

Prüfbericht-Nr.: <i>Test report No.:</i>	60403119 001	Auftrags-Nr.: <i>Order No.:</i>	168273021	Seite 1 von 24 <i>Page 1 of 24</i>	
Kunden-Referenz-Nr.: <i>Client reference No.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	06.07.2020		
Auftraggeber: <i>Client:</i>	LEEDARSON LIGHTING CO., LTD. Xingtai Industrial Zone, Economic Development Zone, Changtai County, Zhangzhou City, Fujian Province, P.R. China				
Prüfgegenstand: <i>Test item:</i>	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module				
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	M-LA02302 (Trademark: LEEDARSON)				
Auftrags-Inhalt: <i>Order content:</i>	FCC & IC approval				
Prüfgrundlage: <i>Test specification:</i>	CFR47 FCC Part 15: Subpart C Section 15.247 CFR47 FCC Part 15: Subpart C Section 15.207 CFR47 FCC Part 2: Section 2.1091		RSS-247 Issue 2 February 2017 RSS-Gen Issue 5 March 2019 RSS-102 Issue 5 March 2015		
Wareneingangsdatum: <i>Date of receipt:</i>	01.07.2020	Please refer to photo documents			
Prüfmuster-Nr.: <i>Test sample No.:</i>	A002858734				
Prüfzeitraum: <i>Testing period:</i>	06.07.2020 - 23.07.2020				
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd. Testing Center				
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.				
Prüfergebnis*: <i>Test result*:</i>	Pass				
geprüft von / tested by:		kontrolliert von / reviewed by:			
					
07.08.2020 Alex Lan / Senior Project Engineer		07.08.2020 Winnie Hou / Technical Certifier			
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>
Sonstiges / Other:					
FCC ID: 2AB2Q-MLA02302 IC: 10256A-MLA02302; HVIN: M-LA02302					
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>			Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged:</i>		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specifications(s) F(ail) = failed a.m. test specifications(s) N/A = not applicable N/T = not tested					
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>					

Test Summary

5.1.1 ANTENNA REQUIREMENT

RESULT: Pass

5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER

RESULT: Pass

5.1.3 CONDUCTED POWER SPECTRAL DENSITY

RESULT: Pass

5.1.4 99%dB BANDWIDTH

RESULT: Pass

5.1.5 6dB BANDWIDTH

RESULT: Pass

5.1.6 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHz BANDWIDTH

RESULT: Pass

5.1.7 RADIATED SPURIOUS EMISSION

RESULT: Pass

5.1.8 CONDUCTED EMISSION ON AC MAINS

RESULT: Pass

6.1.1 ELECTROMAGNETIC FIELDS

RESULT: Pass

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1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Photographs of the Test Set-up

Appendix B: Test Results of Conducted Testing

Appendix C: Test Results of Radiated Testing and conducted emission on AC mains

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd. Testing Center

No. 362 Huanguan Road Middle, Longhua District, Shenzhen 518110, People's Republic of China

FCC Registration No.: 694916

IC Registration No.: 25069

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Radio Spectrum Testing				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Wireless Connectivity Tester	Rohde & Schwarz	CMW270	101375	2020-08-30
Signal Analyzer	Rohde & Schwarz	FSV 40	101441	2020-08-30
Vector Signal Generator	Rohde & Schwarz	SMBV100A	263301	2020-08-30
Signal Generator	Rohde & Schwarz	SMB100A	115186	2020-08-30
OSP	Rohde & Schwarz	OSP 150	101017	2020-12-20
Control PC	DELL	OptiPlex 7050	FTJZ9P2	N/A
Test Software	Rohde & Schwarz	WMS32 (V10.40.10)	N/A	N/A
Power Meter	Rohde & Schwarz	NRP2	107105	2020-12-20
Wideband Power Sensor	Rohde & Schwarz	NRP-Z81	105350	2020-12-20
Unwanted Emission Testing				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Signal Generator	Rohde & Schwarz	SMB100A	180840	2020-08-30
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	165339	2020-08-30
Signal Analyzer	Rohde & Schwarz	FSV 40	101440	2020-08-30
System Controller Interface	Rohde & Schwarz	SCI-100	S10010036	N/A
Filterbank	Rohde & Schwarz	CDMA	100751	2020-08-30
Filterbank	Rohde & Schwarz	GSM	100811	2020-08-30
OSP	Rohde & Schwarz	OSP 120	102041	N/A
OSP	Rohde & Schwarz	OSP 150	101385	N/A
Pre-amplifier	Rohde & Schwarz	SCU08F1	08320030	2020-08-30
Amplifier	Rohde & Schwarz	SCU-18F	180079	2020-08-30
Amplifier	Rohde & Schwarz	SCU40A	100450	2020-09-03
Trilog Broadband Antenna (30 MHz - 1 GHz)	Schwarzbeck	VULB9162	192	2020-09-02
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218719	2020-09-02
Wideband Ridged Horn Antenna (12- 18 GHz)	Steatite	QMS-00208	18312	2020-09-02
Wideband Ridged Horn Antenna (18- 40 GHz)	Steatite	QMS-00880	19066	2020-09-02
Biconical Broadband	Schwarzbeck	VUBA 9117	357	2020-09-02

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Antenna (30 MHz - 1 GHz)				
Conducted Emissions				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
EMI Test Receiver	R&S	ESR3	102428	2020-08-19
Artificial Mains Network	R&S	ENV216	102333	2020-08-19

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

Item		Extended Uncertainty
Conducted Emission		± 2.74 dB
Radiated Emission (30-1000MHz)	Field strength (dB μ V/m)	4.27dB
Radiated Emission (above 1000MHz)	Field strength (dB μ V/m)	4.46dB
Radio Spectrum		± 1.5 dB

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B & C of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Testing Center Test facility located at East of F/1, F/2 - F/4, Building 1, Cybio Technology Building, No. 6 Langshan No. 2 Road, North Hi-tech Industry Park, Nanshan District, Shenzhen, P.R. China, P. R. China. is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module, it supports Wi-Fi 802.11 b/g/n and Bluetooth Low Energy wireless technology.

Wi-Fi and Bluetooth Low Energy share one antenna and can't transmitting simultaneously.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Type Designation	M-LA02302
Trade Mark	LEEDARSON
FCC ID	2AB2Q-MLA02302
IC	10256A-MLA02302
HVIN	M-LA02302
Operating Voltage	DC 5V via USB interface
Testing Voltage	DC 5V via USB interface
Technical Specification of Wi-Fi 802.11 b/g/n	
Operating Frequency	2412 - 2462 MHz for 802.11b/g/n(HT20) 2422 - 2452 MHz for 802.11n(HT40)
Type of Modulation	DSSS(DBPSK/DQPSK/CCK) OFDM(BPSK/QPSK/16QAM/64QAM)
Data Rate	1/2/5.5/11 Mbps for 802.11b 6/9/12/18/24/36/48/54 Mbps for 802.11g MCS0 ~ MCS7 for 802.11n
Channel Number	11 channels for 802.11b/g/n(HT20) 7 channels for 802.11n(HT40)
Channel Separation	5 MHz
Antenna Type	Integral Antenna
Gain	-0.2 dBi
Technical Specification of Bluetooth Low Energy	
Operating Frequency	2402 – 2480 MHz
Bluetooth Core Version	4.2
Channel Number	40 channels
Channel separation	2MHz
Modulation	GFSK
Antenna Type	Integral Antenna
Antenna Gain	-0.2 dBi

Table 3: RF Channel and Frequency of Wi-Fi 802.11 b/g/n

RF Channel	802.11 b/g/n(HT20)	802.11 n(HT40)
	Frequency (MHz)	Frequency (MHz)
01	2412	/
02	2417	/
03	2422	2422
04	2427	2427
05	2432	2432
06	2437	2437
07	2442	2442
08	2447	2447
09	2452	2452
10	2457	/
11	2462	/

Test frequencies are lowest channel: 2412 MHz, middle channel: 2437 MHz and highest channel: 2462 MHz for 802.11b/g/n(HT20)

Test frequencies are lowest channel: 2422 MHz, middle channel: 2437 MHz and highest channel: 2452 MHz for 802.11n(HT40)

Table 4: RF Channel and Frequency of Bluetooth Low Energy

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
00	2402.00	10	2422.00	20	2442.00	30	2462.00
01	2404.00	11	2424.00	21	2444.00	31	2464.00
02	2406.00	12	2426.00	22	2446.00	32	2466.00
03	2408.00	13	2428.00	23	2448.00	33	2468.00
04	2410.00	14	2430.00	24	2450.00	34	2470.00
05	2412.00	15	2432.00	25	2452.00	35	2472.00
06	2414.00	16	2434.00	26	2454.00	36	2474.00
07	2416.00	17	2436.00	27	2456.00	37	2476.00
08	2418.00	18	2438.00	28	2458.00	38	2478.00
09	2420.00	19	2440.00	29	2460.00	39	2480.00

3.3 Independent Operation Modes

The basic operation modes are:

- A. On, Wi-Fi 802.11 b/g/n wireless transmitting
 - 1. Low channel
 - 2. Middle channel
 - 3. High channel
- B. On, Bluetooth Low Energy wireless transmitting
 - 4. Low channel
 - 5. Middle channel
 - 6. High channel
- C. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- | | |
|----------------------------------|------------------|
| - Application Form | - Photo Document |
| - Block Diagram | - Schematics |
| - FCC/IC Label and Location Info | - User Manual |
| - Operation Description | |

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.10: 2013.

4.3 Special Accessories and Auxiliary Equipment

Table 5: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N
Notebook	Lenovo	ThinkPad X260	N/A

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

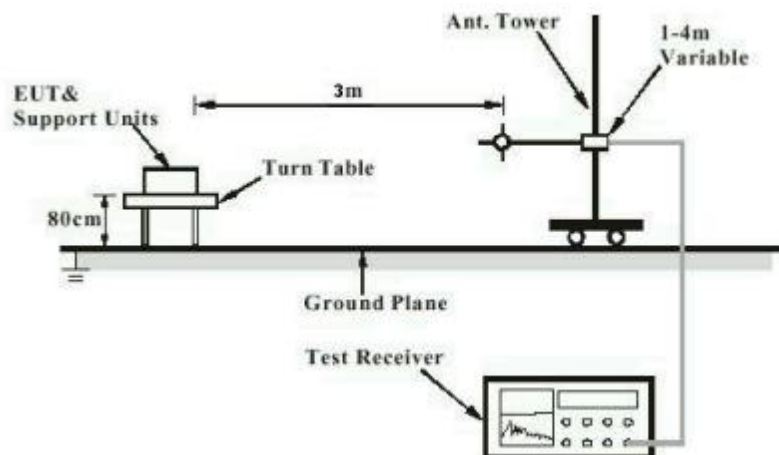


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

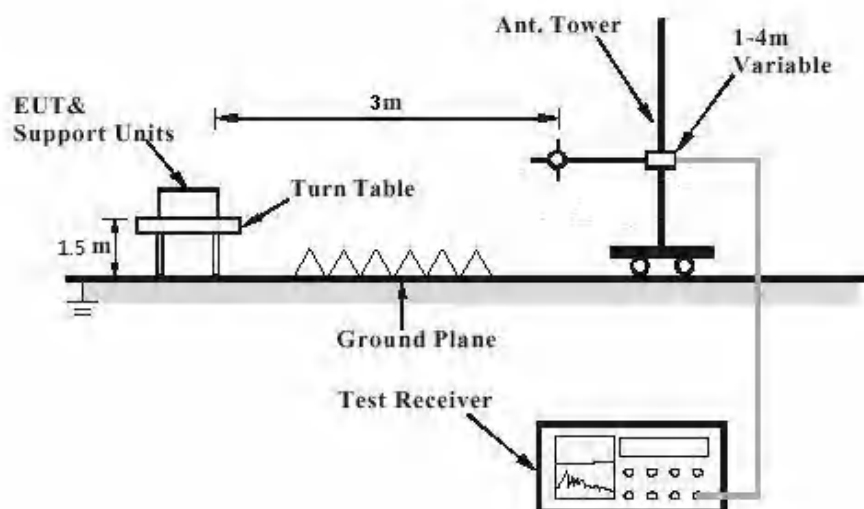


Diagram of Measurement Configuration for Mains Conduction Measurement

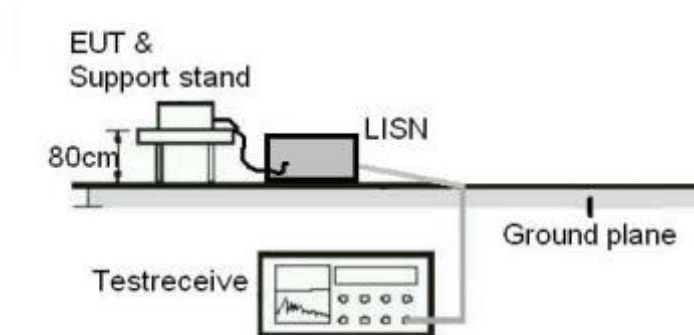
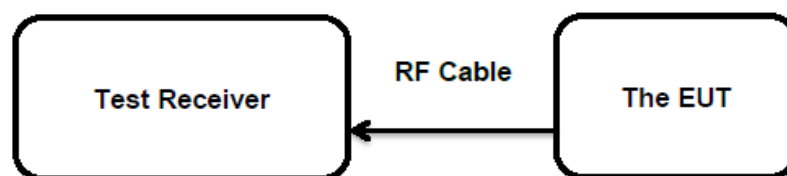


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:**Pass****Test Specification**

Test standard	:	FCC Part 15.247(b)(4) and Part 15.203
Limit	:	the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declared, the EUT has an internal antenna, the directional gain of antenna is -0.2 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 Maximum Peak Conducted Output Power

RESULT:
Pass
Test Specification

Test standard	: FCC Part 15.247(b)(3)
	: RSS-247 Clause 5.4(2)&(4)
Basic standard	: ANSI C63.10: 2013
Limits	: < 1 Watt (Maximum Conducted Peak Power)
	: e.i.r.p. <4W
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 03.07.2020 - 20.07.2020
Input voltage	: DC 5V
Operation mode	: A, B
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
Atmospheric pressure	: 101 kPa

For details refer to following test result.

Table 6: Test Result of Maximum Peak Conducted Output Power, Wi-Fi 802.11 b/g/n

Mode	802.11b			802.11g		
Data Rate	1Mbps			6Mbps		
Channel	1	6	11	1	6	11
Frequency (MHz)	2412	2437	2462	2412	2437	2462
Peak. Power (dBm)	19.0	19.2	19.1	18.7	19.9	15.6
Avg. Power (dBm)	17.2	17.4	17.2	15.2	16.5	11.9
Mode	802.11n HT20			802.11n HT40		
Data Rate	MCS0 6.5Mbps			MCS0 13.5Mbps		
Channel	1	6	11	3	6	9
Frequency(MHz)	2412	2437	2462	2422	2437	2452
Peak. Power (dBm)	18.1	20.0	14.5	14.5	18.4	12.1
Avg. Power (dBm)	14.2	16.6	10.5	12.2	16.6	9.0

Table 7: Test Result of Maximum Peak Conducted Output Power, Bluetooth Low Energy

Mode	Bluetooth Low Energy		
Channel	1	19	39
Frequency (MHz)	2402	2440	2480
Peak. Power (dBm)	8.4	9.0	8.8
Avg. Power (dBm)	8.3	8.8	8.6

Note: The cable loss is taken into account in results and the e.i.r.p. is 19.8 dBm less than 4W (36 dBm).

5.1.3 Conducted Power Spectral Density

RESULT:
Pass
Test Specification

Test standard : FCC Part 15.247(e)
 : RSS-247 Clause 5.2(2)
 Basic standard : ANSI C63.10: 2013
 Limits : 8 dBm / 3kHz
 Kind of test site : Shielded Room

Test Setup

Date of testing : 20.07.2020
 Input voltage : DC 5V
 Operation mode : A, B
 Test channel : Low / Middle / High
 Ambient temperature : 25 °C
 Relative humidity : 56 %
 Atmospheric pressure : 101 kPa

For details refer to following test result.

Table 8: Test Result of Power Spectral Density

Test Mode	Data Rate	Frequency (MHz)	Measured Peak Power Spectral Density (dBm/3KHz)
802.11b	1 Mbps	2412	-6.32
		2437	-8.01
		2462	-7.93
802.11g	6 Mbps	2412	-12.72
		2437	-13.52
		2462	-17.83
802.11n (HT20)	MCS0	2412	-12.87
		2437	-12.38
		2462	-18.76
802.11n (HT40)	MCS0	2422	-17.14
		2437	-14.16
		2452	-22.80
Bluetooth Low Energy	1 Mbps	2402	-7.60
		2440	-7.51
		2480	-7.36
Maximum Measured Value			-7.36

Note: The cable loss is taken into account in results.

For the measurement records, refer to the appendix B.

5.1.4 99%dB Bandwidth

RESULT:
Pass
Test Specification

Test standard : RSS-Gen clause 6.7
Basic standard : ANSI C63.10: 2013
Kind of test site : Shielded Room

Test Setup

Date of testing : 20.07.2020
Input voltage : DC 5V
Operation mode : A, B
Test channel : Low / Middle / High
Ambient temperature : 25 °C
Relative humidity : 56 %
Atmospheric pressure : 101 kPa

Table 9: Test Result of 99% Bandwidth

Test Mode	Data Rate	Frequency (MHz)	99% Bandwidth (MHz)	Limit (MHz)
802.11b	1 Mbps	2412	13.200	/
		2437	13.100	
		2462	13.200	
802.11g	6 Mbps	2412	16.700	
		2437	16.700	
		2462	16.700	
802.11n (HT20)	MCS0	2412	17.600	
		2437	17.600	
		2462	17.600	
802.11n (HT40)	MCS0	2422	37.000	
		2437	36.750	
		2452	36.500	
Bluetooth Low Energy	1 Mbps	2402	1.005	
		2440	1.010	
		2480	1.005	
Minimum Measured Value			1.005	

For the measurement records, refer to the appendix B.

5.1.5 6dB Bandwidth

RESULT:
Pass
Test Specification

Test standard : FCC Part 15.247(a)(2)
 : RSS-247 Clause 5.2(a)
 Basic standard : ANSI C63.10: 2013
 Limits : > 500 KHz
 Kind of test site : Shielded Room

Test Setup

Date of testing : 20.07.2020
 Input voltage : DC 5V
 Operation mode : A, B
 Test channel : Low / Middle / High
 Ambient temperature : 25 °C
 Relative humidity : 56 %
 Atmospheric pressure : 101 kPa

For details refer to following test result.

Table 10: Test Result of 6dB Bandwidth

Test Mode	Data Rate	Frequency (MHz)	-6dB Bandwidth (MHz)	Limit (kHz)
802.11b	1 Mbps	2412	10.15	> 500
		2437	10.15	
		2462	10.15	
802.11g	6 Mbps	2412	16.50	
		2437	16.50	
		2462	16.55	
802.11n (HT20)	MCS0	2412	17.65	
		2437	17.65	
		2462	17.65	
802.11n (HT40)	MCS0	2422	36.50	
		2437	36.50	
		2452	36.45	
Bluetooth Low Energy	1 Mbps	2402	0.67	
		2440	0.67	
		2480	0.67	
Minimum Measured Value			0.67	

For the measurement records, refer to the appendix B.

5.1.6 Conducted Spurious Emissions Measured in 100 kHz Bandwidth**RESULT:****Pass****Test Specification**

Test standard	: FCC Part 15.247(d) RSS-247 Clause 5.5
Basic standard	: ANSI C63.10: 2013
Limits	: 30dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power); In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 03.07.2020 – 23.07.2020
Input voltage	: DC 5V
Operation mode	: A, B
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
Atmospheric pressure	: 101 kPa

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to test plots, and compliance is achieved as well.

For the measurement records, refer to the appendix B.

5.1.7 Radiated Spurious Emission

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.247(d) & FCC Part 15.205 RSS-247 Clause 3.3 & 5.5
Basic standard	: ANSI C63.10: 2013
Limits	: Refer to 15.209(a) of FCC part 15.247(d) RSS-Gen Table 4 & Table 5
Kind of test site	: 3m Semi-anechoic Chamber

Test Setup

Date of testing	: 03.07.2020 – 23.07.2020
Input voltage	: DC 5V
Operation mode	: A, B
Test channel	: Low / Middle / High
Ambient temperature	: 22°C
Relative humidity	: 50 %
Atmospheric pressure	: 101 kPa

Remark:

Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix C.

5.1.8 Conducted Emission on AC Mains

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.207(a) RSS-Gen Clause 8.8
Basic standard	: ANSI C63.10: 2013
Frequency range	: 0.15 – 30MHz
Limits	: FCC Part 15.207(a) RSS-Gen Table 4
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 08.07.2020
Input voltage	: DC 5V
Operation mode	: A, B
Earthing	: Not connected
Ambient temperature	: 24 °C
Relative humidity	: 53 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix C.

6 Safety Human Exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT:**Pass****Test Specification**

Test standard : CFR47 FCC Part 2: Section 2.1091
CFR47 FCC Part 1: Section 1.1310
FCC KDB Publication 447498 v06
FCC KDB Publication 865664 D02 v01r02
OET Bulletin 65 (Edition 97-01)
RSS-102 Issue 5 March 2019

FCC requirement: Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20cm normally can be maintained between the user and the device.

MPE Calculation Method according to OET Bulletin 65

Power Density: $S_{(mW/cm^2)} = PG/4\pi R^2$ or $EIRP/4\pi R^2$

Where:

S = power density (mW/cm²)

P = power input to the antenna (mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (cm)

The nominal maximum conducted output power specified:

802.11b/g/n: 20.00 dBm

BLuetooth Low Energy: 9.00 dBm

From the peak RF output power, the minimum mobile separation distance, d=20 cm, as well as the antenna gain (-0.2 dBi 802.11b/g/n and Bluetooth Low Energy), the RF power density can be calculated as below:

For 802.11b/g/n: $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.019 \text{ mW/cm}^2$

For BLuetooth Low Energy: $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.002 \text{ mW/cm}^2$

Limits for Maximum Permissible Exposure (MPE) according to FCC Part 1.1310: 1.0 mW/cm²

➤ **IC requirements:** The EUT shall comply with the requirement of RSS-102 section 2.5.2.

Exemption from Routine Evaluation Limits – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;

- RF exposure evaluation exempted power for 2.4G DTS: 2.676 W

The nominal maximum conducted output power specified:

802.11b/g/n: 20.00 dBm

Bluetooth Low Energy: 9.00 dBm

Antenna Gain: -0.2 dBi 802.11b/g/n and Bluetooth Low Energy

The Max. e.i.r.p. for 802.11b/g/n: 19.8dBm = 0.095 W

The Max. e.i.r.p. for Bluetooth Low Energy: 8.8dBm = 0.008 W

Both e.i.r.p. for the 802.11b/g/n and Bluetooth Low Energy are less than the RF exposure evaluation exempted power. So RF exposure evaluation is not required.

“RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons.”

7 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix A.

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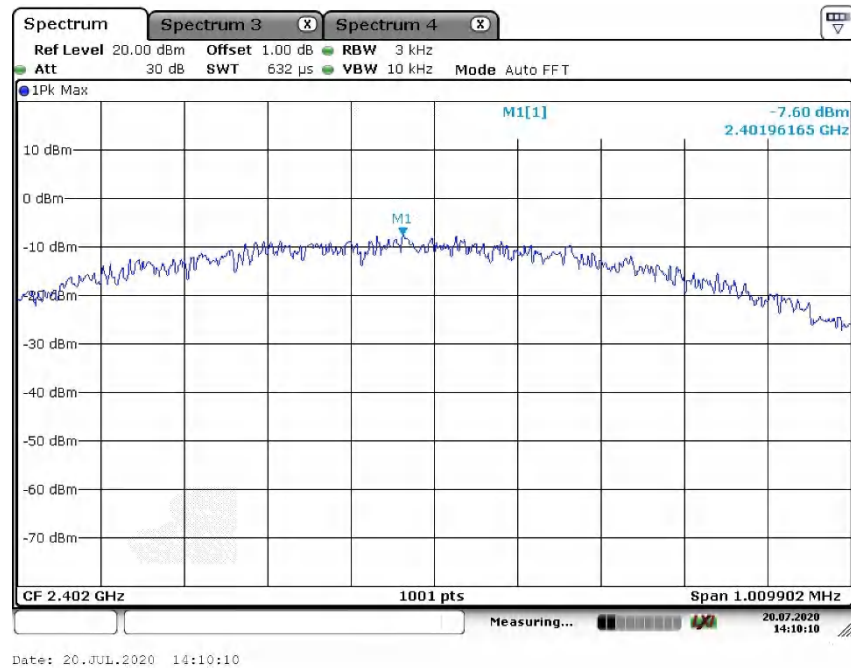
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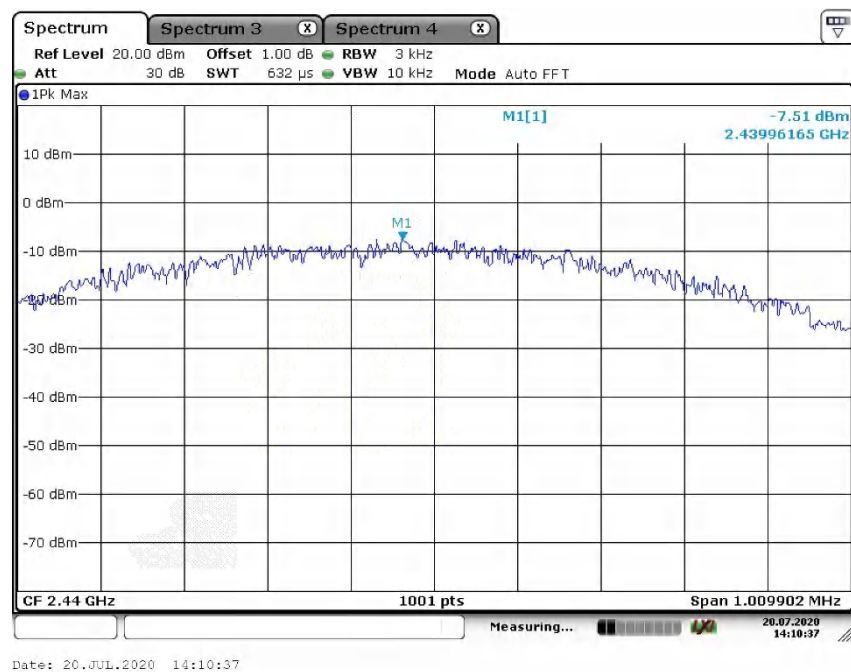
Appendix B.1: Conducted Power Spectral Density

Bluetooth Low Energy

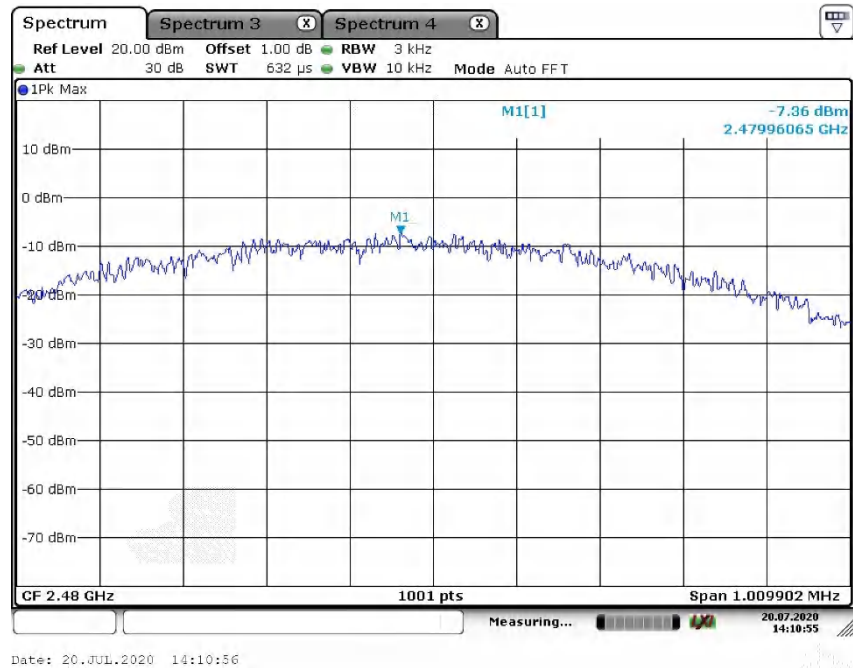
Low Channel



Middle Channel

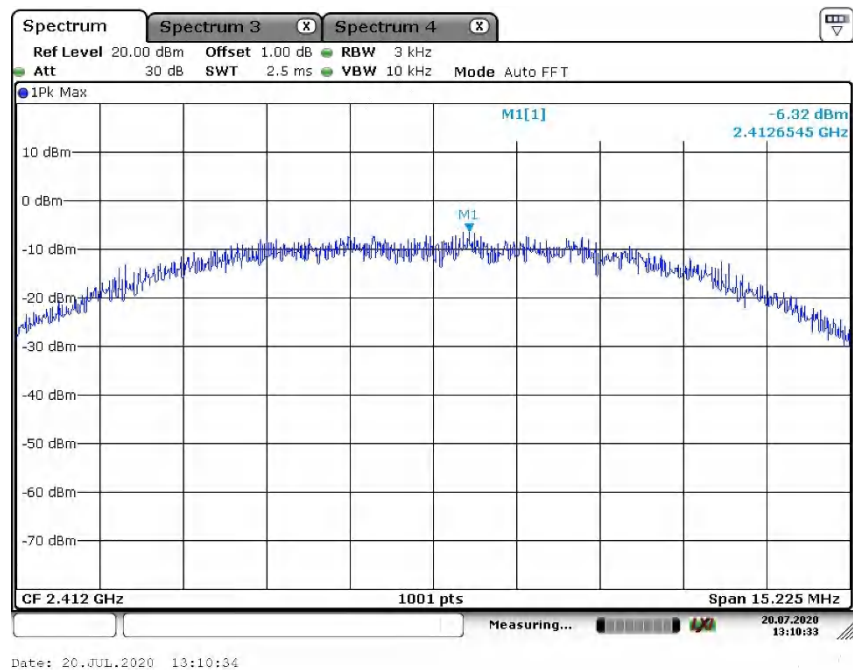


High Channel

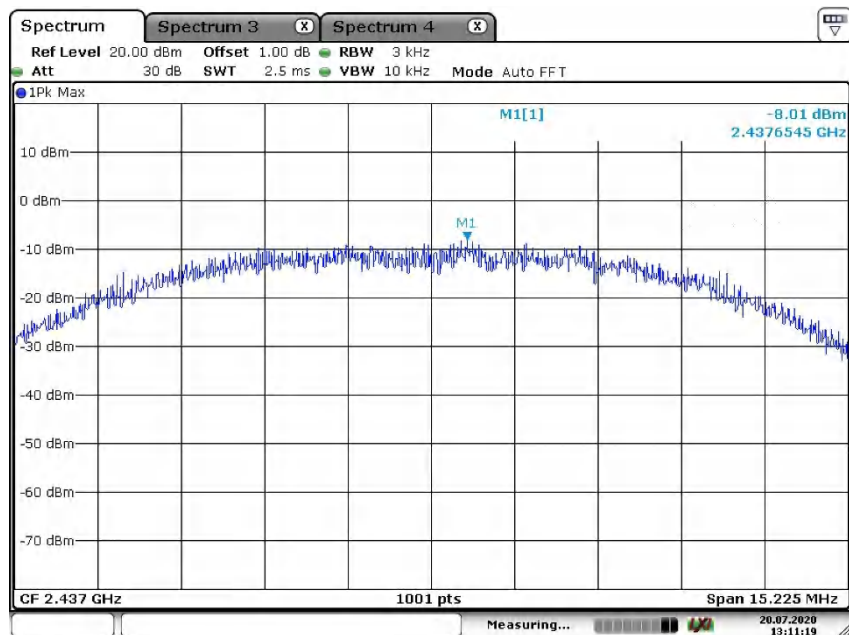


Wi-Fi 802.11 b mode, 1 Mbps

Low Channel

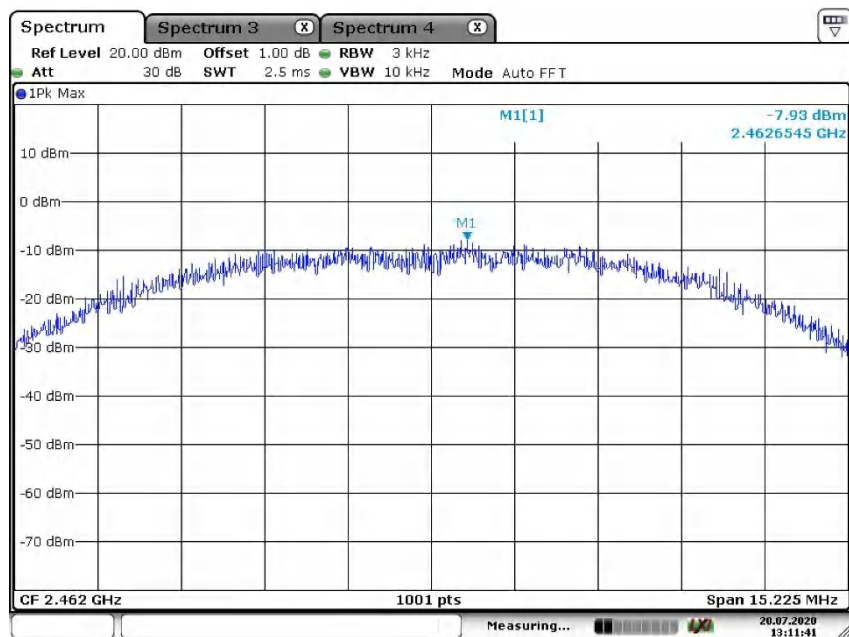


Middle Channel



Date: 20.JUL.2020 13:11:19

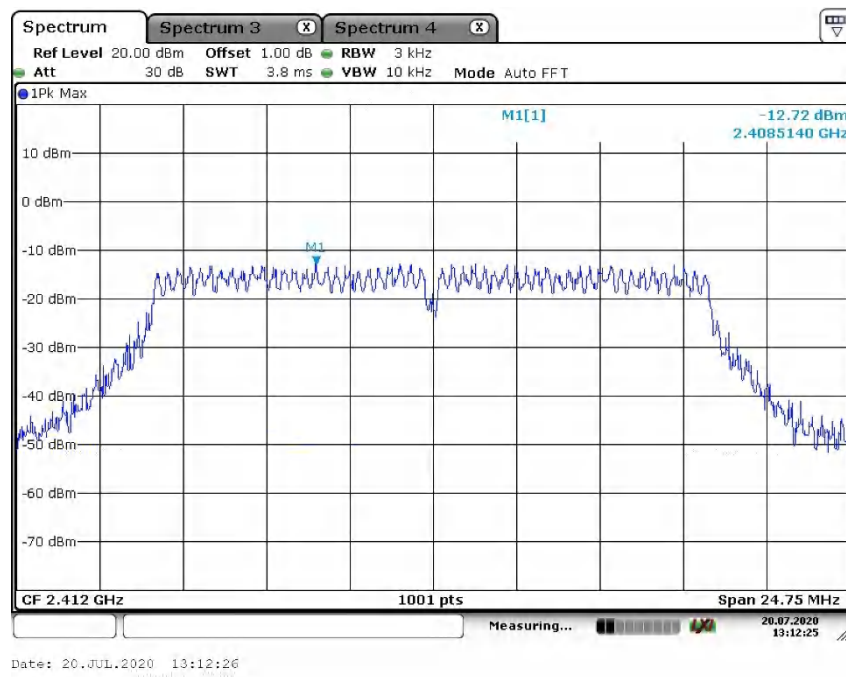
High Channel



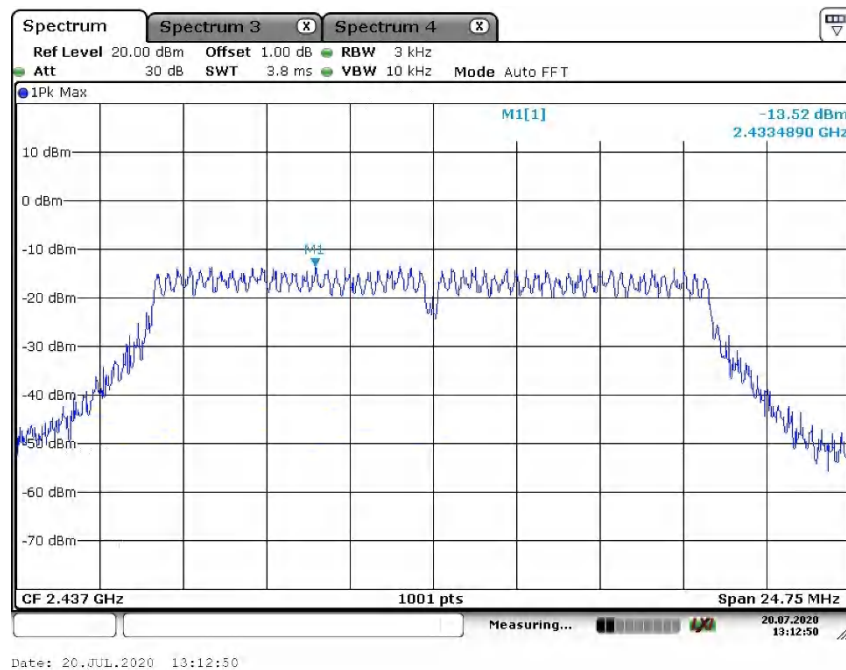
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Wi-Fi 802.11 g mode, 6 Mbps

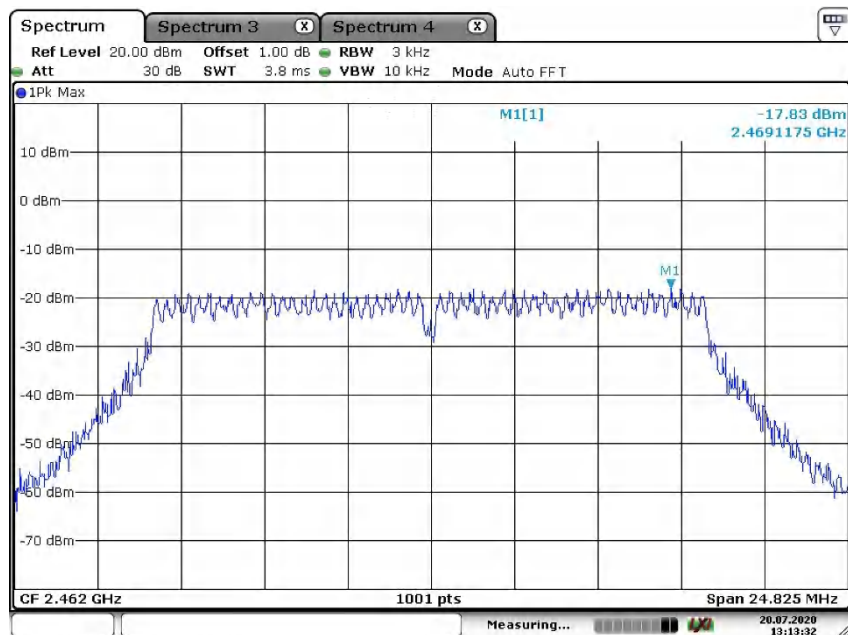
Low Channel



Middle Channel



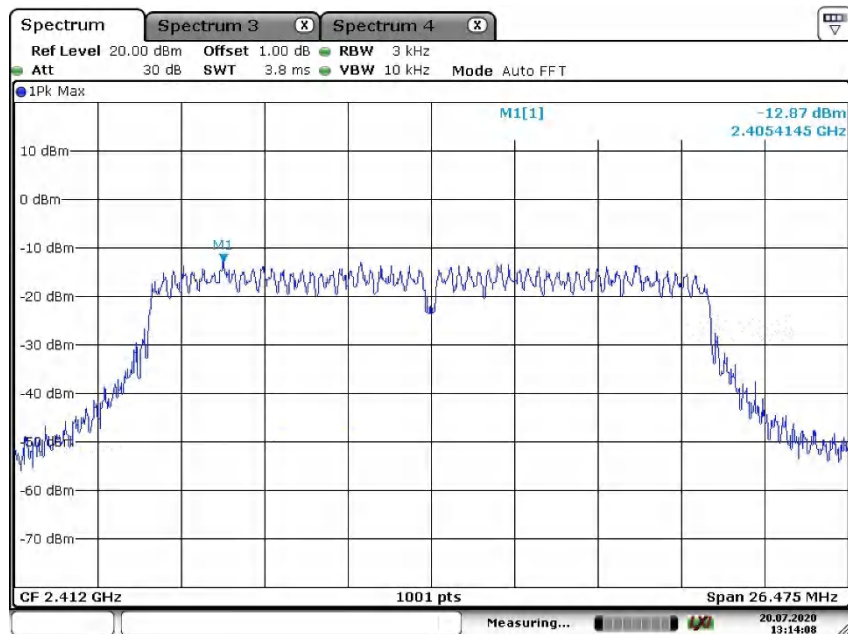
High Channel



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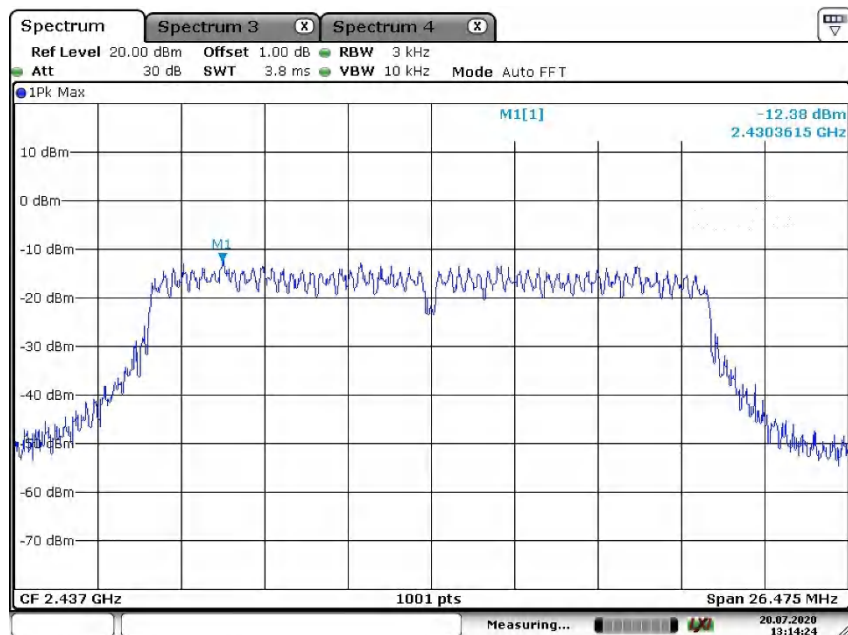
Wi-Fi 802.11 n(HT20) mode, MCS0

Low Channel



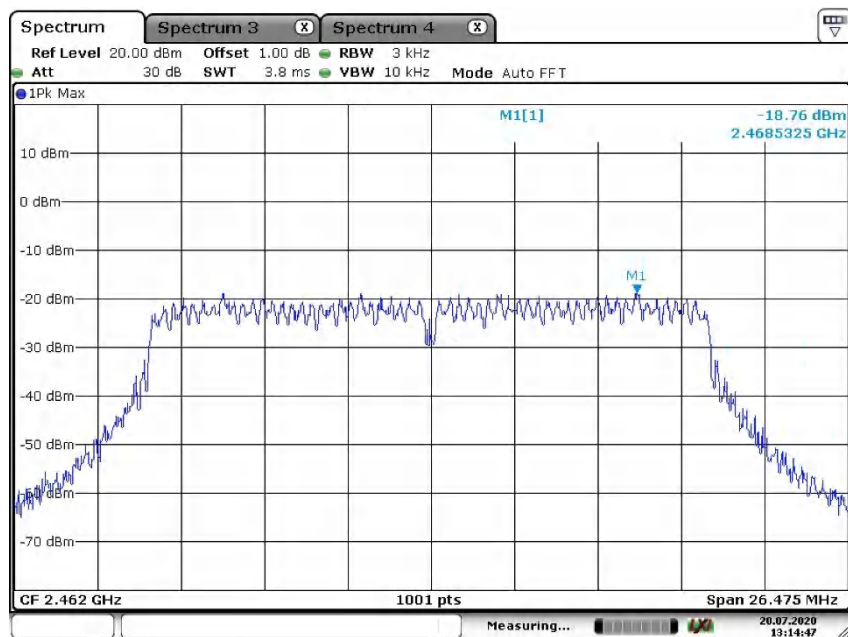
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Middle Channel



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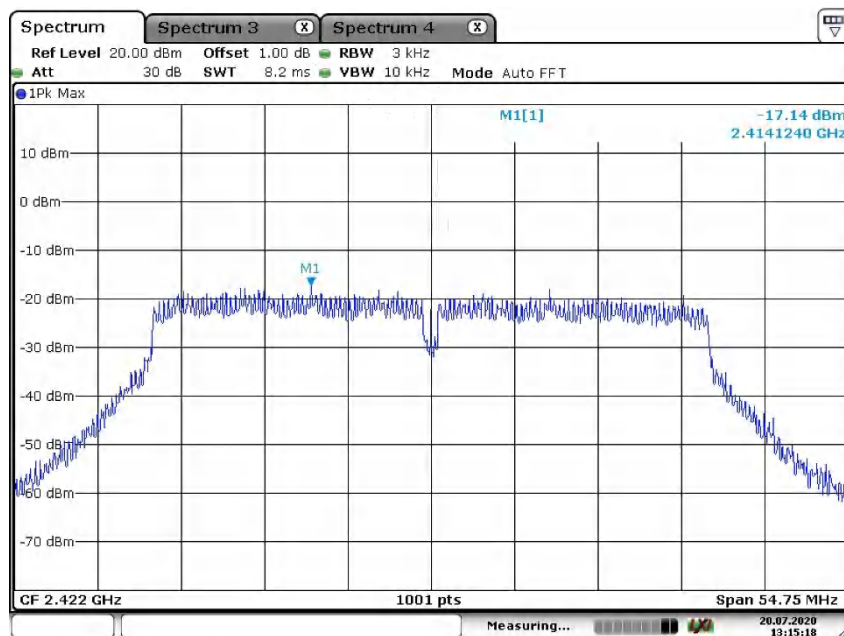
High Channel



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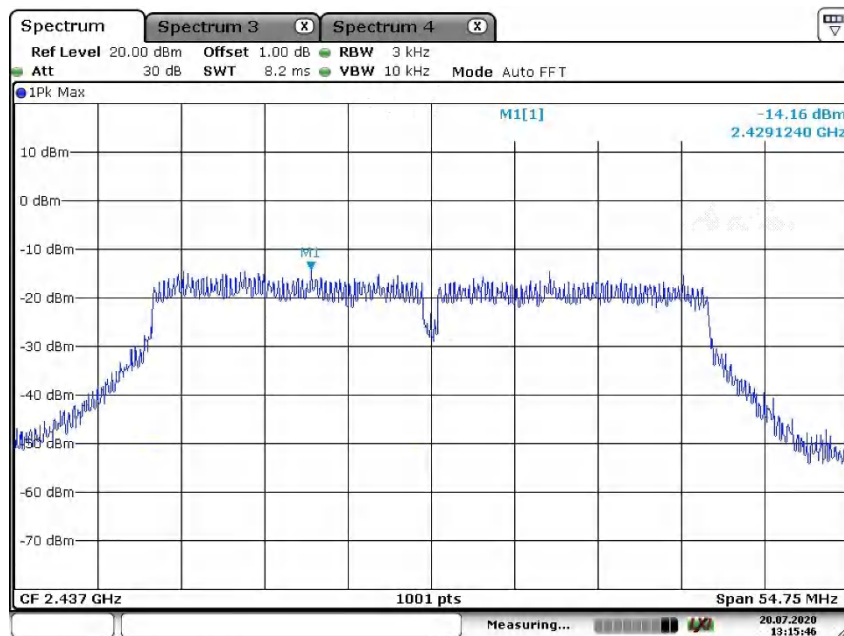
Wi-Fi 802.11 n(HT40) mode, MCS0

Low Channel



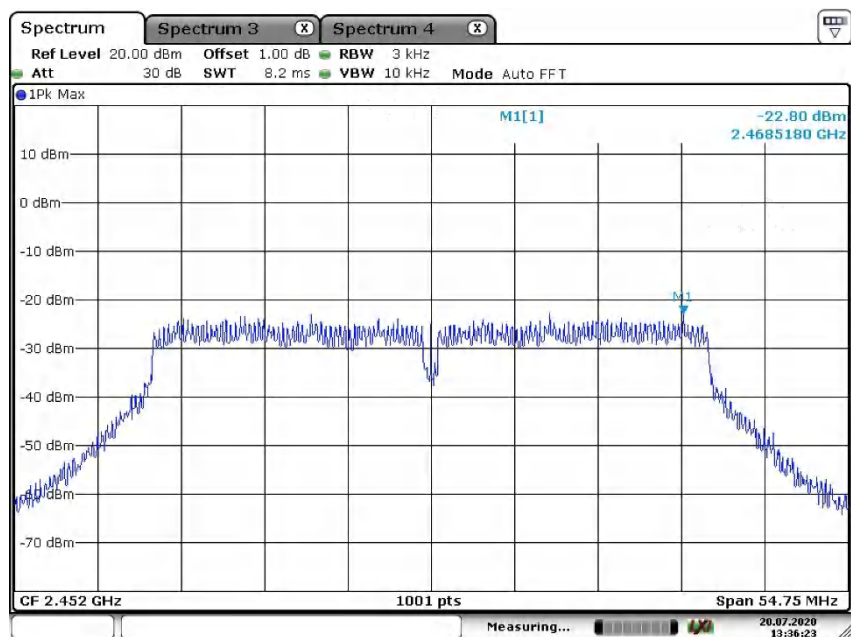
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Middle Channel



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High Channel



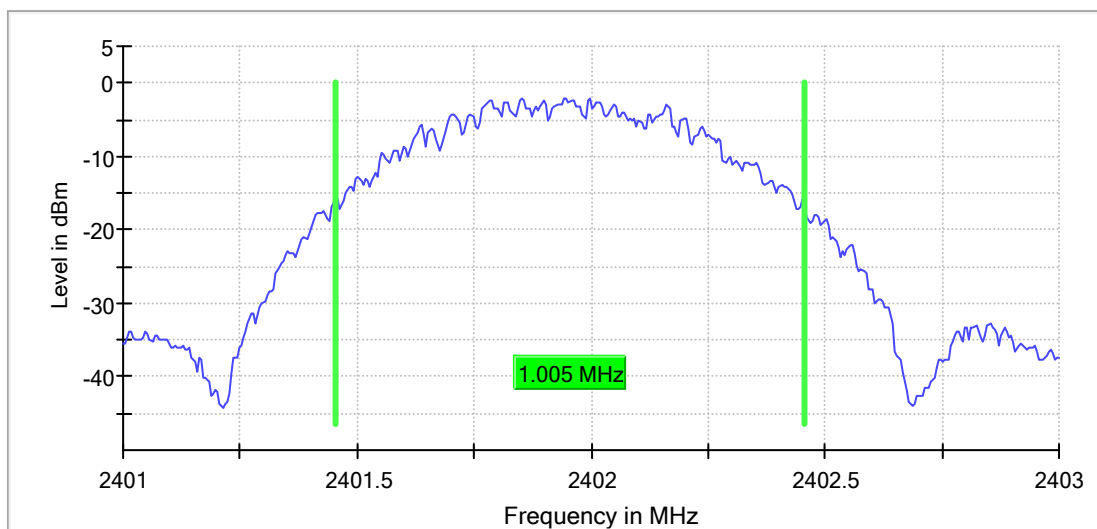
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Appendix B.2: 99% Bandwidth

Bluetooth Low Energy

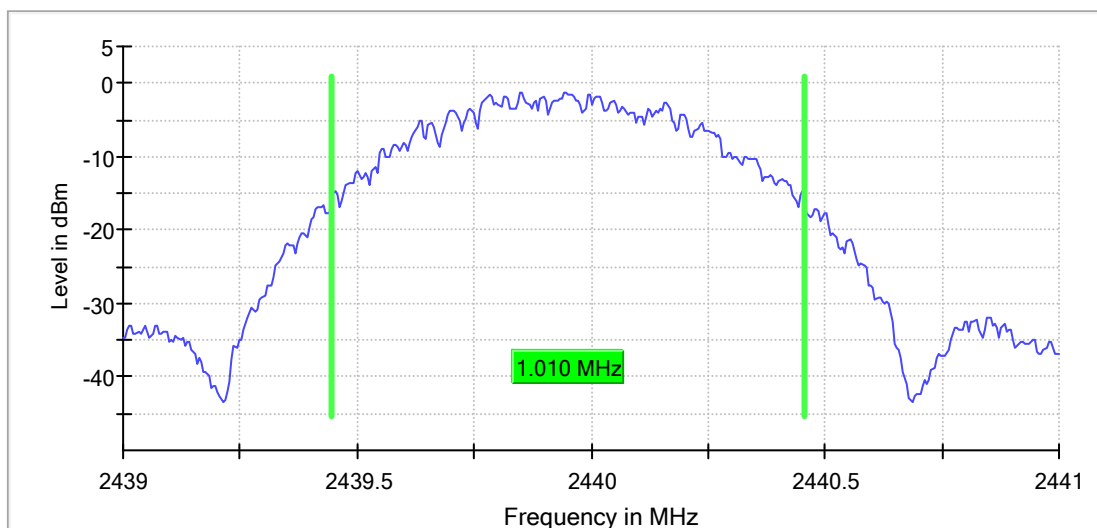
Low Channel
RBW=30KHz, VBW=100KHz

99 % Bandwidth

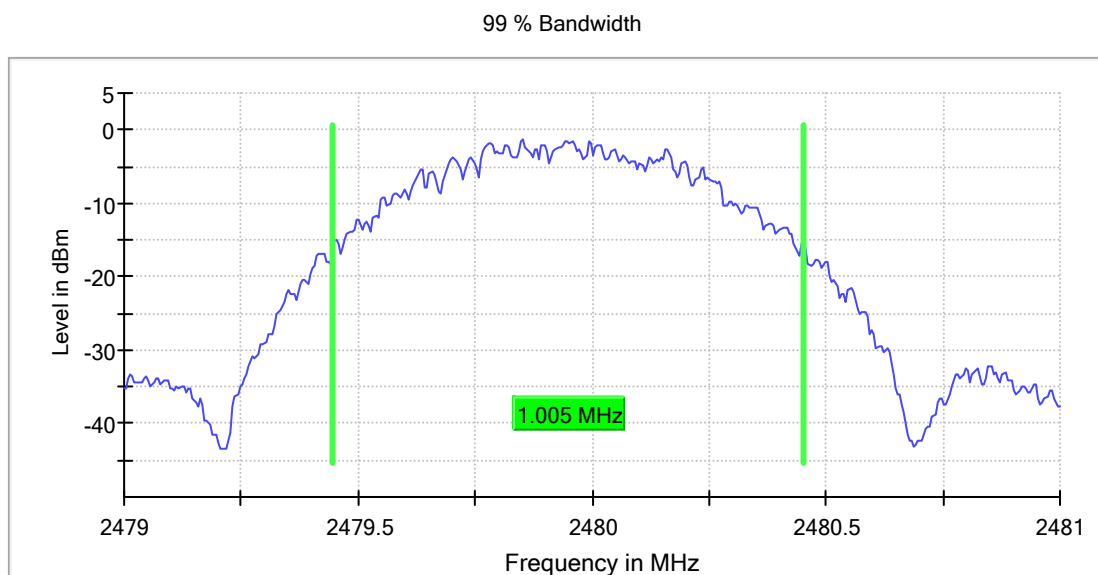


Middle Channel
RBW=30KHz, VBW=100KHz

99 % Bandwidth

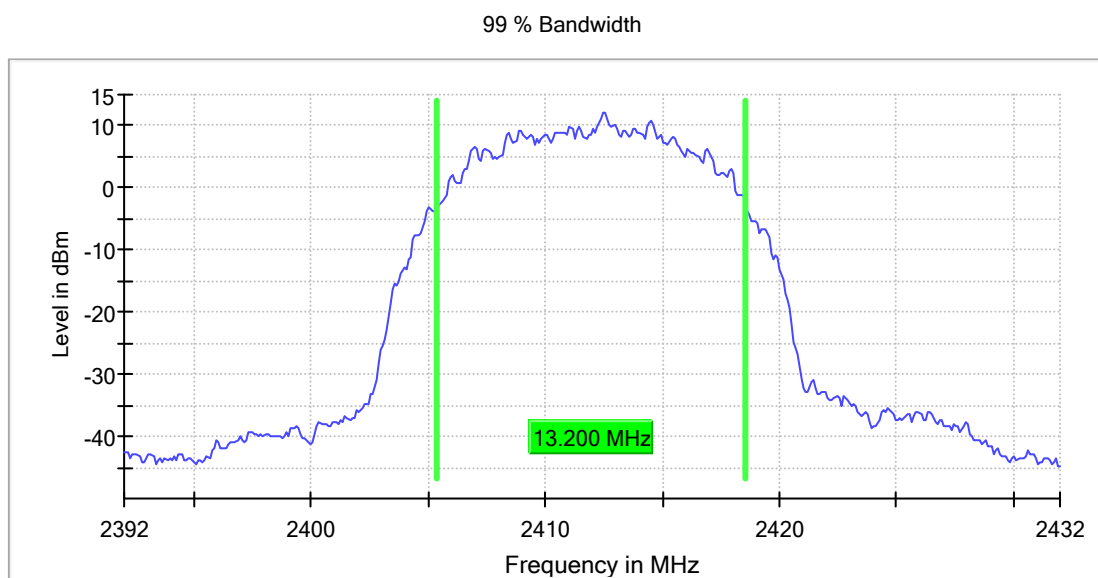


High Channel
RBW=30KHz, VBW=100KHz



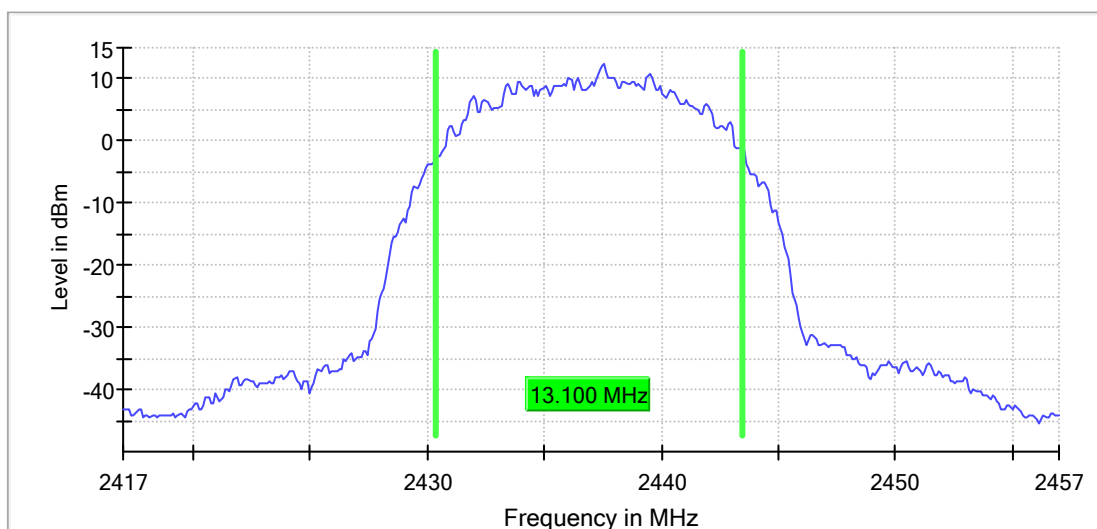
Wi-Fi 802.11 b mode, 1 Mbps

Low Channel
RBW=300KHz, VBW=1MHz



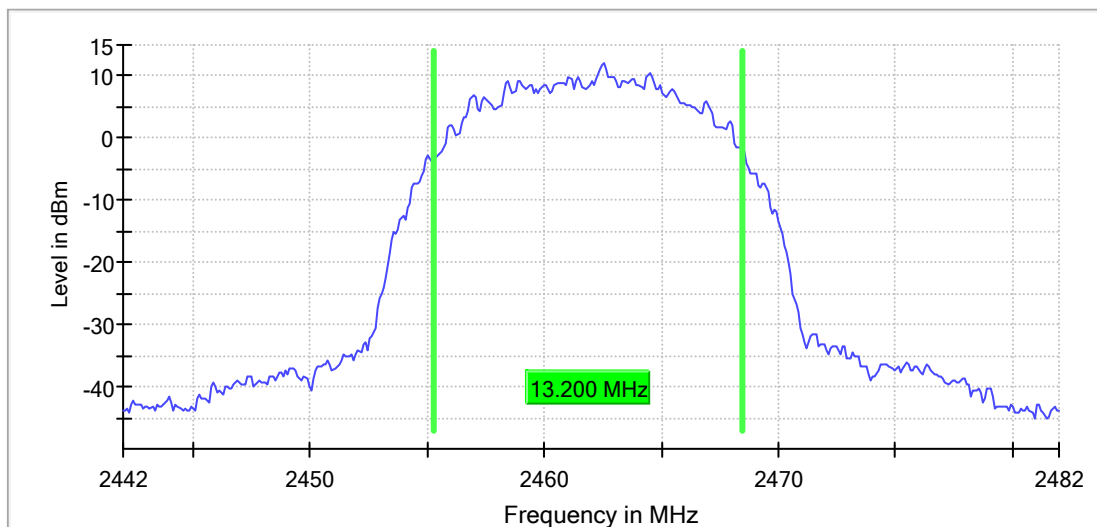
Middle Channel
RBW=300KHz, VBW=1MHz

99 % Bandwidth



High Channel
RBW=300KHz, VBW=1MHz

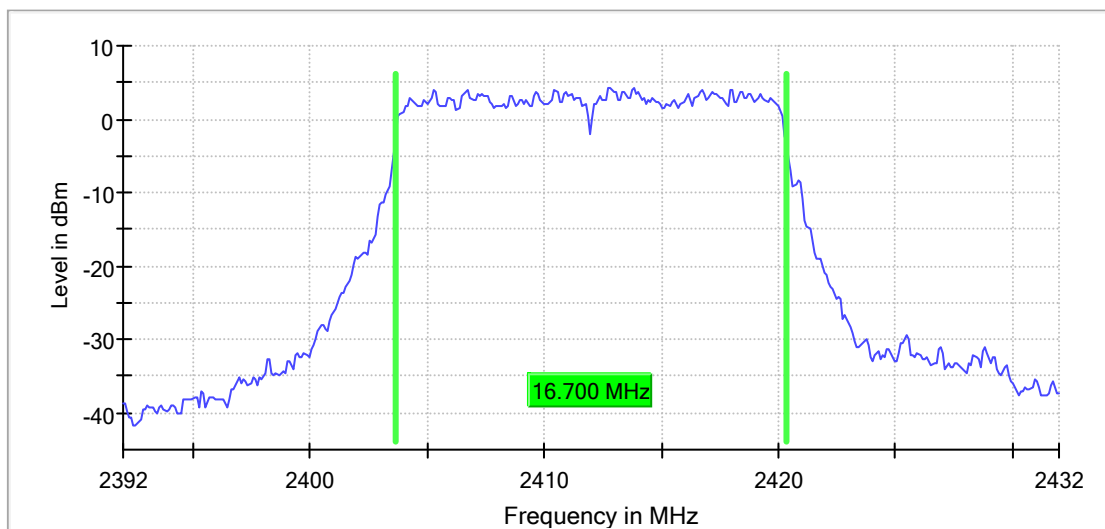
99 % Bandwidth



Wi-Fi 802.11 g mode, 6 Mbps

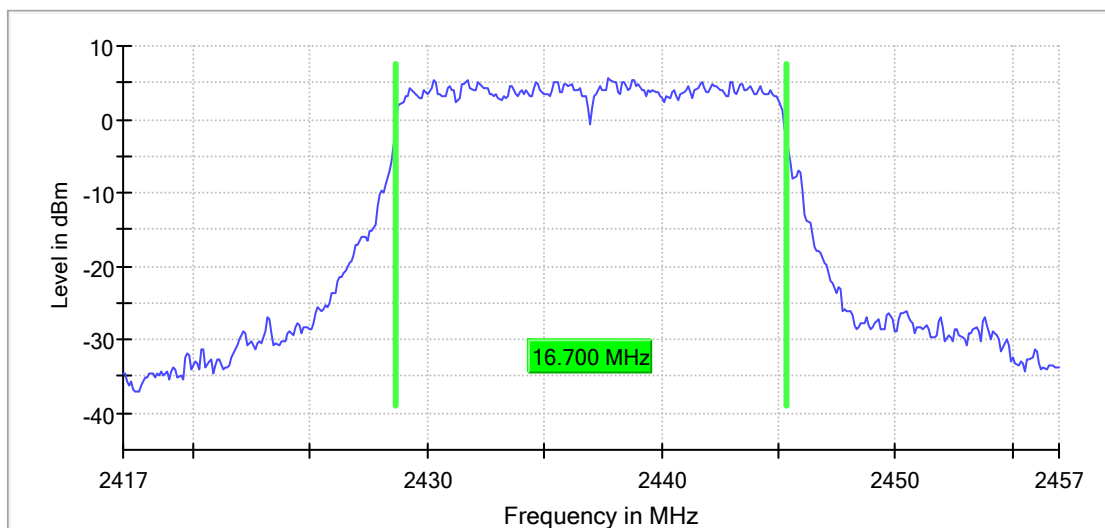
Low Channel
RBW=300KHz, VBW=1MHz

99 % Bandwidth



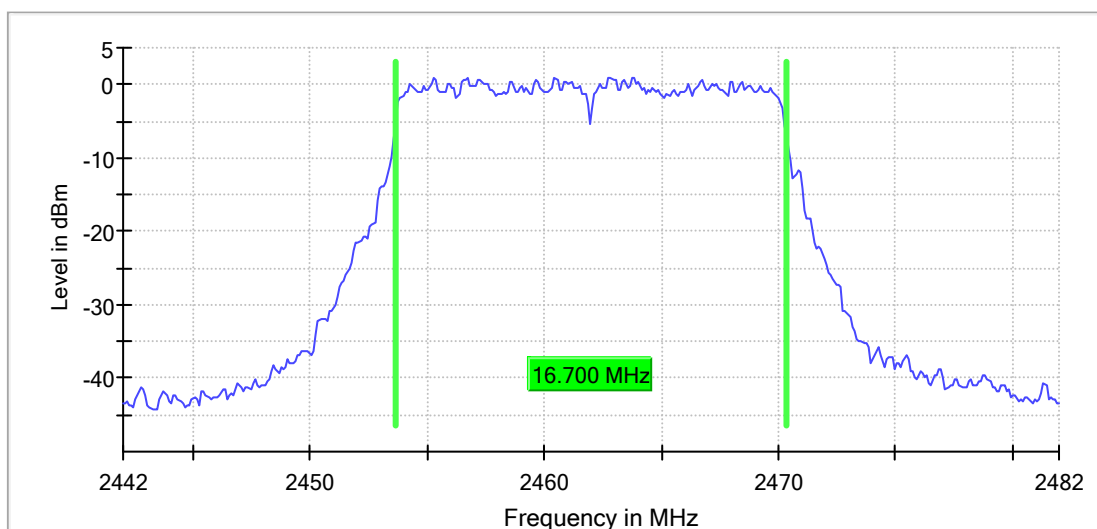
Middle Channel
RBW=300KHz, VBW=1MHz

99 % Bandwidth



High Channel
RBW=300KHz, VBW=1MHz

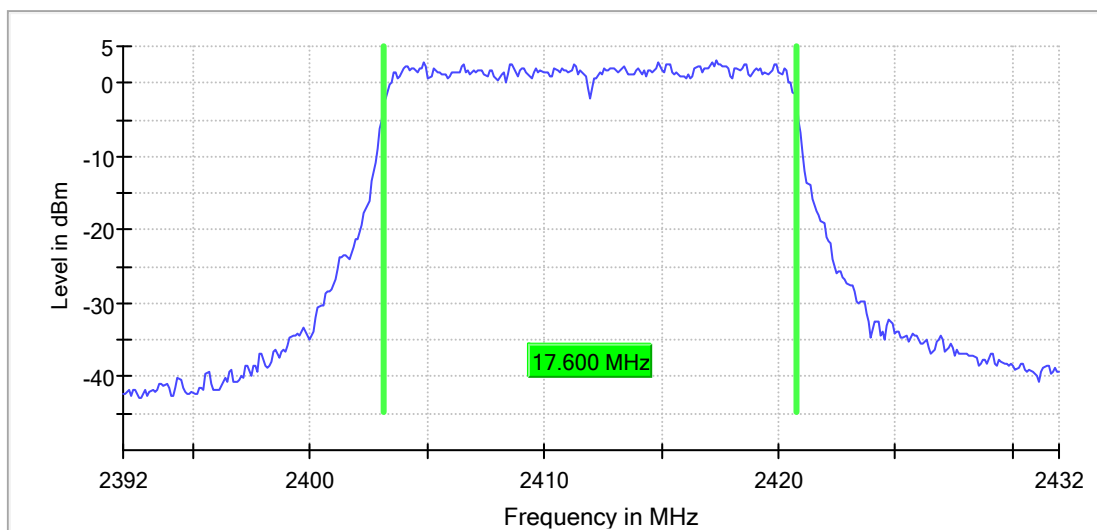
99 % Bandwidth



Wi-Fi 802.11 n(HT20) mode, MCS0

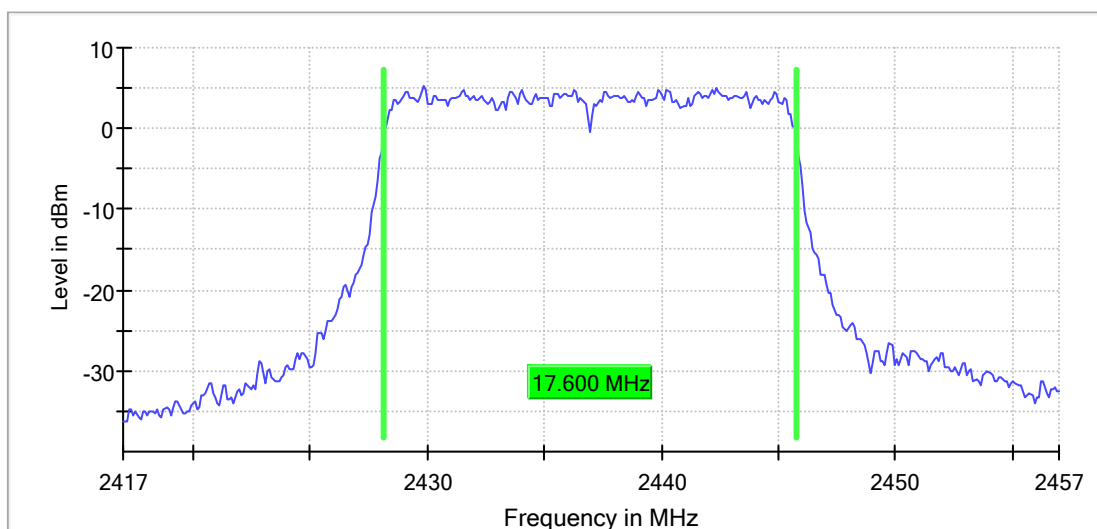
Low Channel
RBW=300KHz, VBW=1MHz

99 % Bandwidth



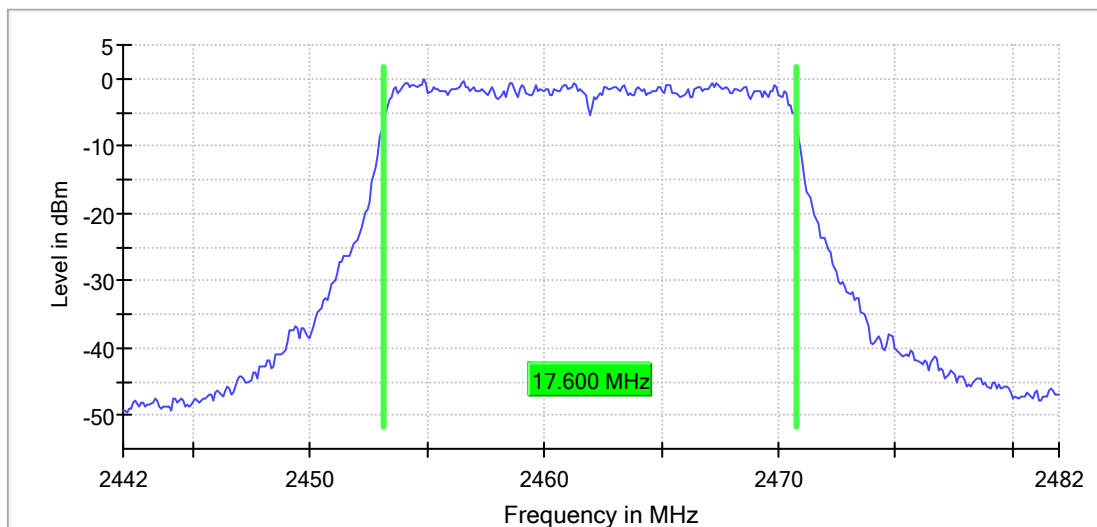
Middle Channel
RBW=300KHz, VBW=1MHz

99 % Bandwidth



High Channel
RBW=300KHz, VBW=1MHz

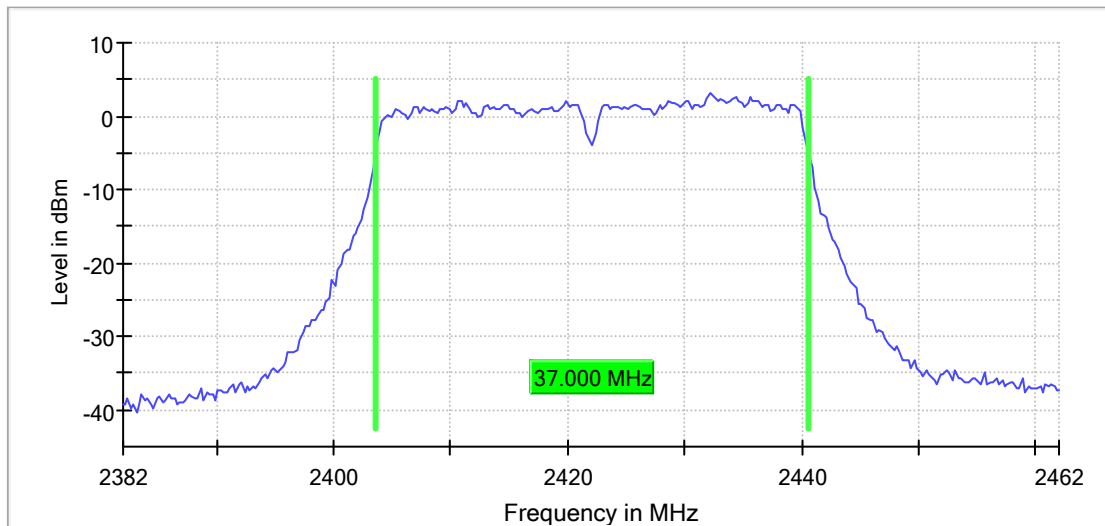
99 % Bandwidth



Wi-Fi 802.11 n(HT40) mode, MCS0

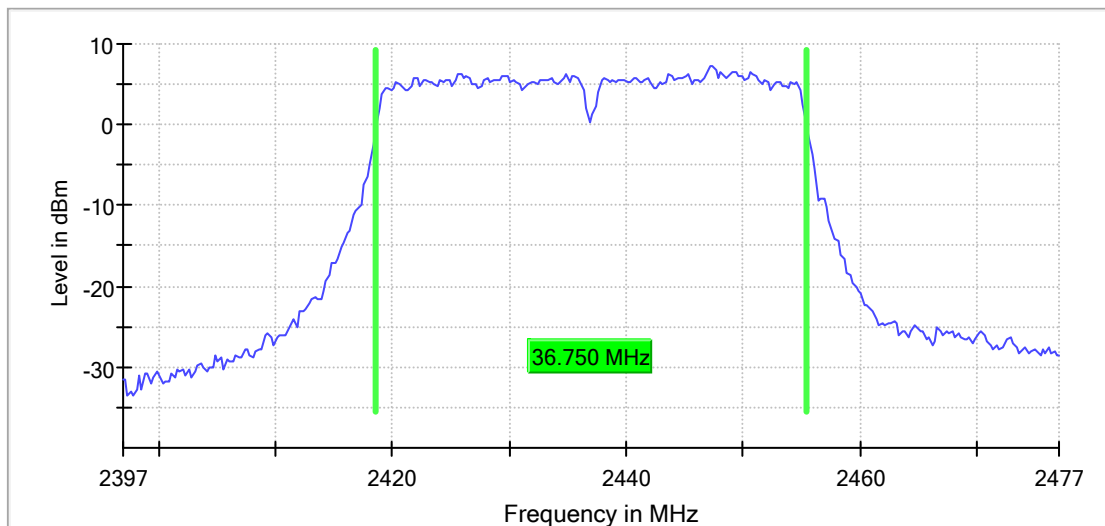
Low Channel
RBW=500KHz, VBW=2MHz

99 % Bandwidth



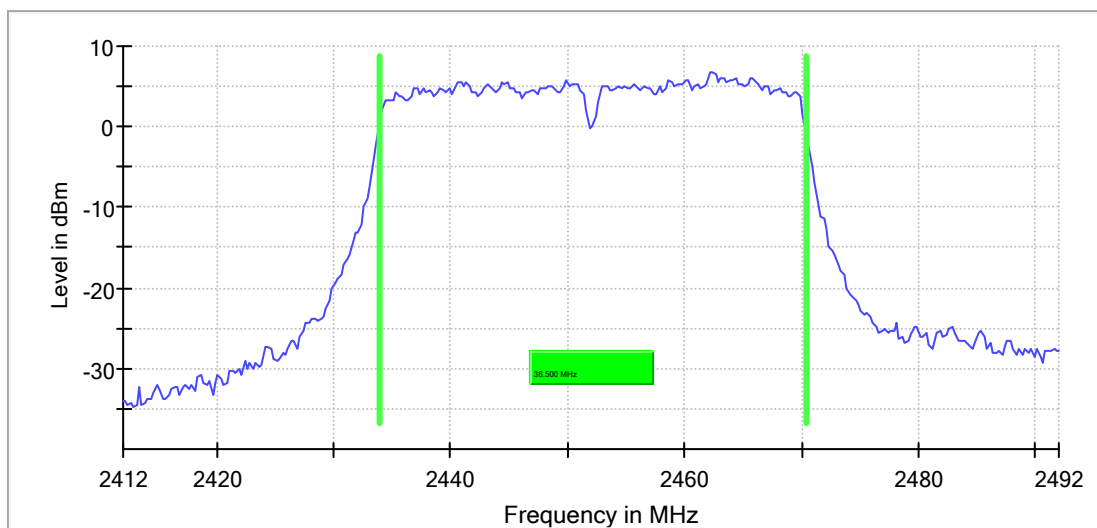
Middle Channel
RBW=500KHz, VBW=2MHz

99 % Bandwidth



High Channel
RBW=500KHz, VBW=2MHz

99 % Bandwidth

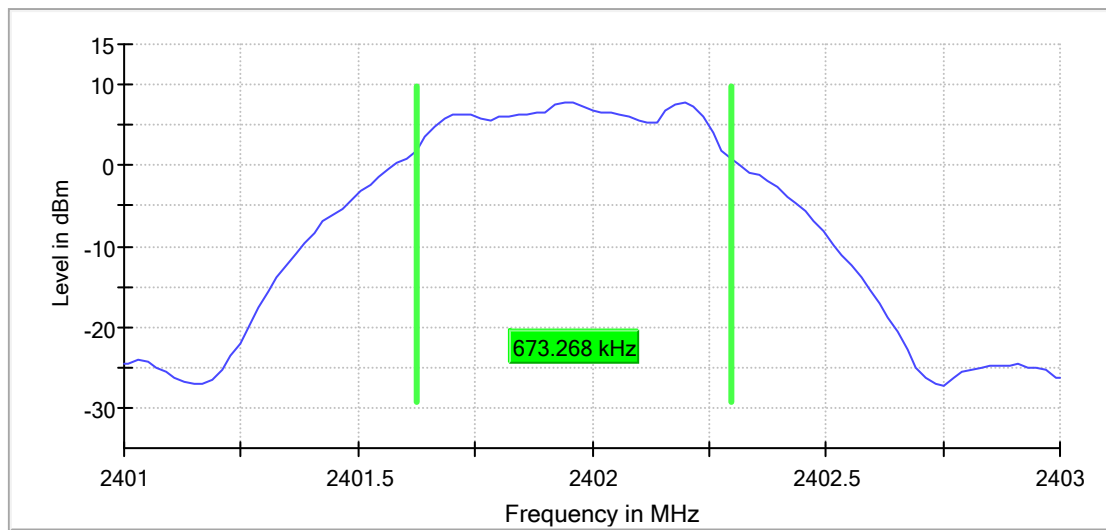


Appendix B.3: 6dB Bandwidth

Bluetooth Low Energy

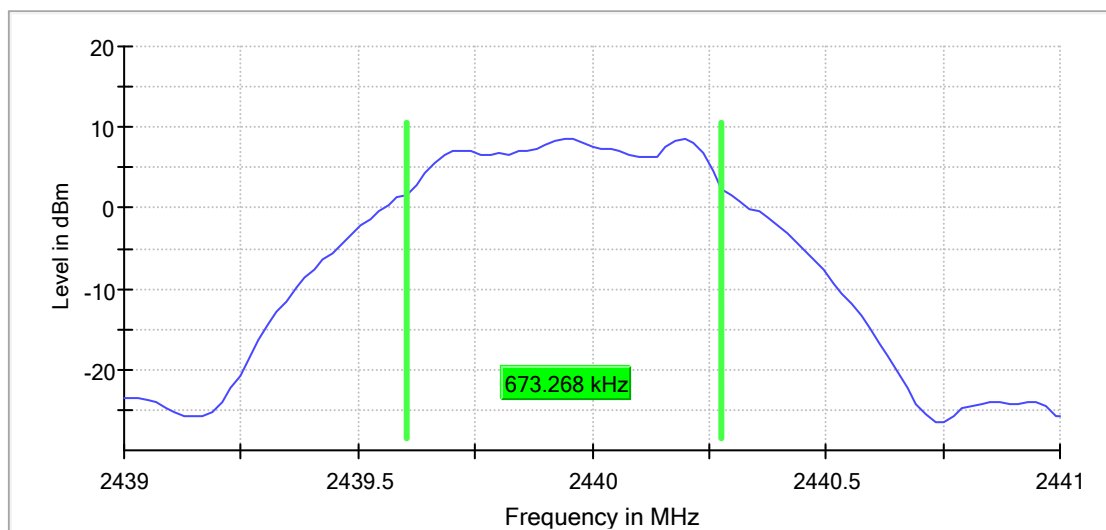
Low Channel
RBW=100KHz, VBW=300KHz

6 dB Bandwidth



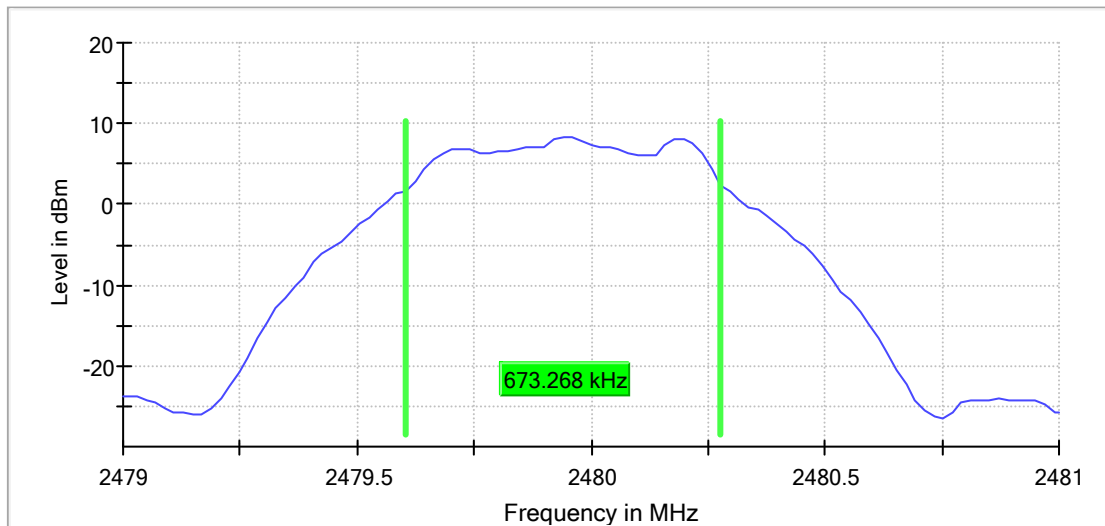
Middle Channel
RBW=100KHz, VBW=300KHz

6 dB Bandwidth



High Channel
RBW=100KHz, VBW=300KHz

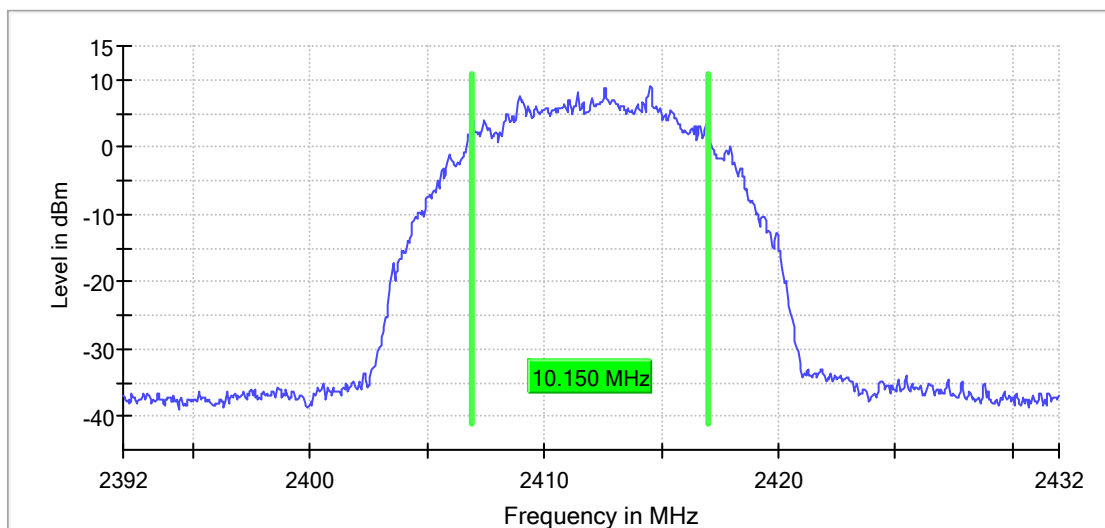
6 dB Bandwidth



Wi-Fi 802.11 b mode, 1 Mbps

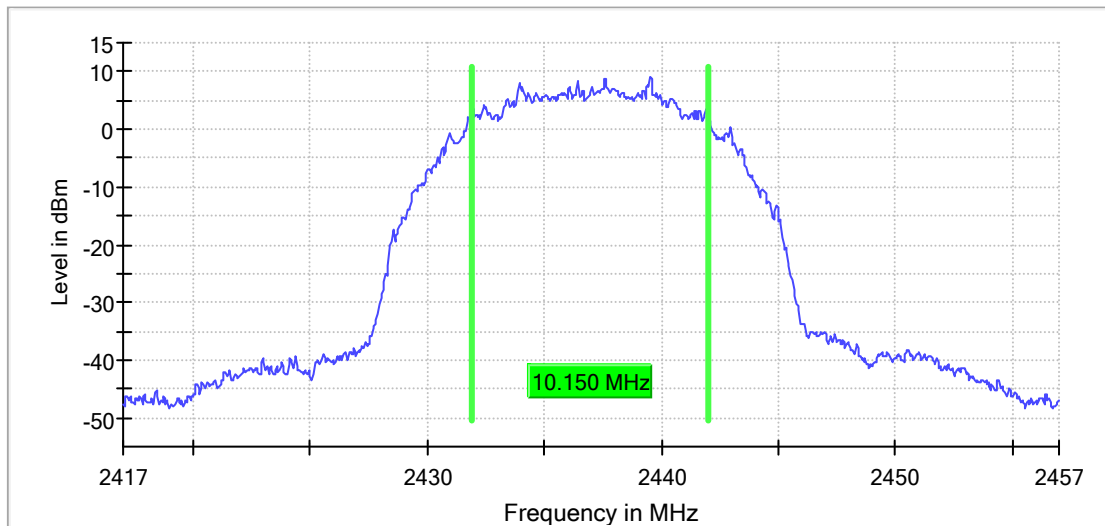
Low Channel
RBW=100KHz, VBW=300KHz

6 dB Bandwidth



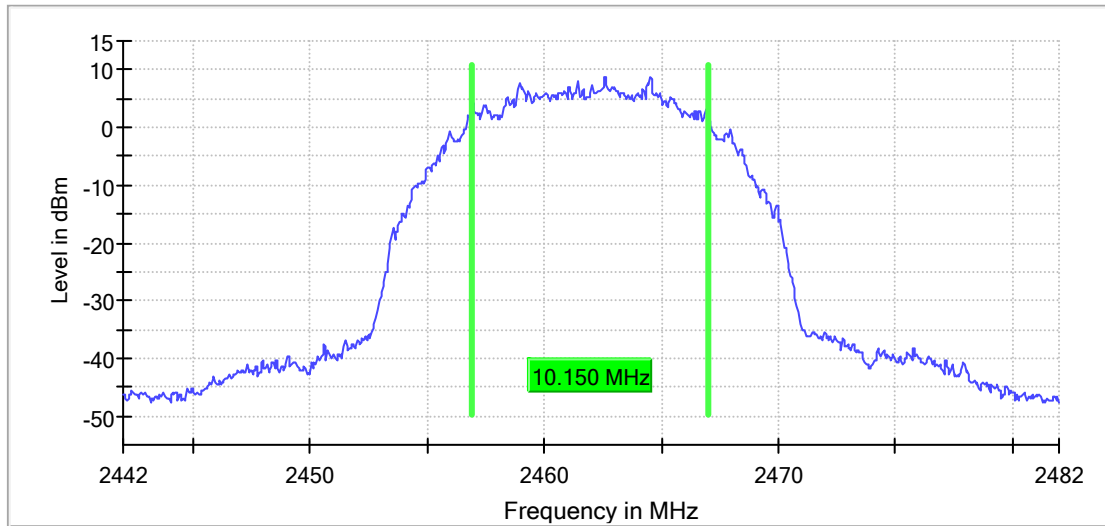
Middle Channel
RBW=100KHz, VBW=300KHz

6 dB Bandwidth



High Channel
RBW=100KHz, VBW=300KHz

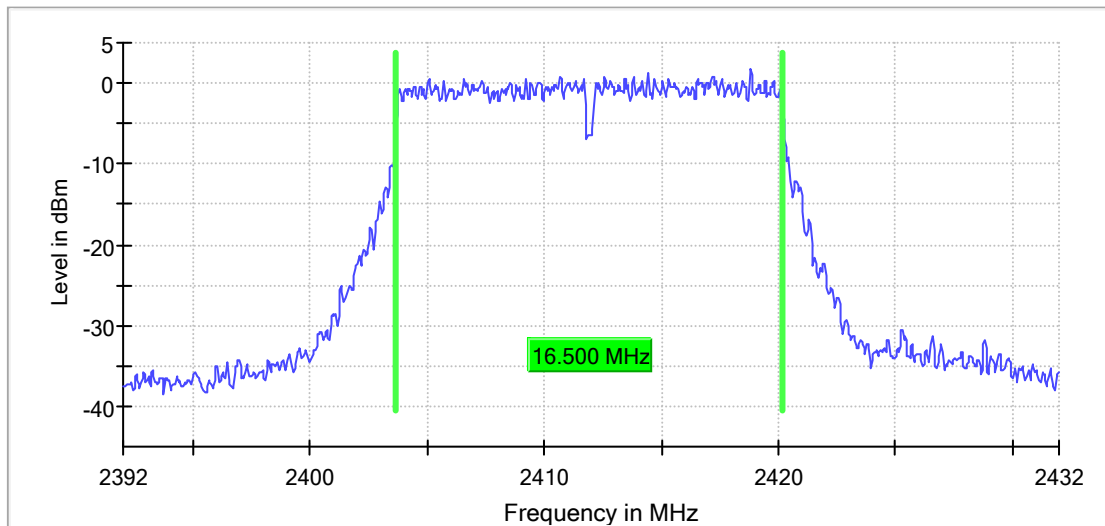
6 dB Bandwidth



Wi-Fi 802.11 g mode, 6 Mbps

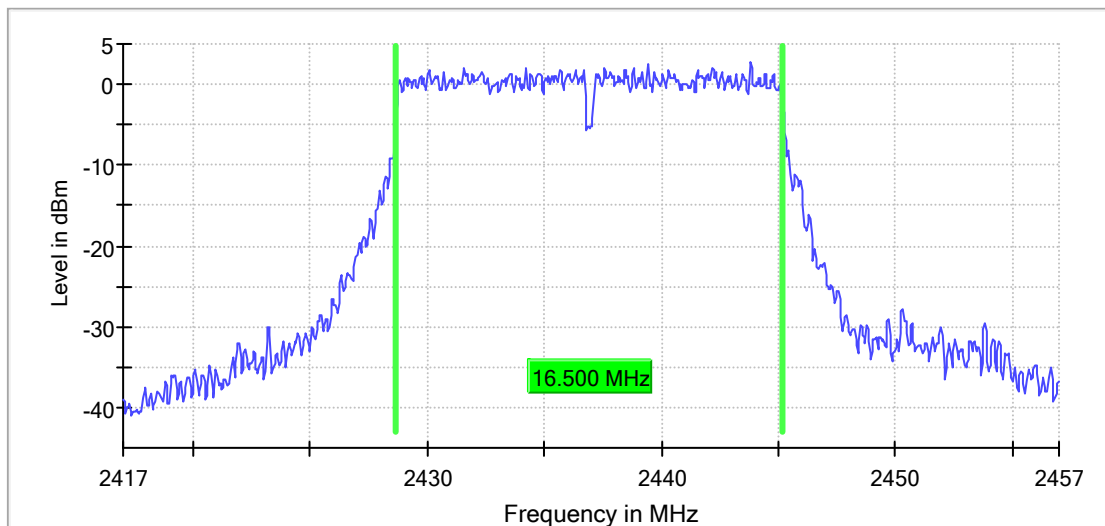
Low Channel
RBW=100KHz, VBW=300KHz

6 dB Bandwidth



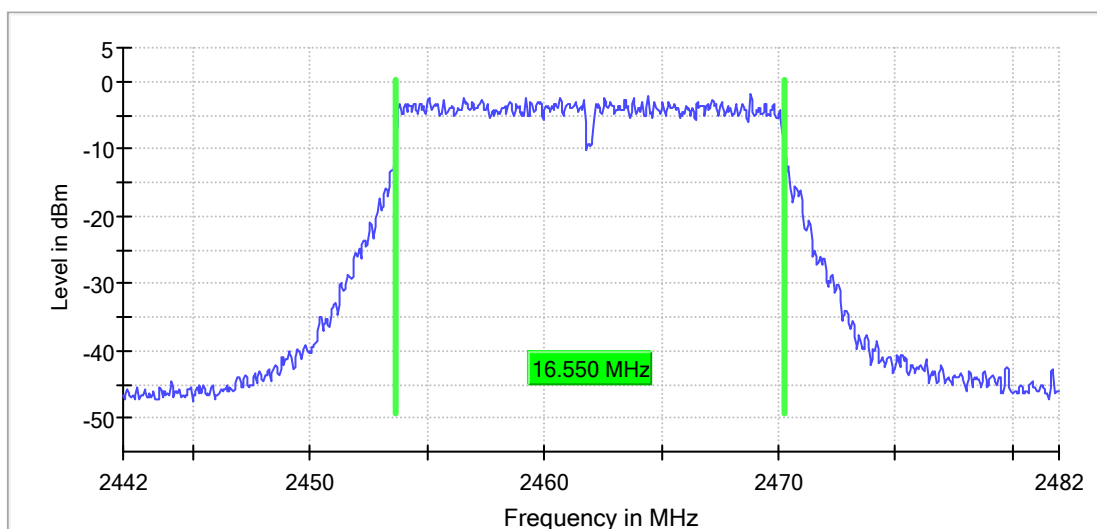
Middle Channel
RBW=100KHz, VBW=300KHz

6 dB Bandwidth



High Channel
RBW=100KHz, VBW=300KHz

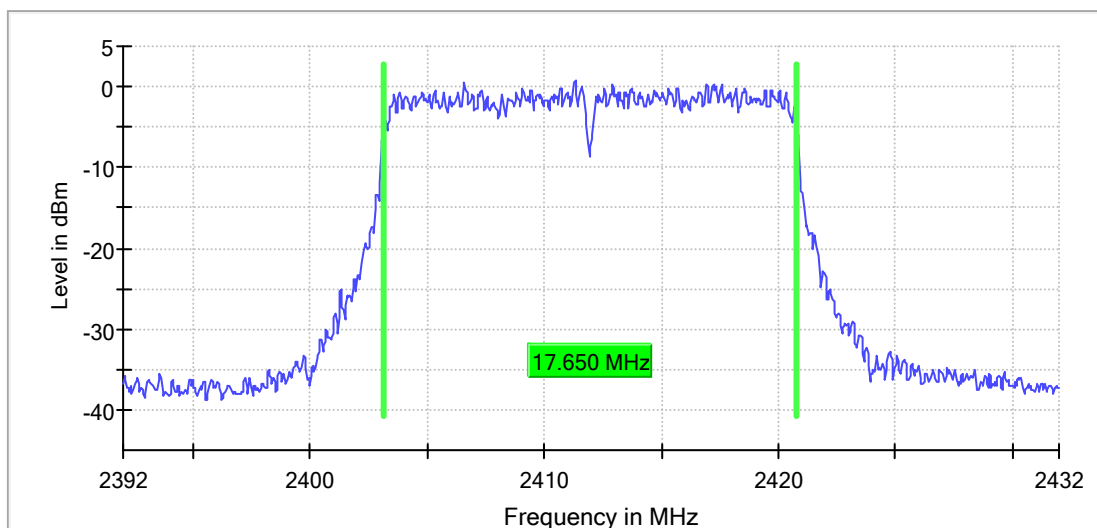
6 dB Bandwidth



Wi-Fi 802.11 n(HT20) mode, MCS0

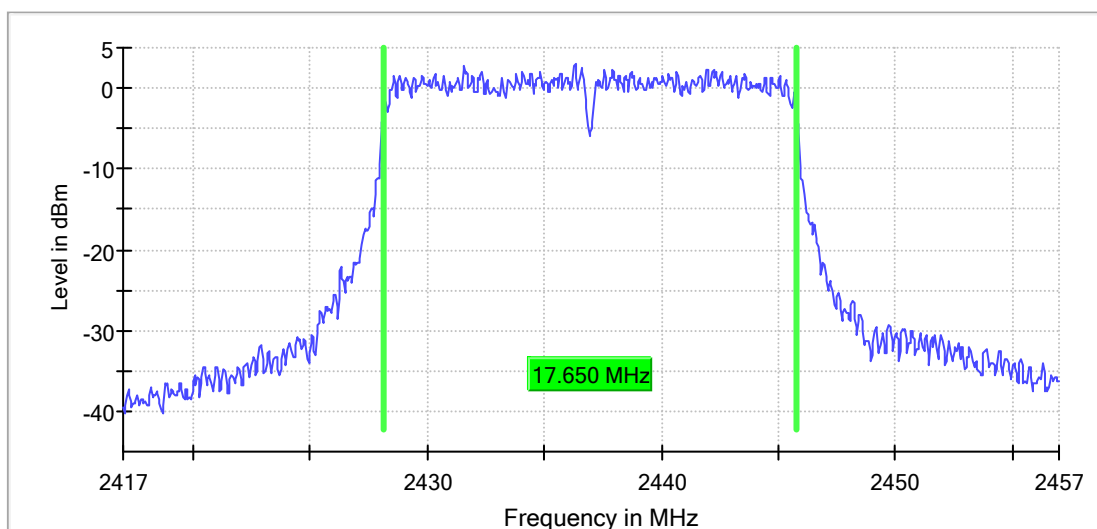
Low Channel
RBW=100KHz, VBW=300KHz

6 dB Bandwidth



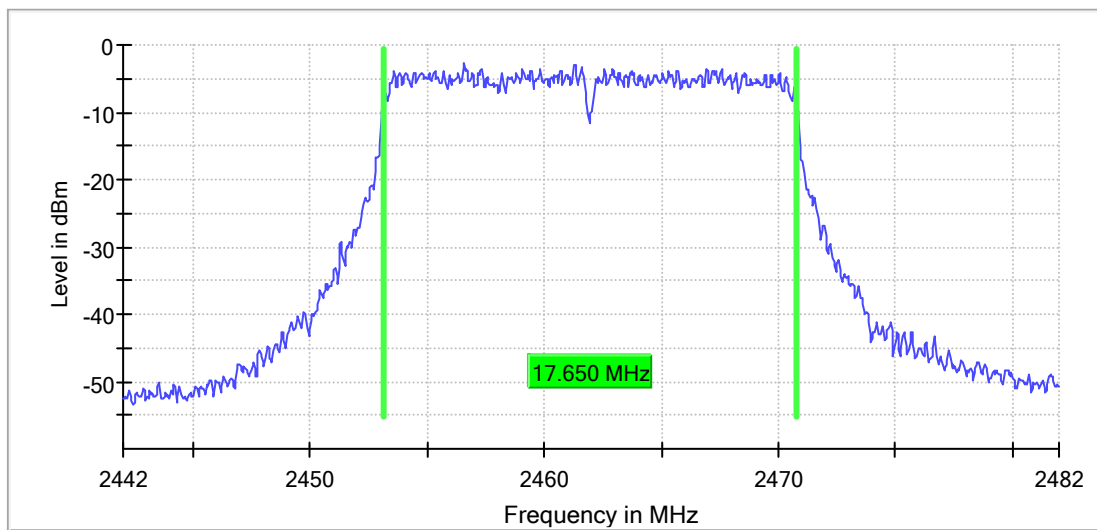
Middle Channel
RBW=100KHz, VBW=300KHz

6 dB Bandwidth



High Channel
RBW=100KHz, VBW=300KHz

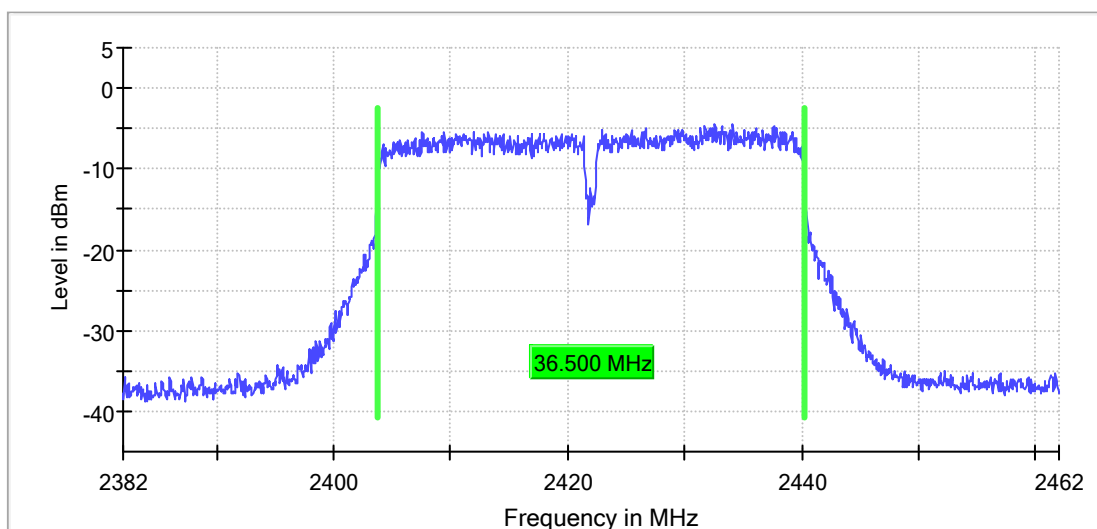
6 dB Bandwidth



Wi-Fi 802.11 n(HT40) mode, MCS0

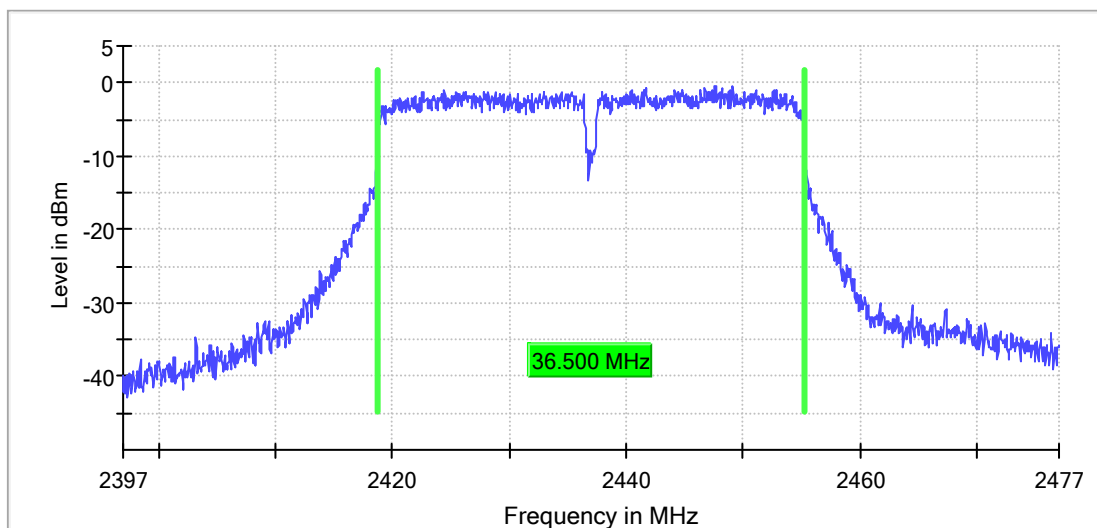
Low Channel
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6 dB Bandwidth



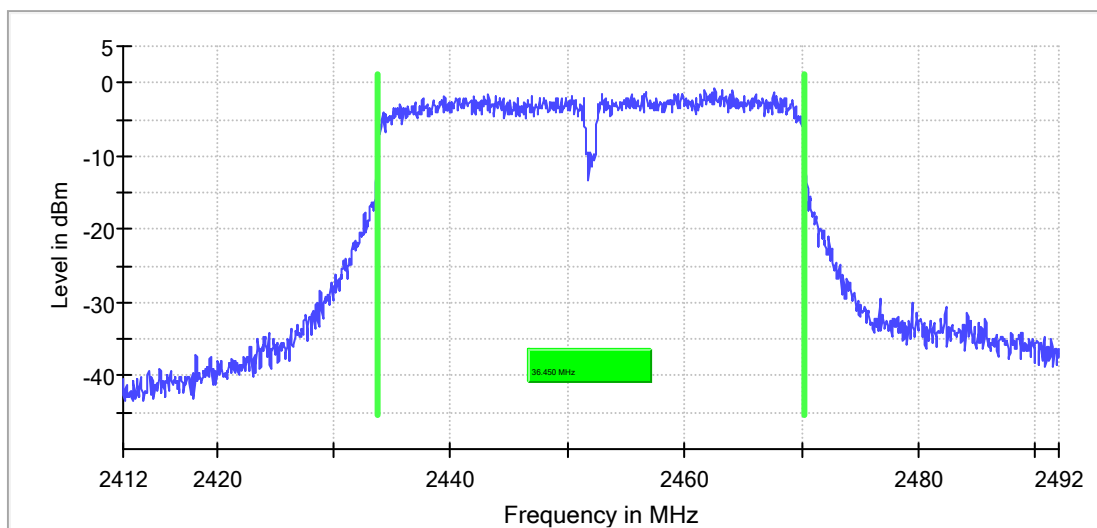
Middle Channel
RBW=100KHz, VBW=300KHz

6 dB Bandwidth



High Channel
RBW=100KHz, VBW=300KHz

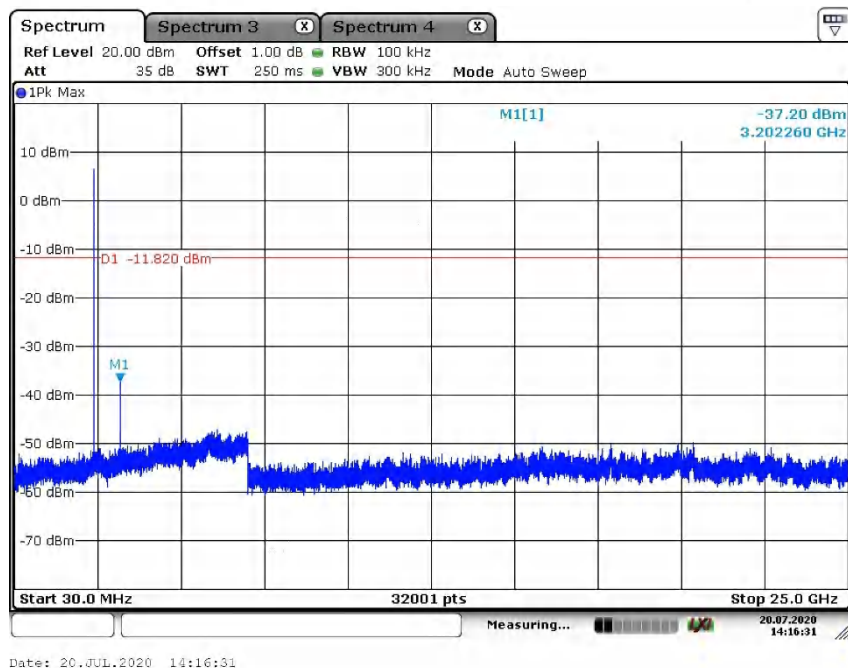
6 dB Bandwidth



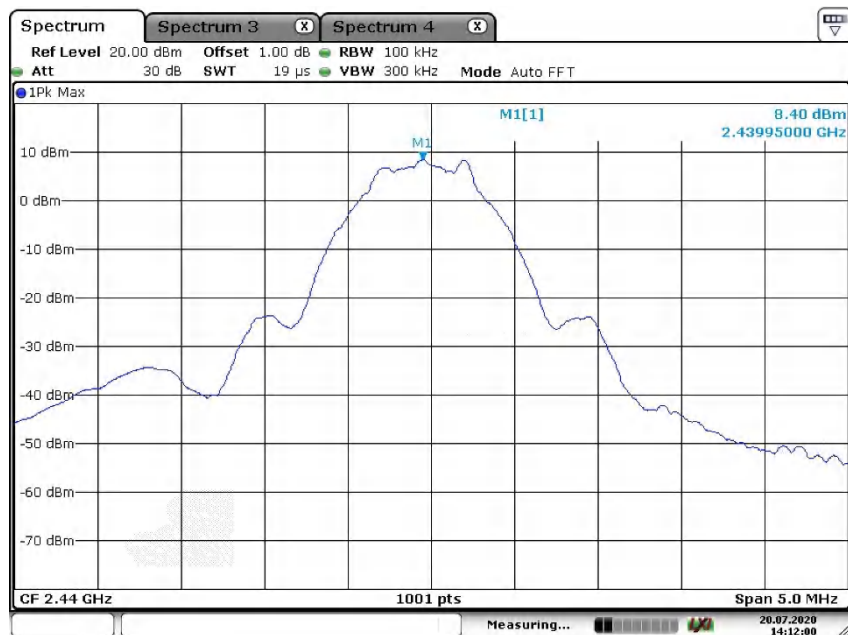
Appendix B.4: Conducted Spurious Emissions Measured in 100 kHz Bandwidth

Bluetooth Low Energy

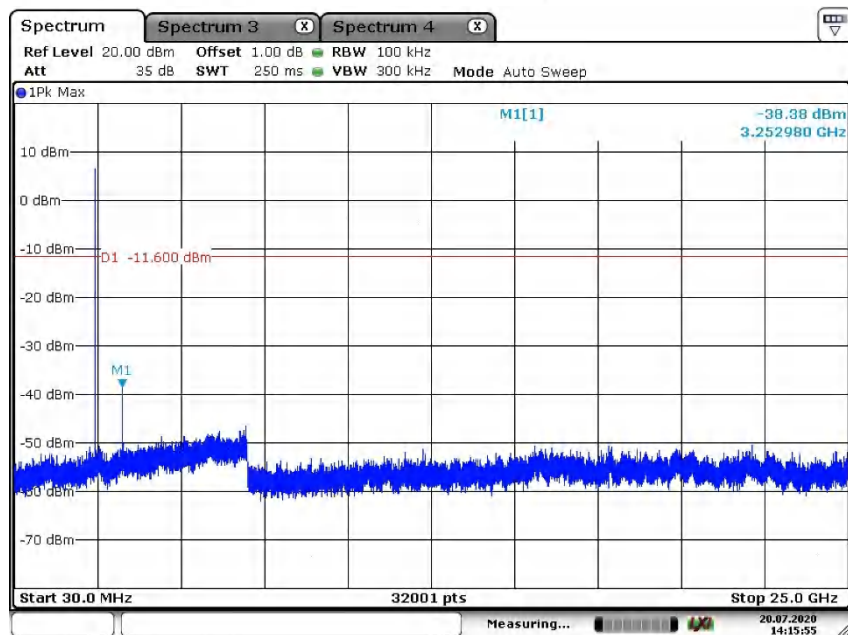
Low Channel



Middle Channel

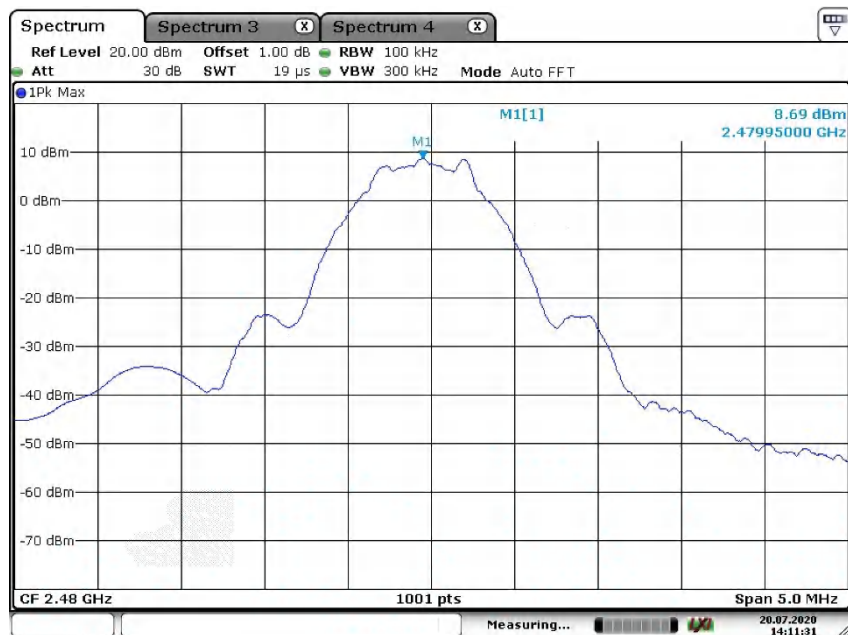


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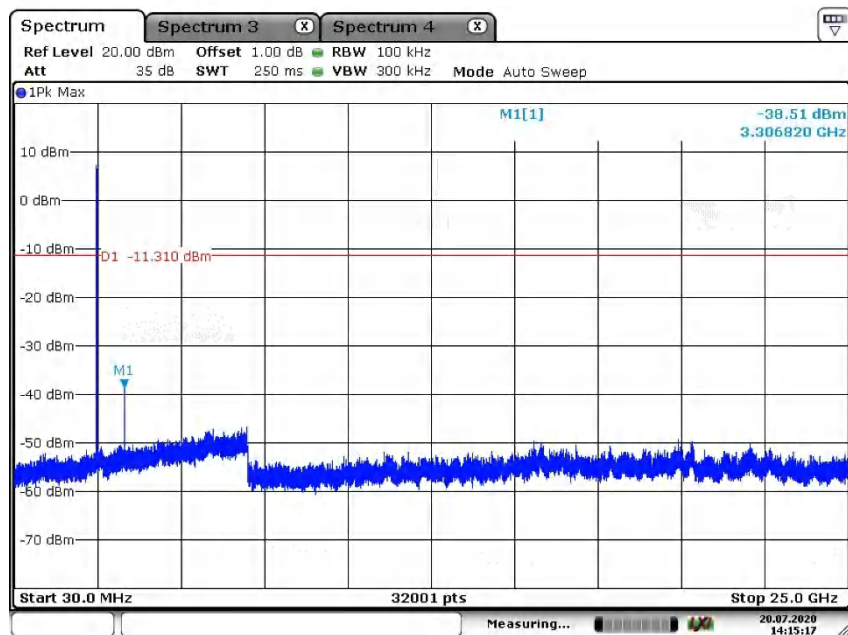


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High Channel

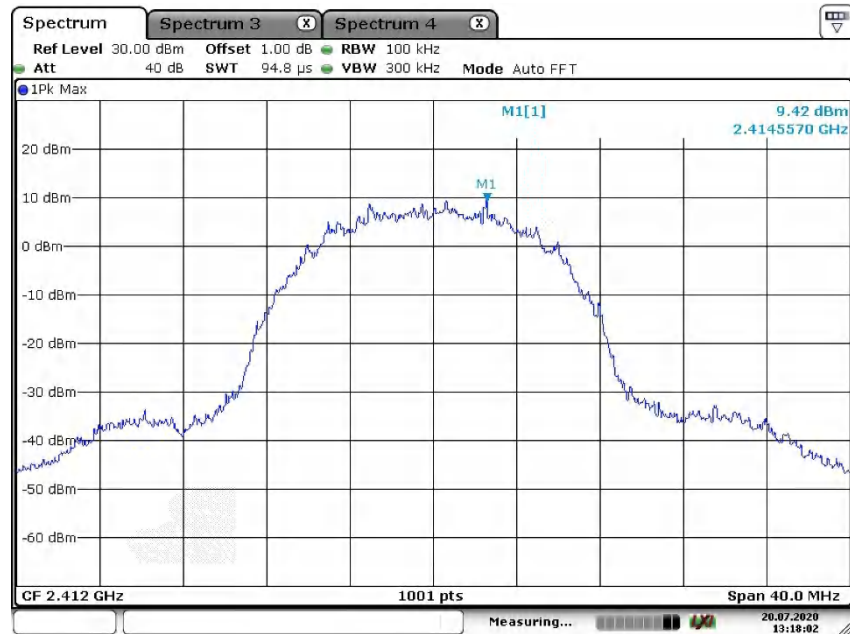


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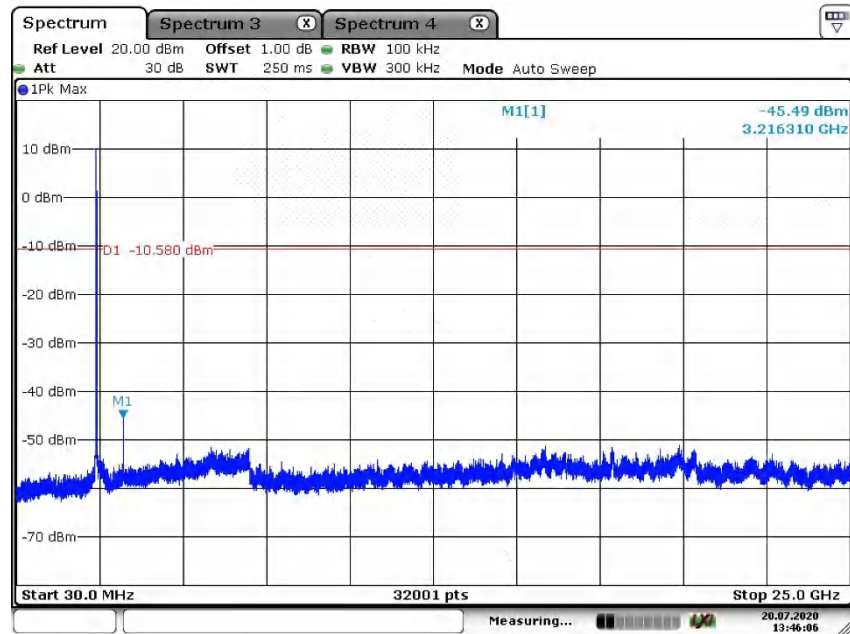


Date: 20.JUL.2020 14:15:18

Wi-Fi 802.11 b mode, 1 Mbps
Low Channel

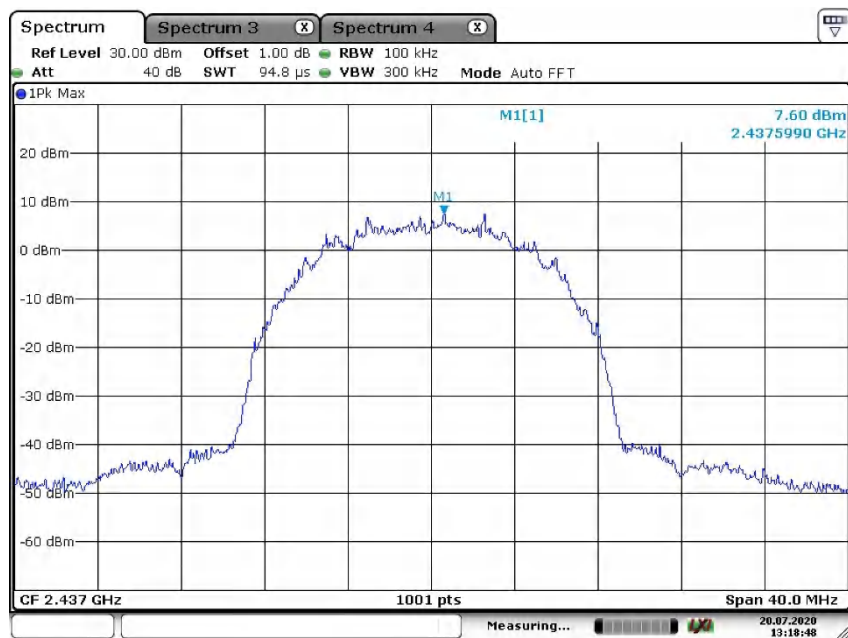


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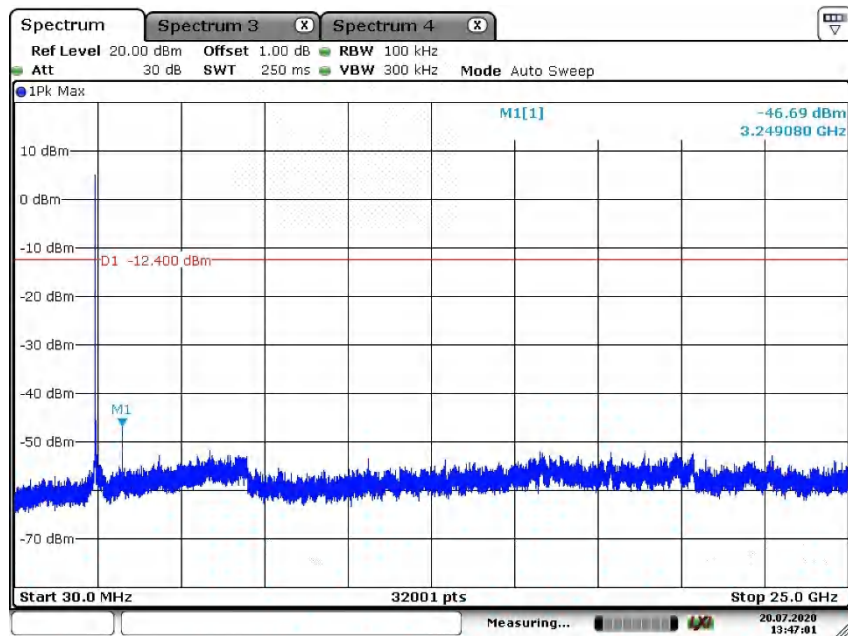


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Middle Channel

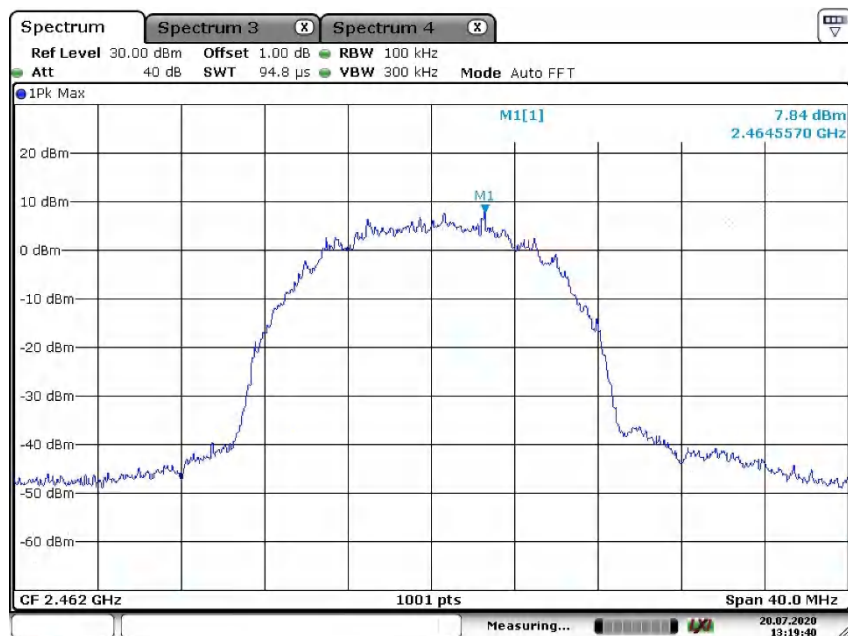


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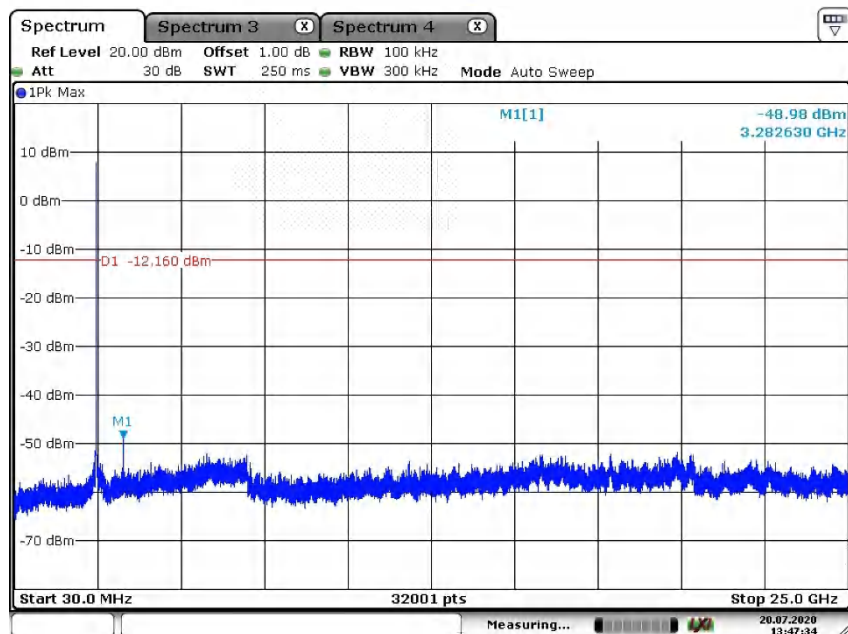


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High Channel

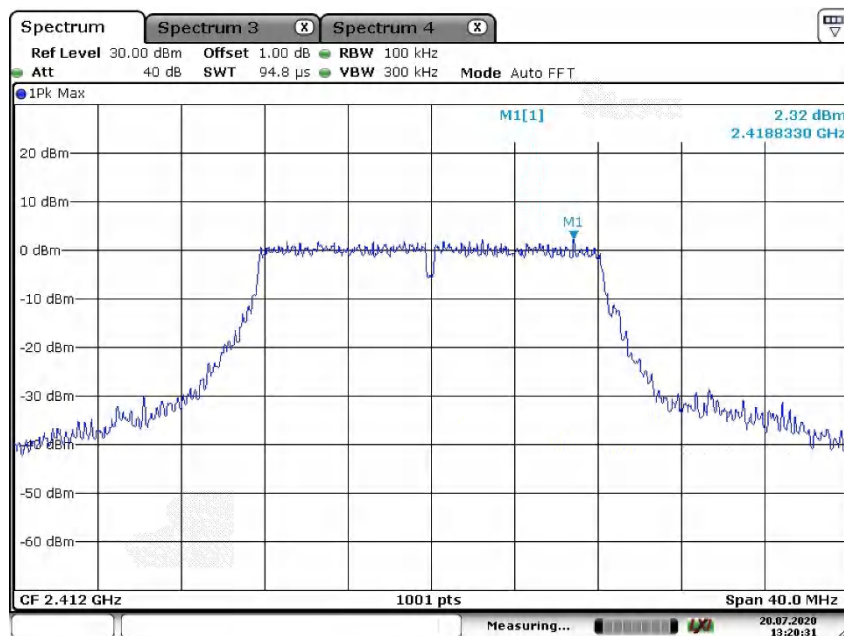


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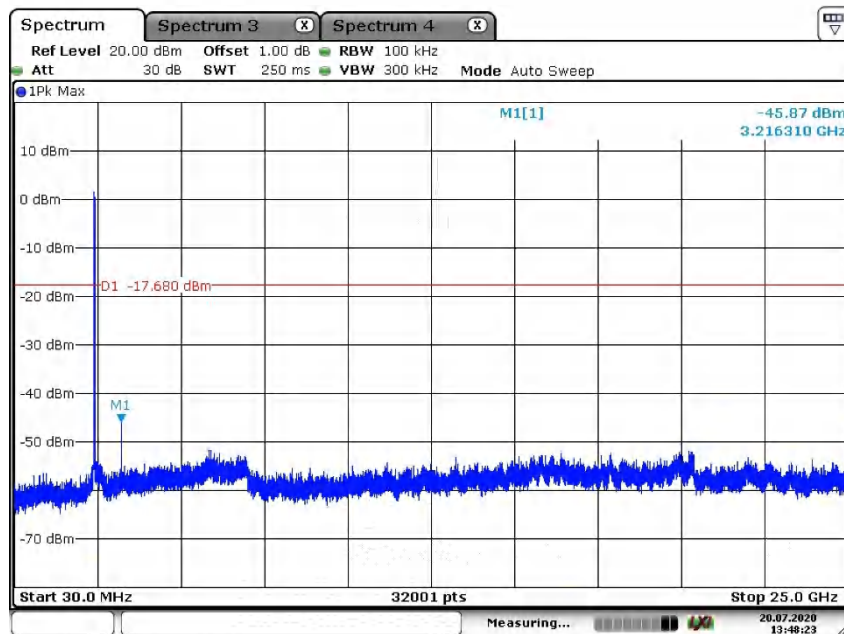


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Wi-Fi 802.11 g mode, 6 Mbps
Low Channel

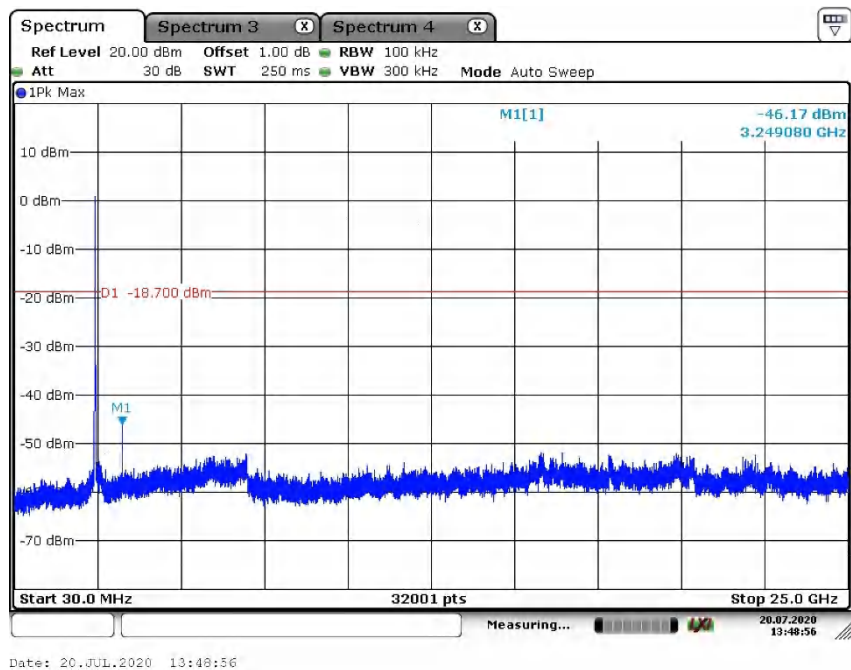
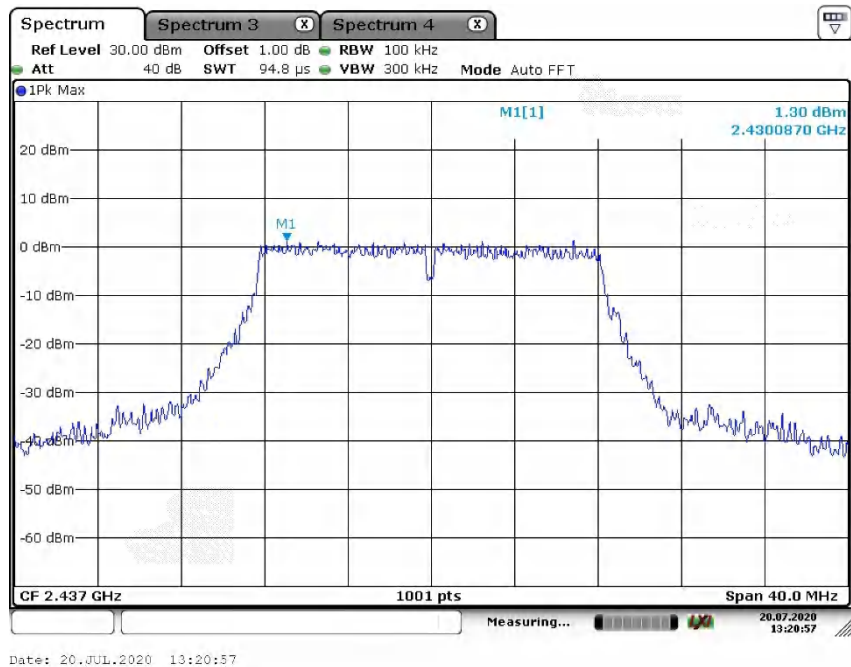


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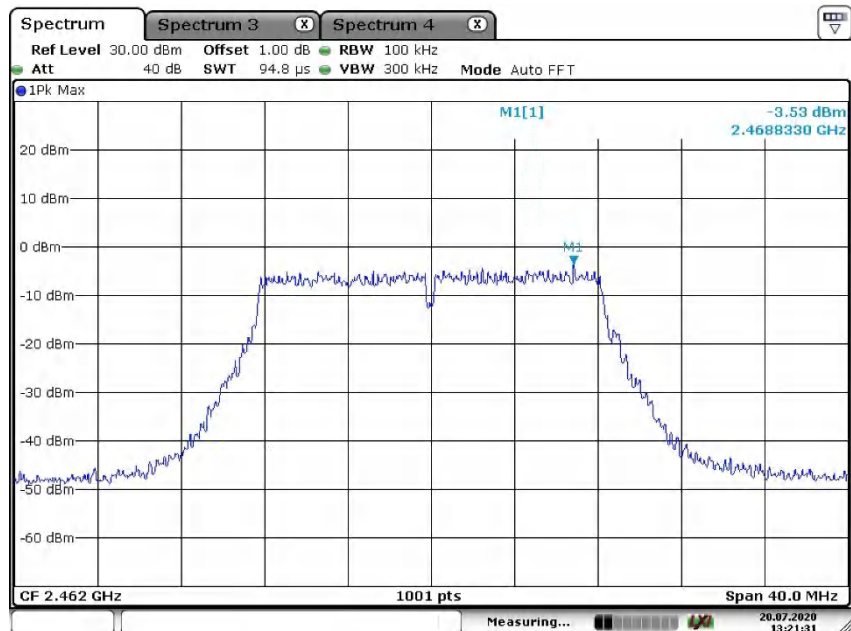


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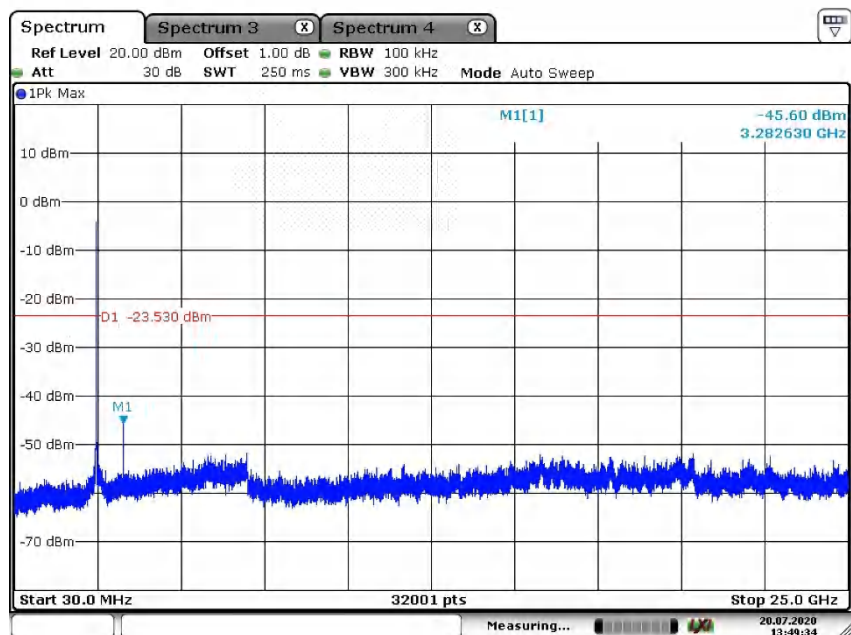
Middle Channel



High Channel

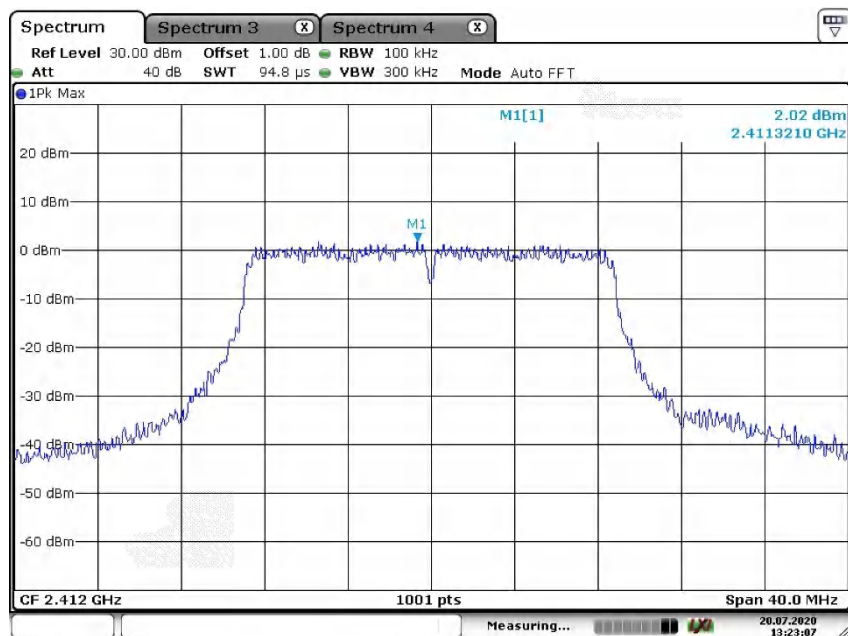


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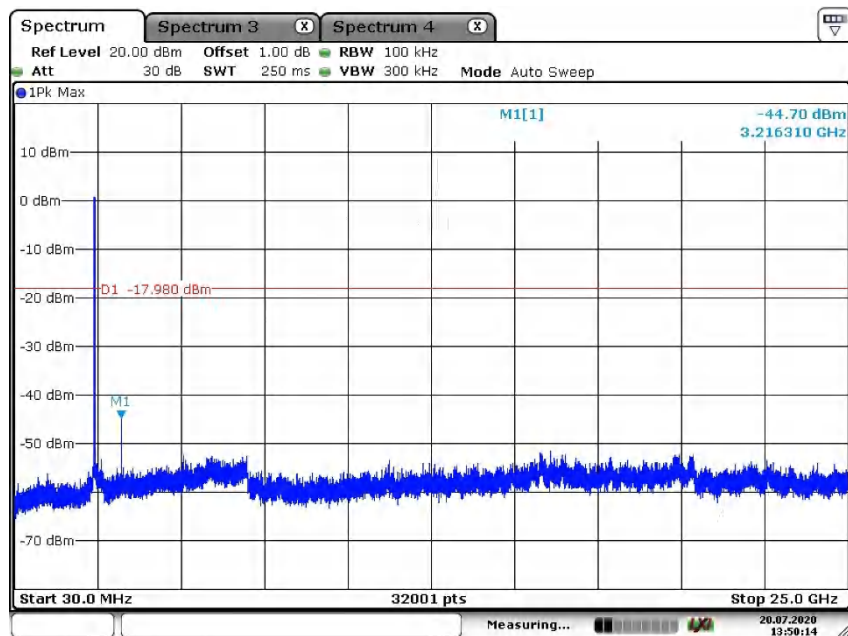


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Wi-Fi 802.11 n(HT20) mode, MCS0
Low Channel

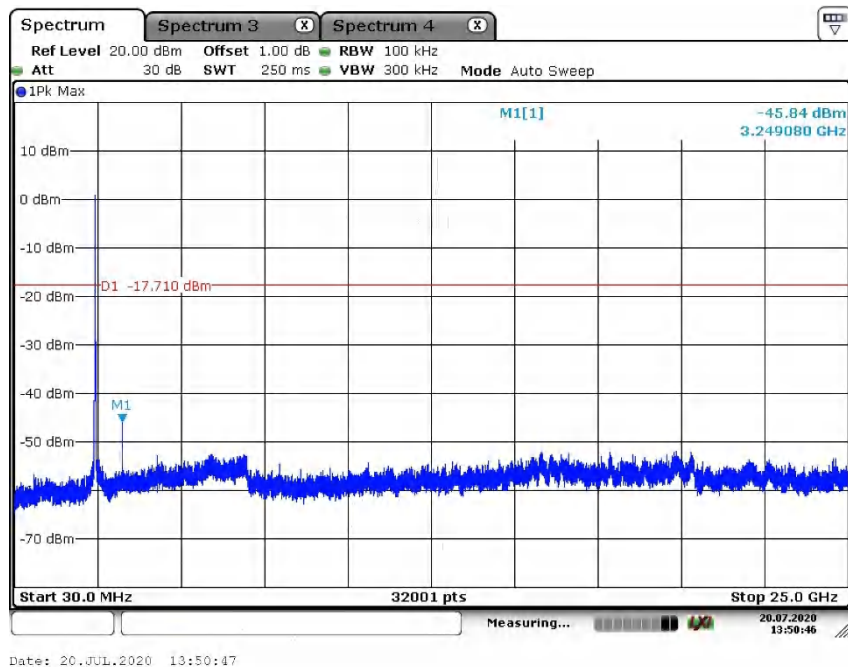
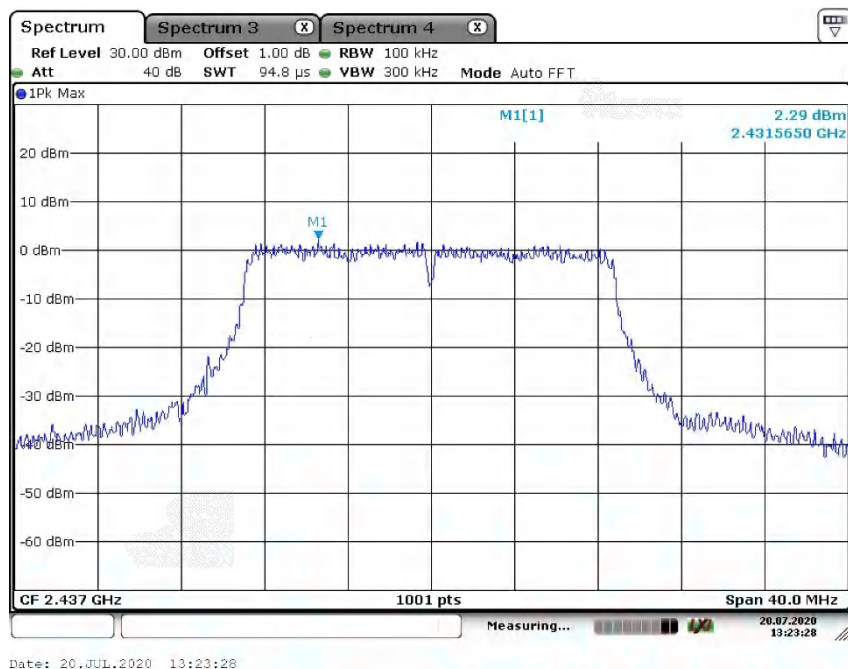


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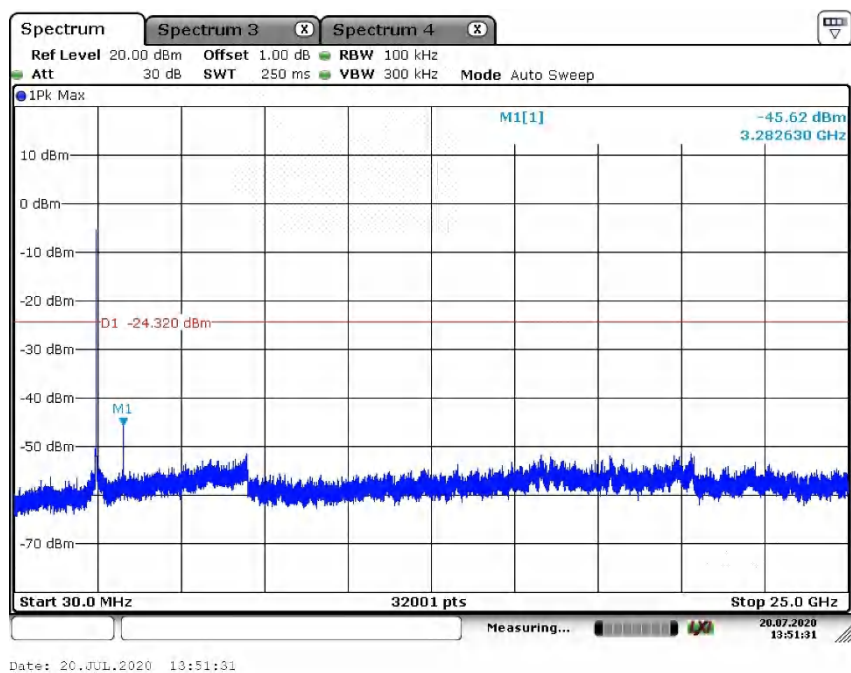
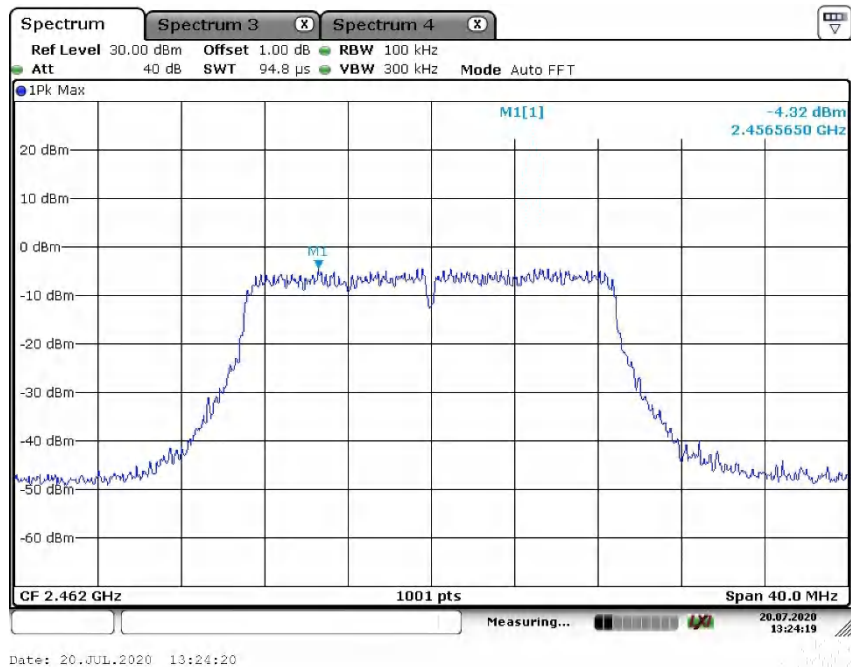


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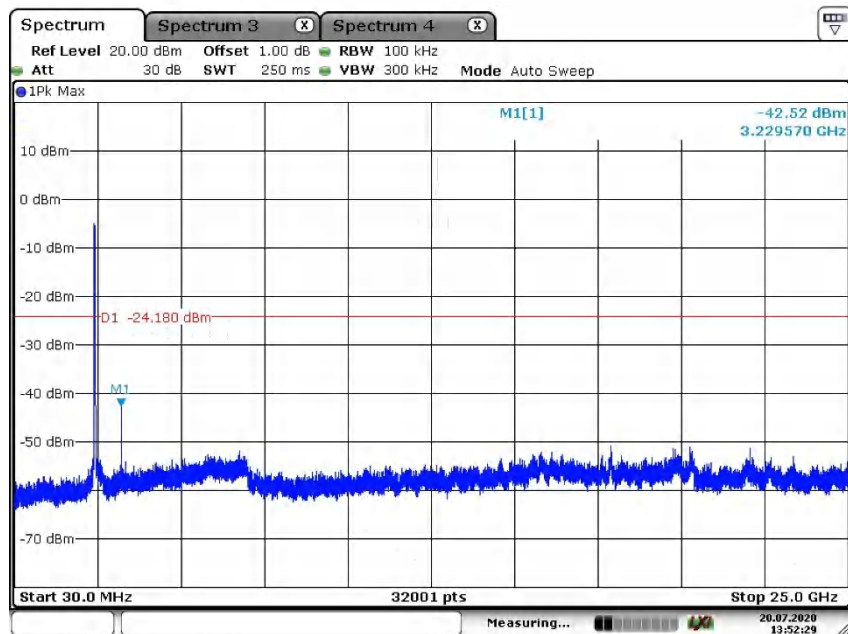
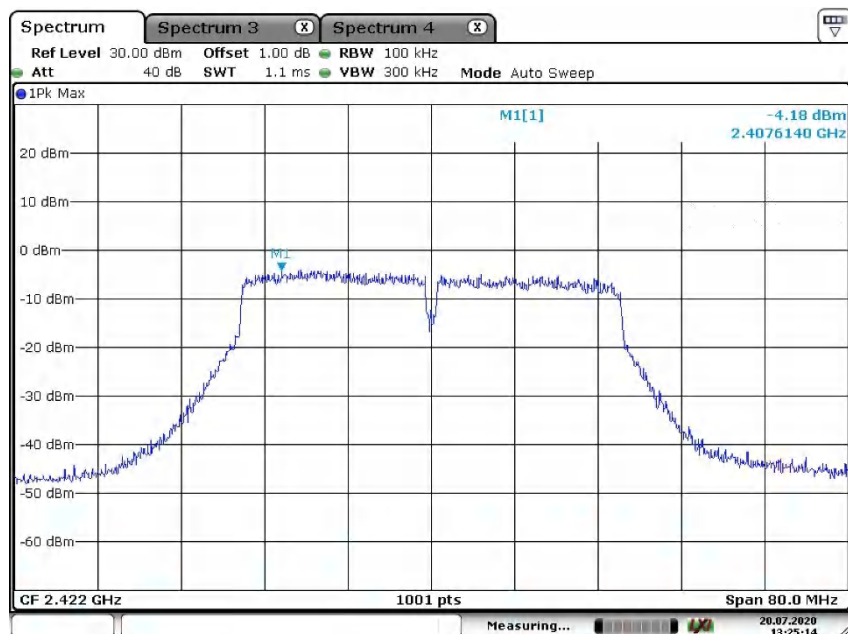
Middle Channel



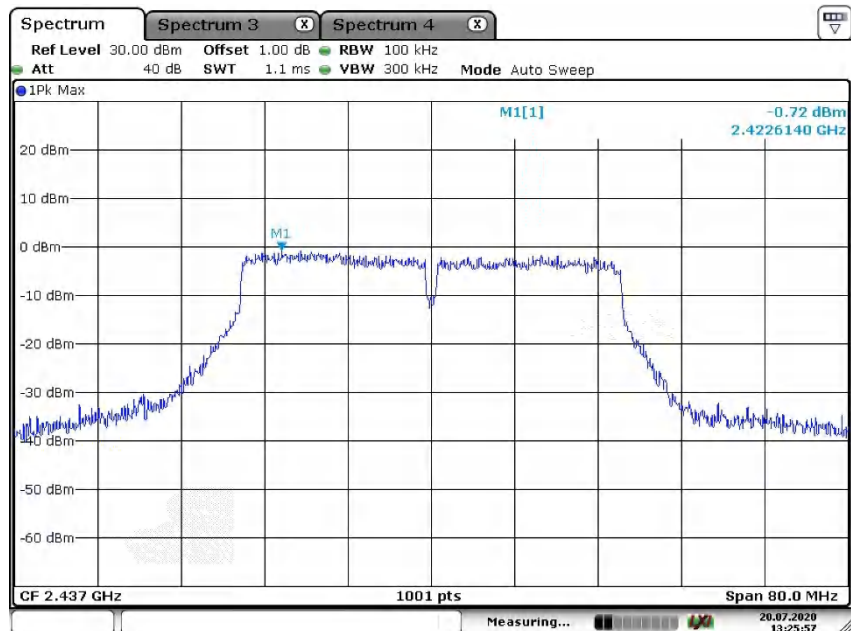
High Channel



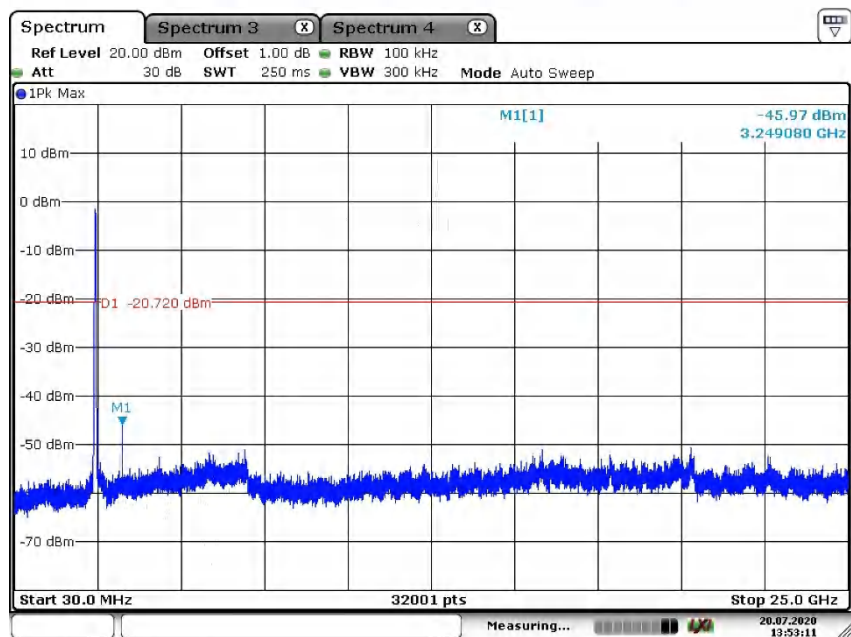
Wi-Fi 802.11 n(HT40) mode, MCS0
Low Channel



Middle Channel

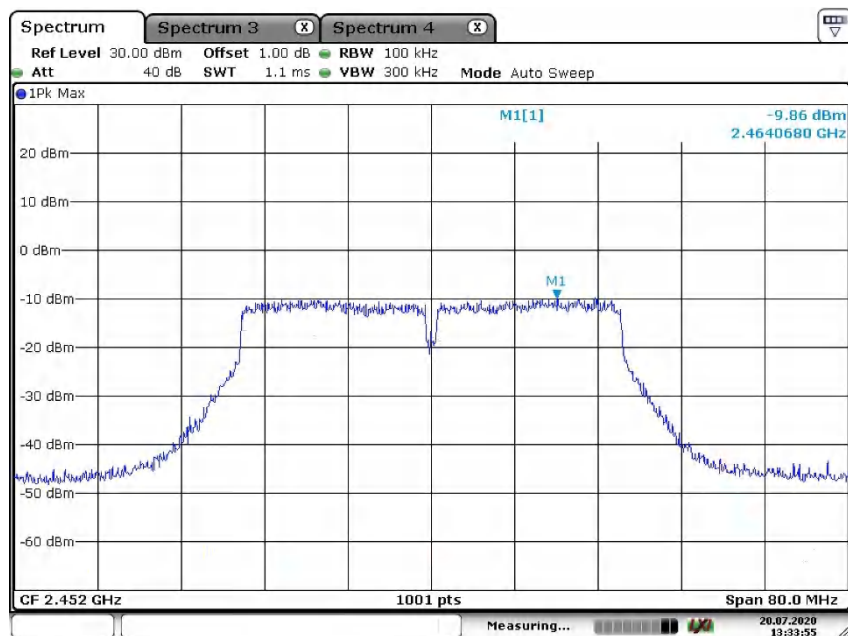


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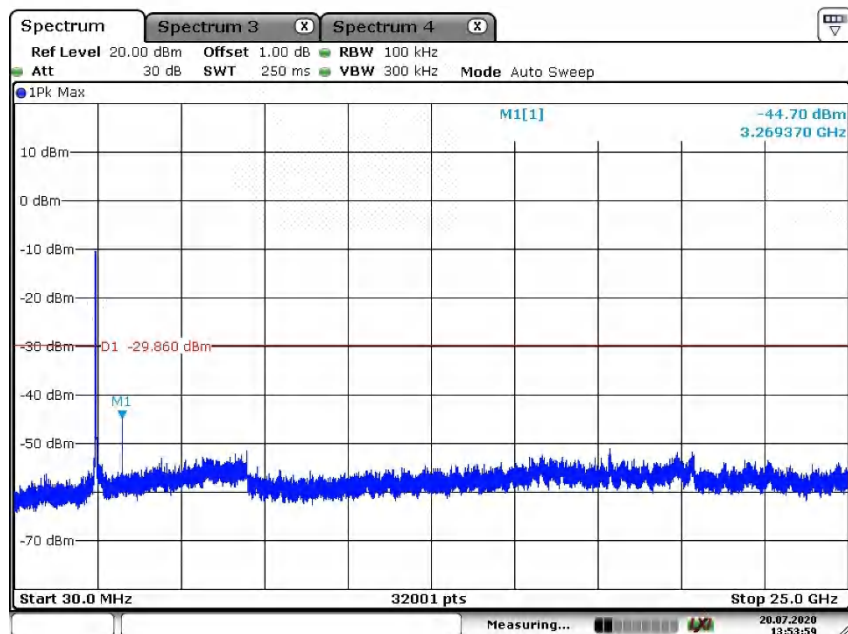


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High Channel



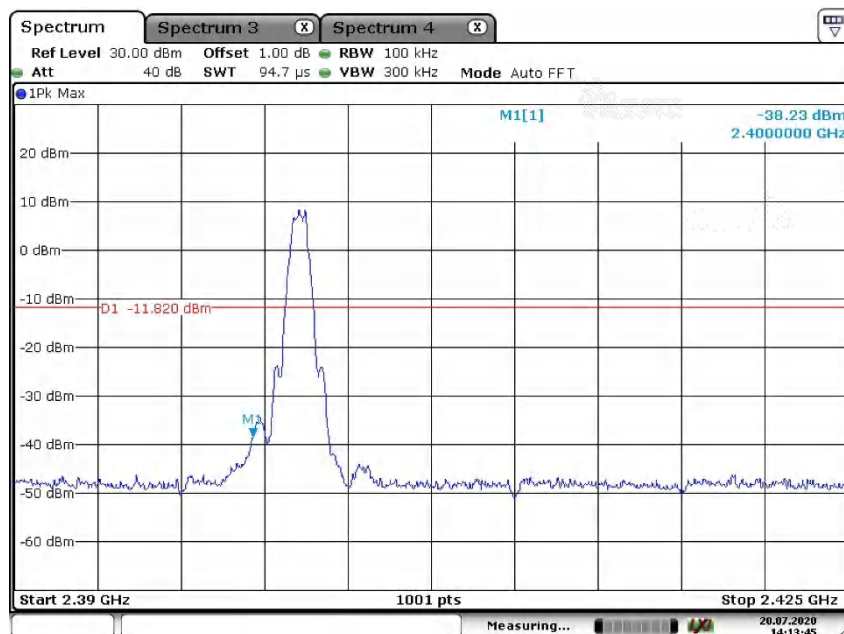
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Date: 20.JUL.2020 13:54:00

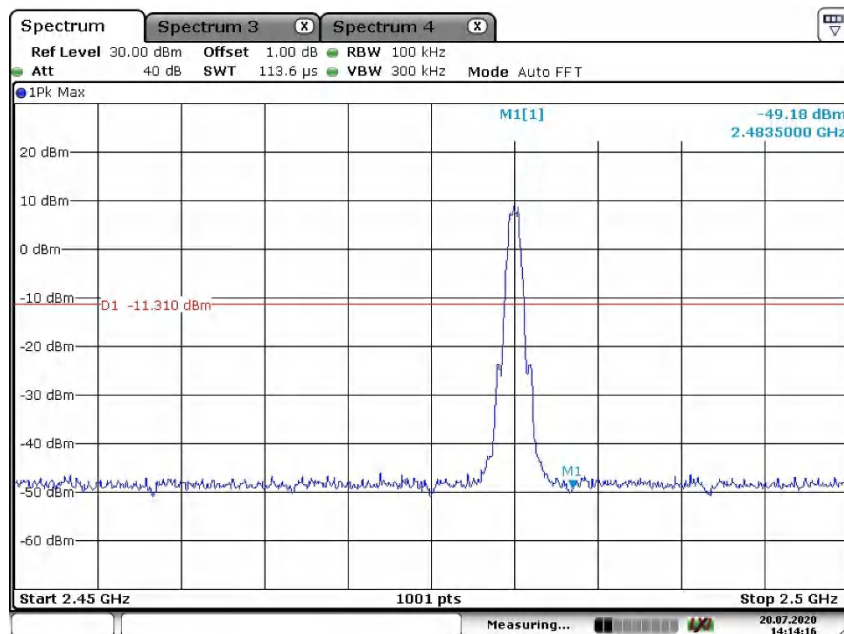
Bluetooth Low Energy, Band Edge

Low Channel



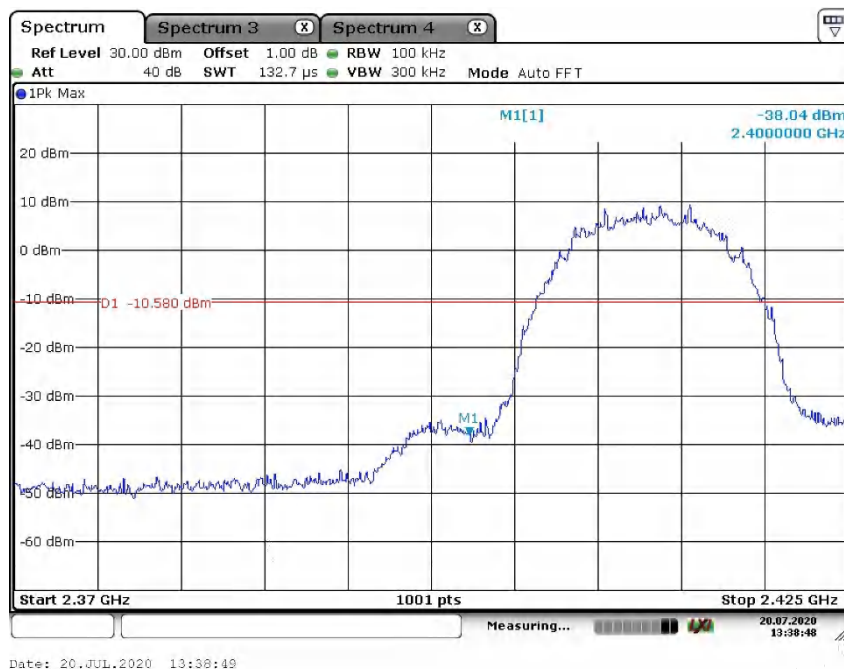
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High Channel

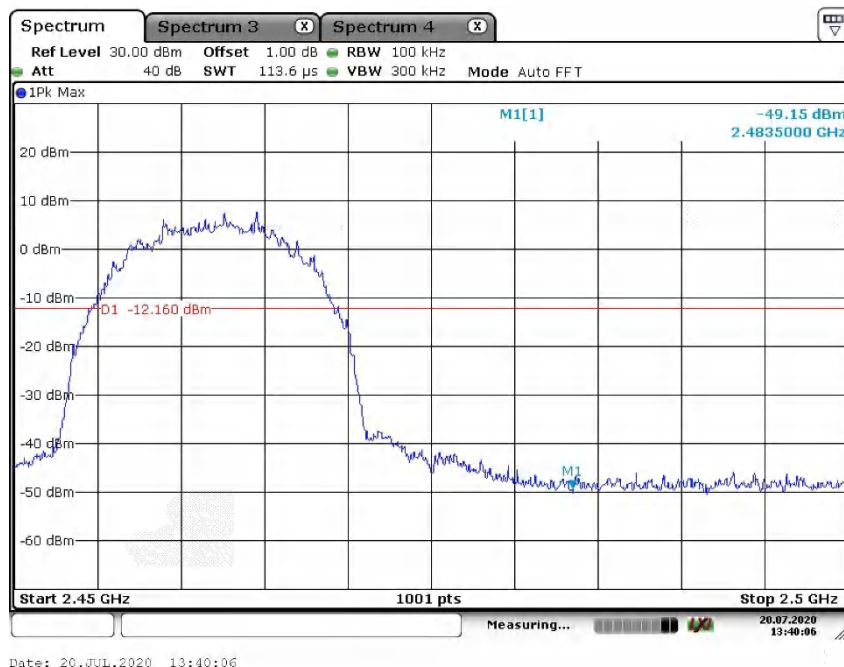


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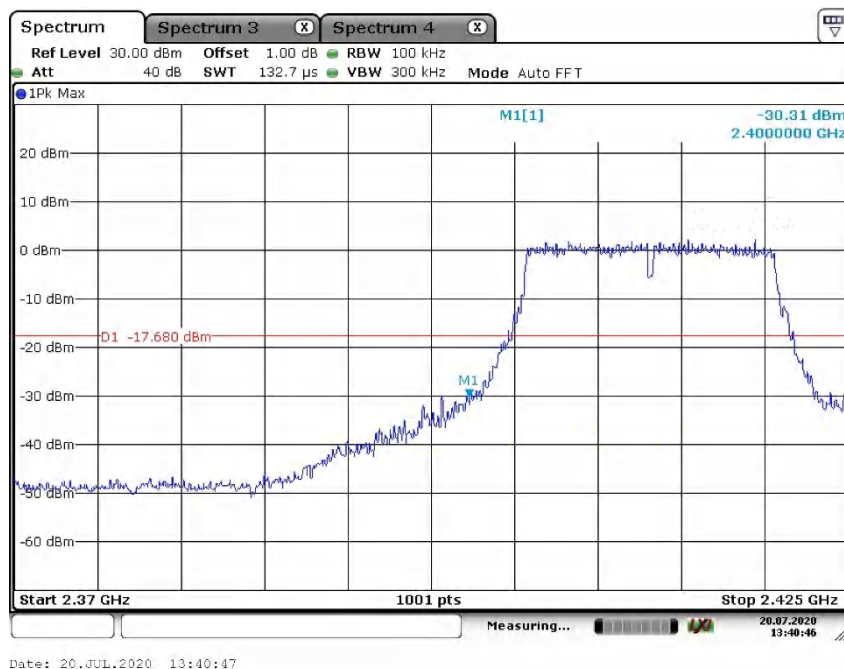
Wi-Fi 802.11 b mode, Band Edge Low Channel



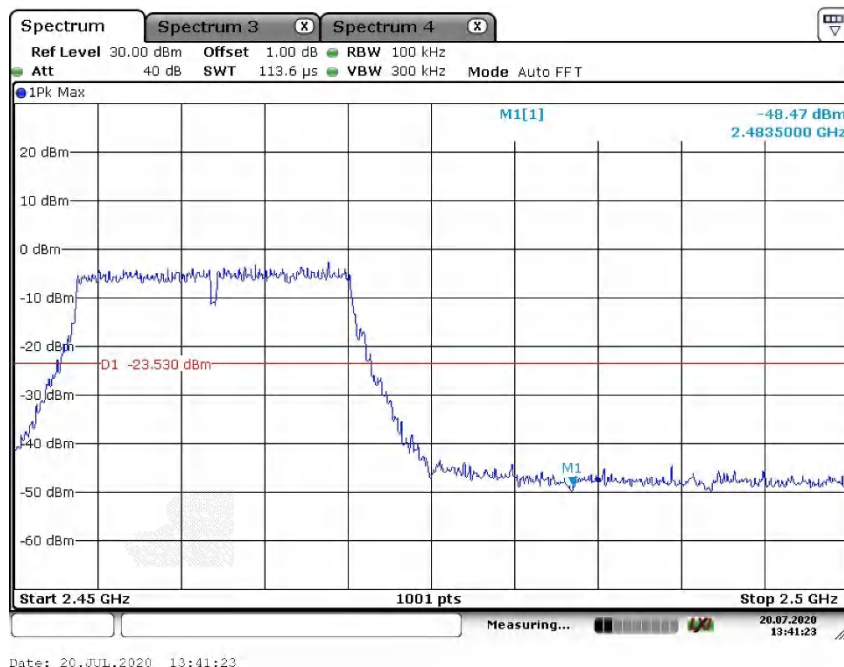
High Channel



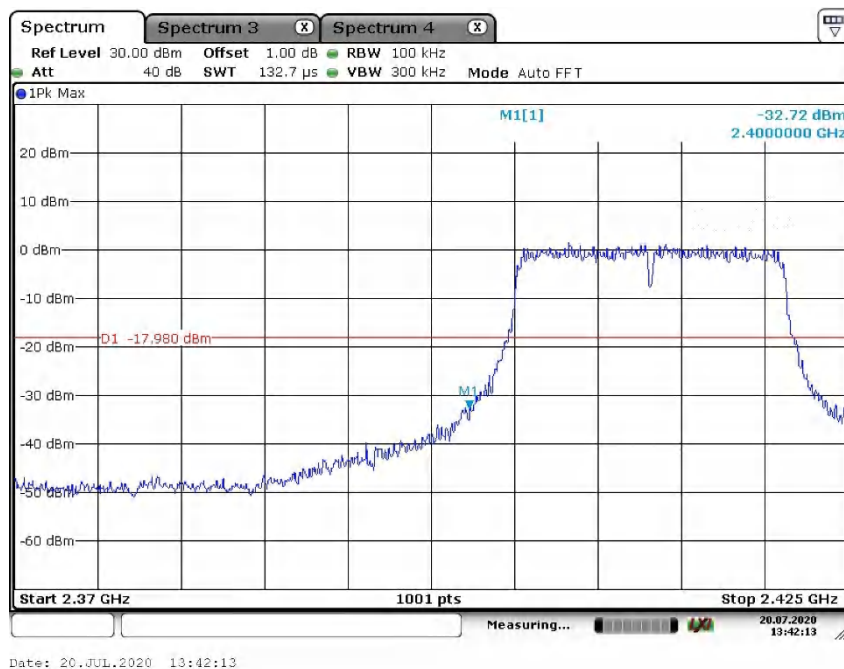
Wi-Fi 802.11 g mode, Band Edge Low Channel



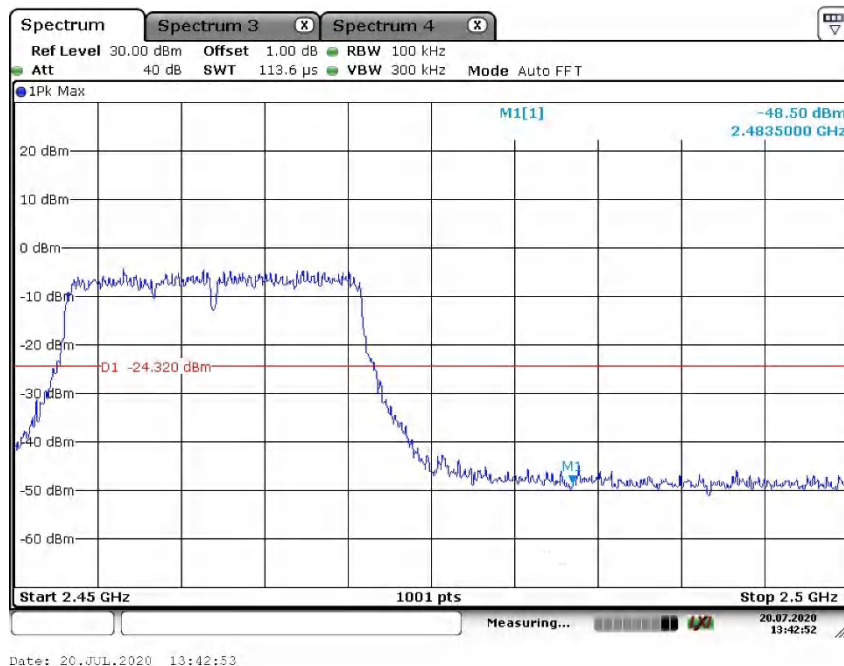
High Channel



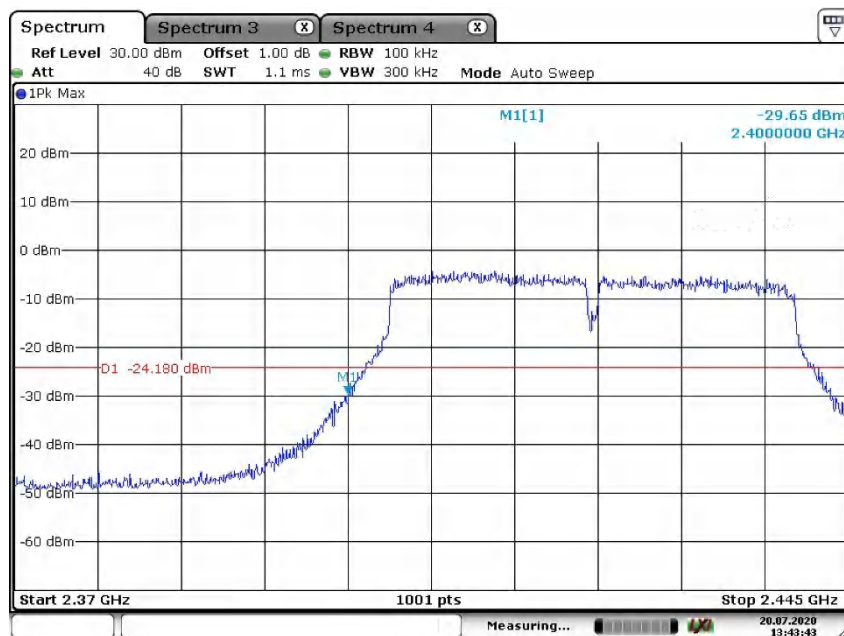
Wi-Fi 802.11 n(HT20) mode, Band Edge
Low Channel



High Channel

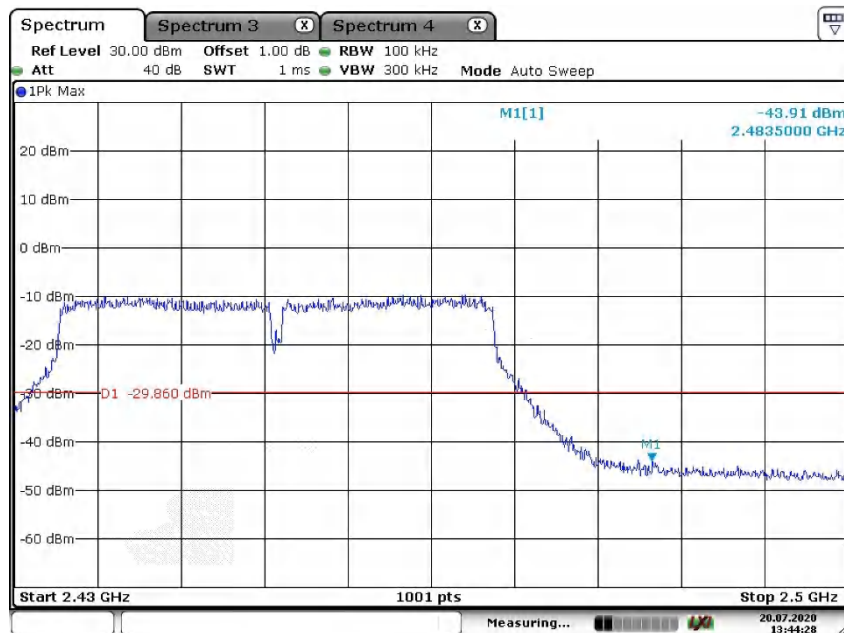


Wi-Fi 802.11 n(HT40) mode, Band Edge
Low Channel



Date: 20.JUL.2020 13:43:44

High Channel



Date: 20.JUL.2020 13:44:28

Appendix C: Test Results of Radiated Testing

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Note 1: Testing was carried out within frequency range 9 kHz to the tenth harmonics. The measurement results below 30MHz and above 18GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

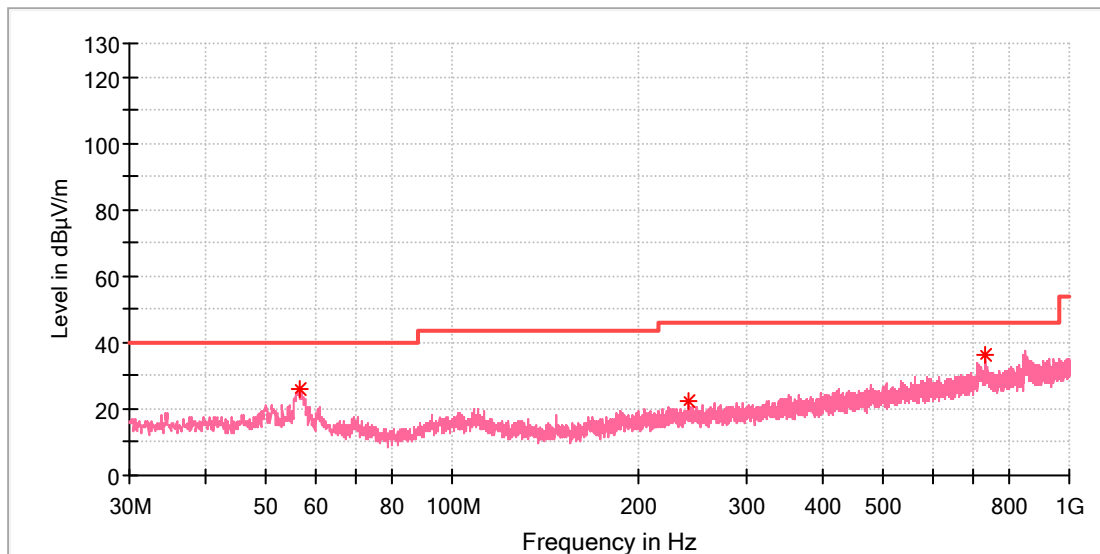
Appendix C.1: Test Results of Radiated Spurious Emissions

Bluetooth Low Energy

30MHz - 1GHz

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	BLE_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

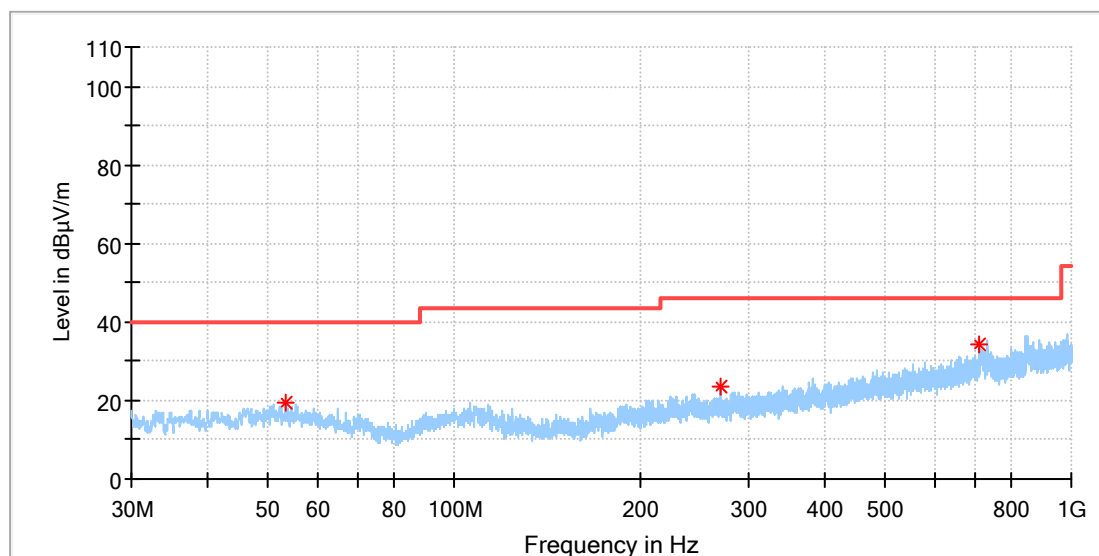


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
56.626500	26.28	---	40.00	13.72	100.0	V	289.0	-18.9
240.975000	22.24	---	46.00	23.76	100.0	V	170.0	-18.0
728.448500	36.00	---	46.00	10.00	100.0	V	170.0	-7.9

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	BLE_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

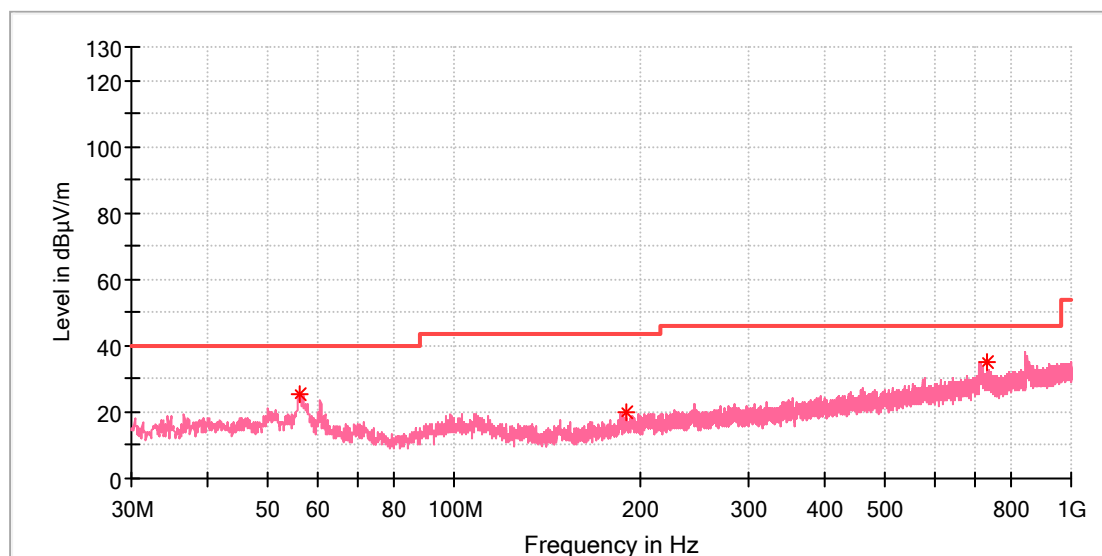


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
53.280000	19.45	---	40.00	20.55	100.0	H	15.0	-18.7
269.881000	23.70	---	46.00	22.30	100.0	H	347.0	-17.3
709.824500	34.34	---	46.00	11.66	100.0	H	328.0	-8.3

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	BLE_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

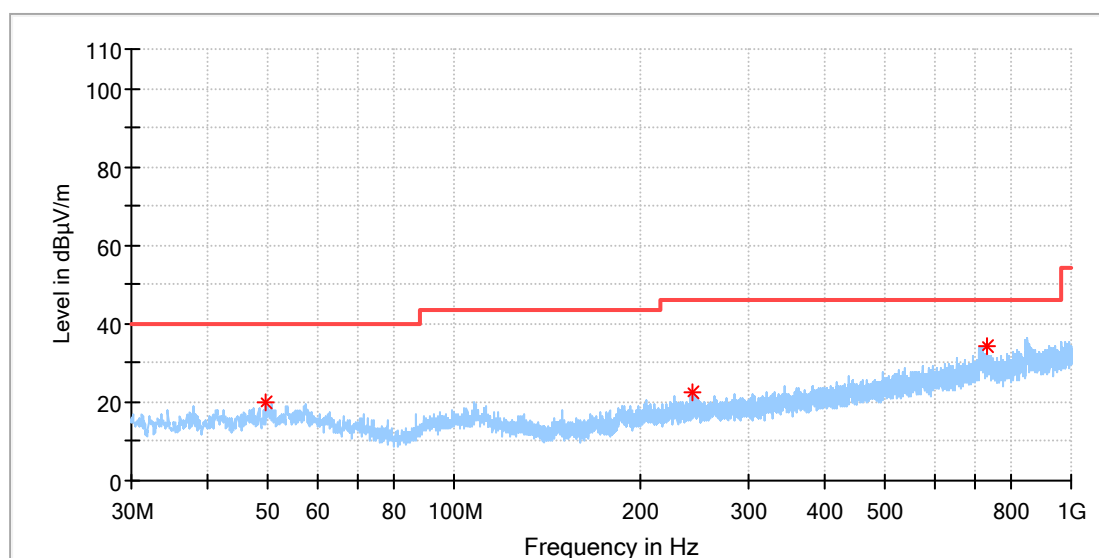


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
56.093000	25.18	---	40.00	14.82	100.0	V	40.0	-18.9
189.516500	19.79	---	43.50	23.71	100.0	V	124.0	-19.9
728.400000	35.11	---	46.00	10.89	100.0	V	354.0	-7.9

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	BLE_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

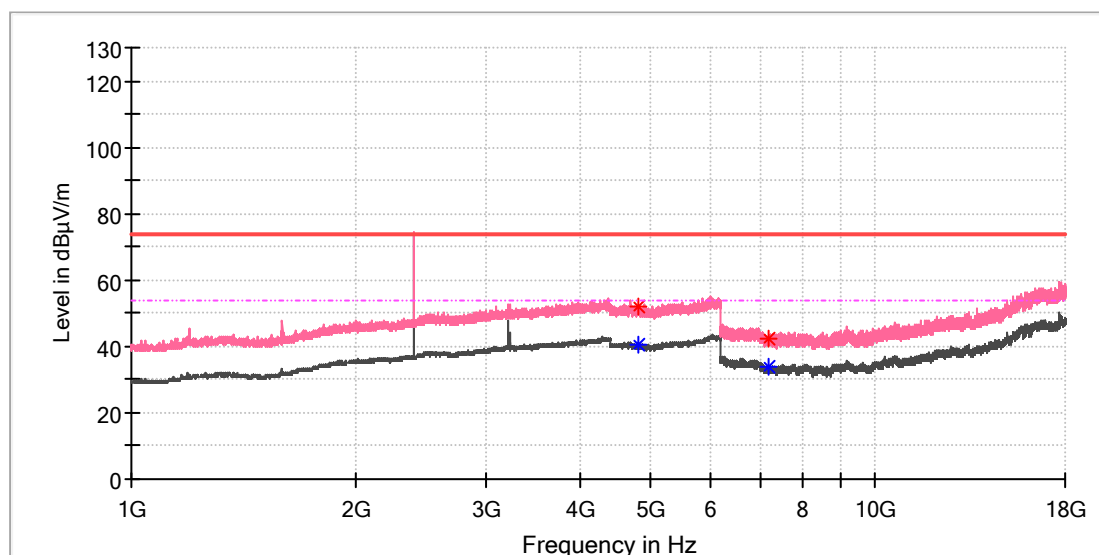


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
49.400000	19.98	---	40.00	20.02	100.0	H	158.0	-18.6
244.127500	22.75	---	46.00	23.25	100.0	H	192.0	-17.9
729.515500	34.12	---	46.00	11.88	100.0	H	283.0	-7.9

1GHz - 18GHz**EUT Information**

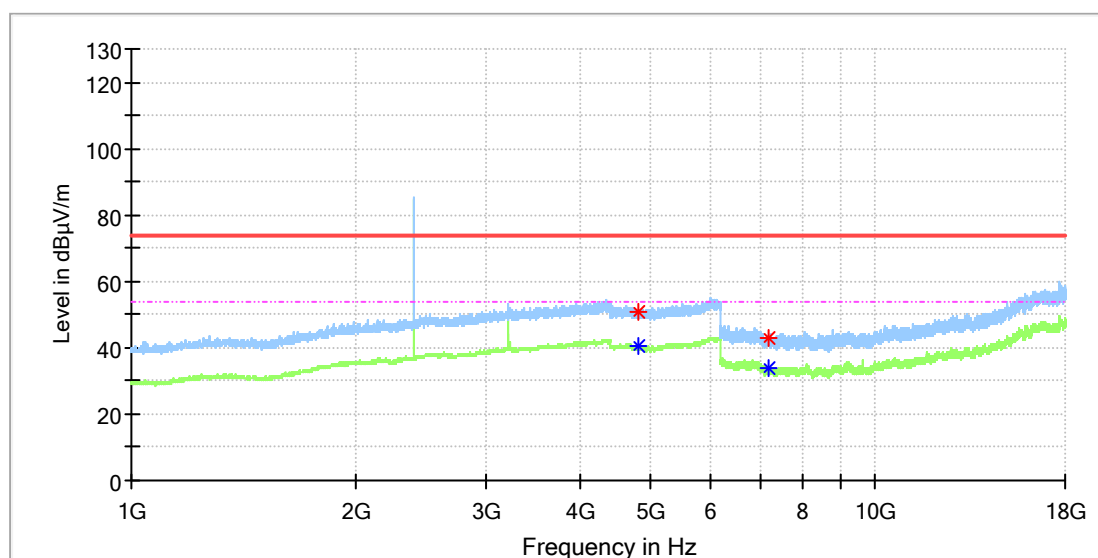
EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	BLE_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

**Critical Freqs**

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4802.000000	---	40.65	54.00	13.35	100.0	V	177.0	13.6
4804.500000	52.08	---	74.00	21.92	100.0	V	47.0	13.6
7203.983333	42.47	---	74.00	31.53	100.0	V	153.0	8.8
7205.950000	---	33.58	54.00	20.42	100.0	V	359.0	8.8

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	BLE_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

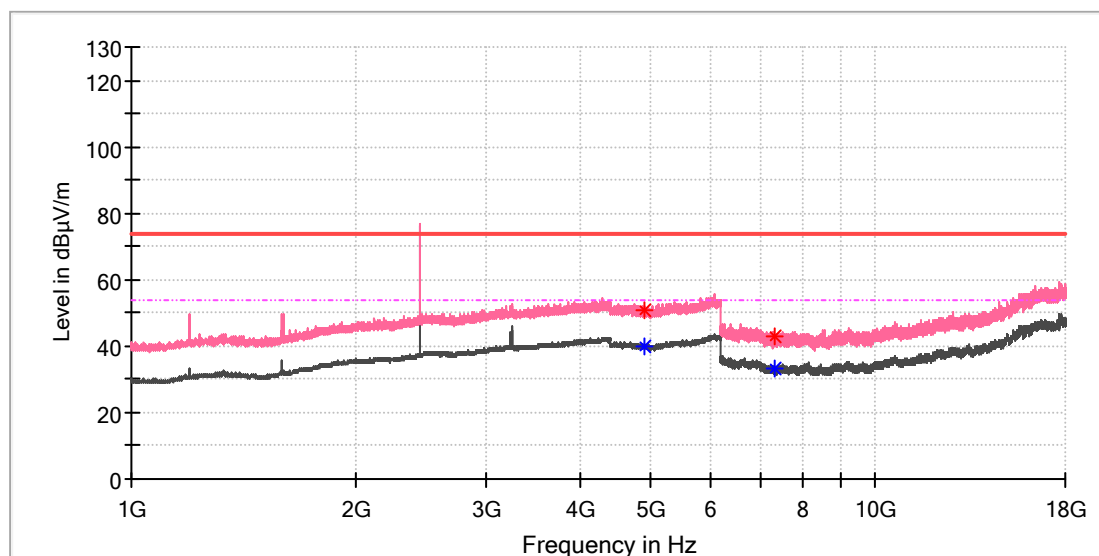


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4804.500000	---	40.31	54.00	13.69	100.0	H	330.0	13.6
4805.500000	50.52	---	74.00	23.48	100.0	H	215.0	13.6
7204.966667	---	34.13	54.00	19.87	100.0	H	3.0	8.8
7204.966667	42.73	---	74.00	31.27	100.0	H	3.0	8.8

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	BLE_Mid CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

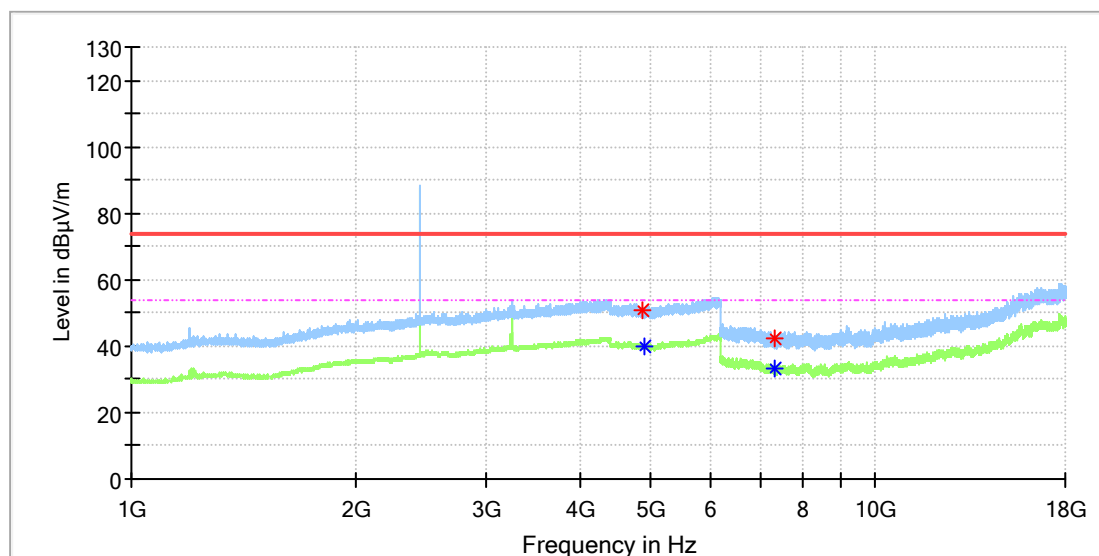


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4878.500000	50.50	---	74.00	23.50	100.0	V	62.0	13.4
4879.500000	---	39.97	54.00	14.03	100.0	V	163.0	13.4
7318.050000	43.01	---	74.00	30.99	100.0	V	168.0	8.2
7322.475000	---	33.29	54.00	20.71	100.0	V	213.0	8.2

EUT Information

EUT Name:	M-LA02302 WI-Fi and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	BLE_Mid CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

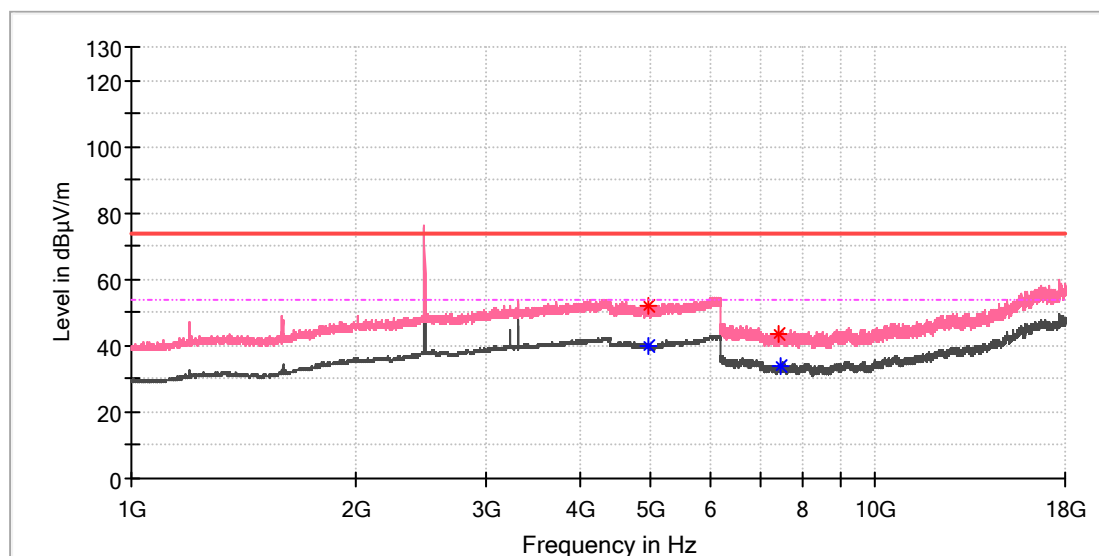


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4878.000000	50.71	---	74.00	23.29	100.0	H	76.0	13.4
4880.000000	---	40.20	54.00	13.80	100.0	H	270.0	13.4
7319.033333	42.56	---	74.00	31.44	100.0	H	239.0	8.2
7321.491667	---	32.98	54.00	21.02	100.0	H	300.0	8.2

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	BLE_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

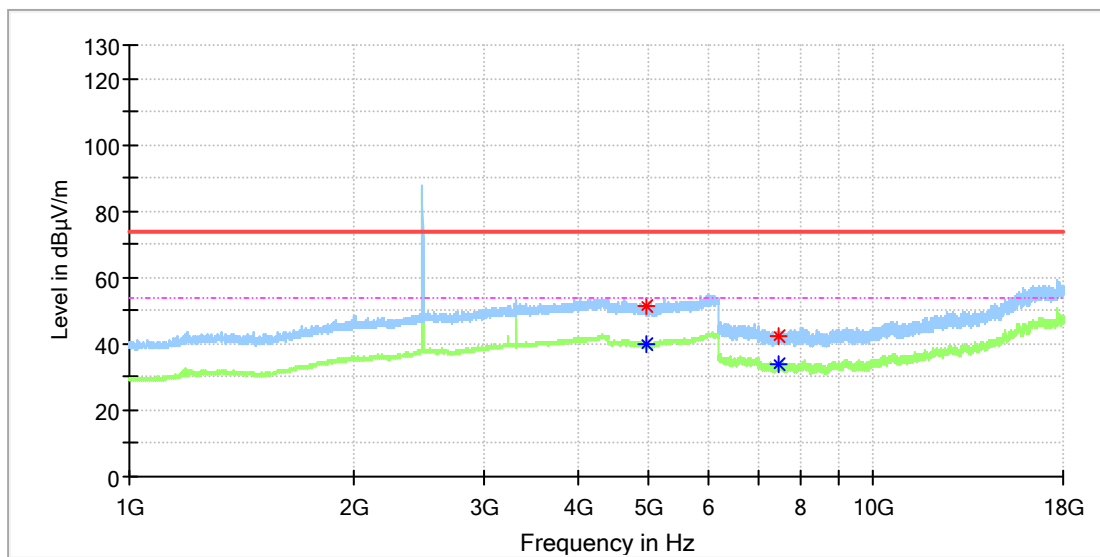


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4957.500000	51.96	---	74.00	22.04	100.0	V	132.0	13.2
4961.000000	---	40.07	54.00	13.93	100.0	V	260.0	13.2
7436.541667	43.30	---	74.00	30.70	100.0	V	21.0	8.4
7441.950000	---	33.91	54.00	20.09	100.0	V	242.0	8.4

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	BLE_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

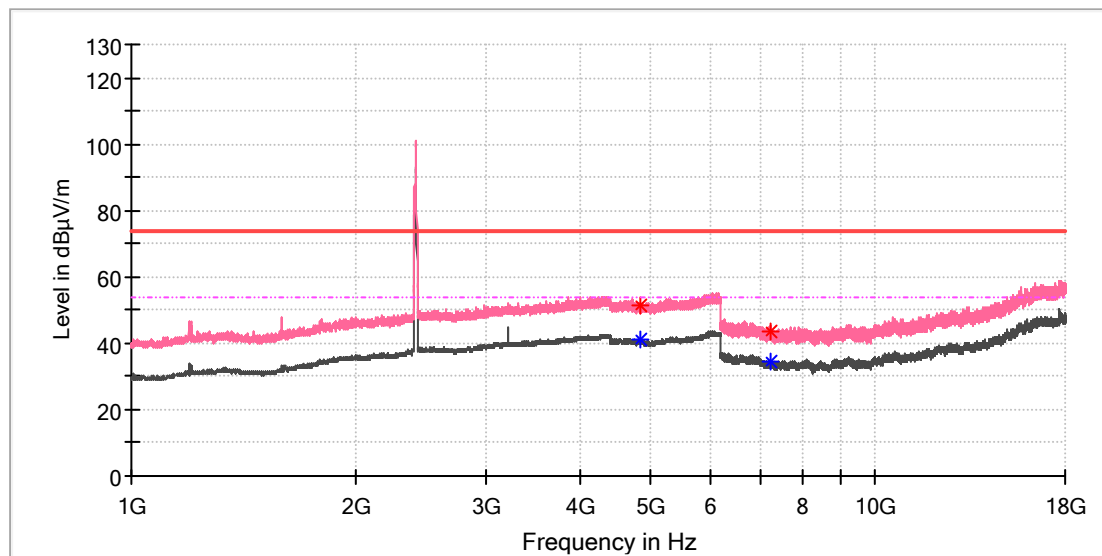


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4959.000000	---	40.10	54.00	13.90	100.0	H	284.0	13.2
4960.500000	51.20	---	74.00	22.80	100.0	H	292.0	13.2
7440.966667	42.08	---	74.00	31.92	100.0	H	67.0	8.4
7444.900000	---	33.83	54.00	20.17	100.0	H	2.0	8.5

Wi-Fi 802.11 b mode, 1 Mbps**1GHz - 18GHz****EUT Information**

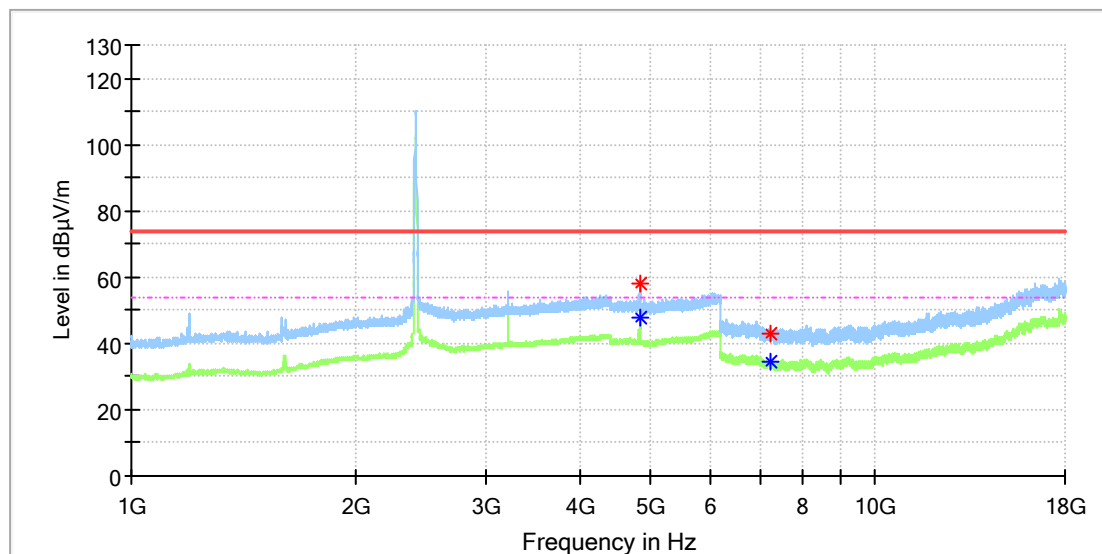
EUT Name:	M-LA02302 WI-Fi and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11b_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

**Critical Freqs**

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4819.000000	---	40.87	54.00	13.13	100.0	V	35.0	13.5
4820.500000	51.34	---	74.00	22.66	100.0	V	1.0	13.5
7239.383333	43.53	---	74.00	30.47	100.0	V	222.0	8.6
7239.875000	---	34.18	54.00	19.82	100.0	V	234.0	8.6

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11b_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

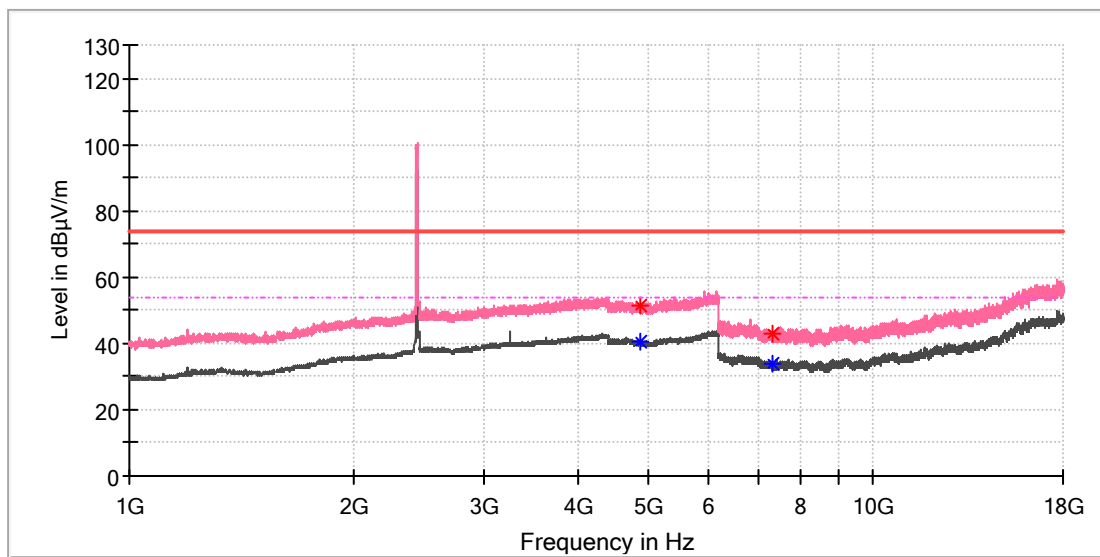


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4823.000000	---	47.62	54.00	6.38	100.0	H	140.0	13.5
4823.500000	57.99	---	74.00	16.01	100.0	H	96.0	13.5
7236.925000	---	34.66	54.00	19.34	100.0	H	227.0	8.6
7240.366667	43.07	---	74.00	30.93	100.0	H	1.0	8.6

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11b_Mid CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

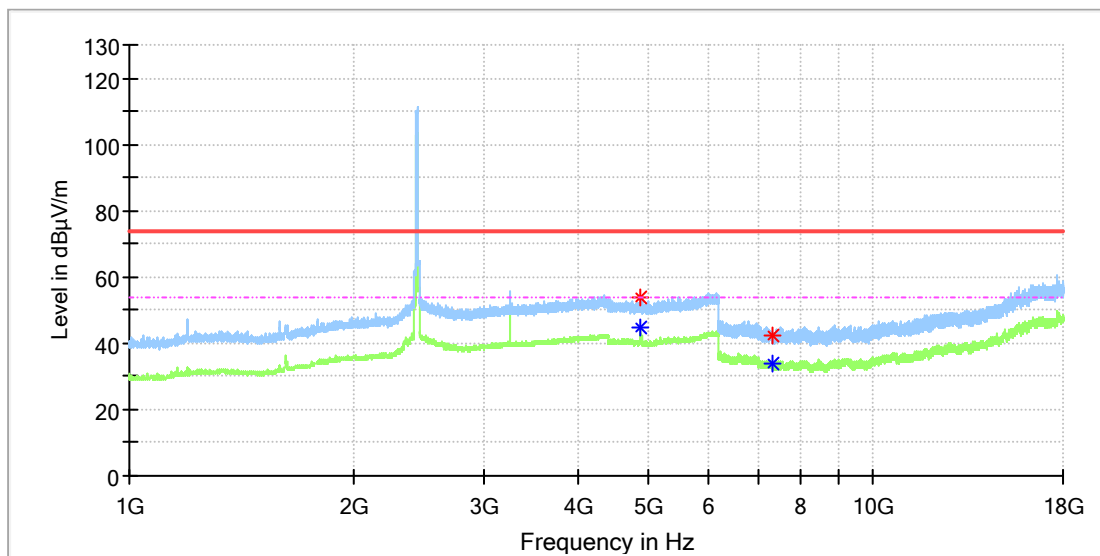


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4873.500000	---	40.75	54.00	13.25	100.0	V	2.0	13.4
4875.000000	51.63	---	74.00	22.37	100.0	V	356.0	13.4
7308.216667	43.10	---	74.00	30.90	100.0	V	257.0	8.2
7309.691667	---	33.97	54.00	20.03	100.0	V	320.0	8.2

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11b_Mid CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

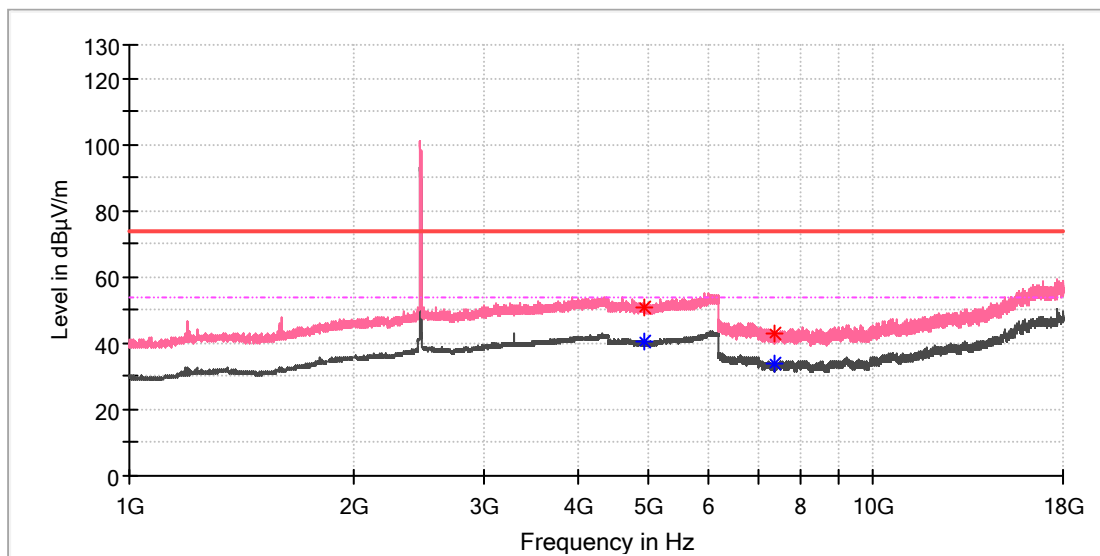


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4873.500000	---	44.51	54.00	9.49	100.0	H	82.0	13.4
4876.500000	53.84	---	74.00	20.16	100.0	H	58.0	13.4
7309.200000	42.22	---	74.00	31.78	100.0	H	288.0	8.2
7311.658333	---	33.62	54.00	20.38	100.0	H	57.0	8.2

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11b_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

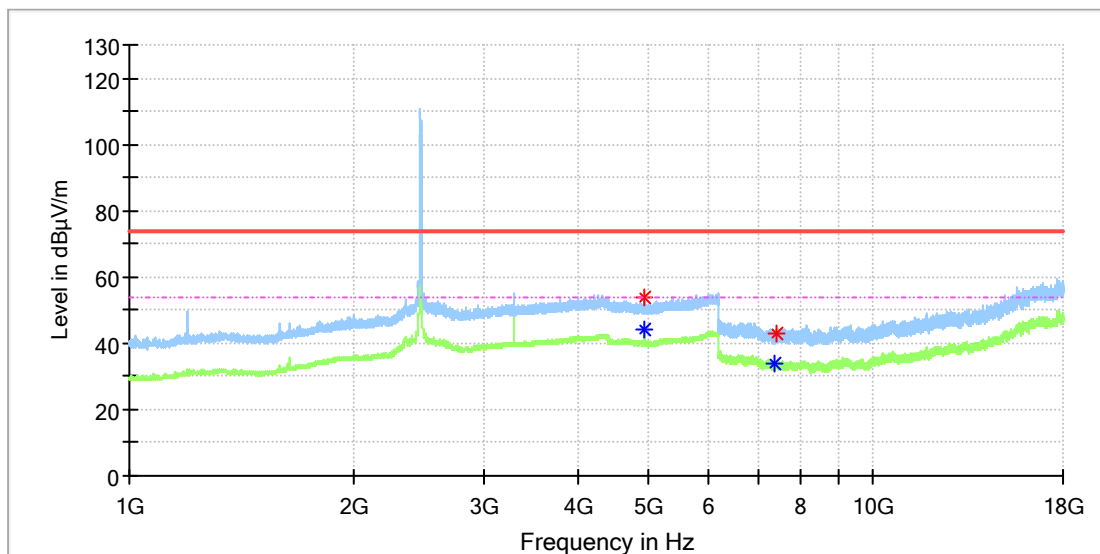


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4923.000000	51.05	---	74.00	22.95	100.0	V	311.0	13.3
4924.500000	---	40.42	54.00	13.58	100.0	V	6.0	13.3
7379.016667	42.77	---	74.00	31.23	100.0	V	303.0	8.2
7382.950000	---	33.99	54.00	20.01	100.0	V	151.0	8.2

EUT Information

EUT Name: M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model: M-LA02302
Test Mode: WIFI 2.4G_11b_High CH
Test Voltage:: DC 5V From USB
Remark: Temp 22 Humi:50%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin

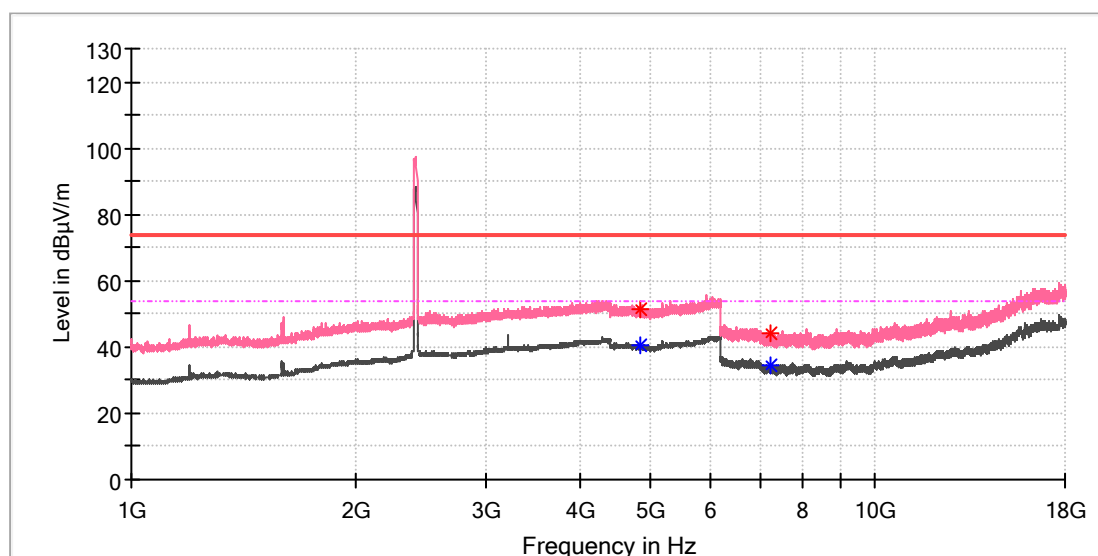


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4923.000000	53.61	---	74.00	20.39	100.0	H	82.0	13.3
4923.000000	---	44.32	54.00	9.68	100.0	H	82.0	13.3
7387.375000	---	33.67	54.00	20.33	100.0	H	105.0	8.2
7392.783333	43.20	---	74.00	30.80	100.0	H	170.0	8.3

Wi-Fi 802.11 g mode, 6Mbps
1GHz - 18GHz
EUT Information

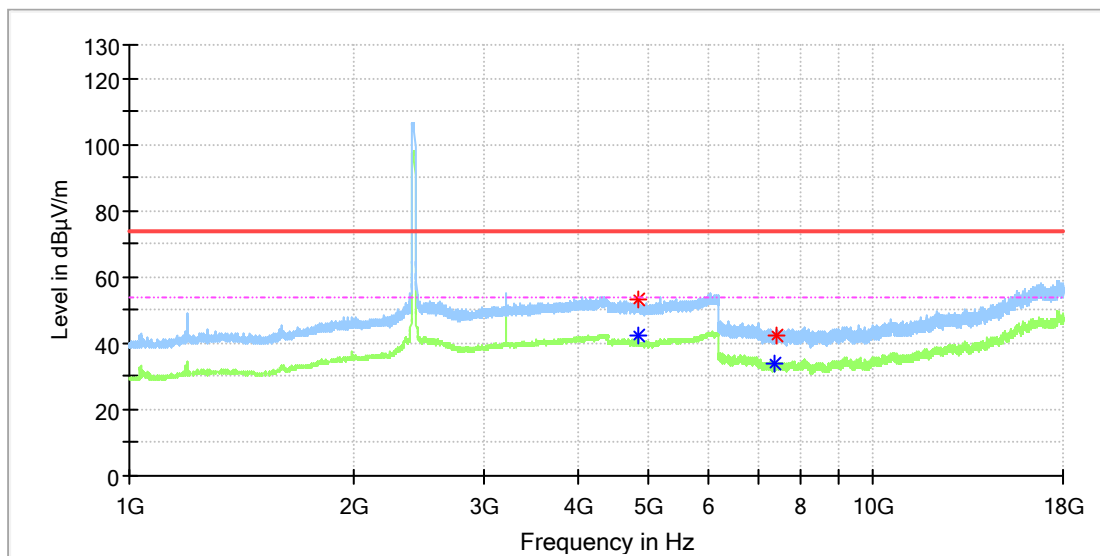
EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11g_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4822.500000	---	40.40	54.00	13.60	100.0	V	231.0	13.5
4823.000000	51.30	---	74.00	22.70	100.0	V	3.0	13.5
7232.500000	---	34.30	54.00	19.70	100.0	V	323.0	8.6
7232.991667	44.22	---	74.00	29.78	100.0	V	260.0	8.6

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11g_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

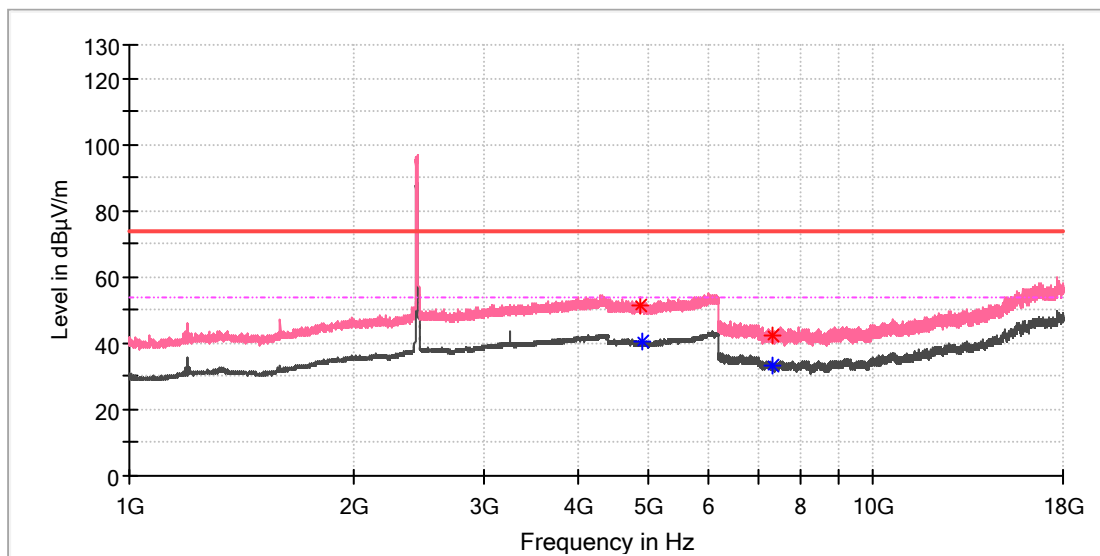


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4820.500000	---	42.13	54.00	11.87	100.0	H	117.0	13.5
4822.500000	52.97	---	74.00	21.03	100.0	H	63.0	13.5
7388.850000	---	33.69	54.00	20.31	100.0	H	116.0	8.2
7391.800000	42.42	---	74.00	31.58	100.0	H	21.0	8.3

EUT Information

EUT Name: M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
 Model: M-LA02302
 Test Mode: WIFI 2.4G_11g_Mid CH
 Test Voltage:: DC 5V From USB
 Remark: Temp 22 Humi:50%
 Test Standard: FCC 15.247
 Tested By: Kei Zhang
 Reviewed By: Terry Yin

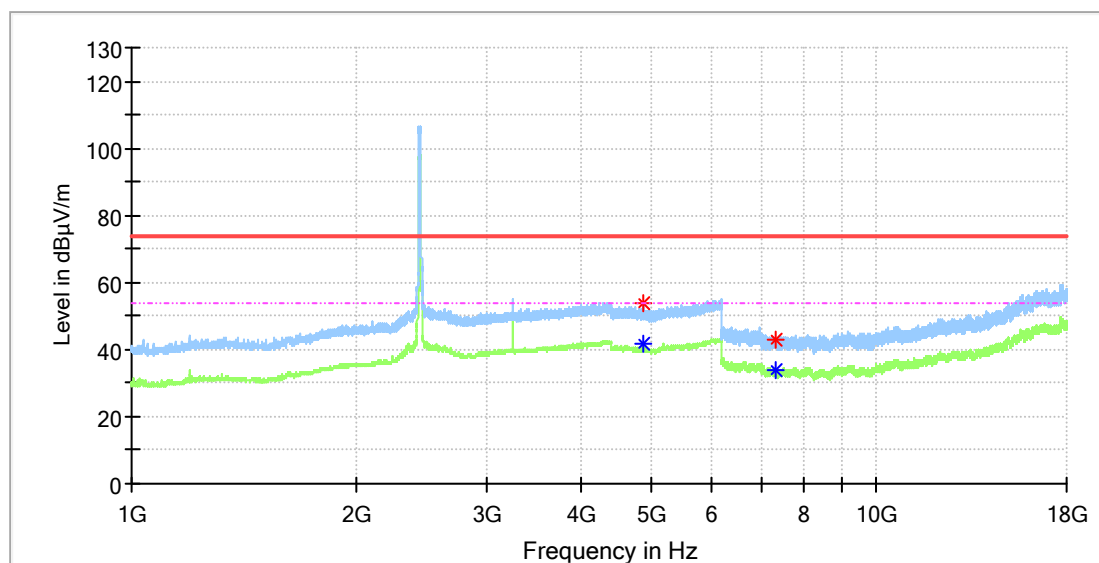


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4875.500000	51.25	---	74.00	22.75	100.0	V	112.0	13.4
4879.000000	---	40.29	54.00	13.71	100.0	V	37.0	13.4
7311.166667	42.47	---	74.00	31.53	100.0	V	216.0	8.2
7313.625000	---	33.48	54.00	20.52	100.0	V	34.0	8.2

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11g_Mid CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

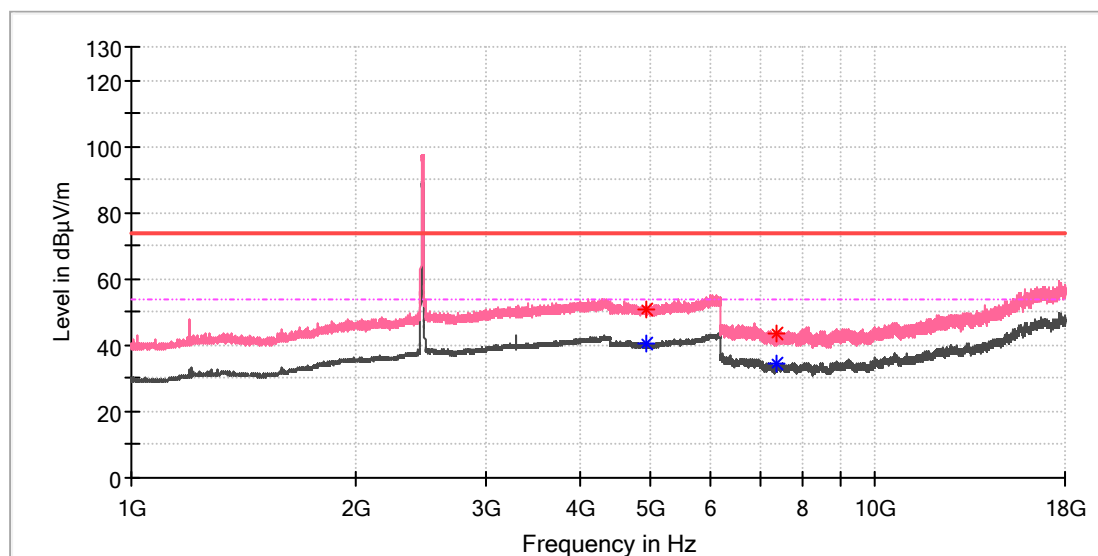


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4867.000000	---	41.63	54.00	12.37	100.0	H	268.0	13.4
4873.500000	53.88	---	74.00	20.12	100.0	H	67.0	13.4
7309.691667	43.20	---	74.00	30.80	100.0	H	78.0	8.2
7312.150000	---	33.59	54.00	20.41	100.0	H	188.0	8.2

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11g_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

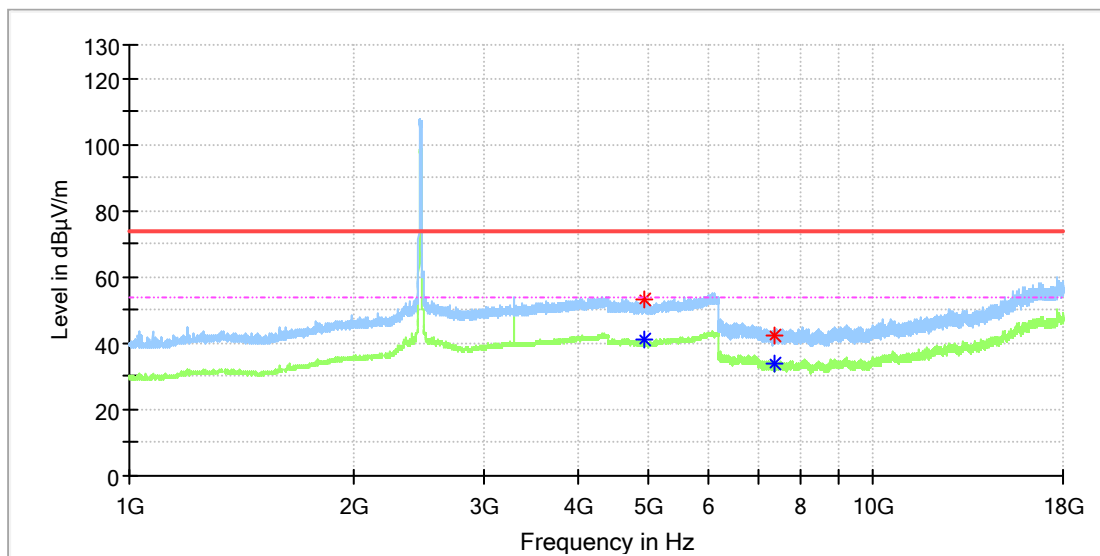


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4923.000000	50.98	---	74.00	23.02	100.0	V	16.0	13.3
4924.000000	---	40.26	54.00	13.74	100.0	V	27.0	13.3
7387.866667	---	34.30	54.00	19.70	100.0	V	64.0	8.2
7389.341667	43.28	---	74.00	30.72	100.0	V	183.0	8.2

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11g_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

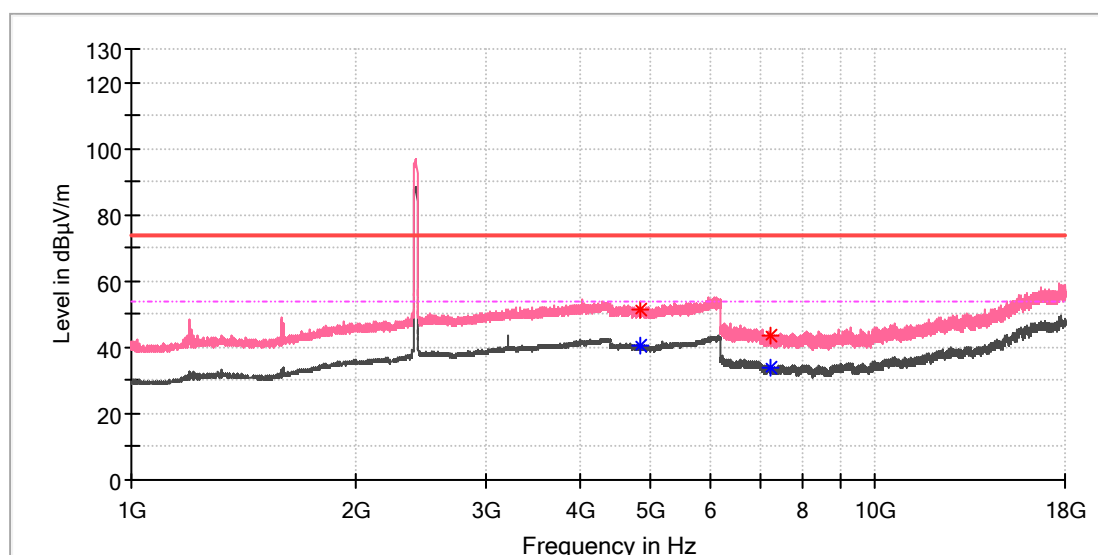


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4925.000000	53.00	---	74.00	21.00	100.0	H	359.0	13.3
4926.000000	---	41.34	54.00	12.66	100.0	H	67.0	13.3
7383.933333	42.54	---	74.00	31.46	100.0	H	35.0	8.2
7386.883333	---	33.79	54.00	20.21	100.0	H	319.0	8.2

Wi-Fi 802.11 n(HT20) mode, MCS0
1GHz - 18GHz
EUT Information

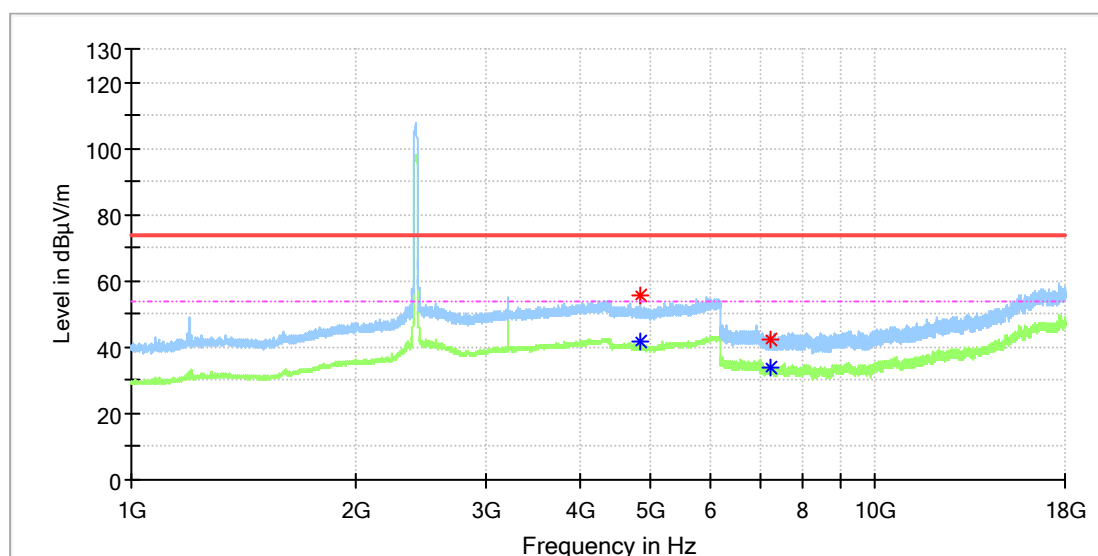
EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n20M_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4821.500000	---	40.52	54.00	13.48	100.0	V	4.0	13.5
4821.500000	51.37	---	74.00	22.63	100.0	V	4.0	13.5
7237.416667	43.37	---	74.00	30.63	100.0	V	144.0	8.6
7238.400000	---	33.87	54.00	20.13	100.0	V	117.0	8.6

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n20M_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

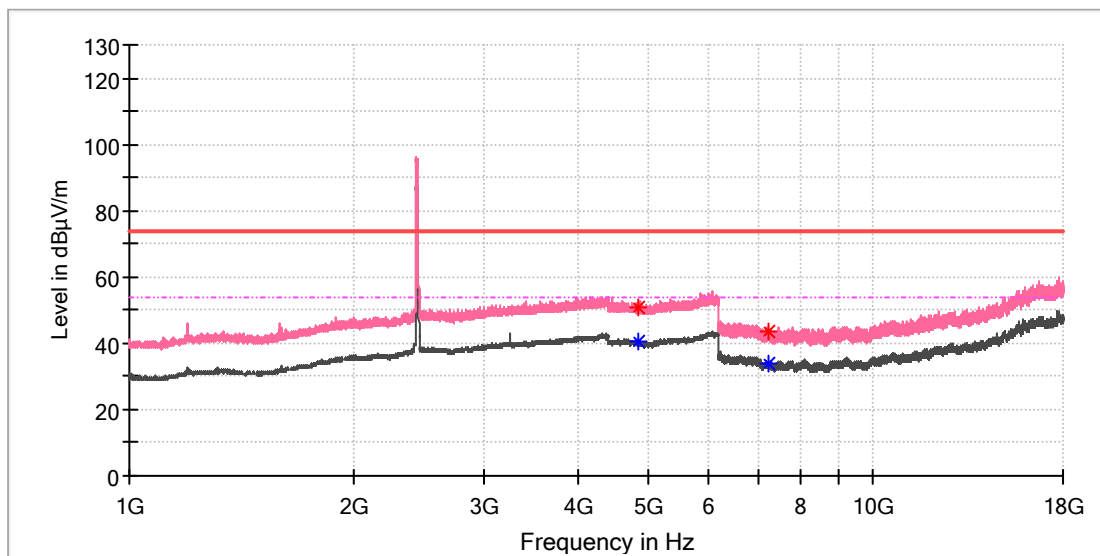


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4821.000000	---	41.78	54.00	12.22	100.0	H	50.0	13.5
4822.000000	55.45	---	74.00	18.55	100.0	H	65.0	13.5
7234.958333	---	33.94	54.00	20.06	100.0	H	131.0	8.6
7235.450000	42.48	---	74.00	31.52	100.0	H	80.0	8.6

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n20M_Mid CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

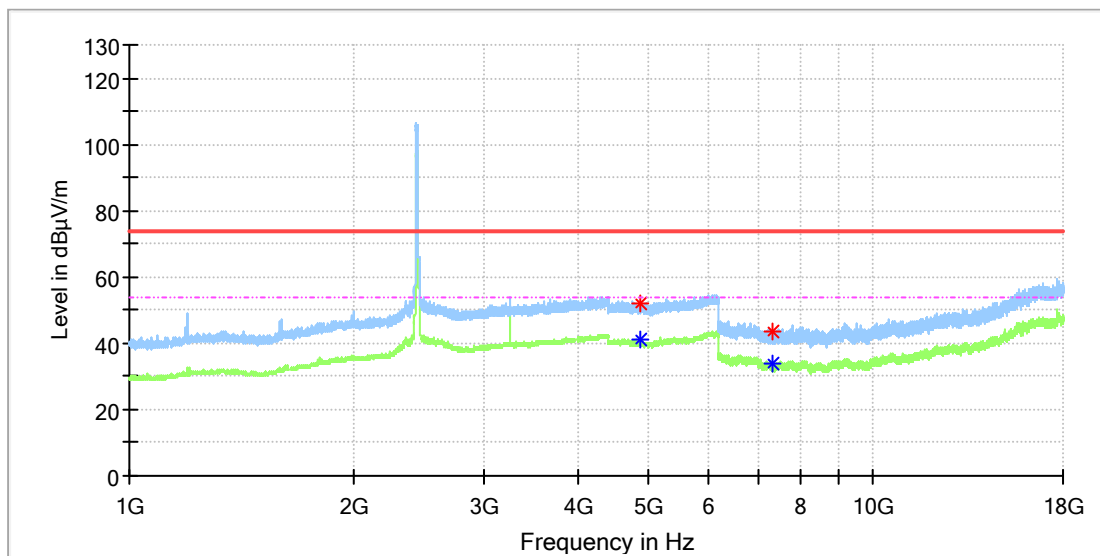


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4823.500000	---	40.28	54.00	13.72	100.0	V	197.0	13.5
4825.000000	50.72	---	74.00	23.28	100.0	V	220.0	13.5
7234.958333	---	33.90	54.00	20.10	100.0	V	291.0	8.6
7236.433333	43.45	---	74.00	30.55	100.0	V	328.0	8.6

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n20M_Mid CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

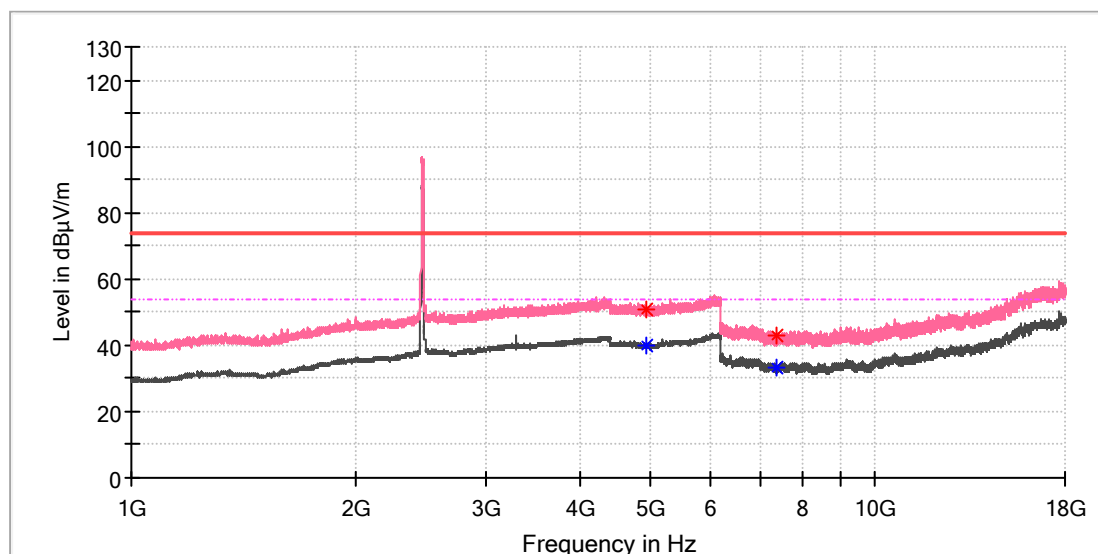


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4875.000000	---	41.36	54.00	12.64	100.0	H	79.0	13.4
4876.500000	51.91	---	74.00	22.09	100.0	H	79.0	13.4
7313.625000	43.61	---	74.00	30.39	100.0	H	70.0	8.2
7314.116667	---	33.62	54.00	20.38	100.0	H	149.0	8.2

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n20M_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

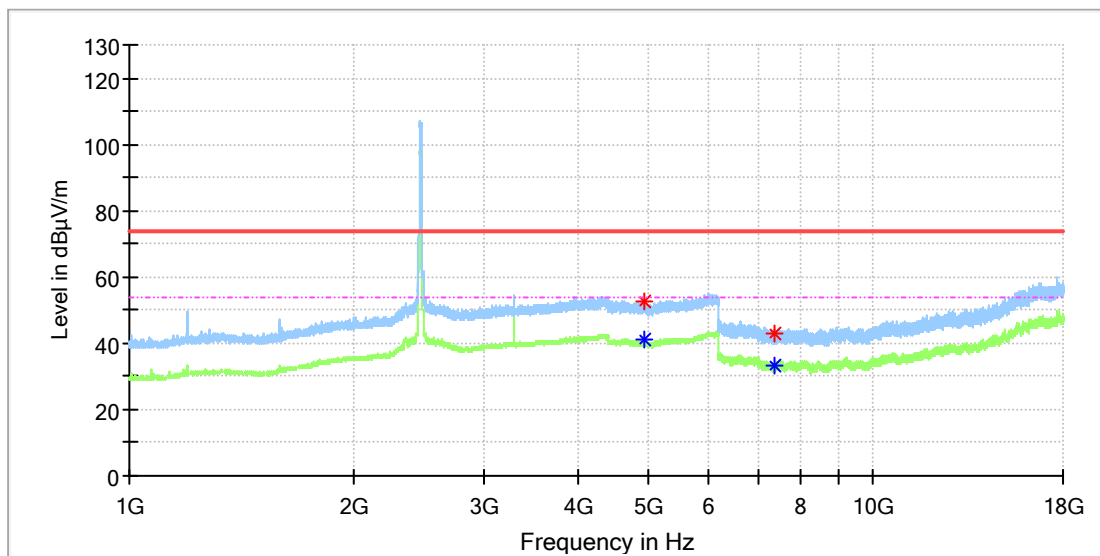


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4920.500000	50.95	---	74.00	23.05	100.0	V	181.0	13.3
4921.000000	---	40.07	54.00	13.93	100.0	V	209.0	13.3
7384.916667	---	33.26	54.00	20.74	100.0	V	291.0	8.2
7387.866667	42.68	---	74.00	31.32	100.0	V	353.0	8.2

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n20M_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

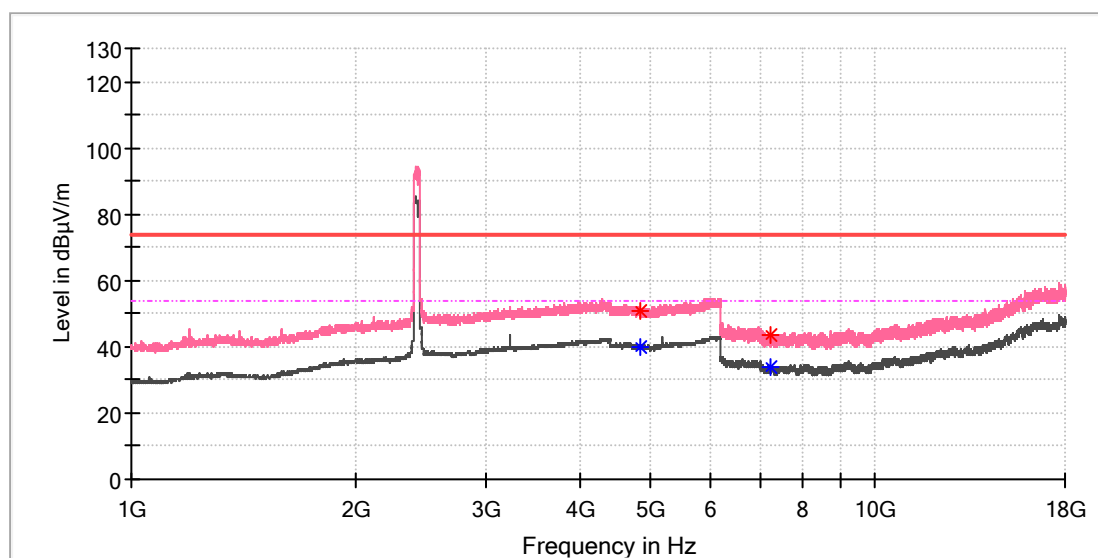


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4917.000000	---	41.30	54.00	12.70	100.0	H	67.0	13.3
4920.500000	52.86	---	74.00	21.14	100.0	H	67.0	13.3
7387.375000	42.70	---	74.00	31.30	100.0	H	61.0	8.2
7389.341667	---	33.43	54.00	20.57	100.0	H	14.0	8.2

Wi-Fi 802.11 n(HT40) mode, MCS0
1GHz - 18GHz
EUT Information

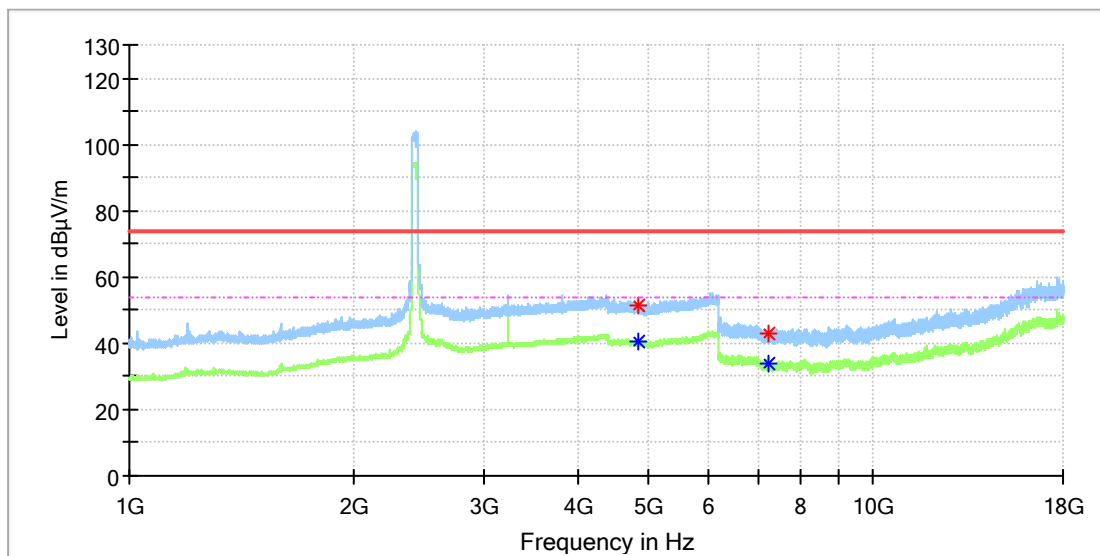
EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n40M_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4822.500000	50.91	---	74.00	23.09	100.0	V	242.0	13.5
4824.500000	---	40.14	54.00	13.86	100.0	V	290.0	13.5
7234.958333	---	33.71	54.00	20.29	100.0	V	295.0	8.6
7237.416667	43.69	---	74.00	30.31	100.0	V	320.0	8.6

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n40M_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

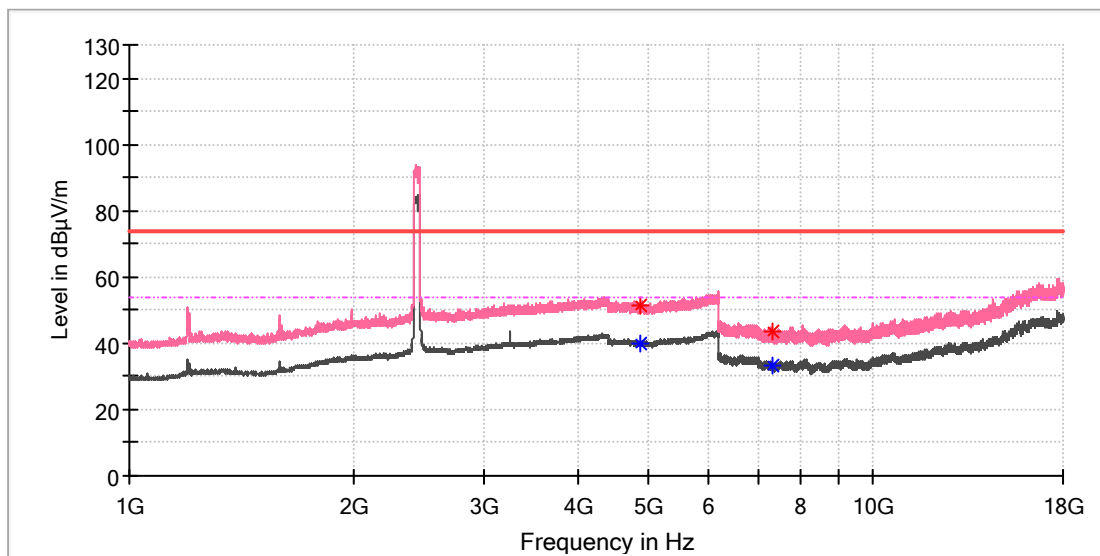


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4824.000000	51.66	---	74.00	22.34	100.0	H	83.0	13.5
4824.500000	---	40.31	54.00	13.69	100.0	H	222.0	13.5
7234.958333	---	33.86	54.00	20.14	100.0	H	134.0	8.6
7236.925000	43.04	---	74.00	30.96	100.0	H	1.0	8.6

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n40M_Mid CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

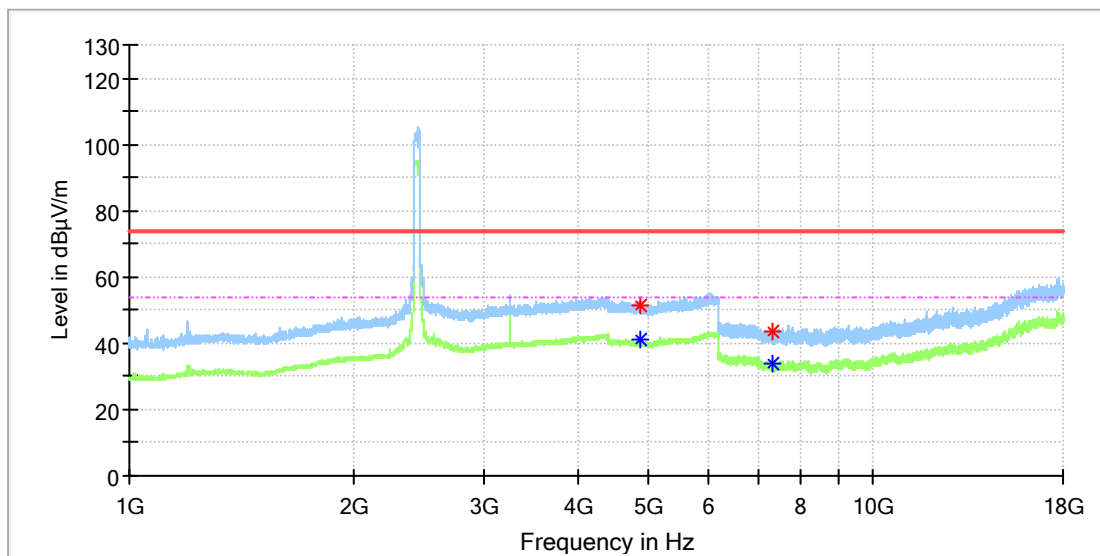


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4872.000000	51.23	---	74.00	22.77	100.0	V	24.0	13.4
4872.500000	---	39.87	54.00	14.13	100.0	V	24.0	13.4
7308.216667	43.61	---	74.00	30.39	100.0	V	286.0	8.2
7311.166667	---	33.24	54.00	20.76	100.0	V	221.0	8.2

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n40M_Mid CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

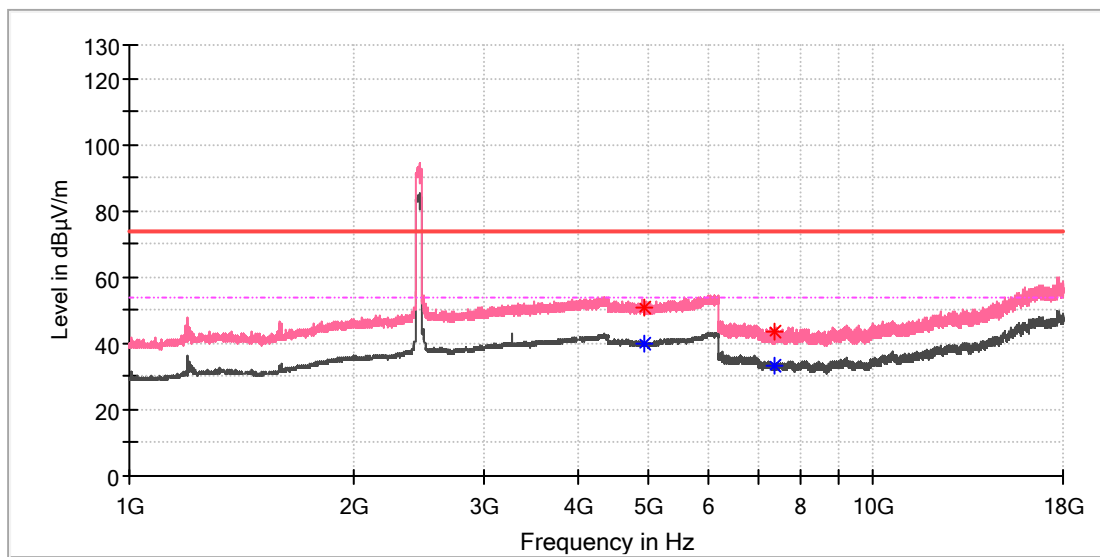


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4874.000000	---	41.05	54.00	12.95	100.0	H	58.0	13.4
4874.500000	51.26	---	74.00	22.74	100.0	H	144.0	13.4
7313.625000	43.39	---	74.00	30.61	100.0	H	8.0	8.2
7313.625000	---	34.03	54.00	19.97	100.0	H	8.0	8.2

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n40M_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

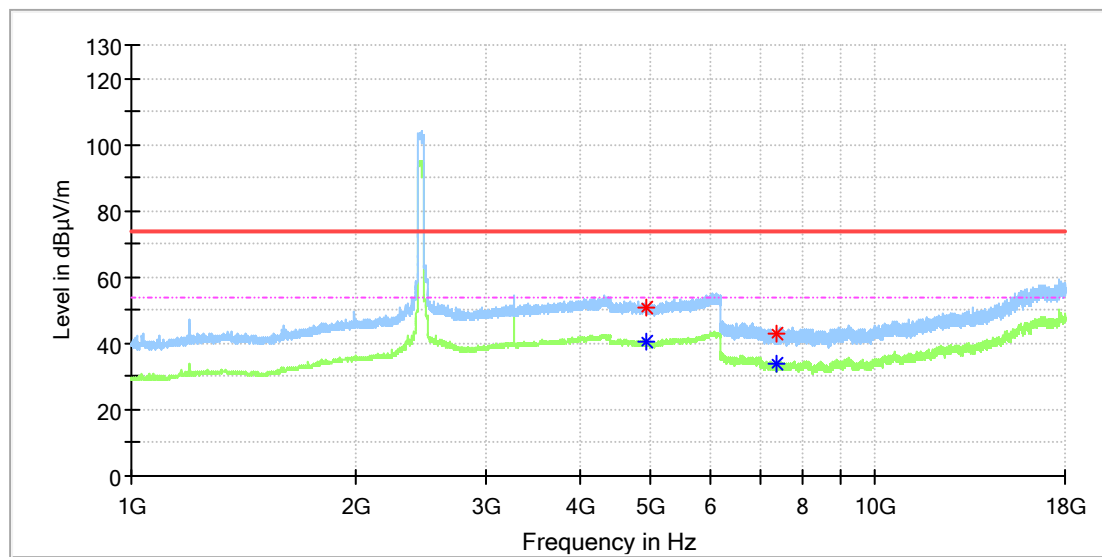


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4923.000000	50.92	---	74.00	23.08	100.0	V	85.0	13.3
4925.500000	---	39.76	54.00	14.24	100.0	V	245.0	13.3
7384.916667	43.49	---	74.00	30.51	100.0	V	337.0	8.2
7389.341667	---	33.50	54.00	20.50	100.0	V	49.0	8.2

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n40M_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

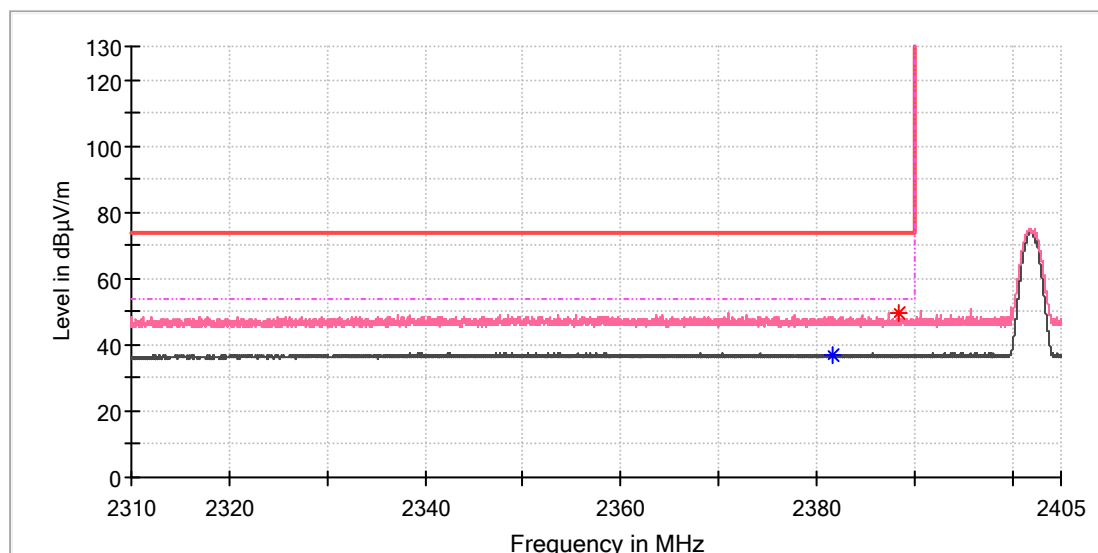
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4922.500000	---	40.60	54.00	13.40	100.0	H	75.0	13.3
4925.500000	50.70	---	74.00	23.30	100.0	H	312.0	13.3
7389.341667	42.65	---	74.00	31.35	100.0	H	75.0	8.2
7390.816667	---	33.69	54.00	20.31	100.0	H	91.0	8.3

Appendix C.2: Test Results of Radiated Emissions in Restricted Bands

Bluetooth Low Energy Low channel

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	BLE_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

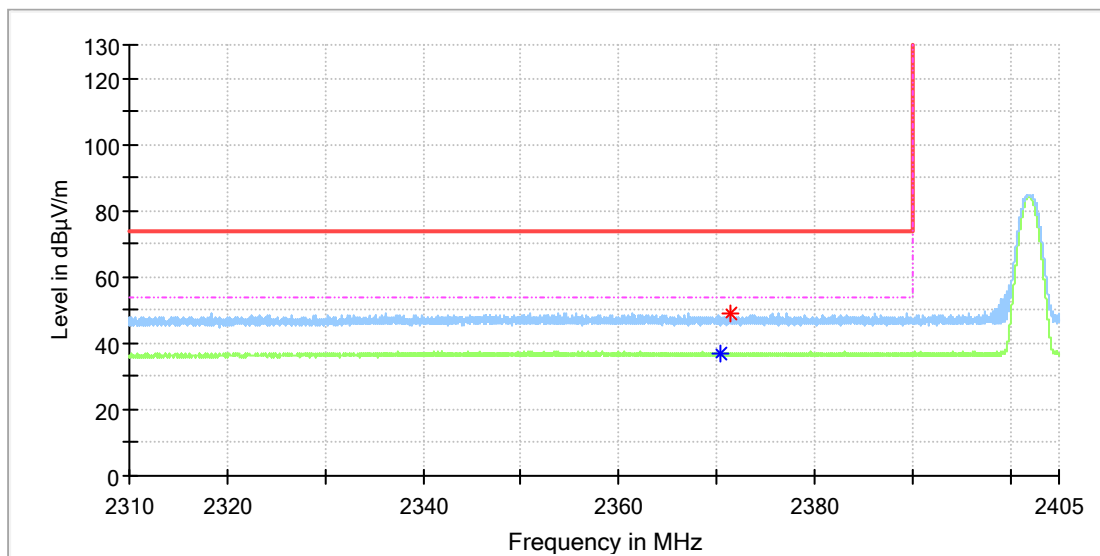


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2381.697059	---	37.08	54.00	16.92	100.0	V	186.0	7.0
2388.416912	49.60	---	74.00	24.40	100.0	V	282.0	7.0

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	BLE_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

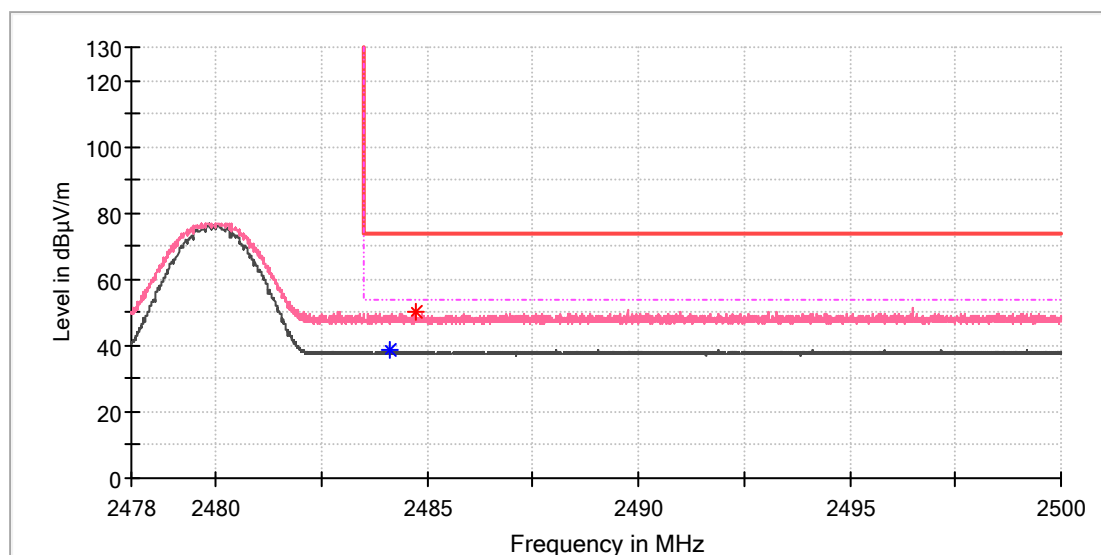


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2370.338971	---	37.05	54.00	16.95	100.0	H	263.0	6.9
2371.358824	48.95	---	74.00	25.05	100.0	H	117.0	6.9

High channel**EUT Information**

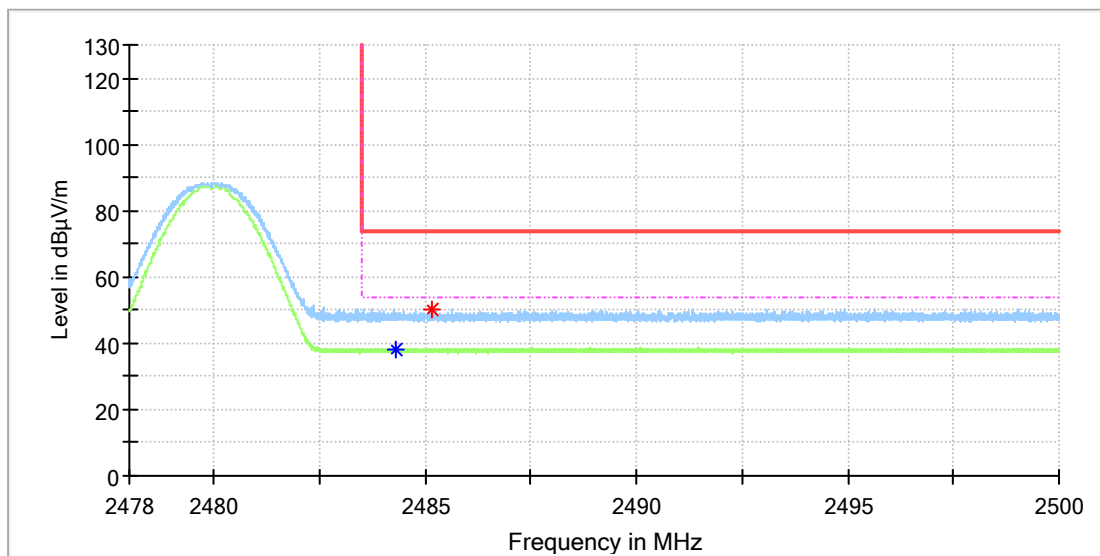
EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	BLE_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

**Critical_Freqs**

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2484.098530	---	38.59	54.00	15.41	100.0	V	194.0	7.4
2484.726177	50.35	---	74.00	23.65	100.0	V	6.0	7.4

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	BLE_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

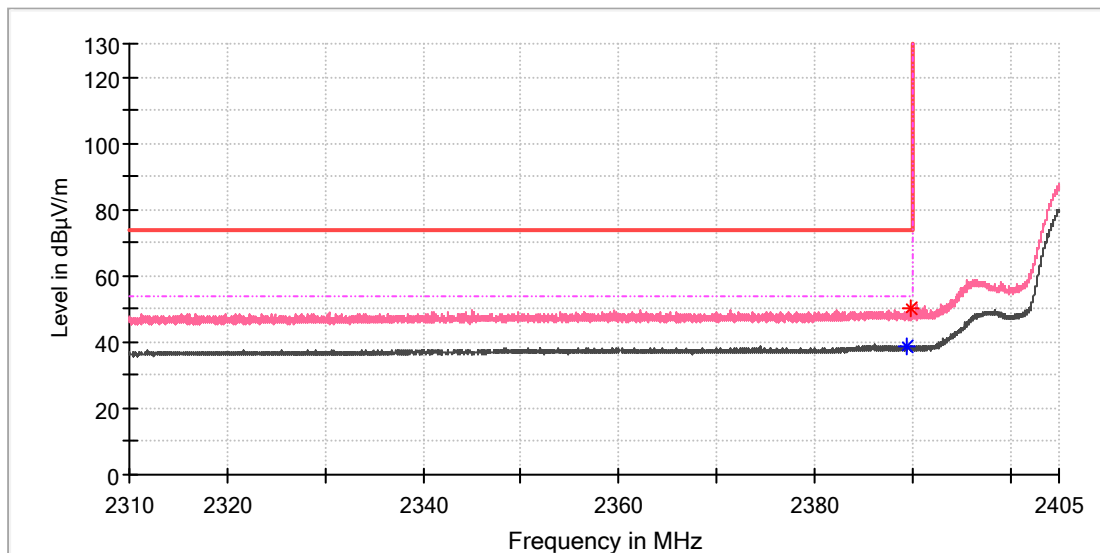
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2484.302353	---	38.28	54.00	15.72	100.0	H	271.0	7.4
2485.162941	50.23	---	74.00	23.77	100.0	H	174.0	7.4

Produkte
Products

Wi-Fi 802.11 b mode, 1 Mbps Low channel

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11b_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

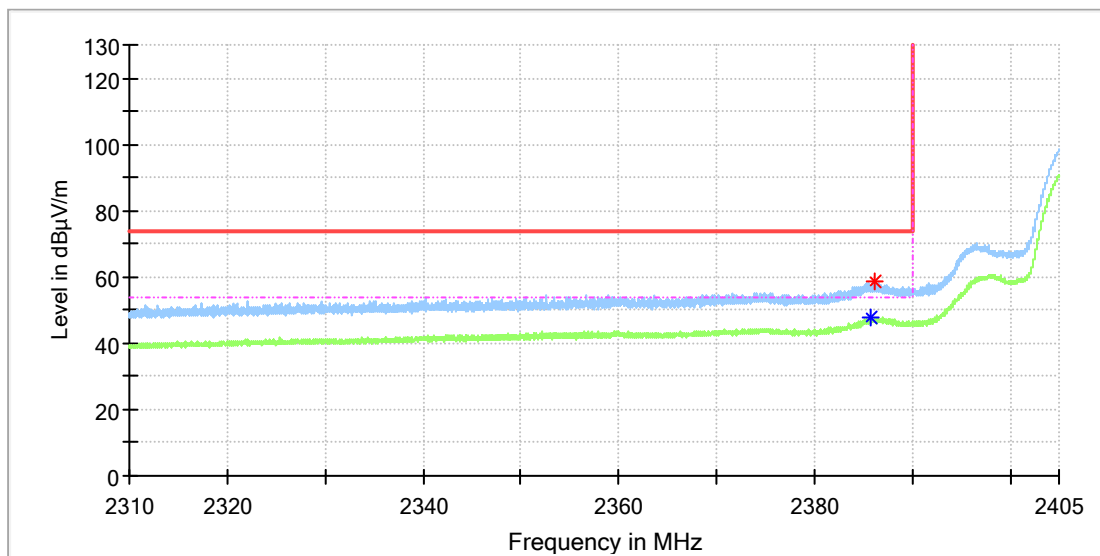


Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.408824	---	38.97	54.00	15.03	100.0	V	283.0	7.0
2389.758088	50.38	---	74.00	23.62	100.0	V	305.0	7.0

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11b_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



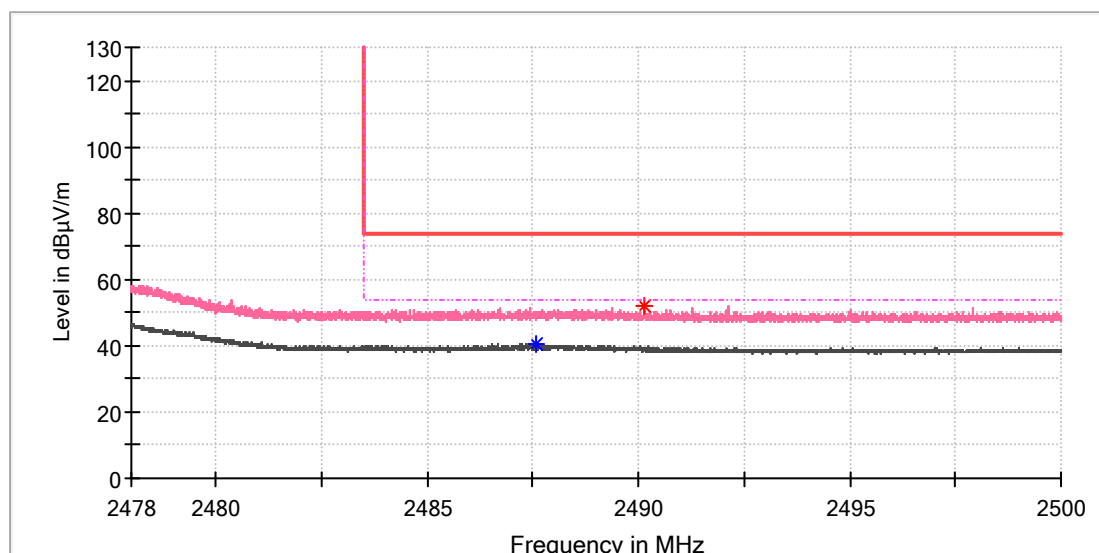
Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2385.734559	---	47.63	54.00	6.37	100.0	H	171.0	7.0
2386.209559	58.50	---	74.00	15.50	100.0	H	171.0	7.0

High channel

EUT Information

EUT Name: M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model: M-LA02302
Test Mode: WIFI 2.4G_11b_High CH
Test Voltage:: DC 5V From USB
Remark: Temp 22 Humi:50%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin

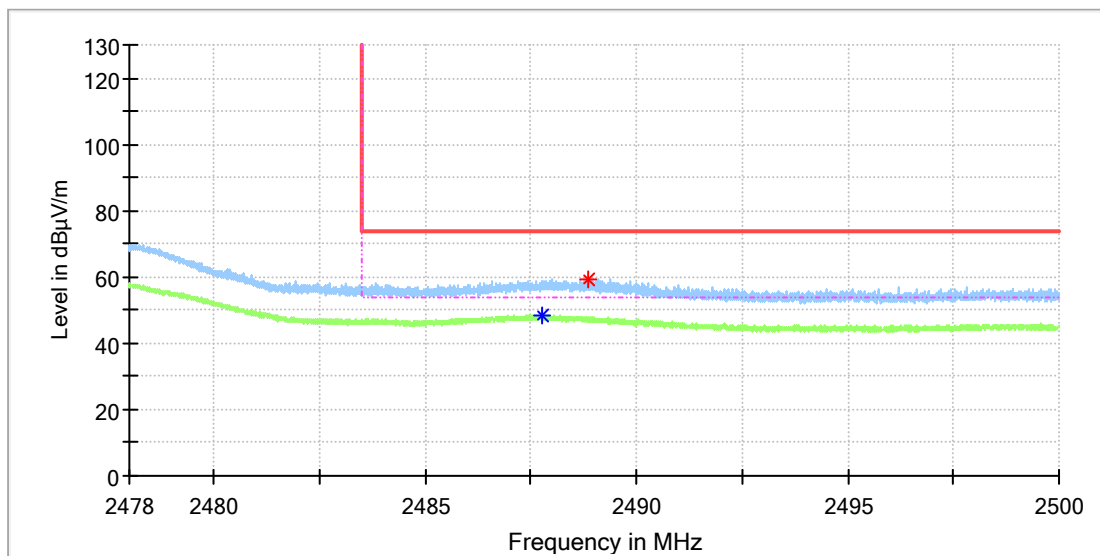


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2487.576471	---	40.32	54.00	13.68	100.0	V	317.0	7.4
2490.151765	52.09	---	74.00	21.91	100.0	V	317.0	7.4

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11b_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

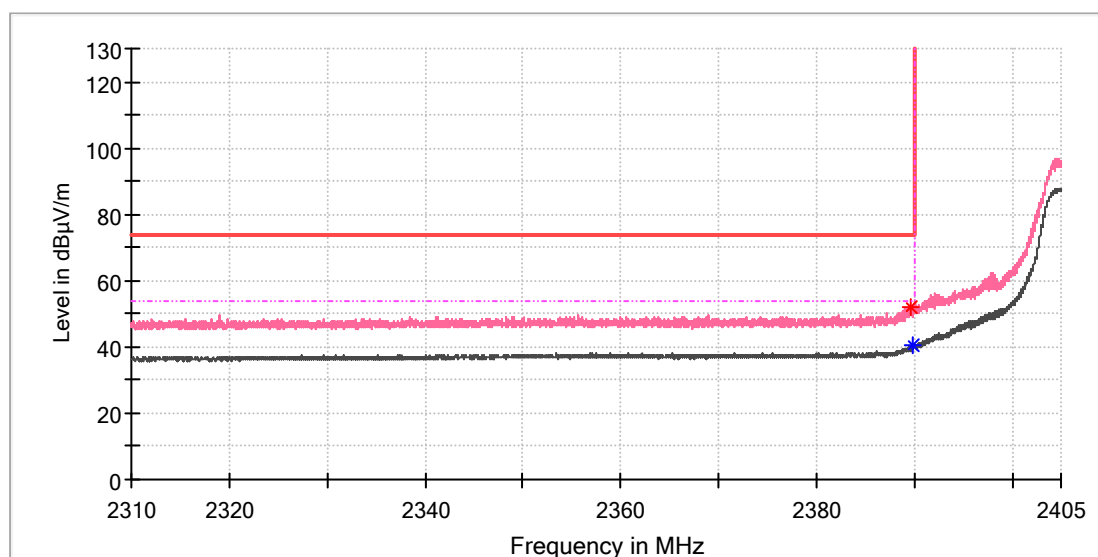


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2487.767353	---	48.46	54.00	5.54	100.0	H	172.0	7.4
2488.835000	59.11	---	74.00	14.89	100.0	H	172.0	7.4

Wi-Fi 802.11 g mode, 6 Mbps
Low channel
EUT Information

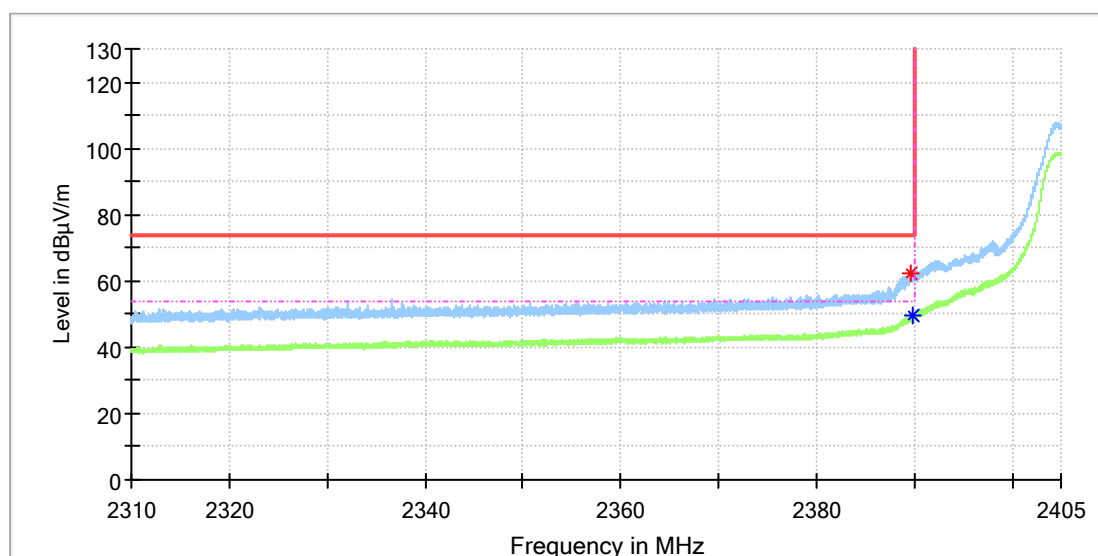
EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11g_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin


Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.590441	52.17	---	74.00	21.83	100.0	V	199.0	7.0
2389.800000	---	40.49	54.00	13.51	100.0	V	199.0	7.0

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11g_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



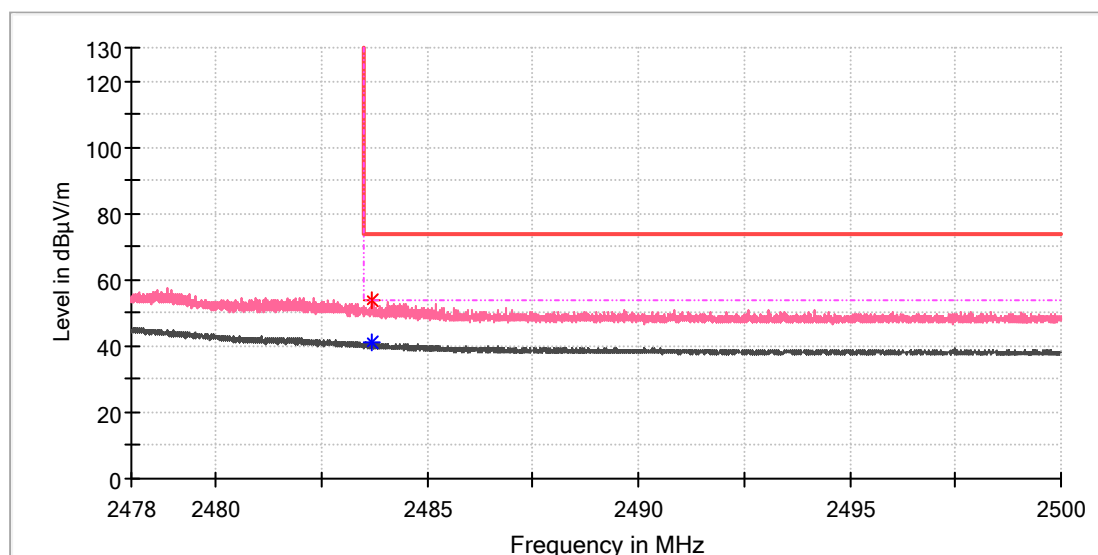
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.646324	62.16	---	74.00	11.84	100.0	H	159.0	7.0
2389.939706	---	49.68	54.00	4.32	100.0	H	185.0	7.0

High channel

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11g_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

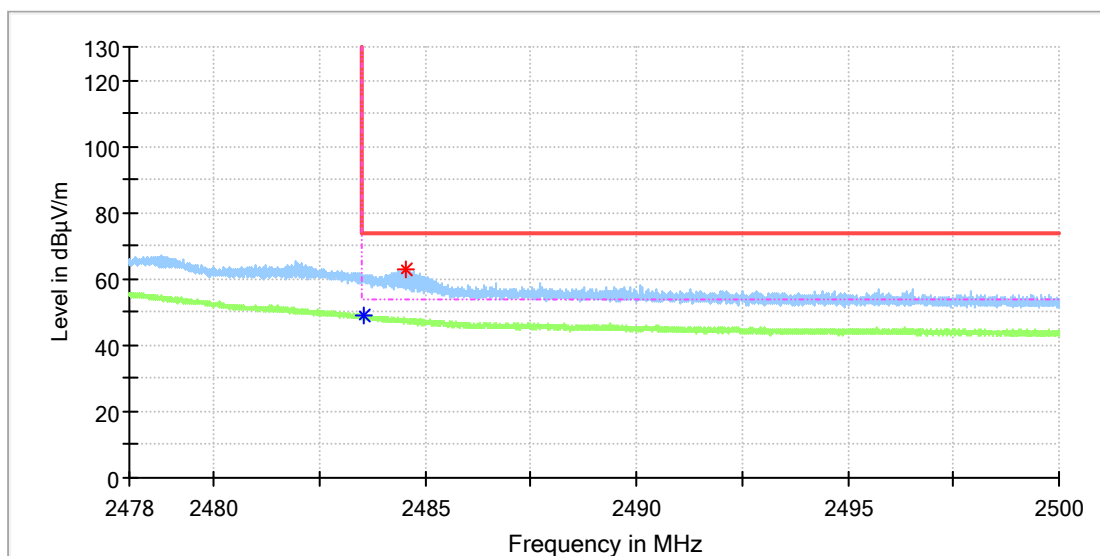


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.690882	---	41.09	54.00	12.91	100.0	V	82.0	7.4
2483.697353	53.64	---	74.00	20.36	100.0	V	82.0	7.4

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11g_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

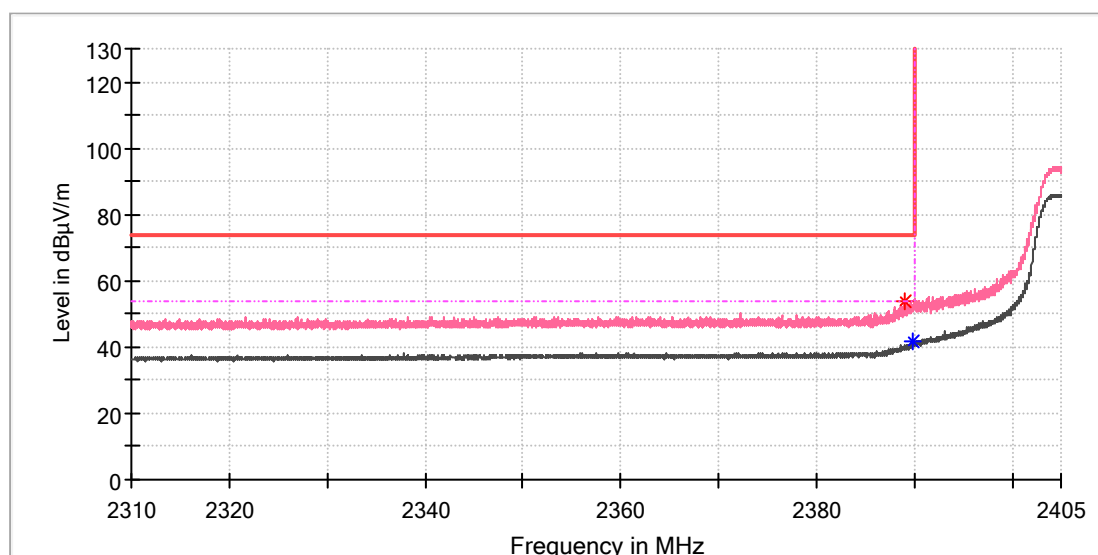


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.532353	---	49.22	54.00	4.78	100.0	H	121.0	7.4
2484.548235	62.69	---	74.00	11.31	100.0	H	148.0	7.4

Wi-Fi 802.11 n(HT20) mode, MCS0
Low channel
EUT Information

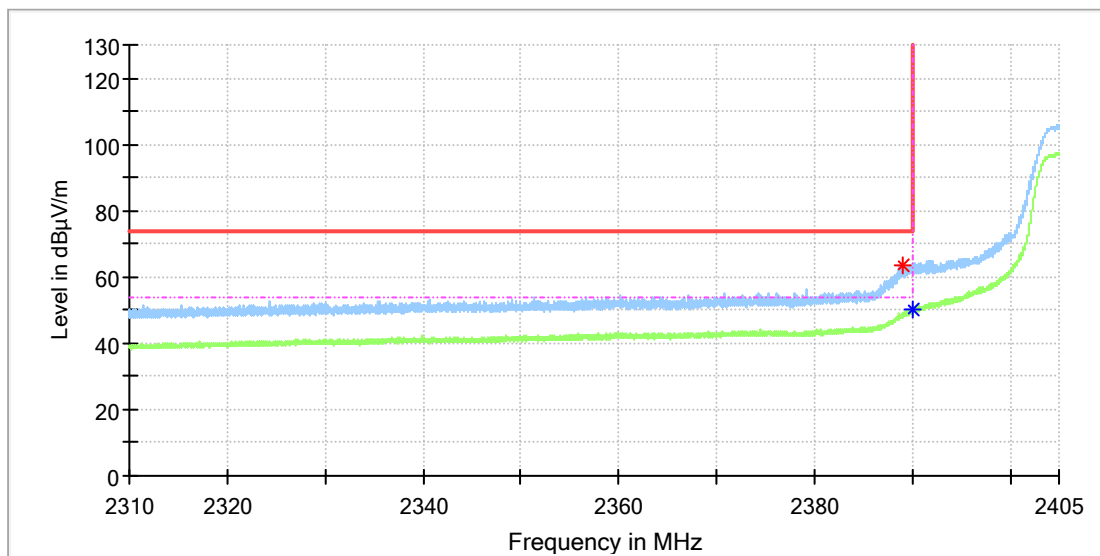
EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n20M_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.045588	53.58	---	74.00	20.42	100.0	V	191.0	7.0
2389.925735	---	41.50	54.00	12.50	100.0	V	115.0	7.0

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n20M_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



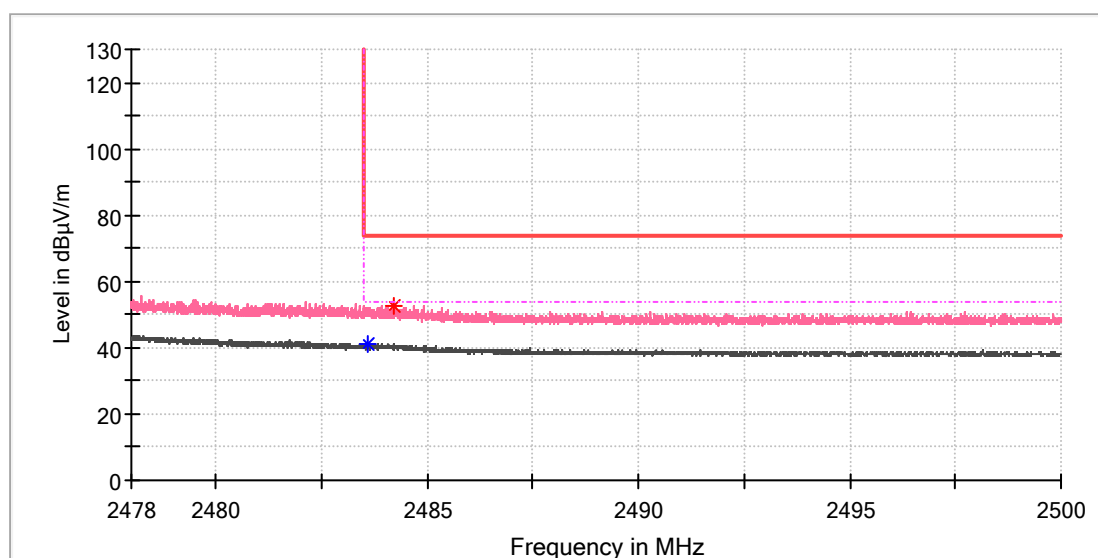
Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.073529	63.41	---	74.00	10.59	100.0	H	130.0	7.0
2389.981618	---	50.15	54.00	3.85	100.0	H	155.0	7.0

High channel

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n20M_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

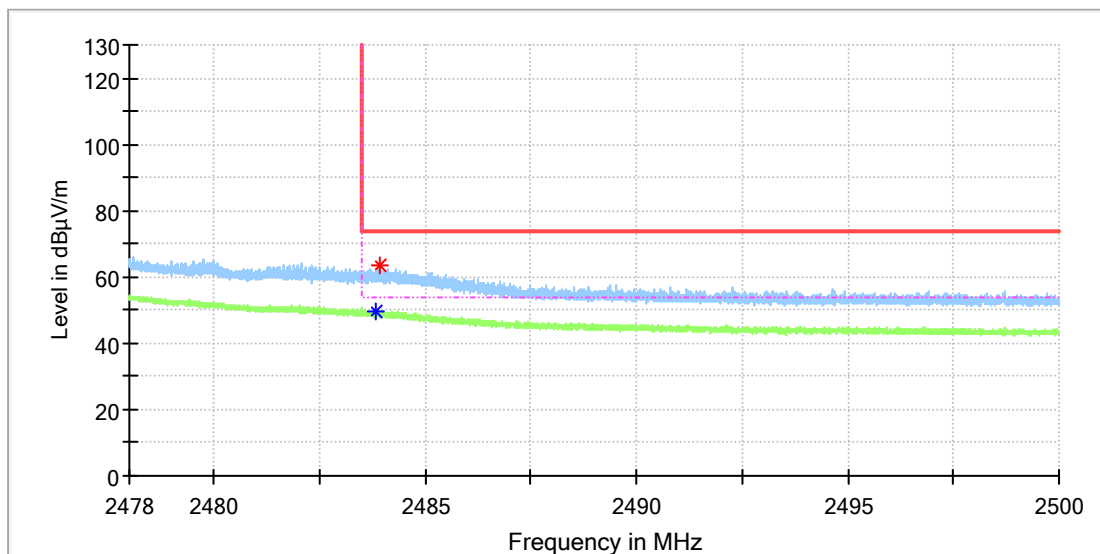


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.610000	---	41.42	54.00	12.58	100.0	V	72.0	7.4
2484.198824	52.66	---	74.00	21.34	100.0	V	72.0	7.4

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n20M_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



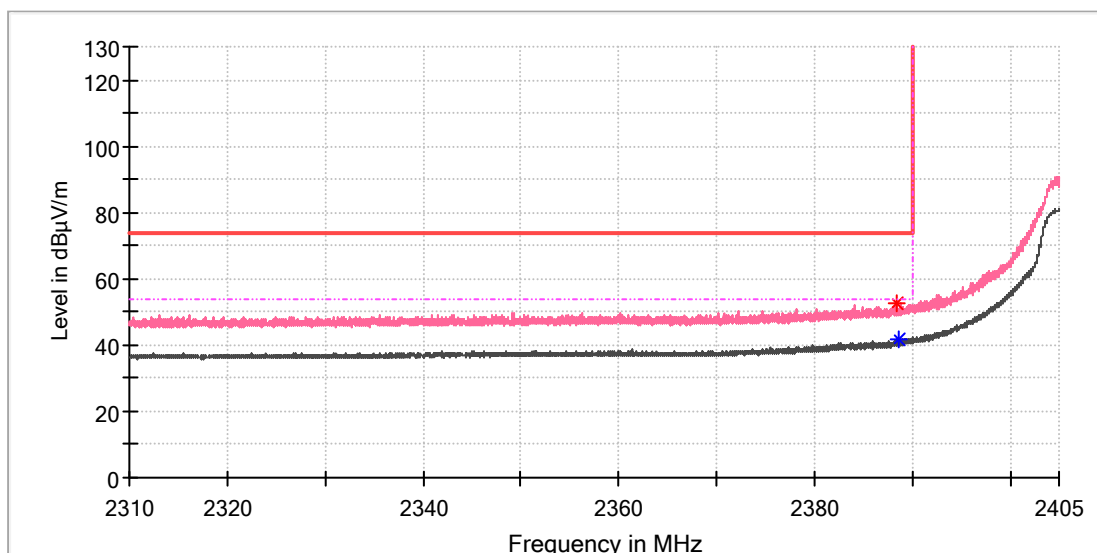
Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.839706	---	49.85	54.00	4.15	100.0	H	180.0	7.4
2483.946471	63.21	---	74.00	10.79	100.0	H	180.0	7.4

Wi-Fi 802.11 n(HT40) mode, MCS0
Low channel

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n40M_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

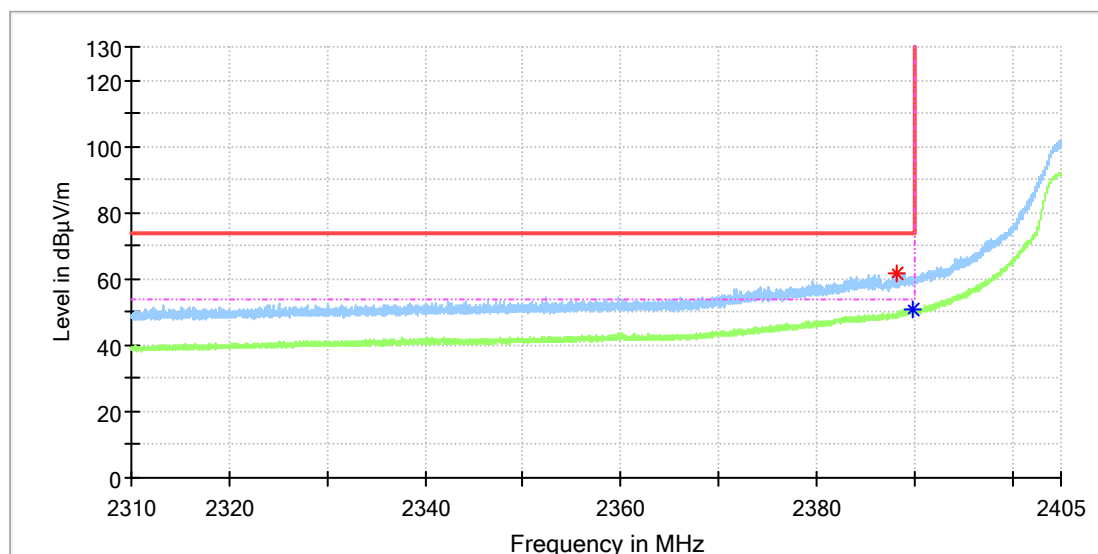


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2388.472794	52.63	---	74.00	21.37	100.0	V	354.0	7.0
2388.696324	---	41.72	54.00	12.28	100.0	V	101.0	7.0

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n40M_Low CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



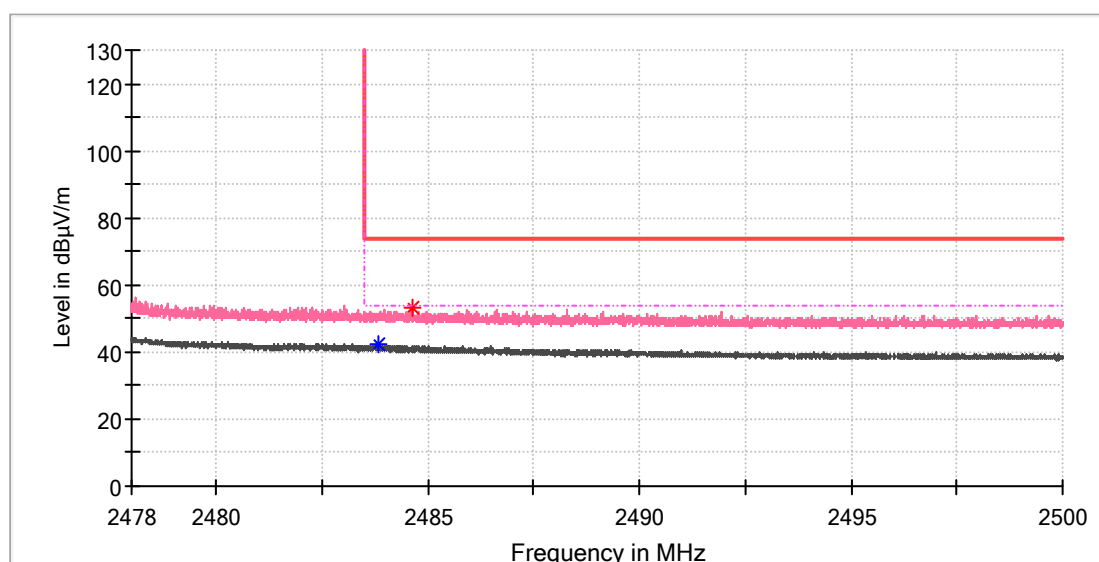
Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2388.277206	61.98	---	74.00	12.02	100.0	H	129.0	7.0
2389.855882	---	50.60	54.00	3.40	100.0	H	141.0	7.0

High channel

EUT Information

EUT Name: M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model: M-LA02302
Test Mode: WIFI 2.4G_11n40M_High CH
Test Voltage:: DC 5V From USB
Remark: Temp 22 Humi:50%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin

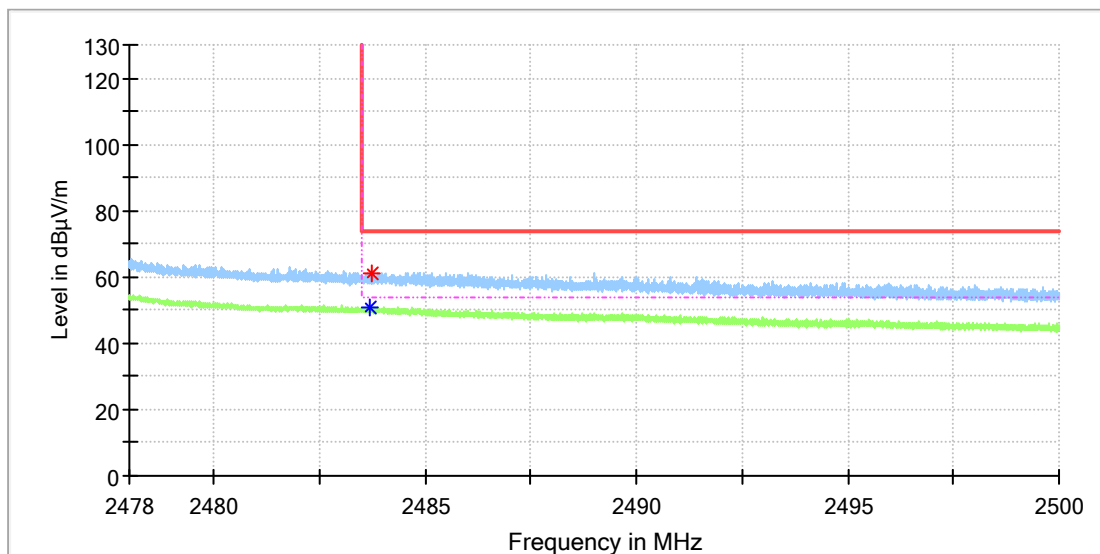


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.852647	---	42.22	54.00	11.78	100.0	V	73.0	7.4
2484.658235	53.23	---	74.00	20.77	100.0	V	73.0	7.4

EUT Information

EUT Name:	M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
Model:	M-LA02302
Test Mode:	WIFI 2.4G_11n40M_High CH
Test Voltage::	DC 5V From USB
Remark:	Temp 22 Humi:50%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



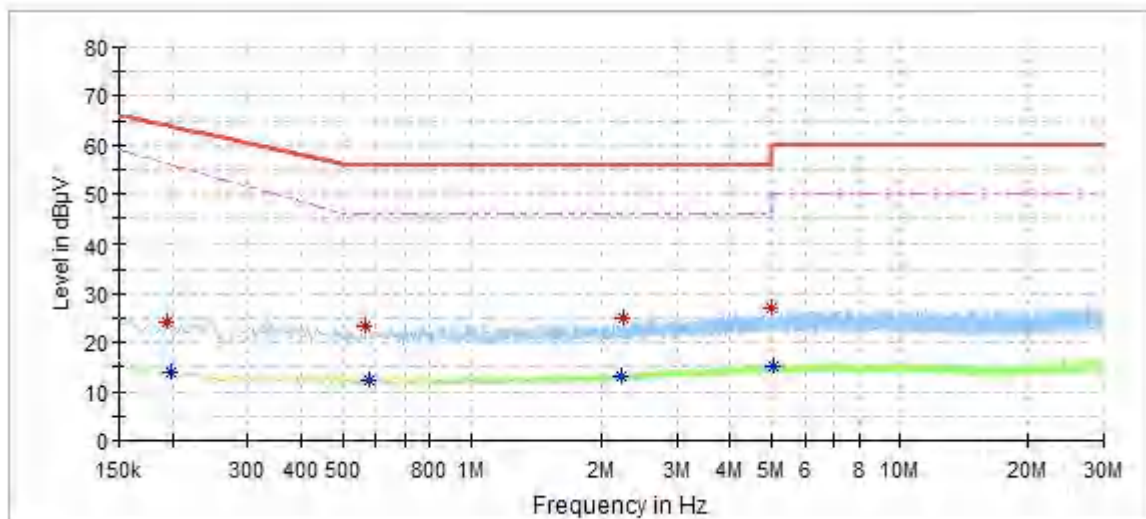
Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.694118	---	50.83	54.00	3.17	100.0	H	146.0	7.4
2483.752353	61.32	---	74.00	12.68	100.0	H	177.0	7.4

Appendix C.3: Test Results of Conducted Emission on AC Mains

EUT Information

EUT Name: M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
 Model: M-LA02302
 Test Mode: TX
 Test Voltage: AC 120V/60Hz
 Test By: Desmond Zheng
 Review By: Gary Chen
 Remark:

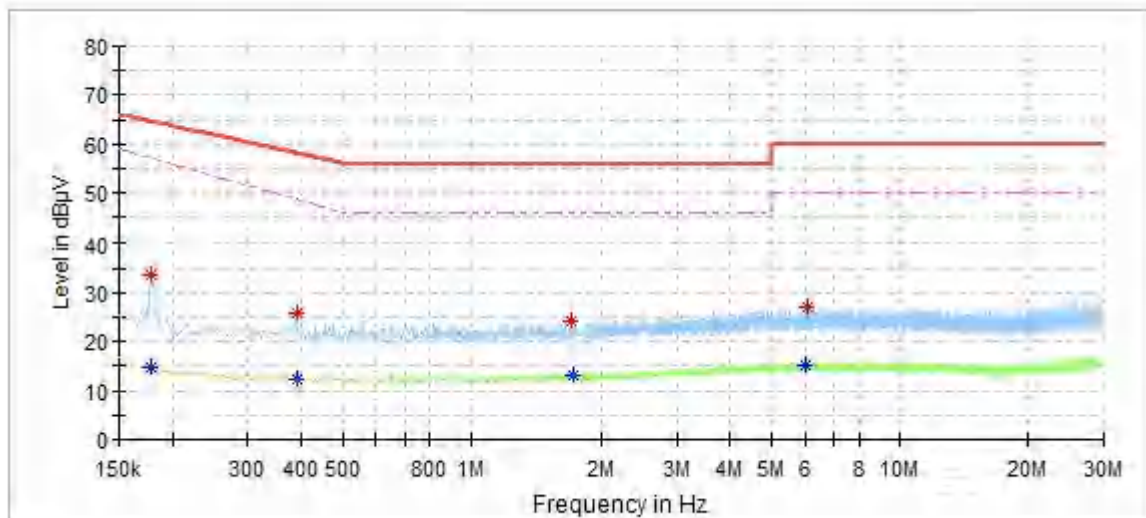


Critical Freqs

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.194000	24.06	---	63.86	39.80	L1	9.6
0.198000	---	13.76	56.00	42.24	L1	9.6
0.568000	23.55	---	56.00	32.45	L1	9.7
0.580000	---	12.43	46.00	33.57	L1	9.7
2.216000	---	13.15	46.00	32.85	L1	9.7
2.252000	25.21	---	56.00	30.79	L1	9.7
5.004000	26.88	---	60.00	33.12	L1	10.0
5.052000	---	15.22	50.00	34.78	L1	10.0

EUT Information

EUT Name: M-LA02302 WI-FI and Bluetooth SMART (BLE) Combo Module
 Model: M-LA02302
 Test Mode: TX
 Test Voltage: AC 120V/60Hz
 Test By: Desmond Zheng
 Review By: Gary Chen
 Remark:



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.178000	33.76	---	64.58	30.82	N	9.6
0.178000	---	14.63	57.15	42.52	N	9.6
0.390000	26.03	---	58.06	32.04	N	9.7
0.390000	---	12.42	48.68	36.26	N	9.7
1.700000	24.14	---	56.00	31.86	N	9.7
1.712000	---	13.02	46.00	32.98	N	9.7
6.032000	---	15.35	50.00	34.65	N	10.0
6.044000	27.13	---	60.00	32.87	N	10.0