



FCC TEST REPORT

REPORT NO.: RF960528H07

MODEL NO.: MC1770

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TESTED: May 28 to 30, 2007

ISSUED: June 06, 2007

APPLICANT: Symbol Technologies Inc.

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U.S.A.

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1 CERTIFICATION

PRODUCT : PERSONAL SHOPPING SYSTEM-BARCODE SCANNER
BRAND NAME : Symbol Technologies Inc.
MODEL NO. : MC1770
TESTED: May 28 to 30, 2007
APPLICANT : Symbol Technologies Inc.
TEST ITEM: ENGINEERING SAMPLE
STANDARDS : 47 CFR Part 15, Subpart C (Section 15.247)
ANSI C63.4-2003

The above equipment (Model: MC1770) has been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Claire Kuan , **DATE:** June 06, 2007
(Claire Kuan, Specialist)

TECHNICAL ACCEPTANCE : Hank Chung , **DATE:** June 06, 2007
Responsible for RF (Hank Chung, Deputy Manager)

APPROVED BY : May Chen , **DATE:** June 06, 2007
(May Chen, Deputy Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	Test Type and Limit	Result	REMARK
15.207	AC Power Conducted Emission	NA	Not Applicable
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 Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit
15.247(c)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -0.60 dB at 2483.50 MHz
15.247(d)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit
15.247(c)	Band Edge Measurement Limit: 20 dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit

Note: The power input of EUT is DC type so no conducted emission test was executed.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	PERSONAL SHOPPING SYSTEM-BARCODE SCANNER
MODEL NO.	MC1770
FCC ID	H9PMC1770
POWER SUPPLY	DC 12V from power charger or DC 3.7V from battery
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
RADIO TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11
CHANNEL SPACING	5MHz
OUTPUT POWER	802.11b: 38.019mW 802.11g: 87.096mW
ANTENNA TYPE	Please see note 1
DATA CABLE	NA
I/O PORT	NA

NOTE:

1. There is antenna provided to this EUT, please refer to the following table:

Brand name	Model name	Antenna Type	Gain (dBi)
ETHERTRONICS	1000172	Chip	2.4

2. The EUT could be supplied with the Li-ion Battery as below:

Li-ion Battery	
Brand:	Symbol Technologies Inc.
Model No.:	82-97131-01
RATING:	3.7V, 2400mAh.

3. The EUT operates in the 2.4GHz frequency spectrum with throughput of up to 54Mbps.

4. The EUT complies with IEEE 802.11g standards, and backwards compatible with IEEE 802.11b products.

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

3.2 DESCRIPTION OF TEST MODES

Operated in 2400 ~ 2483.5MHz band:

For 802.11b/g normal mode: Eleven channels are provided to this EUT.

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		

3.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE [≥] 1G	APCM	
-	5	√	√	√	NA

Where PLC: Power Line Conducted Emission RE<1G: Radiated Emission below 1GHz
 RE[≥]1G: Radiated Emission above 1GHz APCM: Antenna Port Conducted Measurement

Radiated Emission Test (Below 1 GHz):

- 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.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	11	DSSS	CCK	1

- The EUT was pre-tested under the following test modes for three different axes placements:

Test Mode	Description
Mode A	X-Y plane
Mode B	Y-Z plane
Mode C	Z-X plane

From the above modes, the worst emission level was found in **Mode B**. Therefore only the test data of the modes were recorded in this report individually.

Radiated Emission Test (Above 1 GHz):

- 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.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	CCK	1
802.11g	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	6

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.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 11	DSSS	CCK	1
802.11g	1 to 11	1, 2, 10, 11	OFDM	BPSK	6

Antenna Port Conducted 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.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	CCK	1
802.11g	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	6



3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a PERSONAL SHOPPING SYSTEM-BARCODE SCANNER. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

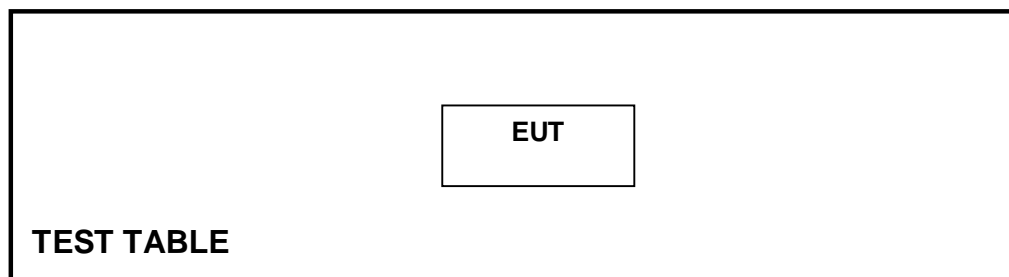
47 CFR Part 15, Subpart C. (15.247)
ANSI C63.4 : 2003

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

3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit.

3.6 CONFIGURATION OF SYSTEM UNDER TEST



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.	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 03, 2007
HP Pre_Amplifier	8449B	3008A01922	Sep. 18, 2007
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Sep. 20, 2007
CHASE Broadband Antenna	VULB 9168	138	July 17, 2007
Schwarzbeck Horn_Antenna	BBHA9120	D124	Jan. 01, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 05, 2008
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 08, 2009
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 08, 2009
R&S Loop Antenna	HFH2-Z2	881058/15	Nov. 29, 2007
RF Switches (ARNITSU)	CS-201	1565157	NA
RF CABLE (Chaintek)	SF102	22054-2	Nov. 14, 2007
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1 GHz	Jul. 15, 2007
Software	ADT_Radiated_V 7.6.15.7	NA	NA
CHANCE MOST Antenna Tower	AT-100	0203	NA
CHANCE MOST Turn Table	TT-100	0203	NA

- Note: 1. The calibration interval of the above test instruments is 12 months (36 months for Biconical and Periodic Antenna) and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: R3271A) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in ADT Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 4824A-3.
7. The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Radiated emissions (30MHz-1GHz)	2.98 dB
Radiated emissions (1GHz ~18GHz)	2.21 dB
Radiated emissions (18GHz ~40GHz)	1.88 dB

8. Loop antenna was used for all emissions below 30 MHz.

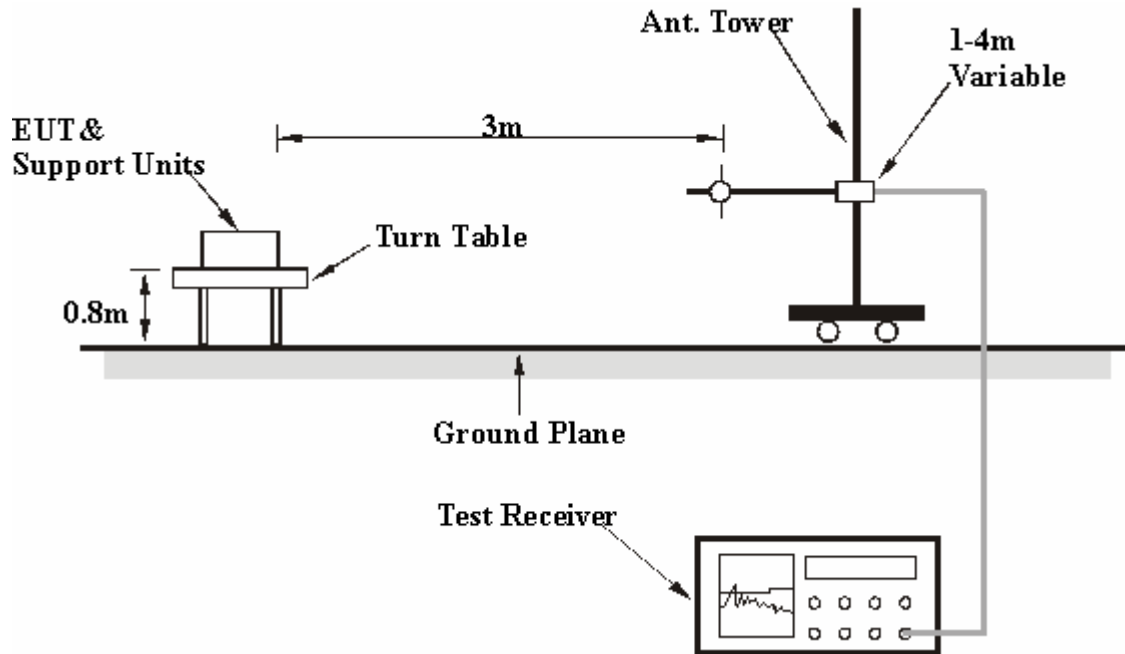
4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. 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 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin 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 is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.1.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.5 EUT OPERATING CONDITIONS

The software provided by client enabled the EUT to transmit and receive data at specific channel frequencies individually.

4.1.6 TEST RESULTS

Below 1GHz Worst-Case Data

MODULATION TYPE	CCK	CHANNEL	Channel 1
INPUT POWER (SYSTEM)	120Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	22deg. C, 68%RH, 960hPa	TRANSFER RATE	1Mbps
TESTED BY	Sky Liao	DETECTOR FUNCTION	Quasi-Peak, 120kHz

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	57.22	24.75 QP	40.00	-15.25	1.38 H	145	10.65	14.10
2	123.56	21.37 QP	43.50	-22.13	1.50 H	92	9.26	12.11
3	208.26	20.29 QP	43.50	-23.21	1.35 H	307	8.33	11.96
4	315.01	24.66 QP	46.00	-21.34	1.13 H	44	7.66	17.00
5	426.27	24.89 QP	46.00	-21.11	1.23 H	303	5.10	19.79
6	568.78	27.51 QP	46.00	-18.49	1.30 H	176	3.80	23.71
7	723.68	29.63 QP	46.00	-16.37	1.55 H	316	3.10	26.53
8	843.39	31.40 QP	46.00	-14.60	1.60 H	102	3.11	28.29

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	57.23	26.99 QP	40.00	-13.01	1.00 V	260	12.90	14.09
2	123.96	21.62 QP	43.50	-21.88	1.00 V	250	9.48	12.14
3	208.26	22.74 QP	43.50	-20.76	1.00 V	343	10.78	11.96
4	315.05	27.20 QP	46.00	-18.80	1.00 V	156	10.20	17.00
5	426.82	28.56 QP	46.00	-17.44	1.00 V	205	8.76	19.80
6	568.71	30.26 QP	46.00	-15.74	1.00 V	7	6.56	23.70
7	723.75	30.08 QP	46.00	-15.92	1.00 V	190	3.54	26.54
8	843.39	30.57 QP	46.00	-15.43	1.00 V	28	2.28	28.29

- 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.

4.1.7 TEST RESULTS - DSSS

802.11b DSSS modulation

MODE	Channel 1	FREQUENCY RANGE	1000~25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
ENVIRONMENTAL CONDITIONS	22 deg. C, 68%RH, 960hPa	TESTED BY	Sky Liao

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	57.90 PK	74.00	-16.10	1.45 H	229	27.50	30.40
2	2390.00	46.95 AV	54.00	-7.05	1.45 H	229	16.55	30.40
3	*2412.00	108.00 PK			1.47 H	228	77.51	30.49
4	*2412.00	104.00 AV			1.47 H	228	73.51	30.49
5	4824.00	47.90 PK	74.00	-26.10	1.20 H	113	12.21	35.69
6	4824.00	38.90 AV	54.00	-15.10	1.20 H	113	3.21	35.69
7	7236.00	52.10 PK	74.00	-21.90	1.00 H	15	9.86	42.24
8	7236.00	39.20 AV	54.00	-14.80	1.00 H	15	-3.04	42.24

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	56.72 PK	74.00	-17.28	1.00 V	313	26.32	30.40
2	2390.00	44.67 AV	54.00	-9.33	1.00 V	313	14.27	30.40
3	*2412.00	100.90 PK			1.00 V	310	70.41	30.49
4	*2412.00	95.30 AV			1.00 V	310	64.81	30.49
5	4824.00	46.50 PK	74.00	-27.50	1.11 V	95	10.81	35.69
6	4824.00	33.60 AV	54.00	-20.40	1.11 V	95	-2.09	35.69
7	7236.00	52.40 PK	74.00	-21.60	1.25 V	35	10.16	42.24
8	7236.00	39.00 AV	54.00	-15.00	1.25 V	35	-3.24	42.24

- 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 limit value is defined as per 15.247
 6. “ * “ : Fundamental frequency

MODE	Channel 6	FREQUENCY RANGE	1000~25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
ENVIRONMENTAL CONDITIONS	22 deg. C, 68%RH, 960hPa	TESTED BY	Sky Liao

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	*2437.00	110.20 PK			1.15 H	196	79.59	30.61
2	*2437.00	105.40 AV			1.15 H	196	74.79	30.61
3	4874.00	49.70 PK	74.00	-24.30	1.13 H	240	13.90	35.80
4	4874.00	42.70 AV	54.00	-11.30	1.13 H	240	6.90	35.80
5	7311.00	52.50 PK	74.00	-21.50	1.00 H	28	9.98	42.52
6	7311.00	39.70 AV	54.00	-14.30	1.00 H	28	-2.82	42.52

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	*2437.00	102.40 PK			1.27 V	300	71.79	30.61
2	*2437.00	97.20 AV			1.27 V	300	66.59	30.61
3	4874.00	48.50 PK	74.00	-25.50	1.45 V	102	12.70	35.80
4	4874.00	38.50 AV	54.00	-15.50	1.45 V	102	2.70	35.80
5	7311.00	53.00 PK	74.00	-21.00	1.22 V	18	10.48	42.52
6	7311.00	39.60 AV	54.00	-14.40	1.22 V	18	-2.92	42.52

- 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 limit value is defined as per 15.247
 6. “ * “ : Fundamental frequency



MODE	Channel 11	FREQUENCY RANGE	1000~25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 66%RH, 961hPa	TESTED BY	Phoenix Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

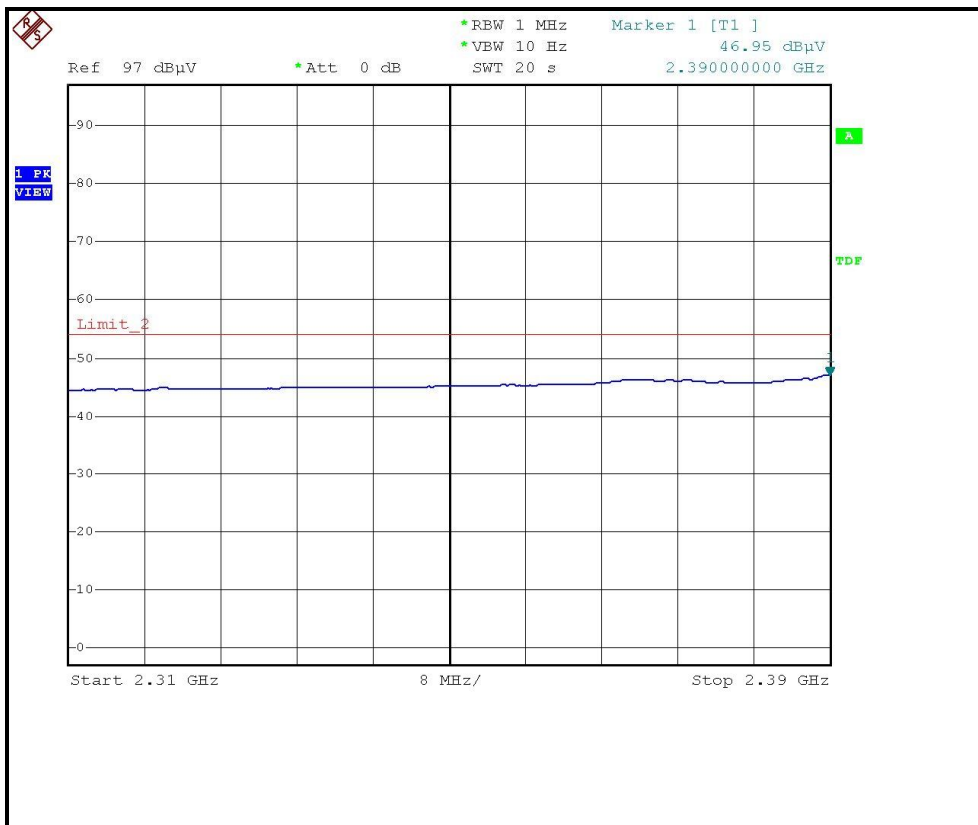
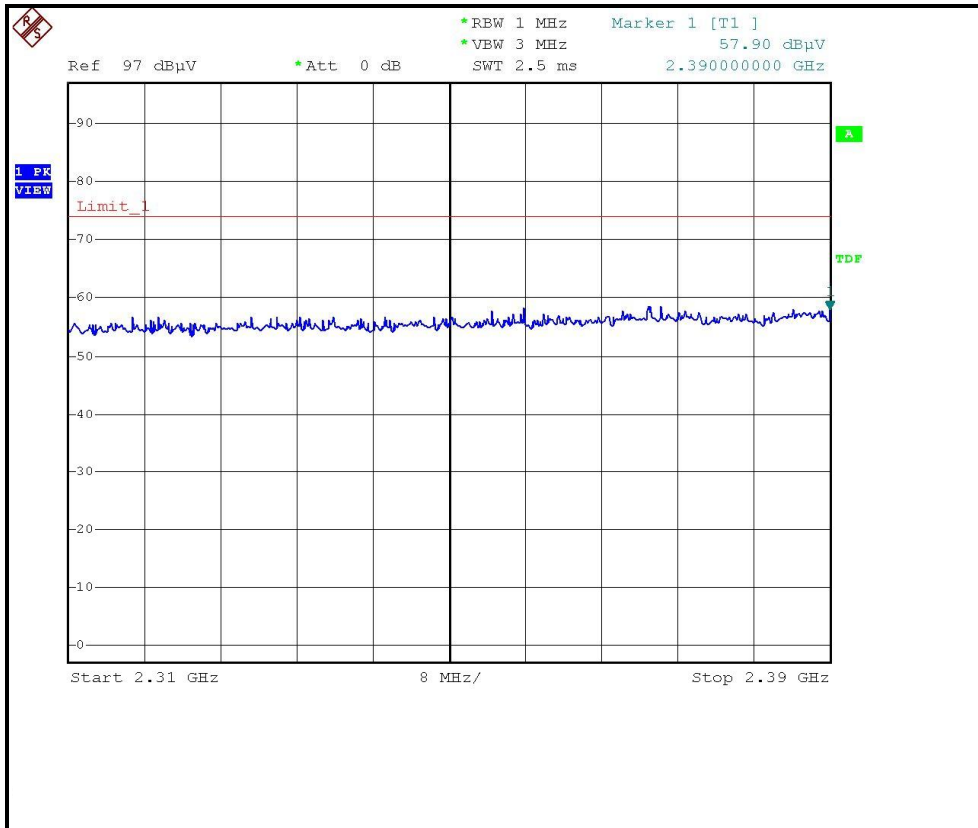
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	110.50 PK			1.15 H	221	79.78	30.72
2	*2462.00	105.80 AV			1.15 H	221	75.08	30.72
3	2483.50	59.07 PK	74.00	-14.93	1.16 H	222	28.25	30.82
4	2483.50	48.09 AV	54.00	-5.91	1.16 H	222	17.27	30.82
5	4924.00	49.10 PK	74.00	-24.90	1.03 H	135	13.20	35.90
6	4924.00	41.70 AV	54.00	-12.30	1.03 H	135	5.80	35.90
7	7386.00	53.20 PK	74.00	-20.80	1.10 H	25	10.40	42.80
8	7386.00	39.40 AV	54.00	-14.60	1.10 H	25	-3.40	42.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

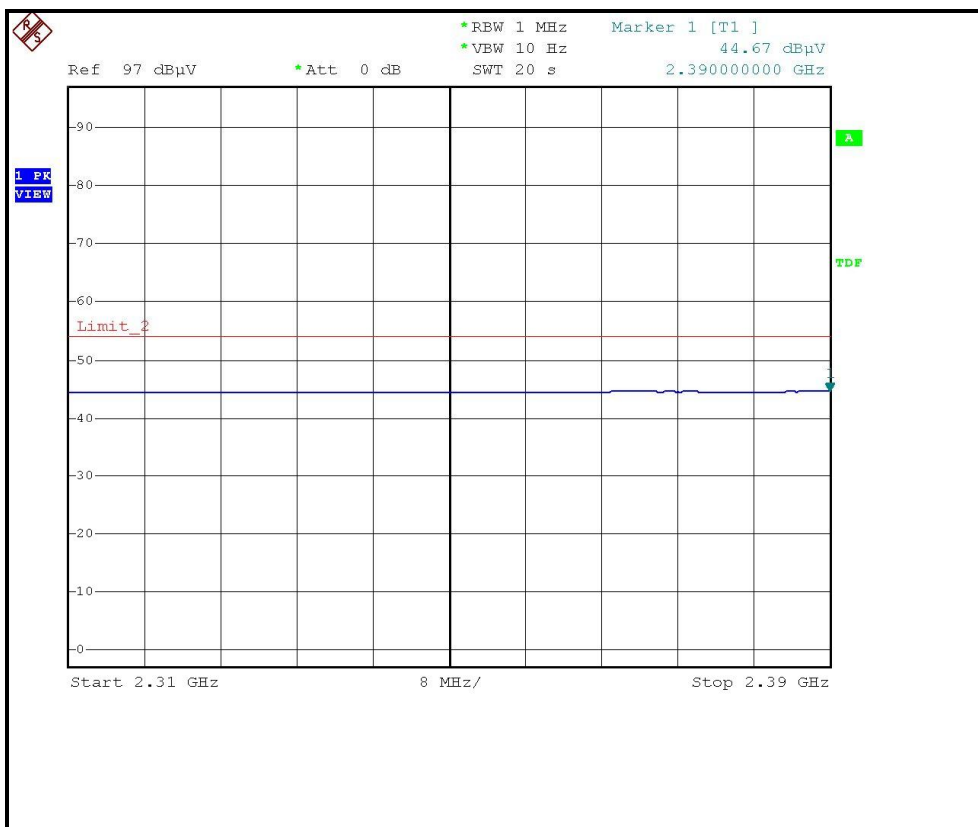
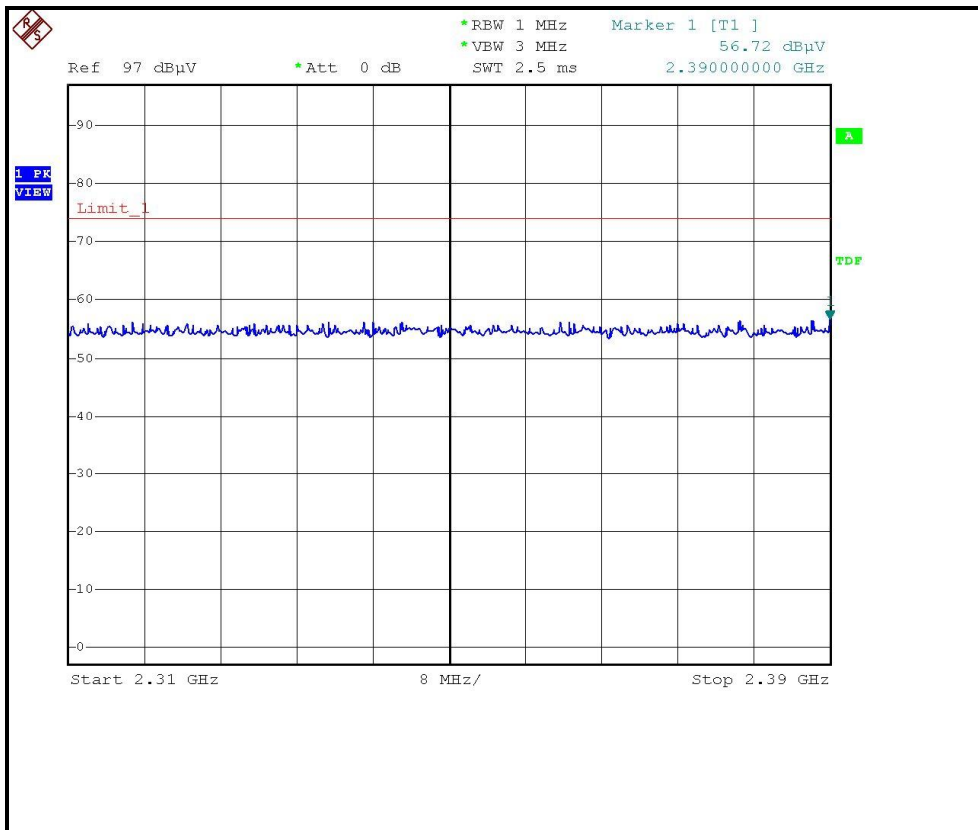
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	102.20 PK			1.20 V	310	71.48	30.72
2	*2462.00	97.00 AV			1.20 V	310	66.28	30.72
3	2483.50	55.57 PK	74.00	-18.43	1.20 V	310	24.75	30.82
4	2483.50	44.40 AV	54.00	-9.60	1.20 V	310	13.58	30.82
5	4924.00	48.20 PK	74.00	-25.80	1.57 V	110	12.30	35.90
6	4924.00	38.20 AV	54.00	-15.80	1.57 V	110	2.30	35.90
7	7386.00	52.80 PK	74.00	-21.20	1.20 V	10	10.00	42.80
8	7386.00	39.30 AV	54.00	-14.70	1.20 V	10	-3.50	42.80

- 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 limit value is defined as per 15.247
 6. “ * “ : Fundamental frequency

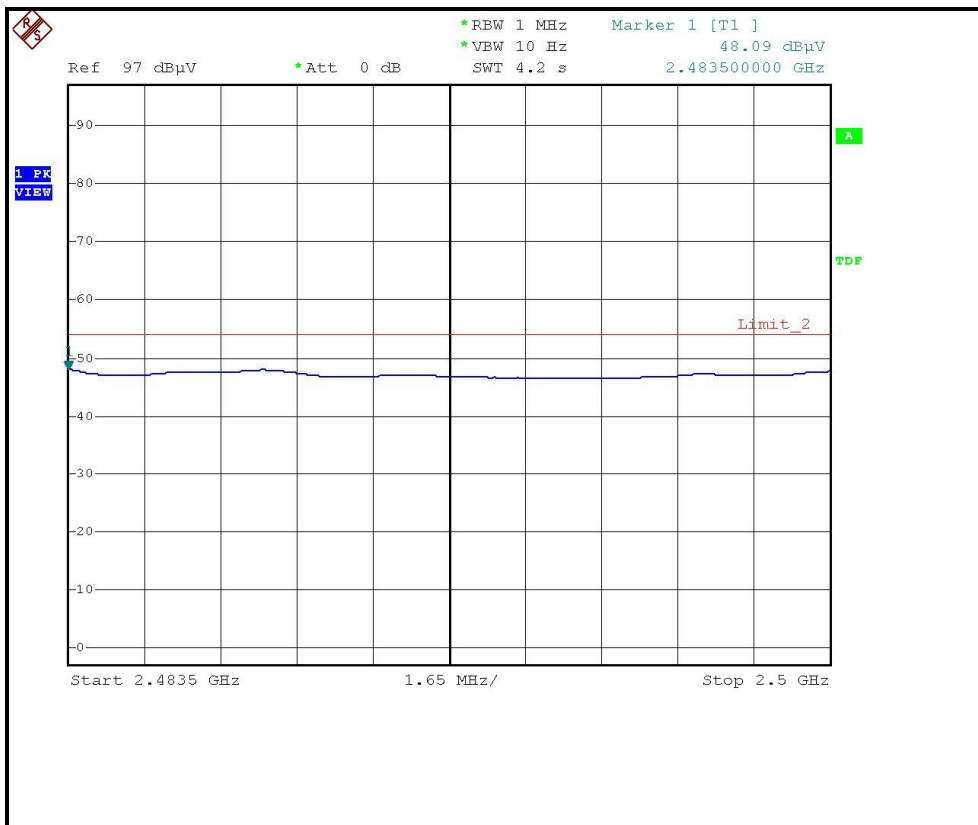
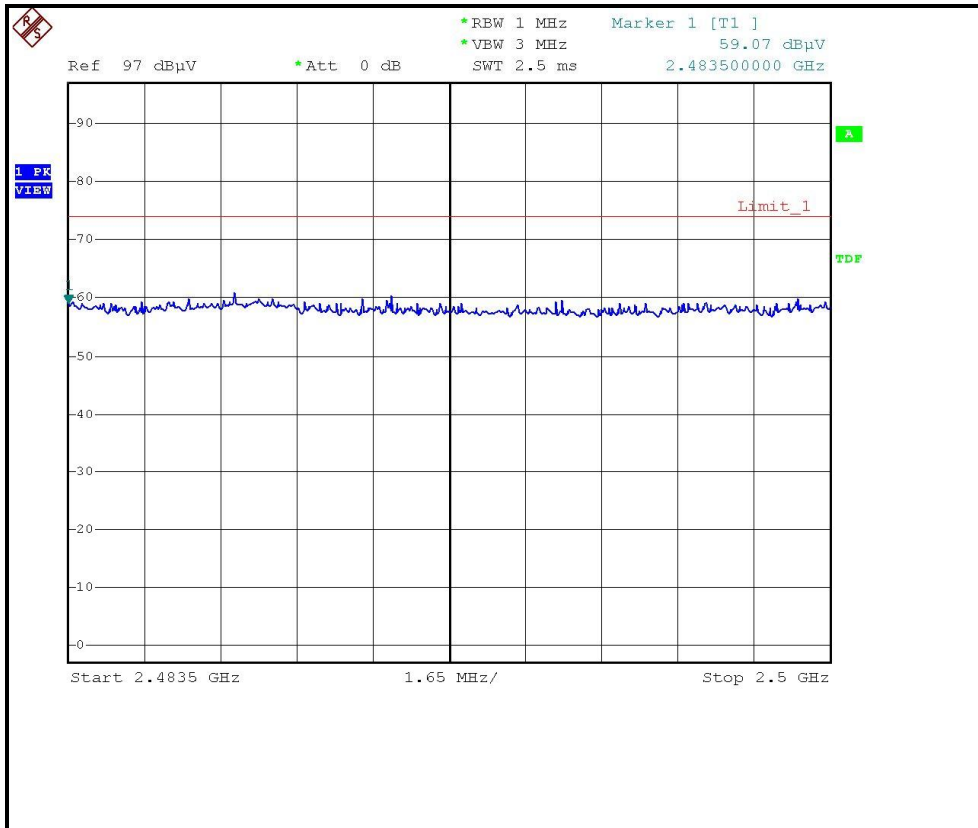
RESTRICTED BANDEDGE (802.11b MODE, CH1, HORIZONTAL)



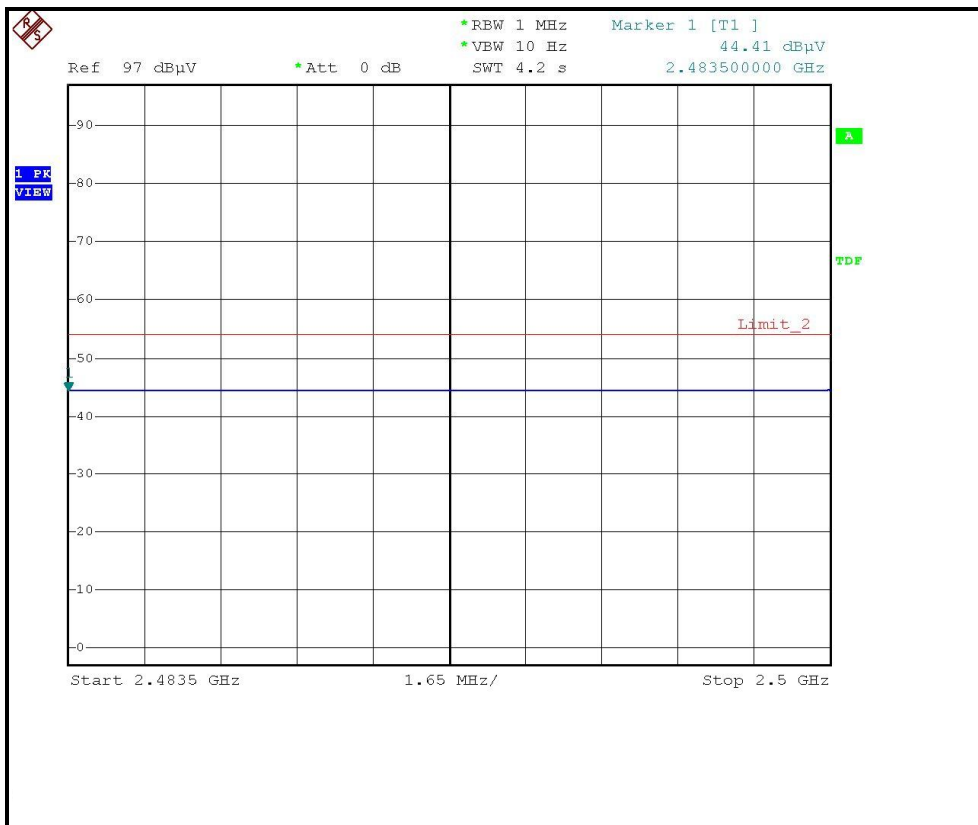
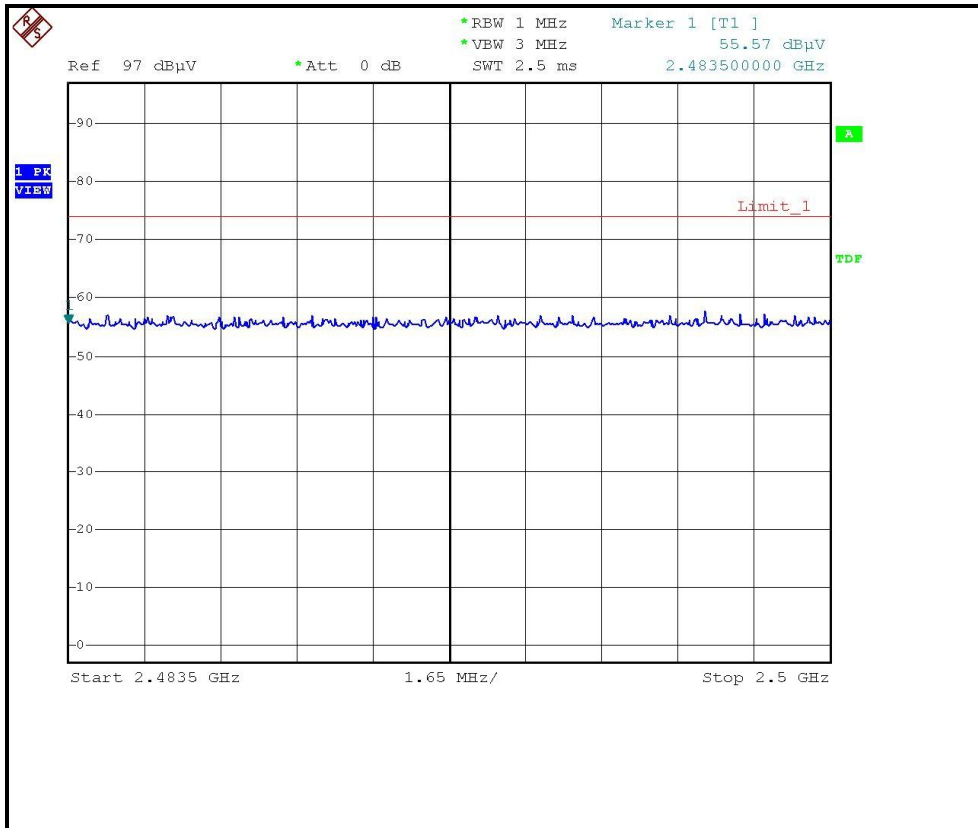
RESTRICTED BANDEDGE (802.11b MODE, CH1, VERTICAL)



RESTRICTED BANDEDGE (802.11b MODE, CH11, HORIZONTAL)



RESTRICTED BANDEDGE (802.11b MODE, CH11, VERTICAL)



4.1.8 TEST RESULTS - OFDM

802.11g Normal OFDM modulation

MODE	Channel 1	FREQUENCY RANGE	1000~25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
ENVIRONMENTAL CONDITIONS	22 deg. C, 68%RH, 960hPa	TESTED BY	Sky Liao

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	71.92 PK	74.00	-2.08	1.23 H	196	41.52	30.40
2	2390.00	52.53 AV	54.00	-1.47	1.23 H	196	22.13	30.40
3	*2412.00	109.30 PK			1.45 H	195	78.81	30.49
4	*2412.00	98.90 AV			1.45 H	195	68.41	30.49
5	4824.00	46.20 PK	74.00	-27.80	1.09 H	145	10.51	35.69
6	4824.00	32.70 AV	54.00	-21.30	1.09 H	145	-2.99	35.69
7	7236.00	52.40 PK	74.00	-21.60	1.02 H	36	10.16	42.24
8	7236.00	38.90 AV	54.00	-15.10	1.02 H	36	-3.34	42.24

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	63.50 PK	74.00	-10.50	1.36 V	235	33.10	30.40
2	2390.00	47.30 AV	54.00	-6.70	1.36 V	235	16.90	30.40
3	*2412.00	102.50 PK			1.00 V	235	72.01	30.49
4	*2412.00	92.60 AV			1.00 V	235	62.11	30.49
5	4824.00	45.50 PK	74.00	-28.50	1.00 V	95	9.81	35.69
6	4824.00	32.20 AV	54.00	-21.80	1.00 V	95	-3.49	35.69
7	7236.00	52.00 PK	74.00	-22.00	1.00 V	76	9.76	42.24
8	7236.00	38.60 AV	54.00	-15.40	1.00 V	76	-3.64	42.24

- 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 limit value is defined as per 15.247
 6. “ * “ : Fundamental frequency



MODE	Channel 2	FREQUENCY RANGE	1000~25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
ENVIRONMENTAL CONDITIONS	22 deg. C, 68%RH, 960hPa	TESTED BY	Sky Liao

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	69.50 PK	74.00	-4.50	1.73 H	355	39.10	30.40
2	2390.00	53.00 AV	54.00	-1.00	1.73 H	355	22.60	30.40
3	*2417.00	110.40 PK			1.75 H	335	79.88	30.52
4	*2417.00	99.90 AV			1.75 H	335	69.38	30.52

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	64.10 PK	74.00	-9.90	1.23 V	250	33.70	30.40
2	2390.00	48.90 AV	54.00	-5.10	1.23 V	250	18.50	30.40
3	*2417.00	105.50 PK			1.18 V	252	74.98	30.52
4	*2417.00	94.80 AV			1.18 V	252	64.28	30.52

- 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 limit value is defined as per 15.247
 6. “ * “ : Fundamental frequency

MODE	Channel 6	FREQUENCY RANGE	1000~25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
ENVIRONMENTAL CONDITIONS	22 deg. C, 68%RH, 960hPa	TESTED BY	Sky Liao

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	*2437.00	114.60 PK			1.14 H	215	83.99	30.61
2	*2437.00	104.00 AV			1.14 H	215	73.39	30.61
3	4874.00	53.10 PK	74.00	-20.90	1.02 H	218	17.30	35.80
4	4874.00	38.40 AV	54.00	-15.60	1.02 H	218	2.60	35.80
5	7311.00	53.50 PK	74.00	-20.50	1.00 H	266	10.98	42.52
6	7311.00	41.10 AV	54.00	-12.90	1.00 H	266	-1.42	42.52

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	*2437.00	105.50 PK			1.23 V	310	74.89	30.61
2	*2437.00	95.30 AV			1.23 V	310	64.69	30.61
3	4874.00	49.30 PK	74.00	-24.70	1.00 V	240	13.50	35.80
4	4874.00	35.50 AV	54.00	-18.50	1.00 V	240	-0.30	35.80
5	7311.00	52.90 PK	74.00	-21.10	1.00 V	28	10.38	42.52
6	7311.00	39.80 AV	54.00	-14.20	1.00 V	28	-2.72	42.52

- 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 limit value is defined as per 15.247
 6. “ * “ : Fundamental frequency



MODE	Channel 10	FREQUENCY RANGE	1000~25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
ENVIRONMENTAL CONDITIONS	22 deg. C, 68%RH, 960hPa	TESTED BY	Sky Liao

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	*2457.00	110.70 PK			1.40 H	343	80.00	30.70
2	*2457.00	100.10 AV			1.40 H	343	69.40	30.70
3	2483.50	72.00 PK	74.00	-2.00	1.41 H	0	41.18	30.82
4	2483.50	53.40 AV	54.00	-0.60	1.41 H	0	22.58	30.82

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	*2457.00	105.20 PK			1.15 V	271	74.50	30.70
2	*2457.00	94.50 AV			1.15 V	271	63.80	30.70
3	2483.50	67.80 PK	74.00	-6.20	1.10 V	270	36.98	30.82
4	2483.50	50.10 AV	54.00	-3.90	1.10 V	270	19.28	30.82

- 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 limit value is defined as per 15.247
 6. “ * “ : Fundamental frequency

MODE	Channel 11	FREQUENCY RANGE	1000~25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
ENVIRONMENTAL CONDITIONS	22 deg. C, 68%RH, 960hPa	TESTED BY	Sky Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

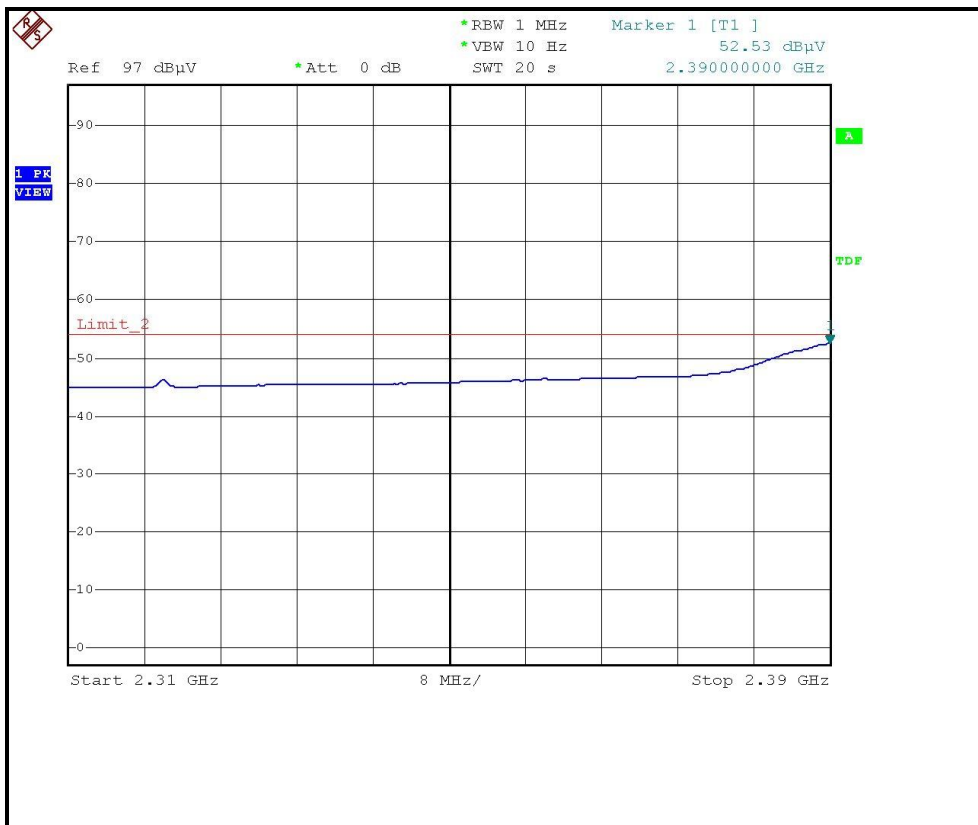
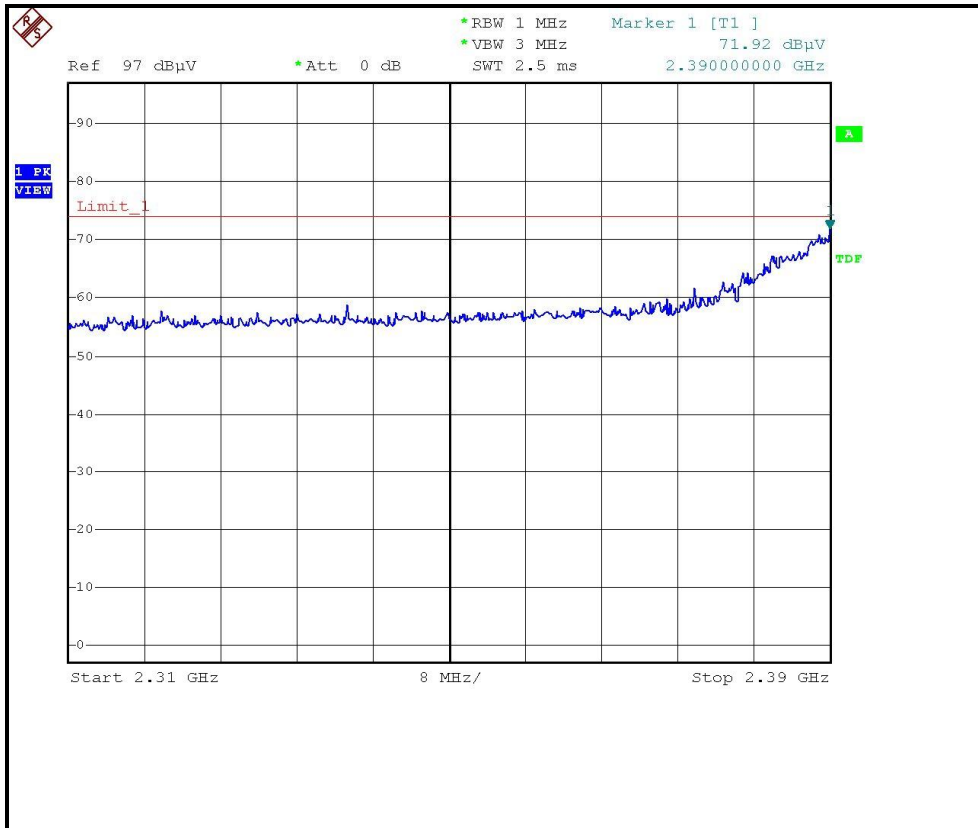
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	110.60 PK			1.16 H	203	79.88	30.72
2	*2462.00	100.00 AV			1.16 H	203	69.28	30.72
3	2483.50	72.57 PK	74.00	-1.43	1.16 H	198	41.75	30.82
4	2483.50	53.36 AV	54.00	-0.64	1.16 H	198	22.54	30.82
5	4924.00	46.40 PK	74.00	-27.60	1.06 H	132	10.50	35.90
6	4924.00	32.80 AV	54.00	-21.20	1.06 H	132	-3.10	35.90
7	7386.00	52.20 PK	74.00	-21.80	1.00 H	52	9.40	42.80
8	7386.00	38.80 AV	54.00	-15.20	1.00 H	52	-4.00	42.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

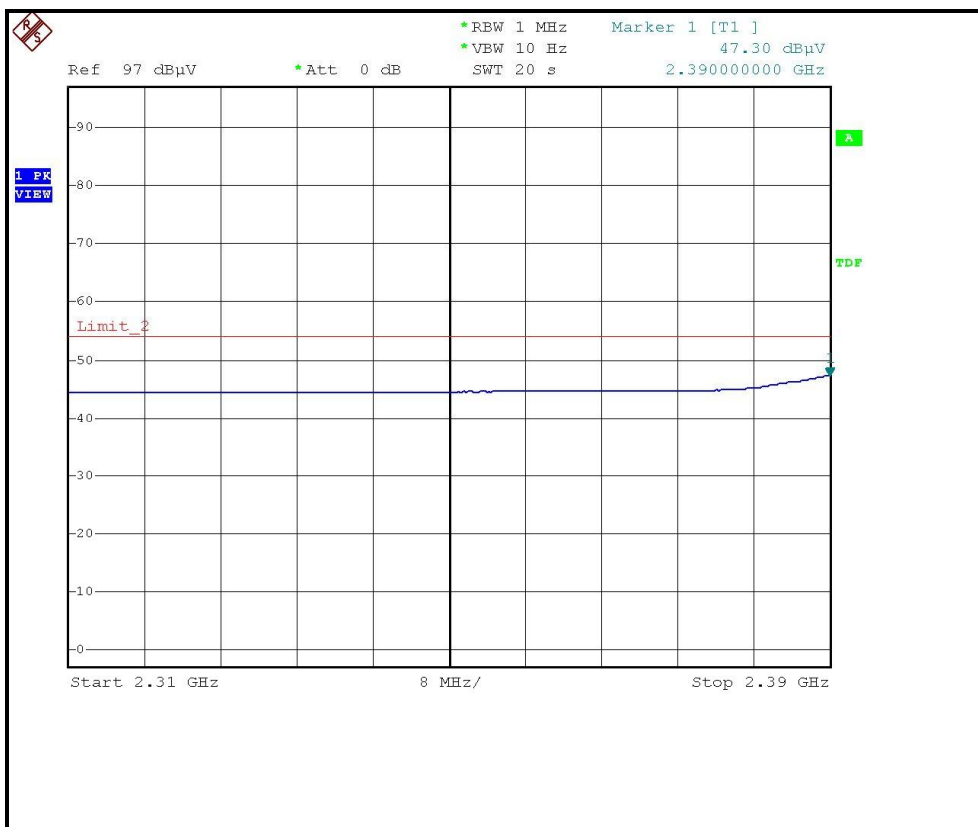
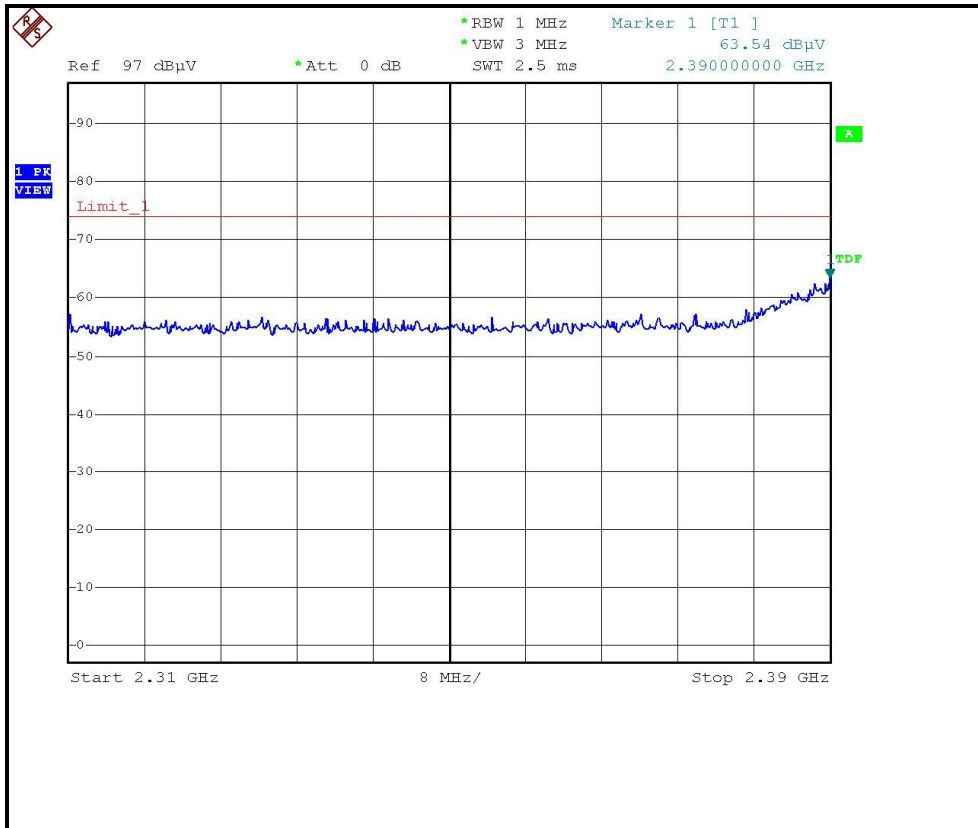
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	102.50 PK			1.02 V	320	71.78	30.72
2	*2462.00	91.80 AV			1.02 V	320	61.08	30.72
3	2483.50	57.24 PK	74.00	-16.76	1.00 V	307	26.42	30.82
4	2483.50	44.53 AV	54.00	-9.47	1.00 V	307	13.71	30.82
5	4924.00	45.70 PK	74.00	-28.30	1.05 V	68	9.80	35.90
6	4924.00	32.00 AV	54.00	-22.00	1.05 V	68	-3.90	35.90
7	7386.00	52.20 PK	74.00	-21.80	1.00 V	44	9.40	42.80
8	7386.00	38.50 AV	54.00	-15.50	1.00 V	44	-4.30	42.80

- 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 limit value is defined as per 15.247
 6. “ * “ : Fundamental frequency

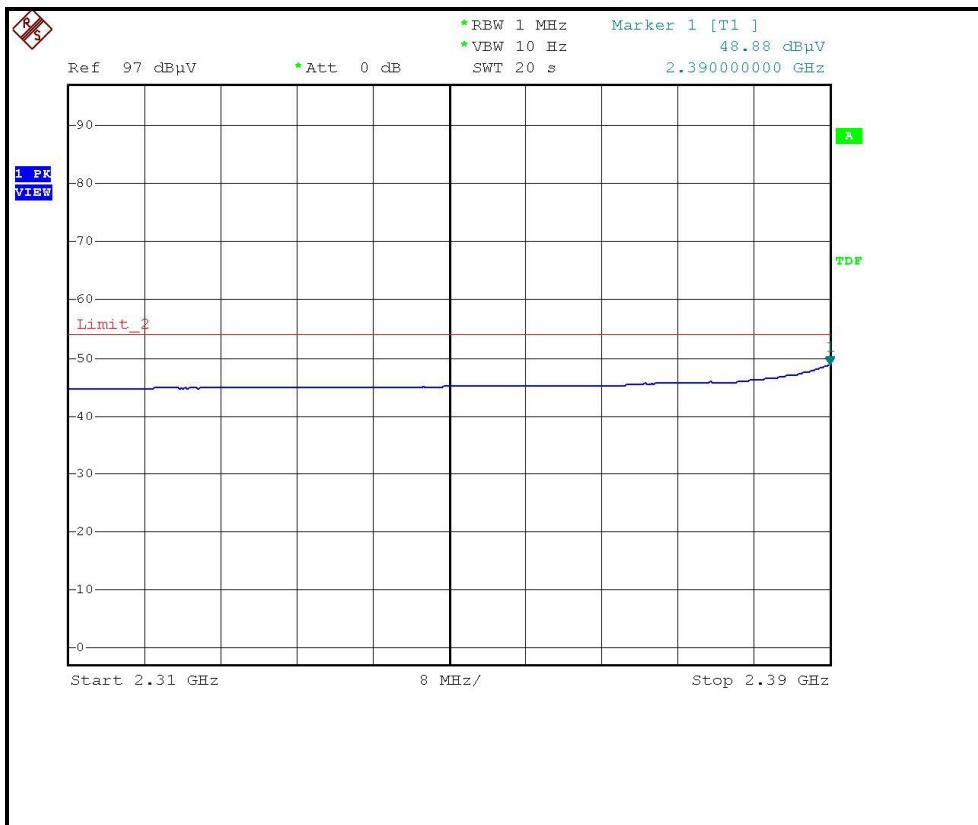
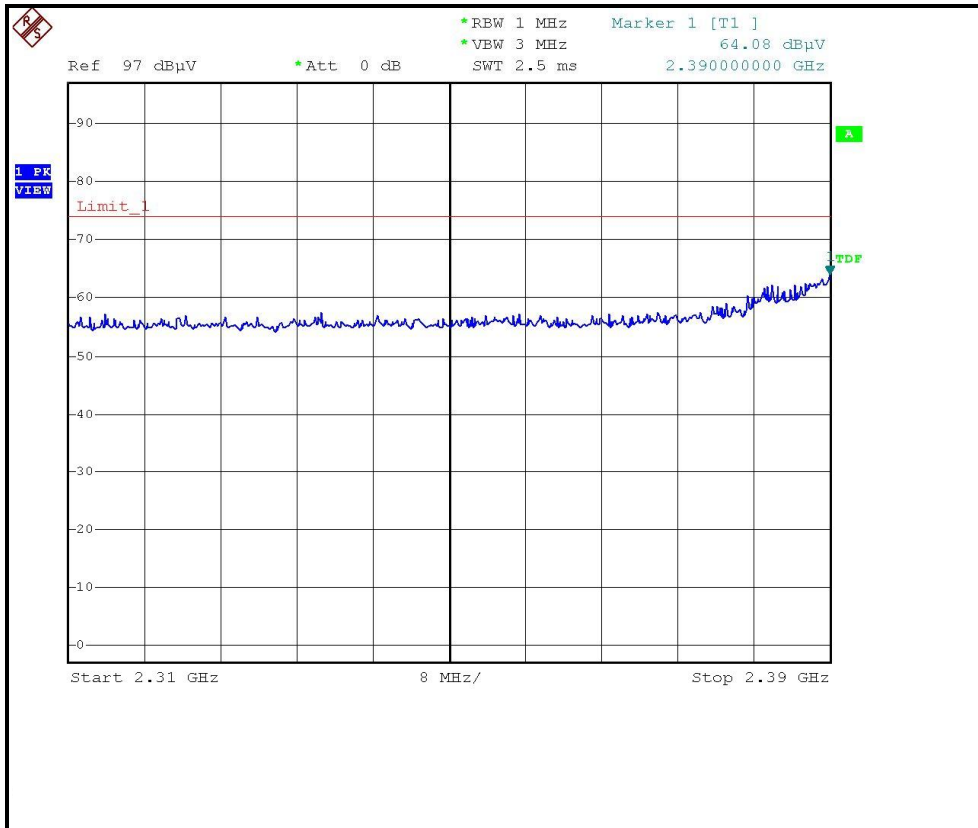
RESTRICTED BANDEDGE (802.11g MODE, CH1, HORIZONTAL)



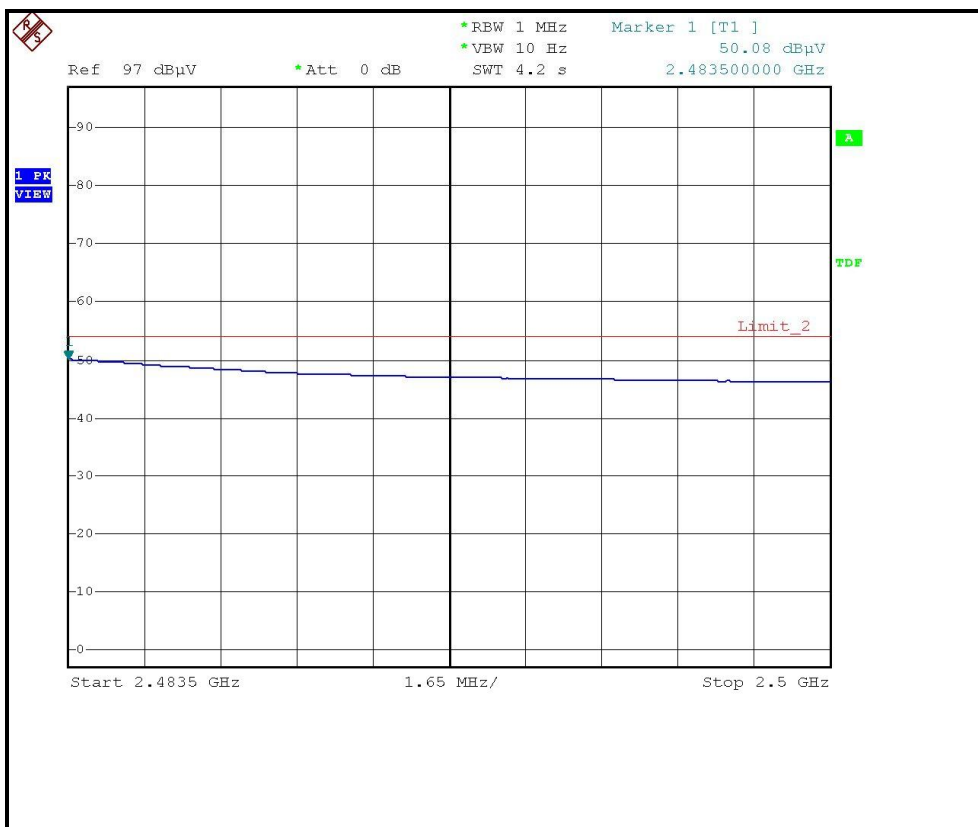
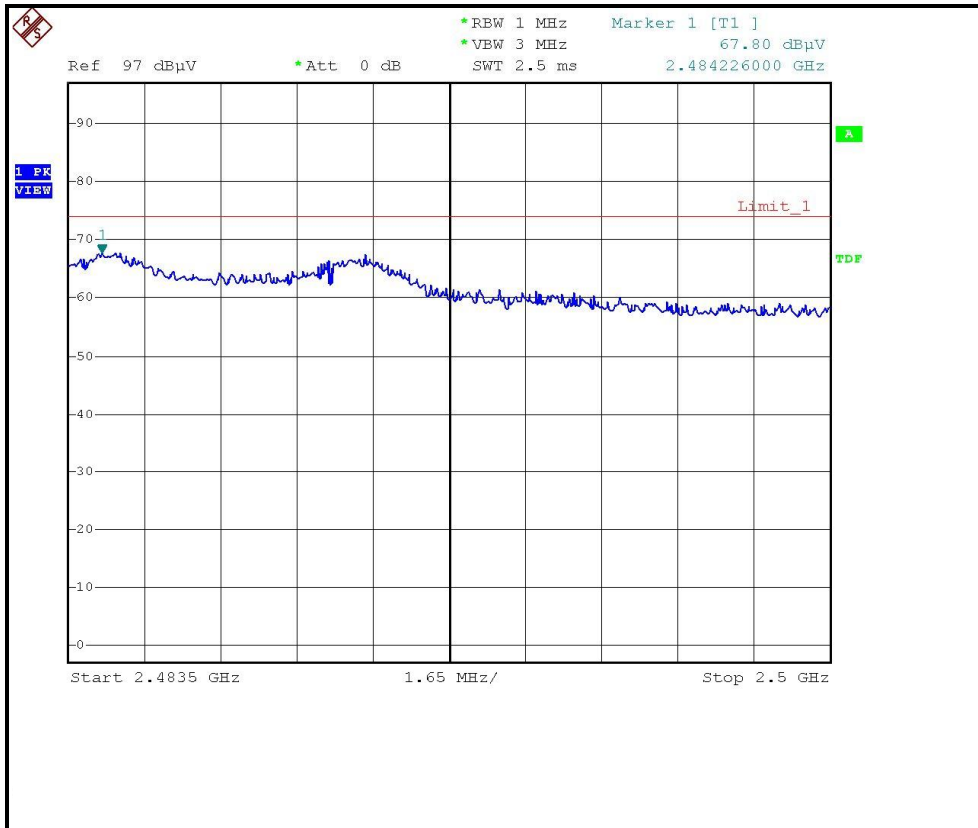
RESTRICTED BANDEDGE (802.11g MODE, CH1, VERTICAL)



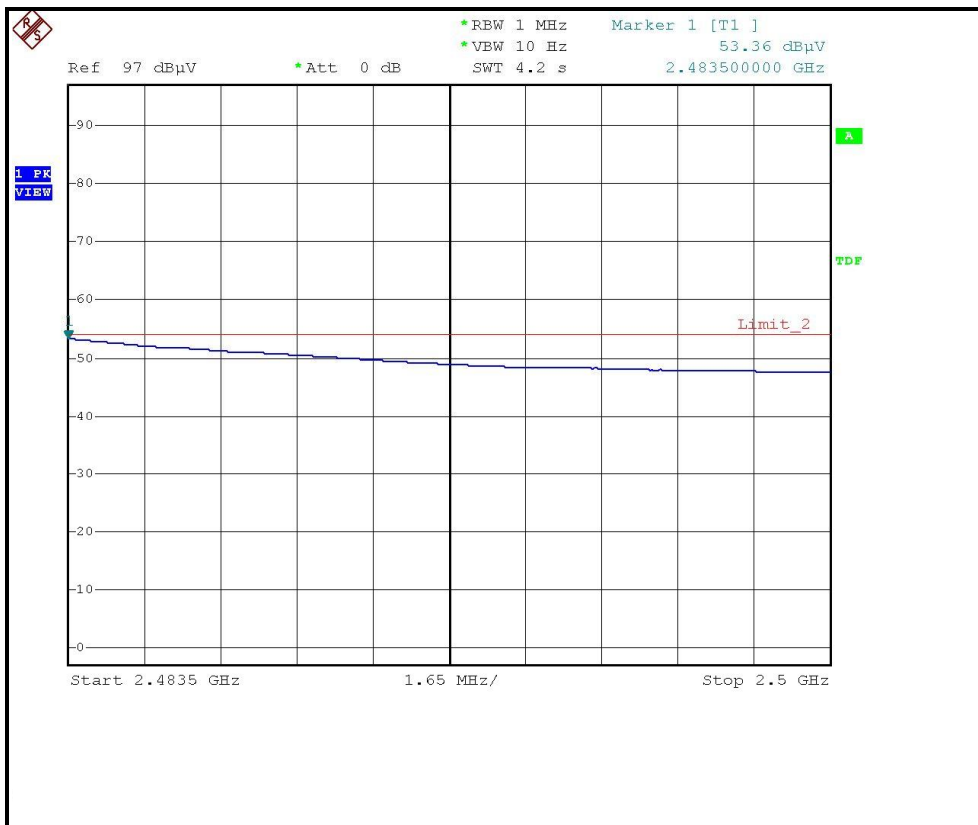
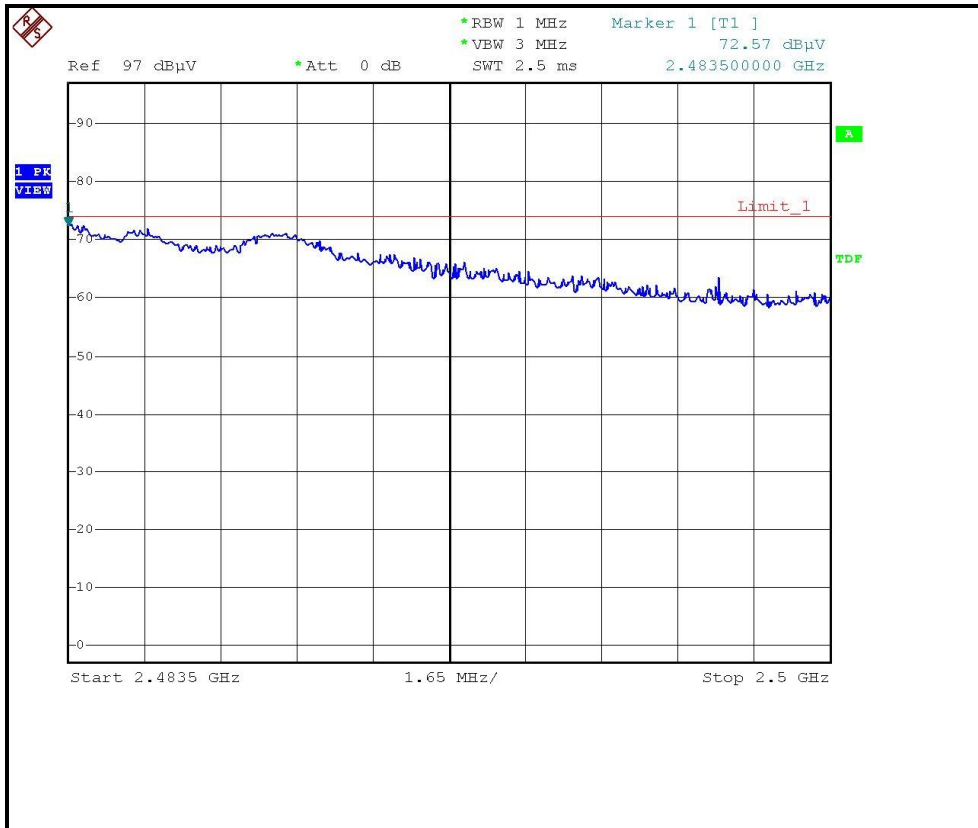
RESTRICTED BANDEDGE (802.11g MODE,CH2, VERTICAL)



RESTRICTED BANDEDGE (802.11g MODE,CH10, VERTICAL)



RESTRICTED BANDEDGE (802.11g MODE,CH11, HORIZONTAL)



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.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 09, 2007

NOTE:

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.2.3 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 100 kHz RBW and 100 kHz VBW. The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.

4.2.4 TEST SETUP



For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

4.2.5 EUT OPERATING CONDITIONS

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



4.2.6 TEST RESULTS –DSSS

802.11b DSSS modulation

MODULATION TYPE	CCK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	26deg. C, 55RH, 960hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	12.18	0.5	PASS
6	2437	12.11	0.5	PASS
11	2462	12.18	0.5	PASS