

for 3J Tech. Co., Ltd.

Super Modem III Model No.: SM\_III

Prepared for : 3J Tech. Co., Ltd.

Address : 2F, No.342 Fushing N Rd., Taipei, Taiwan

Prepared By : Shenzhen Anbotek Compliance Laboratory Limited

Address : 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road,

Nanshan District, Shenzhen, Guangdong, China

Tel: (86) 755-26066544 Fax: (86) 755-26014772

Report Number : 201403920F

Date of Test : Mar. 27~ Apr. 21, 2014

Date of Report : Apr. 22, 2014



# TABLE OF CONTENT

# Description

	Page
Test Report	
1. GENERAL INFORMATION	4
1.1. Description of Device (EUT)	4
1.2. Auxiliary Equipment Used during Test	
1.3. Description of Test Facility	(
1.4. Measurement Uncertainty	
2. TEST METHODOLOGY	····· 7
2.1. Summary of Test Results	
2.2. Description of Test Modes	
2.3. List of channels:	8
3. CONDUCTED EMISSION TEST	
3.1. Block Diagram of Test Setup	
3.2. Power Line Conducted Emission Measurement Limits (15.207)	
3.3. Configuration of EUT on Measurement	
3.4. Operating Condition of EUT	9
3.5. Test Procedure	10
3.6. Test equipment	
3.7. Power Line Conducted Emission Measurement Results	
4. FCC PART 15.247 REQUIREMENTS FOR DSSS & OFDM MODULATION	13
4.1 Test Setup	13
4.2 6dB Bandwidth	13
4.3. Maximum Peak output power test	
4.4. Band Edges Measurement	29
4.5. Peak Power Spectral Density	
4.6. Radiated Emissions.	
5. PHOTOGRAPH	85
5.1. Photo of Conducted Emission Measurement	
5.2. Photo of Radiation Emission Test	83
APPENDIX I (EXTERNAL PHOTOS)	80
APPENDIX II (INTERNAL PHOTOS)	



#### TEST REPORT

Applicant : 3J Tech. Co., Ltd.

Manufacturer : 3J Tech. Co., Ltd.

EUT : Super Modem III

Model No. : SM\_III
Serial No. : N.A.
Trade Mark : 3JTech

Rating : DC 8V, 1A Via Adapter

Measurement Procedure Used:

FCC Part15 Subpart C, Paragraph 15.247

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test:	Mar. 27~ Apr. 21, 2014
Prepared by:	Zock zeng
	(Tested Engineer / Rock Zeng)
Reviewer:	Amy Ding
	(Project Manager / Amy Ding)
Ammanad & Anthoninad Signan	Ton Jaen
Approved & Authorized Signer :	(Manager / Tom Chen)
	(ivialiager / Tolli Clicil)



#### 1. GENERAL INFORMATION

# 1.1. Description of Device (EUT)

EUT : Super Modem III

Model Number : SM III

Test Power Supply: DC 8V, 1A Via Adapter

Adapter : Model: RSS1002-080080-W2-B

Input: AC 100-240V, 50/60Hz, 0.2A Output: DC 8V, 1.0A, 8.0W Max.

RF Transmission : 2412MHz~2462MHz (802.11b/802.11g/802.11n(HT20))

Frequency 2422MHz~2452MHz ( 802.11n(HT40))

Channels : 11 For (802.11b/802.11g/802.11n(HT20))

7 For (802.11n(HT40))

Modulation 802.11b CCK

802.11g OFDM 802.11n MCS

Antenna Gain: : 0dBi

Applicant : 3J Tech. Co., Ltd.

Address : 2F, No.342 Fushing N Rd., Taipei, Taiwan

Manufacturer : 3J Tech. Co., Ltd.

Address : 2F, No.342 Fushing N Rd., Taipei, Taiwan

Factory : 3J Tech. Co., Ltd.

Address : 7F, No. 29, 169 Lane, Kang Ling Rd., 221, Shi Tse, Taipei County,

Taiwan

Date of receipt : Mar. 27, 2014

Date of Test : Mar. 27~ Apr. 21, 2014



1.2. Auxiliary Equipment Used during Test

PC : Manufacturer: DELL

M/N: OPTIPLEX 380

S/N: 1J63X2X CE , FCC: DOC

MONITOR : Manufacturer: DELL

M/N: E170Sc

S/N: CN-00V539-64180-055-0UPS

CE, FCC: DOC

KEYBOARD : Manufacturer: DELL

M/N: SK-8115

S/N: CN-0DJ313-71616-06C-02XN

CE , FCC: DOC Cable: 1m, unshielded

MOUSE : Manufacturer: DELL

M/N: M-UARDEL7

S/N: N/A CE , FCC: DOC

Cable: 1m, unshielded

Printer : Manufacturer: Brother

M/N: MFC-3360C

S/N: N/A

CE, FCC:DOC

Power Line : Non-Shielded, 1.5m

VGA Cable : Non-Shielded, 1.5m



# 1.3. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

#### CNAS - LAB Code: L3503

Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

#### FCC-Registration No.: 752021

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registed and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, July 10, 2013.

#### IC-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A, February 22, 2013.

#### **Test Location**

All Emissions tests were performed at

Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

# 1.4. Measurement Uncertainty

Radiation Uncertainty : Ur = 4.3dB

Conduction Uncertainty : Uc = 3.4dB



#### 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2009 and FCC Part 15, Paragraph 15.247.

# 2.1. Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.107, 15.207	Conducted Emission Test	PASS	Complies
FCC Part 15, Paragraph 15.247(b)(1)	Peak Output Power	PASS	Complies
FCC Part 15, Paragraph 15.247(a)(2)	6dB Bandwidth	PASS	Complies
FCC Part 15, Paragraph 15.247(c)	100kHz Bandwidth of Frequency Band Edges	PASS	Complies
FCC Part 15, Paragraph 15.209(a)(f)	Spurious Emission	PASS	Complies
FCC Part 15, Paragraph 15.247(a)(1)	Frequency Separation		N/A
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Number of Hopping Frequency	-	N/A
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Time of Occupancy	-	N/A
FCC Part 15, Paragraph 15.247(c)	Peak Power Density	PASS	Complies

# 2.2. Description of Test Modes

The EUT has been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

IEEE802.11b: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 1 Mbps lowest data rate (worst case) are chosen for the final testing.

IEEE802.11g: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 6 Mbps lowest data rate (the worst case) are chosen for the final testing.

IEEE802.11n (HT20): Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with MCS 0 Mbps lowest data rate (the worst case) are chosen for the final testing.

IEEE802.11n (HT40): Channel 3(2422MHz), Channel 6(2437MHz) and Channel 9(2452MHz) with MCS 0 Mbps lowest data rate (the worst case) are chosen for the final testing.



# 2.3. List of channels:

√ - available

X - tested

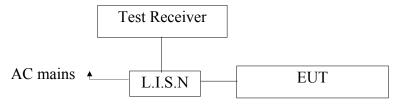
Number	Frequency(MHz)		802.11	802.11
			b/g/n	b/g/n
			(HT20)	(HT40)
1	2412	√	X	
2	2417	√		
3	2422	√		X
4	2427	√		
5	2432	√		
6	2437	√	X	X
7	2442	√		
8	2447	√		
9	2452	√		X
10	2457	√		
11	2462	√	X	



## 3. Conducted Emission Test

# 3.1. Block Diagram of Test Setup

3.1.1. Block diagram of connection between the EUT and simulators



# 3.2. Power Line Conducted Emission Measurement Limits (15.207)

Frequency	Limits dB(μV)				
MHz	Quasi-peak Level	Average Level			
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*			
0.50 ~ 5.00	56	46			
5.00 ~ 30.00	60	50			

Notes: 1. \*Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

## 3.3. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

# 3.4. Operating Condition of EUT

- 3.4.1. Setup the EUT and simulator as shown as Section 3.1.
- 3.4.2. Turn on the power of all equipment.
- 3.4.3. Let the EUT work in test mode (Charging to adapter) and measure it.



#### 3.5. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.4-2003 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9KHz.

The frequency range from 150KHz to 30MHz is checked.

The test results are reported on Section 3.6.

# 3.6. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval	
1.	Two-Line	Rohde & Schwarz	ENV216	100055	Apr. 23, 2013	1 Year	
	V-network	Ronde & Schwarz	E11 V 210	100033	Apr. 23, 2013	1 1 Cai	
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Apr. 23, 2013	1 Year	
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Apr. 23, 2013	1 Year	

# 3.7. Power Line Conducted Emission Measurement Results **PASS.**

The frequency range from 150KHz to 30 MHz is investigated.



#### CONDUCTED EMISSION TEST DATA

Test Site: 1# Shielded Room

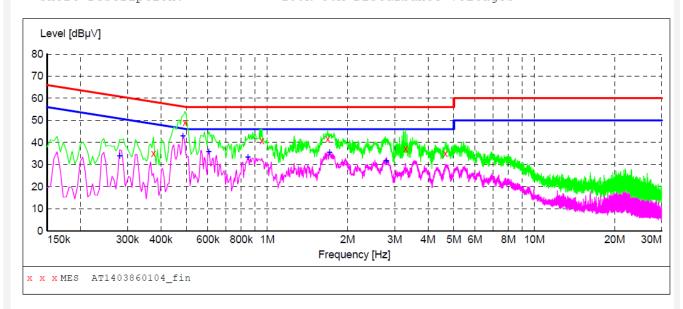
**Operating Condition:** ON

Test Specification: DC 8V, 1A Via Adapter

Comment: Live Line

Tem:25℃ Hum:50%

SCAN TABLE: "Voltage (150K~30M) FIN"
Short Description: 150K-30M Disturbance Voltages



#### MEASUREMENT RESULT: "AT1403860104 fin"

3/27/2014 4:	13PM						
Frequency	Level	Transd	Limit	Margin	Detector	Line	PE
MHz	dΒμV	dB	dΒμV	dB			
0.375000	34.90	20.1	58	23.5	QP	L1	GND
0.492000	49.00	20.1	56	7.1	QP	L1	GND
0.955500	40.80	20.2	56	15.2	QP	L1	GND
1.684000	41.70	20.3	56	14.3	QP	L1	GND
3.299500	37.30	20.4	56	18.7	QP	L1	GND
4.640500	34.90	20.5	56	21.1	QP	L1	GND

#### MEASUREMENT RESULT: "AT1403860104 fin2"

3/27/2014 4: Frequency MHz	13PM Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.280500 0.483000 0.604500 0.847500 1.711000	34.00 42.90 35.80 33.30 35.50	20.1 20.1 20.1 20.1 20.3	51 46 46 46 46	16.8 3.4 10.2 12.7 10.5	AV AV AV AV	L1 L1 L1 L1 L1	GND GND GND GND GND
2.795500	31.80	20.4	46	14.2	AV	L1	GND



#### CONDUCTED EMISSION TEST DATA

Test Site: 1# Shielded Room

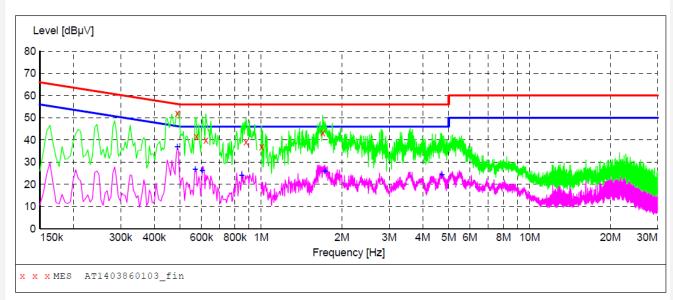
**Operating Condition:** ON

Test Specification: DC 8V, 1A Via Adapter

Comment: **Neutral Line** 

Tem:25°C Hum:50%

SCAN TABLE: "Voltage (150K~30M) FIN"
Short Description: 150K-30M Disturbance Voltages



#### MEASUREMENT RESULT: "AT1403860103 fin"

3/27/201	4:10	PM						
Frequ	iency	Level	Transd	Limit	Margin	Detector	Line	PΕ
	MHz	dBµV	dB	dBuV	dB			
0.48	7500	52.10	20.1	56	4.1	OP	N	GND
0.57	3000	41.50	20.1	56	14.5	ÕΡ	N	GND
0.62	2500	40.00	20.1	56	16.0	OP	N	GND
0.87	9000	39.20	20.1	56	16.8	OP	N	GND
1.00	4500	37.00	20.2	56	19.0	OP	N	GND
	7500	43.10	20.3	56	12.9	OP	N	GND
1.00	7300	13.10	20.5	30	12.5	×τ	TA	CIVID

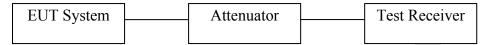
#### MEASUREMENT RESULT: "AT1403860103 fin2"

3/27/2014 4:	10PM						
Frequency	Level	Transd	Limit	Margin	Detector	Line	PE
MHz	dΒμV	dB	dΒμV	dB			
0.487500	37.00	20.1	46	9.2	AV	N	GND
0.568500	26.70	20.1	46	19.3	AV	N	GND
0.604500	26.30	20.1	46	19.7	AV	N	GND
0.847500	23.90	20.1	46	22.1	AV	N	GND
1.729000	26.00	20.3	46	20.0	AV	N	GND
4.712500	24.20	20.5	46	21.8	AV	N	GND



# 4. FCC Part 15.247 Requirements for DSSS & OFDM Modulation

# 4.1 Test Setup



#### 4.2 6dB Bandwidth

#### a. Limit

For the direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

#### **b.Test Procedure**

- 1. Place the EUT on the table and set it in the transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer as:

RBW = 100kHz,  $VBW \ge 3*RBW = 300kHz$ ,

Detector= Peak

Trace mode= Max hold.

Sweep- auto couple.

- 4. Mark the peak frequency and –6dB (upper and lower) frequency.
- 5. Repeat until all the rest channels are investigated.

#### c. Test Setup See 4.1

d. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC01183 0	980100	Aug. 09, 2013	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2013	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

#### e. Test Results

Pass.



## f. Test Data

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	11.76	,	Pass
Mid	2437	11.72	>500	Pass
High	2462	11.76		Pass

# Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	16.48		Pass
Mid	2437	16.48	>500	Pass
High	2462	16.48		Pass

# Test mode: IEEE 802.11n (HT20)

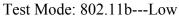
Channal	Frequency	Bandwidth	Limit	Dogulta
Channel	(MHz)	(MHz)	(kHz)	Results
Low	2412	17.68		Pass
Mid	2437	17.68	>500	Pass
High	2462	17.68		Pass

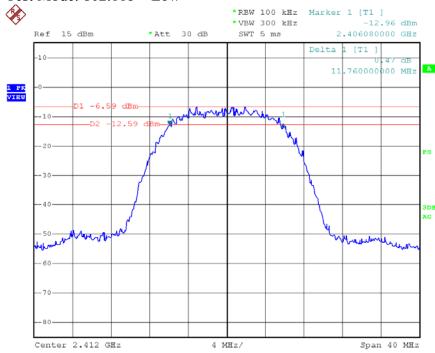
## Test mode: IEEE 802.11n (HT40)

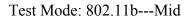
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2422	36.48	,	Pass
Mid	2437	36.48	>500	Pass
High	2452	36.48		Pass

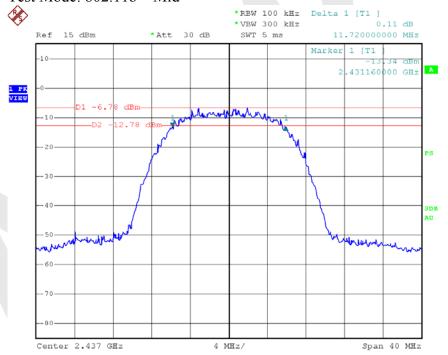
Test Plots See the following page.



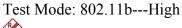


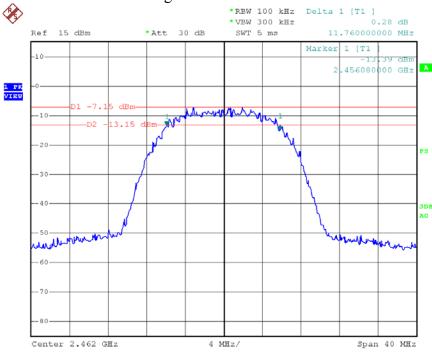


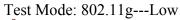


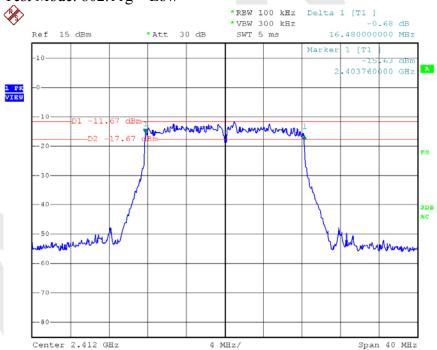




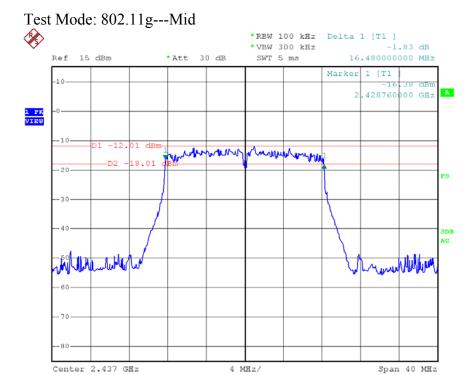


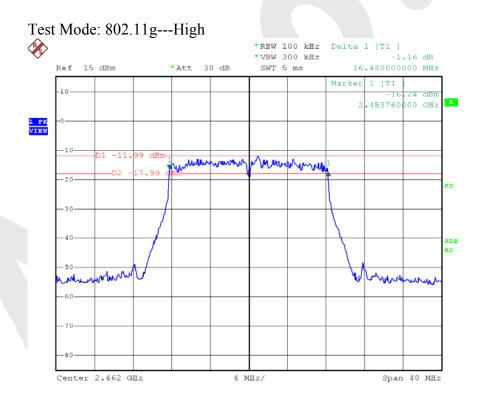




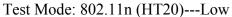


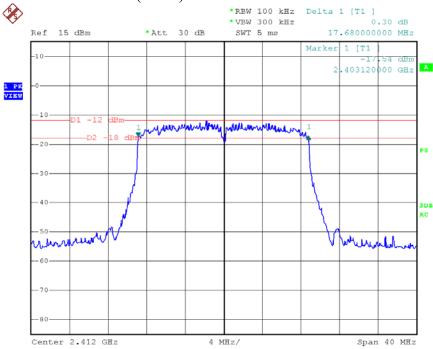




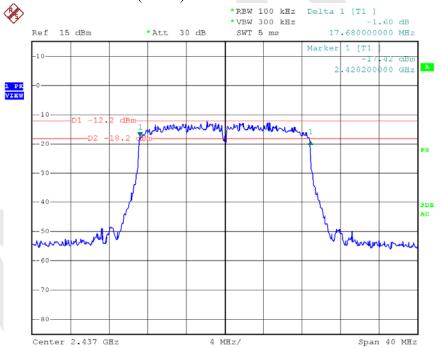






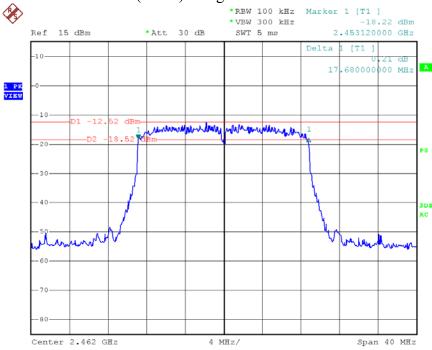


## Test Mode: 802.11n (HT20)---Mid

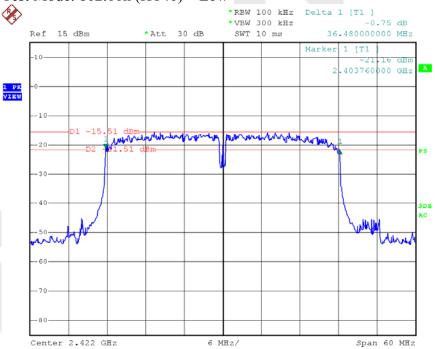




Test Mode: 802.11n (HT20)---High

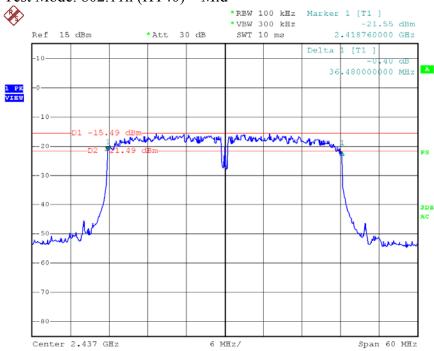


## Test Mode: 802.11n (HT40)---Low

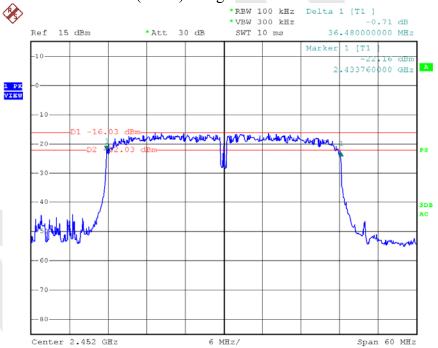




Test Mode: 802.11n (HT40)---Mid



## Test Mode: 802.11n (HT40)---High





# 4.3. Maximum Peak output power test

#### a. Limit

The maximum peak output power of the intentional radiator shall not exceed the following:

- 1. For systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 watt (30dBm).
- 2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antenna of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### b. Configuration of Measurement

EUT	DC block	ATT.		Test receiver
-----	----------	------	--	---------------

#### c. Data Rates

IEEE802.11b: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 1 Mbps data rate (worst case) are chosen for the final testing.

IEEE802.11g: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 6 Mbps data rate (the worst case) are chosen for the final testing.

IEEE802.11n (HT20: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 6.5Mbps data rate (the worst case) are chosen for the final testing.

IEEE802.11n (HT40: Channel 3(2422MHz), Channel 6(2437MHz) and Channel 9(2452MHz) with 13.5Mbps data rate (the worst case) are chosen for the final testing.

#### d. Test Procedure

#### This test was according the kDB 558074 9.1.2:

- 1. This procedure may be used when the maximum available RBW of the measurement instrument is less than the DTS bandwidth.
- 2. Set the RBW = 1 MHz.
- 3. Set the VBW $\geq$ 3\*RBW = 3 MHz.
- 4. Set the span ≥ 1.5\*DTS bandwidth.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS bandwidth.

#### e. Test Equipment

Same as the equipment listed in 4.2.

#### f. Test Results

Pass.



## g. Test Data

Test mode: IEEE 802.11b

Channel Frequency		Maximum transmit power	Limit		Dogult
Chamilei	(MHz)	(dBm)	(dBm)	(watts)	Result
Low	2412	11.99			Pass
Mid	2437	11.63	30	1	Pass
High	2462	11.12			Pass

Test mode: IEEE 802.11g

Channel	Frequency	Maximum transmit power	Li	mit	Result
Chamilei	(MHz)	(dBm)	(dBm)	(watts)	Result
Low	2412	10.11			Pass
Mid	2437	9.90	30	1	Pass
High	2462	9.47			Pass

Test mode: IEEE 802.11n (HT20)

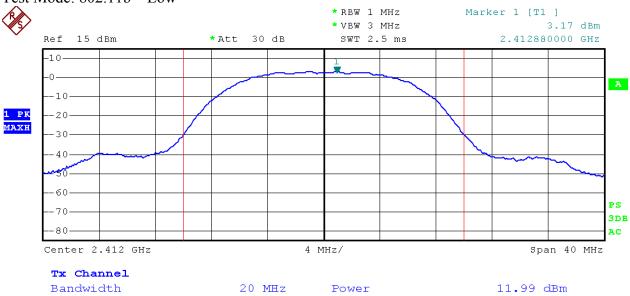
Channel	Frequency	Maximum transmit power	Liı	mit	Result
Chamilei	(MHz)	(dBm)	(dBm)	(watts)	Resuit
Low	2412	9.88			Pass
Mid	2437	9.57	30	1	Pass
High	2462	9.04			Pass

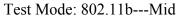
Test mode: IEEE 802.11n (HT40)

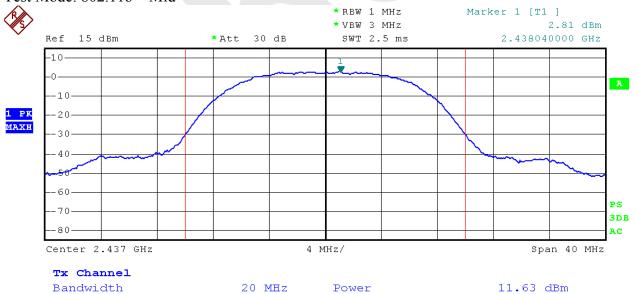
Channel	Frequency	Maximum transmit power	Liı	mit	Dagult
Channel	(MHz)	(dBm)	(dBm)	(watts)	Result
Low	2422	9.39			Pass
Mid	2437	9.37	30	1	Pass
High	2452	8.96			Pass



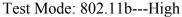




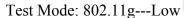






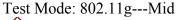




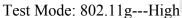








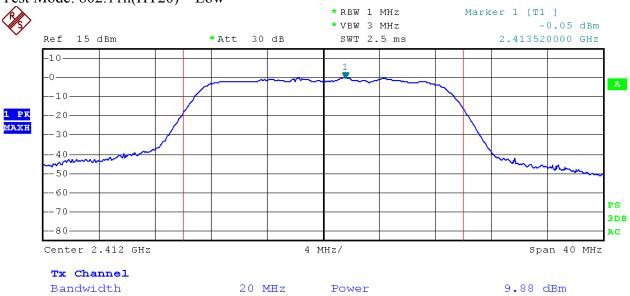










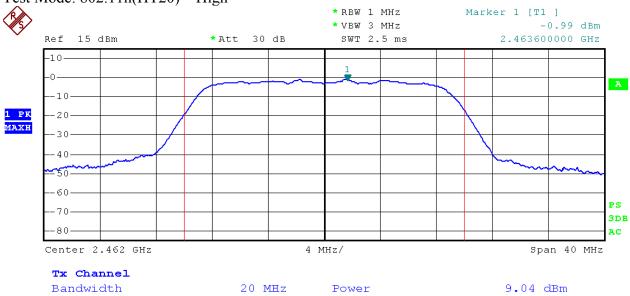




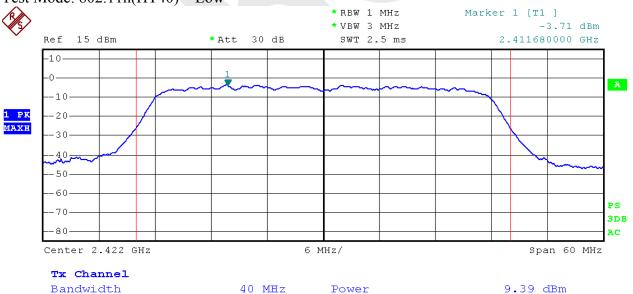






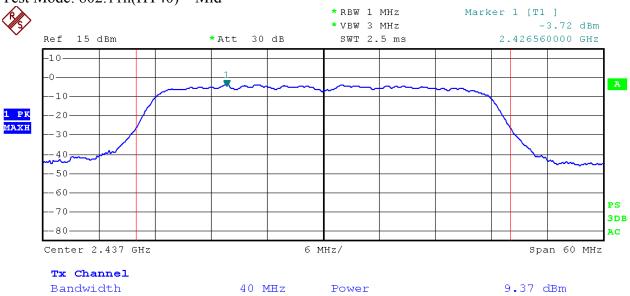




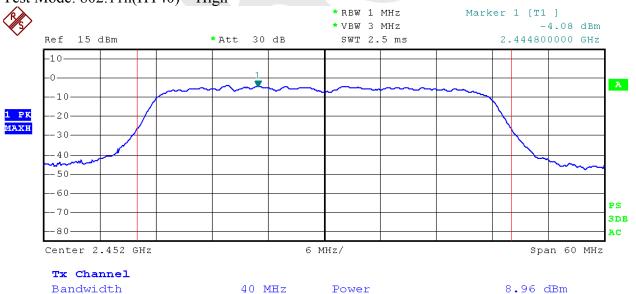














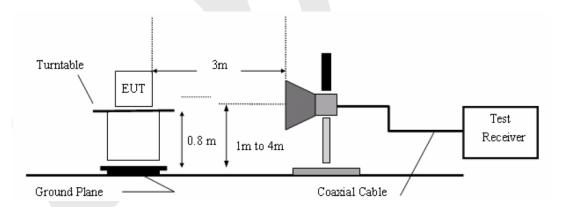
# 4.4. Band Edges Measurement

#### a. Limit

According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in15.209(a).

#### **b.** Test Procedure

- 1. Conducted Method:
- 1) Set RBW=100KHz, VBW=300KHz
- 2) Detector=peak
- 3) Sweep time= auto
- 4) Trace mode=max hold.
- 2. Radiated Method:
- 1) The EUT is placed on a turntable, which is 0.8m above the ground plane.
- 2) The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
- 4) Peak detector: RBW=1MHz, VBW=3MHz, SWT=AUTO Average detector: RBW=1MHz, VBW=10Hz, SWT=AUTO The EUT is tested in 9\*6\*6 Chamber.
- 5) Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.



#### c. Test Equipment

Same as the equipment listed in 4.2.

#### d. Test Results

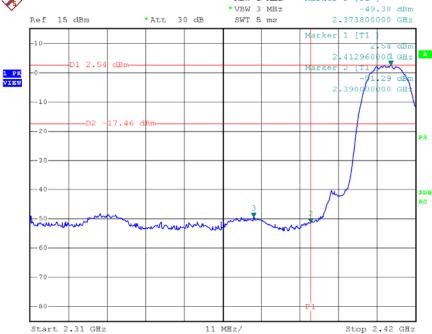
Pass.

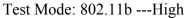
#### e. Test Plots

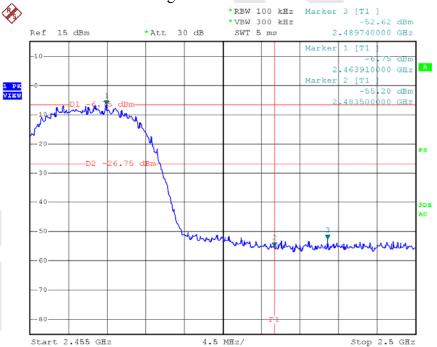
See the following page.



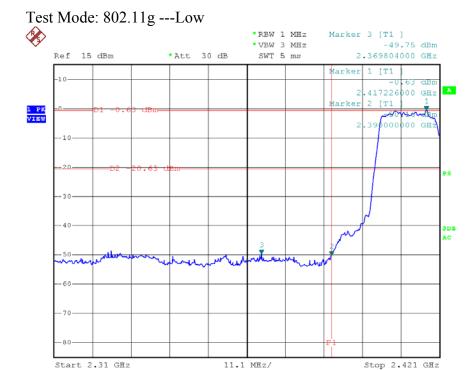


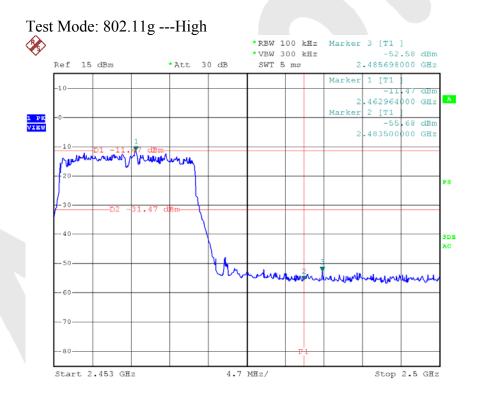






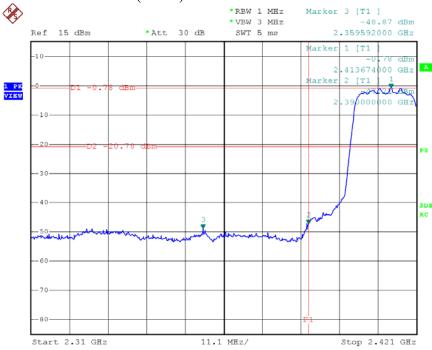




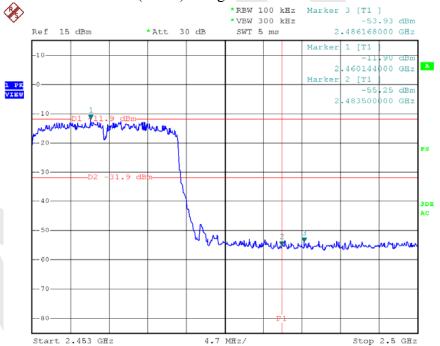




Test Mode: 802.11n (HT20) ---Low

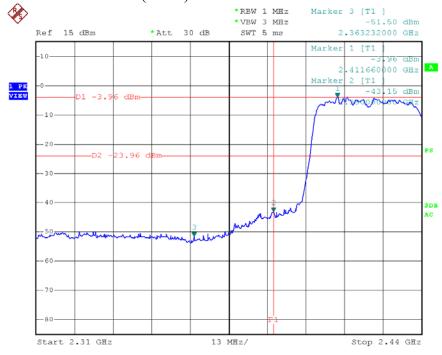




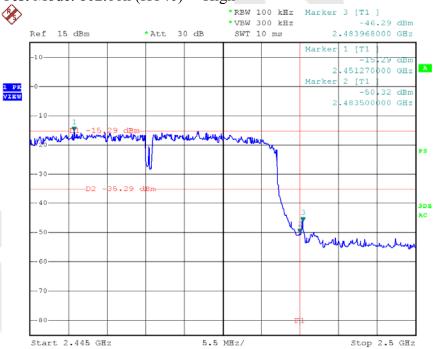




Test Mode: 802.11n (HT40) ---Low





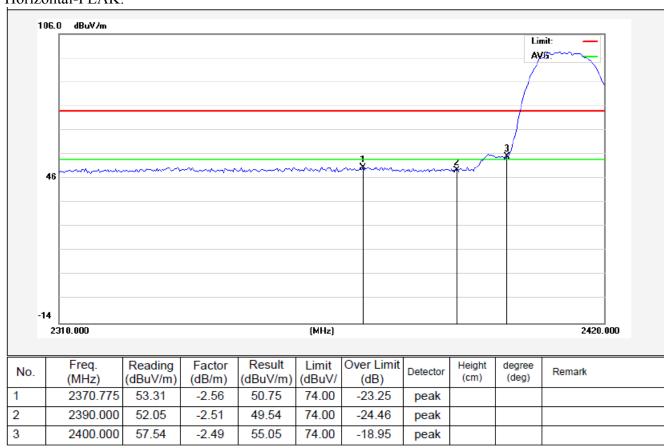




Test Mode: 802.11b

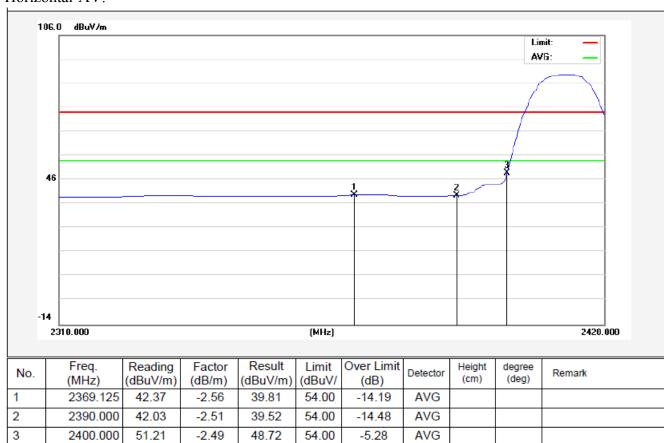
2412MHz

Horizontal-PEAK:





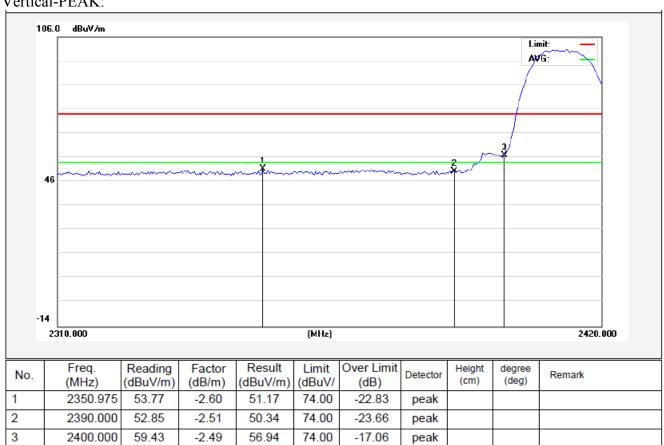
#### Horizontal-AV:



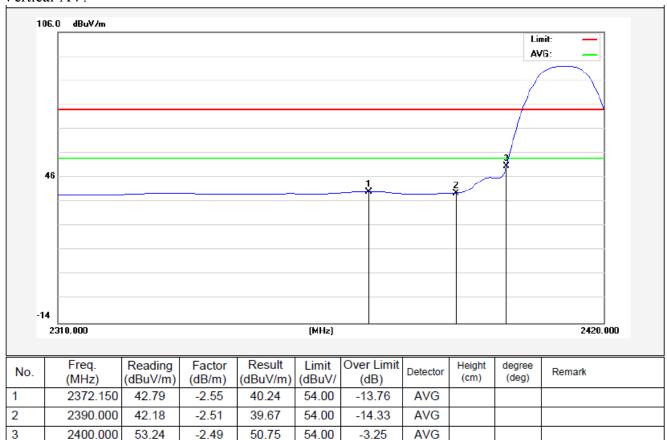


Test Mode: 802.11b

2412MHz Vertical-PEAK:



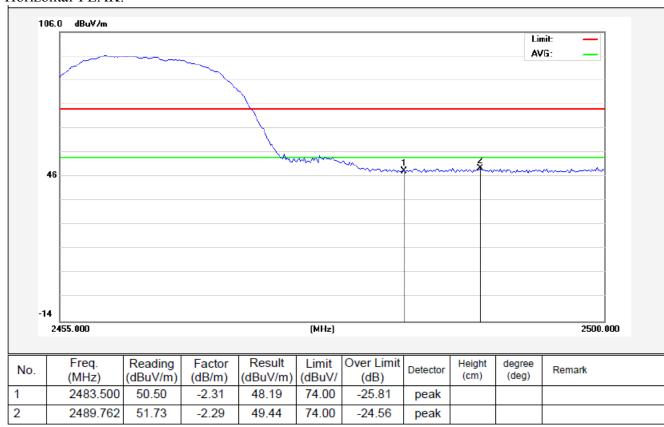




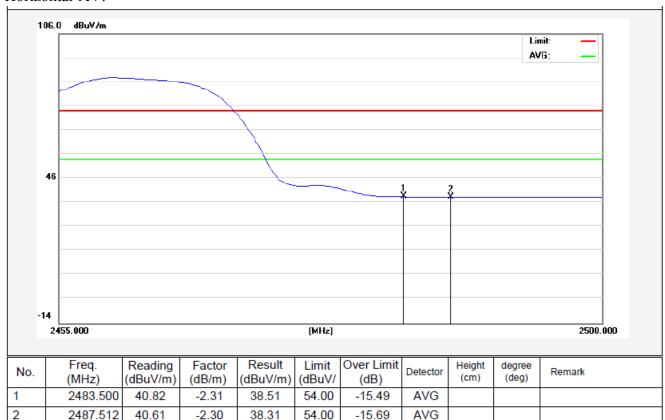


Test Mode: 802.11b

2462MHz

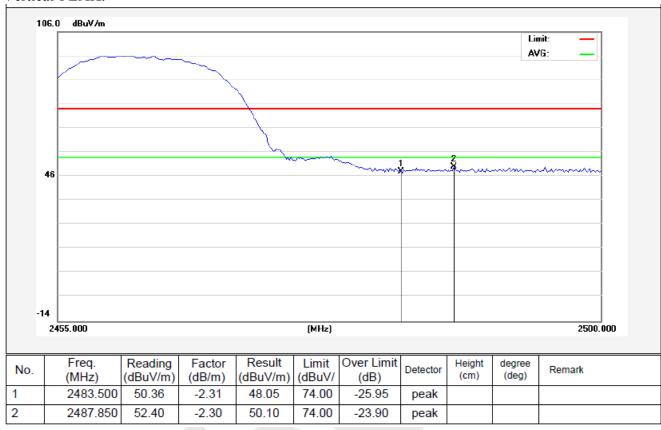




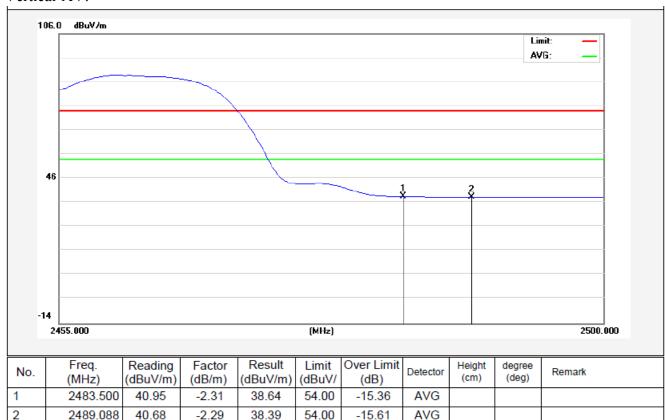




Test Mode: 802.11b



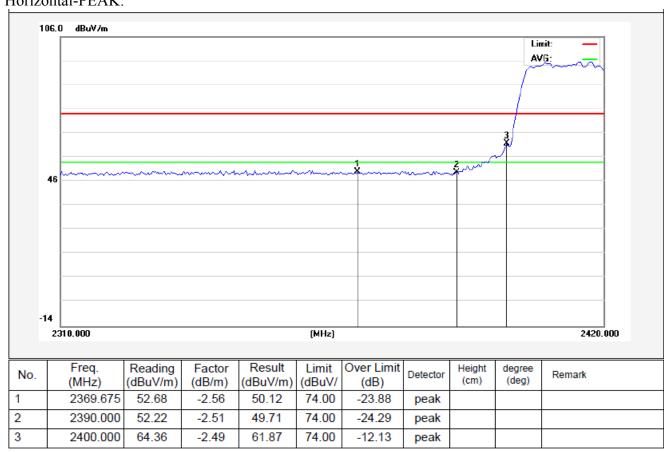




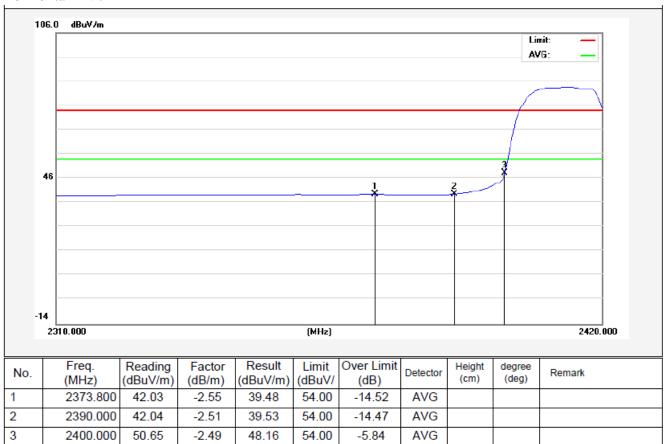


Test Mode: 802.11g

2412MHz

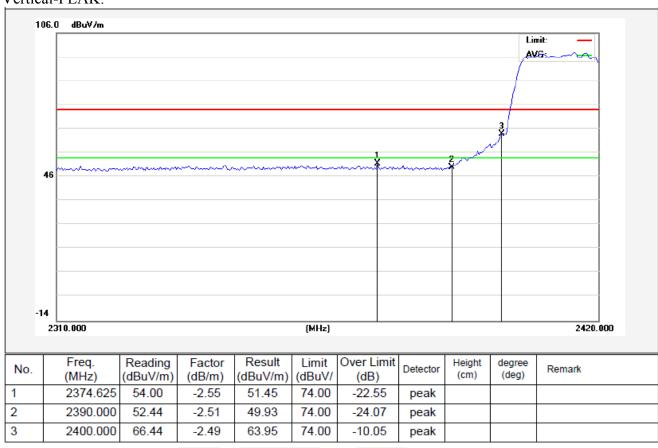




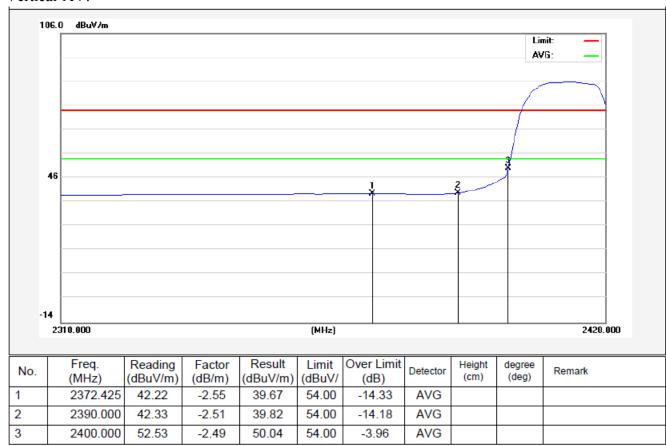




Test Mode: 802.11g



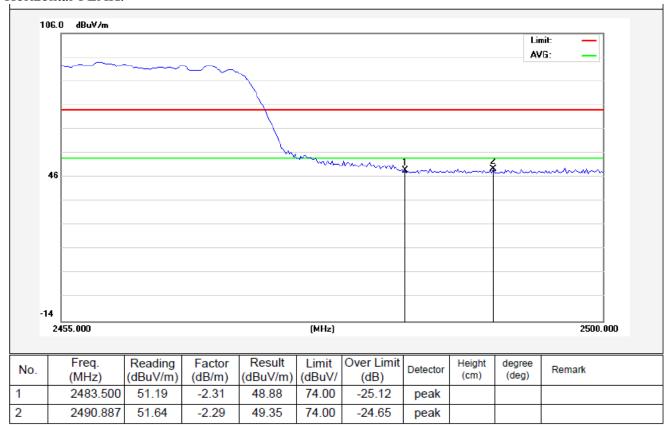




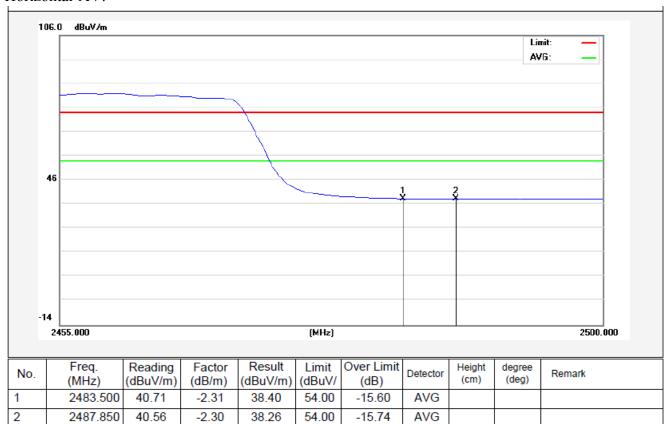


Test Mode: 802.11g

2462MHz

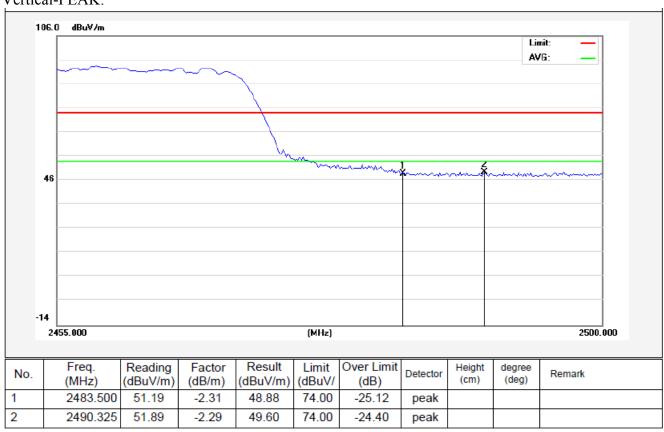




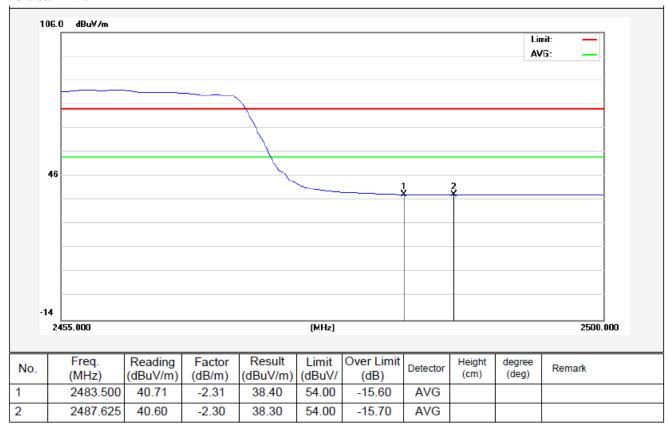




Test Mode: 802.11g



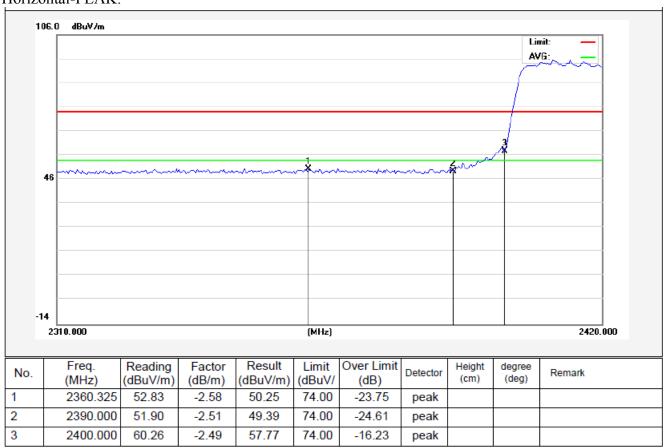






Test Mode: 802.11n (HT20)

2412MHz

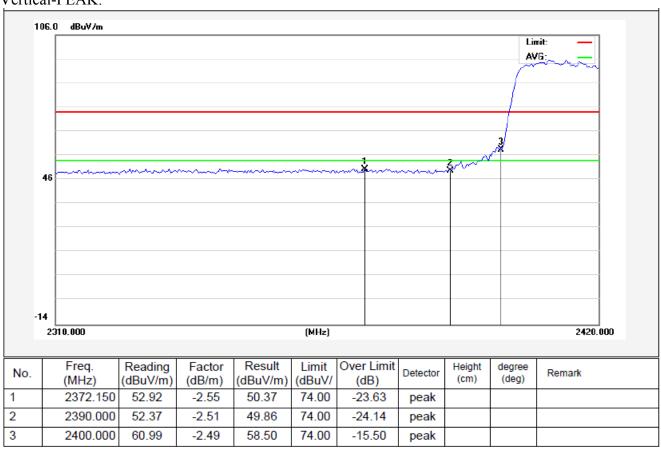




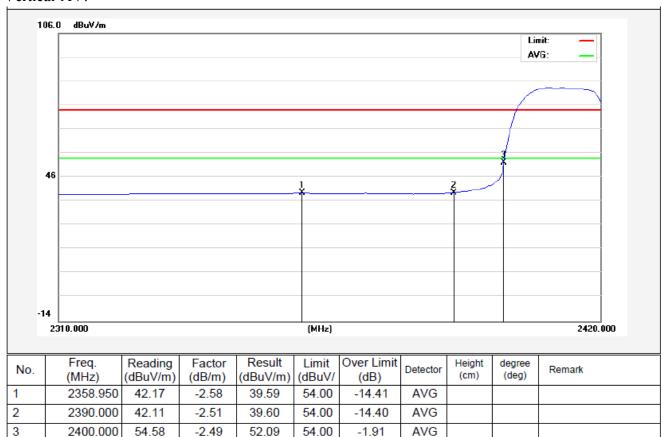




Test Mode: 802.11n (HT20)



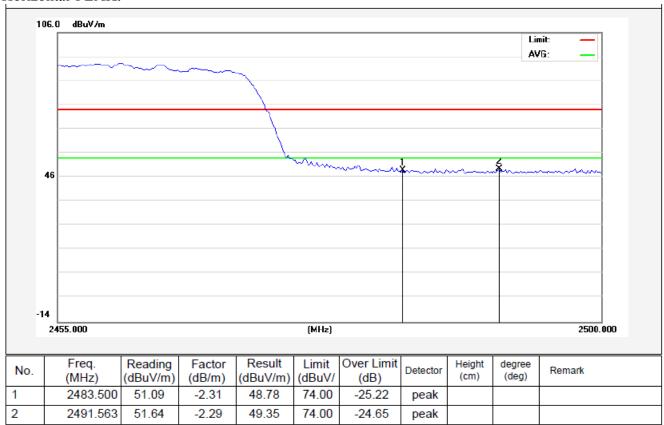




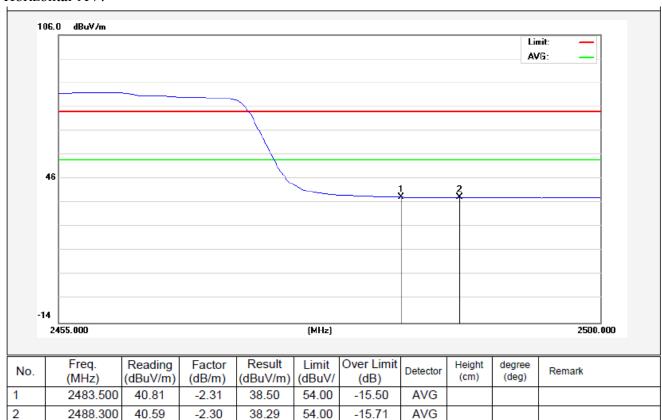


Test Mode: 802.11n (HT20)

2462MHz

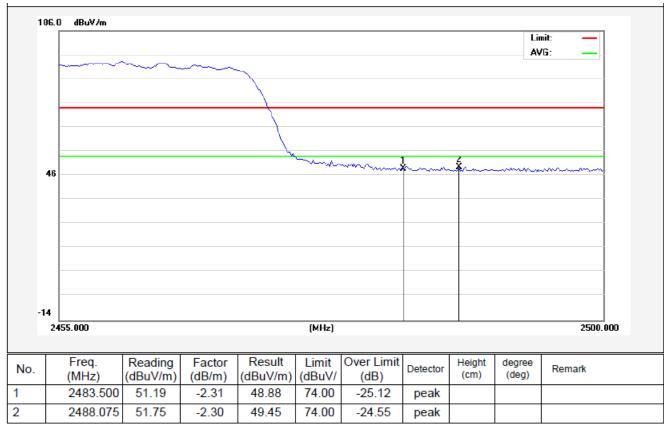




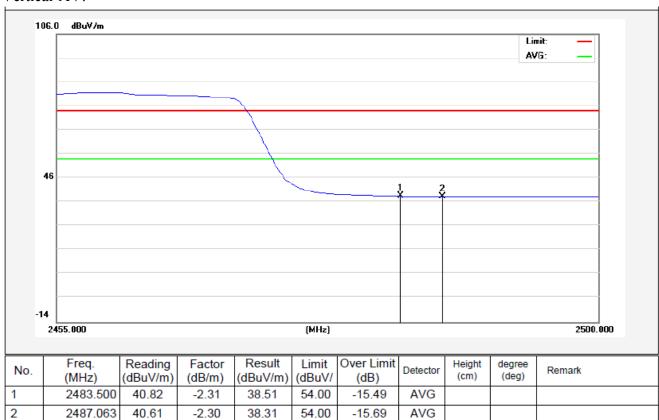




Test Mode: 802.11n (HT20)



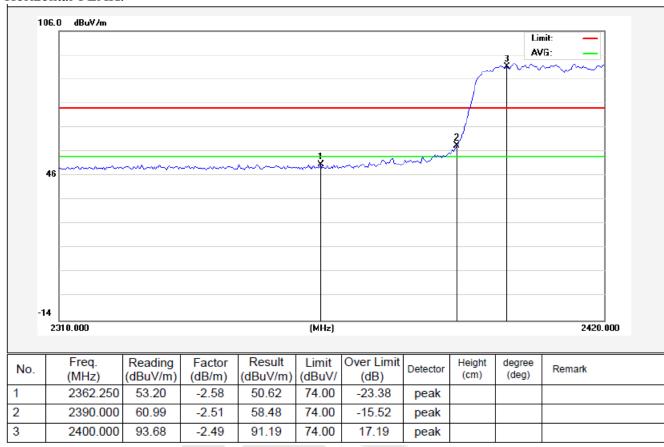




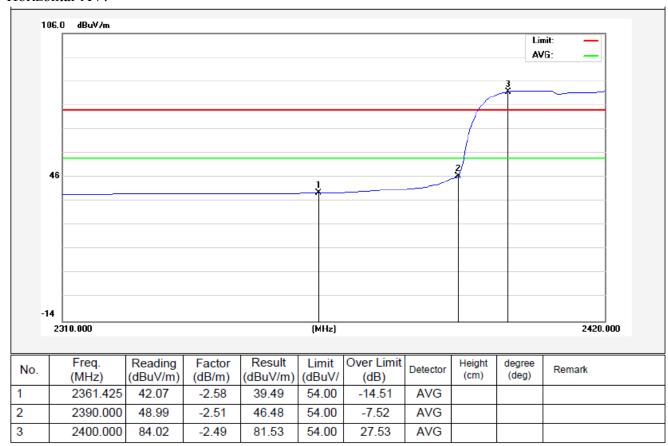


Test Mode: 802.11n (HT40)

2412MHz

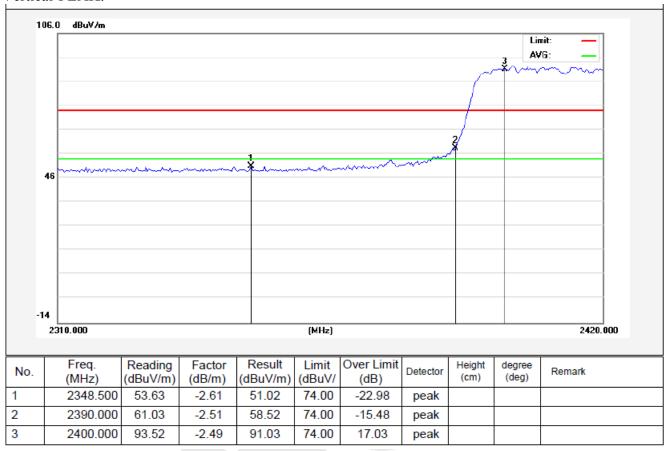




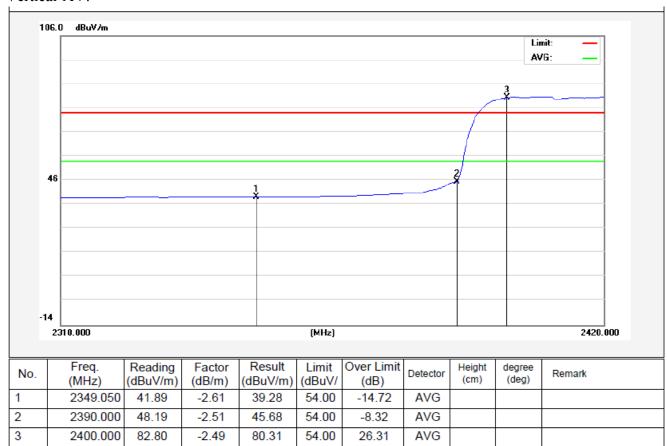




Test Mode: 802.11n (HT40)



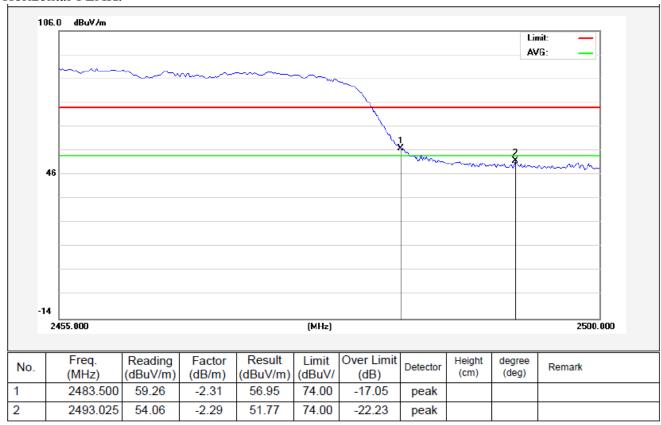




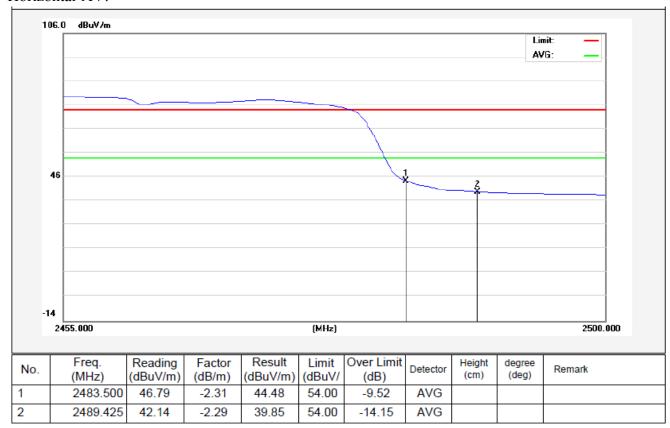


Test Mode: 802.11n (HT40)

2462MHz

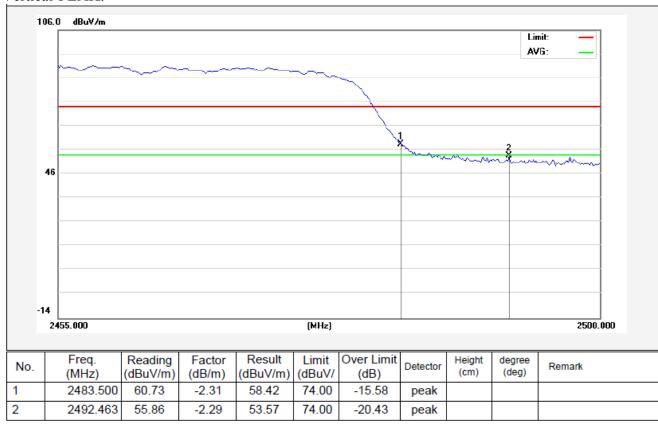




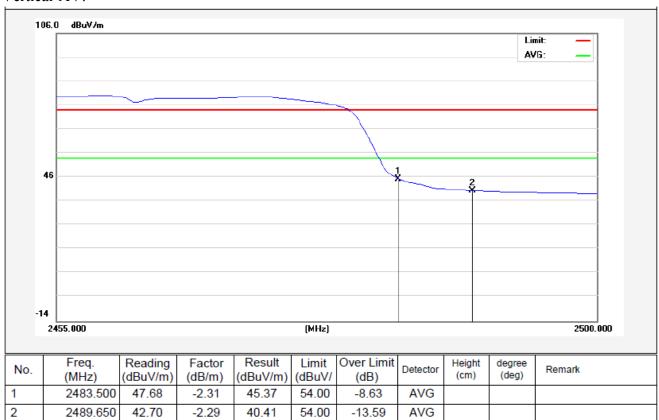




Test Mode: 802.11n (HT40)









# 4.5. Peak Power Spectral Density

#### a. Limit

- 1. For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
- 2. The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

#### **b.** Test Procedure

- 1. Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 2. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 1.5MHz, Sweep=500s
- 3. Record the max. reading.
- 4. Repeat the above procedure until the measurements for all frequencies are completed.

## c. Test Equipment

Same as the equipment listed in 4.2.

## d. Test Setup

See 4.1

#### e. Test Results

**Pass** 

#### f. Test Data

Please refer to the following data.

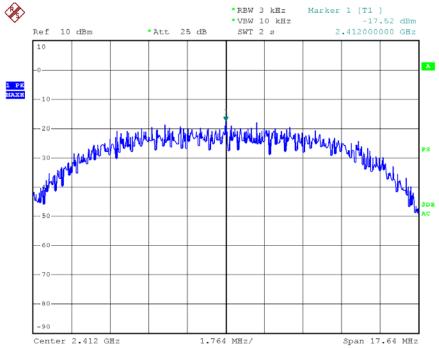
**g. Test Plot** See the following pages



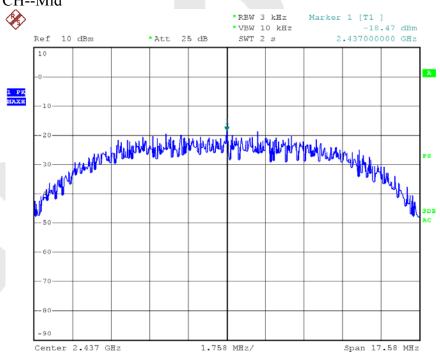
rest infoac. The	EE 802.11b				
Channel	Frequency (MHz)	PPSD (dBm/3KHz)	$\Sigma$ PPSD (dBm/3KHz)	Limit (dBm)	Result
Low	2412	-17.52	-		Pass
Mid	2437	-18.47	-	8.00	Pass
High	2462	-19.35	-		Pass
Test mode: IEE	EE 802.11g				
Channel	Frequency	PPSD	$\Sigma$ PPSD	Limit	D 1
	(MHz)	(dBm)	(dBm)	(dBm)	Result
Low	2412	-19.35	-	,	Pass
Mid	2437	-21.10	_	8.00	Pass
High	2462	-21.92	_		Pass
C					
Test mode: IEE	EE 802.11n (HT	,			
Channel	Frequency	PPSD	$\Sigma$ PPSD	Limit	Result
	$(\mathbf{N}\mathbf{I}\mathbf{I}\mathbf{I}_{-})$	(dBm/3KHz)	(dBm/3KHz)	(dBm)	ixcsuit
	(MHz)	(abili sitile)	(uDill/Sixi1Z)	( )	
Low	(MHZ) 2412	-22.72	-	()	Pass
Low Mid	,	,	- -	8.00	Pass Pass
	2412	-22.72	- - -		
Mid	2412 2437	-22.72 -22.12	- - -		Pass
Mid	2412 2437	-22.72 -22.12	- - -		Pass
Mid High	2412 2437 2462	-22.72 -22.12 -23.05	- - -		Pass
Mid High	2412 2437 2462 EE 802.11n (HT	-22.72 -22.12 -23.05		8.00	Pass
Mid High	2412 2437 2462 EE 802.11n (HT4 Frequency	-22.72 -22.12 -23.05 40) PPSD	- - - Σ PPSD	8.00 Limit	Pass
Mid High Test mode: IEE Channel	2412 2437 2462 EE 802.11n (HT4 Frequency (MHz)	-22.72 -22.12 -23.05 40) PPSD (dBm/3KHz)		8.00	Pass Pass Result
Mid High Test mode: IEE Channel Low	2412 2437 2462 EE 802.11n (HTA Frequency (MHz) 2422	-22.72 -22.12 -23.05 40) PPSD (dBm/3KHz) -21.70	- - - Σ PPSD	8.00 Limit (dBm)	Pass Pass Result Pass
Mid High Test mode: IEE Channel	2412 2437 2462 EE 802.11n (HT4 Frequency (MHz)	-22.72 -22.12 -23.05 40) PPSD (dBm/3KHz)	- - - Σ PPSD	8.00 Limit	Pass Pass Result





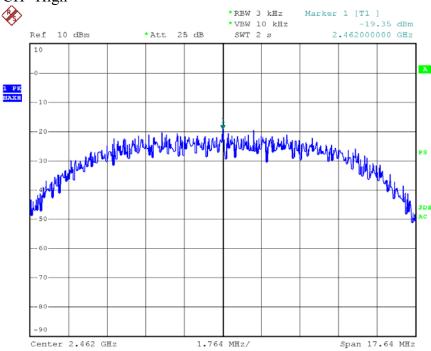




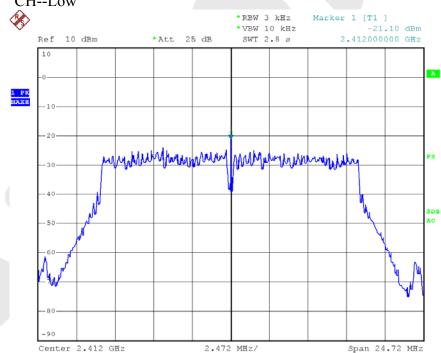






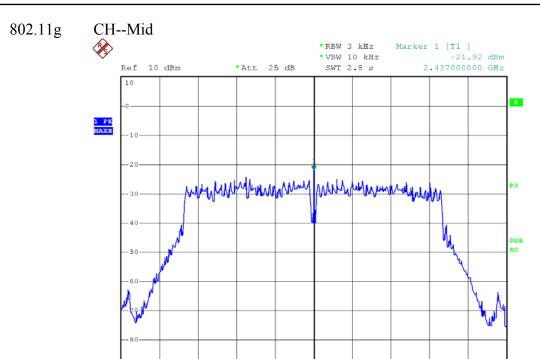






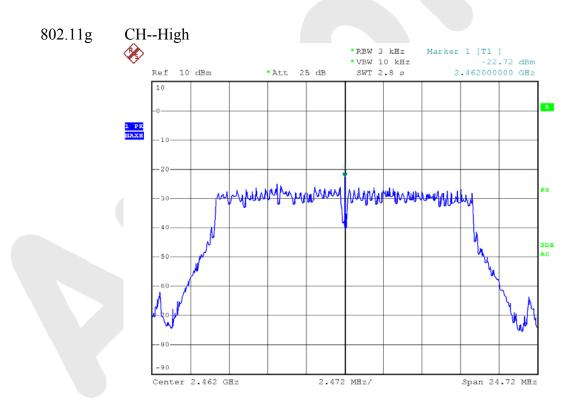
Span 24.72 MHz



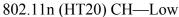


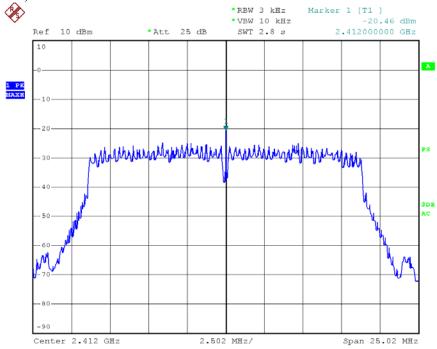
2.472 MHz/

Center 2.437 GHz

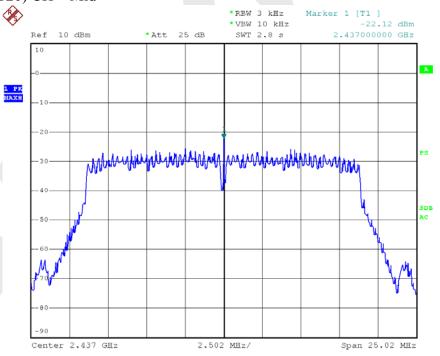






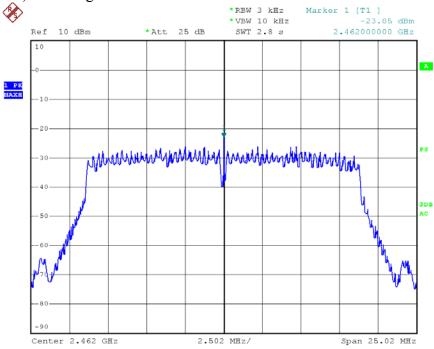


# 802.11n (HT20) CH-Mid

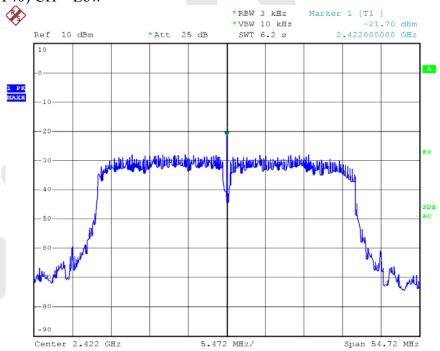




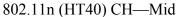


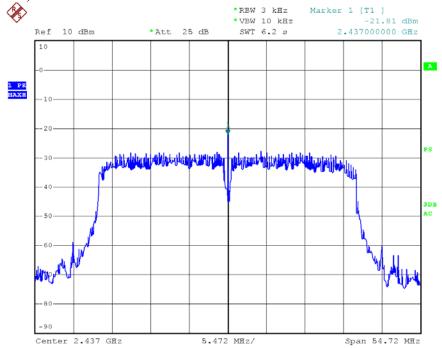


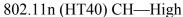
# 802.11n (HT40) CH-Low

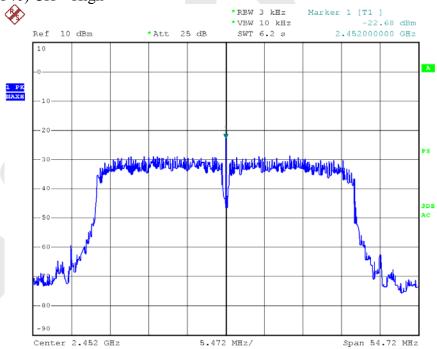














### 4.6. Radiated Emissions

#### 4.6.1.1. Test Limits (< 30 MHZ)

Frequency	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30

4.6.1.2. Test Limits (≥ 30 MHZ)

FIELD STRENGTH	FIELD STRENGTH	S15.209	
of Fundamental:	of Harmonics	30 - 88 MHz	40 dBuV/m
@3M			
902-928 MHZ		88 - 216 MHz	43.5
2.4-2.4835 GHz		216 - 960 MHz	46
94 dBμV/m @3m	54 dBμV/m @3m	ABOVE 960 MHz	54dBuV/m

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

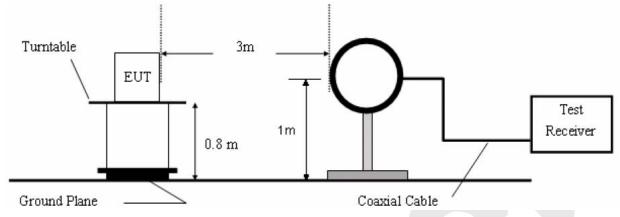
Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Preamplifier	Instruments corporation	EMC01183 0	980100	Aug. 09, 2013	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2013	1 Year
3.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
4.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
5.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2013	1 Year
6.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

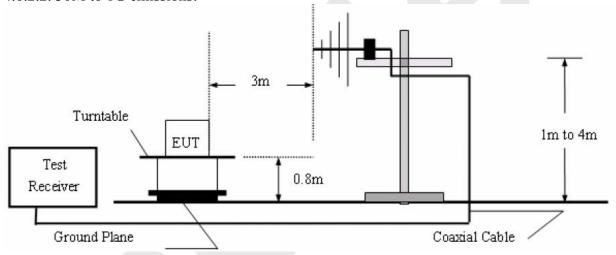


# 4.6.2. Test Configuration:

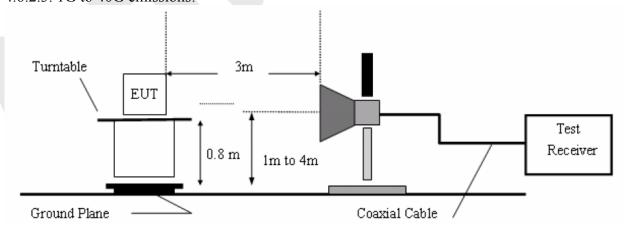
## 4.6.2.1. 9k to 30MHz emissions:



#### 4.6.2.2. 30M to 1G emissions:



## 4.6.2.3. 1G to 40G emissions:





#### 4.6.3. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

Measurements are made on 9KHz to 30MHz and 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. All reading are above 1GHz, peak & average values with a resolution bandwidth of 1MHz

The EUT is tested in 9\*6\*6 Chamber.

The test results are listed in Section 4.6.4.

#### 4.6.4. Test Results

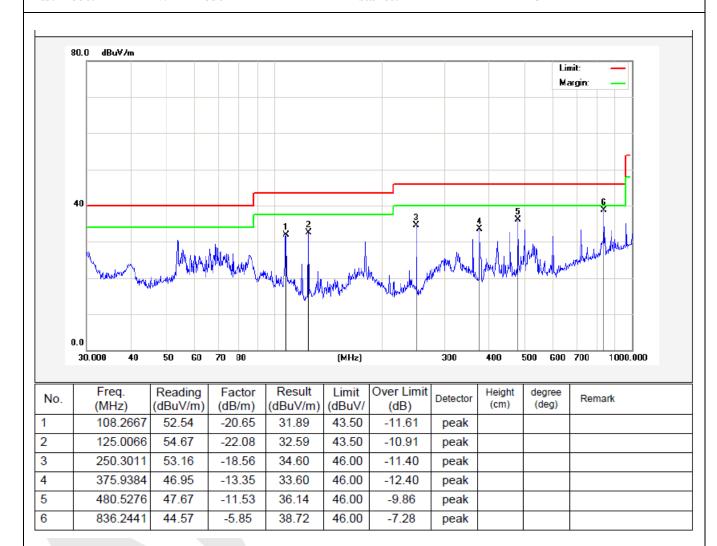
The EUT was tested on (Charging to adapter, WIFI Mode) modes, only the worst data of (WIFI Mode) are attached in the following pages.



Standard: (RE)FCC PART15 C \_3m Power Source: DC 8V, 1A Via Adapter

Test item: Radiation Test Temp.(C)/Hum.(%RH): 24.3(C)/55%RH

Test Mode: WIFI Mode Distance: 3m

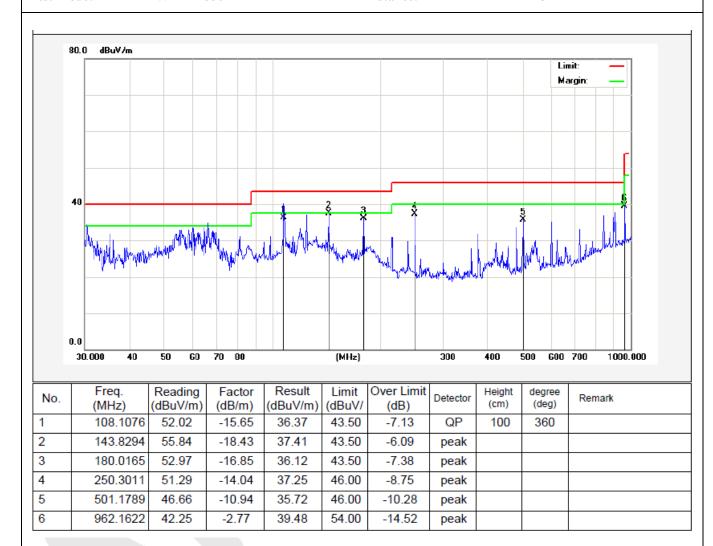




Standard: (RE)FCC PART15 C \_3m Power Source: DC 8V, 1A Via Adapter

Test item: Radiation Test Temp.(C)/Hum.(%RH): 24.3(C)/55%RH

Test Mode: WIFI Mode Distance: 3m

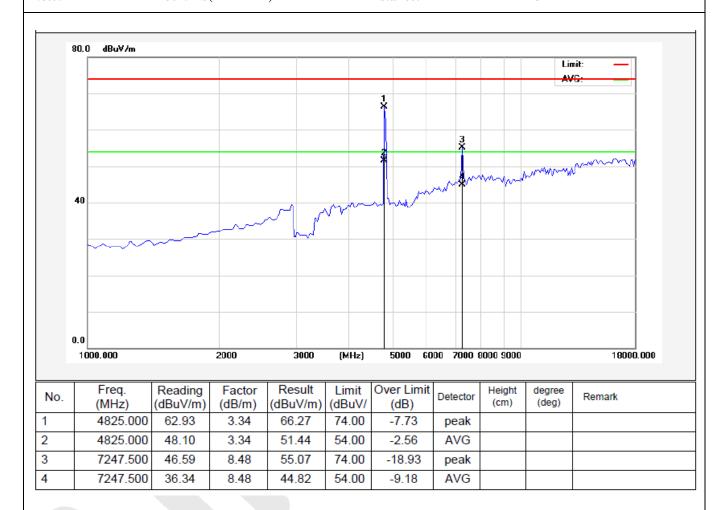




Standard: (RE)FCC PART15 C \_3m Power Source: DC 8V, 1A Via Adapter

Test item: Radiation Test Temp.(C)/Hum.(%RH): 24.3(C)/55%RH

Note: 802.11b(2412MHz) Distance: 3m

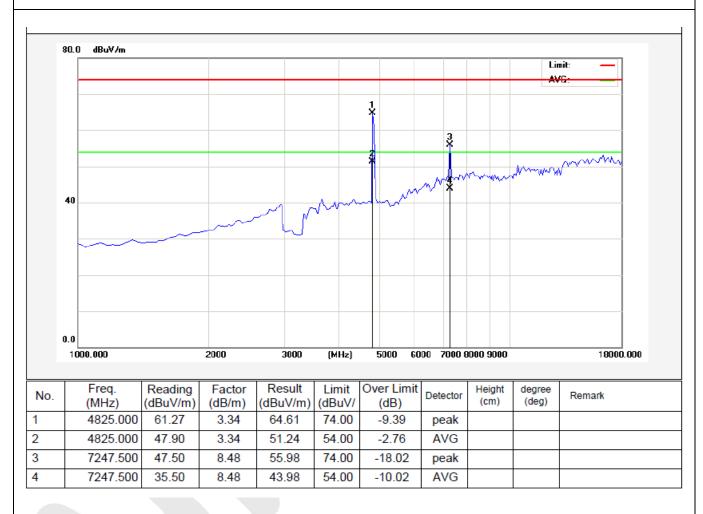




Standard: (RE)FCC PART15 C \_3m Power Source: DC 8V, 1A Via Adapter

Test item: Radiation Test Temp.(C)/Hum.(%RH): 24.3(C)/55%RH

Note: 802.11b(2412MHz) Distance: 3m

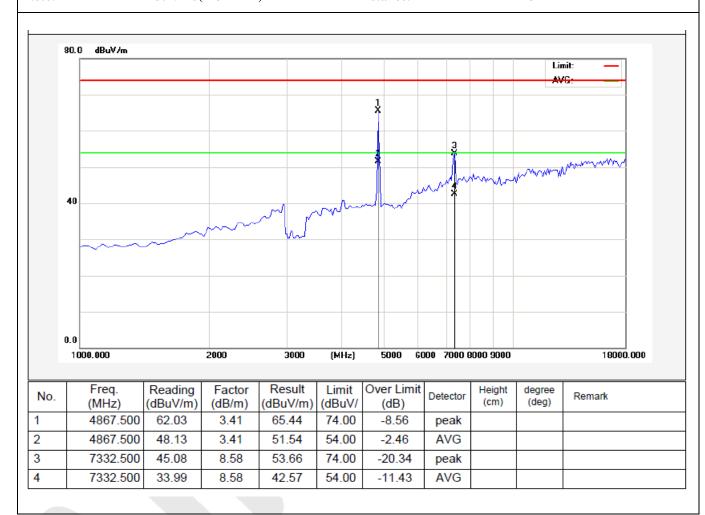




Standard: (RE)FCC PART15 C \_3m Power Source: DC 8V, 1A Via Adapter

Test item: Radiation Test Temp.(C)/Hum.(%RH): 24.3(C)/55%RH

Note: 802.11b(2437MHz) Distance: 3m



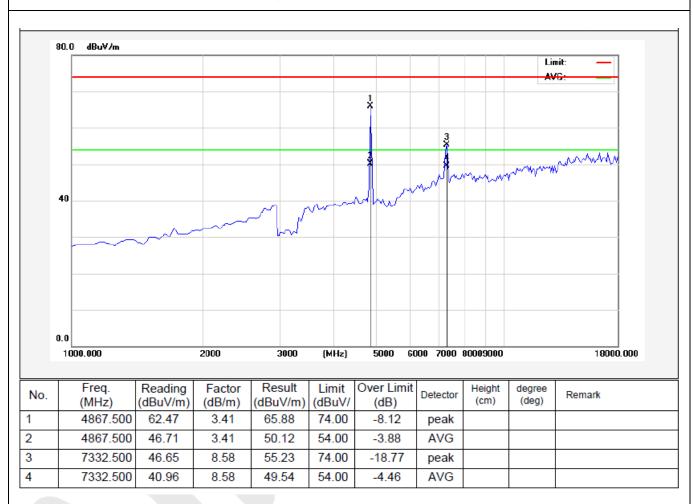


Standard: (RE)FCC PART15 C \_3m Power Source: DC 8V, 1A Via Adapter

Test item: Radiation Test Temp.(C)/Hum.( 24.3(C)/55%RH

%RH):

Note: 802.11b(2437MHz) Distance: 3m

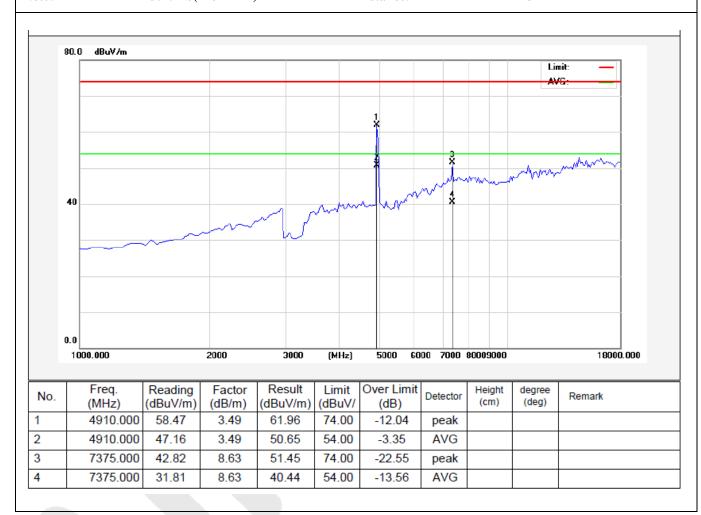




Standard: (RE)FCC PART15 C \_3m Power Source: DC 8V, 1A Via Adapter

Test item: Radiation Test Temp.(C)/Hum.(%RH): 24.3(C)/55%RH

Note: 802.11b(2462MHz) Distance: 3m

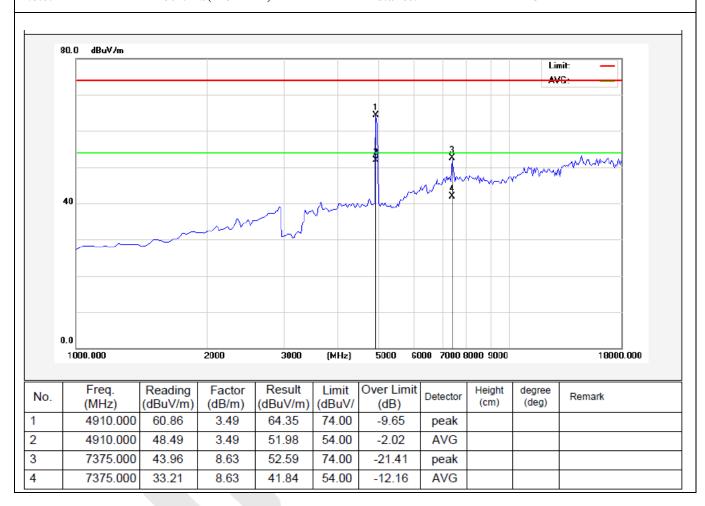




Standard: (RE)FCC PART15 C \_3m Power Source: DC 8V, 1A Via Adapter

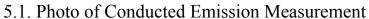
Test item: Radiation Test Temp.(C)/Hum.(%RH): 24.3(C)/55%RH

Note: 802.11b(2462MHz) Distance: 3m





# **5. PHOTOGRAPH**





# 5.2. Photo of Radiation Emission Test



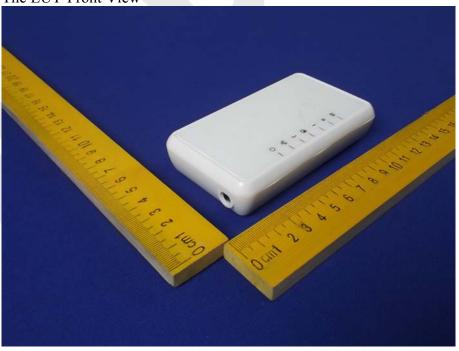


# **APPENDIX I (EXTERNAL PHOTOS)**

Figure 1
The EUT-Overall View



Figure 2
The EUT-Front View







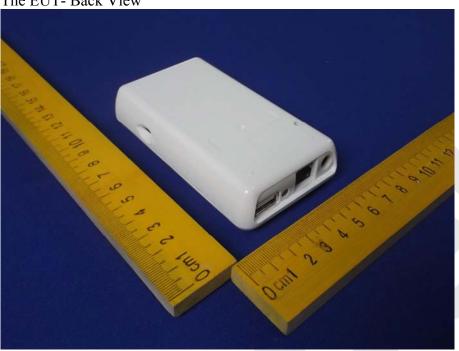


Figure 4
The EUT- Port View



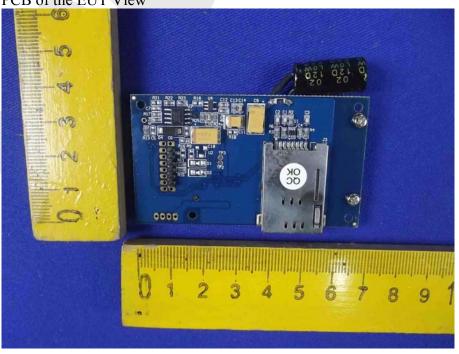


# APPENDIX III (INTERNAL PHOTOS)

Figure 5
The EUT-Inside View



Figure 6 PCB of the EUT View







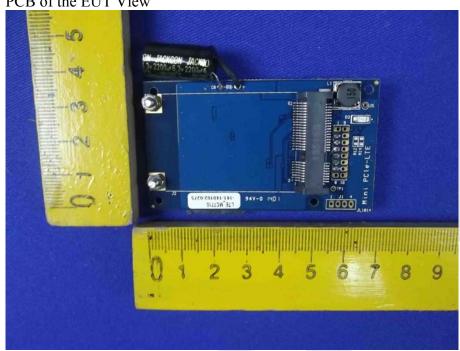


Figure 8
PCB of the EUT View







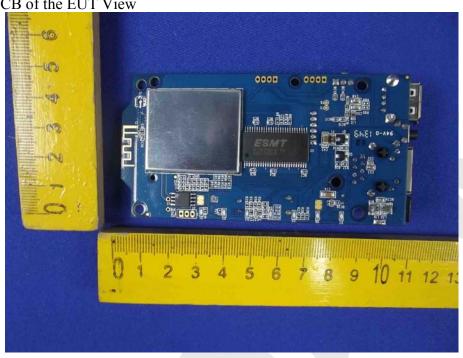


Figure 10 PCB of the EUT View

