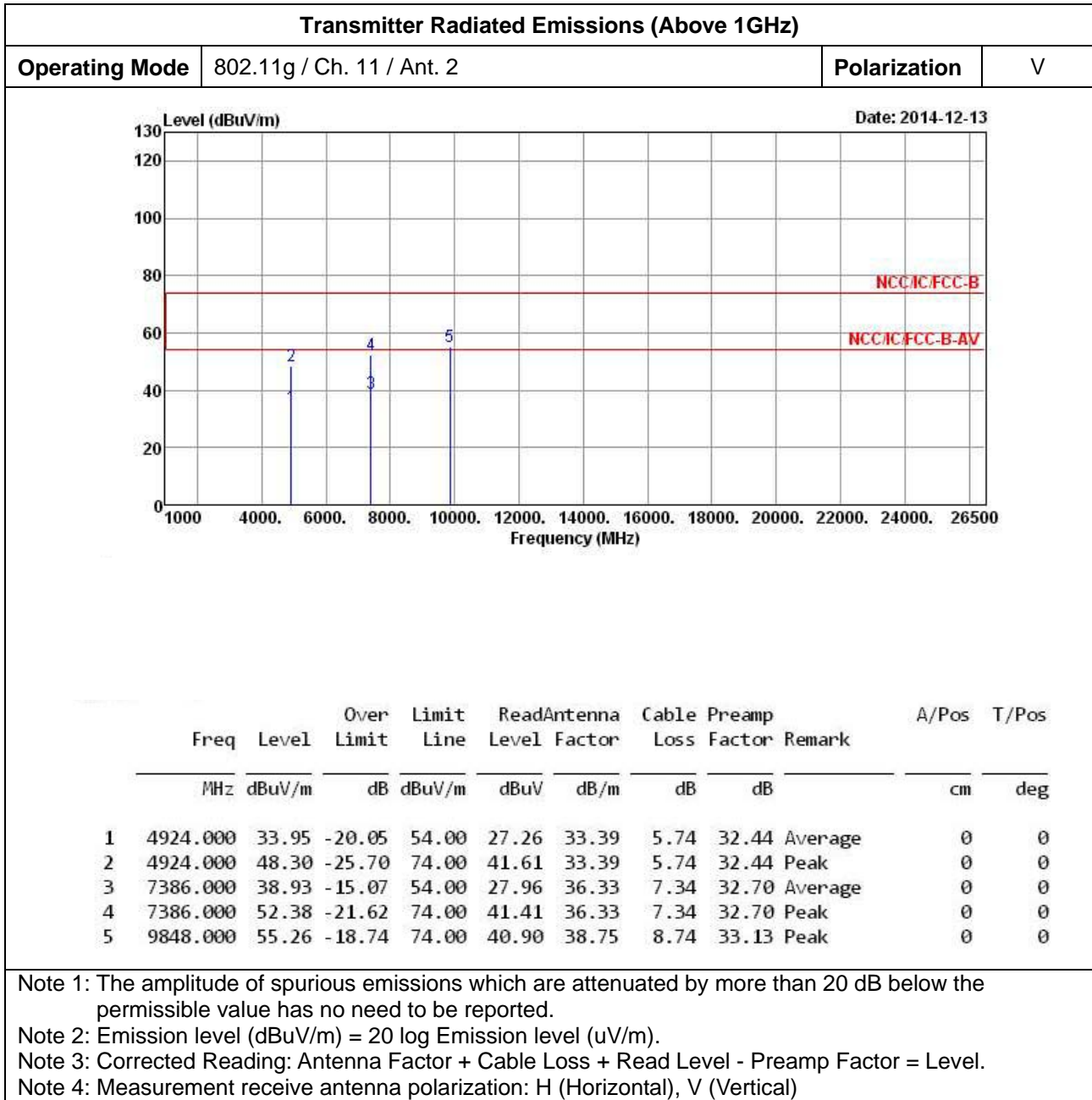
MODE	TX Chain	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	Ant.2	1, 6, 11	DSSS	DBPSK	1
802.11b	Ant.1+2(CDD)	1, 6, 11	DSSS	DBPSK	1
802.11g	Ant.2	1, 6, 11	OFDM	BPSK	6
802.11g	Ant.1+2(CDD)	1, 6, 11	OFDM	BPSK	6
802.11n 20MHz	Ant.2	1, 6, 11	OFDM	BPSK	MCS0 (6.5)
802.11n 20MHz	Ant.1+2(CDD)	1, 6, 11	OFDM	BPSK	MCS0 (6.5)
802.11n 40MHz	Ant.2	3, 6, 9	OFDM	BPSK	MCS0 (13)
802.11n 40MHz	Ant.1+2(CDD)	3, 6, 9	OFDM	BPSK	MCS0 (13)

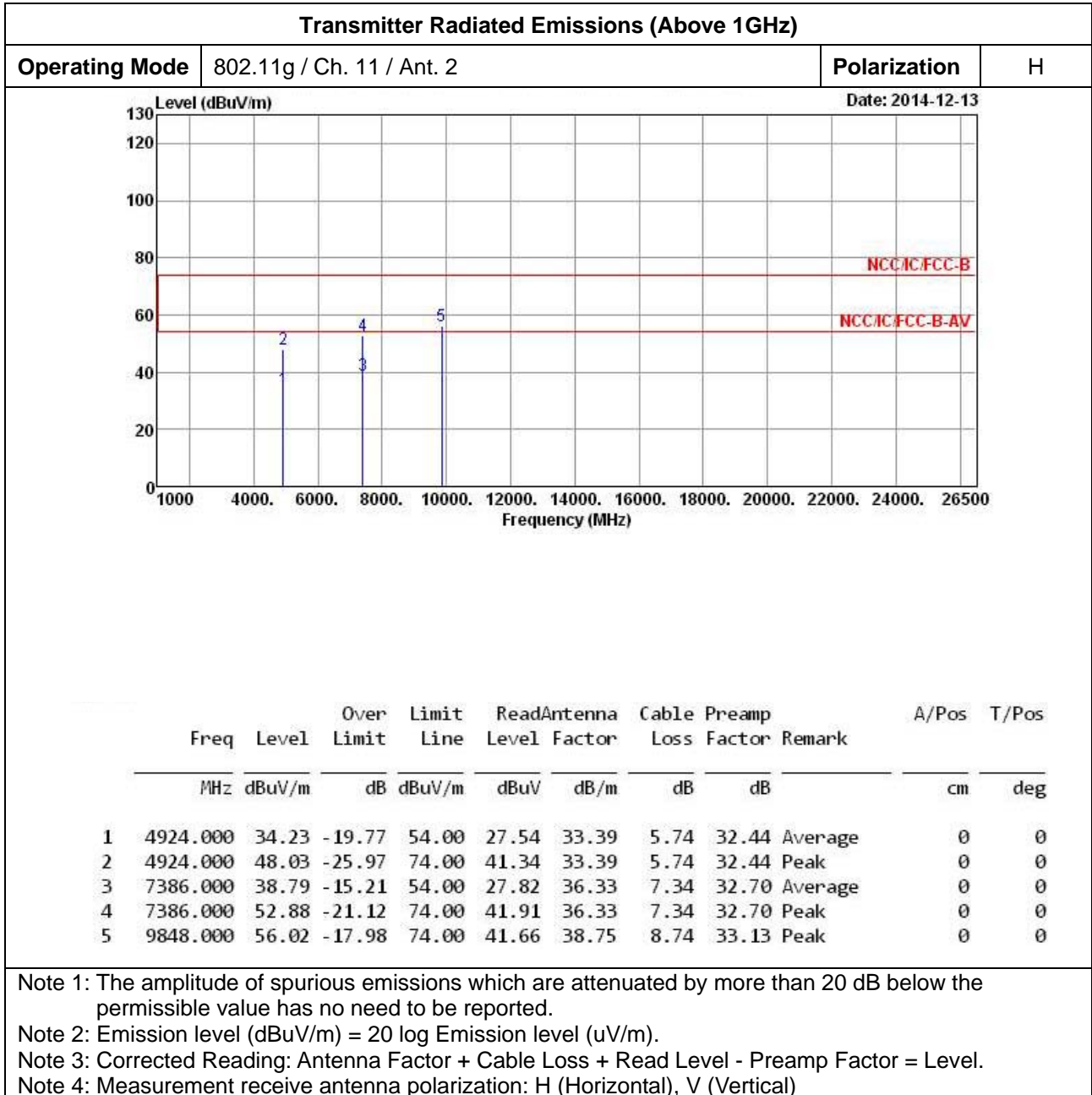


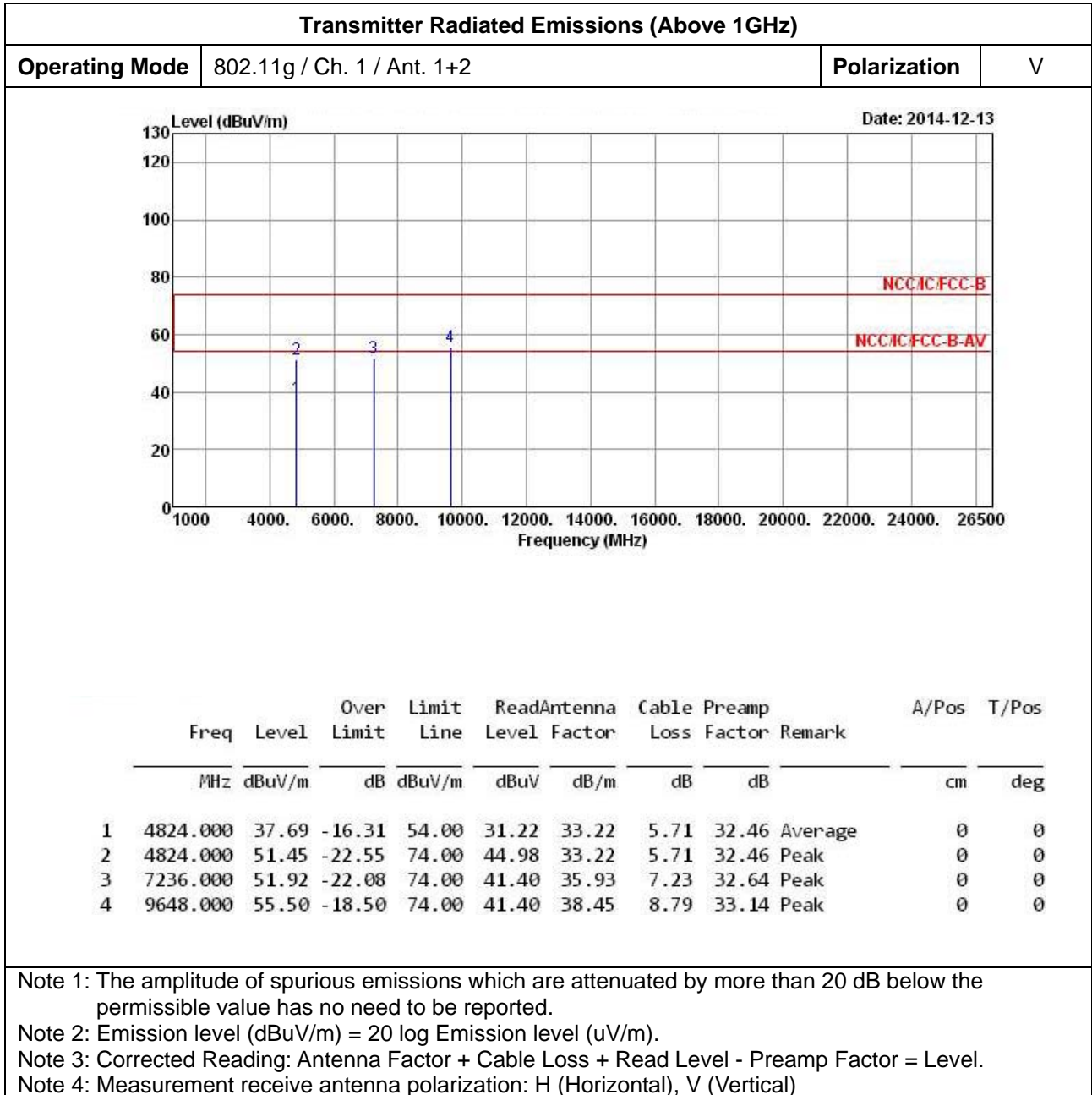


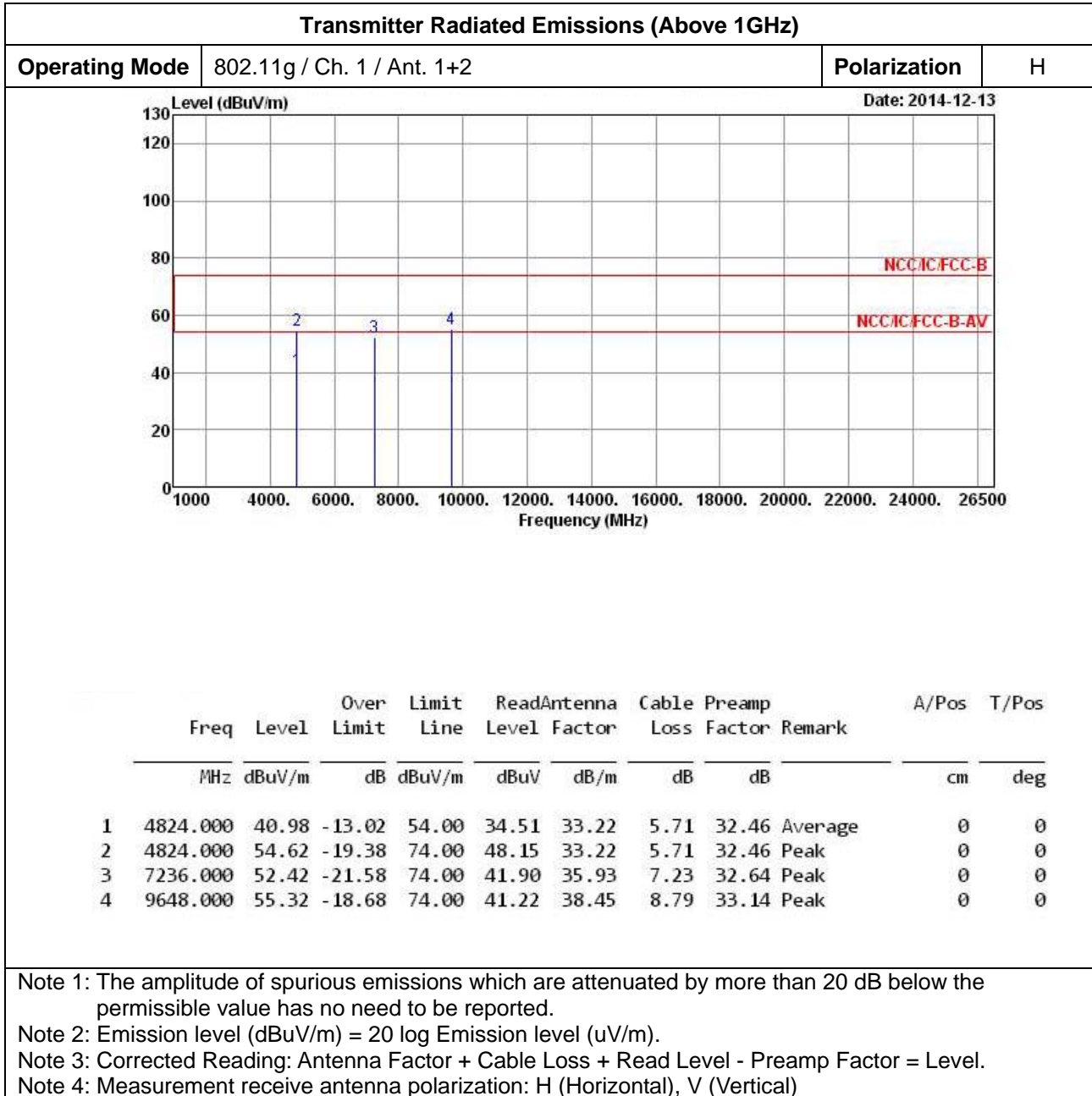


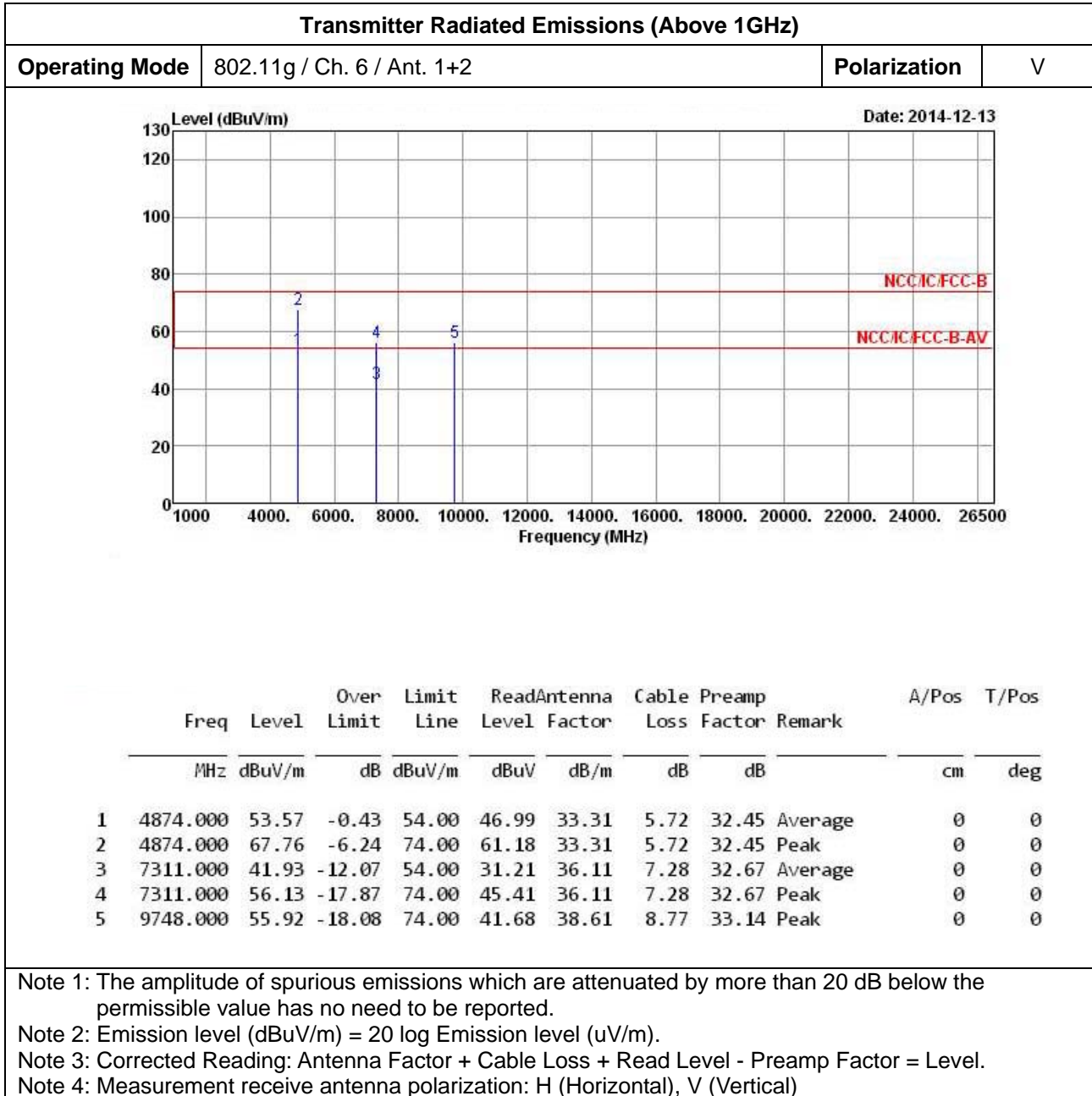


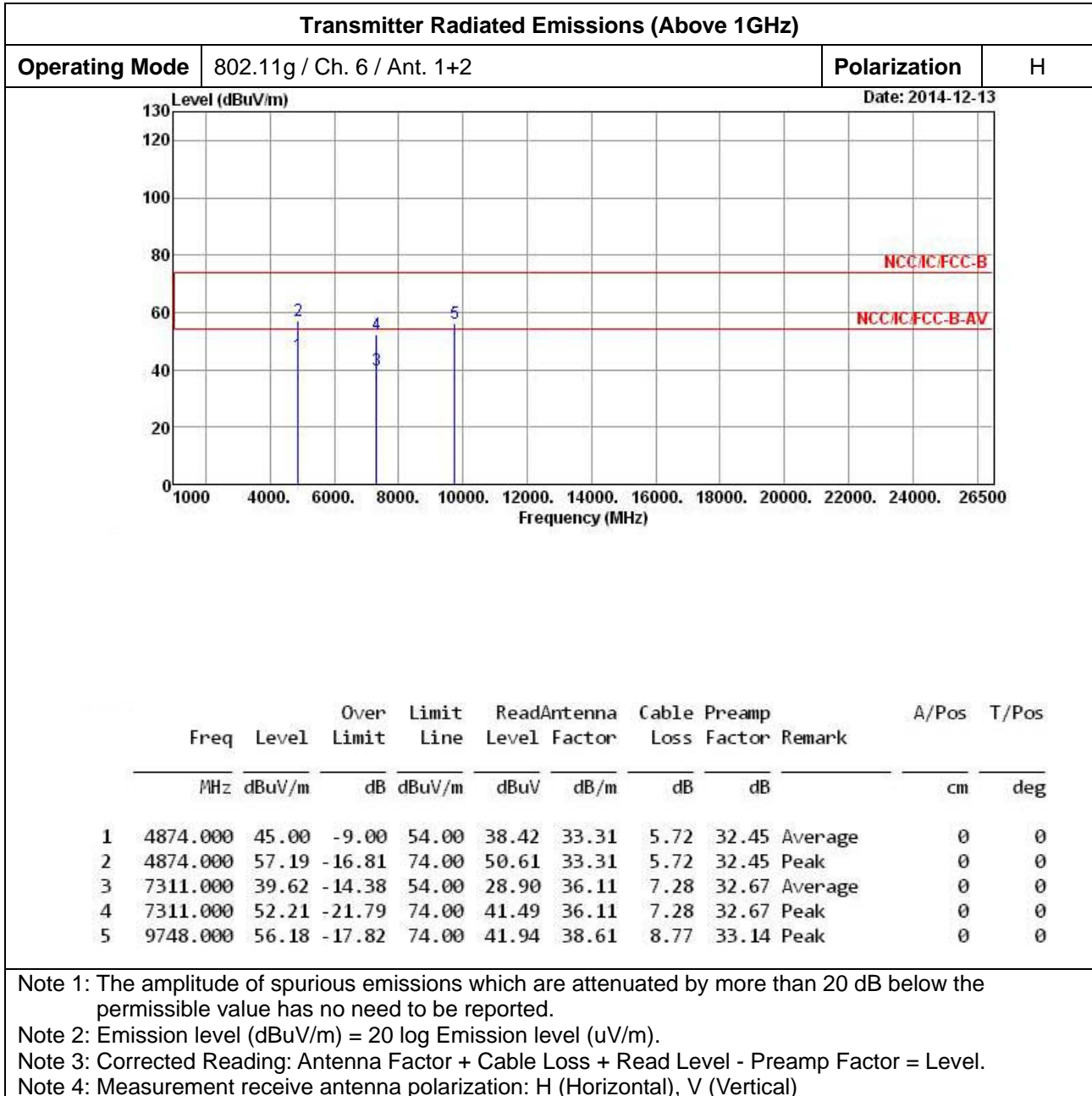


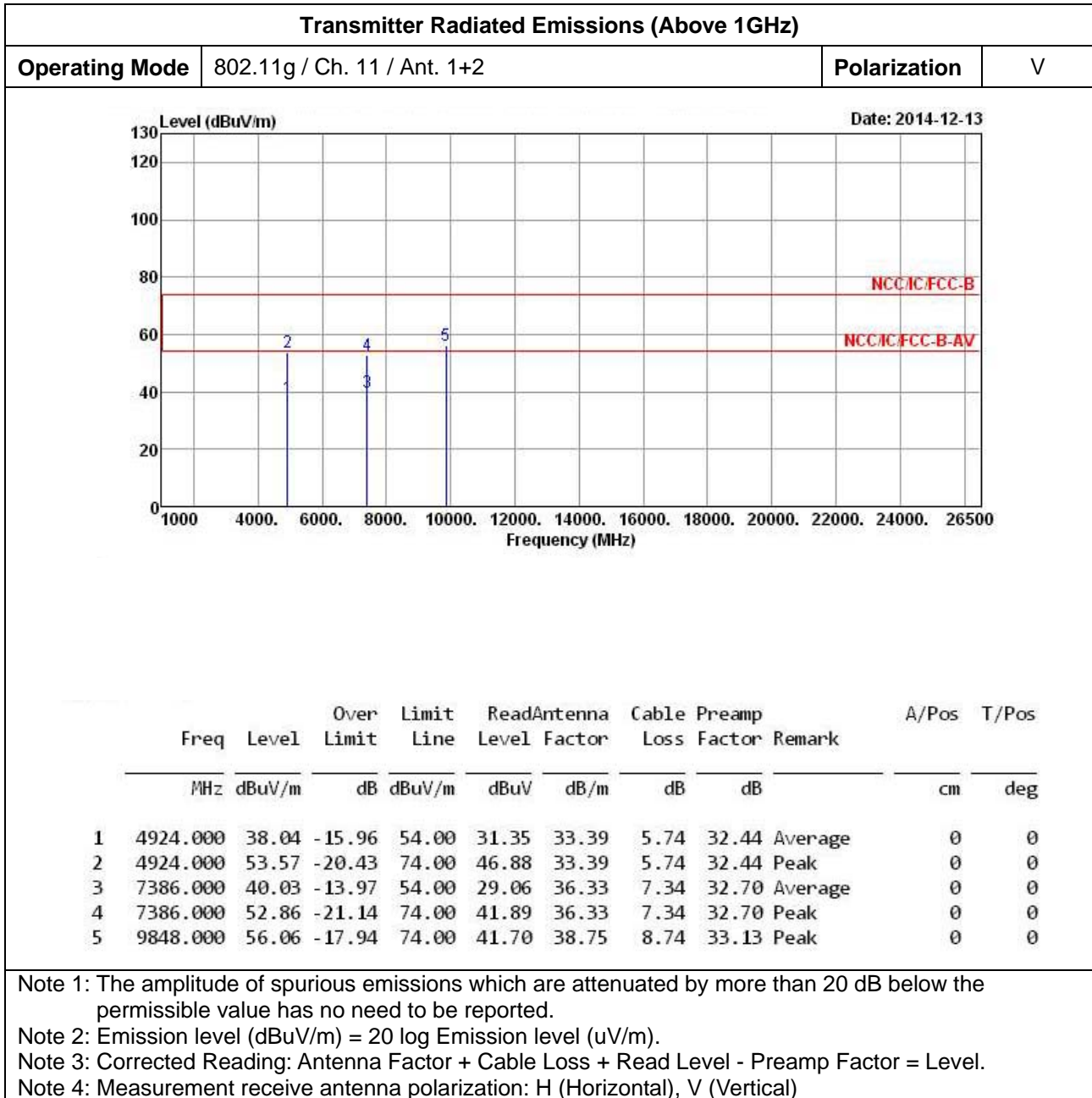


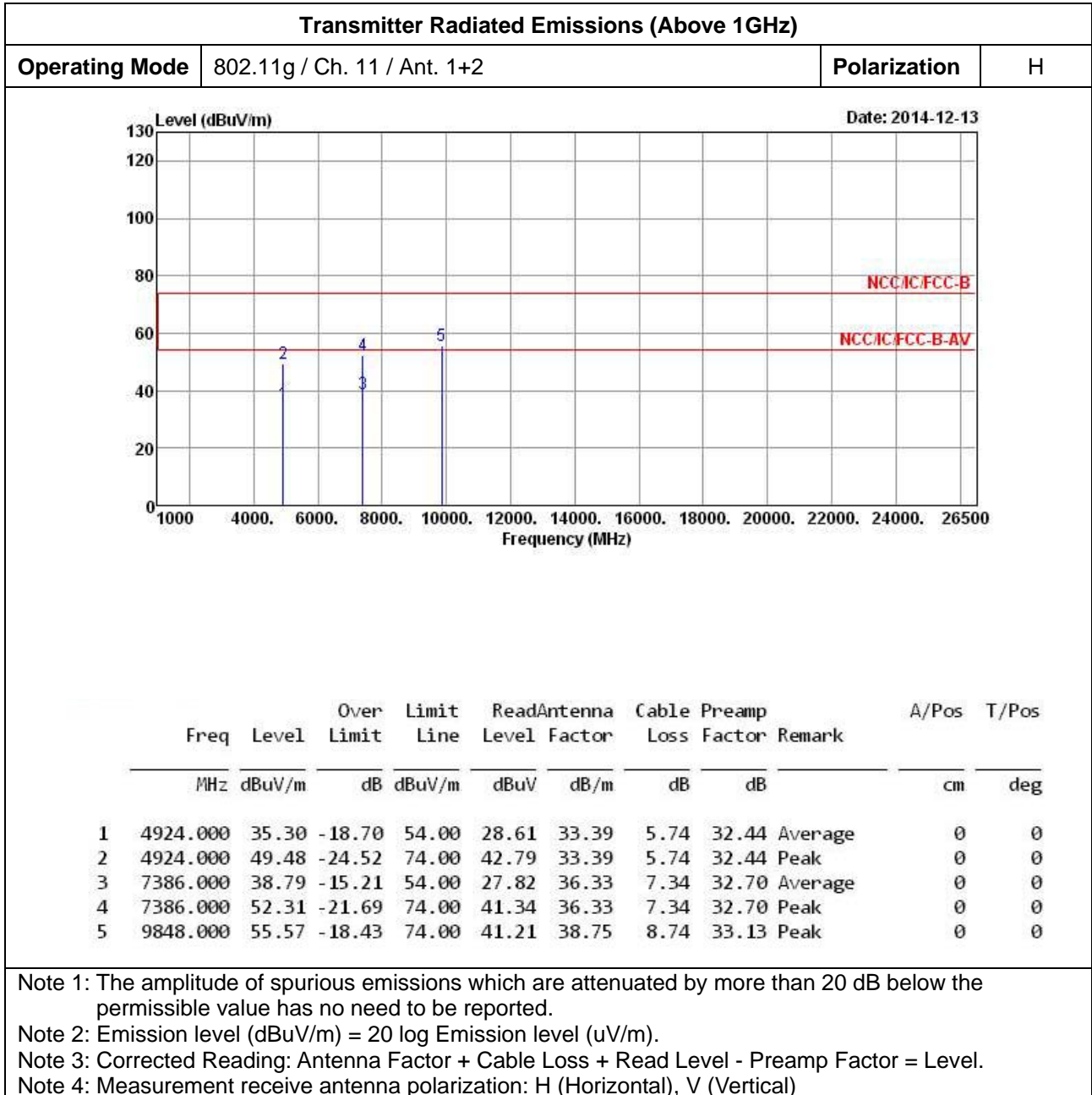


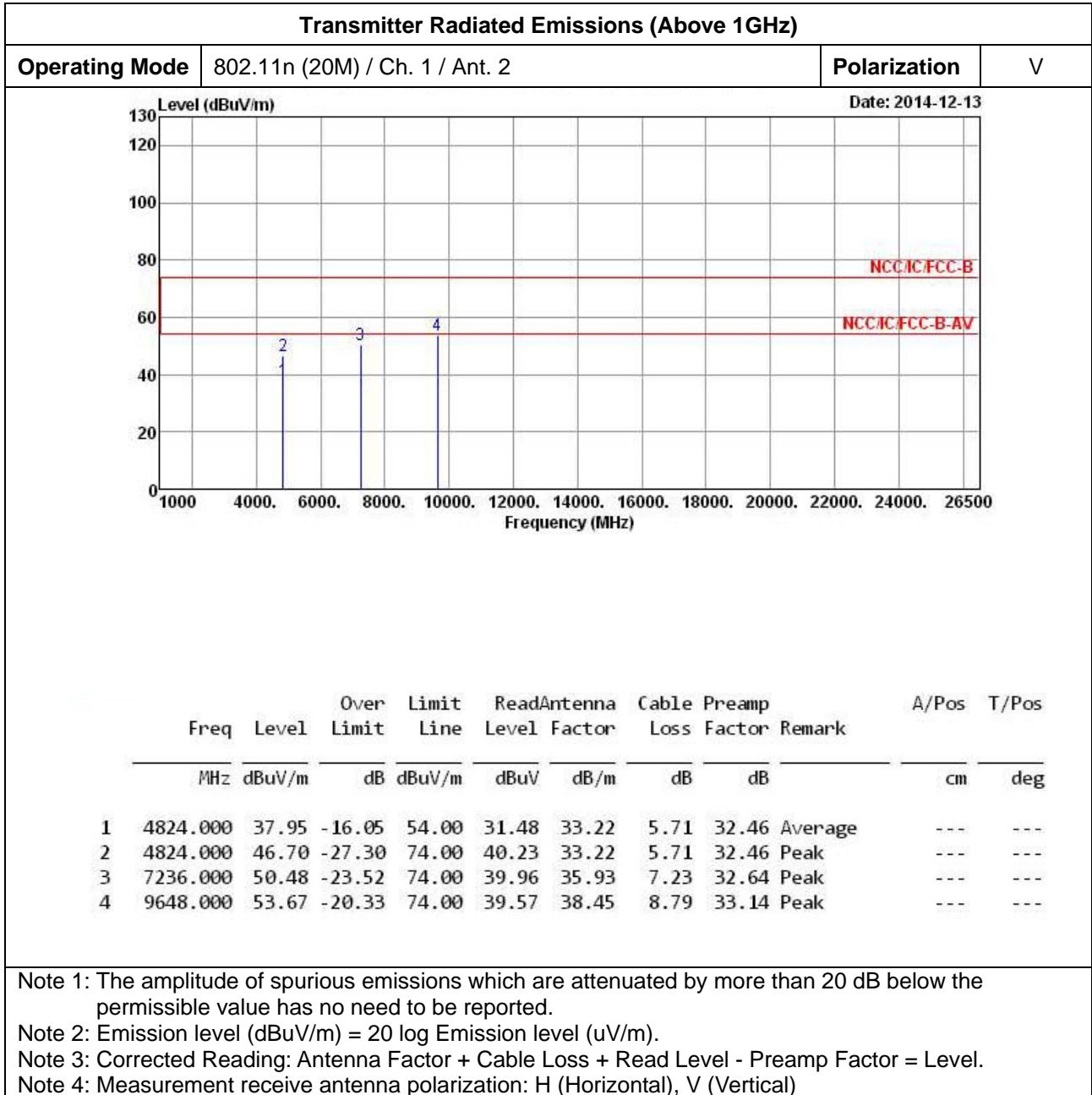


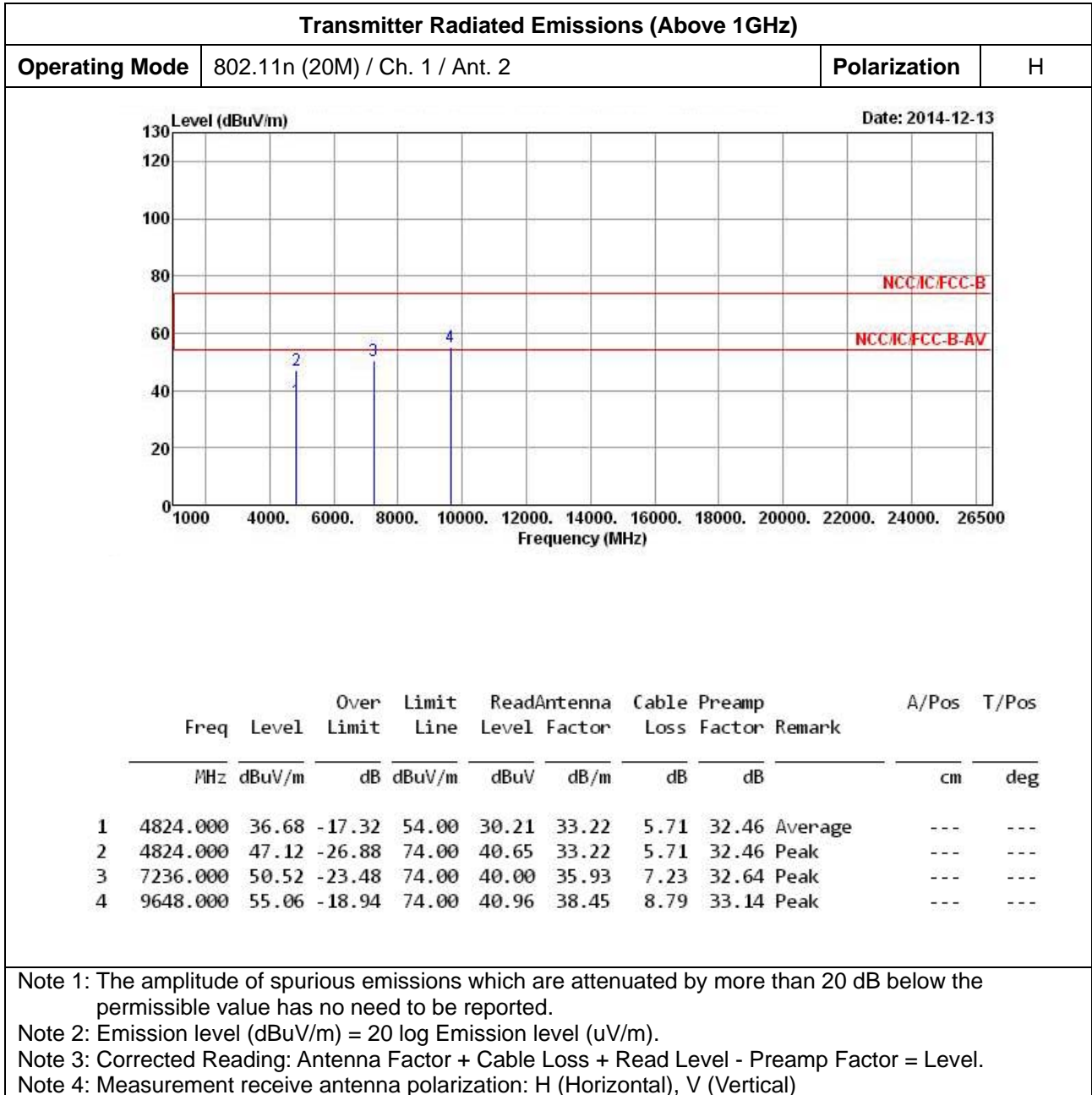


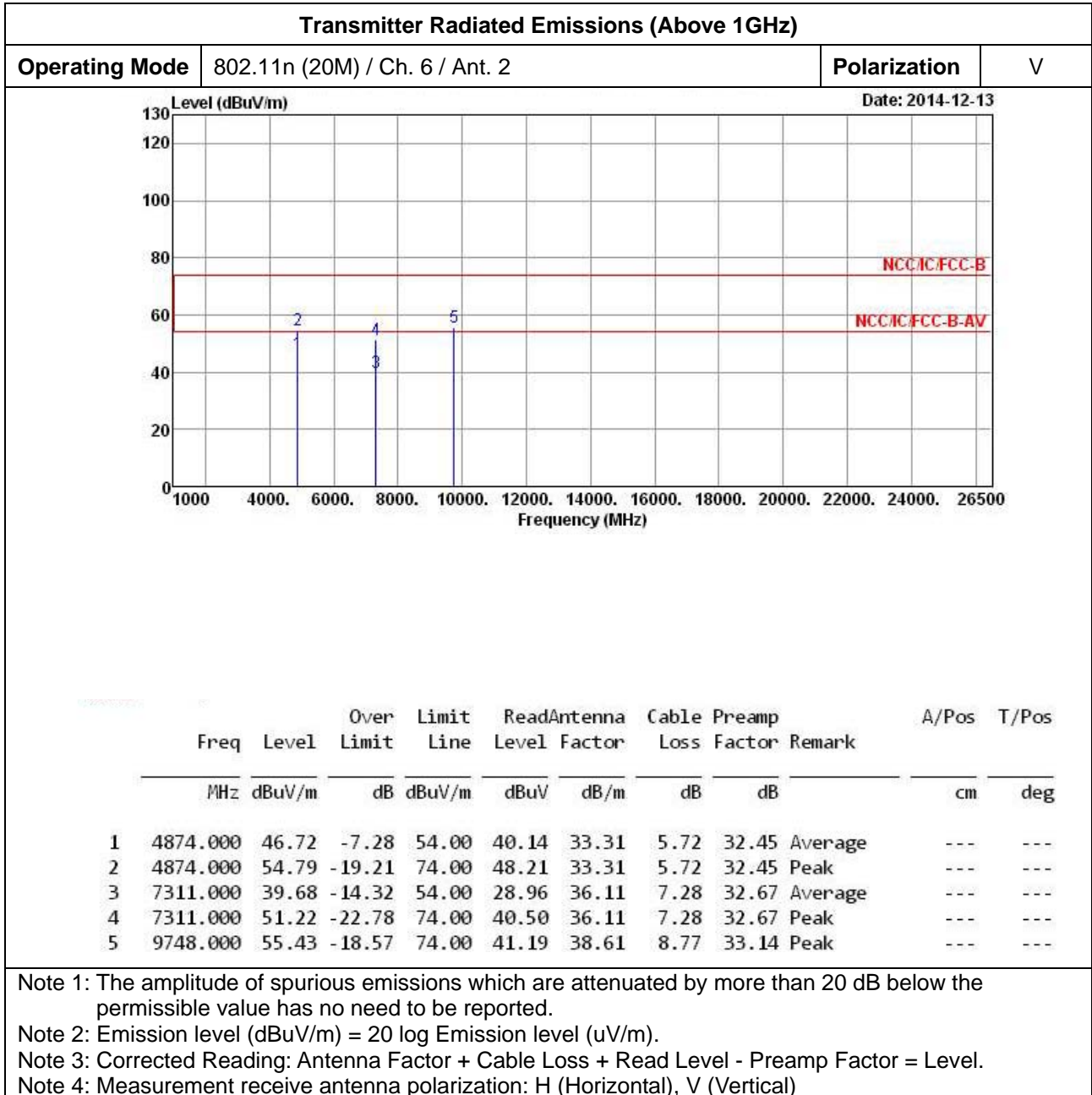


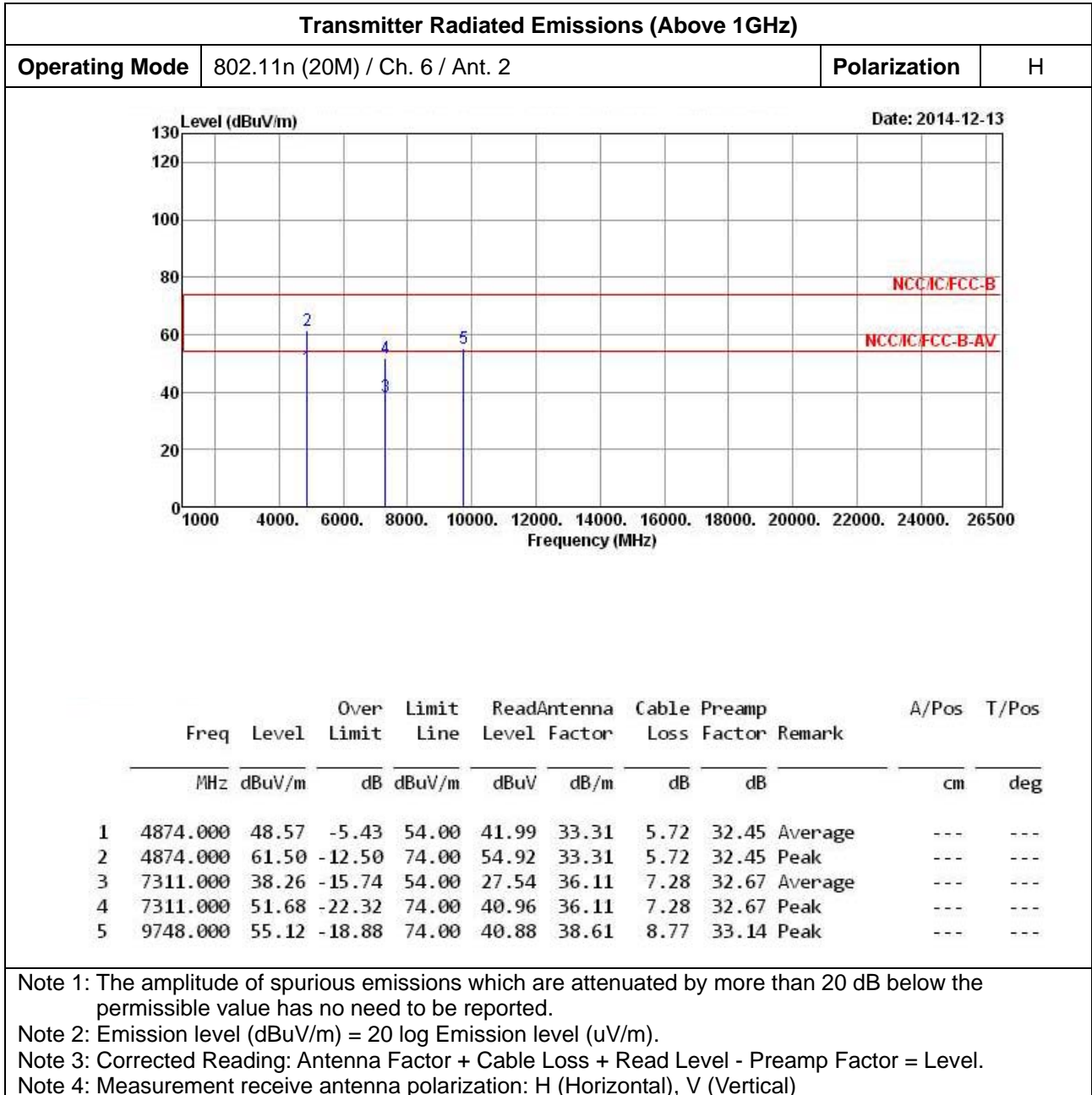


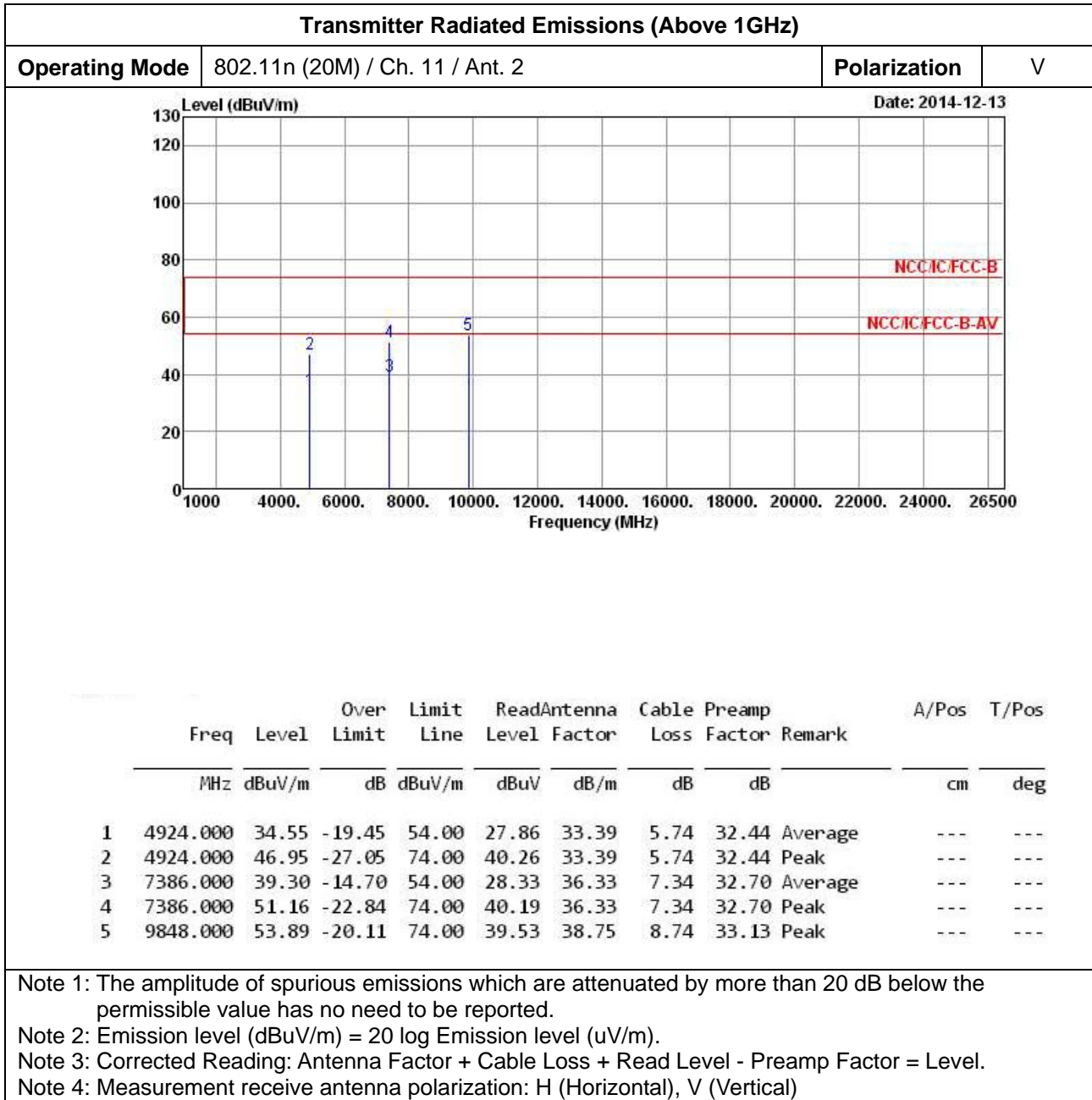


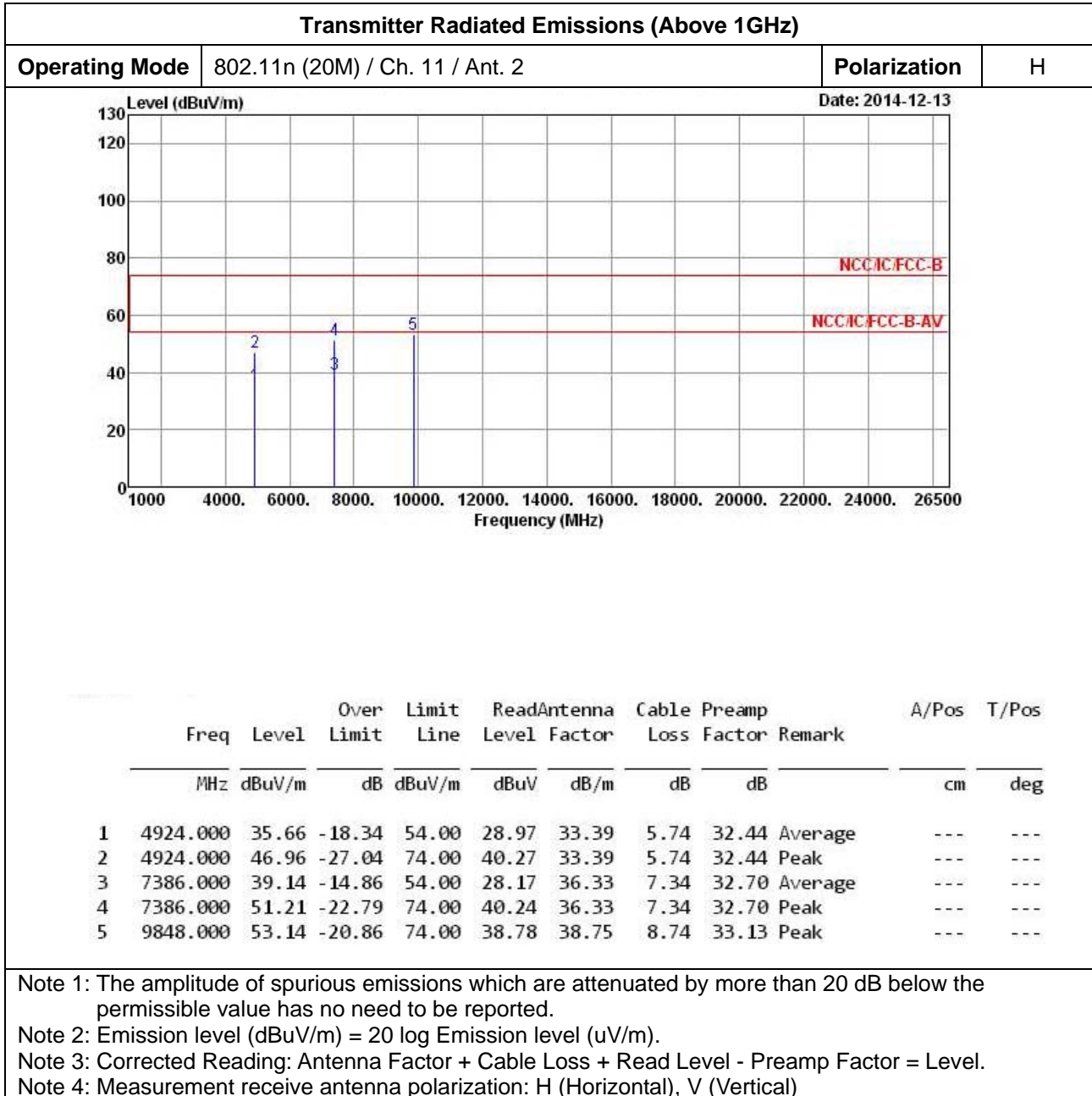


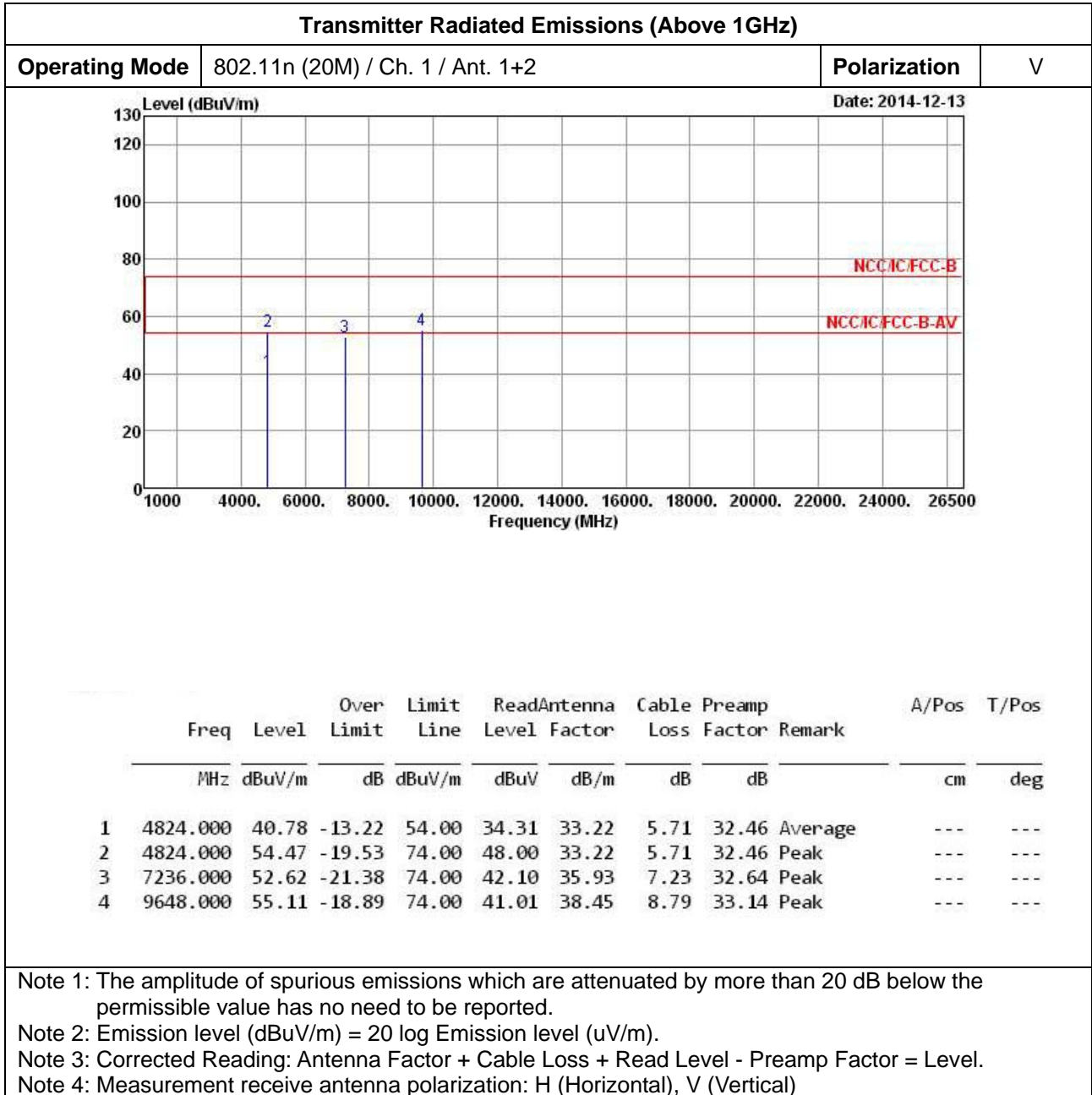


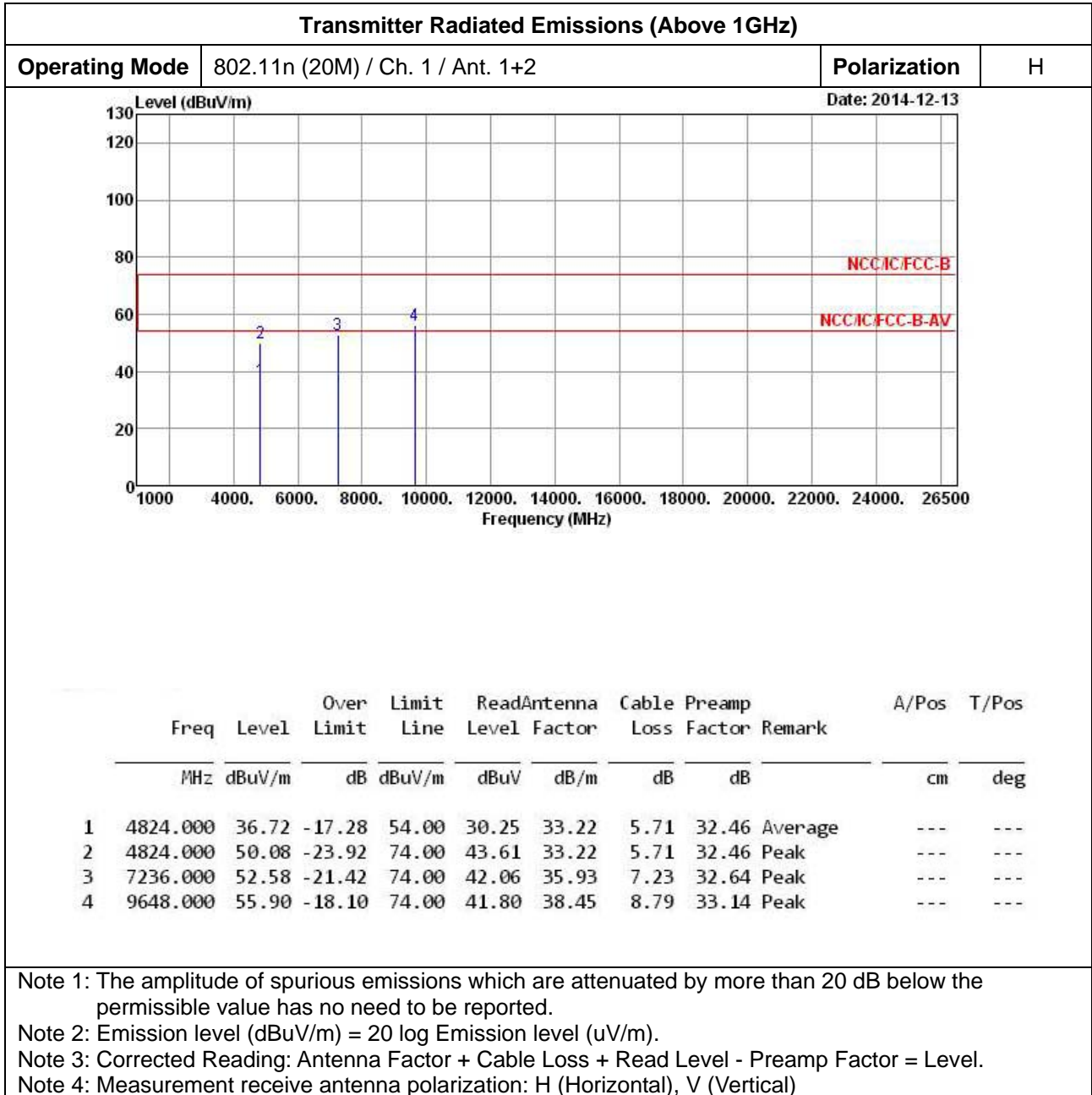


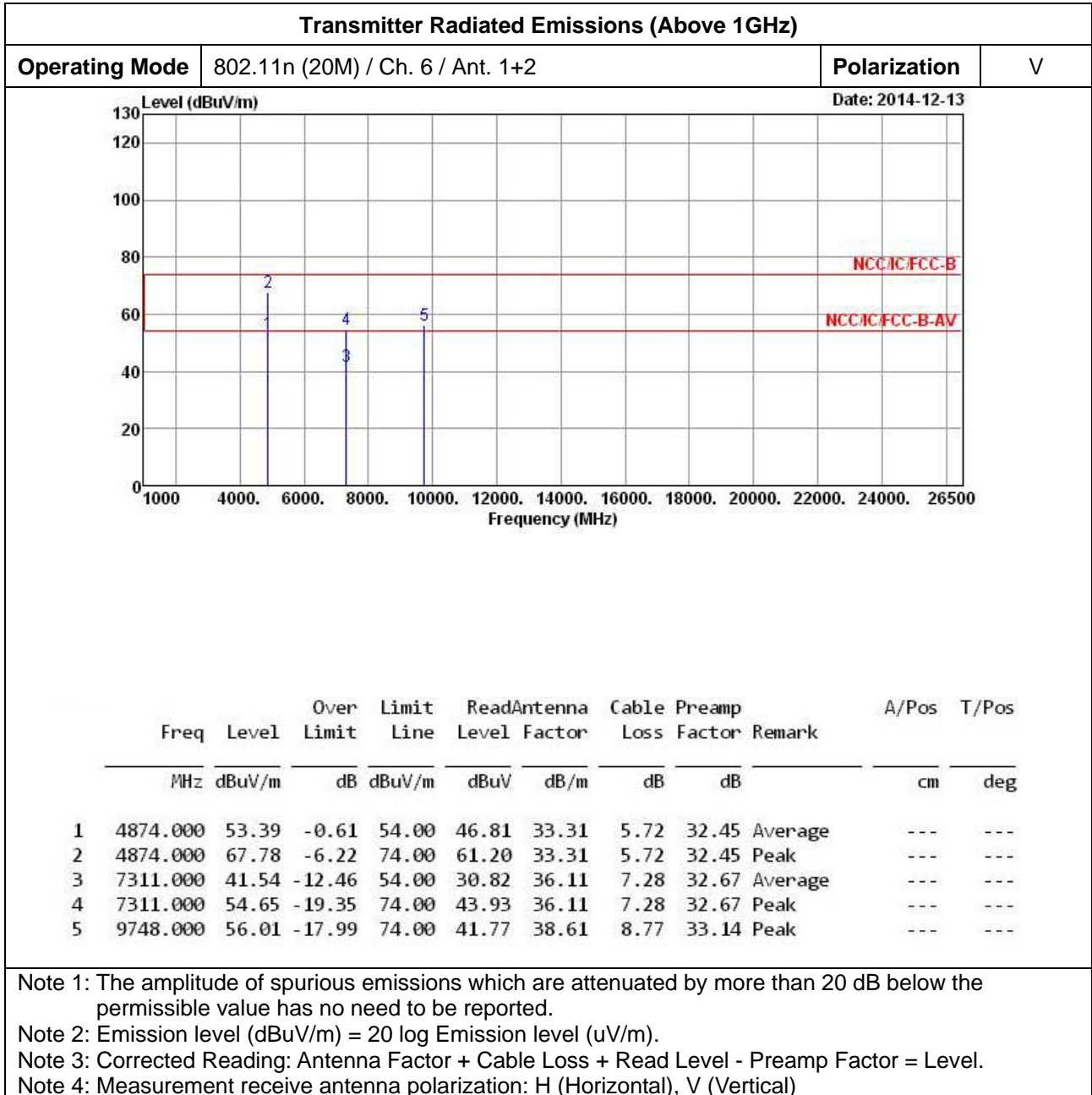


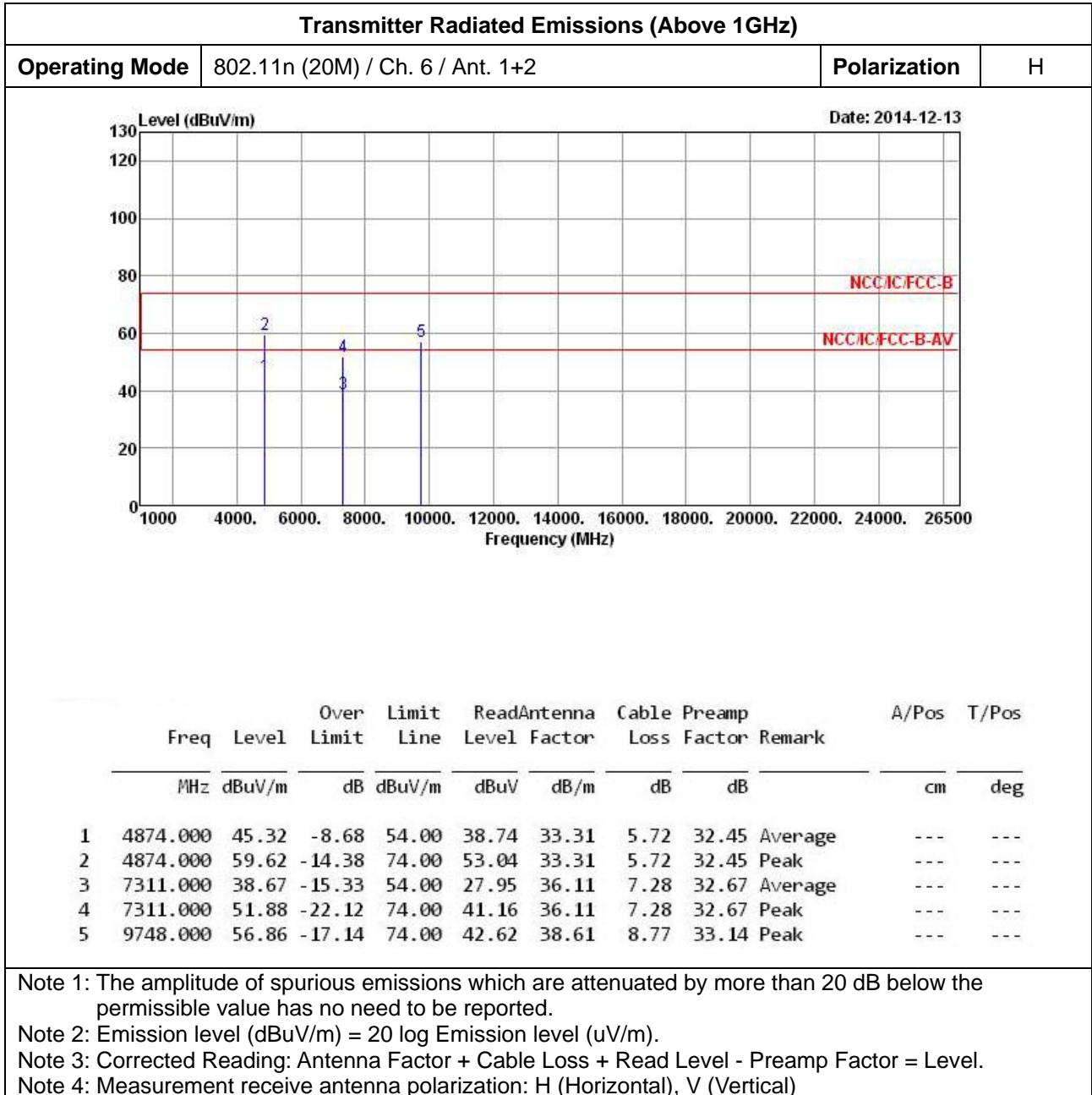








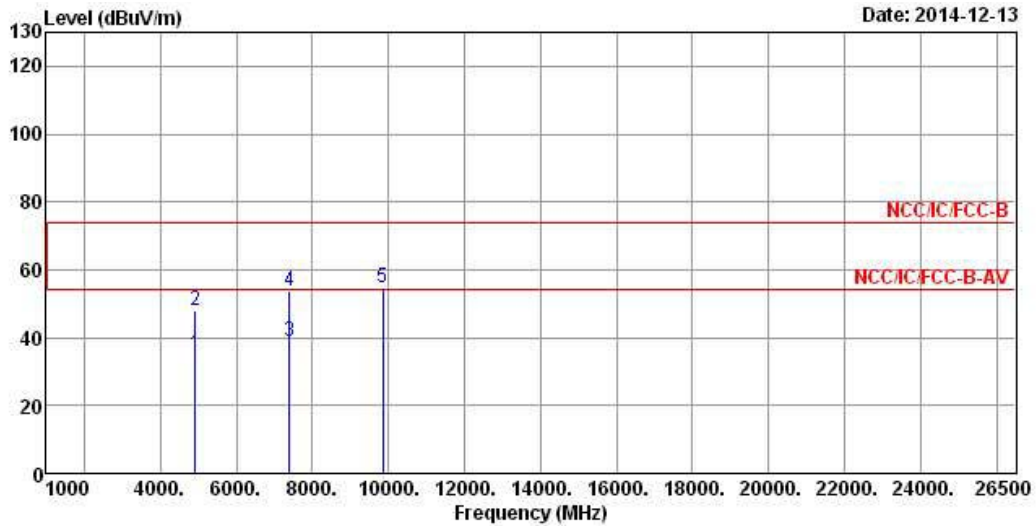






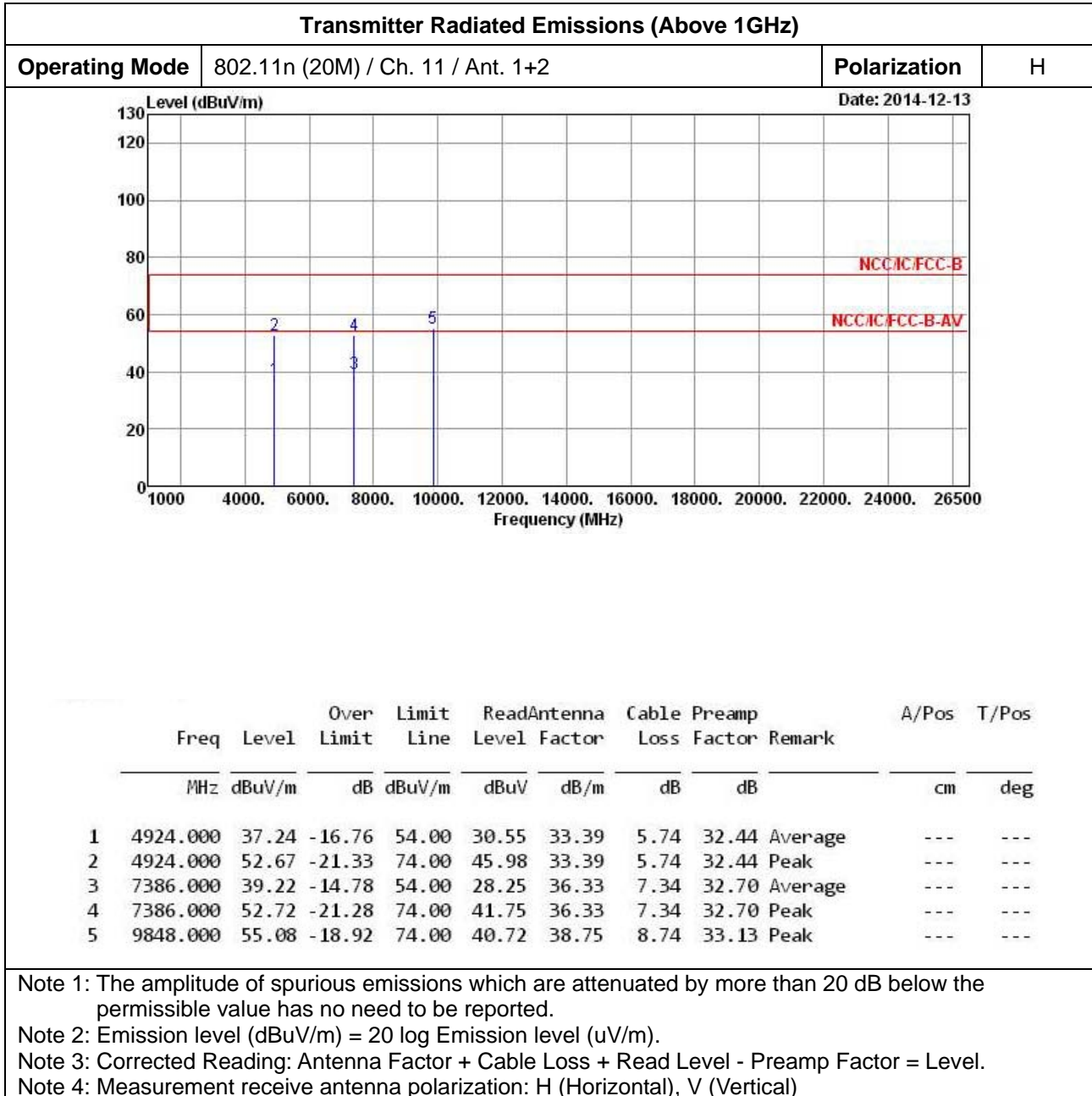
Transmitter Radiated Emissions (Above 1GHz)

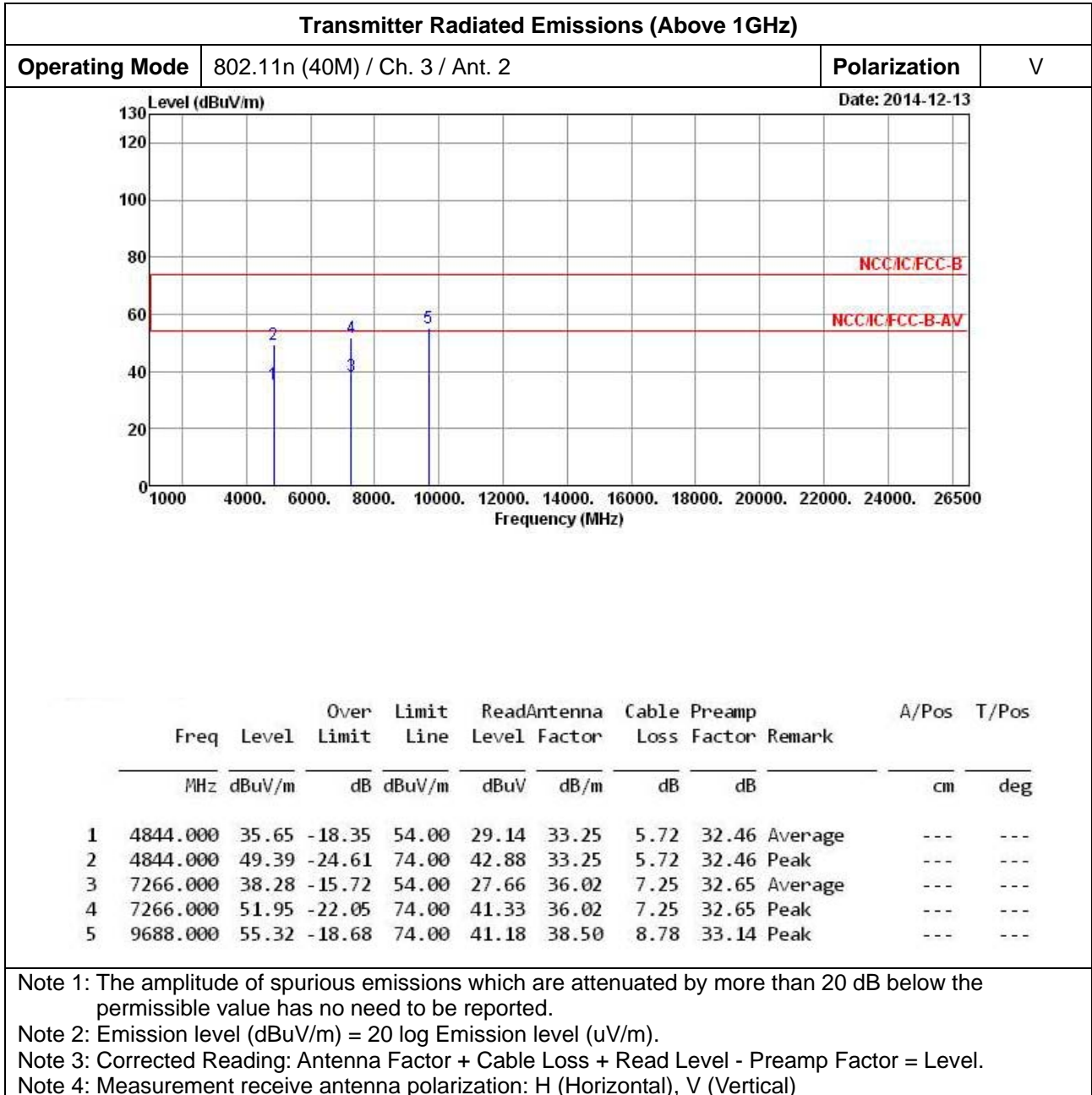
Operating Mode	802.11n (20M) / Ch. 11 / Ant. 1+2	Polarization	V
----------------	-----------------------------------	--------------	---

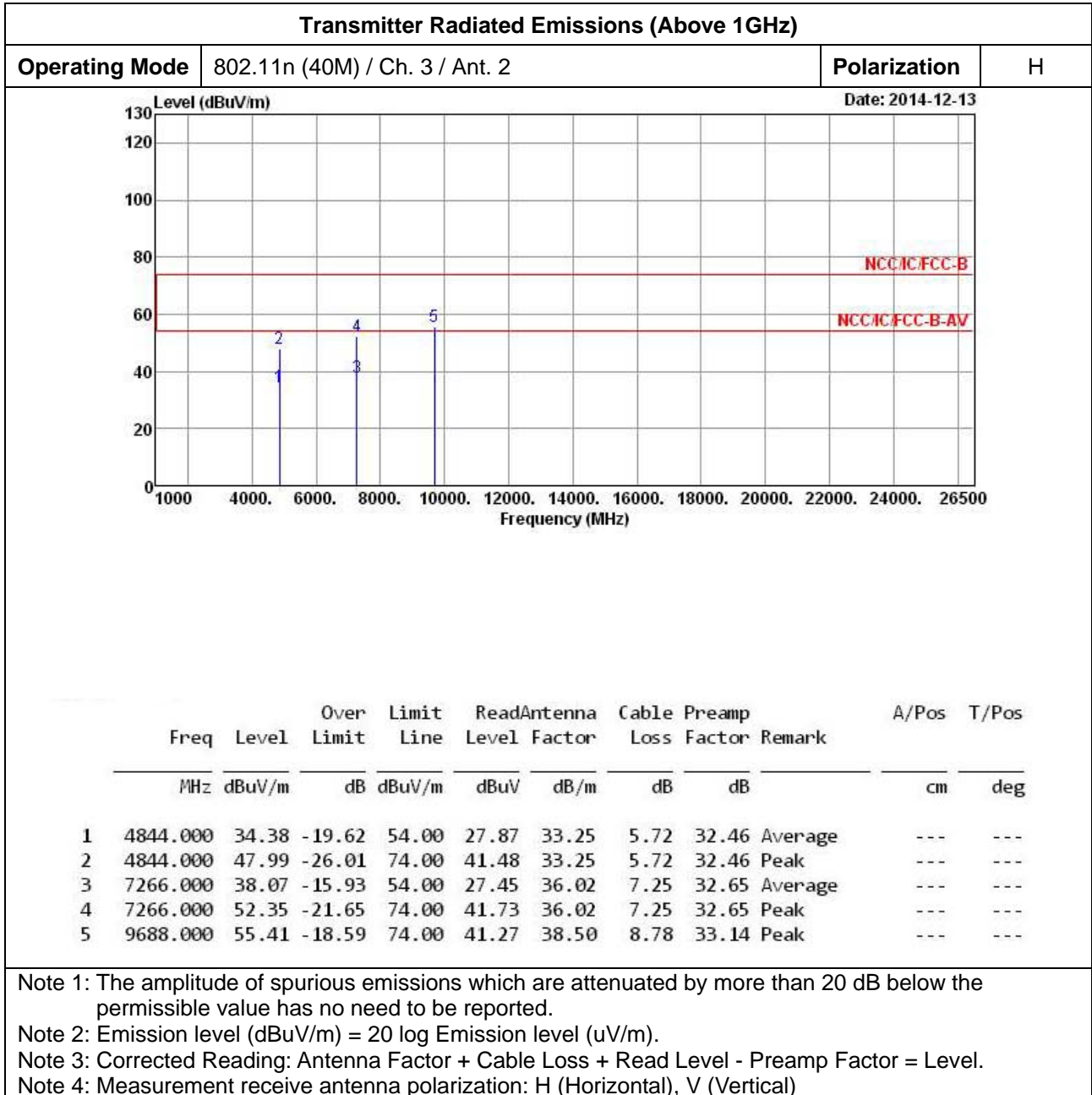


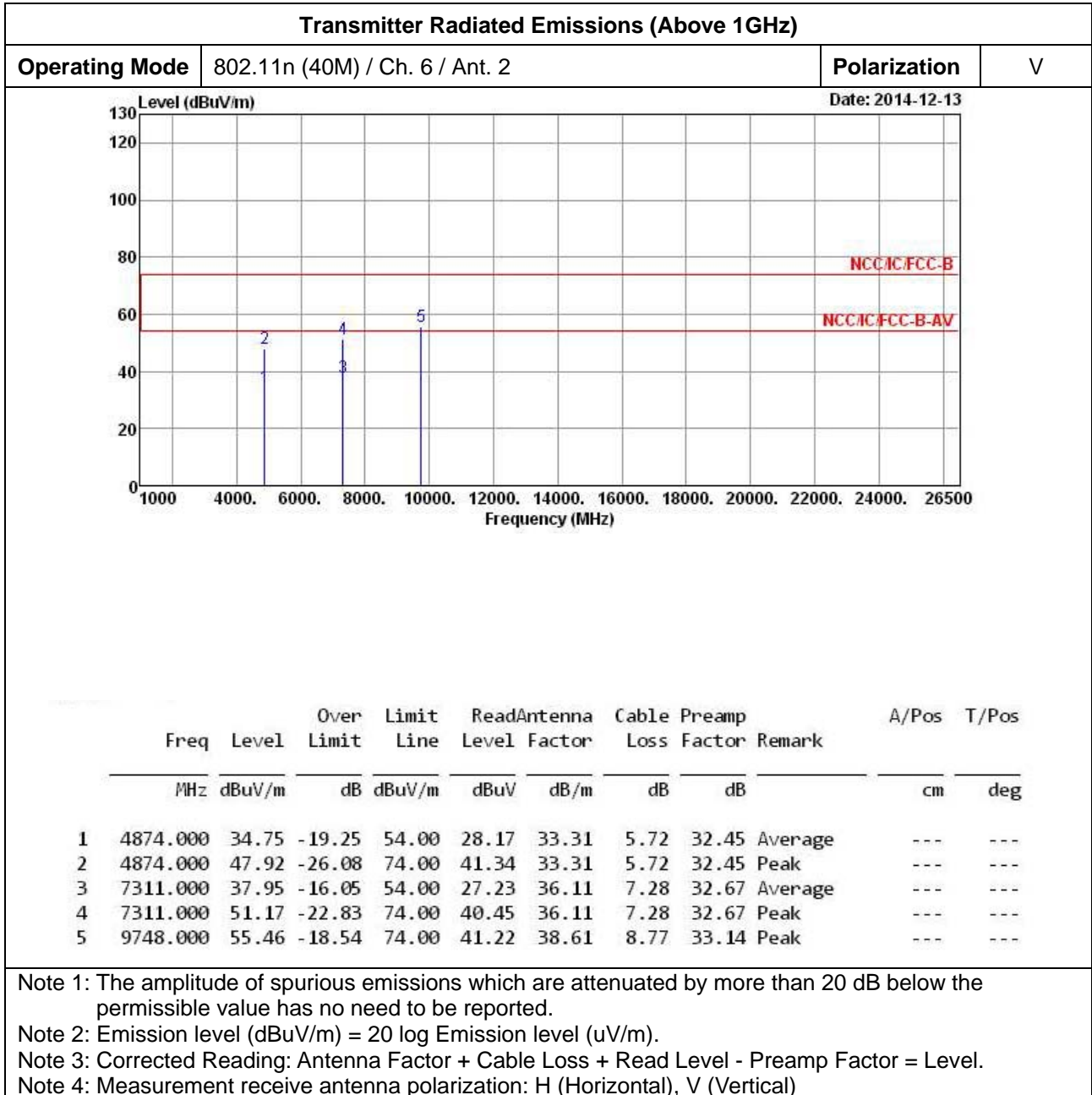
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	34.82	-19.18	54.00	28.13	33.39	5.74	32.44	Average	---	---
2	4924.000	48.09	-25.91	74.00	41.40	33.39	5.74	32.44	Peak	---	---
3	7386.000	39.01	-14.99	54.00	28.04	36.33	7.34	32.70	Average	---	---
4	7386.000	53.77	-20.23	74.00	42.80	36.33	7.34	32.70	Peak	---	---
5	9848.000	54.64	-19.36	74.00	40.28	38.75	8.74	33.13	Peak	---	---

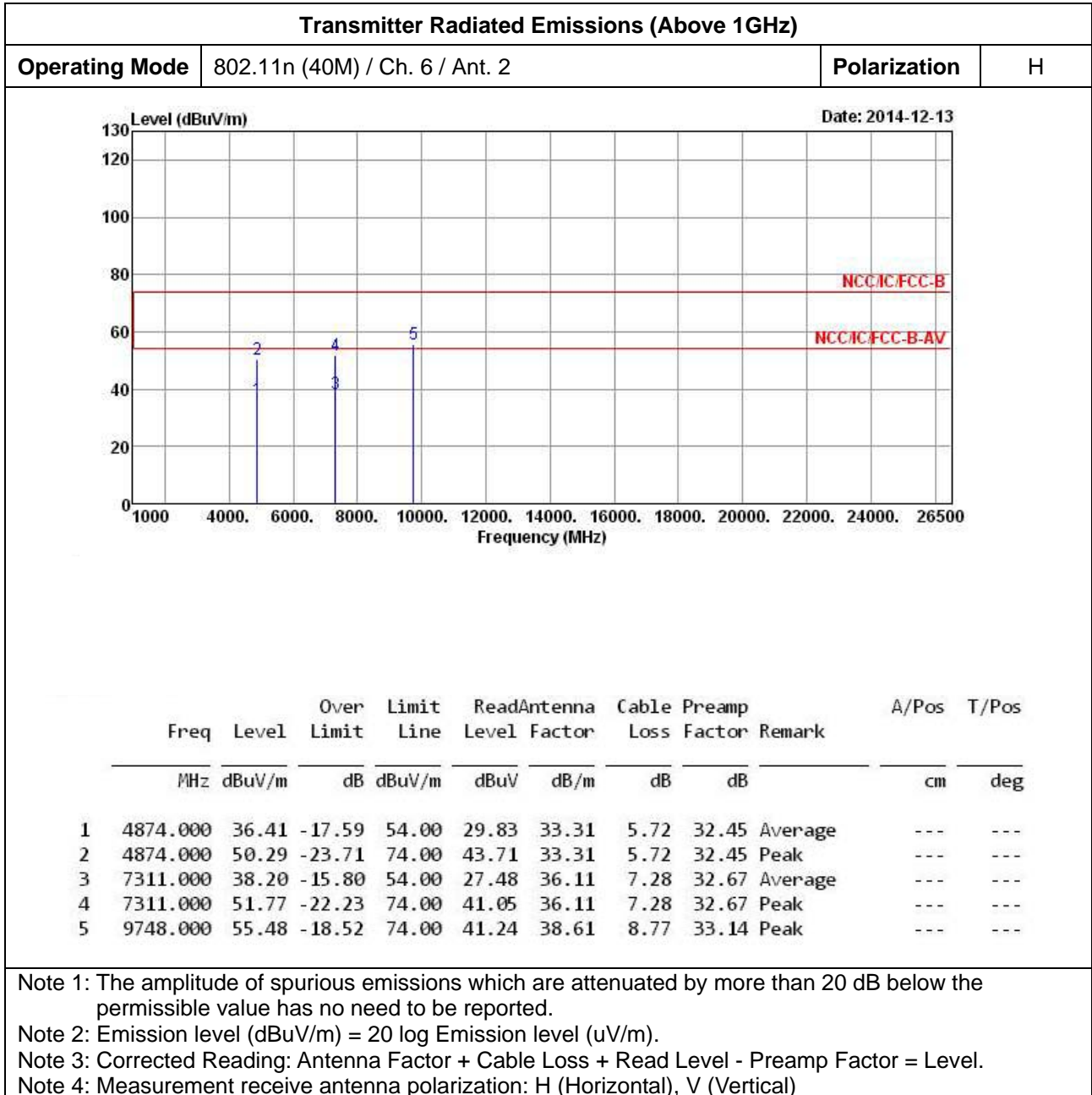
Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.
 Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).
 Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.
 Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)













Transmitter Radiated Emissions (Above 1GHz)											
Operating Mode	802.11n (40M) / Ch. 9 / Ant. 2								Polarization	V	
										Date: 2014-12-13	
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4904.000	35.69	-18.31	54.00	29.05	33.36	5.73	32.45	Average	---	---
2	4904.000	49.06	-24.94	74.00	42.42	33.36	5.73	32.45	Peak	---	---
3	7356.000	38.54	-15.46	54.00	27.68	36.24	7.31	32.69	Average	---	---
4	7356.000	52.32	-21.68	74.00	41.46	36.24	7.31	32.69	Peak	---	---
5	9808.000	55.20	-18.80	74.00	40.88	38.70	8.75	33.13	Peak	---	---

Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.
 Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).
 Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.
 Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

