



FCC RF Test Report

APPLICANT : D-Link Corporation
EQUIPMENT : 4G/LTE Mobile Router
BRAND NAME : D-Link
MODEL NAME : DWR-932C
FCC ID : KA2WR932CF1
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System
TEST DATE(S) : May 13, 2021 ~ Jun. 01, 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
FR140123	Rev. 01	Initial issue of report	Jun. 17, 2021
FR140123	Rev. 02	Correct the gain of WLAN ant.1 and ant.2	Jun. 23, 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	-	Report only	-
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 2.18 dB at 4926.00 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 11.22 dB at 0.187 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	15.203	Pass	-

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

D-Link Corporation

No.289, Xinhua 3rd Rd., Neihu District, Taipei 11494, Taiwan, R.O.C.

1.2 Manufacturer

D-Link Corporation

No.289, Xinhua 3rd Rd., Neihu District, Taipei 11494, Taiwan, R.O.C.

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	4G/LTE Mobile Router
Brand Name	D-Link
Model Name	DWR-932C
FCC ID	KA2WR932CF1
EUT supports Radios application	GSM/WCDMA/LTE WLAN 11b/g/n HT20/HT40
HW Version	F1
SW Version	01.04.WW
EUT Stage	Production Unit

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	802.11b : 16.62 dBm (0.0459 W) 802.11g : 21.68 dBm (0.1472 W) 802.11n HT20 : 21.64 dBm (0.1459 W) 802.11n HT40 : 22.30 dBm (0.1698 W)		
Antenna Type / Gain	Ant. 1: Internal Antenna with gain 0.24 dBi Ant. 2: Internal Antenna with gain -0.23 dBi		
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)		
Antenna Function		Ant. 1	Ant. 2
	802.11b/g SISO	V	V
	802.11n MIMO	V	

Remark: WLAN ant.1 corresponds to Antenna 3 of EP, and WLAN ant.2 corresponds to Antenna 4 of EP.

1.5 Modification of EUT

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

1.6 Testing Location

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 03CH05-KS TH01-KS	CN1257	314309

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH05-KS	AUDIX	E3	6.2009-8-24al
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.

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.

- a. For 802.11b/g SISO mode, only the SISO Antenna with higher output power perform full test.
- b. For 802.11n HT20/HT40, MIMO mode cover SISO mode (MIMO=SISO Ant 1 + SISO Ant 2), only MIMO mode perform full test.

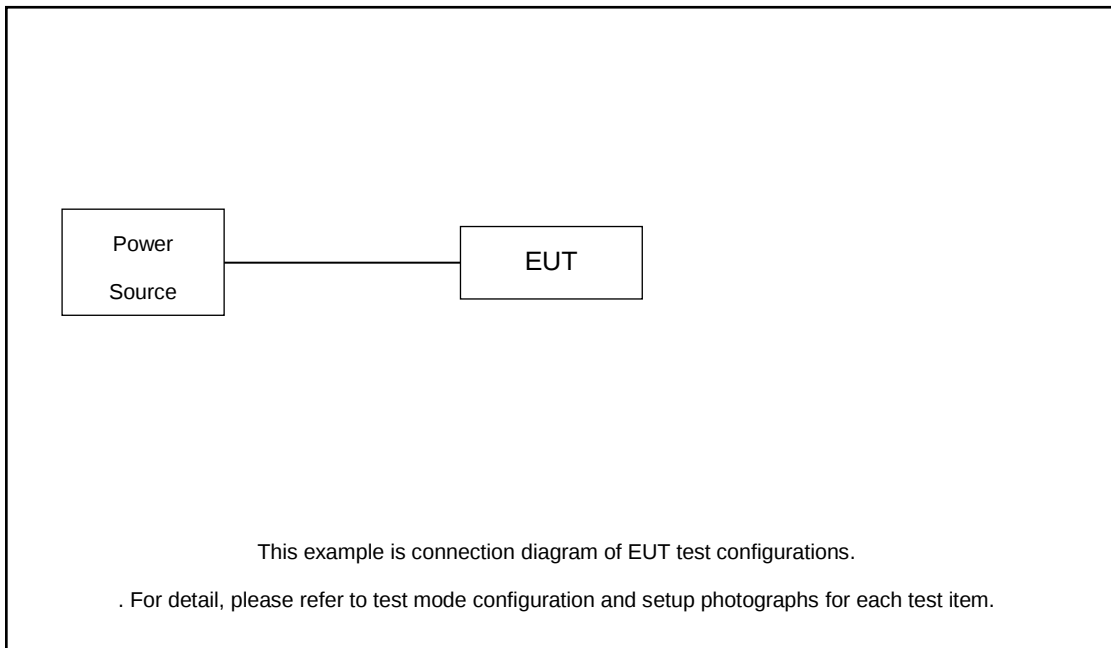
Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

Co-location
WIFI 802.11b & LTE B4 BW=20M

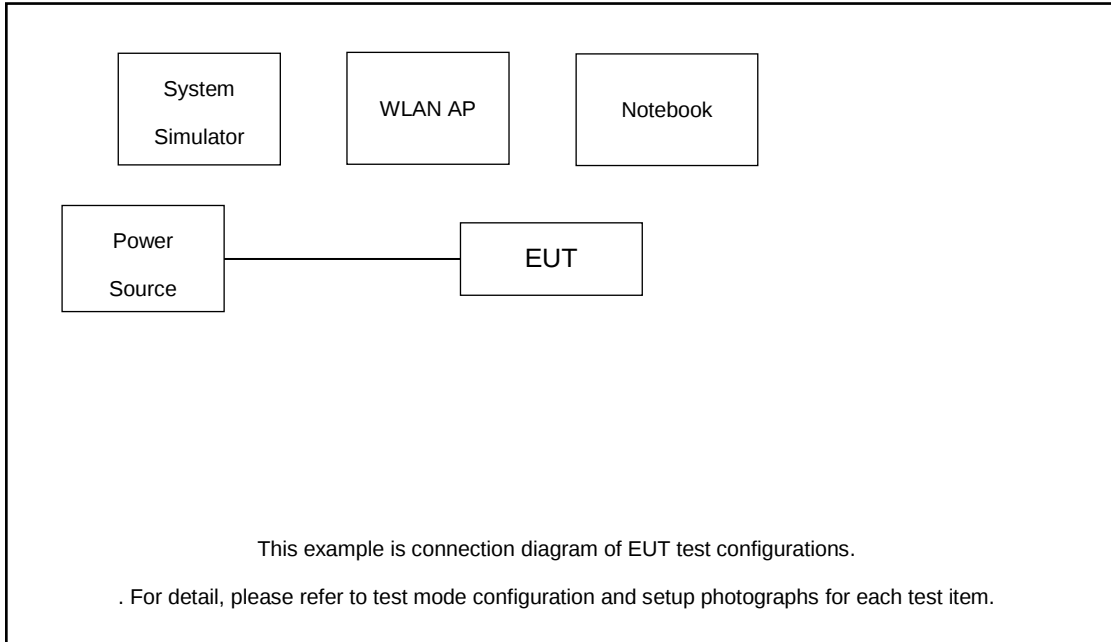
Test Cases	
AC Conducted Emission	Mode 1 :WCDMA Band V Idle + WLAN Link(2.4G) + USB Cable (Charging from Adapter 1)
Remark: For Radiated Test Cases, The tests were performance with Adapter 1 and USB Cable.	

2.3 Connection Diagram of Test System

For Radiated Emission



For AC Conducted Emission



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.	WLAN AP	N/A	N/A	N/A	N/A	N/A
3.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Hard Disk	Lenovo	F310	DoC	Shielded, 1.2m	N/A
5.	SD Card	Kingston	8GB	N/A	N/A	N/A

2.5 EUT Operation Test Setup

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

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 6.0 dB.

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} . \\ &= 6.0 \text{ (dB)} \end{aligned}$$

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.

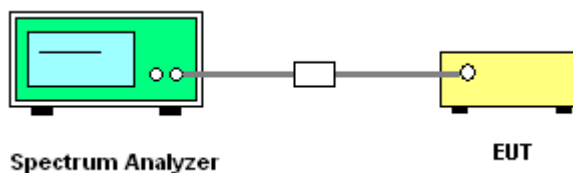
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

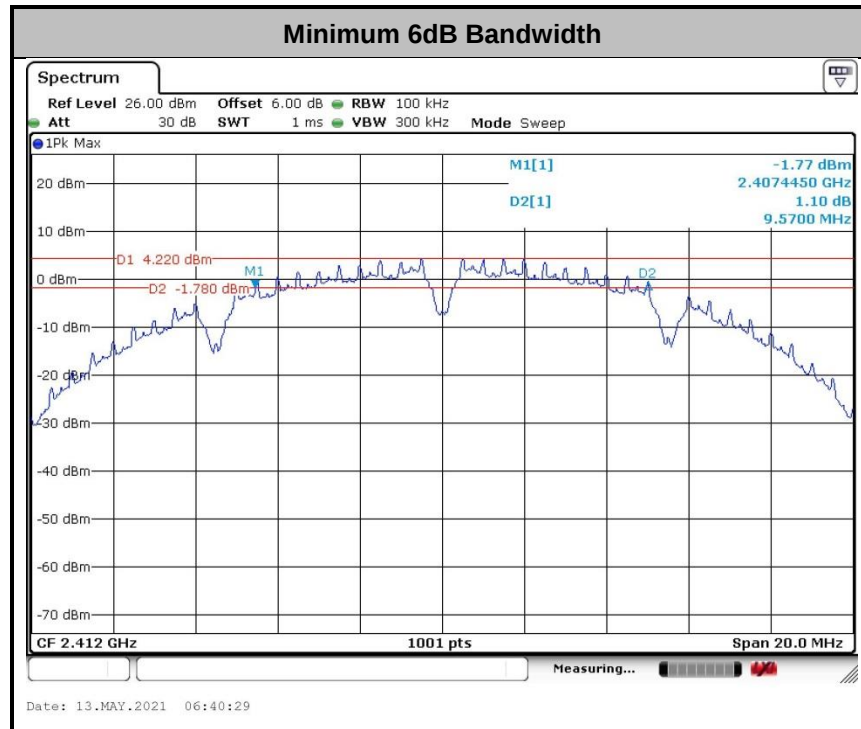
1. The testing follows ANSI C63.10-2013 clause 11.8
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement 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 Occupied Bandwidth

Please refer to Appendix A.



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.

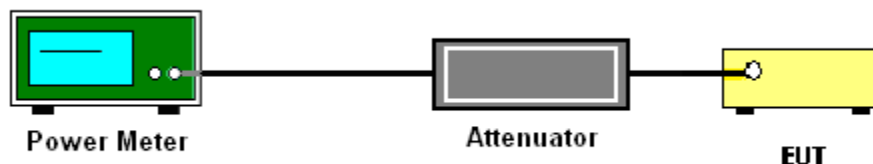
3.2.2 Measuring Instruments

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.

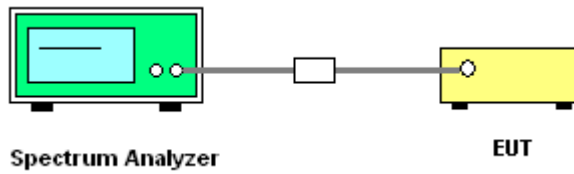
If measurements performed using method (2) plus 10 log (N) exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

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.

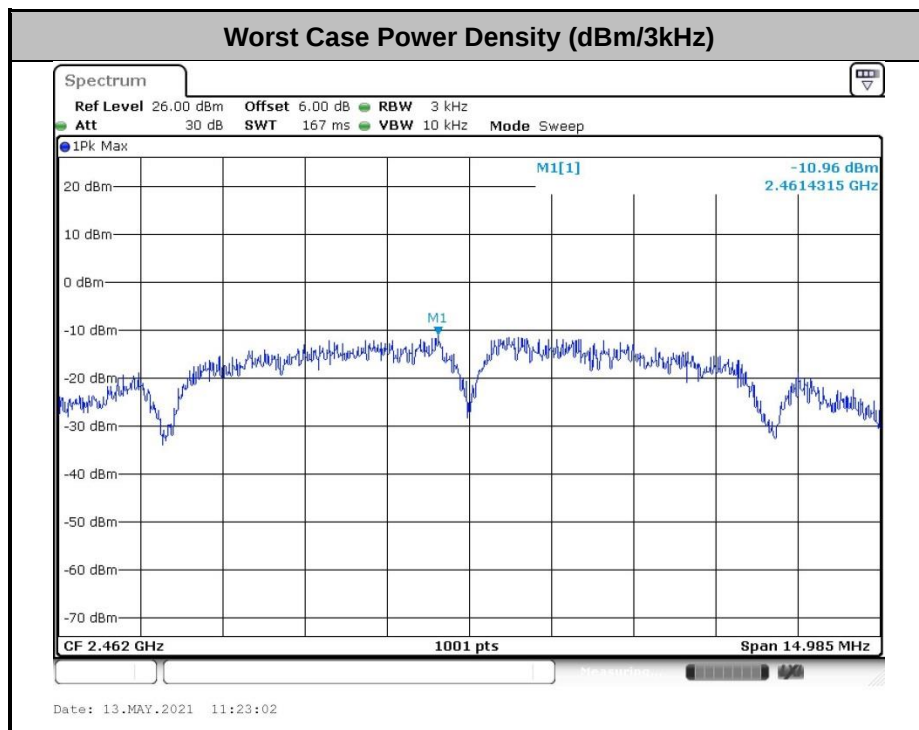
Method (2): Measure and add 10 log (N) dB, where N is the number of outputs. (N=2)

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.

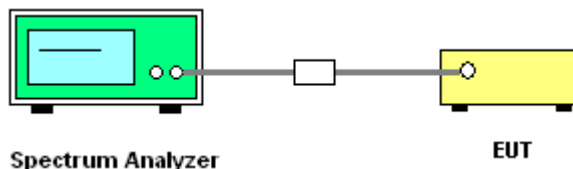
3.4.2 Measuring Instruments

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



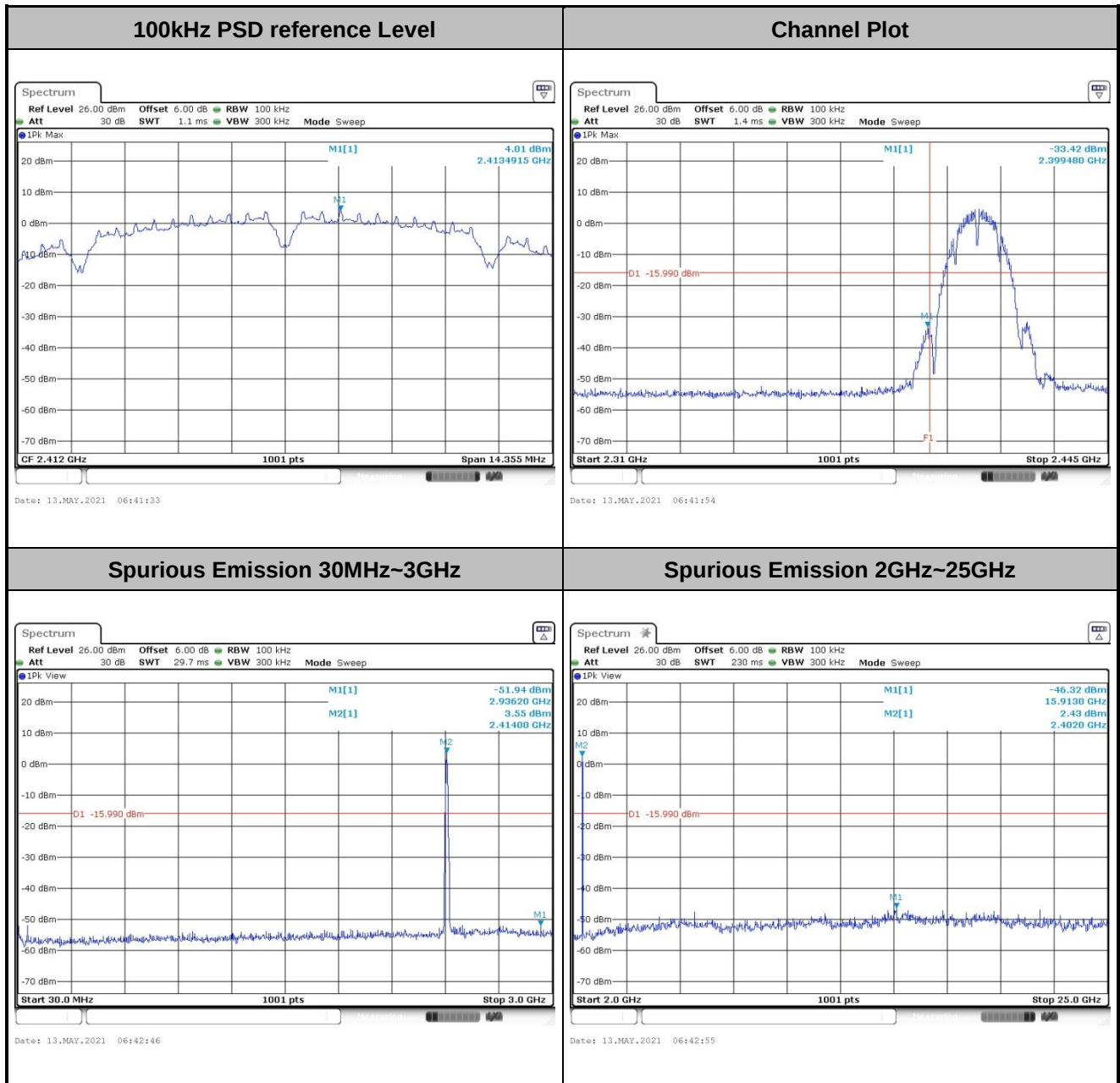


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Engineer :	Rise Liu/HeYong	Temperature :	21~25°C
		Relative Humidity :	51~54%

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

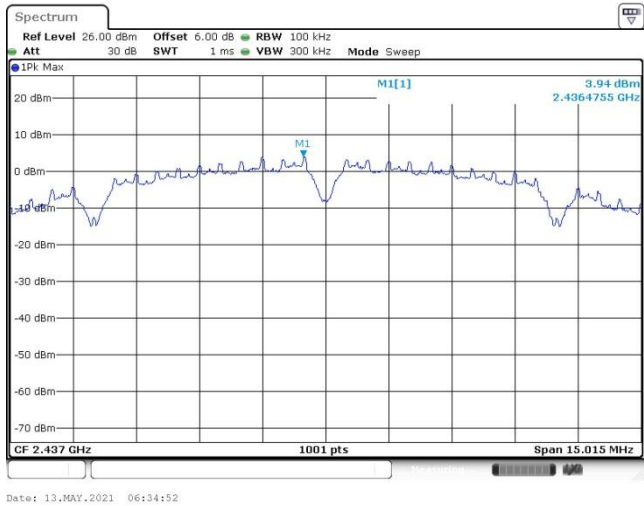
Test Mode :	802.11b	Test Channel :	01
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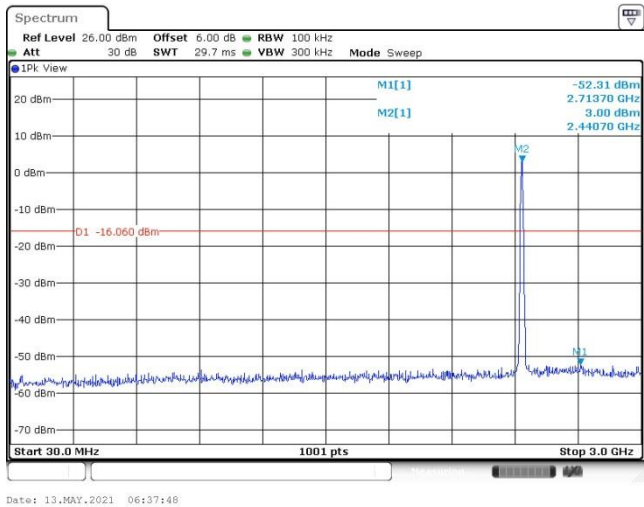


Test Mode :	802.11b	Test Channel :	06
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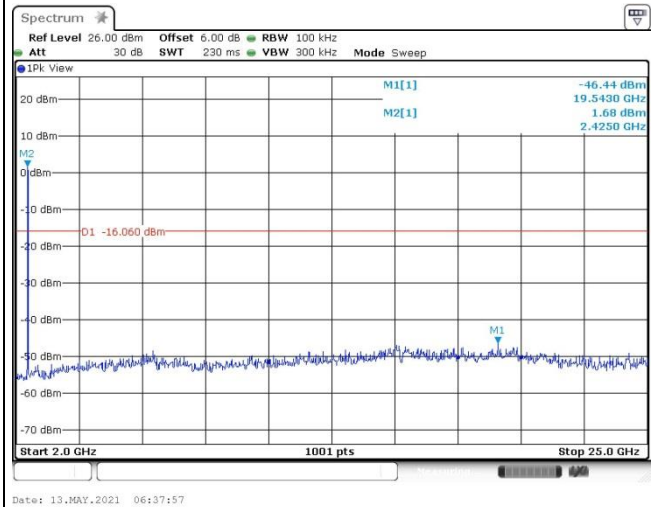
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

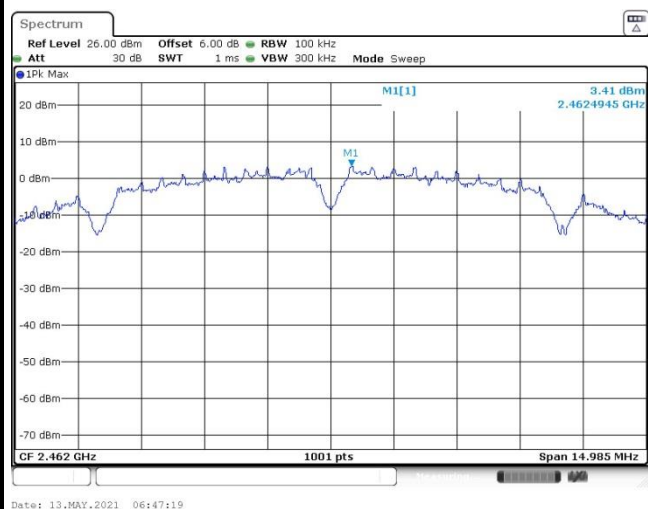




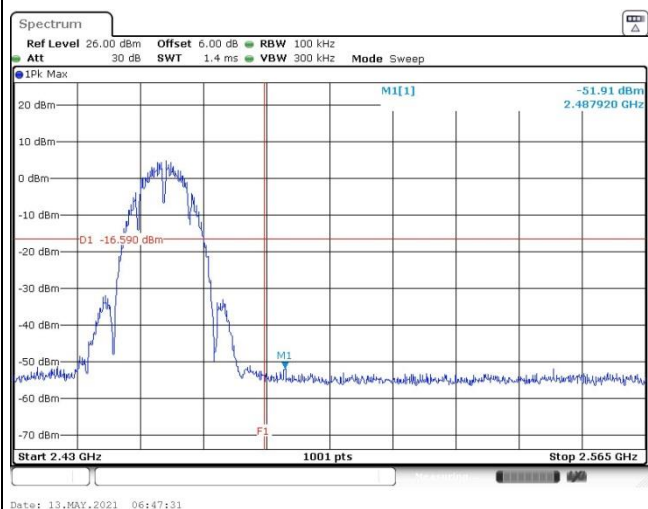
Test Mode : 802.11b

Test Channel : 11

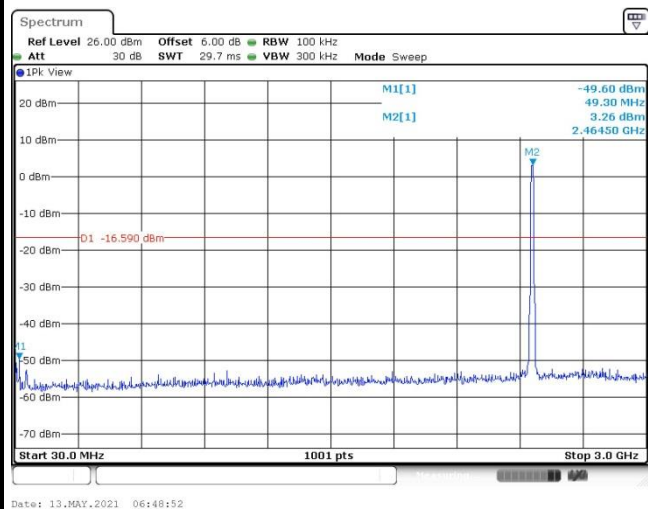
100kHz PSD reference Level



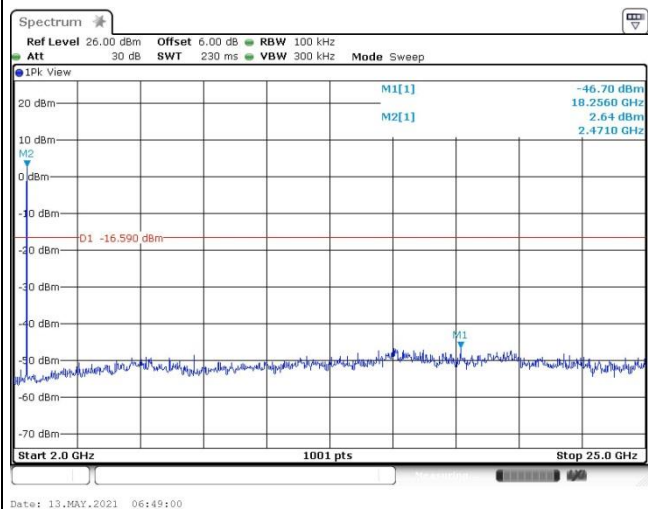
Channel Plot



Spurious Emission 30MHz~3GHz



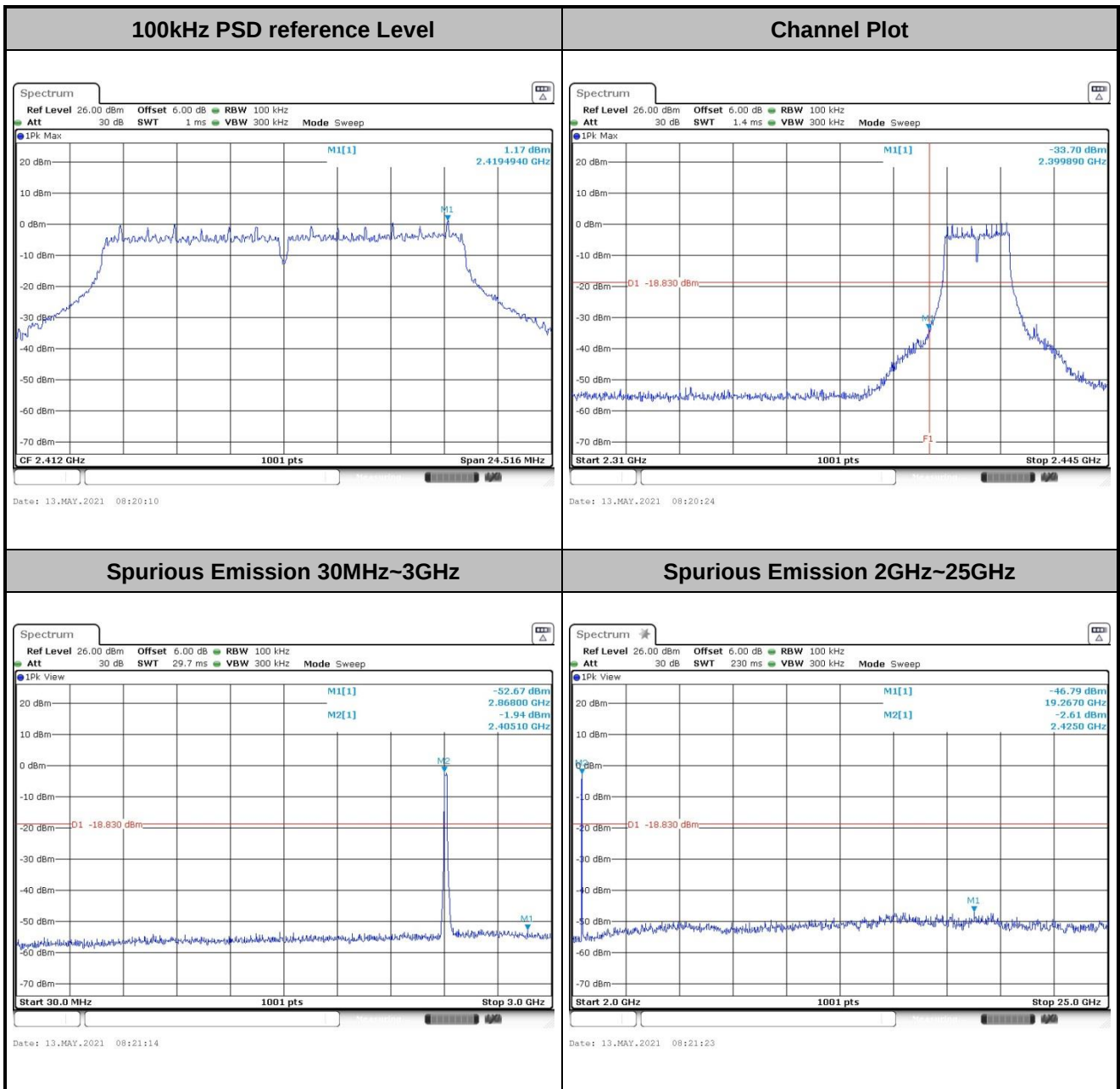
Spurious Emission 2GHz~25GHz





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

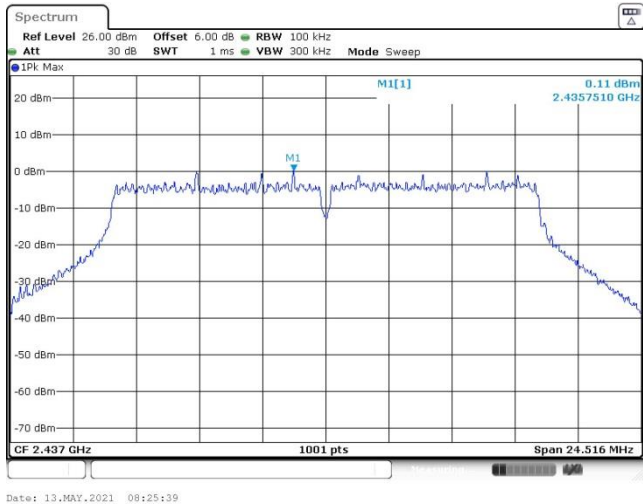
Test Mode :	802.11g	Test Channel :	01
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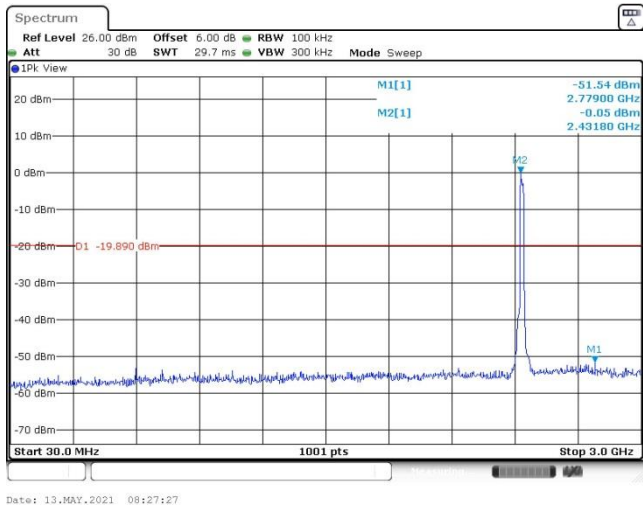


Test Mode :	802.11g	Test Channel :	06
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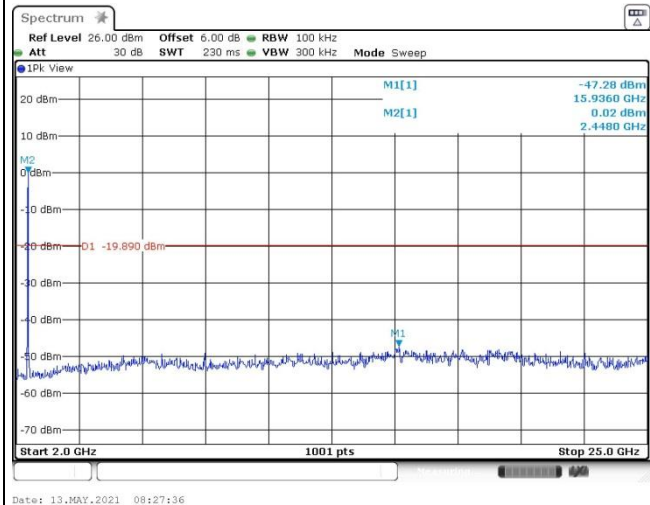
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



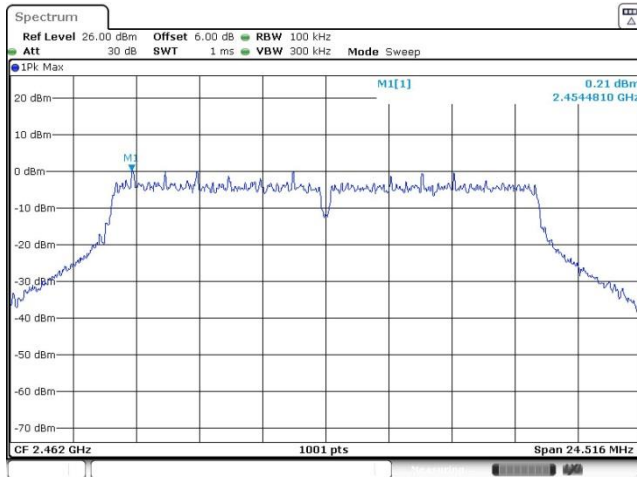
Spurious Emission 2GHz~25GHz



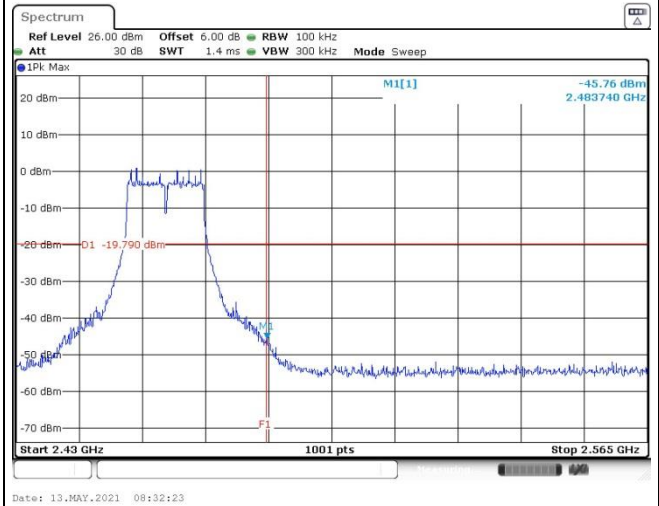


Test Mode :	802.11g	Test Channel :	11
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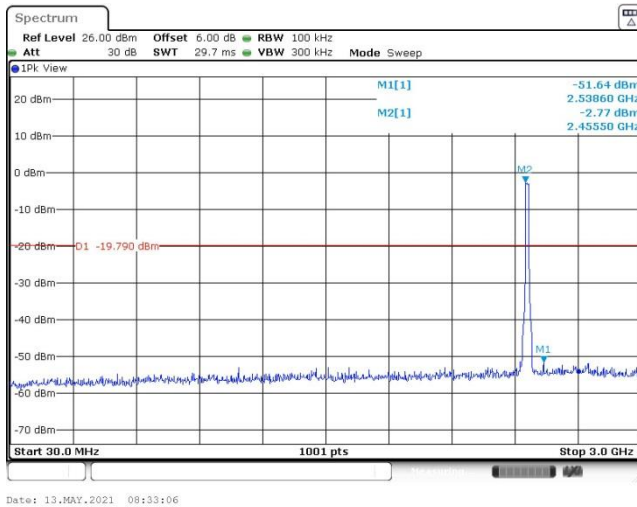
100kHz PSD reference Level



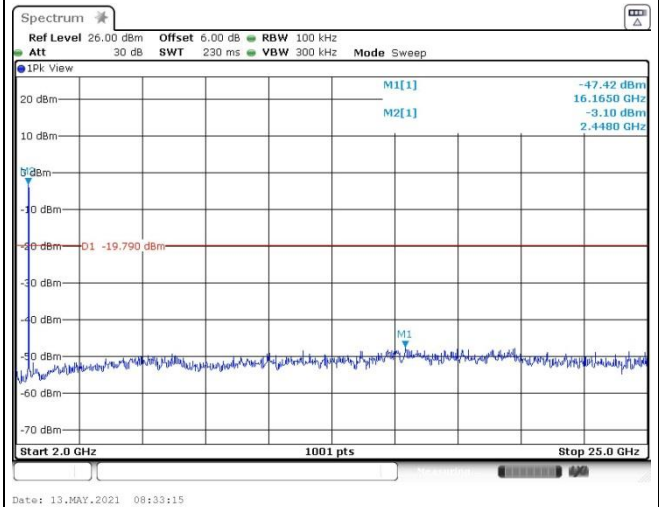
Channel Plot



Spurious Emission 30MHz~3GHz



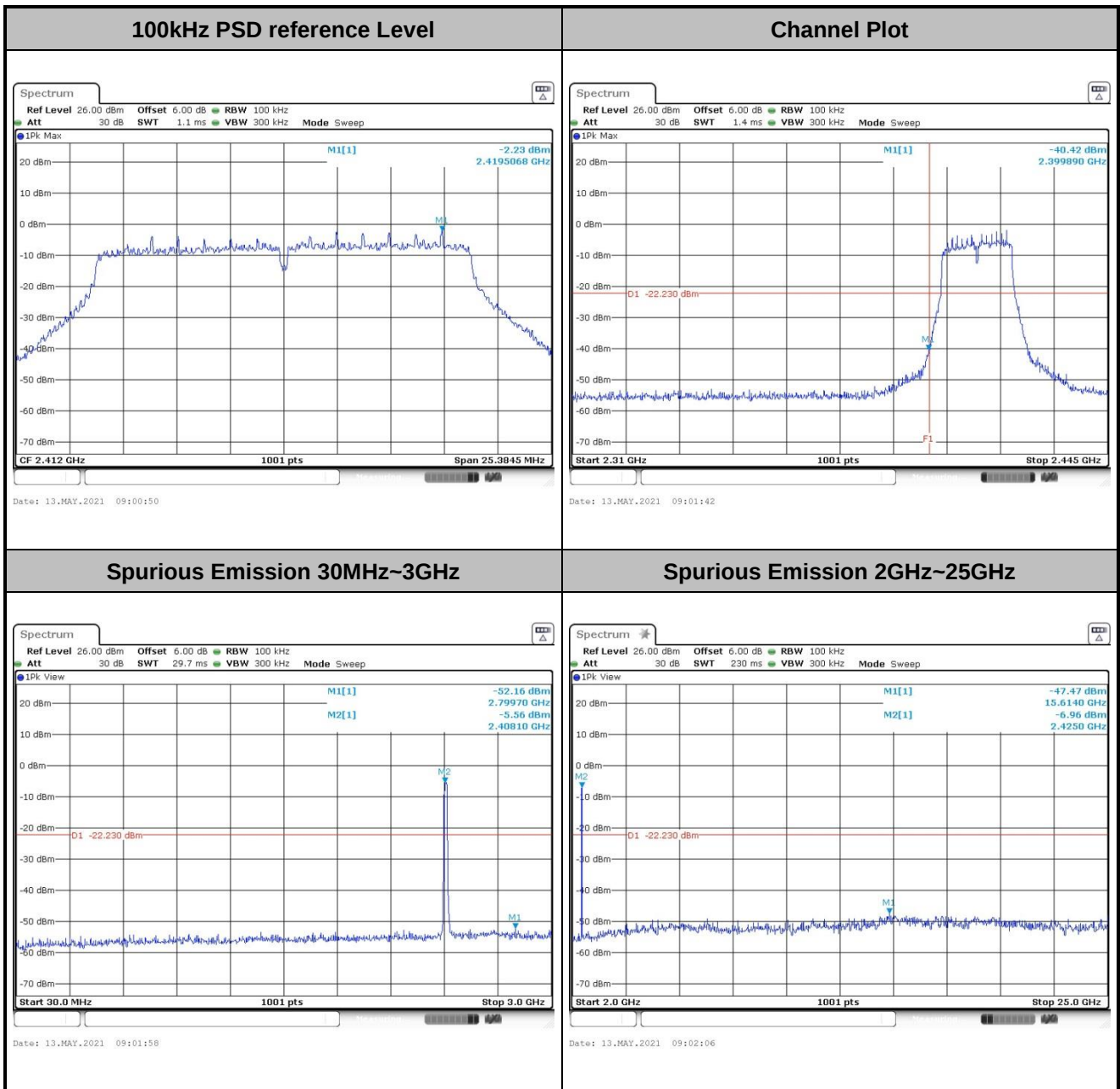
Spurious Emission 2GHz~25GHz





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

Test Mode :	802.11n HT20	Test Channel :	01
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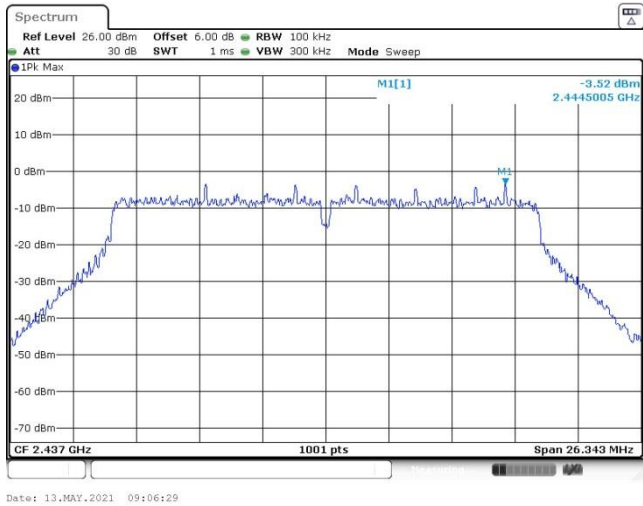




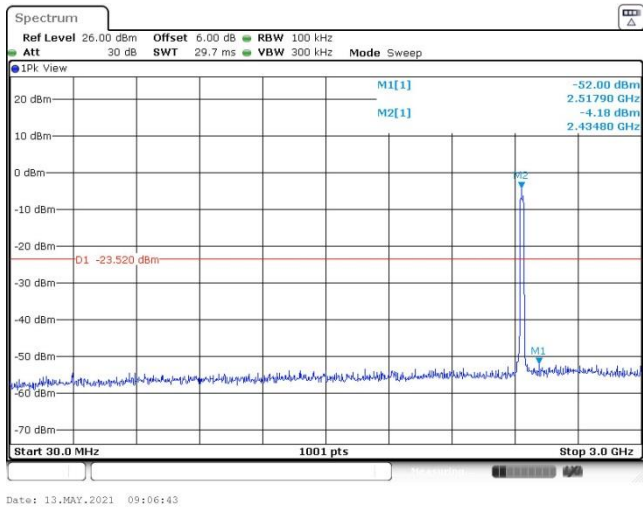
Test Mode : 802.11n HT20

Test Channel : 06

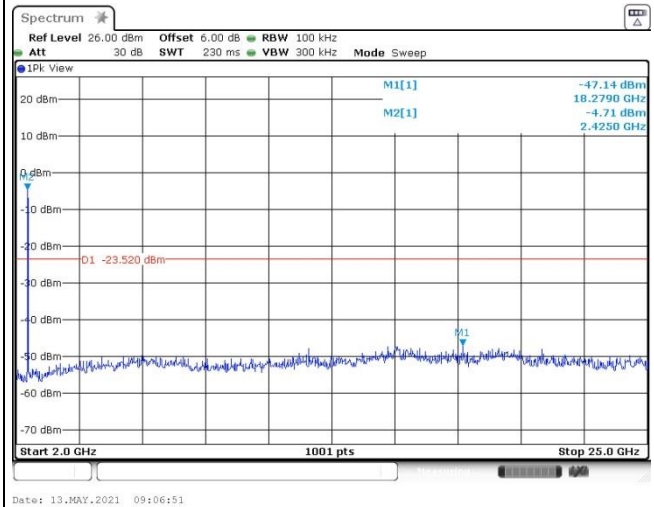
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

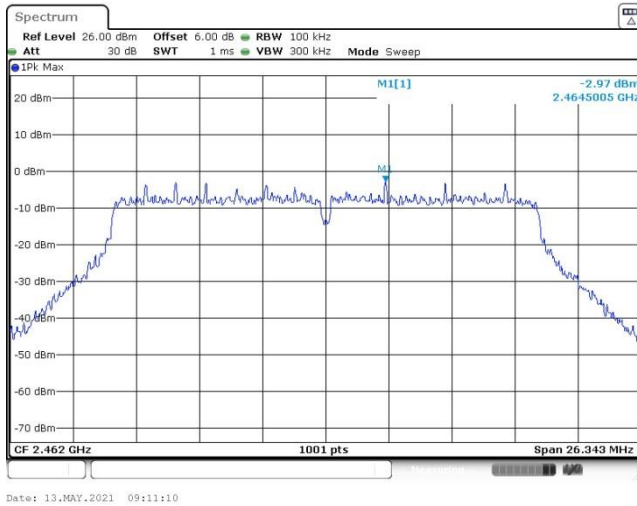




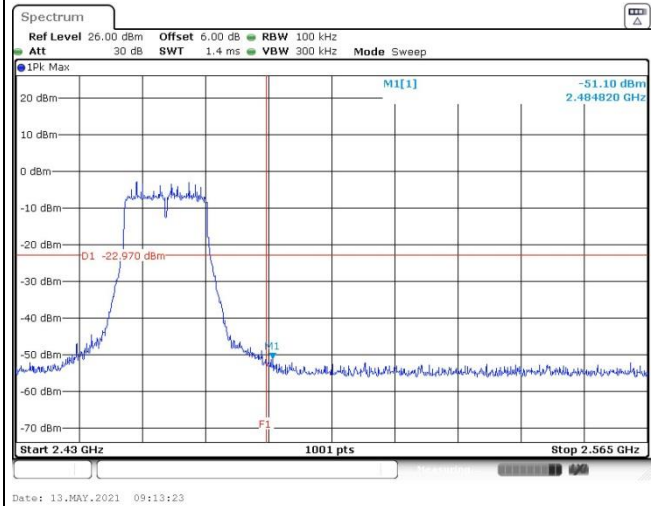
Test Mode : 802.11n HT20

Test Channel : 11

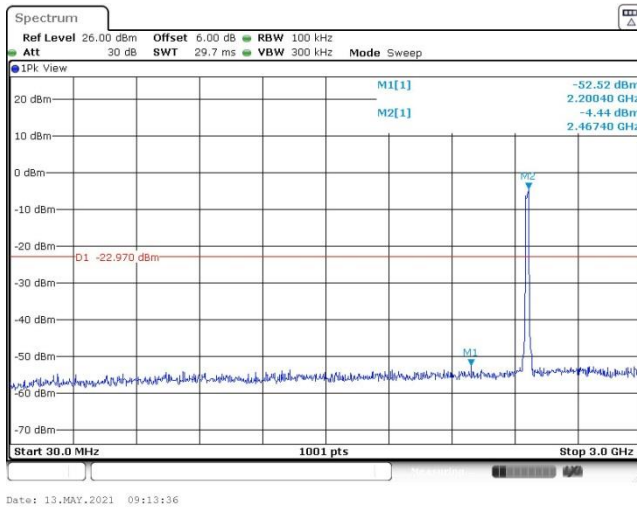
100kHz PSD reference Level



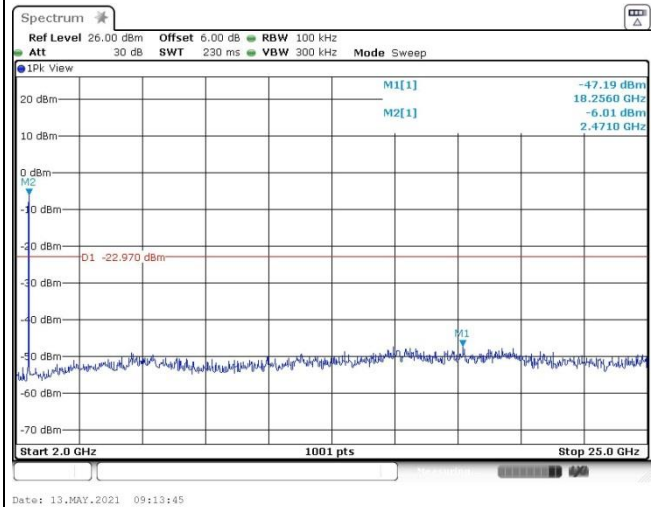
Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

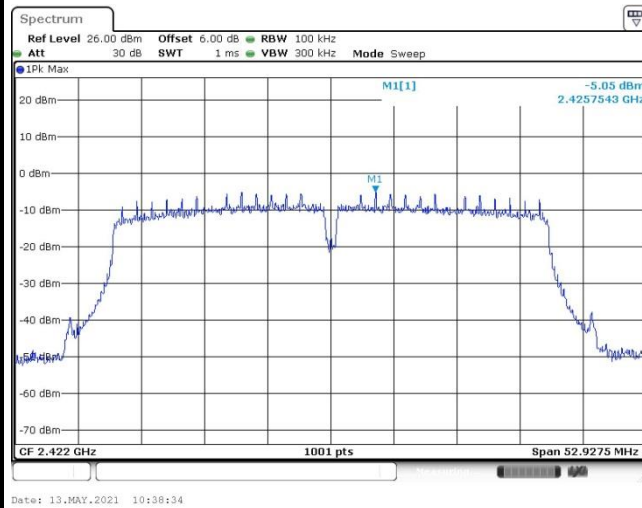




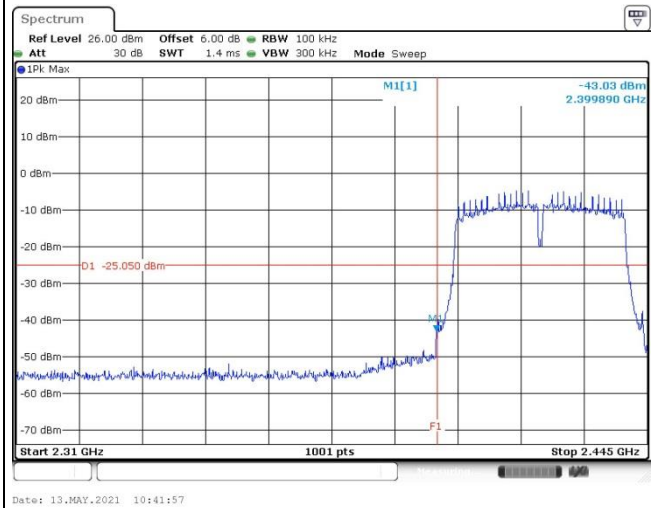
Test Mode : 802.11n HT40

Test Channel : 03

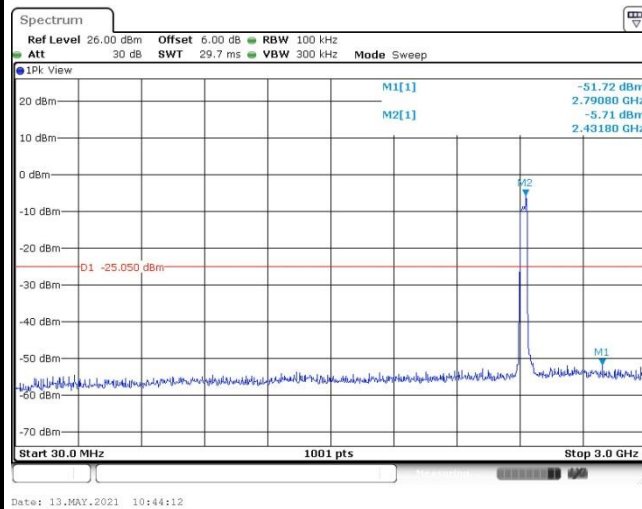
100kHz PSD reference Level



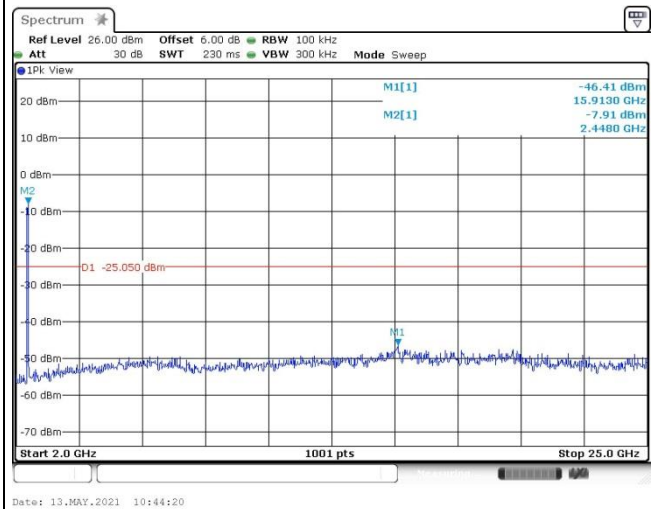
Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

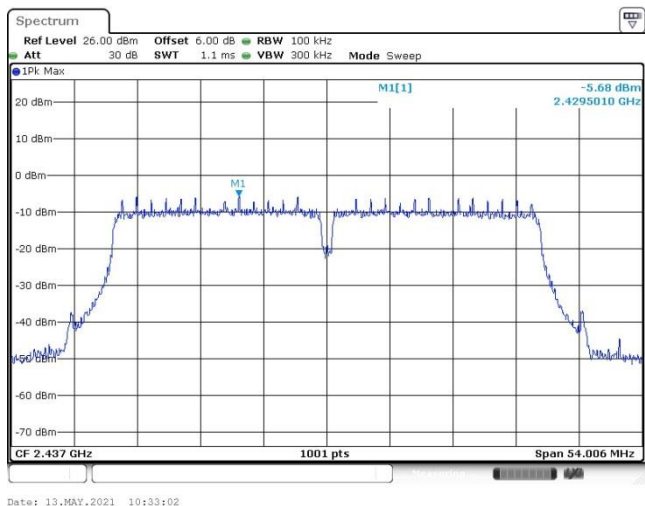




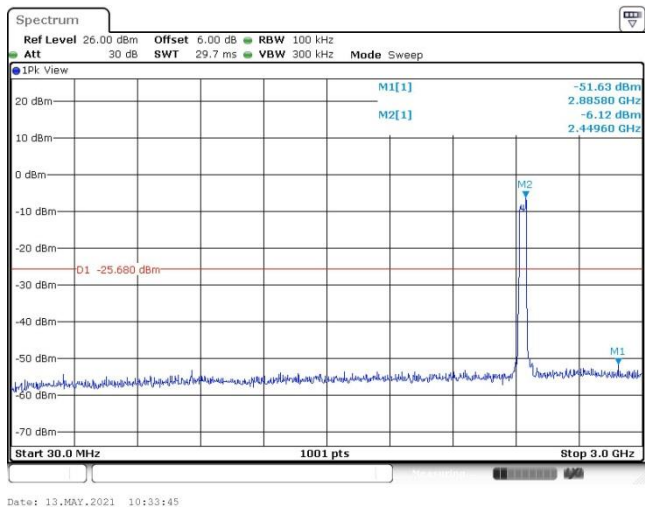
Test Mode : 802.11n HT40

Test Channel : 06

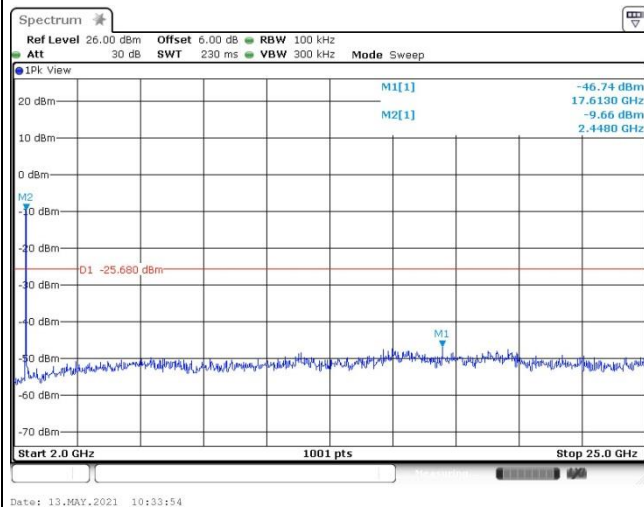
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

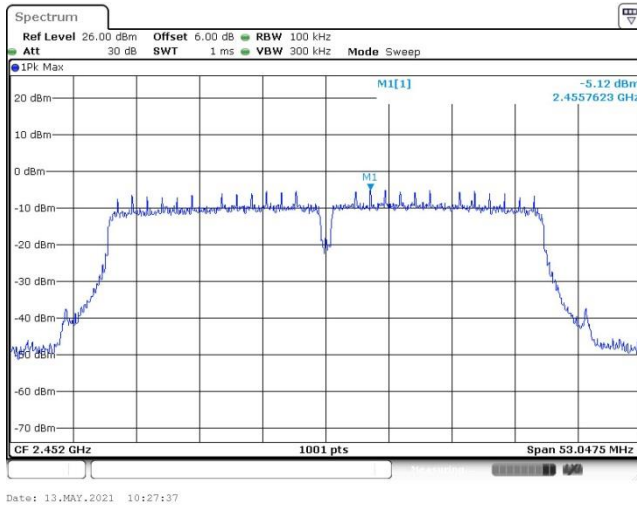




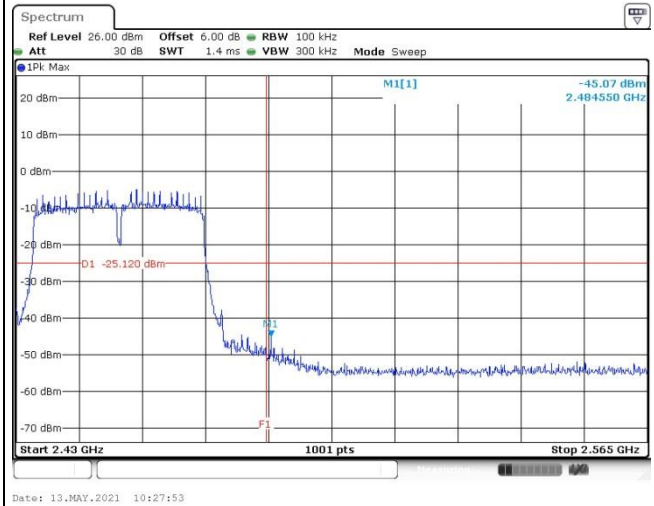
Test Mode : 802.11n HT40

Test Channel : 09

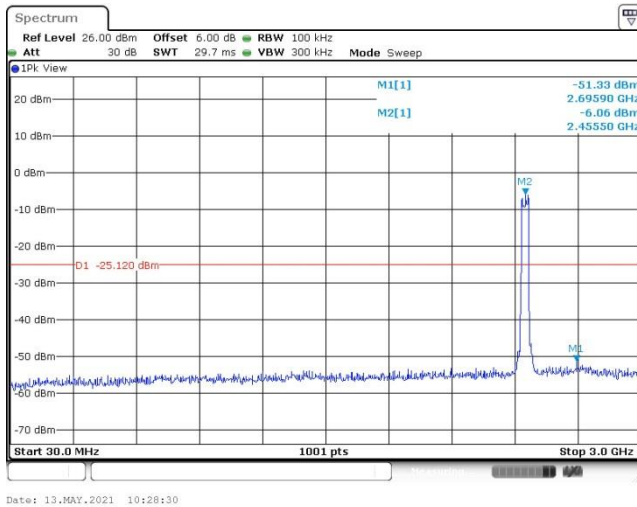
100kHz PSD reference Level



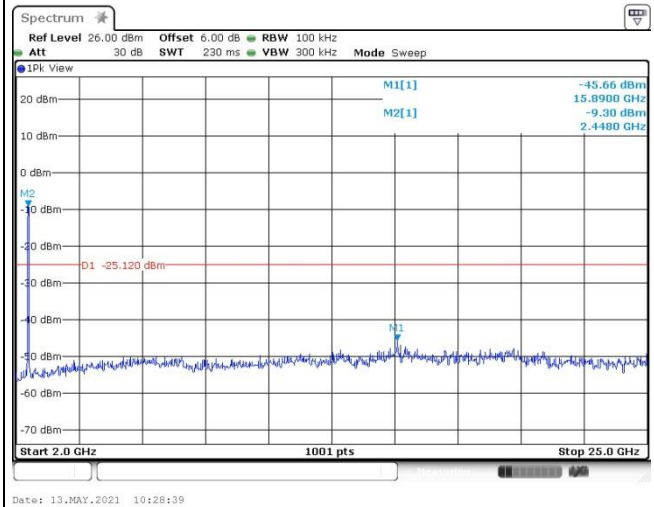
Channel Plot



Spurious Emission 30MHz~3GHz



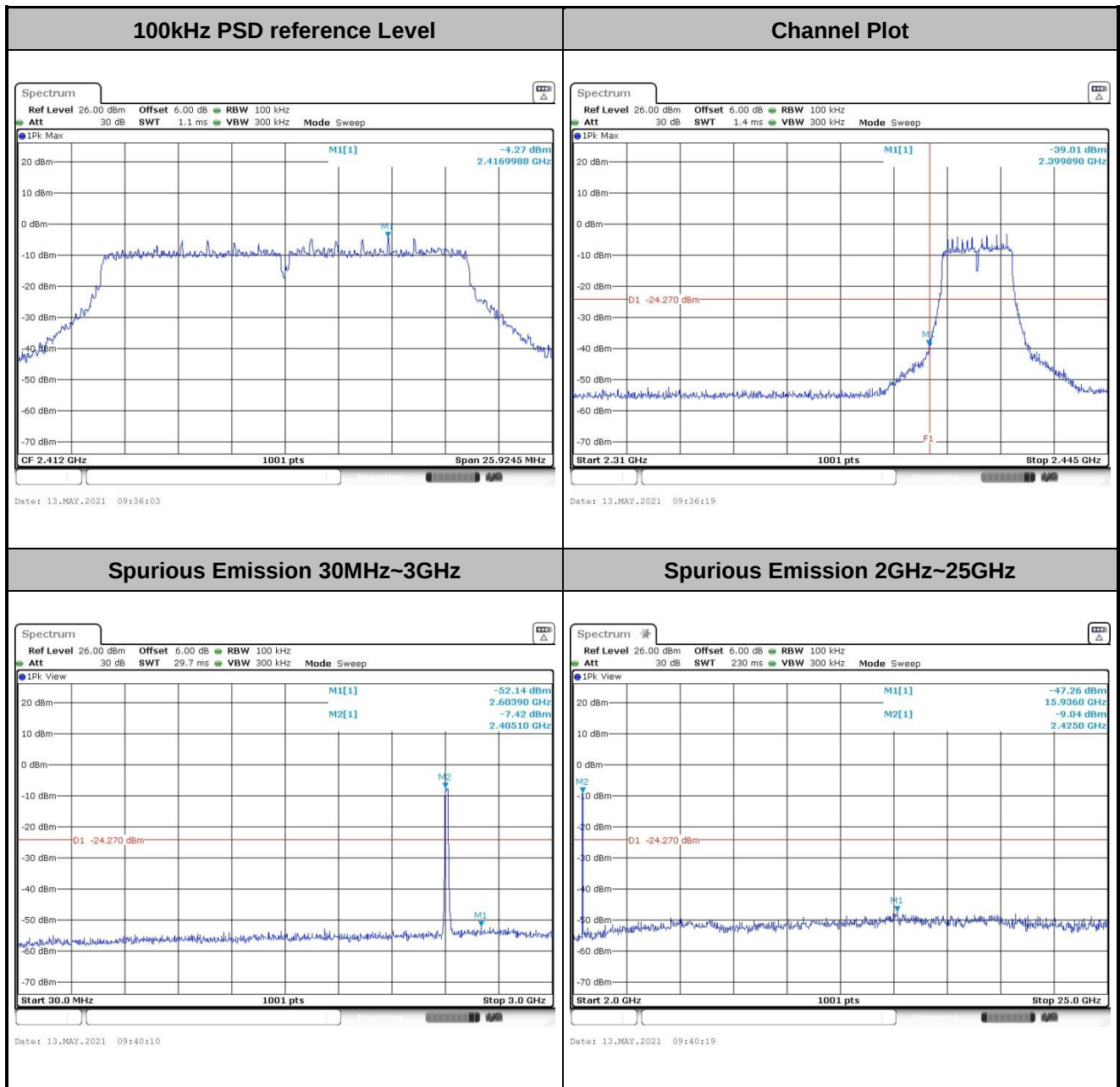
Spurious Emission 2GHz~25GHz





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

Test Mode :	802.11n HT20	Test Channel :	01
-------------	--------------	----------------	----

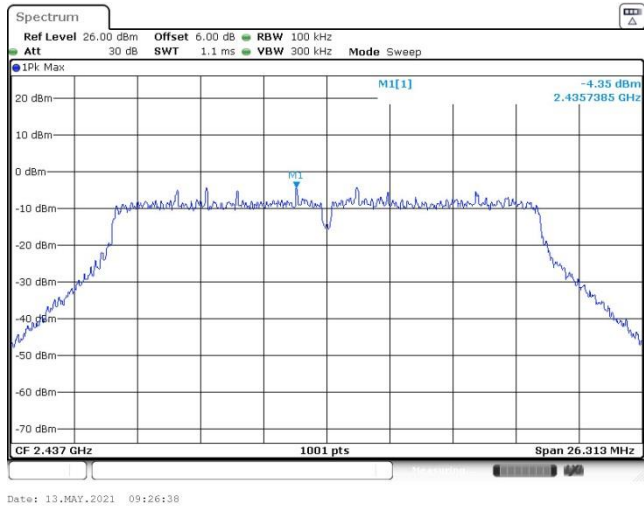




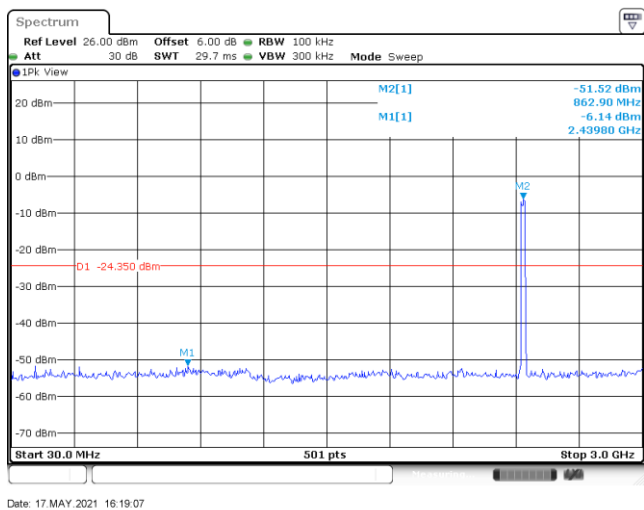
Test Mode : 802.11n HT20

Test Channel : 06

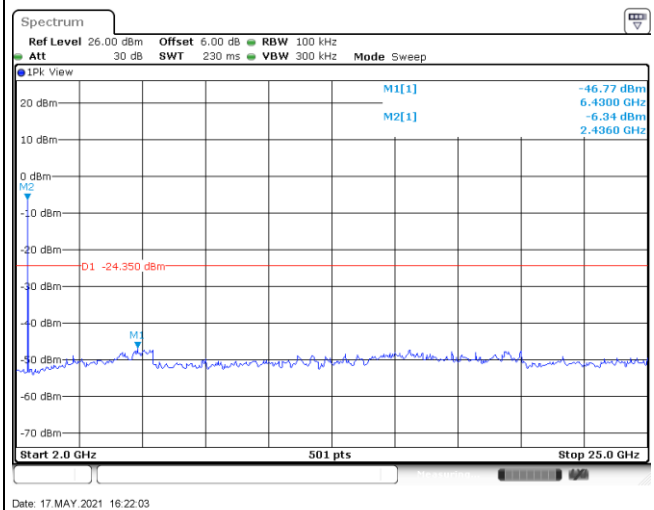
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

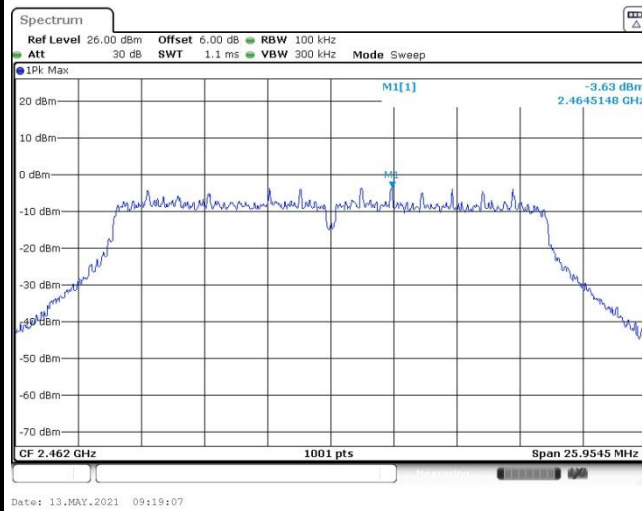




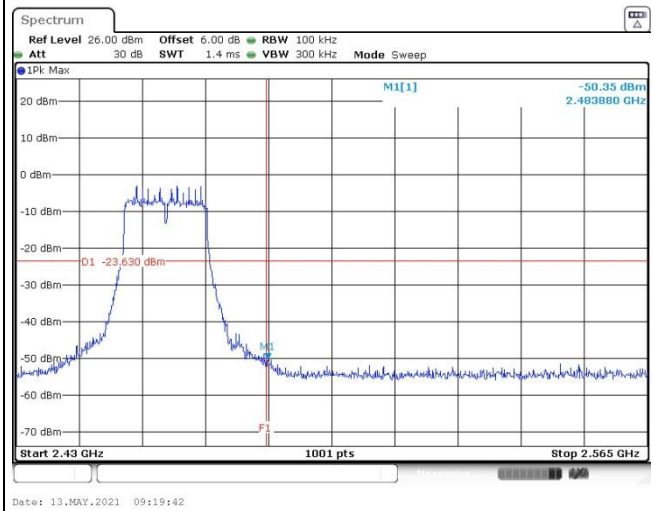
Test Mode : 802.11n HT20

Test Channel : 11

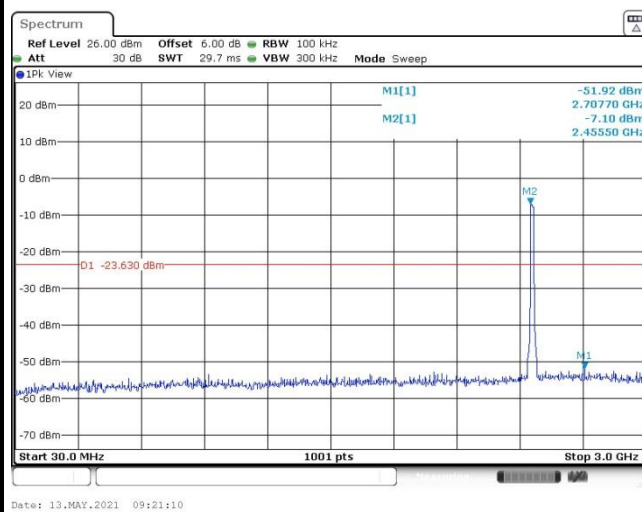
100kHz PSD reference Level



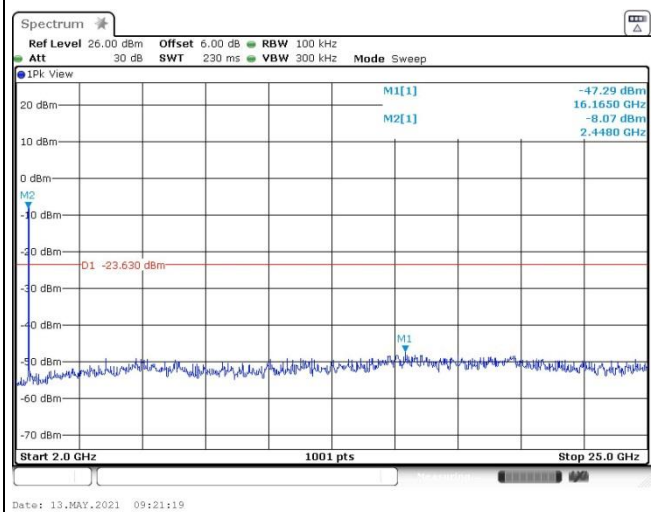
Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

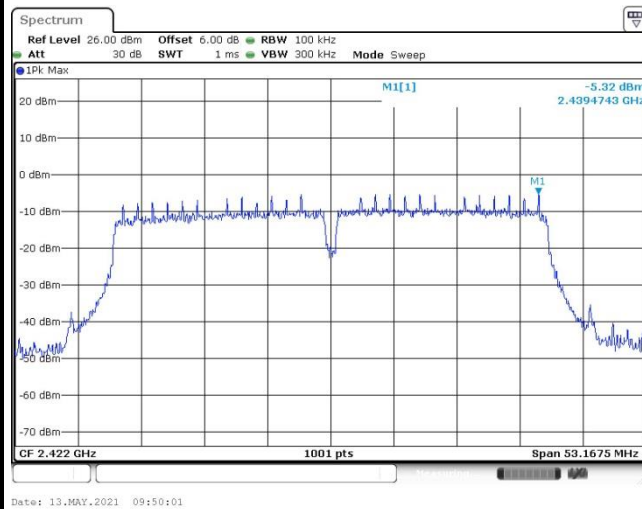




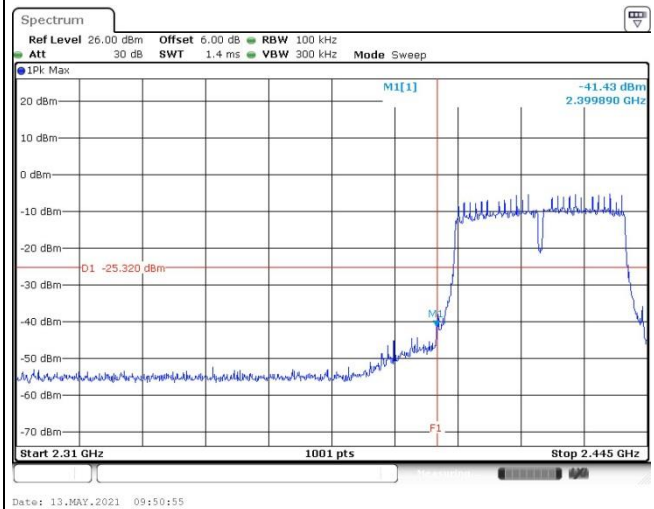
Test Mode : 802.11n HT40

Test Channel : 03

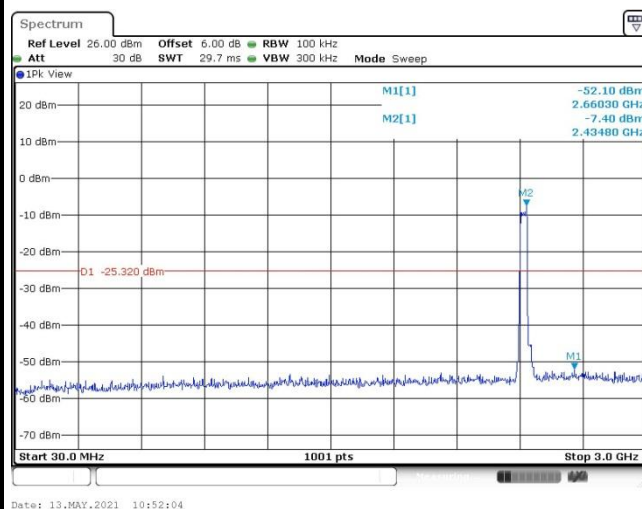
100kHz PSD reference Level



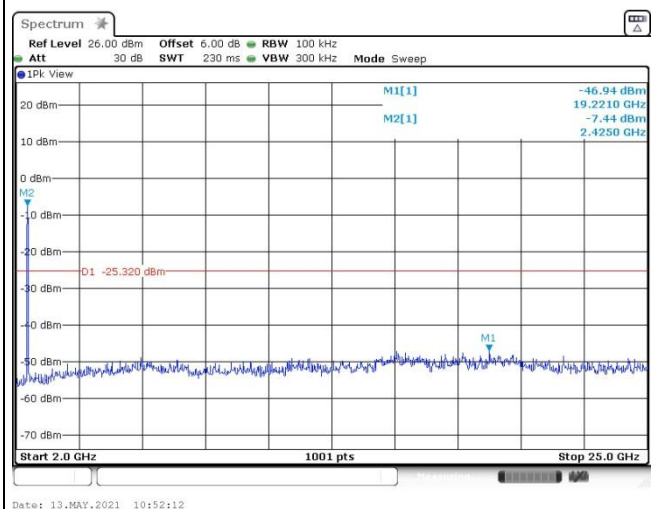
Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

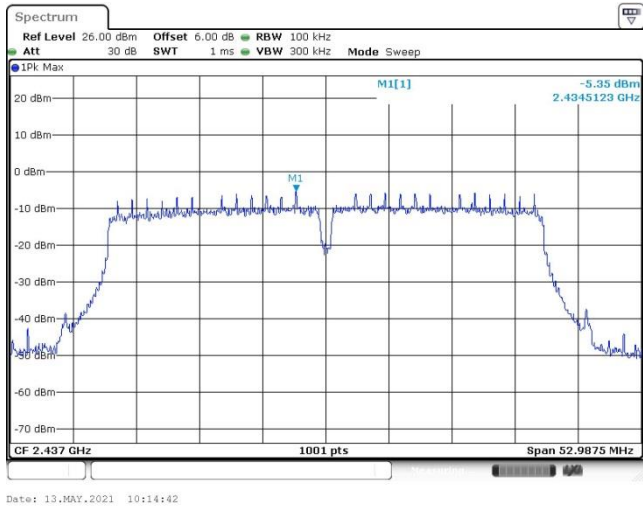




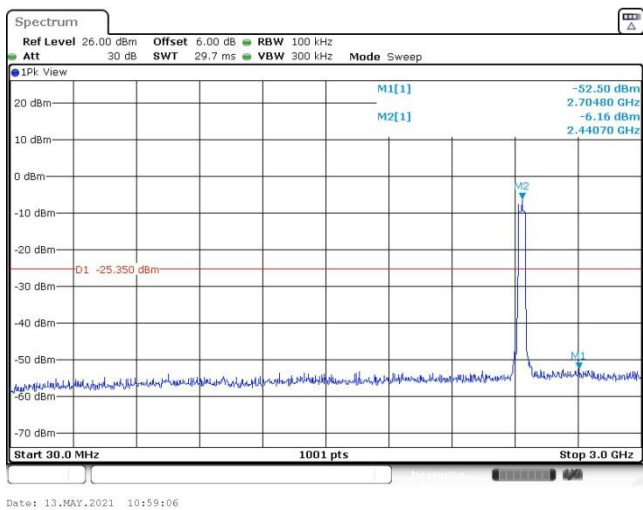
Test Mode : 802.11n HT40

Test Channel : 06

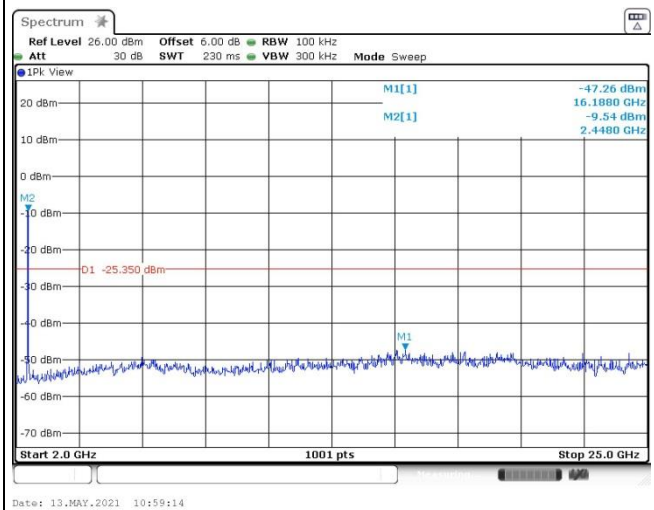
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

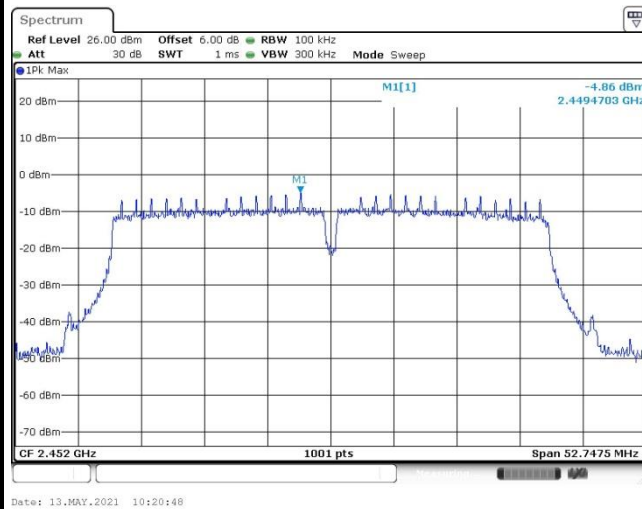




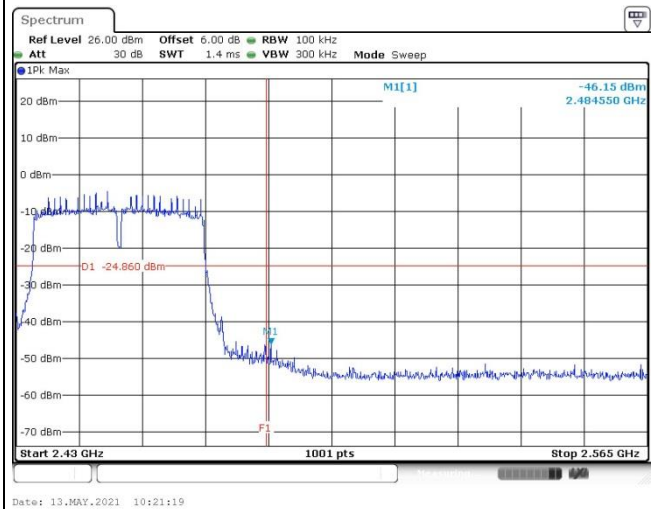
Test Mode : 802.11n HT40

Test Channel : 09

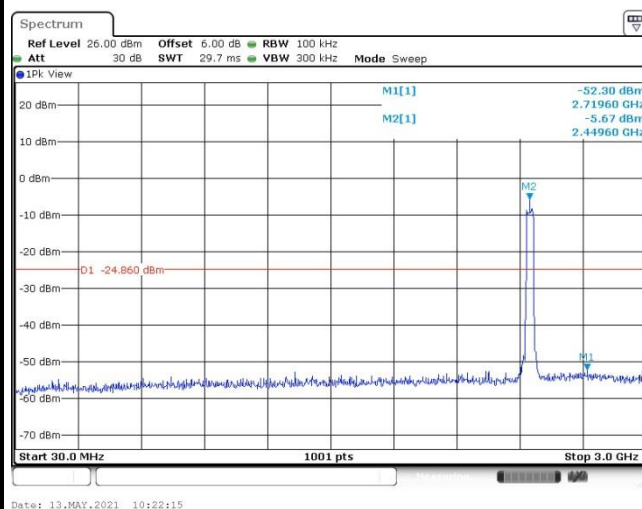
100kHz PSD reference Level



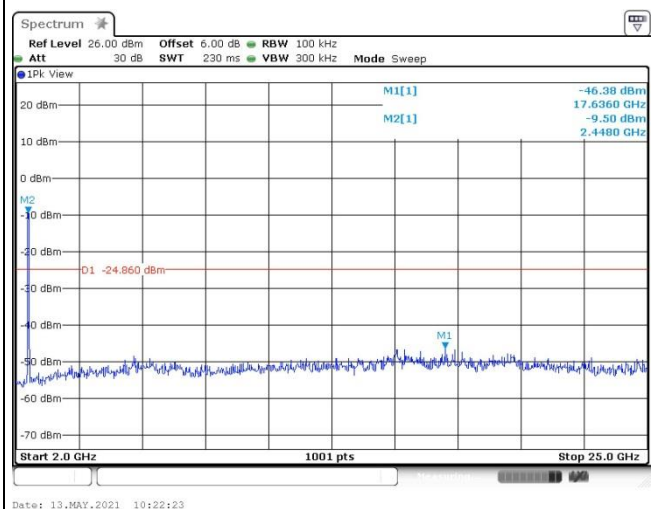
Channel Plot



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 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

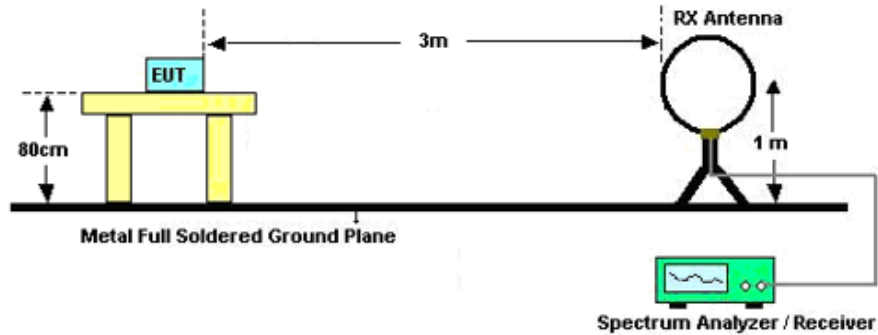
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better 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:

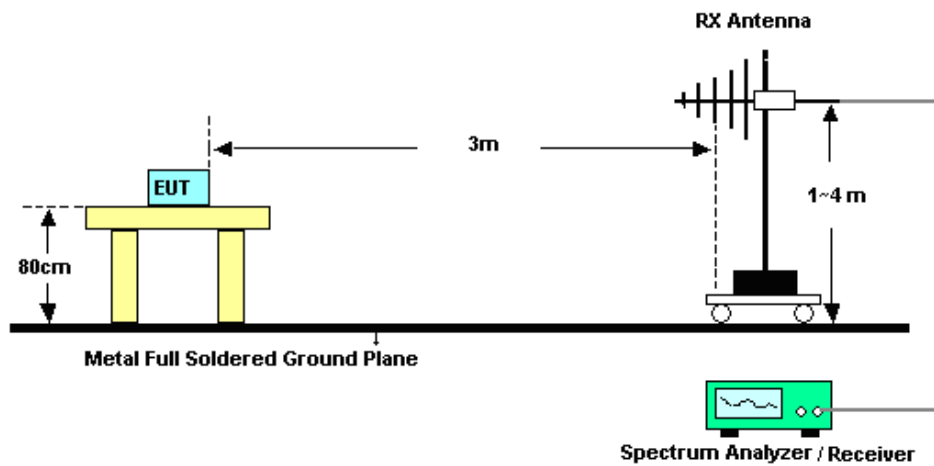
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

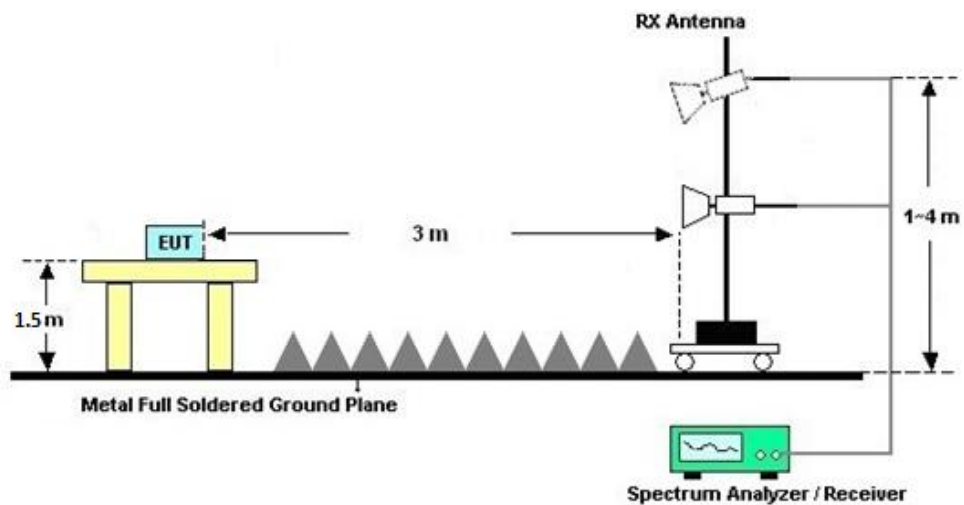
For radiated emissions below 30MHz



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.

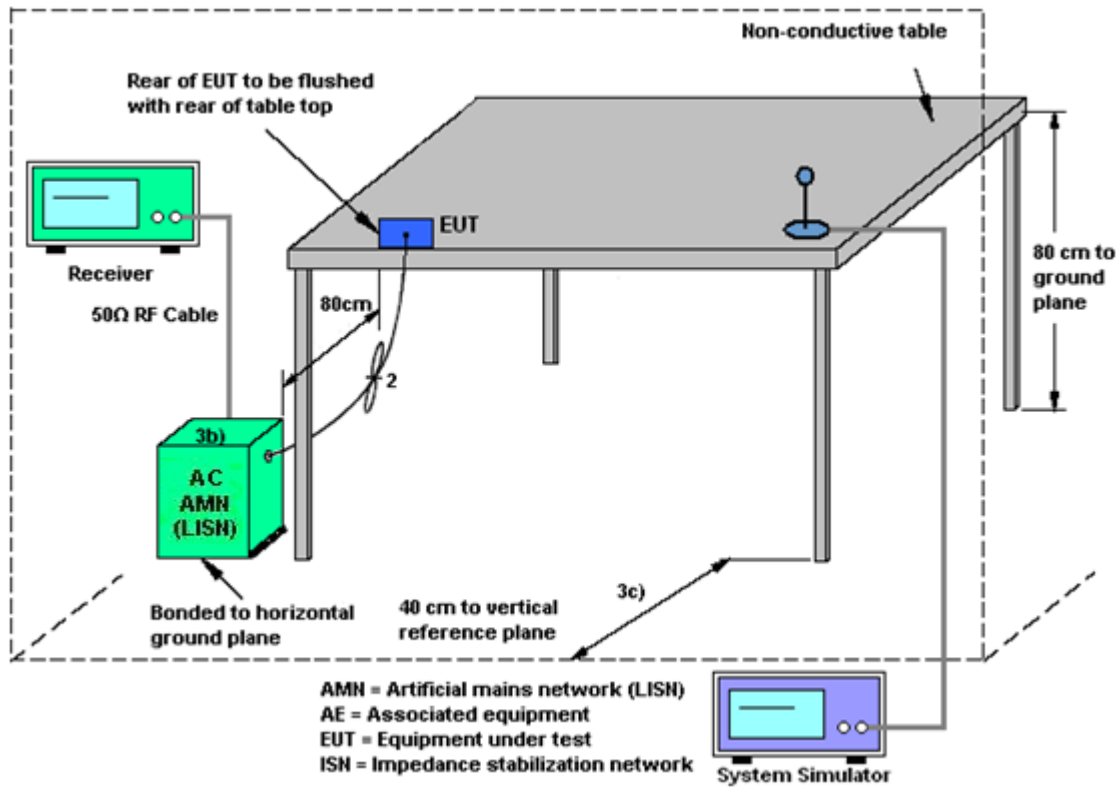
3.6.2 Measuring Instruments

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	0.24	-0.23	0.24	3.02	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	Nov. 01, 2020	May 13, 2021~ May 17, 2021	Oct. 31, 2021	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 07, 2021	May 13, 2021~ May 17, 2021	Jan. 06, 2022	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 07, 2021	May 13, 2021~ May 17, 2021	Jan. 06, 2022	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY564000 04	3Hz~8.5GHz; Max 30dBm	Oct. 17, 2020	May 21, 2021	Oct. 16, 2021	Radiation (03CH05-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY551502 44	10Hz~44G, MAX 30dB	Apr. 13, 2021	May 21, 2021	Apr. 12, 2022	Radiation (03CH05-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 01, 2020	May 21, 2021	Oct. 31, 2021	Radiation (03CH05-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz~1GHz	May 30, 2020	May 21, 2021	May 29, 2021	Radiation (03CH05-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 24, 2021	May 21, 2021	Apr. 23, 2022	Radiation (03CH05-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 10, 2020	May 21, 2021	Nov. 09, 2021	Radiation (03CH05-KS)
Amplifier	SONOMA	310N	187289	9KHz~1GHz	Apr. 13, 2021	May 21, 2021	Apr. 12, 2022	Radiation (03CH05-KS)
Amplifier	MITEQ	EM18G40GG A	060728	18~40GHz	Jan. 07, 2021	May 21, 2021	Jan. 06, 2022	Radiation (03CH05-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2012228	1Ghz~18Ghz	Oct. 17, 2020	May 21, 2021	Oct. 16, 2021	Radiation (03CH05-KS)
Amplifier	Keysight	83017A	MY532703 16	500MHz~26.5G Hz	Oct. 17, 2020	May 21, 2021	Oct. 16, 2021	Radiation (03CH05-KS)
AC Power Source	Chroma	61601	F1040900 04	N/A	NCR	May 21, 2021	NCR	Radiation (03CH05-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	May 21, 2021	NCR	Radiation (03CH05-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	May 21, 2021	NCR	Radiation (03CH05-KS)
EMI Receiver	R&S	ESC17	100768	9kHz~7GHz;	Apr. 21, 2021	Jun. 01, 2021	Apr. 20, 2022	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 17, 2020	Jun. 01, 2021	Oct. 16, 2021	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	Apr. 13, 2021	Jun. 01, 2021	Apr. 12, 2022	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	AC 0V~300V, 45Hz~1000Hz	Oct. 17, 2020	Jun. 01, 2021	Oct. 16, 2021	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 (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.94dB
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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
---	-------

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

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



Appendix A. Conducted Test Results

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Rise Liu/HeYong	Temperature:	21~25	°C
Test Date:	2021/5/13~2021/5/17	Relative Humidity:	51~54	%

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	1	1	2412	14.94	-	9.57	-	0.50	Pass
11b	1Mbps	1	6	2437	15.23	-	10.01	-	0.50	Pass
11b	1Mbps	1	11	2462	14.99	-	9.99	-	0.50	Pass
11g	6Mbps	1	1	2412	-	18.03		16.34	0.50	Pass
11g	6Mbps	1	6	2437	-	18.08		16.34	0.50	Pass
11g	6Mbps	1	11	2462	-	17.93		16.34	0.50	Pass
HT20	MCS0	2	1	2412	18.98	18.93	16.92	17.28	0.50	Pass
HT20	MCS0	2	6	2437	19.08	19.23	17.56	17.54	0.50	Pass
HT20	MCS0	2	11	2462	18.83	18.93	17.56	17.30	0.50	Pass
HT40	MCS0	2	3	2422	36.06	36.36	35.29	35.45	0.50	Pass
HT40	MCS0	2	6	2437	36.36	36.36	36.00	35.33	0.50	Pass
HT40	MCS0	2	9	2452	36.36	36.46	35.37	35.17	0.50	Pass

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
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	16.27	16.04	-	30.00	30.00	0.24	-0.23	16.51	15.81	36.00	36.00	Pass
11b	1Mbps	1	6	2437	16.01	16.48	-	30.00	30.00	0.24	-0.23	16.25	16.25	36.00	36.00	Pass
11b	1Mbps	1	11	2462	16.62	16.37	-	30.00	30.00	0.24	-0.23	16.86	16.14	36.00	36.00	Pass
11g	6Mbps	1	1	2412	21.49	21.67	-	30.00	30.00	0.24	-0.23	21.73	21.44	36.00	36.00	Pass
11g	6Mbps	1	6	2437	20.70	21.46	-	30.00	30.00	0.24	-0.23	20.94	21.23	36.00	36.00	Pass
11g	6Mbps	1	11	2462	21.64	21.68	-	30.00	30.00	0.24	-0.23	21.88	21.45	36.00	36.00	Pass
HT20	MCS0	2	1	2412	19.07	18.14	21.64	30.00		0.24		21.88		36.00		Pass
HT20	MCS0	2	6	2437	18.24	18.15	21.21	30.00		0.24		21.45		36.00		Pass
HT20	MCS0	2	11	2462	18.65	18.41	21.54	30.00		0.24		21.78		36.00		Pass
HT40	MCS0	2	3	2422	19.24	19.10	22.18	30.00		0.24		22.42		36.00		Pass
HT40	MCS0	2	6	2437	19.25	19.01	22.14	30.00		0.24		22.38		36.00		Pass
HT40	MCS0	2	9	2452	19.31	19.26	22.30	30.00		0.24		22.54		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)		
					Ant 1	Ant 2	Ant 1	Ant 2	SUM
11b	1Mbps	1	1	2412	0.00	0.00	14.02	13.83	-
11b	1Mbps	1	6	2437	0.00	0.00	13.76	14.28	
11b	1Mbps	1	11	2462	0.00	0.00	14.39	14.12	
11g	6Mbps	1	1	2412	0.21	0.15	12.11	12.16	
11g	6Mbps	1	6	2437	0.21	0.15	11.98	12.28	
11g	6Mbps	1	11	2462	0.21	0.15	12.23	12.16	
HT20	MCS0	2	1	2412	0.34	0.46	9.03	7.36	11.29
HT20	MCS0	2	6	2437	0.34	0.46	8.04	7.45	10.77
HT20	MCS0	2	11	2462	0.34	0.46	8.62	7.57	11.14
HT40	MCS0	2	3	2422	0.65	0.68	8.46	7.58	11.05
HT40	MCS0	2	6	2437	0.65	0.68	8.53	7.74	11.16
HT40	MCS0	2	9	2452	0.65	0.68	8.46	7.95	11.22

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

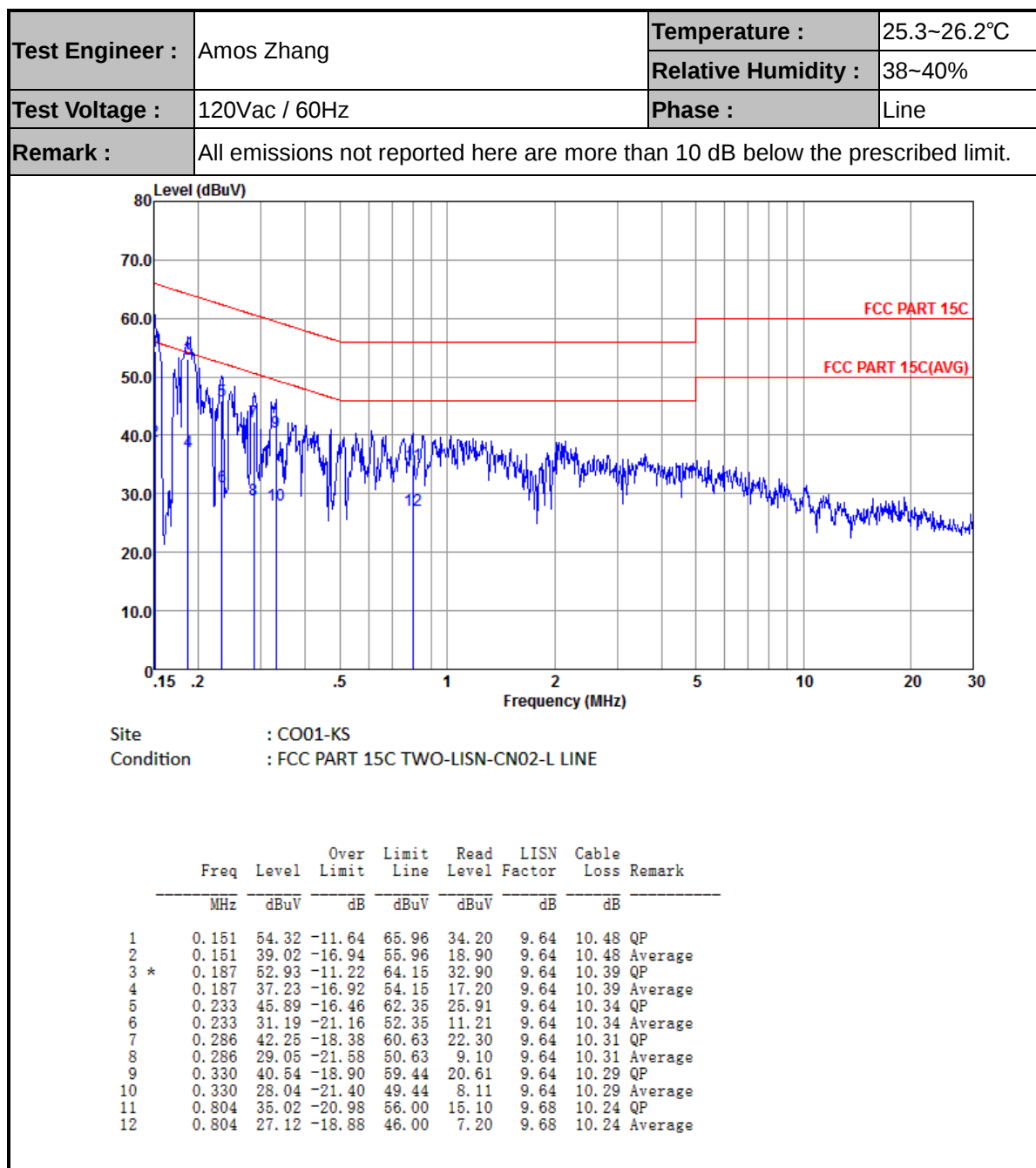
TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	-11.58	-	-	0.24	-0.23	8.00	8.00	Pass
11b	1Mbps	1	6	2437	-11.77	-	-	0.24	-0.23	8.00	8.00	Pass
11b	1Mbps	1	11	2462	-10.96	-	-	0.24	-0.23	8.00	8.00	Pass
11g	6Mbps	1	1	2412	-	-16.82	-	0.24	-0.23	8.00	8.00	Pass
11g	6Mbps	1	6	2437	-	-16.76	-	0.24	-0.23	8.00	8.00	Pass
11g	6Mbps	1	11	2462	-	-16.23	-	0.24	-0.23	8.00	8.00	Pass
HT20	MCS0	2	1	2412	-18.27	-20.03	-15.26	3.02		8.00		Pass
HT20	MCS0	2	6	2437	-19.15	-19.24	-16.14	3.02		8.00		Pass
HT20	MCS0	2	11	2462	-18.76	-19.19	-15.75	3.02		8.00		Pass
HT40	MCS0	2	3	2422	-20.43	-20.81	-17.42	3.02		8.00		Pass
HT40	MCS0	2	6	2437	-21.04	-21.42	-18.03	3.02		8.00		Pass
HT40	MCS0	2	9	2452	-20.39	-20.23	-17.22	3.02		8.00		Pass

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

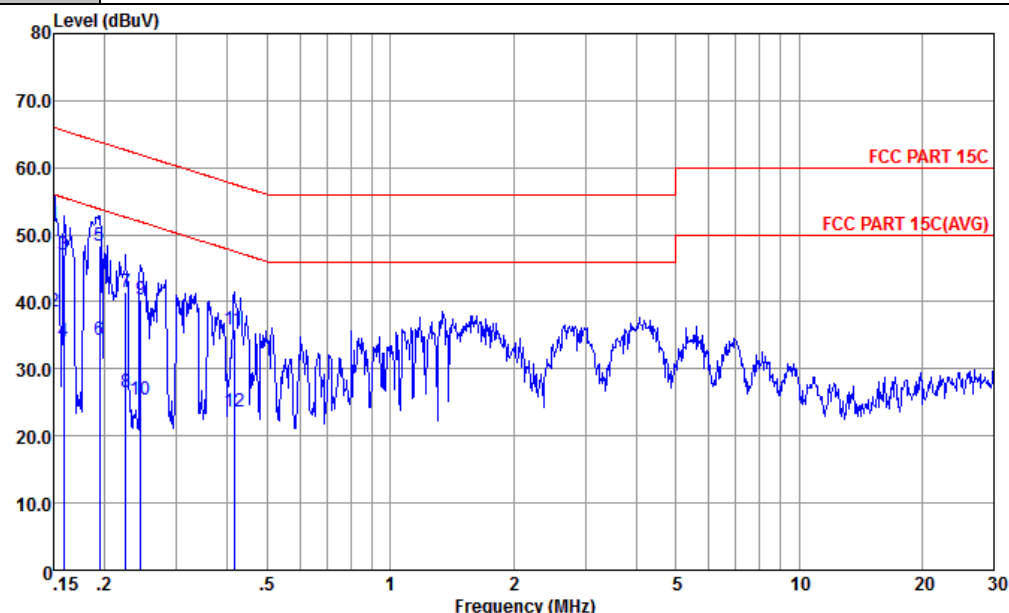


Appendix B. AC Conducted Emission Test Results





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



Site : CO01-KS
Condition : FCC PART 15C TWO-LISN-CN02-N NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1 *	0.150	51.48	-14.52	66.00	31.20	9.80	10.48	QP
2	0.150	38.58	-17.42	56.00	18.30	9.80	10.48	Average
3	0.159	47.07	-18.45	65.52	26.79	9.82	10.46	QP
4	0.159	34.17	-21.35	55.52	13.89	9.82	10.46	Average
5	0.194	48.46	-15.38	63.84	28.21	9.88	10.37	QP
6	0.194	34.36	-19.48	53.84	14.11	9.88	10.37	Average
7	0.226	41.41	-21.20	62.61	21.20	9.86	10.35	QP
8	0.226	26.41	-26.20	52.61	6.20	9.86	10.35	Average
9	0.246	40.37	-21.54	61.91	20.19	9.84	10.34	QP
10	0.246	25.47	-26.44	51.91	5.29	9.84	10.34	Average
11	0.415	35.81	-21.74	57.55	15.80	9.75	10.26	QP
12	0.415	23.61	-23.94	47.55	3.60	9.75	10.26	Average

Note:

- Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
- Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)



Appendix C. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b Ant 1 (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamplifier 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)
802.11b CH 01 2412MHz		2389.04	56.62	-17.38	74	48.48	32.2	7.59	31.65	156	150	P	H
		2389.95	45.35	-8.65	54	37.21	32.2	7.59	31.65	156	150	A	H
	*	2412	104.45	-	-	96.3	32.18	7.62	31.65	156	150	P	H
	*	2410	99.84	-	-	91.69	32.18	7.62	31.65	156	150	A	H
		2368.63	56.21	-17.79	74	48.16	32.15	7.56	31.66	389	297	P	V
		2388.52	44.81	-9.19	54	36.67	32.2	7.59	31.65	389	297	A	V
	*	2412	100.83	-	-	92.68	32.18	7.62	31.65	389	297	P	V
	*	2410	97.17	-	-	89.02	32.18	7.62	31.65	389	297	A	V
802.11b CH 11 2462MHz	*	2462	104.63	-	-	96.4	32.13	7.7	31.6	100	154	P	H
	*	2460	100.36	-	-	92.13	32.13	7.7	31.6	100	154	A	H
		2495.38	56.74	-17.26	74	48.44	32.1	7.76	31.56	100	154	P	H
		2483.5	45.61	-8.39	54	37.34	32.12	7.73	31.58	100	154	A	H
	*	2462	97.79	-	-	89.56	32.13	7.7	31.6	377	324	P	V
	*	2460	94.02	-	-	85.79	32.13	7.7	31.6	377	324	A	V
		2494.72	56.57	-17.43	74	48.27	32.1	7.76	31.56	377	324	P	V
		2486.26	45.12	-8.88	54	36.85	32.12	7.73	31.58	377	324	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 Ant 1 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b		4824	49.5	-24.5	74	64.17	34.31	11.06	60.04	300	0	P	H
CH 01		4824	53.15	-20.85	74	67.82	34.31	11.06	60.04	305	132	P	V
2412MHz	!	4824	51.36	-2.64	54	66.03	34.31	11.06	60.04	305	132	A	V
802.11b		4872	44.95	-29.05	74	59.6	34.34	11.04	60.03	300	0	P	H
CH 06		7308	43.4	-30.6	74	54.49	35.94	13.48	60.51	300	0	P	H
2437MHz		4872	46.65	-27.35	74	61.3	34.34	11.04	60.03	300	360	P	V
		7308	43.55	-30.45	74	54.64	35.94	13.48	60.51	300	360	P	V
802.11b		4926	47.85	-26.15	74	62.48	34.36	11.03	60.02	300	0	P	H
CH 11		7386	43.52	-30.48	74	54.58	35.92	13.55	60.53	300	0	P	H
2462MHz		4926	54.98	-19.02	74	69.61	34.36	11.03	60.02	344	84	P	V
	!	4926	51.82	-2.18	54	66.45	34.36	11.03	60.02	344	84	A	V
		7386	43.64	-30.36	74	54.7	35.92	13.55	60.53	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 802.11g Ant 1 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable 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	61.2	-12.8	74	53.06	32.2	7.59	31.65	158	147	P	H
	!	2389.95	50.13	-3.87	54	41.99	32.2	7.59	31.65	158	147	A	H
	*	2414	105.64	-	-	97.49	32.18	7.62	31.65	158	147	P	H
	*	2414	97.78	-	-	89.63	32.18	7.62	31.65	158	147	A	H
		2389.69	56.68	-17.32	74	48.54	32.2	7.59	31.65	386	331	P	V
		2389.95	46.65	-7.35	54	38.51	32.2	7.59	31.65	386	331	A	V
	*	2416	102.8	-	-	94.63	32.18	7.62	31.63	386	331	P	V
	*	2418	95.02	-	-	86.85	32.18	7.62	31.63	386	331	A	V
802.11g CH 11 2462MHz	*	2460	103.11	-	-	94.88	32.13	7.7	31.6	100	129	P	H
	*	2460	94.29	-	-	86.06	32.13	7.7	31.6	100	129	A	H
		2483.68	57.52	-16.48	74	49.25	32.12	7.73	31.58	100	129	P	H
		2483.5	46.96	-7.04	54	38.69	32.12	7.73	31.58	100	129	A	H
	*	2456	101.29	-	-	93.06	32.13	7.7	31.6	332	320	P	V
	*	2456	93.49	-	-	85.26	32.13	7.7	31.6	332	320	A	V
		2484.34	57.65	-16.35	74	49.38	32.12	7.73	31.58	332	320	P	V
		2483.5	47.05	-6.95	54	38.78	32.12	7.73	31.58	332	320	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 Ant 1 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	50.36	-23.64	74	65.03	34.31	11.06	60.04	300	0	P	H
		4824	54.51	-19.49	74	69.18	34.31	11.06	60.04	304	116	P	V
		4824	41.73	-12.27	54	56.4	34.31	11.06	60.04	304	116	A	V
802.11g CH 06 2437MHz		4872	46.48	-27.52	74	61.13	34.34	11.04	60.03	300	0	P	H
		7308	43.53	-30.47	74	54.62	35.94	13.48	60.51	300	0	P	H
		4872	47.78	-26.22	74	62.43	34.34	11.04	60.03	300	360	P	V
		7308	42.79	-31.21	74	53.88	35.94	13.48	60.51	300	360	P	V
802.11g CH 11 2462MHz		4926	44.93	-29.07	74	59.56	34.36	11.03	60.02	300	0	P	H
		7386	43.55	-30.45	74	54.61	35.92	13.55	60.53	300	0	P	H
		4926	48.19	-25.81	74	62.82	34.36	11.03	60.02	300	360	P	V
		7386	45.6	-28.4	74	56.66	35.92	13.55	60.53	300	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



WIFI 802.11b Ant 2 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		2369.67	55.75	-18.25	74	47.7	32.15	7.56	31.66	299	141	P	H
		2389.69	44.66	-9.34	54	36.52	32.2	7.59	31.65	299	141	A	H
	*	2412	99.24	-	-	91.09	32.18	7.62	31.65	299	141	P	H
	*	2414	95.39	-	-	87.24	32.18	7.62	31.65	299	141	A	H
		2340.81	56.32	-17.68	74	48.43	32.06	7.5	31.67	387	76	P	V
		2388.65	44.56	-9.44	54	36.42	32.2	7.59	31.65	387	76	A	V
	*	2412	96.4	-	-	88.25	32.18	7.62	31.65	387	76	P	V
	*	2414	93.08	-	-	84.93	32.18	7.62	31.65	387	76	A	V
802.11b CH 11 2462MHz	*	2462	99.19	-	-	90.96	32.13	7.7	31.6	174	164	P	H
	*	2464	94.83	-	-	86.6	32.13	7.7	31.6	174	164	A	H
		2496.16	56.61	-17.39	74	48.31	32.1	7.76	31.56	174	164	P	H
		2490.4	45.12	-8.88	54	36.84	32.1	7.76	31.58	174	164	A	H
	*	2462	96.29	-	-	88.06	32.13	7.7	31.6	376	90	P	V
	*	2464	91.95	-	-	83.72	32.13	7.7	31.6	376	90	A	V
		2494.66	56.98	-17.02	74	48.68	32.1	7.76	31.56	376	90	P	V
		2490.76	44.93	-9.07	54	36.65	32.1	7.76	31.58	376	90	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 Ant 2 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	46.49	-27.51	74	61.16	34.31	11.06	60.04	300	0	P	H
		9648	50.31	-24.28	74.59	58.84	36.89	15.53	60.95	100	360	P	H
		4824	50.28	-23.72	74	64.95	34.31	11.06	60.04	300	360	P	V
		9648	50.8	-18.81	69.61	59.33	36.89	15.53	60.95	100	0	P	V
802.11b CH 06 2437MHz		4872	47.38	-26.62	74	62.03	34.34	11.04	60.03	300	0	P	H
		7308	43.72	-30.28	74	54.81	35.94	13.48	60.51	300	0	P	H
		4872	48.75	-25.25	74	63.4	34.34	11.04	60.03	300	360	P	V
		7308	44.05	-29.95	74	55.14	35.94	13.48	60.51	300	360	P	V
802.11b CH 11 2462MHz		4926	46.7	-27.3	74	61.33	34.36	11.03	60.02	300	0	P	H
		7386	43.31	-30.69	74	54.37	35.92	13.55	60.53	300	0	P	H
		4926	49.87	-24.13	74	64.5	34.36	11.03	60.02	300	360	P	V
		7386	43.09	-30.91	74	54.15	35.92	13.55	60.53	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 802.11g Ant 2 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2389.95	58.56	-15.44	74	50.42	32.2	7.59	31.65	235	170	P	H
		2389.95	45.87	-8.13	54	37.73	32.2	7.59	31.65	235	170	A	H
	*	2420	100.6	-	-	92.42	32.17	7.64	31.63	235	170	P	H
	*	2418	92.4	-	-	84.23	32.18	7.62	31.63	235	170	A	H
		2387.74	56.26	-17.74	74	48.12	32.2	7.59	31.65	297	69	P	V
		2389.56	45.31	-8.69	54	37.17	32.2	7.59	31.65	297	69	A	V
	*	2420	96.58	-	-	88.4	32.17	7.64	31.63	297	69	P	V
	*	2420	87.3	-	-	79.12	32.17	7.64	31.63	297	69	A	V
802.11g CH 11 2462MHz	*	2470	100.28	-	-	92.05	32.13	7.7	31.6	124	147	P	H
	*	2468	91.86	-	-	83.63	32.13	7.7	31.6	124	147	A	H
		2483.8	57.71	-16.29	74	49.44	32.12	7.73	31.58	124	147	P	H
		2483.5	47.09	-6.91	54	38.82	32.12	7.73	31.58	124	147	A	H
	*	2460	93.47	-	-	85.24	32.13	7.7	31.6	305	3	P	V
	*	2460	85.63	-	-	77.4	32.13	7.7	31.6	305	3	A	V
		2491.36	56.02	-17.98	74	47.74	32.1	7.76	31.58	305	3	P	V
		2483.68	45.4	-8.6	54	37.13	32.12	7.73	31.58	305	3	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 Ant 2 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	43.46	-30.54	74	58.13	34.31	11.06	60.04	300	0	P	H
		4824	46.72	-27.28	74	61.39	34.31	11.06	60.04	300	360	P	V
802.11g CH 06 2437MHz		4872	47.61	-26.39	74	62.26	34.34	11.04	60.03	300	0	P	H
		7308	43.14	-30.86	74	54.23	35.94	13.48	60.51	300	0	P	H
		4872	49.02	-24.98	74	63.67	34.34	11.04	60.03	300	360	P	V
		7308	43.32	-30.68	74	54.41	35.94	13.48	60.51	300	360	P	V
802.11g CH 11 2462MHz		4926	43.06	-30.94	74	57.69	34.36	11.03	60.02	300	0	P	H
		7386	43.09	-30.91	74	54.15	35.92	13.55	60.53	300	0	P	H
		4926	46.69	-27.31	74	61.32	34.36	11.03	60.02	300	360	P	V
		7386	43.3	-30.7	74	54.36	35.92	13.55	60.53	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 802.11n HT20 Ant 1+2 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		2389.43	57.39	-16.61	74	49.25	32.2	7.59	31.65	155	117	P	H
		2389.56	47.21	-6.79	54	39.07	32.2	7.59	31.65	155	117	A	H
	*	2414	102.94	-	-	94.79	32.18	7.62	31.65	155	117	P	H
	*	2414	94.56	-	-	86.41	32.18	7.62	31.65	155	117	A	H
		2374.74	56.85	-17.15	74	48.8	32.15	7.56	31.66	315	305	P	V
		2389.82	45.88	-8.12	54	37.74	32.2	7.59	31.65	315	305	A	V
	*	2410	97.47	-	-	89.32	32.18	7.62	31.65	315	305	P	V
	*	2414	89.36	-	-	81.21	32.18	7.62	31.65	315	305	A	V
802.11n HT20 CH 11 2462MHz	*	2456	101.34	-	-	93.11	32.13	7.7	31.6	100	137	P	H
	*	2460	92.52	-	-	84.29	32.13	7.7	31.6	100	137	A	H
		2495.38	57.14	-16.86	74	48.84	32.1	7.76	31.56	100	137	P	H
		2483.98	46.1	-7.9	54	37.83	32.12	7.73	31.58	100	137	A	H
	*	2458	95.64	-	-	87.41	32.13	7.7	31.6	376	307	P	V
	*	2454	87.27	-	-	79.04	32.13	7.7	31.6	376	307	A	V
		2498.62	56.81	-17.19	74	48.51	32.1	7.76	31.56	376	307	P	V
		2484.7	45.64	-8.36	54	37.37	32.12	7.73	31.58	376	307	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 802.11n HT20 Ant 1+2 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		4824	43.54	-30.46	74	58.21	34.31	11.06	60.04	300	0	P	H
		4824	48.18	-25.82	74	62.85	34.31	11.06	60.04	300	360	P	V
802.11n HT20 CH 06 2437MHz		4872	41.93	-32.07	74	56.58	34.34	11.04	60.03	300	0	P	H
		7308	43.62	-30.38	74	54.71	35.94	13.48	60.51	300	0	P	H
		4872	42.56	-31.44	74	57.21	34.34	11.04	60.03	300	360	P	V
		7308	44	-30	74	55.09	35.94	13.48	60.51	300	360	P	V
802.11n HT20 CH 11 2462MHz		4926	41.71	-32.29	74	56.34	34.36	11.03	60.02	300	0	P	H
		7386	42.83	-31.17	74	53.89	35.92	13.55	60.53	300	0	P	H
		4926	43.24	-30.76	74	57.87	34.36	11.03	60.02	300	360	P	V
		7386	43.52	-30.48	74	54.58	35.92	13.55	60.53	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 802.11n HT40 Ant 1+2 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 03 2422MHz		2388.26	57.62	-16.38	74	49.48	32.2	7.59	31.65	100	118	P	H
	!	2389.95	48.39	-5.61	54	40.25	32.2	7.59	31.65	100	118	A	H
	*	2426	99.98	-	-	91.8	32.17	7.64	31.63	100	118	P	H
	*	2424	91.32	-	-	83.14	32.17	7.64	31.63	100	118	A	H
		2493.28	56.37	-17.63	74	48.07	32.1	7.76	31.56	100	118	P	H
		2486.32	45.84	-8.16	54	37.57	32.12	7.73	31.58	100	118	A	H
		2354.98	57.48	-16.52	74	49.51	32.11	7.53	31.67	379	287	P	V
		2388.91	45.99	-8.01	54	37.85	32.2	7.59	31.65	379	287	A	V
	*	2426	95.95	-	-	87.77	32.17	7.64	31.63	379	287	P	V
	*	2424	87.4	-	-	79.22	32.17	7.64	31.63	379	287	A	V
		2497.78	56.23	-17.77	74	47.93	32.1	7.76	31.56	379	287	P	V
		2486.5	45.9	-8.1	54	37.63	32.12	7.73	31.58	379	287	A	V
802.11n HT40 CH 09 2452MHz		2369.02	56.59	-17.41	74	48.54	32.15	7.56	31.66	118	117	P	H
		2389.82	45.63	-8.37	54	37.49	32.2	7.59	31.65	118	117	A	H
	*	2456	97.86	-	-	89.63	32.13	7.7	31.6	118	117	P	H
	*	2454	89.87	-	-	81.64	32.13	7.7	31.6	118	117	A	H
		2487.16	58.22	-15.78	74	49.95	32.12	7.73	31.58	118	117	P	H
	!	2483.74	48	-6	54	39.73	32.12	7.73	31.58	118	117	A	H
		2384.62	56.48	-17.52	74	48.42	32.15	7.56	31.65	372	291	P	V
		2388.91	45.62	-8.38	54	37.48	32.2	7.59	31.65	372	291	A	V
	*	2438	94.53	-	-	86.32	32.15	7.67	31.61	372	291	P	V
	*	2448	86.35	-	-	78.14	32.15	7.67	31.61	372	291	A	V
		2485.18	58.5	-15.5	74	50.23	32.12	7.73	31.58	372	291	P	V
		2483.5	46.7	-7.3	54	38.43	32.12	7.73	31.58	372	291	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 802.11n HT40 Ant 1+2 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n		4842	41.54	-32.46	74	56.2	34.32	11.05	60.03	300	0	P	H
HT40		7266	43.07	-30.93	74	54.19	35.94	13.45	60.51	300	0	P	H
CH 03		4842	42.64	-31.36	74	57.3	34.32	11.05	60.03	300	360	P	V
2422MHz		7266	43.62	-30.38	74	54.74	35.94	13.45	60.51	300	360	P	V
802.11n		4872	41.35	-32.65	74	56	34.34	11.04	60.03	300	0	P	H
HT40		7308	42.99	-31.01	74	54.08	35.94	13.48	60.51	300	0	P	H
CH 06		4872	41.78	-32.22	74	56.43	34.34	11.04	60.03	300	360	P	V
2437MHz		7308	43.44	-30.56	74	54.53	35.94	13.48	60.51	300	360	P	V
802.11n		4902	42.68	-31.32	74	57.32	34.35	11.03	60.02	300	0	P	H
HT40		7356	43.33	-30.67	74	54.4	35.93	13.52	60.52	300	0	P	H
CH 09		4902	43.45	-30.55	74	58.09	34.35	11.03	60.02	300	360	P	V
2452MHz		7356	43.3	-30.7	74	54.37	35.93	13.52	60.52	300	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												