

FCC/ISED

RF

TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
Rugged Smart Phone

ISSUED TO
Trimble Europe BV

Meerheide, 45 Eersel 5521 NETHERLANDS



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Date: Dec. 29, 2018

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Wei Yanquan
(Chief Engineer)

Date: Dec. 29, 2018

Report No.: BL-EC18B0415-603
EUT Name: Rugged Smart Phone
Model Name: TDC600 (refer section 2.4)
Brand Name: Trimble, Spectra Geospatial
Test Standard: 47 CFR Part 15 Subpart C
RSS-Gen (Issue 5, April 2018)
RSS-247 (Issue 2, February 2017)

FCC ID: NZI-11705900
ISED Number: 9288A-11705900

Test Conclusion: Pass
Test Date: Nov. 30, 2018 ~ Dec. 17, 2018
Date of Issue: Dec. 29, 2018

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Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions Content</u>
<u>Rev. 01</u>	<u>Dec. 26, 2018</u>	<u>Initial Issue</u>
<u>Rev. 02</u>	<u>Dec. 29, 2018</u>	<u>Revise the title on page 40-46.</u>

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1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	<p>The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1.</p> <p>The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.</p> <p>The laboratory is a testing organization accredited by American Association for Laboratory Accreditation(A2LA) according to ISO/IEC 17025.The accreditation certificate is 4344.01.</p> <p>The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.</p>
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	20°C to 25°C
Ambient Relative Humidity	45% to 55%
Ambient Pressure	100 kPa to 102 kPa

1.4 Announce

- (1) The test report reference to the report template version v6.2.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Trimble Europe BV
Address	Meerheide, 45 Eersel 5521 NETHERLANDS

2.2 Manufacturer Information

Manufacturer	Trimble Europe BV
Address	Meerheide, 45 Eersel 5521 NETHERLANDS

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Type	Rugged Smart Phone
Model Name Under Test	TDC600
Series Model Name	TDC600, MobileMapper60
Description of Model name differentiation	All models are same with electrical parameters and internal circuit structure, but only different on model name, brand name and colors.
Hardware Version	C601_V1.00_PCB
Software Version	TDC600.53.80.10
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	SJYEnergy
	Model No.	BA7800
	Serial No.	N/A
	Capacity	8000 mAh
	Rated Voltage	3.8 V
	Limited Voltage	4.35 V
Ancillary Equipment 2	Adapter	
	Brand Name	N/A
	Model No.	ASUC71w-050912300
	Serial No.	N/A
	Rated Input	100-240 V~, 50/60 Hz, 0.7 A
	Rated Output	5 V= 3 A or 9 V= 2 A or 12 V= 1.5 A
Ancillary Equipment 3	USB Cable	
	Length (Approx.)	1.0 m

2.6 Technical Information

Network and Wireless connectivity	2G Network GSM/GPRS/EDGE 850/900/1800/1900 MHz 3G Network WCDMA/HSDPA/HSUPA Band 1/2/5/8 TD-SCDMA Band 34/39 4G Network FDD LTE Band 1/2/3/4/5/7/8/12/13/17/20/25/28 TDD LTE Band 38/39/40/41 Bluetooth 4.0 (BR+EDR+BLE) 2.4G WIFI 802.11b, 802.11g, 802.11n(HT20) 5G WIFI 802.11n(HT20) and 802.11ac NFC, GPS, GLONASS, BDS, Galileo
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The requirement for the following technical information of the EUT was tested in this report:

Frequency Range	802.11b/g/n(20 MHz): 2.412 GHz - 2.462 GHz $f_c = 2412 \text{ MHz} + (N-1)*5 \text{ MHz}$, where - f_c = "Operating Frequency" in MHz, - N = "Channel Number" with the range from 1 to 11.
Modulation Type	DSSS, OFDM
Product Type	<input type="checkbox"/> Mobile <input checked="" type="checkbox"/> Portable <input type="checkbox"/> Fix Location
Antenna System (eg., MIMO, Smart Antenna)	N/A
Categorization as Correlated or Completely Uncorrelated	N/A
Antenna Type	PIFA Antenna
Antenna Gain	0.10 dBi
About the Product	Only the WIFI 802.11b, 802.11g and 802.11n (HT20) was tested in this report.

Modulation technology	Modulation Type	Transfer Rate (Mbps)
DSSS (802.11b)	DBPSK	1
	DQPSK	2
	CCK	5.5/ 11
OFDM (802.11g)	BPSK	6 / 9
	QPSK	12 / 18
	16QAM	24 / 36
	64QAM	48 / 54
OFDM (802.11n-20MHz)	BPSK	6.5
	QPSK	13/19.5
	16QAM	26/39
	64QAM	52/58.5/65

Note: Preliminary tests were performed in different data rate in above table to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel	
Output Power	11b/11g/11n20	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
6dB Bandwidth	11b/11g/11n20	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
Conducted Spurious Emission	11b/11g/11n20	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
Conducted Emission	11b/11g/11n20	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
Radiated Spurious Emission	11b/11g/11n20	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
Band Edge	11b/11g/11n20	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
Power spectral density (PSD)	11b/11g/11n20	1/6/6.5/13.5 Mbps	1/6/11	3/6/9

Note: The above EUT information in section 2.4 and 2.6 was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

2.7 Additional Instructions

EUT Software Settings:

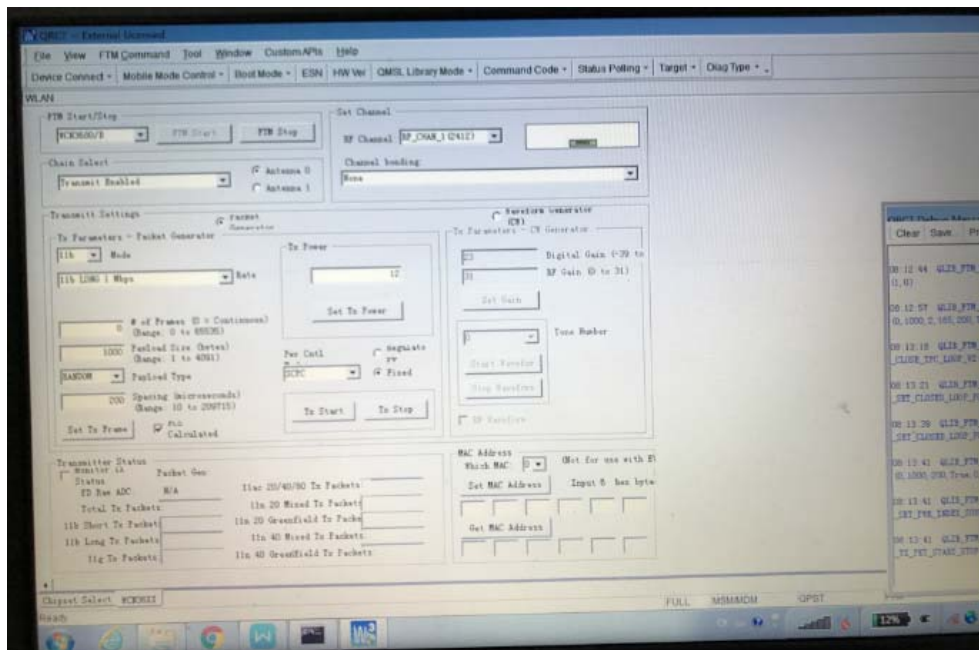
Mode	<input checked="" type="checkbox"/> Special software is used. The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.
------	--

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

EUT Software Settings:

Power level setup in software		
Test Software Version	Test software is set by engineering instruction "QRCT" in engineering mode	
Mode	Channel	Soft Set
802.11 b	All	12
802.11 g	All	12
802.11 n20	All	12

Run software:



3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C (Oct. 01, 2017)	Miscellaneous Wireless Communications Services
2	KDB Publication 558074 D01v05	GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES
3	RSS-Gen (Issue 5, Apr. 2018)	General Requirements for Compliance of Radio Apparatus
4	RSS-247 (Issue 2, February 2017)	Digital Transmission Systems (DTSs), Frequency Hopping Systems(FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
5	ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

3.2 Verdict

No.	Description	FCC PART No.	ISED Part No.	Test Result	Verdict
1	Antenna Requirement	15.203; 15.247(b)	RSS-247, 5.4 (6)	N/A	Pass ^{Note 1}
2	Output Power	15.247(b)	RSS-247, 5.4 (4)	ANNEX A.1	Pass
3	6dB Bandwidth	15.247(a)	RSS-GEN, 6.6; RSS-247, 5.2 (1)	ANNEX A.2	Pass
4	Conducted Spurious Emission	15.247(d)	RSS-247, 5.5	ANNEX A.3	Pass
5	Band Edge(Authorized- band band-edge)	15.209; 15.247(d)	RSS-GEN, 8.9; RSS-247, 5.5	ANNEX A.4	Pass
6	Conducted Emission	15.207	RSS-GEN, 8.8	ANNEX A.5	Pass
7	Radiated Spurious Emission	15.209; 15.247(d)	RSS-247, 5.5	ANNEX A.6	Pass
8	Band Edge(Restricted- band band-edge)	15.209; 15.247(d)	RSS-247, 5.5	ANNEX A.7	Pass
9	Power spectral density (PSD)	15.247(e)	RSS-247, 5.2 (2)	ANNEX A.8	Pass
10	Receiver Spurious Emissions	N/A	RSS-Gen, 7.1.2	N/A	N/A ^{Note 2}

Note ¹: Please refer to section 5.1.

Note ²: Only radio communication receivers operating in stand-alone mode within the band 30-960 MHz, as well as scanner receivers, are subject to Industry Canada requirements, so this test is not applicable.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

During the measurement, the normal environmental conditions were within the listed ranges:

Relative Humidity	45% - 55%	
Atmospheric Pressure	100 kPa - 102 kPa	
Temperature	NT (Normal Temperature)	+22°C to +25°C
Working Voltage of the EUT	NV (Normal Voltage)	3.8 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-30	103118	2018.06.15	2019.06.14
Switch Unit with OSP-B157	ROHDE&SCHWARZ	OSP120	101270	2018.06.15	2019.06.14
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2018.11.07	2019.11.06
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2018.06.13	2019.06.12
LISN	SCHWARZBECK	NSLK 8127	8127-687	2018.06.13	2019.06.12
Bluetooth Tester	ROHDE&SCHWARZ	CBT	101005	2018.06.15	2019.06.14
Power Splitter	KMW	DCPD-LDC	1305003215	--	--
Power Sensor	ROHDE&SCHWARZ	NRP-Z21	103971	2018.06.15	2019.06.14
Attenuator (20 dB)	KMW	ZA-S1-201	110617091	--	--
Attenuator (6 dB)	KMW	ZA-S1-61	1305003189	--	--
DC Power Supply	ROHDE&SCHWARZ	HMP2020	018141664	2018.06.14	2019.06.13
Temperature Chamber	ANGELANTIONI SCIENCE	NTH64-40A	1310	2018.06.26	2019.06.25
Test Antenna- Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2017.11.09	2019.11.08
Test Antenna- Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2017.07.22	2019.07.21
Test Antenna- Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2018.07.11	2020.07.10
Test Antenna- Horn(15-26.5 GHz)	SCHWARZBECK	BBHA 9170	9170-305	2018.06.21	2019.06.20
Test Antenna- Horn (18-40 GHz)	A-INFO	LB- 180400KF	J211060273	2017.01.06	2019.01.05
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2017.02.21	2019.02.20
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60 *7.35m	N/A	2017.08.08	2019.08.07
Shielded Enclosure	ChangNing	CN-130701	130703	--	--
Signal Generator	ROHDE&SCHWARZ	SMB100A	177746	2018.06.15	2019.06.14
Power Amplifier	OPHIR RF	5225F	1037	2018.02.16	2019.02.15
Power Amplifier	OPHIR RF	5273F	1016	2018.02.16	2019.02.15
Directional Coupler	Werlantone	C5982-10	109275	N/A	N/A

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Directional Coupler	Werlantone	CHP-273E	S00801z-01	N/A	N/A
Amplifier	COM-MW	KL_LNA_18 -40G-01	N/A	2018.06.26	2019.06.25
RF Cable 1	ROHDE&SCHWARZ	JUNFLON	APR0914004	2018.07.10	2019.10.09
RF Cable 2	Huber&suhner	RG_400_/U	N/A	2018.07.10	2019.10.09
RF Cable 3	Huber&suhner	RG_400_/U	N/A	2018.07.10	2019.10.09
RF Cable 4	Huber&suhner	SX_04172_ B-60	N/A	2018.07.10	2019.10.09
RF Cable 5	COM-MW	RFJA360- 2.92mm- J/J3M	N/A	2018.07.10	2019.10.09

Note: The calibration period on the Cable is three month.

4.3 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Occupied Channel Bandwidth	±4%
RF output power, conducted	±1.4 dB
Power Spectral Density, conducted	±2.5 dB
Unwanted Emissions, conducted	±2.8 dB
All emissions, radiated	±5.4 dB
Temperature	±1°C
Humidity	±4%

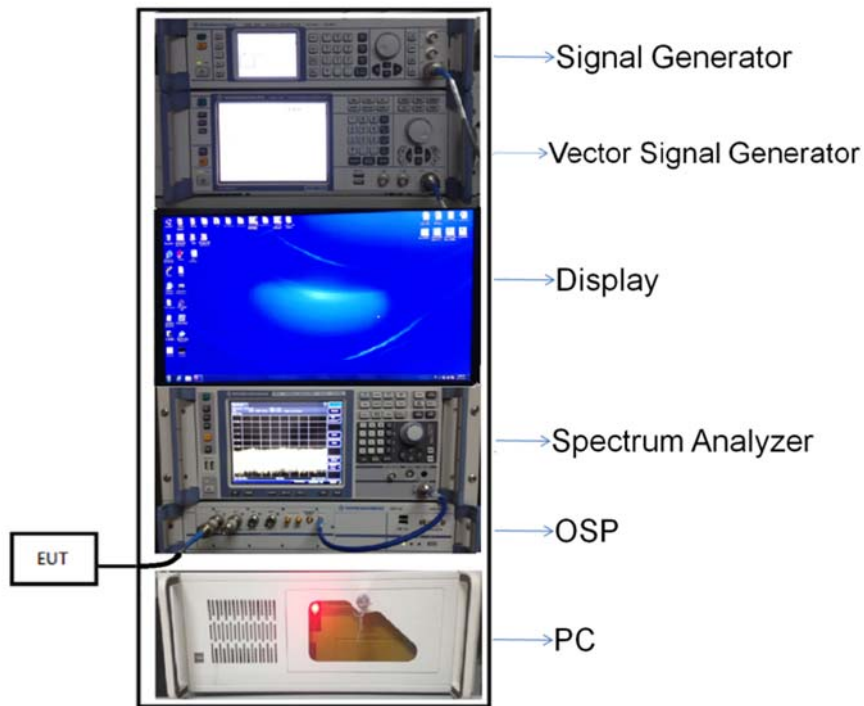
4.4 Description of Test Setup

4.4.1 For Antenna Port Test

Conducted value (dBm) = Measurement value (dBm) + cable loss (dB)

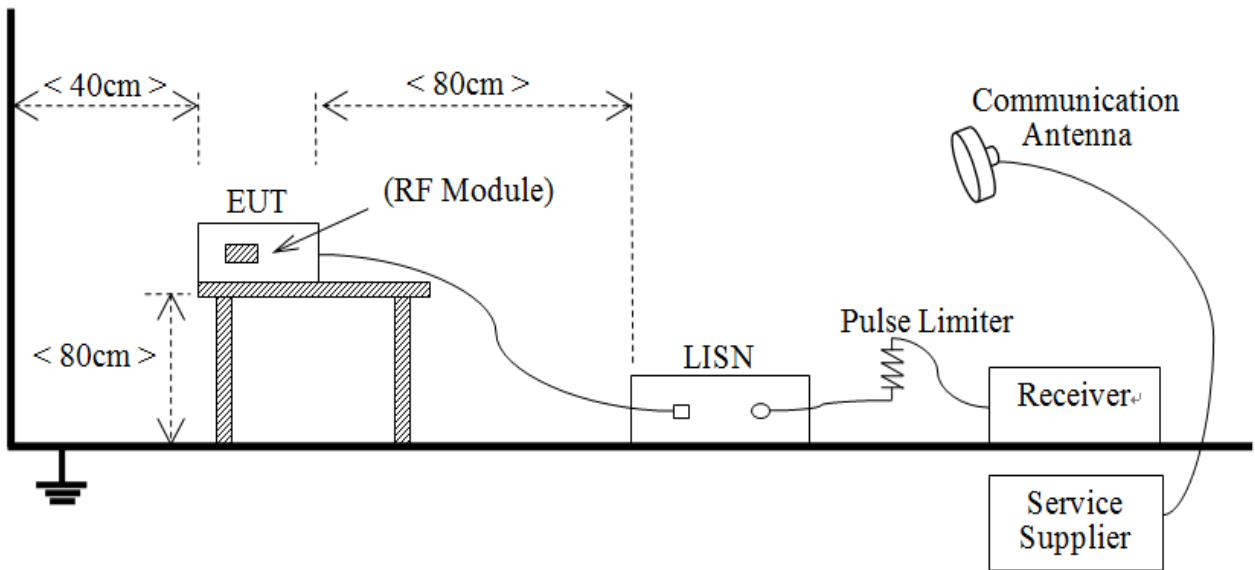
For example: the measurement value is 10 dBm and the cable 0.5dBm used, then the final result of EUT:

Conducted value (dBm) = 10 dBm + 0.5 dB = 10.5 dBm



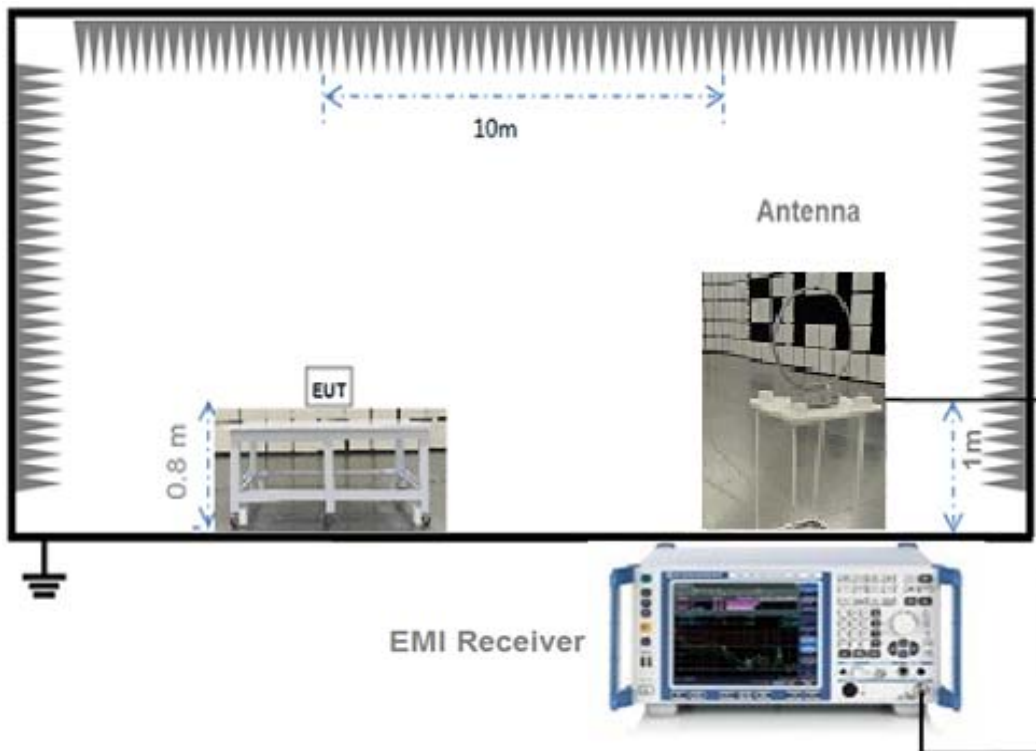
(Diagram 1)

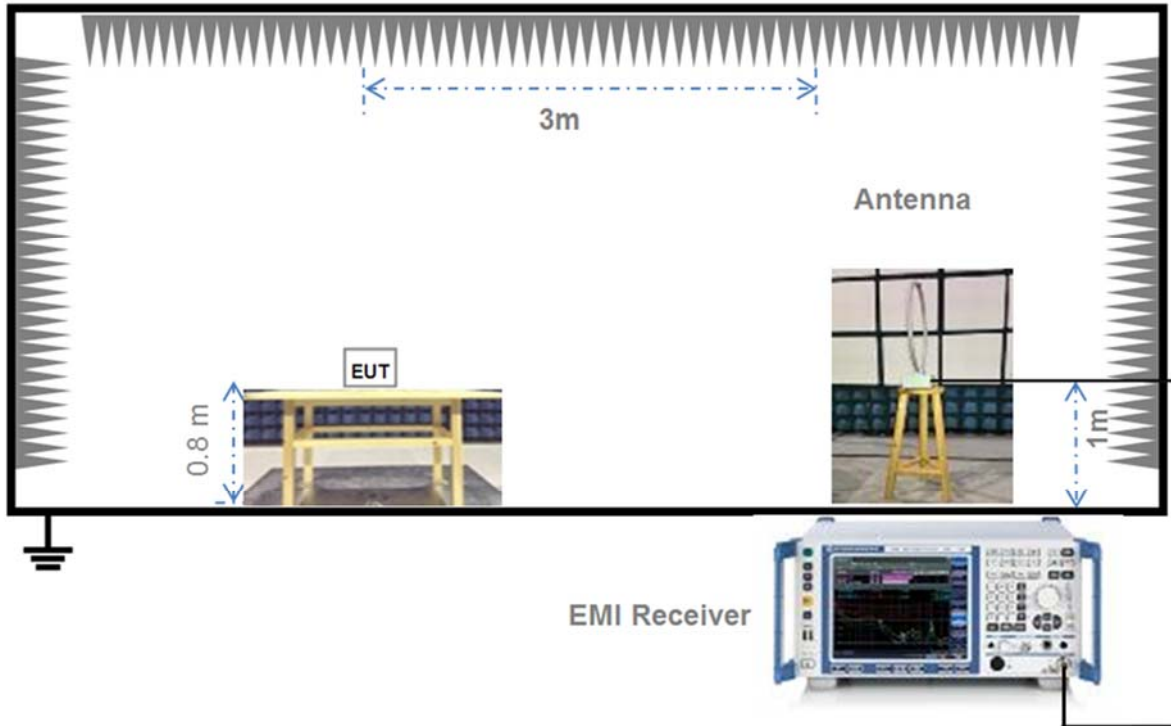
4.4.2 For AC Power Supply Port Test



(Diagram 2)

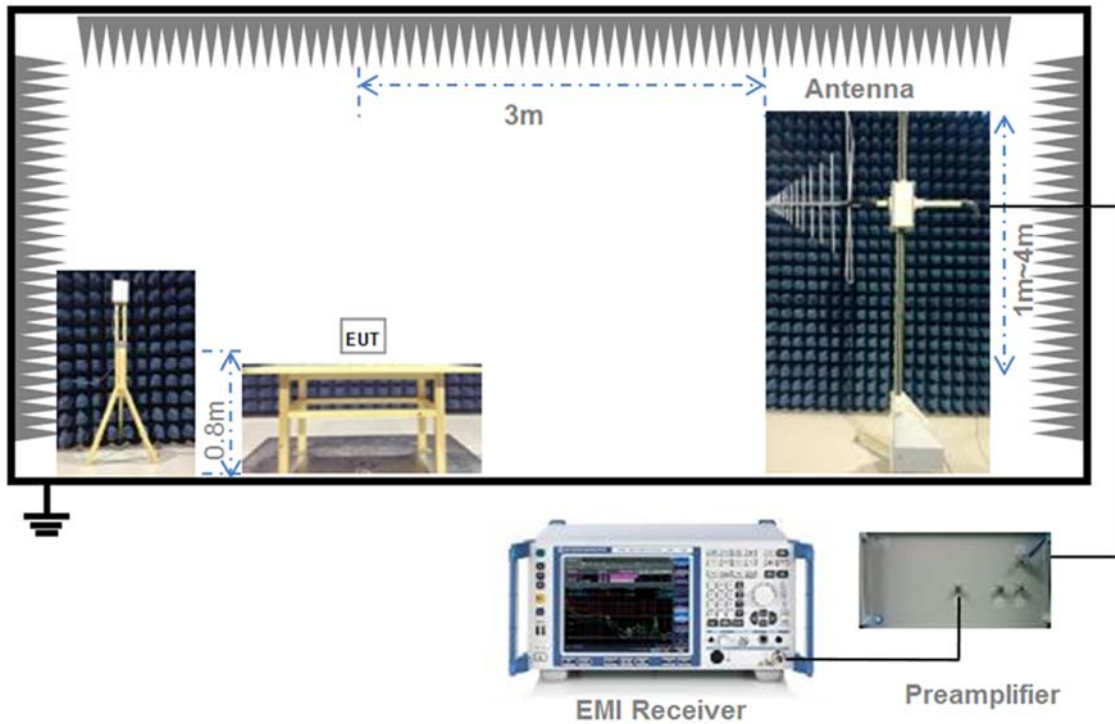
4.4.3 For Radiated Test (Below 30 MHz)





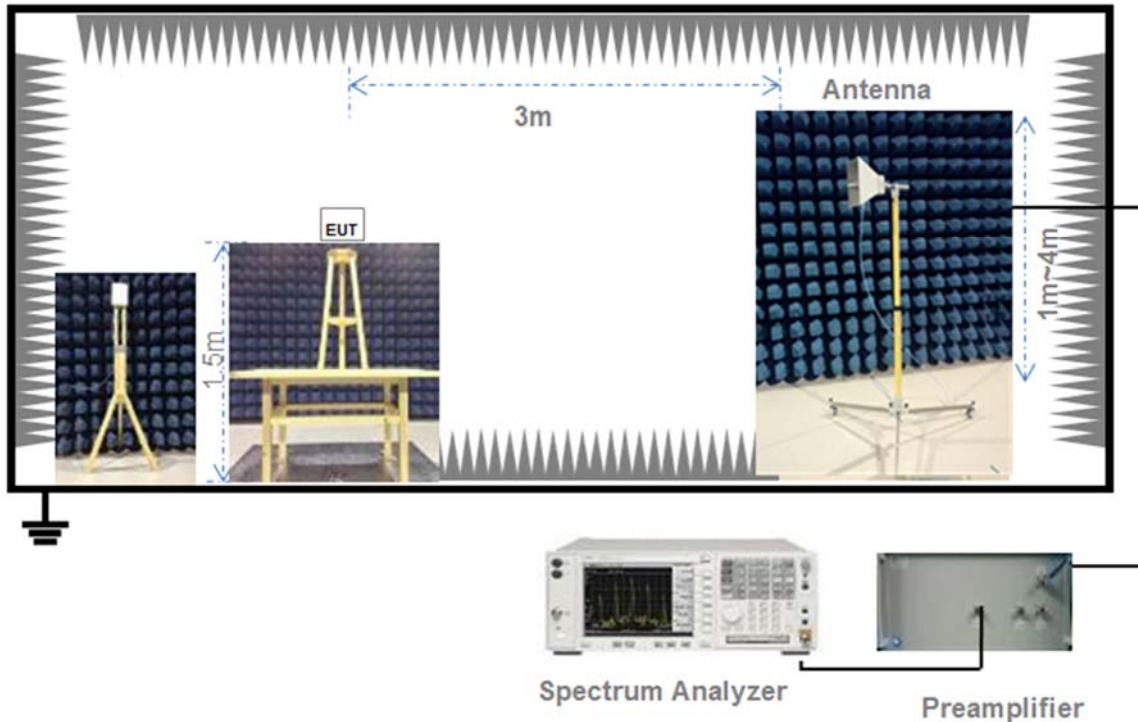
(Diagram 3)

4.4.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.4.5 For Radiated Test (Above 1 GHz)



(Diagram 5)

4.5 Measurement Results Explanation Example

4.5.1 For conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

4.5.2 For radiated band edges and spurious emission test:

$$E = \text{EIRP} - 20 \log D + 104.8$$

where:

E = electric field strength in dB μ V/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

EIRP = Measure Conducted output power Value (dBm) + Maximum transmit antenna gain (dBi) + the appropriate maximum ground reflection factor (dB)

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Relevant Standards

FCC §15.203 & 15.247(b); RSS-247, 5.4 (6)

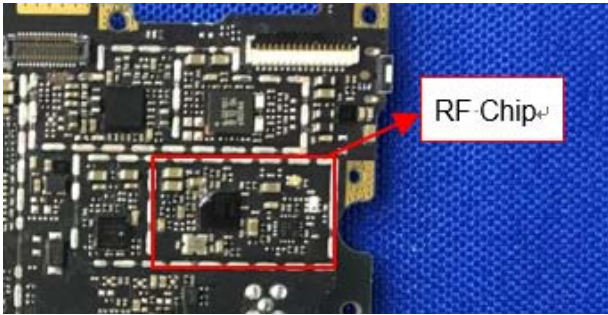
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply 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 use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

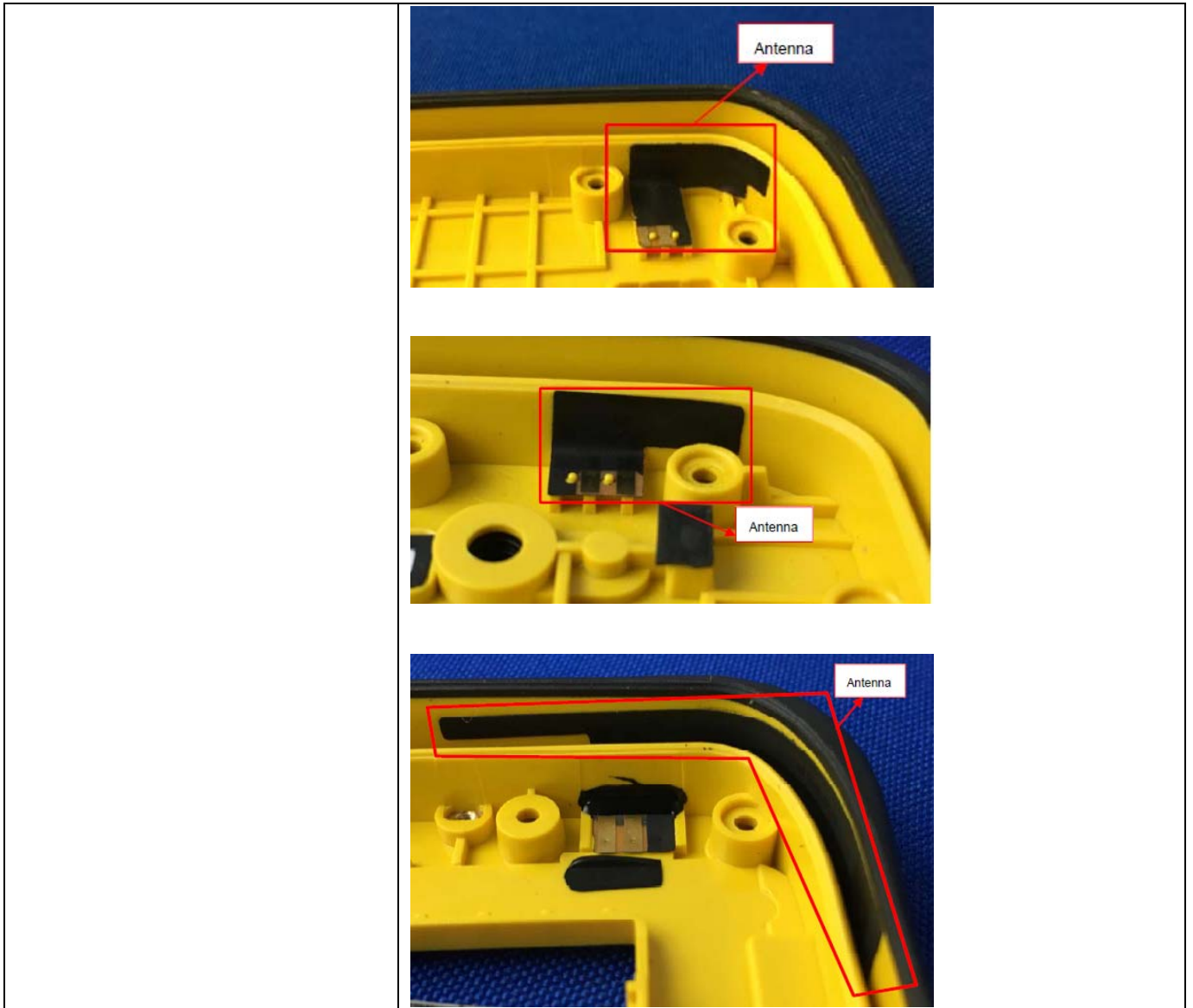
If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The 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 FCC rule.

5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

Protected Method	Description
The antenna is embedded in the product.	An embedded-in antenna design is used.

Reference Documents	Item
Photo	



5.1.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

5.2 Output Power

5.2.1 Test Limit

FCC § 15.247(b); RSS-247, 5.4 (4)

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.

5.2.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

Maximum peak conducted output power

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

Maximum conducted (average) output power (Reporting Only)

a) As an alternative to spectrum analyzer or EMI receiver measurements, measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.

- 1) The EUT is configured to transmit continuously, or to transmit with a constant duty factor.
 - 2) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
 - 3) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
- b) If the transmitter does not transmit continuously, measure the duty cycle (x) of the transmitter output signal as described in Section 6.0.
- c) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
- d) Adjust the measurement in dBm by adding $10\log(1/x)$, where x is the duty cycle to the measurement result.

Measurements of duty cycle

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal.

Set the center frequency of the instrument to the center frequency of the transmission.

Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value.

Set $VBW \geq RBW$. Set detector = peak or average.

The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

5.2.4 Test Result

Please refer to ANNEX A.1.

5.3 6dB Bandwidth

5.3.1 Limit

FCC §15.247(a); RSS-GEN, 6.6

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.

5.3.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

Use the following spectrum analyzer settings:

Set RBW = 100 kHz.

Set the video bandwidth (VBW) \geq 3 RBW.

Detector = Peak.

Trace mode = max hold.

Sweep = auto couple.

Allow the trace to stabilize.

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

5.3.4 Test Result

Please refer to ANNEX A.2.

5.4 Conducted Spurious Emission

5.4.1 Limit

FCC §15.247(d); RSS-247, 5.5

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.

5.4.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

The DTS rules specify that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

- a) If the maximum peak conducted output power procedure was used to demonstrate compliance as described in 9.1, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).
- b) If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).
- c) In either case, attenuation to levels below the 15.209 general radiated emissions limits is not required.

The following procedures shall be used to demonstrate compliance to these limits. Note that these procedures can be used in either an antenna-port conducted or radiated test set-up. Radiated tests must conform to the test site requirements and utilize maximization procedures defined herein.

Reference level measurement

Establish a reference level by using the following procedure:

Set instrument center frequency to DTS channel center frequency.

Set the span to ≥ 1.5 times the DTS bandwidth.

Set the RBW = 100 kHz.

Set the VBW $\geq 3 \times$ RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum PSD level.

Emission level measurement

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

Set the RBW = 100 kHz.

Set the VBW $\geq 3 \times$ RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

5.4.4 Test Result

Please refer to ANNEX A.3.

5.5 Band Edge (Authorized-band band-edge)

5.5.1 Limit

FCC §15.247(d); RSS-GEN, 8.9, RSS-247, 5.5

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.

5.5.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

The following procedures may be used to determine the peak or average field strength or power of an unwanted emission that is within 2 MHz of the authorized band edge. If a peak detector is utilized, use the procedure described in 13.2.1. Use the procedure described in 13.2.2 when using an average detector and the EUT can be configured to transmit continuously (i.e., duty cycle $\geq 98\%$). Use the procedure described in 13.2.3 when using an average detector and the EUT cannot be configured to transmit continuously but the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent). Use the procedure described in 13.2.4 when using an average detector for those cases where the EUT cannot be configured to transmit continuously and the duty cycle is not constant (duty cycle variations equal or exceed 2 percent).

When using a peak detector to measure unwanted emissions at or near the band edge (within 2 MHz of the authorized band), the following integration procedure can be used.

Set instrument center frequency to the frequency of the emission to be measured (must be within 2 MHz of the authorized band edge).

Set span to 2 MHz

RBW = 100 kHz.

VBW $\geq 3 \times$ RBW.

Detector = peak.

Sweep time = auto.

Trace mode = max hold.

Allow sweep to continue until the trace stabilizes (required measurement time may increase for low duty cycle applications)

Compute the power by integrating the spectrum over 1 MHz using the analyzer's band power measurement function with band limits set equal to the emission frequency (femission) ± 0.5 MHz. If the instrument does not have a band power function, then sum the amplitude levels (in power units) at 100 kHz intervals extending across the 1 MHz spectrum defined by femission ± 0.5 MHz.

Standard method(The 99% OBW of the fundamental emission is without 2 MHz of the authorized band):

Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products that fall outside of the authorized band of operation.

Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (\text{OBW}/\text{RBW})]$ below the reference level. Specific guidance is given in 4.1.5.2.

Attenuation: Auto (at least 10 dB preferred).

Sweep time: Coupled.

Resolution bandwidth: 100 kHz.

Video bandwidth: 300 kHz.

Detector: Peak.

Trace: Max hold.

5.5.4 Test Result

Please refer to ANNEX A.4.

5.6 Conducted Emission

5.6.1 Limit

FCC §15.207; RSS-GEN, 8.8

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

5.6.2 Test Setup

See section 4.4.2 for test setup description for the AC power supply port. The photo of test setup please refer to ANNEX B.

5.6.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

5.6.4 Test Result

Please refer to ANNEX A.5.

5.7 Radiated Spurious Emission

5.7.1 Limit

FCC §15.209&15.247(c); RSS-247, 5.5

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V}/\text{m}$)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

1. For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).

5.7.2 Test Setup

See section 4.4.3 to 4.4.5 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.7.3 Test Procedure

Since the emission limits are specified in terms of radiated field strength levels, measurements performed to demonstrate compliance have traditionally relied on a radiated test configuration. Radiated measurements remain the principal method for demonstrating compliance to the specified limits; however antenna-port conducted measurements are also now acceptable to demonstrate compliance (see below for details). When radiated measurements are utilized, test site requirements and procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 shall be followed.

Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

General Procedure for conducted measurements in restricted bands

- a) Measure the conducted output power (in dBm) using the detector specified (see guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).

- b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see guidance on determining the applicable antenna gain)
- c) Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).
- d) For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
- e) Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

$$E = \text{EIRP} - 20\log D + 104.8$$

where:

E = electric field strength in dBμV/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

- f) Compare the resultant electric field strength level to the applicable limit.
- g) Perform radiated spurious emission test.

Quasi-Peak measurement procedure

The specifications for measurements using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Frequency Interference (CISPR) of the International Electrotechnical Commission.

As an alternative to CISPR quasi-peak measurement, compliance can be demonstrated to the applicable emission limits using a peak detector.

Peak power measurement procedure

Peak emission levels are measured by setting the instrument as follows:

- a) RBW = as specified in Table 1.
- b) VBW ≥ 3 x RBW.
- c) Detector = Peak.
- d) Sweep time = auto.
- e) Trace mode = max hold.
- f) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be longer for low duty cycle applications).

Table 1—RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz

> 1000 MHz	1 MHz
------------	-------

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

Trace averaging across on and off times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT (i.e., duty cycle ≥ 98 percent) cannot be achieved and the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent), then the following procedure shall be used:

- a) The EUT shall be configured to operate at the maximum achievable duty cycle.
- b) Measure the duty cycle, x , of the transmitter output signal as described in section 6.0.
- c) RBW = 1 MHz (unless otherwise specified).
- d) VBW $\geq 3 \times$ RBW.
- e) Detector = RMS, if $\text{span}/(\# \text{ of points in sweep}) \leq (\text{RBW}/2)$. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
- f) Averaging type = power (i.e., RMS).
 - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
 - 2) Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
- g) Sweep time = auto.
- h) Perform a trace average of at least 100 traces.
- i) A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
 - 1) If power averaging (RMS) mode was used in step f), then the applicable correction factor is $10 \log(1/x)$, where x is the duty cycle.
 - 2) If linear voltage averaging mode was used in step f), then the applicable correction factor is $20 \log(1/x)$, where x is the duty cycle.
 - 3) If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

NOTE: Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.

Determining the applicable transmit antenna gain

A conducted power measurement will determine the maximum output power associated with a restricted band emission; however, in order to determine the associated EIRP level, the gain of the transmitting antenna (in dBi) must be added to the measured output power (in dBm).

Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.

See KDB 662911 for guidance on calculating the additional array gain term when determining the effective antenna gain for a EUT with multiple outputs occupying the same or overlapping frequency ranges in the same band.

Radiated spurious emission test

An additional consideration when performing conducted measurements of restricted band emissions is that unwanted emissions radiating from the EUT cabinet, control circuits, power leads, or intermediate circuit elements will likely go undetected in a conducted measurement configuration. To address this concern, a radiated test shall be performed to ensure that emissions emanating from the EUT cabinet (rather than the antenna port) also comply with the applicable limits.

For these cabinet radiated spurious emission measurements the EUT transmit antenna may be replaced with a termination matching the nominal impedance of the antenna. Procedures for performing radiated measurements are specified in ANSI C63.10. All detected emissions shall comply with the applicable limits.

The measurement frequency range is from 30 MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

5.7.4 Test Result

Please refer to ANNEX A.6.

5.8 Band Edge (Restricted-band band-edge)

5.8.1 Limit

FCC §15.209&15.247(c); RSS-247, 5.5

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

5.8.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.8.3 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported, Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

For transmitters operating above 1 GHz repeat the measurement with an average detector.

5.8.4 Test Result

Please refer to ANNEX A.7.

5.9 Power Spectral density (PSD)

5.9.1 Limit

FCC §15.247(d); RSS-247, 5.2 (2)

The same method of determining the conducted output power shall be used to determine the power spectral density. If a peak output power is measured, then a peak power spectral density measurement is required. If an average output power is measured, then an average power spectral density measurement should be used.

5.9.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.9.3 Test Procedure

Set analyzer center frequency to DTS channel center frequency.

Set the span to 1.5 times the DTS bandwidth.

Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.

Set the VBW $\geq 3 \text{ RBW}$.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.9.4 Test Result

Please refer to ANNEX A.8.

ANNEX A TEST RESULT

A.1 Output Power

Duty Cycle

Test Mode	Duty Cycle	T (ms)	1/T(kHz)
802.11b	0.9686	8.182	0.12
802.11g	0.8692	1.362	0.73
802.11n-20 MHz	0.8608	1.269	0.79

Average Power Test Data

802.11b Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	14.21	26.35	30	1000	Pass
Middle	12.80	19.05			Pass
High	11.99	15.81			Pass

802.11g Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	13.64	23.11	30	1000	Pass
Middle	11.81	15.17			Pass
High	11.62	14.52			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	11.78	15.07	30	1000	Pass
Middle	10.72	11.80			Pass
High	10.69	11.72			Pass

E.I.R.P Test Data (For ISED)

802.11b Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	14.31	26.98	36	4	Pass
Middle	12.90	19.50			Pass
High	12.09	16.18			Pass

802.11g Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	13.74	23.66	36	4	Pass
Middle	11.91	15.52			Pass
High	11.72	14.86			Pass

802.11n-20 MHz Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	11.88	15.42	36	4	Pass
Middle	10.82	12.08			Pass
High	10.79	11.99			Pass

A.2 Bandwidth

Test Data

802.11b Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	7.659668	12.329957	≥ 500
Middle	7.159180	12.156295	≥ 500
High	8.610840	14.703329	≥ 500

802.11g Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	16.17017	17.829233	≥ 500
Middle	16.02002	18.060781	≥ 500
High	16.47070	17.597685	≥ 500

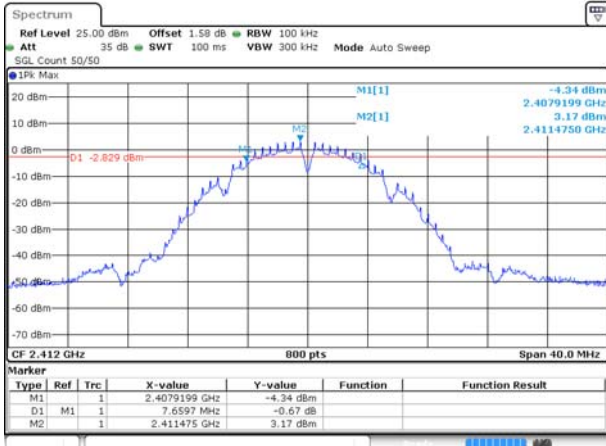
802.11n-20MHz Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	17.02124	19.160637	≥ 500
Middle	16.37036	18.523878	≥ 500
High	17.67188	19.507959	≥ 500

Test plots

6 dB Bandwidth

802.11b LOW CHANNEL



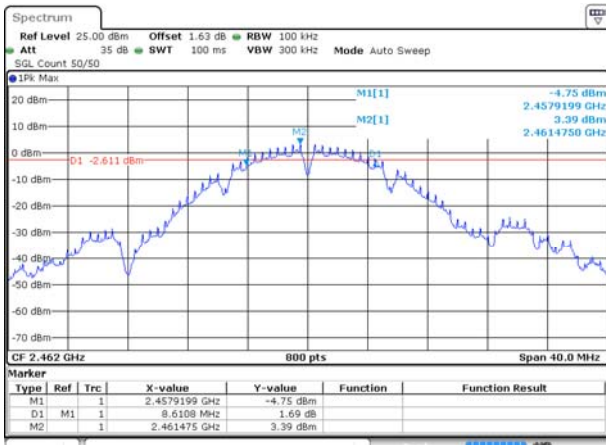
Date: 18 DEC 2018 09:21:55

802.11b MIDDLE CHANNEL



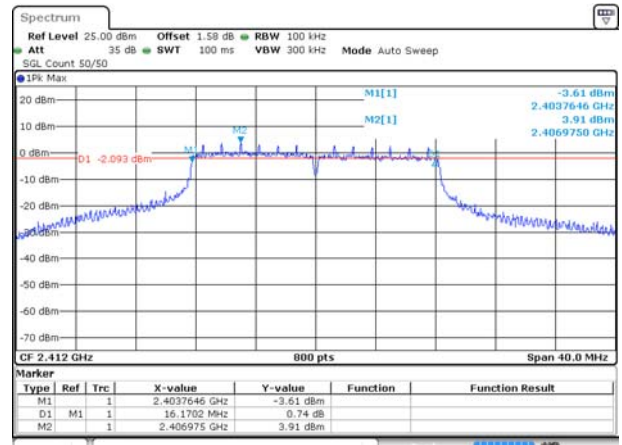
Date: 18 DEC 2018 09:25:17

802.11b HIGH CHANNEL



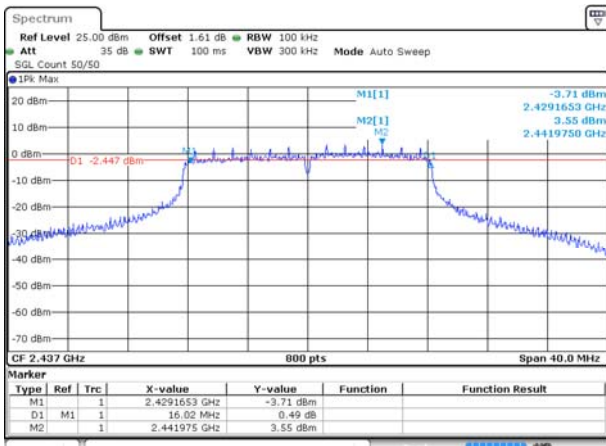
Date: 18 DEC 2018 09:30:05

802.11g LOW CHANNEL



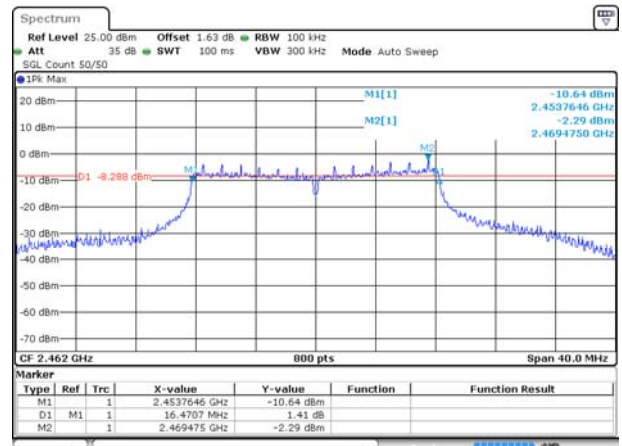
Date: 18 DEC 2018 09:34:56

802.11g MIDDLE CHANNEL



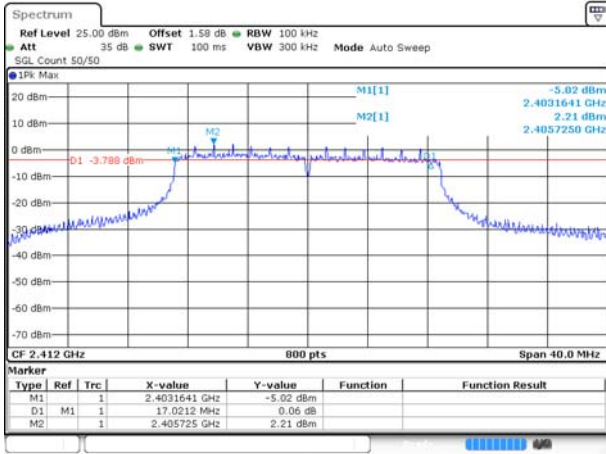
Date: 18 DEC 2018 09:38:52

802.11g HIGH CHANNEL



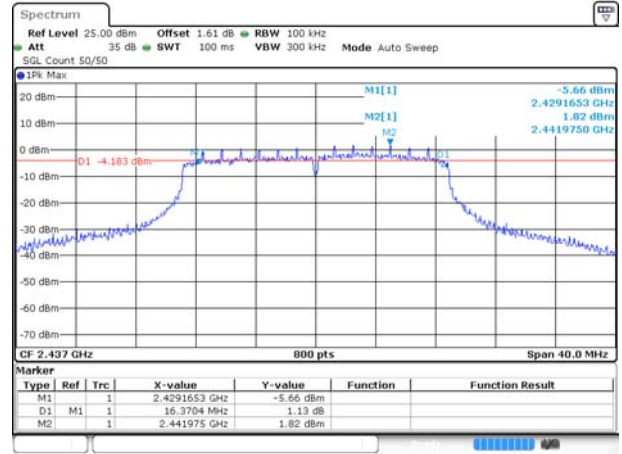
Date: 18 DEC 2018 09:43:36

802.11n-20 MHz LOW CHANNEL



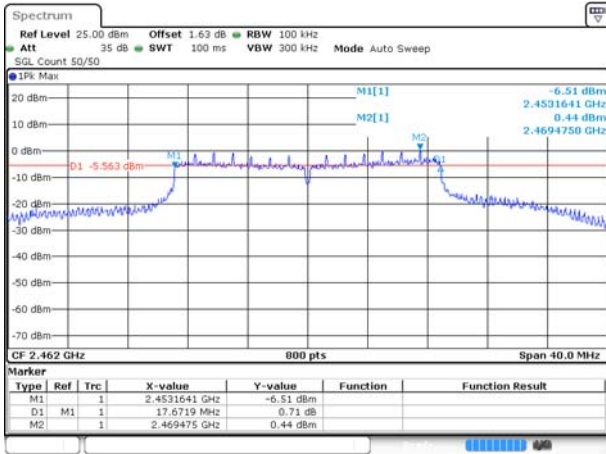
Date: 18 DEC 2016 09:50:17

802.11 n-20 MHz MIDDLE CHANNEL



Date: 18 DEC 2016 09:53:08

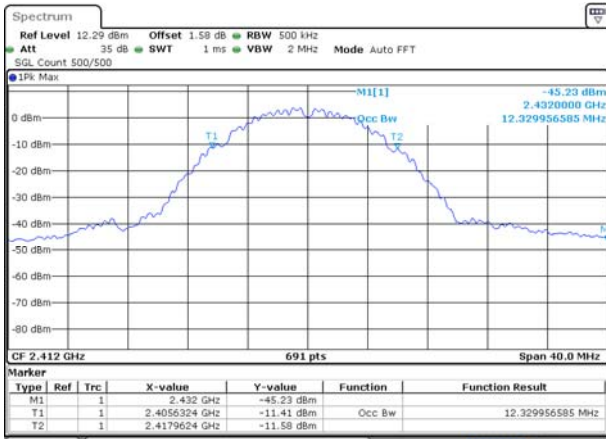
802.11n-20 MHz HIGH CHANNEL



Date: 18 DEC 2016 09:56:45

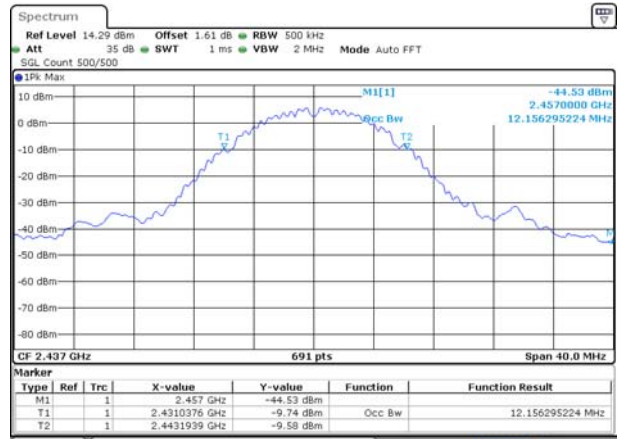
99% Bandwidth

802.11b LOW CHANNEL



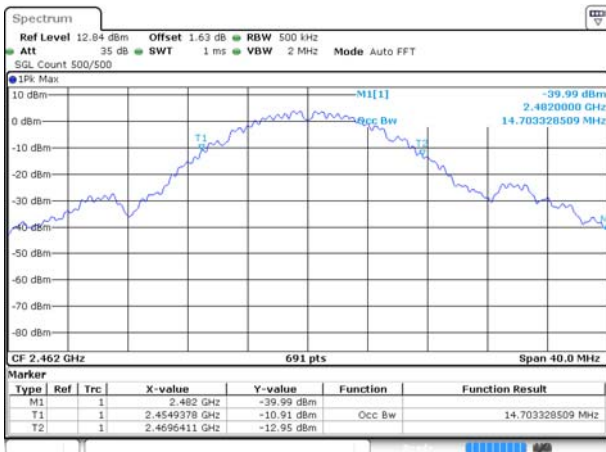
Date: 18 DEC 2016 09:22:05

802.11b MIDDLE CHANNEL



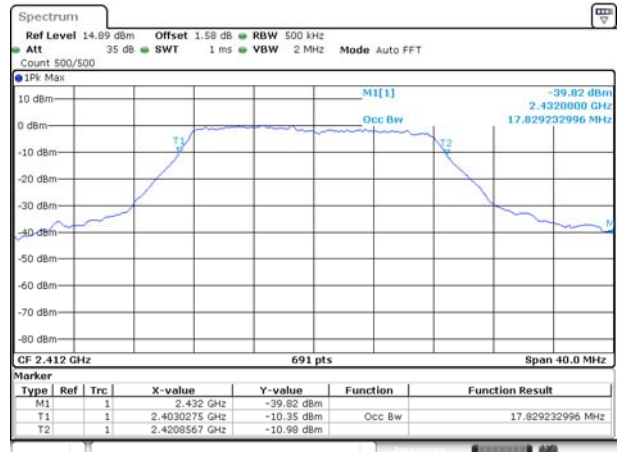
Date: 18 DEC 2016 09:25:26

802.11b HIGH CHANNEL



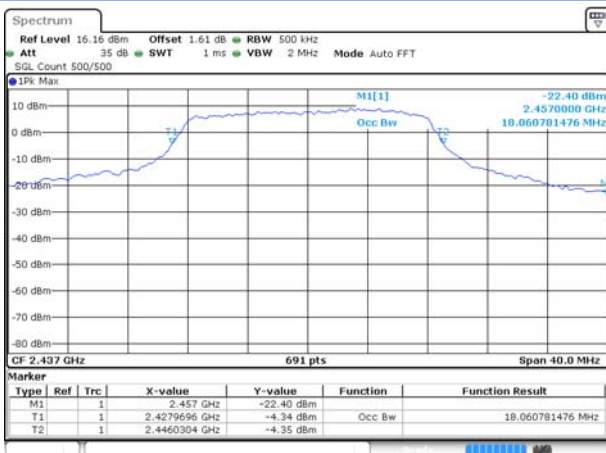
Date: 18 DEC 2016 09:30:14

802.11g LOW CHANNEL



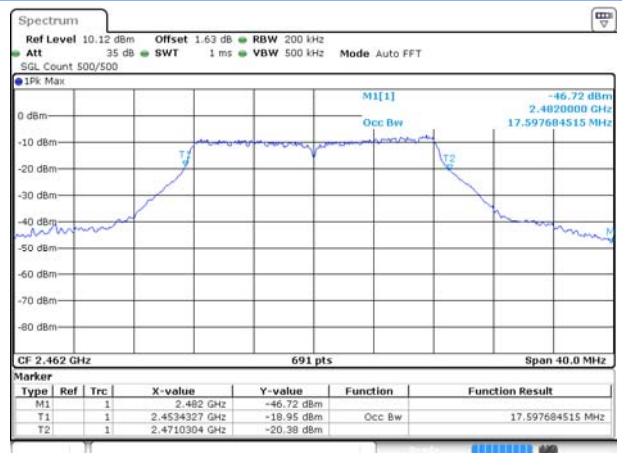
Date: 18 DEC 2016 09:41:59

802.11g MIDDLE CHANNEL



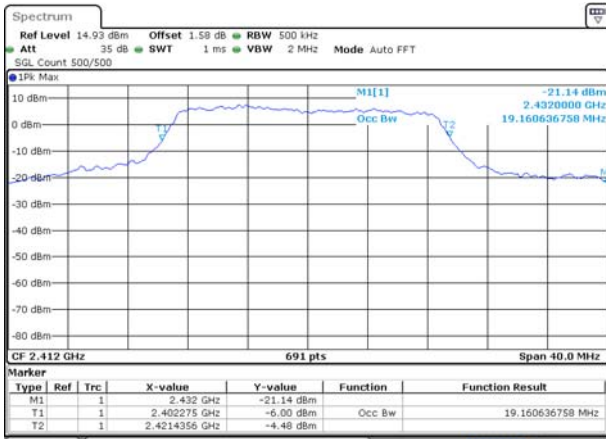
Date: 18 DEC 2016 09:39:01

802.11g HIGH CHANNEL



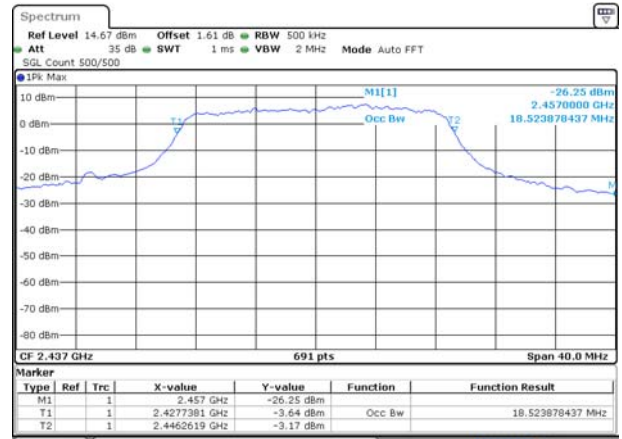
Date: 18 DEC 2016 09:45:04

802.11n-20 MHz LOW CHANNEL



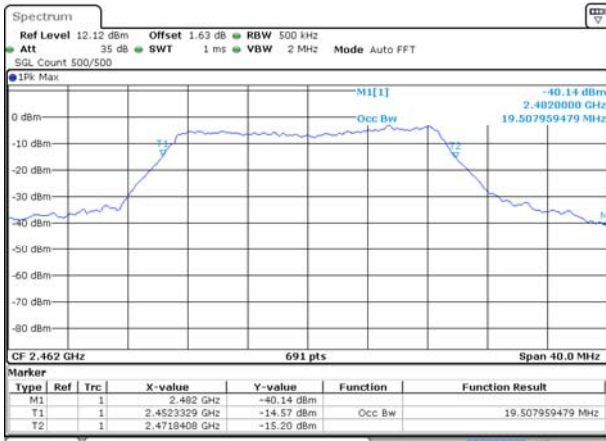
Date: 18 DEC 2016 09:50:26

802.11 n-20 MHz MIDDLE CHANNEL



Date: 18 DEC 2016 09:53:17

802.11n-20 MHz HIGH CHANNEL



Date: 18 DEC 2016 09:57:18

A.3 Conducted Spurious Emissions

Test Data

802.11b Mode:

Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 30 dBc Limit	
Low	-50.96	3.17	-26.83	Pass
Middle	-50.54	4.47	-25.53	Pass
High	-50.57	2.83	-27.17	Pass

802.11g Mode:

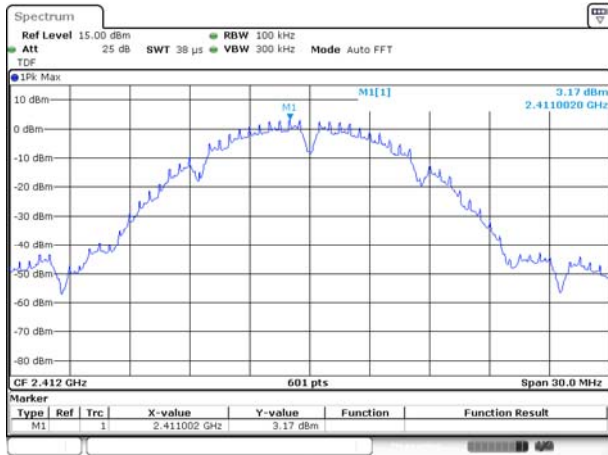
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 30 dBc Limit	
Low	-50.92	2.61	-27.39	Pass
Middle	-51.06	3.72	-26.28	Pass
High	-50.37	1.76	-28.24	Pass

802.11n-20MHz Mode:

Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 30 dBc Limit	
Low	-50.24	2.42	-27.58	Pass
Middle	-50.68	1.07	-28.93	Pass
High	-51.26	0.79	-29.21	Pass

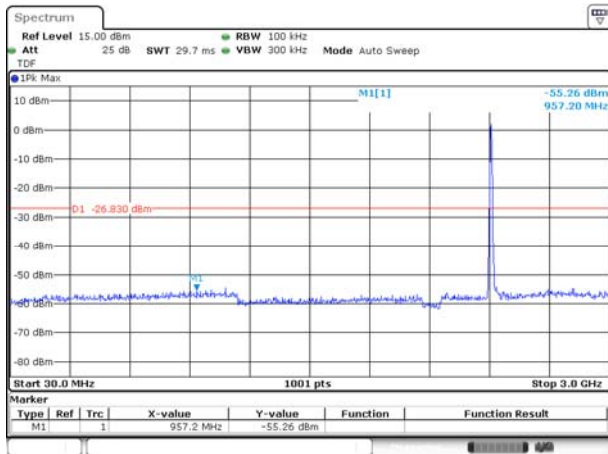
Test Plots

802.11b LOW CHANNEL CARRIER LEVEL



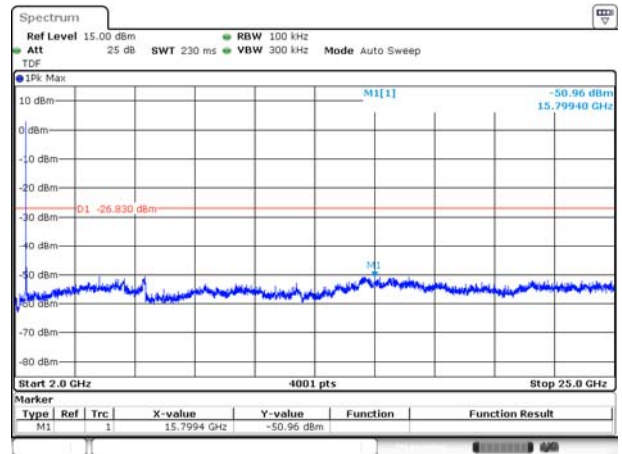
Date: 18 DEC 2016 09:22:26

802.11b LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



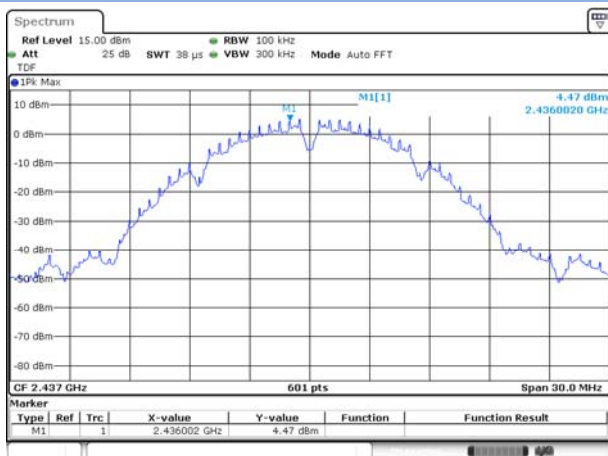
Date: 18 DEC 2016 09:23:03

802.11b LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



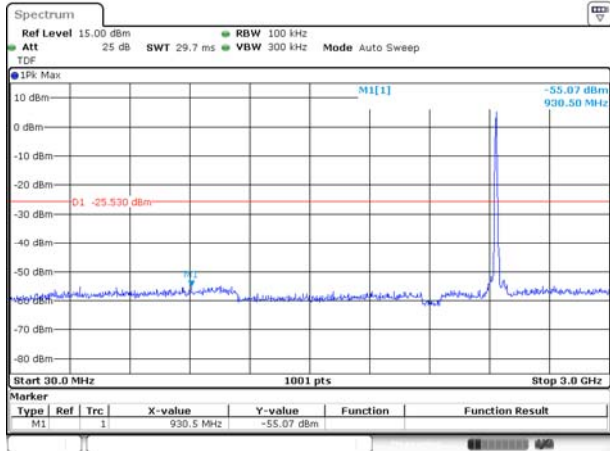
Date: 18 DEC 2016 09:23:19

802.11b MIDDLE CHANNEL CARRIER LEVEL



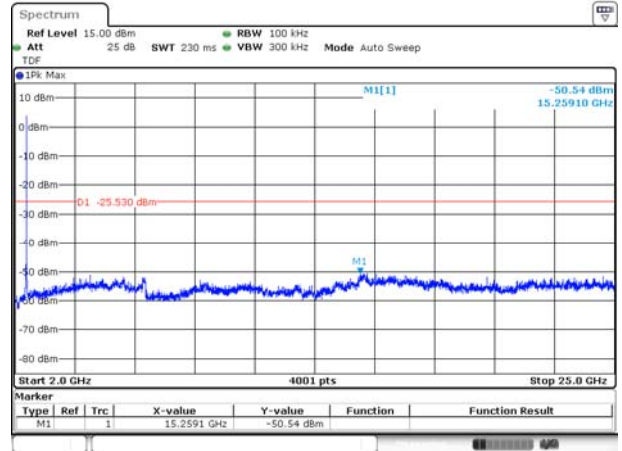
Date: 18 DEC 2016 09:25:37

802.11b MIDDLE CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



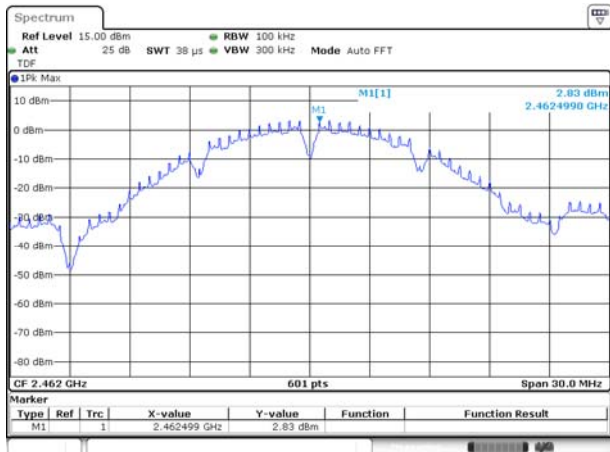
Date: 18 DEC 2016 09:26:18

802.11b MIDDLE CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



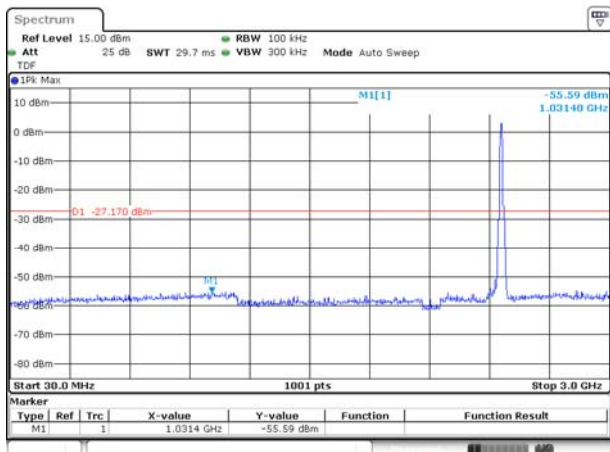
Date: 18 DEC 2016 09:26:32

802.11b HIGH CHANNEL CARRIER LEVEL



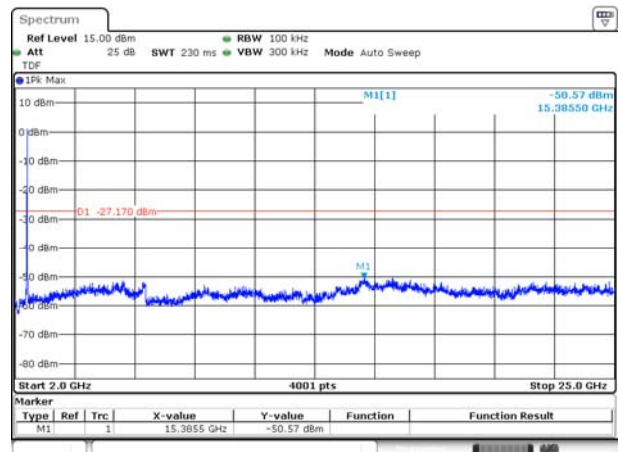
Date: 18 DEC 2016 09:30:28

802.11b HIGH CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



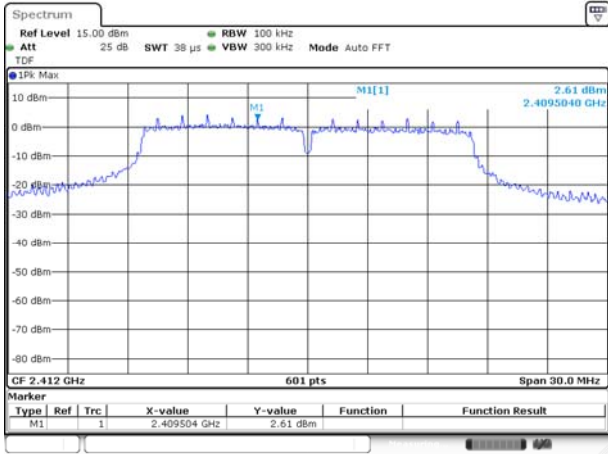
Date: 18 DEC 2016 09:31:32

802.11b HIGH CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



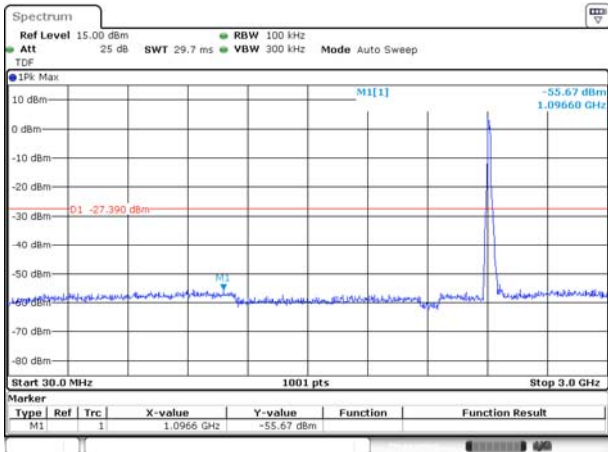
Date: 18 DEC 2016 09:31:45

802.11g LOW CHANNEL CARRIER LEVEL



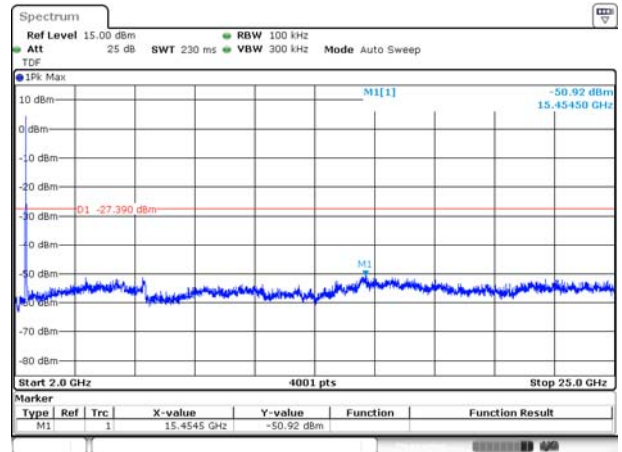
Date: 18 DEC 2018 09:35:42

802.11g LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



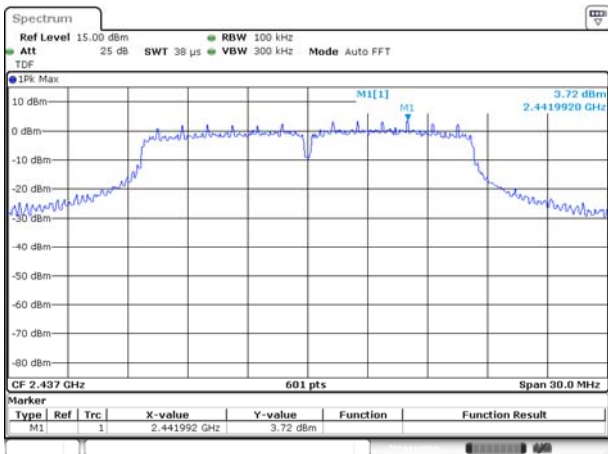
Date: 18 DEC 2018 09:36:24

802.11g LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



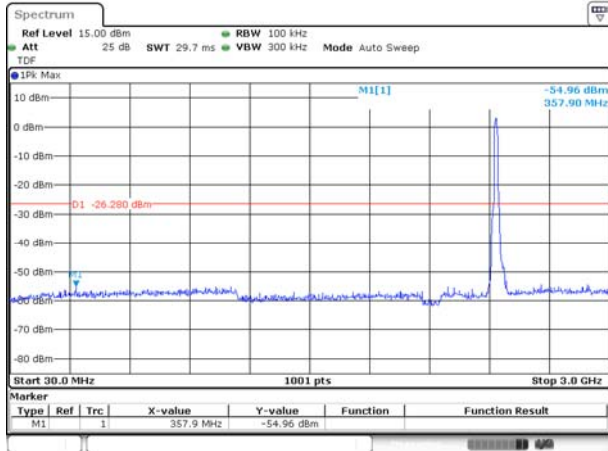
Date: 18 DEC 2018 09:36:34

802.11g MIDDLE CHANNEL CARRIER LEVEL



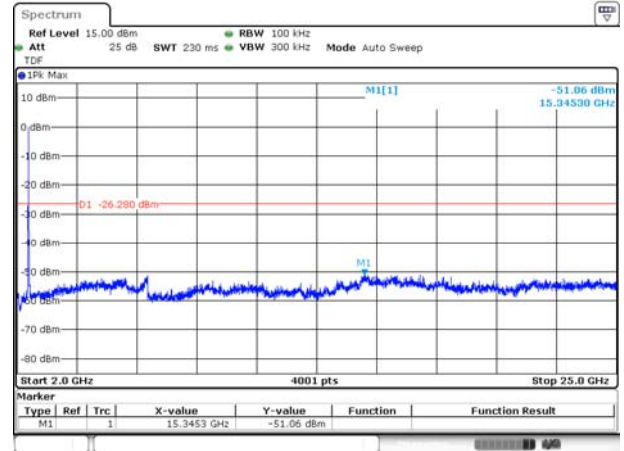
Date: 18 DEC 2018 09:39:26

802.11g MIDDLE CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



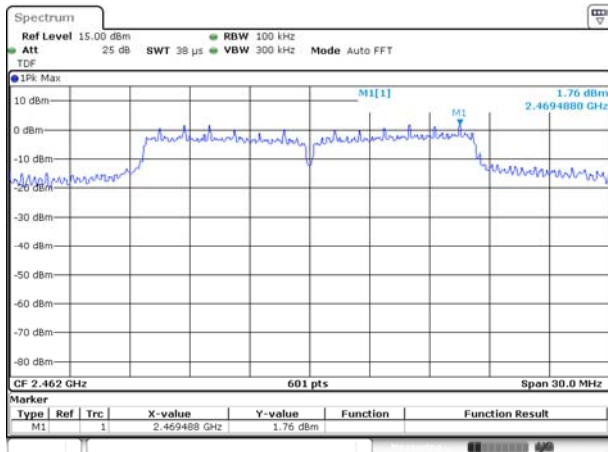
Date: 18 DEC 2016 09:40:08

802.11g MIDDLE CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



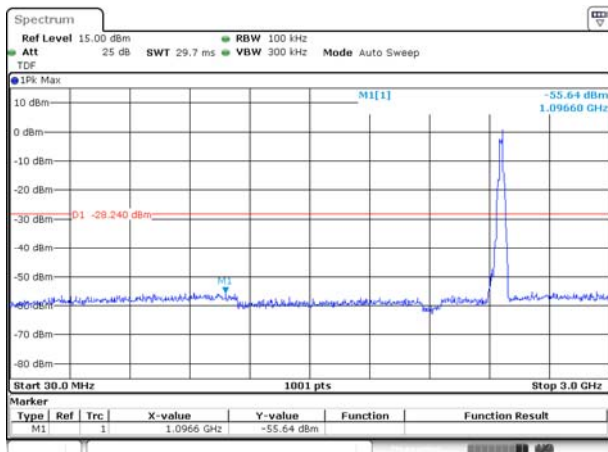
Date: 18 DEC 2016 09:40:20

802.11g HIGH CHANNEL CARRIER LEVEL



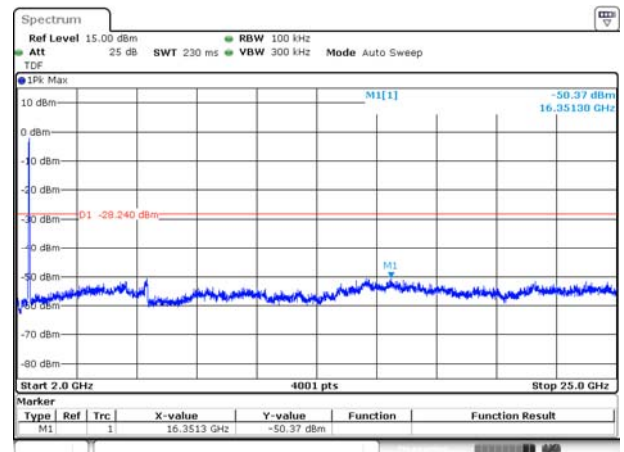
Date: 18 DEC 2016 09:46:29

802.11g HIGH CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



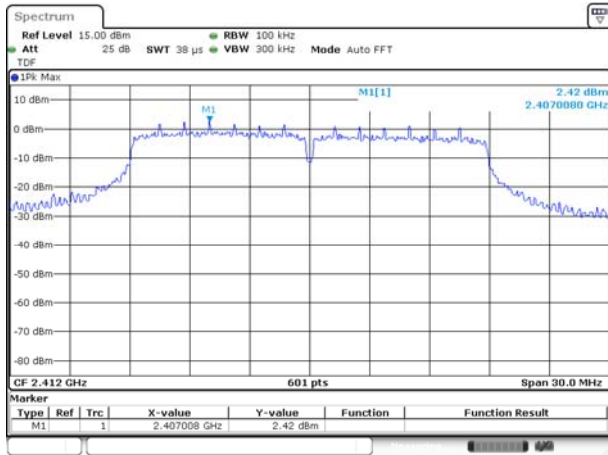
Date: 18 DEC 2016 09:47:04

802.11g HIGH CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



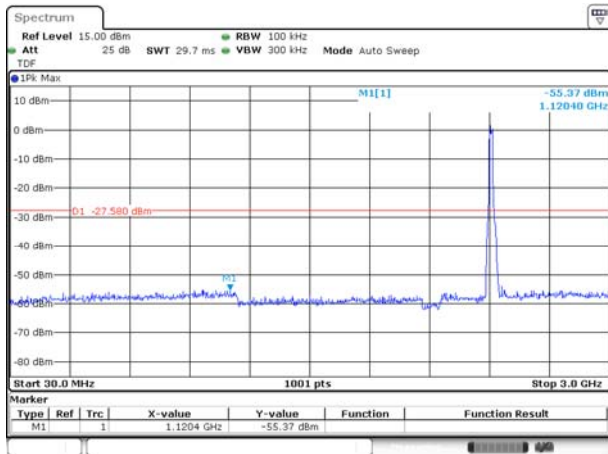
Date: 18 DEC 2016 09:47:15

802.11n-20 LOW CHANNEL CARRIER LEVEL



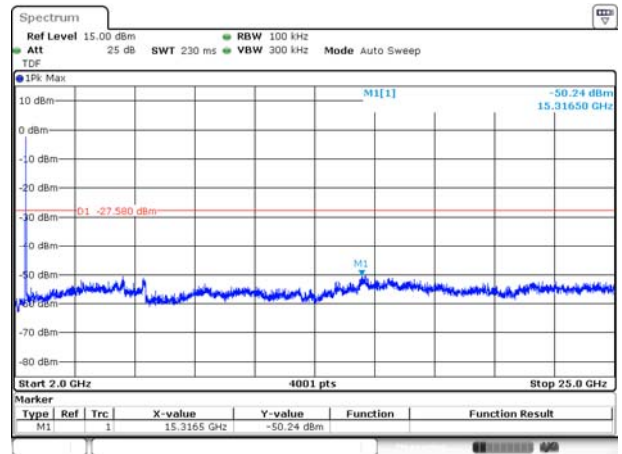
Date: 18 DEC 2016 09:50:46

802.11n-20 LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



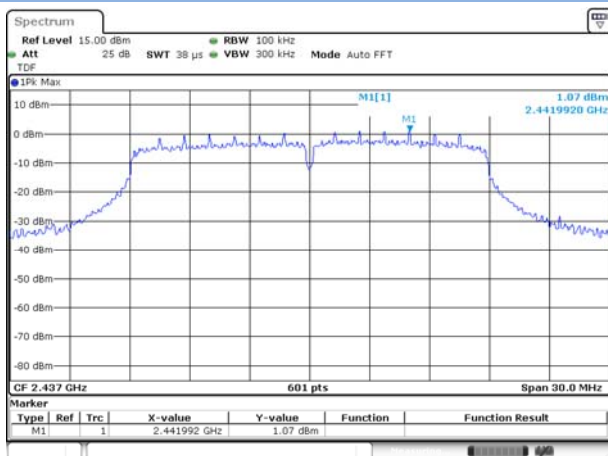
Date: 18 DEC 2016 09:51:16

802.11n-20 LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



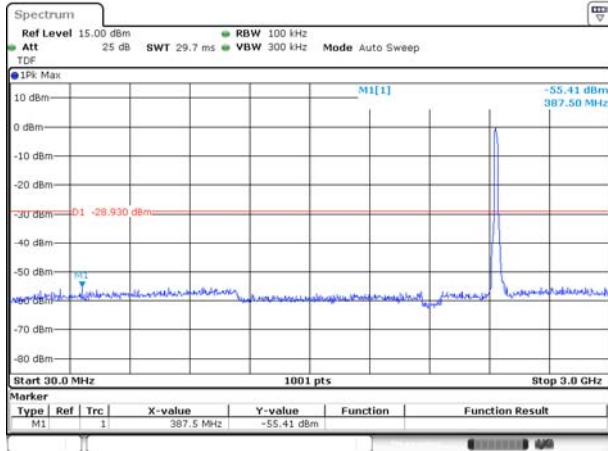
Date: 18 DEC 2016 09:51:25

802.11n-20 MIDDLE CHANNEL CARRIER LEVEL



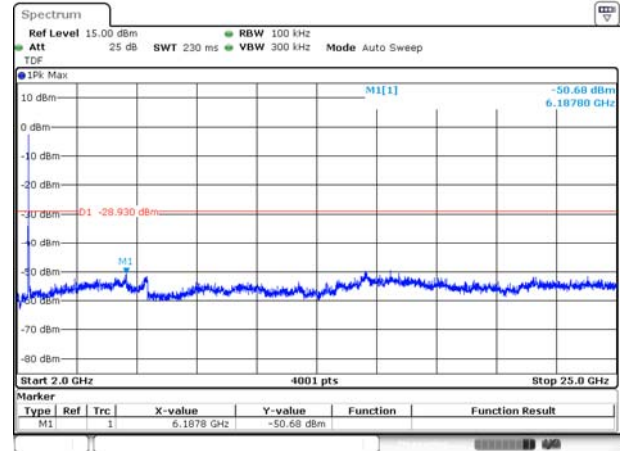
Date: 18 DEC 2016 09:54:01

802.11n-20 MIDDLE CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



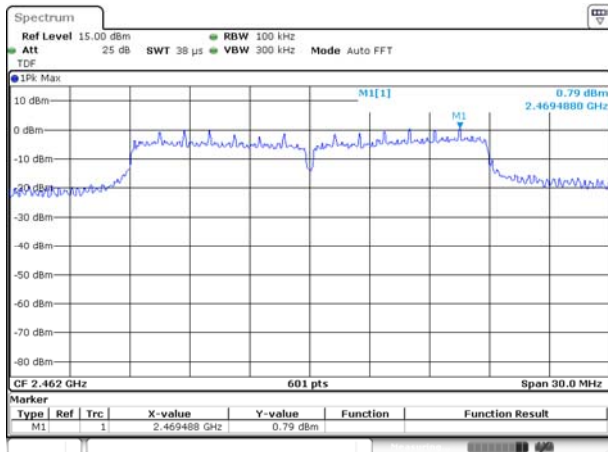
Date: 18 DEC 2016 09:54:41

802.11n-20 MIDDLE CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



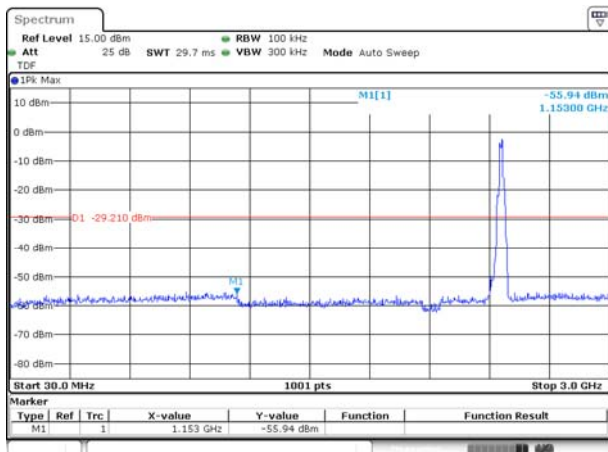
Date: 18 DEC 2016 09:55:01

802.11n-20 HIGH CHANNEL CARRIER LEVEL



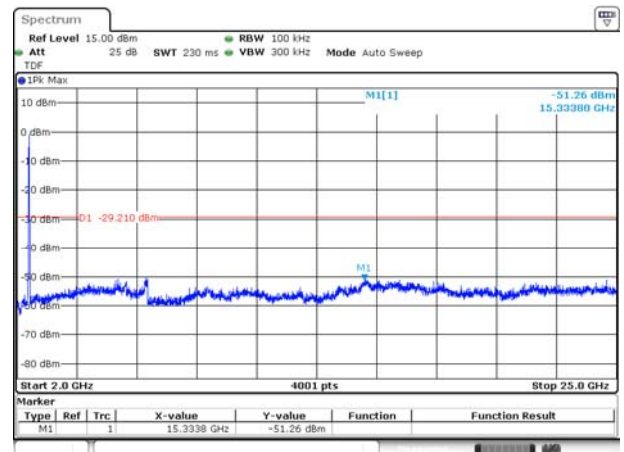
Date: 18 DEC 2016 09:58:00

802.11n-20 HIGH CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



Date: 18 DEC 2016 09:58:27

802.11n-20 HIGH CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



Date: 18 DEC 2016 09:58:50

A.4 Band Edge (Authorized-band band-edge)

Test Data

Note: The 99% OBW of the fundamental emission is without 2 MHz of the authorized band.

802.11b Mode:

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 30 dBc Limit	
Low Channel	-44.68	3.17	-26.83	Pass
High Channel	-44.80	2.83	-27.17	Pass

802.11g Mode:

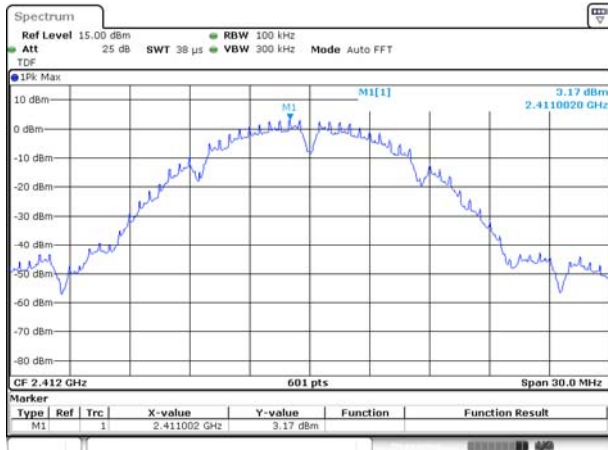
Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 30 dBc Limit	
Low Channel	-30.20	2.61	-27.39	Pass
High Channel	-32.53	1.76	-28.24	Pass

802.11n-20 MHz Mode:

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 30 dBc Limit	
Low Channel	-31.65	2.42	-27.58	Pass
High Channel	-30.27	0.79	-29.21	Pass

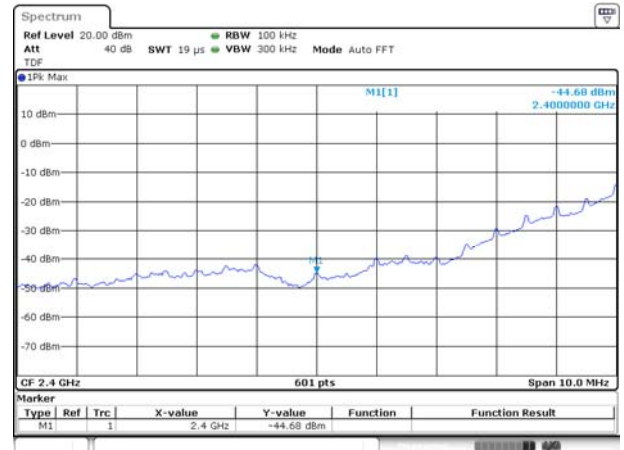
Test Plots

802.11b LOW CHANNEL, Carrier level



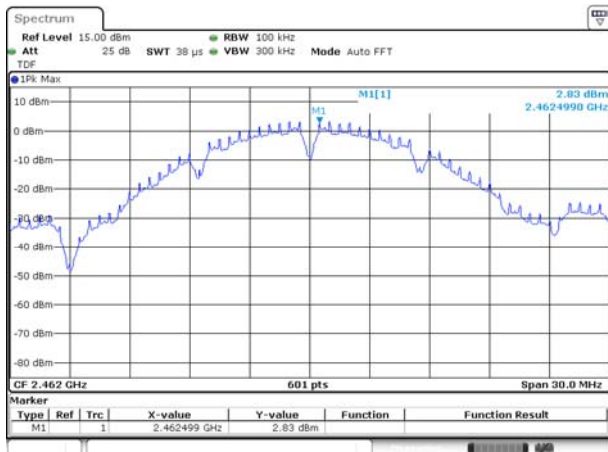
Date: 18 DEC 2016 09:22:26

802.11b LOW CHANNEL, Reference level



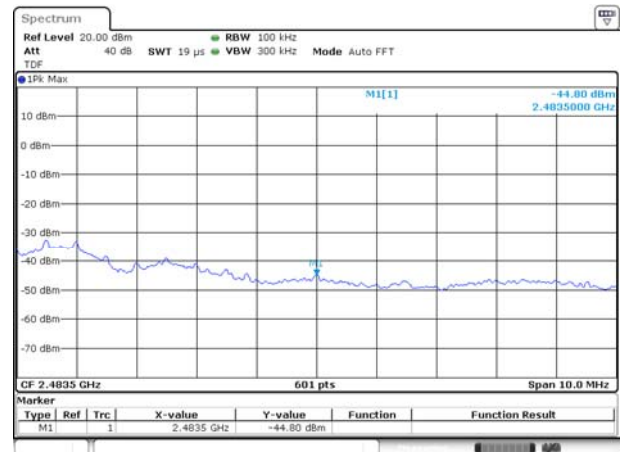
Date: 18 DEC 2016 09:23:29

802.11b HIGH CHANNEL, Carrier level



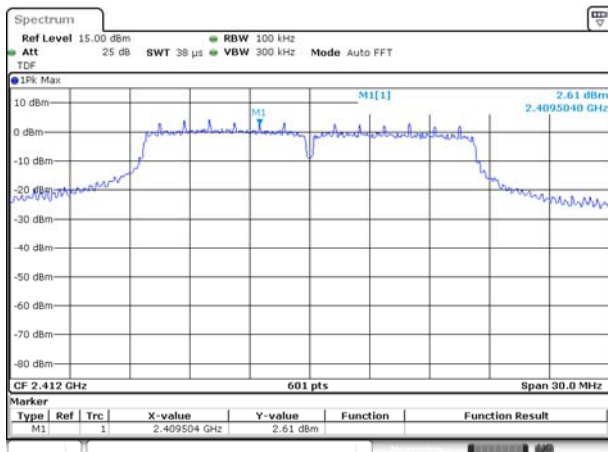
Date: 18 DEC 2016 09:30:28

802.11b HIGH CHANNEL, Reference level



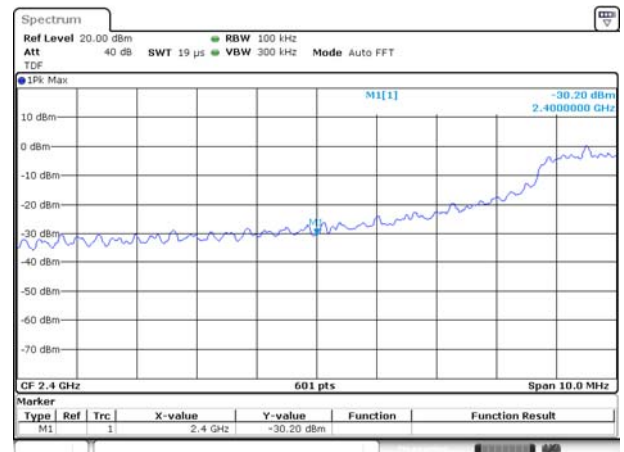
Date: 18 DEC 2016 09:31:57

802.11g LOW CHANNEL, Carrier level



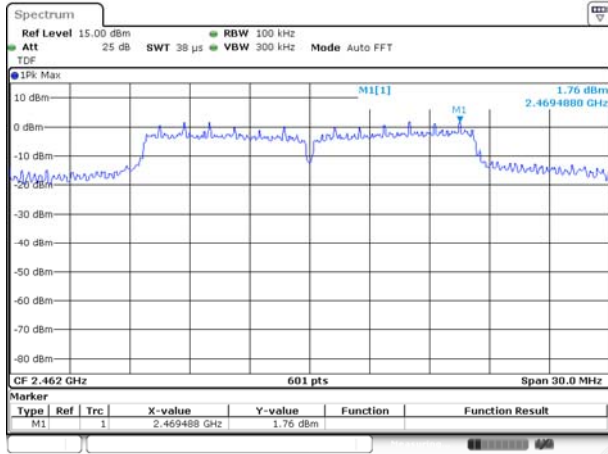
Date: 18 DEC 2016 09:35:42

802.11g LOW CHANNEL, Reference level



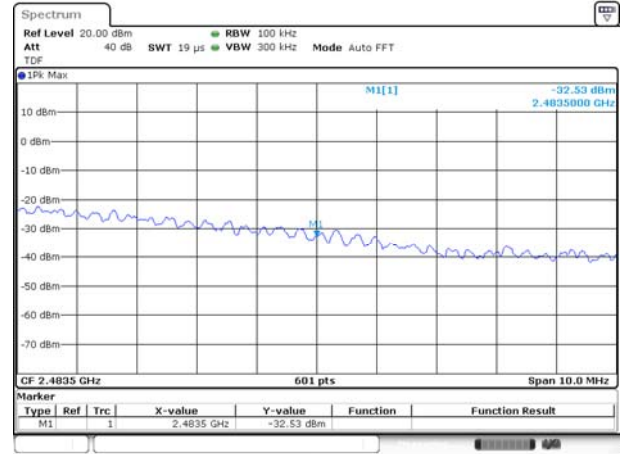
Date: 18 DEC 2016 09:37:18

802.11g HIGH CHANNEL, Carrier level



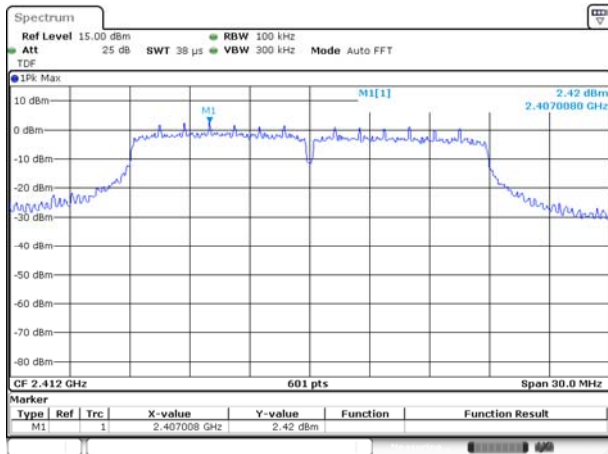
Date: 18 DEC 2018 09:46:29

802.11g HIGH CHANNEL, Reference level



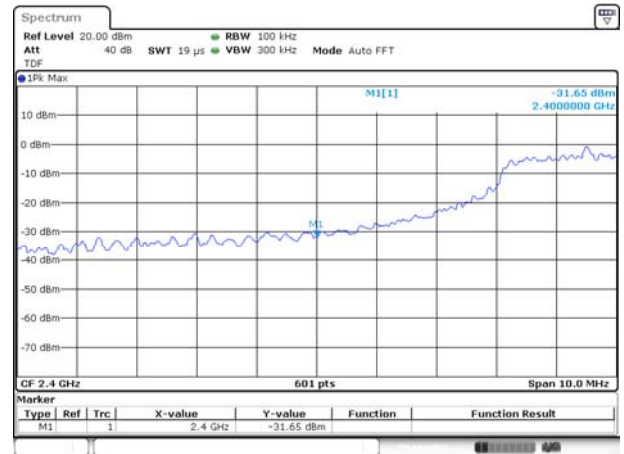
Date: 18 DEC 2018 09:47:33

802.11n-20 MHz LOW CHANNEL, Carrier level



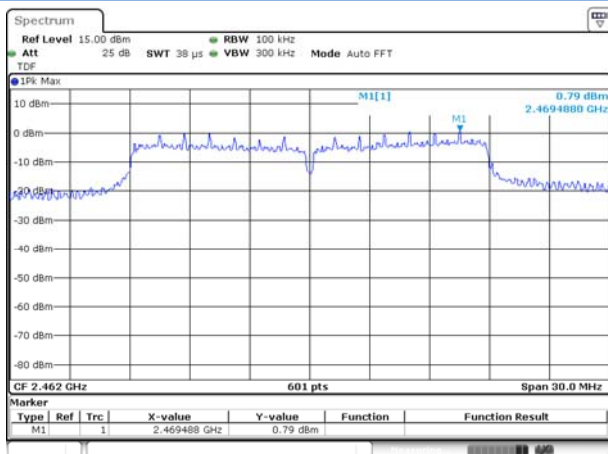
Date: 18 DEC 2018 09:50:46

802.11n-20 MHz LOW CHANNEL, Reference level



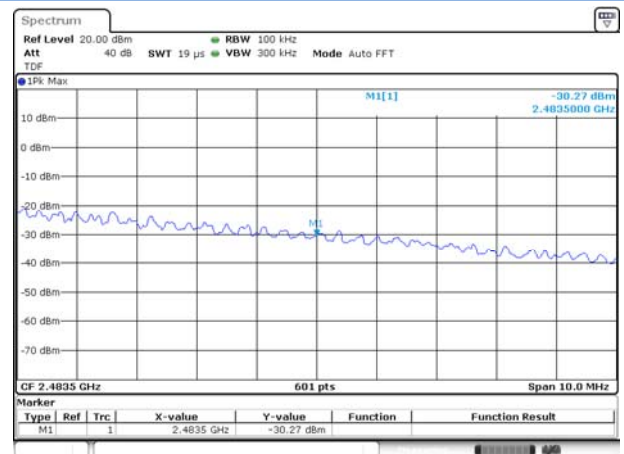
Date: 18 DEC 2018 09:51:46

802.11n-20 MHz HIGH CHANNEL, Carrier level



Date: 18 DEC 2018 09:58:00

802.11n-20 MHz HIGH CHANNEL, Reference level



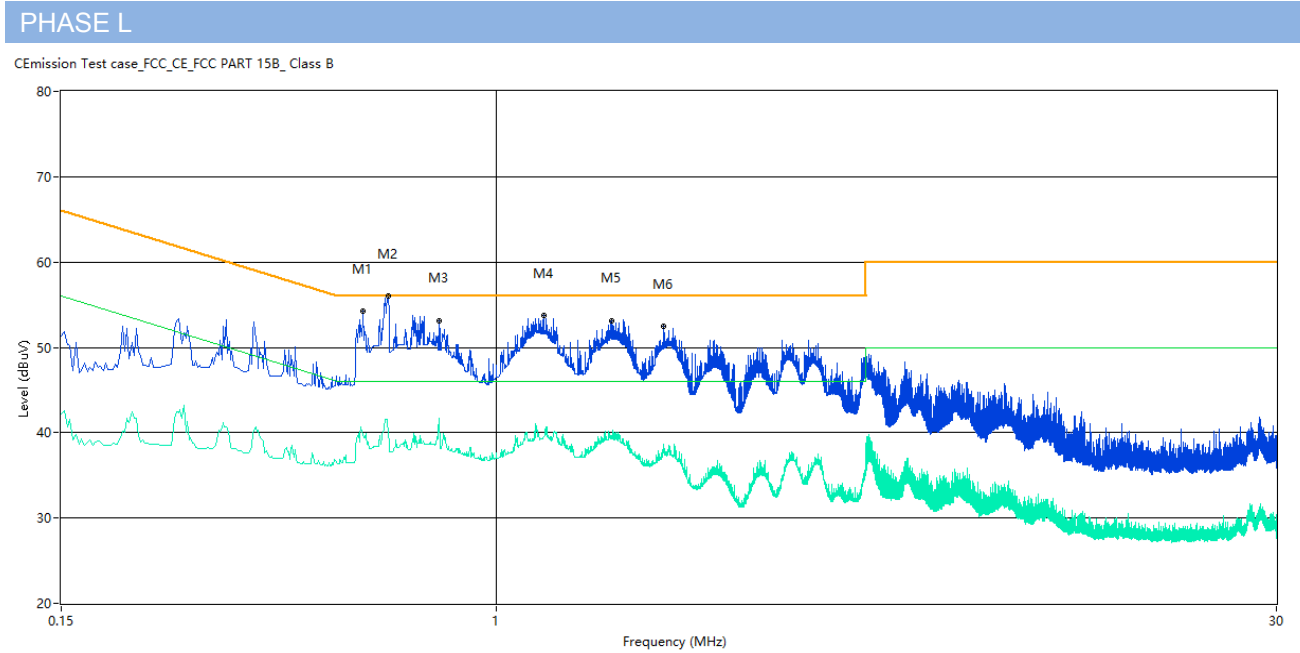
Date: 18 DEC 2018 09:59:14

A.5 Conducted Emissions

Note¹: The EUT is working in the Normal link mode.

Note²: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (120 VAC, 60 Hz) shown here.

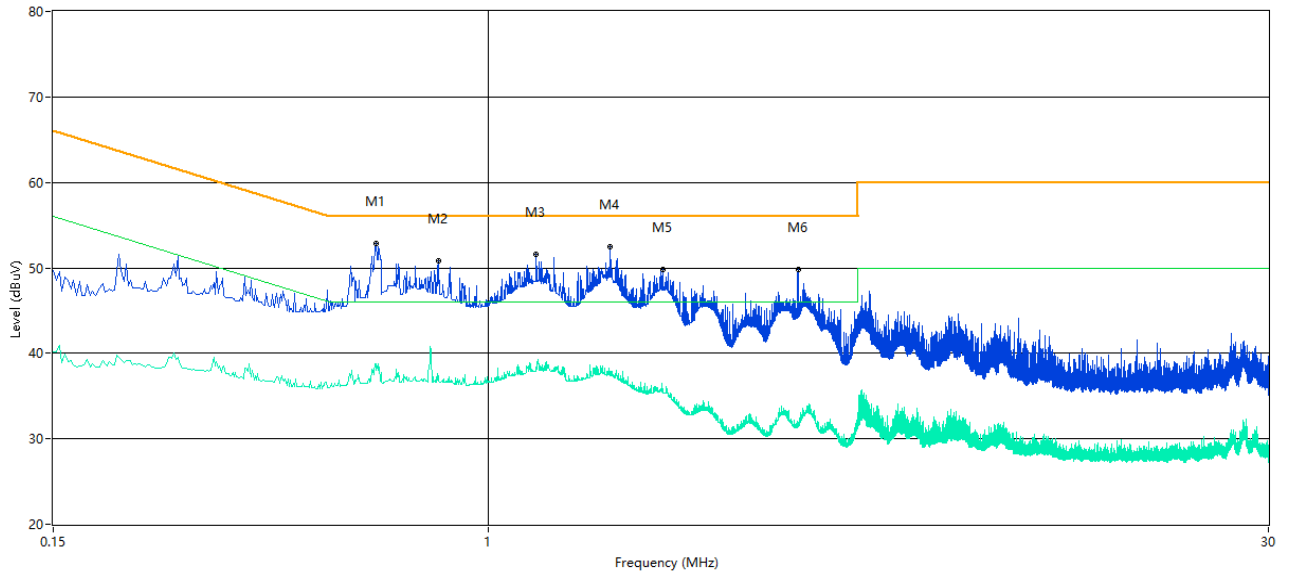
Test Data and Plots



Frequency (MHz)	Peak Level (dBuV)	Q-peak Level (dBuV)	Average Level (dBuV)	Factor (dB)	QP Limit (dBuV)	AV Limit (dBuV)	Margin (dB)	Line	Verdict
0.560	52.75	47.96	37.49	10.54	56.0	46.0	8.04	L Line	Pass
0.624	55.04	51.51	36.72	10.53	56.0	46.0	4.49	L Line	Pass
0.778	51.82	45.42	33.89	10.54	56.0	46.0	10.58	L Line	Pass
1.228	51.79	46.44	33.51	10.55	56.0	46.0	9.56	L Line	Pass
1.652	52.12	47.22	35.44	10.55	56.0	46.0	8.78	L Line	Pass
2.076	50.92	46.10	35.38	10.55	56.0	46.0	9.90	L Line	Pass

PHASE N

C Emission Test case_FCC_CE_FCC PART 15B_ Class B



Frequency (MHz)	Peak Level (dBuV)	Q-peak Level (dBuV)	Average Level (dBuV)	Factor (dB)	QP Limit (dBuV)	AV Limit (dBuV)	Margin (dB)	Line	Verdict
0.614	51.34	48.33	32.96	10.53	56.0	46.0	7.67	N Line	Pass
0.804	47.71	43.89	27.98	10.54	56.0	46.0	12.11	N Line	Pass
1.230	48.77	43.35	28.57	10.55	56.0	46.0	12.65	N Line	Pass
1.700	47.66	43.67	29.84	10.55	56.0	46.0	12.33	N Line	Pass
2.138	46.93	42.45	30.06	10.55	56.0	46.0	13.55	N Line	Pass
3.866	49.03	39.08	27.38	10.58	56.0	46.0	16.92	N Line	Pass

A.6 Radiated Emission

Note¹: The symbol of “--” in the table which means not application.

Note²: For the test data above 1 GHz, According the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

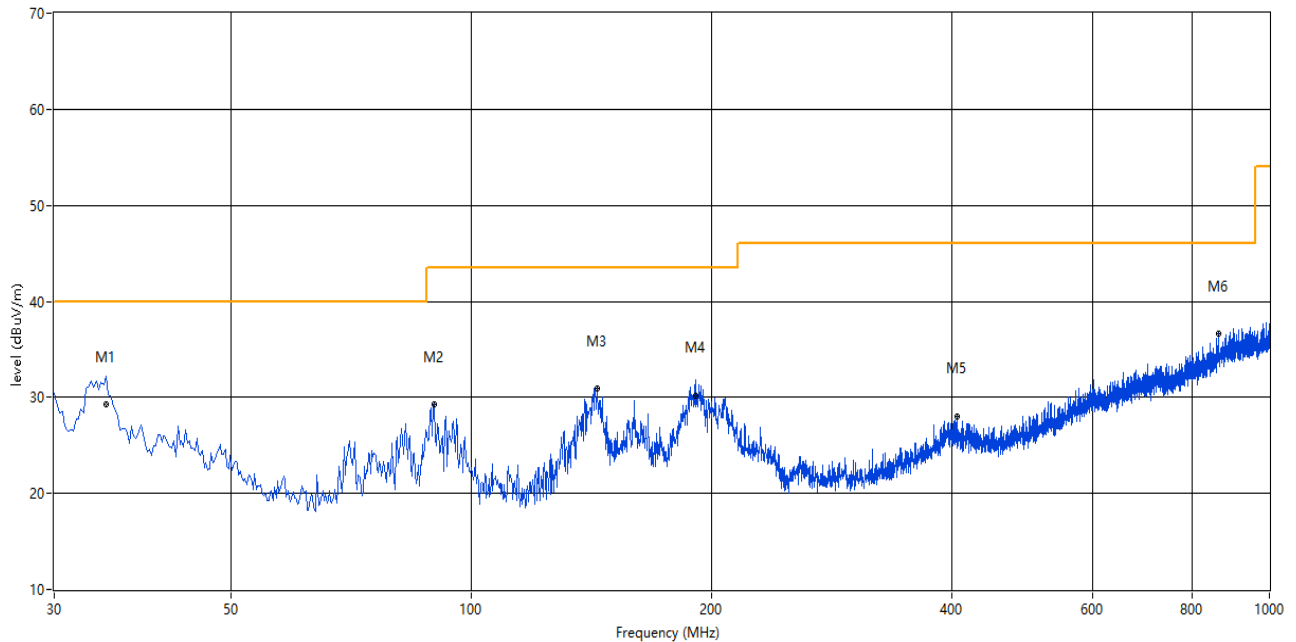
Note³: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Note⁴: The EUT is working in the Normal link mode below 1 GHz.

Test Data and Plots

30 MHz to 1 GHz, ANT V

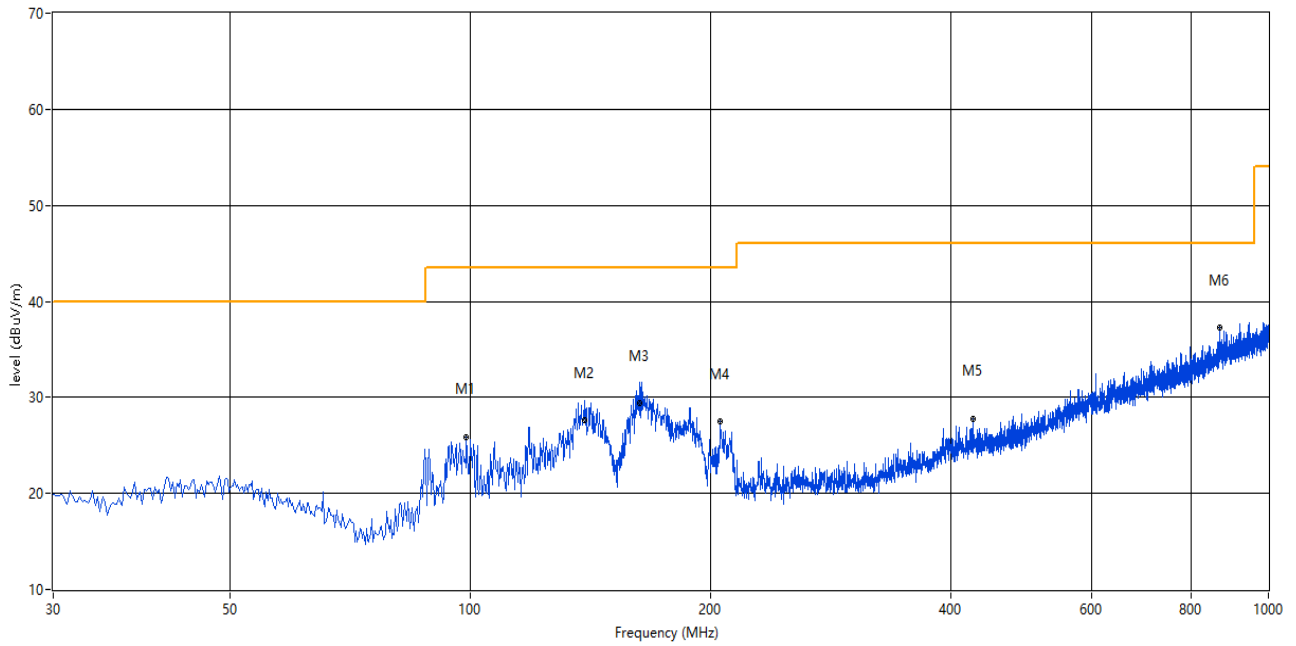
REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_30MHz-1GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
34.849	32.15	29.29	--	-28.39	--	40.0	--	10.71	7.90	150	Vertical	Pass
89.883	29.32	--	--	-30.40	--	43.5	--	14.18	233.20	150	Vertical	Pass
143.704	30.92	--	--	-32.06	--	43.5	--	12.58	48.40	150	Vertical	Pass
190.737	31.88	30.19	--	-29.48	--	43.5	--	13.31	346.60	150	Vertical	Pass
405.781	28.06	--	--	-23.96	--	46.0	--	17.94	56.30	150	Vertical	Pass
863.992	36.67	--	--	-14.30	--	46.0	--	9.33	83.20	150	Vertical	Pass

30 MHz to 1 GHz, ANT H

REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_30MHz-1GHz

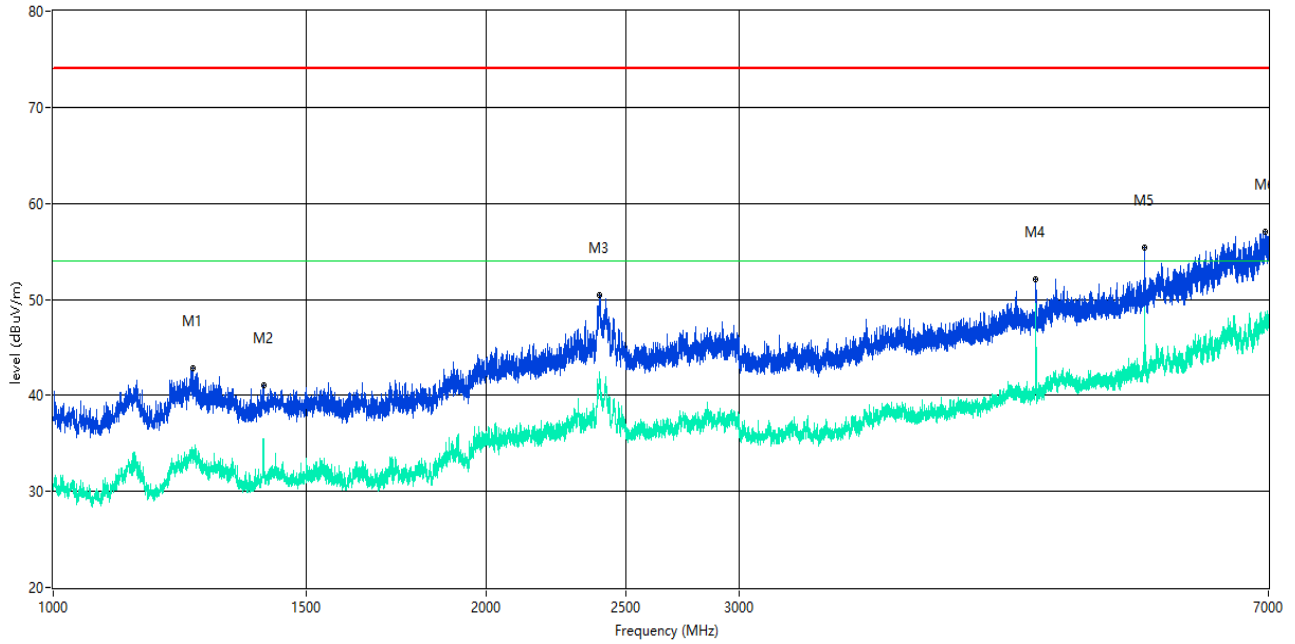


Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
98.853	25.88	--	--	-28.88	--	43.5	--	17.62	158.20	150	Horizontal	Pass
138.855	29.64	27.62	--	-32.05	--	43.5	--	15.88	358.20	150	Horizontal	Pass
163.099	31.56	29.46	--	-31.41	--	43.5	--	14.04	354.90	150	Horizontal	Pass
205.769	27.52	--	--	-28.54	--	43.5	--	15.98	37.30	150	Horizontal	Pass
426.388	27.71	--	--	-23.35	--	46.0	--	18.29	356.90	150	Horizontal	Pass
868.840	37.26	--	--	-14.18	--	46.0	--	8.74	217.50	150	Horizontal	Pass

Note 1: The marked spikes near 2400 MHz with circle should be ignored because they are Fundamental signal.
 Note 2: Because of the spurious from 18-25GHz is noise only, so do not show on this report.

1 GHz to 7 GHz, ANT V 802.11b Low Channel

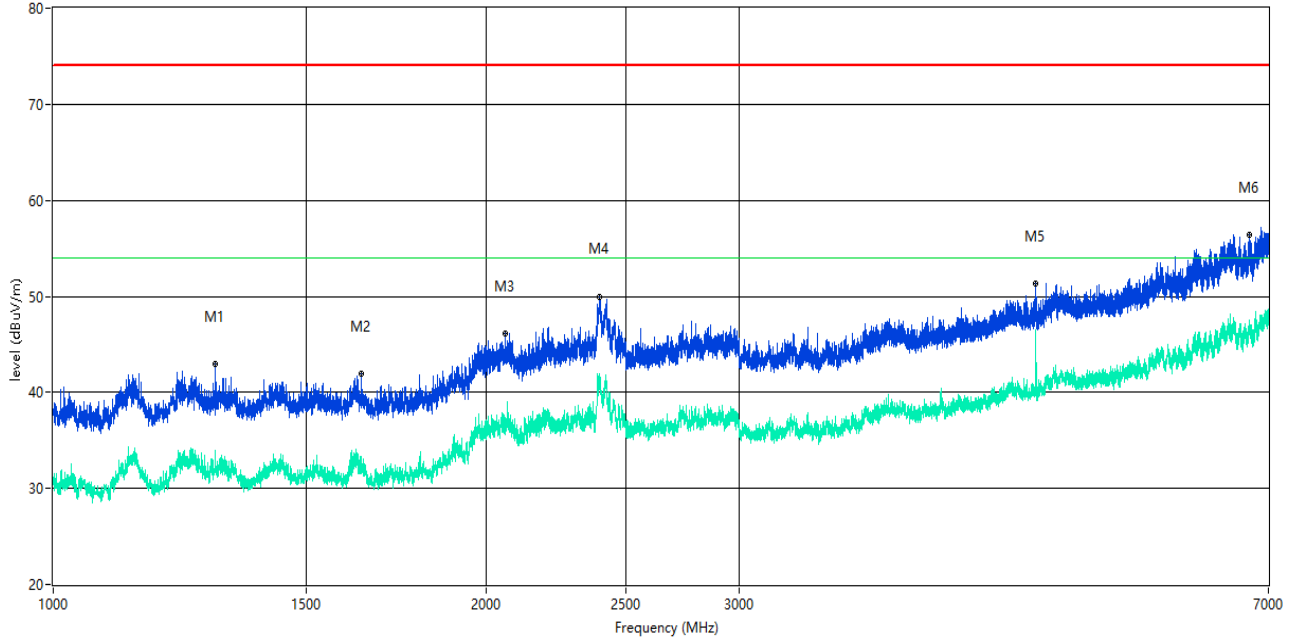
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1249.969	42.80	--	34.3	-12.25	74.0	--	54.0	19.70	64.30	150	Vertical	Pass
1400.450	41.06	--	34.8	-11.82	74.0	--	54.0	19.20	36.90	150	Vertical	Pass
2396.075	50.39	--	41.0	0.06	74.0	--	54.0	13.00	218.00	150	Vertical	Pass
4823.397	52.05	--	47.8	-0.60	74.0	--	54.0	6.20	28.50	150	Vertical	Pass
5738.283	55.38	--	48.6	2.20	74.0	--	54.0	5.40	45.50	150	Vertical	Pass
6959.255	57.00	--	48.0	8.55	74.0	--	54.0	6.00	334.70	150	Vertical	Pass

1 GHz to 7 GHz, ANT H 802.11b Low Channel

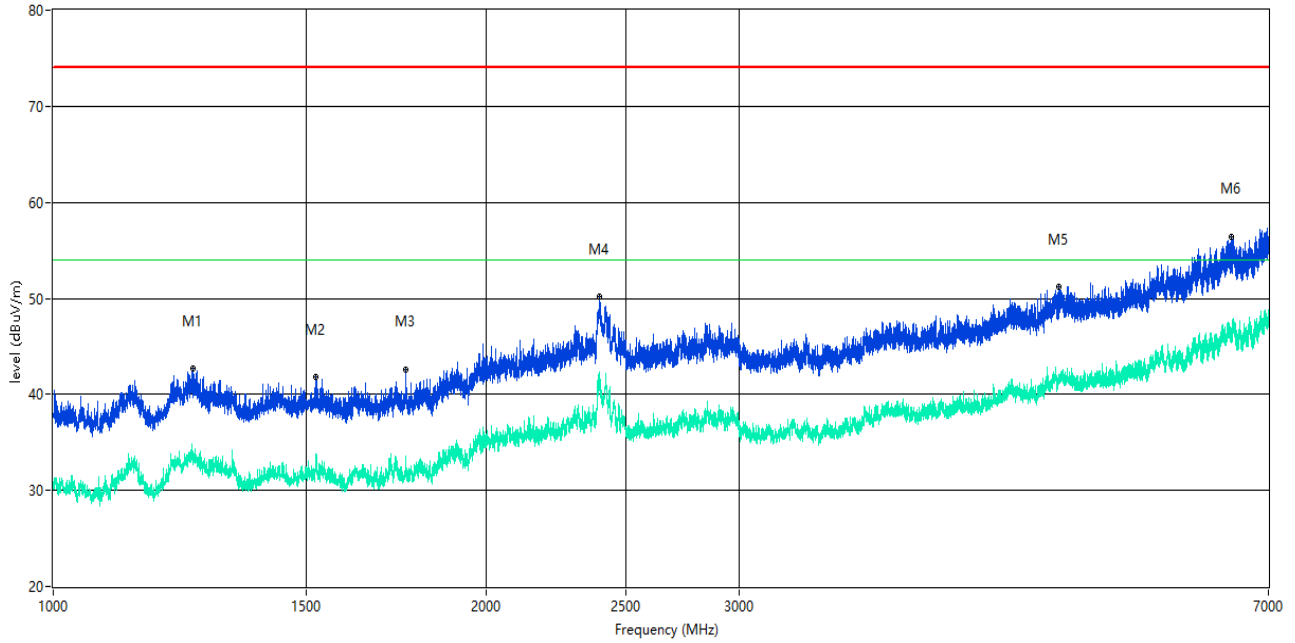
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1296.463	42.92	--	34.0	-12.32	74.0	--	54.0	20.00	22.40	150	Horizontal	Pass
1637.920	41.93	--	33.3	-11.75	74.0	--	54.0	20.70	179.40	150	Horizontal	Pass
2061.117	46.10	--	37.1	-8.35	74.0	--	54.0	16.90	32.60	150	Horizontal	Pass
2399.325	49.98	--	41.7	-0.07	74.0	--	54.0	12.30	339.50	150	Horizontal	Pass
4823.772	51.27	--	46.5	-0.61	74.0	--	54.0	7.50	201.50	150	Horizontal	Pass
6793.276	56.38	--	46.5	7.62	74.0	--	54.0	7.50	116.70	150	Horizontal	Pass

1 GHz to 7 GHz, ANT V 802.11b Middle Channel

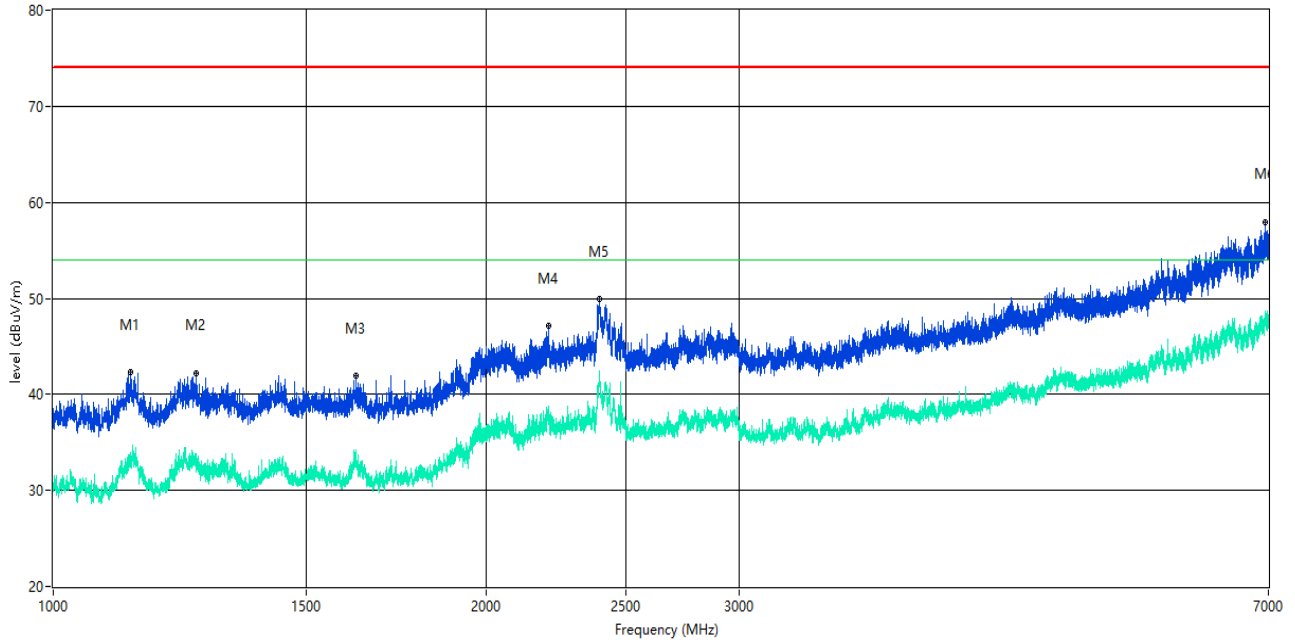
REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1250.469	42.65	--	33.7	-12.23	74.0	--	54.0	20.30	39.50	150	Vertical	Pass
1523.685	41.77	--	32.7	-11.60	74.0	--	54.0	21.30	177.10	150	Vertical	Pass
1759.905	42.61	--	33.5	-10.96	74.0	--	54.0	20.50	177.10	150	Vertical	Pass
2398.575	50.15	--	41.7	-0.05	74.0	--	54.0	12.30	123.80	150	Vertical	Pass
5007.124	51.19	--	41.5	0.86	74.0	--	54.0	12.50	215.10	150	Vertical	Pass
6593.051	56.44	--	46.1	7.44	74.0	--	54.0	7.90	2.20	150	Vertical	Pass

1 GHz to 7 GHz, ANT H 802.11b Middle Channel

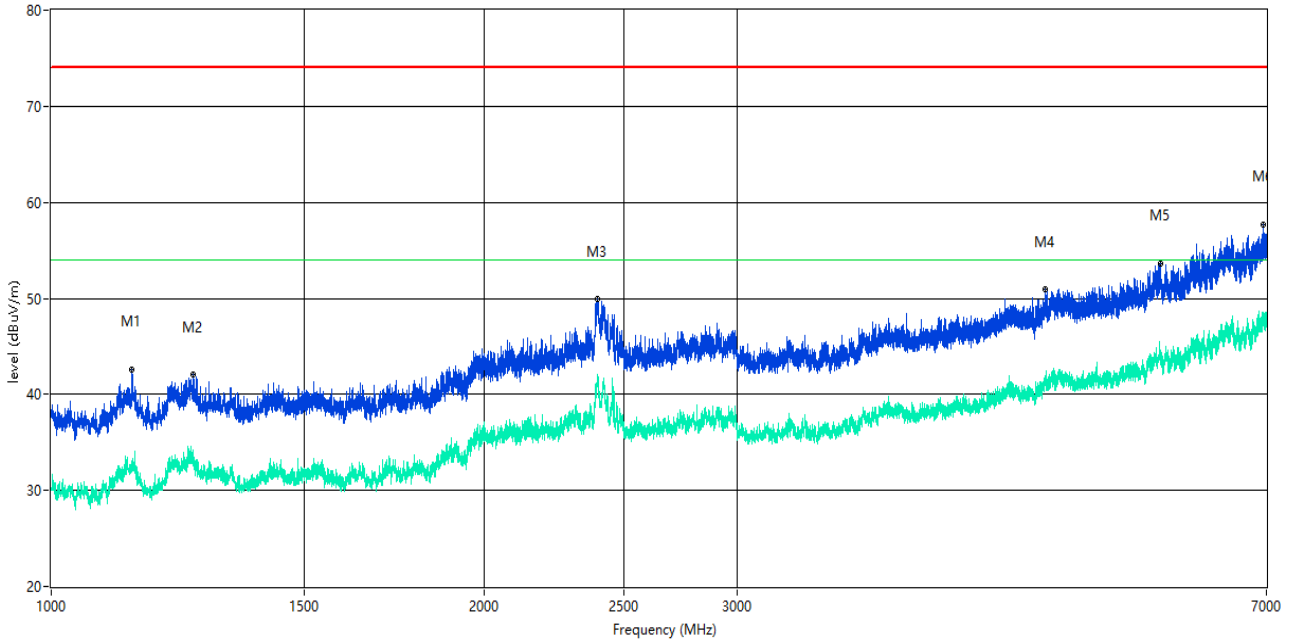
REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1131.484	42.28	--	33.8	-11.94	74.0	--	54.0	20.20	33.10	150	Horizontal	Pass
1256.718	42.22	--	33.1	-12.36	74.0	--	54.0	20.90	50.40	150	Horizontal	Pass
1623.172	41.92	--	34.2	-11.89	74.0	--	54.0	19.80	180.60	150	Horizontal	Pass
2209.849	47.11	--	38.3	-6.09	74.0	--	54.0	15.70	33.10	150	Horizontal	Pass
2398.075	49.93	--	41.3	-0.03	74.0	--	54.0	12.70	259.20	150	Horizontal	Pass
6970.004	57.89	--	47.9	8.78	74.0	--	54.0	6.10	129.40	150	Horizontal	Pass

1 GHz to 7 GHz, ANT V 802.11b High Channel

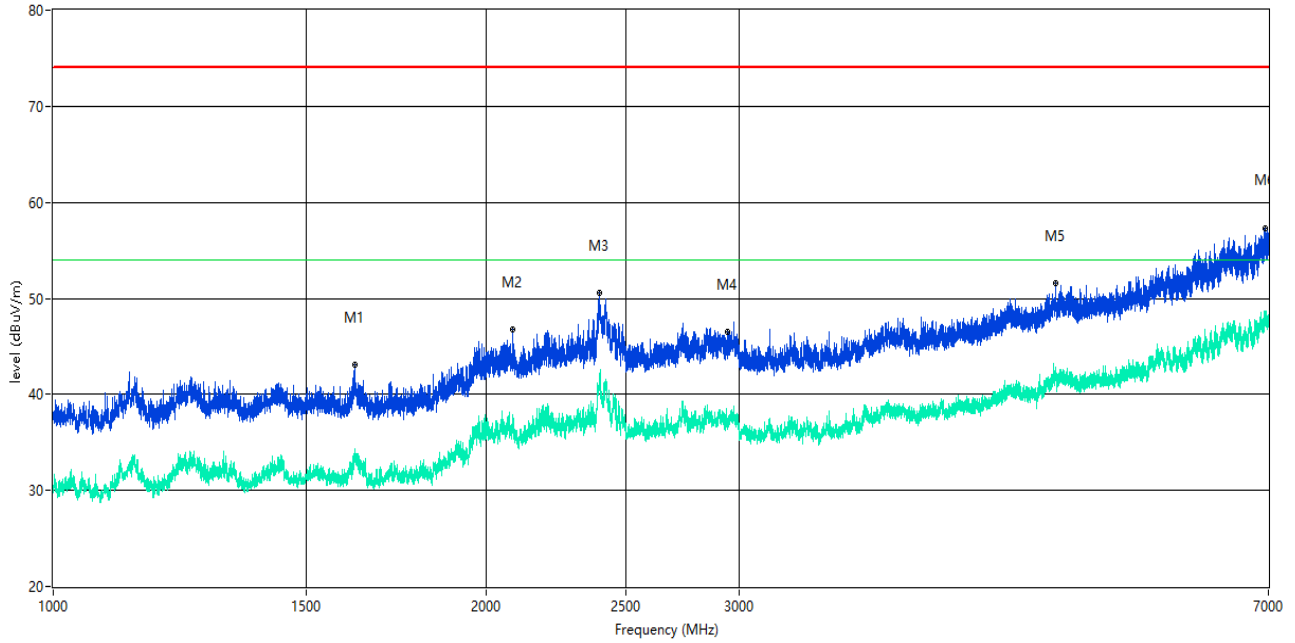
REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1137.733	42.61	--	33.0	-11.63	74.0	--	54.0	21.00	42.80	150	Vertical	Pass
1253.968	42.08	--	34.3	-12.15	74.0	--	54.0	19.70	29.20	150	Vertical	Pass
2398.575	49.88	--	41.5	-0.05	74.0	--	54.0	12.50	94.20	150	Vertical	Pass
4911.511	50.91	--	41.7	0.45	74.0	--	54.0	12.30	74.40	150	Vertical	Pass
5905.512	53.63	--	44.2	4.32	74.0	--	54.0	9.80	161.70	150	Vertical	Pass
6967.004	57.61	--	48.2	8.69	74.0	--	54.0	5.80	5.30	150	Vertical	Pass

1 GHz to 7 GHz, ANT H 802.11b High Channel

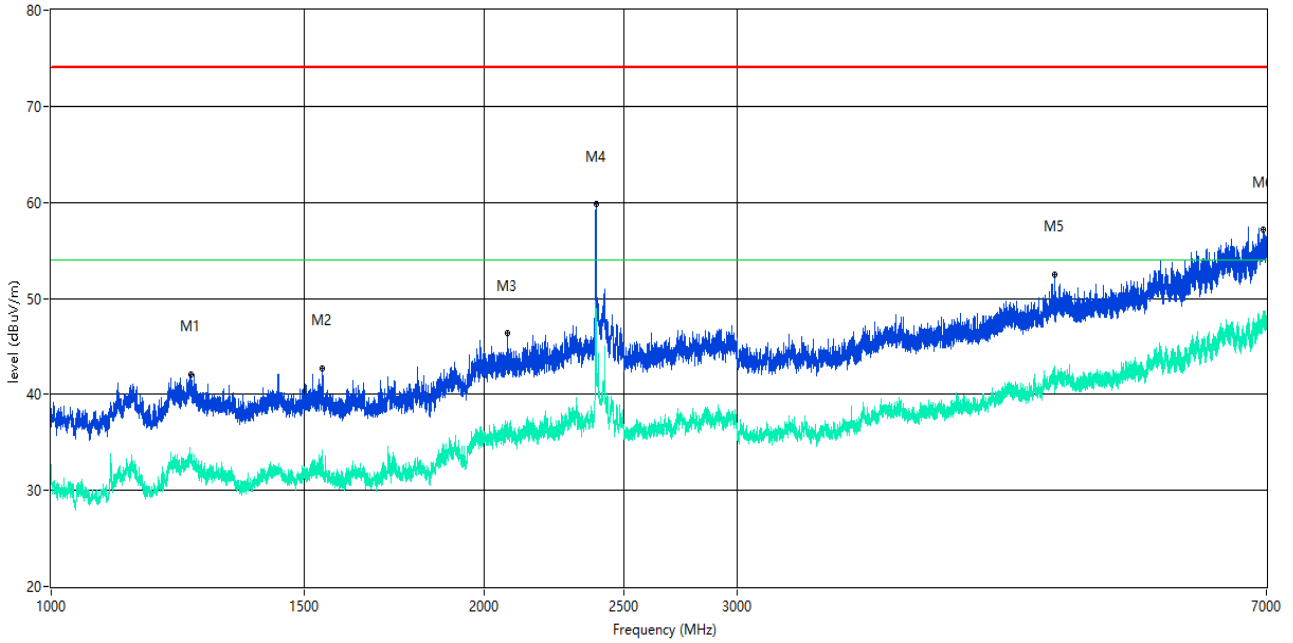
REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1622.172	43.07	--	34.0	-11.84	74.0	--	54.0	20.00	179.10	150	Horizontal	Pass
2088.114	46.75	--	36.9	-7.66	74.0	--	54.0	17.10	25.90	150	Horizontal	Pass
2399.325	50.52	--	41.7	-0.07	74.0	--	54.0	12.30	264.90	150	Horizontal	Pass
2945.507	46.50	--	37.1	-3.80	74.0	--	54.0	16.90	155.40	150	Horizontal	Pass
4979.378	51.59	--	41.9	1.56	74.0	--	54.0	12.10	40.20	150	Horizontal	Pass
6961.880	57.29	--	48.2	8.61	74.0	--	54.0	5.80	0.10	150	Horizontal	Pass

1 GHz to 7 GHz, ANT V 802.11g Low Channel

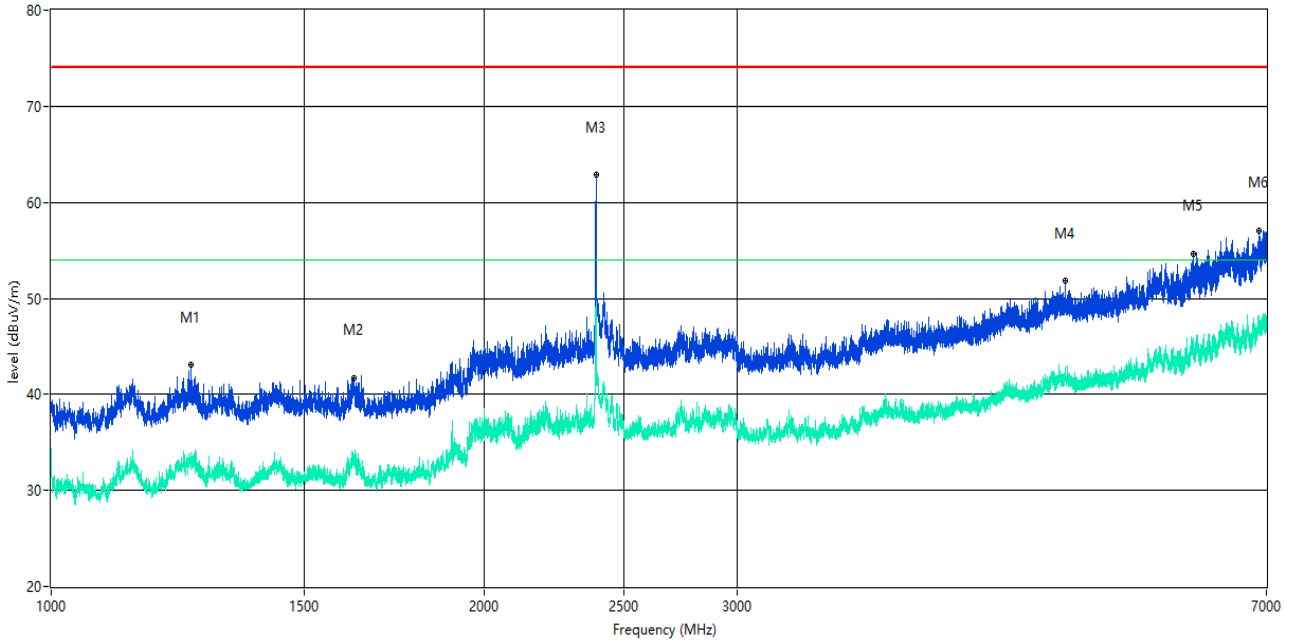
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1249.719	42.09	--	33.6	-12.26	74.0	--	54.0	20.40	36.30	150	Vertical	Pass
1542.432	42.77	--	33.1	-11.77	74.0	--	54.0	20.90	247.80	150	Vertical	Pass
2076.865	46.39	--	37.1	-8.05	74.0	--	54.0	16.90	66.90	150	Vertical	Pass
2392.076	59.84	--	48.9	-0.10	74.0	--	54.0	5.10	97.80	150	Vertical	Pass
4983.877	52.51	--	42.9	1.16	74.0	--	54.0	11.10	314.70	150	Vertical	Pass
6961.130	57.12	--	47.7	8.59	74.0	--	54.0	6.30	67.30	150	Vertical	Pass

1 GHz to 7 GHz, ANT H 802.11g Low Channel

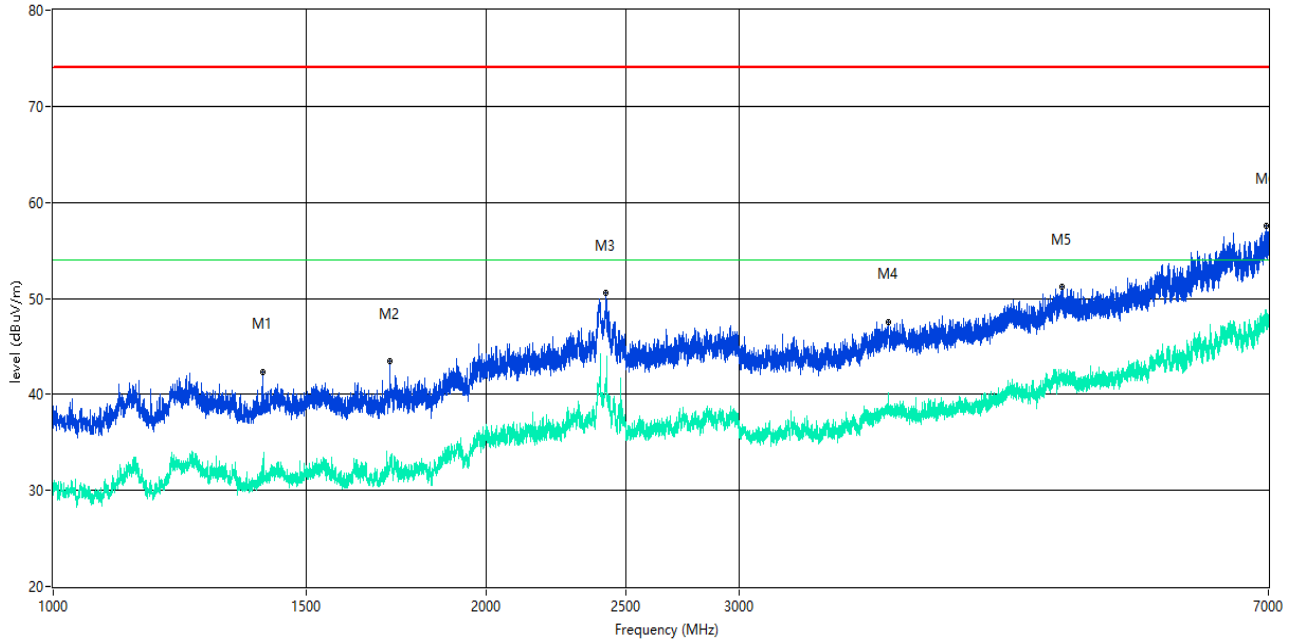
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1249.969	43.07	--	34.0	-12.25	74.0	--	54.0	20.00	13.10	150	Horizontal	Pass
1622.672	41.73	--	33.3	-11.87	74.0	--	54.0	20.70	170.30	150	Horizontal	Pass
2392.826	62.88	--	49.7	0.23	74.0	--	54.0	4.30	37.10	150	Horizontal	Pass
5074.241	51.78	--	42.8	1.89	74.0	--	54.0	11.20	24.30	150	Horizontal	Pass
6227.722	54.62	--	44.5	5.34	74.0	--	54.0	9.50	282.60	150	Horizontal	Pass
6914.886	57.01	--	47.8	8.59	74.0	--	54.0	6.20	311.30	150	Horizontal	Pass

1 GHz to 7 GHz, ANT V 802.11g Middle Channel

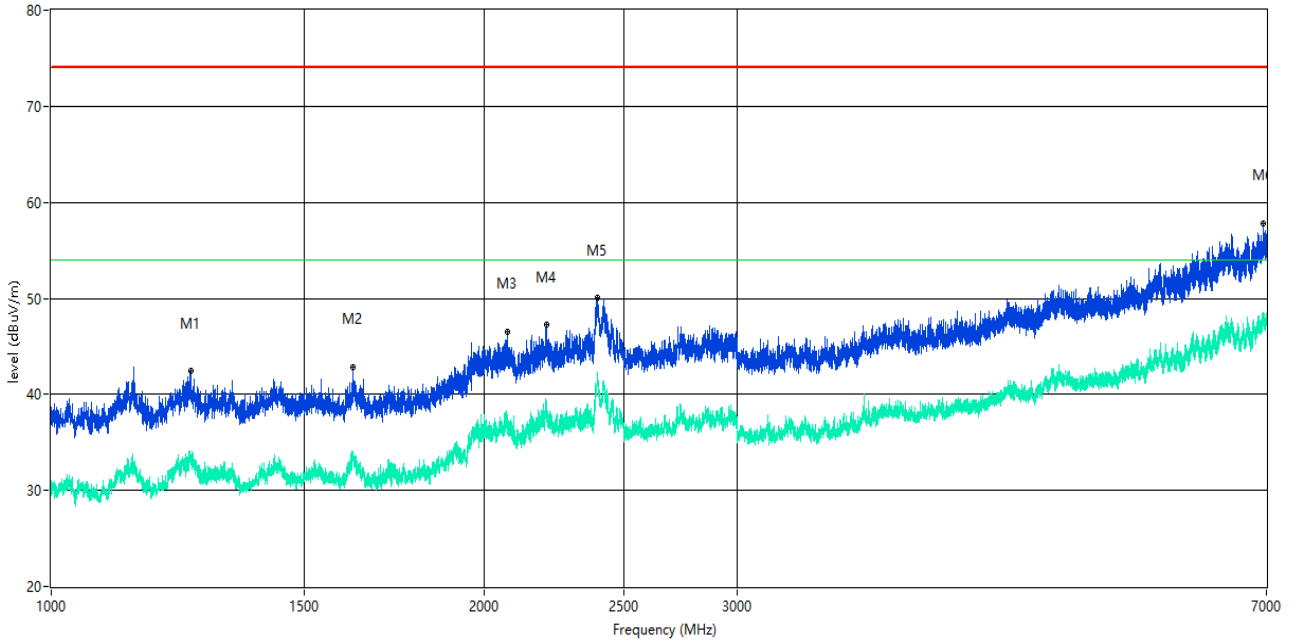
REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1397.950	42.37	--	33.3	-11.84	74.0	--	54.0	20.70	180.90	150	Vertical	Pass
1713.911	43.47	--	33.0	-11.48	74.0	--	54.0	21.00	160.60	150	Vertical	Pass
2423.072	50.56	--	41.1	-0.86	74.0	--	54.0	12.90	51.90	150	Vertical	Pass
3806.524	47.55	--	38.4	-2.43	74.0	--	54.0	15.60	359.70	150	Vertical	Pass
5029.996	51.20	--	41.9	0.80	74.0	--	54.0	12.10	11.70	150	Vertical	Pass
6971.004	57.49	--	48.4	8.82	74.0	--	54.0	5.60	239.90	150	Vertical	Pass

1 GHz to 7 GHz, ANT H 802.11g Middle Channel

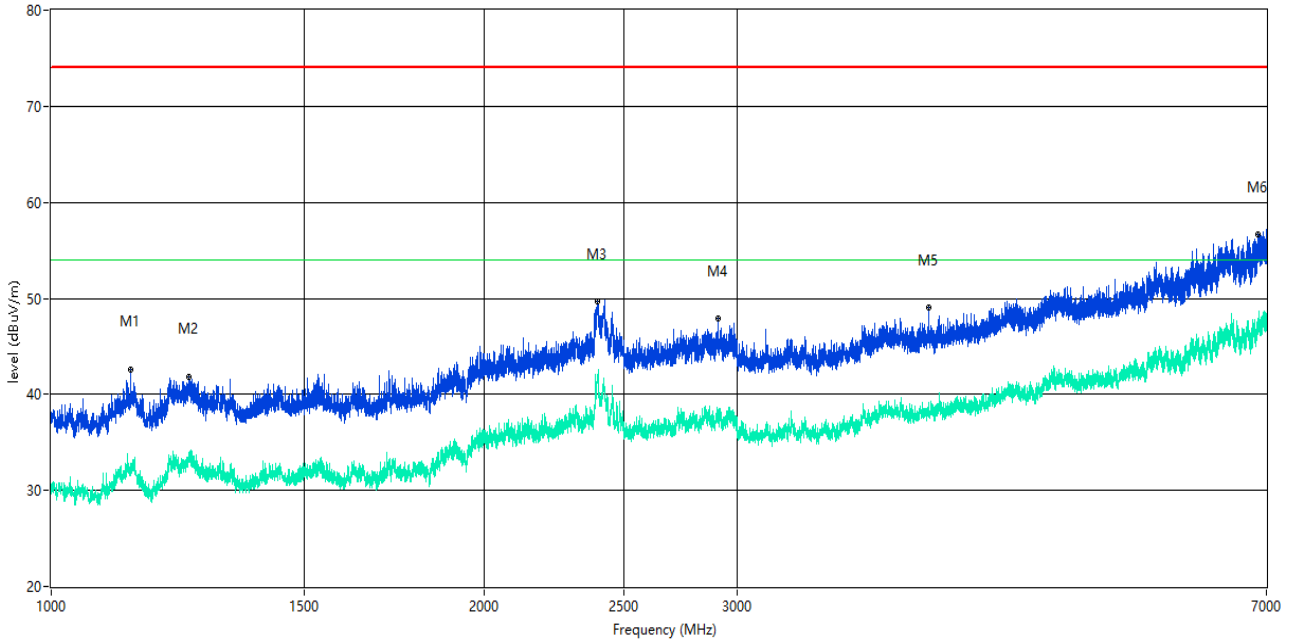
REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1250.969	42.42	--	33.2	-12.22	74.0	--	54.0	20.80	11.80	150	Horizontal	Pass
1621.672	42.85	--	34.0	-11.82	74.0	--	54.0	20.00	175.40	150	Horizontal	Pass
2077.615	46.53	--	37.0	-8.16	74.0	--	54.0	17.00	21.90	150	Horizontal	Pass
2210.599	47.22	--	38.9	-6.16	74.0	--	54.0	15.10	38.80	150	Horizontal	Pass
2398.825	50.01	--	41.7	-0.05	74.0	--	54.0	12.30	349.60	150	Horizontal	Pass
6962.380	57.84	--	47.9	8.62	74.0	--	54.0	6.10	158.50	150	Horizontal	Pass

1 GHz to 7 GHz, ANT V 802.11g High Channel

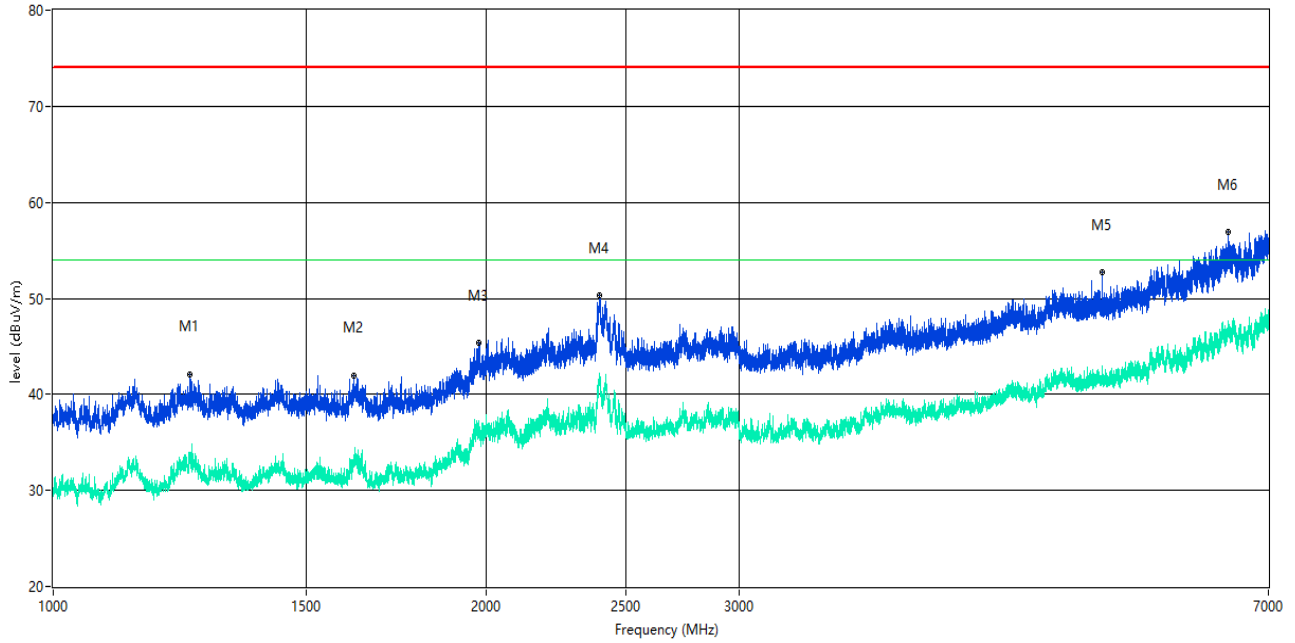
REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1135.233	42.63	--	31.9	-11.96	74.0	--	54.0	22.10	77.90	150	Vertical	Pass
1246.719	41.85	--	33.6	-12.29	74.0	--	54.0	20.40	64.30	150	Vertical	Pass
2397.075	49.64	--	41.2	0.01	74.0	--	54.0	12.80	101.80	150	Vertical	Pass
2909.761	47.85	--	37.7	-3.52	74.0	--	54.0	16.30	296.80	150	Vertical	Pass
4074.241	49.00	--	38.8	-2.52	74.0	--	54.0	15.20	177.50	150	Vertical	Pass
6906.012	56.68	--	47.3	8.40	74.0	--	54.0	6.70	357.80	150	Vertical	Pass

1 GHz to 7 GHz, ANT H 802.11g High Channel

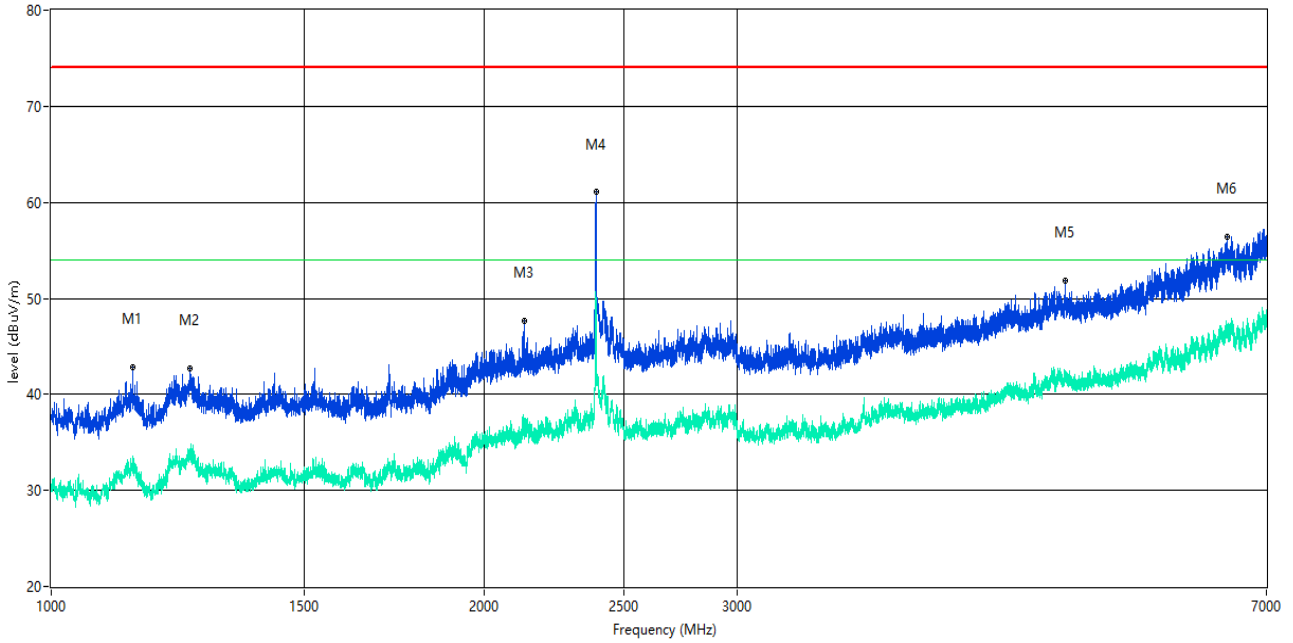
REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1244.969	42.11	--	33.9	-12.30	74.0	--	54.0	20.10	11.10	150	Horizontal	Pass
1617.923	42.00	--	33.5	-11.74	74.0	--	54.0	20.50	221.90	150	Horizontal	Pass
1978.128	45.33	--	37.3	-8.49	74.0	--	54.0	16.70	7.70	150	Horizontal	Pass
2399.825	50.29	--	41.5	-0.08	74.0	--	54.0	12.50	293.80	150	Horizontal	Pass
5362.580	52.67	--	43.0	0.74	74.0	--	54.0	11.00	359.80	150	Horizontal	Pass
6564.304	56.86	--	47.0	8.35	74.0	--	54.0	7.00	320.60	150	Horizontal	Pass

1 GHz to 7 GHz, ANT V 802.11n20 Low Channel

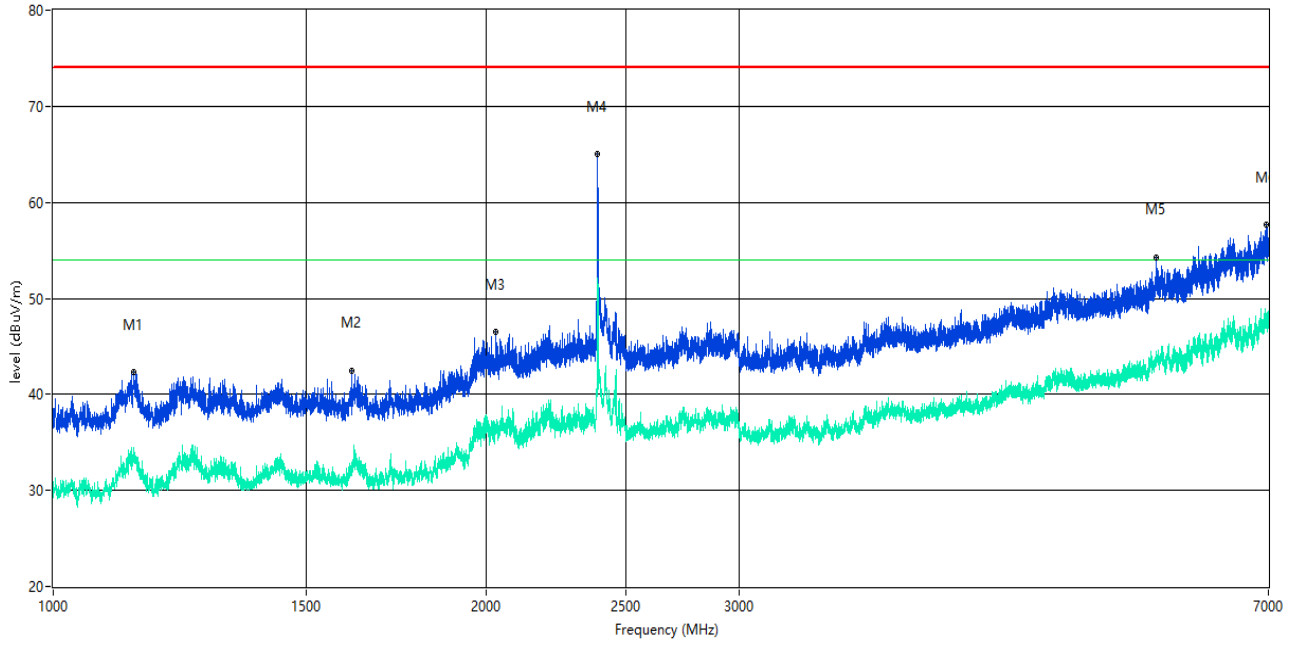
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1139.983	42.84	--	33.5	-11.55	74.0	--	54.0	20.50	81.60	150	Vertical	Pass
1249.469	42.74	--	34.0	-12.26	74.0	--	54.0	20.00	30.70	150	Vertical	Pass
2132.858	47.70	--	37.5	-7.57	74.0	--	54.0	16.50	156.70	150	Vertical	Pass
2393.076	61.07	--	48.4	0.22	74.0	--	54.0	5.60	102.10	150	Vertical	Pass
5075.366	51.87	--	42.2	1.90	74.0	--	54.0	11.80	336.40	150	Vertical	Pass
6575.678	56.40	--	47.2	7.83	74.0	--	54.0	6.80	159.60	150	Vertical	Pass

1 GHz to 7 GHz, ANT H 802.11n20 Low Channel

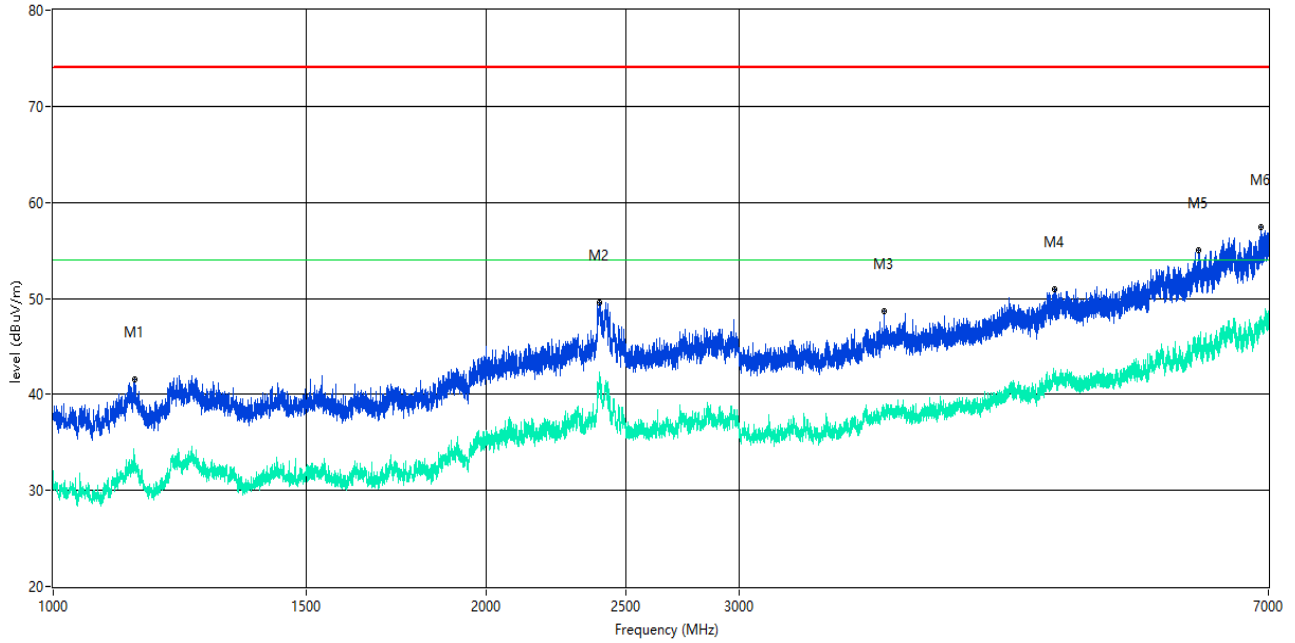
REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1136.983	42.30	--	33.3	-11.73	74.0	--	54.0	20.70	38.80	150	Horizontal	Pass
1613.423	42.42	--	31.7	-12.49	74.0	--	54.0	22.30	178.60	150	Horizontal	Pass
2031.871	46.47	--	36.7	-7.85	74.0	--	54.0	17.30	22.00	150	Horizontal	Pass
2391.076	65.04	--	52.2	-0.71	74.0	--	54.0	1.80	38.80	150	Horizontal	Pass
5850.769	54.28	--	44.0	3.59	74.0	--	54.0	10.00	231.90	150	Horizontal	Pass
6973.753	57.69	--	48.3	8.89	74.0	--	54.0	5.70	125.40	150	Horizontal	Pass

1 GHz to 7 GHz, ANT V 802.11n20 Middle Channel

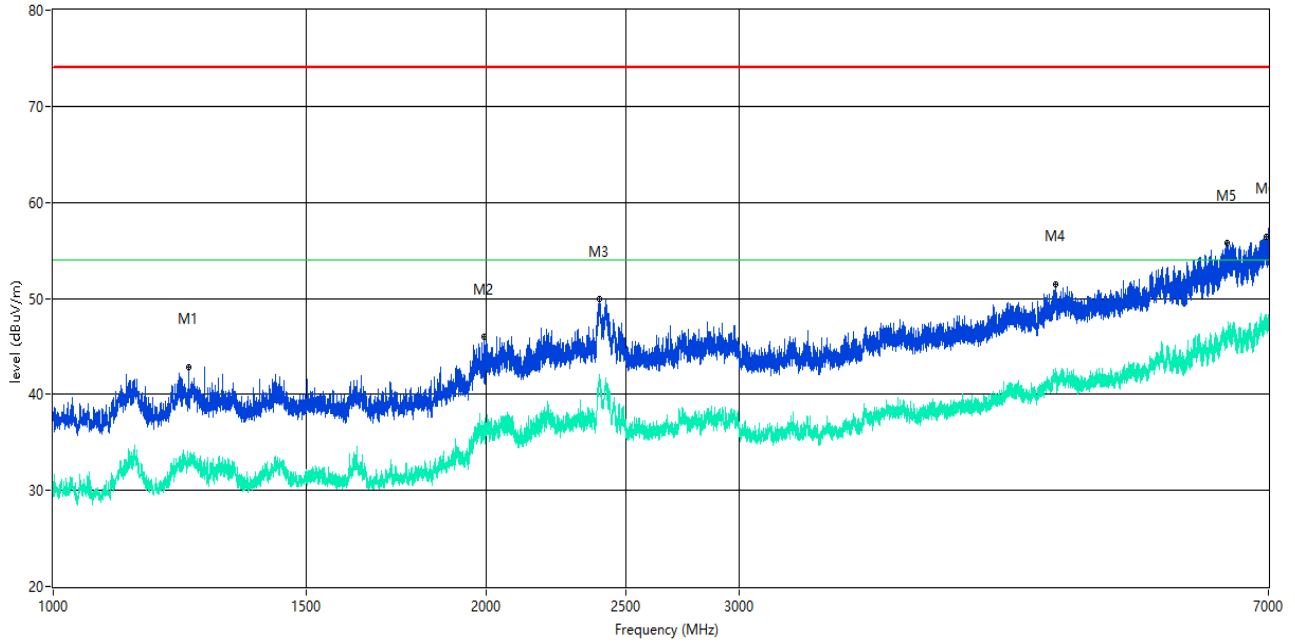
REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1139.233	41.53	--	32.9	-11.50	74.0	--	54.0	21.10	52.80	150	Vertical	Pass
2397.325	49.49	--	41.6	-0.01	74.0	--	54.0	12.40	251.00	150	Vertical	Pass
3780.652	48.62	--	38.2	-2.78	74.0	--	54.0	15.80	269.50	150	Vertical	Pass
4967.754	51.01	--	41.9	1.16	74.0	--	54.0	12.10	15.50	150	Vertical	Pass
6260.842	54.95	--	46.0	5.92	74.0	--	54.0	8.00	334.40	150	Vertical	Pass
6916.385	57.41	--	47.9	8.73	74.0	--	54.0	6.10	110.00	150	Vertical	Pass

1 GHz to 7 GHz, ANT H 802.11n20 Middle Channel

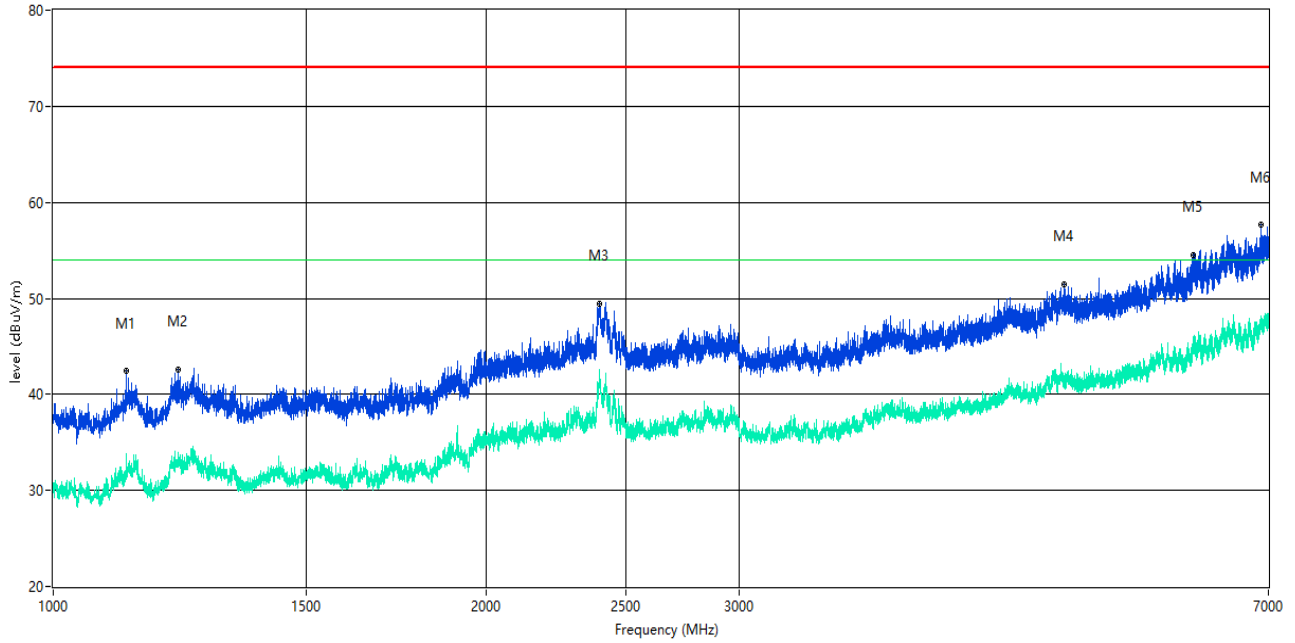
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1241.970	42.82	--	32.7	-12.38	74.0	--	54.0	21.30	16.30	150	Horizontal	Pass
1994.876	45.95	--	37.0	-8.88	74.0	--	54.0	17.00	12.90	150	Horizontal	Pass
2398.075	49.90	--	41.5	-0.03	74.0	--	54.0	12.50	317.10	150	Horizontal	Pass
4979.003	51.49	--	42.1	1.51	74.0	--	54.0	11.90	153.50	150	Horizontal	Pass
6553.806	55.83	--	46.7	7.22	74.0	--	54.0	7.30	357.90	150	Horizontal	Pass
6974.128	56.41	--	47.8	8.88	74.0	--	54.0	6.20	315.70	150	Horizontal	Pass

1 GHz to 7 GHz, ANT V 802.11n20 High Channel

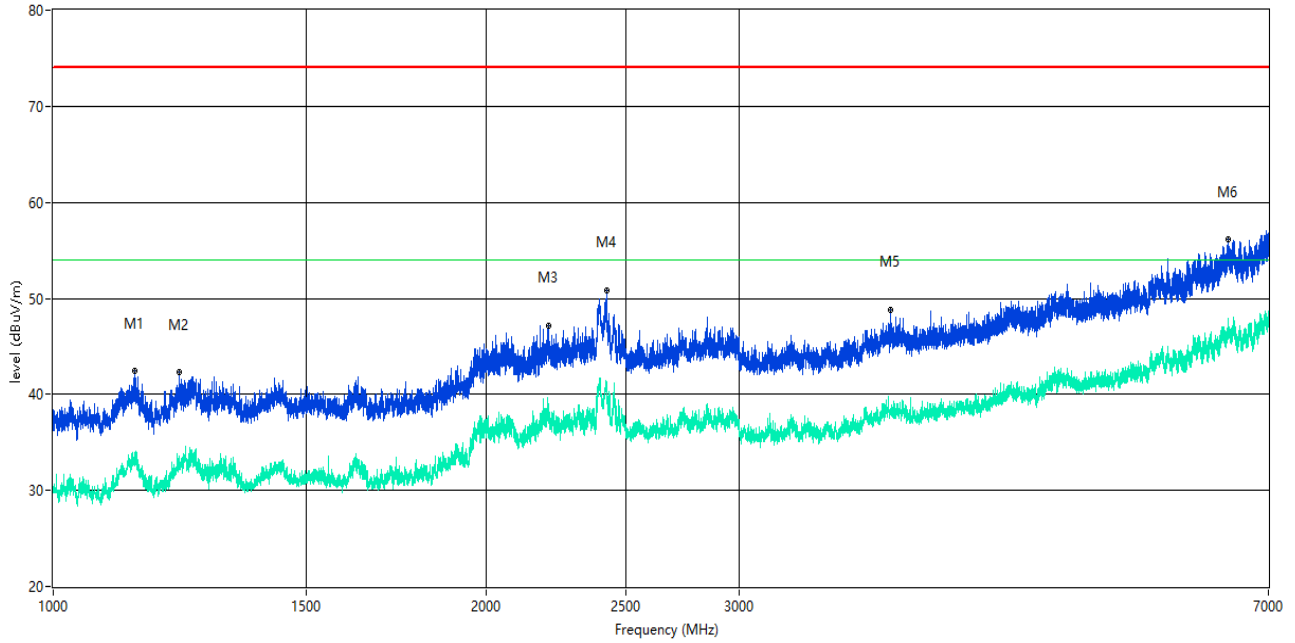
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1124.484	42.39	--	33.8	-11.81	74.0	--	54.0	20.20	40.60	150	Vertical	Pass
1220.472	42.61	--	33.9	-12.45	74.0	--	54.0	20.10	33.60	150	Vertical	Pass
2399.575	49.45	--	42.6	-0.07	74.0	--	54.0	11.40	13.10	150	Vertical	Pass
5047.994	51.46	--	41.6	1.02	74.0	--	54.0	12.40	312.20	150	Vertical	Pass
6207.224	54.53	--	45.2	5.60	74.0	--	54.0	8.80	321.10	150	Vertical	Pass
6923.010	57.68	--	47.8	8.45	74.0	--	54.0	6.20	340.20	150	Vertical	Pass

1 GHz to 7 GHz, ANT H 802.11n20 High Channel

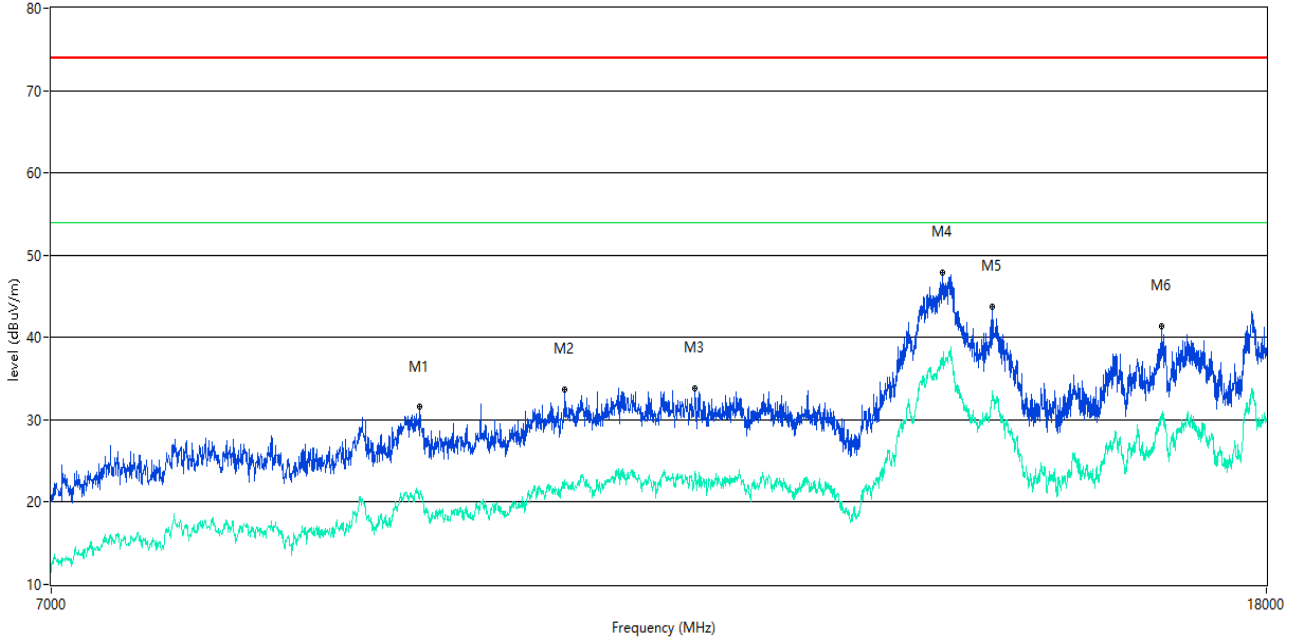
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1139.733	42.46	--	33.8	-11.53	74.0	--	54.0	20.20	42.70	150	Horizontal	Pass
1224.472	42.26	--	33.3	-12.31	74.0	--	54.0	20.70	19.00	150	Horizontal	Pass
2209.349	47.20	--	38.3	-6.03	74.0	--	54.0	15.70	36.00	150	Horizontal	Pass
2425.322	50.89	--	41.3	-0.97	74.0	--	54.0	12.70	32.30	150	Horizontal	Pass
3818.898	48.77	--	38.4	-3.17	74.0	--	54.0	15.60	358.60	150	Horizontal	Pass
6559.930	56.10	--	47.3	8.13	74.0	--	54.0	6.70	44.00	150	Horizontal	Pass

7 GHz to 18 GHz, ANT V 802.11b Low Channel

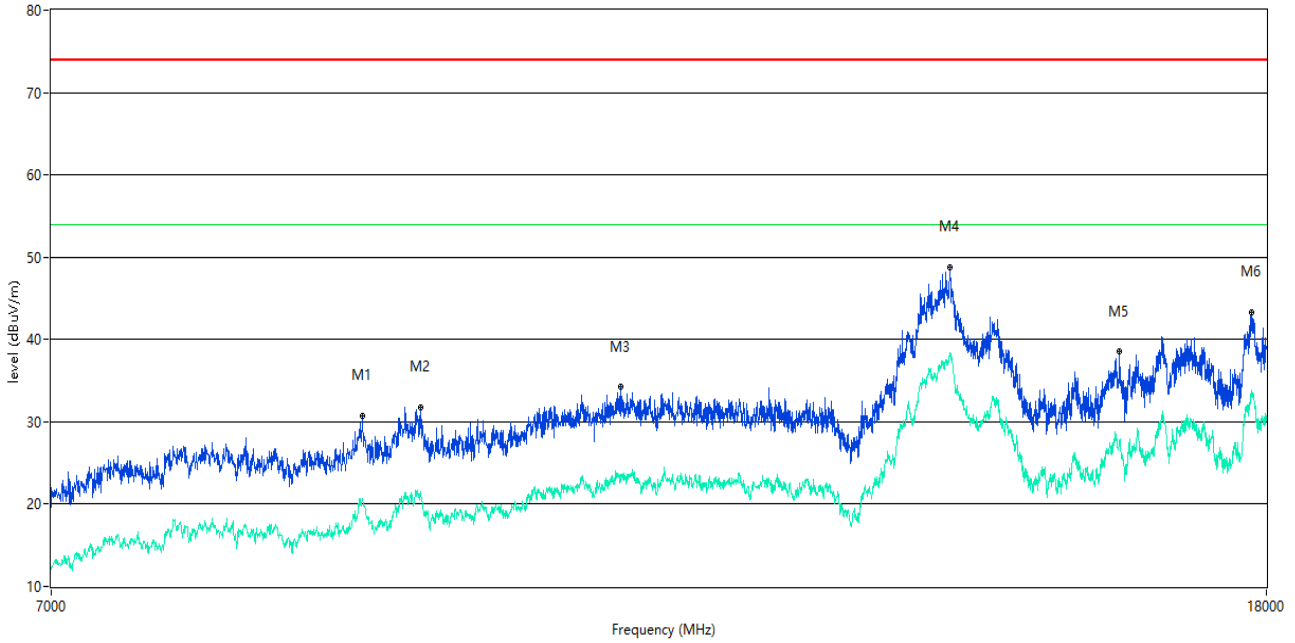
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
9323.169	31.68	--	20.8	-31.66	74.0	--	54.0	33.20	239.00	150	Vertical	Pass
10436.641	33.71	--	22.5	-27.68	74.0	--	54.0	31.50	8.00	150	Vertical	Pass
11544.614	33.81	--	23.4	-23.76	74.0	--	54.0	30.60	177.00	150	Vertical	Pass
13991.502	47.86	--	37.3	-6.87	74.0	--	54.0	16.70	66.00	150	Vertical	Pass
14544.114	43.74	--	33.6	-11.53	74.0	--	54.0	20.40	7.00	150	Vertical	Pass
16595.101	41.37	--	30.8	-10.68	74.0	--	54.0	23.20	299.00	150	Vertical	Pass

7 GHz to 18 GHz, ANT H 802.11b Low Channel

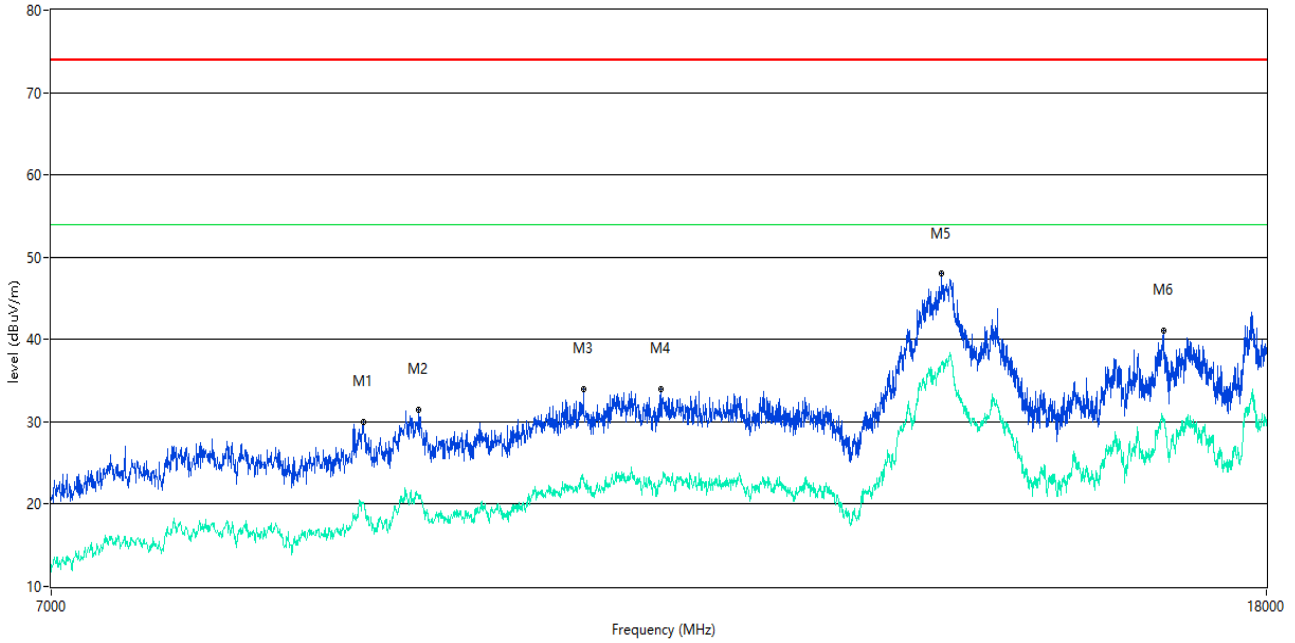
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8916.271	30.72	--	20.4	-32.29	74.0	--	54.0	33.60	65.00	150	Horizontal	Pass
9331.417	31.78	--	21.3	-31.85	74.0	--	54.0	32.70	254.00	150	Horizontal	Pass
10901.275	34.22	--	23.5	-25.38	74.0	--	54.0	30.50	23.00	150	Horizontal	Pass
14076.731	48.79	--	38.3	-6.48	74.0	--	54.0	15.70	91.00	150	Horizontal	Pass
16056.236	38.60	--	27.8	-15.39	74.0	--	54.0	26.20	102.00	150	Horizontal	Pass
17799.300	43.23	--	33.2	-7.95	74.0	--	54.0	20.80	188.00	150	Horizontal	Pass

7 GHz to 18 GHz, ANT V 802.11b Middle Channel

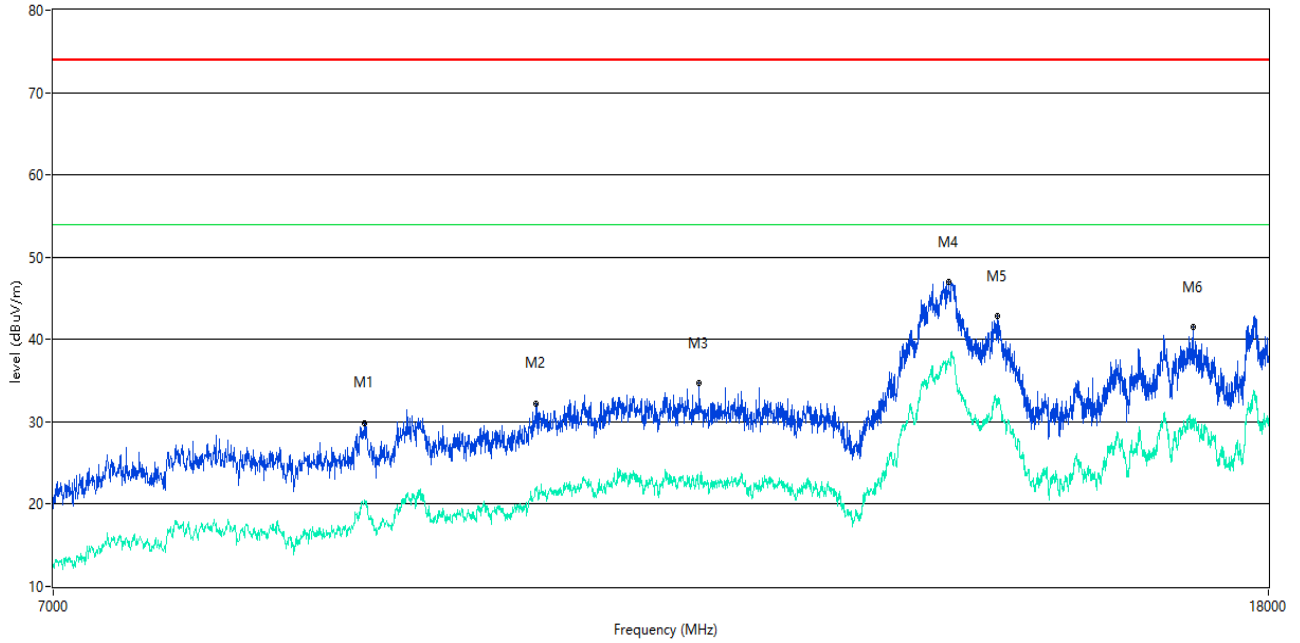
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8921.770	29.93	--	20.1	-32.33	74.0	--	54.0	33.90	287.00	150	Vertical	Pass
9314.921	31.52	--	20.6	-31.34	74.0	--	54.0	33.40	219.00	150	Vertical	Pass
10587.853	33.99	--	22.9	-26.17	74.0	--	54.0	31.10	163.00	150	Vertical	Pass
11242.189	33.91	--	22.6	-24.98	74.0	--	54.0	31.40	146.00	150	Vertical	Pass
13983.254	48.08	--	37.0	-6.99	74.0	--	54.0	17.00	337.00	150	Vertical	Pass
16614.346	41.11	--	30.1	-10.26	74.0	--	54.0	23.90	188.00	150	Vertical	Pass

7 GHz to 18 GHz, ANT H 802.11b Middle Channel

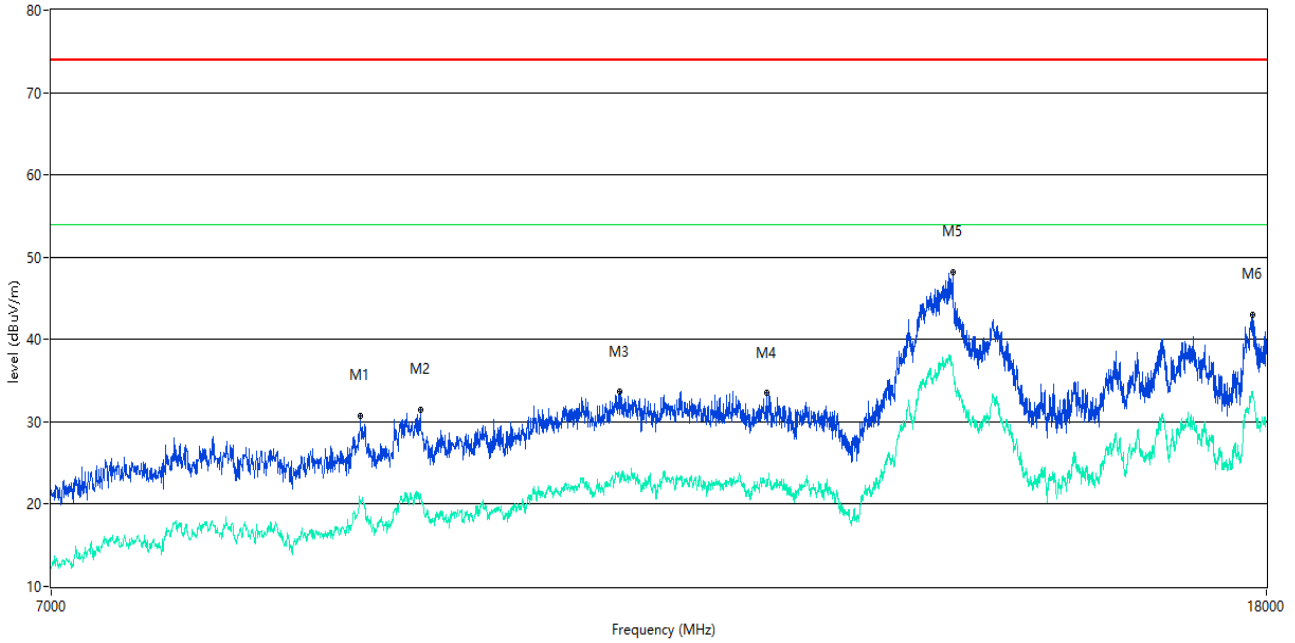
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8913.522	29.87	--	20.3	-32.36	74.0	--	54.0	33.70	243.00	150	Horizontal	Pass
10186.453	32.18	--	21.8	-28.39	74.0	--	54.0	32.20	305.00	150	Horizontal	Pass
11563.859	34.67	--	22.3	-24.05	74.0	--	54.0	31.70	1.00	150	Horizontal	Pass
14038.240	46.94	--	37.3	-6.75	74.0	--	54.0	16.70	336.00	150	Horizontal	Pass
14585.354	42.90	--	32.8	-10.86	74.0	--	54.0	21.20	190.00	150	Horizontal	Pass
16971.757	41.59	--	30.5	-10.52	74.0	--	54.0	23.50	30.00	150	Horizontal	Pass

7 GHz to 18 GHz, ANT V 802.11b High Channel

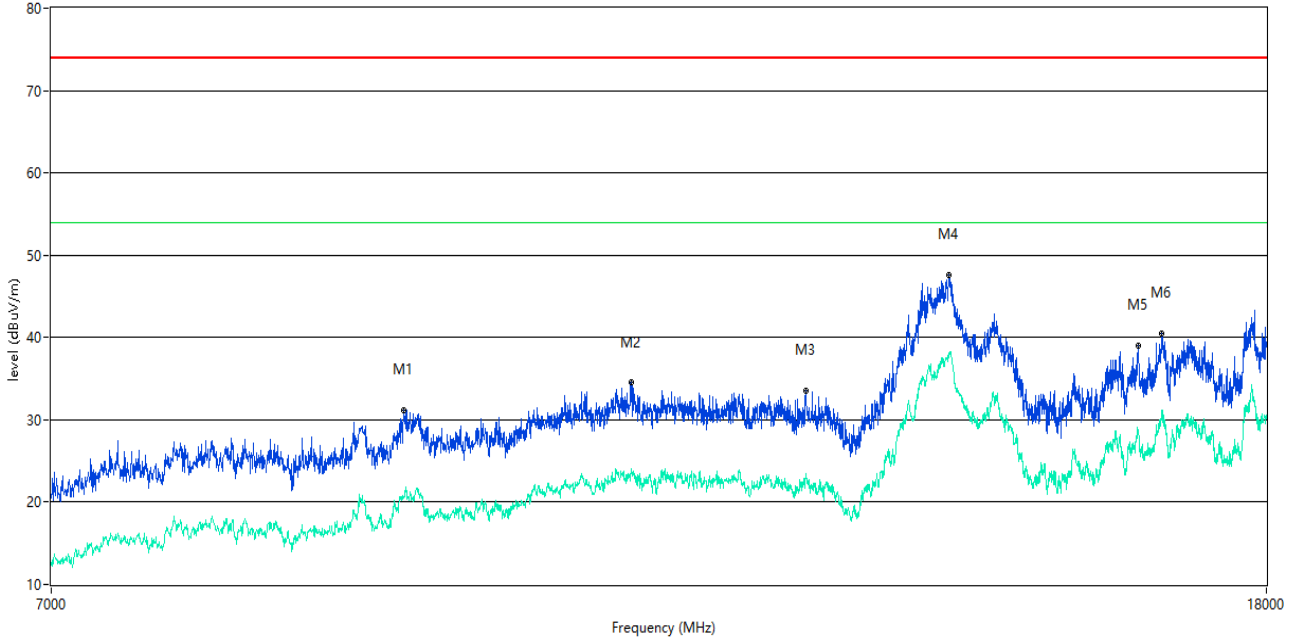
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8902.524	30.70	--	20.0	-32.46	74.0	--	54.0	34.00	157.00	150	Vertical	Pass
9328.668	31.45	--	21.2	-31.73	74.0	--	54.0	32.80	181.00	150	Vertical	Pass
10884.779	33.61	--	23.1	-25.07	74.0	--	54.0	30.90	243.00	150	Vertical	Pass
12204.449	33.58	--	22.9	-24.37	74.0	--	54.0	31.10	318.00	150	Vertical	Pass
14104.224	48.16	--	37.0	-7.08	74.0	--	54.0	17.00	211.00	150	Vertical	Pass
17810.297	42.95	--	33.4	-8.11	74.0	--	54.0	20.60	256.00	150	Vertical	Pass

7 GHz to 18 GHz, ANT H 802.11b High Channel

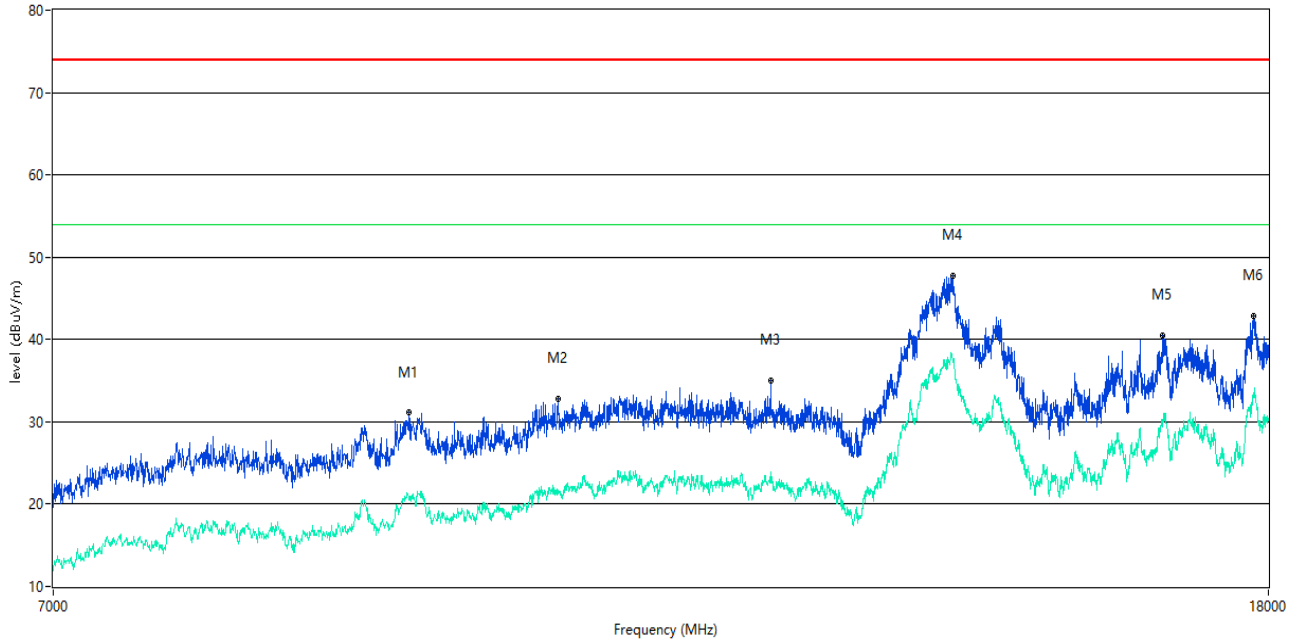
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
9207.698	31.17	--	20.7	-32.20	74.0	--	54.0	33.30	174.00	150	Horizontal	Pass
10989.253	34.51	--	24.1	-24.55	74.0	--	54.0	29.90	86.00	150	Horizontal	Pass
12581.105	33.48	--	23.4	-24.38	74.0	--	54.0	30.60	49.00	150	Horizontal	Pass
14068.483	47.54	--	37.7	-6.65	74.0	--	54.0	16.30	284.00	150	Horizontal	Pass
16292.677	39.03	--	28.8	-14.09	74.0	--	54.0	25.20	28.00	150	Horizontal	Pass
16595.101	40.45	--	30.8	-10.68	74.0	--	54.0	23.20	338.00	150	Horizontal	Pass

7 GHz to 18 GHz, ANT V 802.11g Low Channel

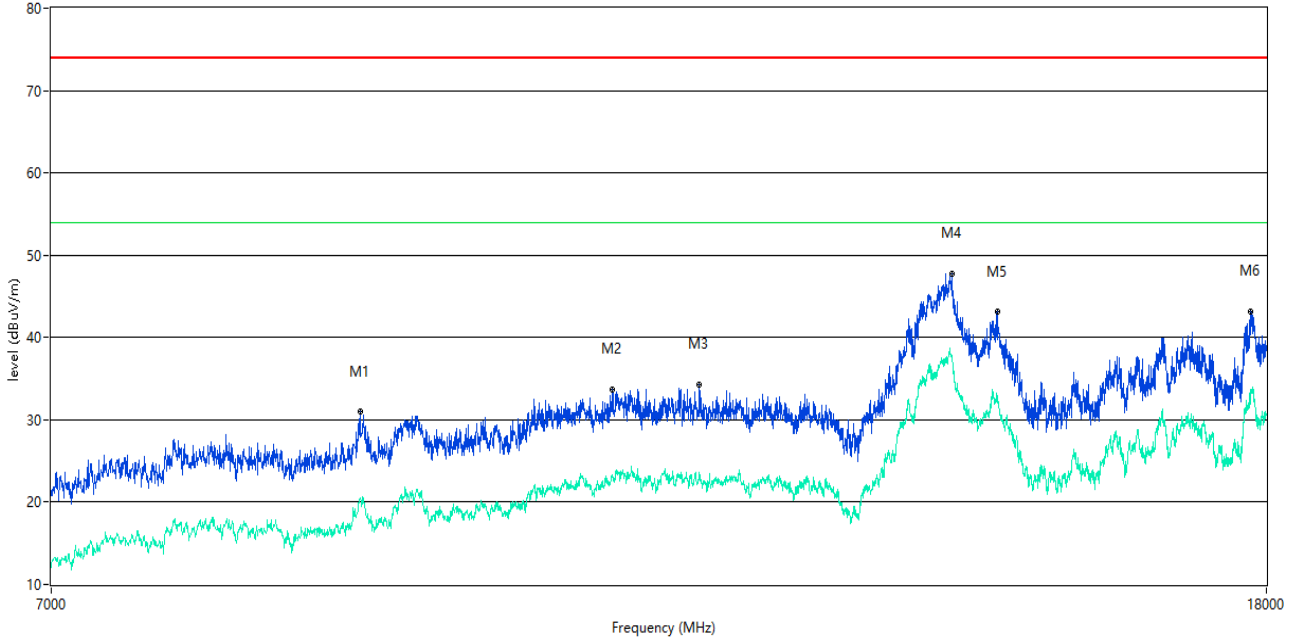
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
9229.693	31.10	--	20.5	-32.07	74.0	--	54.0	33.50	120.00	150	Vertical	Pass
10362.409	32.81	--	21.7	-28.02	74.0	--	54.0	32.30	297.00	150	Vertical	Pass
12226.443	35.03	--	23.9	-24.30	74.0	--	54.0	30.10	87.00	150	Vertical	Pass
14084.979	47.78	--	37.7	-6.61	74.0	--	54.0	16.30	144.00	150	Vertical	Pass
16581.355	40.47	--	30.3	-11.18	74.0	--	54.0	23.70	81.00	150	Vertical	Pass
17788.303	42.83	--	33.2	-8.07	74.0	--	54.0	20.80	43.00	150	Vertical	Pass

7 GHz to 18 GHz, ANT H 802.11g Low Channel

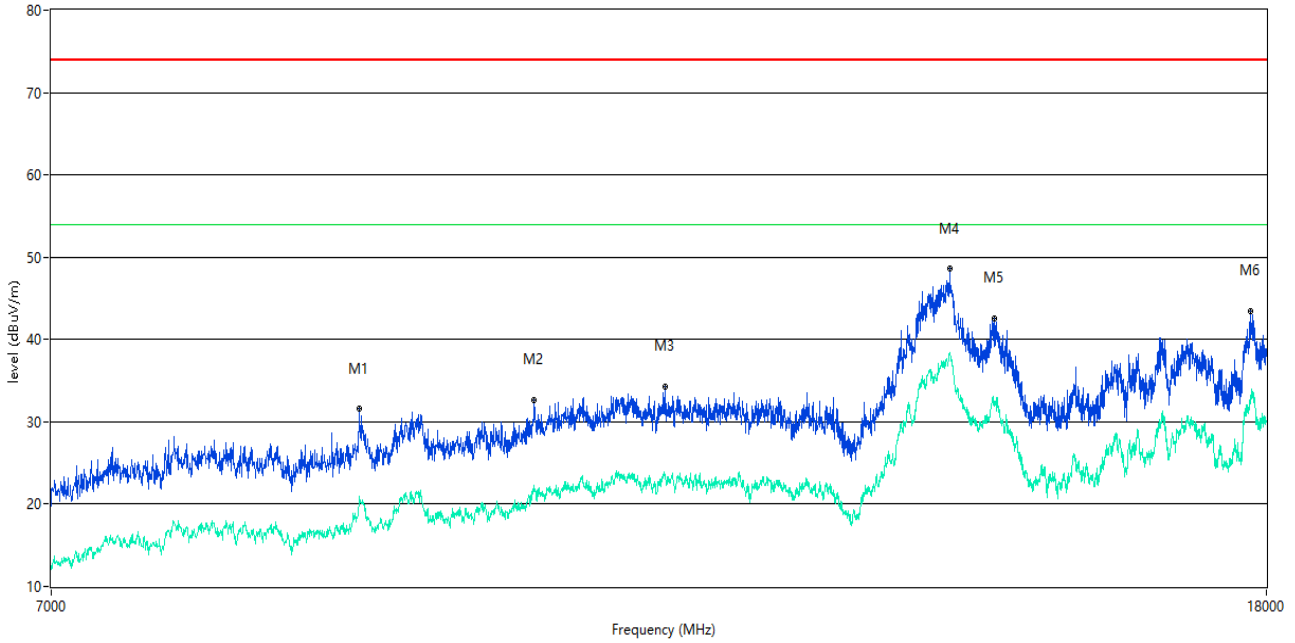
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8899.775	30.98	--	20.5	-32.30	74.0	--	54.0	33.50	154.00	150	Horizontal	Pass
10829.793	33.70	--	23.1	-25.92	74.0	--	54.0	30.90	110.00	150	Horizontal	Pass
11585.854	34.28	--	23.6	-23.73	74.0	--	54.0	30.40	15.00	150	Horizontal	Pass
14095.976	47.75	--	37.8	-6.74	74.0	--	54.0	16.20	121.00	150	Horizontal	Pass
14604.599	43.08	--	32.9	-10.92	74.0	--	54.0	21.10	230.00	150	Horizontal	Pass
17785.554	43.14	--	33.7	-8.18	74.0	--	54.0	20.30	83.00	150	Horizontal	Pass

7 GHz to 18 GHz, ANT V 802.11g Middle Channel

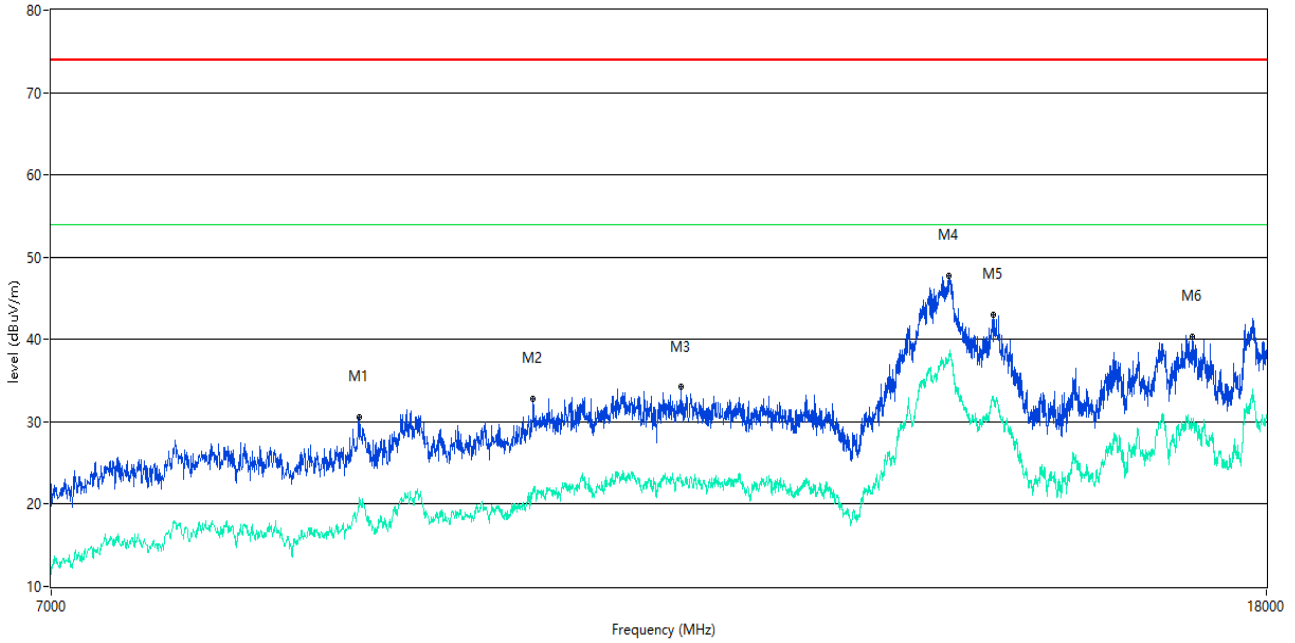
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8894.276	31.64	--	20.4	-32.19	74.0	--	54.0	33.60	298.00	150	Vertical	Pass
10189.203	32.63	--	22.2	-28.24	74.0	--	54.0	31.80	217.00	150	Vertical	Pass
11280.680	34.20	--	23.4	-24.72	74.0	--	54.0	30.60	44.00	150	Vertical	Pass
14076.731	48.61	--	38.1	-6.48	74.0	--	54.0	15.90	155.00	150	Vertical	Pass
14566.108	42.56	--	32.4	-11.10	74.0	--	54.0	21.60	34.00	150	Vertical	Pass
17780.055	43.48	--	32.7	-8.37	74.0	--	54.0	21.30	135.00	150	Vertical	Pass

7 GHz to 18 GHz, ANT H 802.11g Middle Channel

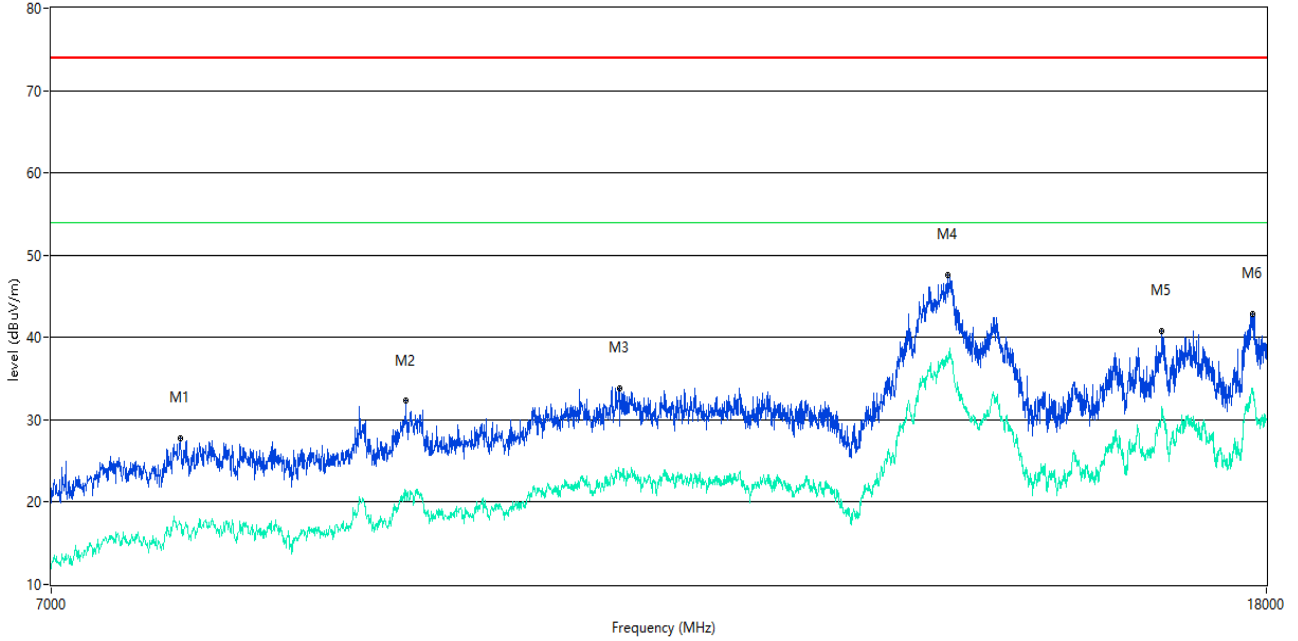
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8897.026	30.53	--	20.8	-32.04	74.0	--	54.0	33.20	133.00	150	Horizontal	Pass
10178.205	32.83	--	21.3	-28.74	74.0	--	54.0	32.70	243.00	150	Horizontal	Pass
11418.145	34.26	--	23.0	-24.09	74.0	--	54.0	31.00	32.00	150	Horizontal	Pass
14065.734	47.71	--	38.1	-6.61	74.0	--	54.0	15.90	251.00	150	Horizontal	Pass
14552.362	42.94	--	32.8	-11.24	74.0	--	54.0	21.20	53.00	150	Horizontal	Pass
16999.250	40.30	--	29.8	-10.61	74.0	--	54.0	24.20	220.00	150	Horizontal	Pass

7 GHz to 18 GHz, ANT V 802.11g High Channel

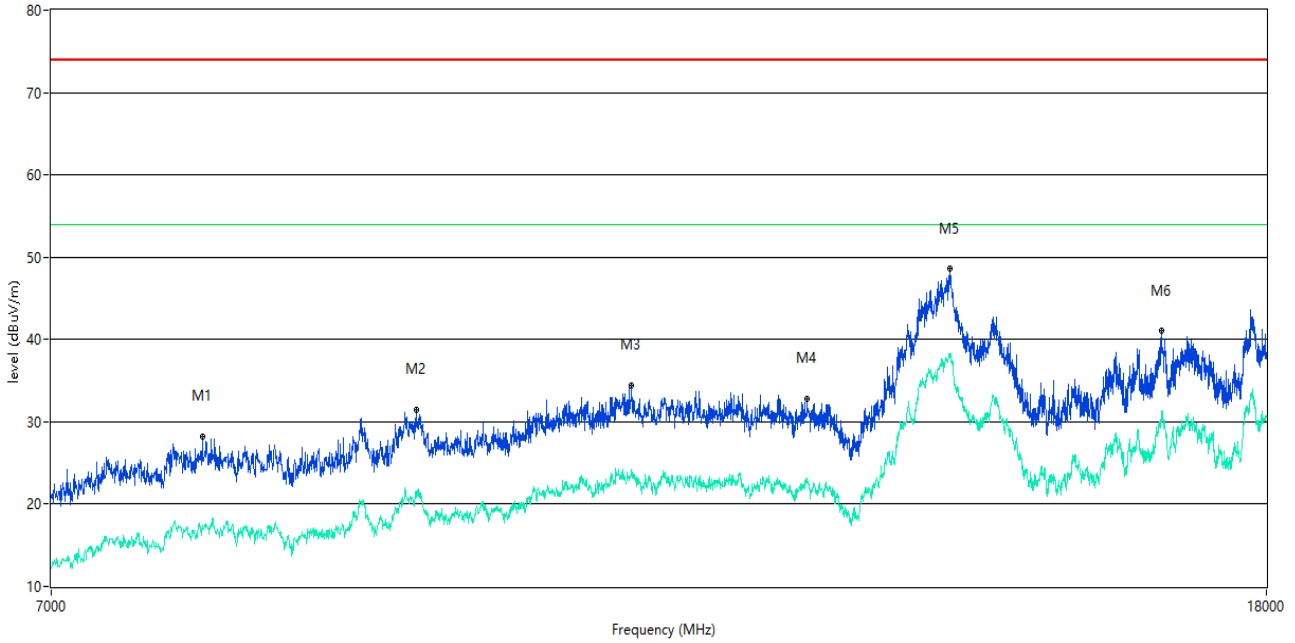
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
7739.565	27.72	--	17.3	-35.88	74.0	--	54.0	36.70	278.00	150	Vertical	Pass
9221.445	32.40	--	20.9	-32.09	74.0	--	54.0	33.10	107.00	150	Vertical	Pass
10884.779	33.77	--	23.1	-25.07	74.0	--	54.0	30.90	359.00	150	Vertical	Pass
14049.238	47.66	--	37.5	-6.62	74.0	--	54.0	16.50	206.00	150	Vertical	Pass
16592.352	40.83	--	30.9	-10.81	74.0	--	54.0	23.10	312.00	150	Vertical	Pass
17807.548	42.84	--	33.4	-8.07	74.0	--	54.0	20.60	25.00	150	Vertical	Pass

7 GHz to 18 GHz, ANT H 802.11g High Channel

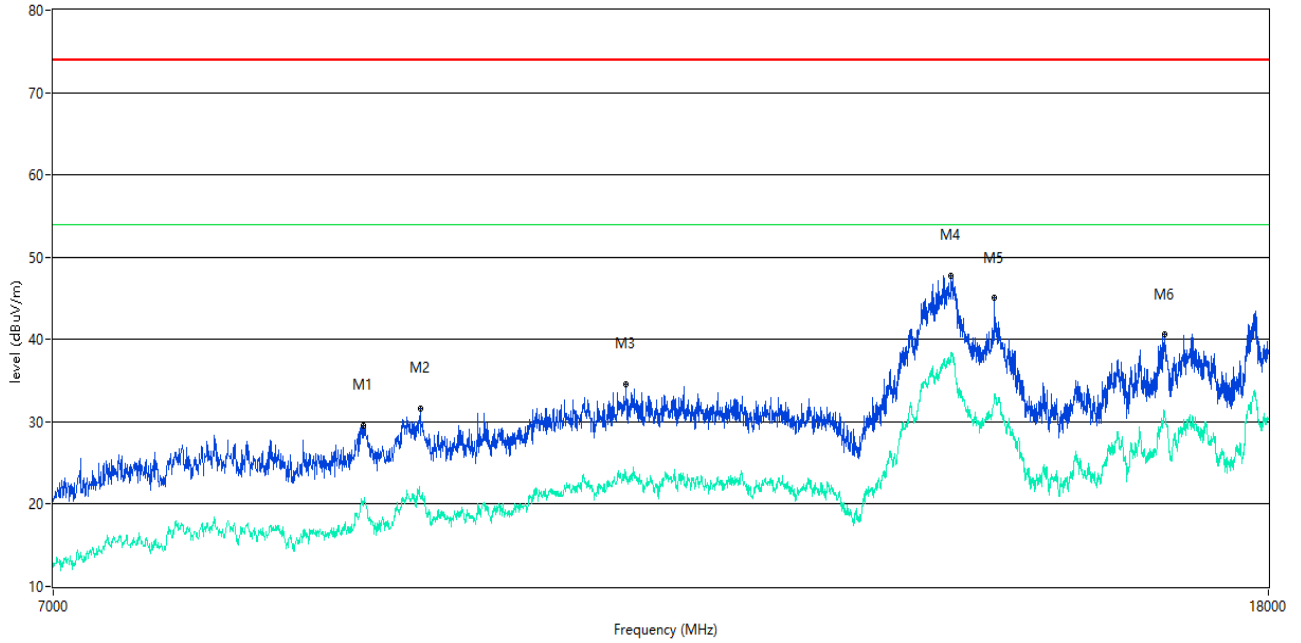
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
7871.532	28.20	--	17.4	-36.88	74.0	--	54.0	36.60	5.00	150	Horizontal	Pass
9295.676	31.51	--	21.5	-30.88	74.0	--	54.0	32.50	2.00	150	Horizontal	Pass
10986.503	34.48	--	23.9	-24.74	74.0	--	54.0	30.10	105.00	150	Horizontal	Pass
12597.601	32.83	--	23.1	-24.31	74.0	--	54.0	30.90	34.00	150	Horizontal	Pass
14076.731	48.62	--	38.3	-6.48	74.0	--	54.0	15.70	141.00	150	Horizontal	Pass
16586.853	41.06	--	30.0	-10.77	74.0	--	54.0	24.00	223.00	150	Horizontal	Pass

7 GHz to 18 GHz, ANT V 802.11n20 Low Channel

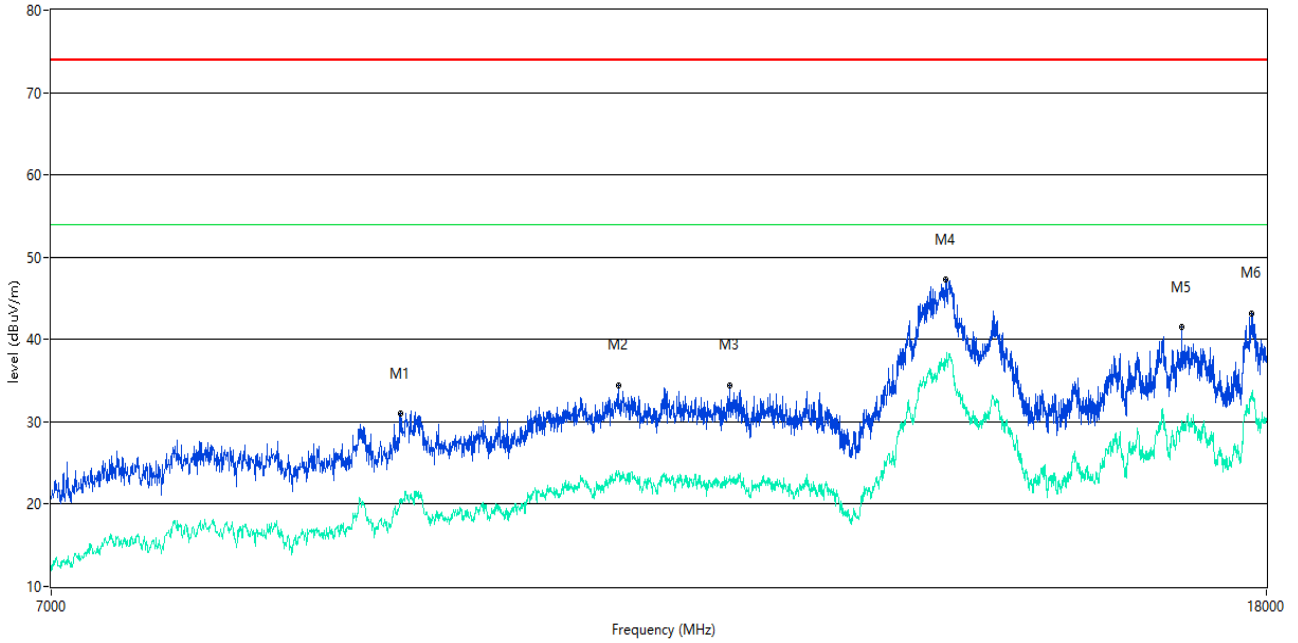
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8905.274	29.48	--	20.4	-32.43	74.0	--	54.0	33.60	75.00	150	Vertical	Pass
9309.423	31.55	--	20.8	-30.97	74.0	--	54.0	33.20	37.00	150	Vertical	Pass
10928.768	34.55	--	23.6	-25.59	74.0	--	54.0	30.40	236.00	150	Vertical	Pass
14062.984	47.77	--	38.4	-6.42	74.0	--	54.0	15.60	142.00	150	Vertical	Pass
14546.863	45.02	--	33.4	-11.40	74.0	--	54.0	20.60	103.00	150	Vertical	Pass
16603.349	40.56	--	31.3	-10.25	74.0	--	54.0	22.70	139.00	150	Vertical	Pass

7 GHz to 18 GHz, ANT H 802.11n20 Low Channel

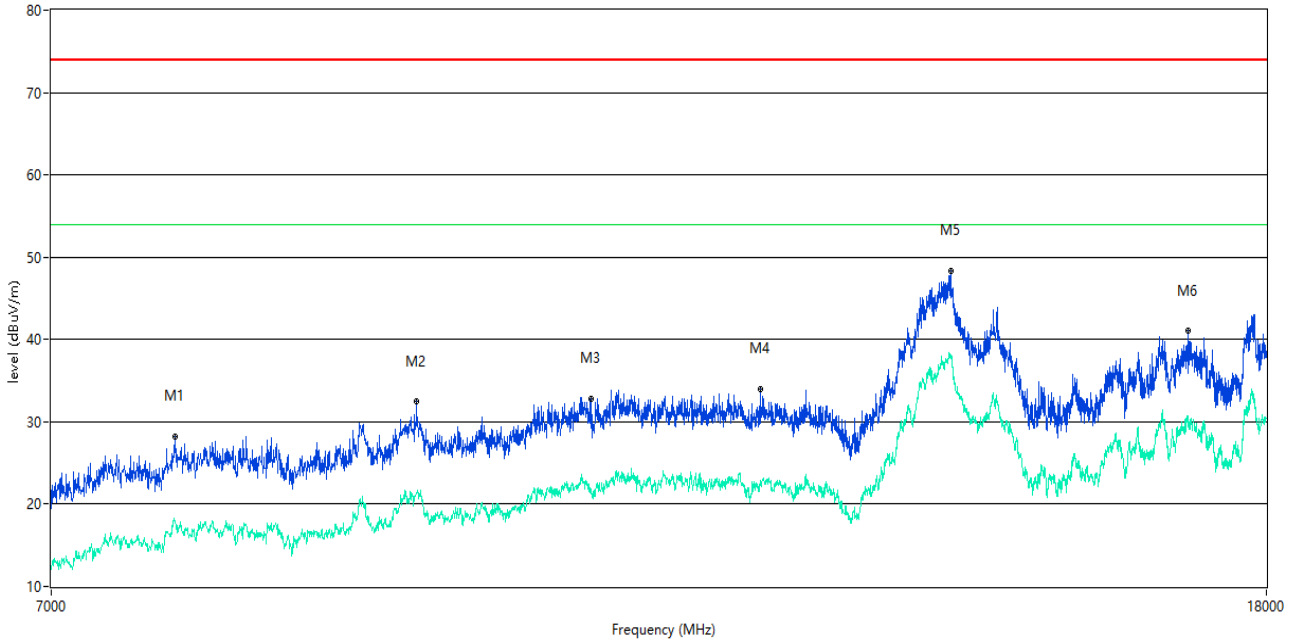
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
9185.704	31.08	--	20.2	-32.58	74.0	--	54.0	33.80	193.00	150	Horizontal	Pass
10879.280	34.40	--	24.0	-25.20	74.0	--	54.0	30.00	353.00	150	Horizontal	Pass
11858.035	34.40	--	22.9	-24.51	74.0	--	54.0	31.10	1.00	150	Horizontal	Pass
14027.243	47.31	--	37.3	-6.83	74.0	--	54.0	16.70	40.00	150	Horizontal	Pass
16850.787	41.47	--	29.1	-12.01	74.0	--	54.0	24.90	300.00	150	Horizontal	Pass
17799.300	43.14	--	33.5	-7.95	74.0	--	54.0	20.50	28.00	150	Horizontal	Pass

7 GHz to 18 GHz, ANT V 802.11n20 Middle Channel

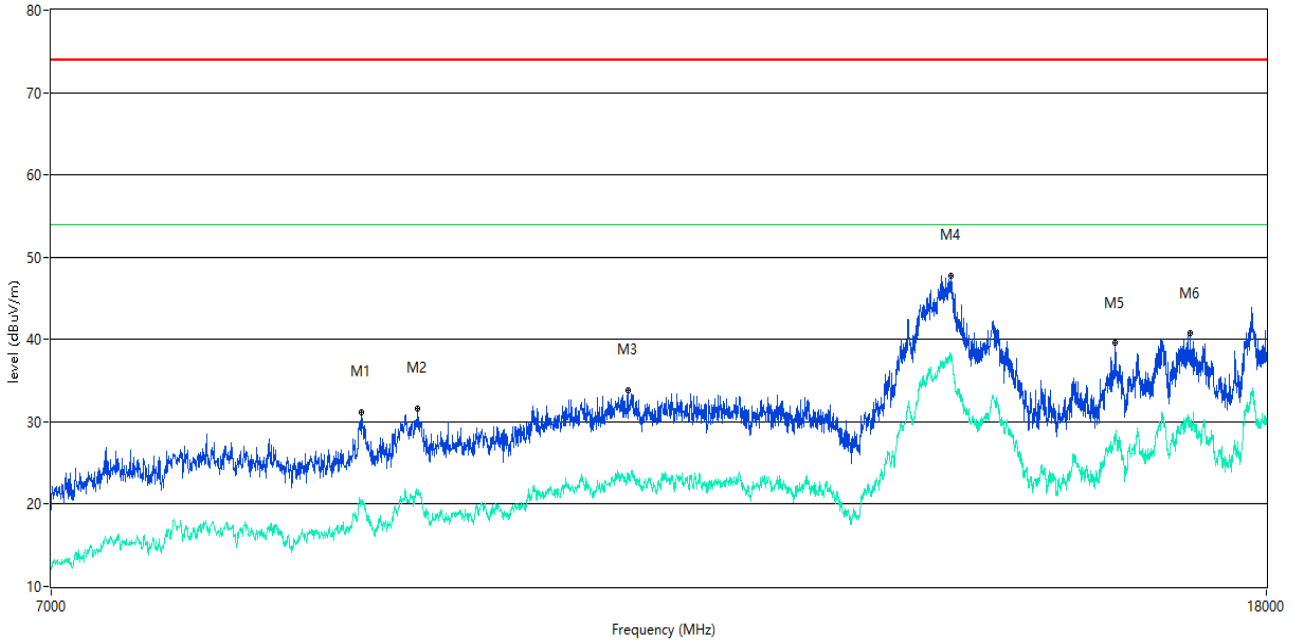
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
7706.573	28.23	--	17.8	-35.88	74.0	--	54.0	36.20	4.00	150	Vertical	Pass
9298.425	32.44	--	21.3	-31.18	74.0	--	54.0	32.70	299.00	150	Vertical	Pass
10651.087	32.78	--	21.7	-26.42	74.0	--	54.0	32.30	13.00	150	Vertical	Pass
12143.964	33.96	--	22.3	-24.81	74.0	--	54.0	31.70	25.00	150	Vertical	Pass
14087.728	48.33	--	37.9	-6.71	74.0	--	54.0	16.10	143.00	150	Vertical	Pass
16930.517	41.06	--	30.2	-10.87	74.0	--	54.0	23.80	288.00	150	Vertical	Pass

7 GHz to 18 GHz, ANT H 802.11n20 Middle Channel

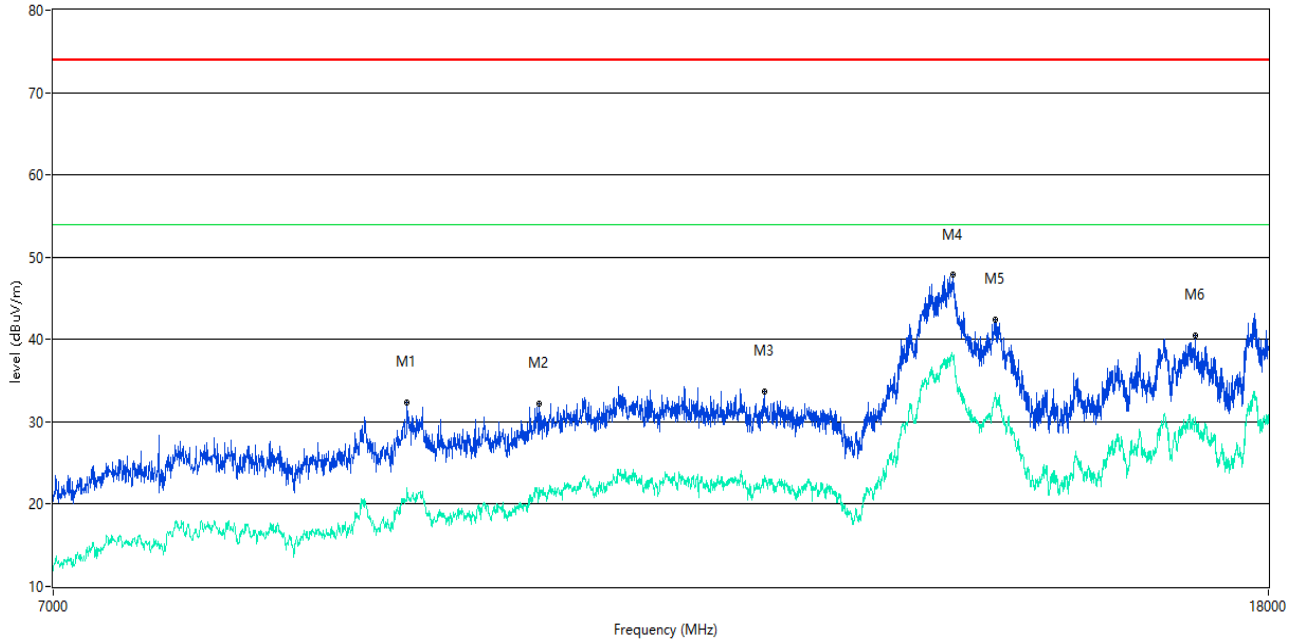
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8905.274	31.20	--	20.3	-32.43	74.0	--	54.0	33.70	51.00	150	Horizontal	Pass
9306.673	31.60	--	21.4	-31.10	74.0	--	54.0	32.60	137.00	150	Horizontal	Pass
10956.261	33.86	--	23.8	-24.62	74.0	--	54.0	30.20	263.00	150	Horizontal	Pass
14082.229	47.69	--	38.2	-6.62	74.0	--	54.0	15.80	87.00	150	Horizontal	Pass
16006.748	39.55	--	28.5	-14.18	74.0	--	54.0	25.50	73.00	150	Horizontal	Pass
16966.258	40.71	--	30.2	-10.56	74.0	--	54.0	23.80	274.00	150	Horizontal	Pass

7 GHz to 18 GHz, ANT V 802.11n20 High Channel

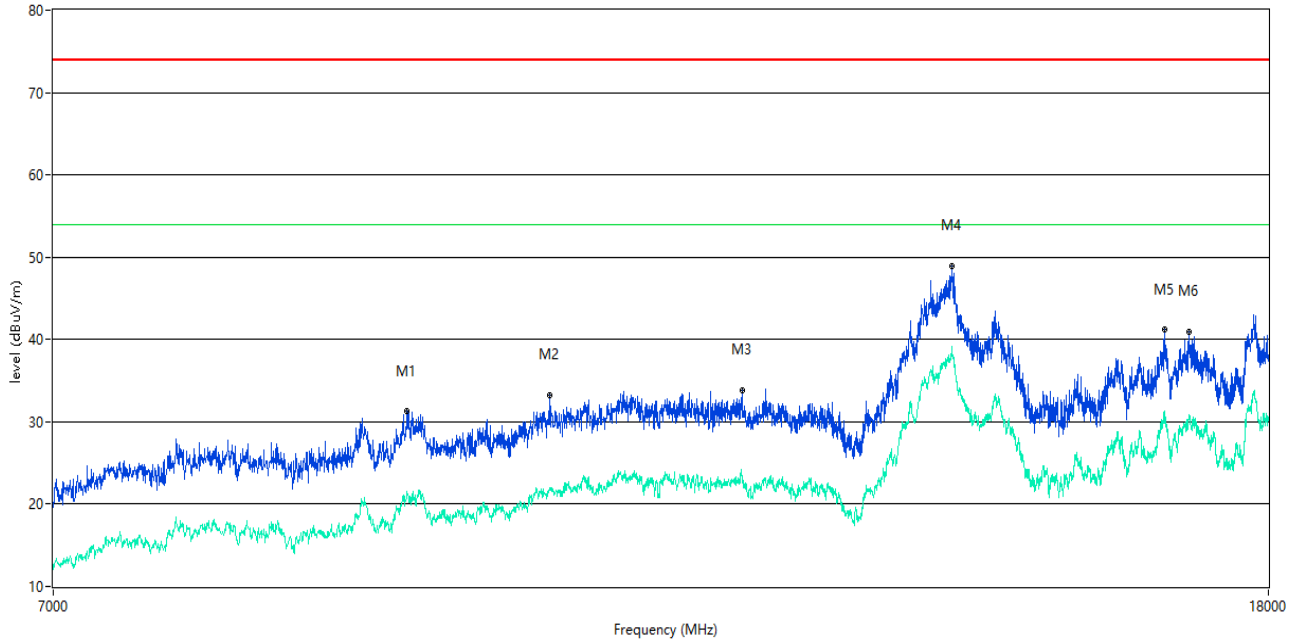
REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
9215.946	32.39	--	21.9	-31.70	74.0	--	54.0	32.10	190.00	150	Vertical	Pass
10213.947	32.22	--	22.0	-27.90	74.0	--	54.0	32.00	179.00	150	Vertical	Pass
12163.209	33.74	--	23.2	-24.60	74.0	--	54.0	30.80	234.00	150	Vertical	Pass
14087.728	47.91	--	37.5	-6.71	74.0	--	54.0	16.50	85.00	150	Vertical	Pass
14552.362	42.45	--	33.1	-11.24	74.0	--	54.0	20.90	225.00	150	Vertical	Pass
17010.247	40.46	--	30.5	-10.60	74.0	--	54.0	23.50	249.00	150	Vertical	Pass

7 GHz to 18 GHz, ANT H 802.11n20 High Channel

REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
9215.946	31.28	--	21.6	-31.70	74.0	--	54.0	32.40	297.00	150	Horizontal	Pass
10299.175	33.23	--	22.0	-27.53	74.0	--	54.0	32.00	250.00	150	Horizontal	Pass
11954.261	33.76	--	23.4	-24.28	74.0	--	54.0	30.60	291.00	150	Horizontal	Pass
14073.982	48.94	--	39.1	-6.53	74.0	--	54.0	14.90	219.00	150	Horizontal	Pass
16600.600	41.18	--	31.3	-10.26	74.0	--	54.0	22.70	25.00	150	Horizontal	Pass
16919.520	40.95	--	30.4	-11.39	74.0	--	54.0	23.60	188.00	150	Horizontal	Pass

A.7 Band Edge (Restricted-band band-edge)

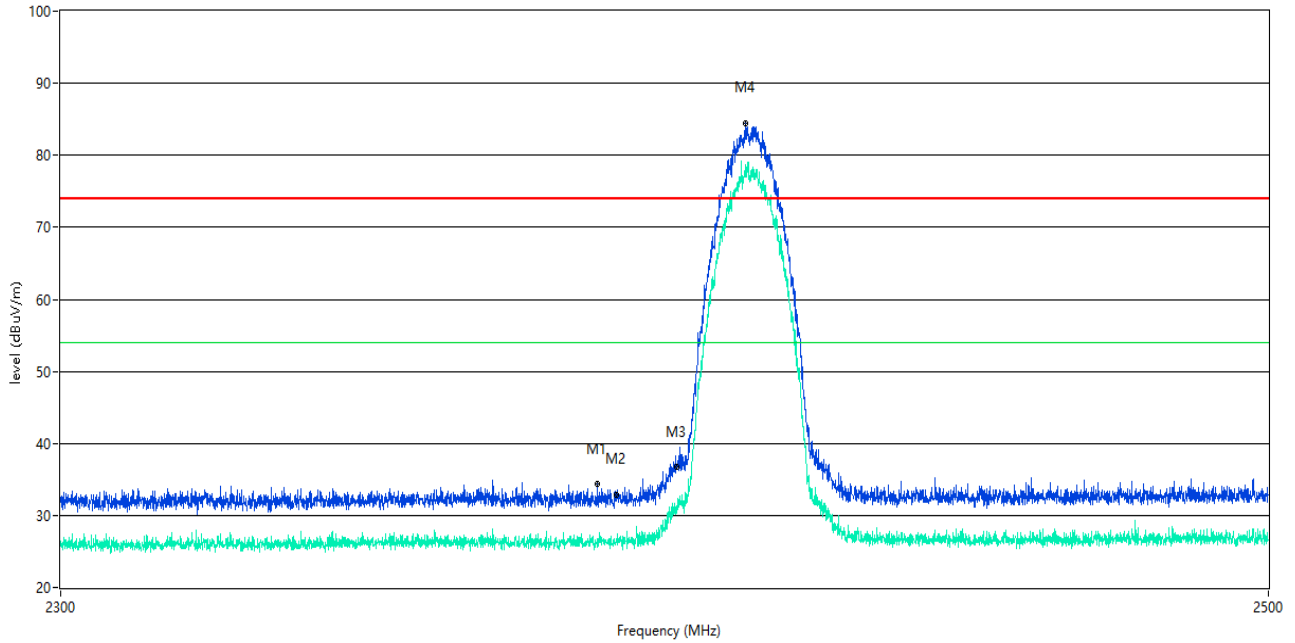
Test Data

Note 1: The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.

Note 2: The test data all are tested in the vertical and horizontal antenna which the trace is max hold. So these plots have shown the worst case.

ANT V 802.11b Low Channel

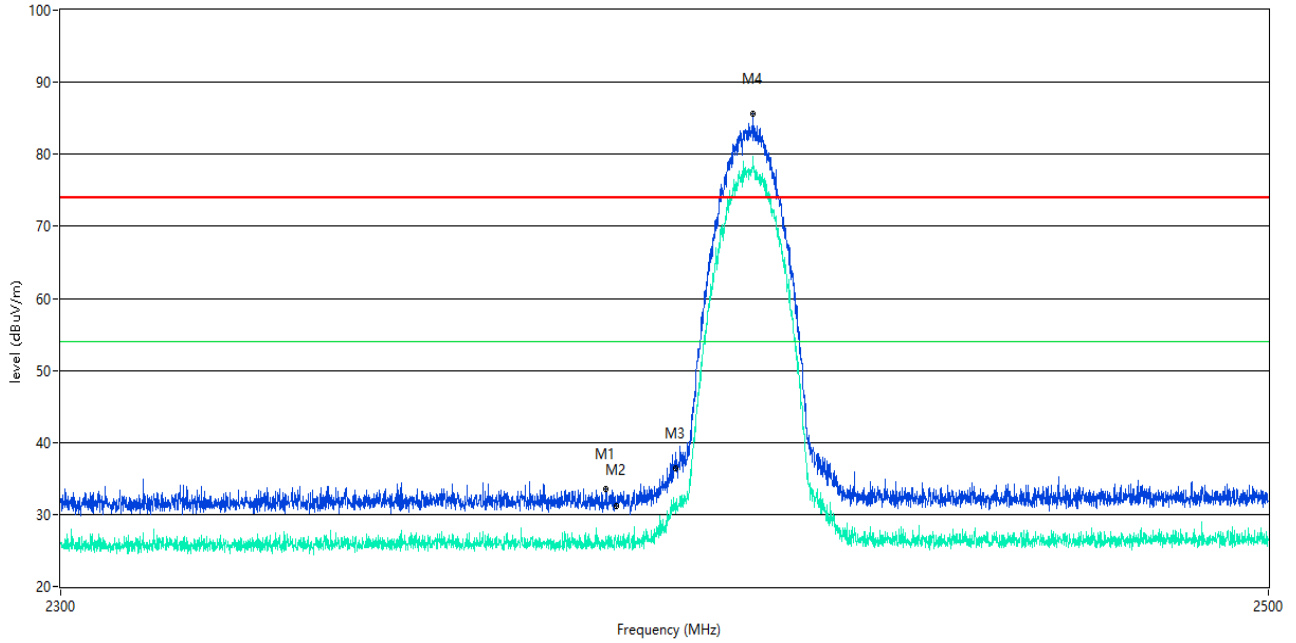
REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_bandedge 2400



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2386.878	34.35	--	26.8	2.08	74.0	--	54.0	27.20	109.90	150	Vertical	Pass
2390.000	32.91	--	26.4	2.02	74.0	--	54.0	27.60	211.16	150	Vertical	Pass
2400.000	36.90	--	31.3	1.85	74.0	--	54.0	22.70	57.45	150	Vertical	Pass
2411.422	84.48	--	77.9	2.05	74.0	--	54.0	-23.90	59.50	150	Vertical	N.A

ANT H 802.11b Low Channel

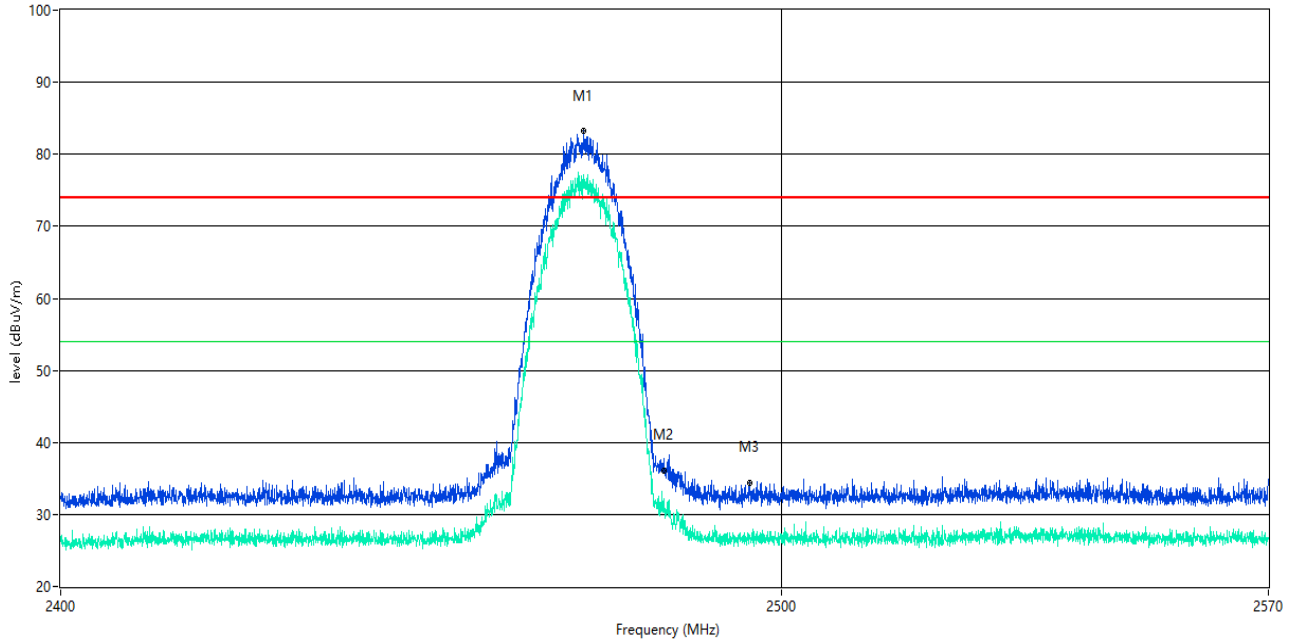
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_bandedge 2400



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2388.278	33.45	--	26.7	2.06	74.0	--	54.0	27.30	2.00	150	Horizontal	Pass
2390.000	31.24	--	25.6	2.02	74.0	--	54.0	28.40	84.55	150	Horizontal	Pass
2400.000	36.35	--	30.6	1.85	74.0	--	54.0	23.40	59.90	150	Horizontal	Pass
2412.572	85.57	--	79.7	2.06	74.0	--	54.0	-25.70	3.70	150	Horizontal	N.A

ANT V 802.11b High Channel

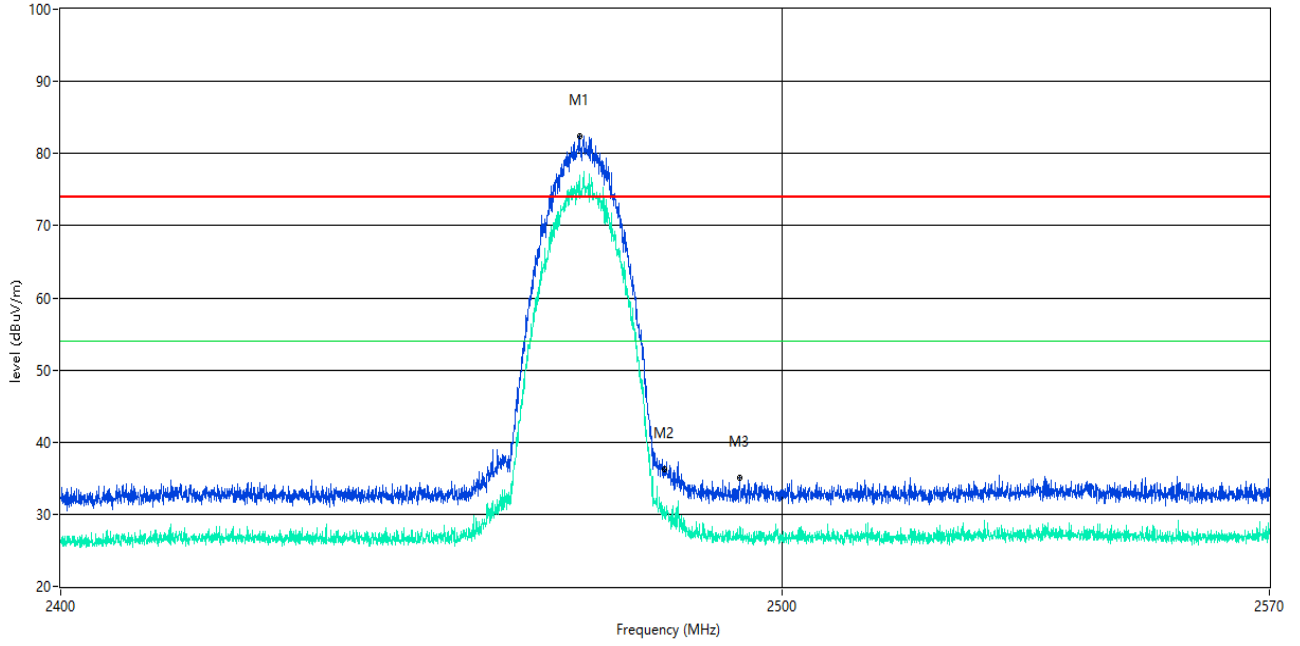
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_bandedge 2480



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2472.147	83.21	--	77.1	2.49	74.0	--	54.0	-23.10	76.90	150	Vertical	N.A
2483.500	36.09	--	31.5	2.71	74.0	--	54.0	22.50	99.53	150	Vertical	Pass
2495.601	34.34	--	26.9	2.73	74.0	--	54.0	27.10	103.60	150	Vertical	Pass

ANT H 802.11b High Channel

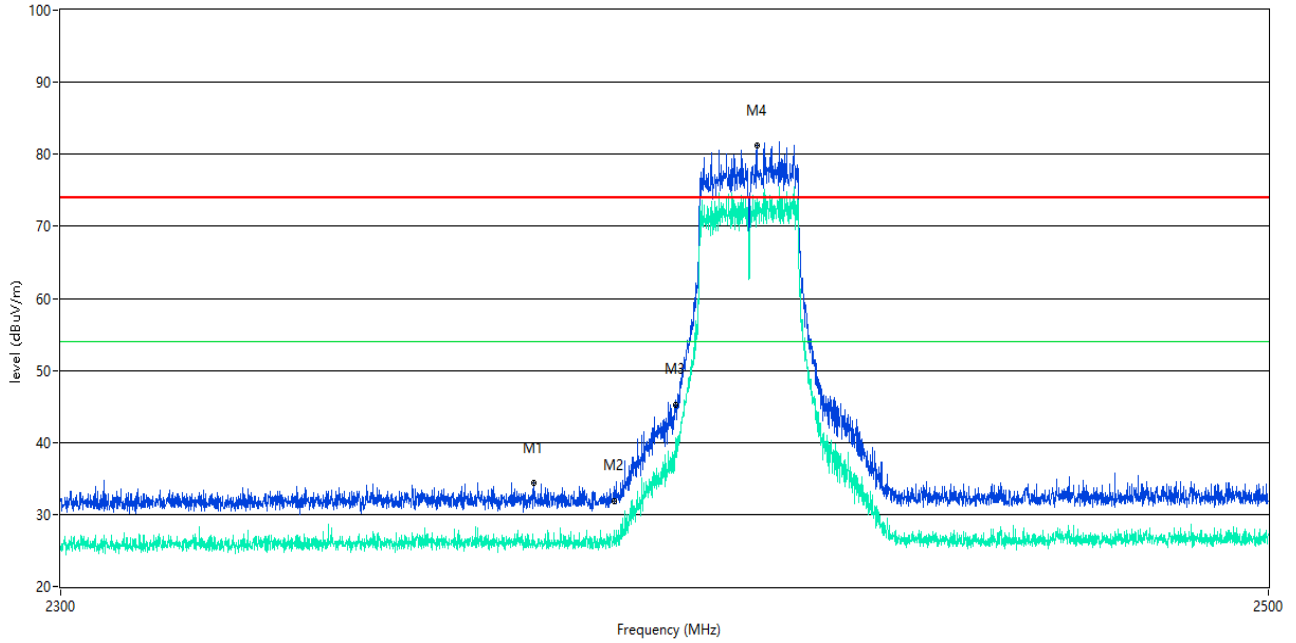
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_bandedge 2480



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2471.595	82.42	--	77.0	2.48	74.0	--	54.0	-23.00	106.30	150	Horizontal	N.A
2483.500	36.15	--	30.3	2.71	74.0	--	54.0	23.70	357.31	150	Horizontal	Pass
2494.071	35.02	--	28.4	2.72	74.0	--	54.0	25.60	231.30	150	Horizontal	Pass

ANT V 802.11g Low Channel

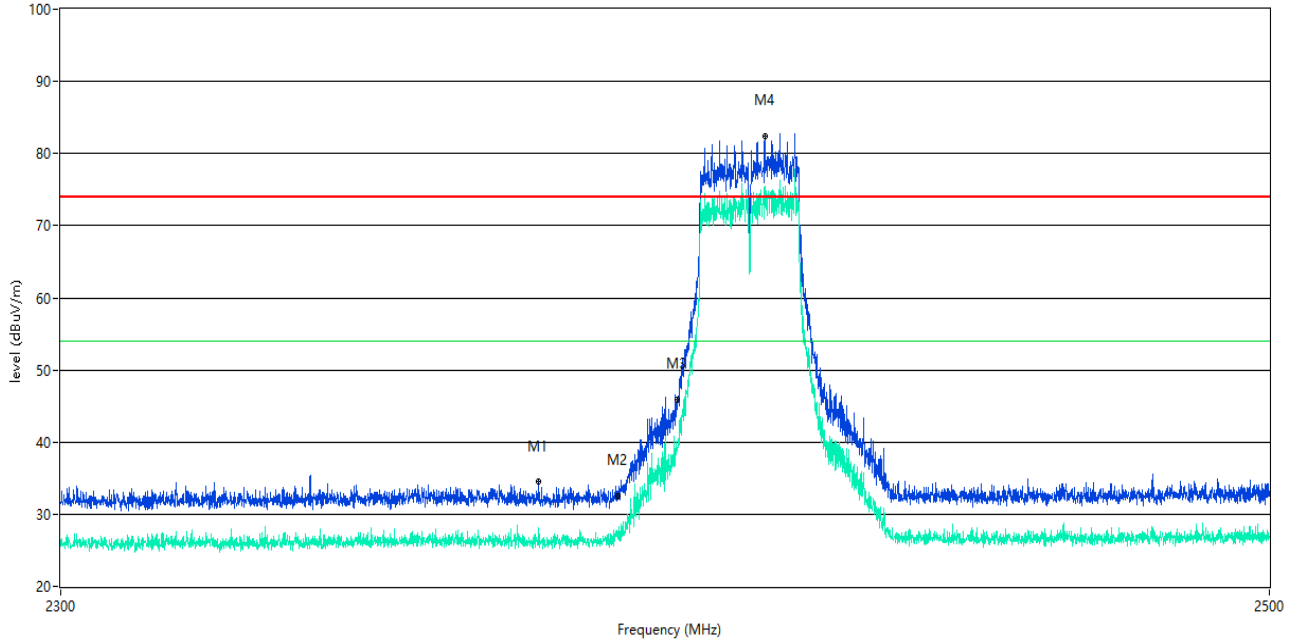
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_bandedge 2400



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2376.431	34.37	--	26.4	2.07	74.0	--	54.0	27.60	114.50	150	Vertical	Pass
2390.000	31.87	--	26.8	2.02	74.0	--	54.0	27.20	32.99	150	Vertical	Pass
2400.000	45.21	--	39.4	1.85	74.0	--	54.0	14.60	8.85	150	Vertical	Pass
2413.222	81.15	--	73.7	2.06	74.0	--	54.0	-19.70	64.10	150	Vertical	N.A

ANT H 802.11g Low Channel

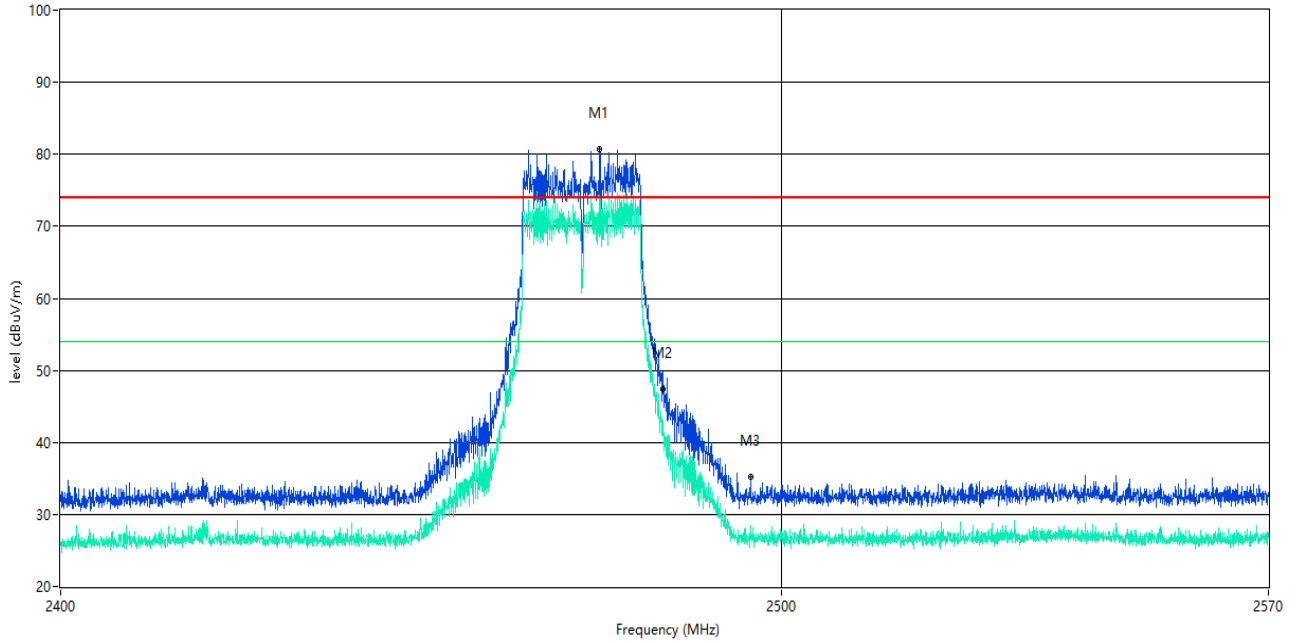
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_bandedge 2400



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2377.131	34.50	--	28.1	2.06	74.0	--	54.0	25.90	116.60	150	Horizontal	Pass
2390.000	32.75	--	27.4	2.02	74.0	--	54.0	26.60	46.62	150	Horizontal	Pass
2400.000	46.11	--	39.2	1.85	74.0	--	54.0	14.80	36.30	150	Horizontal	Pass
2414.471	82.37	--	75.5	2.08	74.0	--	54.0	-21.50	54.10	150	Horizontal	N.A

ANT V 802.11g High Channel

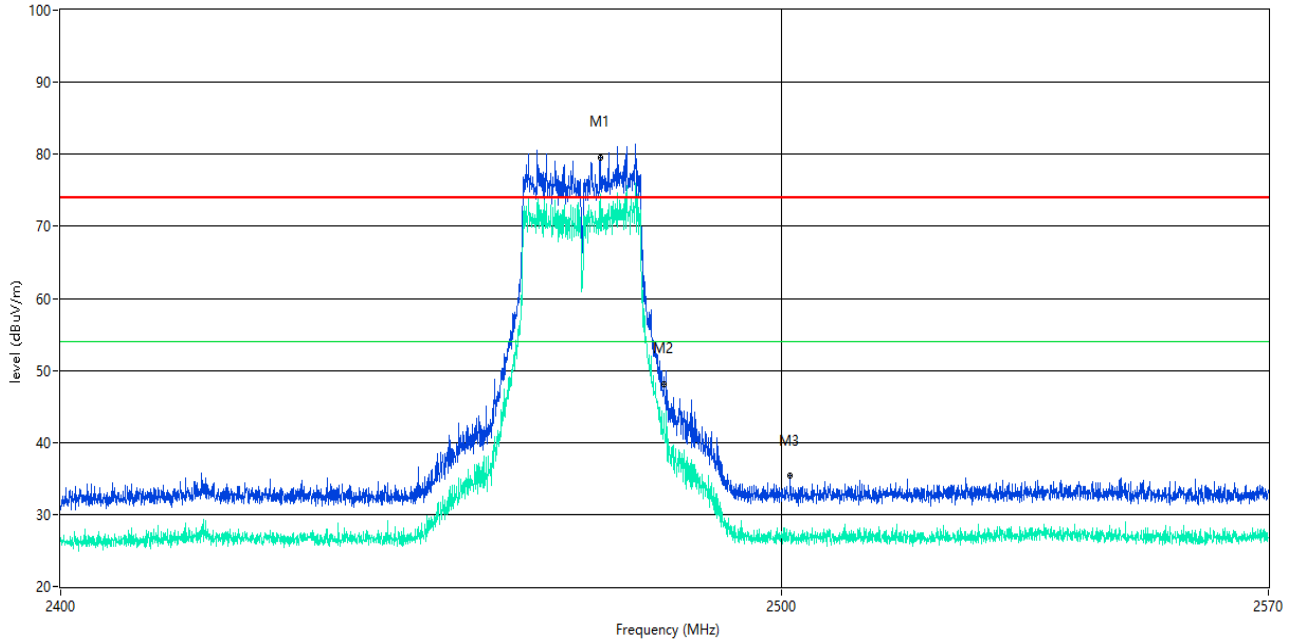
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_bandedge 2480



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2474.441	80.80	--	74.3	2.56	74.0	--	54.0	-20.30	67.30	150	Vertical	N.A
2483.500	47.45	--	41.0	2.71	74.0	--	54.0	13.00	99.03	150	Vertical	Pass
2495.644	35.19	--	28.4	2.73	74.0	--	54.0	25.60	0.00	150	Vertical	Pass

ANT H 802.11g High Channel

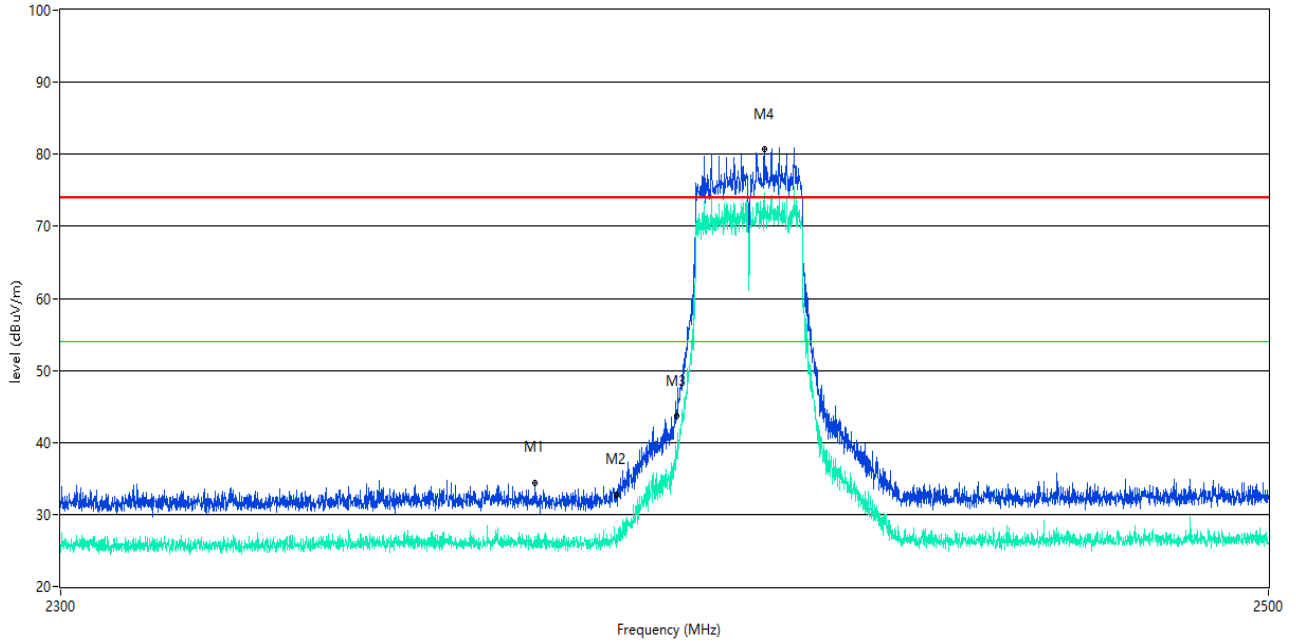
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_bandedge 2480



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2474.484	79.56	--	74.5	2.56	74.0	--	54.0	-20.50	75.10	150	Horizontal	N.A
2483.500	48.62	--	43.5	2.71	74.0	--	54.0	10.50	58.38	150	Horizontal	Pass
2501.295	35.32	--	27.4	2.72	74.0	--	54.0	26.60	110.70	150	Horizontal	Pass

ANT V 802.11n20 Low Channel

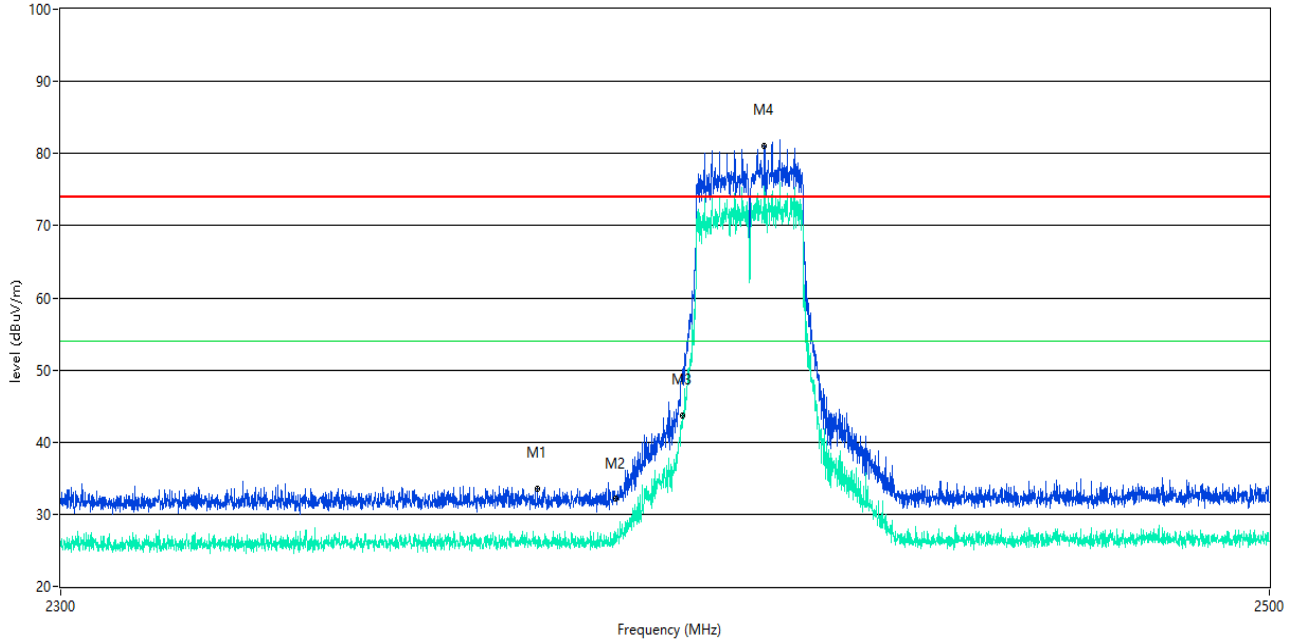
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_bandedge 2400



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2376.631	34.41	--	25.8	2.07	74.0	--	54.0	28.20	101.30	150	Vertical	Pass
2390.000	32.76	--	26.6	2.02	74.0	--	54.0	27.40	81.95	150	Vertical	Pass
2400.000	43.77	--	38.3	1.85	74.0	--	54.0	15.70	68.80	150	Vertical	Pass
2414.471	80.70	--	74.6	2.08	74.0	--	54.0	-20.60	53.80	150	Vertical	N.A

ANT H 802.11n20 Low Channel

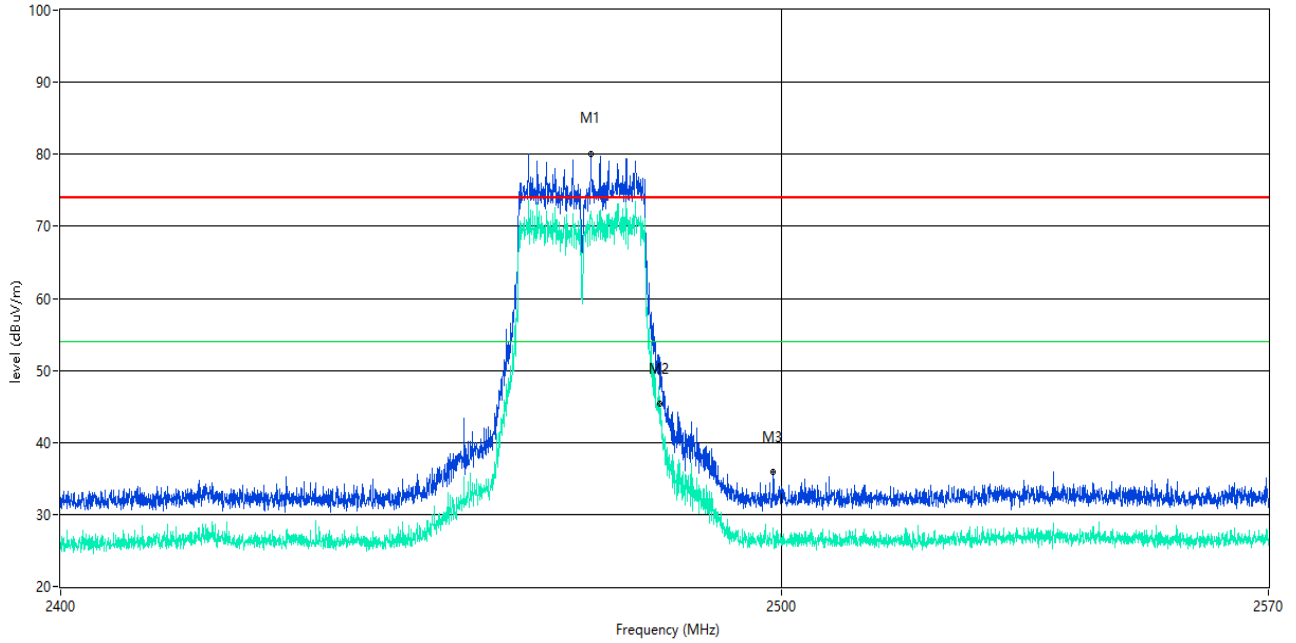
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_bandedge 2400



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2376.881	33.55	--	25.9	2.06	74.0	--	54.0	28.10	34.40	150	Horizontal	Pass
2390.000	31.95	--	26.3	2.02	74.0	--	54.0	27.70	135.79	150	Horizontal	Pass
2400.000	43.73	--	38.3	1.85	74.0	--	54.0	15.70	55.05	150	Horizontal	Pass
2414.421	81.04	--	75.5	2.08	74.0	--	54.0	-21.50	61.10	150	Horizontal	N.A

ANT V 802.11n20 High Channel

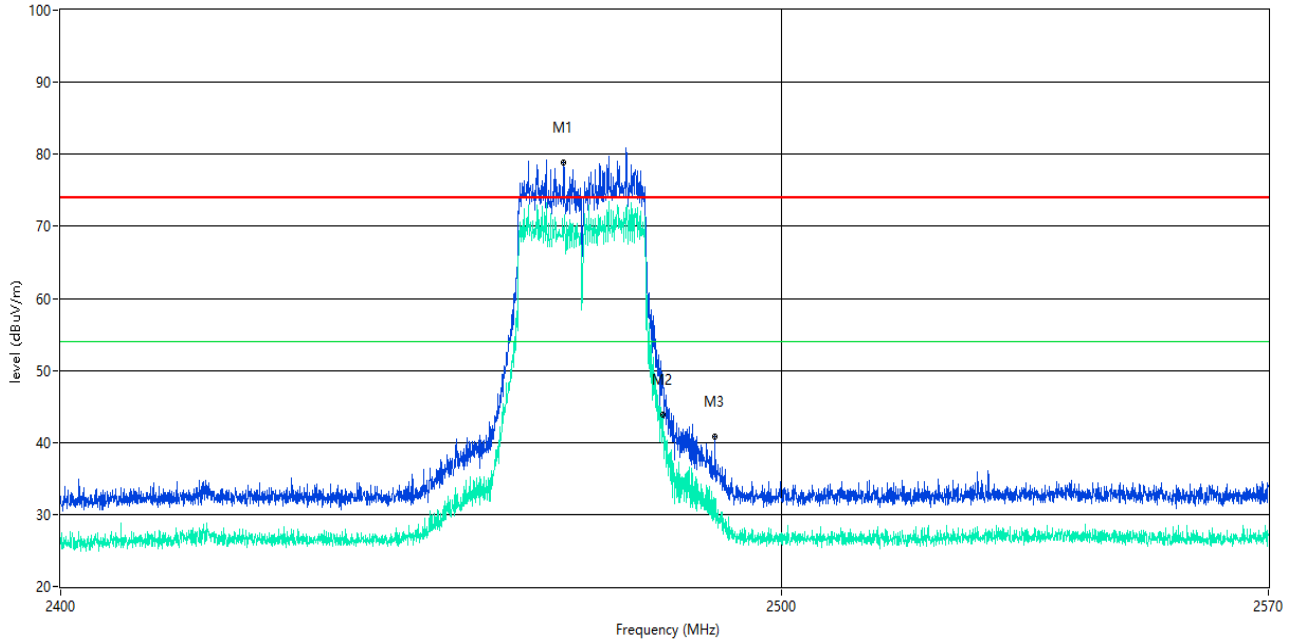
R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_bandedge 2480



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2473.209	80.06	--	71.2	2.52	74.0	--	54.0	-17.20	67.00	150	Vertical	N.A
2483.500	45.65	--	39.7	2.71	74.0	--	54.0	14.30	96.55	150	Vertical	Pass
2498.915	35.89	--	27.8	2.73	74.0	--	54.0	26.20	78.60	150	Vertical	Pass

ANT H 802.11n20 High Channel

R Emission Test case_FCC_Part 15C_FCC 15.247(2.4G)_bandedge 2480



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2469.428	78.82	--	69.3	2.44	74.0	--	54.0	-15.30	65.90	150	Horizontal	N.A
2483.500	43.79	--	38.1	2.71	74.0	--	54.0	15.90	43.85	150	Horizontal	Pass
2490.630	40.78	--	32.1	2.71	74.0	--	54.0	21.90	102.00	150	Horizontal	Pass

A.8 Power Spectral Density (PSD)

Test Data

802.11b Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-21.58	8
Middle	-19.35	8
High	-21.08	8

802.11g Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-22.51	8
Middle	-21.45	8
High	-23.83	8

802.11n-20 MHz Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-26.82	8
Middle	-24.10	8
High	-24.77	8

Test plots

802.11b LOW CHANNEL



Date: 18 DEC 2016 09:24:03

802.11b MIDDLE CHANNEL



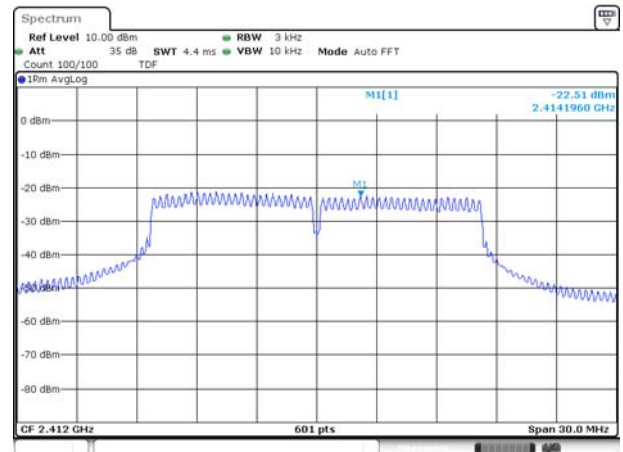
Date: 18 DEC 2016 09:27:18

802.11b HIGH CHANNEL



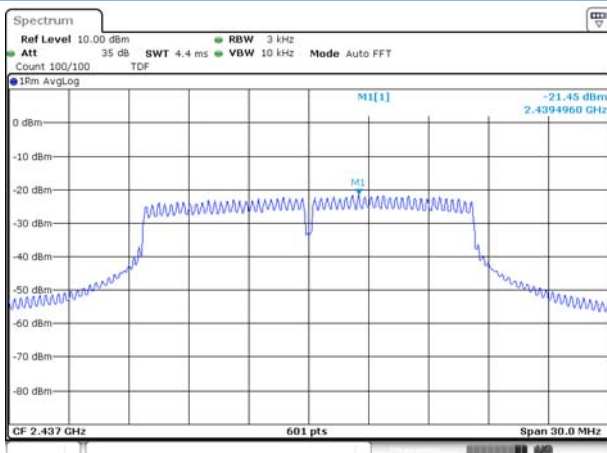
Date: 18 DEC 2016 09:32:49

802.11g LOW CHANNEL



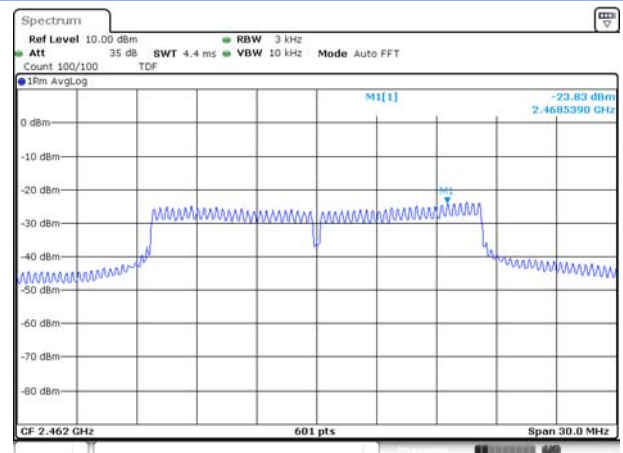
Date: 18 DEC 2016 09:37:49

802.11g MIDDLE CHANNEL



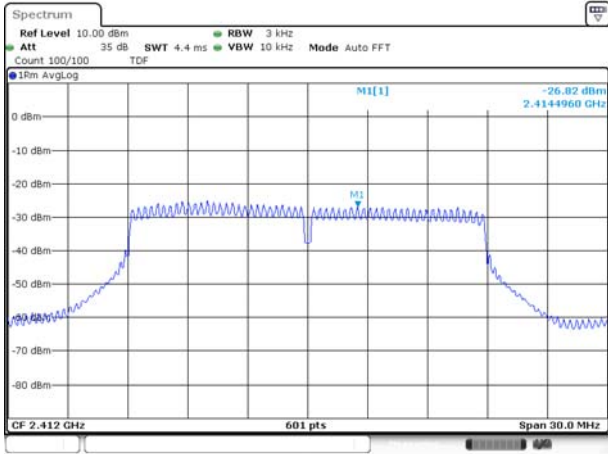
Date: 18 DEC 2016 09:40:36

802.11g HIGH CHANNEL



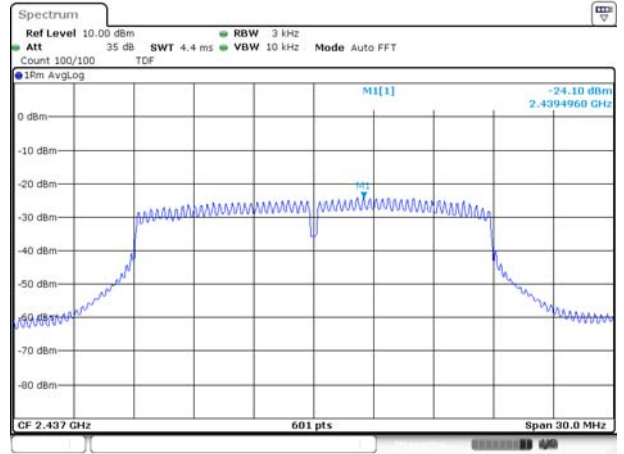
Date: 18 DEC 2016 09:47:59

802.11n-20 MHz LOW CHANNEL



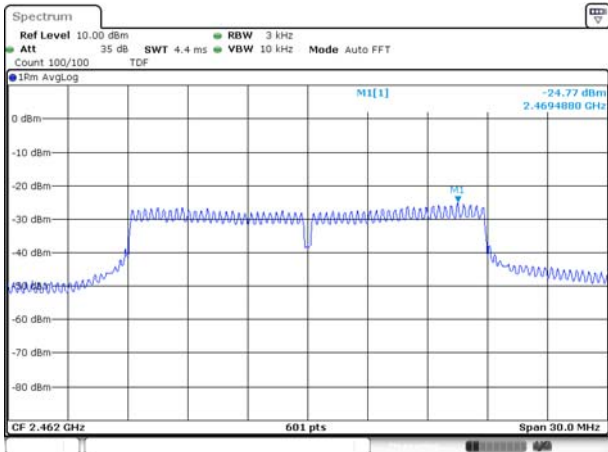
Date: 18 DEC 2016 09:52:09

802.11 n-20 MHz MIDDLE CHANNEL



Date: 18 DEC 2016 09:55:17

802.11n-20 MHz HIGH CHANNEL



Date: 18 DEC 2016 09:59:56

ANNEX B TEST SETUP PHOTOS

Please refer the document "BL-EC18B0415-AR-2.pdf".

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document "BL-EC18B0415-AW.pdf".

ANNEX D EUT INTERNAL PHOTOS

Please refer the document "BL-EC18B0415-AI.pdf".

--END OF REPORT--