FCC RF Test Report

APPLICANT	:	**Acer Incorporated**
EQUIPMENT	:	**Notebook computer**
BRAND NAME	:	**acer**
MODEL NAME	:	**N18H1**
FCC ID	:	**Contains FCC ID : HLZ9560D2W**
STANDARD	:	**FCC Part 15 Subpart C §15.247**
CLASSIFICATION	:	**(DTS) Digital Transmission System**

The product was installed a module during the test: WLAN and BT, 2*2 PCIe M.2 1216 SD adapter card (Brand Name: acer, Model Name: 9560D2W, FCC ID: HLZ9560D2W) during test.

The product was received on Mar. 28, 2018 and testing was completed on May 04, 2018. We, Sporton International (Shenzhen) 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 (Shenzhen) Inc., the test report shall not be reproduced except in full.

Eric Shih

Approved by: Eric Shih / Manager

NVLAP®
TESTING
NVLAP LAB CODE 600156-0

Sporton International (Shenzhen) Inc.
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Guangdong Province 518055 China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR832801C	Rev. 01	Initial issue of report	May 11, 2018

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	1
-	-	99% Bandwidth	-	Pass	1
3.1	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
-	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	1
-	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	1
		Conducted Spurious Emission		Pass	1
3.2	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 1.19 dB at 2389.800 MHz
3.3	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 5.40 dB at 0.520 MHz
3.4	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

Remark 1: All conducted test items were leverage from module RF report which can refer to Report No. "170919-03.TR04".

1 General Description

1.1 Applicant

Acer Incorporated
8F ,88, Sec.1 Xintai 5th Rd. Xizhi, New Taipei City 221, Taiwan, R.O.C

1.2 Manufacturer

Acer Incorporated
8F ,88, Sec.1 Xintai 5th Rd. Xizhi, New Taipei City 221, Taiwan, R.O.C

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Notebook computer
Brand Name	acer
Model Name	N18H1
FCC ID	Contains FCC ID : HLZ9560D2W
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80/VHT160 Bluetooth v3.0+EDR/Bluetooth v5.0 LE
EUT Stage	Identical Prototype

Module Feature & Specification	
Equipment	WLAN and BT, 2*2 PCIe M.2 1216 SD adapter card
Brand Name	acer
Model Name	9560D2W
FCC ID	HLZ9560D2W
Applicant	**Acer Incorporated** 8F ,88, Sec.1 Xintai 5th Rd. Xizhi, New Taipei City 221, Taiwan, R.O.C
Manufacturer	**Acer Incorporated** 8F ,88, Sec.1 Xintai 5th Rd. Xizhi, New Taipei City 221, Taiwan, R.O.C

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

<table>
<tr><th colspan="2">Standards-related Product Specification</th></tr>
<tr><td>Tx/Rx Channel Frequency Range</td><td>2412 MHz ~ 2462 MHz</td></tr>
<tr><td>Maximum (Peak) Output Power to antenna</td><td><Ant. 1>
802.11b : 18.70 dBm (0.0741 W)
802.11g : 20.30 dBm (0.1072 W)
802.11n HT20 : 19.97 dBm (0.0993 W)
802.11n HT40 : 19.38 dBm (0.0867 W)
<Ant. 2>
802.11b : 18.68 dBm (0.0738 W)
802.11g : 20.74 dBm (0.1186 W)
802.11n HT20 : 20.57 dBm (0.1140 W)
802.11n HT40 : 19.59 dBm (0.0910 W)
MIMO <Ant. 1 + 2>
802.11n HT20 : 23.28 dBm (0.2128 W)
802.11n HT40 : 22.25 dBm (0.1679 W)</td></tr>
<tr><td>Antenna Type / Gain</td><td>Ant. 1: PIFA Antenna with gain 3.3 dBi
Ant. 2: PIFA Antenna with gain 2.0 dBi</td></tr>
<tr><td>Type of Modulation</td><td>802.11b : DSSS (DBPSK / DQPSK / CCK)
802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)</td></tr>
<tr><td>Antenna Function for Transmitter</td><td>
<table>
<tr><th></th><th>Ant. 1</th><th>Ant. 2</th></tr>
<tr><td>802.11 b/g/n SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n MIMO</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
</table>

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

1.5 Modification of EUT

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

1.6 Testing Location

Sporton International (Shenzhen) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600156-0) and the FCC designation No are CN5018 and CN5019.

Test Site	Sporton International (Shenzhen) Inc.		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan Shenzhen City Guangdong Province 518055 China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595		
Test Site No.	**Sporton Site No.**		**FCC Test Firm Registration No.**
	TH01-SZ	CO01-SZ	251365

Test Site	Sporton International (Shenzhen) Inc.	
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan District Shenzhen City Guangdong Province 518055 China TEL: +86-755-3320-2398	
Test Site No.	**Sporton Site No.**	**FCC Test Firm Registration No.**
	03CH04-SZ	577730

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

1.7 Applicable Standards

According to the specifications of 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 v04
- 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.

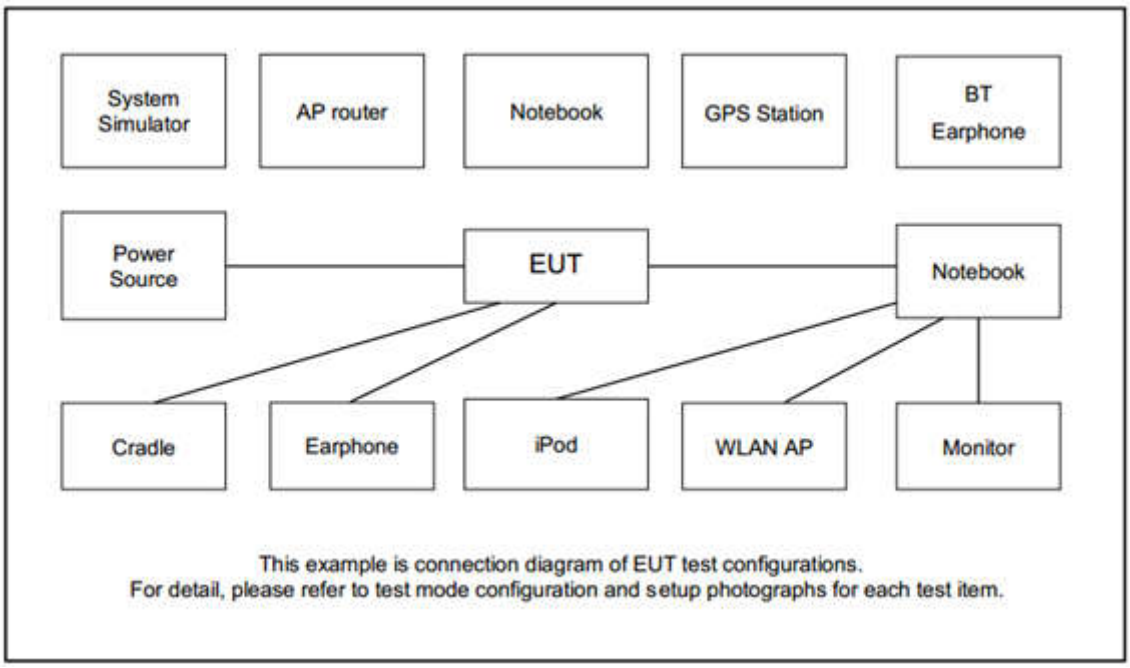
For 802.11b/g, 802.11n HT20/HT40 mode, we only test MIMO mode for RSE by referring to the higher conducted power.

MIMO Antenna

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS8
802.11n HT40	MCS8

Test Cases	
AC Conducted Emission	Mode 1 :Bluetooth Link + WLAN Link(2.4G) + Adapter 1 + Earphone **Mode 2 :Bluetooth Link + WLAN Link(2.4G) + Adapter 2 + Earphone**
Remark: **1.** The worst case of conducted emission is mode 2; only the test data of it was reported. **2.** For Radiated Test Cases, The tests were performance with Adapter 1/2 and Earphone.	

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	Dlink	DIR-820L	KA2IR820LA1	N/A	Unshielded,1.8m
2.	Bluetooth Earphone	Samsung	EO-MG900	PYAHS-107W	N/A	N/A
3.	Golden Earphone	Apple	N/A	N/A	N/A	N/A
4.	SD Card	N/A	MicroSD HC	FCC DoC	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.

3 Test Result

3.1 Output Power Measurement

3.1.1 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.

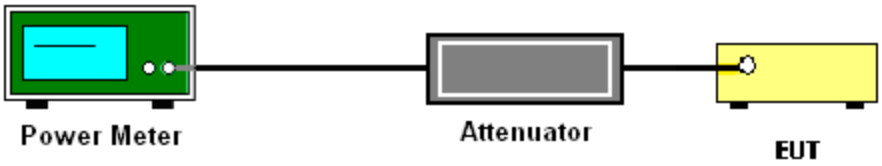
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v04 section 9.1.3 PKPM1 Peak power meter 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.

3.1.4 Test Setup



3.1.5 Test Result of 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)		Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	16.84	16.62		30.00	30.00	3.30	2.00	20.14	18.62	Pass
11b	1Mbps	1	6	2437	18.70	18.68		30.00	30.00	3.30	2.00	22.00	20.68	Pass
11b	1Mbps	1	11	2462	18.58	18.43		30.00	30.00	3.30	2.00	21.88	20.43	Pass
11g	6Mbps	1	1	2412	19.75	20.27		30.00	30.00	3.30	2.00	23.05	22.27	Pass
11g	6Mbps	1	6	2437	20.30	20.58		30.00	30.00	3.30	2.00	23.60	22.58	Pass
11g	6Mbps	1	11	2462	20.07	20.74		30.00	30.00	3.30	2.00	23.37	22.74	Pass
HT20	MCS0	1	1	2412	19.66	20.42		30.00	30.00	3.30	2.00	22.96	22.42	Pass
HT20	MCS0	1	6	2437	19.97	20.57		30.00	30.00	3.30	2.00	23.27	22.57	Pass
HT20	MCS0	1	11	2462	19.68	20.23		30.00	30.00	3.30	2.00	22.98	22.23	Pass
HT40	MCS0	1	3	2422	18.81	19.07		30.00	30.00	3.30	2.00	22.11	21.07	Pass
HT40	MCS0	1	6	2437	19.38	19.59		30.00	30.00	3.30	2.00	22.68	21.59	Pass
HT40	MCS0	1	9	2452	18.56	18.65		30.00	30.00	3.30	2.00	21.86	20.65	Pass
HT20	MCS8	2	1	2412	19.76	20.45	23.13	30.00		3.30		26.43		Pass
HT20	MCS8	2	6	2437	20.10	20.44	23.28	30.00		3.30		26.58		Pass
HT20	MCS8	2	11	2462	19.83	20.16	23.01	30.00		3.30		26.31		Pass
HT40	MCS8	2	3	2422	18.51	18.42	21.48	30.00		3.30		24.78		Pass
HT40	MCS8	2	6	2437	19.21	19.26	22.25	30.00		3.30		25.55		Pass
HT40	MCS8	2	9	2452	18.44	18.21	21.34	30.00		3.30		24.64		Pass

3.2 Radiated Band Edges and Spurious Emission Measurement

3.2.1 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

3.2.2 Measuring Instruments

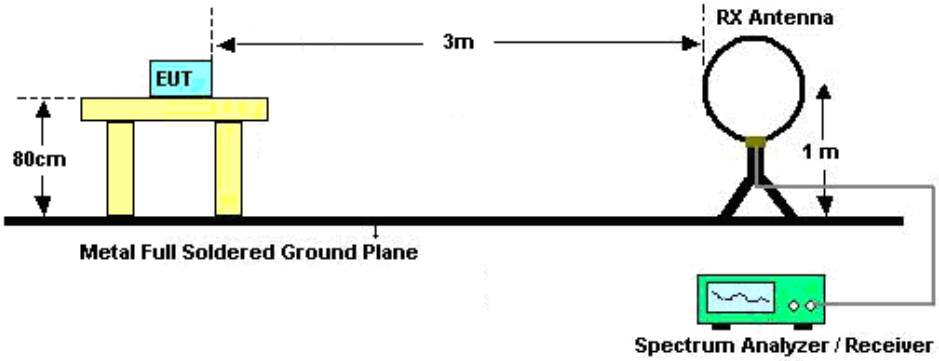
The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

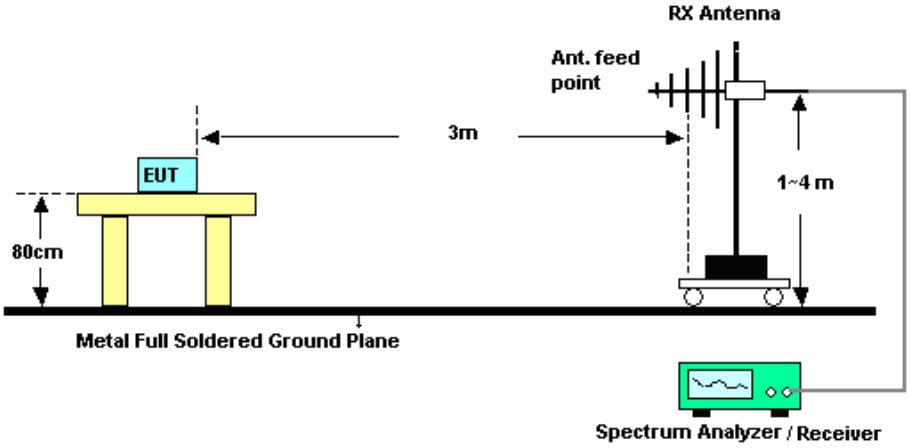
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test 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 average 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 ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz 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.

3.2.4 Test Setup

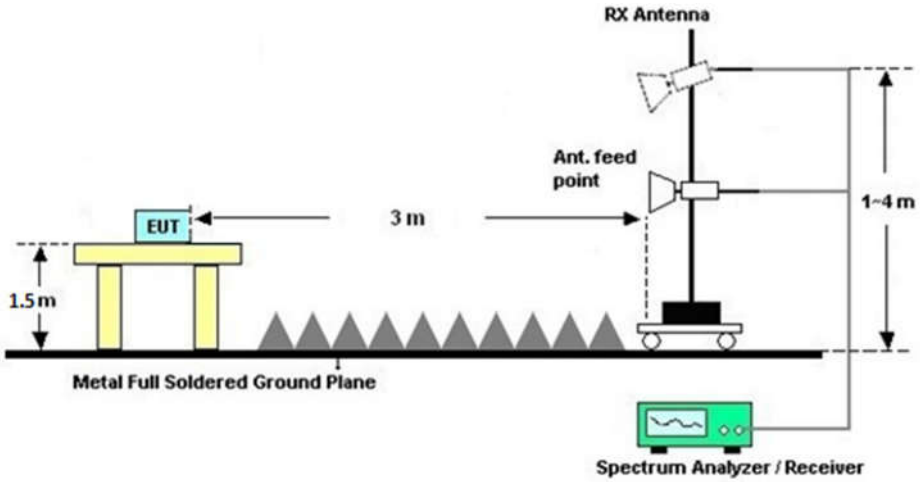
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.2.5 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.

3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A.

3.2.7 Duty Cycle

Please refer to Appendix B.

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

Please refer to Appendix A.

3.2.9 Test Result of Radiated Spurious Emission (Simultaneous TX)

Please refer to test report (FR832801B).

3.3 AC Conducted Emission Measurement

3.3.1 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.

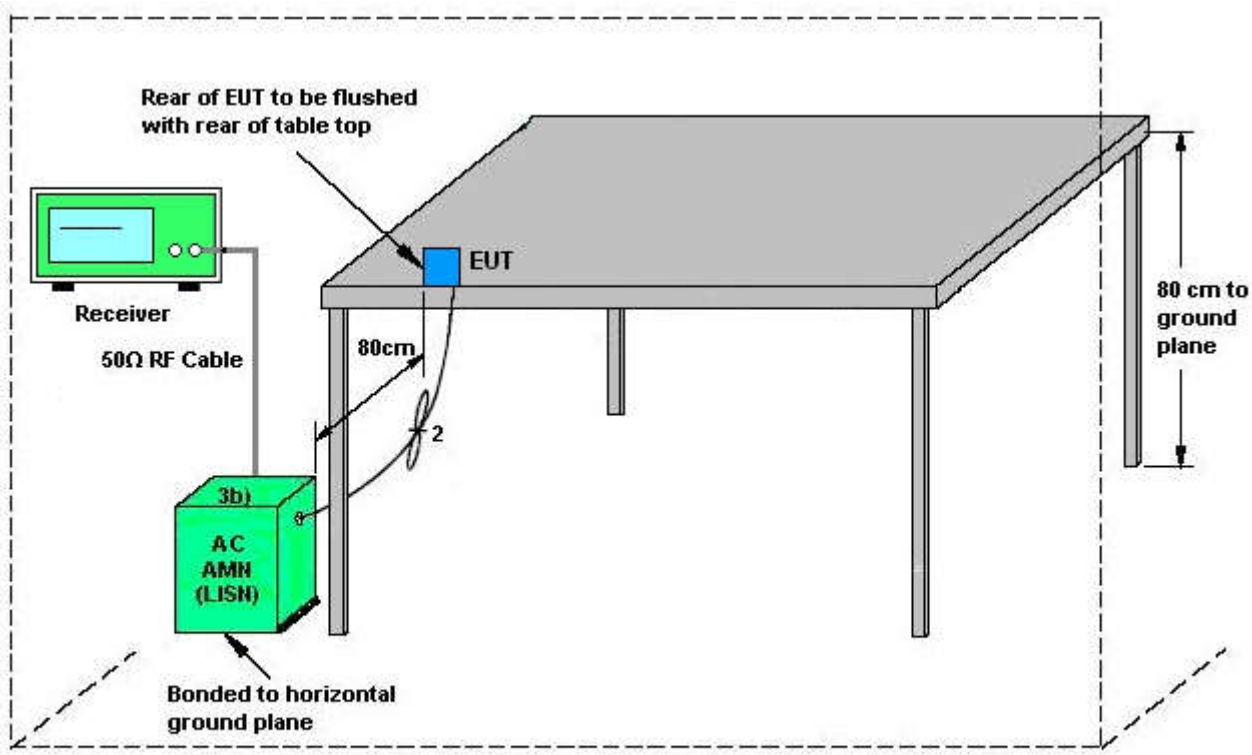
3.3.2 Measuring Instruments

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

3.3.3 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.

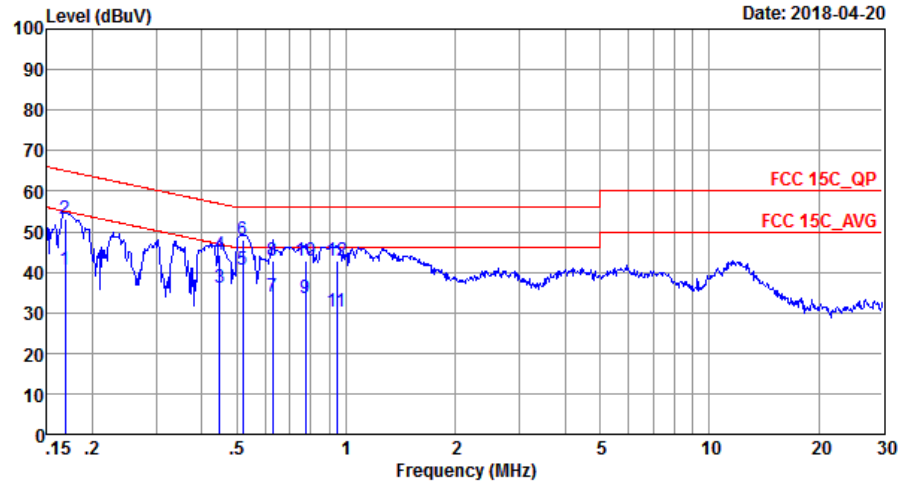
3.3.4 Test Setup



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

3.3.5 Test Result of AC Conducted Emission

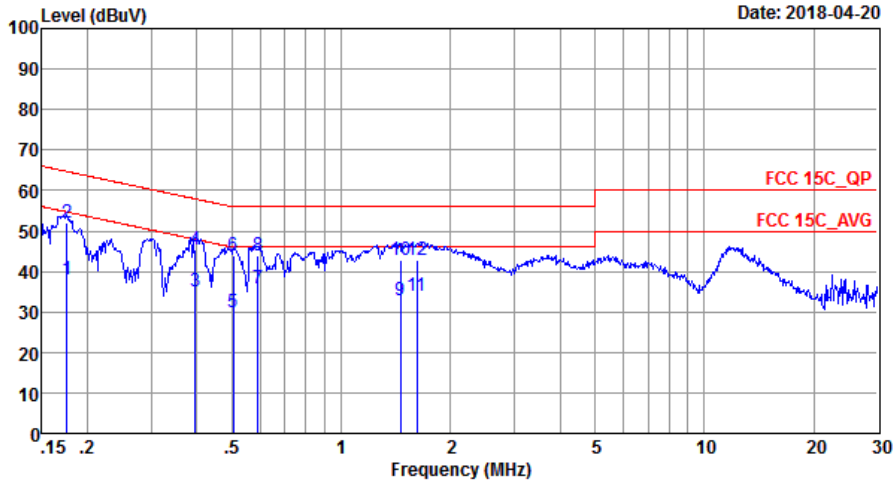
Test Mode :	Mode 2	Temperature :	22~25℃
Test Engineer :	Lion Gao	Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Link + WLAN Link(2.4G) + Adapter 2 + Earphone		



Site : CO01-SZ
Condition : FCC 15C_QP LISN_20170907_L LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.17	40.49	-14.54	55.03	30.39	0.03	10.07	Average
2		0.17	53.10	-11.93	65.03	43.00	0.03	10.07	QP
3		0.45	36.30	-10.59	46.89	26.20	0.02	10.08	Average
4		0.45	44.10	-12.79	56.89	34.00	0.02	10.08	QP
5	*	0.52	40.60	-5.40	46.00	30.50	0.02	10.08	Average
6		0.52	47.80	-8.20	56.00	37.70	0.02	10.08	QP
7		0.63	33.80	-12.20	46.00	23.70	0.02	10.08	Average
8		0.63	42.70	-13.30	56.00	32.60	0.02	10.08	QP
9		0.77	33.52	-12.48	46.00	23.41	0.03	10.08	Average
10		0.77	42.92	-13.08	56.00	32.81	0.03	10.08	QP
11		0.94	30.15	-15.85	46.00	20.00	0.06	10.09	Average
12		0.94	42.65	-13.35	56.00	32.50	0.06	10.09	QP

Test Mode :	Mode 2	Temperature :	22~25℃
Test Engineer :	Lion Gao	Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link + WLAN Link(2.4G) + Adapter 2 + Earphone		



Site : CO01-SZ
Condition : FCC 15C_QP LISN_20170907_N NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.18	38.10	-16.58	54.68	28.00	0.03	10.07	Average
2		0.18	52.10	-12.58	64.68	42.00	0.03	10.07	QP
3		0.40	35.20	-12.75	47.95	25.10	0.02	10.08	Average
4		0.40	45.50	-12.45	57.95	35.40	0.02	10.08	QP
5		0.50	29.80	-16.20	46.00	19.70	0.02	10.08	Average
6		0.50	43.90	-12.10	56.00	33.80	0.02	10.08	QP
7	*	0.59	35.80	-10.20	46.00	25.70	0.02	10.08	Average
8		0.59	43.90	-12.10	56.00	33.80	0.02	10.08	QP
9		1.46	32.95	-13.05	46.00	22.80	0.05	10.10	Average
10		1.46	42.75	-13.25	56.00	32.60	0.05	10.10	QP
11		1.62	33.95	-12.05	46.00	23.80	0.05	10.10	Average
12		1.62	42.95	-13.05	56.00	32.80	0.05	10.10	QP

3.4 Antenna Requirements

3.4.1 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.

3.4.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.4.3 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>

	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	3.30	2.00	3.30	5.68	0.00	0.00

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

PSD Limit Reduction = DG(PSD) – 6dBi, (0.46dB)

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Pulse Power Senor	Anritsu	MA2411B	1207253	30MHz~40GHz	Dec. 26, 2017	Apr. 16, 2018	Dec. 25, 2018	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 26, 2017	Apr. 16, 2018	Dec. 25, 2018	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Apr. 19, 2018	May 01, 2018~ May 04, 2018	Apr. 18, 2019	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Apr. 19, 2018	May 01, 2018~ May 04, 2018	Apr. 18, 2019	Radiation (03CH04-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 14, 2017	May 01, 2018~ May 04, 2018	May 13, 2018	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	May 16, 2017	May 01, 2018~ May 04, 2018	May 15, 2018	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1285	1GHz~18GHz	Dec. 13, 2017	May 01, 2018~ May 04, 2018	Dec. 12, 2018	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	9170#679	15GHz~40GHz	May 17, 2017	May 01, 2018~ May 04, 2018	May 16, 2018	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 19, 2017	May 01, 2018~ May 04, 2018	Oct. 18, 2018	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1989346	1GHz~18GHz	Jul. 27, 2017	May 01, 2018~ May 04, 2018	Jul. 26, 2018	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1988315	18GHz~40GHz	Jul. 27, 2017	May 01, 2018~ May 04, 2018	Jul. 26, 2018	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY53270156	500MHz~26.5GHz	Apr. 19, 2018	May 01, 2018~ May 04, 2018	Apr. 18, 2019	Radiation (03CH04-SZ)
AC Power Source	Chroma	61601	N/A	N/A	NCR	May 01, 2018~ May 04, 2018	NCR	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	May 01, 2018~ May 04, 2018	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	May 01, 2018~ May 04, 2018	NCR	Radiation (03CH04-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Dec. 26, 2017	Apr. 20, 2018	Dec. 25, 2018	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Dec. 26, 2017	Apr. 20, 2018	Dec. 25, 2018	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	MessTec	3816/2SH	00103892	9kHz~30MHz	Nov. 01, 2017	Apr. 20, 2018	Oct. 31, 2018	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 19, 2017	Apr. 20, 2018	Jul. 18, 2018	Conduction (CO01-SZ)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.6dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.1dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.8dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.1dB

Appendix A. Radiated Spurious Emission

For Adapter 1

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable 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)
802.11b CH 01 2412MHz		2389.485	63.56	-10.44	74	59.56	27.7	4.78	28.48	165	122	P	H
		2385.915	46.64	-7.36	54	42.64	27.7	4.78	28.48	165	122	A	H
	*	2412	102.97	-	-	98.86	27.69	4.78	28.36	165	122	P	H
	*	2412	100.11	-	-	96	27.69	4.78	28.36	165	122	A	H
		2389.59	63.47	-10.53	74	59.47	27.7	4.78	28.48	177	93	P	V
		2385.81	46.9	-7.1	54	42.9	27.7	4.78	28.48	177	93	A	V
	*	2412	103.44	-	-	99.33	27.69	4.78	28.36	177	93	P	V
	*	2412	100.44	-	-	96.33	27.69	4.78	28.36	177	93	A	V
802.11b CH 06 2437MHz		2379.44	51.72	-22.28	74	47.76	27.72	4.72	28.48	165	122	P	H
		2389.38	40.86	-13.14	54	36.86	27.7	4.78	28.48	165	122	A	H
	*	2437	105.3	-	-	101.06	27.66	4.82	28.24	165	122	P	H
	*	2437	102.34	-	-	98.1	27.66	4.82	28.24	165	122	A	H
		2488.38	51.79	-22.21	74	47.34	27.61	4.85	28.01	165	122	P	H
		2496.36	41.83	-12.17	54	37.27	27.61	4.85	27.9	165	122	A	H
		2362.78	51.71	-22.29	74	47.84	27.74	4.72	28.59	339	87	P	V
		2388.68	40.95	-13.05	54	36.95	27.7	4.78	28.48	339	87	A	V
	*	2437	104.84	-	-	100.6	27.66	4.82	28.24	339	87	P	V
	*	2437	102.01	-	-	97.77	27.66	4.82	28.24	339	87	A	V
		2485.58	53.02	-20.98	74	48.55	27.63	4.85	28.01	339	87	P	V
		2487.47	41.96	-12.04	54	37.49	27.63	4.85	28.01	339	87	A	V

802.11b CH 11 2462MHz	*	2462	105.04	-	-	100.71	27.64	4.82	28.13	170	126	P	H
	*	2462	102.07	-	-	97.74	27.64	4.82	28.13	170	126	A	H
		2483.52	68.71	-5.29	74	64.24	27.63	4.85	28.01	170	126	P	H
		2487.72	52.04	-1.96	54	47.59	27.61	4.85	28.01	170	126	A	H
	*	2462	105.26	-	-	100.93	27.64	4.82	28.13	343	89	P	V
	*	2462	102.33	-	-	98	27.64	4.82	28.13	343	89	A	V
		2484.12	67.15	-6.85	74	62.68	27.63	4.85	28.01	343	89	P	V
		2487.76	52.23	-1.77	54	47.78	27.61	4.85	28.01	343	89	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI Ant. 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 CH 01 2412MHz		4824	41.37	-32.63	74	62.25	31.76	5.55	58.19	142	217	P	H
		4824	40.03	-33.97	74	61.18	31.49	5.55	58.19	141	214	P	V
802.11b CH 06 2437MHz		4874	39.05	-34.95	74	59.62	31.88	5.65	58.1	114	148	P	H
		7311	44.16	-29.84	74	57.94	36.88	7.26	57.92	189	238	P	H
		4874	39.82	-34.18	74	60.66	31.61	5.65	58.1	217	201	P	V
		7311	42.88	-31.12	74	57.37	36.17	7.26	57.92	100	140	P	V
802.11b CH 11 2462MHz		4924	39.11	-34.89	74	59.27	32	5.86	58.02	185	287	P	H
		7386	43.7	-30.3	74	56.94	37.21	7.2	57.65	189	238	P	H
		4924	39.27	-34.73	74	59.7	31.73	5.86	58.02	185	32	P	V
		7386	43.52	-30.48	74	57.69	36.28	7.2	57.65	157	238	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI Ant. 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		2389.8	56.46	-17.54	74	52.34	27.7	4.78	28.36	358	142	P	H
		2389.8	42.03	-11.97	54	37.91	27.7	4.78	28.36	358	142	A	H
	*	2412	105.56	-	-	101.45	27.69	4.78	28.36	358	142	P	H
	*	2412	96.41	-	-	92.3	27.69	4.78	28.36	358	142	A	H
		2389.38	55.97	-18.03	74	51.97	27.7	4.78	28.48	252	54	P	V
		2389.8	43.11	-10.89	54	38.99	27.7	4.78	28.36	252	54	A	V
	*	2412	104.44	-	-	100.33	27.69	4.78	28.36	252	54	P	V
	*	2412	97.06	-	-	92.95	27.69	4.78	28.36	252	54	A	V
802.11g CH 06 2437MHz		2387.56	47.7	-26.3	74	43.7	27.7	4.78	28.48	358	143	P	H
		2388.82	37.21	-16.79	54	33.21	27.7	4.78	28.48	358	143	A	H
	*	2437	105.7	-	-	101.46	27.66	4.82	28.24	358	143	P	H
	*	2437	97.42	-	-	93.18	27.66	4.82	28.24	358	143	A	H
		2487.61	47.03	-26.97	74	42.58	27.61	4.85	28.01	358	143	P	H
		2483.69	36.31	-17.69	54	31.84	27.63	4.85	28.01	358	143	A	H
		2389.94	46.76	-27.24	74	42.64	27.7	4.78	28.36	258	25	P	V
		2389.8	36.81	-17.19	54	32.69	27.7	4.78	28.36	258	58	A	V
	*	2437	104.56	-	-	100.32	27.66	4.82	28.24	258	58	P	V
	*	2437	97.12	-	-	92.88	27.66	4.82	28.24	258	58	A	V
		2487.05	46.26	-27.74	74	41.79	27.63	4.85	28.01	258	58	P	V
		2486.21	36.3	-17.7	54	31.83	27.63	4.85	28.01	258	58	A	V

802.11g CH 11 2462MHz	*	2462	105.82	-	-	101.49	27.64	4.82	28.13	359	144	P	H
	*	2462	97.67	-	-	93.34	27.64	4.82	28.13	359	144	A	H
		2484.4	59.01	-14.99	74	54.54	27.63	4.85	28.01	359	144	P	H
		2483.52	44.39	-9.61	54	39.92	27.63	4.85	28.01	359	144	A	H
	*	2462	103.3	-	-	98.97	27.64	4.82	28.13	247	54	P	V
	*	2462	95.34	-	-	91.01	27.64	4.82	28.13	247	54	A	V
		2483.68	57.01	-16.99	74	52.54	27.63	4.85	28.01	247	54	P	V
		2483.52	41.69	-12.31	54	37.22	27.63	4.85	28.01	247	54	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 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	40.19	-33.81	74	61.07	31.76	5.55	58.19	158	320	P	H
		4824	38.81	-35.19	74	59.96	31.49	5.55	58.19	141	214	P	V
802.11g CH 06 2437MHz		4874	38.2	-35.8	74	58.77	31.88	5.65	58.1	217	201	P	H
		7311	44.54	-29.46	74	58.32	36.88	7.26	57.92	100	140	P	H
		4874	38.31	-35.69	74	59.15	31.61	5.65	58.1	114	148	P	V
		7311	43.29	-30.71	74	57.78	36.17	7.26	57.92	189	238	P	V
802.11g CH 11 2462MHz		4924	38.09	-35.91	74	58.25	32	5.86	58.02	150	269	P	H
		7386	44.71	-29.29	74	57.95	37.21	7.2	57.65	189	238	P	H
		4924	37.84	-36.16	74	58.27	31.73	5.86	58.02	185	287	P	V
		7386	43.03	-30.97	74	57.2	36.28	7.2	57.65	189	238	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 (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)
		2389.275	64.68	-9.32	74	60.68	27.7	4.78	28.48	162	128	P	H
		2389.8	52.81	-1.19	54	48.69	27.7	4.78	28.36	162	128	A	H
802.11n	*	2412	109.46	-	-	105.35	27.69	4.78	28.36	162	128	P	H
HT20	*	2412	101.24	-	-	97.13	27.69	4.78	28.36	162	128	A	H
CH 01		2389.17	55.6	-18.4	74	51.6	27.7	4.78	28.48	259	98	P	V
2412MHz		2389.905	43.98	-10.02	54	39.86	27.7	4.78	28.36	259	98	A	V
	*	2412	107.29	-	-	103.18	27.69	4.78	28.36	259	98	P	V
	*	2412	100.25	-	-	96.14	27.69	4.78	28.36	259	98	P	V
		2372.58	52.92	-21.08	74	48.96	27.72	4.72	28.48	145	136	P	H
		2389.24	43.32	-10.68	54	39.32	27.7	4.78	28.48	145	136	A	H
	*	2437	109.48	-	-	105.24	27.66	4.82	28.24	145	136	P	H
	*	2437	102.1	-	-	97.86	27.66	4.82	28.24	145	136	A	H
802.11n		2489.15	53.7	-20.3	74	49.25	27.61	4.85	28.01	145	136	P	H
HT20		2483.76	43.66	-10.34	54	39.19	27.63	4.85	28.01	145	136	A	H
CH 06		2389.38	47.82	-26.18	74	43.82	27.7	4.78	28.48	264	95	P	V
2437MHz		2387.28	38.24	-15.76	54	34.24	27.7	4.78	28.48	264	95	A	V
	*	2437	107.92	-	-	103.68	27.66	4.82	28.24	264	95	P	V
	*	2437	100.12	-	-	95.88	27.66	4.82	28.24	264	95	A	V
		2486.56	49.72	-24.28	74	45.25	27.63	4.85	28.01	264	95	P	V
		2483.62	38.43	-15.57	54	33.96	27.63	4.85	28.01	264	95	A	V

802.11n HT20 CH 11 2462MHz	*	2462	109.29	-	-	104.96	27.64	4.82	28.13	127	131	P	H
	*	2462	101.91	-	-	97.58	27.64	4.82	28.13	127	131	A	H
		2484	65.31	-8.69	74	60.84	27.63	4.85	28.01	127	131	P	H
		2483.8	52.39	-1.61	54	47.92	27.63	4.85	28.01	127	131	A	H
	*	2462	106.64	-	-	102.31	27.64	4.82	28.13	265	95	P	V
	*	2462	99.49	-	-	95.16	27.64	4.82	28.13	265	95	A	V
		2483.88	61.81	-12.19	74	57.34	27.63	4.85	28.01	265	95	P	V
		2484.12	49.12	-4.88	54	44.65	27.63	4.85	28.01	265	95	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 (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	38.8	-35.2	74	59.68	31.76	5.55	58.19	141	214	P	H
		4824	38.44	-35.56	74	59.59	31.49	5.55	58.19	158	320	P	V
802.11n HT20 CH 06 2437MHz		4874	38.5	-35.5	74	59.07	31.88	5.65	58.1	217	201	P	H
		7311	44.33	-29.67	74	58.11	36.88	7.26	57.92	100	140	P	H
		4874	37.95	-36.05	74	58.79	31.61	5.65	58.1	114	148	P	V
		7311	42.93	-31.07	74	57.42	36.17	7.26	57.92	189	238	P	V
802.11n HT20 CH 11 2462MHz		4924	38.61	-35.39	74	58.77	32	5.86	58.02	185	287	P	H
		7386	43.77	-30.23	74	57.01	37.21	7.2	57.65	189	238	P	H
		4924	36.99	-37.01	74	57.42	31.73	5.86	58.02	150	269	P	V
		7386	43.41	-30.59	74	57.58	36.28	7.2	57.65	189	238	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 (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)
		2389.8	64.86	-9.14	74	60.74	27.7	4.78	28.36	148	131	P	H
		2389.1	52.04	-1.96	54	48.04	27.7	4.78	28.48	148	131	A	H
	*	2422	103.6	-	-	99.39	27.67	4.78	28.24	148	131	P	H
	*	2422	95.79	-	-	91.58	27.67	4.78	28.24	148	131	A	H
802.11n		2486.98	55.34	-18.66	74	50.87	27.63	4.85	28.01	148	131	P	H
HT40		2483.76	45.71	-8.29	54	41.24	27.63	4.85	28.01	148	131	A	H
CH 03		2389.94	65.87	-8.13	74	61.75	27.7	4.78	28.36	177	95	P	V
2422MHz		2389.52	52.56	-1.44	54	48.56	27.7	4.78	28.48	177	95	A	V
	*	2422	105.4	-	-	101.19	27.67	4.78	28.24	177	95	P	V
	*	2422	98.07	-	-	93.86	27.67	4.78	28.24	177	95	A	V
		2484.6	54.43	-19.57	74	49.96	27.63	4.85	28.01	177	95	P	V
		2484.25	44.41	-9.59	54	39.94	27.63	4.85	28.01	177	95	A	V
		2389.38	55.37	-18.63	74	51.37	27.7	4.78	28.48	147	133	P	H
		2389.66	45.9	-8.1	54	41.9	27.7	4.78	28.48	147	133	A	H
	*	2437	104.01	-	-	99.77	27.66	4.82	28.24	147	133	P	H
	*	2437	96.52	-	-	92.28	27.66	4.82	28.24	147	133	A	H
802.11n		2496.71	54.28	-19.72	74	49.72	27.61	4.85	27.9	147	133	P	H
HT40		2485.72	44.2	-9.8	54	39.73	27.63	4.85	28.01	147	133	A	H
CH 06		2389.94	59.53	-14.47	74	55.41	27.7	4.78	28.36	183	91	P	V
2437MHz		2389.52	48.07	-5.93	54	44.07	27.7	4.78	28.48	183	91	A	V
	*	2437	105.8	-	-	101.56	27.66	4.82	28.24	183	91	P	V
	*	2437	98.28	-	-	94.04	27.66	4.82	28.24	183	91	A	V
		2483.69	54.12	-19.88	74	49.65	27.63	4.85	28.01	183	91	P	V
		2484.25	44.79	-9.21	54	40.32	27.63	4.85	28.01	183	91	A	V

802.11n HT40 CH 09 2452MHz		2388.82	51.48	-22.52	74	47.48	27.7	4.78	28.48	124	130	P	H
		2388.96	42.82	-11.18	54	38.82	27.7	4.78	28.48	124	130	A	H
	*	2452	103.54	-	-	99.19	27.66	4.82	28.13	124	130	P	H
	*	2452	95.9	-	-	91.55	27.66	4.82	28.13	124	130	A	H
		2484.74	64.7	-9.3	74	60.23	27.63	4.85	28.01	124	130	P	H
		2484.95	50.27	-3.73	54	45.8	27.63	4.85	28.01	124	130	A	H
		2389.66	52.86	-21.14	74	48.86	27.7	4.78	28.48	183	91	P	V
		2388.82	43.68	-10.32	54	39.68	27.7	4.78	28.48	183	91	A	V
	*	2452	104.65	-	-	100.3	27.66	4.82	28.13	183	91	P	V
	*	2452	97.22	-	-	92.87	27.66	4.82	28.13	183	91	A	V
		2485.23	62.53	-11.47	74	58.06	27.63	4.85	28.01	183	91	P	V
		2486.63	50.58	-3.42	54	46.11	27.63	4.85	28.01	183	91	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 (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		4844	37.55	-36.45	74	58.26	31.8	5.65	58.16	200	210	P	H
HT40		7266	43.87	-30.13	74	57.86	36.75	7.29	58.03	105	269	P	H
CH 03		4844	37.57	-36.43	74	58.55	31.53	5.65	58.16	114	148	P	V
2422MHz		7266	43.21	-30.79	74	57.82	36.13	7.29	58.03	189	238	P	V
802.11n		4874	38.16	-35.84	74	58.73	31.88	5.65	58.1	114	148	P	H
HT40		7311	43.24	-30.76	74	57.02	36.88	7.26	57.92	189	238	P	H
CH 06		4874	37.36	-36.64	74	58.2	31.61	5.65	58.1	217	201	P	V
2437MHz		7311	42.94	-31.06	74	57.43	36.17	7.26	57.92	100	140	P	V
802.11n		4904	38.23	-35.77	74	58.55	31.96	5.76	58.04	152	149	P	H
HT40		7356	43.9	-30.1	74	57.35	37.08	7.23	57.76	180	225	P	H
CH 09		4904	37.59	-36.41	74	58.18	31.69	5.76	58.04	200	89	P	V
2452MHz		7356	43.37	-30.63	74	57.67	36.23	7.23	57.76	181	318	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11n HT20 LF		30	23.79	-16.21	40	30.61	24.9	0.25	31.97	-	-	P	H
		191.02	35.25	-8.25	43.5	49.94	15.16	1.52	31.37	100	94	P	H
		263.77	26.78	-19.22	46	36.13	20.13	1.75	31.23	-	-	P	H
		455.83	27.94	-18.06	46	33.83	23.07	2.32	31.28	-	-	P	H
		513.06	28.35	-17.65	46	32.9	24.23	2.46	31.24	-	-	P	H
		819.58	32.42	-13.58	46	31.73	28.66	3.2	31.17	-	-	P	H
		54.25	31.09	-8.91	40	48.8	13.46	0.75	31.92	-	-	P	V
		78.5	33.89	-6.11	40	51.46	13.44	0.84	31.85	100	301	P	V
		190.05	33.7	-9.8	43.5	48.41	15.15	1.51	31.37	-	-	P	V
		479.11	29.96	-16.04	46	35.27	23.56	2.38	31.25	-	-	P	V
		540.22	29.72	-16.28	46	33.72	24.72	2.53	31.25	-	-	P	V
		926.28	34.47	-11.53	46	32.69	29.61	3.43	31.26	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

For Adapter 2

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		2389.8	61.39	-12.61	74	57.27	27.7	4.78	28.36	147	124	P	H
		2389.485	50.17	-3.83	54	46.17	27.7	4.78	28.48	147	124	A	H
802.11n	*	2412	108.68	-	-	104.57	27.69	4.78	28.36	147	124	P	H
HT20	*	2412	101.32	-	-	97.21	27.69	4.78	28.36	147	124	A	H
CH 01		2389.8	57.03	-16.97	74	52.91	27.7	4.78	28.36	220	94	P	V
2412MHz		2389.695	47.8	-6.2	54	43.8	27.7	4.78	28.48	220	94	A	V
	*	2412	109.69	-	-	105.58	27.69	4.78	28.36	220	94	P	V
	*	2412	102.35	-	-	98.24	27.69	4.78	28.36	220	94	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 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n		4824	38.82	-35.18	74	59.7	31.76	5.55	58.19	141	214	P	H
HT20													
CH 01		4824	38.5	-35.5	74	59.65	31.49	5.55	58.19	158	320	P	V
2412MHz													
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Note symbol

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

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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

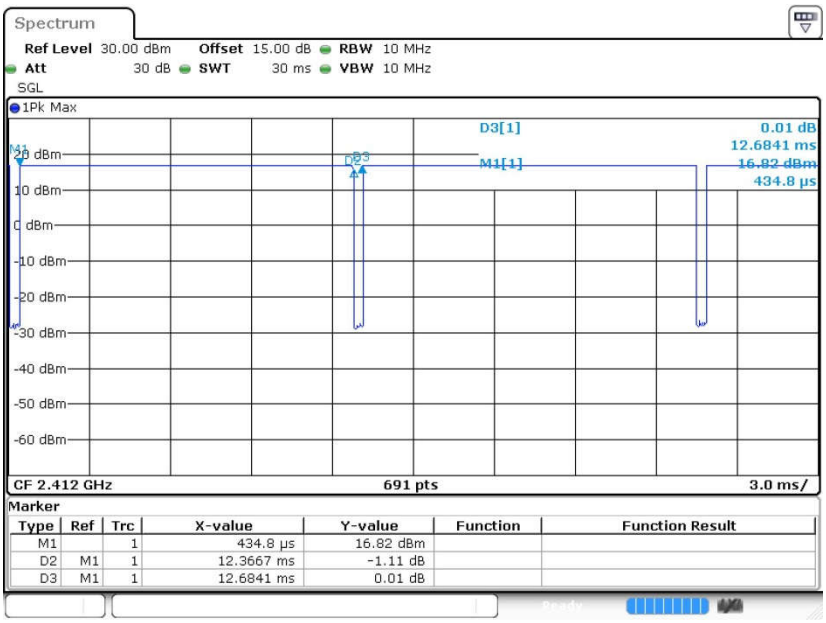
= -10.46(dB)

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

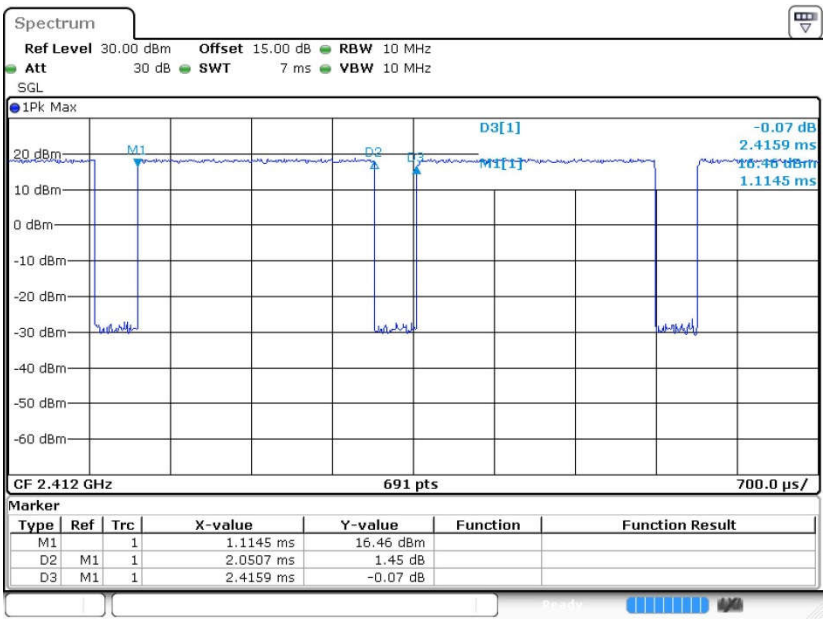
Appendix B. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1	802.11b	97.50	12.367	0.081	100Hz
2	802.11g	84.88	2.051	0.488	1kHz
(1+2)1	802.11n HT20	84.27	0.978	1.022	3kHz
(1+2)2	802.11n HT20	84.27	0.978	1.022	3kHz
(1+2)1	802.11n HT40	83.74	0.493	2.029	3kHz
(1+2)2	802.11n HT40	83.78	0.494	2.023	3kHz

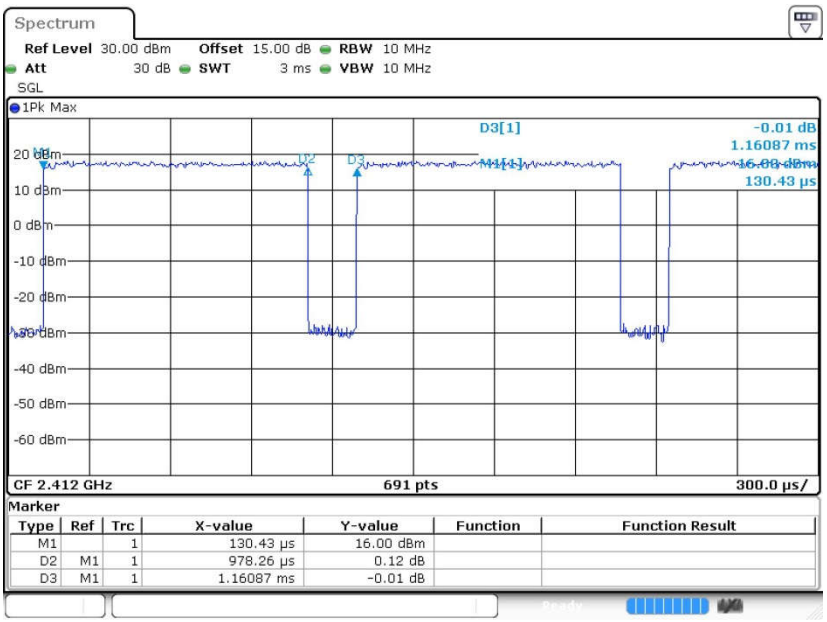
802.11b Ant. 1



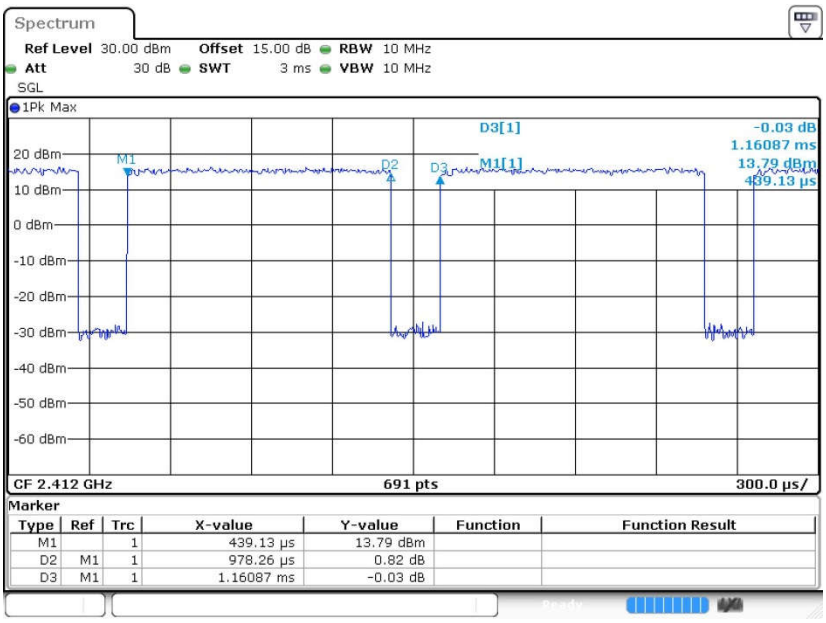
802.11g Ant. 2



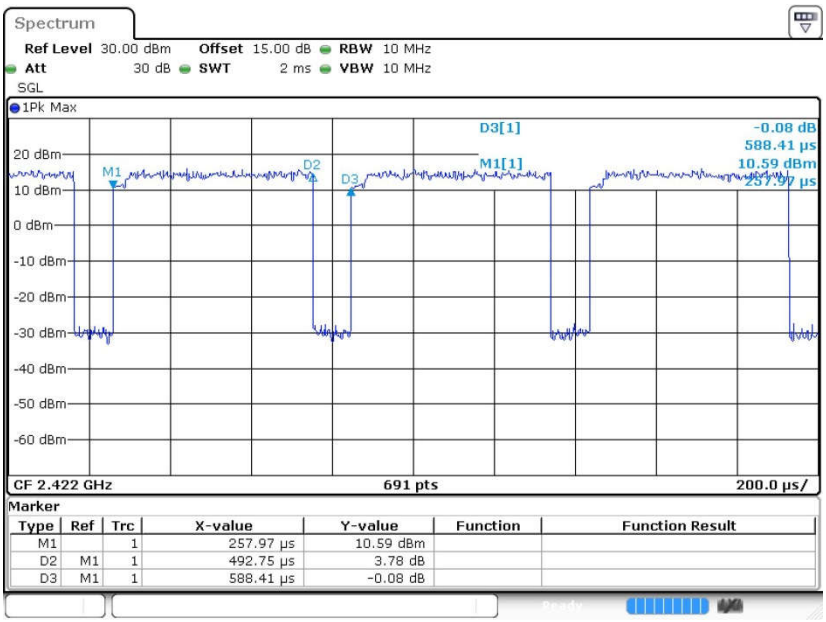
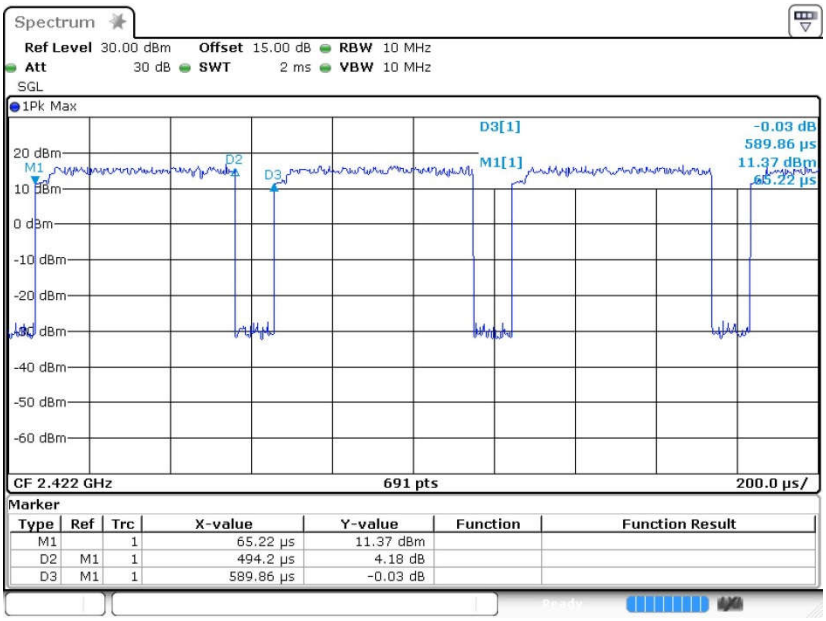
802.11n HT20 Ant. (1+2)1



802.11n HT20 Ant. (1+2)2



802.11n HT40 Ant. (1+2)1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