



Test report No. : 4790186607-US-R0-V0
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Issued date : 2022/1/11
FCC ID : BY4WFD5000PRO

RADIO TEST REPORT

Product : 4K UHD Wireless Presentation Receiver
Model Name : WFD-5000 PRO
FCC ID : BY4WFD5000PRO
Test Regulation : FCC 47 CFR Part 15 Subpart C (Section 15.247)
Received Date : 2021/8/18
Test Date : 2021/8/18 ~ 2021/12/2
Issued Date : 2022/1/11

Applicant : Trans Electric Co., Ltd
771 Sec.2 Chungshan Rd, Huatang, Changhua, Taiwan 503

Issued By : Underwriters Laboratories Taiwan Co., Ltd.
Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd.,
Zhudong Township, Hsinchu County, Taiwan



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REVISION HISTORY

Original Test Report No.: 4790186607-US-R0-V0

[illegible]

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1. Attestation of Test Results

APPLICANT: Trans Electric Co., Ltd
771 Sec.2 Chungshan Rd, Huatang, Changhua, Taiwan 503

MANUFACTURER: Trans Electric Co., Ltd
771 Sec.2 Chungshan Rd, Huatang, Changhua, Taiwan 503

EUT DESCRIPTION: 4K UHD Wireless Presentation Receiver

BRAND: PX

MODEL: WFD-5000 PRO

SAMPLE STAGE: Engineering Verification Test sample

DATE of TESTED: 2021/8/18 ~ 2021/12/2

APPLICABLE STANDARDS	
STANDARD	Test Results
FCC 47 CFR PART 15 Subpart C (Section 15.247)	PASS

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:

Sally Lu Date : 2022/1/11
Project Handler

Approved and Authorized By:

Waternil Guan Date : 2022/1/11
Engineer

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2. Summary of Test Results

Summary of Test Results		
FCC Clause	Test Items	Result
15.247(a)(2)	6dB Bandwidth	PASS
15.247(b)	Conducted Output Power	PASS
15.247(e)	Power Spectral Density	PASS
15.247(d)	Antenna Port Emission	PASS
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS
15.207	AC Power Conducted Emission	PASS
15.203	Antenna Requirement	PASS

Note:

1. For the Radiated Band Edge test plots were recorded in Appendix I, the Radiated Emissions test plots were recorded in Appendix II.

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3. Test Methodology and Reference Procedures

The tests documented in this report were performed in accordance with 47 CFR FCC Part 2, KDB558074 D01 Meas Guidance v05r02, KDB414788 D01 Radiated Test Site v01r01, ANSI C63.10-2013.

4. Facilities and Accreditation

Test Location	Underwriters Laboratories Taiwan Co., Ltd.
Address	Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Accreditation Certificate	Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398.

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5. Measurement Uncertainty

For statement of conformity, accuracy method (Section 8.2.4 and 8.2.5 of ISO Guide 98-4) was applied as decision rule for measurement in this test report.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k=2$.

Measurement	Frequency	Uncertainty
Conducted disturbance at mains terminals ports	150kHz ~ 30MHz	± 3.1 dB
RF Conducted	9 kHz - 40GHz	± 1.9 dB
Radiated disturbance below 30MHz	9 kHz - 30 MHz	± 1.9 dB
Radiated disturbance below 1 GHz	30MHz ~ 1GHz	± 5.4 dB
Radiated disturbance above 1 GHz	1GHz ~ 40GHz	± 4.7 dB

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6. Equipment under Test

6.1. Description of EUT

Product	4K UHD Wireless Presentation Receiver
Brand Name	PX
Model Name	WFD-5000 PRO
Operating Frequency	2412MHz ~ 2462MHz
Modulation	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Transfer Rate	802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to MCS7
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Maximum Output Power	802.11b: 19.47 dBm 802.11g: 22.86 dBm 802.11n (HT20): 21.69 dBm 802.11n (HT40): 22.01 dBm
Normal Voltage	5Vdc from adapter
Sample ID	Conducted Test: 4194515, 4423811 Radiated Test: 4194514, 4423811
Software Version	00.0003.07.20190211

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Note:

1. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

Modulation Mode	Tx,Rx Function
802.11b	1TX,1RX
802.11g	1TX,1RX
802.11n (HT20)	1TX,1RX
802.11n (HT40)	1TX,1RX

2. The EUT contains following accessory devices:

Product	Brand	Model	Description
Type C USB Cable	PX	F1563G	Length: 1m

3. The EUT have two optional crystal as the following table:

Brand Name	Model	Location
HSIA	CH3227.000A20A3H	Y1
HSIA	X32-27.000-20	Y1

These two kinds of crystal are not RF-related circuits, and it doesn't affect the performance of the RF. Per pretest, CH3227.000A20A3H with the worst characteristics. The presentation of test reports is represented by this model.

4. The above EUT information is declared by manufacturer and for more detailed features description, please refer the manufacturer's or user's manual.

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6.2. Channel List

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	-	-

7 channels are provided for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	7	2442
4	2427	8	2447
5	2432	9	2452
6	2437	-	-

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6.3. Test Condition

Test Item	Test Site No.	Environmental Condition	Input Power	Test Date	Tested by
Antenna Port Conducted Measurement	SR4	22~26°C/ 62~68%RH	5Vdc	2021/08/18~ 2021/12/02	Mike Cai
Radiated Spurious Emission	966-2	22~26°C/ 62~68%RH	5Vdc	2021/08/18~ 2021/12/02	Mike Cai
AC power Line Conducted Emission	SR1	22~26°C/ 62~68%RH	5Vdc	2021/12/02~ 2021/12/02	Mike Cai

FCC Test Firm Registration Number: 498077

6.4. Description of Available Antennas

Ant. No.	Transmitter Circuit	Brand Name	Model Name	Ant. Type	Maximum Gain (dBi)
1	Chain (0)	PX	PX_Wifi	PCB PIFA	2.4GHz: -7 5GHz: -7

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual.

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6.5. Test Mode Applicability and Tested Channel Detail

- The fundamental of the EUT was investigated in three orthogonal X-Y/Y-Z/X-Z, it was determined that X-Y plane was worst-case. Therefore, all final radiated testing was performed with the EUT in X-Y plane.
- For AC power line conducted emissions, the pre-scan has been determined by AC power 120Vac/60Hz (worst case)
- For Antenna Port Conducted Measurement, this item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.
- For below 1 GHz radiated emission and AC power line conducted emission have performed all modes of operation were investigated and the worst-case emissions are reported.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Test item	Mode	Modulation Technology	Modulation Type	Available Channel	Test Channel	Data Rate
Radiated Emissions (Above 1GHz)	802.11b	DSSS	DBPSK	1 to 11	1,6,11	1 Mbps
	802.11g	OFDM	BPSK	1 to 11	1,6,11	6 Mbps
	802.11n20	OFDM	BPSK	1 to 11	1,6,11	MCS0
	802.11n40	OFDM	BPSK	3 to 9	3,6,9	MCS0
Radiated Emissions (Below 1GHz)	802.11b	DSSS	DBPSK	1 to 11	1	1 Mbps
AC Power Line Conducted Emission	802.11b	DSSS	DBPSK	1 to 11	1	1 Mbps
*Antenna Port Conducted Measurement	802.11b	DSSS	DBPSK	1 to 11	1,6,11	1 Mbps
	802.11g	OFDM	BPSK	1 to 11	1,6,11	6 Mbps
	802.11n20	OFDM	BPSK	1 to 11	1,6,11	MCS0
	802.11n40	OFDM	BPSK	3 to 9	3,6,9	MCS0

*Note: For Antenna Port Conducted Measurement item, Inner channels only test Power and Conducted Out of Band Emission.

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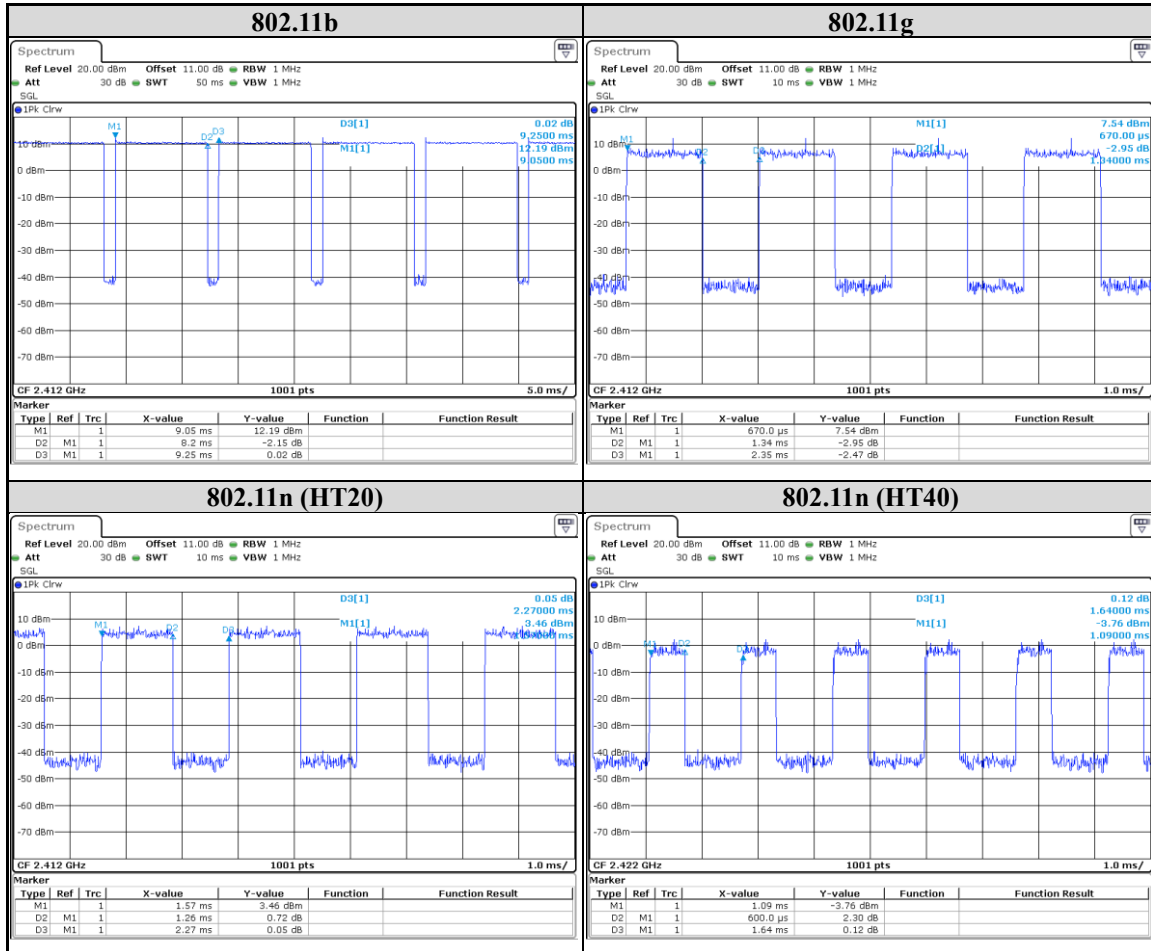
6.6. Duty cycle

802.11b: Duty cycle = $8.2/9.25 = 0.886$, Duty factor(dB) = $10 * \log(1/0.886) = 0.53$

802.11g: Duty cycle = $1.34/2.35 = 0.57$, Duty factor(dB) = $10 * \log(1/0.57) = 2.44$

802.11n(HT20): Duty cycle = $1.26/2.27 = 0.555$, Duty factor(dB) = $10 * \log(1/0.555) = 2.56$

802.11n(HT40): Duty cycle = $0.6/1.64 = 0.366$, Duty factor(dB) = $10 * \log(1/0.366) = 4.37$





7. Test Equipment

Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Expired date
Radiated Spurious Emission					
Spectrum Analyzer	Keysight	N9010A	MY56070827	2020/11/11	2021/11/10
				2021/11/9	2022/11/8
EMI Test Receiver	Rohde & Schwarz	ESR7	101754	2020/12/11	2021/12/10
Loop Antenna	ETS lindgren	6502	00213440	2020/12/25	2021/12/24
Trilog-Broadband Antenna with 5dB Attenuator	Schwarzbeck & EMCI	VULB 9168 & N-6-05	774 & AT-N0538	2021/1/13	2022/1/12
Horn Antenna (1-18 GHz)	Schwarzbeck	BBHA 9120 D	01690	2020/12/30	2021/12/29
Horn Antenna (18-40 GHz)	Schwarzbeck	BBHA 9170	781	2020/12/30	2021/12/29
Preamplifier (30-1000 MHz)	EMCI	EMC330E	980405	2021/6/8	2022/6/7
Preamplifier (1-18 GHz)	EMCI	EMC051835BE	980406	2021/2/3	2022/2/2
Preamplifier (18-40GHz)	EMCI	EMC184040SEE	980426	2021/5/19	2022/5/18
Cables	Hanyitek	K1K50-UP0264-K1K50-2500	170214-4 & 170425-2	2021/1/22	2022/1/21
Cables	Hanyitek	K1K50-UP0264-K1K50-2500	170214-1 & 170214-2	2021/1/22	2022/1/21

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Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Expired date
Antenna Port Conducted Measurement					
Spectrum Analyzer	Keysight	N9010A	MY56070834	2020/11/6	2021/11/5
				2021/10/29	2022/10/28
Pulse Power Sensor	Anritsu	MA2411B	1531202	2020/12/21	2021/12/20
Power Meter	Anritsu	ML2495A	1645002	2020/12/21	2021/12/20
AC power Line Conducted Emission					
EMI Test Receiver	Rohde & Schwarz	ESR7	101753	2021/11/15	2022/11/14
Two-Line V-Network	Rohde & Schwarz	ENV216	102136	2021/8/30	2022/8/29
Impuls-Begrenzer Pulse Limiter	Rohde & Schwarz	ESH3-Z2	102219-Qt	2021/8/26	2022/8/25
Cables	TITAN	CFD200	T0732ACFD20 020A300-1	2021/3/2	2022/3/1

UL Software		
Description	Name	Version
Radiated measurement	e3	6.191211 (V6)
Conducted measurement	RF Conducted Test Tools	ver 2.4.0.620b
AC power Line Conducted Emission	EZ EMC	UL-3A1.2

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8. Description of Test Setup

Support Equipment

ID	Equipment	Brand Name	Model Name	S/N	Remark
A	Adapter	HTC	TC P900-US	79H00130-01M	Provide by Lab
B	Monitor	LG	22MP58VQ	802NTZN6V197	Provide by Lab

I/O Cables

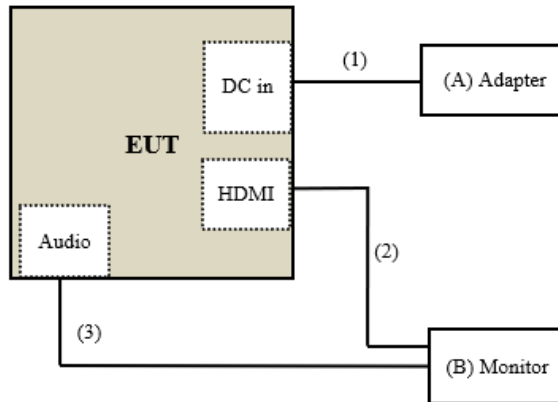
ID	Equipment	Brand Name	Model Name	Length (m)	Remark
1	Type C USB Cable	PX	F1563G	1	Provide by Client
2	HDMI Cable	PX	HD2-1.5MX	1.5	Provide by Lab
3	3.5mm Cable	CUMA	SY0011	1.8	Provide by Lab

Test Setup

Controlled using a bespoke application (Realtek 11ac 8822B USB WLAN MP_00.0003.07.20190211) on a test Notebook. The application was used to enable a continuous transmission mode and to select the test channels, data rates, modulation schemes and power setting as required.



Setup Diagram for Test



Under Table

Remote Site

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9. Test Results

9.1. 6dB Bandwidth

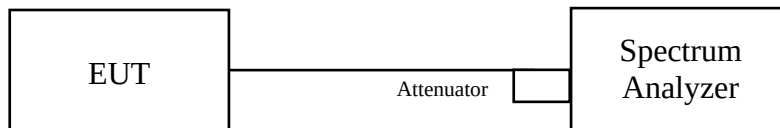
Requirements

The minimum 6 dB bandwidth shall be at least 500 kHz.

Test procedure

- Set resolution bandwidth (RBW) = 100kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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Test Data

802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	10.07	0.5	PASS
6	2437	10.07	0.5	PASS
11	2462	10.07	0.5	PASS

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.06	0.5	PASS
6	2437	16.06	0.5	PASS
11	2462	16.06	0.5	PASS

802.11n (HT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.26	0.5	PASS
6	2437	15.94	0.5	PASS
11	2462	16.54	0.5	PASS

802.11n (HT40)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	35.09	0.5	PASS
6	2437	35.09	0.5	PASS
9	2452	35.09	0.5	PASS

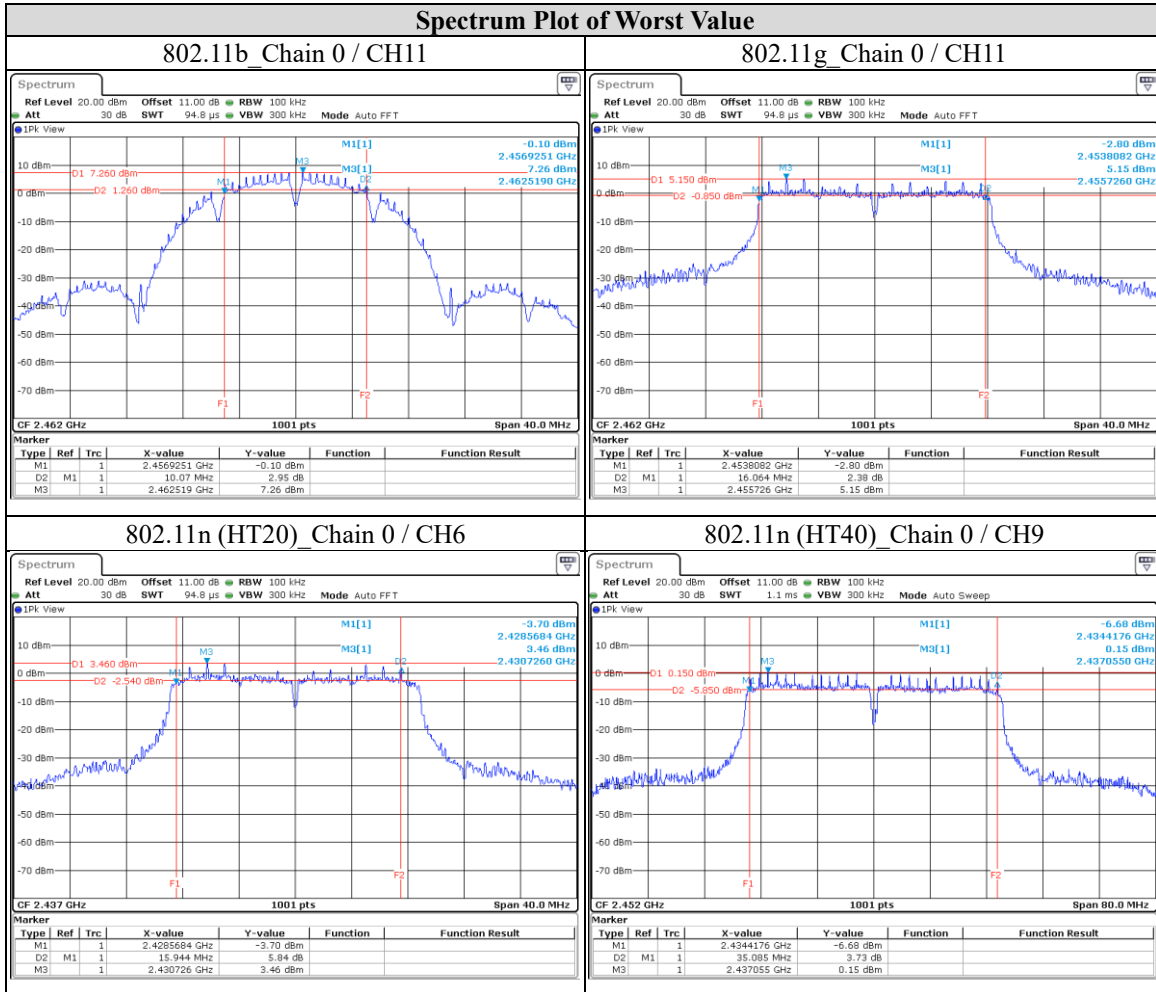
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9.2. Conducted Output Power

Requirements

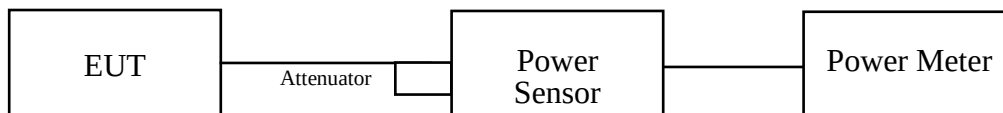
For systems using digital modulation in the 2400-2483.5 MHz bands: 1 Watt.

Test Procedure

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

- Set the RBW $\geq$ DTS bandwidth.
- Set VBW $\geq 3 \times$ RBW.
- Set span $\geq 3 \times$ RBW.
- Sweep time = auto couple.
- Detector = peak.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use peak marker function to determine the peak amplitude level.

Test Setup



The loss between RF output port of the EUT and the input port of the Power Meter has been taken into consideration.

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Test Data

Peak Power

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	88.512	19.47	30	PASS
6	2437	86.896	19.39	30	PASS
11	2462	85.901	19.34	30	PASS

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	192.752	22.85	30	PASS
6	2437	193.197	22.86	30	PASS
11	2462	185.78	22.69	30	PASS

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	147.571	21.69	30	PASS
6	2437	145.211	21.62	30	PASS
11	2462	142.561	21.54	30	PASS

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
3	2422	107.647	20.32	30	PASS
6	2437	158.855	22.01	30	PASS
9	2452	143.219	21.56	30	PASS

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Average Power (Reference Only)

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	49.204	16.92
6	2437	47.863	16.80
11	2462	48.195	16.83

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	38.194	15.82
6	2437	39.994	16.02
11	2462	38.194	15.82

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	25.763	14.11
6	2437	24.946	13.97
11	2462	25.527	14.07

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	17.022	12.31
6	2437	25.119	14.00
9	2452	23.281	13.67

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9.3. Power Spectral Density

Requirements

The Maximum of Power Spectral Density Measurement is 8dBm in any 3 kHz (If $G_{TX} > 6$ dBi, then $PSD = 8 - (G_{TX} - 6)$).

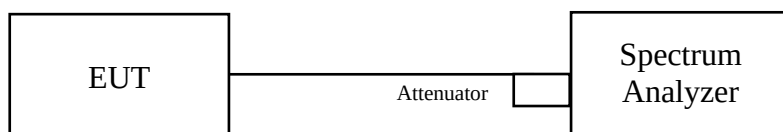
Note:

1. PSD = power spectral density that the same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz.
2. G_{TX} = the maximum transmitting antenna directional gain in dBi.

Test procedure

- a. Set analyzer center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d. Set the VBW $\geq 3 \times \text{RBW}$.
- e. Detector = peak.
- f. Sweep time = auto couple.
- g. Trace mode = max hold.
- h. Allow trace to fully stabilize.
- i. Use the peak marker function to determine the maximum amplitude level within the RBW.

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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Test Data

802.11b

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-6.01	8	PASS
6	2437	-6.32	8	PASS
11	2462	-6.29	8	PASS

802.11g

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-9.79	8	PASS
6	2437	-9.70	8	PASS
11	2462	-9.73	8	PASS

802.11n (HT20)

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-11.47	8	PASS
6	2437	-11.40	8	PASS
11	2462	-11.48	8	PASS

802.11n (HT40)

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
3	2422	-16.85	8	PASS
6	2437	-15.30	8	PASS
9	2452	-15.46	8	PASS

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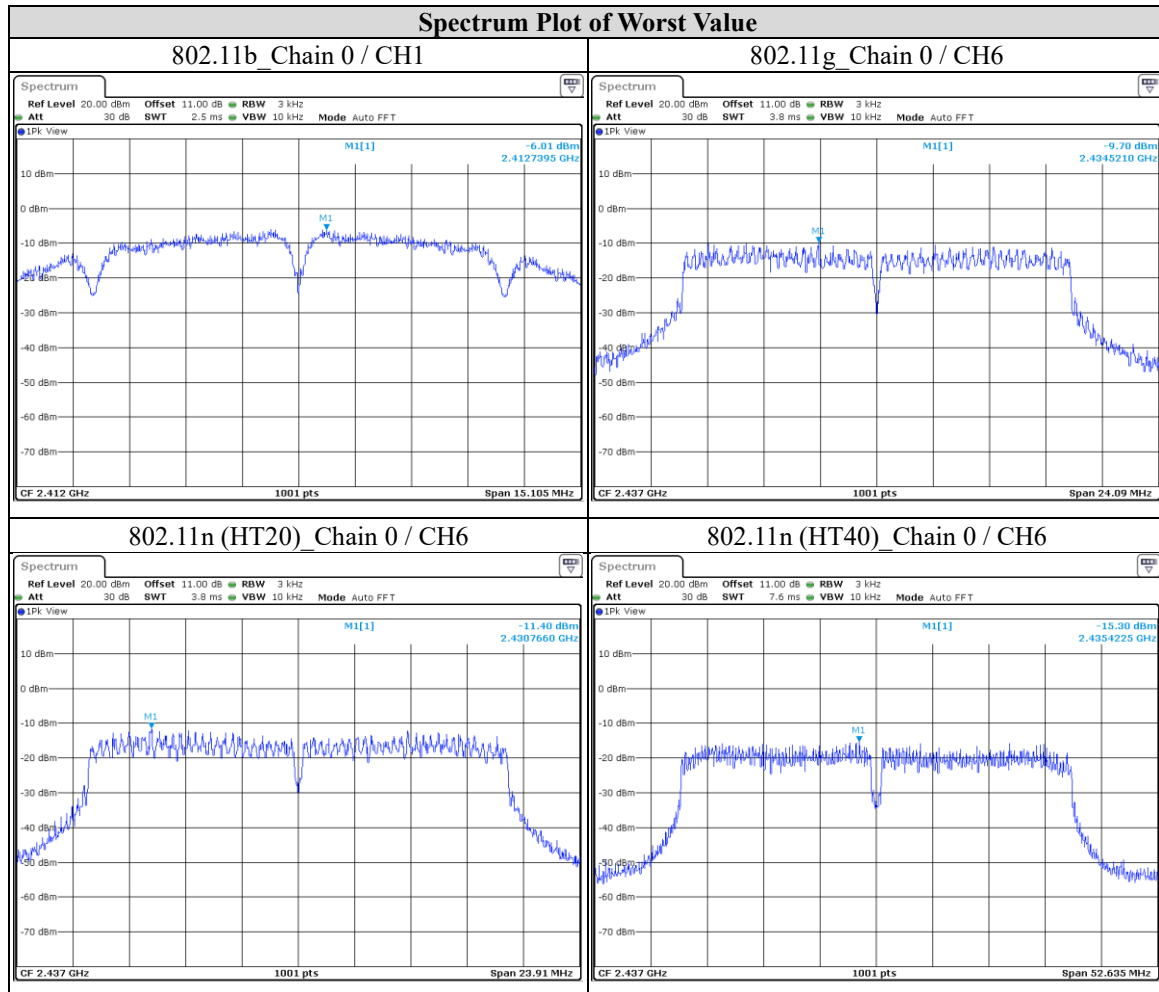
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9.4. Conducted Out of Band Emission

Requirements

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b) (3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209 (a) is not required.

Test procedure

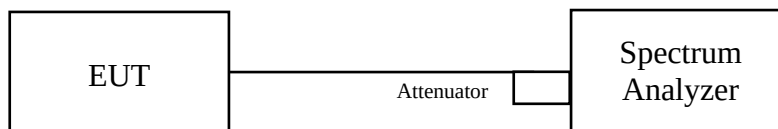
Measurement Procedure REF

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Set the span to 1.5 times the DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

Measurement Procedure OOBE

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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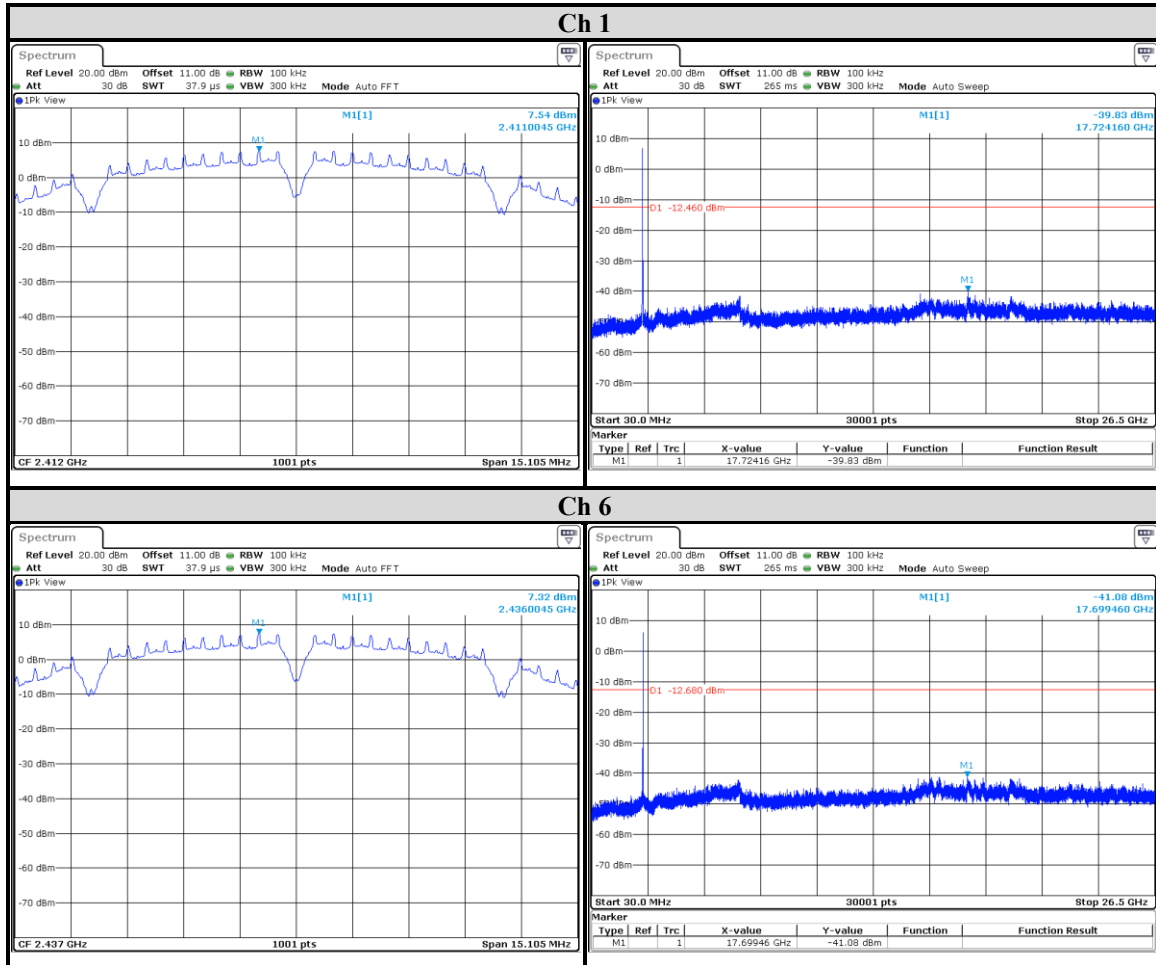
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Test Data

802.11b



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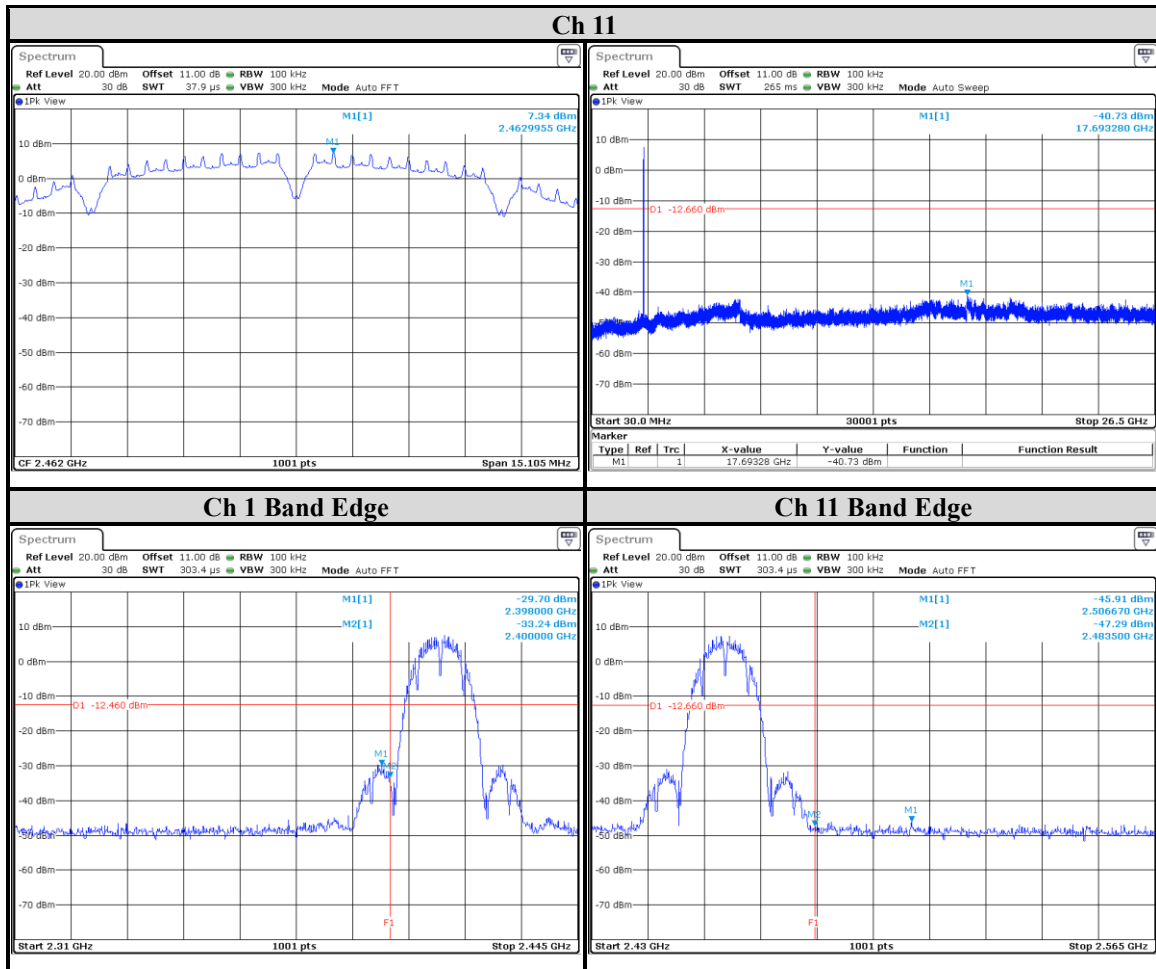
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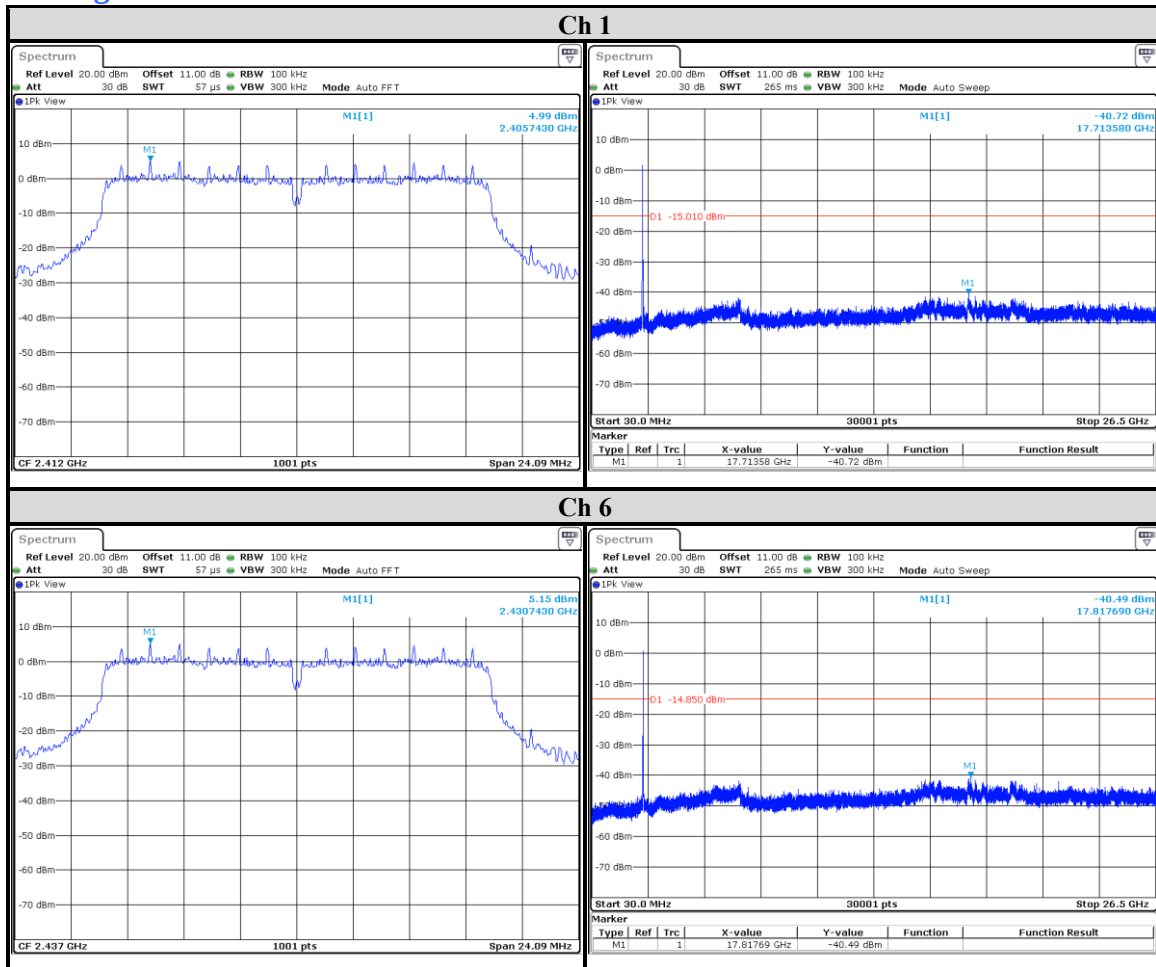
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802.11g



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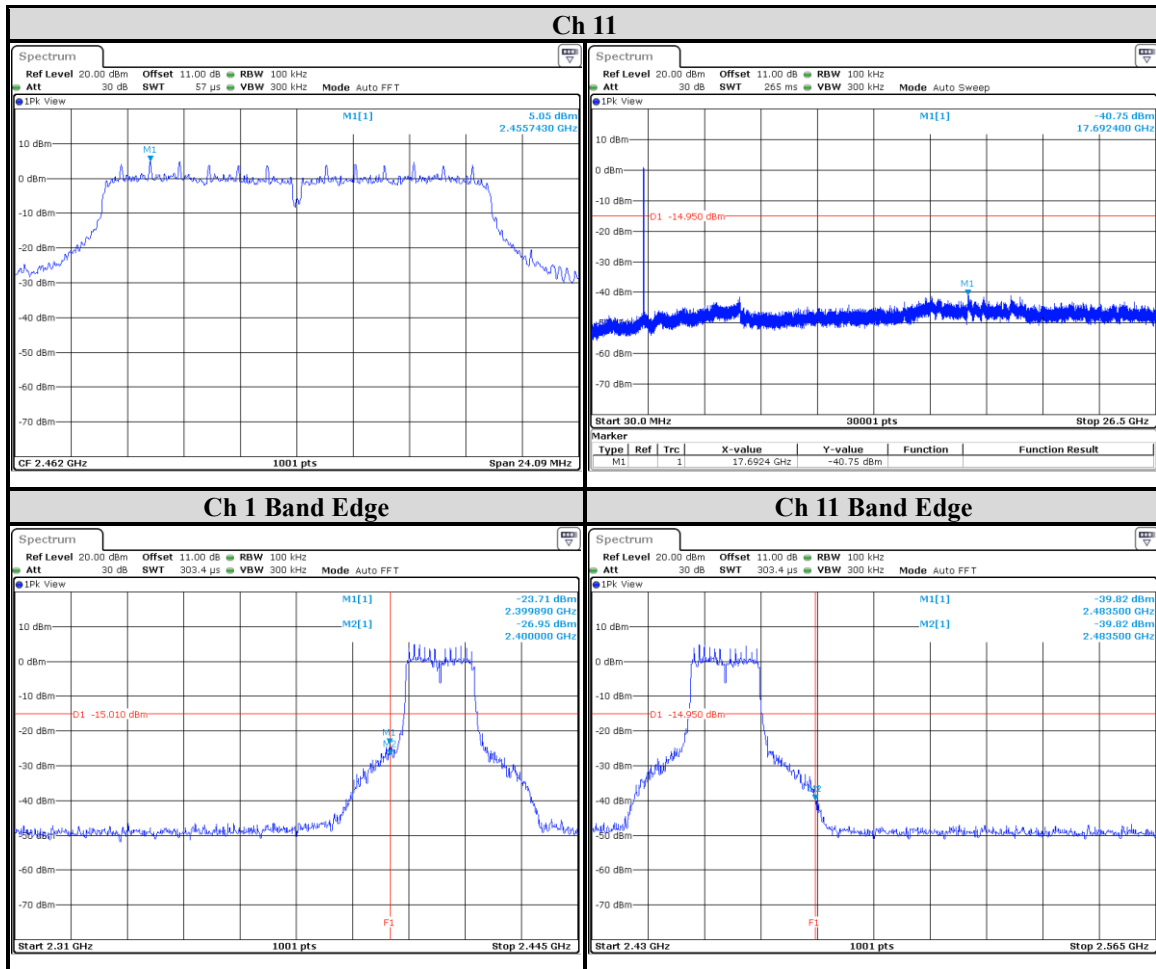
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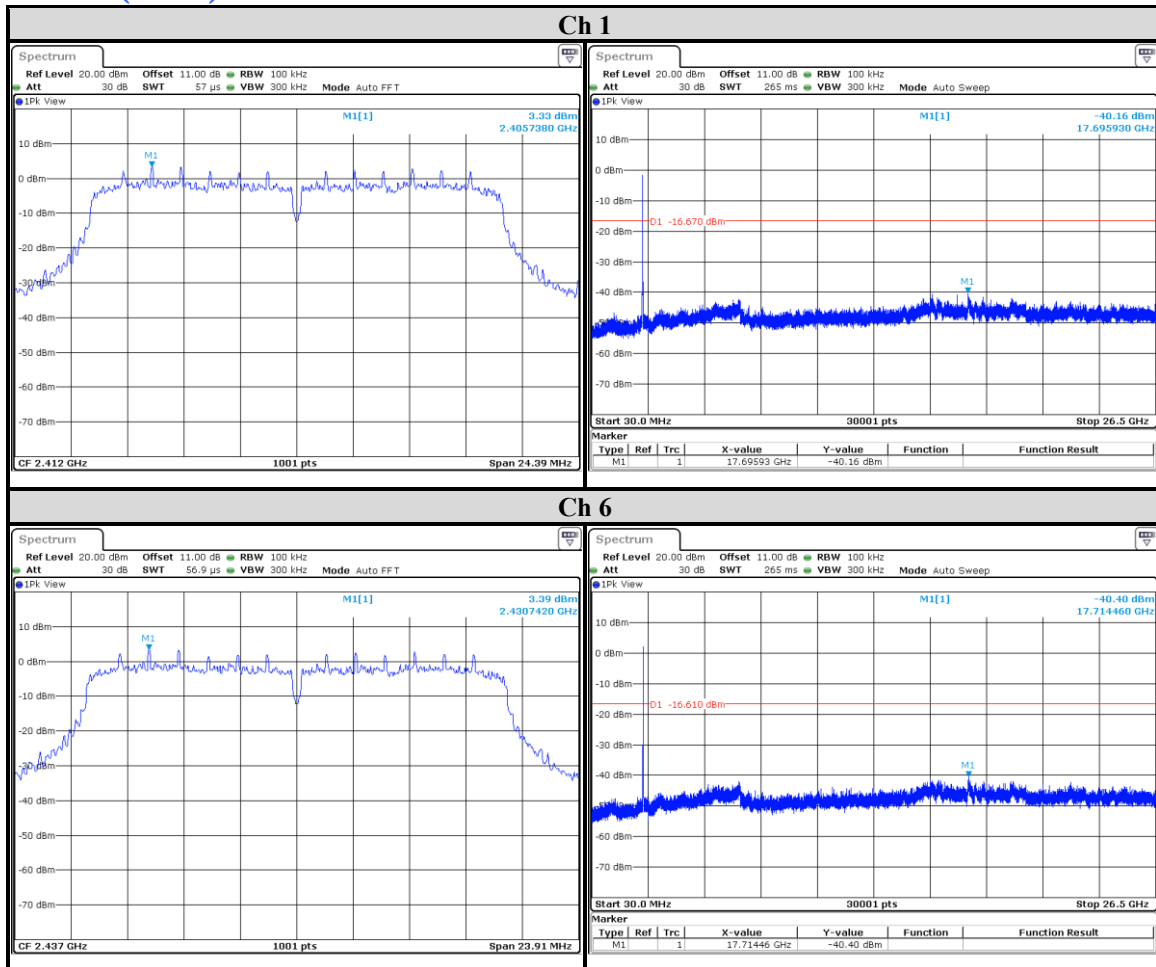
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802.11n (HT20)



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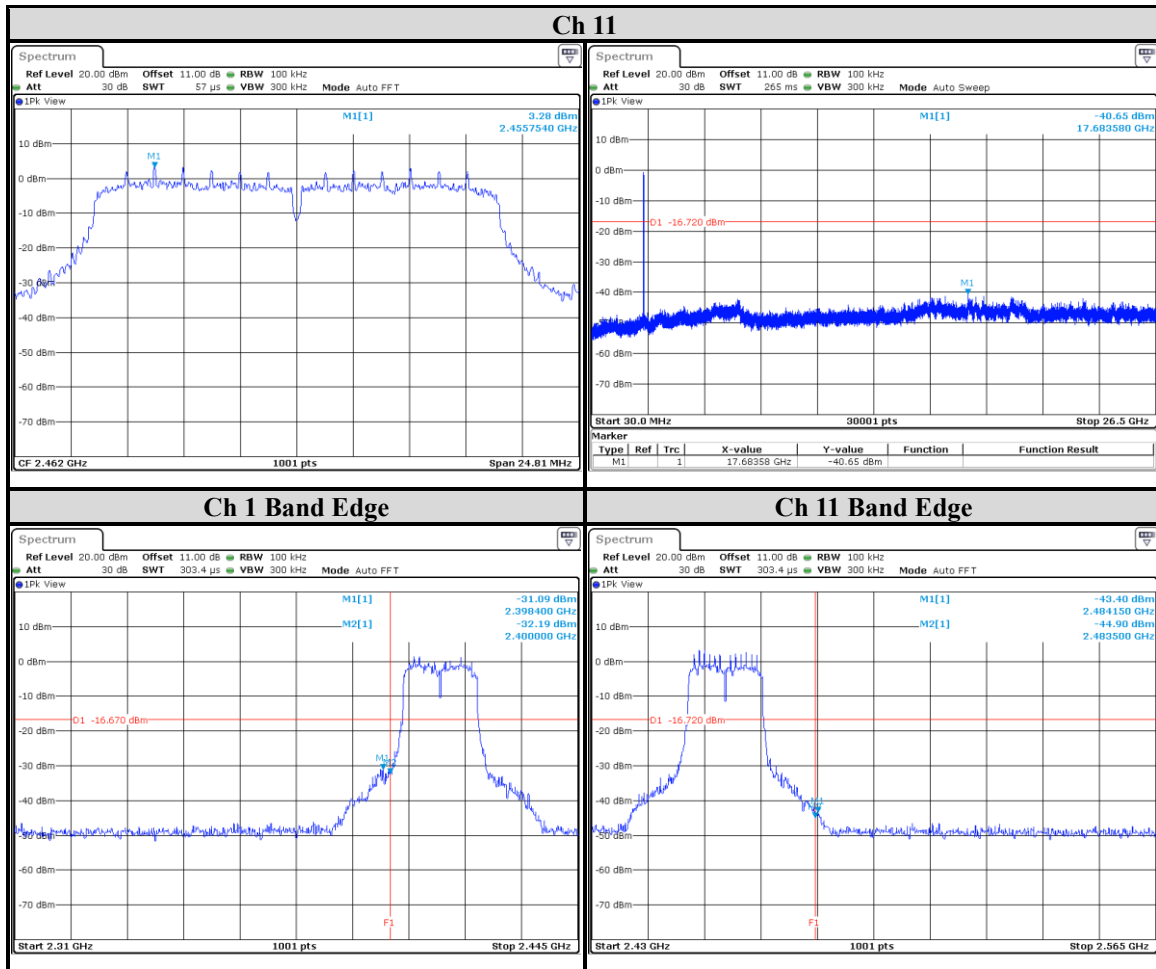
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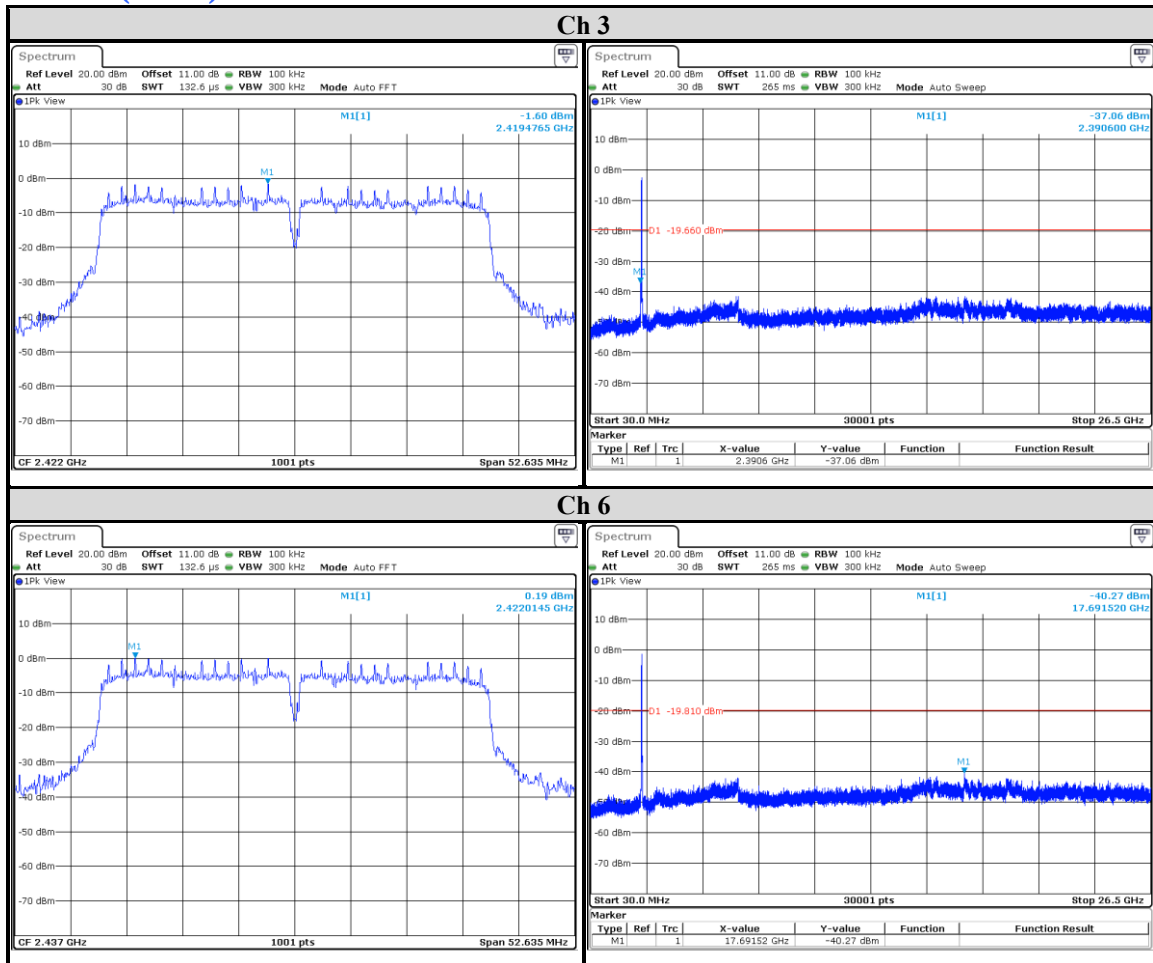
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802.11n (HT40)



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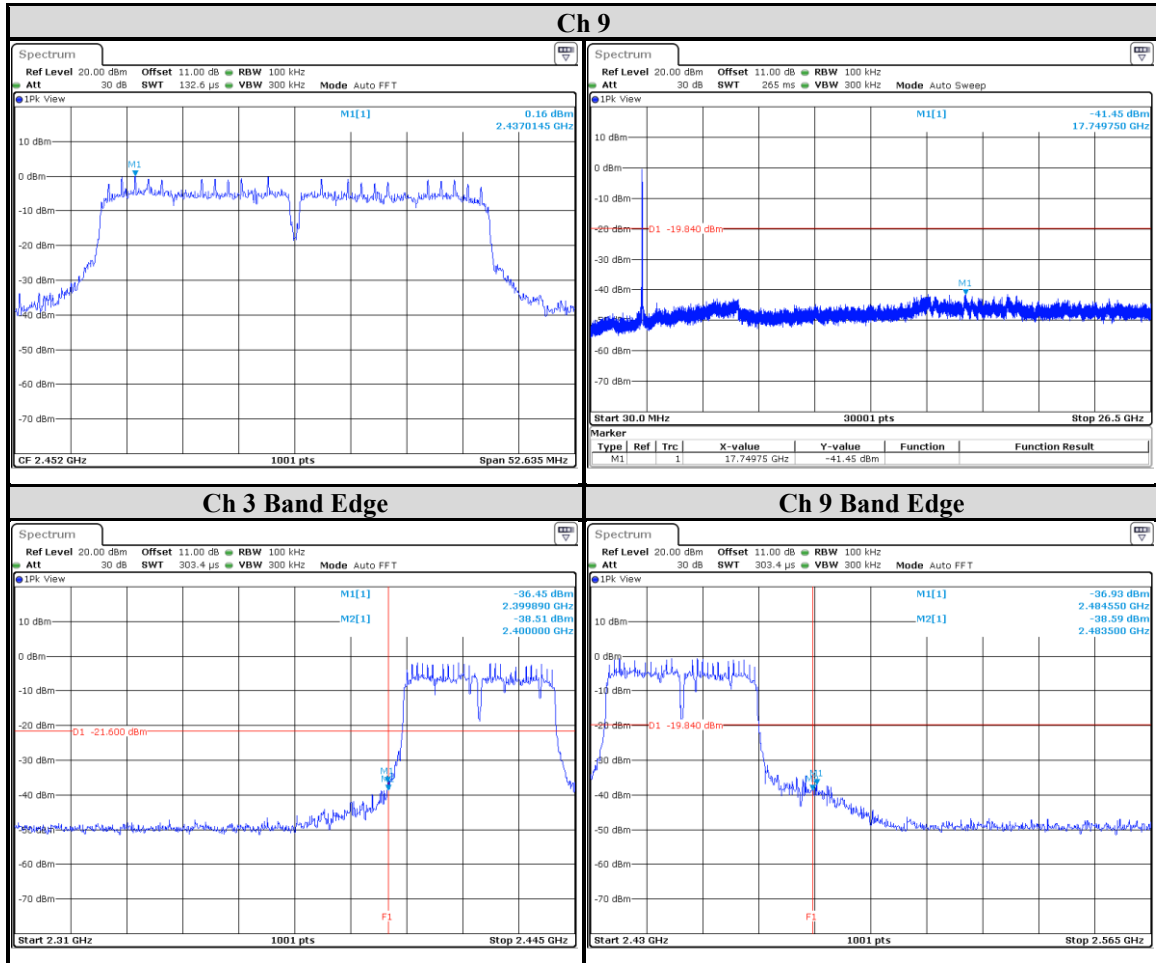
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9.5. Radiated Spurious Emission

Requirements

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequency(MHz)	Field strength (microvolts/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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

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Test Procedures

[For 9 kHz ~ 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. For measurement below 30MHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

[For above 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

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Note:

- a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- b. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.

Configuration	Average	
	RBW	VBW
802.11b	1MHz	200Hz
802.11g		1kHz
802.11n (HT20)		1kHz
802.11n (HT40)		2kHz

Note: Refer to section 6.6 for duty cycle.

- d. All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported, the other emission levels were low against the limit.

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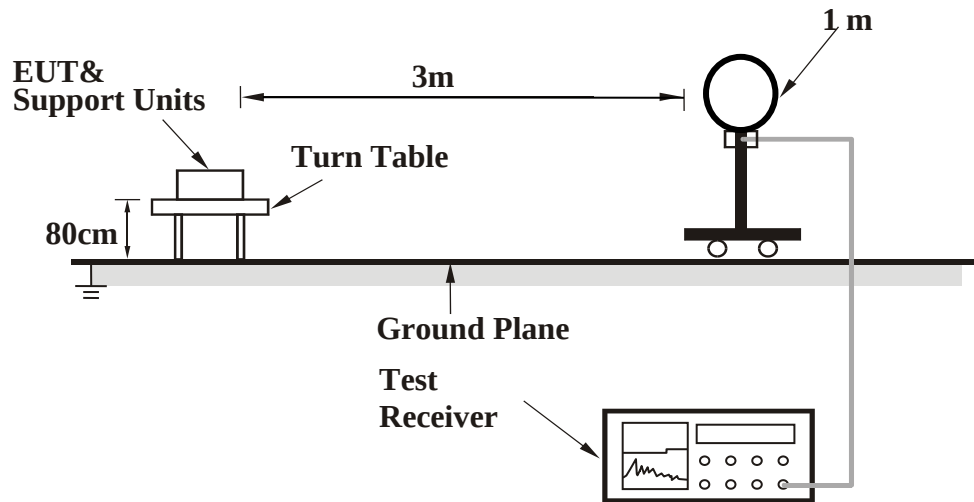
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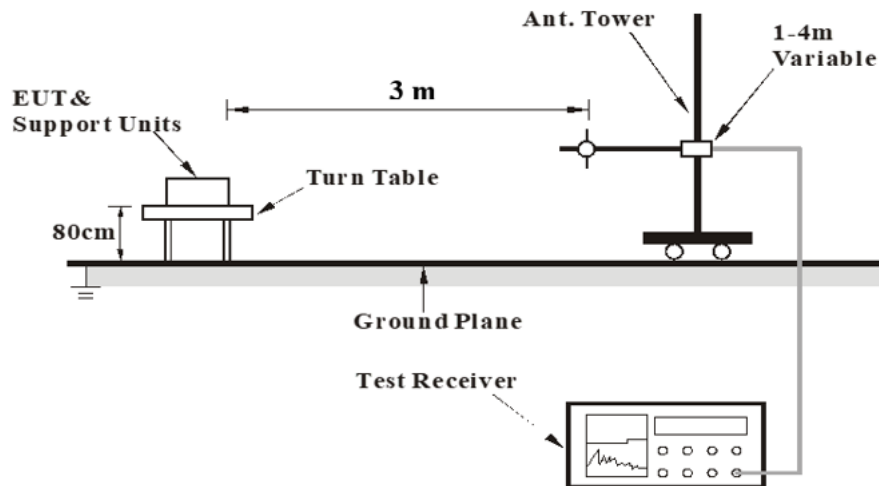


Test Setup

<Frequency Range 9 kHz ~ 30 MHz>



<Frequency Range 30 MHz ~ 1 GHz >



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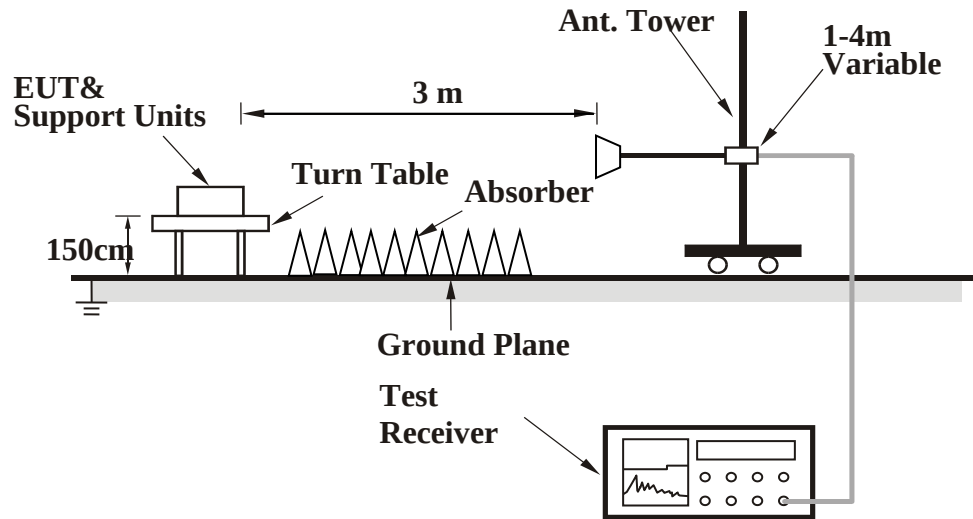
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<Frequency Range above 1 GHz>



For the actual test configuration, please refer to the Setup Configurations.

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Test Data

Above 1GHz Data

802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4824	51.32	2.55	53.87	74	-20.13	Peak
-	2386	43.33	6.09	49.42	54	-4.58	Average
@	2412	93.17	6.13	99.3	-	-	Average
-	2385.62	48.74	6.09	54.83	74	-19.17	Peak
@	2412	97.14	6.13	103.27	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4824	47.74	2.55	50.29	74	-23.71	Peak
-	2386.38	38.17	6.09	44.26	54	-9.74	Average
@	2412	86.45	6.13	92.58	-	-	Average
-	2386.57	43.99	6.1	50.09	74	-23.91	Peak
@	2412	90.34	6.13	96.47	-	-	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	47.74	2.66	50.4	74	-23.6	Peak
-	2333.75	34.18	6.1	40.28	54	-13.72	Average
@	2437	93.15	6.12	99.27	-	-	Average
-	2486.13	31	6.1	37.1	54	-16.9	Average
-	2339.26	45.59	6.07	51.66	74	-22.34	Peak
@	2437	97.01	6.12	103.13	-	-	Peak
-	2484.61	41.91	6.1	48.01	74	-25.99	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	45.59	2.66	48.25	74	-25.75	Peak
-	2334.32	31.61	6.09	37.7	54	-16.3	Average
@	2437	86	6.12	92.12	-	-	Average
-	2485.18	29.74	6.1	35.84	54	-18.16	Average
-	2340.4	42.82	6.07	48.89	74	-25.11	Peak
@	2437	89.91	6.12	96.03	-	-	Peak
-	2492.4	39.67	6.11	45.78	74	-28.22	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4924	45.43	2.61	48.04	74	-25.96	Peak
@	2462	92.49	6.12	98.61	-	-	Average
-	2487.65	36.48	6.1	42.58	54	-11.42	Average
@	2462	96.47	6.12	102.59	-	-	Peak
-	2487.65	43.61	6.1	49.71	74	-24.29	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4924	44.49	2.61	47.1	74	-26.9	Peak
@	2462	86.99	6.12	93.11	-	-	Average
-	2488.03	33.49	6.1	39.59	54	-14.41	Average
@	2462	90.85	6.12	96.97	-	-	Peak
-	2487.46	41.87	6.11	47.98	74	-26.02	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4824	44.18	2.55	46.73	74	-27.27	Peak
-	2389.99	46.1	6.1	52.2	54	-1.8	Average
@	2412	88.11	6.13	94.24	-	-	Average
-	2389.42	57.65	6.1	63.75	74	-10.25	Peak
@	2412	96.91	6.13	103.04	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4824	41.23	2.55	43.78	74	-30.22	Peak
-	2389.99	40.89	6.1	46.99	54	-7.01	Average
@	2412	81.51	6.13	87.64	-	-	Average
-	2389.8	51.99	6.1	58.09	74	-15.91	Peak
@	2412	89.37	6.13	95.5	-	-	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0876 / 6.0



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EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	41.95	2.66	44.61	74	-29.39	Peak
-	2334.32	34.22	6.09	40.31	54	-13.69	Average
@	2437	88.04	6.12	94.16	-	-	Average
-	2484.99	31.19	6.1	37.29	54	-16.71	Average
-	2310.76	46.99	6.2	53.19	74	-20.81	Peak
@	2437	96.55	6.12	102.67	-	-	Peak
-	2492.59	40.9	6.1	47	74	-27	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	39.62	2.66	42.28	74	-31.72	Peak
-	2334.32	31.65	6.09	37.74	54	-16.26	Average
@	2437	81.39	6.12	87.51	-	-	Average
-	2487.84	29.76	6.1	35.86	54	-18.14	Average
-	2345.91	42.52	6.04	48.56	74	-25.44	Peak
@	2437	89.81	6.12	95.93	-	-	Peak
-	2492.59	40.29	6.1	46.39	74	-27.61	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4924	41.11	2.61	43.72	74	-30.28	Peak
@	2462	87.85	6.12	93.97	-	-	Average
-	2483.66	41.84	6.1	47.94	54	-6.06	Average
@	2462	96.35	6.12	102.47	-	-	Peak
-	2483.66	54	6.1	60.1	74	-13.9	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4924	38.93	2.61	41.54	74	-32.46	Peak
@	2462	82.84	6.12	88.96	-	-	Average
-	2483.66	37.7	6.1	43.8	54	-10.2	Average
@	2462	90.14	6.12	96.26	-	-	Peak
-	2483.66	46.34	6.1	52.44	74	-21.56	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4824	43.89	2.55	46.44	74	-27.56	Peak
-	2389.61	44.7	6.1	50.8	54	-3.2	Average
@	2412	86.46	6.13	92.59	-	-	Average
-	2388.09	57.08	6.1	63.18	74	-10.82	Peak
@	2412	95.81	6.13	101.94	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4824	38.6	2.55	41.15	74	-32.85	Peak
-	2389.99	40.77	6.1	46.87	54	-7.13	Average
@	2412	79.69	6.13	85.82	-	-	Average
-	2388.47	52.08	6.1	58.18	74	-15.82	Peak
@	2412	85.08	6.13	91.21	-	-	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	37.79	2.66	40.45	74	-33.55	Peak
-	2369.66	34.44	6.07	40.51	54	-13.49	Average
@	2437	86.02	6.12	92.14	-	-	Average
-	2485.94	31.39	6.1	37.49	54	-16.51	Average
-	2365.86	45.5	6.06	51.56	74	-22.44	Peak
@	2437	93.34	6.12	99.46	-	-	Peak
-	2489.93	39.99	6.1	46.09	74	-27.91	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	37.91	2.66	40.57	74	-33.43	Peak
-	2342.49	31.68	6.07	37.75	54	-16.25	Average
@	2437	79.71	6.12	85.83	-	-	Average
-	2497.91	29.92	6.1	36.02	54	-17.98	Average
-	2339.64	42.14	6.07	48.21	74	-25.79	Peak
@	2437	88.46	6.12	94.58	-	-	Peak
-	2488.79	39.91	6.1	46.01	74	-27.99	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4924	38.57	2.61	41.18	74	-32.82	Peak
@	2462	85.9	6.12	92.02	-	-	Average
-	2483.66	38.38	6.1	44.48	54	-9.52	Average
@	2462	94.65	6.12	100.77	-	-	Peak
-	2483.85	50.96	6.1	57.06	74	-16.94	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4924	36.89	2.61	39.5	74	-34.5	Peak
@	2462	80.64	6.12	86.76	-	-	Average
-	2483.66	34.93	6.1	41.03	54	-12.97	Average
@	2462	87.77	6.12	93.89	-	-	Peak
-	2483.66	43.47	6.1	49.57	74	-24.43	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 3	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4844	37.03	2.66	39.69	74	-34.31	Peak
-	2387.33	46.61	6.1	52.71	54	-1.29	Average
@	2422	80.5	6.13	86.63	-	-	Average
-	2385.05	57.46	6.09	63.55	74	-10.45	Peak
@	2422	90.74	6.13	96.87	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4844	38.97	2.66	41.63	74	-32.37	Peak
-	2389.8	41.83	6.1	47.93	54	-6.07	Average
@	2422	77.36	6.13	83.49	-	-	Average
-	2384.67	53.89	6.09	59.98	74	-14.02	Peak
@	2422	83.02	6.13	89.15	-	-	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	39.06	2.66	41.72	74	-32.28	Peak
-	2389.99	43.66	6.1	49.76	54	-4.24	Average
@	2437	84.34	6.12	90.46	-	-	Average
-	2484.04	37.98	6.1	44.08	54	-9.92	Average
-	2388.47	53.36	6.1	59.46	74	-14.54	Peak
@	2437	92.81	6.12	98.93	-	-	Peak
-	2485.18	49.16	6.1	55.26	74	-18.74	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	37.04	2.66	39.7	74	-34.3	Peak
-	2388.66	37.47	6.1	43.57	54	-10.43	Average
@	2437	79.41	6.12	85.53	-	-	Average
-	2484.61	36.07	6.1	42.17	54	-11.83	Average
-	2389.99	46.11	6.1	52.21	74	-21.79	Peak
@	2437	86.65	6.12	92.77	-	-	Peak
-	2484.04	43.54	6.1	49.64	74	-24.36	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 9	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4904	39.14	2.63	41.77	74	-32.23	Peak
@	2452	83.99	6.12	90.11	-	-	Average
-	2483.85	45.47	6.1	51.57	54	-2.43	Average
@	2452	91.92	6.12	98.04	-	-	Peak
-	2483.66	59.69	6.1	65.79	74	-8.21	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4904	37.73	2.63	40.36	74	-33.64	Peak
@	2452	80.16	6.12	86.28	-	-	Average
-	2486.32	42.77	6.1	48.87	54	-5.13	Average
@	2452	89.33	6.12	95.45	-	-	Peak
-	2484.61	56.58	6.1	62.68	74	-11.32	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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9 kHz ~ 30 MHz Data:

For 9 kHz to 30 MHz radiated emission have performed all modes of operation were investigated. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

No non-compliance noted:

KDB 414788 D01 OATS and Chamber Correlation Justification

- Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

- OATs and chamber correlation testing had been performed and chamber measured test results is the worst case test result.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

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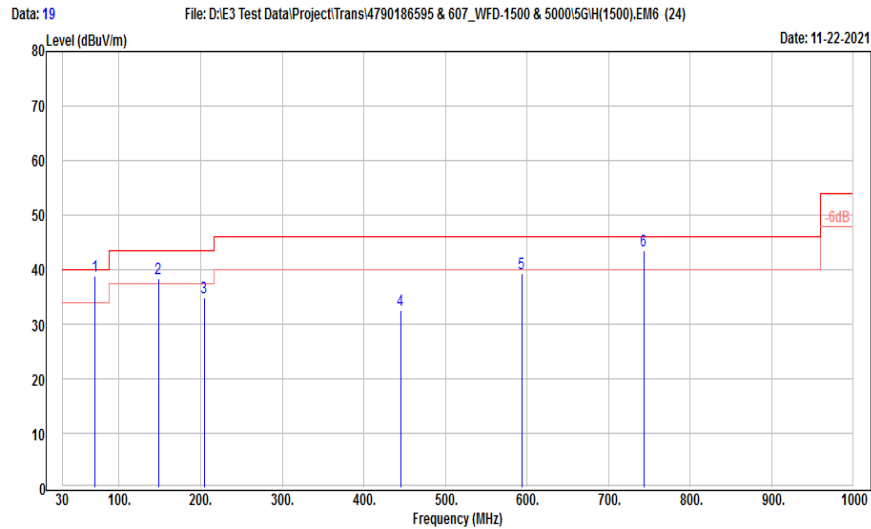


30 MHz ~ 1 GHz Data

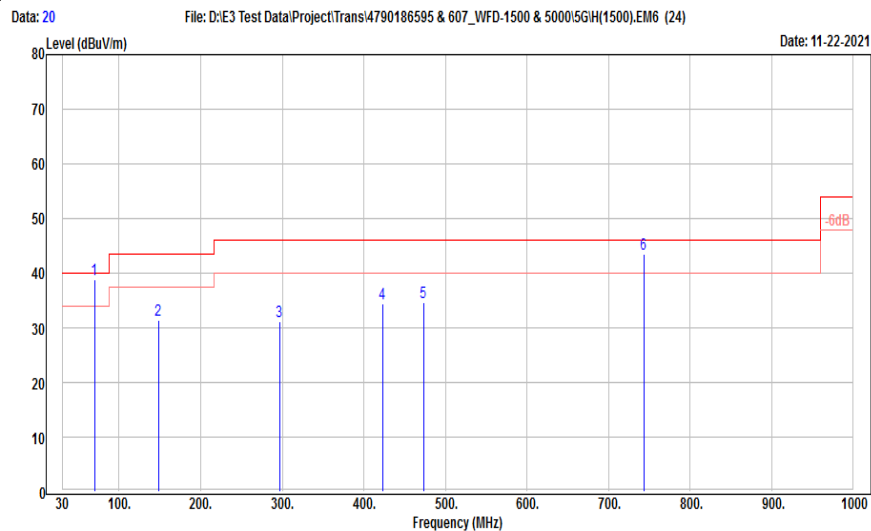
802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	30 MHz ~ 1 GHz

Horizontal



Vertical



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Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	70.74	53.1	-14.25	38.85	40	-1.15	QP
-	148.34	49.95	-11.54	38.41	43.5	-5.09	Peak
-	204.6	48.78	-13.97	34.81	43.5	-8.69	Peak
-	445.16	38.29	-5.79	32.5	46	-13.5	Peak
-	593.57	41.48	-2.16	39.32	46	-6.68	Peak
-	742.95	43.03	0.38	43.41	46	-2.59	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	69.77	52.8	-14.04	38.76	40	-1.24	QP
-	148.34	42.89	-11.54	31.35	43.5	-12.15	Peak
-	296.75	41.32	-10.08	31.24	46	-14.76	Peak
-	422.85	40.71	-6.38	34.33	46	-11.67	Peak
-	473.29	39.87	-5.17	34.7	46	-11.3	Peak
-	742.95	43.08	0.38	43.46	46	-2.54	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
4. The peak result complies with QP limit, QP result is deemed to comply with QP limit.
5. The other emission levels were very low against the limit.

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9.6. AC Power Line Conducted Emission

Requirements

Frequency (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

Test Procedures

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.
2. All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported, the other emission levels were low against the limit.
3. Test data of Result value (dBuV) = Reading value (dBuV) + Correction Factor (dB).
4. Test data of Margin(dB) = Result value (dBuV) - Limit value (dBuV).
5. Test data of Correction Factor (dB) = Insertion loss(dB) + Cable loss(dB).

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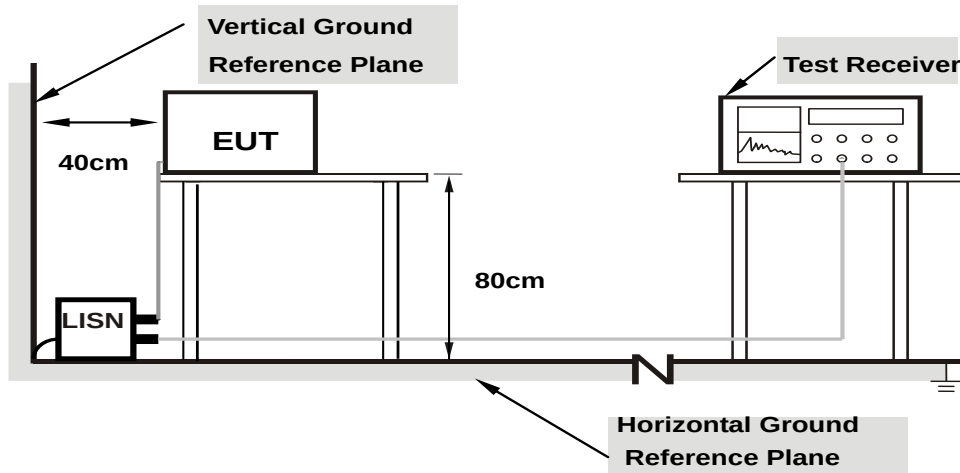
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Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the Setup Configurations.

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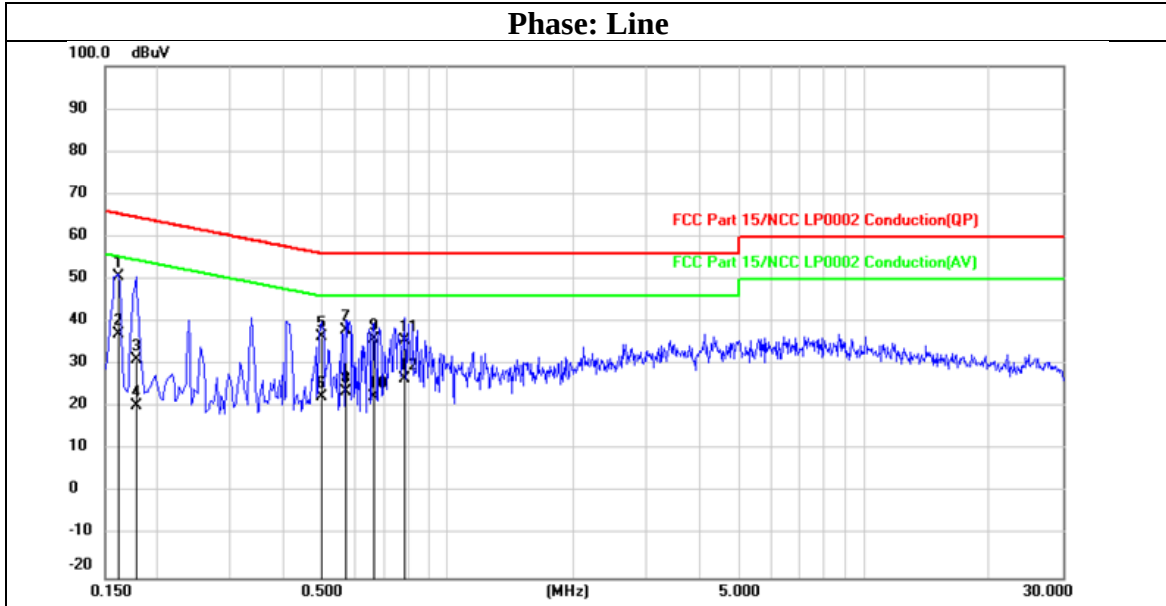
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Test Data

Mode	11b_TX	Channel	1
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1620	31.20	19.49	50.69	65.36	-14.67	QP
2	0.1620	17.54	19.49	37.03	55.36	-18.33	AVG
3	0.1780	11.81	19.49	31.30	64.58	-33.28	QP
4	0.1780	0.72	19.49	20.21	54.58	-34.37	AVG
5	0.4980	16.92	19.49	36.41	56.03	-19.62	QP
6	0.4980	2.97	19.49	22.46	46.03	-23.57	AVG
7	0.5700	18.42	19.50	37.92	56.00	-18.08	QP
8	0.5700	4.03	19.50	23.53	46.00	-22.47	AVG
9	0.6620	16.38	19.50	35.88	56.00	-20.12	QP
10	0.6620	2.81	19.50	22.31	46.00	-23.69	AVG
11	0.7900	16.02	19.52	35.54	56.00	-20.46	QP
12	0.7900	6.99	19.52	26.51	46.00	-19.49	AVG

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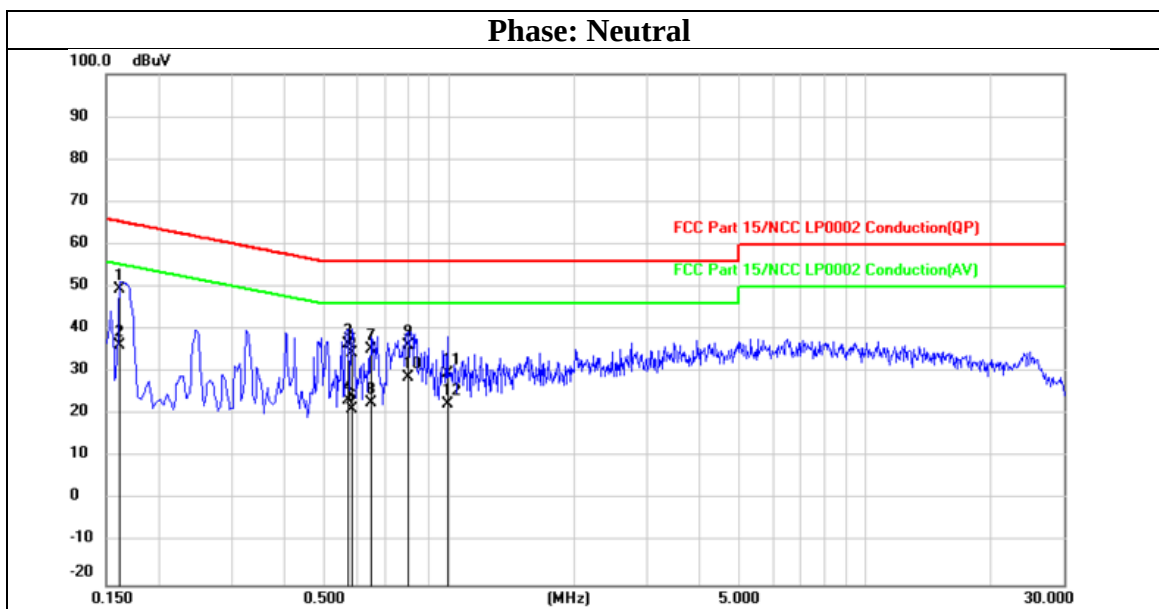
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Mode	11b_TX	Channel	1
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1620	30.01	19.49	49.50	65.36	-15.86	QP
2	0.1620	16.68	19.49	36.17	55.36	-19.19	AVG
3	0.5740	16.99	19.50	36.49	56.00	-19.51	QP
4	0.5740	3.84	19.50	23.34	46.00	-22.66	AVG
5	0.5860	14.96	19.50	34.46	56.00	-21.54	QP
6	0.5860	1.90	19.50	21.40	46.00	-24.60	AVG
7	0.6540	15.88	19.50	35.38	56.00	-20.62	QP
8	0.6540	3.26	19.50	22.76	46.00	-23.24	AVG
9	0.7980	16.78	19.51	36.29	56.00	-19.71	QP
10	0.7980	9.30	19.51	28.81	46.00	-17.19	AVG
11	0.9940	10.05	19.50	29.55	56.00	-26.45	QP
12	0.9940	2.87	19.50	22.37	46.00	-23.63	AVG

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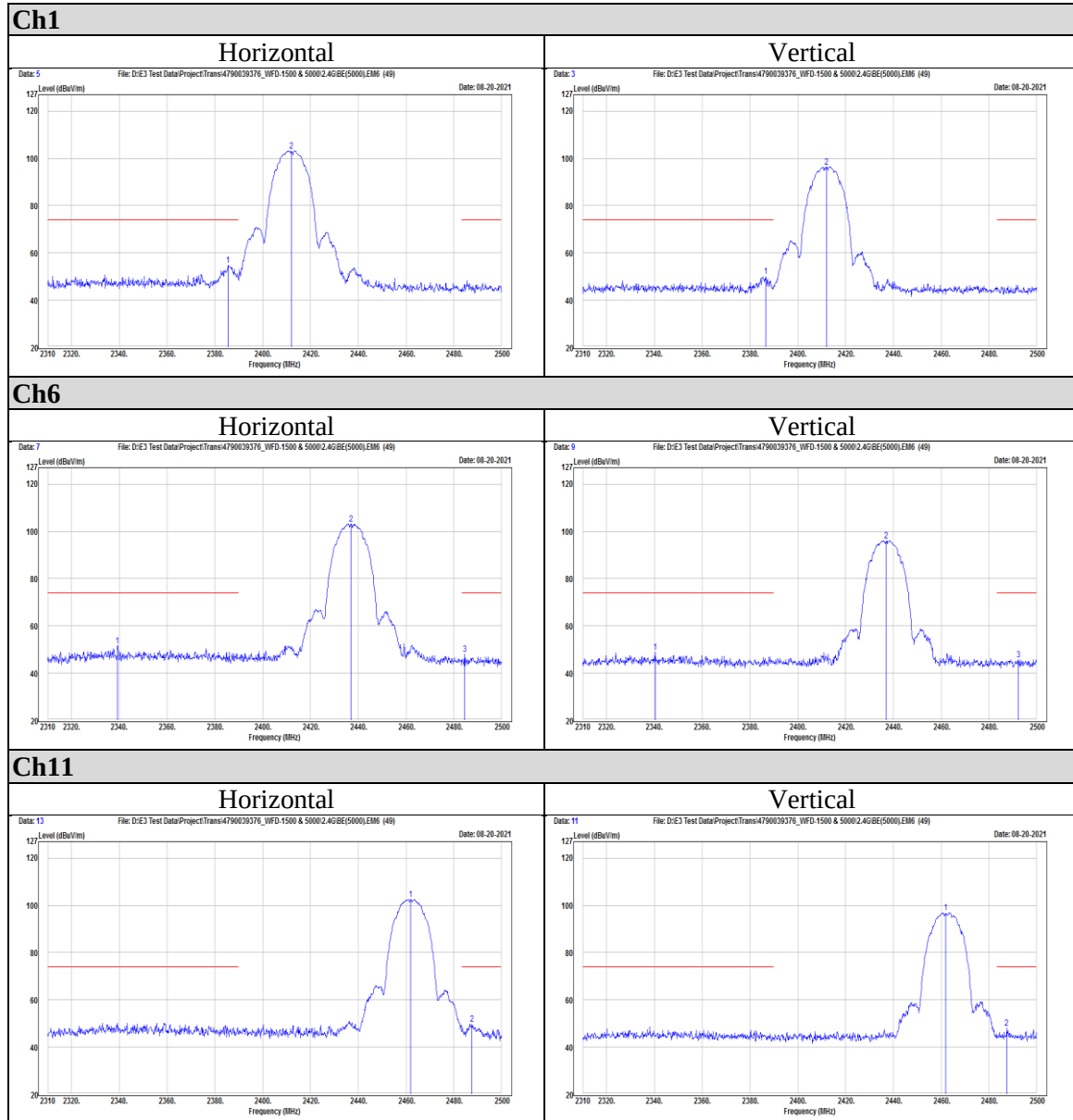
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Appendix I Radiated Band Edge Measurement

802.11b

Peak



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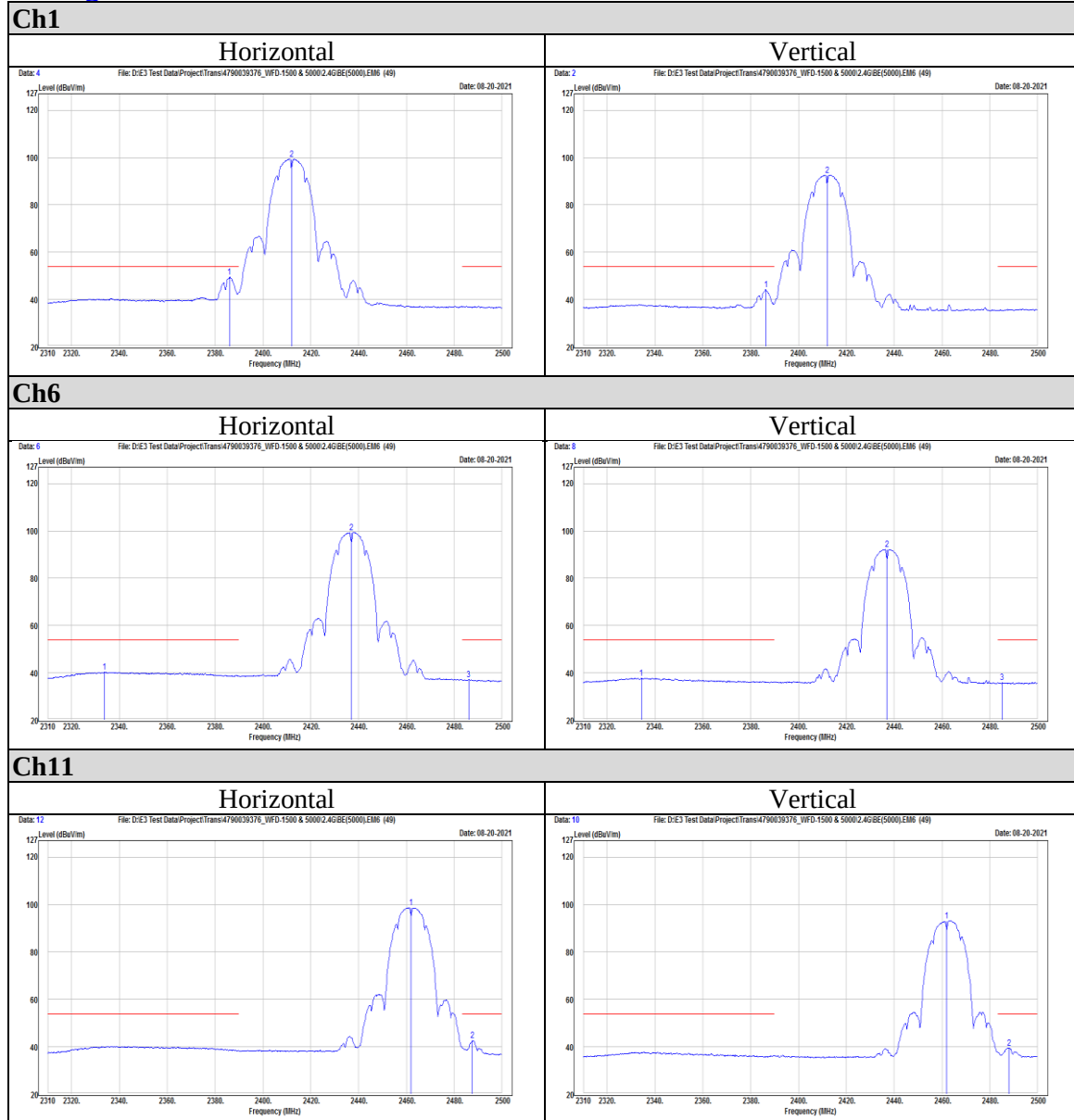
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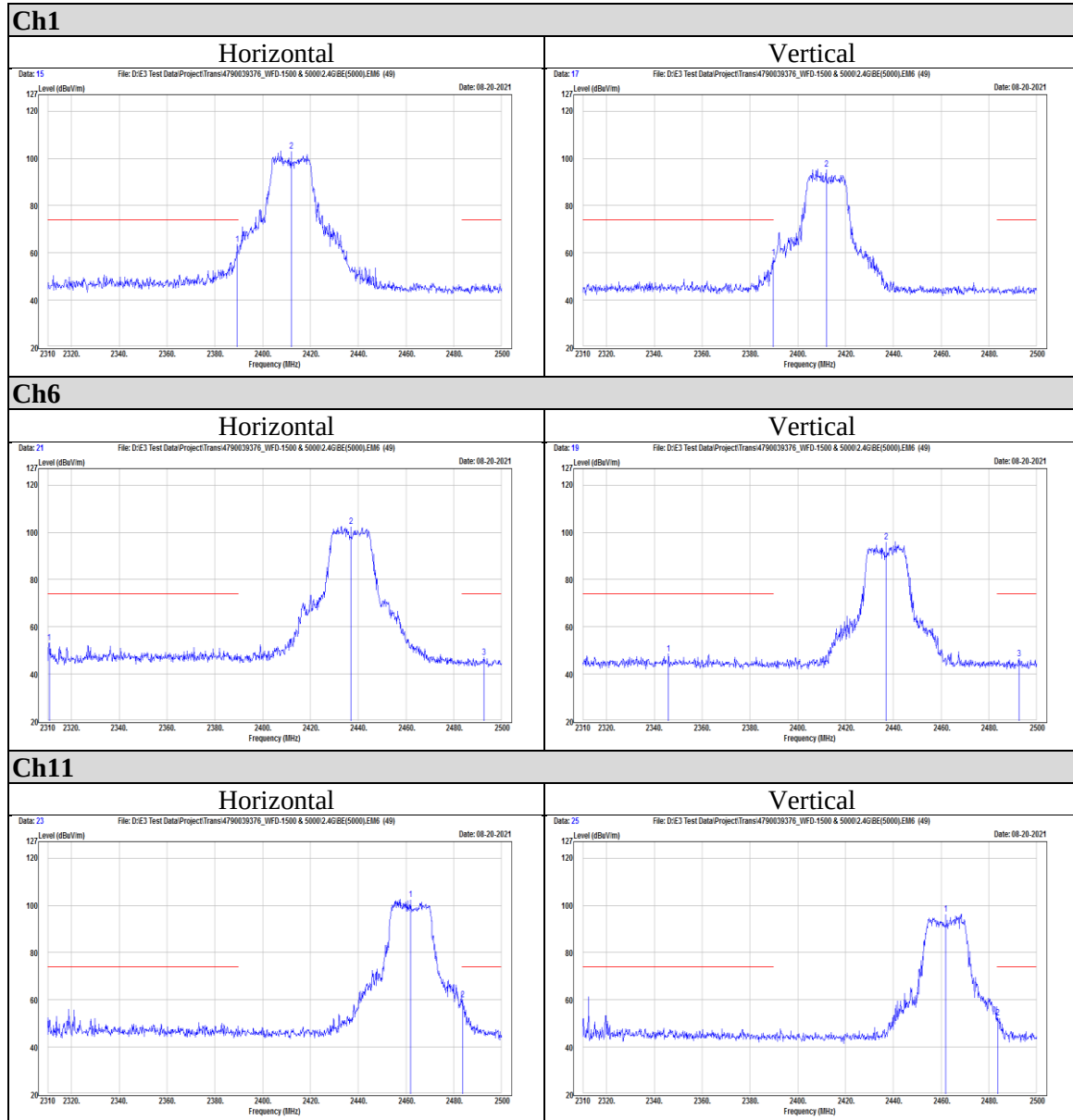
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802.11g

Peak



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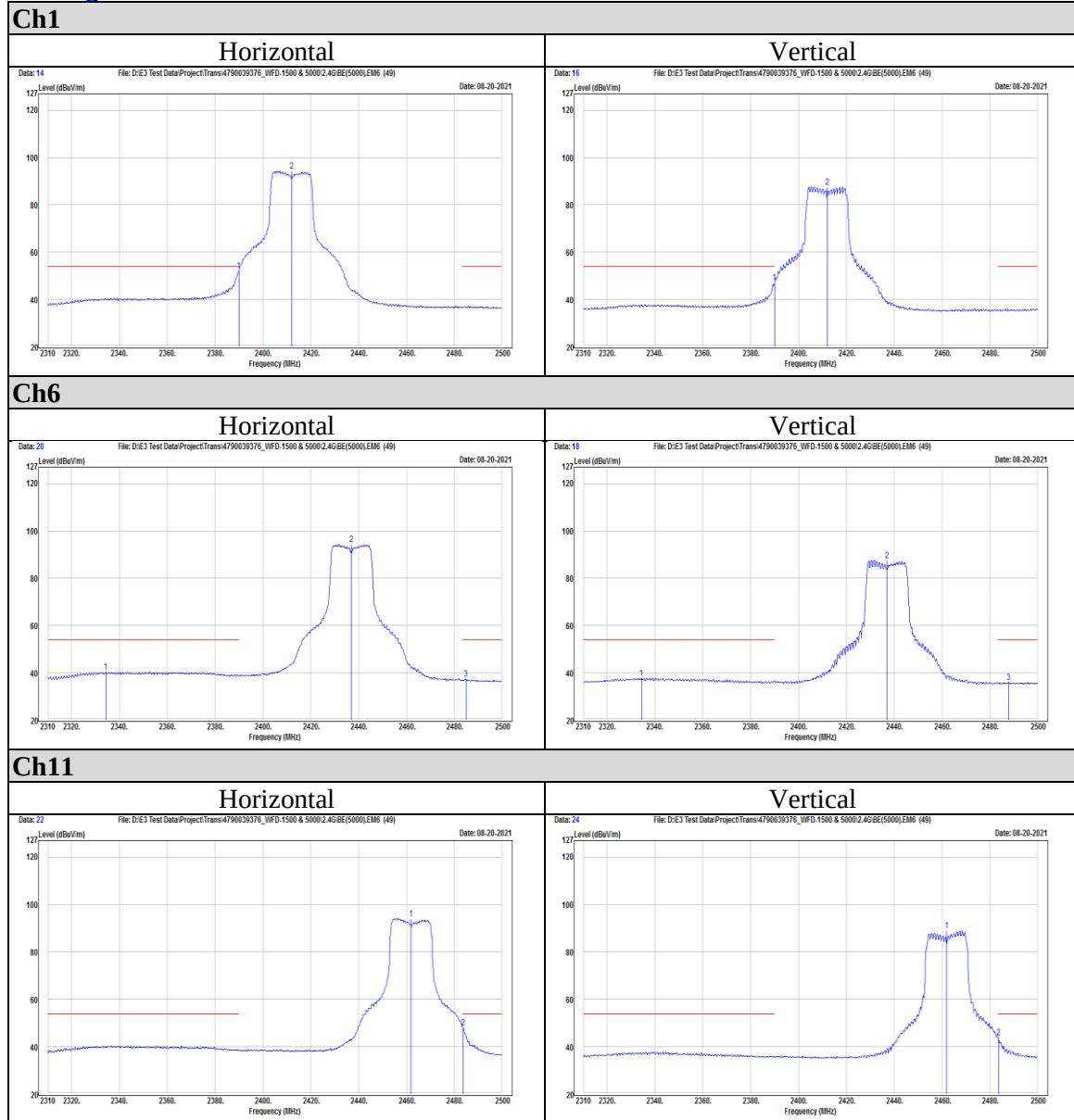
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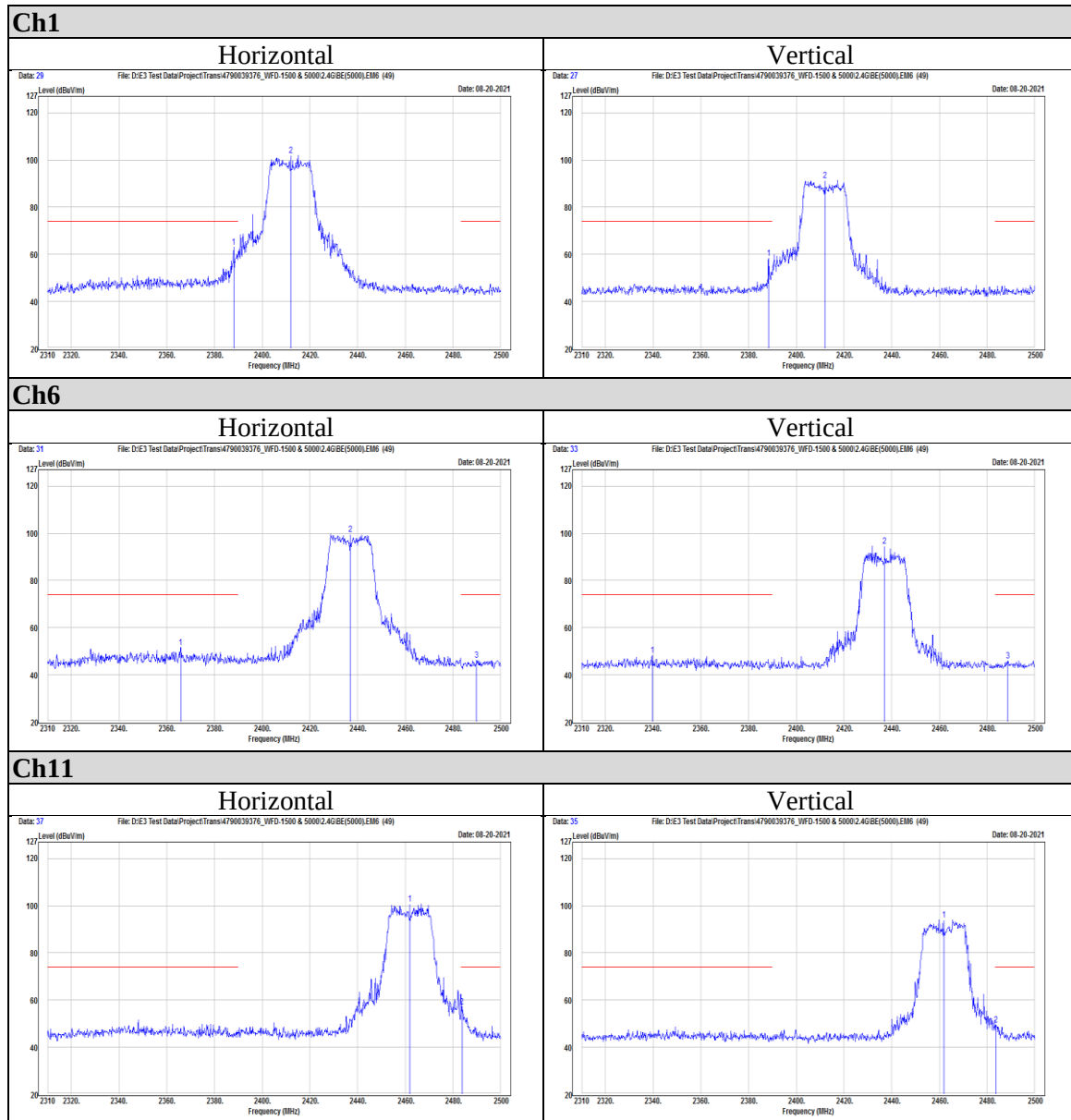
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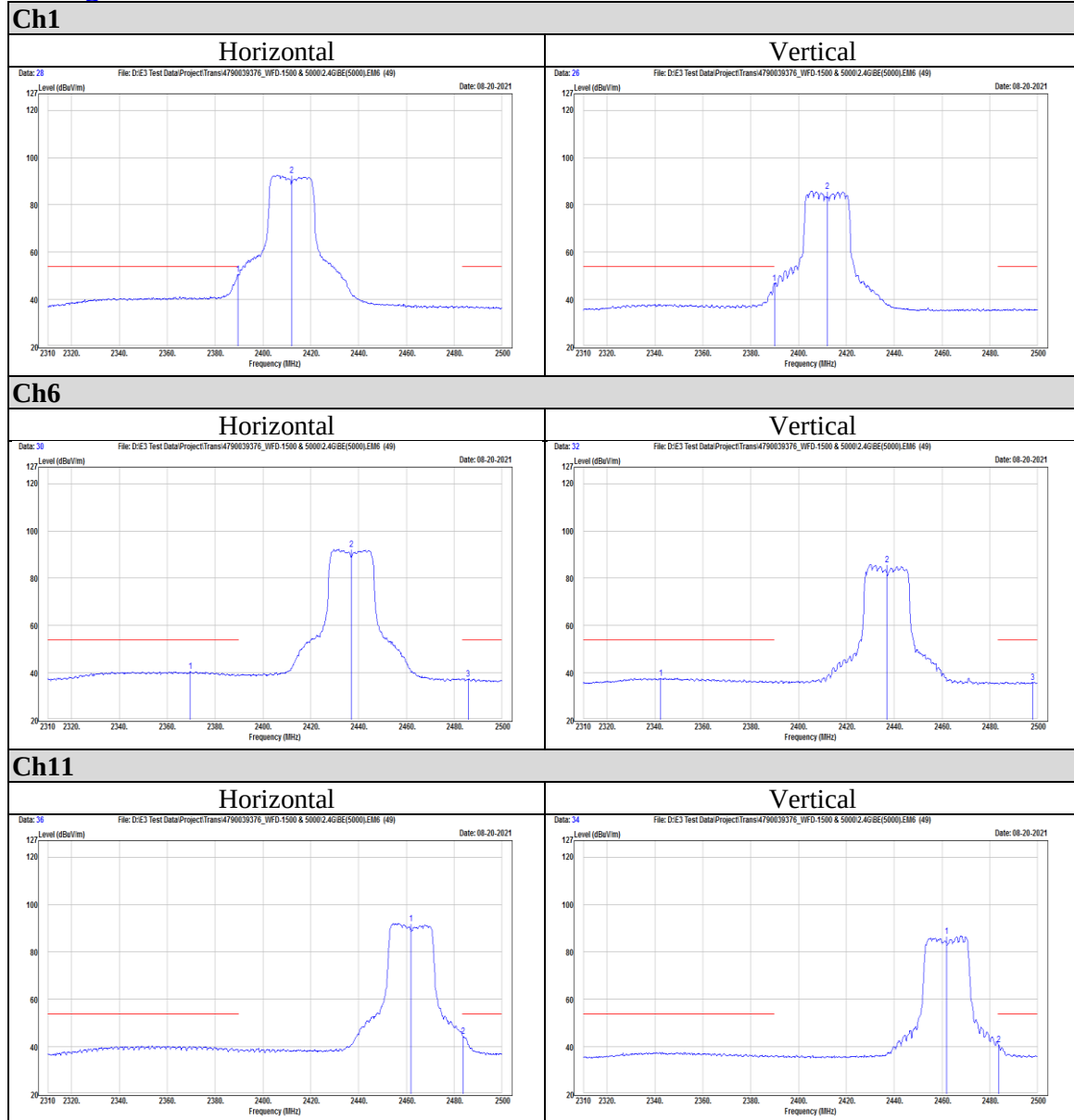
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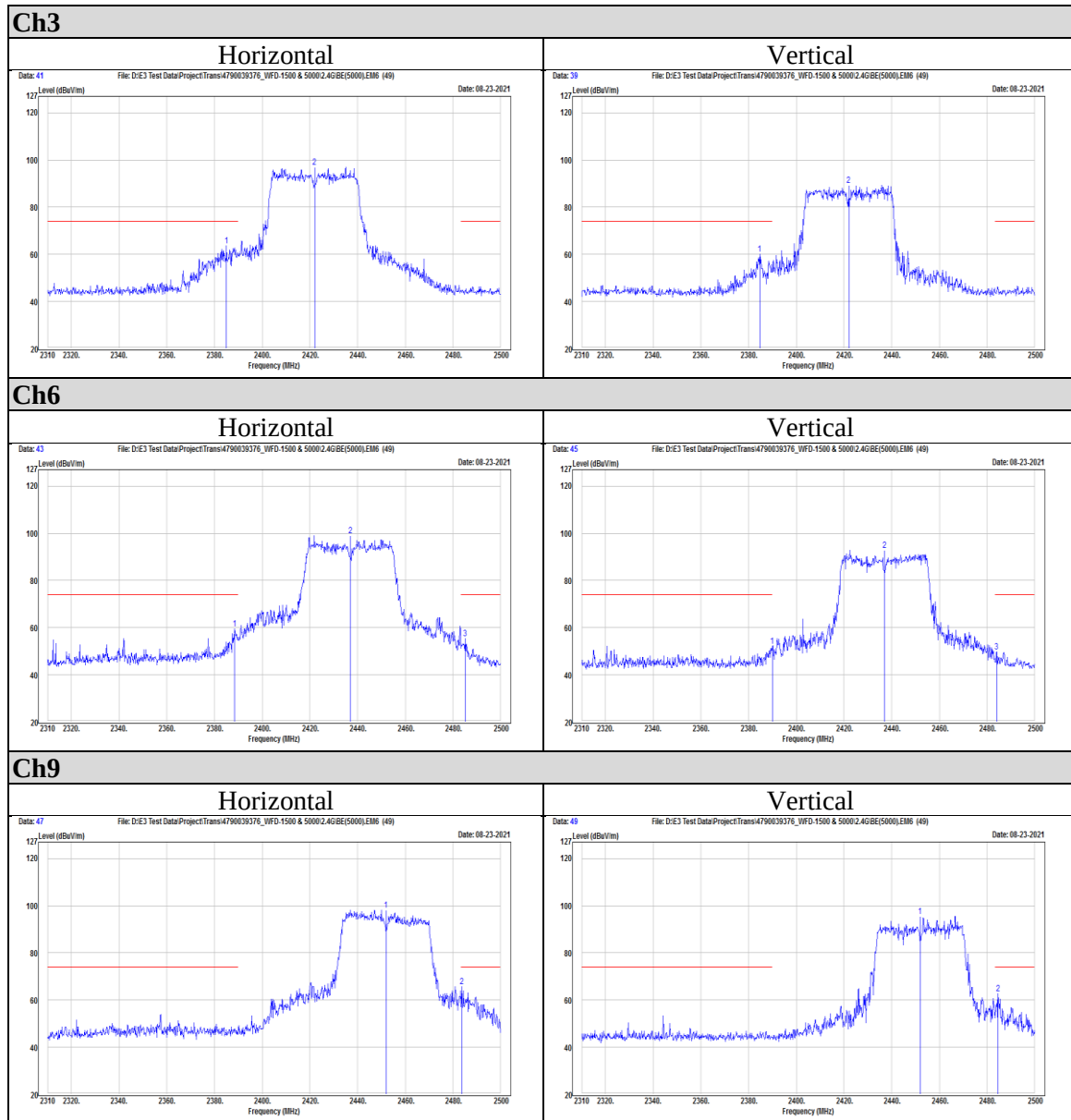
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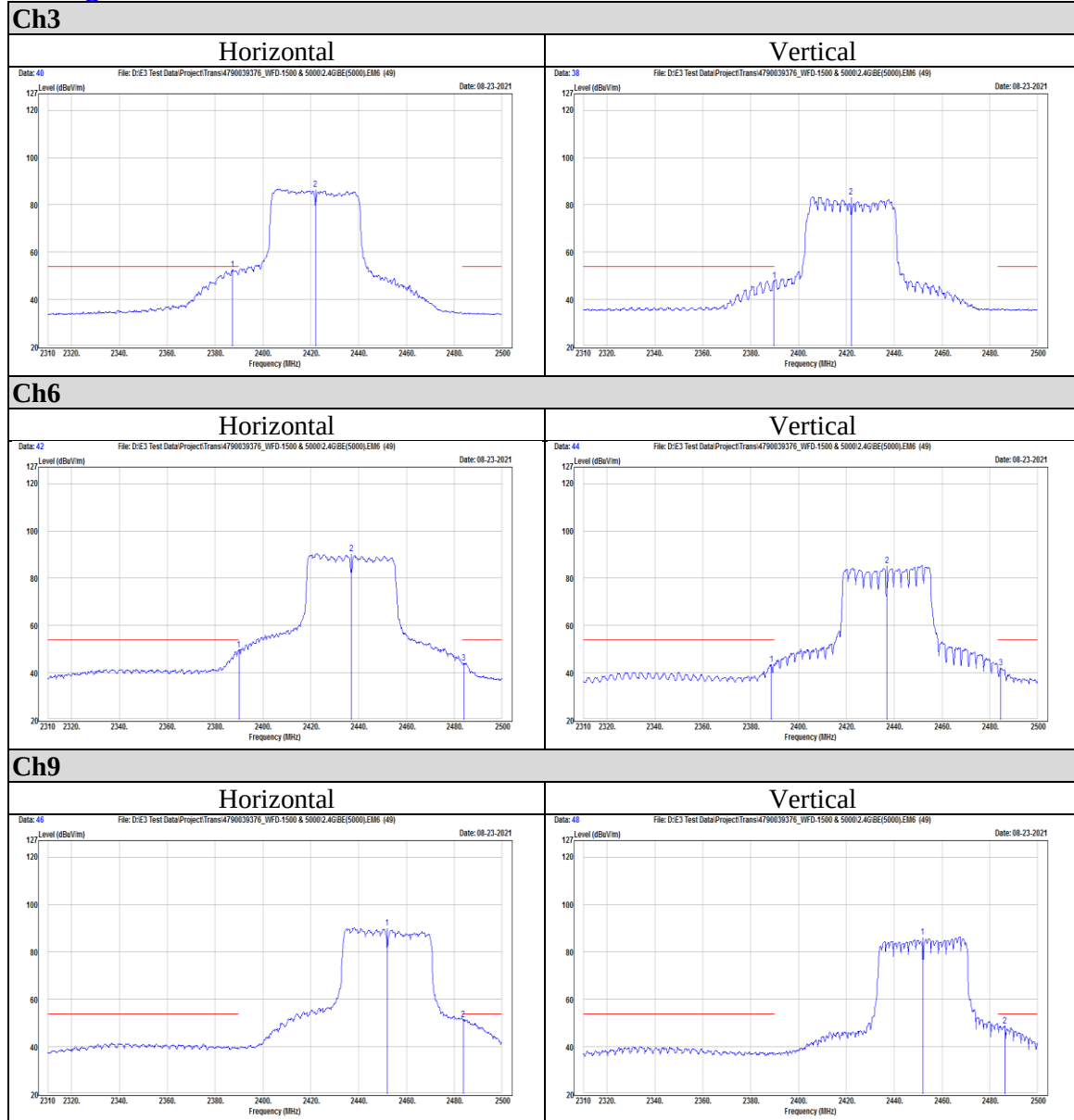
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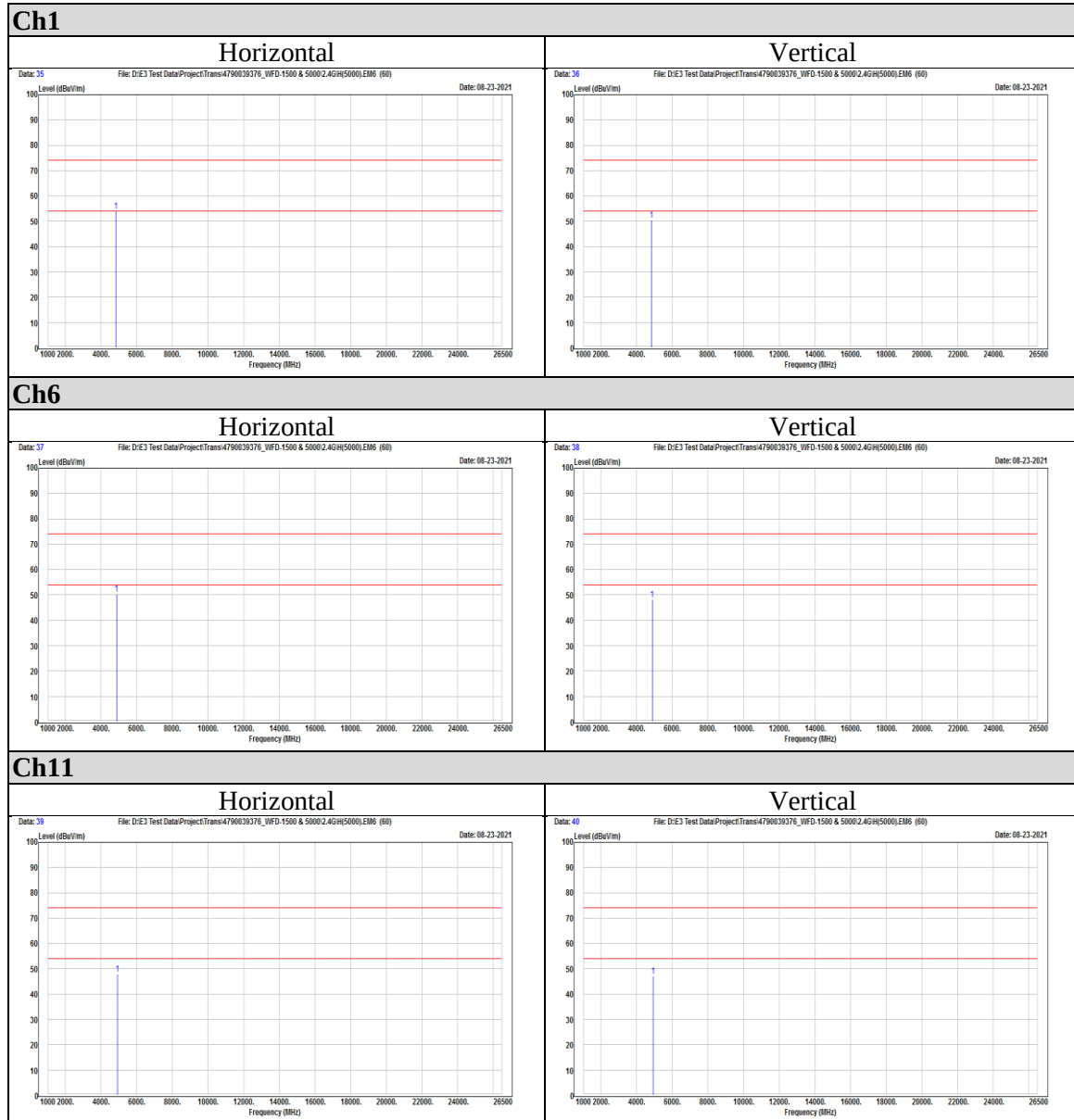




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Appendix II Radiated Spurious Emission Measurement

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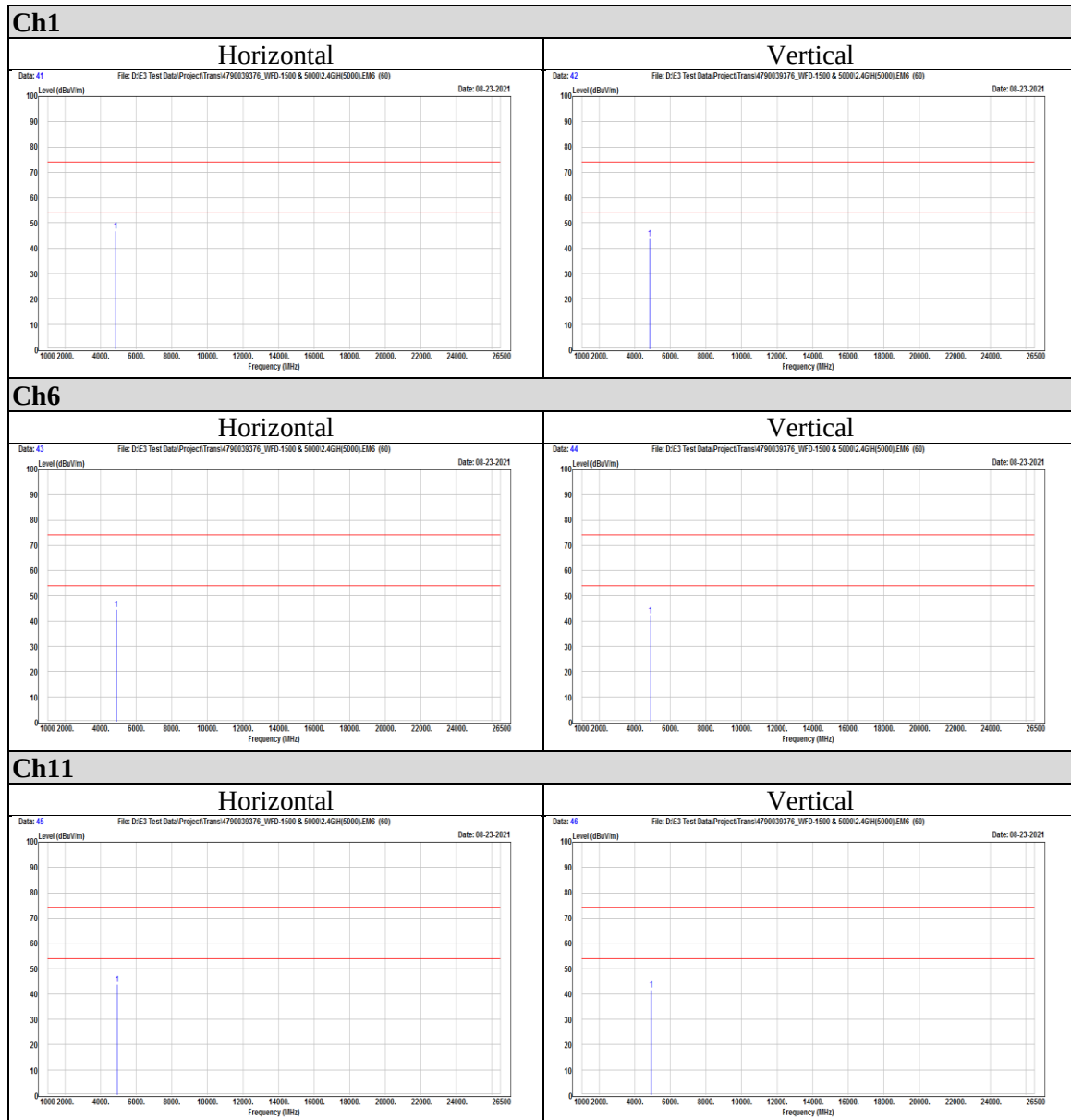
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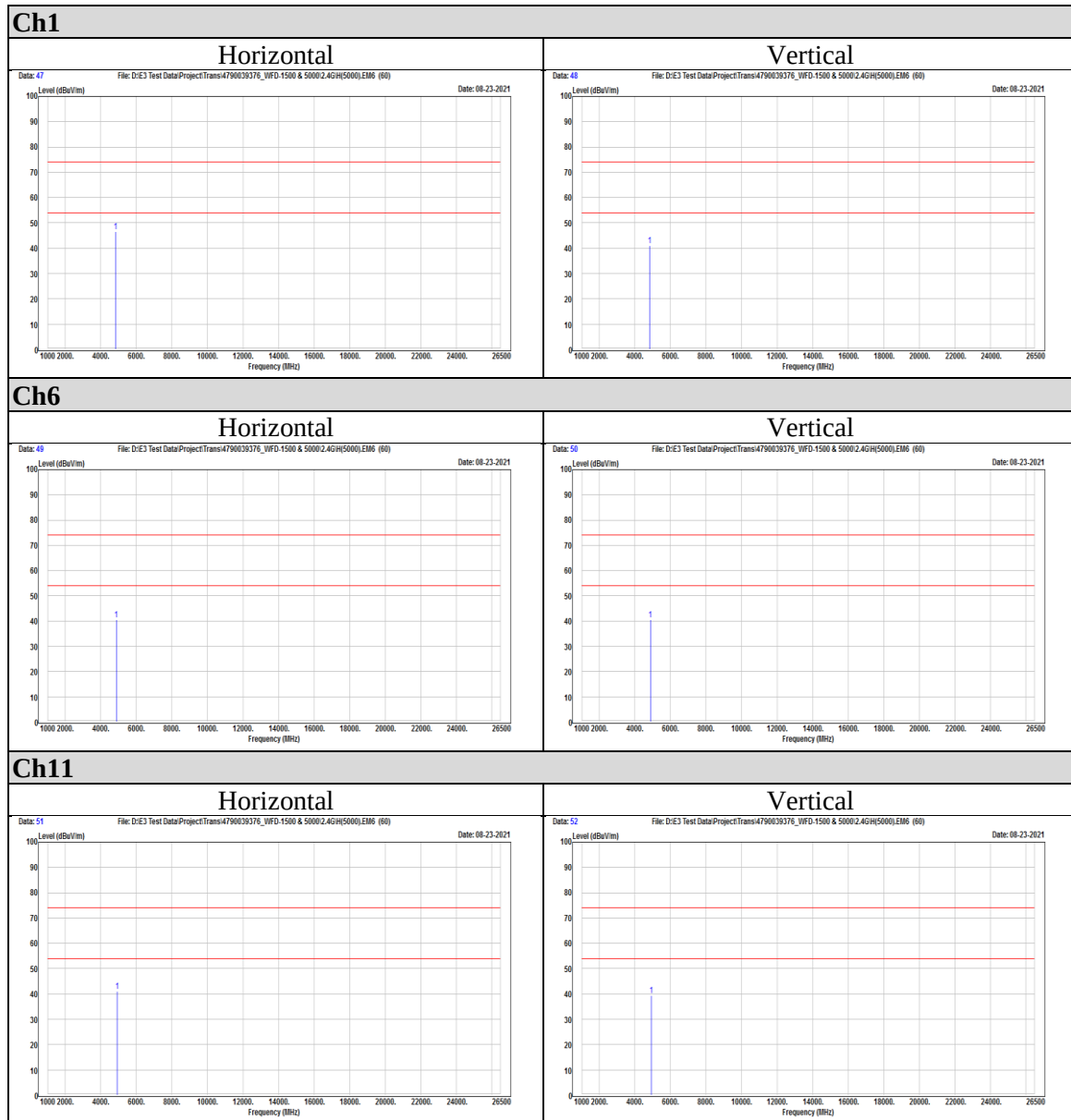
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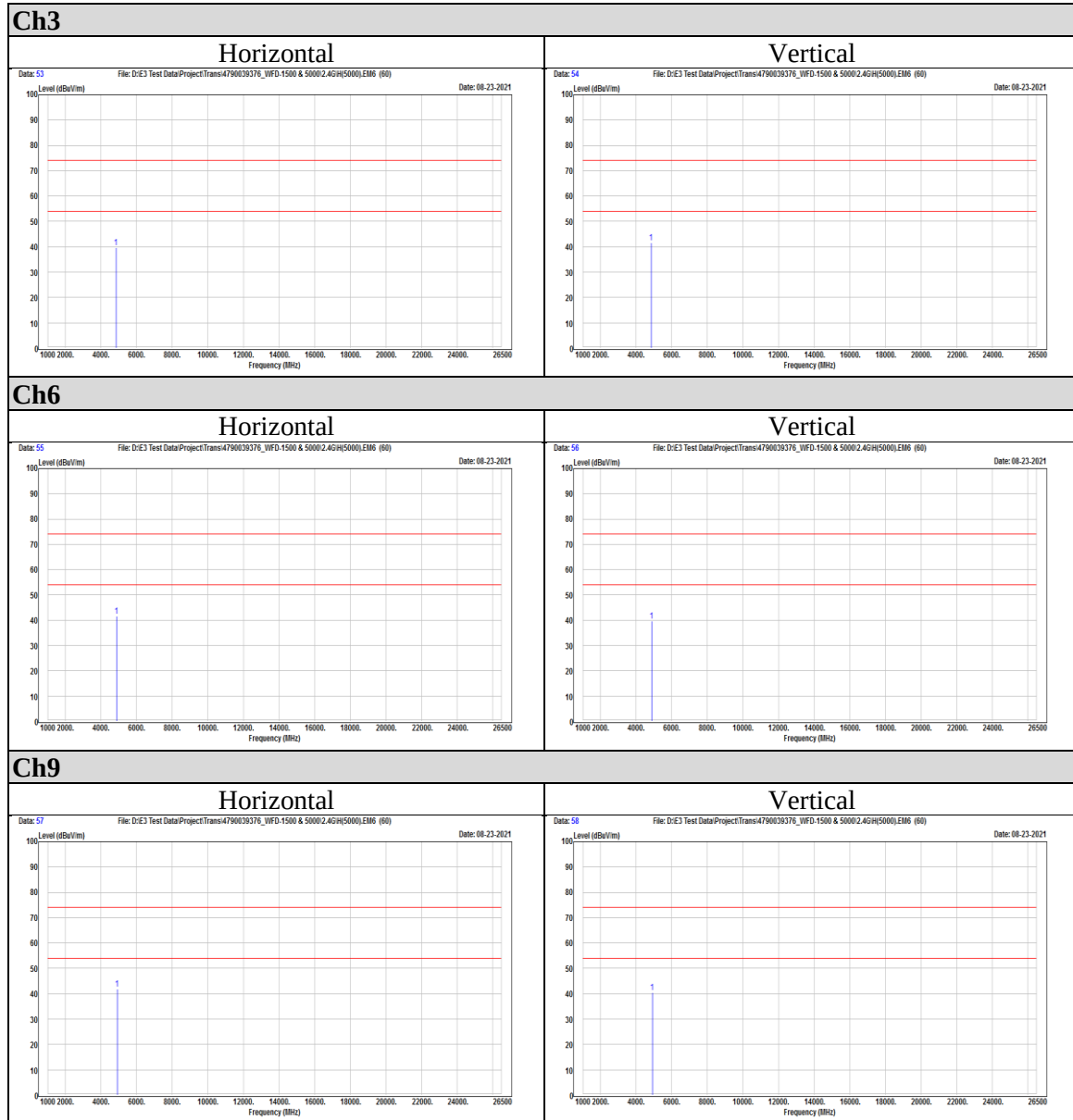
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