



FCC RF Test Report

APPLICANT : Acer Incorporated
EQUIPMENT : Intel Module
BRAND NAME : acer
MODEL NAME : 7265D2W
MARKETING NAME : 7265D2W
FCC ID : HLZ7265D2
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was integrated the Notebook Computer (Brand Name: acer, Model Name: N17H2, Marketing Name: SP111-32N) during the test.

The product was received on May 05, 2017 and testing was completed on Jun. 01, 2017. 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.

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Approved by: Jones Tsai / Manager



SPORTON International (ShenZhen) INC.

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Guangdong Province, China***



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR750510C	Rev. 01	Initial issue of report	Jun. 20, 2017

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	15.247(a)(2)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	1
-	-	99% Bandwidth	-	Pass	1
3.1	15.247(b)	Power Output Measurement	$\leq 30\text{dBm}$	Pass	-
-	15.247(e)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$	Pass	1
-	15.247(d)	Conducted Band Edges	$\leq 20\text{dBc}$	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 1.92 dB at 2483.500 MHz
3.3	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 5.77 dB at 0.440 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. "FCC 7265D2W_DTS_Report".



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	Intel Module
Brand Name	acer
Model Name	7265D2W
Marketing Name	7265D2W
FCC ID	HLZ7265D2
EUT supports Radios application	WLAN2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n/ac HT20/HT40/VHT20/VHT40/VHT80 Bluetooth v3.0 + EDR/Bluetooth v4.0 LE
HW Version	N/A
SW Version	N/A
EUT Stage	Pre-Production

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		Chain Port 1		
		802.11b : 18.13 dBm (0.0650 W)		
		802.11g : 19.35 dBm (0.0861 W)		
		802.11n HT20 : 19.11 dBm (0.0815 W)		
		802.11n HT40 : 18.55 dBm (0.0716 W)		
		Chain Port 2		
		802.11b : 18.11 dBm (0.0647 W)		
		802.11g : 19.08 dBm (0.0809 W)		
		802.11n HT20 : 19.76 dBm (0.0946 W)		
		802.11n HT40 : 17.42 dBm (0.0552 W)		
		Chain Port 1+2		
		802.11n HT20 : 22.76 dBm (0.1888 W)		
		802.11n HT40 : 21.62 dBm (0.1452 W)		
Antenna Type / Gain		Chain Port 1: PIFA Antenna with gain 1.06 dBi Chain Port 2: PIFA Antenna with gain 1.07 dBi		
Type of Modulation		802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)		
Antenna Function for Transmitter				
		Chain Port 1	Chain Port 2	
		802.11 b/g/n SISO	V	V
		802.11 n MIMO	V	V

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

Host Feature & Specification	
Equipment Name	Notebook Computer
Brand Name	acer
Model Name	N17H2
Marketing Name	SP111-32N
HW	N8101_MB_V3
SW	15063

1.5 Component list

Remark: There are two types of the host, the details refer the following table. According to the difference, we choose sample 1 to perform full test.

Name	Notebook Computer	
	First Source	Second Source
PCB--MB	N8101_mainboard PCB_V3.0 (EAGLE)	N8101_mainboard PCB_V3.0 (WUZHU)
CPU	N4200 (INTEL)	N3350 (INTEL)
EMMC	128G (SANDISK)	64G (Hynix)
Adapter	Adapter is split type (Delta). The US, EU adapter are the same except pin feet.	Adapter is integrated type (Chicony). The US, EU adapter are the same except pin feet.
Camera	6SF009N2 (LITE-ON)	CNFG023 (Chicony)

1.6 Modification of EUT

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

1.7 Testing Location

Test Site	SPORTON International (ShenZhen) INC.	
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan District, Shenzhen City, Guangdong Province, China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595	
Test Site No.	Sporton Site No.	
	TH01-SZ	CO01-SZ

Test Site	SPORTON International (ShenZhen) INC.	
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755- 3320-2398	
Test Site No.	Sporton Site No.	FCC Registration No.
	03CH03-SZ	565805

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

1.8 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

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: conducted emission (150 kHz to 30 MHz) and radiated 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 were recorded in this report.

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 mode of radiated spurious emissions is considering the modulation as below table.

Single Antenna

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

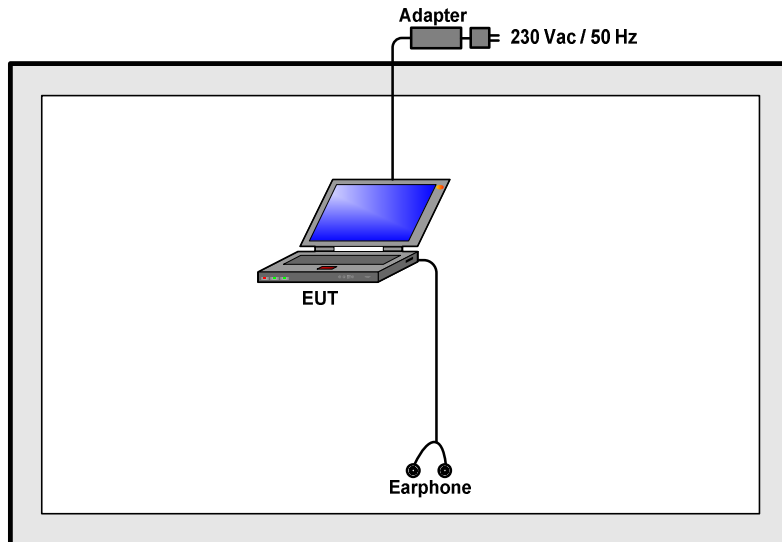
MIMO Antenna

Modulation	Data Rate
802.11n HT20	MCS0
802.11n HT40	MCS0

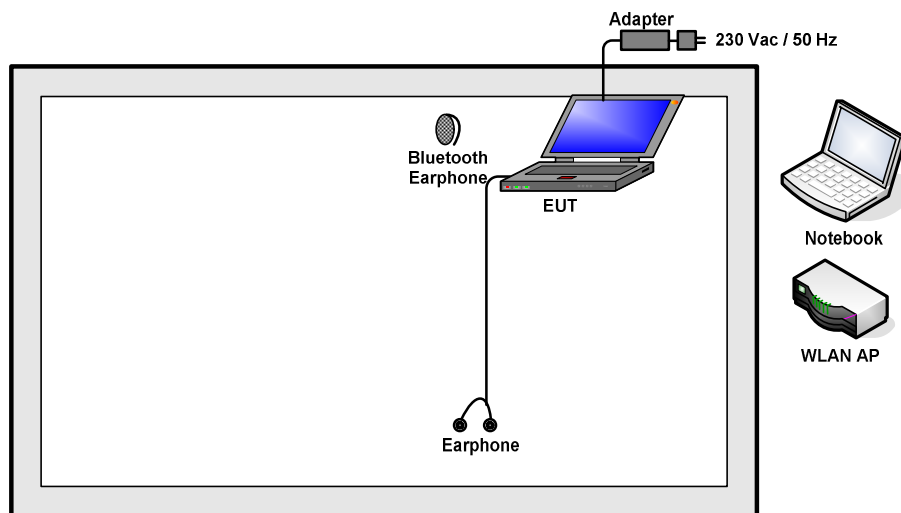
Test Cases	
AC Conducted Emission	Mode 1: Bluetooth Link + WLAN Link + Earphone + Adapter 1 Mode 2: Bluetooth Link + WLAN Link + Earphone + Adapter 2
Remark: The worst case of conducted emission is mode 2; only the test data of it was reported.	

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



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	D-link	DIR-820L	KA2IR820LA1	N/A	Unshielded, 1.8m
2.	Notebook	Lenovo	E540	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
3.	Bluetooth Earphone	Nokia	BH-108	PYAHS-107W	N/A	N/A
4.	iPod Earphone	Apple	MC690ZP/A	FCC DoC	Unshielded, 1.6m	N/A

2.5 EUT Operation Test Setup

For WLAN function, the 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 Notebook under large package sizes transmission.

3 Test Result

3.1 Peak and Average Output Power Measurement

3.1.1 Limit of Peak and Average Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi are 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.

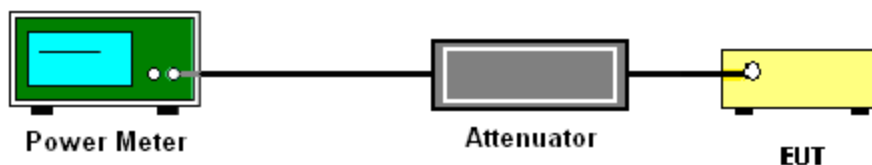
3.1.2 Measuring Instruments

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 9.1.2 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.

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)		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	17.57	18.09		30.00	30.00	1.06	1.07	18.63	19.16	36.00	36.00	Pass
11b	1Mbps	1	6	2437	18.13	18.11		30.00	30.00	1.06	1.07	19.19	19.18	36.00	36.00	Pass
11b	1Mbps	1	11	2462	17.49	17.74		30.00	30.00	1.06	1.07	18.55	18.81	36.00	36.00	Pass
11g	6Mbps	1	1	2412	14.01	14.17		30.00	30.00	1.06	1.07	15.07	15.24	36.00	36.00	Pass
11g	6Mbps	1	6	2437	19.35	19.08		30.00	30.00	1.06	1.07	20.41	20.15	36.00	36.00	Pass
11g	6Mbps	1	11	2462	14.13	15.39		30.00	30.00	1.06	1.07	15.19	16.46	36.00	36.00	Pass
HT20	MCS0	1	1	2412	14.89	15.26		30.00	30.00	1.06	1.07	15.95	16.33	36.00	36.00	Pass
HT20	MCS0	1	6	2437	19.11	19.76		30.00	30.00	1.06	1.07	20.17	20.83	36.00	36.00	Pass
HT20	MCS0	1	11	2462	14.02	15.97		30.00	30.00	1.06	1.07	15.08	17.04	36.00	36.00	Pass
HT40	MCS0	1	3	2422	15.13	14.65		30.00	30.00	1.06	1.07	16.19	15.72	36.00	36.00	Pass
HT40	MCS0	1	6	2437	18.55	17.42		30.00	30.00	1.06	1.07	19.61	18.49	36.00	36.00	Pass
HT40	MCS0	1	9	2452	14.78	14.07		30.00	30.00	1.06	1.07	15.84	15.14	36.00	36.00	Pass
HT20	MCS0	2	1	2412	14.11	15.21	17.71	30.00		1.07		18.78		36.00		Pass
HT20	MCS0	2	6	2437	19.42	20.05	22.76	30.00		1.07		23.83		36.00		Pass
HT20	MCS0	2	11	2462	15.02	14.49	17.77	30.00		1.07		18.84		36.00		Pass
HT40	MCS0	2	3	2422	11.38	10.94	14.18	30.00		1.07		15.25		36.00		Pass
HT40	MCS0	2	6	2437	18.47	18.75	21.62	30.00		1.07		22.69		36.00		Pass
HT40	MCS0	2	9	2452	11.58	11.36	14.48	30.00		1.07		15.55		36.00		Pass



3.1.6 Test Result of Average output Power (Reporting Only)

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	0.05	0.05	16.47	16.37	
11b	1Mbps	1	6	2437	0.05	0.05	17.26	17.39	
11b	1Mbps	1	11	2462	0.05	0.05	16.48	16.46	
11g	6Mbps	1	1	2412	0.05	0.06	12.46	12.49	
11g	6Mbps	1	6	2437	0.05	0.06	17.25	17.24	
11g	6Mbps	1	11	2462	0.05	0.06	12.47	12.38	
HT20	MCS0	1	1	2412	0.06	0.06	12.44	12.40	
HT20	MCS0	1	6	2437	0.06	0.06	17.21	17.38	
HT20	MCS0	1	11	2462	0.06	0.06	12.48	12.48	
HT40	MCS0	1	3	2422	0.14	0.12	13.46	13.20	
HT40	MCS0	1	6	2437	0.14	0.12	16.29	15.47	
HT40	MCS0	1	9	2452	0.14	0.12	12.75	11.33	
HT20	MCS0	2	1	2412	0.06	0.06	11.88	12.09	15.00
HT20	MCS0	2	6	2437	0.06	0.06	16.97	17.31	20.15
HT20	MCS0	2	11	2462	0.06	0.06	9.79	10.03	12.92
HT40	MCS0	2	3	2422	0.12	0.12	9.33	9.51	12.43
HT40	MCS0	2	6	2437	0.12	0.12	16.16	15.83	19.01
HT40	MCS0	2	9	2452	0.12	0.12	9.24	9.29	12.27

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

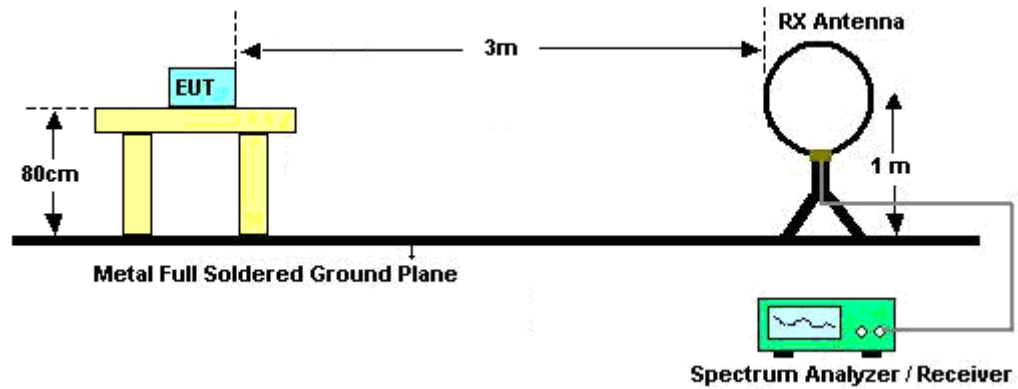
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test 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 measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. 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:

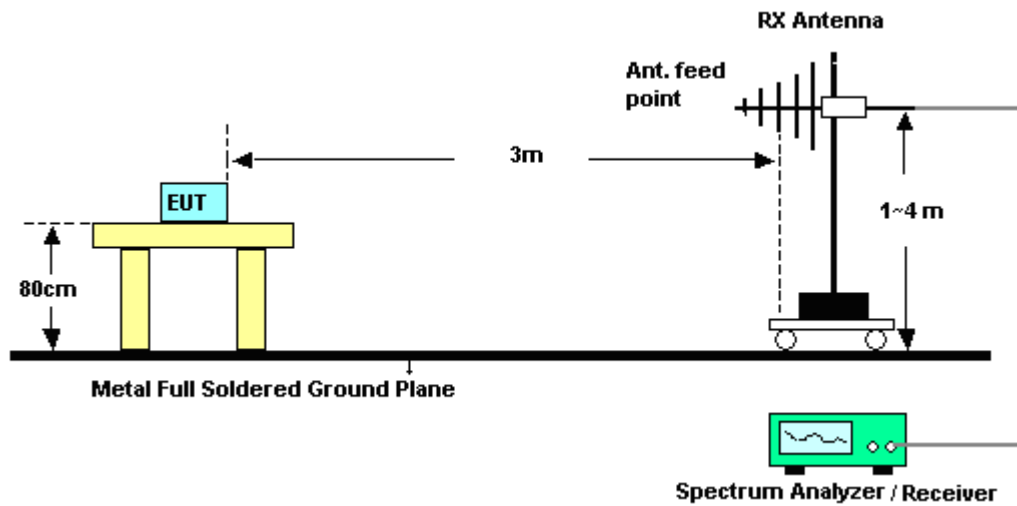
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.2.4 Test Setup

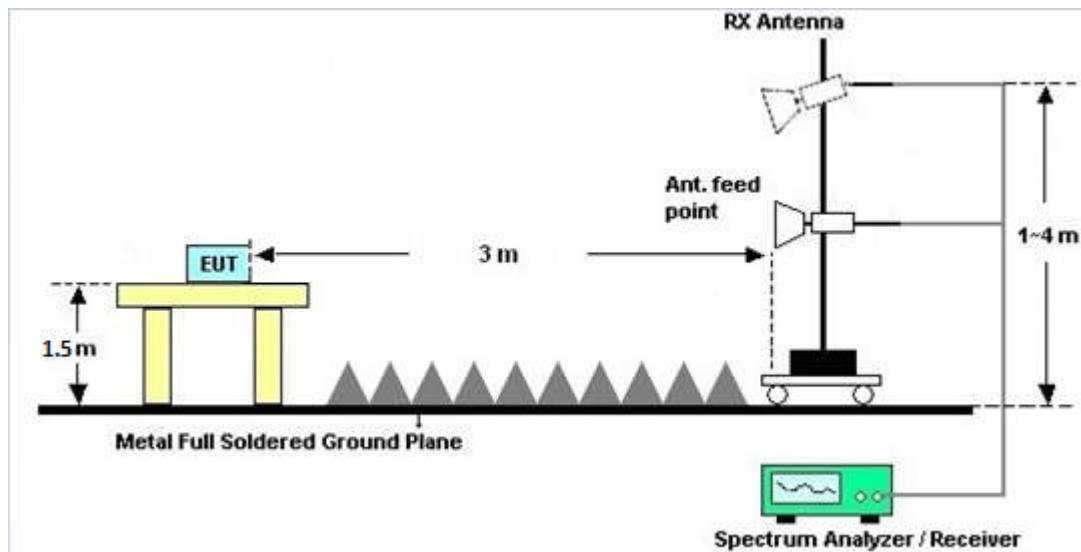
For radiated emissions below 30MHz



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.

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 (FR750510B).

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.

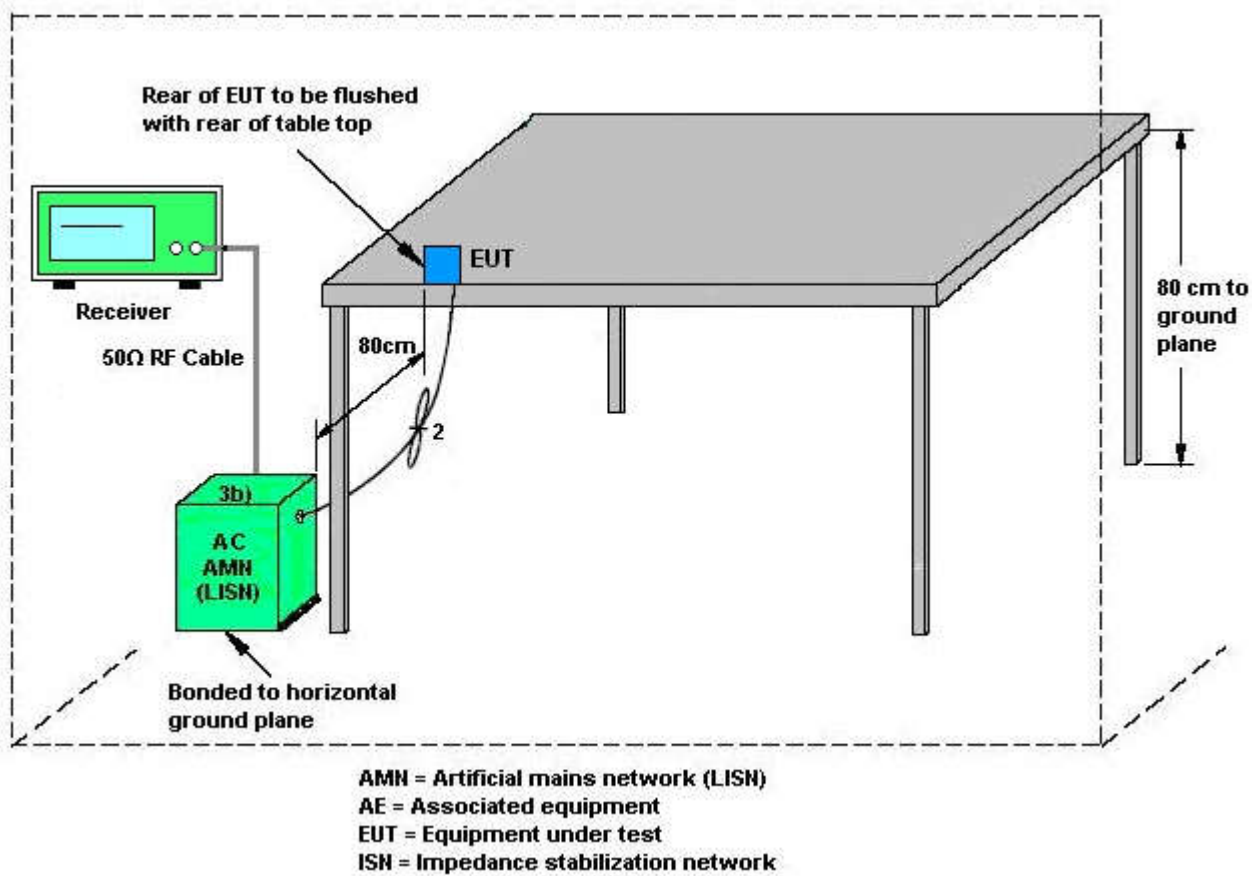
3.3.2 Measuring Instruments

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

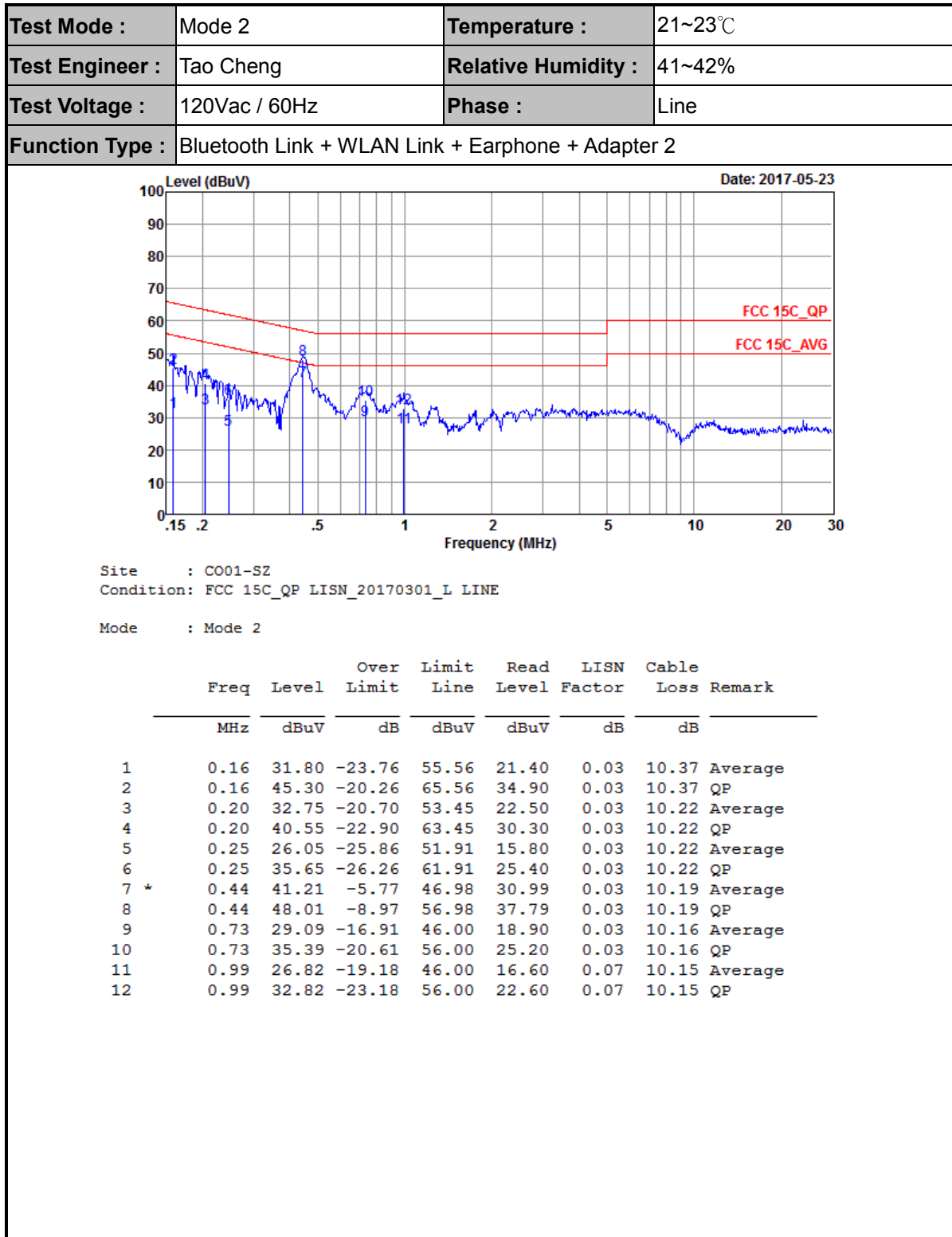
3.3.3 Test Procedures

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

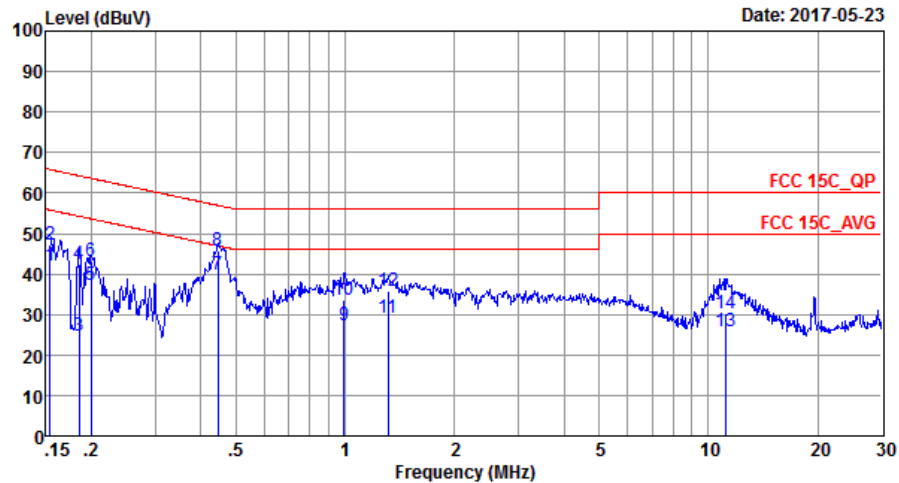


3.3.5 Test Result of AC Conducted Emission





Test Mode :	Mode 2	Temperature :	21~23℃
Test Engineer :	Tao Cheng	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link + WLAN Link + Earphone + Adapter 2		



Site : C001-SZ
Condition: FCC 15C_QP LISN_20170301_N NEUTRAL

Mode : Mode 2

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15	42.12	-13.66	55.78	31.70	0.03	10.39	Average
2	0.15	47.22	-18.56	65.78	36.80	0.03	10.39	QP
3	0.19	24.80	-29.44	54.24	14.50	0.03	10.27	Average
4	0.19	42.40	-21.84	64.24	32.10	0.03	10.27	QP
5	0.20	37.45	-16.17	53.62	27.20	0.03	10.22	Average
6	0.20	43.25	-20.37	63.62	33.00	0.03	10.22	QP
7 *	0.45	39.81	-7.12	46.93	29.60	0.02	10.19	Average
8	0.45	45.81	-11.12	56.93	35.60	0.02	10.19	QP
9	0.99	27.20	-18.80	46.00	17.00	0.05	10.15	Average
10	0.99	33.40	-22.60	56.00	23.20	0.05	10.15	QP
11	1.31	29.00	-17.00	46.00	18.80	0.05	10.15	Average
12	1.31	35.70	-20.30	56.00	25.50	0.05	10.15	QP
13	11.20	25.76	-24.24	50.00	15.20	0.21	10.35	Average
14	11.20	30.36	-29.64	60.00	19.80	0.21	10.35	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 FCC rule.

3.4.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.4.3 Antenna Gain

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.

			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	1.06	1.07	1.07	4.08	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	Aug. 09, 2016	May 24, 2017	Aug. 08, 2017	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	1207253	30MHz~40GHz	Jan. 06, 2017	May 24, 2017	Jan. 05, 2018	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Jan. 06, 2017	May 24, 2017	Jan. 05, 2018	Conducted (TH01-SZ)
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY54450083	20Hz~8.4GHz	Apr. 20, 2017	May 14, 2017~Jun. 01, 2017	Apr. 19, 2018	Radiation (03CH03-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150246	10Hz~44GHz;	Apr.20, 2017	May 14, 2017~Jun. 01, 2017	Apr.19, 2018	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 14, 2017	May 14, 2017~Jun. 01, 2017	May 13, 2018	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz~2GHz	May 14, 2017	May 14, 2017~Jun. 01, 2017	May 13, 2018	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1355	1GHz~18GHz	May 07, 2017	May 14, 2017~Jun. 01, 2017	May 06, 2018	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18GHz~40GHz	Aug. 10, 2016	May 14, 2017~Jun. 01, 2017	Aug. 09, 2017	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102210	0.01Hz~3000MHz	Oct. 11, 2016	May 14, 2017~Jun. 01, 2017	Oct. 10, 2017	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Jan. 06, 2017	May 14, 2017~Jun. 01, 2017	Jan. 05, 2018	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 16, 2016	May 14, 2017~Jun. 01, 2017	Jul. 15, 2017	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	May 14, 2017~Jun. 01, 2017	NCR	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	May 14, 2017~Jun. 01, 2017	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	May 14, 2017~Jun. 01, 2017	NCR	Radiation (03CH03-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Jan. 06, 2017	May 23, 2017	Jan. 05, 2018	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103892	9kHz~30MHz	Jan. 05, 2017	May 23, 2017	Jan. 04, 2018	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	MessTec	3816/2SH	00103912	9kHz~30MHz	Jan. 05, 2017	May 23, 2017	Jan. 04, 2018	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 16, 2016	May 23, 2017	Jul. 15, 2017	Conduction (CO01-SZ)
Pulse Limiter	COM-POWER	LIT-153 Transient Limiter	53139	150kHz~30MHz	Oct. 11, 2016	May 23, 2017	Oct. 10, 2017	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% ($U = 2Uc(y)$)	2.5dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1dB
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Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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Appendix A. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2387.28	53.39	-20.61	74	55.04	27.51	5.06	34.22	203	221	P	H
		2386.125	48.05	-5.95	54	49.7	27.51	5.06	34.22	203	221	A	H
	*	2412	94.4	-	-	95.97	27.57	5.06	34.2	203	221	P	H
	*	2412	91.24	-	-	92.81	27.57	5.06	34.2	203	221	A	H
		2386.23	53.61	-20.39	74	55.26	27.51	5.06	34.22	211	223	P	V
		2386.02	48.44	-5.56	54	50.09	27.51	5.06	34.22	211	223	A	V
	*	2412	96.42	-	-	97.99	27.57	5.06	34.2	211	223	P	V
	*	2412	93.38	-	-	94.95	27.57	5.06	34.2	211	223	A	V
802.11b CH 06 2437MHz		2386.3	48.07	-25.93	74	49.72	27.51	5.06	34.22	176	11	P	H
		2388.4	38.22	-15.78	54	39.87	27.51	5.06	34.22	176	11	A	H
	*	2437	97.43	-	-	98.79	27.7	5.12	34.18	176	11	P	H
	*	2437	94.28	-	-	95.64	27.7	5.12	34.18	176	11	A	H
		2499.65	48.3	-25.7	74	49.32	27.9	5.19	34.11	176	11	P	H
		2494.54	38.54	-15.46	54	39.56	27.9	5.19	34.11	176	11	A	H
		2322.04	49.67	-24.33	74	51.71	27.24	4.98	34.26	250	180	P	V
		2388.4	39.93	-14.07	54	41.58	27.51	5.06	34.22	250	180	A	V
	*	2437	100.45	-	-	101.81	27.7	5.12	34.18	250	180	P	V
	*	2437	97.38	-	-	98.74	27.7	5.12	34.18	250	180	A	V
		2494.61	49.77	-24.23	74	50.79	27.9	5.19	34.11	250	180	P	V
		2494.54	40.35	-13.65	54	41.37	27.9	5.19	34.11	250	180	A	V



802.11b CH 11 2462MHz	*	2462	94.62	-	-	95.88	27.77	5.12	34.15	168	222	P	H
	*	2462	91.66	-	-	92.92	27.77	5.12	34.15	168	222	A	H
		2498.4	48.87	-25.13	74	49.89	27.9	5.19	34.11	168	222	P	H
		2485.88	39.47	-14.53	54	40.58	27.83	5.19	34.13	168	222	A	H
	*	2462	96.45	-	-	97.71	27.77	5.12	34.15	150	47	P	V
	*	2462	93.09	-	-	94.35	27.77	5.12	34.15	150	47	A	V
		2485.92	49.53	-24.47	74	50.64	27.83	5.19	34.13	150	47	P	V
		2483.52	39.99	-14.01	54	41.1	27.83	5.19	34.13	150	47	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	43.15	-30.85	74	61.31	31.59	8.59	58.34	250	0	P	H
		4824	43.73	-30.27	74	61.89	31.59	8.59	58.34	250	0	P	V
802.11b CH 06 2437MHz		4874	46.29	-27.71	74	64.31	31.71	8.6	58.33	250	0	P	H
		7311	50.14	-23.86	74	63.03	36.27	10.24	59.4	250	0	P	H
		4874	46.97	-27.03	74	64.99	31.71	8.6	58.33	250	0	P	V
		7311	49.86	-24.14	74	62.75	36.27	10.24	59.4	250	0	P	V
802.11b CH 11 2462MHz		4924	45.71	-28.29	74	63.57	31.83	8.64	58.33	250	0	P	H
		7386	49.82	-24.18	74	62.68	36.38	10.2	59.44	250	0	P	H
		4924	49.48	-24.52	74	67.34	31.83	8.64	58.33	250	0	P	V
		7386	49.16	-24.84	74	62.02	36.38	10.2	59.44	250	0	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. 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		2389.905	56.43	-17.57	74	58.06	27.51	5.06	34.2	229	227	P	H
		2390	45.64	-8.36	54	47.27	27.51	5.06	34.2	229	227	A	H
	*	2412	96.27	-	-	97.84	27.57	5.06	34.2	229	227	P	H
	*	2412	89.35	-	-	90.92	27.57	5.06	34.2	229	227	A	H
		2390	57.47	-16.53	74	59.1	27.51	5.06	34.2	150	48	P	V
		2390	46.15	-7.85	54	47.78	27.51	5.06	34.2	150	48	A	V
	*	2412	95.71	-	-	97.28	27.57	5.06	34.2	150	48	P	V
	*	2412	88.65	-	-	90.22	27.57	5.06	34.2	150	48	A	V
802.11g CH 06 2437MHz		2388.26	49.2	-24.8	74	51.07	27.29	5.06	34.22	150	222	P	H
		2389.94	38.71	-15.29	54	40.56	27.29	5.06	34.2	150	222	P	H
	*	2437	97.99	-	-	99.65	27.4	5.12	34.18	150	222	P	H
	*	2437	90.74	-	-	92.4	27.4	5.12	34.18	150	222	A	H
		2485.16	49.49	-24.51	74	50.96	27.47	5.19	34.13	150	222	P	H
		2483.9	39.08	-14.92	54	40.55	27.47	5.19	34.13	150	222	A	H
		2383.08	51.32	-22.68	74	53.26	27.26	5.02	34.22	243	181	P	V
		2389.8	41.39	-12.61	54	43.24	27.29	5.06	34.2	243	181	A	V
	*	2437	103.21	-	-	104.87	27.4	5.12	34.18	243	181	P	V
	*	2437	95.97	-	-	97.63	27.4	5.12	34.18	243	181	A	V
		2483.9	53.1	-20.9	74	54.57	27.47	5.19	34.13	243	181	P	V
		2483.5	41.97	-12.03	54	43.44	27.47	5.19	34.13	243	181	A	V



802.11g CH 11 2462MHz	*	2462	94.6	-	-	95.86	27.77	5.12	34.15	233	226	P	H
	*	2462	87.14	-	-	88.4	27.77	5.12	34.15	233	226	A	H
		2487.72	49.77	-24.23	74	50.81	27.9	5.19	34.13	233	226	P	H
		2483.56	39.29	-14.71	54	40.4	27.83	5.19	34.13	233	226	A	H
	*	2462	97.12	-	-	98.38	27.77	5.12	34.15	219	182	P	V
	*	2462	89.3	-	-	90.56	27.77	5.12	34.15	219	182	A	V
		2486.88	51.19	-22.81	74	52.3	27.83	5.19	34.13	219	182	P	V
		2483.52	40.68	-13.32	54	41.79	27.83	5.19	34.13	219	182	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. 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	43.36	-30.64	74	61.52	31.59	8.59	58.34	250	0	P	H
		4824	43.49	-30.51	74	61.65	31.59	8.59	58.34	250	0	P	V
802.11g CH 06 2437MHz		4874	44.44	-29.56	74	62.46	31.71	8.6	58.33	250	0	P	H
		7311	49.22	-24.78	74	62.11	36.27	10.24	59.4	250	0	P	H
		4874	48.5	-25.5	74	66.52	31.71	8.6	58.33	250	0	P	V
		7311	48.83	-25.17	74	61.72	36.27	10.24	59.4	250	0	P	V
802.11g CH 11 2462MHz		4924	42.36	-31.64	74	60.22	31.83	8.64	58.33	250	0	P	H
		7386	48.48	-25.52	74	61.34	36.38	10.2	59.44	250	0	P	H
		4924	42.87	-31.13	74	60.73	31.83	8.64	58.33	250	0	P	V
		7386	49.34	-24.66	74	62.2	36.38	10.2	59.44	250	0	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	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		2386.86	51.45	-22.55	74	53.1	27.51	5.06	34.22	244	217	P	H
		2390	41.05	-12.95	54	42.68	27.51	5.06	34.2	244	217	A	H
	*	2412	95.65	-	-	97.22	27.57	5.06	34.2	244	217	P	H
	*	2412	87.89	-	-	89.46	27.57	5.06	34.2	244	217	A	H
		2389.8	54.8	-19.2	74	56.43	27.51	5.06	34.2	212	231	P	V
		2390	43.41	-10.59	54	45.04	27.51	5.06	34.2	212	231	A	V
	*	2412	97.75	-	-	99.32	27.57	5.06	34.2	212	231	P	V
	*	2412	90.33	-	-	91.9	27.57	5.06	34.2	212	231	A	V
802.11n HT20 CH 06 2437MHz		2389.52	50.44	-23.56	74	52.09	27.51	5.06	34.22	240	222	P	H
		2389.66	39.53	-14.47	54	41.18	27.51	5.06	34.22	240	222	A	H
	*	2437	101.45	-	-	102.81	27.7	5.12	34.18	240	222	P	H
	*	2437	93.5	-	-	94.86	27.7	5.12	34.18	240	222	A	H
		2495.94	50.16	-23.84	74	51.18	27.9	5.19	34.11	240	222	P	H
		2483.69	39.58	-14.42	54	40.69	27.83	5.19	34.13	240	222	A	H
		2387.42	50.86	-23.14	74	52.51	27.51	5.06	34.22	194	192	P	V
		2389.38	39.26	-14.74	54	40.91	27.51	5.06	34.22	194	192	A	V
	*	2437	103.34	-	-	104.7	27.7	5.12	34.18	194	192	P	V
	*	2437	96.39	-	-	97.75	27.7	5.12	34.18	194	192	A	V
		2483.5	52.88	-21.12	74	53.99	27.83	5.19	34.13	194	192	P	V
		2483.5	41.26	-12.74	54	42.37	27.83	5.19	34.13	194	192	A	V



802.11n HT20 CH 11 2462MHz	*	2462	93.2	-	-	94.46	27.77	5.12	34.15	234	220	P	H
	*	2462	85.47	-	-	86.73	27.77	5.12	34.15	234	220	A	H
		2483.96	49.63	-24.37	74	50.74	27.83	5.19	34.13	234	220	P	H
		2483.6	38.81	-15.19	54	39.92	27.83	5.19	34.13	234	220	A	H
	*	2462	96.67	-	-	97.93	27.77	5.12	34.15	211	215	P	V
	*	2462	88.9	-	-	90.16	27.77	5.12	34.15	211	215	A	V
		2484.2	49.46	-24.54	74	50.57	27.83	5.19	34.13	211	215	P	V
		2483.5	39.54	-14.46	54	40.65	27.83	5.19	34.13	211	215	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	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	41.14	-32.86	74	59.3	31.59	8.59	58.34	250	0	P	H
		4824	40.77	-33.23	74	58.93	31.59	8.59	58.34	250	0	P	V
802.11n HT20 CH 06 2437MHz		4874	47.17	-26.83	74	65.19	31.71	8.6	58.33	250	0	P	H
		7311	49.68	-24.32	74	62.57	36.27	10.24	59.4	250	0	P	H
		4874	50.28	-23.72	74	68.3	31.71	8.6	58.33	250	0	P	V
		7311	47.84	-26.16	74	60.73	36.27	10.24	59.4	250	0	P	V
802.11n HT20 CH 11 2462MHz		4924	42.48	-31.52	74	60.34	31.83	8.64	58.33	250	0	P	H
		7386	47.22	-26.78	74	60.08	36.38	10.2	59.44	250	0	P	H
		4924	42.67	-31.33	74	60.53	31.83	8.64	58.33	250	0	P	V
		7386	46.83	-27.17	74	59.69	36.38	10.2	59.44	250	0	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	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		2389.8	53.76	-20.24	74	55.39	27.51	5.06	34.2	201	221	P	H
		2389.52	46.66	-7.34	54	48.31	27.51	5.06	34.22	201	221	A	H
	*	2422	87.51	-	-	88.99	27.64	5.06	34.18	201	221	P	H
	*	2422	79.49	-	-	80.97	27.64	5.06	34.18	201	221	A	H
		2486.49	48.8	-25.2	74	49.91	27.83	5.19	34.13	201	221	P	H
		2496.71	39.39	-14.61	54	40.41	27.9	5.19	34.11	201	221	A	H
		2389.24	56.57	-17.43	74	58.22	27.51	5.06	34.22	250	179	P	V
		2389.38	49.31	-4.69	54	50.96	27.51	5.06	34.22	250	179	A	V
	*	2422	92.15	-	-	93.63	27.64	5.06	34.18	250	179	P	V
	*	2422	84.39	-	-	85.87	27.64	5.06	34.18	250	179	A	V
		2483.9	48.91	-25.09	74	50.02	27.83	5.19	34.13	250	179	P	V
		2483.62	40.49	-13.51	54	41.6	27.83	5.19	34.13	250	179	A	V
802.11n HT40 CH 06 2437MHz		2388.12	54.38	-19.62	74	56.03	27.51	5.06	34.22	230	325	P	H
		2389.52	45.83	-8.17	54	47.48	27.51	5.06	34.22	230	325	A	H
	*	2437	97.95	-	-	99.31	27.7	5.12	34.18	230	325	P	H
	*	2437	90.13	-	-	91.49	27.7	5.12	34.18	230	325	A	H
		2485.02	55.59	-18.41	74	56.7	27.83	5.19	34.13	230	325	P	H
		2483.55	48.12	-5.88	54	49.23	27.83	5.19	34.13	230	325	A	H
		2388.26	56.03	-17.97	74	57.68	27.51	5.06	34.22	250	212	P	V
		2387.98	48.17	-5.83	54	49.82	27.51	5.06	34.22	250	212	A	V
	*	2437	99.74	-	-	101.1	27.7	5.12	34.18	250	212	P	V
	*	2437	92.3	-	-	93.66	27.7	5.12	34.18	250	212	A	V
		2484.25	58.86	-15.14	74	59.97	27.83	5.19	34.13	250	212	P	V
		2483.5	50.93	-3.07	54	52.04	27.83	5.19	34.13	250	212	A	V



802.11n HT40 CH 09 2452MHz		2350.74	47.61	-26.39	74	49.52	27.31	5.02	34.24	230	326	P	H
		2364.74	39	-15	54	40.82	27.38	5.02	34.22	230	326	A	H
	*	2452	91.08	-	-	92.41	27.7	5.12	34.15	230	326	P	H
	*	2452	83.95	-	-	85.28	27.7	5.12	34.15	230	326	A	H
		2483.83	51.62	-22.38	74	52.73	27.83	5.19	34.13	230	326	P	H
		2483.55	43.04	-10.96	54	44.15	27.83	5.19	34.13	230	326	A	H
		2354.1	47.66	-26.34	74	49.5	27.38	5.02	34.24	209	219	P	V
		2385.18	39.16	-14.84	54	40.88	27.44	5.06	34.22	209	219	A	V
	*	2452	94.33	-	-	95.66	27.7	5.12	34.15	209	219	P	V
	*	2452	86.48	-	-	87.81	27.7	5.12	34.15	209	219	A	V
		2485.16	54.29	-19.71	74	55.4	27.83	5.19	34.13	209	219	P	V
		2483.76	45.38	-8.62	54	46.49	27.83	5.19	34.13	209	219	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	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	41.5	-32.5	74	59.61	31.63	8.6	58.34	250	0	P	H
HT40		7266	46.85	-27.15	74	59.75	36.23	10.25	59.38	250	0	P	H
CH 03		4844	41.3	-32.7	74	59.41	31.63	8.6	58.34	250	0	P	V
2422MHz		7266	47.62	-26.38	74	60.52	36.23	10.25	59.38	250	0	P	V
802.11n		4874	45.26	-28.74	74	63.28	31.71	8.6	58.33	250	0	P	H
HT40		7311	47.89	-26.11	74	60.78	36.27	10.24	59.4	250	0	P	H
CH 06		4874	46.93	-27.07	74	64.95	31.71	8.6	58.33	250	0	P	V
2437MHz		7311	47.53	-26.47	74	60.42	36.27	10.24	59.4	250	0	P	V
802.11n		4904	42.69	-31.31	74	60.61	31.79	8.62	58.33	250	0	P	H
HT40		7356	47.22	-26.78	74	60.1	36.33	10.22	59.43	250	0	P	H
CH 09		4904	41.78	-32.22	74	59.7	31.79	8.62	58.33	250	0	P	V
2452MHz		7356	47.17	-26.83	74	60.05	36.33	10.22	59.43	250	0	P	V
Remark		1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. All above test cases are performed on Antenna 1 with adapter 1											



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		2390	48.87	-25.13	74	50.5	27.51	5.06	34.2	236	330	P	H
		2390	39.05	-14.95	54	40.68	27.51	5.06	34.2	236	330	A	H
	*	2412	95.37	-	-	96.94	27.57	5.06	34.2	236	330	P	H
	*	2412	87.54	-	-	89.11	27.57	5.06	34.2	236	330	A	H
		2388.96	50.53	-23.47	74	52.18	27.51	5.06	34.22	168	212	P	V
		2390	39.54	-14.46	54	41.17	27.51	5.06	34.2	168	212	A	V
	*	2412	94.21	-	-	95.78	27.57	5.06	34.2	168	212	P	V
	*	2412	87	-	-	88.57	27.57	5.06	34.2	168	212	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Antenna 2 performed worst case of Antenna 1 for 11b/11g TX mode.												

**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	39.36	-34.64	74	57.52	31.59	8.59	58.34	250	0	P	H
		7236	48.22	-25.78	74	61.12	36.19	10.27	59.36	250	0	P	H
		4824	39.95	-34.05	74	58.11	31.59	8.59	58.34	250	0	P	V
		7236	47.52	-26.48	74	60.42	36.19	10.27	59.36	250	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Antenna 2 performed worst case of Antenna 1 for 11b/11g TX mode.												



2.4GHz 2400~2483.5MHz

WIFI 802.11n HT40 (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)
802.11n HT40 CH 06 2437MHz		2388.96	55.69	-18.31	74	57.34	27.51	5.06	34.22	248	323	P	H
		2388.12	47.22	-6.78	54	48.87	27.51	5.06	34.22	248	323	A	H
	*	2437	98.44	-	-	99.8	27.7	5.12	34.18	248	323	P	H
	*	2437	91.12	-	-	92.48	27.7	5.12	34.18	248	323	A	H
		2483.97	57.06	-16.94	74	58.17	27.83	5.19	34.13	248	323	P	H
		2483.5	48.99	-5.01	54	50.1	27.83	5.19	34.13	248	323	A	H
		2386.3	58.8	-15.2	74	60.45	27.51	5.06	34.22	250	218	P	V
		2388.12	50.08	-3.92	54	51.73	27.51	5.06	34.22	250	218	A	V
	*	2437	100.69	-	-	102.05	27.7	5.12	34.18	250	218	P	V
	*	2437	94.14	-	-	95.5	27.7	5.12	34.18	250	218	A	V
		2484.04	59.88	-14.12	74	60.99	27.83	5.19	34.13	250	218	P	V
		2483.5	52.08	-1.92	54	53.19	27.83	5.19	34.13	250	218	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Adapter 2 performed worst case of Adapter 1.												



2.4GHz 2400~2483.5MHz
WIFI 802.11n HT40 (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)
802.11n		4874	42.23	-31.77	74	60.25	31.71	8.6	58.33	250	0	P	H
HT40		7311	45.75	-28.25	74	58.64	36.27	10.24	59.4	250	0	P	H
CH 06		4874	43.26	-30.74	74	61.28	31.71	8.6	58.33	250	0	P	V
2437MHz		7311	45.62	-28.38	74	58.51	36.27	10.24	59.4	250	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Adapter 2 performed worst case of Adapter 1.												



Emission below 1GHz

2.4GHz WIFI 802.11n HT40 (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11n HT40 LF		30.97	25.72	-14.28	40	30.87	26.28	0.57	32	100	0	P	H
		127	19.01	-24.49	43.5	31.21	18.26	1.16	31.62	-	-	P	H
		250.19	19.78	-26.22	46	31.51	18	1.66	31.39	-	-	P	H
		444.19	27.49	-18.51	46	31.38	25.03	2.24	31.16	-	-	P	H
		738.1	31.23	-14.77	46	32.13	27.39	2.95	31.24	-	-	P	H
		982.54	33.13	-20.87	54	30.86	30.05	3.45	31.23	-	-	P	H
		31.94	26.8	-13.2	40	32.35	25.86	0.59	32	100	158	P	V
		126.03	19.48	-24.02	43.5	31.67	18.28	1.16	31.63	-	-	P	V
		376.29	29.8	-16.2	46	35.65	23.36	2.05	31.26	-	-	P	V
		527.61	28.55	-17.45	46	33.28	23.96	2.47	31.16	-	-	P	V
		857.41	31.82	-14.18	46	31.69	28.16	3.22	31.25	-	-	P	V
		978.66	33.61	-20.39	54	31.41	29.98	3.44	31.22	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against 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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		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)

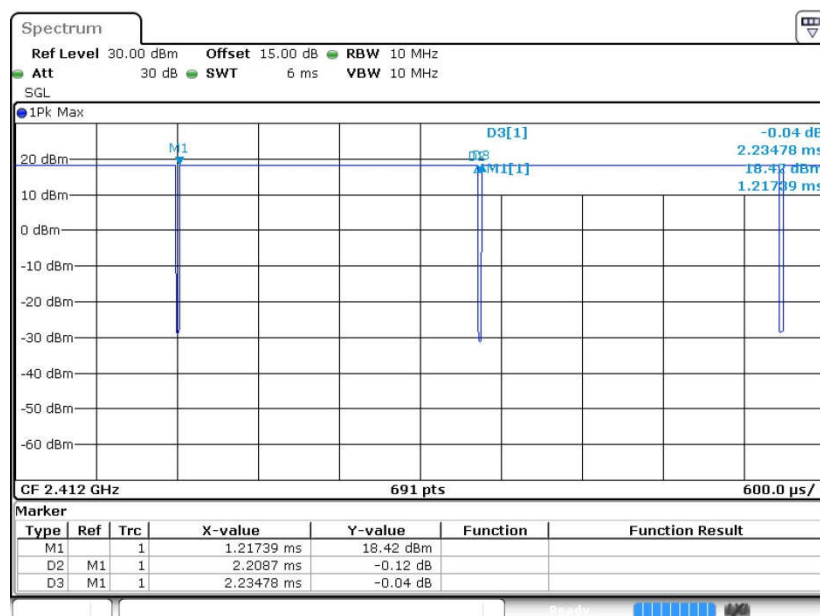
= -10.46(dB)

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

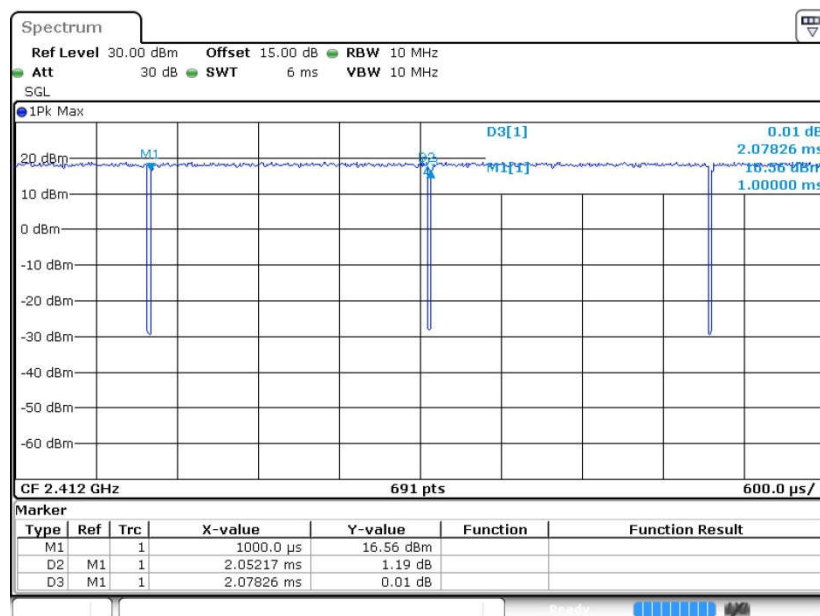
Appendix B. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1	802.11 b	98.83	-	-	10Hz
1	802.11 g	98.74	-	-	10Hz
2	802.11 g	98.74	-	-	10Hz
1+2	802.11n HT20	98.65	-	-	10Hz
1+2	802.11n HT40	97.30	0.94	1.06	3kHz

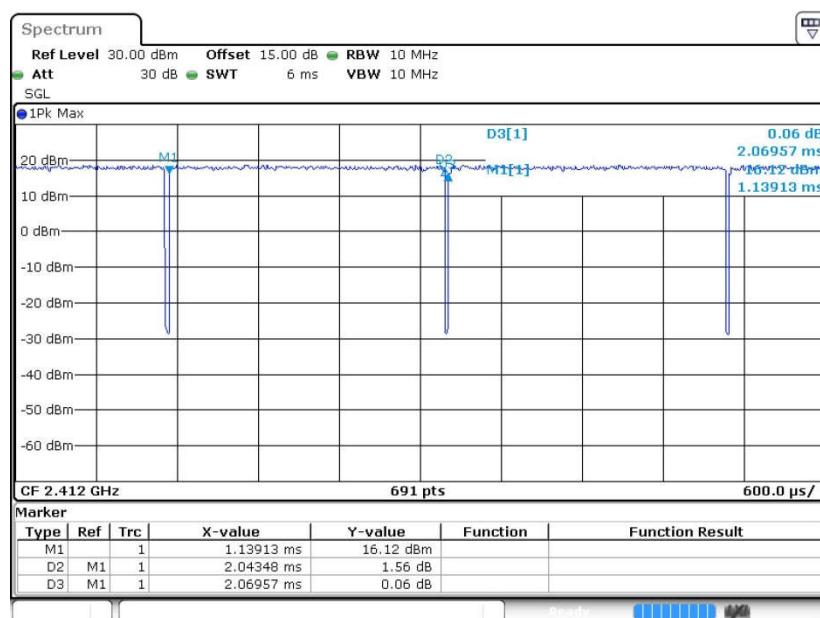
802.11b Antenna 1



802.11g Antenna 1

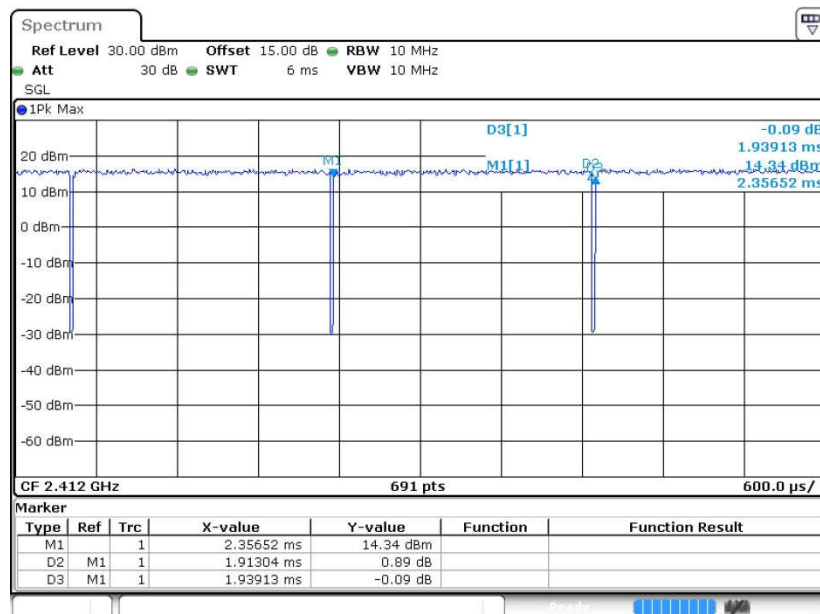


802.11g Antenna 2



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802.11n20 Antenna 1+2



802.11n40 Antenna 1+2

