TESTING LABORATORY
CERTIFICATE#4323.01

FCC PART 15.247

TEST REPORT

For

Hangzhou Roombanker Technology Co., Ltd.

A#801 Wantong center, Hangzhou, China

FCC ID: 2AUXBDSGW-020

Report Type:	**Product Type:**
Original Report	Dual band Wi-Fi Smart Gateway

Project Engineer:	CK Huang
Report Number:	RSHD201119001-00A
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Reviewed By:	Oscar Ye EMC Manager
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 7
SUPPORT EQUIPMENT LIST AND DETAILS 13
EXTERNAL I/O CABLE 13
BLOCK DIAGRAM OF TEST SETUP 14
SUMMARY OF TEST RESULTS **17**
TEST EQUIPMENT LIST **18**
FCC §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE) **19**
FCC §15.203 - ANTENNA REQUIREMENT **23**
APPLICABLE STANDARD 23
ANTENNA CONNECTOR CONSTRUCTION 23
FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS **24**
APPLICABLE STANDARD 24
EUT SETUP 24
EMI TEST RECEIVER SETUP 24
TEST PROCEDURE 25
FACTOR & OVER LIMIT CALCULATION 25
TEST RESULTS SUMMARY 25
TEST DATA 25
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS **38**
APPLICABLE STANDARD 38
EUT SETUP 38
EMI TEST RECEIVER SETUP 39
TEST PROCEDURE 39
CORRECTED AMPLITUDE & MARGIN CALCULATION 39
TEST RESULTS SUMMARY 39
TEST DATA 40
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH **92**
APPLICABLE STANDARD 92
TEST PROCEDURE 92
TEST DATA 92
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER **109**
APPLICABLE STANDARD 109
TEST PROCEDURE 109
TEST DATA 110
FCC §15.247(d) – BAND EDGE **115**

APPLICABLE STANDARD 115
TEST PROCEDURE 115
TEST DATA 115

FCC §15.247(e) - POWER SPECTRAL DENSITY 126

APPLICABLE STANDARD 126
TEST PROCEDURE 126
TEST DATA 126

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Hangzhou Roombanker Technology Co., Ltd.
Tested Model	DSGW-020
Series Model	DSGW-020-1, DSGW-020-2, DSGW-020-3, DSGW-020-4, DSGW-020-5
Model Difference	See declaration letter
Product Type	Dual band Wi-Fi Smart Gateway
Power Supply	DC 5V from Adapter and DC 48V from PoE
RF Function	2.4G Wi-Fi, BLE(1Mbps), BLE(2Mbps)
Operating Band/Frequency	2.4G Wi-Fi: 2412-2462 MHz(802.11b/g/n-HT20) 2422-2452 MHz(802.11n-HT40) BLE(1Mbps)/BLE(2Mbps): 2402-2480 MHz
Channel Number	2.4G Wi-Fi: 11(802.11b/g/n-HT20), 9(802.11n-HT40) BLE(1Mbps)/BLE(2Mbps): 40
Channel Separation	2.4G Wi-Fi: 5 MHz, BLE(1Mbps)/BLE(2Mbps): 2 MHz
Modulation Type	2.4G Wi-Fi: OFDM,DSSS; BLE(1Mbps)/BLE(2Mbps): GFSK
Antenna Type	2.4G Wi-Fi: Omni Antenna, BLE(1Mbps)/BLE(2Mbps): FPC Antenna
*Maximum Antenna Gain	2.4G Wi-Fi: 2.0 dBi, BLE(1Mbps)/BLE(2Mbps): 0 dBi

Adapter information:
Model: A8A-050200U-US1
Input: AC 100-240V, 50/60Hz, 0.35A
Output: DC 5V, 2A

Note: The Maximum Antenna Gain was declared by the manufacturer.

**All measurement and test data in this report was gathered from production sample serial number: RSHD201119001-1. (Assigned by the BACL. The EUT supplied by the applicant was received on 2020-11-19)*

Objective

This report is prepared on behalf of *Hangzhou Roombanker 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 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)

FCC Part 15.247 DTS for Zigbee Submittal with FCC ID: 2AUXBDSGW-020
FCC Part 15.407 NII Submittal with FCC ID: 2AUXBDSGW-020

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℃
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.

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 tool: secureCRT for 2.4G Wi-Fi and bgtool for BLE

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

Mode	Data Rate	Channel	Power Level Setting	
			Chain0	Chain1
802.11b	1 Mbps	Low	30	25
		Middle	30	25
		High	30	25
802.11g	6 Mbps	Low	25	23
		Middle	25	23
		High	25	23
802.11n-HT20	MCS0	Low	23	23
		Middle	23	23
		High	23	23
802.11n-HT40	MCS0	Low	20	20
		Middle	20	20
		High	20	20
BLE	1Mbps	Low	20	
		Middle	20	
		High	20	
	2Mbps	Low	20	
		Middle	20	
		High	20	

Note 1: 802.11b/g supports SISO, 802.11n20/n40 supports SISO and MIMO mode. For Radiated Emission, according to pretest, the worst case for 802.11n20/n40 is MIMO mode. So 802.11n20/n40 MIMO mode test data were recorded in the report.

Note 2: The power level setting was declared by the applicant.

For Conducted Test:

802.11b & 802.11g & 802.11n: each transmit chains were tested.

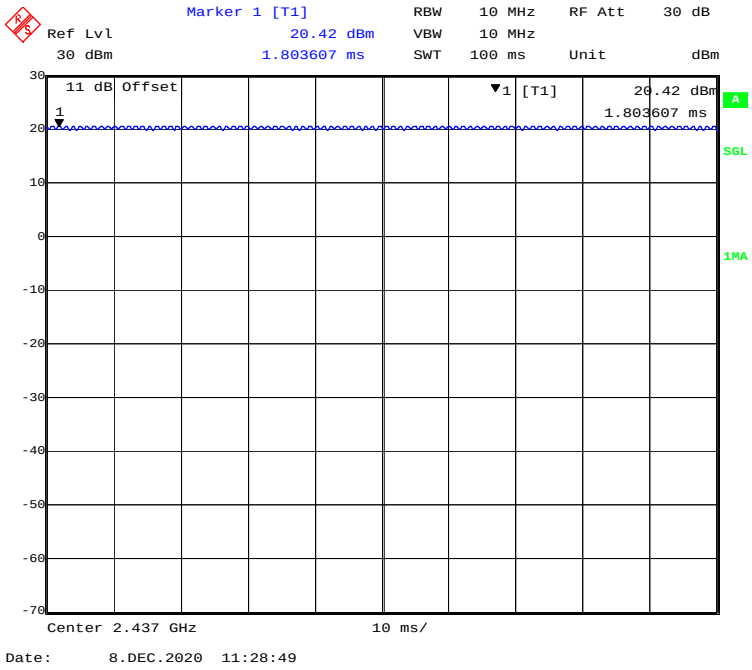
For Radiated Test:

802.11b & 802.11g, SISO for each transmit chain
802.11n: MIMO for two transmit chains

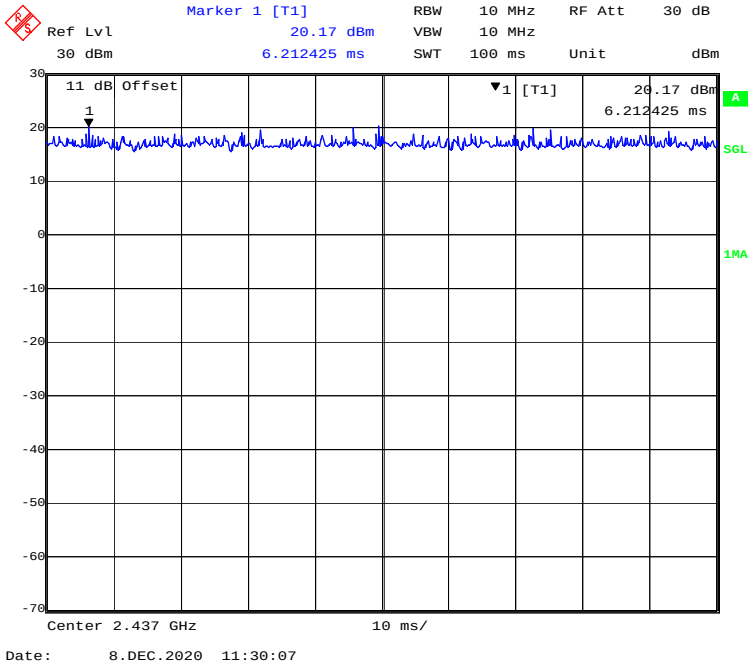
Duty Cycle:

Chain0:

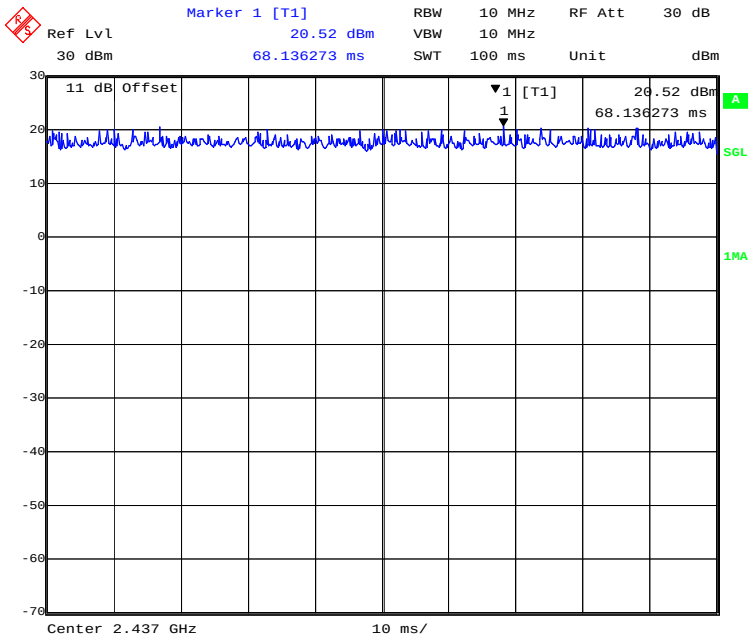
802.11b Mode Middle Channel



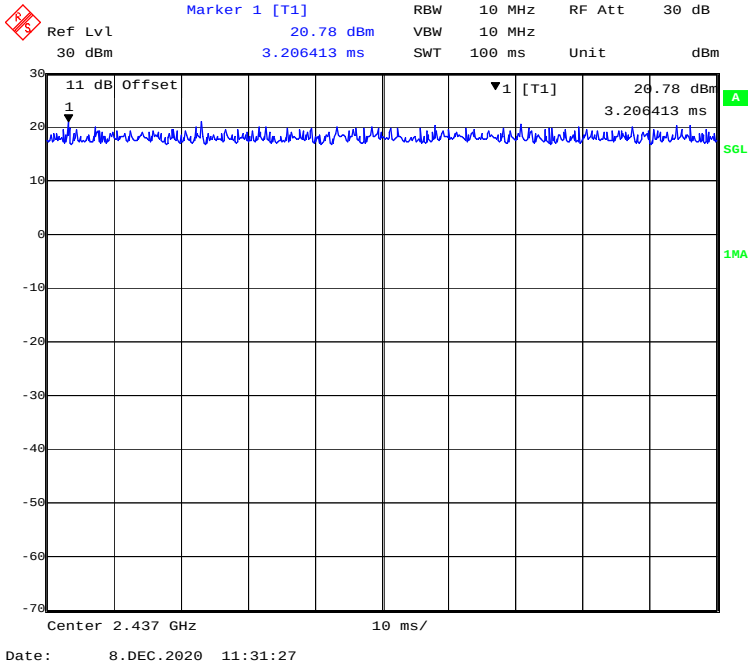
802.11g Mode Middle Channel



802.11n-HT20 Mode Middle Channel

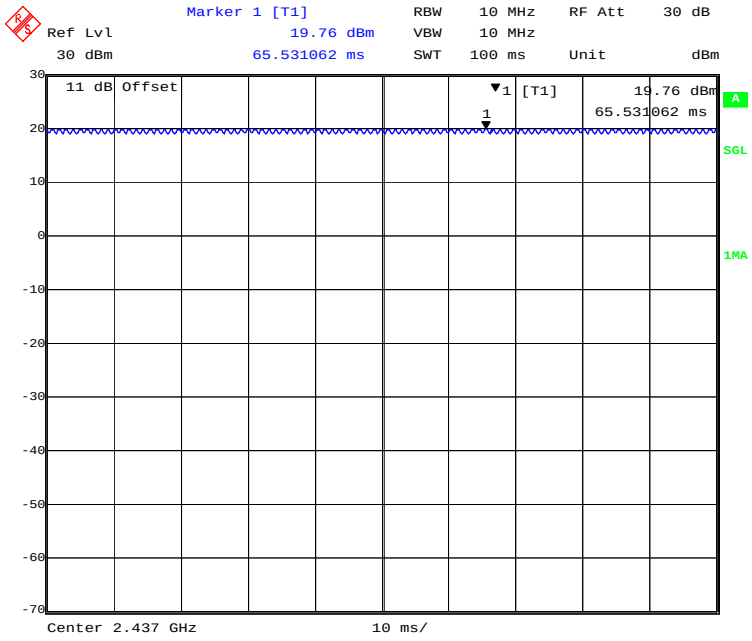


802.11n-HT40 Mode Middle Channel

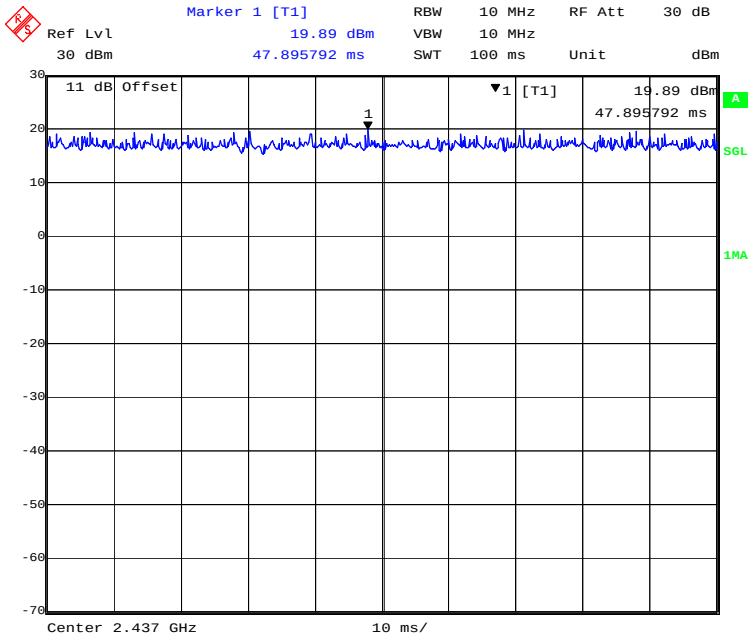


Chain1:

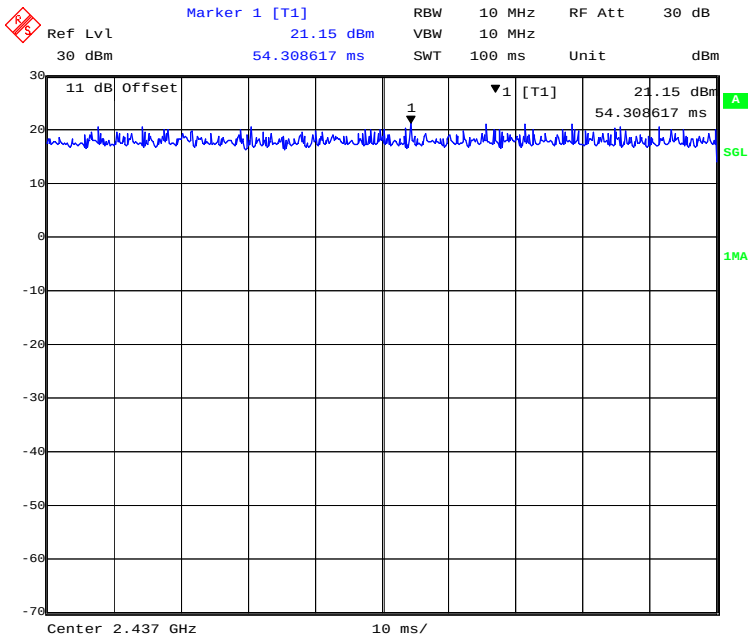
802.11b Mode Middle Channel



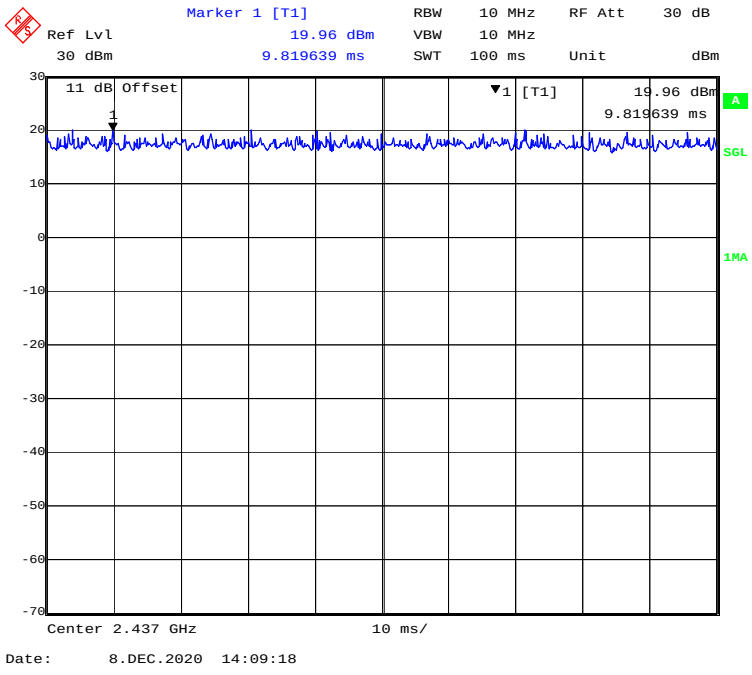
802.11g Mode Middle Channel



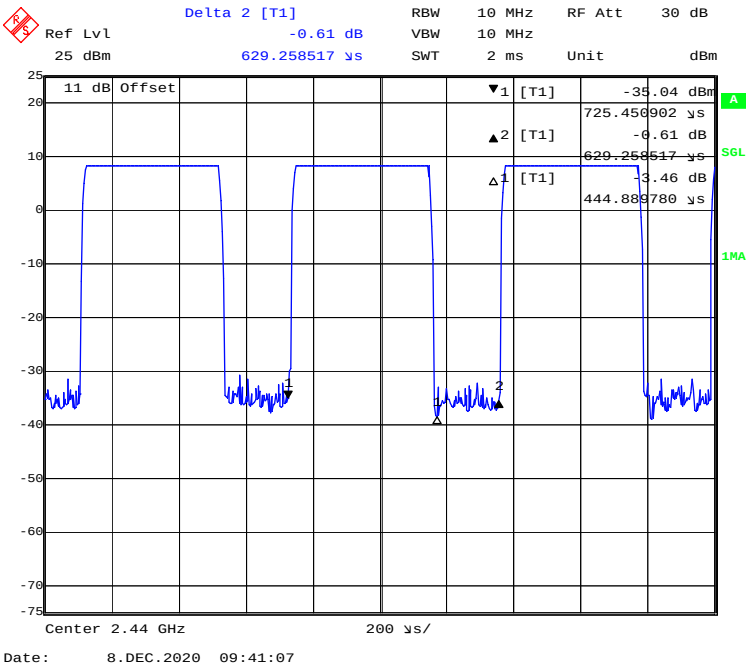
802.11n-HT20 Mode Middle Channel



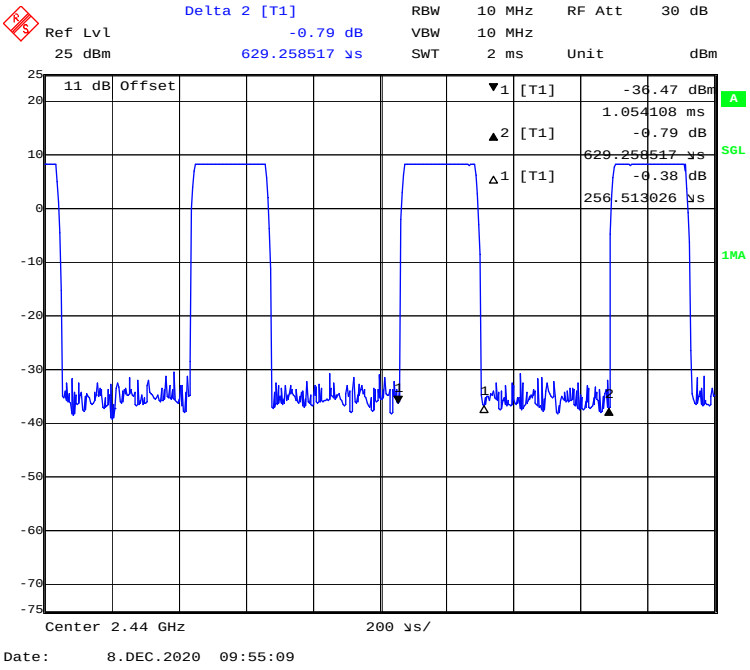
802.11n-HT40 Mode Middle Channel



BLE(1Mbps) Mode Middle Channel



BLE(2Mbps) Mode Middle Channel



Chain	Mode	Duty Cycle (%)	T(ms)	1/T(kHz)	10log(1/x)
Chain0	802.11b	100	/	/	0
	802.11g	100	/	/	0
	802.11n-HT20	100	/	/	0
	802.11n-HT40	100	/	/	0
Chain1	802.11b	100	/	/	0
	802.11g	100	/	/	0
	802.11n-HT20	100	/	/	0
	802.11n-HT40	100	/	/	0
/	BLE(1Mbps)	70.75	0.445	2.25	1.50
/	BLE(2Mbps)	40.86	0.257	3.89	3.89

Note: "x" means the Duty Cycle.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
TP-LINK	Router	TL-WDR5620	1188431022424
DELL	Notebook	GX620	D65874152
DELL	Adapter 1	LA65NS0-00	DF263
NETGEAR	PoE	GS308P	4F217B5000891
NETGEAR	Adapter 2	2ABF060R	332-10771-01

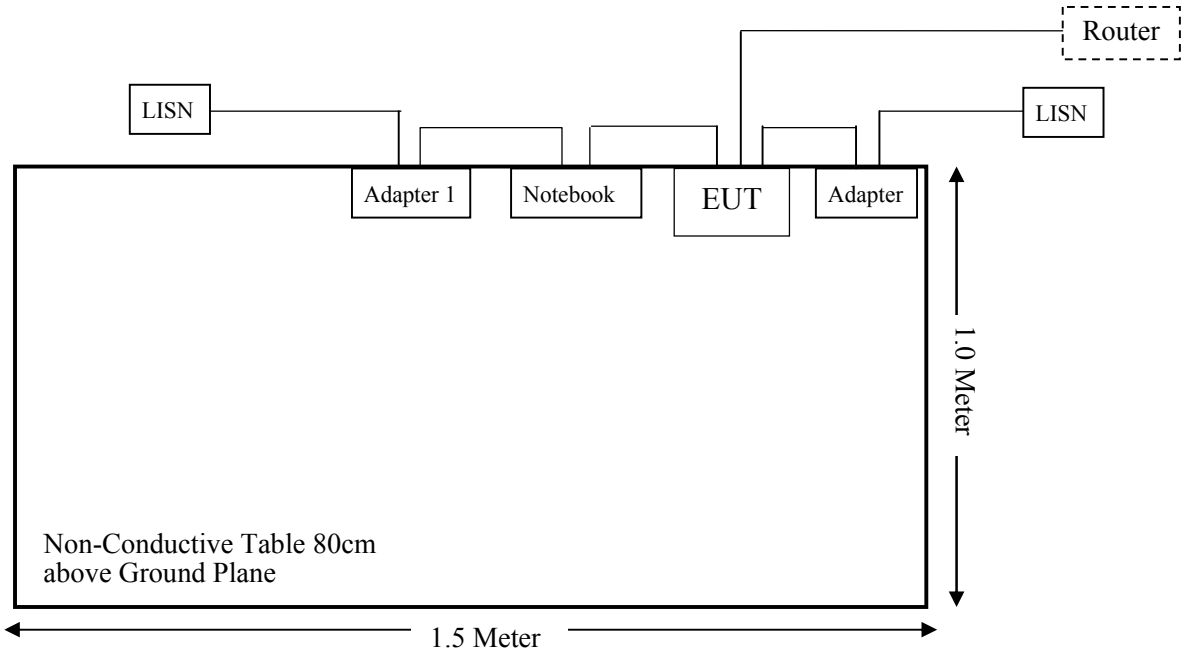
External I/O Cable

Cable Description	Length (m)	From Port	To
Power Cable 1	1.0	EUT	Adapter
Power Cable 2	1.0	Adapter	LISN/AC source
RJ45 Cable 1	3.0	EUT	Router
RJ45 Cable 2	3.0	EUT	Notebook
Power Cable 3	1.0	Notebook	Adapter 1
Power Cable 4	1.0	Adapter 1	LISN/AC source
RJ45 Cable 3	3.0	EUT	PoE
Power Cable 5	1.0	PoE	Adapter 2
Power Cable 6	1.0	Adapter 2	LISN/AC source

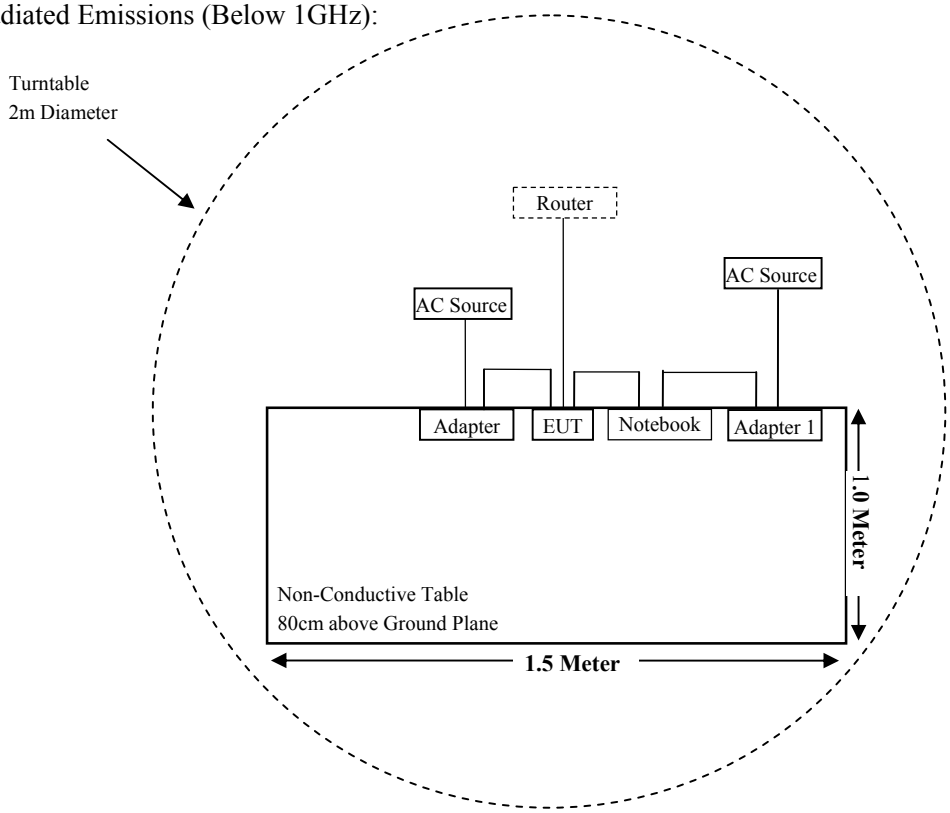
Block Diagram of Test Setup

For adapter power supply:

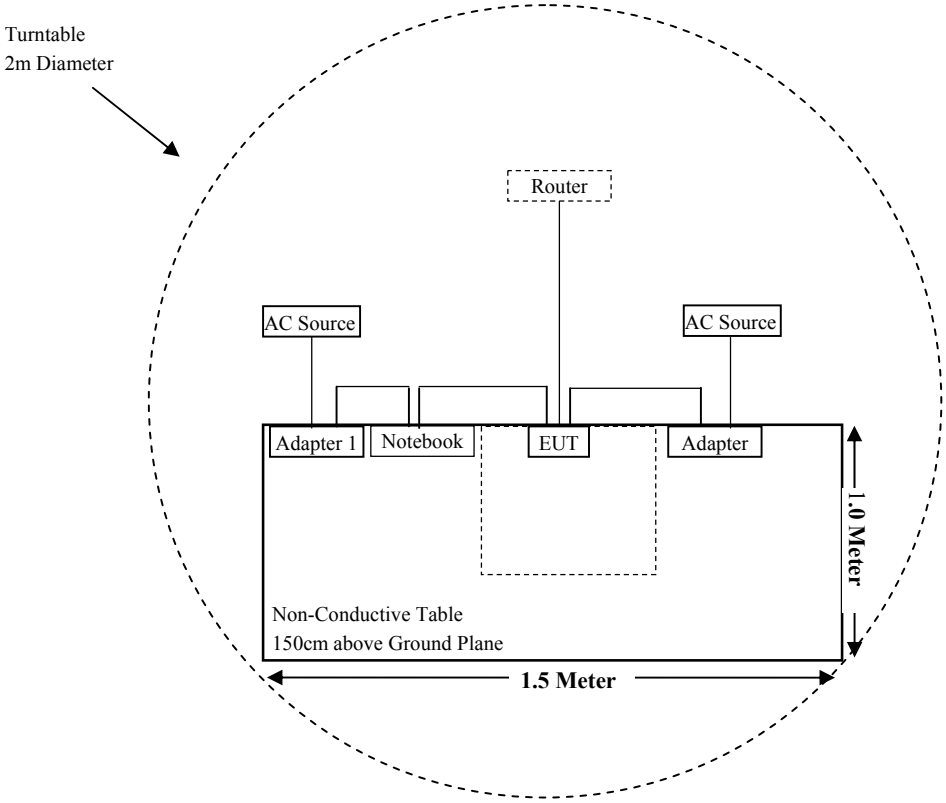
For Conducted Emissions:



For Radiated Emissions (Below 1GHz):

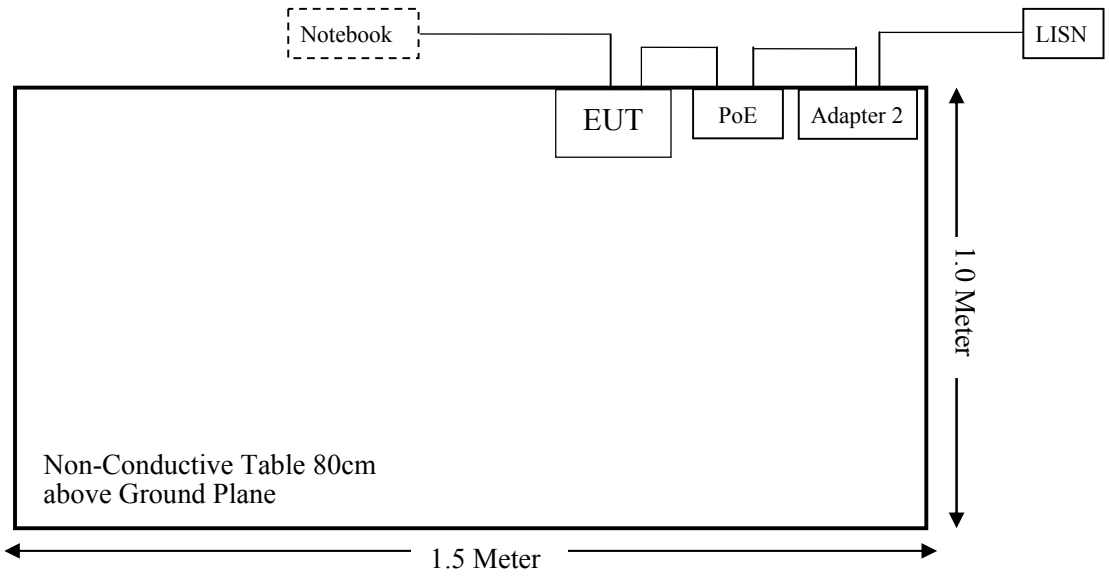


For Radiated Emissions (Above 1GHz):

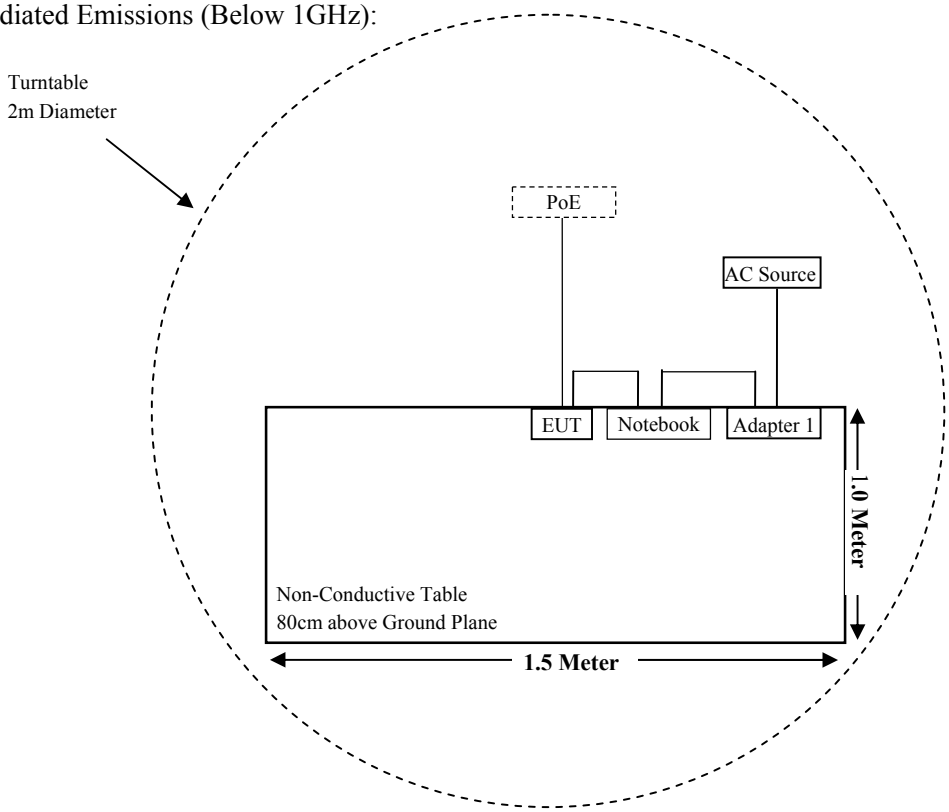


For PoE power supply:

For Conducted Emissions:



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)	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	A090314-2	2020-01-07	2023-01-06
Sonoma Instrument	Pre-amplifier	310N	171205	2020-08-14	2021-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
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 Test Receiver	ESU40	100207/040	2020-04-01	2021-03-31
ETS-LINDGREN	Horn Antenna	3115	9311-4159	2020-07-15	2023-07-14
ETS-LINDGREN	Horn Antenna	3116	2516	2020-01-17	2023-01-16
A.H.Systems,inc	Amplifier	PAM-0118P	512	2020-08-14	2021-08-13
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	/	/
MICRO-COAX	Coaxial Cable	Cable-4	004	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-5	005	2020-08-15	2021-08-14
RF Conducted Test					
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048/027	2020-11-27	2021-11-26
Agilent	Power Meter	N1912A	MY5000492	2020-11-18	2021-11-17
Agilent	Power Sensor	N1921A	MY54210024	2020-11-18	2021-11-17
Narda	Attenuator	10dB	010	2020-08-15	2021-08-14
Roombanker	RF Cable	Roombanker 01	C01	Each Time	/
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03 -101746-zn	2020-07-28	2021-07-27
Rohde & Schwarz	LISN	ENV216	101115	2020-11-27	2021-11-26
COM-POWER	LISN	LI-3P-132	20200002	2020-11-27	2021-11-26
Audix	Test Software	e3	V9	/	/
Rohde & Schwarz	Pulse limiter	ESH3-Z2	100552	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 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^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

Calculated Formulary:

Predication of MPE limit at a given distance

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

2.4G Wi-Fi&BLE&Zigbee&5G Wi-Fi:

Mode	Frequency (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)			
2.4G Wi-Fi 802.11b	2412~2462	2.0	1.58	21.50	141.25	20	0.0444	1.0
2.4G Wi-Fi 802.11g		2.0	1.58	21.00	125.89	20	0.0396	1.0
2.4G Wi-Fi 802.11n-HT20		2.0	1.58	24.50	281.84	20	0.0886	1.0
2.4G Wi-Fi 802.11n-HT40	2422~2452	2.0	1.58	25.00	316.23	20	**0.0994**	**1.0**
BLE(1Mbps)	2402~2480	0	1.00	8.50	7.08	20	**0.0014**	**1.0**
BLE(2Mbps)	2402~2480	0	1.00	8.50	7.08	20	0.0014	1.0
Zigbee	2405~2480	0	1.00	19.50	89.13	20	**0.0177**	**1.0**
5G Wi-Fi 802.11a	5150~5250	2.0	1.58	16.00	39.81	20	0.0125	1.0
	5725~5850	2.0	1.58	14.00	25.12	20	0.0079	1.0
5G Wi-Fi 802.11ac20	5150~5250	2.0	1.58	15.50	35.48	20	0.0112	1.0
	5725~5850	2.0	1.58	16.50	44.67	20	**0.0140**	**1.0**
5G Wi-Fi 802.11n20	5150~5250	2.0	1.58	15.50	35.48	20	0.0112	1.0
	5725~5850	2.0	1.58	16.50	44.67	20	0.0140	1.0
5G Wi-Fi 802.11ac40	5150~5250	2.0	1.58	16.00	39.81	20	0.0125	1.0
	5725~5850	2.0	1.58	15.00	31.62	20	0.0099	1.0
5G Wi-Fi 802.11n40	5150~5250	2.0	1.58	15.50	35.48	20	0.0112	1.0
	5725~5850	2.0	1.58	14.50	28.18	20	0.0089	1.0
5G Wi-Fi 802.11ac80	5150~5250	2.0	1.58	15.50	35.48	20	0.0112	1.0
	5725~5850	2.0	1.58	14.50	28.18	20	0.0089	1.0

GSM:

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)			
GSM 850	824.2-848.8	4	2.51	27.50	562.34	20	**0.2810**	**0.55**
GSM 1900	1850.2-1909.8	4	2.51	26.50	446.68	20	0.2232	1.00

Note:
GPRS 850: Tune-up maximum output power with 1 slot is 32.50 dBm, 2 slots is 32.50 dBm, 3 slots is 31.50 dBm, 4 slots is 30.50 dBm, so the tune-up time based Ave. power compared to sloted Ave. power is 27.50dBm.
EGPRS 850: Tune-up maximum output power with 1 slot is 27.00 dBm, 2 slots is 27.00 dBm, 3 slots is 26.50 dBm, 4 slots is 26.50 dBm so the tune-up time based Ave. power compared to sloted Ave. power is 23.50 dBm.
GPRS 1900: Tune-up maximum output power with 1 slot is 30.00 dBm, 2 slots is 30.00 dBm, 3 slots is 30.00 dBm, 4 slots is 29.50 dBm so the tune-up time based Ave. power compared to sloted Ave. power is 26.50 dBm.
EGPRS 1900: Tune-up maximum output power with 1 slot is 26.50 dBm, 2 slots is 26.00 dBm, 3 slots is 26.00 dBm, 4 slots is 26.00 dBm so the tune-up time based Ave. power compared to sloted Ave. power is 23.00 dBm.

Number of Time slot	1	2	3	4
Duty Cycle	1:8	1:4	1:2.66	1:2
Time based Ave. power compared to slotted Ave. power	-9 dB	-6 dB	-4.26 dB	-3 dB

LTE CAT-M1:

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)			
LTE Band 2	1850.7~1909.3	4	2.51	24	251.19	20	0.1255	1.00
LTE Band 4	1710.7~1754.3	4	2.51	23	199.53	20	0.0997	1.00
LTE Band 5	824.7~848.3	4	2.51	24	251.19	20	0.1255	0.55
LTE Band 12	699.7~715.3	4	2.51	24	251.19	20	0.1255	0.47
LTE Band 13	779.5~784.5	4	2.51	24	251.19	20	0.1255	0.52
LTE Band 26	814.7~848.3	4	2.51	24	251.19	20	0.1255	0.54

LTE NB-IOT:

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)			
LTE Band 2	1850.7~1909.3	4	2.51	25	316.23	20	0.1579	1.00
LTE Band 4	1710.7~1754.3	4	2.51	25	316.23	20	0.1579	1.00
LTE Band 5	824.7~848.3	4	2.51	25	316.23	20	0.1579	0.55
LTE Band 12	699.7~715.3	4	2.51	25	316.23	20	0.1579	0.47
LTE Band 13	779.5~784.5	4	2.51	25	316.23	20	0.1579	0.52

Note:
1. For the above tune up power were declared by the manufacturer.
2. For 802.11b, 802.11g, 802.11a, the tune-up power is base on SISO mode
   For 802.11ac20/n20/n40/ac40/ac80, the tune-up power is base on MIMO mode
3. The LTE module FCC ID: XMR201707BG96 (Grant:09/08/2020).
4. 2.4G Wi-Fi & BLE & Zigbee & 5G Wi-Fi & GSM850 can transmit simultaneously; the worst condition as below:

$$\sum_i \frac{S_i}{S_{Limit,i}} = 0.0994/1.00+0.0014/1.00+0.0177/1.00+0.0140/1.00+0.2810/0.55=0.6434 < 1.0$$

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 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 two omni antennas for Wi-Fi, the antenna gain is 2.0 dBi for chain0 and 2.0 dBi for chain1; and the EUT has an FPC antenna for BLE, the antenna gain is 0 dBi; The antennas are permanently attached to the unit, fulfill the requirement of this section. Please refer to the EUT photos.

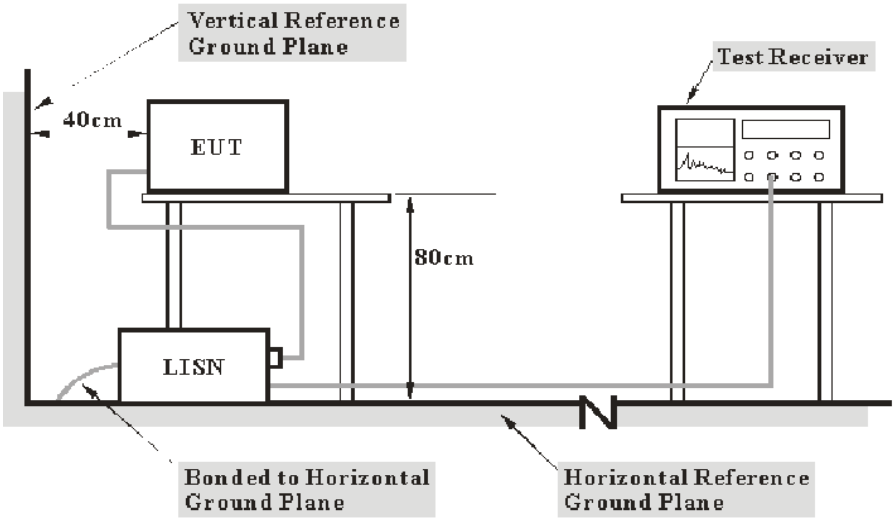
Result: Compliant.

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.

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:

Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + 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:

Over Limit (dB) = Read level (dBµV) + Factor (dB) - Limit (dBµV)

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:	22.3 ℃
Relative Humidity:	50 %
ATM Pressure:	101.5 kPa

The testing was performed by CK Huang on 2021-01-19.

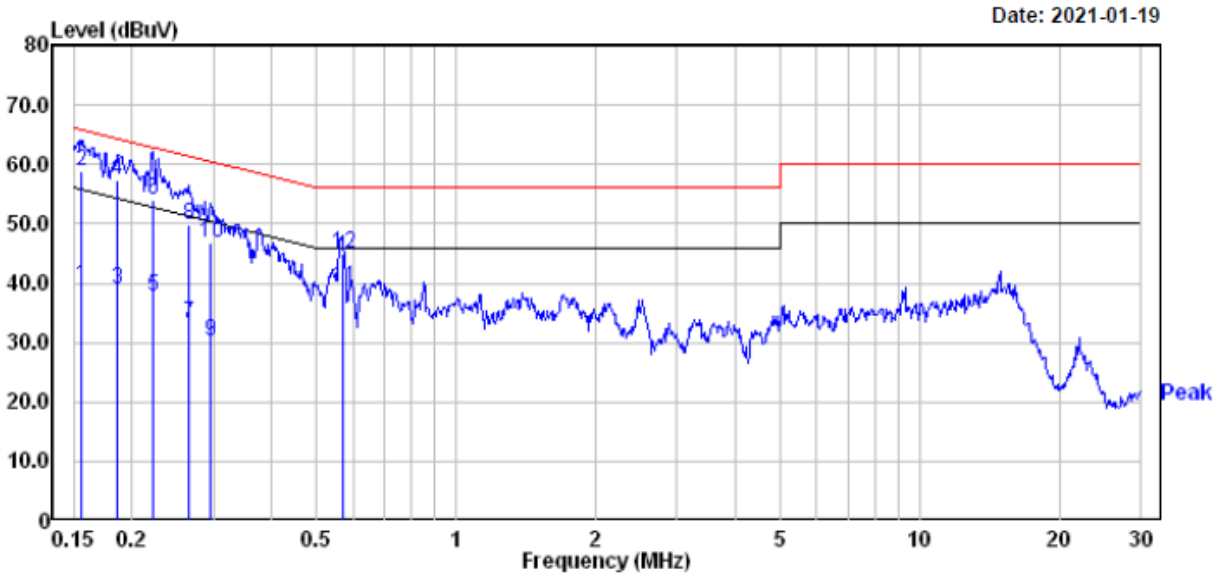
Test Result: Compliant.

For Wi-Fi Mode:

EUT operation mode: Transmitting in 802.11n-HT40 mode high channel (worst case)

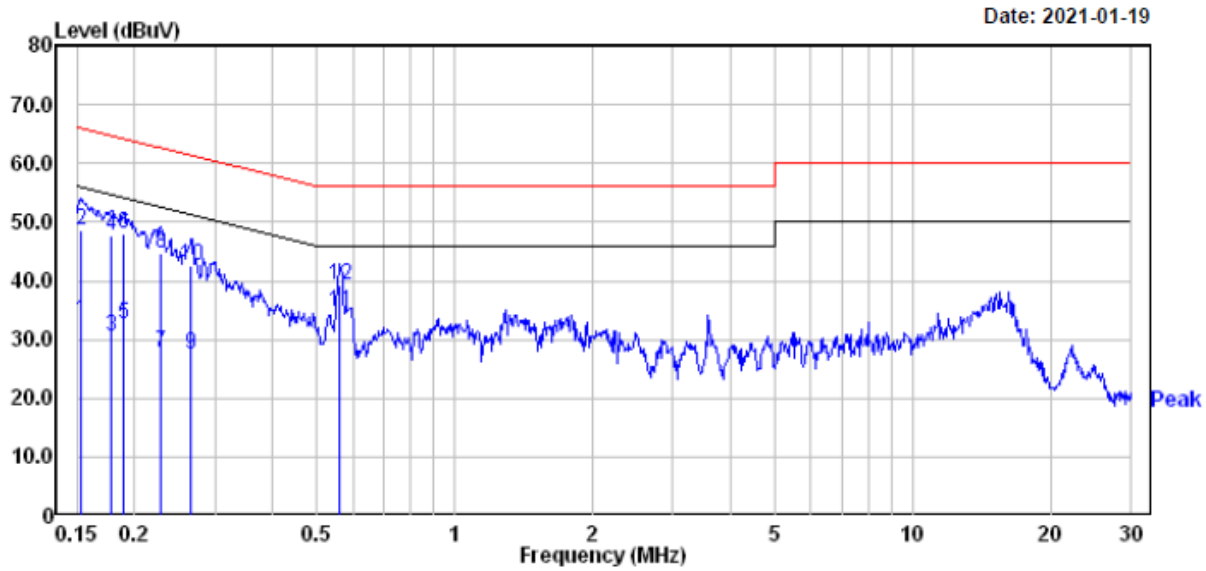
For adapter power supply

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.156	19.60	19.82	39.42	55.69	-16.27	Average
2	0.156	39.10	19.82	58.92	65.69	-6.77	QP
3	0.186	19.01	19.82	38.83	54.20	-15.37	Average
4	0.186	37.61	19.82	57.43	64.20	-6.77	QP
5	0.222	17.90	19.82	37.72	52.74	-15.02	Average
6	0.222	34.30	19.82	54.12	62.74	-8.62	QP
7	0.264	13.40	19.82	33.22	51.29	-18.07	Average
8	0.264	29.90	19.82	49.72	61.29	-11.57	QP
9	0.296	10.40	19.83	30.23	50.37	-20.14	Average
10	0.296	27.10	19.83	46.93	60.37	-13.44	QP
11	0.570	19.50	19.75	39.25	46.00	-6.75	Average
12	0.570	25.10	19.75	44.85	56.00	-11.15	QP

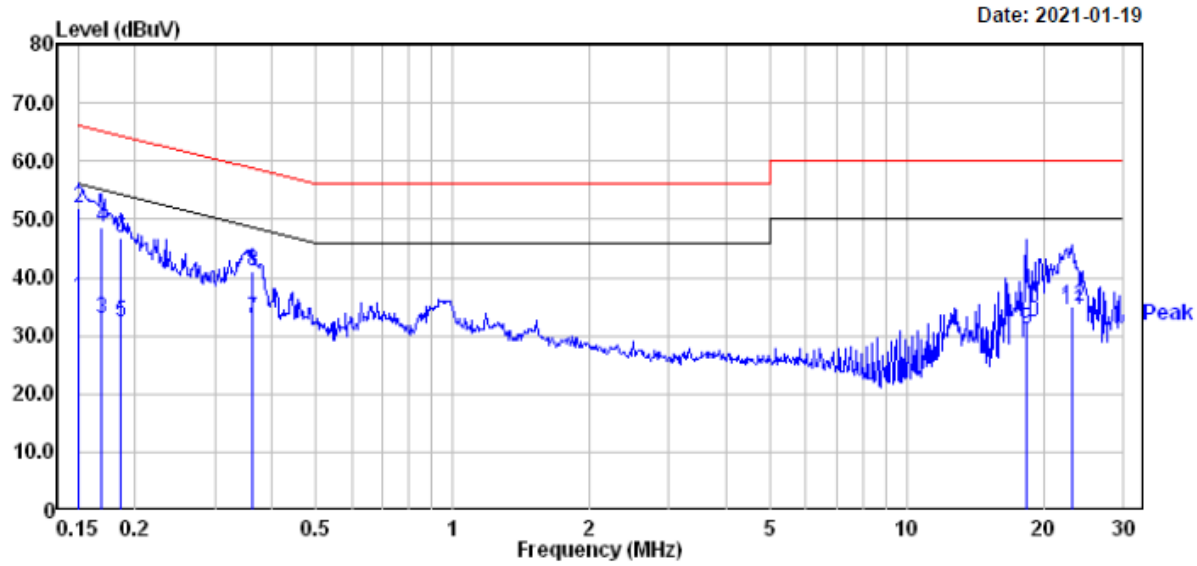
AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.152	13.40	19.82	33.22	55.87	-22.65	Average
2	0.152	28.70	19.82	48.52	65.87	-17.35	QP
3	0.178	10.80	19.83	30.63	54.59	-23.96	Average
4	0.178	27.90	19.83	47.73	64.59	-16.86	QP
5	0.189	12.80	19.82	32.62	54.06	-21.44	Average
6	0.189	28.10	19.82	47.92	64.06	-16.14	QP
7	0.228	8.10	19.82	27.92	52.52	-24.60	Average
8	0.228	25.00	19.82	44.82	62.52	-17.70	QP
9	0.266	7.80	19.82	27.62	51.25	-23.63	Average
10	0.266	22.60	19.82	42.42	61.25	-18.83	QP
11	0.561	14.90	19.75	34.65	46.00	-11.35	Average
12	0.561	19.60	19.75	39.35	56.00	-16.65	QP

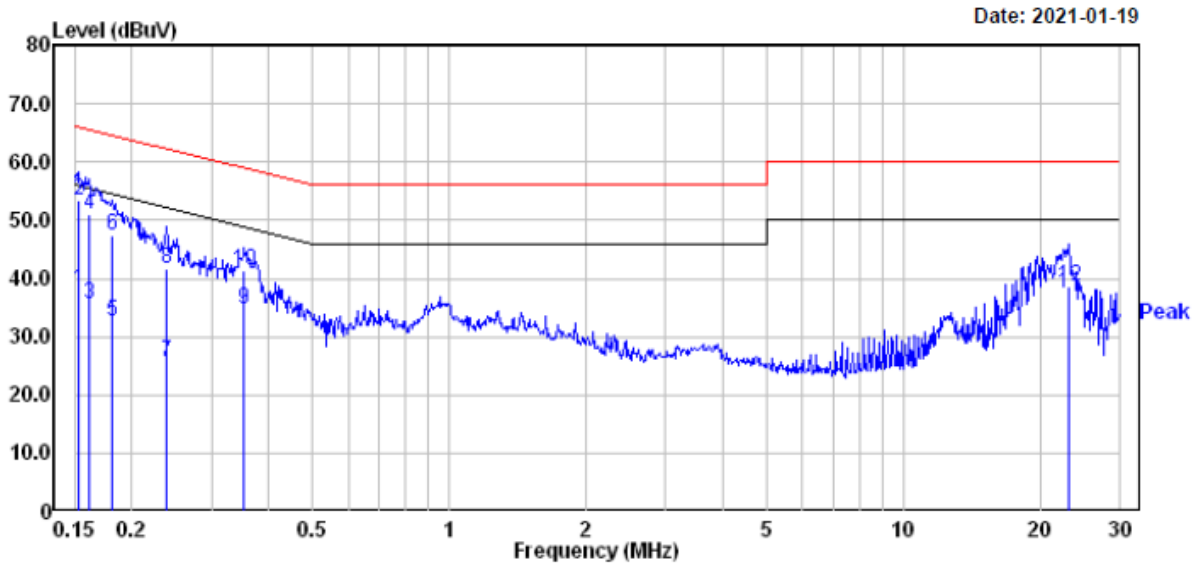
For PoE power supply

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	16.60	19.82	36.42	56.00	-19.58	Average
2	0.150	32.10	19.82	51.92	66.00	-14.08	QP
3	0.169	13.00	19.83	32.83	55.03	-22.20	Average
4	0.169	28.90	19.83	48.73	65.03	-16.30	QP
5	0.186	12.41	19.82	32.23	54.20	-21.97	Average
6	0.186	27.11	19.82	46.93	64.20	-17.27	QP
7	0.363	13.10	19.79	32.89	48.65	-15.76	Average
8	0.363	21.30	19.79	41.09	58.65	-17.56	QP
9	18.328	11.10	19.86	30.96	50.00	-19.04	Average
10	18.328	12.40	19.86	32.26	60.00	-27.74	QP
11	23.140	14.49	19.79	34.28	50.00	-15.72	Average
12	23.140	15.19	19.79	34.98	60.00	-25.02	QP

AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.152	18.30	19.82	38.12	55.87	-17.75	Average
2	0.152	33.60	19.82	53.42	65.87	-12.45	QP
3	0.162	15.80	19.83	35.63	55.38	-19.75	Average
4	0.162	31.20	19.83	51.03	65.38	-14.35	QP
5	0.182	12.80	19.83	32.63	54.42	-21.79	Average
6	0.182	27.60	19.83	47.43	64.42	-16.99	QP
7	0.238	5.90	19.82	25.72	52.17	-26.45	Average
8	0.238	21.70	19.82	41.52	62.17	-20.65	QP
9	0.354	14.90	19.80	34.70	48.87	-14.17	Average
10	0.354	21.50	19.80	41.30	58.87	-17.57	QP
11	23.140	17.79	19.79	37.58	50.00	-12.42	Average
12	23.140	18.89	19.79	38.68	60.00	-21.32	QP

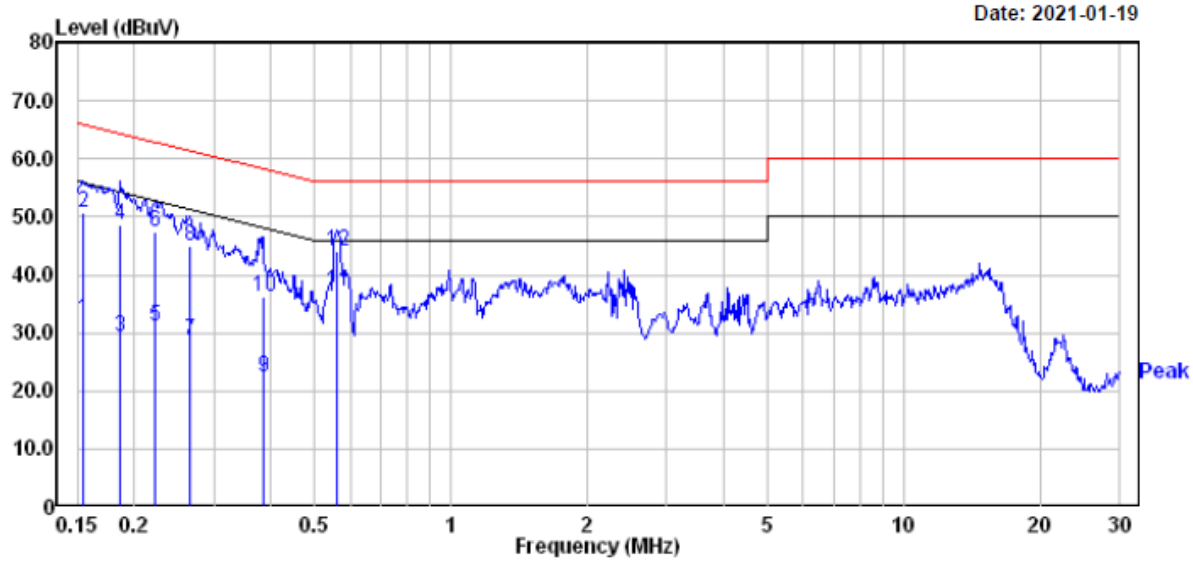
Note:
1) Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
2) Over Limit (dB) = Read level (dBµV) + Factor (dB) - Limit (dBµV)

For BLE (1Mbps) Mode:

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

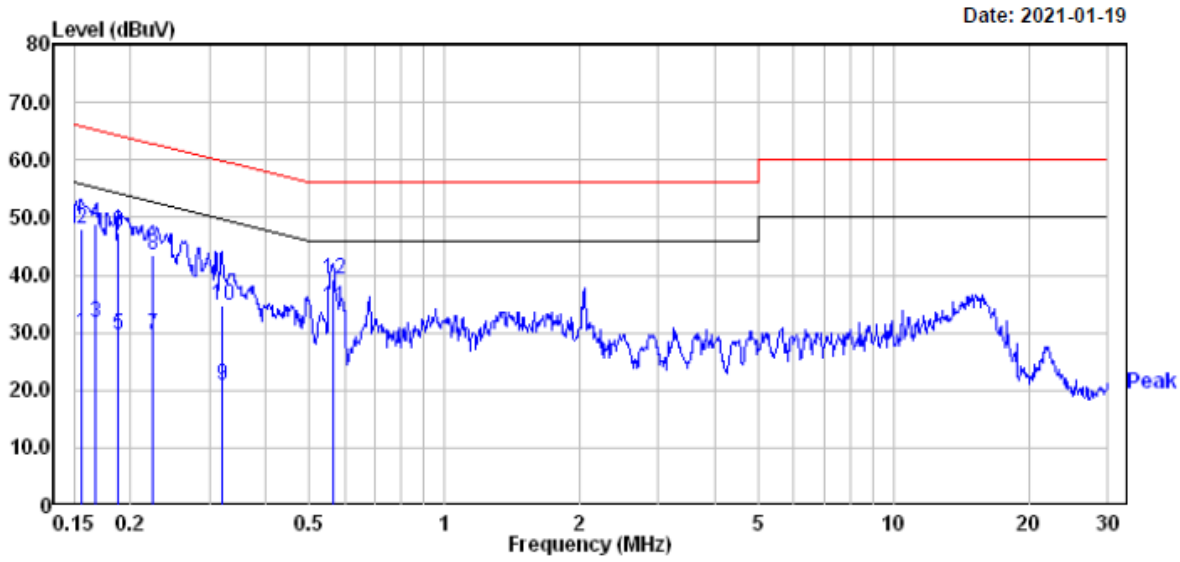
For adapter power supply

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.154	12.50	19.82	32.32	55.78	-23.46	Average
2	0.154	31.00	19.82	50.82	65.78	-14.96	QP
3	0.186	9.41	19.82	29.23	54.20	-24.97	Average
4	0.186	28.81	19.82	48.63	64.20	-15.57	QP
5	0.222	11.30	19.82	31.12	52.74	-21.62	Average
6	0.222	27.60	19.82	47.42	62.74	-15.32	QP
7	0.266	9.00	19.82	28.82	51.25	-22.43	Average
8	0.266	25.30	19.82	45.12	61.25	-16.13	QP
9	0.385	2.50	19.76	22.26	48.17	-25.91	Average
10	0.385	16.60	19.76	36.36	58.17	-21.81	QP
11	0.561	17.50	19.75	37.25	46.00	-8.75	Average
12	0.561	24.30	19.75	44.05	56.00	-11.95	QP

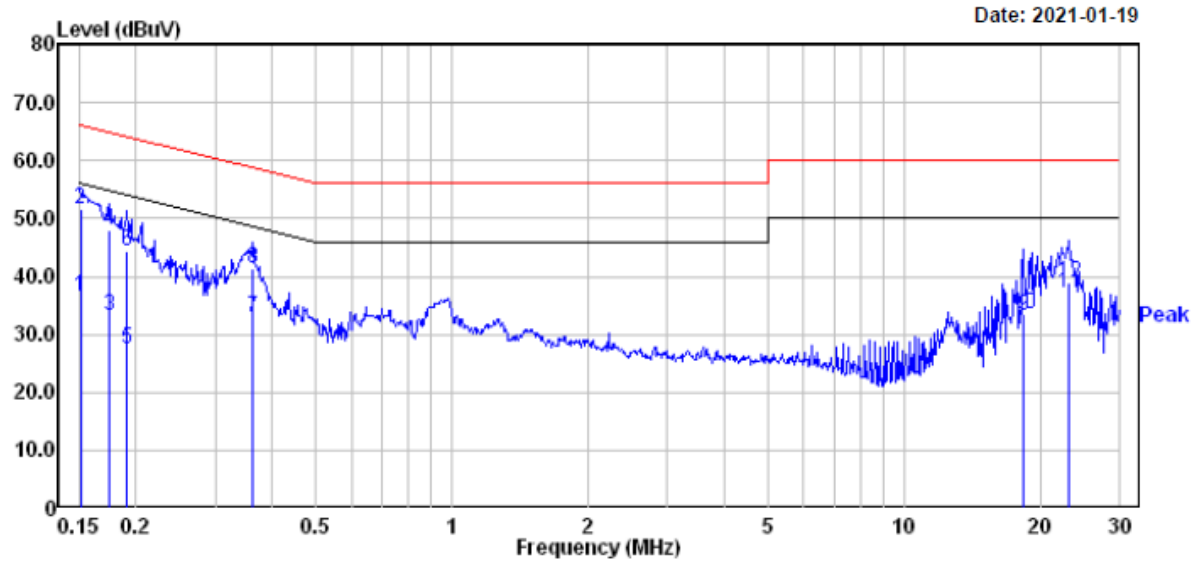
AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.156	10.00	19.82	29.82	55.69	-25.87	Average
2	0.156	28.20	19.82	48.02	65.69	-17.67	QP
3	0.167	11.80	19.83	31.63	55.12	-23.49	Average
4	0.167	29.00	19.83	48.83	65.12	-16.29	QP
5	0.188	9.71	19.82	29.53	54.11	-24.58	Average
6	0.188	27.71	19.82	47.53	64.11	-16.58	QP
7	0.223	9.80	19.82	29.62	52.70	-23.08	Average
8	0.223	23.70	19.82	43.52	62.70	-19.18	QP
9	0.320	0.90	19.82	20.72	49.71	-28.99	Average
10	0.320	14.80	19.82	34.62	59.71	-25.09	QP
11	0.567	14.80	19.75	34.55	46.00	-11.45	Average
12	0.567	19.50	19.75	39.25	56.00	-16.75	QP

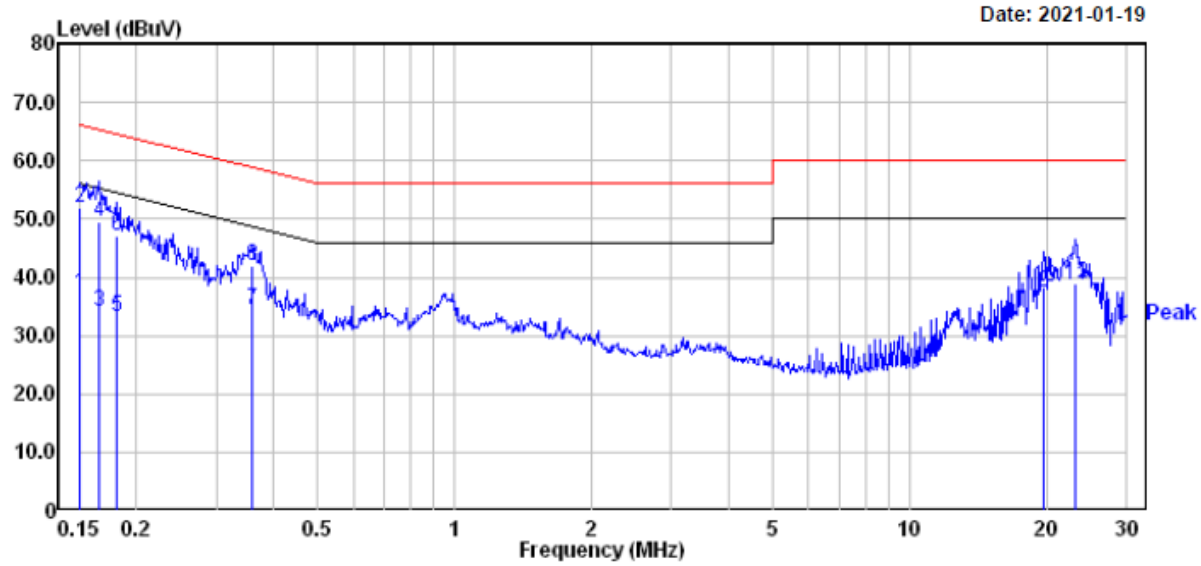
For PoE power supply

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.151	16.60	19.82	36.42	55.96	-19.54	Average
2	0.151	31.80	19.82	51.62	65.96	-14.34	QP
3	0.174	13.50	19.83	33.33	54.77	-21.44	Average
4	0.174	28.30	19.83	48.13	64.77	-16.64	QP
5	0.191	7.80	19.82	27.62	53.98	-26.36	Average
6	0.191	24.50	19.82	44.32	63.98	-19.66	QP
7	0.363	13.20	19.79	32.99	48.65	-15.66	Average
8	0.363	21.50	19.79	41.29	58.65	-17.36	QP
9	18.328	13.40	19.86	33.26	50.00	-16.74	Average
10	18.328	13.80	19.86	33.66	60.00	-26.34	QP
11	23.140	17.29	19.79	37.08	50.00	-12.92	Average
12	23.140	19.19	19.79	38.98	60.00	-21.02	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	17.40	19.82	37.22	56.00	-18.78	Average
2	0.150	32.00	19.82	51.82	66.00	-14.18	QP
3	0.165	14.40	19.83	34.23	55.21	-20.98	Average
4	0.165	29.80	19.83	49.63	65.21	-15.58	QP
5	0.181	13.40	19.83	33.23	54.46	-21.23	Average
6	0.181	27.20	19.83	47.03	64.46	-17.43	QP
7	0.360	14.59	19.80	34.39	48.74	-14.35	Average
8	0.360	22.09	19.80	41.89	58.74	-16.85	QP
9	19.740	17.60	19.94	37.54	50.00	-12.46	Average
10	19.740	18.30	19.94	38.24	60.00	-21.76	QP
11	23.140	18.99	19.79	38.78	50.00	-11.22	Average
12	23.140	19.29	19.79	39.08	60.00	-20.92	QP

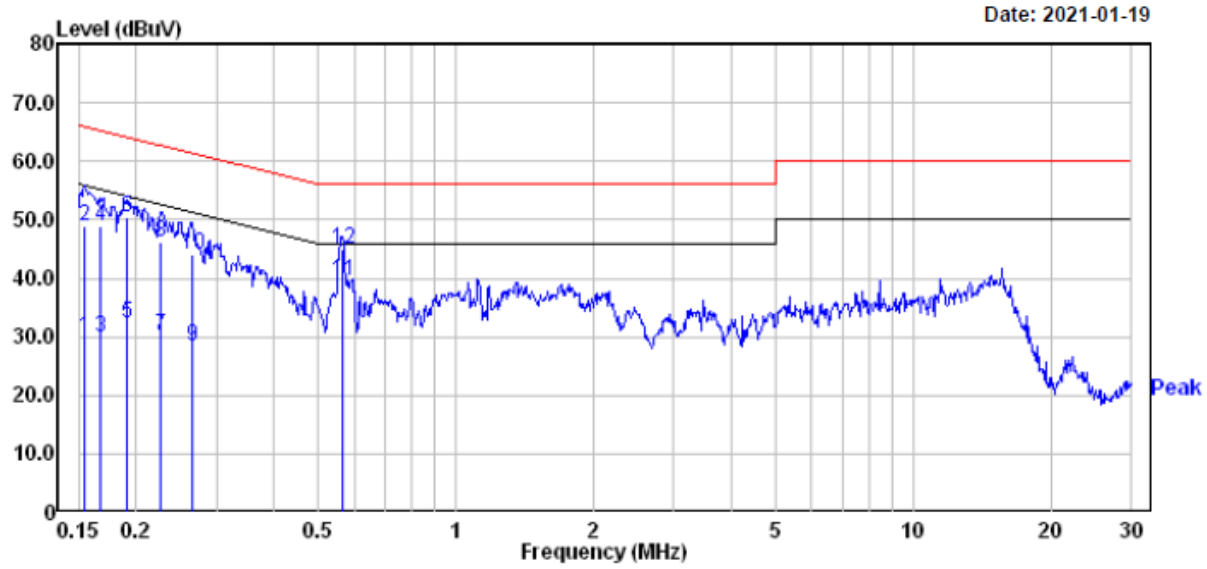
Note:
1) Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
2) Over Limit (dB) = Read level (dBµV) + Factor (dB) - Limit (dBµV)

For BLE (2Mbps) Mode:

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

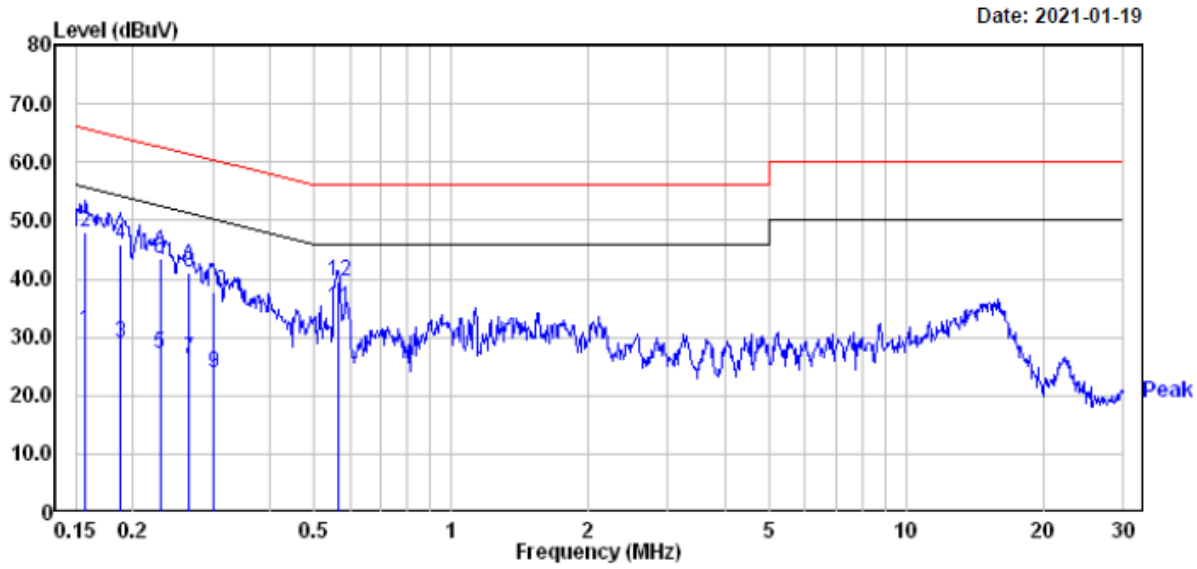
For adapter power supply

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.154	10.00	19.82	29.82	55.78	-25.96	Average
2	0.154	29.20	19.82	49.02	65.78	-16.76	QP
3	0.167	10.00	19.83	29.83	55.12	-25.29	Average
4	0.167	29.00	19.83	48.83	65.12	-16.29	QP
5	0.190	12.60	19.82	32.42	54.02	-21.60	Average
6	0.190	30.50	19.82	50.32	64.02	-13.70	QP
7	0.226	10.40	19.82	30.22	52.61	-22.39	Average
8	0.226	26.50	19.82	46.32	62.61	-16.29	QP
9	0.264	8.50	19.82	28.32	51.29	-22.97	Average
10	0.264	24.30	19.82	44.12	61.29	-17.17	QP
11	0.564	19.70	19.75	39.45	46.00	-6.55	Average
12	0.564	25.20	19.75	44.95	56.00	-11.05	QP

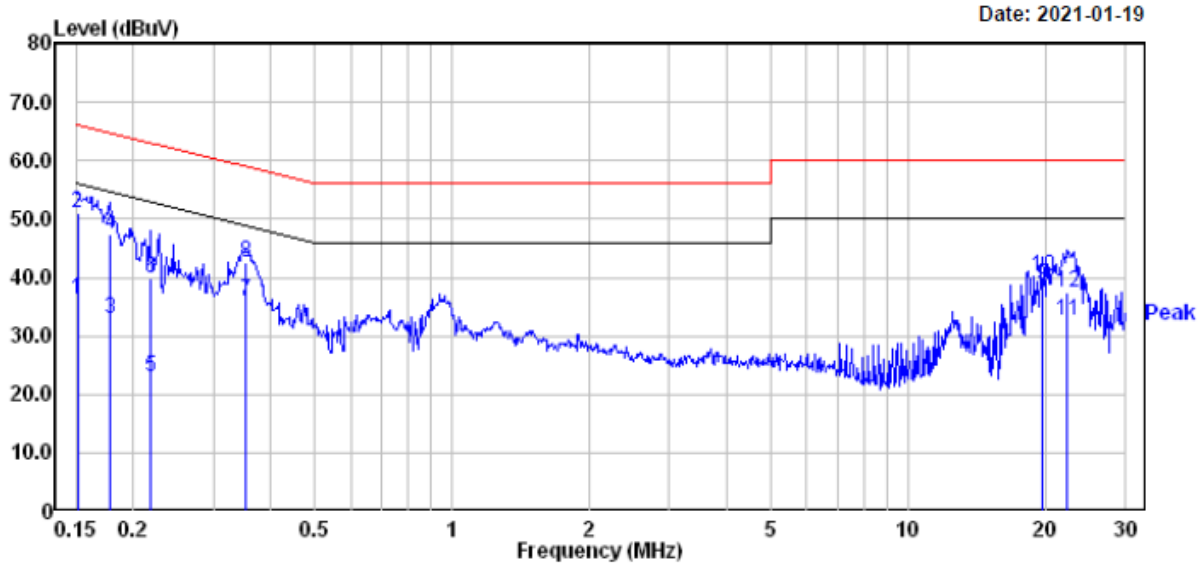
AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.157	11.30	19.82	31.12	55.60	-24.48	Average
2	0.157	28.30	19.82	48.12	65.60	-17.48	QP
3	0.187	9.11	19.82	28.93	54.15	-25.22	Average
4	0.187	26.21	19.82	46.03	64.15	-18.12	QP
5	0.229	7.50	19.82	27.32	52.48	-25.16	Average
6	0.229	23.80	19.82	43.62	62.48	-18.86	QP
7	0.264	6.40	19.82	26.22	51.29	-25.07	Average
8	0.264	21.20	19.82	41.02	61.29	-20.27	QP
9	0.302	4.09	19.83	23.92	50.19	-26.27	Average
10	0.302	17.89	19.83	37.72	60.19	-22.47	QP
11	0.564	15.40	19.75	35.15	46.00	-10.85	Average
12	0.564	19.90	19.75	39.65	56.00	-16.35	QP

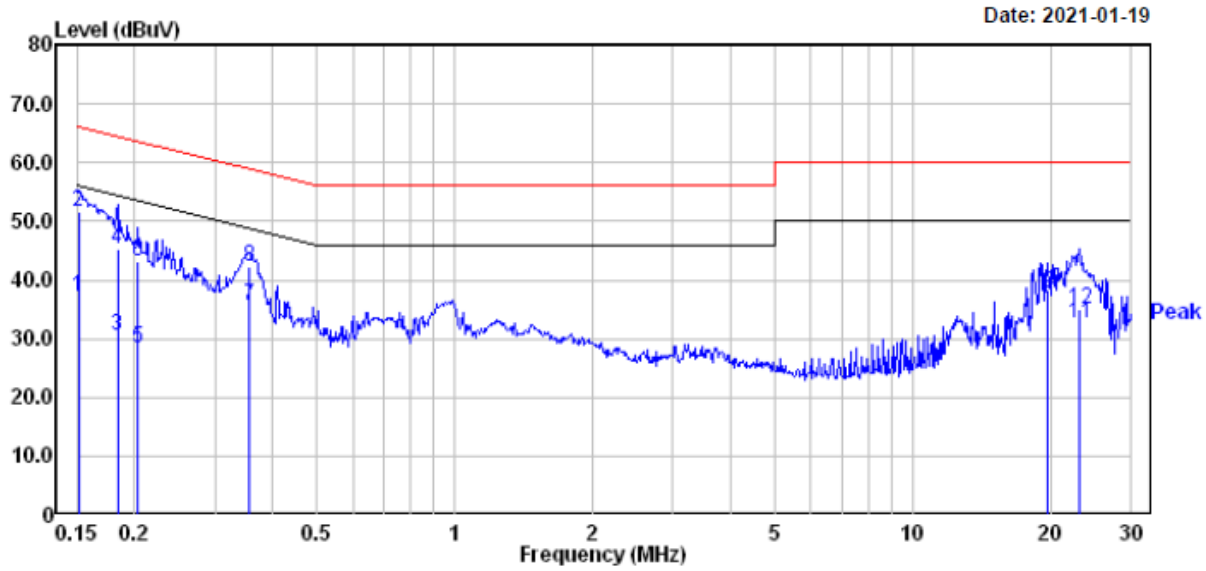
For PoE power supply

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.151	16.40	19.82	36.22	55.96	-19.74	Average
2	0.151	31.20	19.82	51.02	65.96	-14.94	QP
3	0.178	13.00	19.83	32.83	54.59	-21.76	Average
4	0.178	27.60	19.83	47.43	64.59	-17.16	QP
5	0.217	3.00	19.82	22.82	52.92	-30.10	Average
6	0.217	20.10	19.82	39.92	62.92	-23.00	QP
7	0.352	16.19	19.81	36.00	48.91	-12.91	Average
8	0.352	22.69	19.81	42.50	58.91	-16.41	QP
9	19.740	18.60	19.94	38.54	50.00	-11.46	Average
10	19.740	20.10	19.94	40.04	60.00	-19.96	QP
11	22.416	12.70	19.82	32.52	50.00	-17.48	Average
12	22.416	17.50	19.82	37.32	60.00	-22.68	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	17.20	19.82	37.02	55.96	-18.94	Average
2	0.151	31.90	19.82	51.72	65.96	-14.24	QP
3	0.183	10.80	19.83	30.63	54.33	-23.70	Average
4	0.183	25.60	19.83	45.43	64.33	-18.90	QP
5	0.204	8.50	19.82	28.32	53.45	-25.13	Average
6	0.204	23.50	19.82	43.32	63.45	-20.13	QP
7	0.356	15.90	19.80	35.70	48.83	-13.13	Average
8	0.356	22.50	19.80	42.30	58.83	-16.53	QP
9	19.740	17.90	19.94	37.84	50.00	-12.16	Average
10	19.740	18.30	19.94	38.24	60.00	-21.76	QP
11	23.140	12.89	19.79	32.68	50.00	-17.32	Average
12	23.140	15.29	19.79	35.08	60.00	-24.92	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)

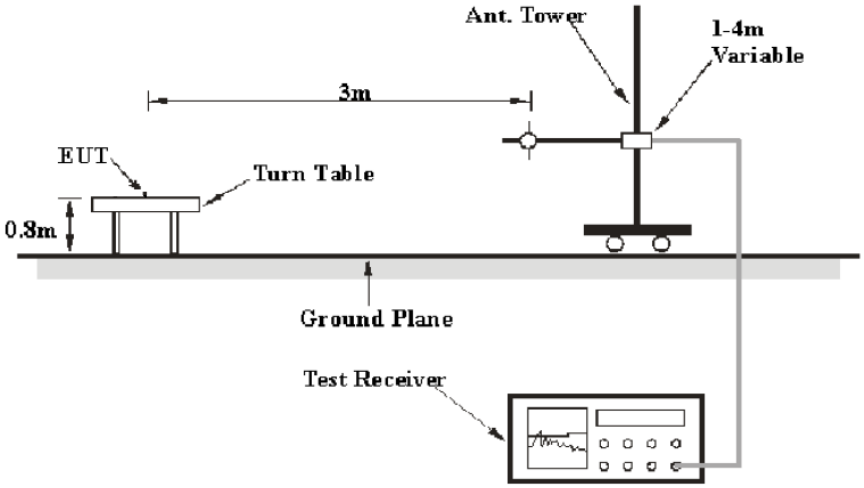
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

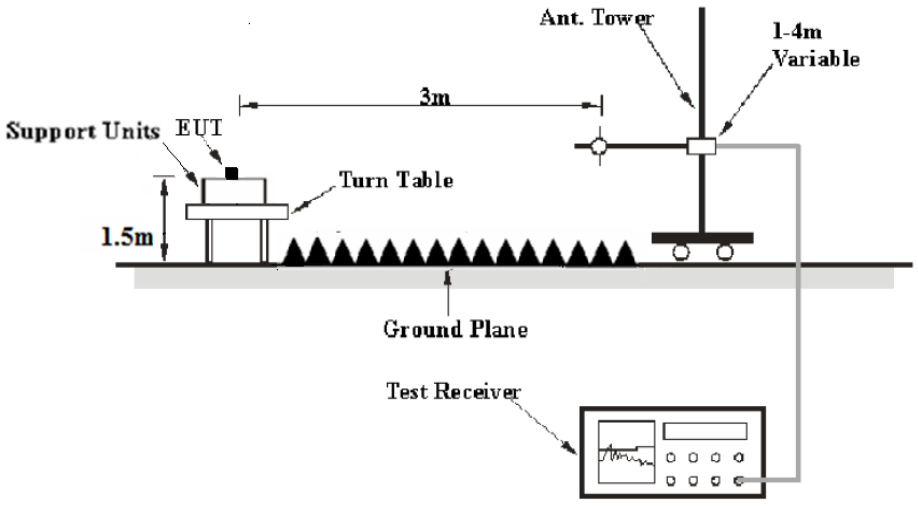
FCC §15.247 (d); §15.209; §15.205;

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	/	Ave.

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.

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 (dBμV/m) = Meter Reading (dBμV) + 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 (dBμV/m) – Corrected Amplitude (dBμV/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:	21.1~22.5 ℃
Relative Humidity:	50~52 %
ATM Pressure:	101.2~101.5 kPa

The testing was performed by CK Huang from 2020-12-05 to 2020-12-08.

Test Result: Compliant.

EUT operation mode: Transmitting

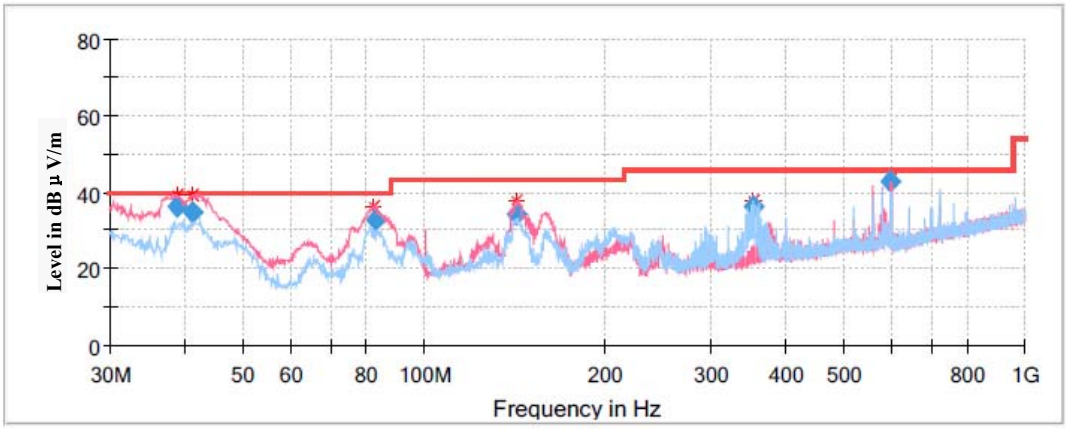
For Wi-Fi Mode:

Spurious Emission Test:

30MHz-1GHz:

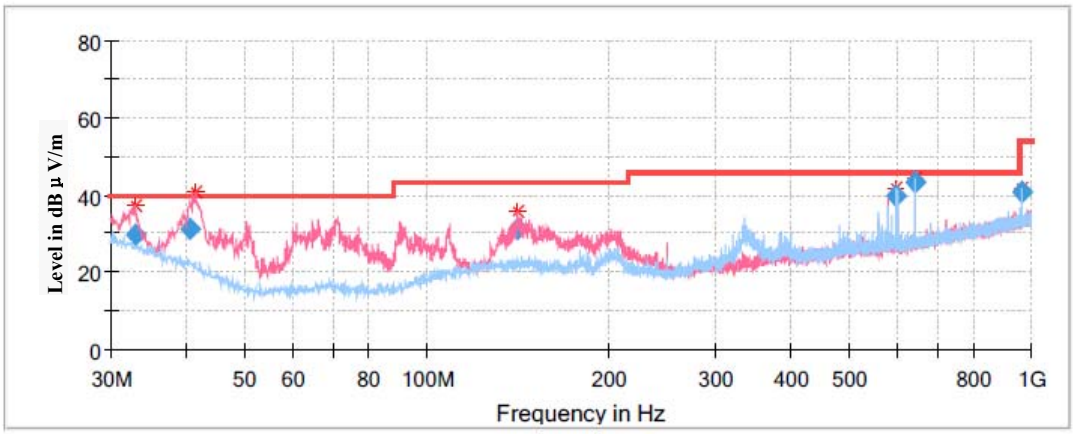
Pre-scan with 802.11b, 802.11g, 802.11n-HT20 and 802.11n-HT40 modes of operation in the X,Y and Z axes of orientation, the worst case ***high channel of 802.11n-HT40 mode in Z-axis of orientation*** *was recorded*

For adapter power supply



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)				
38.918400	36.17	100.0	V	109.0	-9.8	40.00	3.83
41.283100	34.54	100.0	V	224.0	-11.4	40.00	5.46
82.967700	32.65	100.0	V	145.0	-17.0	40.00	7.35
142.499700	34.00	100.0	V	49.0	-11.2	43.50	9.50
354.027100	36.07	100.0	H	167.0	-9.1	46.00	9.93
597.499500	42.68	100.0	V	296.0	-5.0	46.00	3.32

For PoE power supply



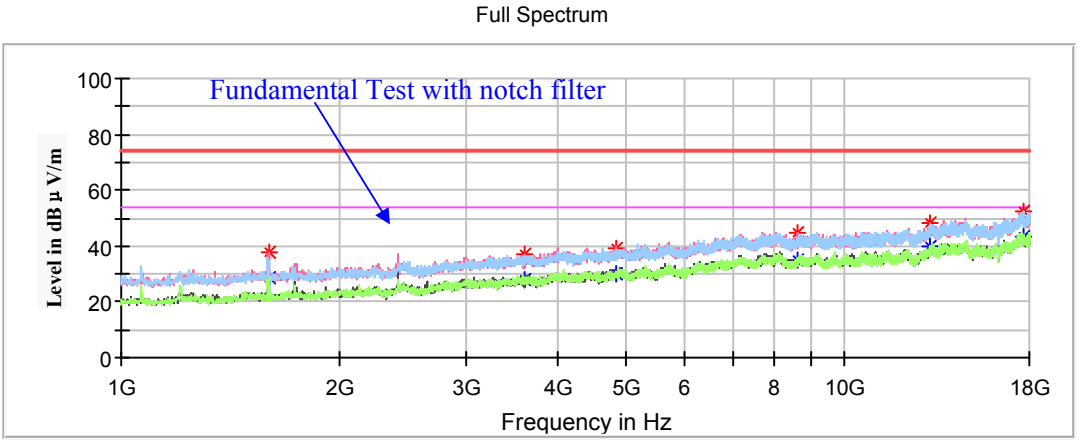
Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	QuasiPeak (dBµV/m)	Height (cm)	Polar (H/V)				
32.910100	29.53	100.0	V	273.0	-5.3	40.00	10.47
40.677550	30.96	100.0	V	177.0	-11.0	40.00	9.04
141.191350	31.13	100.0	V	301.0	-11.1	43.50	12.37
597.510350	39.82	200.0	H	346.0	-5.0	46.00	6.18
640.003950	43.23	200.0	H	334.0	-4.0	46.00	2.77
966.680900	40.93	100.0	H	119.0	2.2	53.90	12.97

1GHz-18GHz – adapter power supply (worst case)

802.11b Mode (Chain0):
*(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)*

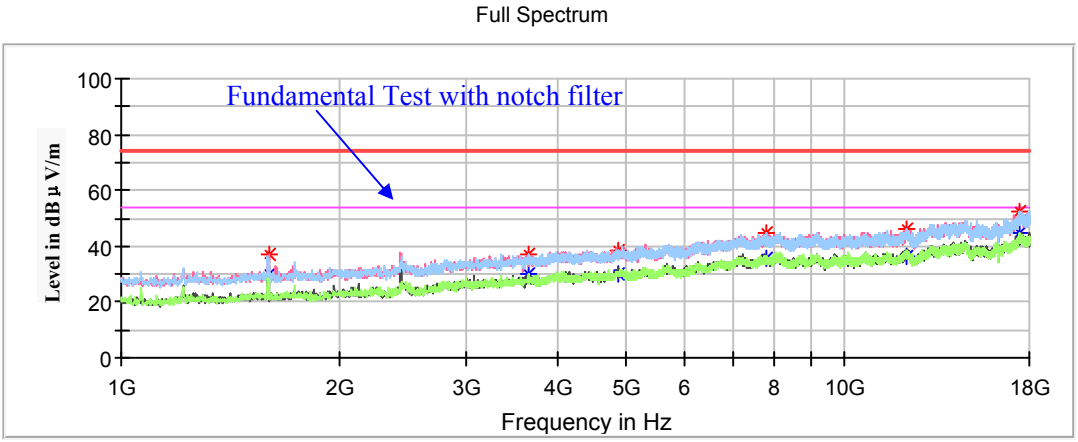
Note:
1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
   Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)
   Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

Low Channel: 2412MHz



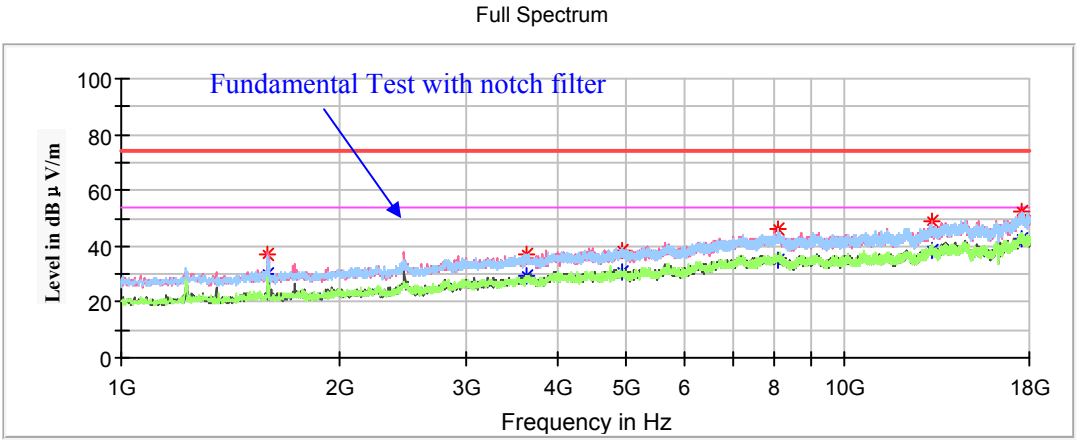
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1598.400000	---	28.87	150.0	H	182.0	-16.0	54.00	25.13
1598.400000	37.77	---	150.0	H	182.0	-16.0	74.00	36.23
3612.900000	---	28.22	150.0	V	187.0	-8.4	54.00	25.78
3612.900000	36.75	---	150.0	V	187.0	-8.4	74.00	37.25
4824.000000	38.97	---	150.0	V	226.0	-5.5	74.00	35.03
4824.000000	---	30.28	150.0	V	226.0	-5.5	54.00	23.72
8612.600000	---	34.88	150.0	V	98.0	1.5	54.00	19.12
8612.600000	44.99	---	150.0	V	98.0	1.5	74.00	29.01
13136.300000	---	39.90	150.0	V	175.0	5.3	54.00	14.10
13136.300000	48.34	---	150.0	V	175.0	5.3	74.00	25.66
17619.200000	---	43.04	150.0	V	358.0	8.9	54.00	10.96
17619.200000	52.13	---	150.0	V	358.0	8.9	74.00	21.87

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)				
1598.400000	36.94	---	150.0	V	1.0	-16.0	74.00	37.06
1598.400000	---	29.89	150.0	V	1.0	-16.0	54.00	24.11
3650.300000	37.29	---	150.0	H	354.0	-8.3	74.00	36.71
3650.300000	---	29.91	150.0	H	354.0	-8.3	54.00	24.09
4874.000000	38.63	---	150.0	H	129.0	-5.4	74.00	35.37
4874.000000	---	29.95	150.0	H	129.0	-5.4	54.00	24.05
7772.800000	---	35.81	150.0	H	194.0	1.5	54.00	18.19
7772.800000	44.71	---	150.0	H	194.0	1.5	74.00	29.29
12206.400000	---	36.18	150.0	H	219.0	3.4	54.00	17.82
12206.400000	46.14	---	150.0	H	219.0	3.4	74.00	27.86
17486.600000	---	44.41	150.0	V	1.0	8.8	54.00	9.59
17486.600000	52.41	---	150.0	V	1.0	8.8	74.00	21.59

High Channel: 2462MHz

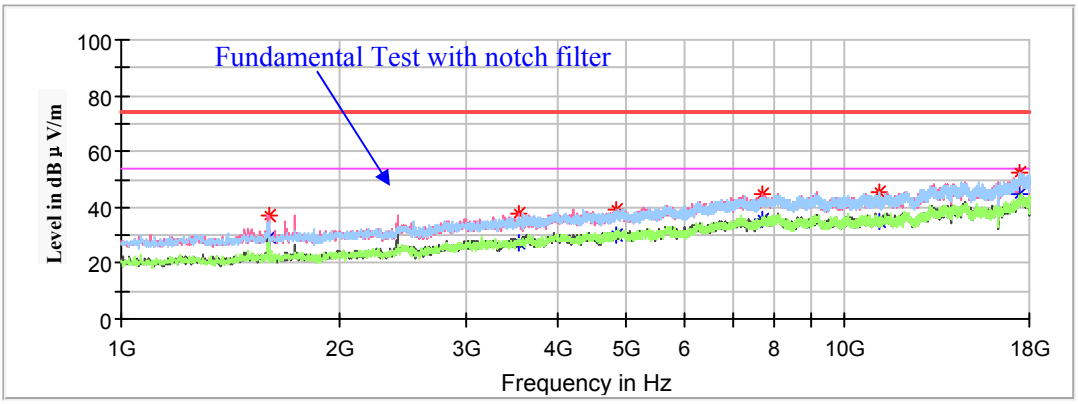


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1591.600000	36.85	---	150.0	V	22.0	-16.0	74.00	37.15
1591.600000	---	30.36	150.0	V	22.0	-16.0	54.00	23.64
3623.100000	---	29.24	150.0	H	337.0	-8.4	54.00	24.76
3623.100000	36.83	---	150.0	H	337.0	-8.4	74.00	37.17
4924.000000	---	30.70	150.0	V	98.0	-5.3	54.00	23.30
4924.000000	38.22	---	150.0	V	98.0	-5.3	74.00	35.78
8107.700000	---	35.24	150.0	H	248.0	1.7	54.00	18.76
8107.700000	45.90	---	150.0	H	248.0	1.7	74.00	28.10
13199.200000	---	38.51	150.0	V	72.0	5.4	54.00	15.49
13199.200000	48.77	---	150.0	V	72.0	5.4	74.00	25.23
17558.000000	---	42.55	150.0	H	185.0	8.9	54.00	11.45
17558.000000	52.15	---	150.0	H	185.0	8.9	74.00	21.85

802.11g Mode (Chain0):
*(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)*

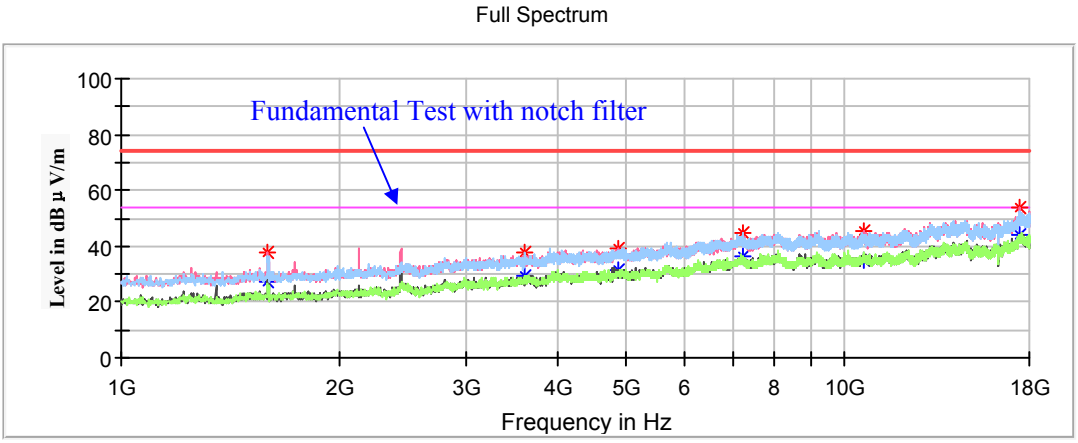
Note:
1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
   Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)
   Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

Low Channel: 2412MHz



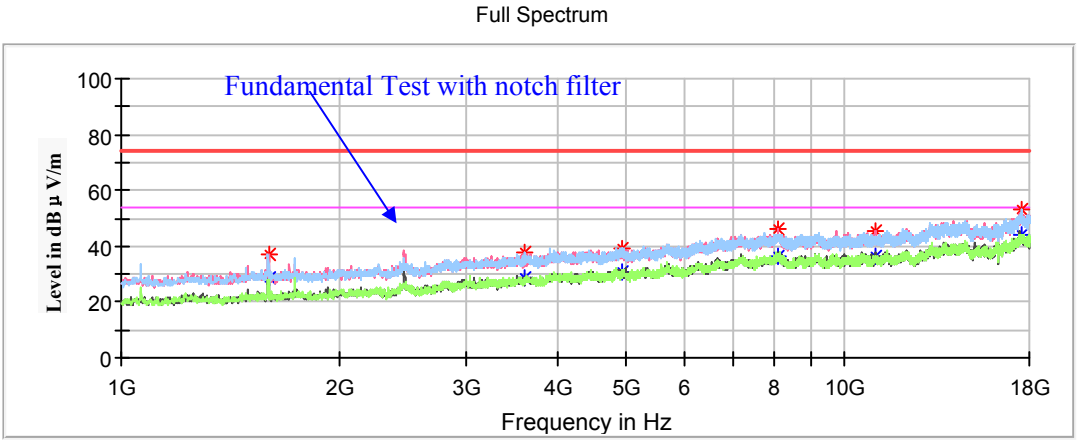
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1598.400000	36.73	---	150.0	V	6.0	-16.0	74.00	37.27
1598.400000	---	29.21	150.0	V	6.0	-16.0	54.00	24.79
3551.700000	37.78	---	150.0	V	165.0	-8.6	74.00	36.22
3551.700000	---	27.57	150.0	V	165.0	-8.6	54.00	26.43
4824.000000	38.96	---	150.0	V	14.0	-5.5	74.00	35.04
4824.000000	---	29.86	150.0	V	14.0	-5.5	54.00	24.14
7674.200000	44.57	---	150.0	V	204.0	1.3	74.00	29.43
7674.200000	---	35.66	150.0	V	204.0	1.3	54.00	18.34
11137.100000	---	35.10	150.0	H	51.0	2.9	54.00	18.90
11137.100000	45.29	---	150.0	H	51.0	2.9	74.00	28.71
17496.800000	---	44.51	150.0	V	140.0	8.9	54.00	9.49
17496.800000	52.78	---	150.0	V	140.0	8.9	74.00	21.22

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)				
1595.000000	37.48	---	150.0	V	0.0	-16.0	74.00	36.52
1595.000000	---	27.22	150.0	V	0.0	-16.0	54.00	26.78
3621.400000	38.03	---	150.0	H	300.0	-8.4	74.00	35.97
3621.400000	---	29.55	150.0	H	300.0	-8.4	54.00	24.45
4874.000000	39.50	---	150.0	V	0.0	-5.4	74.00	34.50
4874.000000	---	31.55	150.0	V	0.0	-5.4	54.00	22.45
7311.000000	---	36.15	150.0	V	130.0	0.4	54.00	17.85
7311.000000	44.92	---	150.0	V	130.0	0.4	74.00	29.08
10635.600000	---	35.24	150.0	V	358.0	2.5	54.00	18.76
10635.600000	45.75	---	150.0	V	358.0	2.5	74.00	28.25
17486.600000	---	44.24	150.0	V	97.0	8.8	54.00	9.76
17486.600000	53.99	---	150.0	V	97.0	8.8	74.00	20.01

High Channel: 2462MHz

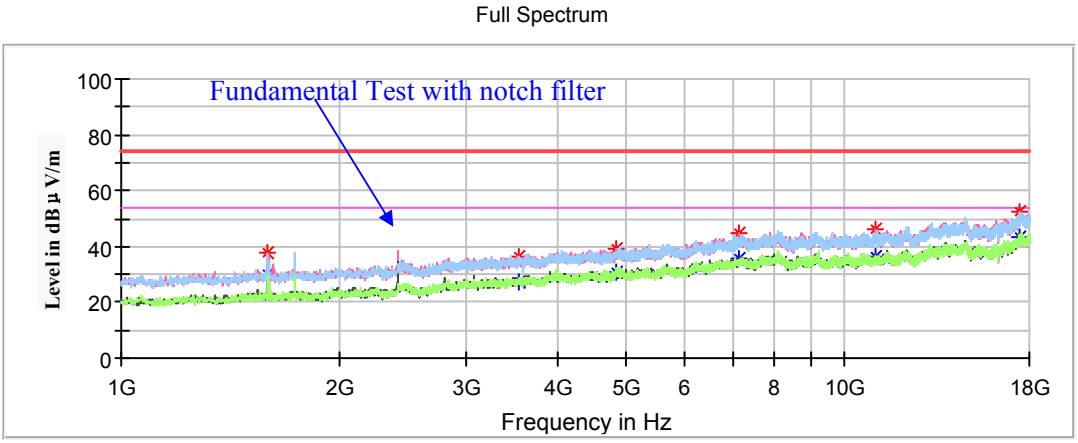


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1598.400000	36.98	---	150.0	V	22.0	-16.0	74.00	37.02
1598.400000	---	28.74	150.0	V	22.0	-16.0	54.00	25.26
3619.700000	38.03	---	150.0	H	262.0	-8.4	74.00	35.97
3619.700000	---	28.76	150.0	H	262.0	-8.4	54.00	25.24
4924.000000	39.17	---	150.0	V	0.0	-5.3	74.00	34.83
4924.000000	---	30.54	150.0	V	0.0	-5.3	54.00	23.46
8083.900000	46.10	---	150.0	V	345.0	1.7	74.00	27.90
8083.900000	---	36.16	150.0	V	345.0	1.7	54.00	17.84
11031.700000	45.54	---	150.0	V	136.0	2.9	74.00	28.46
11031.700000	---	36.24	150.0	V	136.0	2.9	54.00	17.76
17507.000000	---	44.09	150.0	H	287.0	8.9	54.00	9.91
17507.000000	52.89	---	150.0	H	287.0	8.9	74.00	21.11

802.11b Mode (Chain1):
*(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)*

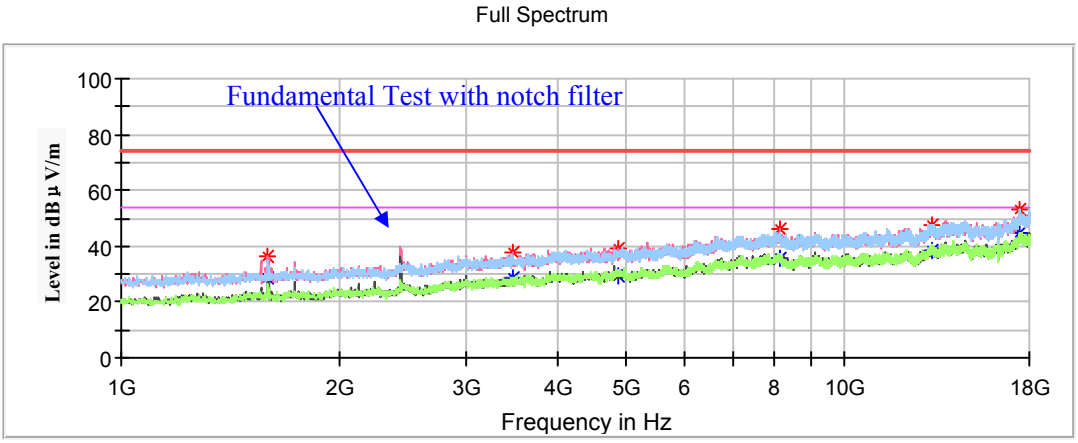
Note:
1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
   Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)
   Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

Low Channel: 2412MHz



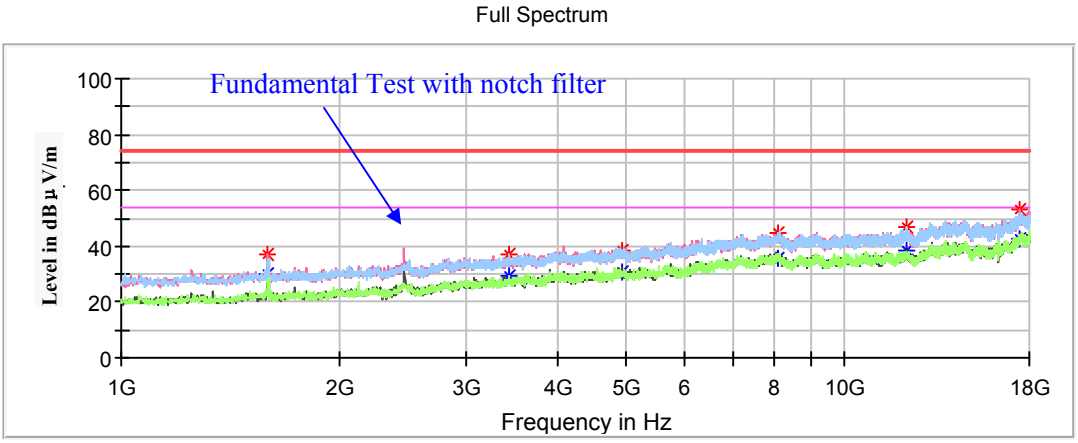
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1593.300000	---	29.93	150.0	V	4.0	-16.0	54.00	24.07
1593.300000	37.81	---	150.0	V	4.0	-16.0	74.00	36.19
3543.200000	---	27.44	150.0	V	85.0	-8.7	54.00	26.56
3543.200000	36.55	---	150.0	V	85.0	-8.7	74.00	37.45
4824.000000	38.98	---	150.0	V	324.0	-5.5	74.00	35.02
4824.000000	---	30.80	150.0	V	324.0	-5.5	54.00	23.20
7236.000000	44.53	---	150.0	V	85.0	0.5	74.00	29.47
7236.000000	---	35.87	150.0	V	85.0	0.5	54.00	18.13
11019.800000	---	36.45	150.0	V	239.0	2.9	54.00	17.55
11019.800000	45.85	---	150.0	V	239.0	2.9	74.00	28.15
17491.700000	---	43.47	150.0	V	279.0	8.9	54.00	10.53
17491.700000	52.12	---	150.0	V	279.0	8.9	74.00	21.88

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)				
1595.000000	36.60	---	150.0	V	0.0	-16.0	74.00	37.40
1595.000000	---	28.86	150.0	V	0.0	-16.0	54.00	25.14
3476.900000	---	28.40	150.0	V	27.0	-8.9	54.00	25.60
3476.900000	37.78	---	150.0	V	27.0	-8.9	74.00	36.22
4874.000000	38.85	---	150.0	V	128.0	-5.4	74.00	35.15
4874.000000	---	29.64	150.0	V	128.0	-5.4	54.00	24.36
8119.600000	45.85	---	150.0	V	103.0	1.7	74.00	28.15
8119.600000	---	36.00	150.0	V	103.0	1.7	54.00	18.00
13194.100000	---	38.52	150.0	H	350.0	5.4	54.00	15.48
13194.100000	47.90	---	150.0	H	350.0	5.4	74.00	26.10
17467.900000	---	44.50	150.0	H	0.0	8.8	54.00	9.50
17467.900000	52.88	---	150.0	H	0.0	8.8	74.00	21.12

High Channel: 2462MHz

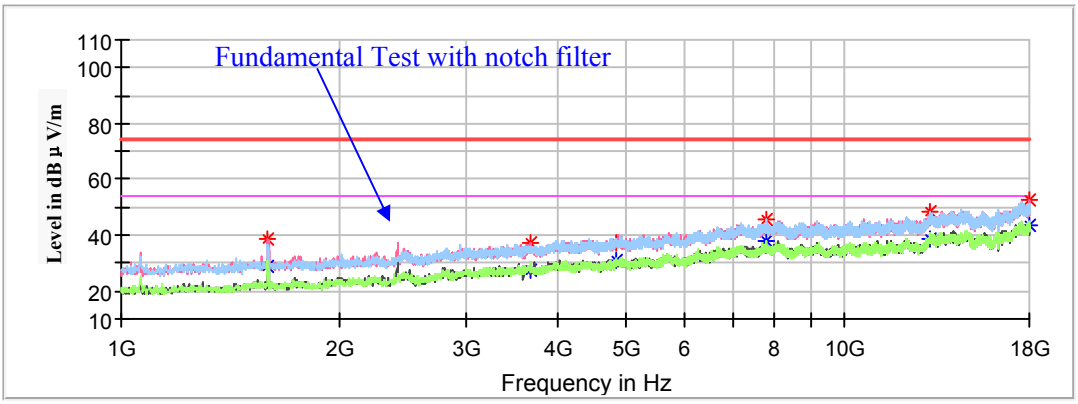


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1593.300000	37.25	---	150.0	V	4.0	-16.0	74.00	36.75
1593.300000	---	29.79	150.0	V	4.0	-16.0	54.00	24.21
3439.500000	36.78	---	150.0	H	301.0	-9.0	74.00	37.22
3439.500000	---	29.05	150.0	H	301.0	-9.0	54.00	24.95
4924.000000	38.50	---	150.0	H	250.0	-5.3	74.00	35.50
4924.000000	---	30.67	150.0	H	250.0	-5.3	54.00	23.33
8065.200000	45.09	---	150.0	H	186.0	1.7	74.00	28.91
8065.200000	---	35.68	150.0	H	186.0	1.7	54.00	18.32
12170.700000	---	38.27	150.0	V	60.0	3.5	54.00	15.73
12170.700000	46.77	---	150.0	V	60.0	3.5	74.00	27.23
17491.700000	---	42.76	150.0	V	179.0	8.9	54.00	11.24
17491.700000	52.94	---	150.0	V	179.0	8.9	74.00	21.06

802.11g Mode (Chain1):
*(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)*

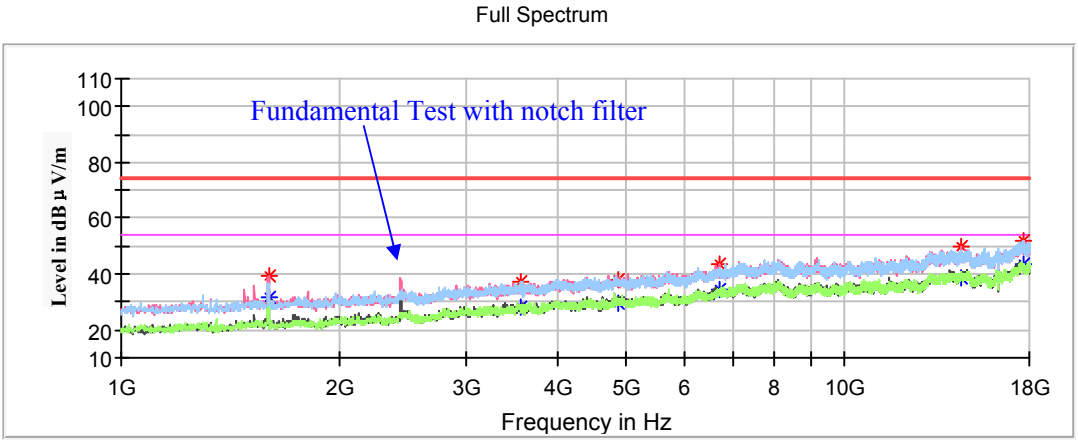
Note:
1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
   Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)
   Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

Low Channel: 2412MHz



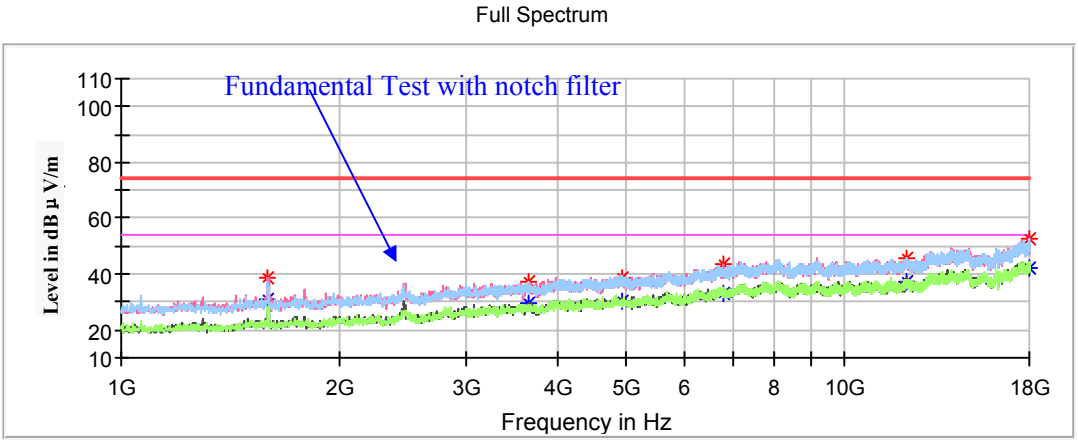
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1596.700000	---	29.08	150.0	V	15.0	-16.0	54.00	24.92
1596.700000	38.96	---	150.0	V	15.0	-16.0	74.00	35.04
3687.700000	---	27.36	150.0	V	170.0	-8.1	54.00	26.64
3687.700000	37.55	---	150.0	V	170.0	-8.1	74.00	36.45
4824.000000	37.58	---	150.0	H	345.0	-5.5	74.00	36.42
4824.000000	---	31.05	150.0	H	345.0	-5.5	54.00	22.95
7776.200000	45.33	---	150.0	H	72.0	1.5	74.00	28.67
7776.200000	---	37.70	150.0	H	72.0	1.5	54.00	16.30
13121.000000	48.22	---	150.0	H	22.0	5.3	74.00	25.78
13121.000000	---	38.94	150.0	H	22.0	5.3	54.00	15.06
17977.900000	---	43.70	150.0	V	25.0	8.8	54.00	10.30
17977.900000	52.68	---	150.0	V	25.0	8.8	74.00	21.32

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)				
1598.400000	39.13	---	150.0	V	15.0	-16.0	74.00	34.87
1598.400000	---	31.82	150.0	V	15.0	-16.0	54.00	22.18
3563.600000	37.17	---	150.0	H	283.0	-8.6	74.00	36.83
3563.600000	---	28.45	150.0	H	283.0	-8.6	54.00	25.55
4874.000000	37.80	---	150.0	V	334.0	-5.4	74.00	36.20
4874.000000	---	29.71	150.0	V	334.0	-5.4	54.00	24.29
6720.500000	43.78	---	150.0	V	15.0	-0.7	74.00	30.22
6720.500000	---	34.22	150.0	V	15.0	-0.7	54.00	19.78
14484.400000	49.77	---	150.0	V	0.0	6.5	74.00	24.23
14484.400000	---	38.45	150.0	V	0.0	6.5	54.00	15.55
17675.300000	---	43.65	150.0	V	0.0	8.9	54.00	10.35
17675.300000	51.87	---	150.0	V	0.0	8.9	74.00	22.13

High Channel: 2462MHz

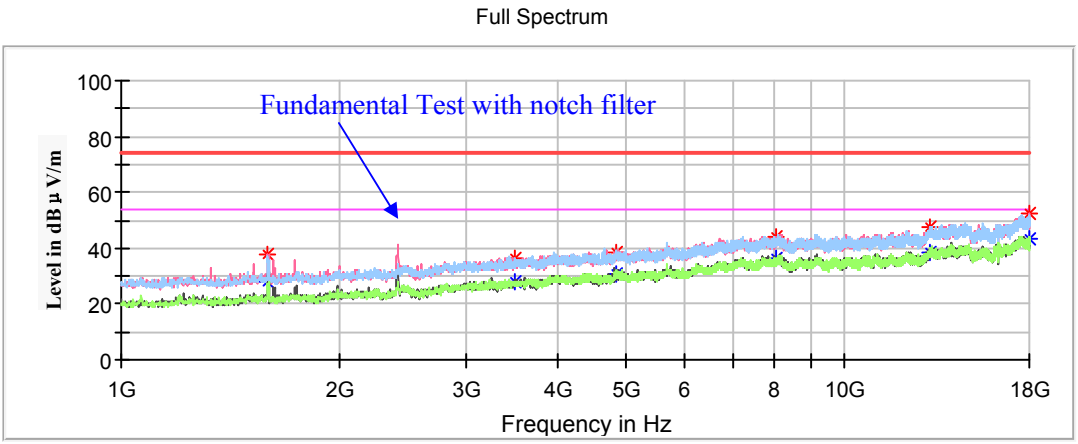


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1591.600000	38.54	---	150.0	V	15.0	-16.0	74.00	35.46
1591.600000	---	31.07	150.0	V	15.0	-16.0	54.00	22.93
3645.200000	37.21	---	150.0	H	0.0	-8.3	74.00	36.79
3645.200000	---	29.60	150.0	H	0.0	-8.3	54.00	24.40
4924.000000	38.97	---	150.0	V	103.0	-5.3	74.00	35.03
4924.000000	---	30.07	150.0	V	103.0	-5.3	54.00	23.93
6778.300000	43.68	---	150.0	V	211.0	-0.6	74.00	30.32
6778.300000	---	32.90	150.0	V	211.0	-0.6	54.00	21.10
12206.400000	46.00	---	150.0	H	352.0	3.4	74.00	28.00
12206.400000	---	37.32	150.0	H	352.0	3.4	54.00	16.68
17957.500000	---	42.36	150.0	V	338.0	8.8	54.00	11.64
17957.500000	52.50	---	150.0	V	338.0	8.8	74.00	21.50

802.11n-HT20 Mode (Chain0+Chain1):
*(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)*

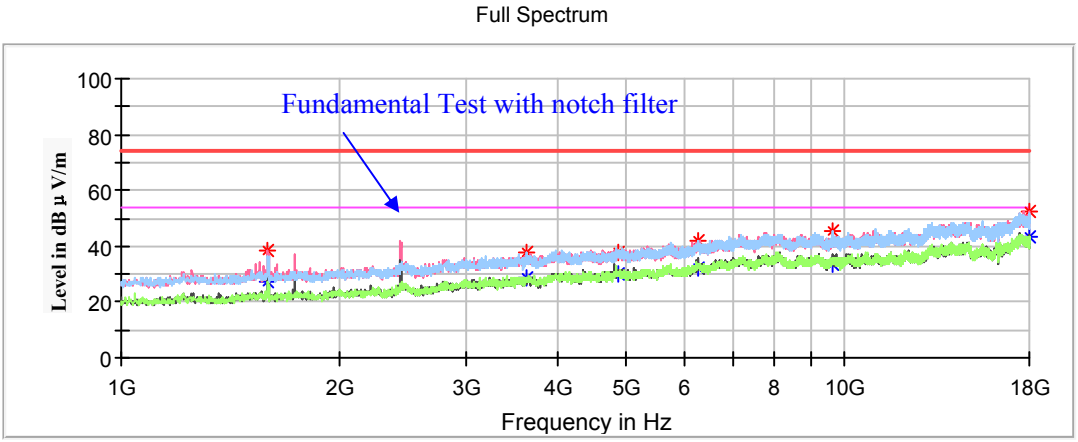
Note:
1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
   Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)
   Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

Low Channel: 2412MHz



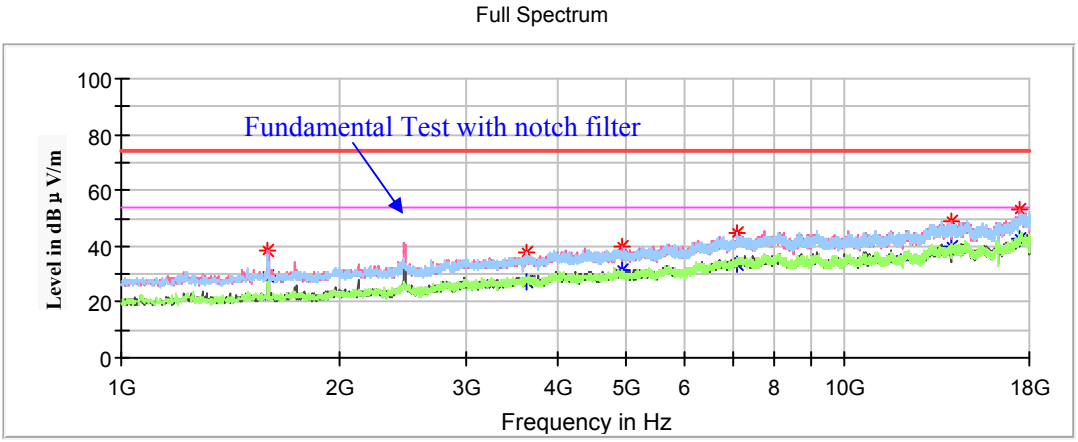
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1595.000000	38.06	---	150.0	V	15.0	-16.0	74.00	35.94
1595.000000	---	27.68	150.0	V	15.0	-16.0	54.00	26.32
3495.600000	36.30	---	150.0	H	23.0	-8.8	74.00	37.70
3495.600000	---	27.71	150.0	H	23.0	-8.8	54.00	26.29
4824.000000	38.41	---	150.0	H	0.0	-5.5	74.00	35.59
4824.000000	---	30.95	150.0	H	0.0	-5.5	54.00	23.05
8024.400000	44.01	---	150.0	V	238.0	1.8	74.00	29.99
8024.400000	---	36.11	150.0	V	238.0	1.8	54.00	17.89
13139.700000	---	38.43	150.0	H	279.0	5.3	54.00	15.57
13139.700000	47.83	---	150.0	H	279.0	5.3	74.00	26.17
17989.800000	---	43.08	150.0	H	213.0	8.8	54.00	10.92
17989.800000	52.56	---	150.0	H	213.0	8.8	74.00	21.44

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)				
1595.000000	---	27.47	150.0	V	25.0	-16.0	54.00	26.53
1595.000000	38.41	---	150.0	V	25.0	-16.0	74.00	35.59
3629.900000	---	28.59	150.0	H	77.0	-8.3	54.00	25.41
3629.900000	37.66	---	150.0	H	77.0	-8.3	74.00	36.34
4874.000000	37.90	---	150.0	H	179.0	-5.4	74.00	36.10
4874.000000	---	30.07	150.0	H	179.0	-5.4	54.00	23.93
6276.800000	---	32.31	150.0	H	179.0	-2.0	54.00	21.69
6276.800000	42.03	---	150.0	H	179.0	-2.0	74.00	31.97
9644.500000	---	33.88	150.0	H	77.0	2.1	54.00	20.12
9644.500000	45.23	---	150.0	H	77.0	2.1	74.00	28.77
17986.400000	52.51	---	150.0	H	283.0	8.8	74.00	21.49
17986.400000	---	43.68	150.0	H	283.0	8.8	54.00	10.32

High Channel: 2462MHz

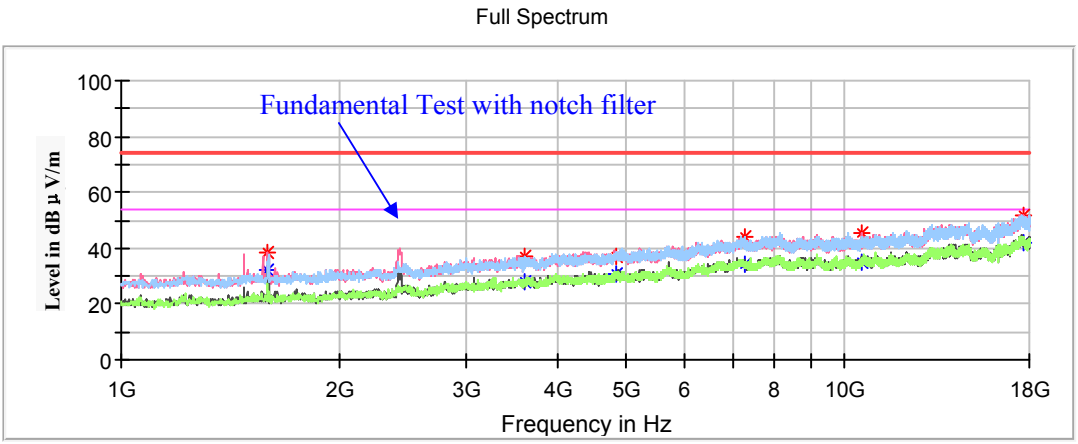


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1595.000000	38.67	---	150.0	V	7.0	-16.0	74.00	35.33
1595.000000	---	29.23	150.0	V	7.0	-16.0	54.00	24.77
3640.100000	37.78	---	150.0	H	129.0	-8.3	74.00	36.22
3640.100000	---	27.05	150.0	H	129.0	-8.3	54.00	26.95
4924.000000	39.67	---	150.0	V	209.0	-5.3	74.00	34.33
4924.000000	---	31.43	150.0	V	209.0	-5.3	54.00	22.57
7094.500000	44.84	---	150.0	H	218.0	0.1	74.00	29.16
7094.500000	---	33.81	150.0	H	218.0	0.1	54.00	20.19
14023.700000	---	40.17	150.0	V	197.0	6.2	54.00	13.83
14023.700000	49.24	---	150.0	V	197.0	6.2	74.00	24.76
17442.400000	---	42.70	150.0	V	355.0	8.7	54.00	11.30
17442.400000	52.81	---	150.0	V	355.0	8.7	74.00	21.19

802.11n-HT40 Mode (Chain0+Chain1):
*(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)*

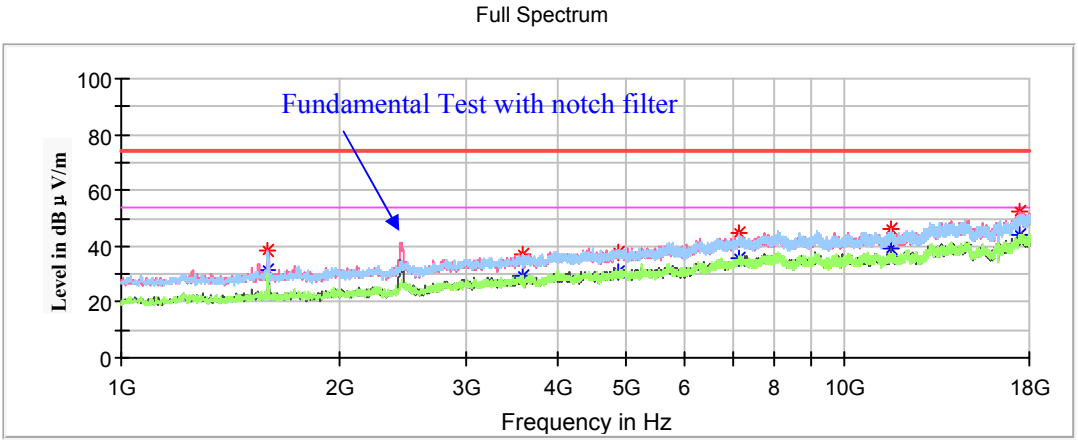
Note:
1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
   Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)
   Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

Low Channel: 2422MHz



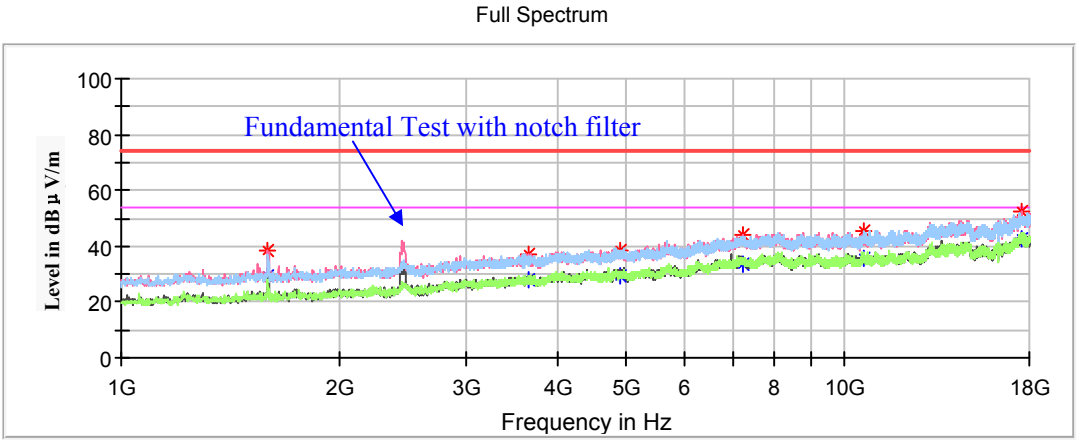
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1593.300000	---	31.97	150.0	V	7.0	-16.0	54.00	22.03
1593.300000	38.15	---	150.0	V	7.0	-16.0	74.00	35.85
3621.400000	37.08	---	150.0	H	1.0	-8.4	74.00	36.92
3621.400000	---	27.73	150.0	H	1.0	-8.4	54.00	26.27
4844.000000	37.35	---	150.0	H	217.0	-5.5	74.00	36.65
4844.000000	---	31.04	150.0	H	217.0	-5.5	54.00	22.96
7266.000000	44.10	---	150.0	H	39.0	0.5	74.00	29.90
7266.000000	---	34.27	150.0	H	39.0	0.5	54.00	19.73
10531.900000	---	34.96	150.0	V	0.0	2.3	54.00	19.04
10531.900000	45.13	---	150.0	V	0.0	2.3	74.00	28.87
17666.800000	---	42.05	150.0	H	77.0	8.9	54.00	11.95
17666.800000	51.83	---	150.0	H	77.0	8.9	74.00	22.17

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)				
1596.700000	38.74	---	150.0	V	15.0	-16.0	74.00	35.26
1596.700000	---	31.35	150.0	V	15.0	-16.0	54.00	22.65
3584.000000	37.36	---	150.0	H	64.0	-8.5	74.00	36.64
3584.000000	---	29.19	150.0	H	64.0	-8.5	54.00	24.81
4874.000000	---	30.57	150.0	V	0.0	-5.4	54.00	23.43
4874.000000	38.10	---	150.0	V	0.0	-5.4	74.00	35.90
7311.000000	44.86	---	150.0	V	180.0	0.4	74.00	29.14
7311.000000	---	35.40	150.0	V	180.0	0.4	54.00	18.60
11584.200000	---	38.82	150.0	V	282.0	3.0	54.00	15.18
11584.200000	45.99	---	150.0	V	282.0	3.0	74.00	28.01
17483.200000	---	44.33	150.0	H	64.0	8.8	54.00	9.67
17483.200000	52.19	---	150.0	H	64.0	8.8	74.00	21.81

High Channel: 2452MHz

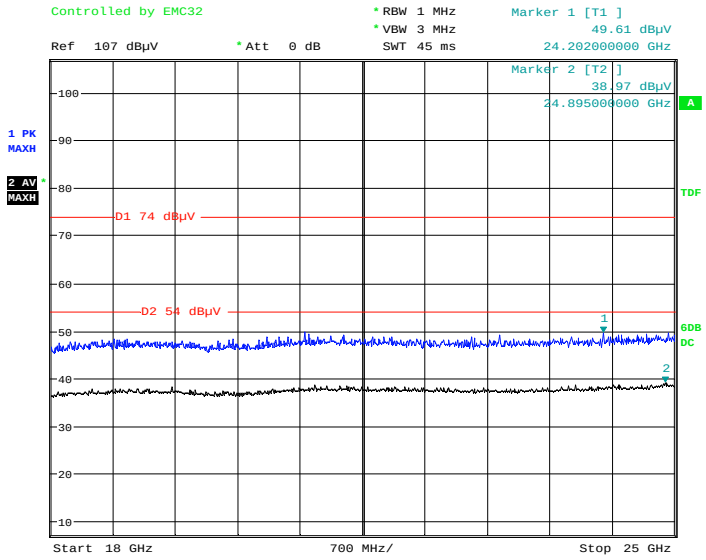


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1595.000000	38.27	---	150.0	V	2.0	-16.0	74.00	35.73
1595.000000	---	29.34	150.0	V	2.0	-16.0	54.00	24.66
3662.200000	37.33	---	150.0	V	225.0	-8.2	74.00	36.67
3662.200000	---	27.95	150.0	V	225.0	-8.2	54.00	26.05
4904.000000	38.68	---	150.0	V	350.0	-5.4	74.00	35.32
4904.000000	---	29.42	150.0	V	350.0	-5.4	54.00	24.58
7356.000000	44.17	---	150.0	V	0.0	0.3	74.00	29.83
7356.000000	---	33.86	150.0	V	0.0	0.3	54.00	20.14
10656.000000	45.78	---	150.0	H	47.0	2.5	74.00	28.22
10656.000000	---	35.99	150.0	H	47.0	2.5	54.00	18.01
17575.000000	---	42.72	150.0	V	90.0	8.9	54.00	11.28
17575.000000	52.54	---	150.0	V	90.0	8.9	74.00	21.46

18GHz-25GHz – adapter power supply (worst case)

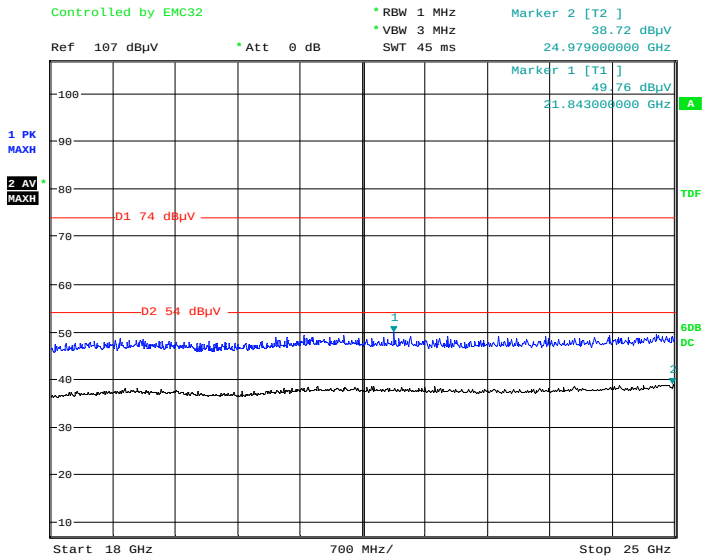
Pre-scan with 802.11b, 802.11g, 802.11n-HT20 and 802.11n-HT40 modes of operation in the X,Y and Z axes of orientation, the worst case ***high channel of 802.11n-HT40 mode in Z-axis of orientation*** *was recorded*

Horizontal



Date: 5.DEC.2020 13:32:44

Vertical



Date: 5.DEC.2020 13:34:28

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 (Chain0): *(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								
2390.000000	44.73	---	150.0	V	21.0	-2.9	74.00	29.27
2390.000000	---	41.88	150.0	V	21.0	-2.9	54.00	12.12
High Channel: 2462MHz								
2483.500000	45.81	---	150.0	V	304.0	-2.5	74.00	28.19
2483.500000	---	43.04	150.0	V	304.0	-2.5	54.00	10.96

802.11g Mode (Chain0): *(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								
2390.000000	44.01	---	150.0	V	10.0	-2.9	74.00	29.99
2390.000000	---	41.90	150.0	V	10.0	-2.9	54.00	12.10
High Channel: 2462MHz								
2483.500000	45.29	---	150.0	V	0.0	-2.5	74.00	28.71
2483.500000	---	41.84	150.0	V	0.0	-2.5	54.00	12.16

802.11b Mode (Chain1): *(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								
2390.000000	44.50	---	150.0	V	75.0	-2.9	74.00	29.50
2390.000000	---	41.48	150.0	V	75.0	-2.9	54.00	12.52
High Channel: 2462MHz								
2483.500000	45.78	---	150.0	V	106.0	-2.5	74.00	28.22
2483.500000	---	43.34	150.0	V	106.0	-2.5	54.00	10.66

802.11g Mode (Chain1): *(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								
2390.000000	45.67	---	150.0	V	207.0	-2.9	74.00	28.33
2390.000000	---	41.99	150.0	V	207.0	-2.9	54.00	12.01
High Channel: 2462MHz								
2483.500000	45.99	---	150.0	V	216.0	-2.5	74.00	28.01
2483.500000	---	43.61	150.0	V	216.0	-2.5	54.00	10.39

802.11n-HT20 Mode (Chain0+Chain1): *(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								
2390.000000	47.14	---	150.0	V	305.0	-2.9	74.00	26.86
2390.000000	---	42.41	150.0	V	305.0	-2.9	54.00	11.59
High Channel: 2462MHz								
2483.500000	---	42.51	150.0	V	222.0	-2.5	54.00	11.49
2483.500000	45.83	---	150.0	V	222.0	-2.5	74.00	28.17

802.11n-HT40 Mode (Chain0+Chain1): *(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	48.95	---	150.0	V	307.0	-2.9	74.00	25.05
2390.000000	---	43.91	150.0	V	307.0	-2.9	54.00	10.09
High Channel: 2452MHz								
2483.500000	50.70	---	150.0	V	240.0	-2.5	74.00	23.30
2483.500000	---	46.67	150.0	V	240.0	-2.5	54.00	7.33

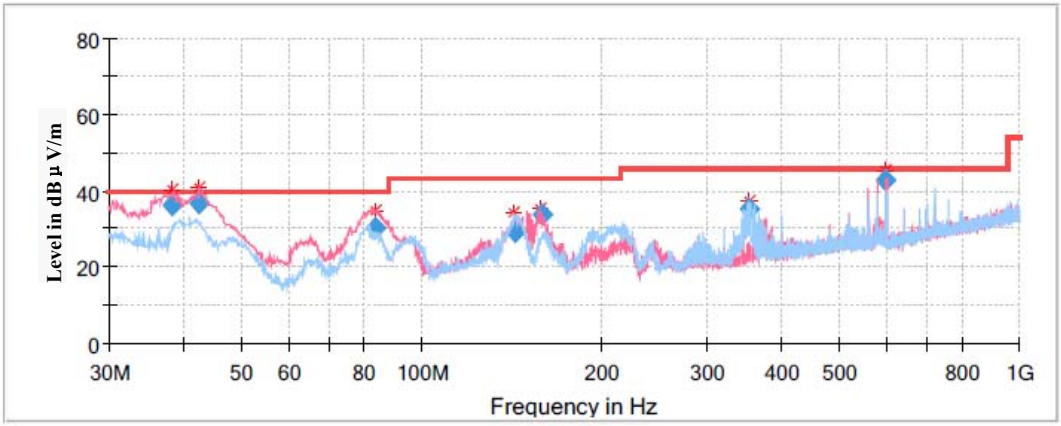
For BLE(1Mbps) Mode:

Spurious Emission Test:

30MHz-1GHz

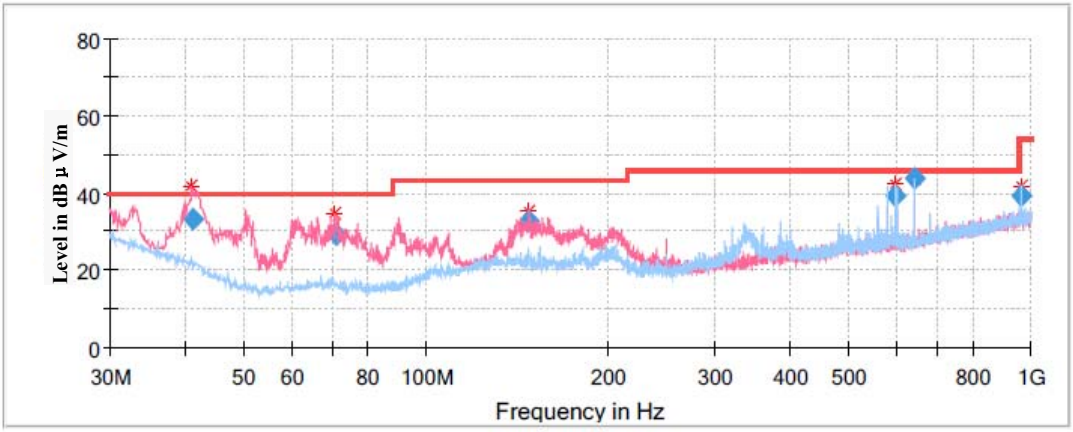
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case ***high channel of operation in the Z axis of orientation*** *was recorded)*

For adapter power supply:



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)				
38.174100	36.15	100.0	V	265.0	-9.3	40.00	3.85
42.306250	36.65	100.0	V	223.0	-12.8	40.00	3.35
83.711650	30.05	100.0	V	229.0	-17.0	40.00	9.95
143.022400	29.01	200.0	H	201.0	-11.2	43.50	14.49
158.758450	33.53	100.0	V	115.0	-11.9	43.50	9.97
354.001300	35.34	100.0	H	176.0	-9.1	46.00	10.66
597.498950	42.65	100.0	V	289.0	-5.0	46.00	3.35

For PoE power supply:

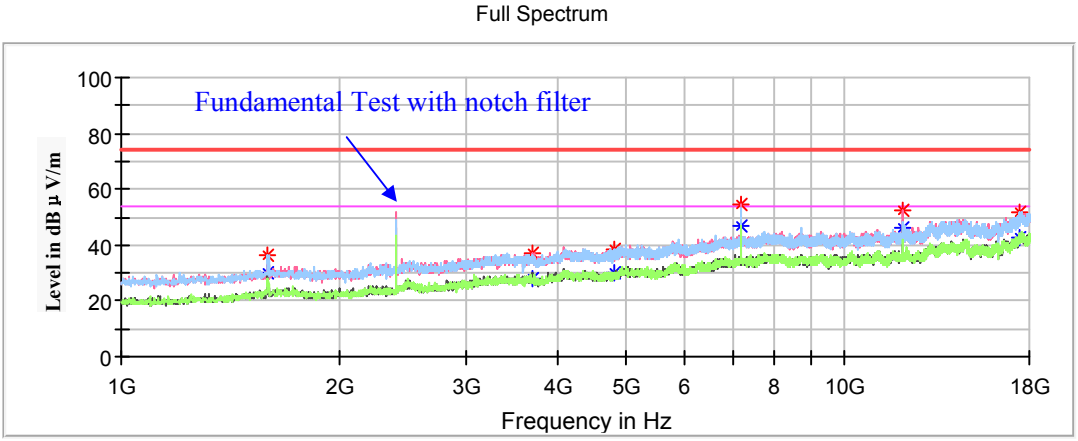


Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	QuasiPeak (dBµV/m)	Height (cm)	Polar (H/V)				
41.201750	33.39	100.0	V	52.0	-11.3	40.00	6.61
71.156100	29.36	100.0	V	28.0	-16.2	40.00	10.64
148.153600	32.77	100.0	V	330.0	-11.5	43.50	10.73
597.515400	39.43	200.0	H	165.0	-5.0	46.00	6.57
639.994050	43.55	200.0	H	305.0	-4.0	46.00	2.45
966.710000	39.18	100.0	H	174.0	2.2	53.90	14.72

1GHz-18GHz – adapter power supply (worst case)
*(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)*

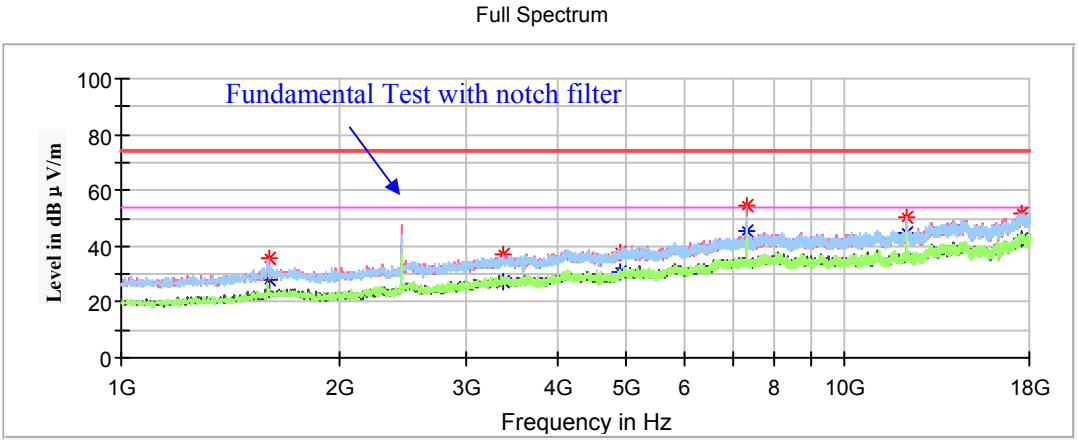
Note:
1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
   Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)
   Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

Low Channel: 2402MHz



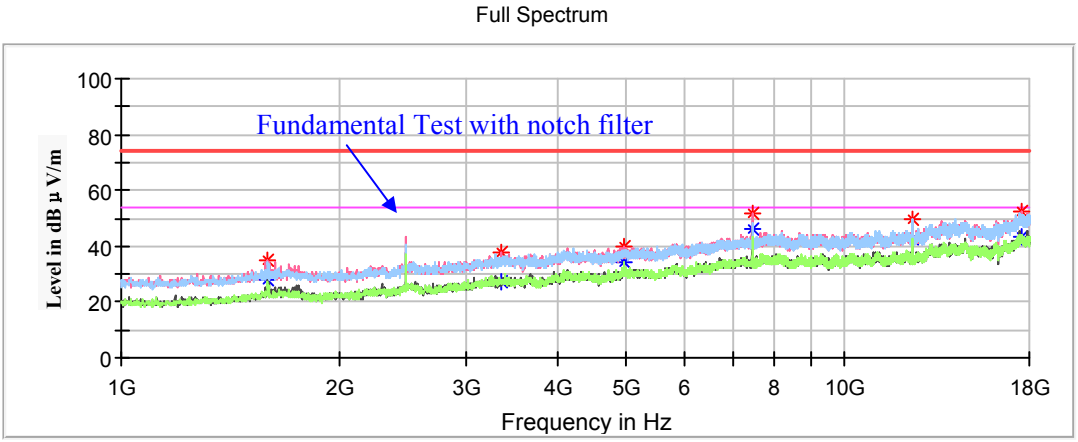
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1593.300000	36.14	---	150.0	H	142.0	-16.0	74.00	37.86
1593.300000	---	29.79	150.0	H	142.0	-16.0	54.00	24.21
3709.800000	37.13	---	150.0	V	359.0	-8.1	74.00	36.87
3709.800000	---	28.11	150.0	V	359.0	-8.1	54.00	25.89
4804.000000	---	30.17	150.0	V	156.0	-5.6	54.00	23.83
4804.000000	38.35	---	150.0	V	156.0	-5.6	74.00	35.65
7206.000000	---	46.63	150.0	V	283.0	0.4	54.00	7.37
7206.000000	54.41	---	150.0	V	283.0	0.4	74.00	19.59
12010.900000	---	45.97	150.0	V	245.0	3.8	54.00	8.03
12010.900000	52.11	---	150.0	V	245.0	3.8	74.00	21.89
17478.100000	---	42.96	150.0	V	321.0	8.8	54.00	11.04
17478.100000	51.69	---	150.0	V	321.0	8.8	74.00	22.31

Middle Channel: 2440MHz



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)				
1598.400000	35.76	---	150.0	V	325.0	-16.0	74.00	38.24
1598.400000	---	27.91	150.0	V	325.0	-16.0	54.00	26.09
3374.900000	---	27.58	150.0	V	0.0	-9.1	54.00	26.42
3374.900000	36.84	---	150.0	V	0.0	-9.1	74.00	37.16
4880.000000	---	30.74	150.0	V	15.0	-5.4	54.00	23.26
4880.000000	37.69	---	150.0	V	15.0	-5.4	74.00	36.31
7320.000000	---	45.54	150.0	V	287.0	0.6	54.00	8.46
7320.000000	54.83	---	150.0	V	287.0	0.6	74.00	19.17
12201.300000	---	44.93	150.0	H	270.0	3.5	54.00	9.07
12201.300000	50.19	---	150.0	H	270.0	3.5	74.00	23.81
17590.300000	---	42.92	150.0	H	39.0	8.9	54.00	11.08
17590.300000	52.08	---	150.0	H	39.0	8.9	74.00	21.92

High Channel: 2480MHz

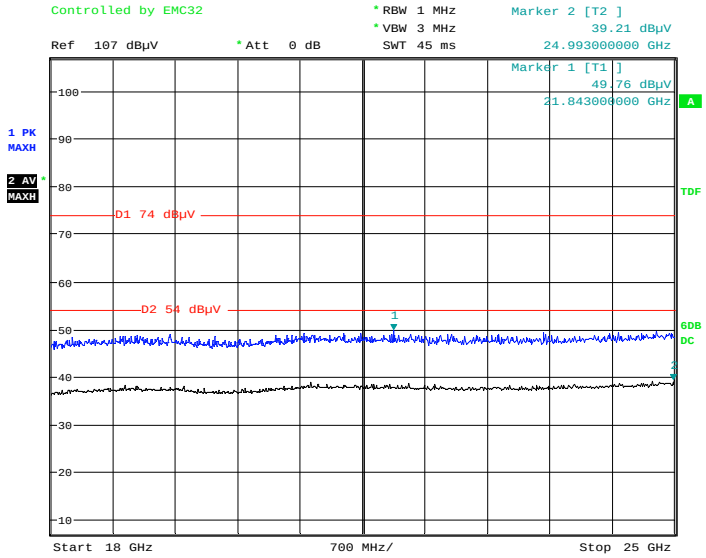


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1595.000000	---	28.28	150.0	V	333.0	-16.0	54.00	25.72
1595.000000	35.26	---	150.0	V	333.0	-16.0	74.00	38.74
3352.800000	---	27.50	150.0	V	244.0	-9.2	54.00	26.50
3352.800000	37.79	---	150.0	V	244.0	-9.2	74.00	36.21
4960.000000	---	34.49	150.0	V	308.0	-5.3	54.00	19.51
4960.000000	40.17	---	150.0	V	308.0	-5.3	74.00	33.83
7440.000000	---	46.07	150.0	V	270.0	0.9	54.00	7.93
7440.000000	51.89	---	150.0	V	270.0	0.9	74.00	22.11
12398.500000	---	42.94	150.0	H	270.0	3.1	54.00	11.06
12398.500000	49.97	---	150.0	H	270.0	3.1	74.00	24.03
17561.400000	---	43.30	150.0	V	50.0	8.9	54.00	10.70
17561.400000	52.37	---	150.0	V	50.0	8.9	74.00	21.63

18GHz-25GHz – adapter power supply (worst case)

*(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)*

Horizontal



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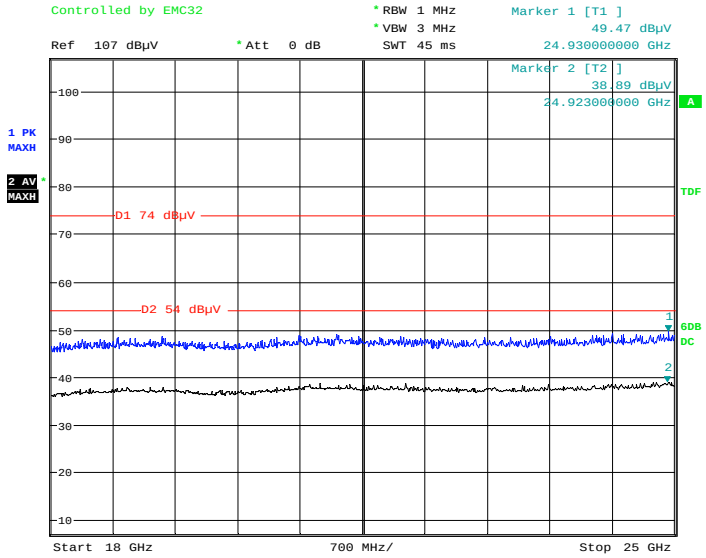
Vertical



Date: 5.DEC.2020 13:37:20

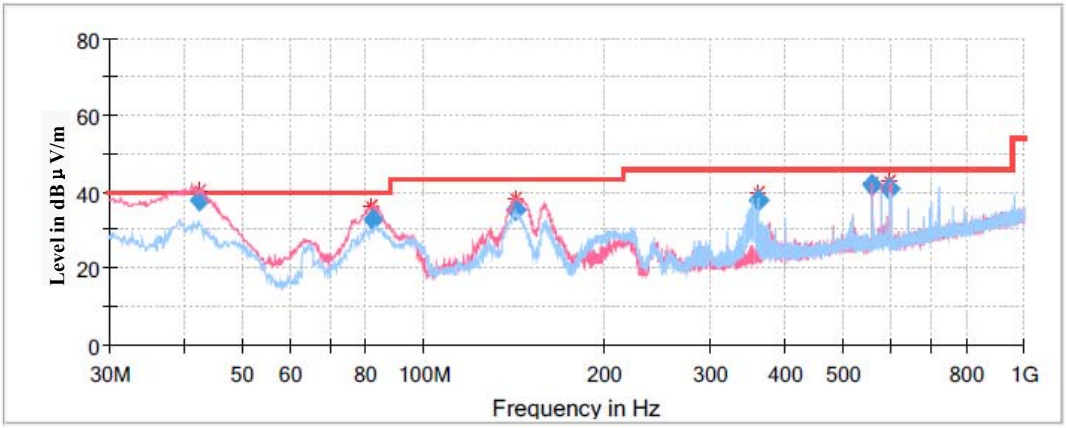
For BLE(2Mbps) Mode:

Spurious Emission Test:

30MHz-1GHz

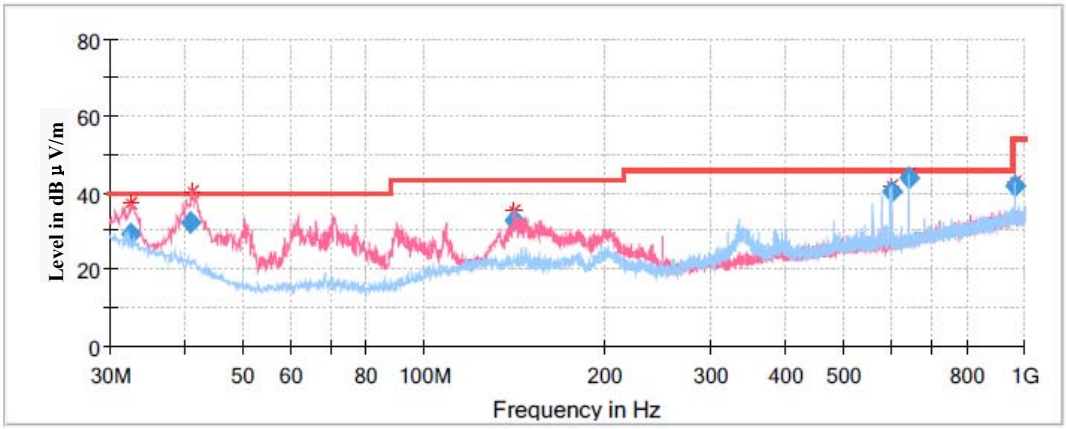
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case ***high channel of operation in the Z axis of orientation*** *was recorded)*

For adapter power supply:



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)				
42.340000	37.53	100.0	V	133.0	-12.1	40.00	2.47
82.337100	32.92	100.0	V	139.0	-17.0	40.00	7.08
142.709700	35.06	100.0	V	133.0	-11.2	43.50	8.44
360.008300	37.76	100.0	H	200.0	-9.0	46.00	8.24
560.002050	41.73	100.0	V	297.0	-5.1	46.00	4.27
597.502500	40.91	100.0	V	266.0	-5.0	46.00	5.09

For PoE power supply:

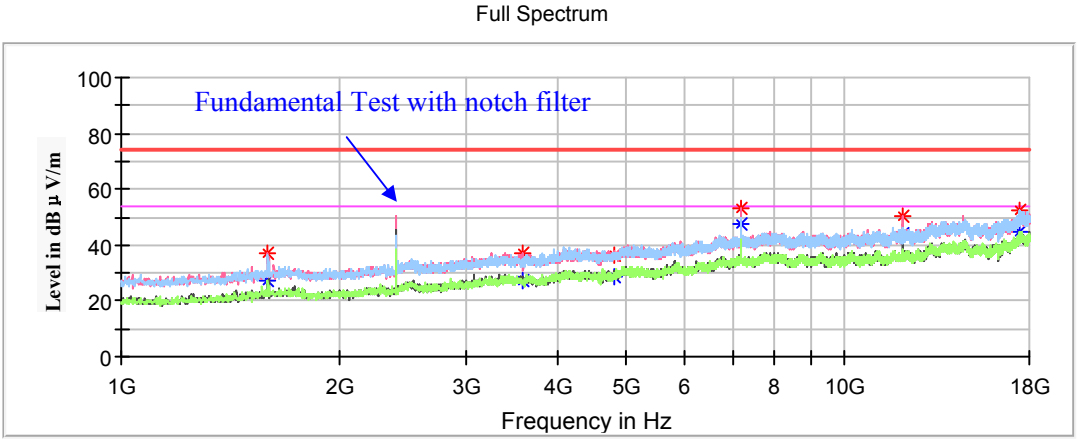


Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	QuasiPeak (dBµV/m)	Height (cm)	Polar (H/V)				
32.440600	29.25	100.0	V	271.0	-5.5	40.00	10.75
40.809400	31.95	100.0	V	187.0	-11.1	40.00	8.05
141.197650	32.92	100.0	V	339.0	-11.1	43.50	10.58
599.986300	40.26	200.0	H	6.0	-5.0	46.00	5.74
639.985350	43.65	200.0	H	321.0	-4.0	46.00	2.35
966.655400	41.92	100.0	H	165.0	2.2	53.90	11.98

1GHz-18GHz – adapter power supply (worst case)
*(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)*

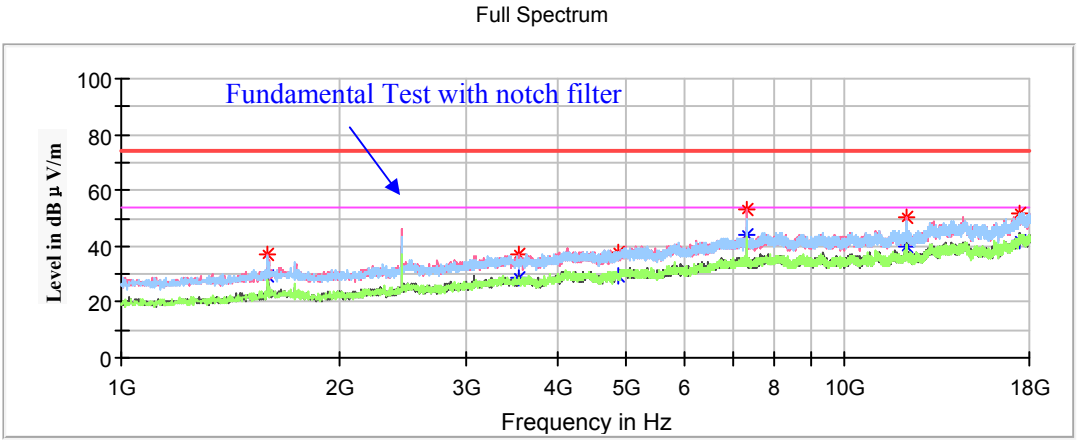
Note:
1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
   Corrected Amplitude (dBμV/m) = Corrected Factor (dB/m) + Reading (dBμV)
   Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

Low Channel: 2402MHz



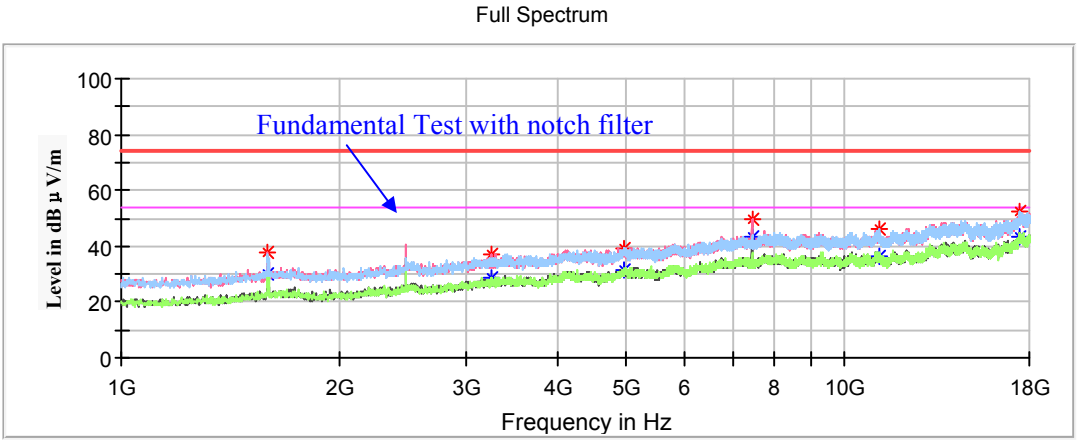
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1593.300000	---	27.19	150.0	H	86.0	-16.0	54.00	26.81
1593.300000	36.78	---	150.0	H	86.0	-16.0	74.00	37.22
3584.000000	---	27.30	150.0	V	327.0	-8.5	54.00	26.70
3584.000000	36.91	---	150.0	V	327.0	-8.5	74.00	37.09
4804.000000	---	28.41	150.0	V	78.0	-5.6	54.00	25.59
4804.000000	36.23	---	150.0	V	78.0	-5.6	74.00	37.77
7206.000000	---	47.50	150.0	V	50.0	0.4	54.00	6.50
7206.000000	53.09	---	150.0	V	50.0	0.4	74.00	20.91
12007.500000	---	44.04	150.0	V	226.0	3.8	54.00	9.96
12007.500000	50.61	---	150.0	V	226.0	3.8	74.00	23.39
17484.900000	---	44.47	150.0	H	162.0	8.8	54.00	9.53
17484.900000	52.80	---	150.0	H	162.0	8.8	74.00	21.20

Middle Channel: 2440MHz



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)				
1596.700000	36.82	---	150.0	V	312.0	-16.0	74.00	37.18
1596.700000	---	29.07	150.0	V	312.0	-16.0	54.00	24.93
3555.100000	37.17	---	150.0	V	7.0	-8.6	74.00	36.83
3555.100000	---	28.81	150.0	V	7.0	-8.6	54.00	25.19
4880.000000	---	29.43	150.0	V	198.0	-5.4	54.00	24.57
4880.000000	37.81	---	150.0	V	198.0	-5.4	74.00	36.19
7320.000000	---	43.80	150.0	V	274.0	0.6	54.00	10.20
7320.000000	52.99	---	150.0	V	274.0	0.6	74.00	21.01
12203.000000	50.36	---	150.0	V	248.0	3.5	74.00	23.64
12203.000000	---	40.20	150.0	V	248.0	3.5	54.00	13.80
17459.400000	51.80	---	150.0	H	251.0	8.8	74.00	22.20
17459.400000	---	42.20	150.0	H	251.0	8.8	54.00	11.80

High Channel: 2480MHz

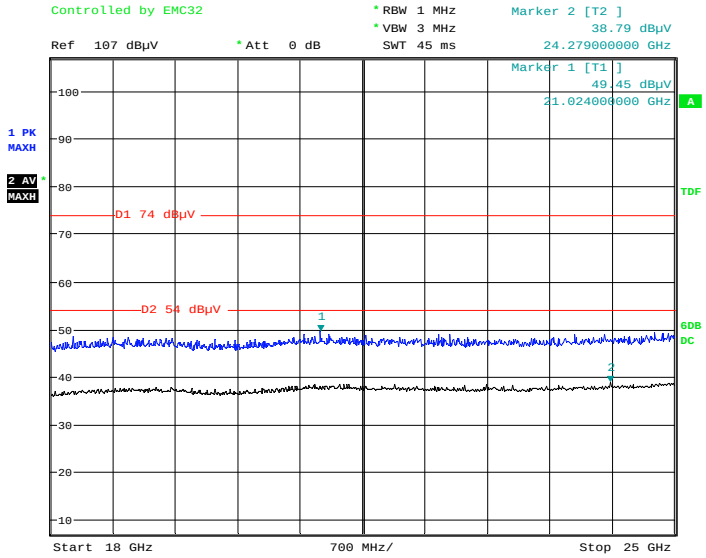


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1593.300000	37.56	---	150.0	V	325.0	-16.0	74.00	36.44
1593.300000	---	30.10	150.0	V	325.0	-16.0	54.00	23.90
3254.200000	37.32	---	150.0	V	15.0	-9.4	74.00	36.68
3254.200000	---	28.43	150.0	V	15.0	-9.4	54.00	25.57
4960.000000	39.08	---	150.0	V	300.0	-5.3	74.00	34.92
4960.000000	---	31.59	150.0	V	300.0	-5.3	54.00	22.41
7440.000000	49.65	---	150.0	V	274.0	0.9	74.00	24.35
7440.000000	---	43.57	150.0	V	274.0	0.9	54.00	10.43
11145.600000	---	36.64	150.0	H	212.0	2.9	54.00	17.36
11145.600000	46.12	---	150.0	H	212.0	2.9	74.00	27.88
17471.300000	---	43.52	150.0	H	161.0	8.8	54.00	10.48
17471.300000	52.35	---	150.0	H	161.0	8.8	74.00	21.65

18GHz-25GHz – adapter power supply (worst case)

*(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)*

Horizontal



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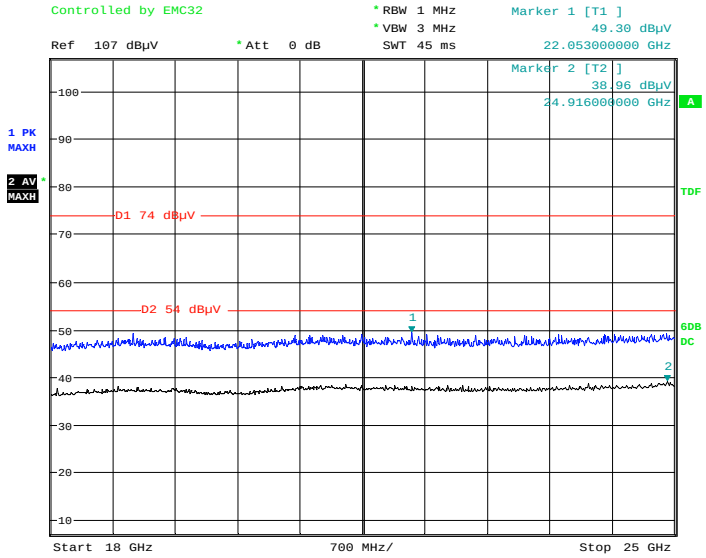
Vertical



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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)

BLE(1Mbps) mode:

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	---	48.66	150.0	V	270.0	-2.9	54.00	5.34
2390.000000	51.12	---	150.0	V	270.0	-2.9	74.00	22.88
High Channel: 2480MHz								
2483.500000	55.20	---	150.0	V	291.0	-2.5	74.00	18.80
2483.500000	---	52.06	150.0	V	291.0	-2.5	54.00	1.94

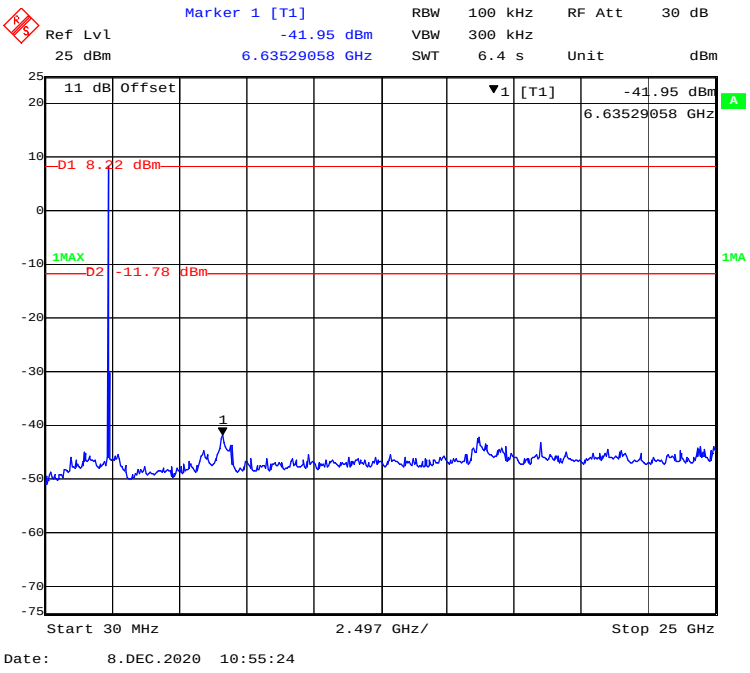
BLE(2Mbps) mode:

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	49.37	---	150.0	V	290.0	-2.9	74.00	24.63
2390.000000	---	47.38	150.0	V	290.0	-2.9	54.00	6.62
High Channel: 2480MHz								
2483.500000	---	50.44	150.0	V	307.0	-2.5	54.00	3.56
2483.500000	53.64	---	150.0	V	307.0	-2.5	74.00	20.36

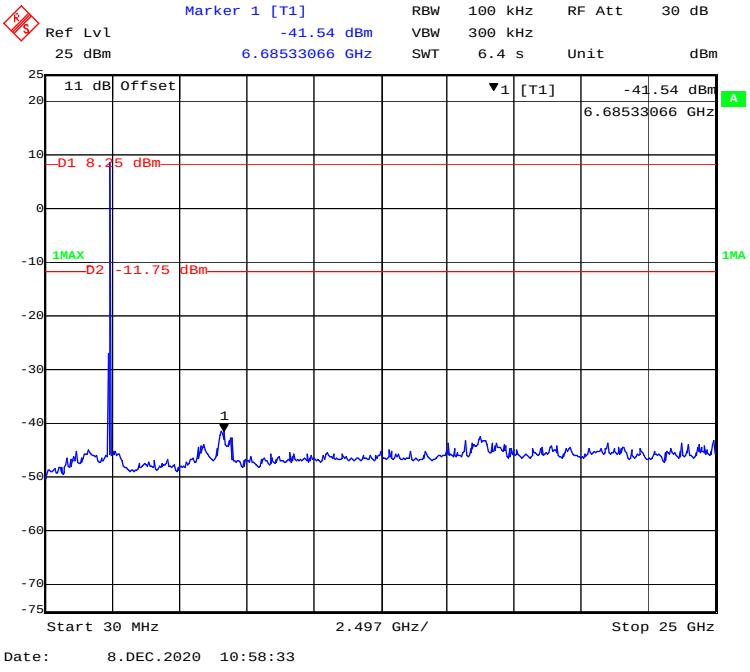
Conducted Spurious Emissions at Antenna Port

Chain0:

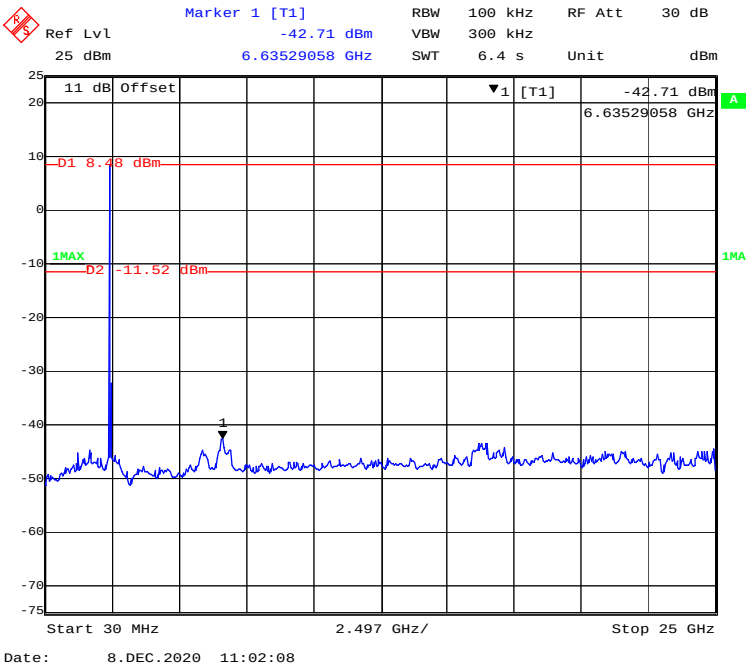
802.11b Mode Low Channel



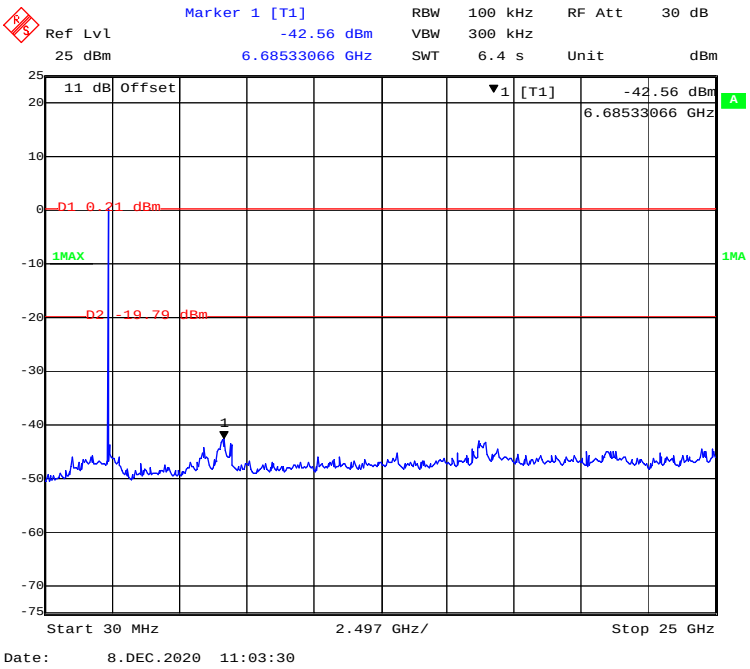
802.11b Mode Middle Channel



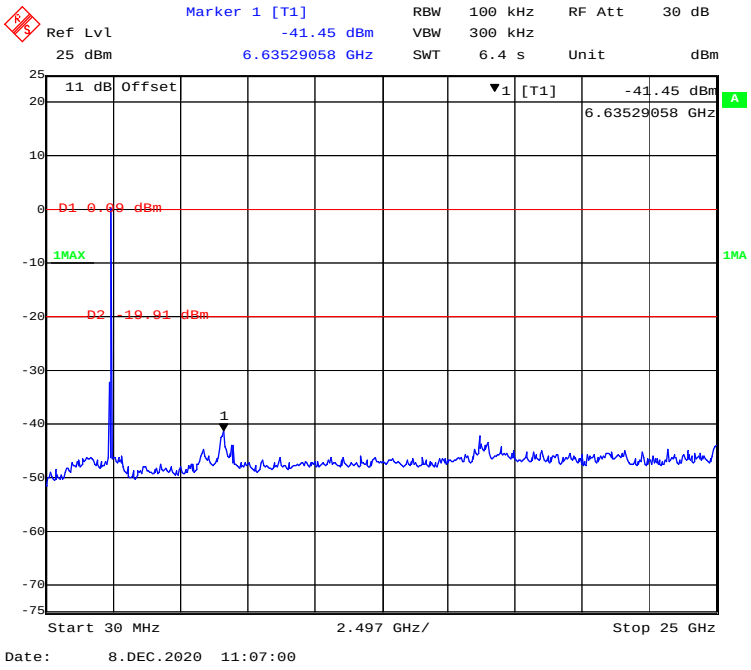
802.11b Mode High Channel



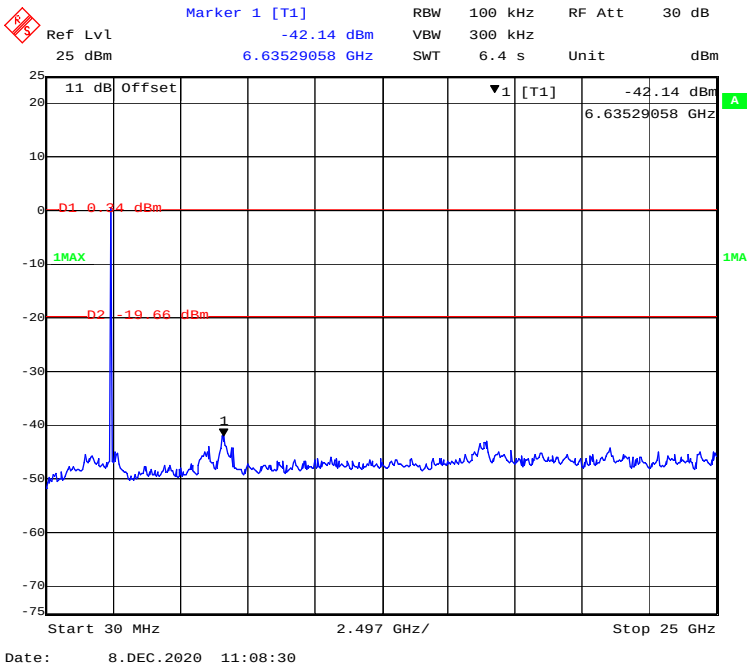
802.11g Mode Low Channel



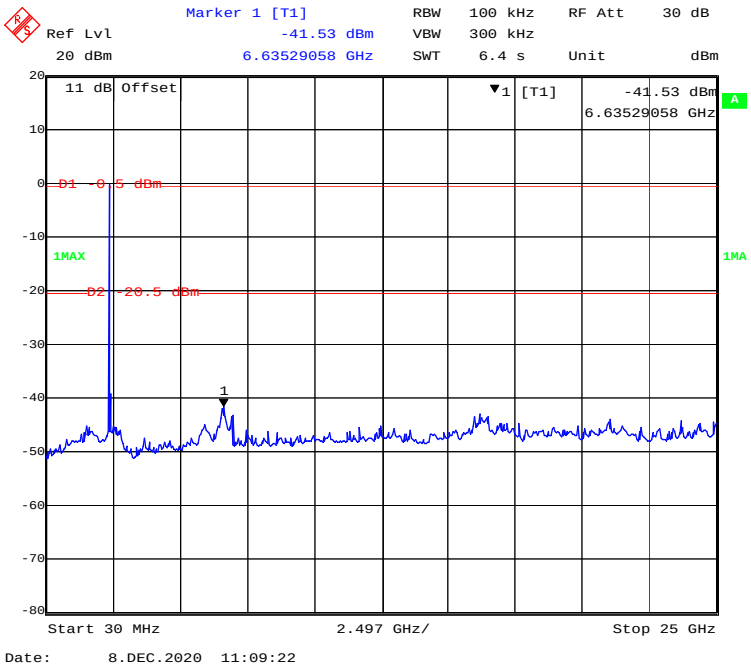
802.11g Mode Middle Channel



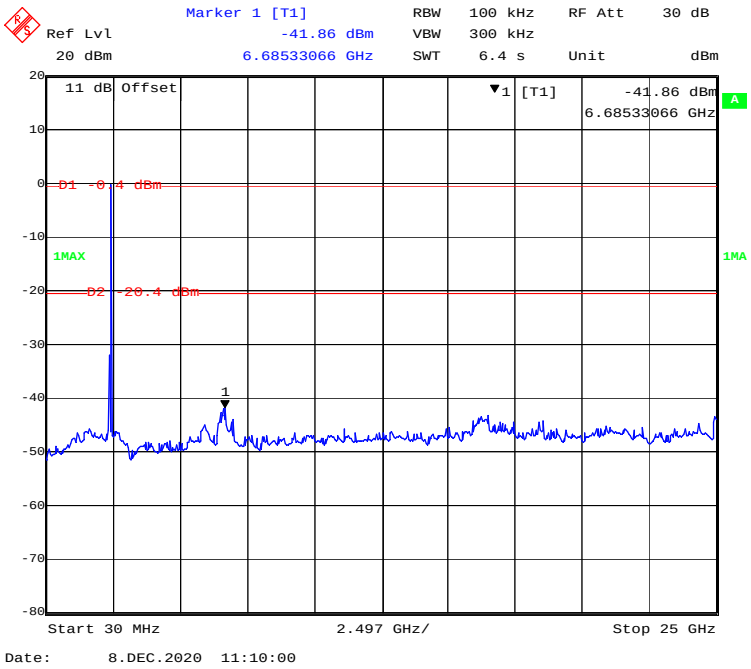
802.11g Mode High Channel



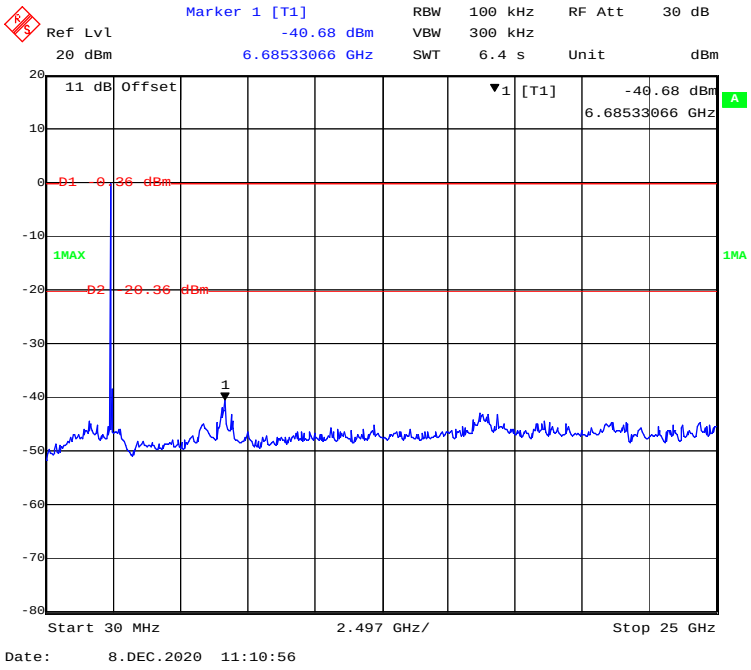
802.11n-HT20 Mode Low Channel



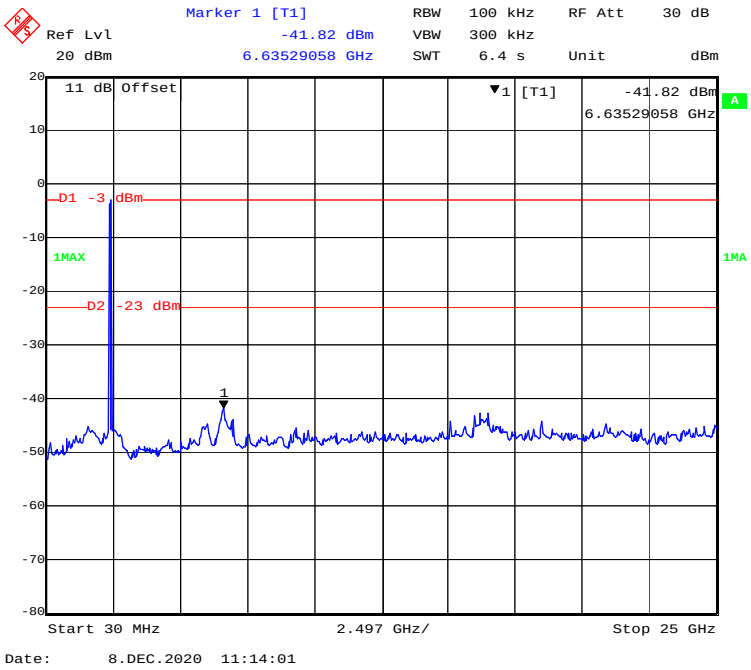
802.11n-HT20 Mode Middle Channel



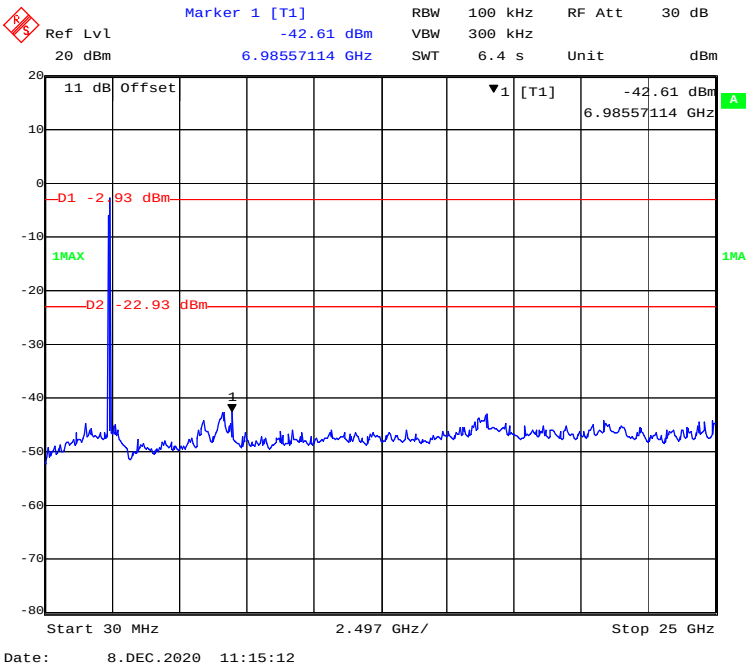
802.11n-HT20 Mode High Channel



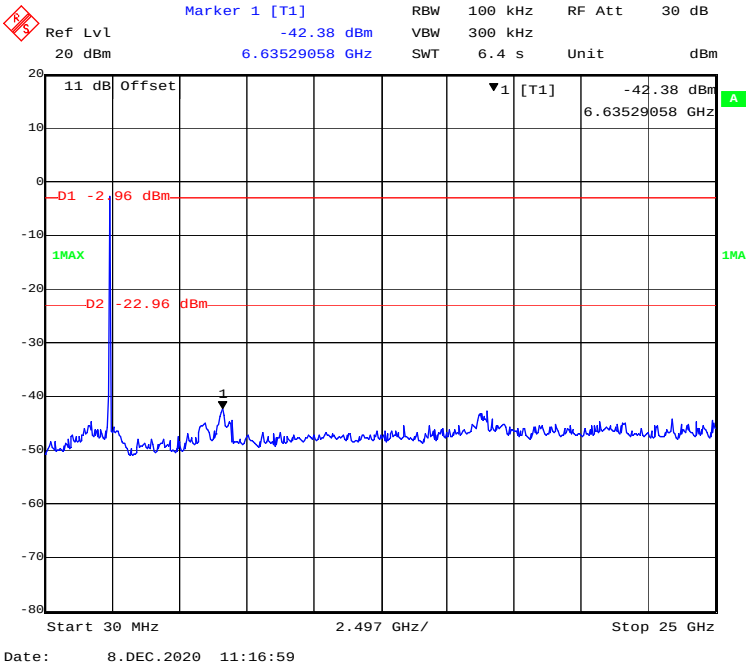
802.11n-HT40 Mode Low Channel



802.11n-HT40 Mode Middle Channel

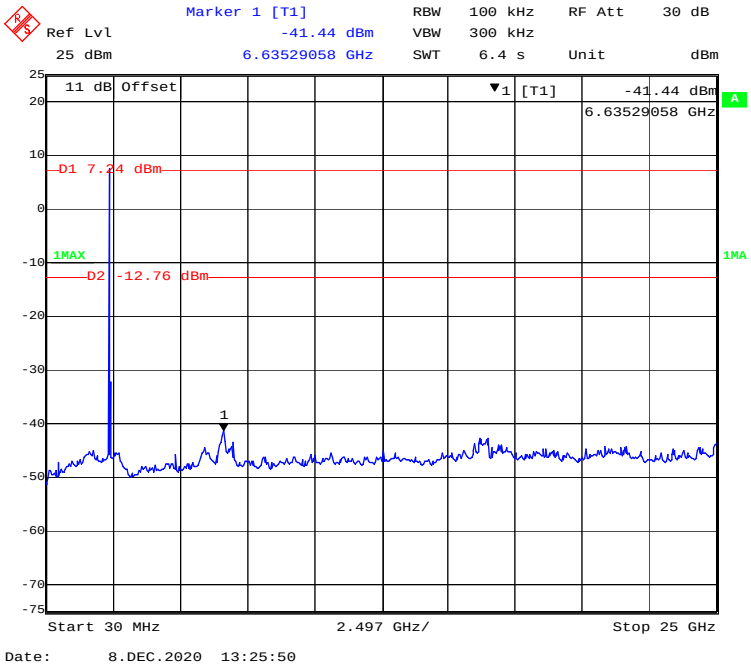


802.11n-HT40 Mode High Channel

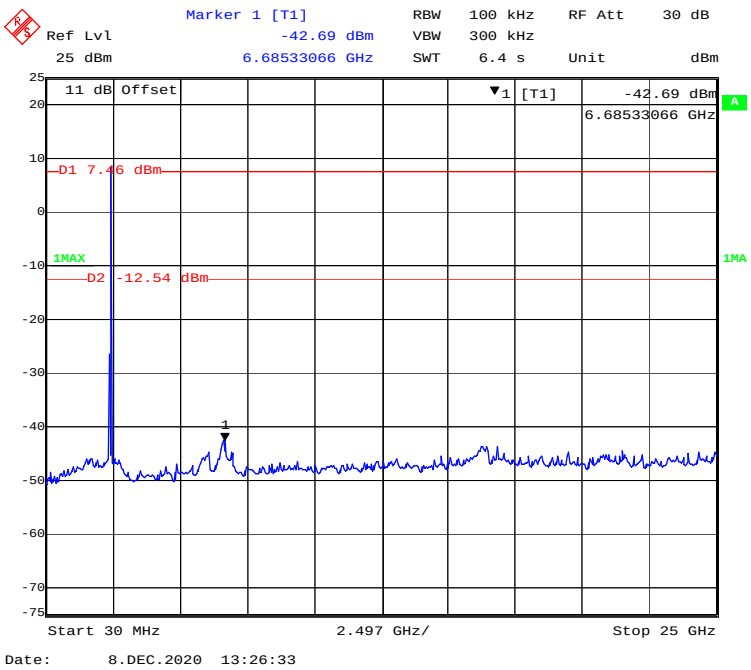


Chain1:

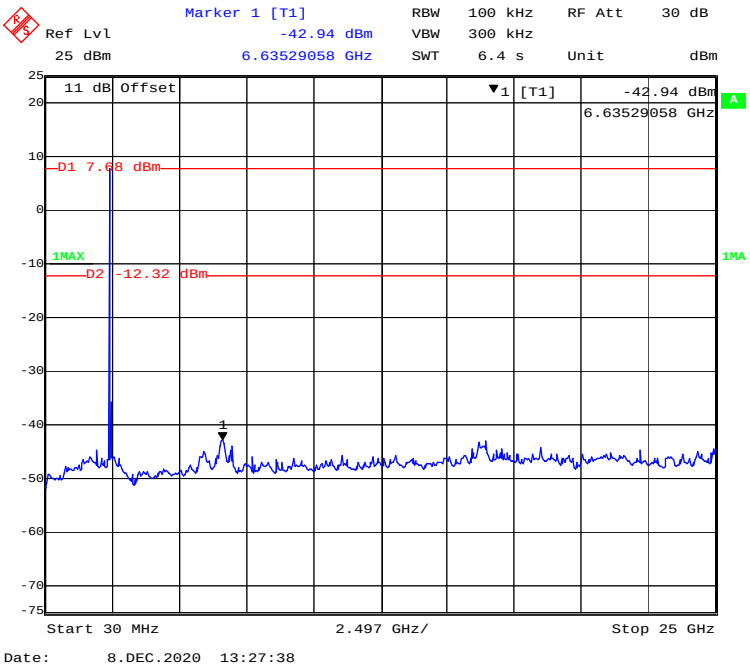
802.11b Mode Low Channel



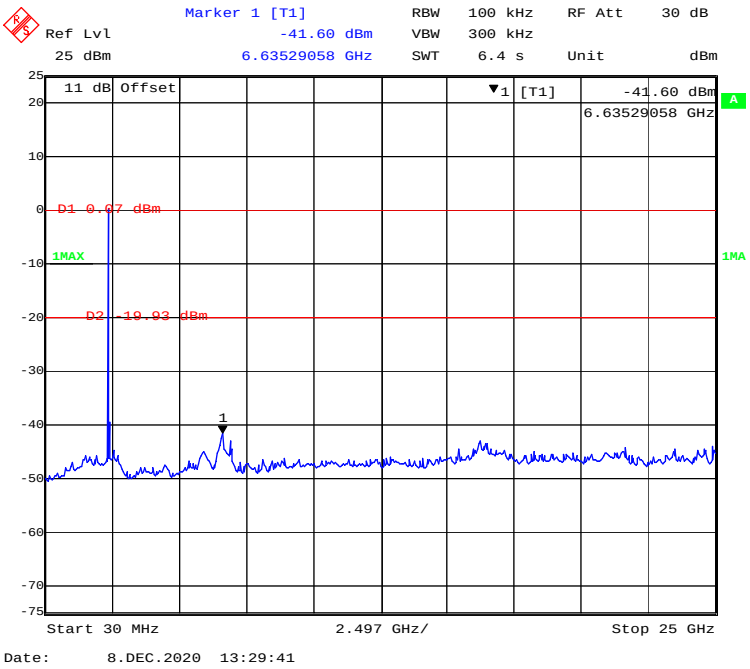
802.11b Mode Middle Channel



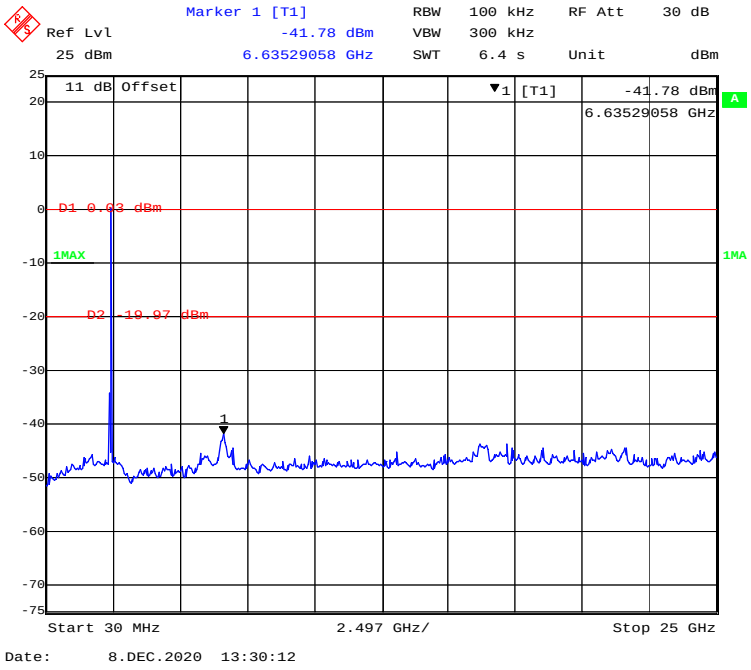
802.11b Mode High Channel



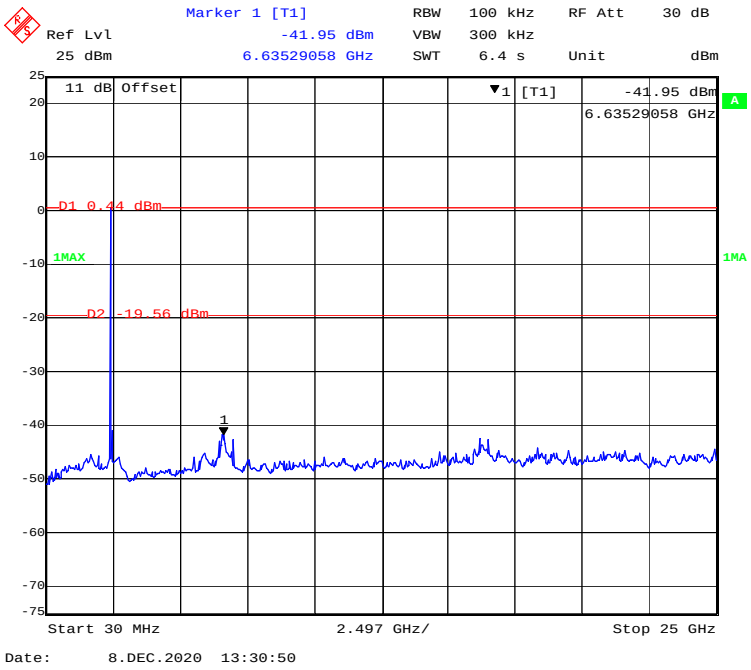
802.11g Mode Low Channel



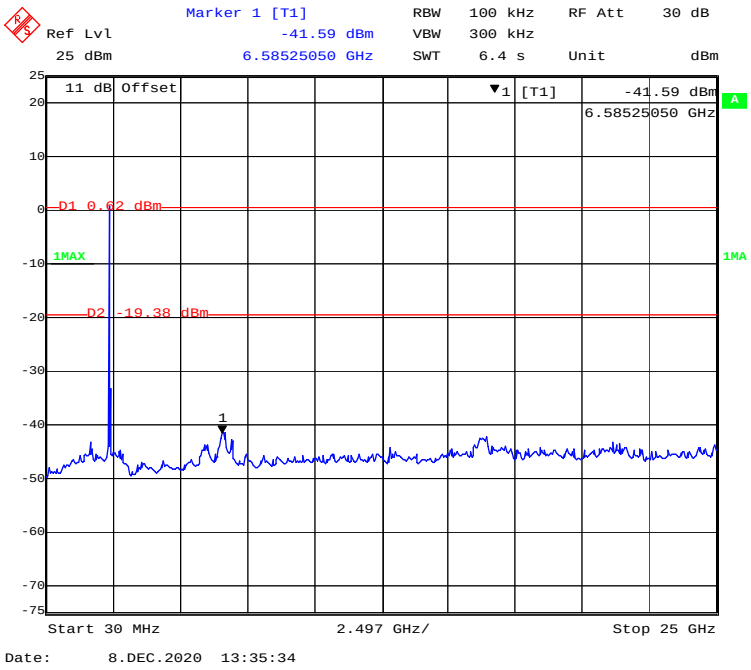
802.11g Mode Middle Channel



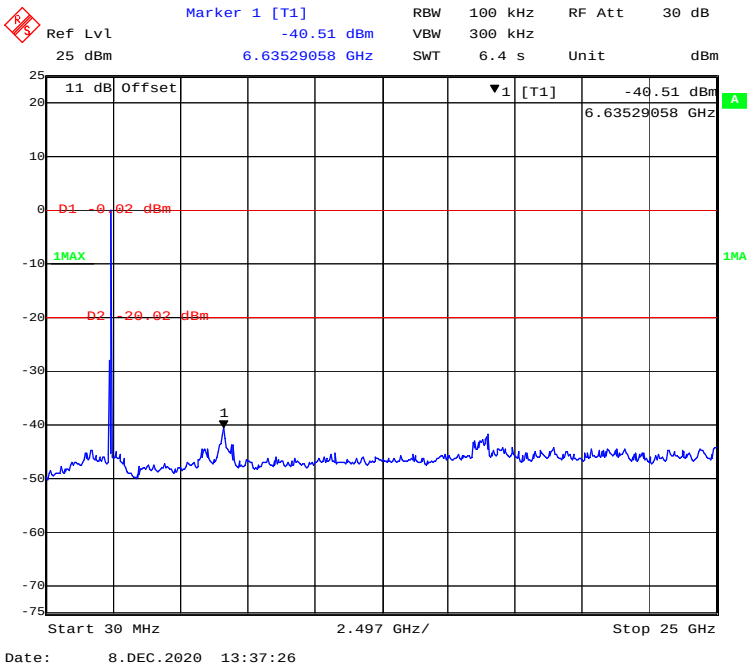
802.11g Mode High Channel



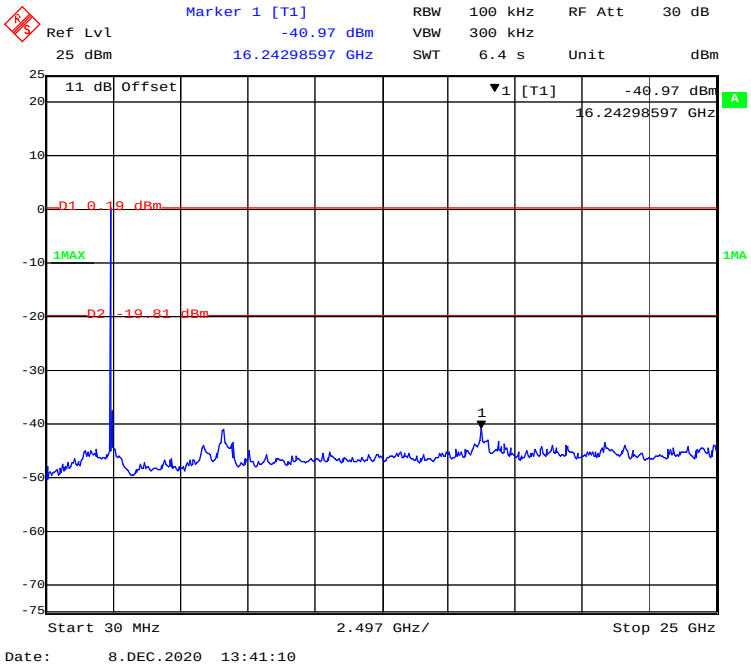
802.11n-HT20 Mode Low Channel



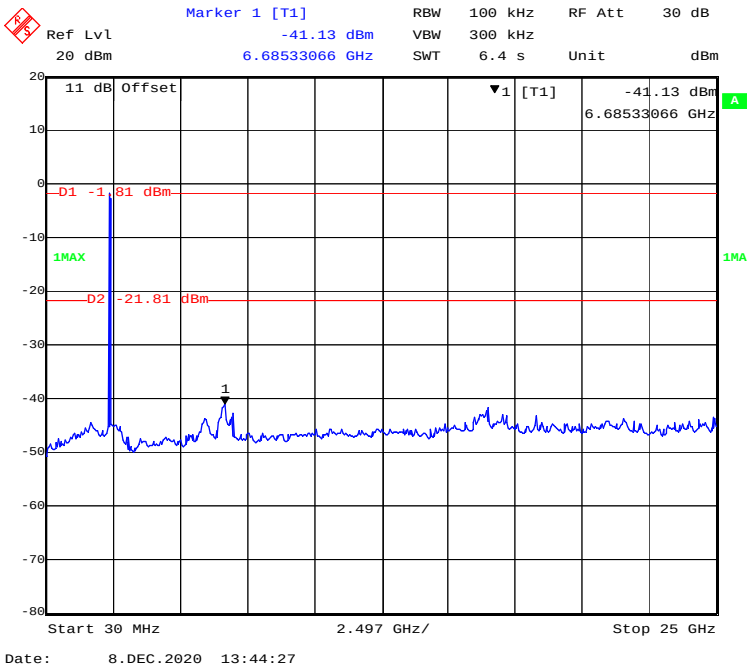
802.11n-HT20 Mode Middle Channel



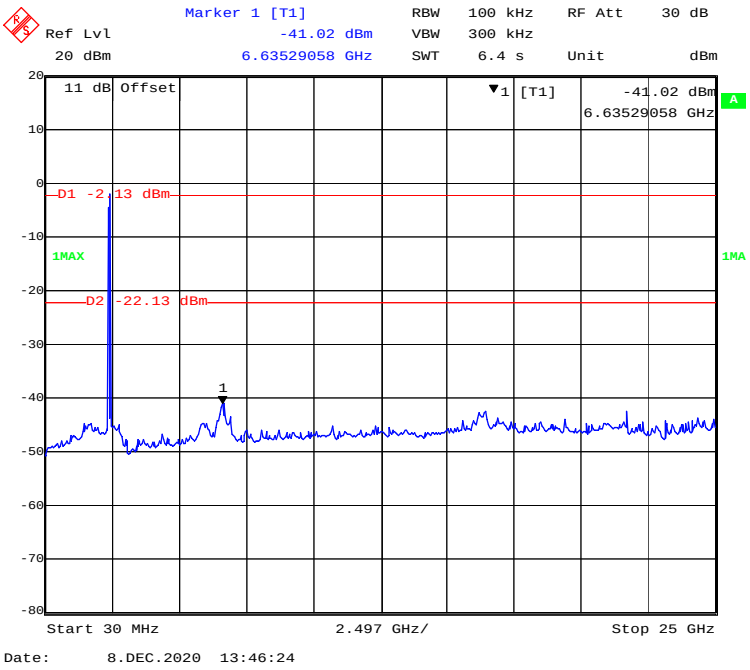
802.11n-HT20 Mode High Channel



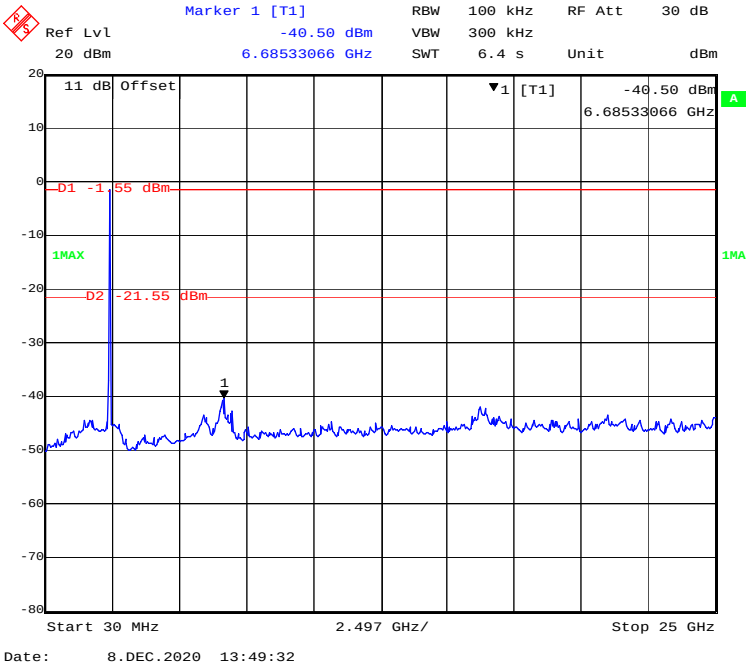
802.11n-HT40 Mode Low Channel



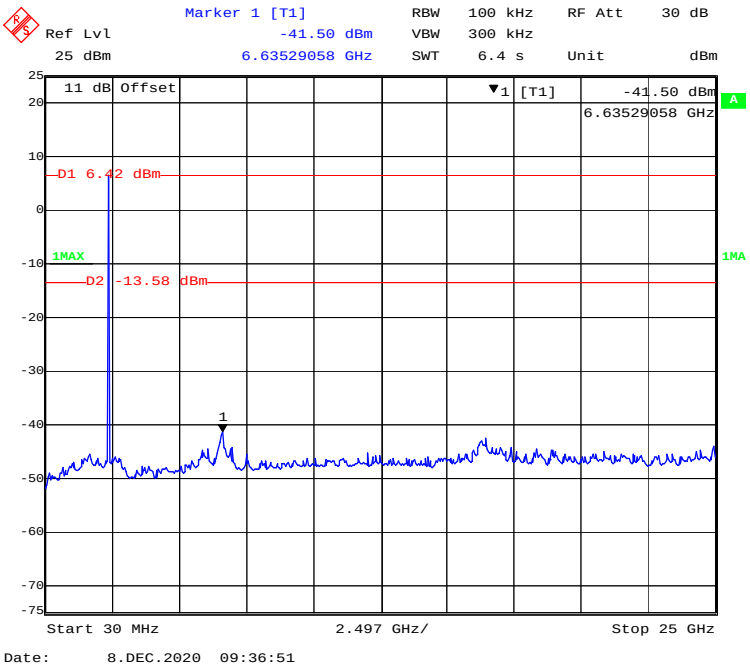
802.11n-HT40 Mode Middle Channel



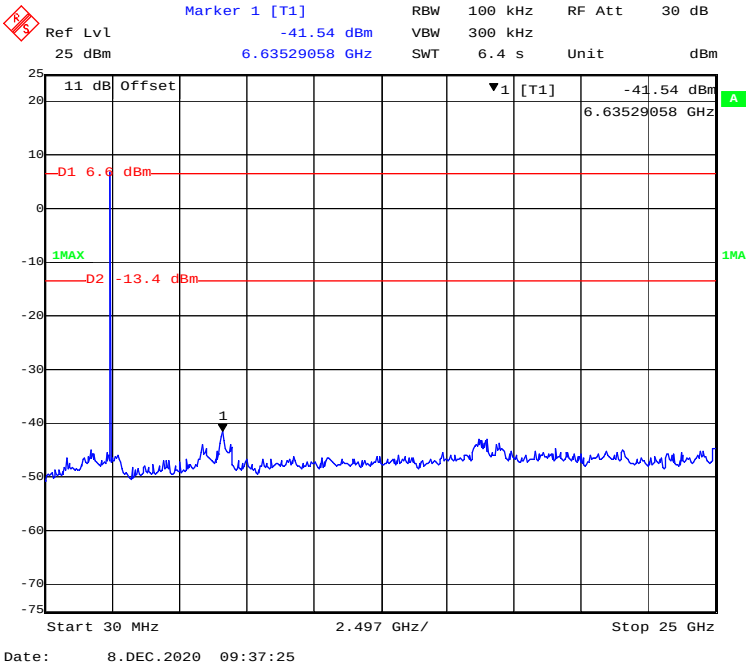
802.11n-HT40 Mode High Channel



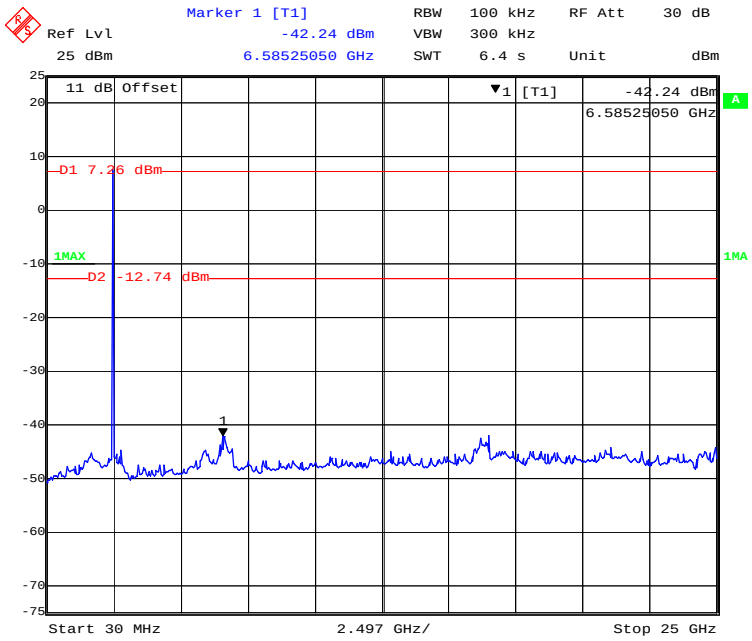
BLE(1Mbps) Mode Low Channel



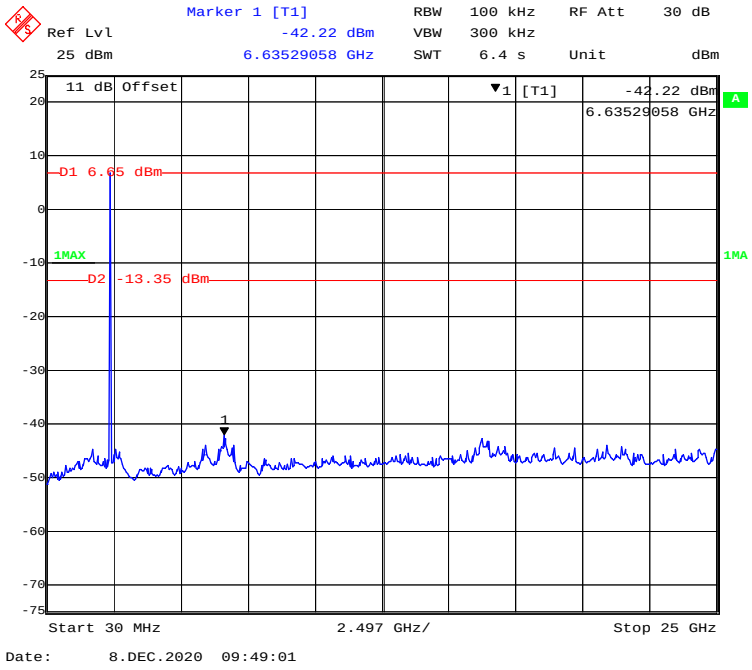
BLE(1Mbps) Mode Middle Channel



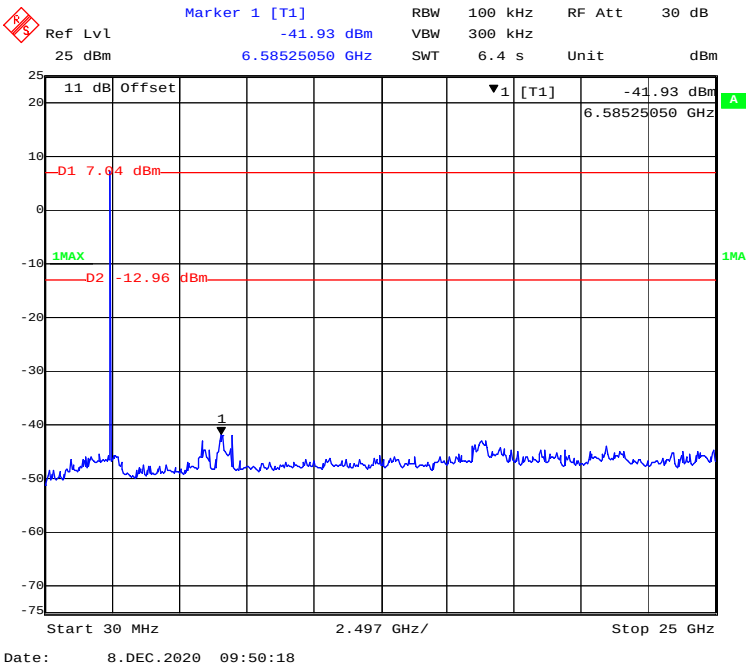
BLE(1Mbps) Mode High Channel



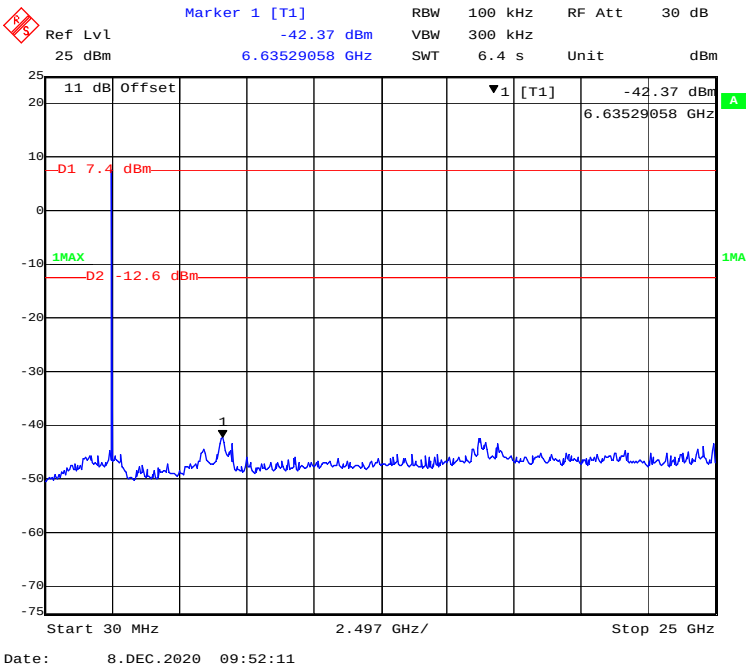
BLE(2Mbps) Mode Low Channel



BLE(2Mbps) Mode Middle Channel



BLE(2Mbps) Mode High Channel



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

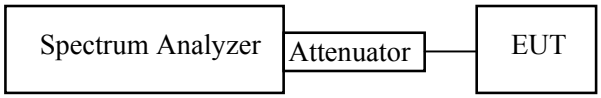
Applicable Standard

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) ≥ 3 x 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:	21.1 ℃
Relative Humidity:	50 %
ATM Pressure:	101.5 kPa

The testing was performed by CK Huang on 2020-12-08.

Test Result: Compliant.

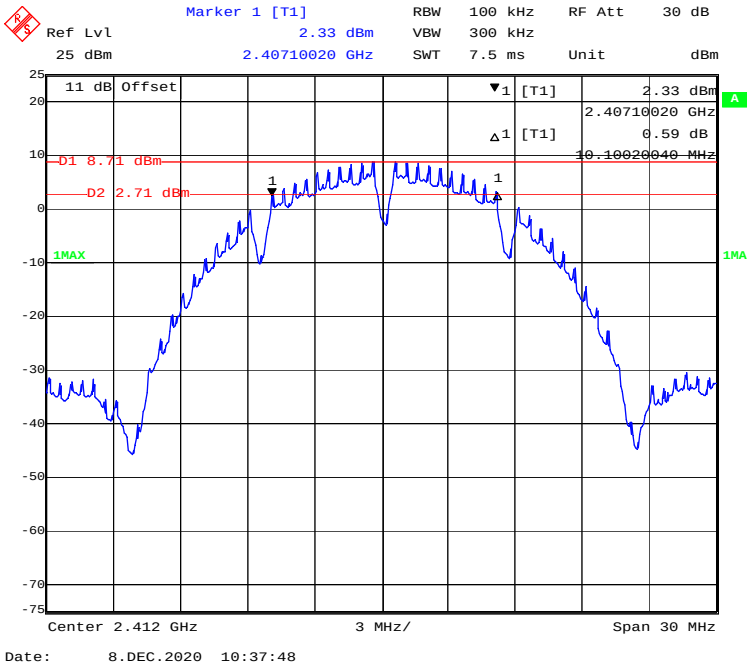
EUT operation mode: Transmitting

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)		Limit (kHz)
		Chain0	Chain1	
802.11b mode				
Low	2412	10.100	10.100	≥500
Middle	2437	10.040	10.040	≥500
High	2462	10.040	10.040	≥500
802.11g mode				
Low	2412	16.052	16.413	≥500
Middle	2437	16.172	16.353	≥500
High	2462	16.293	16.353	≥500
802.11n-HT20 mode				
Low	2412	17.315	17.555	≥500
Middle	2437	17.435	17.555	≥500
High	2462	17.315	17.555	≥500
802.11n-HT40 mode				
Low	2422	35.952	35.711	≥500
Middle	2437	34.870	35.711	≥500
High	2452	35.591	35.711	≥500

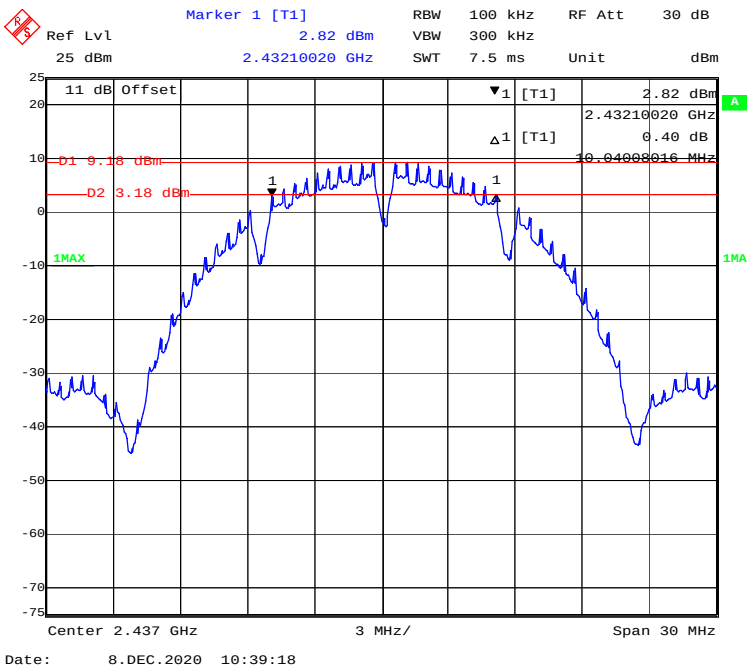
Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (MHz)
BLE(1Mbps) Mode			
Low	2402	0.691	≥0.5
Middle	2440	0.685	≥0.5
High	2480	0.703	≥0.5
BLE(2Mbps) Mode			
Low	2402	1.106	≥0.5
Middle	2440	1.130	≥0.5
High	2480	1.142	≥0.5

Chain0:

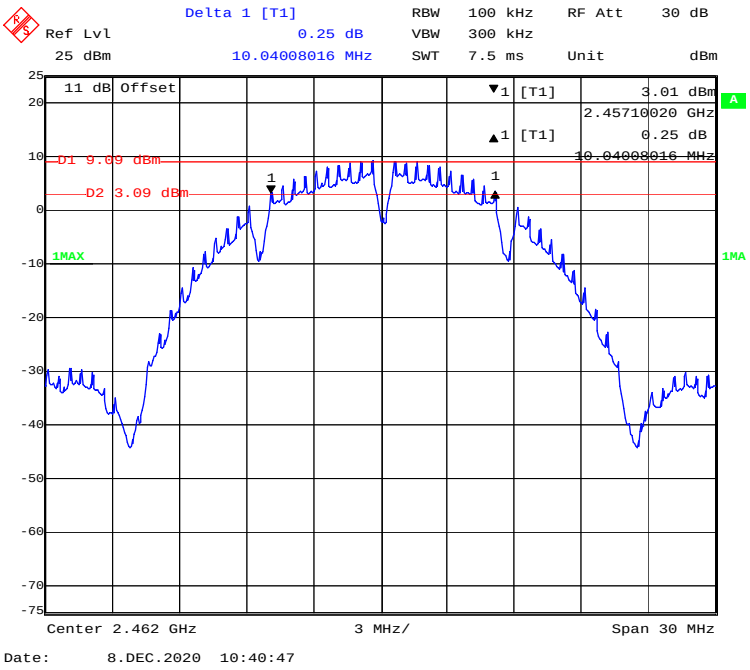
802.11b Mode Low Channel



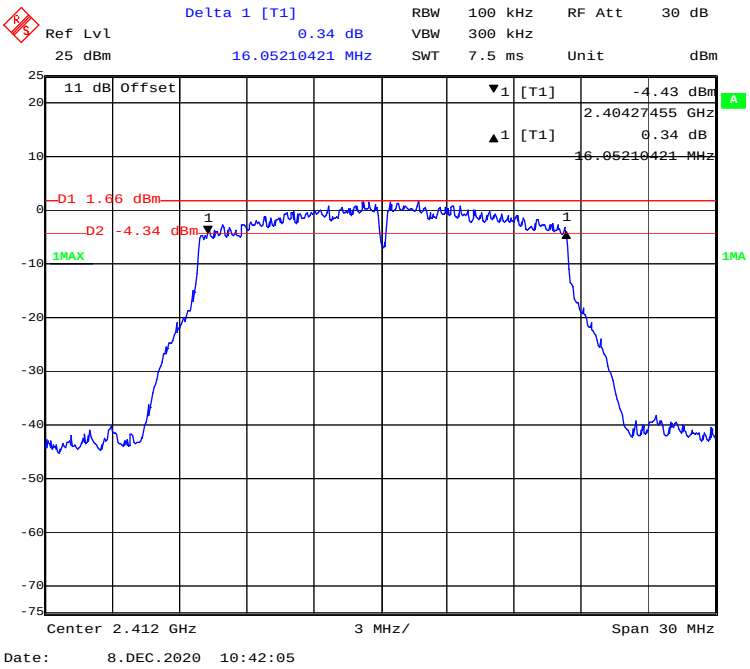
802.11b Mode Middle Channel



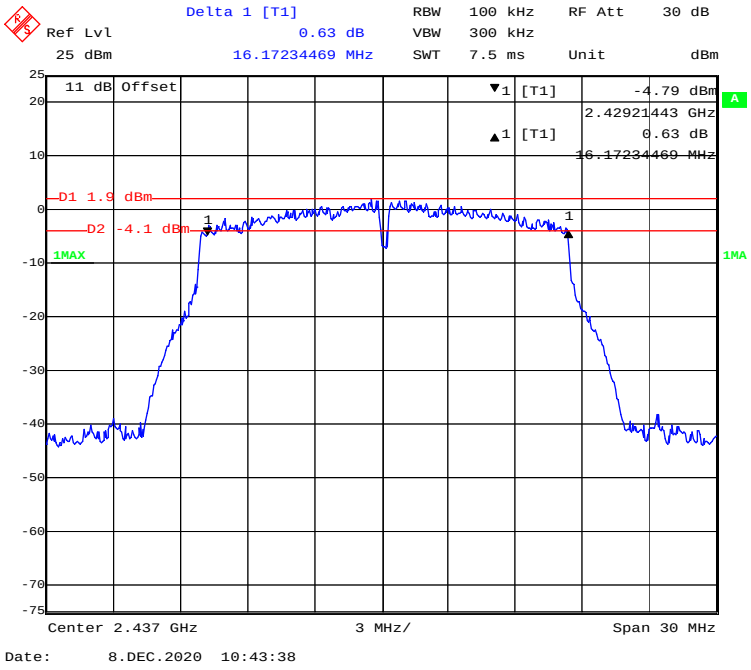
802.11b Mode High Channel



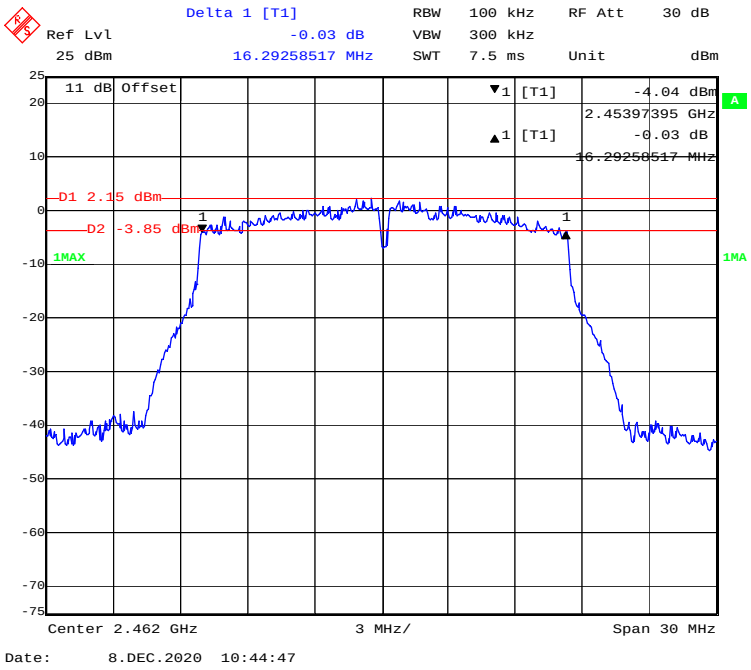
802.11g Mode Low Channel



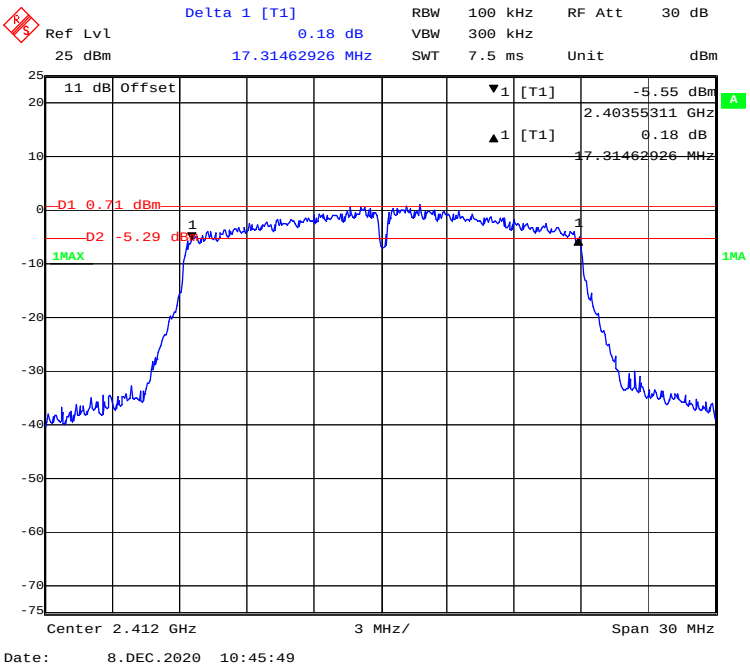
802.11g Mode Middle Channel



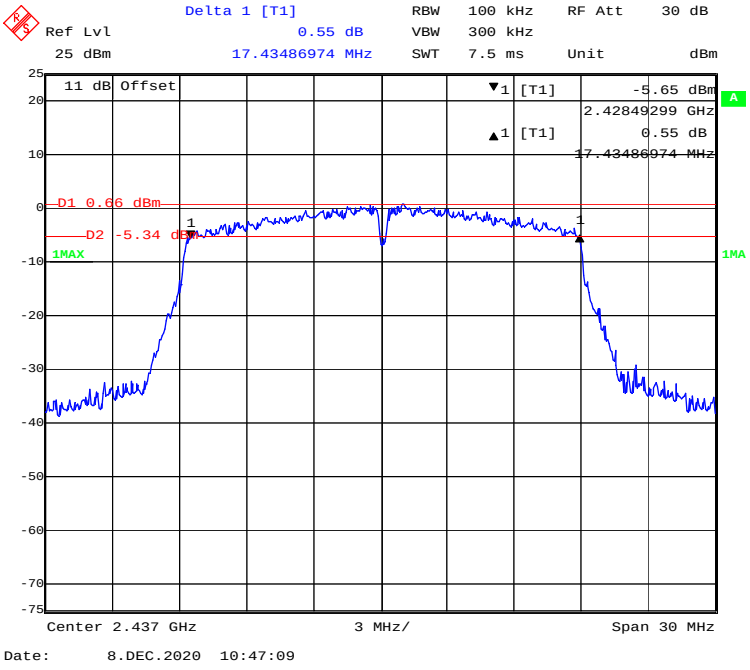
802.11g Mode High Channel



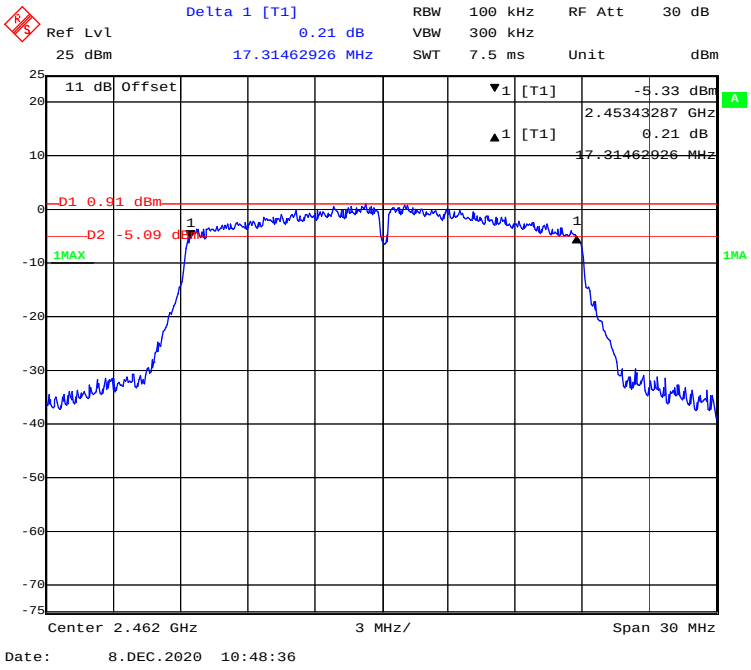
802.11n-HT20 Mode Low Channel



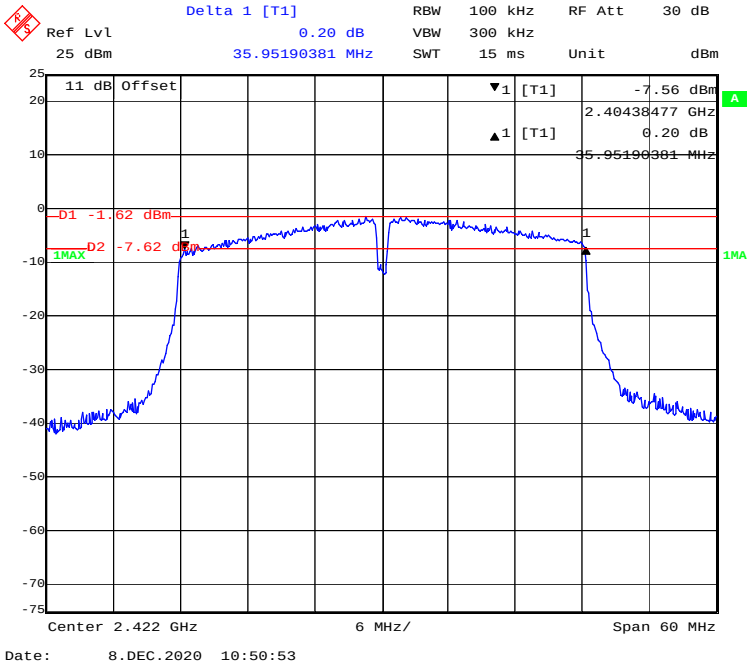
802.11n-HT20 Mode Middle Channel



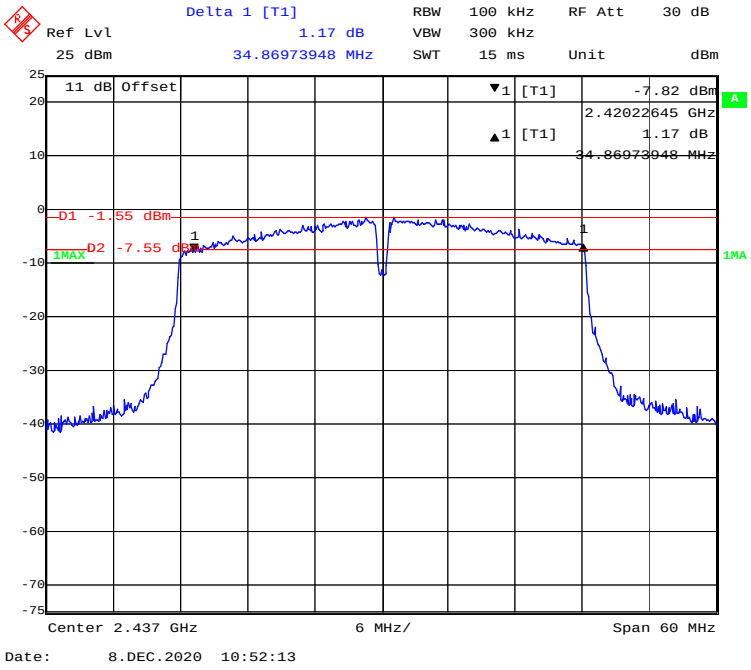
802.11n-HT20 Mode High Channel



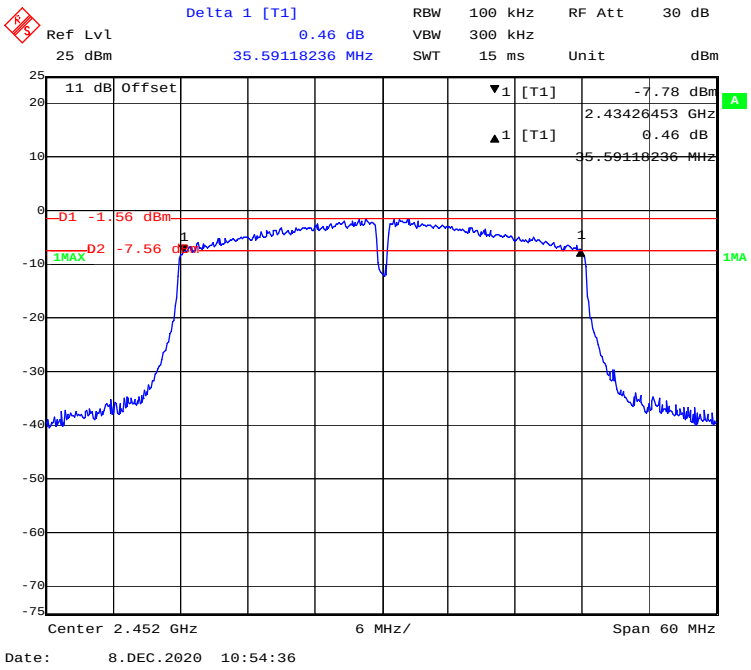
802.11n-HT40 Mode Low Channel



802.11n-HT40 Mode Middle Channel

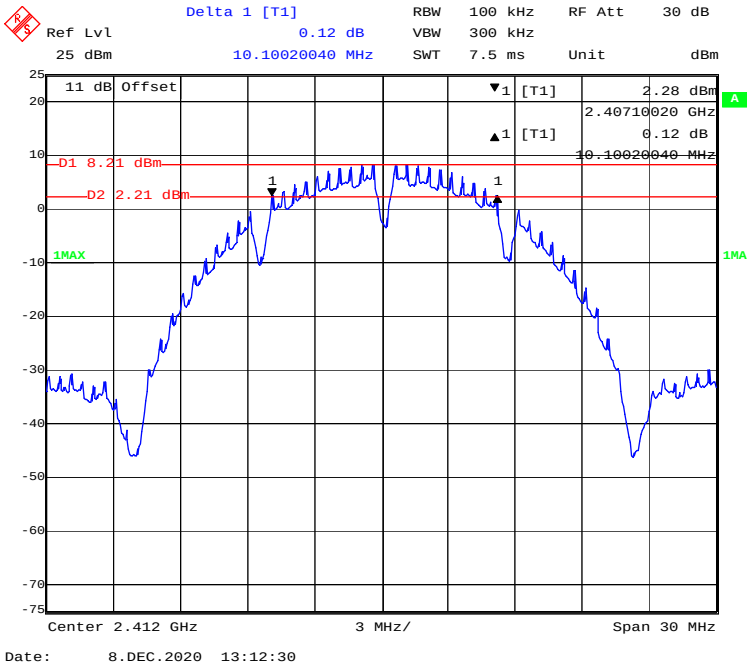


802.11n-HT40 Mode High Channel

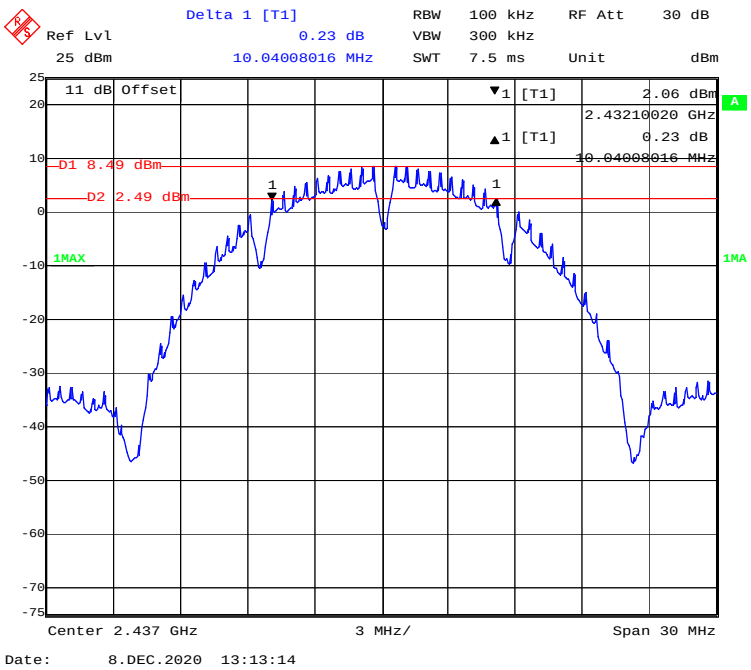


Chain1:

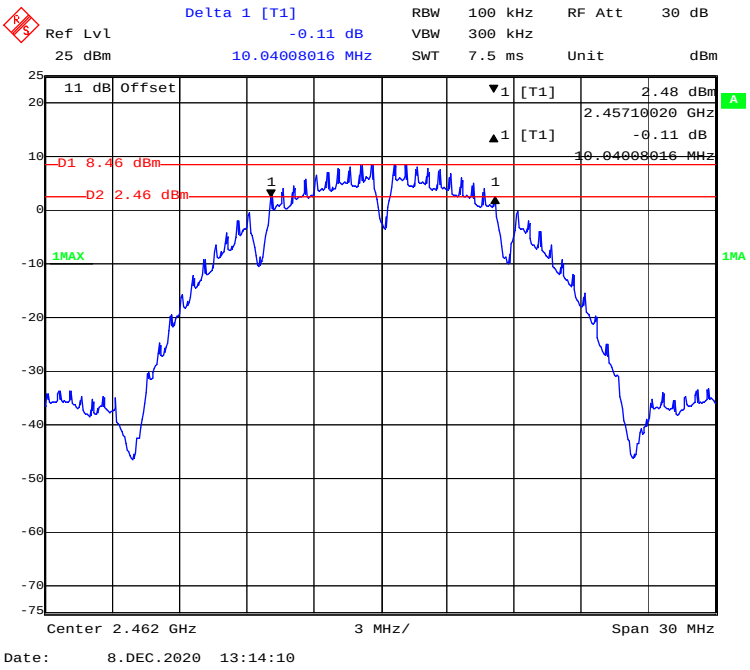
802.11b Mode Low Channel



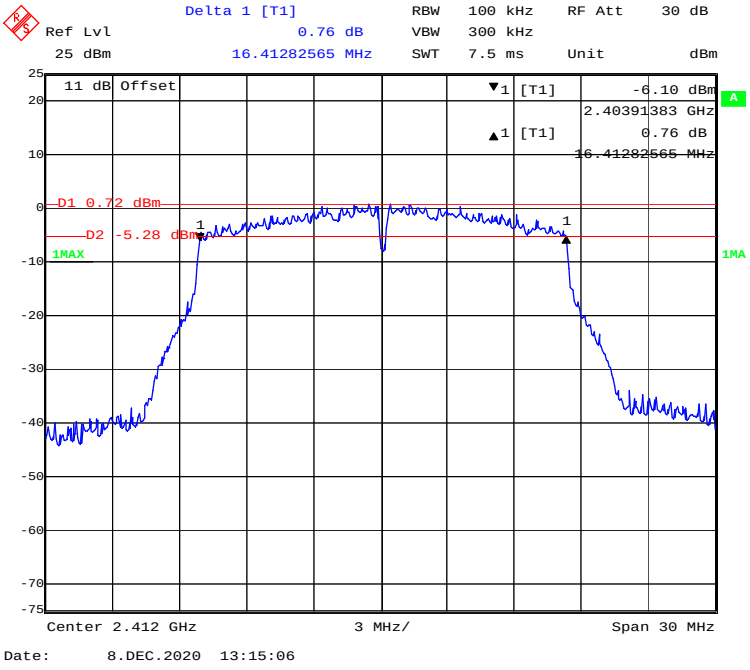
802.11b Mode Middle Channel



802.11b Mode High Channel

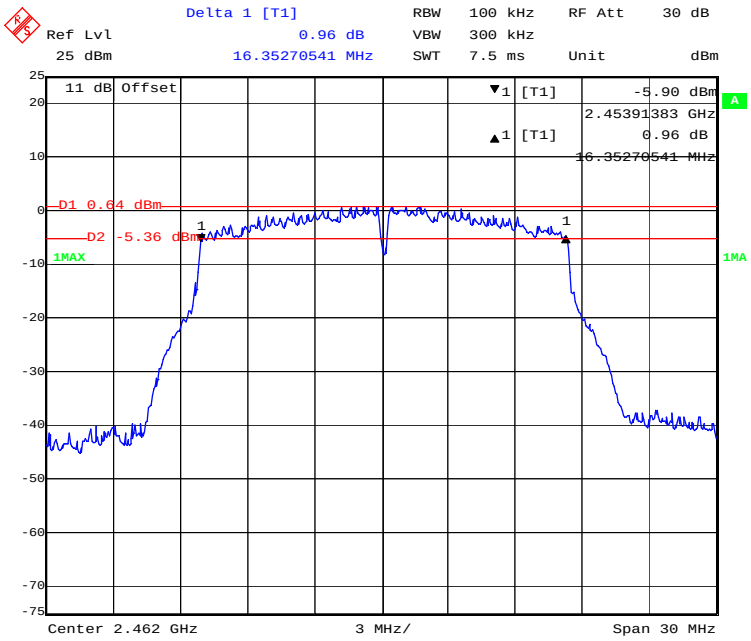


802.11g Mode Low Channel

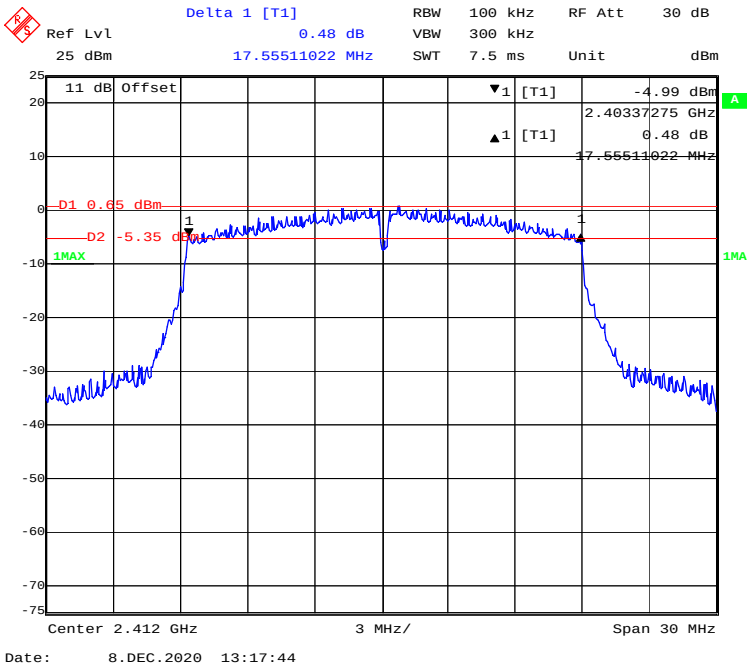


802.11g Mode Middle Channel

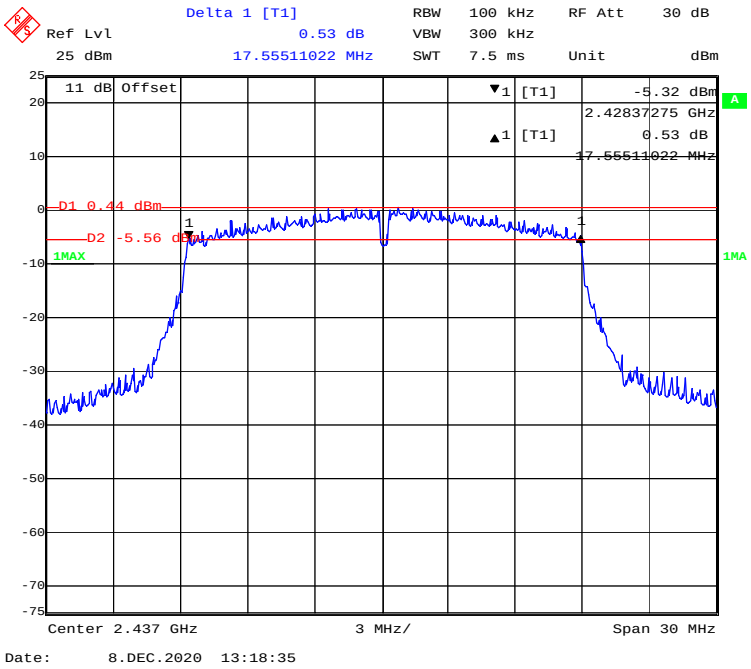
802.11g Mode High Channel



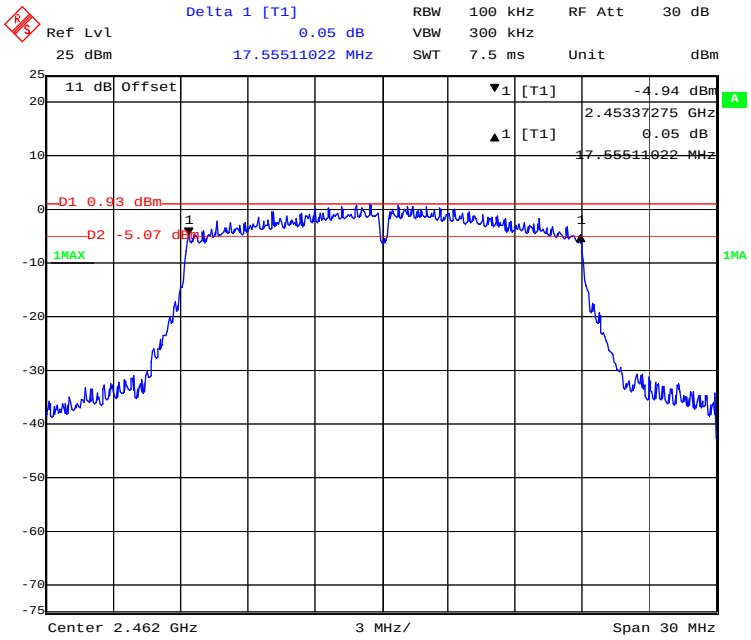
802.11n-HT20 Mode Low Channel



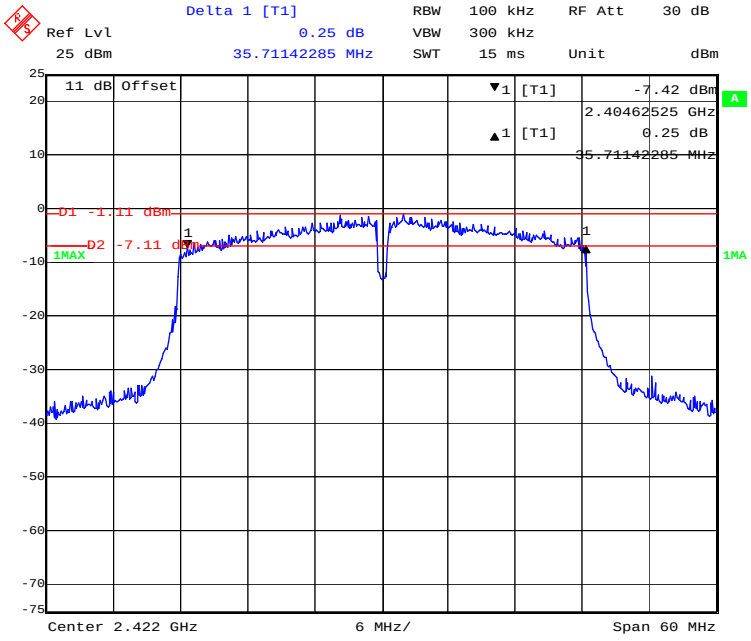
802.11n-HT20 Mode Middle Channel



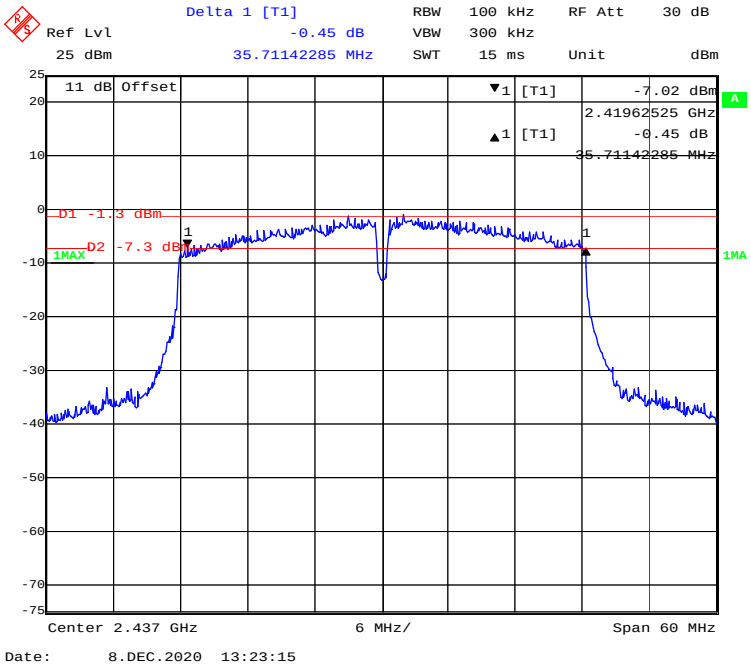
802.11n-HT20 Mode High Channel



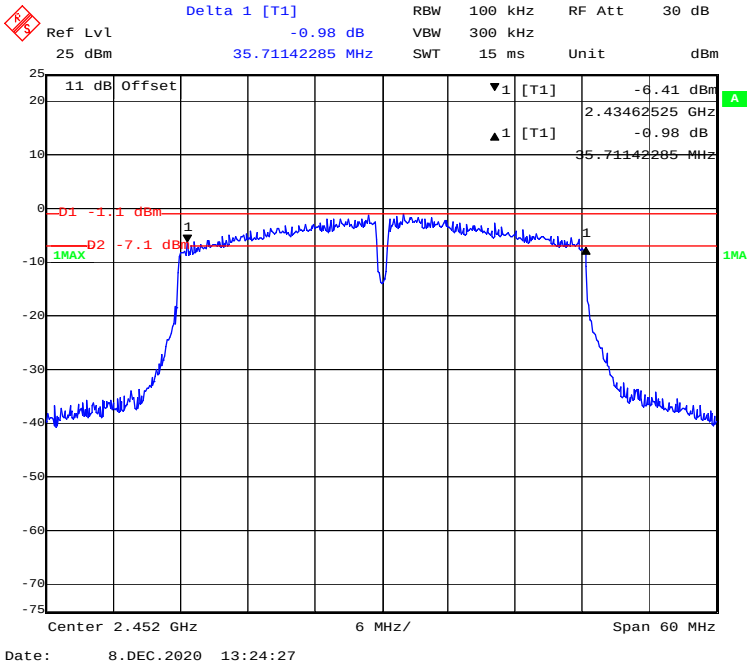
802.11n-HT40 Mode Low Channel



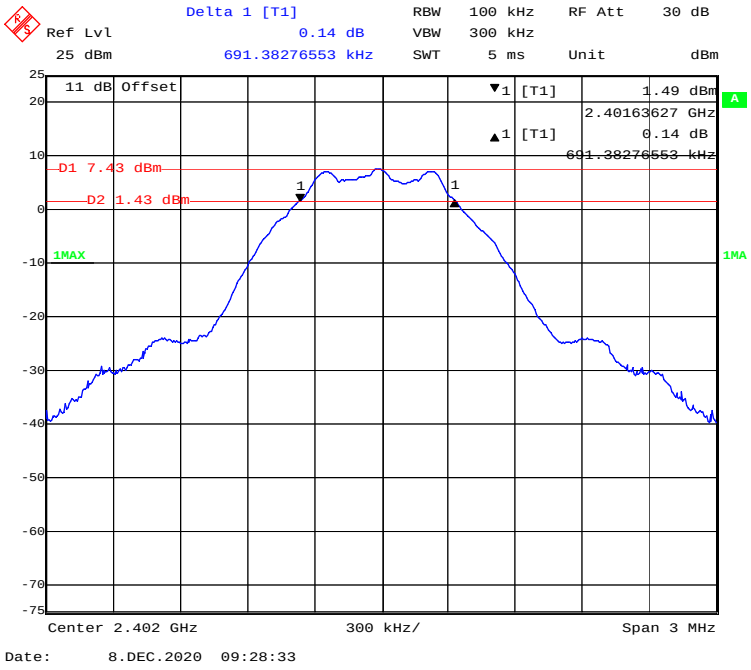
802.11n-HT40 Mode Middle Channel



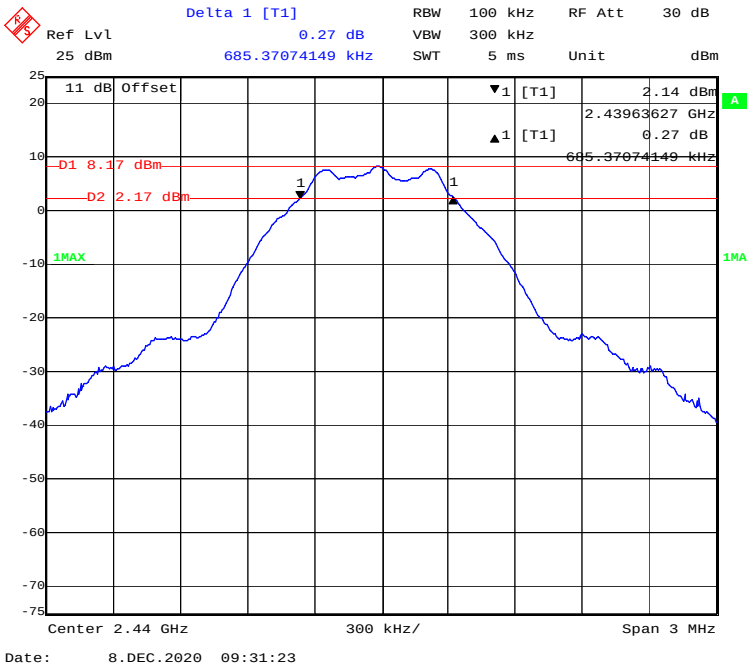
802.11n-HT40 Mode High Channel



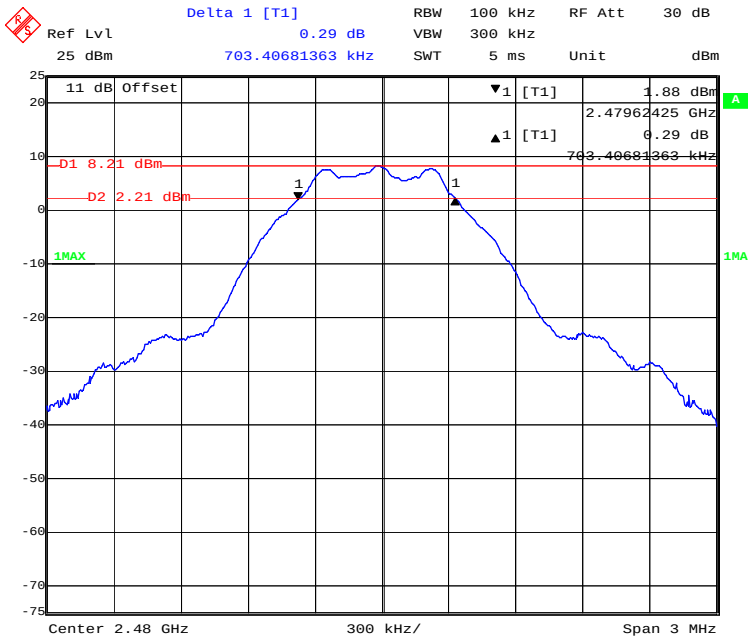
BLE(1Mbps) Mode Low Channel



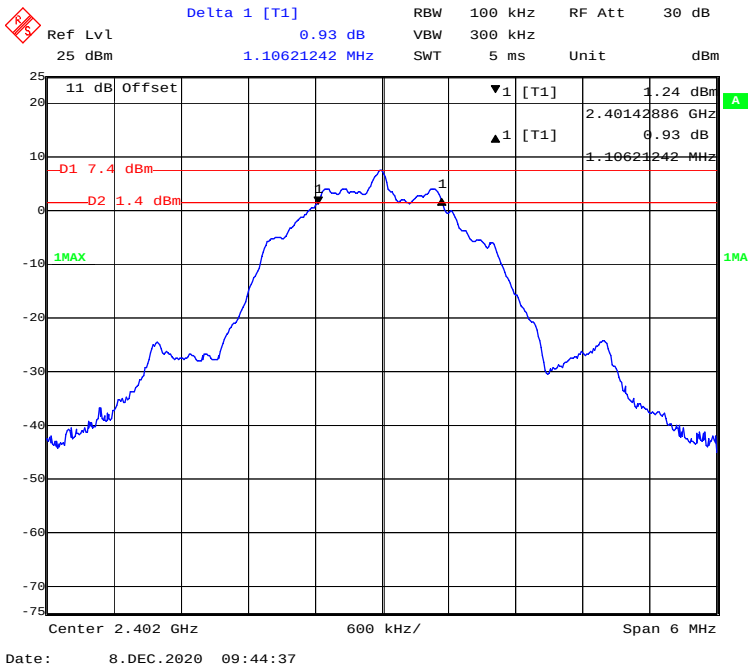
BLE(1Mbps) Mode Middle Channel



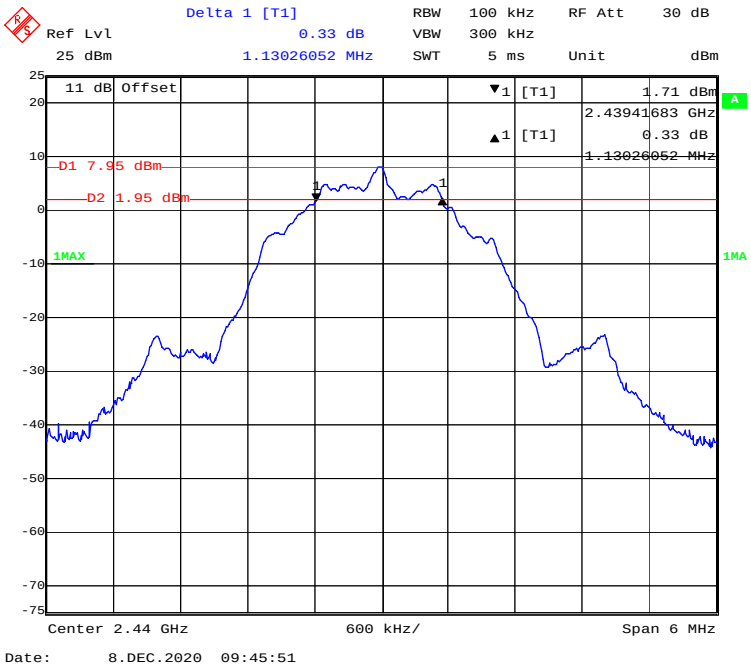
BLE(1Mbps) Mode High Channel



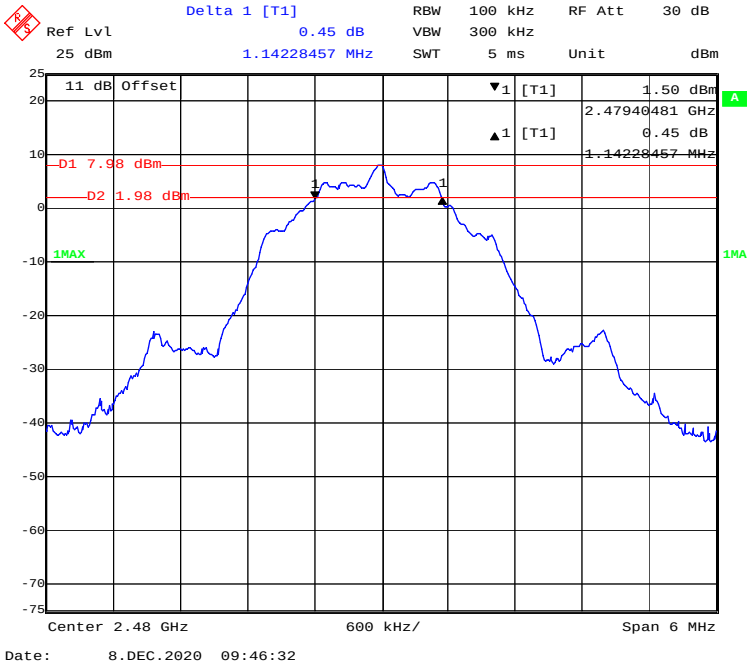
BLE(2Mbps) Mode Low Channel



BLE(2Mbps) Mode Middle Channel



BLE(2Mbps) Mode High Channel



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

Applicable Standard

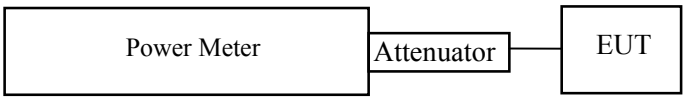
According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, Compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted 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

For Wi-Fi:

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

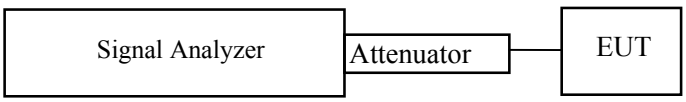
The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.



For BLE:

According to ANSI C63.10-2013 sub-clause 11.9.1.1

1. Set the RBW ≥ DTS bandwidth.
2. Set VBW ≥ 3 x RBW.
3. Set span ≥ 3 x RBW
4. Sweep time = auto couple.
5. Detector = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use peak marker function to determine the peak amplitude level.



Test Data

Environmental Conditions

Temperature:	22.8 ℃
Relative Humidity:	54 %
ATM Pressure:	101.5 kPa

The testing was performed by CK Huang on 2020-12-08

Test Result: Compliant.

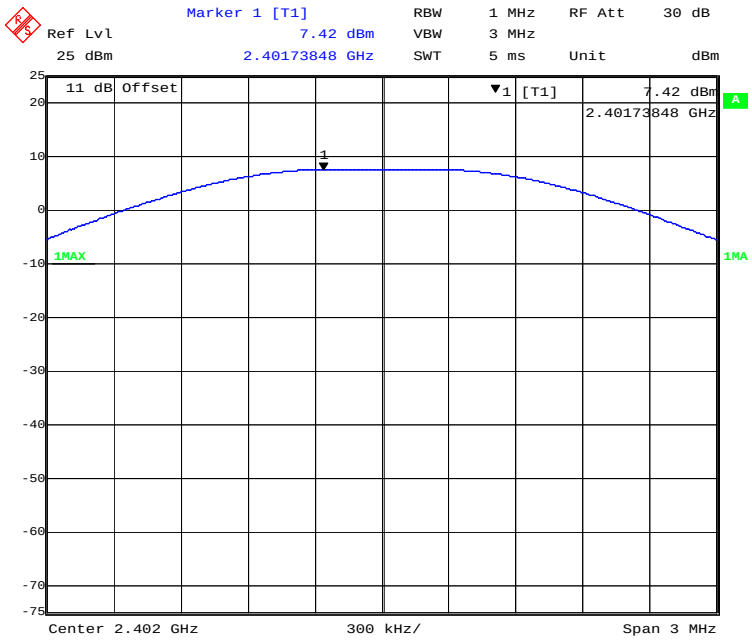
EUT operation mode: Transmitting

Test mode	Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)			Limit (dBm)	Result
			Chain0	Chain1	Total		
802.11b	Low	2412	20.93	20.53	/	30	Pass
	Middle	2437	21.09	20.25	/	30	Pass
	High	2462	20.57	20.32	/	30	Pass
802.11g	Low	2412	20.86	20.69	/	30	Pass
	Middle	2437	20.70	20.60	/	30	Pass
	High	2462	20.79	20.71	/	30	Pass
802.11n-HT20	Low	2412	20.91	21.13	24.03	30	Pass
	Middle	2437	21.04	21.33	24.20	30	Pass
	High	2462	21.13	21.26	24.21	30	Pass
802.11n-HT40	Low	2422	21.48	21.62	24.56	30	Pass
	Middle	2437	21.61	21.62	24.63	30	Pass
	High	2452	21.59	21.69	24.65	30	Pass

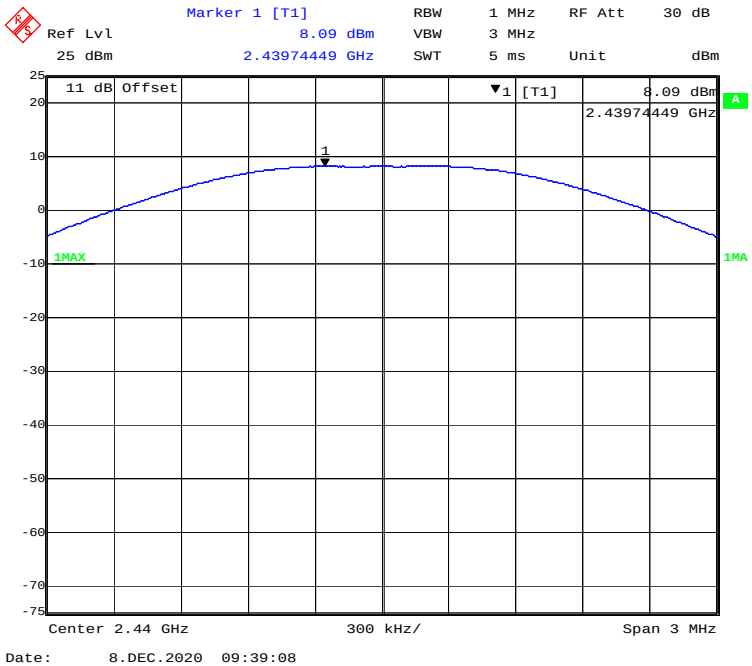
Note: The total output power=$10Log_{10}$ (10^ (Chain 0/10) +10^ (Chain 1/10))
The maximum antenna gain is 2.0dBi, the device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:
Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;
So:
Directional gain = GANT + Array Gain = 2.0dBi < 6dBi

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Limit (dBm)	Result
BLE(1Mbps) Mode				
Low	2402	7.42	30	Pass
Middle	2440	8.09	30	Pass
High	2480	8.11	30	Pass
BLE(2Mbps) Mode				
Low	2402	7.36	30	Pass
Middle	2440	7.98	30	Pass
High	2480	8.11	30	Pass

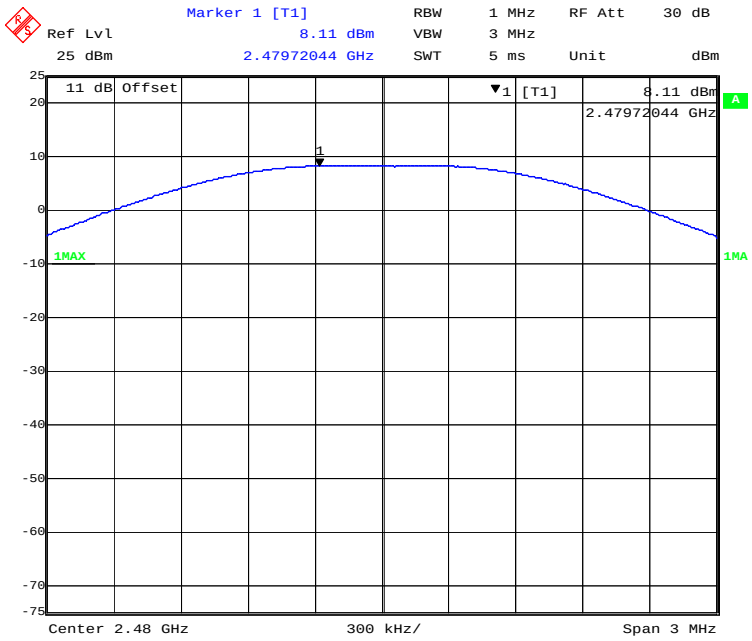
BLE(1Mbps) Mode Low Channel



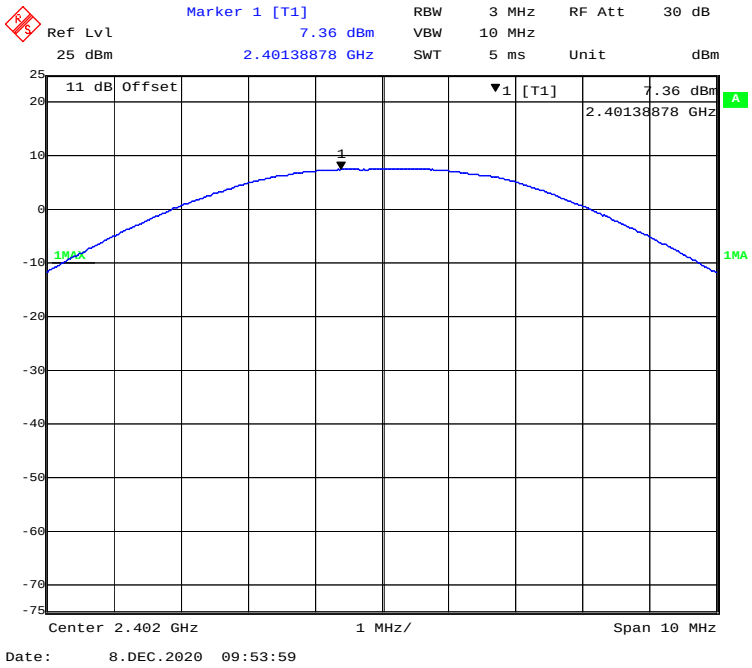
BLE(1Mbps) Mode Middle Channel



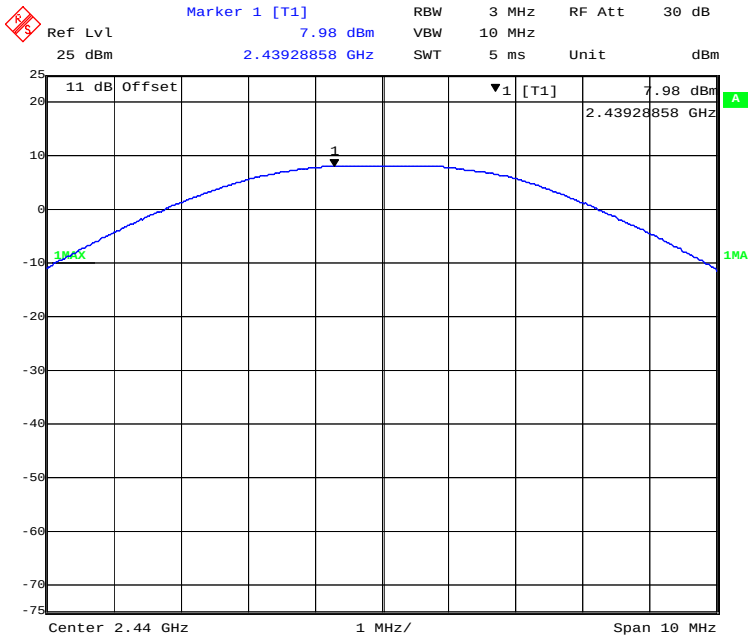
BLE(1Mbps) Mode High Channel



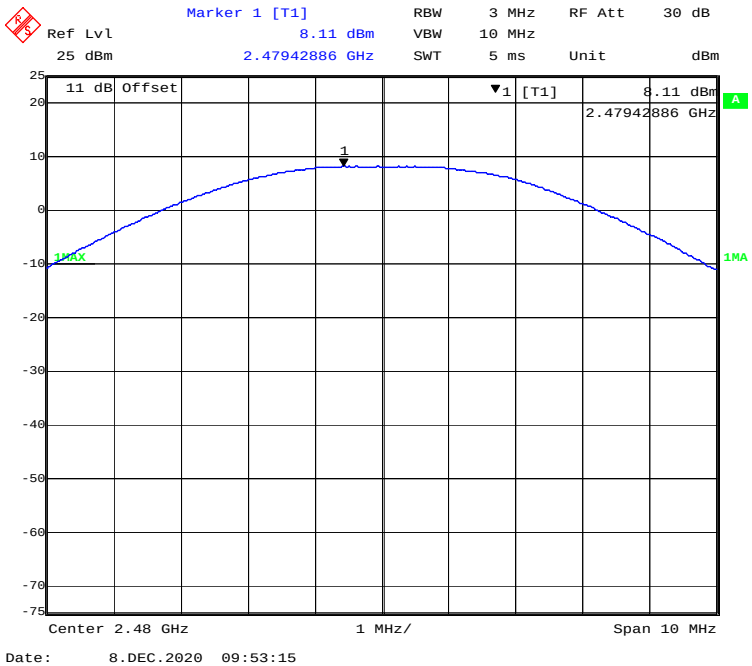
BLE(2Mbps) Mode Low Channel



BLE(2Mbps) Mode Middle Channel



BLE(2Mbps) Mode High Channel



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:	21.3-22.5 ℃
Relative Humidity:	46-50 %
ATM Pressure:	101.3-101.5 kPa

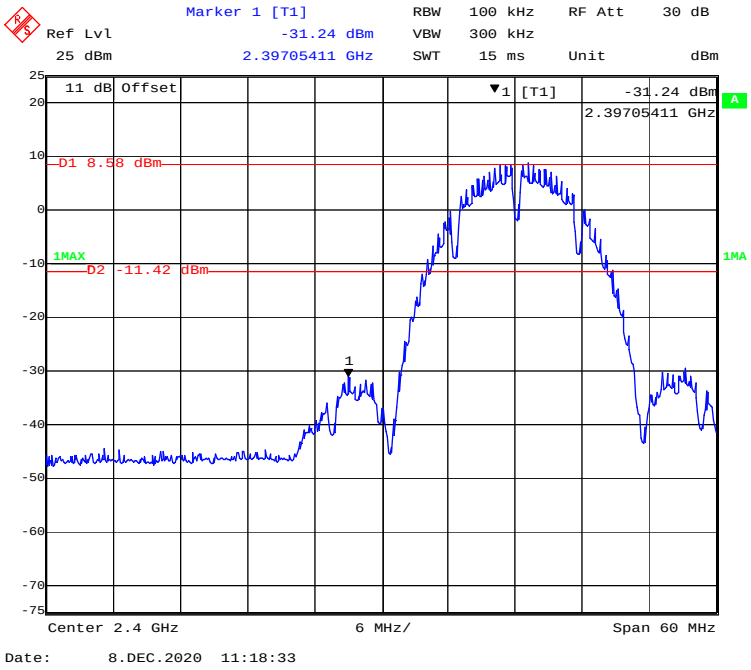
The testing was performed by CK Huang from 2020-12-08 to 2021-01-25.

Test Result: Compliant.

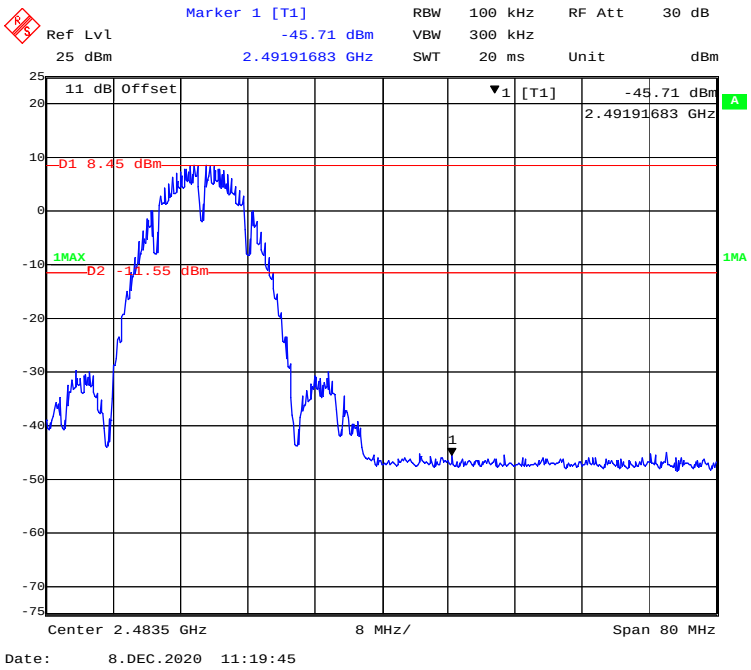
EUT operation mode: Transmitting

Chain0:

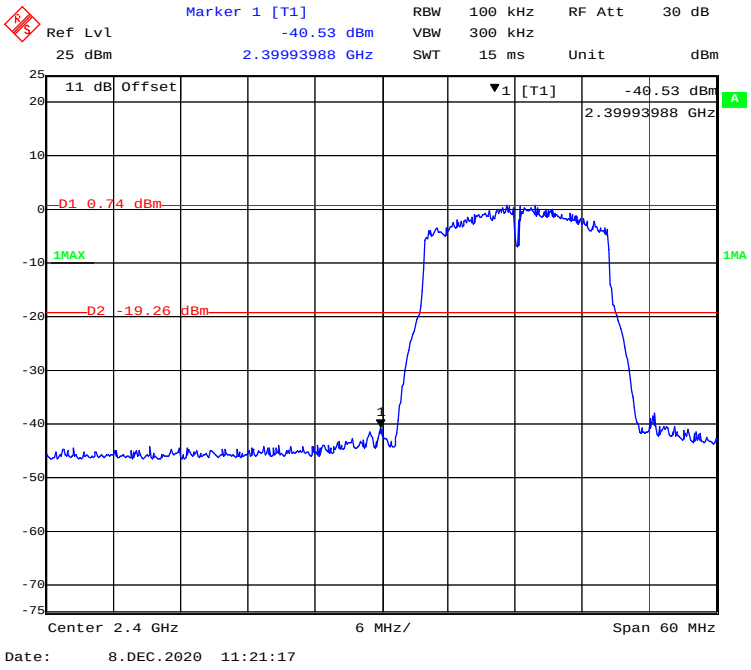
802.11b Mode Left Side



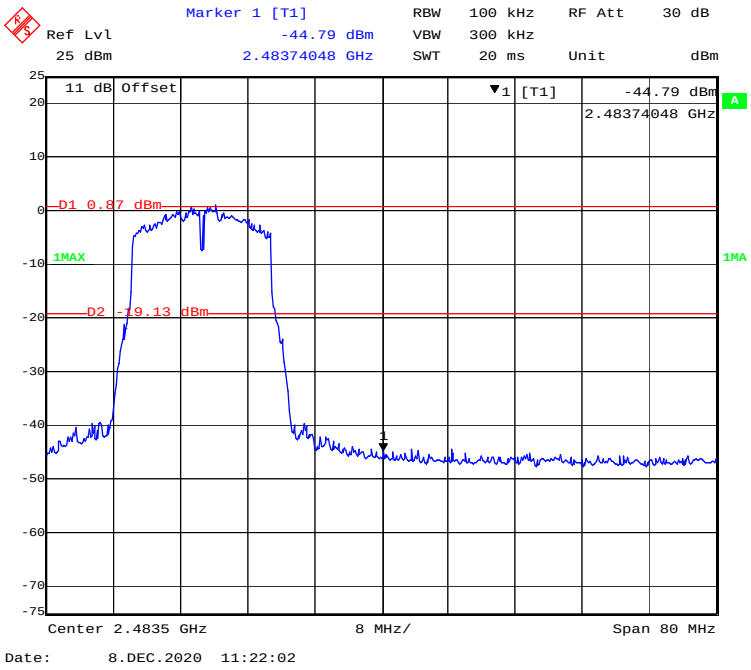
802.11b Mode Right Side



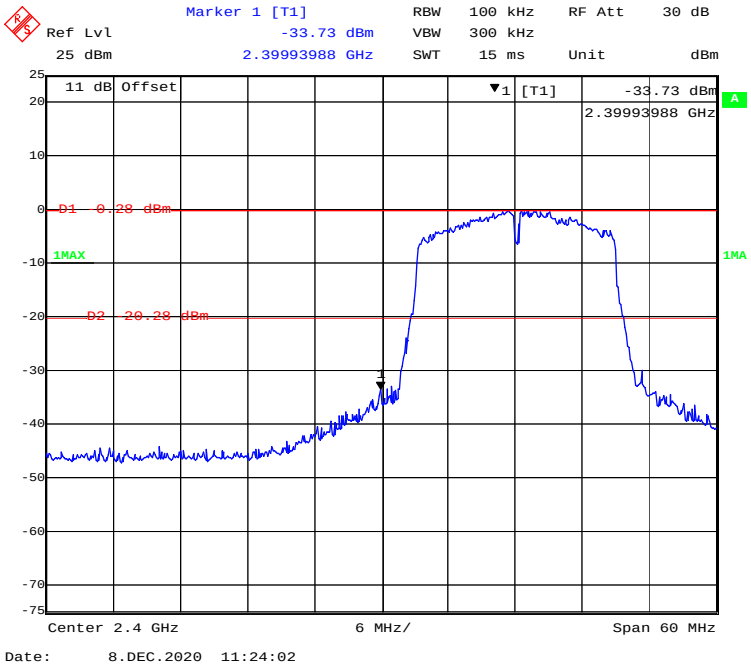
802.11g Mode Left Side



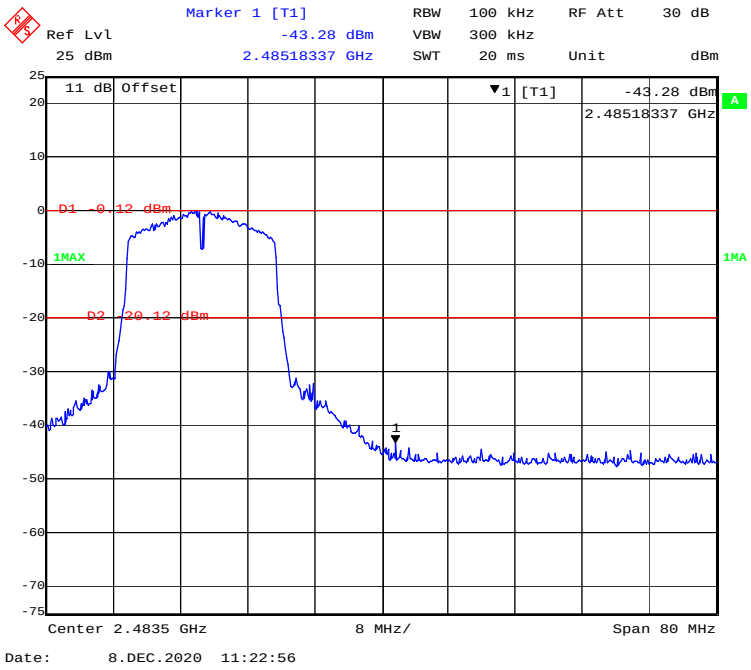
802.11g Mode Right Side



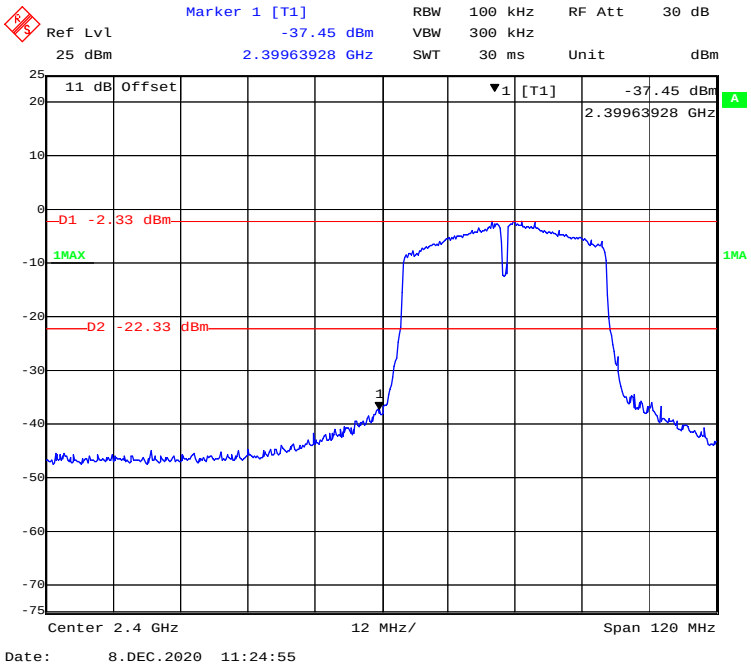
802.11n-HT20 Mode Left Side



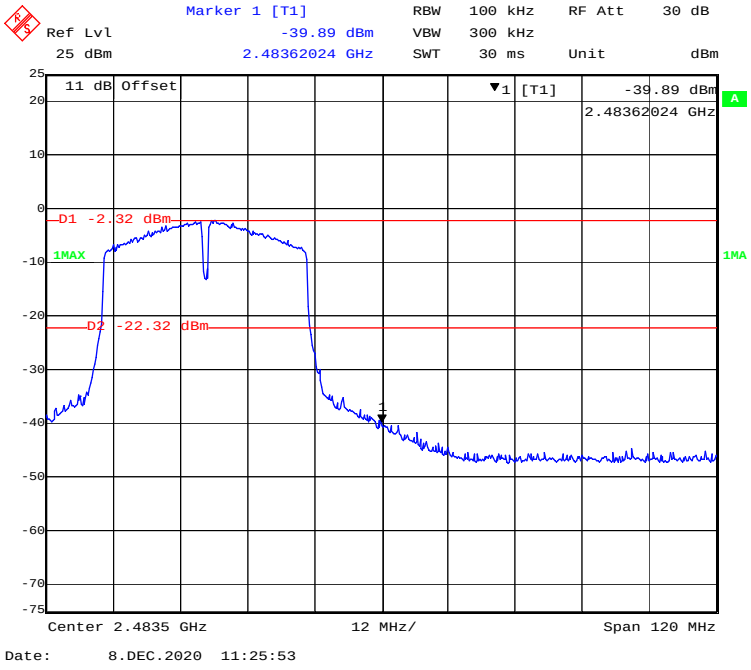
802.11n-HT20 Mode Right Side



802.11n-HT40 Mode Left Side

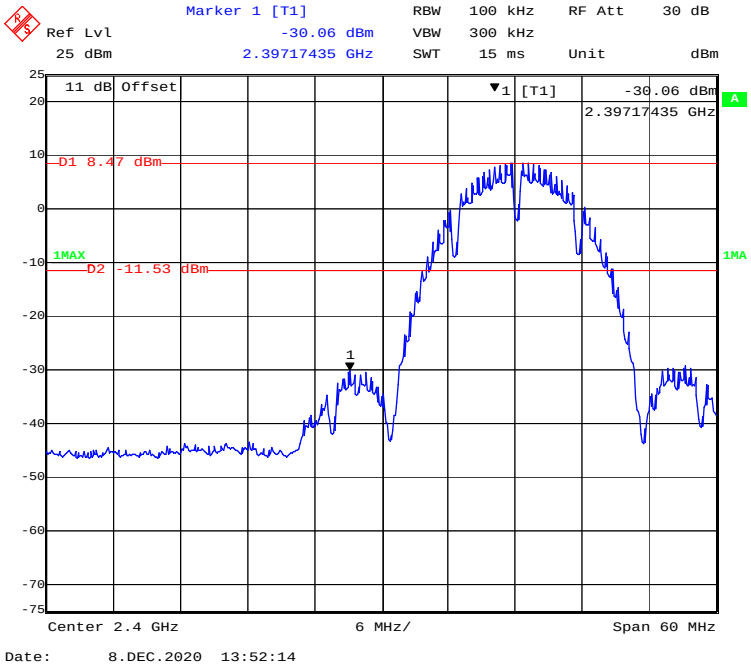


802.11n-HT40 Mode Right Side

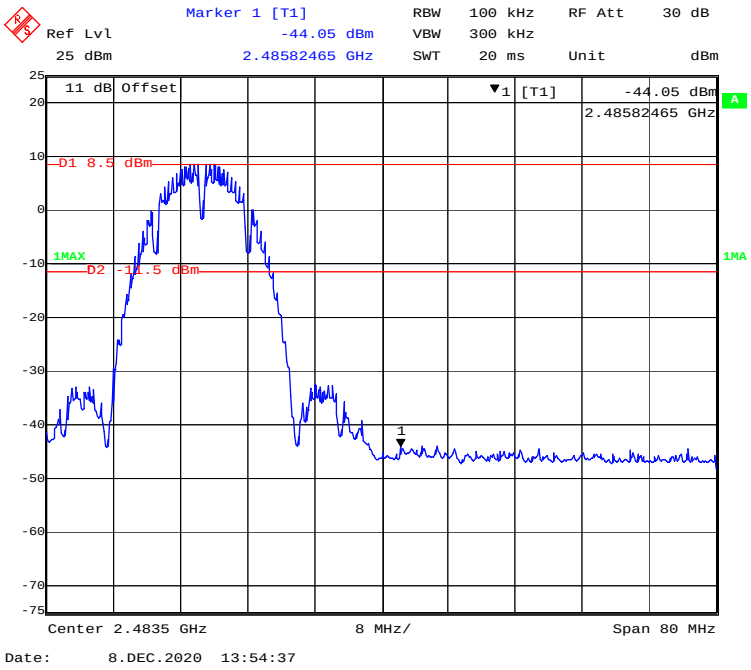


Chain1:

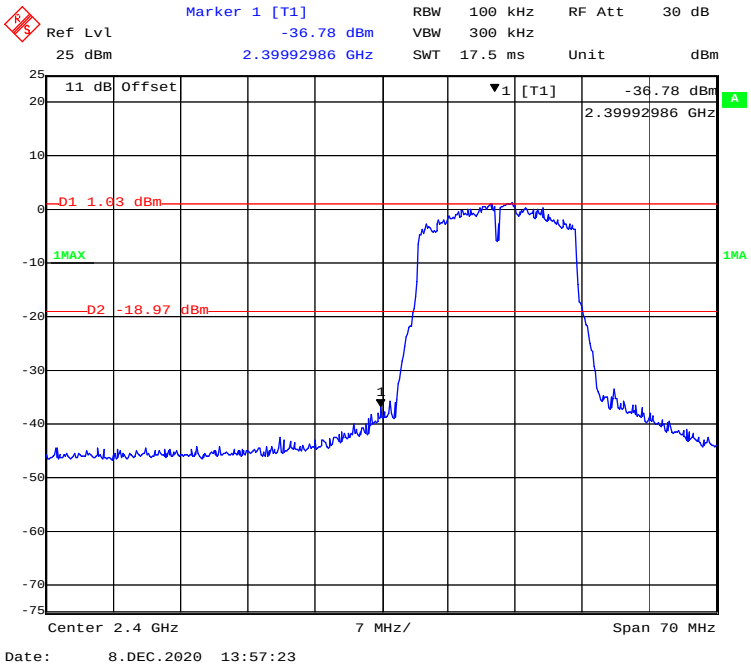
802.11b Mode Left Side



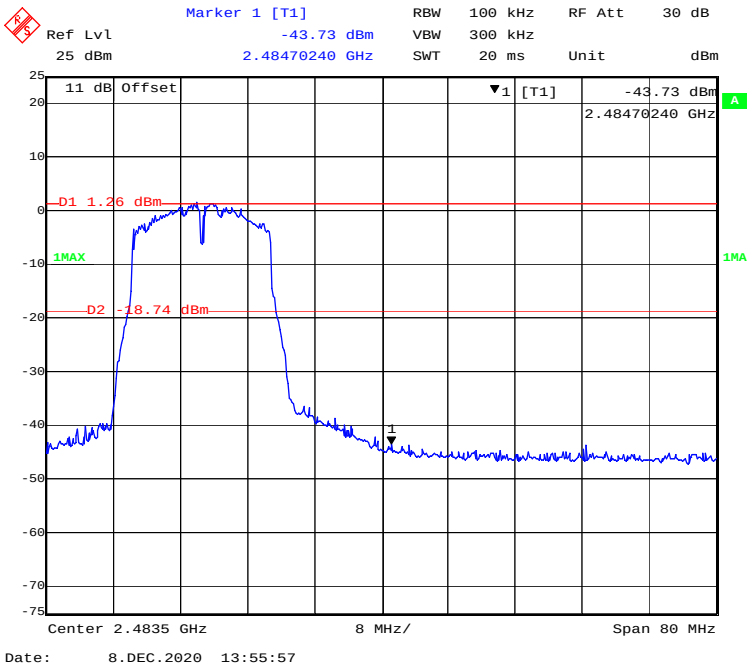
802.11b Mode Right Side



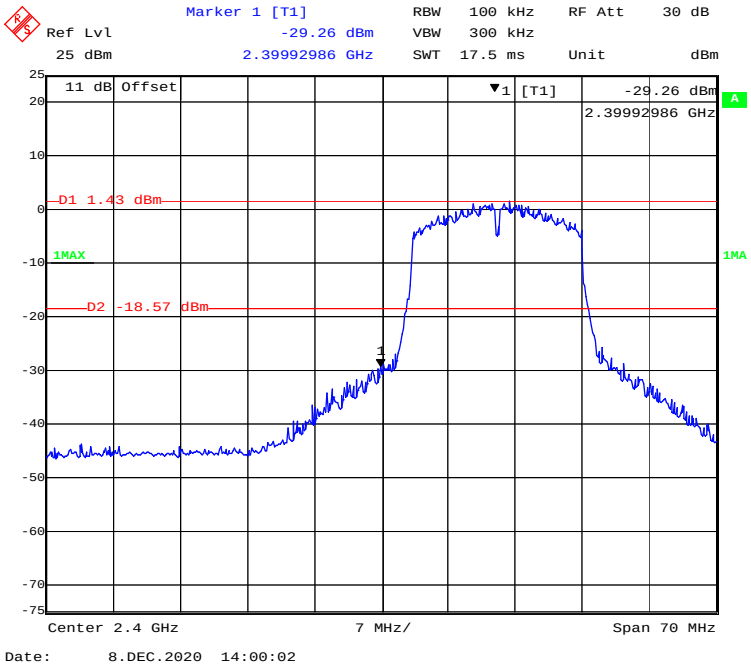
802.11g Mode Left Side



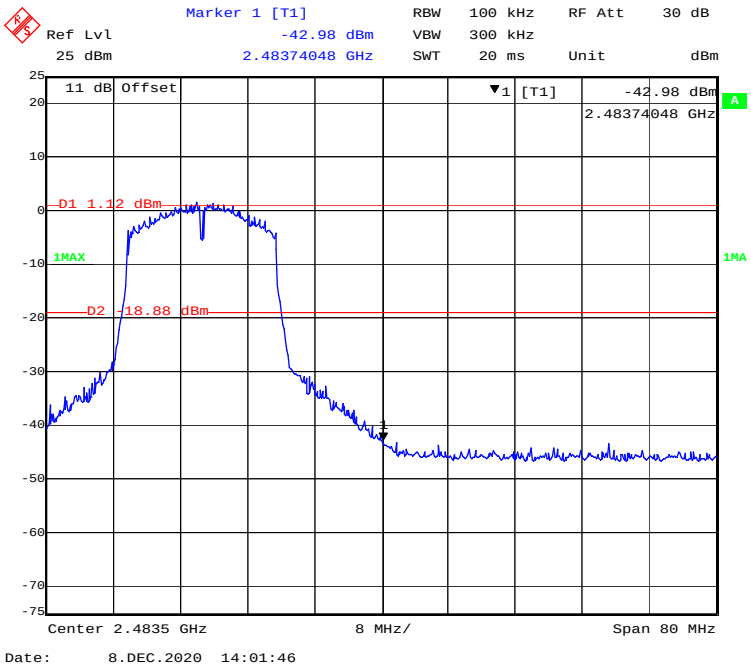
802.11g Mode Right Side



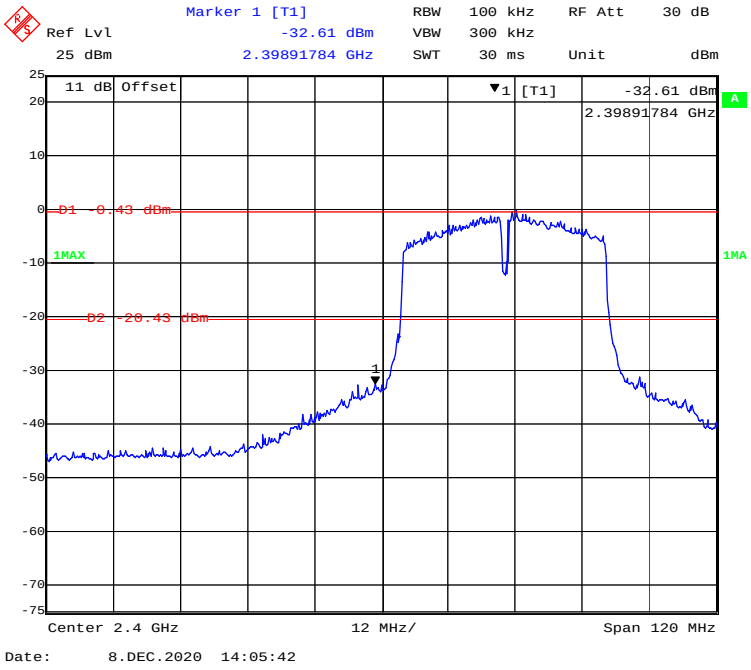
802.11n-HT20 Mode Left Side



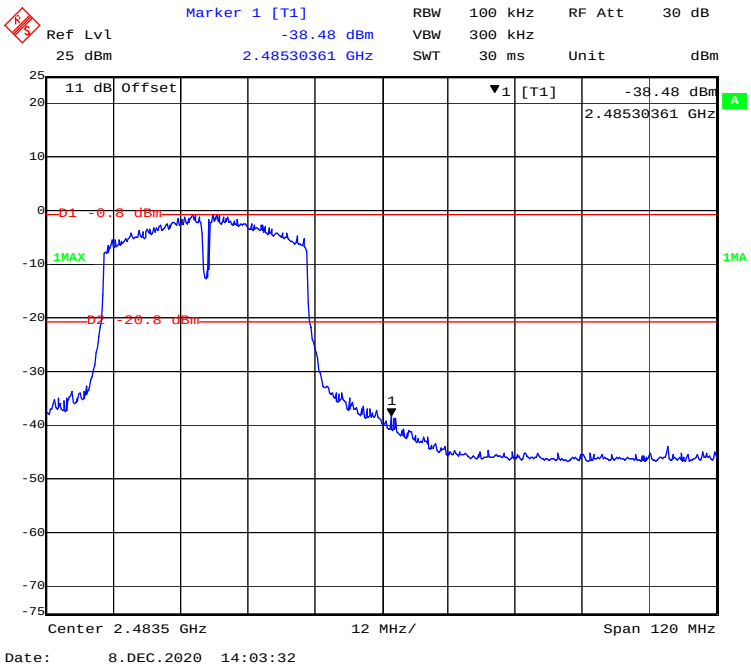
802.11n-HT20 Mode Right Side



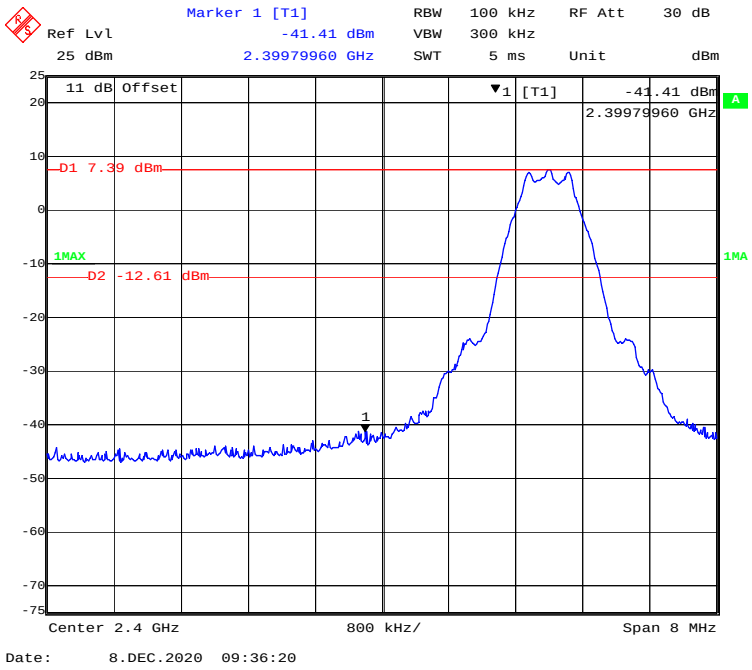
802.11n-HT40 Mode Left Side



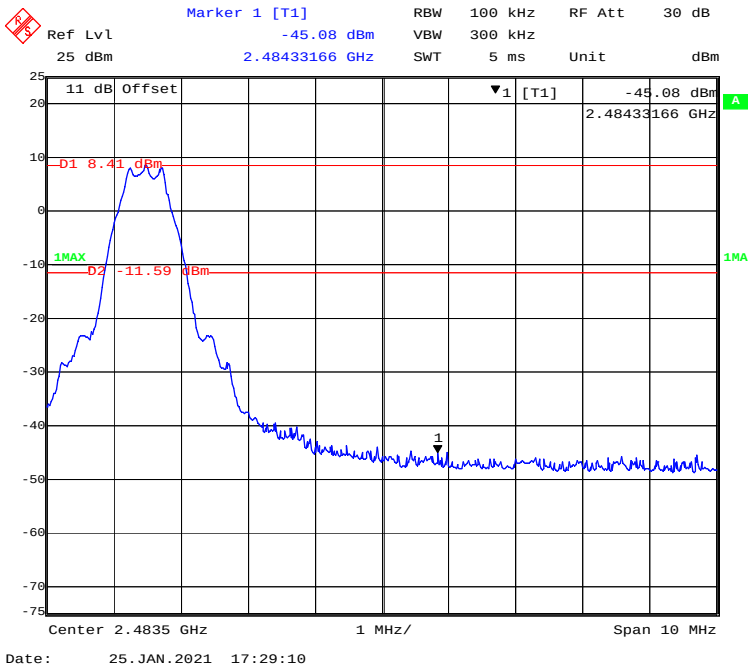
802.11n-HT40 Mode Right Side



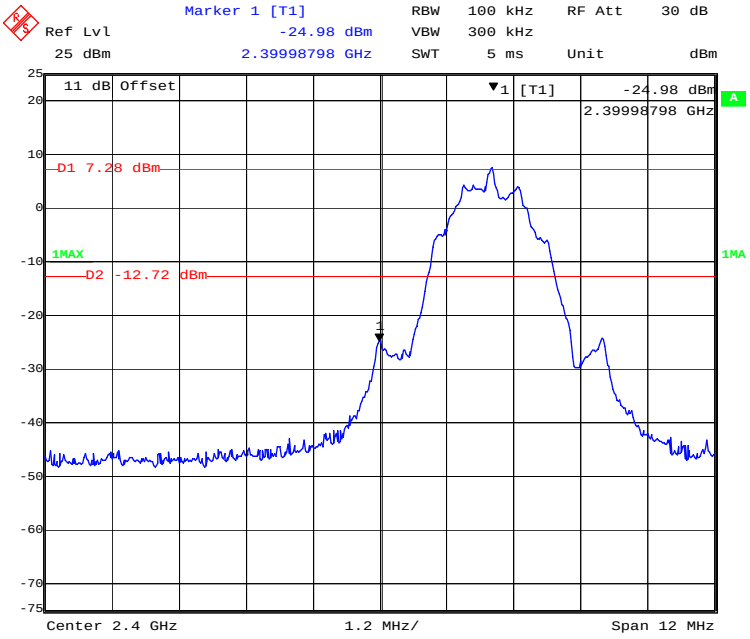
BLE(1Mbps) Mode Left Side



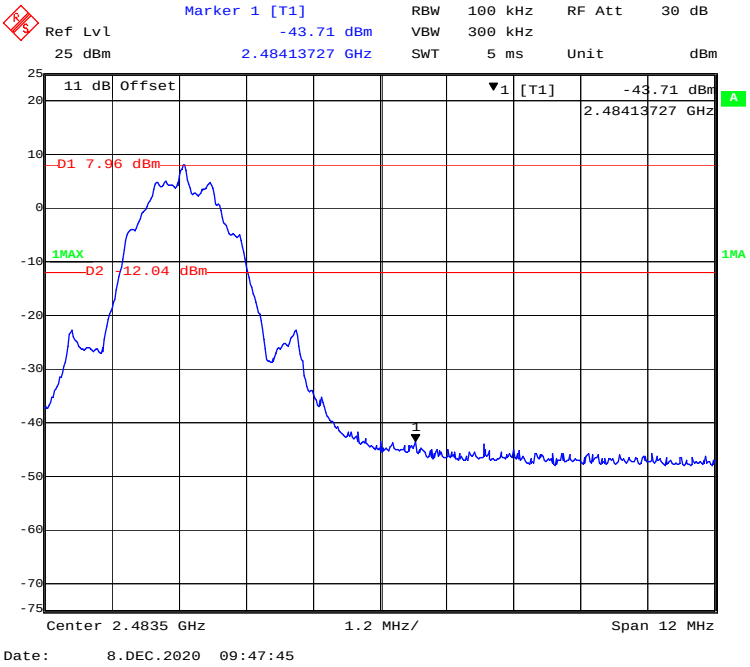
BLE(1Mbps) Mode Right Side



BLE(2Mbps) Mode Left Side



BLE(2Mbps) 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: 3kHz≤ RBW≤100 kHz.
2. Set the VBW ≥ 3xRBW.
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:	22.1 ℃
Relative Humidity:	52 %
ATM Pressure:	101.3 kPa

The testing was performed by CK Huang on 2020-12-08.

Test Result: Compliant.

EUT operation mode: Transmitting

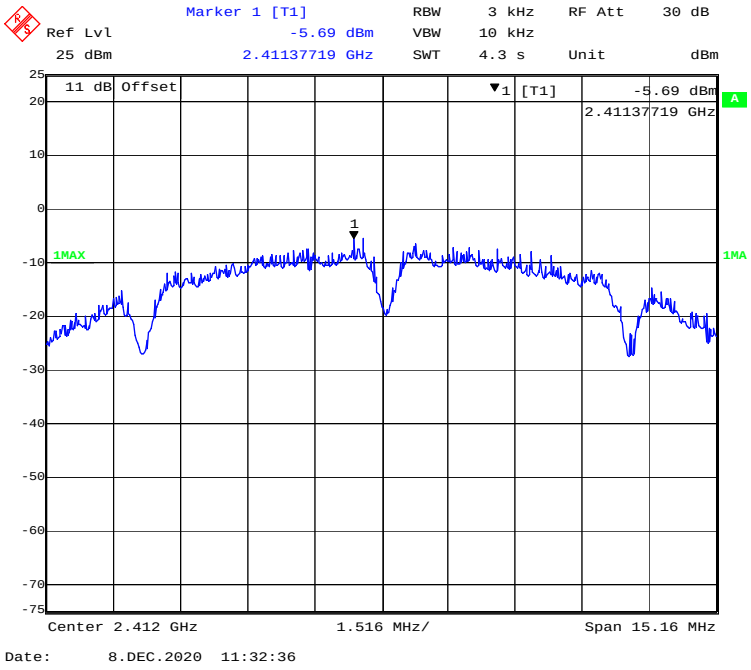
Channel	Frequency (MHz)	PSD (dBm/3kHz)			Limit (dBm/3kHz)
		Chain0	Chain1	Total	
802.11b mode					
Low	2412	-5.69	-5.42	/	≤8
Middle	2437	-5.84	-5.70	/	≤8
High	2462	-5.67	-4.17	/	≤8
802.11g mode					
Low	2412	-11.98	-12.31	/	≤8
Middle	2437	-13.30	-11.46	/	≤8
High	2462	-13.52	-11.77	/	≤8
802.11n-HT20 mode					
Low	2412	-12.47	-11.46	-8.93	≤8
Middle	2437	-12.18	-11.44	-8.78	≤8
High	2462	-12.46	-11.51	-8.95	≤8
802.11n-HT40 mode					
Low	2422	-15.01	-12.80	-10.76	≤8
Middle	2437	-15.14	-13.51	-11.24	≤8
High	2452	-14.55	-13.79	-11.14	≤8

Note:
The total PSD=10*Log_{10} (10^ (Chain 0/10) +10^ (Chain 1/10))
The maximum antenna gain is 2.0dBi. The device employed Cyclic Delay Diversity (CDD) for 802.11MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01,
for power spectral density (PSD)measurements on the devices:
Array Gain = 10*log(N_{ANT}/N_{SS}) dB.
So:
Directional gain = GANT + Array Gain = 2.0+10*log(2/1) =5.0dBi < 6dBi.

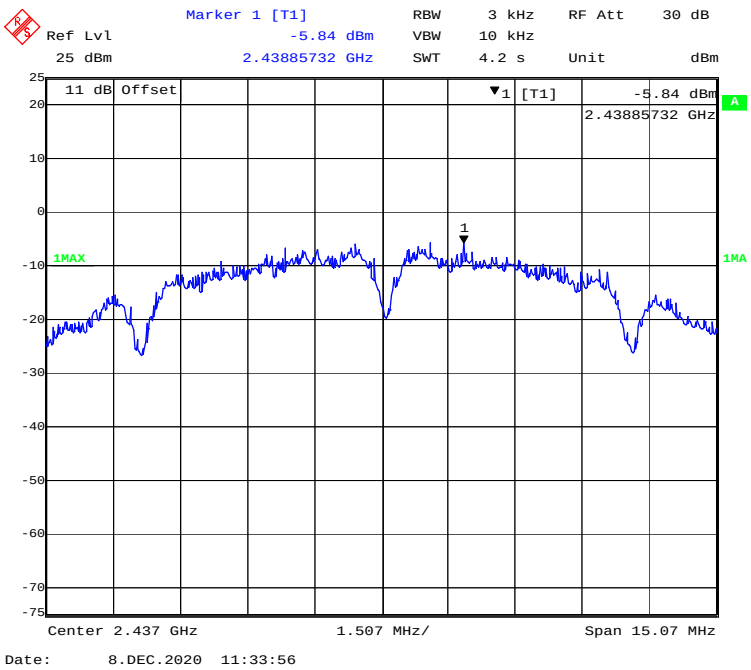
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
BLE(1Mbps) Mode			
Low	2402	-7.25	≤8
Middle	2440	-6.54	≤8
High	2480	-6.52	≤8
BLE(2Mbps) Mode			
Low	2402	-8.05	≤8
Middle	2440	-7.41	≤8
High	2480	-7.40	≤8

Chain0:

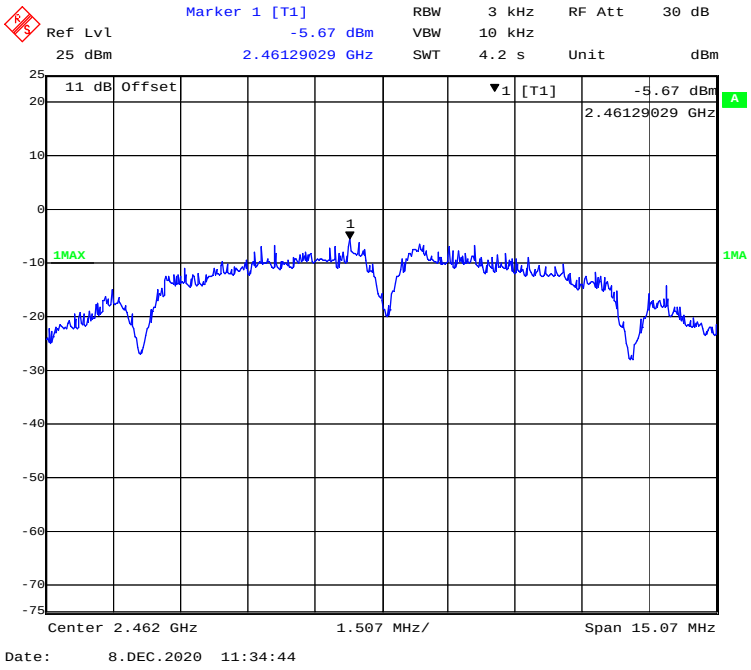
802.11b Low Channel



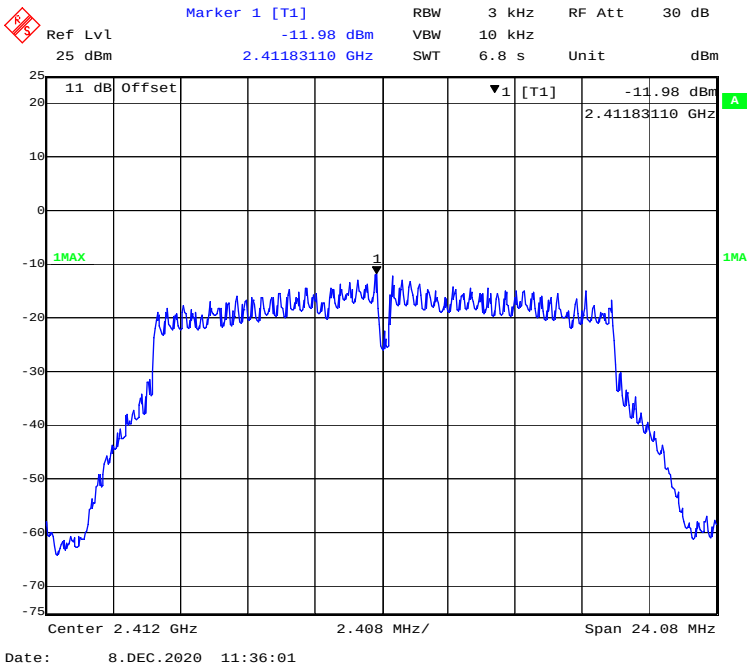
802.11b Middle Channel



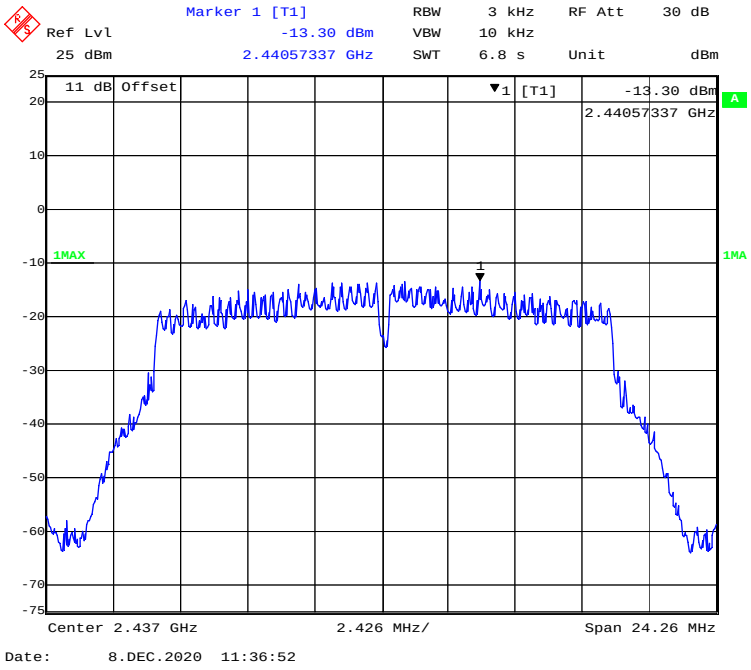
802.11b High Channel



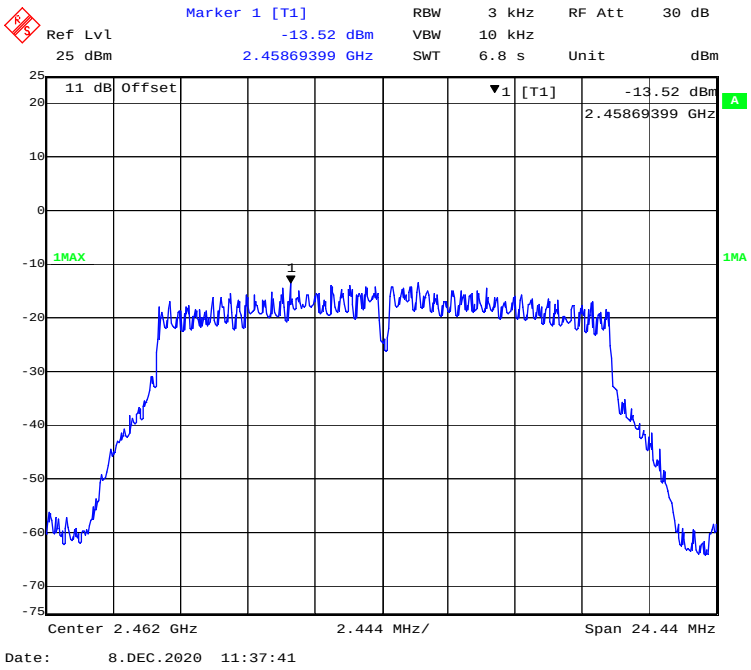
802.11g Low Channel



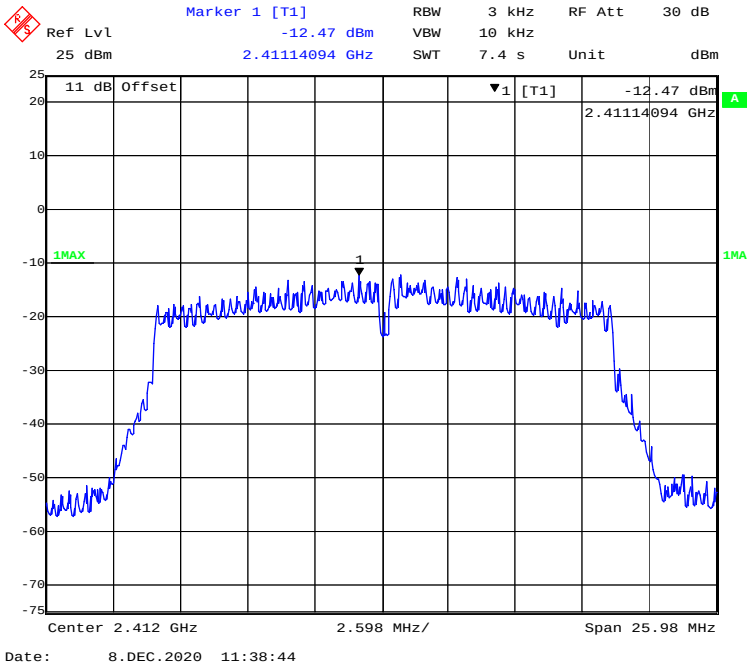
802.11g Middle Channel



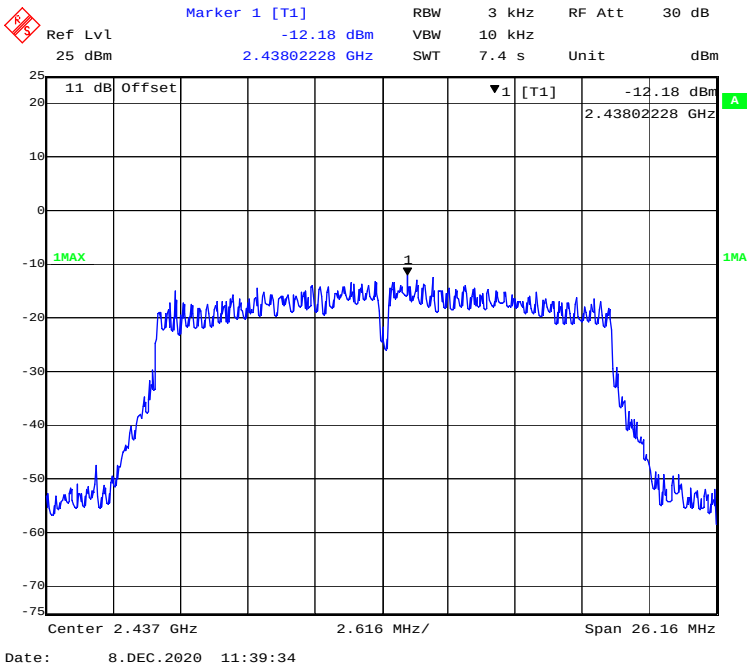
802.11g High Channel



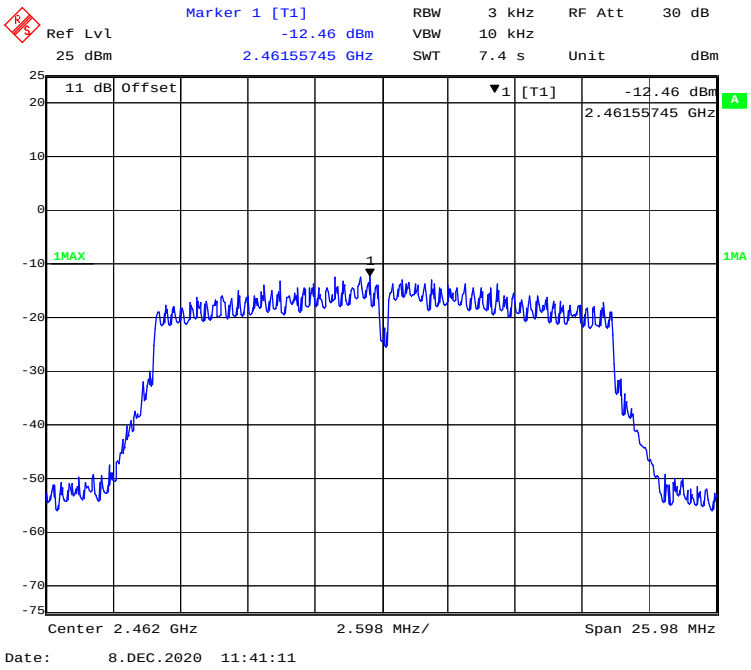
802.11n-HT20 Low Channel



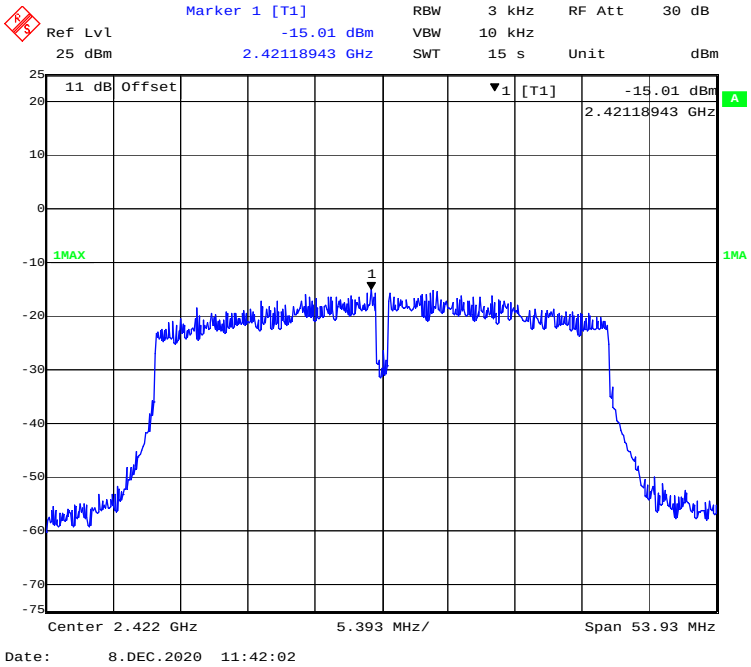
802.11n-HT20 Middle Channel



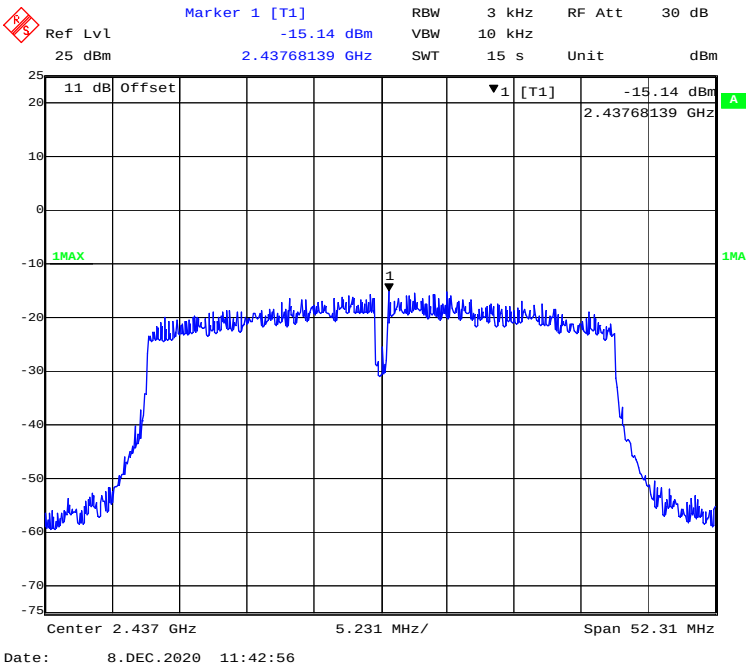
802.11n-HT20 High Channel



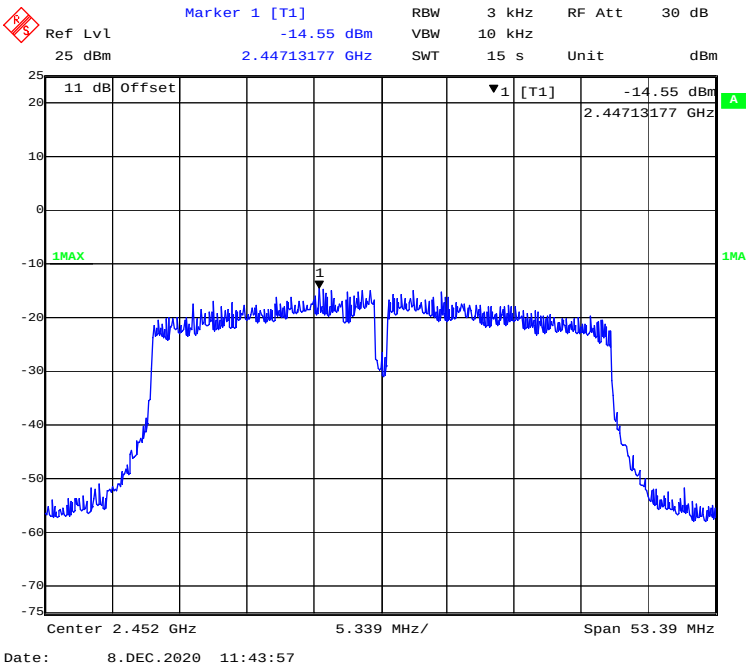
802.11n-HT40 Low Channel



802.11n-HT40 Middle Channel

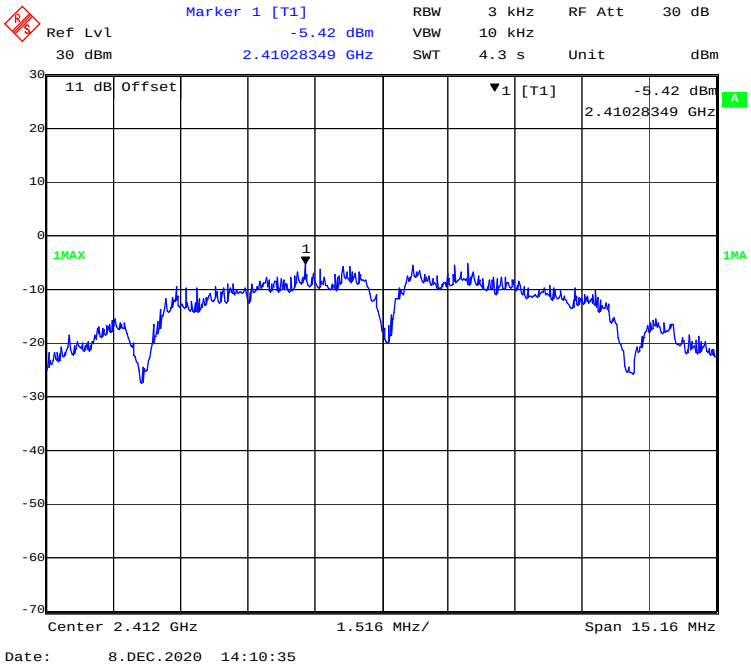


802.11n-HT40 High Channel

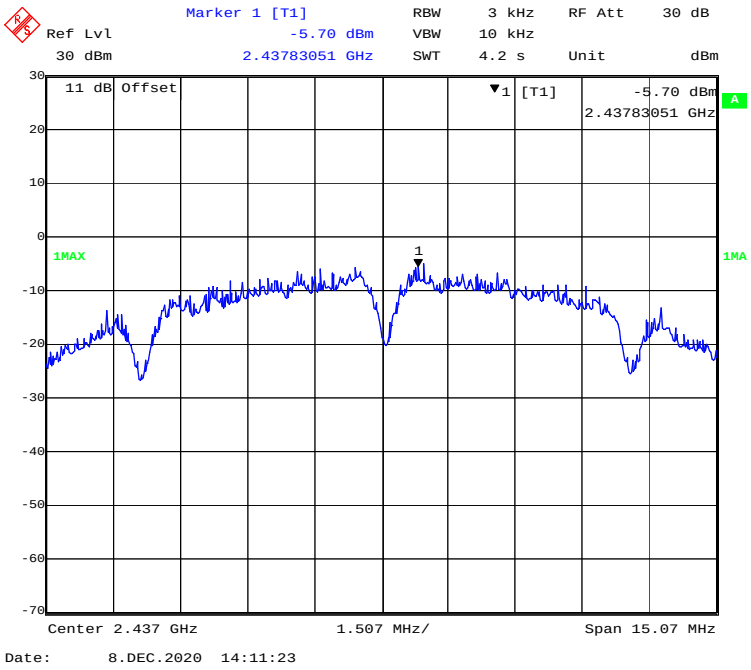


Chain1:

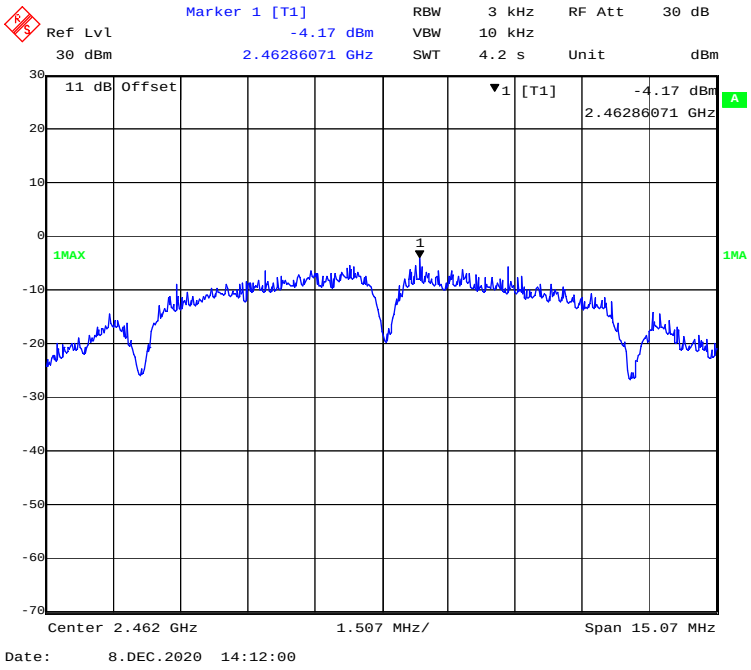
802.11b Low Channel



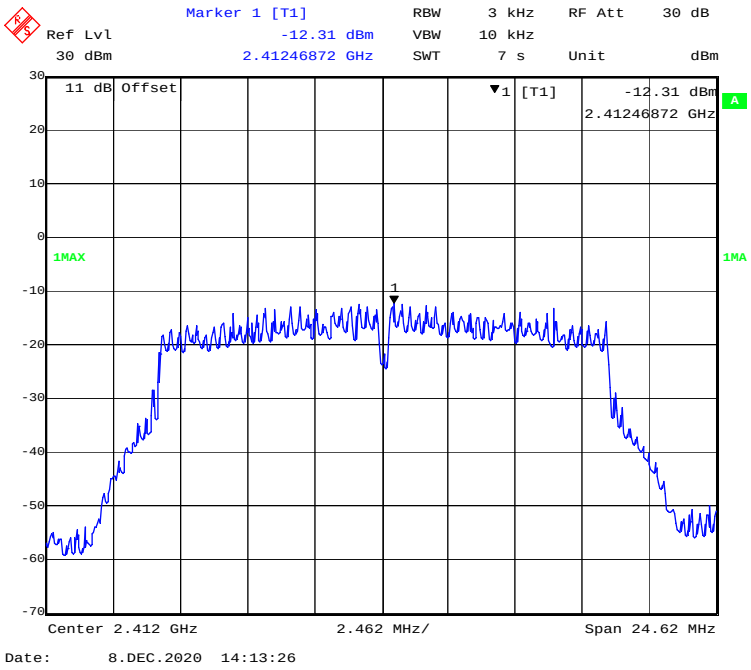
802.11b Middle Channel



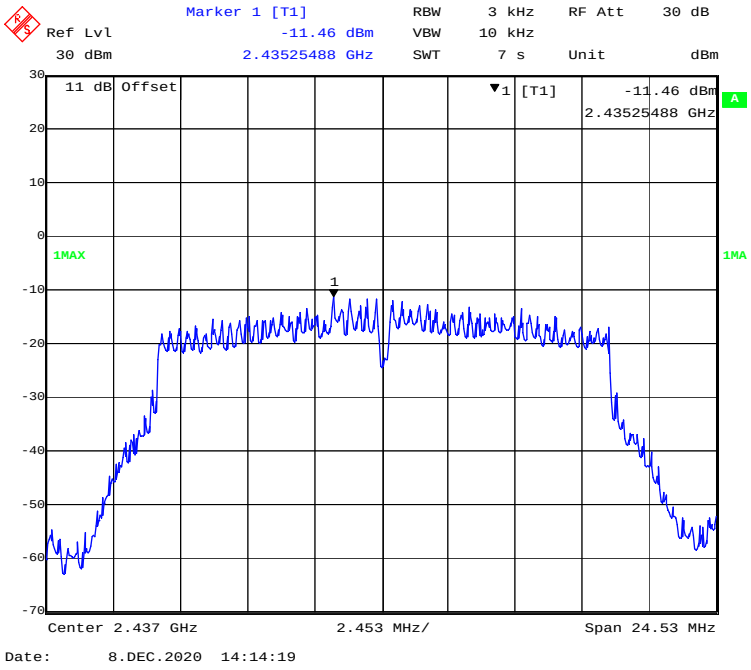
802.11b High Channel



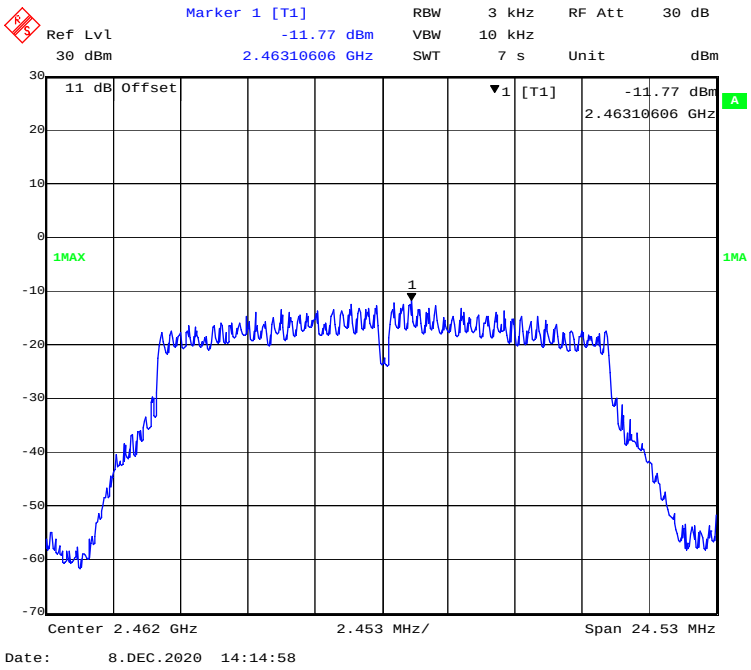
802.11g Low Channel



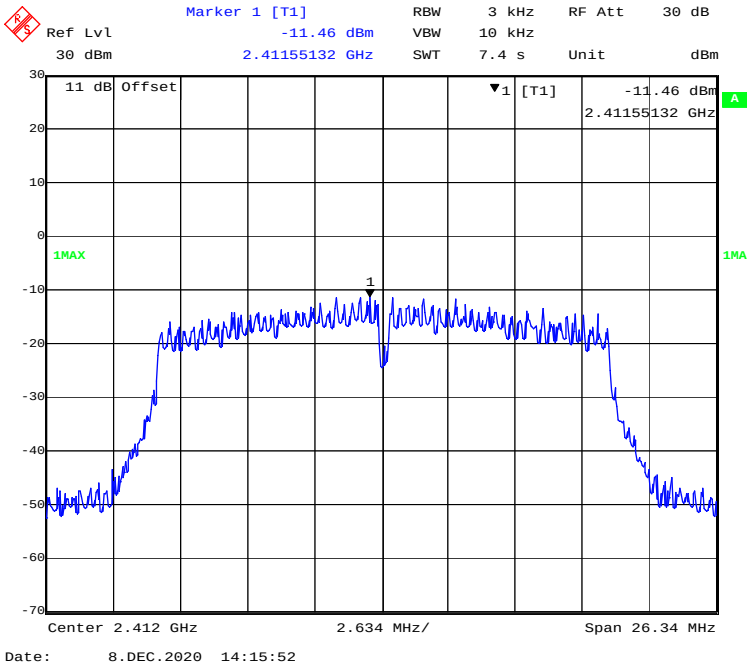
802.11g Middle Channel



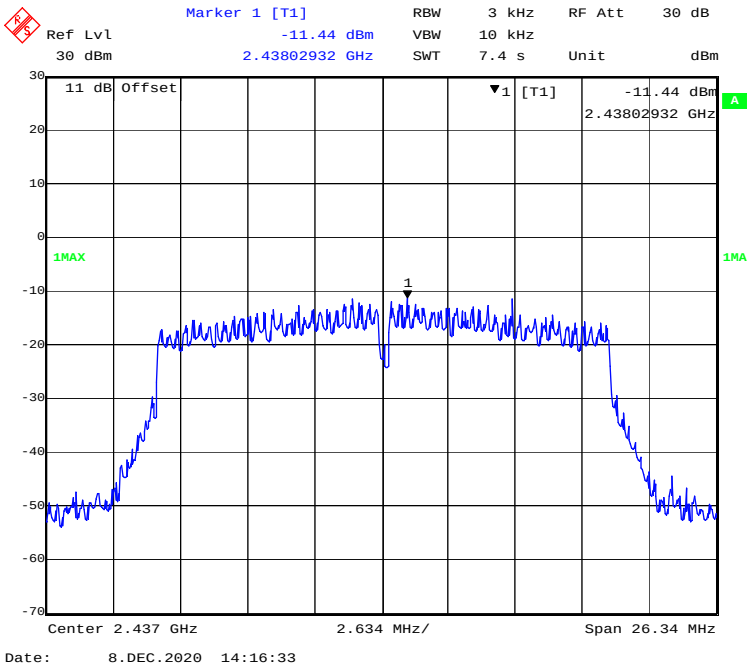
802.11g High Channel



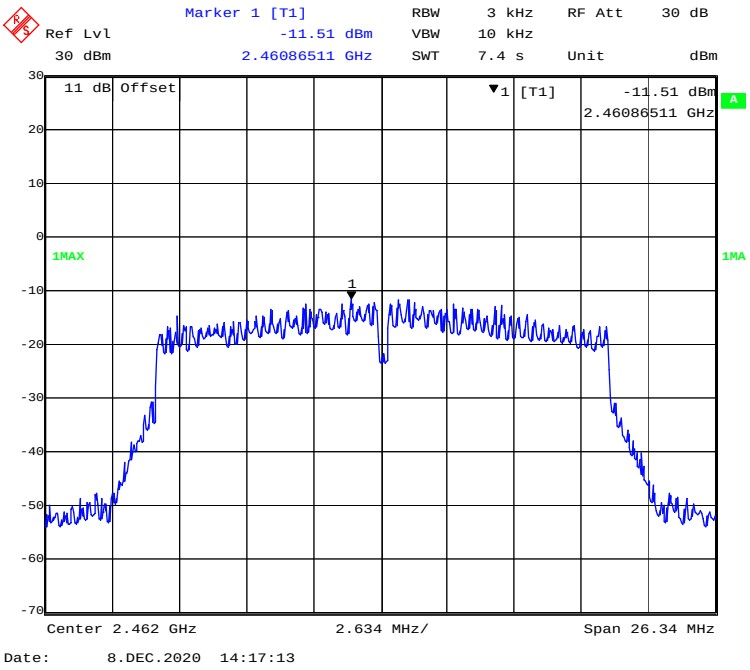
802.11n-HT20 Low Channel



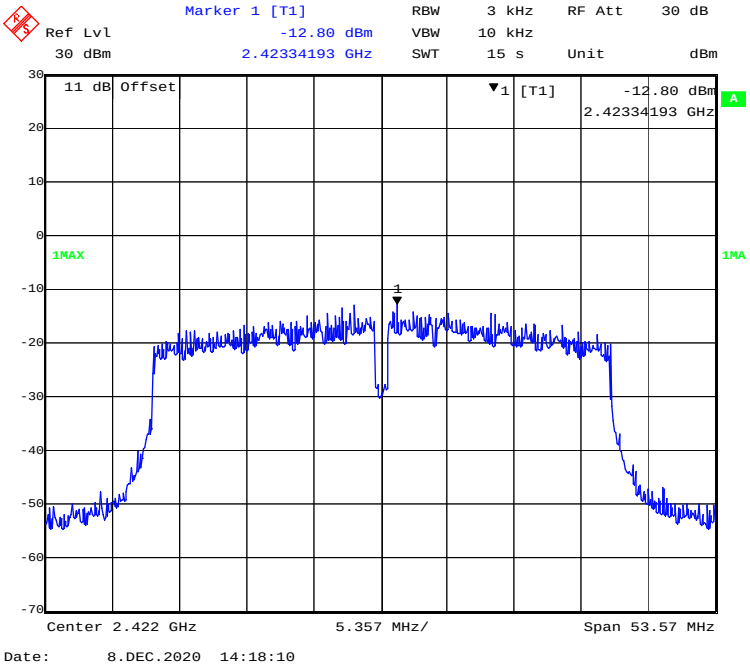
802.11n-HT20 Middle Channel



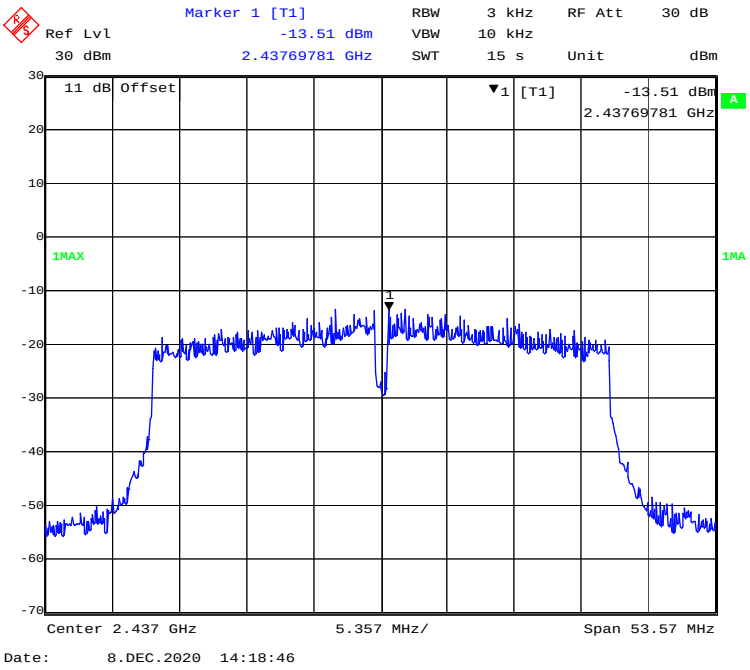
802.11n-HT20 High Channel



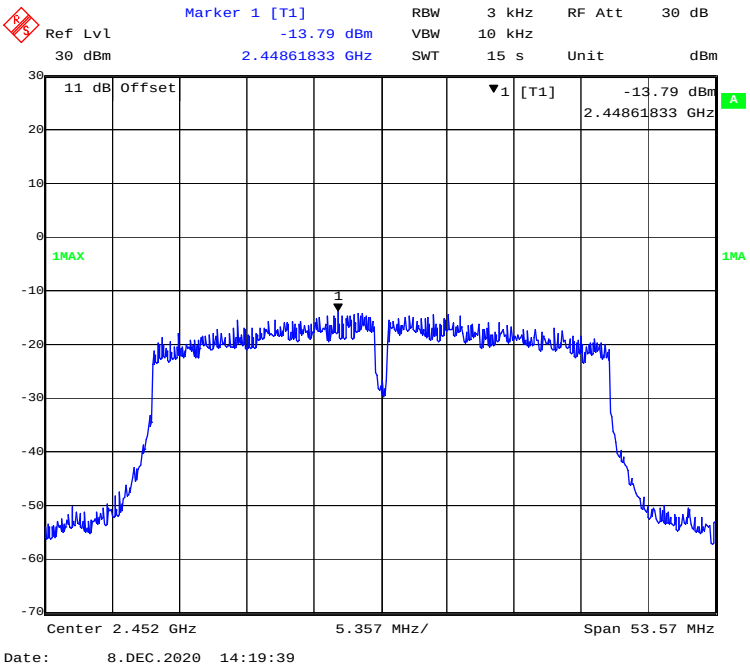
802.11n-HT40 Low Channel



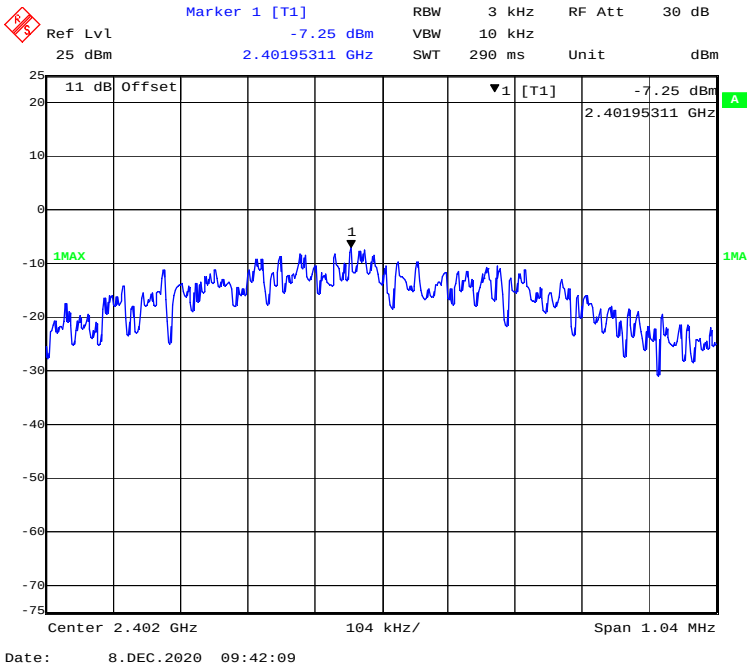
802.11n-HT40 Middle Channel



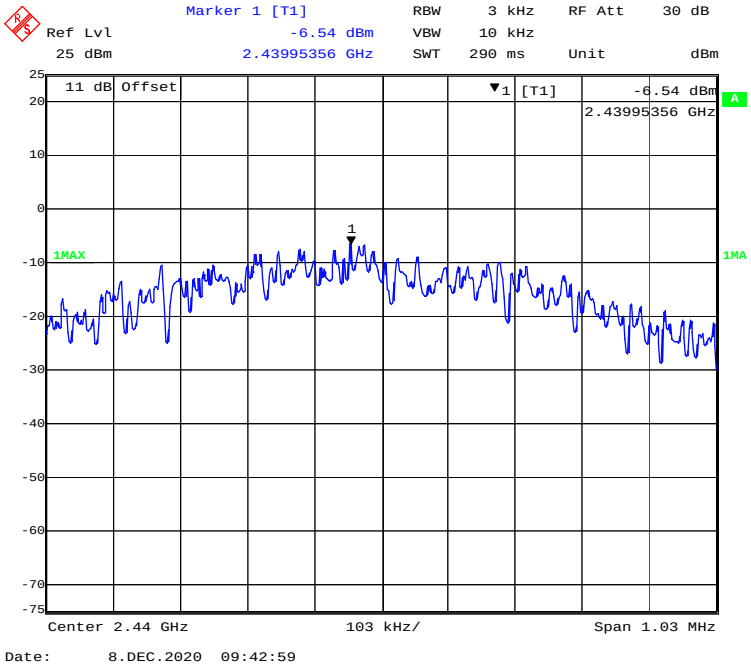
802.11n-HT40 High Channel



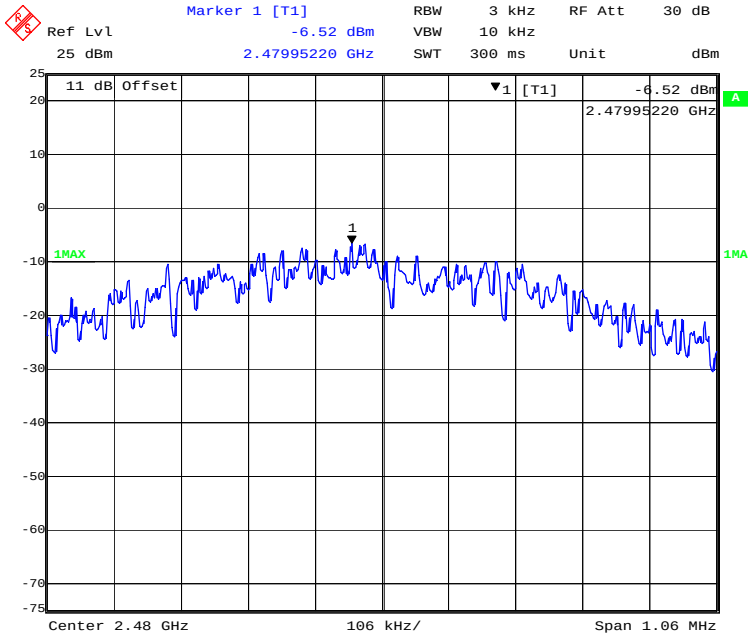
BLE(1Mbps) Mode Low Channel



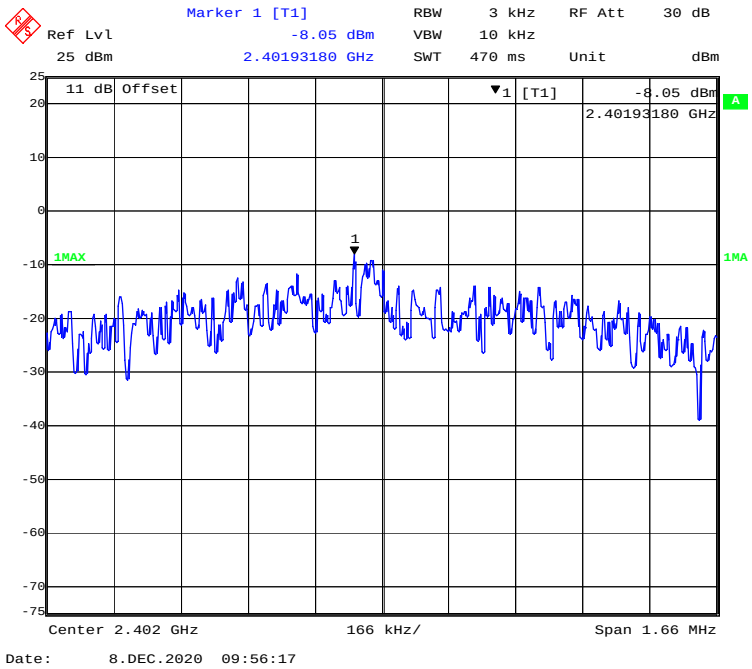
BLE(1Mbps) Mode Middle Channel



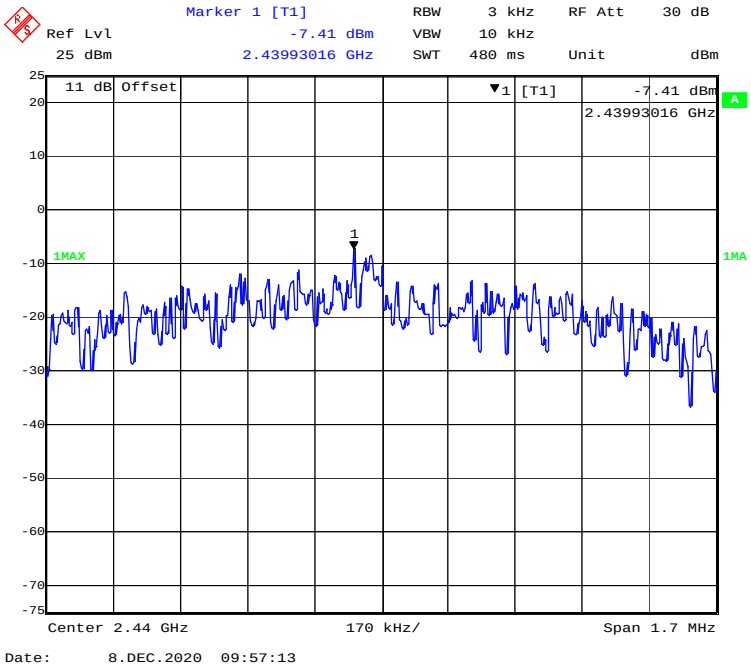
BLE(1Mbps) Mode High Channel



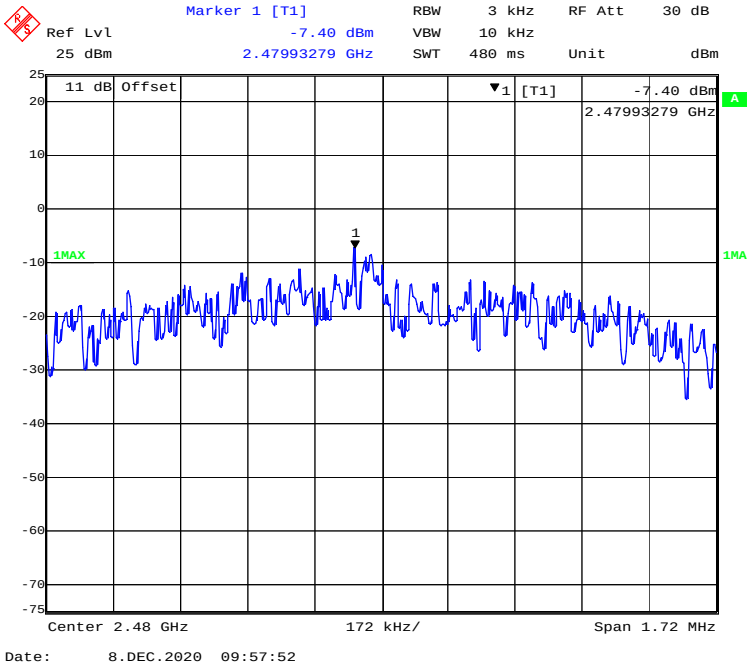
BLE(2Mbps) Mode Low Channel



BLE(2Mbps) Mode Middle Channel



BLE(2Mbps) Mode High Channel



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.

5: This report cannot be reproduced except in full, without prior written approval of the Company.

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