RF Test Report

For

Applicant Name:	**Shenzhen Sunchip Technology Co.,Ltd**
Address:	2nd-3rd Floor, Building 4, Fuan Industry Area Phase 2,Dayang Development Zone, Fuyong, Baoan, Shenzhen, China
EUT Name:	RK3588 Edge Computing Device
Brand Name:	SUNCHIP
Model Number:	AD-0160
Series Model Number:	Refer to Section 2

Issued By

Company Name:	**BTF Testing Lab (Shenzhen) Co., Ltd.**
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Report Number:	BTF230317R01204
Test Standards:	47 CFR Part 15E
Test Conclusion:	Pass
Test Date:	2023-03-19 to 2023-03-31
Date of Issue:	2023-04-11
Prepared By:	Gavin Cui
	Gavin Cui / Project Engineer
Date:	2023-04-11
Approved By:	Ryan.CJ
	Ryan.CJ / EMC Manager
Date:	2023-04-11

Note: All the test results in this report only related to the testing samples. Which can be duplicated completely for the legal use with approval of applicant; it shall not be reproduced except in full without the written approval of BTF Testing Lab (Shenzhen) Co., Ltd., All the objections should be raised within thirty days from the date of issue. To validate the report, you can contact us.

Revision History		
Version	Issue Date	Revisions Content
R_V0	2023-04-11	Original
Note: Once the revision has been made, then previous versions reports are invalid.		

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

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F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

1 Introduction

1.1 Identification of Testing Laboratory

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone Number:	+86-0755-23146130
Fax Number:	+86-0755-23146130

1.2 Identification of the Responsible Testing Location

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone Number:	+86-0755-23146130
Fax Number:	+86-0755-23146130
FCC Registration Number:	518915
Designation Number:	CN1330

1.3 Announcement

(1) The test report reference to the report template version v0.
(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.
(3) The test report is invalid if there is any evidence and/or falsification.
(4) This document may not be altered or revised in any way unless done so by BTF and all revisions are duly noted in the revisions section.
(5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
(6) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2 Product Information

2.1 Application Information

Company Name:	Shenzhen Sunchip Technology Co.,Ltd
Address:	2nd-3rd Floor, Building 4, Fuan Industry Area Phase 2,Dayang Development Zone, Fuyong, Baoan, Shenzhen, China

2.2 Manufacturer Information

Company Name:	Shenzhen Sunchip Technology Co.,Ltd
Address:	2nd-3rd Floor, Building 4, Fuan Industry Area Phase 2,Dayang Development Zone, Fuyong, Baoan, Shenzhen, China

2.3 Factory Information

Company Name:	Shenzhen Sunchip Technology Co.,Ltd
Address:	2nd-3rd Floor, Building 4, Fuan Industry Area Phase 2,Dayang Development Zone, Fuyong, Baoan, Shenzhen, China

2.4 General Description of Equipment under Test (EUT)

EUT Name:	RK3588 Edge Computing Device
Test Model Number:	AD-0160
Series Model Number:	AD-0160A, AD-0160B, AD-0160C, AD-0160D
Description of Model differentiation:	The model name is different from the exterior color of the case, others are the same.

2.5 Technical Information

Power Supply:	DC 12V
Operation Frequency:	802.11a/n(HT20)/ac(HT20) : U-NII Band 1: 5180MHz to 5240MHz; U-NII Band 2A: 5260MHz to 5320MHz; U-NII Band 3: 5745MHz to 5825MHz; 802.11n(HT40)/ac(HT40) : U-NII Band 1: 5190MHz to 5230MHz; U-NII Band 2A: 5270MHz to 5310MHz; U-NII Band 3: 5755MHz to 5795MHz; 802.11ac(HT80) : U-NII Band 1: 5210MHz; U-NII Band 2A: 5290MHz; U-NII Band 3: 5775MHz Note: In Canada, 5600MHz to 5650MHz is not avaliable.
Number of Channels:	802.11a/n(HT20)/ac(HT20)): U-NII Band 1: 4; U-NII Band 2A: 4; U-NII Band 3: 5; 802.11n(HT40)/ac(HT40): U-NII Band 1: 2; U-NII Band 2A: 2; U-NII Band 3: 2; 802.11ac(HT80)): U-NII Band 1: 1;

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	U-NII Band 2A: 1; U-NII Band 3:
Modulation Type:	802.11a: OFDM(BPSK, QPSK, 16QAM, 64QAM); 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM); 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM);
Antenna Type:	External antenna
Antenna Gain:	5150-5250 3.09dBi 5250-5350 3.13dBi 5725-5850 3.73dBi

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3 Summary of Test Results

3.1 Test Standards

The tests were performed according to following standards:
47 CFR Part 15E: Unlicensed National Information Infrastructure Devices

3.2 Uncertainty of Test

Item	Measurement Uncertainty
Conducted Emission (150 kHz-30 MHz)	±2.64dB
The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3.3 Summary of Test Result

Item	Standard	Requirement	Result
Antenna requirement	47 CFR Part 15E	Part 15.203	Pass
Conducted Emission at AC power line	47 CFR Part 15E	47 CFR Part 15.207(a)	Pass
Maximum conducted output power	47 CFR Part 15E	47 CFR Part 15.407(a)(1)(i) 47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii) 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(2) 47 CFR Part 15.407(a)(3)(i)	Pass
Power spectral density	47 CFR Part 15E	47 CFR Part 15.407(a)(1)(i) 47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii) 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(2) 47 CFR Part 15.407(a)(3)(i)	Pass
Emission bandwidth and occupied bandwidth	47 CFR Part 15E	U-NII 1, U-NII 2A, U-NII 2C: No limits, only for report use. 47 CFR Part 15.407(e)	Pass
Channel Availability Check Time	47 CFR Part 15E	47 CFR Part 15.407(h)(2)(ii)	Pass
U-NII Detection Bandwidth	47 CFR Part 15E	47 CFR Part 15.407(h)(2)	Pass
Statistical Performance Check	47 CFR Part 15E	KDB 935210 D02, Clause 5.1 Table 2	Pass
Channel Move Time, Channel Closing Transmission Time	47 CFR Part 15E	47 CFR Part 15.407(h)(2)(iii)	Pass
Non-Occupancy Period Test	47 CFR Part 15E	47 CFR Part 15.407(h)(2)(iv)	Pass
DFS Detection Thresholds	47 CFR Part 15E	KDB 905462 D02, Clause 5.2 Table 3	Pass
Band edge emissions (Radiated)	47 CFR Part 15E	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(2) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)	Pass
Undesirable emission limits (below 1GHz)	47 CFR Part 15E	47 CFR Part 15.407(b)(9)	Pass
Undesirable emission limits (above 1GHz)	47 CFR Part 15E	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(2) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)	Pass

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4 Test Configuration

4.1 Test Equipment List

Conducted Emission at AC power line					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	00953	2022-11-24	2023-11-23
Coaxial Switcher	SCHWARZBECK	CX210	CX210	2022-11-24	2023-11-23
V-LISN	SCHWARZBECK	NSLK 8127	01073	2022-11-24	2023-11-23
LISN	AFJ	LS16/110VAC	16010020076	2023-02-23	2024-02-22
EMI Receiver	ROHDE&SCHWARZ	ESCI3	101422	2022-11-24	2023-11-23

Duty Cycle					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Maximum conducted output power					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

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Power spectral density					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Emission bandwidth and occupied bandwidth					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Channel Availability Check Time					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23

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MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

U-NII Detection Bandwidth					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Statistical Performance Check					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Channel Move Time, Channel Closing Transmission Time					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23

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WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Non-Occupancy Period Test					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

DFS Detection Thresholds					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Band edge emissions (Radiated)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1m	21101568	2022-11-24	2023-11-23

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RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplilifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ_EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

Undesirable emission limits (below 1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplilifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ_EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

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Undesirable emission limits (above 1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplilifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ_EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

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4.2 Test Auxiliary Equipment

The EUT was tested as an independent device.

4.3 Test Modes

No.	Test Modes	Description
TM1	802.11a mode	Keep the EUT connect to AC power line and works in continuously transmitting mode with 802.11a modulation type. All data rates has been tested and found the data rate @ 6Mbps is the worst case. Only the data of worst case is recorded in the report.
TM2	802.11n mode	Keep the EUT connect to AC power line and works in continuously transmitting mode with 802.11n modulation type. All bandwidth and data rates has been tested and found the data rate @ MCS0 is the worst case. Only the data of worst case is recorded in the report.
TM3	802.11ac mode	Keep the EUT connect to AC power line and works in continuously transmitting mode with 802.11ac modulation type. All bandwidth and data rates has been tested and found the data rate @ MCS0 is the worst case. Only the data of worst case is recorded in the report.
TM4	802.11ax mode	Keep the EUT connect to AC power line and works in continuously transmitting mode with 802.11ax modulation type. All bandwidth and data rates has been tested and found the data rate @ MCS0 is the worst case. Only the data of worst case is recorded in the report.
TM5	Normal Operating	Keep the EUT works in normal operating mode and connect to companion device

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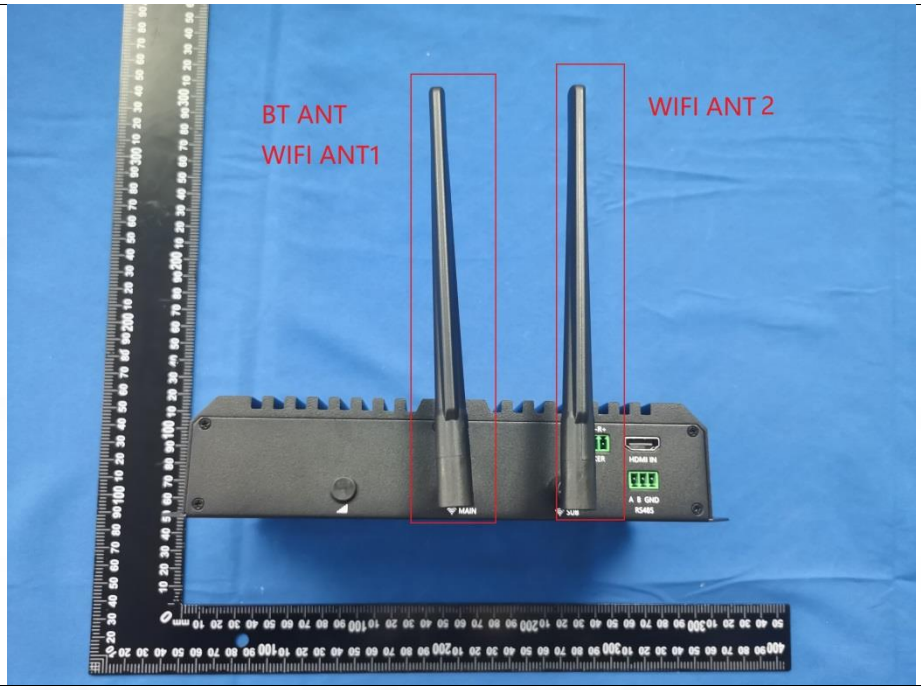
5 Evaluation Results (Evaluation)

5.1 Antenna requirement

Test Requirement:	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

5.1.1 Conclusion:



Note: The product has two external antennas, the gain of both antennas is the same, 3.09 dBi for 5150-5250MHz band, 3.13 dBi for 5250-5350MHz band and 3.73 dBi for 5725-5850MHz band, and the product is a CDD devicewith the same gain, according to KDB 662911 D01 section F, the Directional gain=Gant + Array gain
For power spectral density measurements on all antenna, Array gain=10log(Nant/Nss) dB, Nss =1.
Directional gain=Gant + Array gain=3.09+10log(2/1)=6.1dBi, for 5150-5250MHz
Directional gain=Gant + Array gain=3.13+10log(2/1)=6.14dBi, for 5250-5350MHz
Directional gain=Gant + Array gain=3.73+10log(2/1)=6.74dBi, for 5725-5850MHz

For power measurements on IEEE 802.11 devices, Array gain=0 dB for Nant≤4
Directional gain=Gant + Array gain=3.09+0=3.09dBi, for 5150-5250MHz
Directional gain=Gant + Array gain=3.13+0=3.13dBi, for 5250-5350MHz
Directional gain=Gant + Array gain=3.73+0=3.73dBi, for 5725-5850MHz

Power limit: 5150-5250MHz =24dBm, 5250-5350MHz=24dBm, 5725-5850MHz=30dBm

5150-5250 band PSD limit=11dBm/MHz-(GTx-6)dB=11-(6.1-6)=10.9dBm/MHz
5250-5350 band PSD limit=11dBm/MHz -(GTx-6)dB=11-(6.14-6)=10.86dBm/MHz
5725-5850 band PSD limit=30dBm/500KHz-(GTx-6)dB=30-(6.74-6)=29.26dBm/500KHz
please refer to the antenna photo.

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6 Radio Spectrum Matter Test Results (RF)

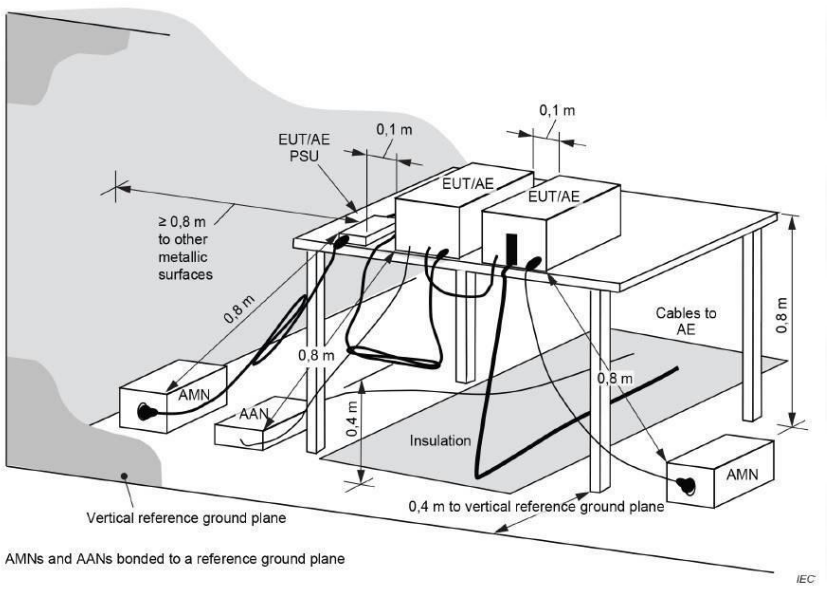
6.1 Conducted Emission at AC power line

Test Requirement:	47 CFR Part 15.207(a)
Test Method:	Refer to ANSI C63.10-2013 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices
Test Limit:	Frequency of emission (MHz) / Conducted limit (dBμV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 *Decreases with the logarithm of the frequency.

6.1.1 E.U.T. Operation:

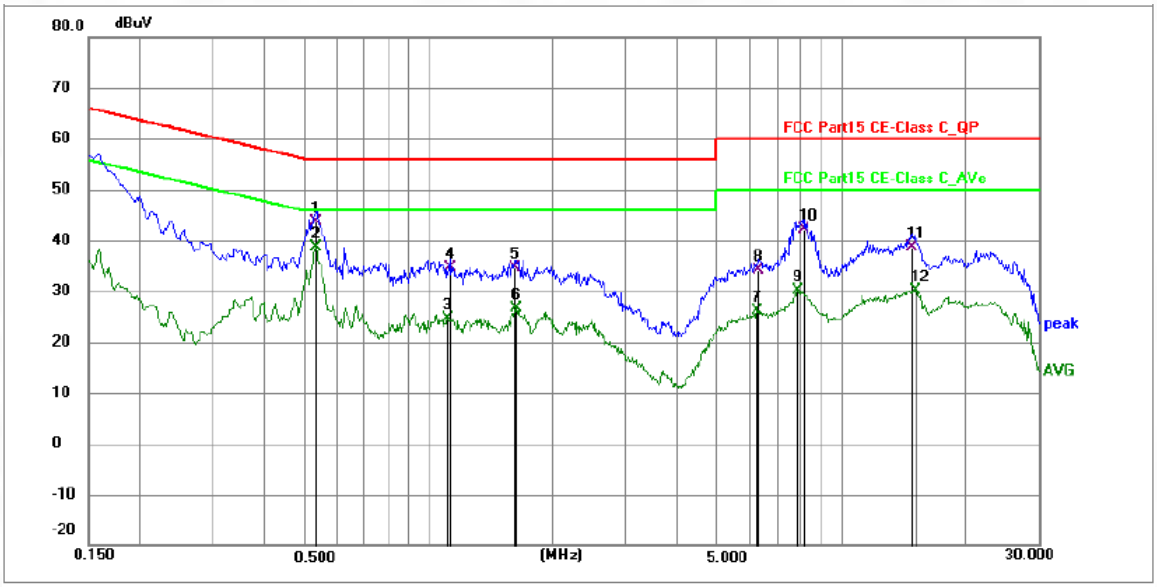
Operating Environment:	
Temperature:	25.5 °C
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar

6.1.2 Test Setup Diagram:



6.1.3 Test Data:

TM1 / Line: Line / Band: U-NII 1 / BW: 20 / CH: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.5322	32.93	10.63	43.56	56.00	-12.44	QP	P	
2 *	0.5322	28.12	10.63	38.75	46.00	-7.25	AVG	P	
3	1.1130	13.77	10.77	24.54	46.00	-21.46	AVG	P	
4	1.1265	23.81	10.77	34.58	56.00	-21.42	QP	P	
5	1.6210	23.90	10.72	34.62	56.00	-21.38	QP	P	
6	1.6305	15.92	10.72	26.64	46.00	-19.36	AVG	P	
7	6.2385	15.53	10.72	26.25	50.00	-23.75	AVG	P	
8	6.3060	23.38	10.72	34.10	60.00	-25.90	QP	P	
9	7.8450	19.28	10.80	30.08	50.00	-19.92	AVG	P	
10	8.1330	31.32	10.82	42.14	60.00	-17.86	QP	P	
11	14.7522	27.58	10.93	38.51	60.00	-21.49	QP	P	
12	15.0810	19.22	10.92	30.14	50.00	-19.86	AVG	P	

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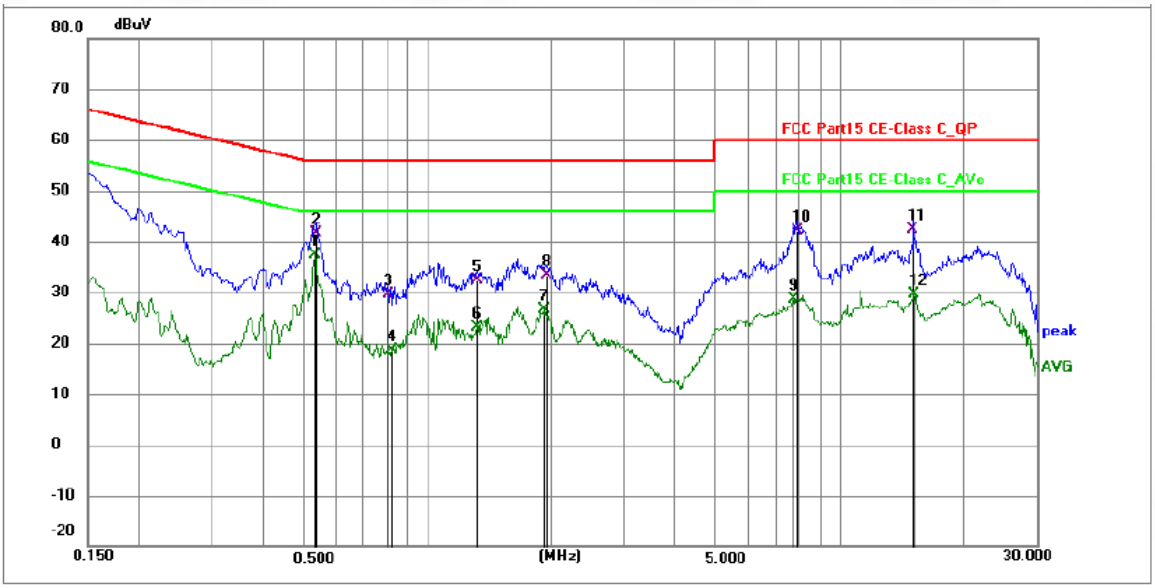
TM1 / Line: Neutral / Band: U-NII 1 / BW: 20 / CH: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1 *	0.5322	26.68	10.63	37.31	46.00	-8.69	AVG	P	
2	0.5370	31.12	10.63	41.75	56.00	-14.25	QP	P	
3	0.8024	18.81	10.75	29.56	56.00	-26.44	QP	P	
4	0.8205	8.00	10.75	18.75	46.00	-27.25	AVG	P	
5	1.3200	21.70	10.75	32.45	56.00	-23.55	QP	P	
6	1.3200	12.33	10.75	23.08	46.00	-22.92	AVG	P	
7	1.9092	16.05	10.70	26.75	46.00	-19.25	AVG	P	
8	1.9410	22.58	10.70	33.28	56.00	-22.72	QP	P	
9	7.7190	17.90	10.79	28.69	50.00	-21.31	AVG	P	
10	7.8673	31.37	10.80	42.17	60.00	-17.83	QP	P	
11	15.0270	31.49	10.82	42.31	60.00	-17.69	QP	P	
12	15.0990	18.91	10.82	29.73	50.00	-20.27	AVG	P	

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6.2 Duty Cycle

Test Requirement:	All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximum-power transmission duration, T, are required for each tested mode of operation.
Test Method:	ANSI C63.10-2013 section 12.2 (b)
Test Limit:	No limits, only for report use.
Procedure:	i) Set the center frequency of the instrument to the center frequency of the transmission. ii) Set RBW >= EBW if possible; otherwise, set RBW to the largest available value. iii) Set VBW >= RBW. iv) Set detector = peak. v) The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T, where T is defined in item a1) of 12.2, and the number of sweep points across duration T exceeds 100.

6.2.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 °C
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar

6.2.2 Test Data:

Please Refer to Appendix for Details.

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6.3 Maximum conducted output power

Test Requirement:	47 CFR Part 15.407(a)(1)(i) 47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii) 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(2) 47 CFR Part 15.407(a)(3)(i)
Test Method:	ANSI C63.10-2013, section 12.3
Test Limit:	For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm). For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations. For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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	For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
Procedure:	Method SA-1 a) Set span to encompass the entire 26 dB EBW or 99% OBW of the signal. b) Set RBW = 1 MHz. c) Set VBW >= 3 MHz. d) Number of points in sweep >= [2 × span / RBW]. (This gives bin-to-bin spacing <= RBW / 2, so that narrowband signals are not lost between frequency bins.) e) Sweep time = auto. f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode. g) If transmit duty cycle < 98%, use a video trigger with the trigger level set to enable triggering only on full power pulses. The transmitter shall operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no OFF intervals) or at duty cycle >= 98%, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run.” h) Trace average at least 100 traces in power averaging (rms) mode. i) Compute power by integrating the spectrum across the 26 dB EBW or 99% OBW of the signal using the instrument’s band power measurement function, with band limits set equal to the EBW or OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at 1 MHz intervals extending across the 26 dB EBW or 99% OBW of the spectrum.

6.3.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 °C
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar

6.3.2 Test Data:

Please Refer to Appendix for Details.

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6.4 Power spectral density

Test Requirement:	47 CFR Part 15.407(a)(1)(i) 47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii) 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(2) 47 CFR Part 15.407(a)(3)(i)
Test Method:	ANSI C63.10-2013, section 12.5
Test Limit:	For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations. For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. For the band 5.725-5.850 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter

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	conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
Procedure:	a) Create an average power spectrum for the EUT operating mode being tested by following the instructions in 12.3.2 for measuring maximum conducted output power using a spectrum analyzer or EMI receiver; that is, select the appropriate test method (SA-1, SA-2, SA-3, or their respective alternatives) and apply it up to, but not including, the step labeled, “Compute power….” (This procedure is required even if the maximum conducted output power measurement was performed using the power meter method PM.) b) Use the peak search function on the instrument to find the peak of the spectrum. c) Make the following adjustments to the peak value of the spectrum, if applicable: 1) If method SA-2 or SA-2A was used, then add [10 log (1 / D)], where D is the duty cycle, to the peak of the spectrum. 2) If method SA-3A was used and the linear mode was used in step h) of 12.3.2.7, add 1 dB to the final result to compensate for the difference between linear averaging and power averaging. d) The result is the PPSD. e) The procedure in item a) through item c) requires the use of 1 MHz resolution bandwidth to satisfy the 1 MHz measurement bandwidth specified by some regulatory authorities.This requirement also permits use of resolution bandwidths less than 1 MHz “provided that the measured power is integrated to show the total power over the measurement bandwidth” (i.e., 1 MHz). If measurements are performed using a reduced resolution bandwidth and integrated over 1 MHz bandwidth, the following adjustments to the procedures apply: 1) Set RBW >= 1 / T, where T is defined in 12.2 a). 2) Set VBW >= [3 × RBW]. 3) Care shall be taken such that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

6.4.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 °C
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar

6.4.2 Test Data:

Please Refer to Appendix for Details.

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6.5 Emission bandwidth and occupied bandwidth

Test Requirement:	U-NII 1, U-NII 2A, U-NII 2C: No limits, only for report use. U-NII 3, U-NII 4: 47 CFR Part 15.407(e)
Test Method:	ANSI C63.10-2013, section 6.9.3 & 12.4 KDB 789033 D02, Clause C.2
Test Limit:	U-NII 1, U-NII 2A, U-NII 2C: No limits, only for report use. U-NII 3, U-NII 4: Within the 5.725-5.850 GHz and 5.850-5.895 GHz bands, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.
Procedure:	Emission bandwidth: a) Set RBW = approximately 1% of the emission bandwidth. b) Set the VBW > RBW. c) Detector = peak. d) Trace mode = max hold. e) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the instrument. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%. Occupied bandwidth: a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW. b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement. c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2. d) Step a) through step c) might require iteration to adjust within the specified range. e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used. f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth. g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until

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	99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies. h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s). 6 dB emission bandwidth: a) Set RBW = 100 kHz. b) Set the video bandwidth (VBW) ≥ 3 >= RBW. c) Detector = Peak. d) Trace mode = max hold. e) Sweep = auto couple. f) Allow the trace to stabilize. g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.5.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 °C
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar

6.5.2 Test Data:

Please Refer to Appendix for Details.

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6.6 Band edge emissions (Radiated)

Test Requirement:	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(2) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)
Test Method:	ANSI C63.10-2013, section 12.7.4, 12.7.5, 12.7.6
Test Limit:	For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz. For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz. For transmitters operating solely in the 5.725-5.850 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2]Above 38.6

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in § 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in § 15.209shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in § 15.209shall be demonstrated based on the average value of the measured emissions. The provisions in § 15.35apply to these measurements.

Except as provided elsewhere in this subpart, the emissions from an intentional

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	radiator shall not exceed the field strength levels specified in the following table: 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
Procedure:	Above 1GHz: a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. 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 antenna height 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel, the middle channel, the Highest channel. h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case. i. Repeat above procedures until all frequencies measured was complete. Remark: 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor 2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. 3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report. 4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

6.6.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 °C
Humidity:	50.6 %

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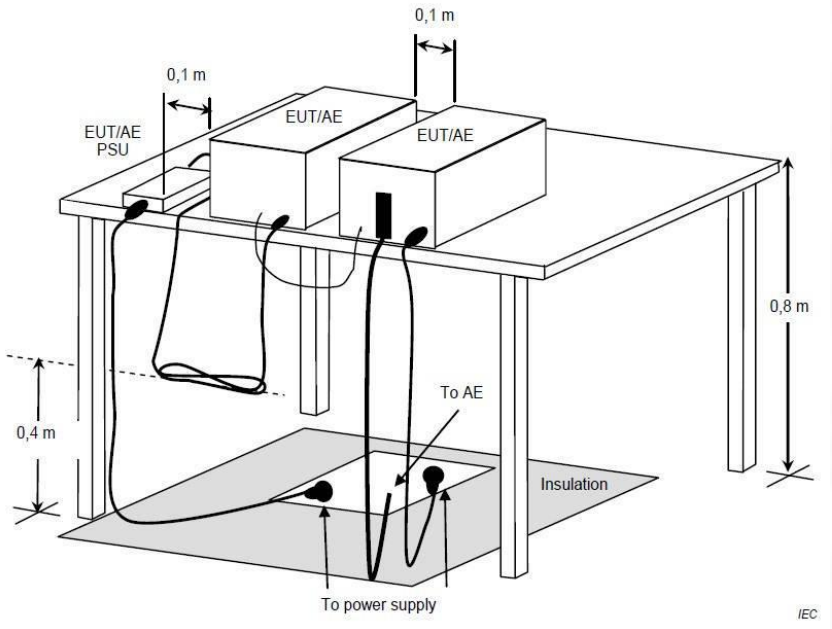
Atmospheric Pressure:	1010 mbar

6.6.2 Test Setup Diagram:



6.6.3 Test Data:

UNII-1 & 2A_20M_5180MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5127.100	80.58	-31.95	48.63	68.20	-19.57	peak	P
2 *	5150.000	82.37	-32.02	50.35	68.20	-17.85	peak	P

UNII-1 & 2A_20M_5180MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5106.500	-5028.75	5074.60	45.85	68.20	-22.35	peak	P
2 *	5150.000	-5068.63	5117.98	49.35	68.20	-18.85	peak	P

UNII-1 & 2A_20M_5320MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	5350.000	42.06	0.87	42.93	68.20	-25.27	peak	P
2	5460.000	42.17	0.67	42.84	68.20	-25.36	peak	P

UNII-1 & 2A_20M_5320MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	5350.000	46.80	-0.87	45.93	68.20	-22.27	peak	P
2	5460.000	46.95	-1.11	45.84	68.20	-22.36	peak	P

UNII-3_20M_5745MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	5683.275	44.72	1.68	46.40	93.13	-46.73	peak	P
2	5712.975	52.44	1.75	54.19	108.98	-54.79	peak	P
3	5726.395	69.62	1.79	71.41	122.20	-50.79	peak	P

UNII-3_20M_5745MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	5675.000	41.07	4.36	45.43	86.94	-41.51	peak	P
2	5710.000	49.06	4.45	53.51	108.20	-54.69	peak	P
3	5722.325	65.66	4.48	70.14	116.10	-45.96	peak	P

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UNII-3_20M_5825MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5853.600	52.95	2.12	55.07	113.99	-58.92	peak	P
2	5863.300	48.06	2.14	50.20	108.64	-58.44	peak	P
3	5895.700	43.75	2.23	45.98	90.08	-44.10	peak	P
4 *	5945.100	43.82	2.36	46.18	68.20	-22.02	peak	P

UNII-3_20M_5825MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5853.600	51.75	4.82	56.57	113.99	-57.42	peak	P
2	5863.300	46.86	4.84	51.70	108.64	-56.94	peak	P
3	5895.700	43.05	4.93	47.98	90.08	-42.10	peak	P
4 *	5945.100	44.62	5.06	49.68	68.20	-18.52	peak	P

UNII-1 & 2A_40M_5190MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5129.800	-5047.74	5097.84	50.10	68.20	-18.10	peak	P
2 *	5150.000	-5066.79	5117.98	51.19	68.20	-17.01	peak	P

UNII-1 & 2A_40M_5190MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	5141.300	-5058.40	5109.31	50.91	68.20	-17.29	peak	P
2	5150.000	-5068.29	5117.98	49.69	68.20	-18.51	peak	P

UNII-1 & 2A_40M_5310MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	5350.000	42.92	0.87	43.79	68.20	-24.41	peak	P
2	5460.000	40.29	0.67	40.96	68.20	-27.24	peak	P

UNII-1 & 2A_40M_5310MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5350.000	42.66	-0.87	41.79	68.20	-26.41	peak	P
2 *	5460.000	45.07	-1.11	43.96	68.20	-24.24	peak	P

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UNII-3_40M_5755MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5690.315	51.52	1.69	53.21	98.38	-45.17	peak	P
2 *	5713.580	66.88	1.76	68.64	109.13	-40.49	peak	P
3	5721.335	66.56	1.78	68.34	113.84	-45.50	peak	P

UNII-3_40M_5755MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5694.220	51.58	4.41	55.99	101.29	-45.30	peak	P
2 *	5713.580	60.68	4.46	65.14	109.13	-43.99	peak	P
3	5722.710	66.07	4.48	70.55	116.98	-46.43	peak	P

UNII-3_40M_5795MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5853.100	56.97	2.12	59.09	115.13	-56.04	peak	P
2	5867.000	50.09	2.15	52.24	107.68	-55.44	peak	P
3	5900.100	42.17	2.24	44.41	86.79	-42.38	peak	P
4 *	5955.000	44.01	2.38	46.39	68.20	-21.81	peak	P

UNII-3_40M_5795MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5852.200	52.09	4.82	56.91	117.18	-60.27	peak	P
2	5864.000	47.29	4.85	52.14	108.46	-56.32	peak	P
3	5893.300	42.12	4.92	47.04	91.87	-44.83	peak	P
4 *	5956.000	38.65	5.09	43.74	68.20	-24.46	peak	P

UNII-1 & 2A_80M_5210MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5114.200	-5033.65	5082.28	48.63	68.20	-19.57	peak	P
2 *	5150.000	-5068.88	5117.98	49.10	68.20	-19.10	peak	P

UNII-1 & 2A_80M_5210MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	5115.000	-5032.04	5083.08	51.04	68.20	-17.16	peak	P
2	5150.000	-5068.38	5117.98	49.60	68.20	-18.60	peak	P

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UNII-1 & 2A_80M_5290MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	5350.000	42.62	0.87	43.49	68.20	-24.71	peak	P
2	5460.000	39.39	0.67	40.06	68.20	-28.14	peak	P

UNII-1 & 2A_80M_5290MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	5350.000	46.36	-0.87	45.49	68.20	-22.71	peak	P
2	5460.000	43.17	-1.11	42.06	68.20	-26.14	peak	P

UNII-3_80M_5775MHz_Horizontal_L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	5679.425	60.97	1.67	62.64	90.25	-27.61	peak	P
2	5712.150	61.25	1.75	63.00	108.76	-45.76	peak	P
3	5723.480	63.06	1.78	64.84	118.74	-53.90	peak	P

UNII-3_80M_5775MHz_Vertical_L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	5679.425	51.73	4.37	56.10	90.25	-34.15	peak	P
2	5719.685	58.21	4.47	62.68	110.72	-48.04	peak	P
3	5724.000	57.29	4.48	61.77	119.92	-58.15	peak	P

UNII-3_80M_5775MHz_Horizontal_H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5853.100	59.15	2.12	61.27	115.13	-53.86	peak	P
2	5861.300	60.14	2.14	62.28	109.16	-46.88	peak	P
3	5902.700	46.38	2.25	48.63	84.84	-36.21	peak	P
4 *	5962.900	42.36	2.40	44.76	68.20	-23.44	peak	P

UNII-3_80M_5775MHz_Vertical_H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5854.300	62.77	4.82	67.59	112.40	-44.81	peak	P
2	5865.000	60.44	4.85	65.29	108.20	-42.91	peak	P
3	5907.900	45.04	4.96	50.00	80.96	-30.96	peak	P
4 *	5962.900	42.66	5.10	47.76	68.20	-20.44	peak	P

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6.7 Undesirable emission limits (below 1GHz)

Test Requirement:	47 CFR Part 15.407(b)(9)
Test Method:	ANSI C63.10-2013, section 12.7.4, 12.7.5, 12.7.6
Test Limit:	Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209. Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table: 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
Procedure:	Below 1GHz: a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel, the middle channel, the Highest channel. h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case. i. Repeat above procedures until all frequencies measured was complete. Remark: 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor 2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. 3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. Above 1GHz:

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	a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. 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 antenna height 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel, the middle channel, the Highest channel. h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case. i. Repeat above procedures until all frequencies measured was complete. Remark: 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor 2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. 3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report. 4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

6.7.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 °C
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar

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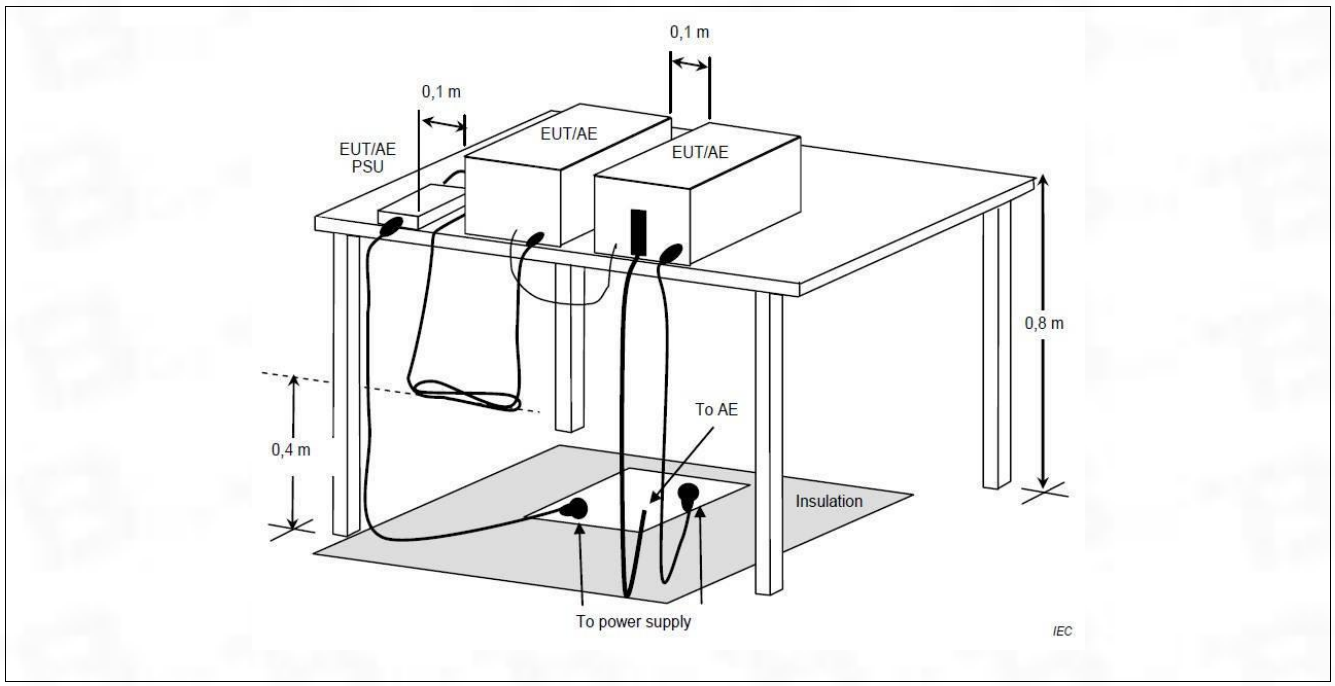
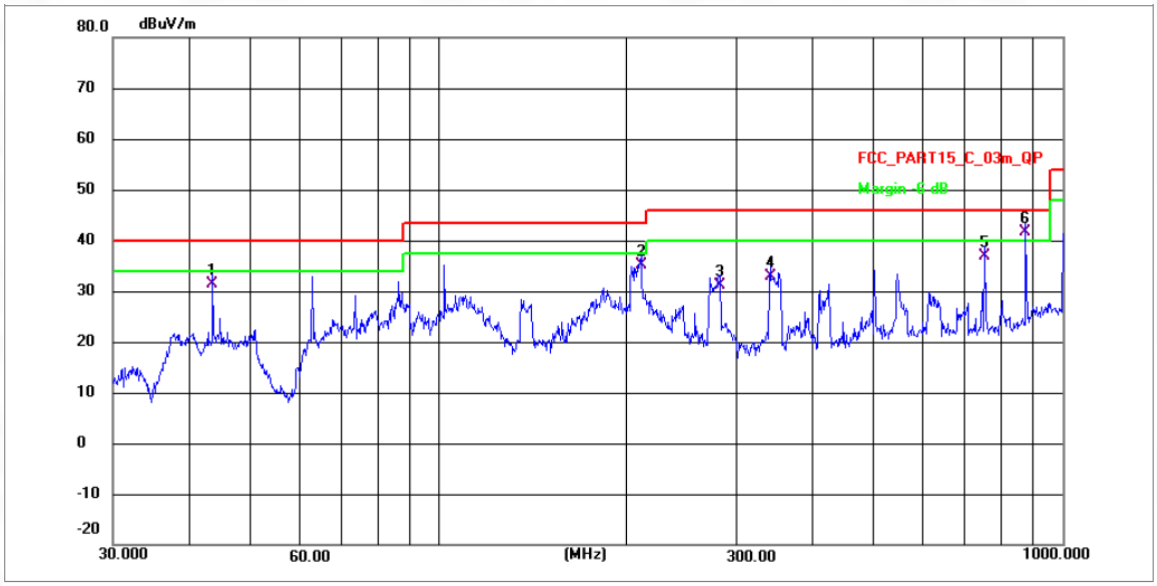
6.7.2 Test Setup Diagram:



6.7.3 Test Data:

TM1 / Polarization: Horizontal / Band: U-NII 1 / BW: 20 / CH: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	43.3534	49.75	-18.35	31.40	40.00	-8.60	QP	P
2	210.7860	61.88	-26.85	35.03	43.50	-8.47	QP	P
3	281.9945	56.73	-25.59	31.14	46.00	-14.86	QP	P
4	340.1847	58.07	-25.11	32.96	46.00	-13.04	QP	P
5	750.1082	60.72	-23.96	36.76	46.00	-9.24	QP	P
6 *	875.2470	64.09	-22.49	41.60	46.00	-4.40	QP	P

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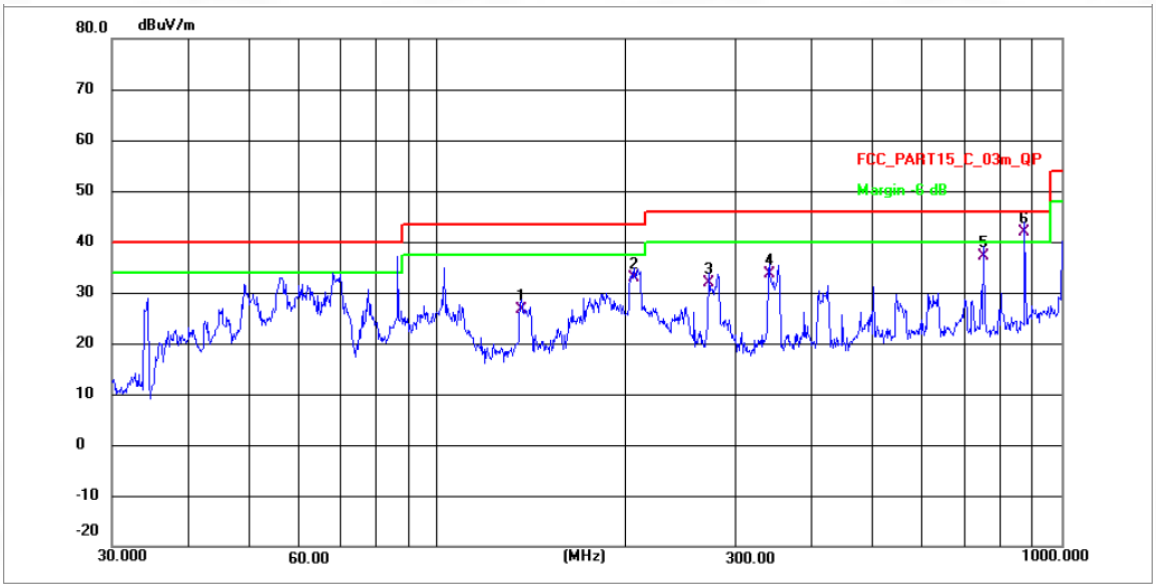
TM1 / Polarization: Vertical / Band: U-NII 1 / BW: 20 / CH: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	136.2208	54.53	-27.91	26.62	43.50	-16.88	QP	P
2	207.1226	59.95	-27.02	32.93	43.50	-10.57	QP	P
3	272.2776	57.54	-25.66	31.88	46.00	-14.12	QP	P
4	339.5888	58.85	-25.11	33.74	46.00	-12.26	QP	P
5	750.1083	61.06	-23.96	37.10	46.00	-8.90	QP	P
6 *	875.2470	64.34	-22.49	41.85	46.00	-4.15	QP	P

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6.8 Undesirable emission limits (above 1GHz)

Test Requirement:	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(2) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)
Test Method:	ANSI C63.10-2013, section 12.7.4, 12.7.5, 12.7.6
Test Limit:	For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz. For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz. For transmitters operating solely in the 5.725-5.850 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2]Above 38.6

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in § 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in § 15.209shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in § 15.209shall be demonstrated based on the average value of the measured emissions. The provisions in § 15.35apply to these measurements.

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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	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
Procedure:	Above 1GHz: a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. 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 antenna height 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel, the middle channel, the Highest channel. h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case. i. Repeat above procedures until all frequencies measured was complete. Remark: 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor 2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. 3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report. 4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.		

6.8.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 °C
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar

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6.8.2 Test Data:

UNII-1 & 2A_20M_5180MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	4988.058	77.45	-31.61	45.84	68.20	-22.36	peak	P
2	6479.383	78.03	-31.89	46.14	68.20	-22.06	peak	P
3	8129.663	81.39	-34.44	46.95	68.20	-21.25	peak	P
4	10185.534	83.79	-34.56	49.23	68.20	-18.97	peak	P
5	14724.178	84.32	-32.55	51.77	68.20	-16.43	peak	P
6*	16915.473	84.08	-31.15	52.93	68.20	-15.27	peak	P

UNII-1 & 2A_20M_5180MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	3714.443	74.12	-31.43	42.69	68.20	-25.51	peak	P
2	5847.517	77.92	-32.10	45.82	68.20	-22.38	peak	P
3	10039.393	81.82	-34.24	47.58	68.20	-20.62	peak	P
4	14304.686	84.20	-32.72	51.48	68.20	-16.72	peak	P
5 *	16151.014	83.25	-31.74	51.51	68.20	-16.69	peak	P
6	17563.161	85.09	-34.85	50.24	68.20	-17.96	peak	P

UNII-1 & 2A_20M_5240MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	4966.479	77.17	-31.60	45.57	68.20	-22.63	peak	P
2	6498.138	77.96	-31.90	46.06	68.20	-22.14	peak	P
3	10185.534	83.79	-34.56	49.23	68.20	-18.97	peak	P
4	12632.858	84.02	-33.87	50.15	68.20	-18.05	peak	P
5 *	14830.959	84.32	-32.34	51.98	68.20	-16.22	peak	P
6	17386.383	83.76	-33.75	50.01	68.20	-18.19	peak	P

UNII-1 & 2A_20M_5240MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	5439.885	75.79	-32.83	42.96	68.20	-25.24	peak	P
2	6045.151	77.45	-31.72	45.73	68.20	-22.47	peak	P
3	7695.244	80.07	-33.76	46.31	68.20	-21.89	peak	P
4	12560.042	83.43	-33.86	49.57	68.20	-18.63	peak	P
5	14724.178	84.32	-32.55	51.77	68.20	-16.43	peak	P
6 *	17311.166	85.73	-33.25	52.48	68.20	-15.72	peak	P

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UNII-1 & 2A_20M_5320MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	4139.677	74.07	-31.63	42.44	68.20	-25.76	peak	P
2	5915.515	77.45	-31.92	45.53	68.20	-22.67	peak	P
3	7628.806	81.12	-33.62	47.50	68.20	-20.70	peak	P
4	11237.329	83.08	-34.67	48.41	68.20	-19.79	peak	P
5	14366.840	84.64	-32.81	51.83	68.20	-16.37	peak	P
6 *	16915.473	83.08	-31.15	51.93	68.20	-16.27	peak	P

UNII-1 & 2A_20M_5320MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	5689.137	76.97	-32.51	44.46	68.20	-23.74	peak	P
2	6845.164	79.43	-32.79	46.64	68.20	-21.56	peak	P
3	9285.710	82.76	-33.25	49.51	68.20	-18.69	peak	P
4	13501.216	83.89	-33.60	50.29	68.20	-17.91	peak	P
5 *	15025.121	85.23	-32.04	53.19	68.20	-15.01	peak	P
6	16386.121	82.14	-31.17	50.97	68.20	-17.23	peak	P

UNII-3_20M_5745MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	4316.859	76.16	-31.66	44.50	68.20	-23.70	peak	P
2	6404.903	79.58	-31.86	47.72	68.20	-20.48	peak	P
3	9258.909	82.65	-33.29	49.36	68.20	-18.84	peak	P
4	14099.444	83.38	-32.44	50.94	68.20	-17.26	peak	P
5 *	16721.031	83.42	-31.03	52.39	68.20	-15.81	peak	P

UNII-3_20M_5745MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	6442.036	77.82	-31.88	45.94	68.20	-22.26	peak	P
2	9461.813	82.17	-32.94	49.23	68.20	-18.97	peak	P
3	10885.668	83.81	-34.82	48.99	68.20	-19.21	peak	P
4 *	13423.394	87.09	-33.65	53.44	68.20	-14.76	peak	P
5	14938.515	83.94	-32.12	51.82	68.20	-16.38	peak	P
6	17013.540	83.79	-31.29	52.50	68.20	-15.70	peak	P

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UNII-3_20M_5785MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	5471.422	77.22	-32.92	44.30	68.20	-23.90	peak	P
2	7169.159	78.95	-33.25	45.70	68.20	-22.50	peak	P
3	9461.813	80.67	-32.94	47.73	68.20	-20.47	peak	P
4	11940.536	80.73	-34.16	46.57	68.20	-21.63	peak	P
5 *	15046.851	83.82	-32.07	51.75	68.20	-16.45	peak	P
6	17087.464	82.20	-31.77	50.43	68.20	-17.77	peak	P

UNII-3_20M_5785MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	5239.274	77.59	-32.27	45.32	68.20	-22.88	peak	P
2	7273.519	79.29	-33.28	46.01	68.20	-22.19	peak	P
3	9502.924	80.92	-32.88	48.04	68.20	-20.16	peak	P
4	11701.375	83.24	-34.43	48.81	68.20	-19.39	peak	P
5 *	14724.178	84.32	-32.55	51.77	68.20	-16.43	peak	P
6	16793.683	82.41	-31.08	51.33	68.20	-16.87	peak	P

UNII-3_20M_5825MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	6331.279	79.78	-31.83	47.95	68.20	-20.25	peak	P
2	7200.309	79.88	-33.26	46.62	68.20	-21.58	peak	P
3	9683.148	82.48	-33.34	49.14	68.20	-19.06	peak	P
4	12379.831	83.63	-33.91	49.72	68.20	-18.48	peak	P
5	15155.972	83.17	-32.25	50.92	68.20	-17.28	peak	P
6 *	16648.693	82.36	-30.99	51.37	68.20	-16.83	peak	P

UNII-3_20M_5825MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	4335.616	73.91	-31.67	42.24	68.20	-25.96	peak	P
2	6358.789	78.58	-31.84	46.74	68.20	-21.46	peak	P
3	8738.852	80.36	-34.17	46.19	68.20	-22.01	peak	P
4	12027.129	82.21	-34.08	48.13	68.20	-20.07	peak	P
5 *	15046.851	84.32	-32.07	52.25	68.20	-15.95	peak	P
6	16915.473	82.58	-31.15	51.43	68.20	-16.77	peak	P

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UNII-1 & 2A_40M_5190MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	3577.463	74.79	-31.35	43.44	68.20	-24.76	peak	P
2	4988.058	76.32	-31.61	44.71	68.20	-23.49	peak	P
3	7076.516	77.96	-33.22	44.74	68.20	-23.46	peak	P
4	9475.497	81.01	-32.91	48.10	68.20	-20.10	peak	P
5	13697.751	81.59	-33.09	48.50	68.20	-19.70	peak	P
6 *	16915.473	82.09	-31.15	50.94	68.20	-17.26	peak	P

UNII-1 & 2A_40M_5190MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	6267.553	78.90	-31.81	47.09	68.20	-21.11	peak	P
2	7326.267	80.25	-33.30	46.95	68.20	-21.25	peak	P
3	9627.333	83.57	-33.19	50.38	68.20	-17.82	peak	P
4	11566.869	84.88	-34.58	50.30	68.20	-17.90	peak	P
5	13857.036	82.38	-32.67	49.71	68.20	-18.49	peak	P
6 *	16721.031	81.49	-31.03	50.46	68.20	-17.74	peak	P

UNII-1 & 2A_40M_5310MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	3475.541	77.07	-31.28	45.79	68.20	-22.41	peak	P
2	4341.886	76.59	-31.67	44.92	68.20	-23.28	peak	P
3	6640.541	79.78	-32.27	47.51	68.20	-20.69	peak	P
4	9725.221	82.79	-33.45	49.34	68.20	-18.86	peak	P
5	13817.042	83.21	-32.78	50.43	68.20	-17.77	peak	P
6 *	16648.693	82.51	-30.99	51.52	68.20	-16.68	peak	P

UNII-1 & 2A_40M_5310MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	6097.797	75.90	-31.74	44.16	68.20	-24.04	peak	P
2	6985.070	78.13	-33.16	44.97	68.20	-23.23	peak	P
3	8930.359	79.46	-33.86	45.60	68.20	-22.60	peak	P
4	11384.444	81.79	-34.66	47.13	68.20	-21.07	peak	P
5	13957.529	81.53	-32.41	49.12	68.20	-19.08	peak	P
6 *	16600.642	81.23	-30.96	50.27	68.20	-17.93	peak	P

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UNII-3_40M_5755MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	2909.532	74.17	-30.99	43.18	68.20	-25.02	peak	P
2	4010.130	74.65	-31.60	43.05	68.20	-25.15	peak	P
3	6285.695	77.87	-31.81	46.06	68.20	-22.14	peak	P
4	9585.684	82.75	-33.09	49.66	68.20	-18.54	peak	P
5	11467.005	83.52	-34.66	48.86	68.20	-19.34	peak	P
6 *	17013.540	81.16	-31.29	49.87	68.20	-18.33	peak	P

UNII-3_40M_5755MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	5194.040	76.65	-32.14	44.51	68.20	-23.69	peak	P
2	6195.508	76.32	-31.78	44.54	68.20	-23.66	peak	P
3	7773.486	78.45	-33.92	44.53	68.20	-23.67	peak	P
4	9952.717	81.11	-34.03	47.08	68.20	-21.12	peak	P
5	13462.249	83.59	-33.62	49.97	68.20	-18.23	peak	P
6 *	17087.464	82.67	-31.77	50.90	68.20	-17.30	peak	P

UNII-3_40M_5795MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	3475.541	74.57	-31.28	43.29	68.20	-24.91	peak	P
2	6679.040	78.53	-32.36	46.17	68.20	-22.03	peak	P
3	8477.621	80.83	-34.54	46.29	68.20	-21.91	peak	P
4	9824.103	80.09	-33.70	46.39	68.20	-21.81	peak	P
5	14895.399	82.11	-32.21	49.90	68.20	-18.30	peak	P
6 *	17038.145	83.04	-31.45	51.59	68.20	-16.61	peak	P

UNII-3_40M_5795MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	3450.518	75.38	-31.26	44.12	68.20	-24.08	peak	P
2	4937.852	77.47	-31.62	45.85	68.20	-22.35	peak	P
3	6805.708	79.09	-32.70	46.39	68.20	-21.81	peak	P
4	9627.333	84.07	-33.19	50.88	68.20	-17.32	peak	P
5	13817.042	81.71	-32.78	48.93	68.20	-19.27	peak	P
6 *	16793.683	83.37	-31.08	52.29	68.20	-15.91	peak	P

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UNII-1 & 2A_80M_5210MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	2182.346	68.50	-30.94	37.56	68.20	-30.64	peak	P
2	3536.340	74.94	-31.32	43.62	68.20	-24.58	peak	P
3	4874.042	75.83	-31.63	44.20	68.20	-24.00	peak	P
4	7127.835	76.79	-33.24	43.55	68.20	-24.65	peak	P
5	9544.214	82.72	-32.98	49.74	68.20	-18.46	peak	P
6 *	14981.755	84.69	-32.03	52.66	68.20	-15.54	peak	P

UNII-1 & 2A_80M_5210MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	2880.247	74.74	-31.02	43.72	68.20	-24.48	peak	P
2	3500.746	76.07	-31.30	44.77	68.20	-23.43	peak	P
3	4867.004	77.25	-31.62	45.63	68.20	-22.57	peak	P
4	7326.267	79.63	-33.30	46.33	68.20	-21.87	peak	P
5	9502.924	81.40	-32.88	48.52	68.20	-19.68	peak	P
6 *	15025.121	85.00	-32.04	52.96	68.20	-15.24	peak	P

UNII-3_80M_5775MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	4916.490	77.75	-31.61	46.14	68.20	-22.06	peak	P
2	6267.553	78.27	-31.81	46.46	68.20	-21.74	peak	P
3	7595.802	80.30	-33.55	46.75	68.20	-21.45	peak	P
4	9683.148	81.00	-33.34	47.66	68.20	-20.54	peak	P
5	11533.485	83.66	-34.61	49.05	68.20	-19.15	peak	P
6 *	16481.119	81.67	-30.94	50.73	68.20	-17.47	peak	P

UNII-3_80M_5775MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin(dB)	Detector	P/F
1	5623.741	77.23	-32.68	44.55	68.20	-23.65	peak	P
2	6583.209	78.58	-32.12	46.46	68.20	-21.74	peak	P
3	7541.114	79.87	-33.43	46.44	68.20	-21.76	peak	P
4	10083.014	82.67	-34.33	48.34	68.20	-19.86	peak	P
5	12891.057	82.73	-33.89	48.84	68.20	-19.36	peak	P
6 *	17013.540	82.34	-31.29	51.05	68.20	-17.15	peak	P

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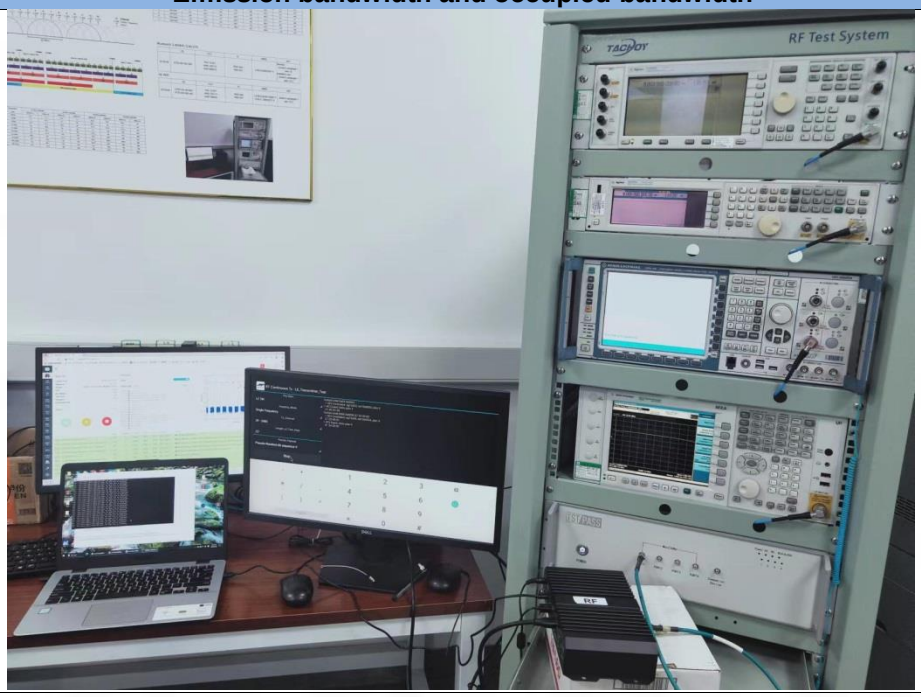
7 Test Setup Photos

Conducted Emission at AC power line


Duty Cycle Maximum conducted output power Power spectral density Emission bandwidth and occupied bandwidth


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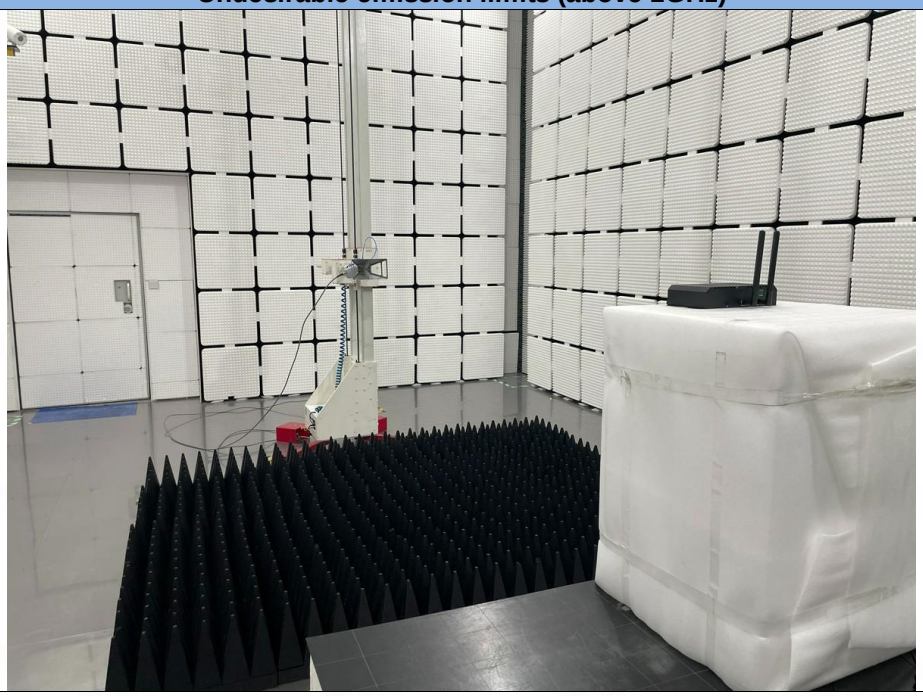
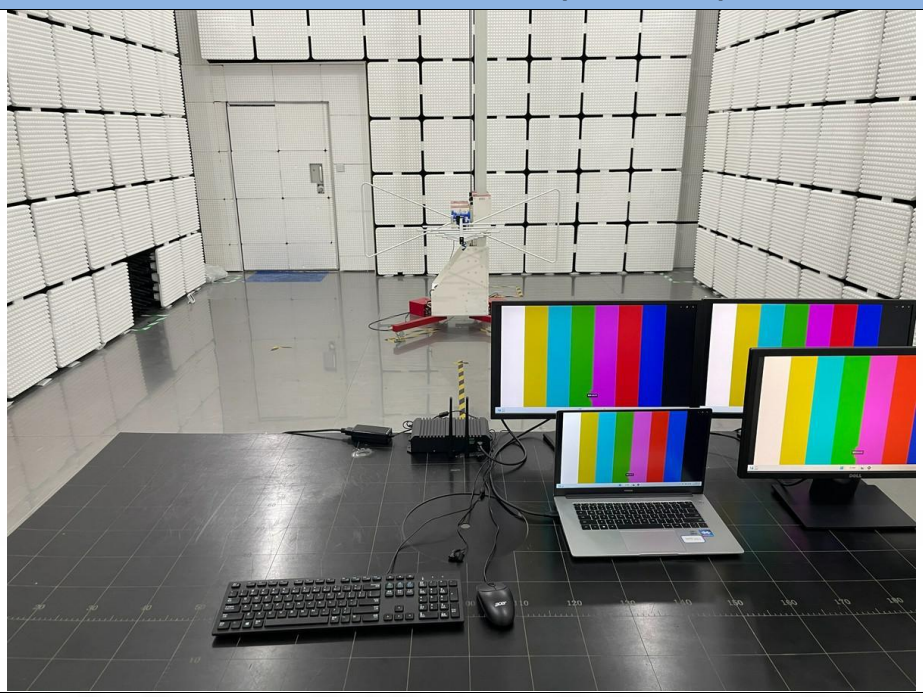
Band edge emissions (Radiated) Undesirable emission limits (above 1GHz)


Undesirable emission limits (below 1GHz)


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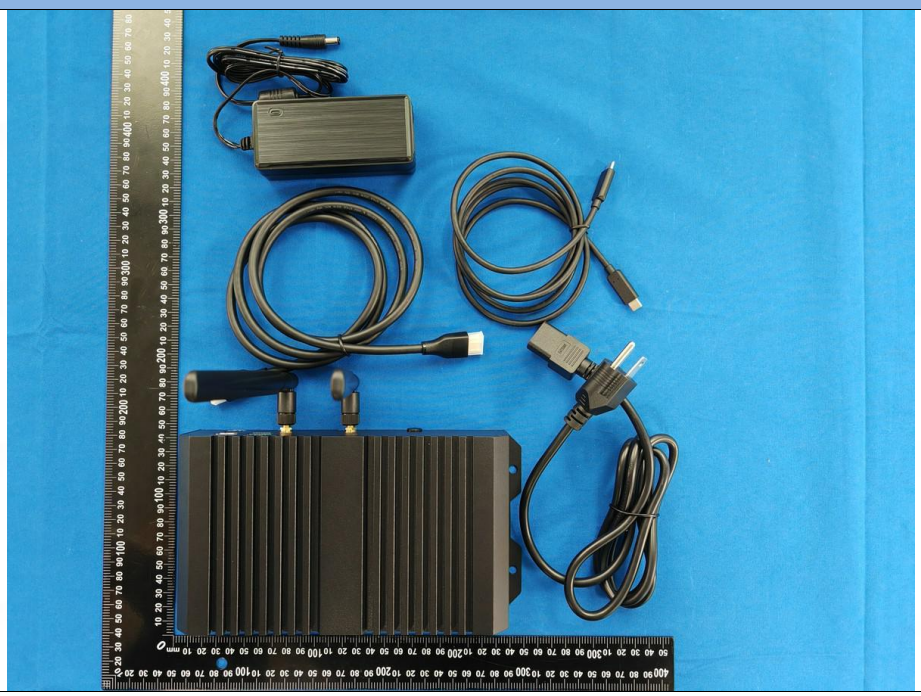
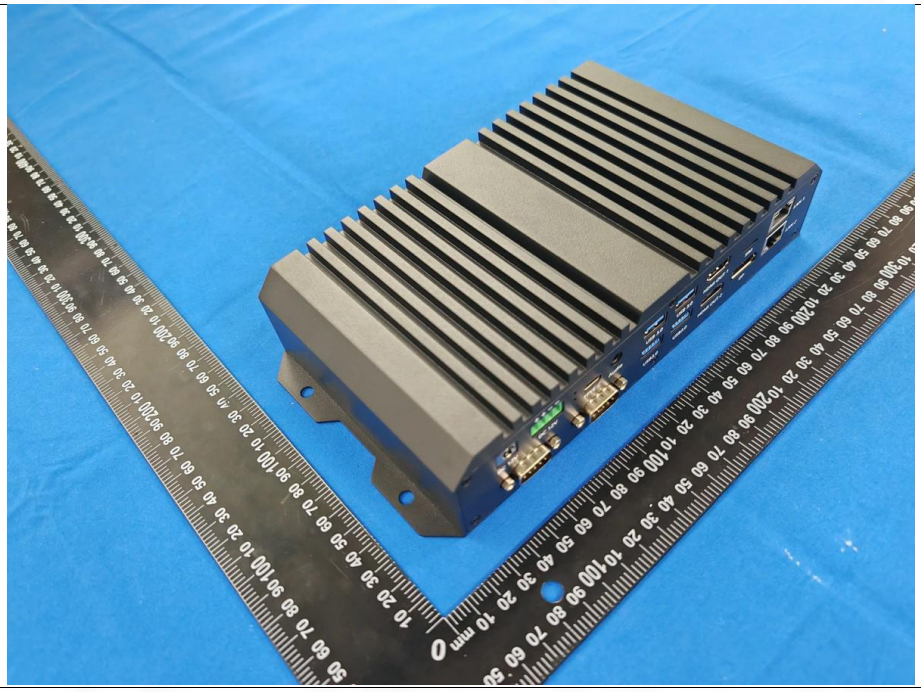
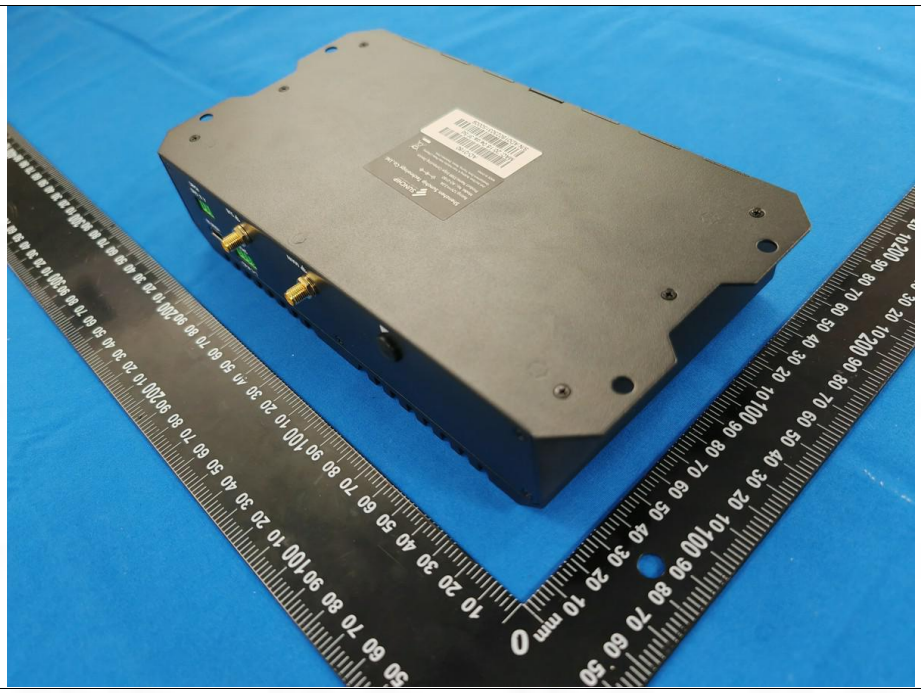
8 EUT Constructional Details (EUT Photos)

External





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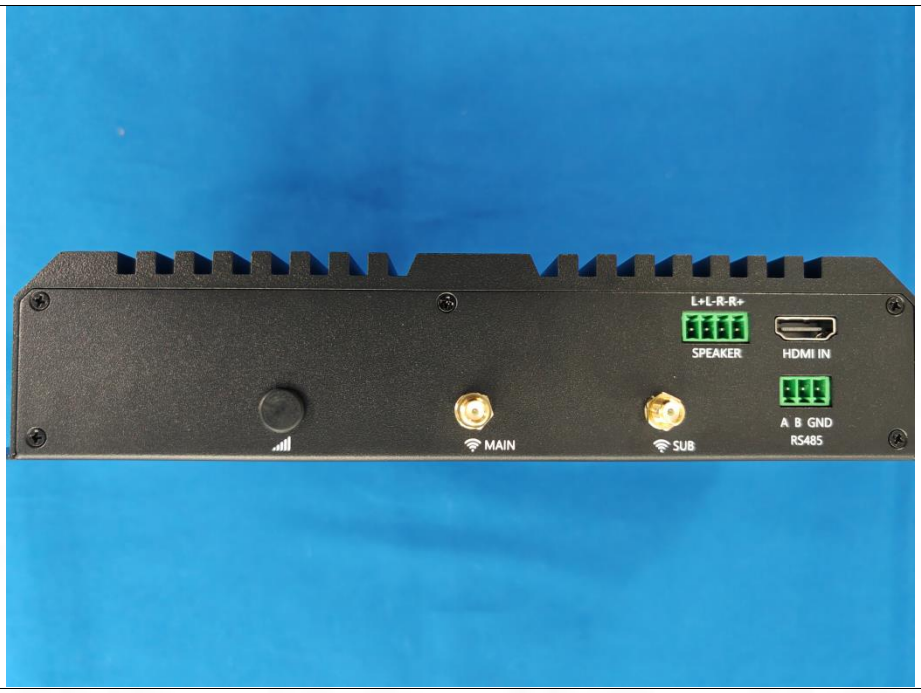
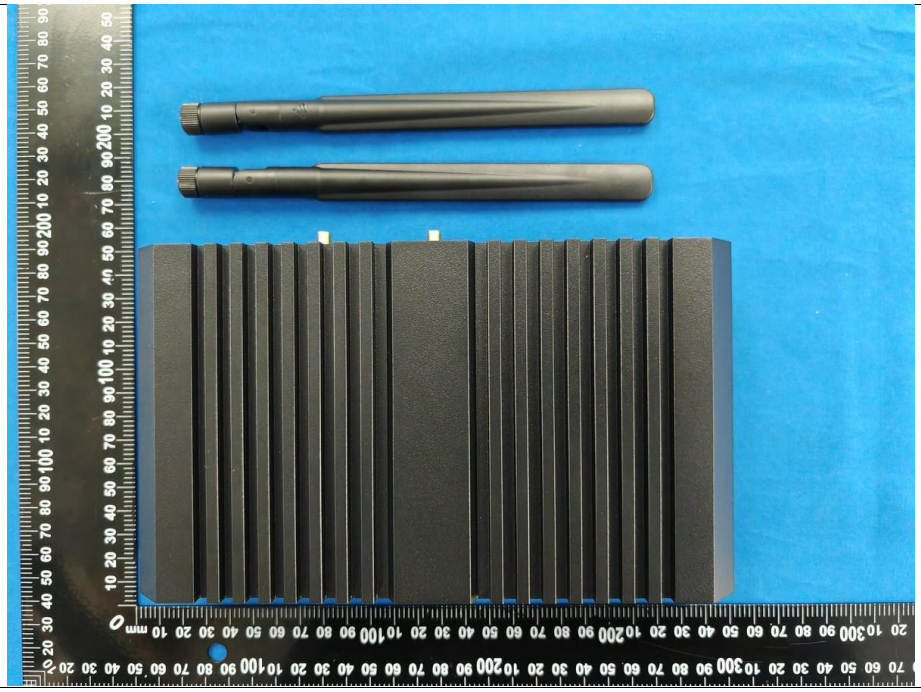

L+L-R-R+
SPEAKER
HDMI IN
A B GND
RS485
MAIN
SUB



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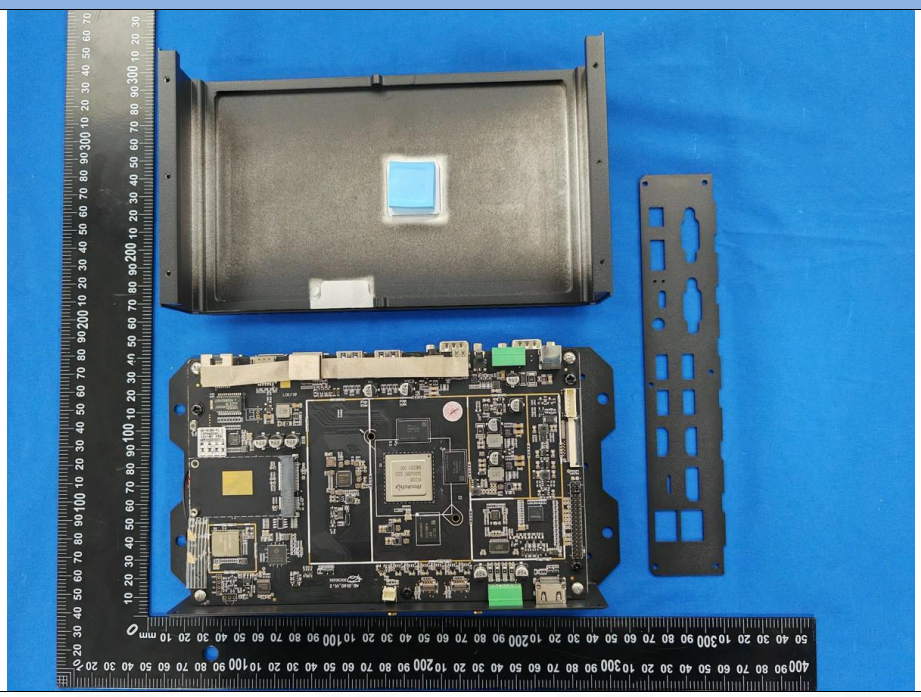
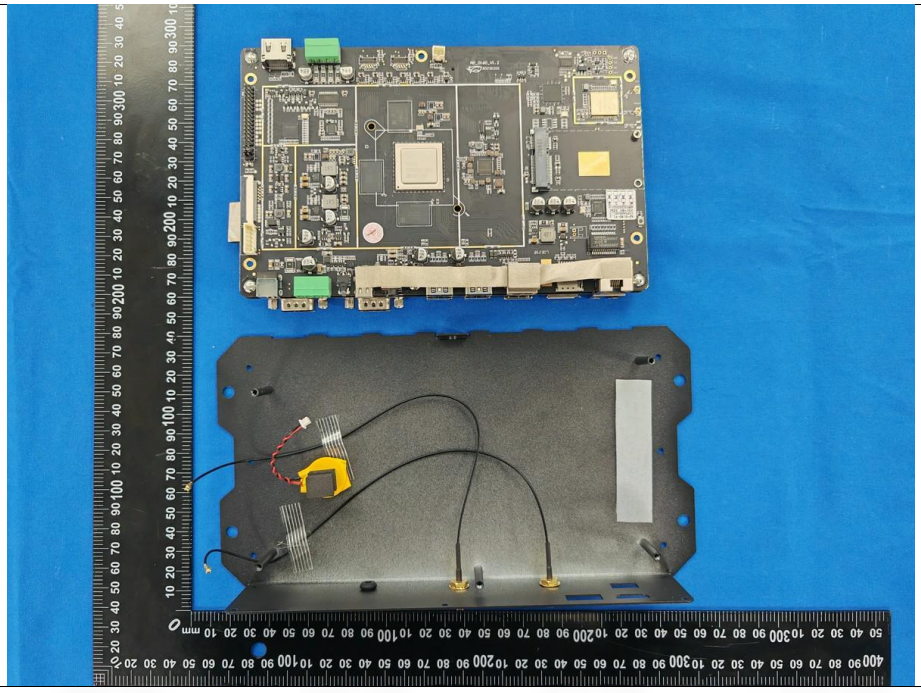

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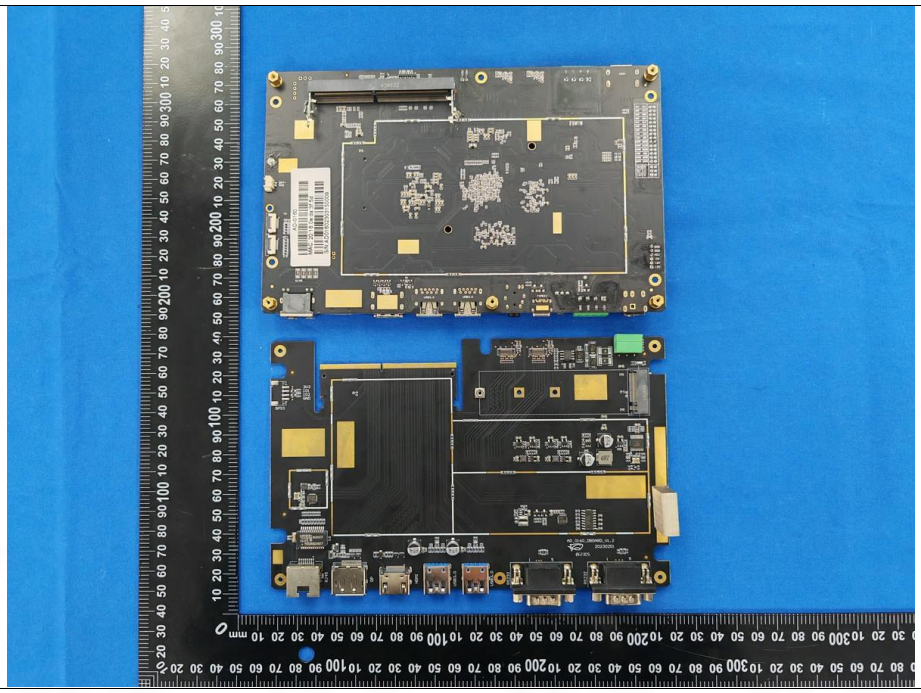

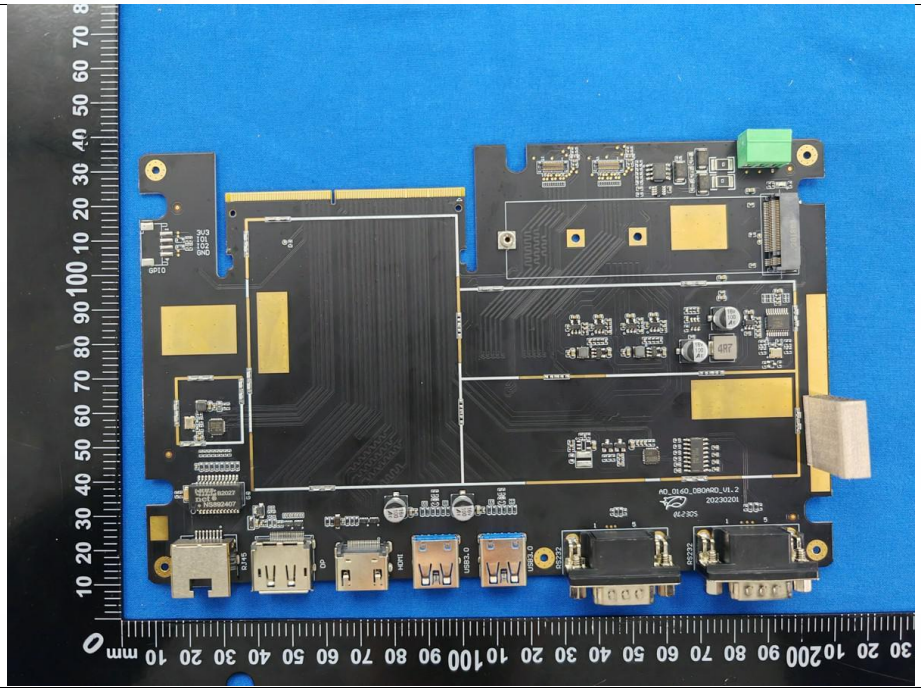

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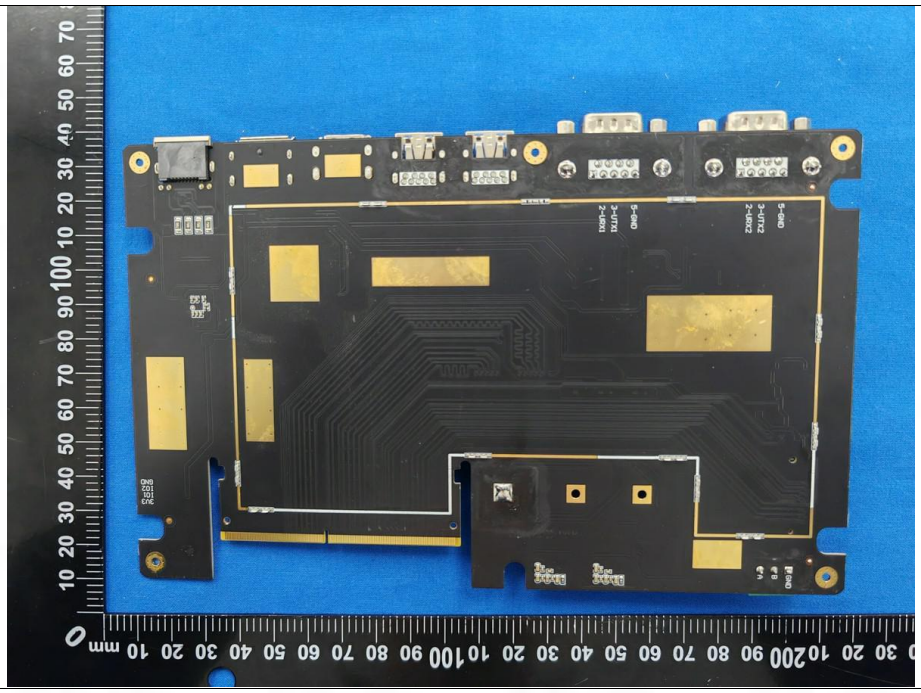
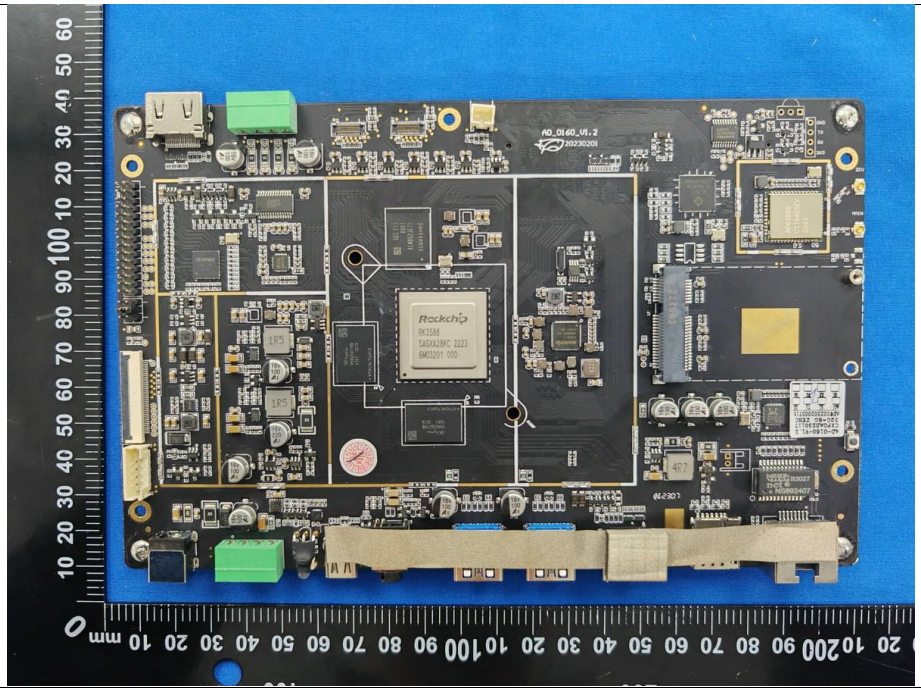
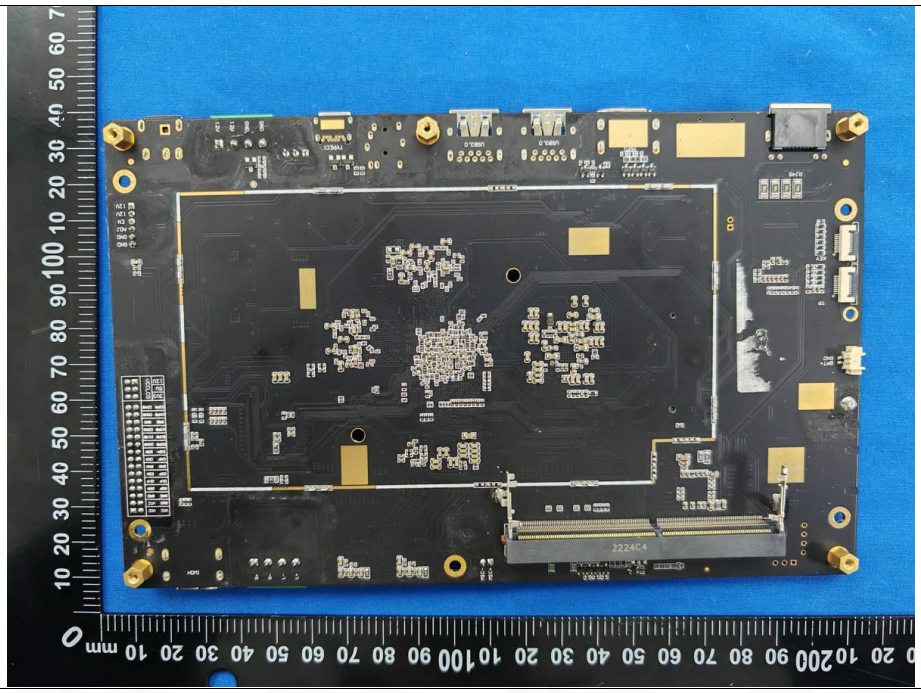



Rockchip



Appendix

1. Duty Cycle

1.1 Ant1

1.1.1 Test Result

Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
802.11a	SISO	5180	1.396	1.437	97.15	0.13	0.03
		5200	1.398	1.438	97.22	0.12	0.06
		5240	1.396	1.437	97.15	0.13	0.03
		5260	1.398	1.437	97.29	0.12	0.07
		5300	1.397	1.437	97.22	0.12	0.03
		5320	1.396	1.437	97.15	0.13	0.00
		5745	1.397	1.438	97.15	0.13	0.06
		5785	1.397	1.438	97.15	0.13	0.06
		5825	1.396	1.437	97.15	0.13	0.03
802.11n (HT20)	MIMO	5180	1.308	1.349	96.96	0.13	0.03
		5200	1.308	1.349	96.96	0.13	0.03
		5240	1.310	1.350	97.04	0.13	0.04
		5260	1.310	1.349	97.11	0.13	0.07
		5300	1.308	1.349	96.96	0.13	0.03
		5320	1.308	1.349	96.96	0.13	0.03
		5745	1.309	1.350	96.96	0.13	0.07
		5785	1.309	1.350	96.96	0.13	0.03
		5825	1.308	1.349	96.96	0.13	0.03
802.11n (HT40)	MIMO	5190	0.648	0.689	94.05	0.27	0.06
		5230	0.648	0.689	94.05	0.27	0.10
		5270	0.648	0.689	94.05	0.27	0.07
		5310	0.648	0.689	94.05	0.27	0.13
		5755	0.648	0.689	94.05	0.27	0.03
		5795	0.649	0.690	94.06	0.27	0.03
802.11ac (VHT20)	MIMO	5180	1.316	1.358	96.91	0.14	0.07
		5200	1.318	1.357	97.13	0.13	0.03
		5240	1.316	1.357	96.98	0.13	0.03
		5260	1.317	1.357	97.05	0.13	0.07
		5300	1.316	1.357	96.98	0.13	0.03
		5320	1.316	1.357	96.98	0.13	0.03
		5745	1.316	1.357	96.98	0.13	0.07
		5785	1.317	1.358	96.98	0.13	0.03
		5825	1.316	1.358	96.91	0.14	0.07
802.11ac (VHT40)	MIMO	5190	0.656	0.697	94.12	0.26	0.07
		5230	0.656	0.697	94.12	0.26	0.03
		5270	0.656	0.697	94.12	0.26	0.03
		5310	0.658	0.698	94.27	0.26	0.04

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		5755	0.656	0.697	94.12	0.26	0.04
		5795	0.656	0.697	94.12	0.26	0.03
802.11ac (VHT80)	MIMO	5210	0.325	0.366	88.80	0.52	0.04
		5290	0.324	0.365	88.77	0.52	0.07
		5775	0.324	0.365	88.77	0.52	0.08

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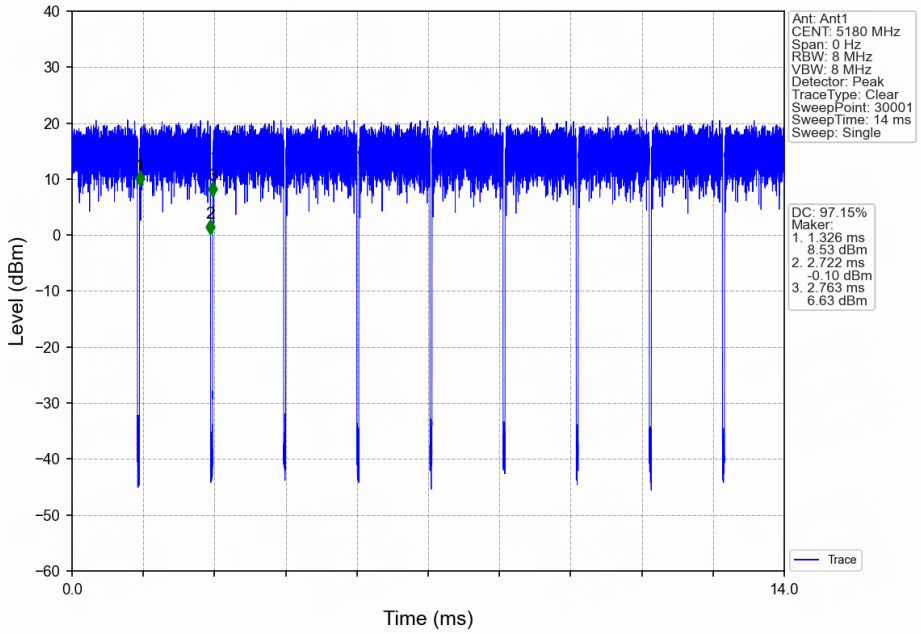
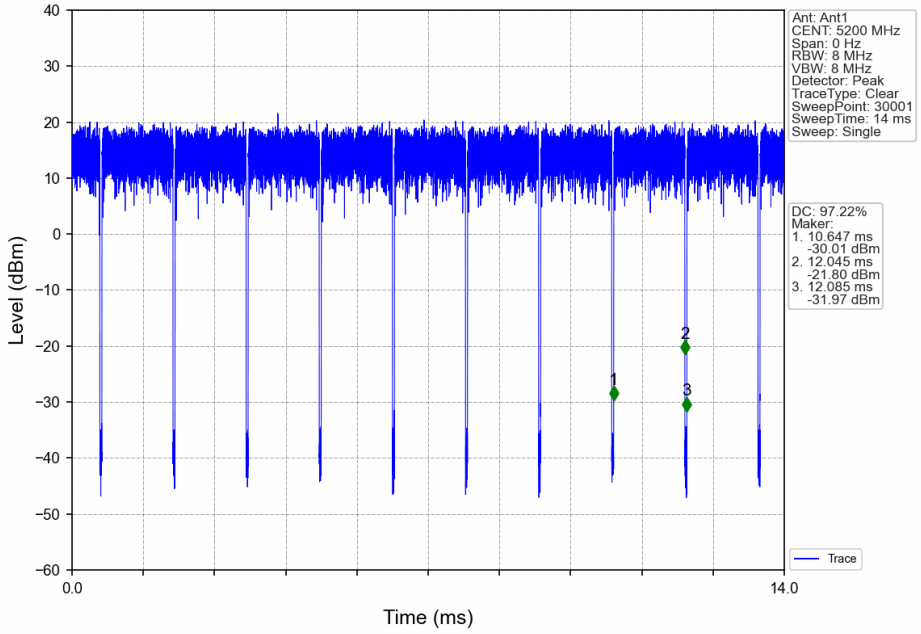
1.1.2 Test Graph

802.11a_LCH_5180MHz_Ant1_NTNV



802.11a_MCH_5200MHz_Ant1_NTNV



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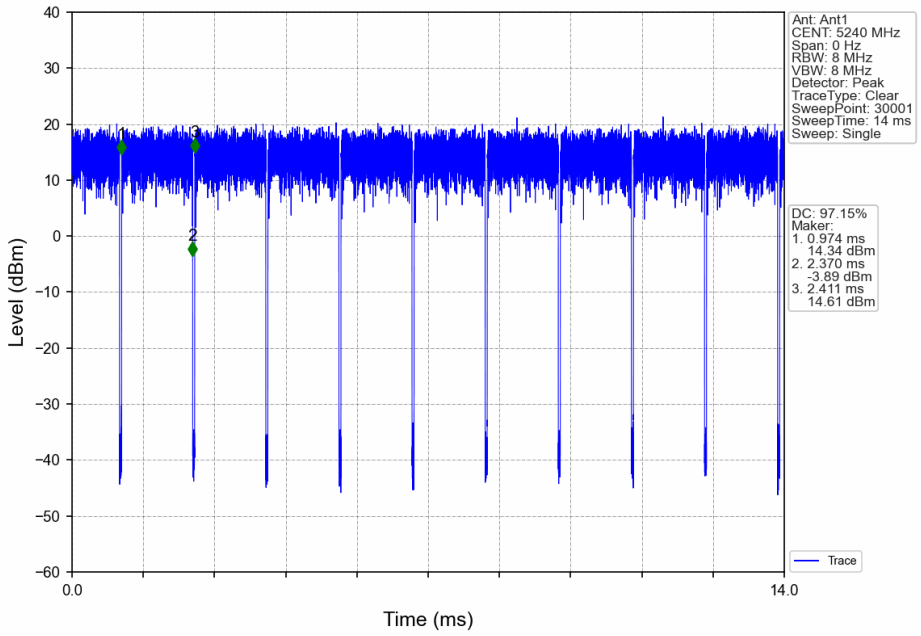
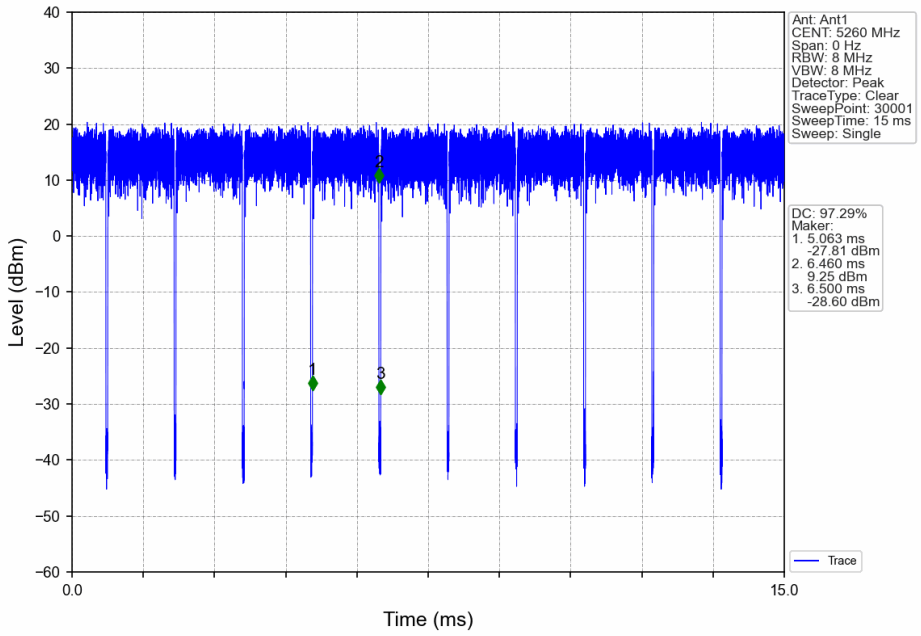
802.11a_HCH_5240MHz_Ant1_NTNV



802.11a_LCH_5260MHz_Ant1_NTNV



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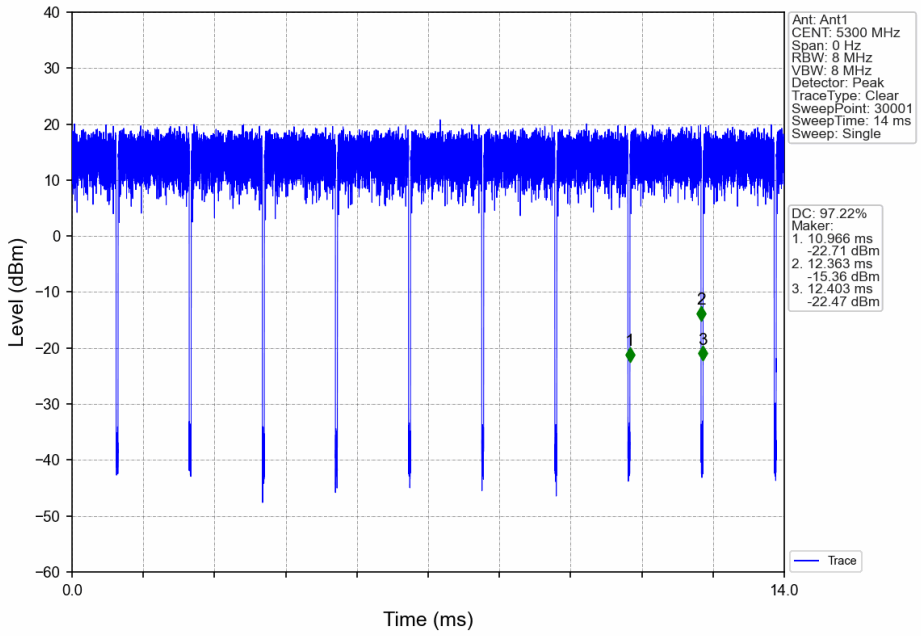
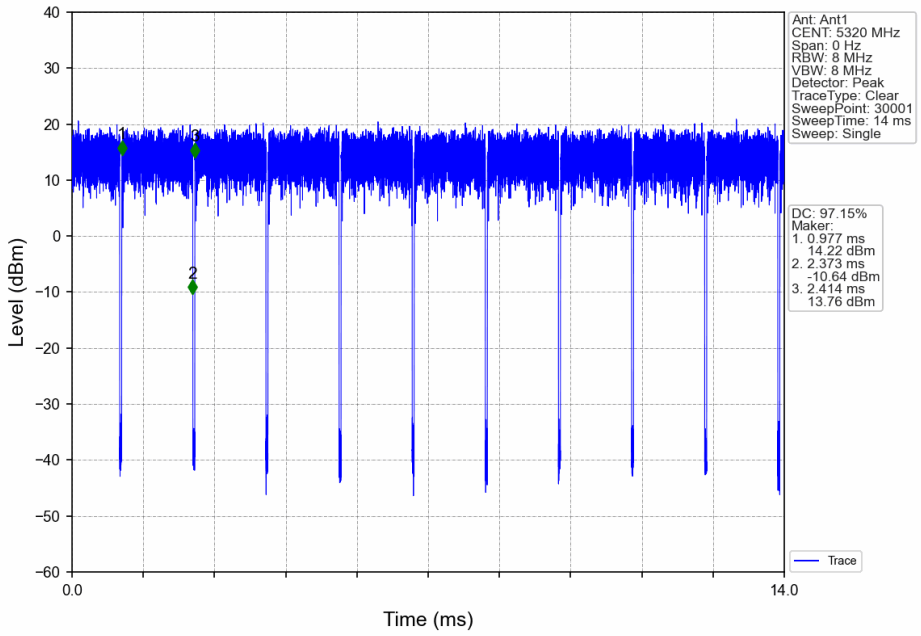
802.11a_MCH_5300MHz_Ant1_NTNV



802.11a_HCH_5320MHz_Ant1_NTNV



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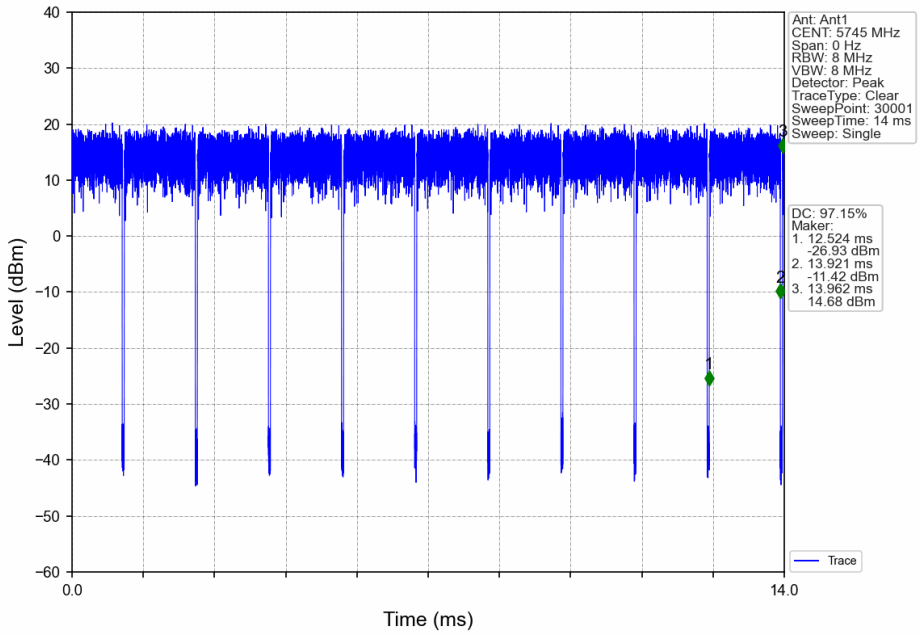
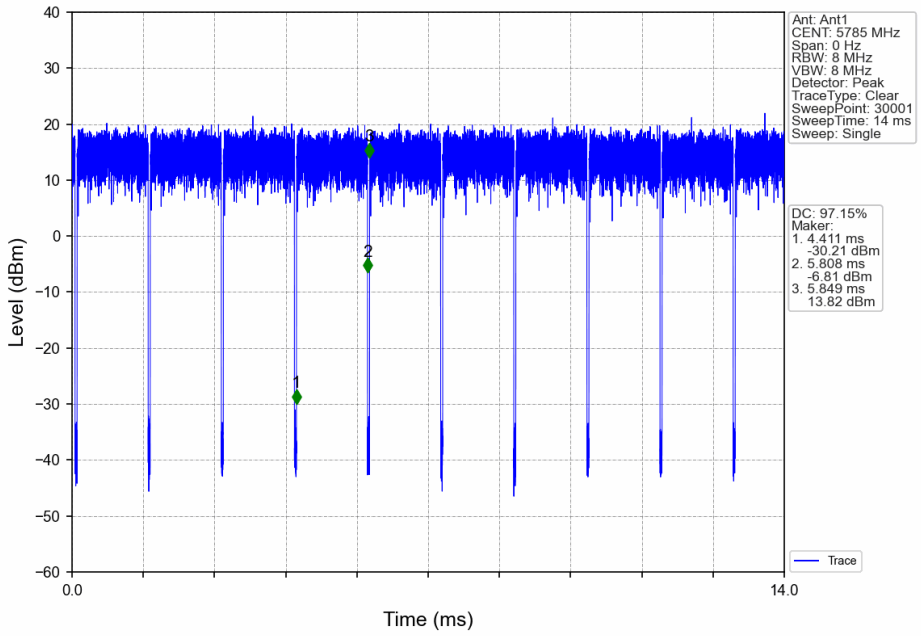
802.11a_LCH_5745MHz_Ant1_NTNV



802.11a_MCH_5785MHz_Ant1_NTNV



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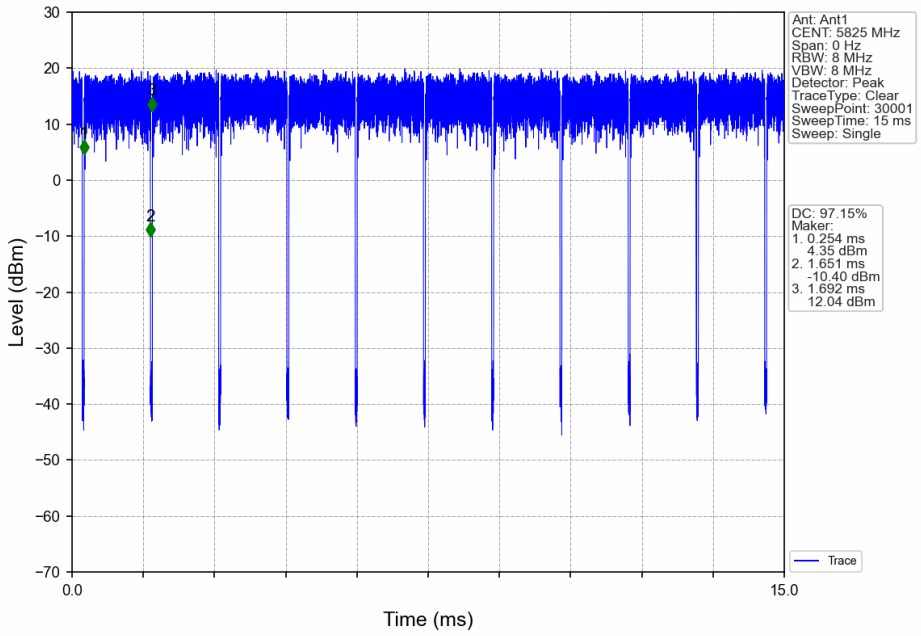
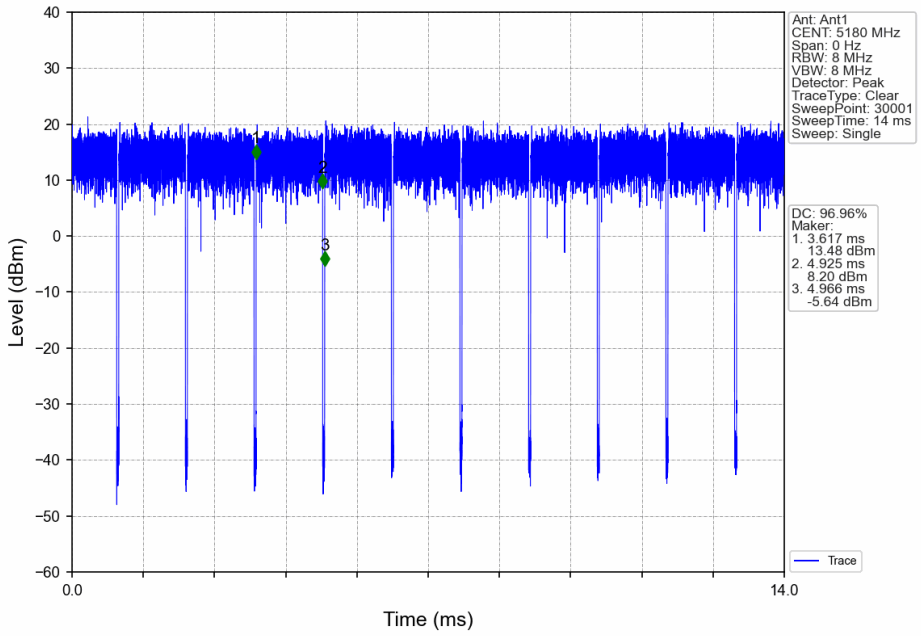
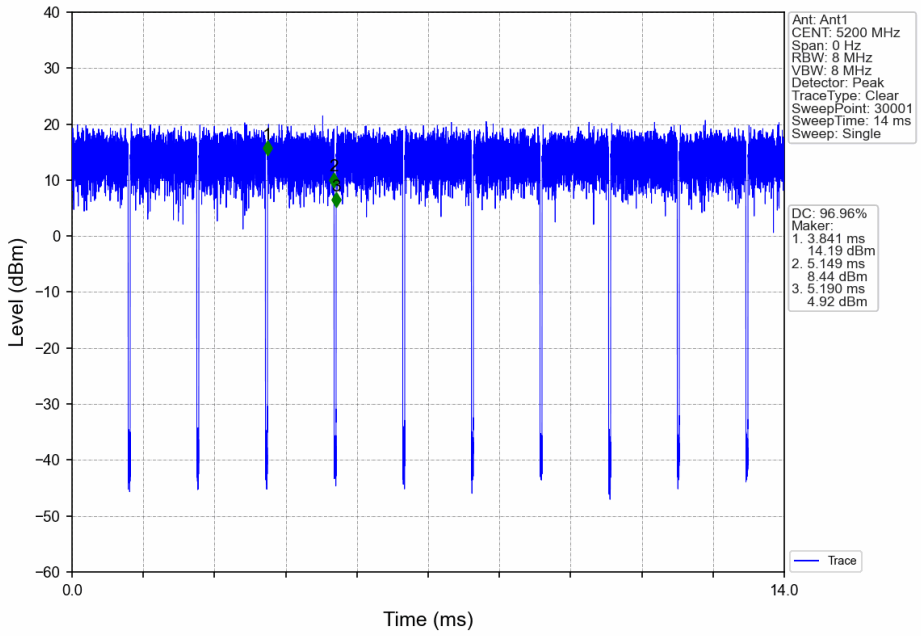
802.11a_HCH_5825MHz_Ant1_NTNV



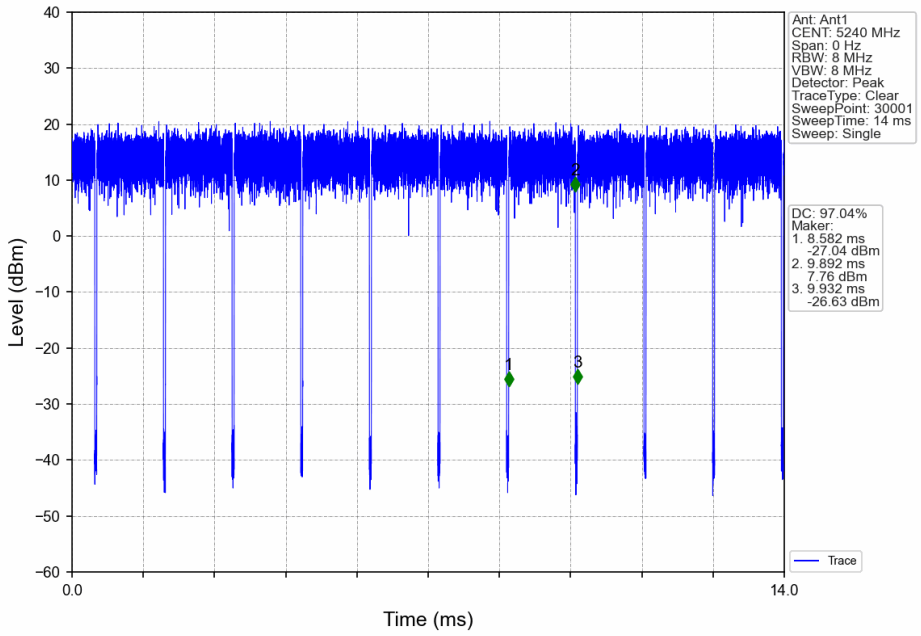
802.11n(HT20)_LCH_5180MHz_Ant1_NTNV



802.11n(HT20)_MCH_5200MHz_Ant1_NTNV



802.11n(HT20)_HCH_5240MHz_Ant1_NTNV



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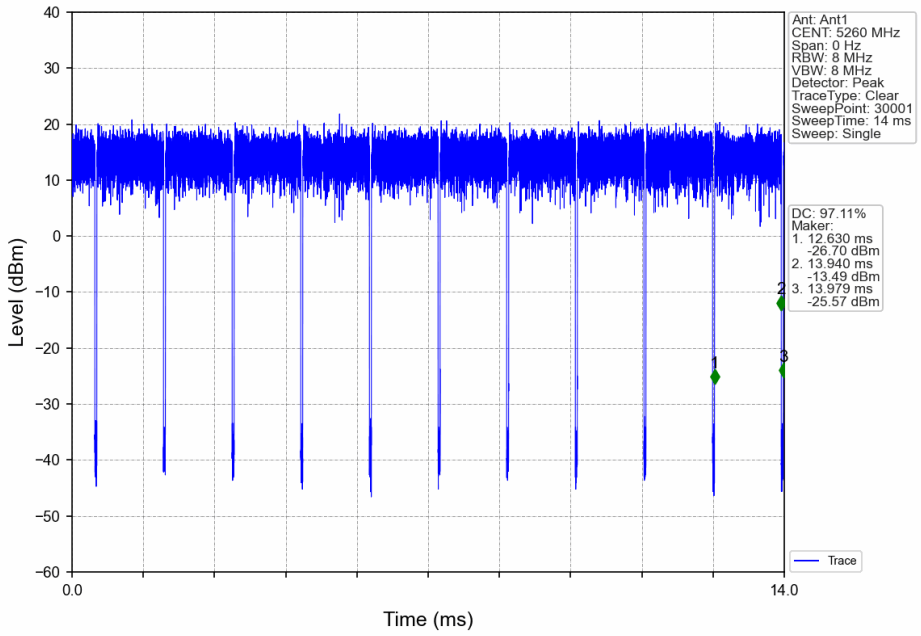
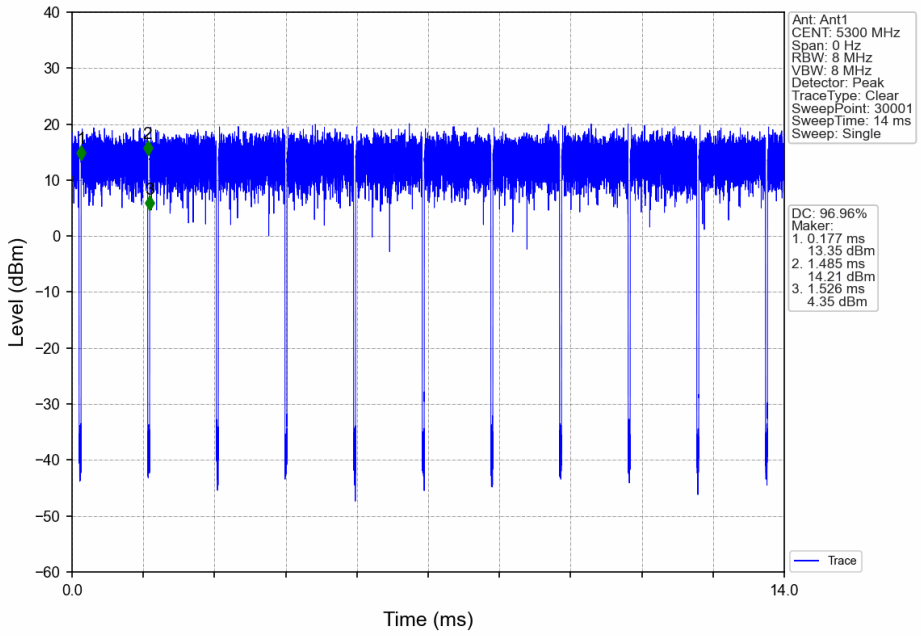
802.11n(HT20)_LCH_5260MHz_Ant1_NTNV



802.11n(HT20)_MCH_5300MHz_Ant1_NTNV



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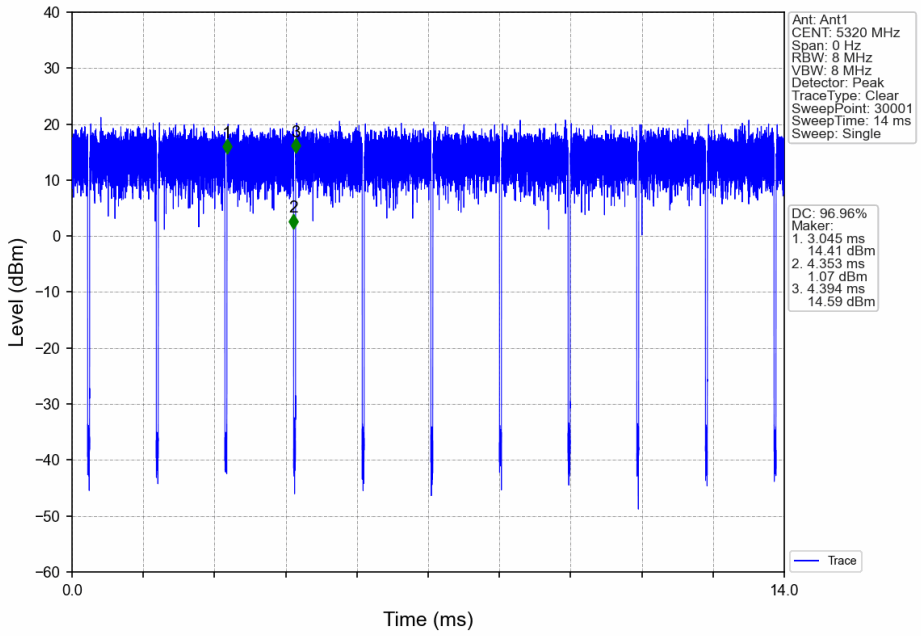
802.11n(HT20)_HCH_5320MHz_Ant1_NTNV



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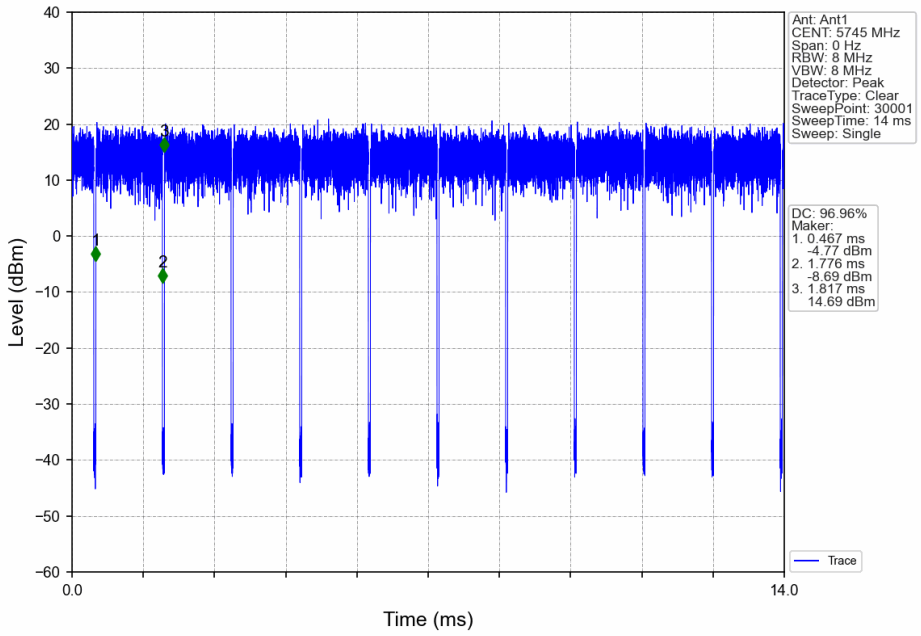

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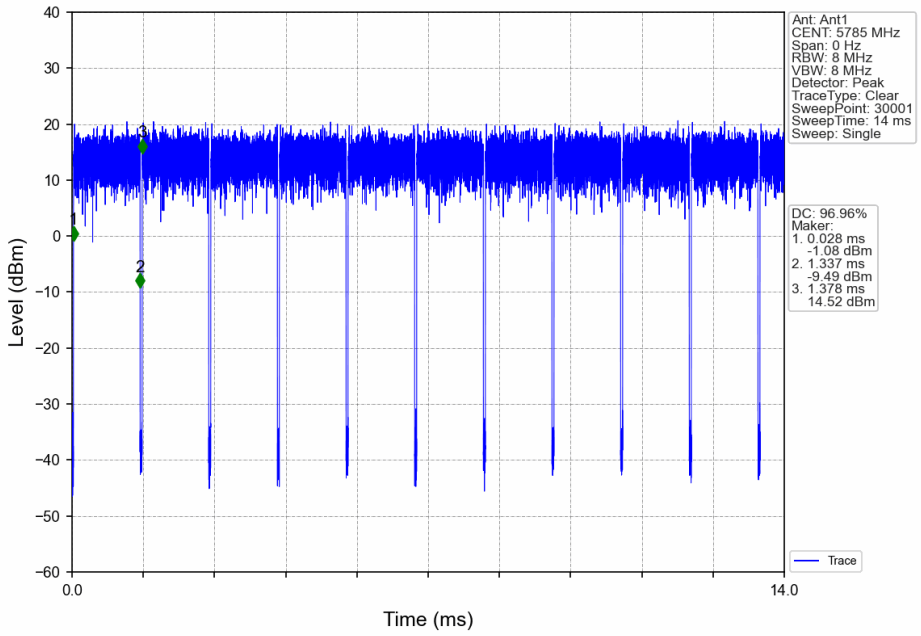
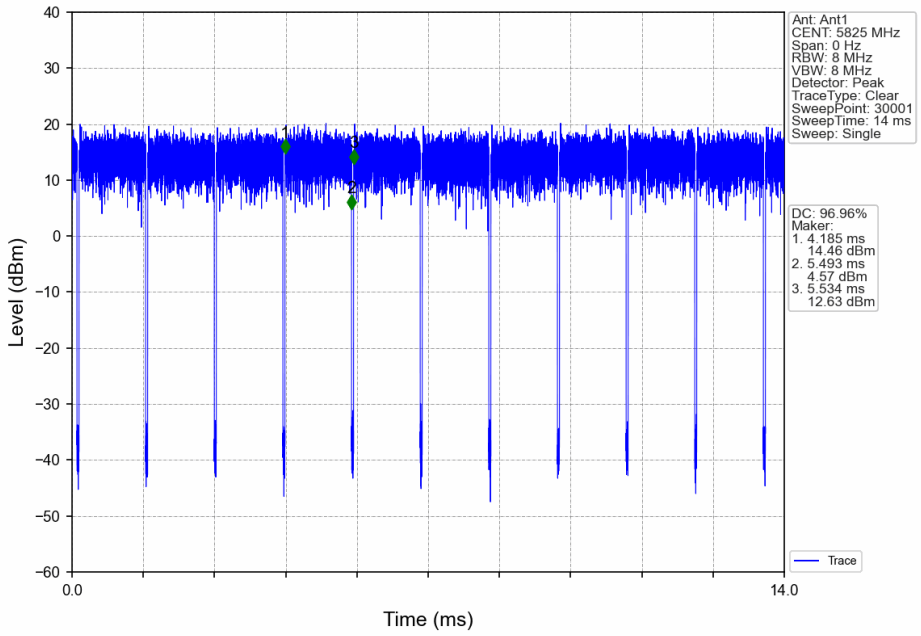
802.11n(HT20)_MCH_5785MHz_Ant1_NTNV



802.11n(HT20)_HCH_5825MHz_Ant1_NTNV



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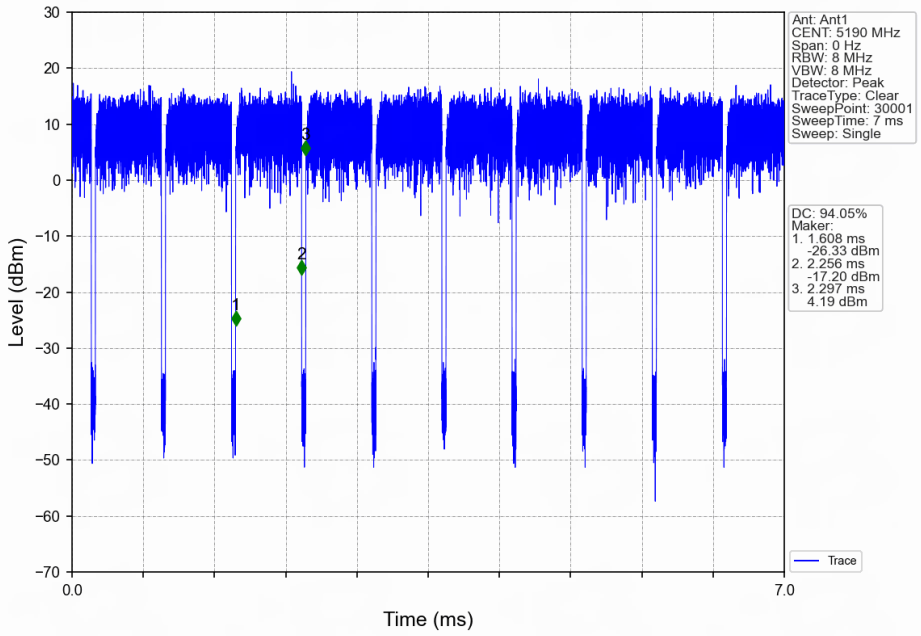
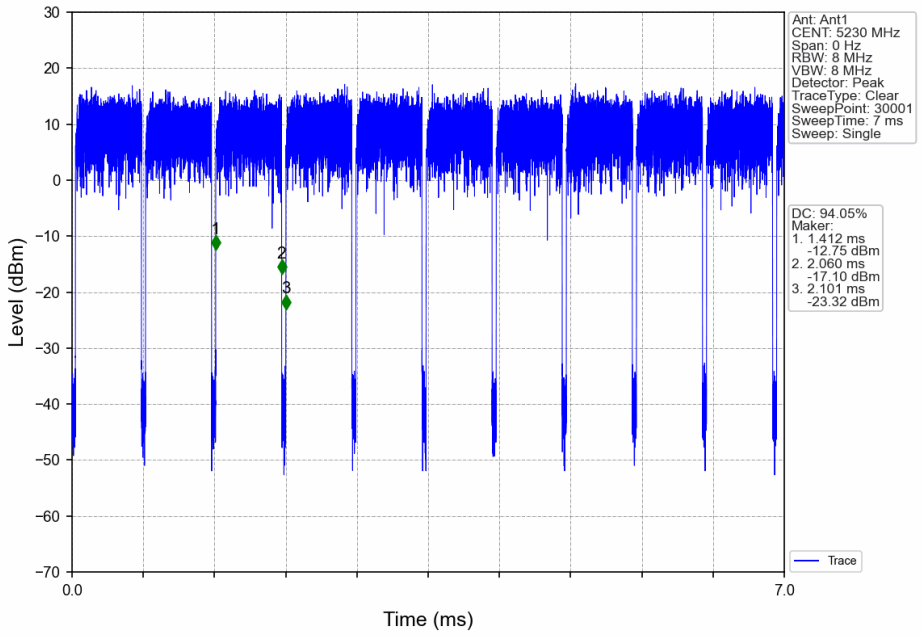
802.11n(HT40)_LCH_5190MHz_Ant1_NTNV



802.11n(HT40)_HCH_5230MHz_Ant1_NTNV



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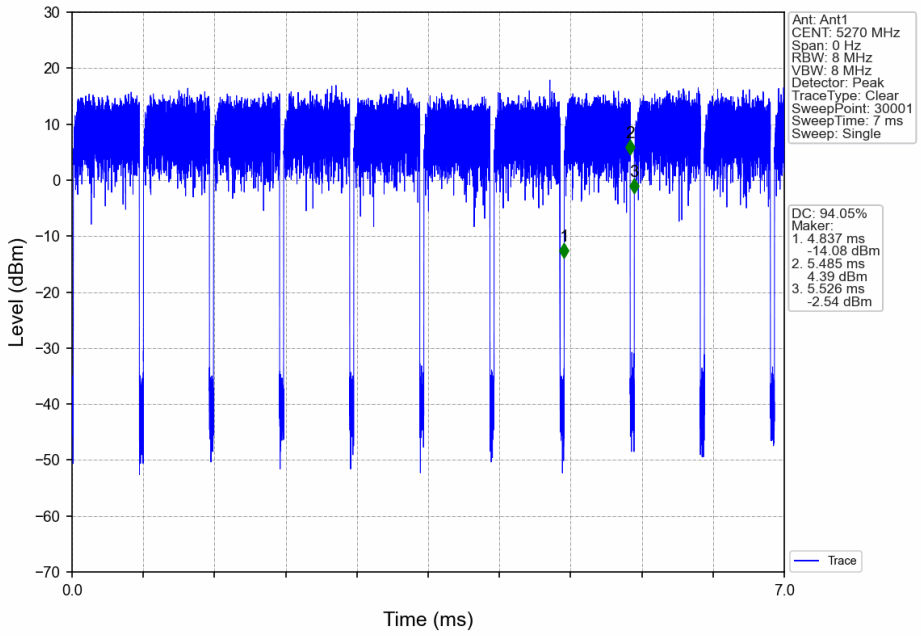
802.11n(HT40)_LCH_5270MHz_Ant1_NTNV



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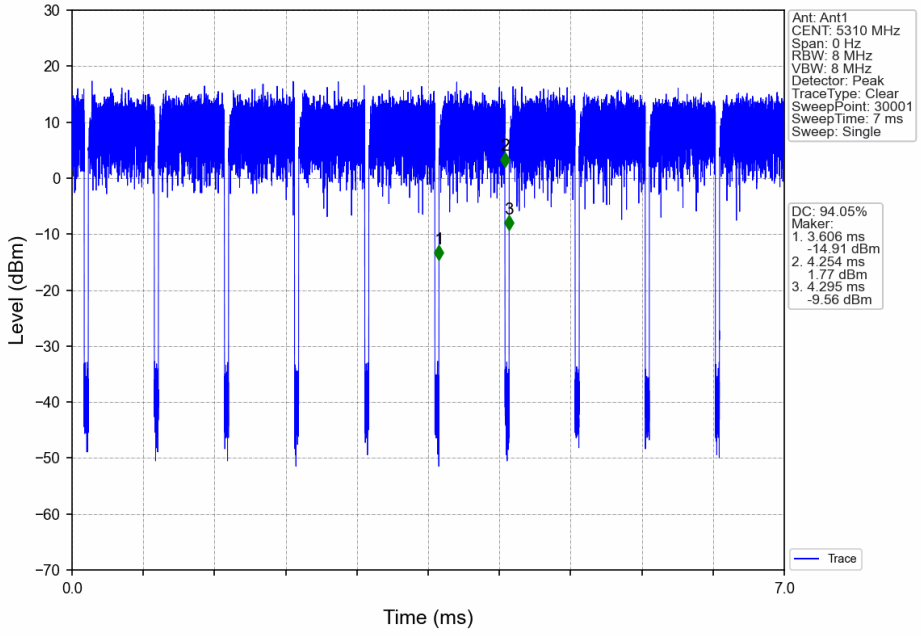

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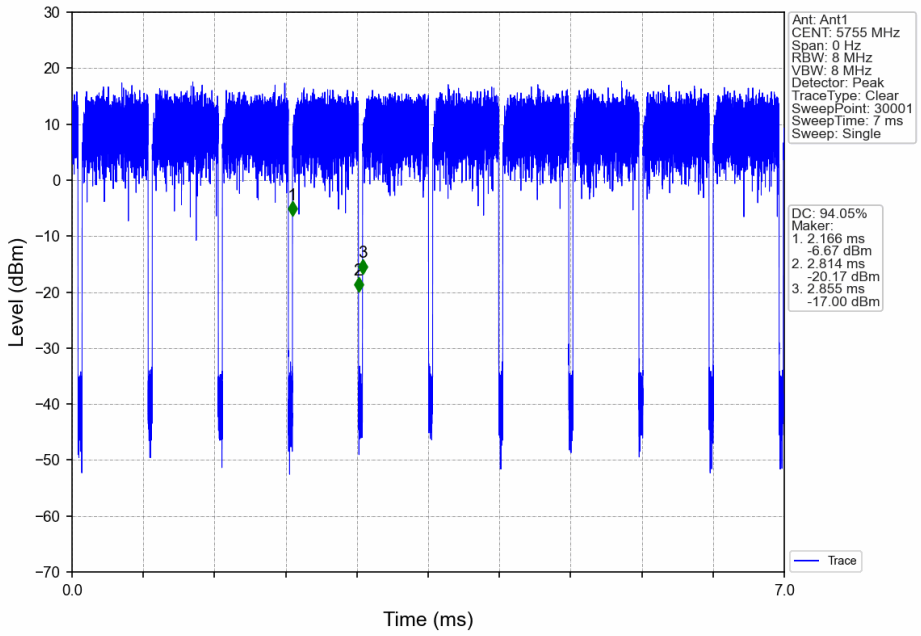
802.11n(HT40)_LCH_5755MHz_Ant1_NTNV



802.11n(HT40)_HCH_5795MHz_Ant1_NTNV