



Test report No. : 4789813598-US-R0-V0
Page : 1 of 115
Issued date : 2021/8/16
FCC ID : 2AAJXQS-IQWIFI6

RADIO TEST REPORT

Product : IQ WiFi 6
Model Name : IQ WiFi 6
FCC ID : 2AAJXQS-IQWIFI6
Test Regulation : FCC 47 CFR Part 15 Subpart C (Section 15.247)
Received Date : 2021/3/8
Test Date : 2021/3/23 ~ 2021/4/27
Issued Date : 2021/8/16

Applicant : Qolsys Inc.
1900 The Alameda, Suite 420, San Jose, CA 95126

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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Doc No: 17-EM-F0876 / 5.0



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1. Attestation of Test Results

APPLICANT: Qolsys Inc.
 1900 The Alameda, Suite 420, San Jose, CA 95126

MANUFACTURER: Funing Precision Component Co, Ltd
 Lot B, Que Vo Industrial Zone, Nam Son Ward, Bac Ninh
 City, Bac Ninh Province, Vietnam.

EUT DESCRIPTION: IQ WiFi 6

BRAND: Qolsys

MODEL: IQ WiFi 6

SAMPLE STAGE: Mass-Production

DATE of TESTED: 2021/3/23 ~ 2021/4/27

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:

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Date : 2021/8/16

Approved and Authorized By:

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Date : 2021/8/16

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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 and KDB 662911 D01 Multiple Transmitter Output v02r01.

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. The full scope of accreditation can be viewed at http://accreditation.taftw.org.tw/taf/public/basic/viewApplyItems.action?unitNo=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	IQ WiFi 6
Brand Name	Qolsys
Model Name	IQ WiFi 6
Operating Frequency	2412MHz ~ 2462MHz
Modulation	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
Transfer Rate	802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to MCS15 802.11ax: up to HE11
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20), 802.11ax (HE20) 7 for 802.11n (HT40), 802.11ax (HE40)
Maximum Output Power	Non-Beamforming mode: 802.11b: 28.32 dBm 802.11g: 29.76 dBm 802.11ax (HE20): 29.69 dBm 802.11ax (HE40): 28.84 dBm Beamforming mode: 802.11ax (HE20): 29.18 dBm 802.11ax (HE40): 28.84 dBm
Normal Voltage	120Vac/ 60Hz
S/N	HHA3210500038
Software Version	N/A

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Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	Tx,Rx Function
802.11b	2TX,2RX
802.11g	2TX,2RX
802.11n (HT20)	2TX,2RX
802.11n (HT40)	2TX,2RX
802.11ax (HE20)	2TX,2RX
802.11ax (HE40)	2TX,2RX

* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ax mode for HE20 / HE40, therefore investigated worst case to representative mode in test report.

2. The EUT contains following accessory devices:

Product	Brand	Model	Description
AC adapter	Sure Power	SW81-120150-01	Input: 100-240V, 50-60 Hz, 0.68A Output: 12V, 1.5A Length: 1.8m
RJ-45 cable	Neiyi	NYS4681	Non-shielded Length: 1.5m
cradle	N/A	N/A	N/A

3. The device of WLAN 2.4G radio and WLAN 5G radio can transmit simultaneously, simultaneously transmission condition as following table:

Condition	Technology
1	WLAN (2.4GHz) + WLAN (5GHz)

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found, worst case to representative condition in test report.

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, 802.11n (HT20), 802.11ax (HE20):

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), 802.11ax (HE40):

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	23~27°C/ 60~65%RH	120Vac/ 60Hz	2021/03/23~ 2021/04/27	WaterNil Guan
Radiated Spurious Emission	966-2	22~26°C/ 60~65%RH	120Vac/ 60Hz	2021/03/23~ 2021/04/27	WaterNil Guan
AC power Line Conducted Emission	SR1	22~26°C/ 60~65%RH	120Vac/ 60Hz	2021/03/23~ 2021/04/27	WaterNil Guan

FCC Test Firm Registration Number: 498077

6.4. Description of Available Antennas

Ant. No.	Transmitter Circuit	Brand Name	Model Name	Ant. Type	Frequency Band (GHz)	Maximum Gain (dBi)
1	Chain (0)	Passive System Alliance	WA-P-LB-02-849	PIFA	2.4~2.4835	3.74
					5.15~5.35	5.42
					5.47~5.725	5.77
					5.725~5.85	5.51
2	Chain (1)	Passive System Alliance	WA-P-LB-03-172	PIFA	2.4~2.4835	3.43
					5.15~5.35	5.17
					5.47~5.725	5.26
					5.725~5.85	5.26

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

- For AC power line conducted emissions, the pre-scan has been determined by AC power 120Vac/60Hz (worst case)
- The antenna No.1 has the highest gain, the following tests are all carried out using this antenna
- The fundamental of the EUT was investigated in three orthogonal axes X/Y/Z, it was determined that Z axis was worst-case . Therefore, all final radiated testing was performed with the EUT in Z axis.
- The EUT was investigated in Beamforming mode and non-Beamforming mode, it was determined that non-Beamforming mode was worst-case for bandedge test result. Therefore, all final radiated testing was performed with the EUT in Beamforming mode (Except for legacy mode modulation).
- 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).

Non-Beamforming mode

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	1,2,6,10,11	6 Mbps
	802.11ax20	OFDMA	BPSK	1 to 11	1,2,6,10,11	HE0
	802.11ax40	OFDMA	BPSK	3 to 9	3,4,6,8,9	HE0
Radiated Emissions (Below 1GHz)	802.11b	DSSS	DBPSK	1 to 11	11	1 Mbps
AC Power Line Conducted Emission	802.11b	DSSS	DBPSK	1 to 11	11	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	1,2,6,10,11	6 Mbps
	802.11ax20	OFDMA	BPSK	1 to 11	1,2,6,10,11	HE0
	802.11ax40	OFDMA	BPSK	3 to 9	3,4,6,8,9	HE0

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

*Note: The worse spurious emissions test and maximum output power was found in Non-Beamforming mode. Therefore Beamforming mode only the test data of the RF output power were recorded in this report.

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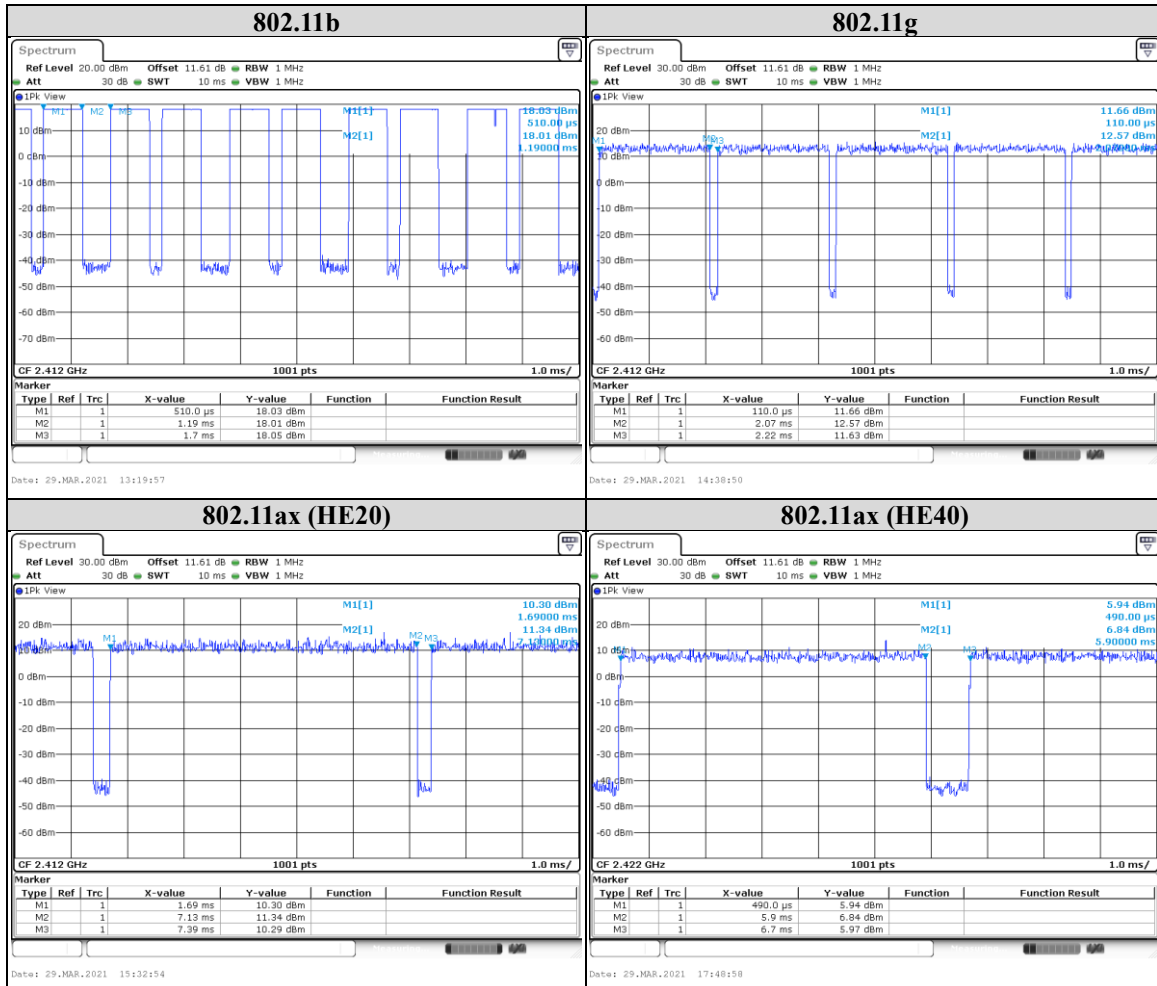
6.6. Duty cycle

802.11b: Duty cycle = 0.68/1.19 = 0.571, Duty factor(dB) = 10 * log(1/0.571) = 2.44

802.11g: Duty cycle = 1.96/2.11 = 0.929, Duty factor(dB) = 10 * log(1/0.929) = 0.33

802.11ax (HE20): Duty cycle = 5.44/5.7 = 0.954, Duty factor(dB) = 10 * log(1/0.954) = 0.21

802.11ax (HE40): Duty cycle = 5.41/6.21 = 0.871, Duty factor(dB) = 10 * log(1/0.871) = 0.6





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
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	2020/6/9	2021/6/8
Preamplifier (1-18 GHz)	EMCI	EMC051835BE	980406	2021/2/3	2022/2/2
Preamplifier (18-40GHz)	EMCI	EMC184040SEE	980426	2020/5/19	2021/5/18
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
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	2020/11/17	2021/11/16
Two-Line V-Network	Rohde & Schwarz	ENV216	102136	2020/8/19	2021/8/18
Impuls-Begrenzer Pulse Limiter	Rohde & Schwarz	ESH3-Z2	102219-Qt	2020/8/12	2021/8/11
Cables	TITAN	CFD200	T0732ACFD20 020A300-1	2021/3/2	2022/3/1

UL Software		
Description	Name	Version
Radiated measurement	EZ_EMG	1.1.4.2
Conducted measurement	Keysight.TestSystem	1.0.0.0
AC power Line Conducted Emission	EZ_EMG	1.1.4.2

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8. Description of Test Setup

Support Equipment

ID	Equipment	Brand Name	Model Name	S/N	Remark
A	Laptop	DELL	Latitude E5470	CXSKWF2	N/A
B	Adapter	Sure Power	SW81-120150-01	N/A	N/A

I/O Cables

ID	Equipment	Brand Name	Model Name	Length (m)	Remark
1	RJ-45 Cable	Fastlink	FL-61STU-04	10	N/A
2	DC cable	Sure Power	SW81-120150-01	N/A	N/A
3	RJ-45 Cable	Neiyi	NYS4681	1.5	N/A

Test Setup

Controlled using a bespoke application (QSPR (5.0-00197)) 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.

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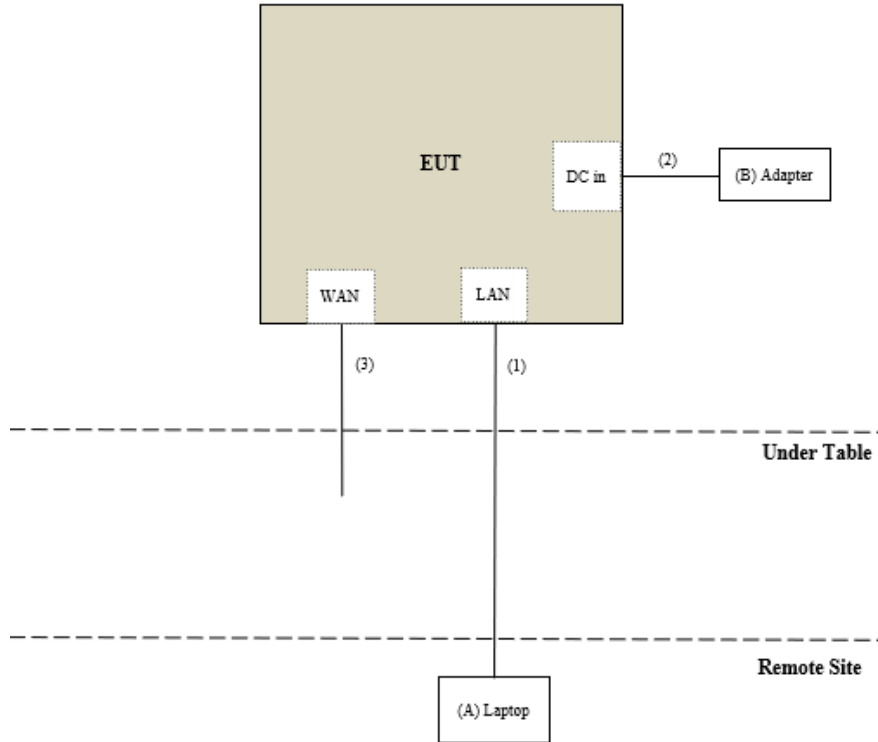
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Setup Diagram for Test



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9. Test Results

9.1. 6dB Bandwidth

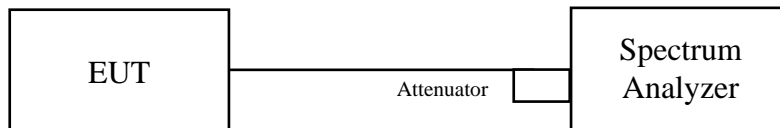
Requirements

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
		Chain 0	Chain 1		
1	2412	7.07	7.03	0.5	PASS
6	2437	7.07	7.07	0.5	PASS
11	2462	7.03	7.07	0.5	PASS

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.70	15.42	0.5	PASS
2	2417	15.74	15.74	0.5	PASS
6	2437	15.90	15.70	0.5	PASS
10	2457	16.26	16.26	0.5	PASS
11	2462	16.30	15.62	0.5	PASS

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802.11ax (HE20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.50	16.86	0.5	PASS
2	2417	16.94	17.06	0.5	PASS
6	2437	18.42	18.26	0.5	PASS
10	2457	18.58	18.54	0.5	PASS
11	2462	18.26	18.26	0.5	PASS

802.11ax (HE40)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	36.28	36.28	0.5	PASS
4	2427	36.28	36.68	0.5	PASS
6	2437	37.48	37.56	0.5	PASS
8	2447	37.80	37.56	0.5	PASS
9	2452	37.56	37.80	0.5	PASS

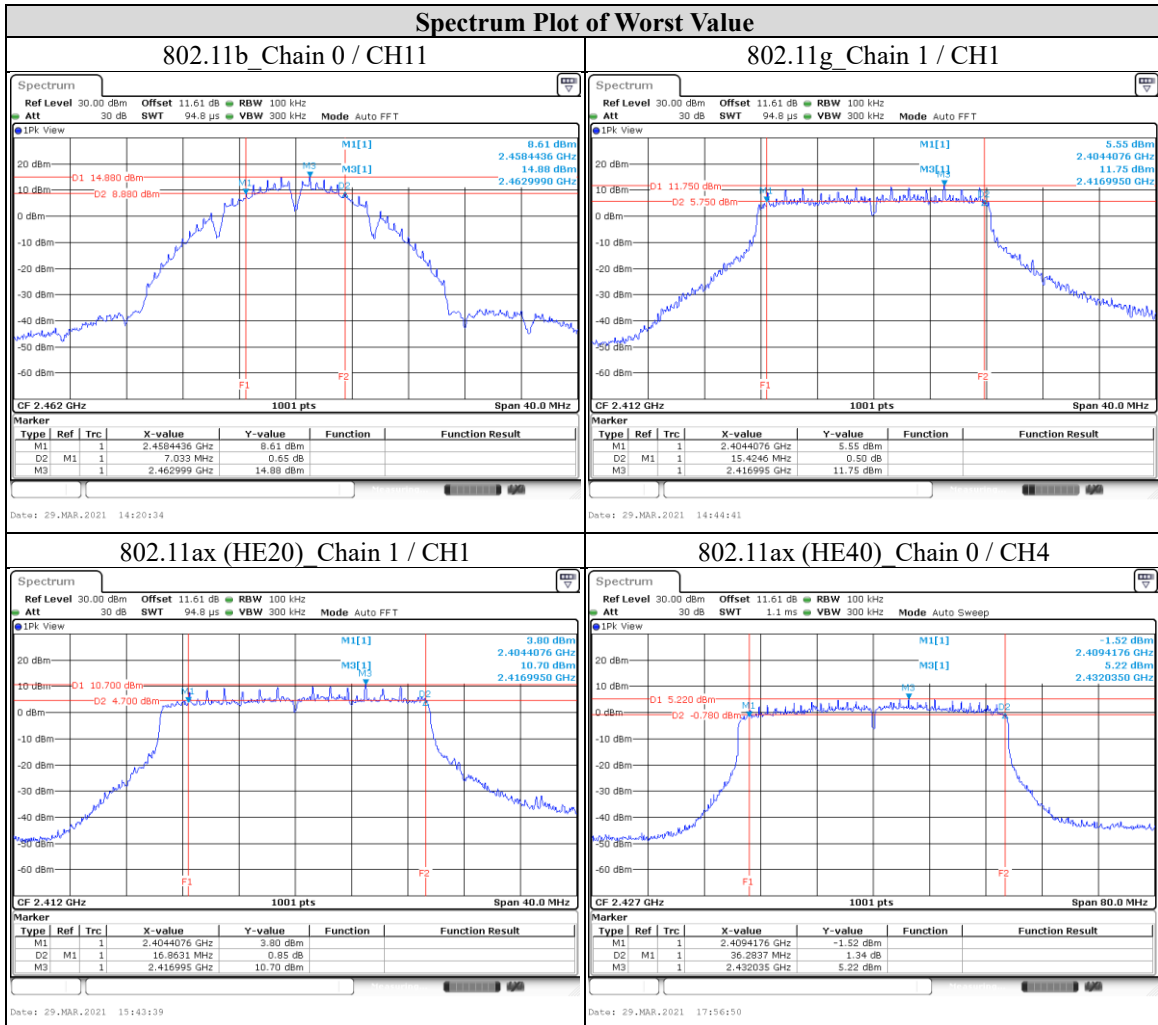
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9.2. Conducted Output Power

Requirements

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

Directional Gain Calculation

Non-Beamforming mode (CDD)

Transmit signals are correlated, then

Directional gain = $G_{ANT\ MAX}$ + Array Gain

Array Gain = $10 \log (N_{ANT}/N_{SS})$ dB

However, per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

Beamforming mode

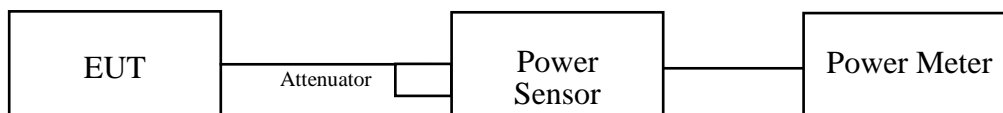
Transmit signals are correlated, then

Directional gain = $10 \log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}]$ dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

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.

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

Non-Beamforming mode

Peak Power

802.11b

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	25.02	24.89	626.614	27.97	30	PASS
6	2437	25.15	24.90	636.796	28.04	30	PASS
11	2462	25.35	25.27	679.204	28.32	30	PASS

802.11g

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	26.67	26.59	920.45	29.64	30	PASS
2	2417	26.69	26.57	920.45	29.64	30	PASS
6	2437	26.81	26.68	946.237	29.76	30	PASS
10	2457	26.61	26.49	903.649	29.56	30	PASS
11	2462	25.23	24.94	645.654	28.10	30	PASS

802.11ax (HE20)

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	26.56	26.55	905.733	29.57	30	PASS
2	2417	26.56	26.57	907.821	29.58	30	PASS
6	2437	26.68	26.45	907.821	29.58	30	PASS
10	2457	26.88	26.48	931.108	29.69	30	PASS
11	2462	24.92	24.90	619.441	27.92	30	PASS

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802.11ax (HE40)

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	26.01	25.64	765.597	28.84	30	PASS
4	2427	25.02	24.84	622.3	27.94	30	PASS
6	2437	24.10	24.19	519.996	27.16	30	PASS
8	2447	21.15	20.95	254.683	24.06	30	PASS
9	2452	20.92	20.90	246.604	23.92	30	PASS

Average Power (Reference Only)

802.11b

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	22.41	22.31	344.35	25.37
6	2437	22.50	22.29	347.536	25.41
11	2462	22.73	22.66	372.392	25.71

802.11g

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	21.32	21.29	270.396	24.32
2	2417	21.34	21.27	270.396	24.32
6	2437	21.39	21.36	274.789	24.39
10	2457	21.13	21.01	255.859	24.08
11	2462	19.64	19.44	179.887	22.55

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802.11ax (HE20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	19.70	19.78	188.365	22.75
2	2417	19.73	19.76	188.799	22.76
6	2437	19.82	19.70	189.234	22.77
10	2457	20.02	19.76	194.984	22.90
11	2462	18.16	18.02	128.825	21.10

802.11ax (HE40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
3	2422	19.05	18.89	157.761	21.98
4	2427	18.11	17.95	127.057	21.04
6	2437	17.22	17.20	105.196	20.22
8	2447	14.31	14.18	53.211	17.26
9	2452	14.28	14.16	52.845	17.23

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Beamforming mode

Peak Power

802.11ax (HE20)

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	26.10	25.94	799.834	29.03	29.39	PASS
2	2417	26.07	25.99	801.678	29.04	29.39	PASS
6	2437	26.15	26.07	816.582	29.12	29.39	PASS
10	2457	26.25	26.09	827.942	29.18	29.39	PASS
11	2462	24.92	24.90	619.441	27.92	29.39	PASS

802.11ax (HE40)

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	26.01	25.64	765.597	28.84	29.39	PASS
4	2427	25.02	24.84	622.3	27.94	29.39	PASS
6	2437	24.10	24.19	519.996	27.16	29.39	PASS
8	2447	21.15	20.95	254.683	24.06	29.39	PASS
9	2452	20.92	20.90	246.604	23.92	29.39	PASS

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Average Power (Reference Only)

802.11ax (HE20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	19.21	19.20	166.725	22.22
2	2417	19.30	19.17	167.88	22.25
6	2437	19.29	19.26	169.434	22.29
10	2457	19.43	19.44	175.792	22.45
11	2462	18.16	18.02	128.825	21.10

802.11ax (HE40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
3	2422	19.05	18.89	157.761	21.98
4	2427	18.11	17.95	127.057	21.04
6	2437	17.22	17.20	105.196	20.22
8	2447	14.31	14.18	53.211	17.26
9	2452	14.28	14.16	52.845	17.23

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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 he 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.
3. Directional Gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{Gn/20})^2 / Nant]$ dBi.

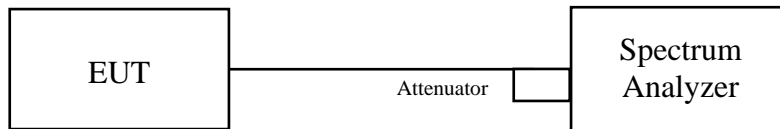
Nant: Number of Transmit Antennas

G1, G2, ..., Gn: Gain of Individual Antennas

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: $3 \text{ kHz} \leq RBW \leq 100 \text{ kHz}$.
- d. Set the VBW $\geq 3 \times RBW$.
- 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

TX Chain	Channel	Frequency (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	3.93	3.01	6.94	7.39	PASS
	6	2437	3.80	3.01	6.81	7.39	PASS
	11	2462	3.79	3.01	6.80	7.39	PASS
1	1	2412	3.64	3.01	6.65	7.39	PASS
	6	2437	3.80	3.01	6.81	7.39	PASS
	11	2462	3.99	3.01	7.00	7.39	PASS

NOTE: Directional gain = 6.61 dBi > 6 dBi , so the limit shall be reduced.

802.11g

TX Chain	Channel	Frequency (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-3.77	3.01	-0.76	7.39	PASS
	2	2417	-3.84	3.01	-0.83	7.39	PASS
	6	2437	-4.03	3.01	-1.02	7.39	PASS
	10	2457	-4.60	3.01	-1.59	7.39	PASS
	11	2462	-6.47	3.01	-3.46	7.39	PASS
1	1	2412	-3.72	3.01	-0.71	7.39	PASS
	2	2417	-3.56	3.01	-0.55	7.39	PASS
	6	2437	-4.14	3.01	-1.13	7.39	PASS
	10	2457	-4.45	3.01	-1.44	7.39	PASS
	11	2462	-5.91	3.01	-2.90	7.39	PASS

NOTE: Directional gain = 6.61 dBi > 6 dBi , so the limit shall be reduced.

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802.11ax (HE20)

TX Chain	Channel	Frequency (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-5.67	3.01	-2.66	7.39	PASS
	2	2417	-5.08	3.01	-2.07	7.39	PASS
	6	2437	-4.80	3.01	-1.79	7.39	PASS
	10	2457	-5.15	3.01	-2.14	7.39	PASS
	11	2462	-6.59	3.01	-3.58	7.39	PASS
1	1	2412	-4.98	3.01	-1.97	7.39	PASS
	2	2417	-5.22	3.01	-2.21	7.39	PASS
	6	2437	-4.91	3.01	-1.90	7.39	PASS
	10	2457	-5.01	3.01	-2.00	7.39	PASS
	11	2462	-6.97	3.01	-3.96	7.39	PASS

NOTE: Directional gain = 6.61 dBi > 6 dBi , so the limit shall be reduced.

802.11ax (HE40)

TX Chain	Channel	Frequency (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	3	2422	-7.67	3.01	-4.66	7.39	PASS
	4	2427	-8.89	3.01	-5.88	7.39	PASS
	6	2437	-9.84	3.01	-6.83	7.39	PASS
	8	2447	-12.72	3.01	-9.71	7.39	PASS
	9	2452	-12.94	3.01	-9.93	7.39	PASS
1	3	2422	-7.82	3.01	-4.81	7.39	PASS
	4	2427	-9.08	3.01	-6.07	7.39	PASS
	6	2437	-10.10	3.01	-7.09	7.39	PASS
	8	2447	-12.75	3.01	-9.74	7.39	PASS
	9	2452	-13.23	3.01	-10.22	7.39	PASS

NOTE: Directional gain = 6.61 dBi > 6 dBi , so the limit shall be reduced.

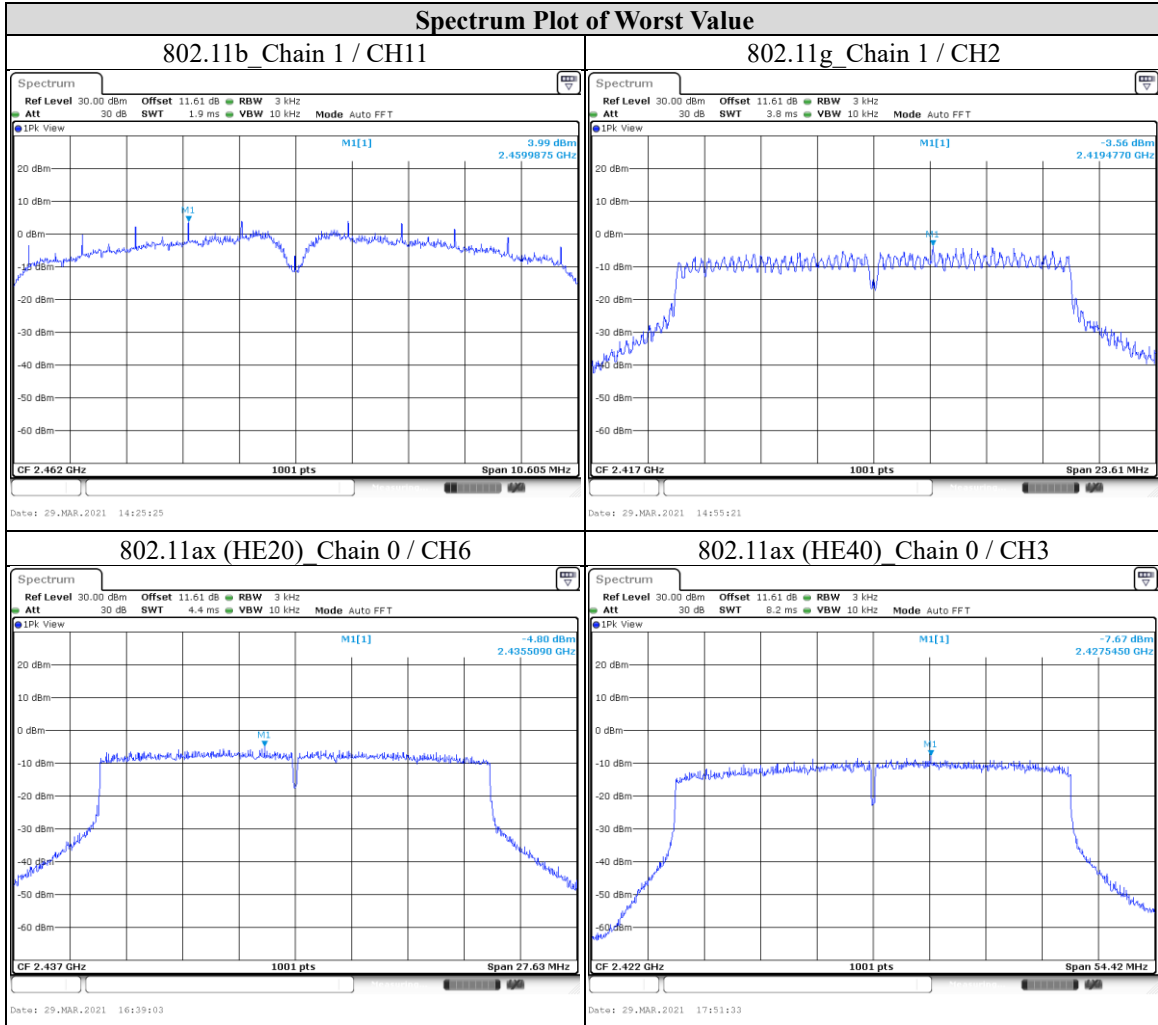
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9.4. Conducted Out of Band Emission

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

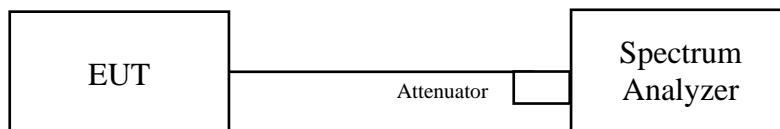
Measurement Procedure REF

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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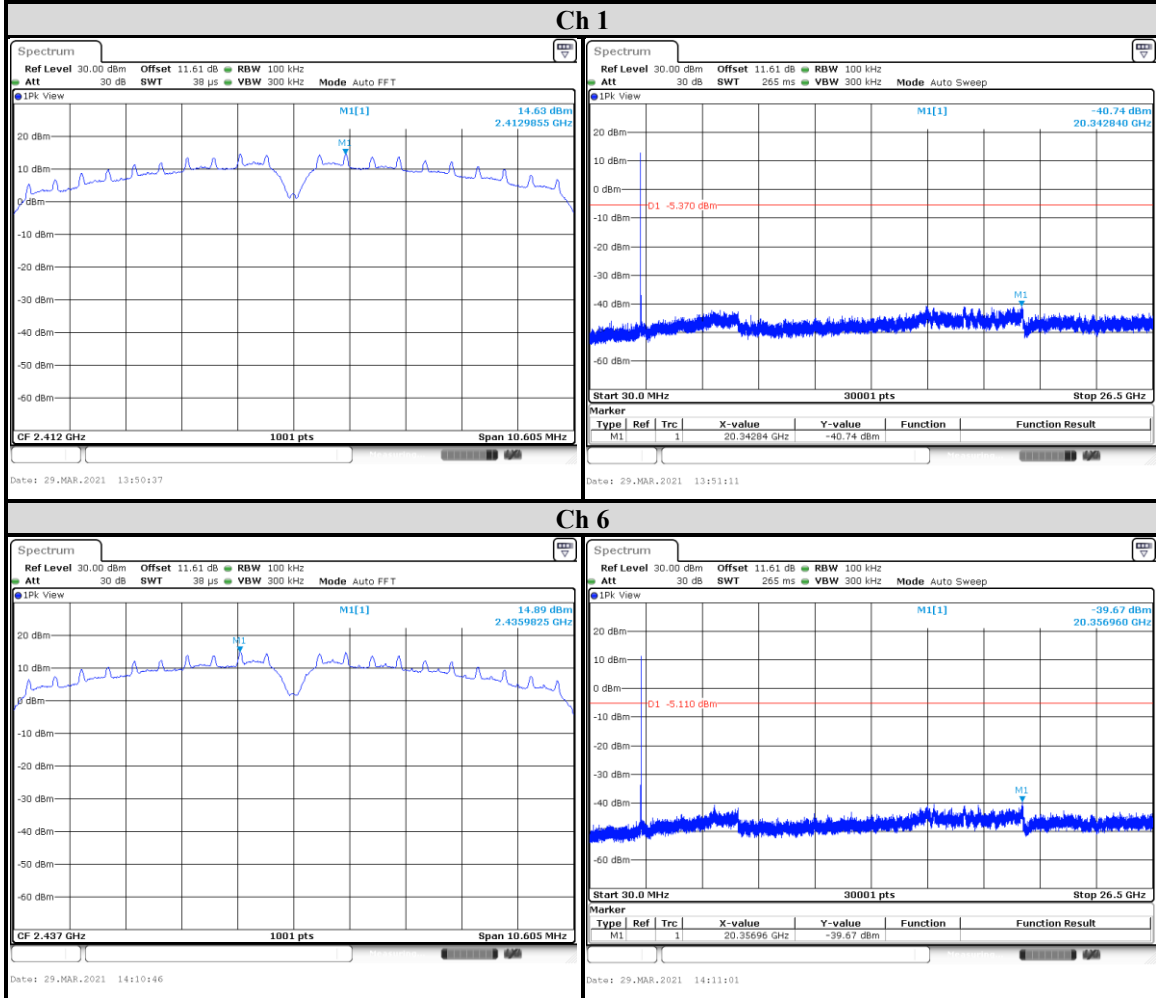
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Test Data

802.11b

Chain 0

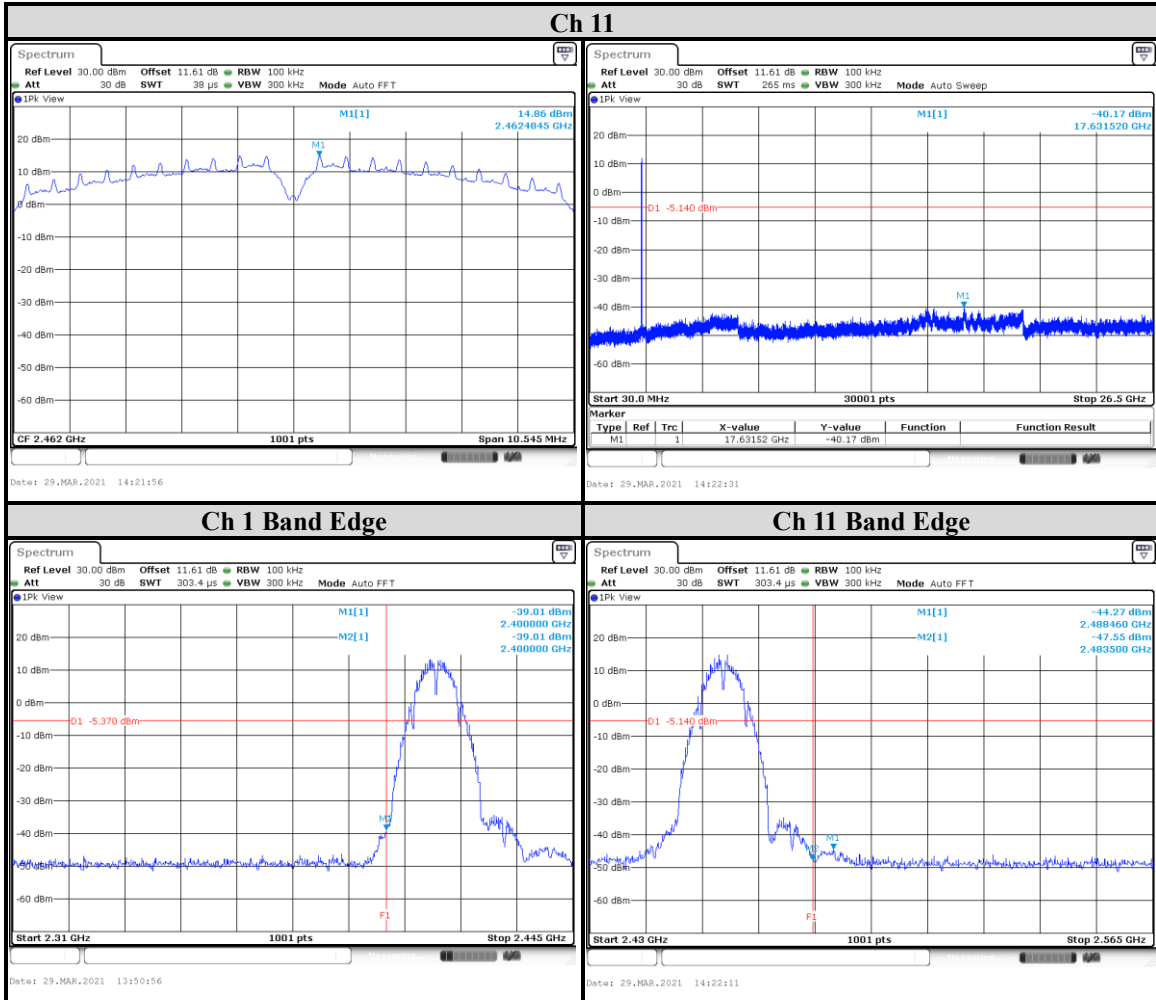


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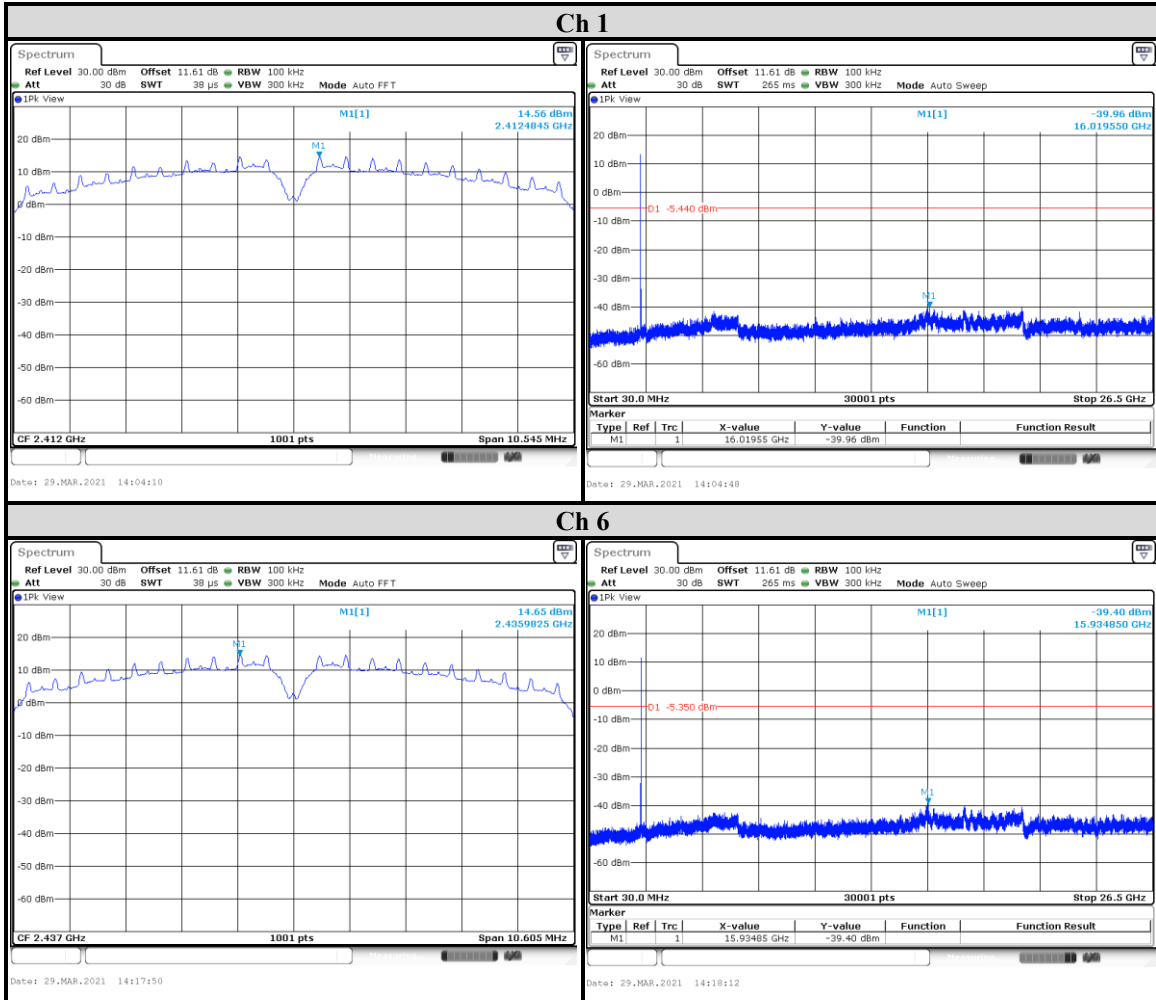
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Chain 1



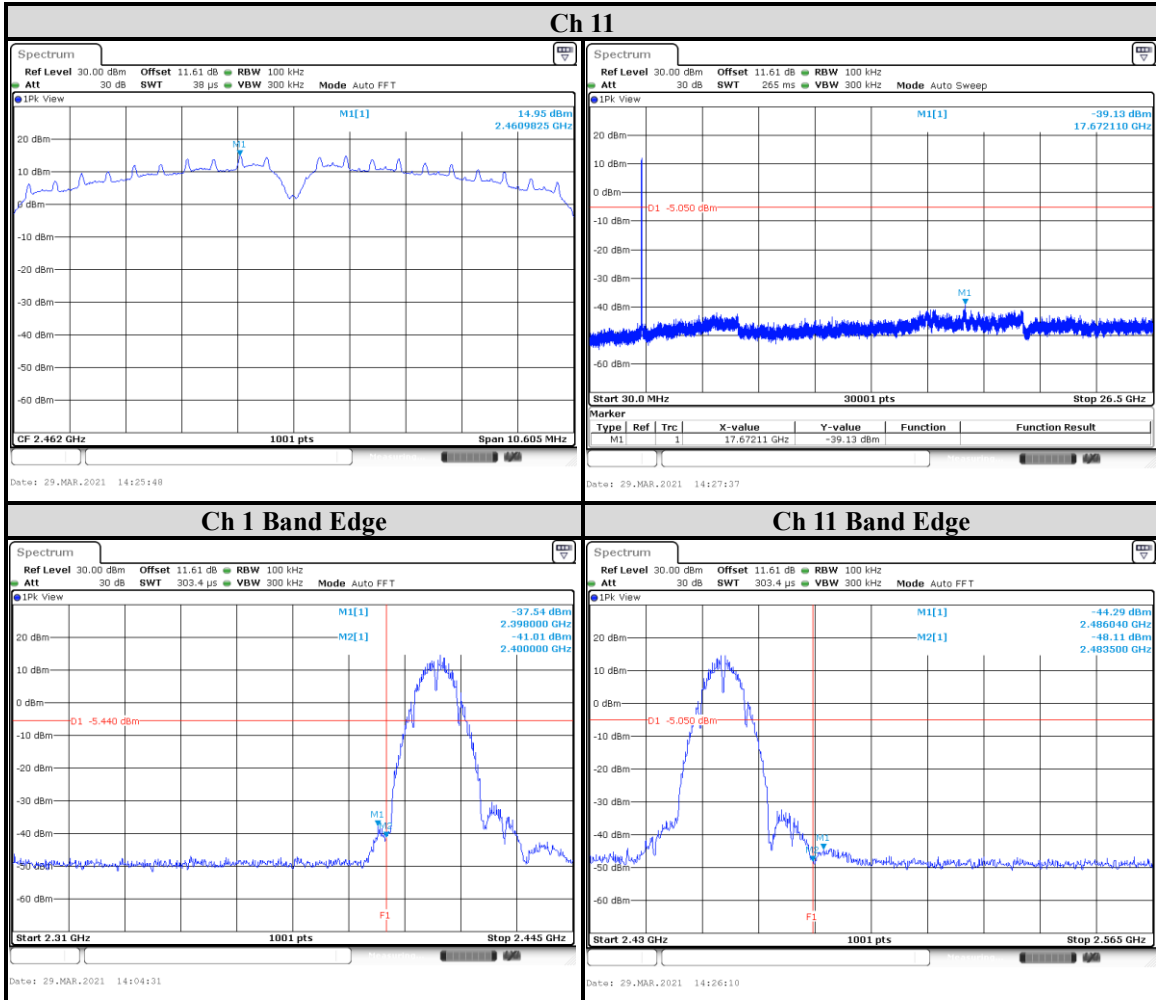
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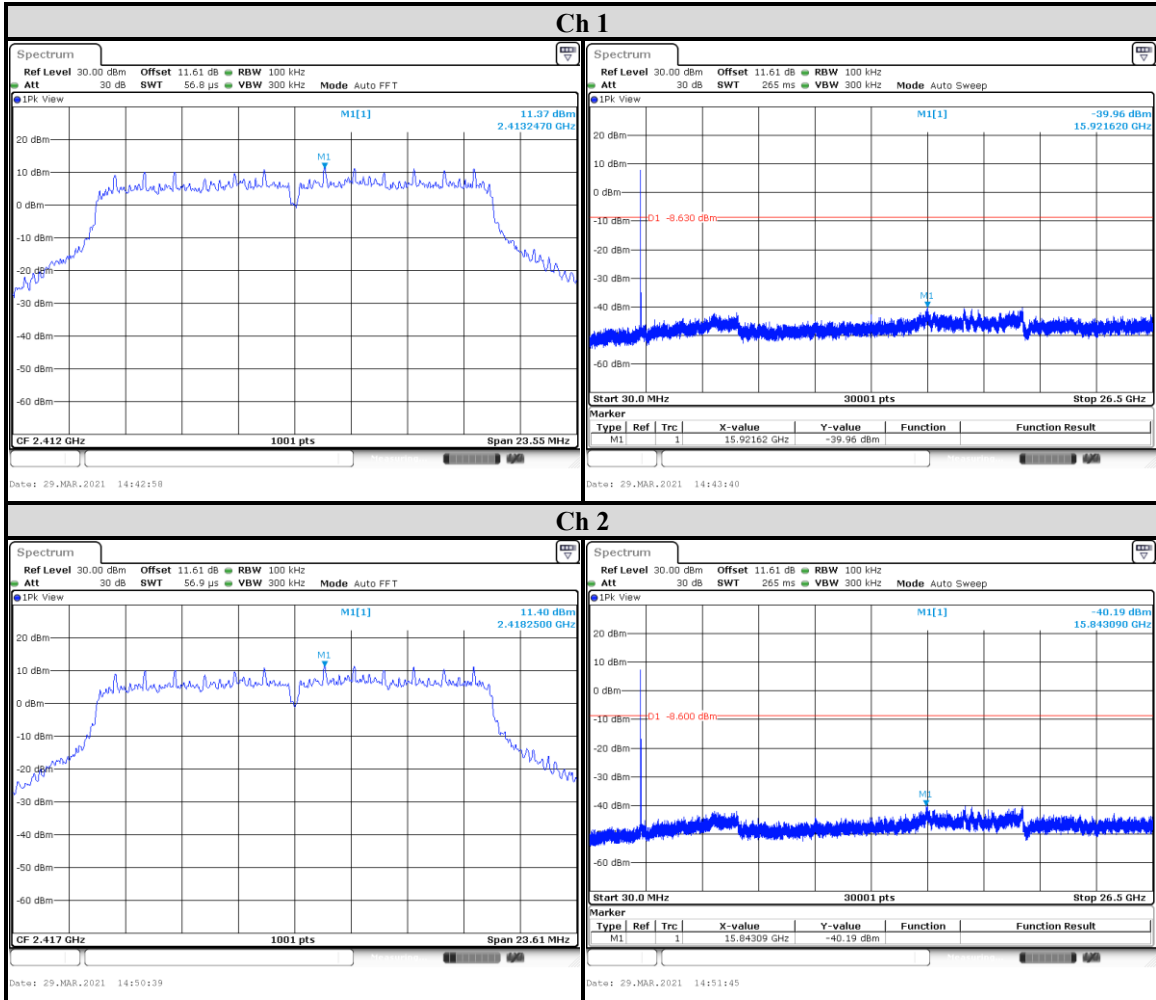
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802.11g

Chain 0

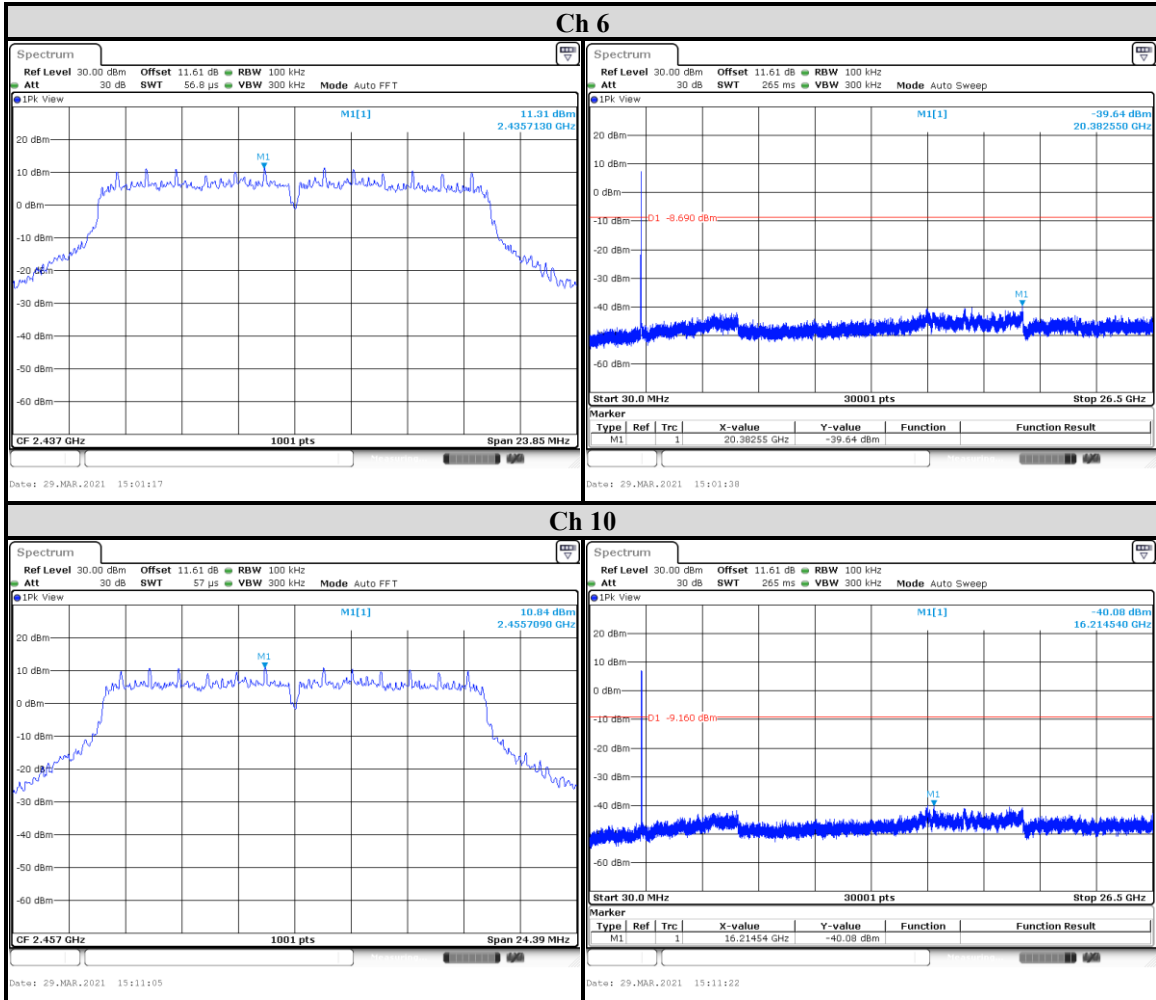


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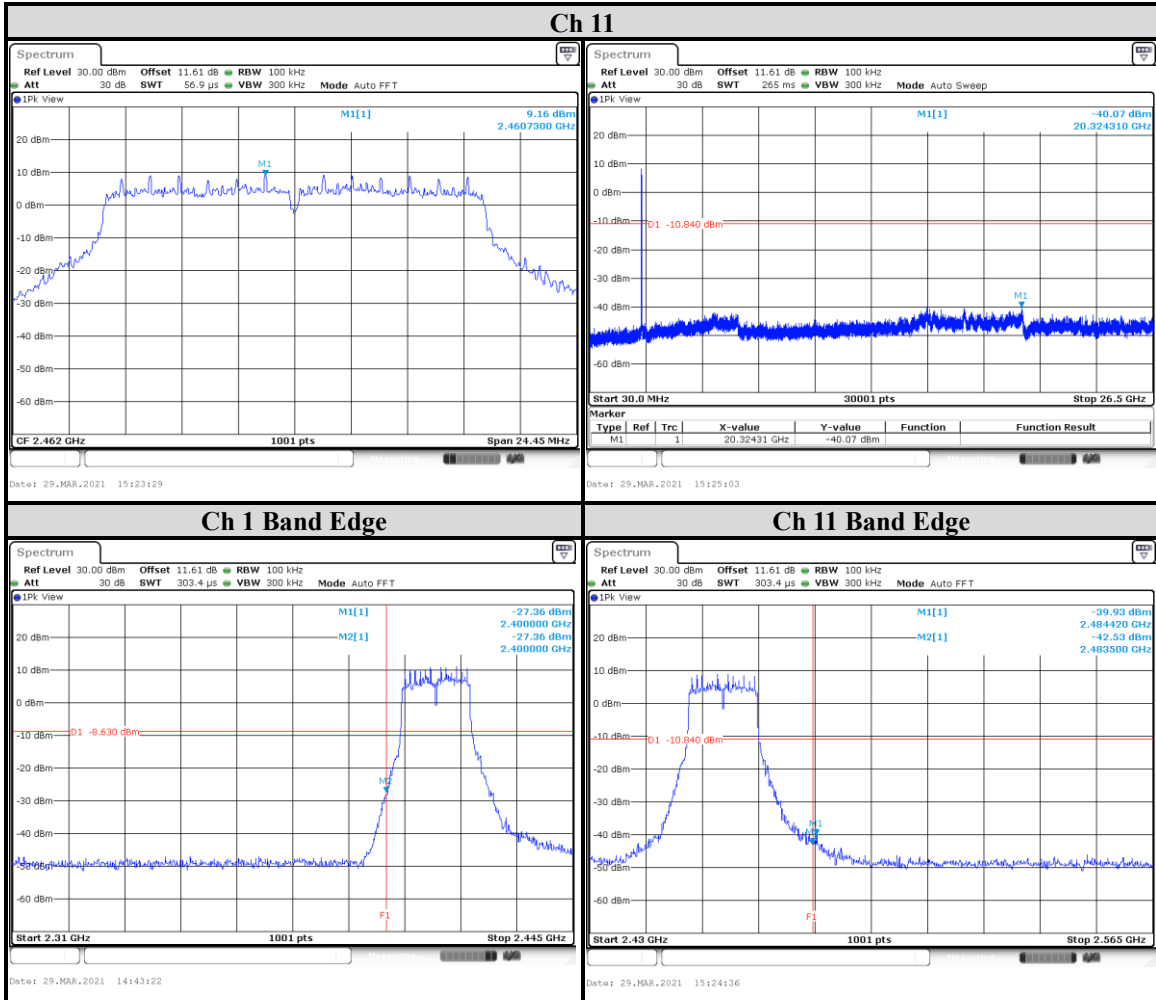


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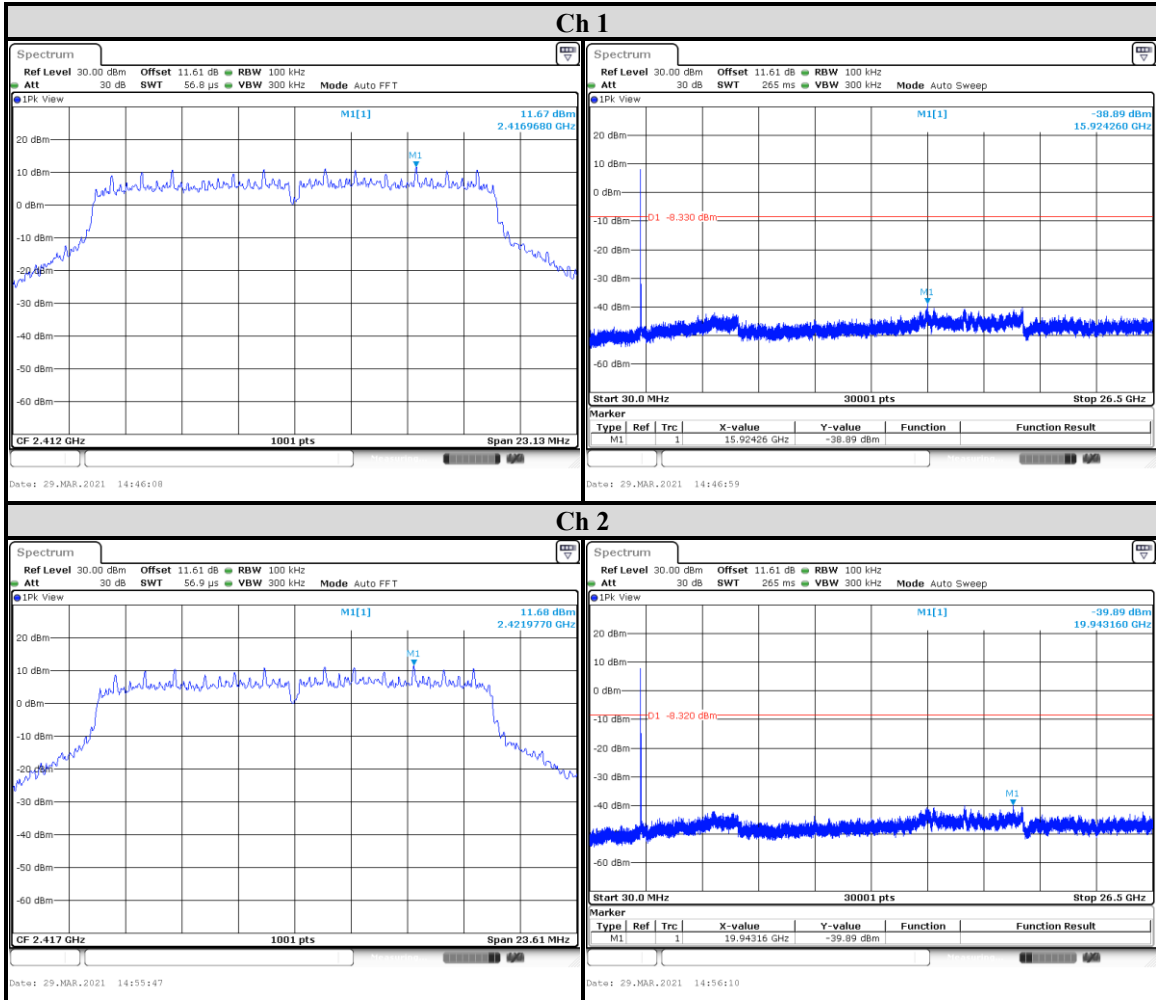
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Chain 1

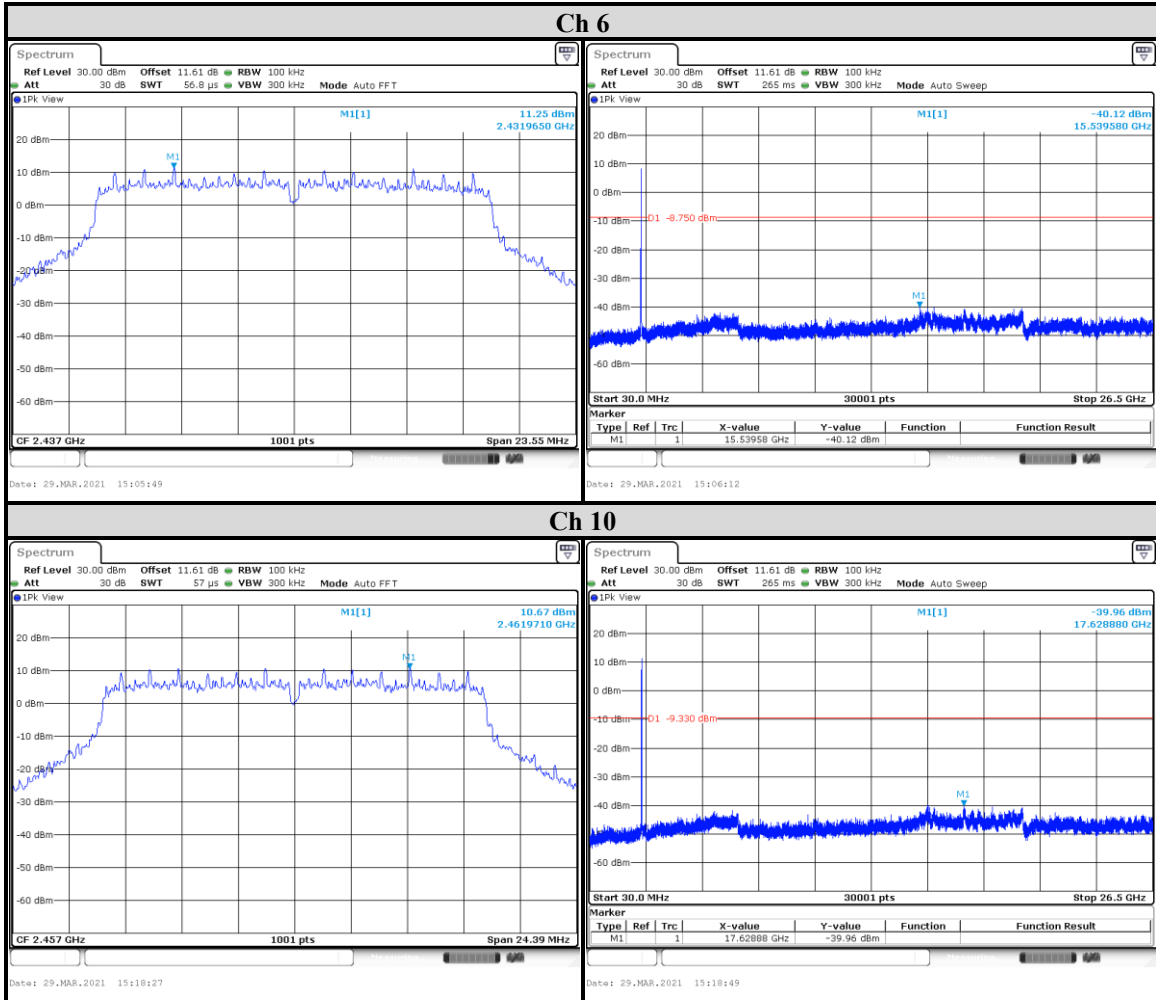


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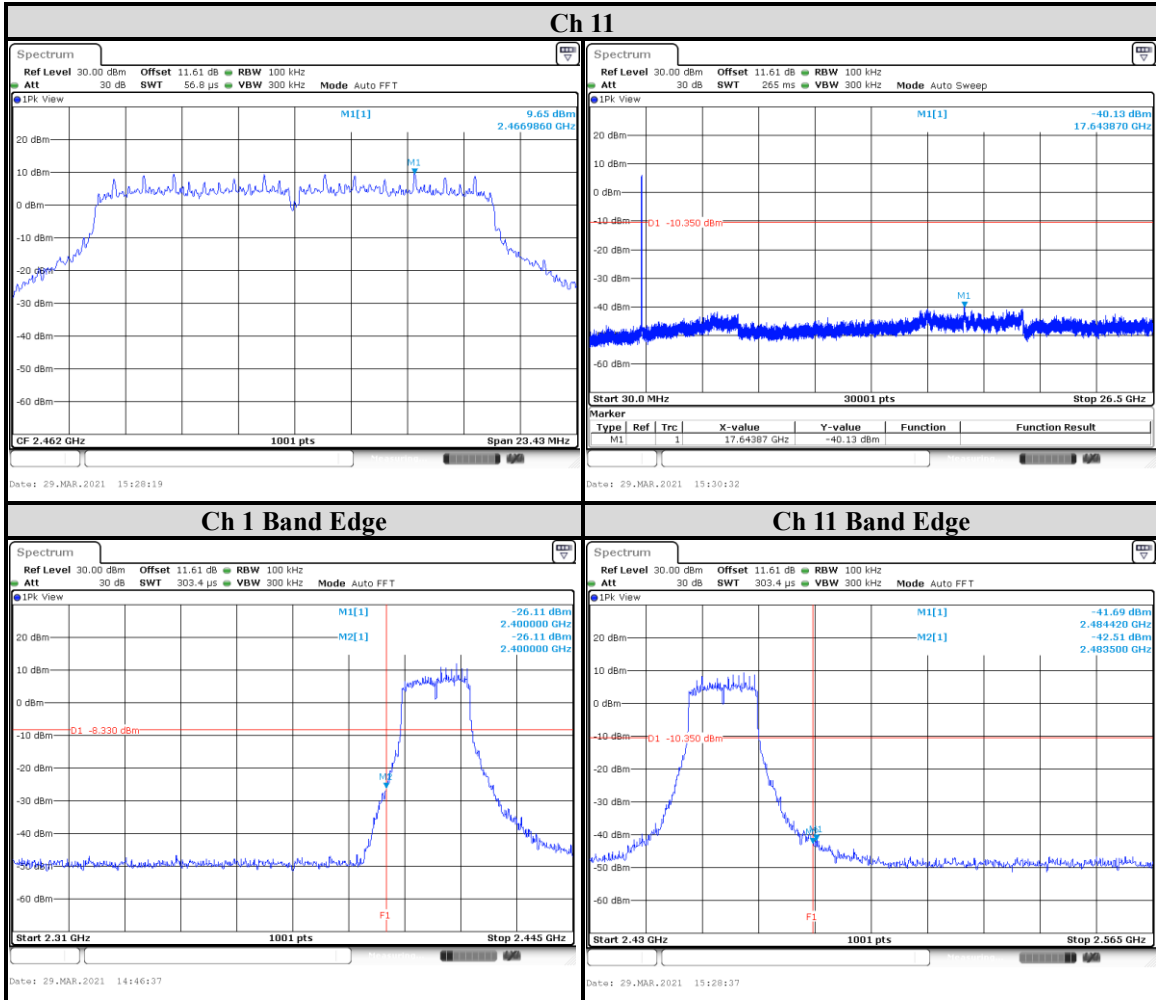
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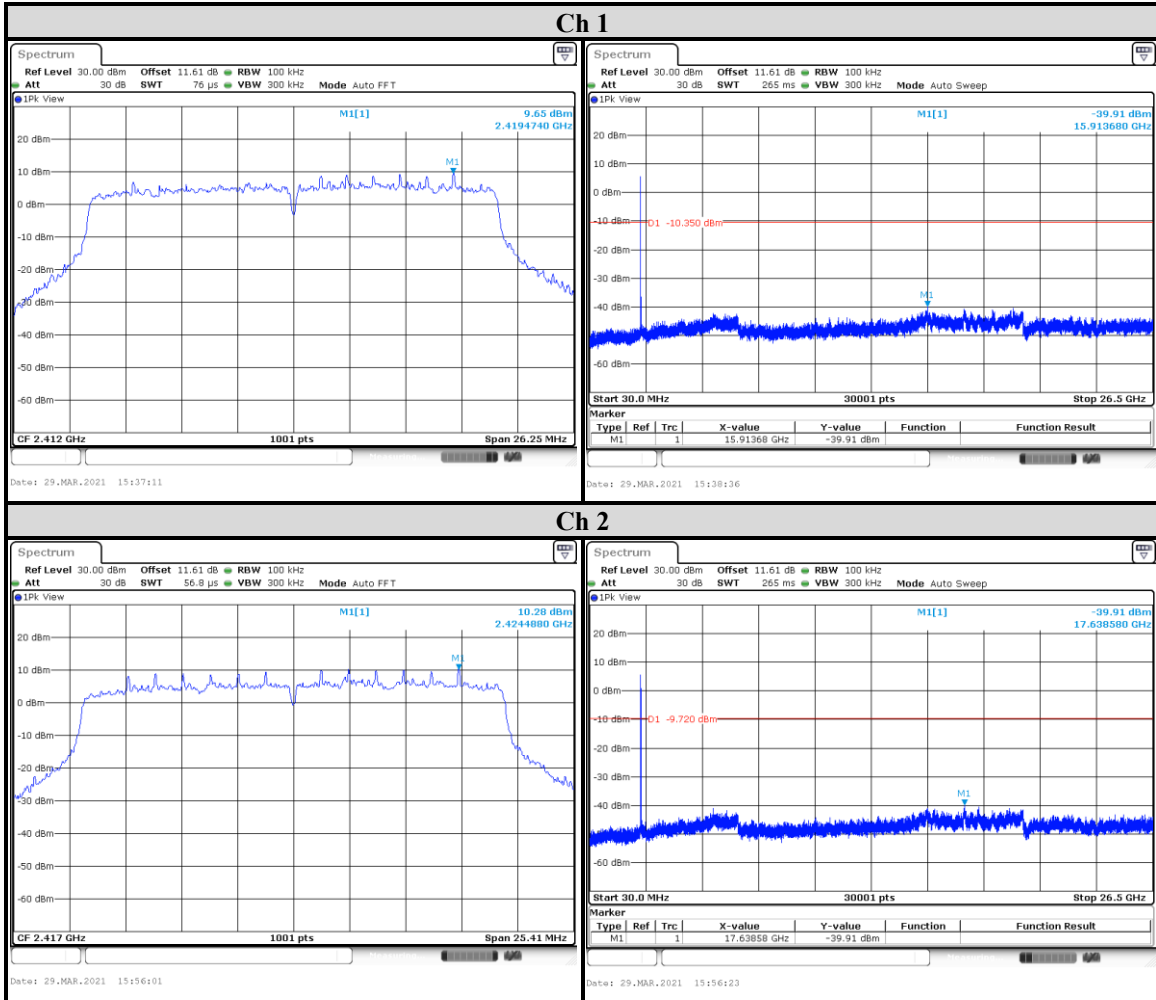
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802.11ax (HE20)

Chain 0

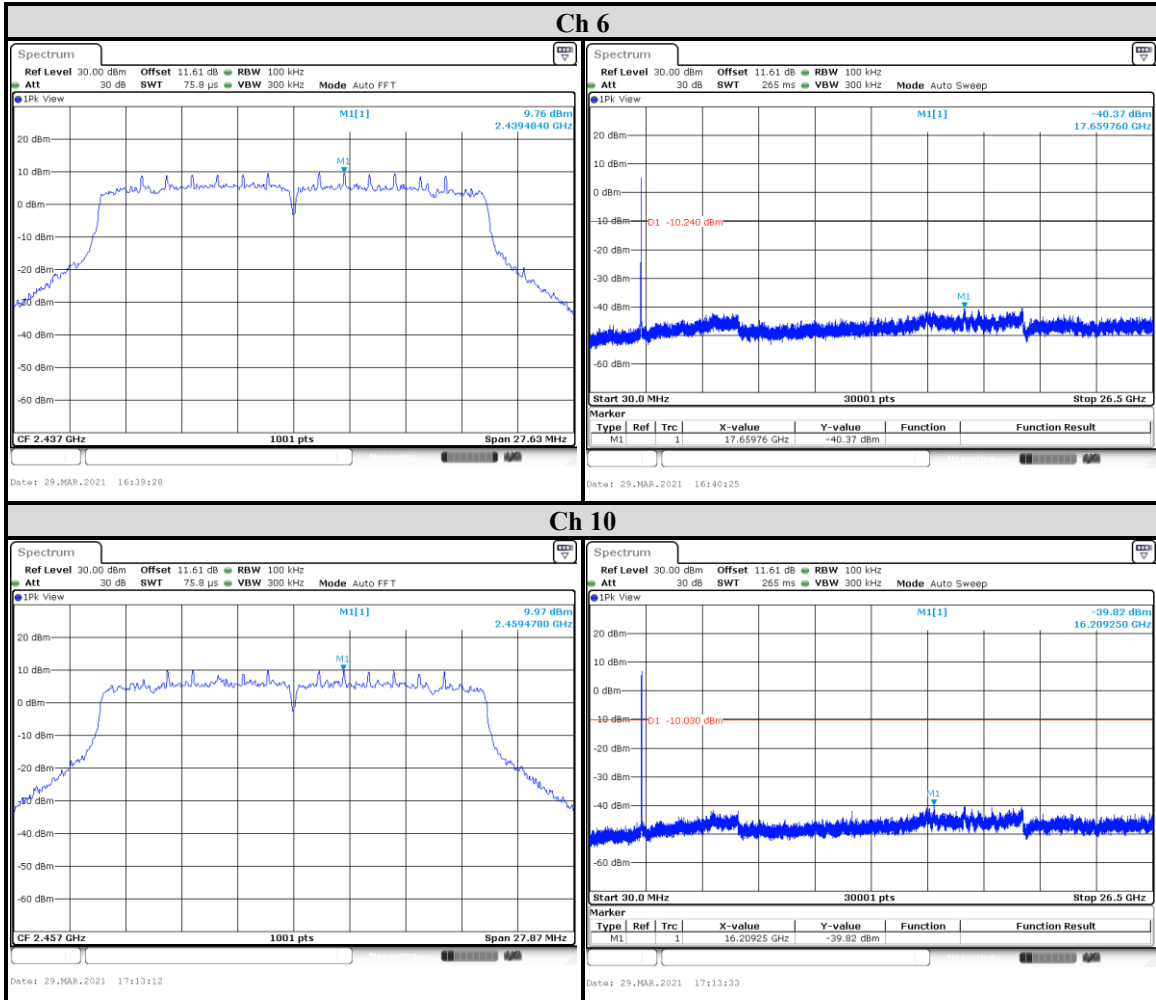


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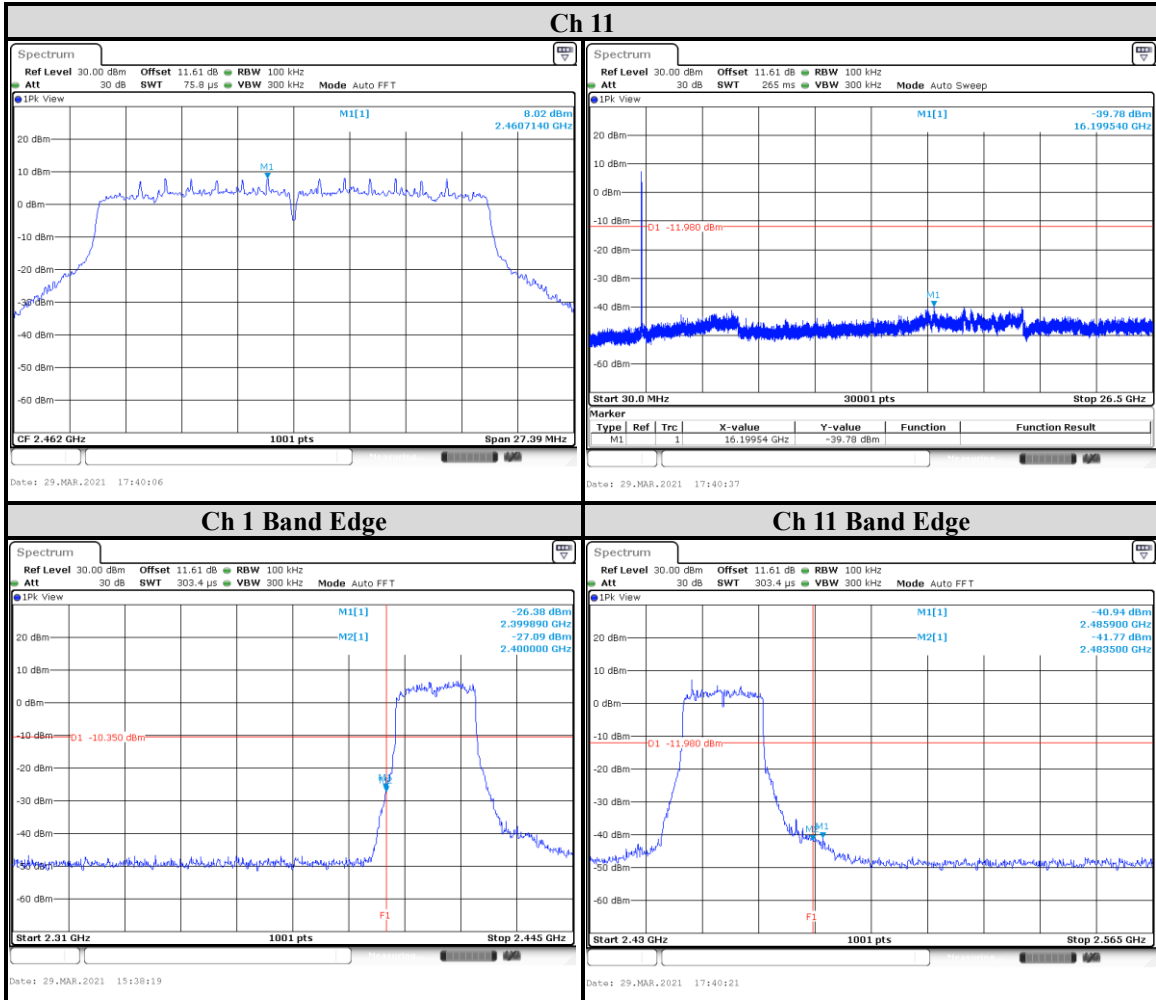


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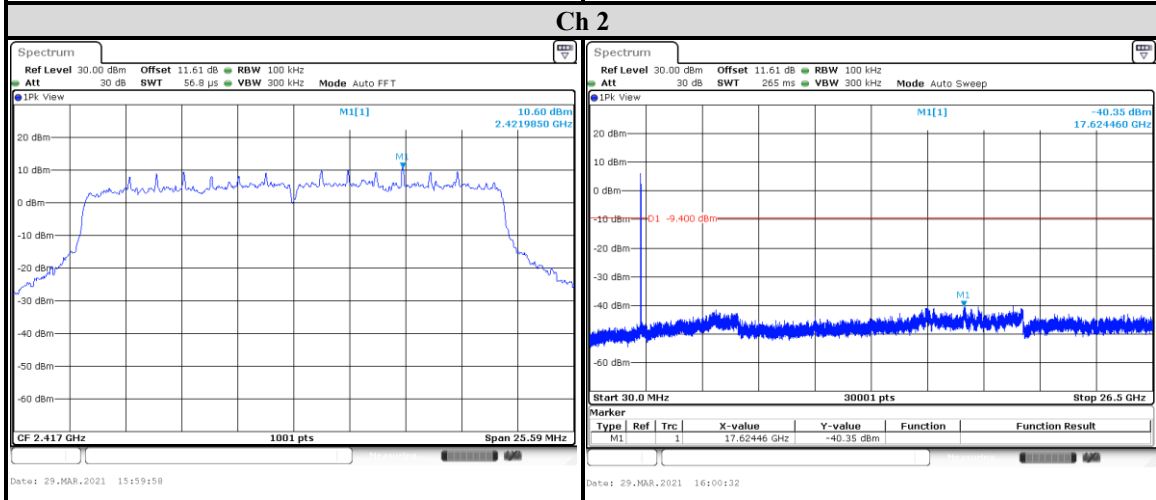
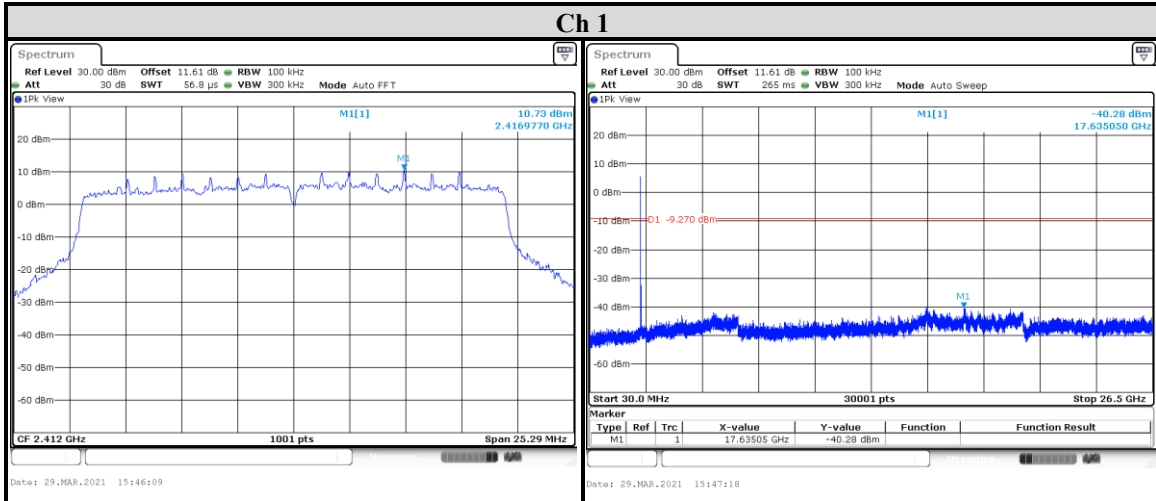
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Chain 1

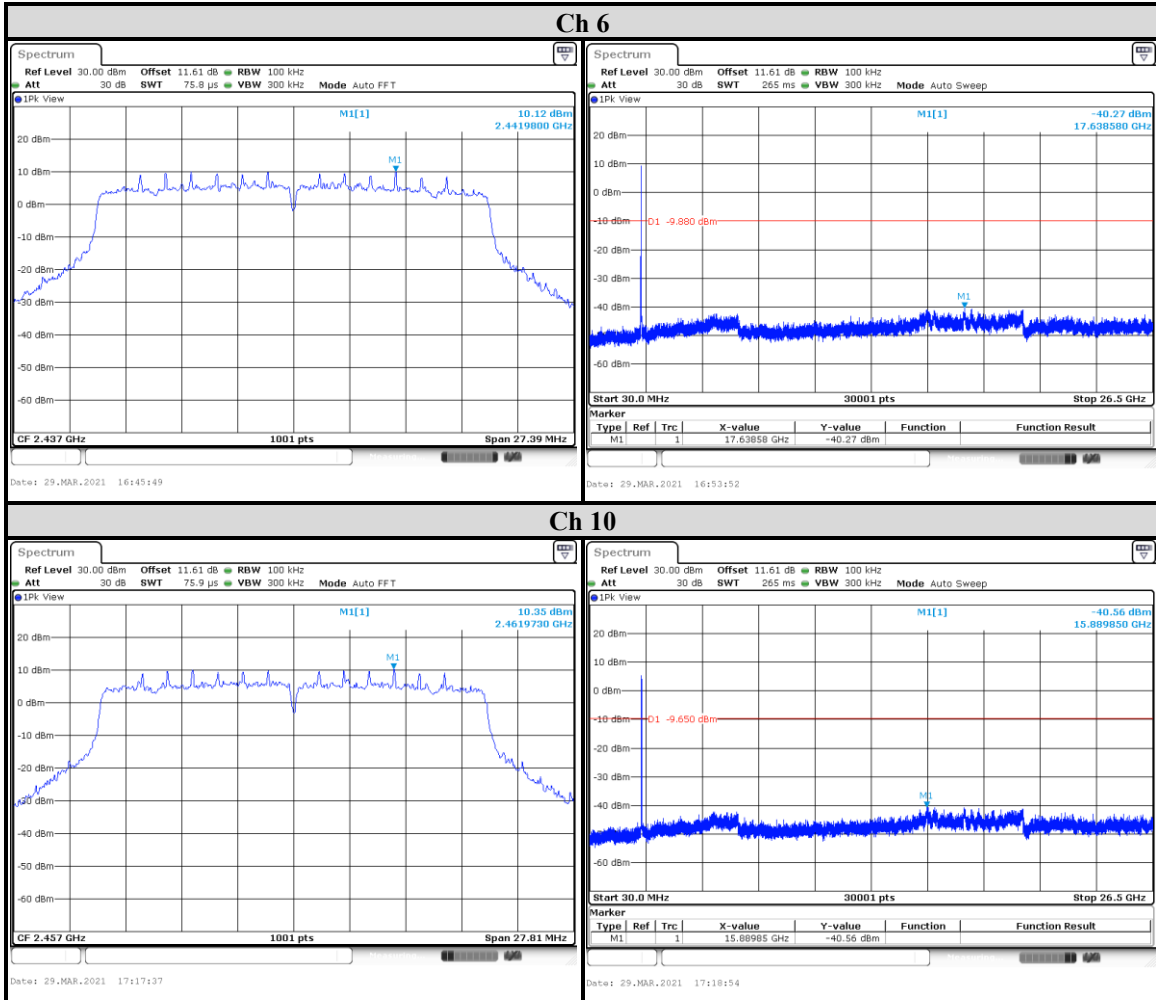


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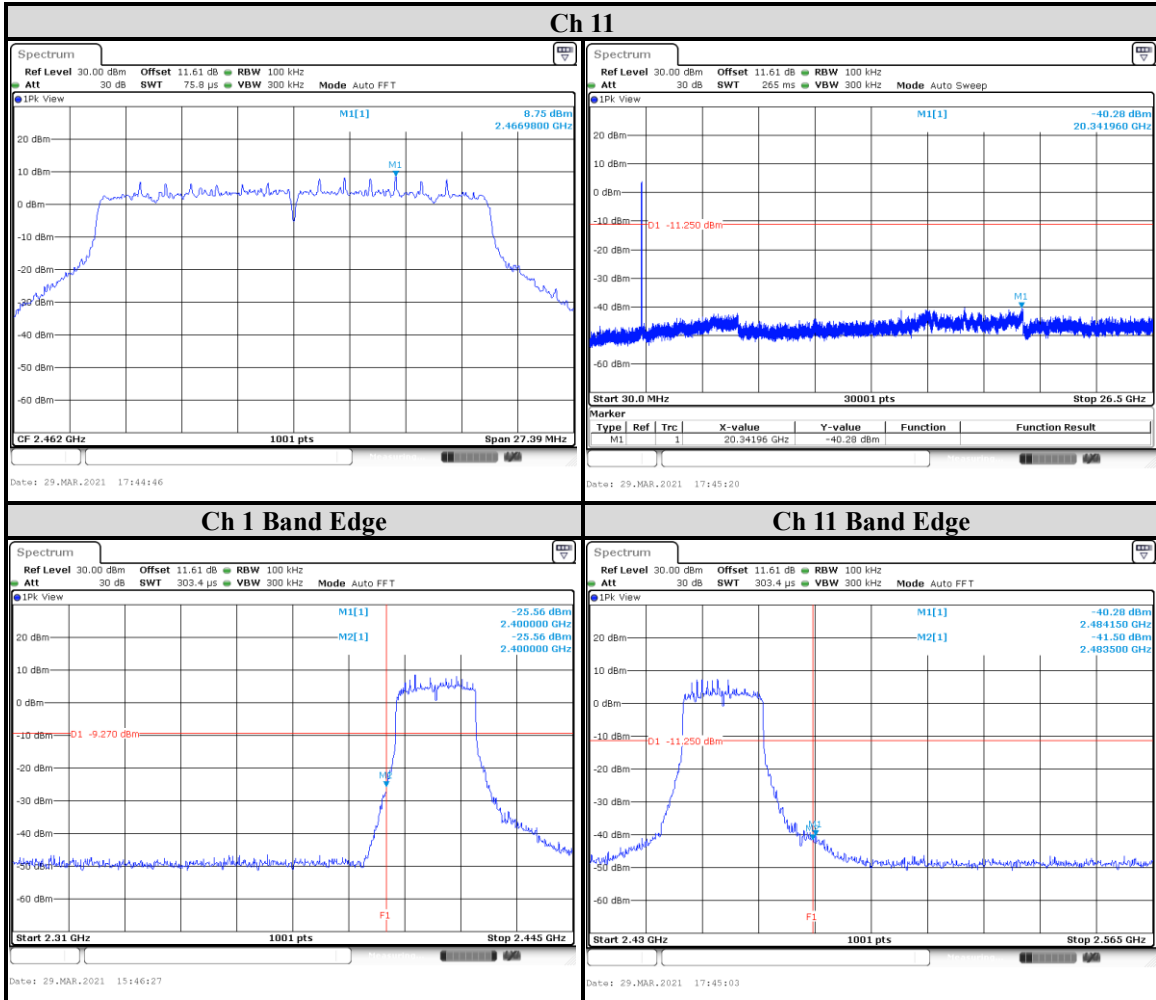


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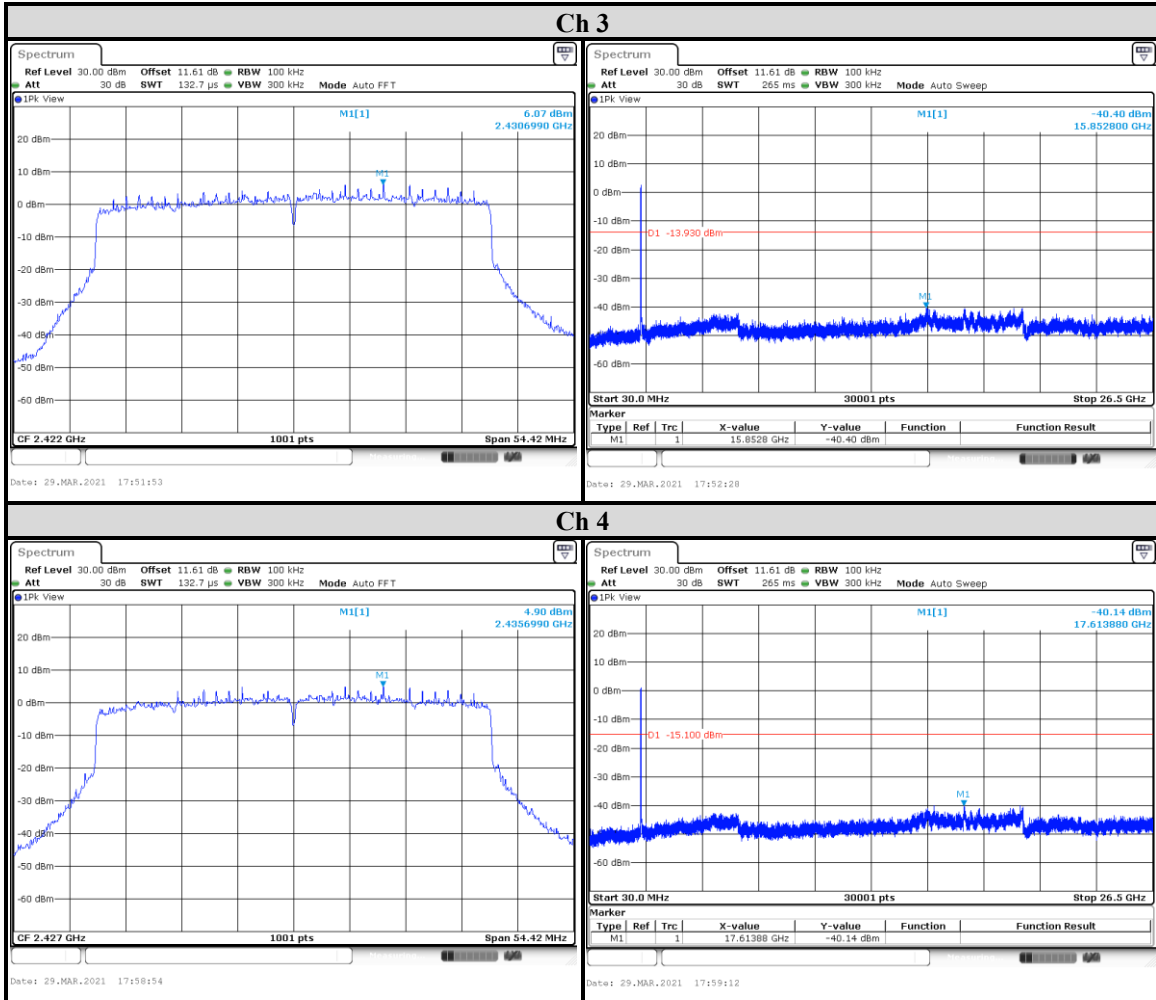
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802.11ax (HE40)

Chain 0

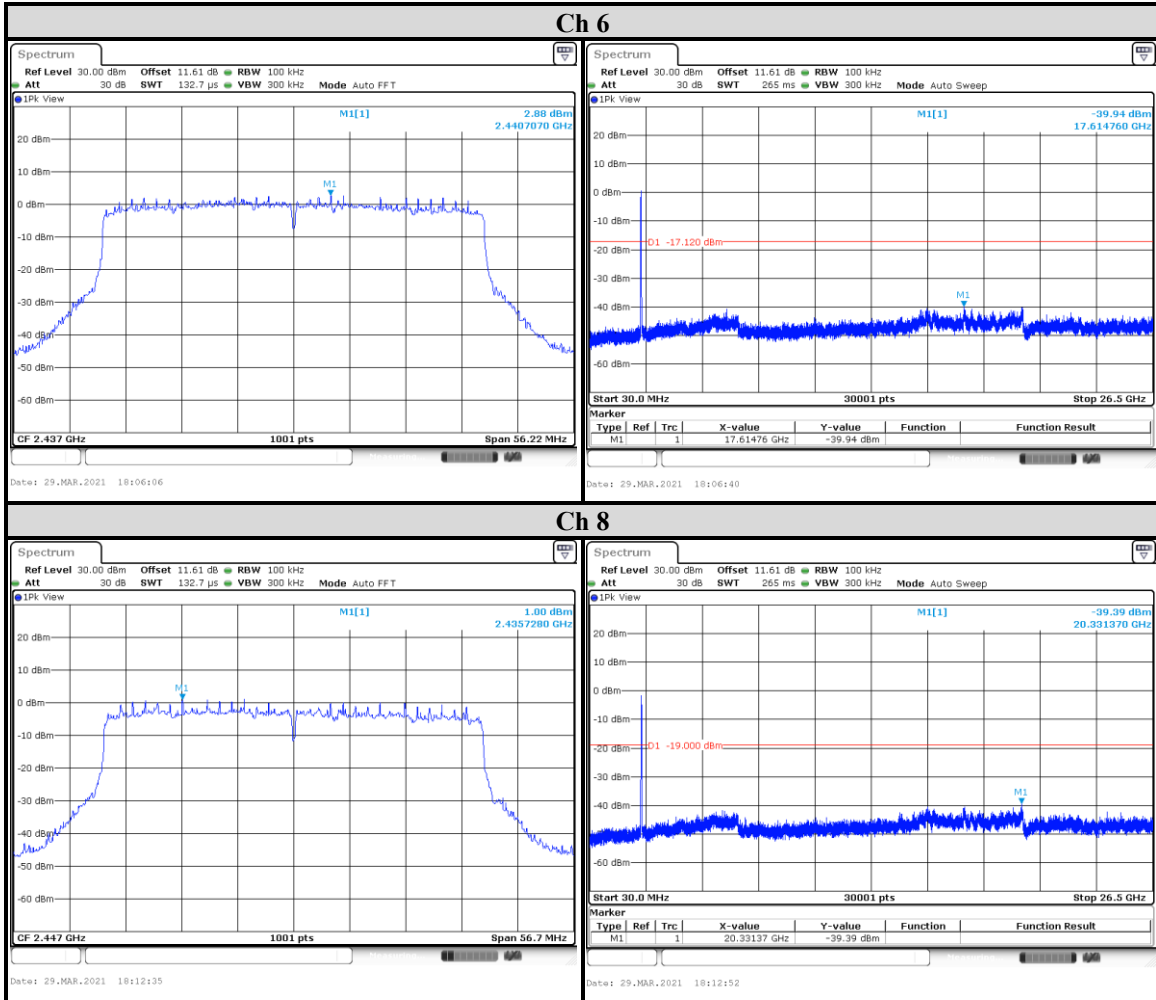


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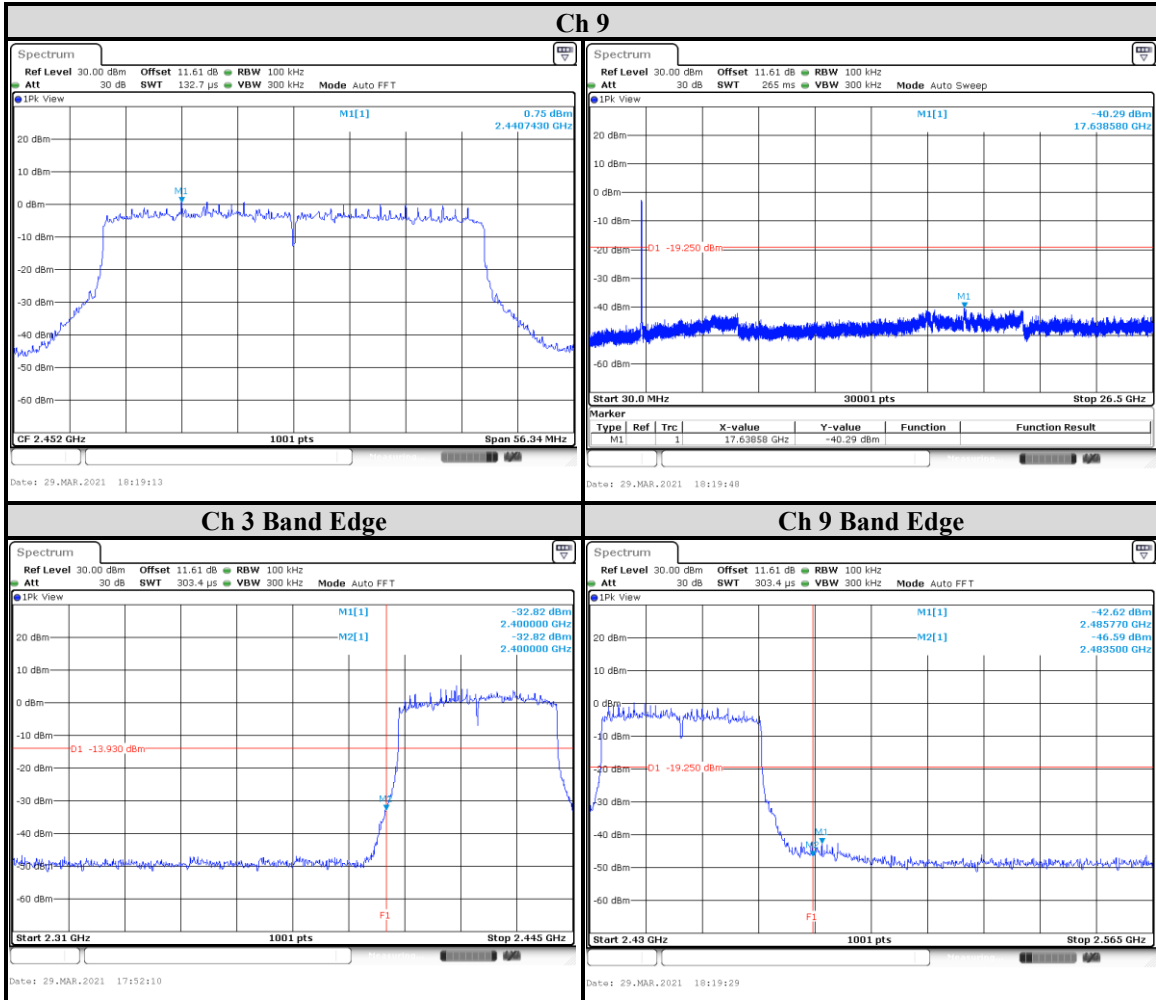
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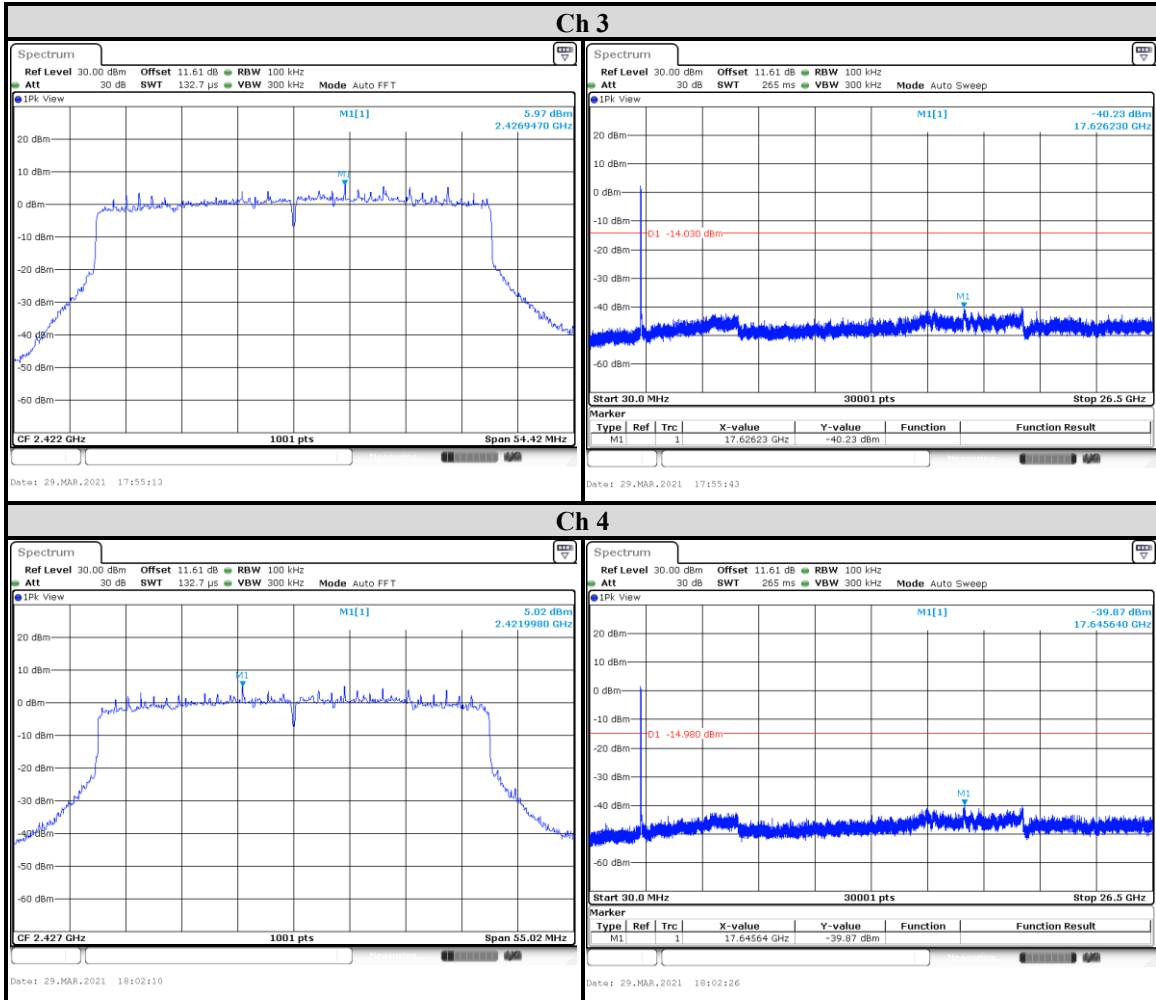
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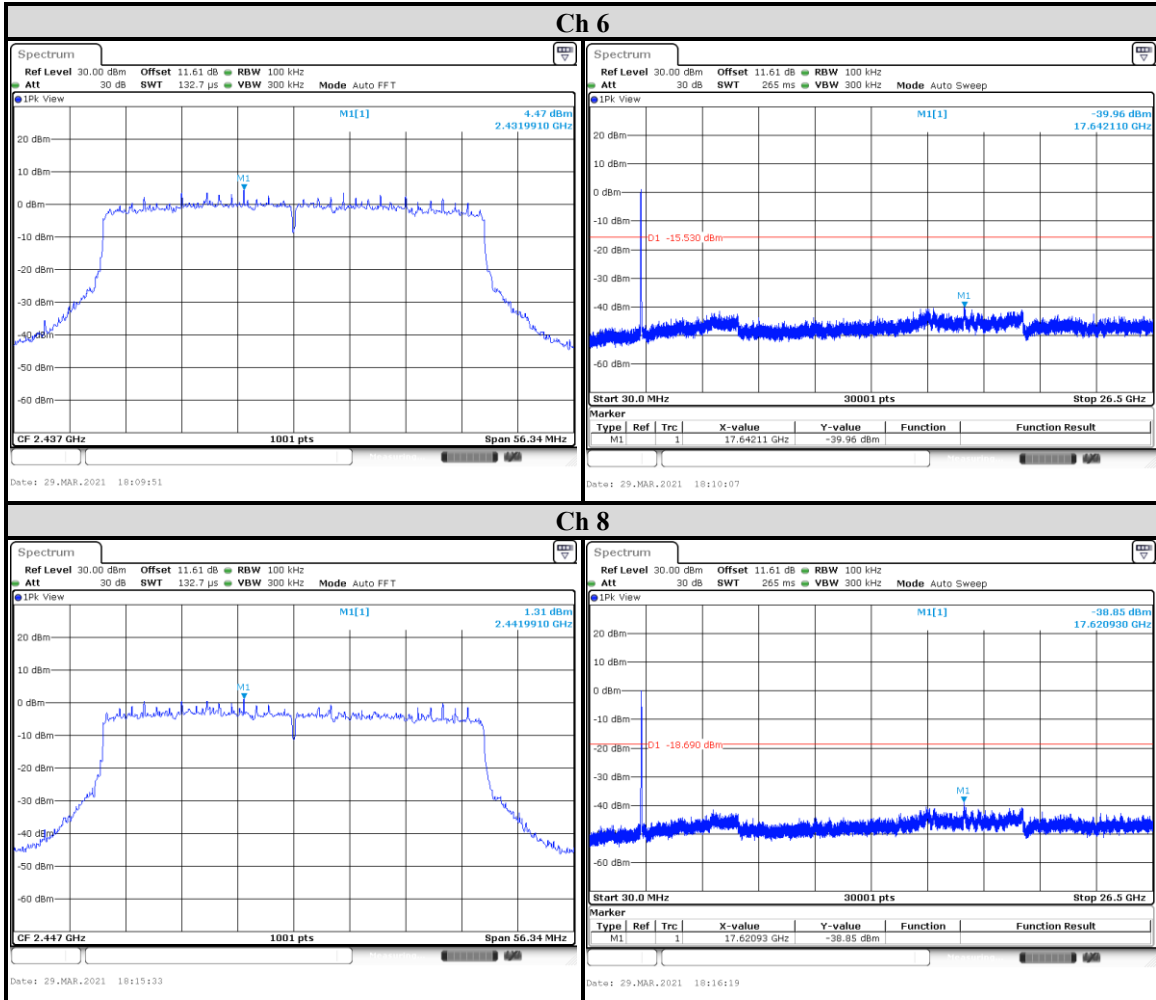


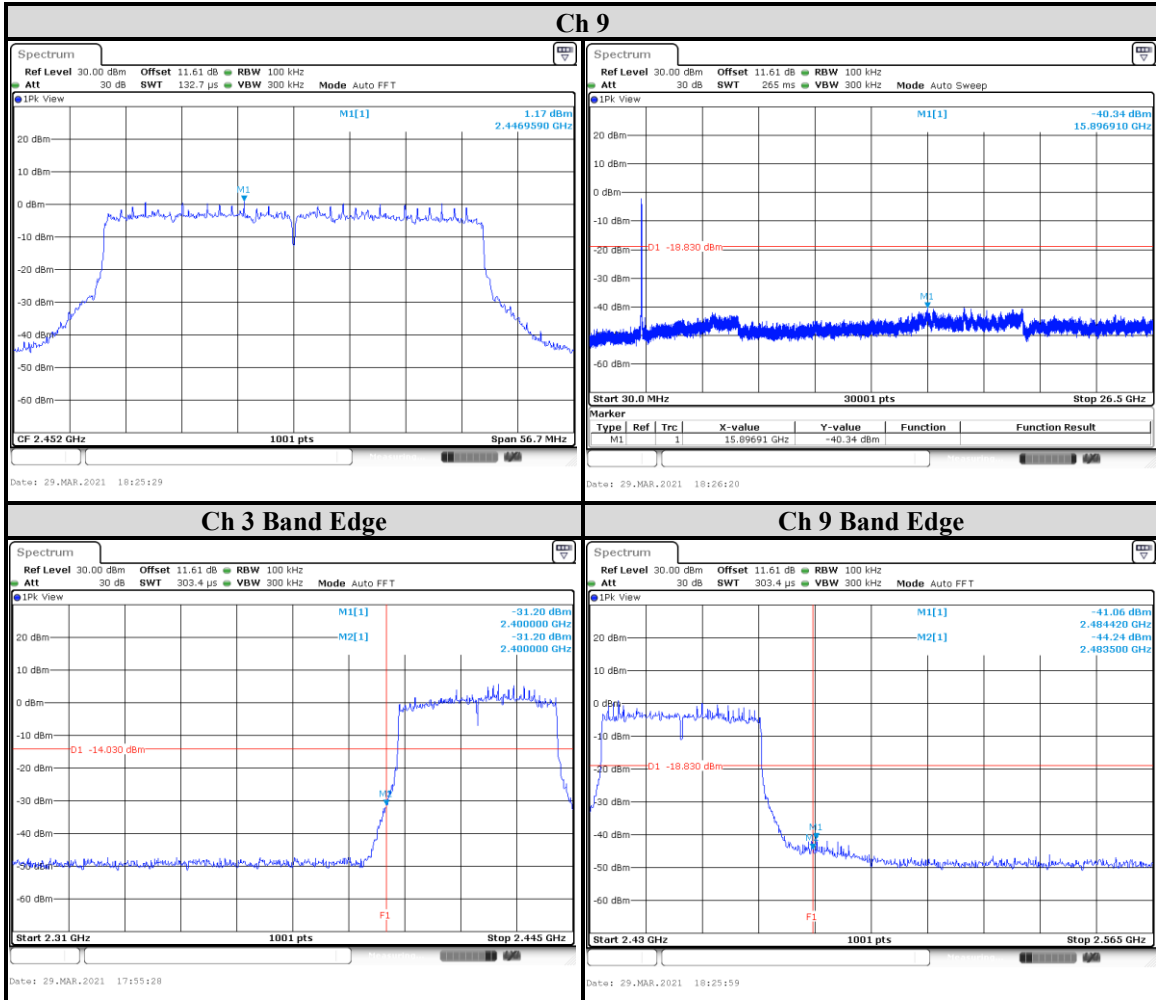
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9.5. Radiated Spurious Emission

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	2kHz
802.11g		1kHz
802.11ax (HE20)		200Hz
802.11ax (HE40)		200Hz

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.

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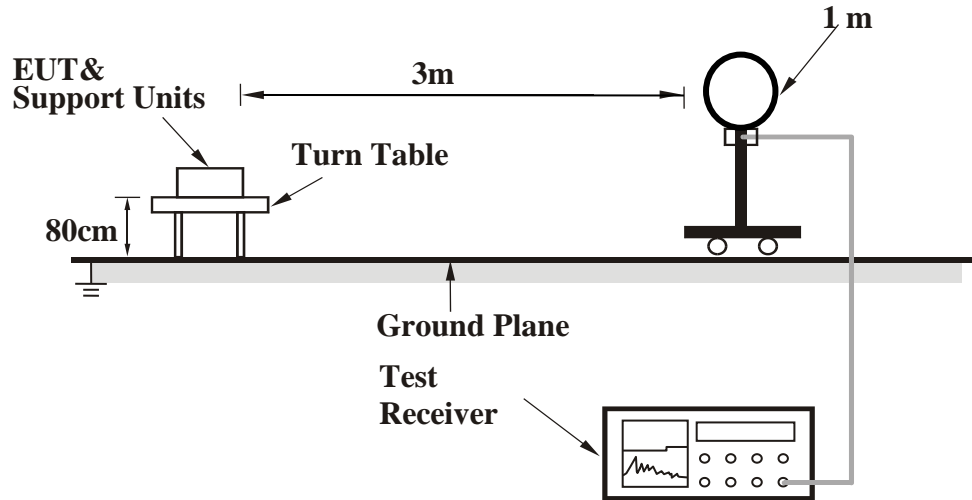
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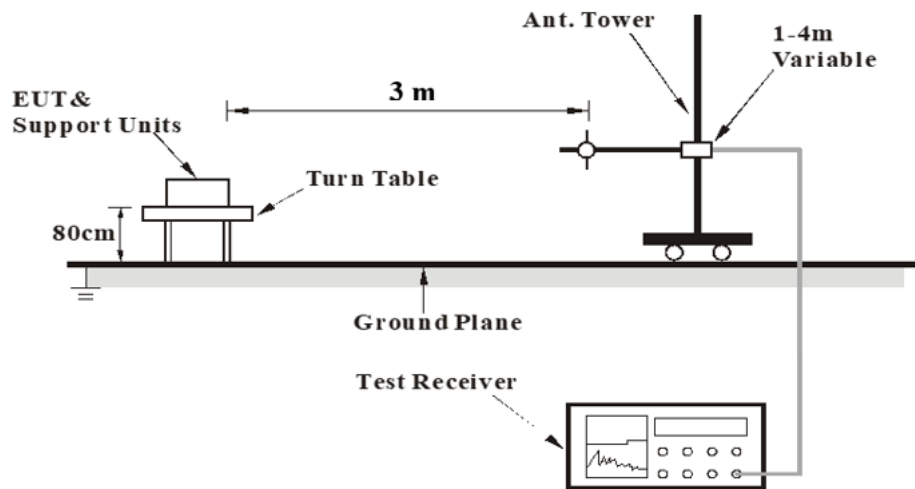


Test Setup

<Frequency Range 9 kHz ~ 30 MHz>



<Frequency Range 30 MHz ~ 1 GHz >



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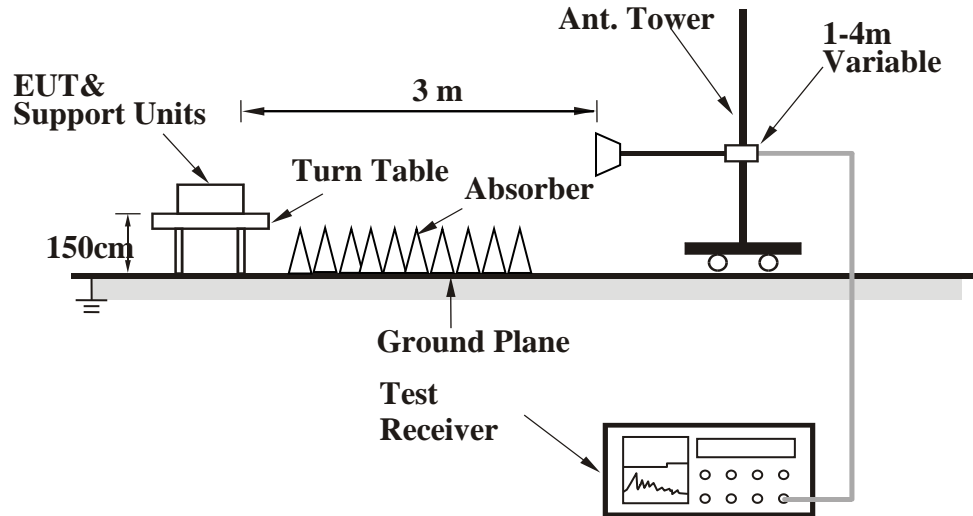
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<Frequency Range above 1 GHz>



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



Test Data

Above 1GHz Data

Non-Beamforming mode

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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4824	37.9	2.55	40.45	74	-33.55	Peak
-	2387.4	31.42	16.1	47.52	54	-6.48	Average
@	2412	100.3	16.13	116.43	-	-	Average
-	2374.4	46.99	16.08	63.07	74	-10.93	Peak
@	2412	103.52	16.13	119.65	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4824	39.66	2.55	42.21	74	-31.79	Peak
-	2339	30.64	16.08	46.72	54	-7.28	Average
@	2412	99.7	16.13	115.83	-	-	Average
-	2344.6	47.08	16.05	63.13	74	-10.87	Peak
@	2412	102.61	16.13	118.74	-	-	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	38.73	2.66	41.39	74	-32.61	Peak
-	2369.2	30.16	16.07	46.23	54	-7.77	Average
@	2437	100.35	16.12	116.47	-	-	Average
-	2487.2	33.21	16.11	49.32	54	-4.68	Average
-	2314.4	46.85	16.18	63.03	74	-10.97	Peak
@	2437	103.86	16.12	119.98	-	-	Peak
-	2501.2	47.25	16.1	63.35	74	-10.65	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	38.65	2.66	41.31	74	-32.69	Peak
-	2343.4	30.24	16.06	46.3	54	-7.7	Average
@	2437	99.94	16.12	116.06	-	-	Average
-	2486	31.46	16.1	47.56	54	-6.44	Average
-	2332.6	46.81	16.09	62.9	74	-11.1	Peak
@	2437	103.11	16.12	119.23	-	-	Peak
-	2497.6	47.86	16.1	63.96	74	-10.04	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4924	38.07	2.61	40.68	74	-33.32	Peak
@	2462	100.67	16.12	116.79	-	-	Average
-	2489.8	37.1	16.1	53.2	54	-0.8	Average
@	2462	103.07	16.12	119.19	-	-	Peak
-	2490.2	47.96	16.1	64.06	74	-9.94	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4924	41.66	2.61	44.27	74	-29.73	Peak
@	2462	99.95	16.12	116.07	-	-	Average
-	2490.2	37.25	16.1	53.35	54	-0.65	Average
@	2462	103.07	16.12	119.19	-	-	Peak
-	2487.2	48.01	16.11	64.12	74	-9.88	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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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802.11g

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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4824	38.82	2.55	41.37	74	-32.63	Peak
-	2390	31.98	16.1	48.08	54	-5.92	Average
@	2412	91.99	16.13	108.12	-	-	Average
-	2313.2	46.93	16.18	63.11	74	-10.89	Peak
@	2412	99.64	16.13	115.77	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4824	39.62	2.55	42.17	74	-31.83	Peak
-	2389.4	36.73	16.1	52.83	54	-1.17	Average
@	2412	93.15	16.13	109.28	-	-	Average
-	2389.8	48.75	16.1	64.85	74	-9.15	Peak
@	2412	99.85	16.13	115.98	-	-	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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 2	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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4834	38.97	2.61	41.58	74	-32.42	Peak
-	2389.6	32.67	16.1	48.77	54	-5.23	Average
@	2417	96.65	16.13	112.78	-	-	Average
-	2333.2	46.34	16.1	62.44	74	-11.56	Peak
@	2417	103.67	16.13	119.8	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4834	39.3	2.61	41.91	74	-32.09	Peak
-	2388.6	36.16	16.1	52.26	54	-1.74	Average
@	2417	97	16.13	113.13	-	-	Average
-	2332.6	46.98	16.09	63.07	74	-10.93	Peak
@	2417	103.61	16.13	119.74	-	-	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	38.89	2.66	41.55	74	-32.45	Peak
-	2354.6	30.24	16.04	46.28	54	-7.72	Average
@	2437	96.4	16.12	112.52	-	-	Average
-	2484.2	35	16.1	51.1	54	-2.9	Average
-	2325.6	47.38	16.13	63.51	74	-10.49	Peak
@	2437	104.04	16.12	120.16	-	-	Peak
-	2496.8	47.79	16.1	63.89	74	-10.11	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	40.14	2.66	42.8	74	-31.2	Peak
-	2367.2	30.02	16.07	46.09	54	-7.91	Average
@	2437	96.6	16.12	112.72	-	-	Average
-	2483.6	33.62	16.1	49.72	54	-4.28	Average
-	2384.2	47.55	16.09	63.64	74	-10.36	Peak
@	2437	104.87	16.12	120.99	-	-	Peak
-	2488.8	47.48	16.1	63.58	74	-10.42	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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 10	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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4914	37.56	2.63	40.19	74	-33.81	Peak
@	2457	96.98	16.12	113.1	-	-	Average
-	2483.6	36.5	16.1	52.6	54	-1.4	Average
@	2457	103.22	16.12	119.34	-	-	Peak
-	2499.6	47.66	16.1	63.76	74	-10.24	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4914	41.24	2.63	43.87	74	-30.13	Peak
@	2457	95.27	16.12	111.39	-	-	Average
-	2484	36.65	16.1	52.75	54	-1.25	Average
@	2457	102.19	16.12	118.31	-	-	Peak
-	2485.2	47.46	16.1	63.56	74	-10.44	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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 / 5.0



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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4924	37.85	2.61	40.46	74	-33.54	Peak
@	2462	90.31	16.12	106.43	-	-	Average
-	2483.6	36.1	16.1	52.2	54	-1.8	Average
@	2462	98.51	16.12	114.63	-	-	Peak
-	2483.6	46.89	16.1	62.99	74	-11.01	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4924	39.9	2.61	42.51	74	-31.49	Peak
@	2462	90.64	16.12	106.76	-	-	Average
-	2483.8	36.04	16.1	52.14	54	-1.86	Average
@	2462	99.45	16.12	115.57	-	-	Peak
-	2505.2	47.92	16.1	64.02	74	-9.98	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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 / 5.0



802.11ax (HE20)

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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4824	38.6	2.55	41.15	74	-32.85	Peak
-	2389.4	32.94	16.1	49.04	54	-4.96	Average
@	2412	90.72	16.13	106.85	-	-	Average
-	2347.4	47.21	16.05	63.26	74	-10.74	Peak
@	2412	99.48	16.13	115.61	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4824	39.07	2.55	41.62	74	-32.38	Peak
-	2390	36.61	16.1	52.71	54	-1.29	Average
@	2412	91.27	16.13	107.4	-	-	Average
-	2367	46.97	16.07	63.04	74	-10.96	Peak
@	2412	100.04	16.13	116.17	-	-	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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 2	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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4834	38.69	2.61	41.3	74	-32.7	Peak
-	2390	36.05	16.1	52.15	54	-1.85	Average
@	2417	93.66	16.13	109.79	-	-	Average
-	2348.8	47.36	16.04	63.4	74	-10.6	Peak
@	2417	102.9	16.13	119.03	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4834	39.08	2.61	41.69	74	-32.31	Peak
-	2390	36.57	16.1	52.67	54	-1.33	Average
@	2417	94.38	16.13	110.51	-	-	Average
-	2389.8	48.58	16.1	64.68	74	-9.32	Peak
@	2417	103.93	16.13	120.06	-	-	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	39.42	2.66	42.08	74	-31.92	Peak
-	2362	30.23	16.06	46.29	54	-7.71	Average
@	2437	95.31	16.12	111.43	-	-	Average
-	2484.2	35.71	16.1	51.81	54	-2.19	Average
-	2355	46.93	16.04	62.97	74	-11.03	Peak
@	2437	103.97	16.12	120.09	-	-	Peak
-	2492.8	48.41	16.1	64.51	74	-9.49	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	39.84	2.66	42.5	74	-31.5	Peak
-	2389.6	30.23	16.1	46.33	54	-7.67	Average
@	2437	95.82	16.12	111.94	-	-	Average
-	2484.2	34.17	16.1	50.27	54	-3.73	Average
-	2360	47.12	16.05	63.17	74	-10.83	Peak
@	2437	105.13	16.12	121.25	-	-	Peak
-	2490.6	46.65	16.1	62.75	74	-11.25	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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 10	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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4914	38.86	2.63	41.49	74	-32.51	Peak
@	2457	92.96	16.12	109.08	-	-	Average
-	2483.6	37.02	16.1	53.12	54	-0.88	Average
@	2457	104.4	16.12	120.52	-	-	Peak
-	2484	49.06	16.1	65.16	74	-8.84	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4914	41.26	2.63	43.89	74	-30.11	Peak
@	2457	91.21	16.12	107.33	-	-	Average
-	2483.6	33.9	16.1	50	54	-4	Average
@	2457	101.71	16.12	117.83	-	-	Peak
-	2499.4	47.06	16.1	63.16	74	-10.84	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4924	38.87	2.61	41.48	74	-32.52	Peak
@	2462	88.78	16.12	104.9	-	-	Average
-	2483.6	36.88	16.1	52.98	54	-1.02	Average
@	2462	99.23	16.12	115.35	-	-	Peak
-	2504.4	47.62	16.1	63.72	74	-10.28	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4924	40.8	2.61	43.41	74	-30.59	Peak
@	2462	88.84	16.12	104.96	-	-	Average
-	2484.2	36.9	16.1	53	54	-1	Average
@	2462	99.48	16.12	115.6	-	-	Peak
-	2483.6	48.39	16.1	64.49	74	-9.51	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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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802.11ax (HE40)

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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4844	40.39	2.66	43.05	74	-30.95	Peak
-	2385.6	34.04	16.09	50.13	54	-3.87	Average
@	2422	87.31	16.13	103.44	-	-	Average
-	2484	36.52	16.1	52.62	54	-1.38	Average
-	2364.6	47.4	16.06	63.46	74	-10.54	Peak
@	2422	96.91	16.13	113.04	-	-	Peak
-	2485.2	49.25	16.1	65.35	74	-8.65	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4844	39.14	2.66	41.8	74	-32.2	Peak
-	2386.8	36.24	16.1	52.34	54	-1.66	Average
@	2422	87.34	16.13	103.47	-	-	Average
-	2387.6	47.63	16.1	63.73	74	-10.27	Peak
@	2422	97.6	16.13	113.73	-	-	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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 4	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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4854	38.15	2.68	40.83	74	-33.17	Peak
-	2390	32.96	16.1	49.06	54	-4.94	Average
@	2427	88.22	16.12	104.34	-	-	Average
-	2484.8	36.74	16.1	52.84	54	-1.16	Average
-	2371.4	47.25	16.07	63.32	74	-10.68	Peak
@	2427	95.28	16.12	111.4	-	-	Peak
-	2493	47.43	16.1	63.53	74	-10.47	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4854	39.71	2.68	42.39	74	-31.61	Peak
-	2390	33.6	16.1	49.7	54	-4.3	Average
@	2427	88.13	16.12	104.25	-	-	Average
-	2316.2	46.65	16.17	62.82	74	-11.18	Peak
@	2427	96.16	16.12	112.28	-	-	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	37.67	2.66	40.33	74	-33.67	Peak
-	2366.2	30.19	16.06	46.25	54	-7.75	Average
@	2437	86.39	16.12	102.51	-	-	Average
-	2484.8	36.81	16.1	52.91	54	-1.09	Average
-	2331.4	46.73	16.1	62.83	74	-11.17	Peak
@	2437	95.26	16.12	111.38	-	-	Peak
-	2502.8	47.63	16.1	63.73	74	-10.27	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4874	41.02	2.66	43.68	74	-30.32	Peak
-	2386.2	30.31	16.09	46.4	54	-7.6	Average
@	2437	85.88	16.12	102	-	-	Average
-	2484.4	33.73	16.1	49.83	54	-4.17	Average
-	2376.8	47.24	16.08	63.32	74	-10.68	Peak
@	2437	95.36	16.12	111.48	-	-	Peak
-	2492.8	47.51	16.1	63.61	74	-10.39	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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 8	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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4894	37.6	2.64	40.24	74	-33.76	Peak
@	2447	85.07	16.12	101.19	-	-	Average
-	2483.6	36.5	16.1	52.6	54	-1.4	Average
@	2447	92.58	16.12	108.7	-	-	Peak
-	2506.2	47.74	16.1	63.84	74	-10.16	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4894	41.54	2.64	44.18	74	-29.82	Peak
@	2447	84.44	16.12	100.56	-	-	Average
-	2483.6	34.27	16.1	50.37	54	-3.63	Average
@	2447	91.42	16.12	107.54	-	-	Peak
-	2484.6	48.5	16.1	64.6	74	-9.4	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4904	38.24	2.63	40.87	74	-33.13	Peak
@	2452	84.48	16.12	100.6	-	-	Average
-	2484	36	16.1	52.1	54	-1.9	Average
@	2452	93.7	16.12	109.82	-	-	Peak
-	2485.2	47.27	16.1	63.37	74	-10.63	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4904	39.58	2.63	42.21	74	-31.79	Peak
@	2452	82.76	16.12	98.88	-	-	Average
-	2485.6	33.68	16.1	49.78	54	-4.22	Average
@	2452	91.73	16.12	107.85	-	-	Peak
-	2490.8	47.37	16.1	63.47	74	-10.53	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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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Co-location mode

802.11b + 802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 11 + Channel 149	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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4961	41.15	2.62	43.77	74	-30.23	Peak
*	11489	31.82	19.02	50.84	74	-23.16	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4960	42.86	2.62	45.48	74	-28.52	Peak
-	11490	33.21	19.02	52.23	54	-1.77	Average
-	11490	36.03	19.02	55.05	74	-18.95	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. " * ": The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
5. 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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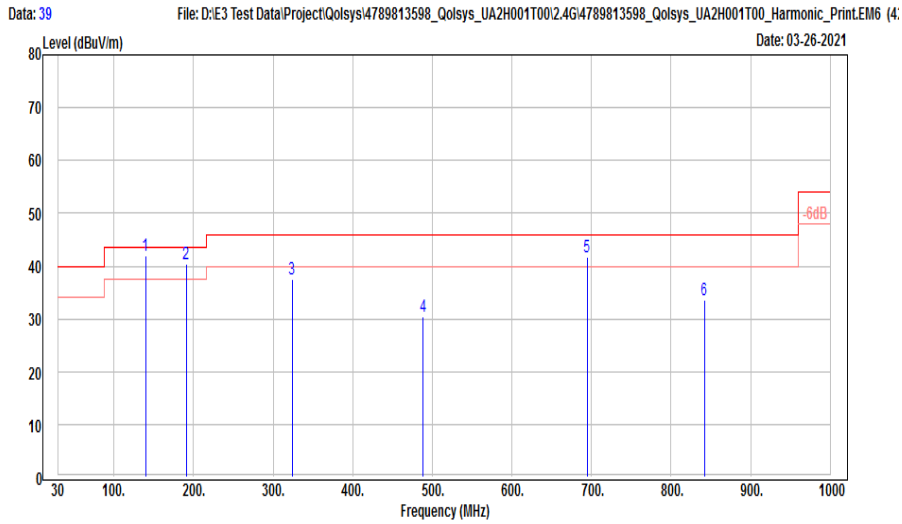
30 MHz ~ 1 GHz Data

Non-Beamforming mode

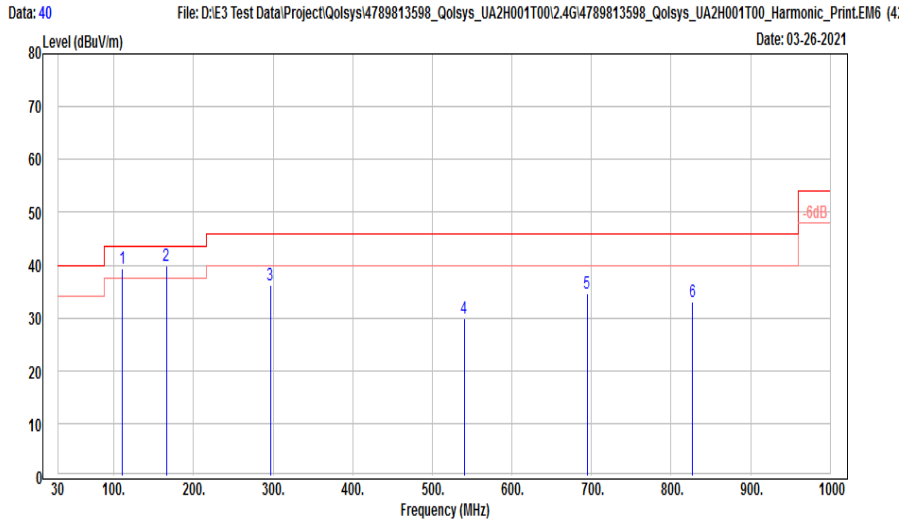
802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 11	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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	139.61	54.2	-12.27	41.93	43.5	-1.57	QP
*	191.02	54.68	-14.38	40.3	43.5	-3.2	Peak
*	323.91	47.2	-9.8	37.4	46	-8.6	Peak
*	488.81	35.65	-5.32	30.33	46	-15.67	Peak
*	694.45	42.68	-1.08	41.6	46	-4.4	Peak
*	841.89	32.21	1.4	33.61	46	-12.39	Peak

Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	110.51	54.51	-15.15	39.36	43.5	-4.14	Peak
*	165.8	51.8	-11.82	39.98	43.5	-3.52	Peak
*	296.75	46.88	-10.74	36.14	46	-9.86	Peak
*	540.22	34.09	-4.26	29.83	46	-16.17	Peak
*	694.45	35.77	-1.08	34.69	46	-11.31	Peak
*	827.34	31.72	1.27	32.99	46	-13.01	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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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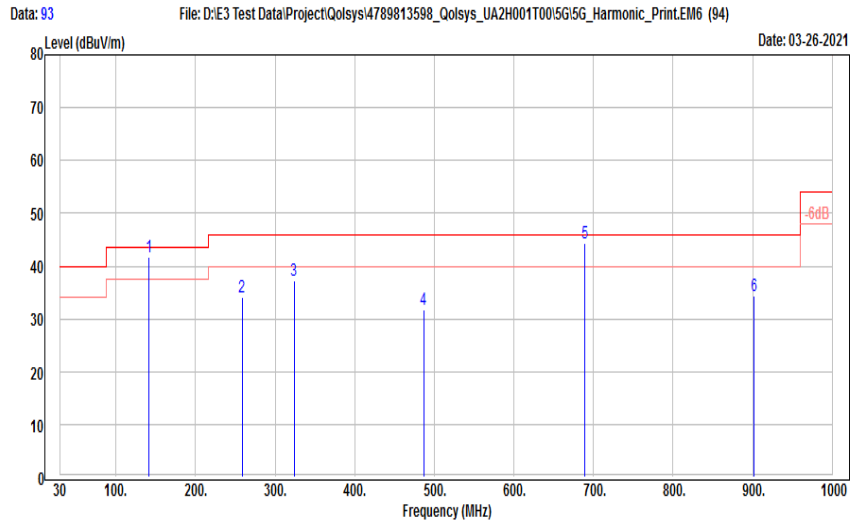


Co-location mode

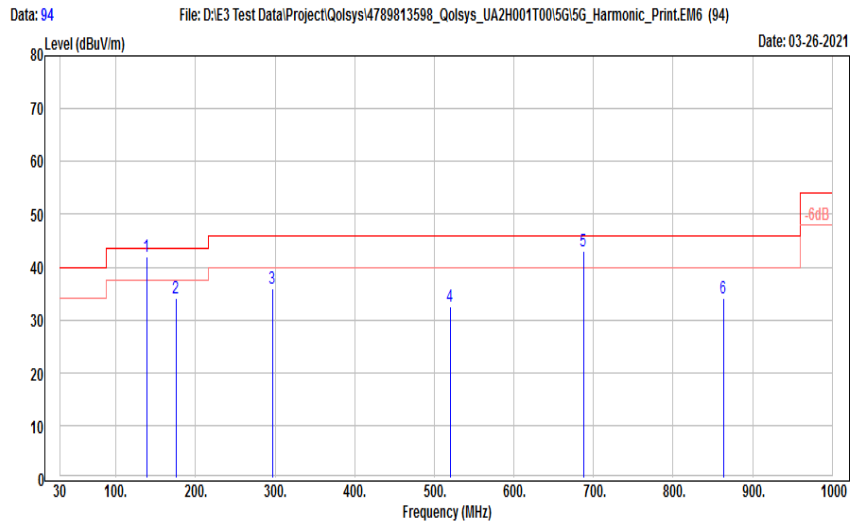
802.11b + 802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 11 + Channel 149	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/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	141.55	54	-12.21	41.79	43.5	-1.71	QP
*	258.92	46.67	-12.48	34.19	46	-11.81	Peak
*	323.91	47.06	-9.8	37.26	46	-8.74	Peak
*	486.87	36.98	-5.33	31.65	46	-14.35	Peak
*	689.6	45.51	-1.11	44.4	46	-1.6	Peak
*	902.03	32.13	2.32	34.45	46	-11.55	Peak

Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	138.64	54.22	-12.38	41.84	43.5	-1.66	Peak
*	175.5	46.7	-12.48	34.22	43.5	-9.28	Peak
*	296.75	46.55	-10.74	35.81	46	-10.19	Peak
*	519.85	36.96	-4.55	32.41	46	-13.59	Peak
*	687.66	44.07	-1.16	42.91	46	-3.09	Peak
*	863.23	32.33	1.69	34.02	46	-11.98	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/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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Doc No: 17-EM-F0876 / 5.0



9.6. AC Power Line Conducted Emission

Requirements

Frequency (MHz)	Conducted limit (dB μ V)	
	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.

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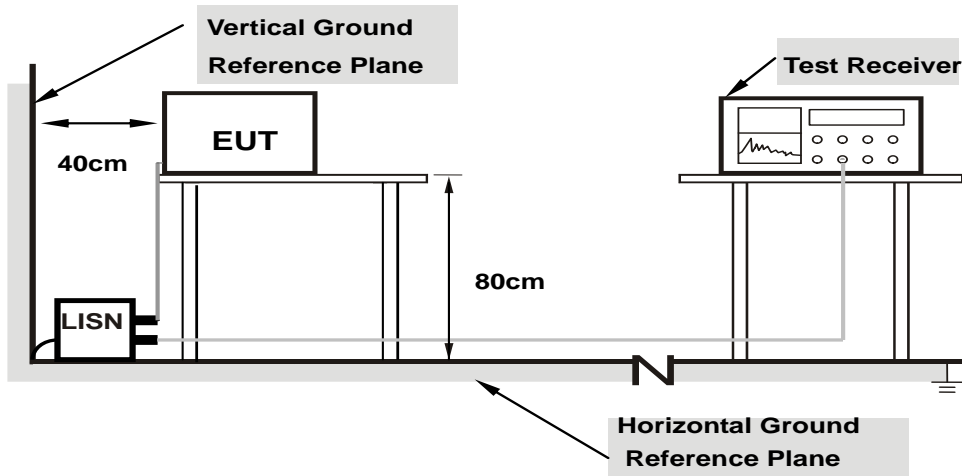
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Test Setup



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

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

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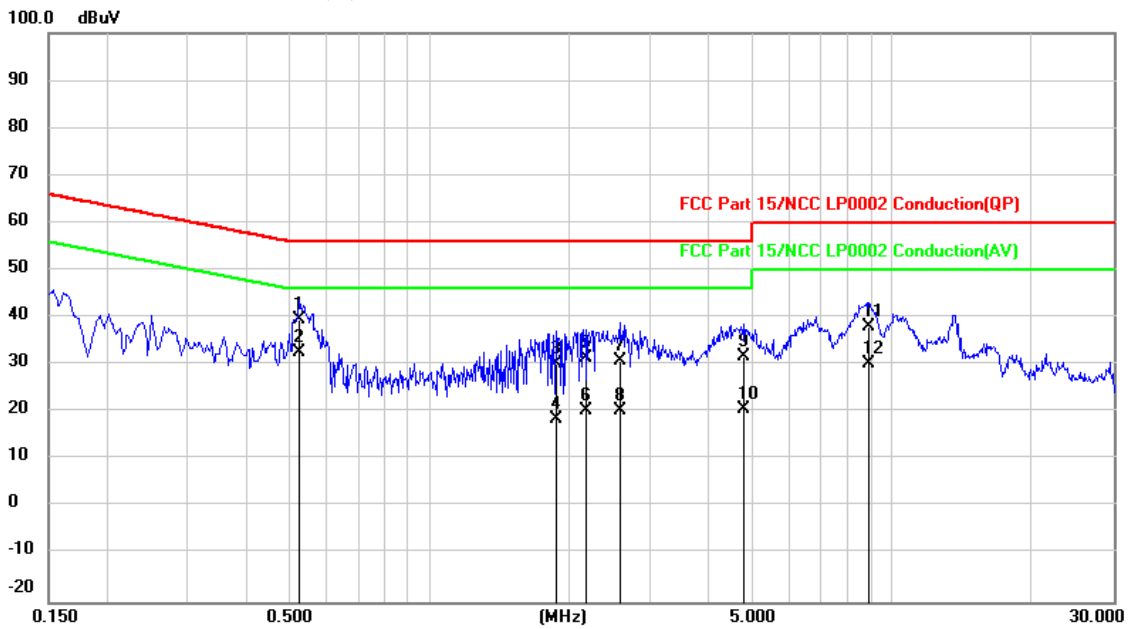
Test Data

Non-Beamforming mode

802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	150 kHz ~ 30 MHz

Phase of Power : Line (L)



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No.	Frequency (MHz)	Reading (dBuV)	Correct dB	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.5220	20.07	19.49	39.56	56.00	-16.44	QP
2	0.5220	13.11	19.49	32.60	46.00	-13.40	AVG
3	1.8700	10.80	19.53	30.33	56.00	-25.67	QP
4	1.8700	-1.01	19.53	18.52	46.00	-27.48	AVG
5	2.1740	11.83	19.53	31.36	56.00	-24.64	QP
6	2.1740	0.79	19.53	20.32	46.00	-25.68	AVG
7	2.5780	11.29	19.54	30.83	56.00	-25.17	QP
8	2.5780	0.67	19.54	20.21	46.00	-25.79	AVG
9	4.7619	12.05	19.59	31.64	56.00	-24.36	QP
10	4.7619	1.08	19.59	20.67	46.00	-25.33	AVG
11	8.8940	18.41	19.66	38.07	60.00	-21.93	QP
12	8.8940	10.55	19.66	30.21	50.00	-19.79	AVG

Remarks:

1. Result value (dBuV) = Reading value (dBuV) + Correction Factor (dB)
2. Margin(dB) = Result value (dBuV) - Limit value (dBuV)
3. Correction Factor(dB) = Insertion loss(dB) + Cable loss(dB)
4. The other emission levels were very low against the limit.

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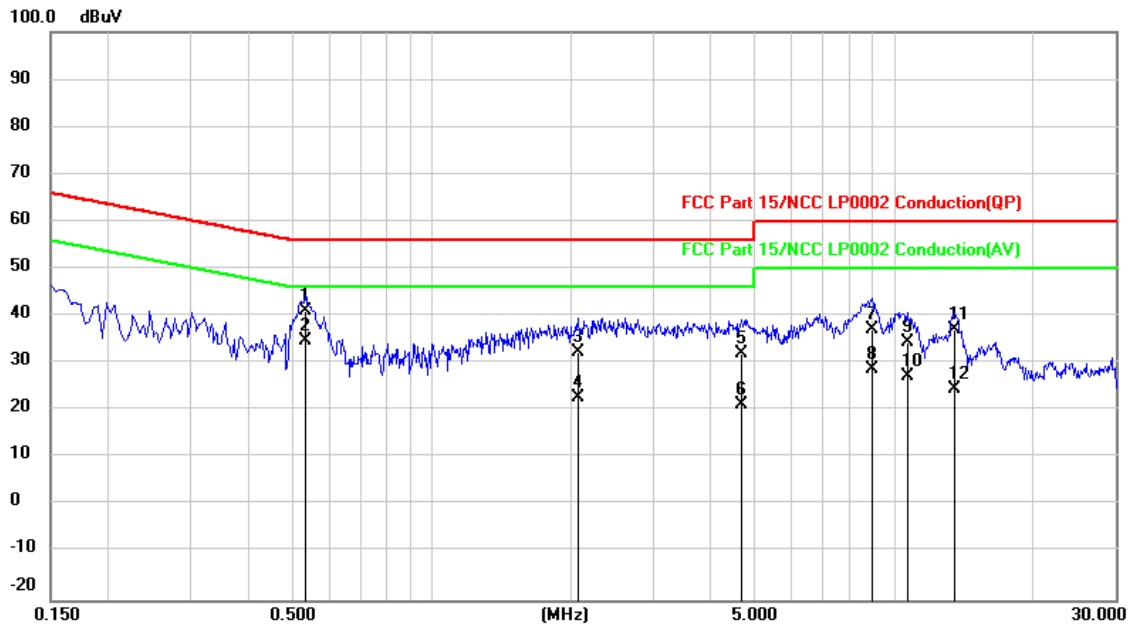
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Phase of Power : Neutral (N)



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No.	Frequency (MHz)	Reading (dBuV)	Correct dB	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.5340	21.65	19.49	41.14	56.00	-14.86	QP
2	0.5340	15.19	19.49	34.68	46.00	-11.32	AVG
3	2.0700	12.81	19.52	32.33	56.00	-23.67	QP
4	2.0700	3.26	19.52	22.78	46.00	-23.22	AVG
5	4.6820	12.39	19.60	31.99	56.00	-24.01	QP
6	4.6820	1.78	19.60	21.38	46.00	-24.62	AVG
7	8.9220	17.34	19.67	37.01	60.00	-22.99	QP
8	8.9220	9.05	19.67	28.72	50.00	-21.28	AVG
9	10.6459	14.81	19.69	34.50	60.00	-25.50	QP
10	10.6459	7.71	19.69	27.40	50.00	-22.60	AVG
11	13.4540	17.44	19.74	37.18	60.00	-22.82	QP
12	13.4540	4.96	19.74	24.70	50.00	-25.30	AVG

Remarks:

1. Result value (dBuV) = Reading value (dBuV) + Correction Factor (dB)
2. Margin(dB) = Result value (dBuV) - Limit value (dBuV)
3. Correction Factor(dB) = Insertion loss(dB) + Cable loss(dB)
4. The other emission levels were very low against the limit.

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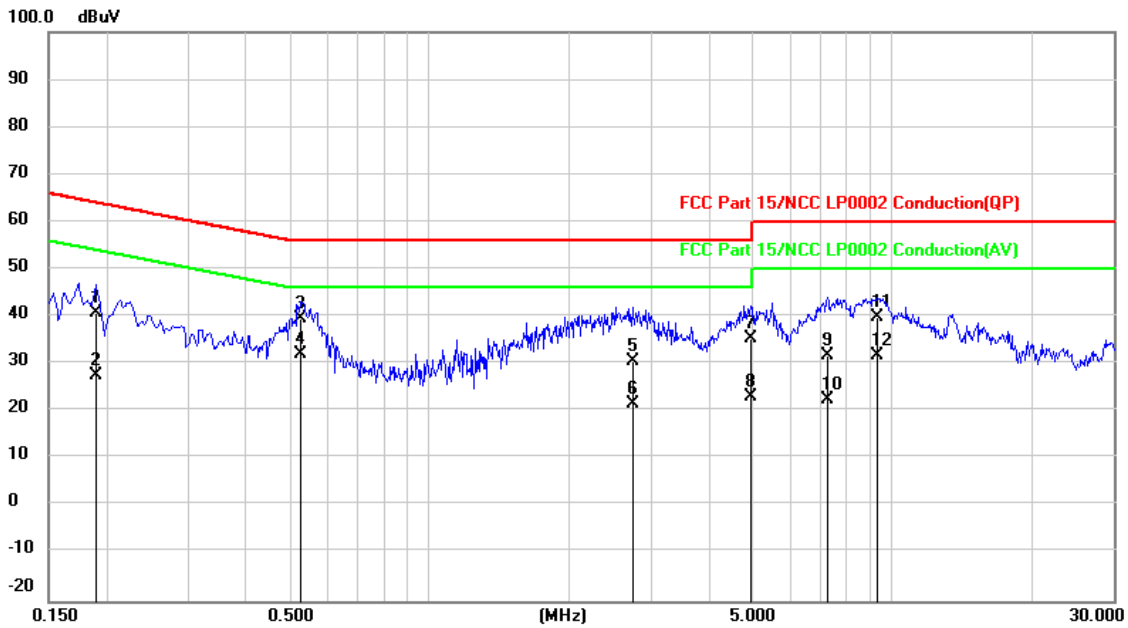


Co-location mode

802.11b + 802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 11 + Channel 149	Frequency Range	150 kHz ~ 30 MHz

Phase of Power : Line (L)



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No.	Frequency (MHz)	Reading (dBuV)	Correct dB	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1900	21.32	19.49	40.81	64.04	-23.23	QP
2	0.1900	7.94	19.49	27.43	54.04	-26.61	AVG
3	0.5260	20.14	19.49	39.63	56.00	-16.37	QP
4	0.5260	12.55	19.49	32.04	46.00	-13.96	AVG
5	2.7500	10.90	19.54	30.44	56.00	-25.56	QP
6	2.7500	1.89	19.54	21.43	46.00	-24.57	AVG
7	4.9340	15.75	19.60	35.35	56.00	-20.65	QP
8	4.9340	3.60	19.60	23.20	46.00	-22.80	AVG
9	7.2460	12.25	19.63	31.88	60.00	-28.12	QP
10	7.2460	2.91	19.63	22.54	50.00	-27.46	AVG
11	9.2700	20.17	19.67	39.84	60.00	-20.16	QP
12	9.2700	12.18	19.67	31.85	50.00	-18.15	AVG

Remarks:

1. Result value (dBuV) = Reading value (dBuV) + Correction Factor (dB)
2. Margin(dB) = Result value (dBuV) - Limit value (dBuV)
3. Correction Factor(dB) = Insertion loss(dB) + Cable loss(dB)
4. The other emission levels were very low against the limit.

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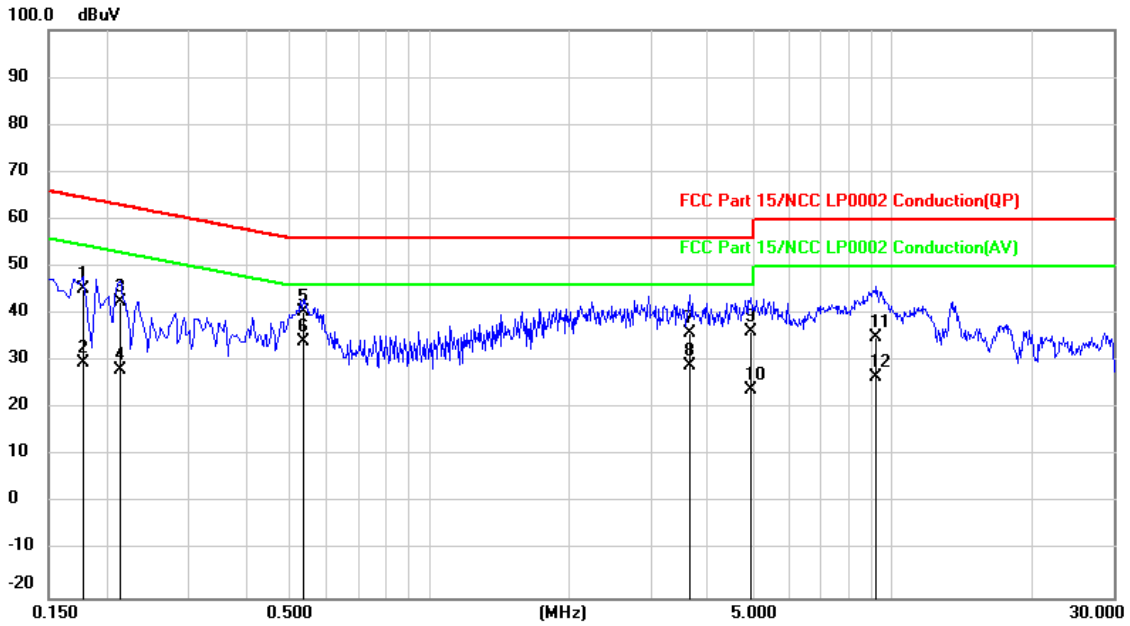
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Phase of Power : Neutral (N)



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No.	Frequency (MHz)	Reading (dBuV)	Correct dB	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1780	25.63	19.49	45.12	64.58	-19.46	QP
2	0.1780	10.09	19.49	29.58	54.58	-25.00	AVG
3	0.2140	23.01	19.49	42.50	63.05	-20.55	QP
4	0.2140	8.63	19.49	28.12	53.05	-24.93	AVG
5	0.5340	20.89	19.49	40.38	56.00	-15.62	QP
6	0.5340	14.69	19.49	34.18	46.00	-11.82	AVG
7	3.6420	16.42	19.57	35.99	56.00	-20.01	QP
8	3.6420	9.36	19.57	28.93	46.00	-17.07	AVG
9	4.9460	16.77	19.60	36.37	56.00	-19.63	QP
10	4.9460	4.21	19.60	23.81	46.00	-22.19	AVG
11	9.2180	15.26	19.67	34.93	60.00	-25.07	QP
12	9.2180	6.98	19.67	26.65	50.00	-23.35	AVG

Remarks:

1. Result value (dBuV) = Reading value (dBuV) + Correction Factor (dB)
2. Margin(dB) = Result value (dBuV) - Limit value (dBuV)
3. Correction Factor(dB) = Insertion loss(dB) + Cable loss(dB)
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