Test Lab
Cert 2951.01

TEST REPORT

Applicant:	Brookstone, Inc.
Address:	One Innovation Way, Merrimack, NH 03054 United States

Manufacturer or Supplier	Guangzhou Panyu Fantasia Creation Toys Co., Ltd
Address	Block 3, Biaozhun Industrial Zone, Tai Shi Industrial Park, Dongyong, Panyu Guangzhou Guangdong China
Product:	Rover II
Brand Name:	Brookstone
Model:	BS000002
Additional Model & Model Difference:	N/A
Date of tests:	June 09 ~ July 02 , 2012

the tests have been carried out according to the requirements of the following standards:

☒ **FCC Part 15, Subpart C (Section 15.247)**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Glyn He Project Engineer / EMC Department	Approved by Sam Tung Manager / EMC Department
Glyn	Date: July 02, 2012

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	N/A	July 02, 2012

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
15.207	AC Power Conducted Emission	N/A	N/A
15.205 15.209	Restricted bands of operation. & Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -3.71dB at 4874.00MHz.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.247(d)	Out of Band Emission Measurement	PASS	Meet the requirement of limit.

2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44dB
Radiated emissions	30MHz ~ 200MHz	3.19dB
	200MHz ~1000MHz	3.21dB
	1GHz ~ 18GHz	2.26dB
	18GHz ~ 40GHz	1.94dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Rover Ⅱ
MODEL NO.	BS000002
FCC ID	ZRB792593
NOMINAL VOLTAGE	DC 9V By Battery
MODULATION TYPE	DSSS
OPERATING FREQUENCY	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40)
PEAK POWER	22.26dBm (Measured Max.)
ANTENNA TYPE	Dedicated Antenna; 2.0dBi gain
I/O PORTS	ANT Port
DATA CABLE SUPPLIED	N/A

NOTE:

1. The EUT was powered by the following adapters:

ADAPTER	
BRAND:	N/A
MODEL:	N/A
INPUT:	N/A
OUTPUT:	N/A
DC LINE:	N/A

2. The EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11n (HT20)	1TX
802.11n (HT40)	1TX

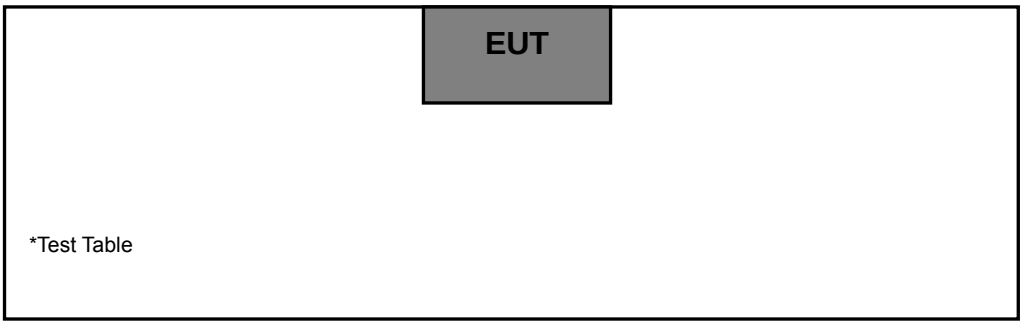
3. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

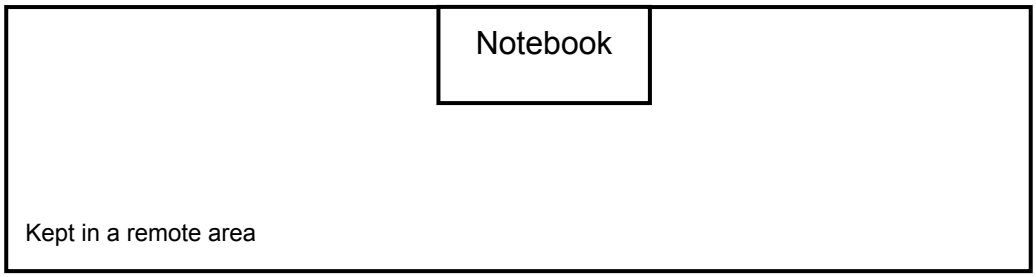
3.2 DESCRIPTION OF TEST MODES

Eleven channels are provided for 802.11b, 802.11g and 802.11n:

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

3.2.1. CONFIGURATION OF SYSTEM UNDER TEST





3.2.2. TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO					DESCRIPTION
	RE≥1G	RE<1G	PLC	BM	APCM	
-	√	√	-	√	√	

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement
BM: BANDEDGE MEASUREMENT

RADIATED EMISSION TEST (ABOVE 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
-	802.11b	1 to 11	1, 6, 11	CCK	DBPSK	1.0	Z
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	Z
-	802.11n HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5	Z
-	802.11n HT40	3 to 9	3, 6, 9	OFDM	BPSK	13.5	Z

RADIATED EMISSION TEST (BELOW 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
-	802.11b	1 to 11	6	CCK	DBPSK	1.0	Z

AC POWER CONDUCTED EMISSION TEST:

. ☐ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☐ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11g	1 to 11	6	CCK	DBPSK	1.0

BANDEDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 11	CCK	DBPSK	1.0
-	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
-	802.11n HT20	1 to 11	1, 11	OFDM	BPSK	6.5
-	802.11n HT40	3 to 9	3, 9	OFDM	BPSK	13.5

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	CCK	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n HT40	3 to 9	3, 6, 9	OFDM	BPSK	13.5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 55%RH	DC 9V By Battery	Glyn He
RE<1G	25deg. C, 55%RH	DC 9V By Battery	Glyn He
PLC	25deg. C, 56%RH	DC 9V By Battery	Glyn He
APCM	25deg. C, 56%RH	DC 9V By Battery	Glyn He

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.247)

ANSI C63.4-2003

ANSI C63.10-2009

All test items have been performed and recorded as per the above standards.

NOTE: It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (Verification). The test report has been issued separately.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	D531	CN-0XM006-48643-81U-2610	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line :Unshielded, Detachable 1.5m

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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).

FREQUENCIES (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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Spectrum Analyzer ROHDE & SCHWARZ	E4446A	MY46180622	May 02, 12	May 01, 13
Test Receiver ROHDE & SCHWARZ	ESVD	847398/004	May 15,12	May 14,13
Bilog Antenna TESEQ	CBL 6111D	25758	Nov.07,11	Nov.07,12
Horn Antenna EMCO	3117	00062558	Nov.07,11	Nov.07,12
10m Semi-anechoic Chamber ETS-LINDGREN	21.4m*12.1m*8.8m	NSEMC006	Mar 24,12	Mar 23,13
RF Cable IMRO	IMRO-400	10m Cable 1#10m	May 16,12	May 15,13
RF Cable IMRO	IMRO-400	10m Cable 2#3m	May 16,12	May 15,13
Signal Amplifier EMCI	EMC330	980095	Nov 07,11	Nov 07,12
Signal Amplifier EMCI	EMC 012645	980077	Nov 07,11	Nov 07,12
RF Cable DRAKA	M06/25-RG102	10m Cable 2#	May 16,12	May 15,13
Test software ADT	ADT_Radiated_V7.6.15	N/A	N/A	N/A

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA.

2. The test was performed in Dongguan Chamber 10m.

3. The horn antenna are used only for the measurement of emission frequency above 1GHz if tested.

4.1.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

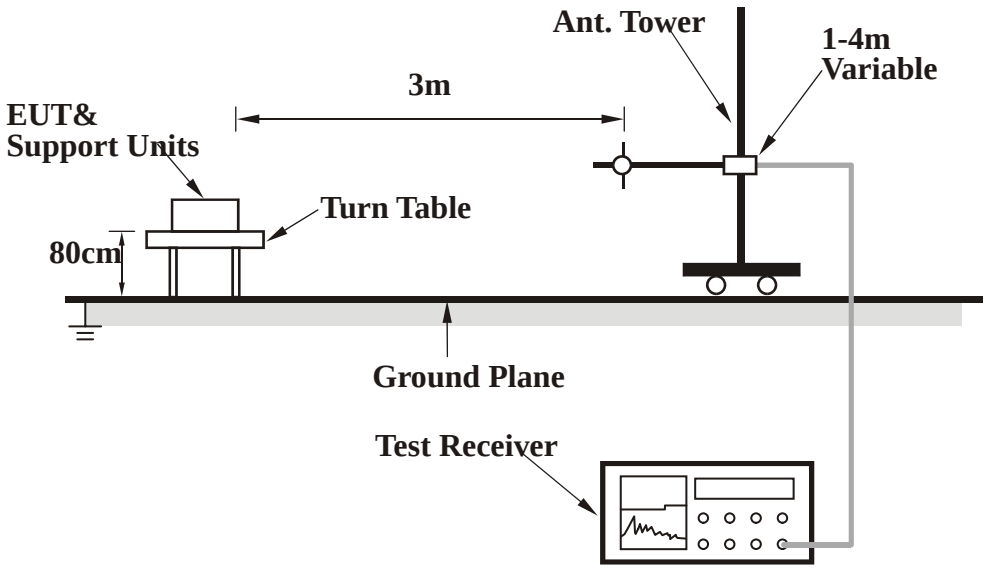
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT OPERATING CONDITIONS

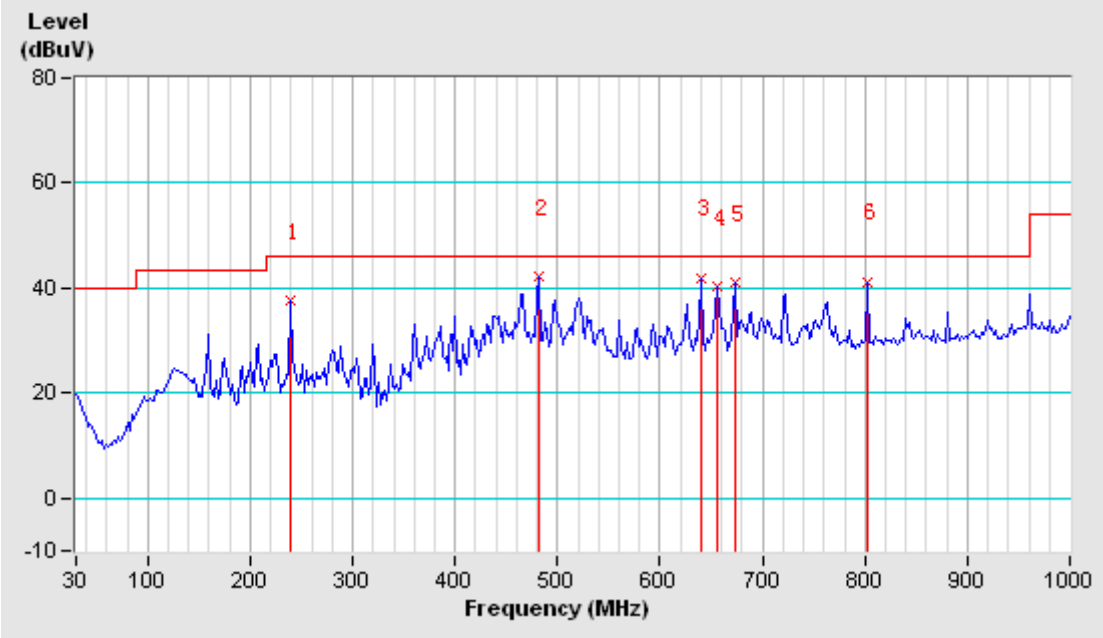
a. Set the EUT under full load condition and placed them on a testing table.
b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
c. The necessary accessories enable the EUT in full functions.

4.1.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA: 802.11b- CH6

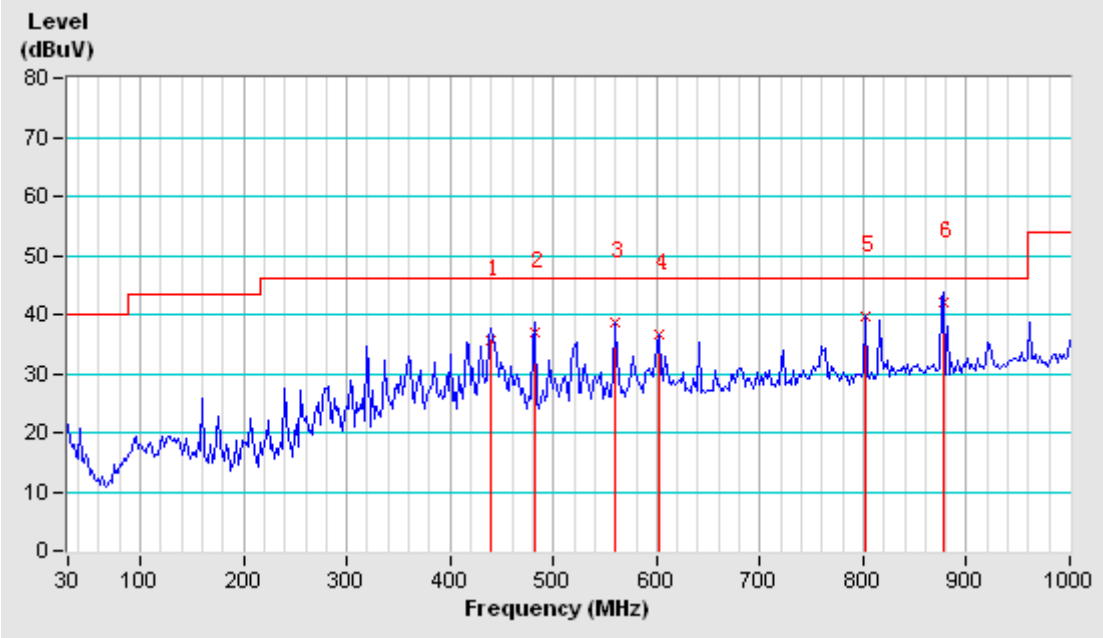
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value（dBuV）	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	239.52	13.6	24.12	37.72	46	-8.28	187	235
2	**482.02**	**21.81**	**20.5**	**42.31**	**46**	**-3.69**	**189**	**245**
3	641.1	25.65	16.39	42.04	46	-3.96	210	0
4	656.62	25.58	14.74	40.32	46	-5.68	180	0
5	674.08	25.65	15.31	40.96	46	-5.04	190	4
6	802.12	28.28	13	41.28	46	-4.72	200	62

REMARKS: 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. All the readings were Quasi-Peak values.



ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value （dBuV）	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	439.34	20.71	14.87	35.58	46	-10.42	100	340
2	482.02	21.81	15.2	37.01	46	-8.99	100	340
3	559.62	24.52	14.28	38.81	46	-7.19	100	320
4	602.3	24.38	12.29	36.67	46	-9.33	100	300
5	802.12	28.28	11.48	39.76	46	-6.24	100	100
6	877.78	29.55	12.41	41.96	46	-4.04	100	279

REMARKS: 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. All the readings were Quasi-Peak values.



802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1, 6, 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 9V By Battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 57%RH	TESTED BY	Glyn He

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1#	2390.00 PK	50.74	74	-23.26	3.30 H	23	14.33	36.41
#	2390.00 AV	33.65	54	-20.35	3.30 H	23	-2.76	36.41
2#	2483.50 PK	46.25	74	-27.75	3.50 H	345	9.01	37.24
#	2483.50 AV	33.25	54	-20.75	3.50 H	345	-3.99	37.24
3	4824.00 PK	57.32	74	-16.68	3.00 H	33	8.07	49.25
	4824.00 AV	49.52	54	-4.48	3.00 H	33	0.27	49.25
4	4874.00 PK	58.88	74	-15.12	2.00 H	320	9.64	49.24
	4874.00 AV	**50.29**	**54**	**-3.71**	**2.00 H**	**320**	**1.05**	**49.24**
5	4924.00 PK	57.92	74	-16.08	3.25 H	35	8.7	49.22
	4924.00 AV	48.66	54	-5.34	3.25 H	35	-0.56	49.22
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1#	2390.00 PK	46.74	74.0	-27.26	1.50 H	150	10.33	36.41
#	2390.00 AV	36.64	54.0	-17.36	1.50 H	150	0.23	36.41
2#	2483.50 PK	46.85	74.0	-27.15	1.38 H	20	9.61	37.24
#	2483.50 AV	32.68	54.0	-21.32	1.38 H	20	-4.56	37.24
3	4824.00 PK	58.78	74.0	-15.22	1.25 H	56	9.53	49.25
	4824.00 AV	47.52	54.0	-6.48	1.25 H	56	-1.73	49.25
4	4874.00 PK	59.84	74.0	-14.16	1.30 H	325	10.60	49.24
	4874.00 AV	46.22	54.0	-7.78	1.30 H	325	-3.02	49.24
5	4924.00 PK	58.48	74.0	-15.52	1.25 H	300	9.26	49.22
	4924.00 AV	50.12	54.0	-3.88	1.25 H	300	0.90	49.22

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. "#": The radiated frequency is out the restricted band.

802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1, 6, 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 9V By Battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 57%RH	TESTED BY	Glyn He

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1#	2390.00 PK	48.52	74	-25.48	3.00 H	345	12.11	36.41
#	2390.00 AV	32.52	54	-21.48	3.00 H	345	-3.89	36.41
2#	2483.50 PK	43.68	74	-30.32	3.38 H	22	6.44	37.24
#	2483.50 AV	31.97	54	-22.03	3.38 H	22	-5.27	37.24
3	4824.00 PK	58.74	74	-15.26	3.25 H	53	9.49	49.25
	4824.00 AV	43.85	54	-10.15	3.25 H	53	-5.4	49.25
4	4874.00 PK	57.62	74	-16.38	3.00 H	118	8.38	49.24
	4874.00 AV	42.25	54	-11.75	3.00 H	118	-6.99	49.24
5	4924.00 PK	59.85	74	-14.15	3.00 H	16	10.63	49.22
	4924.00 AV	44.98	54	-9.02	3.00 H	16	-4.24	49.22
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1#	2390.00 PK	47.94	74	-26.06	1.50V	235	11.53	36.41
#	2390.00 AV	32.16	54	-21.84	1.50V	235	-4.25	36.41
2#	2483.50 PK	43.27	74	-30.73	1.35V	150	6.03	37.24
#	2483.50 AV	31.58	54	-22.42	1.35V	150	-5.66	37.24
3	4824.00 PK	59.87	74	-14.13	1.55V	82	10.62	49.25
	4824.00 AV	45.32	54	-8.68	1.55V	82	-3.93	49.25
4	4874.00 PK	57.62	74	-16.38	1.50V	35	8.38	49.24
	4874.00 AV	44.21	54	-9.79	1.50V	35	-5.03	49.24
5	4924.00 PK	60.78	74	-13.22	1.50V	0	11.56	49.22
	4924.00 AV	43.98	54	-10.02	1.50V	0	-5.24	49.22

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. "#":The radiated frequency is out the restricted band.

802.11n HT20

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1, 6, 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 9V By Battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 55%RH	TESTED BY	Glyn He

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1#	2390.00 PK	46.7	74	-27.3	2.65 H	45	10.29	36.41
#	2390.00 AV	31.2	54	-22.8	2.65 H	45	-5.21	36.41
2#	2483.50 PK	44.68	74	-29.32	2.55 H	113	7.44	37.24
#	2483.50 AV	30.79	54	-23.21	2.55 H	113	-6.45	37.24
3	4824.00 PK	62.52	74	-11.48	2.65 H	314	13.27	49.25
	4824.00 AV	45.58	54	-8.42	2.65 H	314	-3.67	49.25
4	4874.00 PK	59.85	74	-14.15	3.00 H	58	10.61	49.24
	4874.00 AV	44.69	54	-9.31	3.00 H	58	-4.55	49.24
5	4924.00 PK	62.52	74	-11.48	3.35 H	252	13.3	49.22
	4924.00 AV	45.47	54	-8.53	3.35 H	252	-3.75	49.22
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1#	2390.00 PK	47.63	74	-26.37	1.25V	15	11.22	36.41
#	2390.00 AV	32.05	54	-21.95	1.25V	15	-4.36	36.41
2#	2483.50 PK	43.43	74	-30.57	1.50V	115	6.19	37.24
#	2483.50 AV	31.7	54	-22.3	1.50V	115	-5.54	37.24
3	4824.00 PK	61.52	74	-12.48	1.25V	356	12.27	49.25
	4824.00 AV	46.32	54	-7.68	1.25V	356	-2.93	49.25
4	4874.00 PK	58.87	74	-15.13	1.25V	0	9.63	49.24
	4874.00 AV	45.23	54	-8.77	1.25V	0	-4.01	49.24
5	4924.00 PK	61.82	74	-12.18	1.25V	305	12.6	49.22
	4924.00 AV	44.58	54	-9.42	1.25V	305	-4.64	49.22

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. "#":The radiated frequency is out the restricted band.

802.11n HT40

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3, 6, 9	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 9V By Battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 55%RH	TESTED BY	Glyn He

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1#	2390.00 PK	45.93	74	-28.07	3.30 H	24	9.52	36.41
#	2390.00 AV	32.26	54	-21.74	3.30 H	24	-4.15	36.41
2#	2483.50 PK	44.26	74	-29.74	3.10 H	352	7.02	37.24
#	2483.50 AV	31.43	54	-22.57	3.10 H	352	-5.81	37.24
3	4844.00 PK	58.87	74	-15.13	3.50 H	310	9.63	49.24
	4844.00 AV	46.56	54	-7.44	3.50 H	310	-2.68	49.24
4	4874.00 PK	64.36	74	-9.64	3.10 H	185	15.12	49.24
	4874.00 AV	44.87	54	-9.13	3.10 H	185	-4.37	49.24
5	4904.00 PK	63.98	74	-10.02	3.55 H	117	14.75	49.23
	4904.00 AV	46.85	54	-7.15	3.55 H	117	-2.38	49.23
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1#	2390.00 PK	47.66	74	-26.34	1.00V	0	11.25	36.41
#	2390.00 AV	32.95	54	-21.05	1.00V	0	-3.46	36.41
2#	2483.50 PK	45.71	74	-28.29	1.00V	24	8.47	37.24
#	2483.50 AV	33.04	54	-20.96	1.00V	24	-4.2	37.24
3	4844.00 PK	61.58	74	-12.42	1.25V	116	12.34	49.24
	4844.00 AV	45.88	54	-8.12	1.25V	116	-3.36	49.24
4	4874.00 PK	63.52	74	-10.48	1.38V	325	14.28	49.24
	4874.00 AV	45.98	54	-8.02	1.38V	325	-3.26	49.24
5	4904.00 PK	62.58	74	-11.42	1.38V	60	13.35	49.23
	4904.00 AV	46.24	54	-7.76	1.38V	60	-2.99	49.23

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

3. The other emission levels were very low against the limit.

4. Margin value = Emission level – Limit value.

5. "#":The radiated frequency is out the restricted band.

4.2 6dB BANDWIDTH MEASUREMENT

4.2.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Spectrum Analyzer Agilent	E7405A	MY45118807	May 15,12	May 14,13

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA

2. The test was performed in Dongguan RF Chamber.

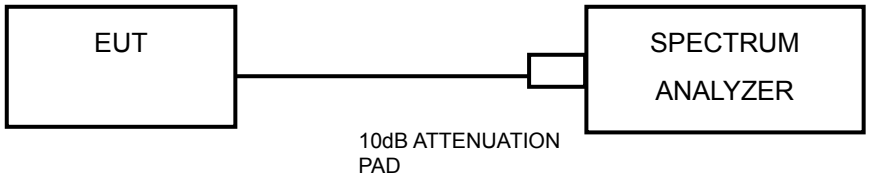
4.2.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = approximately 1% to 5% of the signal Bandwidth requirements
2. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



4.2.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.2.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.47	0.5	PASS
6	2437	10.47	0.5	PASS
11	2462	10.72	0.5	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.96	0.5	PASS
6	2437	16.96	0.5	PASS
11	2462	16.96	0.5	PASS

802.11n HT20

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.96	0.5	PASS
6	2437	17.96	0.5	PASS
11	2462	17.96	0.5	PASS

802.11n HT40

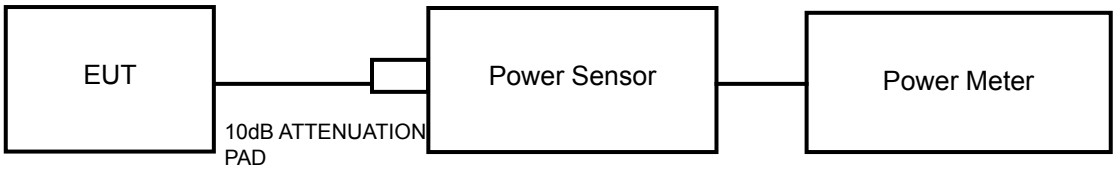
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	36.91	0.5	PASS
6	2437	36.91	0.5	PASS
9	2452	36.91	0.5	PASS

4.3 CONDUCTED OUTPUT POWER

4.3.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm)

4.3.2 TEST SETUP



4.3.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Power Meter Anritsu	ML2495A	1139001	Nov.07,11	Nov.07,12

4.3.4 TEST PROCEDURES

A power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

4.3.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PEAK POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	17.41	19.72	30	PASS
6	2437	15.52	17.87	30	PASS
11	2462	14.75	17.11	30	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PEAK POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	13.14	22.26	30	PASS
6	2437	11.21	20.62	30	PASS
11	2462	10.43	20.09	30	PASS

802.11n HT20

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PEAK POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	14.03	22.25	30	PASS
6	2437	12.20	20.64	30	PASS
11	2462	11.22	19.75	30	PASS

802.11n HT40

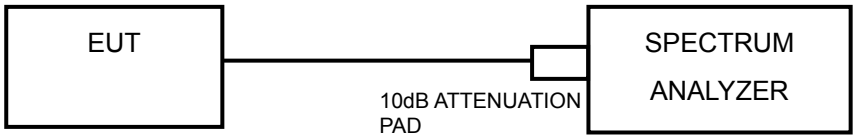
CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PEAK POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
3	2422	13.06	21.45	30	PASS
6	2437	12.00	20.85	30	PASS
9	2452	10.70	19.54	30	PASS

4.4 POWER SPECTRAL DENSITY MEASUREMENT

4.4.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

4.4.4 TEST PROCEDURE

1. Set the RBW = 100 kHz, VBW =300 kHz, Detector = peak.
2. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
3. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(3 kHz/100kHz)

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.4.7 TEST RESULTS

802.11b

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-11.27	8	PASS
6	2437	-10.55	8	PASS
11	2462	-11.10	8	PASS

802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-8.47	8	PASS
6	2437	-9.27	8	PASS
11	2462	-10.18	8	PASS

802.11n HT20

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-8.28	8	PASS
6	2437	-9.68	8	PASS
11	2462	-10.88	8	PASS

802.11n HT40

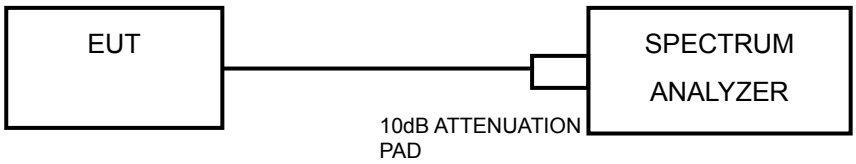
Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
3	2422	-9.11	8	PASS
6	2437	-9.58	8	PASS
9	2452	-10.35	8	PASS

4.5 OUT OF BAND EMISSION MEASUREMENT

4.5.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

4.5.4 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Set span to encompass the spectrum to be examined.
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

4.5.5 DEVIATION FROM TEST STANDARD

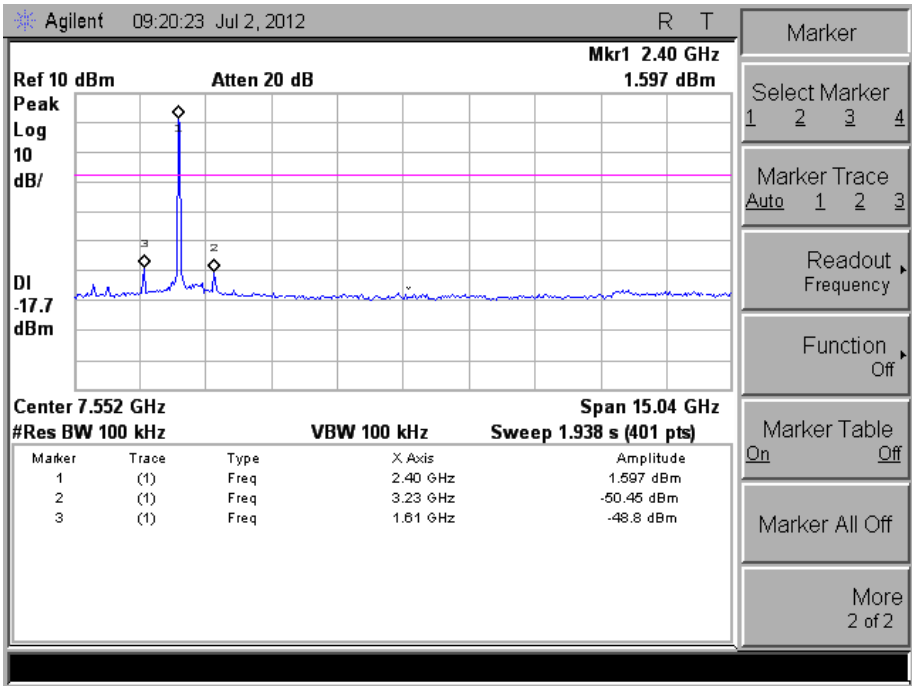
No deviation.

4.5.6 EUT OPERATING CONDITION

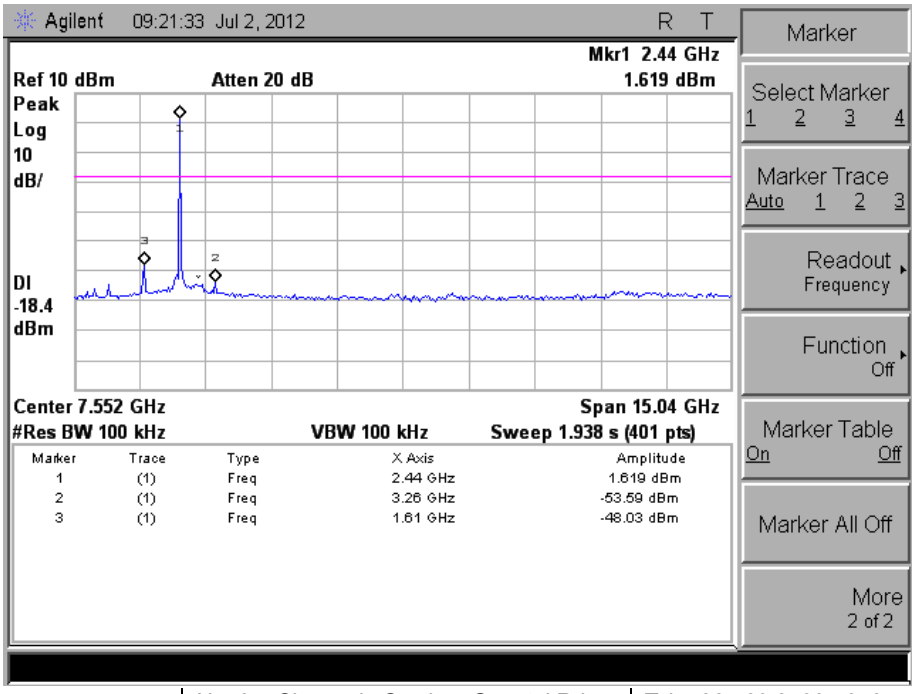
Same as Item 4.3.6

4.5.7 TEST RESULTS

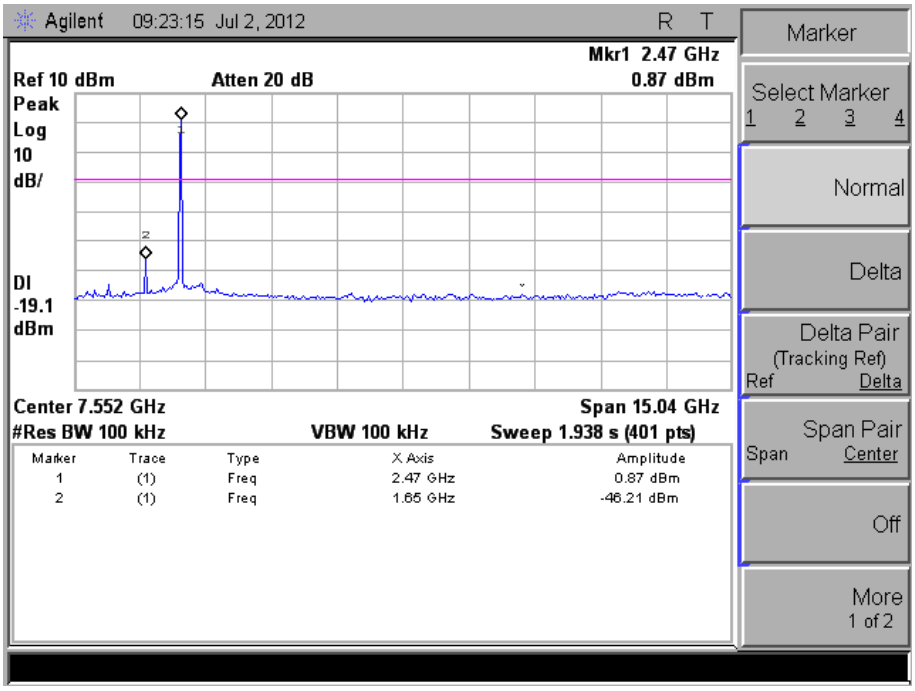
802.11b- CH 1



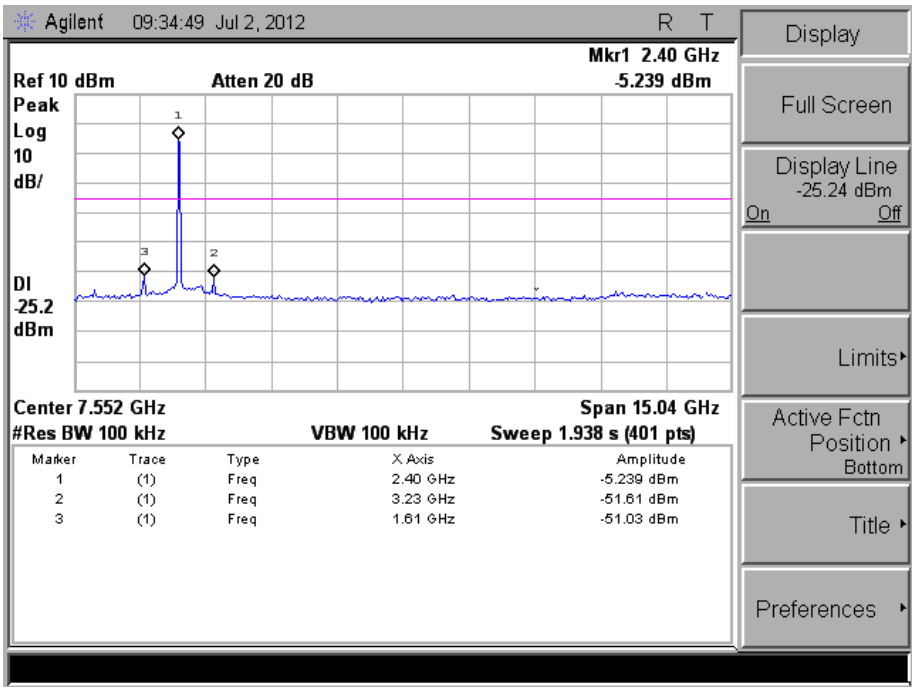
802.11b- CH 6



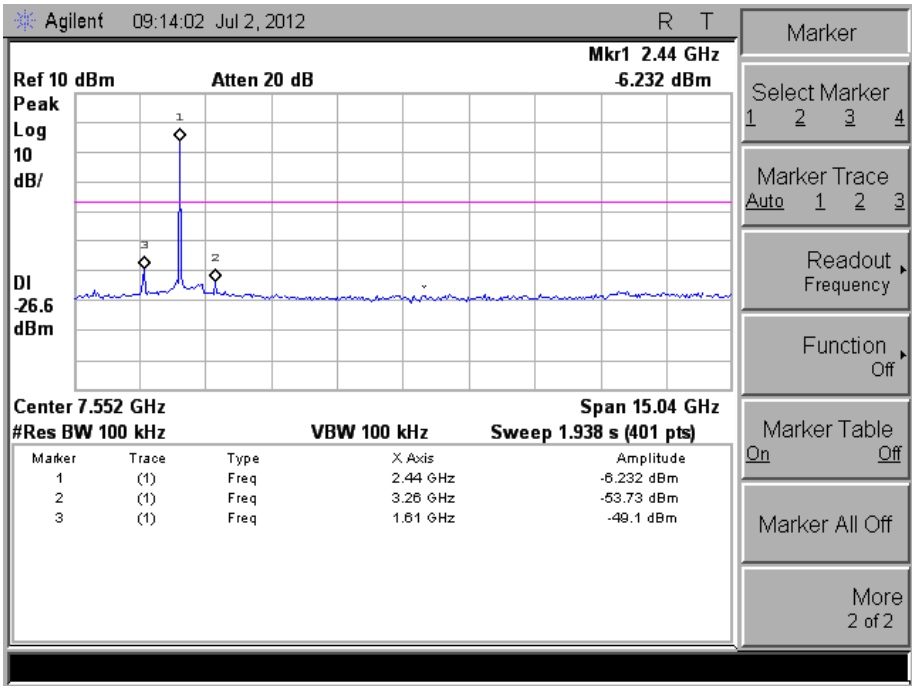
802.11b- CH 11



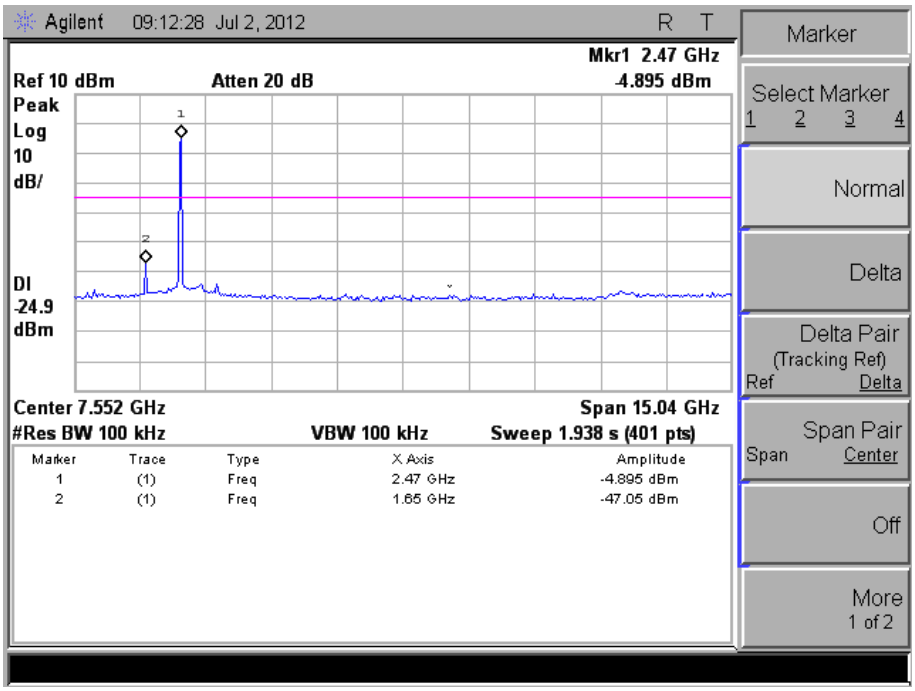
802.11g- CH 1



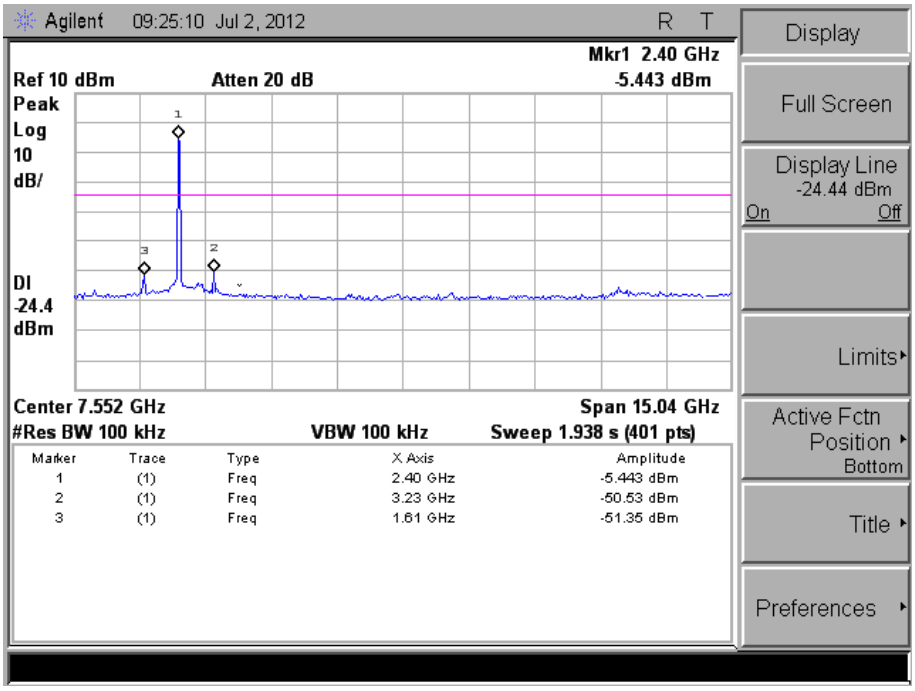
802.11g- CH 6



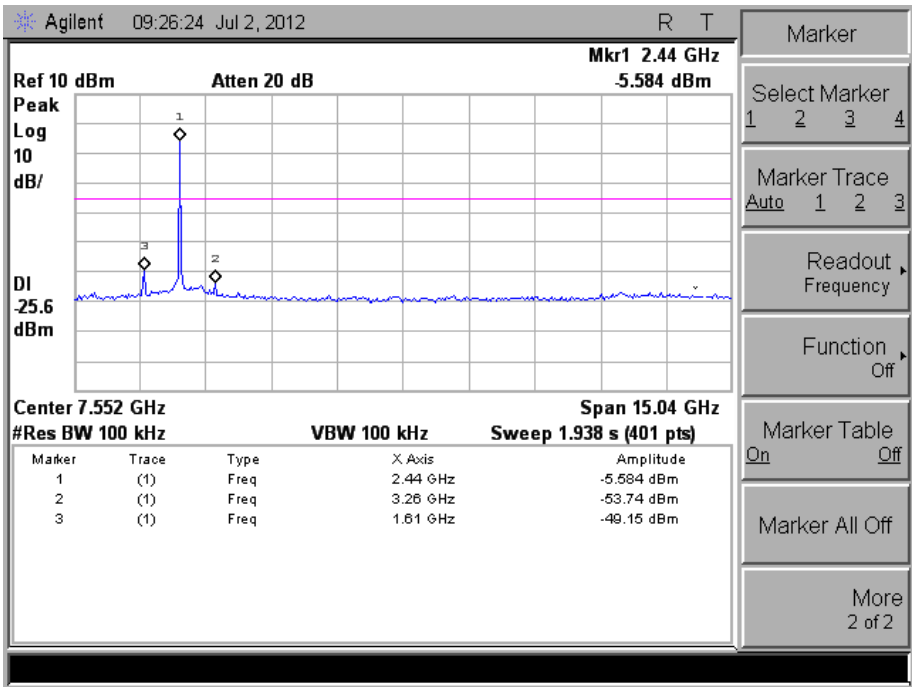
802.11g- CH 11



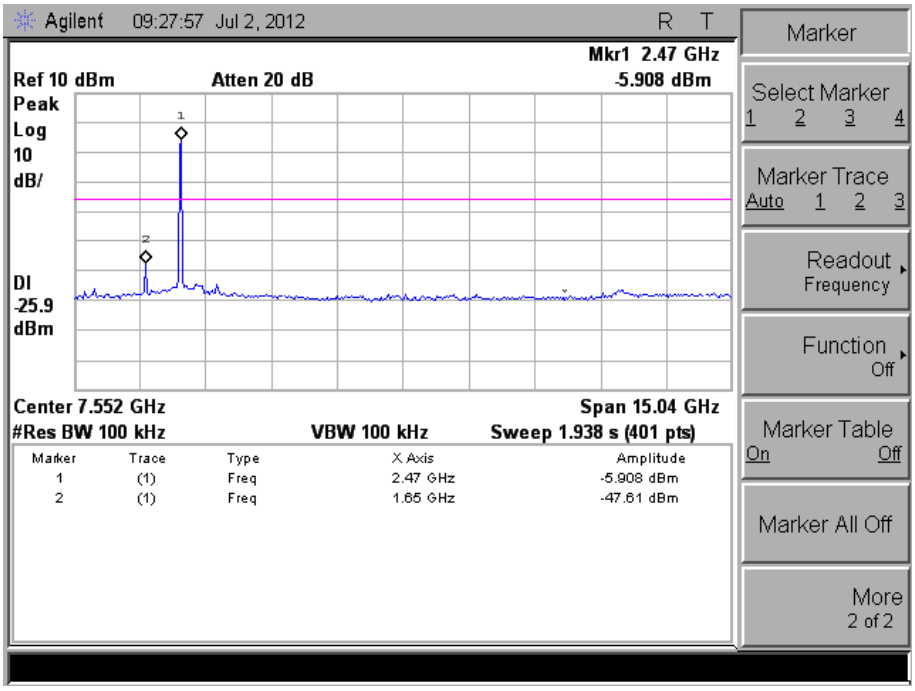
802.11n HT20- CH 1



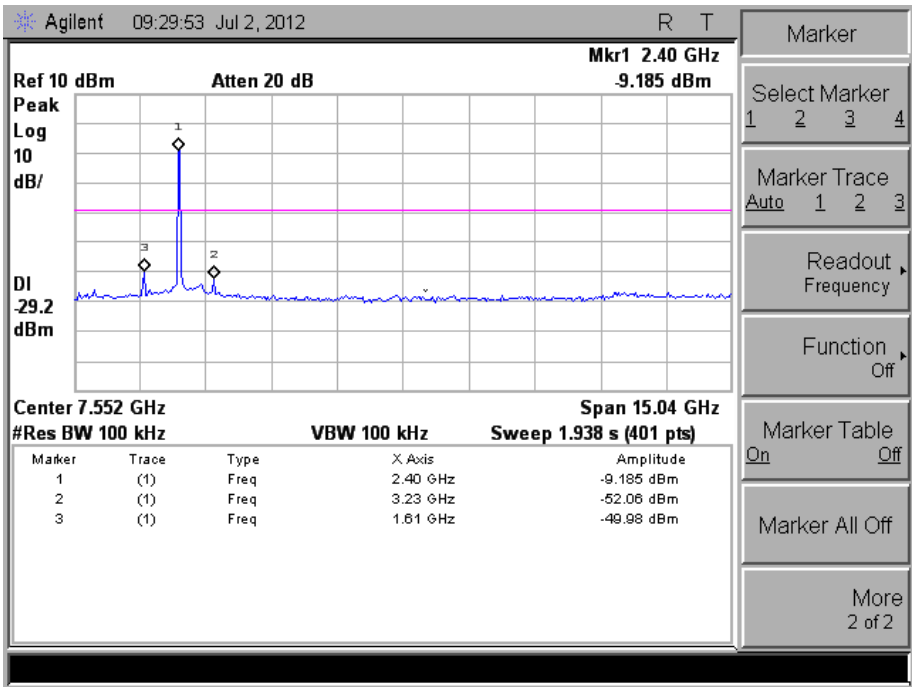
802.11n HT20- CH 6



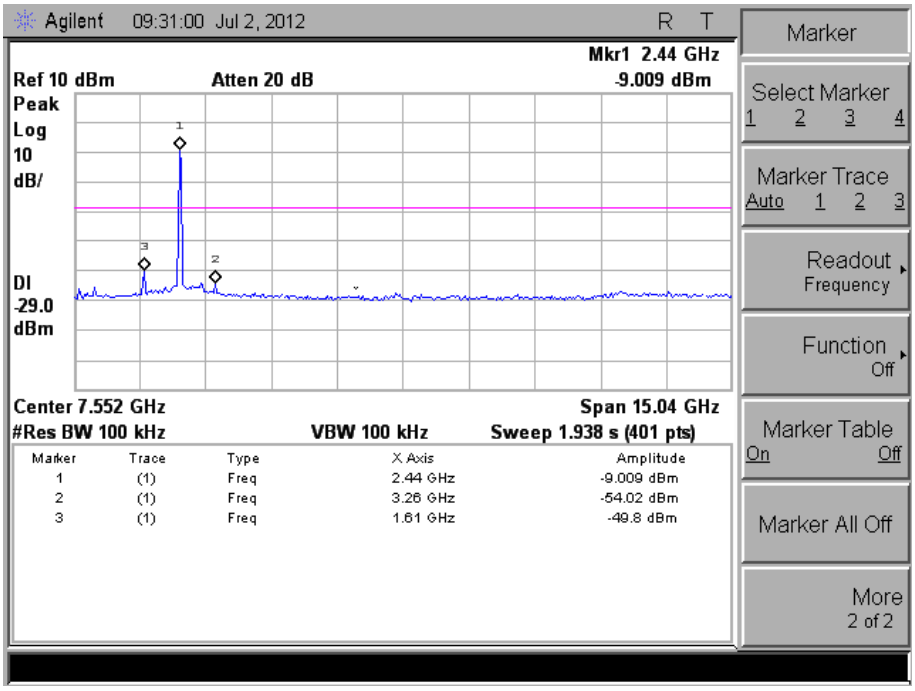
802.11n HT20- CH 11



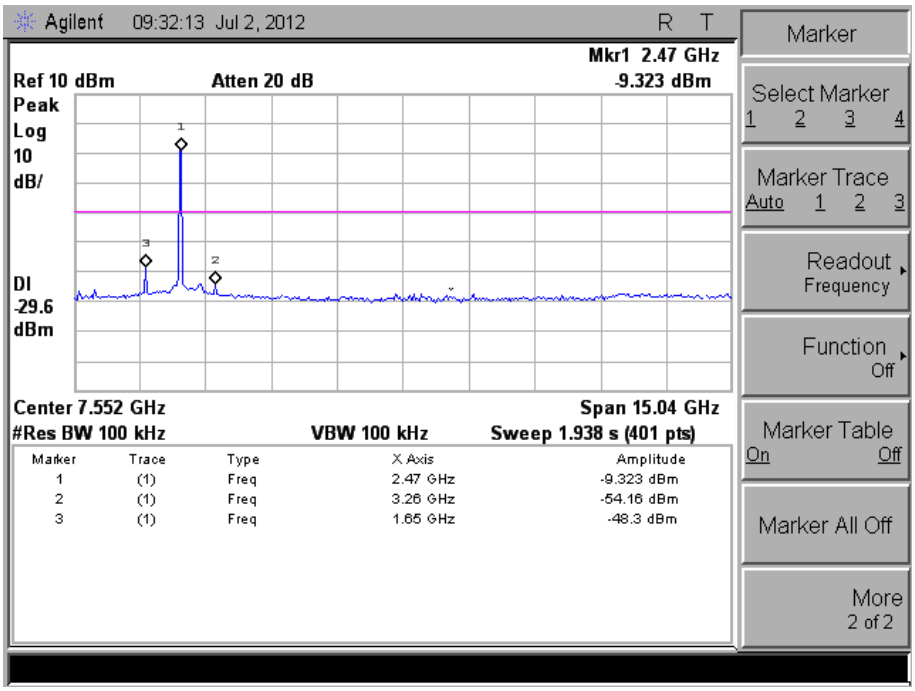
802.11n HT40- CH 3



802.11n HT40- CH 6



802.11n HT40- CH 9



5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---