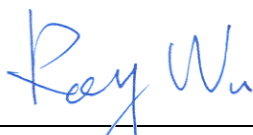


FCC RF Test Report

APPLICANT : Inventec Corporation
EQUIPMENT : Pharos 565 PDA
BRAND NAME : Pharos 565 PDA
MODEL NAME : PTL565
FCC ID : DGILOTUS1
STANDARD : FCC Part 15 Subpart E
CLASSIFICATION : Unlicensed National Information Infrastructure (UNII)

The product was received on Nov. 02, 2009 and completely tested on Feb. 03, 2010. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown 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 INC., the test report shall not be reproduced except in full.



Reviewed by: Roy Wu / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR9N0214C	Rev. 01	Initial issue of report	Feb. 04, 2010

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	A9.2	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	A9.2	Maximum Conducted Output Power	$\leq 17, 24, 30$ dBm (depend on band)	Pass	-
3.3	15.407(a)	A9.2	Power Spectral Density	$\leq 4, 11, 17$ dBm (depend on band)	Pass	-
3.4	15.407(b)	A9.3	Frequency Band Edges	$\leq -17, -27$ dBm (depend on band)&15.209(a)	Pass	-
3.5	15.407(b)	A9.3	Spurious Emission	< 20 dBc	Pass	-
3.6	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 7.1 dB at 0.622 MHz
3.7	15.407(b)	A9.3	Transmitter Radiated Emission	$\leq -17, -27$ dBm (depend on band)&15.209(a)	Pass	Under limit 5.24 dB at 455.40 MHz
3.8	15.407(b)	A9.3	Peak Excursion Ratio	≤ 13 dB	Pass	-
3.9	15.407(c)	A9.5	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.10	15.407(g)	A9.5	Frequency Stability	Within Operation Band	Pass	-
3.11	15.203 & 15.407(a)	A9.2	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Inventec Corporation

Inventec Building, No. 66, Hou-Kang Street, Shihlin District, Taipei 11170, Taiwan

1.2 Manufacturer

Inventec Corporation

Inventec Building, No. 66, Hou-Kang Street, Shihlin District, Taipei 11170, Taiwan

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Pharos 565 PDA
Brand Name	Pharos 565 PDA
Model Name	PTL565
FCC ID	DGILOTUS1
Tx/Rx Frequency Range	5150 MHz ~ 5250 MHz
Maximum Output Power to Antenna	11.76 dBm
Antenna Type	PIFA Antenna with gain 0 dBi
HW Version	LOTUS_6050A2299701_MB_X02
SW Version	CE OS 5.2.21840 (Build 21840.5.0.60) , BSP V10_4_1_2_003_20090817
Type of Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Identical Prototype

Remark:

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Unlicensed National Information Infrastructure (UNII).
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	CO05-HY	03CH06-HY	TW1022/4086B-1

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart E
- ♦ FCC Public Notice DA 02-2138, (Measurement Guidelines of UNII)
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issued 7

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
5.	Bluetooth Earphone	Samsung	SBH500	A3LSBH500	N/A	N/A
6.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A

2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

Channel Spacing 20MHz					
Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
36	5180	40	5200	44	5220

Remark: The channel 48 (5240MHz) was disabled by manufacturer.

2.2 RF Power

Preliminary RF power output tests were performed in different data rate and recorded the in the following table:

Channel	Frequency	5GHz 802.11a RF Power (dBm)							
		At OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 036	5180 MHz	11.76	11.07	11.70	11.14	11.74	11.72	11.72	11.74
CH 040	5200 MHz	10.55	10.67	10.79	10.56	10.75	10.67	10.66	10.55
CH 044	5220 MHz	11.65	11.05	11.57	11.58	11.47	11.39	11.42	11.37

Remark:

1. The 802.11a data rate was set in 6Mbps due to the highest RF output power.
2. The EUT is programmed to transmit signal continuously for all testing.

2.3 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

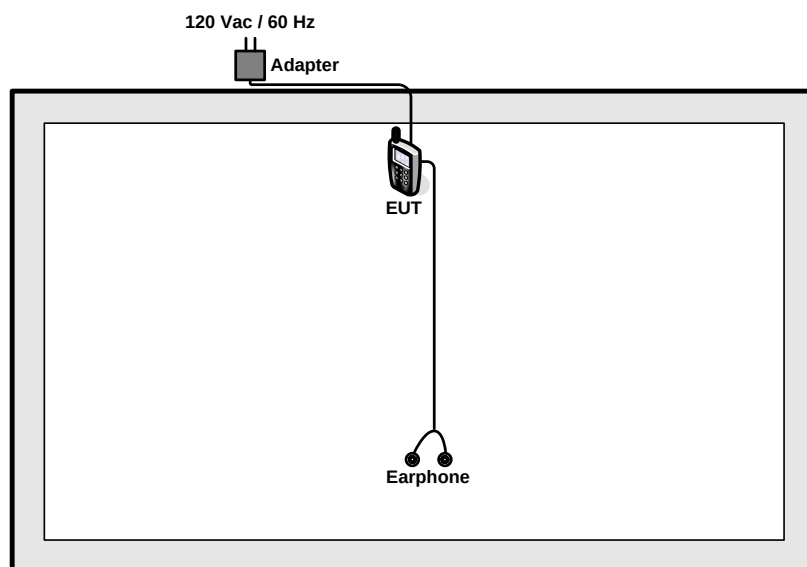
Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

The following tables are showing the test modes as the worst cases and recorded in this report.

Test Cases	
Test Item	802.11a (Modulation : OFDM)
Conducted TCs	■ Mode 1: CH36_5180 MHz ■ Mode 2: CH40_5200 MHz ■ Mode 3: CH44_5220 MHz
Radiated TCs	■ Mode 1: CH36_5180 MHz ■ Mode 2: CH40_5200 MHz ■ Mode 3: CH44_5220 MHz
AC Conducted Emission	Mode 1 : WLAN (5G) Link + Bluetooth Link + GPS Rx + Earphone + Adapter Mode 2 : WLAN (5G) Link + Bluetooth Link + MPEG4 + Earphone + USB Cable (Link with Notebook)
Remark: The worst case of conducted emission is mode 2; only the test data of it was reported.	

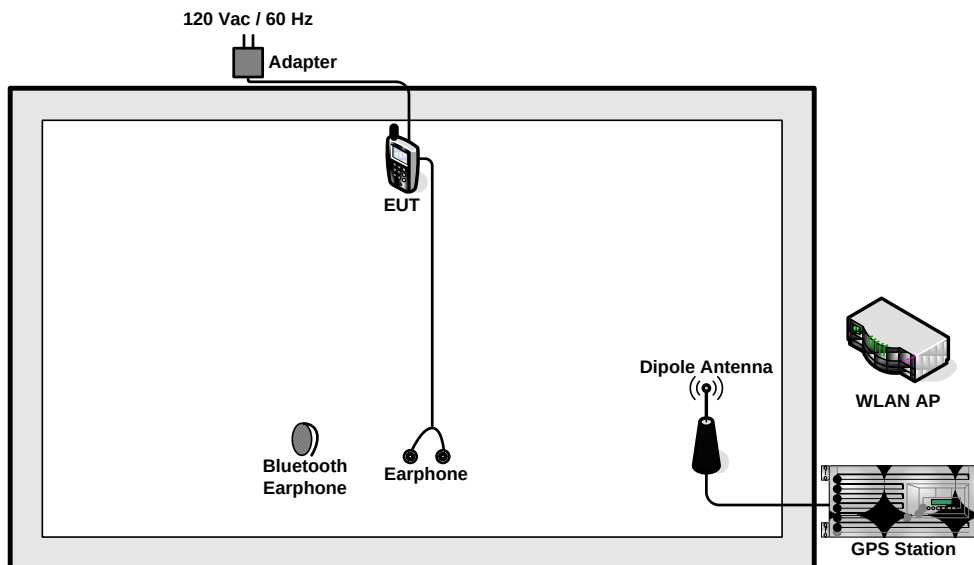
2.4 Connection Diagram of Test System

<Radiation Test>

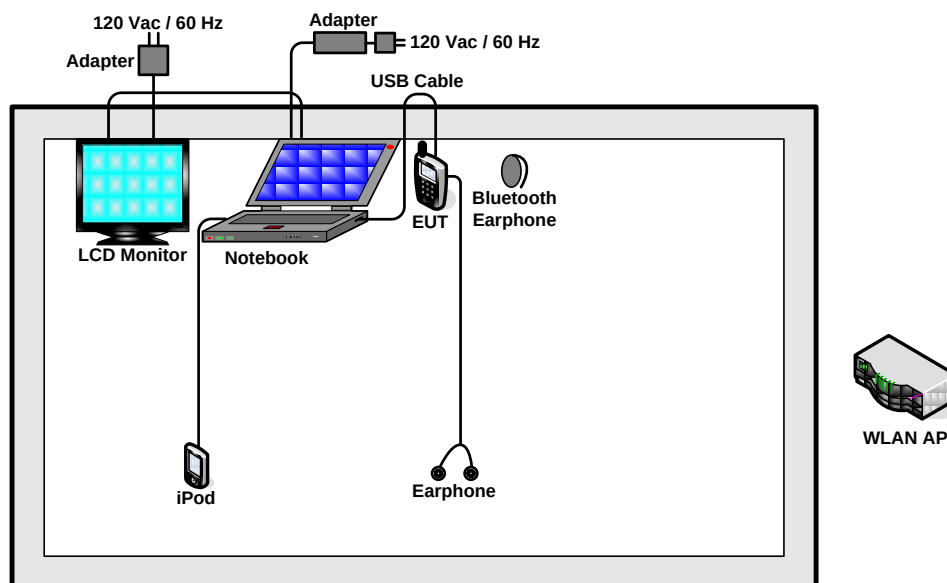


<Conduction Test>

EUT with Adapter Mode



EUT with USB Cable (Link with Notebook) Mode



2.5 RF Utility

The programmed RF utility, "mfgui.exe" is installed in EUT to provide channel selection, power level, data rate and the application type. RF utility can send transmitting signal for all testing. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

3 Test Result

3.1 26dB & 99% Bandwidth Measurement

3.1.1 Limit of 26dB & 99% Bandwidth

There is no restriction limits for bandwidth. The maximum conducted output power can be limited by measured emission bandwidth (B). For the band 5.15~5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log B.

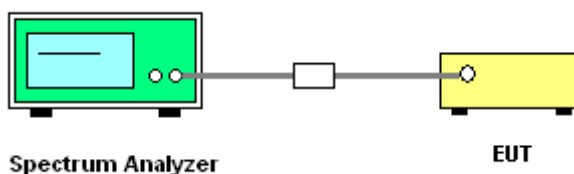
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC Public Notice DA 02-2138 (Measurement Guidelines of UNII).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Read RBW and repeat measurement as needed until the RBW/BW ratio is approximately 1%.
4. Use a RBW = approximately 1% of the emission bandwidth; Set the VBW > RBW; Use a peak detector.
5. Measure the maximum width of the emission that is 26 dB relative to the peak of the emission and 99% occupied bandwidth.

3.1.4 Test Setup



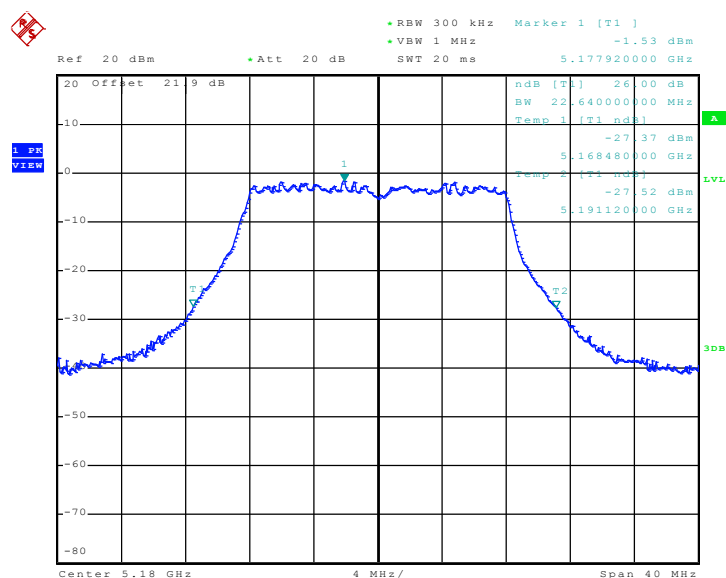
3.1.5 Test Result of 26dB & 99% Bandwidth

Test Mode :	Mode 1~3	Temperature :	25~27℃
Test Engineer :	Andy Yeh	Relative Humidity :	48~50%

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Pass/Fail
36	5180	22.64	Pass
40	5200	22.56	Pass
44	5220	22.64	Pass

3.1.6 Test Result of 26dB Bandwidth Plots

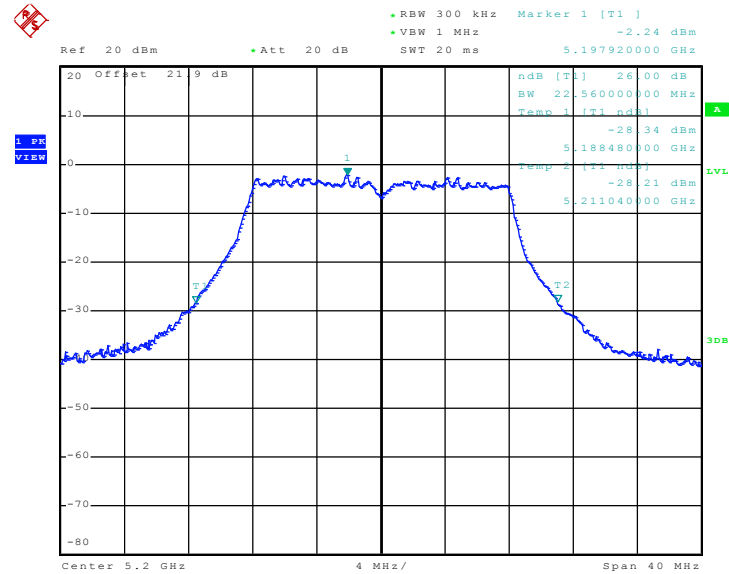
Mode 1 : 26 dB Bandwidth Plot on 802.11a Channel 36



Date: 3.FEB.2010 18:12:22

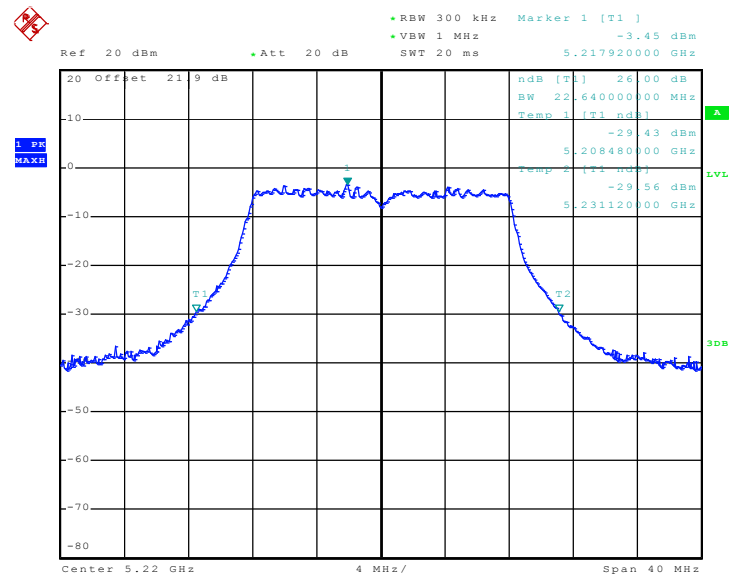


Mode 2 : 26 dB Bandwidth Plot on 802.11a Channel 40



Date: 3.FEB.2010 18:09:02

Mode 3 : 26 dB Bandwidth Plot on 802.11a Channel 44



Date: 3.FEB.2010 18:13:23

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

For the band 5.15~5.25 GHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or $4 \text{ dBm} + 10\log B$, where B is the 26 dB emissions bandwidth in MHz. If transmitting antenna directional gain is greater than 6 dBi, the peak output power and power density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

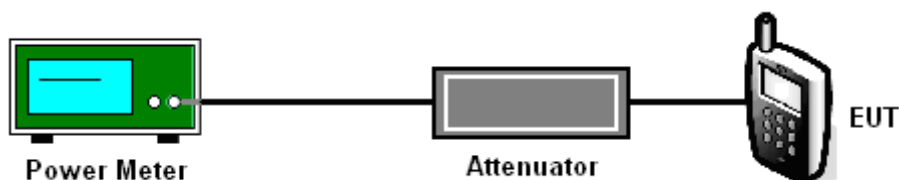
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the power meter by a low loss cable.
3. Measure the power by power meter.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Test Mode :	Mode 1~3	Temperature :	25~27°C
Test Engineer :	Andy Yeh	Relative Humidity :	48~50%

Channel	Frequency (MHz)	Measured Power Output (dBm)	Max. Limits (dBm)	Pass/Fail
36	5180	11.76	17	Pass
40	5200	10.55	17	Pass
44	5220	11.65	17	Pass

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

For the band 5.15–5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1MHz band. If transmitting antenna directional gain is greater than 6 dBi, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

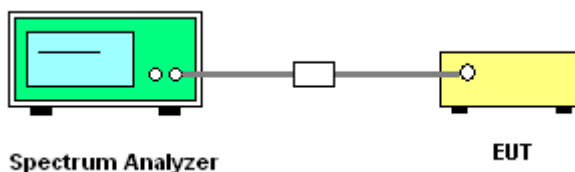
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

The transmitter output is connected to the spectrum analyzer. According to the method 3 of DA-02-2138, the resolution bandwidth is set to 1 MHz, video bandwidth is 3MHz, trace average 100 traces in power averaging mode, and sample detection is used, and the analyzer is set for video averaging.

3.3.4 Test Setup



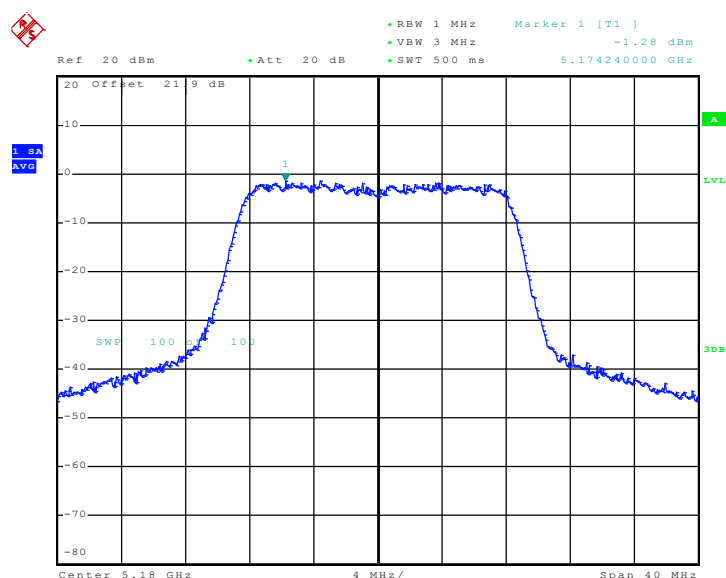
3.3.5 Test Result of Power Spectral Density

Test Mode :	Mode 1~3	Temperature :	25~27℃
Test Engineer :	Andy Yeh	Relative Humidity :	48~50%

Channel	Frequency (MHz)	Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
36	5180	-1.28	4	Pass
40	5200	-3.50	4	Pass
44	5220	-4.22	4	Pass

3.3.6 Test Result of Power Spectral Density Plots

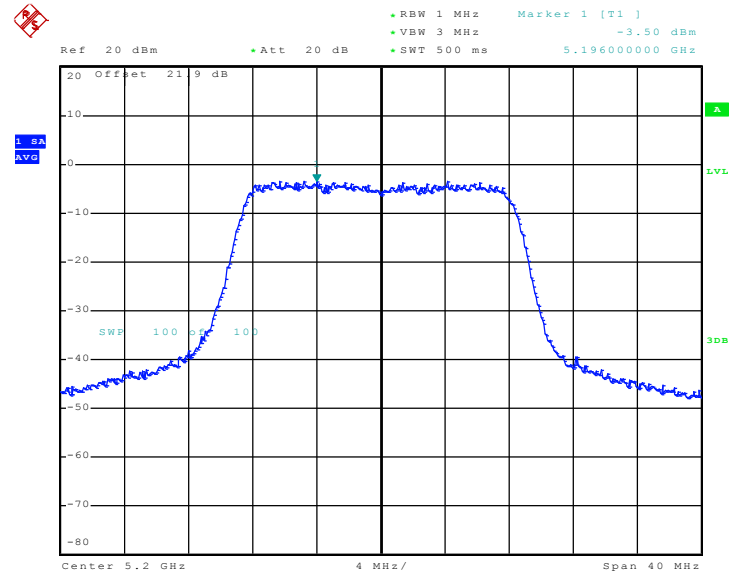
Mode 1 : PSD Plot on 802.11a Channel 36



Date: 12..JAN..2010 15:15:58

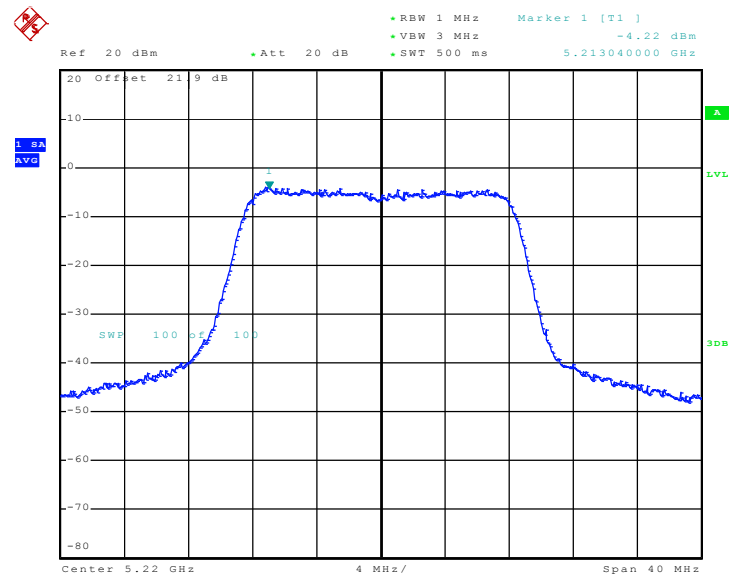


Mode 2 : PSD Plot on 802.11a Channel 40



Date: 3.FEB.2010 19:15:59

Mode 3 : PSD Plot on 802.11a Channel 44



Date: 12.JAN.2010 15:18:44

3.4 Band Edges Measurement

3.4.1 Limit of Band Edges

- (1) For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of –27 dBm/MHz in the 5.15–5.25 GHz band. For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of –27 dBm/MHz.
- (2) The provisions of Section 15.205 Restricted bands of operation of this part apply to intentional radiators operating under this section.

3.4.2 Measuring Instruments

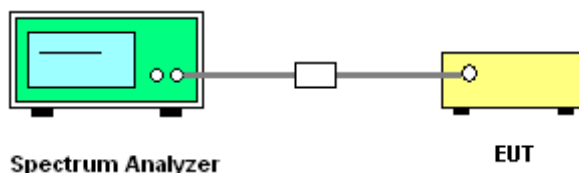
See list of measuring instruments of this test report.

3.4.3 Test Procedures

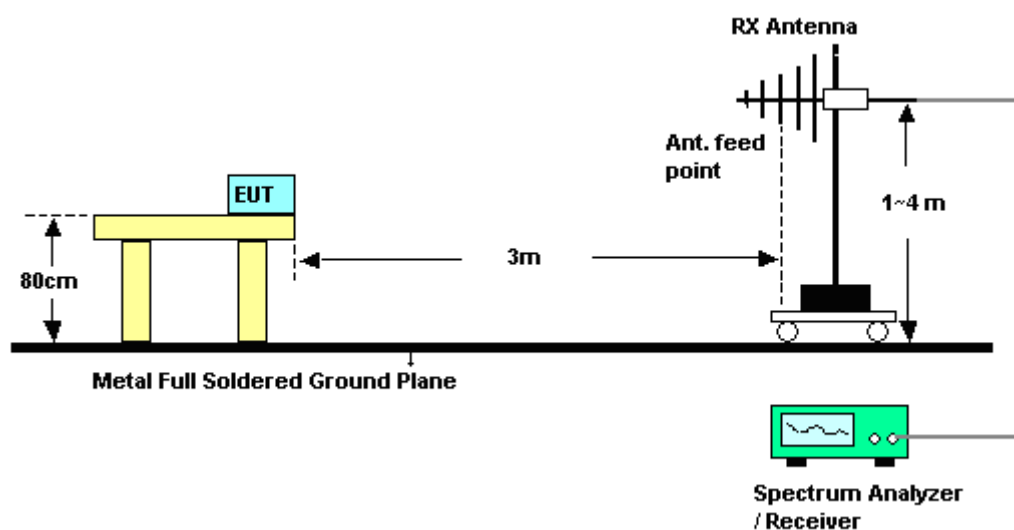
1. Set both RBW and VBW of spectrum analyzer to 1MHz with convenient frequency span including 1MHz bandwidth from band edge.
2. The band edges was measured and recorded.

3.4.4 Test Setup

<Conducted>



<Radiated>



3.4.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	21~23°C
Test Band :	802.11a	Relative Humidity :	44~46%
Test Channel :	36	Test Engineer :	Elvis Chen

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5150	51.83	-22.17	74	47.9	34.02	5.98	36.07	100	129	Peak
5150	39.86	-14.14	54	35.93	34.02	5.98	36.07	100	129	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5150	48.59	-25.41	74	44.66	34.02	5.98	36.07	110	58	Peak
5150	36.6	-17.4	54	32.67	34.02	5.98	36.07	110	58	Average

Test Mode :	Mode 3	Temperature :	21~23°C
Test Band :	802.11a	Relative Humidity :	44~46%
Test Channel :	44	Test Engineer :	Elvis Chen

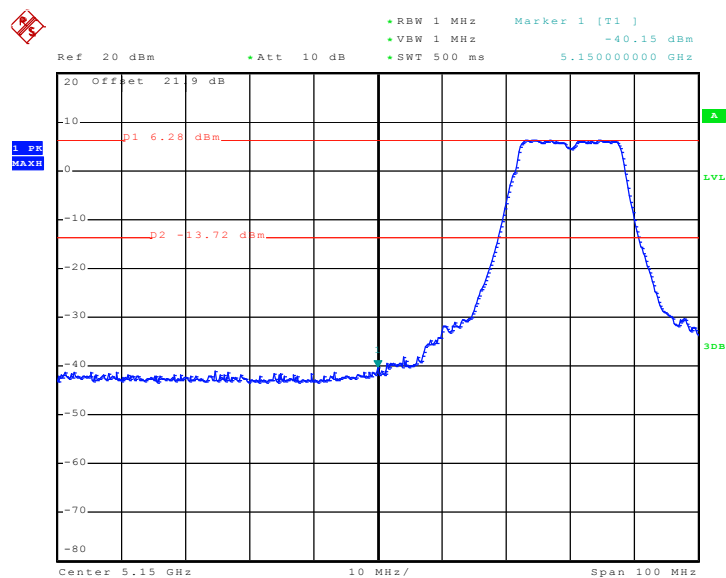
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5250	59.6	-8.7	68.3	55.51	34.1	6.04	36.05	157	112	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5250	57.54	-10.76	68.3	53.45	34.1	6.04	36.05	110	56	Peak

3.4.6 Test Result of Conducted Band Edges

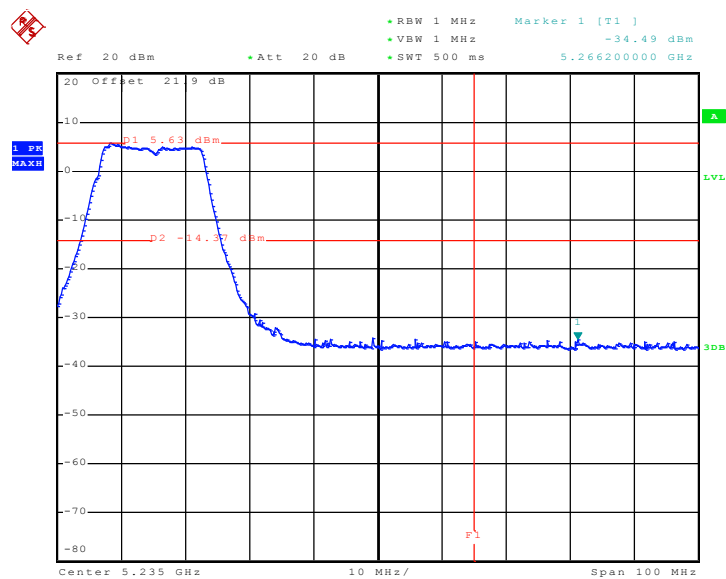
Test Mode :	Mode 1 and Mode 3	Temperature :	25~27℃
Test Engineer :	Andy Yeh	Relative Humidity :	48~50%

Mode 1 : Low Band Edge Plot on Channel 36



Date: 29.JAN.2010 07:12:29

Mode 3 : High Band Edge Plot on Channel 44



Date: 3.FEB.2010 19:13:23

3.5 Spurious Emission

3.5.1 Limit of Spurious Emission Measurement

All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band.

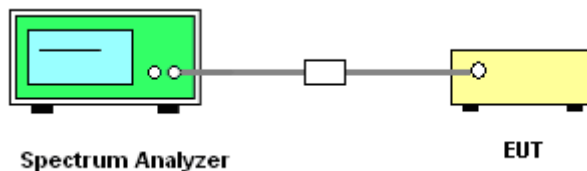
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 kHz, Video bandwidth (VBW) > RBW, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

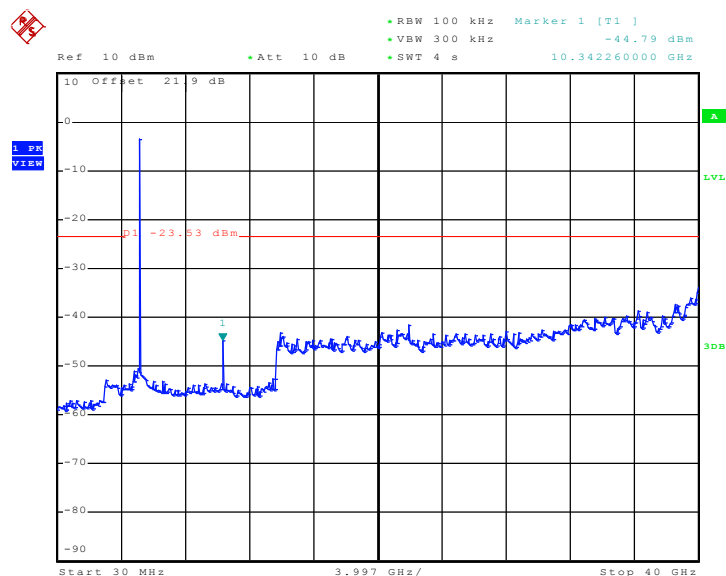
3.5.4 Test Setup



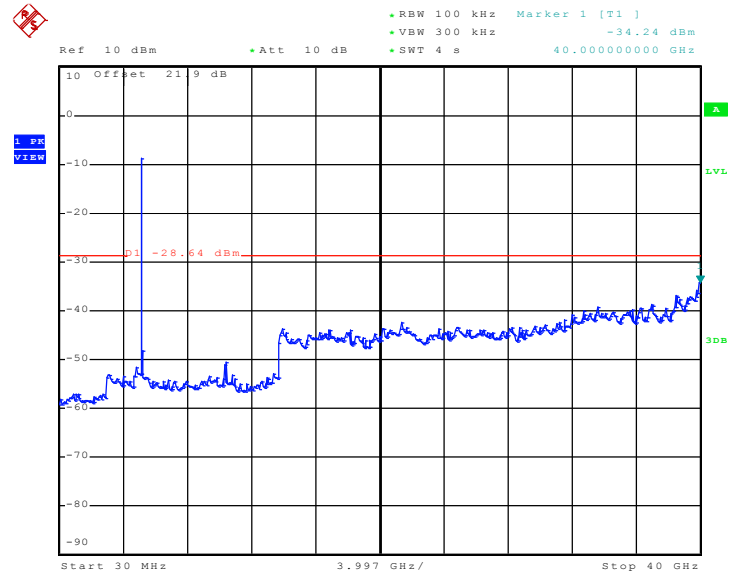
3.5.5 Test Result

Test Mode :	Mode 1~3	Temperature :	25~27°C
Test Engineer :	Andy Yeh	Relative Humidity :	48~50%

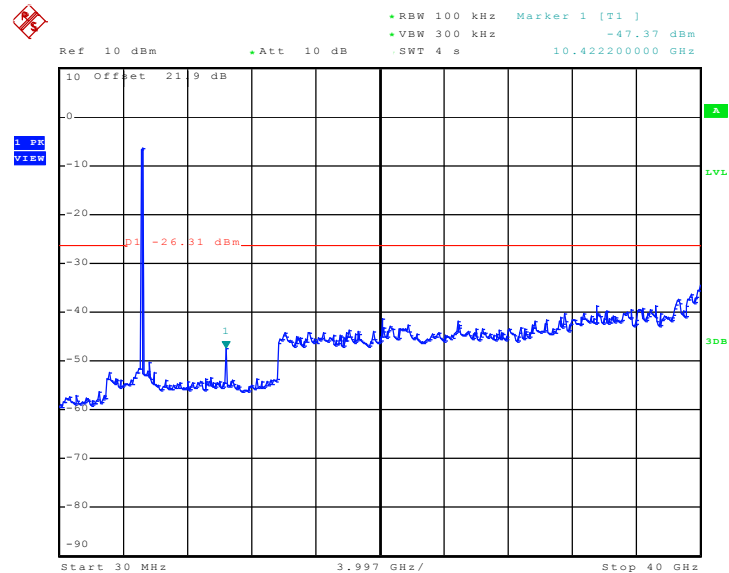
**Mode 1 : Spurious Emission Plot on channel 36
between 30 MHz~40 GHz**



Date: 29.JAN.2010 05:54:49

**Mode 2 : Spurious Emission Plot on channel 40
between 30 MHz~40 GHz**


Date: 3.FEB.2010 18:51:04

**Mode 3 : Spurious Emission Plot on channel 44
between 30 MHz~40 GHz**


Date: 29.JAN.2010 05:53:14

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 (dBuV)	
	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.

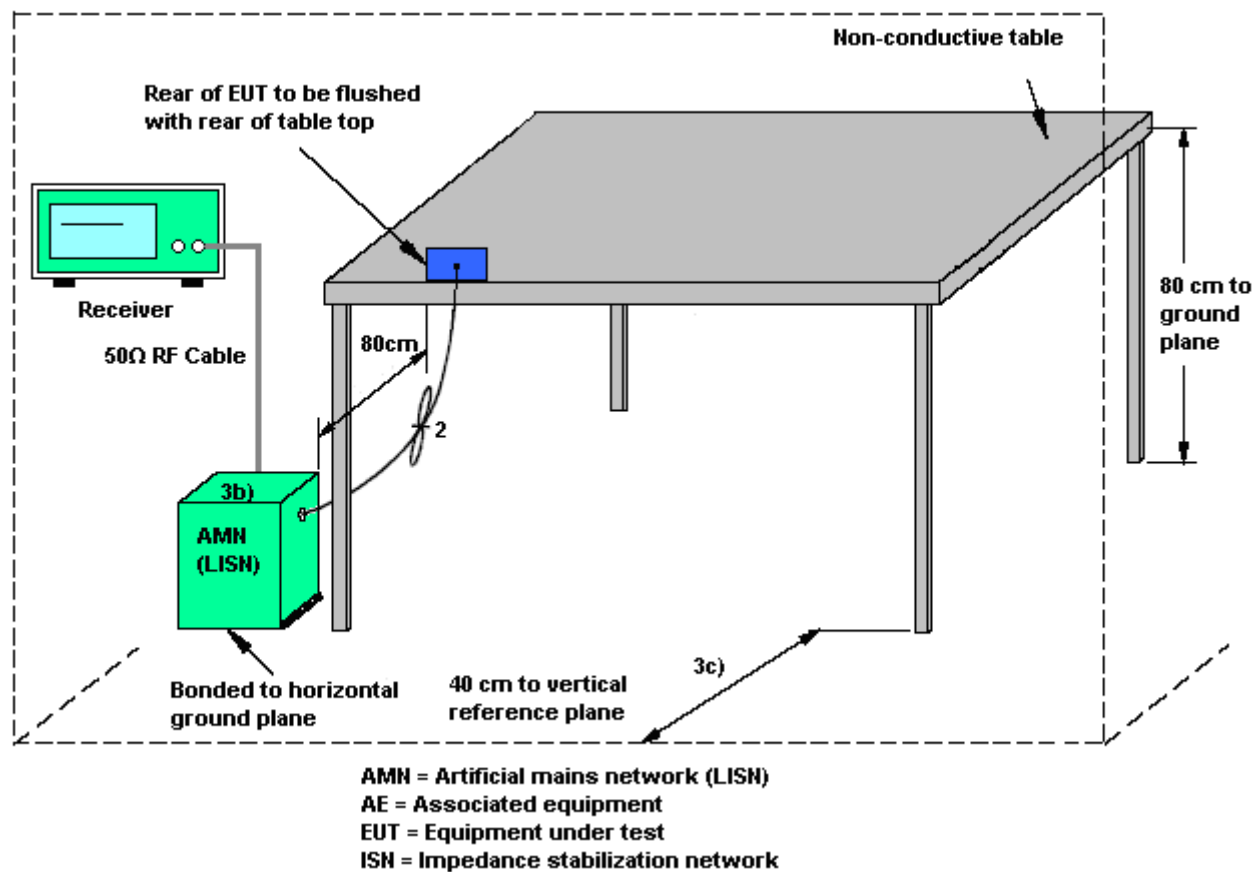
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

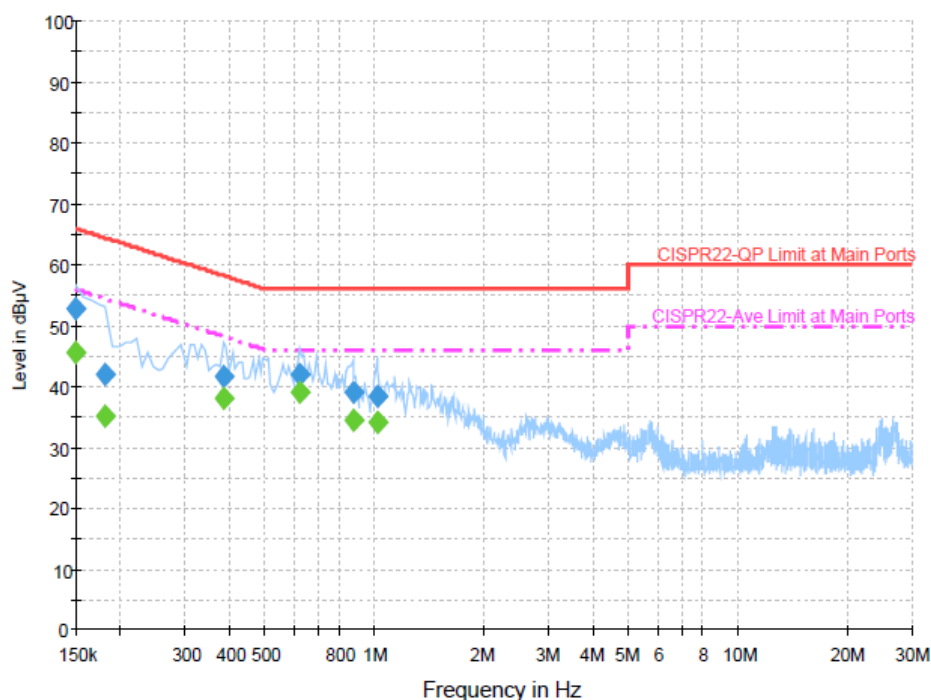
4. Please follow the guidelines in ANSI C63.4-2003.
5. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
6. Connect EUT to the power mains through a line impedance stabilization network (LISN).
7. All the support units are connecting to the other LISN.
8. The LISN provides 50 ohm coupling impedance for the measuring instrument.
9. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
10. Both sides of AC line were checked for maximum conducted interference.
11. The frequency range from 150 kHz to 30 MHz was searched.
12. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 2	Temperature :	20~22℃
Test Engineer :	Hayden Wu	Relative Humidity :	43~46%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN (5G) Link + Bluetooth Link + MPEG4 + Earphone + USB Cable (Link with Notebook)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



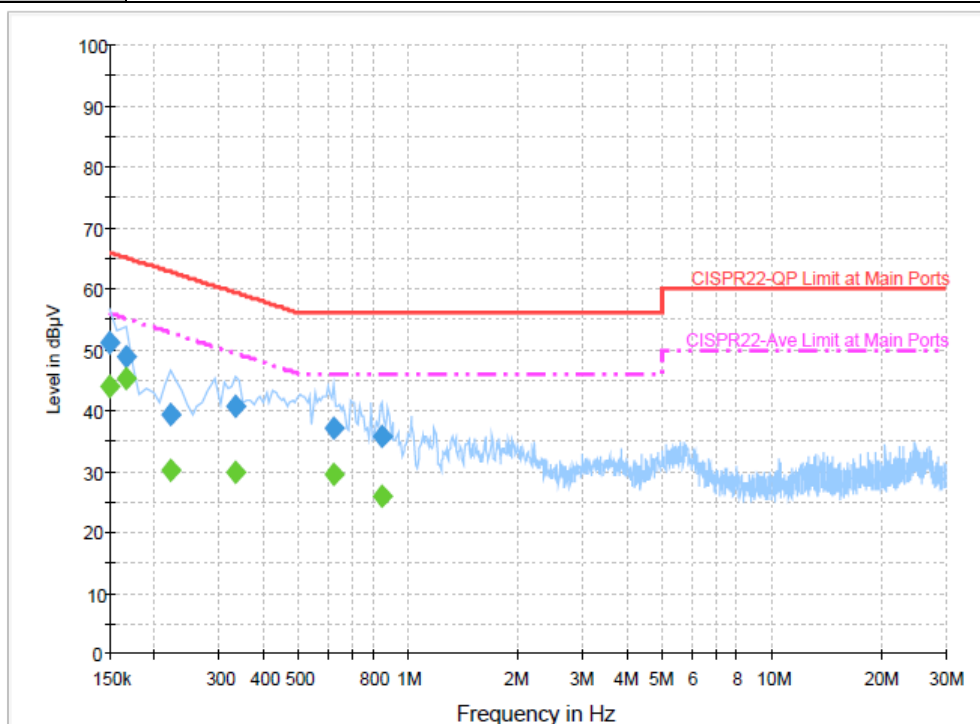
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	52.9	Off	L1	19.5	13.1	66.0
0.182000	42.0	Off	L1	19.5	22.4	64.4
0.382000	41.7	Off	L1	19.5	16.5	58.2
0.622000	42.0	Off	L1	19.5	14.0	56.0
0.870000	39.1	Off	L1	19.4	16.9	56.0
1.014000	38.5	Off	L1	19.4	17.5	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	45.6	Off	L1	19.5	10.4	56.0
0.182000	35.2	Off	L1	19.5	19.2	54.4
0.382000	38.1	Off	L1	19.5	10.1	48.2
0.622000	38.9	Off	L1	19.5	7.1	46.0
0.870000	34.4	Off	L1	19.4	11.6	46.0
1.014000	34.1	Off	L1	19.4	11.9	46.0

Test Mode :	Mode 2	Temperature :	20~22°C
Test Engineer :	Hayden Wu	Relative Humidity :	43~46%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN (5G) Link + Bluetooth Link + MPEG4 + Earphone + USB Cable (Link with Notebook)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	51.3	Off	N	19.5	14.7	66.0
0.166000	48.7	Off	N	19.5	16.5	65.2
0.222000	39.3	Off	N	19.5	23.4	62.7
0.334000	40.6	Off	N	19.5	18.8	59.4
0.622000	37.1	Off	N	19.5	18.9	56.0
0.846000	35.8	Off	N	19.4	20.2	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	44.0	Off	N	19.5	12.0	56.0
0.166000	45.2	Off	N	19.5	10.0	55.2
0.222000	30.2	Off	N	19.5	22.5	52.7
0.334000	29.9	Off	N	19.5	19.5	49.4
0.622000	29.5	Off	N	19.5	16.5	46.0
0.846000	25.8	Off	N	19.4	20.2	46.0

3.7 Radiated Emission Measurement

3.7.1 Limit of Radiated Emission

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209.

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

- (1) For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. (2) For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of –27 dBm/MHz in the 5.15–5.25 GHz band. (3) For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of –27 dBm/MHz.
- (2) The provisions of Section 15.205 Restricted bands of operation of this part apply to intentional radiators operating under this section.

3.7.2 Measuring Instruments

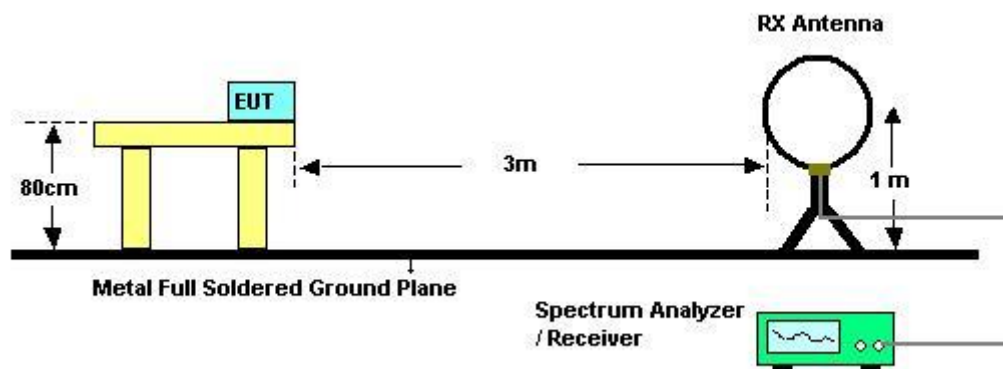
See list of measuring instruments of this test report.

3.7.3 Test Procedures

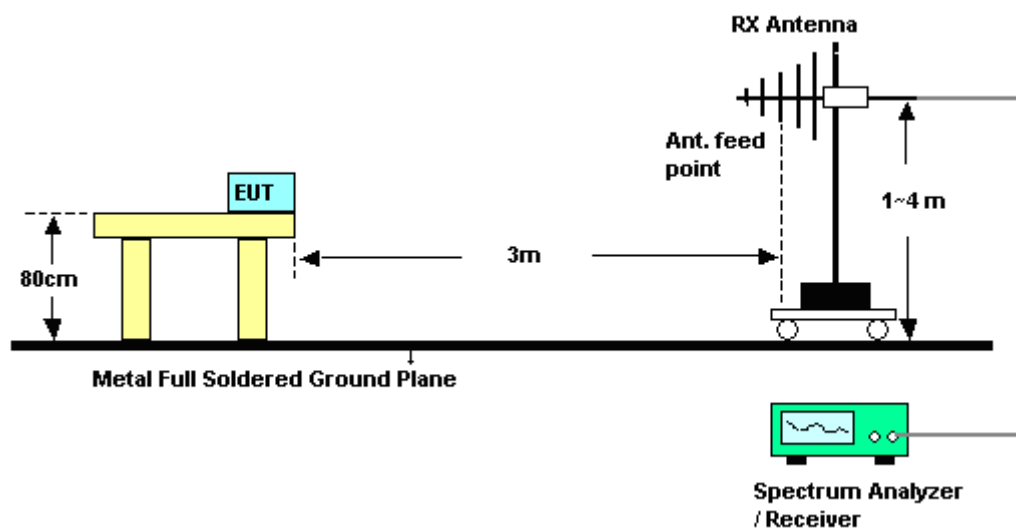
1. The testing follows the guidelines in FCC Public Notice DA 02-2138, (Measurement Guidelines of UNII)
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest radiation.
5. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
6. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
7. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
8. For testing below 1GHz, If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the quasi-peak method and reported.
9. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.7.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



3.7.5 Test Results of Radiated Emissions (9kHz ~ 30MHz)

Temperature	21~23°C	Humidity	44~46%
Test Engineer	Elvis Chen		

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

3.7.6 Test Result of Radiated Emission

Test Mode :	Mode 1	Temperature :	21~23°C
Test Channel :	36	Relative Humidity :	44~46%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	1. 5180 MHz is Fundamental Signals which can be ignored. 2. 10360 MHz is not within a restricted band.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
68.88	23.74	-16.26	40	47.65	6.57	1.32	31.8	-	-	Peak
101.28	26.09	-17.41	43.5	45.59	10.87	1.65	32.02	-	-	Peak
156.09	32.16	-11.34	43.5	51.75	10.17	2.07	31.83	-	-	Peak
367.9	35.27	-10.73	46	48.81	14.84	3.38	31.76	-	-	Peak
455.4	40.37	-5.63	46	51.96	16.67	3.78	32.04	100	77	Peak
481.3	35.25	-10.75	46	46.29	17.13	3.89	32.06	-	-	Peak
5150	51.83	-22.17	74	47.9	34.02	5.98	36.07	100	129	Peak
5150	39.86	-14.14	54	35.93	34.02	5.98	36.07	100	129	Average
5180	97.36	-	-	93.37	34.05	6	36.06	100	129	Peak
5180	87.71	-	-	83.72	34.05	6	36.06	100	129	Average
5350	48.38	-25.62	74	44.14	34.18	6.09	36.03	100	129	Peak
5350	35.25	-18.75	54	31.01	34.18	6.09	36.03	100	129	Average
8844	51.16	-22.84	74	44.41	35.97	7.62	36.84	100	221	Peak
8844	39.29	-14.71	54	32.54	35.97	7.62	36.84	100	221	Average
10360	36.56	-31.74	68.3	74.3	-9.17	8.25	36.82	100	0	Peak
15540	41.38	-32.62	74	75	-6.62	9.52	36.52	100	0	Peak



Test Mode :	Mode 1	Temperature :	21~23°C
Test Channel :	36	Relative Humidity :	44~46%
Test Engineer :	Elvis Chen	Polarization :	Vertical
Remark :	1. 5180 MHz is Fundamental Signals which can be ignored. 2. 10360 MHz is not within a restricted band.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
33.24	25.99	-14.01	40	39.9	16.93	0.88	31.72	-	-	Peak
46.74	30.81	-9.19	40	51	10.54	1.09	31.82	-	-	Peak
149.88	27.28	-16.22	43.5	46.65	10.3	2.01	31.68	-	-	Peak
428.8	35.41	-10.59	46	47.55	16.18	3.66	31.98	-	-	Peak
455.4	37.79	-8.21	46	49.38	16.67	3.78	32.04	100	207	Peak
481.3	33.49	-12.51	46	44.53	17.13	3.89	32.06	-	-	Peak
5150	36.6	-17.4	54	32.67	34.02	5.98	36.07	110	58	Average
5150	48.59	-25.41	74	44.66	34.02	5.98	36.07	110	58	Peak
5180	85.41	-	-	81.42	34.05	6	36.06	110	58	Average
5180	94.78	-	-	90.81	34.03	6	36.06	110	58	Peak
5350	47.73	-26.27	74	43.49	34.18	6.09	36.03	110	58	Peak
5350	35.36	-18.64	54	31.12	34.18	6.09	36.03	110	58	Average
8702	51.16	-22.84	74	44.63	35.86	7.45	36.78	100	168	Peak
8702	39.34	-14.66	54	32.81	35.86	7.45	36.78	100	168	Average
10360	36.57	-31.73	68.3	74.31	-9.17	8.25	36.82	100	0	Peak
15540	41.27	-32.73	74	74.89	-6.62	9.52	36.52	100	0	Peak

Test Mode :	Mode 2	Temperature :	21~23°C
Test Channel :	40	Relative Humidity :	44~46%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	1. 5200 MHz is Fundamental Signals which can be ignored. 2. 10400 MHz is not within a restricted band.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
68.88	23.48	-16.52	40	47.39	6.57	1.32	31.8	-	-	Peak
101.28	25.92	-17.58	43.5	45.42	10.87	1.65	32.02	-	-	Peak
156.09	30.49	-13.01	43.5	50.08	10.17	2.07	31.83	-	-	Peak
372.8	34.96	-11.04	46	48.37	14.97	3.4	31.78	-	-	Peak
455.4	40.76	-5.24	46	52.35	16.67	3.78	32.04	100	227	Peak
481.3	35.04	-10.96	46	46.08	17.13	3.89	32.06	-	-	Peak
5150	52.18	-21.82	74	48.25	34.02	5.98	36.07	164	121	Peak
5150	40.17	-13.83	54	36.24	34.02	5.98	36.07	164	121	Average
5200	100.88	-	-	96.87	34.06	6.01	36.06	164	121	Peak
5200	91.23	-	-	87.21	34.07	6.01	36.06	164	121	Average
5250	52.9	-15.4	68.3	48.81	34.1	6.04	36.05	164	121	Peak
8910	50.7	-23.3	74	43.83	36.02	7.71	36.86	100	233	Peak
8910	39.09	-14.91	54	32.22	36.02	7.71	36.86	100	233	Average
10400	39.17	-29.13	68.3	76.78	-9.1	8.27	36.78	100	0	Peak
15600	40.49	-33.51	74	74.2	-6.65	9.55	36.61	100	0	Peak

Test Mode :	Mode 2	Temperature :	21~23°C
Test Channel :	40	Relative Humidity :	44~46%
Test Engineer :	Elvis Chen	Polarization :	Vertical
Remark :	1. 5200 and 5250 MHz are Fundamental Signals which can be ignored. 2. 10400 MHz is not within a restricted band.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.54	27.75	-12.25	40	40.53	17.98	0.85	31.61	-	-	Peak
46.74	31.16	-8.84	40	51.35	10.54	1.09	31.82	-	-	Peak
149.34	27.72	-15.78	43.5	47.03	10.37	2	31.68	-	-	Peak
428.8	35.06	-10.94	46	47.2	16.18	3.66	31.98	-	-	Peak
455.4	37.59	-8.41	46	49.18	16.67	3.78	32.04	100	277	Peak
481.3	33.31	-12.69	46	44.35	17.13	3.89	32.06	-	-	Peak
5150	50.38	-23.62	74	46.45	34.02	5.98	36.07	100	43	Peak
5150	39.3	-14.7	54	35.37	34.02	5.98	36.07	100	43	Average
5200	98.13	-	-	94.12	34.06	6.01	36.06	100	43	Peak
5200	88.83	-	-	84.81	34.07	6.01	36.06	100	43	Average
5250	50.58	-17.72	68.3	46.49	34.1	6.04	36.05	100	43	Peak
8982	51.22	-22.78	74	44.22	36.09	7.8	36.89	100	92	Peak
8982	39.29	-14.71	54	32.29	36.09	7.8	36.89	100	92	Average
10400	39.54	-28.76	68.3	77.14	-9.1	8.28	36.78	100	0	Peak
15600	39.74	-34.26	74	73.45	-6.65	9.55	36.61	100	0	Peak

Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	44	Relative Humidity :	44~46%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	1. 5220 MHz is Fundamental Signals which can be ignored. 2. 10440 MHz is not within a restricted band.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
69.69	23.6	-16.4	40	47.44	6.59	1.33	31.76	-	-	Peak
98.58	25.84	-17.66	43.5	45.6	10.65	1.63	32.04	-	-	Peak
156.09	32.04	-11.46	43.5	51.63	10.17	2.07	31.83	-	-	Peak
372.8	34.33	-11.67	46	47.74	14.97	3.4	31.78	-	-	Peak
455.4	40.56	-5.44	46	52.15	16.67	3.78	32.04	100	187	Peak
481.3	34.91	-11.09	46	45.95	17.13	3.89	32.06	-	-	Peak
5150	52.67	-21.33	74	48.74	34.02	5.98	36.07	157	112	Peak
5150	40.96	-13.04	54	37.03	34.02	5.98	36.07	157	112	Average
5220	101.23	-	-	97.2	34.07	6.02	36.06	157	112	Peak
5220	91.79	-	-	87.73	34.09	6.02	36.05	157	112	Average
5250	59.6	-8.7	68.3	55.51	34.1	6.04	36.05	157	112	Peak
8806	50.75	-23.25	74	44.07	35.94	7.56	36.82	100	152	Peak
8806	39.17	-14.83	54	32.49	35.94	7.56	36.82	100	152	Average
10440	40.11	-28.19	68.3	77.61	-9.05	8.29	36.74	100	0	Peak
15660	41.46	-32.54	74	75.22	-6.68	9.57	36.65	100	0	Peak

Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	44	Relative Humidity :	44~46%
Test Engineer :	Elvis Chen	Polarization :	Vertical
Remark :	1. 5220 MHz is Fundamental Signals which can be ignored. 2. 10440 MHz is not within a restricted band.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
33.78	27.34	-12.66	40	41.82	16.41	0.89	31.78	-	-	Peak
46.74	31.14	-8.86	40	51.33	10.54	1.09	31.82	-	-	Peak
149.88	27.36	-16.14	43.5	46.73	10.3	2.01	31.68	-	-	Peak
428.8	35.24	-10.76	46	47.38	16.18	3.66	31.98	-	-	Peak
455.4	37.42	-8.58	46	49.01	16.67	3.78	32.04	100	271	Peak
481.3	33.12	-12.88	46	44.16	17.13	3.89	32.06	-	-	Peak
5150	51.04	-22.96	74	47.11	34.02	5.98	36.07	110	56	Peak
5150	38.61	-15.39	54	34.68	34.02	5.98	36.07	110	56	Average
5220	97.92	-	-	93.86	34.09	6.02	36.05	110	56	Peak
5220	88.44	-	-	84.38	34.09	6.02	36.05	110	56	Average
5250	57.54	-10.76	68.3	53.45	34.1	6.04	36.05	110	56	Peak
8820	50.2	-23.8	74	43.49	35.95	7.59	36.83	100	302	Peak
8820	39.16	-14.84	54	32.45	35.95	7.59	36.83	100	302	Average
10440	39.75	-28.55	68.3	77.25	-9.05	8.29	36.74	100	0	Peak
15660	38.16	-35.84	74	71.92	-6.68	9.57	36.65	100	0	Peak

3.8 Peak Excursion Ratio Measurement

3.8.1 Limit of Peak Excursion Ratio

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

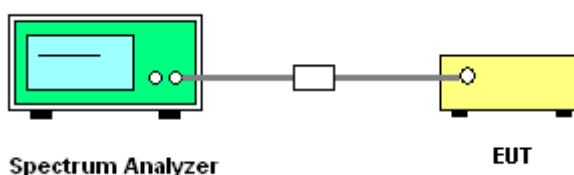
3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 Test Procedures

1. The transmitter output is connected to the spectrum analyzer.
2. The resolution bandwidth is set to and maintained at 1 MHz. The video bandwidth is set to 3 MHz.
3. Trace A is set peak detector and to Max Hold, then to View. Then the detector is readjusted to sample detector, max hold to run for 60 seconds, and the signal under this measurement condition is captured in Trace B in Accordance with the method 3 of DA-02-2138.
4. The difference between the traces is investigated. The marker is placed at the frequency, which shows the largest difference. The amplitude delta between the traces at this frequency is the peak excursion.

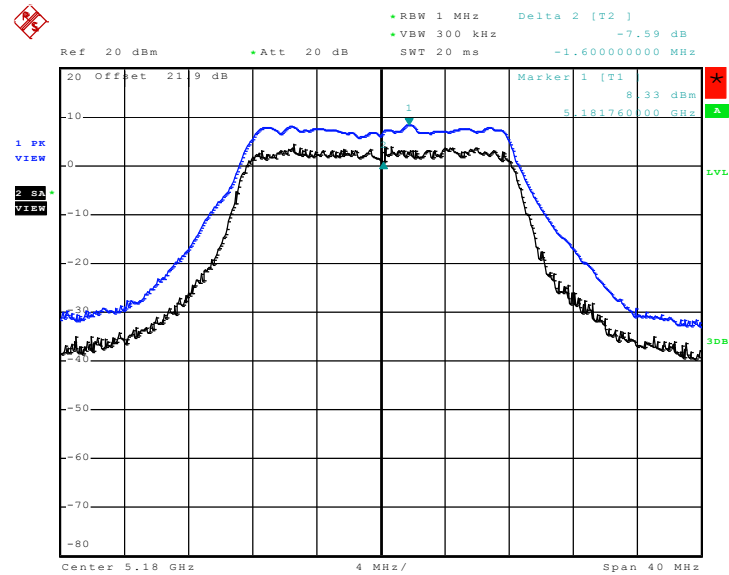
3.8.4 Test Setup



3.8.5 Test Result of Peak Excursion Ratio

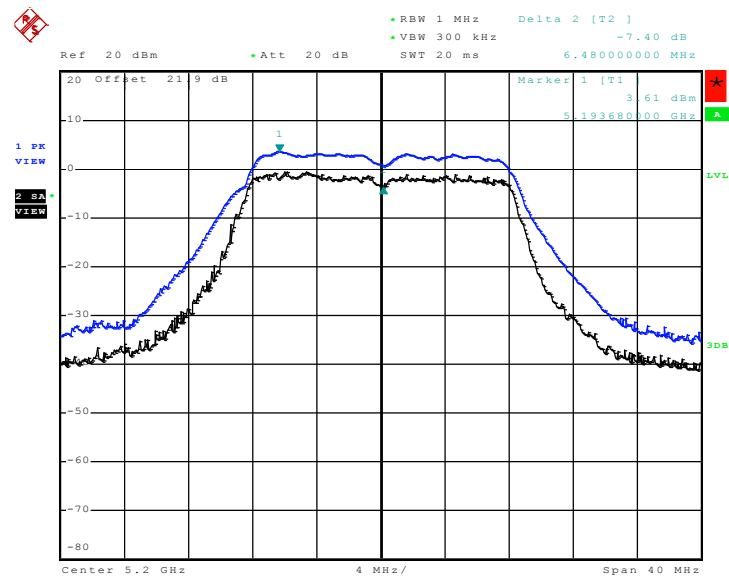
Test Mode :	Mode 1~3	Temperature :	25~27℃
Test Engineer :	Andy Yeh	Relative Humidity :	48~50%

Mode 1 : Peak Excursion Ratio Plot on 802.11a Channel 36



Date: 12.JAN.2010 09:08:42

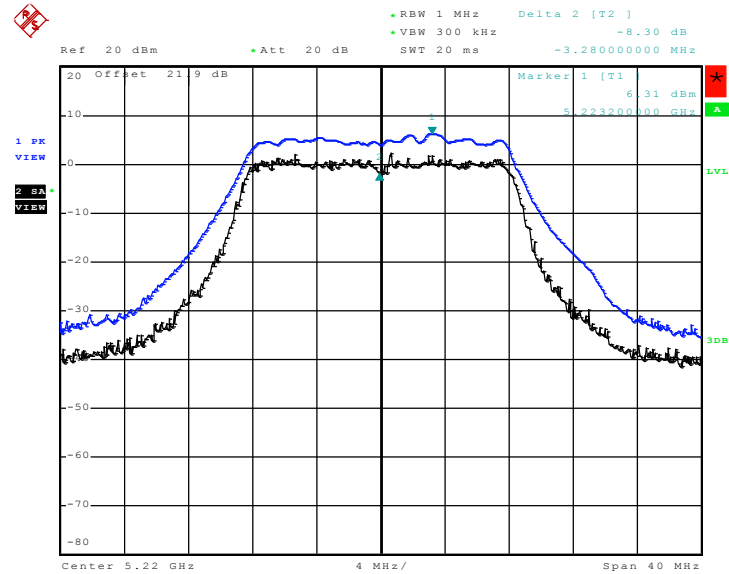
Mode 2 : Peak Excursion Ratio Plot on 802.11a Channel 40



Date: 3.FEB.2010 18:23:54



Mode 3 : Peak Excursion Ratio Plot on 802.11a Channel 44



Date: 12.JAN.2010 09:11:12

3.9 Automatically Discontinue Transmission

3.9.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.9.2 Measuring Instruments

See list of measuring instruments of this test report.

3.9.3 Test Result of Automatically Discontinue Transmission

During no any information transmission, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

3.10 Frequency Stability Measurement

3.10.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

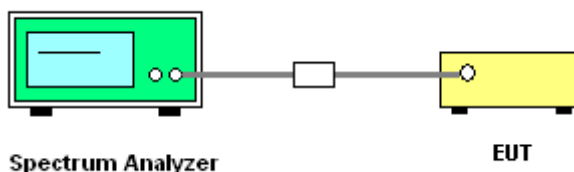
3.10.2 Measuring Instruments

See list of measuring instruments of this test report.

3.10.3 Test Procedures

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

3.10.4 Test Setup



3.10.5 Test Result of Frequency Stability

Test Mode :	Mode 1~3	Temperature :	25~27℃
Test Engineer :	Andy Yeh	Relative Humidity :	48~50%

Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.64	5188.32	-3.86
40	5200	5191.64	5208.32	-3.85
44	5220	5211.64	5228.32	-3.83

3.11 Antenna Requirements

3.11.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2), if transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.11.2 Antenna Connected Construction

The antenna type used in this product is PIFA Antenna without connector and it is considered to meet antenna requirement of FCC.

3.11.3 Antenna Gain

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

4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 23, 2009	Jun. 22, 2010	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 17, 2009	Sep. 16, 2010	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 10, 2009	Sep. 09, 2010	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 05, 2009	Aug. 04, 2010	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9kHz~30MHz	Nov. 30, 2009	Nov. 29, 2010	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9kHz~30MHz	Nov. 23, 2009	Nov. 22, 2010	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
GPS Station	T&E	GS-50	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Spectrum Analyzer	Agilent	E4408B	MY44211030	9KHz-26.5GHz	Oct. 23, 2009	Oct. 22, 2010	Radiation (03CH06-HY)
Spectrum Analyzer	R&S	FSP40	100057	9KHz-40GHz	Oct. 20, 2009	Oct. 19, 2010	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/003	20MHz-1000MHz	Apr. 28, 2009	Apr. 27, 2010	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Oct. 31, 2009	Oct. 30, 2010	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz~18GHz	Aug. 20, 2009	Aug. 19, 2010	Radiation (03CH06-HY)
Double Ridge Horn Antenna	Training Research	AH-0801	95119	8GHz~18GHz	Nov. 02, 2009	Nov. 01, 2010	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 14, 2009	Oct. 13, 2010	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Nov. 11, 2009	Nov. 10, 2010	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz~1GHz	Apr. 20, 2009	Apr. 19, 2010	Radiation (03CH06-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9KHz~30MHz	May 22, 2008	May 21, 2010	Radiation (03CH06-HY)

5 Uncertainty of Evaluation

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

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.10	Normal (k=2)	0.05
Cable Loss	0.10	Normal (k=2)	0.05
AMN Insertion Loss	2.50	Rectangular	0.63
Receiver Specification	1.50	Rectangular	0.43
Site Imperfection	1.39	Rectangular	0.80
Mismatch	+0.34 / -0.35	U-Shape	0.24
Combined Standard Uncertainty $U_c(y)$	1.13		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.26		

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

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54		

Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	± 0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	± 1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	± 0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	± 2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	± 1.50	Rectangular	0.87	1	0.87
Site Imperfection	± 2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				



Appendix A. Photographs of EUT

Please refer to Sporton report number EP9N0214 as below.