

TEST REPORT

To:	Zoom Telephonics, Inc
Address:	Zoom Telephonics, Inc., 207 South Street, Boston, MA 02111 USA

Manufacturer or Supplier	ZOOM TELEPHONICS, INC	
Location	Zoom Telephonics, Inc., 207 South Street, Boston, MA 02111 USA	
Product	ZOOM ADSL MODEM/ROUTER W/ WIRELESS-N	
Model	SERIES 1093 MODEL 5790XY WHERE X=A,B,C,D,E,F OR NOTHING AND Y=G,H,J,K,L,M OR NOTHING	
Tested Sample	Engineering sample	
Date of tests	Jun. 11 ~ Jul. 10 , 2011	

☒ FCC Part 15, Subpart C (Section 15.247)

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

Prepared by Jade Yang Specialist / EMC Department	Approved by Sam Tung Manager / EMC Department
	 Date: Sep. 30, 2011

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FC110517N41	N/A	Jul. 19, 2011
FC110721N017	Change the model number, appearance color, applicant and manufacturer information	Sep. 30, 2011

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	PASS	Meet the requirement of limit. Minimum passing margin is -10.98dB at 0.1856 MHz.
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -2.42dB at 42.22MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	External Antenna: Antenna connector is R-SMA not a standard connector.

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	2.56dB
Radiated emissions	30MHz~ 1GHz	3.58dB
	1GHz ~ 40GHz	3.56dB

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	ZOOM ADSL MODEM/ROUTER W/ WIRELESS-N
MODEL NO.	SERIES 1093 MODEL 5790XY WHERE X=A,B,C,D,E,F OR NOTHING AND Y=G,H,J,K,L,M OR NOTHING
FCC ID	BDN1093WL
NOMINAL VOLTAGE	9dc (Adapter)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300Mbps
OPERATING FREQUENCY	2.4GHz: 2412.0 ~ 2462.0MHz
NUMBER OF CHANNEL	2.4GHz: 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
OUTPUT POWER	215.54mW for 2412.0 ~ 2462.0MHz
ANTENNA TYPE	5.1dBi gain
DATA CABLE	RJ11 Line:Unshielded,Detachable,3.8m
I/O PORTS	RJ45,RJ11
ACCESSORY DEVICES	Adapter

NOTE:

1. The frequency bands used in this EUT are listed as follows:

FREQUENCY BAND (MHz)	2412~2462
802.11b	√
802.11g	√
802.11n (20MHz)	√
802.11n (40MHz)	√

2. The EUT provides two completed transmitters and two receivers.

MODULATION MODE	TX FUNCTION
802.11b	1TX 1RX
802.11g	1TX 1RX
802.11n (20MHz)	2TX 2RX
802.11n (40MHz)	2TX 2RX

3. The EUT was powered by the following adapters:

ADAPTER	
BRAND:	TENDA
MODEL:	TEA09U-09100
P/N:	332-10166-01
INPUT:	100~240V 50/60Hz 0.3A
OUTPUT:	9dc, 1A
DC LINE	1.8m non-shielded cable with core

4. 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

:

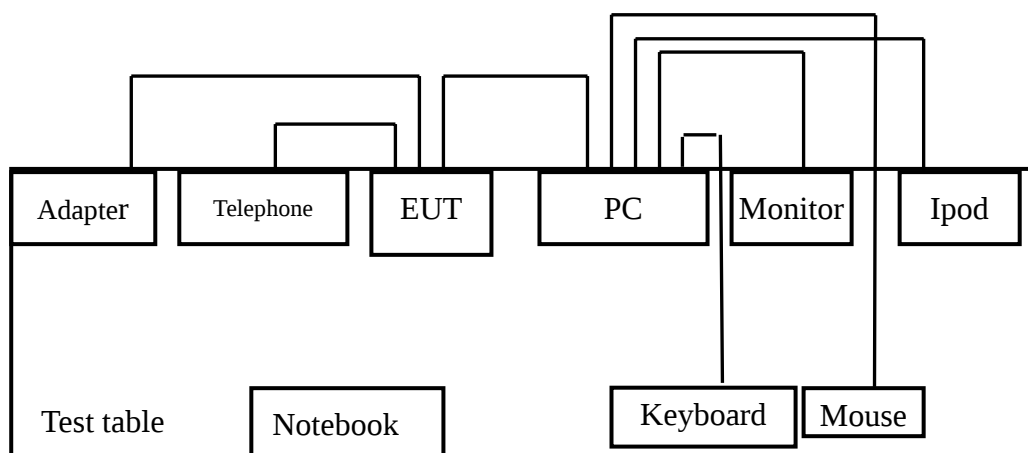
11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

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

7 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2422MHz	5	2442MHz
2	2427MHz	6	2447MHz
3	2432MHz	7	2452MHz
4	2437MHz		

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	APCM	ANTENNA	POWER SUPPLY
-	√	√	√	√	Internal	Adapter

Where **RE≥1G**: Radiated Emission above 1GHz

PLC: Power Line Conducted Emission

RE<1G: Radiated Emission below 1GHz

APCM: Antenna Port Conducted Measurement

NOTE: “-” means no effect.

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	DSSS	DBPSK	1.0	Z
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	Z
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2	Z
-	802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	15.0	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
-	802.11g	1 to 11	6	OFDM	BPSK	6.0	Z

POWER LINE 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	OFDM	BPSK	6.0

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	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	1 to 7	1, 7	OFDM	BPSK	15.0

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	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	15.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	25deg. C, 65%RH, 1019 hPa	120Vac, 60Hz	David Liu
RE<1G	23deg. C, 63%RH, 1024 hPa	120Vac, 60Hz	David Liu
PLC	22deg. C, 62%RH, 1024 hPa	120Vac, 60Hz	David Liu
APCM	23deg. C, 62%RH, 1019 hPa	120Vac, 60Hz	David Liu

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

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

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	PC	DELL	E6400	N/A	FCC DOC
2	PC	DELL	E6402	N/A	FCC DOC
3	Monitor	HP	KBT44AA	CNC8280K98	FCC DOC
4	PSII Keyboard	DELL	DXNP67	H0K00K92	FCC DOC
5	USB Mouse	DELL	SK-8115	CN-0DJ3B-91D-O AE4	FCC DOC
6	iPod	Apple	A1199	6U715B28VQ5	FCC DOC
7	Phone	Meisiqi	HCD2968	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	VGA Line:Unshielded, Detachable 1.5m LAN line:Unshielded,Detachable 3.5m
2	VGA Line:Unshielded, Detachable 1.5m LAN line:Unshielded,Detachable 3.5m
3	N/A
4	Singal Line: Unshielded, Undetachable 1.8m
5	Singal Line: Unshielded, Undetachable 1.8m
6	USB Cable:Unshielded,Detachable 0.6m
7	N/A

NOTE:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item 1~2 acted communication partners to transfer data.

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

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 Agilent	E4446A	MY46180622	Apr. 25, 2011	Apr. 24, 2012
BILOG Antenna Teseq	CBL 6111D	25758	Nov.22,2010	Nov.22,2011
HORN Antenna EMCO	3117	00085519	Nov.01,2010	Nov.01,2011
Signal Generator Rohde&Schwarz	SMF100A	101431	Jan. 12, 2011	Jan. 01, 2012
Preamplifier BURGEON	PEC-38-3018G-12 -SFF	NSEMC001	Oct.16,2010	Oct.16,2011
Preamplifier Agilent	8447D	2944A11174	May 2,2011	May 2,2012
Software ADT.	ADT_Radiated V7.5.14	NA	NA	NA
Temperature & Humidity chamber Giant Force	ITH-150-70-CP-AR	IAA0602-002	Apr. 18, 2011	Apr. 17, 2012

- 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 Chamber 10m.
 3. The horn antenna and preamplifier (model: PEC-38-3018G-12-SFF) 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 3 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.

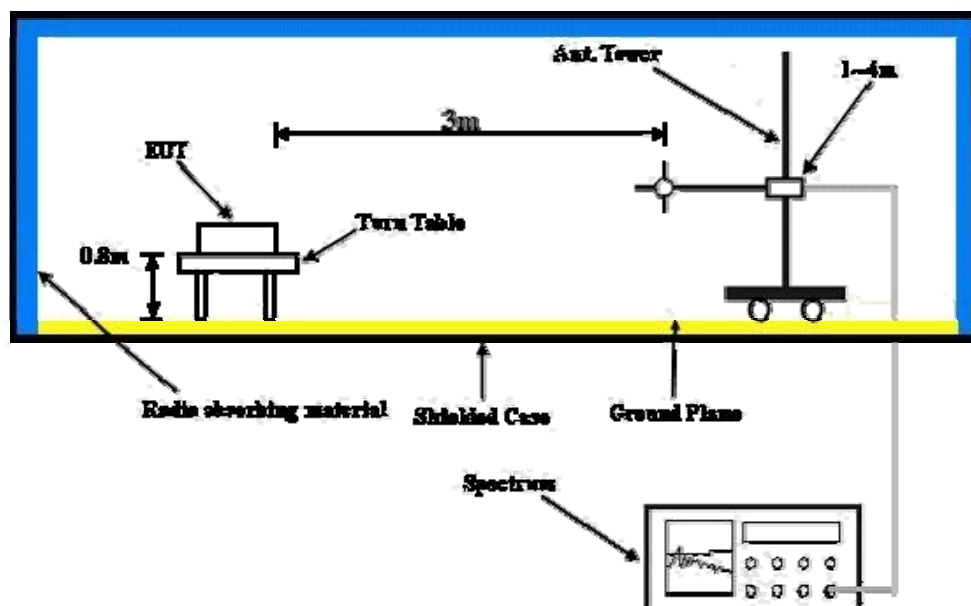
NOTE:

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 100kHz and video bandwidth is 300kHz 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

- Turned on the power of all equipment.
- EUT via a LAN cable connected to PC.
- Controlling software (provided by manufacturer) has been activated to set the EUT on specific status.
- EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.
- All Mode was running, include PHONE, LAN and wireless.

4.1.7 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA : 802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1019 hPa	TESTED BY	David Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	3520.00	56.24 PK	74.0	-17.76	151	82	13.04	43.2
2	3520.00	50.25 AV	54.0	-3.75	151	82	7.05	43.2
3	*2412.00	107.25 PK			112	201	71.13	36.12
4	*2412.00	101.21 AV			123	220	65.09	36.12
5	4824.00	56.62 PK	74.0	-17.38	121	42	8.14	48.48
6	4824.00	44.25 AV	54.0	-9.75	121	42	-4.23	48.48
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	3520.00	54.11 PK	74.0	-19.89	100	75	10.91	43.2
2	3520.00	52.00 AV	54.0	-2.00	100	75	8.8	43.2
3	*2412.00	108.02PK			150	10	71.09	36.12
4	*2412.00	102.01AV			150	10	65.89	36.12
5	4824.00	48.74 PK	74.0	-25.26	112	128	0.37	48.37
6	4824.00	36.60AV	54.0	-17.40	112	128	-11.77	48.37

- 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. “ * ”: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1019 hPa	TESTED BY	David Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	106.4 PK			100	300	69.75	36.65
2	*2437.00	99.5AV			100	300	62.85	36.65
3	3520.00	53.41 PK	74.0	-17.38	210	250	16.76	36.65
4	3520.00	40.25AV	54.0	-20.59	210	250	3.60	36.65
5	4874.00	56.62 PK	74.0	-13.75	100	42	10.2	48.48
6	4874.00	33.30 AV	54.0	-20.70	100	42	-2.95	48.48
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	103.86 PK			100	25	67.21	36.65
2	*2437.00	97.91 AV			100	25	61.26	36.65
3	4874.00	58.80 PK	74.0	-16.12	115	33	10.33	48.48
4	4874.00	45.25 AV	54.0	-21.80	115	33	-3.23	48.48

- 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. “ * ”: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1019 hPa	TESTED BY	David Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	107.82 PK			208	32	80.29	37.55
2	*2462.00	103.74 AV			208	32	73.15	37.55
3	4924.00	53.22 PK	74.0	-20.78	210	33	4.73	48.49
4	4924.00	35.50 AV	54.0	-18.50	210	33	-12.99	48.49
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	117.03 PK			100	0	79.48	37.55
2	*2462.00	104.74 AV			100	0	57.19	37.55
3	3520.00	55.20 PK	74.0	-18.6	210	250	12.20	43.20
4	3520.00	52.00 AV	54.0	-2.00	210	250	8.80	43.20
5	4924.00	56.76 PK	74.0	-17.24	105	29	8.27	48.49
6	4924.00	45.20 AV	54.0	-8.80	105	29	-3.29	48.49

- 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. “ * “: Fundamental frequency.

802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1019 hPa	TESTED BY	David Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2412.00	108.08 PK			210	64	79.52	36.12
2	*2412.00	101.80AV			210	64	70.27	36.12
3	4824.00	55.00 PK	74.0	-19.00	120	150	6.63	48.37
4	4824.00	40.00AV	54.0	-14.00	120	150	-8.37	48.37
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2412.00	114.80 PK			210	15	78.68	36.12
2	*2412.00	96.63 AV			210	15	60.51	36.12
3	4824.00	57.04	74.0	-16.96	120	160	10.45	48.37
4	4824.00	42.10	54.0	-11.90	120	160	-6.17	48.37

- 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. “ * “: Fundamental frequency.



BUREAU
VERITAS

Test Report No.: FC110721N017

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1019 hPa	TESTED BY	David Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	115.6 PK			100	55	78.95	36.65
2	*2437.00	106.11AV			100	55	69.46	36.65
3	4874.00	60.40 PK	74.0	-13.60	114	55	11.93	48.48
4	4874.00	48.36 AV	54.0	-5.64	114	55	-0.12	48.48
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	115.49 PK			105	27	78.84	36.65
2	*2437.00	97.62 AV			105	27	60.97	36.65
3	4874.00	55.00 PK	74.0	-19.00	100	360	6.52	48.48
4	4874.00	42.30 AV	54.0	-11.70	100	360	-6.18	48.48

- 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. “ * ”: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1019 hPa	TESTED BY	David Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	109.90 PK			103	66	75.32	37.55
2	*2462.00	96.57 AV			103	66	59.02	37.55
3	4924.00	58.44 PK	74.0	-15.56	100	62	9.95	48.49
4	4924.00	40.00 AV	54.0	-14.00	100	62	-8.49	48.49
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.20 PK			120	0	72.65	37.55
2	*2462.00	97.25 AV			120	0	59.70	37.55
3	4924.00	57.00 PK	74.0	-17.00	100	80	8.52	48.49
4	4924.00	36.00 AV	54.0	-18.00	100	80	-12.48	48.49

- 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. “ * ”: Fundamental frequency.

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1019 hPa	TESTED BY	David Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
3	*2412.00	105.64 PK			100	60	69.52	36.12
4	*2412.00	101.31 AV			100	60	65.19	36.12
5	4824.00	53.22 PK	74.0	-20.78	200	100	4.85	48.37
6	4824.00	39.25 AV	54.0	-14.75	200	100	-9.12	48.37
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
3	*2412.00	108.10 PK			140	25	71.98	36.12
4	*2412.00	101.68 AV			140	25	65.56	36.12
5	4824.00	57.04 PK	74.0	-16.96	100	220	8.67	48.37
6	4824.00	42.10 AV	54.0	-11.90	100	220	-6.27	48.37

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. “ * ”: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1019 hPa	TESTED BY	David Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	107.56 PK			200	10	70.91	36.65
2	*2437.00	93.98 AV			200	10	57.33	36.65
3	4874.00	56.78 PK	74.0	-17.22	100	20	8.30	48.48
4	4874.00	43.20 AV	54.0	-10.80	100	20	-5.28	48.48
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	108.83 PK			100	91	72.18	36.65
2	*2437.00	94.00 AV			100	91	57.35	36.65
3	4874.00	53.27 PK	74.0	-20.73	100	50	4.90	48.48
4	4874.00	35.00 AV	54.0	-19.00	100	50	-13.37	48.48

- 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. “ * ”: Fundamental frequency.



BUREAU
VERITAS

Test Report No.: FC110721N017

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1019 hPa	TESTED BY	David Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	109.25 PK			100	50	75.15	37.55
2	*2462.00	95.25 AV			100	50	66.24	37.55
3	4924.00	52.59 PK	74.0	-21.41	111	110	4.10	48.49
4	4924.00	42.20 AV	54.0	-11.80	111	110	-6.29	48.49
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.05 PK			123	10	72.5	37.55
2	*2462.00	96.44 AV			123	10	58.89	37.55
3	4924.00	57.01 PK	74.0	-16.99	100	100	8.52	48.49
4	4924.00	42.36 AV	54.0	-11.64	100	100	-6.12	48.49

- 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. “ * ”: Fundamental frequency.

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1019 hPa	TESTED BY	David Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2422.00	107.96 PK			110	60	71.70	36.26
2	*2422.00	92.60 AV			110	60	56.34	36.26
3	4844.00	52.98 PK	74.00 PK	-21.02	120	60	4.57	48.41
4	4844.00	39.65 AV	54.00 AV	-14.35	120	60	-8.76	48.41
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2422.00	106.25 PK			120	20	69.99	36.26
2	*2422.00	92.70 AV			120	20	56.50	36.26
3	4844.00	52.5 5 PK	74.00 PK	-21.45	100	50	4.12	48.41
4	4844.00	35.60 AV	54.00 AV	-18.40	100	50	-12.81	48.41

- 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. “ * “: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1019 hPa	TESTED BY	David Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
3	*2437.00	113.75 PK			100	57	77.10	36.65
4	*2437.00	102.45 AV			100	57	65.80	36.65
5	4874.00	53.46 PK	74.0	-20.54	100	50	4.99	48.48
6	4874.00	39.52 AV	54.0	-14.48	100	50	-8.96	48.48
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
3	*2437.00	107.20 PK			100	348	70.55	36.65
4	*2437.00	88.48 AV			100	348	51.83	36.65
5	4874.00	53.86 PK	74.0	-20.14	100	100	5.38	48.48
6	4874.00	36.00 AV	54.0	-18.00	100	100	-12.48	48.48

- 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. “ * ”: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1019 hPa	TESTED BY	David Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	106.10 PK			105	67	74.70	37.05
2	*2452.00	86.59 AV			105	67	62.70	37.05
3	4904.00	52.53 PK	74.0	-26.5	200	140	4.01	37.30
4	4904.00	36.70 AV	54.0	-19.9	200	140	-11.82	37.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	106.73 PK			126	0	69.68	37.05
2	*2452.00	88.90 AV			126	0	51.85	37.05
3	4904.00	57.58 PK	74.0	-16.41	100	100	9.05	37.30
4	4904.00	45.30 AV	54.0	-8.70	100	100	-3.22	37.30

- 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. “ * ”: Fundamental frequency.

BELOW 1GHz WORST-CASE DATA : 802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 63%RH 1024 hPa	TESTED BY	David Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	190.05	35.60	43.50	-7.90	300	250	25.22	10.38
2	250.00	40.25	46.00	-5.75	120	39	26.34	13.91
3	450.00	37.58	46.00	-8.42	100	30	17.58	20.00
4	640.00	42.00	46.00	-4.00	100	10	18.39	23.61
5	800.00	39.25	46.00	-6.75	101	93	13.28	25.97
6	876.00	39.00	46.00	-7.00	201	178	11.92	27.08
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	42.22	37.58	40.00	-2.42	100	341	24.20	13.38
2	105.17	36.50	43.50	-7.00	120	100	24.80	11.70
3	109.25	37.00	43.50	-6.50	111	10	24.71	12.29
4	255.36	35.66	46.00	-10.34	110	100	21.30	14.36
5	640.00	40.25	46.00	-5.75	120	290	16.64	23.61
6	801.25	39.20	46.00	-6.80	100	135	13.22	25.98

- 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 emission levels was Quasi-Peak.

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

- NOTE:** 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
EMI Test Receiver	ESCS30	100199	May 25,2011	May 25,2012
Artificial Mains Network	ESH3-Z5	100317	May 25,2011	May 25,2012
Artificial Mains Network (AUX)	ENV216	101173	May 25,2011	May 25,2012
Pulse Limiter	ESH3-Z2	100168	May 2,2011	May 2,2012
Software ADT	ADT_Cond_V7.3.7	NA	NA	NA

- 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 Shielded Room 843.

4.2.3 TEST PROCEDURES

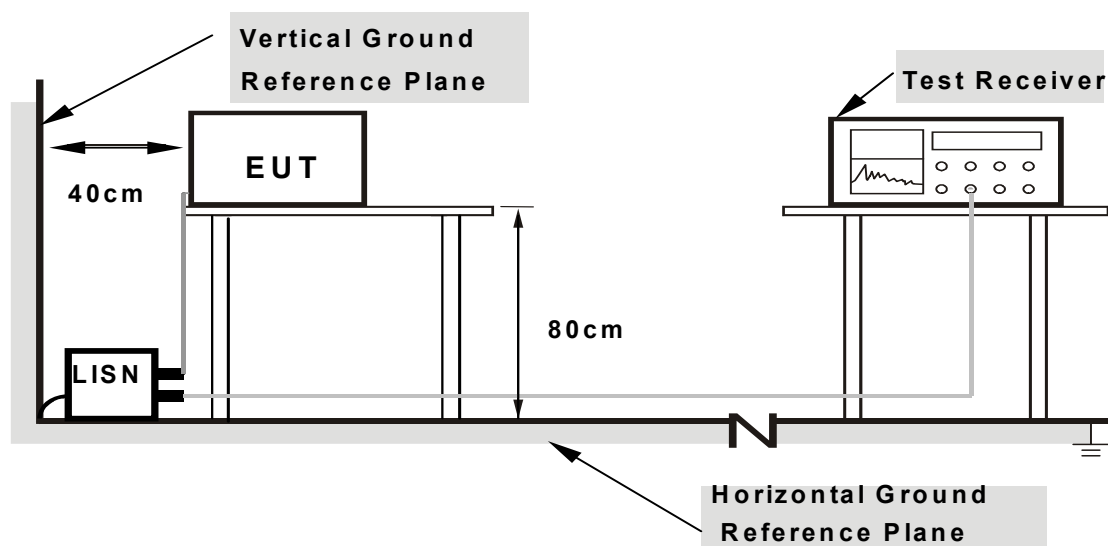
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

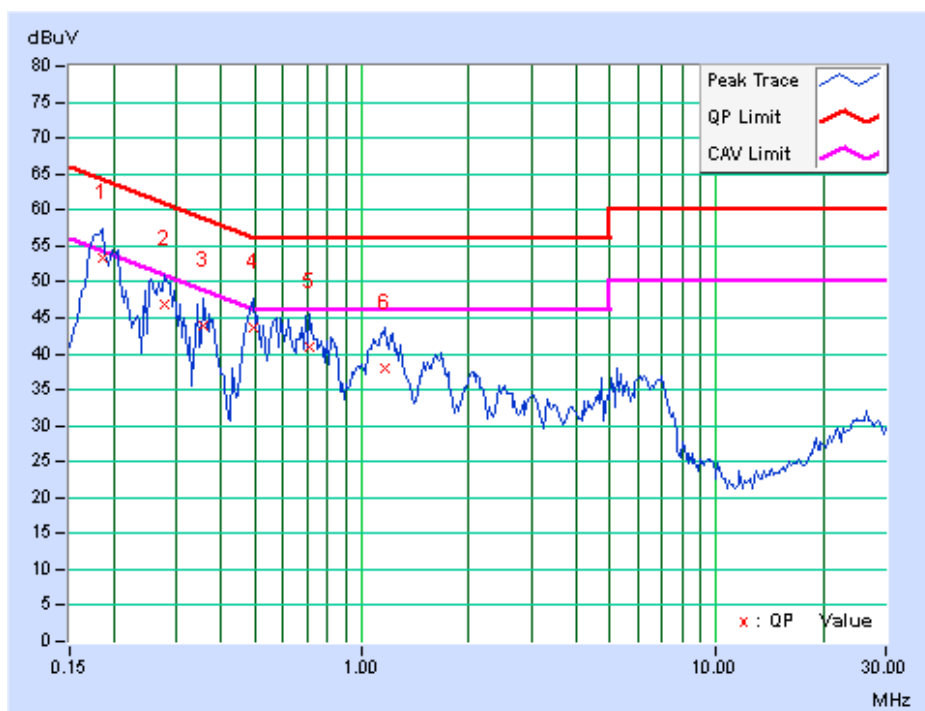
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA : 802.11g

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18516	9.64	43.63	29.90	53.27	39.54	64.25	54.25	-10.98	-14.71
2	0.27891	9.58	37.29	26.15	46.87	35.73	60.85	50.85	-13.98	-15.12
3	0.35703	9.52	34.36	21.44	43.88	30.96	58.80	48.80	-14.92	-17.84
4	0.49375	9.41	34.19	19.62	43.60	29.03	56.10	46.10	-12.50	-17.07
5	0.7125	9.72	31.31	18.24	41.03	27.96	56.00	46.00	-14.97	-18.04
6	1.15625	9.97	28.07	17.25	38.04	27.22	56.00	46.00	-17.96	-18.78

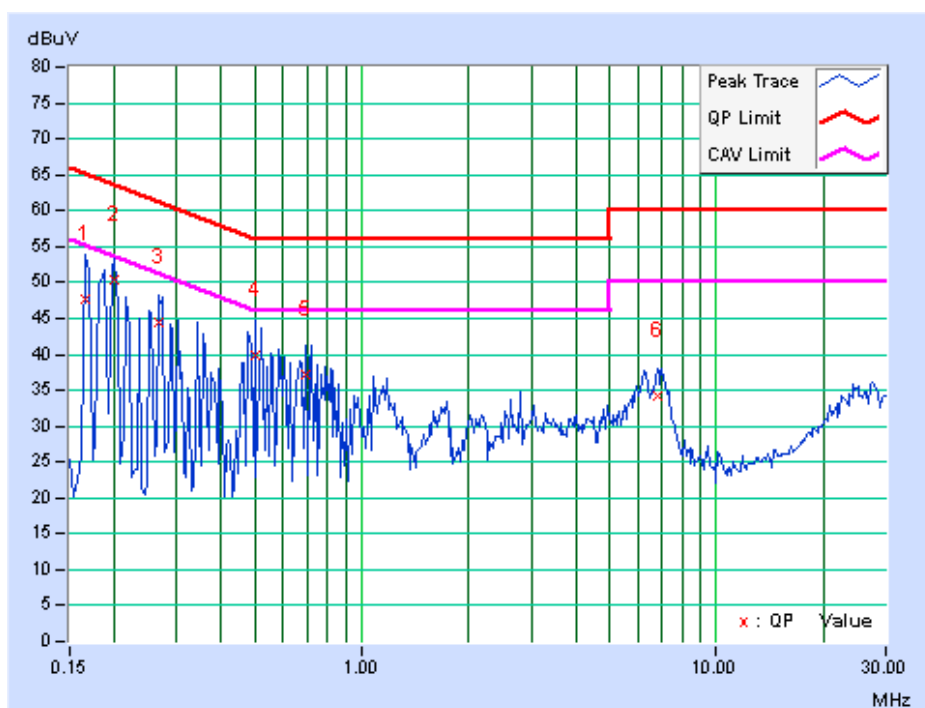
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



PHASE	Neutral	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	9.63	38.12	18.83	47.75	28.46	65.18	55.18	-17.43	-26.72
2	0.20078	9.63	40.70	23.60	50.33	33.23	63.58	53.58	-13.25	-20.35
3	0.26719	9.58	34.87	19.67	44.45	29.25	61.20	51.20	-16.75	-21.95
4	0.5000	9.41	30.35	14.49	39.76	23.90	56.00	46.00	-16.24	-22.10
5	0.69688	9.70	27.52	12.47	37.22	22.17	56.00	46.00	-18.78	-23.83
6	6.78125	10.30	23.91	13.14	34.21	23.44	60.00	50.00	-25.79	-26.56

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSL3	101507	May 25,2011	May 25,2012

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

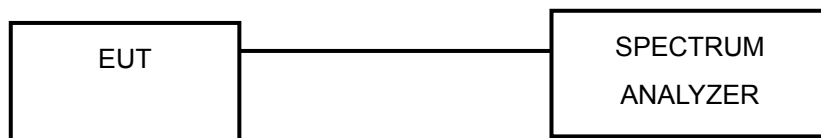
4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

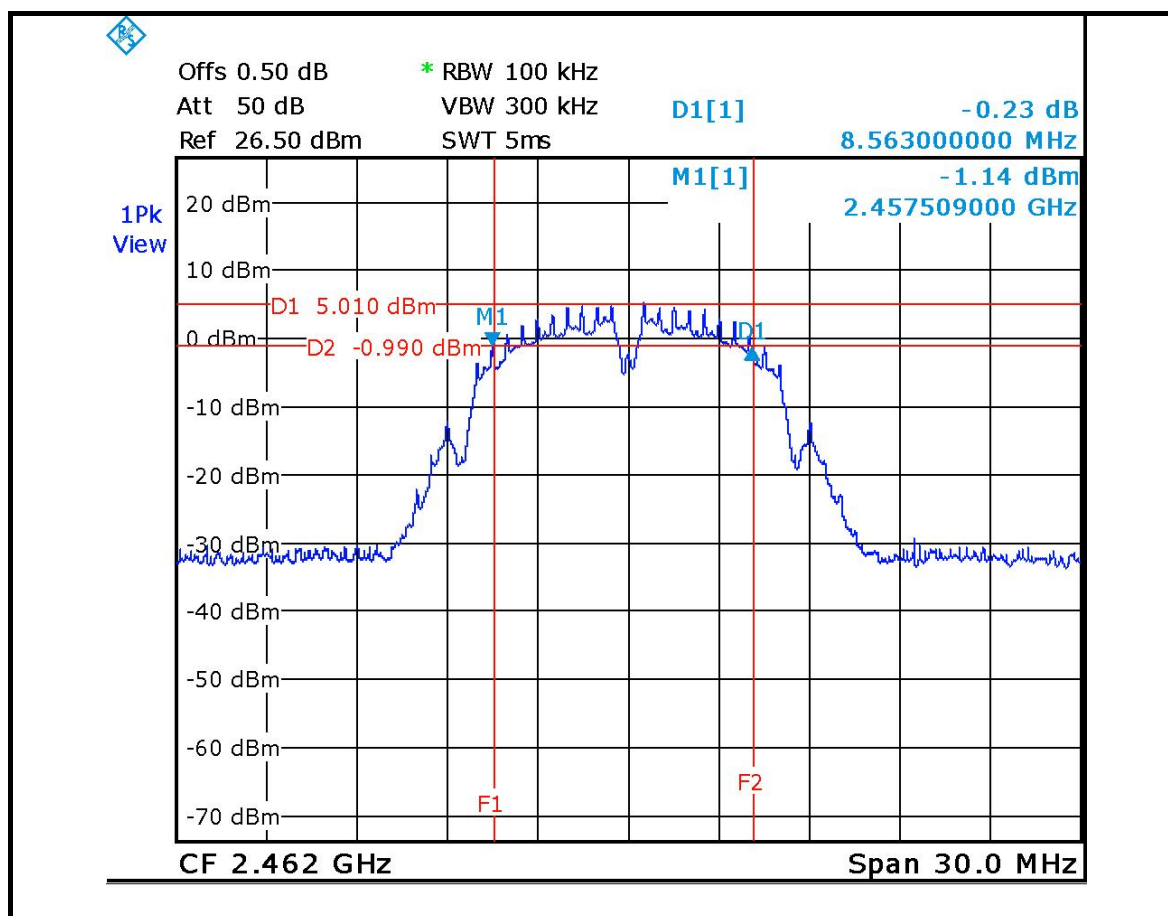
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	7.863	8.024	0.5	PASS
6	2437	7.876	8.024	0.5	PASS
11	2462	7.958	8.563	0.5	PASS

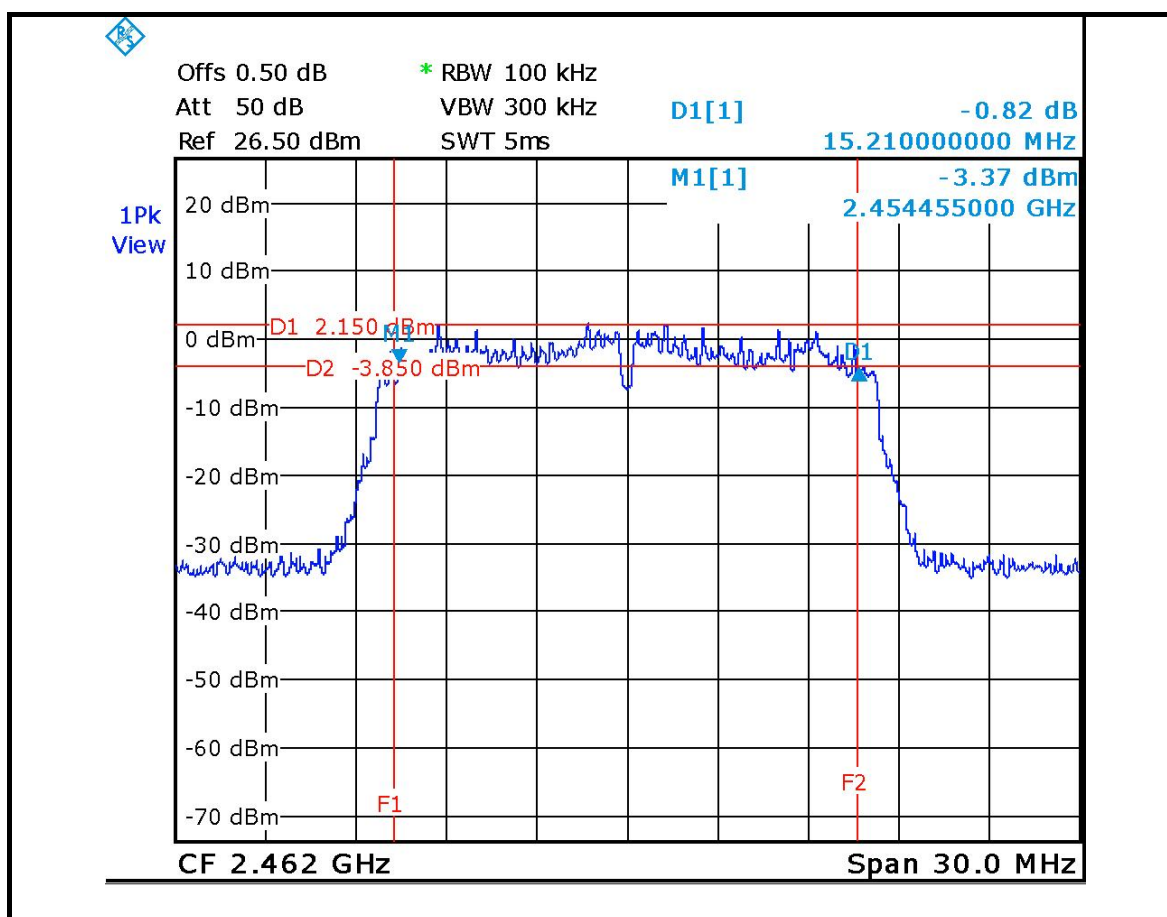
CHAIN 1: CH 11



802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	15.150	14.865	0.5	PASS
6	2437	15.156	14.798	0.5	PASS
11	2462	15.210	14.962	0.5	PASS

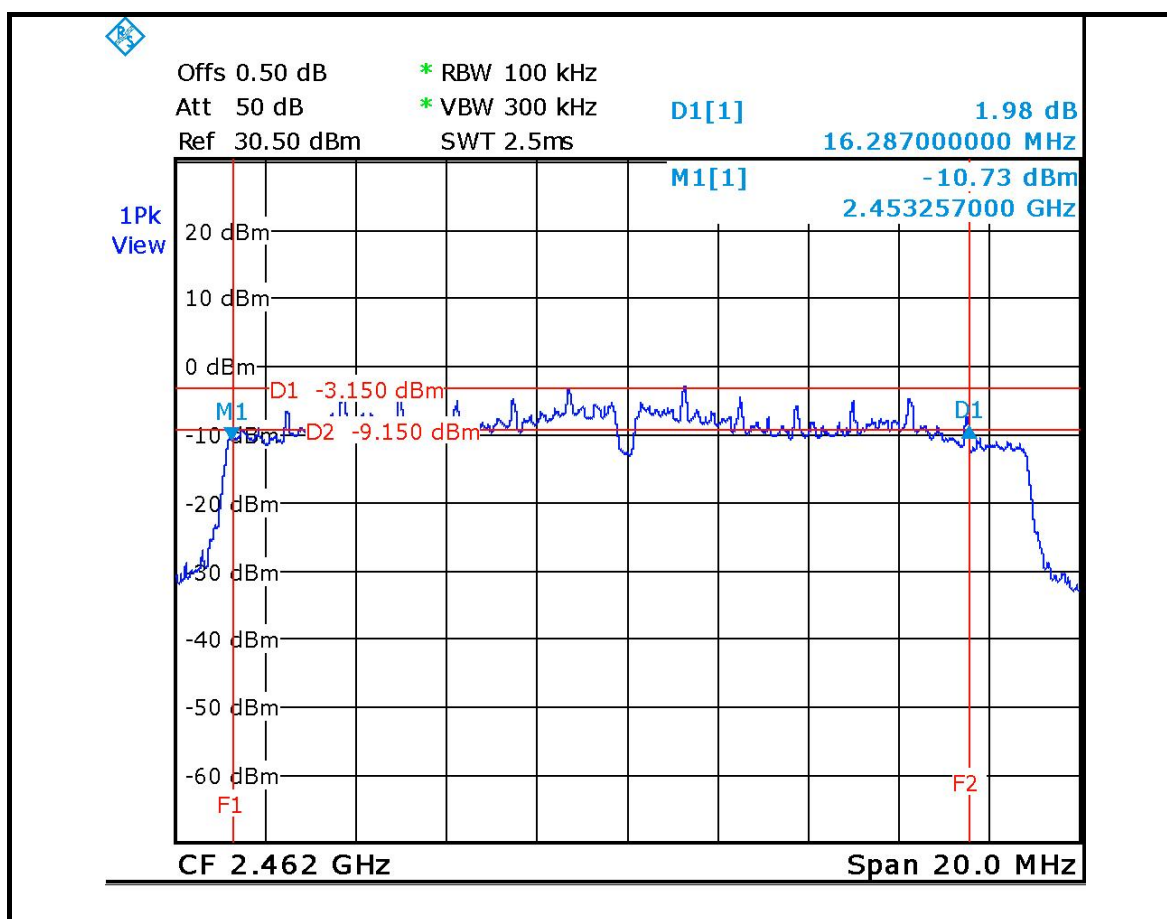
CHAIN 0: CH 11

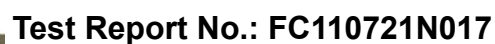


802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.048	15.694	0.5	PASS
6	2437	16.088	15.878	0.5	PASS
11	2462	16.287	16.214	0.5	PASS

FOR CHAIN 0: CH 11





CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2422	36.030	36.024	0.5	PASS
4	2437	35.830	35.597	0.5	PASS
7	2452	36.030	35.981	0.5	PASS

1Pk View

Offs 0.50 dB
Att 50 dB
Ref 30.50 dBm

* RBW 100 kHz
* VBW 300 kHz
SWT 5ms

D1[1] -0.57 dB
36.03000000 MHz

M1[1] -11.41 dBm
2.433740000 GHz

D1 -6.160 dBm
D2 -12.160 dBm

F1 F2

CF 2.452 GHz Span 50.0 MHz

4.4 MAXIMUM OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

The Maximum Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Power Meter	ML2495A	0842159	MAY 21, 2011	MAY 21, 2012
Power Sensor	MA2411B	0738365	MAY 21, 2011	MAY 21, 2012

Note:

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

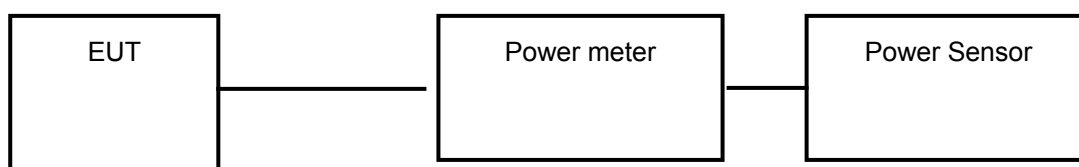
4.4.3 TEST PROCEDURES

Connect EUT's power output port and power-sense. Record the power level.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

4.4.7 TEST RESULTS

802.11b

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)		POWER (mW)	POWER LIMIT (dBm)	PASS / FAIL
		CH 0	CH1			
1	2412	17.45	17.05	55.59	30.0	PASS
6	2437	17.55	17.12	56.89	30.0	PASS
11	2462	17.76	17.33	59.70	30.0	PASS

802.11g

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)		POWER (mW)	POWER LIMIT (dBm)	PASS / FAIL
		CH 0	CH1			
1	2412	20.32	19.36	107.65	30.0	PASS
6	2437	19.91	19.25	97.95	30.0	PASS
11	2462	20.60	18.86	114.81	30.0	PASS

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (DBM)		TOTAL POWER OUTPUT (mW)	TOTAL POWER OUTPUT (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CH 0	CH1				
1	2412	20.53	20.11	215.54	23.34	30.0	PASS
6	2437	20.36	19.55	198.80	22.98	30.0	PASS
11	2462	19.23	18.58	155.86	21.93	30.0	PASS

Note: Total Power Output = CH0 level (mW) + CH1 level (mW)

802.11n (40MHz)

CHAN	CHAN. FREQ. (MHz)	POWER OUTPUT (DBM)		TOTAL POWER OUTPUT (mW)	TOTAL POWER OUTPUT (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CH 0	CH1				
1	2422	17.52	17.01	106.73	20.28	30.0	PASS
4	2437	17.22	17.03	103.19	20.14	30.0	PASS
7	2452	18.52	17.88	132.50	21.22	30.0	PASS

Note: Total Power Output = CH0 level (mW) + CH1 level (mW)

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSL3	101507	May 25, 2011	May 25, 2012

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

4.5.3 TEST PROCEDURE

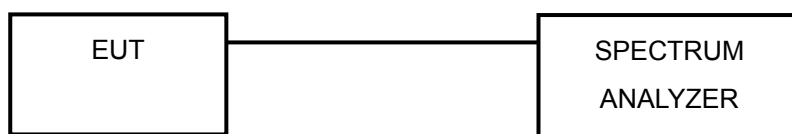
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

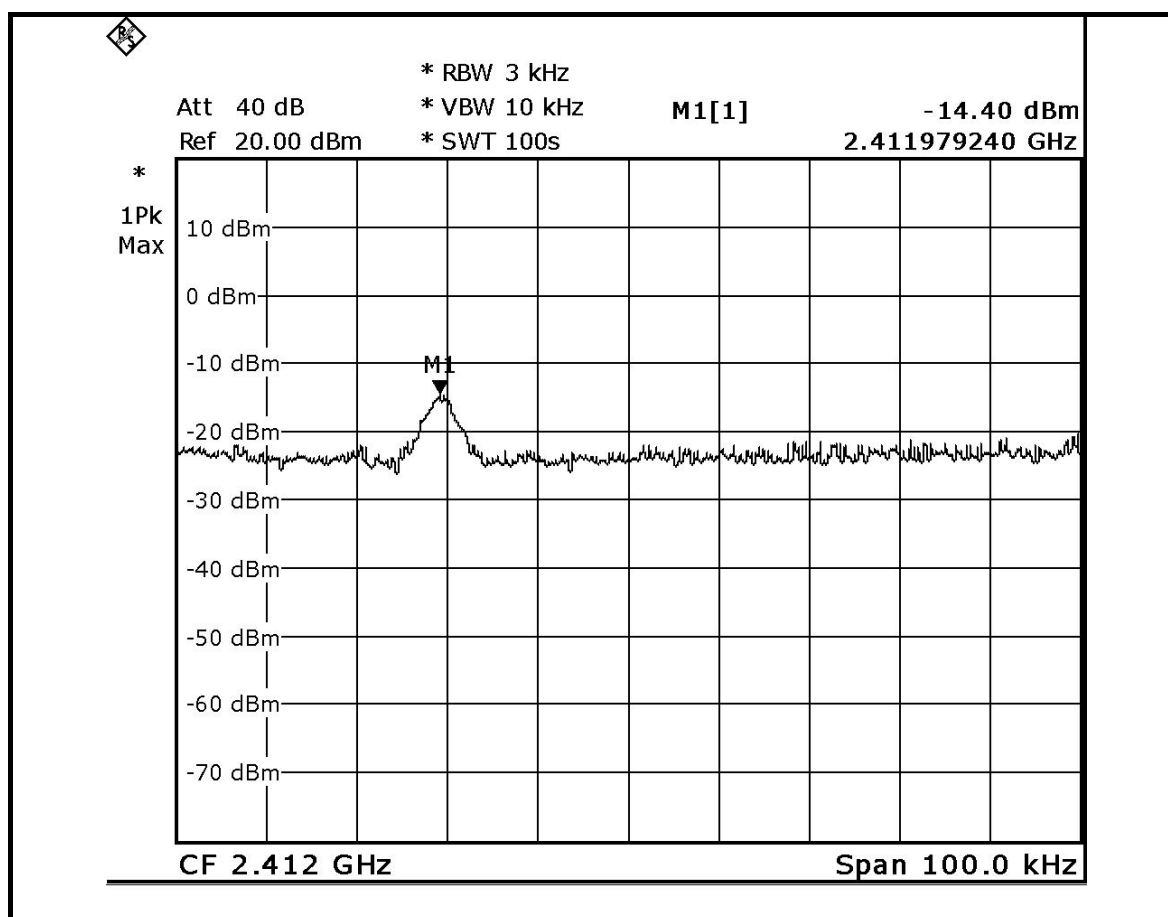
Same as Item 4.3.6

4.5.7 TEST RESULTS

802.11b

CHAN.	CHAN. FREQ. (MHz)	POWER DENSITY IN 3kHz BW (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
1	2412	-14.40	8.0	PASS
6	2437	-15.25	8.0	PASS
11	2462	-14.90	8.0	PASS

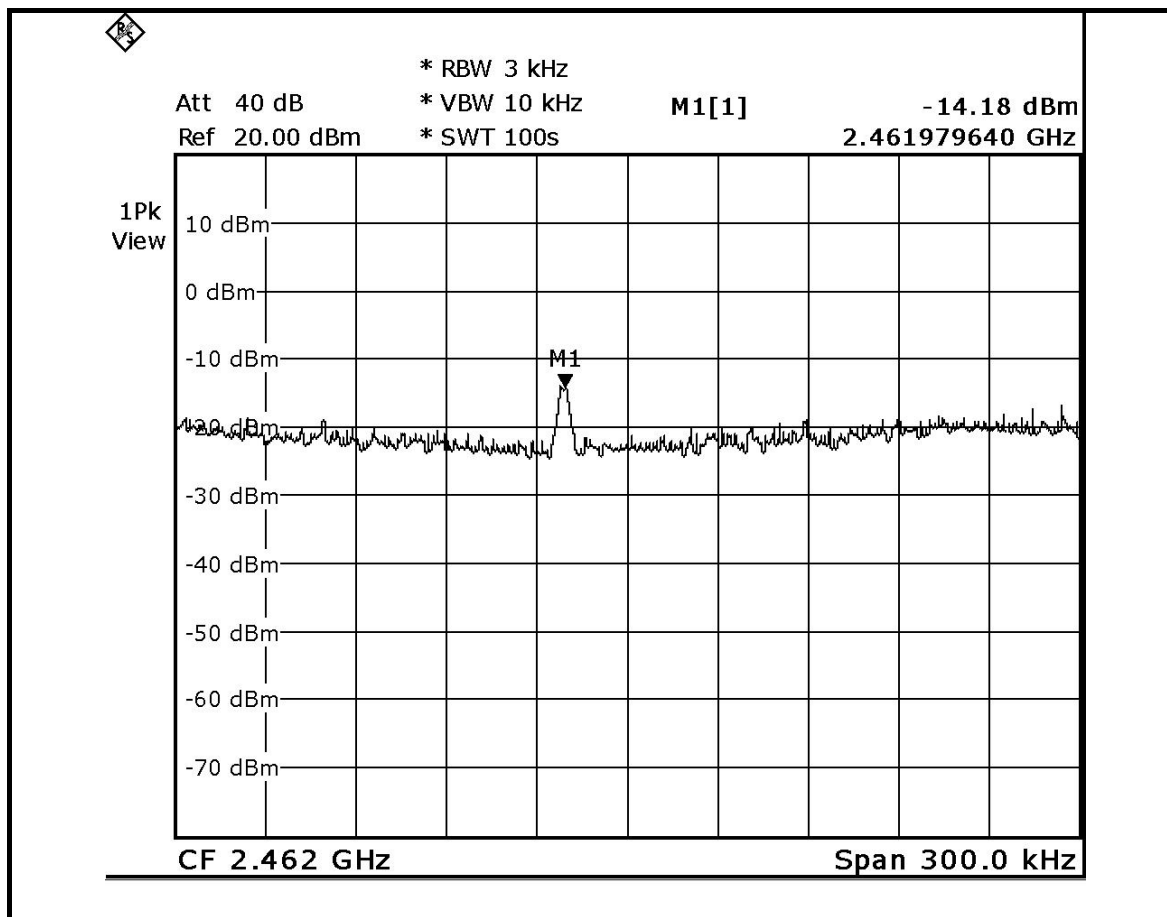
FOR CHAIN 1: CH 1



802.11g

CHAN.	CHAN. FREQ. (MHz)	POWER DENSITY IN 3kHz BW (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
1	2412	-15.39	8.0	PASS
6	2437	-15.25	8.0	PASS
11	2462	-14.18	8.0	PASS

FOR CHAIN 1: CH 11

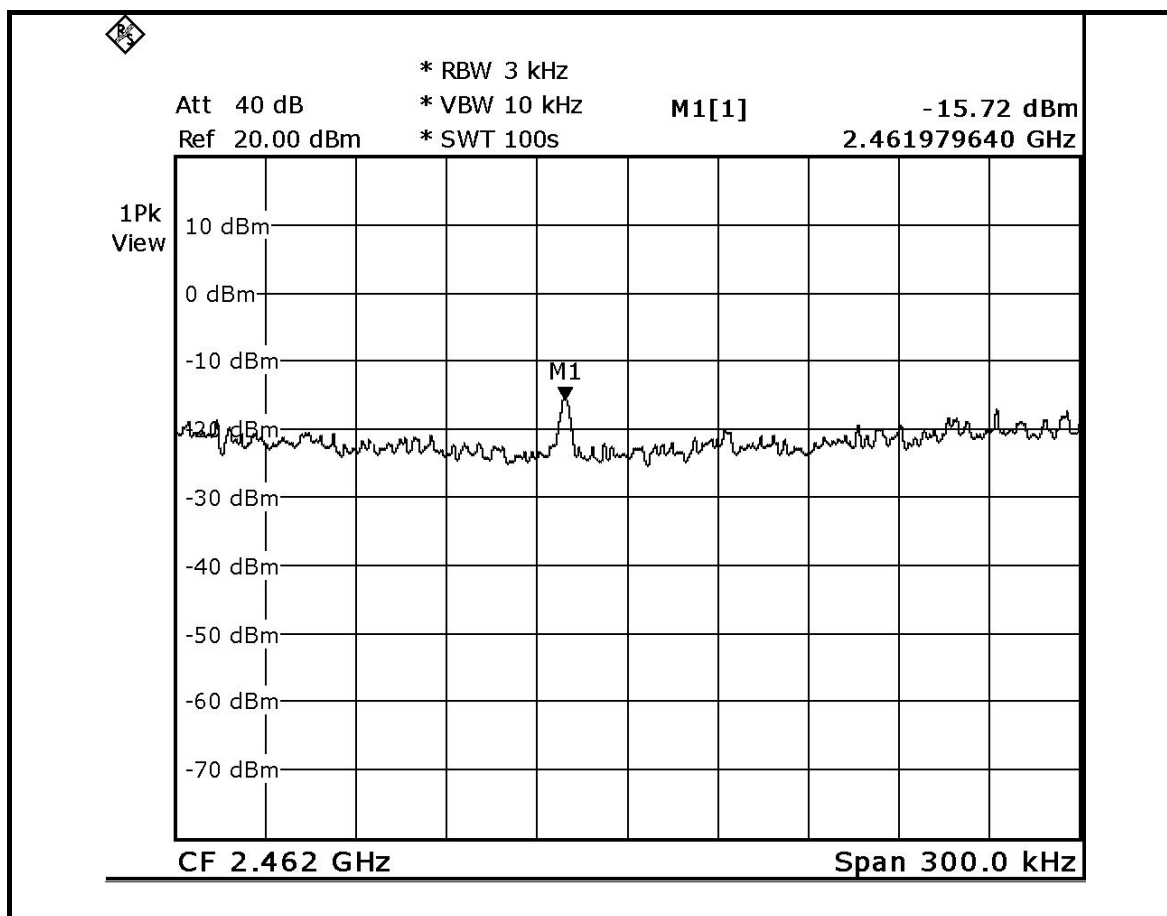


802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	TOTAL POWER DENSITY IN 3kHz BW (dBm)			MAX. LIMIT (dBm)	PASS / FAIL
		Ant1	Ant2	Total		
1	2412	-16.45	-16.93	-13.67	8.0	PASS
6	2437	-16.36	-16.89	-13.61	8.0	PASS
11	2462	-15.72	-16.27	-12.98	8.0	PASS

NOTE1: 1: Total power density =Ant1 level(mW)+Ant2 level(mW) , test report only record max level,

FOR CHAIN 1: CH 11

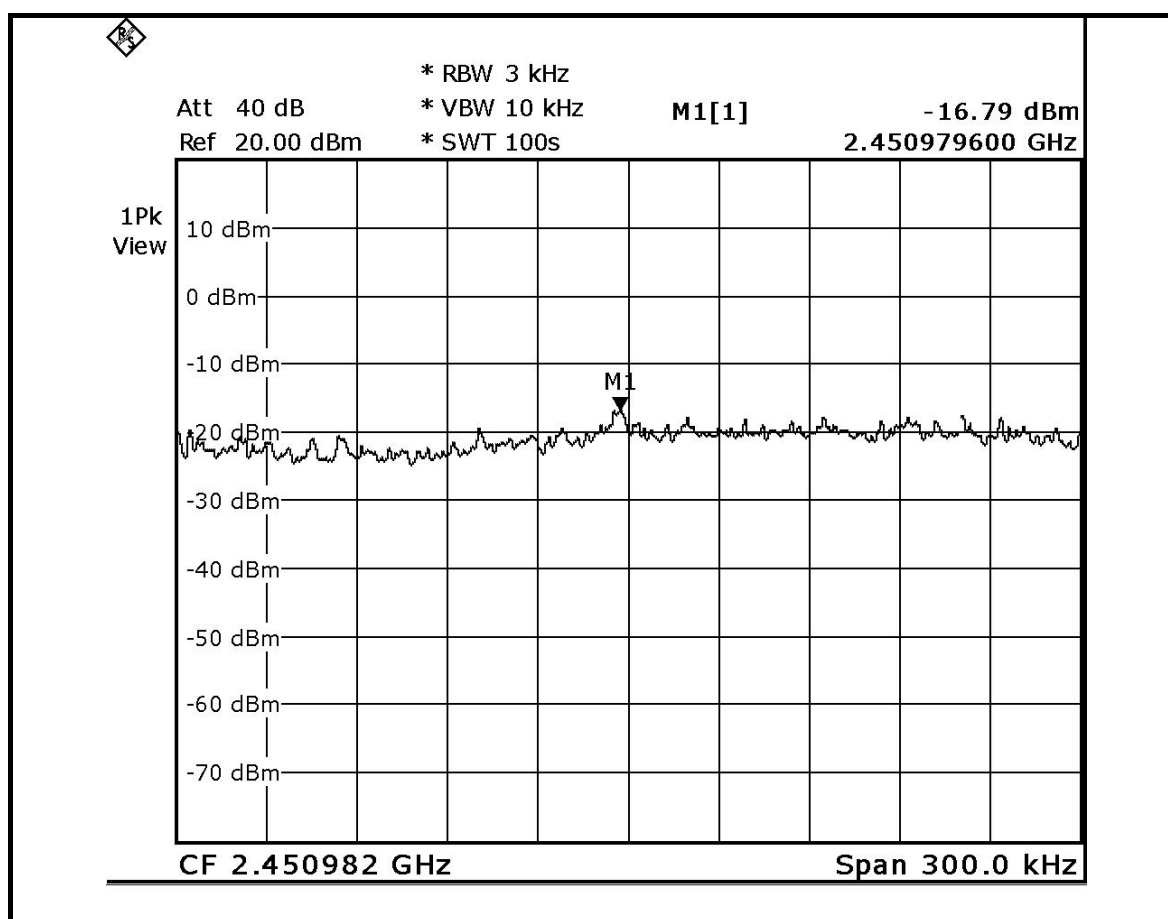


802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	TOTAL POWER DENSITY IN 3kHz BW (dBm)			MAX. LIMIT (dBm)	PASS / FAIL
		Ant1	Ant2	Total		
1	2422	-16.89	-17.14	-14.00	8.0	PASS
4	2437	-17.58	-17.87	-14.71	8.0	PASS
7	2452	-16.79	-16.93	-13.85	8.0	PASS

NOTE1: Total power density =Ant1 level(mW)+Ant2 level(mW) , test report only record max level.

FOR CHAIN 0: CH 7



4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Spectrum Analyzer ROHDE & SCHWARZ	FSL3	101507	May 25,2011	May 25,2012
Spectrum Analyzer Agilent	E4446A	MY46180622	Apr. 25, 2011	Apr. 24, 2012
BILOG Antenna Teseq	CBL 6111D	25758	Nov.22,2010	Nov.22,2011
HORN Antenna EMCO	3117	00085519	Nov.01,2010	Nov.01,2011
Signal Generator Rohde&Schwarz	SMF100A	101431	Jan. 12, 2011	Jan. 01, 2012
Preamplifier BURGEON	PEC-38-3018G-12-SFF	NSEMC001	Oct.16,2010	Oct.16,2011
Preamplifier Agilent	8447D	2944A11174	May 2,2011	May 2,2012
Software ADT.	ADT_Radiated V7.5.14	NA	NA	NA
Temperature & Humidity chamber Giant Force	ITH-150-70-CP-AR	IAA0602-002	Apr. 18, 2011	Apr. 17, 2012

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

4.6.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter 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. Set both RBW and VBW of spectrum analyzer to 100kHz and 300kHz with suitable frequency span including 100MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (Peak RBW = 100kHz, VBW = 300kHz) are attached on the following pages.

NOTE: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation.

4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6.

4.6.6 TEST RESULTS

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

802.11b

RESTRICT BAND (2310 ~ 2390 MHz)

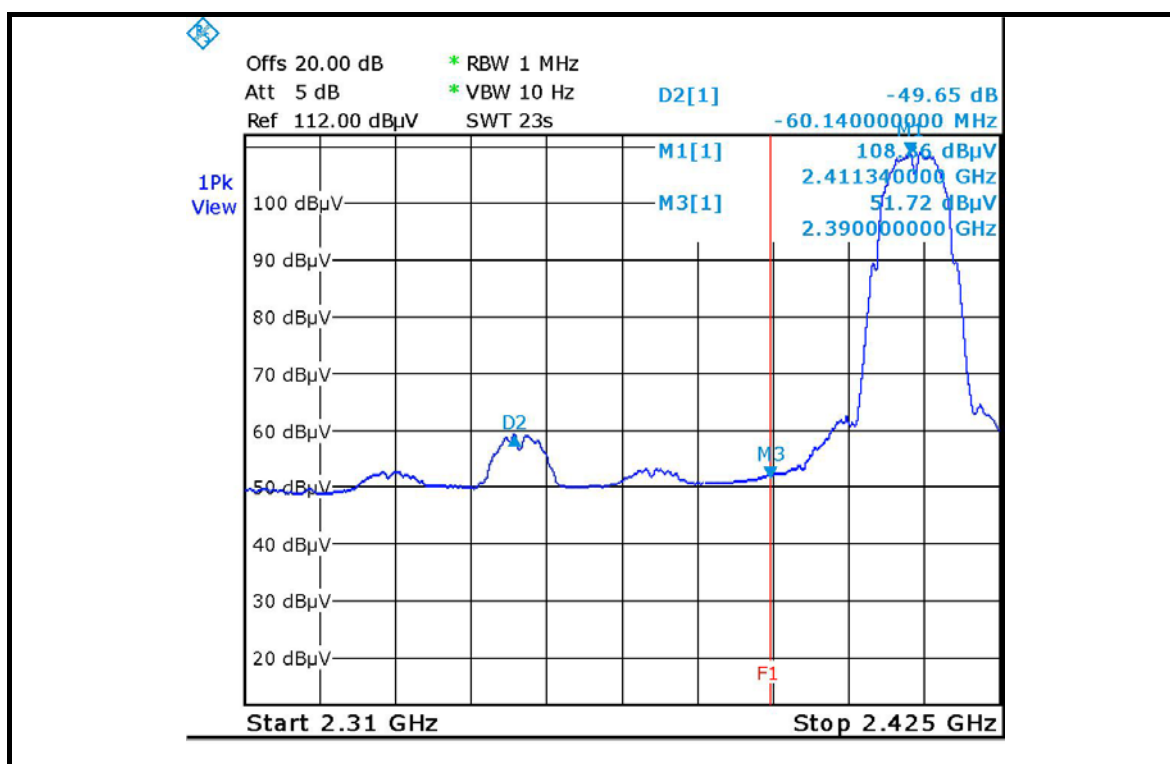
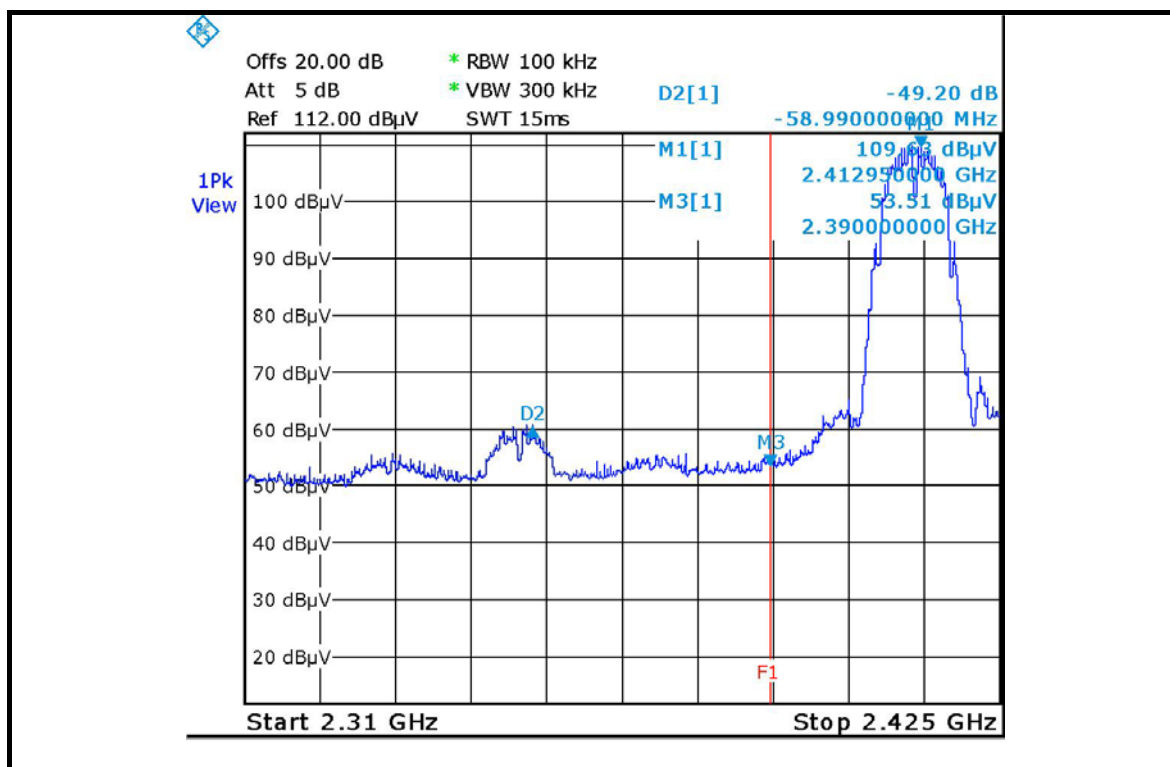
FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2412.00 (PK)	108.02	49.20	58.82	74.00
2412.00 (AV)	102.01	49.65	52.36	54.00

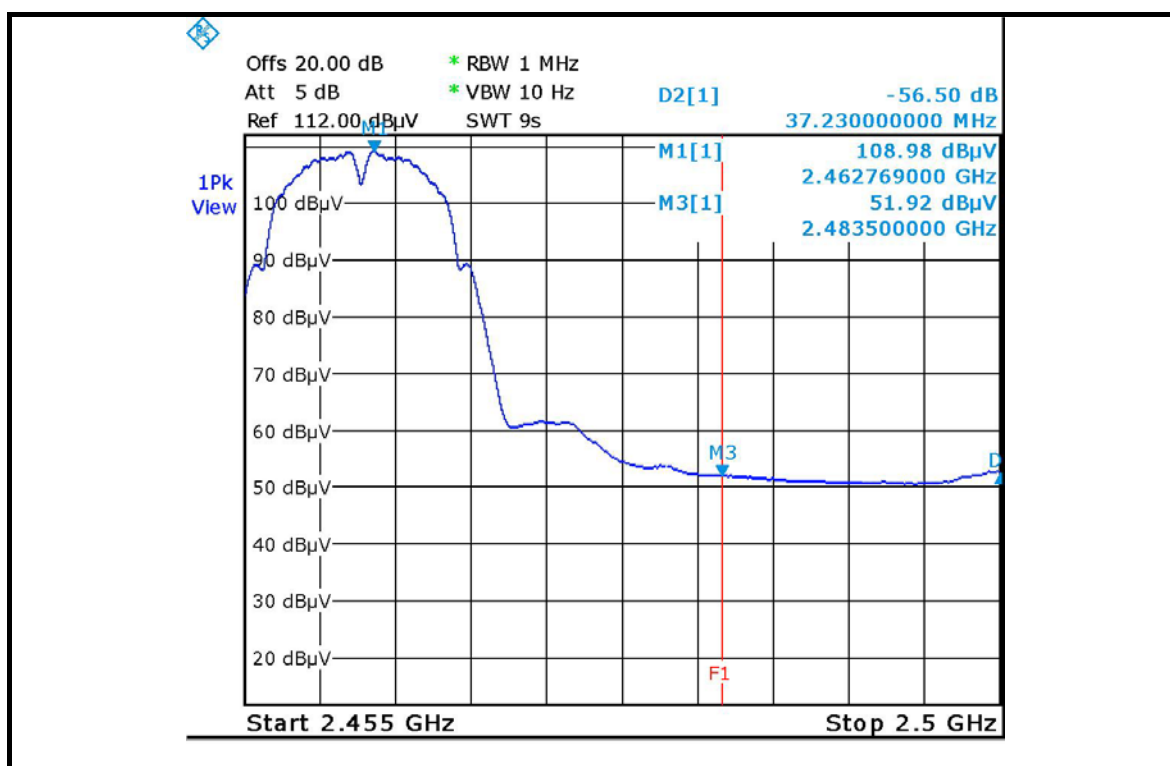
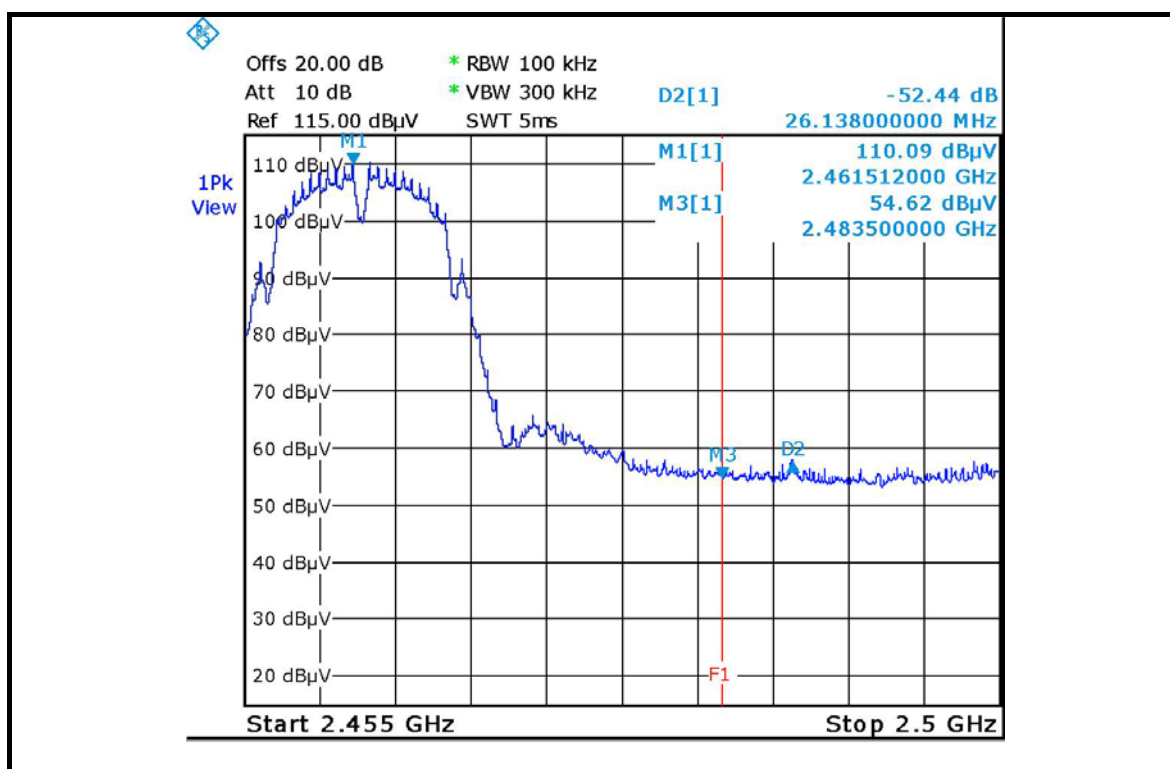
RESTRICT BAND (2483.5 ~ 2500 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2462.00 (PK)	117.03	52.44	64.59	74.00
2462.00 (AV)	104.74	56.50	48.24	54.00

NOTE:

- Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission. Please check following 2 pages.
- Maximum field strength in restrict band = Fundamental emission – Delta.





802.11g

RESTRICT BAND (2310 ~ 2390 MHz)

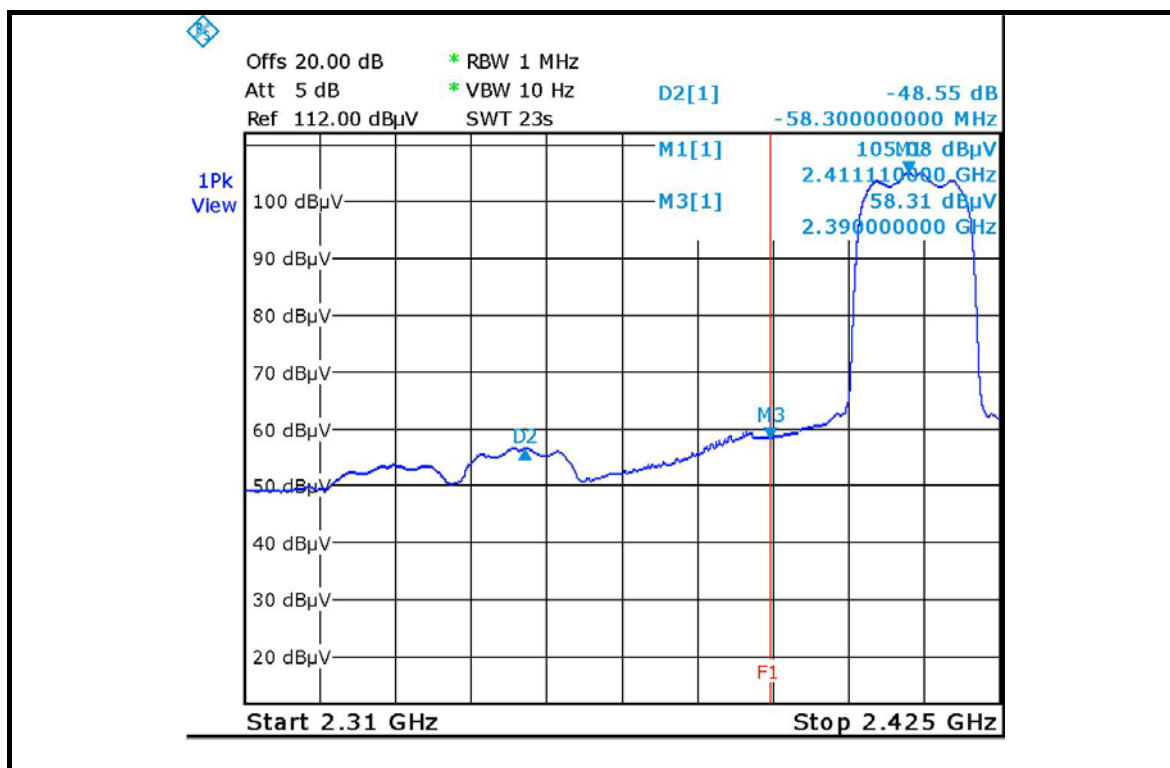
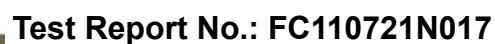
FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2412.00 (PK)	114.80	50.58	64.22	74.00
2412.00 (AV)	101.80	48.55	53.25	54.00

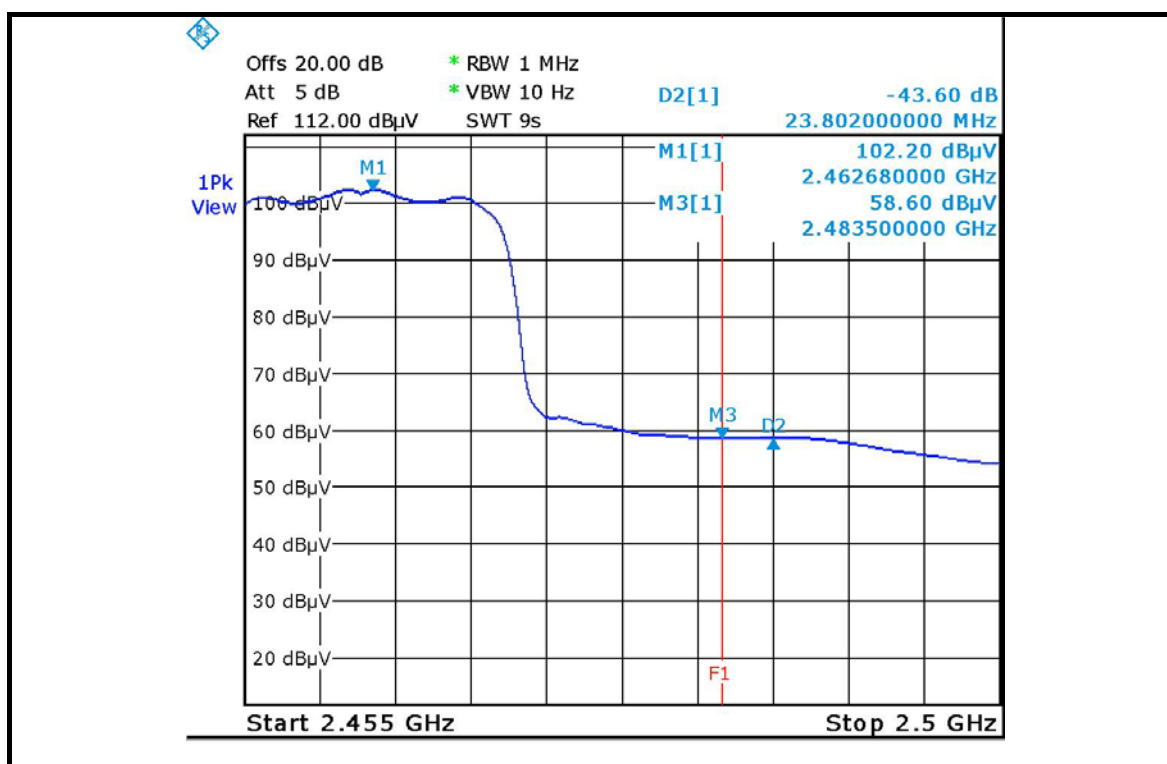
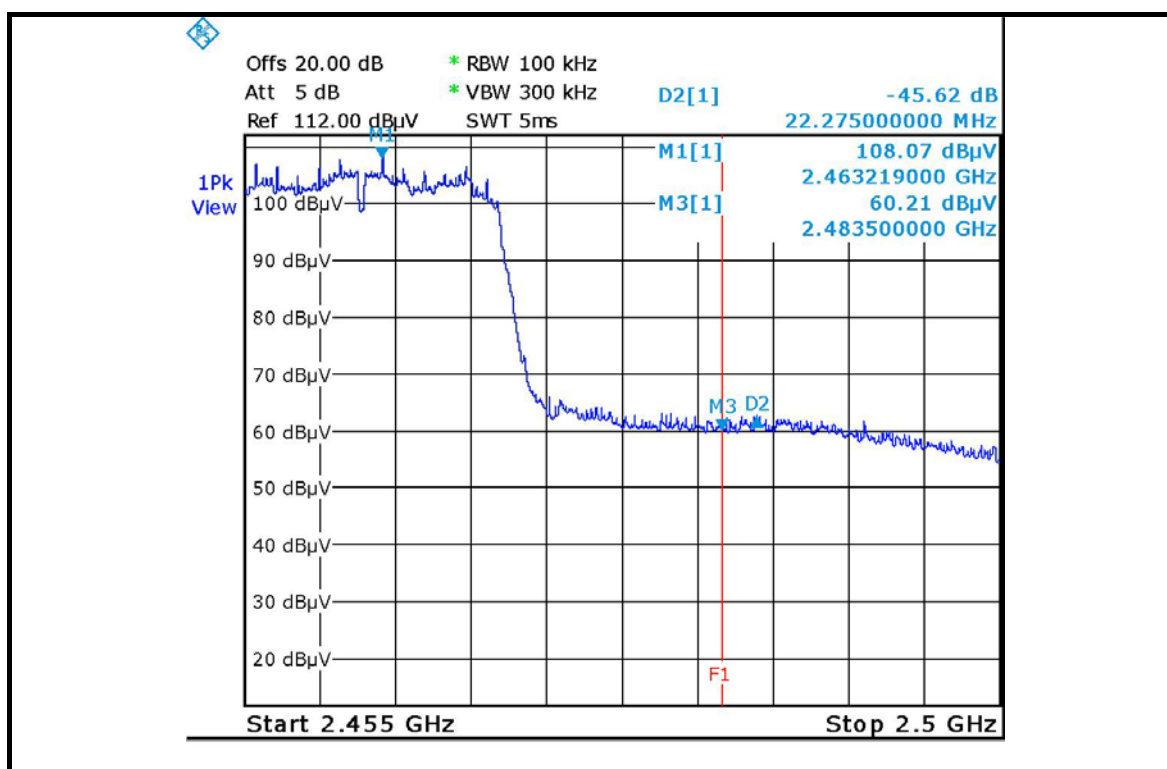
RESTRICT BAND (2483.5 ~ 2500 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2462.00 (PK)	110.20	45.62	64.58	74.00
2462.00 (AV)	97.25	43.60	53.65	54.00

NOTE:

- Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission.
Please check following 2 pages.
- Maximum field strength in restrict band = Fundamental emission – Delta.





802.11n (20MHz)

RESTRICT BAND (2310 ~ 2390 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2412.00 (PK)	108.10	49.60	58.5	74.00
2412.00 (AV)	101.68	48.75	52.93	54.00

RESTRICT BAND (2483.5 ~ 2500 MHz)

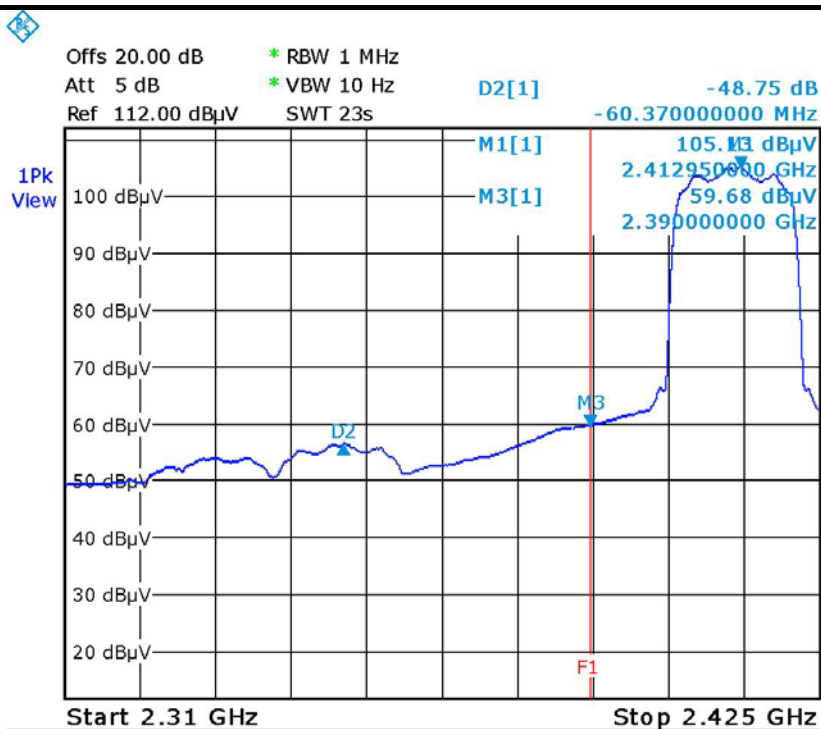
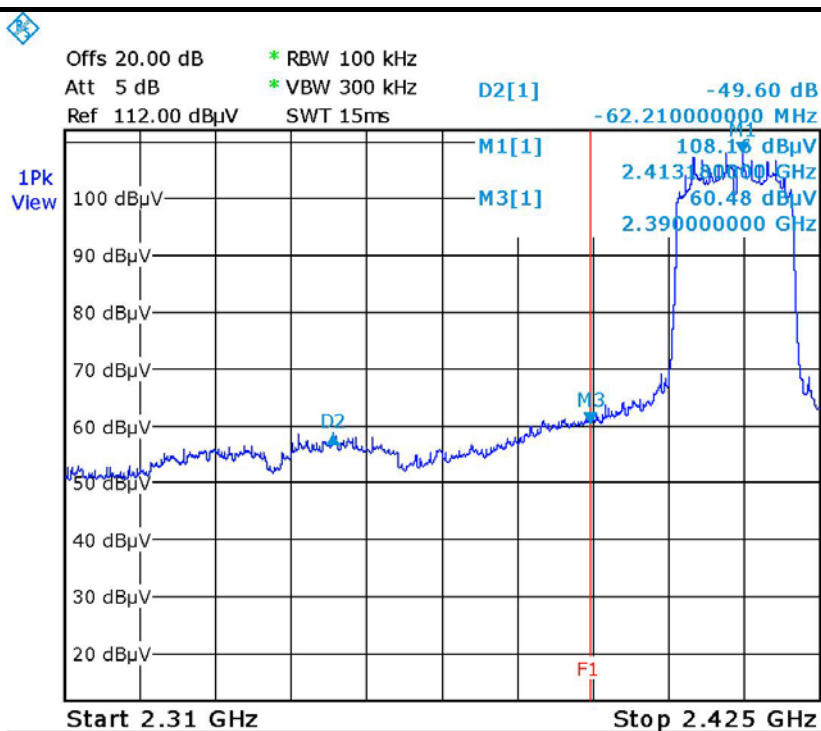
FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2462.00 (PK)	110.05	45.72	64.33	74.00
2462.00 (AV)	96.44	43.44	53.00	54.00

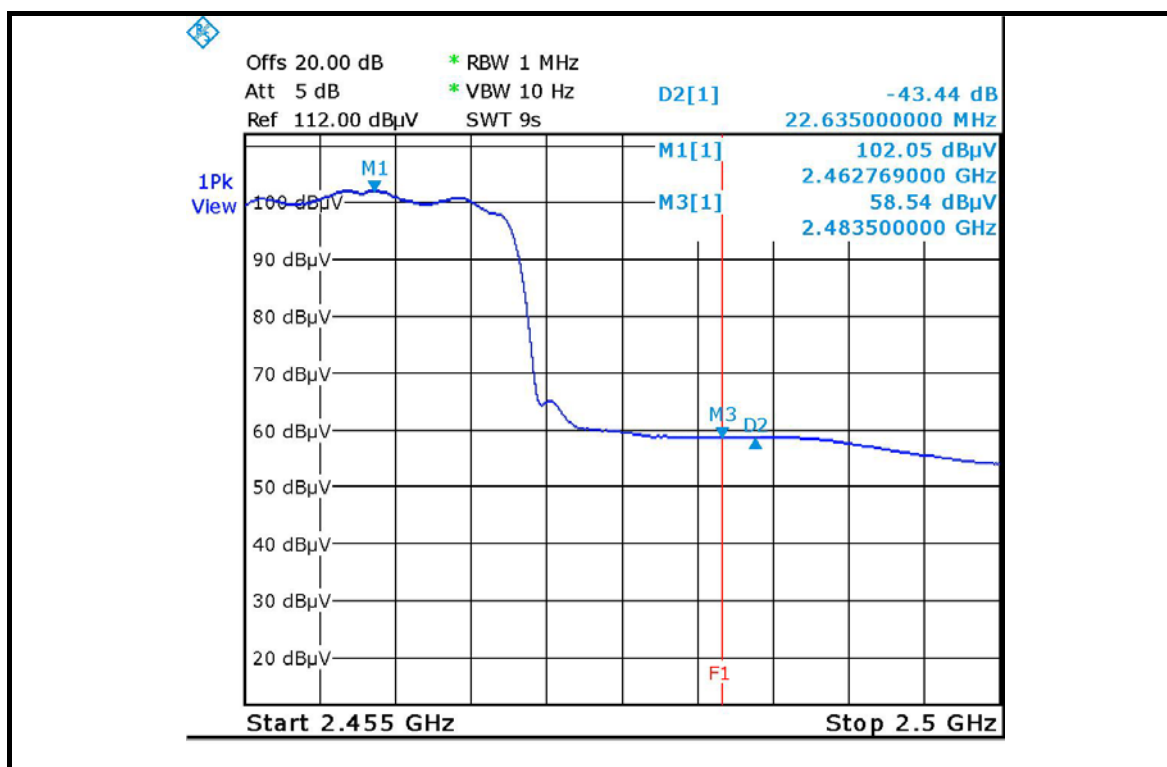
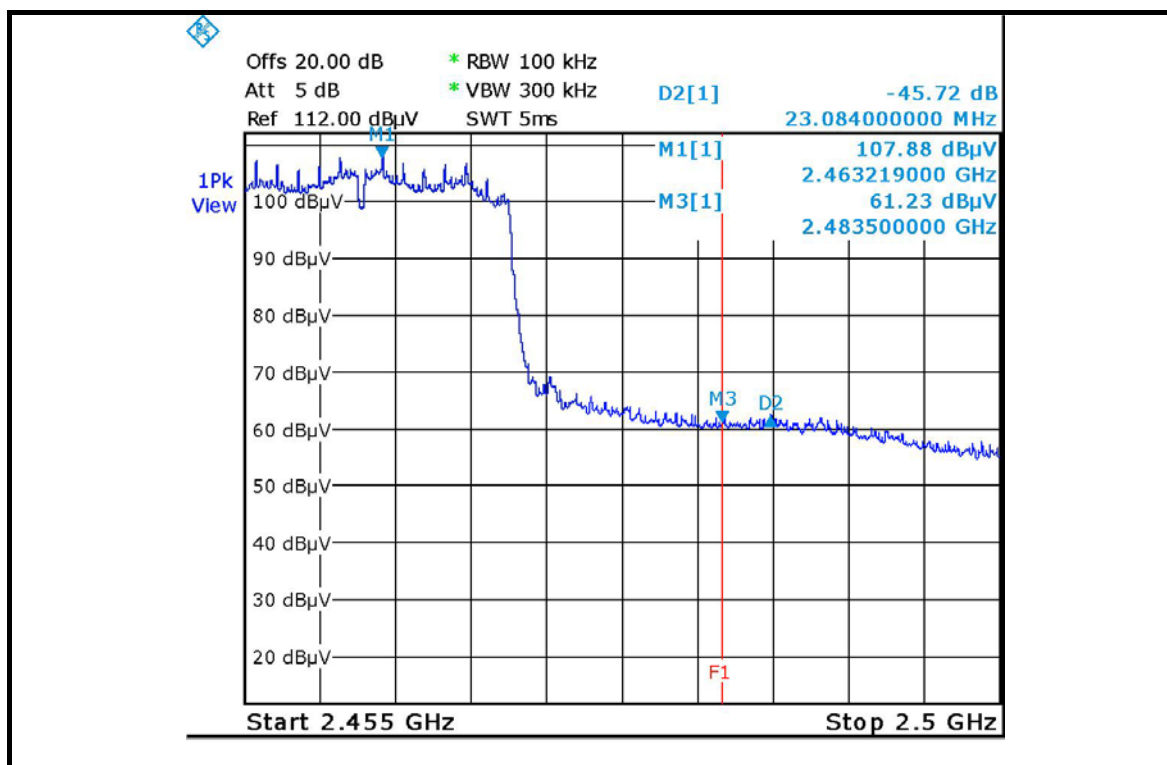
NOTE:

- Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission.
Please check following 2 pages.
- Maximum field strength in restrict band = Fundamental emission – Delta.



Test Report No.: FC110721N017





802.11n (40MHz)

RESTRICT BAND (2310 ~ 2390 MHz)

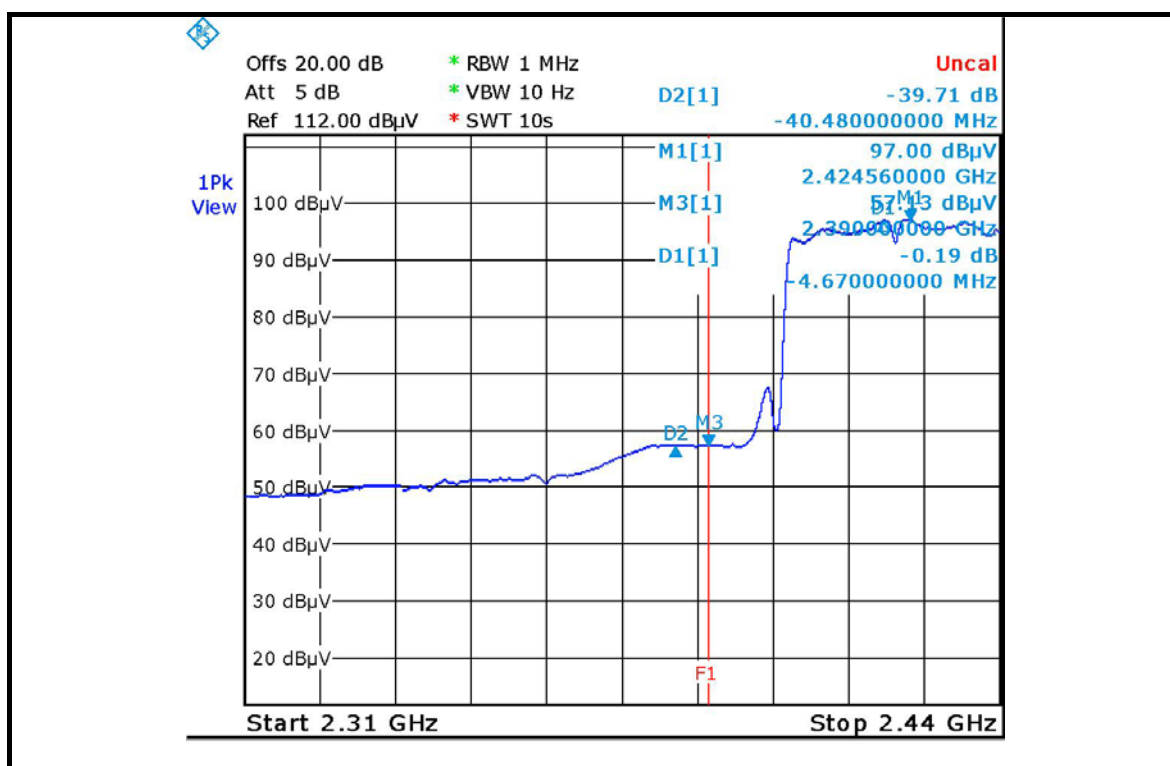
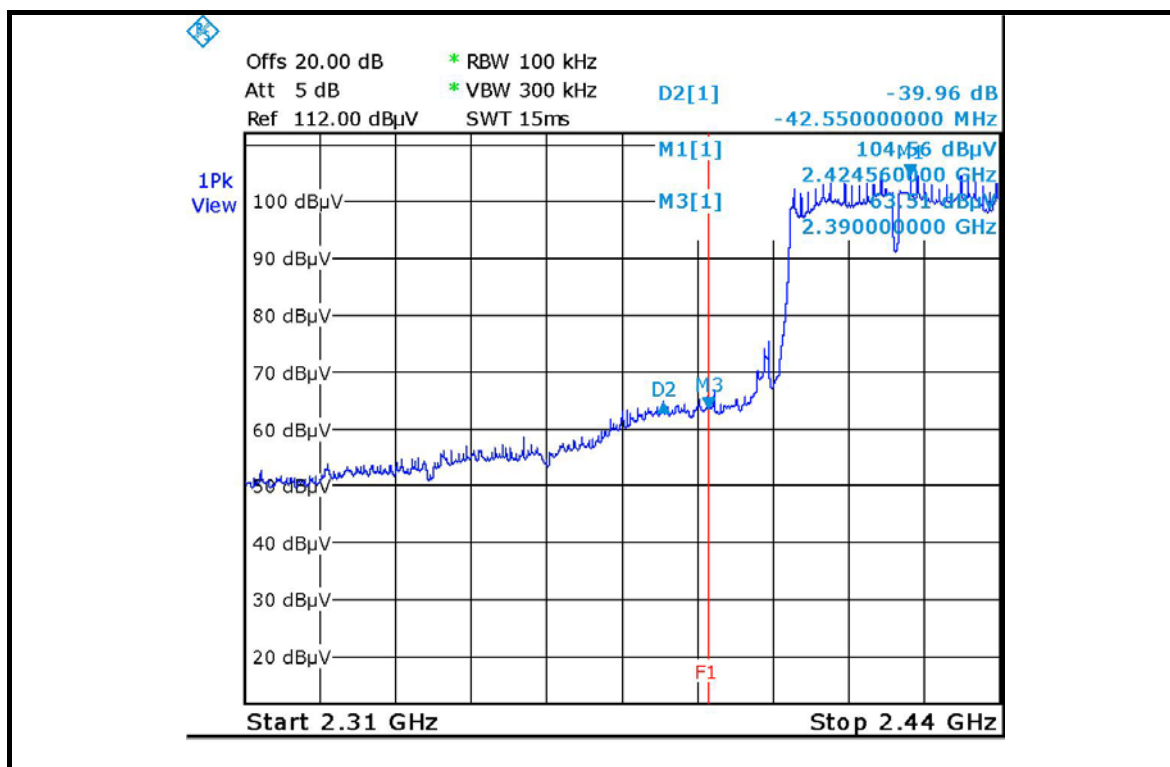
FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2422.00 (PK)	107.96	39.96	68.00	74.00
2422.00 (AV)	92.70	39.71	52.99	54.00

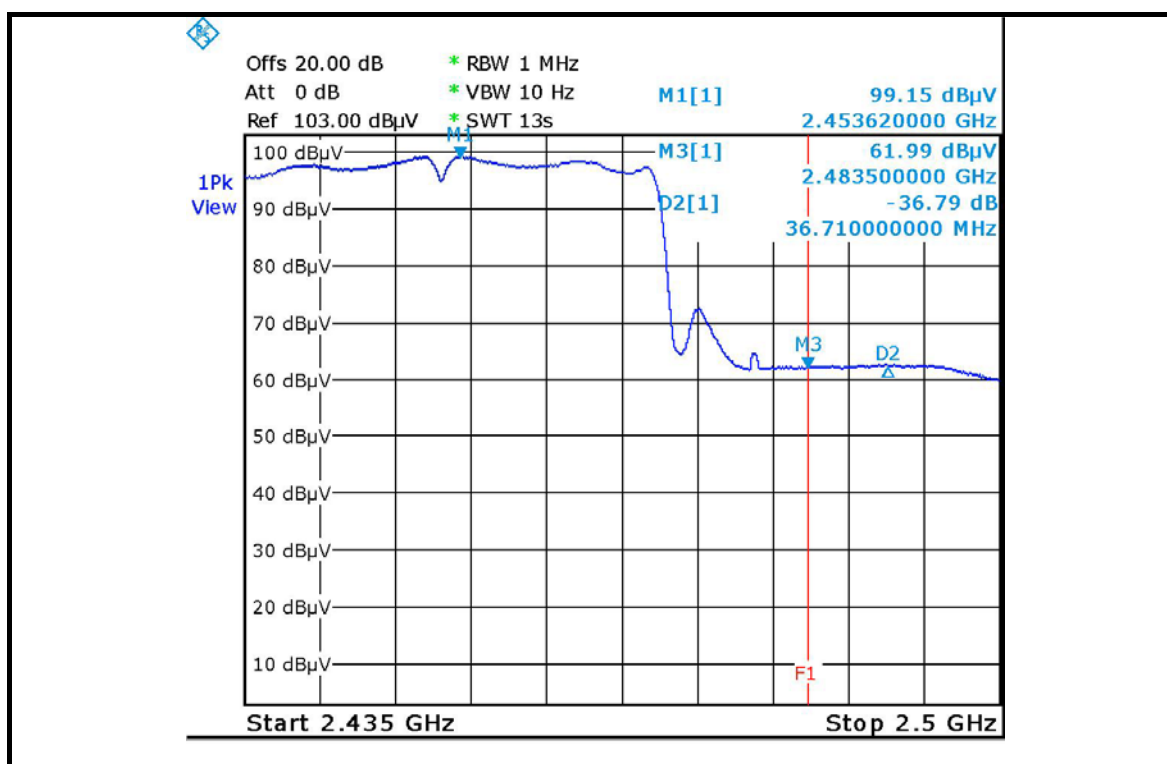
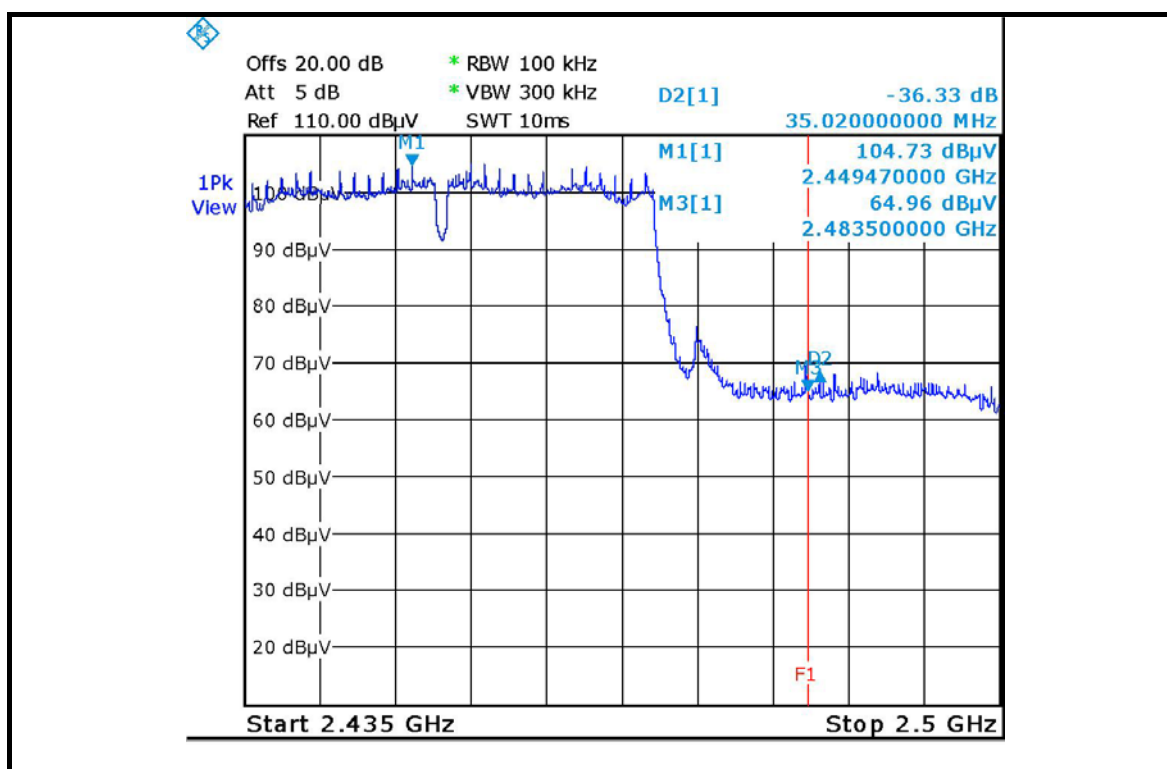
RESTRICT BAND (2483.5 ~ 2500 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2452.00 (PK)	106.73	36.33	70.4	74.00
2452.00 (AV)	88.90	36.79	52.11	54.00

NOTE:

1. Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission.
Please check following 2 pages.
2. Maximum field strength in restrict band = Fundamental emission – Delta.

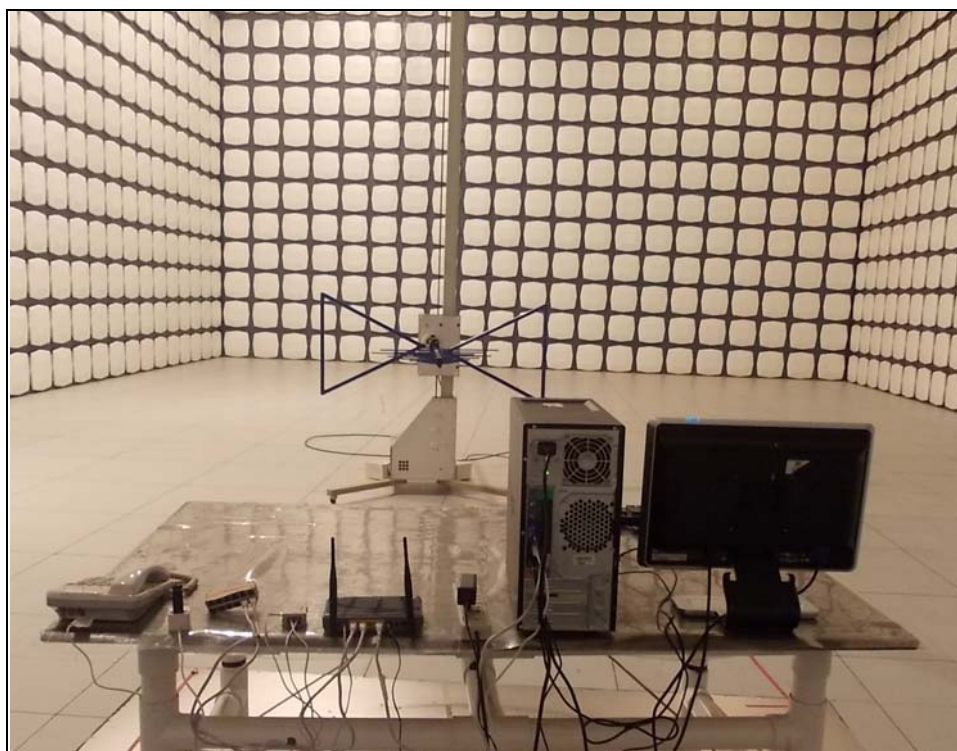
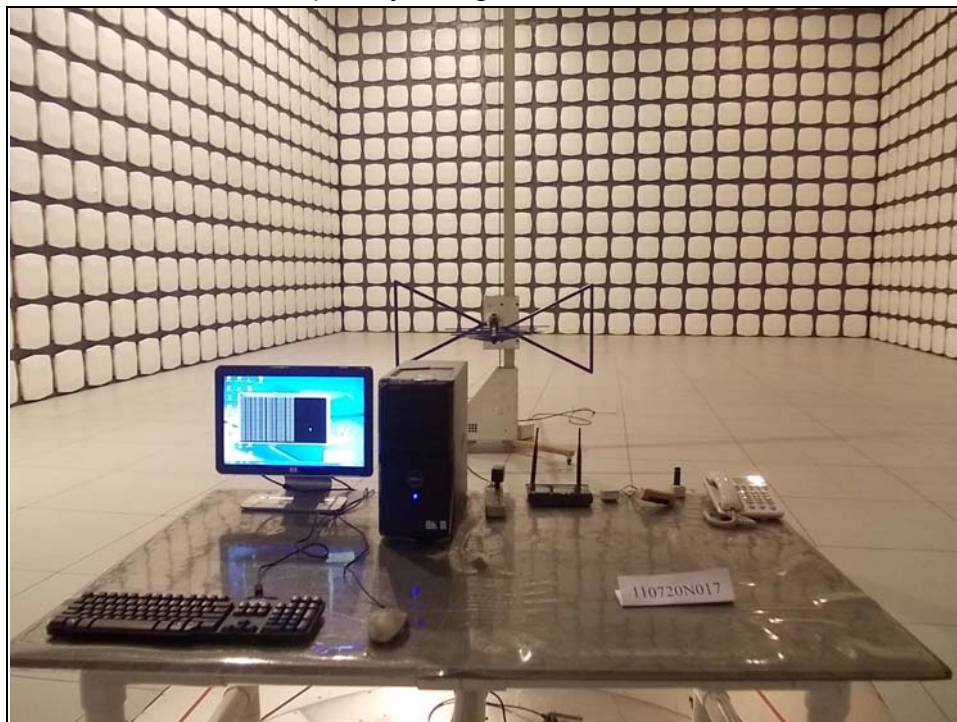




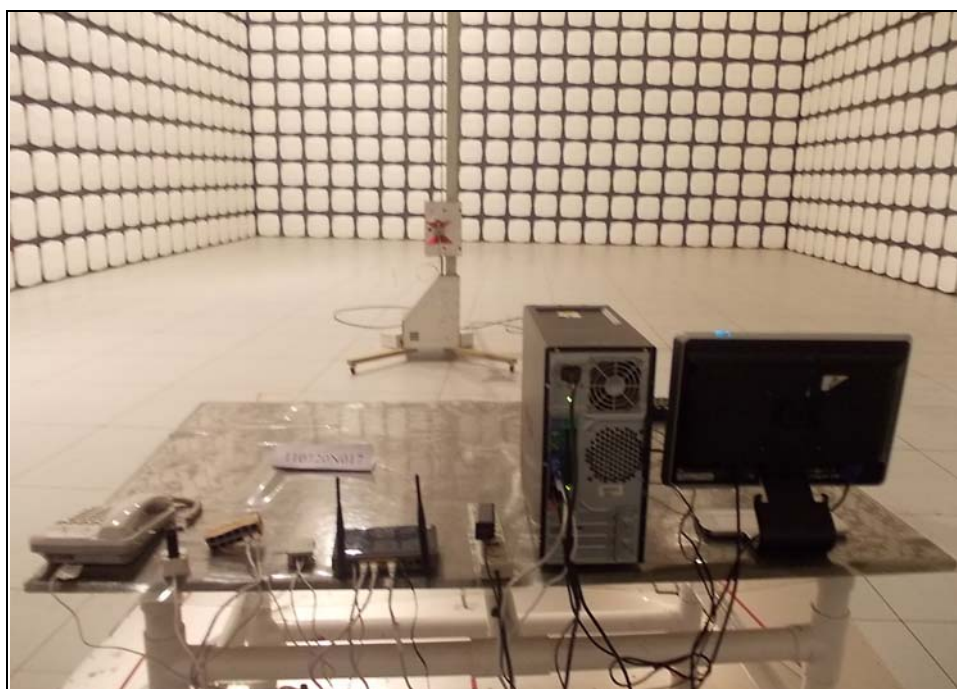
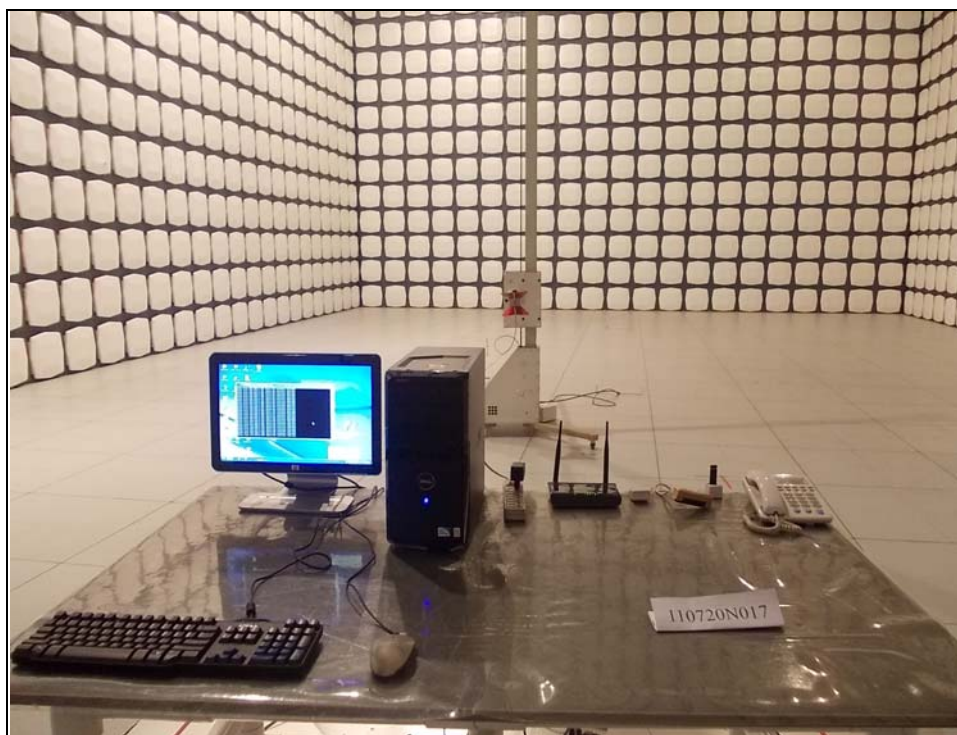
5. PHOTOGRAPHS OF THE TEST CONFIGURATION

RADIATED EMISSION TEST

<Frequency Range 30MHz~1GHz>



<Frequency Range above 1GHz>



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---