



FCC RF Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : XT2201-1
FCC ID : IHDT56AB1
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System
TEST DATE(S) : Nov. 05, 2021 ~ Nov. 30, 2021

We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

Alex Wang

Approved by: Alex Wang / Manager



Sporton International (Kunshan) Inc.

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR192317C	Rev. 01	Initial issue of report	Dec. 10, 2021

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.1	-	99% Bandwidth	-	Not Required	-
3.2	15.247(b)	Power Output Measurement	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(e)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$	Pass	-
3.4	15.247(d)	Conducted Band Edges	$\leq 20\text{dBc}$	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.86 dB at 2483.500 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 8.70 dB at 0.150 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	15.203 & 15.247(b)	Pass	-
Remark: Not required means after assessing, test items are not necessary to carry out.					

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1 General Description

1.1 Applicant

Motorola Mobility LLC

222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.2 Manufacturer

Motorola Mobility LLC

222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2201-1
FCC ID	IHDT56AB1
HW Version	DVT2
SW Version	SSH32.79
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification			
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz		
Maximum (Peak) Output Power to antenna	<MIMO Ant.1+2> 802.11b : 24.65 dBm (0.2917 W) 802.11g : 29.00 dBm (0.7943 W) 802.11n HT20 : 29.07 dBm (0.8072 W) 802.11n HT40 : 27.73 dBm (0.5929 W) 802.11ax HE20 : 29.39 dBm (0.8690 W) 802.11ax HE40 : 28.13 dBm (0.6501 W)		
Antenna Type / Gain	<Ant.1>:IFA Antenna type with gain -2.88 dBi <Ant.2>:PIFA Antenna type with gain -3.76 dBi		
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n/ax : OFDM (BPSK / QPSK / 16QAM / 64QAM)		
Antenna Function Description		Ant. 1	Ant. 2
	802.11 b/g/n/ax SISO/MIMO	V	V

Note:

1. For WLAN SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to the higher conducted power.
2. For 802.11n/11ax of 20M/40M RSE test modes, the full testing assessed 802.11ax HE20/HE40 by referring to the maximum output power.
3. 802.11ax support full RU tone and partial RU tone, both full RU and partial RU-left (for low CH) and partial RU-right (for high CH) are tested, only the worse data were reported.
4. Ant.1 corresponds to ant.4 in EP. Ant.2 corresponds to ant.6 in EP

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

<FCC>-KS

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	CO01-KS 03CH06-KS TH01-KS	CN1257	314309

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH06-KS	AUDIX	E3	6.2009-8-24a1
2.	CO01-KS	AUDIX	E3	6.2009-8-24



1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 15 Subpart C §15.247
- ♦ FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

1.9 Specification of Accessory

Specification of Accessory				
AC Adapter 1(US)	Brand Name	Motorola (Salom)	Model Name	MC-681
AC Adapter 1(EU)	Brand Name	Motorola (Salom)	Model Name	MC-682
AC Adapter 1(UK)	Brand Name	Motorola (Salom)	Model Name	MC-683
AC Adapter 1(AR)	Brand Name	Motorola (Salom)	Model Name	MC-686
AC Adapter 1(BR)	Brand Name	Motorola (Salom)	Model Name	MC-687
AC Adapter 1(Chile)	Brand Name	Motorola (Salom)	Model Name	MC-689
AC Adapter 2(AU)	Brand Name	Motorola (Salom)	Model Name	MC-305
AC Adapter 3(AU)	Brand Name	Motorola (Acbel)	Model Name	MC-305
Battery	Brand Name	Motorola (ATL)	Model Name	NA50
Earphone	Brand Name	Motorola(Lyand)	Model Name	MD211(SH38D20195)
USB Cable 1	Brand Name	Motorola(Saibao)	Model Name	SC18D13215
USB Cable 2	Brand Name	Motorola(Cabletech)	Model Name	SC18D13216
USB Cable 3	Brand Name	Motorola(Luxshare)	Model Name	SC18D13217
USB Cable 4	Brand Name	Motorola(Saibao)	Model Name	SC18D24968
Type C to HDMI Cable /USBC Cable	Brand Name	Motorola(Linxee)	Model Name	SC18D02146
Stylus	Brand Name	Motorola smart stylus	Model Name	XT2201-S
Smart Folio	Brand Name	Motorola(Techson)	Model Name	SS68D36907,SS68D36906
Wireless Dongle	Brand Name	Motorola	Model Name	MD-02
HDMI Cable	Brand Name	Motorola	Model Name	HC-01
USB Cable(Type A/C)	Brand Name	Motorola	Model Name	SC18C24367

2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

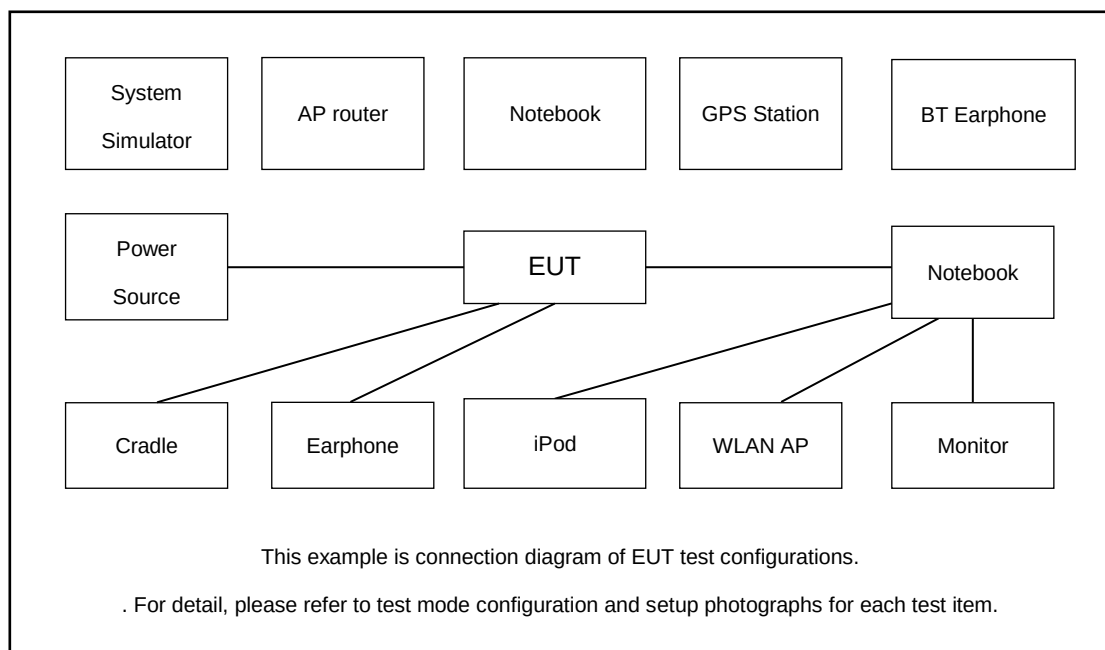
MIMO Antenna

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11ax HE20	MCS0
802.11ax HE40	MCS0

Co-location
WLAN 2.4GHz 11ax HE20 + WWAN Part 96 LTE B48

Test Cases	
AC Conducted Emission	Mode 1 :GSM 850 Idle + Bluetooth Link + WLAN Link (2.4G) + USB Cable4(Charging from Adapter1)
Remark: For Radiated Test Cases, The tests were performance with Adapter1 and USB Cable4	

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritus	MT8821C	N/A	N/A	Unshielded,1.8m
2.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
3.	Notebook	Lenovo	V130-15IKB005	N/A	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
4.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example :

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 6.00dB.

$$\begin{aligned}
 \text{Offset(dB)} &= \text{RF cable loss(dB)}. \\
 &= 6.00(\text{dB})
 \end{aligned}$$

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

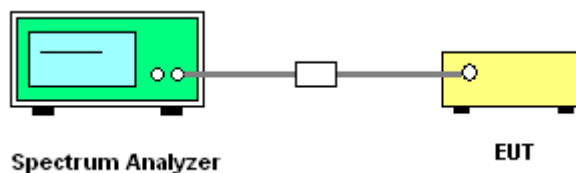
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

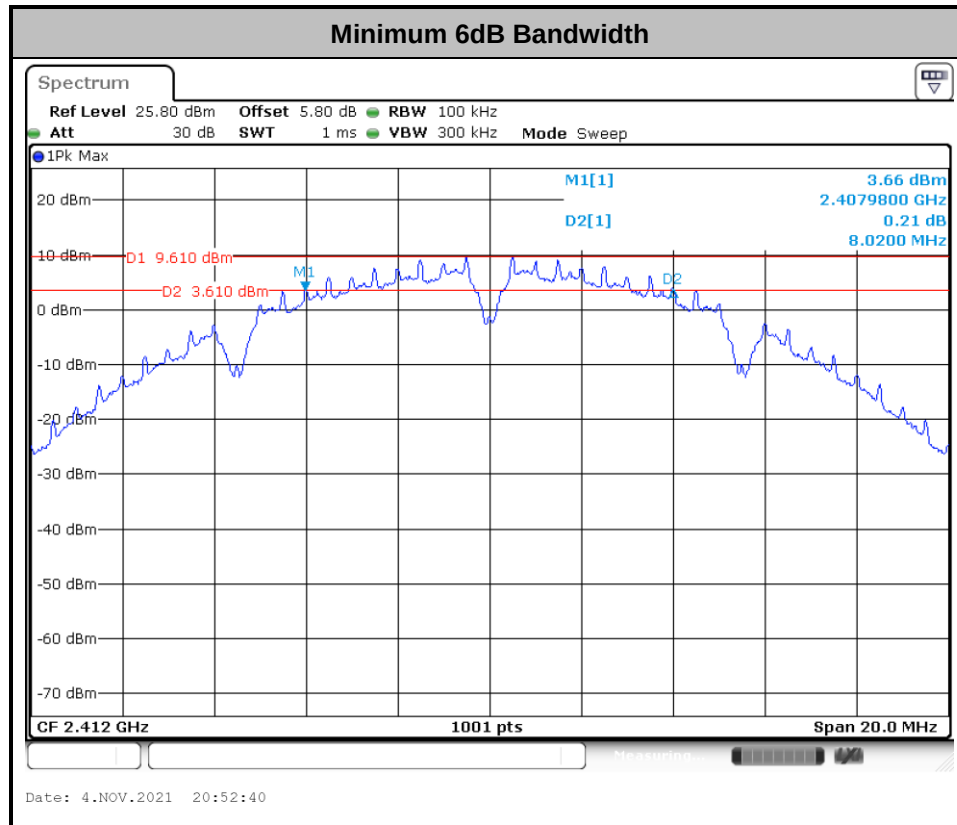
1. The testing follows ANSI C63.10-2013 clause 11.8
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.



Note : The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

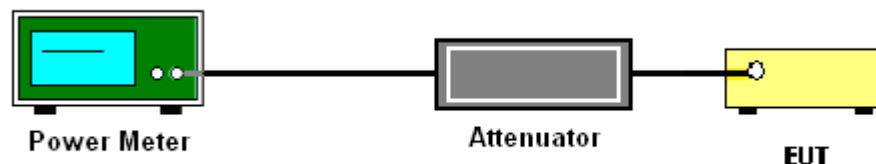
3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 clause 11.9.1.3 PKPM1 Peak power meter or ANSI C63.10-2013 clause 11.9.2.3.2 Method AVGPM-G method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.2.4 Test Setup



3.2.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.2.6 Test Result of Average Output Power (Reporting Only)

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

1. The testing follows Measurement Procedure of ANSI C63.10-2013 clause 11.10.2 Method PKPSD.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.
7. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

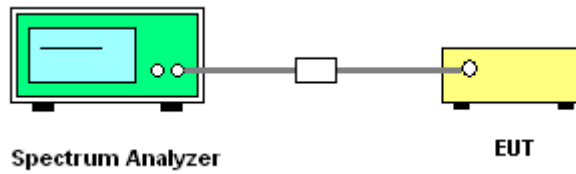
If measurements performed using method (2) plus $10 \log(N)$ exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

Method (1): Measure and sum the spectra across the outputs.

The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

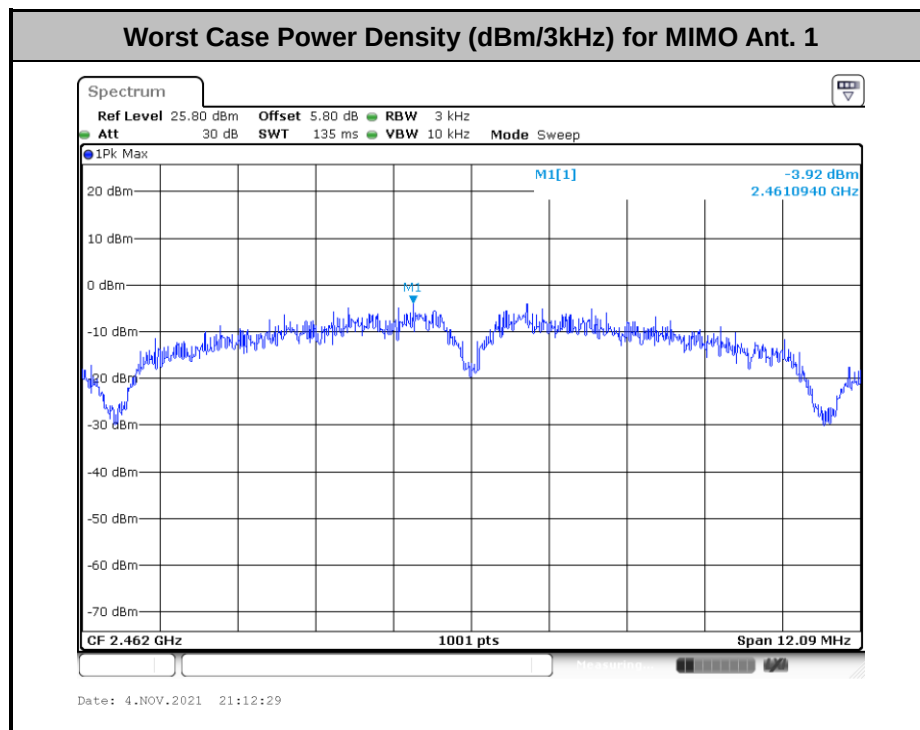
Method (2): Measure and add $10 \log(N)$ dB, where N is the number of outputs. (N=2)

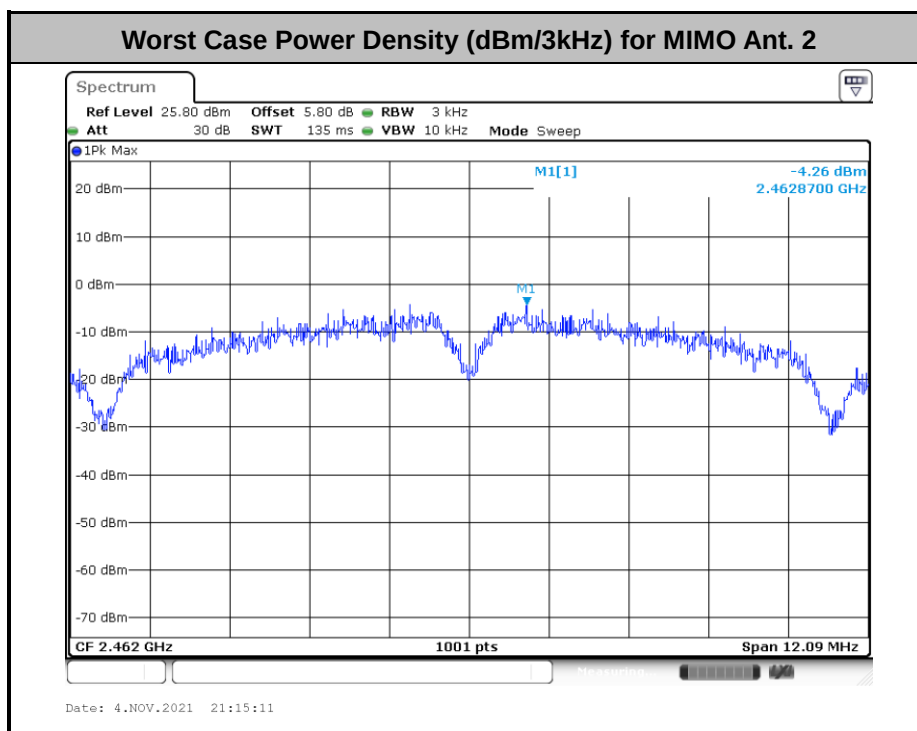
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.





3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement.

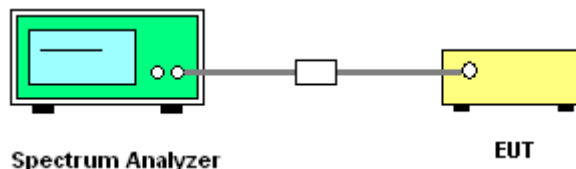
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 11.13
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions 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 when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup



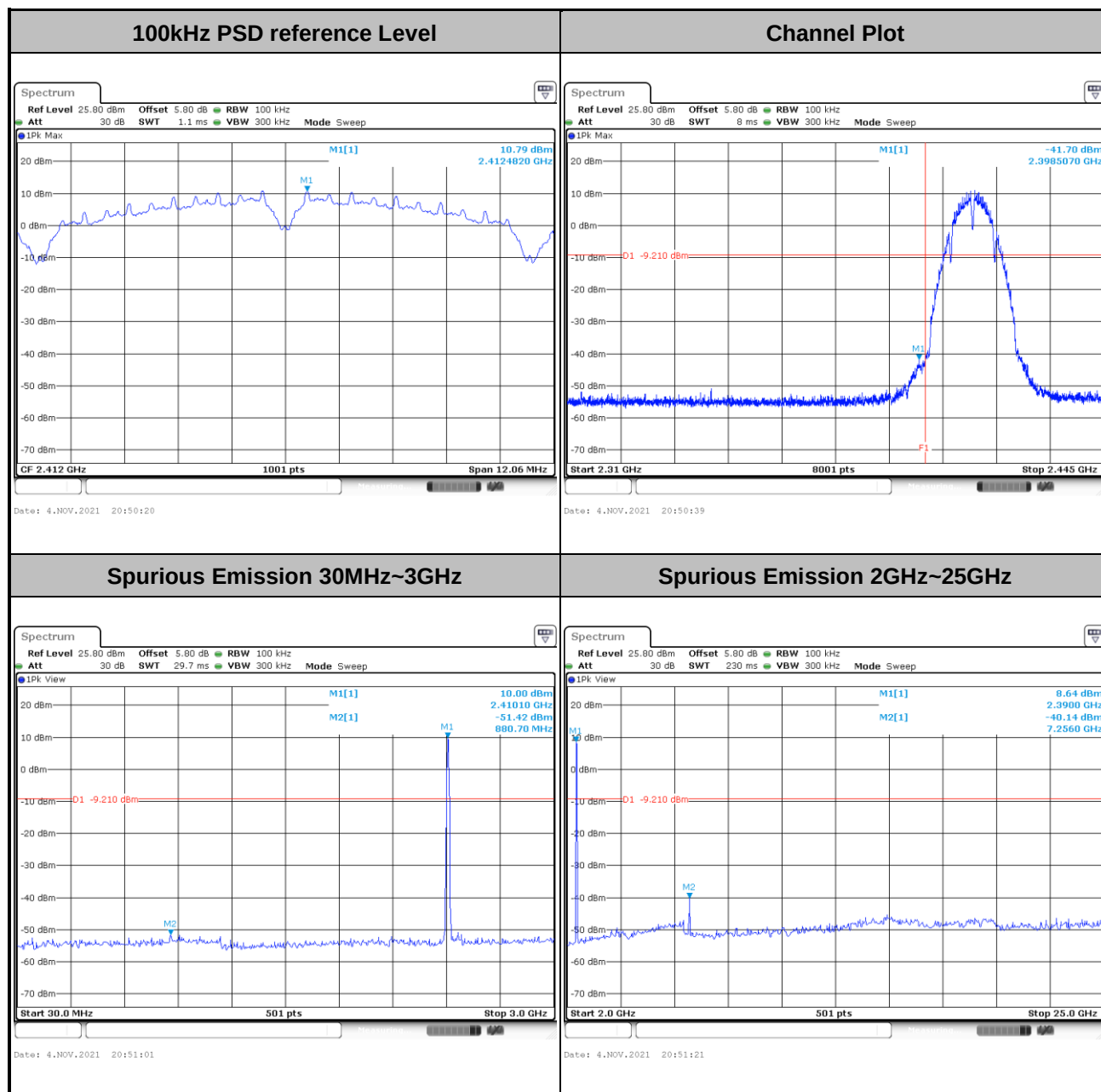


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Engineer :	You Zhou	Temperature :	0~40℃
		Relative Humidity :	51~54%

Number of TX = 2, Ant. 1 (Measured)

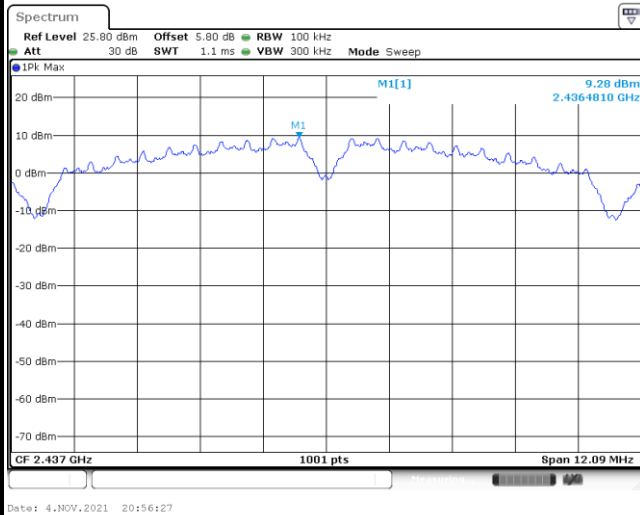
Test Mode :	802.11b	Test Channel :	01
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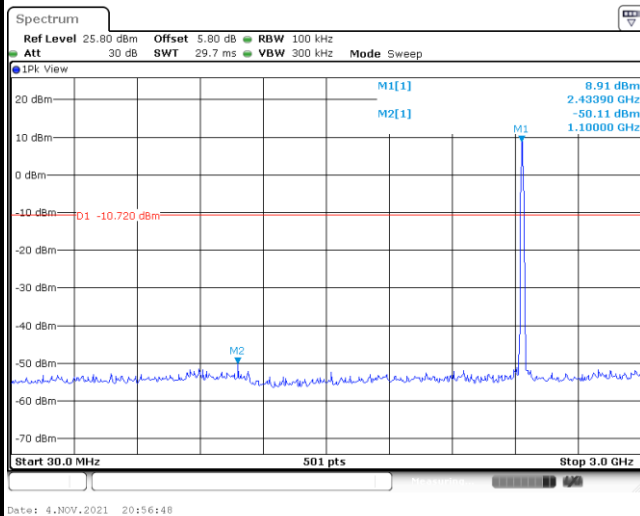
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100kHz PSD reference Level

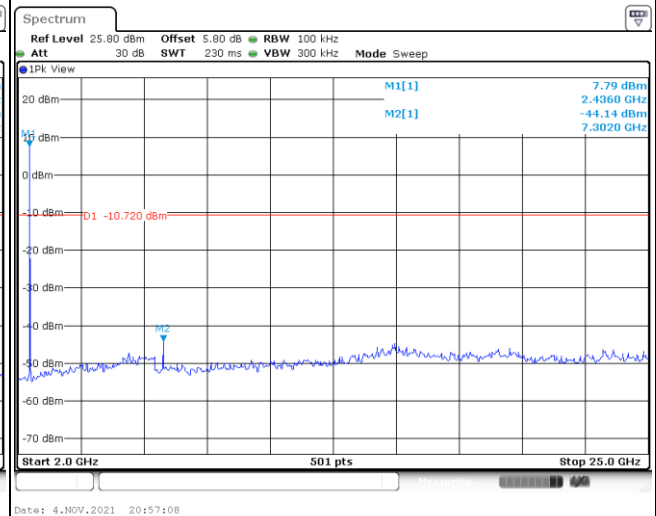


Channel Plot

Spurious Emission 30MHz~3GHz



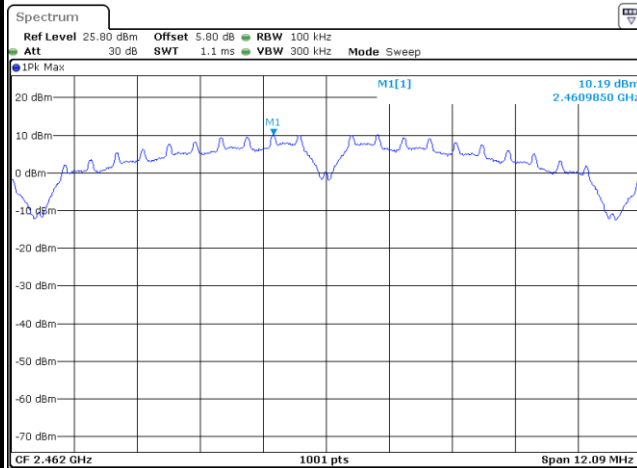
Spurious Emission 2GHz~25GHz





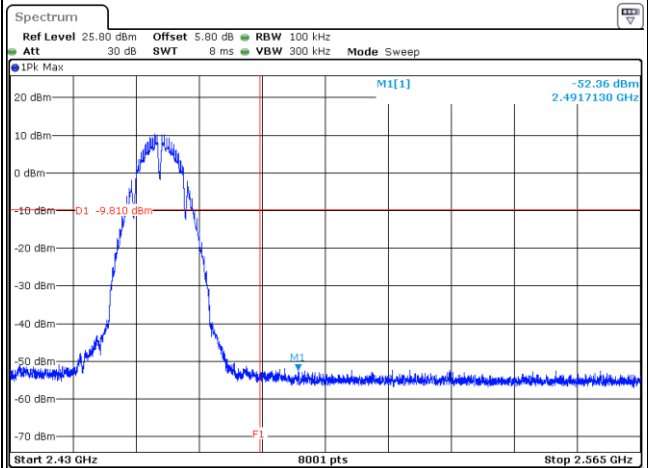
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100kHz PSD reference Level



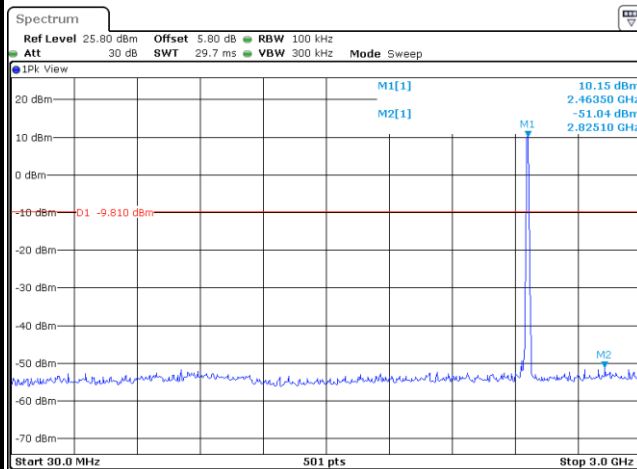
Date: 4.NOV.2021 21:12:48

Channel Plot



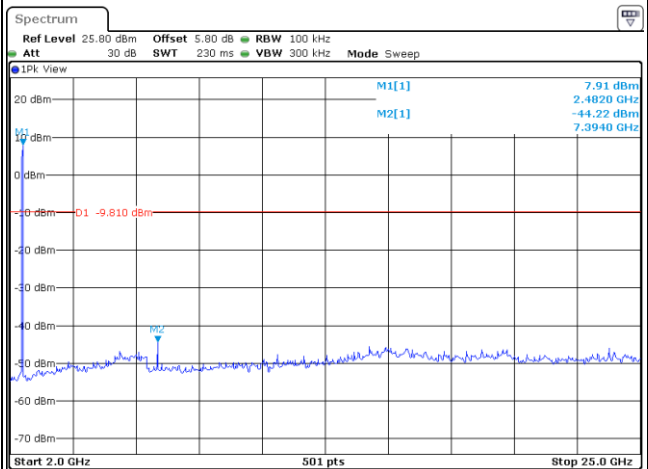
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Spurious Emission 30MHz~3GHz



Date: 4.NOV.2021 21:13:28

Spurious Emission 2GHz~25GHz

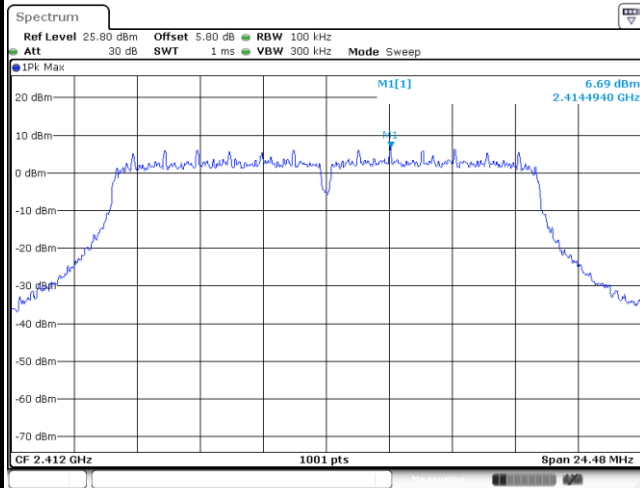


Date: 4.NOV.2021 21:13:48

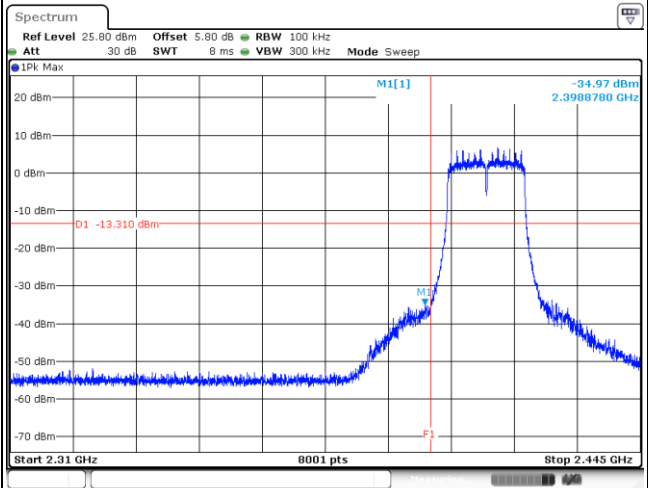


Test Mode :	802.11g	Test Channel :	01
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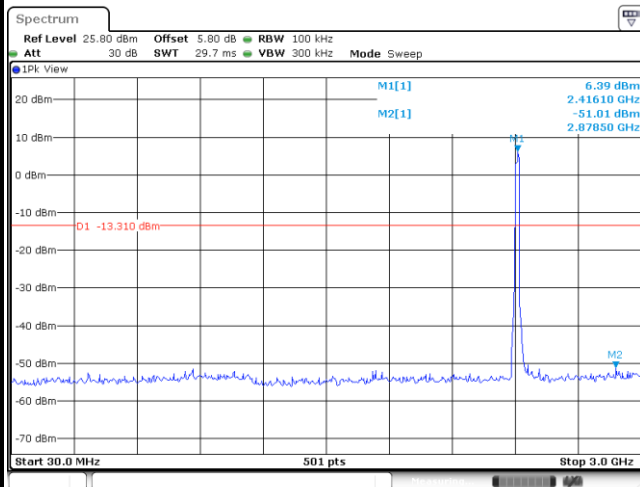
100kHz PSD reference Level



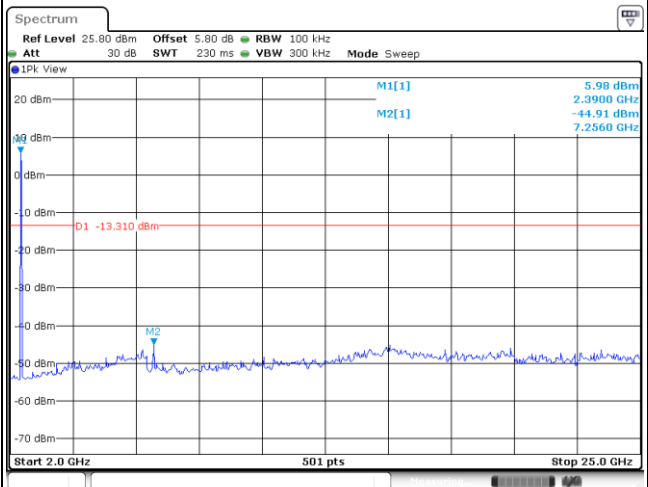
Channel Plot



Spurious Emission 30MHz~3GHz



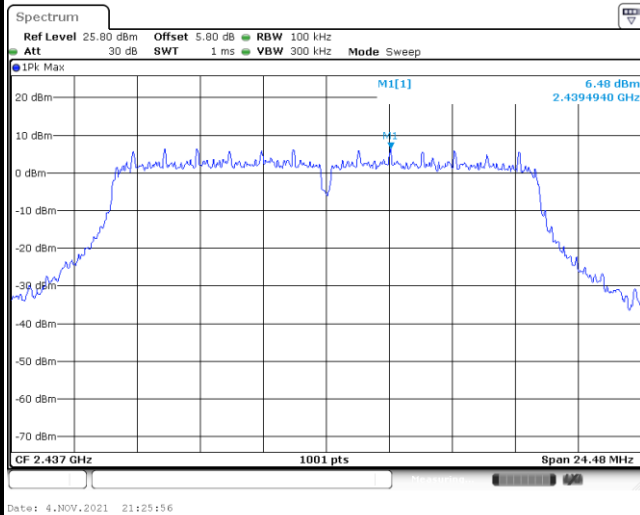
Spurious Emission 2GHz~25GHz





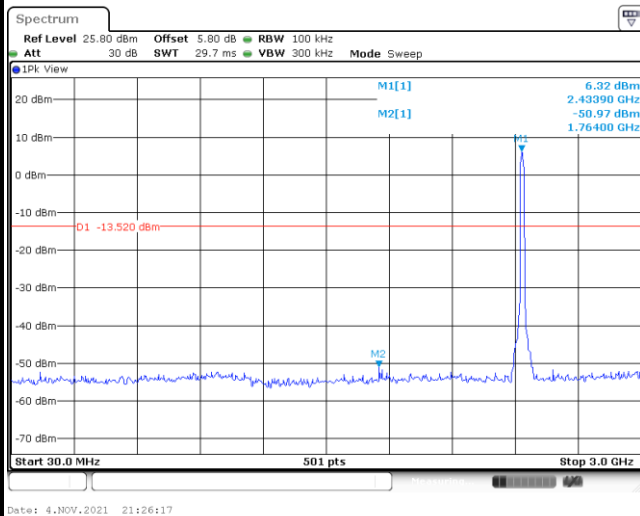
Test Mode :	802.11g	Test Channel :	06
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100kHz PSD reference Level

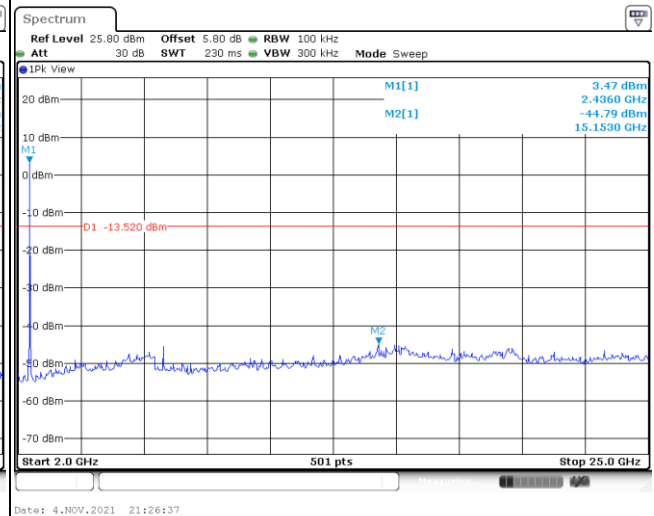


Channel Plot

Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

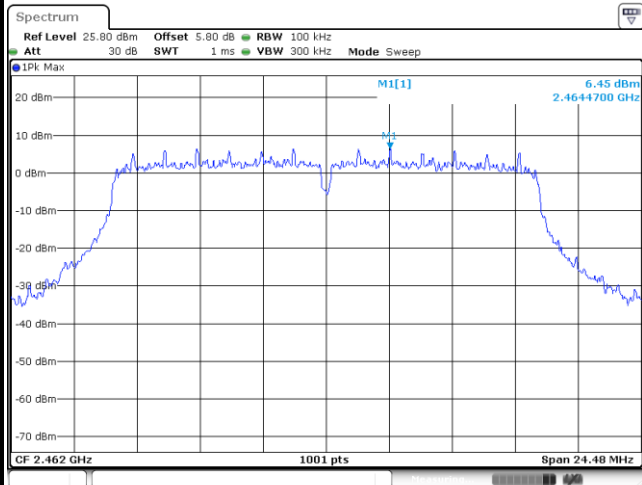




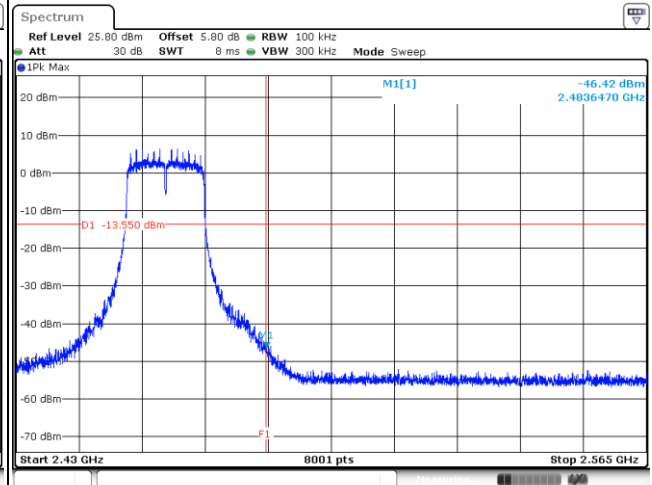
Test Mode : 802.11g

Test Channel : 11

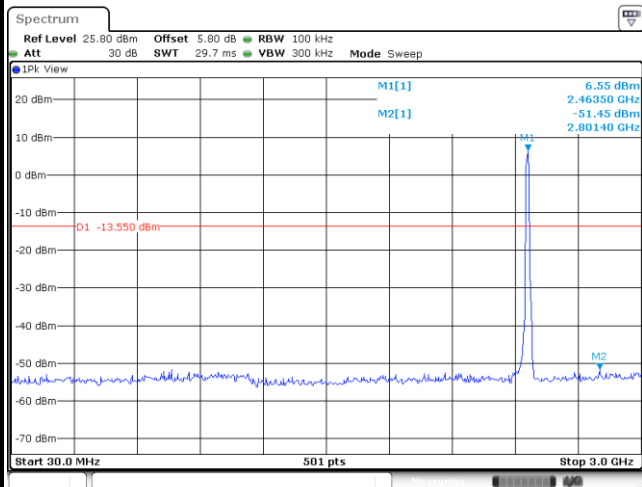
100kHz PSD reference Level



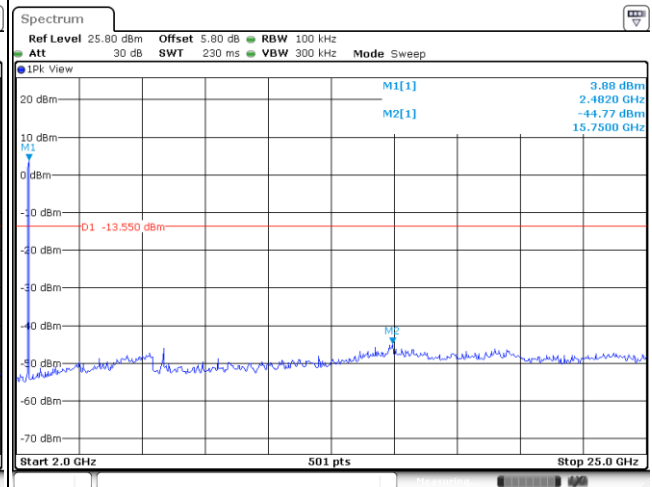
Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

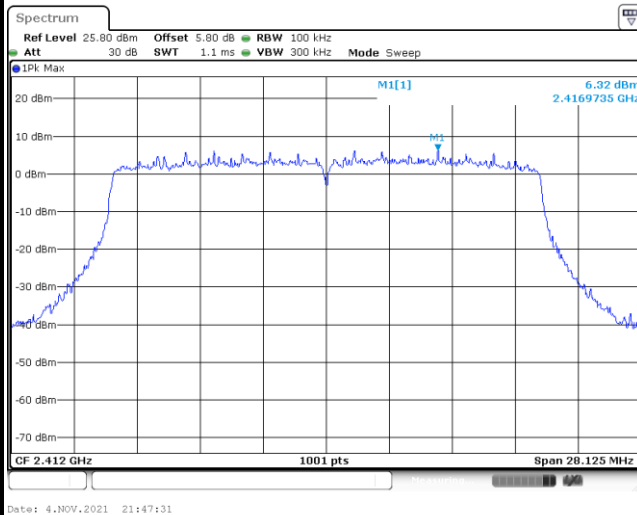




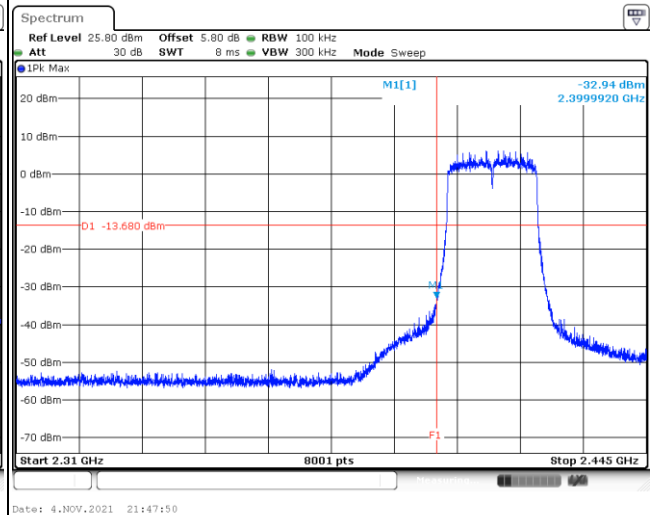
Test Mode : 802.11ax HE20

Test Channel : 01

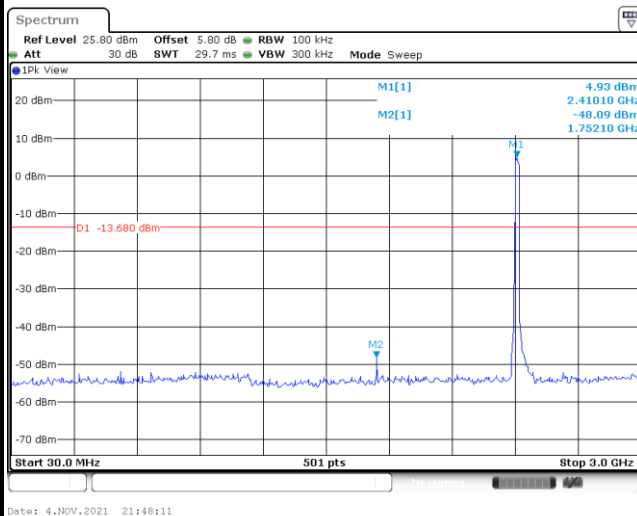
100kHz PSD reference Level



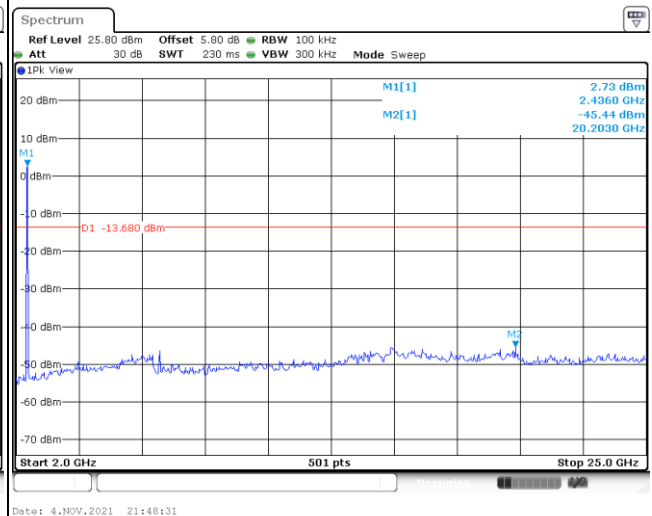
Channel Plot



Spurious Emission 30MHz~3GHz



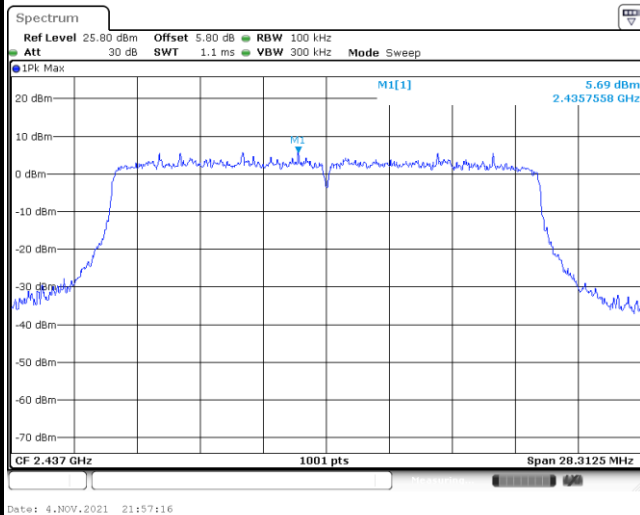
Spurious Emission 2GHz~25GHz





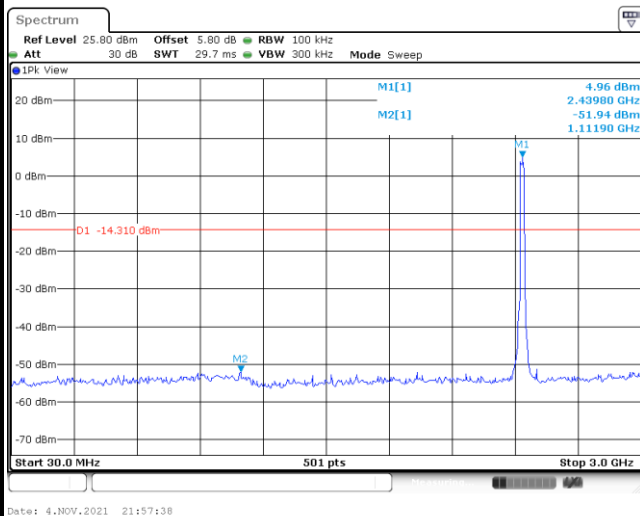
Test Mode :	802.11ax HE20	Test Channel :	06
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100kHz PSD reference Level

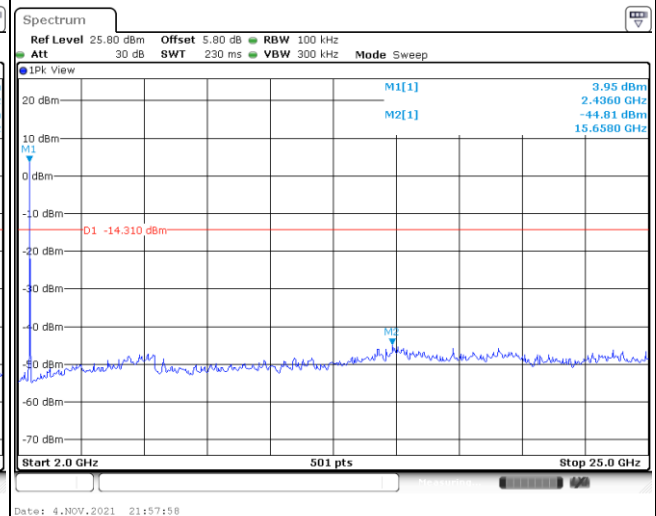


Channel Plot

Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

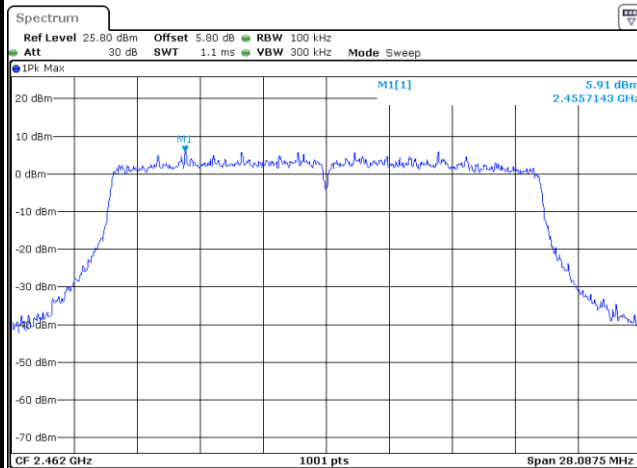




Test Mode : 802.11ax HE20

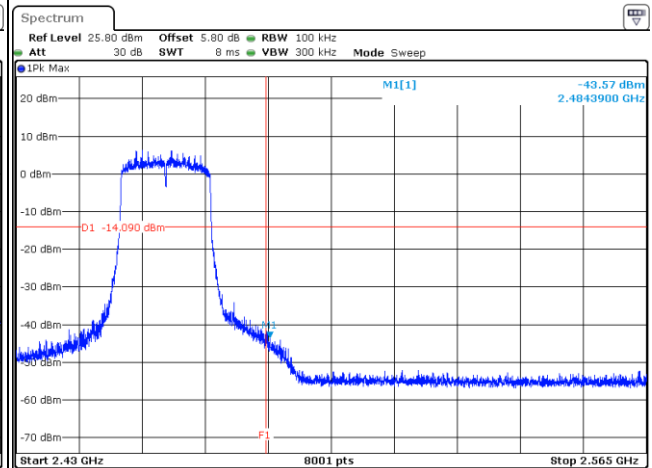
Test Channel : 11

100kHz PSD reference Level



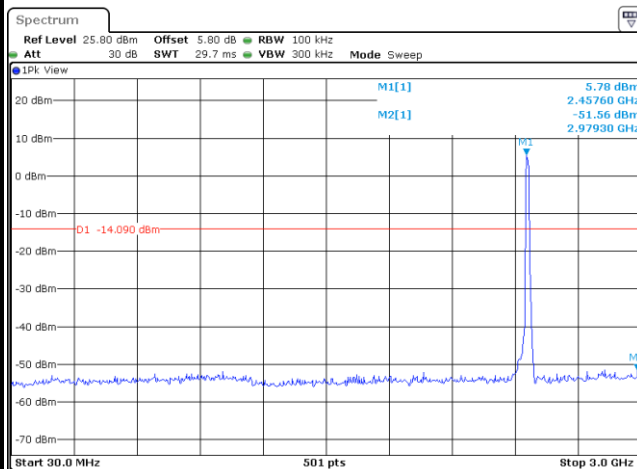
Date: 4.NOV.2021 21:59:33

Channel Plot



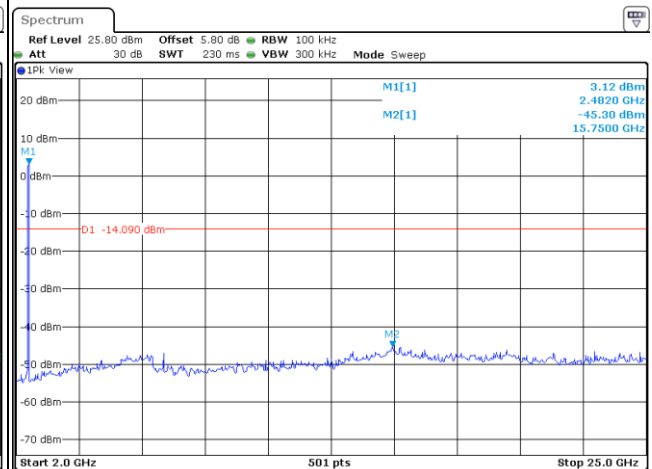
Date: 4.NOV.2021 21:59:52

Spurious Emission 30MHz~3GHz



Date: 4.NOV.2021 22:00:13

Spurious Emission 2GHz~25GHz



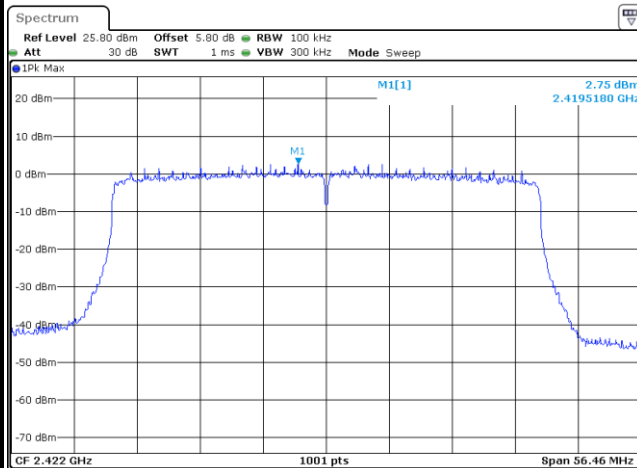
Date: 4.NOV.2021 22:00:33



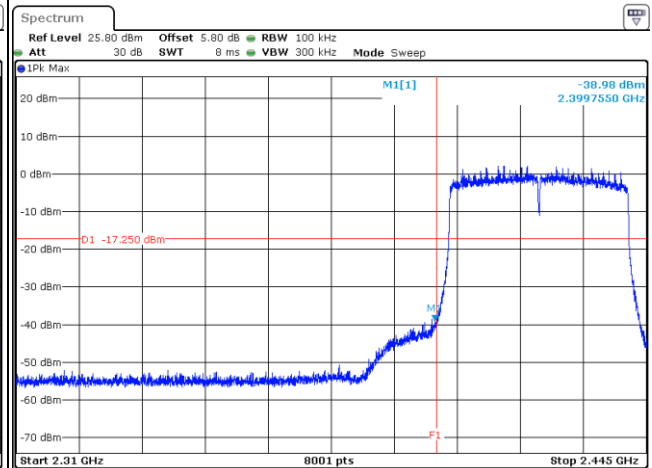
Test Mode : 802.11ax HE40

Test Channel : 03

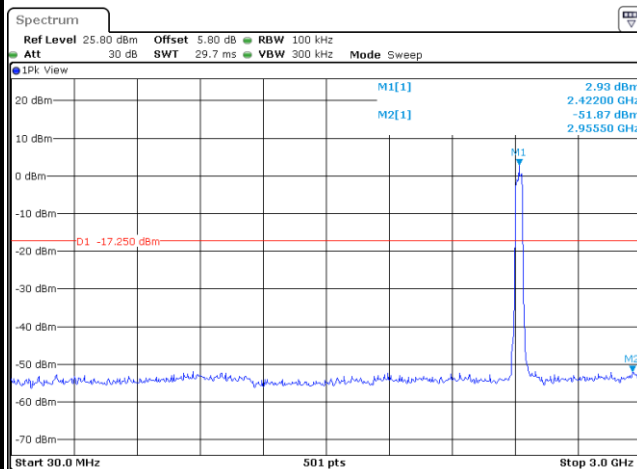
100kHz PSD reference Level



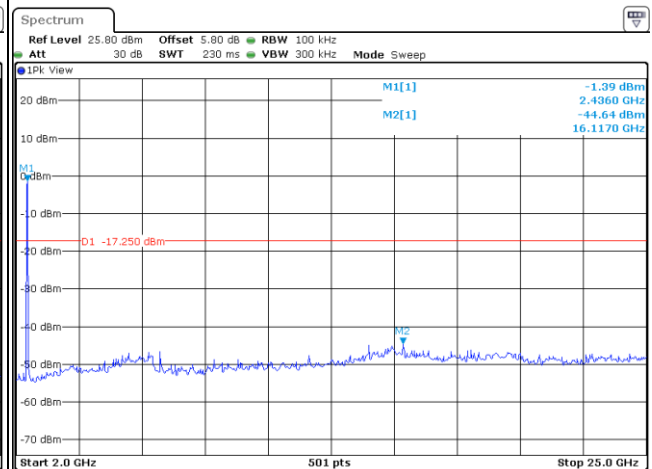
Channel Plot



Spurious Emission 30MHz~3GHz

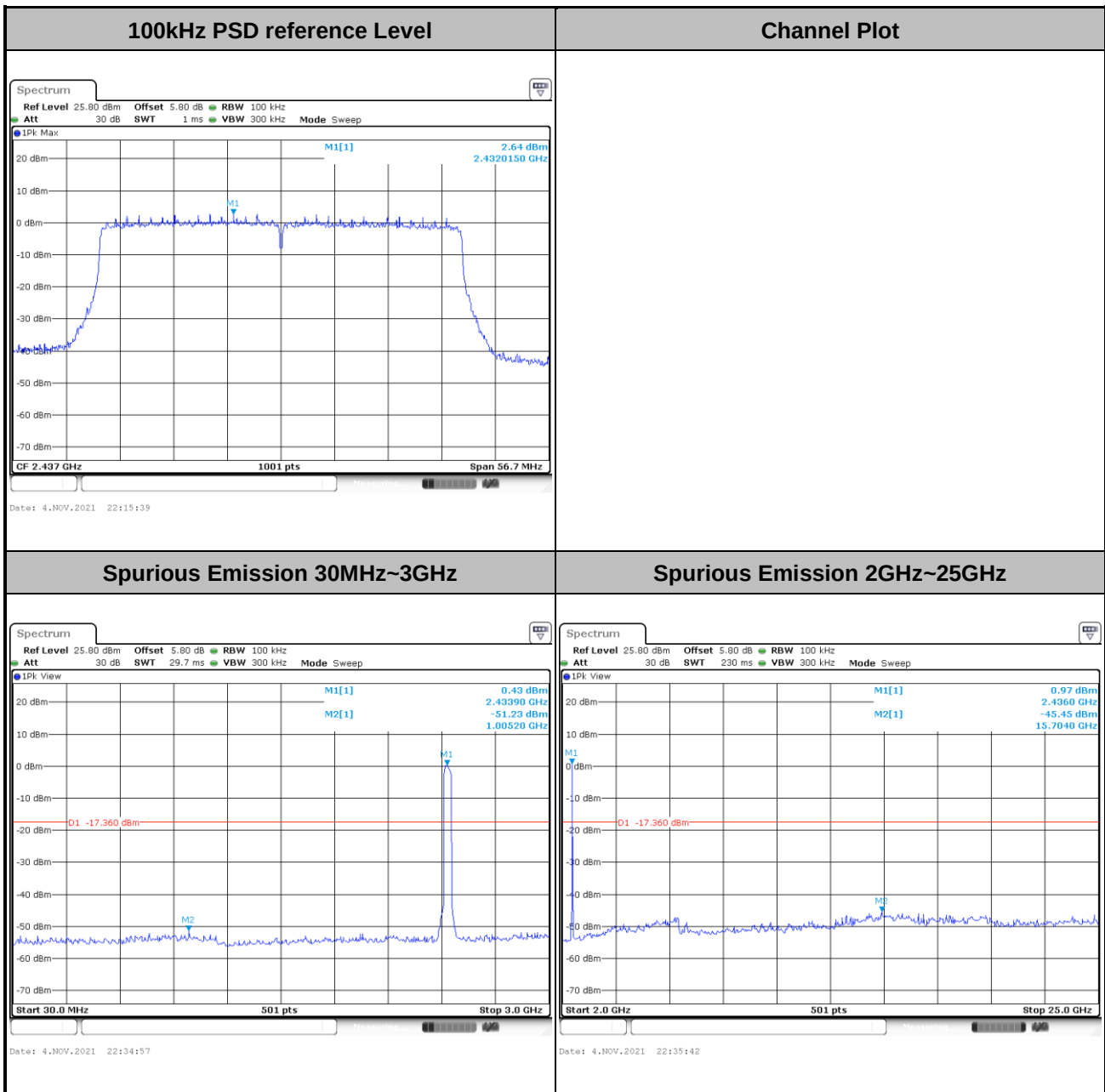


Spurious Emission 2GHz~25GHz



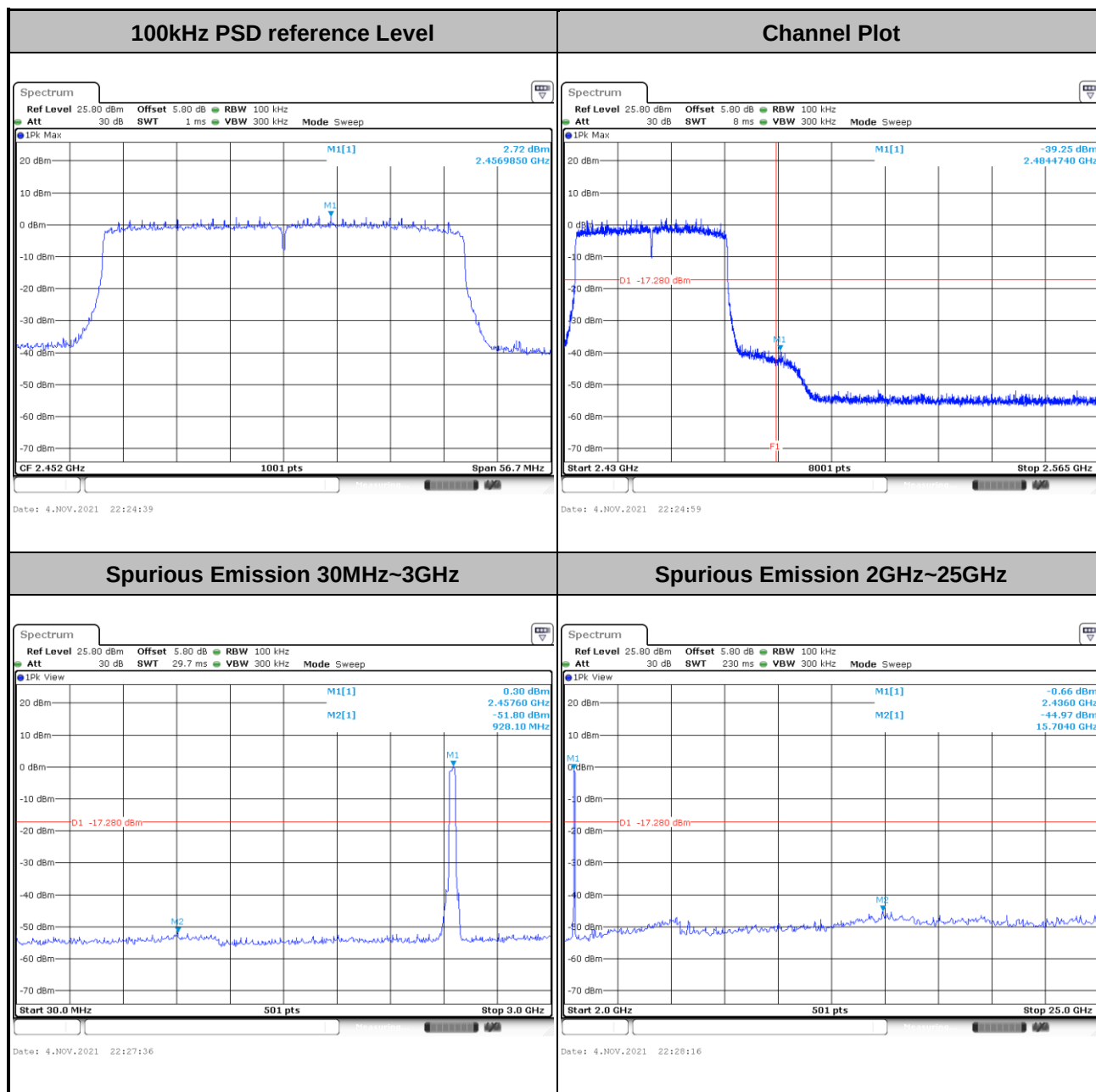


Test Mode :	802.11ax HE40	Test Channel :	06
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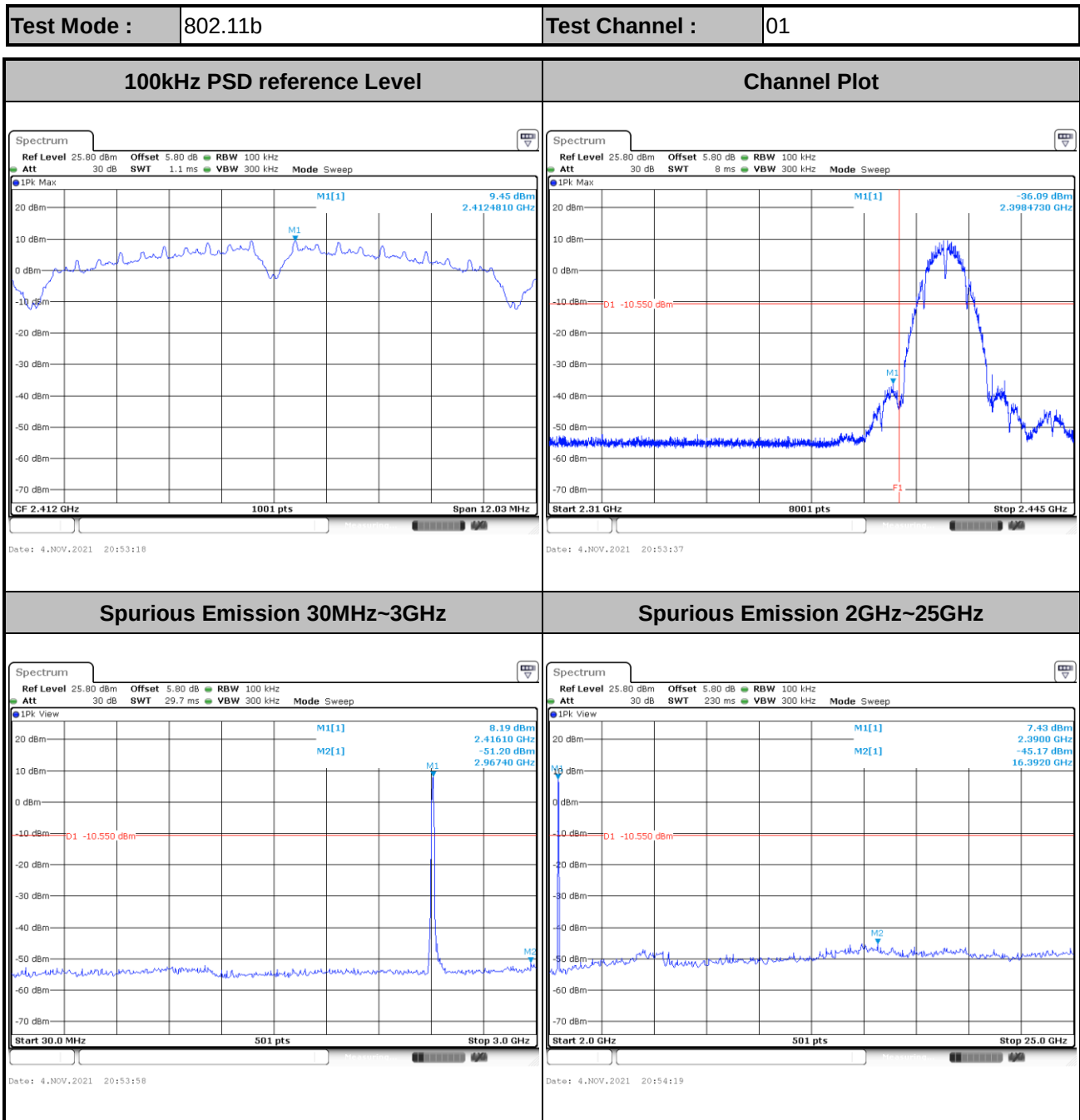


Test Mode :	802.11ax HE40	Test Channel :	09
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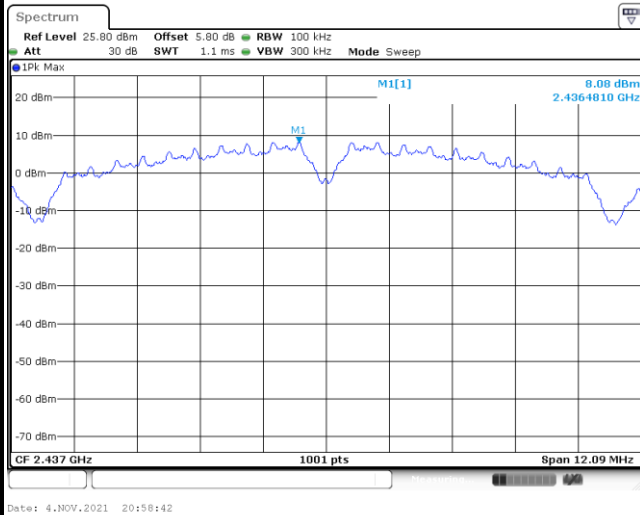
Number of TX = 2, Ant. 2 (Measured)





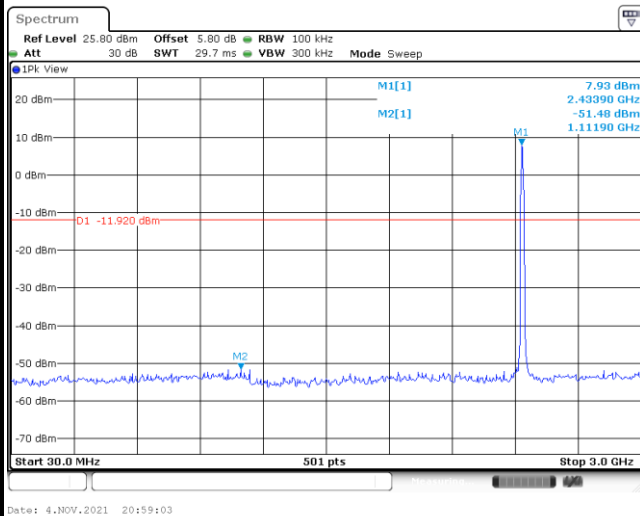
Test Mode :	802.11b	Test Channel :	06
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100kHz PSD reference Level

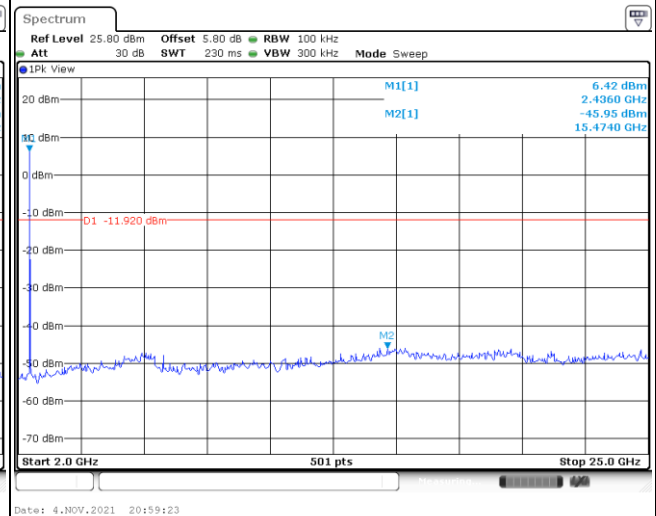


Channel Plot

Spurious Emission 30MHz~3GHz



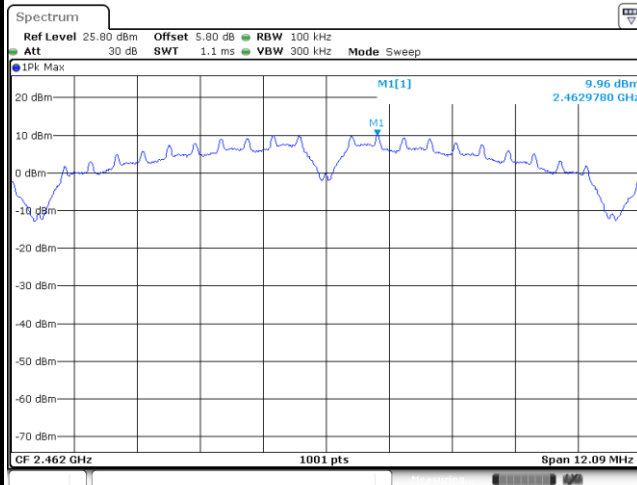
Spurious Emission 2GHz~25GHz





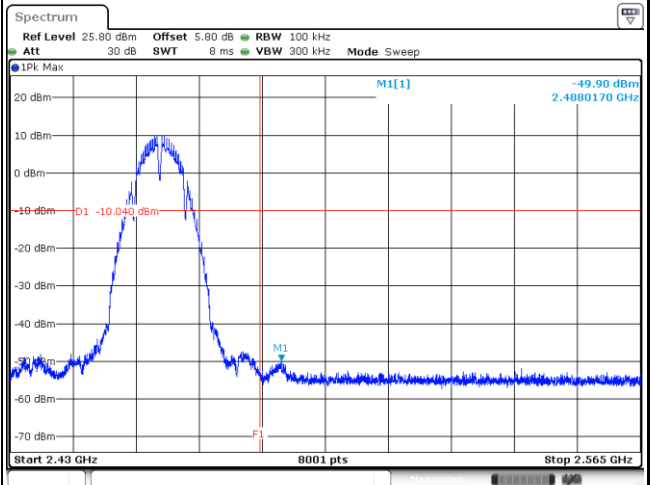
Test Mode :	802.11b	Test Channel :	11
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100kHz PSD reference Level



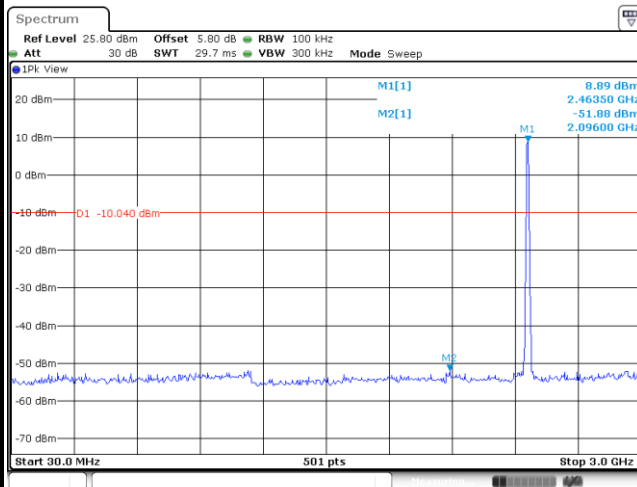
Date: 4.NOV.2021 21:15:30

Channel Plot



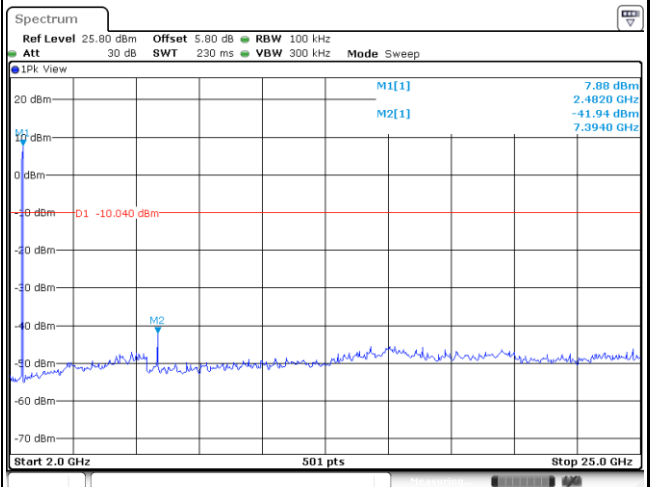
Date: 4.NOV.2021 21:15:49

Spurious Emission 30MHz~3GHz



Date: 4.NOV.2021 21:18:25

Spurious Emission 2GHz~25GHz

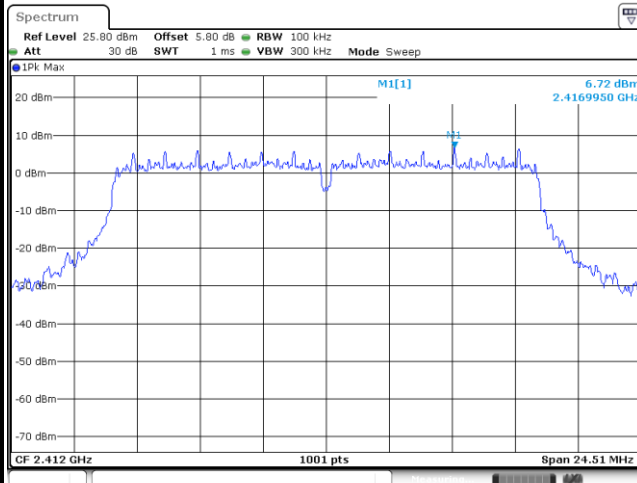


Date: 4.NOV.2021 21:18:37



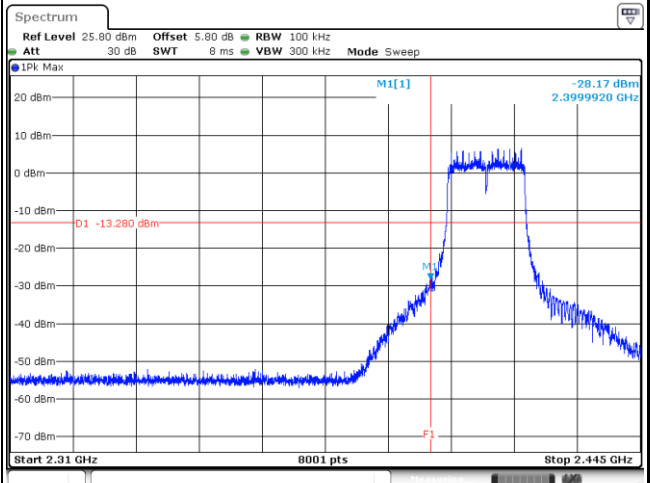
Test Mode :	802.11g	Test Channel :	01
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100kHz PSD reference Level



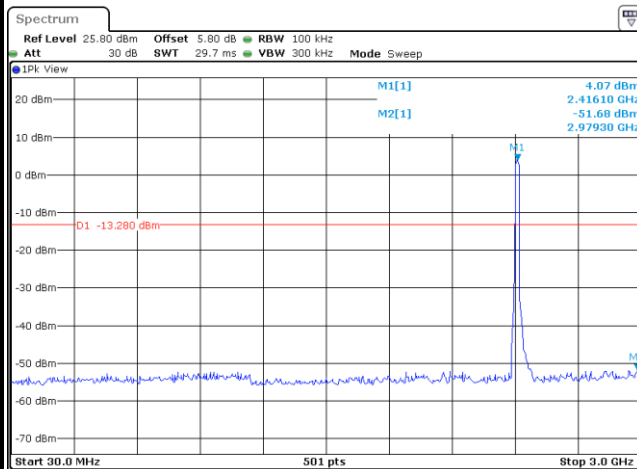
Date: 4.NOV.2021 21:19:25

Channel Plot



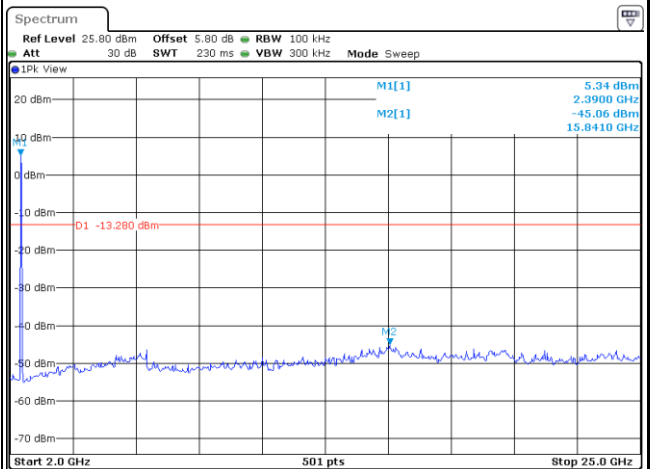
Date: 4.NOV.2021 21:19:45

Spurious Emission 30MHz~3GHz



Date: 4.NOV.2021 21:20:06

Spurious Emission 2GHz~25GHz

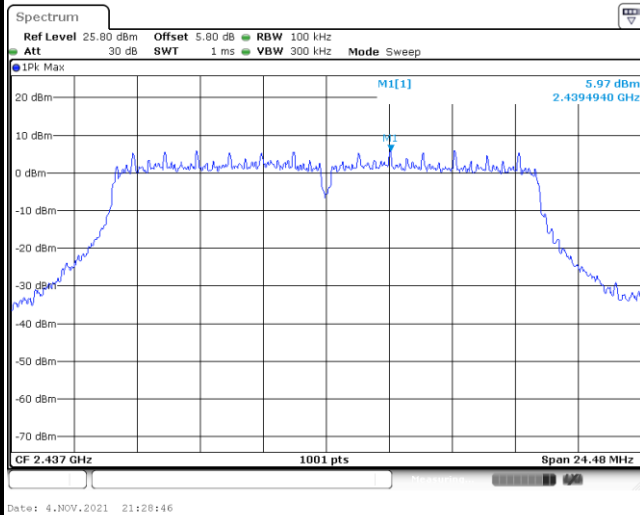


Date: 4.NOV.2021 21:20:26



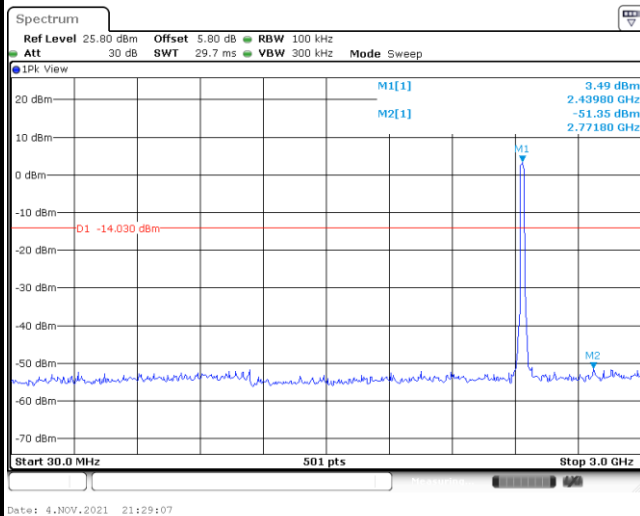
Test Mode :	802.11g	Test Channel :	06
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100kHz PSD reference Level

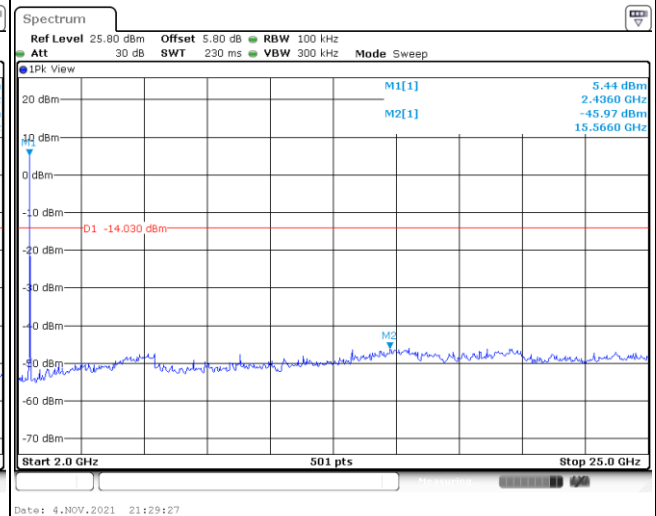


Channel Plot

Spurious Emission 30MHz~3GHz



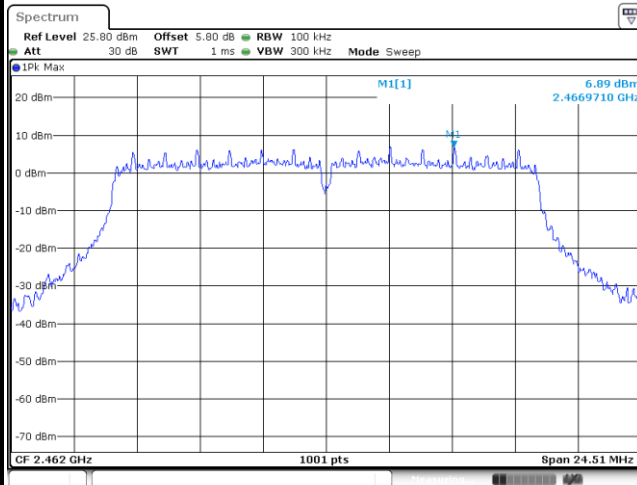
Spurious Emission 2GHz~25GHz



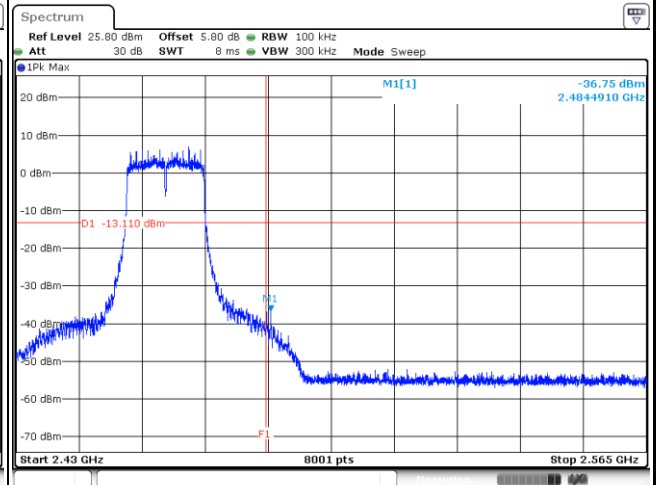


Test Mode :	802.11g	Test Channel :	11
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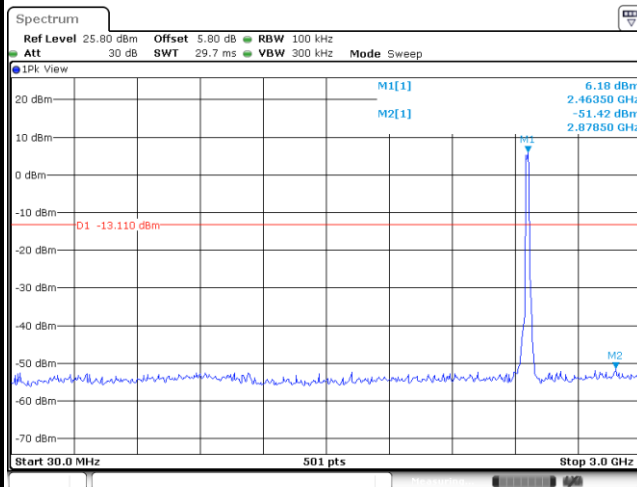
100kHz PSD reference Level



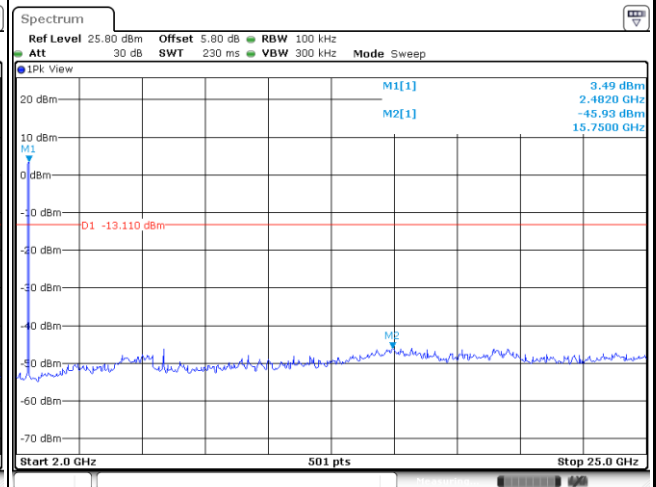
Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

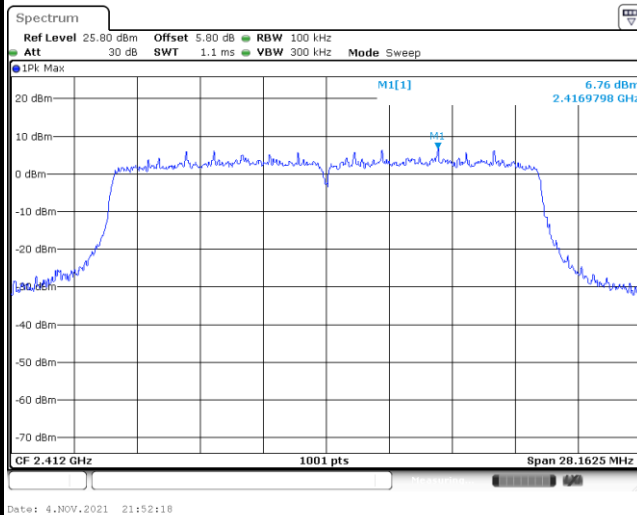




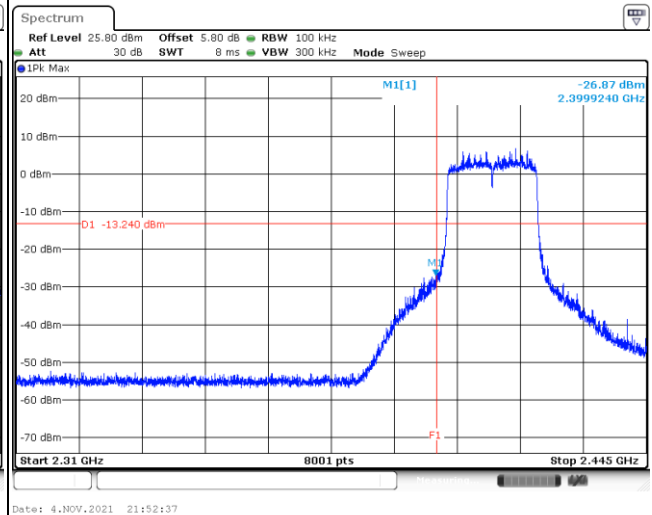
Test Mode : 802.11ax HE20

Test Channel : 01

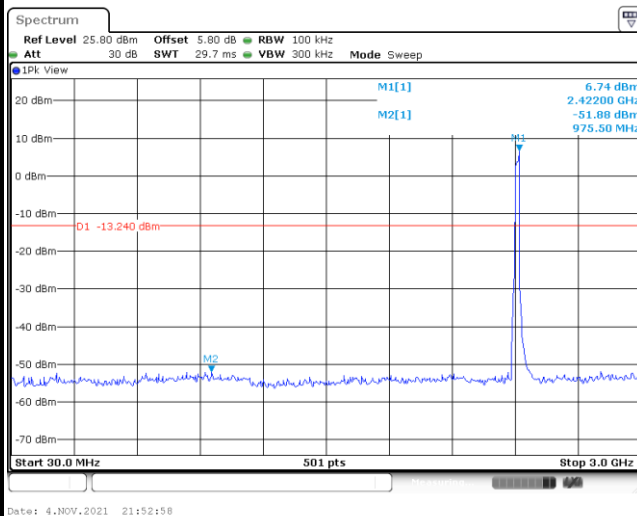
100kHz PSD reference Level



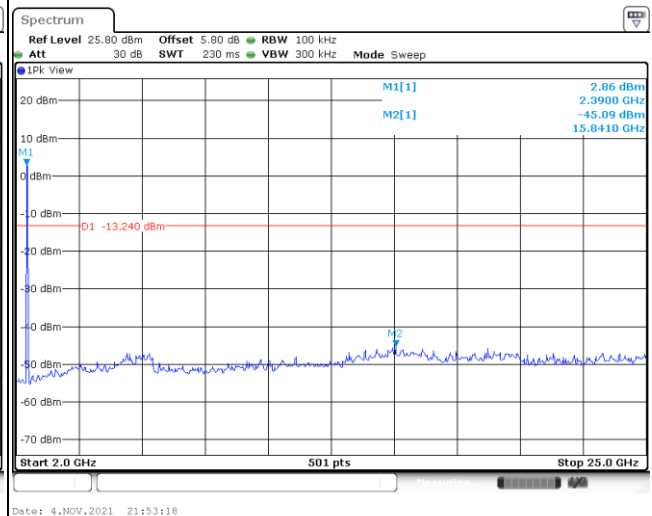
Channel Plot



Spurious Emission 30MHz~3GHz

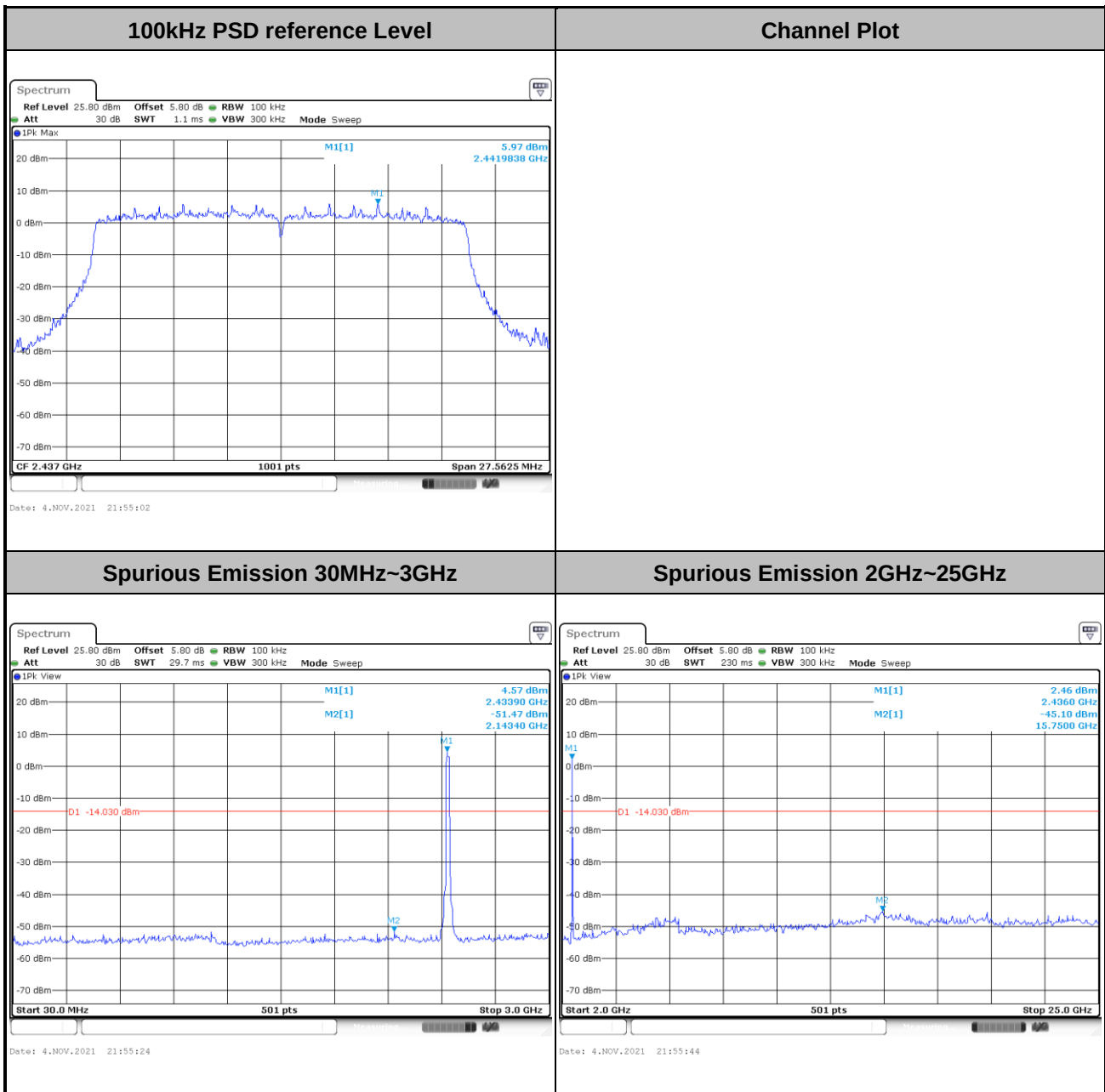


Spurious Emission 2GHz~25GHz





Test Mode :	802.11ax HE20	Test Channel :	06
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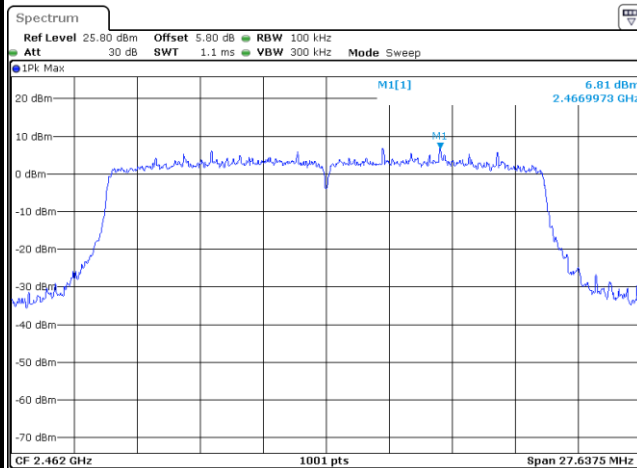




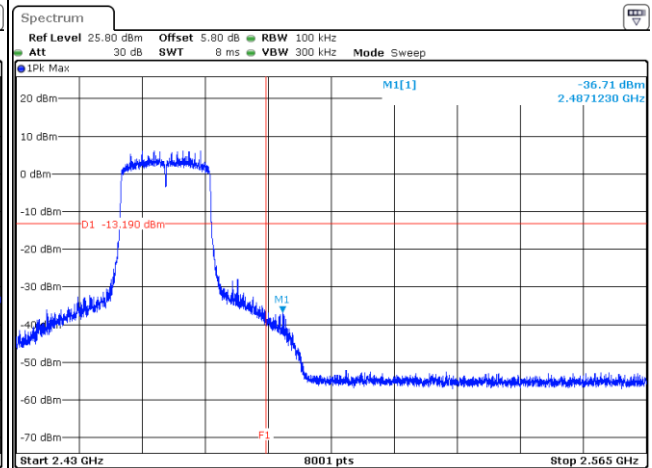
Test Mode : 802.11ax HE20

Test Channel : 11

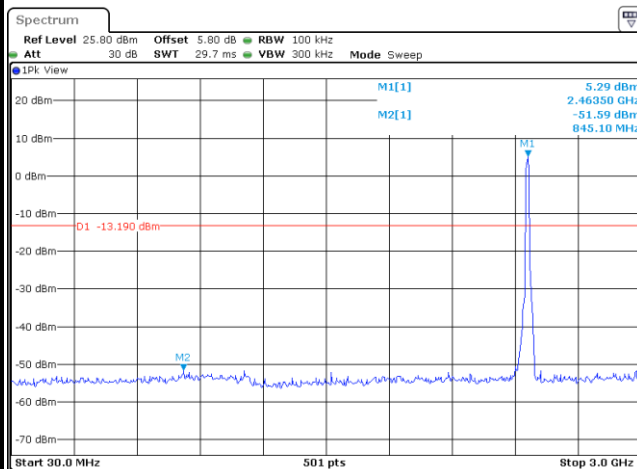
100kHz PSD reference Level



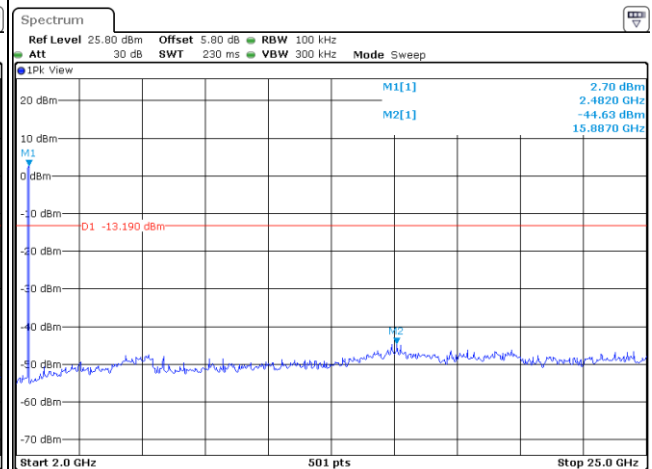
Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

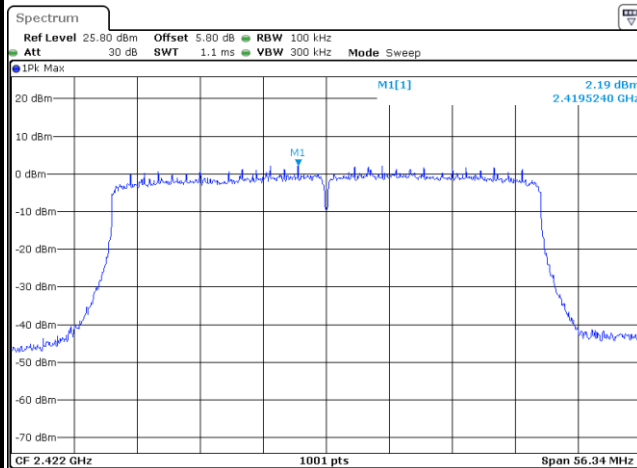




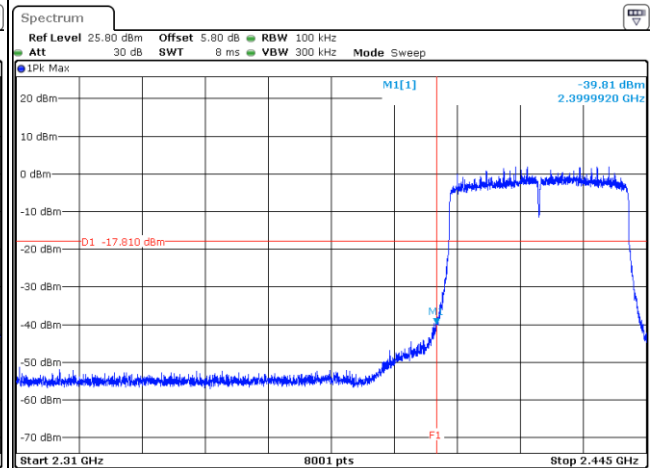
Test Mode : 802.11ax HE40

Test Channel : 03

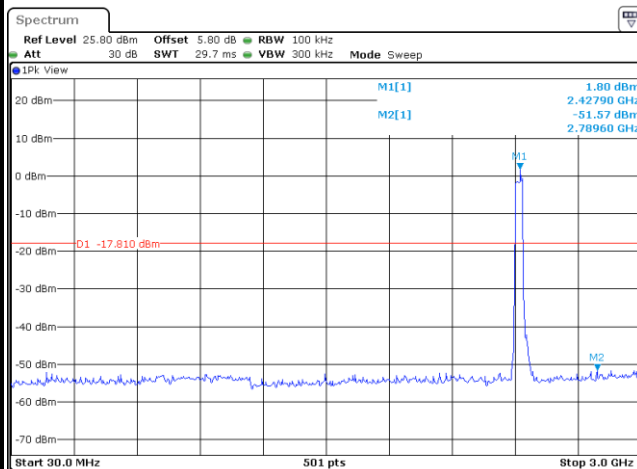
100kHz PSD reference Level



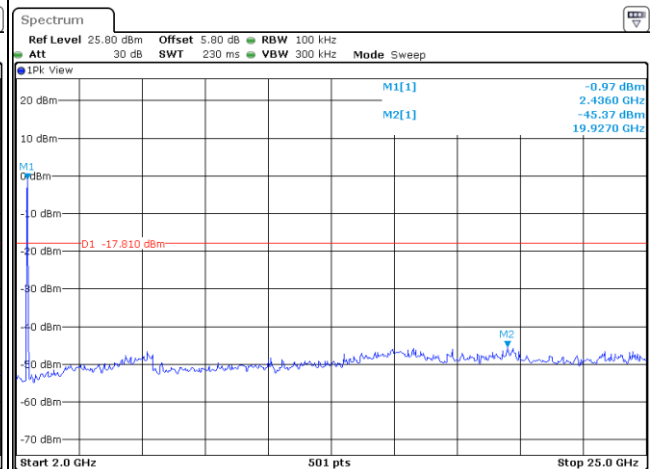
Channel Plot



Spurious Emission 30MHz~3GHz

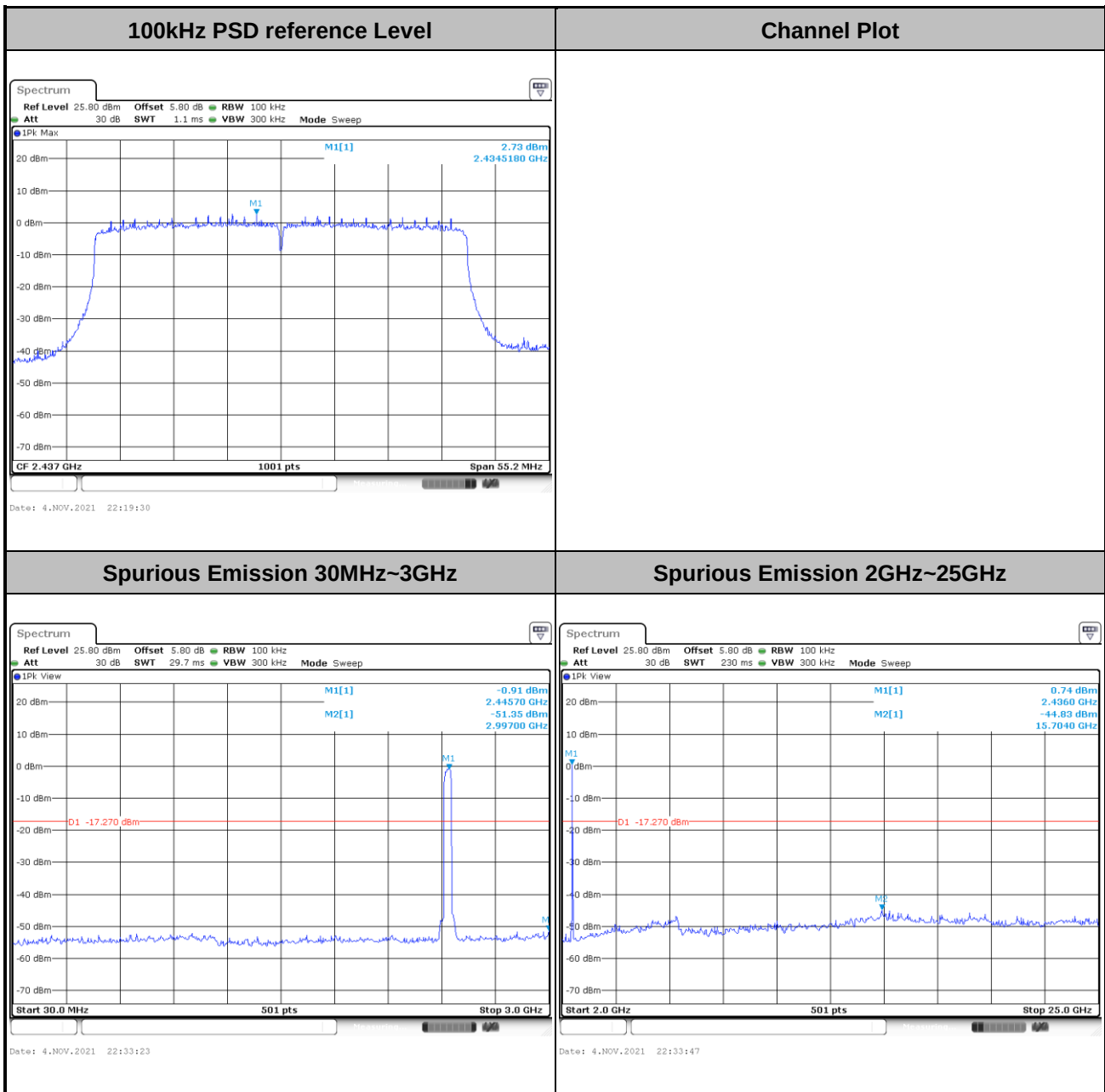


Spurious Emission 2GHz~25GHz





Test Mode :	802.11ax HE40	Test Channel :	06
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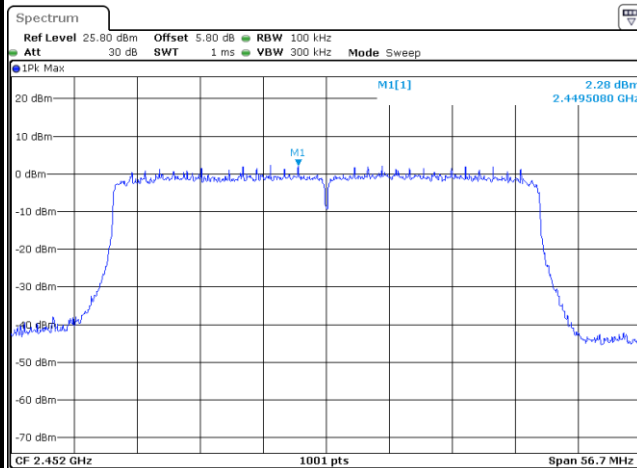




Test Mode : 802.11ax HE40

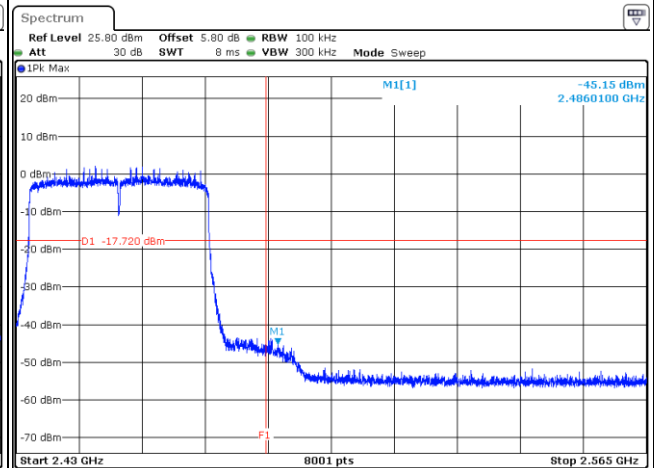
Test Channel : 09

100kHz PSD reference Level



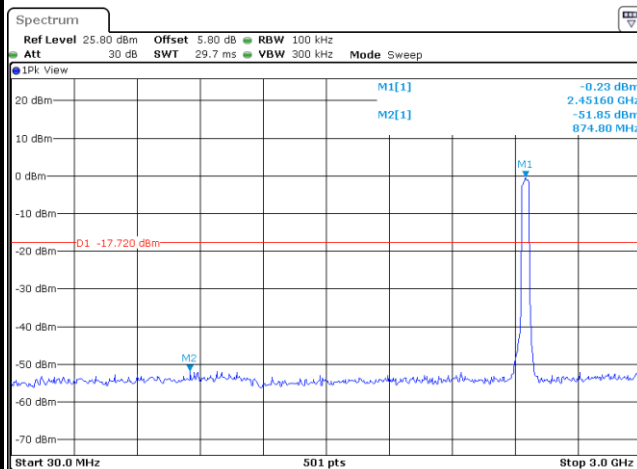
Date: 4.NOV.2021 22:29:53

Channel Plot



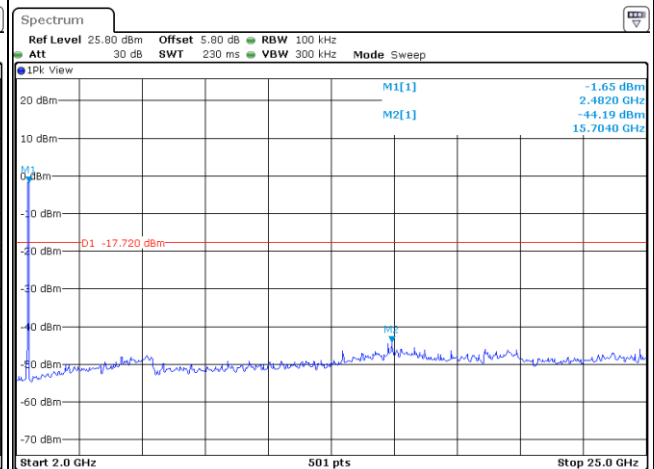
Date: 4.NOV.2021 22:30:12

Spurious Emission 30MHz~3GHz



Date: 4.NOV.2021 22:31:42

Spurious Emission 2GHz~25GHz



Date: 4.NOV.2021 22:31:55

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
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

3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

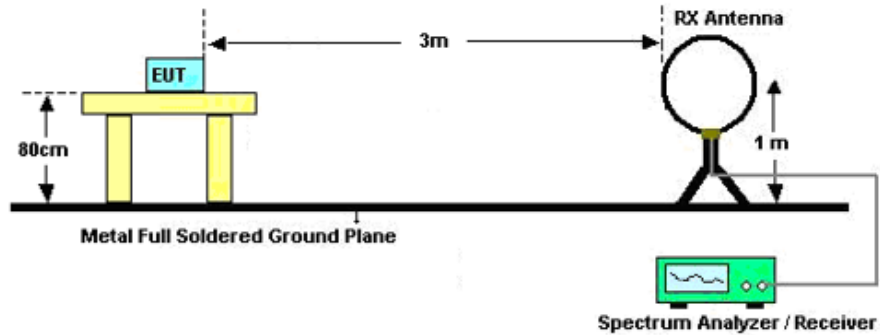
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.

For average measurement:

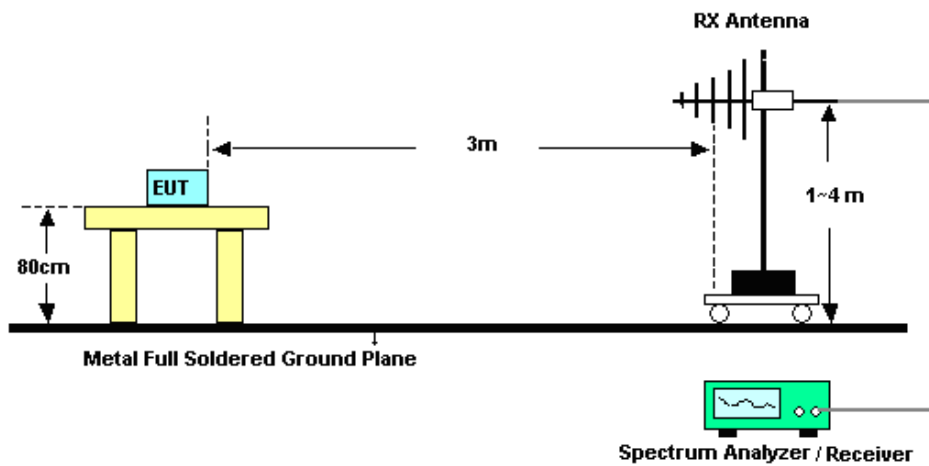
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

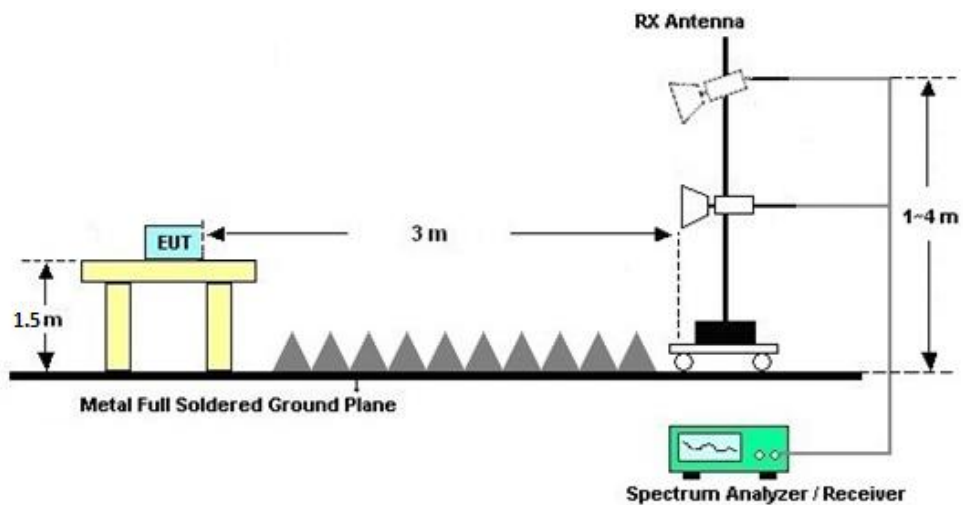
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



**3.5.5 Test Results of Radiated Spurious Emissions (9kHz ~ 30MHz)**

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

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.5.7 Duty Cycle

Please refer to Appendix D.

3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

Please refer to Appendix C.

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment 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 or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

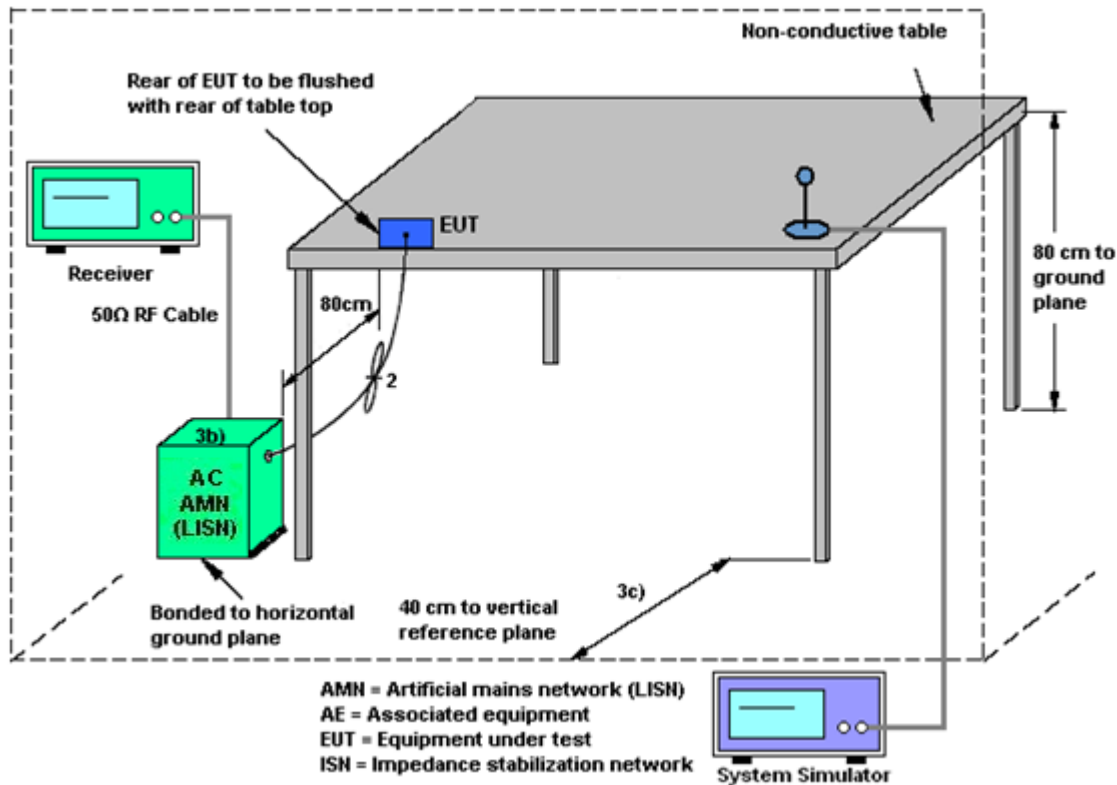
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9kHz) with Maximum Hold Mode.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. 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 rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = $10 \log(N_{ANT}/N_{SS}=1)$ dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain G_{ANT} is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

<CDD Modes>						
			DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
	Ant. 1 (dBi)	Ant. 2 (dBi)				
2.4 GHz	-2.88	-3.76	-2.88	-0.30	0.00	0.00

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 14, 2021	Nov. 04, 2021	Oct. 13, 2022	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 07, 2021	Nov. 04, 2021	Jan. 06, 2022	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 07, 2021	Nov. 04, 2021	Jan. 06, 2022	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz; Max 30dBm	Oct. 16, 2021	Nov. 23, 2021	Oct. 15, 2022	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz~44GHz	Apr. 12, 2021	Nov. 23, 2021	Apr. 11, 2022	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	Nov. 23, 2021	Oct. 29, 2022	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	49921	30MHz~1GHz	May 27, 2021	Nov. 23, 2021	May 26, 2022	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 25, 2021	Nov. 23, 2021	Apr. 24, 2022	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101093	18GHz~40GHz	Jan. 06, 2021	Nov. 23, 2021	Jan. 05, 2022	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Apr. 12, 2021	Nov. 23, 2021	Apr. 11, 2022	Radiation (03CH06-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 06, 2021	Nov. 23, 2021	Jan. 05, 2022	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Jan. 06, 2021	Nov. 23, 2021	Jan. 05, 2022	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY53270203	500MHz~26.5GHz	Apr. 13, 2021	Nov. 23, 2021	Apr. 12, 2022	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Nov. 23, 2021	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Nov. 23, 2021	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Nov. 23, 2021	NCR	Radiation (03CH06-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 21, 2021	Nov. 30, 2021	Apr. 20, 2022	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 14, 2021	Nov. 30, 2021	Oct. 13, 2022	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	Apr. 13, 2021	Nov. 30, 2021	Apr. 12, 2022	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 14, 2021	Nov. 30, 2021	Oct. 13, 2022	Conduction (CO01-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage $K=2$ to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.9dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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----- THE END -----



Appendix A. Conducted Test Results

Report Number : FR192317C

Test Engineer:	You Zhou	Temperature:	0-40	°C
Test Date:	2021/11/4	Relative Humidity:	51~54	%

TEST RESULTS DATA
Peak Output Power

2.4GHz Band																	
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Peak Conducted Power (dBm)				Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					RU	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	2	1	2412	-	22.02	21.01	24.55	30.00		-2.88		21.67		36.00		Pass
11b	1Mbps	2	6	2437	-	21.87	20.73	24.35	30.00		-2.88		21.47		36.00		Pass
11b	1Mbps	2	11	2462	-	21.78	21.50	24.65	30.00		-2.88		21.77		36.00		Pass
11g	6Mbps	2	1	2412	-	26.12	25.86	29.00	30.00		-2.88		26.12		36.00		Pass
11g	6Mbps	2	6	2437	-	25.55	26.05	28.82	30.00		-2.88		25.94		36.00		Pass
11g	6Mbps	2	11	2462	-	25.51	25.63	28.58	30.00		-2.88		25.70		36.00		Pass
HT20	MCS0	2	1	2412	-	26.42	25.66	29.07	30.00		-2.88		26.19		36.00		Pass
HT20	MCS0	2	6	2437	-	25.67	25.92	28.81	30.00		-2.88		25.93		36.00		Pass
HT20	MCS0	2	11	2462	-	25.72	25.77	28.76	30.00		-2.88		25.88		36.00		Pass
HT40	MCS0	2	3	2422	-	24.55	24.42	27.50	30.00		-2.88		24.62		36.00		Pass
HT40	MCS0	2	6	2437	-	24.76	24.67	27.73	30.00		-2.88		24.85		36.00		Pass
HT40	MCS0	2	9	2452	-	24.82	24.44	27.64	30.00		-2.88		24.76		36.00		Pass
HE20	MCS0	2	1	2412	FULL	26.67	26.07	29.39	30.00		-2.88		26.51		36.00		Pass
HE20	MCS0	2	1	2412	26	20.21	19.43	22.85	30.00		-2.88		19.97		36.00		Pass
HE20	MCS0	2	1	2412	52	21.14	19.51	23.41	30.00		-2.88		20.53		36.00		Pass
HE20	MCS0	2	1	2412	106	24.72	23.95	27.36	30.00		-2.88		24.48		36.00		Pass
HE20	MCS0	2	6	2437	FULL	25.85	26.31	29.10	30.00		-2.88		26.22		36.00		Pass
HE20	MCS0	2	6	2437	26	18.36	17.02	20.75	30.00		-2.88		17.87		36.00		Pass
HE20	MCS0	2	6	2437	52	19.24	18.14	21.74	30.00		-2.88		18.86		36.00		Pass
HE20	MCS0	2	6	2437	106	24.92	21.68	26.61	30.00		-2.88		23.73		36.00		Pass
HE20	MCS0	2	11	2462	FULL	25.81	25.85	28.84	30.00		-2.88		25.96		36.00		Pass
HE20	MCS0	2	11	2462	26	18.85	18.08	21.49	30.00		-2.88		18.61		36.00		Pass
HE20	MCS0	2	11	2462	52	19.78	19.38	22.59	30.00		-2.88		19.71		36.00		Pass
HE20	MCS0	2	11	2462	106	24.43	22.88	26.73	30.00		-2.88		23.85		36.00		Pass
HE40	MCS0	2	3	2422	FULL	24.95	24.75	27.86	30.00		-2.88		24.98		36.00		Pass
HE40	MCS0	2	3	2422	242	19.02	18.12	21.60	30.00		-2.88		18.72		36.00		Pass
HE40	MCS0	2	6	2437	FULL	25.22	25.01	28.13	30.00		-2.88		25.25		36.00		Pass
HE40	MCS0	2	6	2437	242	19.25	18.37	21.84	30.00		-2.88		18.96		36.00		Pass
HE40	MCS0	2	9	2452	FULL	24.97	24.97	27.98	30.00		-2.88		25.10		36.00		Pass
HE40	MCS0	2	9	2452	242	19.08	18.19	21.67	30.00		-2.88		18.79		36.00		Pass

Note: Measured power (dBm) has offset with cable loss.

TEST RESULTS DATA
Average Output Power

2.4GHz Band										
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Duty Factor (dB)			Average Conducted Power (dBm)		
					RU	Ant 1	Ant 2	Ant 1	Ant 2	SUM
11b	1Mbps	2	1	2412	-	0.09	0.09	19.56	18.55	22.10
11b	1Mbps	2	6	2437	-	0.09	0.09	19.37	18.24	21.86
11b	1Mbps	2	11	2462	-	0.09	0.09	19.23	18.96	22.11
11g	6Mbps	2	1	2412	-	0.03	0.03	18.14	18.11	21.14
11g	6Mbps	2	6	2437	-	0.03	0.03	17.90	17.59	20.76
11g	6Mbps	2	11	2462	-	0.03	0.03	17.40	17.65	20.54
HT20	MCS0	2	1	2412	-	0.00	0.00	17.99	18.03	21.02
HT20	MCS0	2	6	2437	-	0.00	0.00	17.78	17.53	20.67
HT20	MCS0	2	11	2462	-	0.00	0.00	17.27	17.38	20.34
HT40	MCS0	2	3	2422	-	0.00	0.00	16.45	16.41	19.44
HT40	MCS0	2	6	2437	-	0.00	0.00	16.61	16.65	19.64
HT40	MCS0	2	9	2452	-	0.00	0.00	16.34	16.36	19.36
HE20	MCS0	2	1	2412	FULL	0.00	0.00	18.01	18.11	21.07
HE20	MCS0	2	1	2412	26	0.00	0.00	9.42	8.05	11.80
HE20	MCS0	2	1	2412	52	0.00	0.00	9.24	8.01	11.68
HE20	MCS0	2	1	2412	106	0.00	0.00	13.44	12.35	15.94
HE20	MCS0	2	6	2437	FULL	0.00	0.00	17.84	17.56	20.71
HE20	MCS0	2	6	2437	26	0.00	0.00	7.69	6.18	10.01
HE20	MCS0	2	6	2437	52	0.00	0.00	8.86	8.03	11.48
HE20	MCS0	2	6	2437	106	0.00	0.00	12.83	11.18	15.09
HE20	MCS0	2	11	2462	FULL	0.00	0.00	17.33	17.46	20.41
HE20	MCS0	2	11	2462	26	0.00	0.00	7.86	7.14	10.53
HE20	MCS0	2	11	2462	52	0.00	0.00	8.76	8.54	11.66
HE20	MCS0	2	11	2462	106	0.00	0.00	13.45	11.90	15.75
HE40	MCS0	2	3	2422	FULL	0.00	0.00	16.48	16.44	19.47
HE40	MCS0	2	3	2422	242	0.00	0.00	8.67	7.34	11.07
HE40	MCS0	2	6	2437	FULL	0.00	0.00	16.67	16.69	19.69
HE40	MCS0	2	6	2437	242	0.00	0.00	9.18	8.42	11.83
HE40	MCS0	2	9	2452	FULL	0.00	0.00	16.39	16.38	19.40
HE40	MCS0	2	9	2452	242	0.00	0.00	8.22	7.78	11.02

Note: Measured power (dBm) has offset with cable loss.

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2		
11b	1Mbps	2	1	2412	13.39	13.74	8.04	8.02	0.50	Pass
11b	1Mbps	2	6	2437	13.34	13.29	8.06	8.06	0.50	Pass
11b	1Mbps	2	11	2462	13.24	13.19	8.06	8.06	0.50	Pass
11g	6Mbps	2	1	2412	17.03	17.23	16.32	16.34	0.50	Pass
11g	6Mbps	2	6	2437	17.13	17.13	16.32	16.32	0.50	Pass
11g	6Mbps	2	11	2462	17.03	17.08	16.32	16.34	0.50	Pass
HE20	MCS0	2	1	2412	19.38	19.43	18.75	18.78	0.50	Pass
HE20	MCS0	2	6	2437	19.48	19.38	18.88	18.38	0.50	Pass
HE20	MCS0	2	11	2462	19.33	19.33	18.73	18.43	0.50	Pass
HE40	MCS0	2	3	2422	37.86	37.96	37.64	37.56	0.50	Pass
HE40	MCS0	2	6	2437	37.96	37.86	37.80	36.80	0.50	Pass
HE40	MCS0	2	9	2452	37.86	37.96	37.80	37.80	0.50	Pass

TEST RESULTS DATA
Peak Power Spectral Density

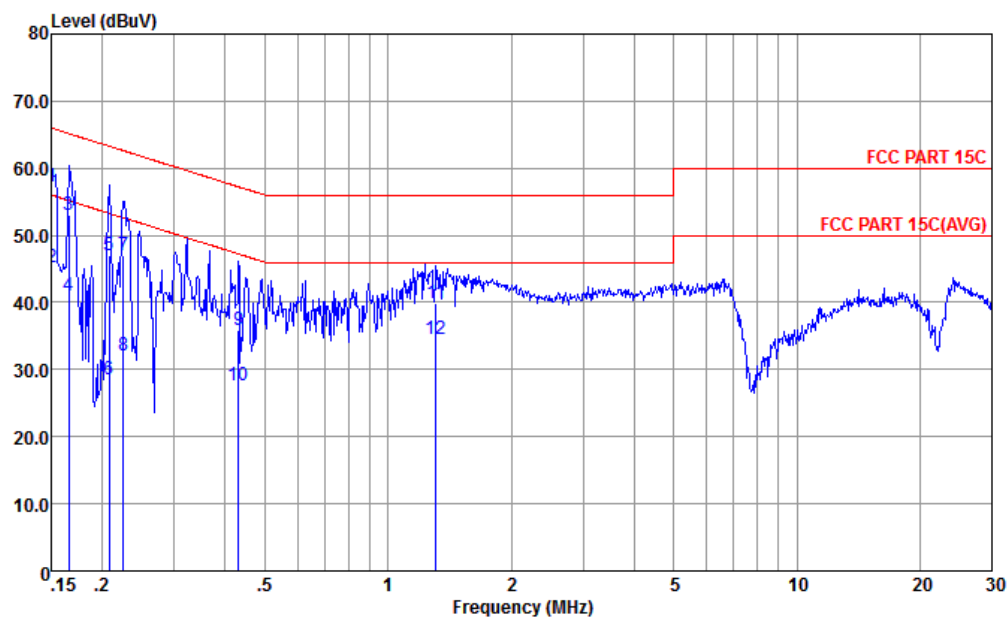
2.4GHz Band													
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)				DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					RU	Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	2	1	2412	-	-4.27	-5.62	-1.26	-0.30		8.00		Pass
11b	1Mbps	2	6	2437	-	-4.09	-5.03	-1.08	-0.30		8.00		Pass
11b	1Mbps	2	11	2462	-	-3.92	-4.26	-0.91	-0.30		8.00		Pass
11g	6Mbps	2	1	2412	-	-8.49	-7.62	-4.61	-0.30		8.00		Pass
11g	6Mbps	2	6	2437	-	-7.83	-8.59	-4.82	-0.30		8.00		Pass
11g	6Mbps	2	11	2462	-	-9.00	-8.35	-5.34	-0.30		8.00		Pass
HE20	MCS0	2	1	2412	FULL	-8.69	-8.78	-5.68	-0.30		8.00		Pass
HE20	MCS0	2	1	2412	26	-7.73	-9.45	-4.72	-0.30		8.00		Pass
HE20	MCS0	2	1	2412	52	-9.59	-10.26	-6.58	-0.30		8.00		Pass
HE20	MCS0	2	1	2412	106	-8.79	-9.58	-5.78	-0.30		8.00		Pass
HE20	MCS0	2	6	2437	FULL	-8.68	-9.15	-5.67	-0.30		8.00		Pass
HE20	MCS0	2	6	2437	26	-9.50	-10.28	-6.49	-0.30		8.00		Pass
HE20	MCS0	2	6	2437	52	-10.09	-10.69	-7.08	-0.30		8.00		Pass
HE20	MCS0	2	6	2437	106	-9.69	-10.23	-6.68	-0.30		8.00		Pass
HE20	MCS0	2	11	2462	FULL	-8.82	-8.86	-5.81	-0.30		8.00		Pass
HE20	MCS0	2	11	2462	26	-9.09	-9.88	-6.08	-0.30		8.00		Pass
HE20	MCS0	2	11	2462	52	-10.60	-10.71	-7.59	-0.30		8.00		Pass
HE20	MCS0	2	11	2462	106	-9.11	-9.64	-6.10	-0.30		8.00		Pass
HE40	MCS0	2	3	2422	FULL	-12.27	-12.09	-9.08	-0.30		8.00		Pass
HE40	MCS0	2	3	2422	242	-17.11	-16.90	-13.89	-0.30		8.00		Pass
HE40	MCS0	2	6	2437	FULL	-11.24	-12.43	-8.23	-0.30		8.00		Pass
HE40	MCS0	2	6	2437	242	-17.37	-17.48	-14.36	-0.30		8.00		Pass
HE40	MCS0	2	9	2452	FULL	-12.46	-12.79	-9.45	-0.30		8.00		Pass
HE40	MCS0	2	9	2452	242	-17.92	-17.73	-14.72	-0.30		8.00		Pass

Measured power density (dBm) has offset with cable loss.



Appendix B. AC Conducted Emission Test Results

Test Engineer :	Amos Zhang	Temperature :	25.3~26.2°C
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

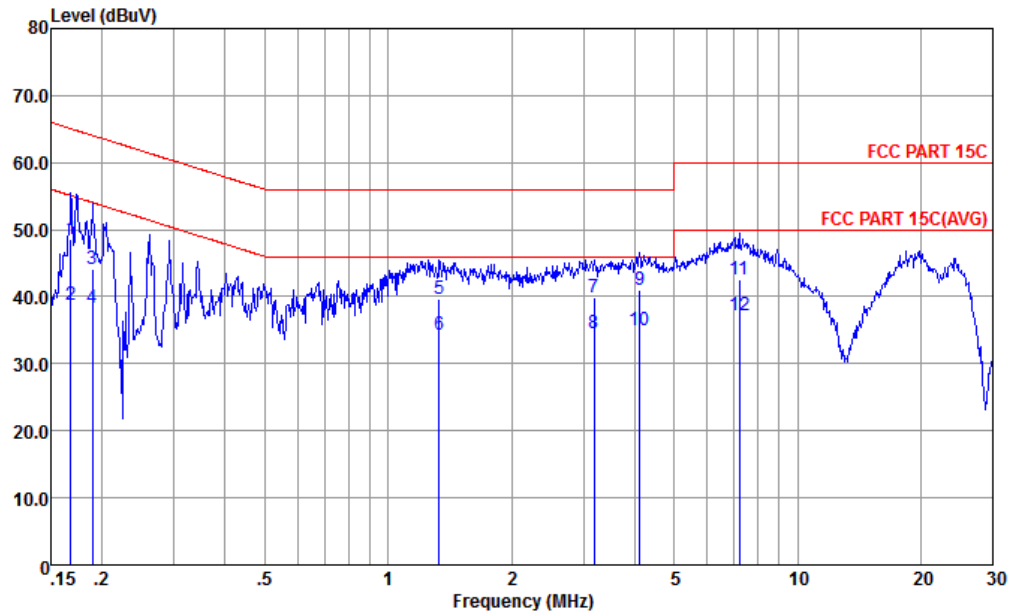


Site : CO01-KS
Condition : FCC PART 15C LISN-060105-L LINE

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1 *	0.150	57.30	-8.70	66.00	46.80	0.02	10.48	QP
2	0.150	45.30	-10.70	56.00	34.80	0.02	10.48	Average
3	0.166	53.07	-12.09	65.16	42.60	0.03	10.44	QP
4	0.166	41.07	-14.09	55.16	30.60	0.03	10.44	Average
5	0.208	47.00	-16.27	63.27	36.60	0.04	10.36	QP
6	0.208	28.50	-24.77	53.27	18.10	0.04	10.36	Average
7	0.226	47.00	-15.61	62.61	36.60	0.05	10.35	QP
8	0.226	32.20	-20.41	52.61	21.80	0.05	10.35	Average
9	0.431	35.95	-21.29	57.24	25.60	0.09	10.26	QP
10	0.431	27.55	-19.69	47.24	17.20	0.09	10.26	Average
11	1.310	39.97	-16.03	56.00	29.61	0.13	10.23	QP
12	1.310	34.57	-11.43	46.00	24.21	0.13	10.23	Average



Test Engineer :	Amos Zhang	Temperature :	25.3~26.2°C
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : FCC PART 15C LISN-060105-N NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.168	48.64	-16.44	65.08	38.10	0.11	10.43	QP
2	0.168	38.84	-16.24	55.08	28.30	0.11	10.43	Average
3	0.189	44.09	-19.97	64.06	33.61	0.10	10.38	QP
4	0.189	38.29	-15.77	54.06	27.81	0.10	10.38	Average
5	1.331	39.66	-16.34	56.00	29.30	0.13	10.23	QP
6	1.331	34.26	-11.74	46.00	23.90	0.13	10.23	Average
7	3.190	39.90	-16.10	56.00	29.51	0.15	10.24	QP
8	3.190	34.50	-11.50	46.00	24.11	0.15	10.24	Average
9	4.114	40.92	-15.08	56.00	30.50	0.17	10.25	QP
10 *	4.114	35.02	-10.98	46.00	24.60	0.17	10.25	Average
11	7.213	42.61	-17.39	60.00	32.10	0.20	10.31	QP
12	7.213	37.11	-12.89	50.00	26.60	0.20	10.31	Average

Note:

1. Level(dBuV) = Read Level(dBuV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBuV) – Limit Line(dBuV)



Appendix C. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
4+6		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2325.34	53.64	-20.36	74	49.35	30.71	7.04	33.46	107	220	P	H
		2388.91	42.79	-11.21	54	38.14	30.94	7.16	33.45	107	220	A	H
	*	2412	108.24	-	-	103.5	31	7.18	33.44	107	220	P	H
	*	2412	104.92	-	-	100.18	31	7.18	33.44	107	220	A	H
		2375.65	53.65	-20.35	74	49.09	30.88	7.13	33.45	374	126	P	V
		2389.3	42.42	-11.58	54	37.77	30.94	7.16	33.45	374	126	A	V
	*	2414	104.67	-	-	99.93	31	7.18	33.44	374	126	P	V
	*	2414	101.13	-	-	96.39	31	7.18	33.44	374	126	A	V
802.11b CH 11 2462MHz	*	2462	109.4	-	-	104.48	31.1	7.25	33.43	100	214	P	H
	*	2462	105.92	-	-	101	31.1	7.25	33.43	100	214	A	H
		2485.6	55.12	-18.88	74	50.11	31.17	7.27	33.43	100	214	P	H
		2488.06	44.09	-9.91	54	39.04	31.17	7.3	33.42	100	214	A	H
	*	2464	106.06	-	-	101.14	31.1	7.25	33.43	396	143	P	V
	*	2464	103.24	-	-	98.32	31.1	7.25	33.43	396	143	A	V
		2486.14	54.76	-19.24	74	49.74	31.17	7.27	33.42	396	143	P	V
		2487.76	43.76	-10.24	54	38.71	31.17	7.3	33.42	396	143	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI Ant. 4+6	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	41.15	-32.85	74	58.13	34.57	10.26	61.81	100	360	P	H
		4824	41.6	-32.4	74	58.58	34.57	10.26	61.81	100	360	P	V
802.11b CH 06 2437MHz		4872	39.96	-34.04	74	56.75	34.66	10.32	61.77	100	360	P	H
		7308	44.68	-29.32	74	57.43	36.56	12.75	62.06	100	360	P	H
		4872	40.5	-33.5	74	57.29	34.66	10.32	61.77	100	360	P	V
		7308	45.27	-28.73	74	58.02	36.56	12.75	62.06	100	360	P	V
802.11b CH 11 2462MHz		4926	40.18	-33.82	74	56.78	34.75	10.39	61.74	100	360	P	H
		7386	41.8	-32.2	74	54.46	36.58	12.83	62.07	100	360	P	H
		4926	40.97	-33.03	74	57.57	34.75	10.39	61.74	100	360	P	V
		7386	43.37	-30.63	74	56.03	36.58	12.83	62.07	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
WIFI 802.11g (Band Edge @ 3m)

WIFI Ant. 4+6	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2389.82	60.21	-13.79	74	55.56	30.94	7.16	33.45	149	94	P	H
		2389.95	47.48	-6.52	54	42.83	30.94	7.16	33.45	149	94	A	H
	*	2414	108.59	-	-	103.85	31	7.18	33.44	149	94	P	H
	*	2414	100.64	-	-	95.9	31	7.18	33.44	149	94	A	H
		2389.43	54.88	-19.12	74	50.23	30.94	7.16	33.45	304	73	P	V
		2389.95	43.4	-10.6	54	38.75	30.94	7.16	33.45	304	73	A	V
	*	2410	101.43	-	-	96.69	31	7.18	33.44	304	73	P	V
	*	2408	93.97	-	-	89.23	31	7.18	33.44	304	73	A	V
802.11g CH 11 2462MHz	*	2466	108.77	-	-	103.85	31.1	7.25	33.43	133	152	P	H
	*	2460	101.28	-	-	96.36	31.1	7.25	33.43	133	152	A	H
		2483.5	61.91	-12.09	74	56.94	31.13	7.27	33.43	133	152	P	H
		2483.5	48.18	-5.82	54	43.21	31.13	7.27	33.43	133	152	A	H
	*	2466	102.99	-	-	98.07	31.1	7.25	33.43	298	43	P	V
	*	2464	95.39	-	-	90.47	31.1	7.25	33.43	298	43	A	V
		2484.04	55.74	-18.26	74	50.77	31.13	7.27	33.43	298	43	P	V
		2483.5	44.34	-9.66	54	39.37	31.13	7.27	33.43	298	43	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 4+6	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	41.46	-32.54	74	58.44	34.57	10.26	61.81	300	0	P	H
		4824	41.45	-32.55	74	58.43	34.57	10.26	61.81	300	360	P	V
802.11g CH 06 2437MHz		4872	39.78	-34.22	74	56.57	34.66	10.32	61.77	300	0	P	H
		7308	43.24	-30.76	74	55.99	36.56	12.75	62.06	300	0	P	H
		4872	41.94	-32.06	74	58.73	34.66	10.32	61.77	300	360	P	V
		7308	43.3	-30.7	74	56.05	36.56	12.75	62.06	300	360	P	V
802.11g CH 11 2462MHz		4926	40.23	-33.77	74	56.83	34.75	10.39	61.74	300	0	P	H
		7386	43.05	-30.95	74	55.71	36.58	12.83	62.07	300	0	P	H
		4926	40.35	-33.65	74	56.95	34.75	10.39	61.74	300	360	P	V
		7386	43.31	-30.69	74	55.97	36.58	12.83	62.07	300	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11 ax HE20 Full (Band Edge @ 3m)

WIFI Ant. 4+6	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE20 Full CH 01 2412MHz		2387.87	62.21	-11.79	74	57.56	30.94	7.16	33.45	100	94	P	H
		2389.69	47.77	-6.23	54	43.12	30.94	7.16	33.45	100	94	A	H
	*	2406	110.8	-	-	106.06	31	7.18	33.44	100	94	P	H
	*	2406	100.15	-	-	95.41	31	7.18	33.44	100	94	A	H
		2389.95	60	-14	74	55.35	30.94	7.16	33.45	369	133	P	V
		2389.95	46.31	-7.69	54	41.66	30.94	7.16	33.45	369	133	A	V
	*	2418	108.17	-	-	103.4	31.03	7.18	33.44	369	133	P	V
	*	2418	97.67	-	-	92.9	31.03	7.18	33.44	369	133	A	V
8802.11ax HE20 Full CH 11 2462MHz	*	2468	110.59	-	-	105.67	31.1	7.25	33.43	131	154	P	H
	*	2458	100.62	-	-	95.7	31.1	7.25	33.43	131	154	A	H
		2483.5	63.48	-10.52	74	58.51	31.13	7.27	33.43	131	154	P	H
		2483.5	50.14	-3.86	54	45.17	31.13	7.27	33.43	131	154	A	H
	*	2460	106.93	-	-	102.01	31.1	7.25	33.43	400	129	P	V
	*	2460	97.13	-	-	92.21	31.1	7.25	33.43	400	129	A	V
		2483.56	61.49	-12.51	74	56.52	31.13	7.27	33.43	400	129	P	V
		2483.5	48.74	-5.26	54	43.77	31.13	7.27	33.43	400	129	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11 ax HE20 Full (Harmonic @ 3m)

WIFI Ant. 4+6	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamplifier Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE20 Full		4824	41.22	-32.78	74	58.2	34.57	10.26	61.81	300	0	P	H
CH 01 2412MHz		4824	42.41	-31.59	74	59.39	34.57	10.26	61.81	300	360	P	V
802.11ax HE20 Full		4872	40.18	-33.82	74	56.97	34.66	10.32	61.77	300	0	P	H
CH 06 2437MHz		7308	43.06	-30.94	74	55.81	36.56	12.75	62.06	300	0	P	H
		4872	40.35	-33.65	74	57.14	34.66	10.32	61.77	300	360	P	V
		7308	43.09	-30.91	74	55.84	36.56	12.75	62.06	300	360	P	V
802.11ax HE20 Full		4926	40.35	-33.65	74	56.95	34.75	10.39	61.74	300	0	P	H
CH 11 2462MHz		7386	42.9	-31.1	74	55.56	36.58	12.83	62.07	300	0	P	H
		4926	40.9	-33.1	74	57.5	34.75	10.39	61.74	300	360	P	V
		7386	42.94	-31.06	74	55.6	36.58	12.83	62.07	300	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11ax HE20 Partial 26 (Band Edge @ 3m)

WIFI Ant. 4+6	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE20 Partial 26/0 CH 01 2412MHz		2370.58	54.41	-19.59	74	49.85	30.88	7.13	33.45	104	227	P	H
		2389.82	42.66	-11.34	54	38.01	30.94	7.16	33.45	104	227	A	H
		2404	105.43	-	-	100.69	31	7.18	33.44	104	227	P	H
		2402	96.79	-	-	92.07	31	7.16	33.44	104	227	A	H
		2366.81	53.72	-20.28	74	49.19	30.88	7.1	33.45	334	139	P	V
		2389.04	42.56	-11.44	54	37.91	30.94	7.16	33.45	334	139	A	V
		2404	101.29	-	-	96.55	31	7.18	33.44	334	139	P	V
		2402	92.07	-	-	87.35	31	7.16	33.44	334	139	A	V
802.11ax HE20 Partial 26/8 CH 11 2462MHz		2486.2	54.72	-19.28	74	49.7	31.17	7.27	33.42	100	214	P	H
		2484.1	43.02	-10.98	54	38.05	31.13	7.27	33.43	100	214	A	H
		2470	104.54	-	-	99.59	31.13	7.25	33.43	100	214	P	H
		2472	94.85	-	-	89.88	31.13	7.27	33.43	100	214	A	H
		2494.72	54.45	-19.55	74	49.4	31.17	7.3	33.42	302	264	P	V
		2487.34	42.96	-11.04	54	37.94	31.17	7.27	33.42	302	264	A	V
		2472	97.78	-	-	92.81	31.13	7.27	33.43	302	264	P	V
		2472	88.96	-	-	83.99	31.13	7.27	33.43	302	264	A	V
Remark	3. No other spurious found.												
	4. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11ax HE20 Partial 52 (Band Edge @ 3m)

WIFI Ant. 4+6	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE20 Partial 52/37 CH 01 2412MHz		2349.13	53.38	-20.62	74	48.93	30.83	7.07	33.45	100	192	P	H
		2389.69	42.59	-11.41	54	37.94	30.94	7.16	33.45	100	192	A	H
		2406	104.73	-	-	99.99	31	7.18	33.44	100	192	P	H
		2402	91.98	-	-	87.26	31	7.16	33.44	100	192	A	H
		2310.52	54	-20	74	49.81	30.65	7.01	33.47	352	68	P	V
		2389.95	42.46	-11.54	54	37.81	30.94	7.16	33.45	352	68	A	V
		2406	98.06	-	-	93.32	31	7.18	33.44	352	68	P	V
		2406	88.43	-	-	83.69	31	7.18	33.44	352	68	A	V
802.11ax HE20 Partial 52/40 CH 11 2462MHz		2487.16	54.05	-19.95	74	49.03	31.17	7.27	33.42	179	202	P	H
		2484.46	42.99	-11.01	54	38.02	31.13	7.27	33.43	179	202	A	H
		2468	104.48	-	-	99.56	31.1	7.25	33.43	179	202	P	H
		2468	95.43	-	-	90.51	31.1	7.25	33.43	179	202	A	H
		2486.02	54.43	-19.57	74	49.41	31.17	7.27	33.42	309	264	P	V
		2486.38	42.88	-11.12	54	37.86	31.17	7.27	33.42	309	264	A	V
		2470	95.96	-	-	91.01	31.13	7.25	33.43	309	264	P	V
		2470	87.16	-	-	82.21	31.13	7.25	33.43	309	264	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11ax HE20 Partial 106 (Band Edge @ 3m)

WIFI Ant. 4+6	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE20 Partial 106/53 CH 01 2412MHz		2379.29	54.12	-19.88	74	49.56	30.88	7.13	33.45	102	188	P	H
		2389.56	42.56	-11.44	54	37.91	30.94	7.16	33.45	102	188	A	H
		2406	107.45	-	-	102.71	31	7.18	33.44	102	188	P	H
		2408	97.79	-	-	93.05	31	7.18	33.44	102	188	A	H
		2321.83	53.57	-20.43	74	49.28	30.71	7.04	33.46	378	140	P	V
		2389.43	42.56	-11.44	54	37.91	30.94	7.16	33.45	378	140	A	V
		2406	102.05	-	-	97.31	31	7.18	33.44	378	140	P	V
		2408	93.1	-	-	88.36	31	7.18	33.44	378	140	A	V
802.11ax HE20 Partial 106/54 CH 11 2462MHz		2484.22	58.61	-15.39	74	53.64	31.13	7.27	33.43	133	153	P	H
		2483.86	43.29	-10.71	54	38.32	31.13	7.27	33.43	133	153	A	H
		2466	106.79	-	-	101.87	31.1	7.25	33.43	133	153	P	H
		2466	97.82	-	-	92.9	31.1	7.25	33.43	133	153	A	H
		2484.94	55.91	-18.09	74	50.94	31.13	7.27	33.43	400	124	P	V
		2483.5	43.05	-10.95	54	38.08	31.13	7.27	33.43	400	124	A	V
		2470	104.08	-	-	99.13	31.13	7.25	33.43	400	124	P	V
		2468	94.08	-	-	89.16	31.1	7.25	33.43	400	124	A	V
Remark	3. No other spurious found.												
	4. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11 ax HE40 Full (Band Edge @ 3m)

WIFI Ant. 4+6	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE40 Full CH 03 2422MHz		2388.91	55.36	-18.64	74	50.71	30.94	7.16	33.45	100	192	P	H
		2389.95	44.79	-9.21	54	40.14	30.94	7.16	33.45	100	192	A	H
	*	2430	106.27	-	-	101.48	31.03	7.2	33.44	100	192	P	H
	*	2430	96.06	-	-	91.27	31.03	7.2	33.44	100	192	A	H
		2484.46	54.37	-19.63	74	49.4	31.13	7.27	33.43	100	192	P	H
		2483.98	43.54	-10.46	54	38.57	31.13	7.27	33.43	100	192	A	H
		2344.45	53.58	-20.42	74	49.2	30.77	7.07	33.46	296	72	P	V
		2389.95	42.71	-11.29	54	38.06	30.94	7.16	33.45	296	72	A	V
	*	2426	100.31	-	-	95.52	31.03	7.2	33.44	296	72	P	V
	*	2426	90.2	-	-	85.41	31.03	7.2	33.44	296	72	A	V
		2484.46	53.68	-20.32	74	48.71	31.13	7.27	33.43	296	72	P	V
		2484.76	42.73	-11.27	54	37.76	31.13	7.27	33.43	296	72	A	V
802.11ax HE40 Full CH 06 2437MHz		2389.56	56.14	-17.86	74	51.49	30.94	7.16	33.45	100	194	P	H
		2389.95	45.1	-8.9	54	40.45	30.94	7.16	33.45	100	194	A	H
	*	2432	106.77	-	-	101.98	31.03	7.2	33.44	100	194	P	H
	*	2424	96.08	-	-	91.29	31.03	7.2	33.44	100	194	A	H
		2483.62	57.57	-16.43	74	52.6	31.13	7.27	33.43	100	194	P	H
		2483.5	45.49	-8.51	54	40.52	31.13	7.27	33.43	100	194	A	H
		2389.82	53.89	-20.11	74	49.24	30.94	7.16	33.45	365	147	P	V
		2389.95	43.23	-10.77	54	38.58	30.94	7.16	33.45	365	147	A	V
	*	2426	102.49	-	-	97.7	31.03	7.2	33.44	365	147	P	V
	*	2428	92.11	-	-	87.32	31.03	7.2	33.44	365	147	A	V
		2483.5	55.13	-18.87	74	50.16	31.13	7.27	33.43	365	147	P	V
		2483.8	44.01	-9.99	54	39.04	31.13	7.27	33.43	365	147	A	V



WIFI Ant. 4+6	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE40 Full CH 09 2452MHz		2388	54.25	-19.75	74	49.6	30.94	7.16	33.45	100	200	P	H
		2389.95	42.64	-11.36	54	37.99	30.94	7.16	33.45	100	200	A	H
	*	2460	106.04	-	-	101.12	31.1	7.25	33.43	100	200	P	H
	*	2460	95.76	-	-	90.84	31.1	7.25	33.43	100	200	A	H
		2485.9	65.75	-8.25	74	60.73	31.17	7.27	33.42	100	200	P	H
		2483.5	47.95	-6.05	54	42.98	31.13	7.27	33.43	100	200	A	H
		2379.81	53.38	-20.62	74	48.82	30.88	7.13	33.45	400	120	P	V
		2389.56	42.26	-11.74	54	37.61	30.94	7.16	33.45	400	120	A	V
	*	2458	103.31	-	-	98.39	31.1	7.25	33.43	400	120	P	V
	*	2460	93.04	-	-	88.12	31.1	7.25	33.43	400	120	A	V
		2485.12	65.17	-8.83	74	60.16	31.17	7.27	33.43	400	120	P	V
		2483.5	48.29	-5.71	54	43.32	31.13	7.27	33.43	400	120	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11 ax HE40 Full (Harmonic @ 3m)

WIFI Ant. 4+6	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax		4842	40.84	-33.16	74	57.75	34.6	10.28	61.79	300	0	P	H
HE40 Full		7266	42.47	-31.53	74	55.25	36.55	12.72	62.05	300	0	P	H
CH 03		4842	41.39	-32.61	74	58.3	34.6	10.28	61.79	300	360	P	V
2422MHz		7266	43.19	-30.81	74	55.97	36.55	12.72	62.05	300	360	P	V
802.11ax		4872	40.54	-33.46	74	57.33	34.66	10.32	61.77	300	0	P	H
HE40 Full		7308	42.49	-31.51	74	55.24	36.56	12.75	62.06	300	0	P	H
CH 06		4872	42.02	-31.98	74	58.81	34.66	10.32	61.77	300	360	P	V
2437MHz		7308	43.11	-30.89	74	55.86	36.56	12.75	62.06	300	360	P	V
802.11ax		4902	40.46	-33.54	74	57.15	34.69	10.37	61.75	300	0	P	H
HE40 Full		7356	42.98	-31.02	74	55.67	36.57	12.8	62.06	300	0	P	H
CH 09		4902	40.31	-33.69	74	57	34.69	10.37	61.75	300	360	P	V
2452MHz		7356	43.41	-30.59	74	56.1	36.57	12.8	62.06	300	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11ax HE40 Partial 242 (Band Edge @ 3m)

WIFI Ant. 4+6	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE40 Partial 242/61 CH 03 2422MHz		2349.65	54.18	-19.82	74	49.73	30.83	7.07	33.45	130	228	P	H
		2389.95	42.63	-11.37	54	37.98	30.94	7.16	33.45	130	228	A	H
		2483.8	53.68	-20.32	74	48.71	31.13	7.27	33.43	130	228	P	H
		2483.98	43.03	-10.97	54	38.06	31.13	7.27	33.43	130	228	A	H
		2420	100.41	-	-	95.62	31.03	7.2	33.44	130	228	P	H
		2420	89.94	-	-	85.15	31.03	7.2	33.44	130	228	A	H
		2350.3	53.71	-20.29	74	49.26	30.83	7.07	33.45	372	137	P	V
		2389.95	42.47	-11.53	54	37.82	30.94	7.16	33.45	372	137	A	V
		2487.58	54.04	-19.96	74	48.99	31.17	7.3	33.42	372	137	P	V
		2486.68	42.88	-11.12	54	37.86	31.17	7.27	33.42	372	137	A	V
		2420	96.31	-	-	91.52	31.03	7.2	33.44	372	137	P	V
		2420	86.61	-	-	81.82	31.03	7.2	33.44	372	137	A	V
802.11ax HE40 Partial 242/62 CH 09 2452MHz		2382.15	53.69	-20.31	74	49.13	30.88	7.13	33.45	101	220	P	H
		2389.82	42.57	-11.43	54	37.92	30.94	7.16	33.45	101	220	A	H
		2491.3	54.37	-19.63	74	49.32	31.17	7.3	33.42	101	220	P	H
		2483.5	43.05	-10.95	54	38.08	31.13	7.27	33.43	101	220	A	H
		2460	98.92	-	-	94	31.1	7.25	33.43	101	220	P	H
		2460	90.25	-	-	85.33	31.1	7.25	33.43	101	220	A	H
		2320.79	53.85	-20.15	74	49.57	30.71	7.04	33.47	400	129	P	V
		2389.04	42.35	-11.65	54	37.7	30.94	7.16	33.45	400	129	A	V
		2488.6	53.55	-20.45	74	48.5	31.17	7.3	33.42	400	129	P	V
		2483.62	42.73	-11.27	54	37.76	31.13	7.27	33.43	400	129	A	V
		2458	96.72	-	-	91.8	31.1	7.25	33.43	400	129	P	V
		2458	87.71	-	-	82.79	31.1	7.25	33.43	400	129	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz WIFI 802.11ax HE20 (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
4+6		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11ax HE20 LF		35.82	27.26	-12.74	40	36.22	21.77	0.66	31.39	-	-	P	H
		55.22	22.09	-17.91	40	38.94	13.45	0.96	31.26	-	-	P	H
		114.39	29.01	-14.49	43.5	41.81	17.17	1.73	31.7	-	-	P	H
		127	29.01	-14.49	43.5	41.79	16.97	1.82	31.57	-	-	P	H
		288.02	23.49	-22.51	46	33.26	19.05	2.75	31.57	-	-	P	H
		891.36	34.29	-11.71	46	33.9	26.7	4.87	31.18	-	-	P	H
		36.79	29.42	-10.58	40	38.5	21.7	0.68	31.46	-	-	P	V
		56.19	30.3	-9.7	40	46.63	14.04	0.97	31.34	-	-	P	V
		127.97	25.59	-17.91	43.5	37.55	17.77	1.83	31.56	-	-	P	V
		157.07	24.33	-19.17	43.5	36.29	17.34	2.02	31.32	-	-	P	V
		258.92	18.42	-27.58	46	27.69	19.54	2.6	31.41	-	-	P	V
		678.93	26.04	-19.96	46	27.24	25.78	4.24	31.22	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Co-location

2.4GHz 2400~2483.5MHz&WWAN Part 96 LTE B48

WIFI 802.11 ax HE20 Full (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
8802.11ax HE20 Full CH 11 2462MHz	*	2483.74	59.44	-14.56	74	53.68	31.13	7.27	32.64	152	147	P	H
	*	2483.5	47.82	-6.18	54	42.06	31.13	7.27	32.64	152	147	A	H
		2464	109.11	---	---	103.47	31.1	7.25	32.71	152	147	P	H
		2462	98.6	---	---	92.96	31.1	7.25	32.71	152	147	A	H
	*	2483.68	59.04	-14.96	74	53.28	31.13	7.27	32.64	395	127	P	V
	*	2483.5	46.82	-7.18	54	41.06	31.13	7.27	32.64	395	127	A	V
		2462	108.05	---	---	102.41	31.1	7.25	32.71	395	127	P	V
		2462	99.73	---	---	94.09	31.1	7.25	32.71	395	127	A	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11 ax HE20 Full (Harmonic @ 3m)

WIFI Ant.	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax		4926	41.23	-32.77	74	56.11	34.75	10.39	60.02	100	0	P	H
HE20 Full		7392	43.27	-30.73	74	54.39	36.58	12.83	60.53	100	360	P	H
CH 11		4926	41.37	-32.63	74	56.25	34.75	10.39	60.02	100	360	P	V
2462MHz		7392	42.74	-31.26	74	53.86	36.58	12.83	60.53	100	0	P	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
4+6		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H
2412MHz													

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)

2. Level(dBμV/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

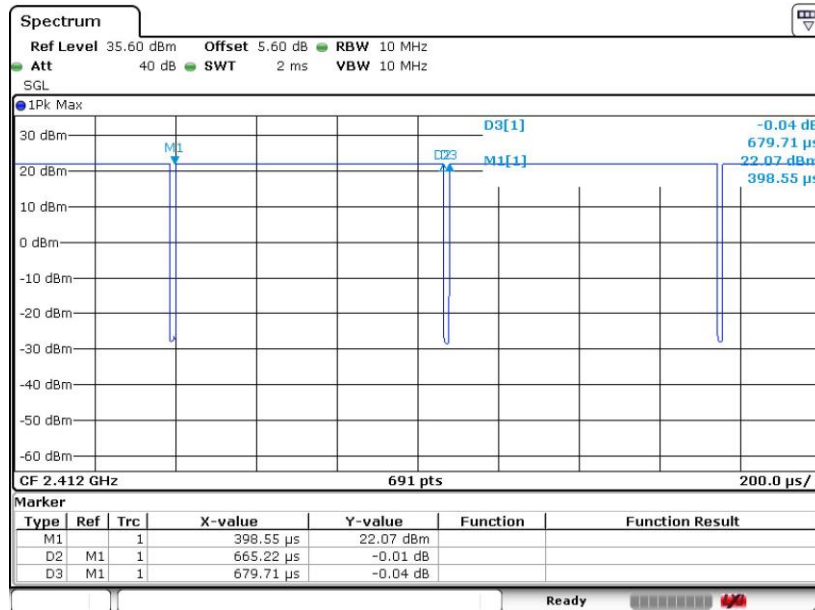
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.

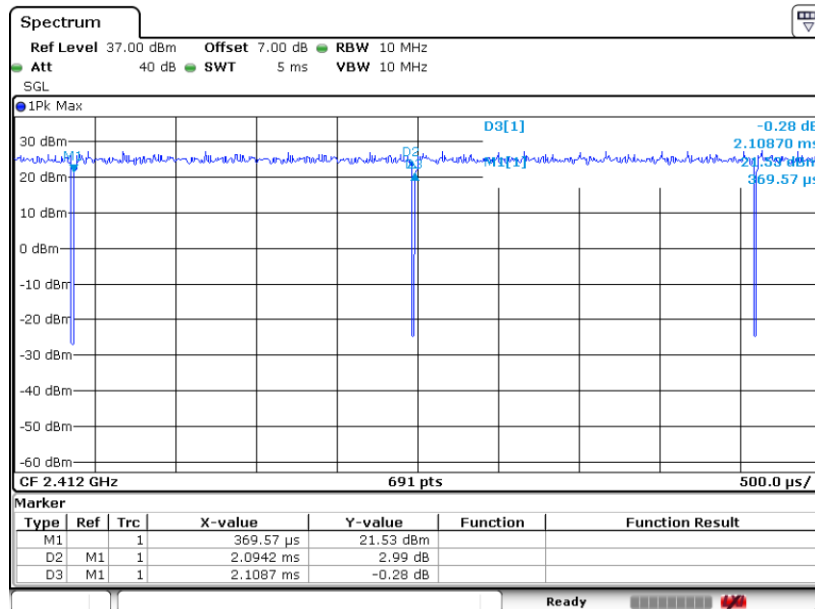
Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	97.87	0.665	1.503	3kHz
802.11g	99.31	-	-	10Hz
802.11ax HE20	100	-	-	10Hz
802.11ax HE20	100	-	-	10Hz

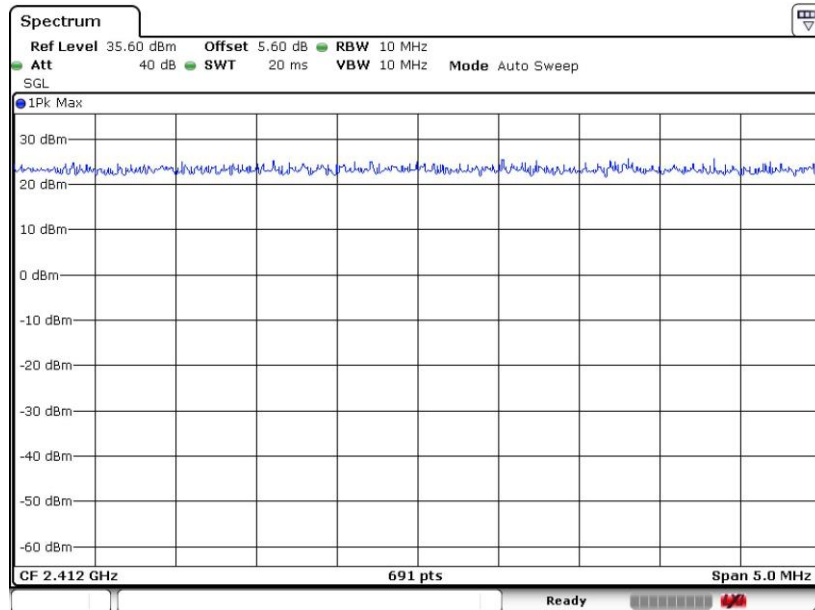
802.11b



802.11g



802.11ax HE20



802.11ax HE40

