

FCC RF Test Report

APPLICANT : Advantech Co., Ltd.
EQUIPMENT : Tablet PC
BRAND NAME : ADVANTECH
MODEL NAME : S10A
FCC ID : M82-S10A
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Apr. 11, 2011 and completely tested on May 07, 2011. 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 the 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:



Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

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



TABLE OF CONTENTS

REVISION HISTORY.....3

SUMMARY OF TEST RESULT4

1 GENERAL DESCRIPTION5

 1.1 Applicant5

 1.2 Manufacturer.....5

 1.3 Feature of Equipment Under Test5

 1.4 Testing Site.....6

 1.5 Applied Standards6

 1.6 Ancillary Equipment List7

2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST8

 2.1 RF Power.....8

 2.2 Test Mode.....9

 2.3 Connection Diagram of Test System.....10

 2.4 RF Utility11

3 TEST RESULT.....12

 3.1 6dB Bandwidth Measurement12

 3.2 Output Power Measurement.....21

 3.3 Band Edges Measurement23

 3.4 Spurious Emission Measurement.....33

 3.5 Power Spectral Density Measurement46

 3.6 AC Conducted Emission Measurement.....55

 3.7 Radiated Emission Measurement.....59

 3.8 Antenna Requirements86

4 LIST OF MEASURING EQUIPMENT87

5 UNCERTAINTY OF EVALUATION88

APPENDIX A. PHOTOGRAPHS OF EUT

APPENDIX B. SETUP PHOTOGRAPHS

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	A8.2(a)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.2	15.247(b)	A8.4	Power Output	≤ 30dBm	Pass	-
3.3	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
3.4	15.247(d)	A8.5	Spurious Emission	< 20 dBc	Pass	-
3.5	15.247(e)	A8.2(b)	Power Spectral Density	≤ 8dBm	Pass	-
3.6	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 10.7 dB at 0.19 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.29 dB at 4824 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Advantech Co., Ltd.

No.1, alley 20, Lane 26, Rueiguang Road NeiHu District, Taipei 114, R.O.C.

1.2 Manufacturer

Advantech Co., Ltd.

No.1, alley 20, Lane 26, Rueiguang Road NeiHu District, Taipei 114, R.O.C.

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Tablet PC
Brand Name	ADVANTECH
Model Name	S10A
FCC ID	M82-S10A
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	11
Carrier Frequency of Each Channel	2412+(n-1)*5 MHz; n=1~11
Channel Spacing	5 MHz
Maximum Output Power to Antenna	802.11b : 19.75 dBm (0.094 W) 802.11g : 24.64 dBm (0.291 W) 802.11n (BW 20MHz) : 24.71 dBm (0.296 W) 802.11n (BW 40MHz) : 22.29 dBm (0.169 W)
Antenna Type	Dipole Antenna with gain 3.09 dBi
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Production Unit

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 Digital Transmission System (DTS).
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	722060/4086B-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 C §15.247
- ♦ FCC KDB Publication No. 558074 (Measurement Guidelines of DTS)
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issue 8

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.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	Earphone	Ergotech	ET-E200	FCC DoC	Unshielded, 1.8 m	N/A
3.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
6.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
7.	Modem	ACCEX	DM1414	IFAXDM1414	Shielded, 1.5 m	N/A
8.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A

2 Test Configuration of Equipment Under Test

2.1 RF Power

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

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	19.75	19.54	19.64	19.67
CH 06	2437 MHz	19.46	-	-	-
CH 11	2462 MHz	18.91	-	-	-

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412 MHz	22.45	22.47	22.61	23.15	22.84	22.72	22.58	22.97
CH 06	2437 MHz	24.45	-	-	-	-	-	-	24.59
CH 11	2462 MHz	24.58	24.6	24.56	24.61	24.57	24.62	24.53	24.64

Channel	Frequency	2.4GHz 802.11n (BW 20MHz) RF Power (dBm)							
		OFDM Data Rate							
		MCS=0	MCS=1	MCS=2	MCS=3	MCS=4	MCS=5	MCS=6	MCS=7
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
CH 01	2412 MHz	22.86	22.73	22.5	22.72	22.99	23.05	22.64	23.19
CH 06	2437 MHz	24.2	-	-	-	-	-	-	24.5
CH 11	2462 MHz	24.5	24.57	24.6	24.55	24.58	24.56	24.67	24.71

Channel	Frequency	2.4GHz 802.11n (BW 40MHz) RF Power (dBm)							
		OFDM Data Rate							
		MCS=0	MCS=1	MCS=2	MCS=3	MCS=4	MCS=5	MCS=6	MCS=7
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
CH 03	2422 MHz	19.85	-	-	-	-	-	-	-
CH 06	2437 MHz	22.29	22.03	22.07	21.99	22.06	21.88	21.97	22.15
CH 09	2452 MHz	22	-	-	-	-	-	-	-

Remark:

- The data rates of WLAN 802.11b/g/n were set in 1Mbps for 802.11b, 54Mbps for 802.11g, 65Mbps for 802.11n (BW 20MHz), and 6.5Mbps for 802.11n (BW 40MHz) for all the test cases due to the highest RF output power.
- The EUT is programmed to transmit signals continuously for all testing.

2.2 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: conducted emission (150 kHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

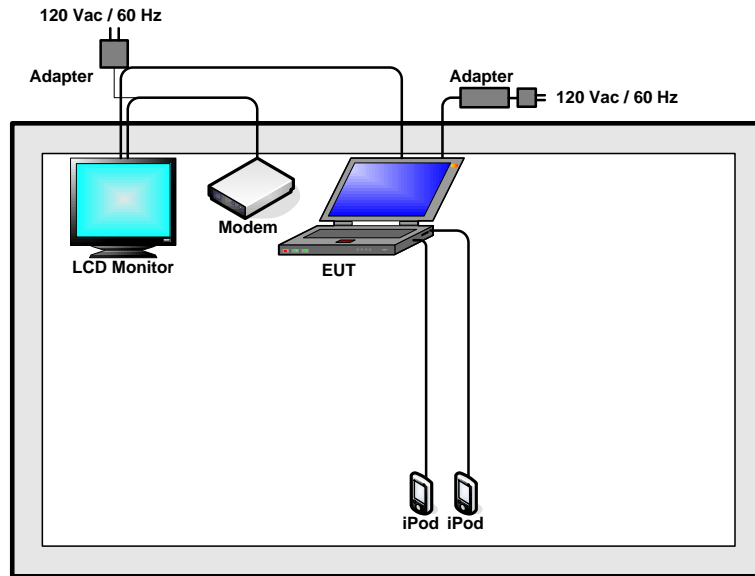
Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

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

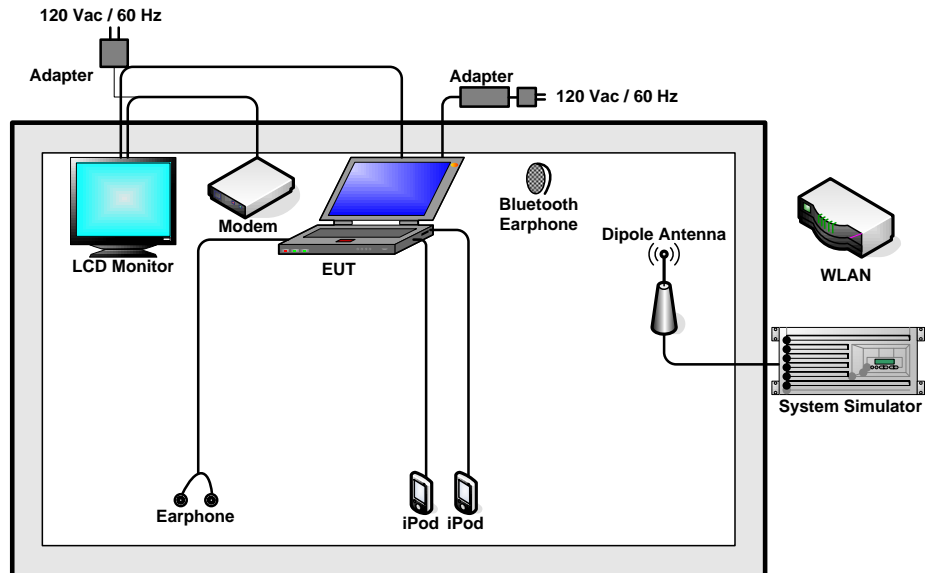
Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g/n (Modulation : OFDM)
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 MHz Mode 8: 802.11n (BW 20M)_CH06_2437 MHz Mode 9: 802.11n (BW 20M)_CH11_2462 MHz Mode 10: 802.11n (BW 40M)_CH03_2422 MHz Mode 11: 802.11n (BW 40M)_CH06_2437 MHz Mode 12: 802.11n (BW 40M)_CH09_2452 MHz
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 MHz Mode 8: 802.11n (BW 20M)_CH06_2437 MHz Mode 9: 802.11n (BW 20M)_CH11_2462 MHz Mode 10: 802.11n (BW 40M)_CH03_2422 MHz Mode 11: 802.11n (BW 40M)_CH06_2437 MHz Mode 12: 802.11n (BW 40M)_CH09_2452 MHz
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link +TC (Charging from Adapter)	
Remark:		
1. TC stands for Test Configuration, and consists of iPod, monitor, earphone, and modem.		

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>





2.4 RF Utility

The programmed RF utility "art \id=30a" 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 6dB Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

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

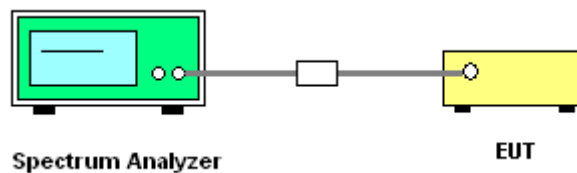
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 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 spectrum analyzer by a low loss cable.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz.
In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.
4. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

3.1.4 Test Setup



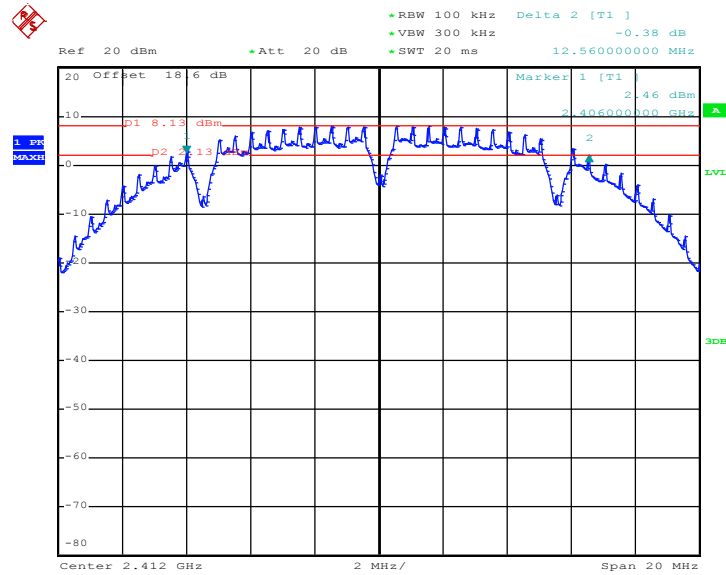


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50-53%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	12.56	0.5	Pass
06	2437	12.08	0.5	Pass
11	2462	12.04	0.5	Pass

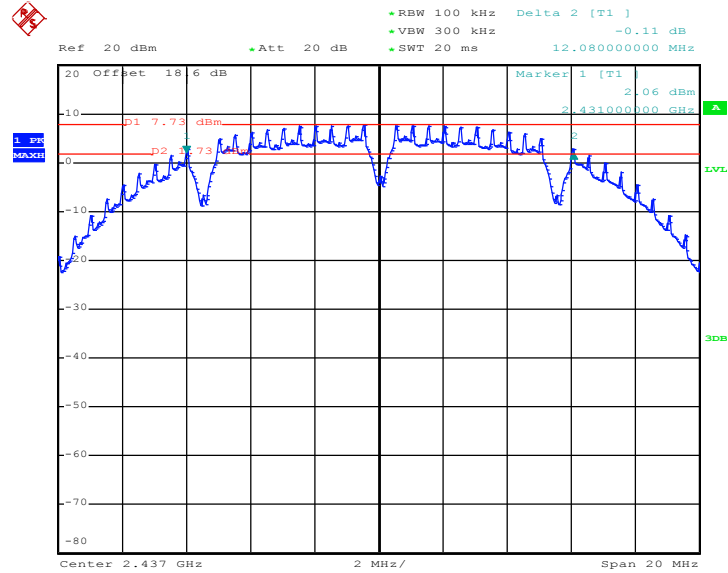
Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



Date: 27.APR.2011 17:17:10

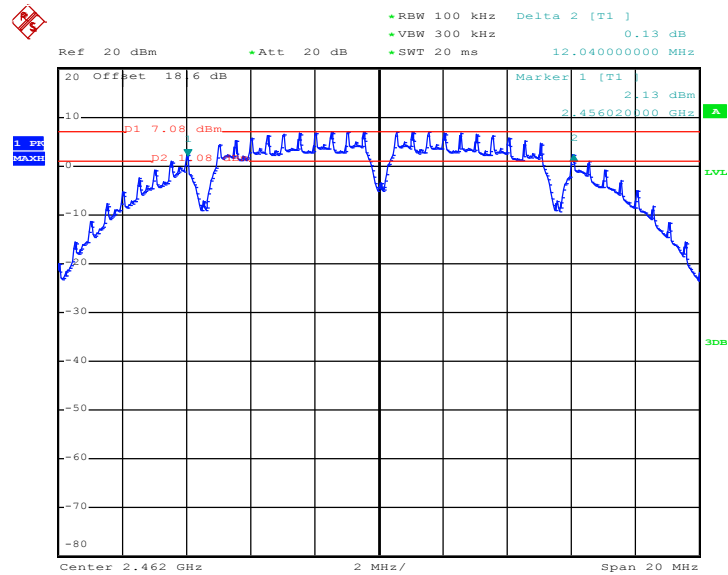


Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 06



Date: 27.APR.2011 17:30:27

Mode 3 : 6 dB Bandwidth Plot on 802.11b Channel 11



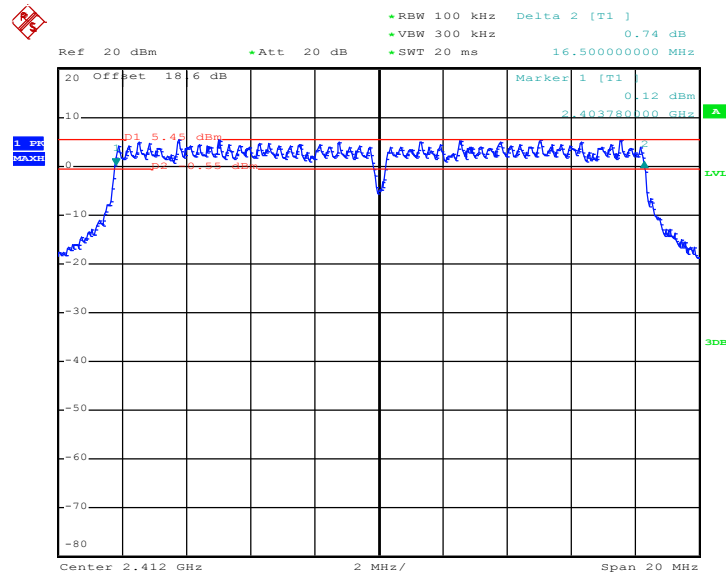
Date: 27.APR.2011 17:43:13



Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50-53%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.50	0.5	Pass
06	2437	16.52	0.5	Pass
11	2462	16.52	0.5	Pass

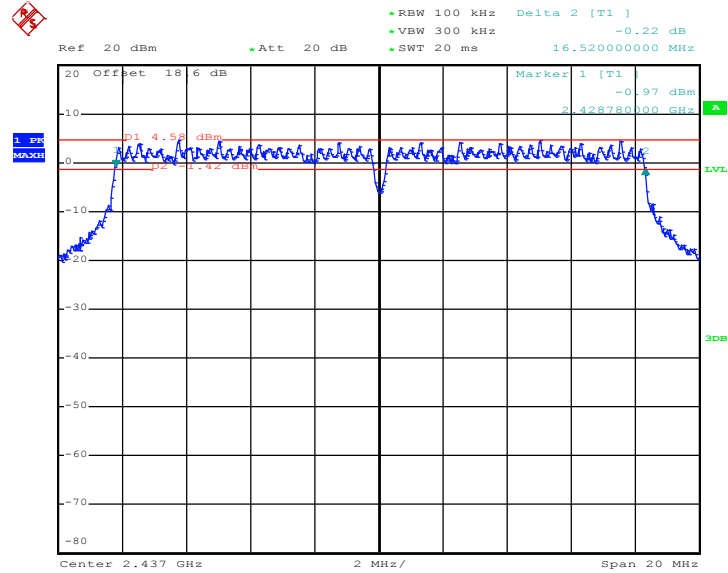
Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01



Date: 27.APR.2011 16:40:56

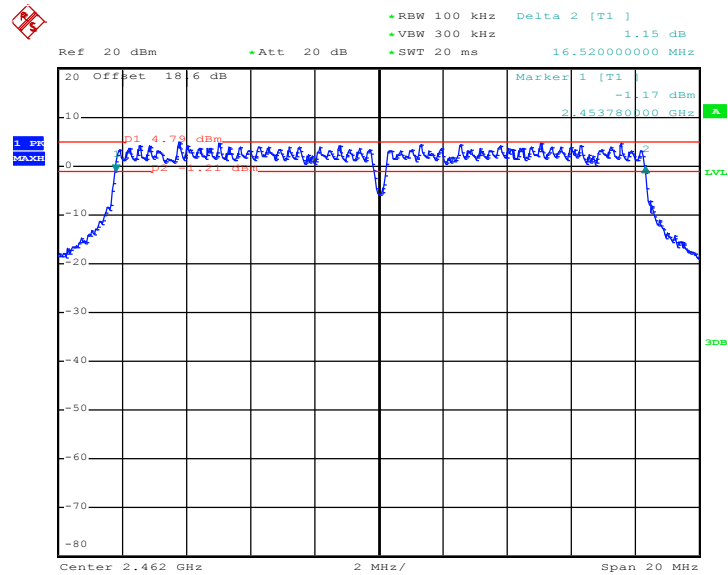


Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06



Date: 27.APR.2011 16:59:15

Mode 6 : 6 dB Bandwidth Plot on 802.11g Channel 11



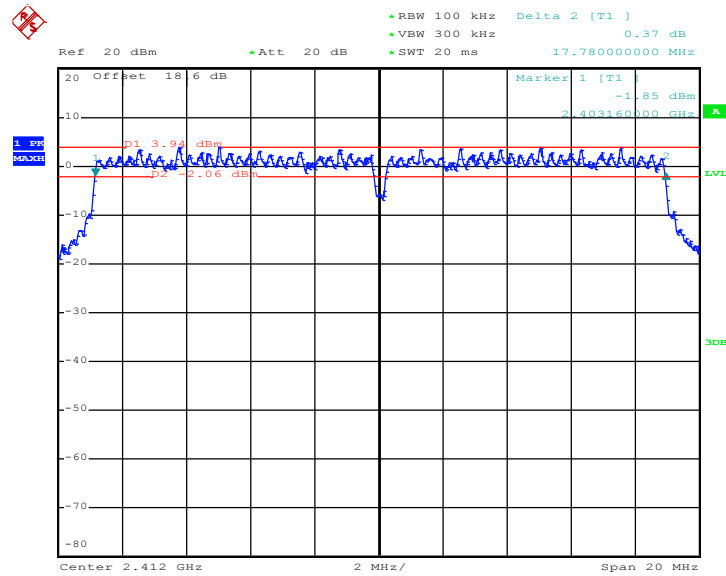
Date: 27.APR.2011 16:26:23



Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50-53%

Channel	Frequency (MHz)	802.11n (BW 20MHz) 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	17.78	0.5	Pass
06	2437	17.72	0.5	Pass
11	2462	17.72	0.5	Pass

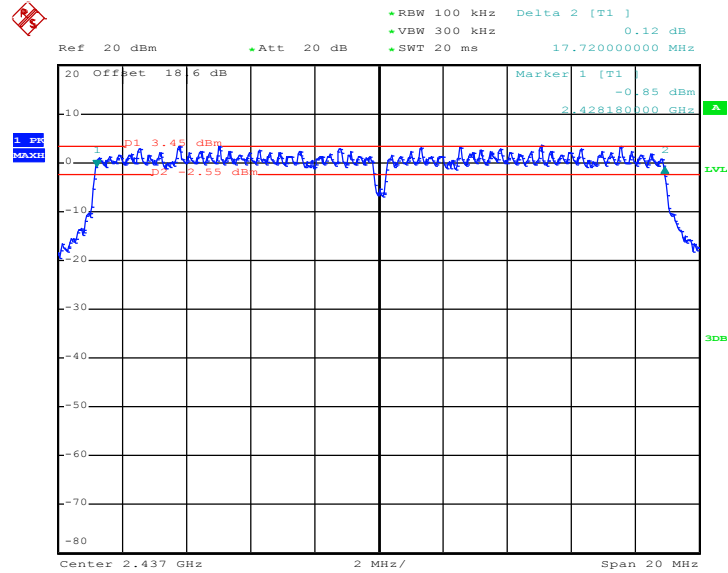
Mode 7 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 01



Date: 27.APR.2011 15:42:07

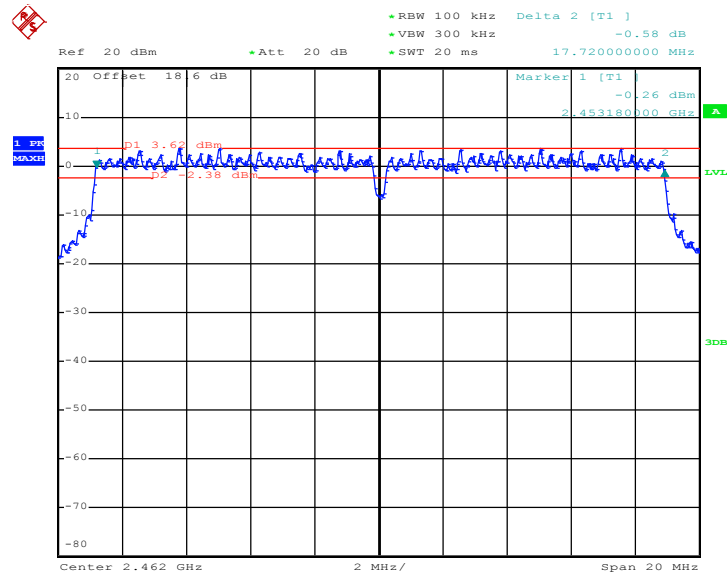


Mode 8 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 06



Date: 27.APR.2011 15:55:53

Mode 9 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 11



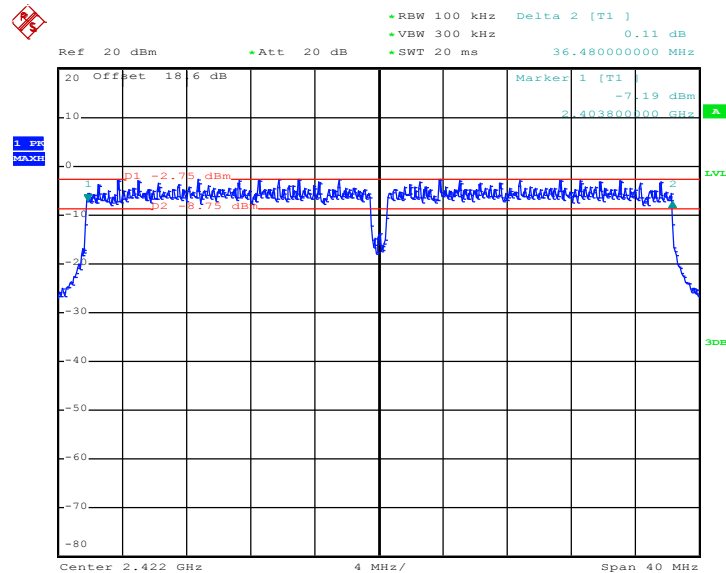
Date: 27.APR.2011 16:10:23



Test Mode :	Mode 10, 11, 12	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50-53%

Channel	Frequency (MHz)	802.11n (BW 40MHz) 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
03	2422	36.48	0.5	Pass
06	2437	36.52	0.5	Pass
09	2452	36.48	0.5	Pass

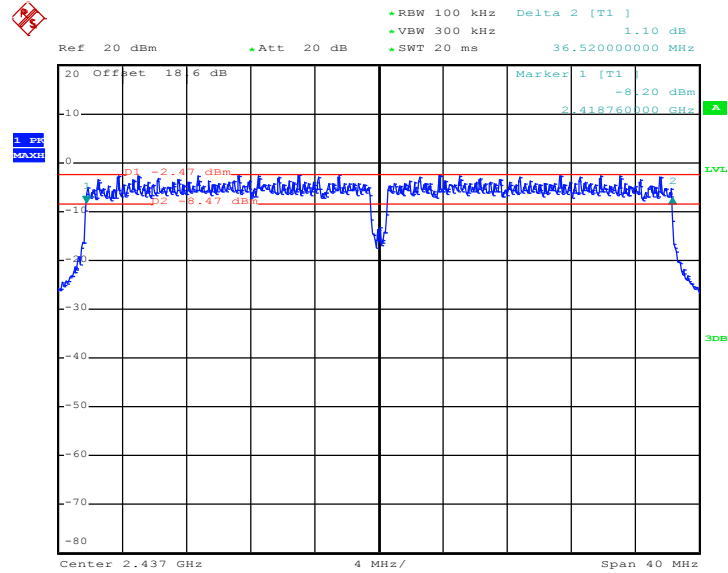
Mode 10 : 6 dB Bandwidth Plot on 802.11n(BW 40MHz) Channel 03



Date: 27.APR.2011 14:38:53

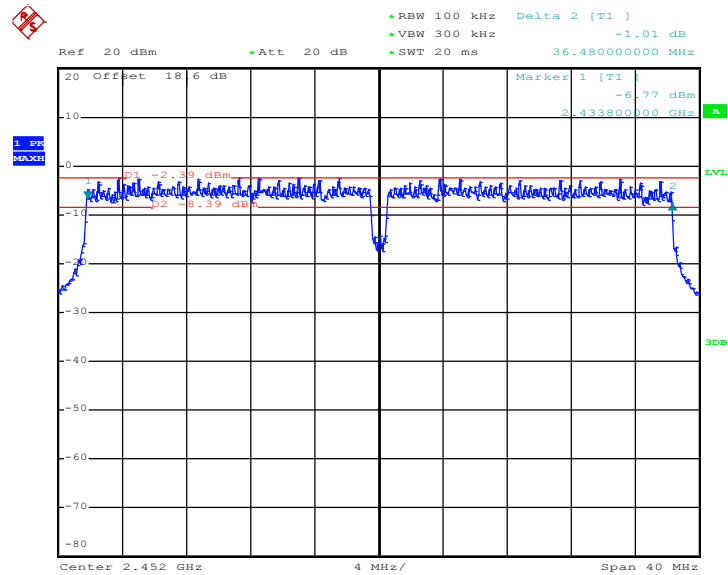


Mode 11 : 6 dB Bandwidth Plot on 802.11n(BW 40MHz) Channel 06



Date: 27.APR.2011 14:13:39

Mode 12 : 6 dB Bandwidth Plot on 802.11n(BW 40MHz) Channel 09



Date: 27.APR.2011 14:26:24

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.

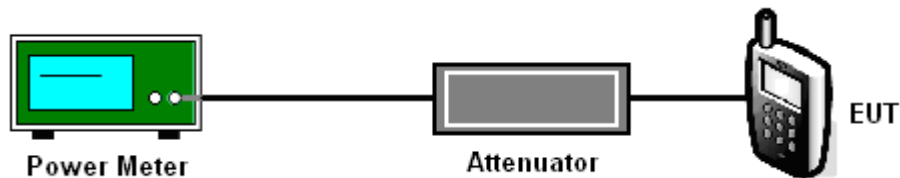
3.2.2 Measuring Instruments

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 Output Power

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50-53%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	19.75	30	Pass
06	2437	19.46	30	Pass
11	2462	18.91	30	Pass

Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50-53%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.97	30	Pass
06	2437	24.59	30	Pass
11	2462	24.64	30	Pass

Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50-53%

Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	23.19	30	Pass
06	2437	24.5	30	Pass
11	2462	24.71	30	Pass

Test Mode :	Mode 10, 11, 12	Temperature :	24~26
Test Engineer :	Pinkston Tu	Relative Humidity :	50-53

Channel	Frequency (MHz)	802.11n (BW 40MHz) Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
03	2422	19.85	30	Pass
06	2437	22.29	30	Pass
09	2452	22	30	Pass



3.3 Band Edges Measurement

3.3.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. 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.

3.3.2 Measuring Instruments

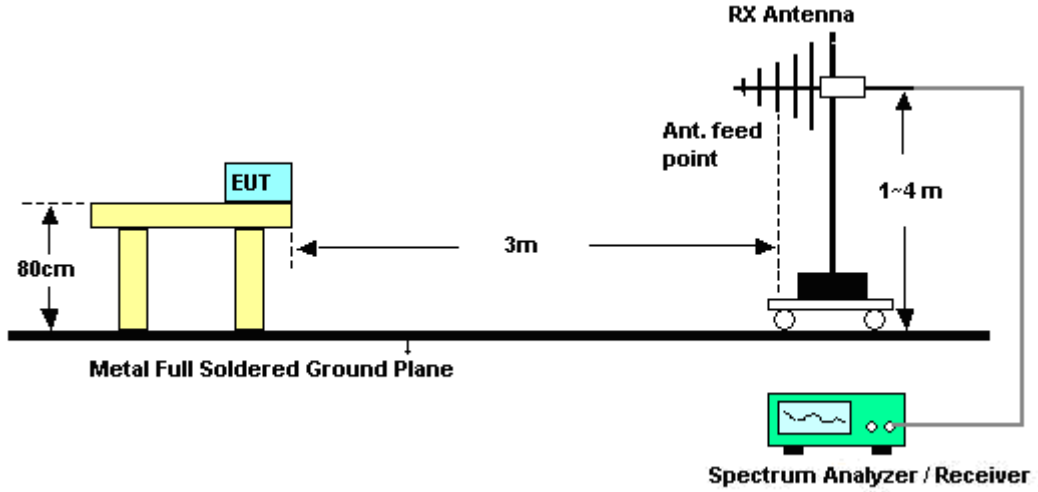
See list of measuring instruments of this test report.

3.3.3 Test Procedures

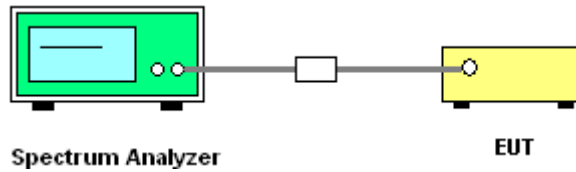
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) \geq RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Apply to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep=Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation as in FCC Section 15.35(b) and (c).

3.3.4 Test Setup

<Radiated Band Edges>



<Conducted Band Edges>





3.3.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	26~27°C
Test Band :	802.11b	Relative Humidity :	49~50%
Test Channel :	01	Test Engineer :	Kay Wu

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
2386.38	61.26	-12.74	74	58.35	31.9	5.4	34.39	100	132	Peak
2386.38	53.56	-0.44	54	50.65	31.9	5.4	34.39	100	132	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
2385.81	53.34	-20.66	74	50.43	31.9	5.4	34.39	109	16	Peak
2385.81	45.68	-8.32	54	42.77	31.9	5.4	34.39	109	16	Average

Test Mode :	Mode 3	Temperature :	26~27°C
Test Band :	802.11b	Relative Humidity :	49~50%
Test Channel :	11	Test Engineer :	Kay Wu

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
2483.5	50.81	-23.19	74	47.68	31.98	5.52	34.37	100	124	Peak
2483.5	39.05	-14.95	54	35.92	31.98	5.52	34.37	100	124	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
2498.1	48.63	-25.37	74	45.5	31.98	5.52	34.37	198	354	Peak
2498.1	34.51	-19.49	54	31.38	31.98	5.52	34.37	198	354	Average



Test Mode :	Mode 4	Temperature :	26~27°C
Test Band :	802.11g	Relative Humidity :	49~50%
Test Channel :	01	Test Engineer :	Kay Wu

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
2389.61	73.4	-0.6	74	70.49	31.9	5.4	34.39	100	109	Peak
2389.61	49.24	-4.76	54	46.33	31.9	5.4	34.39	100	109	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
2384.86	58.13	-15.87	74	55.22	31.9	5.4	34.39	100	109	Peak
2384.86	36.43	-17.57	54	33.52	31.9	5.4	34.39	100	109	Average

Test Mode :	Mode 6	Temperature :	26~27°C
Test Band :	802.11g	Relative Humidity :	49~50%
Test Channel :	11	Test Engineer :	Kay Wu

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
2483.66	73	-1	74	69.87	31.98	5.52	34.37	100	135	Peak
2483.66	52.59	-1.41	54	49.46	31.98	5.52	34.37	100	135	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
2483.85	64.39	-9.61	74	61.26	31.98	5.52	34.37	199	353	Peak
2483.85	44.34	-9.66	54	41.21	31.98	5.52	34.37	199	353	Average



Test Mode :	Mode 7	Temperature :	26~27°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	49~50%
Test Channel :	01	Test Engineer :	Kay Wu

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
2389.61	73.6	-0.4	74	70.69	31.9	5.4	34.39	126	109	Peak
2389.61	51.89	-2.11	54	48.98	31.9	5.4	34.39	126	109	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
2389.61	64.98	-9.02	74	62.07	31.9	5.4	34.39	100	22	Peak
2389.61	43.66	-10.34	54	40.75	31.9	5.4	34.39	100	22	Average

Test Mode :	Mode 9	Temperature :	26~27°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	49~50%
Test Channel :	11	Test Engineer :	Kay Wu

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
2483.5	70.54	-3.46	74	67.41	31.98	5.52	34.37	100	136	Peak
2483.5	52.3	-1.7	54	49.17	31.98	5.52	34.37	100	136	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
2485.94	61.1	-12.9	74	57.97	31.98	5.52	34.37	199	353	Peak
2485.94	44.62	-9.38	54	41.49	31.98	5.52	34.37	199	353	Average



Test Mode :	Mode 10	Temperature :	26~27°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	49~50%
Test Channel :	03	Test Engineer :	Kay Wu

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
2383.34	69.51	-4.49	74	66.6	31.9	5.4	34.39	100	110	Peak
2383.34	52.27	-1.73	54	49.36	31.9	5.4	34.39	100	110	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
2389.61	61.54	-12.46	74	58.63	31.9	5.4	34.39	105	360	Peak
2389.61	44.01	-9.99	54	41.1	31.9	5.4	34.39	105	360	Average

Test Mode :	Mode 12	Temperature :	26~27°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	49~50%
Test Channel :	09	Test Engineer :	Kay Wu

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
2491.26	68.16	-5.84	74	65.03	31.98	5.52	34.37	100	131	Peak
2491.26	51.1	-2.9	54	47.97	31.98	5.52	34.37	100	131	Average

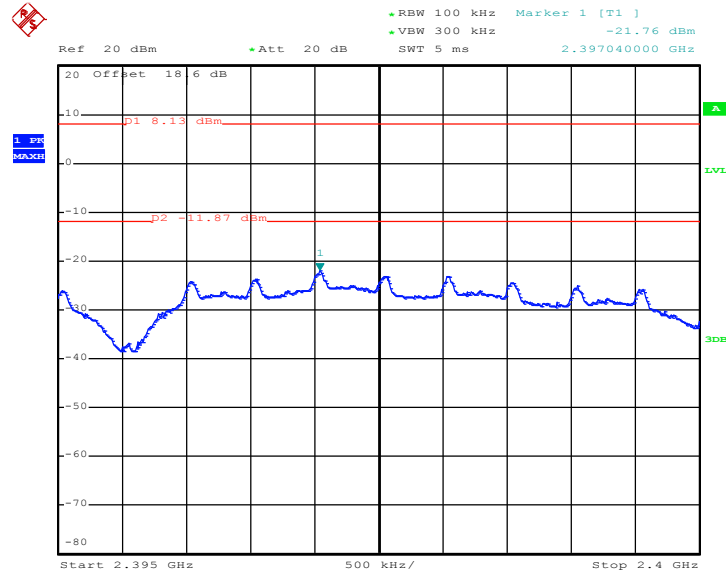
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.66	60.05	-13.95	74	56.92	31.98	5.52	34.37	199	351	Peak
2483.66	42.2	-11.8	54	39.07	31.98	5.52	34.37	199	351	Average



3.3.6 Test Plots of Conducted Band Edges

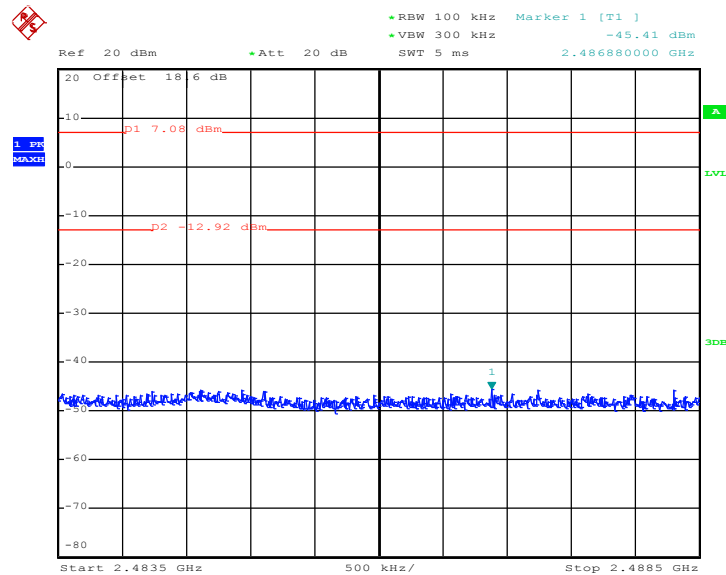
Test Mode :	Mode 1 and 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50-53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11b Channel 01



Date: 27.APR.2011 17:18:19

High Band Edge Plot on 802.11b Channel 11

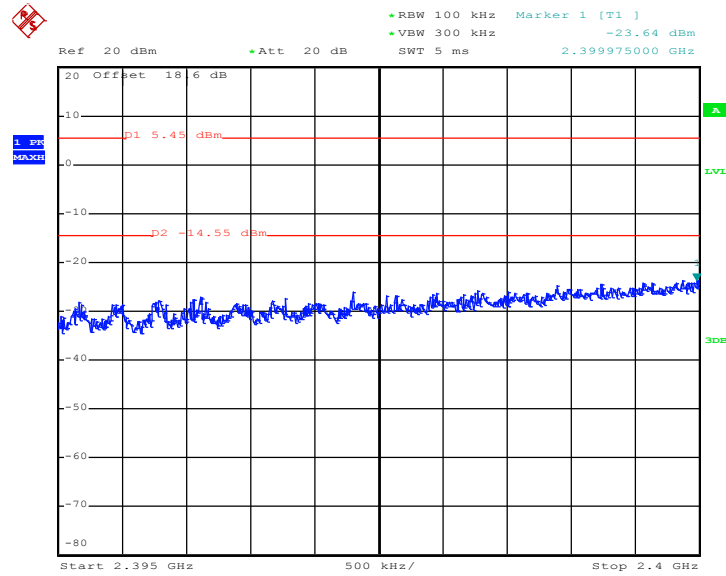


Date: 27.APR.2011 17:44:00



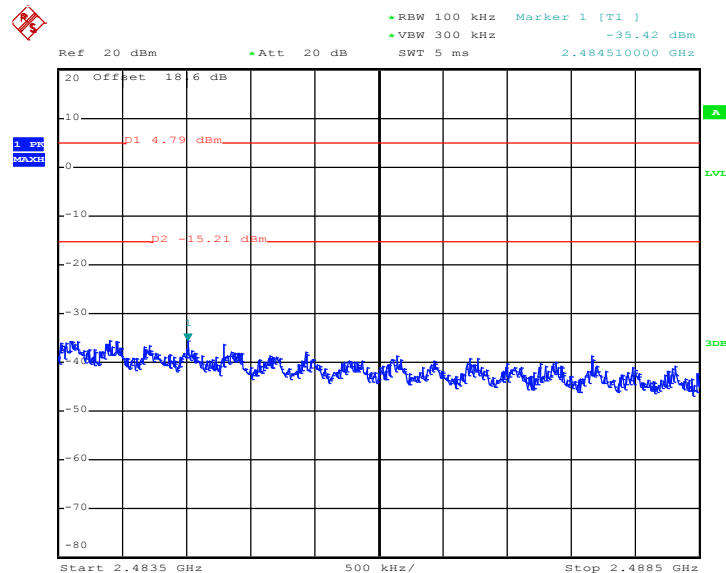
Test Mode :	Mode 4 and 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50-53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11g Channel 01



Date: 27.APR.2011 16:42:04

High Band Edge Plot on 802.11g Channel 11

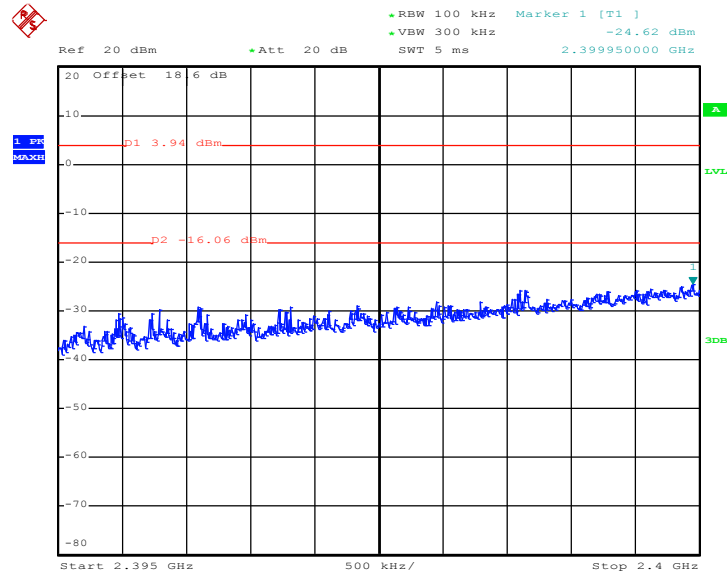


Date: 27.APR.2011 16:27:10



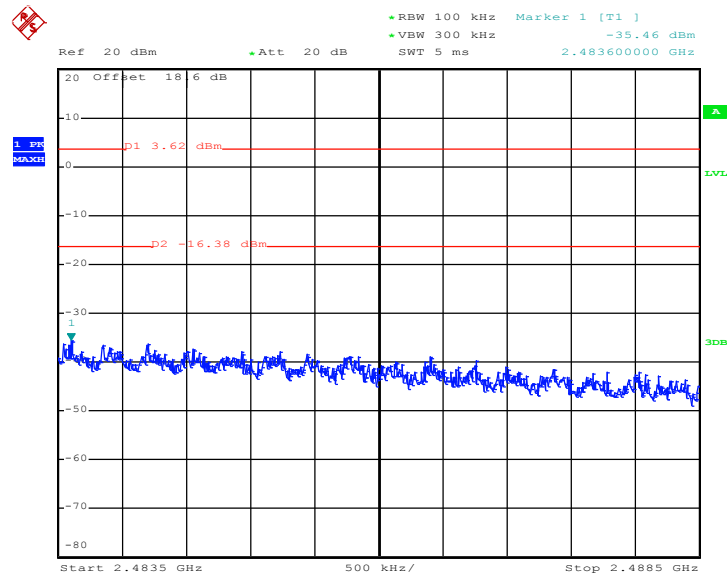
Test Mode :	Mode 7 and 9	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50-53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11n (BW 20MHz) Channel 01



Date: 27.APR.2011 15:43:15

High Band Edge Plot on 802.11n (BW 20MHz) Channel 11

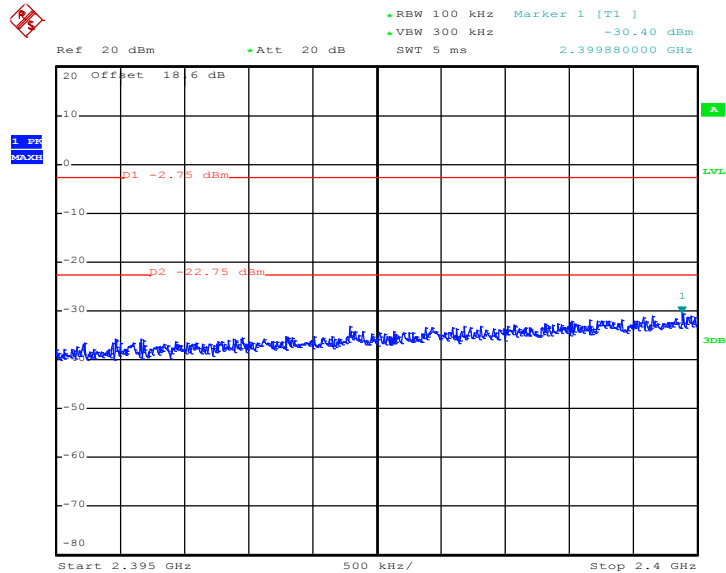


Date: 27.APR.2011 16:11:10



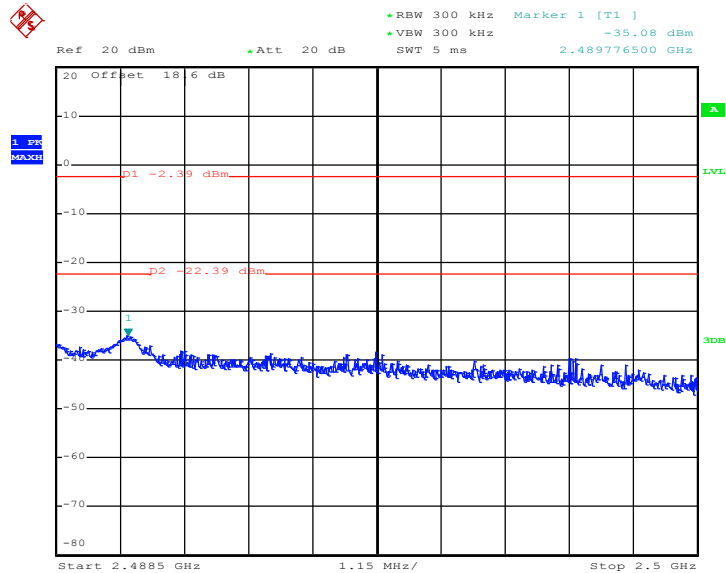
Test Mode :	Mode 10 and 12	Temperature :	24~26°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	50-53%
Test Channel :	03 and 09	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11n (BW 40MHz) Channel 03



Date: 27.APR.2011 14:40:02

High Band Edge Plot on 802.11n (BW 40MHz) Channel 09



Date: 27.APR.2011 14:27:11

3.4 Spurious Emission Measurement

3.4.1 Limit of Spurious Emission Measurement

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

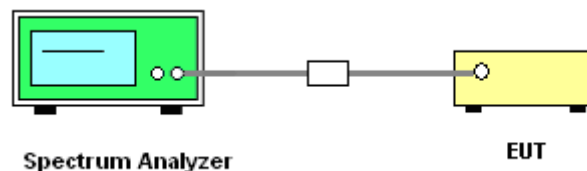
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer via a low loss cable.
2. Set RBW = 100 kHz, Video bandwidth (VBW) \geq 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.

3.4.4 Test Setup

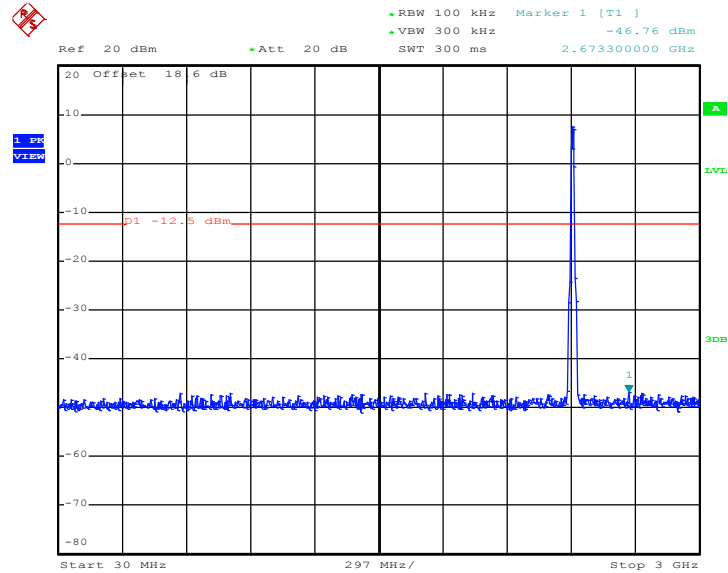




3.4.5 Test Plots of Spurious Emission

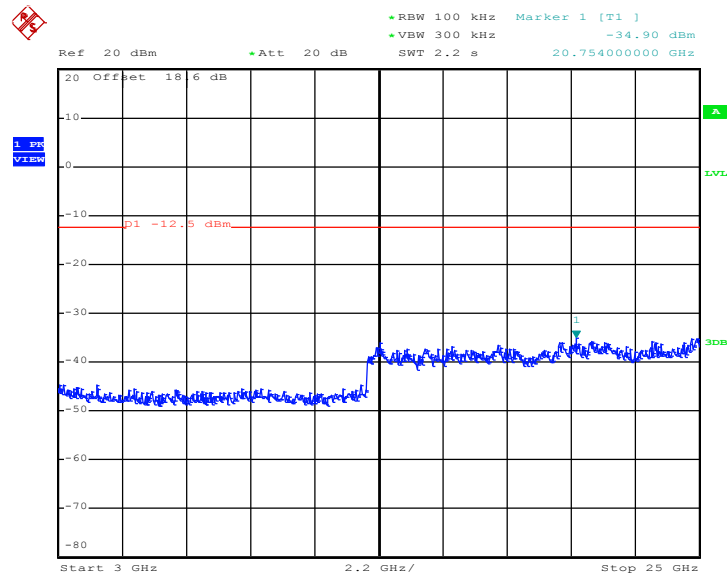
Test Mode :	Mode 1	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50-53%
Test Channel :	01	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 27.APR.2011 17:14:44

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

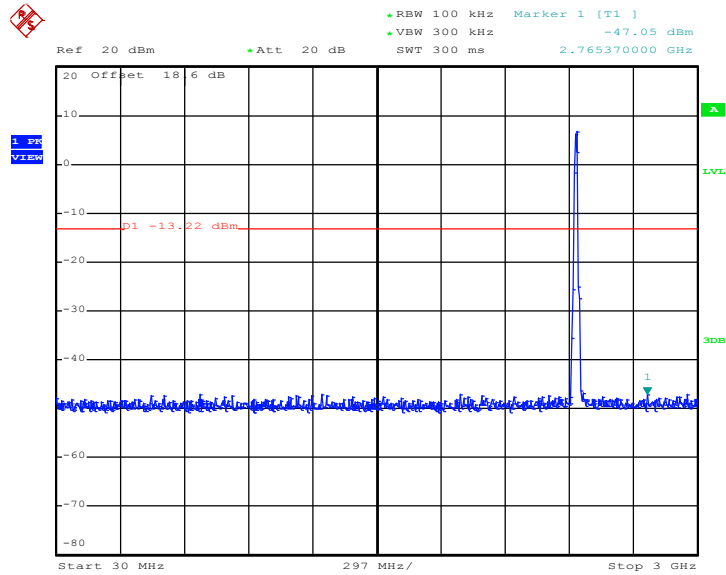


Date: 27.APR.2011 17:15:01



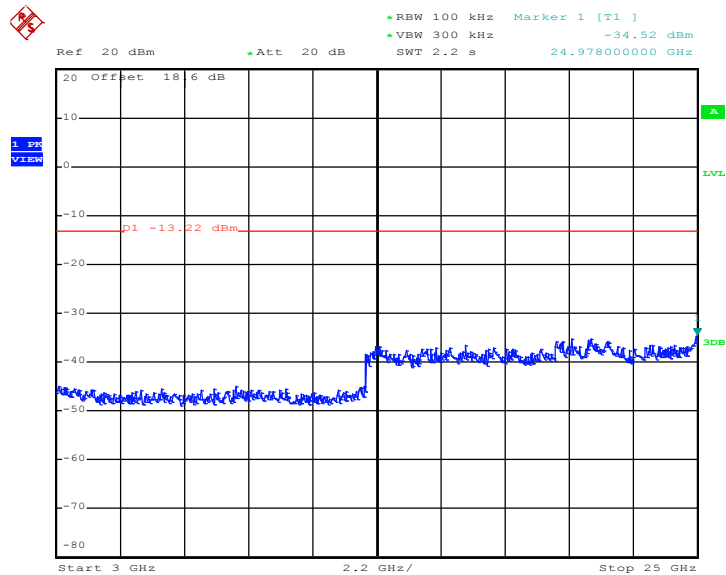
Test Mode :	Mode 2	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50-53%
Test Channel :	06	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 27.APR.2011 17:40:01

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

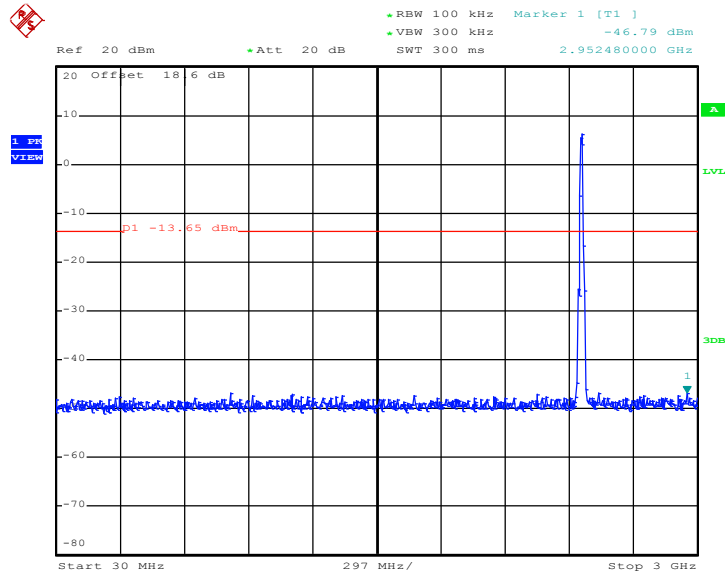


Date: 27.APR.2011 17:40:18



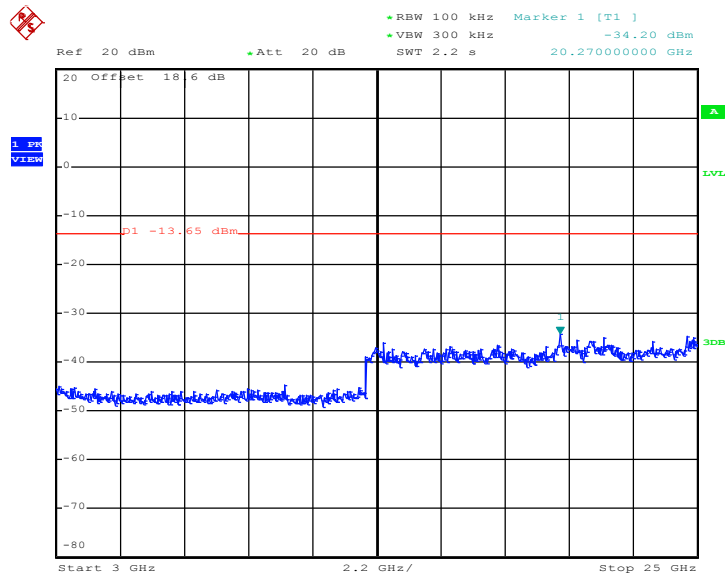
Test Mode :	Mode 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50-53%
Test Channel :	11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 27.APR.2011 17:53:23

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

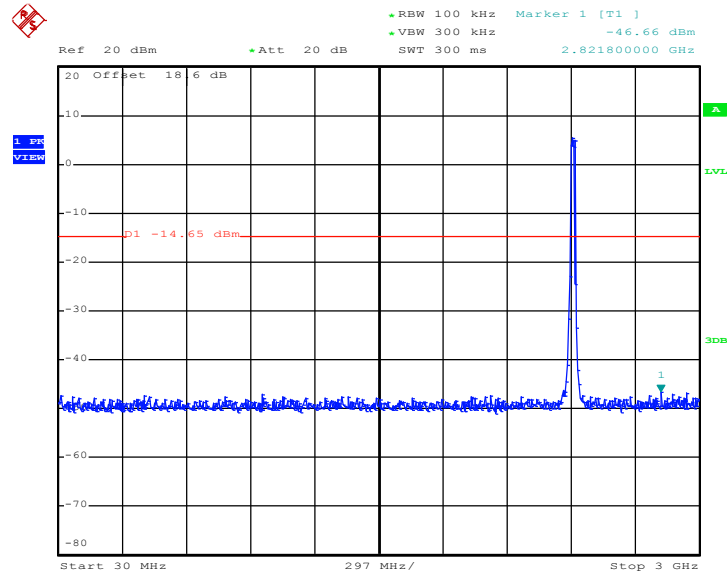


Date: 27.APR.2011 17:53:40



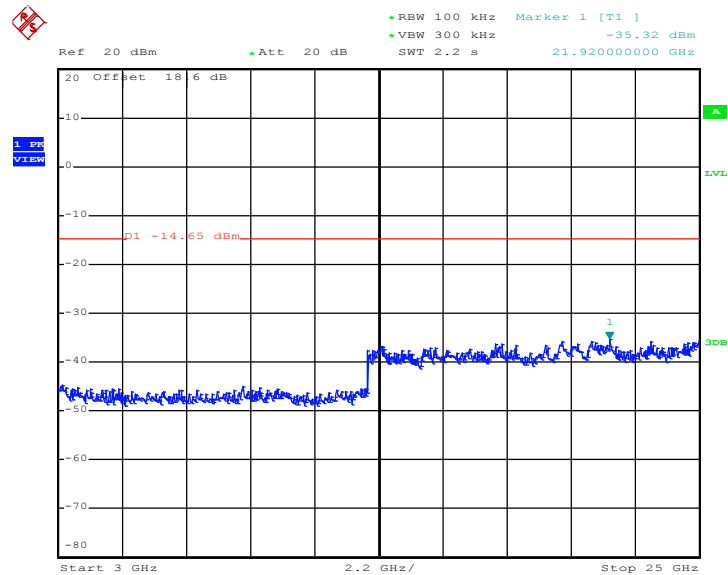
Test Mode :	Mode 4	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50-53%
Test Channel :	01	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 27.APR.2011 17:12:55

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

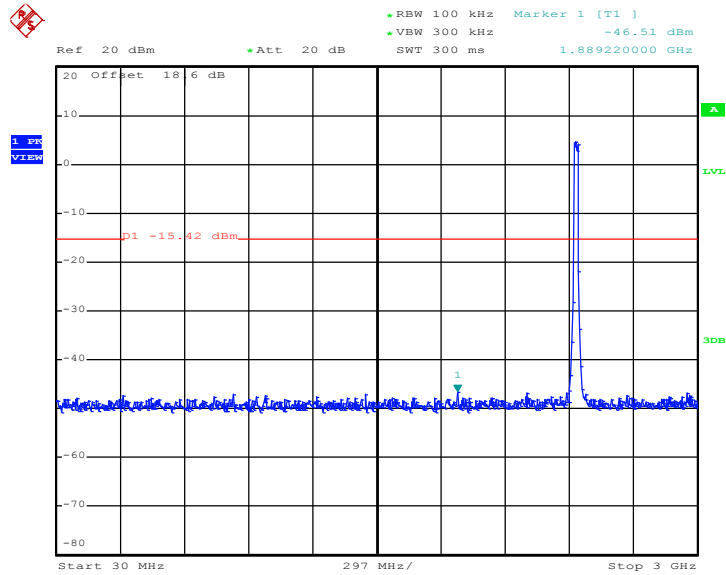


Date: 27.APR.2011 17:13:12



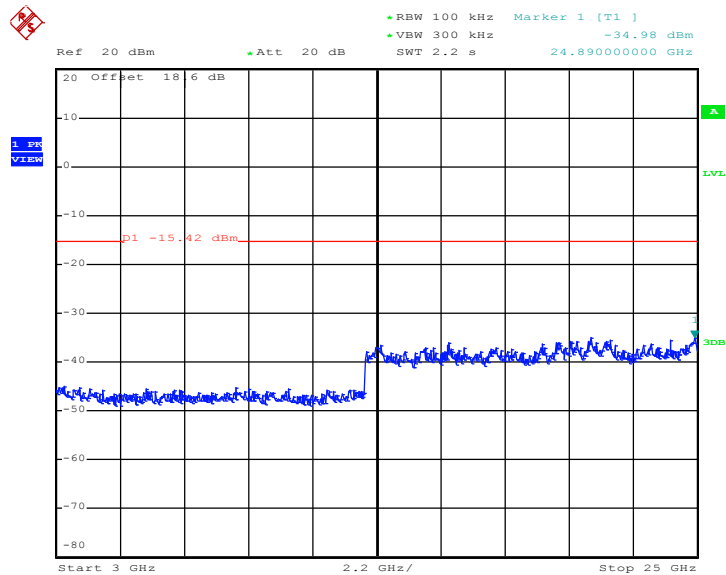
Test Mode :	Mode 5	Temperature :	24~26
Test Band :	802.11g	Relative Humidity :	50-53
Test Channel :	06	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 27.APR.2011 17:08:44

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

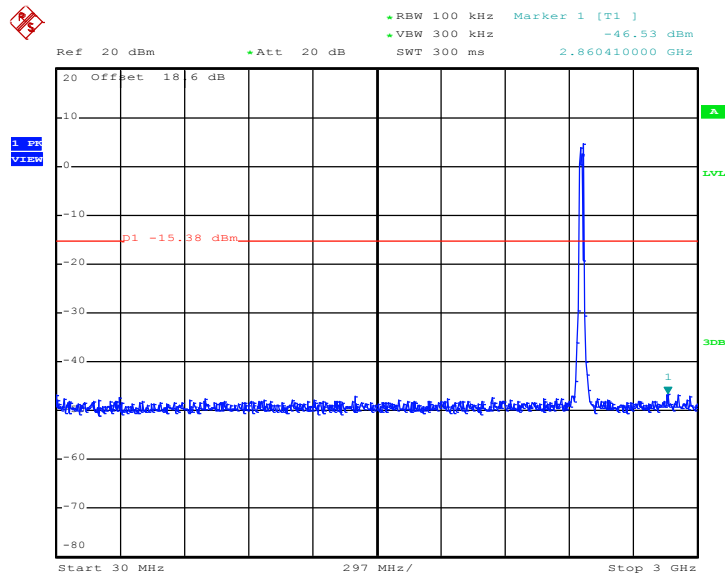


Date: 27.APR.2011 17:09:00



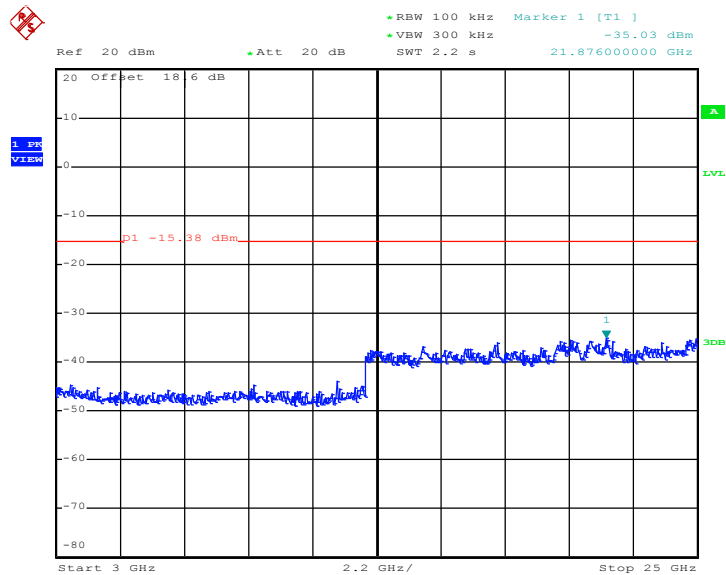
Test Mode :	Mode 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50-53%
Test Channel :	11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 27.APR.2011 16:36:35

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

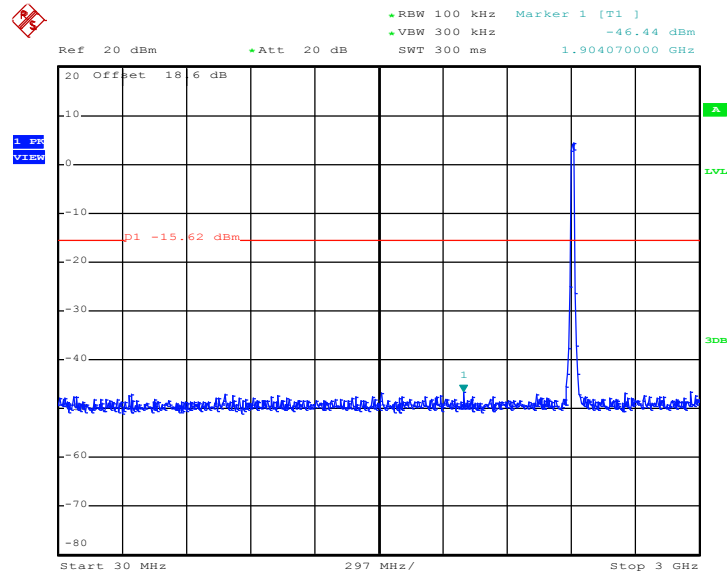


Date: 27.APR.2011 16:36:51



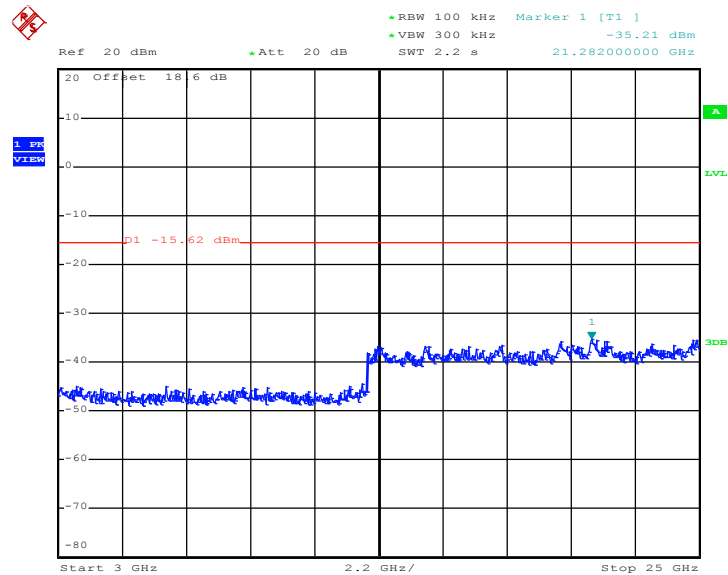
Test Mode :	Mode 7	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50-53%
Test Channel :	01	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 27.APR.2011 16:38:17

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

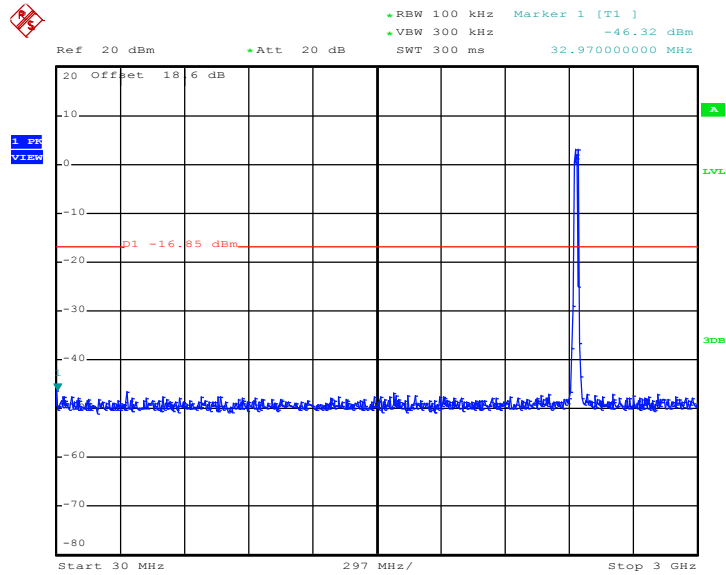


Date: 27.APR.2011 16:38:34



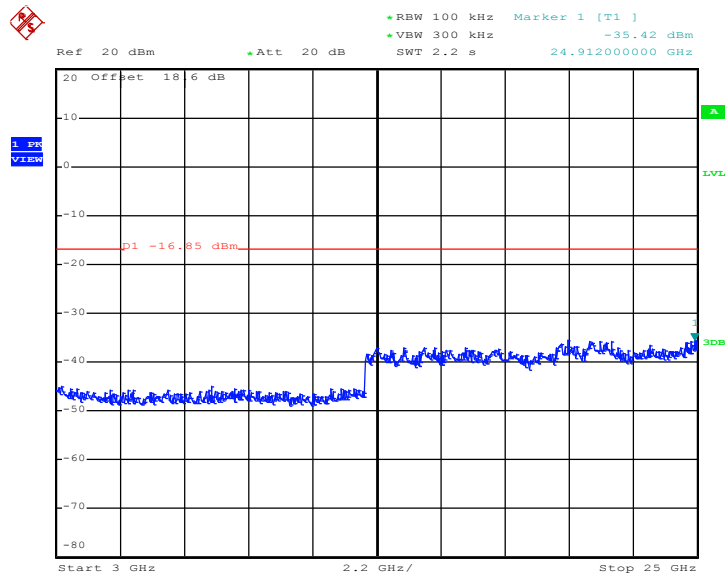
Test Mode :	Mode 8	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50-53%
Test Channel :	06	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 27.APR.2011 16:05:58

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

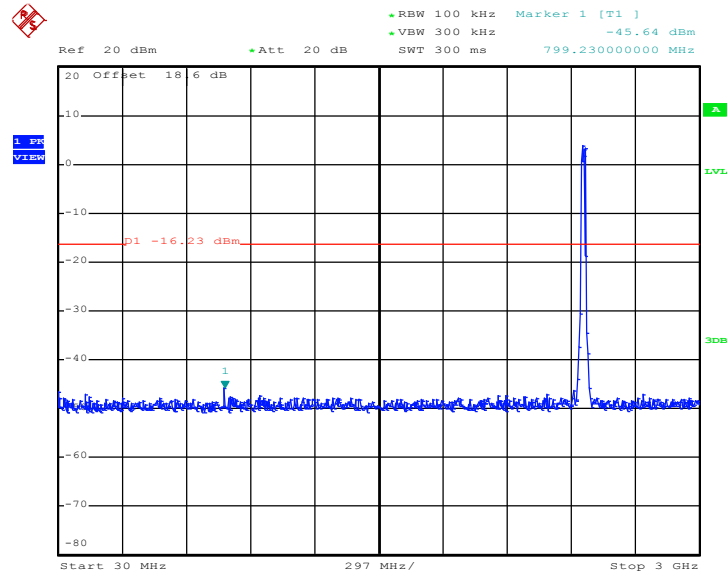


Date: 27.APR.2011 16:06:21



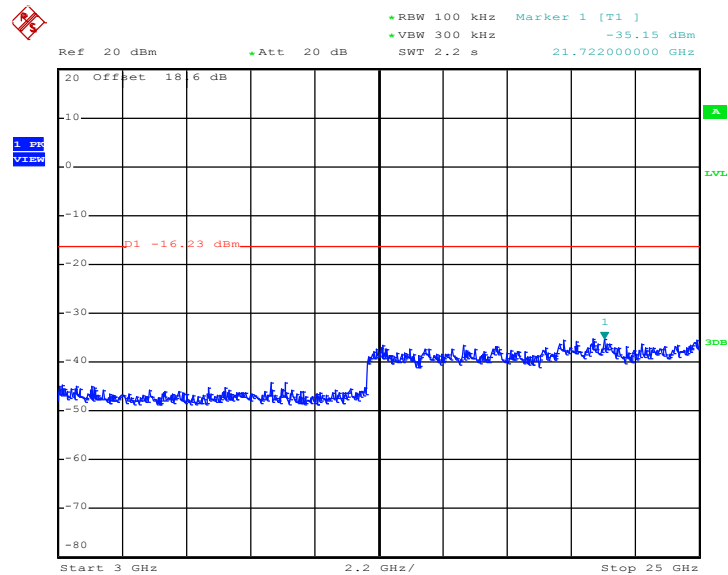
Test Mode :	Mode 9	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50-53%
Test Channel :	11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 27.APR.2011 17:58:58

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

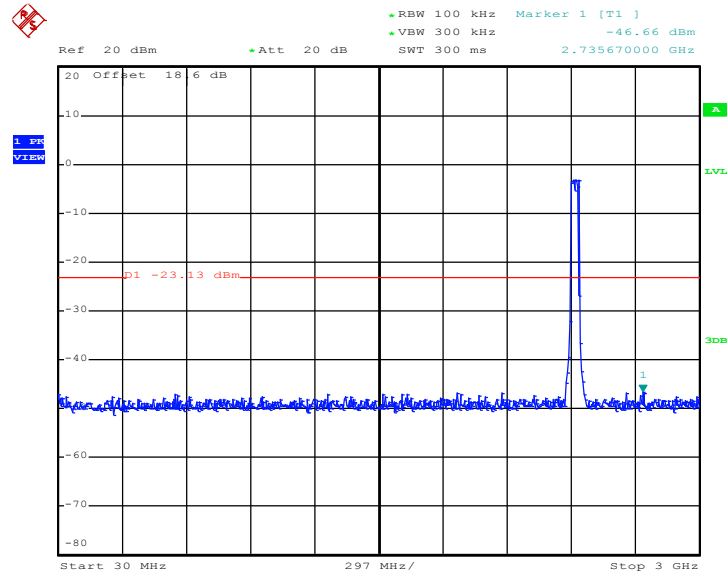


Date: 27.APR.2011 17:59:15



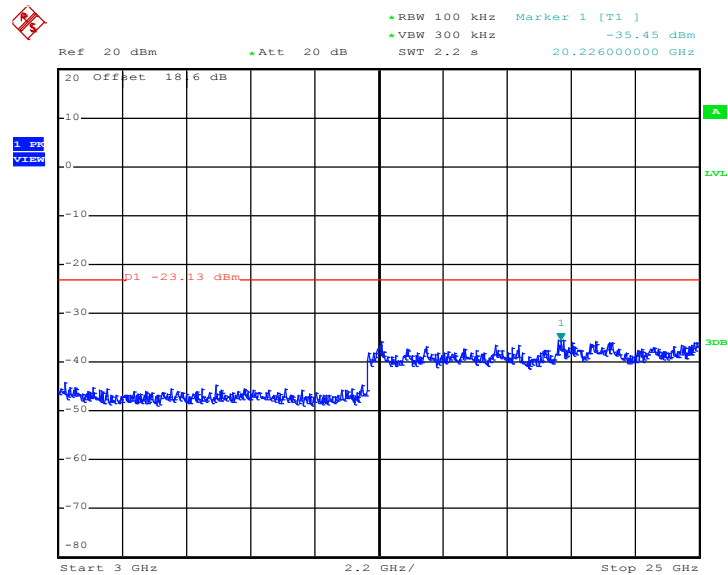
Test Mode :	Mode 10	Temperature :	24~26°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	50-53%
Test Channel :	03	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 27.APR.2011 14:50:32

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

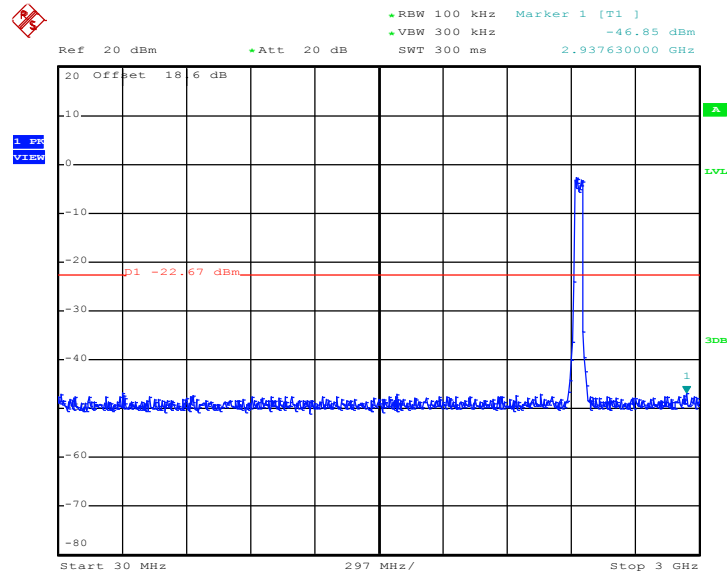


Date: 27.APR.2011 14:50:49



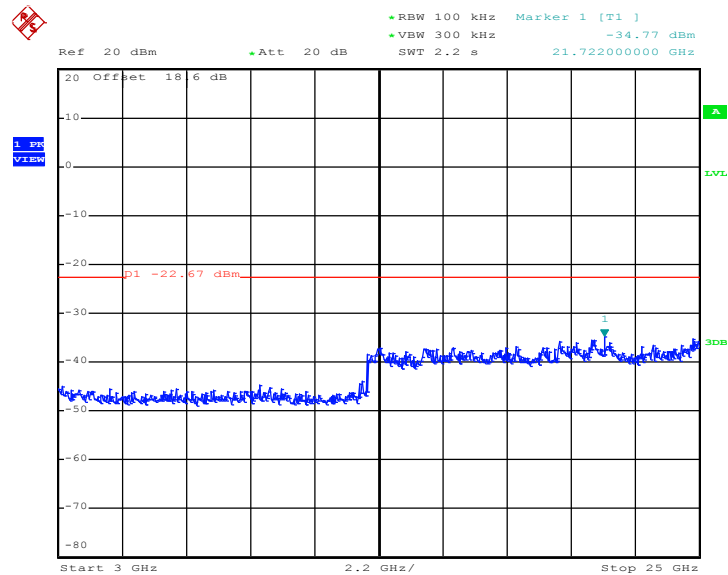
Test Mode :	Mode 11	Temperature :	24~26°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	50-53%
Test Channel :	06	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 27.APR.2011 14:23:08

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

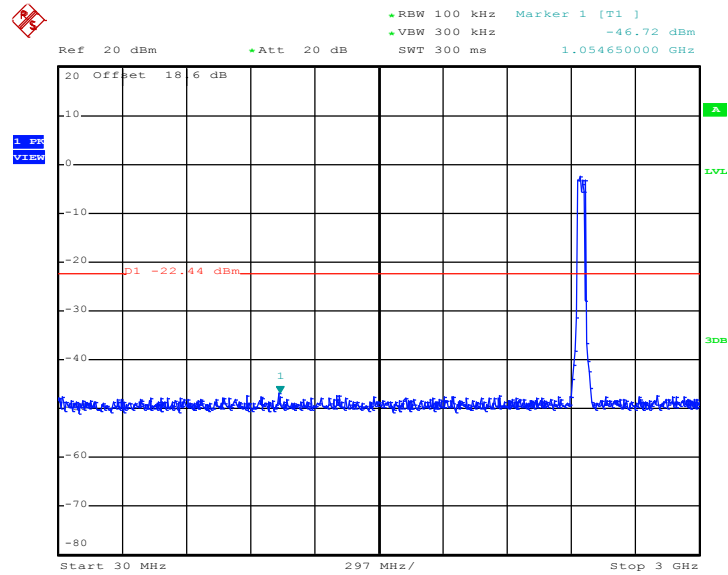


Date: 27.APR.2011 14:23:25



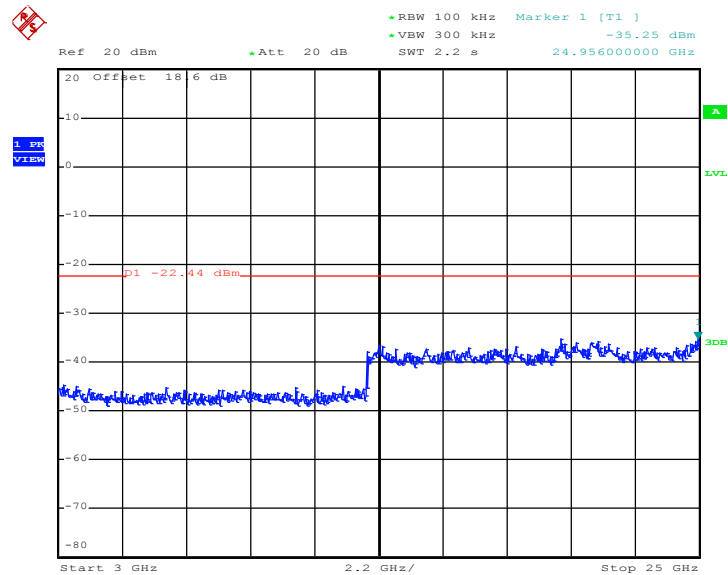
Test Mode :	Mode 12	Temperature :	24~26°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	50-53%
Test Channel :	09	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 27.APR.2011 14:36:35

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 27.APR.2011 14:36:52

3.5 Power Spectral Density Measurement

3.5.1 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.

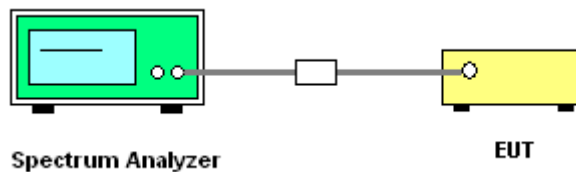
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The test follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Take the measured data from spectrum analyzer.

3.5.4 Test Setup



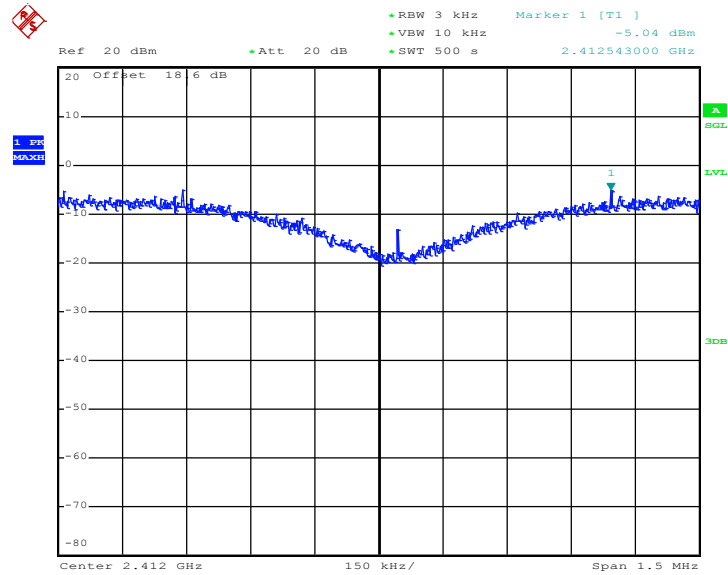


3.5.5 Test Result of Power Spectral Density

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50-53%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-5.04	8	Pass
06	2437	-5.52	8	Pass
11	2462	-5.68	8	Pass

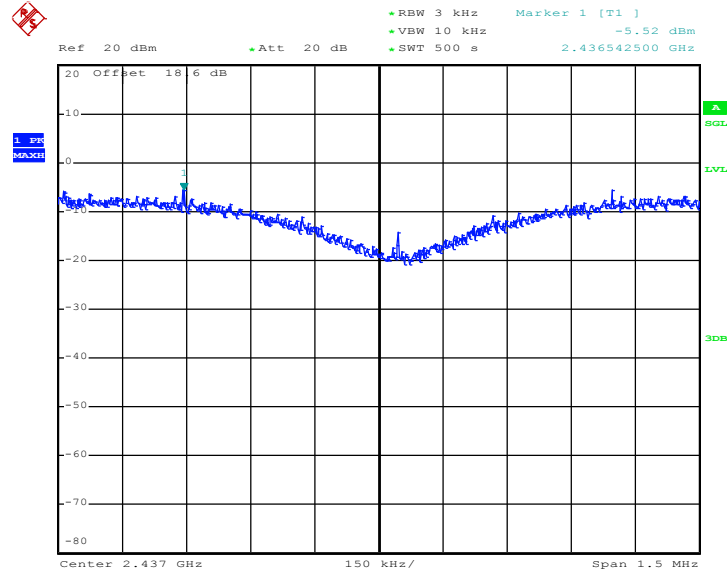
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 27.APR.2011 17:27:33

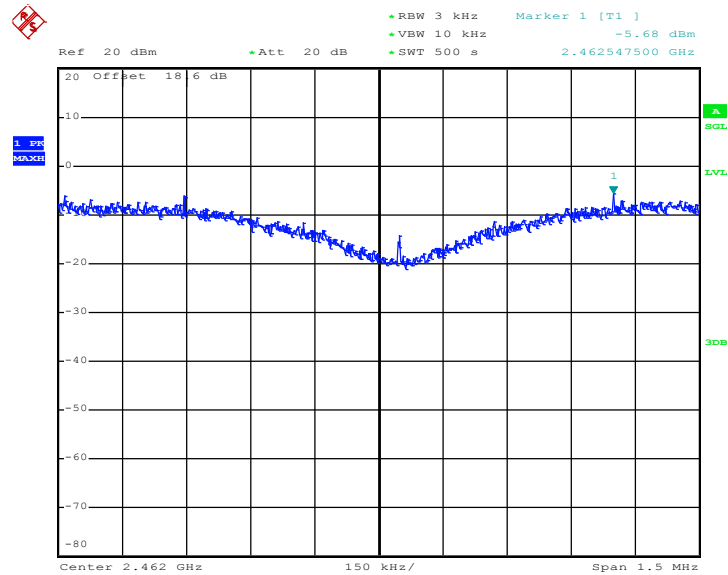


Mode 2 : PSD Plot on 802.11b Channel 06



Date: 27.APR.2011 17:39:40

Mode 3 : PSD Plot on 802.11b Channel 11



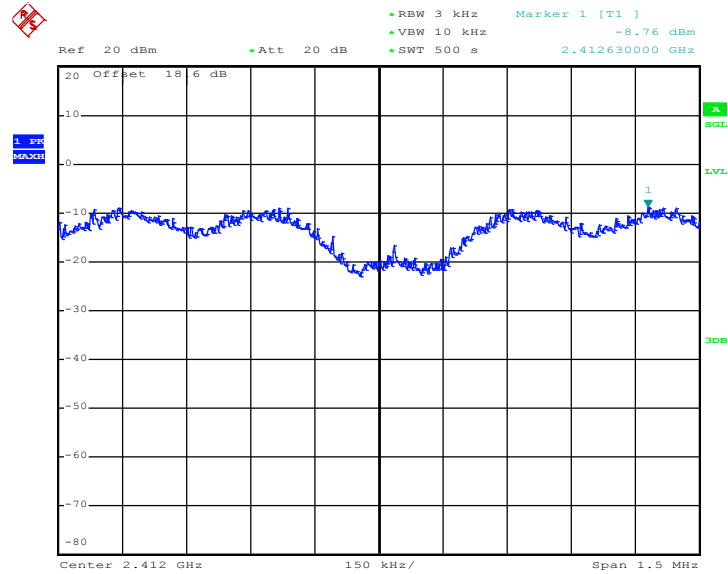
Date: 27.APR.2011 17:53:02



Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50-53%

Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-8.76	8	Pass
06	2437	-9.45	8	Pass
11	2462	-9.43	8	Pass

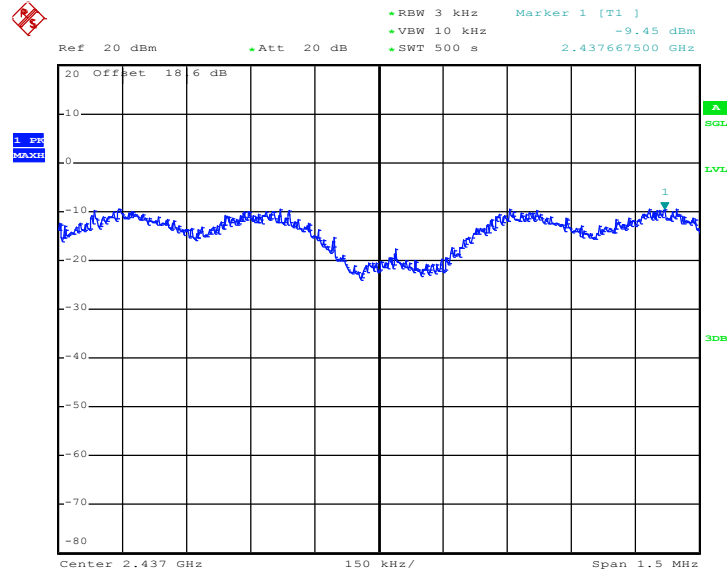
Mode 4 : PSD Plot on 802.11g Channel 01



Date: 27.APR.2011 16:52:15

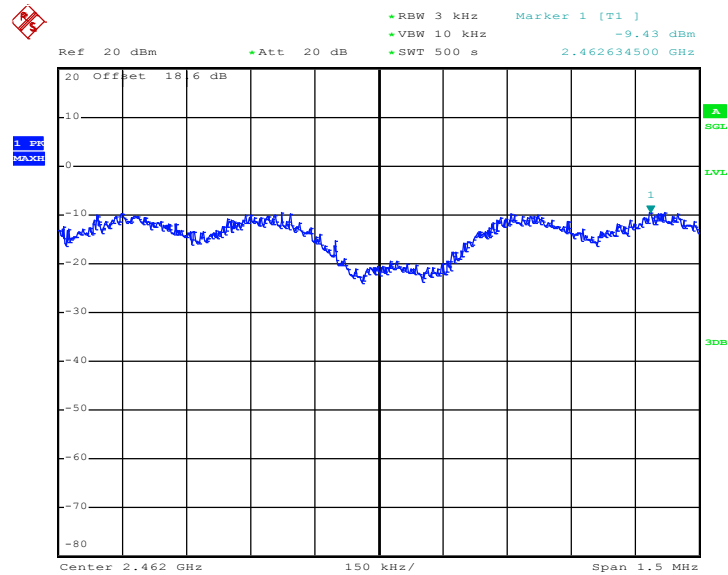


Mode 5 : PSD Plot on 802.11g Channel 06



Date: 27.APR.2011 17:08:23

Mode 6 : PSD Plot on 802.11g Channel 11



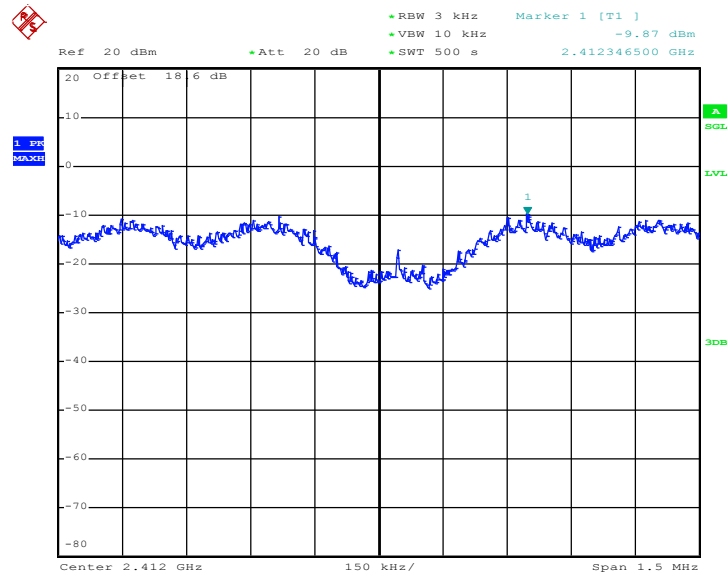
Date: 27.APR.2011 16:36:14



Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50-53%

Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-9.87	8	Pass
06	2437	-10.34	8	Pass
11	2462	-10.17	8	Pass

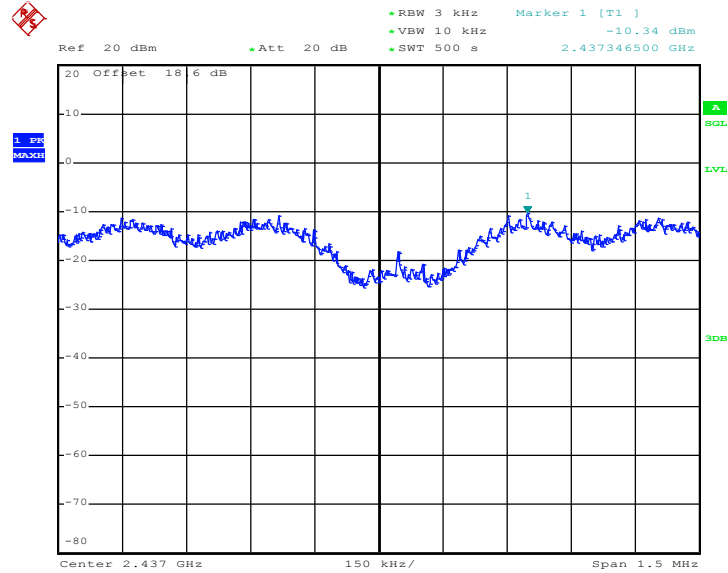
Mode 7 : PSD Plot on 802.11n (BW 20MHz) Channel 01



Date: 27.APR.2011 15:52:15

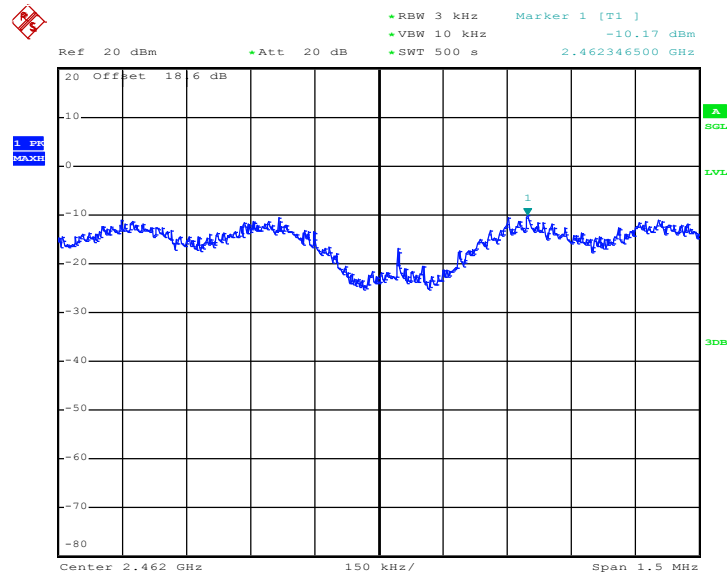


Mode 8 : PSD Plot on 802.11n (BW 20MHz) Channel 06



Date: 27.APR.2011 16:05:19

Mode 9 : PSD Plot on 802.11n (BW 20MHz) Channel 11



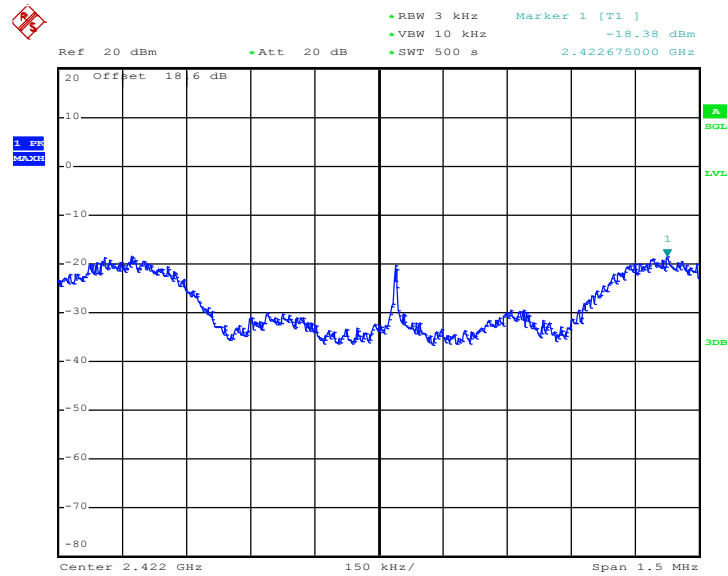
Date: 27.APR.2011 16:20:25



Test Mode :	Mode 10, 11, 12	Temperature :	24~26
Test Engineer :	Pinkston Tu	Relative Humidity :	50-53

Channel	Frequency (MHz)	802.11n (BW 40MHz) Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
03	2422	-18.38	8	Pass
06	2437	-18.07	8	Pass
09	2452	-18.07	8	Pass

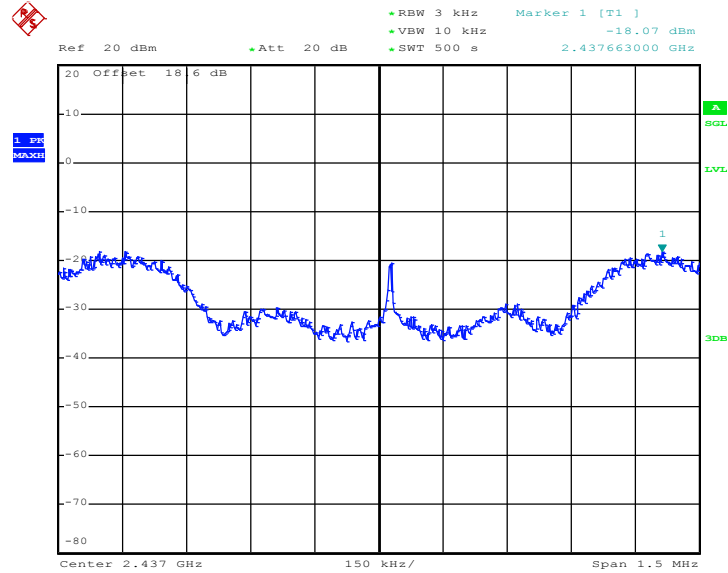
Mode 10 : PSD Plot on 802.11n (BW 40MHz) Channel 03



Date: 27.APR.2011 14:50:11

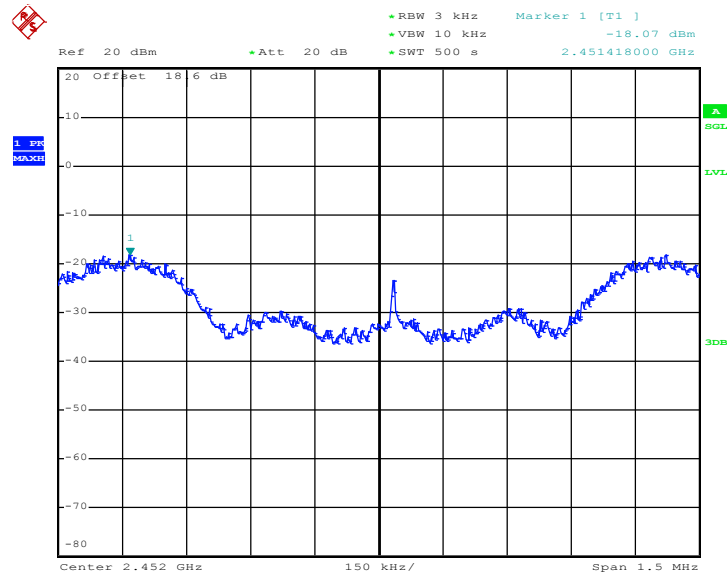


Mode 11 : PSD Plot on 802.11n (BW 40MHz) Channel 06



Date: 27.APR.2011 14:22:47

Mode 12 : PSD Plot on 802.11n (BW 40MHz) Channel 09



Date: 27.APR.2011 14:36:14

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.

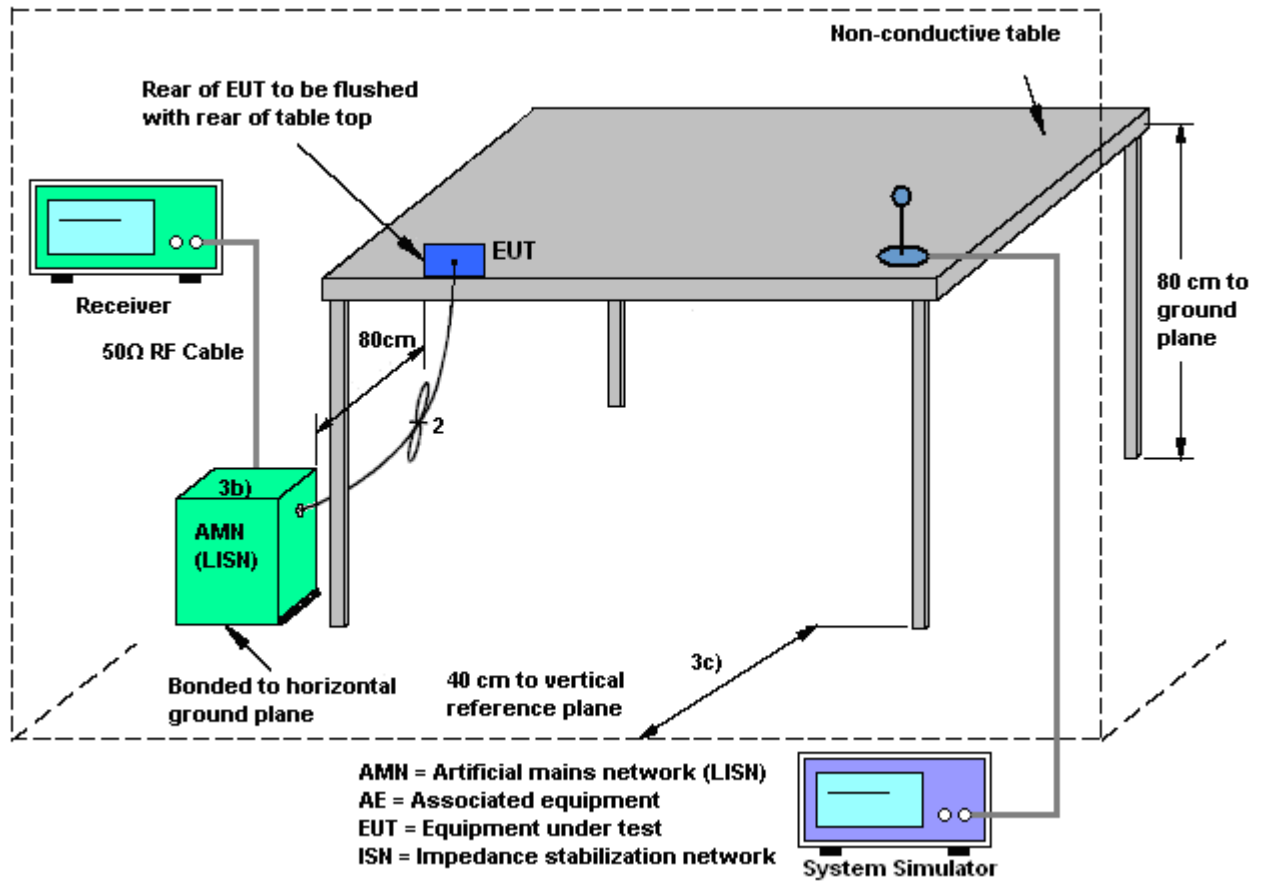
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

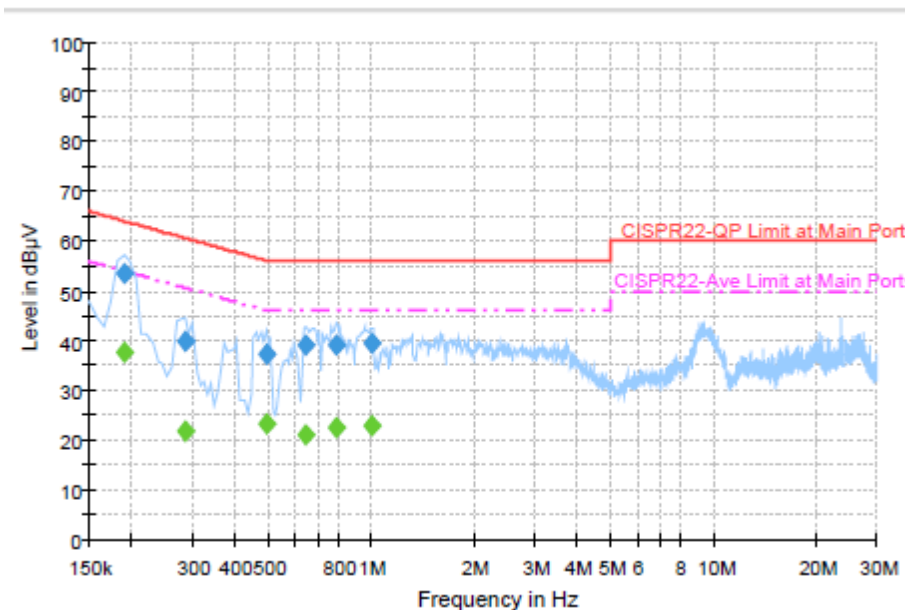
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. 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 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link +TC (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



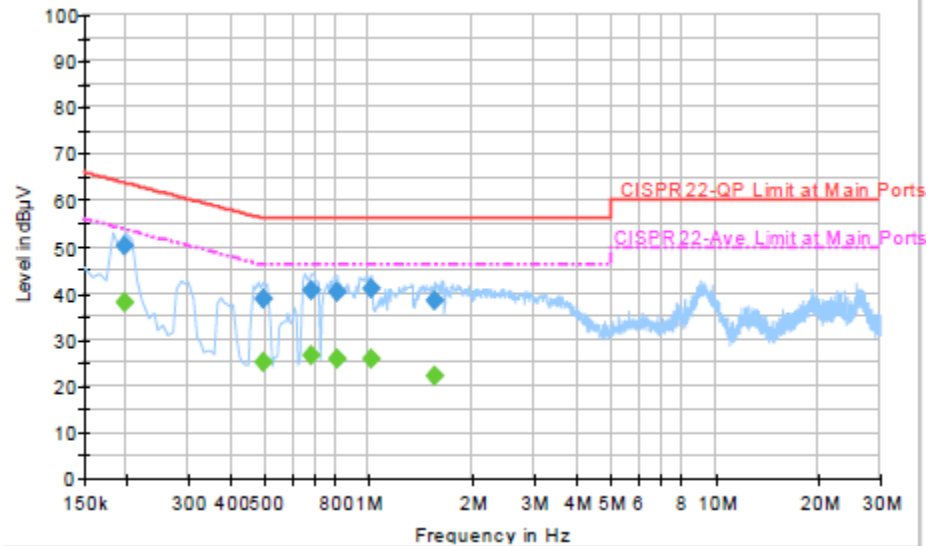
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.190000	53.3	Off	L1	19.4	10.7	64.0
0.286000	39.7	Off	L1	19.4	20.9	60.6
0.494000	37.1	Off	L1	19.4	19.0	56.1
0.646000	39.1	Off	L1	19.4	16.9	56.0
0.790000	39.0	Off	L1	19.4	17.0	56.0
1.006000	39.5	Off	L1	19.4	16.5	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.190000	37.5	Off	L1	19.4	16.5	54.0
0.286000	21.9	Off	L1	19.4	28.7	50.6
0.494000	23.2	Off	L1	19.4	22.9	46.1
0.646000	21.2	Off	L1	19.4	24.8	46.0
0.790000	22.7	Off	L1	19.4	23.3	46.0
1.006000	23.0	Off	L1	19.4	23.0	46.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link +TC (Charging from Adapter)		
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)
0.198000	50.1	Off	N	19.4	13.6	63.7
0.494000	38.8	Off	N	19.4	17.3	56.1
0.686000	40.7	Off	N	19.5	15.3	56.0
0.814000	40.1	Off	N	19.4	15.9	56.0
1.014000	40.8	Off	N	19.5	15.2	56.0
1.558000	38.4	Off	N	19.5	17.6	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.198000	38.0	Off	N	19.4	15.7	53.7
0.494000	25.2	Off	N	19.4	20.9	46.1
0.686000	26.5	Off	N	19.5	19.5	46.0
0.814000	25.9	Off	N	19.4	20.1	46.0
1.014000	26.0	Off	N	19.5	20.0	46.0
1.558000	22.1	Off	N	19.5	23.9	46.0

3.7 Radiated Emission Measurement

3.7.1 Limit of Radiated Emission

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

3.7.2 Measuring Instruments

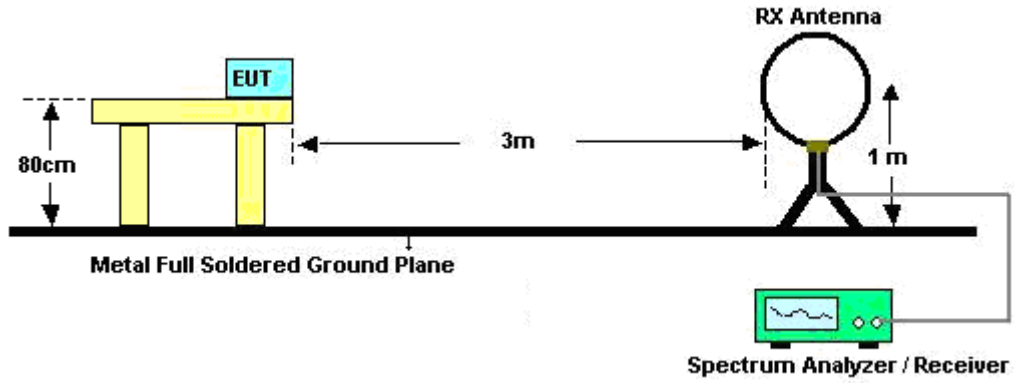
See list of measuring instruments of this test report.

3.7.3 Test Procedures

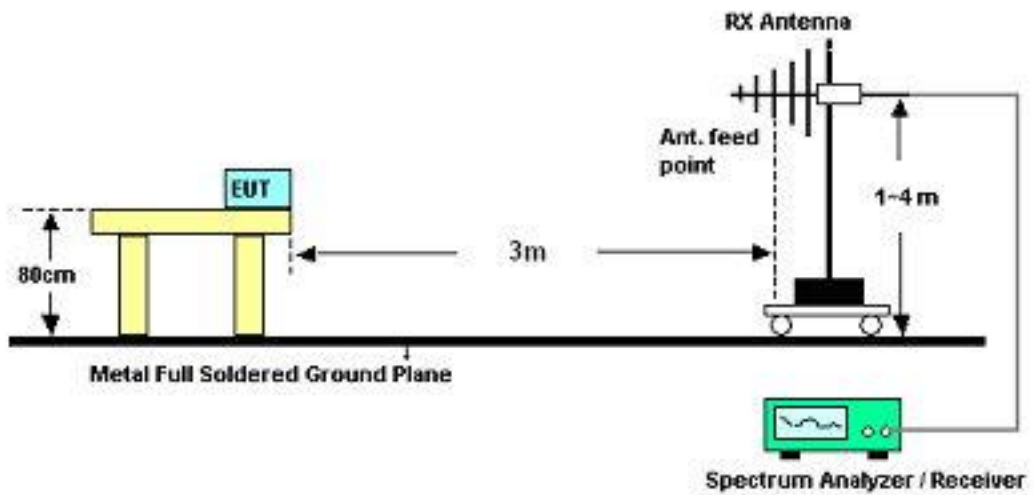
1. The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Use the following spectrum analyzer settings:
 - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold.
 - (2) Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
Distance extrapolation factor = $20 \log(\text{specific distance [3m]} / \text{test distance [1m]})$ (dB)
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.

3.7.4 Test Setup

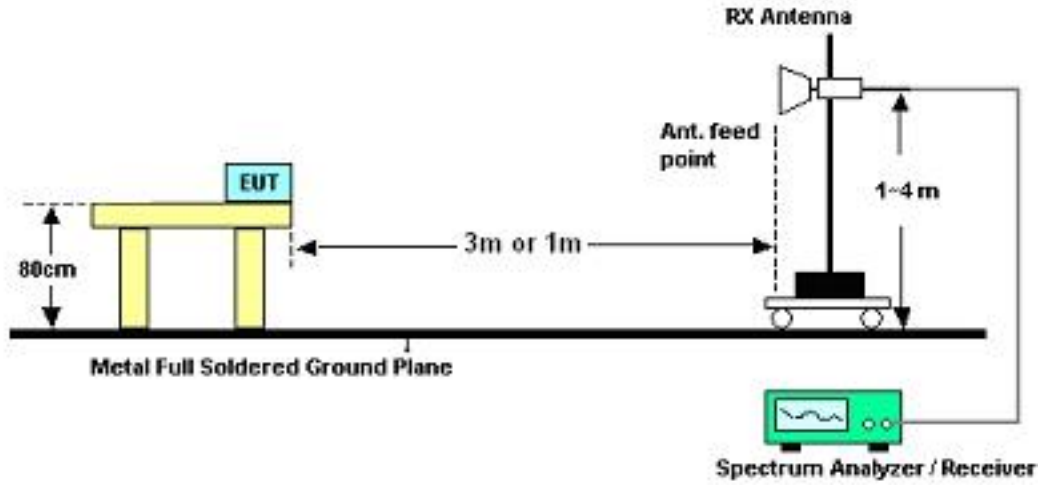
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

Test Engineer :	Kay Wu	Temperature :	26~27°C	
		Relative Humidity :	49~50%	
Frequency (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 (specific distance / test distance) (dB);

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



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

Test Mode :	Mode 1	Temperature :	26~27°C
Test Channel :	01	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

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
133.14	17.11	-26.39	43.5	35.75	11.66	1.4	31.7	-	-	Peak
175.53	25.81	-17.69	43.5	46.38	9.55	1.56	31.68	-	-	Peak
265.98	33	-13	46	49.86	12.92	1.92	31.7	-	-	Peak
414.8	41.35	-4.65	46	54.65	16.08	2.44	31.82	-	-	Peak
675.9	42.03	-3.97	46	51.52	19.34	3.16	31.99	100	337	Peak
700.4	41.56	-4.44	46	50.91	19.39	3.27	32.01	-	-	Peak
2386.38	61.26	-12.74	74	58.35	31.9	5.4	34.39	100	132	Peak
2386.38	53.56	-0.44	54	50.65	31.9	5.4	34.39	100	132	Average
2412	107.61	-	-	104.66	31.91	5.43	34.39	100	132	Peak
2412	103.35	-	-	100.4	31.91	5.43	34.39	100	132	Average
2500	51.89	-22.11	74	48.74	32	5.52	34.37	100	132	Peak
2500	40.83	-13.17	54	37.68	32	5.52	34.37	100	132	Average
4824	55.81	-18.19	74	69.9	34.4	7.96	56.45	100	82	Peak
4824	53.71	-0.29	54	67.8	34.4	7.96	56.45	100	82	Average



Test Mode :	Mode 1	Temperature :	26~27°C
Test Channel :	01	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

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
31.08	34.28	-5.72	40	47.97	17.31	0.72	31.72	-	-	Peak
133.14	23.81	-19.69	43.5	42.45	11.66	1.4	31.7	-	-	Peak
177.69	26.06	-17.44	43.5	46.69	9.5	1.56	31.69	-	-	Peak
628.3	42.13	-3.87	46	51.95	19.23	2.99	32.04	100	124	Peak
724.9	41.9	-4.1	46	50.93	19.72	3.31	32.06	-	-	Peak
796.3	38.05	-7.95	46	45.95	20.72	3.36	31.98	-	-	Peak
2385.81	53.34	-20.66	74	50.43	31.9	5.4	34.39	109	16	Peak
2385.81	45.68	-8.32	54	42.77	31.9	5.4	34.39	109	16	Average
2412	100.74	-	-	97.79	31.91	5.43	34.39	109	16	Peak
2412	96.97	-	-	94.02	31.91	5.43	34.39	109	16	Average
2494	49.6	-24.4	74	46.45	32	5.52	34.37	109	16	Peak
2494	35.29	-18.71	54	32.14	32	5.52	34.37	109	16	Average
4824	52.93	-21.07	74	67.02	34.4	7.96	56.45	103	322	Peak
4824	53.51	-0.49	54	67.6	34.4	7.96	56.45	103	322	Average



Test Mode :	Mode 2	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

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	23.46	-16.54	40	37.15	17.31	0.72	31.72	-	-	Peak
176.88	30.77	-12.73	43.5	51.36	9.53	1.56	31.68	-	-	Peak
265.44	31.33	-14.67	46	48.19	12.92	1.92	31.7	-	-	Peak
451.9	42.09	-3.91	46	54.6	16.83	2.51	31.85	-	-	Peak
554.8	42.38	-3.62	46	52.86	18.56	2.86	31.9	100	217	Peak
675.9	42.1	-3.9	46	51.59	19.34	3.16	31.99	-	-	Peak
2390	47.95	-26.05	74	45.04	31.9	5.4	34.39	100	127	Peak
2390	36.31	-17.69	54	33.4	31.9	5.4	34.39	100	127	Average
2437	105.45	-	-	102.44	31.93	5.46	34.38	100	127	Peak
2437	101.95	-	-	98.92	31.95	5.46	34.38	100	127	Average
2486	50.21	-23.79	74	47.08	31.98	5.52	34.37	100	127	Peak
2486	37.86	-16.14	54	34.73	31.98	5.52	34.37	100	127	Average



Test Mode :	Mode 2	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

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
31.62	33.8	-6.2	40	48.06	16.72	0.73	31.71	-	-	Peak
133.14	23.38	-20.12	43.5	42.02	11.66	1.4	31.7	-	-	Peak
166.89	25.18	-18.32	43.5	45.46	9.84	1.54	31.66	-	-	Peak
451.9	35.29	-10.71	46	47.8	16.83	2.51	31.85	-	-	Peak
628.3	41.78	-4.22	46	51.6	19.23	2.99	32.04	100	174	Peak
724.9	41.34	-4.66	46	50.37	19.72	3.31	32.06	-	-	Peak
2356	45.36	-28.64	74	42.57	31.86	5.34	34.41	102	360	Peak
2356	33	-21	54	30.21	31.86	5.34	34.41	102	360	Average
2437	98.94	-	-	95.91	31.95	5.46	34.38	102	360	Peak
2437	95.05	-	-	92.02	31.95	5.46	34.38	102	360	Average
2486	50.69	-23.31	74	47.56	31.98	5.52	34.37	102	360	Peak
2486	35.74	-18.26	54	32.61	31.98	5.52	34.37	102	360	Average



Test Mode :	Mode 3	Temperature :	26~27°C
Test Channel :	11	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

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	22.82	-17.18	40	35.91	17.91	0.72	31.72	-	-	Peak
232.23	25.1	-20.9	46	43.47	11.46	1.78	31.61	-	-	Peak
265.98	33.12	-12.88	46	49.98	12.92	1.92	31.7	-	-	Peak
451.9	42.01	-3.99	46	54.52	16.83	2.51	31.85	-	-	Peak
724.9	42.15	-3.85	46	51.18	19.72	3.31	32.06	100	341	Peak
796.3	41.7	-4.3	46	49.6	20.72	3.36	31.98	-	-	Peak
2374	46.36	-27.64	74	43.51	31.88	5.37	34.4	100	124	Peak
2374	35.14	-18.86	54	32.29	31.88	5.37	34.4	100	124	Average
2462	102.52	-	-	99.44	31.97	5.49	34.38	100	124	Peak
2462	98.85	-	-	95.77	31.97	5.49	34.38	100	124	Average
2483.5	50.81	-23.19	74	47.68	31.98	5.52	34.37	100	124	Peak
2483.5	39.05	-14.95	54	35.92	31.98	5.52	34.37	100	124	Average



Test Mode :	Mode 3	Temperature :	26~27°C
Test Channel :	11	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

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
31.89	33.93	-6.07	40	48.19	16.72	0.73	31.71	-	-	Peak
133.14	23.99	-19.51	43.5	42.63	11.66	1.4	31.7	-	-	Peak
265.98	24.15	-21.85	46	41.01	12.92	1.92	31.7	-	-	Peak
628.3	41.62	-4.38	46	51.44	19.23	2.99	32.04	100	254	Peak
724.9	39.37	-6.63	46	48.4	19.72	3.31	32.06	-	-	Peak
796.3	35.97	-10.03	46	43.87	20.72	3.36	31.98	-	-	Peak
2310	44.95	-29.05	74	42.24	31.81	5.31	34.41	198	354	Peak
2310	32.46	-21.54	54	29.75	31.81	5.31	34.41	198	354	Average
2462	97.67	-	-	94.59	31.97	5.49	34.38	198	354	Peak
2462	94.16	-	-	91.08	31.97	5.49	34.38	198	354	Average
2498.1	48.63	-25.37	74	45.5	31.98	5.52	34.37	198	354	Peak
2498.1	34.51	-19.49	54	31.38	31.98	5.52	34.37	198	354	Average



Test Mode :	Mode 4	Temperature :	26~27°C
Test Channel :	01	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

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	23.61	-16.39	40	36.7	17.91	0.72	31.72	-	-	Peak
191.73	20.37	-23.13	43.5	41.03	9.39	1.61	31.66	-	-	Peak
265.44	33.01	-12.99	46	49.87	12.92	1.92	31.7	-	-	Peak
451.9	41.61	-4.39	46	54.12	16.83	2.51	31.85	-	-	Peak
724.9	41.8	-4.2	46	50.83	19.72	3.31	32.06	100	124	Peak
798.4	40.33	-5.67	46	48.21	20.74	3.36	31.98	-	-	Peak
2389.61	73.4	-0.6	74	70.49	31.9	5.4	34.39	100	109	Peak
2389.61	49.24	-4.76	54	46.33	31.9	5.4	34.39	100	109	Average
2412	105.36	-	-	102.41	31.91	5.43	34.39	100	109	Peak
2412	91.86	-	-	88.91	31.91	5.43	34.39	100	109	Average
2486	47.81	-26.19	74	44.68	31.98	5.52	34.37	100	109	Peak
2486	34.69	-19.31	54	31.56	31.98	5.52	34.37	100	109	Average
4824	48.72	-25.28	74	62.81	34.4	7.96	56.45	100	0	Peak



Test Mode :	Mode 4	Temperature :	26~27°C
Test Channel :	01	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

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	33.65	-6.35	40	47.34	17.31	0.72	31.72	-	-	Peak
132.6	23.56	-19.94	43.5	42.2	11.66	1.4	31.7	-	-	Peak
177.69	27.63	-15.87	43.5	48.26	9.5	1.56	31.69	-	-	Peak
628.3	41.45	-4.55	46	51.27	19.23	2.99	32.04	100	21	Peak
724.9	39.25	-6.75	46	48.28	19.72	3.31	32.06	-	-	Peak
796.3	35.23	-10.77	46	43.13	20.72	3.36	31.98	-	-	Peak
2384.86	58.13	-15.87	74	55.22	31.9	5.4	34.39	100	109	Peak
2384.86	36.43	-17.57	54	33.52	31.9	5.4	34.39	100	109	Average
2412	98.39	-	-	95.44	31.91	5.43	34.39	100	109	Peak
2412	84.34	-	-	81.39	31.91	5.43	34.39	100	109	Average
2494	51.3	-22.7	74	48.15	32	5.52	34.37	100	109	Peak
2494	35.01	-18.99	54	31.86	32	5.52	34.37	100	109	Average



Test Mode :	Mode 5	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

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	22.8	-17.2	40	35.89	17.91	0.72	31.72	-	-	Peak
191.73	20.05	-23.45	43.5	40.71	9.39	1.61	31.66	-	-	Peak
265.98	32.75	-13.25	46	49.61	12.92	1.92	31.7	-	-	Peak
451.9	41.51	-4.49	46	54.02	16.83	2.51	31.85	-	-	Peak
724.9	42.66	-3.34	46	51.69	19.72	3.31	32.06	100	21	Peak
799.8	40.74	-5.26	46	48.58	20.77	3.36	31.97	-	-	Peak
2388	48.71	-25.29	74	45.8	31.9	5.4	34.39	100	133	Peak
2388	35.82	-18.18	54	32.91	31.9	5.4	34.39	100	133	Average
2437	106.93	-	-	103.9	31.95	5.46	34.38	100	133	Peak
2437	93.6	-	-	90.57	31.95	5.46	34.38	100	133	Average
2484	51.97	-22.03	74	48.84	31.98	5.52	34.37	100	133	Peak
2484	39.57	-14.43	54	36.44	31.98	5.52	34.37	100	133	Average



Test Mode :	Mode 5	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

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
31.08	33.85	-6.15	40	47.54	17.31	0.72	31.72	-	-	Peak
132.33	23.57	-19.93	43.5	42.17	11.7	1.4	31.7	-	-	Peak
166.08	23.6	-19.9	43.5	43.85	9.88	1.53	31.66	-	-	Peak
628.3	41.91	-4.09	46	51.73	19.23	2.99	32.04	100	117	Peak
724.9	39.46	-6.54	46	48.49	19.72	3.31	32.06	-	-	Peak
798.4	37.83	-8.17	46	45.71	20.74	3.36	31.98	-	-	Peak
2358	44.91	-29.09	74	42.08	31.86	5.37	34.4	200	358	Peak
2358	32.52	-21.48	54	29.69	31.86	5.37	34.4	200	358	Average
2437	100.86	-	-	97.85	31.93	5.46	34.38	200	358	Peak
2437	87.64	-	-	84.63	31.93	5.46	34.38	200	358	Average
2486	48.35	-25.65	74	45.22	31.98	5.52	34.37	200	358	Peak
2486	35.27	-18.73	54	32.14	31.98	5.52	34.37	200	358	Average



Test Mode :	Mode 6	Temperature :	26~27°C
Test Channel :	11	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

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
191.73	20.31	-23.19	43.5	40.97	9.39	1.61	31.66	-	-	Peak
232.23	25.41	-20.59	46	43.78	11.46	1.78	31.61	-	-	Peak
266.79	33.72	-12.28	46	50.56	12.93	1.92	31.69	-	-	Peak
451.9	42.43	-3.57	46	54.94	16.83	2.51	31.85	100	217	Peak
724.9	42.42	-3.58	46	51.45	19.72	3.31	32.06	-	-	Peak
798.4	40.45	-5.55	46	48.33	20.74	3.36	31.98	-	-	Peak
2358	45.85	-28.15	74	43.02	31.86	5.37	34.4	100	135	Peak
2358	35.29	-18.71	54	32.46	31.86	5.37	34.4	100	135	Average
2462	105.93	-	-	102.85	31.97	5.49	34.38	100	135	Peak
2462	91.75	-	-	88.67	31.97	5.49	34.38	100	135	Average
2483.66	73	-1	74	69.87	31.98	5.52	34.37	100	135	Peak
2483.66	52.59	-1.41	54	49.46	31.98	5.52	34.37	100	135	Average



Test Mode :	Mode 6	Temperature :	26~27°C
Test Channel :	11	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

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
31.89	34	-6	40	48.26	16.72	0.73	31.71	-	-	Peak
165.54	23.9	-19.6	43.5	44.15	9.88	1.53	31.66	-	-	Peak
213.33	22.17	-21.33	43.5	41.86	10.24	1.71	31.64	-	-	Peak
628.3	41.01	-4.99	46	50.83	19.23	2.99	32.04	100	107	Peak
724.9	38.81	-7.19	46	47.84	19.72	3.31	32.06	-	-	Peak
796.3	35.25	-10.75	46	43.15	20.72	3.36	31.98	-	-	Peak
2380	45.03	-28.97	74	42.14	31.88	5.4	34.39	199	353	Peak
2380	32.54	-21.46	54	29.65	31.88	5.4	34.39	199	353	Average
2462	100.84	-	-	97.76	31.97	5.49	34.38	199	353	Peak
2462	87.25	-	-	84.17	31.97	5.49	34.38	199	353	Average
2483.85	64.39	-9.61	74	61.26	31.98	5.52	34.37	199	353	Peak
2483.85	44.34	-9.66	54	41.21	31.98	5.52	34.37	199	353	Average



Test Mode :	Mode 7	Temperature :	26~27°C
Test Channel :	01	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

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
2389.61	73.6	-0.4	74	70.69	31.9	5.4	34.39	126	109	Peak
2389.61	51.89	-2.11	54	48.98	31.9	5.4	34.39	126	109	Average
2412	105.9	-	-	102.95	31.91	5.43	34.39	126	109	Peak
2412	91.75	-	-	88.8	31.91	5.43	34.39	126	109	Average
2500	49.66	-24.34	74	46.51	32	5.52	34.37	126	109	Peak
2500	37.34	-16.66	54	34.19	32	5.52	34.37	126	109	Average



Test Mode :	Mode 7	Temperature :	26~27°C
Test Channel :	01	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

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
2389.61	64.98	-9.02	74	62.07	31.9	5.4	34.39	100	22	Peak
2389.61	43.66	-10.34	54	40.75	31.9	5.4	34.39	100	22	Average
2412	96.69	-	-	93.74	31.91	5.43	34.39	100	22	Peak
2412	83.48	-	-	80.53	31.91	5.43	34.39	100	22	Average
2494	49.79	-24.21	74	46.64	32	5.52	34.37	100	22	Peak
2494	34.79	-19.21	54	31.64	32	5.52	34.37	100	22	Average



Test Mode :	Mode 8	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

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
2388	46.9	-27.1	74	43.99	31.9	5.4	34.39	100	127	Peak
2388	35.25	-18.75	54	32.34	31.9	5.4	34.39	100	127	Average
2437	107.09	-	-	104.08	31.93	5.46	34.38	100	127	Peak
2437	92.26	-	-	89.25	31.93	5.46	34.38	100	127	Average
2486	50.58	-23.42	74	47.45	31.98	5.52	34.37	100	127	Peak
2486	38.22	-15.78	54	35.09	31.98	5.52	34.37	100	127	Average



Test Mode :	Mode 8	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

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
2390	45.46	-28.54	74	42.55	31.9	5.4	34.39	135	357	Peak
2390	33.07	-20.93	54	30.16	31.9	5.4	34.39	135	357	Average
2437	100.63	-	-	97.6	31.95	5.46	34.38	135	357	Peak
2437	86.37	-	-	83.34	31.95	5.46	34.38	135	357	Average
2500	48.95	-25.05	74	45.8	32	5.52	34.37	135	357	Peak
2500	34.47	-19.53	54	31.32	32	5.52	34.37	135	357	Average



Test Mode :	Mode 9	Temperature :	26~27°C
Test Channel :	11	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

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
2364	46.31	-27.69	74	43.48	31.86	5.37	34.4	100	136	Peak
2364	34.96	-19.04	54	32.13	31.86	5.37	34.4	100	136	Average
2462	90.13	-	-	87.05	31.97	5.49	34.38	100	136	Average
2462	104.62	-	-	101.54	31.97	5.49	34.38	100	136	Peak
2483.5	70.54	-3.46	74	67.41	31.98	5.52	34.37	100	136	Peak
2483.5	52.3	-1.7	54	49.17	31.98	5.52	34.37	100	136	Average



Test Mode :	Mode 9	Temperature :	26~27°C
Test Channel :	11	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

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
2366	44.71	-29.29	74	41.88	31.86	5.37	34.4	199	353	Peak
2366	32.39	-21.61	54	29.56	31.86	5.37	34.4	199	353	Average
2462	85.53	-	-	82.45	31.97	5.49	34.38	199	353	Average
2462	98.71	-	-	95.63	31.97	5.49	34.38	199	353	Peak
2485.94	61.1	-12.9	74	57.97	31.98	5.52	34.37	199	353	Peak
2485.94	44.62	-9.38	54	41.49	31.98	5.52	34.37	199	353	Average



Test Mode :	Mode 10	Temperature :	26~27°C
Test Channel :	03	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2422 MHz is Fundamental Signals which can be ignored.		

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
2383.34	69.51	-4.49	74	66.6	31.9	5.4	34.39	100	110	Peak
2383.34	52.27	-1.73	54	49.36	31.9	5.4	34.39	100	110	Average
2422	98.94	-	-	95.97	31.93	5.43	34.39	100	110	Peak
2422	88.21	-	-	85.24	31.93	5.43	34.39	100	110	Average
2484	48.81	-25.19	74	45.68	31.98	5.52	34.37	100	110	Peak
2484	35.3	-18.7	54	32.17	31.98	5.52	34.37	100	110	Average



Test Mode :	Mode 10	Temperature :	26~27°C
Test Channel :	03	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2422 MHz is Fundamental Signals which can be ignored.		

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
2389.61	61.54	-12.46	74	58.63	31.9	5.4	34.39	105	360	Peak
2389.61	44.01	-9.99	54	41.1	31.9	5.4	34.39	105	360	Average
2422	92.32	-	-	89.35	31.93	5.43	34.39	105	360	Peak
2422	80.7	-	-	77.73	31.93	5.43	34.39	105	360	Average
2486	51.55	-22.45	74	48.42	31.98	5.52	34.37	105	360	Peak
2486	35.14	-18.86	54	32.01	31.98	5.52	34.37	105	360	Average



Test Mode :	Mode 11	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

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
2390	59.99	-14.01	74	57.08	31.9	5.4	34.39	100	132	Peak
2390	41.72	-12.28	54	38.81	31.9	5.4	34.39	100	132	Average
2437	99.03	-	-	96	31.95	5.46	34.38	100	132	Peak
2437	88.37	-	-	85.34	31.95	5.46	34.38	100	132	Average
2484	67.67	-6.33	74	64.54	31.98	5.52	34.37	100	132	Peak
2484	46.41	-7.59	54	43.28	31.98	5.52	34.37	100	132	Average



Test Mode :	Mode 11	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

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
2388	51.5	-22.5	74	48.59	31.9	5.4	34.39	100	357	Peak
2388	34.55	-19.45	54	31.64	31.9	5.4	34.39	100	357	Average
2437	92.01	-	-	88.98	31.95	5.46	34.38	100	357	Peak
2437	81.73	-	-	78.7	31.95	5.46	34.38	100	357	Average
2484	58.58	-15.42	74	55.45	31.98	5.52	34.37	100	357	Peak
2484	41.18	-12.82	54	38.05	31.98	5.52	34.37	100	357	Average



Test Mode :	Mode 12	Temperature :	26~27°C
Test Channel :	09	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2452 MHz is Fundamental Signals which can be ignored.		

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
2358	45.68	-28.32	74	42.85	31.86	5.37	34.4	100	131	Peak
2358	34.59	-19.41	54	31.76	31.86	5.37	34.4	100	131	Average
2452	98.32	-	-	95.24	31.97	5.49	34.38	100	131	Peak
2452	87.4	-	-	84.32	31.97	5.49	34.38	100	131	Average
2491.26	68.16	-5.84	74	65.03	31.98	5.52	34.37	100	131	Peak
2491.26	51.1	-2.9	54	47.97	31.98	5.52	34.37	100	131	Average



Test Mode :	Mode 12	Temperature :	26~27°C
Test Channel :	09	Relative Humidity :	49~50%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2452 MHz is Fundamental Signals which can be ignored.		

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
2350	44.93	-29.07	74	42.16	31.84	5.34	34.41	199	351	Peak
2350	32.36	-21.64	54	29.59	31.84	5.34	34.41	199	351	Average
2452	92.44	-	-	89.36	31.97	5.49	34.38	199	351	Peak
2452	82.41	-	-	79.33	31.97	5.49	34.38	199	351	Average
2483.66	60.05	-13.95	74	56.92	31.98	5.52	34.37	199	351	Peak



3.8 Antenna Requirements

3.8.1 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.

3.8.2 Antenna Connected Construction

The antennas type used in this product is Dipole Antenna without connector and it is considered to meet antenna requirement.

3.8.3 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	Due Date	Remark
System Simulator	R&S	CMU200	117995	N/A	Jun. 08, 2009	Jun. 07, 2011	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 11, 2010	Jun. 10, 2011	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	N/A	Feb. 18, 2011	Feb. 17, 2012	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	N/A	Feb. 18, 2011	Feb. 17, 2012	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D35P	TBN-930701	N/A	Jul. 30, 2010	Jul. 29, 2011	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 16, 2010	Aug. 15, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz – 30MHz	Dec. 03, 2010	Dec. 02, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz – 30MHz	Dec. 01, 2010	Nov. 30, 2011	Conduction (CO05-HY)
AC Power Source	APC	APC-1000 W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Oct. 31, 2010	Oct. 31, 2011	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz~18GHz	Aug. 02, 2010	Aug. 01, 2011	Radiation (03CH06-HY)
Double Ridge Horn Antenna	Training Research	AH-0801	95119	8GHz~18GHz	Oct. 20, 2010	Oct. 19, 2011	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Apr. 14, 2011	Apr. 13, 2012	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz~1GHz	Apr. 14, 2011	Apr. 13, 2012	Radiation (03CH06-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH06-HY)
System Simulator	R&S	CMU200	117591	N/A	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH06-HY)

5 Uncertainty of Evaluation

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

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 (30 MHz ~ 1000 MHz)

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 (1 GHz ~ 40 GHz)

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 EP141109 as below.

1. External Photograph of EUT

Brand Name: ADVANTECH / Model Name: S10A



Brand Name: ADVANTECH / Model Name: S10A





2. Photograph of Accessory

Brand Name: ADVANTECH / Model Name: S10A

List of Accessory:

Specification of Accessory		
AC Adapter	Brand Name	FSP
	Model Name	FSP065-RAB
Battery 1	Brand Name	JOULES MILES CO., LTD.
	Model Name	46-12318-041
Battery 2	Brand Name	ADVANTECH
	Model Name	46-12368-041
WWAN Module	Brand Name	SIMENS
	Model Name	HC25
WLAN Module	Brand Name	AzureWave
	Model Name	AW-NE785H
Bluetooth Module	Brand Name	QCOM
	Model Name	QBTM400-01

Remark: For accessories equipped with this EUT, please refer to the following photos.

Brand Name: ADVANTECH / Model Name: S10A

Brand Name: ADVANTECH / Model Name: S10A



Brand Name: ADVANTECH / Model Name: S10A

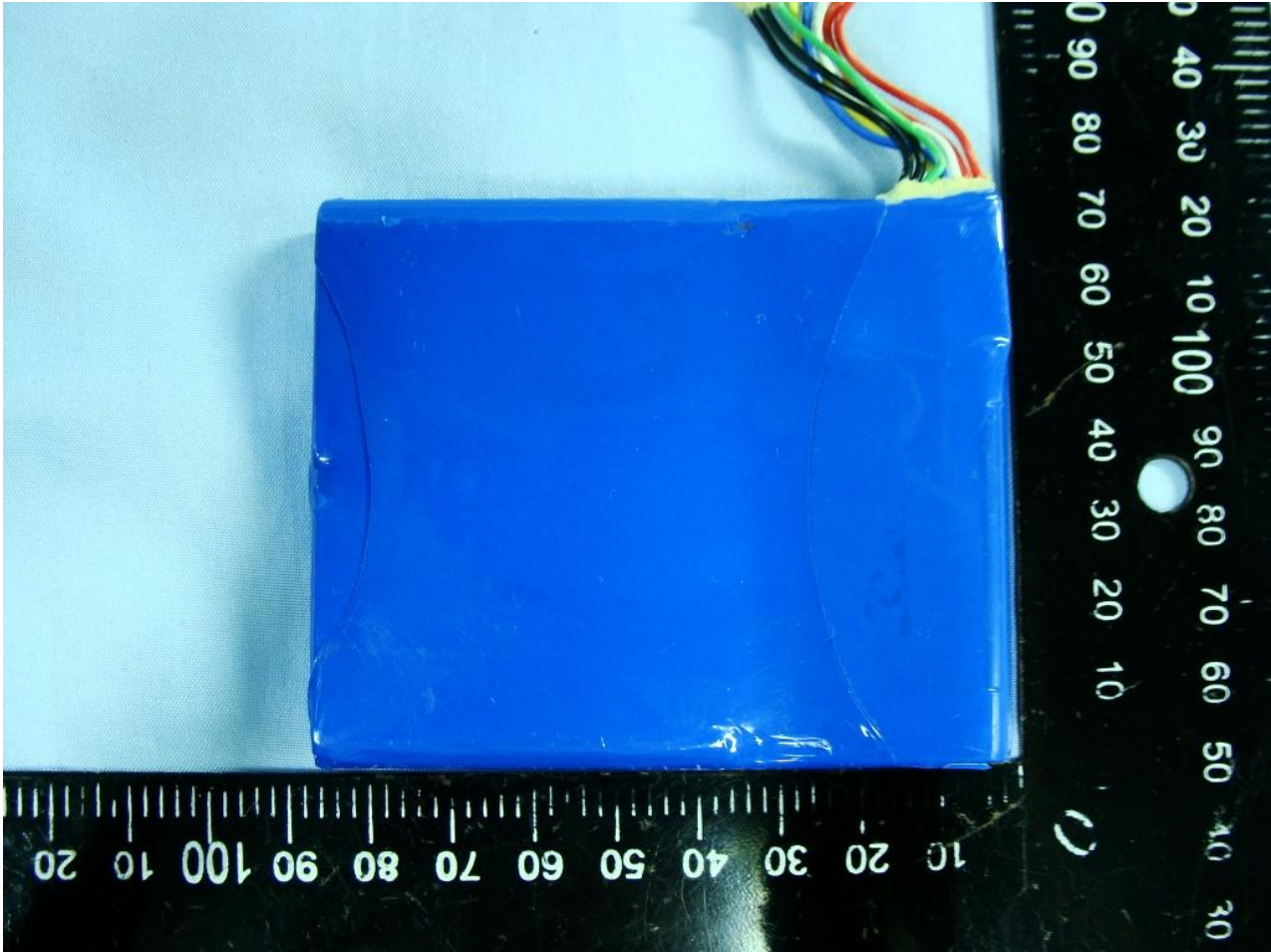


Brand Name: ADVANTECH / Model Name: S10A

Battery 1



Brand Name: ADVANTECH / Model Name: S10A



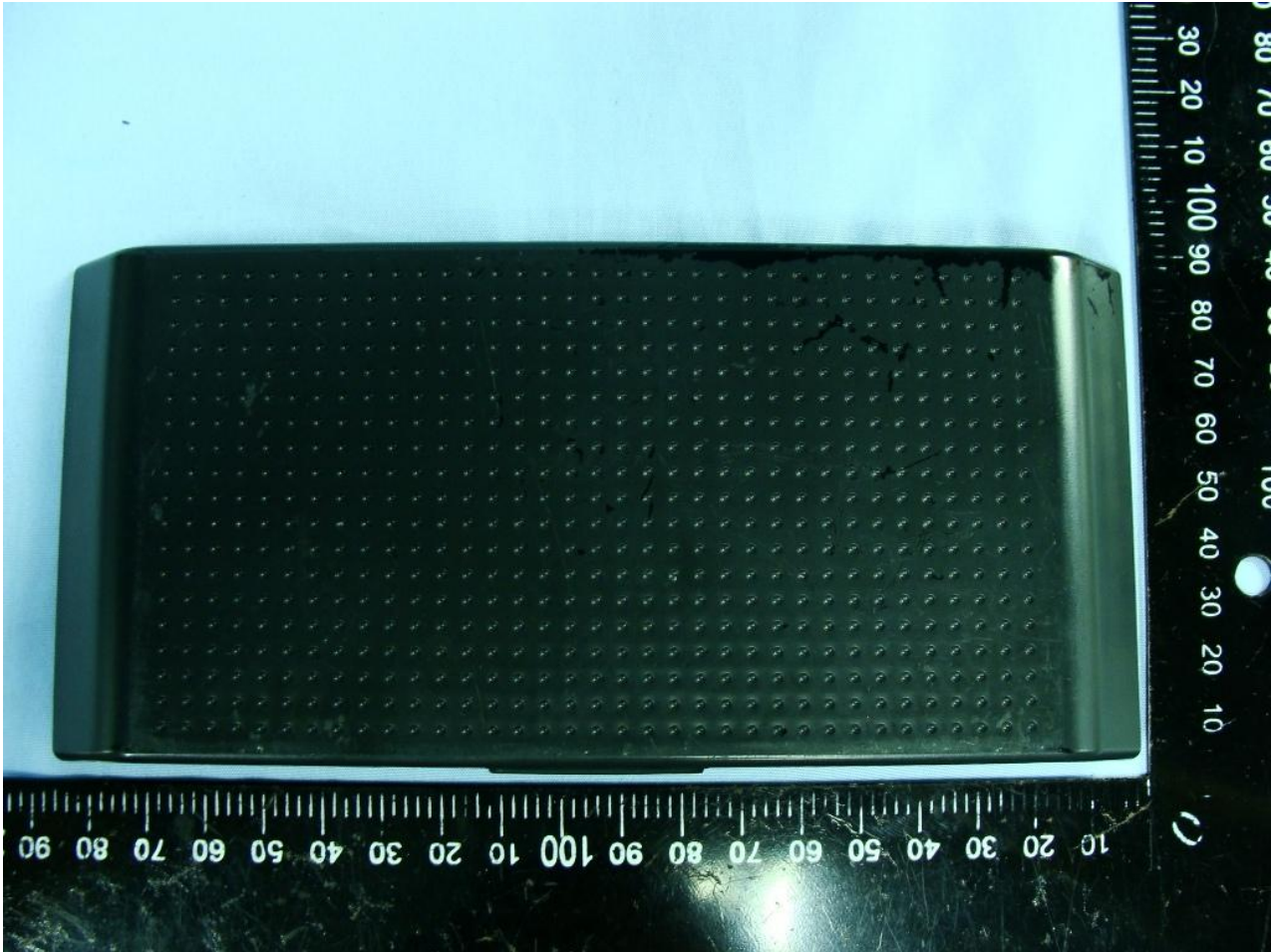
Brand Name: ADVANTECH / Model Name: S10A

Battery 2



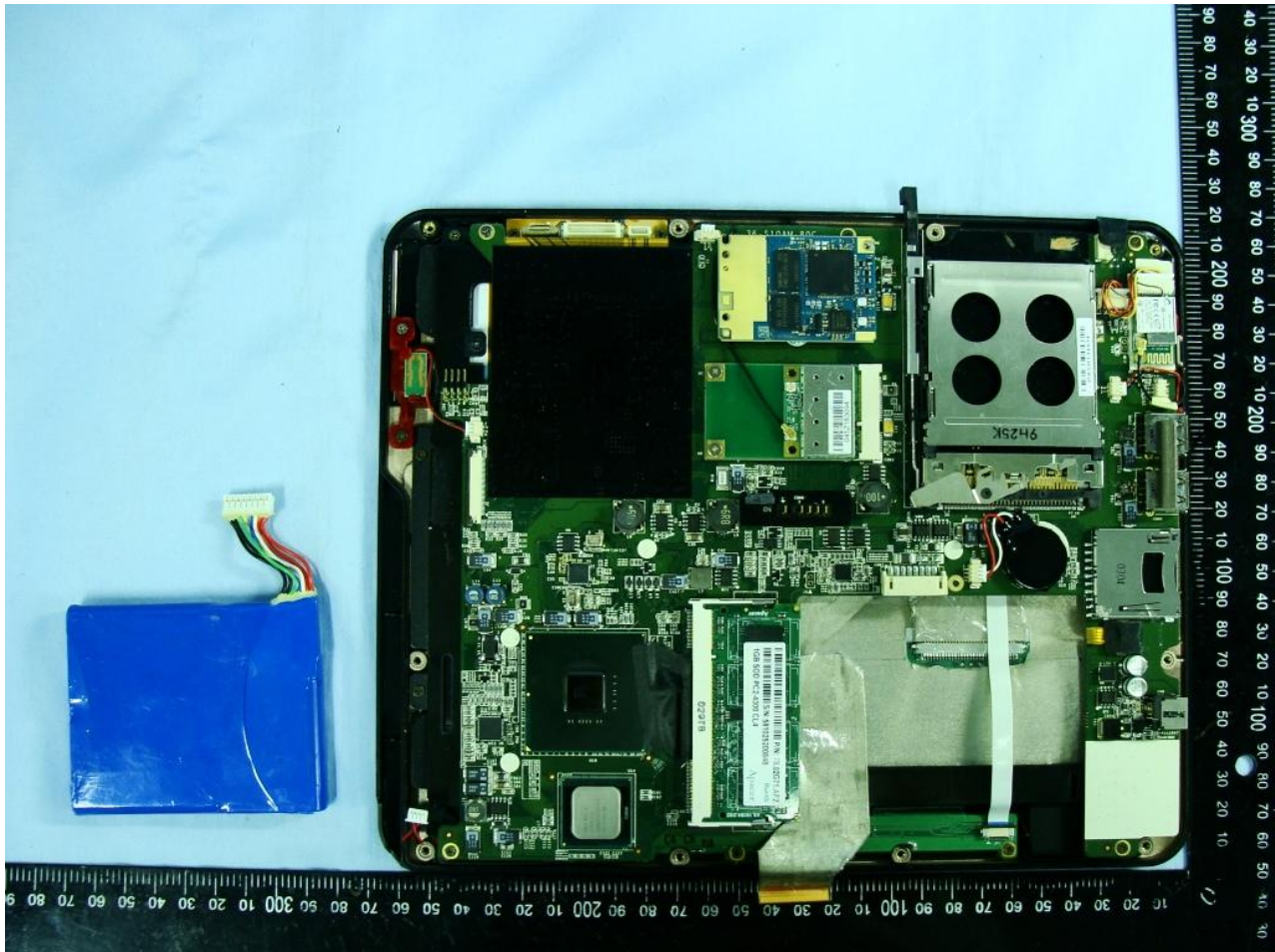


Brand Name: ADVANTECH / Model Name: S10A

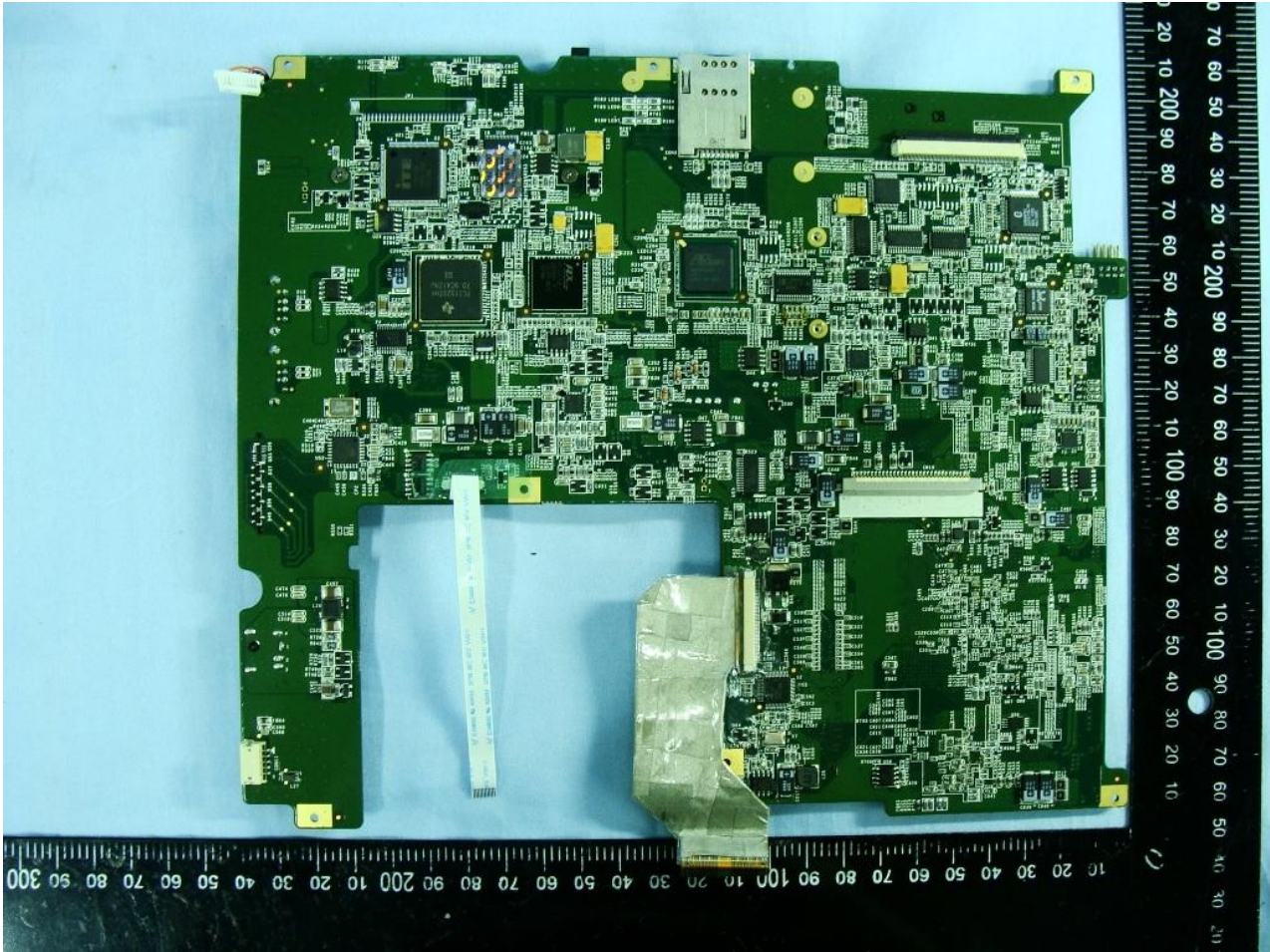


3. Internal Photograph of EUT

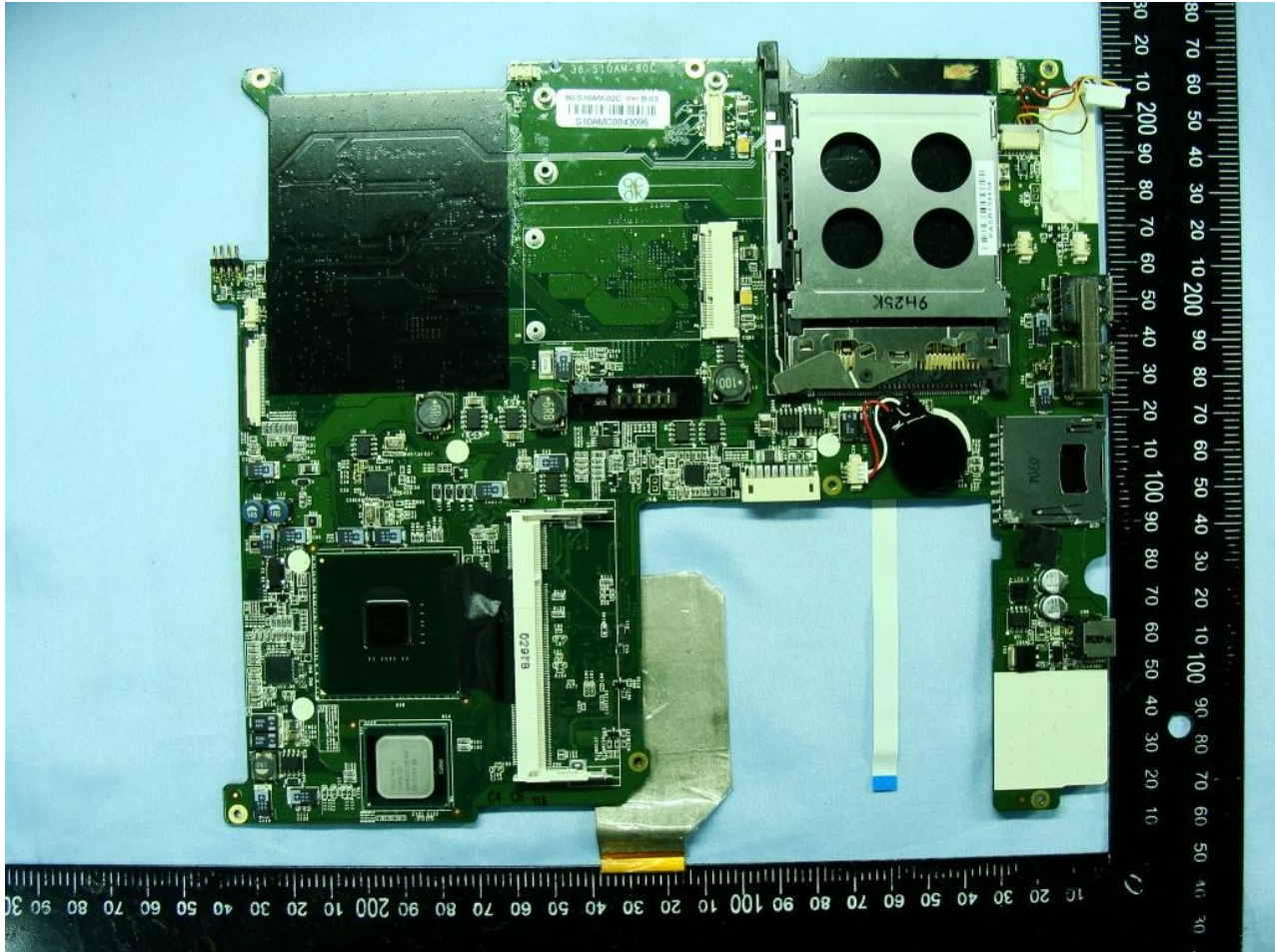
Brand Name: ADVANTECH / Model Name: S10A



Brand Name: ADVANTECH / Model Name: S10A

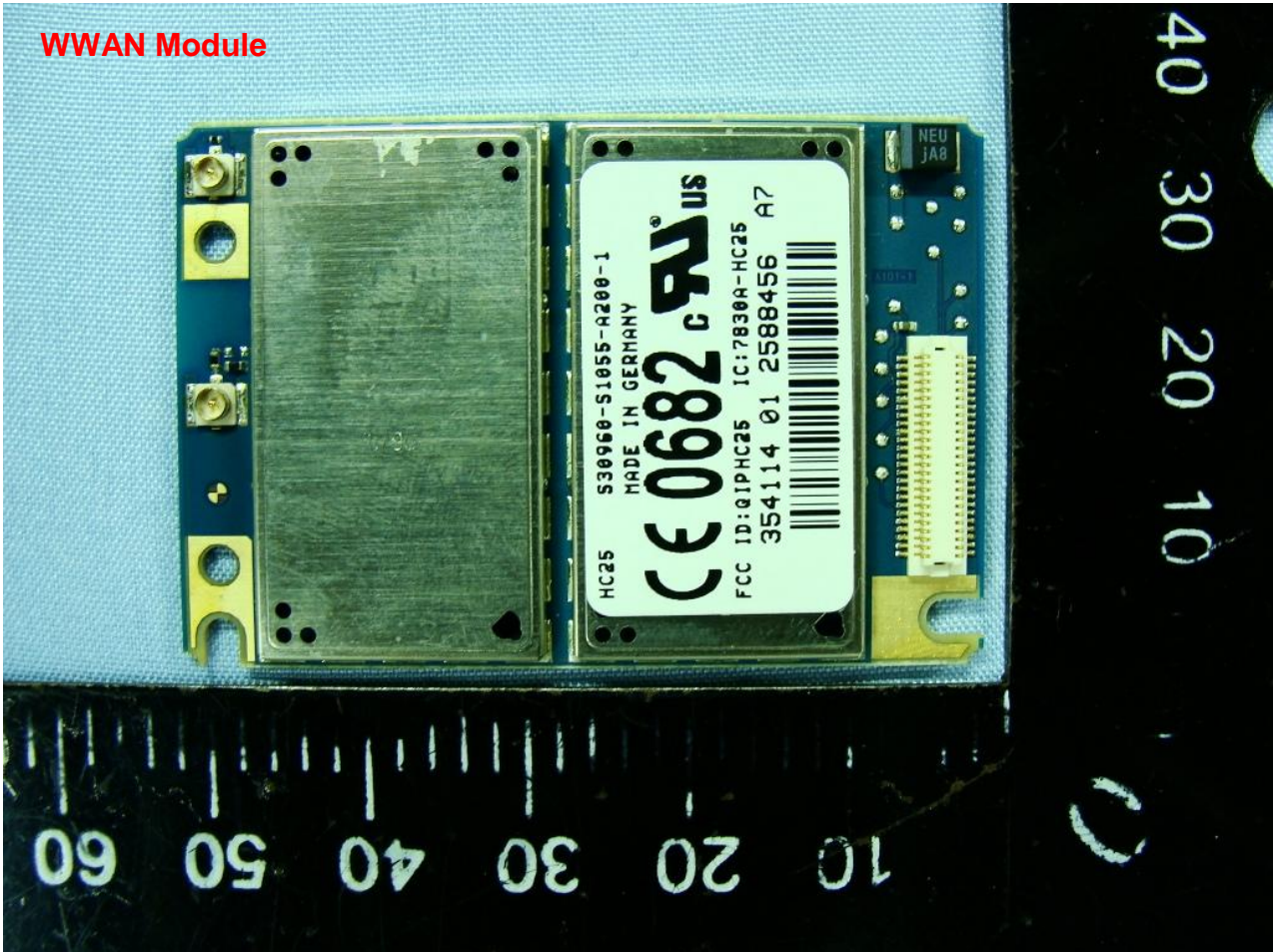


Brand Name: ADVANTECH / Model Name: S10A

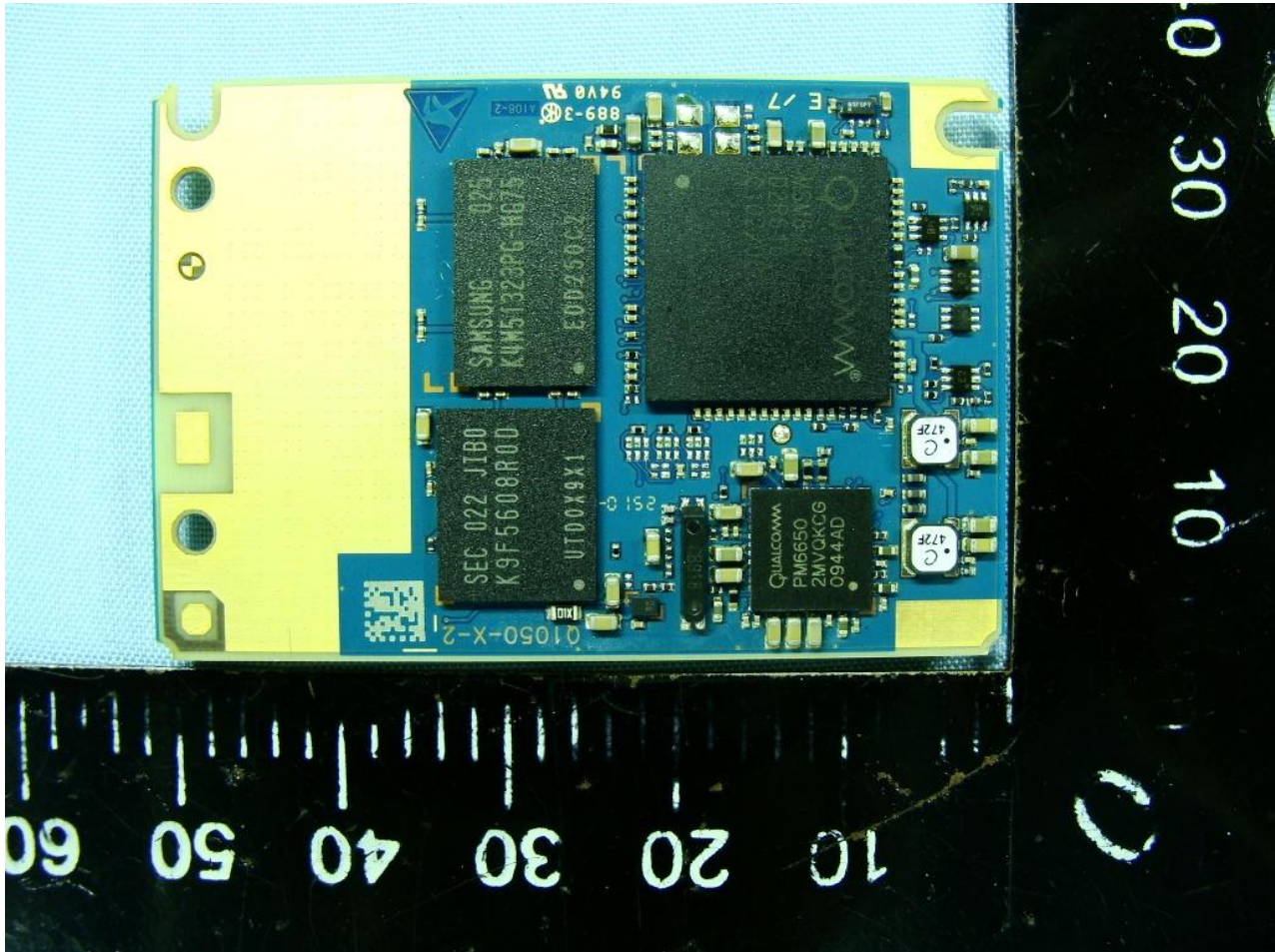


Brand Name: ADVANTECH / Model Name: S10A

WWAN Module

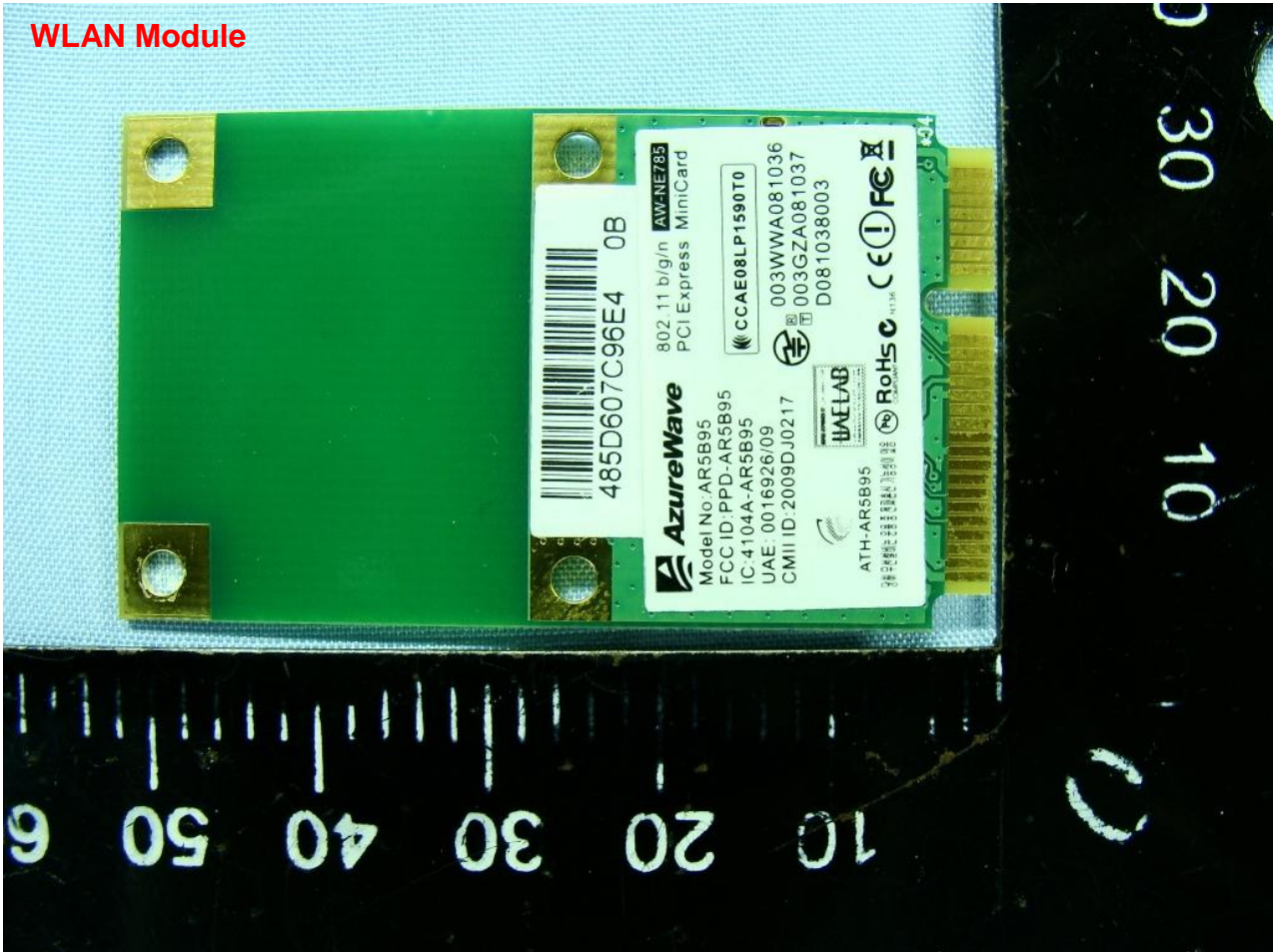


Brand Name: ADVANTECH / Model Name: S10A

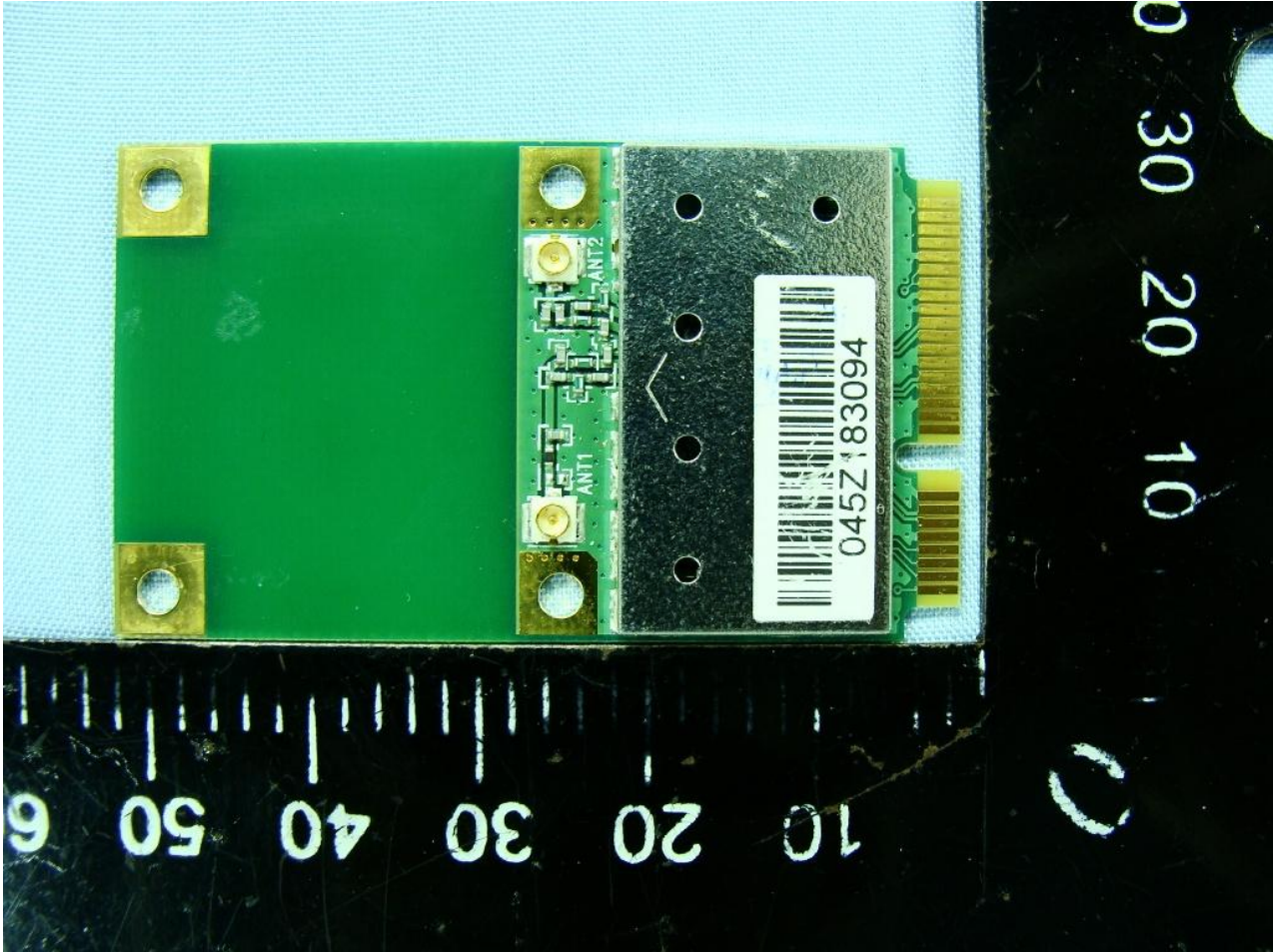


Brand Name: ADVANTECH / Model Name: S10A

WLAN Module

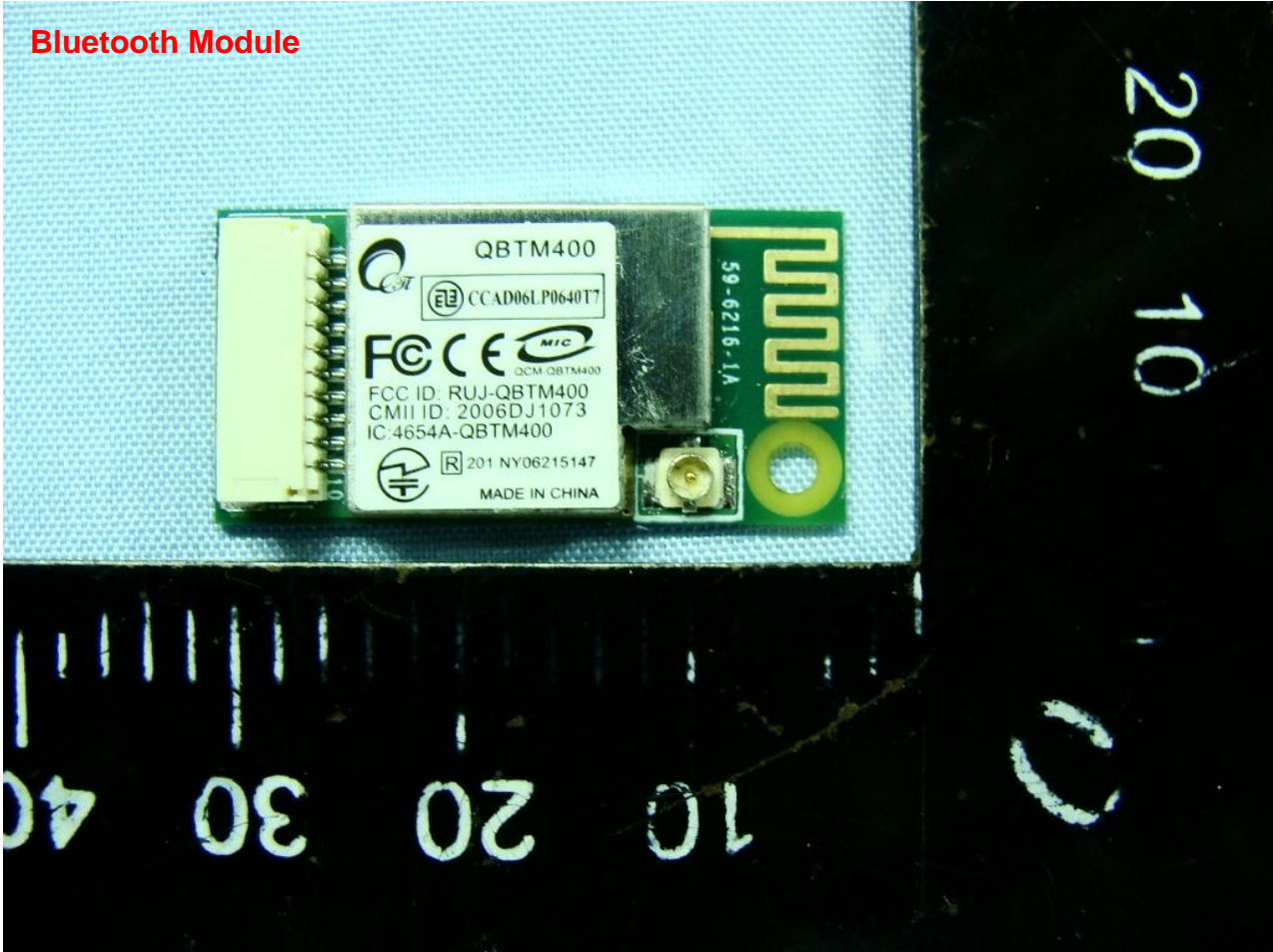


Brand Name: ADVANTECH / Model Name: S10A

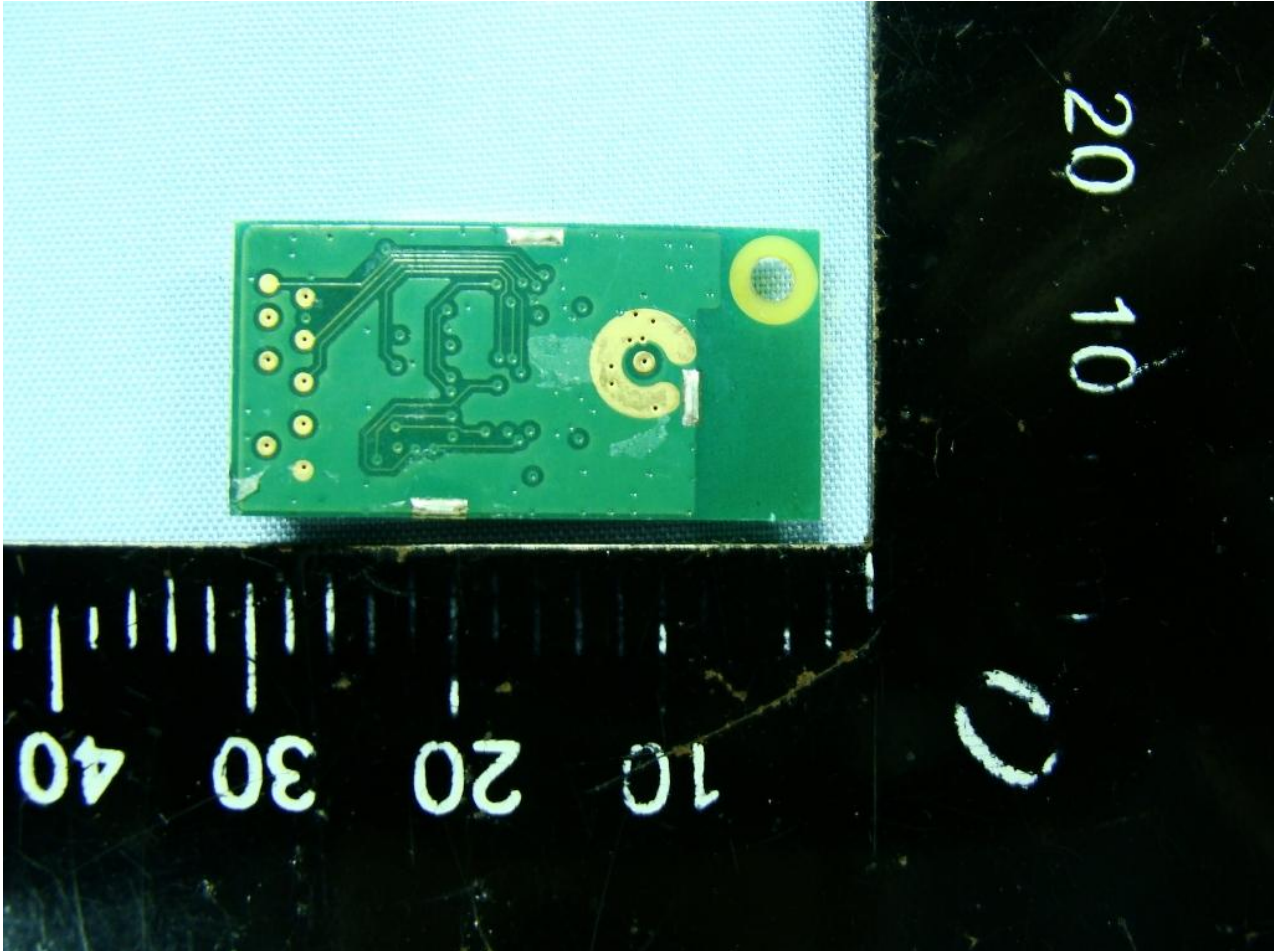


Brand Name: ADVANTECH / Model Name: S10A

Bluetooth Module



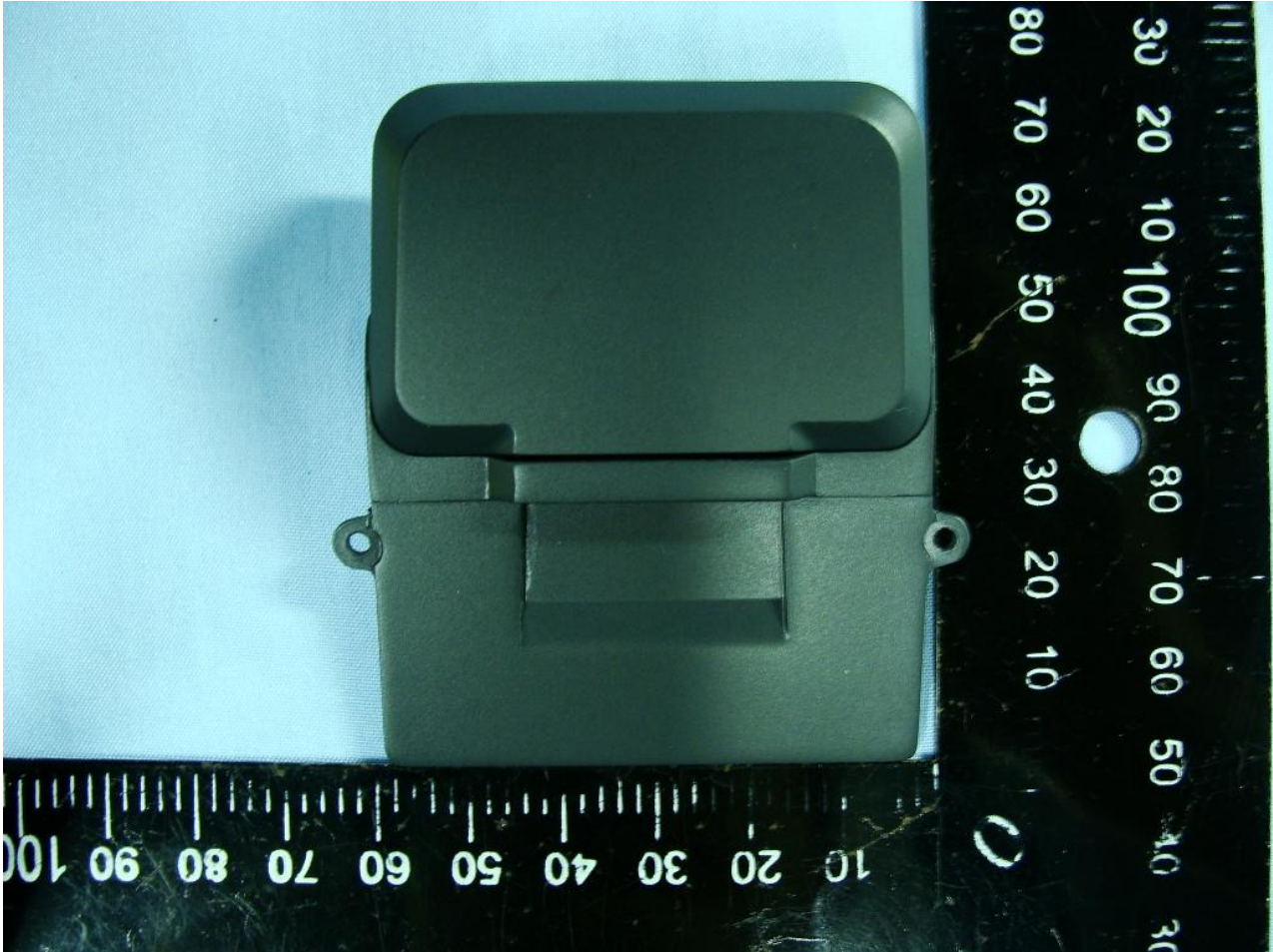
Brand Name: ADVANTECH / Model Name: S10A



Brand Name: ADVANTECH / Model Name: S10A



Brand Name: ADVANTECH / Model Name: S10A



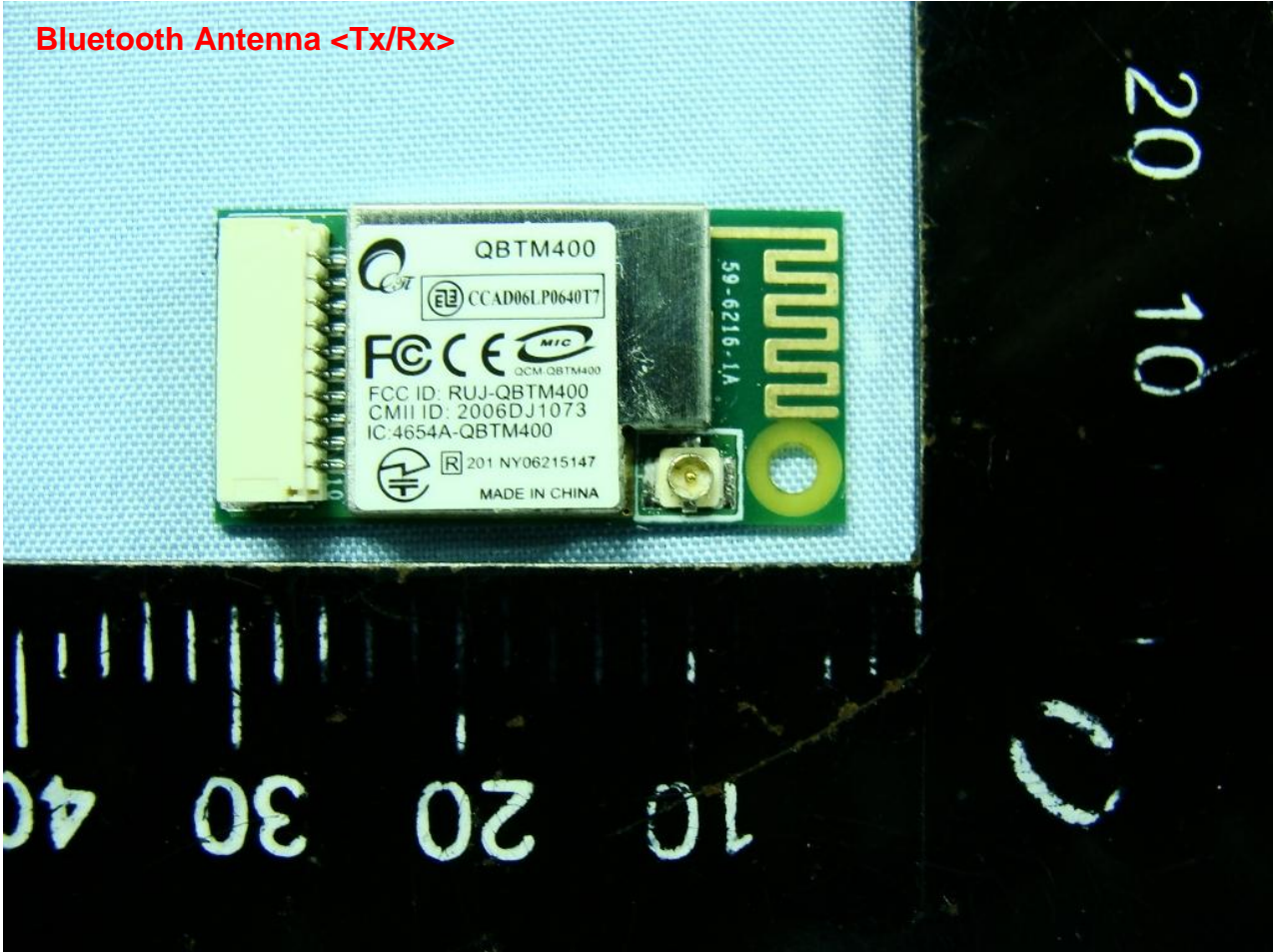
Brand Name: ADVANTECH / Model Name: S10A

WLAN Antenna <Tx/Rx>

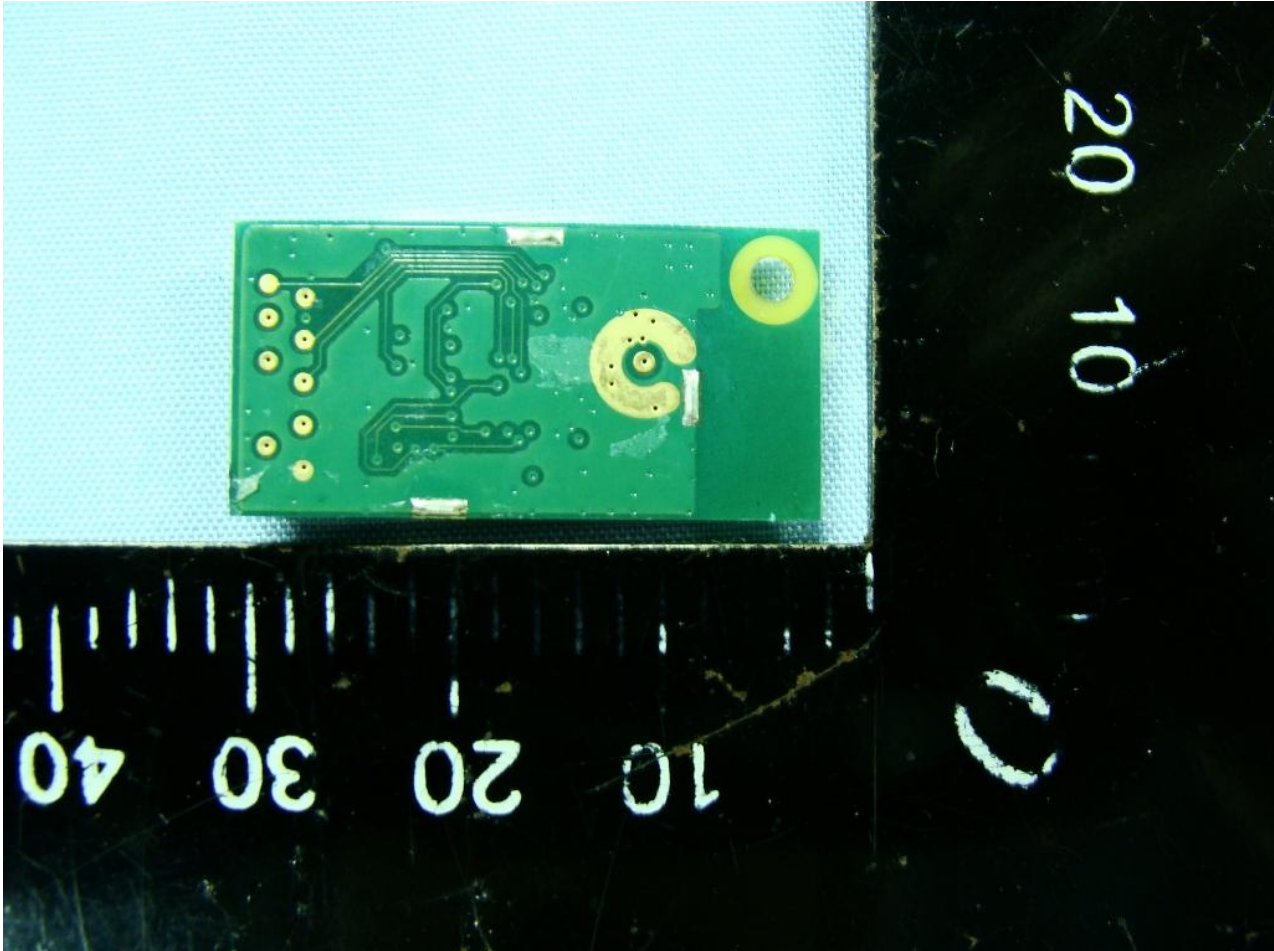


Brand Name: ADVANTECH / Model Name: S10A

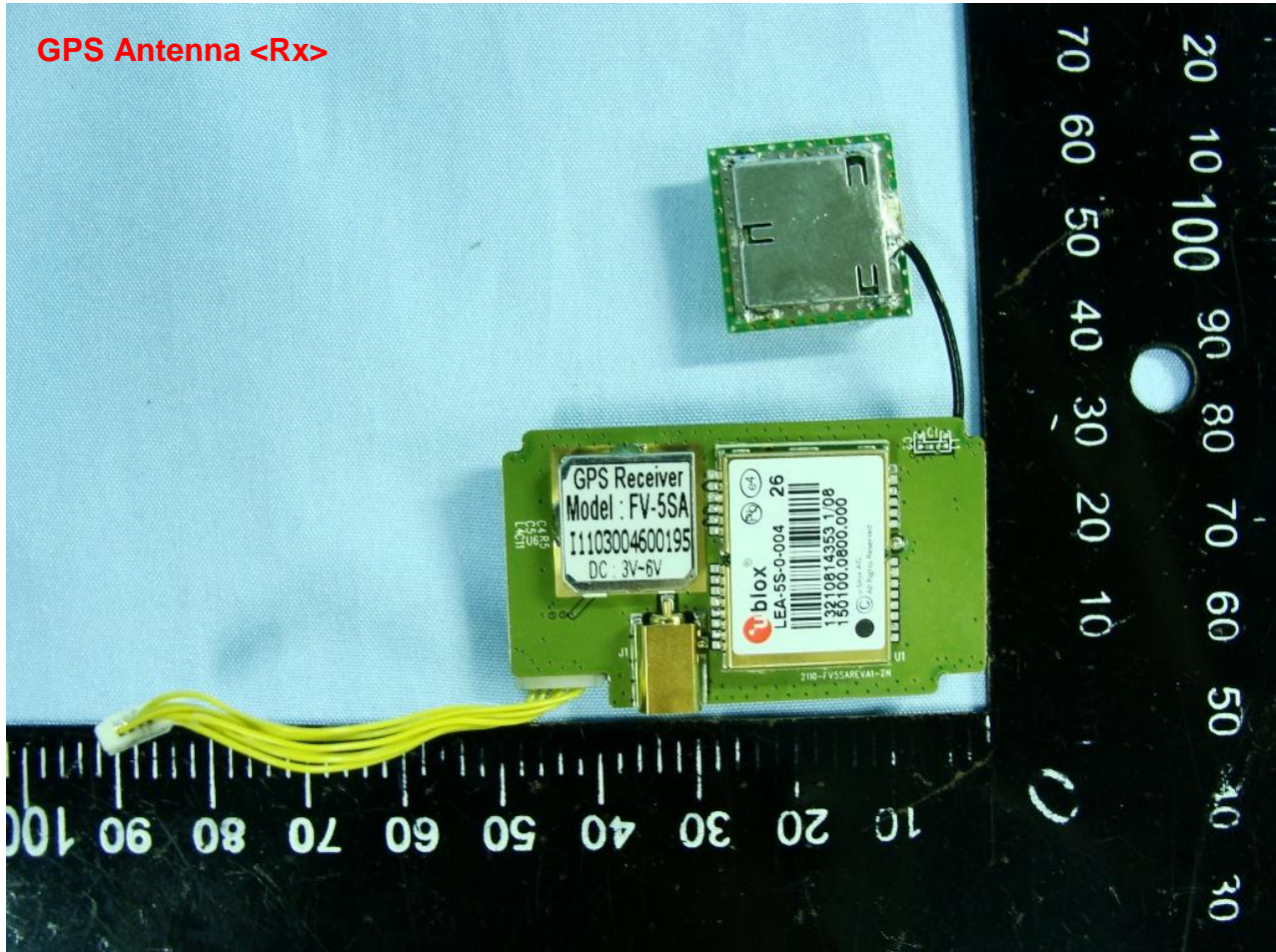
Bluetooth Antenna <Tx/Rx>



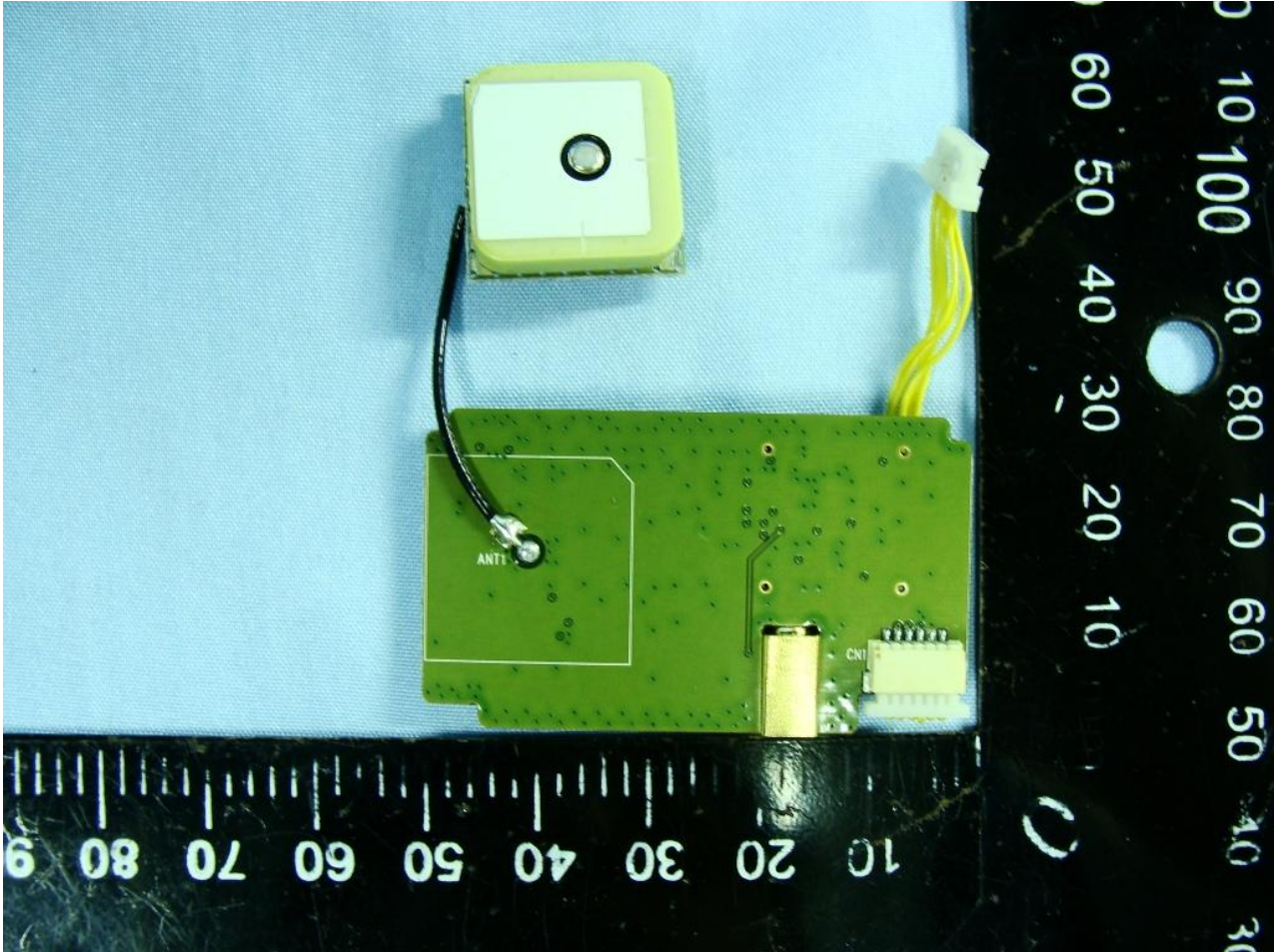
Brand Name: ADVANTECH / Model Name: S10A



Brand Name: ADVANTECH / Model Name: S10A



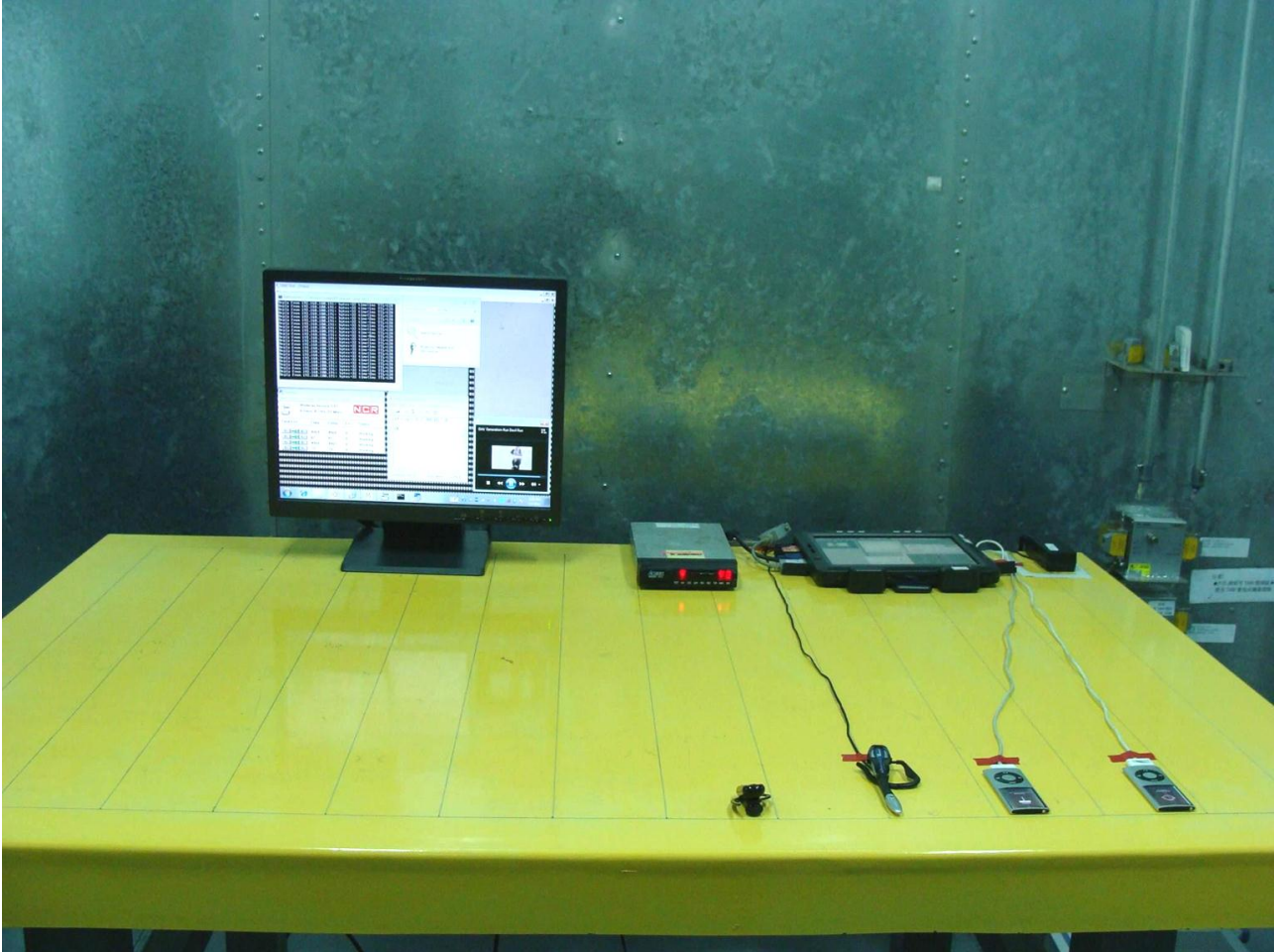
Brand Name: ADVANTECH / Model Name: S10A



Appendix B. Setup Photographs

<Conducted Emission>

Mode 1



<Radiated Emission>

