FCC RF Test Report

APPLICANT	:	CT Asia
EQUIPMENT	:	Smartphone
BRAND NAME	:	BLU
MODEL NAME	:	ADVANCE 4.0 L
FCC ID	:	YHLBLUADVANCE4L
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on Mar. 24, 2015 and testing was completed on Apr. 26, 2015. 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.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory
2353

SPORTON INTERNATIONAL (SHENZHEN) INC.
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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR532405C	Rev. 01	Initial issue of report	May 06, 2015

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	RSS-210 A8.2(a)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	RSS-Gen 6.6	99% Bandwidth	-	Pass	-
3.2	15.247(b)	RSS-210 A8.4	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	RSS-210 A8.2(b)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	RSS-210 A8.5	Conducted Band Edges	≤ 20dBc	Pass	-
			Conducted Spurious Emission		Pass	-
3.5	15.247(d)	RSS-210 A8.5	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 2.5 dB at 2483.560 MHz
3.6	15.207	RSS-Gen 8.8	AC Conducted Emission	15.207(a)	Pass	Under limit 8.25 dB at 0.510 MHz
3.7	15.203 & 15.247(b)	RSS-210 A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

CT Asia
Unit 01, 15/F, Seaview Centre, 139-141 Hoi bun road, Kwun Tong, Kowloon, Hongkong

1.2 Manufacturer

Tinno Mobile Technology Corp.
4/F, H-3 Building, OCT Eastern industrial Park, No.1 Xiang Shan East Road, Nan Shan District, Shenzhen, P.R. China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Smartphone
Brand Name	BLU
Model Name	ADVANCE 4.0 L
FCC ID	YHLBLUADVANCE4L
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/HSPA+(Downlink Only)/ WLAN2.4GHz 802.11b/g/n HT20/HT40/ Bluetooth v3.0+EDR/Bluetooth v4.0 LE
IMEI Code	Conducted: 353919026689715/353924026689715 Conduction: 353919026689699/353919026689699 Radiation: 353919026689764/353919026689764
HW Version	V1.0
SW Version	S4050AP_PR_4.4_BLU_US_03_01
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 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 : 17.50 dBm (0.0562 W) 802.11g : 19.69 dBm (0.0931 W) 802.11n HT20 : 19.57 dBm (0.0906 W) 802.11n HT40 : 19.68 dBm (0.0929 W)
99% Occupied Bandwidth	802.11b : 13.65MHz 802.11g : 17.70MHz 802.11n HT20 : 18.45MHz 802.11n HT40 : 36.40MHz
Antenna Type/Gain	802.11b/g/n : PIFA Antenna with gain 0.50 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 INC.	
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	**Sporton Site No.**	**FCC/IC Registration No.**
	03CH05-HY	TW1022/4086B-1

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
- IC RSS-210 Issue 8
- IC RSS-Gen Issue 4

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 (Z plane) 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	17.22	CH 11	17.48	17.46	17.47
CH 06	2437 MHz	17.26				
CH 11	2462 MHz	**17.50**				

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	19.65	CH 06	19.66	19.64	19.62	19.65	19.63	19.64	19.61
CH 06	2437 MHz	**19.69**								
CH 11	2462 MHz	19.32								

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	19.47	CH 06	19.53	19.49	19.51	19.47	19.43	19.42	19.45
CH 06	2437 MHz	**19.57**								
CH 11	2462 MHz	19.30								

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	19.15	CH 06	19.38	19.36	19.47	19.45	19.49	19.41	19.38
CH 06	2437 MHz	**19.68**								
CH 09	2452 MHz	19.07								

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.

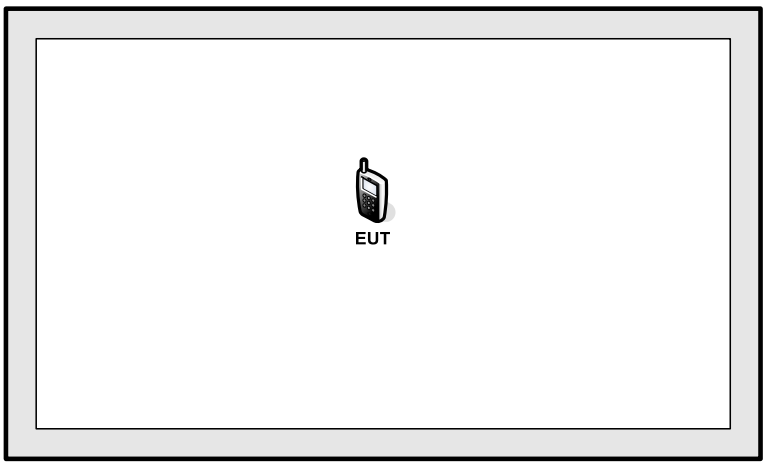
<2.4GHz>

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

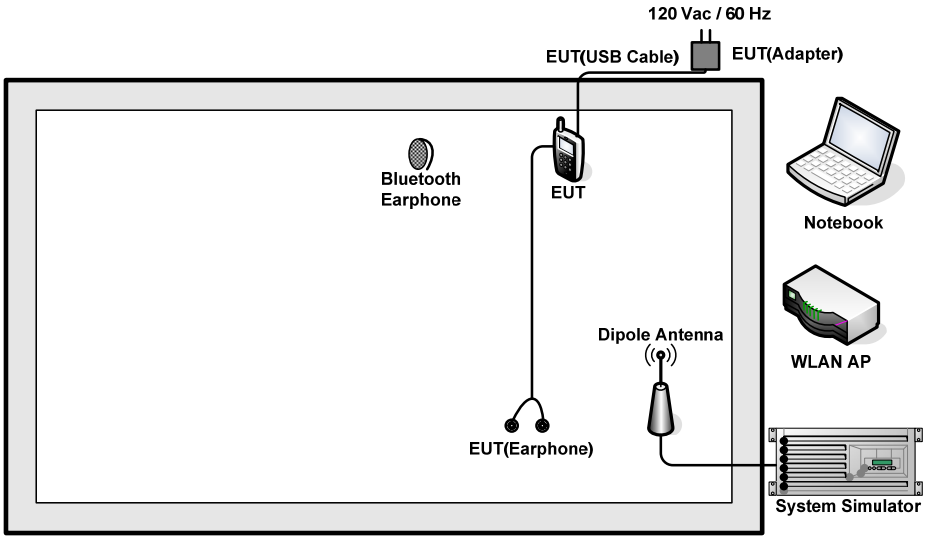
Test Cases	
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter) + Battery
Remark: Remark: For Radiated Test Cases, The tests were performance with Adapter, Earphone, and USB Cable.	

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.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-815	KA2IR815A1	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	E540	PRC4	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Nokia	BH-108	PYAHS-107W	N/A	N/A

2.6 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously 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.

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

= 5.0 + 10 = 15.0 (dB)

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

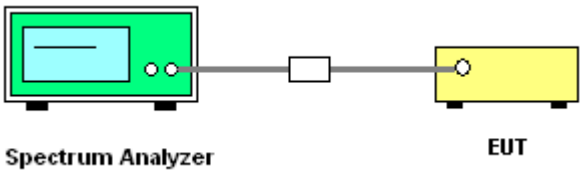
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

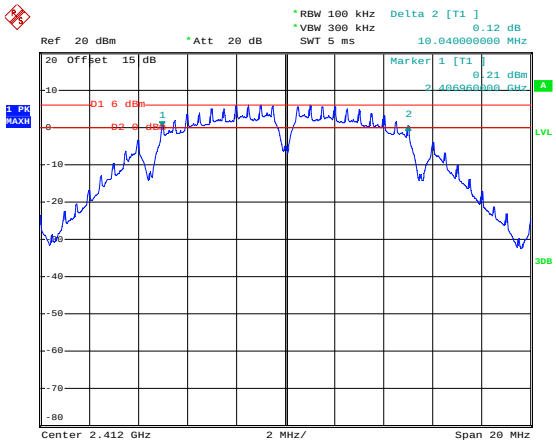
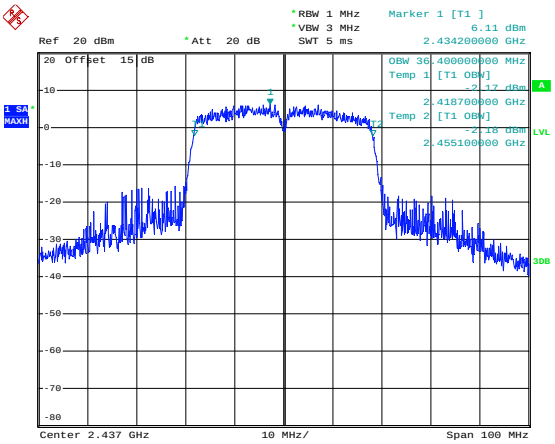
1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r02.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit 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 and 99% Occupied Bandwidth

Please refer to Appendix A of this test report.

Minimum 6dB Bandwidth	Maximum 99% Occupied Bandwidth
 Date: 8.APR.2015 10:13:38	 Date: 8.APR.2015 12:35:03

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.

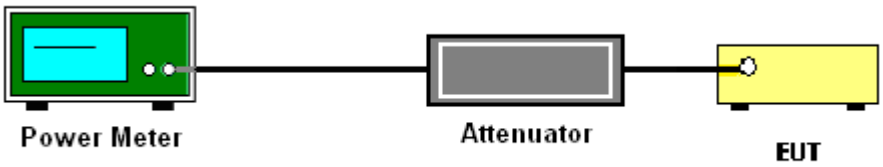
3.2.2 Measuring Instruments

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.

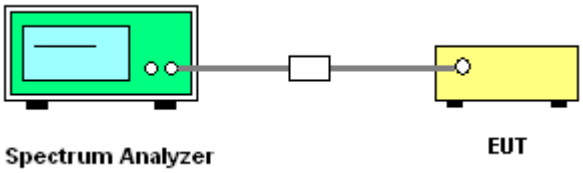
3.3.2 Measuring Instruments

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.

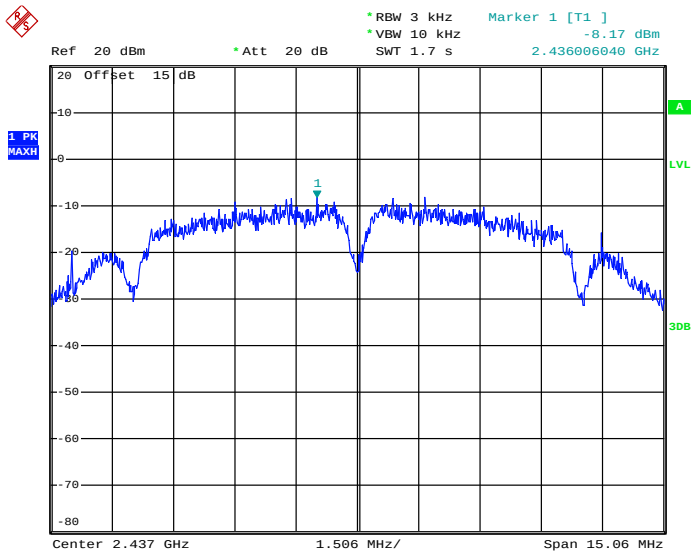
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A of this test report.

Worst Case Power Density (dBm/3kHz)



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).

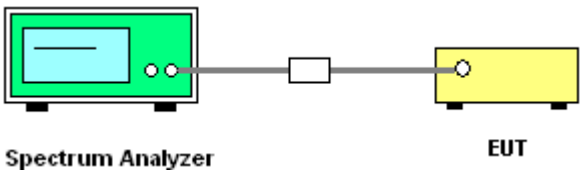
3.4.2 Measuring Instruments

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

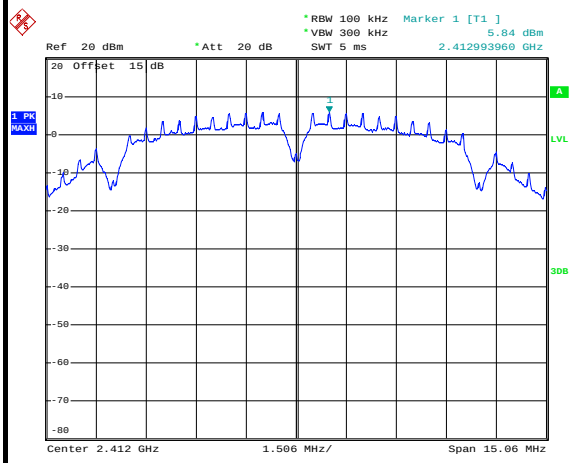


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

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

WLAN 802.11b Channel 01

100kHz PSD reference Level



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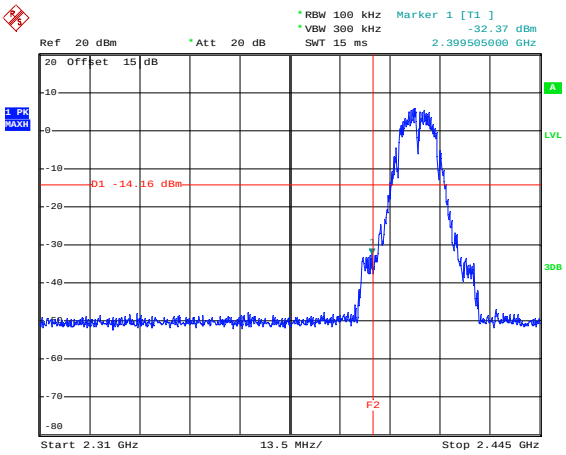
Low Channel Plot



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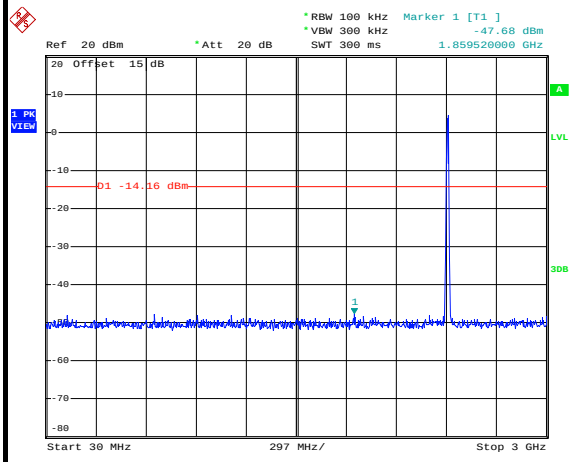
Spurious Emission 30MHz~3GHz



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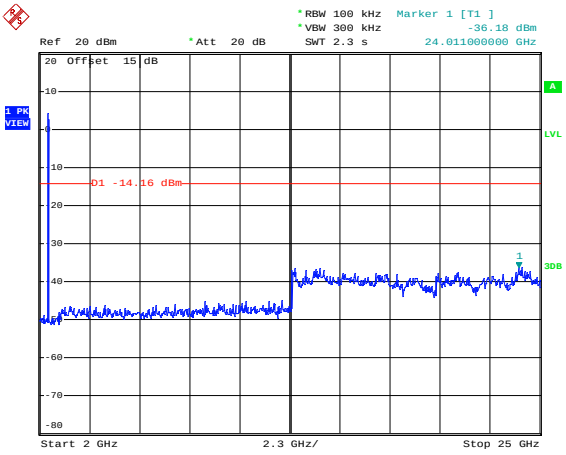
Spurious Emission 2GHz~25GHz

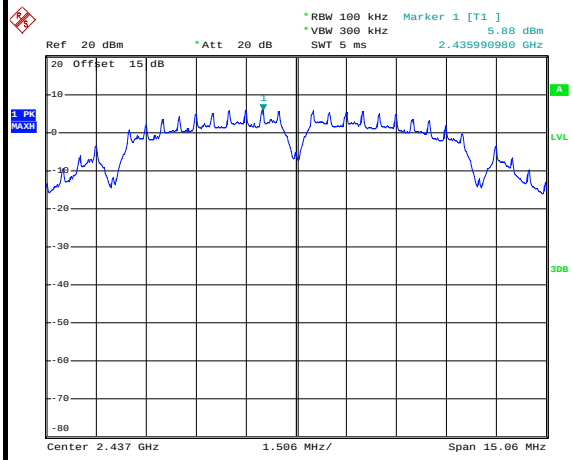


Date: 8.APR.2015 10:17:16

Test Mode :	802.11b	**Temperature :**	24~26℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	50~53%
Test Channel :	06	**Test Engineer :**	Tiny You

WLAN 802.11b Channel 06

100kHz PSD reference Level



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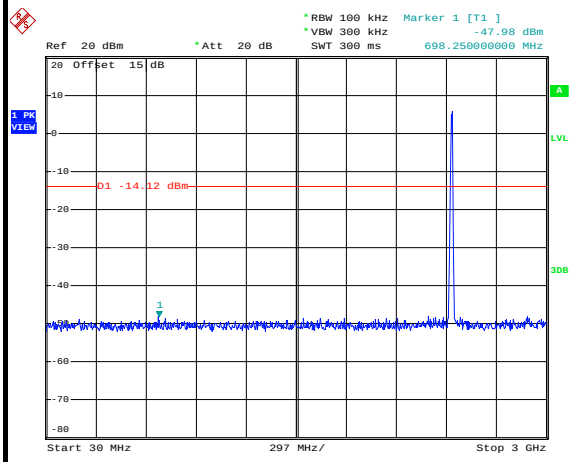
Spurious Emission 30MHz~3GHz



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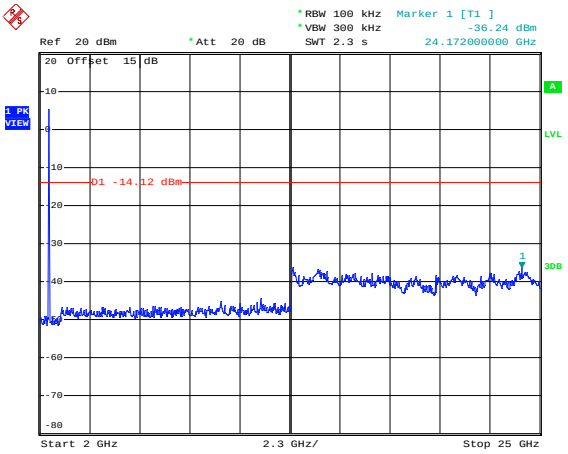
Spurious Emission 2GHz~25GHz

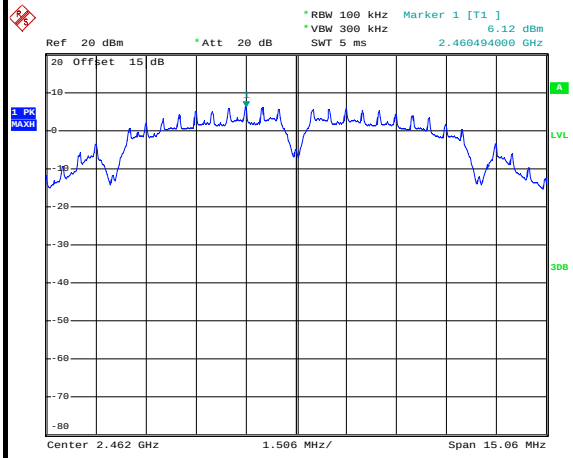


Date: 8.APR.2015 10:26:08

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

WLAN 802.11b Channel 11

100kHz PSD reference Level



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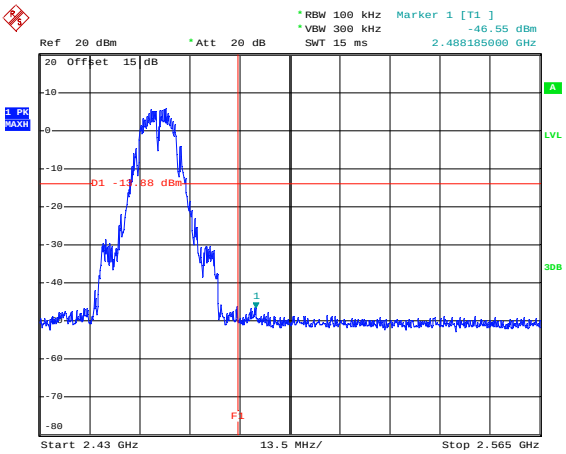
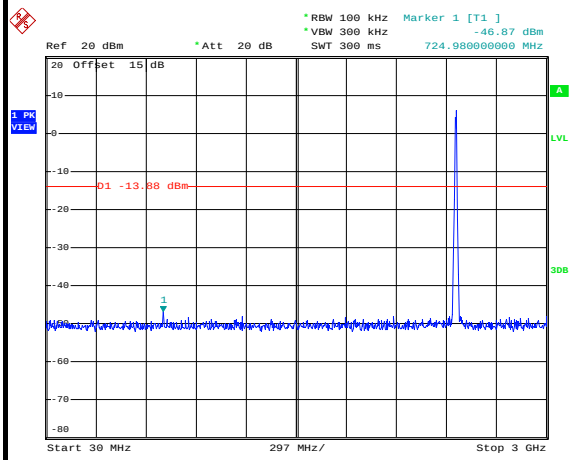
High Channel Plot



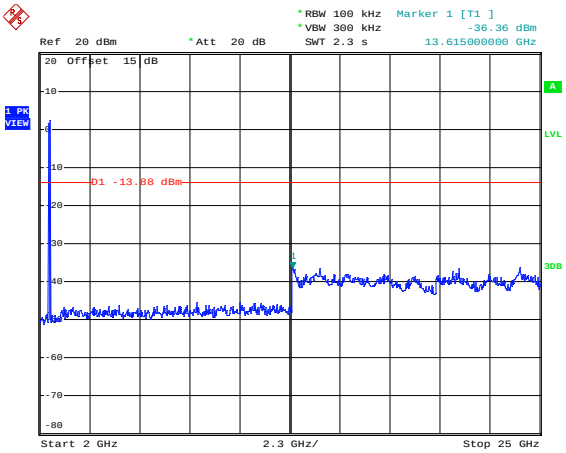
Date: 8.APR.2015 10:35:05

Spurious Emission 30MHz~3GHz



Date: 8.APR.2015 10:35:42

Spurious Emission 2GHz~25GHz

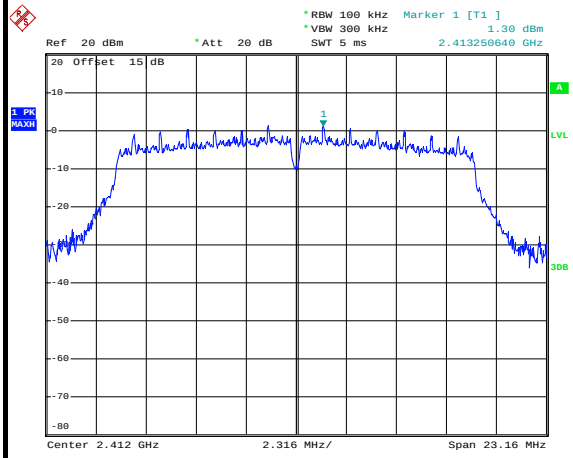


Date: 8.APR.2015 10:36:00

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

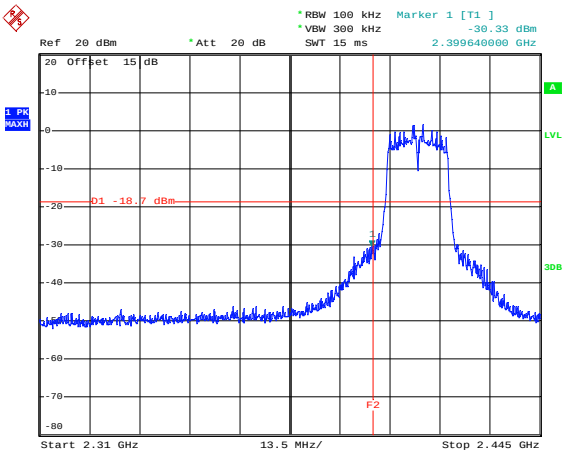
WLAN 802.11g Channel 01

100kHz PSD reference Level



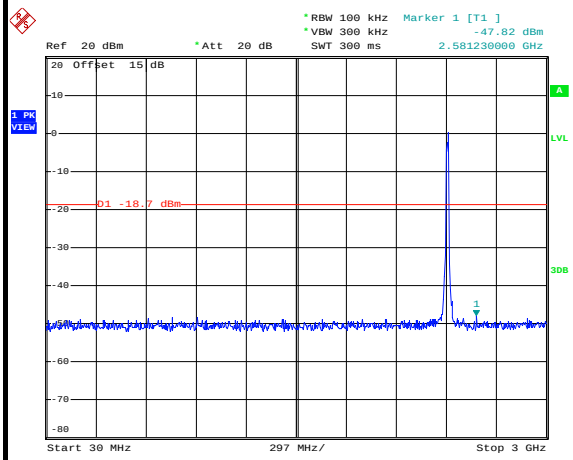
Date: 8.APR.2015 10:45:53

Low Channel Plot



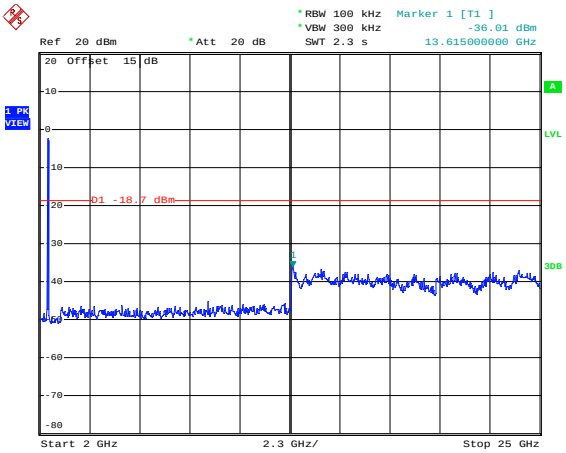
Date: 8.APR.2015 10:47:17

Spurious Emission 30MHz~3GHz



Date: 8.APR.2015 10:49:42

Spurious Emission 2GHz~25GHz

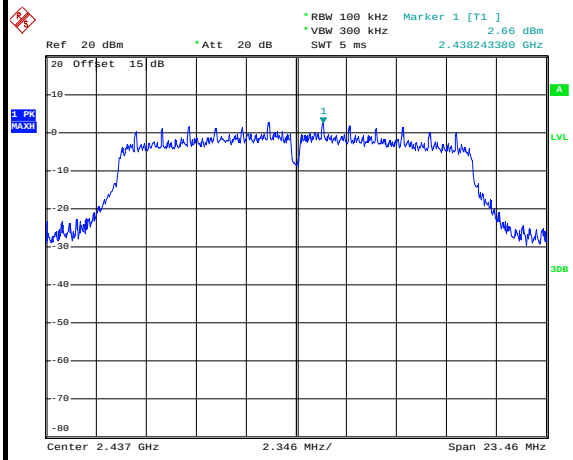


Date: 8.APR.2015 10:49:59

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

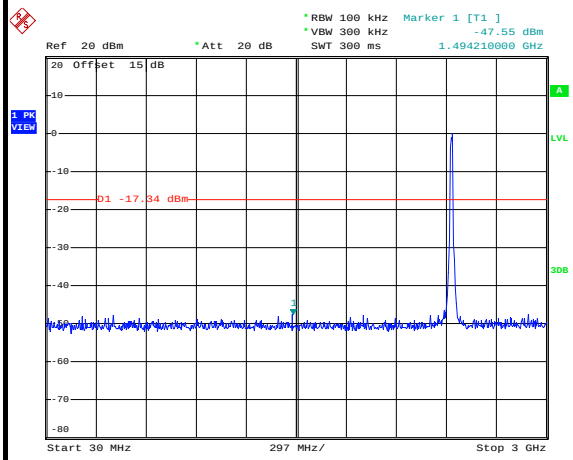
WLAN 802.11g Channel 06

100kHz PSD reference Level



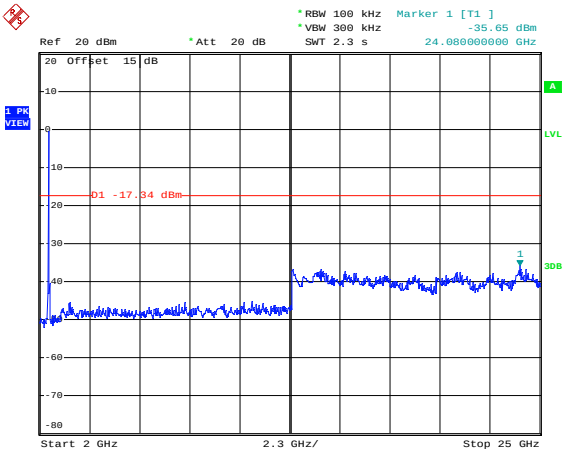
Date: 8.APR.2015 11:01:01

Spurious Emission 30MHz~3GHz



Date: 8.APR.2015 11:03:22

Spurious Emission 2GHz~25GHz

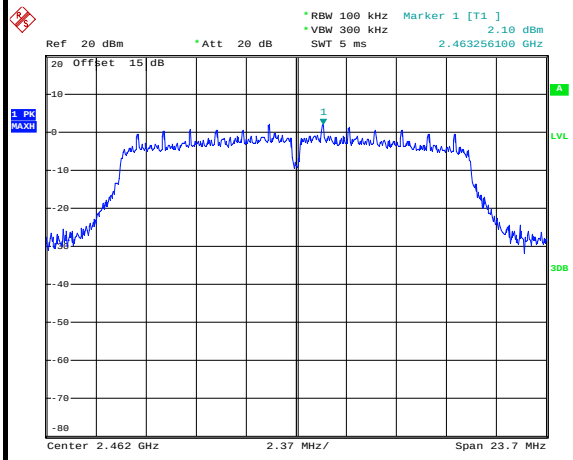


Date: 8.APR.2015 11:03:42

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

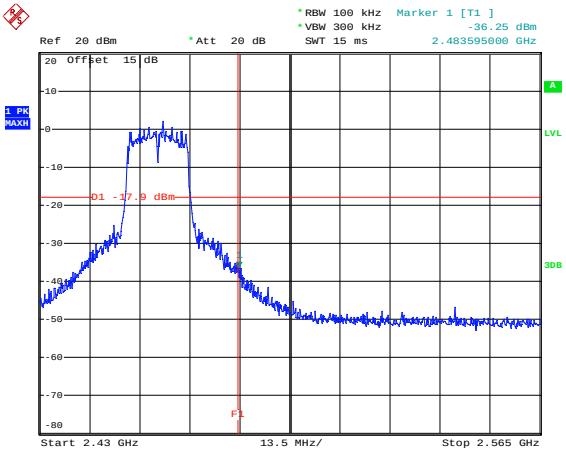
WLAN 802.11g Channel 11

100kHz PSD reference Level



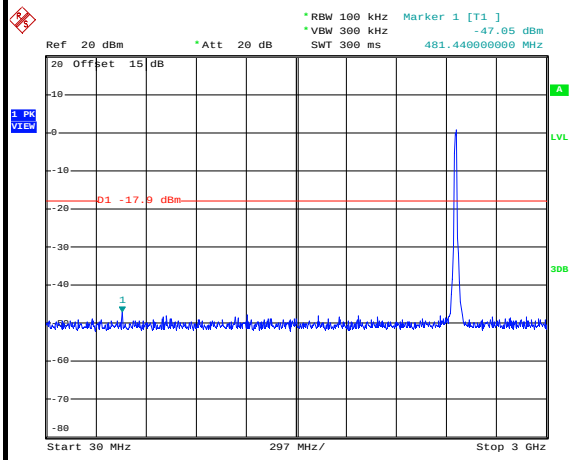
Date: 8.APR.2015 11:13:33

High Channel Plot



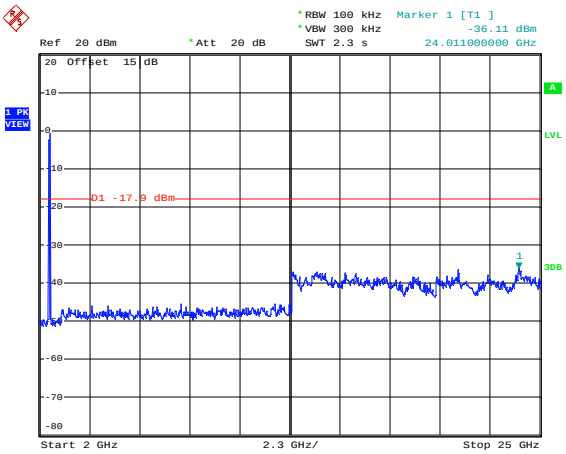
Date: 8.APR.2015 11:15:17

Spurious Emission 30MHz~3GHz



Date: 8.APR.2015 11:16:15

Spurious Emission 2GHz~25GHz

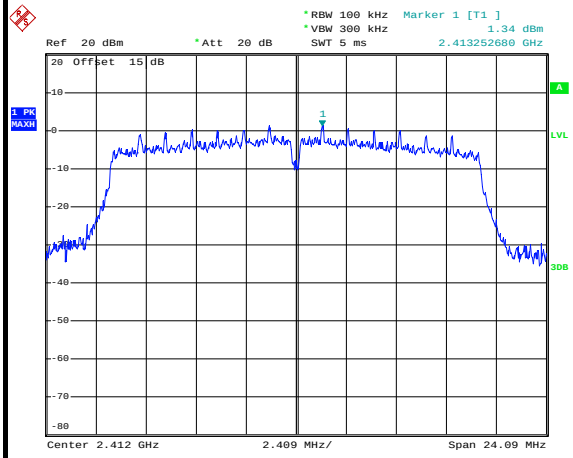


Date: 8.APR.2015 11:16:33

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

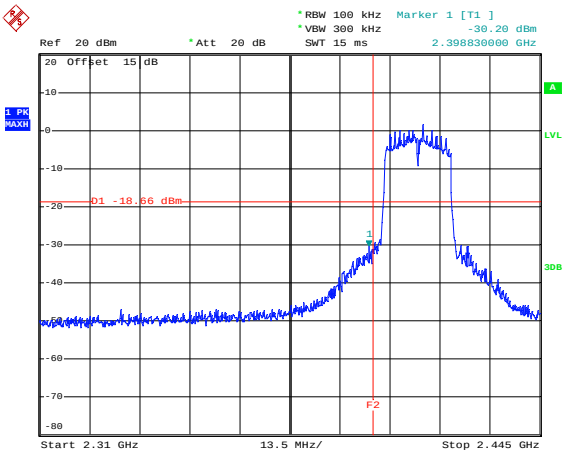
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



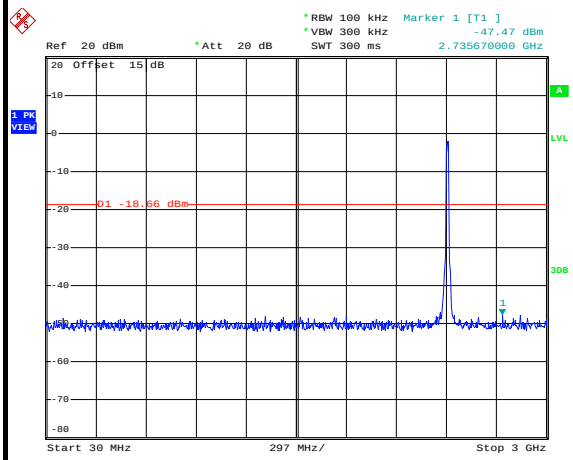
Date: 8.APR.2015 11:51:37

Low Channel Plot



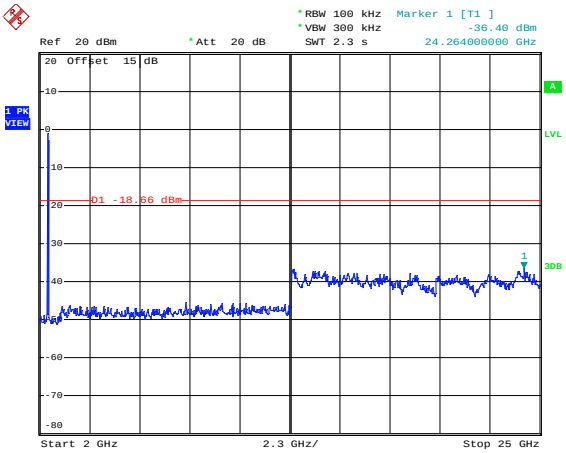
Date: 8.APR.2015 11:52:10

Spurious Emission 30MHz~3GHz



Date: 8.APR.2015 11:52:50

Spurious Emission 2GHz~25GHz

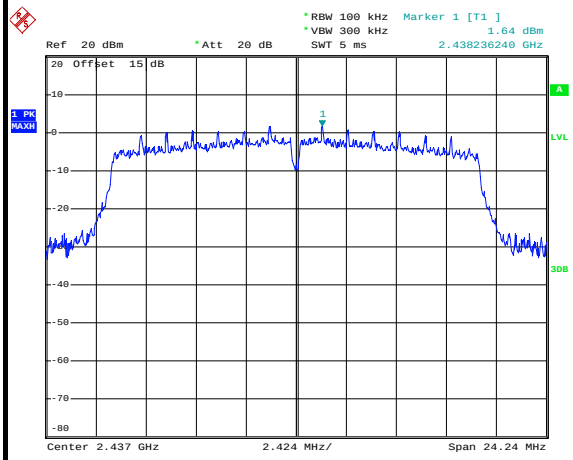


Date: 8.APR.2015 11:53:08

Test Mode :	802.11n HT20	**Temperature :**	24~26℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	50~53%
Test Channel :	06	**Test Engineer :**	Tiny You

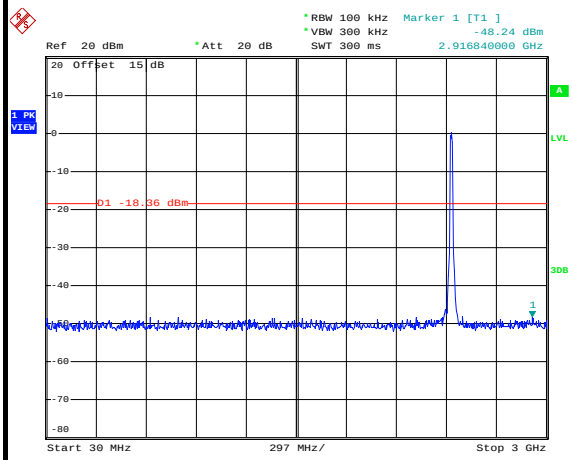
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



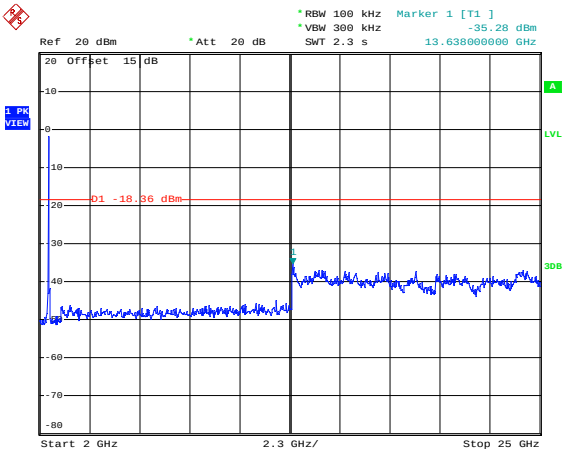
Date: 8.APR.2015 11:59:47

Spurious Emission 30MHz~3GHz



Date: 8.APR.2015 12:03:04

Spurious Emission 2GHz~25GHz

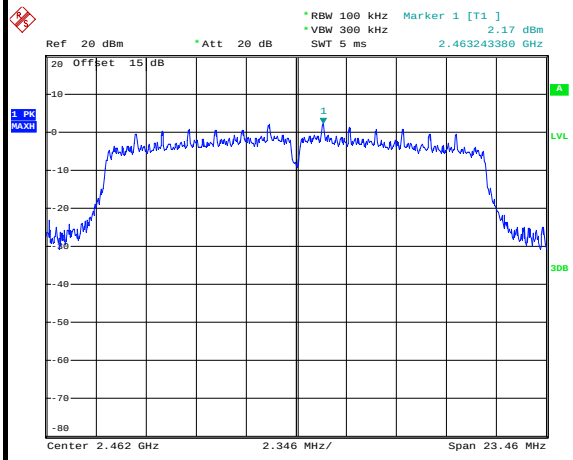


Date: 8.APR.2015 12:03:22

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

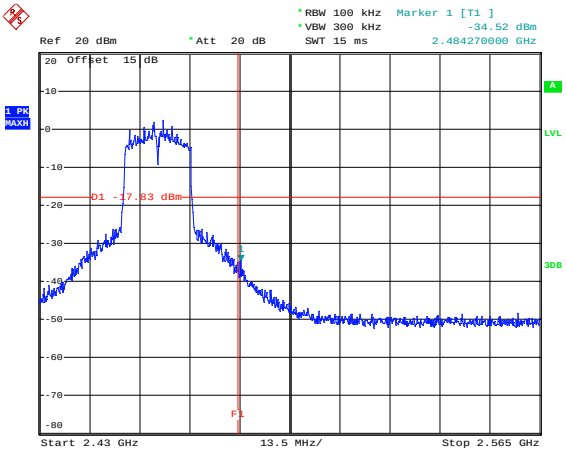
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



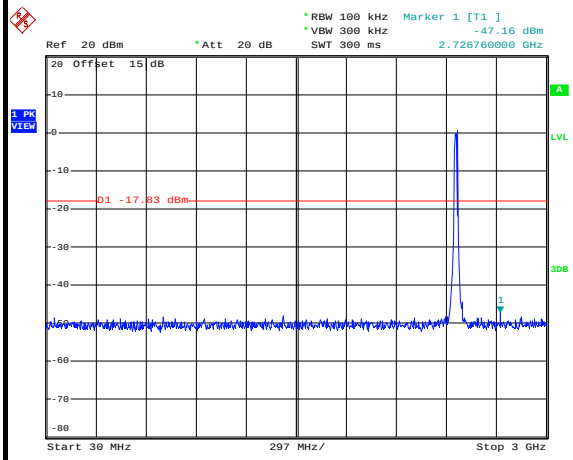
Date: 8.APR.2015 12:13:17

High Channel Plot



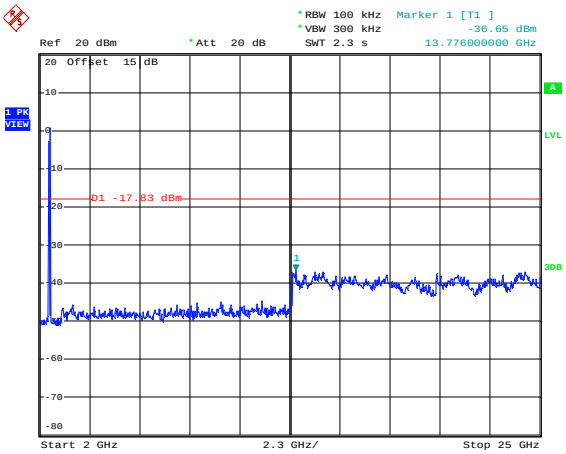
Date: 8.APR.2015 12:13:46

Spurious Emission 30MHz~3GHz



Date: 8.APR.2015 12:14:16

Spurious Emission 2GHz~25GHz

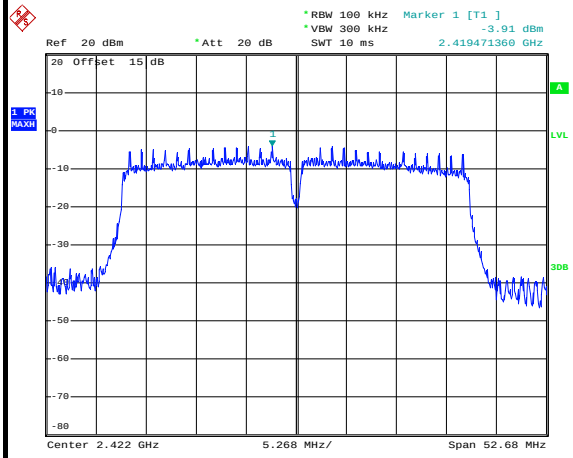


Date: 8.APR.2015 12:14:34

Test Mode :	802.11n HT40	**Temperature :**	24~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	50~53%
Test Channel :	03	**Test Engineer :**	Tiny You

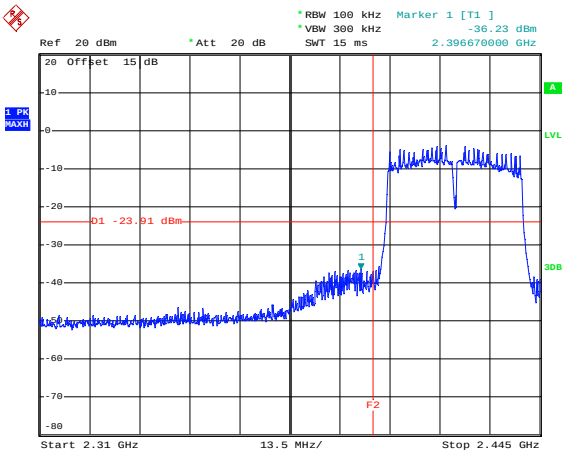
WLAN 802.11n HT40 Channel 03

100kHz PSD reference Level



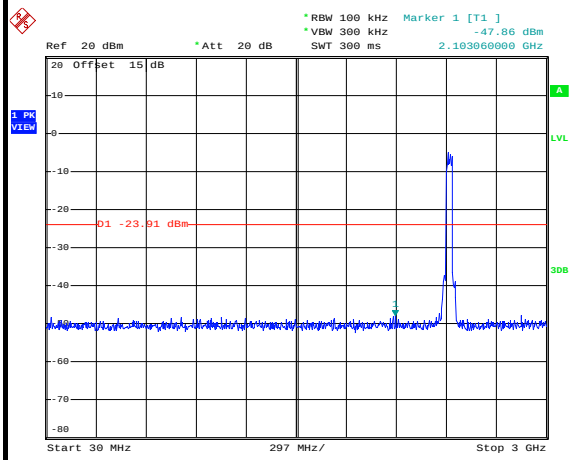
Date: 8.APR.2015 12:24:40

Low Channel Plot



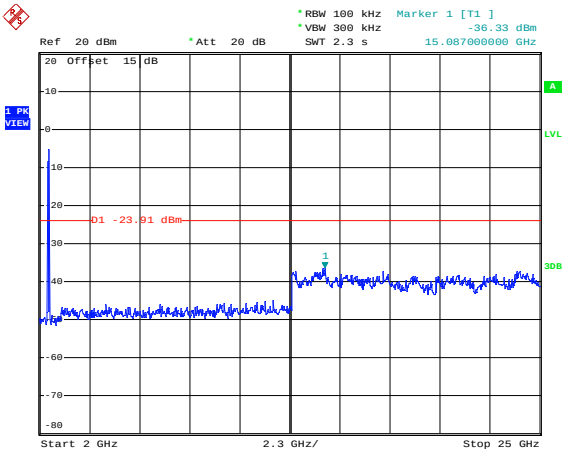
Date: 8.APR.2015 12:25:42

Spurious Emission 30MHz~3GHz



Date: 8.APR.2015 12:26:17

Spurious Emission 2GHz~25GHz

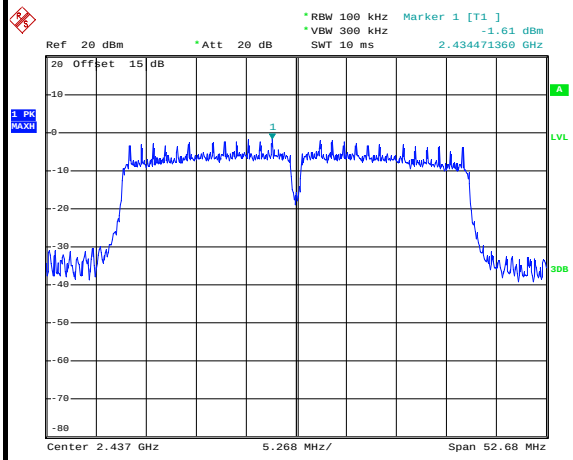


Date: 8.APR.2015 12:26:35

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

WLAN 802.11n HT40 Channel 06

100kHz PSD reference Level



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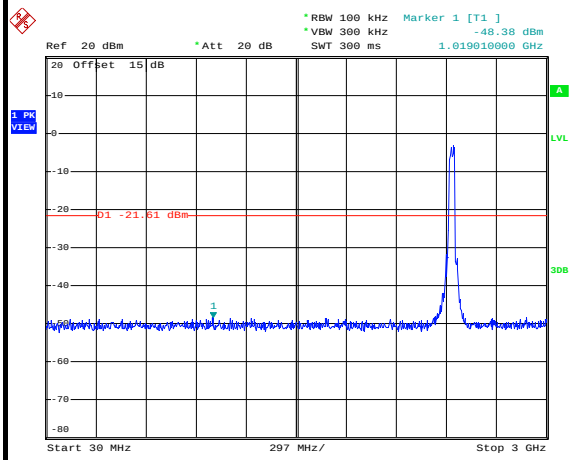
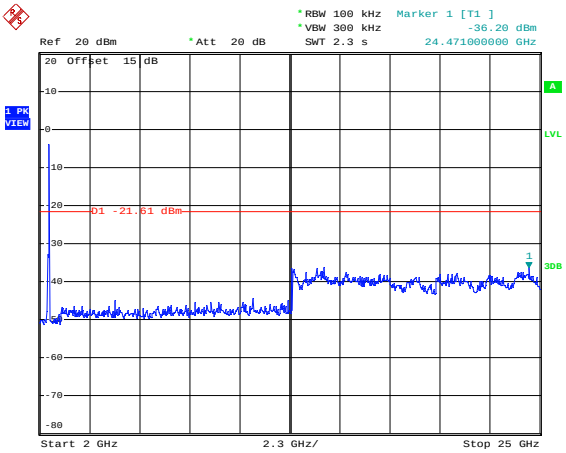
Spurious Emission 30MHz~3GHz



Date: 8.APR.2015 12:35:27

Spurious Emission 2GHz~25GHz

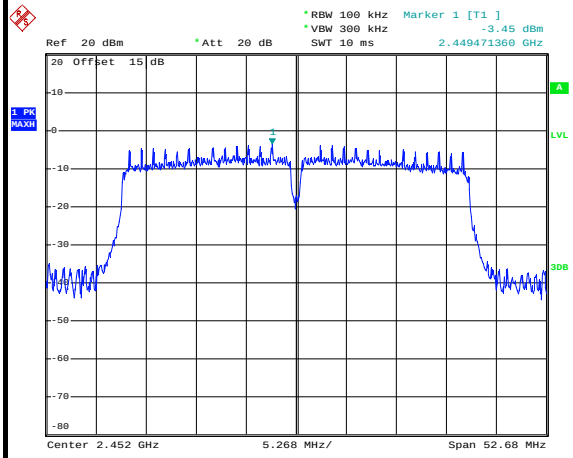


Date: 8.APR.2015 12:35:45

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

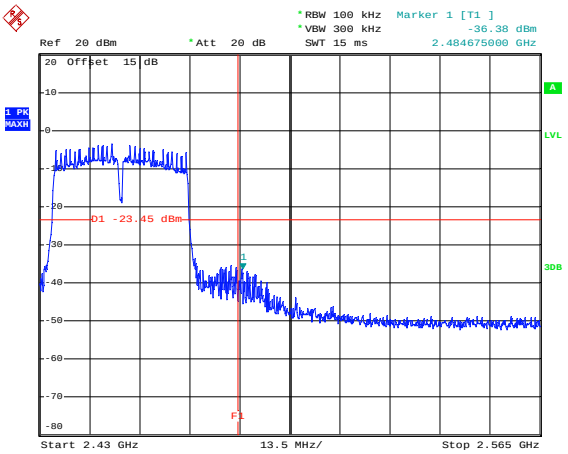
WLAN 802.11n HT40 Channel 09

100kHz PSD reference Level



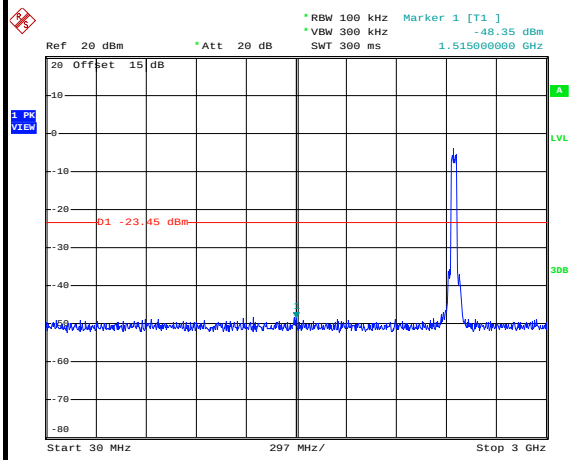
Date: 8.APR.2015 12:42:13

High Channel Plot



Date: 8.APR.2015 12:43:43

Spurious Emission 30MHz~3GHz



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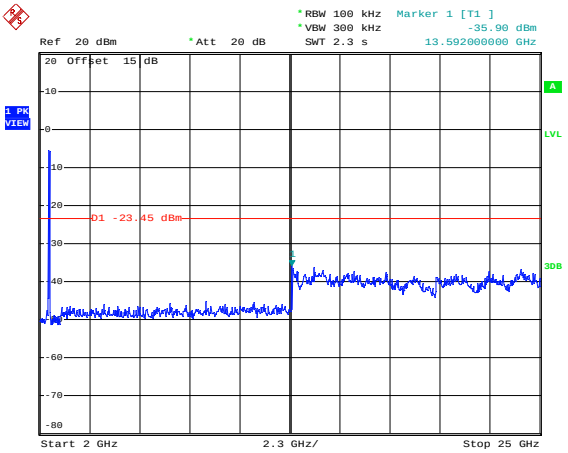
Spurious Emission 2GHz~25GHz



Date: 8.APR.2015 12:48:47

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.

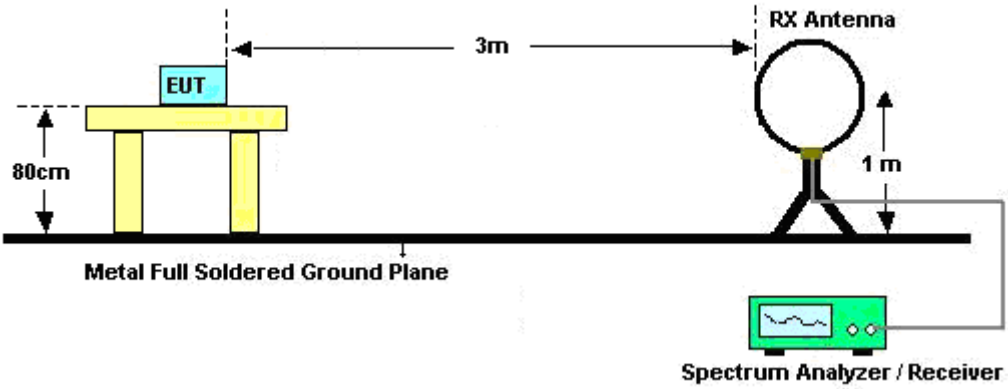
3.5.3 Test Procedures

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 ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

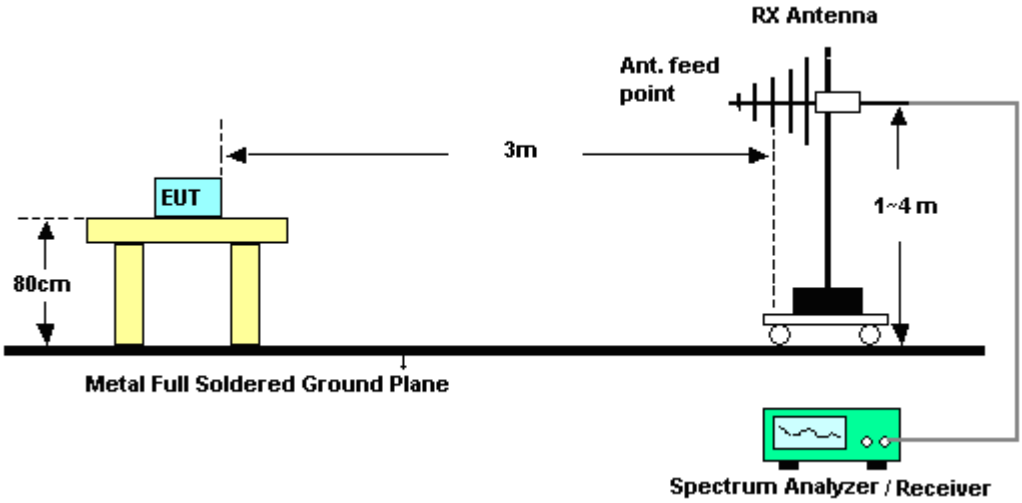
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	97.67	8.40	0.12	300Hz
802.11g	88.56	1.39	0.72	1kHz
2.4GHz 802.11n HT20	87.64	1.30	0.77	1kHz
2.4GHz 802.11n HT40	78.10	0.64	1.56	3kHz

3.5.4 Test Setup

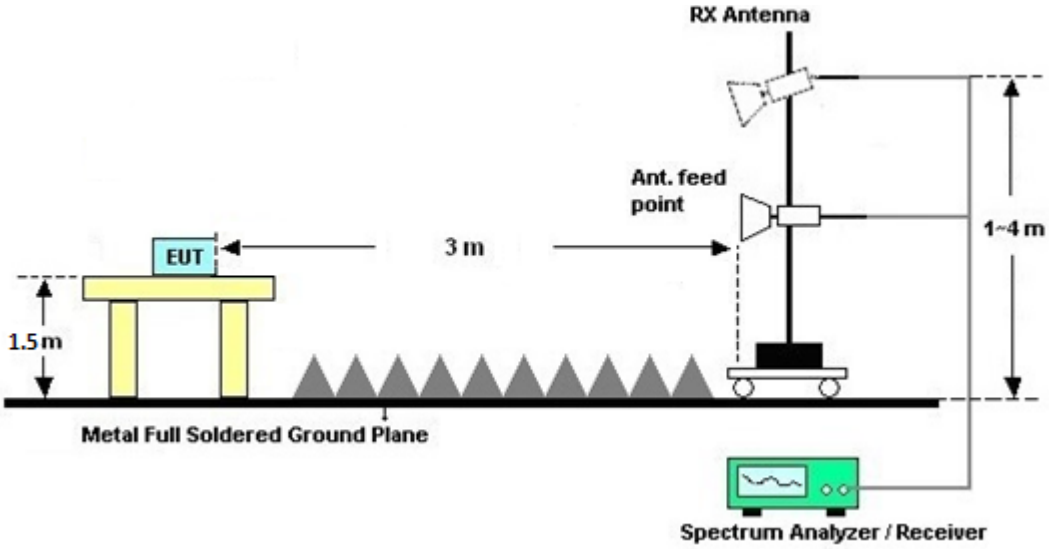
For radiated emissions below 30MHz



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 (dBμV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

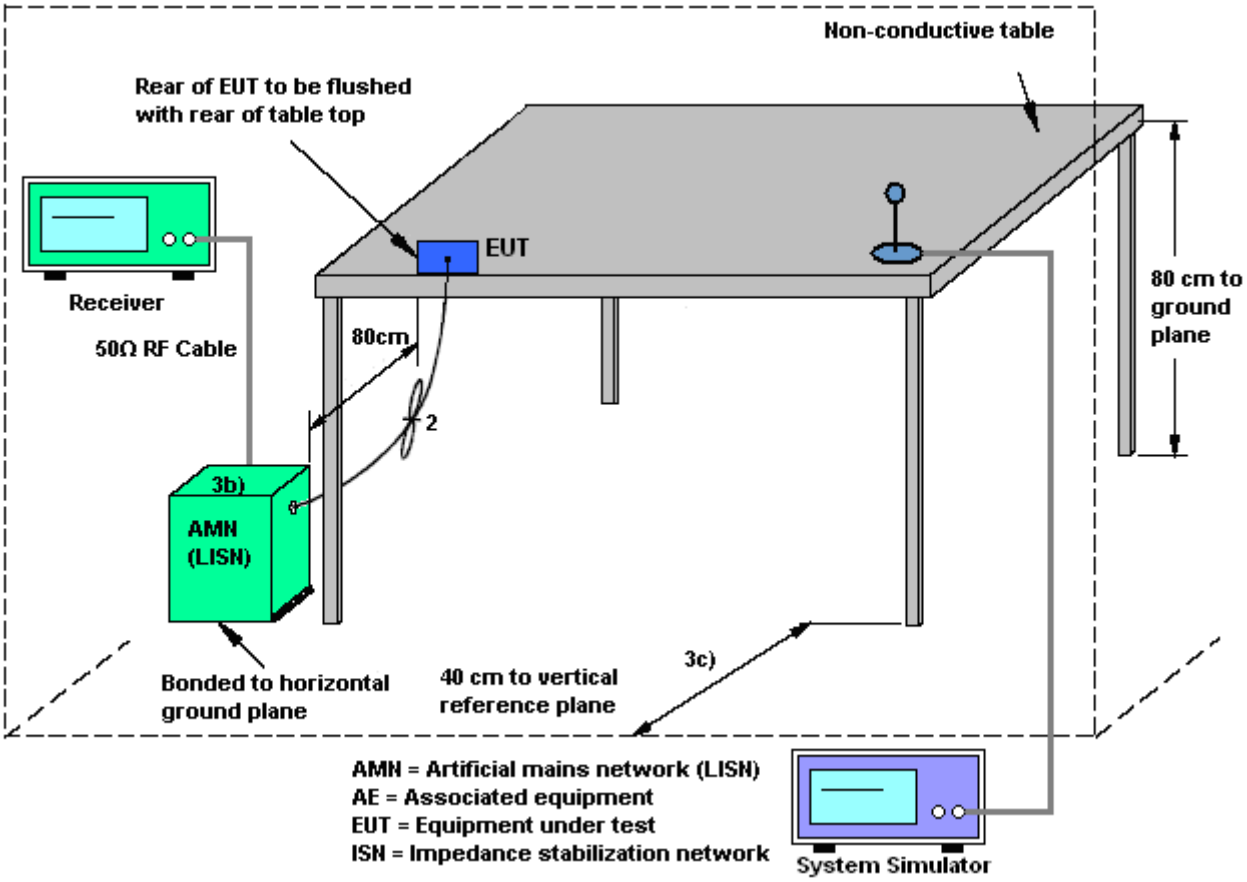
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

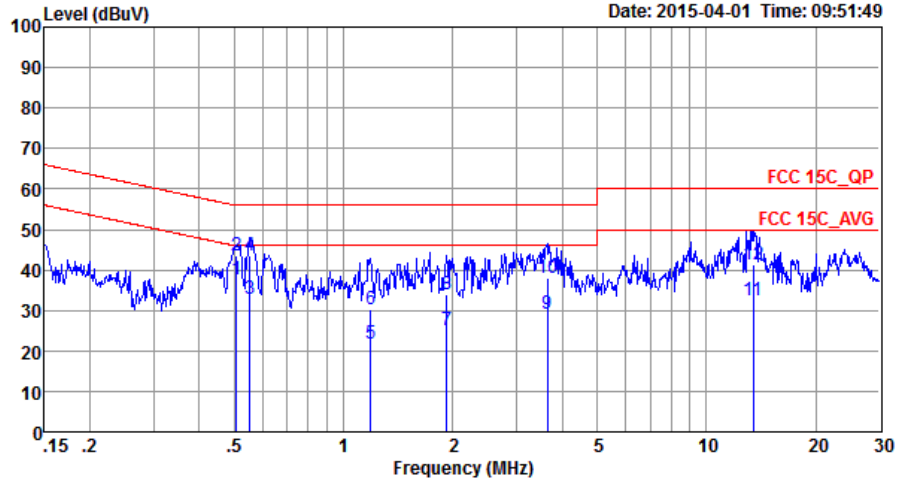
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other 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

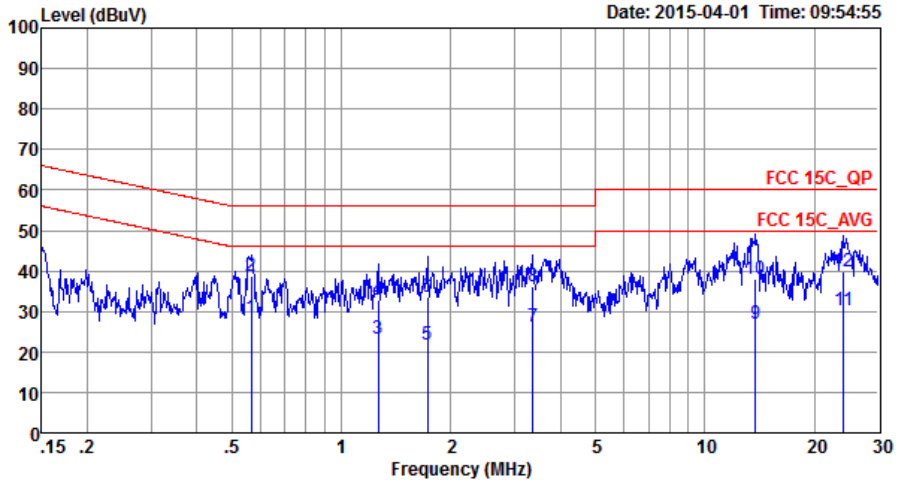
Test Mode :	Mode 1	**Temperature :**	21~22℃
Test Engineer :	Jack Tian	**Relative Humidity :**	41~43%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter) + Battery		



Site : CO01-SZ
Condition: FCC 15C QP LISN_L_20140304 LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	*	0.51	37.75	-8.25	46.00	27.30	0.29	10.16	Average
2		0.51	43.45	-12.55	56.00	33.00	0.29	10.16	QP
3		0.55	32.72	-13.28	46.00	22.31	0.26	10.15	Average
4		0.55	43.62	-12.38	56.00	33.21	0.26	10.15	QP
5		1.19	21.71	-24.29	46.00	11.30	0.25	10.16	Average
6		1.19	30.41	-25.59	56.00	20.00	0.25	10.16	QP
7		1.93	24.91	-21.09	46.00	14.50	0.22	10.19	Average
8		1.93	34.11	-21.89	56.00	23.70	0.22	10.19	QP
9		3.64	29.27	-16.73	46.00	18.70	0.35	10.22	Average
10		3.64	38.17	-17.83	56.00	27.60	0.35	10.22	QP
11		13.48	32.40	-17.60	50.00	20.70	1.23	10.47	Average
12		13.48	41.50	-18.50	60.00	29.80	1.23	10.47	QP

Test Mode :	Mode 1	**Temperature :**	21~22℃
Test Engineer :	Jack Tian	**Relative Humidity :**	41~43%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter) + Battery		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_N_20140304 NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.56	28.51	-17.49	46.00	18.01	0.35	10.15	Average
2	*	0.56	38.61	-17.39	56.00	28.11	0.35	10.15	QP
3		1.26	23.11	-22.89	46.00	12.61	0.34	10.16	Average
4		1.26	32.91	-23.09	56.00	22.41	0.34	10.16	QP
5		1.73	21.94	-24.06	46.00	11.40	0.36	10.18	Average
6		1.73	33.64	-22.36	56.00	23.10	0.36	10.18	QP
7		3.36	26.16	-19.84	46.00	15.50	0.44	10.22	Average
8		3.36	36.26	-19.74	56.00	25.60	0.44	10.22	QP
9		13.77	27.11	-22.89	50.00	15.20	1.42	10.49	Average
10		13.77	38.11	-21.89	60.00	26.20	1.42	10.49	QP
11		24.14	30.28	-19.72	50.00	17.50	2.22	10.56	Average
12		24.14	39.88	-20.12	60.00	27.10	2.22	10.56	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	Apr. 08, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
Power meter	Anritsu	ML2495A	1218010	10Hz~40GHz	Jan. 28, 2015	Apr. 08, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
Power Sensor	Anritsu	MA2411B	1207253	0.3GHz~40GHz	Jan. 28, 2015	Apr. 08, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 09, 2014	Apr. 26, 2015	Jun. 08, 2015	Radiation (03CH05-HY)
Bilog Antenna	Schaffner	CBL6111C	2725	30MHz~1GHz	Sep. 27, 2014	Apr. 26, 2015	Sep. 26, 2015	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	00066584	1GHz~18GHz	Aug. 30, 2014	Apr. 26, 2015	Aug. 29, 2015	Radiation (03CH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz~40GHz	Oct. 02, 2014	Apr. 26, 2015	Oct. 01, 2015	Radiation (03CH05-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590074	100kHz~18GHz	Jul. 07, 2014	Apr. 26, 2015	Jul. 06, 2015	Radiation (03CH05-HY)
Preamplifier	EMCI	EMC011830	980148	DC~18GHz	Jun. 23, 2014	Apr. 26, 2015	Jun. 22, 2015	Radiation (03CH05-HY)
Preamplifier	COM-POWER	PA-103	161075	9kHz~30MHz	Apr. 09, 2015	Apr. 26, 2015	Apr. 08, 2016	Radiation (03CH05-HY)
Preamplifier	Miteq	TTA0204	1872107	18GHz~40GHz	May 23, 2014	Apr. 26, 2015	May 22, 2015	Radiation (03CH05-HY)
Turn Table	HD	HD100	420/611	0 - 360 degree	N/A	Apr. 26, 2015	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	HD100	240/666	1 m - 4 m	N/A	Apr. 26, 2015	N/A	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	100315	9 kHz~30 MHz	Jul. 28, 2014	Apr. 26, 2015	Jul. 27, 2015	Radiation (03CH05-HY)
EMI TEST Receiver	R&S	ESCI7	100768	9kHz~3GHz	May 04, 2014	Apr. 01, 2015	May 03, 2015	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Feb. 02, 2015	Apr. 01, 2015	Feb. 01, 2016	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Feb. 02, 2015	Apr. 01, 2015	Feb. 01, 2016	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Sep. 29, 2014	Apr. 01, 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

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

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

Appendix A. Conducted Test Results

Report Number : FR532405C

Test Engineer:	Tiny You	Temperature:	24~26	°C
Test Date:	2015/4/8	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	13.20	10.04	0.50	Pass
11b	1Mbps	1	6	2437	13.35	10.04	0.50	Pass
11b	1Mbps	1	11	2462	13.65	10.04	0.50	Pass
11g	6Mbps	1	1	2412	17.45	15.44	0.50	Pass
11g	6Mbps	1	6	2437	17.60	15.64	0.50	Pass
11g	6Mbps	1	11	2462	17.70	15.80	0.50	Pass
HT20	MCS0	1	1	2412	18.30	16.06	0.50	Pass
HT20	MCS0	1	6	2437	18.35	16.16	0.50	Pass
HT20	MCS0	1	11	2462	18.45	15.64	0.50	Pass
HT40	MCS0	1	3	2422	36.20	35.12	0.50	Pass
HT40	MCS0	1	6	2437	36.40	35.12	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	17.22	30.00	0.50	17.72	36.00	Pass
11b	1Mbps	1	6	2437	17.26	30.00	0.50	17.76	36.00	Pass
11b	1Mbps	1	11	2462	17.50	30.00	0.50	18.00	36.00	Pass
11g	6Mbps	1	1	2412	19.65	30.00	0.50	20.15	36.00	Pass
11g	6Mbps	1	6	2437	19.69	30.00	0.50	20.19	36.00	Pass
11g	6Mbps	1	11	2462	19.32	30.00	0.50	19.82	36.00	Pass
HT20	MCS0	1	1	2412	19.47	30.00	0.50	19.97	36.00	Pass
HT20	MCS0	1	6	2437	19.57	30.00	0.50	20.07	36.00	Pass
HT20	MCS0	1	11	2462	19.30	30.00	0.50	19.80	36.00	Pass
HT40	MCS0	1	3	2422	19.15	30.00	0.50	19.65	36.00	Pass
HT40	MCS0	1	6	2437	19.68	30.00	0.50	20.18	36.00	Pass
HT40	MCS0	1	9	2452	19.07	30.00	0.50	19.57	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	0.10	14.82
11b	1Mbps	1	6	2437	0.10	14.96
11b	1Mbps	1	11	2462	0.10	15.22
11g	6Mbps	1	1	2412	0.53	12.08
11g	6Mbps	1	6	2437	0.53	13.46
11g	6Mbps	1	11	2462	0.53	12.10
HT20	MCS0	1	1	2412	0.57	11.49
HT20	MCS0	1	6	2437	0.57	12.38
HT20	MCS0	1	11	2462	0.57	12.11
HT40	MCS0	1	3	2422	1.07	8.89
HT40	MCS0	1	6	2437	1.07	12.14
HT40	MCS0	1	9	2452	1.07	9.41

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	-8.47	0.50	8.00	Pass
11b	1Mbps	1	6	2437	-8.17	0.50	8.00	Pass
11b	1Mbps	1	11	2462	-8.79	0.50	8.00	Pass
11g	6Mbps	1	1	2412	-13.56	0.50	8.00	Pass
11g	6Mbps	1	6	2437	-11.04	0.50	8.00	Pass
11g	6Mbps	1	11	2462	-11.95	0.50	8.00	Pass
HT20	MCS0	1	1	2412	-13.12	0.50	8.00	Pass
HT20	MCS0	1	6	2437	-13.00	0.50	8.00	Pass
HT20	MCS0	1	11	2462	-11.97	0.50	8.00	Pass
HT40	MCS0	1	3	2422	-18.53	0.50	8.00	Pass
HT40	MCS0	1	6	2437	-16.53	0.50	8.00	Pass
HT40	MCS0	1	9	2452	-19.13	0.50	8.00	Pass

Appendix B. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2361.57	58.66	-15.34	74	52.68	33.07	6.59	33.68	353	318	P	H
		2378.04	44.81	-9.19	54	38.78	33.04	6.65	33.66	353	318	A	H
	*	2412	106.73	-	-	100.66	33	6.7	33.63	353	318	P	H
	*	2412	101.9	-	-	95.83	33	6.7	33.63	353	318	A	H
		2365.8	61.72	-12.28	74	55.74	33.07	6.59	33.68	134	293	P	V
		2360.85	46.15	-7.85	54	40.17	33.07	6.59	33.68	134	293	A	V
	*	2410.521	109.22	-	-	103.15	33	6.7	33.63	134	293	P	V
	*	2411.105	104.77	-	-	98.7	33	6.7	33.63	134	293	A	V
802.11b CH 06 2437MHz		2346.54	58.02	-15.98	74	52.03	33.09	6.59	33.69	381	323	P	H
		2336.82	44.58	-9.42	54	38.59	33.09	6.59	33.69	381	323	A	H
	*	2437	106.59	-	-	100.53	32.96	6.7	33.6	381	323	P	H
	*	2437	102	-	-	95.94	32.96	6.7	33.6	381	323	A	H
		2489.6	57.17	-16.83	74	51.02	32.9	6.81	33.56	381	323	P	H
		2491.88	44.24	-9.76	54	38.09	32.9	6.81	33.56	381	323	A	H
		2384.25	59.32	-14.68	74	53.29	33.04	6.65	33.66	100	1	P	V
		2384.52	45.49	-8.51	54	39.46	33.04	6.65	33.66	100	1	A	V
	*	2435	109.18	-	-	103.12	32.98	6.7	33.62	100	1	P	V
	*	2435	104.36	-	-	98.3	32.98	6.7	33.62	100	1	A	V
		2486.04	59.7	-14.3	74	53.59	32.92	6.76	33.57	100	1	P	V
		2487.92	44.86	-9.14	54	38.76	32.9	6.76	33.56	100	1	A	V

802.11b CH 11 2462MHz	*	2462	107.1	-	-	100.99	32.94	6.76	33.59	379	212	P	H
	*	2462	102.5	-	-	96.39	32.94	6.76	33.59	379	212	A	H
		2487.4	57.14	-16.86	74	51.03	32.92	6.76	33.57	379	212	P	H
		2483.56	45.19	-8.81	54	39.08	32.92	6.76	33.57	379	212	A	H
	*	2460	108.54	-	-	102.43	32.94	6.76	33.59	101	311	P	V
	*	2460	104.6	-	-	98.49	32.94	6.76	33.59	101	311	A	V
		2483.76	58.79	-15.21	74	52.68	32.92	6.76	33.57	101	311	P	V
		2483.6	46.46	-7.54	54	40.35	32.92	6.76	33.57	101	311	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	40.09	-33.91	74	56.47	32.53	9.7	58.61	100	0	P	H
		4824	41.3	-32.7	74	57.68	32.53	9.7	58.61	100	0	P	V
802.11b CH 06 2437MHz		4875	41.68	-32.32	74	57.88	32.58	9.74	58.52	100	0	P	H
		7314	51	-23	74	63.25	34.06	11.85	58.16	100	0	P	H
		4875	42.43	-31.57	74	58.63	32.58	9.74	58.52	100	0	P	V
		7311	50.22	-23.78	74	62.47	34.06	11.85	58.16	100	0	P	V
802.11b CH 11 2462MHz		4926	43.85	-30.15	74	59.85	32.63	9.79	58.42	100	0	P	H
		7386	51.47	-22.53	74	63.73	34.08	11.97	58.31	100	0	P	H
		4923	43.77	-30.23	74	59.77	32.63	9.79	58.42	100	0	P	V
		7386	49.78	-24.22	74	62.04	34.08	11.97	58.31	100	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		2389.65	66.25	-7.75	74	60.23	33.02	6.65	33.65	351	317	P	H
		2390	48.64	-5.36	54	42.62	33.02	6.65	33.65	351	317	A	H
	*	2412	106.31	-	-	100.24	33	6.7	33.63	351	317	P	H
	*	2412	96.35	-	-	90.28	33	6.7	33.63	351	317	A	H
		2389.74	68.4	-5.6	74	62.38	33.02	6.65	33.65	133	291	P	V
		2390	50.79	-3.21	54	44.77	33.02	6.65	33.65	133	291	A	V
	*	2410.271	109.51	-	-	103.44	33	6.7	33.63	133	291	P	V
	*	2410	98.85	-	-	92.78	33	6.7	33.63	133	291	A	V
802.11g CH 06 2437MHz		2371.47	58.08	-15.92	74	52.05	33.04	6.65	33.66	381	322	P	H
		2357.16	44.84	-9.16	54	38.86	33.07	6.59	33.68	381	322	A	H
	*	2437	106.78	-	-	100.72	32.96	6.7	33.6	381	322	P	H
	*	2437	96.73	-	-	90.67	32.96	6.7	33.6	381	322	A	H
		2484.12	57.18	-16.82	74	51.07	32.92	6.76	33.57	381	322	P	H
		2483.8	44.54	-9.46	54	38.43	32.92	6.76	33.57	381	322	A	H
		2385.51	61.31	-12.69	74	55.29	33.02	6.65	33.65	100	358	P	V
		2356.89	47.35	-6.65	54	41.37	33.07	6.59	33.68	100	358	A	V
	*	2437	109.31	-	-	103.25	32.96	6.7	33.6	100	358	P	V
	*	2437	99.43	-	-	93.37	32.96	6.7	33.6	100	358	A	V
		2488.88	57.76	-16.24	74	51.61	32.9	6.81	33.56	100	358	P	V
		2485.6	45.38	-8.62	54	39.27	32.92	6.76	33.57	100	358	A	V

802.11g CH 11 2462MHz	*	2463	106.53	-	-	100.42	32.94	6.76	33.59	379	212	P	H
	*	2463	96.58	-	-	90.47	32.94	6.76	33.59	379	212	A	H
		2483.6	68.35	-5.65	74	62.24	32.92	6.76	33.57	379	212	P	H
		2483.6	48.27	-5.73	54	42.16	32.92	6.76	33.57	379	212	A	H
	*	2460	108.96	-	-	102.85	32.94	6.76	33.59	157	243	P	V
	*	2460	98.75	-	-	92.64	32.94	6.76	33.59	157	243	A	V
		2483.56	71.32	-2.68	74	65.21	32.92	6.76	33.57	157	243	P	V
		2483.52	50.92	-3.08	54	44.81	32.92	6.76	33.57	157	243	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	39.85	-34.15	74	56.23	32.53	9.7	58.61	100	0	P	H
		4824	39.3	-34.7	74	55.68	32.53	9.7	58.61	100	0	P	V
802.11g CH 06 2437MHz		4875	40.47	-33.53	74	56.67	32.58	9.74	58.52	100	0	P	H
		7311	54.11	-19.89	74	66.36	34.06	11.85	58.16	176	18	P	H
		7311	38.92	-15.08	54	51.17	34.06	11.85	58.16	176	18	A	H
		4875	39.96	-34.04	74	56.16	32.58	9.74	58.52	100	0	P	V
		7311	54.24	-19.76	74	66.49	34.06	11.85	58.16	222	47	P	V
		7311	39.87	-14.13	54	52.12	34.06	11.85	58.16	222	47	A	V
802.11g CH 11 2462MHz		4923	40.23	-33.77	74	56.23	32.63	9.79	58.42	100	0	P	H
		7388	50.99	-23.01	74	63.25	34.08	11.97	58.31	100	0	P	H
		4923	40.77	-33.23	74	56.77	32.63	9.79	58.42	100	0	P	V
		7388	49.42	-24.58	74	61.68	34.08	11.97	58.31	100	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		2389.2	67.44	-6.56	74	61.42	33.02	6.65	33.65	351	320	P	H
		2390	48.48	-5.52	54	42.46	33.02	6.65	33.65	351	320	A	H
	*	2412	105.7	-	-	99.63	33	6.7	33.63	351	320	P	H
	*	2412	95.48	-	-	89.41	33	6.7	33.63	351	320	A	H
		2388.75	71.42	-2.58	74	65.4	33.02	6.65	33.65	136	292	P	V
		2390	51.19	-2.81	54	45.17	33.02	6.65	33.65	136	292	A	V
	*	2410	108.37	-	-	102.3	33	6.7	33.63	136	292	P	V
	*	2410	98.25	-	-	92.18	33	6.7	33.63	136	292	A	V
802.11n HT20 CH 06 2437MHz		2354.28	57.39	-16.61	74	51.41	33.07	6.59	33.68	380	322	P	H
		2356.98	44.91	-9.09	54	38.93	33.07	6.59	33.68	380	322	A	H
	*	2437	106.08	-	-	100.02	32.96	6.7	33.6	380	322	P	H
	*	2437	95.7	-	-	89.64	32.96	6.7	33.6	380	322	A	H
		2484.96	56.82	-17.18	74	50.71	32.92	6.76	33.57	380	322	P	H
		2483.92	44.53	-9.47	54	38.42	32.92	6.76	33.57	380	322	A	H
		2380.11	59.84	-14.16	74	53.81	33.04	6.65	33.66	100	1	P	V
		2357.16	47.4	-6.6	54	41.42	33.07	6.59	33.68	100	1	A	V
	*	2435	108.27	-	-	102.21	32.98	6.7	33.62	100	1	P	V
	*	2435	98.14	-	-	92.08	32.98	6.7	33.62	100	1	A	V
		2484.52	58.55	-15.45	74	52.44	32.92	6.76	33.57	100	1	P	V
		2483.76	45.27	-8.73	54	39.16	32.92	6.76	33.57	100	1	A	V

802.11n HT20 CH 11 2462MHz	*	2462	106.56	-	-	100.45	32.94	6.76	33.59	378	223	P	H
	*	2462	96.48	-	-	90.37	32.94	6.76	33.59	378	223	A	H
		2484.28	70.85	-3.15	74	64.74	32.92	6.76	33.57	378	223	P	H
		2483.52	49.32	-4.68	54	43.21	32.92	6.76	33.57	378	223	A	H
	*	2460	109.48	-	-	103.37	32.94	6.76	33.59	160	292	P	V
	*	2460	99.56	-	-	93.45	32.94	6.76	33.59	160	292	A	V
		2483.56	71.5	-2.5	74	65.39	32.92	6.76	33.57	160	292	P	V
		2483.68	51.25	-2.75	54	45.14	32.92	6.76	33.57	160	292	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	40.16	-33.84	74	56.54	32.53	9.7	58.61	100	0	P	H
		4824	39.91	-34.09	74	56.29	32.53	9.7	58.61	100	0	P	V
802.11n HT20 CH 06 2437MHz		4875	39.35	-34.65	74	55.55	32.58	9.74	58.52	100	0	P	H
		7311	51.14	-22.86	74	63.39	34.06	11.85	58.16	100	0	P	H
		4875	40.17	-33.83	74	56.37	32.58	9.74	58.52	100	0	P	V
		7313	50	-24	74	62.25	34.06	11.85	58.16	100	0	P	V
802.11n HT20 CH 11 2462MHz		4923	40.18	-33.82	74	56.18	32.63	9.79	58.42	100	0	P	H
		7388	51.06	-22.94	74	63.32	34.08	11.97	58.31	100	0	P	H
		4923	39.83	-34.17	74	55.83	32.63	9.79	58.42	100	0	P	V
		7388	50.01	-23.99	74	62.27	34.08	11.97	58.31	100	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		2388.21	66.08	-7.92	74	60.06	33.02	6.65	33.65	343	315	P	H
		2390	47.67	-6.33	54	41.65	33.02	6.65	33.65	343	315	A	H
	*	2420	99.37	-	-	93.31	32.98	6.7	33.62	343	315	P	H
	*	2420	89.47	-	-	83.41	32.98	6.7	33.62	343	315	A	H
		2496.16	57.85	-16.15	74	51.7	32.9	6.81	33.56	343	315	P	H
		2489.52	44.78	-9.22	54	38.63	32.9	6.81	33.56	343	315	A	H
		2388.3	70.87	-3.13	74	64.85	33.02	6.65	33.65	131	289	P	V
		2389.2	51.05	-2.95	54	45.03	33.02	6.65	33.65	131	289	A	V
	*	2420	101.99	-	-	95.93	32.98	6.7	33.62	131	289	P	V
	*	2420	92.25	-	-	86.19	32.98	6.7	33.62	131	289	A	V
		2490.48	57.28	-16.72	74	51.13	32.9	6.81	33.56	131	289	P	V
		2483.68	45.17	-8.83	54	39.06	32.92	6.76	33.57	131	289	A	V
802.11n HT40 CH 06 2437MHz		2389.02	60.39	-13.61	74	54.37	33.02	6.65	33.65	387	324	P	H
		2388.3	46.22	-7.78	54	40.2	33.02	6.65	33.65	387	324	A	H
	*	2424	102.82	-	-	96.76	32.98	6.7	33.62	387	324	P	H
	*	2424	92.32	-	-	86.26	32.98	6.7	33.62	387	324	A	H
		2493.52	57.39	-16.61	74	51.24	32.9	6.81	33.56	387	324	P	H
		2483.8	45.06	-8.94	54	38.95	32.92	6.76	33.57	387	324	A	H
		2387.13	66.86	-7.14	74	60.84	33.02	6.65	33.65	100	358	P	V
		2389.56	50.42	-3.58	54	44.4	33.02	6.65	33.65	100	358	A	V
	*	2435	104.7	-	-	98.64	32.98	6.7	33.62	100	358	P	V
	*	2435	94.91	-	-	88.85	32.98	6.7	33.62	100	358	A	V
		2483.88	68.22	-5.78	74	62.11	32.92	6.76	33.57	100	358	P	V
		2483.88	48.91	-5.09	54	42.8	32.92	6.76	33.57	100	358	A	V

802.11n HT40 CH 09 2452MHz		2337.81	57.34	-16.66	74	51.35	33.09	6.59	33.69	382	322	P	H
		2371.38	45.18	-8.82	54	39.15	33.04	6.65	33.66	382	322	A	H
	*	2452	100.09	-	-	93.97	32.96	6.76	33.6	382	322	P	H
	*	2452	90.13	-	-	84.01	32.96	6.76	33.6	382	322	A	H
		2483.76	66.31	-7.69	74	60.2	32.92	6.76	33.57	382	322	P	H
		2484.76	45.47	-8.53	54	39.36	32.92	6.76	33.57	382	322	A	H
		2384.88	62.62	-11.38	74	56.59	33.04	6.65	33.66	131	259	P	V
		2386.41	46.22	-7.78	54	40.2	33.02	6.65	33.65	131	259	A	V
	*	2454	101.4	-	-	95.29	32.94	6.76	33.59	131	259	P	V
	*	2454	91.55	-	-	85.44	32.94	6.76	33.59	131	259	A	V
		2485.08	70.35	-3.65	74	64.24	32.92	6.76	33.57	131	259	P	V
		2484.64	46.76	-7.24	54	40.65	32.92	6.76	33.57	131	259	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		4845	39.33	-34.67	74	55.67	32.54	9.7	58.58	100	0	P	H
HT40		7264	44.34	-29.66	74	56.58	34.05	11.78	58.07	100	0	P	H
CH 03		4845	39.08	-34.92	74	55.42	32.54	9.7	58.58	100	0	P	V
2422MHz		7268	43.97	-30.03	74	56.23	34.06	11.78	58.1	100	0	P	V
802.11n		4875	40.5	-33.5	74	56.7	32.58	9.74	58.52	100	0	P	H
HT40		7309	47.41	-26.59	74	59.66	34.06	11.85	58.16	100	0	P	H
CH 06		4875	39.31	-34.69	74	55.51	32.58	9.74	58.52	100	0	P	V
2437MHz		7313	46.22	-27.78	74	58.47	34.06	11.85	58.16	100	0	P	V
802.11n		4905	39.76	-34.24	74	55.82	32.61	9.79	58.46	100	0	P	H
HT40		7358	45.45	-28.55	74	57.72	34.07	11.91	58.25	100	0	P	H
CH 09		4905	39.86	-34.14	74	55.92	32.61	9.79	58.46	100	0	P	V
2452MHz		7354	43.94	-30.06	74	56.21	34.07	11.91	58.25	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11n HT20 LF		75.9	9.48	-30.52	40	31.84	6.85	1.22	30.43	-	-	P	H
		113.43	20.23	-23.27	43.5	37.65	11.5	1.48	30.4	-	-	P	H
		159.87	20.61	-22.89	43.5	38.76	10.5	1.71	30.36	100	66	P	H
		556.9	20.25	-25.75	46	26.87	19.98	3.09	29.69	-	-	P	H
		736.8	22.68	-23.32	46	26.47	22.11	3.54	29.44	-	-	P	H
		960.1	26.62	-27.38	54	26.58	24.9	4.08	28.94	-	-	P	H
		41.34	18.36	-21.64	40	35.35	12.44	0.92	30.35	-	-	P	V
		92.1	19.35	-24.15	43.5	39.33	8.96	1.48	30.42	-	-	P	V
		113.16	26.98	-16.52	43.5	44.4	11.5	1.48	30.4	100	96	P	V
		677.3	21.48	-24.52	46	27.25	20.37	3.37	29.51	-	-	P	V
		816.6	23.35	-22.65	46	26.4	22.51	3.78	29.34	-	-	P	V
		981.8	26.68	-27.32	54	26.52	24.88	4.16	28.88	-	-	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 CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

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