FCC PART 15.247

TEST REPORT

For

Inrico Technologies Co., Ltd

3/F, Building No.118, High Tech Industrial Park, 72 Guowei Road,
Luohu District, Shenzhen, China

FCC ID: 2AIV6-2-S200

Report Type:	**Product Type:**
Original Report	Intelligent Two Way Radio

Report Number: SZGMA210719-29698E-RF-00B

Report Date: 2021-09-02

Alvin Huang

Reviewed By: Lab Manager

Prepared By: Bay Area Compliance Laboratories Corp. (Shenzhen)
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Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Intelligent Two Way Radio
Tested Model	S200
Frequency Range	BLE: 2402-2480MHz Wi-Fi: 2412-2472MHz
Maximum Conducted Peak Output Power	BLE: 6.48dBm Wi-Fi: 11.68dBm
Modulation Technique	BLE: GFSK Wi-Fi: DSSS, OFDM
Antenna Specification*	1.5dBi(provided by the applicant)
Voltage Range	DC5V from adapter or DC 3.8V From Battery
Date of Test	2021-07-31 to 2021-09-02
Sample serial number	SZGMA210719-29698E-RFA1-S1 SZGMA210719-29698E-RFA1-S2 (RF Conducted Test) (Assigned by BACL, Shenzhen)
Received date	2021-07-19
Sample/EUT Status	Good condition
Adapter information	Model: HJ-0502000W2-US Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5.0V, 2000mA

Objective

This report is in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commission's rules.

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

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 KDB 558074 D01 15.247 Meas Guidance v05r02.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.
Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF Output Power with Power meter		±0.70dB
RF conducted test with spectrum		±1.4dB
AC Power Lines Conducted Emissions		±1.72dB
Emissions, Radiated	Below 1GHz	±4.40dB
	Above 1GHz	±4.60dB
Temperature		±1℃
Humidity		±6%
Supply voltages		±0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 1st Floor, East (3) Block, Laobing Building, Xingye Road, Baoan District, Shenzhen, Guangdong, P.R.C

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 27372.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

Wi-Fi

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432	12	2467
6	2437	13	2472
7	2442	/	/

For 802.11b, 802.11g, 802.11n-HT20 mode, EUT was tested with Channel 1, 7 and 13

For 802.11n-HT40 mode, EUT was tested with Channel 3, 7 and 11

BLE

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2452
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

EUT was tested with Channel 0, 19 and 39.

Equipment Modifications

No modification was made to the EUT tested.

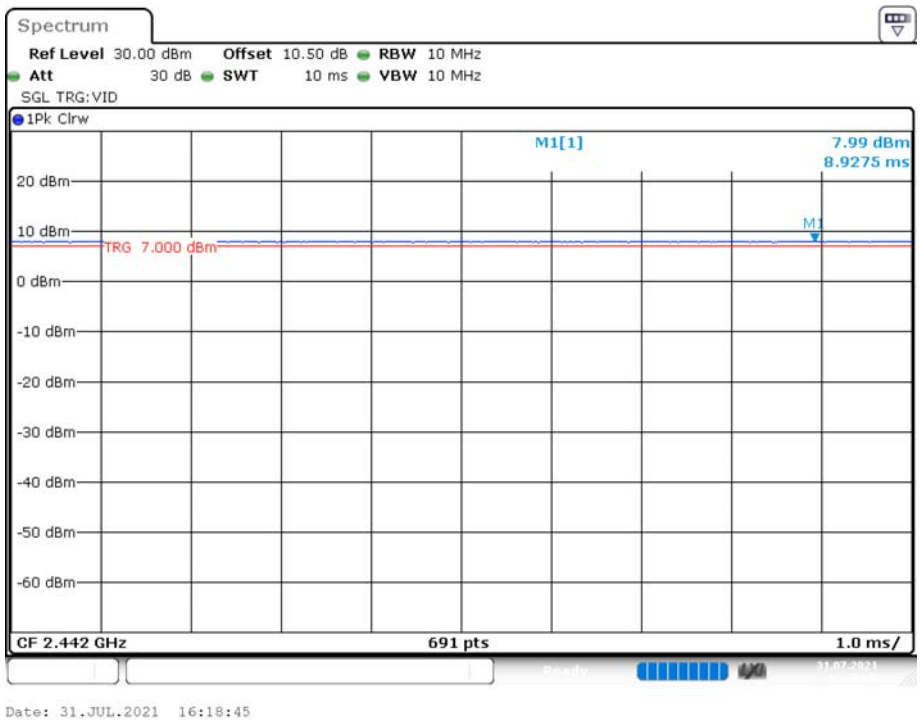
EUT Exercise Software

BLE & Wi-Fi test in the engineer mode.
The device was tested with the worst case was performed as below:

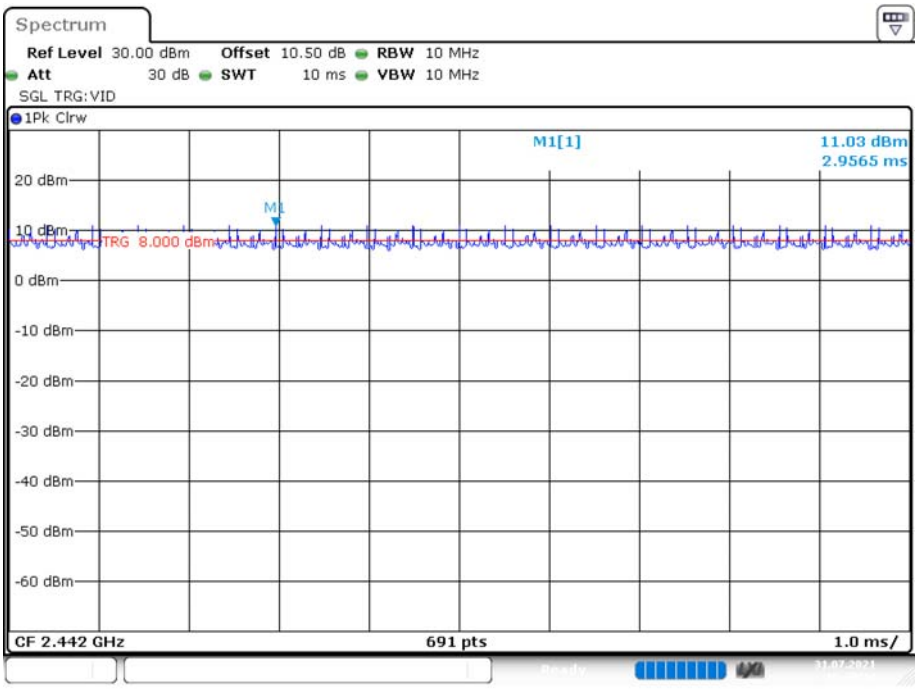
Mode	Data rate	Power level*		
		Low channel	Middle channel	High channel
802.11b	1Mbps	9	9	9
802.11g	6Mbps	5	5	5
802.11n-HT20	MCS0	5	5	5
802.11n-HT40	MCS0	5	5	5
BLE	1Mbps	Default		

Duty cycle

802.11b mode



802.11g mode



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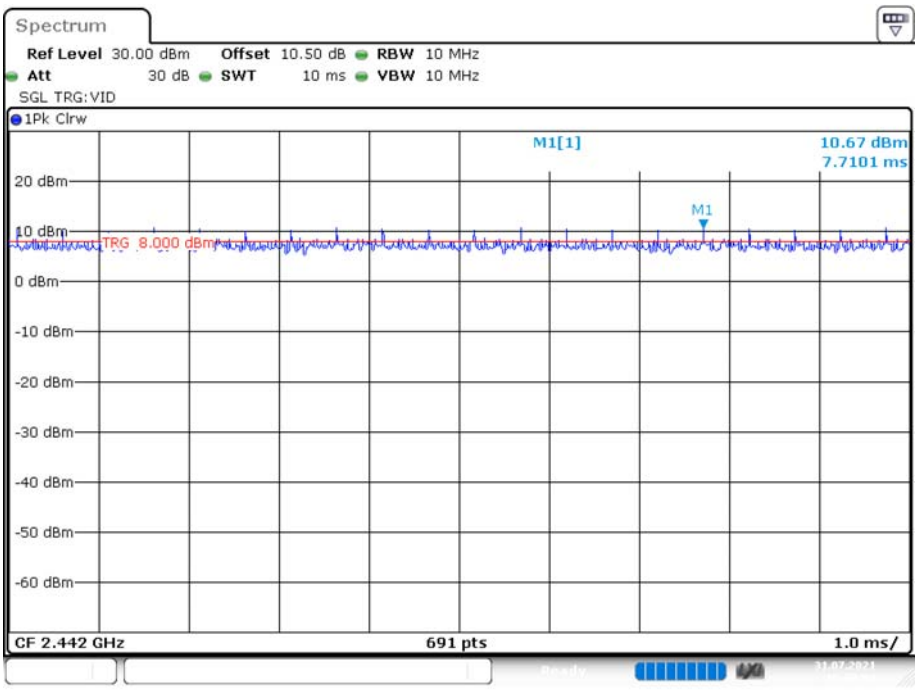
802.11n-HT20 Mode



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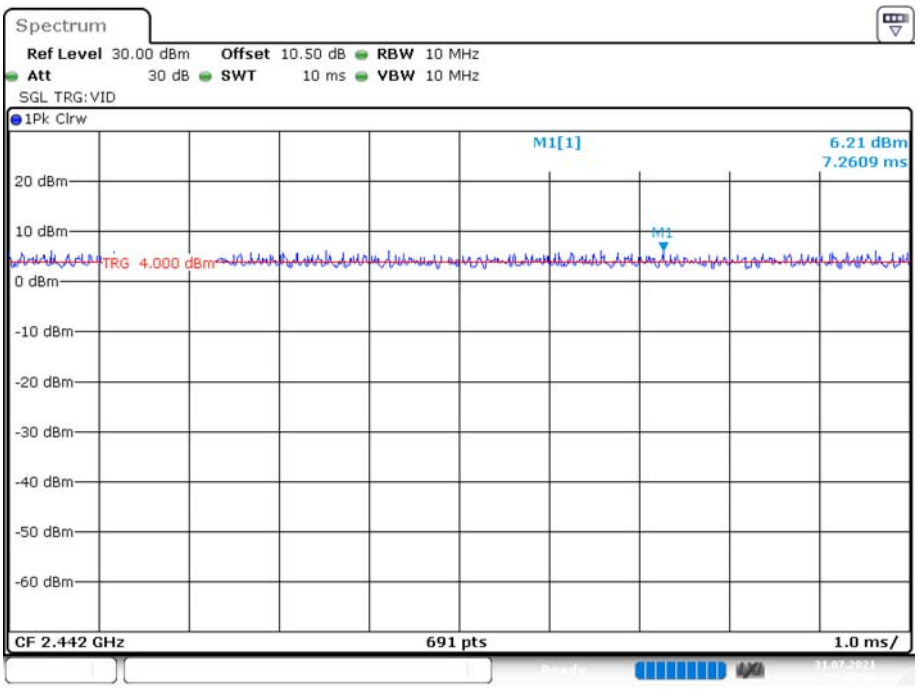
802.11n-HT40 Mode



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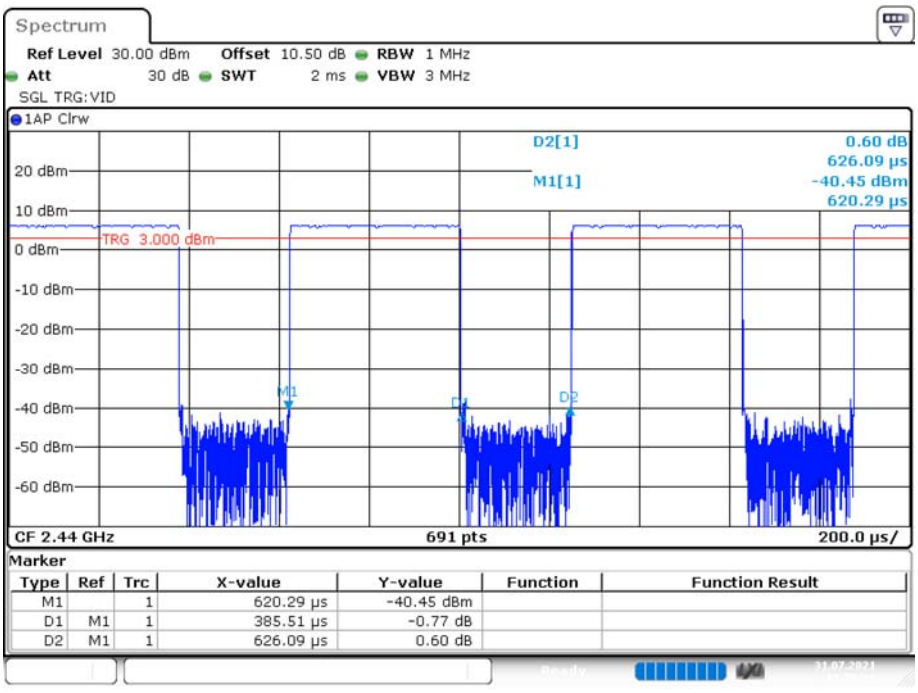
BLE



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Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle (%)
802.11b	/	/	100
802.11g	/	/	100
802.11n-HT20	/	/	100
802.11n-HT40	/	/	100
BLE 1M	0.386	0.626	61.66

Support Equipment List and Details

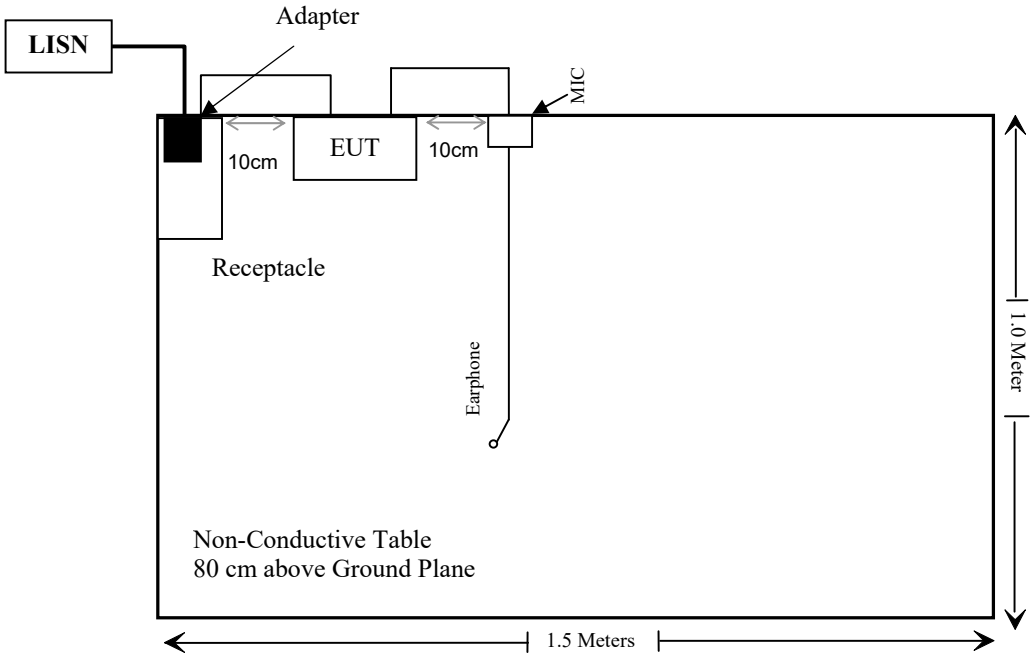
Manufacturer	Description	Model	Serial Number
Inrico	Earphone	Unknown	Unknown
Inrico	MIC	Unknown	Unknown

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-Shielding Un-Detachable AC Cable	1.2	LISN	Receptacle
Un-Shielding Detachable USB Cable	1.0	Adapter	EUT
Un-Shielding Detachable Earphone Cable	1.0	MIC	Earphone
Un-Shielding Detachable MIC Cable	1.0	EUT	MIC

Block Diagram of Test Setup

For conducted emission



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b) (1)& §2.1093	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	Compliant
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliant
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliant
§15.247(b)(3)	Maximum Conducted Output Power	Compliant
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247(e)	Power Spectral Density	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	100784	2021/02/03	2022/02/02
Rohde & Schwarz	LISN	ENV216	101748	2021/02/03	2022/02/02
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2020/11/29	2021/11/28
Rohde & Schwarz	CE Test software	ES-K1	V8.53.0	NCR	NCR
Radiated Emission Test					
R&S	EMI Test Receiver	ESR3	100784	2021/02/02	2022/02/02
Sonoma instrument	Pre-amplifier	310 N	186014	2021/08/03	2022/08/02
SCHWARZBECK	Broadband Antenna	VULB 9163	9163-872	2020/1/5	2023/1/4
Unknown	Cable	Chamber Cable 1	UFB311A-0-0788-50V50VTV	2021/02/03	2022/02/03
Unknown	Cable	Chamber Cable 2	UFB311A-0-0789-50V50VTV	2021/02/03	2022/02/03
Unknown	Cable 2	RF Cable 2	UFB311A-0-0787-50V50VTV	2021/02/03	2022/02/03
Rohde & Schwarz	Auto test software	EZ_EMC.db	1.1.4.2	NCR	NCR
CHIGO	Temperature & Humidity Meter	HTC-1S	T-03-EM458	2021/4/12	2022/4/11
Rohde & Schwarz	Spectrum Analyzer	FSV40	101590	2020/12/14	2021/12/13
Preamplifer	Pre-amplifier	PAM-0118	226	2020/11/29	2021/11/28
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2021/06/29	2022/06/29
Agilent	Horn Antenna	AHA-118S	3017	2021-02-25	2022-2-24
Unknown	Cable	Chamber Cable 1	UFB311A-0-0788-50V50VTV	2021/02/03	2022/02/03
Unknown	Cable	Chamber Cable 2	UFB311A-0-0789-50V50VTV	2021/02/03	2022/02/03
Unknown	Cable 2	RF Cable 2	UFB311A-0-0787-50V50VTV	2021/02/03	2022/02/03
Ducommun Technolagies	Horn antenna	ARH-4223-02	1007726-02 1304	2020/12/06	2023/12/05
wainwrigh	Band Reject filter	WRCG2400	2.4G filter	2021/04/20	2022/04/20

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
R&S	EMI Test Receiver	ESR3	100784	2021/02/02	2022/02/02
Rohde & Schwarz	Spectrum Analyzer	FSV40	101590	2020/12/14	2021/12/13
Agilent	USB wideband power sensor	U2021XA	MY54250007	2021/6/25	2022/6/24
narda	10dB Attenuator	769-10	03407	2020/11/29	2021/11/28
Unknown	RF Cable	Unknown	24533	2020/11/29	2021/11/28

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

FCC§15.247 (i), §1.1307 (b) (1) & §2.1093 – RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

Measurement Result

Mode	Frequency (MHz)	Max Tune-up Conducted Power (dBm)	Max Tune-up Conducted Power (mW)	Calculated Distance (mm)	Calculated value	Threshold (1-g SAR)	SAR Test Exclusion
BLE	2402-2480	7.0	5.01	5	1.6	3.0	Yes
Wi-Fi	2412-2472	8.0	6.31	5	2.0	3.0	Yes

Result: No Standalone SAR test is required

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 an internal antenna arrangement, which was permanently attached and the antenna gain is 1.5dBi, fulfill the requirement of this section. Please refer to the EUT photos.

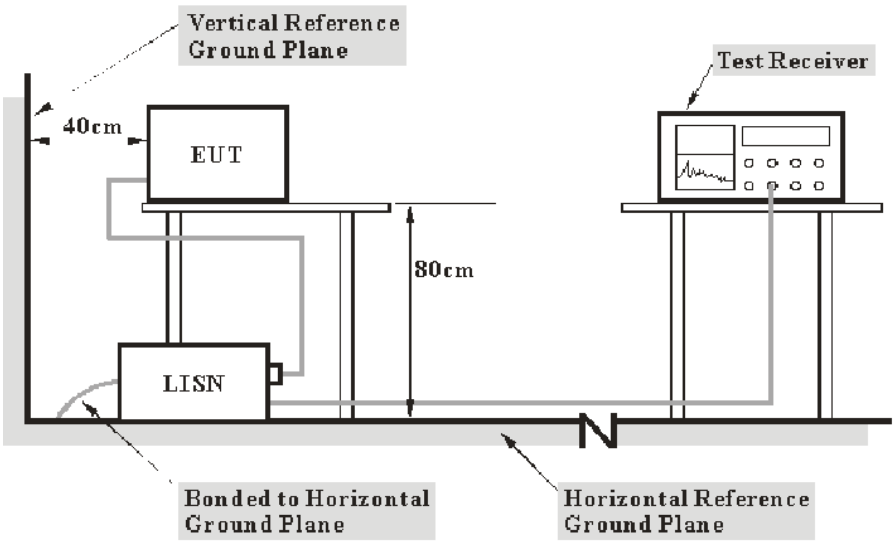
Result: Compliant.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

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 setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

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

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

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

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

Corrected Factor & Margin Calculation

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

Correction Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

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

Margin = Limit – Corrected Amplitude

Test Data

Environmental Conditions

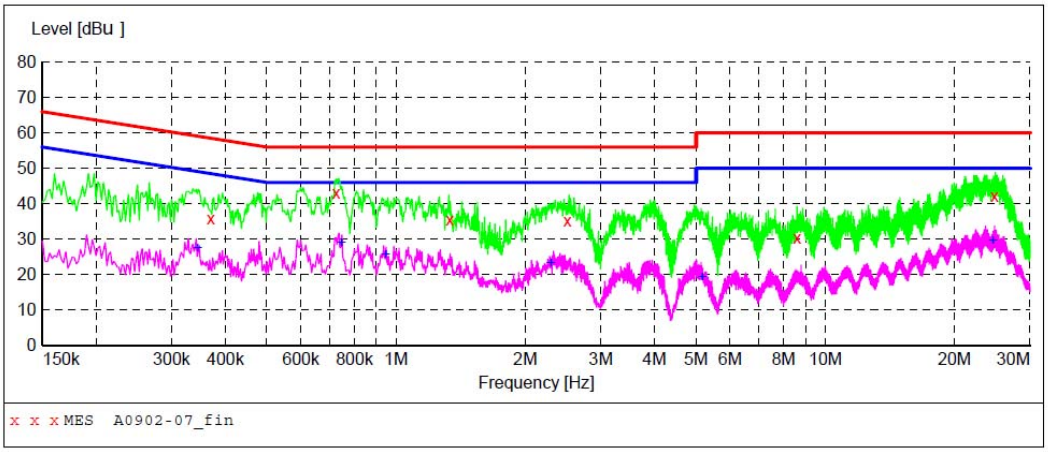
Temperature:	25 ℃
Relative Humidity:	70 %
ATM Pressure:	101.0 kPa

The testing was performed by LYA Liu on 2021-09-02.

EUT operation mode: Transmitting

AC 120V/60 Hz, Line

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "A0902-07_fin"

9/2/2021 10:21AM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.370000	35.80	10.1	59	23.2	QP	L1	GND
0.725000	43.20	10.1	56	12.8	QP	L1	GND
1.335000	35.40	10.1	56	20.6	QP	L1	GND
2.505000	35.20	10.1	56	20.8	QP	L1	GND
8.590000	30.40	10.2	60	29.6	QP	L1	GND
24.795000	42.20	10.3	60	17.8	QP	L1	GND

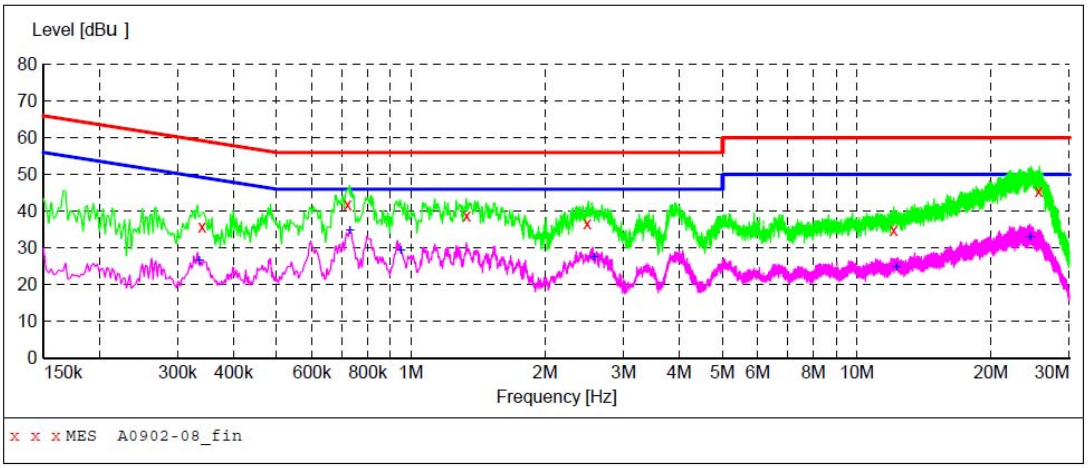
MEASUREMENT RESULT: "A0902-07_fin2"

9/2/2021 10:21AM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.345000	27.70	10.1	49	21.3	AV	L1	GND
0.745000	29.10	10.1	46	16.9	AV	L1	GND
0.945000	25.60	10.1	46	20.4	AV	L1	GND
2.290000	23.30	10.1	46	22.7	AV	L1	GND
5.160000	19.50	10.1	50	30.5	AV	L1	GND
24.575000	29.70	10.3	50	20.3	AV	L1	GND

AC 120V/60 Hz, Neutral:

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "A0902-08_fin"

9/2/2021 10:24AM

Frequency MHz	Level dBuv	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.340000	35.80	10.1	59	23.2	QP	N	GND
0.720000	41.70	10.1	56	14.3	QP	N	GND
1.335000	38.80	10.1	56	17.2	QP	N	GND
2.485000	36.50	10.1	56	19.5	QP	N	GND
12.090000	34.70	10.2	60	25.3	QP	N	GND
25.605000	45.30	10.3	60	14.7	QP	N	GND

MEASUREMENT RESULT: "A0902-08_fin2"

9/2/2021 10:24AM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.335000	26.60	10.1	49	22.4	AV	N	GND
0.730000	34.80	10.1	46	11.2	AV	N	GND
0.950000	29.40	10.1	46	16.6	AV	N	GND
2.570000	27.50	10.1	46	18.5	AV	N	GND
12.265000	24.90	10.2	50	25.1	AV	N	GND
24.450000	33.10	10.3	50	16.9	AV	N	GND

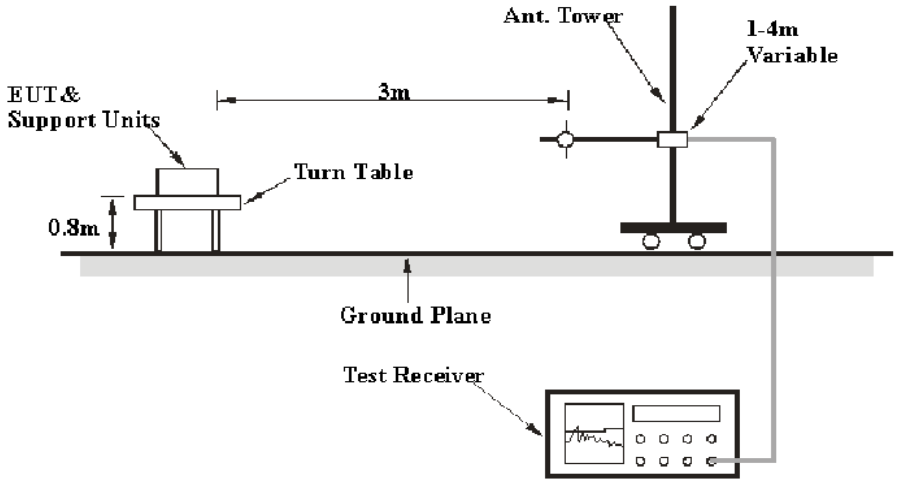
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

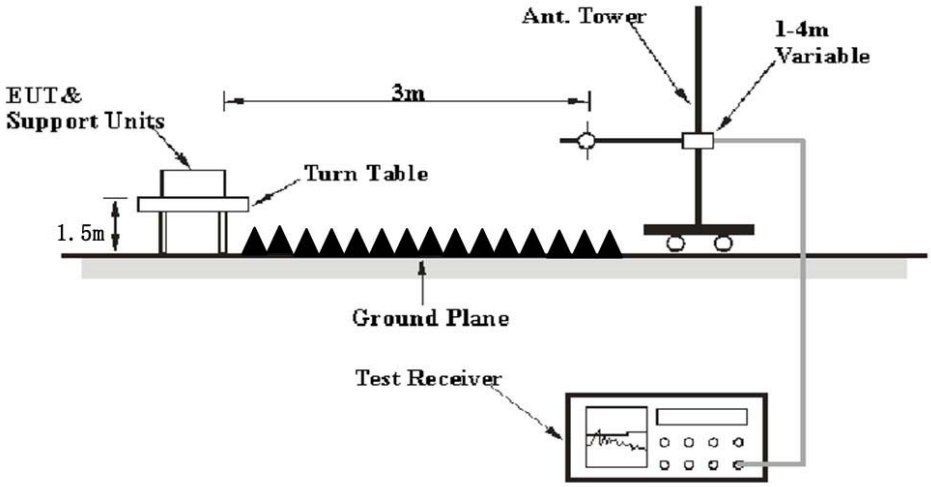
FCC §15.247 (d); §15.209; §15.205;

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 & Spectrum Analyzer Setup

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz Note 1	/	Average
	1MHz	＞1/T Note 2	/	Average

Note 1: when duty cycle is no less than 98%
Note 2: when duty cycle is less than 98%

Test Procedure

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

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

Corrected Amplitude & Margin Calculation

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

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

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 = Limit – Corrected Amplitude

Test Data

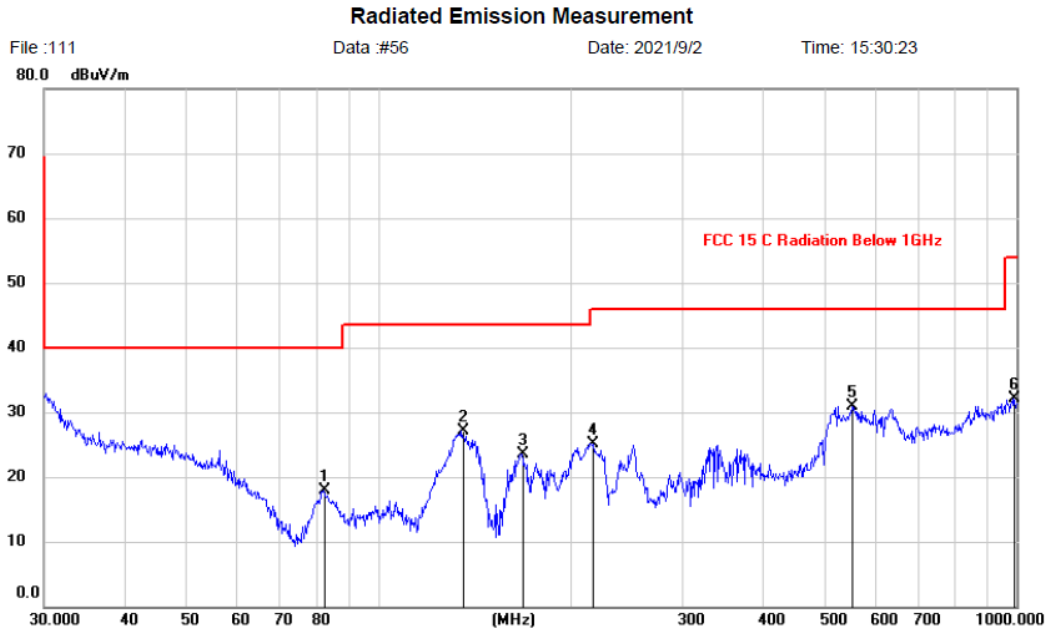
Environmental Conditions

Temperature:	25℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Mark Guo on 2021-09-02 for below 1GHz and on 2021-08-23 for above 1GHz.

EUT operation mode: Transmitting

30 MHz~1 GHz:



Site : 966 Chamber
Limit: FCC 15 C Radiation Below 1GHz
EUT: Intelligent Two Way Radio
M/N: S200
Mode: Charging& transmitting
Note: SZGMA210719-29698E-RF
Inrico Technologies Co., Ltd.

Polarization: *Vertical*
Power: AC 110V/60Hz
Distance: 3m

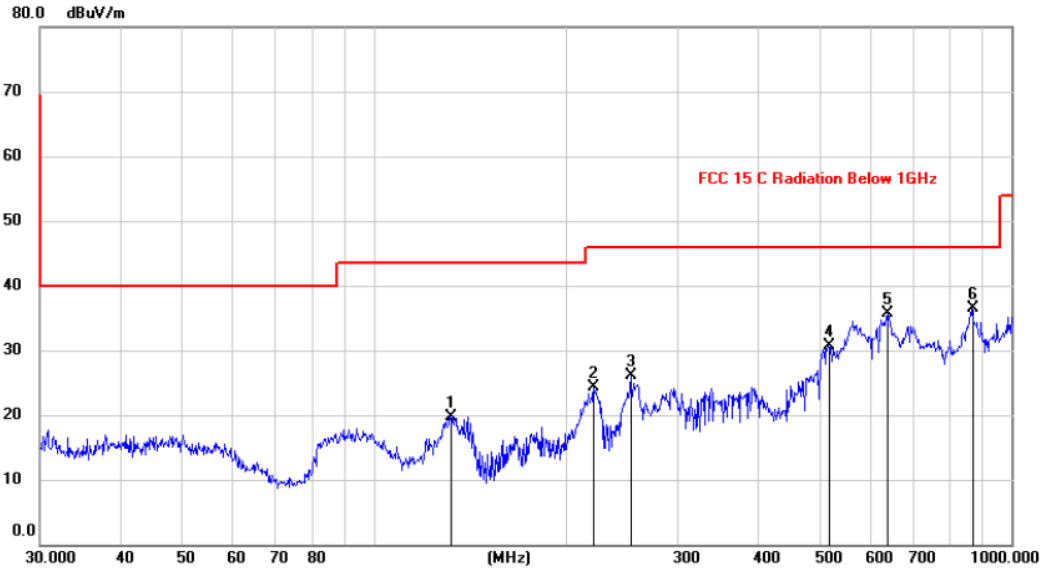
Temperature: 25
Humidity: 56 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		82.2146	34.20	-16.28	17.92	40.00	-22.08	peak			
2		135.5062	42.57	-15.40	27.17	43.50	-16.33	peak			
3		168.1188	39.29	-15.70	23.59	43.50	-19.91	peak			
4		217.1632	37.73	-12.56	25.17	46.00	-20.83	peak			
5	*	552.8832	35.83	-4.91	30.92	46.00	-15.08	peak			
6		991.2719	28.72	3.36	32.08	54.00	-21.92	peak			

*:Maximum data x:Over limit !:over margin

Radiated Emission Measurement

File :111 Data :#57 Date: 2021/9/2 Time: 15:32:25



Site : 966 Chamber
Limit: FCC 15 C Radiation Below 1GHz
EUT: Intelligent Two Way Radio
M/N: S200
Mode: Charging& transmitting
Note: SZGMA210719-29698E-RF
Inrico Technologies Co., Ltd.

Polarization: *Horizontal*
Power: AC 110V/60Hz
Distance: 3m

Temperature: 25
Humidity: 56 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		132.2205	34.95	-15.15	19.80	43.50	-23.70	peak			
2		221.3921	36.72	-12.35	24.37	46.00	-21.63	peak			
3		253.8366	37.29	-11.14	26.15	46.00	-19.85	peak			
4		516.3418	36.03	-5.29	30.74	46.00	-15.26	peak			
5		638.3686	38.65	-2.99	35.66	46.00	-10.34	peak			
6	*	867.6077	35.94	0.59	36.53	46.00	-9.47	peak			

*:Maximum data x:Over limit !:over margin

1 GHz-25 GHz:
BLE:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)				
Low Channel(2402MHz)									
2328.00	29.65	PK	167	1.2	H	30.83	60.48	74.0	13.52
2328.00	15.75	Ave.	167	1.2	H	30.83	46.58	54.0	7.42
2484.80	29.88	PK	125	2.0	H	30.72	60.60	74.0	13.40
2484.80	15.98	Ave.	125	2.0	H	30.72	46.70	54.0	7.30
4804.00	51.56	PK	216	2.4	H	-3.52	48.04	74.0	25.96
4804.00	38.75	Ave.	216	2.4	H	-3.52	35.23	54.0	18.77
Middle Channel(2440MHz)									
4880.00	51.50	PK	17	1.7	H	-2.94	48.56	74.0	25.44
4880.00	38.46	Ave.	17	1.7	H	-2.94	35.52	54.0	18.48
High Channel(2480 MHz)									
2387.54	29.84	PK	14	1.5	H	30.91	60.75	74.0	13.25
2387.54	17.84	Ave.	14	1.5	H	30.91	48.75	54.0	5.25
2491.43	29.78	PK	173	1.8	H	30.72	60.50	74.0	13.50
2491.43	16.27	Ave.	173	1.8	H	30.72	46.99	54.0	7.01
4960.00	50.79	PK	257	1.1	H	-2.73	48.06	74.0	25.94
4960.00	37.81	Ave.	257	1.1	H	-2.73	35.08	54.0	18.92

802.11b Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)				
Low Channel (2412 MHz)									
2390.00	28.82	PK	166	1.4	H	30.91	59.73	74.0	14.27
2390.00	14.07	Ave.	166	1.4	H	30.91	44.98	54.0	9.02
2488.63	29.78	PK	66	1.0	H	30.72	60.50	74.0	13.50
2488.63	16.27	Ave.	66	1.0	H	30.72	46.99	54.0	7.01
7236.00	48.83	PK	175	2.2	H	5.22	54.05	74.0	19.95
7236.00	31.14	Ave.	175	2.2	H	5.22	36.36	54.0	17.64
Middle Channel(2442MHz)									
7326.00	47.41	PK	145	2.2	H	6.46	53.87	74.0	20.13
7326.00	29.68	Ave.	145	2.2	H	6.46	36.14	54.0	17.86
High Channel(2472 MHz)									
2389.76	29.53	PK	177	1.9	H	30.91	60.44	74.0	13.56
2389.76	14.28	Ave.	177	1.9	H	30.91	45.19	54.0	8.81
2490.50	29.36	PK	326	1.9	H	30.72	60.08	74.0	13.92
2490.50	14.28	Ave.	326	1.9	H	30.72	45.00	54.0	9.00
7416.00	45.25	PK	351	2.4	H	8.35	53.60	74.0	20.40
7416.00	27.56	Ave.	351	2.4	H	8.35	35.91	54.0	18.09

802.11g Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)				
Low Channel (2412 MHz)									
2387.63	29.06	PK	195	1.9	H	30.91	59.97	74.0	14.03
2387.63	15.86	Ave.	195	1.9	H	30.91	46.77	54.0	7.23
2488.60	29.67	PK	180	1.1	H	30.72	60.39	74.0	13.61
2488.60	16.27	Ave.	180	1.1	H	30.72	46.99	54.0	7.01
7236.00	46.97	PK	34	2.4	H	5.22	52.19	74.0	21.81
7236.00	30.74	Ave.	176	2.3	H	5.22	35.96	54.0	18.04
Middle Channel(2442MHz)									
7326.00	46.24	PK	22	1.6	H	6.46	52.70	74.0	21.30
7326.00	28.65	Ave.	22	1.6	H	6.46	35.11	54.0	18.89
High Channel(2472 MHz)									
2386.40	29.53	PK	269	2.2	H	30.91	60.44	74.0	13.56
2386.40	14.28	Ave.	269	2.2	H	30.91	45.19	54.0	8.81
2490.61	29.36	PK	99	1.9	H	30.72	60.08	74.0	13.92
2490.61	14.28	Ave.	99	1.9	H	30.72	45.00	54.0	9.00
7416.00	45.98	PK	199	1.3	H	8.35	54.33	74.0	19.67
7416.00	27.54	Ave.	199	1.3	H	8.35	35.89	54.0	18.11

802.11n-HT20 Mode:

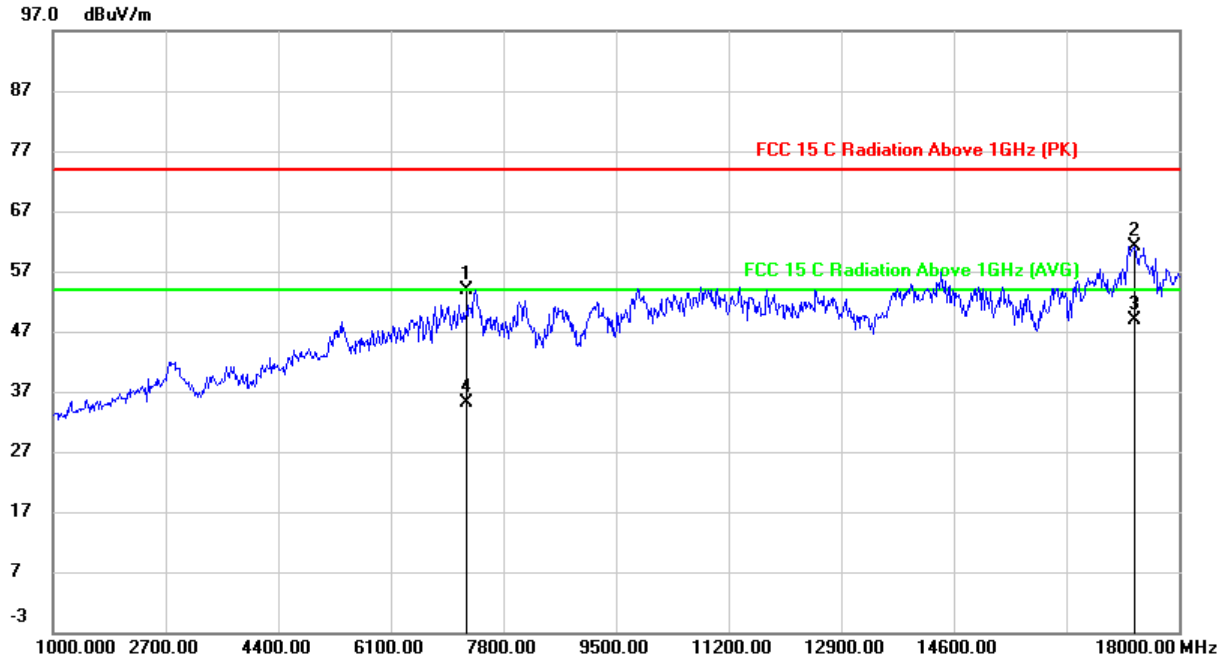
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)				
Low Channel (2412 MHz)									
2388.96	29.06	PK	77	1.8	H	30.91	59.97	74.0	14.03
2388.96	14.04	Ave.	77	1.8	H	30.91	44.95	54.0	9.05
2492.31	29.58	PK	232	1.6	H	30.72	60.30	74.0	13.70
2492.31	14.87	Ave.	232	1.6	H	30.72	45.59	54.0	8.41
7236.00	45.84	PK	228	2.5	H	5.22	51.06	74.0	22.94
7236.00	30.15	Ave.	228	2.5	H	5.22	35.37	54.0	18.63
Middle Channel(2442MHz)									
7326.00	46.34	PK	133	1.8	H	6.46	52.80	74.0	21.20
7326.00	29.71	Ave.	133	1.8	H	6.46	36.17	54.0	17.83
High Channel(2472 MHz)									
2391.64	29.46	PK	252	1.9	H	30.91	60.37	74.0	13.63
2391.64	14.20	Ave.	252	1.9	H	30.91	45.11	54.0	8.89
2483.56	29.68	PK	252	1.4	H	30.72	60.40	74.0	13.60
2483.56	14.29	Ave.	252	1.4	H	30.72	45.01	54.0	8.99
7416.00	45.63	PK	129	2.2	H	8.35	53.98	74.0	20.02
7416.00	27.18	Ave.	129	2.2	H	8.35	35.53	54.0	18.47

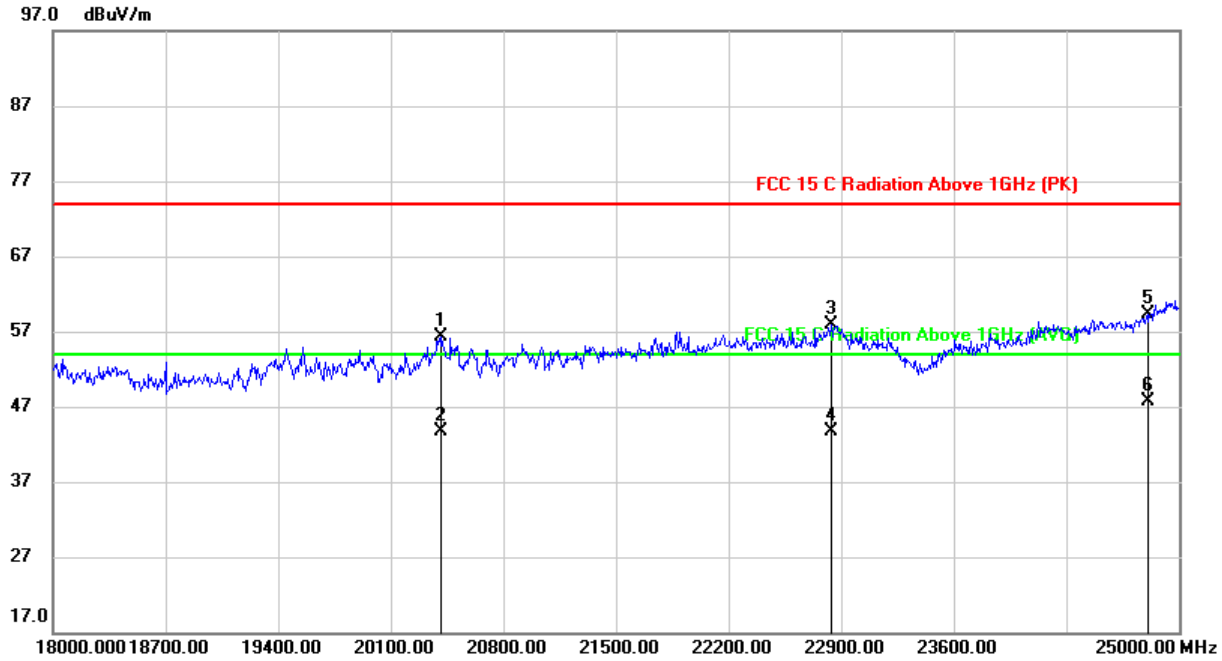
802.11n-HT40 Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)				
Low Channel (2422 MHz)									
2387.60	29.20	PK	277	1.2	H	30.91	60.11	74.0	13.89
2387.60	14.07	Ave.	277	1.2	H	30.91	44.98	54.0	9.02
2488.04	29.36	PK	105	1.6	H	30.72	60.08	74.0	13.92
2488.04	14.16	Ave.	105	1.6	H	30.72	44.88	54.0	9.12
7266.00	45.90	PK	153	1.9	H	6.26	52.16	74.0	21.84
7266.00	29.81	Ave.	153	1.9	H	6.26	36.07	54.0	17.93
Middle Channel(2442MHz)									
7326.00	45.20	PK	32	2.3	H	6.46	51.66	74.0	22.34
7326.00	29.26	Ave.	32	2.3	H	6.46	35.72	54.0	18.28
High Channel(2462 MHz)									
2384.20	29.75	PK	176	1.1	H	30.91	60.66	74.0	13.34
2384.20	14.29	Ave.	176	1.1	H	30.91	45.20	54.0	8.80
2490.30	29.52	PK	284	1.5	H	30.72	60.24	74.0	13.76
2490.30	14.27	Ave.	284	1.5	H	30.72	44.99	54.0	9.01
7386.00	45.08	PK	123	1.1	H	8.25	53.33	74.0	20.67
7386.00	27.55	Ave.	123	1.1	H	8.25	35.80	54.0	18.20

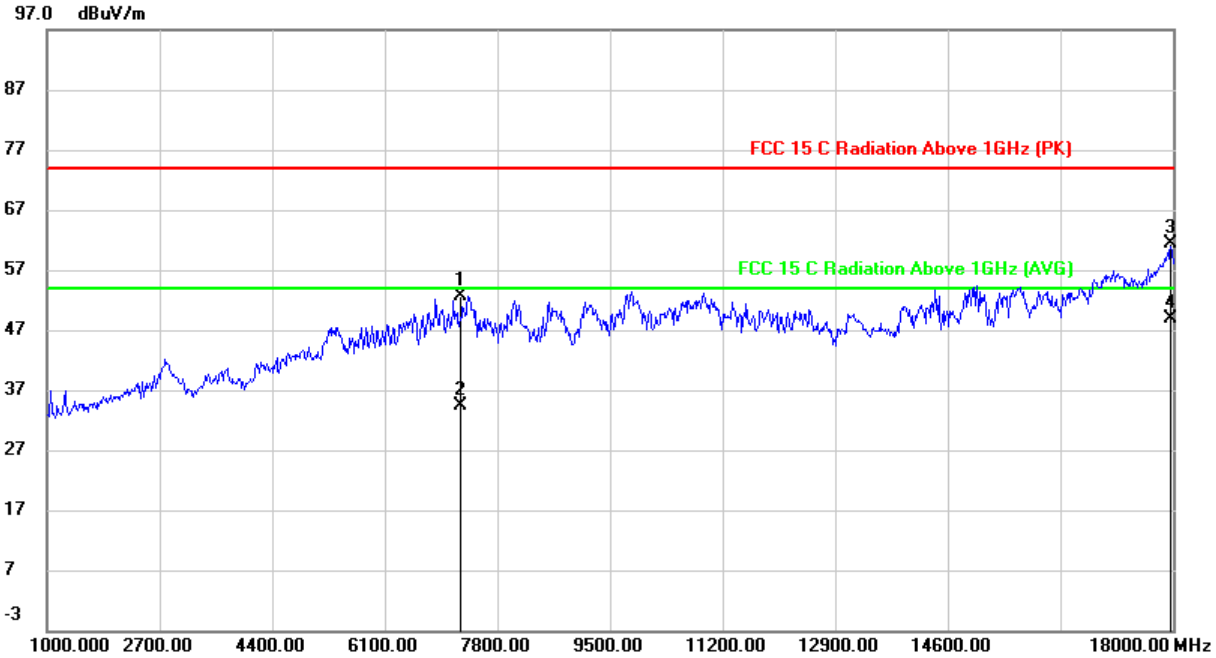
Note:
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude
The other spurious emission which is 20dB to the limit was not recorded.
And for the pre-scan is performed with the 2400-2483.5MHz band filter.

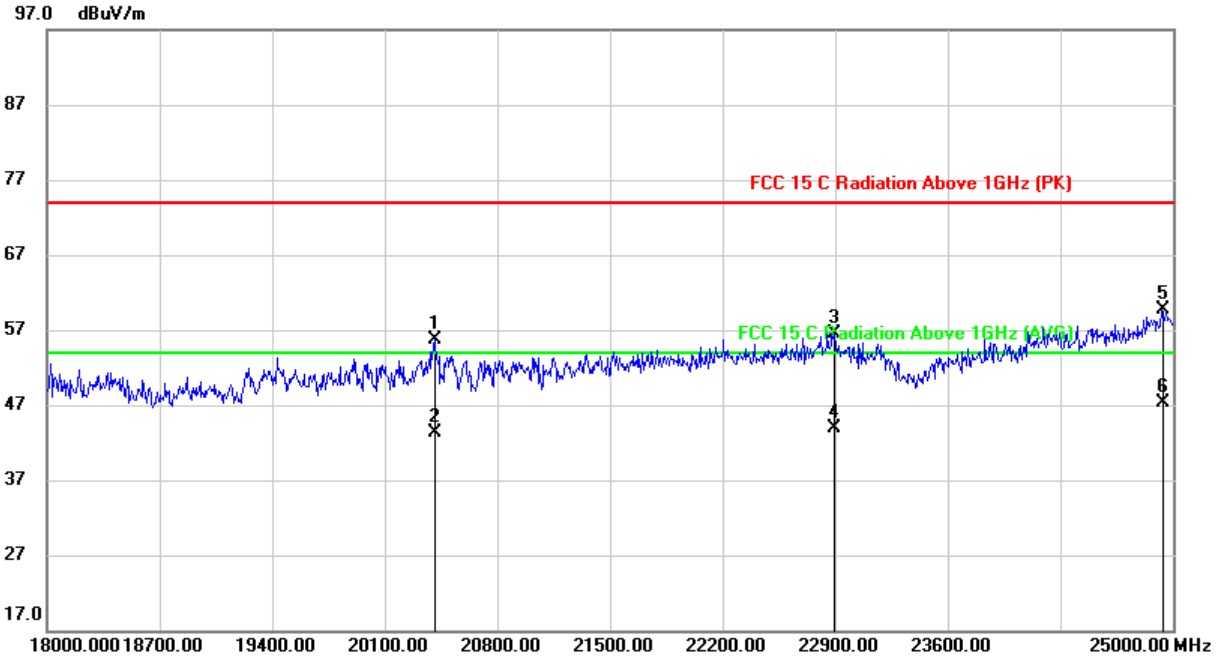
Pre-scan with 802.11b Mode, Middle channel
Horizontal





Vertical


97.0 dBuV/m
87
77
67
57
47
37
27
17
7
-3
FCC 15 C Radiation Above 1GHz (PK)
FCC 15 C Radiation Above 1GHz (AVG)
1000.000 2700.00 4400.00 6100.00 7800.00 9500.00 11200.00 12900.00 14600.00 18000.00 MHz


97.0 dBuV/m
87
77
67
57
47
37
27
17.0
FCC 15 C Radiation Above 1GHz (PK)
FCC 15 C Radiation Above 1GHz (AVG)
18000.000 18700.00 19400.00 20100.00 20800.00 21500.00 22200.00 22900.00 23600.00 25000.00 MHz

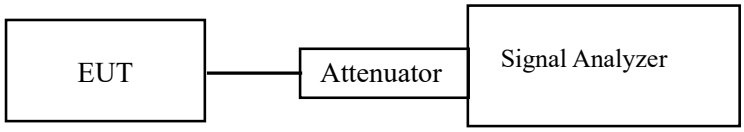
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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

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 it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 ℃
ATM Pressure:	101.0 kPa

The testing was performed by LYA Liu on 2021-07-31.

Test Result: Pass.

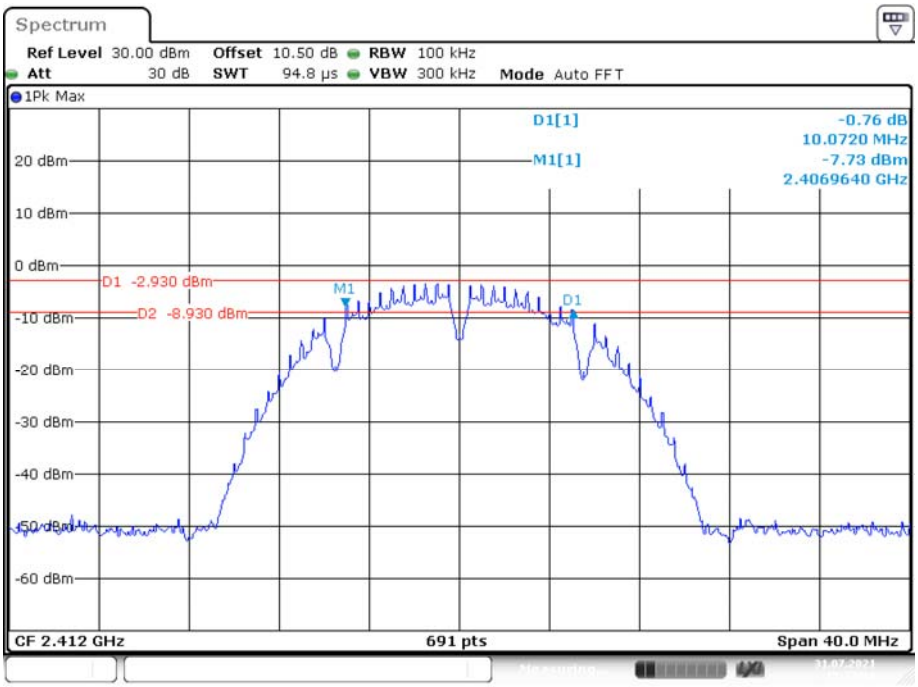
Please refer to the following table and plots.

EUT operation mode: Transmitting

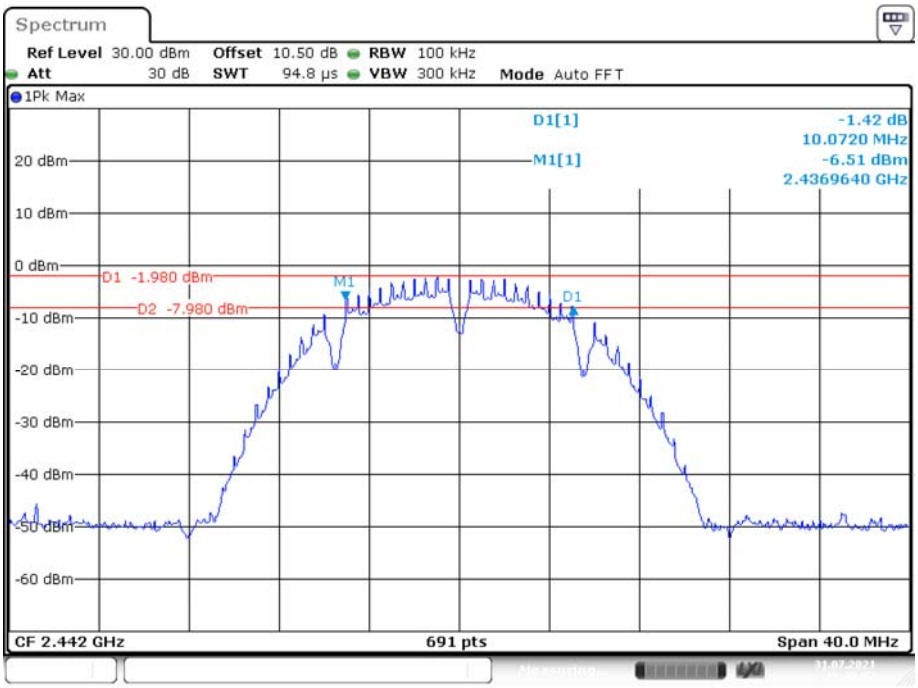
Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)
802.11b mode			
Low	2412	10.072	≥500
Middle	2442	10.072	≥500
High	2472	10.072	≥500
802.11g mode			
Low	2412	16.440	≥500
Middle	2442	16.324	≥500
High	2472	16.382	≥500
802.11n-HT20 mode			
Low	2412	17.598	≥500
Middle	2442	17.424	≥500
High	2472	17.540	≥500
802.11n-HT40 mode			
Low	2422	36.320	≥500
Middle	2442	35.660	≥500
High	2462	35.570	≥500

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)
BLE 1M			
Low	2402	0.718	≥500
Middle	2440	0.718	≥500
High	2480	0.718	≥500

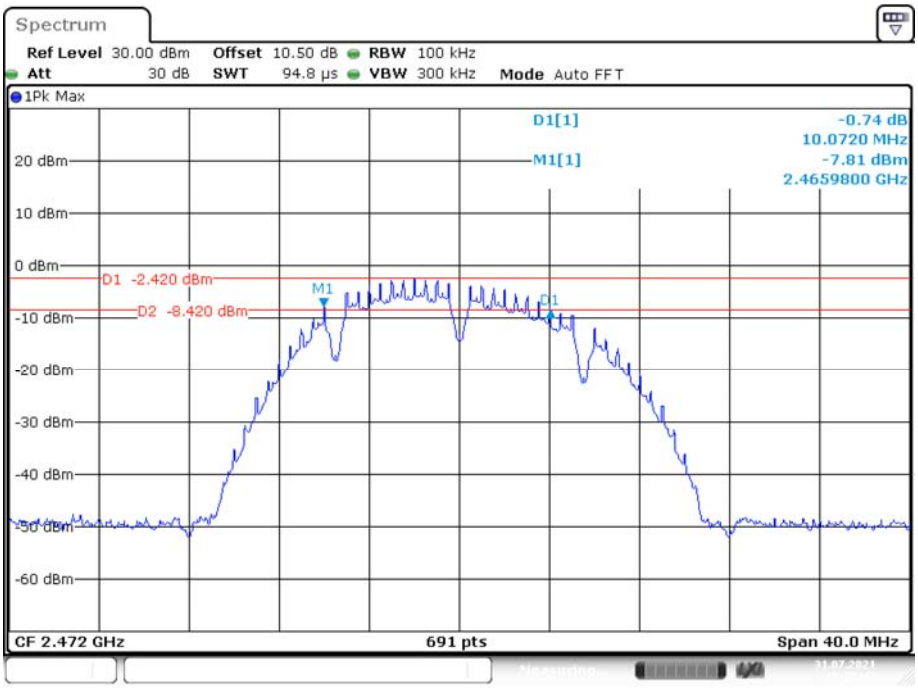
6dB Bandwidth, 802.11b Low Channel



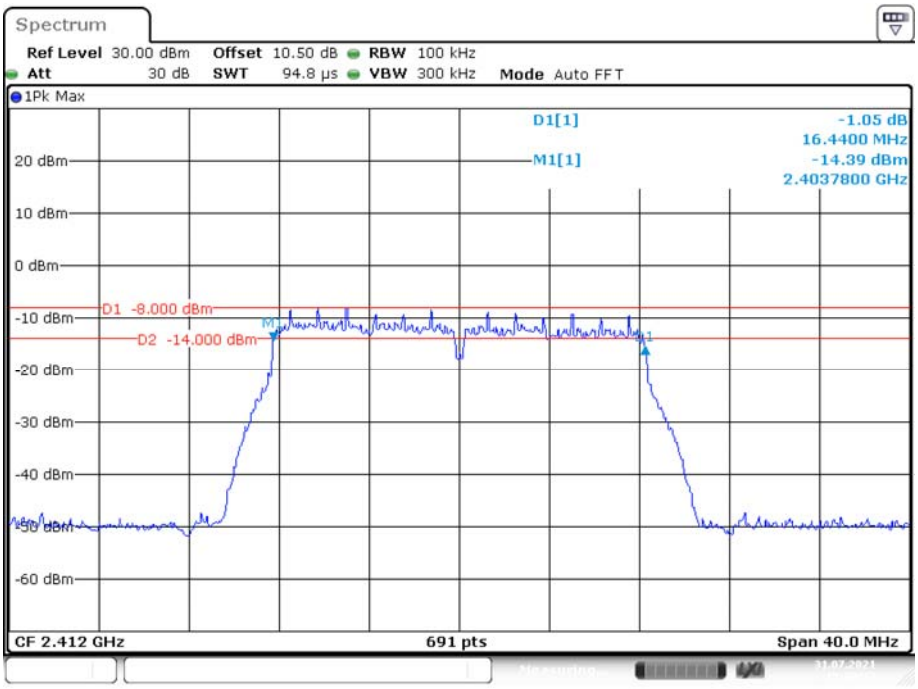
6dB Bandwidth, 802.11b Middle Channel



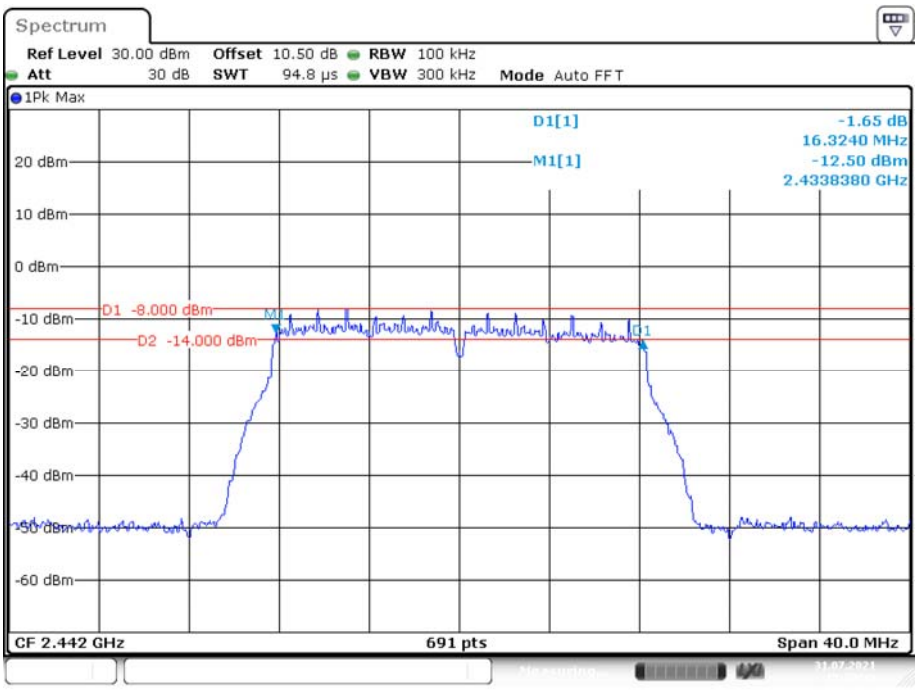
6dB Bandwidth, 802.11b High Channel



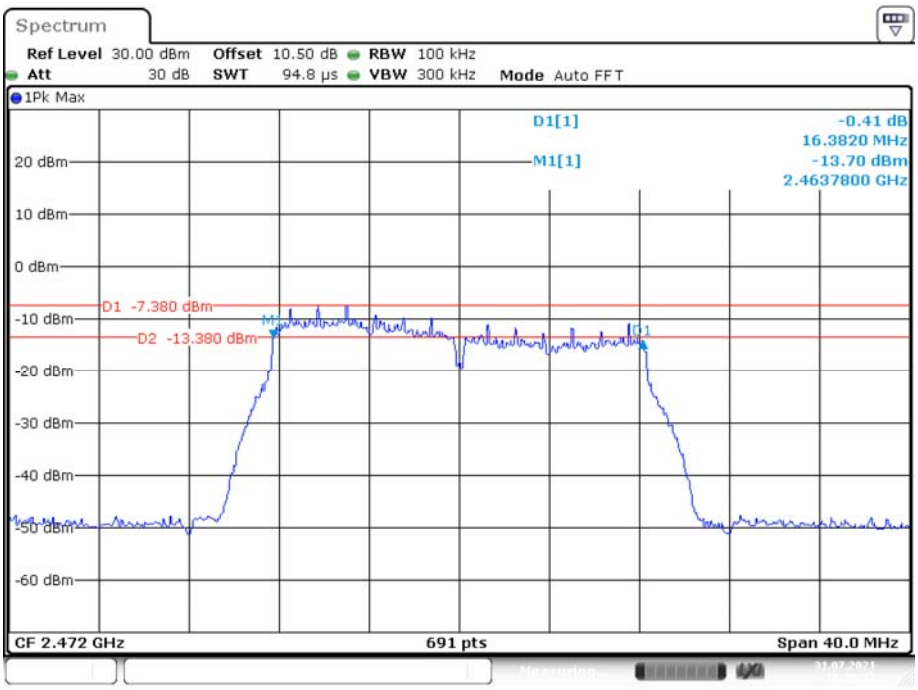
6dB Bandwidth, 802.11g Low Channel



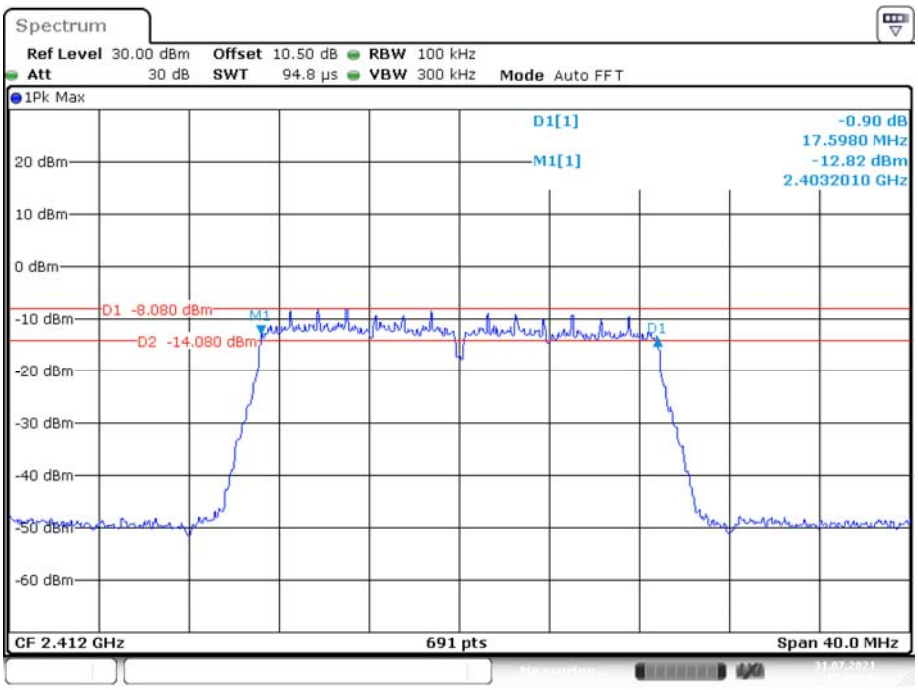
6dB Bandwidth, 802.11g Middle Channel



6dB Bandwidth, 802.11g High Channel

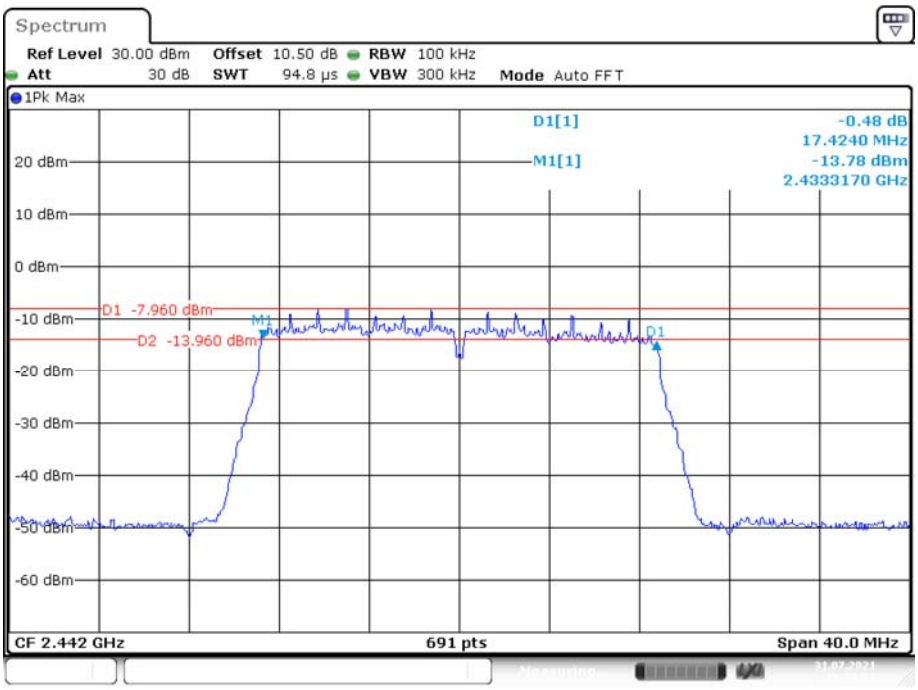


6dB Bandwidth, 802.11n-HT20 Low Channel



Date: 31.JUL.2021 15:30:46

6dB Bandwidth, 802.11n-HT20 Middle Channel



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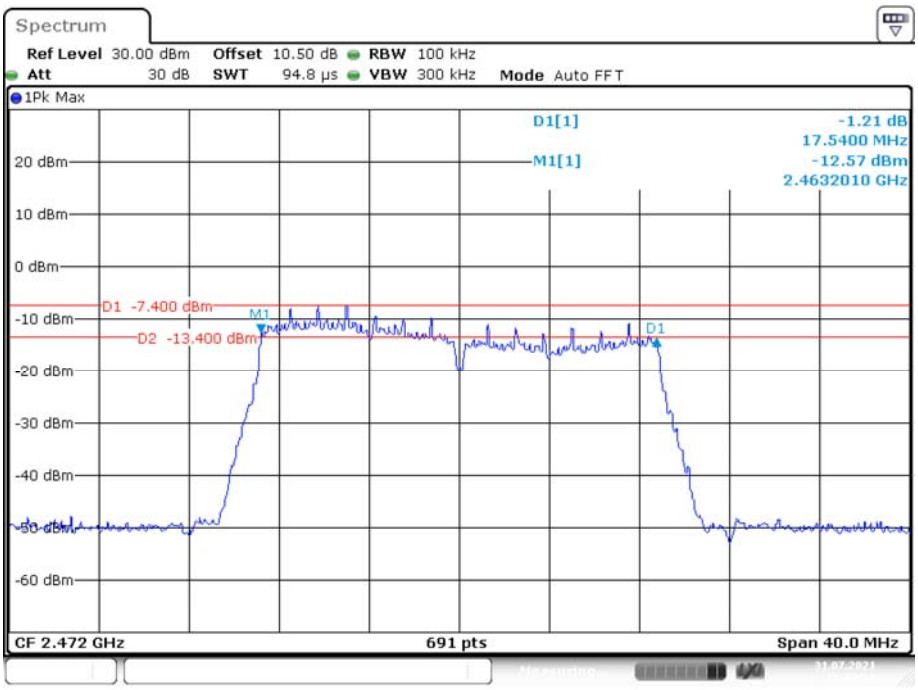
6dB Bandwidth, 802.11n-HT20 High Channel



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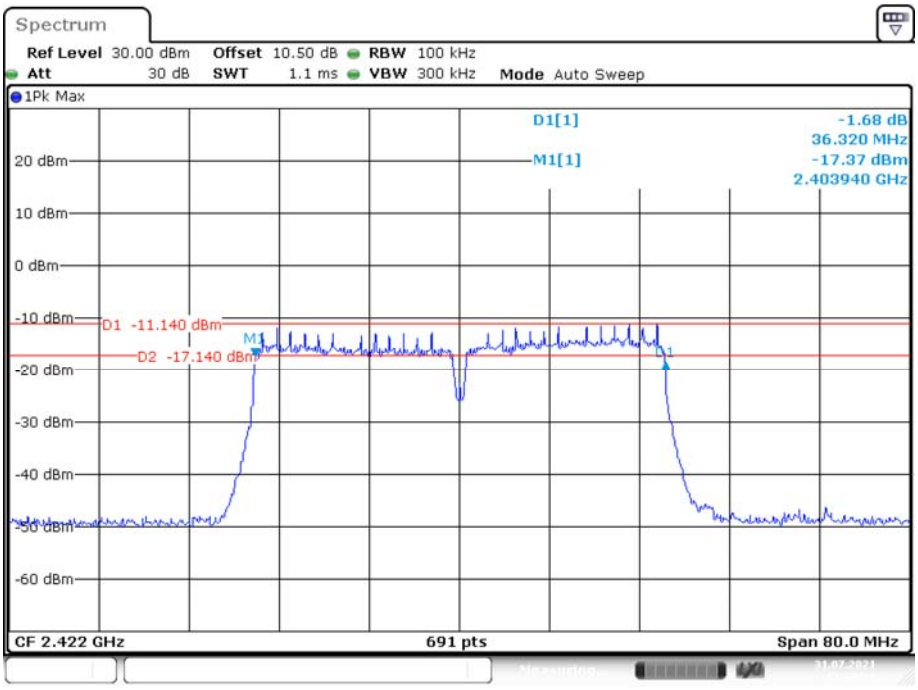
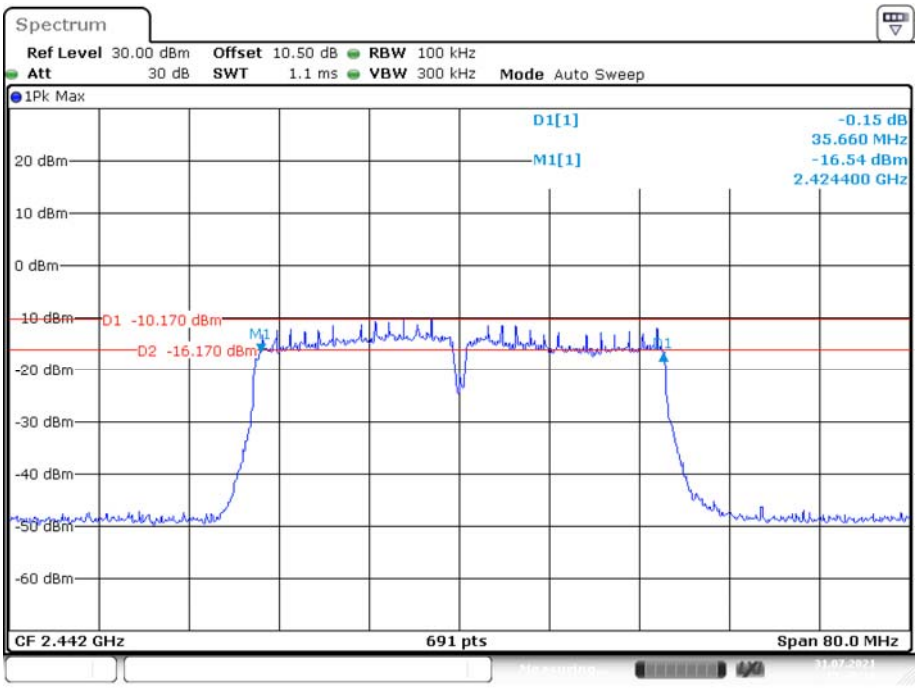
6dB Bandwidth, 802.11n-HT40 Low Channel

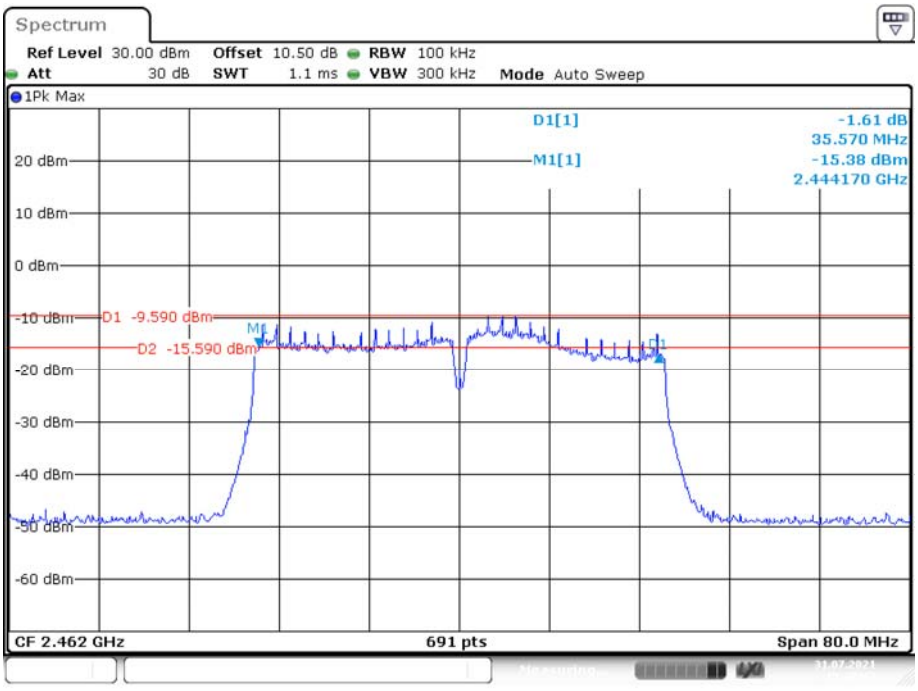


Date: 31.JUL.2021 15:40:21

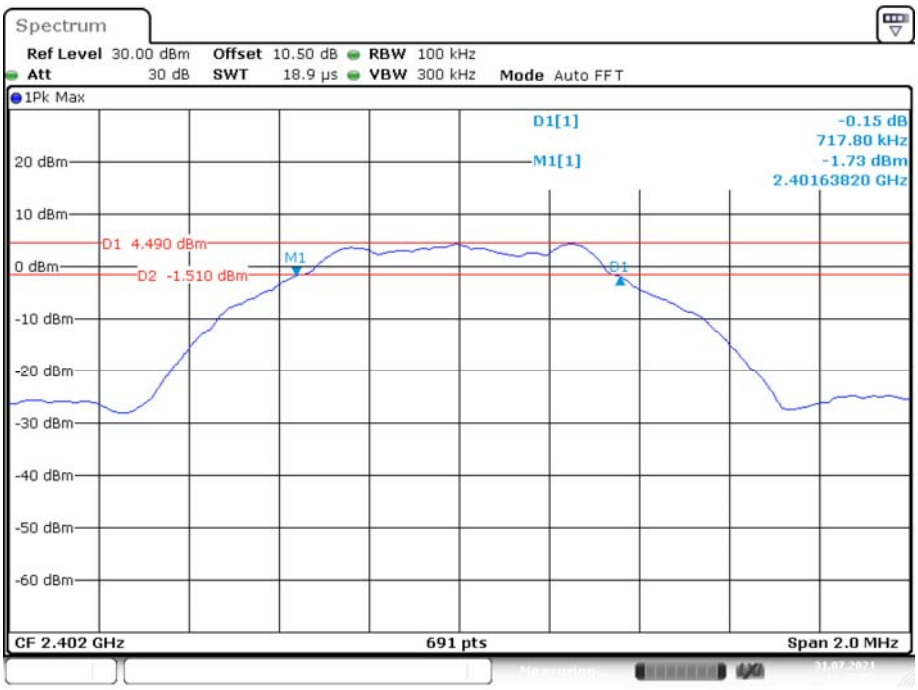
6dB Bandwidth, 802.11n-HT40 Middle Channel



6dB Bandwidth, 802.11n-HT20 High Channel

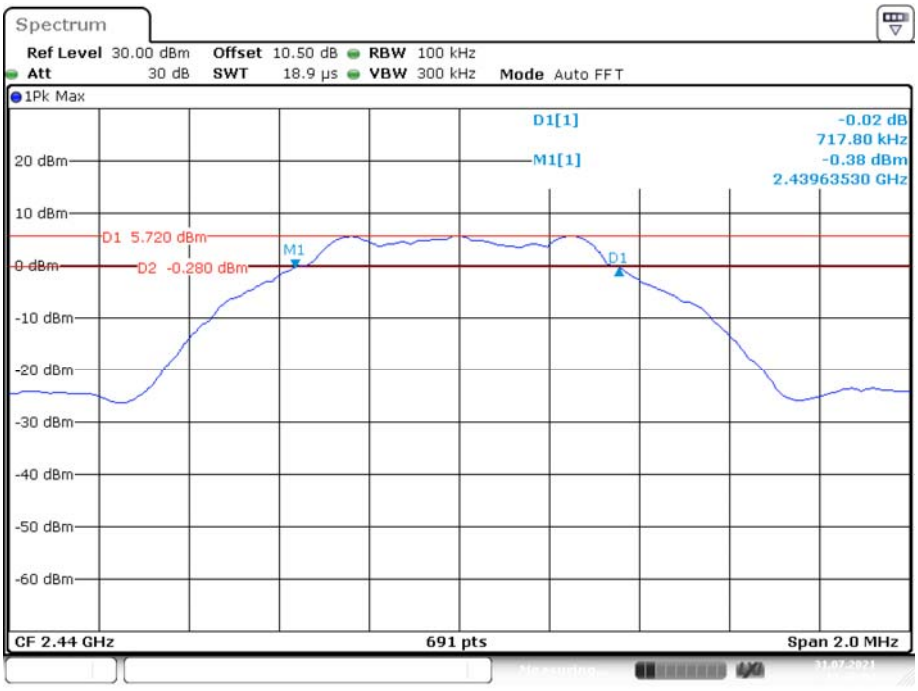


6dB Bandwidth, BLE Low Channel



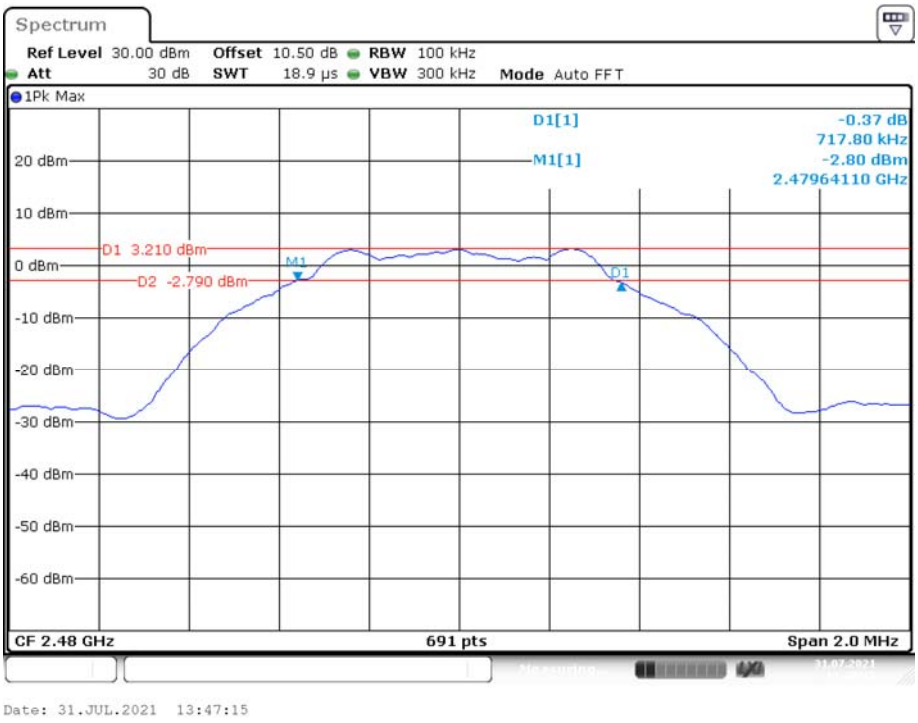
Date: 31.JUL.2021 13:43:57

6dB Bandwidth, BLE Middle Channel



Date: 31.JUL.2021 13:46:04

6dB Bandwidth, BLE High Channel



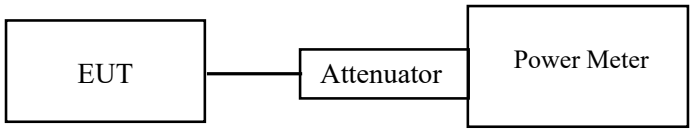
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

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

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



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 ℃
ATM Pressure:	101.0 kPa

The testing was performed by LYA Liu on 2021-07-31.

EUT operation mode: Transmitting

Wi-Fi mode

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Max Conducted Average Output Power (dBm)	Limit (dBm)
802.11b mode				
Low	2412	9.14	7.31	30
Middle	2442	9.64	7.81	30
High	2472	9.45	7.54	30
802.11g mode				
Low	2412	11.16	7.75	30
Middle	2442	11.05	7.77	30
High	2472	10.69	7.39	30
802.11n HT20 mode				
Low	2412	11.20	7.79	30
Middle	2442	11.60	7.79	30
High	2472	10.74	7.47	30
802.11n HT40 mode				
Low	2422	11.09	7.53	30
Middle	2442	11.68	7.88	30
High	2462	11.54	7.76	30

BLE mode

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Limit (dBm)
BLE 1M			
Low	2402	4.96	30
Middle	2440	6.48	30
High	2480	3.92	30

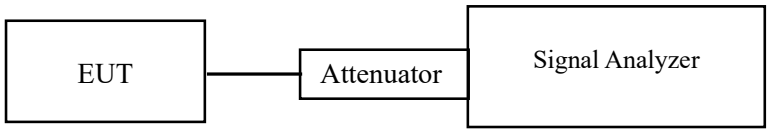
FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates 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

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



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 ℃
ATM Pressure:	101.0 kPa

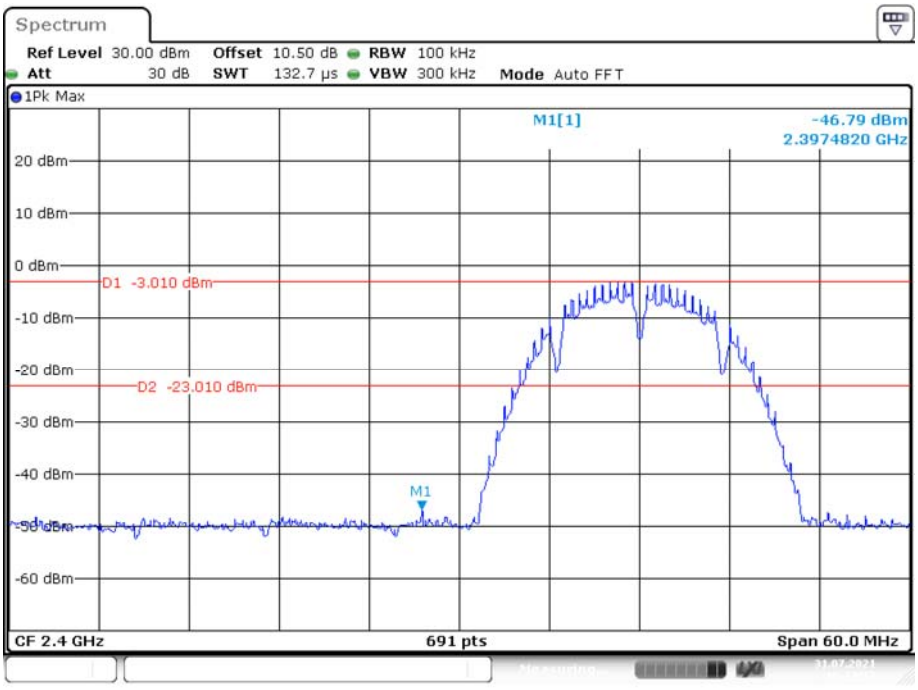
The testing was performed by LYA Liu on 2021-07-31.

EUT operation mode: Transmitting

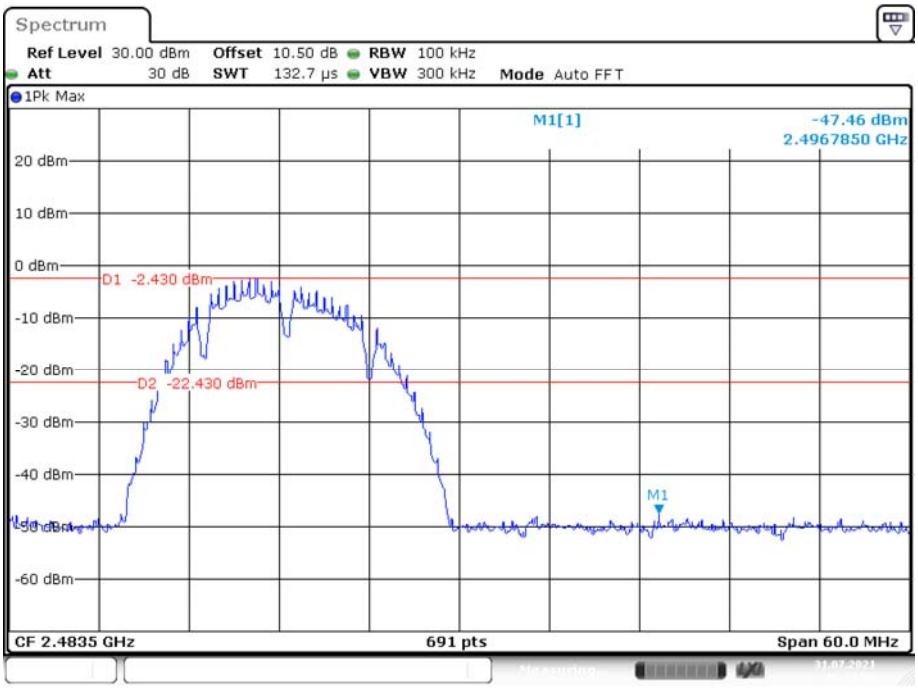
Test Result: Compliant

Please refer to the following plots.

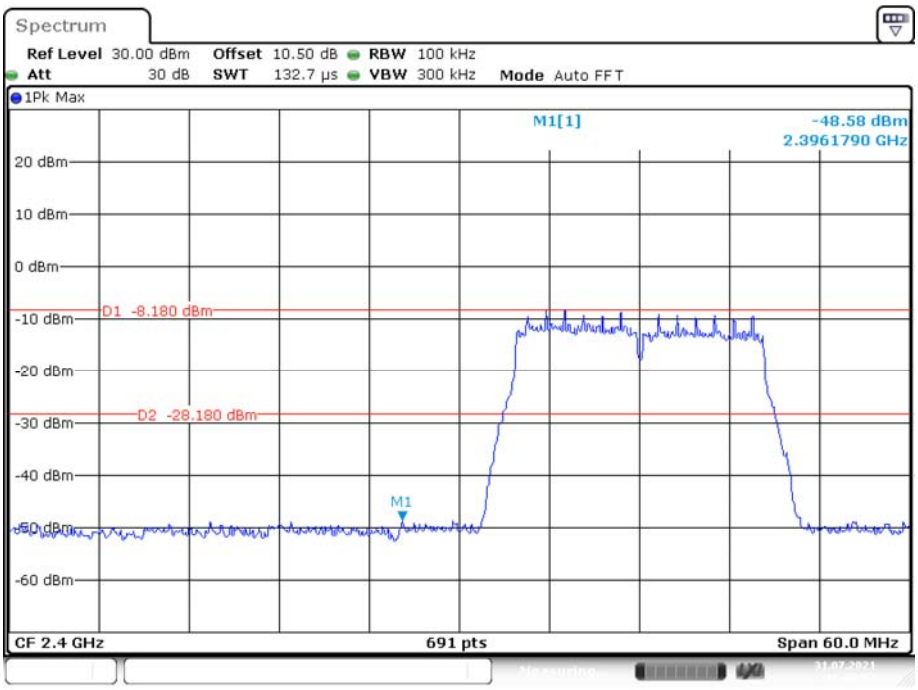
802.11b: Band Edge, Left Side



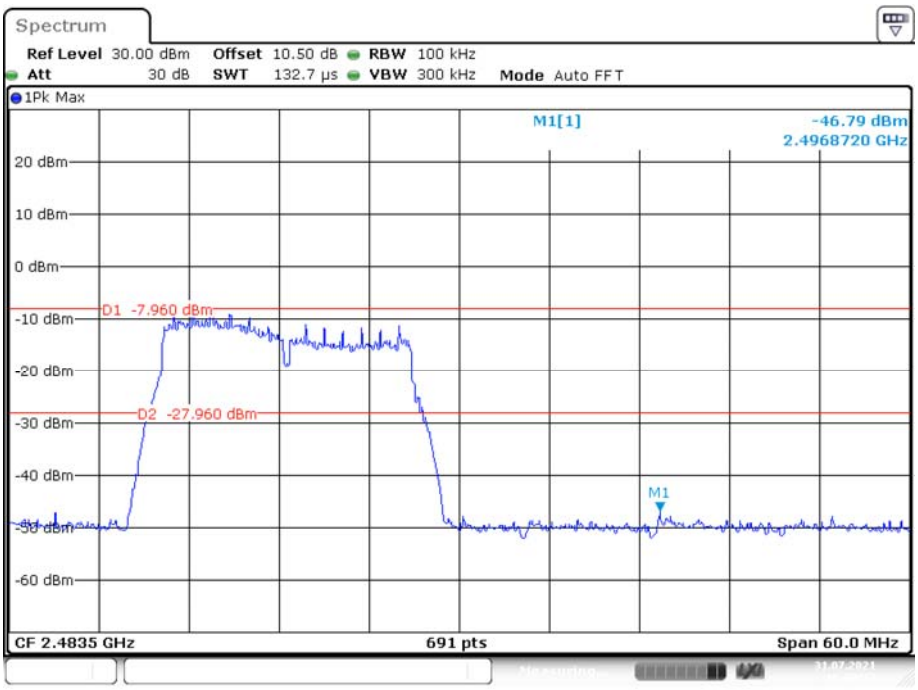
802.11b: Band Edge, Right Side



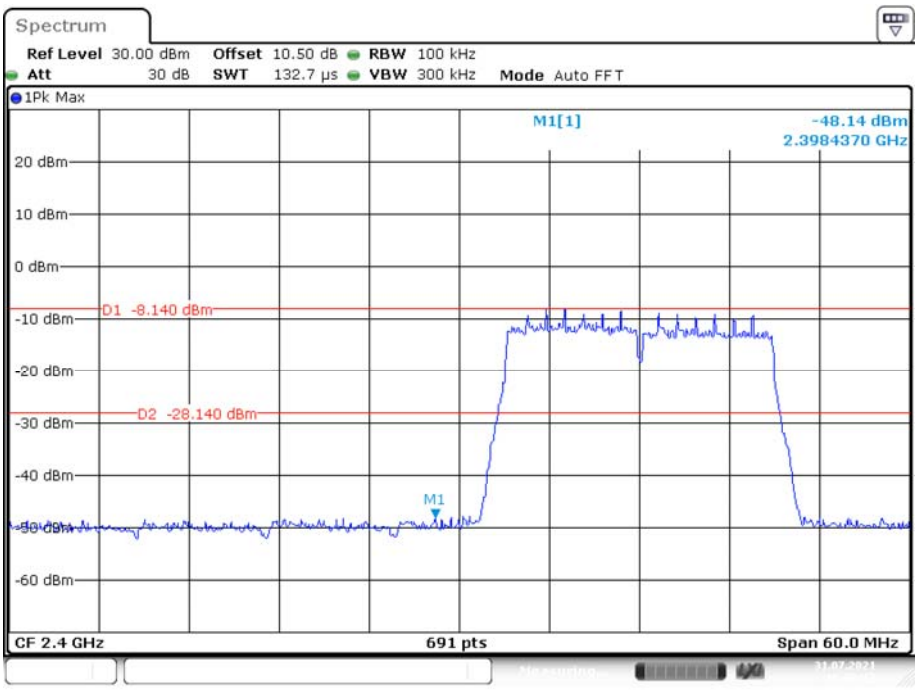
802.11g: Band Edge, Left Side



802.11g: Band Edge, Right Side



802.11n-HT20: Band Edge, Left Side



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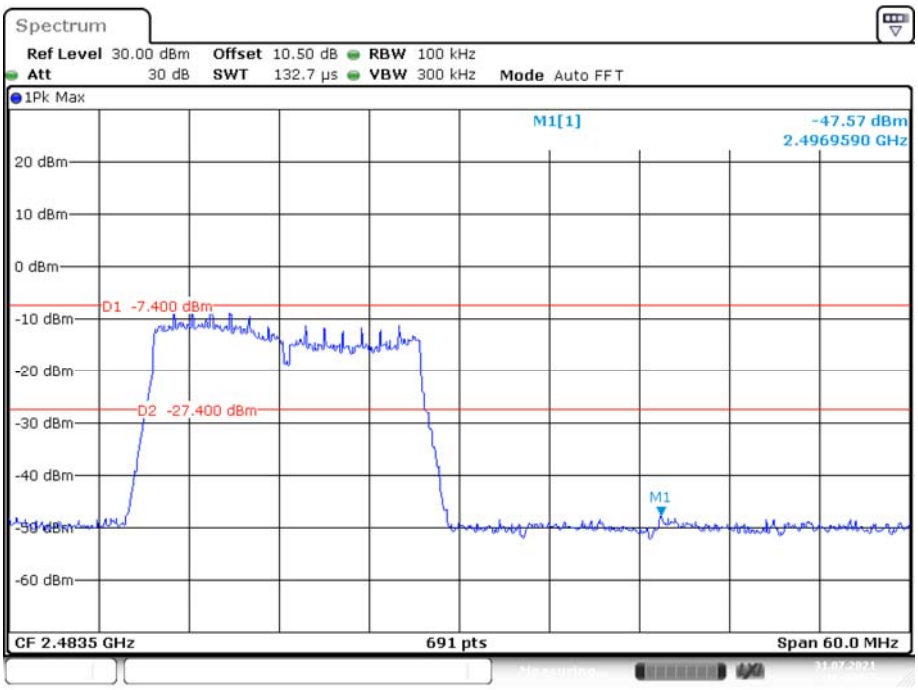
802.11n-HT20: Band Edge, Right Side



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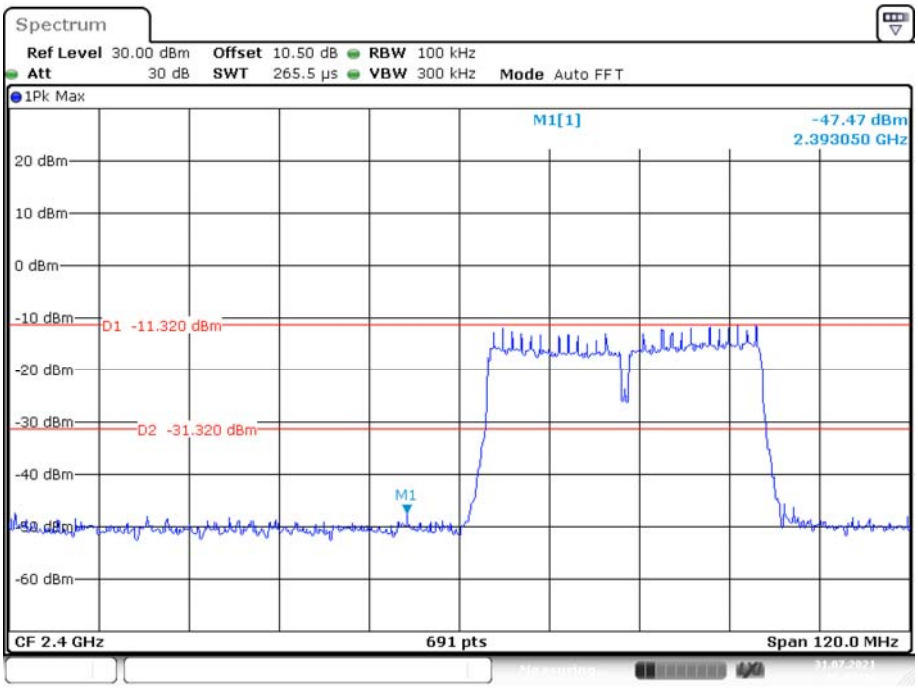
802.11n-HT40: Band Edge, Left Side



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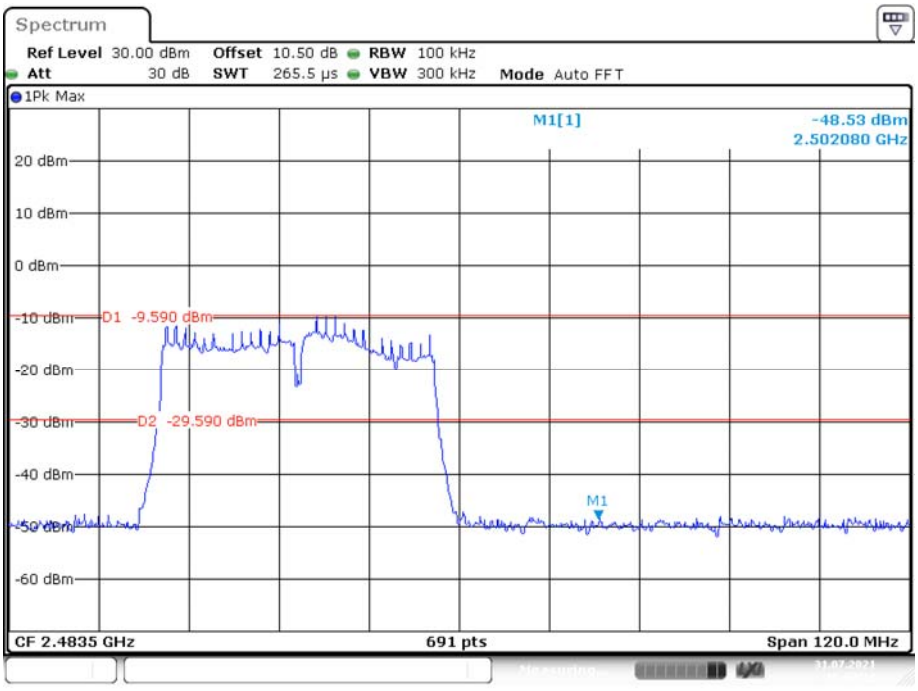
802.11n-HT40: Band Edge, Right Side



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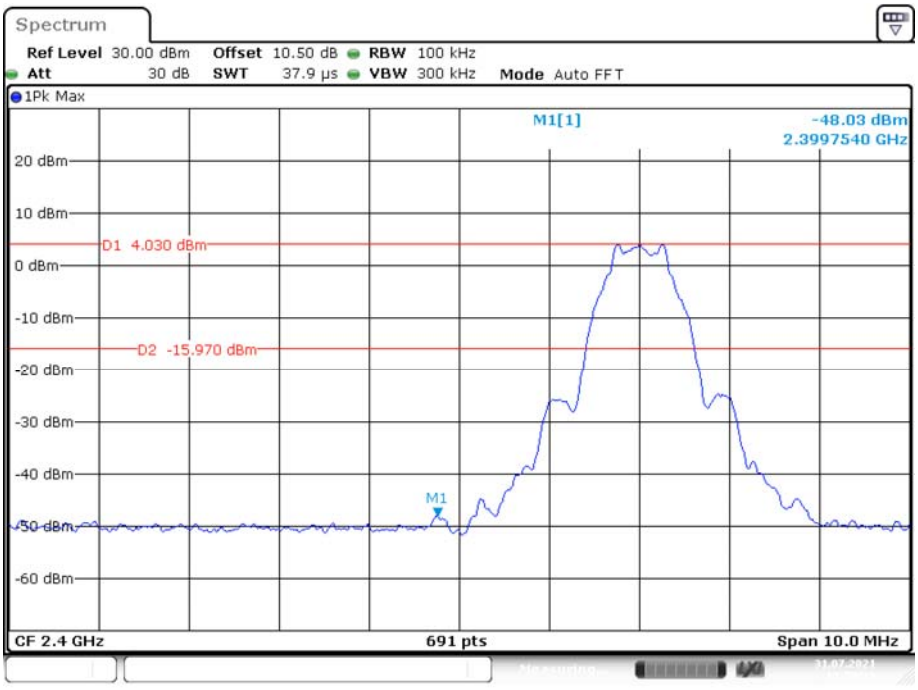
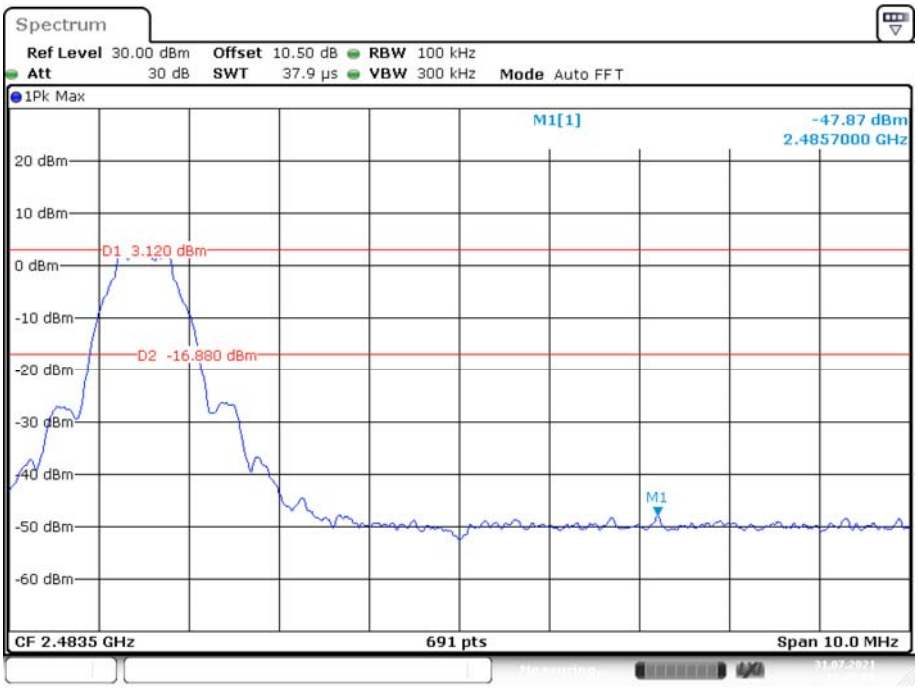
BLE: Band Edge, Left Side



BLE: Band Edge, Right Side



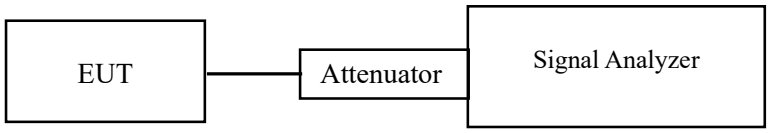
FCC §15.247(e) - POWER SPECTRAL DENSITY

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

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW to: 3kHz≤ RBW≤100 kHz.
3. Set the VBW ≥ 3×RBW.
4. Set the span to 1.5 times the DTS bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 ℃
ATM Pressure:	101.0 kPa

The testing was performed by LYA Liu on 2021-07-31.

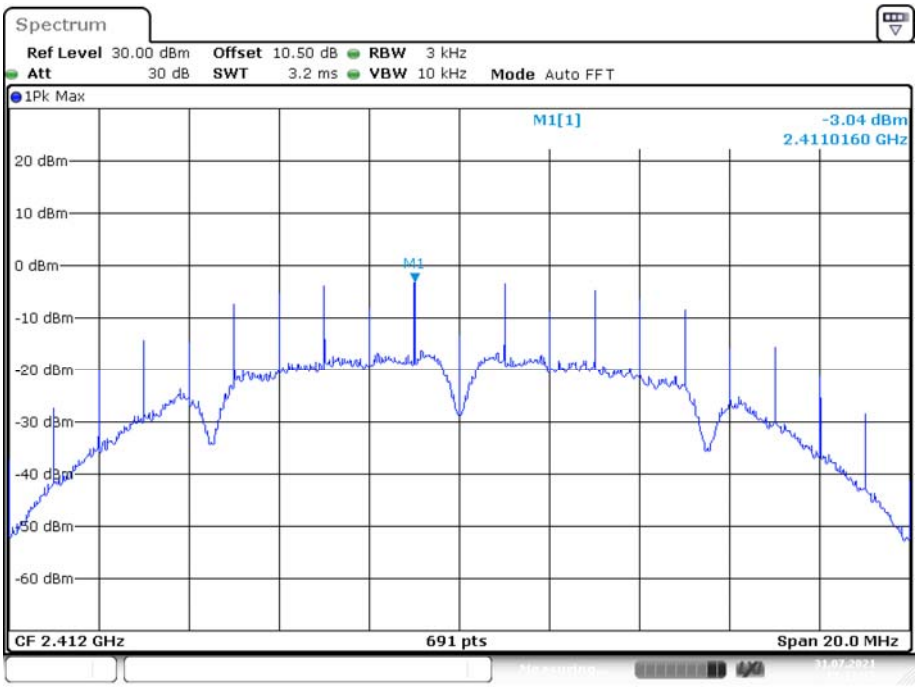
EUT operation mode: Transmitting

Test Result: Pass

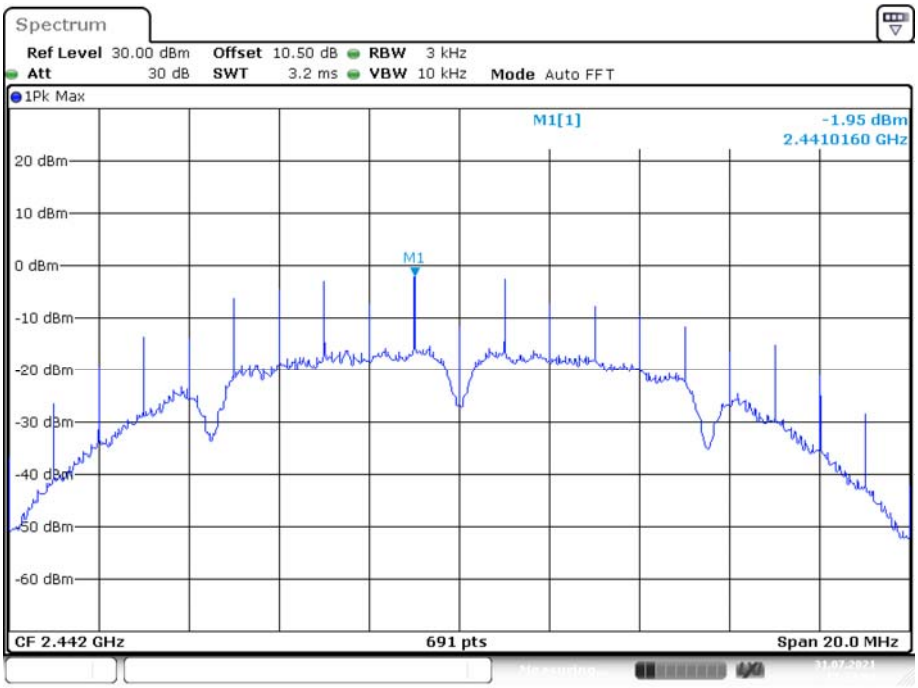
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b mode			
Low	2412	-3.04	≤8
Middle	2442	-1.95	≤8
High	2472	-2.65	≤8
802.11g mode			
Low	2412	-20.72	≤8
Middle	2442	-20.25	≤8
High	2472	-19.83	≤8
802.11n-HT20 mode			
Low	2412	-21.23	≤8
Middle	2442	-20.05	≤8
High	2472	-20.57	≤8
802.11n-HT40 mode			
Low	2422	-24.49	≤8
Middle	2442	-24.27	≤8
High	2462	-22.23	≤8

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
BLE 1M			
Low	2402	-11.06	≤8
Middle	2440	-9.40	≤8
High	2480	-12.01	≤8

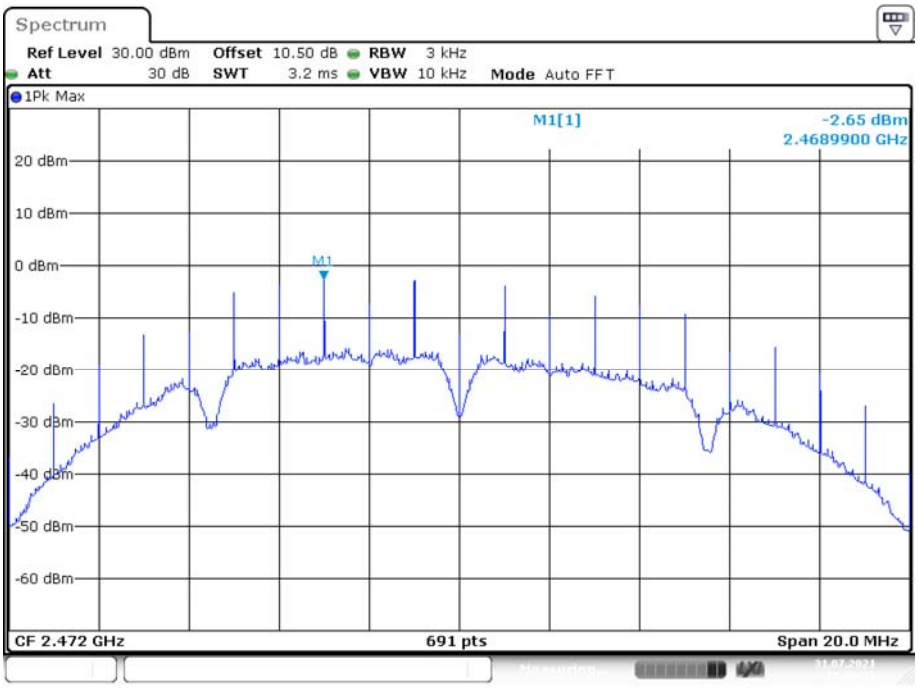
Power Spectral Density, 802.11b Low Channel



Power Spectral Density, 802.11b Middle Channel



Power Spectral Density, 802.11b High Channel



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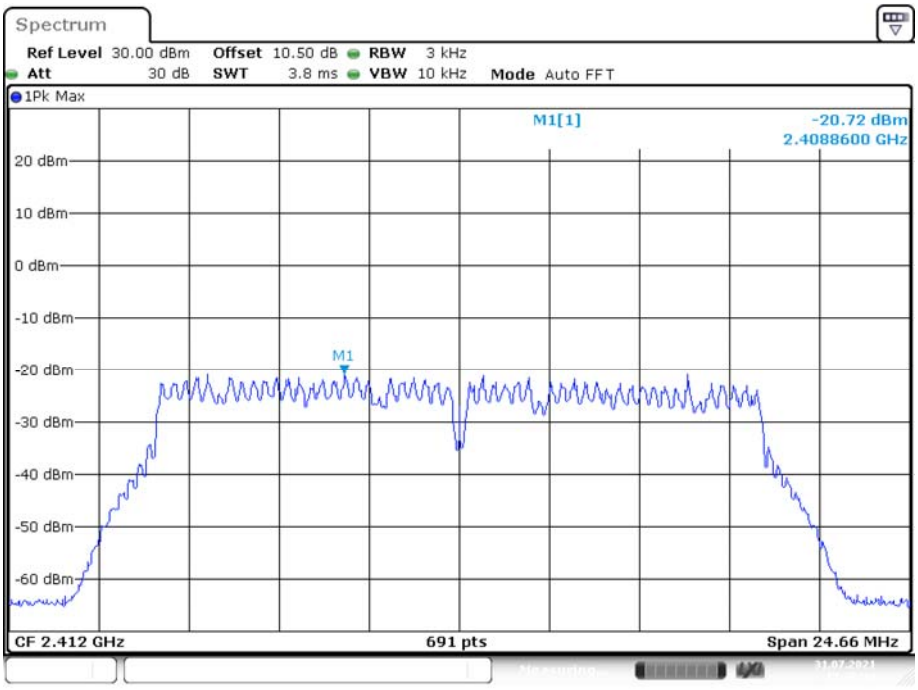
Power Spectral Density, 802.11g Low Channel



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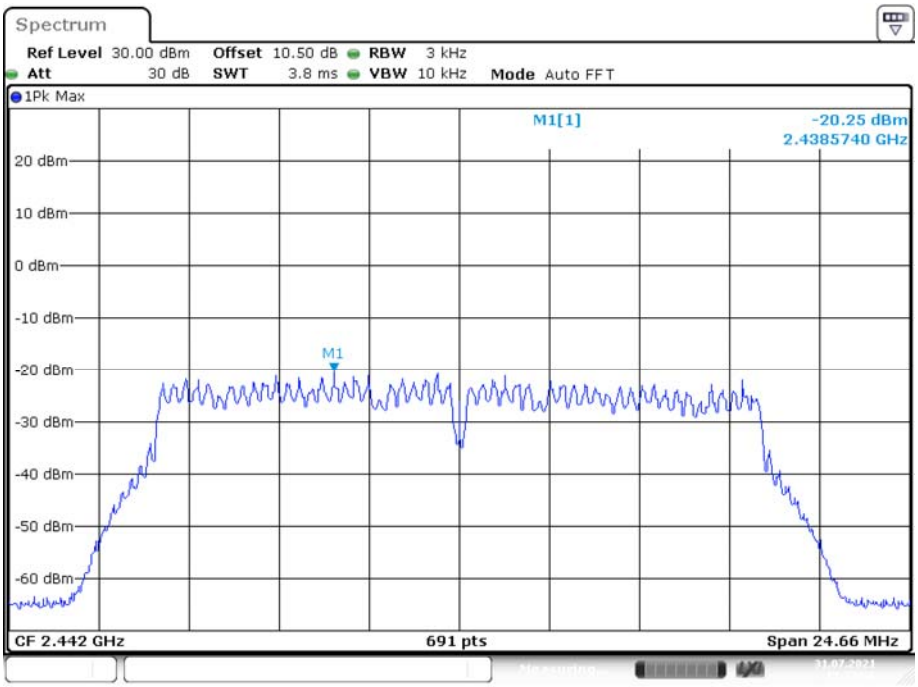
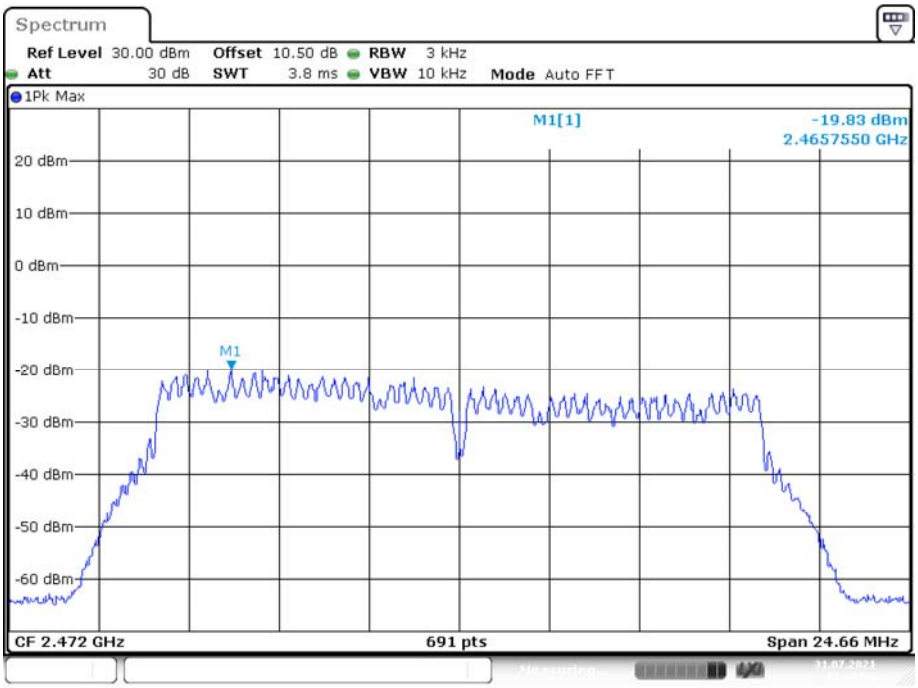
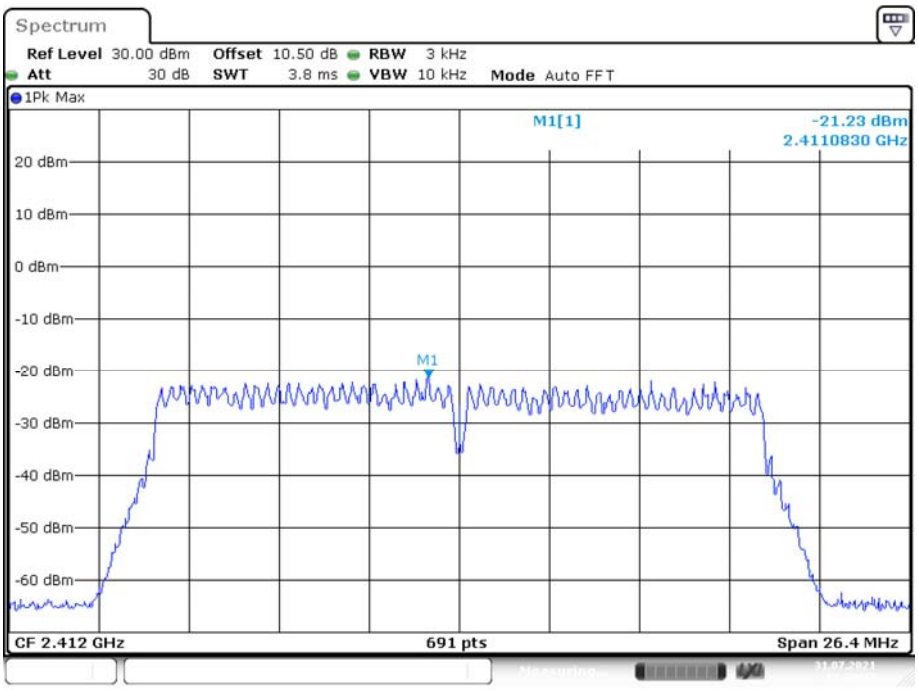
Power Spectral Density, 802.11g Middle Channel



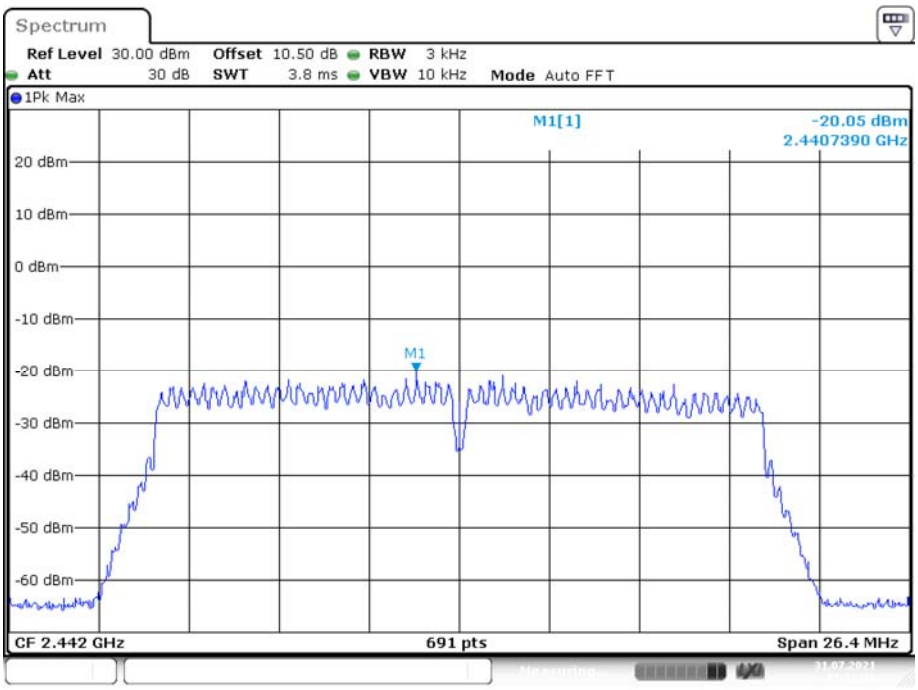
Power Spectral Density, 802.11g High Channel



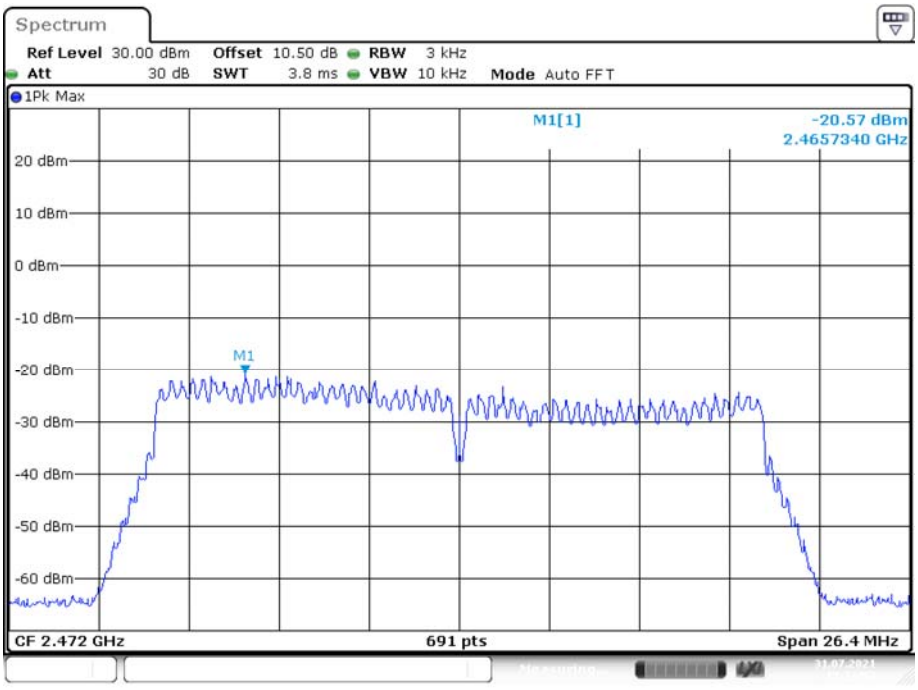
Power Spectral Density, 802.11n-HT20 Low Channel



Power Spectral Density, 802.11n-HT20 Middle Channel



Power Spectral Density, 802.11n-HT20 High Channel



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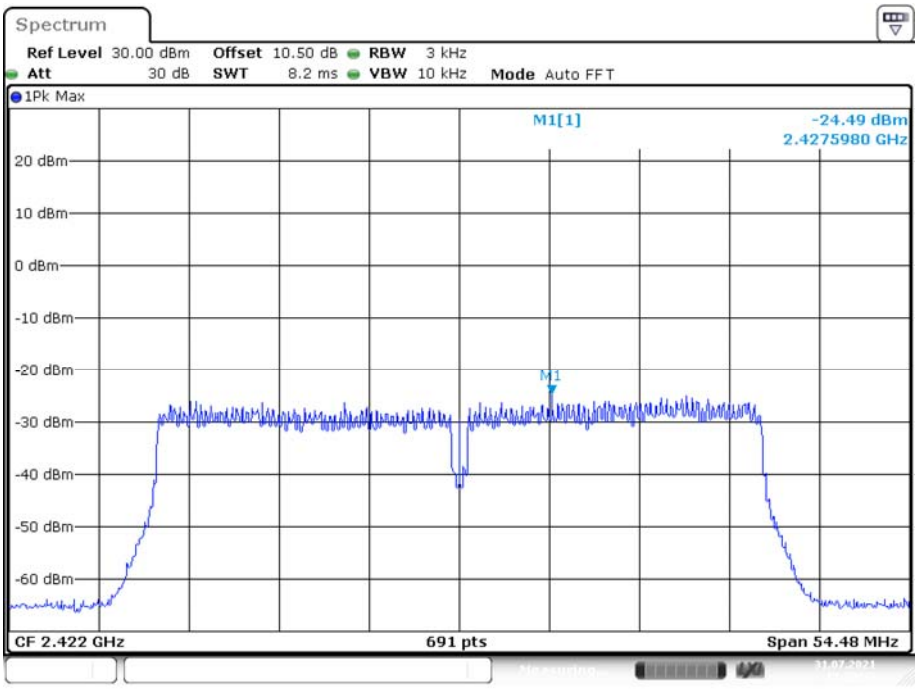
Power Spectral Density, 802.11n-HT40 Low Channel



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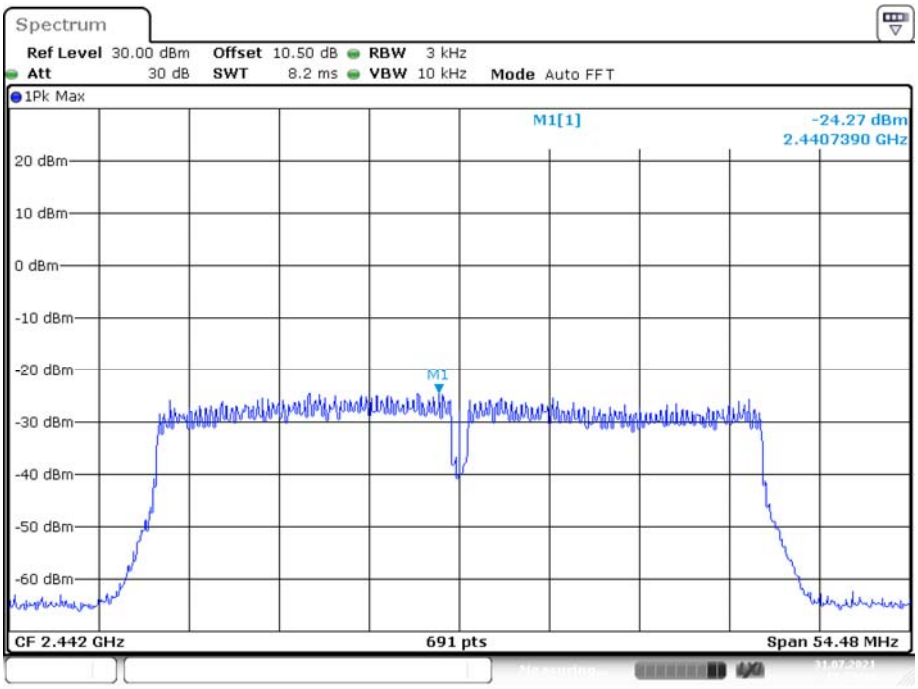
Power Spectral Density, 802.11n-HT40 Middle Channel



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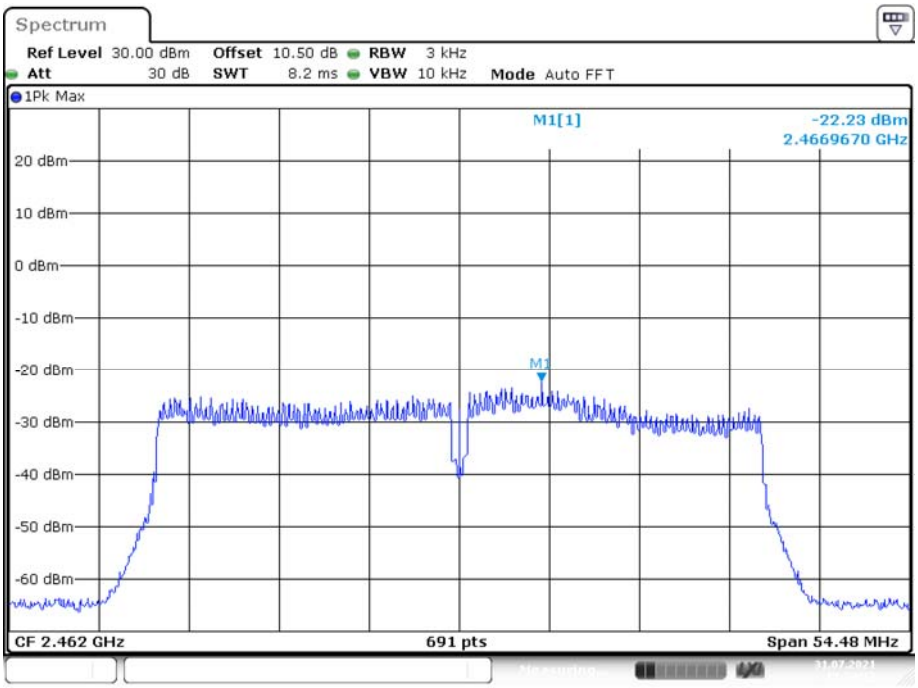
Power Spectral Density, 802.11n-HT40 High Channel



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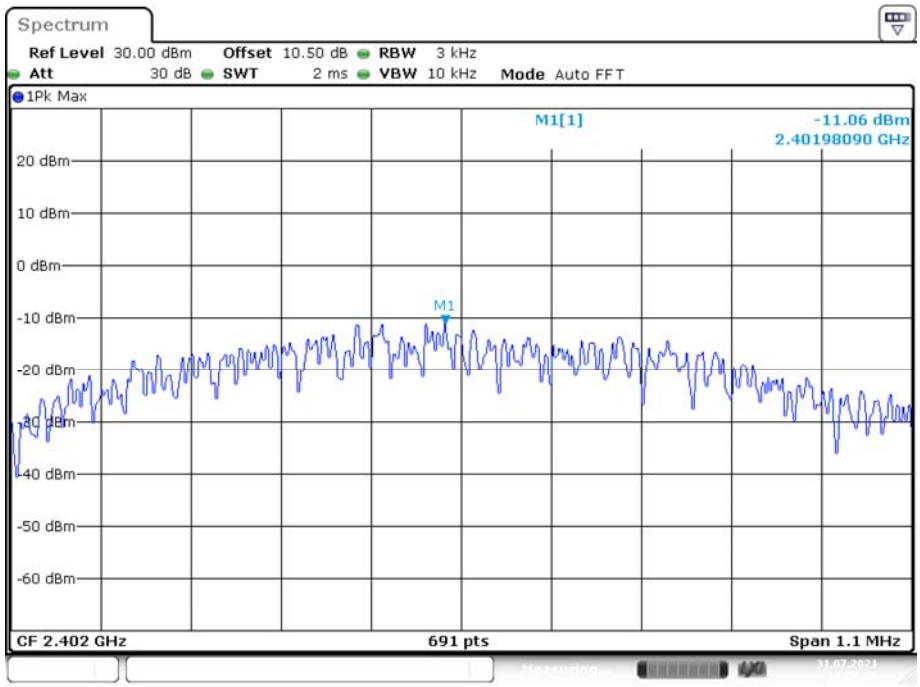
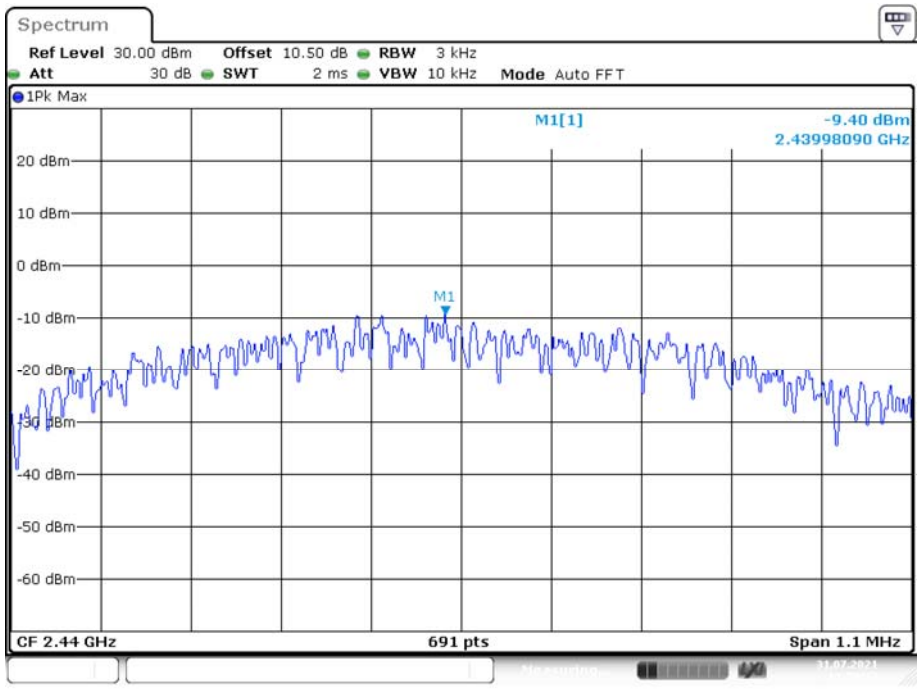
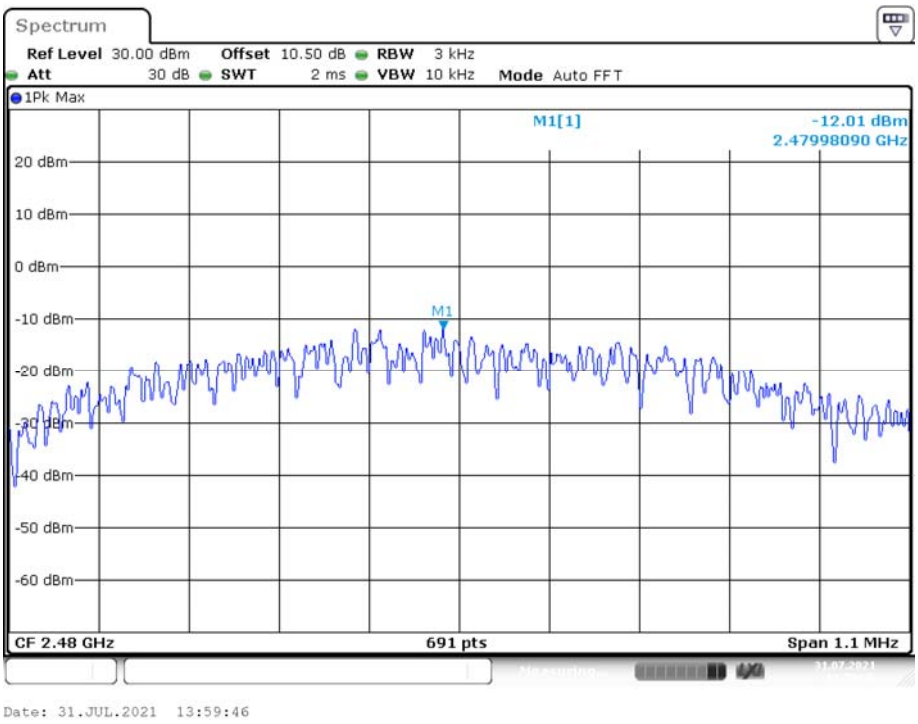
Power Spectral Density, BLE Low Channel



Power Spectral Density, BLE Middle Channel



Power Spectral Density, BLE High Channel



******* END OF REPORT *******