FCC RADIO TEST REPORT

FCC ID	:	**2AIWVN302**
Equipment	:	**Nanit Pro Baby Monitor**
Brand Name	:	**Nanit**
Model Name	:	**N302**
Applicant	:	**Udisense Inc. DBA: Nanit** **244 Fifth Avenue Suite #2702, New York, NY, United States 10001**
Manufacturer	:	**Udisense Inc. DBA: Nanit** **244 Fifth Avenue Suite #2702, New York, NY, United States 10001**
Standard	:	**FCC Part 15 Subpart C §15.247**

The product was received on Feb. 18, 2022 and testing was performed from Mar. 03, 2022 to Mar. 29, 2022. We, Sporton International Inc. Wensan Laboratory, 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 from Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory

No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issue Date
FR221836C	01	Initial issue of report	May 03, 2022
FR221836C	02	1. Revise AC Conducted Emission test mode 2. Revise Antenna Requirements	May 10, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(a)(2)	6dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.247(b)	Power Output Measurement	Pass	-
3.3	15.247(e)	Power Spectral Density	Pass	-
3.4	15.247(d)	Conducted Band Edges	Pass	-
		Conducted Spurious Emission	Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	0.29 dB under the limit at 2483.520 MHz
3.6	15.207	AC Conducted Emission	Pass	15.98 dB under the limit at 0.618 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	Pass	-

Declaration of Conformity:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
   It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to this report "Uncertainty of Evaluation".

Comments and Explanations:

The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Yun Huang

Report Producer: Cindy Liu

1 General Description

1.1 Product Feature of Equipment Under Test

Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n/ac

Product Feature	
Antenna Type	WLAN **<Ant. 1>:** Dipole Antenna **<Ant. 2>:** Dipole Antenna Bluetooth: Dipole Antenna

Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	<Ant. 1>: 3.9 <Ant. 2>: 2.0

Remark: The EUT's information above is declared by manufacturer. Please refer to Comments and Explanations in report summary.

1.2 Modification of EUT

No modifications made to the EUT during the testing.

1.3 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	CO05-HY (TAF Code: 1190)
Remark	The AC Conducted Emission test item subcontracted to Sporton International Inc. EMC & Wireless Communications Laboratory.

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	TH05-HY, 03CH20-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC designation No.: TW1190 and TW3786

1.4 Applicable Standards

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

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r02
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. The TAF code is not including all the FCC KDB listed without accreditation.

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, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and find X plane with Notebook for Ant. 1 and MIMO <Ant. 1+2>; Z plane with Notebook for Ant. 2 as worst plane.

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

The final test modes consider the modulation and the worst data rates as shown in the table below.

Single Antenna

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

MIMO Antenna

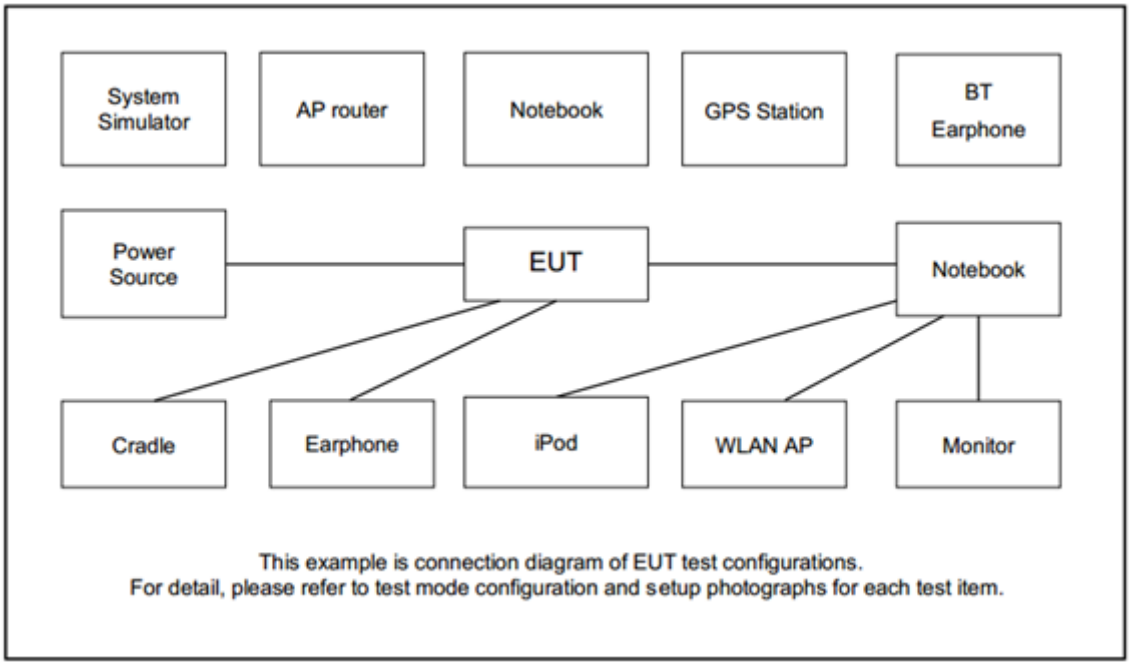
Modulation	Data Rate
802.11n HT20	MCS0
802.11n HT40	MCS0

Test Cases	
AC Conducted Emission	Mode 1 : Bluetooth Link + WLAN (2.4GHz) Link + Multi Stand + Adapter (US)

Ch. #	2400-2483.5 MHz			
	802.11b	802.11g	802.11n HT20	802.11n HT40
Low	01	01	01	03
Middle	06	06	06	06
High	11	11	11	09

Remark: For radiation spurious emission, the modulation and the data rate picked for testing are determined by the Max. RF conducted power.

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
2.	Notebook	DELL	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Notebook	DELL	Latitude5310	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Mobile Phone	SAMSUNG	SM-A730F/DS	A3LSMA730F	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, utility “putty 0.7” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

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 and attenuator factor 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 and attenuator factor.
Offset = RF cable loss + attenuator factor.
Following shows an offset computation example with cable loss 4.2 dB and 10 dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

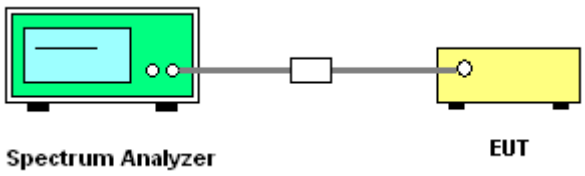
3.1.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.1.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 6.9.3 (OBW) and 11.8.1 (6dB BW).
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to 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. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW) ≥ 3 * RBW.
6. Measure and record the results in the test report.

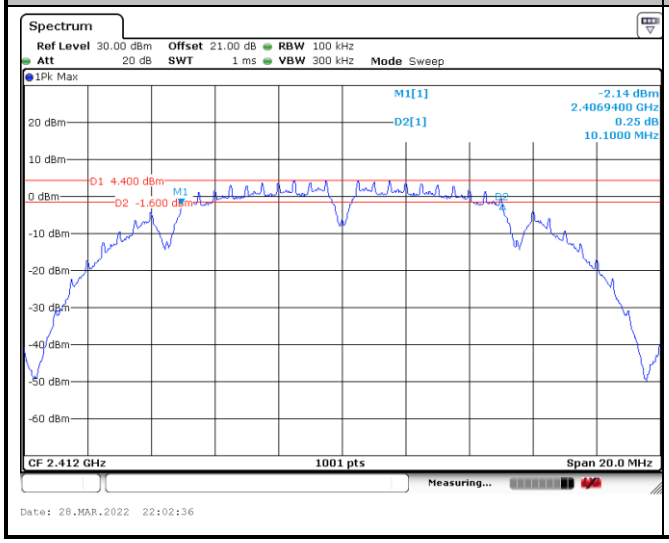
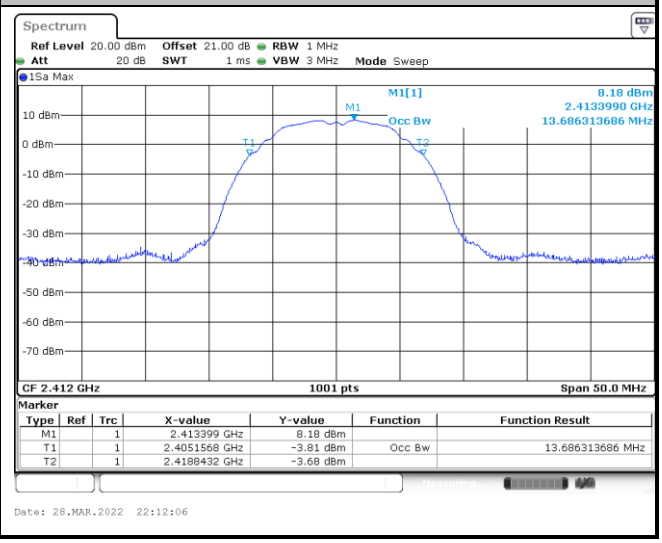
3.1.4 Test Setup



3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

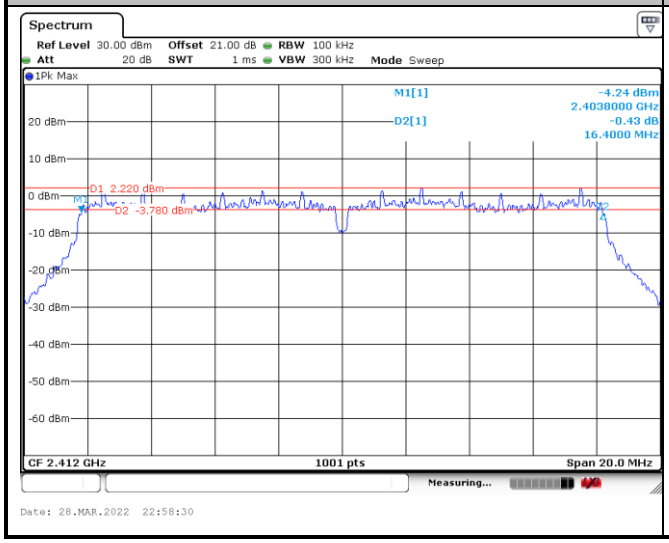
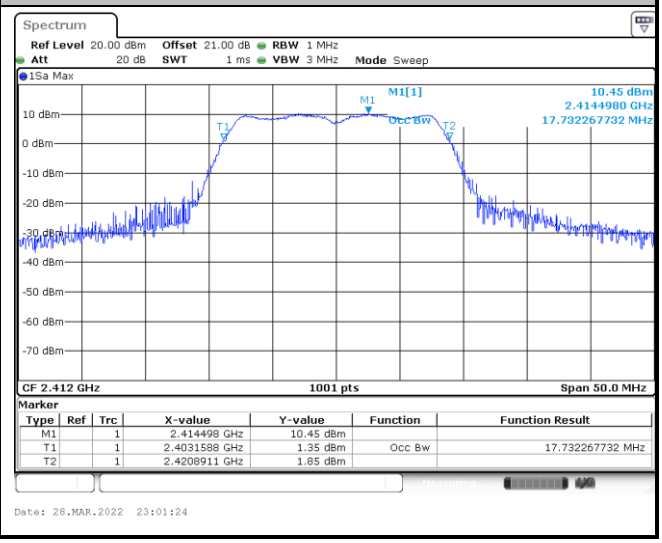
Please refer to Appendix A.

<802.11b>

6dB Bandwidth	99% Occupied Bandwidth
	

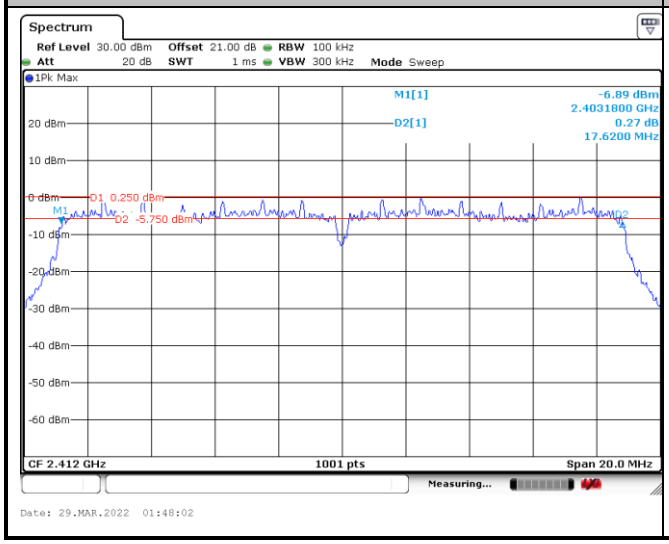
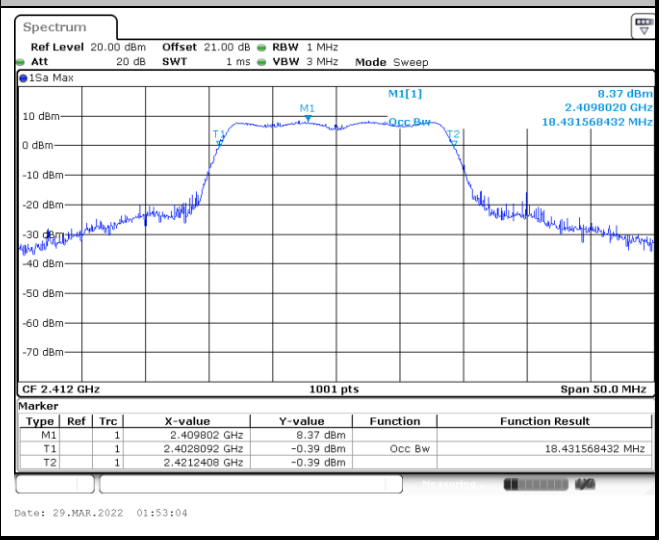
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<802.11g>

6dB Bandwidth	99% Occupied Bandwidth
	

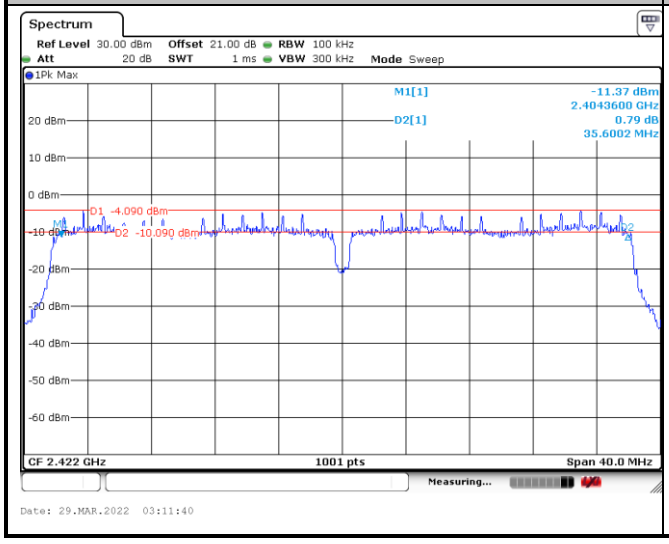
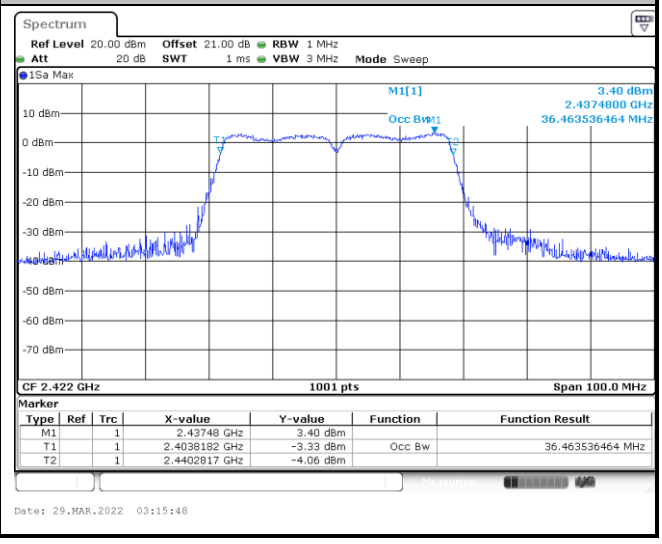
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<802.11n HT20>

6dB Bandwidth	99% Occupied Bandwidth
	

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

<802.11n HT40>

6dB Bandwidth	99% Occupied Bandwidth
	

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 2400-2483.5 MHz, the limit for output power is 30 dBm. If transmitting antenna with directional gain greater than 6 dBi 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 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

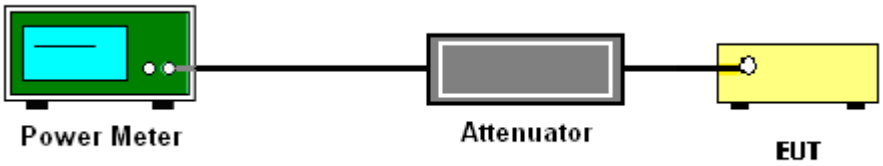
3.2.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.2.3 Test Procedures

1. For Average Power, the testing follows ANSI C63.10 Section 11.9.2.3.2 Method AVGPM-G
2. The RF output of EUT is connected to the power meter by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to 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 Average Output Power

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 8 dBm in any 3 kHz band at any time interval of continuous transmission.

3.3.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.3.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 11.10.2 Method PKPSD.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to 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.

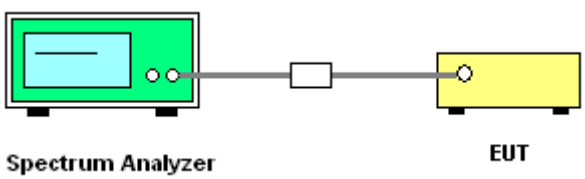
   If measurements performed using method (2) plus 10 log (N) exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

   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

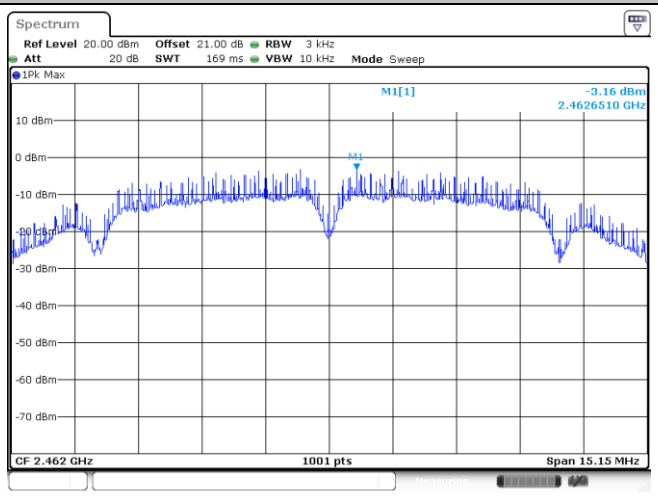


3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

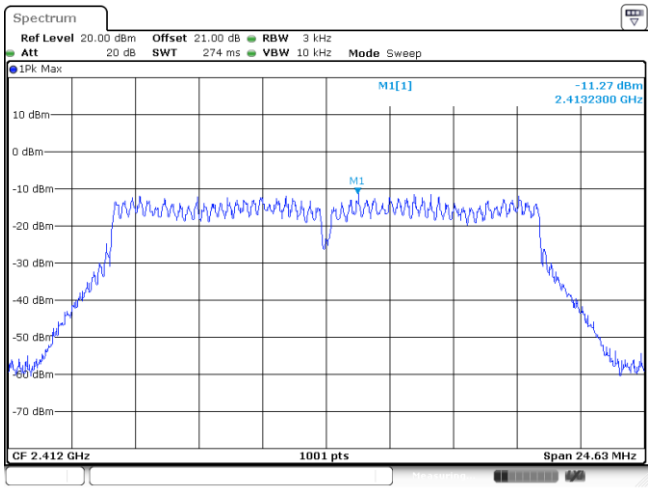
<802.11b>

Maximum Power Density Plot (dBm/3kHz)

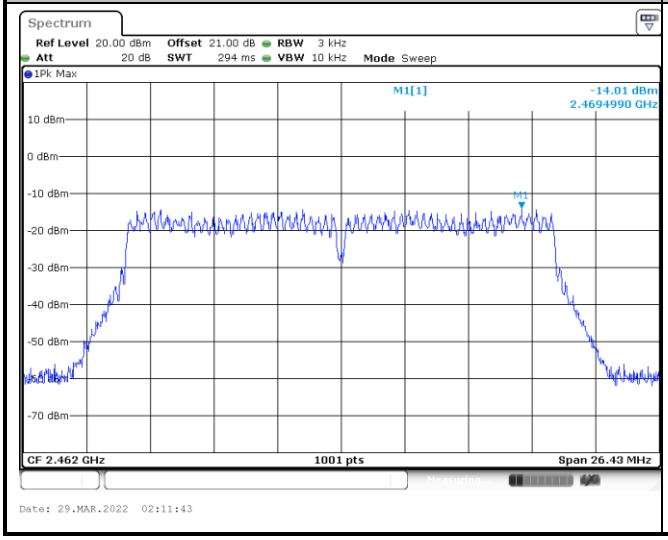
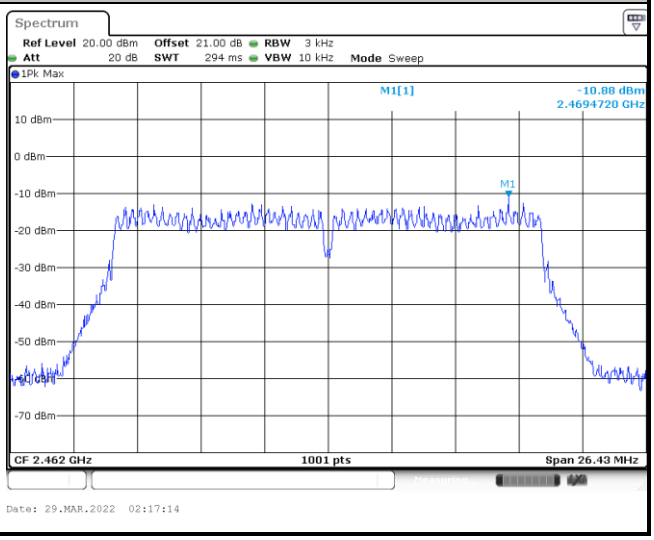


<802.11g>

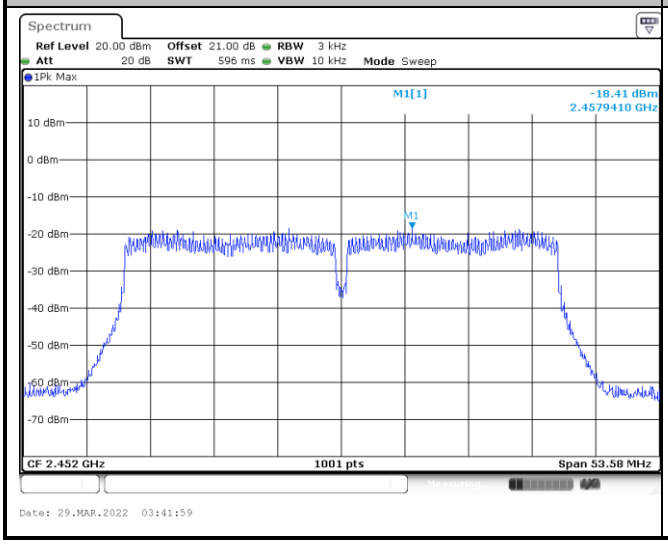
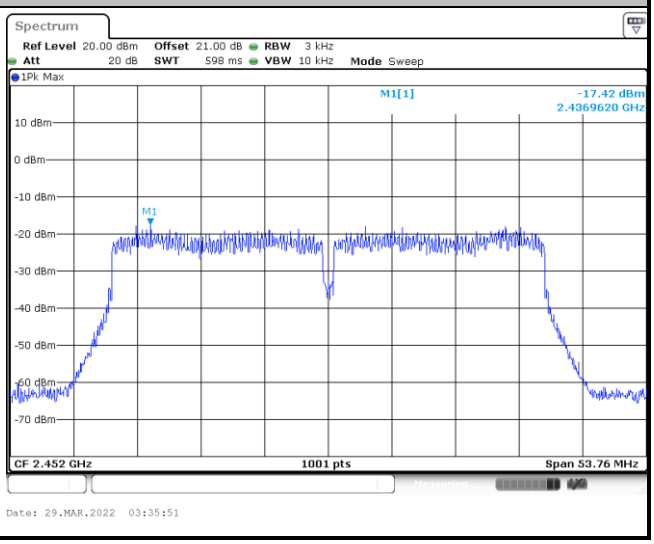
Maximum Power Density Plot (dBm/3kHz)



<802.11n HT20>

Maximum Power Density Plot (dBm/3kHz)	
MIMO Ant. 1	**MIMO Ant. 2**
	

<802.11n HT40>

Maximum Power Density Plot (dBm/3kHz)	
MIMO Ant. 1	**MIMO Ant. 2**
	

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.

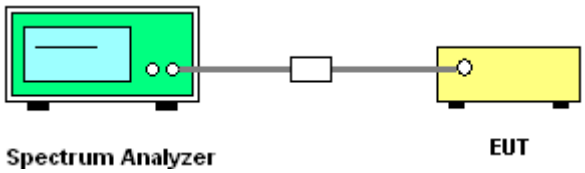
3.4.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.4.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 11.11.3 Emission level measurement.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to 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.

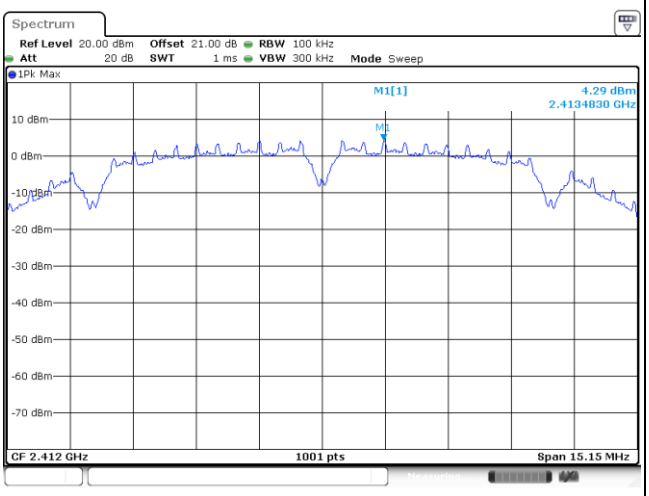
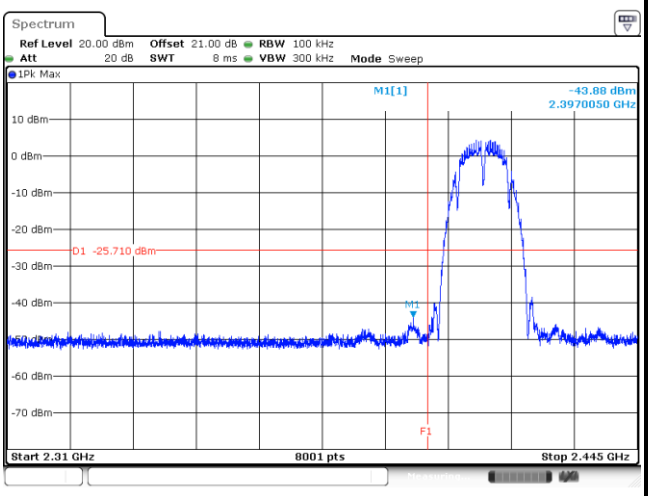
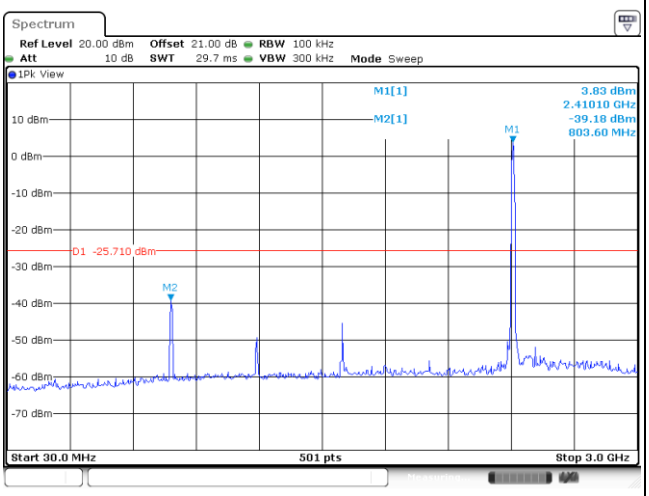
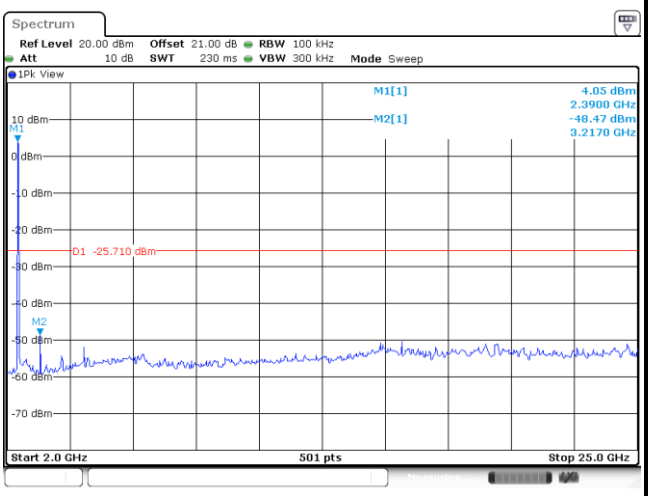
3.4.4 Test Setup



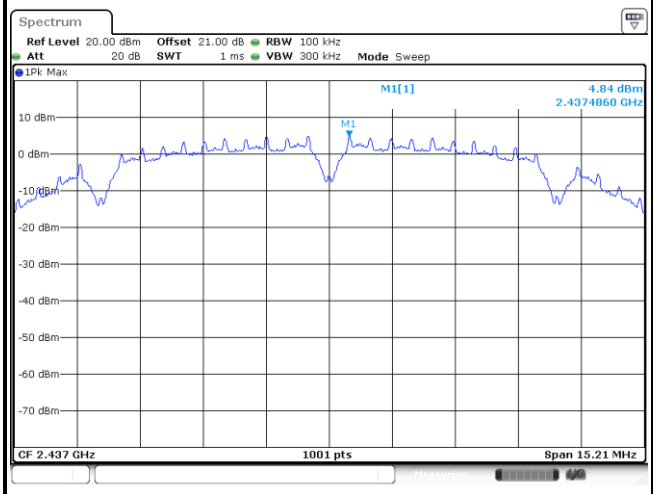
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

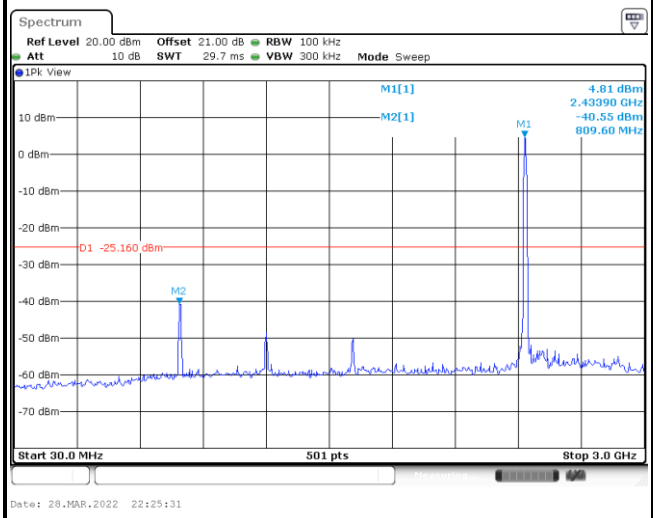
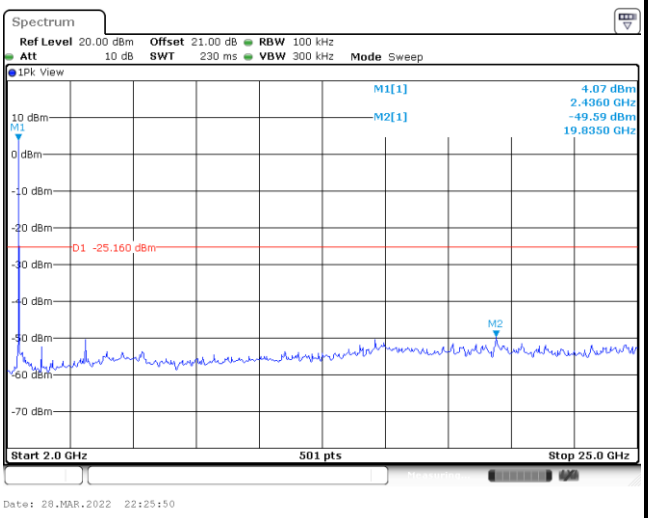
Number of TX = 1, Ant. 1 (Measured)

Test Mode :	802.11b	Test Channel :	01

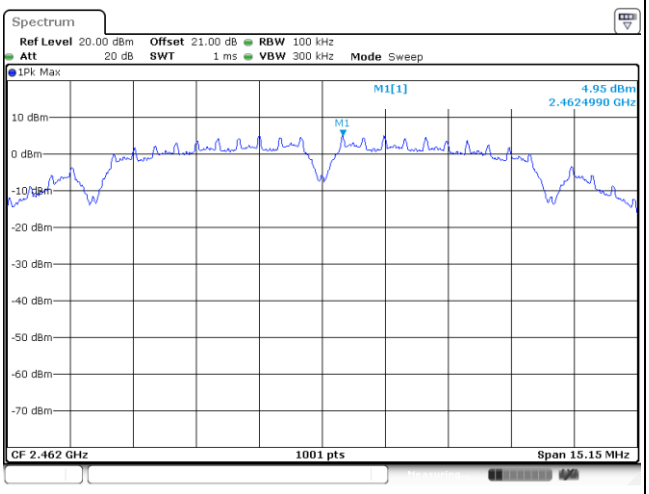
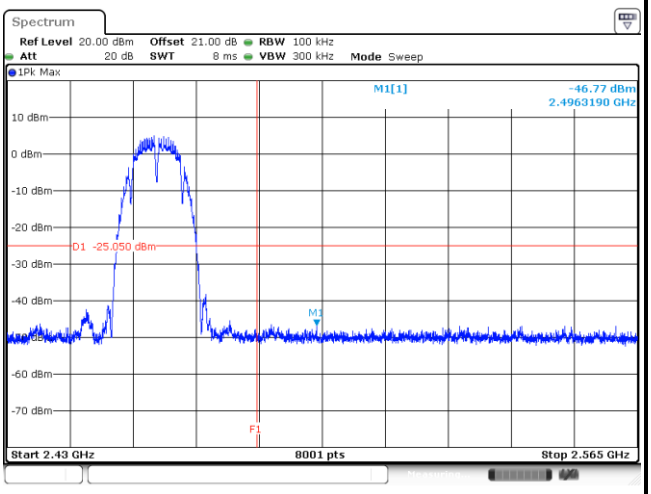
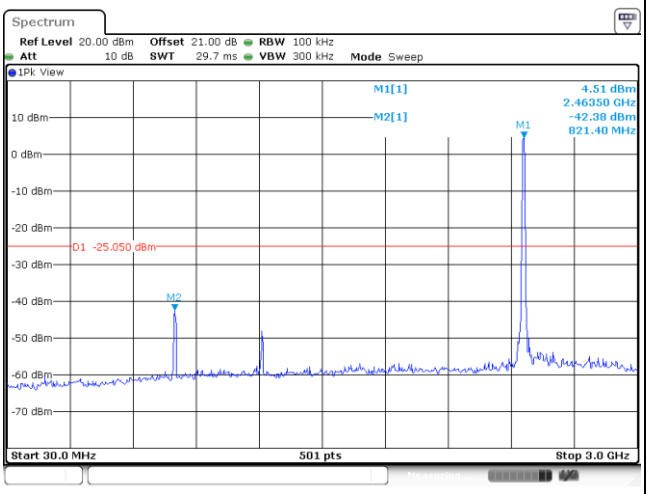
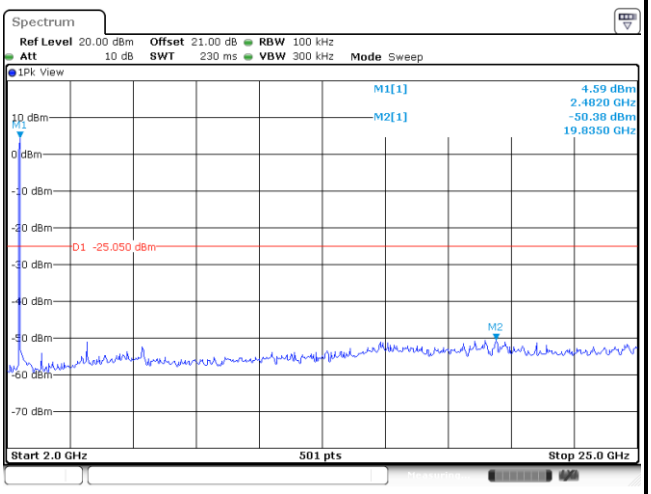
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11b	Test Channel :	06

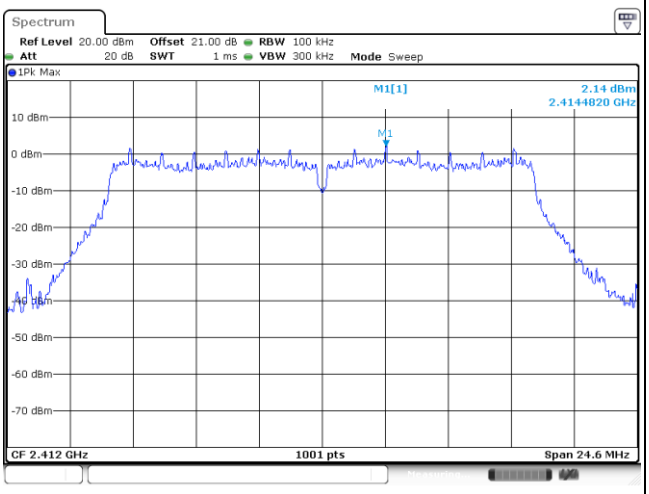
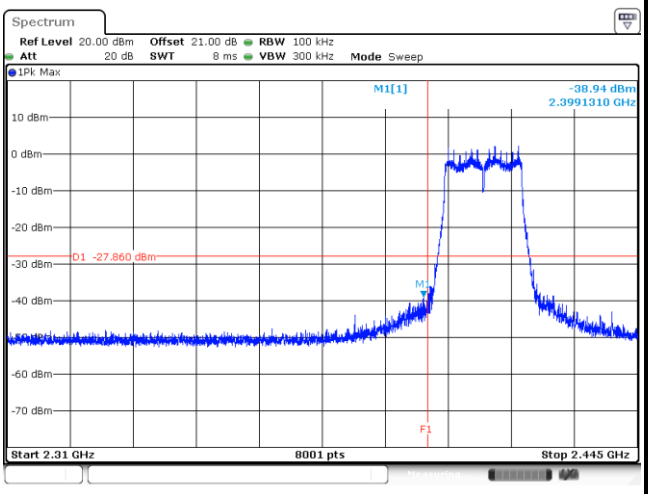
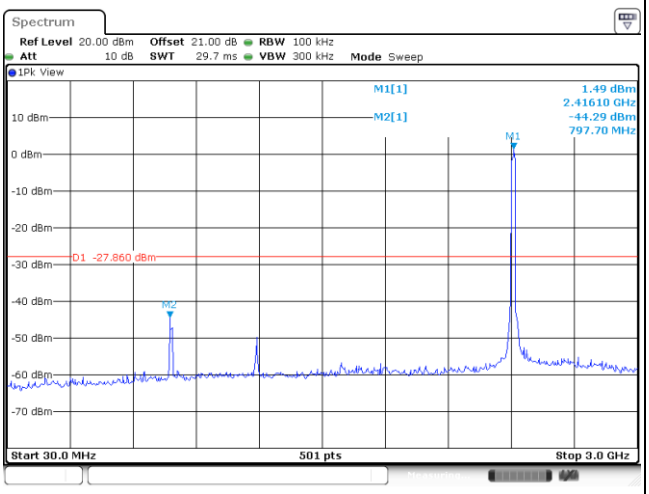
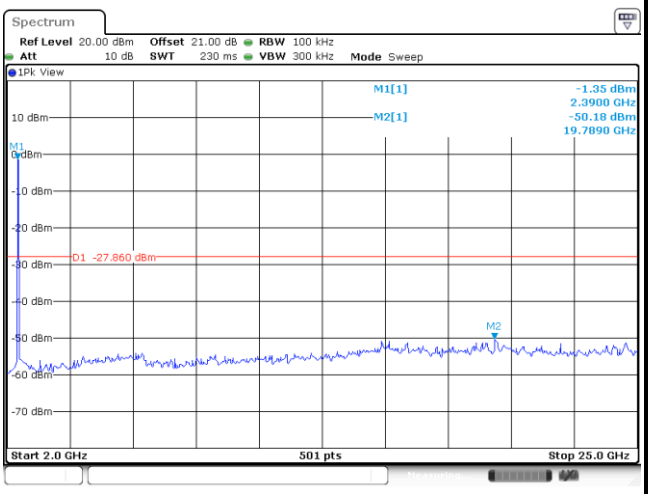
100kHz PSD reference Level	Channel Plot
	

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

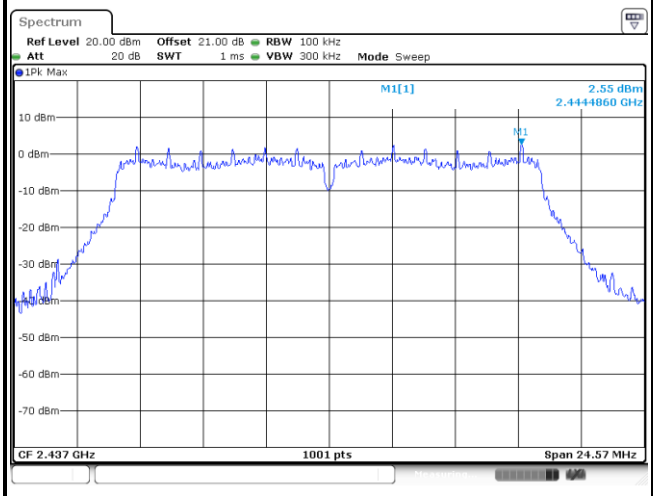
Test Mode :	802.11b	Test Channel :	11

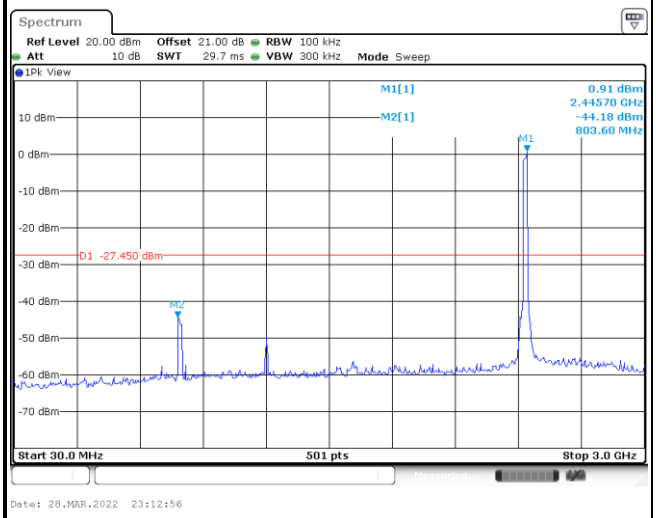
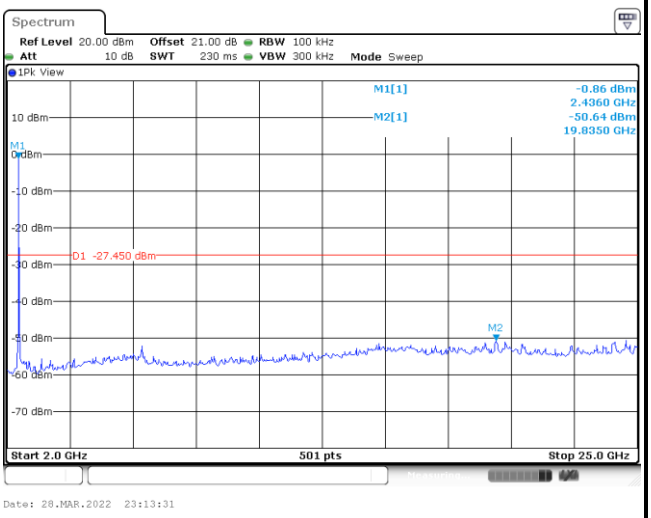
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11g	Test Channel :	01

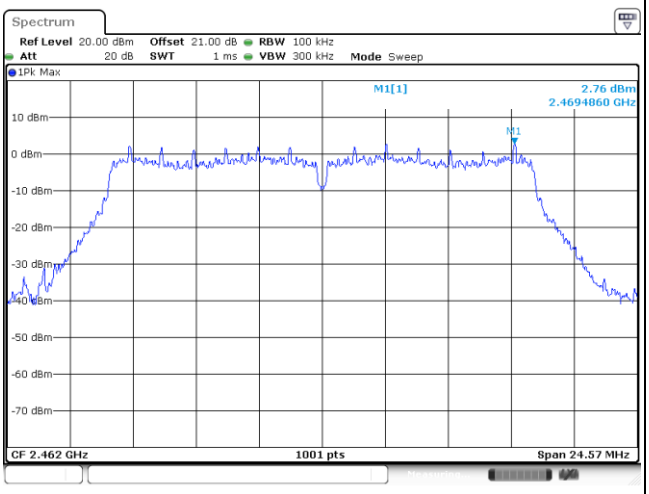
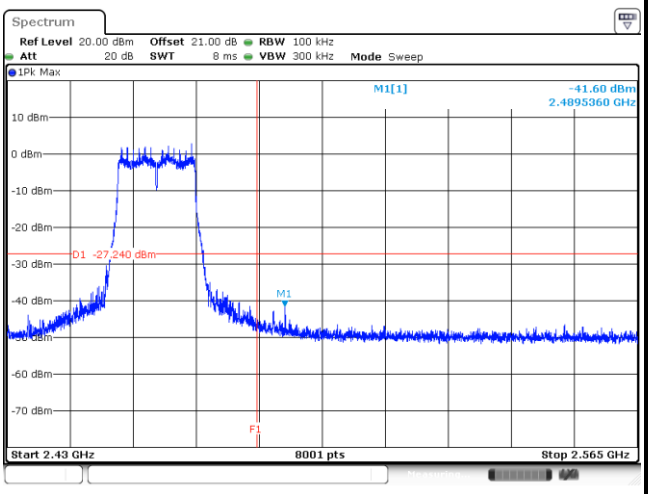
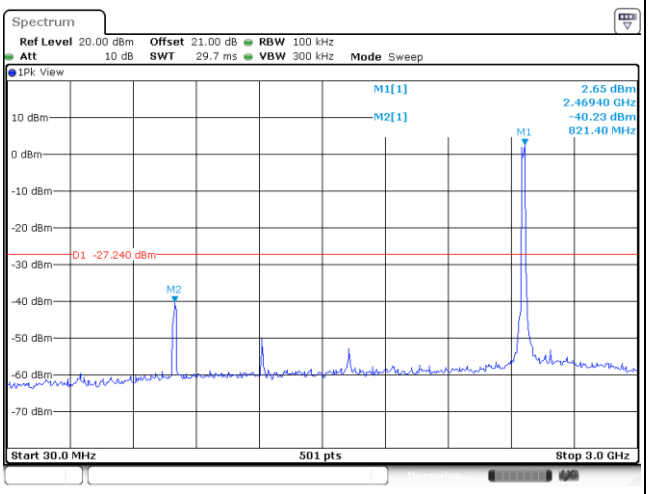
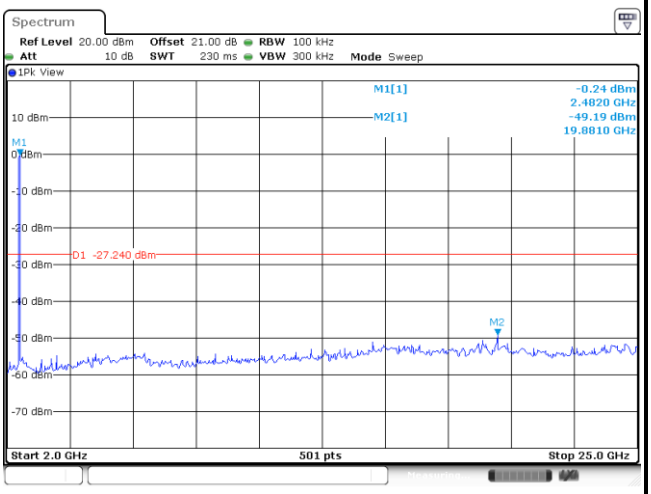
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11g	Test Channel :	06

100kHz PSD reference Level	Channel Plot
	

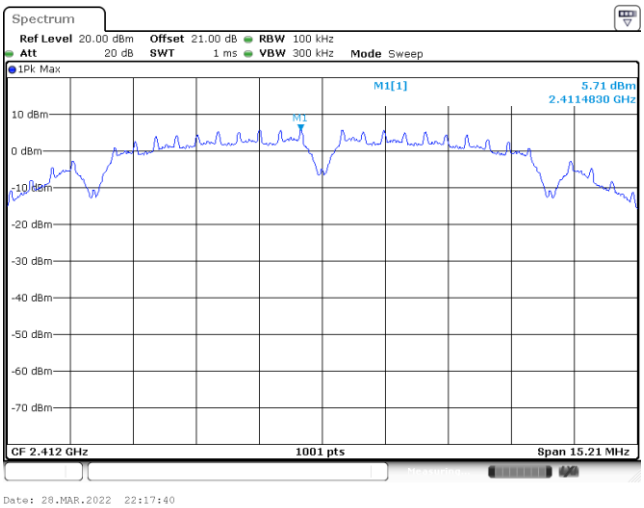
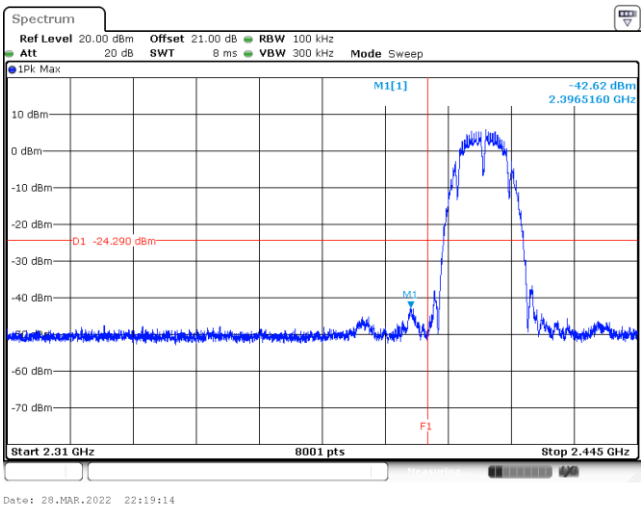
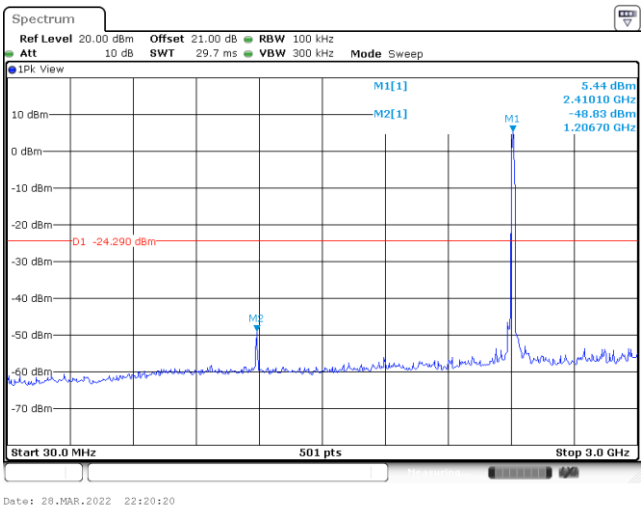
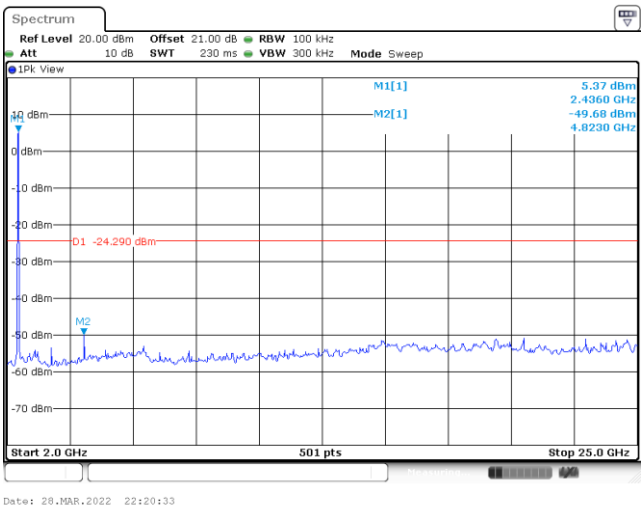
Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

Test Mode :	802.11g	Test Channel :	11

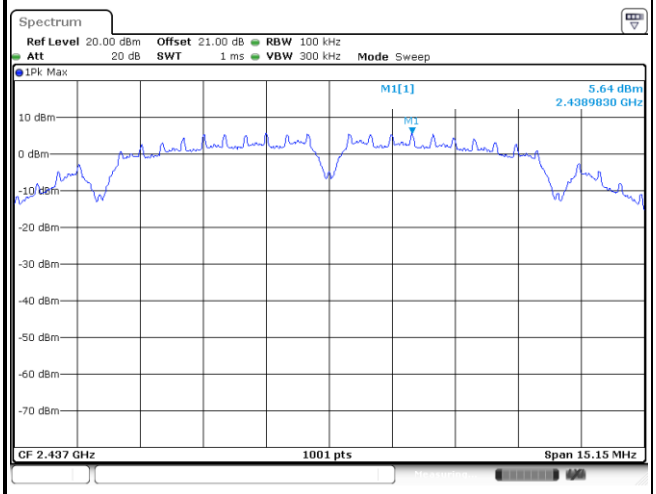
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

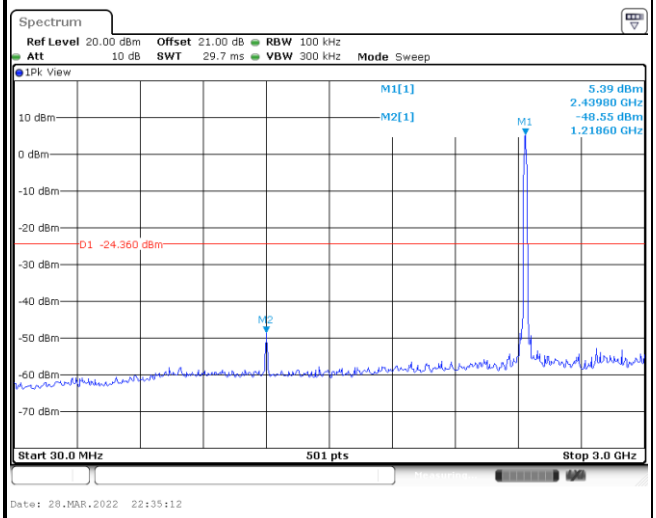
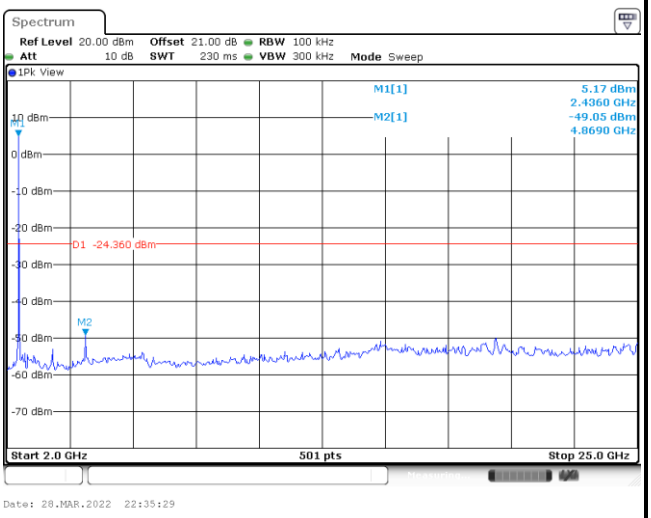
Number of TX = 1, Ant. 2 (Measured)

Test Mode :	802.11b	Test Channel :	01

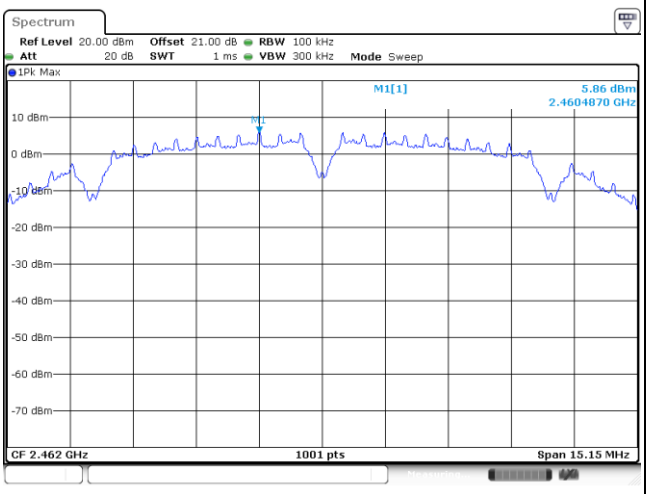
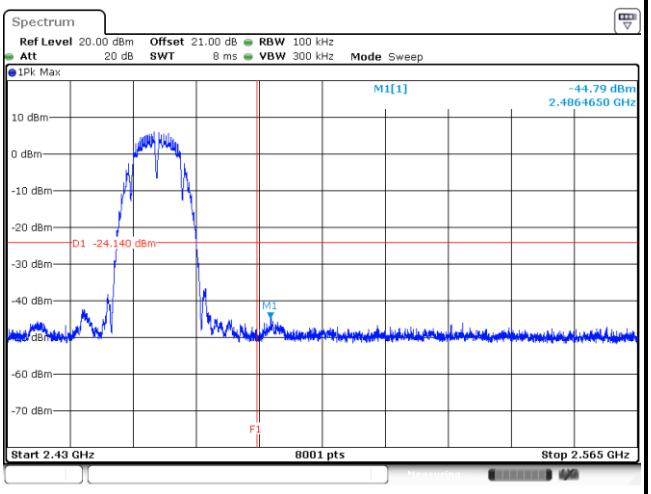
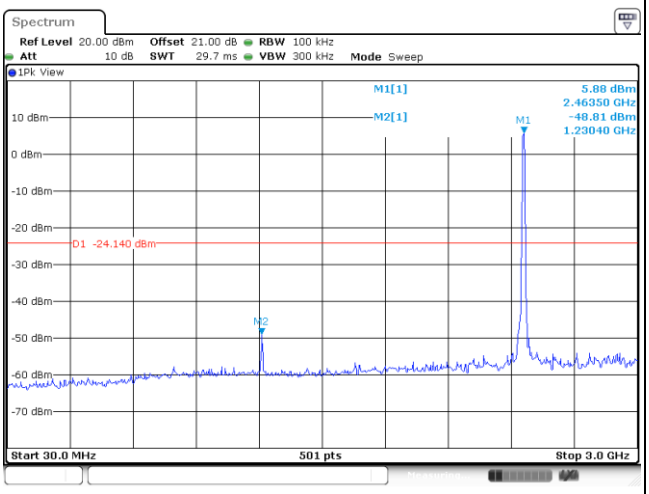
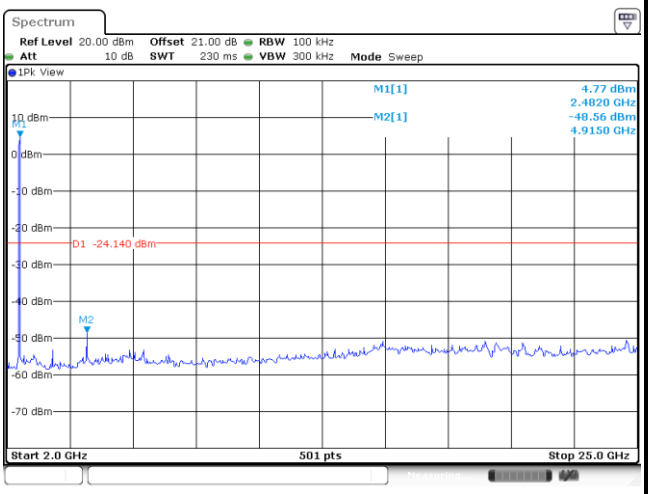
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11b	Test Channel :	06

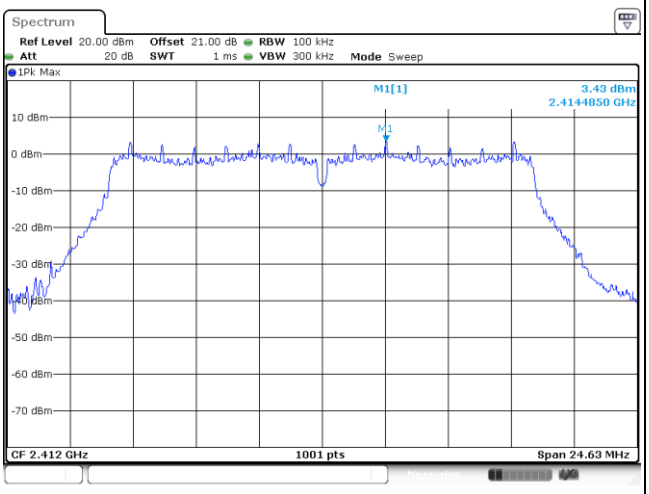
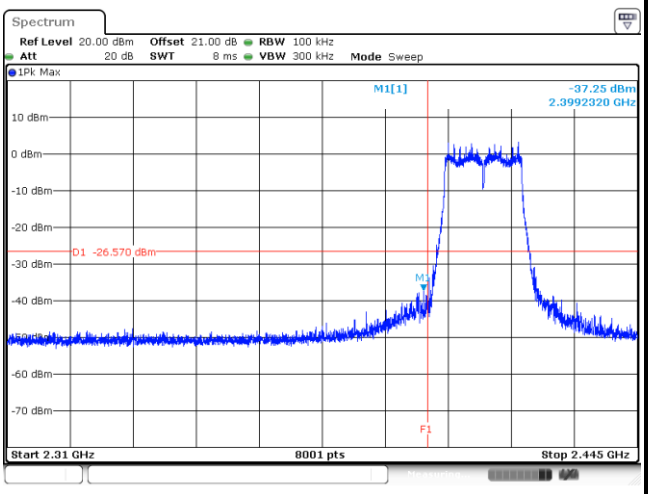
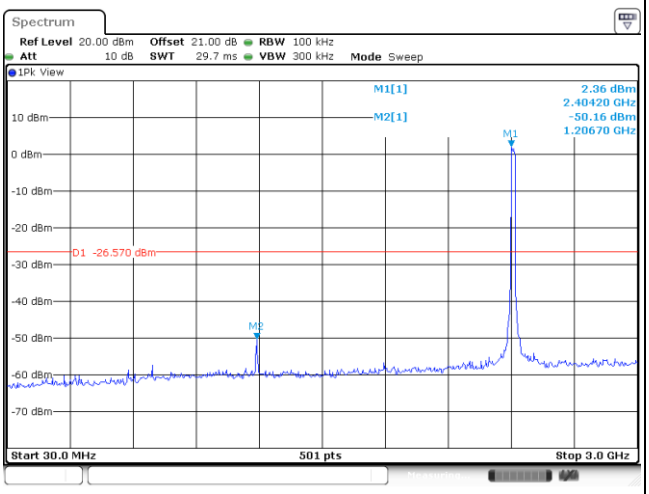
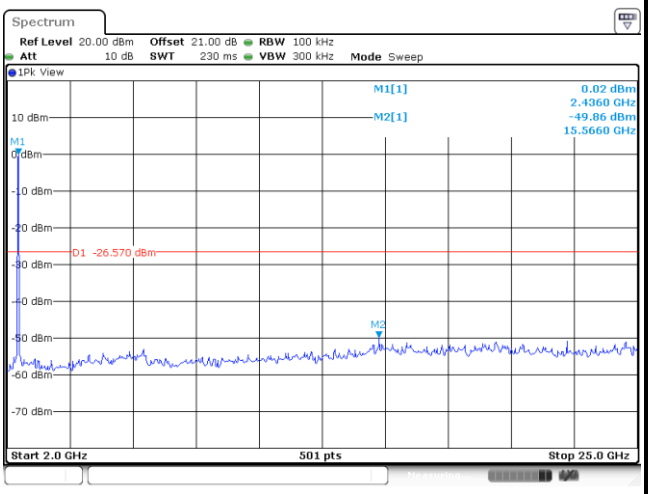
100kHz PSD reference Level	Channel Plot
	

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

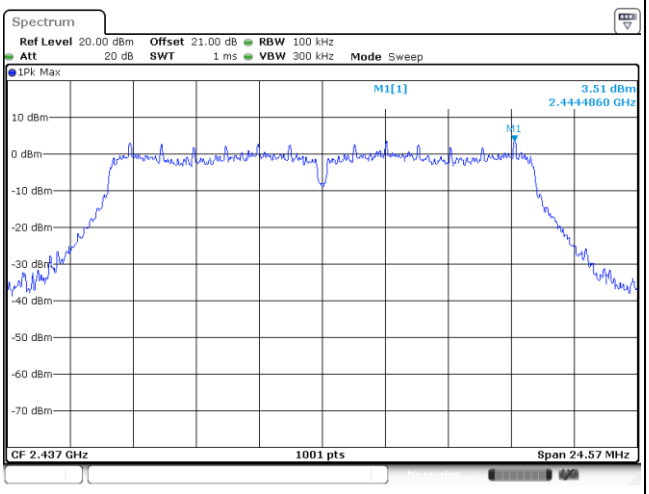
Test Mode :	802.11b	Test Channel :	11

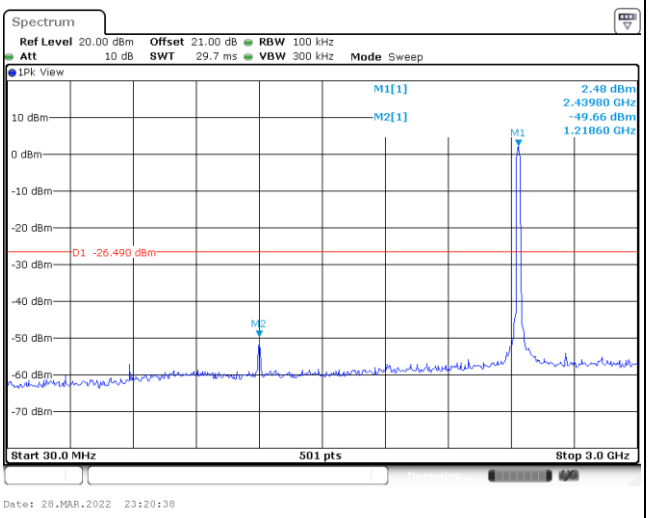
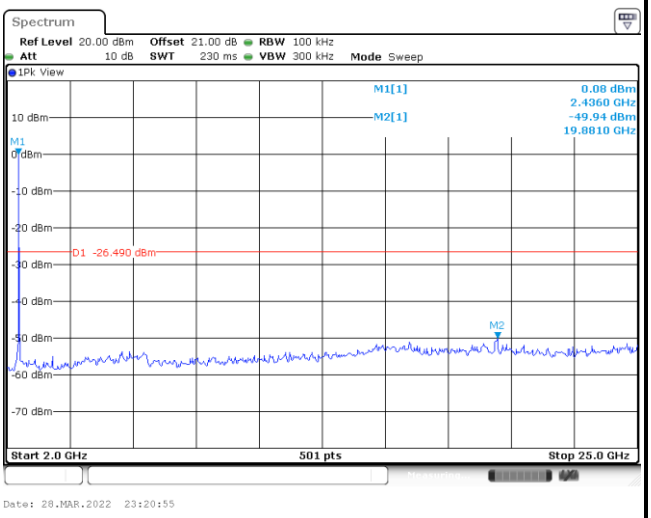
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11g	Test Channel :	01

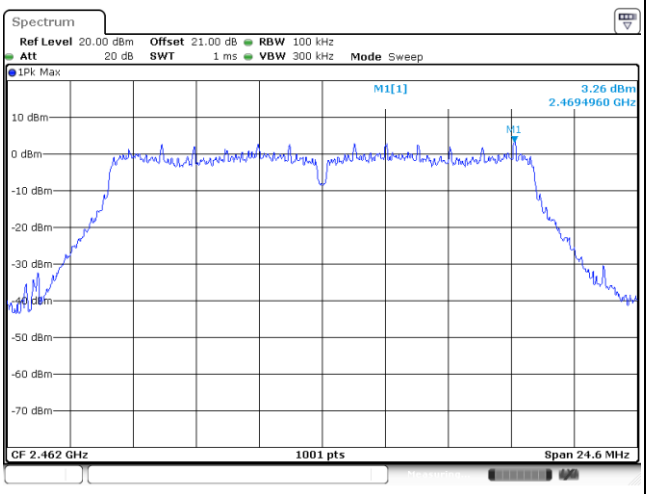
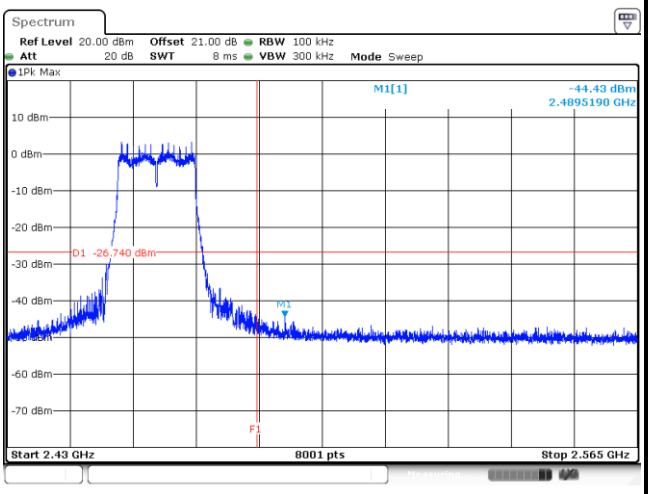
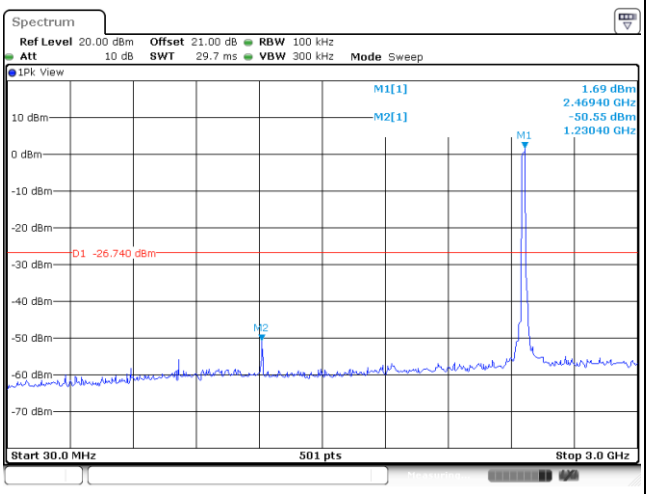
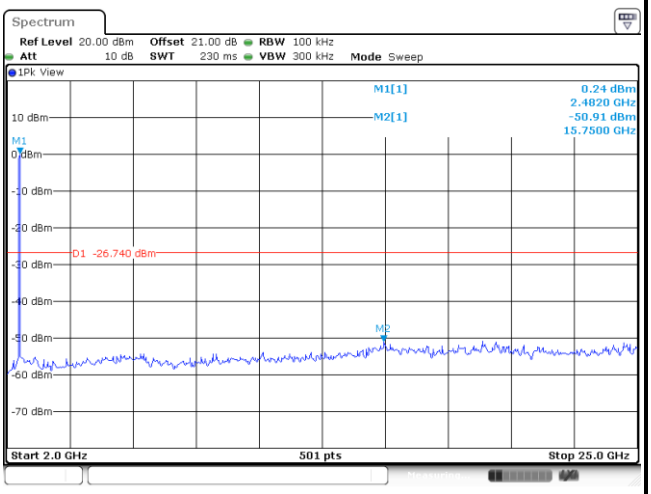
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11g	Test Channel :	06

100kHz PSD reference Level	Channel Plot
	

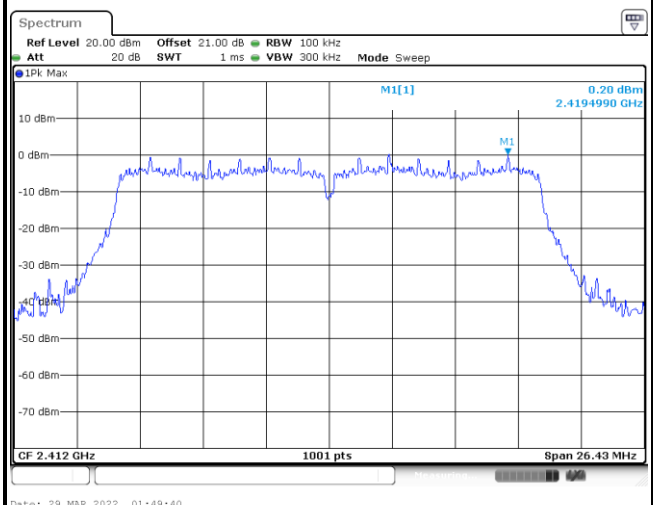
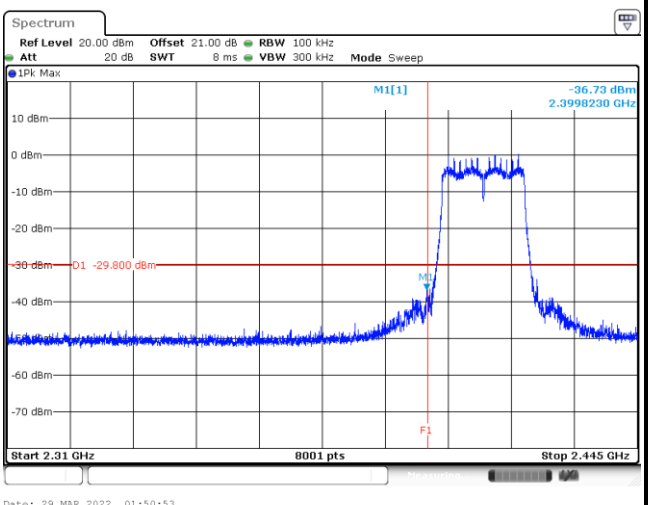
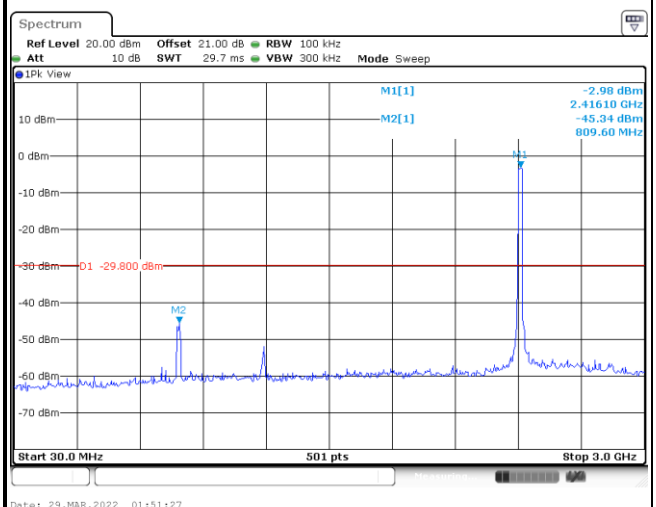
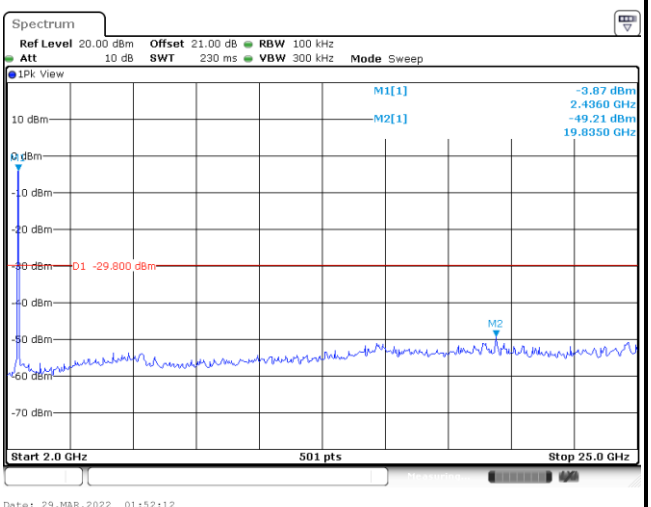
Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

Test Mode :	802.11g	Test Channel :	11

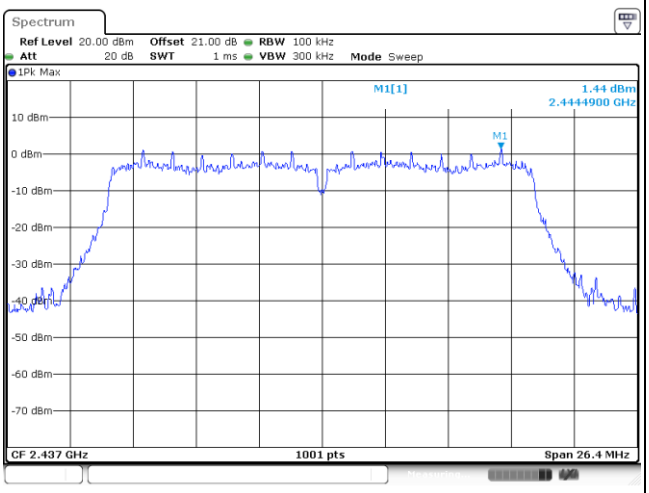
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

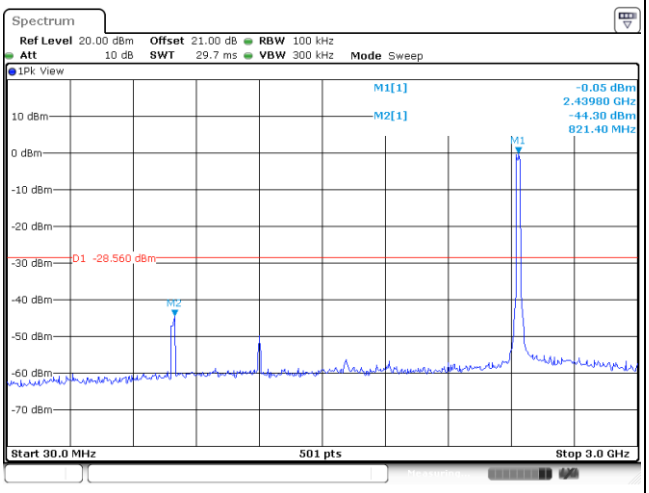
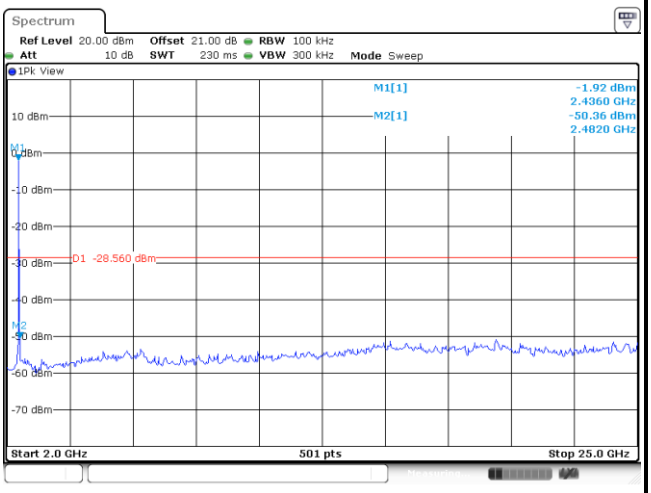
Number of TX = 2, Ant. 1 (Measured)

Test Mode :	802.11n HT20	Test Channel :	01

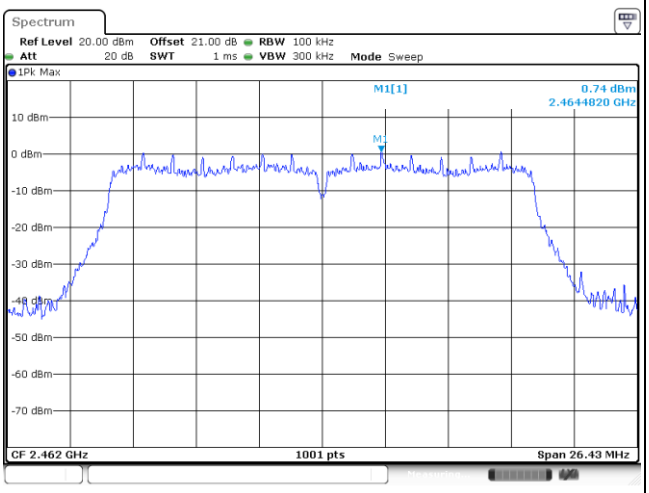
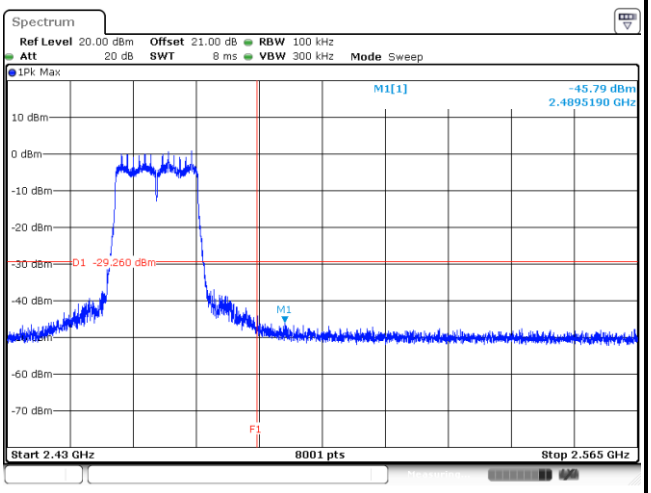
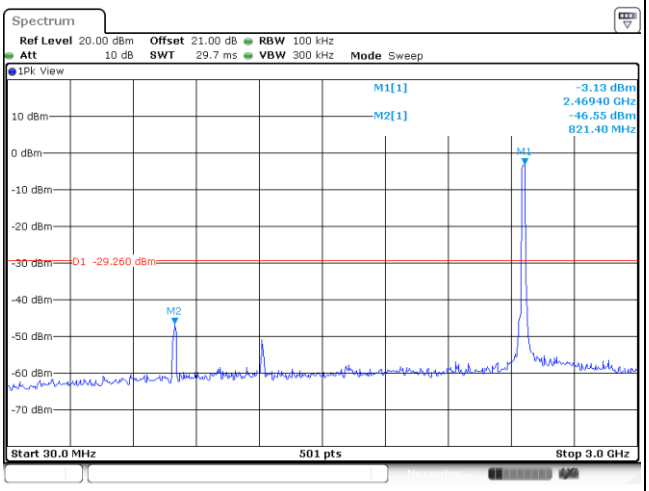
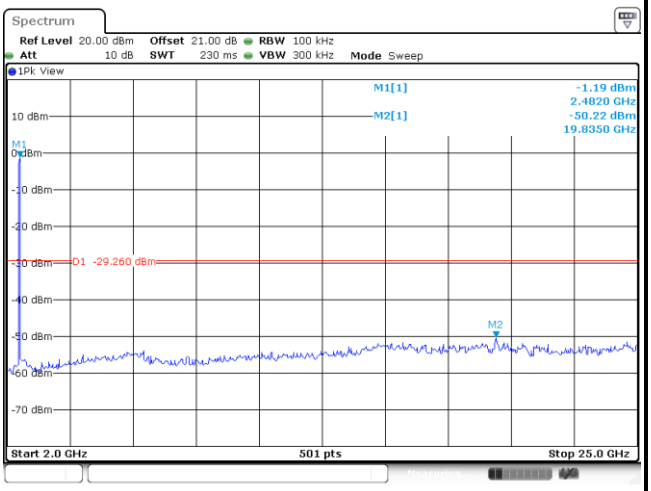
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11n HT20	Test Channel :	06

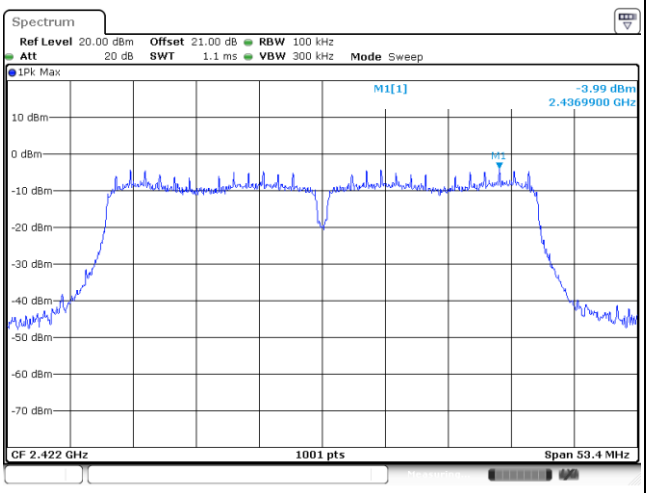
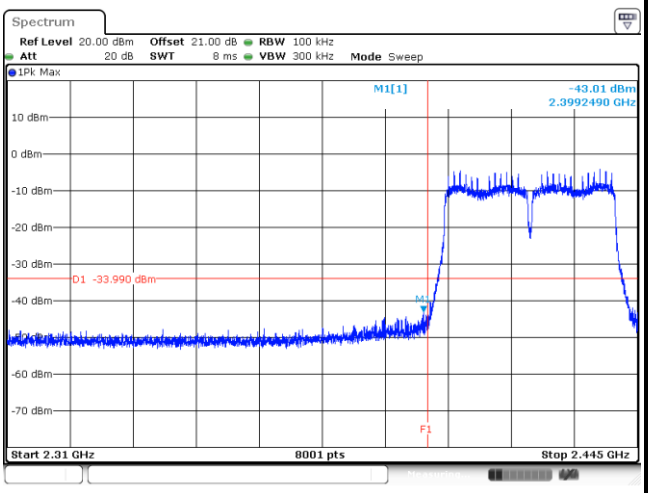
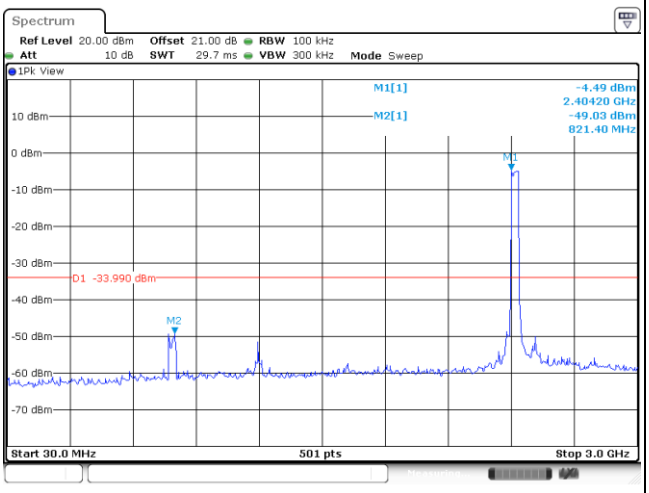
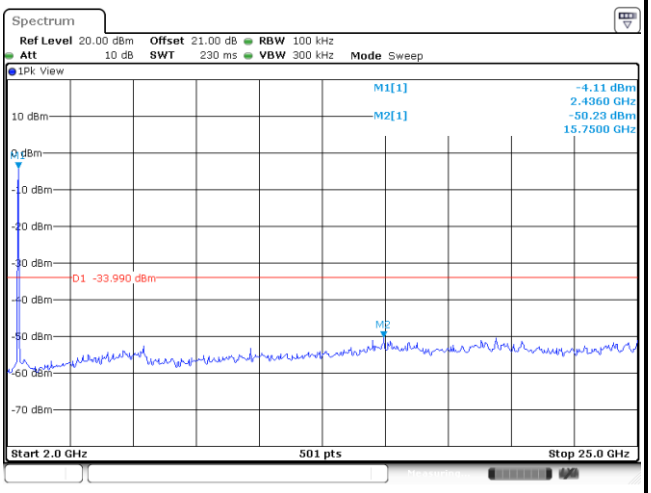
100kHz PSD reference Level	Channel Plot
	

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

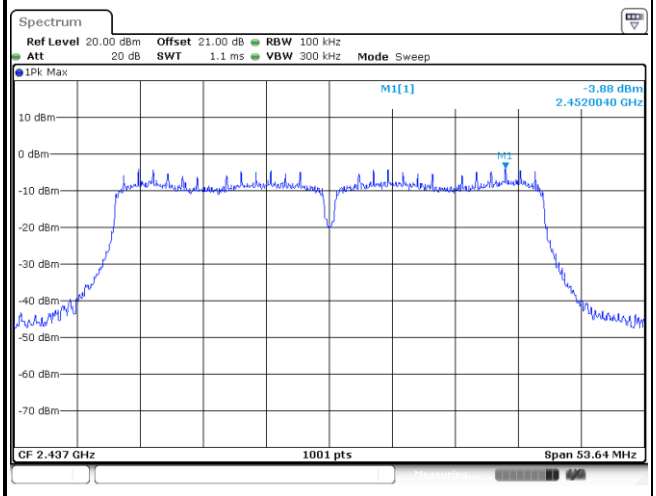
Test Mode :	802.11n HT20	Test Channel :	11

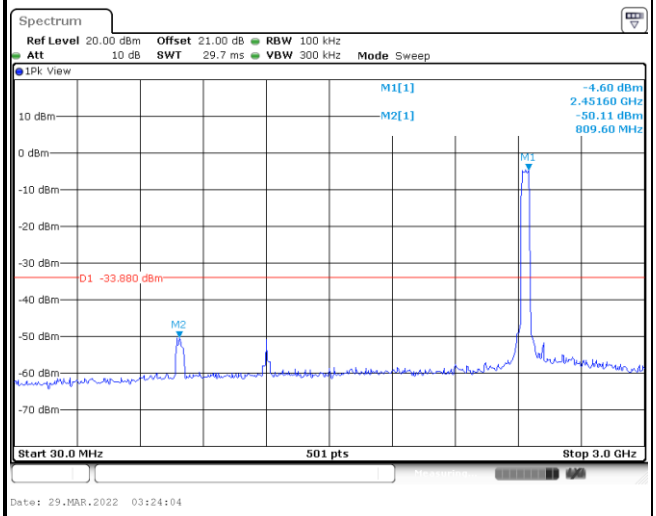
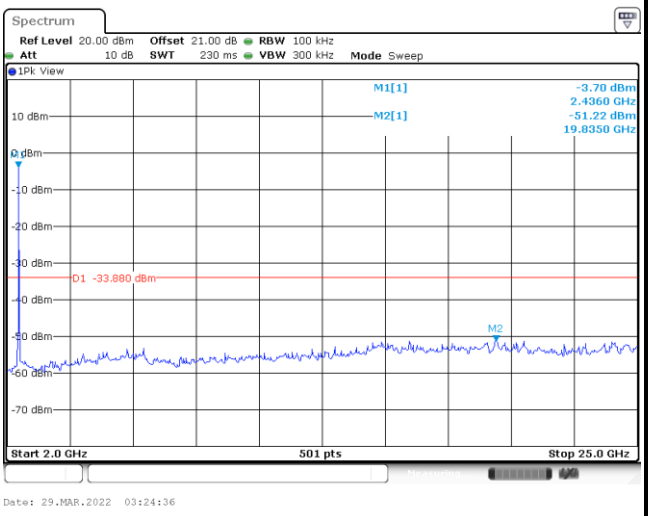
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11n HT40	Test Channel :	03

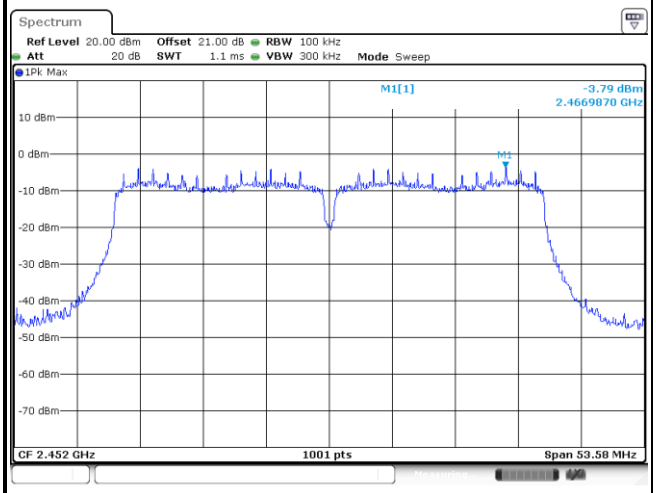
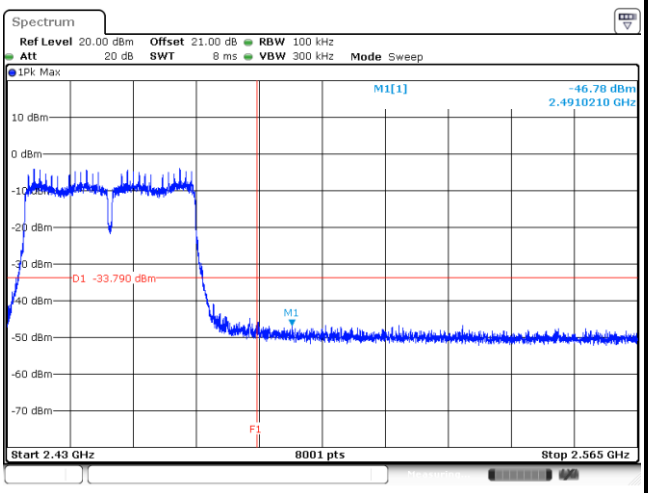
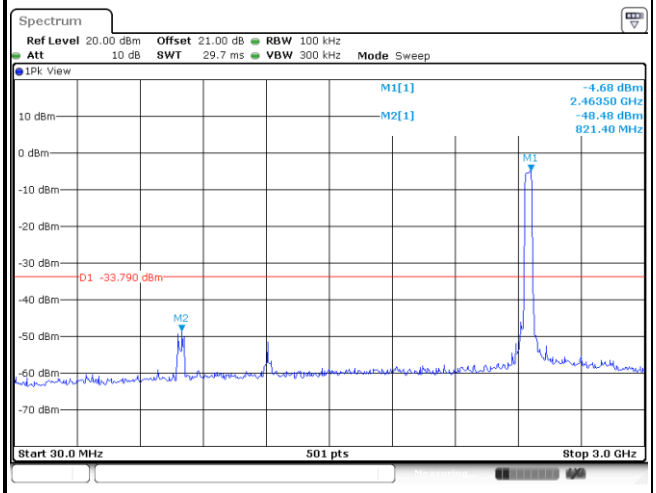
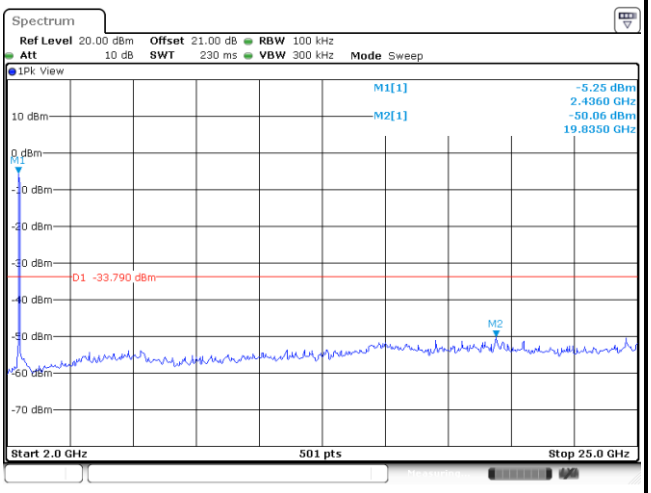
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11n HT40	Test Channel :	06

100kHz PSD reference Level	Channel Plot
	

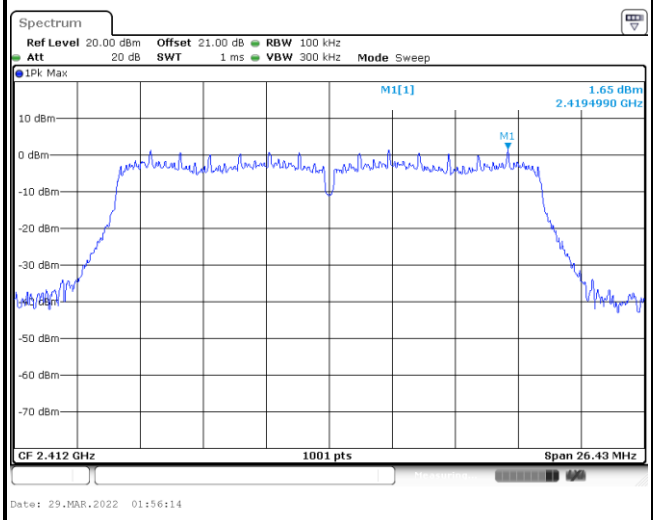
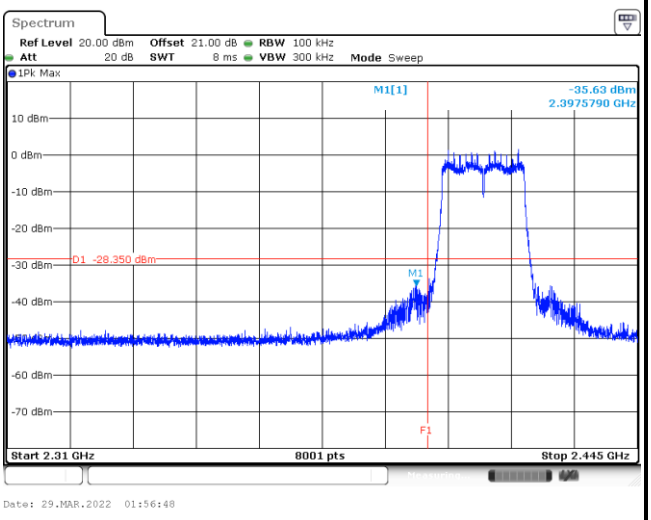
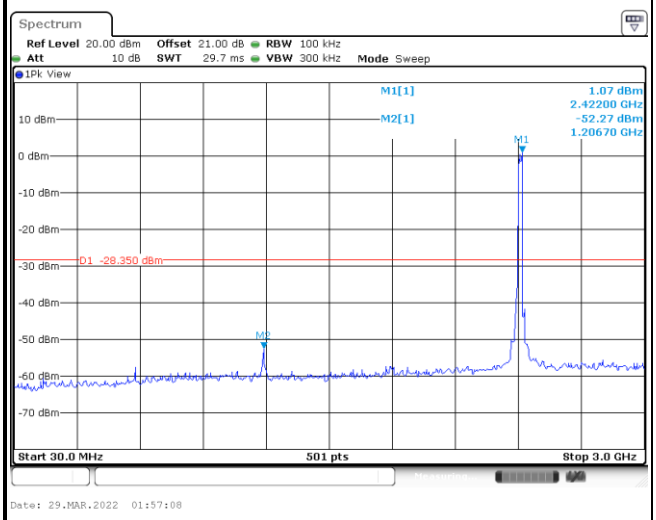
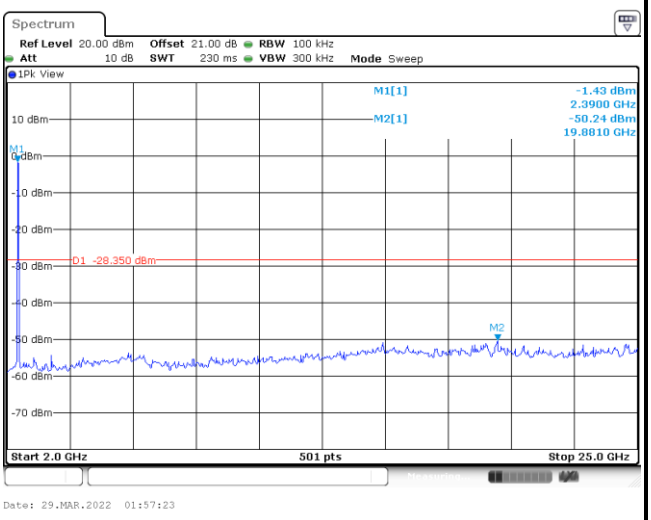
Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

Test Mode :	802.11n HT40	Test Channel :	09

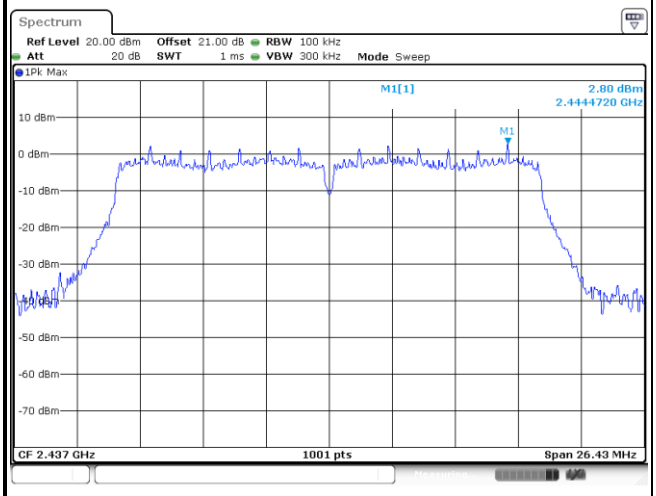
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

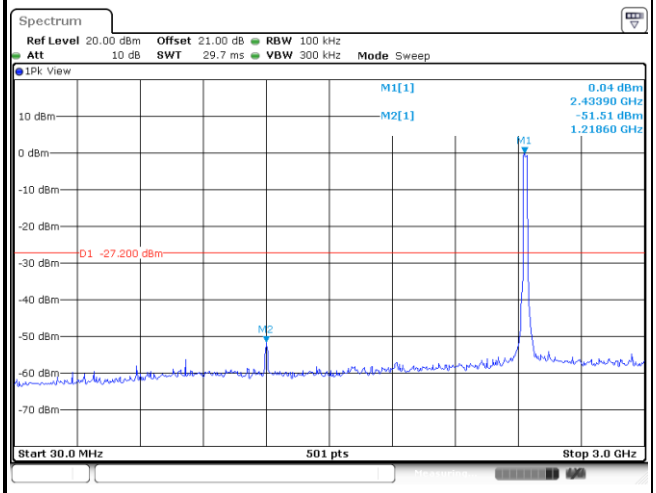
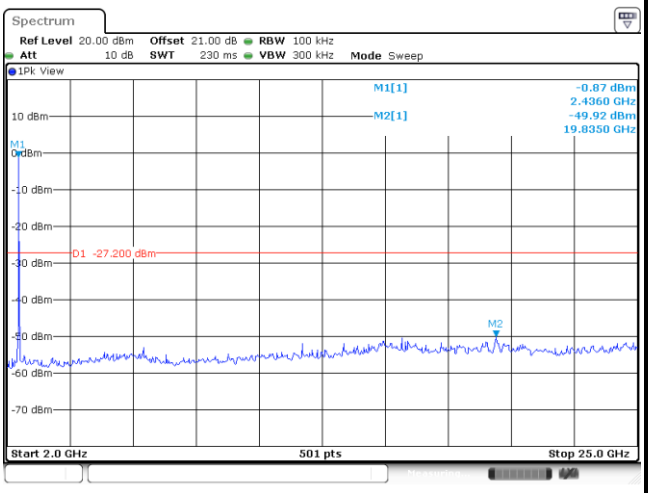
Number of TX = 2, Ant. 2 (Measured)

Test Mode :	802.11n HT20	Test Channel :	01

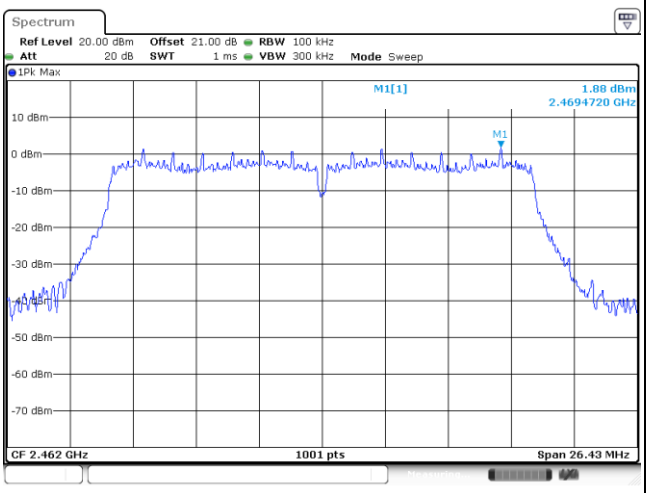
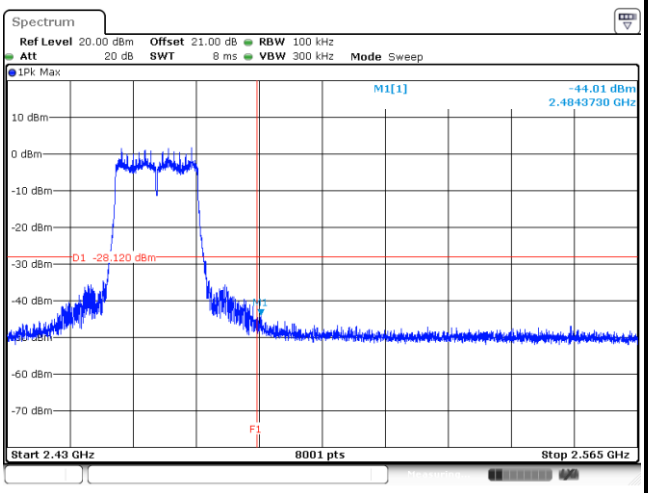
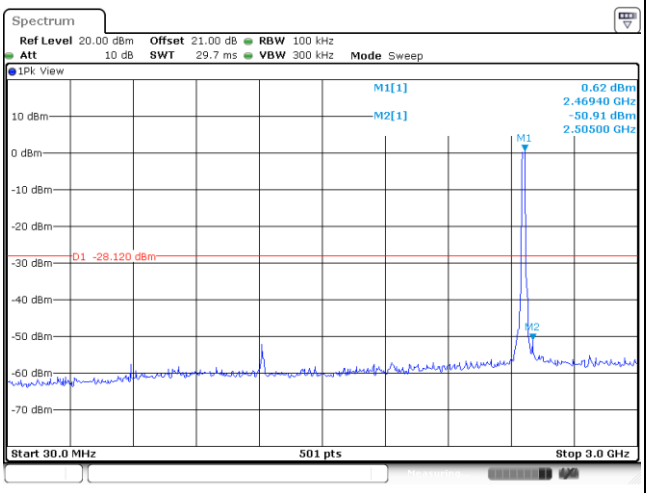
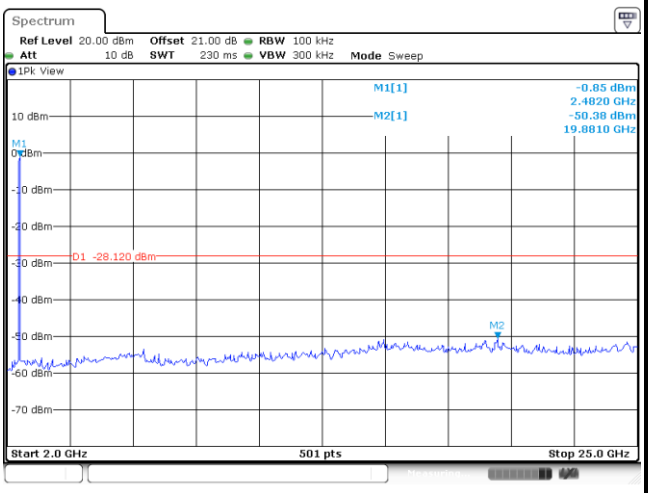
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11n HT20	Test Channel :	06

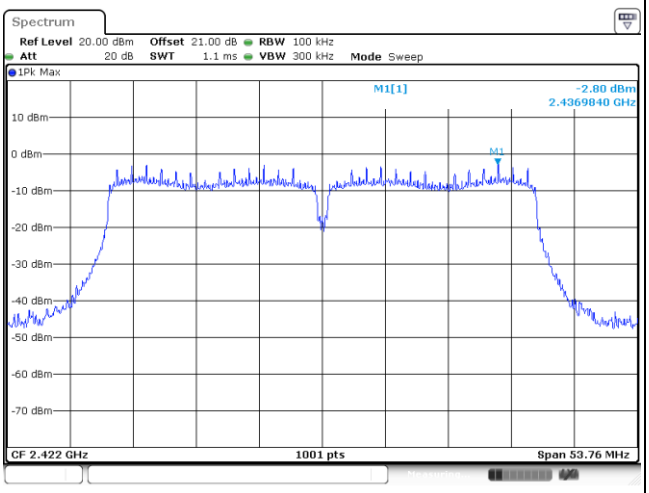
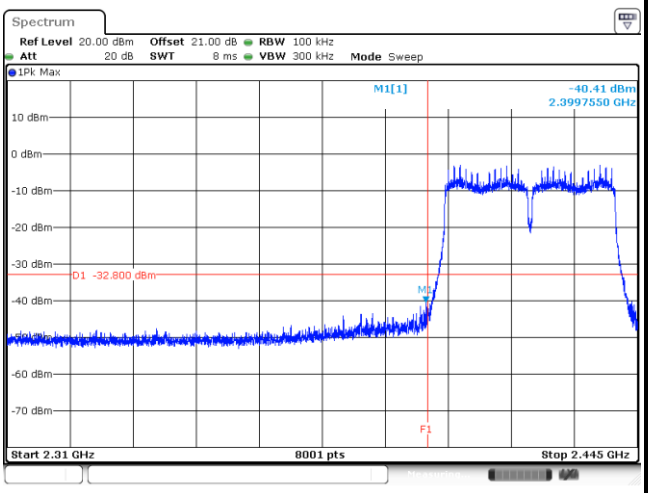
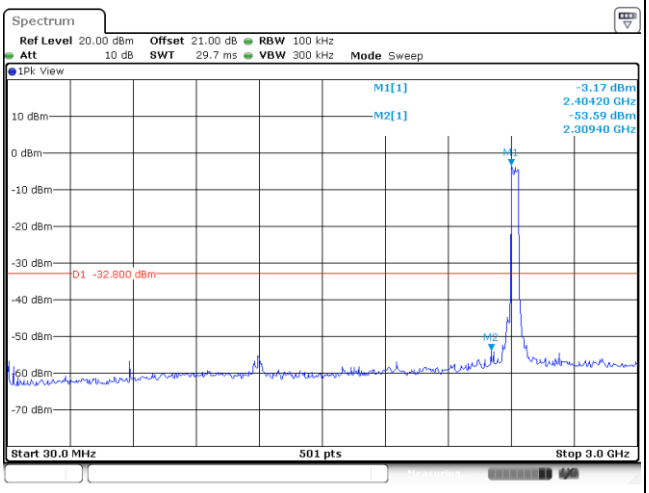
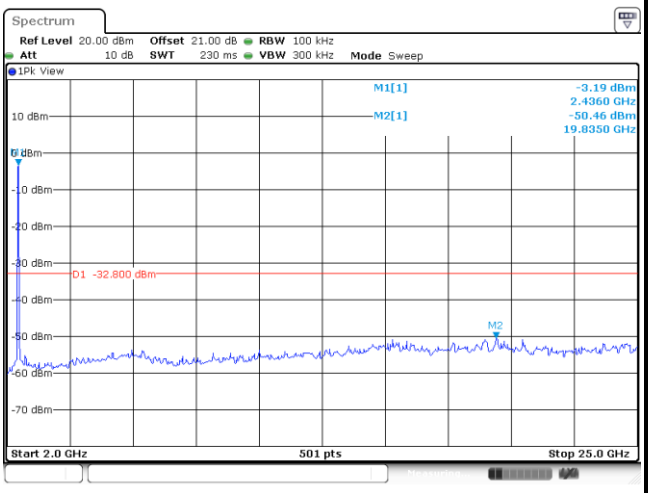
100kHz PSD reference Level	Channel Plot
	

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

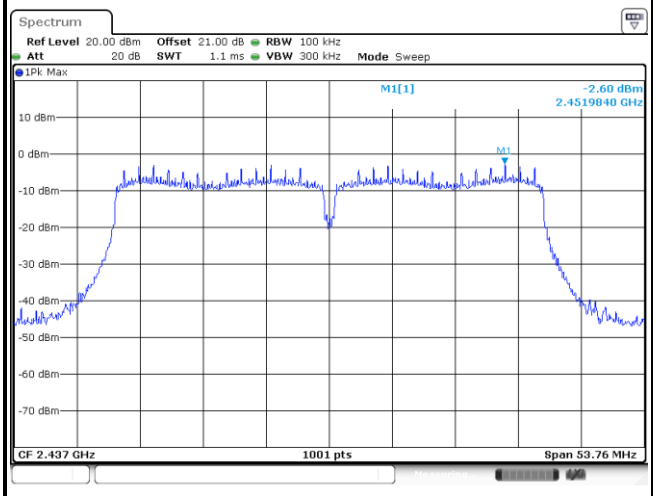
Test Mode :	802.11n HT20	Test Channel :	11

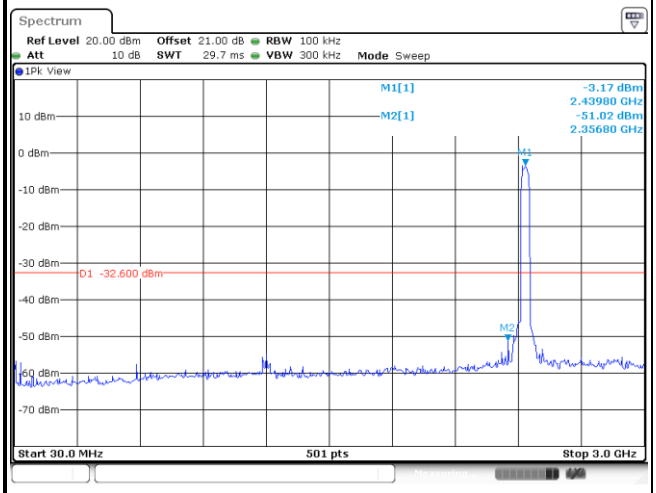
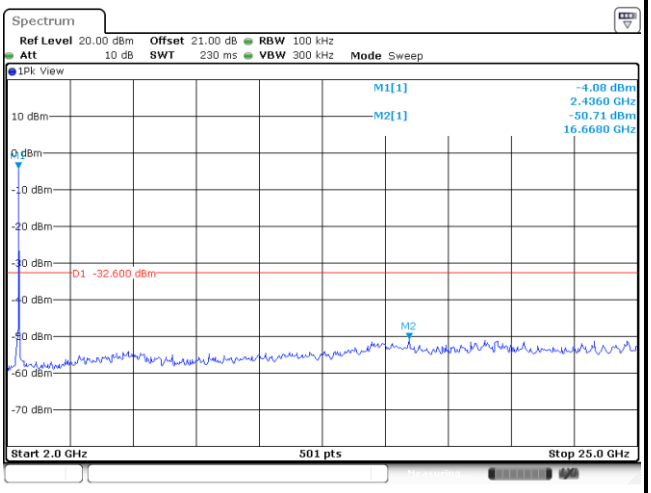
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11n HT40	Test Channel :	03

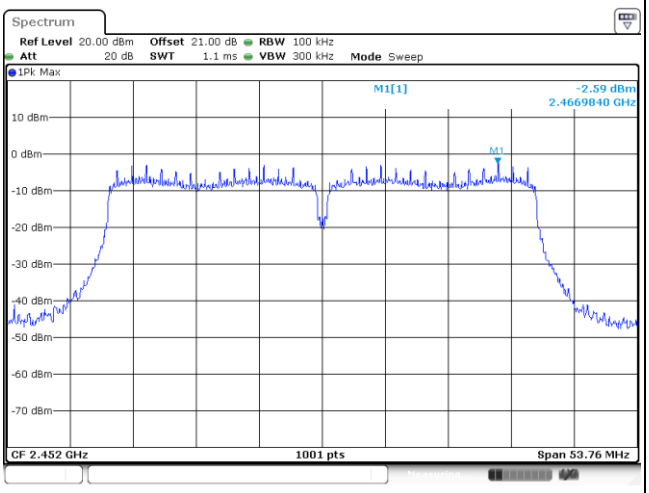
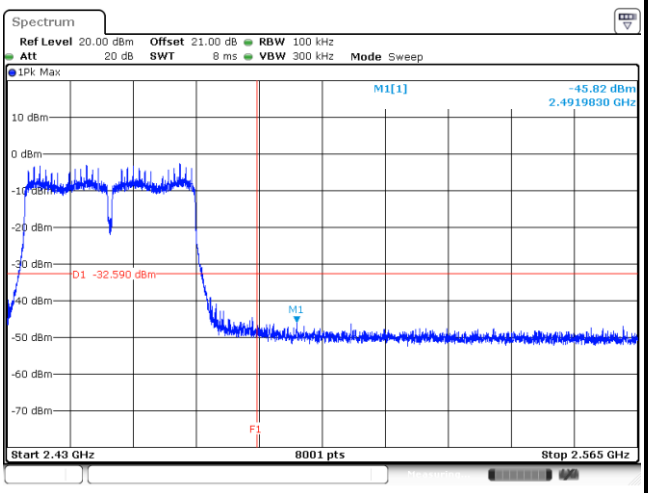
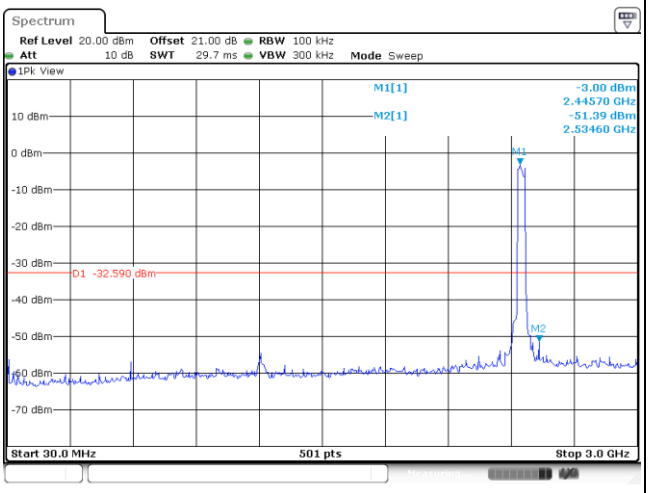
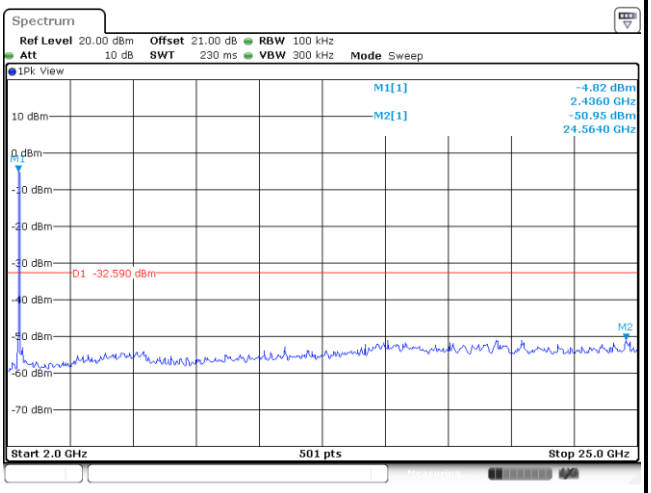
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11n HT40	Test Channel :	06

100kHz PSD reference Level	Channel Plot
	

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

Test Mode :	802.11n HT40	Test Channel :	09

100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

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 is 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

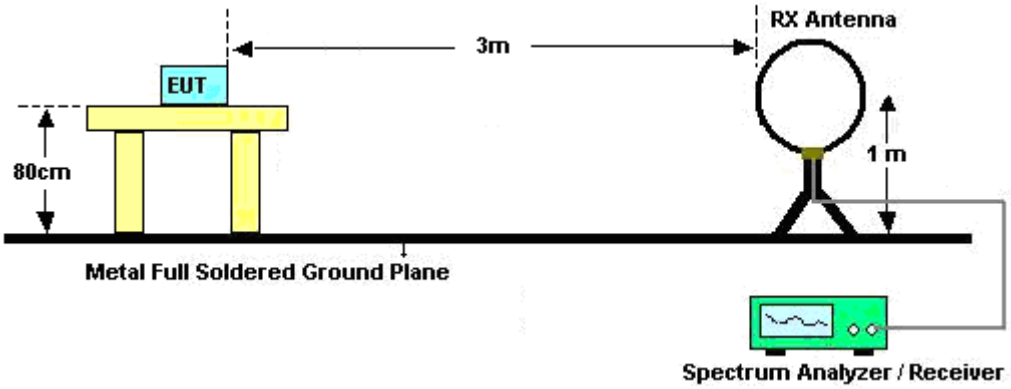
Please refer to the measuring equipment list in this test report.

3.5.3 Test Procedures

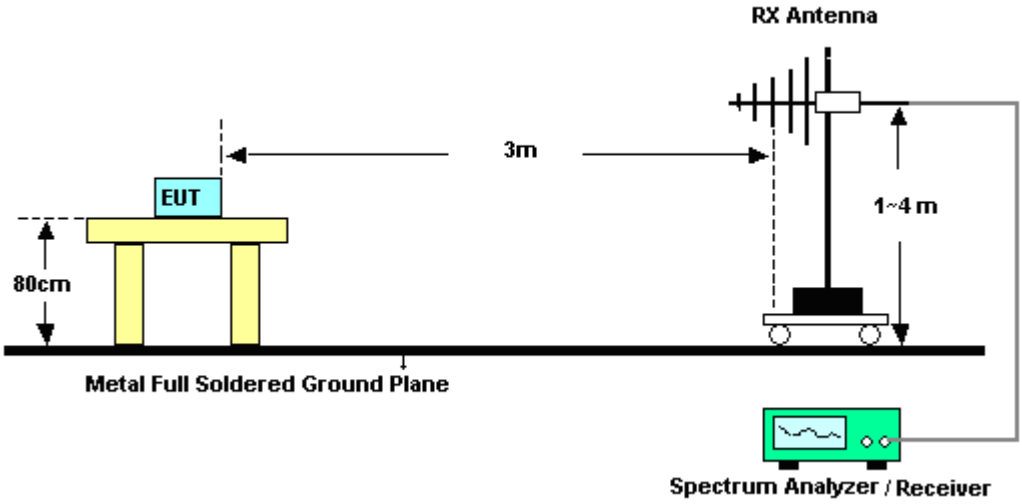
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT is arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
4. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as "-".
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as "-".
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 ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3 MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 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

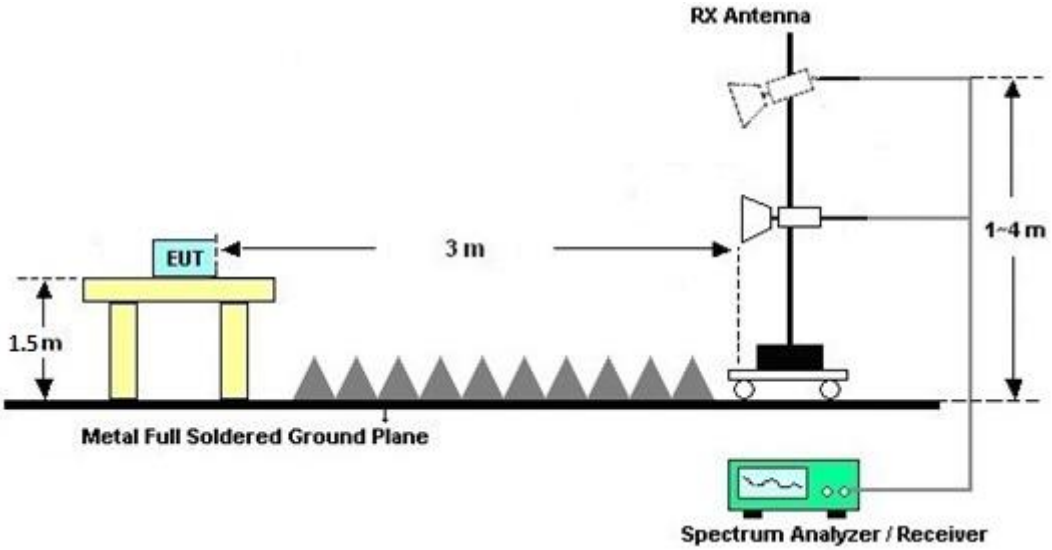
For radiated emissions below 30MHz



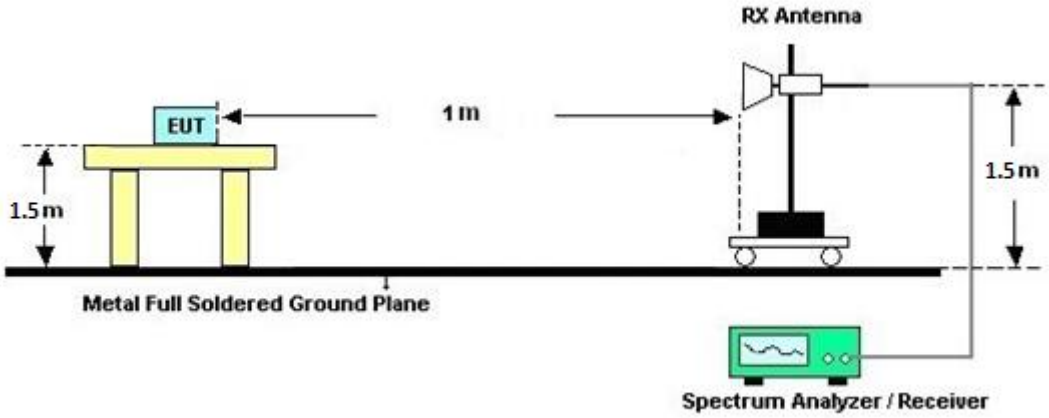
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



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

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

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result comes out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.5.7 Duty Cycle

Please refer to Appendix E.

3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix C and D.

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 (dBμV)	
	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.

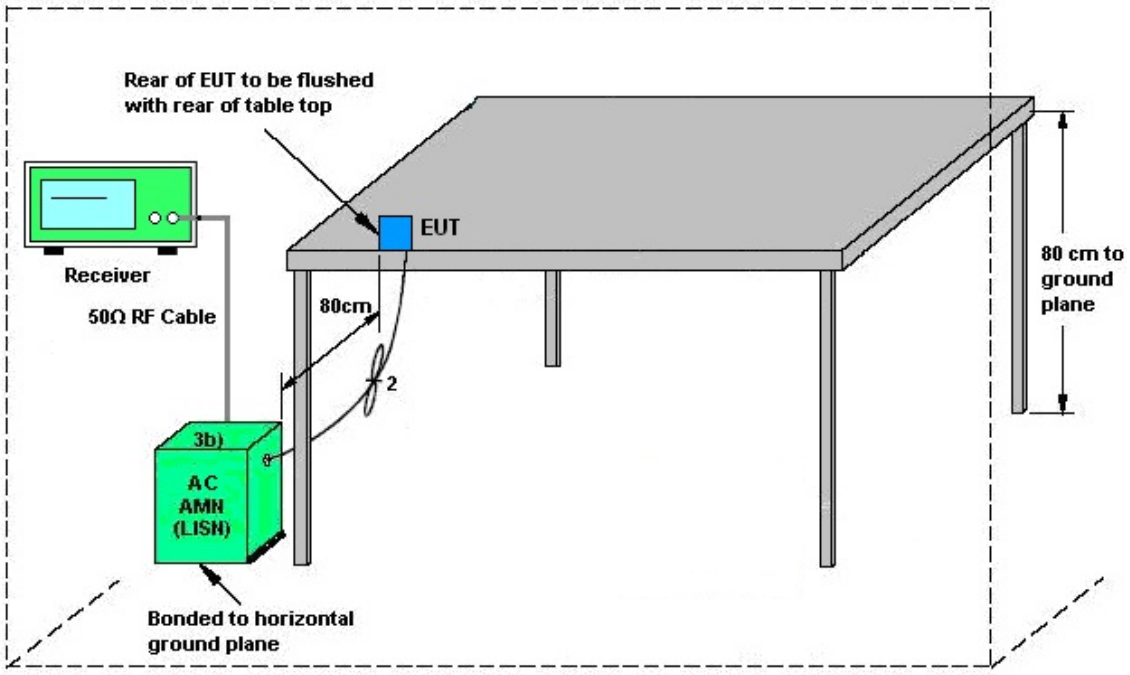
3.6.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.6.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is 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 shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
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



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

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 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 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 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 power measurements on IEEE 802.11 devices,

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

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

G_{ANT} is set equal to the gain of the antenna having the highest gain.

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

$$DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$

where

Each antenna is driven by no more than one spatial stream;
N_{SS} = the number of independent spatial streams of data;
N_{ANT} = the total number of antennas
$g_{j,k} = 10^{G_k/20}$ if the kth antenna is being fed by spatial stream j, or zero if it is not;
G_k is the gain in dBi of the kth antenna.

As minimum N_{SS}=1 is supported by EUT, the formula can be simplified as:

Directional gain = $10*\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ dBi

Where G1, G2….GN denote single antenna gain.

For example: If a device has two antenna, G_{ANT1}= 3.6dBi; G_{ANT2}=4.2dBi

Directional gain of power measurement = max(3.6, 4.2) + 0 = 4.2 dBi

Directional gain of PSD measurement = $10 * \log[(10^{3.6/20} + 10^{4.2/20})^2 / 2]$ = 6.92 dBi

The directional gain of EUT is listed in the following table.

<CDD Modes>						
	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
2.4 GHz	3.90	2.00	3.90	6.01	0.00	0.01

Power limit reduction = Composite gain – 6dBi, (min = 0)

PSD limit reduction = Composite gain + PSD Array gain – 6dBi, (min = 0

Calculation example:

The DG for PSD is derived from formula is

10 x log { { [10^ (3.90 dBi / 20) + 10^ (2.00 dBi / 20)] ^ 2 } / 2 }

= 6.01 dBi

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receicver	Keysight	N9010B	MY60241055	10Hz~44GHz	Jul. 12, 2021	Mar. 15, 2022~ Mar. 26, 2022	Jul. 11, 2022	Radiation (03CH20-HY)
Preamplifier	COM-POWER	PAM-103	18020201	1MHz-1000MHz	Jan. 03, 2022	Mar. 15, 2022~ Mar. 26, 2022	Jan. 02, 2023	Radiation (03CH20-HY)
Amplifier	EMCI	EMC118A45SE	980792	N/A	Nov. 15, 2021	Mar. 15, 2022~ Mar. 26, 2022	Nov. 14, 2022	Radiation (03CH20-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	Jun. 22, 2021	Mar. 15, 2022~ Mar. 26, 2022	Jun. 21, 2022	Radiation (03CH20-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Jan. 07, 2022	Mar. 15, 2022~ Mar. 26, 2022	Jan. 06, 2023	Radiation (03CH20-HY)
Bilog Antenna	TESEQ	CBL 6111D&00802 N1D01N-06	55606 & 08	30MHz~1GHz	Oct. 17, 2021	Mar. 15, 2022~ Mar. 26, 2022	Oct. 16, 2022	Radiation (03CH20-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-02294	1GHz~18GHz	Jun. 23, 2021	Mar. 15, 2022~ Mar. 26, 2022	Jun. 22, 2022	Radiation (03CH20-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA9170	00993	18GHz-40GHz	Nov. 30, 2021	Mar. 15, 2022~ Mar. 26, 2022	Nov. 29, 2022	Radiation (03CH20-HY)
Hygrometer	TECPEL	DTM-303B	TP200889	N/A	Sep. 30, 2021	Mar. 15, 2022~ Mar. 26, 2022	Sep. 29, 2022	Radiation (03CH20-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	519229/2,804 015/2,804027 /2	N/A	Jan. 19, 2022	Mar. 15, 2022~ Mar. 26, 2022	Jan. 18, 2023	Radiation (03CH20-HY)
Software	Audix	E3 6.2009-8-24	RK-002156	N/A	N/A	Mar. 15, 2022~ Mar. 26, 2022	N/A	Radiation (03CH20-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Mar. 15, 2022~ Mar. 26, 2022	N/A	Radiation (03CH20-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Mar. 15, 2022~ Mar. 26, 2022	N/A	Radiation (03CH20-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Mar. 15, 2022~ Mar. 26, 2022	N/A	Radiation (03CH20-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Mar. 03, 2022	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Dec. 01, 2021	Mar. 03, 2022	Nov. 30, 2022	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 17, 2021	Mar. 03, 2022	Nov. 16, 2022	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 03, 2021	Mar. 03, 2022	Dec. 02, 2022	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	Mar. 03, 2022	N/A	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	00691	N/A	Jul. 28, 2021	Mar. 03, 2022	Jul. 27, 2022	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 30, 2021	Mar. 03, 2022	Dec. 29, 2022	Conduction (CO05-HY)
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 16, 2021	Mar. 04, 2022~ Mar. 29, 2022	Nov. 15, 2022	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	15I00041SNO 10 (NO:248)	10MHz~6GHz	Dec. 29, 2021	Mar. 04, 2022~ Mar. 29, 2022	Dec. 28, 2022	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz~40GHz	Aug. 30, 2021	Mar. 04, 2022~ Mar. 29, 2022	Aug. 29, 2022	Conducted (TH05-HY)
Switch Control Manframe	E-IUSTRUMENT	ETF-1405-0	EC1900067 (BOX7)	N/A	Aug. 12, 2021	Mar. 04, 2022~ Mar. 29, 2022	Aug. 11, 2022	Conducted (TH05-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.1 dB**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.9 dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.2 dB**

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.7 dB**

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Ching Chen	Temperature:	21~25	°C
Test Date:	2022/3/4-2022/3/29	Relative Humidity:	51~54	%

Report Number : FR221836C

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band Single Antenna										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant1	Ant2	Ant1	Ant2		
11b	1Mbps	1	1	2412	13.69	13.74	10.10	10.14	0.50	Pass
11b	1Mbps	1	6	2437	13.69	13.69	10.14	10.10	0.50	Pass
11b	1Mbps	1	11	2462	13.69	13.69	10.10	10.10	0.50	Pass
11g	6Mbps	1	1	2412	17.73	17.78	16.40	16.42	0.50	Pass
11g	6Mbps	1	6	2437	17.88	17.83	16.38	16.38	0.50	Pass
11g	6Mbps	1	11	2462	17.78	17.78	16.38	16.40	0.50	Pass

2.4GHz Band MIMO										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant1	Ant2	Ant1	Ant2		
HT20	MCS0	2	1	2412	18.43	18.38	17.62	17.62	0.50	Pass
HT20	MCS0	2	6	2437	18.53	18.38	17.60	17.62	0.50	Pass
HT20	MCS0	2	11	2462	18.53	18.38	17.62	17.62	0.50	Pass
HT40	MCS0	2	3	2422	36.46	36.56	35.60	35.84	0.50	Pass
HT40	MCS0	2	6	2437	36.46	36.56	35.76	35.84	0.50	Pass
HT40	MCS0	2	9	2452	36.66	36.46	35.72	35.84	0.50	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band Single Antenna																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
11b	1Mbps	1	1	2412	14.80	16.10		30.00	30.00	3.90	2.00	18.70	18.10	36.00	36.00	Pass
11b	1Mbps	1	6	2437	15.20	16.10		30.00	30.00	3.90	2.00	19.10	18.10	36.00	36.00	Pass
11b	1Mbps	1	11	2462	15.40	16.00		30.00	30.00	3.90	2.00	19.30	18.00	36.00	36.00	Pass
11g	6Mbps	1	1	2412	13.80	15.20		30.00	30.00	3.90	2.00	17.70	17.20	36.00	36.00	Pass
11g	6Mbps	1	6	2437	14.20	15.10		30.00	30.00	3.90	2.00	18.10	17.10	36.00	36.00	Pass
11g	6Mbps	1	11	2462	14.40	15.00		30.00	30.00	3.90	2.00	18.30	17.00	36.00	36.00	Pass
HT20	MCS0	1	1	2412	11.90	13.20		30.00	30.00	3.90	2.00	15.80	15.20	36.00	36.00	Pass
HT20	MCS0	1	6	2437	13.20	14.20		30.00	30.00	3.90	2.00	17.10	16.20	36.00	36.00	Pass
HT20	MCS0	1	11	2462	12.50	13.20		30.00	30.00	3.90	2.00	16.40	15.20	36.00	36.00	Pass
HT40	MCS0	1	3	2422	9.90	11.10		30.00	30.00	3.90	2.00	13.80	13.10	36.00	36.00	Pass
HT40	MCS0	1	6	2437	10.10	11.10		30.00	30.00	3.90	2.00	14.00	13.10	36.00	36.00	Pass
HT40	MCS0	1	9	2452	10.30	11.00		30.00	30.00	3.90	2.00	14.20	13.00	36.00	36.00	Pass

2.4GHz Band MIMO																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
HT20	MCS0	2	1	2412	12.00	13.30	15.71	30.00		3.90		19.61		36.00		Pass
HT20	MCS0	2	6	2437	13.30	14.30	16.84	30.00		3.90		20.74		36.00		Pass
HT20	MCS0	2	11	2462	12.60	13.30	15.97	30.00		3.90		19.87		36.00		Pass
HT40	MCS0	2	3	2422	10.00	11.20	13.65	30.00		3.90		17.55		36.00		Pass
HT40	MCS0	2	6	2437	10.20	11.20	13.74	30.00		3.90		17.64		36.00		Pass
HT40	MCS0	2	9	2452	10.40	11.10	13.77	30.00		3.90		17.67		36.00		Pass

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

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band Single Antenna												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant1	Ant2	Worse + 3.01	Ant1	Ant2	Ant1	Ant2	
11b	1Mbps	1	1	2412	-4.74	-3.42		3.90	2.00	8.00	8.00	Pass
11b	1Mbps	1	6	2437	-4.25	-3.34		3.90	2.00	8.00	8.00	Pass
11b	1Mbps	1	11	2462	-4.14	-3.16		3.90	2.00	8.00	8.00	Pass
11g	6Mbps	1	1	2412	-13.03	-11.27		3.90	2.00	8.00	8.00	Pass
11g	6Mbps	1	6	2437	-12.71	-11.44		3.90	2.00	8.00	8.00	Pass
11g	6Mbps	1	11	2462	-12.37	-11.52		3.90	2.00	8.00	8.00	Pass

2.4GHz Band MIMO												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant1	Ant2	Worse + 3.01	Ant1	Ant2	Ant1	Ant2	
HT20	MCS0	2	1	2412	-13.91	-12.49	-9.48	6.01		7.99		Pass
HT20	MCS0	2	6	2437	-11.79	-10.94	-7.93	6.01		7.99		Pass
HT20	MCS0	2	11	2462	-14.01	-10.88	-7.87	6.01		7.99		Pass
HT40	MCS0	2	3	2422	-19.21	-17.88	-14.87	6.01		7.99		Pass
HT40	MCS0	2	6	2437	-18.30	-17.95	-14.94	6.01		7.99		Pass
HT40	MCS0	2	9	2452	-18.41	-17.42	-14.41	6.01		7.99		Pass

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

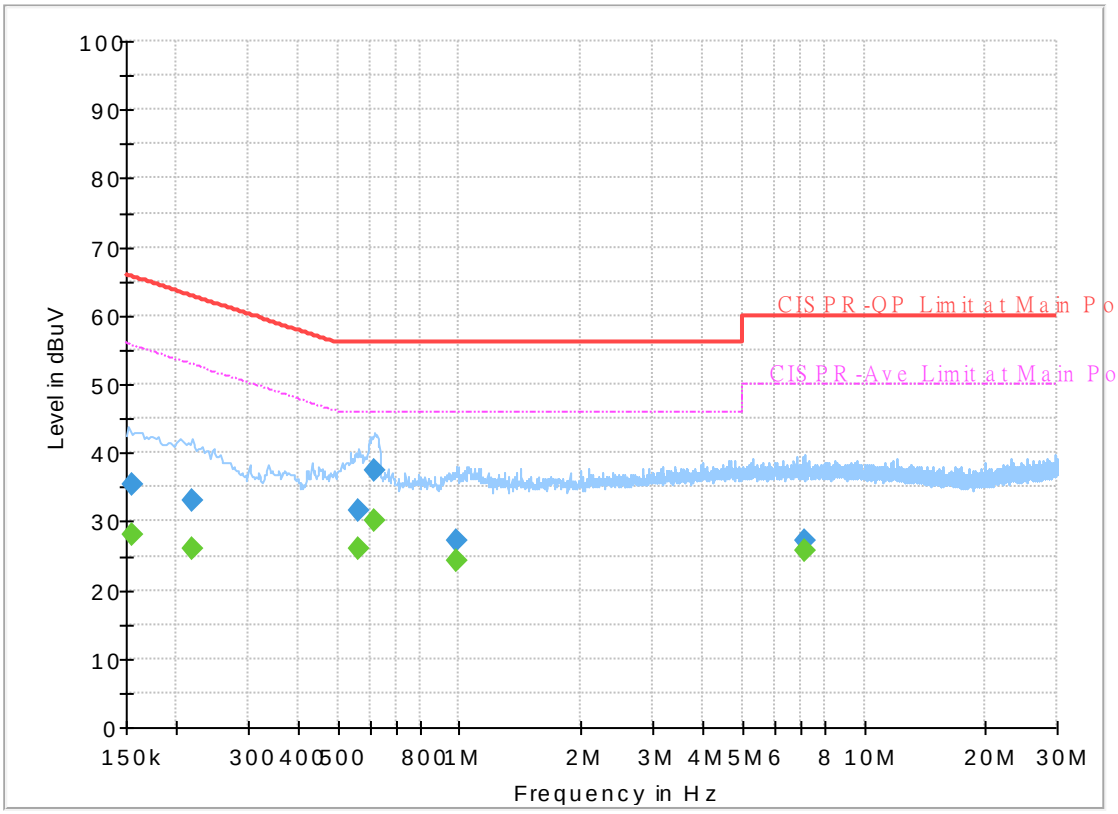
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Calvin Wang	**Temperature :**	23~26℃
		Relative Humidity :	45~55%

EUT Information

Report NO :	221836
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Line

Full Spectrum



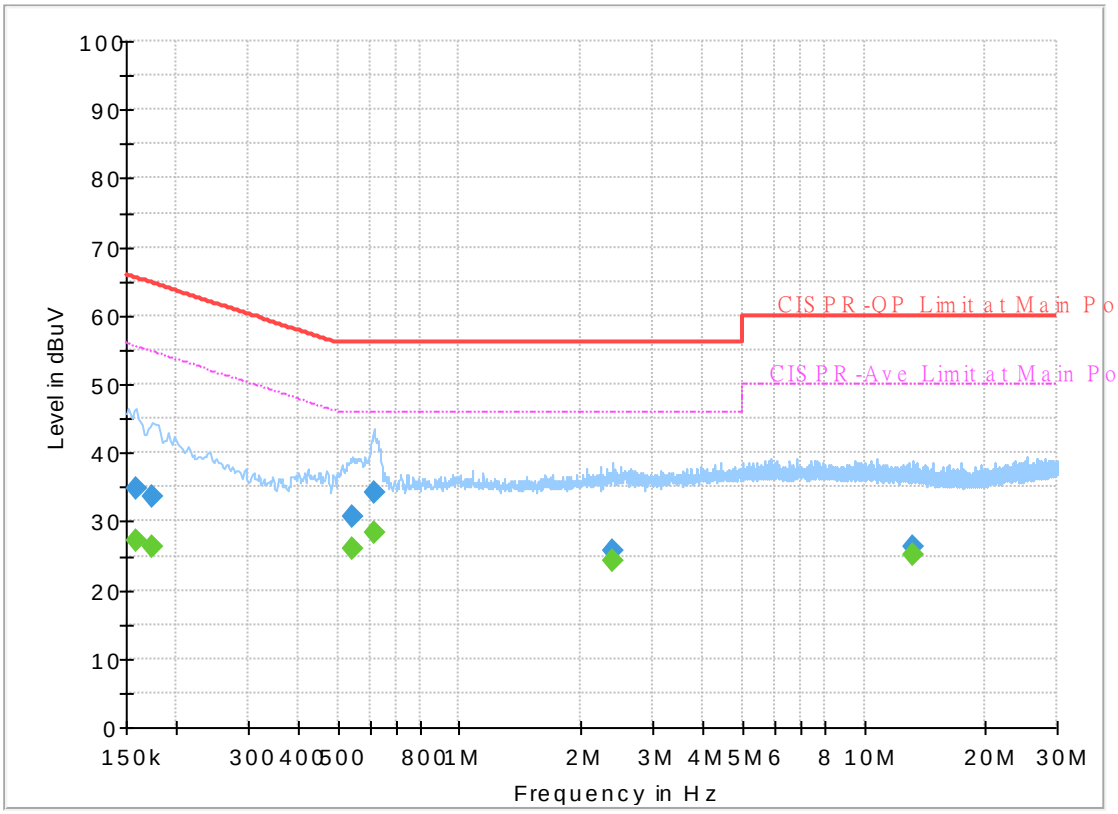
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154500	---	27.94	55.75	27.81	L1	OFF	19.6
0.154500	35.32	---	65.75	30.43	L1	OFF	19.6
0.217500	---	25.90	52.91	27.01	L1	OFF	19.6
0.217500	32.96	---	62.91	29.95	L1	OFF	19.6
0.564000	---	25.97	46.00	20.03	L1	OFF	19.6
0.564000	31.56	---	56.00	24.44	L1	OFF	19.6
0.618000	---	30.02	46.00	15.98	L1	OFF	19.6
0.618000	37.45	---	56.00	18.55	L1	OFF	19.6
0.982500	---	24.22	46.00	21.78	L1	OFF	19.6
0.982500	27.10	---	56.00	28.90	L1	OFF	19.6
7.158750	---	25.62	50.00	24.38	L1	OFF	19.9
7.158750	27.10	---	60.00	32.90	L1	OFF	19.9

EUT Information

Report NO :	221836
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Neutral

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.159000	---	27.26	55.52	28.26	N	OFF	19.6
0.159000	34.89	---	65.52	30.63	N	OFF	19.6
0.174750	---	26.19	54.73	28.54	N	OFF	19.6
0.174750	33.51	---	64.73	31.22	N	OFF	19.6
0.546000	---	25.93	46.00	20.07	N	OFF	19.6
0.546000	30.85	---	56.00	25.15	N	OFF	19.6
0.613500	---	28.32	46.00	17.68	N	OFF	19.6
0.613500	34.07	---	56.00	21.93	N	OFF	19.6
2.379750	---	24.21	46.00	21.79	N	OFF	19.7
2.379750	25.73	---	56.00	30.27	N	OFF	19.7
13.260750	---	25.01	50.00	24.99	N	OFF	20.2
13.260750	26.32	---	60.00	33.68	N	OFF	20.2

Appendix C. Radiated Spurious Emission

Test Engineer :	Bill Chang, JC Liang and Bigshow Wang	Temperature :	18~20°C
		Relative Humidity :	68~70%

2.4GHz 2400~2483.5MHz

WIFI 802.11g (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.
1		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 11 2462MHz	*	2462	111.18	-	-	101.11	27.55	18.82	36.3	198	357	P	H
	*	2462	103.7	-	-	93.63	27.55	18.82	36.3	198	357	A	H
		2483.56	70.65	-3.35	74	60.47	27.63	18.86	36.31	198	357	P	H
		2483.52	53.71	-0.29	54	43.53	27.63	18.86	36.31	198	357	A	H
													H
													H
	*	2462	102.76	-	-	92.69	27.55	18.82	36.3	301	89	P	V
	*	2462	95.01	-	-	84.94	27.55	18.82	36.3	301	89	A	V
		2483.56	59.21	-14.79	74	49.03	27.63	18.86	36.31	301	89	P	V
		2483.52	43.66	-10.34	54	33.48	27.63	18.86	36.31	301	89	A	V
													V
													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. 1	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 11 2462MHz		4924	43.11	-30.89	74	34.93	32.84	12.97	37.63	-	-	P	H
		7386	58.59	-15.41	74	44.76	36.41	16.01	38.59	398	178	P	H
		7386	46.61	-7.39	54	32.78	36.41	16.01	38.59	398	178	A	H
		12690	52.4	-21.6	74	34.93	39.48	21.21	43.22	-	-	P	H
		12690	41.84	-12.16	54	24.37	39.48	21.21	43.22	-	-	A	H
		13290	54.21	-19.79	74	35.77	39.79	21.8	43.15	-	-	P	H
		13290	42.8	-11.2	54	24.36	39.79	21.8	43.15	-	-	A	H
		18000	55.27	-18.73	74	34.05	41.8	24.89	45.47	-	-	P	H
		18000	46.57	-7.43	54	25.35	41.8	24.89	45.47	-	-	A	H
													H
													H
													H
		4924	43.24	-30.76	74	35.06	32.84	12.97	37.63	-	-	P	V
		7386	60.33	-13.67	74	46.5	36.41	16.01	38.59	100	214	P	V
		7386	49.11	-4.89	54	35.28	36.41	16.01	38.59	100	214	A	V
		11805	51.85	-22.15	74	35.83	38.61	20.3	42.89	-	-	P	V
		11805	40.24	-13.76	54	24.22	38.61	20.3	42.89	-	-	A	V
		12310	54.13	-19.87	74	37.44	39.09	20.8	43.2	100	122	P	V
		12310	45.85	-8.15	54	29.16	39.09	20.8	43.2	100	122	A	V
		13290	53.26	-20.74	74	34.82	39.79	21.8	43.15	-	-	P	V
		13290	42.75	-11.25	54	24.31	39.79	21.8	43.15	-	-	A	V
		17955	55.52	-18.48	74	34.61	41.49	24.86	45.44	-	-	P	V
		17955	46.12	-7.88	54	25.21	41.49	24.86	45.44	-	-	A	V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.
4. The emission level close to 18GHz is checked that the average emission level is noise floor only.

Emission above 18GHz

2.4GHz WIFI 802.11g (SHF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11g SHF		23404	39.86	-34.14	74	37.29	38.84	17.79	54.06	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		23215	39.6	-34.4	74	37.36	38.9	17.51	54.17	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

Emission below 1GHz

2.4GHz WIFI 802.11g (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.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11g LF		38.73	24.44	-15.56	40	38.81	19.93	1.33	35.63	-	-	P	H
		143.49	27.76	-15.74	43.5	43.38	17.45	2.42	35.49	-	-	P	H
		405.39	28.12	-17.88	46	36.97	22.13	3.85	34.83	-	-	P	H
		600.36	33.89	-12.11	46	38.11	25.47	4.69	34.38	-	-	P	H
		718.7	39.75	-6.25	46	41.88	26.71	5.03	33.87	-	-	P	H
		825.4	42.59	-3.41	46	42.81	27.77	5.52	33.51	150	66	Q	H
													H
													H
													H
													H
													H
													H
		72.68	30.58	-9.42	40	51.97	12.44	1.75	35.58	-	-	P	V
		131.85	27.89	-15.61	43.5	43.65	17.43	2.32	35.51	-	-	P	V
		295.78	29.04	-16.96	46	41.61	19.29	3.31	35.17	-	-	P	V
		600.36	37.73	-8.27	46	41.95	25.47	4.69	34.38	-	-	P	V
		746.83	36.55	-9.45	46	37.45	27.67	5.18	33.75	-	-	P	V
		828.31	42.15	-3.85	46	42.19	27.92	5.53	33.49	100	306	Q	V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2386.44	49.65	-24.35	74	39.99	27.25	18.68	36.27	111	312	P	H
		2386.44	39.57	-14.43	54	29.91	27.25	18.68	36.27	111	312	A	H
	*	2412	91.9	-	-	82.11	27.35	18.72	36.28	111	312	P	H
	*	2412	88.83	-	-	79.04	27.35	18.72	36.28	111	312	A	H
													H
													H
		2386.44	54.95	-19.05	74	45.29	27.25	18.68	36.27	100	248	P	V
		2386.965	48.33	-5.67	54	38.67	27.25	18.68	36.27	100	248	A	V
	*	2412	107.03	-	-	97.24	27.35	18.72	36.28	100	248	P	V
	*	2412	103.95	-	-	94.16	27.35	18.72	36.28	100	248	A	V
													V
													V
802.11b CH 06 2437MHz		2359.92	49.89	-24.11	74	40.38	27.14	18.63	36.26	100	335	P	H
		2388.4	37.93	-16.07	54	28.27	27.25	18.68	36.27	100	335	A	H
	*	2437	91.97	-	-	82.04	27.45	18.77	36.29	100	335	P	H
	*	2437	88.95	-	-	79.02	27.45	18.77	36.29	100	335	A	H
		2485.92	49.61	-24.39	74	39.42	27.64	18.86	36.31	100	335	P	H
		2485.76	38.64	-15.36	54	28.45	27.64	18.86	36.31	100	335	A	H
		2382	51.63	-22.37	74	42	27.23	18.67	36.27	144	201	P	V
		2337.2	41.83	-12.17	54	32.39	27.1	18.59	36.25	144	201	A	V
	*	2437	108.13	-	-	98.2	27.45	18.77	36.29	144	201	P	V
	*	2437	105.06	-	-	95.13	27.45	18.77	36.29	144	201	A	V
		2485.68	53.86	-20.14	74	43.67	27.64	18.86	36.31	144	201	P	V
		2485.76	44.67	-9.33	54	34.48	27.64	18.86	36.31	144	201	A	V

802.11b CH 11 2462MHz	*	2462	92.88	-	-	82.81	27.55	18.82	36.3	102	301	P	H
	*	2462	89.81	-	-	79.74	27.55	18.82	36.3	102	301	A	H
		2487.44	50.55	-23.45	74	40.34	27.65	18.87	36.31	102	301	P	H
		2486.52	39.9	-14.1	54	29.7	27.65	18.86	36.31	102	301	A	H
													H
													H
	*	2462	108.48	-	-	98.41	27.55	18.82	36.3	108	203	P	V
	*	2462	105.31	-	-	95.24	27.55	18.82	36.3	108	203	A	V
		2486.32	56.66	-17.34	74	46.46	27.65	18.86	36.31	108	203	P	V
		2486.52	50.29	-3.71	54	40.09	27.65	18.86	36.31	108	203	A	V
													V
													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. 2	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	47.88	-26.12	74	40.12	32.3	13.02	37.56	400	45	P	H
		4824	37.34	-16.66	54	29.58	32.3	13.02	37.56	400	45	A	H
		11460	51.56	-22.44	74	35.17	38.98	19.99	42.58	-	-	P	H
		11460	40.7	-13.3	54	24.31	38.98	19.99	42.58	-	-	A	H
		12060	56.97	-17.03	74	40.38	39.12	20.53	43.06	186	66	P	H
		12060	50.86	-3.14	54	34.27	39.12	20.53	43.06	186	66	A	H
		13395	53.26	-20.74	74	34.54	39.99	21.9	43.17	-	-	P	H
		13395	43.1	-10.9	54	24.38	39.99	21.9	43.17	-	-	A	H
		17985	54.16	-19.84	74	33.05	41.69	24.88	45.46	-	-	P	H
		17985	46.6	-7.4	54	25.49	41.69	24.88	45.46	-	-	A	H
													H
													H
		3615	51.9	-22.1	74	47.61	29.53	11.69	36.93	286	267	P	V
		3615	46.85	-7.15	54	42.56	29.53	11.69	36.93	286	267	A	V
		4824	49.63	-24.37	74	41.87	32.3	13.02	37.56	105	303	P	V
		4824	43.93	-10.07	54	36.17	32.3	13.02	37.56	105	303	A	V
		11370	51.01	-22.99	74	34.46	39.04	19.91	42.4	-	-	P	V
		11370	40.68	-13.32	54	24.13	39.04	19.91	42.4	-	-	A	V
		12060	53.86	-20.14	74	37.27	39.12	20.53	43.06	177	68	P	V
		12060	45.96	-8.04	54	29.37	39.12	20.53	43.06	177	68	A	V
		13335	53.09	-20.91	74	34.53	39.87	21.85	43.16	-	-	P	V
		13335	42.78	-11.22	54	24.22	39.87	21.85	43.16	-	-	A	V
		17985	54.07	-19.93	74	32.96	41.69	24.88	45.46	-	-	P	V
		17985	46.58	-7.42	54	25.47	41.69	24.88	45.46	-	-	A	V

WIFI Ant. 2	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)
		4874	43.56	-30.44	74	35.62	32.54	13	37.6	-	-	P	H
		7311	47.79	-26.21	74	33.62	36.78	15.92	38.53	-	-	P	H
		11025	52.08	-21.92	74	35.48	38.7	19.61	41.71	-	-	P	H
		11025	40.97	-13.03	54	24.37	38.7	19.61	41.71	-	-	A	H
		12185	56.85	-17.15	74	40.12	39.2	20.66	43.13	183	301	P	H
		12185	47.98	-6.02	54	31.25	39.2	20.66	43.13	183	301	A	H
		13290	53.37	-20.63	74	34.93	39.79	21.8	43.15	-	-	P	H
		13290	42.79	-11.21	54	24.35	39.79	21.8	43.15	-	-	A	H
		18000	55.56	-18.44	74	34.34	41.8	24.89	45.47	-	-	P	H
		18000	46.53	-7.47	54	25.31	41.8	24.89	45.47	-	-	A	H
													H
802.11b													H
CH 06		3660	52.8	-21.2	74	48.38	29.6	11.78	36.96	258	259	P	V
2437MHz		3660	47.06	-6.94	54	42.64	29.6	11.78	36.96	258	259	A	V
		4874	50.3	-23.7	74	42.36	32.54	13	37.6	102	301	P	V
		4874	45.17	-8.83	54	37.23	32.54	13	37.6	102	301	A	V
		7311	47.97	-26.03	74	33.8	36.78	15.92	38.53	-	-	P	V
		10815	51.69	-22.31	74	34.92	39.06	19.4	41.69	-	-	P	V
		10815	41.04	-12.96	54	24.27	39.06	19.4	41.69	-	-	A	V
		12185	53.49	-20.51	74	36.76	39.2	20.66	43.13	100	7	P	V
		12185	44.58	-9.42	54	27.85	39.2	20.66	43.13	100	7	A	V
		13365	53.06	-20.94	74	34.43	39.93	21.87	43.17	-	-	P	V
		13365	42.97	-11.03	54	24.34	39.93	21.87	43.17	-	-	P	V
		17955	55.02	-18.98	74	34.11	41.49	24.86	45.44	-	-	P	V
		17955	46.11	-7.89	54	25.2	41.49	24.86	45.44	-	-	A	V

WIFI Ant. 2	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)
		4924	48.5	-25.5	74	40.32	32.84	12.97	37.63	248	17	P	H
		4924	40.59	-13.41	54	32.41	32.84	12.97	37.63	248	17	A	H
		7386	47.82	-26.18	74	33.99	36.41	16.01	38.59	-	-	P	H
		11925	51.54	-22.46	74	35.18	38.93	20.4	42.97	-	-	P	H
		11925	40.51	-13.49	54	24.15	38.93	20.4	42.97	-	-	A	H
		12310	55.92	-18.08	74	39.23	39.09	20.8	43.2	193	75	P	H
		12310	49.26	-4.74	54	32.57	39.09	20.8	43.2	193	75	A	H
		13320	52.83	-21.17	74	34.31	39.84	21.84	43.16	-	-	P	H
		13320	42.82	-11.18	54	24.3	39.84	21.84	43.16	-	-	A	H
		17955	54.34	-19.66	74	33.43	41.49	24.86	45.44	-	-	P	H
		17955	46.15	-7.85	54	25.24	41.49	24.86	45.44	-	-	A	H
802.11b													H
CH 11		3690	52.31	-21.69	74	47.85	29.6	11.85	36.99	269	252	P	V
2462MHz		3690	46.65	-7.35	54	42.19	29.6	11.85	36.99	269	252	A	V
		4924	50.42	-23.58	74	42.24	32.84	12.97	37.63	202	328	P	V
		4924	46.16	-7.84	54	37.98	32.84	12.97	37.63	202	328	A	V
		7386	47.59	-26.41	74	33.76	36.41	16.01	38.59	-	-	P	V
		11760	51.91	-22.09	74	35.9	38.6	20.26	42.85	-	-	P	V
		11760	40.16	-13.84	54	24.15	38.6	20.26	42.85	-	-	A	V
		12315	54.55	-19.45	74	37.86	39.08	20.81	43.2	180	69	P	V
		12315	46.53	-7.47	54	29.84	39.08	20.81	43.2	180	69	A	V
		13275	53.73	-20.27	74	35.31	39.78	21.79	43.15	-	-	P	V
		13275	42.63	-11.37	54	24.21	39.78	21.79	43.15	-	-	A	V
		17955	54.83	-19.17	74	33.92	41.49	24.86	45.44	-	-	P	V
		17955	46.25	-7.75	54	25.34	41.49	24.86	45.44	-	-	A	V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.
4. The emission level close to 18GHz is checked that the average emission level is noise floor only.

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI Ant. 2	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		2390	65.96	-8.04	74	56.29	27.26	18.68	36.27	161	173	P	H
		2390	50.45	-3.55	54	40.78	27.26	18.68	36.27	161	173	A	H
	*	2412	90.13	-	-	80.34	27.35	18.72	36.28	161	173	P	H
	*	2412	82.52	-	-	72.73	27.35	18.72	36.28	161	173	A	H
													H
													H
		2389.38	67.81	-6.19	74	58.14	27.26	18.68	36.27	104	205	P	V
		2390	47.25	-6.75	54	37.58	27.26	18.68	36.27	104	205	A	V
	*	2412	108.78	-	-	98.99	27.35	18.72	36.28	104	205	P	V
	*	2412	100.82	-	-	91.03	27.35	18.72	36.28	104	205	A	V
													V
													V
802.11g CH 06 2437MHz		2317.68	49.39	-24.61	74	39.98	27.1	18.55	36.24	100	334	P	H
		2390	38.02	-15.98	54	28.35	27.26	18.68	36.27	100	334	A	H
	*	2437	93.25	-	-	83.32	27.45	18.77	36.29	100	334	P	H
	*	2437	85.64	-	-	75.71	27.45	18.77	36.29	100	334	A	H
		2488.8	50.32	-23.68	74	40.11	27.66	18.87	36.32	100	334	P	H
		2499.36	38.52	-15.48	54	28.25	27.7	18.89	36.32	100	334	A	H
		2390	56.24	-17.76	74	46.57	27.26	18.68	36.27	118	248	P	V
		2390	41.39	-12.61	54	31.72	27.26	18.68	36.27	118	248	A	V
	*	2437	109.16	-	-	99.23	27.45	18.77	36.29	118	248	P	V
	*	2437	101.4	-	-	91.47	27.45	18.77	36.29	118	248	A	V
		2483.68	59.5	-14.5	74	49.32	27.63	18.86	36.31	118	248	P	V
		2483.6	43.2	-10.8	54	33.02	27.63	18.86	36.31	118	248	A	V

802.11g CH 11 2462MHz	*	2464	87.77	-	-	77.69	27.56	18.82	36.3	239	170	P	H
	*	2462	80.03	-	-	69.96	27.55	18.82	36.3	239	170	A	H
		2483.6	62.95	-11.05	74	52.77	27.63	18.86	36.31	239	170	P	H
		2483.52	49.16	-4.84	54	38.98	27.63	18.86	36.31	239	170	A	H
													H
													H
	*	2462	109.68	-	-	99.61	27.55	18.82	36.3	108	258	P	V
	*	2462	101.66	-	-	91.59	27.55	18.82	36.3	108	258	A	V
		2483.64	70.57	-3.43	74	60.39	27.63	18.86	36.31	108	258	P	V
		2483.52	53.42	-0.58	54	43.24	27.63	18.86	36.31	108	258	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												