



FCC RF Test Report

APPLICANT : TCL Communication Ltd.
EQUIPMENT : Tablet PC
BRAND NAME : ALCATEL ONETOUCH
MODEL NAME : 8057, 8056
FCC ID : 2ACCJB008
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Mar. 05, 2015 and testing was completed on Mar. 30, 2015. 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.

Louis Wu

Reviewed by: Joseph Lin / Supervisor

Jones Tsai

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR530506C	Rev. 01	Initial issue of report	Apr. 08, 2015

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	-
3.2	15.247(b)	Power Output Measurement	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(e)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$	Pass	-
3.4	15.247(d)	Conducted Band Edges	$\leq 20\text{dBc}$	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.27 dB at 2483.960 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 6.66 dB at 0.680 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-



1 General Description

1.1 Applicant

TCL Communication Ltd.

5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203

1.2 Manufacturer

TCL Communication Ltd.

5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Tablet PC
Brand Name	ALCATEL ONETOUCH
Model Name	8057, 8056
FCC ID	2ACCJB008
EUT supports Radios application	WLAN2.4GHz 802.11b/g/n HT20/HT40/ Bluetooth v3.0+EDR/Bluetooth v4.0 LE
HW Version	V4.1.0
SW Version	vKD057 for 8057 vKE049 for 8056
EUT Stage	Production Unit

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two types of EUT sample 1(with model name 8057) and sample 2 (with model name 8056), the differences between two samples are only for memory capability, camera resolution, the supplier of flash, additional, sample 1 with GPS function but sample 2 without GPS function. The others are the same including circuit design, PCB board, structure and all components. Since the difference is not affect the RF performance, we only choose sample 1 to perform RF tests.

1.4 Product Specification subjective to this standard

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	802.11b/g/n : 2412 MHz ~ 2462 MHz
Maximum (Peak) Output Power to Antenna	802.11b : 19.79 dBm (0.0953 W) 802.11g : 22.24 dBm (0.1675 W) 802.11n HT20 : 22.16 dBm (0.1644 W) 802.11n HT40 : 22.76 dBm (0.1888 W)
Antenna Type/Gaain	802.11b/g/n : IFA Antenna with gain 2.0 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Modification of EUT

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



1.6 Testing Location

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. 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 (KUNSHAN) INC.	
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
Test Site No.	Sporton Site No.	FCC Registration No.
	03CH01-KS	831040

Note: The test site complies with ANSI C63.4 2009 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 v03r02
- ♦ 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. FCC permits the use of the 1.5 meter table as an alternative in C63.10-2013 through inquiry tracking number 961829.
3. 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.

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.

2.1 Carrier Frequency 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 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test shown in the following tables.

2.4GHz 802.11b RF Output Power (dBm)						
Power vs. Channel			Power vs. Data Rate			
Channel	Frequency (MHz)	Data Rate 1Mbps	Channel	2Mbps	5.5Mbps	11Mbps
CH 01	2412 MHz	19.03	CH 11	19.78	19.76	19.77
CH 06	2437 MHz	19.52				
CH 11	2462 MHz	19.79				

2.4GHz 802.11g RF Output Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	Data Rate 6Mbps	Channel	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412 MHz	21.18	CH 11	22.21	22.16	22.10	22.09	22.06	22.05	22.12
CH 06	2437 MHz	21.78								
CH 11	2462 MHz	22.24								

2.4GHz 802.11n HT20 RF Output Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412 MHz	21.13	CH 11	22.10	22.13	21.94	22.10	21.99	22.12	22.08
CH 06	2437 MHz	21.61								
CH 11	2462 MHz	22.16								

2.4GHz 802.11n HT40 RF Output Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 03	2422 MHz	21.66	CH 09	21.58	21.63	21.69	21.62	21.70	21.63	21.64
CH 06	2437 MHz	21.91								
CH 09	2452 MHz	22.76								

2.3 Test Mode

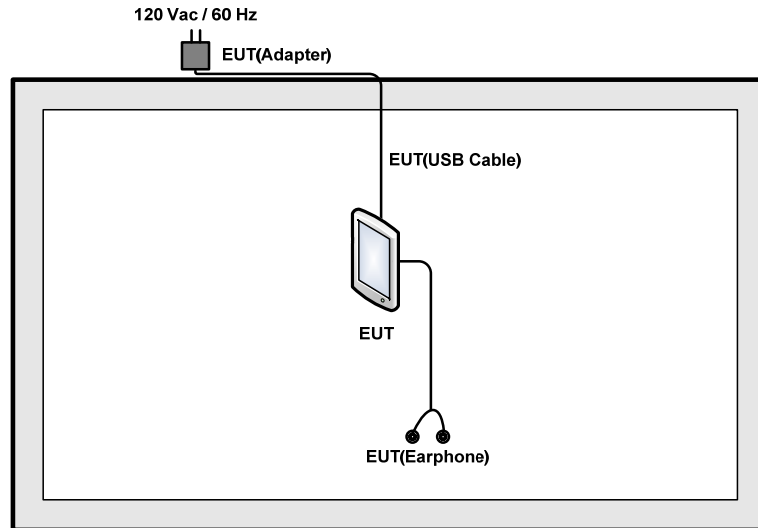
Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates from the power table described in section 2.2.

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

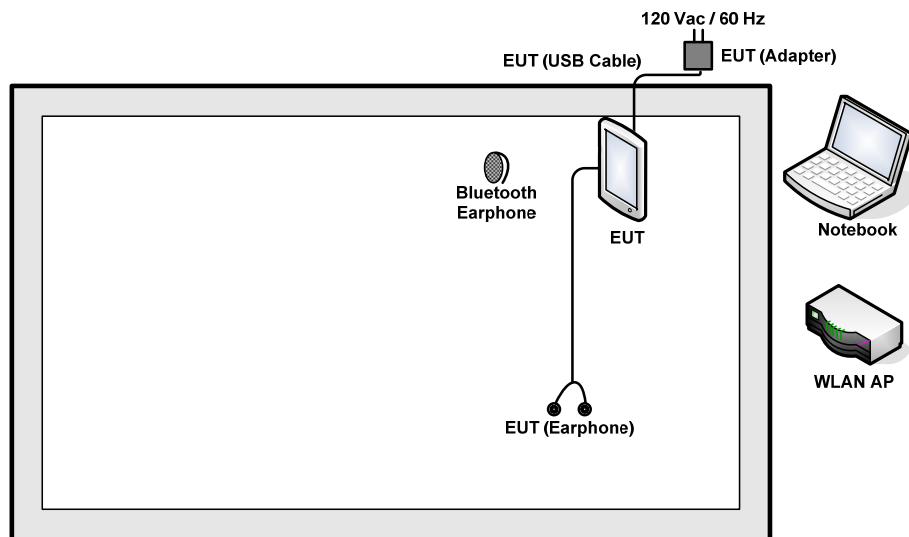
Test Cases	
AC Conducted Emission	Mode 1 : Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter 1) + Earphone + Battery 1
Remark: For radiated test cases, the tests were performance with adapter 1, earphone, Battery 1 and USB cable.	

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 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-815	KA2IR815A1	N/A	Unshielded, 1.8 m
2.	Bluetooth Earphone	Nokia	BH-108	PYAHS-107W	N/A	N/A
3.	Notebook	Lenovo	G480	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.6 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 WLAN AP under large package sizes transmission.



2.7 Measurement Results Explanation Example

For all conducted test items:

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

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 5.0 dB and 10dB attenuator.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 5.0 + 10 = 15.0 \text{ (dB)}\end{aligned}$$

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

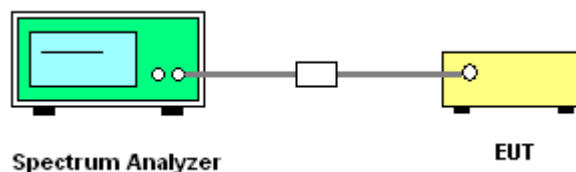
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

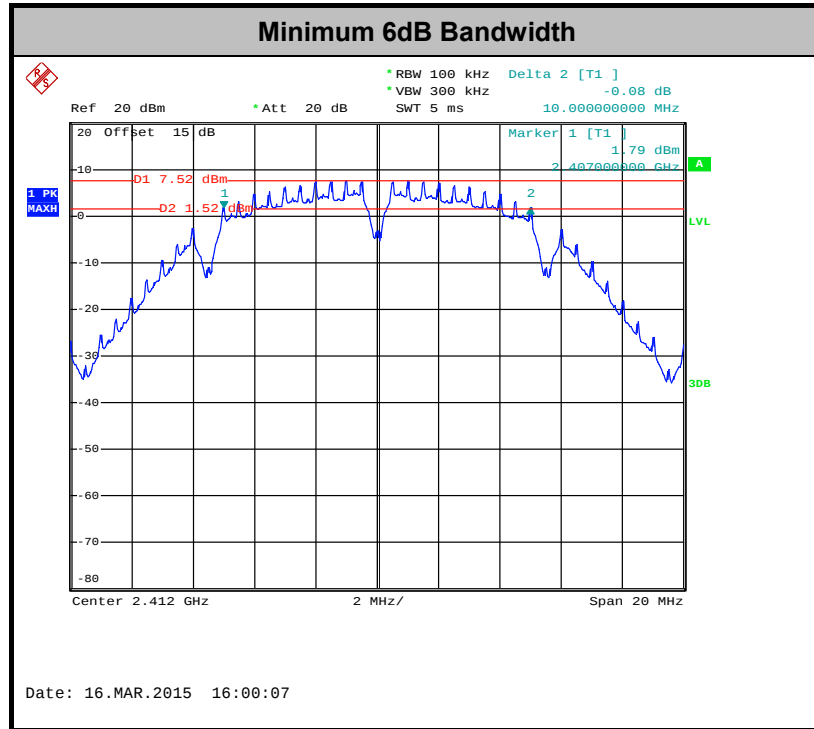
1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r02.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit 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. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1MHz and set the Video bandwidth (VBW) = 3MHz.
6. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A of this test report.



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

3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting Antenna 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.

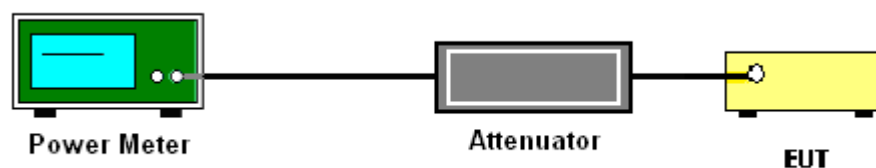
3.2.2 Measuring Instruments

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 FCC KDB No. 558074 DTS D01 Meas. Guidance v03r02.
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.

3.2.4 Test Setup





3.2.5 Test Result of Peak Output Power

Please refer to Appendix A of this test report.

3.2.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A of this test report.

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.

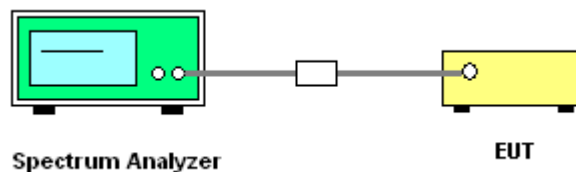
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

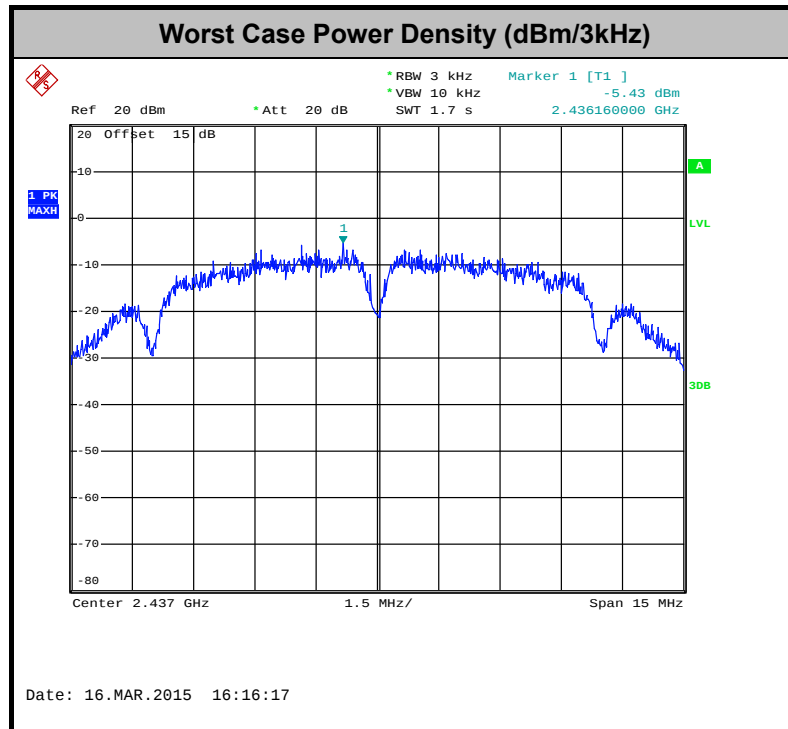
1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum 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.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A of this test report.



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 and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

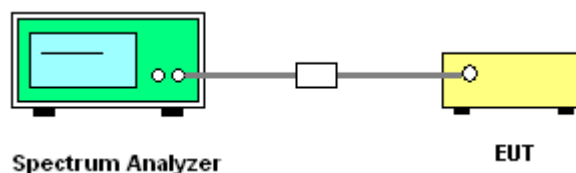
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02.
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



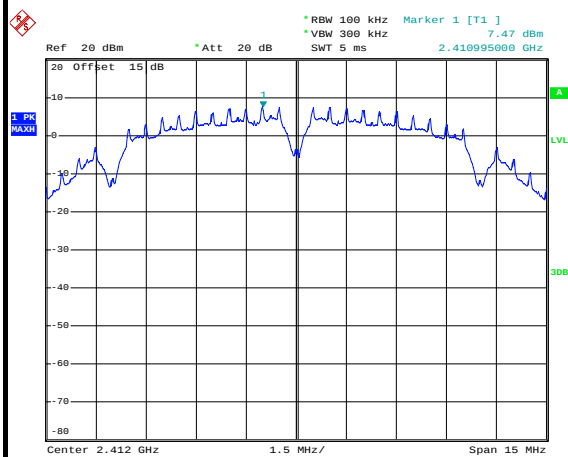


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Mode :	802.11b	Temperature :	24~26℃
Test Band :	2.4GHz Low	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Mygai Mo

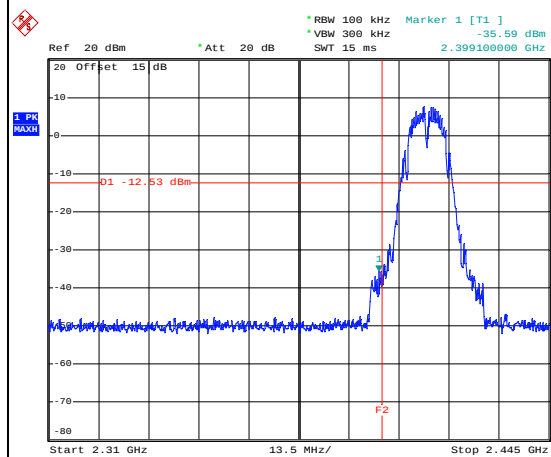
WLAN 802.11b Channel 01

100kHz PSD reference Level



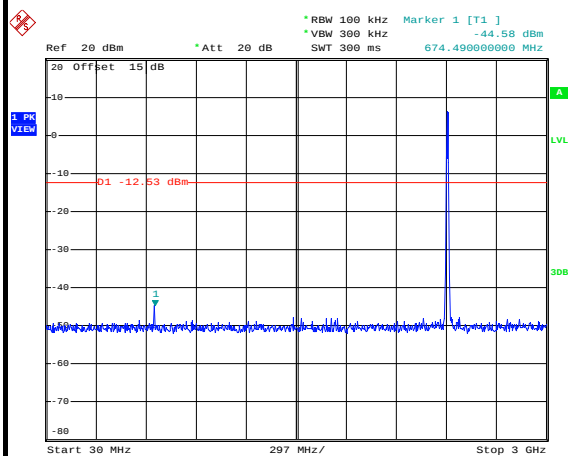
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Low Channel Plot



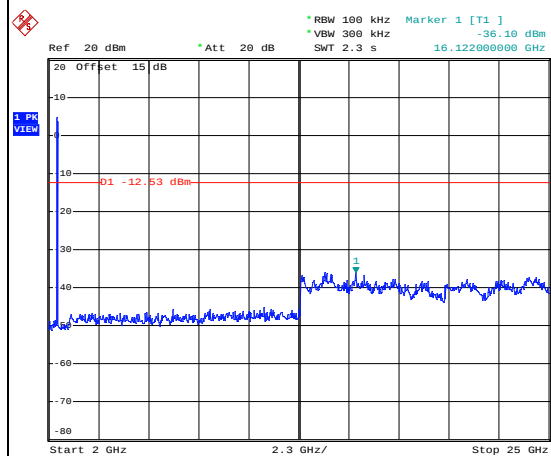
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Spurious Emission 30MHz~3GHz



Date: 16.MAR.2015 16:36:00

Spurious Emission 2GHz~25GHz



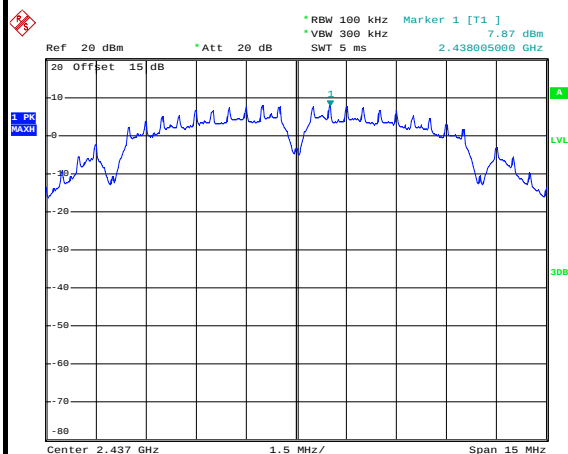
Date: 16.MAR.2015 16:36:17



Test Mode :	802.11b	Temperature :	24~26°C
Test Band :	2.4GHz Mid	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Mygai Mo

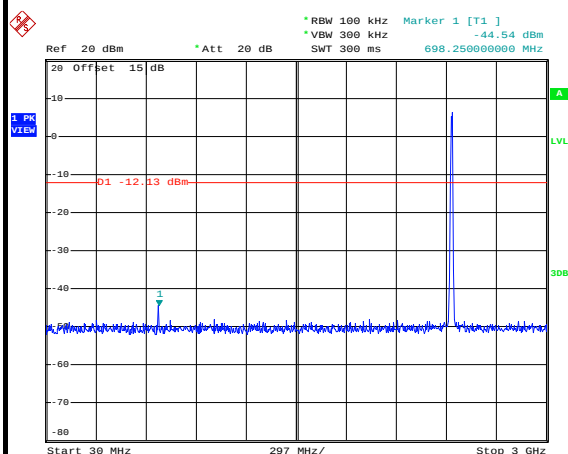
WLAN 802.11b Channel 06

100kHz PSD reference Level



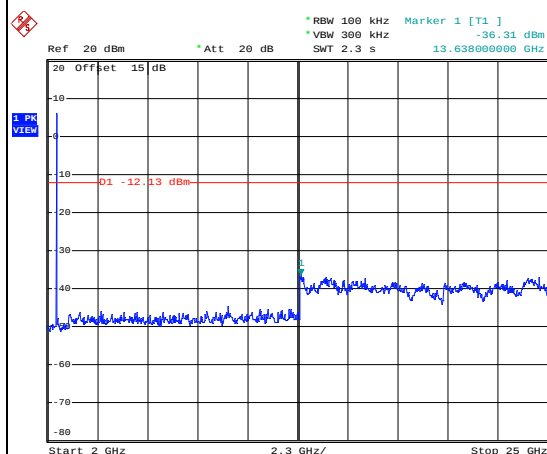
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Spurious Emission 30MHz~3GHz



Date: 16.MAR.2015 16:20:58

Spurious Emission 2GHz~25GHz



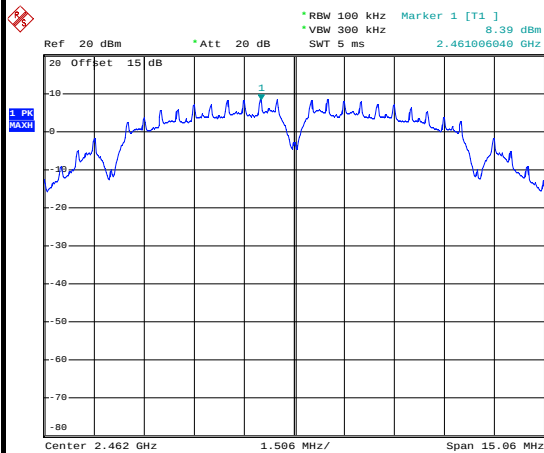
Date: 16.MAR.2015 16:21:15



Test Mode :	802.11b	Temperature :	24~26℃
Test Band :	2.4GHz High	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Mygai Mo

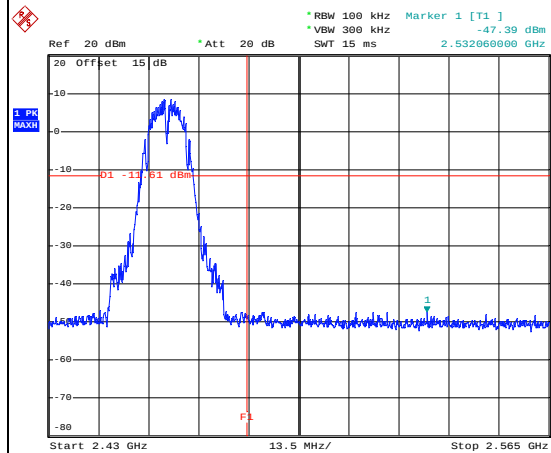
WLAN 802.11b Channel 11

100kHz PSD reference Level



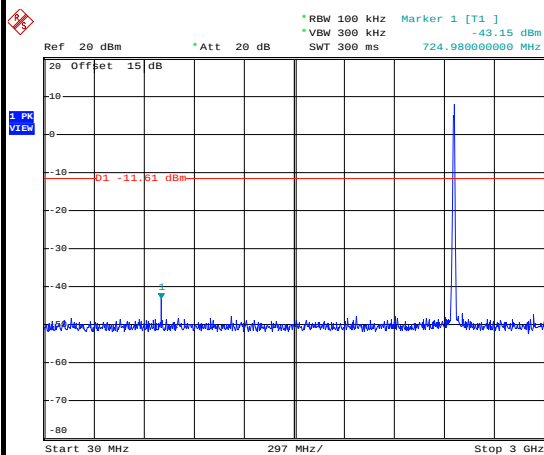
Date: 16.MAR.2015 16:30:39

High Channel Plot



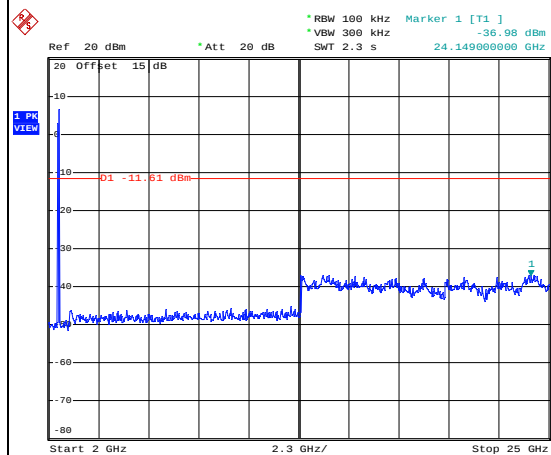
Date: 16.MAR.2015 16:32:06

Spurious Emission 30MHz~3GHz



Date: 16.MAR.2015 16:32:49

Spurious Emission 2GHz~25GHz



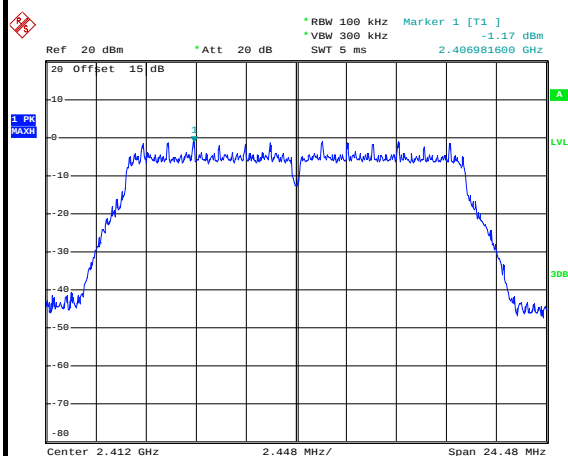
Date: 16.MAR.2015 16:33:06



Test Mode :	802.11g	Temperature :	24~26℃
Test Band :	2.4GHz Low	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Mygai Mo

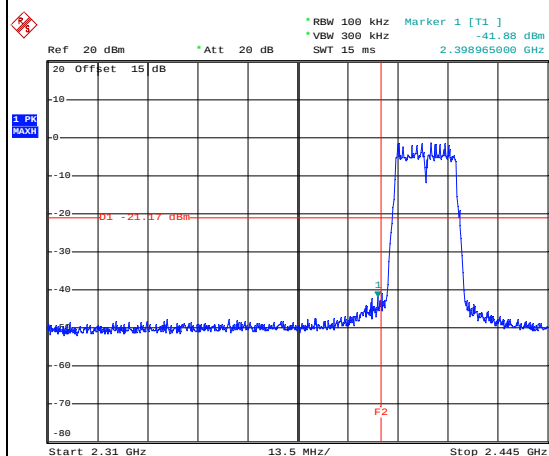
WLAN 802.11g Channel 01

100kHz PSD reference Level



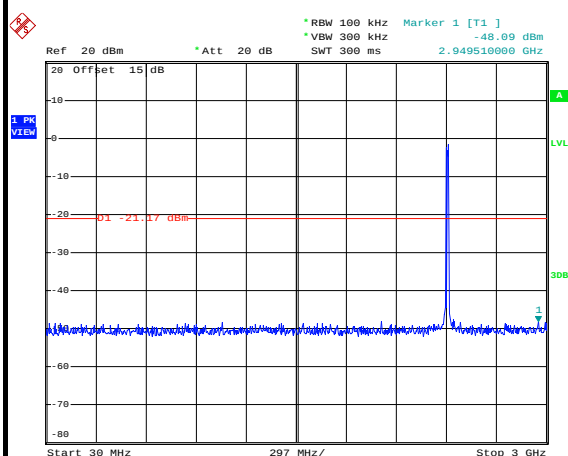
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Low Channel Plot



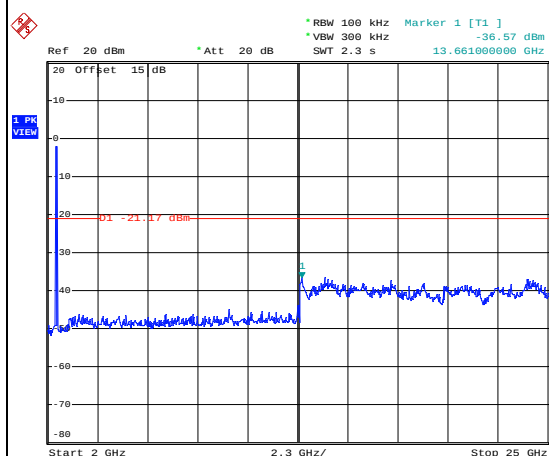
Date: 24.MAR.2015 21:51:57

Spurious Emission 30MHz~3GHz



Date: 24.MAR.2015 21:52:20

Spurious Emission 2GHz~25GHz



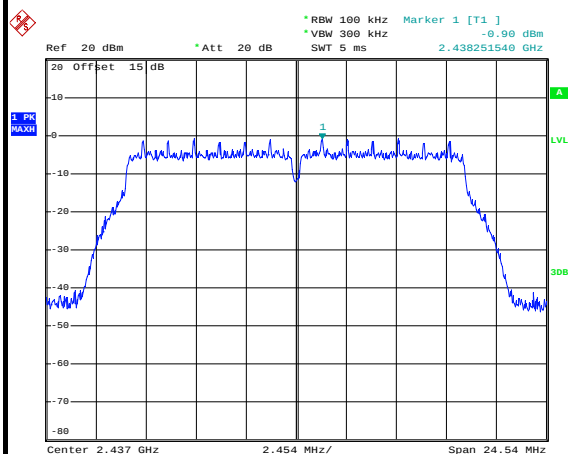
Date: 24.MAR.2015 21:52:38



Test Mode :	802.11g	Temperature :	24~26℃
Test Band :	2.4GHz Mid	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Mygai Mo

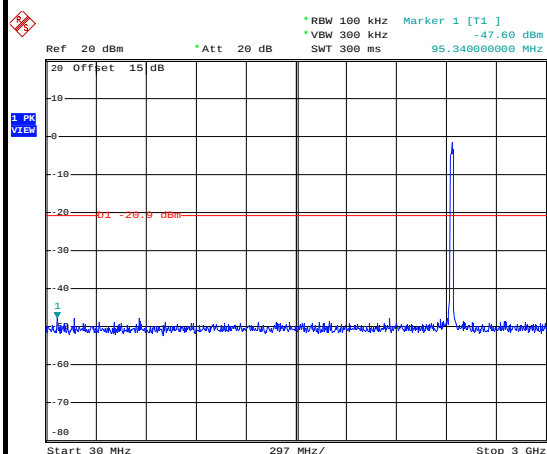
WLAN 802.11g Channel 06

100kHz PSD reference Level



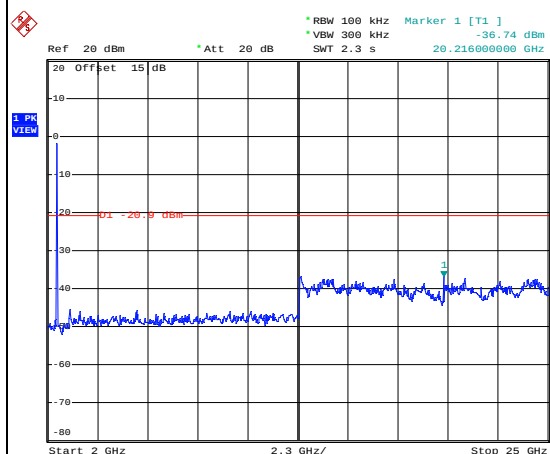
Date: 24.MAR.2015 21:43:06

Spurious Emission 30MHz~3GHz



Date: 24.MAR.2015 21:44:47

Spurious Emission 2GHz~25GHz



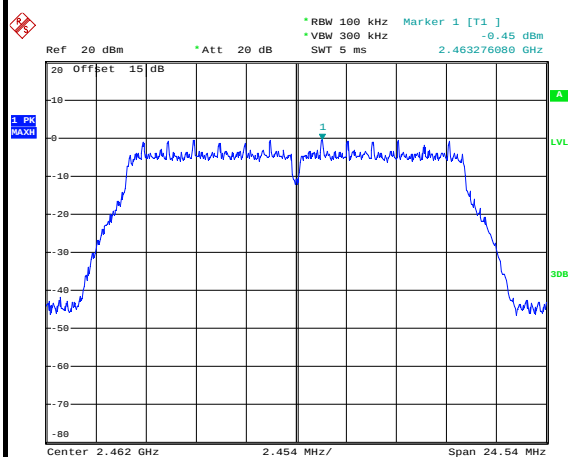
Date: 24.MAR.2015 21:45:05



Test Mode :	802.11g	Temperature :	24~26℃
Test Band :	2.4GHz High	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Mygai Mo

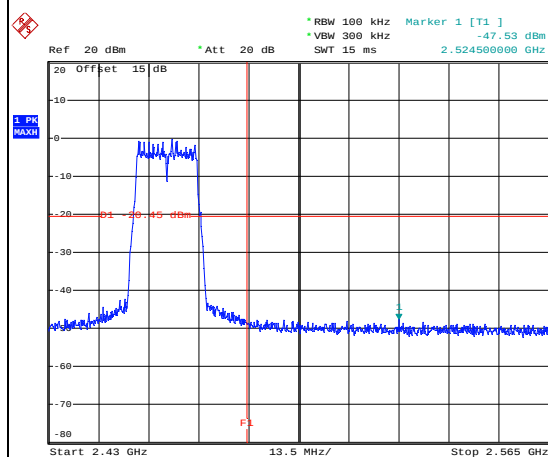
WLAN 802.11g Channel 11

100kHz PSD reference Level



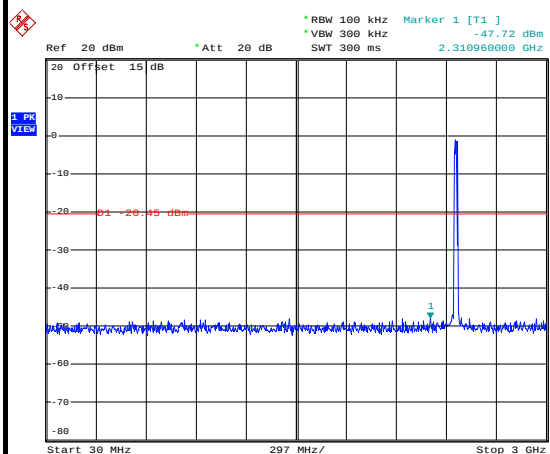
Date: 24.MAR.2015 21:33:46

High Channel Plot



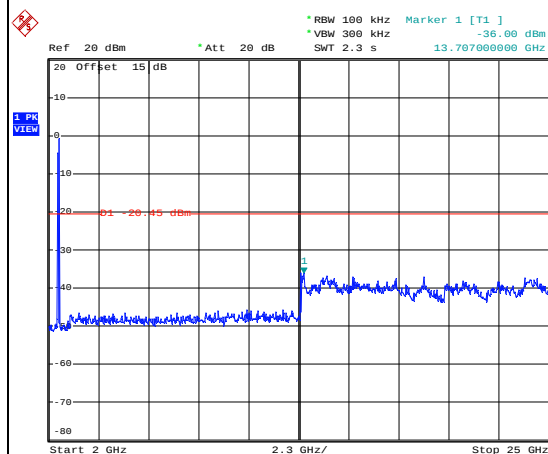
Date: 24.MAR.2015 21:34:11

Spurious Emission 30MHz~3GHz



Date: 24.MAR.2015 21:36:35

Spurious Emission 2GHz~25GHz



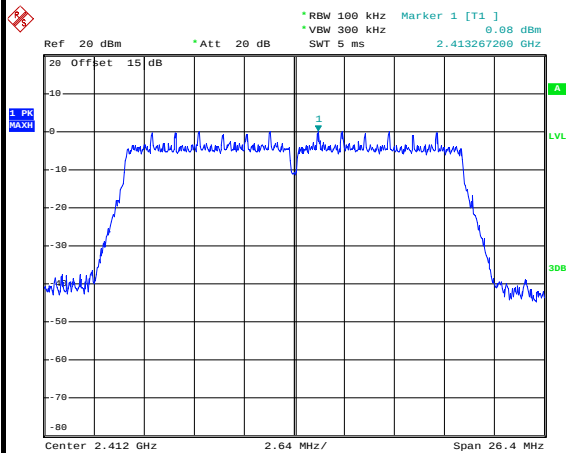
Date: 24.MAR.2015 21:36:52



Test Mode :	802.11n HT20	Temperature :	24~26℃
Test Band :	2.4GHz Low	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Mygai Mo

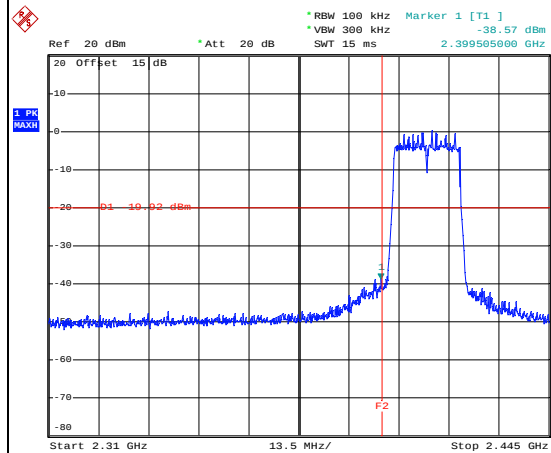
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



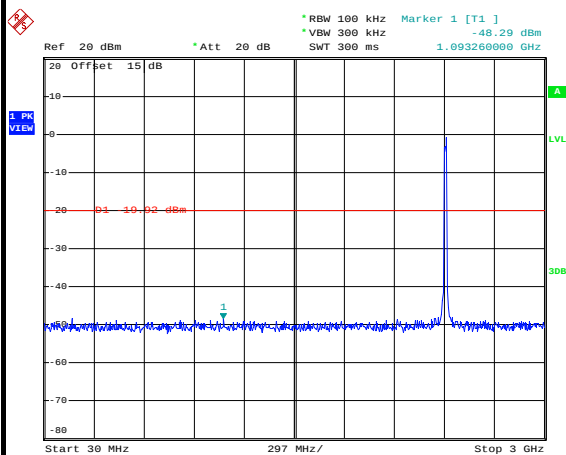
Date: 16.MAR.2015 17:15:33

Low Channel Plot



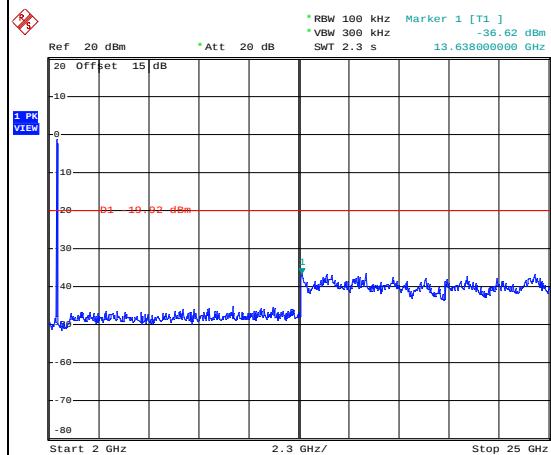
Date: 16.MAR.2015 17:16:00

Spurious Emission 30MHz~3GHz



Date: 16.MAR.2015 17:16:59

Spurious Emission 2GHz~25GHz



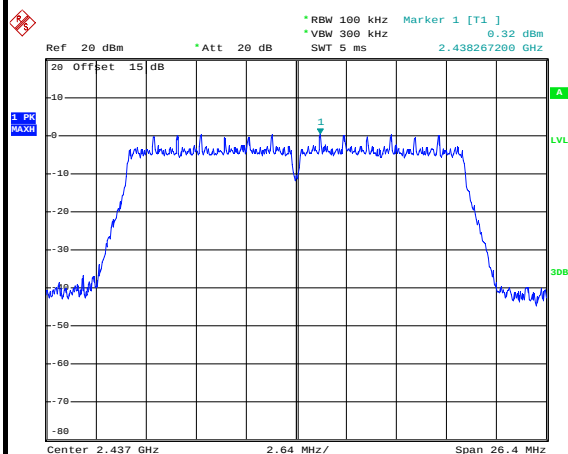
Date: 16.MAR.2015 17:17:17



Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	2.4GHz Mid	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Mygai Mo

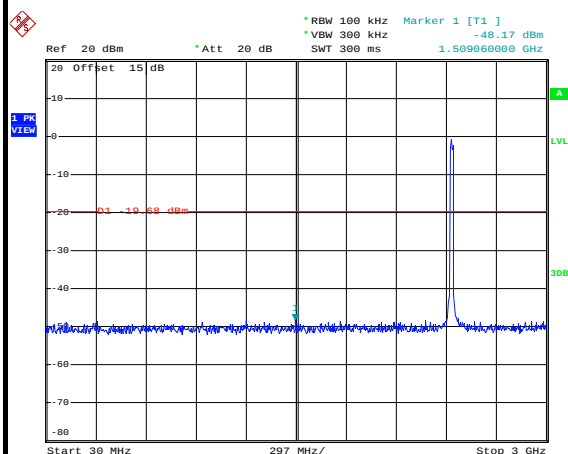
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



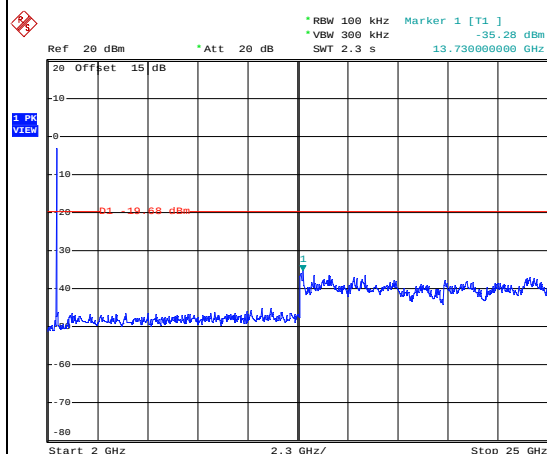
Date: 16.MAR.2015 17:24:21

Spurious Emission 30MHz~3GHz



Date: 16.MAR.2015 17:25:26

Spurious Emission 2GHz~25GHz



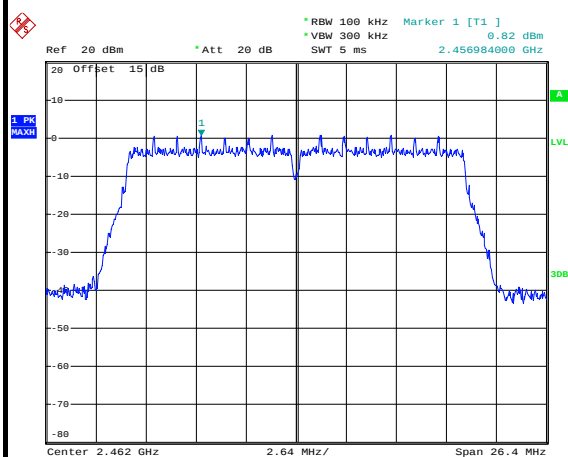
Date: 16.MAR.2015 17:25:44



Test Mode :	802.11n HT20	Temperature :	24~26℃
Test Band :	2.4GHz High	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Mygai Mo

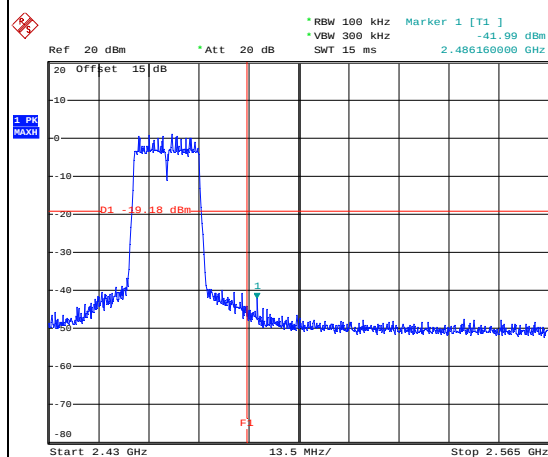
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



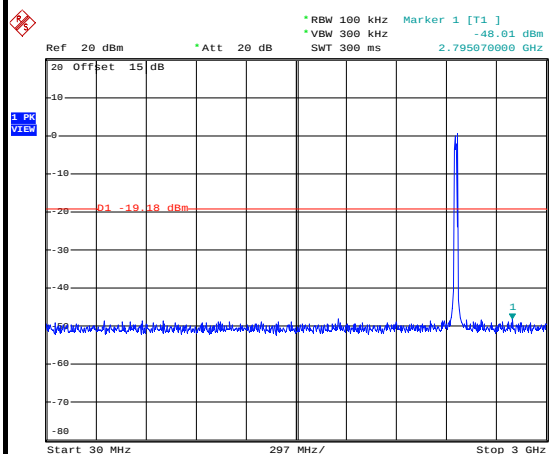
Date: 16.MAR.2015 17:30:12

High Channel Plot



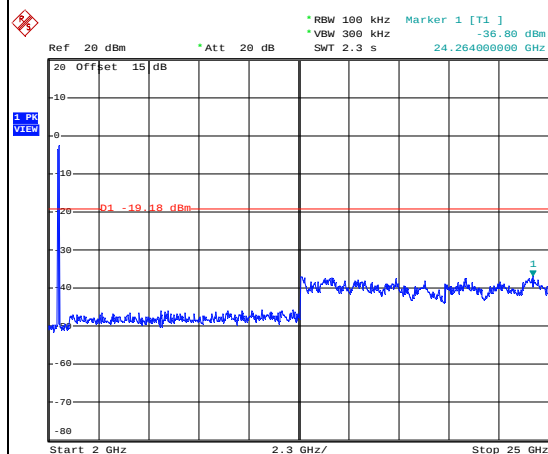
Date: 16.MAR.2015 17:30:32

Spurious Emission 30MHz~3GHz



Date: 16.MAR.2015 17:31:07

Spurious Emission 2GHz~25GHz



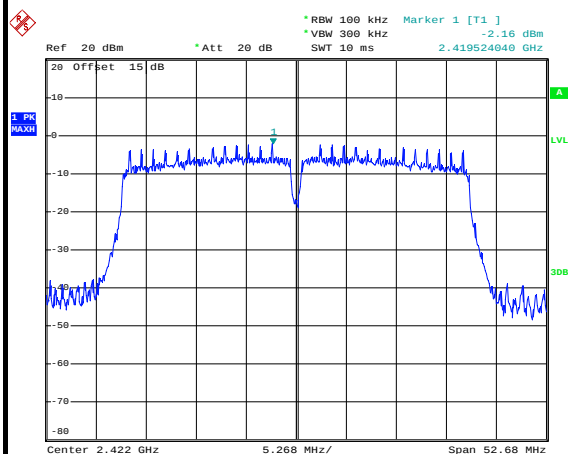
Date: 16.MAR.2015 17:31:25



Test Mode :	802.11n HT40	Temperature :	24~26°C
Test Band :	2.4GHz Low	Relative Humidity :	50~53%
Test Channel :	03	Test Engineer :	Mygai Mo

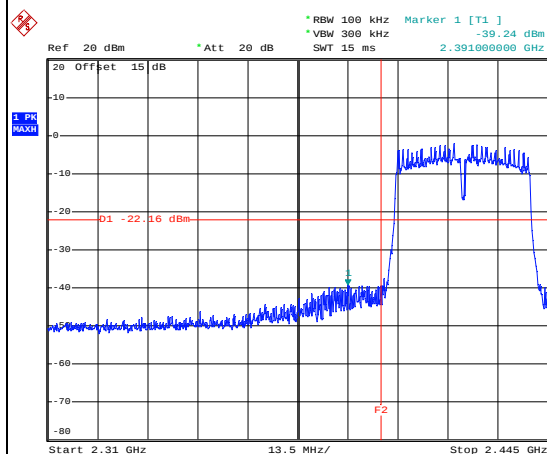
WLAN 802.11n HT40 Channel 03

100kHz PSD reference Level



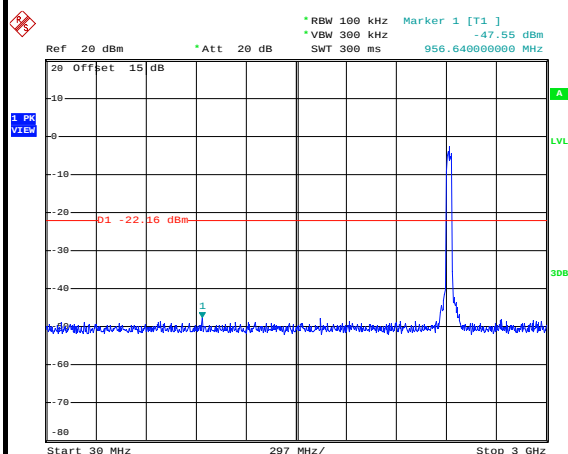
Date: 16.MAR.2015 17:41:46

Low Channel Plot



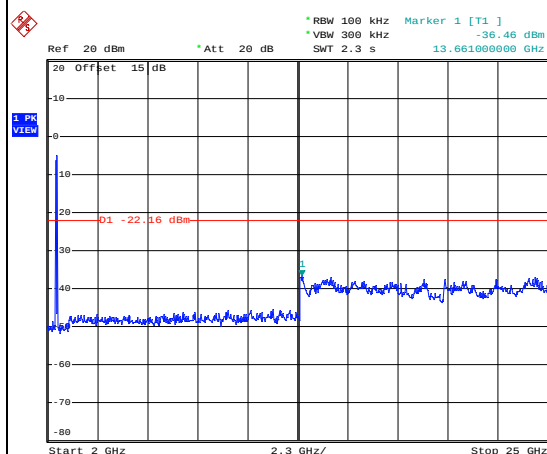
Date: 16.MAR.2015 17:42:22

Spurious Emission 30MHz~3GHz



Date: 16.MAR.2015 18:05:34

Spurious Emission 2GHz~25GHz



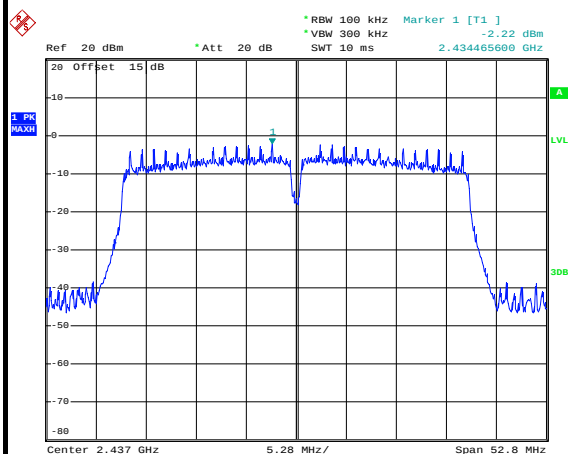
Date: 16.MAR.2015 18:05:52



Test Mode :	802.11n HT40	Temperature :	24~26℃
Test Band :	2.4GHz Mid	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Mygai Mo

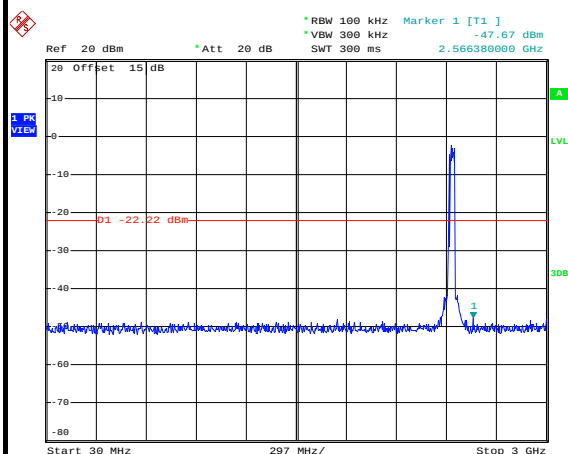
WLAN 802.11n HT40 Channel 06

100kHz PSD reference Level



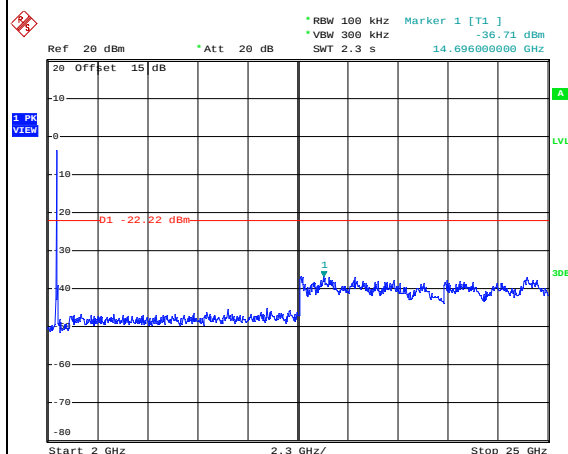
Date: 16.MAR.2015 17:48:12

Spurious Emission 30MHz~3GHz



Date: 16.MAR.2015 18:09:23

Spurious Emission 2GHz~25GHz



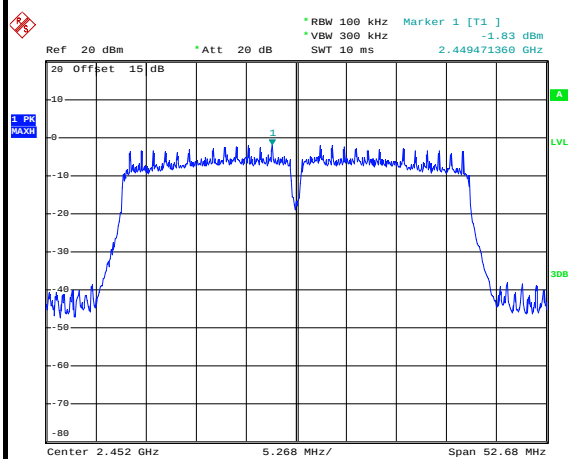
Date: 16.MAR.2015 18:09:40



Test Mode :	802.11n HT40	Temperature :	24~26℃
Test Band :	2.4GHz High	Relative Humidity :	50~53%
Test Channel :	09	Test Engineer :	Mygai Mo

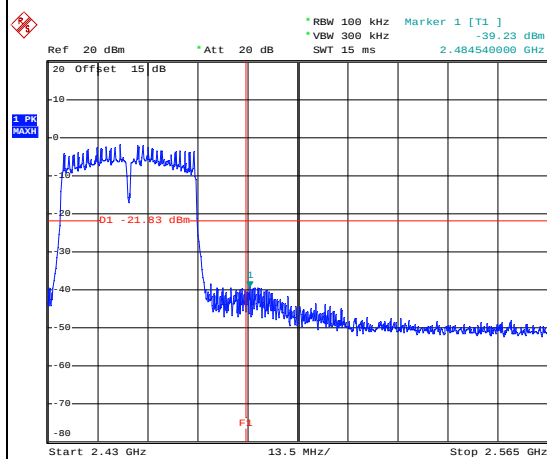
WLAN 802.11n HT40 Channel 09

100kHz PSD reference Level



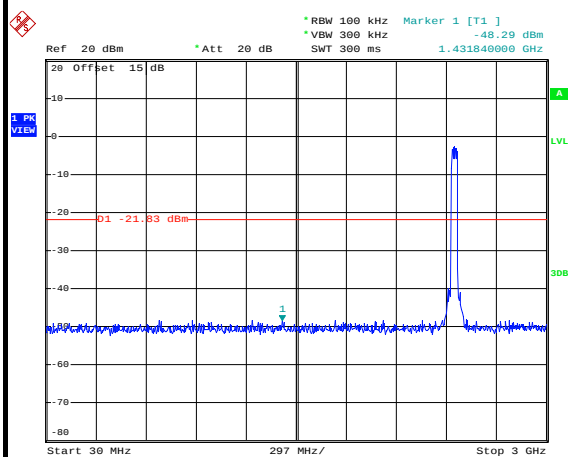
Date: 16.MAR.2015 17:53:32

High Channel Plot



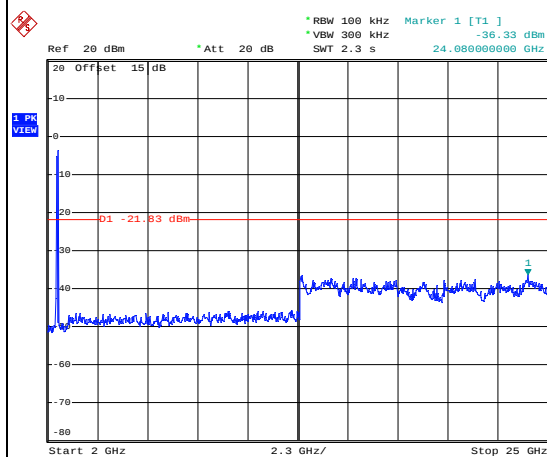
Date: 16.MAR.2015 17:53:55

Spurious Emission 30MHz~3GHz



Date: 16.MAR.2015 18:03:39

Spurious Emission 2GHz~25GHz



Date: 16.MAR.2015 18:03:57

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 FCC section 15.209 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 FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02.
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.

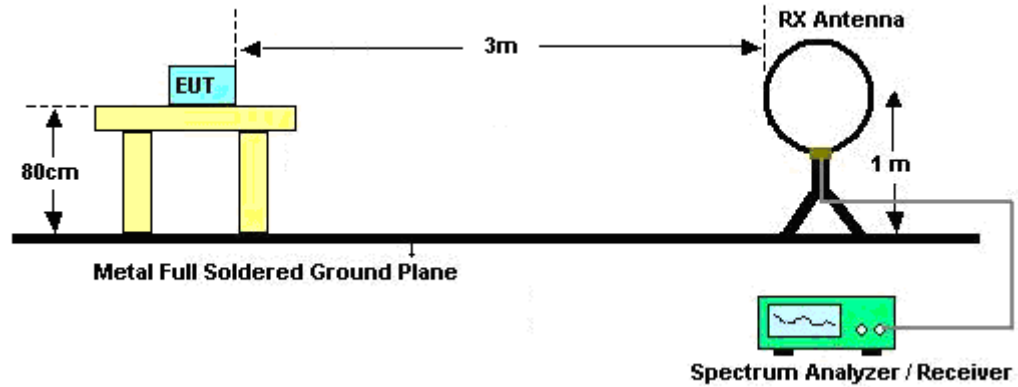
For average measurement:

 - 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.

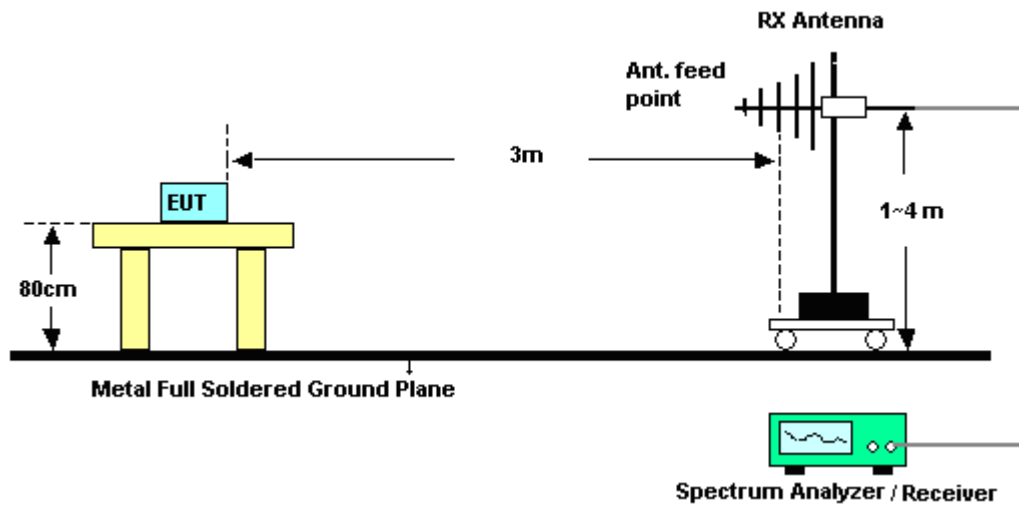
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	97.59	8.40	0.12	300Hz
802.11g	88.84	1.40	0.72	1kHz
2.4GHz 802.11n HT20	88.07	1.30	0.77	1kHz
2.4GHz 802.11n HT40	79.03	0.65	1.55	3kHz

3.5.4 Test Setup

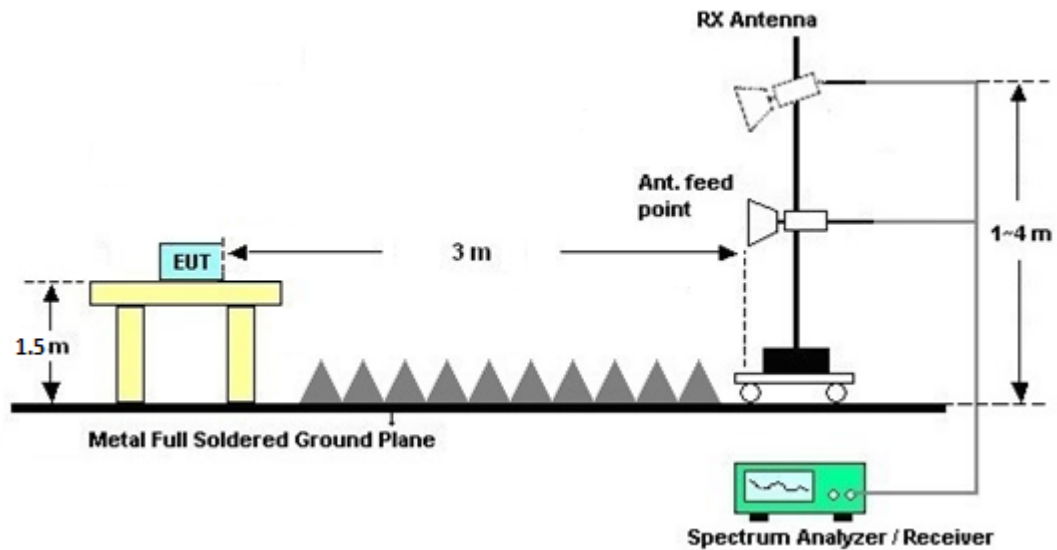
For radiated emissions below 30MHz



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 per 15.31(o) was not reported.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B.

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

Please refer to Appendix B.

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.

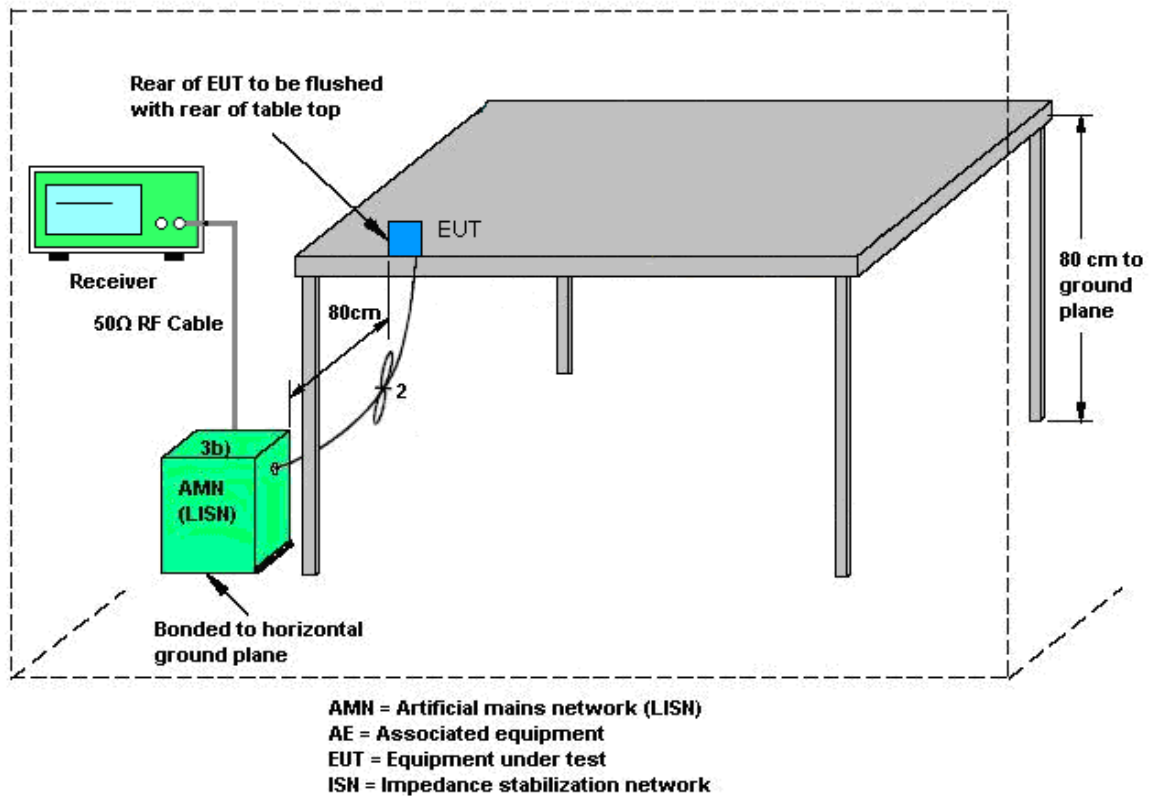
3.6.2 Measuring Instruments

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.

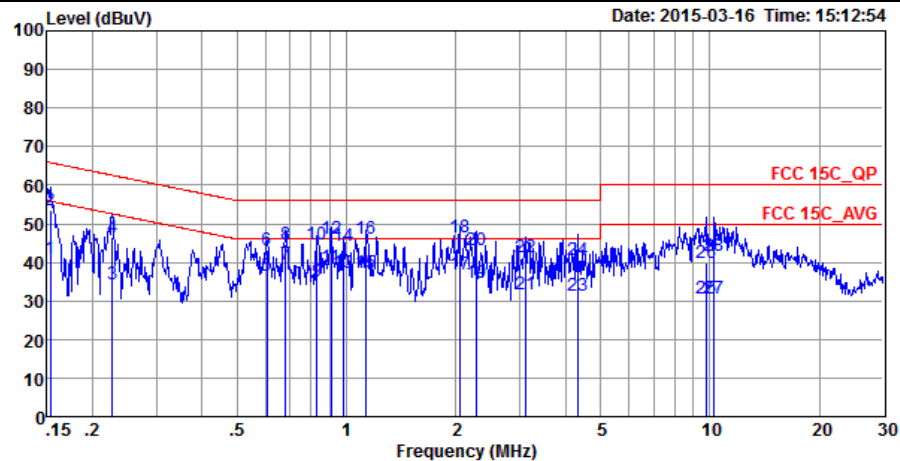
3.6.4 Test Setup





3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	21~22℃
Test Engineer :	Jack Tian	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter 1) + Earphone + Battery 1		

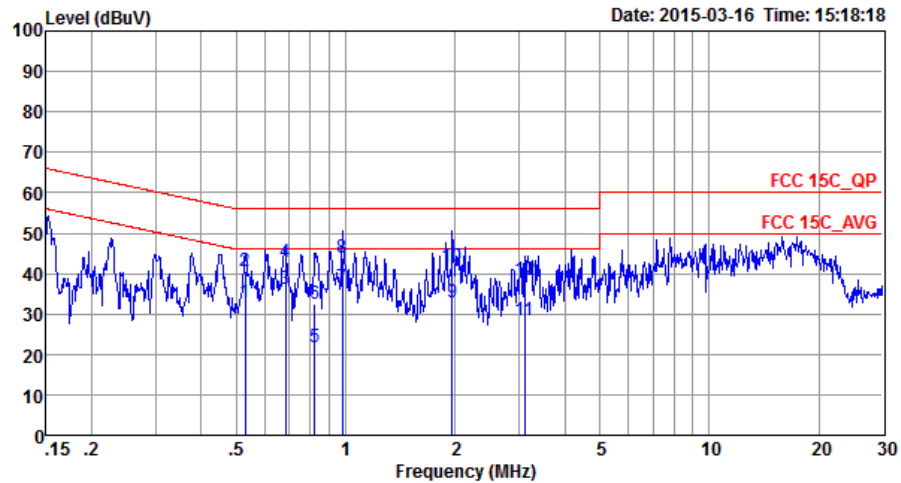


Site : C001-SZ
Condition: FCC 15C_QP LISN_L_20140304 LINE
Project : (FR)530506
Mode : Mode 1

		Level	Over	Limit	Read	LISN	Cable	
			Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15	40.98	-14.84	55.82	30.40	0.22	10.36	Average
2	0.15	53.38	-12.44	65.82	42.80	0.22	10.36	QP
3	0.23	34.20	-18.37	52.57	23.71	0.23	10.26	Average
4	0.23	46.40	-16.17	62.57	35.91	0.23	10.26	QP
5	0.60	36.38	-9.62	46.00	26.00	0.23	10.15	Average
6	0.60	43.08	-12.92	56.00	32.70	0.23	10.15	QP
7 *	0.68	39.34	-6.66	46.00	29.00	0.19	10.15	Average
8	0.68	44.64	-11.36	56.00	34.30	0.19	10.15	QP
9	0.83	35.07	-10.93	46.00	24.70	0.22	10.15	Average
10	0.83	44.77	-11.23	56.00	34.40	0.22	10.15	QP
11	0.91	38.89	-7.11	46.00	28.50	0.24	10.15	Average
12	0.91	46.09	-9.91	56.00	35.70	0.24	10.15	QP
13	0.98	37.41	-8.59	46.00	27.00	0.26	10.15	Average
14	0.98	44.31	-11.69	56.00	33.90	0.26	10.15	QP
15	1.14	37.21	-8.79	46.00	26.80	0.25	10.16	Average
16	1.14	46.11	-9.89	56.00	35.70	0.25	10.16	QP
17	2.04	37.02	-8.98	46.00	26.60	0.23	10.19	Average
18	2.04	46.42	-9.58	56.00	36.00	0.23	10.19	QP
19	2.27	34.54	-11.46	46.00	24.09	0.25	10.20	Average
20	2.27	43.24	-12.76	56.00	32.79	0.25	10.20	QP
21	3.11	31.83	-14.17	46.00	21.30	0.32	10.21	Average
22	3.11	41.23	-14.77	56.00	30.70	0.32	10.21	QP
23	4.31	31.22	-14.78	46.00	20.60	0.39	10.23	Average
24	4.31	40.72	-15.28	56.00	30.10	0.39	10.23	QP
25	9.76	30.55	-19.45	50.00	19.60	0.63	10.32	Average
26	9.76	39.95	-20.05	60.00	29.00	0.63	10.32	QP
27	10.29	30.73	-19.27	50.00	19.70	0.70	10.33	Average
28	10.29	41.63	-18.37	60.00	30.60	0.70	10.33	QP



Test Mode :	Mode 1	Temperature :	21~22℃
Test Engineer :	Jack Tian	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter 1) + Earphone + Battery 1		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_N_20140304 NEUTRAL
Project : (FR)530506
Mode : Mode 1

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.53	32.94	-13.06	46.00	22.41	0.38	10.15	Average
2	0.53	40.74	-15.26	56.00	30.21	0.38	10.15	QP
3	0.68	36.01	-9.99	46.00	25.60	0.26	10.15	Average
4	0.68	42.91	-13.09	56.00	32.50	0.26	10.15	QP
5	0.82	21.93	-24.07	46.00	11.50	0.28	10.15	Average
6	0.82	32.33	-23.67	56.00	21.90	0.28	10.15	QP
7 *	0.98	36.47	-9.53	46.00	26.00	0.32	10.15	Average
8	0.98	43.97	-12.03	56.00	33.50	0.32	10.15	QP
9	1.96	32.86	-13.14	46.00	22.30	0.37	10.19	Average
10	1.96	41.56	-14.44	56.00	31.00	0.37	10.19	QP
11	3.11	28.54	-17.46	46.00	17.90	0.43	10.21	Average
12	3.11	38.24	-17.76	56.00	27.60	0.43	10.21	QP

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. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP30	101400	9kHz~30GHz	Jan. 28, 2015	Mar. 16, 2015~ Mar. 24, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	10Hz~40GHz	Jan. 28, 2015	Mar. 16, 2015~ Mar. 24, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
Power Sensor	Anritsu	MA2411B	1207253	0.3GHz~40GHz	Jan. 28, 2015	Mar. 16, 2015~ Mar. 24, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Oct. 25, 2014	Mar. 30, 2015	Oct. 24, 2015	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	101399	9kHz~30GHz	May 04, 2014	Mar. 30, 2015	May 03, 2015	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 13, 2014	Mar. 30, 2015	Nov. 12, 2015	Radiation (03CH01-KS)
Bilog Antenna	TeseQ	CBL6112D	23182	25Mhz-2Ghz	Jan. 17, 2015	Mar. 30, 2015	Jan. 16, 2016	Radiation (03CH01-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 17, 2015	Mar. 30, 2015	Jan. 16, 2016	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 08, 2014	Mar. 30, 2015	Nov. 07, 2015	Radiation (03CH01-KS)
SHF-EHF Horn	com-power	AH-840	101070	18Ghz-40Ghz	Sep. 04, 2014	Mar. 30, 2015	Sep. 03, 2015	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1GHz /32dB	May 04, 2014	Mar. 30, 2015	May 03, 2015	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A023 71	1GHz~26.5GHz	Oct. 28, 2014	Mar. 30, 2015	Oct. 27, 2015	Radiation (03CH01-KS)
AC Power Source	Chroma	61601	F1040900 04	N/A	NCR	Mar. 30, 2015	NCR	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Mar. 30, 2015	NCR	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Mar. 30, 2015	NCR	Radiation (03CH01-KS)
EMI TEST Receiver	R&S	ESCI7	100768	9kHz~3GHz	May 04, 2014	Mar. 16, 2015	May 03, 2015	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Feb. 02, 2015	Mar. 16, 2015	Feb. 01, 2016	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Feb. 02, 2015	Mar. 16, 2015	Feb. 01, 2016	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000 891	100Vac~250Vac	Sep. 29, 2014	Mar. 16, 2015	Sep. 28, 2015	Conduction (CO01-SZ)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.3dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.5dB
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Test Engineer:	Fly Liang	Temperature:	24~26	°C
Test Date:	2015/3/24	Relative Humidity:	50~53	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band								
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
11b	1Mbps	1	1	2412	12.70	10.00	0.50	Pass
11b	1Mbps	1	6	2437	12.70	10.00	0.50	Pass
11b	1Mbps	1	11	2462	12.70	10.04	0.50	Pass
11g	6Mbps	1	1	2412	17.65	16.32	0.50	Pass
11g	6Mbps	1	6	2437	17.80	16.36	0.50	Pass
11g	6Mbps	1	11	2462	17.85	16.36	0.50	Pass
HT20	MCS0	1	1	2412	18.45	17.60	0.50	Pass
HT20	MCS0	1	6	2437	18.40	17.60	0.50	Pass
HT20	MCS0	1	11	2462	18.50	17.60	0.50	Pass
HT40	MCS0	1	3	2422	36.20	35.12	0.50	Pass
HT40	MCS0	1	6	2437	36.20	35.20	0.50	Pass
HT40	MCS0	1	9	2452	36.20	35.12	0.50	Pass

TEST RESULTS DATA
Peak Power Table

2.4GHz Band										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
11b	1Mbps	1	1	2412	19.03	30.00	2.00	21.03	36.00	Pass
11b	1Mbps	1	6	2437	19.52	30.00	2.00	21.52	36.00	Pass
11b	1Mbps	1	11	2462	19.79	30.00	2.00	21.79	36.00	Pass
11g	6Mbps	1	1	2412	21.18	30.00	2.00	23.18	36.00	Pass
11g	6Mbps	1	6	2437	21.78	30.00	2.00	23.78	36.00	Pass
11g	6Mbps	1	11	2462	22.24	30.00	2.00	24.24	36.00	Pass
HT20	MCS0	1	1	2412	21.13	30.00	2.00	23.13	36.00	Pass
HT20	MCS0	1	6	2437	21.61	30.00	2.00	23.61	36.00	Pass
HT20	MCS0	1	11	2462	22.16	30.00	2.00	24.16	36.00	Pass
HT40	MCS0	1	3	2422	21.66	30.00	2.00	23.66	36.00	Pass
HT40	MCS0	1	6	2437	21.91	30.00	2.00	23.91	36.00	Pass
HT40	MCS0	1	9	2452	22.76	30.00	2.00	24.76	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

2.4GHz Band						
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
11b	1Mbps	1	1	2412	0.11	16.31
11b	1Mbps	1	6	2437	0.11	16.73
11b	1Mbps	1	11	2462	0.11	17.09
11g	6Mbps	1	1	2412	0.51	10.40
11g	6Mbps	1	6	2437	0.51	10.92
11g	6Mbps	1	11	2462	0.51	11.46
HT20	MCS0	1	1	2412	0.55	10.24
HT20	MCS0	1	6	2437	0.55	10.73
HT20	MCS0	1	11	2462	0.55	11.17
HT40	MCS0	1	3	2422	1.02	10.48
HT40	MCS0	1	6	2437	1.02	10.67
HT40	MCS0	1	9	2452	1.02	11.07

TEST RESULTS DATA
Peak Power Density

2.4GHz Band								
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
11b	1Mbps	1	1	2412	-6.47	2.00	8.00	Pass
11b	1Mbps	1	6	2437	-5.43	2.00	8.00	Pass
11b	1Mbps	1	11	2462	-6.04	2.00	8.00	Pass
11g	6Mbps	1	1	2412	-15.15	2.00	8.00	Pass
11g	6Mbps	1	6	2437	-14.48	2.00	8.00	Pass
11g	6Mbps	1	11	2462	-14.76	2.00	8.00	Pass
HT20	MCS0	1	1	2412	-14.76	2.00	8.00	Pass
HT20	MCS0	1	6	2437	-14.61	2.00	8.00	Pass
HT20	MCS0	1	11	2462	-13.13	2.00	8.00	Pass
HT40	MCS0	1	3	2422	-17.07	2.00	8.00	Pass
HT40	MCS0	1	6	2437	-16.83	2.00	8.00	Pass
HT40	MCS0	1	9	2452	-16.42	2.00	8.00	Pass



Appendix B. Radiated Spurious Emission

LP0002 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		2363.55	54.31	-19.69	74	49.04	31.26	6.17	32.16	194	246	P	H
		2390	39.66	-14.34	54	34.32	31.3	6.17	32.13	194	246	A	H
	*	2413.36	104.9	-	-	99.42	31.31	6.22	32.05	194	246	P	H
	*	2413.611	99.96	-	-	94.48	31.31	6.22	32.05	194	246	A	H
		2363.19	52.97	-21.03	74	47.7	31.26	6.17	32.16	150	102	P	V
		2355.63	38.22	-15.78	54	33	31.26	6.12	32.16	150	102	A	V
	*	2413.36	97.06	-	-	91.58	31.31	6.22	32.05	150	102	P	V
	*	2413.611	92.06	-	-	86.58	31.31	6.22	32.05	150	102	A	V
802.11b CH 06 2437MHz	*	2435.655	104.93	-	-	99.34	31.33	6.22	31.96	216	237	P	H
	*	2435.237	99.82	-	-	94.23	31.33	6.22	31.96	216	237	A	H
	*	2438.326	95.75	-	-	90.07	31.34	6.22	31.88	179	45	P	V
	*	2438.577	90.77	-	-	85.09	31.34	6.22	31.88	179	45	A	V



802.11b CH 11 2462MHz	*	2460.705	106.91	-	-	101.06	31.36	6.28	31.79	158	87	P	H
	*	2460.371	101.78	-	-	95.93	31.36	6.28	31.79	158	87	A	H
		2492.24	55.51	-18.49	74	49.41	31.39	6.33	31.62	158	87	P	H
		2485.28	41.01	-12.99	54	35.02	31.37	6.33	31.71	158	87	A	H
	*	2463.46	102.46	-	-	96.61	31.36	6.28	31.79	282	75	P	V
	*	2463.627	97.54	-	-	91.69	31.36	6.28	31.79	282	75	A	V
		2488.48	54.78	-19.22	74	48.68	31.39	6.33	31.62	282	75	P	V
		2485.4	40.51	-13.49	54	34.52	31.37	6.33	31.71	282	75	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



LP0002 2.4GHz 2400~2483.5MHz

WIFI 802.11b (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		4824	46.21	-27.79	74	36.61	34.89	8.73	34.02	166	213	P	H
		4824	47.36	-26.64	74	37.76	34.89	8.73	34.02	175	268	P	V
802.11b CH 06 2437MHz		4875	46.94	-27.06	74	37.25	34.92	8.76	33.99	246	185	P	H
		7311	47.49	-26.51	74	36.56	35.56	10.84	35.47	168	210	P	H
		4875	47.51	-26.49	74	37.82	34.92	8.76	33.99	199	216	P	V
		7311	47.76	-26.24	74	36.83	35.56	10.84	35.47	188	201	P	V
802.11b CH 11 2462MHz		4923	47.61	-26.39	74	37.83	34.95	8.79	33.96	168	216	P	H
		7386	47.83	-26.17	74	37.05	35.58	10.89	35.69	150	0	P	H
		4923	47.33	-26.67	74	37.55	34.95	8.79	33.96	177	195	P	V
		7386	47.05	-26.95	74	36.27	35.58	10.89	35.69	199	45	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



LP0002 2.4GHz 2400~2483.5MHz

WIFI 802.11g (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)
802.11g CH 01 2412MHz		2389.47	63.15	-10.85	74	57.81	31.3	6.17	32.13	150	46	P	H
		2390	41.93	-12.07	54	36.59	31.3	6.17	32.13	150	46	A	H
	*	2412.441	105.38	-	-	99.9	31.31	6.22	32.05	150	46	P	H
	*	2412.274	93.67	-	-	88.19	31.31	6.22	32.05	150	46	A	H
		2389.83	64.13	-9.87	74	58.79	31.3	6.17	32.13	248	102	P	V
		2389.83	41.84	-12.16	54	36.5	31.3	6.17	32.13	248	102	A	V
	*	2413.527	103.58	-	-	98.1	31.31	6.22	32.05	248	102	P	V
	*	2412.775	92.5	-	-	87.02	31.31	6.22	32.05	248	102	A	V
802.11g CH 06 2437MHz	*	2438.493	106.1	-	-	100.42	31.34	6.22	31.88	247	113	P	H
	*	2437.491	94.81	-	-	89.13	31.34	6.22	31.88	247	113	A	H
	*	2435.822	103.14	-	-	97.55	31.33	6.22	31.96	187	105	P	V
	*	2434.987	92.17	-	-	86.58	31.33	6.22	31.96	187	105	A	V



802.11g CH 11 2462MHz	*	2463.126	104.95	-	-	99.1	31.36	6.28	31.79	109	110	P	H
	*	2462.375	94.01	-	-	88.16	31.36	6.28	31.79	109	110	A	H
	!	2483.96	70.73	-3.27	74	64.74	31.37	6.33	31.71	109	110	P	H
		2483.52	44.71	-9.29	54	38.72	31.37	6.33	31.71	109	110	A	H
	*	2459.786	105.21	-	-	99.36	31.36	6.28	31.79	167	105	P	V
	*	2460.204	93.5	-	-	87.65	31.36	6.28	31.79	167	105	A	V
	!	2483.76	69.3	-4.7	74	63.31	31.37	6.33	31.71	167	105	P	V
		2483.6	44.22	-9.78	54	38.23	31.37	6.33	31.71	167	105	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



LP0002 2.4GHz 2400~2483.5MHz

WIFI 802.11g (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 01 2412MHz		4824	45.78	-28.22	74	36.18	34.89	8.73	34.02	154	123	P	H
		4824	46.34	-27.66	74	36.74	34.89	8.73	34.02	188	164	P	V
802.11g CH 06 2437MHz		4875	46.49	-27.51	74	36.8	34.92	8.76	33.99	100	158	P	H
		7311	45.73	-28.27	74	34.8	35.56	10.84	35.47	166	248	P	H
		4875	48.43	-25.57	74	38.74	34.92	8.76	33.99	188	0	P	V
		7311	46.5	-27.5	74	35.57	35.56	10.84	35.47	200	130	P	V
802.11g CH 11 2462MHz		4923	46.46	-27.54	74	36.68	34.95	8.79	33.96	146	120	P	H
		7386	48.15	-25.85	74	37.37	35.58	10.89	35.69	177	101	P	H
		4923	47.14	-26.86	74	37.36	34.95	8.79	33.96	100	146	P	V
		7386	47.15	-26.85	74	36.37	35.58	10.89	35.69	188	46	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



LP0002 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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 01 2412MHz		2390	62.97	-11.03	74	57.63	31.3	6.17	32.13	199	122	P	H
		2390	42.69	-11.31	54	37.35	31.3	6.17	32.13	199	122	A	H
	*	2416.95	102.55	-	-	97.07	31.31	6.22	32.05	199	122	P	H
	*	2413.778	90.96	-	-	85.48	31.31	6.22	32.05	199	122	A	H
		2389.47	62.92	-11.08	74	57.58	31.3	6.17	32.13	223	102	P	V
		2390	43.11	-10.89	54	37.77	31.3	6.17	32.13	223	102	A	V
	*	2414.195	102.08	-	-	96.6	31.31	6.22	32.05	223	102	P	V
	*	2412.441	90.88	-	-	85.4	31.31	6.22	32.05	223	102	A	V
802.11n HT20 CH 06 2437MHz	*	2432.565	103.79	-	-	98.2	31.33	6.22	31.96	218	124	P	H
	*	2433.316	91.68	-	-	86.09	31.33	6.22	31.96	218	124	A	H
	*	2433.4	102.78	-	-	97.19	31.33	6.22	31.96	219	102	P	V
	*	2434.235	91.39	-	-	85.8	31.33	6.22	31.96	219	102	A	V



802.11n HT20 CH 11 2462MHz	*	2459.285	102.06	-	-	96.21	31.36	6.28	31.79	151	127	P	H
	*	2459.869	90.68	-	-	84.83	31.36	6.28	31.79	151	127	A	H
	!	2483.68	69.81	-4.19	74	63.82	31.37	6.33	31.71	151	127	P	H
		2483.52	43.44	-10.56	54	37.45	31.37	6.33	31.71	151	127	A	H
	*	2466.884	102.62	-	-	96.77	31.36	6.28	31.79	237	100	P	V
	*	2464.378	91.22	-	-	85.37	31.36	6.28	31.79	237	100	A	V
	!	2484.6	68.23	-5.77	74	62.24	31.37	6.33	31.71	237	100	P	V
		2483.52	42.94	-11.06	54	36.95	31.37	6.33	31.71	237	100	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



LP0002 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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 01 2412MHz		4824	47.62	-26.38	74	38.02	34.89	8.73	34.02	196	337	P	H
		4824	47.03	-26.97	74	37.43	34.89	8.73	34.02	183	206	P	V
802.11n HT20 CH 06 2437MHz		4875	47.27	-26.73	74	37.58	34.92	8.76	33.99	159	302	P	H
		7311	48.24	-25.76	74	37.31	35.56	10.84	35.47	169	227	P	H
		4875	47.15	-26.85	74	37.46	34.92	8.76	33.99	209	47	P	V
		7311	48.8	-25.2	74	37.87	35.56	10.84	35.47	194	228	P	V
802.11n HT20 CH 11 2462MHz		4923	48.28	-25.72	74	38.5	34.95	8.79	33.96	168	74	P	H
		7386	49.39	-24.61	74	38.61	35.58	10.89	35.69	150	339	P	H
		4923	47.31	-26.69	74	37.53	34.95	8.79	33.96	206	174	P	V
		7386	47.65	-26.35	74	36.87	35.58	10.89	35.69	163	227	P	V
Remark		1. No other spurious found. 2. All results are PASS against Peak and Average limit line.											



LP0002 2.4GHz 2400~2483.5MHz
WIFI 802.11n HT40 (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)
802.11n HT40 CH 03 2422MHz		2388.48	66.65	-7.35	74	61.31	31.3	6.17	32.13	218	124	P	H
		2389.74	46.87	-7.13	54	41.53	31.3	6.17	32.13	218	124	A	H
	*	2428.306	99.92	-	-	94.33	31.33	6.22	31.96	218	124	P	H
	*	2429.058	88.25	-	-	82.66	31.33	6.22	31.96	218	124	A	H
		2485.08	55.26	-18.74	74	49.27	31.37	6.33	31.71	218	124	P	H
		2483.6	40.4	-13.6	54	34.41	31.37	6.33	31.71	218	124	A	H
		2388.48	66.97	-7.03	74	61.63	31.3	6.17	32.13	225	104	P	V
		2389.83	46.48	-7.52	54	41.14	31.3	6.17	32.13	225	104	A	V
	*	2414.112	99.82	-	-	94.34	31.31	6.22	32.05	225	104	P	V
	*	2415.948	89.06	-	-	83.58	31.31	6.22	32.05	225	104	A	V
		2484.52	54.45	-19.55	74	48.46	31.37	6.33	31.71	225	104	P	V
		2484.2	40.49	-13.51	54	34.5	31.37	6.33	31.71	225	104	A	V
802.11n HT40 CH 06 2437MHz		2389.56	60.9	-13.1	74	55.56	31.3	6.17	32.13	248	129	P	H
		2390	41.39	-12.61	54	36.05	31.3	6.17	32.13	248	129	A	H
	*	2449.599	100.04	-	-	94.3	31.34	6.28	31.88	248	129	P	H
	*	2447.929	88.36	-	-	82.62	31.34	6.28	31.88	248	129	A	H
		2483.6	60.9	-13.1	74	54.91	31.37	6.33	31.71	248	129	P	H
		2491.4	41.25	-12.75	54	35.15	31.39	6.33	31.62	248	129	A	H
		2389.74	61.24	-12.76	74	55.9	31.3	6.17	32.13	217	85	P	V
		2387.22	41.35	-12.65	54	36.01	31.3	6.17	32.13	217	85	A	V
	*	2443.002	99.94	-	-	94.2	31.34	6.28	31.88	217	85	P	V
	*	2433.65	88.67	-	-	83.08	31.33	6.22	31.96	217	85	A	V
		2483.88	61.86	-12.14	74	55.87	31.37	6.33	31.71	217	85	P	V
		2483.92	41.46	-12.54	54	35.47	31.37	6.33	31.71	217	85	A	V



802.11n HT40 CH 09 2452MHz		2385.15	57.55	-16.45	74	52.24	31.28	6.17	32.14	168	129	P	H
		2376.24	40.4	-13.6	54	35.09	31.28	6.17	32.14	168	129	A	H
	*	2446.844	99.71	-	-	93.97	31.34	6.28	31.88	168	129	P	H
	*	2445.842	88.89	-	-	83.15	31.34	6.28	31.88	168	129	A	H
	!	2483.88	69.66	-4.34	74	63.67	31.37	6.33	31.71	168	129	P	H
		2484.08	44.58	-9.42	54	38.59	31.37	6.33	31.71	168	129	A	H
		2386.59	58.24	-15.76	74	52.9	31.3	6.17	32.13	242	101	P	V
		2384.34	41.03	-12.97	54	35.72	31.28	6.17	32.14	242	101	A	V
	*	2462.124	100.29	-	-	94.44	31.36	6.28	31.79	242	101	P	V
	*	2461.957	89.64	-	-	83.79	31.36	6.28	31.79	242	101	A	V
	!	2485.44	68.91	-5.09	74	62.92	31.37	6.33	31.71	242	101	P	V
		2483.76	44.11	-9.89	54	38.12	31.37	6.33	31.71	242	101	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



LP0002 2.4GHz 2400~2483.5MHz

WIFI 802.11n HT40 (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n		4845	48.46	-25.54	74	38.84	34.9	8.73	34.01	153	26	P	H
HT40		7266	49.39	-24.61	74	38.4	35.56	10.81	35.38	176	206	P	H
CH 03		4845	46.56	-27.44	74	36.94	34.9	8.73	34.01	183	67	P	V
2422MHz		7266	49.45	-24.55	74	38.46	35.56	10.81	35.38	227	301	P	V
802.11n		4875	46.61	-27.39	74	36.92	34.92	8.76	33.99	198	224	P	H
HT40		7311	48.37	-25.63	74	37.44	35.56	10.84	35.47	174	29	P	H
CH 06		4875	47.01	-26.99	74	37.32	34.92	8.76	33.99	167	63	P	V
2437MHz		7311	49.02	-24.98	74	38.09	35.56	10.84	35.47	206	31	P	V
802.11n		4905	47.7	-26.3	74	37.94	34.94	8.79	33.97	168	229	P	H
HT40		7356	49.26	-24.74	74	38.43	35.57	10.86	35.6	209	87	P	H
CH 09		4905	47.77	-26.23	74	38.01	34.94	8.79	33.97	169	221	P	V
2452MHz		7356	48.57	-25.43	74	37.74	35.57	10.86	35.6	188	261	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



LP0002 Emission below 1GHz

2.4GHz WIFI 802.11b (LF)

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)
2.4GHz 802.11b LF		30	23	-17	40	35.67	19.2	0.79	32.66	-	-	P	H
		60.07	24.35	-15.65	40	50.06	6.1	0.79	32.6	-	-	P	H
		95.96	26.72	-16.78	43.5	47.42	10.86	1.04	32.6	-	-	P	H
		138.64	29.12	-14.38	43.5	48.85	11.61	1.23	32.57	138	260	P	H
		258.92	23.73	-22.27	46	42.15	12.26	1.75	32.43	-	-	P	H
		304.51	25.2	-20.8	46	42.5	13.19	1.9	32.39	-	-	P	H
		30	32.37	-7.63	40	45.04	19.2	0.79	32.66	121	0	P	V
		36.79	28.93	-11.07	40	44.98	15.77	0.79	32.61	-	-	P	V
		61.04	18.54	-21.46	40	44.04	6.31	0.79	32.6	-	-	P	V
		95.96	23.24	-20.26	43.5	43.94	10.86	1.04	32.6	-	-	P	V
		134.76	22.75	-20.75	43.5	42.52	11.58	1.23	32.58	-	-	P	V
		740.04	24.16	-21.84	46	32.92	20.16	3.12	32.04	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



LP0002 Emission below 1GHz

2.4GHz WIFI 802.11g (LF)

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)
2.4GHz 802.11g LF		30	20.94	-19.06	40	33.61	19.2	0.79	32.66	-	-	P	H
		108.57	21.71	-21.79	43.5	41.94	11.37	1.04	32.64	-	-	P	H
		153.19	20.59	-22.91	43.5	40.12	11.59	1.44	32.56	-	-	P	H
		189.08	22.91	-20.59	43.5	43.56	10.21	1.61	32.47	-	-	P	H
		214.3	20.4	-23.1	43.5	40.82	10.46	1.61	32.49	-	-	P	H
		942.77	27.29	-18.71	46	33.58	21.75	3.68	31.72	100	308	P	H
		31.94	29.69	-10.31	40	43.33	18.22	0.79	32.65	154	0	P	V
		36.79	28.82	-11.18	40	44.87	15.77	0.79	32.61	-	-	P	V
		93.05	18.67	-24.83	43.5	39.7	10.53	1.04	32.6	-	-	P	V
		108.57	21.03	-22.47	43.5	41.26	11.37	1.04	32.64	-	-	P	V
		152.22	17.52	-25.98	43.5	37.01	11.63	1.44	32.56	-	-	P	V
		448.07	20.41	-25.59	46	32.89	17.27	2.4	32.15	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



LP0002 Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

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)
2.4GHz 802.11n HT20 LF		31.94	20.52	-19.48	40	34.16	18.22	0.79	32.65	-	-	P	H
		108.57	21.59	-21.91	43.5	41.82	11.37	1.04	32.64	-	-	P	H
		152.22	20.04	-23.46	43.5	39.53	11.63	1.44	32.56	-	-	P	H
		163.86	20.25	-23.25	43.5	40.17	11.18	1.44	32.54	-	-	P	H
		188.11	23.45	-20.05	43.5	44.06	10.25	1.61	32.47	-	-	P	H
		307.42	19.54	-26.46	46	36.6	13.31	2.02	32.39	-	-	P	H
		30	29.38	-10.62	40	42.05	19.2	0.79	32.66	-	-	P	V
		36.79	27.77	-12.23	40	43.82	15.77	0.79	32.61	-	-	P	V
		93.05	19.34	-24.16	43.5	40.37	10.53	1.04	32.6	-	-	P	V
		107.6	19.72	-23.78	43.5	39.96	11.36	1.04	32.64	-	-	P	V
		163.86	19.34	-24.16	43.5	39.26	11.18	1.44	32.54	-	-	P	V
		432.55	20.82	-25.18	46	33.59	17.02	2.4	32.19	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



LP0002 Emission below 1GHz

2.4GHz WIFI 802.11n HT40 (LF)

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)
2.4GHz 802.11n HT40 LF		30.97	19.4	-20.6	40	32.56	18.71	0.79	32.66	100	138	P	H
		61.04	16.07	-23.93	40	41.57	6.31	0.79	32.6	-	-	P	H
		94.02	16.97	-26.53	43.5	37.89	10.64	1.04	32.6	-	-	P	H
		103.72	17.03	-26.47	43.5	37.3	11.33	1.04	32.64	-	-	P	H
		139.61	22.65	-20.85	43.5	42.36	11.62	1.23	32.56	-	-	P	H
		184.23	21.59	-21.91	43.5	42.21	10.4	1.44	32.46	-	-	P	H
		30.97	28.46	-11.54	40	41.62	18.71	0.79	32.66	168	46	P	V
		36.79	27.93	-12.07	40	43.98	15.77	0.79	32.61	-	-	P	V
		62.01	16.02	-23.98	40	41.3	6.52	0.79	32.59	-	-	P	V
		92.08	19.71	-23.79	43.5	40.86	10.42	1.04	32.61	-	-	P	V
		140.58	18.41	-25.09	43.5	38.12	11.62	1.23	32.56	-	-	P	V
		182.29	17.45	-26.05	43.5	38	10.47	1.44	32.46	-	-	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	Peak or Average
H/V	Horizontal or Vertical



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

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		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
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”.