



TESTING LABORATORY
CERTIFICATE#4323.01



FCC PART 15.247

TEST REPORT

For

Signify (China) Investment Co., Ltd.

Building no.9, Lane 888, Tianlin Road, Minhang District Shanghai, 200233 China

FCC ID:2AGBW9290024472X

Report Type: Original Report	Product Type: LED lamp
Test Engineer:	CK Huang
Report Number:	RDG210114050-00A
Report Date:	2021-02-01
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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	7
SUPPORT EQUIPMENT LIST AND DETAILS	11
EXTERNAL I/O CABLE.....	11
BLOCK DIAGRAM OF TEST SETUP	12
SUMMARY OF TEST RESULTS	14
TEST EQUIPMENT LIST	15
FCC §15.247 (I) & §1.1310 & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)	16
APPLICABLE STANDARD	16
CALCULATED FORMULARY:.....	16
CALCULATED DATA:.....	17
FCC §15.203 - ANTENNA REQUIREMENT.....	18
APPLICABLE STANDARD	18
ANTENNA CONNECTOR CONSTRUCTION	18
FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS	19
APPLICABLE STANDARD	19
EUT SETUP.....	19
EMI TEST RECEIVER SETUP.....	19
TEST PROCEDURE	20
FACTOR & OVER LIMIT CALCULATION.....	20
TEST RESULTS SUMMARY	20
TEST DATA	20
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS.....	41
APPLICABLE STANDARD	41
EUT SETUP.....	41
EMI TEST RECEIVER SETUP.....	42
TEST PROCEDURE	42
CORRECTED AMPLITUDE & MARGIN CALCULATION	42
TEST RESULTS SUMMARY	42
TEST DATA	43
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH.....	81
APPLICABLE STANDARD	81
TEST PROCEDURE	81
TEST DATA	81
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER.....	91
APPLICABLE STANDARD	91
TEST PROCEDURE	91
TEST DATA	92
FCC §15.247(d) – BAND EDGE.....	93

APPLICABLE STANDARD	93
TEST PROCEDURE	93
TEST DATA	93
FCC §15.247(e) - POWER SPECTRAL DENSITY	99
APPLICABLE STANDARD	99
TEST PROCEDURE	99
TEST DATA	99
BLE MODE LOW CHANNEL	107
BLE MODE MIDDLE CHANNEL	107
BLE MODE HIGH CHANNEL	108

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Signify (China) Investment Co., Ltd.
Product Type:	LED lamp
Tested Model:	9290024472
Series Model:	9290024471, 9290030188, 9290030189, 9290030233
Model Difference:	See product similarity declaration letter
Power Supply:	AC 120V
RF Function:	2.4G Wi-Fi, BLE(1Mbps)
Operating Band/Frequency:	2.4G Wi-Fi: 2412-2462 MHz BLE(1Mbps): 2402-2480 MHz
Channel Number:	2.4G Wi-Fi: 11, BLE(1Mbps): 40
Channel Separation:	2.4G Wi-Fi: 5 MHz, BLE(1Mbps): 2 MHz
Modulation Type:	2.4G Wi-Fi: OFDM,DSSS; BLE(1Mbps): GFSK
Antenna Type:	Wi-Fi/ BLE(1Mbps): Ceramic Antenna
*Maximum Antenna Gain:	Wi-Fi/BLE(1Mbps): 3.7 dBi

Note: The antenna gain was provided by the applicant.

**All measurement and test data in this report was gathered from production sample serial number: RDG210114050-1.(Assigned by the BACL. The EUT supplied by the applicant was received on 2021-01-14)*

Objective

This report is prepared on behalf of *Signify (China) Investment Co., Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commission's rules.

The tests were performed in order to determine Compliance 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)

No Related Submittal(s)

Test Methodology

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

All emissions measurement was performed at Bay Area Compliance 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), 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;

For 802.11n-HT40 mode, EUT was tested with Channel 3, 6 and 9.

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	/	/

For BLE mode, EUT was tested with channel 0, 19 and 39.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	...	...
...	...	...	...
...	...	...	...
18	2438	38	2478
19	2440	39	2480

Equipment Modifications

No modification was made to the EUT tested.

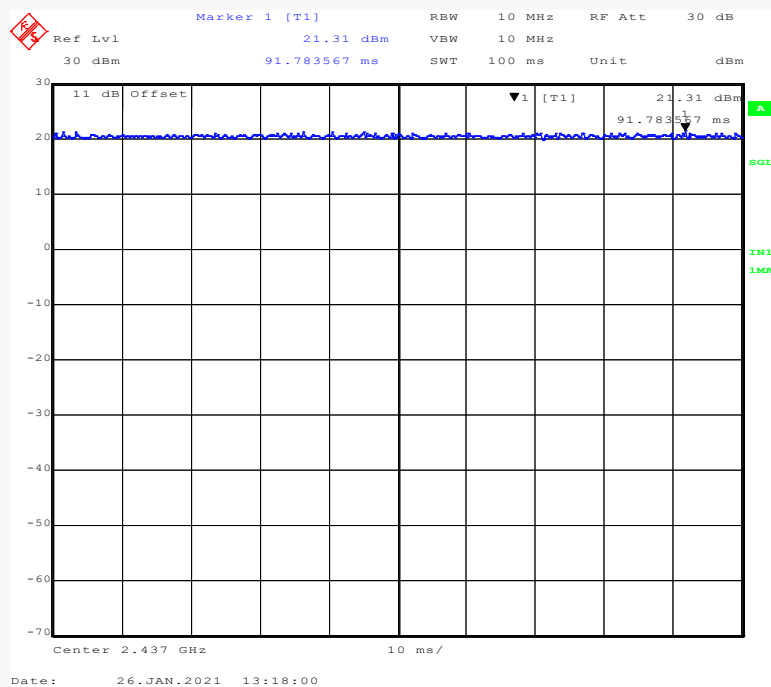
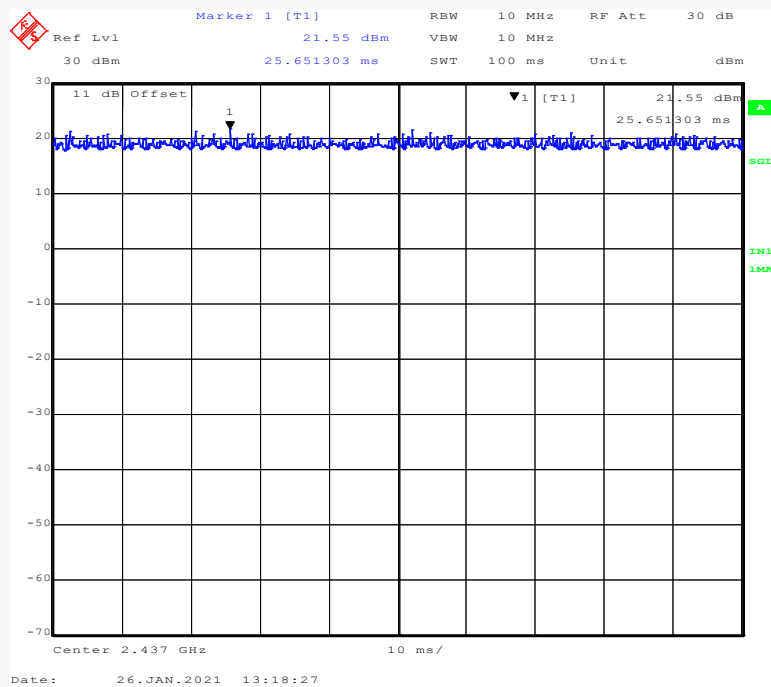
EUT Exercise Software

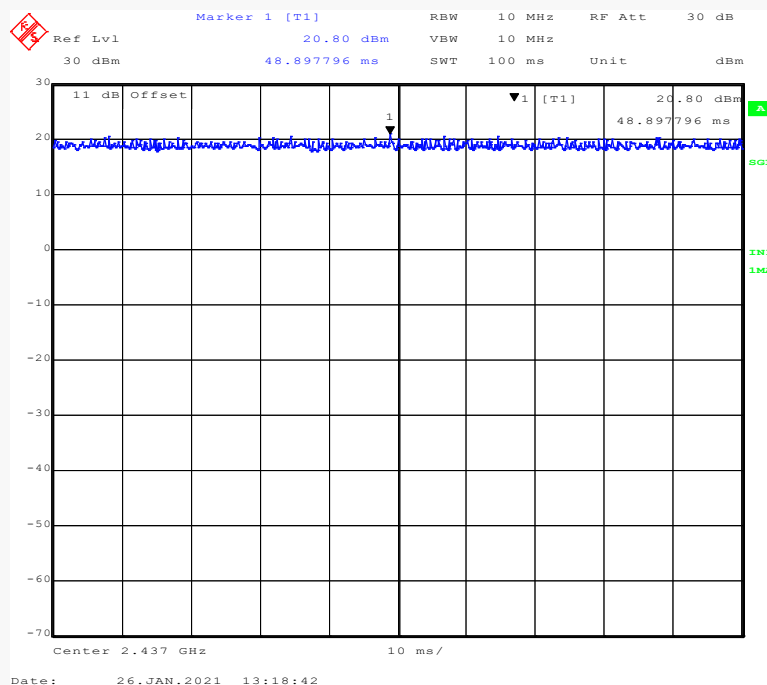
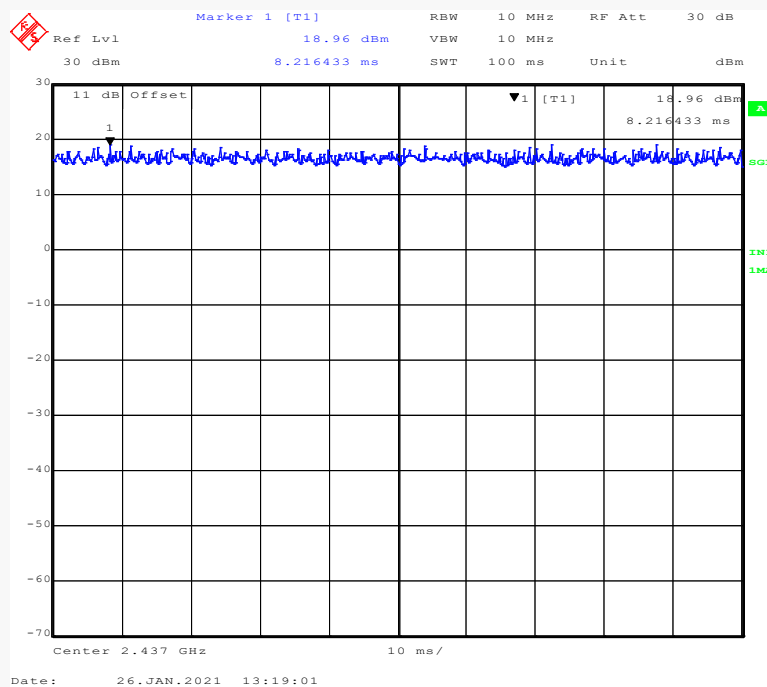
RF test software: ESP_RF_test_tool_v1.1.0

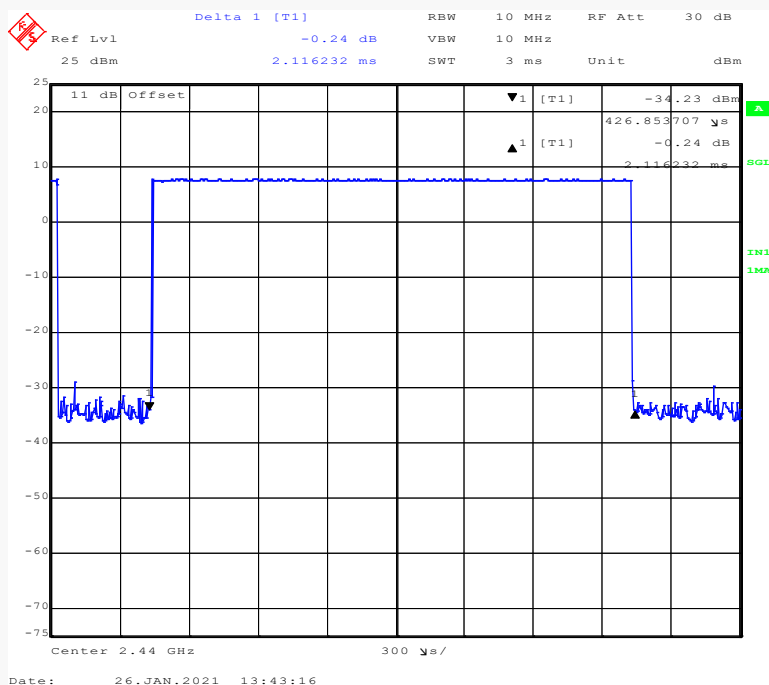
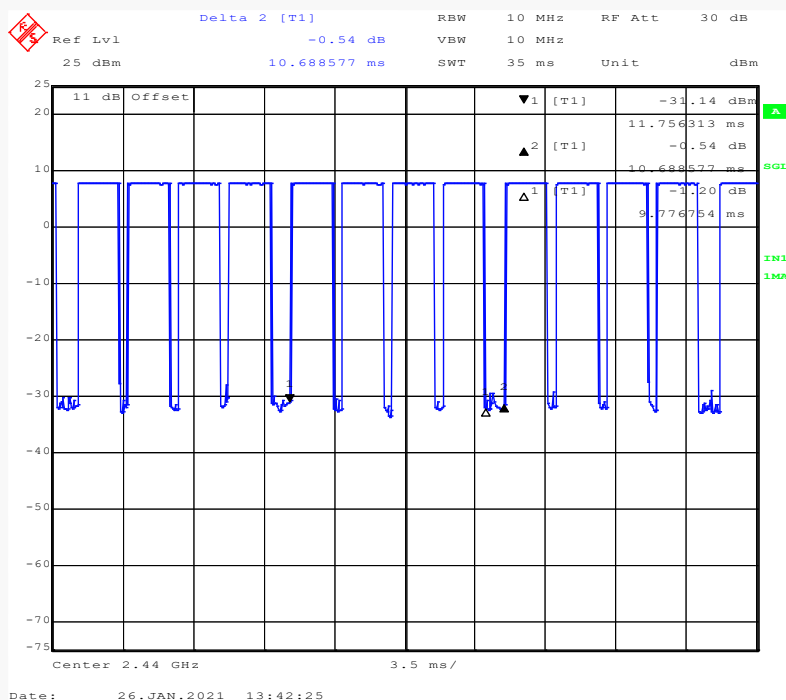
Pre-scan with all the data rates, and the worst case was performed as below:

Mode	Data Rate	Channel	*Power Level Setting
802.11b	1 Mbps	Low	0
		Middle	0
		High	0
802.11g	6 Mbps	Low	4
		Middle	4
		High	8
802.11n-HT20	MCS0	Low	4
		Middle	4
		High	8
802.11n-HT40	MCS0	Low	10
		Middle	10
		High	14
BLE	1Mbps	Low	8
		Middle	8
		High	8

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**802.11n-HT40 Mode Middle Channel**

BLE Mode Middle Channel(3ms)**BLE Mode Middle Channel(35ms)**

Mode	Duty Cycle (%)	T(ms)	1/T(kHz)	10log(1/x)
802.11b	100.00	/	/	0.00
802.11g	100.00	/	/	0.00
802.11n-HT20	100.00	/	/	0.00
802.11n-HT40	100.00	/	/	0.00
BLE	79.18	2.116	0.47	1.01

Note: “x” means the Duty Cycle.

Support Equipment List and Details

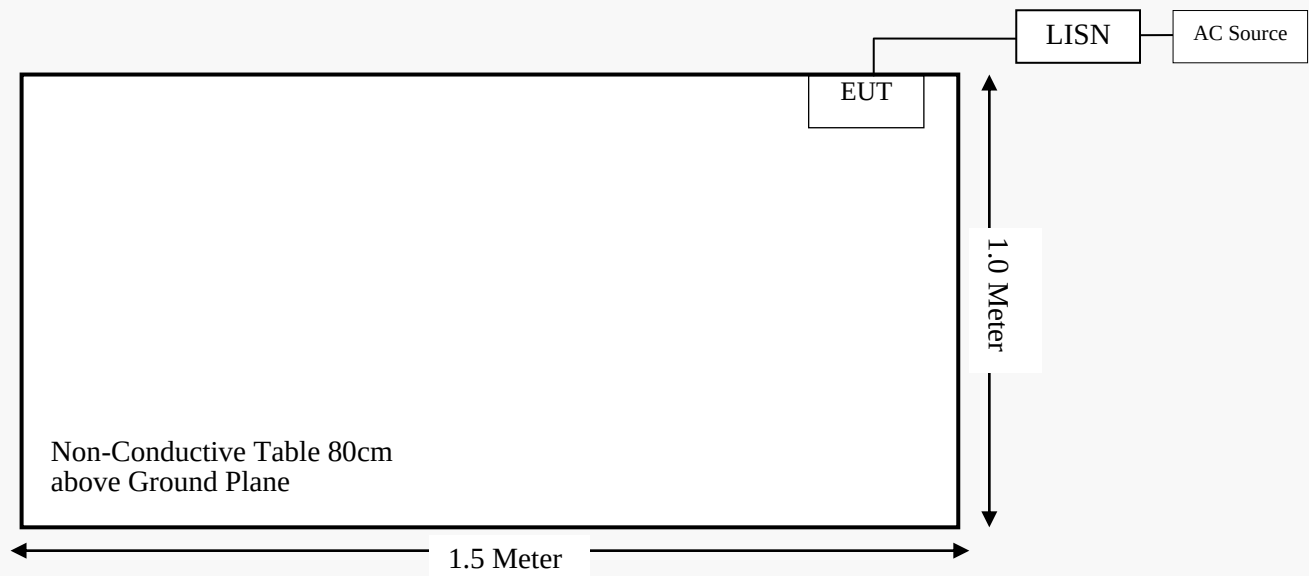
Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

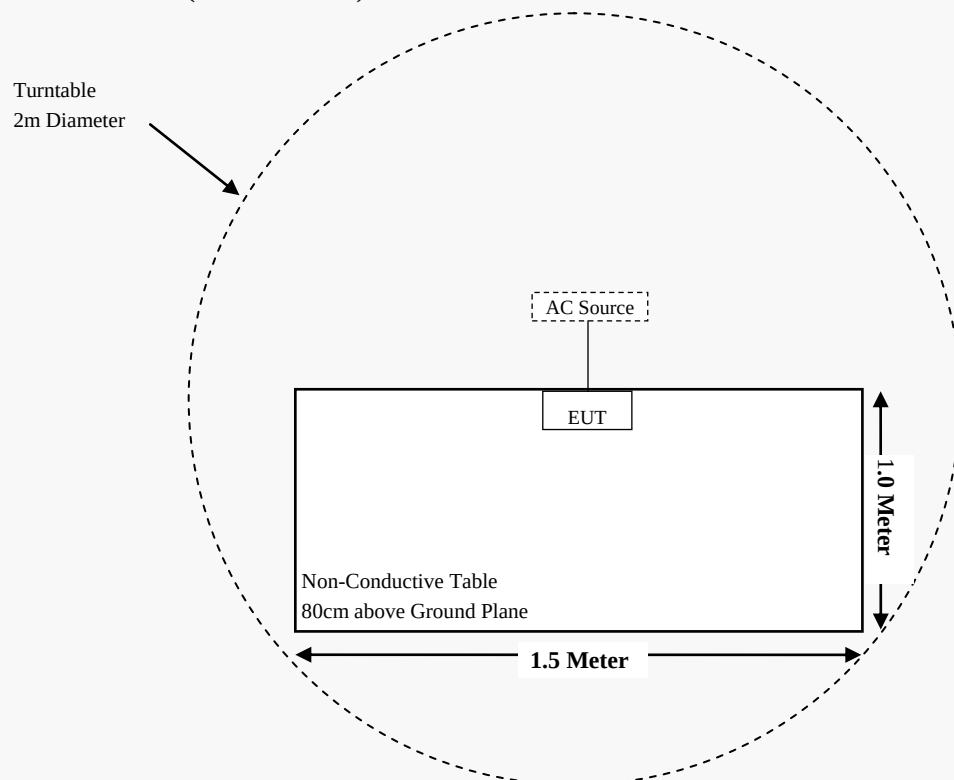
Cable Description	Length (m)	Port From	To Port
Power Cable1	1.2	EUT	LISN/AC Source

Block Diagram of Test Setup

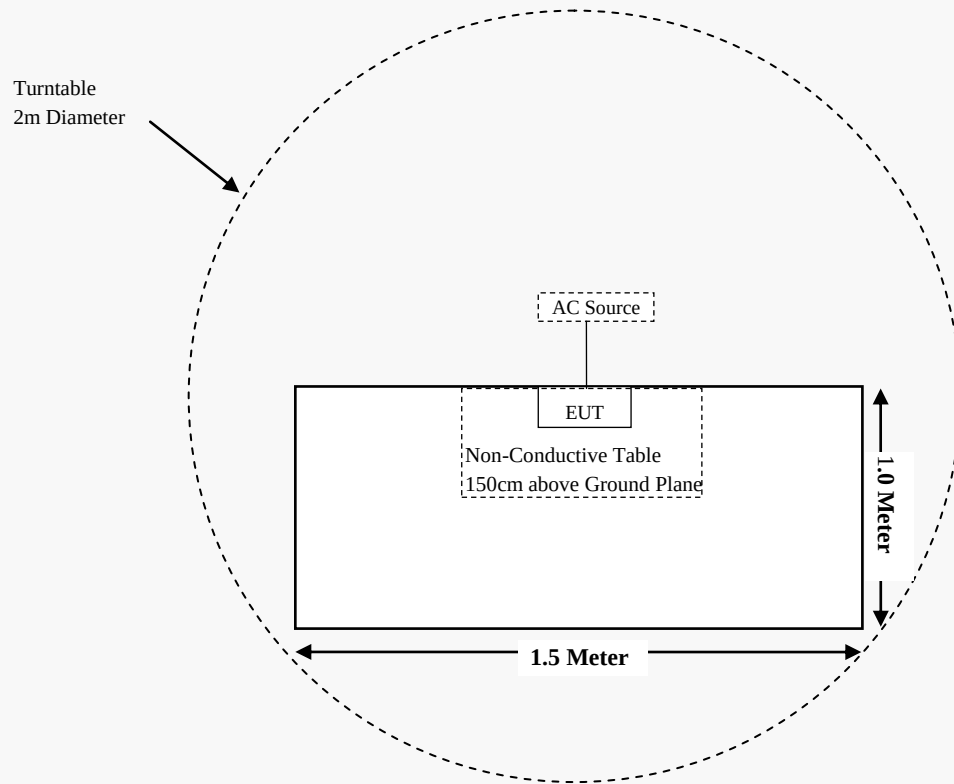
For Conducted Emissions:



For Radiated Emissions (Below 1GHz):



For Radiated Emissions (Above 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)	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	ESR	1316.3003K03-102454-Qd	2020-11-27	2021-11-26
Sunol Sciences	Broadband Antenna	JB3	A090314-1	2020-11-27	2021-11-26
Sonoma Instrument	Amplifier	310N	185700	2020-08-14	2021-08-13
Audix	Test Software	e3	V9	N/A	N/A
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
Radiated Emission Test (Chamber 2#)					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2020-04-01	2021-03-31
ETS-LINDGREN	Horn Antenna	3115	6229	2020-01-10	2023-01-09
ETS-LINDGREN	Horn Antenna	3116	00084159	2019-10-18	2022-10-17
A.H.Systems,inc	Amplifier	PAM-0118P	512	2020-02-20	2021-02-19
EM Electronics Corporation	Amplifier	EM18G40G	060726	2020-03-22	2021-03-21
MICRO-TRONICS	Band Reject Filter	BRM50702	G024	2020-08-05	2021-08-04
Narda	Attenuator	10dB	010	2020-08-15	2021-08-14
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	Signal Analyzer	FSIQ26	836131/009	2020-11-27	2021-11-26
Narda	Attenuator	10dB	010	2020-08-15	2021-08-14
Agilent	Power Meter	N1912A	MY5000492	2020-11-18	2021-11-17
Agilent	Power Sensor	N1921A	MY54210024	2020-11-18	2021-11-17
Signify	RF Cable	01	Signify C01	Each Time	N/A
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2020-11-27	2021-11-26
Rohde & Schwarz	LISN	ENV216	3560655016	2020-11-30	2021-11-29
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 §15.247 (I) & §1.1310 & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247 (i) and subpart 1.1310, 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

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)	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

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);

Calculated Data:**2.4G WiFi&BLE:**

Mode	Frequency Range (MHz)	Maximum Antenna Gain		Tune-up Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11b	2412-2462	3.7	2.34	24.00	251.19	20	0.1171	1.0
802.11g		3.7	2.34	23.00	199.53	20	0.0931	1.0
802.11n-HT20		3.7	2.34	23.00	199.53	20	0.0931	1.0
802.11n-HT40	2422-2452	3.7	2.34	22.00	158.49	20	0.0739	1.0
BLE	2402-2480	3.7	2.34	8.00	6.31	20	0.0029	1.0

Note: 1. For the above tune up power were declared by the manufacturer.
 2. Wi-Fi and BLE can't transmit simultaneously.

Result: The device meet FCC MPE at 20 cm distance.

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 Compliance 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 a Ceramic antenna for WIFI&BLE, which the antenna gain is 3.7 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

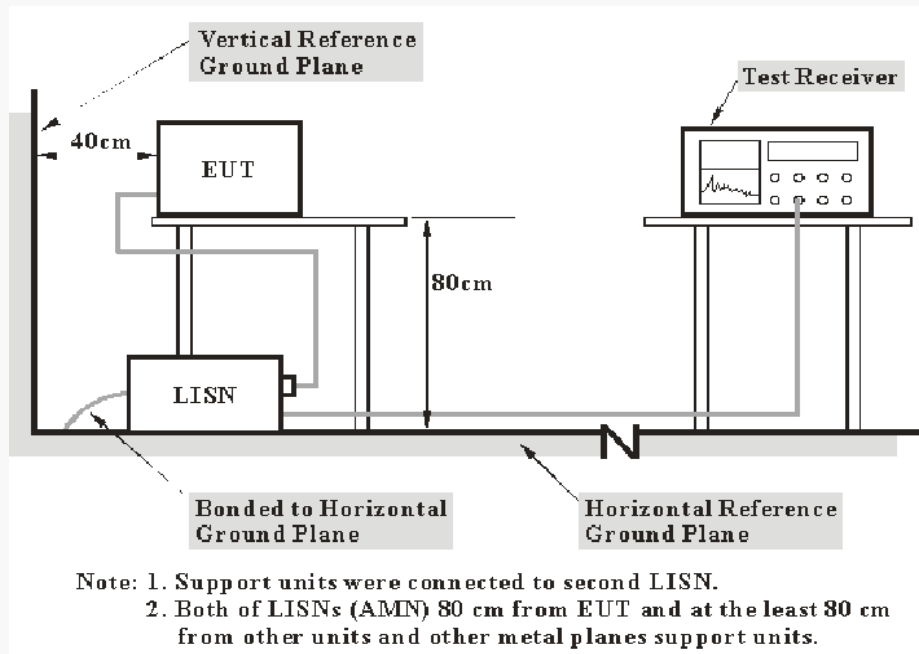
Result: Compliant.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

EUT Setup



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 (dB). 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:	25.5 °C
Relative Humidity:	51%
ATM Pressure:	101.2 kPa

The testing was performed by CK Huang on 2020-01-28.

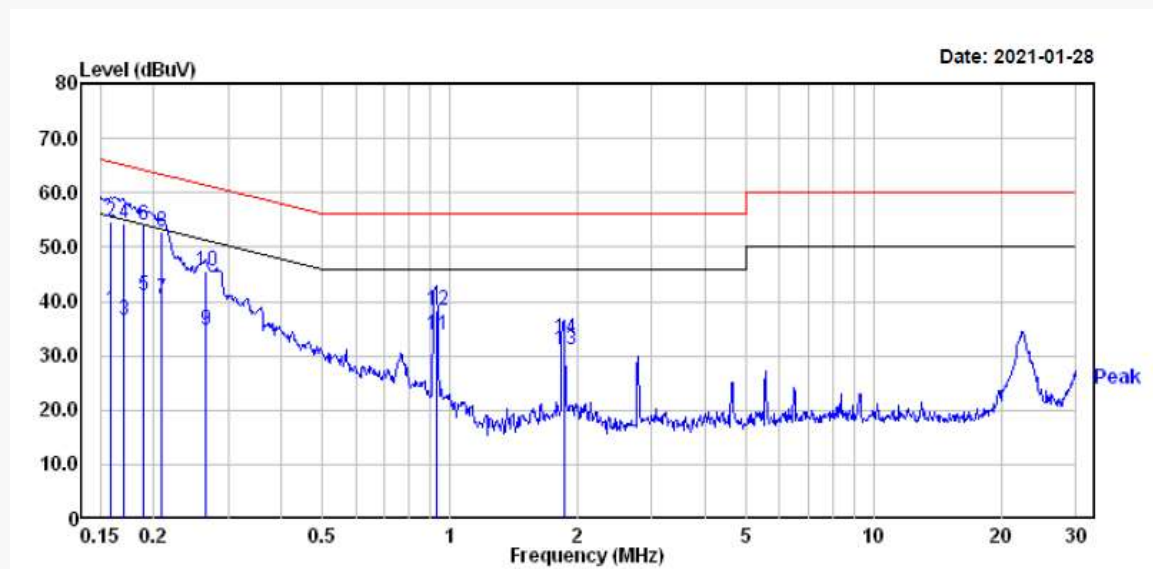
Test Result: Compliant.

For Wi-Fi Mode:

EUT operation mode: Transmitting in 802.11b mode low channel (worst case)

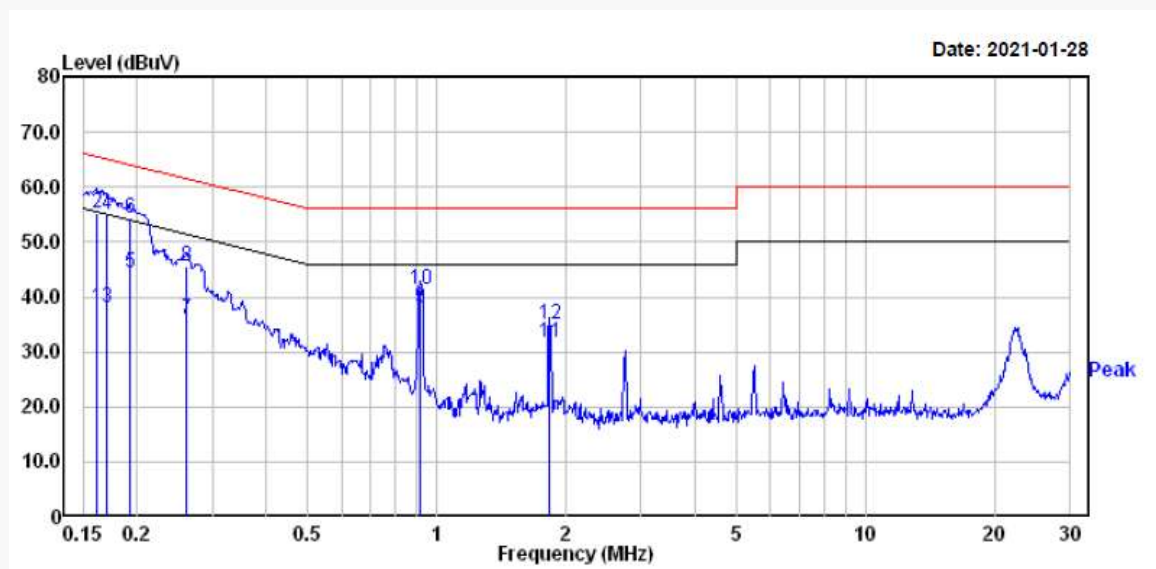
Model:9290024472

AC 120V/60 Hz, Line



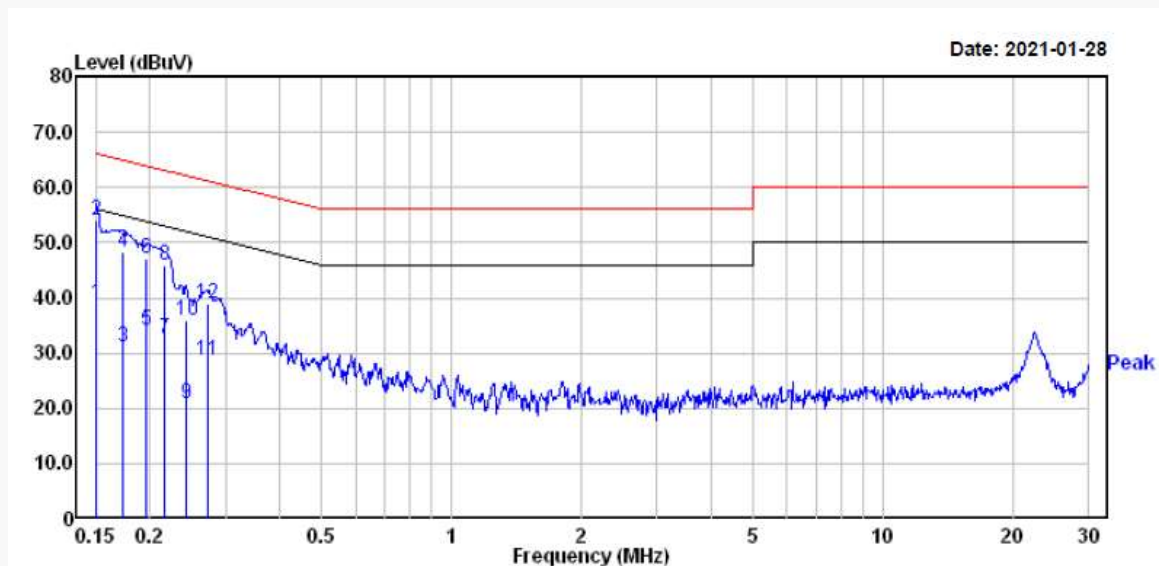
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.158	18.50	19.82	38.32	55.56	-17.24	Average
2	0.158	34.90	19.82	54.72	65.56	-10.84	QP
3	0.169	16.70	19.83	36.53	54.99	-18.46	Average
4	0.169	34.40	19.83	54.23	64.99	-10.76	QP
5	0.189	21.20	19.82	41.02	54.06	-13.04	Average
6	0.189	34.20	19.82	54.02	64.06	-10.04	QP
7	0.209	20.50	19.82	40.32	53.23	-12.91	Average
8	0.209	32.90	19.82	52.72	63.23	-10.51	QP
9	0.264	15.00	19.82	34.82	51.29	-16.47	Average
10	0.264	25.90	19.82	45.72	61.29	-15.57	QP
11	0.928	14.19	19.76	33.95	46.00	-12.05	Average
12	0.928	18.69	19.76	38.45	56.00	-17.55	QP
13	1.858	11.29	19.84	31.13	46.00	-14.87	Average
14	1.858	13.39	19.84	33.23	56.00	-22.77	QP

AC 120V/60 Hz, Neutral



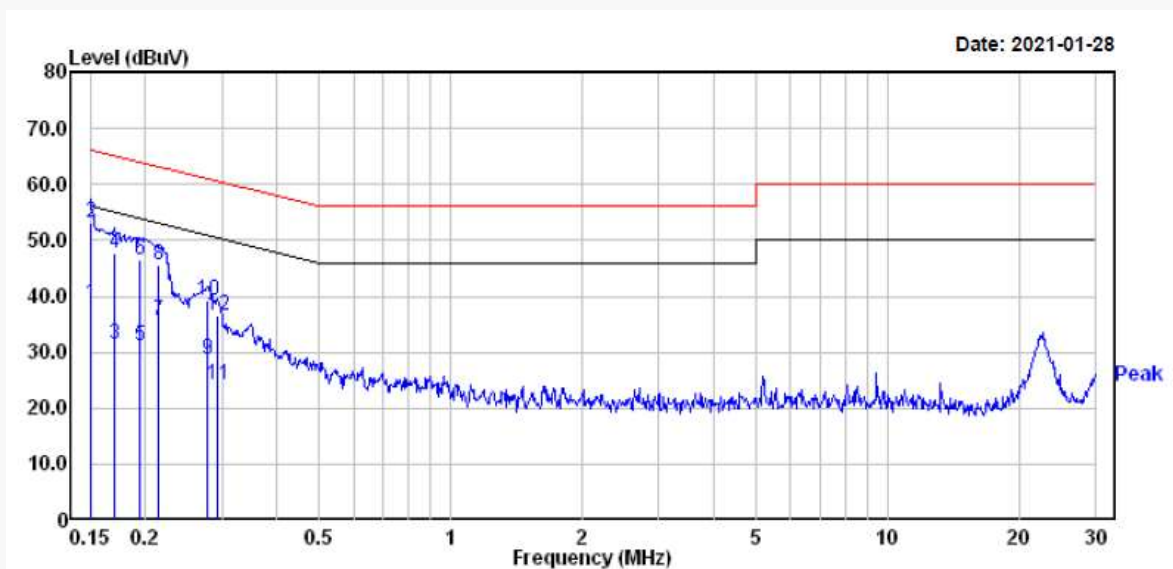
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.161	18.20	19.83	38.03	55.43	-17.40	Average
2	0.161	35.40	19.83	55.23	65.43	-10.20	QP
3	0.170	18.30	19.83	38.13	54.94	-16.81	Average
4	0.170	35.10	19.83	54.93	64.94	-10.01	QP
5	0.192	24.70	19.82	44.52	53.93	-9.41	Average
6	0.192	34.40	19.82	54.22	63.93	-9.71	QP
7	0.262	16.20	19.82	36.02	51.38	-15.36	Average
8	0.262	25.90	19.82	45.72	61.38	-15.66	QP
9	0.918	18.29	19.75	38.04	46.00	-7.96	Average
10	0.918	21.59	19.75	41.34	56.00	-14.66	QP
11	1.829	11.79	19.84	31.63	46.00	-14.37	Average
12	1.829	15.09	19.84	34.93	56.00	-21.07	QP

Model: 9290024471

AC 120V/60 Hz, Line

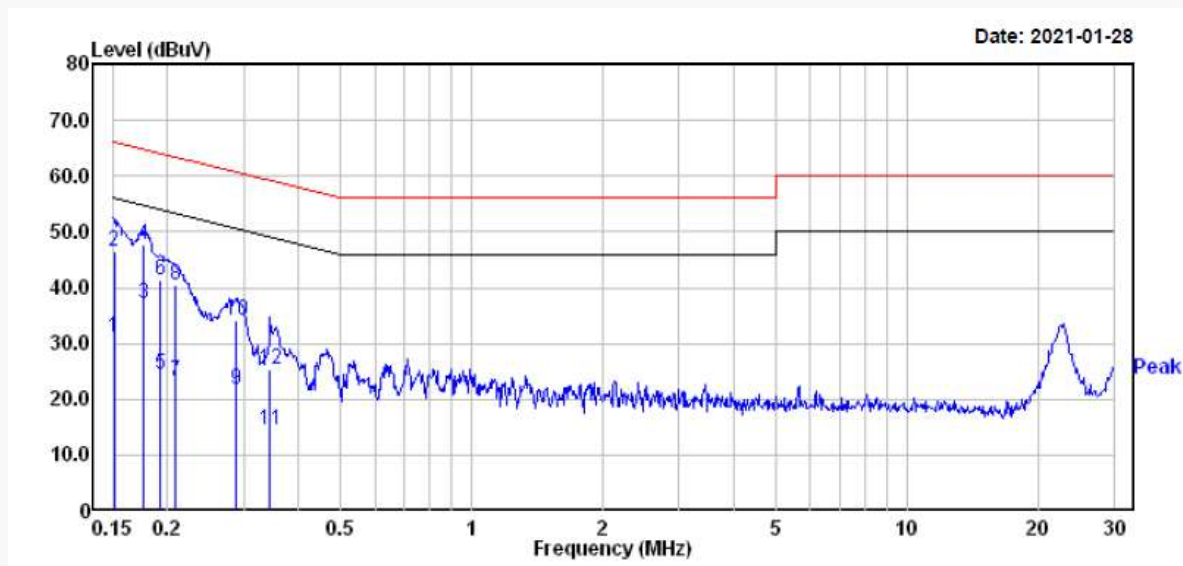
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	19.00	19.82	38.82	56.00	-17.18	Average
2	0.150	34.30	19.82	54.12	66.00	-11.88	QP
3	0.173	11.30	19.83	31.13	54.81	-23.68	Average
4	0.173	28.40	19.83	48.23	64.81	-16.58	QP
5	0.197	14.20	19.82	34.02	53.76	-19.74	Average
6	0.197	27.20	19.82	47.02	63.76	-16.74	QP
7	0.216	12.80	19.82	32.62	52.96	-20.34	Average
8	0.216	26.00	19.82	45.82	62.96	-17.14	QP
9	0.243	1.00	19.82	20.82	52.00	-31.18	Average
10	0.243	16.10	19.82	35.92	62.00	-26.08	QP
11	0.272	8.90	19.82	28.72	51.07	-22.35	Average
12	0.272	19.10	19.82	38.92	61.07	-22.15	QP

AC 120V/60 Hz, Neutral



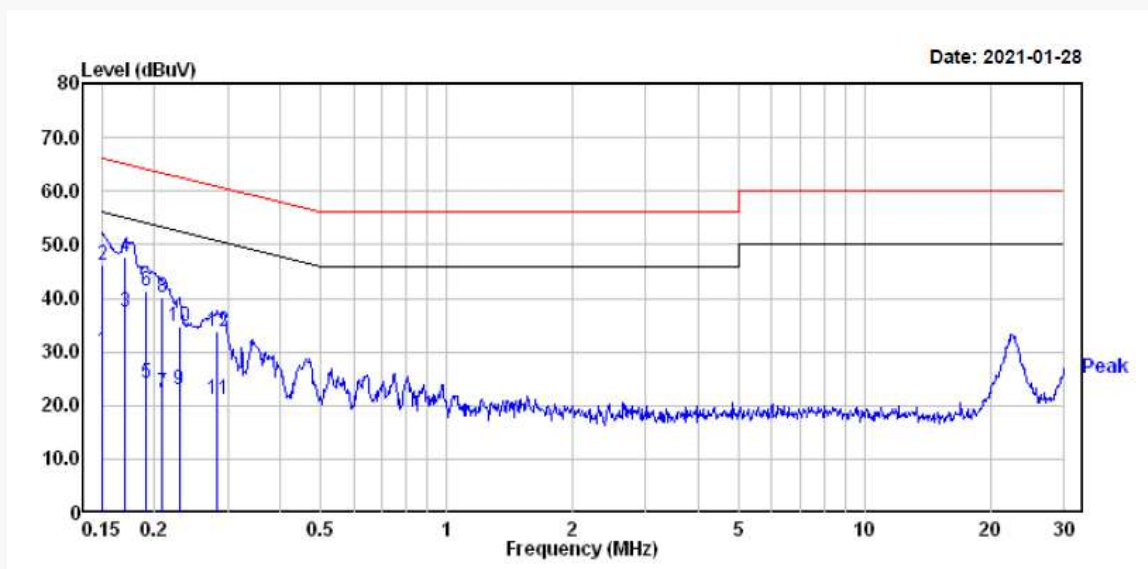
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	18.80	19.82	38.62	56.00	-17.38	Average
2	0.150	33.20	19.82	53.02	66.00	-12.98	QP
3	0.169	11.70	19.83	31.53	54.99	-23.46	Average
4	0.169	28.00	19.83	47.83	64.99	-17.16	QP
5	0.194	11.40	19.82	31.22	53.84	-22.62	Average
6	0.194	26.60	19.82	46.42	63.84	-17.42	QP
7	0.215	15.80	19.82	35.62	53.01	-17.39	Average
8	0.215	25.90	19.82	45.72	63.01	-17.29	QP
9	0.277	8.80	19.82	28.62	50.90	-22.28	Average
10	0.277	19.40	19.82	39.22	60.90	-21.68	QP
11	0.294	4.30	19.83	24.13	50.41	-26.28	Average
12	0.294	16.80	19.83	36.63	60.41	-23.78	QP

Model: 9290030188

AC 120V/60 Hz, Line

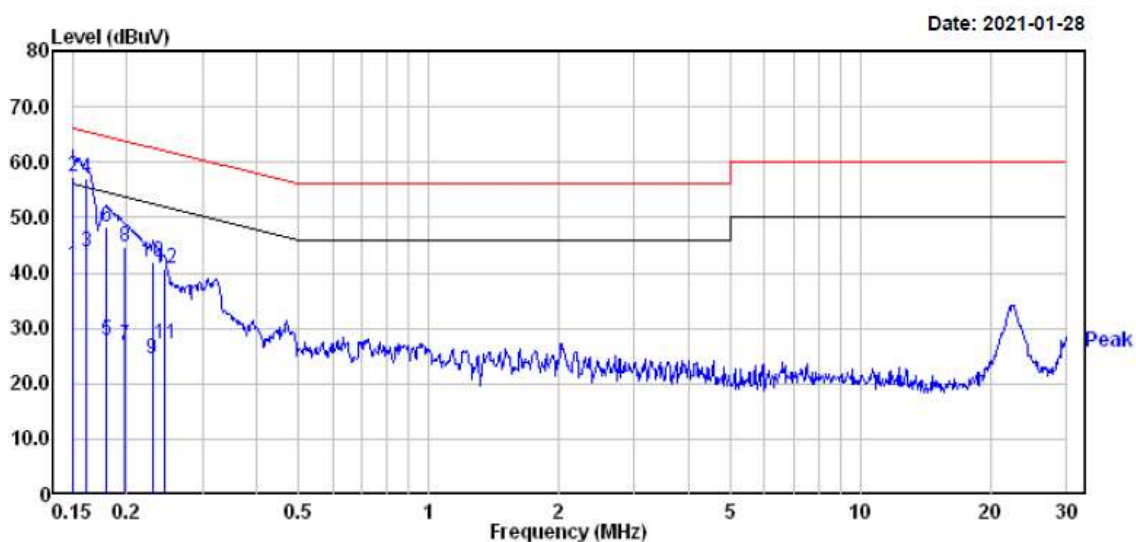
		Read			Limit	Over	
	Freq	Level	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.151	11.30	19.82	31.12	55.96	-24.84	Average
2	0.151	26.80	19.82	46.62	65.96	-19.34	QP
3	0.177	17.30	19.83	37.13	54.64	-17.51	Average
4	0.177	27.80	19.83	47.63	64.64	-17.01	QP
5	0.192	4.70	19.82	24.52	53.93	-29.41	Average
6	0.192	21.50	19.82	41.32	63.93	-22.61	QP
7	0.208	3.30	19.82	23.12	53.27	-30.15	Average
8	0.208	20.70	19.82	40.52	63.27	-22.75	QP
9	0.288	2.00	19.82	21.82	50.59	-28.77	Average
10	0.288	14.40	19.82	34.22	60.59	-26.37	QP
11	0.345	-5.40	19.81	14.41	49.09	-34.68	Average
12	0.345	5.40	19.81	25.21	59.09	-33.88	QP

AC 120V/60 Hz, Neutral



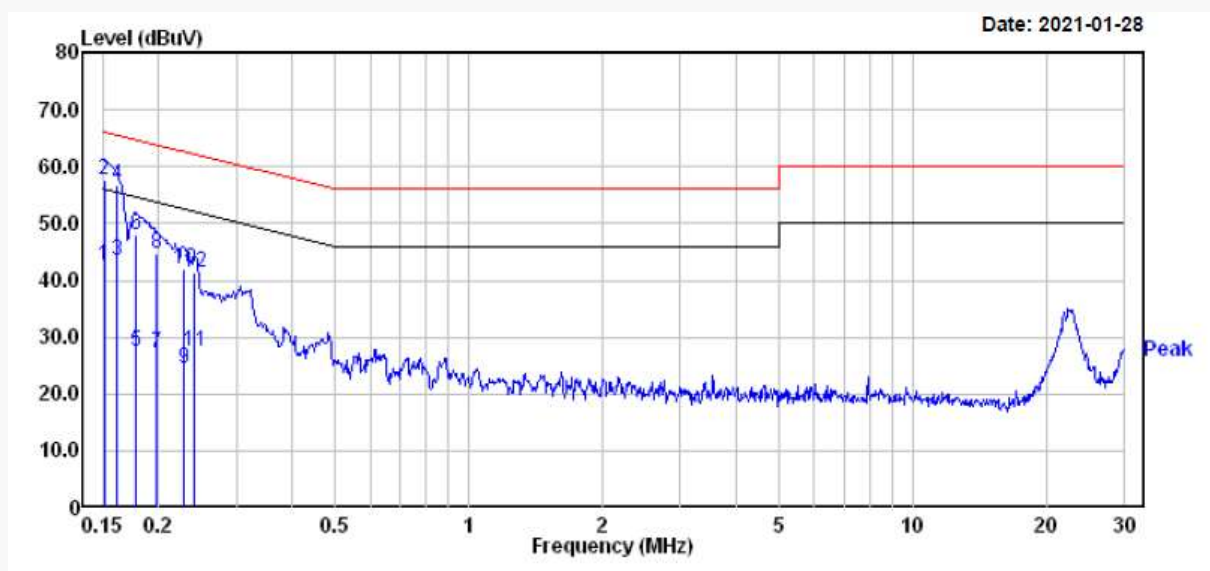
		Read			Limit	Over	
	Freq	Level	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	10.30	19.82	30.12	56.00	-25.88	Average
2	0.150	26.40	19.82	46.22	66.00	-19.78	QP
3	0.170	17.50	19.83	37.33	54.94	-17.61	Average
4	0.170	27.80	19.83	47.63	64.94	-17.31	QP
5	0.190	4.20	19.82	24.02	54.02	-30.00	Average
6	0.190	21.50	19.82	41.32	64.02	-22.70	QP
7	0.208	2.50	19.82	22.32	53.27	-30.95	Average
8	0.208	20.20	19.82	40.02	63.27	-23.25	QP
9	0.229	3.00	19.82	22.82	52.48	-29.66	Average
10	0.229	15.00	19.82	34.82	62.48	-27.66	QP
11	0.282	1.20	19.82	21.02	50.76	-29.74	Average
12	0.282	14.10	19.82	33.92	60.76	-26.84	QP

Model: 9290030189

AC 120V/60 Hz, Line

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	21.50	19.82	41.32	56.00	-14.68	Average
2	0.150	37.60	19.82	57.42	66.00	-8.58	QP
3	0.162	24.00	19.83	43.83	55.38	-11.55	Average
4	0.162	37.20	19.83	57.03	65.38	-8.35	QP
5	0.179	8.00	19.83	27.83	54.55	-26.72	Average
6	0.179	28.40	19.83	48.23	64.55	-16.32	QP
7	0.199	7.10	19.82	26.92	53.67	-26.75	Average
8	0.199	24.80	19.82	44.62	63.67	-19.05	QP
9	0.229	4.60	19.82	24.42	52.48	-28.06	Average
10	0.229	22.10	19.82	41.92	62.48	-20.56	QP
11	0.246	7.40	19.82	27.22	51.91	-24.69	Average
12	0.246	21.00	19.82	40.82	61.91	-21.09	QP

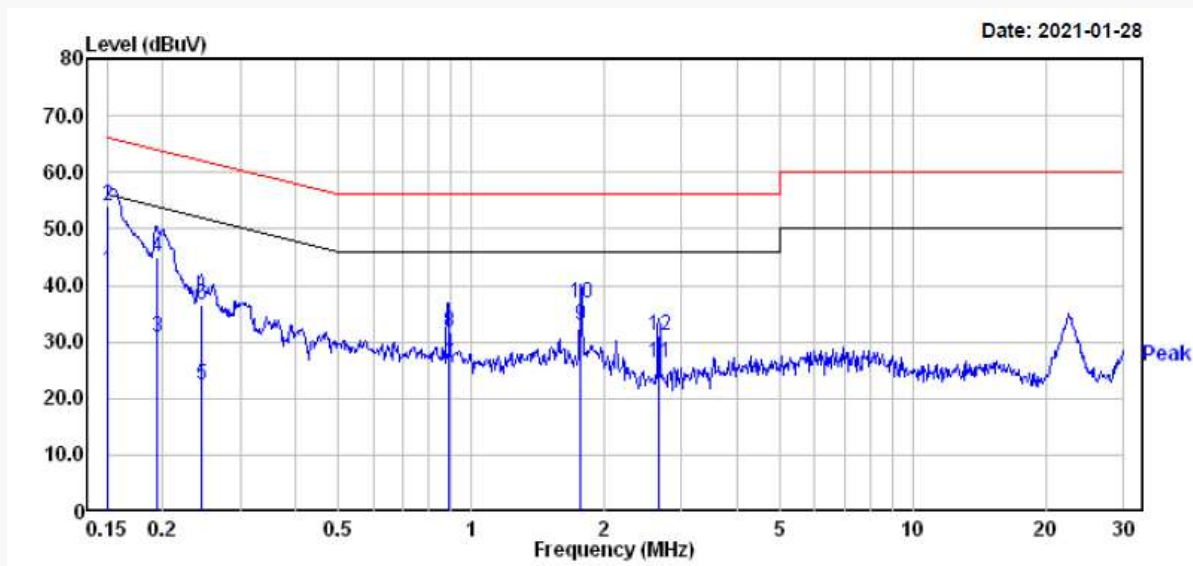
AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.151	22.70	19.82	42.52	55.96	-13.44	Average
2	0.151	37.70	19.82	57.52	65.96	-8.44	QP
3	0.162	23.60	19.83	43.43	55.38	-11.95	Average
4	0.162	37.00	19.83	56.83	65.38	-8.55	QP
5	0.178	7.60	19.83	27.43	54.59	-27.16	Average
6	0.178	28.20	19.83	48.03	64.59	-16.56	QP
7	0.198	7.30	19.82	27.12	53.71	-26.59	Average
8	0.198	24.80	19.82	44.62	63.71	-19.09	QP
9	0.228	4.60	19.82	24.42	52.52	-28.10	Average
10	0.228	22.20	19.82	42.02	62.52	-20.50	QP
11	0.242	7.60	19.82	27.42	52.04	-24.62	Average
12	0.242	21.50	19.82	41.32	62.04	-20.72	QP

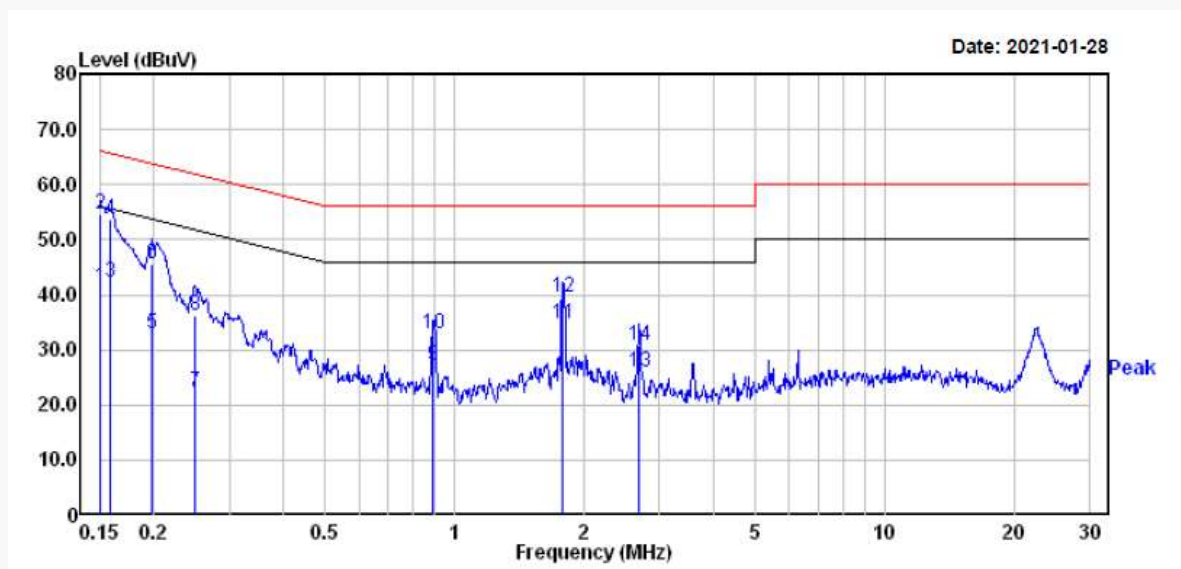
Model: 9290030233

AC 120V/60 Hz, Line



		Read			Limit	Over	
	Freq	Level	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	22.70	19.82	42.52	56.00	-13.48	Average
2	0.150	34.30	19.82	54.12	66.00	-11.88	QP
3	0.194	10.90	19.82	30.72	53.84	-23.12	Average
4	0.194	25.30	19.82	45.12	63.84	-18.72	QP
5	0.246	2.50	19.82	22.32	51.91	-29.59	Average
6	0.246	16.60	19.82	36.42	61.91	-25.49	QP
7	0.890	6.19	19.73	25.92	46.00	-20.08	Average
8	0.890	11.89	19.73	31.62	56.00	-24.38	QP
9	1.772	13.00	19.84	32.84	46.00	-13.16	Average
10	1.772	17.10	19.84	36.94	56.00	-19.06	QP
11	2.664	6.80	19.47	26.27	46.00	-19.73	Average
12	2.664	11.50	19.47	30.97	56.00	-25.03	QP

AC 120V/60 Hz, Neutral



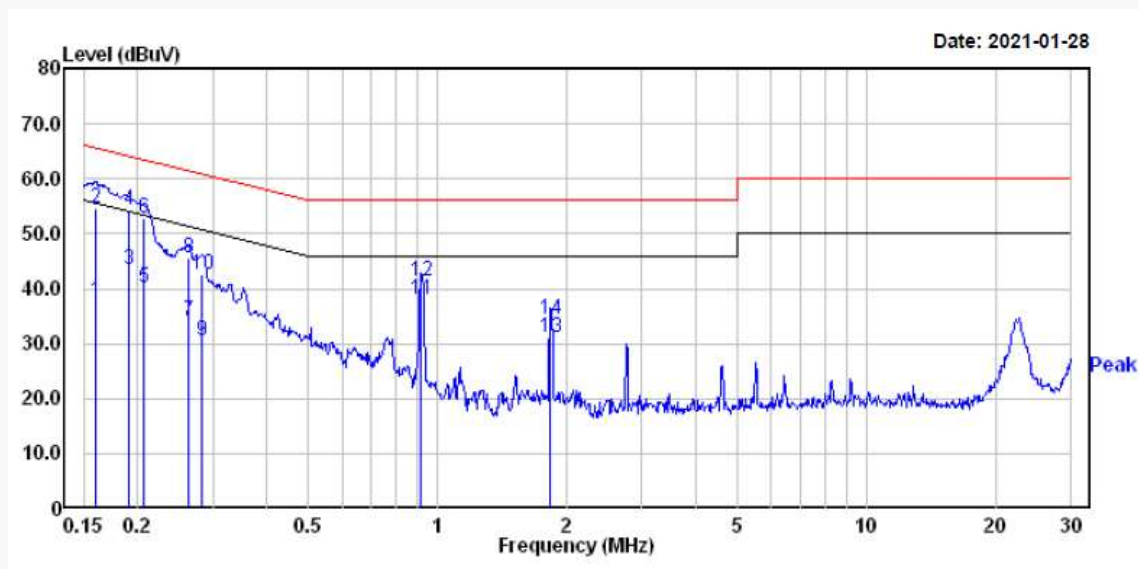
		Read			Limit	Over	
	Freq	Level	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	21.60	19.82	41.42	56.00	-14.58	Average
2	0.150	34.70	19.82	54.52	66.00	-11.48	QP
3	0.158	22.50	19.82	42.32	55.56	-13.24	Average
4	0.158	33.80	19.82	53.62	65.56	-11.94	QP
5	0.199	13.10	19.82	32.92	53.67	-20.75	Average
6	0.199	25.90	19.82	45.72	63.67	-17.95	QP
7	0.249	2.40	19.82	22.22	51.78	-29.56	Average
8	0.249	16.40	19.82	36.22	61.78	-25.56	QP
9	0.894	7.30	19.73	27.03	46.00	-18.97	Average
10	0.894	13.10	19.73	32.83	56.00	-23.17	QP
11	1.790	14.90	19.84	34.74	46.00	-11.26	Average
12	1.790	19.70	19.84	39.54	56.00	-16.46	QP
13	2.692	6.50	19.47	25.97	46.00	-20.03	Average
14	2.692	11.40	19.47	30.87	56.00	-25.13	QP

For BLE Mode:

EUT operation mode: Transmitting in BLE mode high channel (worst case)

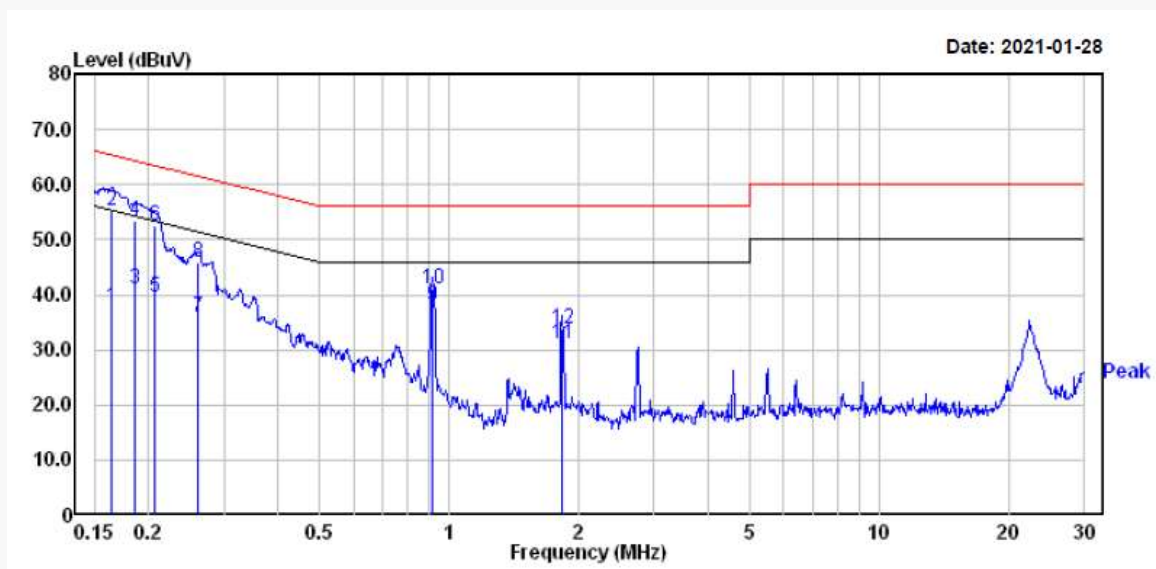
Model: 9290024472

AC 120V/60 Hz, Line



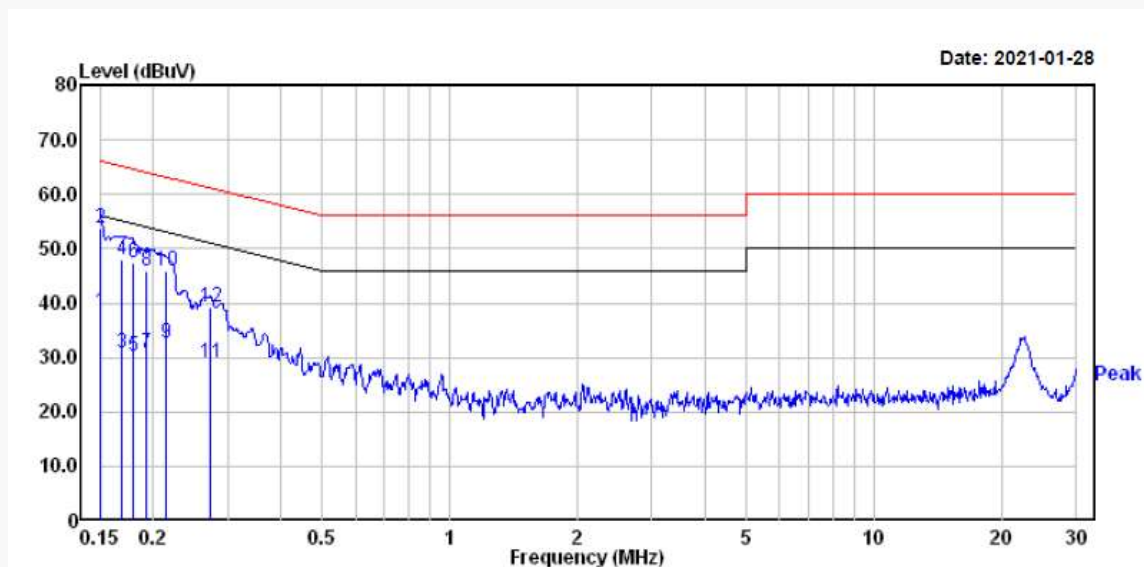
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.160	17.90	19.83	37.73	55.47	-17.74	Average
2	0.160	34.80	19.83	54.63	65.47	-10.84	QP
3	0.191	23.60	19.82	43.42	53.98	-10.56	Average
4	0.191	34.50	19.82	54.32	63.98	-9.66	QP
5	0.206	20.40	19.82	40.22	53.36	-13.14	Average
6	0.206	32.90	19.82	52.72	63.36	-10.64	QP
7	0.263	14.30	19.82	34.12	51.34	-17.22	Average
8	0.263	25.70	19.82	45.52	61.34	-15.82	QP
9	0.283	10.60	19.82	30.42	50.72	-20.30	Average
10	0.283	22.70	19.82	42.52	60.72	-18.20	QP
11	0.918	18.29	19.75	38.04	46.00	-7.96	Average
12	0.918	21.59	19.75	41.34	56.00	-14.66	QP
13	1.839	11.39	19.84	31.23	46.00	-14.77	Average
14	1.839	14.49	19.84	34.33	56.00	-21.67	QP

AC 120V/60 Hz, Neutral



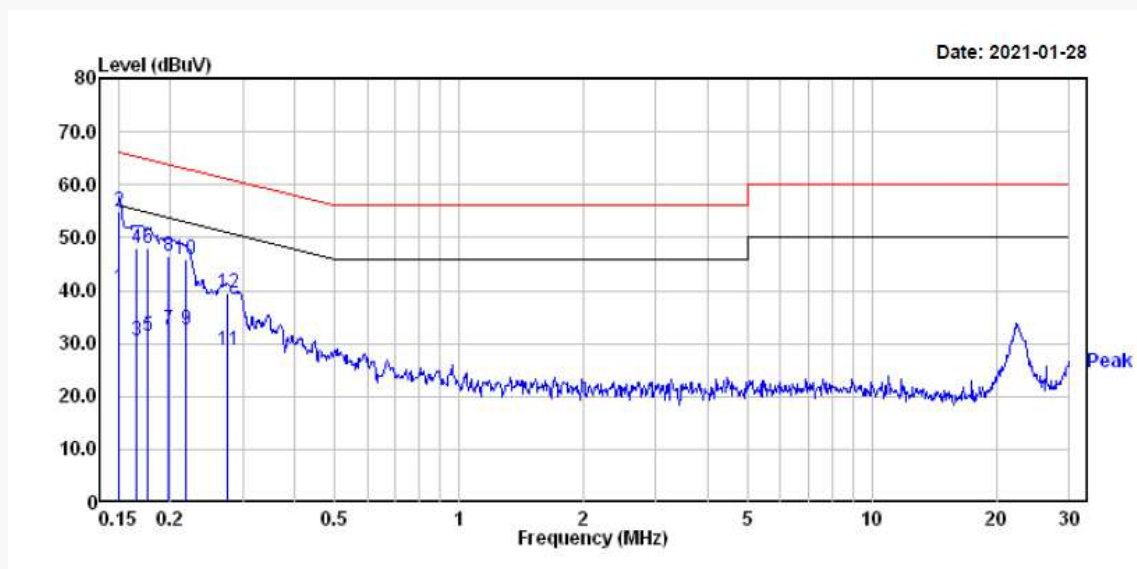
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.164	17.90	19.83	37.73	55.25	-17.52	Average
2	0.164	35.30	19.83	55.13	65.25	-10.12	QP
3	0.186	21.11	19.82	40.93	54.20	-13.27	Average
4	0.186	33.61	19.82	53.43	64.20	-10.77	QP
5	0.206	19.70	19.82	39.52	53.36	-13.84	Average
6	0.206	32.80	19.82	52.62	63.36	-10.74	QP
7	0.262	16.10	19.82	35.92	51.38	-15.46	Average
8	0.262	26.00	19.82	45.82	61.38	-15.56	QP
9	0.918	18.19	19.75	37.94	46.00	-8.06	Average
10	0.918	21.19	19.75	40.94	56.00	-15.06	QP
11	1.829	11.29	19.84	31.13	46.00	-14.87	Average
12	1.829	13.99	19.84	33.83	56.00	-22.17	QP

Model: 9290024471

AC 120V/60 Hz, Line

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	18.40	19.82	38.22	56.00	-17.78	Average
2	0.150	33.80	19.82	53.62	66.00	-12.38	QP
3	0.169	10.90	19.83	30.73	55.03	-24.30	Average
4	0.169	28.30	19.83	48.13	65.03	-16.90	QP
5	0.179	10.50	19.83	30.33	54.55	-24.22	Average
6	0.179	27.70	19.83	47.53	64.55	-17.02	QP
7	0.193	10.90	19.82	30.72	53.89	-23.17	Average
8	0.193	26.10	19.82	45.92	63.89	-17.97	QP
9	0.215	12.70	19.82	32.52	53.01	-20.49	Average
10	0.215	26.10	19.82	45.92	63.01	-17.09	QP
11	0.273	9.10	19.82	28.92	51.03	-22.11	Average
12	0.273	19.50	19.82	39.32	61.03	-21.71	QP

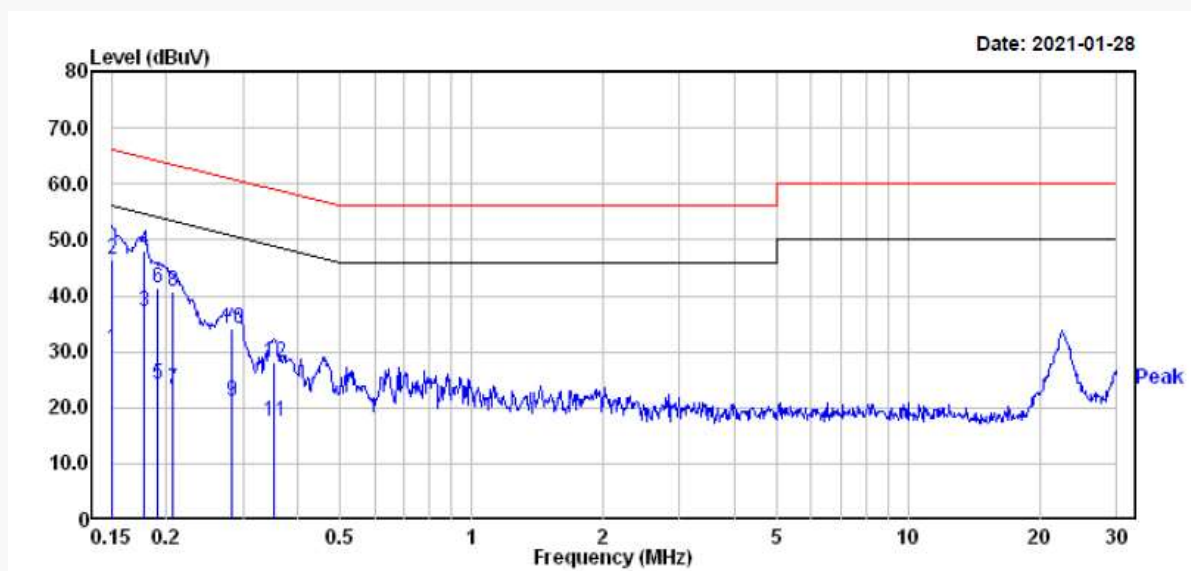
AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	20.50	19.82	40.32	56.00	-15.68	Average
2	0.150	35.00	19.82	54.82	66.00	-11.18	QP
3	0.166	10.60	19.83	30.43	55.16	-24.73	Average
4	0.166	28.10	19.83	47.93	65.16	-17.23	QP
5	0.176	11.60	19.83	31.43	54.68	-23.25	Average
6	0.176	28.10	19.83	47.93	64.68	-16.75	QP
7	0.198	12.90	19.82	32.72	53.71	-20.99	Average
8	0.198	26.70	19.82	46.52	63.71	-17.19	QP
9	0.217	12.90	19.82	32.72	52.92	-20.20	Average
10	0.217	26.00	19.82	45.82	62.92	-17.10	QP
11	0.276	8.80	19.82	28.62	50.94	-22.32	Average
12	0.276	19.60	19.82	39.42	60.94	-21.52	QP

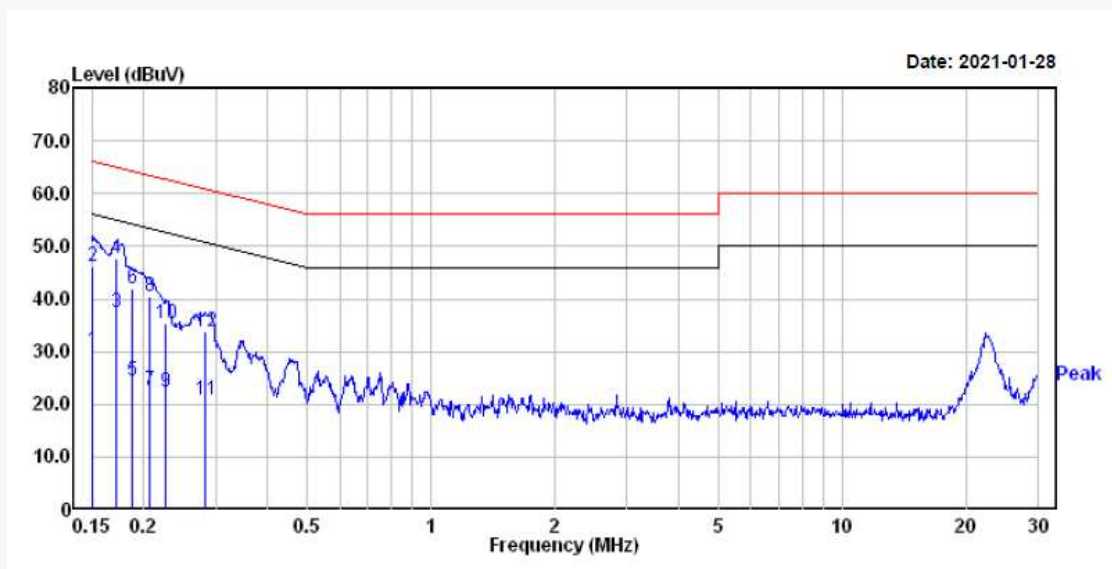
Model: 9290030188

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	10.80	19.82	30.62	56.00	-25.38	Average
2	0.150	26.60	19.82	46.42	66.00	-19.58	QP
3	0.178	17.30	19.83	37.13	54.59	-17.46	Average
4	0.178	28.20	19.83	48.03	64.59	-16.56	QP
5	0.191	4.40	19.82	24.22	53.98	-29.76	Average
6	0.191	21.50	19.82	41.32	63.98	-22.66	QP
7	0.206	3.30	19.82	23.12	53.36	-30.24	Average
8	0.206	20.80	19.82	40.62	63.36	-22.74	QP
9	0.283	1.20	19.82	21.02	50.72	-29.70	Average
10	0.283	14.20	19.82	34.02	60.72	-26.70	QP
11	0.352	-2.41	19.81	17.40	48.91	-31.51	Average
12	0.352	8.29	19.81	28.10	58.91	-30.81	QP

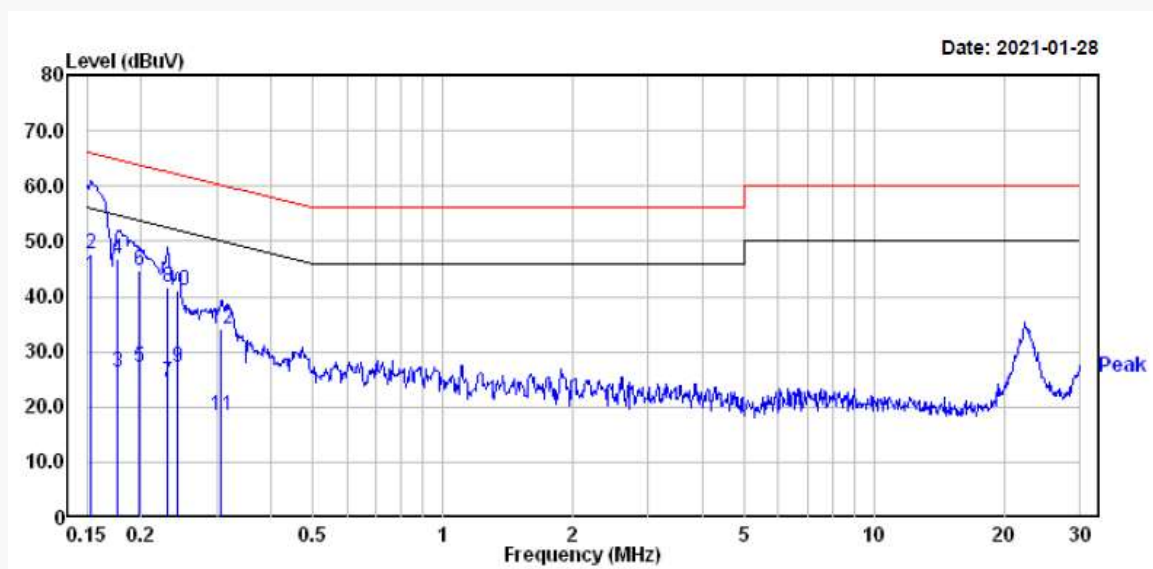
AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	10.30	19.82	30.12	56.00	-25.88	Average
2	0.150	26.30	19.82	46.12	66.00	-19.88	QP
3	0.171	17.50	19.83	37.33	54.90	-17.57	Average
4	0.171	27.90	19.83	47.73	64.90	-17.17	QP
5	0.187	4.71	19.82	24.53	54.15	-29.62	Average
6	0.187	22.01	19.82	41.83	64.15	-22.32	QP
7	0.206	2.70	19.82	22.52	53.36	-30.84	Average
8	0.206	20.50	19.82	40.32	63.36	-23.04	QP
9	0.226	2.60	19.82	22.42	52.61	-30.19	Average
10	0.226	15.40	19.82	35.22	62.61	-27.39	QP
11	0.282	1.10	19.82	20.92	50.76	-29.84	Average
12	0.282	14.10	19.82	33.92	60.76	-26.84	QP

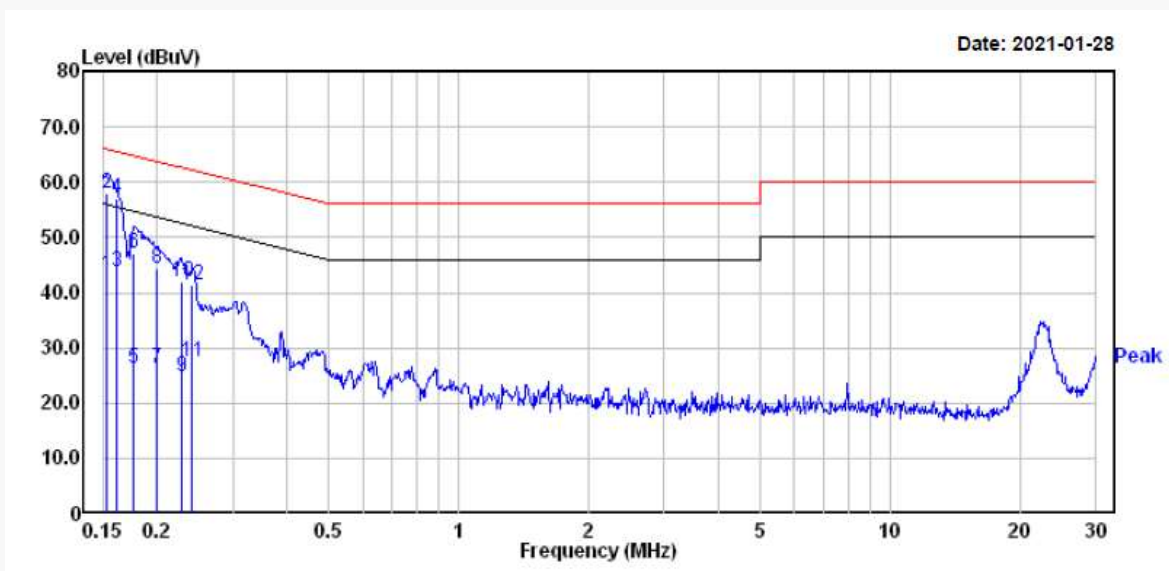
Model: 9290030189

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.153	24.10	19.82	43.92	55.82	-11.90	Average
2	0.153	28.00	19.82	47.82	65.82	-18.00	QP
3	0.177	6.50	19.83	26.33	54.64	-28.31	Average
4	0.177	27.10	19.83	46.93	64.64	-17.71	QP
5	0.198	7.50	19.82	27.32	53.71	-26.39	Average
6	0.198	24.90	19.82	44.72	63.71	-18.99	QP
7	0.230	4.50	19.82	24.32	52.44	-28.12	Average
8	0.230	21.80	19.82	41.62	62.44	-20.82	QP
9	0.243	7.30	19.82	27.12	52.00	-24.88	Average
10	0.243	21.30	19.82	41.12	62.00	-20.88	QP
11	0.307	-1.41	19.83	18.42	50.06	-31.64	Average
12	0.307	14.29	19.83	34.12	60.06	-25.94	QP

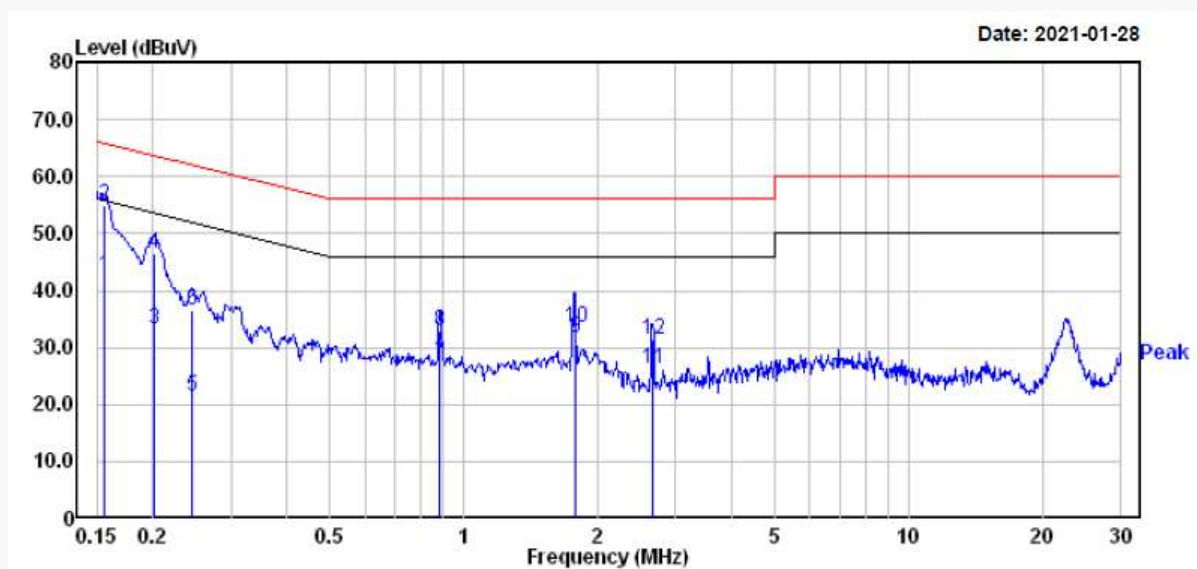
AC 120V/60 Hz, Neutral



	Freq	Read		Limit	Over	
	MHz	Level	Factor	Line	Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB
1	0.152	23.50	19.82	43.32	55.87	-12.55 Average
2	0.152	38.20	19.82	58.02	65.87	-7.85 QP
3	0.162	24.00	19.83	43.83	55.38	-11.55 Average
4	0.162	37.20	19.83	57.03	65.38	-8.35 QP
5	0.177	6.40	19.83	26.23	54.64	-28.41 Average
6	0.177	27.30	19.83	47.13	64.64	-17.51 QP
7	0.200	6.40	19.82	26.22	53.62	-27.40 Average
8	0.200	24.50	19.82	44.32	63.62	-19.30 QP
9	0.228	4.80	19.82	24.62	52.52	-27.90 Average
10	0.228	22.10	19.82	41.92	62.52	-20.60 QP
11	0.242	7.70	19.82	27.52	52.04	-24.52 Average
12	0.242	21.60	19.82	41.42	62.04	-20.62 QP

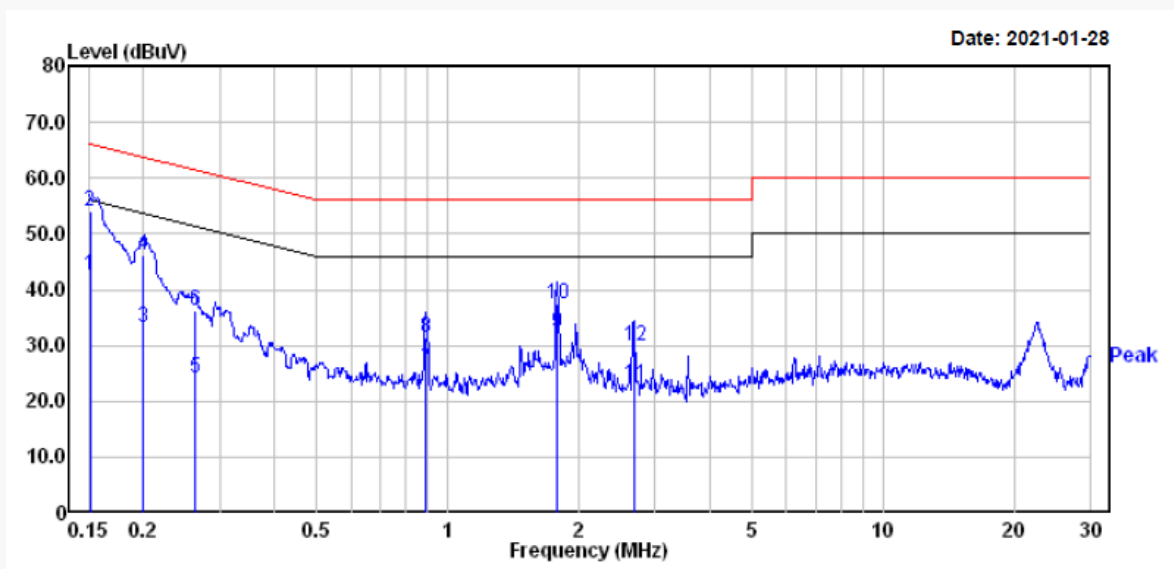
Model: 9290030233

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.156	22.80	19.82	42.62	55.69	-13.07	Average
2	0.156	35.20	19.82	55.02	65.69	-10.67	QP
3	0.202	13.40	19.82	33.22	53.54	-20.32	Average
4	0.202	26.70	19.82	46.52	63.54	-17.02	QP
5	0.244	1.60	19.82	21.42	51.95	-30.53	Average
6	0.244	16.70	19.82	36.52	61.95	-25.43	QP
7	0.885	7.49	19.73	27.22	46.00	-18.78	Average
8	0.885	13.29	19.73	33.02	56.00	-22.98	QP
9	1.781	11.80	19.84	31.64	46.00	-14.36	Average
10	1.781	13.80	19.84	33.64	56.00	-22.36	QP
11	2.664	6.90	19.47	26.37	46.00	-19.63	Average
12	2.664	12.00	19.47	31.47	56.00	-24.53	QP

AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.151	22.80	19.82	42.62	55.96	-13.34	Average
2	0.151	34.10	19.82	53.92	65.96	-12.04	QP
3	0.200	13.50	19.82	33.32	53.62	-20.30	Average
4	0.200	26.30	19.82	46.12	63.62	-17.50	QP
5	0.263	4.40	19.82	24.22	51.34	-27.12	Average
6	0.263	16.40	19.82	36.22	61.34	-25.12	QP
7	0.894	5.90	19.73	25.63	46.00	-20.37	Average
8	0.894	11.60	19.73	31.33	56.00	-24.67	QP
9	1.781	12.60	19.84	32.44	46.00	-13.56	Average
10	1.781	17.50	19.84	37.34	56.00	-18.66	QP
11	2.678	3.60	19.47	23.07	46.00	-22.93	Average
12	2.678	10.40	19.47	29.87	56.00	-26.13	QP

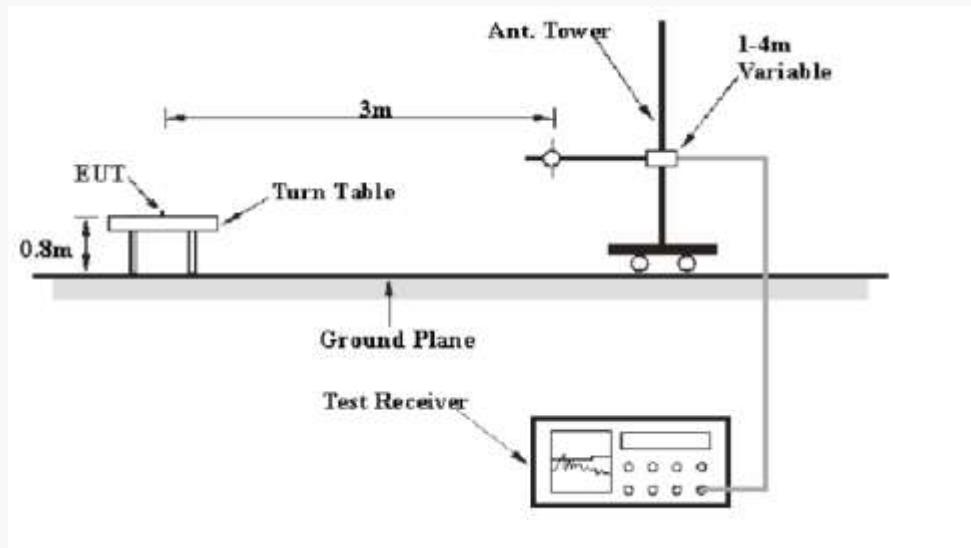
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

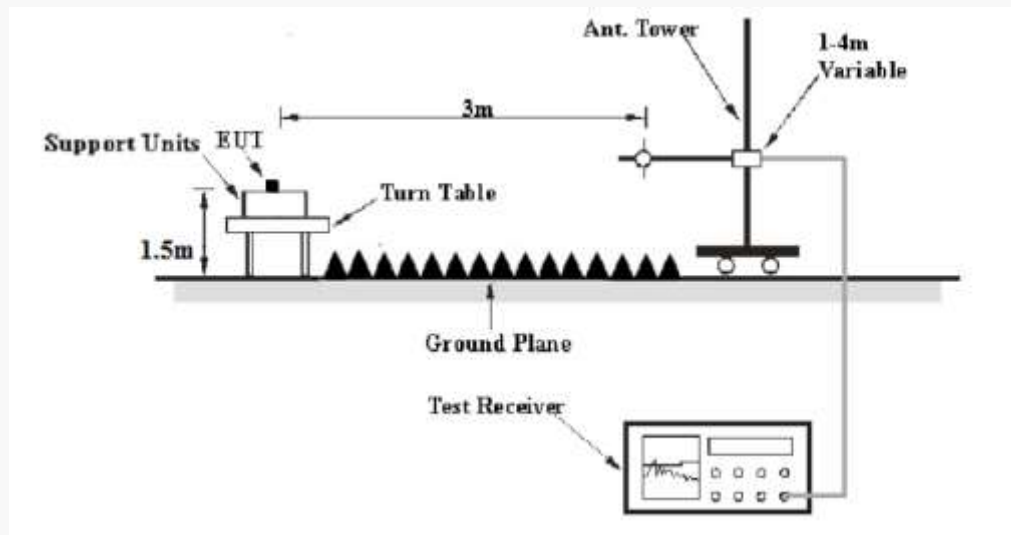
FCC §15.247 (d); §15.209; §15.205;

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	/	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 30 MHz-1 GHz, 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:

$$\text{Corrected Amplitude (dB}\mu\text{V /m)} = \text{Meter Reading (dB}\mu\text{V)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Amplifier Gain (dB)}$$

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:

$$\text{Margin (dB)} = \text{Limit (dB}\mu\text{V/m)} - \text{Corrected Amplitude (dB}\mu\text{V /m)}$$

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:	23.8-25.5°C
Relative Humidity:	49-53%
ATM Pressure:	101.0-101.7kPa

The testing was performed by CK Huang from 2021-01-20 to 2021-01-26.

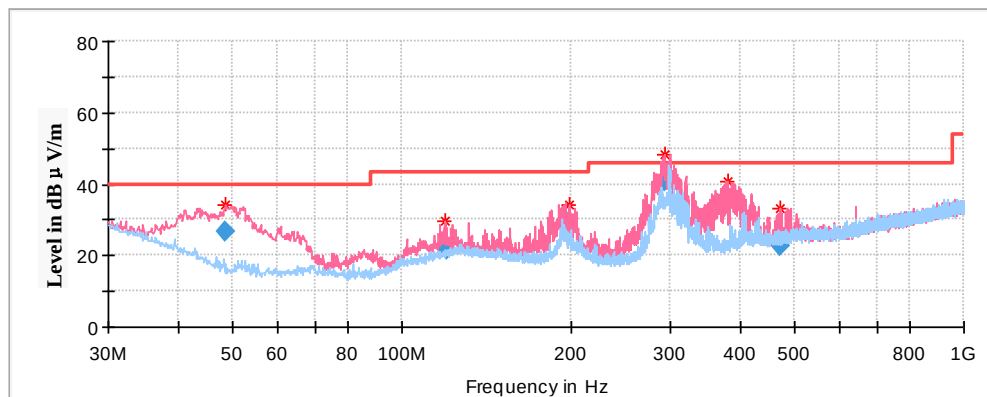
Test Result: Compliant.

EUT operation mode: Transmitting

For Wi-Fi Mode:**Spurious Emission Test:****30MHz-1GHz:**

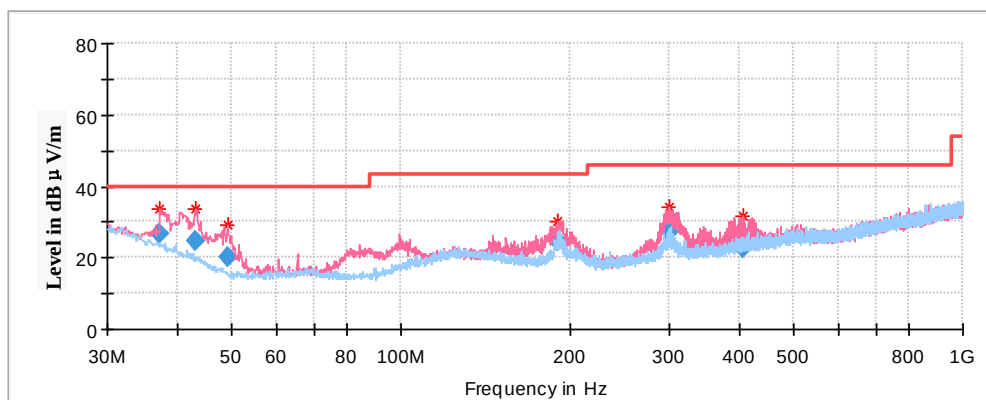
Pre-Scan with 802.11b, 802.11g, 802.11n-HT20 and 802.11n-HT40 modes of operation in the X,Y and Z axes of orientation, the worst case **low channel of 802.11b Mode in Z-axis of orientation** was recorded

Model: 9290024472



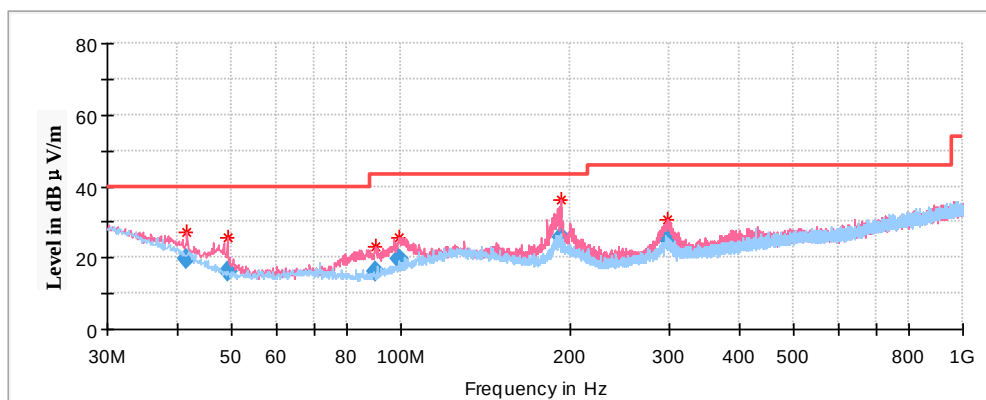
Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	Quasi-peak (dBμV/m)	Height (cm)	Polar (H/V)				
48.373650	26.59	100.0	V	252.0	-16.2	40.00	13.41
120.071200	21.72	100.0	V	296.0	-11.1	43.50	21.78
195.181300	29.90	200.0	V	234.0	-11.1	43.50	13.60
293.682300	40.66	100.0	V	277.0	-10.7	46.00	5.34
378.412450	34.35	100.0	V	173.0	-8.5	46.00	11.65
471.555500	22.48	200.0	V	359.0	-6.2	46.00	23.52

Model: 9290024471



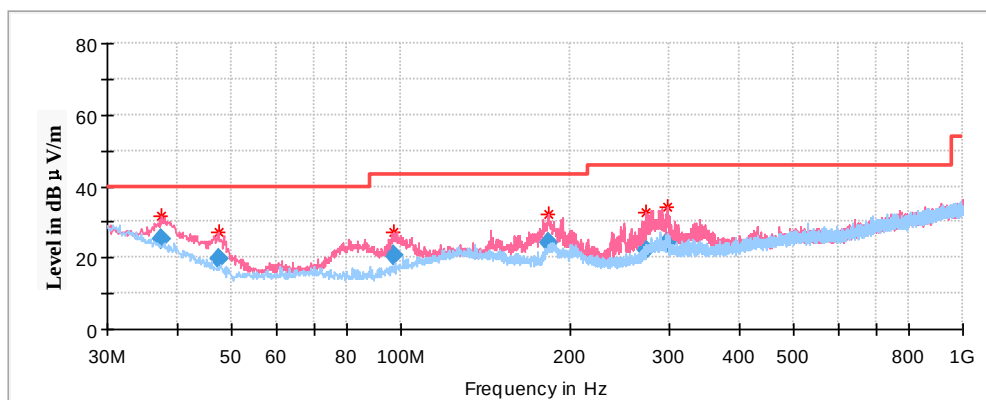
Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	Quasi-peak (dBμV/m)	Height (cm)	Polar (H/V)				
37.293000	26.81	100.0	V	66.0	-9.3	40.00	13.19
43.217350	24.90	100.0	V	180.0	-12.7	40.00	15.10
49.082750	20.20	100.0	V	35.0	-16.6	40.00	19.80
190.428150	24.47	100.0	V	204.0	-11.4	43.50	19.03
300.612800	27.19	200.0	V	65.0	-10.4	46.00	18.81
405.141500	22.47	200.0	V	151.0	-7.9	46.00	23.53

Model: 9290030188



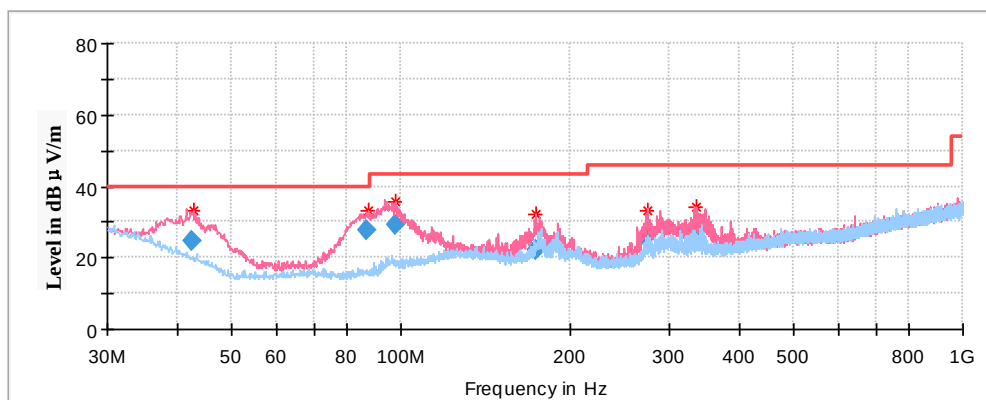
Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	Quasi-peak (dB μ V/m)	Height (cm)	Polar (H/V)				
41.648200	19.60	100.0	V	293.0	-10.9	40.00	20.40
49.039965	15.96	100.0	V	311.0	-16.2	40.00	24.04
89.898700	16.31	100.0	V	133.0	-16.7	43.50	27.19
99.236600	19.57	100.0	V	145.0	-14.2	43.50	23.93
193.324650	25.87	199.0	V	44.0	-11.3	43.50	17.63
298.922200	25.23	199.0	V	38.0	-10.5	46.00	20.77

Model: 9290030189



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)				
37.512140	25.17	100.0	V	45.0	-9.3	40.00	14.83
47.335750	19.74	100.0	V	124.0	-15.0	40.00	20.26
97.298900	20.55	100.0	V	76.0	-14.6	43.50	22.95
182.416450	23.94	199.0	V	101.0	-12.0	43.50	19.56
272.255100	22.16	100.0	V	282.0	-11.6	46.00	23.84
298.690000	24.33	199.0	V	288.0	-10.5	46.00	21.67

Model: 9290030233



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)				
42.377950	24.76	100.0	V	185.0	-12.1	40.00	15.24
86.916700	27.89	100.0	V	149.0	-16.8	40.00	12.11
97.459150	29.15	100.0	V	112.0	-14.8	43.50	14.35
174.450000	22.23	100.0	V	76.0	-12.6	43.50	21.27
273.027200	25.49	200.0	V	9.0	-11.6	46.00	20.51
336.516700	24.94	200.0	V	131.0	-9.6	46.00	21.06

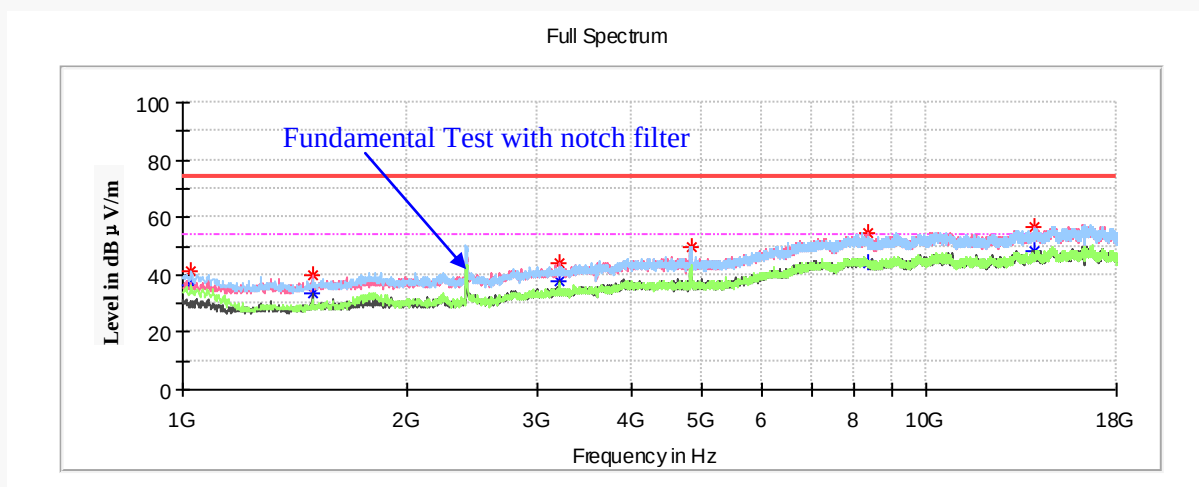
1GHz-18GHz:**802.11b Mode:**

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

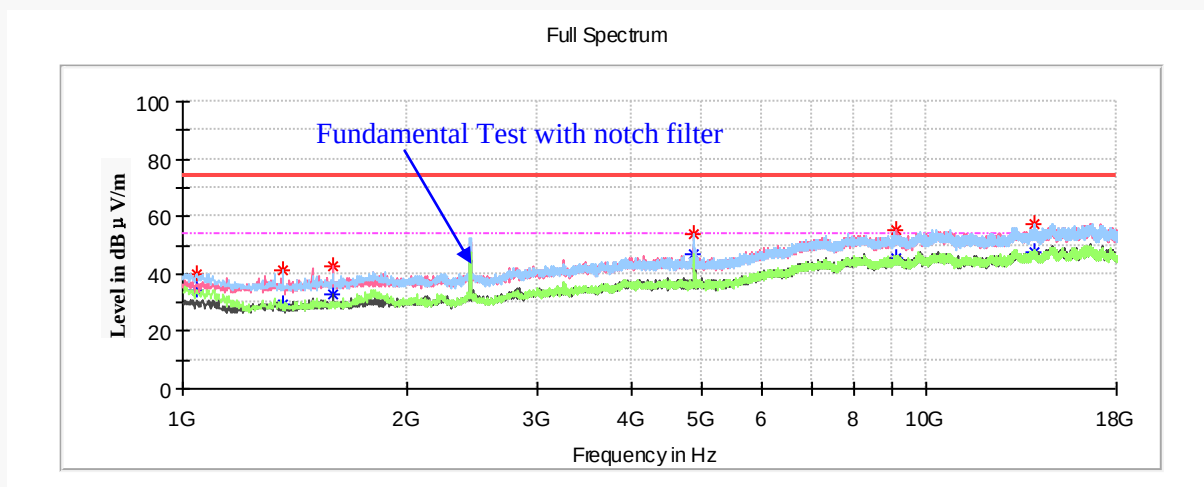
Note:

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)

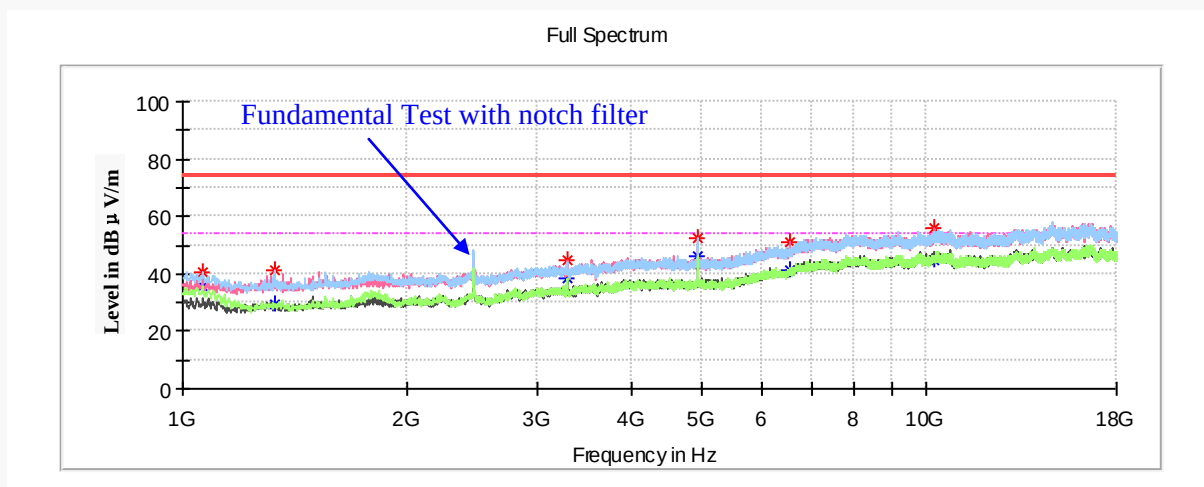
Model: 9290024472 (Worst Case)

Low Channel: 2412MHz

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)				
1027.200000	40.92	---	150.0	H	183.0	-12.3	74.00	33.08
1027.200000	---	36.68	150.0	H	183.0	-12.3	54.00	17.32
1493.000000	---	33.64	150.0	V	293.0	-9.4	54.00	20.36
1493.000000	39.79	---	150.0	V	293.0	-9.4	74.00	34.21
3215.100000	---	37.75	200.0	V	300.0	-2.6	54.00	16.25
3215.100000	43.85	---	200.0	V	300.0	-2.6	74.00	30.15
4814.000000	---	43.24	200.0	H	69.0	1.0	54.00	10.76
4814.000000	49.33	---	200.0	H	69.0	1.0	74.00	24.67
8347.400000	---	44.14	200.0	V	316.0	10.8	54.00	9.86
8347.400000	54.56	---	200.0	V	316.0	10.8	74.00	19.44
13976.100000	---	47.92	200.0	V	178.0	13.4	54.00	6.08
13976.100000	56.84	---	200.0	V	178.0	13.4	74.00	17.16

Middle Channel: 2437MHz

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)				
1045.900000	---	34.52	150.0	H	0.0	-12.2	54.00	19.48
1045.900000	39.91	---	150.0	H	0.0	-12.2	74.00	34.09
1363.800000	---	29.66	150.0	H	346.0	-10.2	54.00	24.34
1363.800000	41.02	---	150.0	H	346.0	-10.2	74.00	32.98
1591.600000	---	32.95	150.0	V	311.0	-9.1	54.00	21.05
1591.600000	42.41	---	150.0	V	311.0	-9.1	74.00	31.59
4874.000000	---	46.53	200.0	H	77.0	1.1	54.00	7.47
4874.000000	53.80	---	200.0	H	77.0	1.1	74.00	20.20
9117.500000	---	45.30	200.0	V	0.0	11.0	54.00	8.70
9117.500000	54.91	---	200.0	V	0.0	11.0	74.00	19.09
13988.000000	---	47.33	150.0	V	336.0	13.4	54.00	6.67
13988.000000	57.17	---	150.0	V	336.0	13.4	74.00	16.83

High Channel: 2462MHz

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)				
1062.900000	---	35.32	200.0	H	209.0	-12.1	54.00	18.68
1062.900000	40.65	---	200.0	H	209.0	-12.1	74.00	33.35
1326.400000	41.13	---	150.0	H	283.0	-10.5	74.00	32.87
1326.400000	---	29.33	150.0	H	283.0	-10.5	54.00	24.67
3281.400000	---	38.75	150.0	V	192.0	-2.4	54.00	15.25
3281.400000	44.48	---	150.0	V	192.0	-2.4	74.00	29.52
4924.000000	---	46.08	150.0	H	253.0	1.1	54.00	7.92
4924.000000	52.55	---	150.0	H	253.0	1.1	74.00	21.45
6543.700000	50.91	---	200.0	V	176.0	6.9	74.00	23.09
6543.700000	---	41.22	200.0	V	176.0	6.9	54.00	12.78
10266.700000	---	44.64	200.0	H	5.0	12.5	54.00	9.36
10266.700000	56.03	---	200.0	H	5.0	12.5	74.00	17.97

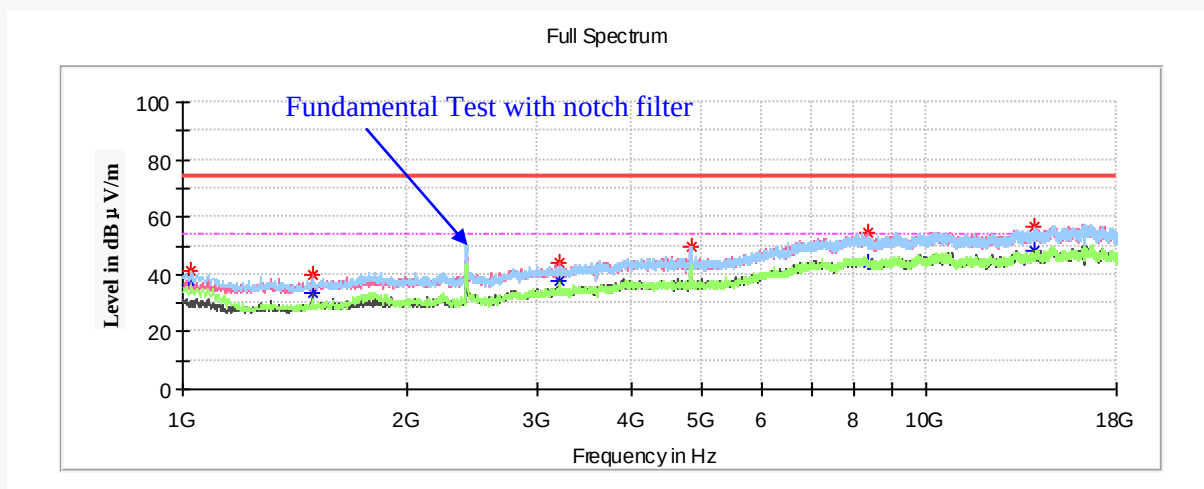
802.11g Mode:

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

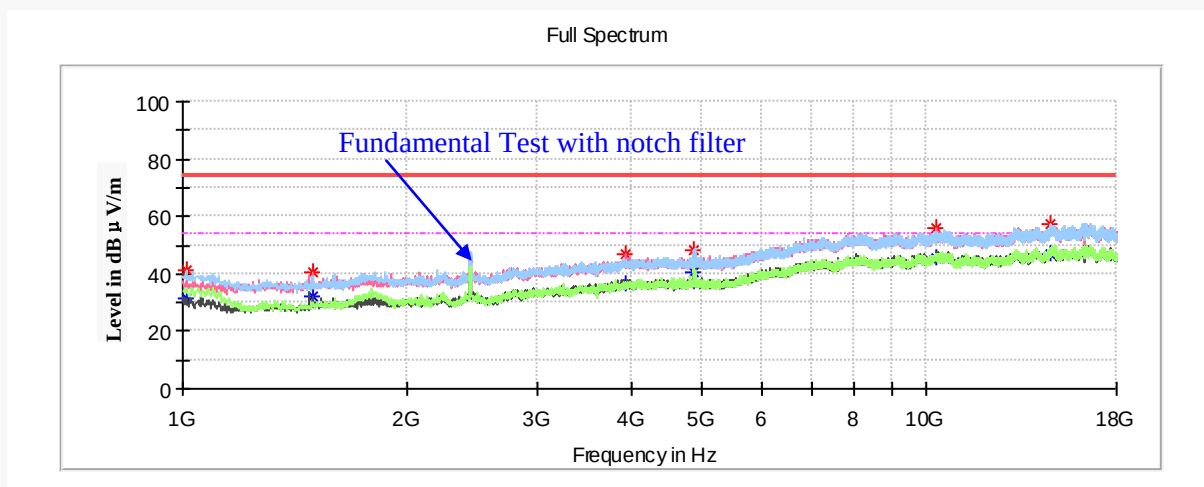
Note:

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 (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)
 Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

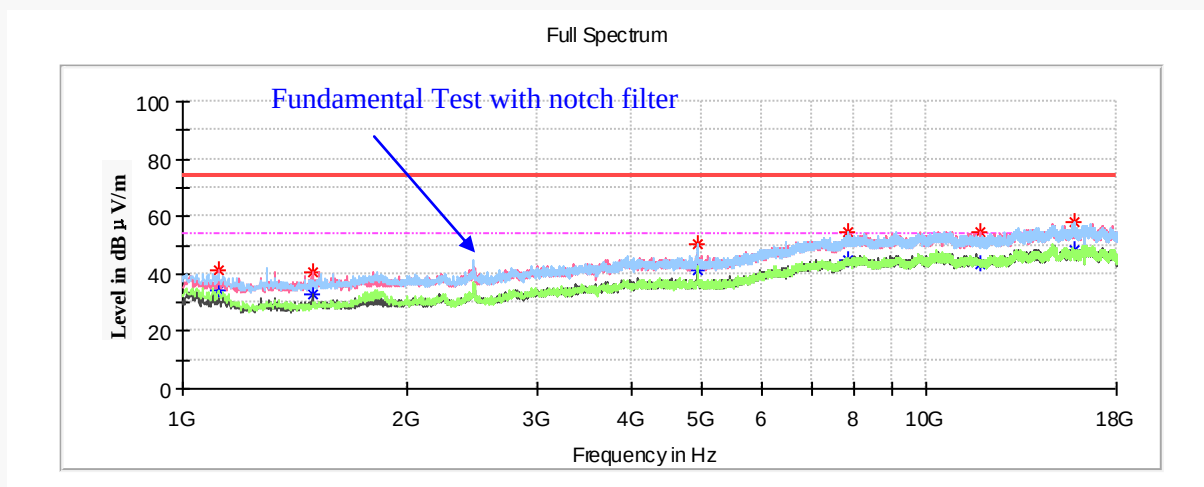
Model: 9290024472 (Worst Case)

Low Channel: 2412MHz

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)				
1027.200000	40.92	---	150.0	H	183.0	-12.3	74.00	33.08
1027.200000	---	36.68	150.0	H	183.0	-12.3	54.00	17.32
1493.000000	---	33.64	150.0	V	293.0	-9.4	54.00	20.36
1493.000000	39.79	---	150.0	V	293.0	-9.4	74.00	34.21
3215.100000	---	37.75	200.0	V	300.0	-2.6	54.00	16.25
3215.100000	43.85	---	200.0	V	300.0	-2.6	74.00	30.15
4814.000000	---	43.24	200.0	H	69.0	1.0	54.00	10.76
4814.000000	49.33	---	200.0	H	69.0	1.0	74.00	24.67
8347.400000	---	44.14	200.0	V	316.0	10.8	54.00	9.86
8347.400000	54.56	---	200.0	V	316.0	10.8	74.00	19.44
13976.100000	---	47.92	200.0	V	178.0	13.4	54.00	6.08
13976.100000	56.84	---	200.0	V	178.0	13.4	74.00	17.16

Middle Channel: 2437MHz

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)				
1010.200000	---	31.13	200.0	V	245.0	-12.4	54.00	22.87
1010.200000	41.06	---	200.0	V	245.0	-12.4	74.00	32.94
1493.000000	---	32.13	150.0	V	39.0	-9.4	54.00	21.87
1493.000000	40.35	---	150.0	V	39.0	-9.4	74.00	33.65
3935.900000	---	36.25	150.0	V	115.0	0.1	54.00	17.75
3935.900000	46.66	---	150.0	V	115.0	0.1	74.00	27.34
4874.000000	---	40.77	200.0	H	137.0	1.1	54.00	13.23
4874.000000	48.46	---	200.0	H	137.0	1.1	74.00	25.54
10283.700000	---	45.15	200.0	V	336.0	12.5	54.00	8.85
10283.700000	55.77	---	200.0	V	336.0	12.5	74.00	18.23
14674.800000	---	47.15	200.0	V	183.0	13.7	54.00	6.85
14674.800000	57.17	---	200.0	H	183.0	13.7	74.00	16.83

High Channel: 2462MHz

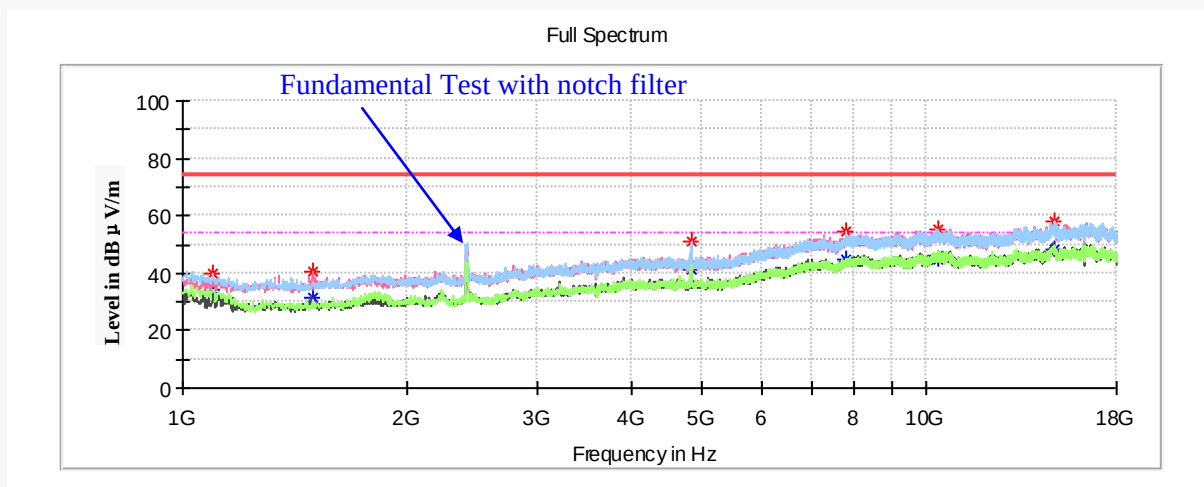
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Height (cm)	Polar (H/V)				
1117.300000	---	34.26	200.0	H	81.0	-11.8	54.00	19.74
1117.300000	41.58	---	200.0	H	81.0	-11.8	74.00	32.42
1494.700000	40.86	---	150.0	V	305.0	-9.4	74.00	33.14
1494.700000	---	33.02	150.0	V	305.0	-9.4	54.00	20.98
4924.000000	50.13	---	150.0	H	25.0	1.1	74.00	23.87
4924.000000	---	41.12	150.0	H	25.0	1.1	54.00	12.88
7822.100000	---	44.59	150.0	V	355.0	10.2	54.00	9.41
7822.100000	54.30	---	150.0	V	355.0	10.2	74.00	19.70
11774.600000	54.22	---	150.0	V	228.0	11.7	74.00	19.78
11774.600000	---	43.61	150.0	V	228.0	11.7	54.00	10.39
15771.300000	---	48.40	200.0	V	133.0	13.8	54.00	5.60
15771.300000	57.95	---	200.0	V	133.0	13.8	74.00	16.05

802.11n-HT20 Mode:

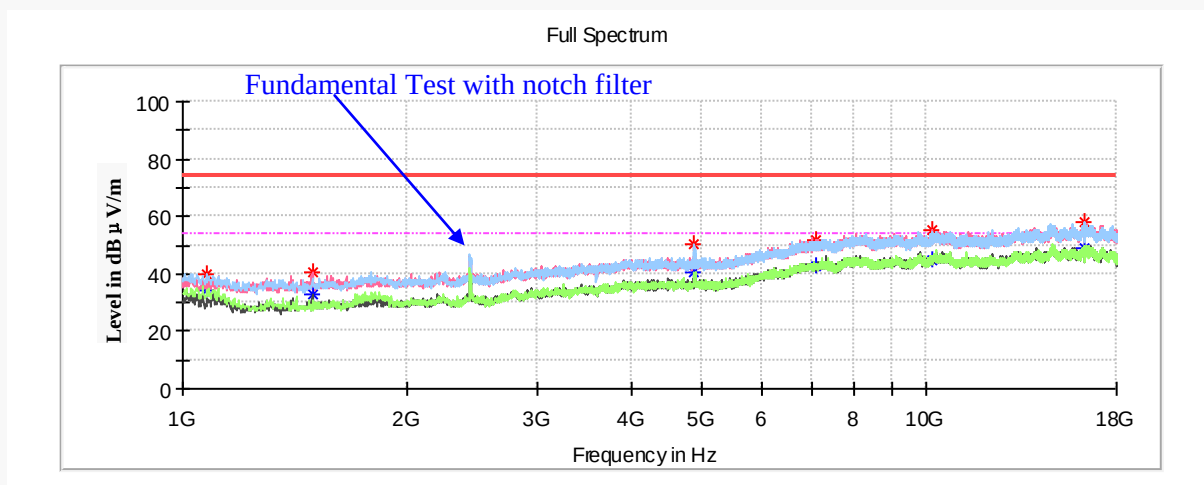
(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)

Note:

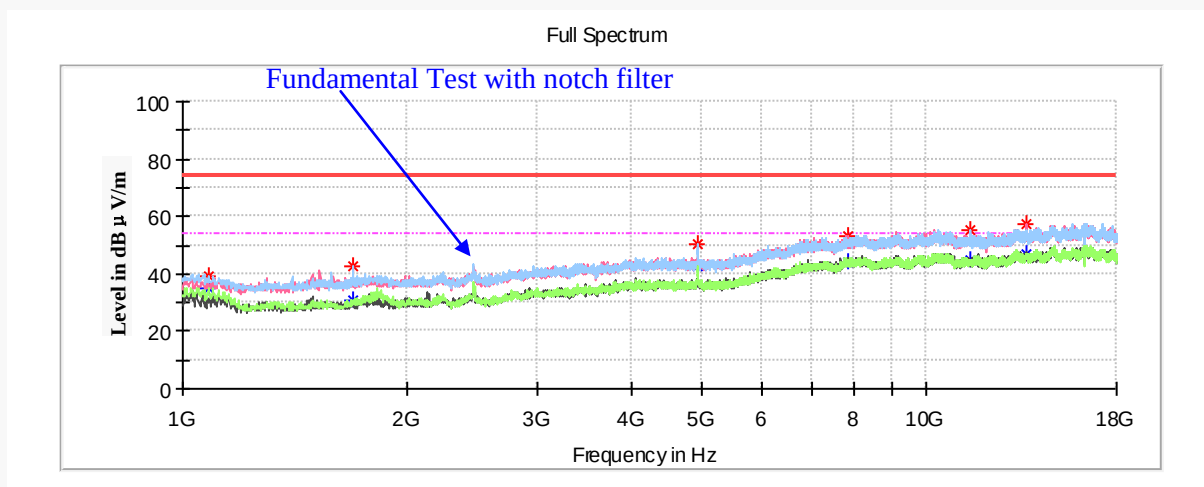
1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)
 Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)
 Model: 9290024472 (Worst Case)

Low Channel : 2412MHz

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)				
1096.900000	---	34.39	200.0	H	81.0	-11.9	54.00	19.61
1096.900000	39.59	---	200.0	H	81.0	-11.9	74.00	34.41
1494.700000	40.49	---	150.0	V	303.0	-9.4	74.00	33.51
1494.700000	---	31.64	150.0	V	303.0	-9.4	54.00	22.36
4814.000000	---	41.24	150.0	H	295.0	1.0	54.00	12.76
4814.000000	51.34	---	150.0	H	295.0	1.0	74.00	22.66
7805.100000	54.30	---	200.0	H	351.0	10.2	74.00	19.70
7805.100000	---	44.88	200.0	H	351.0	10.2	54.00	9.12
10341.500000	---	45.09	200.0	H	2.0	12.7	54.00	8.91
10341.500000	55.29	---	200.0	H	2.0	12.7	74.00	18.71
14827.800000	57.69	---	200.0	H	328.0	13.9	74.00	16.31
14827.800000	---	48.40	200.0	H	328.0	13.9	54.00	5.60

Middle Channel: 2437MHz

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)				
1078.200000	39.78	---	150.0	H	295.0	-12.0	74.00	34.22
1078.200000	---	34.43	150.0	H	295.0	-12.0	54.00	19.57
1493.000000	---	32.75	150.0	V	174.0	-9.4	54.00	21.25
1493.000000	40.62	---	150.0	V	174.0	-9.4	74.00	33.38
4874.000000	50.21	---	200.0	H	281.0	1.1	74.00	23.79
4874.000000	---	40.61	200.0	H	281.0	1.1	54.00	13.39
7118.300000	---	42.68	200.0	V	241.0	9.0	54.00	11.32
7118.300000	51.98	---	200.0	V	241.0	9.0	74.00	22.02
10173.200000	55.48	---	150.0	V	112.0	12.3	74.00	18.52
10173.200000	---	44.87	150.0	V	112.0	12.3	54.00	9.13
16269.400000	---	48.64	150.0	V	317.0	14.2	54.00	5.36
16269.400000	57.90	---	150.0	V	317.0	14.2	74.00	16.10

High Channel : 2462MHz

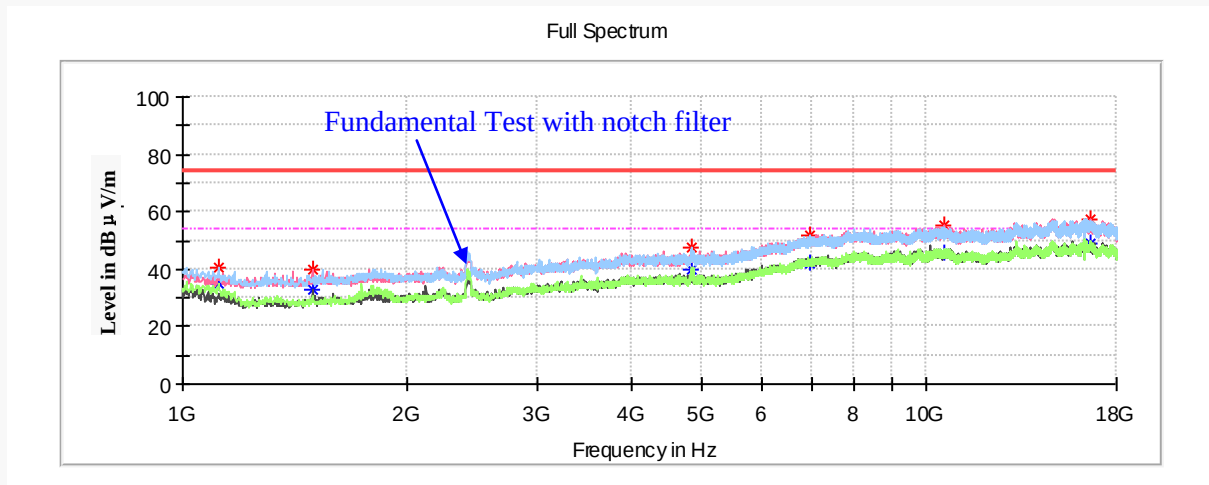
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Height (cm)	Polar (H/V)				
1083.300000	39.20	---	150.0	H	294.0	-12.0	74.00	34.80
1083.300000	---	34.77	150.0	H	294.0	-12.0	54.00	19.23
1691.900000	---	30.58	150.0	H	77.0	-8.7	54.00	23.42
1691.900000	42.47	---	150.0	H	77.0	-8.7	74.00	31.53
4924.000000	50.19	---	150.0	H	294.0	1.1	74.00	23.81
4924.000000	---	42.89	150.0	H	294.0	1.1	54.00	11.11
7856.100000	---	43.91	150.0	V	359.0	10.3	54.00	10.09
7856.100000	53.37	---	150.0	V	359.0	10.3	74.00	20.63
11451.600000	54.97	---	200.0	H	355.0	11.8	74.00	19.03
11451.600000	---	44.58	200.0	H	355.0	11.8	54.00	9.42
13586.800000	---	47.08	150.0	V	359.0	13.1	54.00	6.92
13586.800000	57.22	---	150.0	V	359.0	13.1	74.00	16.78

802.11n-HT40 Mode:

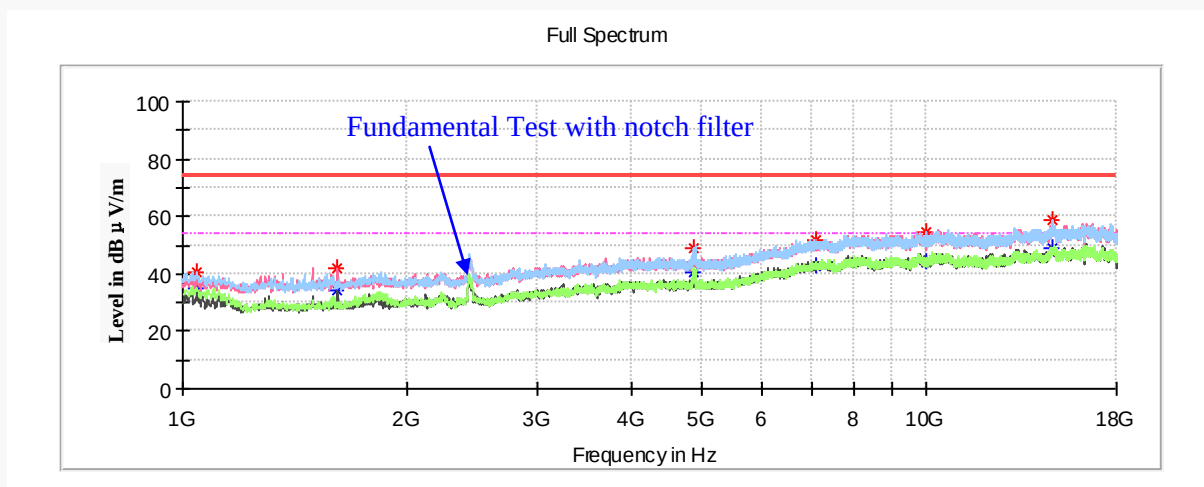
(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)

Note:

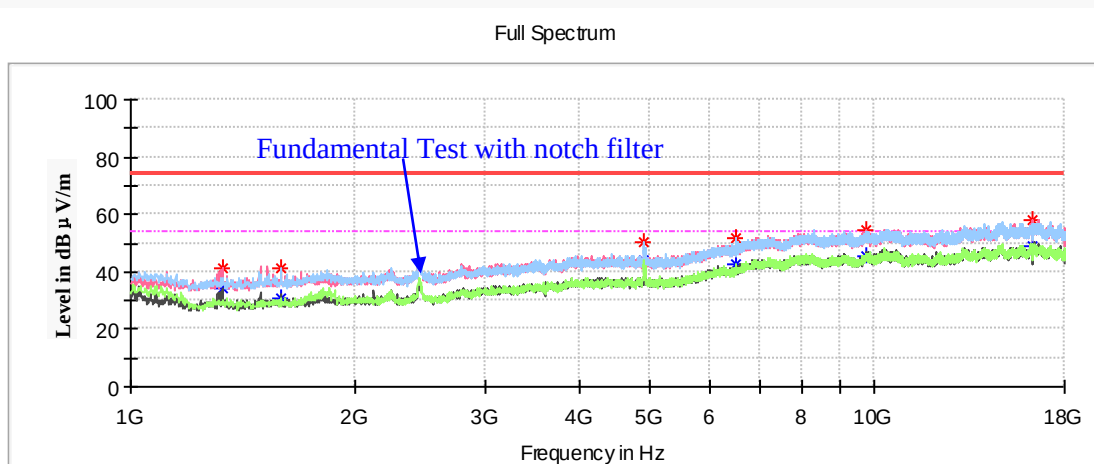
1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dB μ V/m) = Corrected Factor (dB/m) + Reading (dB μ V)
 Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V/m)
 Model: 9290024472 (Worst Case)

Low Channel: 2422MHz

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)				
1117.300000	40.55	---	200.0	H	73.0	-11.8	74.00	33.45
1117.300000	---	34.67	200.0	H	73.0	-11.8	54.00	19.33
1494.700000	---	33.04	150.0	V	298.0	-9.4	54.00	20.96
1494.700000	40.00	---	150.0	V	298.0	-9.4	74.00	34.00
4844.000000	47.55	---	200.0	H	275.0	1.0	74.00	26.45
4844.000000	---	39.70	200.0	H	275.0	1.0	54.00	14.30
6951.700000	51.85	---	200.0	H	321.0	8.7	74.00	22.15
6951.700000	---	42.11	200.0	H	321.0	8.7	54.00	11.89
10537.000000	55.26	---	150.0	V	268.0	12.9	74.00	18.74
10537.000000	---	45.31	150.0	V	268.0	12.9	54.00	8.69
16619.600000	57.67	---	200.0	V	294.0	13.9	74.00	16.33
16619.600000	---	49.24	200.0	V	294.0	13.9	54.00	4.76

Middle Channel: 2437MHz

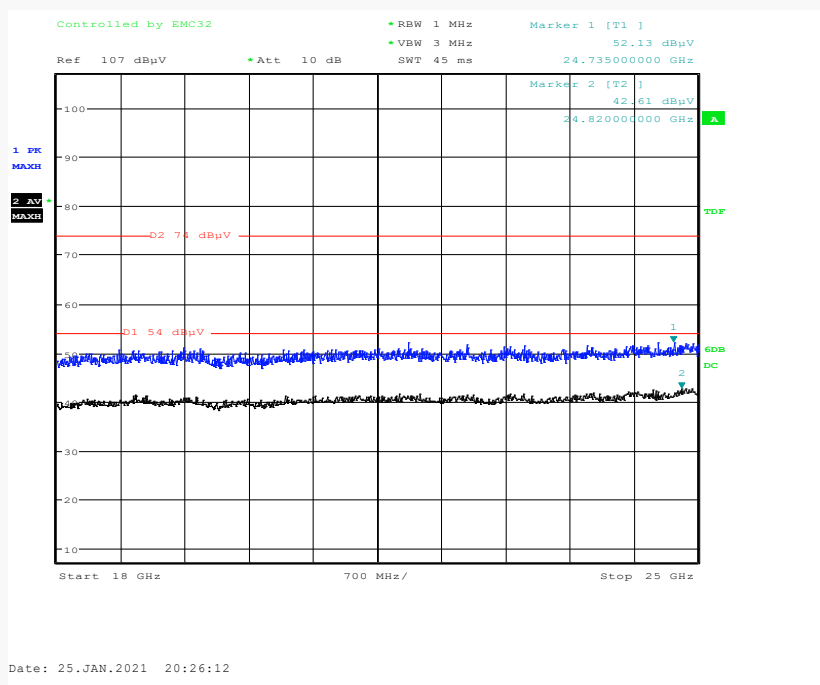
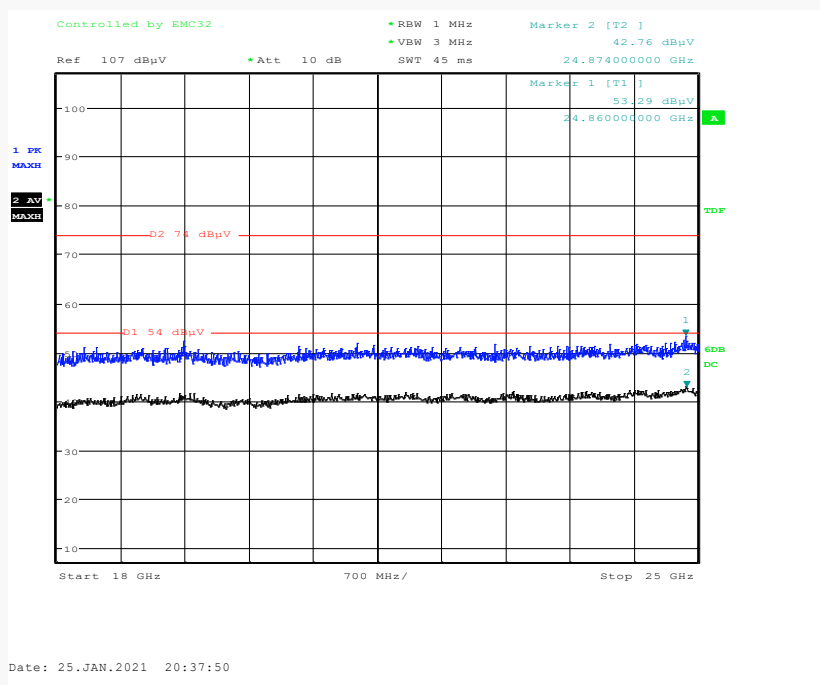
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1045.900000	---	34.71	150.0	H	293.0	-12.2	54.00	19.29
1045.900000	40.31	---	150.0	H	293.0	-12.2	74.00	33.69
1617.100000	---	34.20	150.0	V	81.0	-9.0	54.00	19.80
1617.100000	41.82	---	150.0	V	81.0	-9.0	74.00	32.18
4874.000000	---	40.79	200.0	H	275.0	1.1	54.00	13.21
4874.000000	48.89	---	200.0	H	275.0	1.1	74.00	25.11
7118.300000	52.09	---	150.0	V	30.0	9.0	74.00	21.91
7118.300000	---	42.77	150.0	V	30.0	9.0	54.00	11.23
9974.300000	---	44.04	200.0	H	0.0	11.9	54.00	9.96
9974.300000	54.69	---	200.0	H	0.0	11.9	74.00	19.31
14770.000000	---	49.18	150.0	H	345.0	13.9	54.00	4.82
14770.000000	58.48	---	150.0	H	345.0	13.9	74.00	15.52

High Channel: 2452MHz

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	41.24	---	200.0	V	71.0	-10.5	74.00	32.76
1326.400000	---	34.02	200.0	V	71.0	-10.5	54.00	19.98
1591.600000	---	30.51	200.0	H	335.0	-9.1	54.00	23.49
1591.600000	41.07	---	200.0	H	335.0	-9.1	74.00	32.93
4904.000000	50.42	---	200.0	H	275.0	1.1	74.00	23.58
4904.000000	---	43.85	200.0	H	275.0	1.1	54.00	10.15
6511.400000	---	42.52	150.0	H	310.0	6.8	54.00	11.48
6511.400000	51.50	---	150.0	H	310.0	6.8	74.00	22.50
9726.100000	54.88	---	200.0	V	279.0	11.9	74.00	19.12
9726.100000	---	45.18	200.0	V	279.0	11.9	54.00	8.82
16342.500000	---	49.10	200.0	V	123.0	14.1	54.00	4.90
16342.500000	58.00	---	200.0	V	123.0	14.1	74.00	16.00

18GHz-25GHz:

Pre-scan with 802.11b, 802.11g, 802.11n-HT20 and 802.11n-HT40 modes of operation in the X,Y and Z axes of orientation, the worst case **low channel of 802.11b mode in Z-axis of orientation** was recorded
Model: 9290024472 (Worst Case)

Horizontal**Vertical**

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	50.61	---	150.0	H	280.0	3.8	74.00	23.39
2390.00	---	46.02	150.0	H	280.0	3.8	54.00	7.98
High Channel: 2462MHz								
2483.50	51.89	---	150.0	V	39.0	4.1	74.00	22.11
2483.50	---	46.76	150.0	V	39.0	4.1	54.00	7.24

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	55.40	---	200.0	H	239.0	3.8	74.00	18.60
2390.00	---	47.37	200.0	H	239.0	3.8	54.00	6.63
High Channel: 2462MHz								
2483.50	51.30	---	200.0	V	72.0	4.2	74.00	22.70
2483.50	---	47.02	200.0	V	72.0	4.2	54.00	6.98

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	55.05	---	150.0	H	111.0	3.8	74.00	18.95
2390.00	---	47.97	150.0	H	111.0	3.8	54.00	6.03
High Channel: 2462MHz								
2483.50	55.21	---	150.0	H	309.0	4.1	74.00	18.79
2483.50	---	46.98	150.0	H	309.0	4.1	54.00	7.02

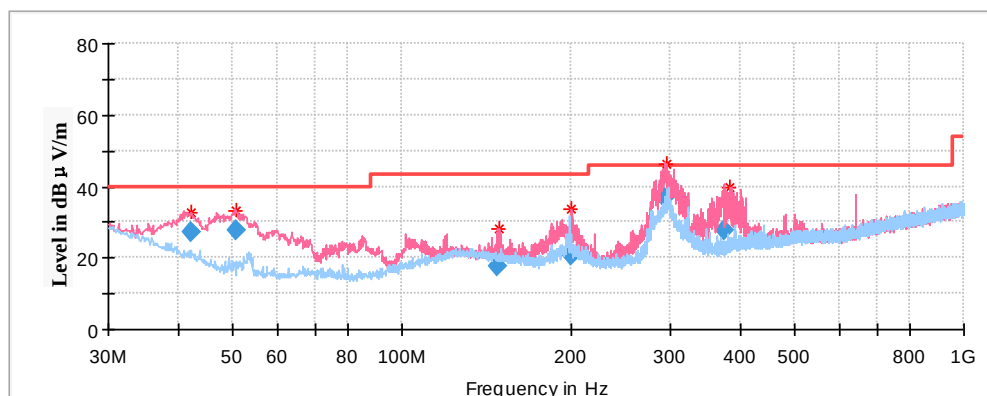
802.11n-HT40 Mode: (Pre-scan in the X,Y and Z axes of orientation, the worst case Z-axis of orientation was recorded)

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: 2422MHz								
2390.000000	52.86	---	200.0	H	246.0	3.8	74.00	21.14
2390.000000	---	47.73	200.0	H	246.0	3.8	54.00	6.27
High Channel: 2452MHz								
2483.500000	52.90	---	150.0	H	310.0	4.1	74.00	21.10
2483.500000	---	47.88	150.0	H	310.0	4.1	54.00	6.12

For BLE Mode:**Spurious Emission Test:****30MHz-1GHz**

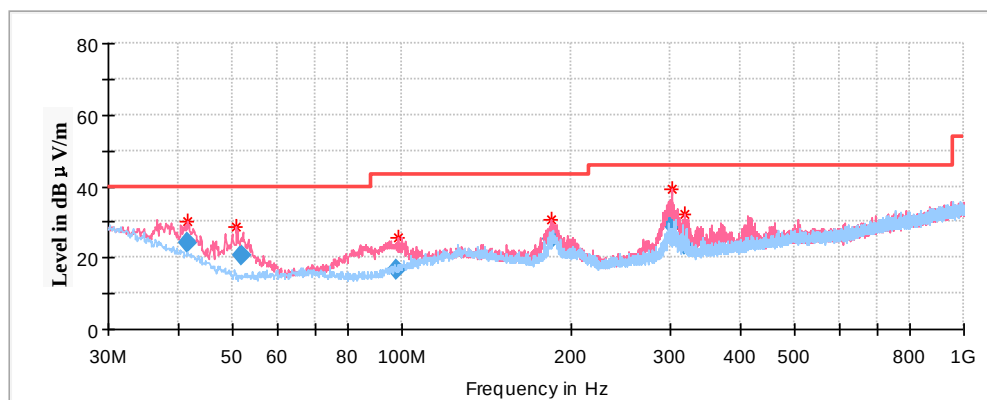
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high channel of operation in the Z axis of orientation** was recorded)

Model: 9290024472



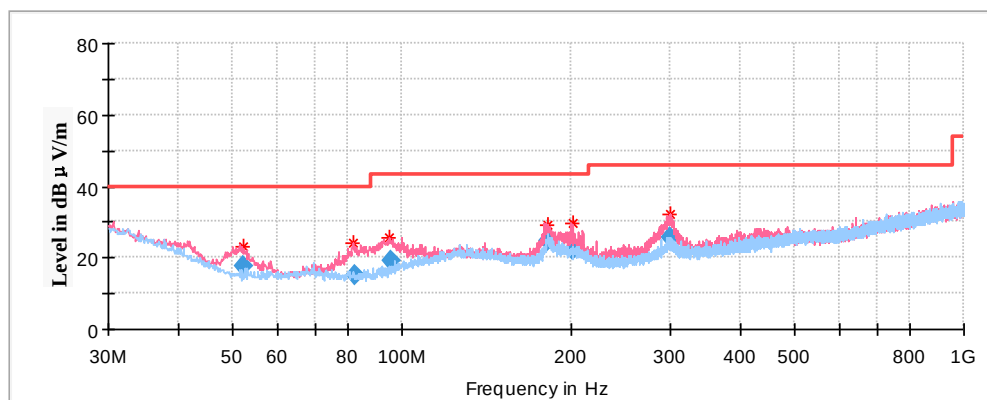
Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	QuasiPeak (dBμV/m)	Height (cm)	Polar (H/V)				
42.161650	27.03	100.0	V	304.0	-12.0	40.00	12.97
50.833800	27.83	100.0	V	298.0	-17.2	40.00	12.17
147.551900	17.50	100.0	V	274.0	-11.4	43.50	26.00
200.264000	20.62	200.0	V	0.0	-10.8	43.50	22.88
293.619850	36.66	200.0	V	310.0	-10.7	46.00	9.34
373.861150	27.67	100.0	V	220.0	-8.6	46.00	18.33

Model: 9290024471



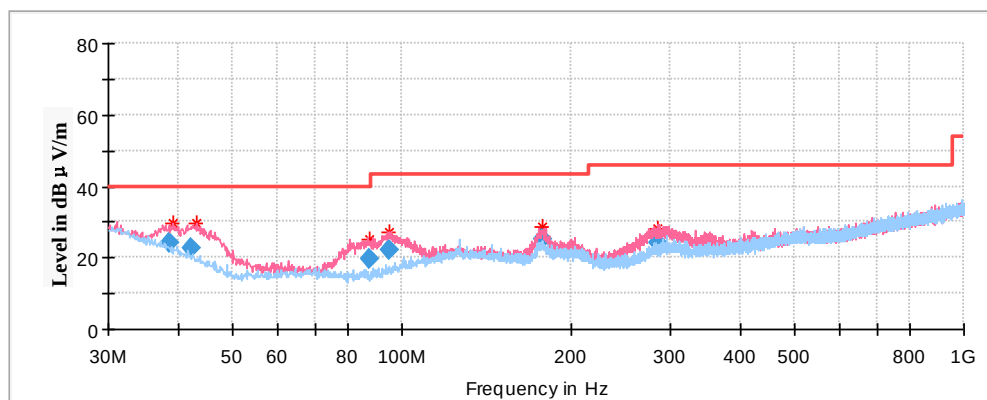
Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	QuasiPeak (dBμV/m)	Height (cm)	Polar (H/V)				
41.494550	23.90	100.0	V	109.0	-7.5	40.00	16.10
51.847050	20.46	100.0	V	0.0	-17.2	40.00	19.54
97.800350	16.68	100.0	V	145.0	-14.7	43.50	26.82
184.817800	25.10	100.0	V	219.0	-11.9	43.50	18.40
303.489700	29.08	200.0	V	359.0	-10.3	46.00	16.92
318.325650	23.78	200.0	V	24.0	-10.0	46.00	22.22

Model: 9290030188



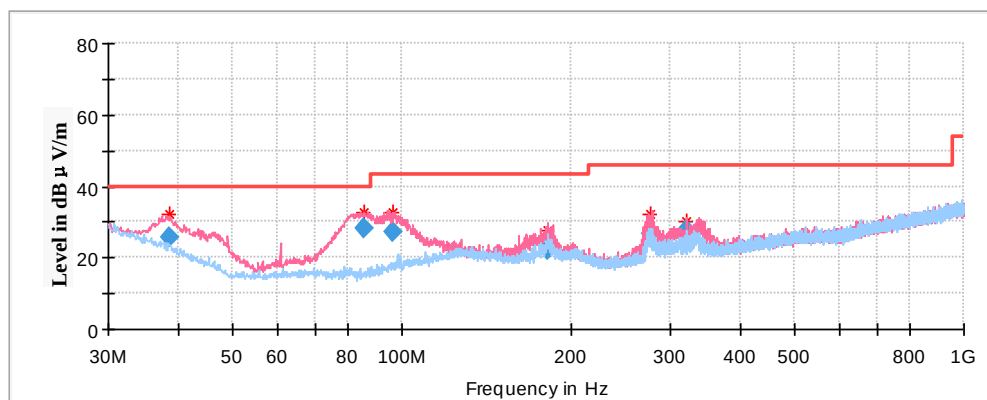
Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	QuasiPeak (dBμV/m)	Height (cm)	Polar (H/V)				
52.084300	17.53	100.0	V	305.0	-17.2	40.00	22.47
82.320050	15.10	200.0	V	12.0	-17.0	40.00	24.90
95.467250	19.27	100.0	V	233.0	-15.3	43.50	24.23
181.598700	24.42	200.0	V	358.0	-12.2	43.50	19.08
200.771750	21.91	100.0	V	205.0	-10.8	43.50	21.59
300.268000	25.78	200.0	V	358.0	-10.4	46.00	20.22

Model: 9290030189



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)				
38.529450	24.10	100.0	V	115.0	-9.6	40.00	15.90
42.034550	22.60	100.0	V	164.0	-11.9	40.00	17.40
87.272750	19.86	100.0	V	206.0	-16.8	40.00	20.14
94.837300	22.02	100.0	V	127.0	-15.5	43.50	21.48
178.223050	24.91	200.0	V	228.0	-12.4	43.50	18.59
284.355200	23.90	200.0	V	15.0	-11.1	46.00	22.10

Model: 9290030233



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)				
38.632150	25.70	100.0	V	192.0	-9.6	40.00	14.30
85.794550	27.95	100.0	V	156.0	-16.9	40.00	12.05
96.165200	26.93	100.0	V	58.0	-15.1	43.50	16.57
181.419050	22.28	200.0	V	96.0	-12.2	43.50	21.22
277.738300	26.65	200.0	V	32.0	-11.4	46.00	19.35
320.017700	27.56	200.0	V	339.0	-10.0	46.00	18.44

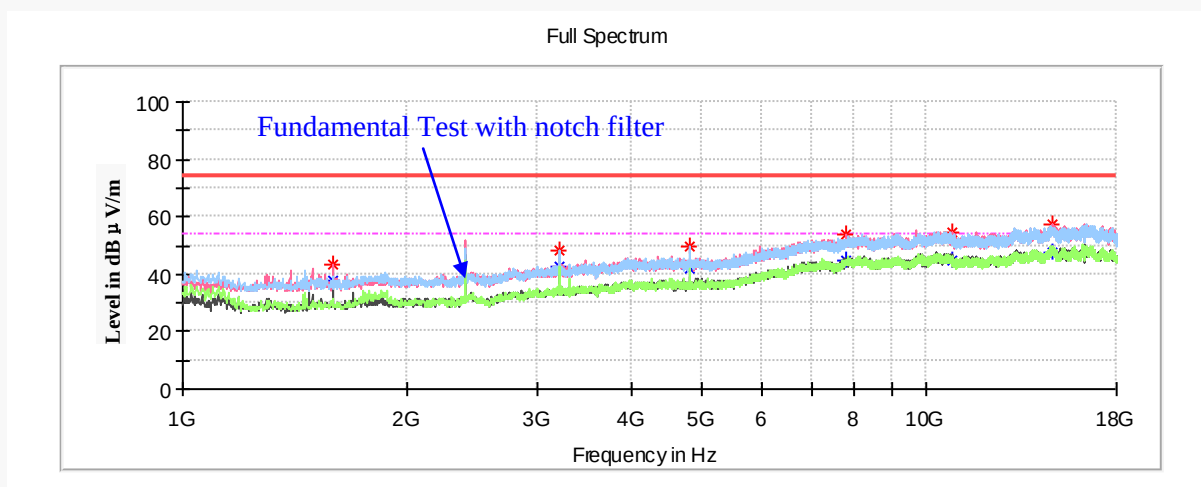
1GHz-18GHz:**BLE mode:**

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

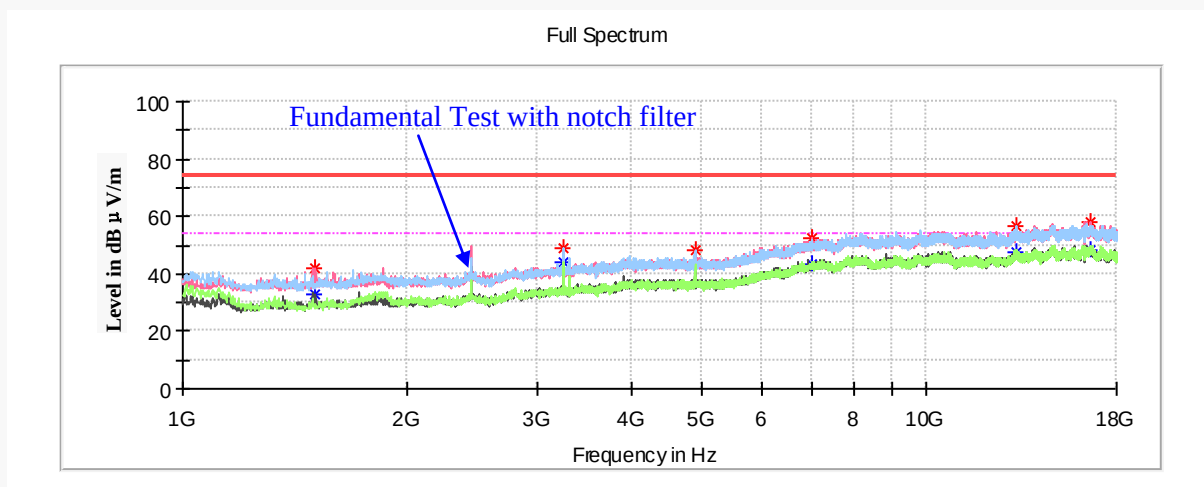
Note:

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)

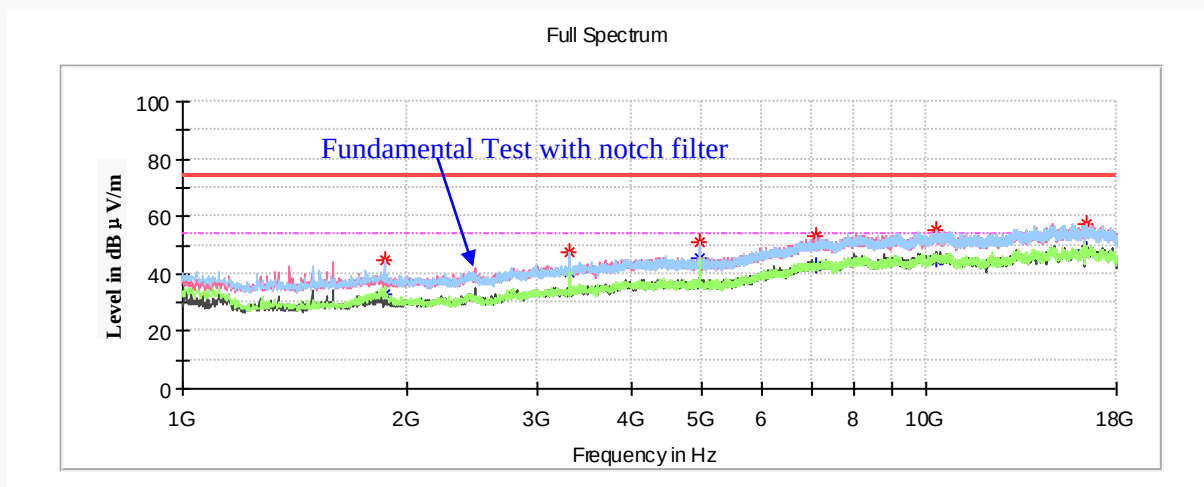
Model: 9290024472 (Worst Case)

Low Channel: 2402MHz

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	---	37.90	200.0	V	278.0	-9.1	54.00	16.10
1595.000000	43.35	---	200.0	V	278.0	-9.1	74.00	30.65
3201.500000	---	42.93	150.0	H	302.0	-2.6	54.00	11.07
3201.500000	48.47	---	150.0	H	302.0	-2.6	74.00	25.53
4804.000000	---	41.99	200.0	H	255.0	1.0	54.00	12.01
4804.000000	49.62	---	200.0	H	255.0	1.0	74.00	24.38
7815.300000	---	44.64	200.0	V	51.0	10.2	54.00	9.36
7815.300000	53.65	---	200.0	V	51.0	10.2	74.00	20.35
10822.600000	---	44.81	150.0	V	323.0	12.0	54.00	9.19
10822.600000	54.62	---	150.0	V	323.0	12.0	74.00	19.38
14785.300000	---	47.88	150.0	H	210.0	13.9	54.00	6.12
14785.300000	57.52	---	150.0	H	210.0	13.9	74.00	16.48

Middle Channel: 2440MHz

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)				
1510.000000	41.74	---	150.0	V	242.0	-9.4	74.00	32.26
1510.000000	---	33.02	150.0	V	242.0	-9.4	54.00	20.98
3252.500000	48.67	---	150.0	H	210.0	-2.5	74.00	25.33
3252.500000	---	44.25	150.0	H	210.0	-2.5	54.00	9.75
4880.000000	48.33	---	150.0	H	345.0	1.1	74.00	25.67
4880.000000	---	43.34	150.0	H	345.0	1.1	54.00	10.66
7021.400000	52.54	---	200.0	V	332.0	8.9	74.00	21.46
7021.400000	---	43.18	200.0	V	332.0	8.9	54.00	10.82
13173.700000	---	47.41	150.0	V	24.0	13.0	54.00	6.59
13173.700000	56.97	---	150.0	V	24.0	13.0	74.00	17.03
16587.300000	---	48.35	150.0	V	84.0	13.9	54.00	5.65
16587.300000	58.14	---	150.0	V	84.0	13.9	74.00	15.86

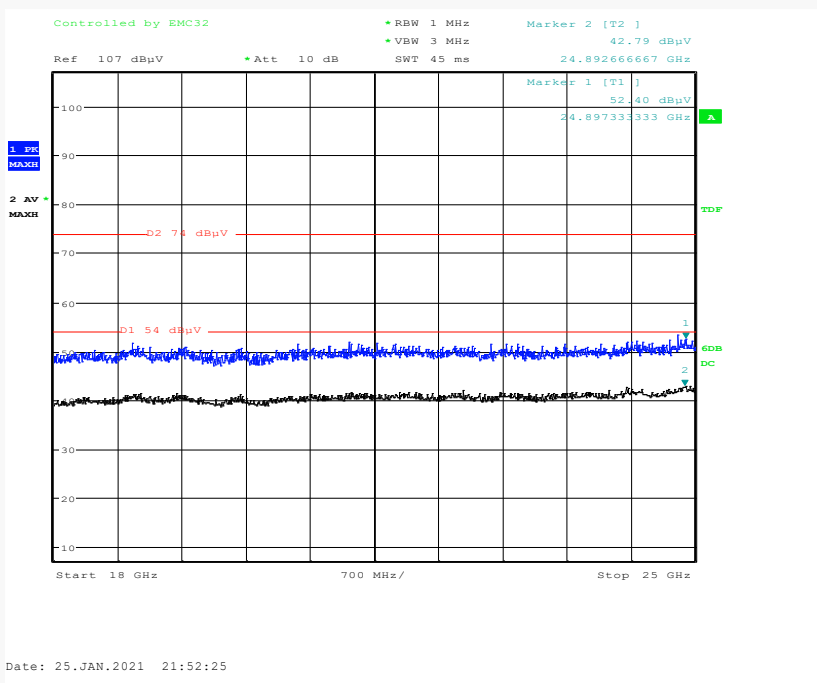
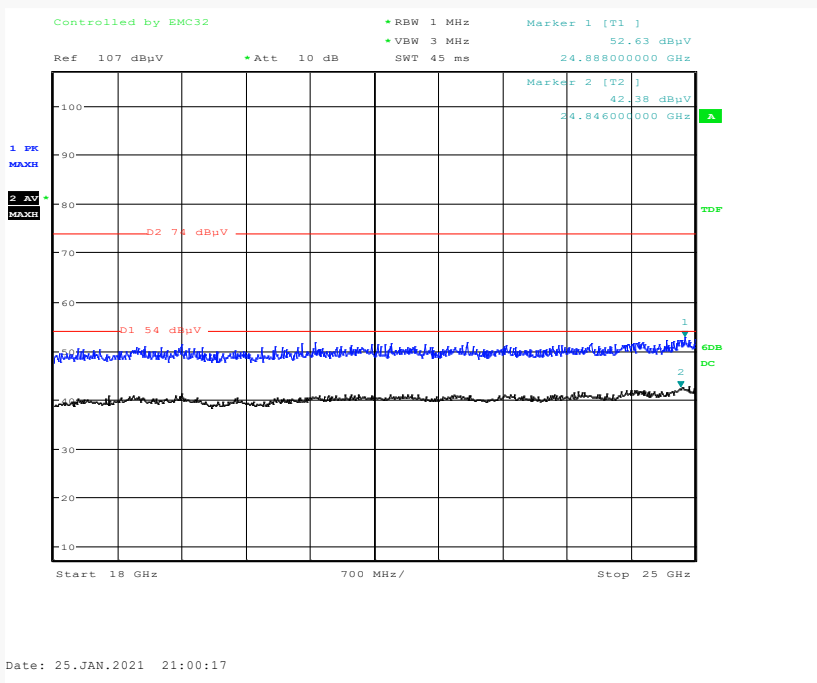
High Channel: 2480MHz

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)				
1865.300000	44.81	---	200.0	H	98.0	-8.1	74.00	29.19
1865.300000	---	32.83	200.0	H	98.0	-8.1	54.00	21.17
3305.200000	47.78	---	200.0	H	213.0	-2.3	74.00	26.22
3305.200000	---	40.81	200.0	H	213.0	-2.3	54.00	13.19
4959.300000	51.12	---	150.0	H	184.0	1.1	74.00	22.88
4959.300000	---	45.42	150.0	H	184.0	1.1	54.00	8.58
7113.200000	52.88	---	150.0	H	231.0	9.0	74.00	21.12
7113.200000	---	42.34	150.0	H	231.0	9.0	54.00	11.66
10305.800000	55.05	---	200.0	H	184.0	12.6	74.00	18.95
10305.800000	---	44.87	200.0	H	184.0	12.6	54.00	9.13
16408.800000	---	47.90	150.0	V	103.0	14.0	54.00	6.10
16408.800000	57.30	---	150.0	V	103.0	14.0	74.00	16.70

18GHz-25GHz

(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high channel of operation in the Z axis of orientation** was recorded)

Model: 9290024472 (Worst Case)

Horizontal**Vertical**

Restricted Bands Emissions Test:

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

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)

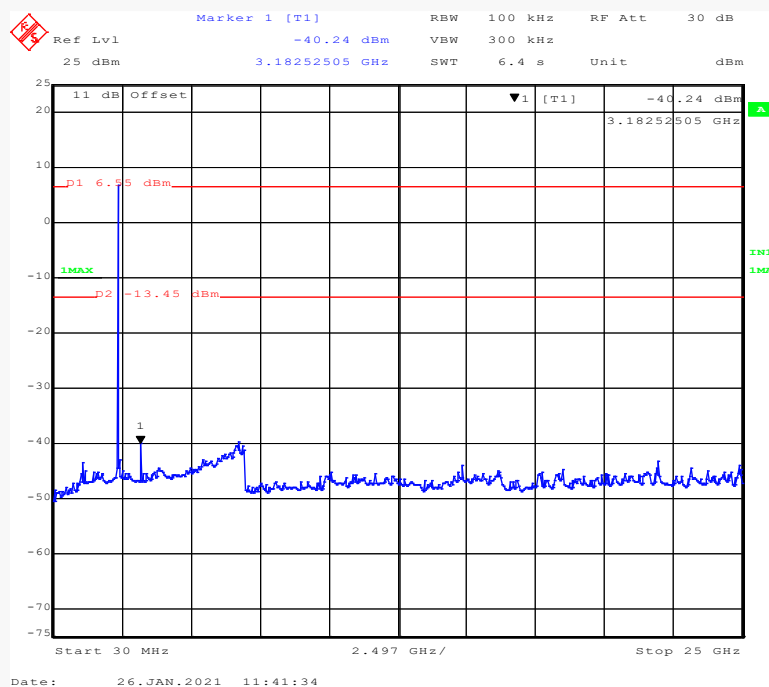
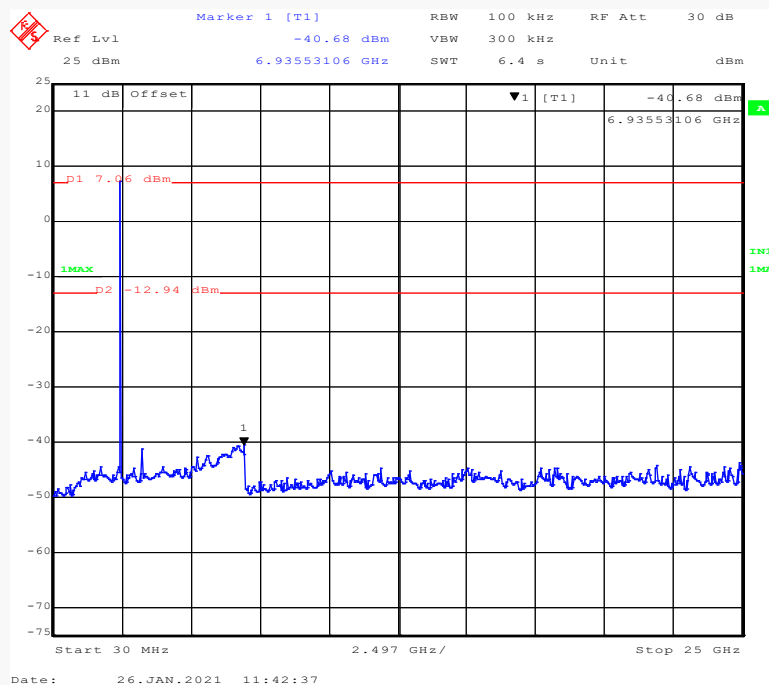
Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)

Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

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: 2402MHz								
2390.000000	50.93	---	150.0	H	346.0	3.8	74.00	23.07
2390.000000	---	46.03	150.0	H	346.0	3.8	54.00	7.97
High Channel: 2480MHz								
2483.500000	51.71	---	100.0	V	198.0	4.1	74.00	22.29
2483.500000	---	45.32	100.0	V	198.0	4.1	54.00	8.68

Conducted Spurious Emissions at Antenna Port

Model: 9290024472 (Worst Case)

802.11b Mode Low Channel**802.11b Mode Middle Channel**

Marker 1 [T1]

RBW 100 kHz RF Att 30 dB

Ref Lvl -39.53 dBm VBW 300 kHz

25 dBm 6.73537074 GHz SWT 6.4 s Unit dBm

11 dB Offset

p1 6.41 dBm

1MAX

p2 -13.39 dBm

1

Start 30 MHz 2.497 GHz/ Stop 25 GHz

Date: 26.JAN.2021 11:43:57

Marker 1 [T1]

Ref Lvl	-39.69 dBm	RBW	100 kHz	RF Att	30 dB
25 dBm	6.63529058 GHz	VBW	300 kHz	Unit	dBm
		SWT	6.4 s		

11 dB Offset

▼1 [T1] -39.69 dBm

6.63529058 GHz

D1 0.05 dBm

1MAX

D2 -19.35 dBm

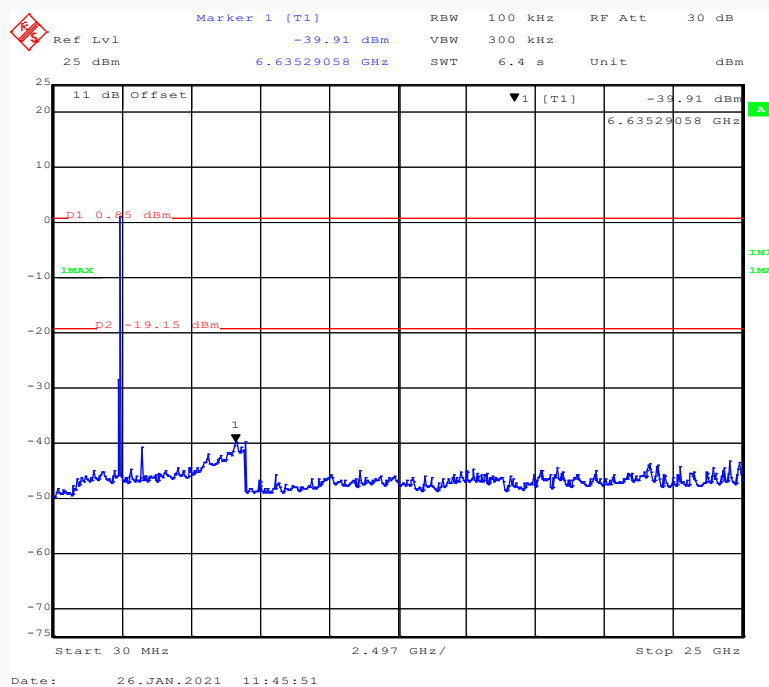
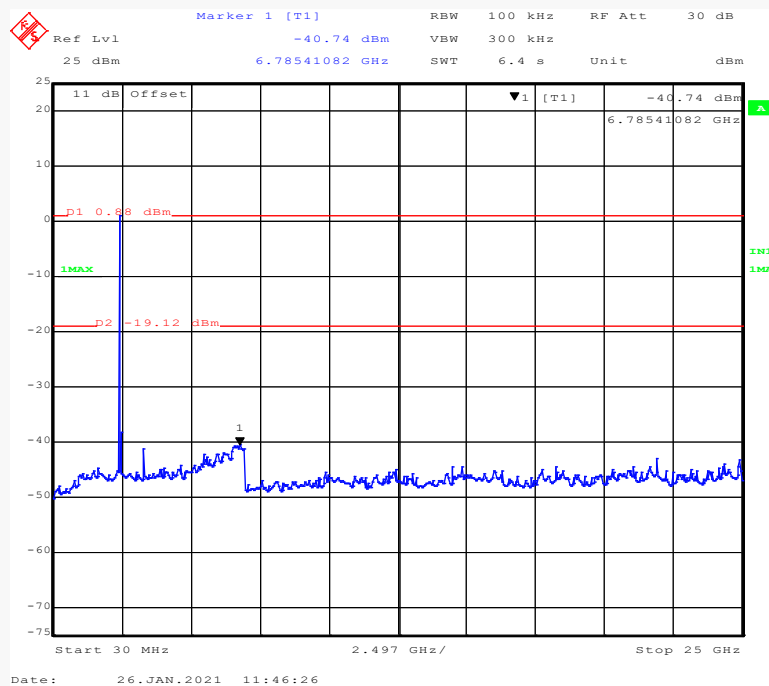
1

Start 30 MHz

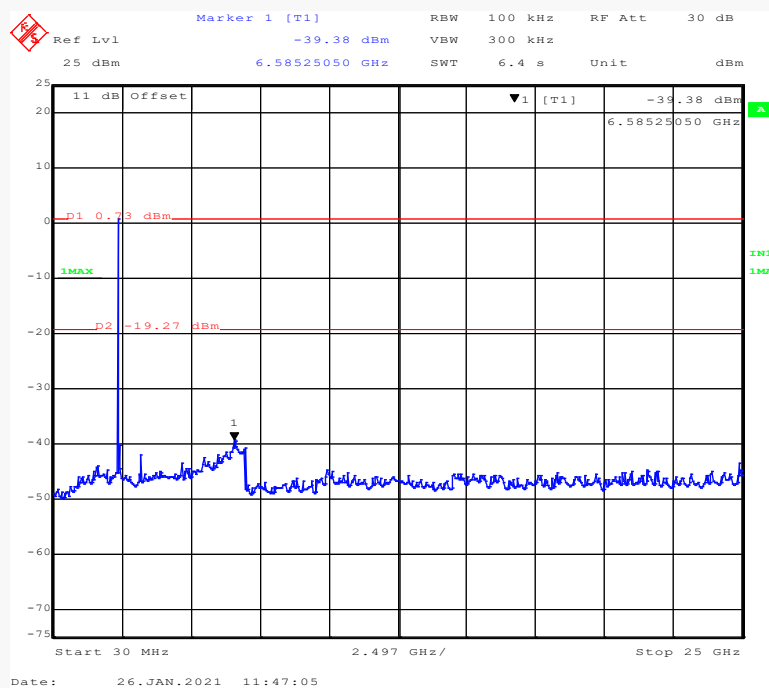
2.497 GHz/

Stop 25 GHz

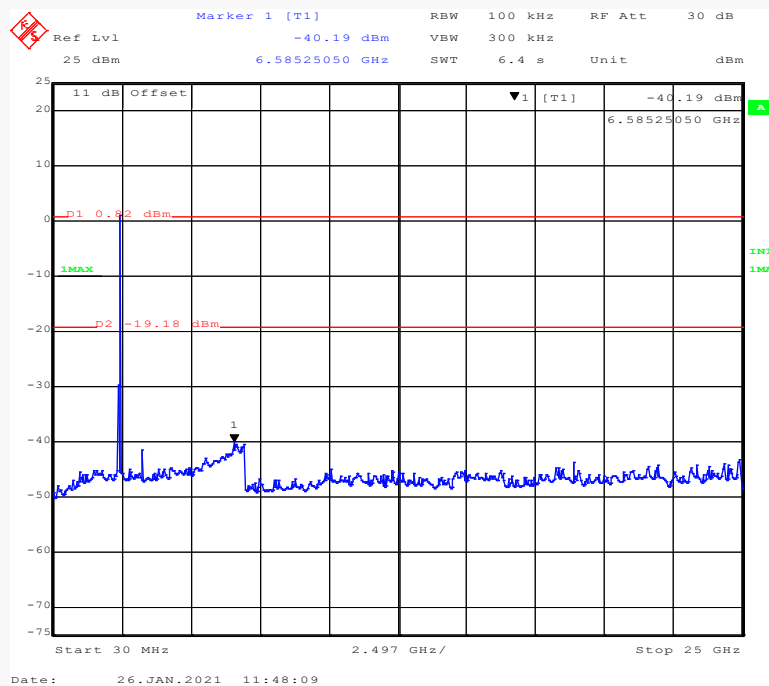
Date: 26.JAN.2021 11:45:19

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

802.11n-HT20 Mode Low Channel



802.11n-HT20 Mode Middle Channel



Ref Lvl 25 dBm

Marker 1 [T1] -39.97 dBm

RBW 100 kHz

RF Att 30 dB

6.58525050 GHz

SWT 6.4 s

Unit dBm

11 dB Offset

p1 0.78 dBm

1MAX

p2 -19.22 dBm

1

Start 30 MHz

2.497 GHz/

Stop 25 GHz

Date: 26.JAN.2021 11:49:18

[illegible]

Marker 1 [T1]
 Ref Lvl -40.10 dBm
 RBW 100 kHz
 RF Att 30 dB
 25 dBm
 6.58525050 GHz
 SWT 6.4 s
 Unit dBm

11 dB Offset
 ▼1 [T1]
 -40.10 dBm
 6.58525050 GHz

p1 -36.5 dBm
 1MAX
 p2 -23.65 dBm
 1
 1MAX

Start 30 MHz
 2.497 GHz/
 Stop 25 GHz

Date: 26.JAN.2021 11:50:38

Marker 1 [T1]
 -38.43 dBm
 6.68533066 GHz

RBW 100 kHz RF Att 30 dB
 VBW 300 kHz
 SWT 6.4 s Unit dBm

Ref Lvl 25 dBm

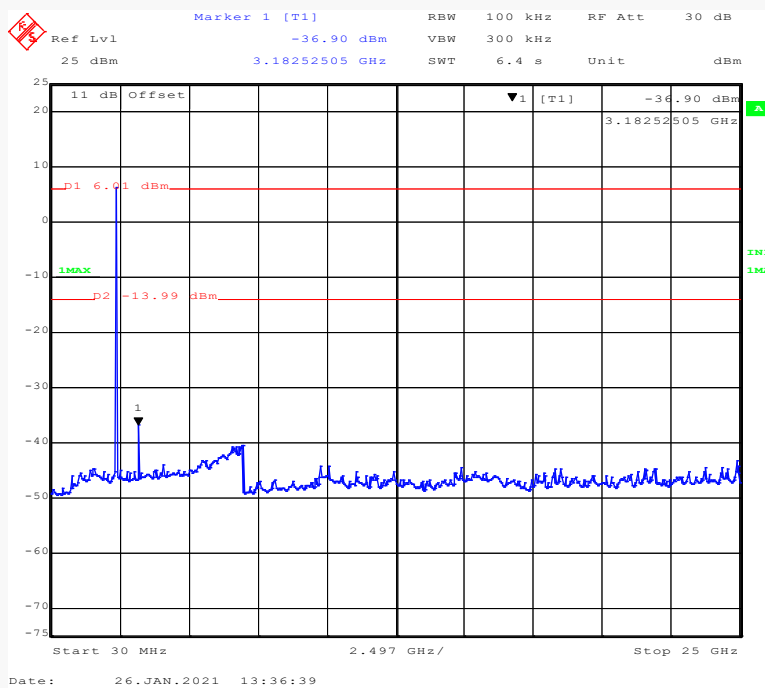
11 dB Offset
 ▼1 [T1]
 -38.43 dBm
 6.68533066 GHz

P1 -38.49 dBm
 1MAX
 P2 -23.49 dBm
 1
 IN1
 1MA

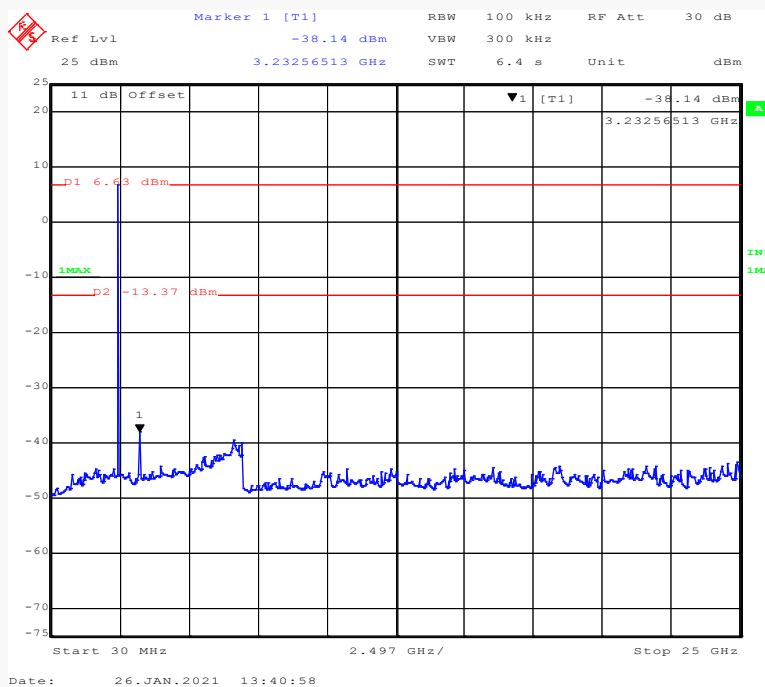
Start 30 MHz 2.497 GHz/ Stop 25 GHz

Date: 26.JAN.2021 11:52:05

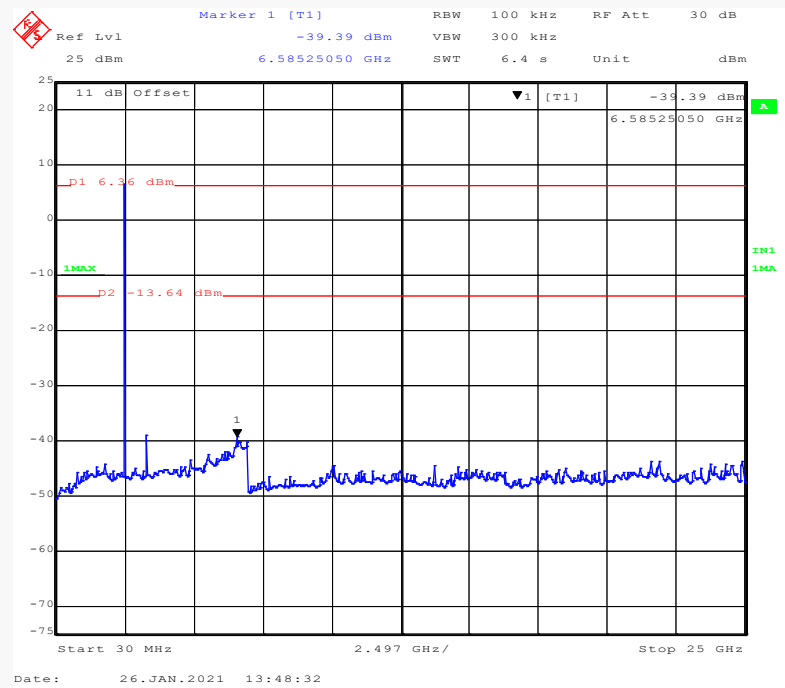
BLE Mode Low Channel



BLE Mode Middle Channel



BLE Mode High Channel



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

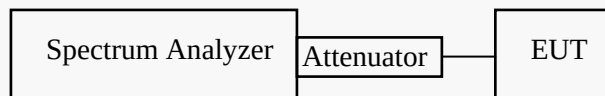
Applicable Standard

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:	25.4°C
Relative Humidity:	50 %
ATM Pressure:	101.2kPa

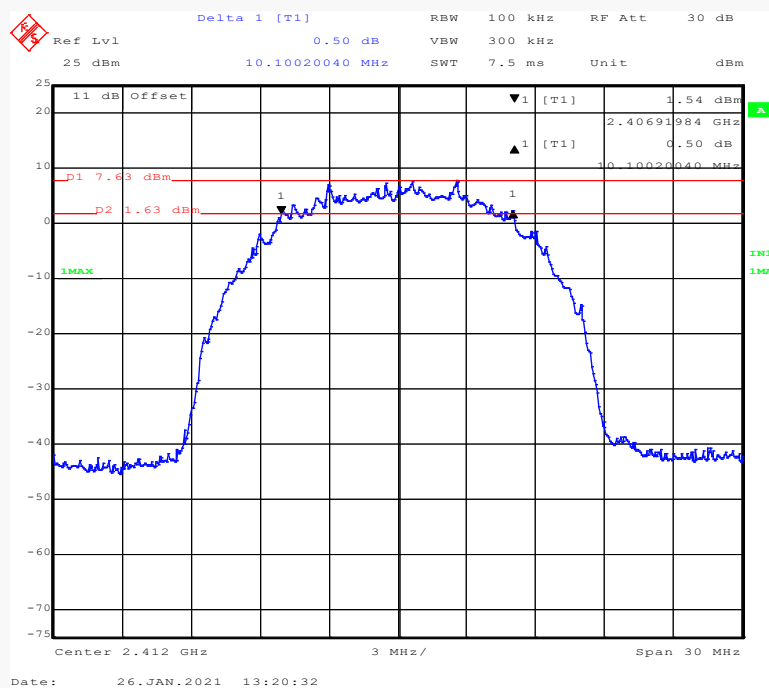
The testing was performed by CK Huang on 2021-01-26.

Test Result: Compliant.

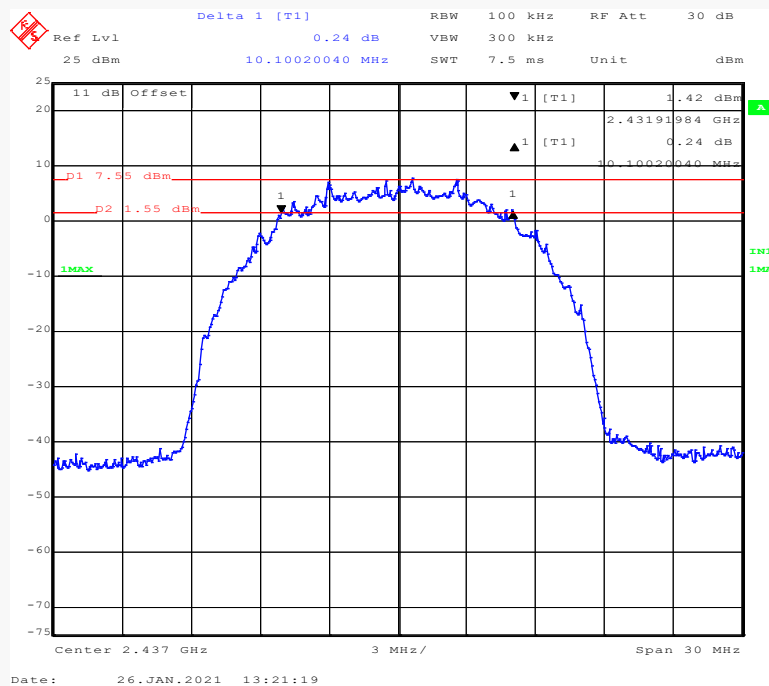
EUT operation mode: Transmitting

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (MHz)
802.11b Mode			
Low	2412	10.10	≥ 0.5
Middle	2437	10.10	≥ 0.5
High	2462	10.10	≥ 0.5
802.11g Mode			
Low	2412	16.47	≥ 0.5
Middle	2437	16.47	≥ 0.5
High	2462	16.47	≥ 0.5
802.11n-HT20 Mode			
Low	2412	17.37	≥ 0.5
Middle	2437	17.37	≥ 0.5
High	2462	17.37	≥ 0.5
802.11n-HT40 Mode			
Low	2422	33.19	≥ 0.5
Middle	2437	33.31	≥ 0.5
High	2452	33.19	≥ 0.5
BLE Mode			
Low	2402	0.69	≥ 0.5
Middle	2440	0.70	≥ 0.5
High	2480	0.70	≥ 0.5

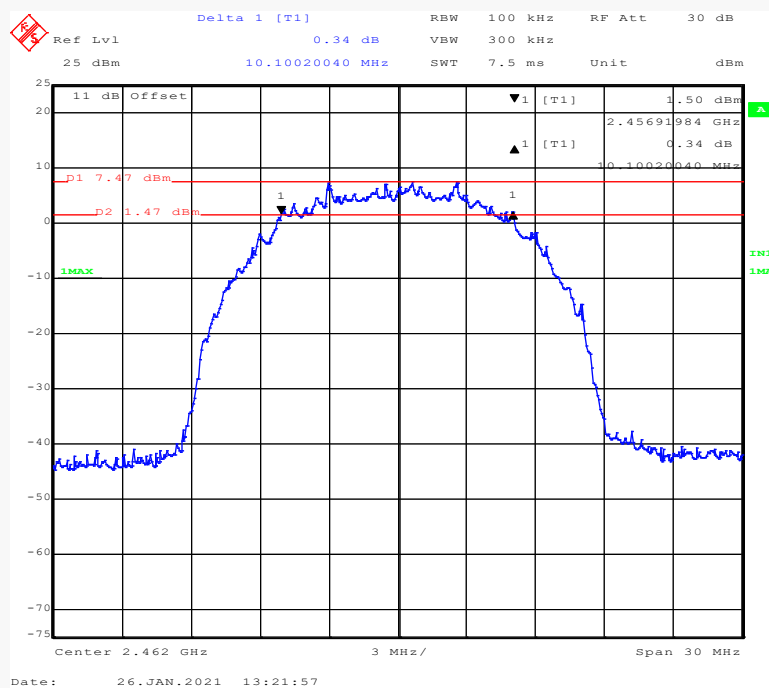
802.11b Mode Low Channel



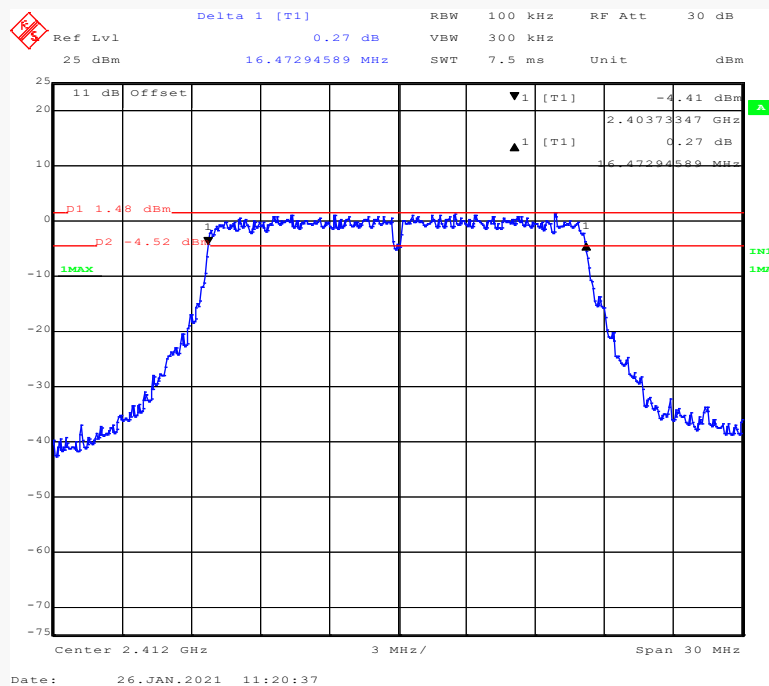
802.11b Mode Middle Channel

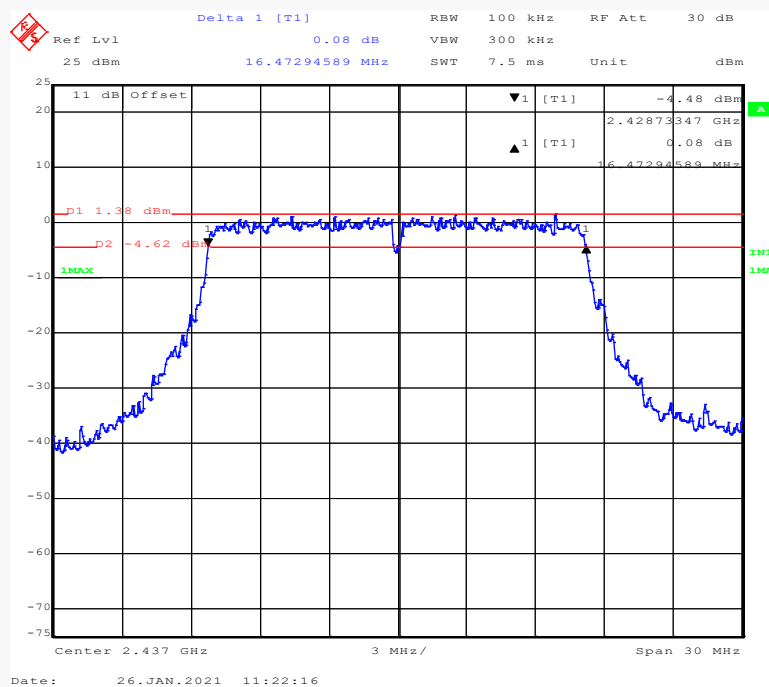
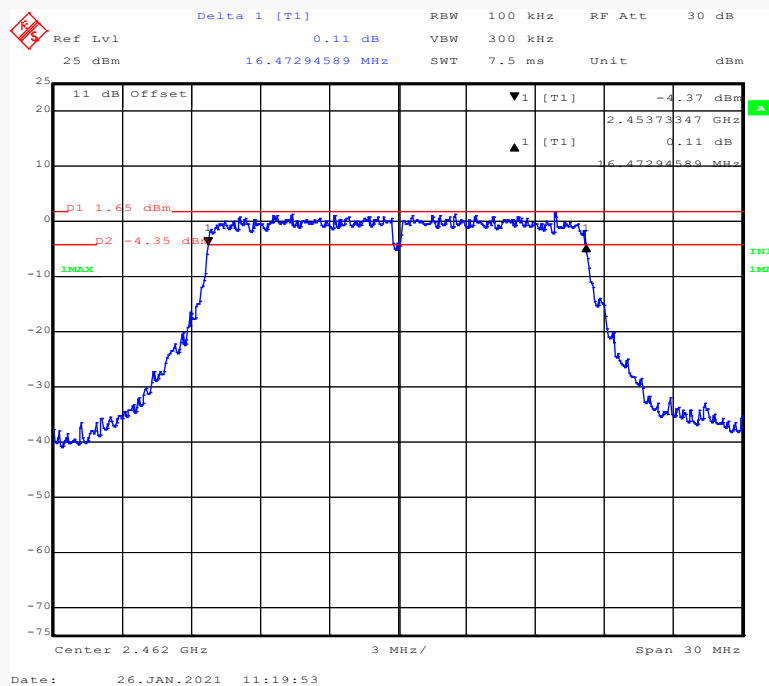


802.11b Mode High Channel



802.11g Mode Low Channel



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

Delta 1 [T1]

Ref Lvl 0.90 dB

25 dBm 17.37474950 MHz

RBW 100 kHz RF Att 30 dB

VBW 300 kHz

SWT 7.5 ms Unit dBm

11 dB Offset

▼1 [T1] -3.11 dBm

▲1 [T1] 0.90 dB

17.37474950 MHz

p1 1.73 dBm

p2 -4.27 dBm

1MAX

IN1

1MA

Center 2.412 GHz 3 MHz/

Span 30 MHz

Date: 26.JAN.2021 11:23:45

Delta 1 [T1]

Ref Lvl 0.41 dB BWB 100 kHz RF Att 30 dB

25 dBm 17.37474950 MHz SWT 7.5 ms Unit dBm

11 dB Offset

▼1 [T1] -5.03 dBm

▲1 [T1] 0.41 dB

17.37474950 MHz

p1 1.49 dBm

p2 -4.51 dBm

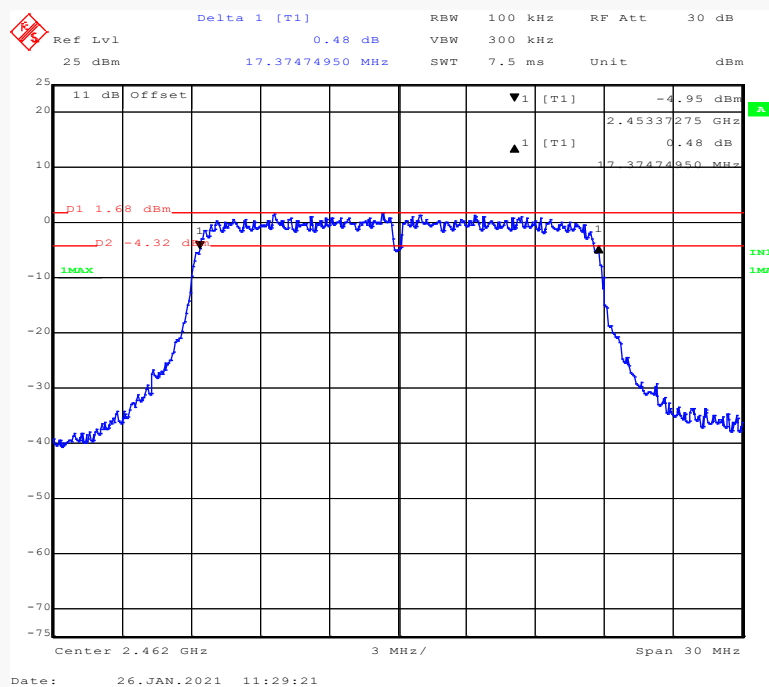
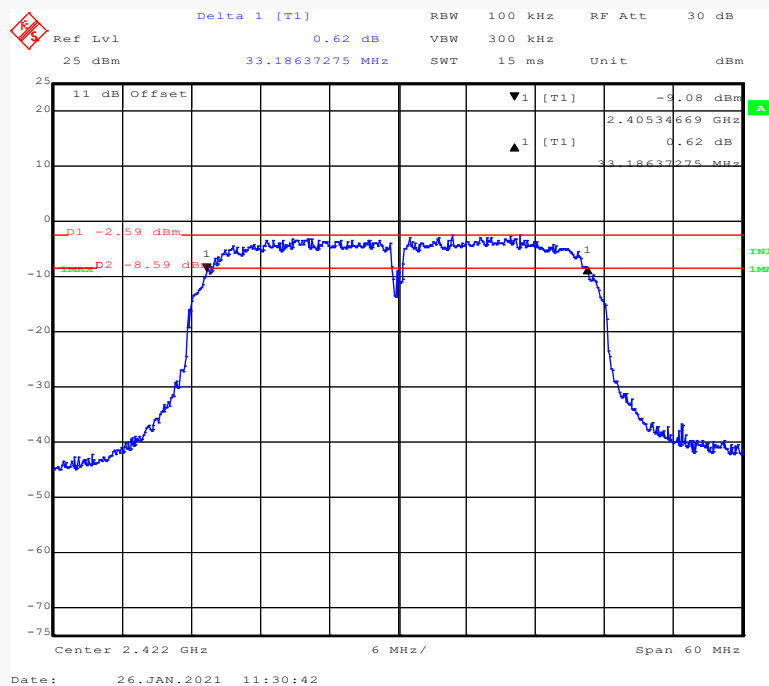
1MAX

IN1

1MA

Center 2.437 GHz 3 MHz/ Span 30 MHz

Date: 26.JAN.2021 11:25:31

802.11n-HT20 Mode High Channel**802.11n-HT40 Mode Low Channel**

Delta 1 [T1] 0.13 dB RBW 100 kHz RF Att 30 dB
 Ref Lvl 25 dBm VBW 300 kHz
 25 dBm 33.30661323 MHz SWT 15 ms Unit dBm

11 dB Offset

▼1 [T1] -3.26 dBm
 ▲1 [T1] 0.13 dB

2.42034669 GHz
 33.30661323 MHz

P1 -2.97 dBm
 D2 -8.97 dBm

1 1

IN1
 IMA

Center 2.437 GHz 6 MHz/
 Span 60 MHz

Date: 26.JAN.2021 11:31:45

Delta 1 [T1]

Ref Lvl 0.42 dB

25 dBm 33.18637275 MHz

RBW 100 kHz RF Att 30 dB

SWT 15 ms Unit dBm

11 dB Offset

▼1 [T1] -2.85 dBm

▲1 [T1] 0.42 dB

2.43534669 GHz

33.18637275 MHz

p1 -2.85 dBm

D2 -8.85 dBm

IN1

IMA

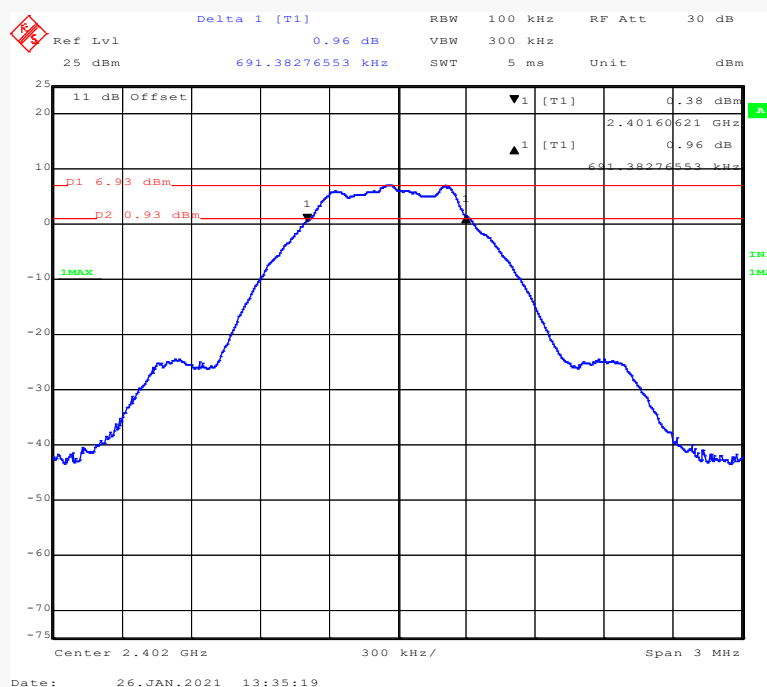
Center 2.452 GHz

6 MHz/

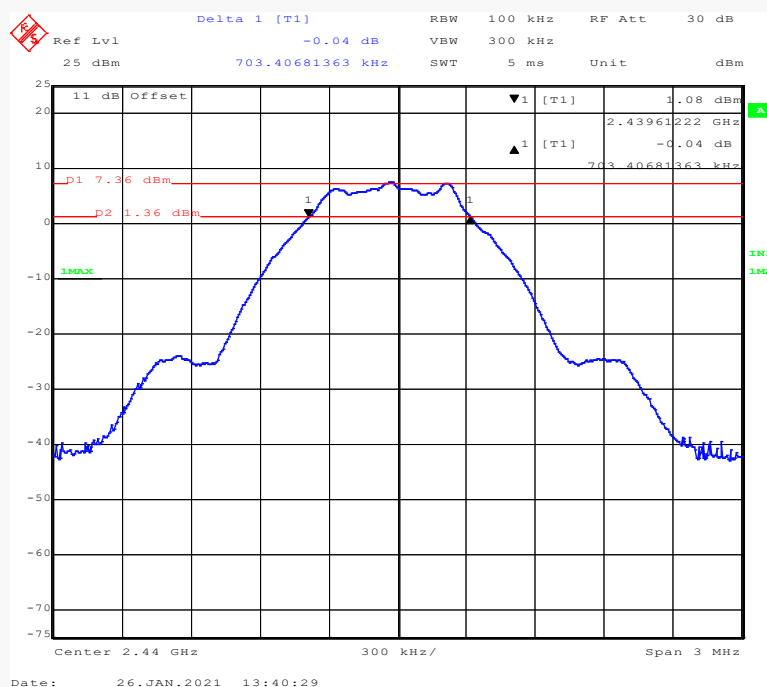
Span 60 MHz

Date: 26.JAN.2021 11:33:05

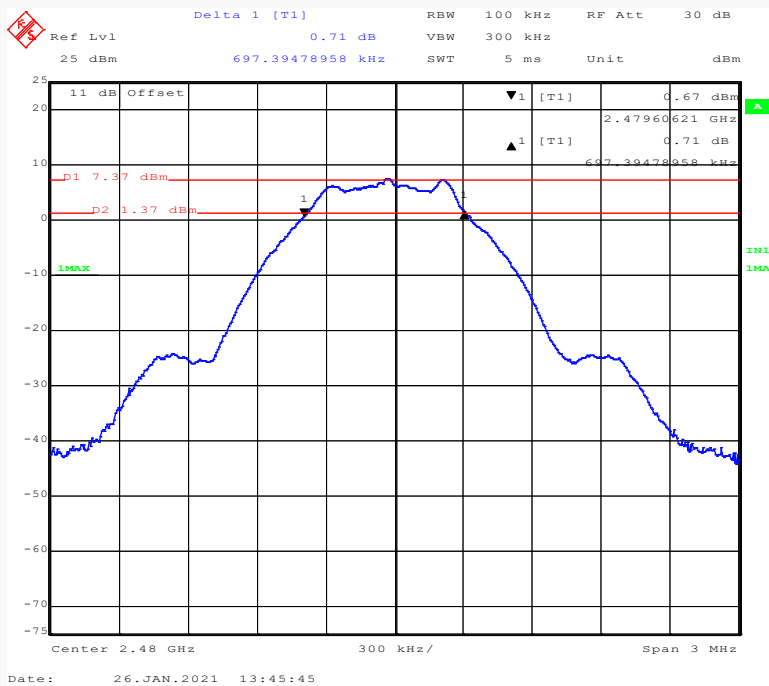
BLE Mode Low Channel



BLE Mode Middle Channel



BLE Mode High Channel



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

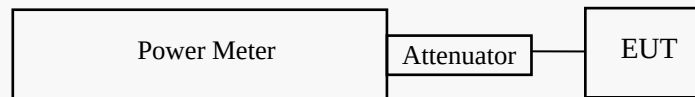
Applicable Standard

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, Compliance 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.



Test Data**Environmental Conditions**

Temperature:	25.4°C
Relative Humidity:	50 %
ATM Pressure:	101.2kPa

The testing was performed by CK Huang on 2021-01-26.

Test Result: Compliant.

EUT operation mode: Transmitting

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Limit (dBm)	Result
802.11b Mode				
Low	2412	23.85	30	Pass
Middle	2437	23.24	30	Pass
High	2462	23.42	30	Pass
802.11g Mode				
Low	2412	22.66	30	Pass
Middle	2437	22.65	30	Pass
High	2462	22.85	30	Pass
802.11n-HT20 Mode				
Low	2412	22.86	30	Pass
Middle	2437	22.64	30	Pass
High	2462	22.94	30	Pass
802.11n-HT40 Mode				
Low	2422	21.14	30	Pass
Middle	2437	21.47	30	Pass
High	2452	21.51	30	Pass
BLE Mode				
Low	2402	7.43	30	Pass
Middle	2440	7.69	30	Pass
High	2480	7.70	30	Pass

FCC §15.247(d) – 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 Compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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:	25.4°C
Relative Humidity:	50 %
ATM Pressure:	101.2kPa

The testing was performed by CK Huang on 2021-01-26.

Test Result: Compliant.

EUT operation mode: Transmitting

Ref Lvl -42.24 dBm RBW 100 kHz RF Att 30 dB
 25 dBm 2.39824649 GHz SWT 12.5 ms Unit dBm

11 dB Offset

11 dB

7.61 dBm

12.49 dBm

42.24 dBm

2.39824649 GHz

Center 2.4 GHz 5 MHz/ Span 50 MHz

Date: 26.JAN.2021 11:34:39

Marker 1 [T1] RBW 100 kHz RF Att 30 dB
 Ref Lvl -43.78 dBm VBW 300 kHz
 25 dBm 2.49367034 GHz SWT 17.5 ms Unit dBm

11 dB Offset ▼1 [T1] -43.78 dBm
 2.49367034 GHz IMAX IMIN
 p1 7.72 dBm p2 -12.28 dBm
 Center 2.4835 GHz 7 MHz/ Span 70 MHz

Ref Lvl 25 dBm

Marker 1 [T1] -35.30 dBm

RBW 100 kHz

VBW 300 kHz

SWT 15 ms

RF Att 30 dB

Unit dBm

11 dB Offset

▼1 (T1) -35.30 dBm

2.4000000 GHz

D1 1.46 dBm

1MAX

P2 -18.54 dBm

Center 2.4 GHz

6 MHz/

Span 60 MHz

Date: 26.JAN.2021 11:37:46

6

Ref Lvl 25 dBm

Marker 1 [T1] -42.34 dBm

RBW 100 kHz

RF Att 30 dB

VBW 300 kHz

SWT 17.5 ms

Unit dBm

11 dB Offset

▼1 [T1] -42.34 dBm

2.4835070 GHz

D1 1.49 dBm

D2 -18.51 dBm

1MAX

IN

1M

Center 2.4835 GHz

7 MHz/

Span 70 MHz

Date: 26.JAN.2021 11:36:23

Marker 1 [T1]

Ref Lvl -35.65 dBm

25 dBm 2.40000000 GHz

RBW 100 kHz RF Att 30 dB

SWT 15 ms Unit dBm

11 dB Offset

▼1 (T1) -35.65 dBm

2.40000000 GHz

D1 1.4 dBm

1MAX

D2 -18.6 dBm

Center 2.4 GHz

6 MHz/

Span 60 MHz

Date: 26.JAN.2021 11:38:28

Ref Lvl 25 dBm Marker 1 [T1] -42.24 dBm RBW 100 kHz RF Att 30 dB
 2.48497295 GHz VBW 300 kHz SWT 17.5 ms Unit dBm

11 dB Offset

▼1 [T1] -42.24 dBm
 2.48497295 GHz

P1 1.7 dBm

1MAX

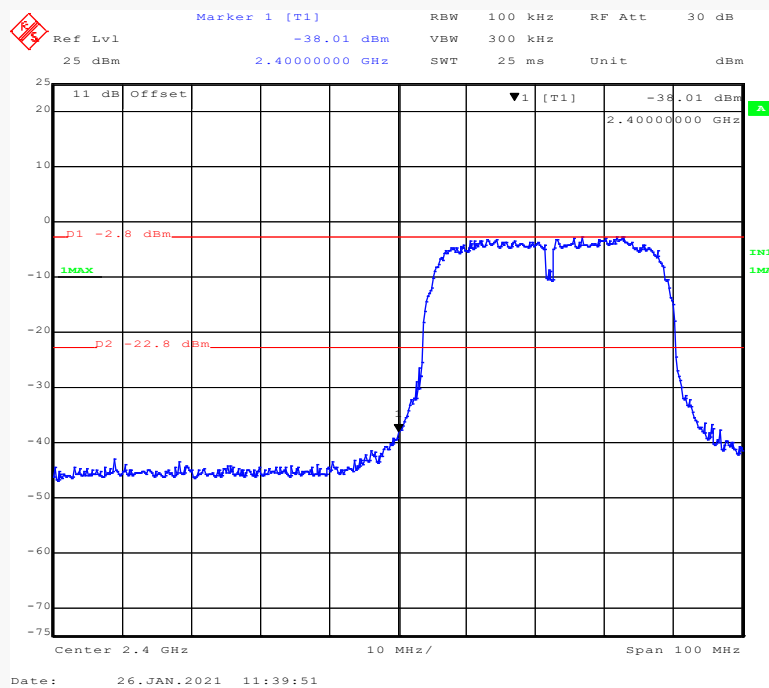
P2 -18.3 dBm

1

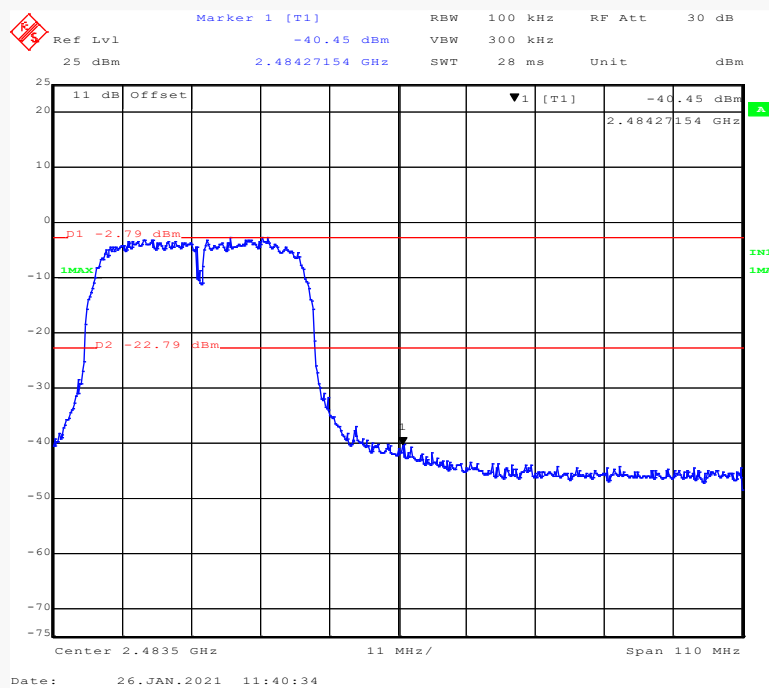
Center 2.4835 GHz 7 MHz/ Span 70 MHz

Date: 26.JAN.2021 11:39:09

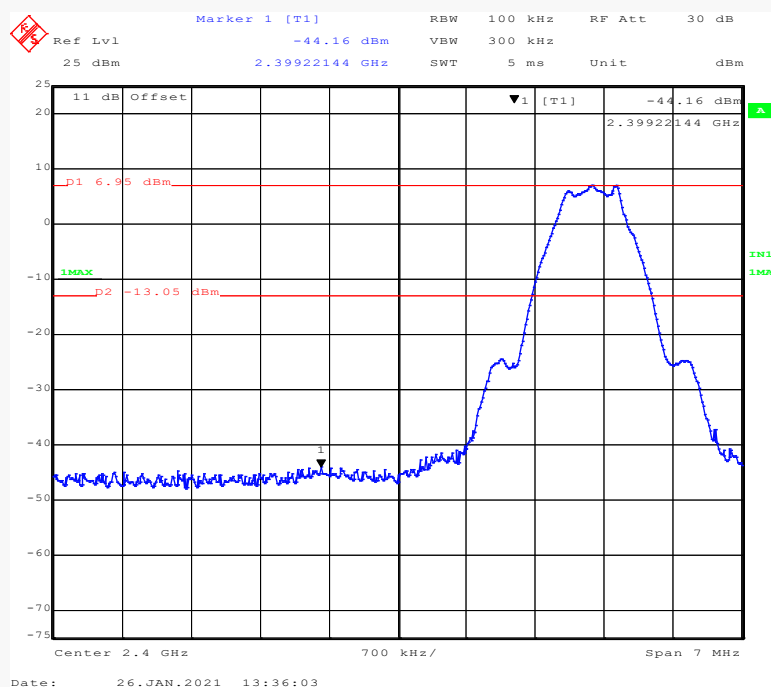
802.11n-HT40 Mode Left Side



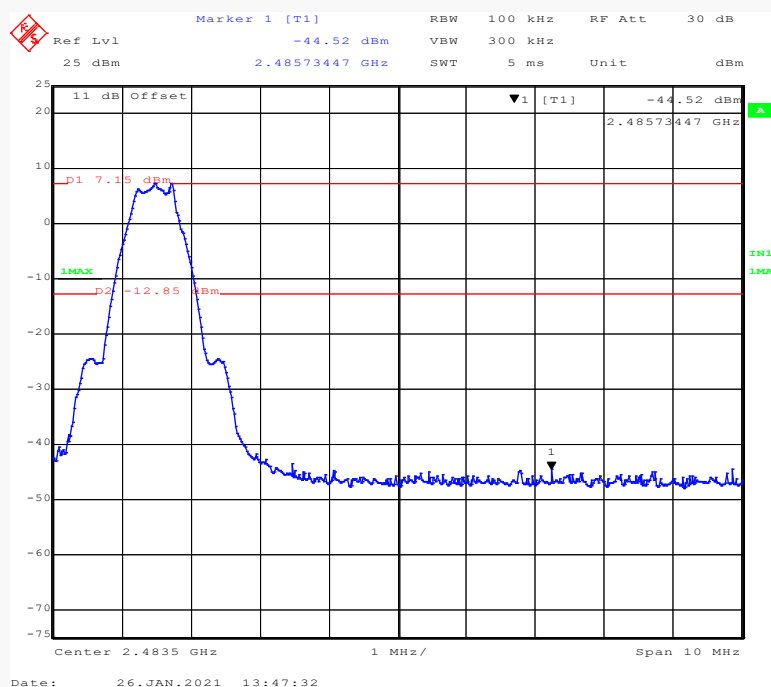
802.11n-HT40 Mode Right Side



BLE Mode Left Side



BLE 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 compliance, and it is optional if the maximum conducted (average) output power was used to determine compliance:

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:	25.4°C
Relative Humidity:	50 %
ATM Pressure:	101.2kPa

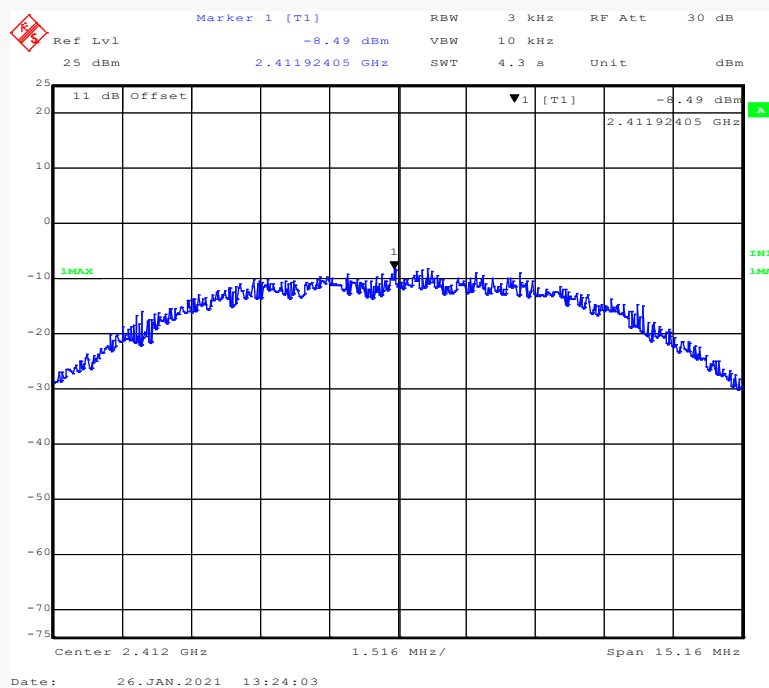
The testing was performed by CK Huang on 2021-01-26.

Test Result: Compliant.

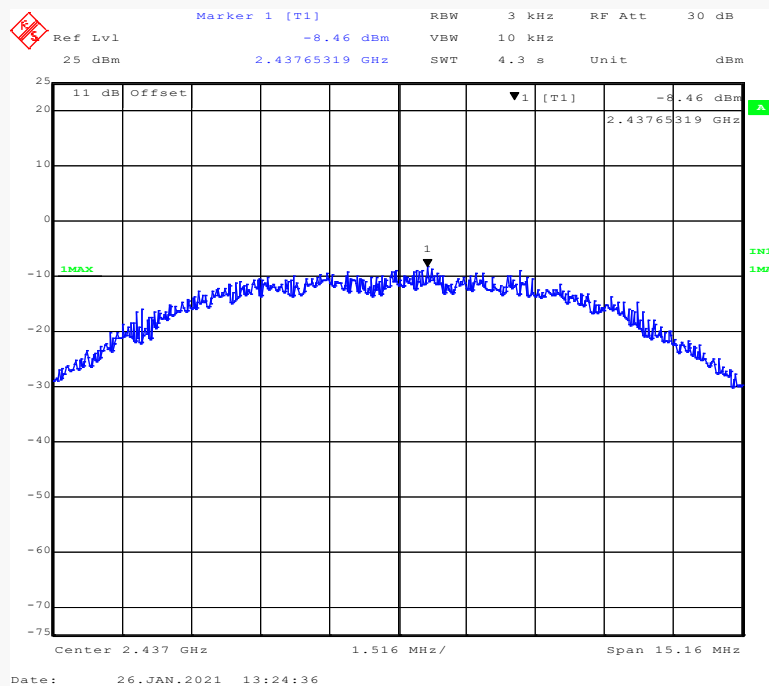
EUT operation mode: Transmitting

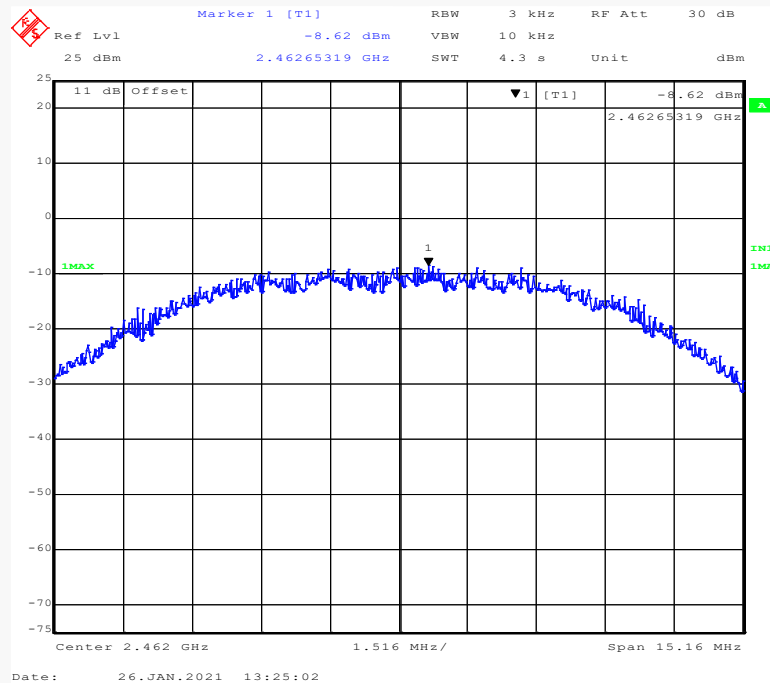
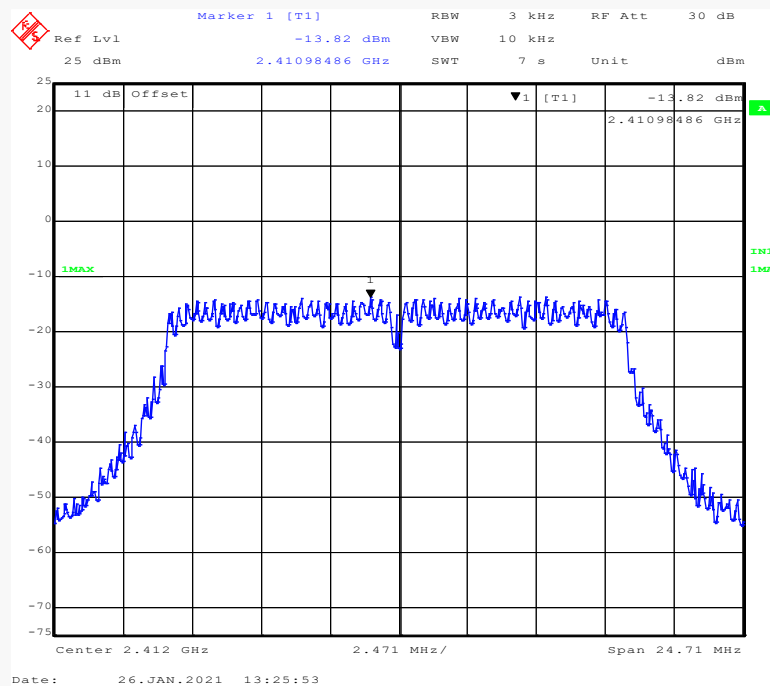
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b mode			
Low	2412	-8.49	≤ 8
Middle	2437	-8.46	≤ 8
High	2462	-8.62	≤ 8
802.11g mode			
Low	2412	-13.82	≤ 8
Middle	2437	-13.95	≤ 8
High	2462	-13.95	≤ 8
802.11n-HT20 mode			
Low	2412	-13.14	≤ 8
Middle	2437	-13.30	≤ 8
High	2462	-13.15	≤ 8
802.11n-HT40 mode			
Low	2422	-15.84	≤ 8
Middle	2437	-16.88	≤ 8
High	2452	-16.09	≤ 8
BLE mode			
Low	2402	-8.19	≤ 8
Middle	2440	-8.21	≤ 8
High	2480	-8.08	≤ 8

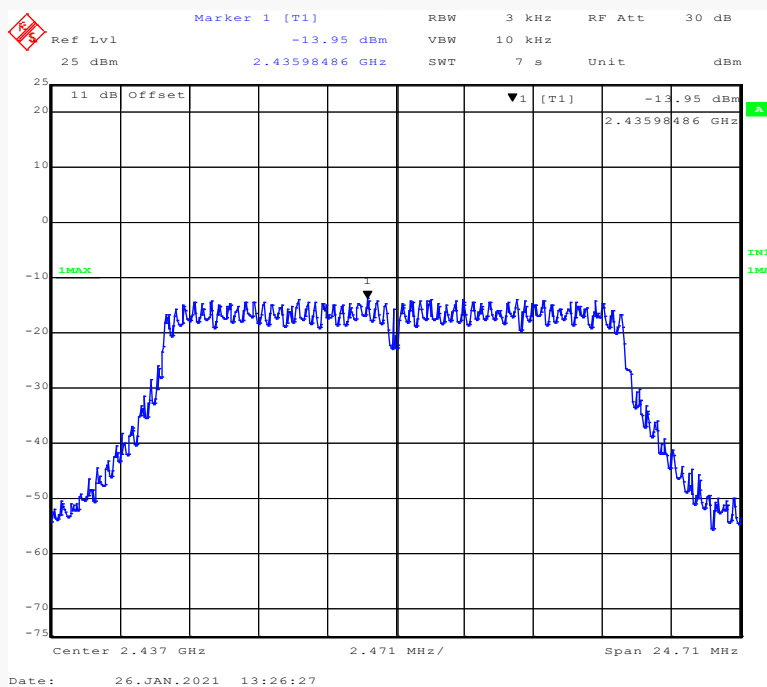
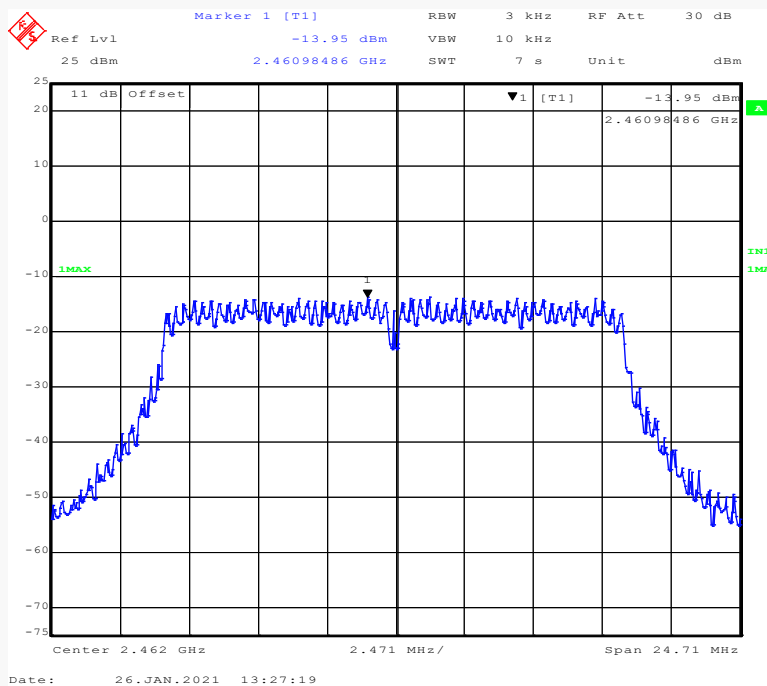
802.11b Mode Low Channel



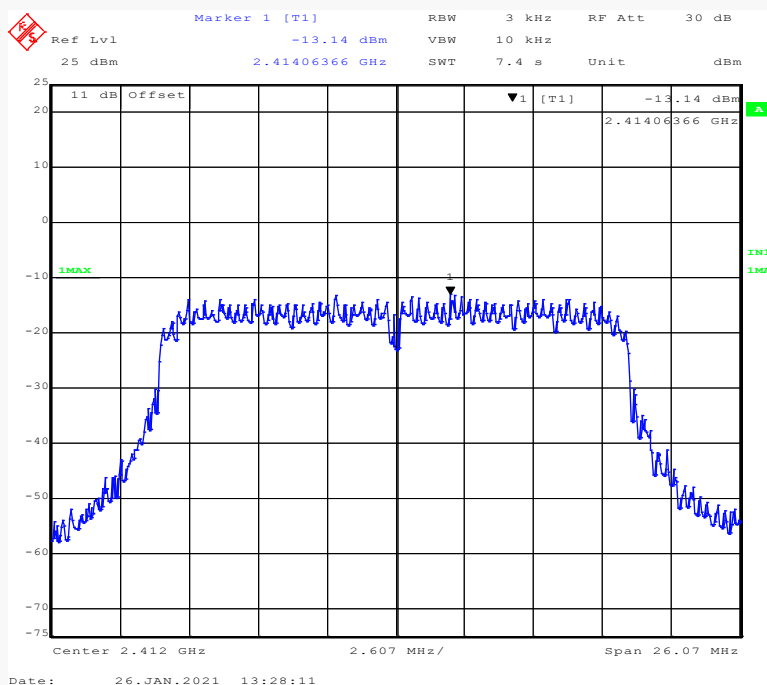
802.11b Mode Middle Channel



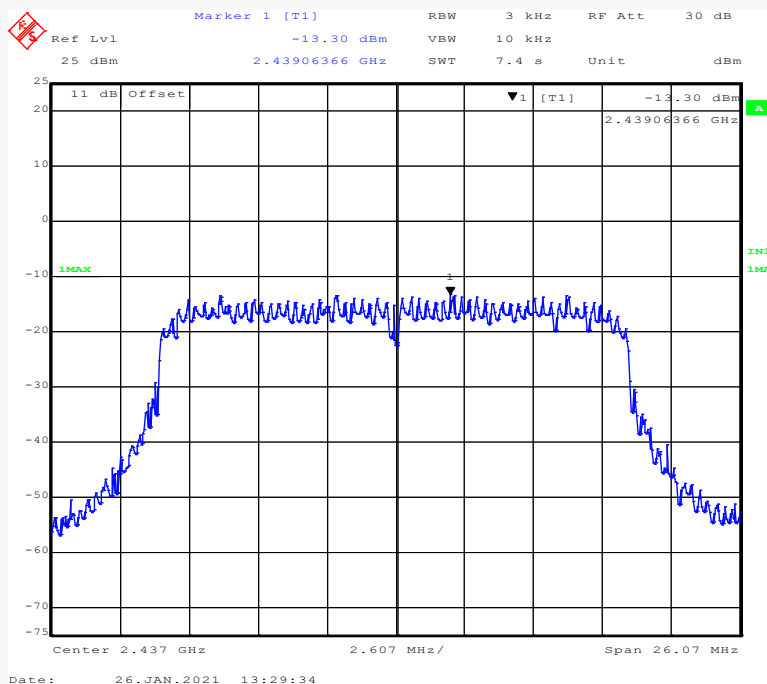
802.11b Mode High Channel**802.11g Mode Low Channel**

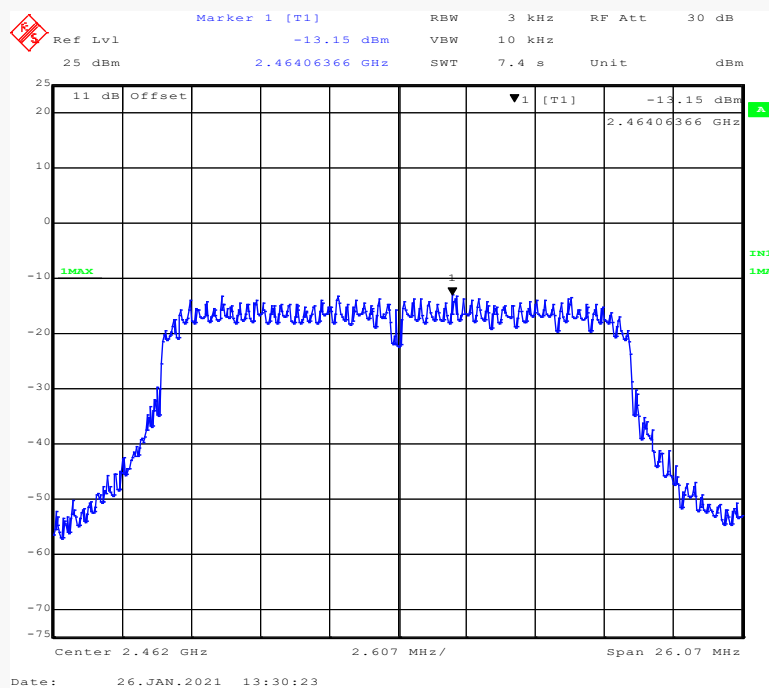
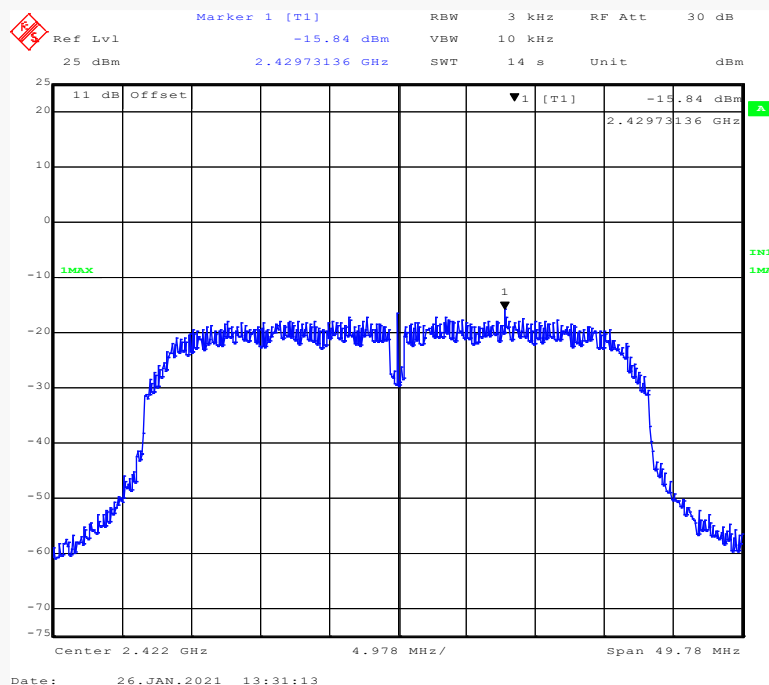
802.11g Mode Middle Channel**802.11g Mode High Channel**

802.11n-HT20 Mode Low Channel

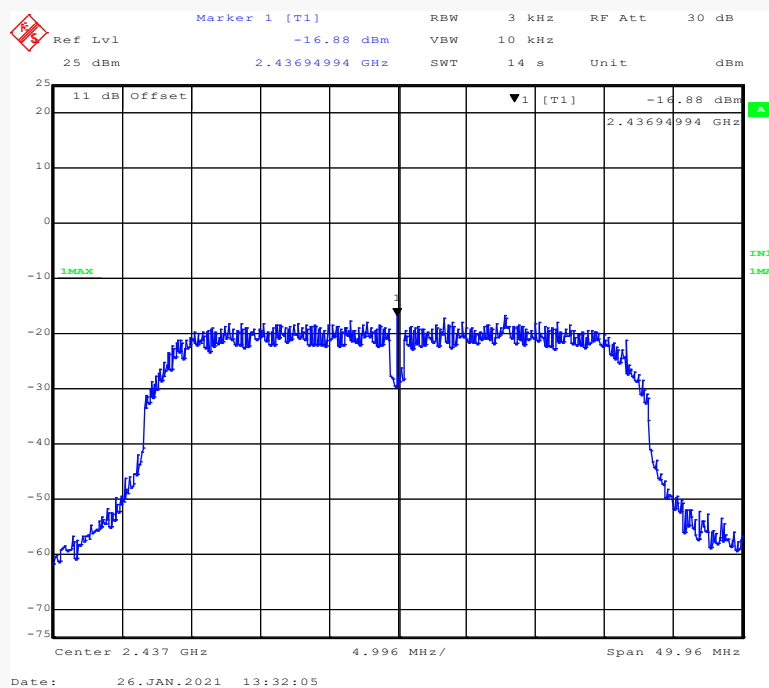


802.11n-HT20 Mode Middle Channel

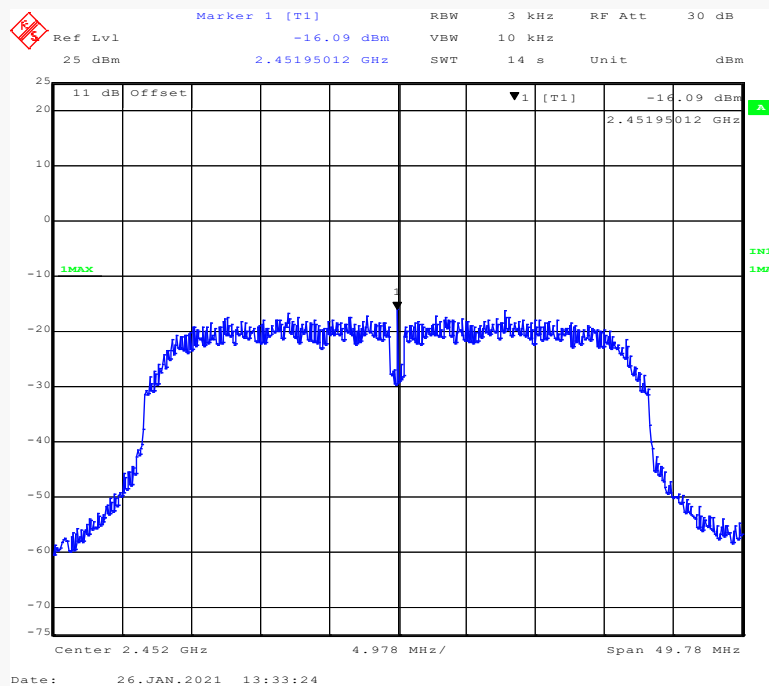


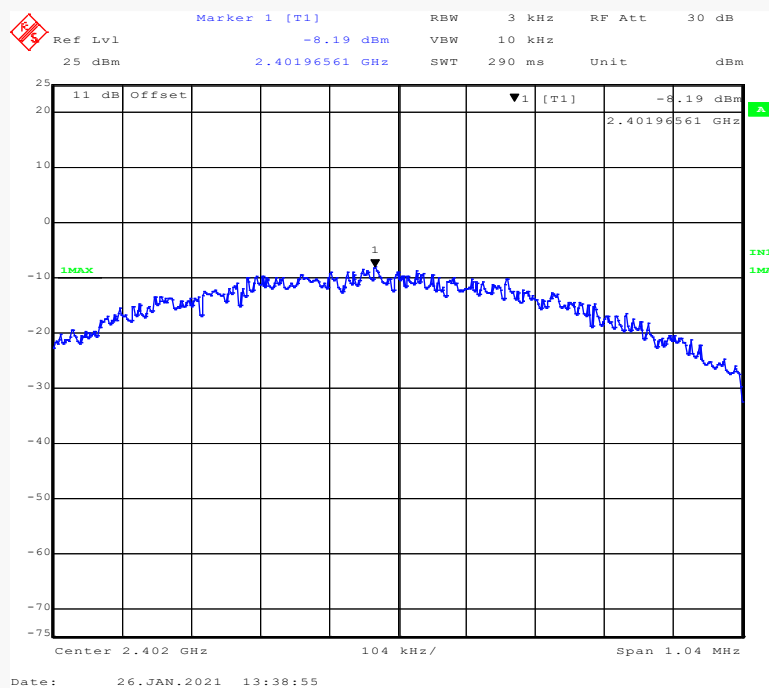
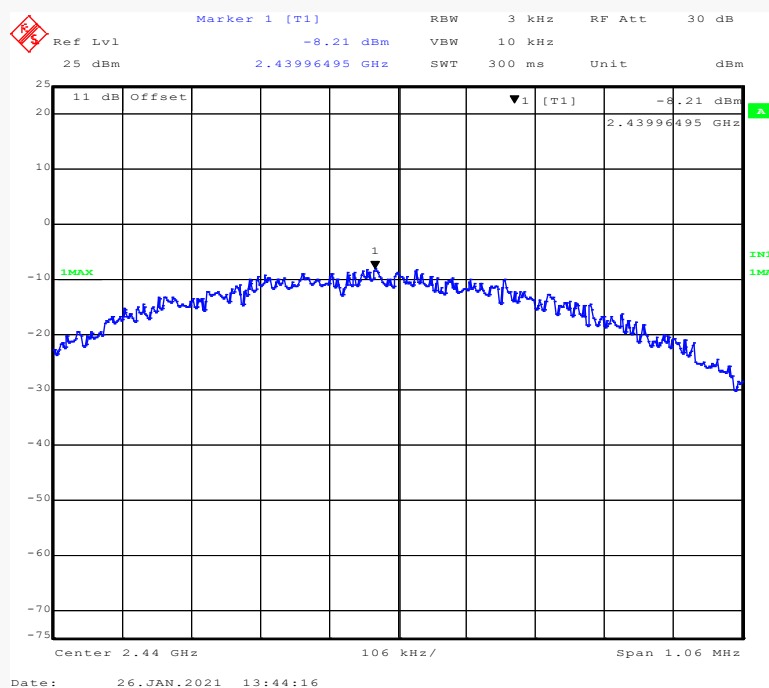
802.11n-HT20 High Channel**802.11n-HT40 Low Channel**

802.11n-HT40 Middle Channel

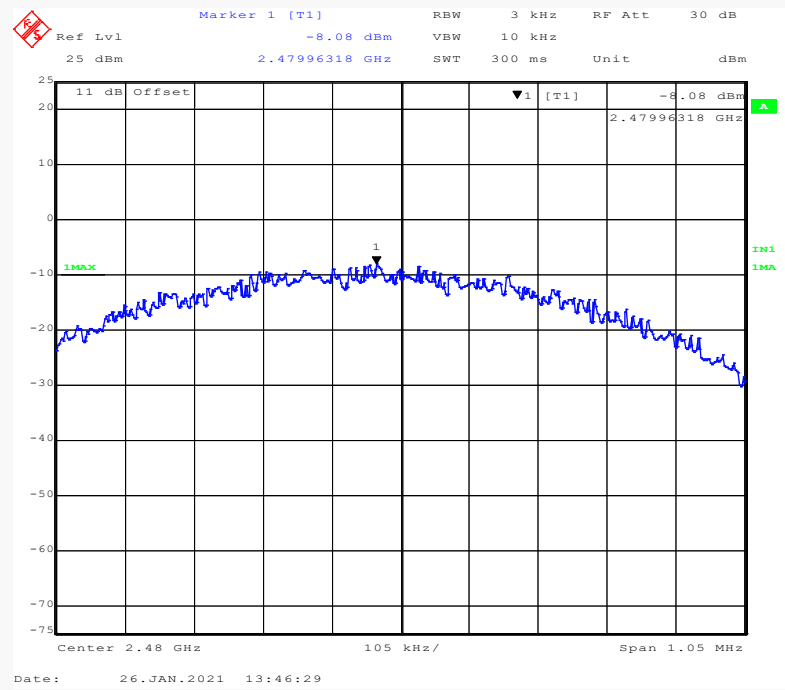


802.11n-HT40 High Channel



BLE Mode Low Channel**BLE Mode Middle Channel**

BLE Mode High Channel



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- 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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