



TESTING LABORATORY
CERTIFICATE#4323.01



FCC PART 15.247

TEST REPORT

For

Hangzhou Meari Technology Co., Ltd.

Room 604-605, Building 1, No.768 Jianghong Road, Changhe street, Binjiang District, Hangzhou,
Zhejiang, China

FCC ID: 2AG7C-BELL15S

Report Type:

Original Report

Product Type:

Wireless Doorbell

Project Engineer:

Miller Xie

Miller Xie

Report Number:

RSHA210125002-00B

Report Date:

2021-05-14

Reviewed By:

Oscar Ye
EMC Manager

Oscar Ye

Prepared By:

Bay Area Compliance Laboratories Corp. (Kunshan)
No.248 Chenghu Road, Kunshan, Jiangsu province, China
Tel: +86-0512-86175000
Fax: +86-0512-88934268
www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
OBJECTIVE	4
RELATED SUBMITTAL(S)/GRANT(S)	4
TEST METHODOLOGY	5
MEASUREMENT UNCERTAINTY	5
TEST FACILITY	5
SYSTEM TEST CONFIGURATION	6
DESCRIPTION OF TEST CONFIGURATION	6
EQUIPMENT MODIFICATIONS	6
EUT EXERCISE SOFTWARE	6
SUPPORT EQUIPMENT LIST AND DETAILS	9
EXTERNAL I/O CABLE	9
BLOCK DIAGRAM OF TEST SETUP	9
SUMMARY OF TEST RESULTS	12
TEST EQUIPMENT LIST	13
FCC §1.1310 & §2.1091 –MAXIMUM PERMISSIBLE EXPOSURE (MPE)	14
FCC §15.203 - ANTENNA REQUIREMENT	16
APPLICABLE STANDARD	16
ANTENNA CONNECTOR CONSTRUCTION	16
FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS	17
APPLICABLE STANDARD	17
EUT SETUP	17
EMI TEST RECEIVER SETUP	17
TEST PROCEDURE	18
FACTOR & OVER LIMIT CALCULATION	18
TEST RESULTS SUMMARY	18
TEST DATA	18
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS	27
APPLICABLE STANDARD	27
EUT SETUP	27
EMI TEST RECEIVER SETUP	28
TEST PROCEDURE	28
TEST RESULTS SUMMARY	28
TEST DATA	29
FCC §15.247(a) (2) - 6 dB EMISSION BANDWIDTH	51
APPLICABLE STANDARD	51
TEST PROCEDURE	51
TEST DATA	51
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER	58
APPLICABLE STANDARD	58
TEST PROCEDURE	58
TEST DATA	58
FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE	60
APPLICABLE STANDARD	60
TEST PROCEDURE	60
TEST DATA	60

FCC §15.247(e) - POWER SPECTRAL DENSITY	64
APPLICABLE STANDARD	64
TEST PROCEDURE	64
TEST DATA	64

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Hangzhou Meari Technology Co., Ltd.
Tested Model:	Bell 15S
Series Model:	Bell 15X, Bell 17S, Bell 15T, Bell 17T
Model Difference:	See Declaration letter
Product Type:	Wireless Doorbell
Power Supply:	DC 5V from adapter, DC 3.6V powered by battery and AC 12V-24V
Maximum Output Power:	802.11b:19.76 dBm; 802.11g:22.47 dBm; 802.11n20:24.20 dBm
RF Function:	2.4G Wi-Fi
Operating Band/Frequency:	2412-2462 MHz
Channel Number:	11
Channel Separation:	5 MHz
Modulation Type:	DSSS, OFDM
Antenna Type:	FPC antenna
Maximum Antenna Gain:	1.92 dBi

Adapter-1 Information:

Model: GTA92-0501000US

Input: AC100-240V~50/60Hz,0.3A

Output: 5.0V, 1.0A,5.0W

Adapter-2 Information:

Model: TPA-46B050100UU

Input: AC100-240V~50/60Hz,0.2A

Output: 5.0V, 1000mA

**All measurement and test data in this report was gathered from production sample serial number: RSHA210125002-1. (Assigned by the BACL. The EUT supplied by the applicant was received on 2021-01-25.)*

Objective

This report is prepared on behalf of *Hangzhou Meari Technology Co., Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions' rules.

The tests were performed in order to determine Compliant with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207,15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15.249 DXX Submittal with FCC ID: 2AG7C-BELL15S

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliant Testing of Unlicensed Wireless Devices and FCC 558074 D01 15.247 Meas Guidance v05r02.

All emissions measurement was performed at Bay Area Compliant Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
Occupied Bandwidth		0.5kHz
Temperature		1.0°C
Humidity		6%

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

Test channel list is as below:

For 802.11b, 802.11g and 802.11n-HT20 mode, EUT was tested with Channel 1, 6 and 11;

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	/	/

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

RF test tool: XCOM V2.0

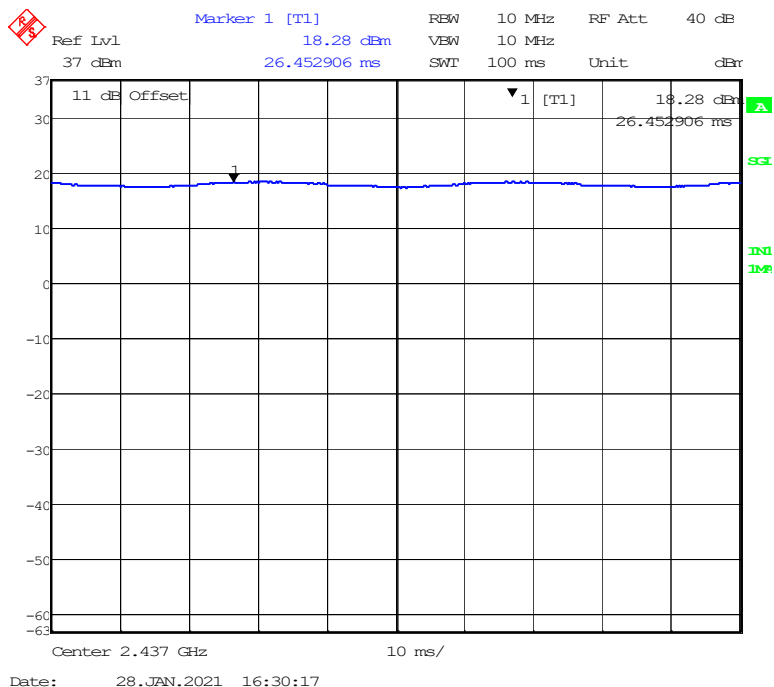
Pre-scan with all the data rates, and the worst case was performed as below:

Mode	Data Rate	Power Level Setting
802.11b	1 Mbps	-20
802.11g	6 Mbps	-40
802.11n-HT20	MCS0	-40

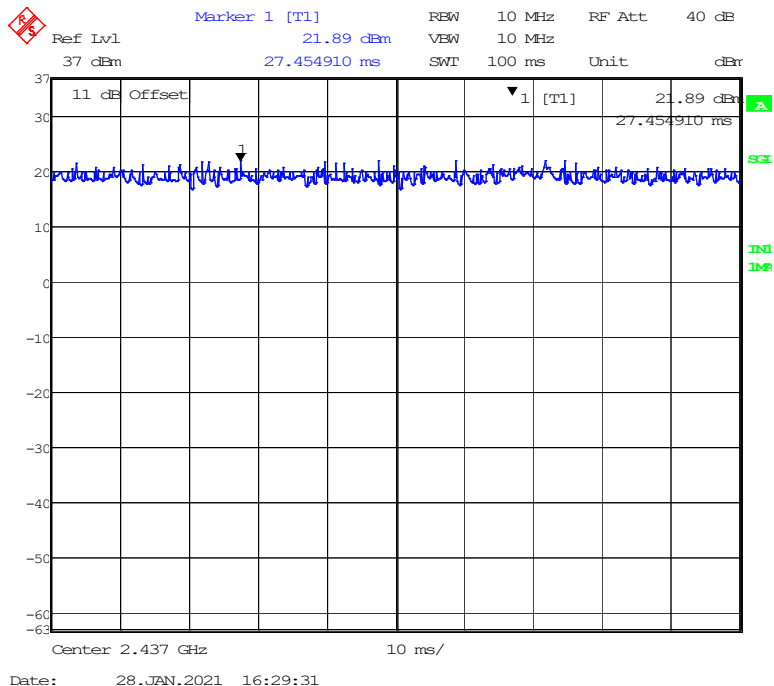
Note: The power level setting was declared by the applicant.

Duty Cycle:

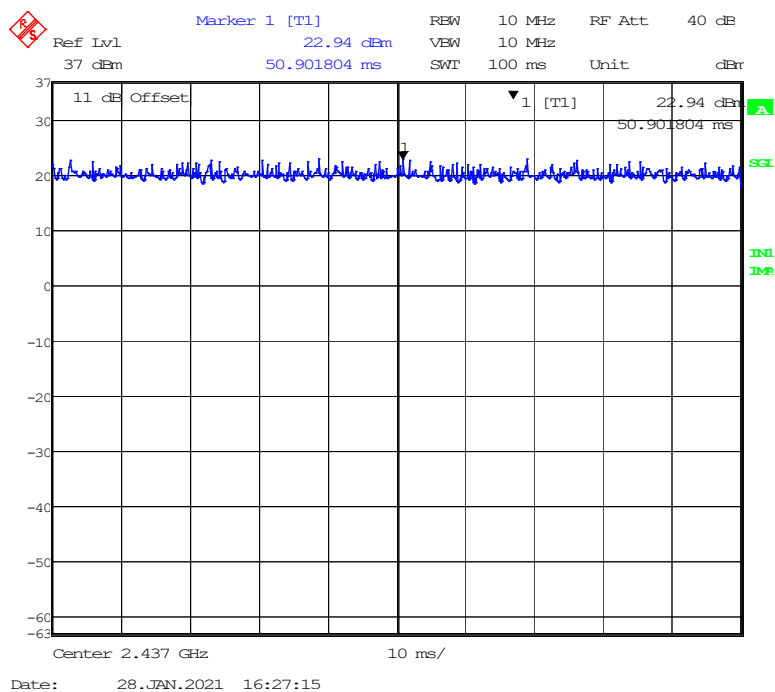
802.11b Mode Middle Channel



802.11g Mode Middle Channel



802.11n-HT20 Mode Middle Channel



Mode	Duty Cycle (%)	T(ms)	1/T(kHz)	10log(1/x)
802.11b	100	/	/	0
802.11g	100	/	/	0
802.11n-HT20	100	/	/	0

Note: “x” means the Duty Cycle.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
SanDisk	SD Card	32G	72810VCP912S
MESTEK	DC Power Supply	DP3020	20190901401

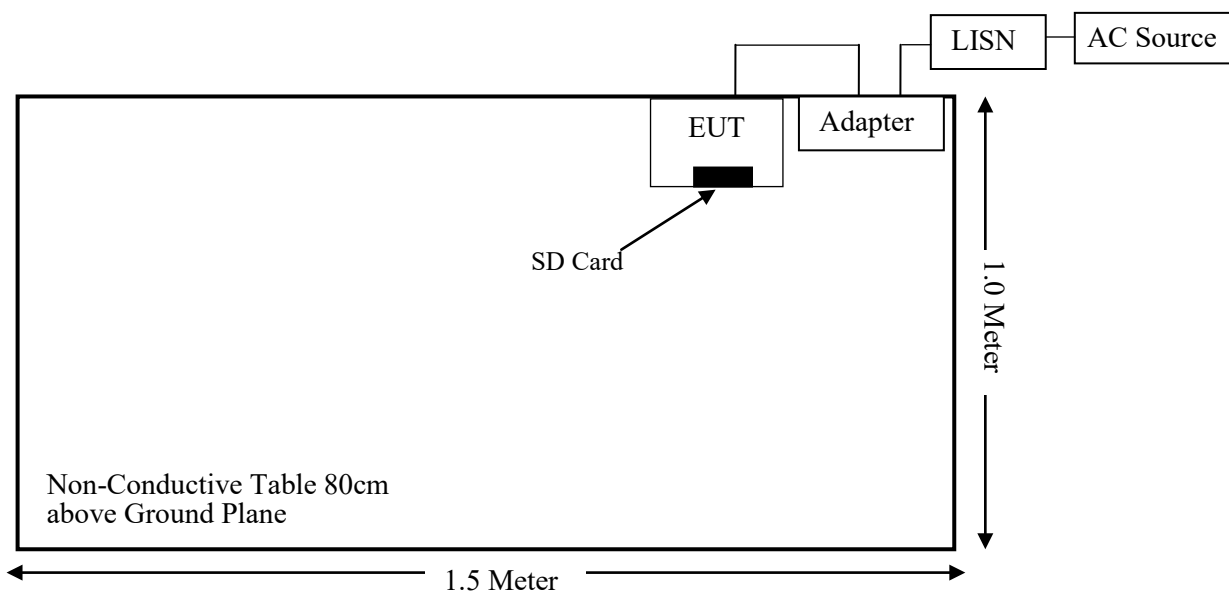
External I/O Cable

Cable Description	Length(m)	From Port	To Port
Power Cable 1	1.0	EUT	Adapter
Power Cable 2	1.0	Adapter	LISN/AC Source
Power Cable 1	1.0	EUT	LISN/AC Source

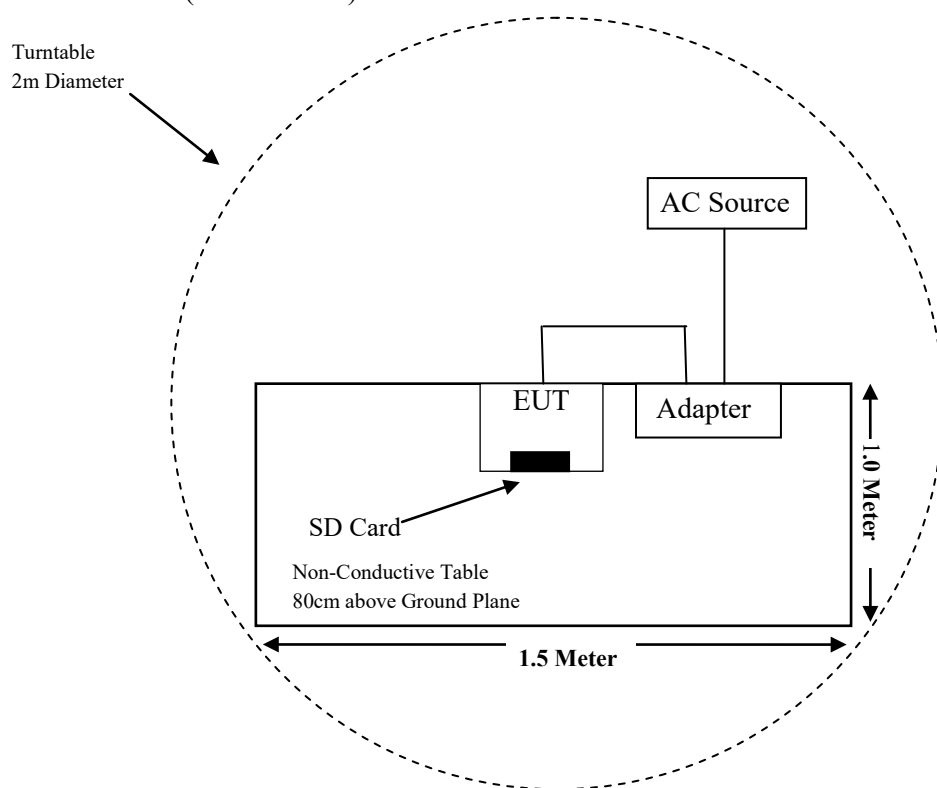
Block Diagram of Test Setup

For Conducted Emissions:

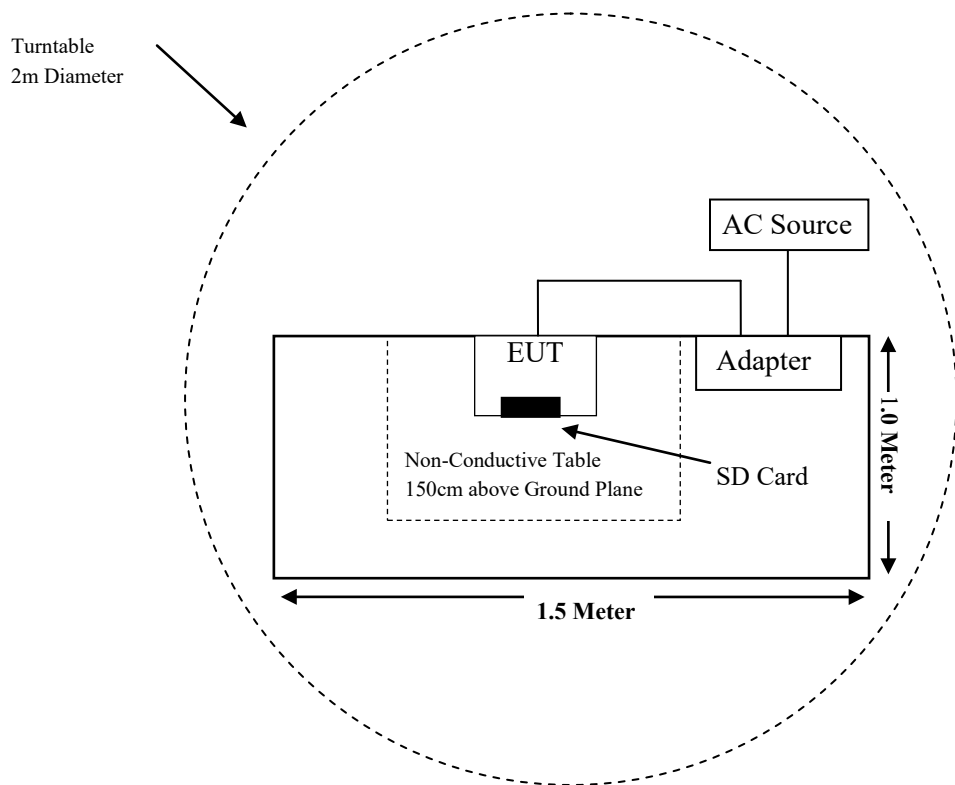
For Adapter :



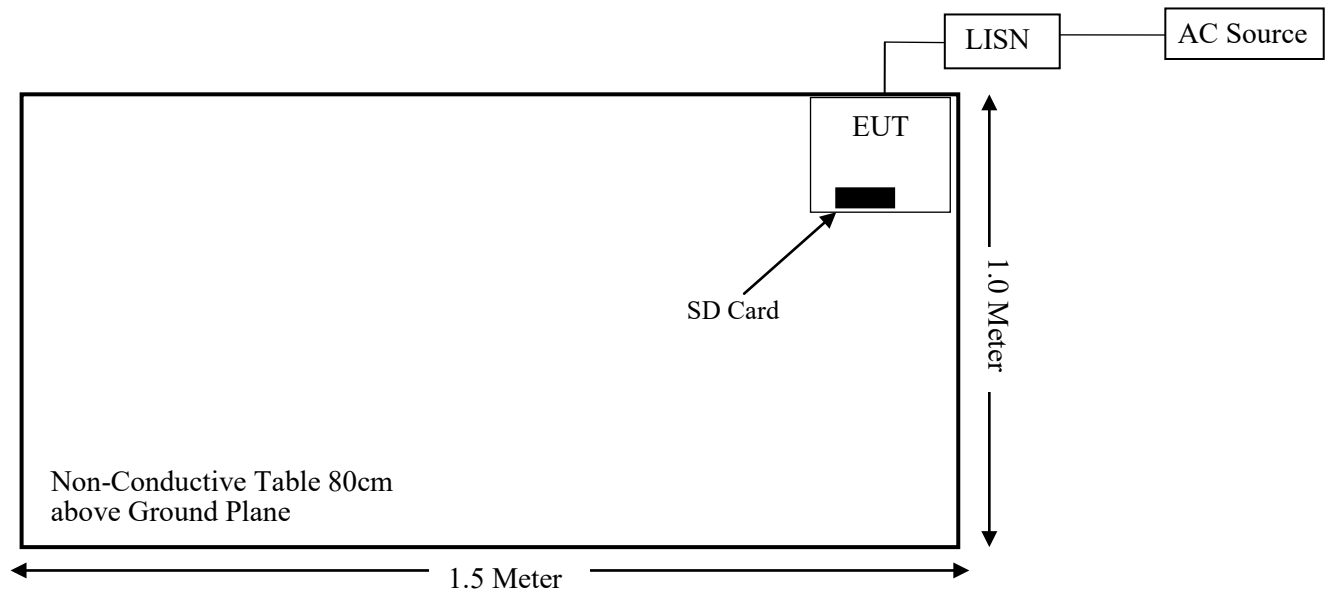
For Radiated Emissions(Below 1GHz):



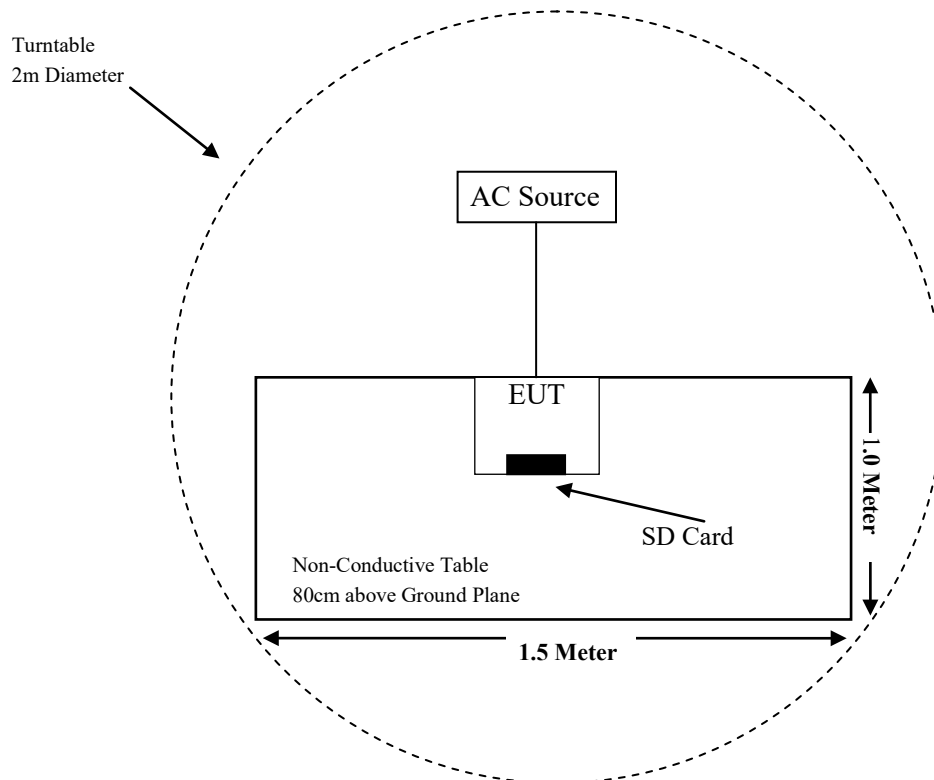
For Radiated Emissions(Above 1GHz):



For AC 12V-24V:



For Radiated Emissions(Below 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (I), §1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	Compliant
§15.247(d)	Spurious Emissions at Antenna Port	Compliant
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliant
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliant
§15.247(b)(3)	Maximum Conducted Output Power	Compliant
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247(e)	Power Spectral Density	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test (Chamber 1#)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2020-11-27	2021-11-26
Sunol Sciences	Hybrid Antenna	JB3	A090314-1	2020-08-05	2023-08-04
Sonoma Instrument	Pre-amplifier	310N	171205	2020-08-14	2021-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-8	008	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2020-08-15	2021-08-14
Radiated Emission Test (Chamber 2#)					
Rohde & Schwarz	EMI Receiver	ESU40	100207	2021-03-16	2022-03-15
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2020-07-15	2023-07-14
ETS-LINDGREN	Horn Antenna	3116	00084159	2020-01-17	2023-01-16
A.H.Systems, inc	Amplifier	PAM-0118P	512	2020-08-14	2021-08-13
SELECTOR	Amplifier	EM18G40G	060726	2020-08-22	2021-08-21
MICRO-TRONICS	Band Reject Filter	BRM50702	G024	2020-08-05	2021-08-04
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-6	006	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2020-08-15	2021-08-14
RF Conducted Test					
Rohde & Schwarz	EMI Test Receiver	ESIB26	100146	2020-12-14	2021-12-13
Narda	Attenuator	10dB	010	2020-08-15	2021-08-14
Hangzhou Meari	RF Cable	Hangzhou Meari C01	N/A	Each Time	N/A
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2020-08-05	2021-08-04
Rohde & Schwarz	LISN	ENV216	101115	2020-11-27	2021-11-26
Audix	Test Software	e3	V9	N/A	N/A
Rohde & Schwarz	Pulse limiter	ESH3-Z2	0357.8810.54	2020-08-10	2021-08-09
MICRO-COAX	Coaxial Cable	Cable-15	015	2020-08-15	2021-08-14

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §1.1310 & §2.1091 –MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart §2.1091 and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

Mode	Frequency Range (MHz)	Antenna Gain		Tune-up Output Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)	MPE Ratio
		(dBi)	(numeric)	(dBm)	(mW)				
802.11b	2412~2462	1.92	1.56	20.00	100.00	20	0.0310	1.0	0.0310
802.11g		1.92	1.56	22.50	177.83	20	0.0550	1.0	0.0550
802.11n-HT20		1.92	1.56	24.50	281.84	20	0.0872	1.0	0.0872

Mode	Frequency Range (MHz)	Maximum Antenna Gain		Tune-up EIRP		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)	MPE Ratio
		(dBi)	(numeric)	(dBm)	(mW)				
SRD	914.92	2.00	1.58	-4.00	0.40	20	0.0001	0.61	0.0002

Note: (1) The tune-up output power was declared by the manufacturer.
 (2) SRD: ERP= 88.74 dBμV/m -95.2=-6.46 dBm, EIRP=ERP+2.15
 (3) 2.4G Wi-Fi and SRD can transmit simultaneously, The worst condition is 2.4G Wi-Fi & SRD, as below:

$$\sum_i \frac{S_i}{S_{Limit,i}} = 0.0872 + 0.0002 = 0.0874 < 1$$

Conclusion: The device meets MPE at distance 20cm.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine Compliant with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has an FPC Antenna with IPEX connector for Wi-Fi and the antenna gain is 1.92 dBi, the antenna was permanently attached, fulfill the requirement of this section. Please refer to the EUT photos.

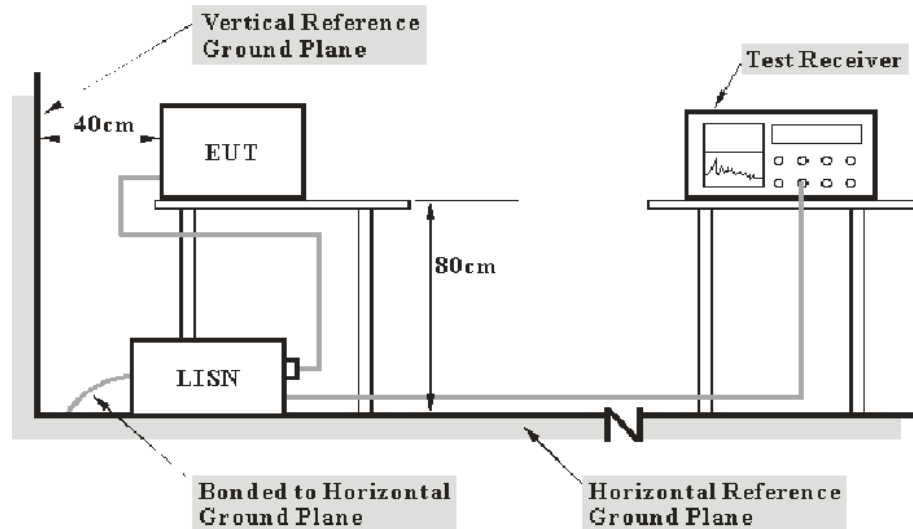
Result: Compliant.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

EUT Setup



Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

ANSI C63.10-2013 clause 6.2

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Factor & Over Limit Calculation

The Factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Factor (dB)} = \text{LISN VDF (dB)} + \text{Cable Loss (dB)} + \text{Transient Limiter Attenuation (dB)}$$

The “**Over Limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit of 7 dB means the emission is 7 dB above the limit. The equation for Over Limit calculation is as follows:

$$\text{Over Limit (dB)} = \text{Read level (dB}\mu\text{V)} + \text{Factor (dB)} - \text{Limit (dB}\mu\text{V)}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Test Data

Environmental Conditions

Temperature:	23.2 ~24.2 °C
Relative Humidity:	48~50 %
ATM Pressure:	101.5~102.3 kPa

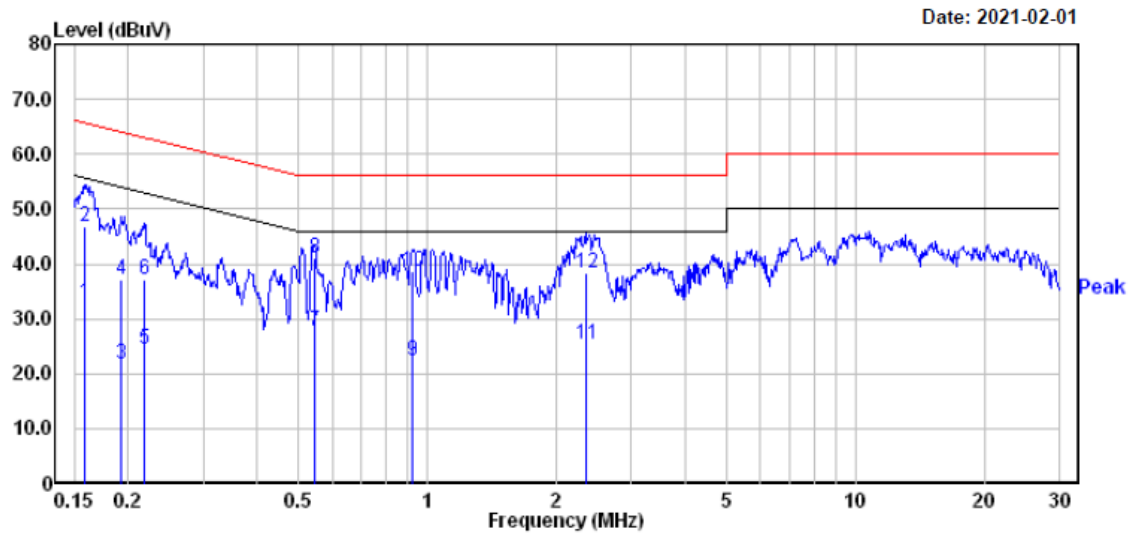
The testing was performed by Miller Xie from 2021-01-27 to 2021-04-30.

Test Result: Compliant.

EUT operation mode: Transmitting in 802.11n-HT20 Mode Middle channel (worst case)

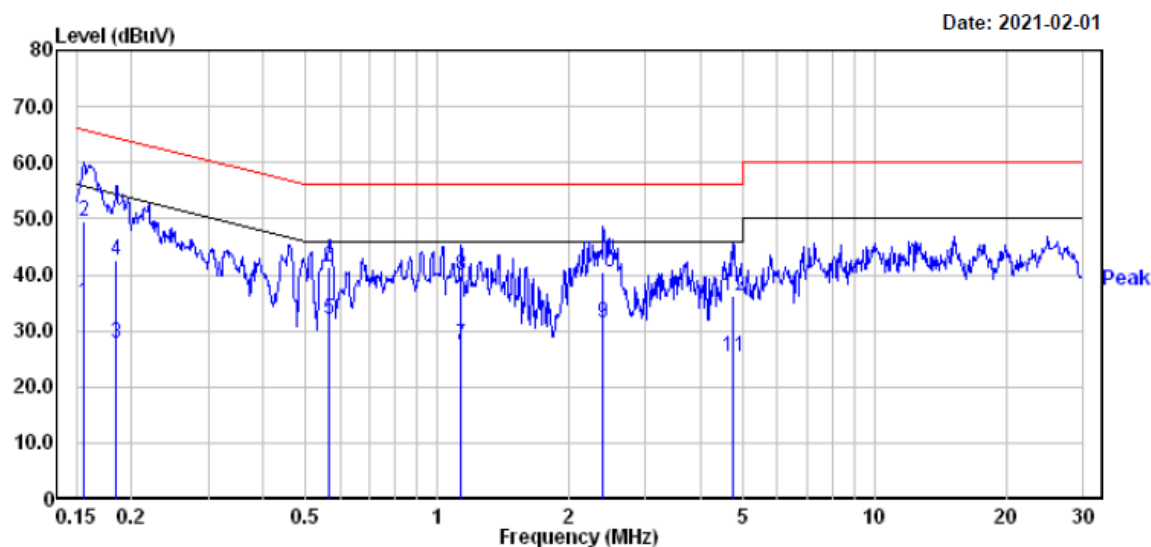
AC 120V/60 Hz, Line

For adapter1:



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.159	13.10	19.82	32.92	55.52	-22.60	Average
2	0.159	26.90	19.82	46.72	65.52	-18.80	QP
3	0.192	1.90	19.82	21.72	53.93	-32.21	Average
4	0.192	17.40	19.82	37.22	63.93	-26.71	QP
5	0.219	4.50	19.82	24.32	52.88	-28.56	Average
6	0.219	17.20	19.82	37.02	62.88	-25.86	QP
7	0.546	7.90	19.75	27.65	46.00	-18.35	Average
8	0.546	21.20	19.75	40.95	56.00	-15.05	QP
9	0.923	2.70	19.75	22.45	46.00	-23.55	Average
10	0.923	19.00	19.75	38.75	56.00	-17.25	QP
11	2.346	5.91	19.57	25.48	46.00	-20.52	Average
12	2.346	18.91	19.57	38.48	56.00	-17.52	QP

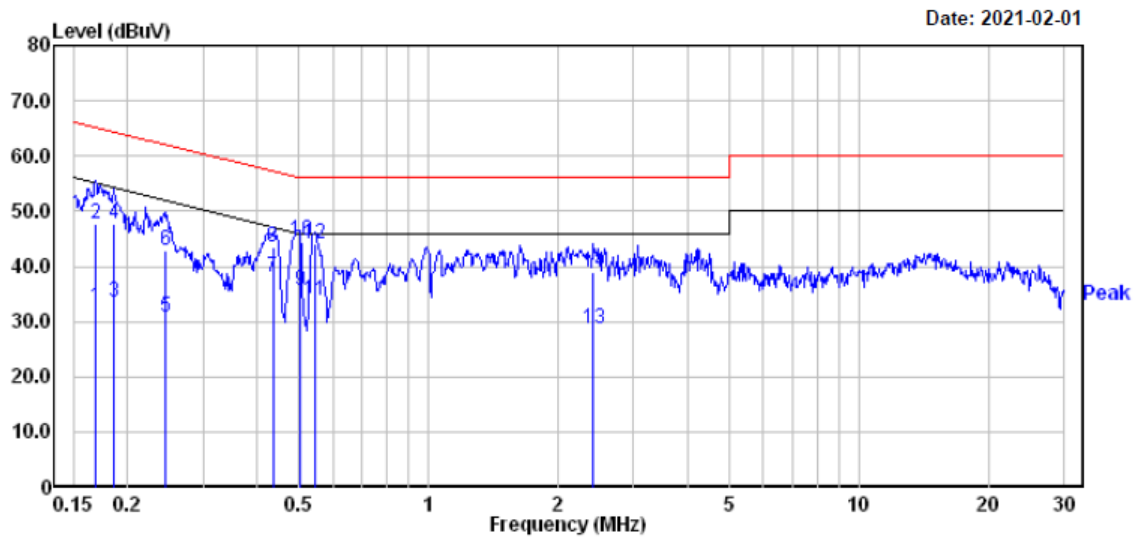
AC 120V/60 Hz, Neutral



		Read			Limit	Over	
	Freq	Level	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.156	15.30	19.82	35.12	55.69	-20.57	Average
2	0.156	29.80	19.82	49.62	65.69	-16.07	QP
3	0.184	7.91	19.82	27.73	54.28	-26.55	Average
4	0.184	22.81	19.82	42.63	64.28	-21.65	QP
5	0.567	12.10	19.75	31.85	46.00	-14.15	Average
6	0.567	21.70	19.75	41.45	56.00	-14.55	QP
7	1.135	7.80	19.81	27.61	46.00	-18.39	Average
8	1.135	20.00	19.81	39.81	56.00	-16.19	QP
9	2.396	11.80	19.54	31.34	46.00	-14.66	Average
10	2.396	20.80	19.54	40.34	56.00	-15.66	QP
11	4.746	5.90	19.49	25.39	46.00	-20.61	Average
12	4.746	16.70	19.49	36.19	56.00	-19.81	QP

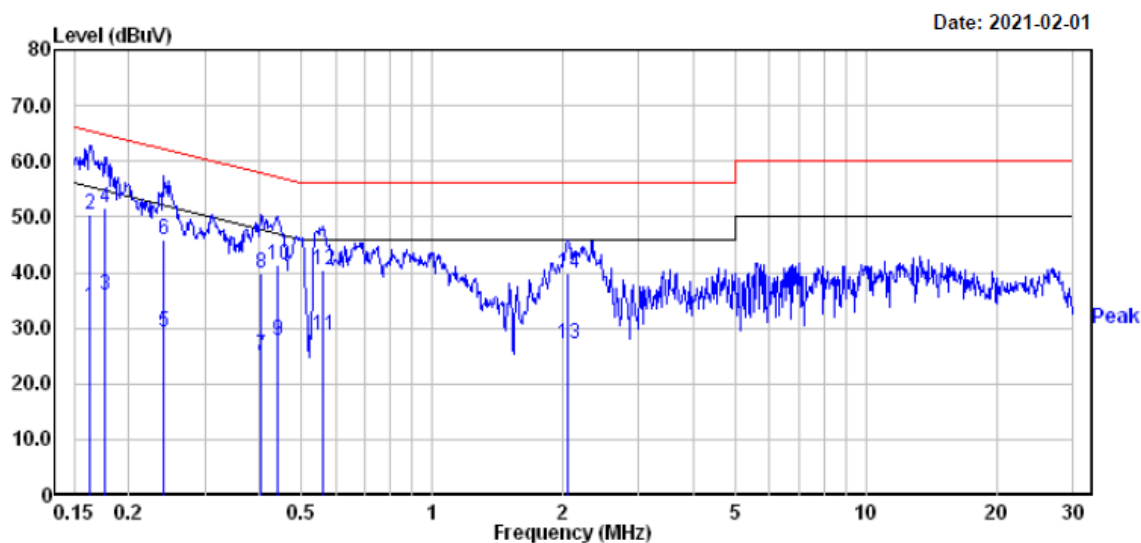
For adapter2:

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.169	12.70	19.83	32.53	55.03	-22.50	Average
2	0.169	27.80	19.83	47.63	65.03	-17.40	QP
3	0.185	13.61	19.82	33.43	54.24	-20.81	Average
4	0.185	27.81	19.82	47.63	64.24	-16.61	QP
5	0.244	11.00	19.82	30.82	51.95	-21.13	Average
6	0.244	23.10	19.82	42.92	61.95	-19.03	QP
7	0.435	18.30	19.75	38.05	47.15	-9.10	Average
8	0.435	23.60	19.75	43.35	57.15	-13.80	QP
9	0.502	15.90	19.76	35.66	46.00	-10.34	Average
10	0.502	24.80	19.76	44.56	56.00	-11.44	QP
11	0.544	14.00	19.75	33.75	46.00	-12.25	Average
12	0.544	24.20	19.75	43.95	56.00	-12.05	QP
13	2.422	9.21	19.52	28.73	46.00	-17.27	Average
14	2.422	19.51	19.52	39.03	56.00	-16.97	QP

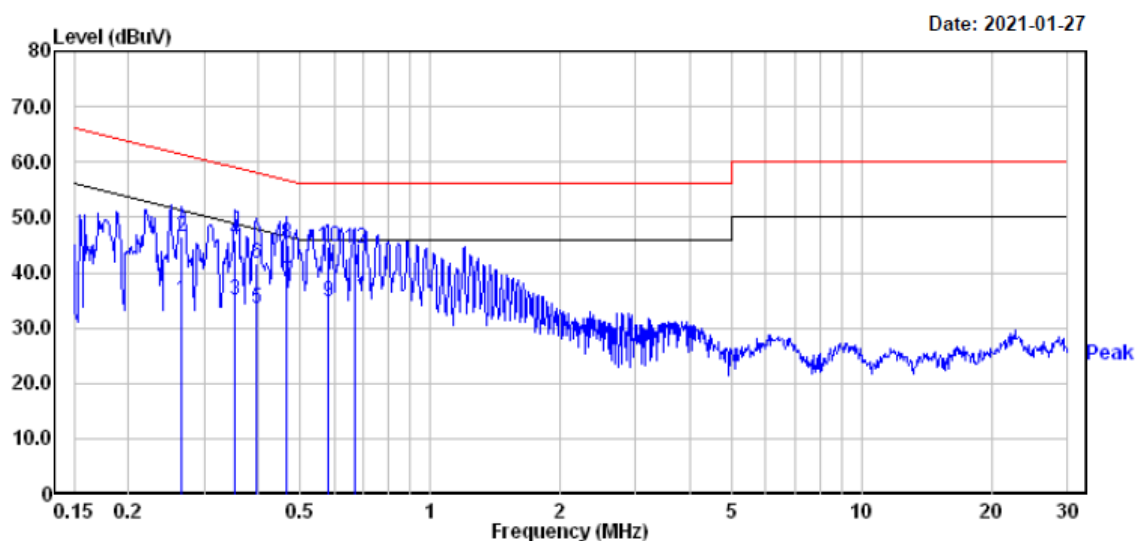
AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.163	14.00	19.83	33.83	55.30	-21.47	Average
2	0.163	30.70	19.83	50.53	65.30	-14.77	QP
3	0.177	16.00	19.83	35.83	54.64	-18.81	Average
4	0.177	31.80	19.83	51.63	64.64	-13.01	QP
5	0.242	9.40	19.82	29.22	52.04	-22.82	Average
6	0.242	26.10	19.82	45.92	62.04	-16.12	QP
7	0.404	5.40	19.74	25.14	47.77	-22.63	Average
8	0.404	20.20	19.74	39.94	57.77	-17.83	QP
9	0.440	7.90	19.75	27.65	47.07	-19.42	Average
10	0.440	21.70	19.75	41.45	57.07	-15.62	QP
11	0.561	8.80	19.75	28.55	46.00	-17.45	Average
12	0.561	20.60	19.75	40.35	56.00	-15.65	QP
13	2.055	7.50	19.79	27.29	46.00	-18.71	Average
14	2.055	20.20	19.79	39.99	56.00	-16.01	QP

For AC 24V (worst case):

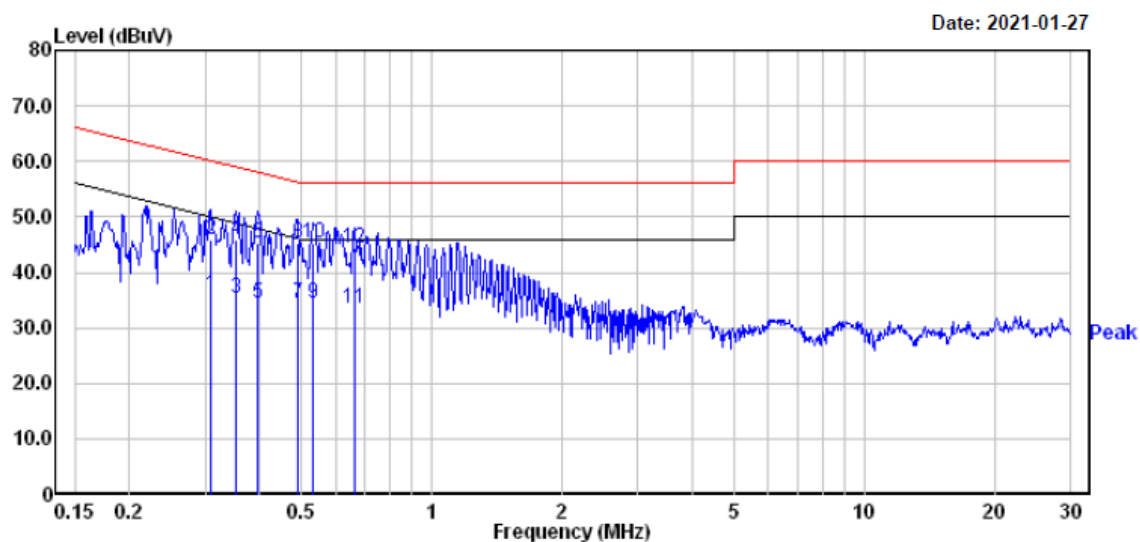
AC 24V/60 Hz, Line



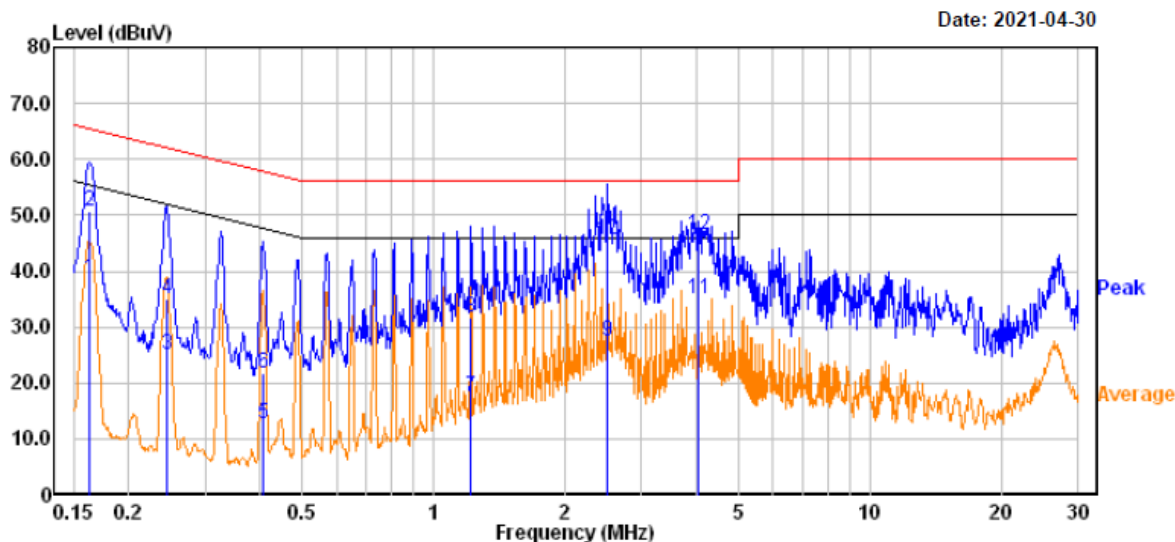
	Freq	Read		Limit	Over	
	MHz	Level	Factor	Line	Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB
1	0.266	15.30	19.82	35.12	51.25	-16.13 Average
2	0.266	26.60	19.82	46.42	61.25	-14.83 QP
3	0.354	15.10	19.80	34.90	48.87	-13.97 Average
4	0.354	26.20	19.80	46.00	58.87	-12.87 QP
5	0.396	13.69	19.75	33.44	47.95	-14.51 Average
6	0.396	21.99	19.75	41.74	57.95	-16.21 QP
7	0.464	18.60	19.75	38.35	46.63	-8.28 Average
8	0.464	25.40	19.75	45.15	56.63	-11.48 QP
9	0.579	14.90	19.75	34.65	46.00	-11.35 Average
10	0.579	25.00	19.75	44.75	56.00	-11.25 QP
11	0.668	16.00	19.75	35.75	46.00	-10.25 Average
12	0.668	24.50	19.75	44.25	56.00	-11.75 QP

Note: Pre-scan AC 12V and AC24V supply voltages, and AC24V was the worst case.

AC 24V/60 Hz, Neutral



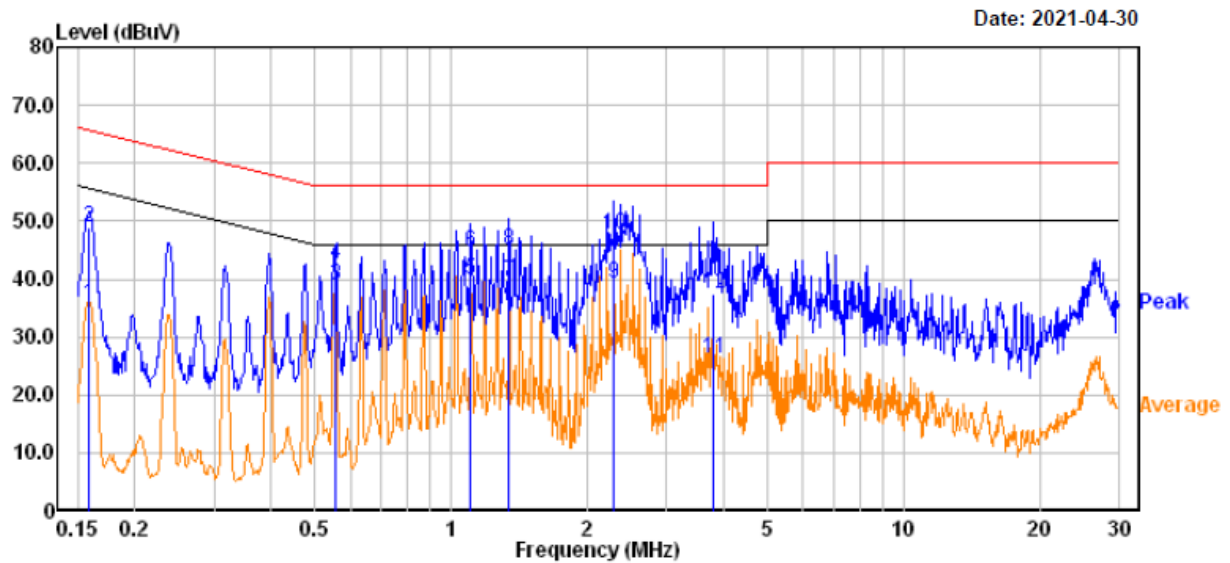
		Read		Limit	Over	
	Freq	Level	Factor	Level	Line	Limit Remark
	MHz	dBuV	dB	dBuV	dBuV	dB
1	0.310	16.09	19.83	35.92	49.97	-14.05 Average
2	0.310	26.09	19.83	45.92	59.97	-14.05 QP
3	0.354	15.60	19.80	35.40	48.87	-13.47 Average
4	0.354	26.20	19.80	46.00	58.87	-12.87 QP
5	0.398	14.80	19.74	34.54	47.90	-13.36 Average
6	0.398	25.60	19.74	45.34	57.90	-12.56 QP
7	0.489	14.70	19.76	34.46	46.19	-11.73 Average
8	0.489	25.60	19.76	45.36	56.19	-10.83 QP
9	0.532	14.61	19.75	34.36	46.00	-11.64 Average
10	0.532	25.41	19.75	45.16	56.00	-10.84 QP
11	0.661	13.90	19.75	33.65	46.00	-12.35 Average
12	0.661	24.70	19.75	44.45	56.00	-11.55 QP

Transmitting simultaneously test:*For adapter2 (worst case):**(The worst case 802.11n-HT20 Mode Middle channel and SRD mode transmitting simultaneously was recorded)***AC 120V/60 Hz, Line:**

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.162	18.80	19.83	38.63	55.34	-16.71	Average
2	0.162	30.80	19.83	50.63	65.34	-14.71	QP
3	0.244	5.10	19.82	24.92	51.94	-27.02	Average
4	0.244	15.20	19.82	35.02	61.94	-26.92	QP
5	0.406	-7.00	19.74	12.74	47.72	-34.98	Average
6	0.406	2.00	19.74	21.74	57.72	-35.98	QP
7	1.217	-2.30	19.81	17.51	46.00	-28.49	Average
8	1.217	11.90	19.81	31.71	56.00	-24.29	QP
9	2.507	7.89	19.48	27.37	46.00	-18.63	Average
10	2.507	25.99	19.48	45.47	56.00	-10.53	QP
11	4.045	15.50	19.47	34.97	46.00	-11.03	Average
12	4.045	26.90	19.47	46.37	56.00	-9.63	QP

Note: Pre-scan adapter1 and adapter2, and adapter2 was the worst case.

AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.158	15.70	19.82	35.52	55.54	-20.02	Average
2	0.158	29.20	19.82	49.02	65.54	-16.52	QP
3	0.554	19.20	19.75	38.95	46.00	-7.05	Average
4	0.554	22.90	19.75	42.65	56.00	-13.35	QP
5	1.107	19.91	19.81	39.72	46.00	-6.28	Average
6	1.107	24.91	19.81	44.72	56.00	-11.28	QP
7	1.344	19.70	19.83	39.53	46.00	-6.47	Average
8	1.344	25.10	19.83	44.93	56.00	-11.07	QP
9	2.292	19.50	19.61	39.11	46.00	-6.89	Average
10	2.292	28.20	19.61	47.81	56.00	-8.19	QP
11	3.791	6.90	19.47	26.37	46.00	-19.63	Average
12	3.791	18.00	19.47	37.47	56.00	-18.53	QP

Note:

- 1) Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
- 2) Over Limit (dB) = Read level (dBμV) + Factor (dB) - Limit (dBμV)

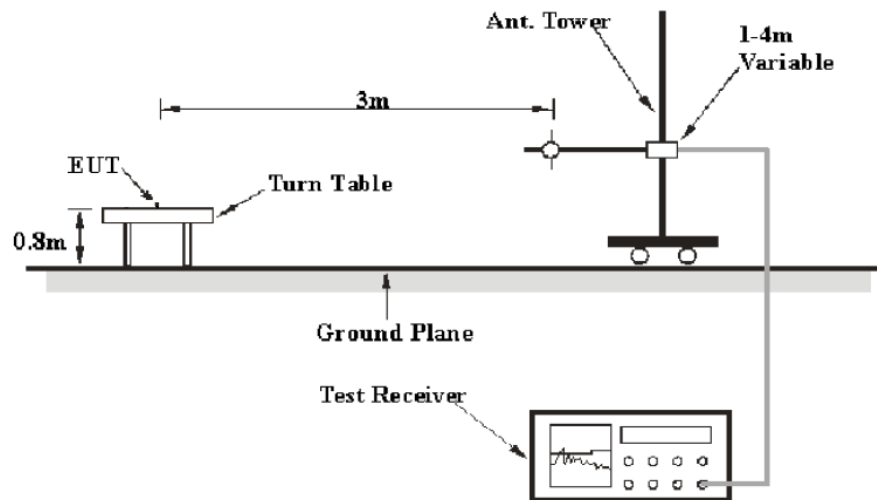
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

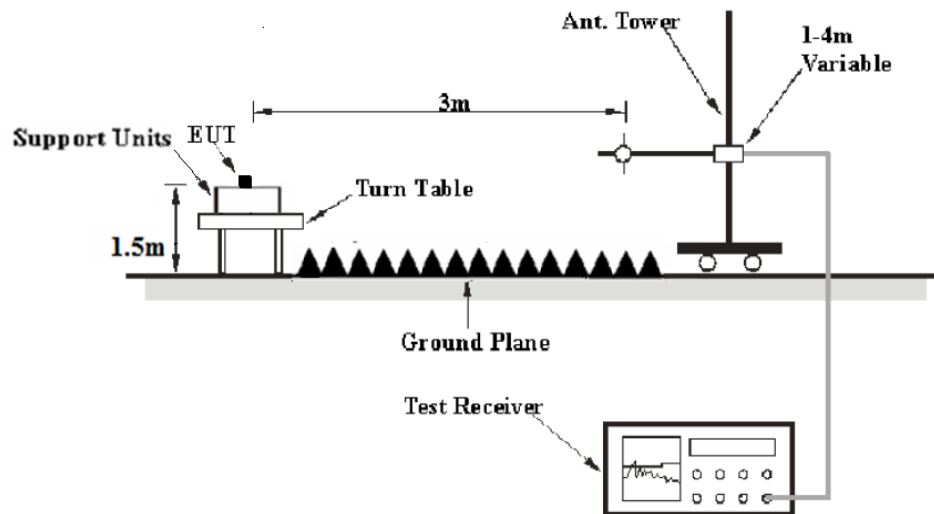
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver setup was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1GHz	1MHz	3 MHz	/	PK
	1MHz	3 MHz	1MHz	AVG.

Test Procedure

According to ANSI C63.10-2013 clause 6.5, 6.6 and 6.7.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30MHz - 1GHz, peak and Average detection mode for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude (dB μ V/m) = Meter Reading (dB μ V) + Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

The “**Margin**” column of the following data tables indicates the degree of Compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V/m)

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

Test Data

Environmental Conditions

Temperature:	25.2~26.5 °C
Relative Humidity:	49-50 %
ATM Pressure:	100.7-101.5 kPa

The testing was performed by Miller Xie from 2021-01-27 to 2021-04-26.

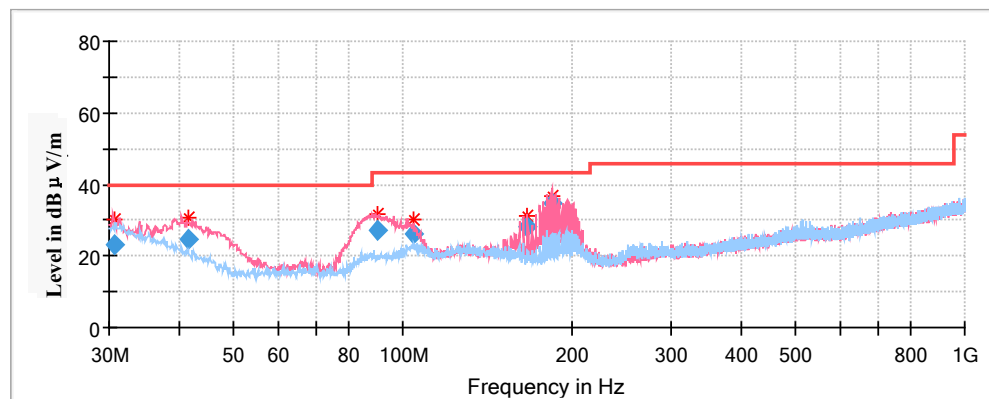
EUT operation mode: Transmitting

Spurious Emission Test:

For adapter1:

30MHz-1GHz:

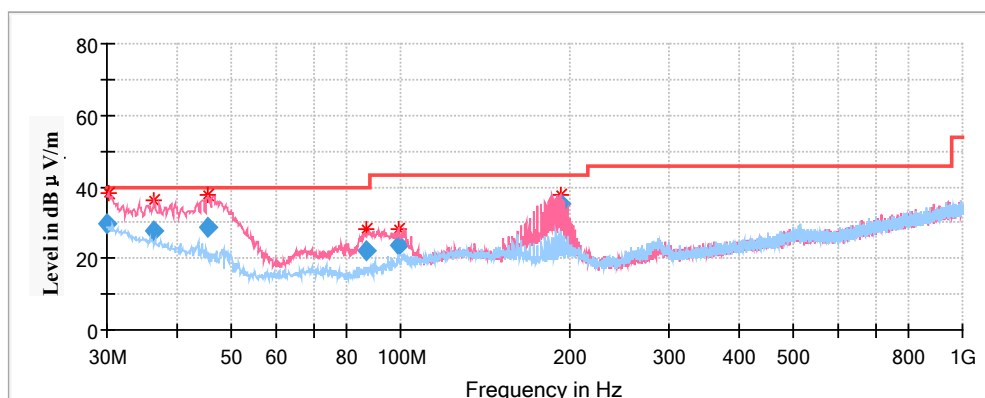
Pre-scan with 802.11b, 802.11g and 802.11n-HT20 modes of operation in the X,Y and Z axes of orientation, the worst case **Middle channel of 802.11n-HT20 mode in Z-axis of orientation** was recorded.



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	Quasi Peak (dBμV/m)	Height (cm)	Polar (H/V)				
30.571847	22.95	100.0	V	69.0	-4.2	40.00	17.05
41.567200	24.86	100.0	V	112.0	-11.6	40.00	15.14
90.230500	27.40	100.0	V	233.0	-16.7	43.50	16.10
104.664100	26.02	100.0	V	269.0	-13.4	43.50	17.48
166.836550	28.09	100.0	V	9.0	-12.3	43.50	15.41
183.827500	34.79	100.0	V	38.0	-12.0	43.50	8.71

For adapter2:**30MHz-1GHz:**

Pre-scan with 802.11b, 802.11g and 802.11n-HT20 modes of operation in the X,Y and Z axes of orientation, the worst case **Middle channel of 802.11n-HT20 mode in Z-axis of orientation** was recorded.

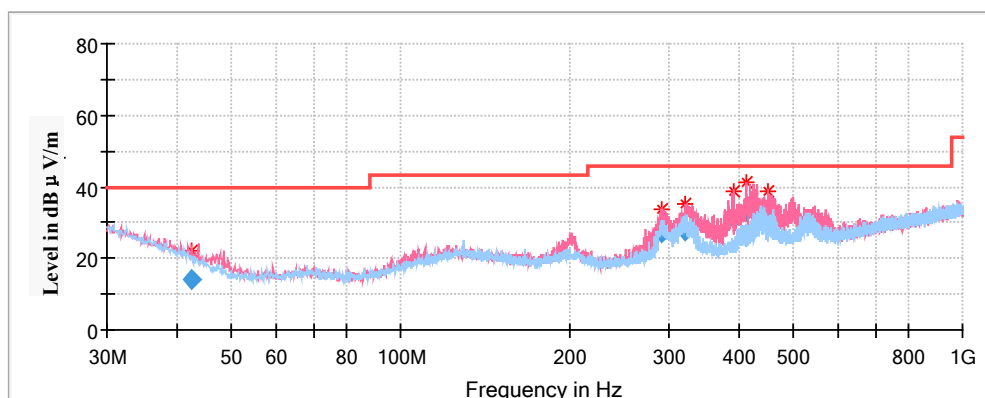


Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	Quasi Peak (dBμV/m)	Height (cm)	Polar (H/V)				
30.012717	29.67	100.0	V	195.0	-3.9	40.00	10.33
36.426955	27.73	100.0	V	346.0	-8.7	40.00	12.27
45.353450	28.80	100.0	V	159.0	-14.1	40.00	11.20
86.828200	22.14	100.0	V	195.0	-16.8	40.00	17.86
98.919850	23.86	100.0	V	339.0	-14.4	43.50	19.64
192.135550	35.45	100.0	V	15.0	-11.3	43.50	8.05

For AC 24V (worst case):

30MHz-1GHz:

Pre-scan with 802.11b, 802.11g and 802.11n-HT20 modes of operation in the X,Y and Z axes of orientation, the worst case **Middle channel of 802.11n-HT20 mode in Z-axis of orientation** was recorded.



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	Quasi Peak (dBμV/m)	Height (cm)	Polar (H/V)				
42.508500	13.89	100.0	V	125.0	-12.2	40.00	26.11
291.394550	27.39	199.0	V	0.0	-10.8	46.00	18.61
320.151200	27.80	199.0	V	320.0	-10.0	46.00	18.20
390.763950	31.38	100.0	V	193.0	-8.2	46.00	14.62
412.671000	33.11	100.0	V	162.0	-7.7	46.00	12.89
449.518850	31.49	100.0	V	162.0	-6.8	46.00	14.51

Note: Pre-scan AC 12V and AC24V supply voltages, and AC24V was the worst case.

For adapter2 (worst case):**1GHz-18GHz:****802.11b Mode:**

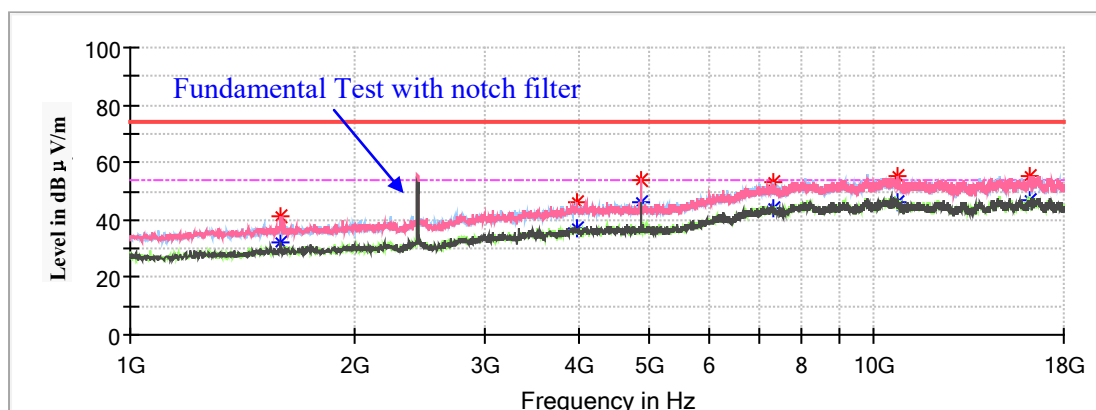
(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)
 Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

Low Channel: 2412MHz

Full Spectrum

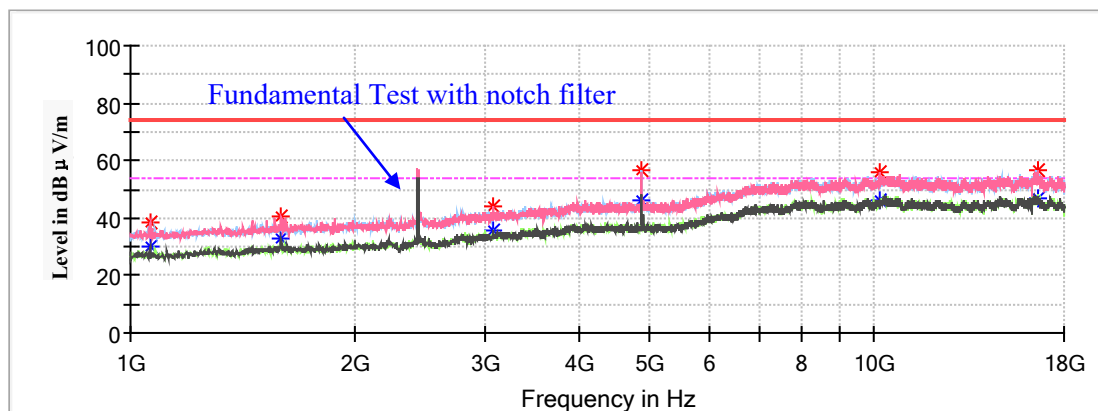


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1589.900000	---	32.45	200.0	V	284.0	-9.1	54.00	21.55
1589.900000	41.43	---	200.0	V	284.0	-9.1	74.00	32.57
3978.400000	---	36.73	200.0	H	72.0	0.3	54.00	17.27
3978.400000	46.17	---	200.0	H	72.0	0.3	74.00	27.83
4824.000000	---	46.08	150.0	V	58.0	1.1	54.00	7.92
4824.000000	53.93	---	150.0	V	58.0	1.1	74.00	20.07
7332.500000	---	43.78	150.0	H	128.0	9.1	54.00	10.22
7332.500000	52.90	---	150.0	H	128.0	9.1	74.00	21.10
10746.100000	---	46.02	150.0	V	147.0	12.2	54.00	7.98
10746.100000	55.57	---	150.0	V	147.0	12.2	74.00	18.43
16208.200000	---	46.61	150.0	H	274.0	12.3	54.00	7.39
16208.200000	55.50	---	150.0	H	274.0	12.3	74.00	18.50

Note: Pre-scan adapter1 and adapter2, and adapter2 was the worst case.

Middle Channel: 2437MHz

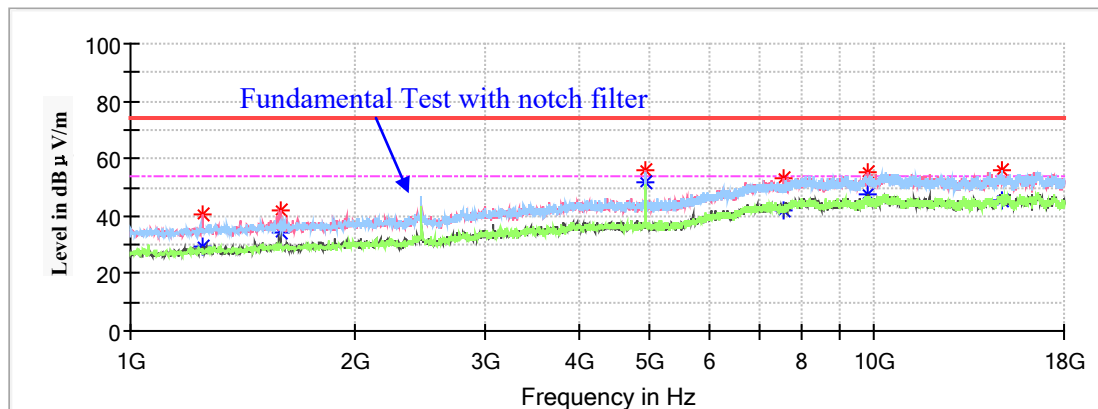
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1061.200000	---	30.33	200.0	V	269.0	-12.1	54.00	23.67
1061.200000	38.25	---	200.0	V	269.0	-12.1	74.00	35.75
1596.700000	---	32.89	150.0	V	64.0	-9.1	54.00	21.11
1596.700000	40.41	---	150.0	V	64.0	-9.1	74.00	33.59
3070.600000	---	35.90	200.0	V	133.0	-3.0	54.00	18.10
3070.600000	43.83	---	200.0	V	133.0	-3.0	74.00	30.17
4874.000000	---	46.13	150.0	V	50.0	1.1	54.00	7.87
4874.000000	56.44	---	150.0	V	50.0	1.1	74.00	17.56
10180.000000	---	46.26	200.0	V	32.0	12.3	54.00	7.74
10180.000000	55.83	---	200.0	V	32.0	12.3	74.00	18.17
16568.600000	---	46.54	200.0	V	203.0	11.9	54.00	7.46
16568.600000	56.64	---	200.0	V	203.0	11.9	74.00	17.36

High Channel: 2462MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1248.200000	---	29.20	150.0	V	248.0	-11.0	54.00	24.80
1248.200000	40.46	---	150.0	V	248.0	-11.0	74.00	33.54
1593.300000	---	34.61	150.0	V	287.0	-9.1	54.00	19.39
1593.300000	41.98	---	150.0	V	287.0	-9.1	74.00	32.02
4924.000000	56.00	---	150.0	V	172.0	1.1	74.00	18.00
4924.000000	---	51.79	150.0	V	172.0	1.1	54.00	2.21
7563.700000	---	42.00	150.0	H	226.0	9.4	54.00	12.00
7563.700000	53.47	---	150.0	H	226.0	9.4	74.00	20.53
9807.700000	---	47.66	150.0	V	274.0	11.9	54.00	6.34
9807.700000	55.05	---	150.0	V	274.0	11.9	74.00	18.95
14843.100000	55.97	---	150.0	H	73.0	12.0	74.00	18.03
14843.100000	---	45.34	150.0	H	73.0	12.0	54.00	8.66

802.11g Mode:

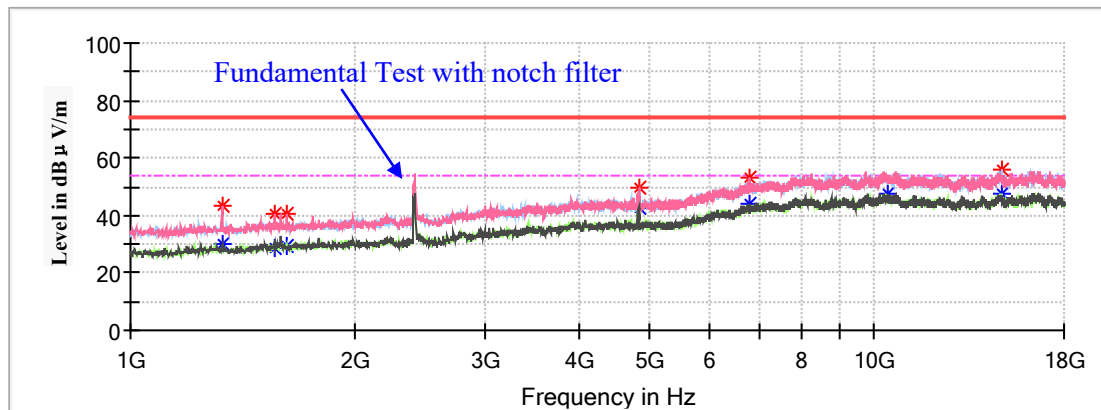
(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dB μ V/m) = Corrected Factor (dB/m) + Reading (dB μ V)
 Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V/m)

Low Channel: 2412MHz

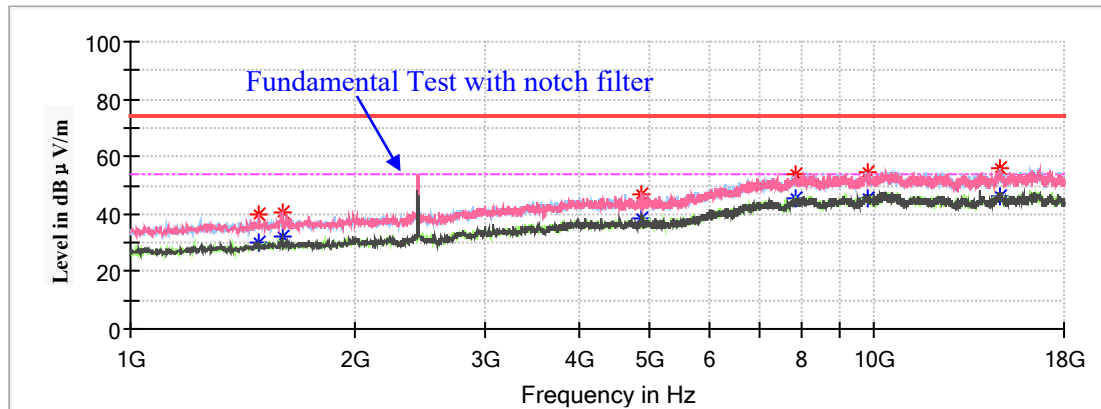
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Height (cm)	Polar (H/V)				
1326.400000	43.02	---	150.0	V	278.0	-10.5	74.00	30.98
1326.400000	---	29.75	150.0	V	278.0	-10.5	54.00	24.25
1561.000000	---	28.98	150.0	V	10.0	-9.2	54.00	25.02
1561.000000	40.75	---	150.0	V	10.0	-9.2	74.00	33.25
1620.500000	---	29.53	150.0	V	20.0	-9.0	54.00	24.47
1620.500000	40.73	---	150.0	V	20.0	-9.0	74.00	33.27
4824.000000	49.94	---	150.0	V	45.0	1.0	74.00	24.06
4824.000000	---	42.52	150.0	V	45.0	1.0	54.00	11.48
6786.800000	---	43.82	200.0	V	327.0	8.0	54.00	10.18
6786.800000	52.92	---	200.0	V	327.0	8.0	74.00	21.08
14812.500000	---	47.43	200.0	H	5.0	11.9	54.00	6.57
14812.500000	55.61	---	150.0	H	110.0	11.9	74.00	18.39

Middle Channel: 2437MHz

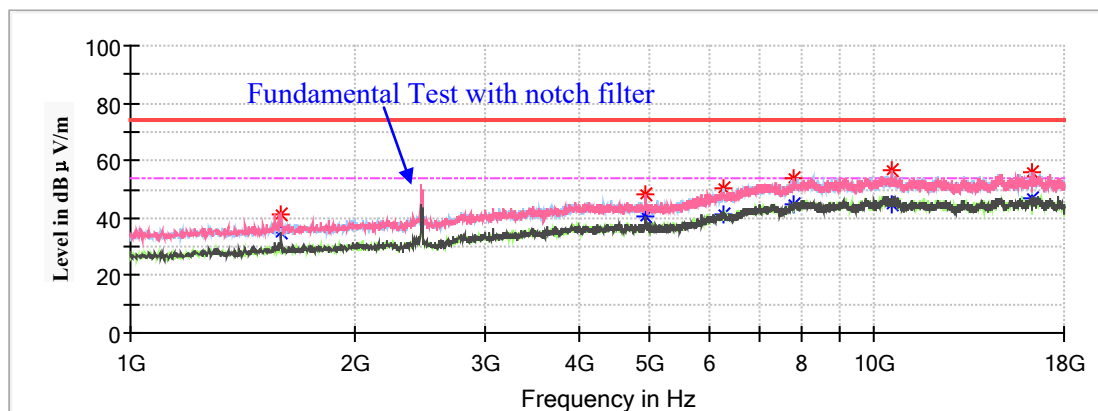
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1491.300000	40.02	---	150.0	V	0.0	-9.5	74.00	33.98
1491.300000	---	30.18	150.0	V	0.0	-9.5	54.00	23.82
1598.400000	---	32.14	150.0	V	310.0	-9.1	54.00	21.86
1598.400000	40.69	---	150.0	V	310.0	-9.1	74.00	33.31
4874.000000	---	38.78	150.0	V	85.0	1.1	54.00	15.22
4874.000000	46.58	---	150.0	V	85.0	1.1	74.00	27.42
7827.200000	---	45.48	200.0	V	102.0	10.3	54.00	8.52
7827.200000	53.83	---	200.0	V	102.0	10.3	74.00	20.17
9777.100000	54.59	---	150.0	V	21.0	11.9	74.00	19.41
9777.100000	---	45.15	150.0	V	21.0	11.9	54.00	8.85
14715.600000	---	46.45	200.0	H	0.0	11.8	54.00	7.55
14715.600000	55.80	---	200.0	H	0.0	11.8	74.00	18.20

High Channel: 2462MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1595.000000	41.60	---	150.0	V	285.0	-9.1	74.00	32.40
1595.000000	---	35.15	150.0	V	285.0	-9.1	54.00	18.85
4924.000000	---	40.63	150.0	V	77.0	1.1	54.00	13.37
4924.000000	47.95	---	150.0	V	77.0	1.1	74.00	26.05
6270.000000	---	40.93	150.0	V	245.0	6.0	54.00	13.07
6270.000000	50.35	---	150.0	V	245.0	6.0	74.00	23.65
7789.800000	---	44.53	150.0	V	336.0	10.1	54.00	9.47
7789.800000	53.84	---	150.0	V	336.0	10.1	74.00	20.16
10531.900000	---	44.92	200.0	H	296.0	12.9	54.00	9.08
10531.900000	56.52	---	200.0	H	296.0	12.9	74.00	17.48
16332.300000	---	47.18	150.0	V	49.0	12.1	54.00	6.82
16332.300000	56.21	---	150.0	V	49.0	12.1	74.00	17.79

802.11n-HT20 Mode:

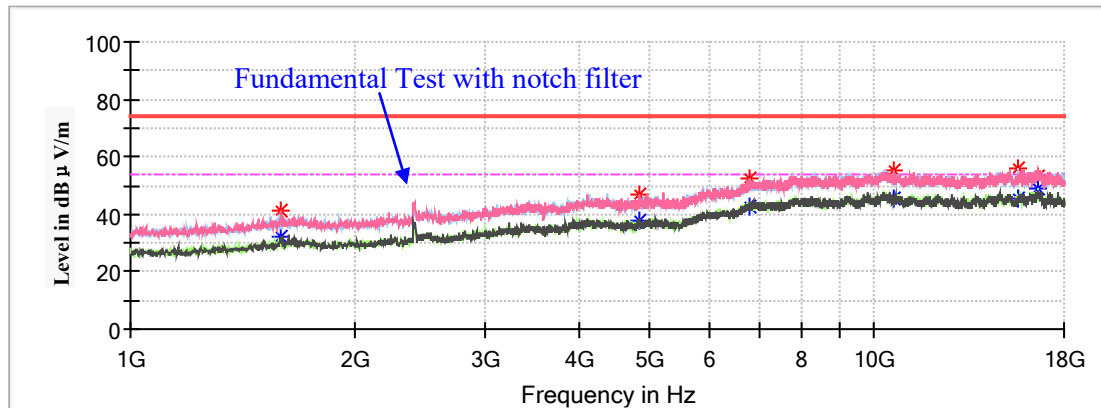
(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dB μ V/m) = Corrected Factor (dB/m) + Reading (dB μ V)
 Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V/m)

Low Channel: 2412MHz

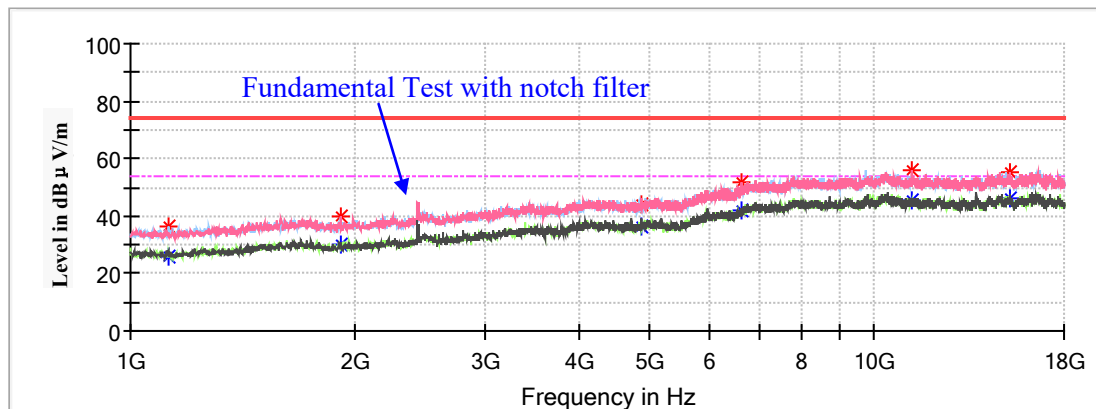
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Height (cm)	Polar (H/V)				
1595.000000	41.57	---	150.0	V	283.0	-9.1	74.00	32.43
1595.000000	---	31.92	150.0	V	283.0	-9.1	54.00	22.08
4824.000000	46.78	---	150.0	V	76.0	1.0	74.00	27.22
4824.000000	---	37.57	150.0	V	76.0	1.0	54.00	16.43
6795.300000	---	42.59	150.0	H	39.0	8.0	54.00	11.41
6795.300000	52.28	---	150.0	H	39.0	8.0	74.00	21.72
10637.300000	---	45.51	150.0	V	14.0	12.6	54.00	8.49
10637.300000	55.22	---	150.0	V	14.0	12.6	74.00	18.78
15625.100000	55.62	---	150.0	H	210.0	11.3	74.00	18.38
15625.100000	---	45.11	150.0	H	210.0	11.3	54.00	8.89
16582.200000	53.24	---	150.0	H	274.0	11.9	74.00	20.76
16582.200000	---	48.68	150.0	H	274.0	11.9	54.00	5.32

Middle Channel: 2437MHz

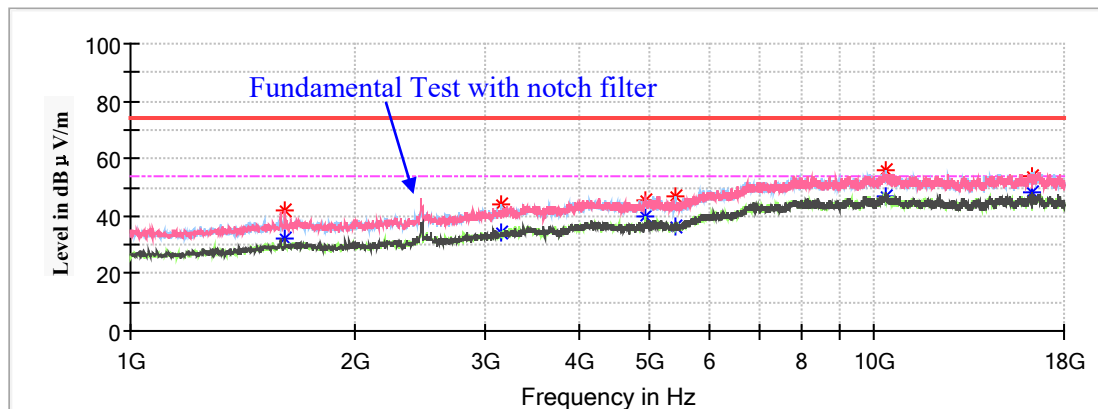
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Height (cm)	Polar (H/V)				
1125.800000	---	26.01	200.0	H	16.0	-11.7	54.00	27.99
1125.800000	36.38	---	200.0	H	16.0	-11.7	74.00	37.62
1914.600000	---	30.20	150.0	H	0.0	-8.0	54.00	23.80
1914.600000	39.58	---	150.0	H	0.0	-8.0	74.00	34.42
4874.000000	---	36.52	150.0	H	288.0	1.1	54.00	17.48
4874.000000	44.29	---	150.0	H	288.0	1.1	74.00	29.71
6642.300000	---	41.94	200.0	V	284.0	7.3	54.00	12.06
6642.300000	51.76	---	200.0	V	284.0	7.3	74.00	22.24
11234.000000	55.63	---	200.0	V	36.0	11.6	74.00	18.37
11234.000000	---	45.26	200.0	V	36.0	11.6	54.00	8.74
15206.900000	---	46.27	150.0	V	109.0	11.7	54.00	7.73
15206.900000	55.50	---	150.0	V	109.0	11.7	74.00	18.50

High Channel: 2462MHz

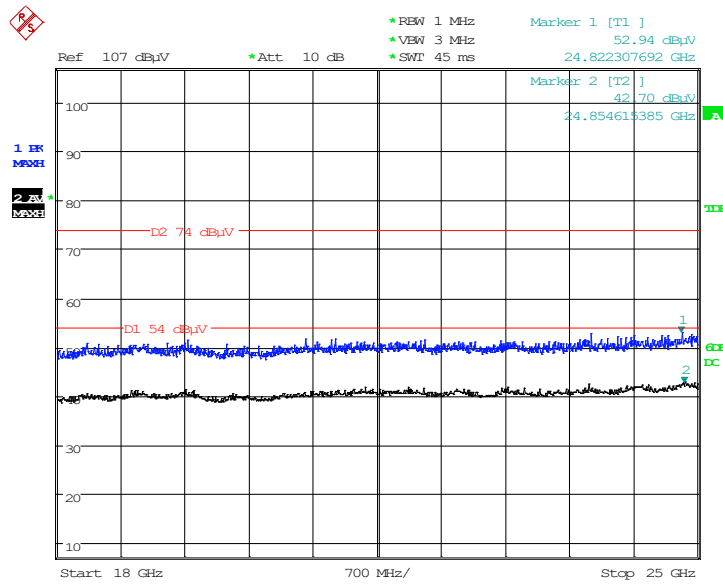
Full Spectrum



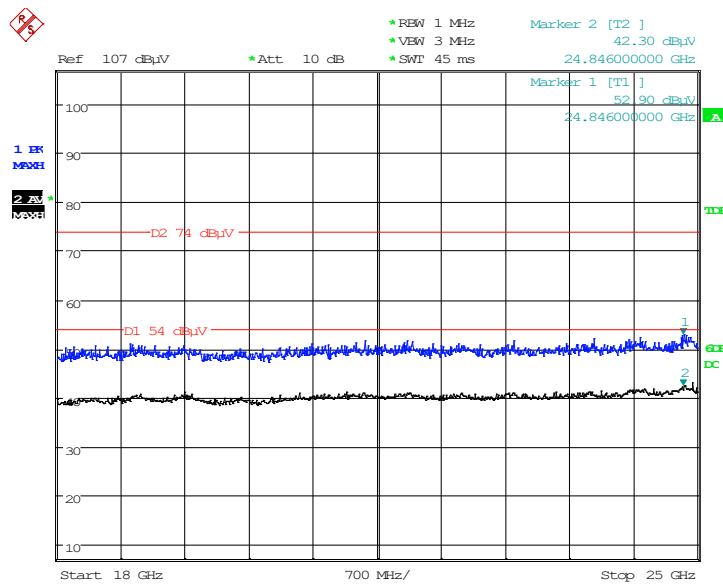
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Height (cm)	Polar (H/V)				
1612.000000	---	32.46	150.0	V	284.0	-9.0	54.00	21.54
1612.000000	41.98	---	150.0	V	284.0	-9.0	74.00	32.02
3157.300000	---	33.99	200.0	V	334.0	-2.7	54.00	20.01
3157.300000	44.10	---	200.0	V	334.0	-2.7	74.00	29.90
4924.000000	45.27	---	200.0	V	7.0	1.1	74.00	28.73
4924.000000	---	40.01	200.0	V	7.0	1.1	54.00	13.99
5411.500000	---	36.46	200.0	V	220.0	1.9	54.00	17.54
5411.500000	46.55	---	200.0	V	220.0	1.9	74.00	27.45
10336.400000	---	47.02	200.0	H	34.0	12.6	54.00	6.98
10336.400000	55.94	---	200.0	H	34.0	12.6	74.00	18.06
16347.600000	---	48.04	200.0	V	346.0	12.1	54.00	5.96
16347.600000	54.09	---	200.0	V	346.0	12.1	74.00	19.91

18GHz-25GHz:

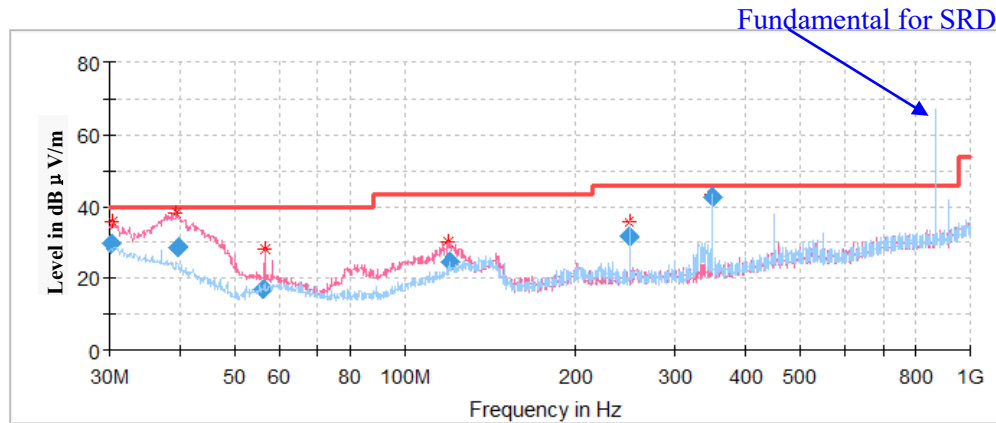
Pre-scan with 802.11b, 802.11g and 802.11n-HT20 modes of operation in the X,Y and Z axes of orientation, the worst case **middle channel of 802.11n-HT20 mode in Z-axis of orientation** was recorded

Vertical

Date: 22.FEB.2021 16:45:05

Horizontal

Date: 22.FEB.2021 15:12:15

Transmitting simultaneously test:***For adapter2 (worst case):*****30MHz-1GHz*****(The worst case 802.11n-HT20 Mode Middle channel and SRD mode transmitting simultaneously was recorded)***

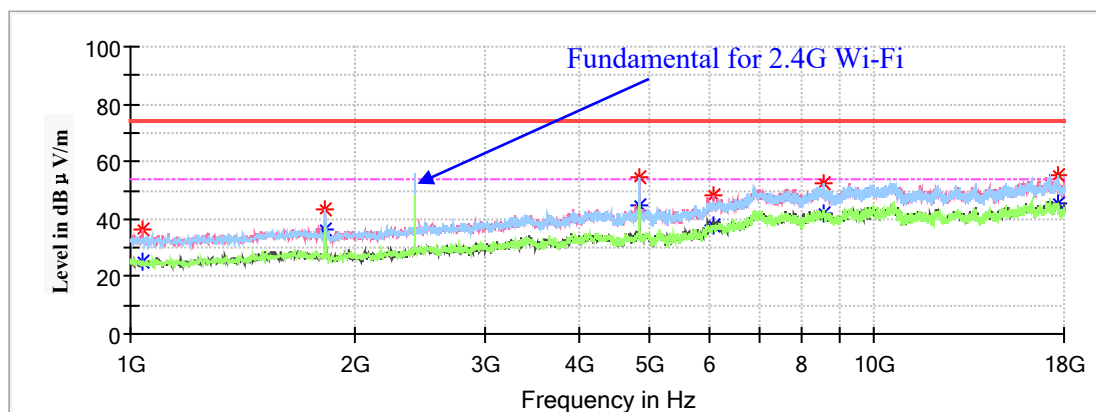
Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	QuasiPeak (dBμV/m)	Height (cm)	Polar (H/V)				
30.301022	29.90	100.0	V	16.0	-3.9	40.00	10.10
39.810300	28.74	100.0	V	118.0	-10.3	40.00	11.26
56.292300	16.89	100.0	V	202.0	-15.2	40.00	23.11
119.856650	24.49	100.0	V	313.0	-10.9	43.50	19.01
249.999450	31.65	100.0	H	105.0	-11.9	46.00	14.35
350.014150	42.55	100.0	H	302.0	-9.4	46.00	3.45

Note: Pre-scan adapter1 and adapter2, and adapter2 was the worst case.

1GHz-18GHz:

(The worst case 802.11n-HT20 Mode Middle channel and SRD mode transmitting simultaneously was recorded)

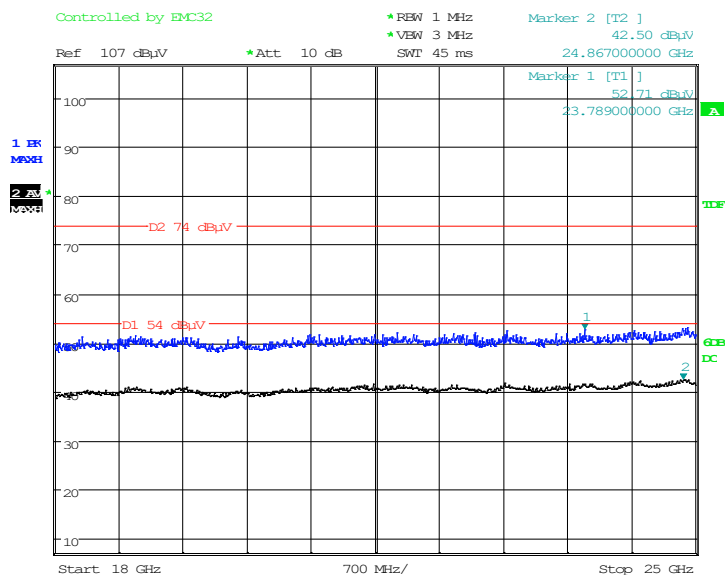
Full Spectrum



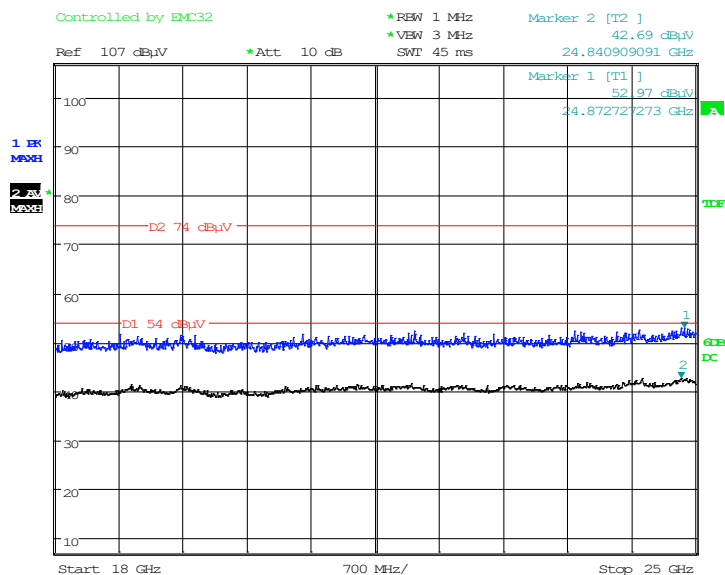
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1037.400000	---	25.10	200.0	V	2.0	-12.3	54.00	28.90
1037.400000	36.60	---	200.0	V	2.0	-12.3	74.00	37.40
1829.600000	---	36.63	150.0	V	101.0	-8.3	54.00	17.37
1829.600000	43.64	---	150.0	V	101.0	-8.3	74.00	30.36
4823.300000	---	45.00	200.0	H	127.0	1.0	54.00	9.00
4823.300000	54.89	---	200.0	H	127.0	1.0	74.00	19.11
6077.900000	---	37.55	200.0	V	294.0	5.4	54.00	16.45
6077.900000	48.16	---	200.0	V	294.0	5.4	74.00	25.84
8536.100000	---	42.13	200.0	H	267.0	10.7	54.00	11.87
8536.100000	52.45	---	200.0	H	267.0	10.7	74.00	21.55
17634.500000	55.06	---	150.0	H	15.0	10.9	74.00	18.94
17634.500000	---	45.76	150.0	H	15.0	10.9	54.00	8.24

18GHz-25GHz:

(The worst case 802.11n-HT20 Mode Middle channel and SRD mode transmitting simultaneously was recorded)

Vertical

Date: 9.APR.2021 17:33:58

Horizontal

Date: 9.APR.2021 17:45:38

Restricted Bands Emissions Test:

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)
 Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

802.11b Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case Z-axis of orientation was recorded)

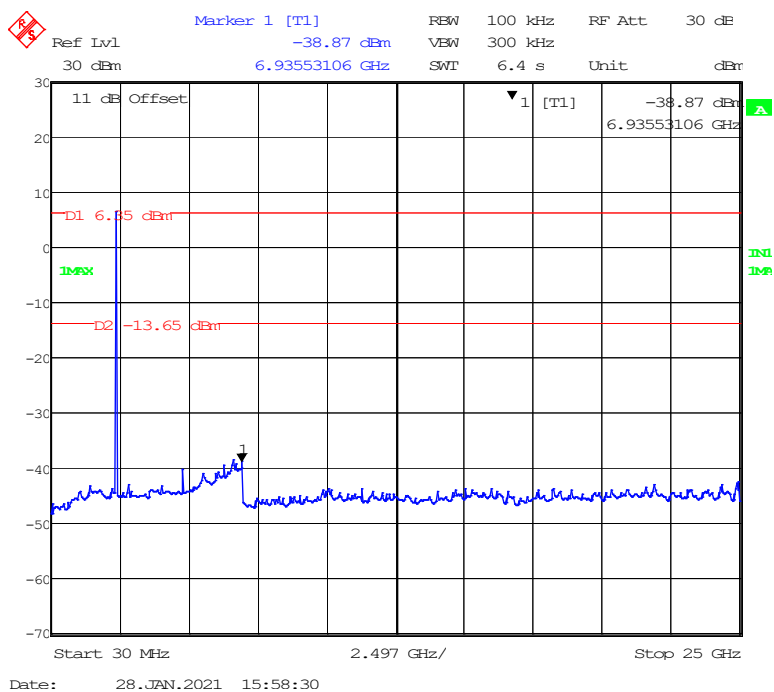
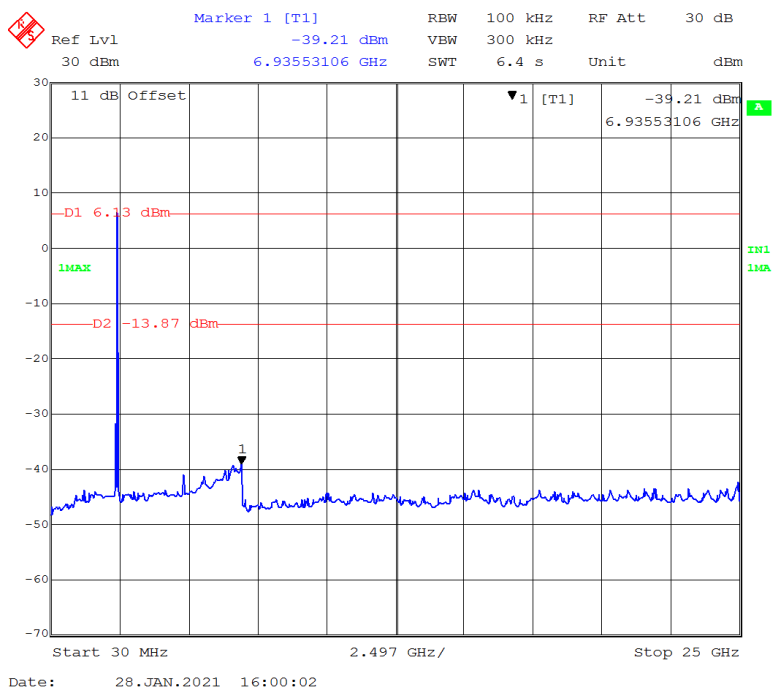
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 2412MHz								
2390.00	55.85	---	200.0	V	336.0	3.8	74.00	18.15
2390.00	---	50.93	200.0	V	336.0	3.8	54.00	3.07
High Channel: 2462MHz								
2483.50	52.16	---	200.0	V	183.0	4.1	74.00	21.84
2483.50	---	47.43	200.0	V	183.0	4.1	54.00	6.57

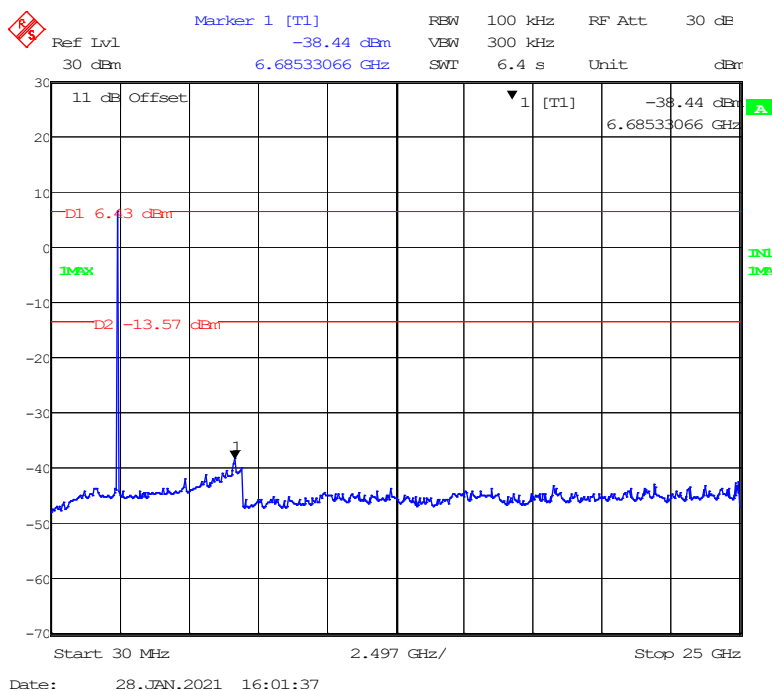
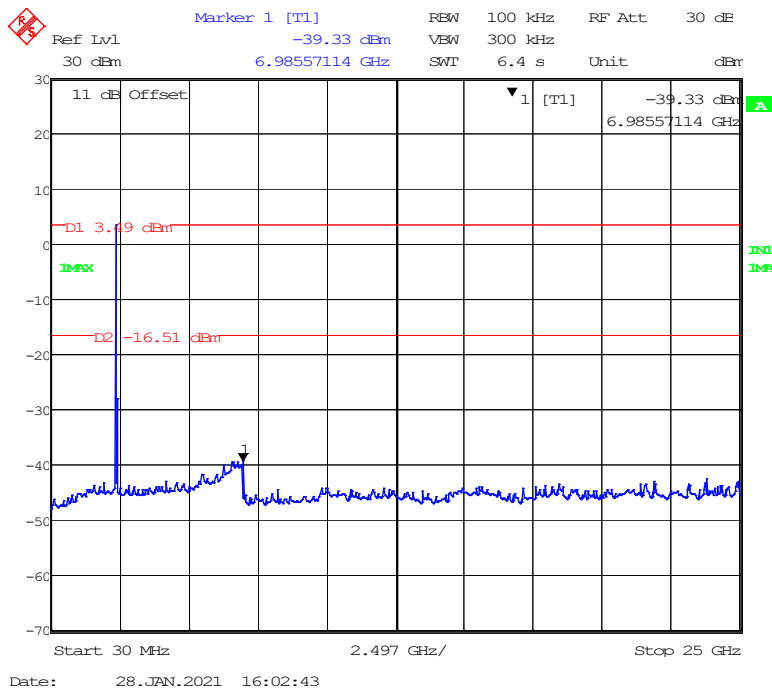
802.11g Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case Z-axis of orientation was recorded)

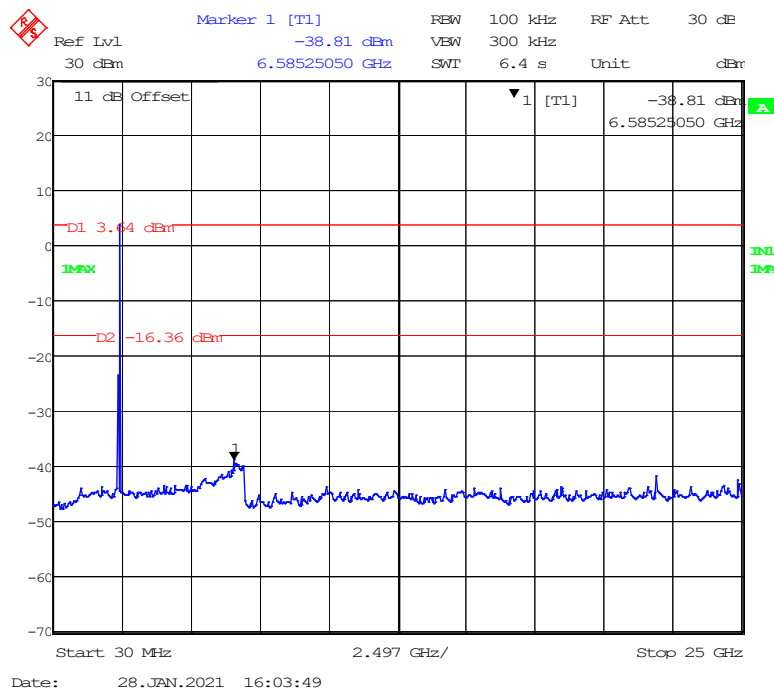
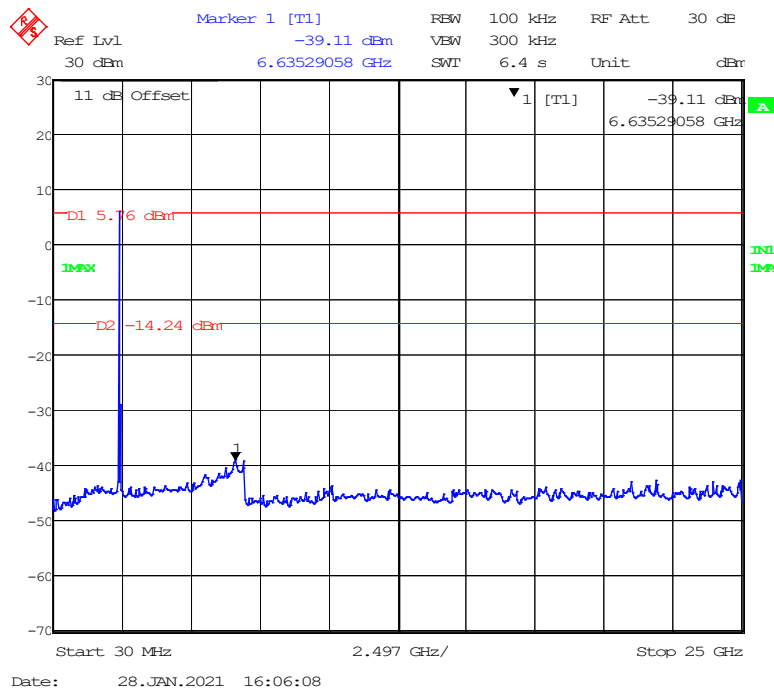
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 2412MHz								
2390.00	60.42	---	150.0	V	241.0	3.8	74.00	13.58
2390.00	---	50.46	150.0	V	241.0	3.8	54.00	3.54
High Channel: 2462MHz								
2483.50	62.39	---	150.0	V	243.0	4.1	74.00	11.61
2483.50	---	50.77	150.0	V	243.0	4.1	54.00	3.23

802.11n-HT20 Mode: (Pre-scan in the X,Y and Z axes of orientation, the worst case Z-axis of orientation was recorded)

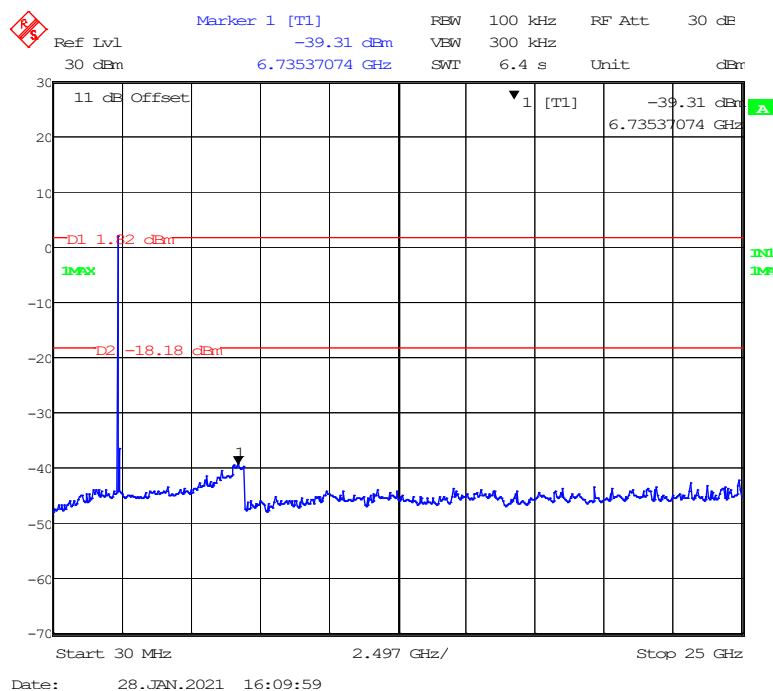
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 2412MHz								
2390.00	56.81	---	150.0	V	62.0	3.8	74.00	17.19
2390.00	---	48.67	150.0	V	62.0	3.8	54.00	5.33
High Channel: 2462MHz								
2483.50	53.59	---	150.0	V	241.0	4.1	74.00	20.41
2483.50	---	48.38	150.0	V	241.0	4.1	54.00	5.62

Conducted Spurious Emissions at Antenna Port**802.11b Mode Low Channel****802.11b Mode Middle Channel**

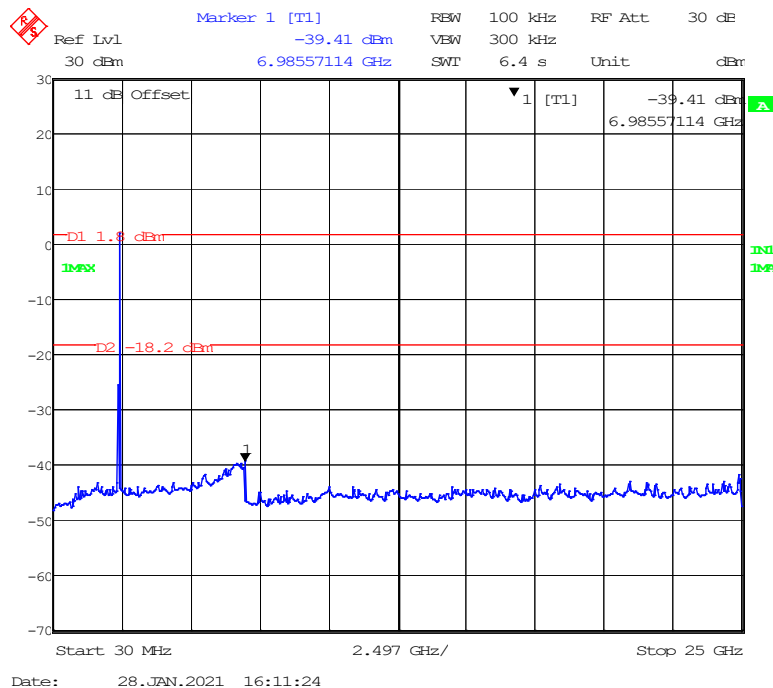
802.11b Mode High Channel**802.11g Mode Low Channel**

802.11g Mode Middle Channel**802.11g Mode High Channel**

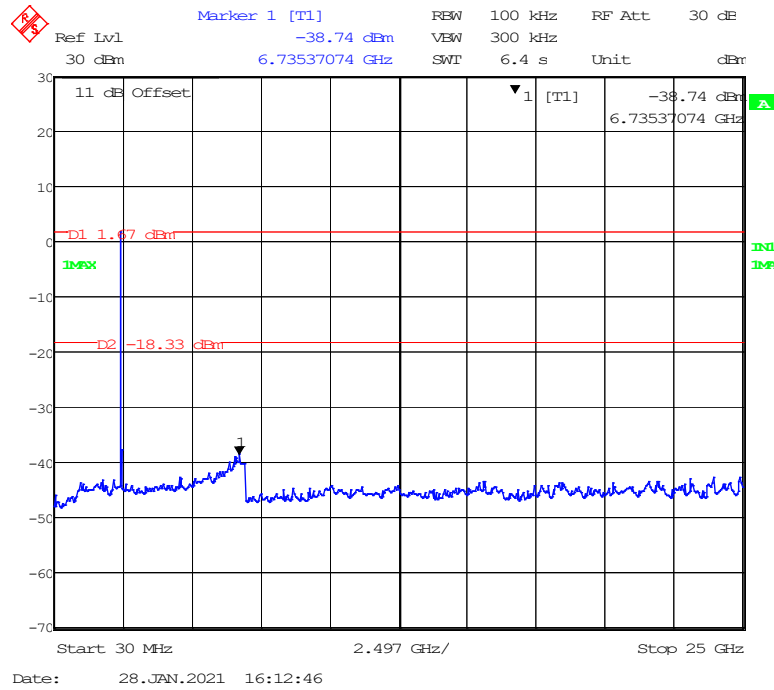
802.11n-HT20 Mode Low Channel



802.11n-HT20 Mode Middle Channel



802.11n-HT20 Mode High Channel



FCC §15.247(a) (2) - 6 dB EMISSION BANDWIDTH

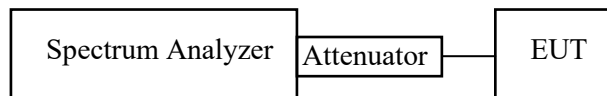
Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

According to ANSI C63.10-2013 sub-clause 11.8.1

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 * \text{RBW}$.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. 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.



Test Data

Environmental Conditions

Temperature:	25.7 °C
Relative Humidity:	49 %
ATM Pressure:	101.2 kPa

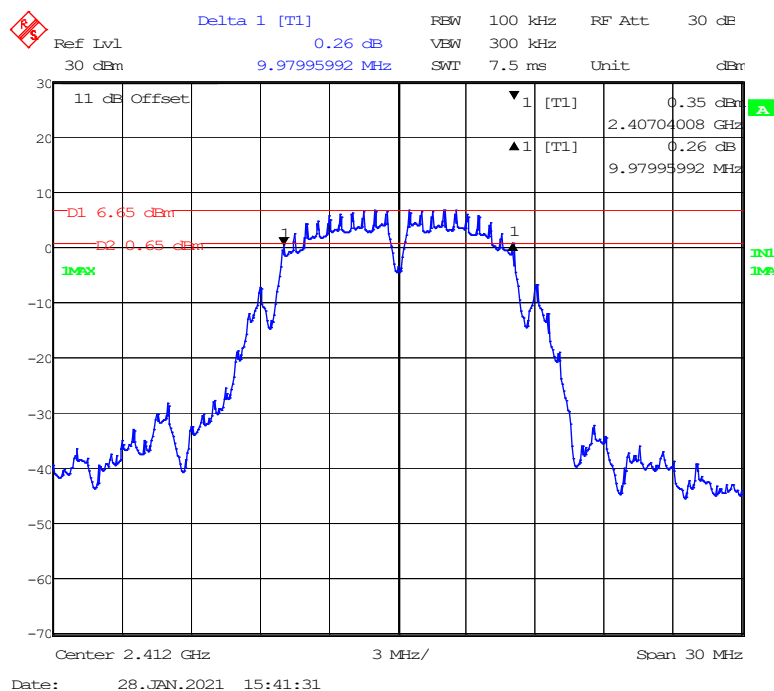
The testing was performed by Miller Xie on 2021-01-28.

EUT operation mode: Transmitting

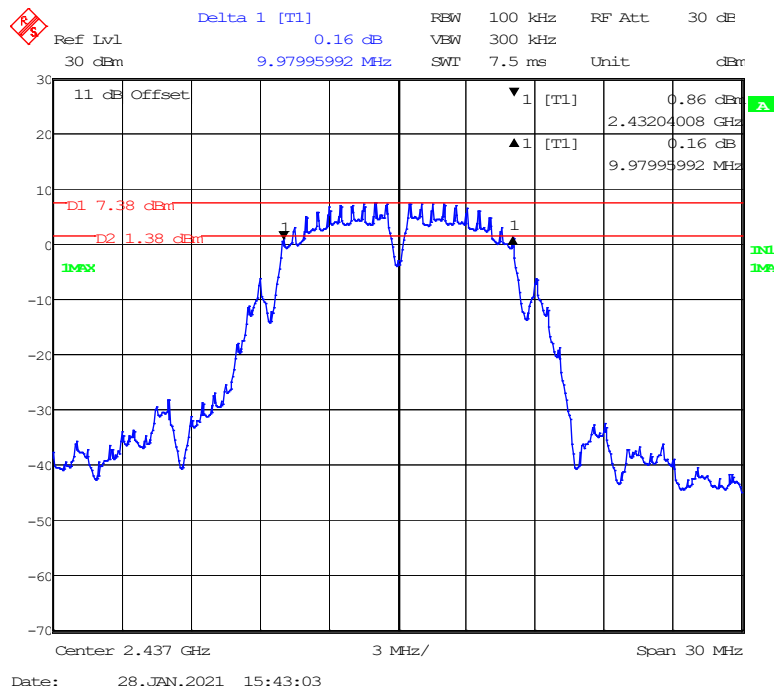
Test Result: Pass

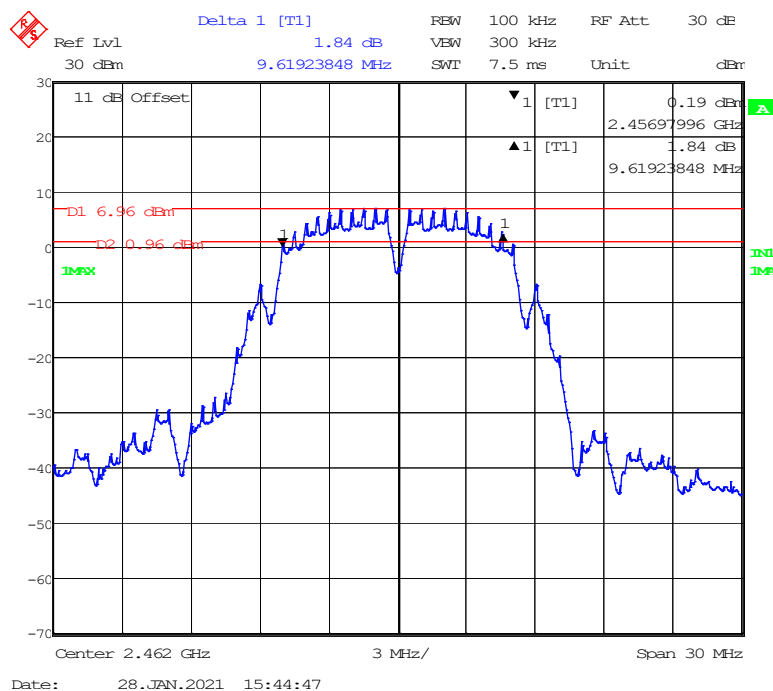
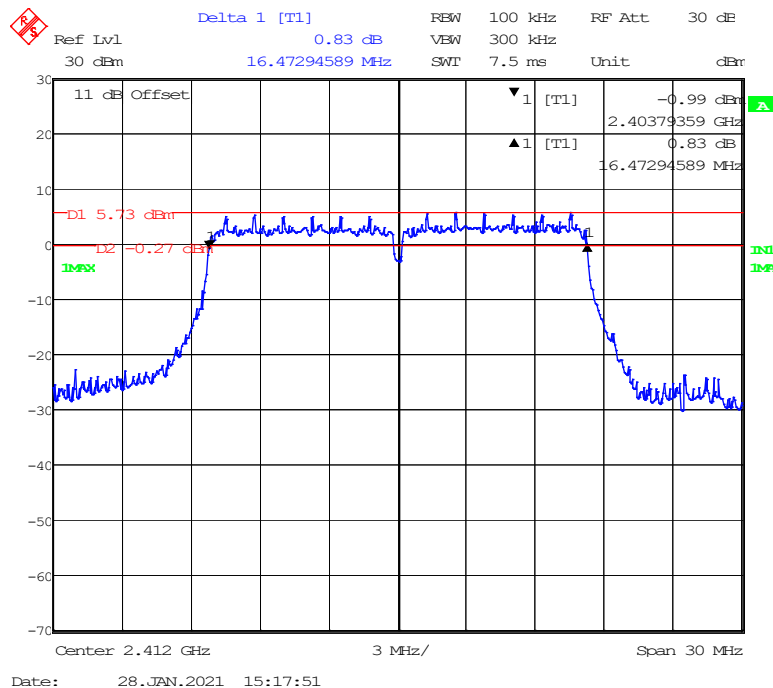
Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (MHz)
802.11b Mode			
Low	2412	9.980	≥ 0.5
Middle	2437	9.980	≥ 0.5
High	2462	9.619	≥ 0.5
802.11g Mode			
Low	2412	16.473	≥ 0.5
Middle	2437	16.473	≥ 0.5
High	2462	16.473	≥ 0.5
802.11n-HT20 Mode			
Low	2412	17.675	≥ 0.5
Middle	2437	17.675	≥ 0.5
High	2462	17.675	≥ 0.5

802.11b Mode Low Channel



802.11b Mode Middle Channel



802.11b Mode High Channel**802.11g Mode Low Channel**

Delta 1 [T1] 0.35 dB
 REW 100 kHz RF Att 30 dB
 Ref Lvl 30 dBm VSW 300 kHz Unit dBm
 16.47294589 MHz

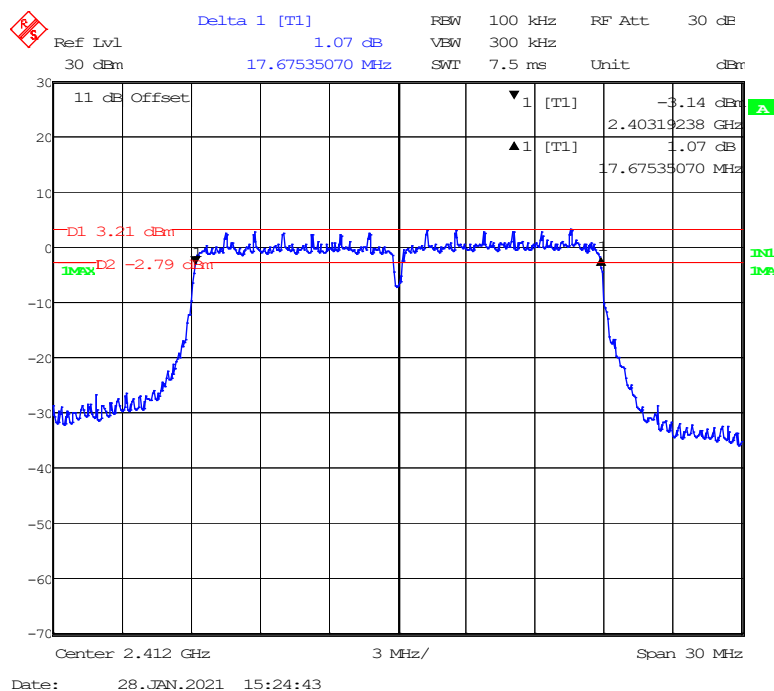
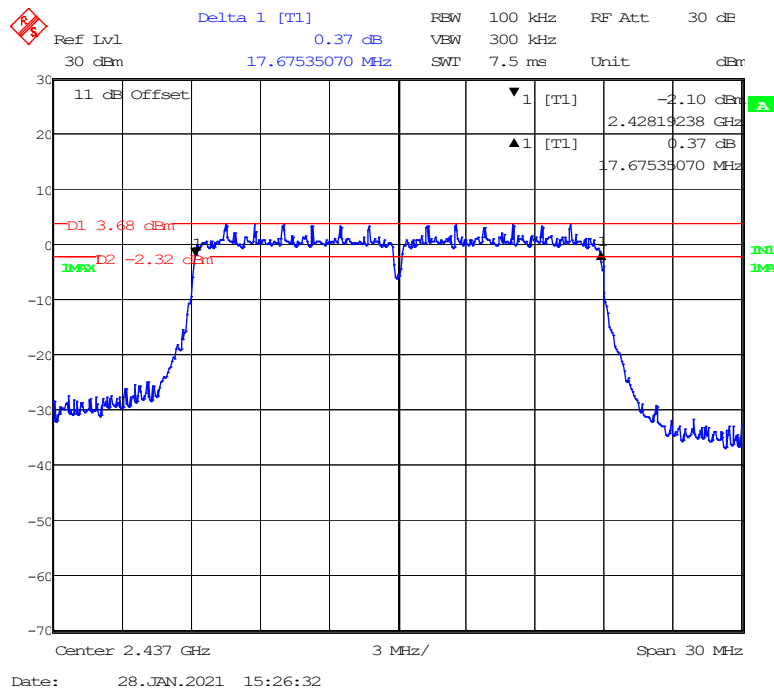
11 dB Offset
 1 [T1] -0.41 dBm
 2.42879359 GHz
 1 [T1] 0.35 dBm
 16.47294589 MHz

D1 5.68 dBm
 D2 -0.32 dBm
 IMAX

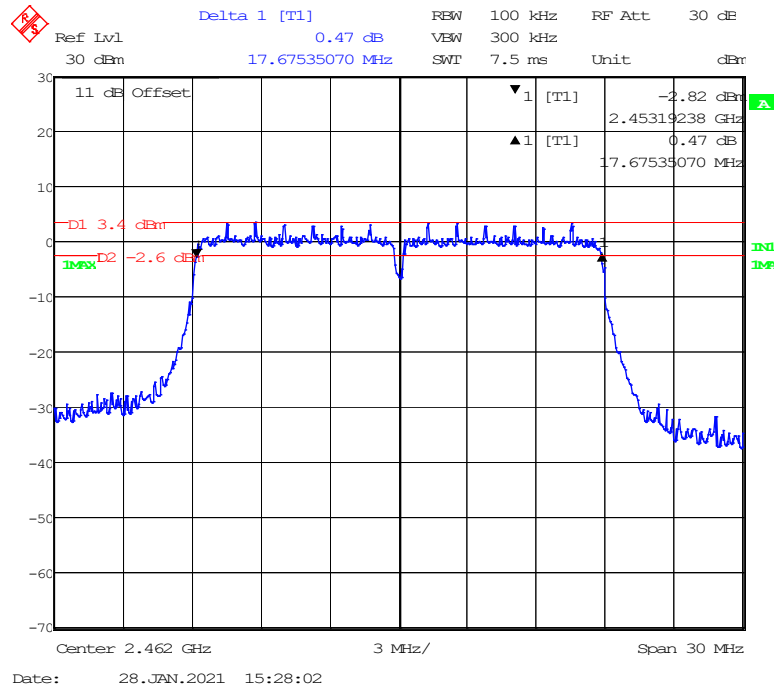
Center 2.437 GHz 3 MHz/ Span 30 MHz

Date: 28.JAN.2021 15:20:49

[illegible]

802.11n-HT20 Mode Low Channel**802.11n-HT20 Mode Middle Channel**

802.11n-HT20 Mode High Channel



FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

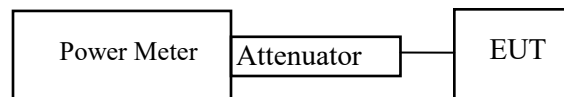
According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, Compliant with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

According to ANSI C63.10-2013 sub-clause 11.9.1.3

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.



Test Data

Environmental Conditions

Temperature:	26.7 °C
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa

The testing was performed by Miller Xie on 2021-01-28.

EUT operation mode: Transmitting

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Limit (dBm)	Result
802.11b Mode				
Low	2412	19.10	30	Pass
Middle	2437	19.76	30	Pass
High	2462	19.42	30	Pass
802.11g Mode				
Low	2412	22.13	30	Pass
Middle	2437	22.47	30	Pass
High	2462	22.17	30	Pass
802.11n-HT20 Mode				
Low	2412	23.59	30	Pass
Middle	2437	24.20	30	Pass
High	2462	23.86	30	Pass

FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

Applicable Standard

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 Compliant 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. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

According to ANSI C63.10-2013 sub-clause 6.10.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Data

Environmental Conditions

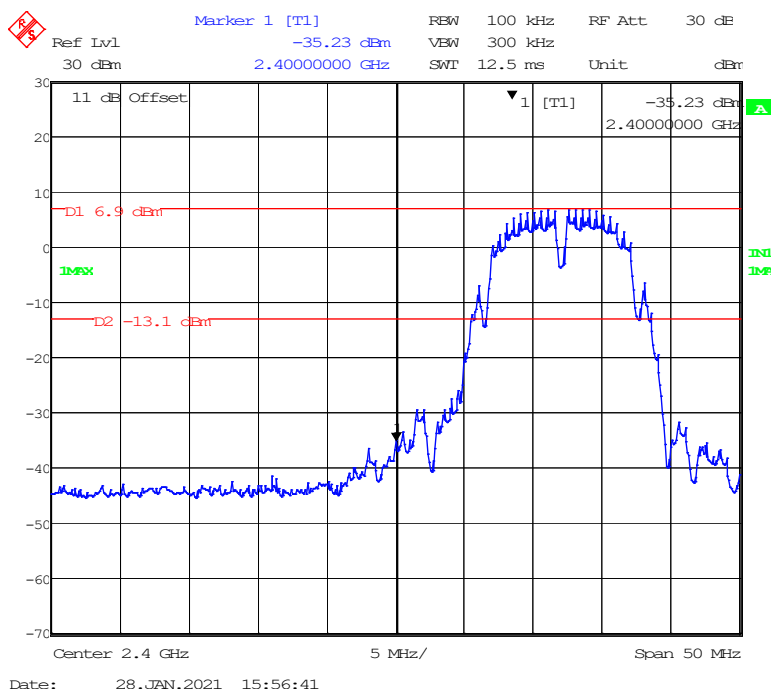
Temperature:	26.7 °C
Relative Humidity:	51 %
ATM Pressure:	101.3 kPa

The testing was performed by Miller Xie on 2021-01-28.

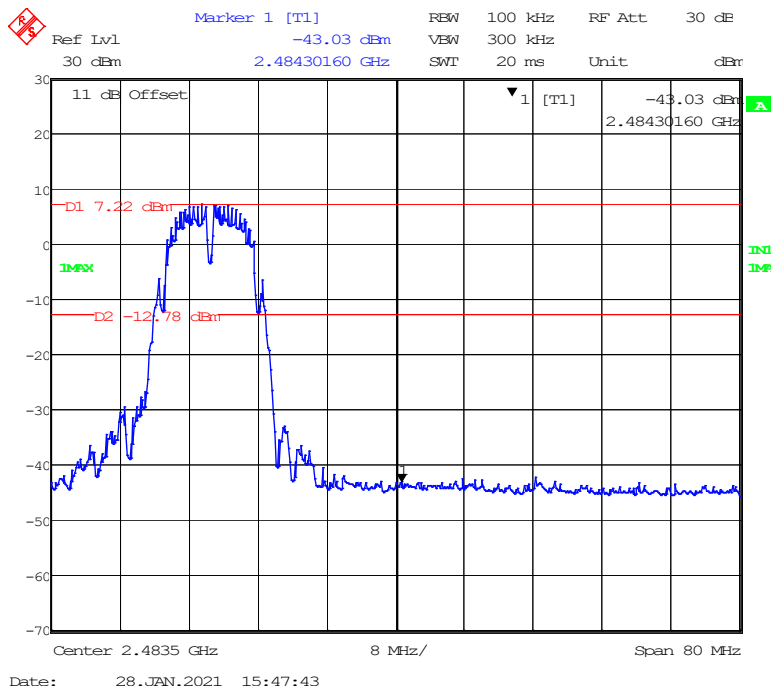
EUT operation mode: Transmitting

Test Result: Compliant

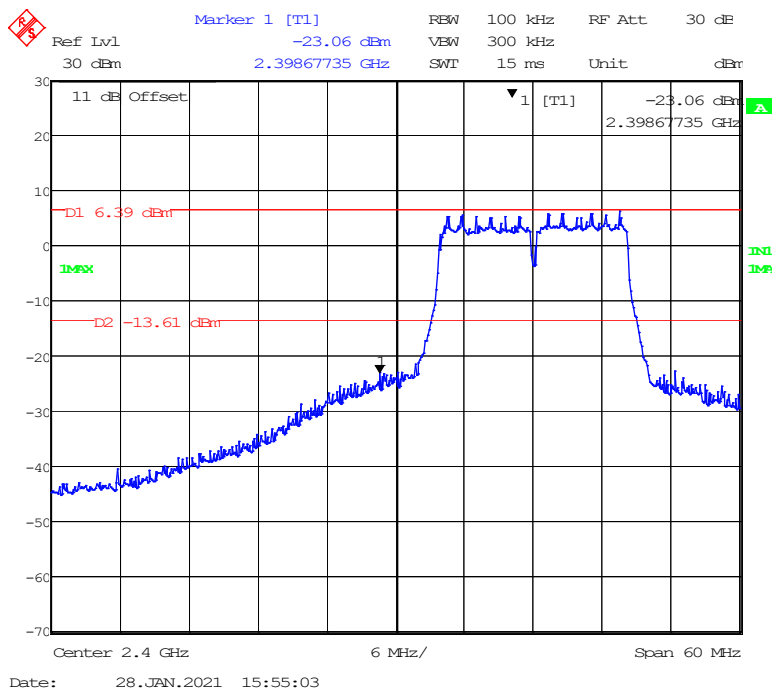
802.11b Mode Left Side



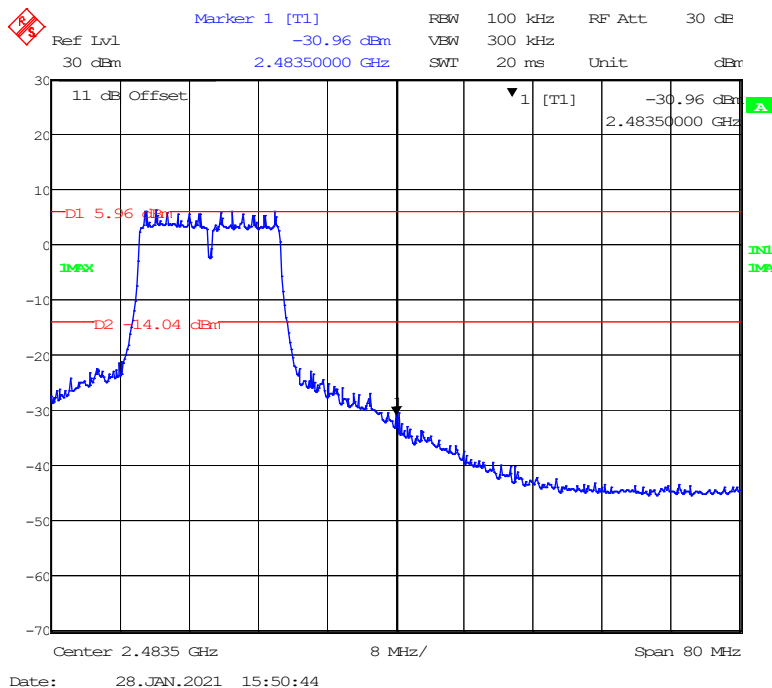
802.11b Mode Right Side



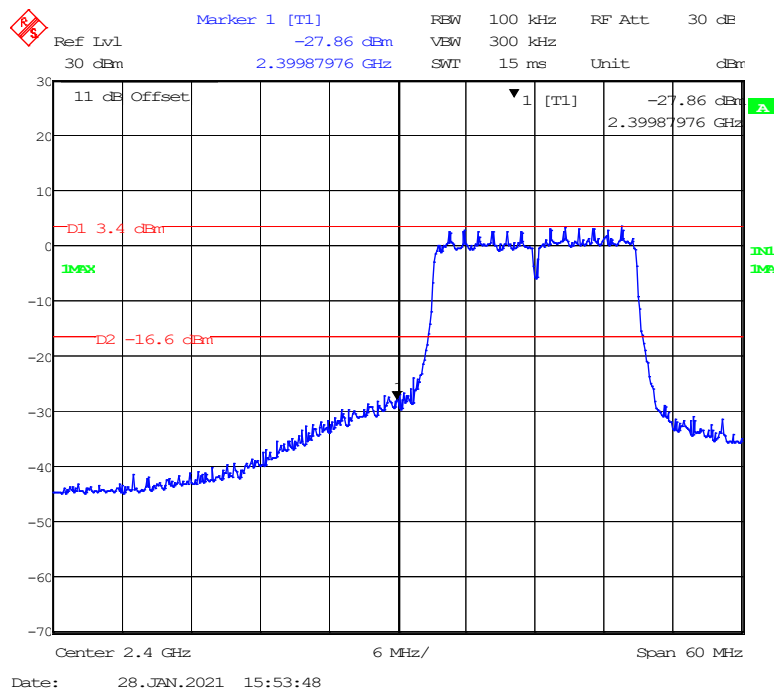
802.11g Mode Left Side



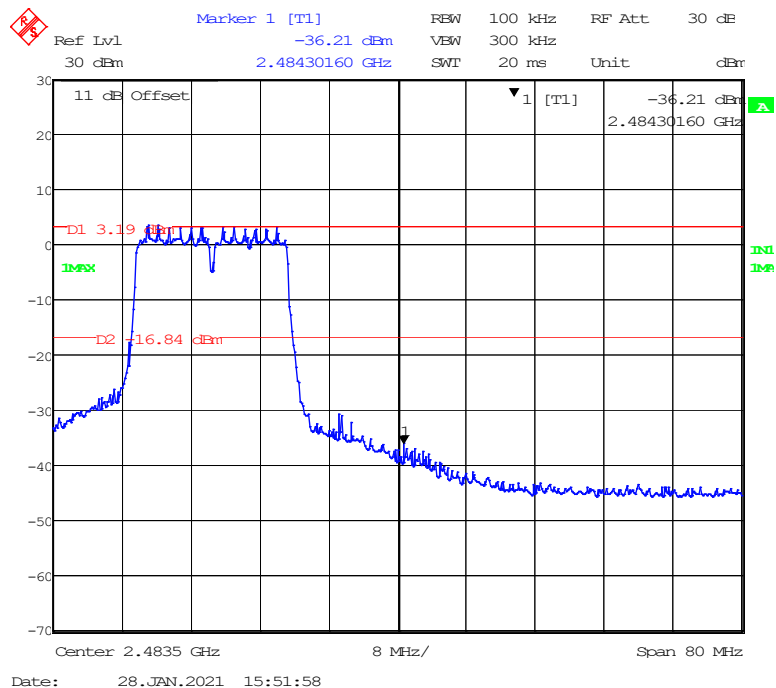
802.11g Mode Right Side



802.11n-HT20 Mode Left Side



802.11n-HT20 Mode Right Side



FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

According to ANSI C63.10-2013 sub-clause 11.10.2

The following procedure shall be used if maximum peak conducted output power was used to determine Compliant, and it is optional if the maximum conducted (average) output power was used to determine Compliant:

1. Set the RBW to: $3\text{kHz} \leq \text{RBW} \leq 100\text{ kHz}$.
2. Set the VBW $\geq 3 \times \text{RBW}$.
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 amplitude level within the RBW.
9. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Data

Environmental Conditions

Temperature:	26.7 °C
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa

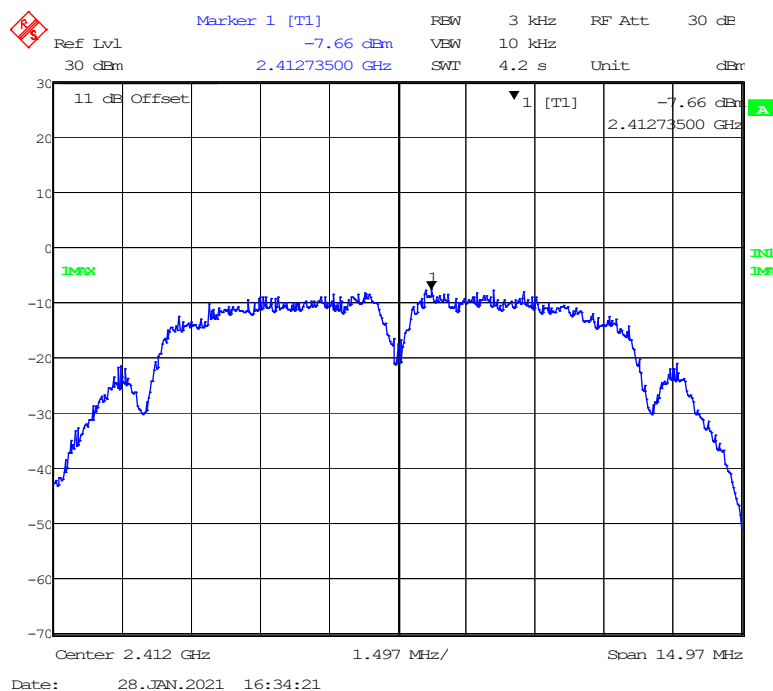
The testing was performed by Miller Xie on 2021-01-28.

EUT operation mode: Transmitting

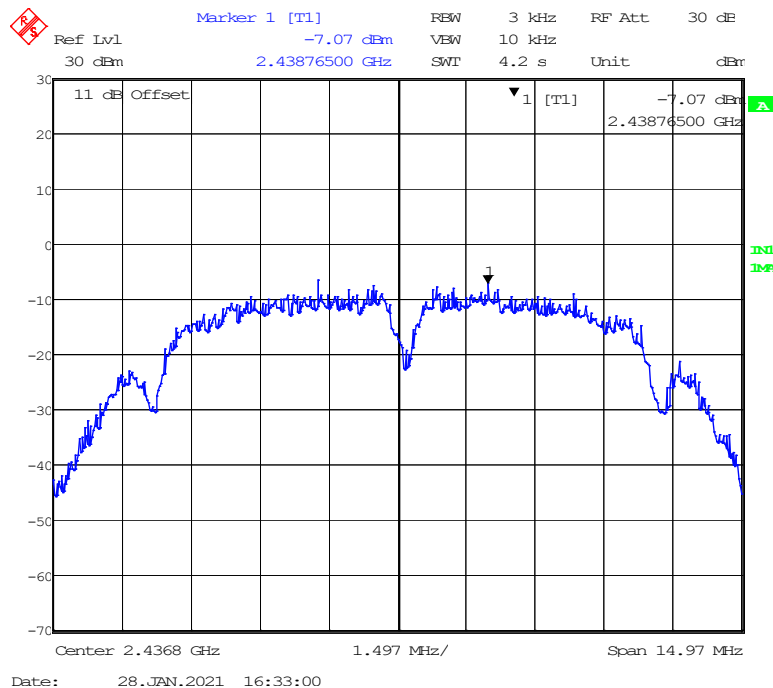
Test Result: Pass

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b Mode			
Low	2412	-7.66	≤ 8
Middle	2437	-7.07	≤ 8
High	2462	-7.32	≤ 8
802.11g Mode			
Low	2412	-11.30	≤ 8
Middle	2437	-10.84	≤ 8
High	2462	-10.71	≤ 8
802.11n-HT20 mode			
Low	2412	-11.04	≤ 8
Middle	2437	-9.07	≤ 8
High	2462	-10.23	≤ 8

802.11b Mode Low Channel



802.11b Mode Middle Channel



REF Lvl: 30 dBm
 Marker 1 [T1]: -7.32 dBm
 FREQ: 2.46126260 GHz
 RES: 3 kHz
 VBW: 10 kHz
 SWT: 4.1 s
 RF Att: 30 dB
 Unit: dBm

11 dB Offset
 1 [T1]
 -7.32 dBm
 2.46126260 GHz

IMAX
 IMIN

Center 2.462 GHz
 1.443 MHz/
 Span 14.43 MHz

Date: 28.JAN.2021 16:35:54

Ref Lvl 30 dBm

Marker 1 [T1] -11.30 dBm

RESW 3 kHz RF Att 30 dB

VEW 10 kHz

SWT 7 s Unit dBm

11 dB Offset

1 [T1] -11.30 dBm

2.41950213 GHz

IMAX

IMIN

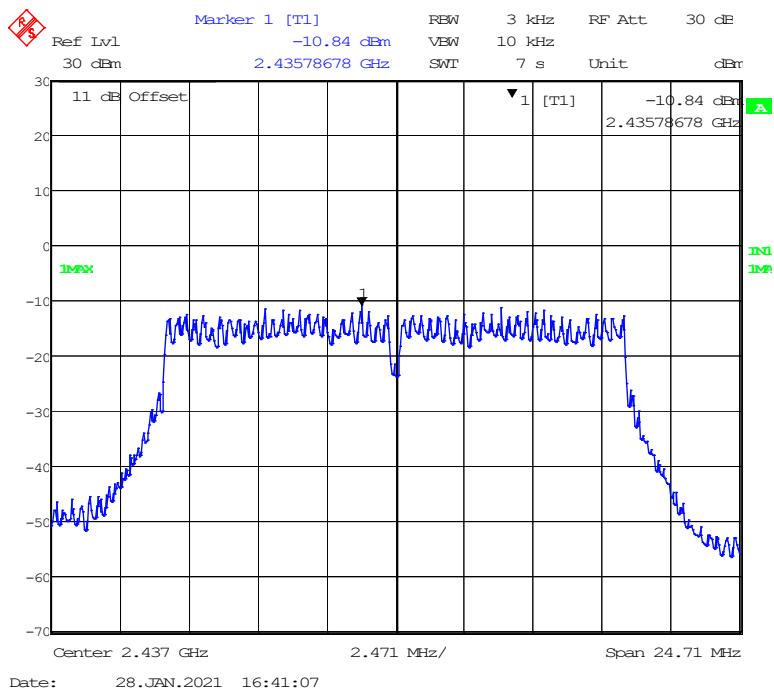
Center 2.412 GHz

2.471 MHz/

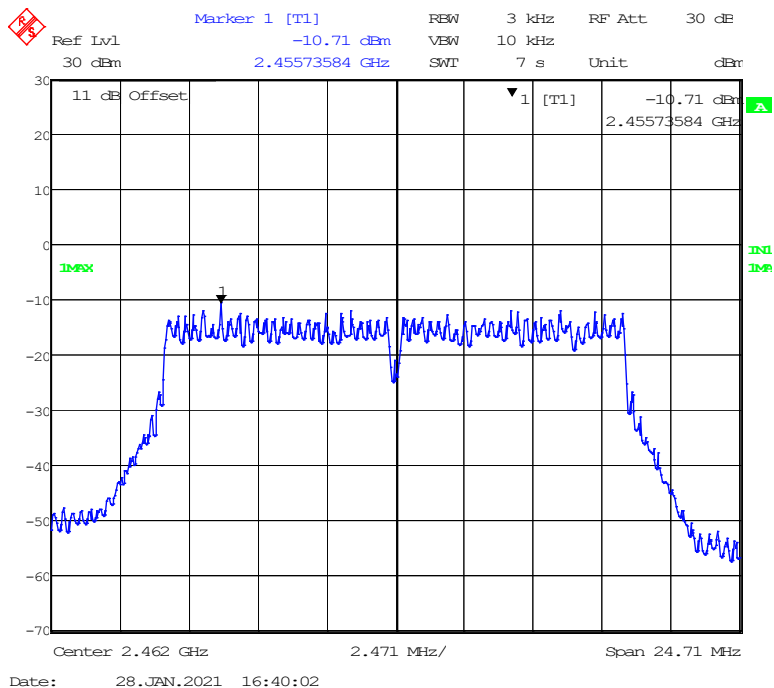
Span 24.71 MHz

Date: 28.JAN.2021 16:42:32

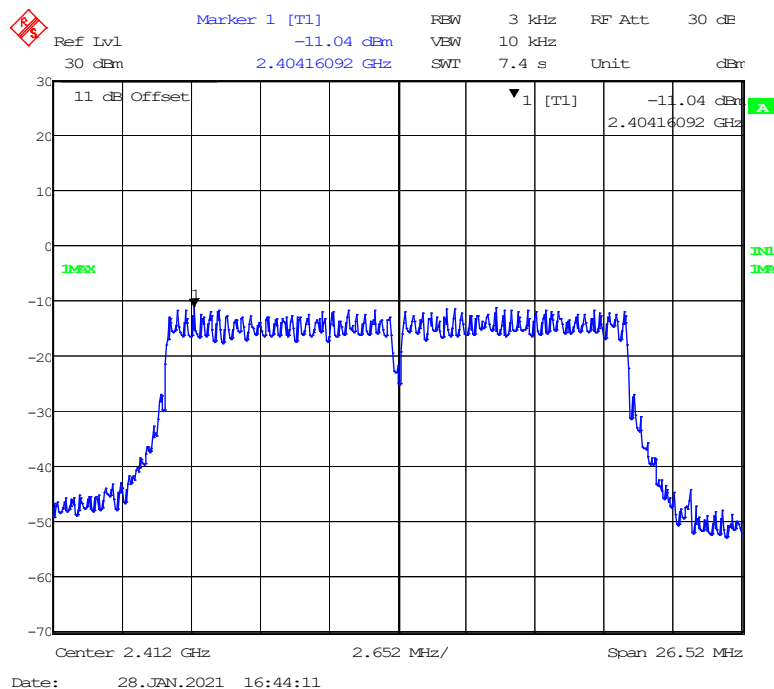
802.11g Mode Middle Channel



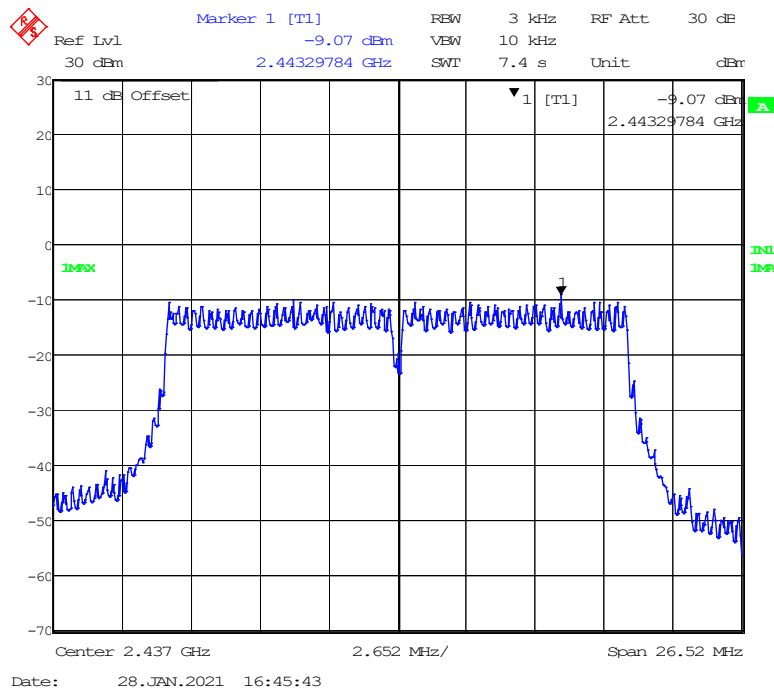
802.11g Mode High Channel



802.11n-HT20 Mode Low Channel



802.11n-HT20 Mode Middle Channel



Marker 1 [T1] REFW 3 kHz RF Att 30 dB

Ref Lvl -10.23 dBm VSW 10 kHz

30 dBm 2.45798745 GHz SWI 7.4 s Unit dBm

11 dB Offset 1 [T1] -10.23 dBm

2.45798745 GHz

IMX

INI

IMP

Center 2.462 GHz 2.652 MHz/ Span 26.52 MHz

Date: 28.JAN.2021 16:46:50

Declarations

- 1: BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.
- 2: Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
- 3: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
- 4: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.
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******* END OF REPORT *******