FCC TEST REPORT (15.247)

REPORT NO.:	RF970612H01
MODEL NO.:	MC1790
RECEIVED:	June 12, 2008
TESTED:	June 16 to Aug. 19, 2008
ISSUED:	Aug. 28, 2008
APPLICANT:	Symbol Technologies Inc.
ADDRESS:	One Symbol Plaza, Holtsville, NY 11742-1300 U.S.A.
ISSUED BY:	Advance Data Technology Corporation
TEST LOCATION:	No. 81-1, Lu Liao Keng, 9 Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien, Taiwan, R.O.C.

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1. CERTIFICATION

PRODUCT:	PERSONAL SHOPPING SYSTEM-BARCODE SCANNER
BRAND NAME:	Symbol Technologies Inc.
MODEL NO.:	MC1790
TEST SAMPLE:	ENGINEERING SAMPLE
TESTED:	June 16 to Aug. 19, 2008
APPLICANT:	Symbol Technologies Inc.
STANDARDS:	FCC Part 15, Subpart C (Section 15.247), ANSI C63.4-2003

The above equipment (Model: MC1790) 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 : Sunny Wen , **DATE:** *Aug. 28, 2008*
(Sunny Wen, Specialist)

TECHNICAL ACCEPTANCE : Hank Chung , **DATE:** *Aug. 28, 2008*
Responsible for RF
(Hank Chung, Deputy Manager)

APPROVED BY : May Chen , **DATE:** *Aug. 28, 2008*
(May Chen, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For 802.11b & g, 2412~2462MHz Band

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.247)			
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(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -3.08dB at 4834.00MHz
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.

For 802.11a, 5725~5850MHz Band

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.247)			
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(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -2.00dB at 11650.00MHz
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.

NOTE:

1. The EUT was operating in 2.412 ~ 2.462GHz, 5.15 ~ 5.35GHz, 5.47GHz ~ 5.725GHz and 5.725 ~ 5.850GHz frequencies band. This report was recorded the RF parameters including 2.412 ~ 2.462GHz and 5.725 ~ 5.850GHz. For the 5.15 ~ 5.35GHz and 5.47GHz ~ 5.725GHz RF parameters was recorded in another test report.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in 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
Conducted emissions	2.45 dB
Radiated emissions (30MHz-1GHz)	3.94 dB
Radiated emissions (1GHz -18GHz)	2.33 dB
Radiated emissions (18GHz -40GHz)	2.55 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	PERSONAL SHOPPING SYSTEM-BARCODE SCANNER
MODEL NO.	MC1790
FCC ID	H9PMC1790
POWER SUPPLY	DC 12V from charge or DC 3.7V from battery
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11 / 5.5 / 2 / 1Mbps 802.11g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps 802.11a: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps
FREQUENCY RANGE	For 15.407 802.11a: 5.18 ~ 5.32GHz, 5.50 ~ 5.70GHz
	For 15.247 802.11b & 802.11g: 2412 ~ 2462MHz 802.11a: 5.745 ~ 5.825GHz
NUMBER OF CHANNEL	**For 15.407** 19 for 802.11a
	For 15.247(2.4GHz) 11 for 802.11b, 802.11g **For 15.247(5GHz)** 5 for 802.11a
MAXIMUM OUTPUT POWER	**For 15.407** 802.11a: 24.831mW **For 15.247(2.4GHz)** 802.11b: 35.156mW 802.11g: 77.446mW **For 15.247(5GHz)** 802.11a: 81.658mW
ANTENNA TYPE	PIFA antenna without Connector (for 2.4GHz antenna gain : 2.04dBi, for 5GHz antenna gain : 4.08dBi)
DATA CABLE	NA

NOTE:

1. The EUT could be supplied with the a charge, power adapter and Li-ion battery as below:

Charger (only for test, not for sale together)	
Brand:	Symbol Technologies Inc.
Model No.:	PSS-3CR01
Input power :	+12V-----9.0A
Output power :	12V-----1.5A
Adapter (only for charger use, not for sale together)	
Brand:	Symbol Technologies Inc.
Model No.:	50-14000-241R
Input power :	100-240V, 50-60Hz, 3.0A
Output power :	+12V-----9.0A
Li-ion Battery	
Brand:	Symbol Technologies Inc.
Model No.:	82-97131-01
RATING:	3.7V, 2400mAh, 8.88Wh

2. The EUT was pre-tested under the following modes:

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

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

3. The EUT operates in both the 5GHz and 2.4GHz Bands and compatibility with 802.11a and 802.11b, 802.11g technology.
4. The above EUT information was 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

Operated in 2400 ~ 2483.5MHz band:

Eleven channels are provided for 802.11b, 802.11g:

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		

Operated in 5725 ~ 5850MHz band:

Five channels are provided for 802.11a:

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	5745 MHz	4	5805 MHz
2	5765 MHz	5	5825 MHz
3	5785 MHz		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

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

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)
For 2.4 GHz 802.11g	1 to 11	1	OFDM	BPSK	6
For 5 GHz	1 to 5	1	OFDM	BPSK	6

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, 2, 6, 10, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	6
802.11a	1 to 5	1, 3, 5	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	DBPSK,	1
802.11g	1 to 11	1, 11	OFDM	BPSK	6
802.11a	1 to 5	1, 5	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	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11a	1 to 5	1, 3, 5	OFDM	BPSK	6

3.3 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:

FCC Part 15, Subpart C. (15.247)
ANSI C63.4-2003

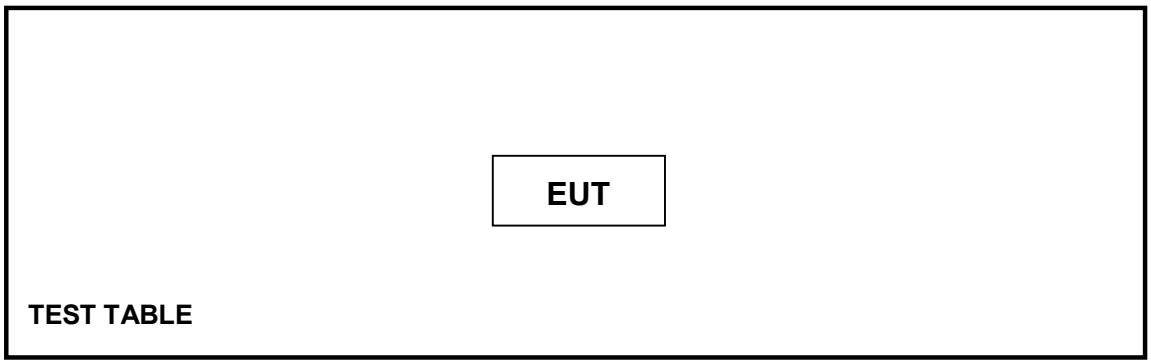
All test items have been performed and recorded as per the above standards.

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit.

3.5 CONFIGURATION OF SYSTEM UNDER TEST



4.TEST TYPES AND RESULTS (802.11b & g, 2400 ~ 2483.5MHz Band)

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 15, 2009
HP Pre_Amplifier	8449B	3008A01922	Oct. 04, 2008
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Mar. 31, 2009
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	April 29, 2009
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 16, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 27, 2009
RF Switches (ARNITSU)	CS-201	1565157	Aug. 13, 2009
RF CABLE (Chaintek)	SF102	22054-2	Dec. 06. 2008
RF Cable	8DFB	STCCAB-30M-1 GHz	Oct. 09, 2008
Software	ADT_Radiated_V 7.6.15.8	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 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 3789C-3.

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 the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

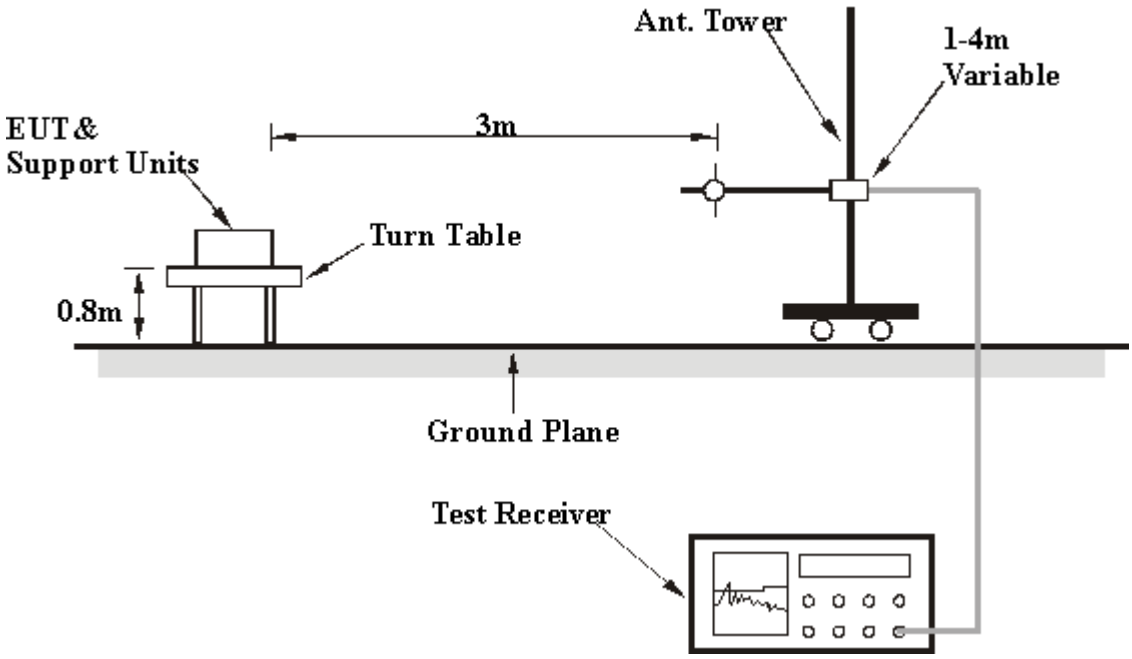
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) 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 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

4.1.6 EUT OPERATING CONDITIONS

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

Below 1GHz Test Data

4.1.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA：802.11g OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	DC 3.7V from battery	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 76%RH 960hPa	TESTED BY	Frank Liu

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	62.50	22.13 QP	40.00	-17.87	1.30 H	175	8.82	13.30
2	200.24	23.43 QP	43.50	-20.07	1.00 H	21	11.25	12.18
3	238.37	22.44 QP	46.00	-23.56	1.30 H	21	8.48	13.96
4	276.52	22.57 QP	46.00	-23.43	1.00 H	66	7.09	15.48
5	375.00	21.33 QP	46.00	-24.67	1.00 H	21	2.17	19.16
6	453.90	35.78 QP	46.00	-10.22	1.30 H	159	15.03	20.75
7	650.00	26.45 QP	46.00	-19.55	1.64 H	34	1.92	24.53
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	62.50	25.50 QP	40.00	-14.50	1.30 V	175	12.20	13.30
2	200.24	26.41 QP	43.50	-17.09	1.00 V	21	14.23	12.18
3	238.37	25.84 QP	46.00	-20.16	1.30 V	21	11.88	13.96
4	250.00	23.76 QP	46.00	-22.24	1.00 V	1	9.26	14.50
5	276.52	24.67 QP	46.00	-21.33	1.00 V	66	9.19	15.48
6	300.00	26.32 QP	46.00	-19.68	1.00 V	238	10.14	16.18
7	375.00	25.51 QP	46.00	-20.49	1.00 V	21	6.35	19.16
8	450.00	24.25 QP	46.00	-21.75	1.00 V	312	3.55	20.70
9	650.00	28.40 QP	46.00	-17.60	1.64 V	34	3.87	24.53

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.

Above 1GHz Test Data

4.1.8 TEST RESULTS

802.11b DSSS MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 3.7V from battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 72%RH 960hPa	TESTED BY	Frank Liu

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	2385.52	65.88 PK	74.00	-8.12	1.23 H	73	35.84	30.04
2	2385.52	44.79 AV	54.00	-9.21	1.23 H	73	14.75	30.04
3	*2412.00	104.39 PK			1.44 H	73	74.24	30.15
4	*2412.00	97.47 AV			1.44 H	73	67.32	30.15
5	4824.00	54.80 PK	74.00	-19.20	1.07 H	62	19.17	35.63
6	4824.00	50.03 AV	54.00	-3.97	1.07 H	62	14.40	35.63
7	#7236.00	52.30 PK	74.00	-21.70	1.00 H	78	10.45	41.85
8	#7236.00	39.02 AV	54.00	-14.98	1.00 H	78	-2.83	41.85
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	2389.36	59.19 PK	74.00	-14.81	1.00 V	27	29.13	30.06
2	2389.36	43.32 AV	54.00	-10.68	1.00 V	27	13.26	30.06
3	*2412.00	101.25 PK			1.00 V	3	71.10	30.15
4	*2412.00	94.26 AV			1.00 V	3	64.11	30.15
5	4824.00	50.23 PK	74.00	-23.77	1.03 V	4	14.77	35.46
6	4824.00	44.85 AV	54.00	-9.15	1.03 V	4	9.39	35.46
7	#7236.00	51.63 PK	74.00	-22.37	1.13 V	13	9.78	41.85
8	#7236.00	38.54 AV	54.00	-15.46	1.13 V	13	-3.31	41.85

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 2	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 3.7V from battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 72%RH 960hPa	TESTED BY	Frank Liu

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	2375.76	61.34 PK	74.00	-12.66	1.44 H	52	31.33	30.01
2	2375.76	43.57 AV	54.00	-10.43	1.44 H	52	13.56	30.01
3	*2417.00	104.60 PK			1.43 H	51	74.43	30.17
4	*2417.00	97.46 AV			1.43 H	51	67.29	30.17
5	4834.00	54.60 PK	74.00	-19.40	1.00 H	71	19.12	35.48
6	**4834.00**	**50.92 AV**	**54.00**	**-3.08**	**1.00 H**	**71**	**15.44**	**35.48**
7	7251.00	52.85 PK	74.00	-21.15	1.32 H	241	10.96	41.89
8	7251.00	49.87 AV	54.00	-4.13	1.32 H	241	7.98	41.89
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	56.83 PK	74.00	-17.17	1.08 V	168	26.77	30.06
2	2390.00	43.05 AV	54.00	-10.95	1.08 V	168	12.99	30.06
3	*2417.00	98.00 PK			1.08 V	168	67.83	30.17
4	*2417.00	90.87 AV			1.08 V	168	60.70	30.17
5	4834.00	49.60 PK	74.00	-24.40	1.41 V	323	14.12	35.48
6	4834.00	43.00 AV	54.00	-11.00	1.41 V	323	7.52	35.48
7	7251.00	52.11 PK	74.00	-21.89	1.30 V	123	10.22	41.89
8	7251.00	38.90 AV	54.00	-15.10	1.30 V	123	-2.99	41.89

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)	DC 3.7V from battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 72%RH 960hPa	TESTED BY	Frank Liu

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	107.90 PK			1.40 H	262	77.66	30.24
2	*2437.00	100.42 AV			1.40 H	262	70.18	30.24
3	4874.00	53.22 PK	74.00	-20.78	1.00 H	240	17.67	35.55
4	4874.00	50.53 AV	54.00	-3.47	1.00 H	240	14.98	35.55
5	7311.00	51.34 PK	74.00	-22.66	1.68 H	156	9.30	42.04
6	7311.00	38.02 AV	54.00	-15.98	1.68 H	156	-4.02	42.04
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	103.52 PK			1.00 V	171	73.28	30.24
2	*2437.00	96.23 AV			1.00 V	171	65.99	30.24
3	4874.00	51.12 PK	74.00	-22.88	1.04 V	275	15.57	35.55
4	4874.00	46.90 AV	54.00	-7.10	1.04 V	275	11.35	35.55
5	7311.00	51.23 PK	74.00	-22.77	1.30 V	265	9.19	42.04
6	7311.00	37.05 AV	54.00	-16.95	1.30 V	265	-4.99	42.04

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 10	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 3.7V from battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 72%RH 960hPa	TESTED BY	Frank Liu

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	107.67 PK			1.44 H	272	77.35	30.32
2	*2457.00	100.49 AV			1.44 H	272	70.17	30.32
3	2493.99	65.95 PK	74.00	-8.05	1.34 H	281	35.48	30.47
4	2493.99	44.71 AV	54.00	-9.29	1.34 H	281	14.24	30.47
5	4914.00	53.91 PK	74.00	-20.09	1.03 H	62	18.29	35.62
6	4914.00	47.66 AV	54.00	-6.34	1.03 H	62	12.04	35.62
7	7371.00	52.90 PK	74.00	-21.10	1.40 H	214	10.71	42.19
8	7371.00	49.79 AV	54.00	-4.21	1.40 H	214	7.60	42.19
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	105.11 PK			1.19 V	3	74.79	30.32
2	*2457.00	97.30 AV			1.19 V	3	66.98	30.32
3	2494.22	64.27 PK	74.00	-9.73	1.19 V	14	33.80	30.47
4	2494.22	43.97 AV	54.00	-10.03	1.19 V	14	13.50	30.47
5	4914.00	51.41 PK	74.00	-22.59	1.07 V	91	15.79	35.62
6	4914.00	43.36 AV	54.00	-10.64	1.07 V	91	7.74	35.62
7	7371.00	51.43 PK	74.00	-22.57	1.10 V	107	9.24	42.19
8	7371.00	48.52 AV	54.00	-5.48	1.10 V	107	6.33	42.19

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.

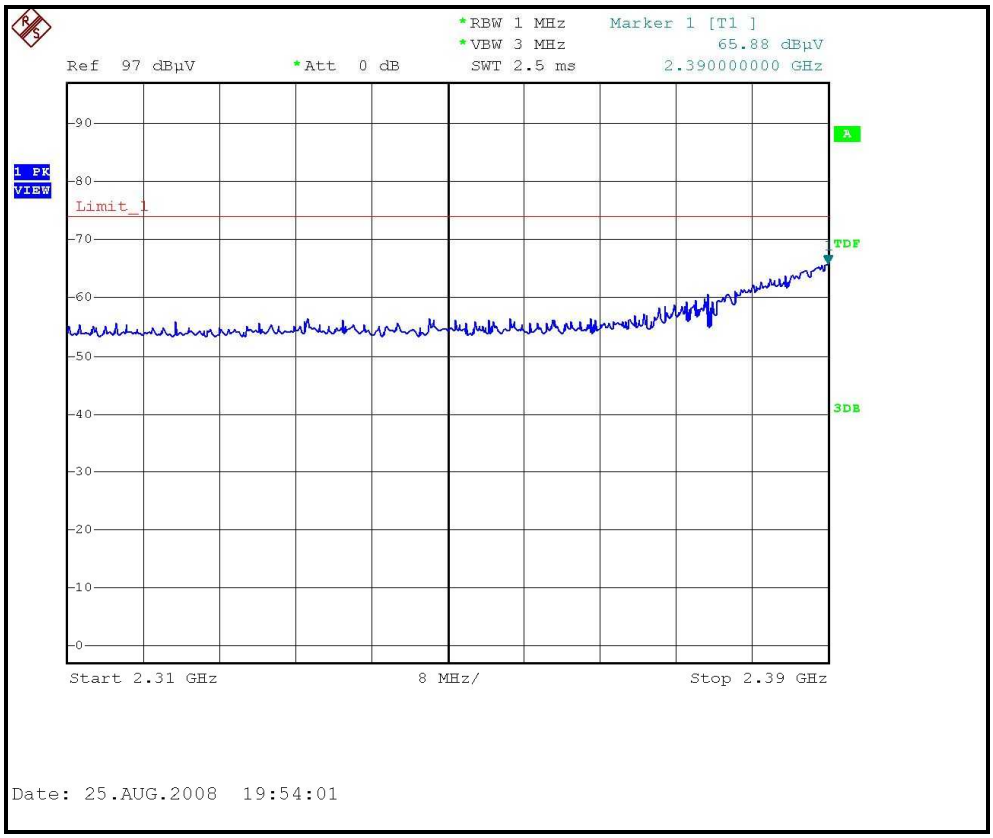
5. " * ": Fundamental frequency.

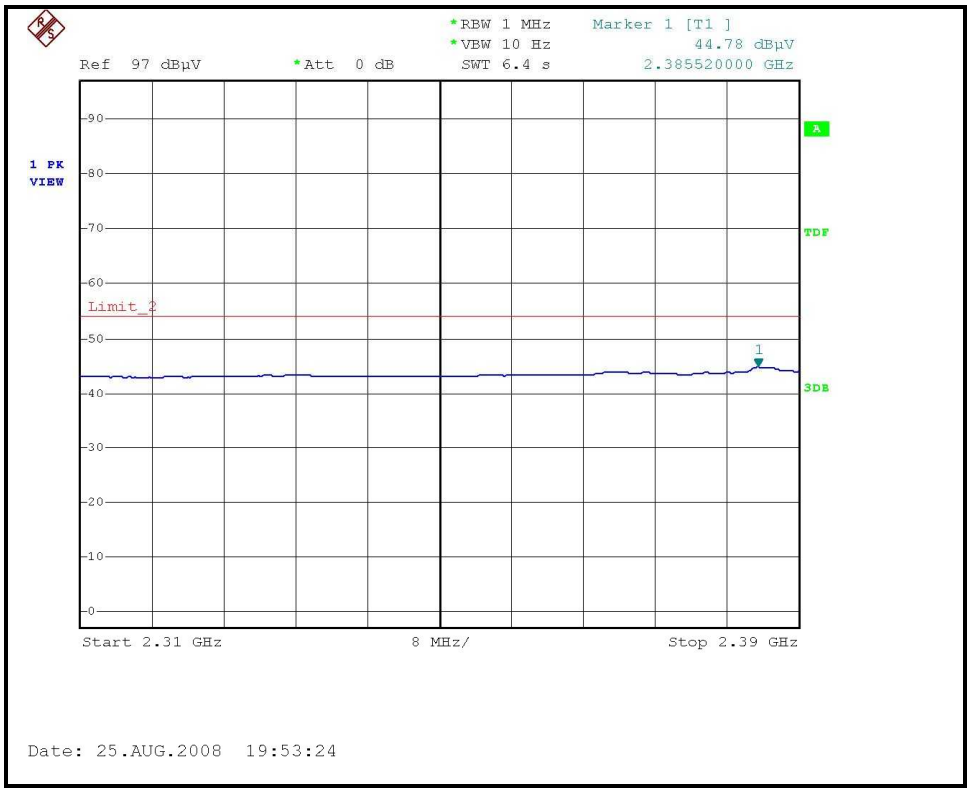
EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 3.7V from battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 66%RH 960hPa	TESTED BY	Frank Liu

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	110.80 PK			1.40 H	251	80.08	30.72
2	*2462.00	103.20 AV			1.40 H	251	72.48	30.72
3	2483.50	70.90 PK	74.00	-3.10	1.37 H	249	40.08	30.82
4	2483.50	46.10 AV	54.00	-7.90	1.37 H	249	15.28	30.82
5	4924.00	54.17 PK	74.00	-19.83	1.06 H	245	18.27	35.90
6	4924.00	49.94 AV	54.00	-4.06	1.06 H	245	14.04	35.90
7	7386.00	51.00 PK	74.00	-23.00	1.04 H	273	8.20	42.80
8	7386.00	36.80 AV	54.00	-17.20	1.04 H	273	-6.00	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	104.43 PK			1.68 V	193	73.71	30.72
2	*2462.00	97.25 AV			1.68 V	193	66.53	30.72
3	2483.50	64.96 PK	74.00	-9.04	1.66 V	196	34.14	30.82
4	2483.50	44.10 AV	54.00	-9.90	1.66 V	196	13.28	30.82
5	4924.00	50.11 PK	74.00	-23.89	1.04 V	132	14.21	35.90
6	4924.00	40.11 AV	54.00	-13.89	1.04 V	132	4.21	35.90
7	7386.00	50.10 PK	74.00	-23.90	1.07 V	146	7.30	42.80
8	7386.00	36.60 AV	54.00	-17.40	1.07 V	146	-6.20	42.80

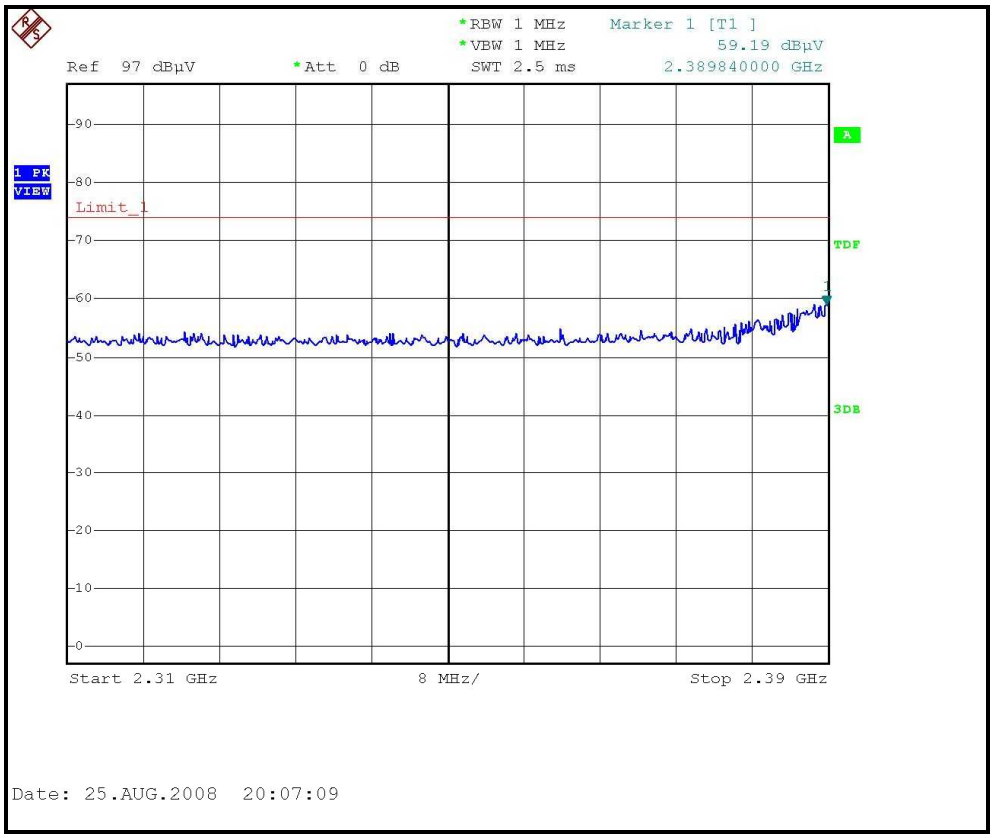
REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

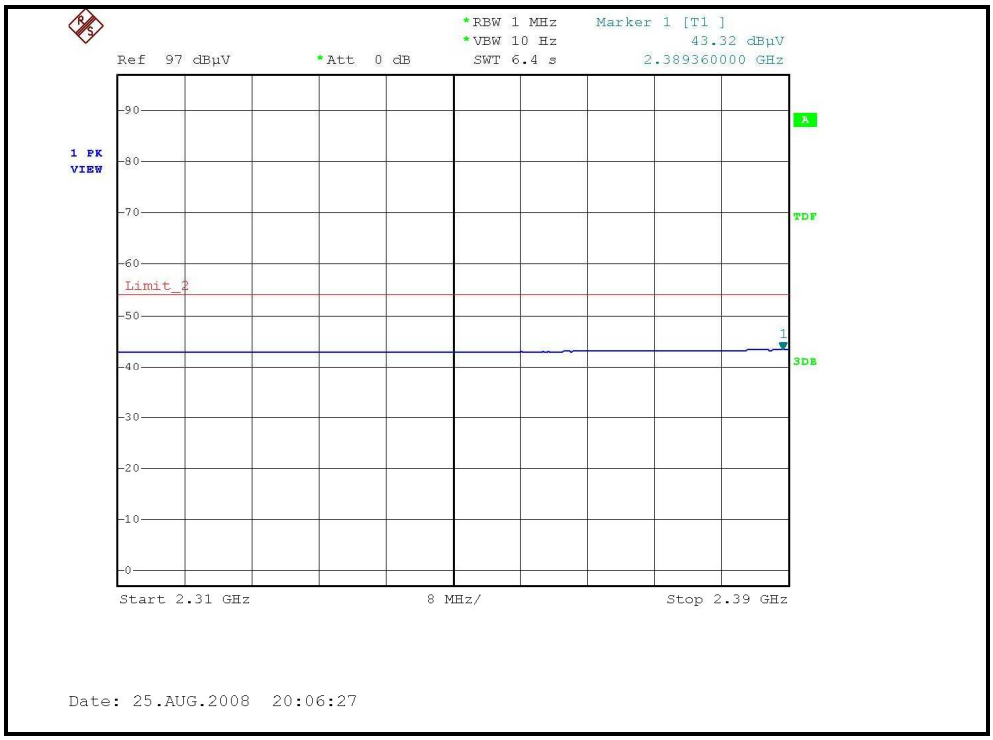
RESTRICTED BANDEDGE (802.11b MODE,CH 1, HORIZONTAL)





RESTRICTED BANDEDGE (802.11b MODE,CH 1, VERTICAL)





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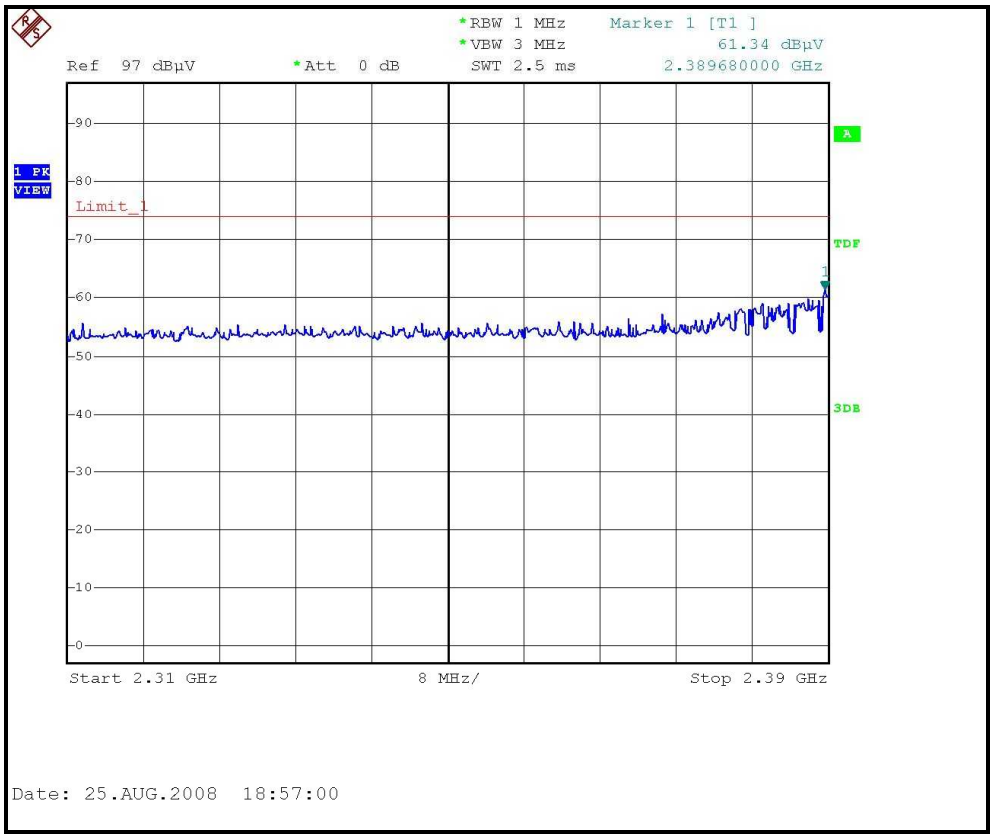

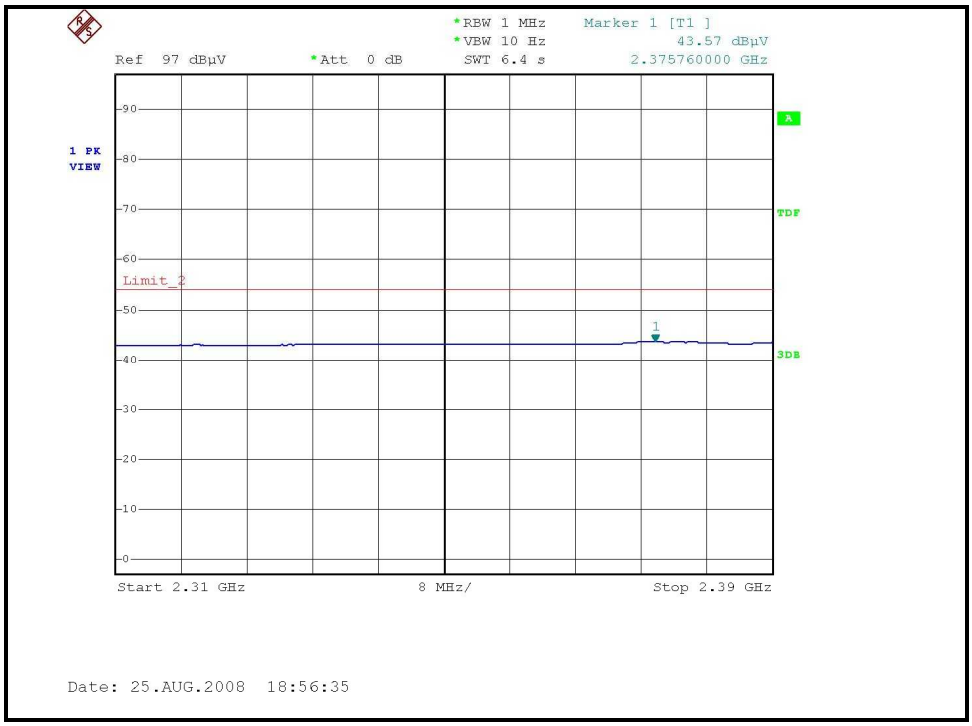

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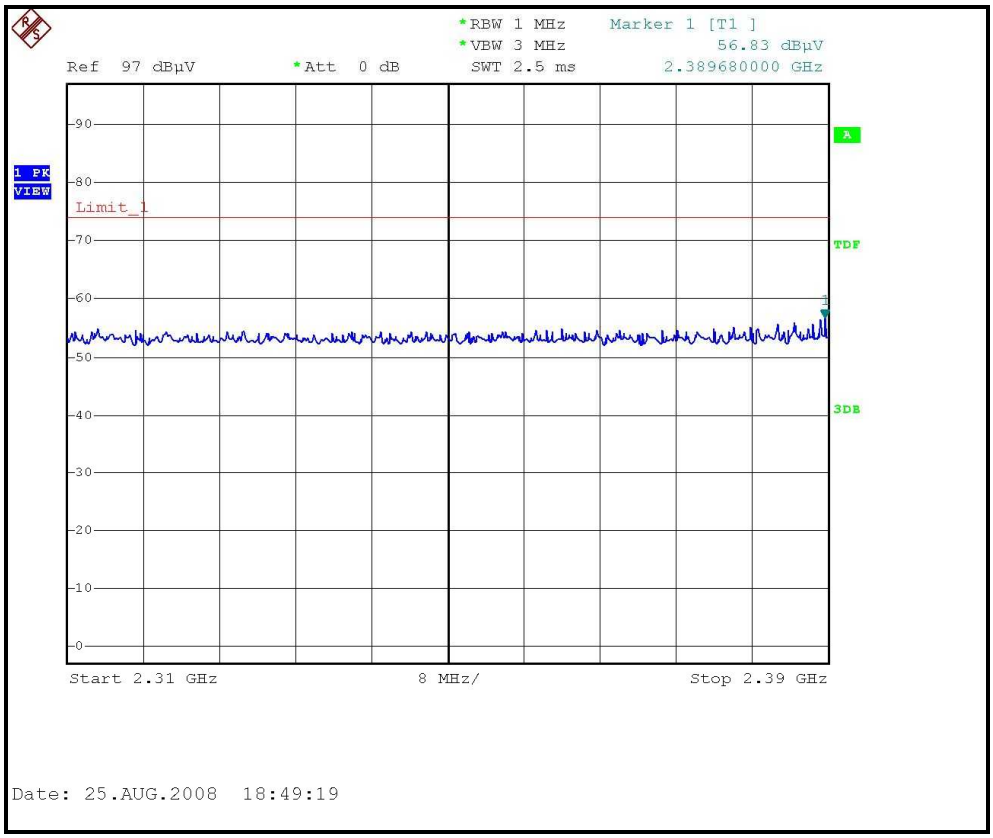

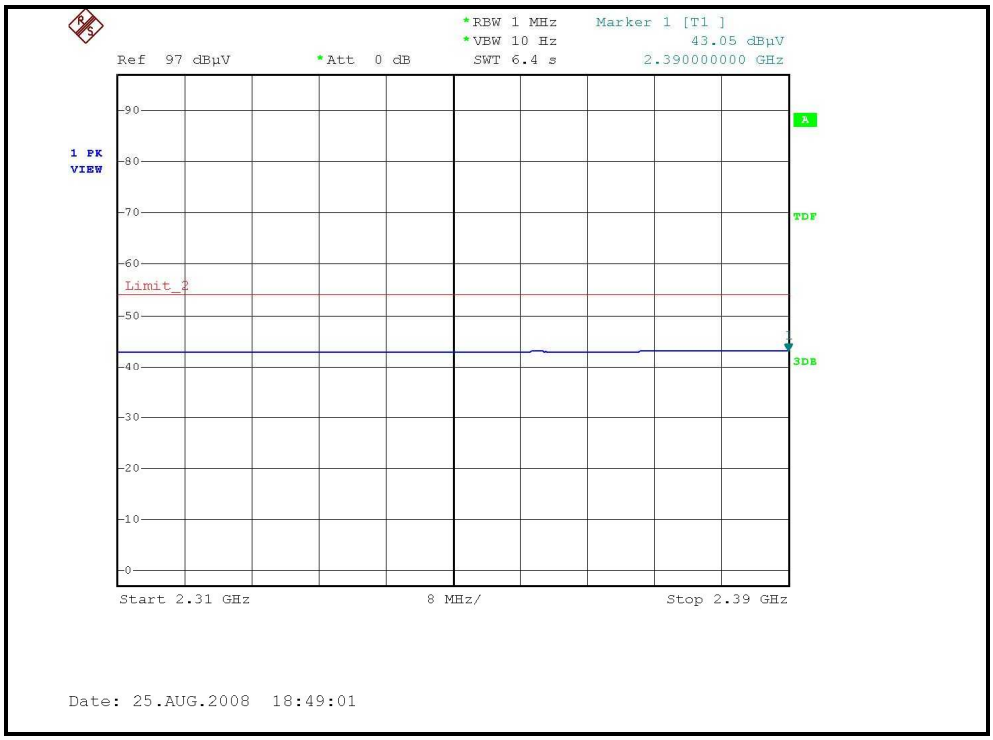

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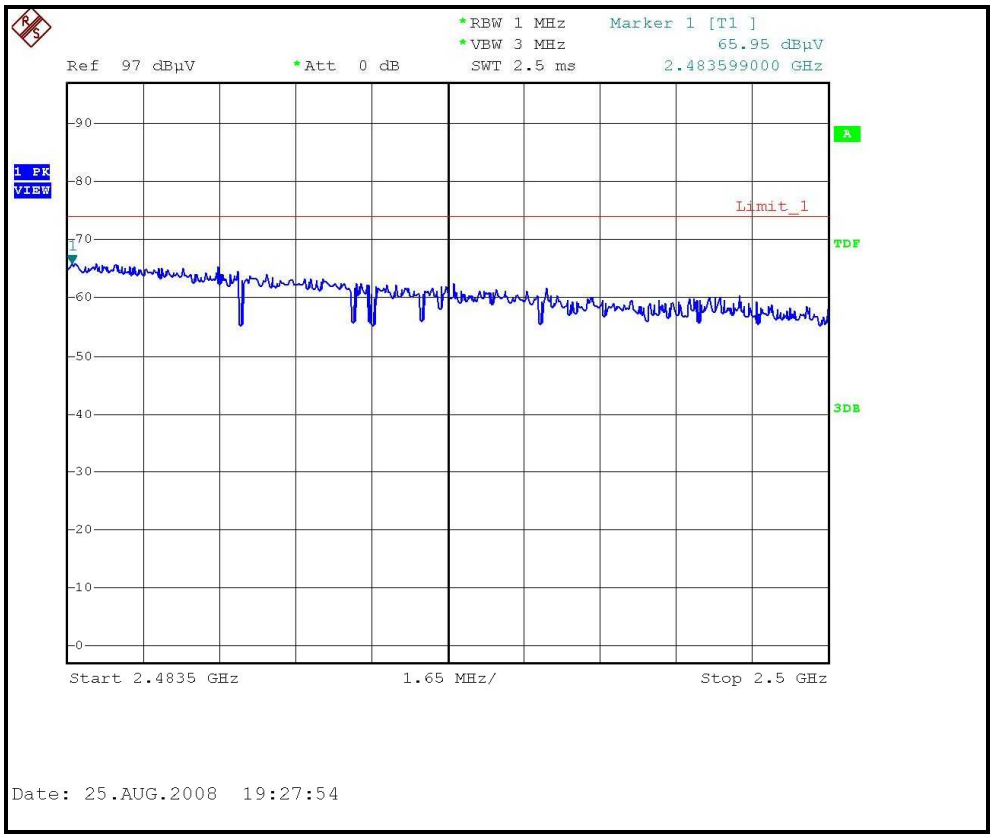

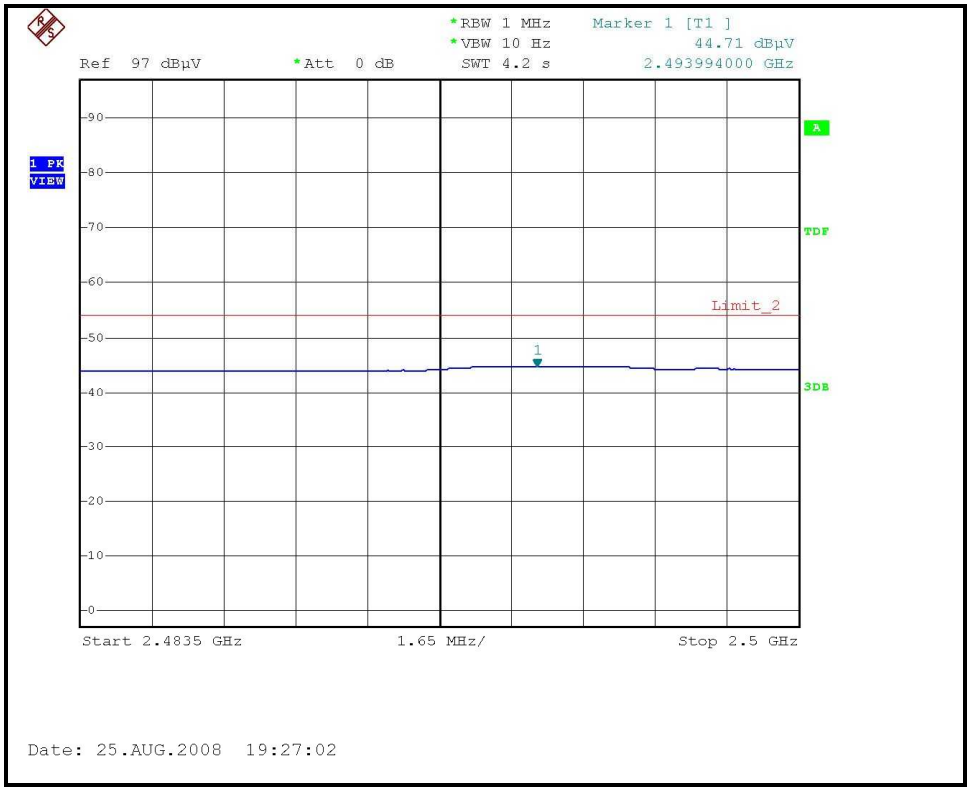

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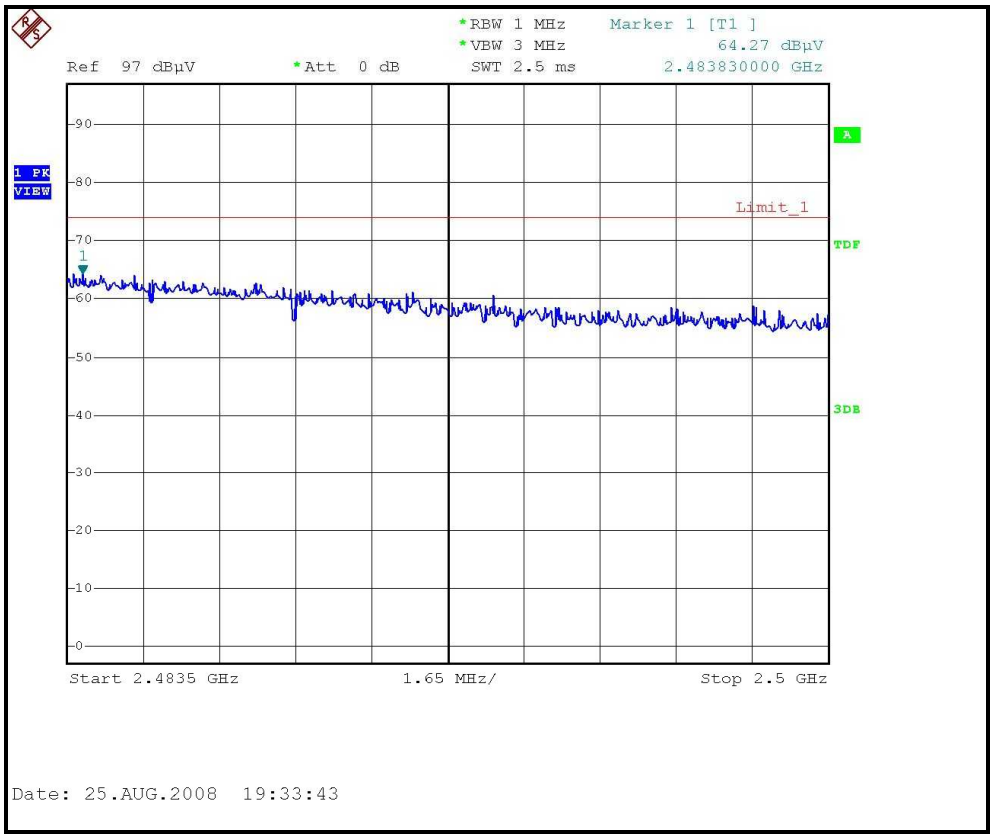

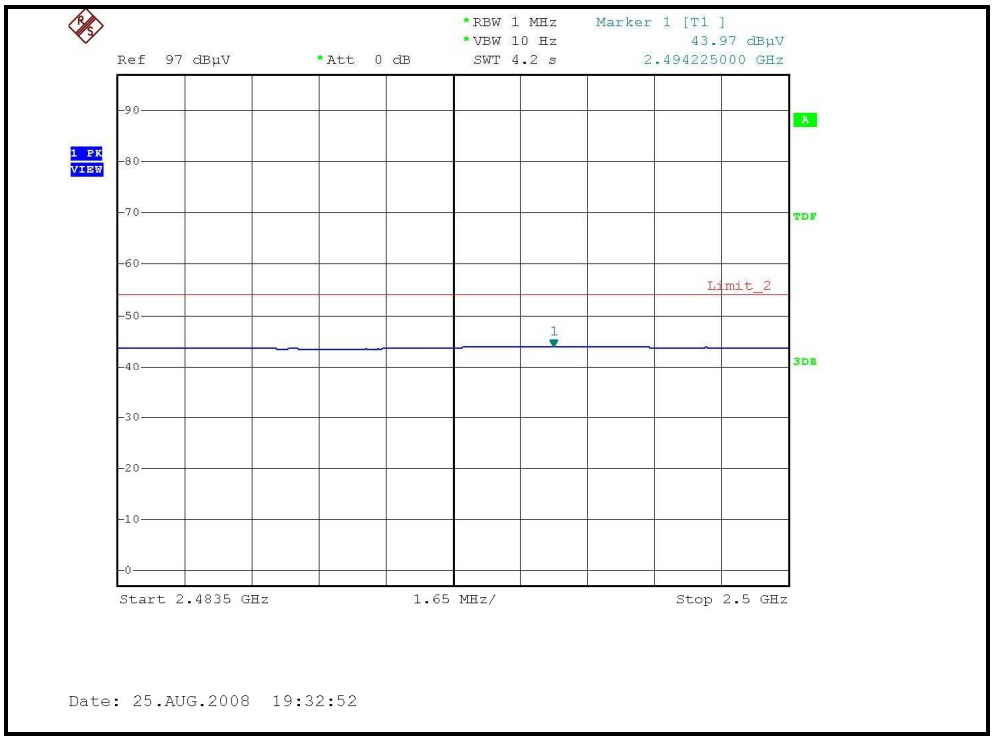

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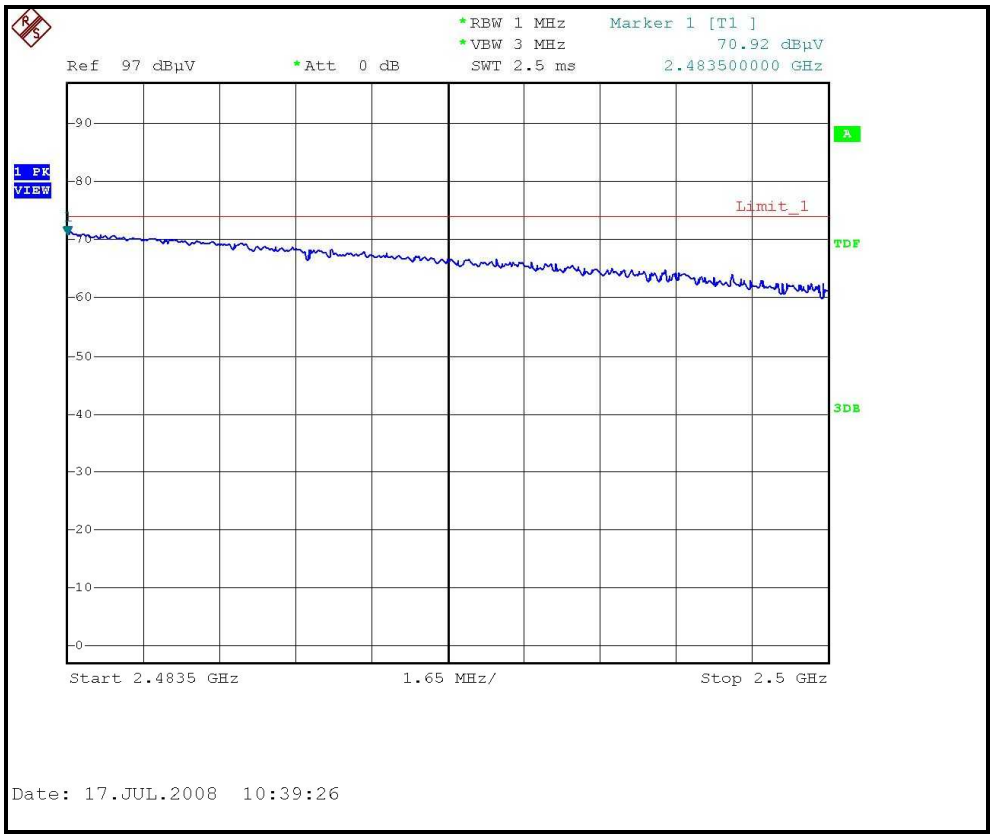

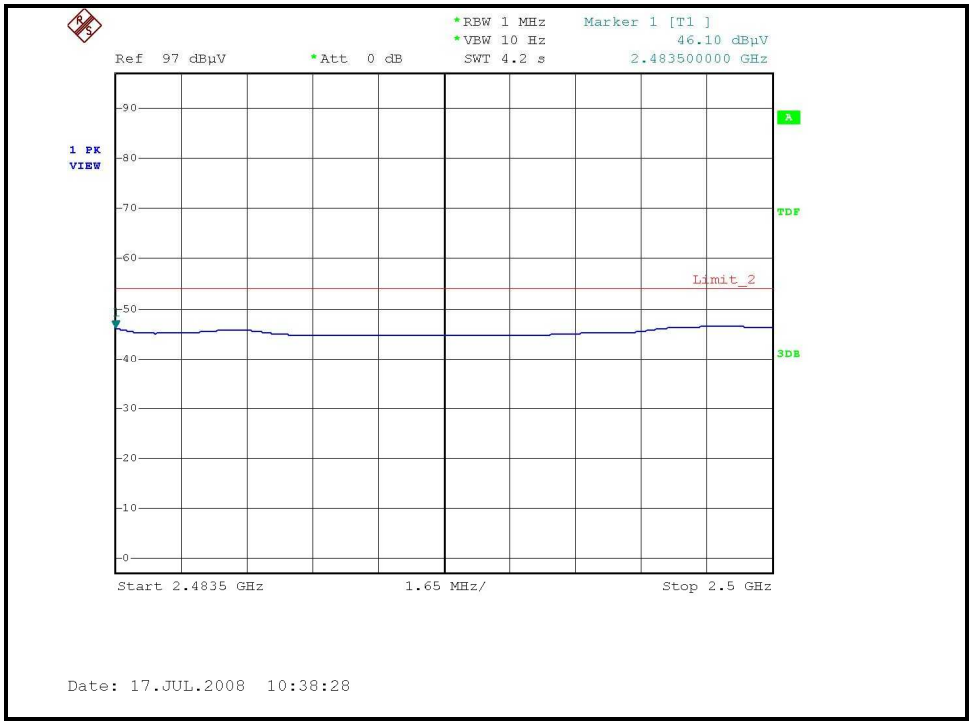

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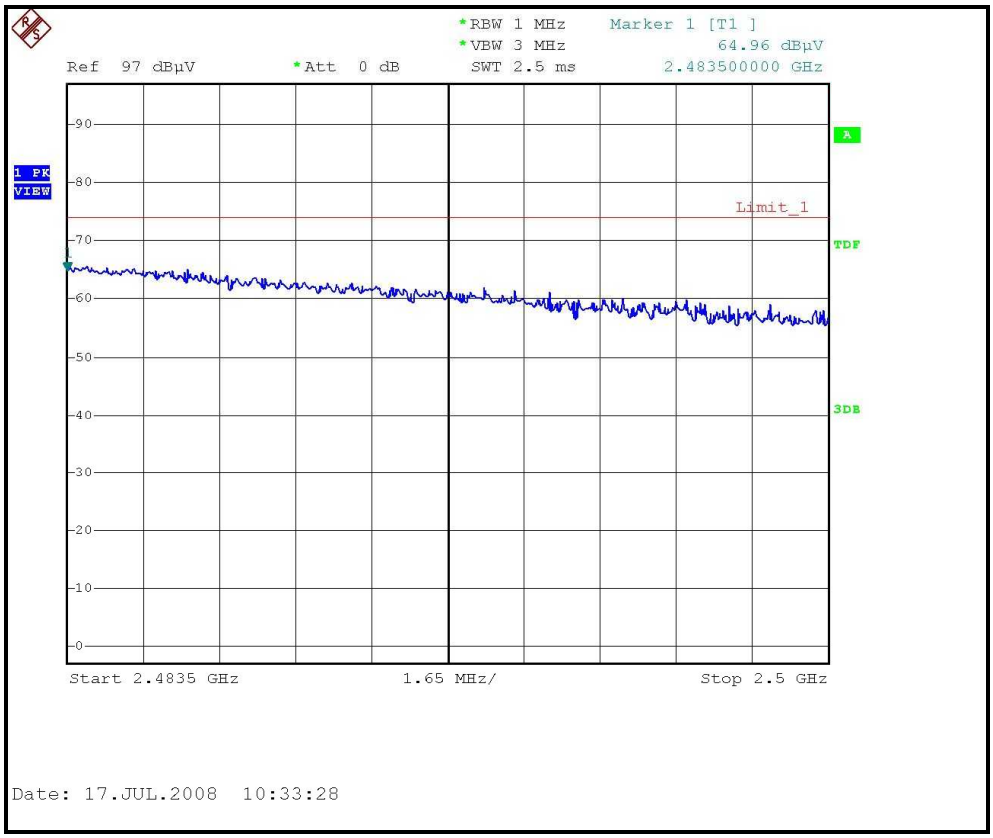
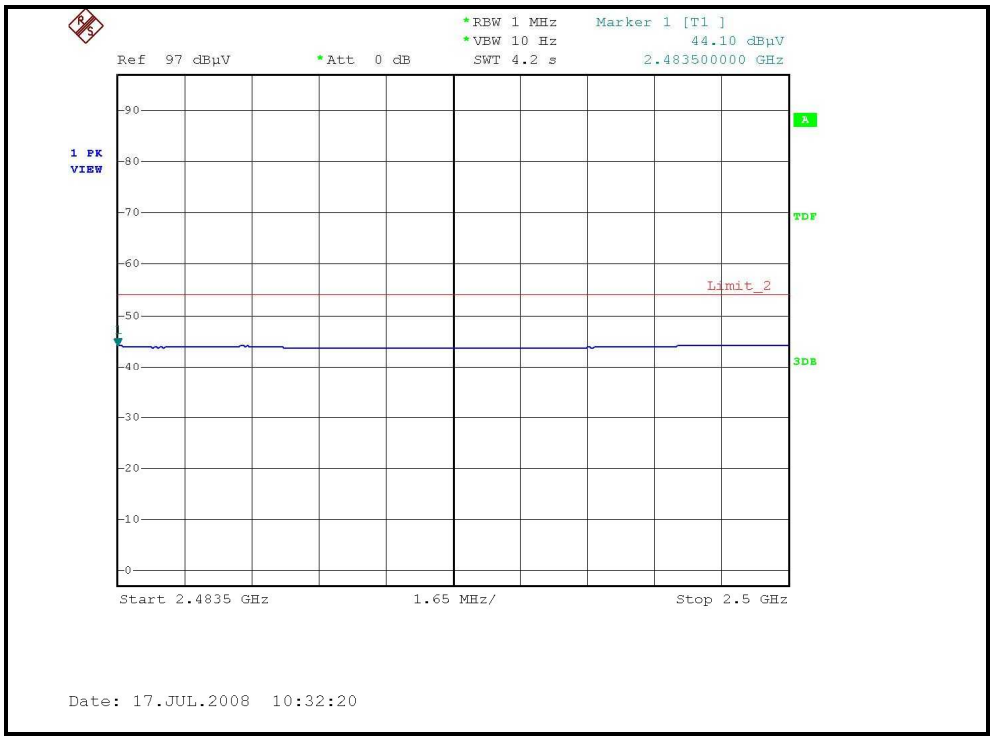




802.11g OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 3.7V from battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 66%RH 960hPa	TESTED BY	Frank Liu

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	65.20 PK	74.00	-8.80	1.40 H	256	44.00	21.20
2	2390.00	48.07 AV	54.00	-5.93	1.40 H	256	26.87	21.20
3	*2412.00	108.10 PK			1.41 H	253	86.90	21.20
4	*2412.00	96.50 AV			1.41 H	253	75.30	21.20
5	4824.00	62.40 PK	74.00	-11.60	1.00 H	250	41.20	21.20
6	4824.00	42.40 AV	54.00	-11.60	1.00 H	250	21.20	21.20
7	#7236.00	51.70 PK	88.10	-36.40	1.03 H	269	30.50	21.20
8	#7236.00	37.50 AV	76.50	-39.00	1.03 H	269	16.30	21.20
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	59.95 PK	74.00	-14.05	1.50 V	188	29.55	30.40
2	2390.00	44.65 AV	54.00	-9.35	1.50 V	188	14.25	30.40
3	*2412.00	99.90 PK			1.97 V	171	69.41	30.49
4	*2412.00	89.10 AV			1.97 V	171	58.61	30.49
5	4824.00	55.50 PK	74.00	-18.50	1.00 V	151	19.81	35.69
6	4824.00	36.10 AV	54.00	-17.90	1.00 V	151	0.41	35.69
7	#7236.00	50.60 PK	79.90	-29.30	1.00 V	154	8.36	42.24
8	#7236.00	37.10 AV	69.10	-32.00	1.00 V	154	-5.14	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. " * ": Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 2	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 3.7V from battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 66%RH 960hPa	TESTED BY	Frank Liu

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	61.22 PK	74.00	-12.78	1.24 H	76	31.16	30.06
2	2390.00	45.98 AV	54.00	-8.02	1.24 H	76	15.92	30.06
3	*2417.00	106.32 PK			1.43 H	78	76.15	30.17
4	*2417.00	95.55 AV			1.43 H	78	65.38	30.17
5	4834.00	61.75 PK	74.00	-12.25	1.03 H	63	26.27	35.48
6	4834.00	43.60 AV	54.00	-10.40	1.03 H	63	8.12	35.48
7	7251.00	51.52 PK	74.00	-22.48	1.15 H	335	9.63	41.89
8	7251.00	38.81 AV	54.00	-15.19	1.15 H	335	-3.08	41.89
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	58.64 PK	74.00	-15.36	1.03 V	13	28.58	30.06
2	2390.00	44.75 AV	54.00	-9.25	1.03 V	13	14.69	30.06
3	*2417.00	102.55 PK			1.03 V	13	72.38	30.17
4	*2417.00	91.23 AV			1.03 V	13	61.06	30.17
5	4834.00	53.61 PK	74.00	-20.39	1.20 V	171	18.13	35.48
6	4834.00	37.82 AV	54.00	-16.18	1.20 V	171	2.34	35.48
7	7251.00	51.24 PK	74.00	-22.76	1.27 V	85	9.35	41.89
8	7251.00	38.26 AV	54.00	-15.74	1.27 V	85	-3.63	41.89

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)	DC 3.7V from battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 66%RH 960hPa	TESTED BY	Frank Liu

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			1.41 H	249	79.59	30.61
2	*2437.00	99.20 AV			1.41 H	249	68.59	30.61
3	4874.00	62.90 PK	74.00	-11.10	1.04 H	238	27.10	35.80
4	4874.00	46.90 AV	54.00	-7.10	1.04 H	238	11.10	35.80
5	7311.00	51.50 PK	74.00	-22.50	1.00 H	277	8.98	42.52
6	7311.00	37.60 AV	54.00	-16.40	1.00 H	277	-4.92	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	103.60 PK			1.66 V	193	72.99	30.61
2	*2437.00	92.50 AV			1.66 V	193	61.89	30.61
3	4874.00	55.10 PK	74.00	-18.90	1.00 V	166	19.30	35.80
4	4874.00	39.00 AV	54.00	-15.00	1.00 V	166	3.20	35.80
5	7311.00	51.00 PK	74.00	-23.00	1.02 V	133	8.48	42.52
6	7311.00	37.40 AV	54.00	-16.60	1.02 V	133	-5.12	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. " * ": Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 10	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 3.7V from battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 66%RH 960hPa	TESTED BY	Frank Liu

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	108.30 PK			1.44 H	77	77.98	30.32
2	*2457.00	96.88 AV			1.44 H	77	66.56	30.32
3	2483.50	66.05 PK	74.00	-7.95	1.44 H	73	35.62	30.43
4	2483.50	46.91 AV	54.00	-7.09	1.44 H	73	16.48	30.43
5	4914.00	55.50 PK	74.00	-18.50	1.03 H	61	19.88	35.62
6	4914.00	38.20 AV	54.00	-15.80	1.03 H	61	2.58	35.62
7	7371.00	52.52 PK	74.00	-21.48	1.24 H	214	10.33	42.19
8	7371.00	38.46 AV	54.00	-15.54	1.24 H	214	-3.73	42.19
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	104.90 PK			1.20 V	3	74.58	30.32
2	*2457.00	93.60 AV			1.20 V	3	63.28	30.32
3	2483.50	61.98 PK	74.00	-12.02	1.18 V	14	31.55	30.43
4	2483.50	45.02 AV	54.00	-8.98	1.18 V	14	14.59	30.43
5	4914.00	51.69 PK	74.00	-22.31	1.08 V	81	16.07	35.62
6	4914.00	35.62 AV	54.00	-18.38	1.08 V	81	0.00	35.62
7	7371.00	52.23 PK	74.00	-21.77	1.13 V	107	10.04	42.19
8	7371.00	38.39 AV	54.00	-15.61	1.13 V	107	-3.80	42.19

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.

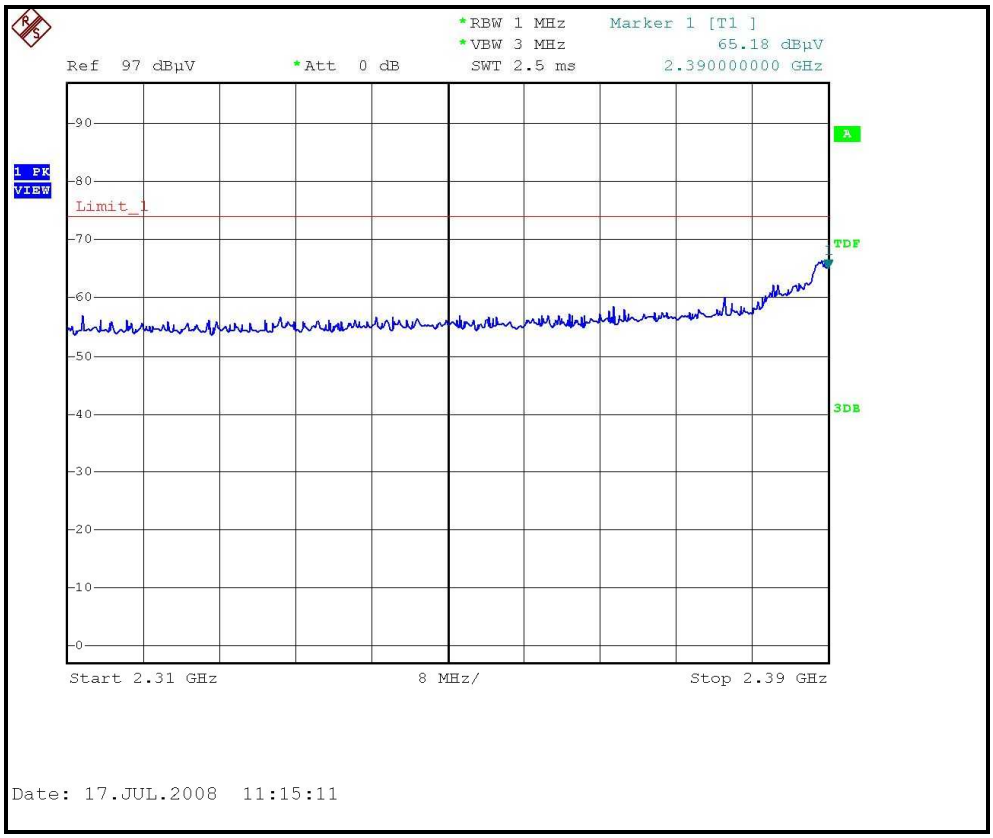
5. " * ": Fundamental frequency.

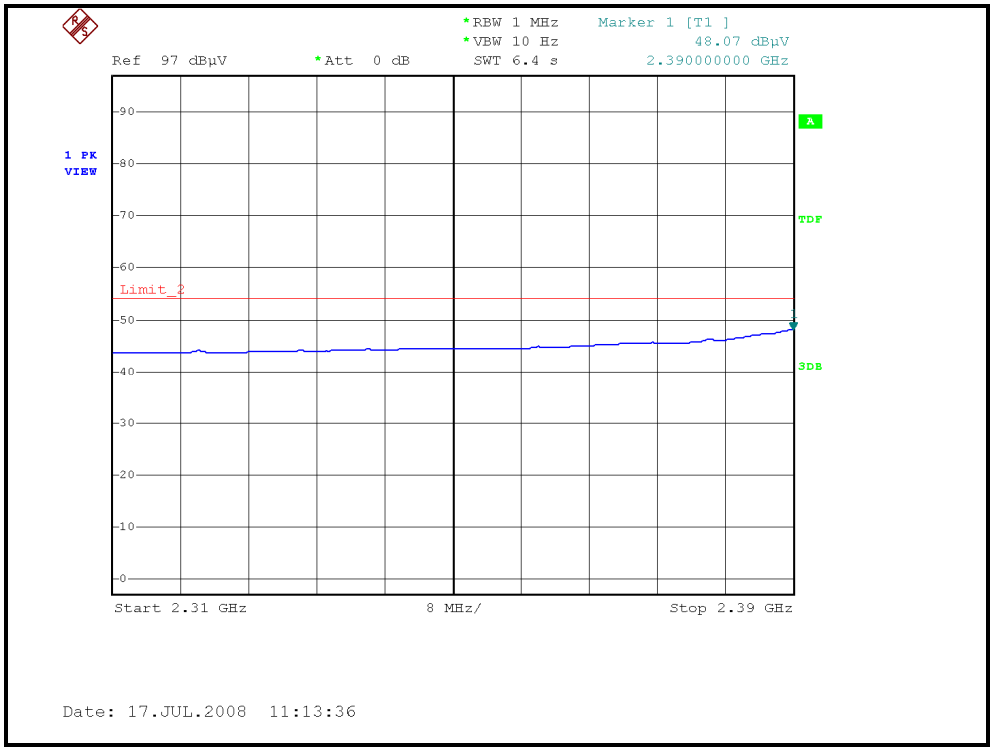
EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 3.7V from battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 66%RH 960hPa	TESTED BY	Frank Liu

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	109.20 PK			1.40 H	250	78.48	30.72
2	*2462.00	98.20 AV			1.40 H	250	67.48	30.72
3	2483.60	69.10 PK	74.00	-4.90	1.39 H	250	38.28	30.82
4	2483.60	47.90 AV	54.00	-6.10	1.39 H	250	17.08	30.82
5	4824.00	55.60 PK	74.00	-18.40	1.00 H	238	19.91	35.69
6	4824.00	37.30 AV	54.00	-16.70	1.00 H	238	1.61	35.69
7	7386.00	51.10 PK	74.00	-22.90	1.03 H	237	8.30	42.80
8	7386.00	37.30 AV	54.00	-16.70	1.03 H	237	-5.50	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	103.10 PK			1.66 V	193	72.38	30.72
2	*2462.00	91.90 AV			1.66 V	193	61.18	30.72
3	2483.50	63.40 PK	74.00	-10.60	1.66 V	193	32.58	30.82
4	2483.50	45.12 AV	54.00	-8.88	1.66 V	193	14.30	30.82
5	4824.00	48.20 PK	74.00	-25.80	1.00 V	171	12.51	35.69
6	4824.00	32.70 AV	54.00	-21.30	1.00 V	171	-2.99	35.69
7	7386.00	50.30 PK	74.00	-23.70	1.04 V	122	7.50	42.80
8	7386.00	37.00 AV	54.00	-17.00	1.04 V	122	-5.80	42.80

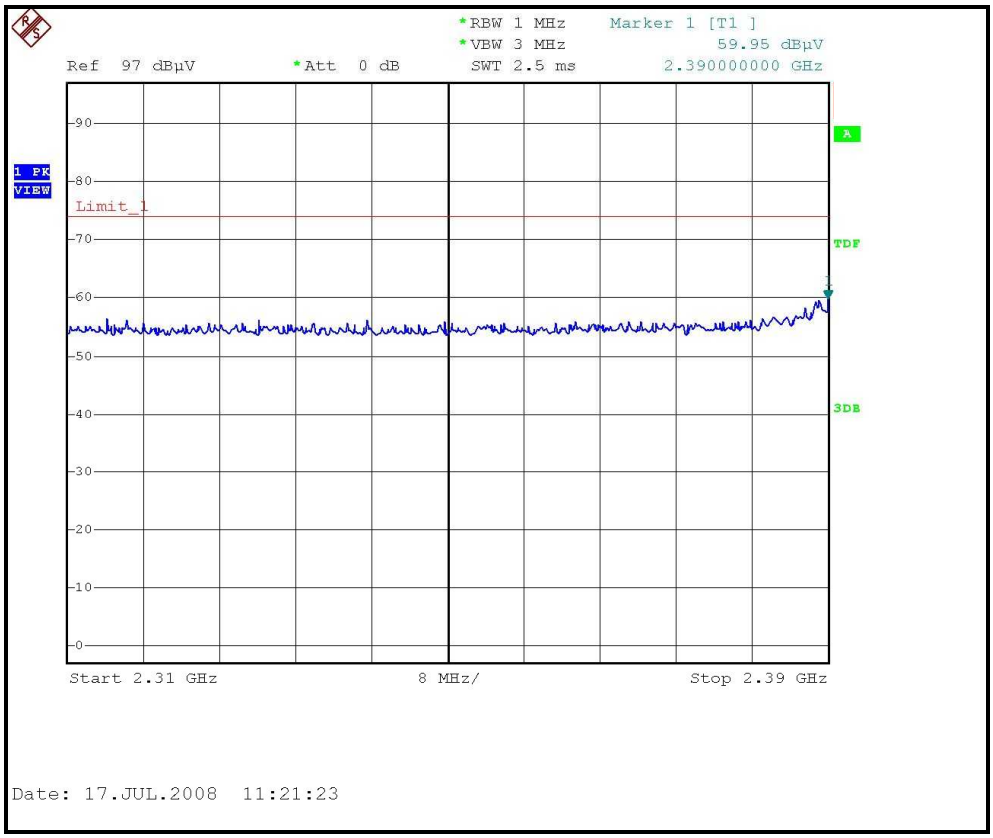
REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

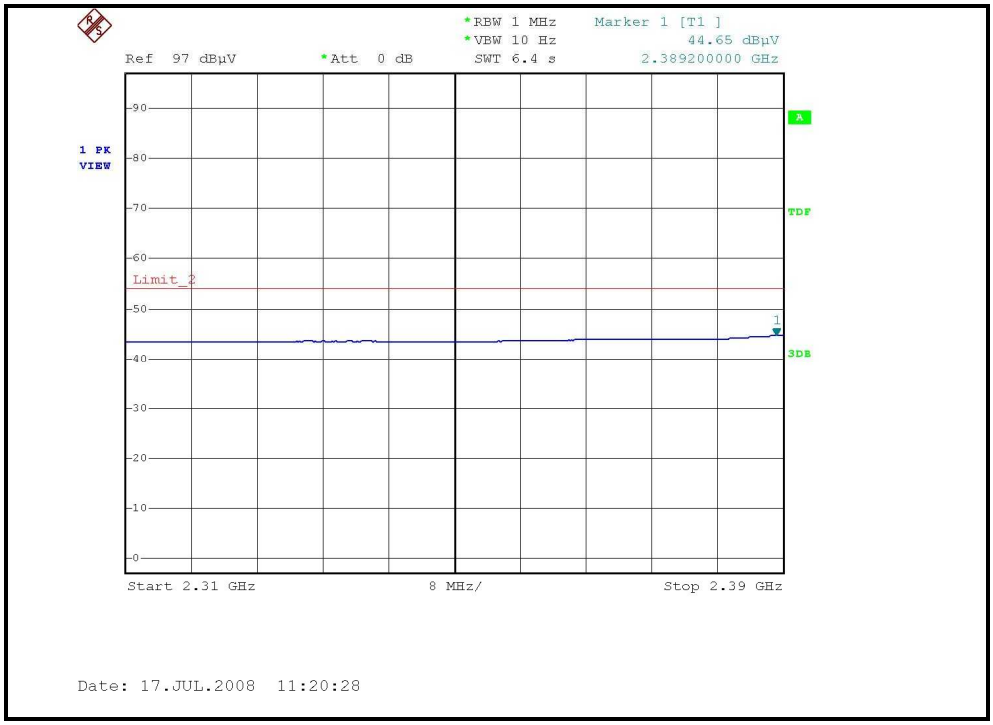
RESTRICTED BANDEDGE (802.11g MODE,CH 1, HORIZONTAL)



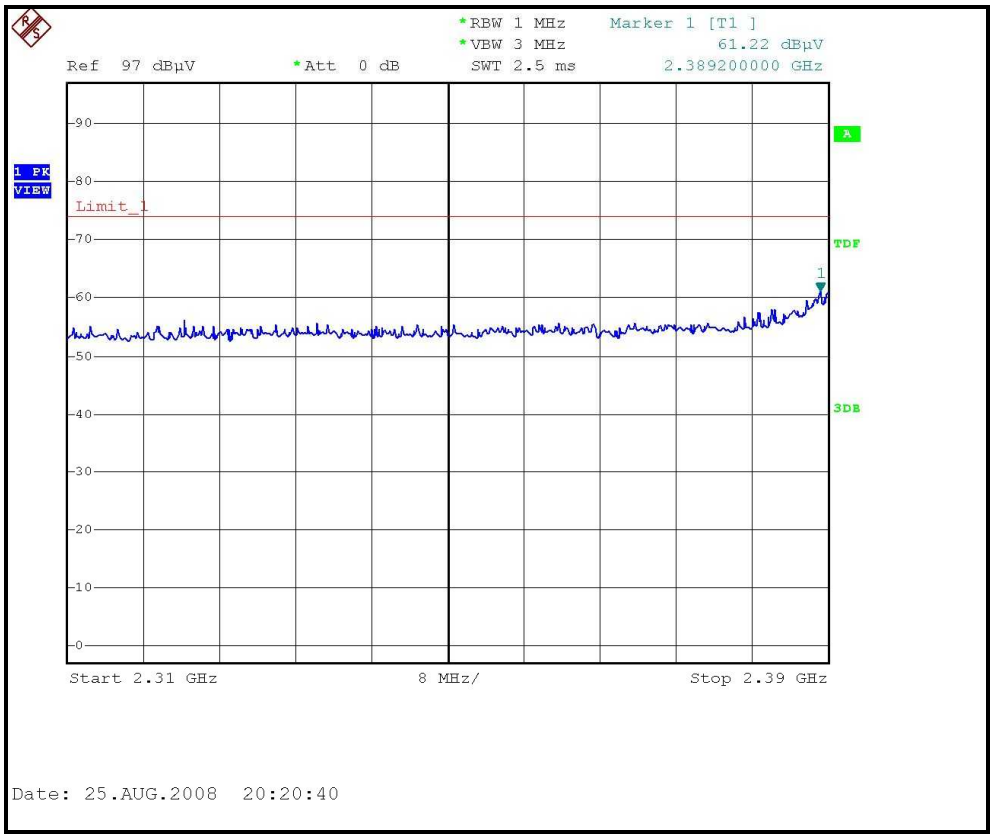


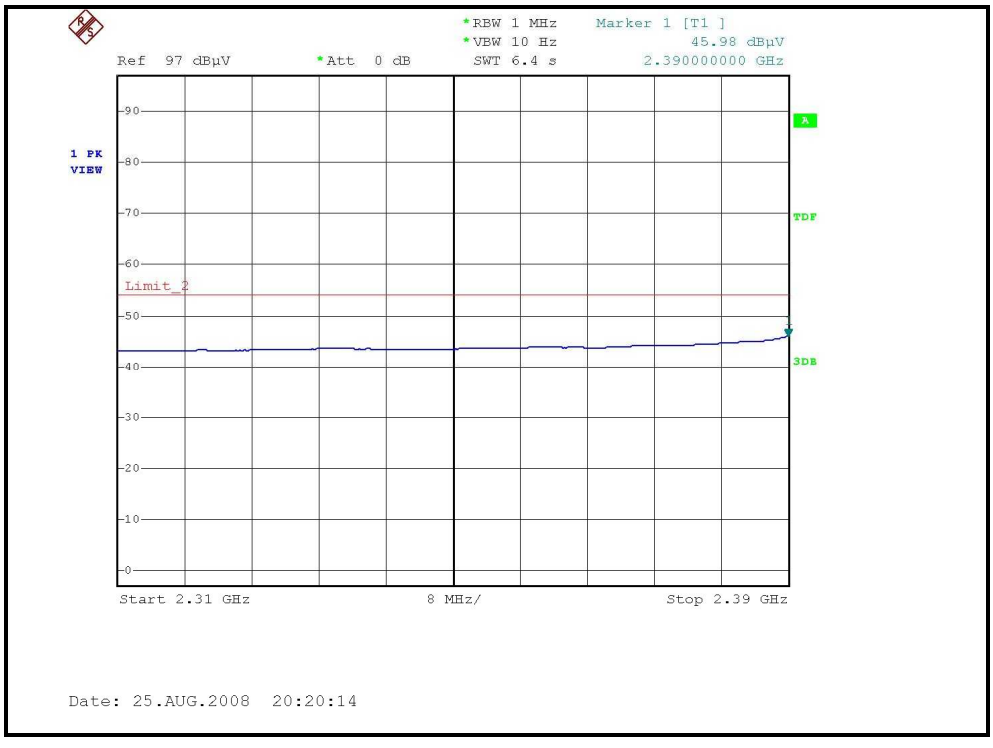
RESTRICTED BANDEDGE (802.11g MODE,CH 1, VERTICAL)



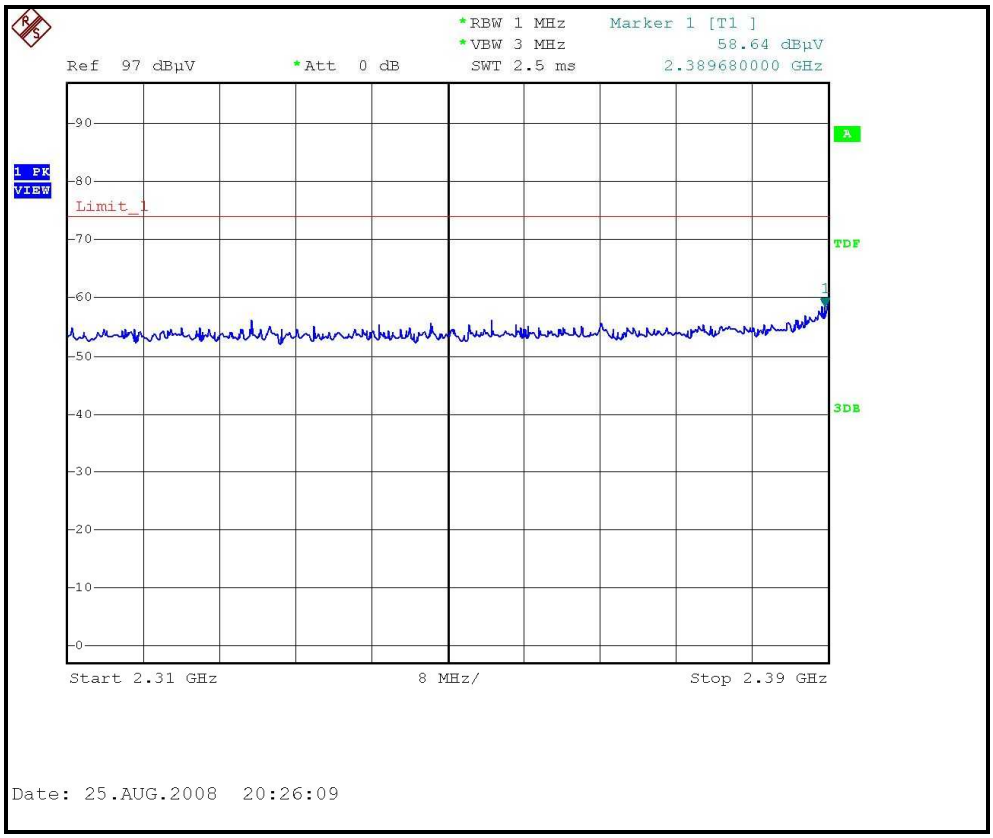


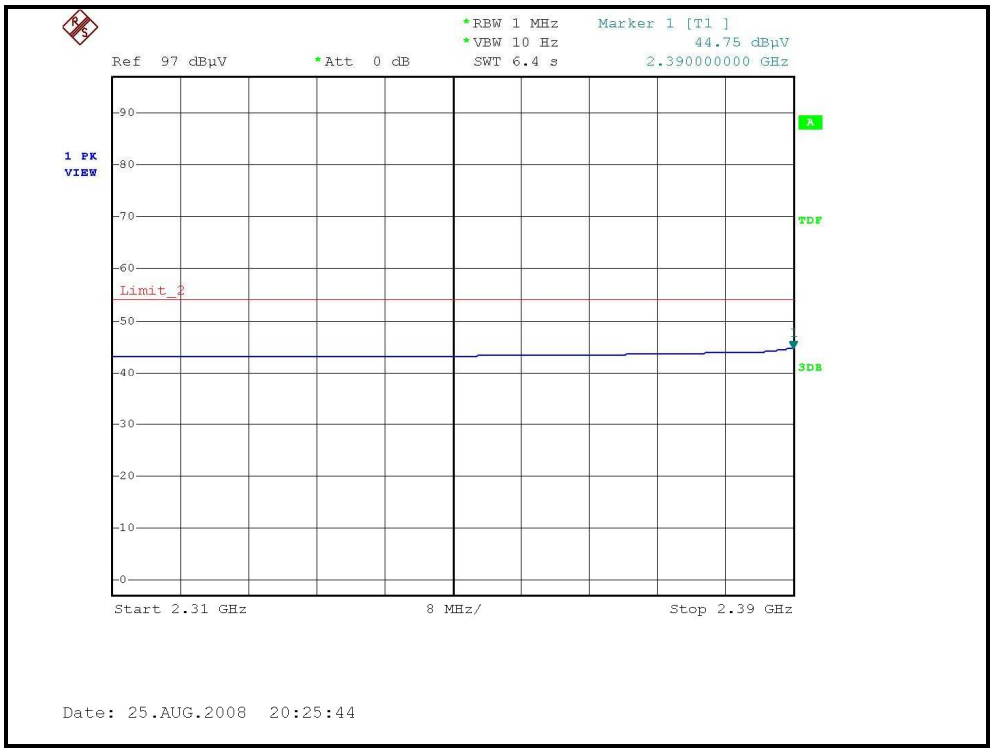
RESTRICTED BANDEDGE (802.11g MODE,CH 2, HORIZONTAL)



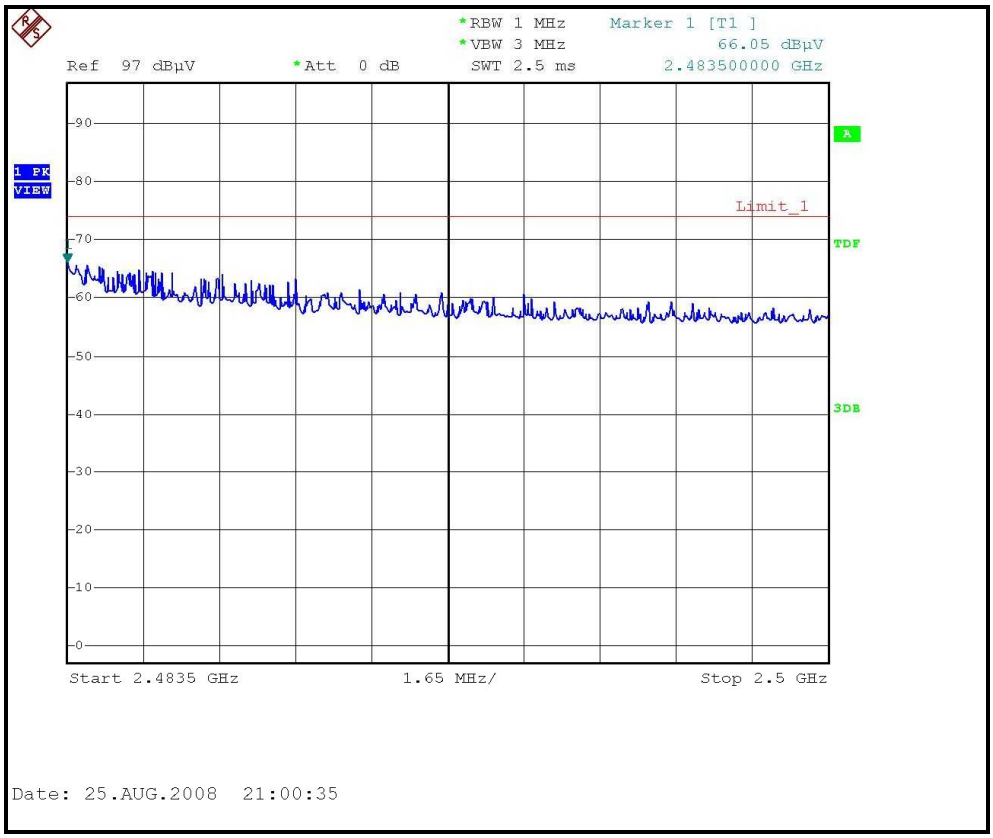


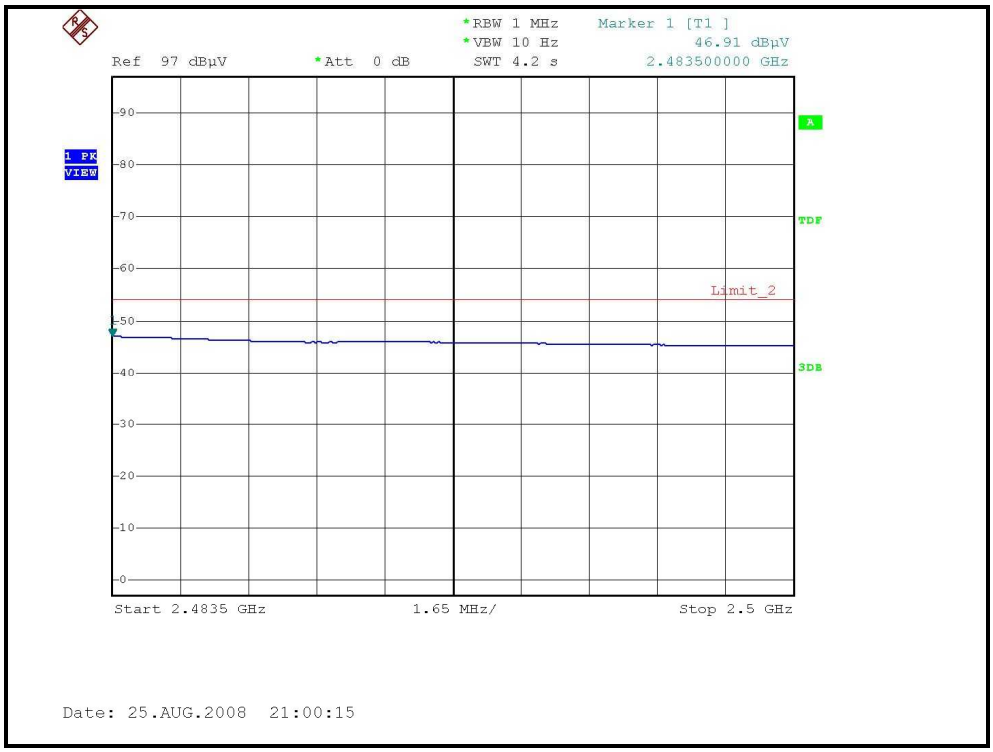
RESTRICTED BANDEDGE (802.11g MODE,CH 2, VERTICAL)



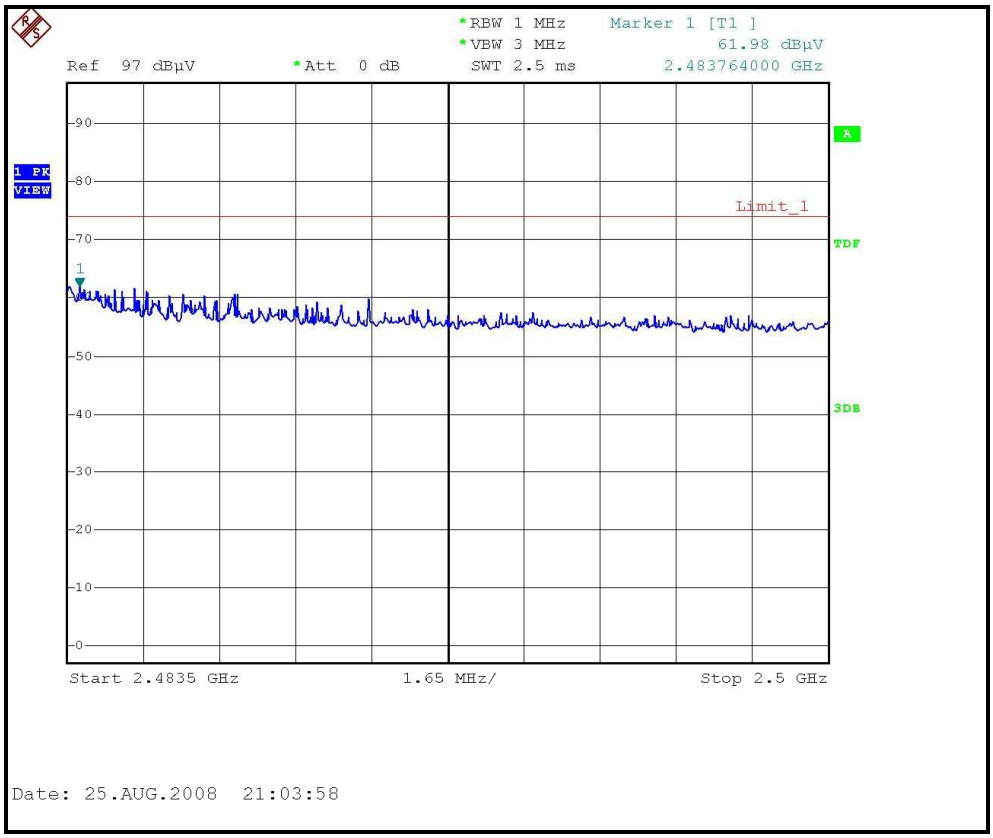


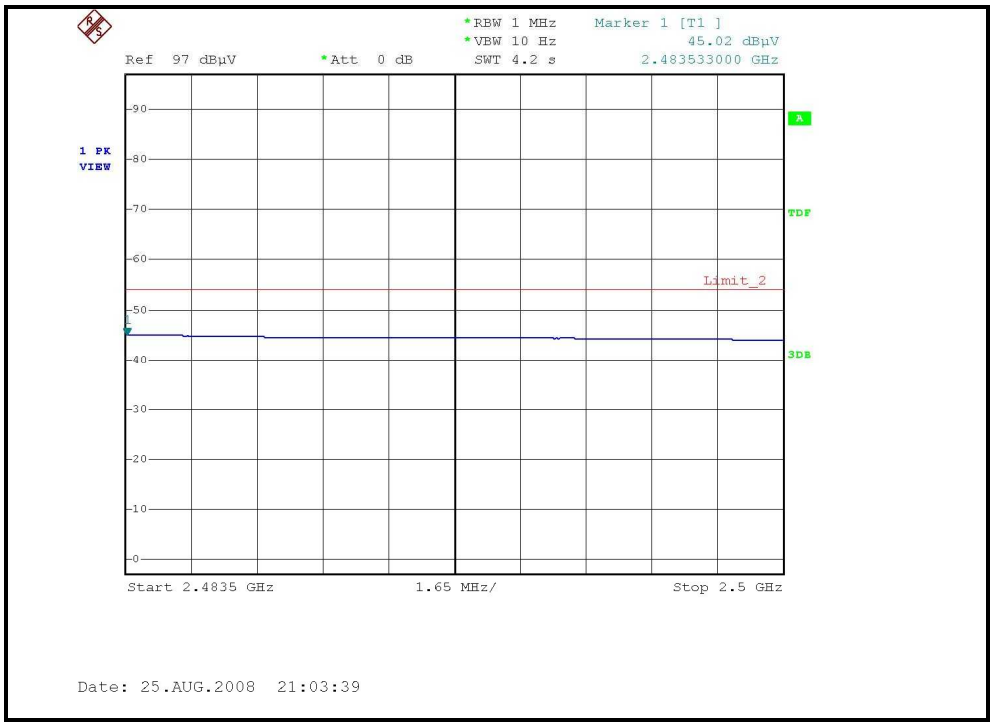
RESTRICTED BANDEDGE (802.11g MODE,CH 10, HORIZONTAL)



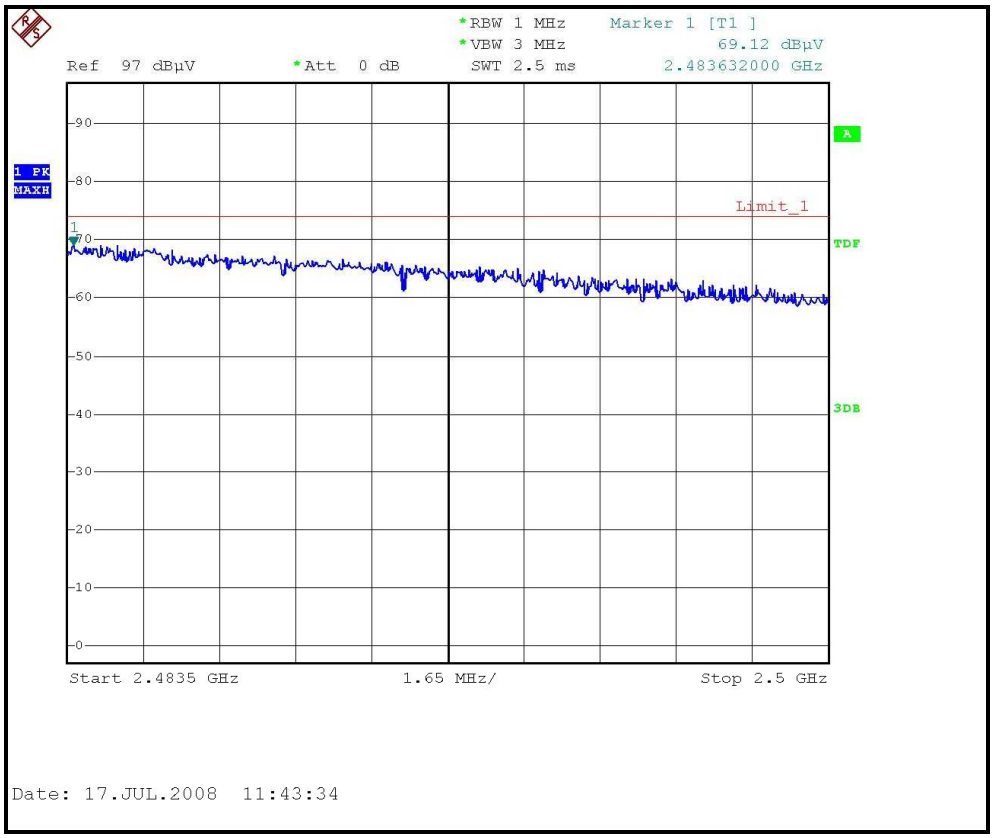


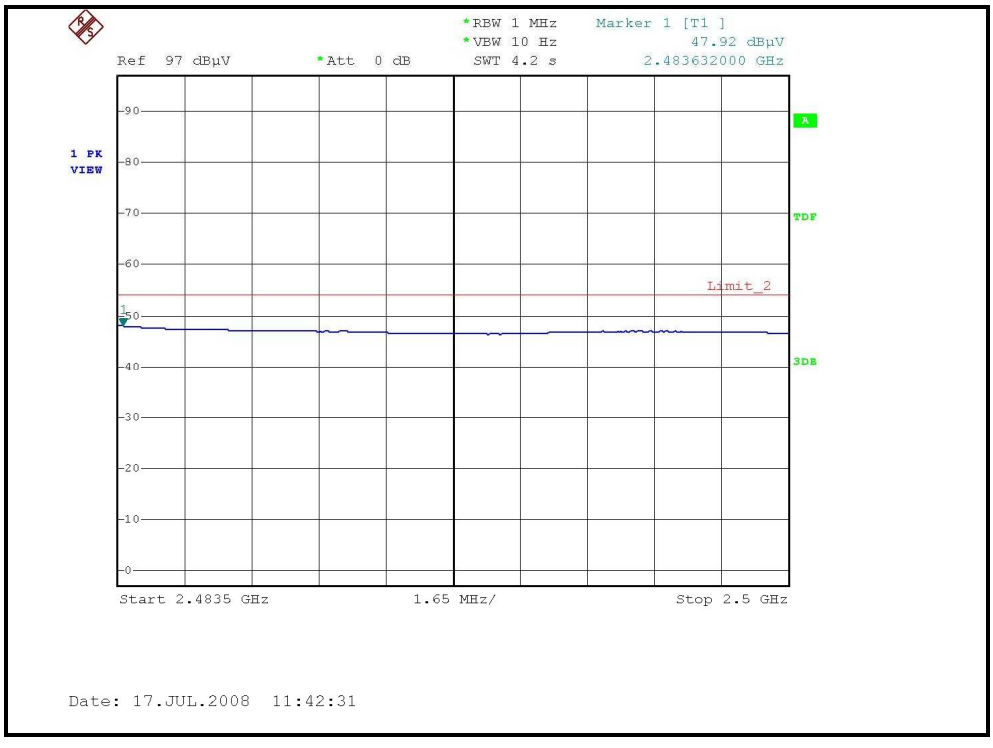
RESTRICTED BANDEDGE (802.11g MODE,CH 10, VERTICAL)



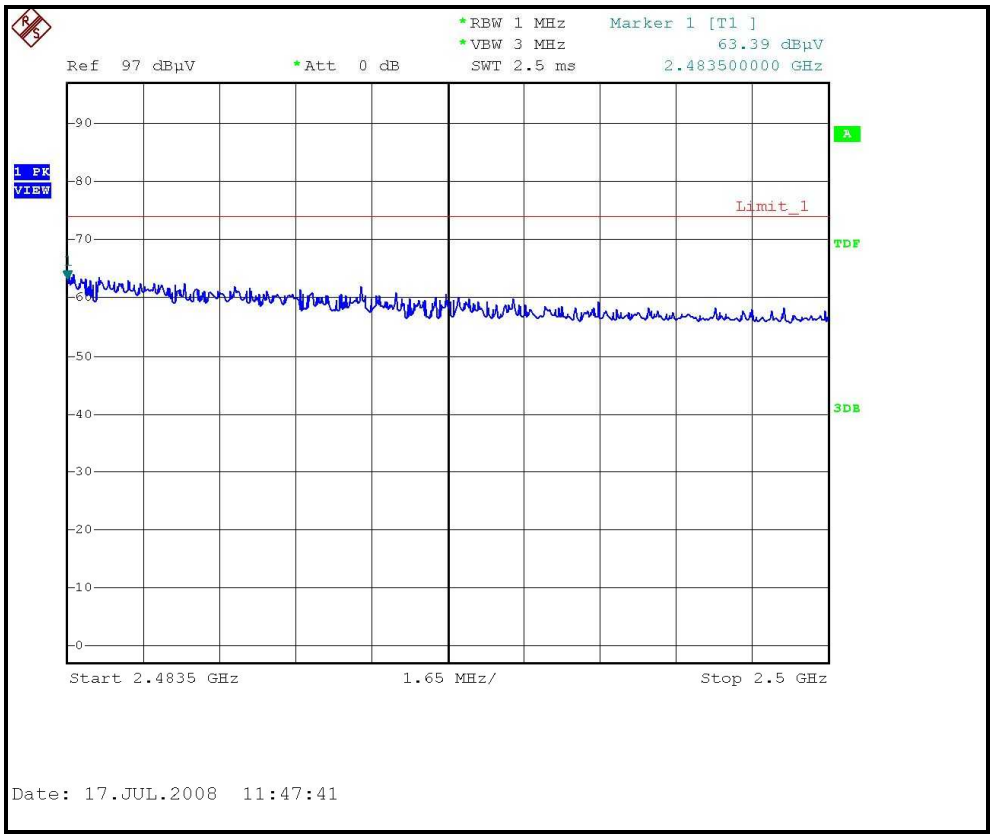


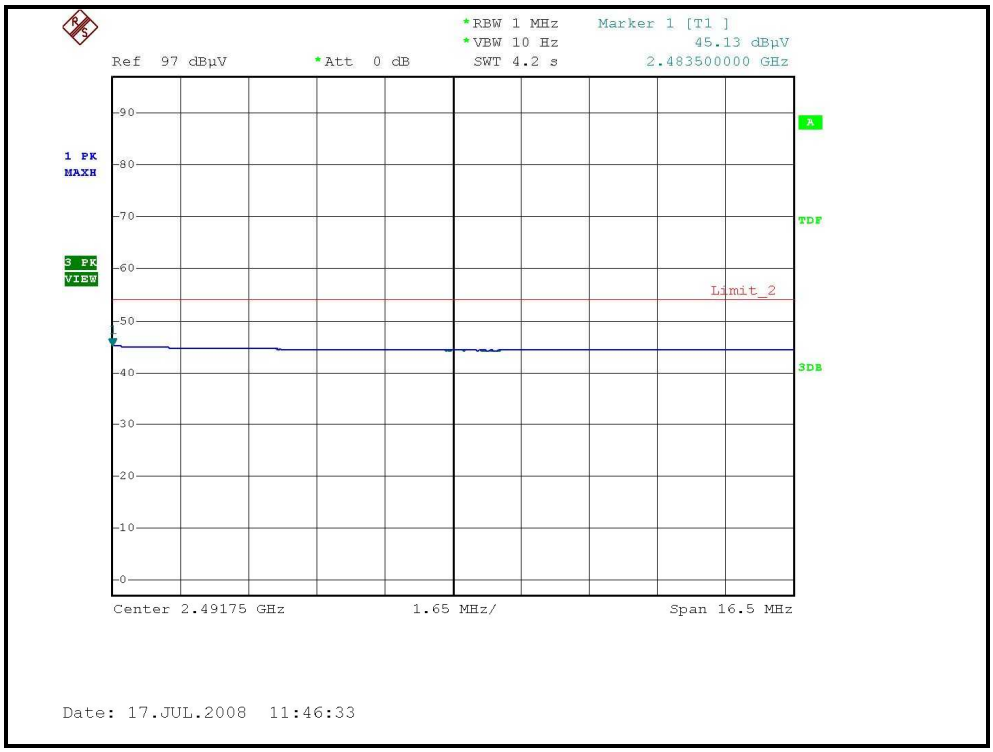
RESTRICTED BANDEDGE (802.11g MODE,CH 11, HORIZONTAL)





RESTRICTED BANDEDGE (802.11g MODE,CH 11, VERTICAL)





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	100037	Aug. 08, 2009

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

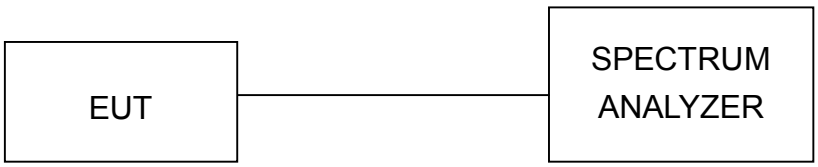
4.2.3 TEST PROCEDURE

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

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.

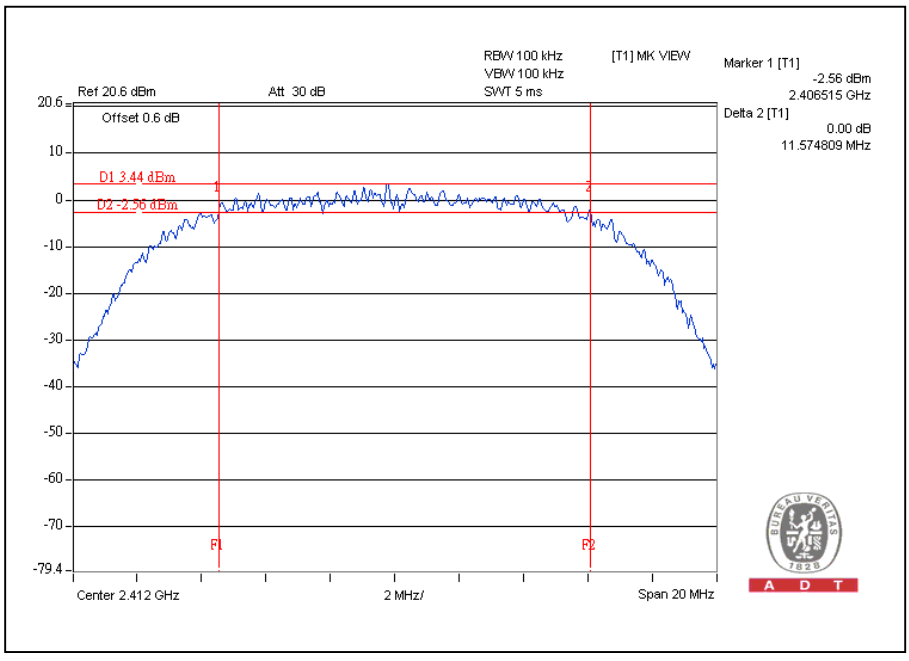
4.2.7 TEST RESULTS

802.11b DSSS MODULATION:

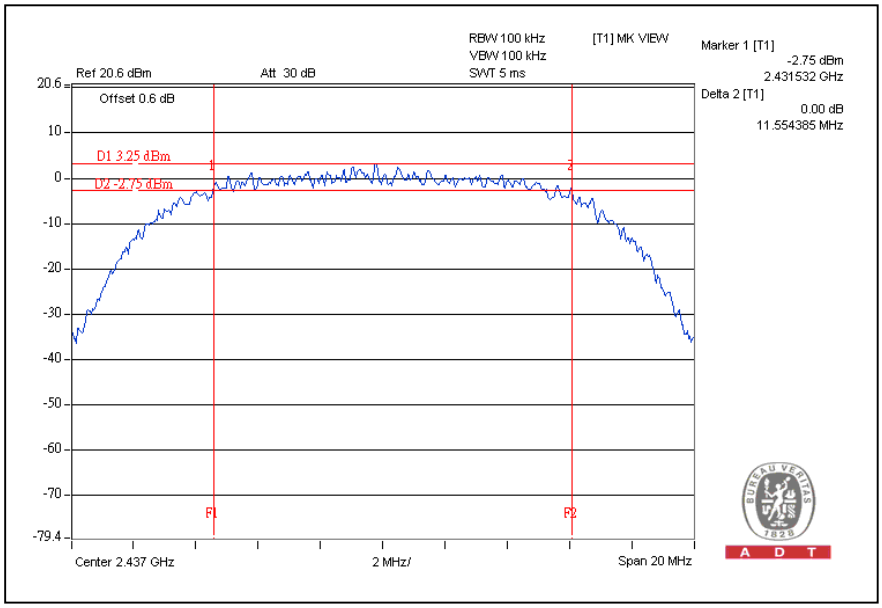
MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	DC 3.7V from battery	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 960hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	11.57	0.5	PASS
6	2437	11.55	0.5	PASS
11	2462	11.55	0.5	PASS

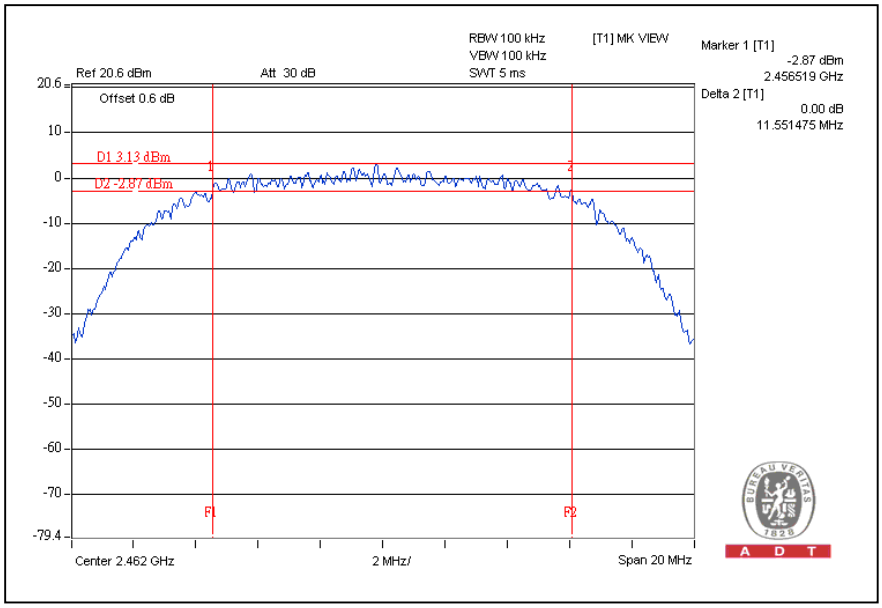
CH1



CH6


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-2.75 dBm
2.431532 GHz
Delta 2 [T1]
0.00 dB
11.554385 MHz
Ref 20.6 dBm
Att 30 dB
Offset 0.6 dB
D1 3.25 dBm
D2 -2.75 dBm
20.6
10
0
-10
-20
-30
-40
-50
-60
-70
-79.4
F1
F2
Center 2.437 GHz
2 MHz/
Span 20 MHz

CH11

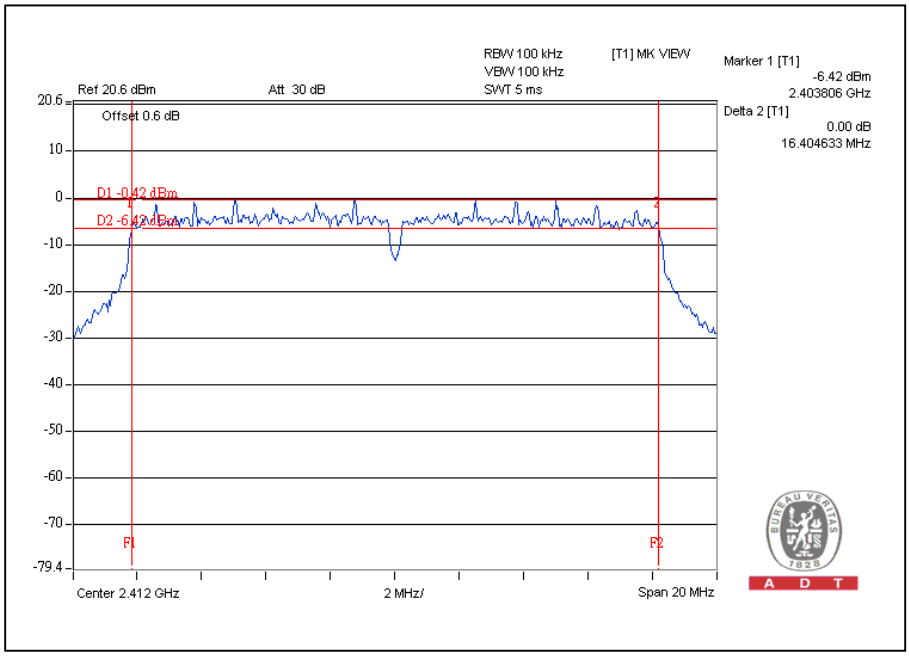

RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-2.87 dBm
2.456519 GHz
Delta 2 [T1]
0.00 dB
11.551475 MHz
Ref 20.6 dBm
Att 30 dB
Offset 0.6 dB
D1 3.13 dBm
D2 -2.87 dBm
20.6
10
0
-10
-20
-30
-40
-50
-60
-70
-79.4
F1
F2
Center 2.462 GHz
2 MHz/
Span 20 MHz

802.11g OFDM MODULATION:

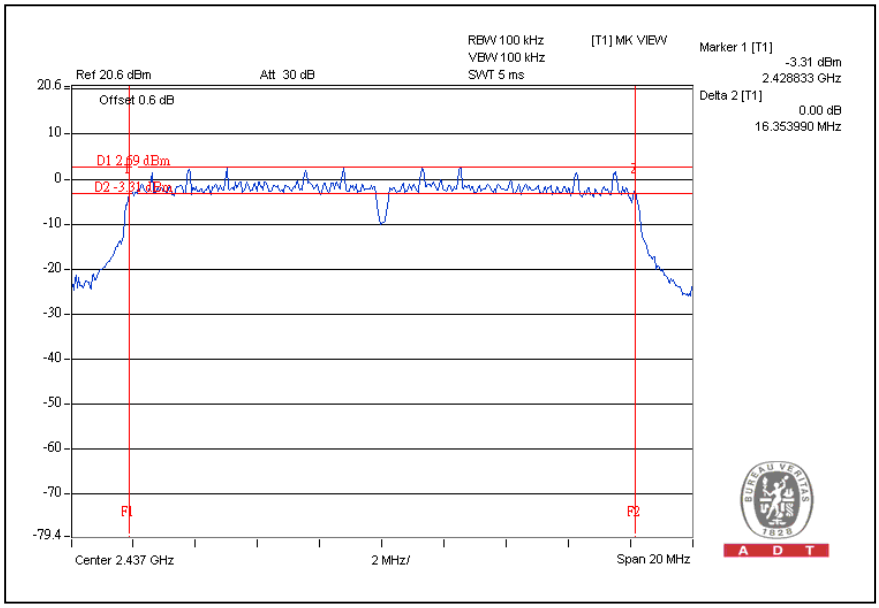
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	DC 3.7V from battery	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 960hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.40	0.5	PASS
6	2437	16.35	0.5	PASS
11	2462	16.40	0.5	PASS

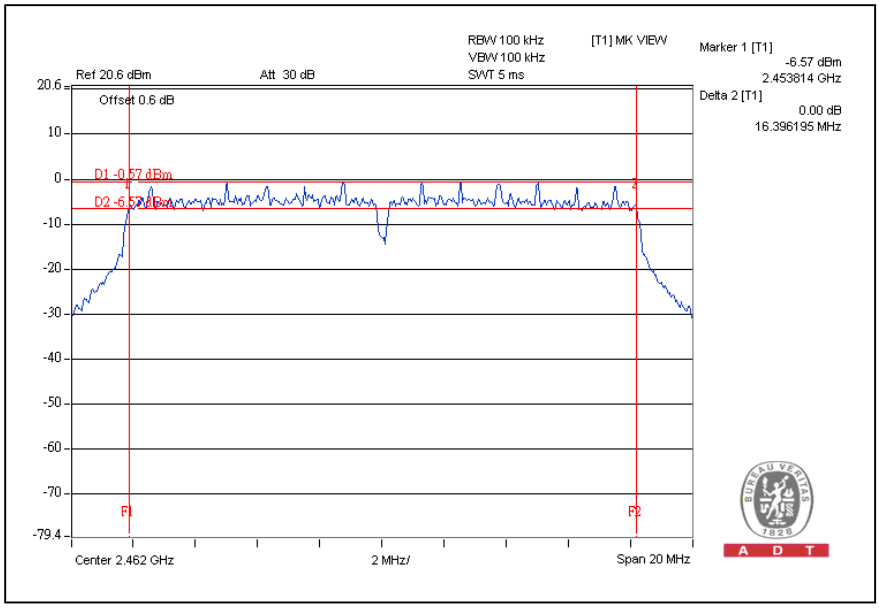
CH1



CH6


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-3.31 dBm
2.428833 GHz
Delta 2 [T1]
0.00 dB
16.353990 MHz
Ref 20.6 dBm
Att 30 dB
Offset 0.6 dB
D1 2.69 dBm
D2 -3.31 dBm
20.6
10
0
-10
-20
-30
-40
-50
-60
-70
-79.4
F1
F2
Center 2.437 GHz
2 MHz/
Span 20 MHz

CH11


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-6.57 dBm
2.453814 GHz
Delta 2 [T1]
0.00 dB
16.396195 MHz
Ref 20.6 dBm
Att 30 dB
Offset 0.6 dB
D1 -0.57 dBm
D2 -6.57 dBm
20.6
10
0
-10
-20
-30
-40
-50
-60
-70
-79.4
F1
F2
Center 2.462 GHz
2 MHz/
Span 20 MHz

4.3 MAXIMUM PEAK OUTPUT POWER

4.3.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.3.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 08, 2009
Agilent SIGNAL GENERATOR	E8257C	MY43320668	Dec. 25, 2008
TEKTRONIX OSCILLOSCOPE	TDS380	B016335	July 20, 2008
NARDA DETECTOR	4503A	FSCM99899	NA

NOTE:
The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 TEST PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.
2. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same reading on oscilloscope. Record the power level.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP

4.3.6 EUT OPERATING CONDITIONS

Same as Item 4.2.6

4.3.7 TEST RESULTS

802.11b DSSS MODULATION:

MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	DC 3.7V from battery	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 960hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	35.156	15.46	30	PASS
6	2437	34.435	15.37	30	PASS
11	2462	31.261	14.95	30	PASS

802.11g OFDM MODULATION:

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	DC 3.7V from battery	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 960hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	40.832	16.11	30	PASS
6	2437	77.446	18.89	30	PASS
11	2462	39.084	15.92	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.

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 08, 2009

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

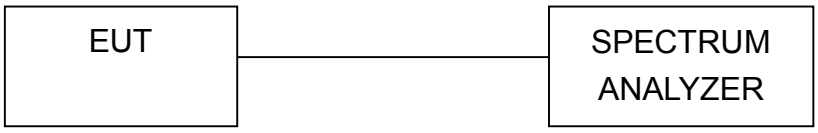
4.4.3 TEST PROCEDURE

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.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITION

Same as Item 4.2.6

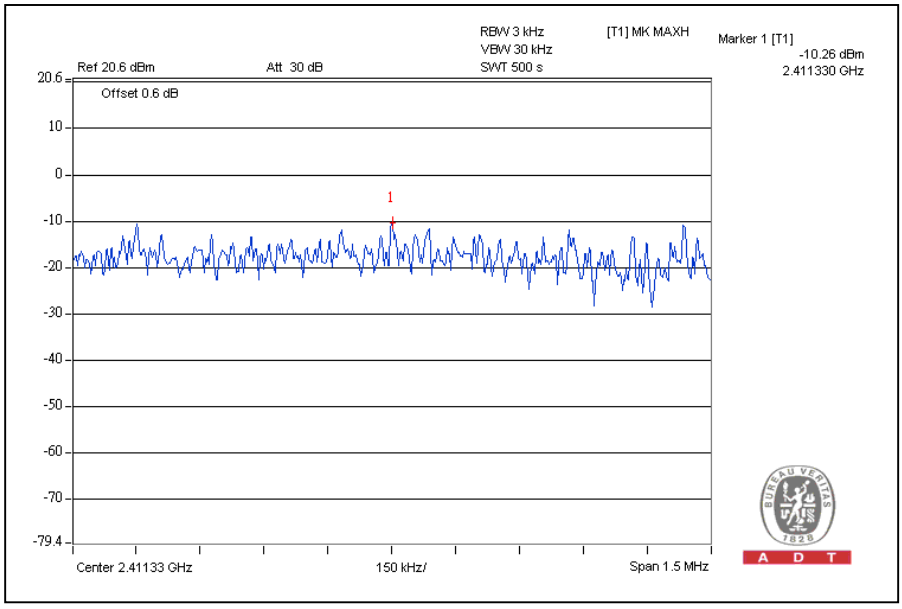
4.4.7 TEST RESULTS

802.11b DSSS MODULATION:

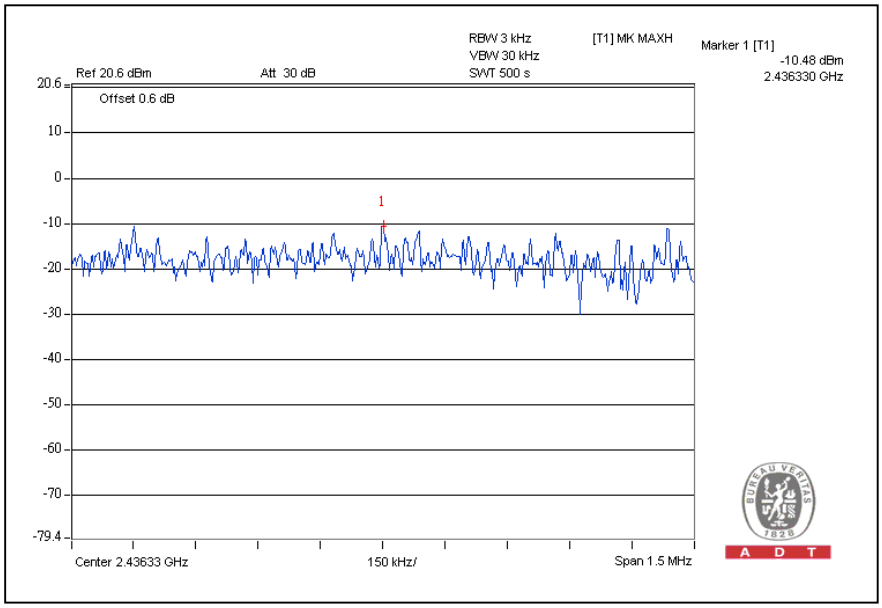
MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	DC 3.7V from battery	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 960hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	2412	-10.26	8	PASS
6	2437	-10.48	8	PASS
11	2462	-10.73	8	PASS

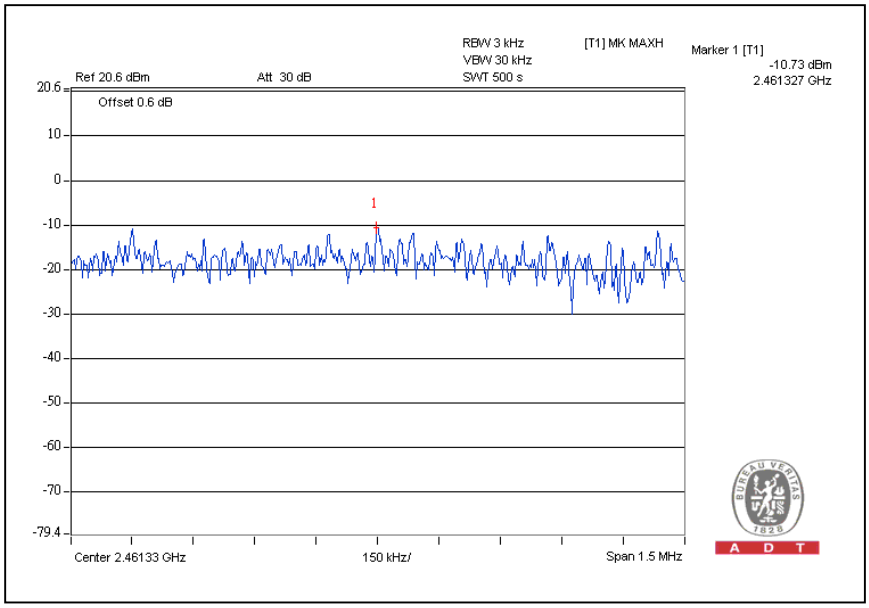
CH1



CH6


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-10.48 dBm
2.436330 GHz
Ref 20.6 dBm
Att 30 dB
Offset 0.6 dB
20.6
10
0
-10
-20
-30
-40
-50
-60
-70
-79.4
Center 2.43633 GHz
150 kHz/
Span 1.5 MHz

CH11

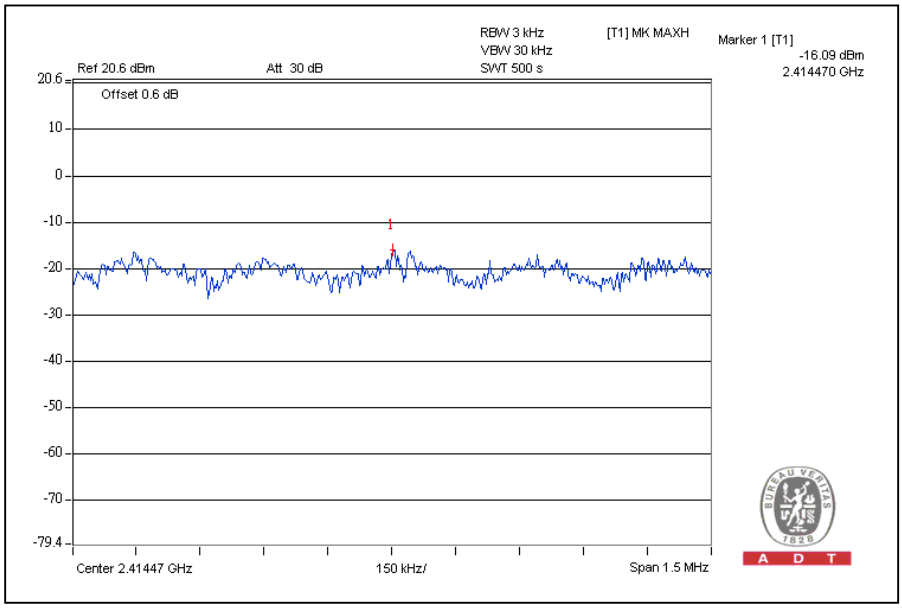

RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-10.73 dBm
2.461327 GHz
Ref 20.6 dBm
Att 30 dB
Offset 0.6 dB
20.6
10
0
-10
-20
-30
-40
-50
-60
-70
-79.4
Center 2.46133 GHz
150 kHz/
Span 1.5 MHz

802.11g OFDM MODULATION:

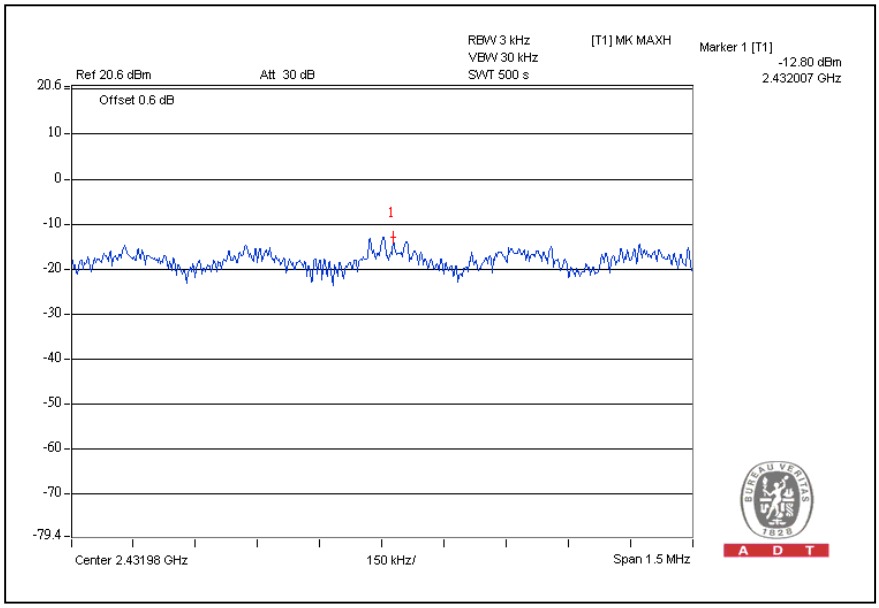
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	DC 3.7V from battery	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 960hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	2412	-16.09	8	PASS
6	2437	-12.80	8	PASS
11	2462	-15.97	8	PASS

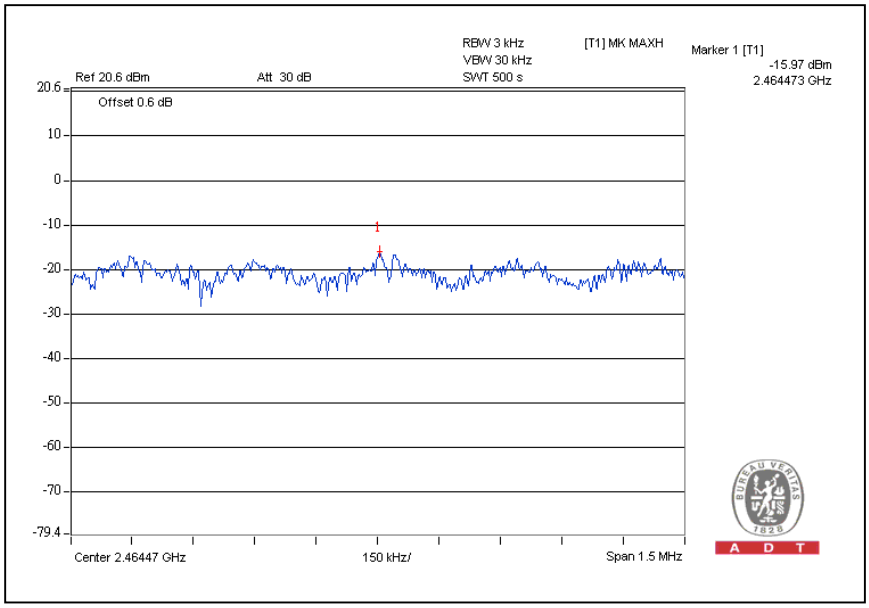
CH1



CH6


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-12.80 dBm
2.432007 GHz
Ref 20.6 dBm
Att 30 dB
Offset 0.6 dB
20.6
10
0
-10
-20
-30
-40
-50
-60
-70
-79.4
Center 2.43198 GHz
150 kHz/
Span 1.5 MHz

CH11


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-15.97 dBm
2.464473 GHz
Ref 20.6 dBm
Att 30 dB
Offset 0.6 dB
20.6
10
0
-10
-20
-30
-40
-50
-60
-70
-79.4
Center 2.46447 GHz
150 kHz/
Span 1.5 MHz

4.5 OUT-BAND EMISSION MEASUREMENT

4.5.1 LIMITS OF OUT-BAND EMISSION MEASUREMENT

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

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 08, 2009

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set RBW of spectrum analyzer to 100kHz and VBW of spectrum analyzer to 300kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

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

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 EUT OPERATING CONDITION

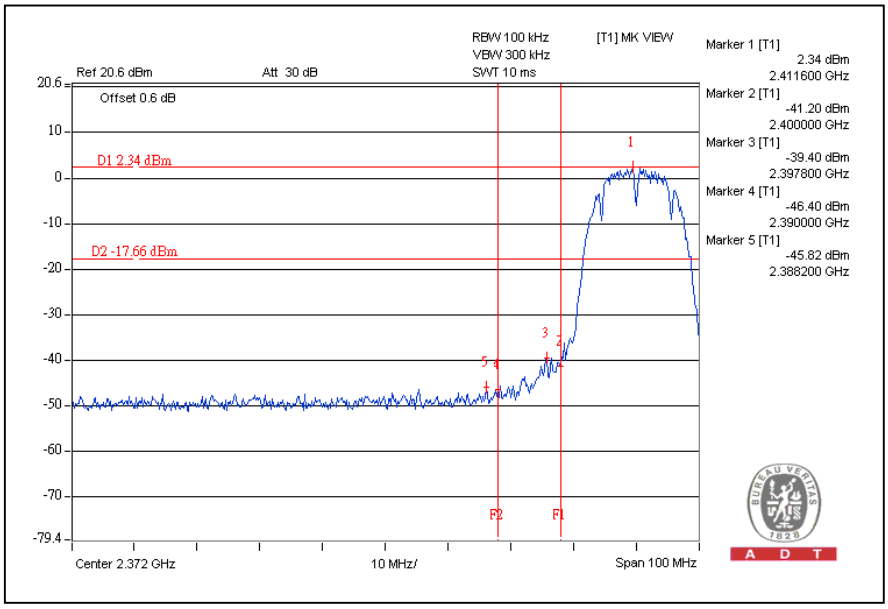
Same as Item 4.2.6

4.5.6 TEST RESULTS

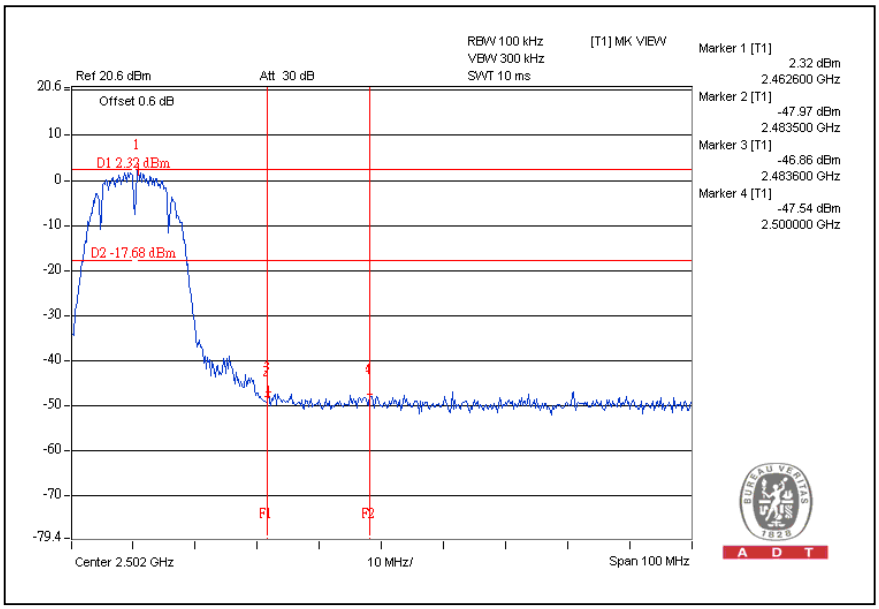
The spectrum plots are attached on the following images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

802.11b DSSS MODULATION:

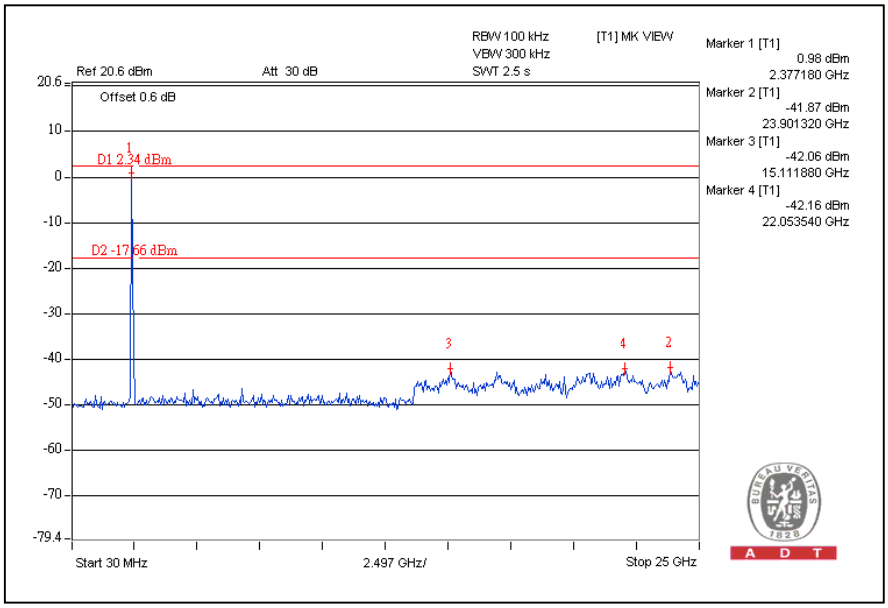
CH1



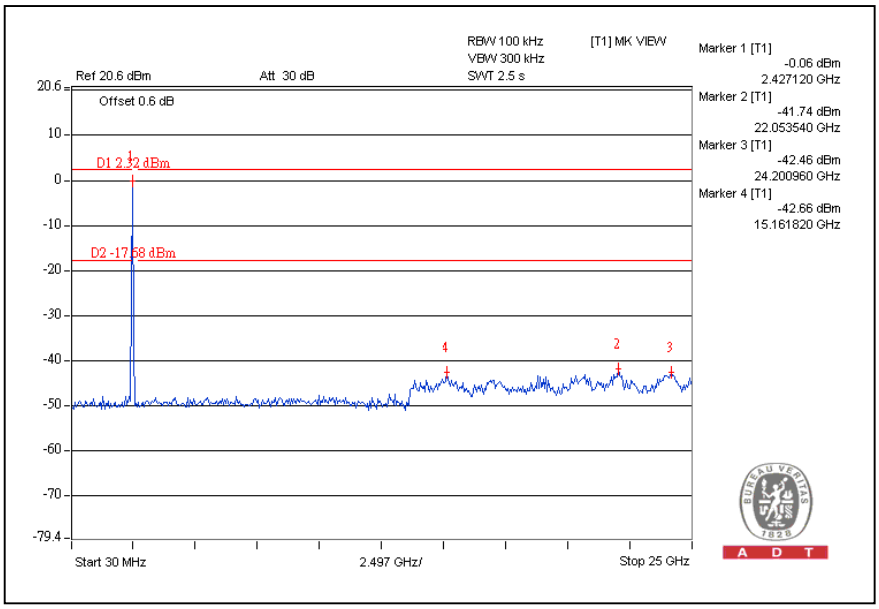
CH11



CH1

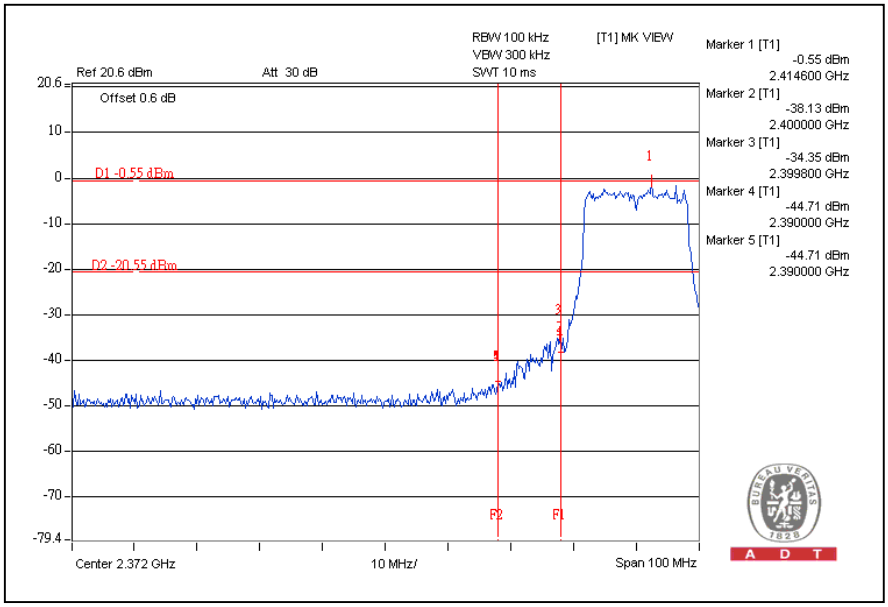

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.6 dBm
Att 30 dB
Offset 0.6 dB
D1 2.34 dBm
D2 -17.66 dBm
Marker 1 [T1]
0.98 dBm
2.377180 GHz
Marker 2 [T1]
-41.87 dBm
23.901320 GHz
Marker 3 [T1]
-42.06 dBm
15.111880 GHz
Marker 4 [T1]
-42.16 dBm
22.053540 GHz
20.6
10
0
-10
-20
-30
-40
-50
-60
-70
-79.4
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH11

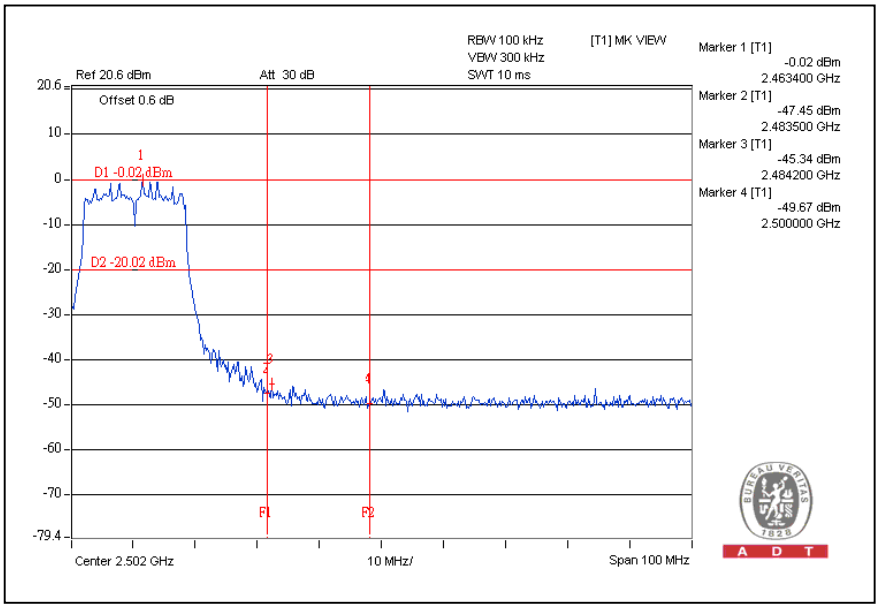

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.6 dBm
Att 30 dB
Offset 0.6 dB
D1 2.32 dBm
D2 -17.68 dBm
Marker 1 [T1]
-0.06 dBm
2.427120 GHz
Marker 2 [T1]
-41.74 dBm
22.053540 GHz
Marker 3 [T1]
-42.46 dBm
24.200960 GHz
Marker 4 [T1]
-42.66 dBm
15.161820 GHz
20.6
10
0
-10
-20
-30
-40
-50
-60
-70
-79.4
Start 30 MHz
2.497 GHz/
Stop 25 GHz

802.11g OFDM MODULATION:

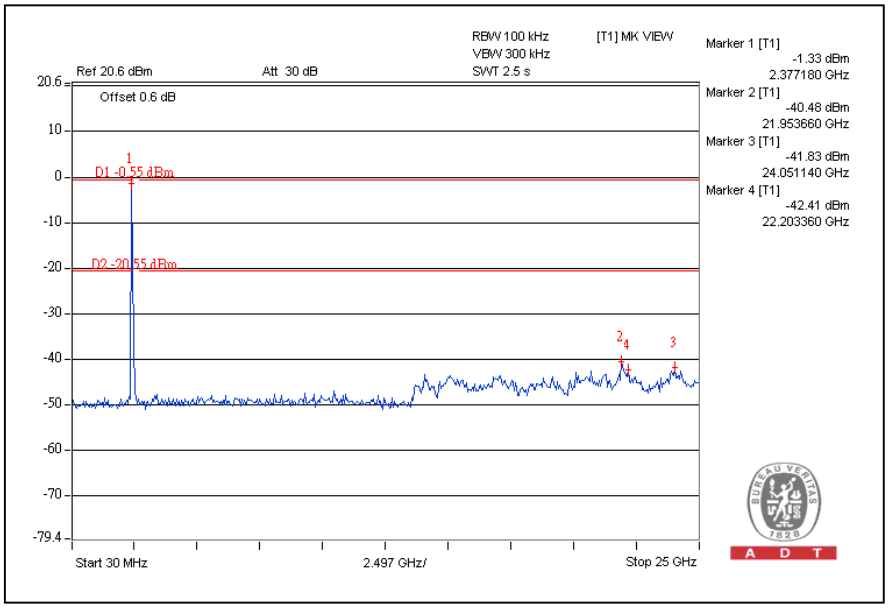
CH1



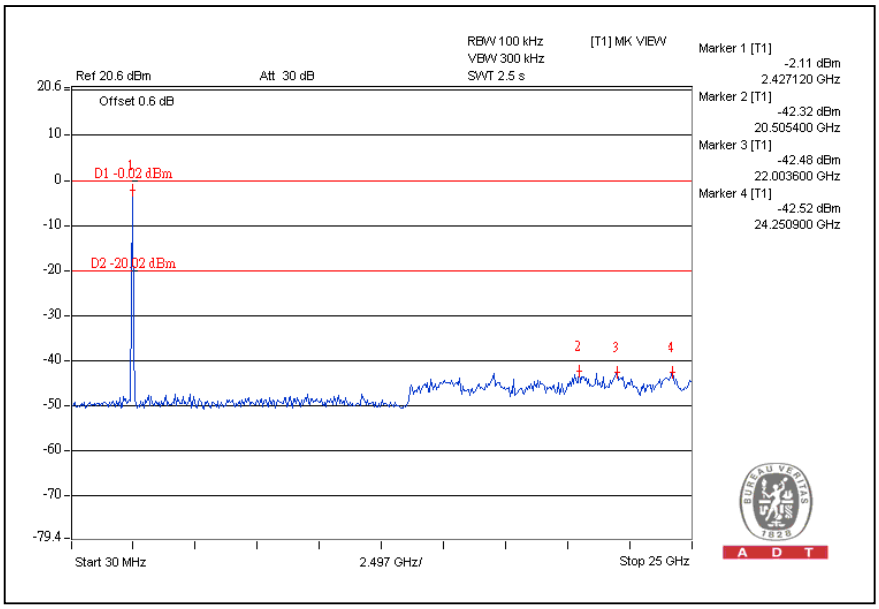
CH11



CH1


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.6 dBm
Att 30 dB
Offset 0.6 dB
D1 -0.55 dBm
D2 -20.55 dBm
Marker 1 [T1]
-1.33 dBm
2.377180 GHz
Marker 2 [T1]
-40.48 dBm
21.953660 GHz
Marker 3 [T1]
-41.83 dBm
24.051140 GHz
Marker 4 [T1]
-42.41 dBm
22.203360 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH11


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.6 dBm
Att 30 dB
Offset 0.6 dB
D1 -0.02 dBm
D2 -20.02 dBm
Marker 1 [T1]
-2.11 dBm
2.427120 GHz
Marker 2 [T1]
-42.32 dBm
20.505400 GHz
Marker 3 [T1]
-42.48 dBm
22.003600 GHz
Marker 4 [T1]
-42.52 dBm
24.250900 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

4.6 ANTENNA REQUIREMENT

4.6.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.6.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is PIFA Antenna without Connector. The maximum Gain of the antenna is 2.04dBi.

5. TEST TYPES AND RESULTS (802.11a, 5725~5850MHz Band)

5.1 RADIATED EMISSION MEASUREMENT

5.1.1 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.

5.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 15, 2009
HP Pre_Amplifier	8449B	3008A01922	Oct. 04, 2008
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Mar. 31, 2009
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	April 29, 2009
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 16, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 27, 2009
RF Switches (ARNITSU)	CS-201	1565157	Aug. 13, 2009
RF CABLE (Chaintek)	SF102	22054-2	Dec. 06. 2008
RF Cable	8DFB	STCCAB-30M-1 GHz	Oct. 09, 2008
Software	ADT_Radiated_V 7.6.15.8	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 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 3789C-3.

5.1.3 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 10dB 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 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

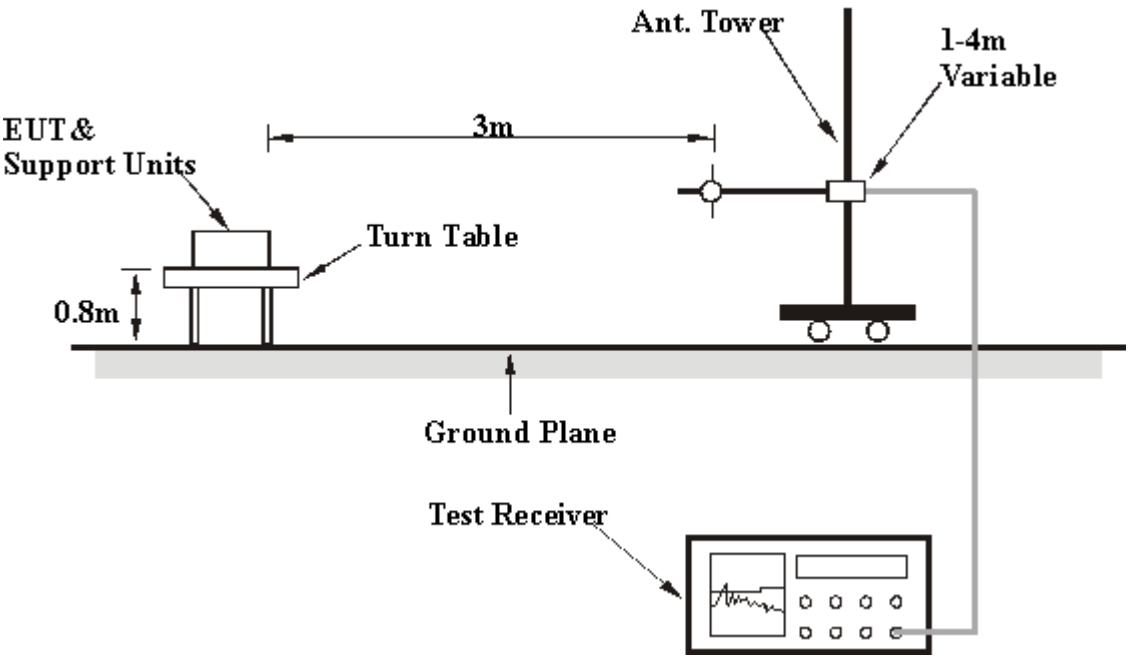
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) 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.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation

5.1.5 TEST SETUP



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

5.1.6 EUT OPERATING CONDITIONS

Same as the 4.1.6

Below 1GHz Test Data

5.1.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA：802.11a OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	DC 3.7V from battery	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 76%RH 960hPa	TESTED BY	Frank Liu

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	62.50	24.13 QP	40.00	-15.87	1.31 H	179	10.82	13.30
2	200.24	24.29 QP	43.50	-19.21	1.03 H	34	12.11	12.18
3	238.37	23.19 QP	46.00	-22.81	1.45 H	37	9.23	13.96
4	276.52	22.18 QP	46.00	-23.82	1.05 H	73	6.70	15.48
5	375.00	22.94 QP	46.00	-23.06	1.13 H	29	3.78	19.16
6	453.90	33.46 QP	46.00	-12.54	1.39 H	164	12.71	20.75
7	650.00	26.79 QP	46.00	-19.21	1.57 H	23	2.26	24.53
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	62.50	27.26 QP	40.00	-12.74	1.37 V	174	13.96	13.30
2	200.24	25.43 QP	43.50	-18.07	1.04 V	29	13.25	12.18
3	238.37	26.76 QP	46.00	-19.24	1.37 V	29	12.80	13.96
4	250.00	24.35 QP	46.00	-21.65	1.07 V	24	9.85	14.50
5	276.52	25.43 QP	46.00	-20.57	1.02 V	73	9.95	15.48
6	300.00	27.92 QP	46.00	-18.08	1.01 V	242	11.74	16.18
7	375.00	26.34 QP	46.00	-19.66	1.07 V	28	7.18	19.16
8	450.00	25.34 QP	46.00	-20.66	1.01 V	34	4.64	20.70
9	650.00	29.47 QP	46.00	-16.53	1.63 V	24	4.94	24.53

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.

Above 1GHz Test Data

5.1.8 TEST RESULTS

802.11a OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	DC 3.7V from battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 72%RH 960hPa	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	*5745.00	108.40 PK			1.10 H	59	71.19	37.21
2	*5745.00	96.90 AV			1.10 H	59	59.69	37.21
3	#11490.00	64.90 PK	74.00	-9.10	1.60 H	336	17.87	47.03
4	#11490.00	51.40 AV	54.00	-2.60	1.60 H	336	4.37	47.03
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	*5745.00	105.05 PK			1.12 V	252	67.84	37.21
2	*5745.00	93.90 AV			1.12 V	252	56.69	37.21
3	#11490.00	58.90 PK	74.00	-15.10	1.31 V	0	11.87	47.03
4	#11490.00	45.10 AV	54.00	-8.90	1.31 V	0	-1.93	47.03

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.
6. " # ": The radiated frequency falling in the restricted band.
7. The limit value is defined as per 15.247.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	DC 3.7V from battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 72%RH 960hPa	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	*5785.00	107.80 PK			1.00 H	56	70.49	37.31
2	*5785.00	96.30 AV			1.00 H	56	58.99	37.31
3	#11570.00	63.70 PK	74.00	-10.30	1.60 H	337	16.73	46.97
4	#11570.00	50.00 AV	54.00	-4.00	1.60 H	337	3.03	46.97
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	*5785.00	105.70 PK			1.02 V	255	68.39	37.31
2	*5785.00	94.70 AV			1.02 V	255	57.39	37.31
3	#11570.00	58.70 PK	74.00	-15.30	1.23 V	255	11.73	46.97
4	#11570.00	44.83 AV	54.00	-9.17	1.23 V	255	-2.14	46.97

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.
6. " # ": The radiated frequency falling in the restricted band.
7. The limit value is defined as per 15.247.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 5	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	DC 3.7V from battery	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27deg. C, 72%RH 960hPa	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	*5825.00	108.40 PK			1.00 H	74	70.98	37.42
2	*5825.00	97.00 AV			1.00 H	74	59.58	37.42
3	#11650.00	65.80 PK	74.00	-8.20	1.60 H	24	18.90	46.90
4	**#11650.00**	**52.00 AV**	**54.00**	**-2.00**	**1.60 H**	**24**	**5.10**	**46.90**
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	*5825.00	104.90 PK			1.07 V	228	67.48	37.42
2	*5825.00	93.90 AV			1.07 V	228	56.48	37.42
3	#11650.00	59.00 PK	74.00	-15.00	1.30 V	38	12.10	46.90
4	#11650.00	46.70 AV	54.00	-7.30	1.30 V	38	-0.20	46.90

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.
6. " # ": The radiated frequency falling in the restricted band.
7. The limit value is defined as per 15.247.

5.2 6dB BANDWIDTH MEASUREMENT

5.2.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

5.2.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 08, 2009

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.2.3 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 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

5.2.4 DEVIATION FROM TEST STANDARD

No deviation

5.2.5 TEST SETUP

5.2.6 EUT OPERATING CONDITIONS

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

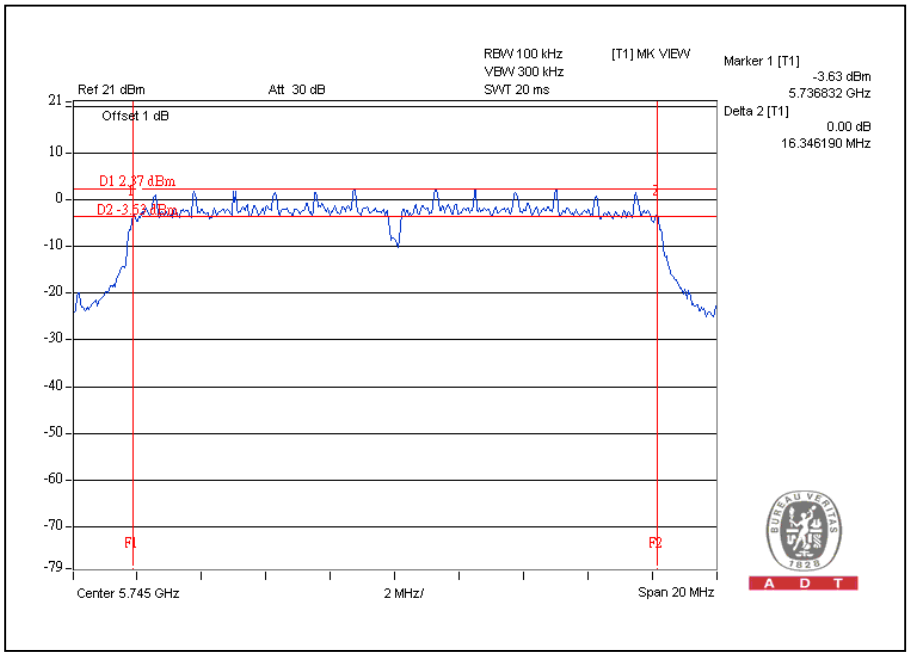
5.2.7 TEST RESULTS

802.11a OFDM MODULATION:

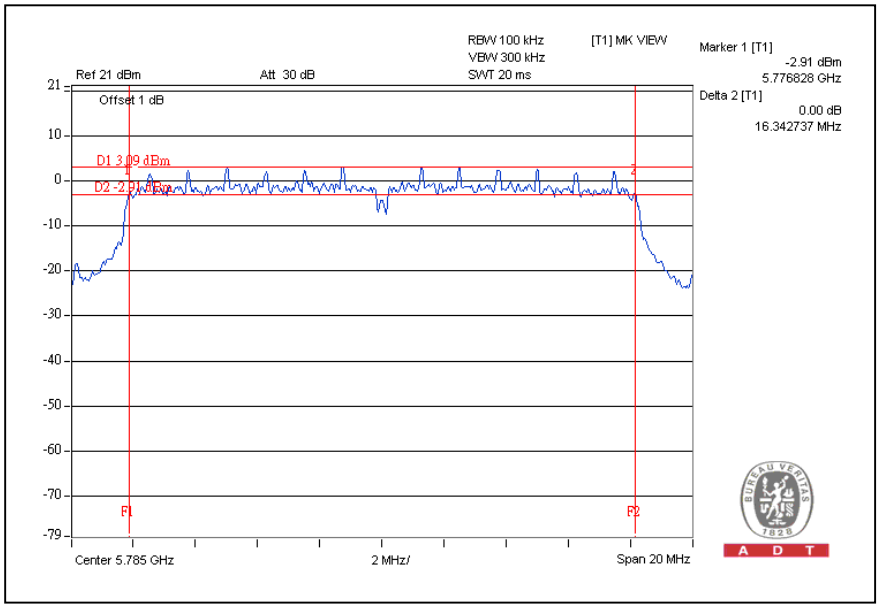
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	DC 3.7V from battery	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 960hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	5745	16.35	0.5	PASS
3	5785	16.34	0.5	PASS
5	5825	16.33	0.5	PASS

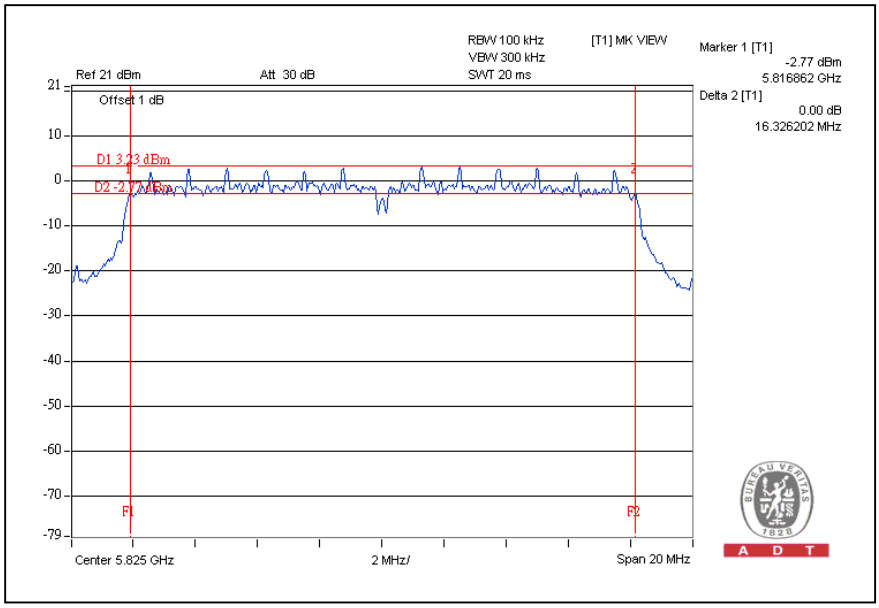
CH1



CH3


RBW 100 kHz
VBW 300 kHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
-2.91 dBm
5.776828 GHz
Delta 2 [T1]
0.00 dB
16.342737 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 3.09 dBm
D2 -2.91 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 5.785 GHz
2 MHz/
Span 20 MHz

CH5


RBW 100 kHz
VBW 300 kHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
-2.77 dBm
5.816862 GHz
Delta 2 [T1]
0.00 dB
16.326202 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 3.23 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 5.825 GHz
2 MHz/
Span 20 MHz

5.3 MAXIMUM PEAK OUTPUT POWER

5.3.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

5.3.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 08, 2009
Agilent SIGNAL GENERATOR	E8257C	MY43320668	Dec. 25, 2008
TEKTRONIX OSCILLOSCOPE	TDS380	B016335	Jul. 20, 2009
NARDA DETECTOR	4503A	FSCM99899	NA

NOTE:
The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.3.3 TEST PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.
2. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same reading on oscilloscope. Record the power level.

5.3.4 DEVIATION FROM TEST STANDARD

No deviation

5.3.5 TEST SETUP

5.3.6 EUT OPERATING CONDITIONS

Same as Item 5.2.6

5.3.7 TEST RESULTS

802.11a OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	DC 3.7V from battery	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 960hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	5745	65.313	18.15	30	PASS
3	5785	79.433	19.00	30	PASS
5	5825	81.658	19.12	30	PASS

5.4 POWER SPECTRAL DENSITY MEASUREMENT

5.4.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

5.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 08, 2009

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

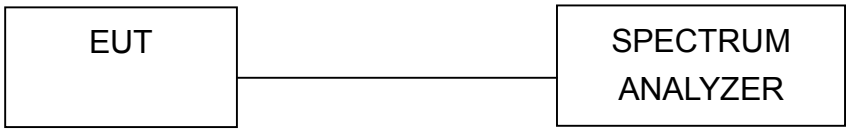
5.4.3 TEST PROCEDURE

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 3 kHz RBW and 30 kHz VBW, set sweep time = span/3 kHz. The power spectral density was measured and recorded.
The sweep time is allowed to be longer than span/3 kHz for a full response of the mixer in the spectrum analyzer.

5.4.4 DEVIATION FROM TEST STANDARD

No deviation

5.4.5 TEST SETUP



5.4.6 EUT OPERATING CONDITION

Same as Item 5.2.6

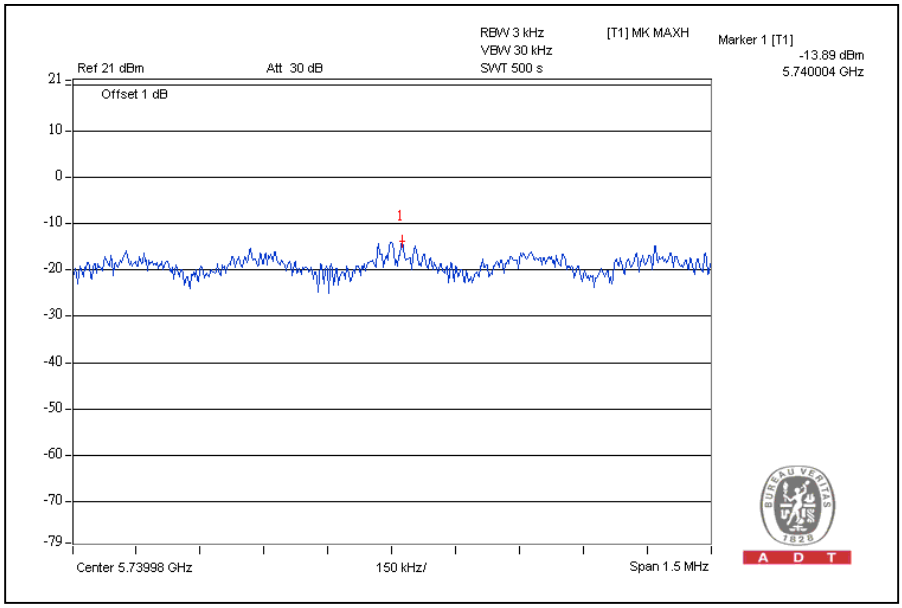
5.4.7 TEST RESULTS

802.11a OFDM modulation

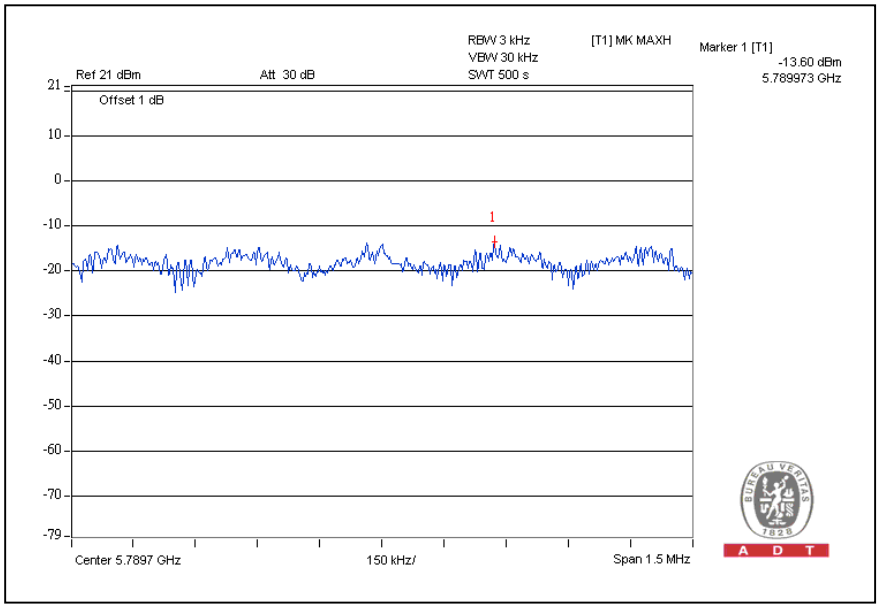
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	DC 3.7V from battery	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 960hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	5745	-13.89	8	PASS
3	5785	-13.60	8	PASS
5	5825	-10.14	8	PASS

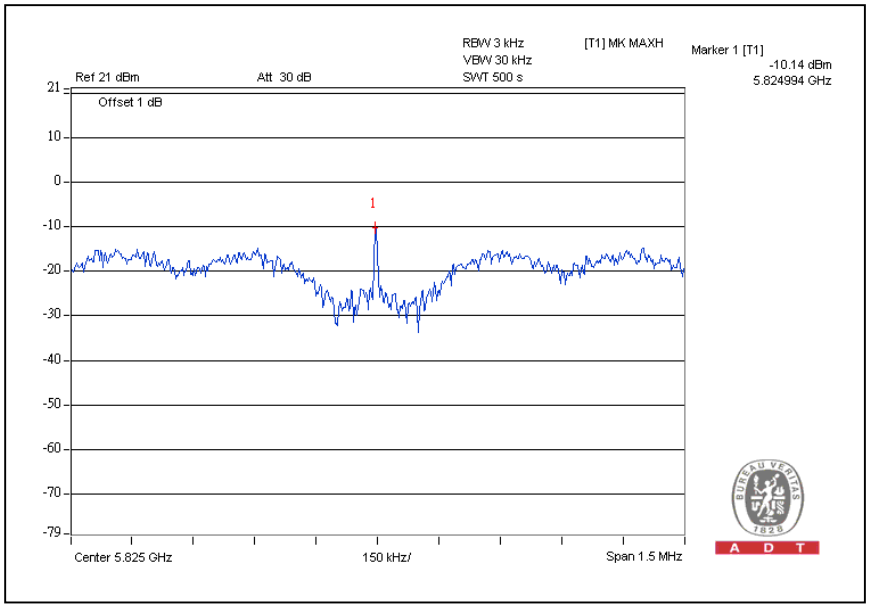
CH1



CH3


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-13.60 dBm
5.789973 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
1
Center 5.7897 GHz
150 kHz/
Span 1.5 MHz

CH5


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-10.14 dBm
5.824994 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
1
Center 5.825 GHz
150 kHz/
Span 1.5 MHz

5.5 OUT-BAND EMISSION MEASUREMENT

5.5.1 LIMITS OF OUT-BAND EMISSION MEASUREMENT

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

5.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 08, 2009

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.

5.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set RBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

5.5.4 DEVIATION FROM TEST STANDARD

No deviation

5.5.5 EUT OPERATING CONDITION

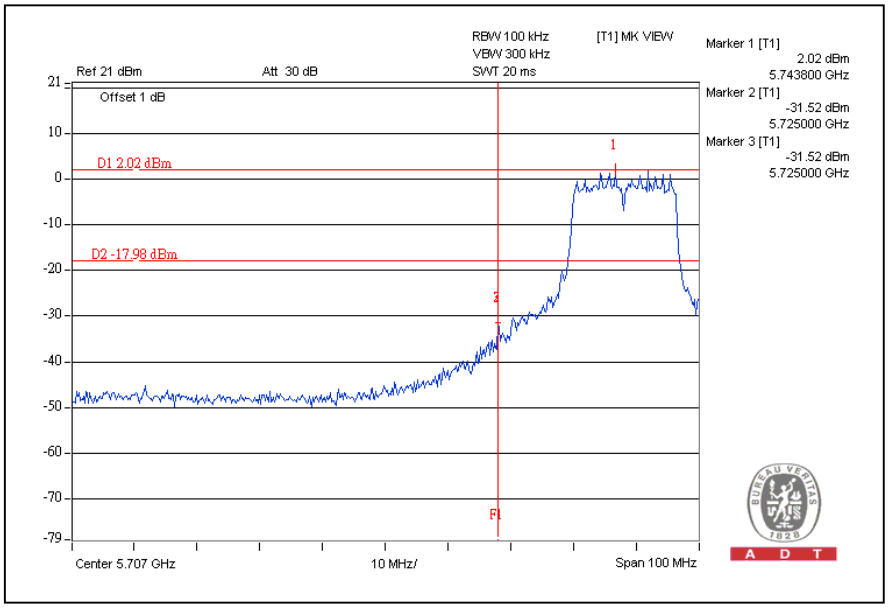
Same as Item 5.2.6

5.5.6 TEST RESULTS

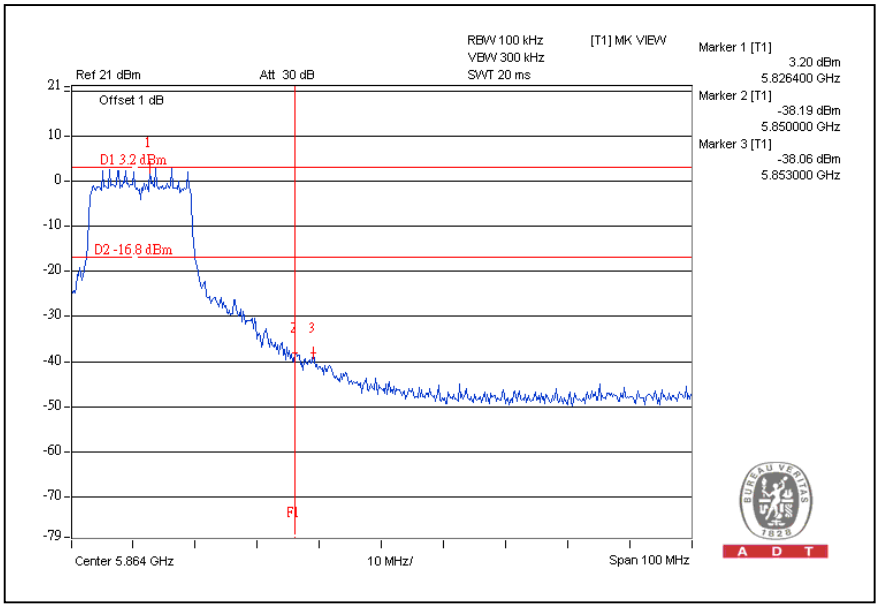
The spectrum plots are attached on the following pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).

802.11a OFDM modulation

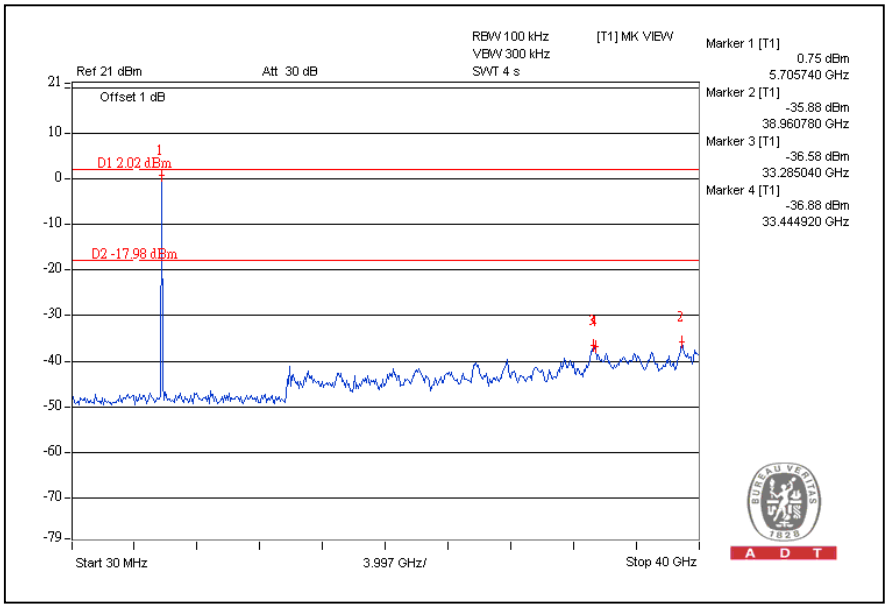
CH1



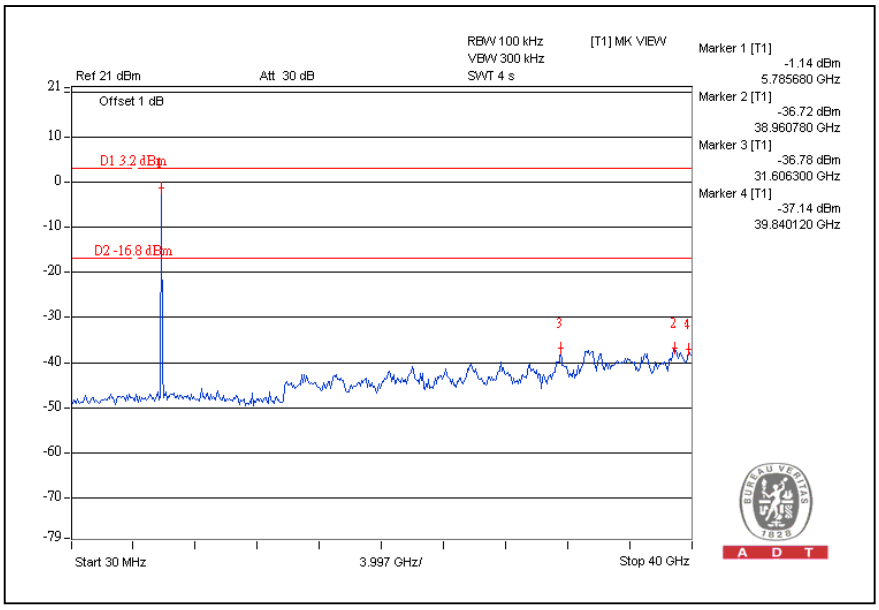
CH5



CH1


RBW 100 kHz
VBW 300 kHz
SWT 4 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 2.02 dBm
D2 -17.98 dBm
Marker 1 [T1]
0.75 dBm
5.705740 GHz
Marker 2 [T1]
-35.88 dBm
38.960780 GHz
Marker 3 [T1]
-36.58 dBm
33.285040 GHz
Marker 4 [T1]
-36.88 dBm
33.444920 GHz
Start 30 MHz
3.997 GHz/
Stop 40 GHz

CH5


RBW 100 kHz
VBW 300 kHz
SWT 4 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 3.2 dBm
D2 -16.8 dBm
Marker 1 [T1]
-1.14 dBm
5.785680 GHz
Marker 2 [T1]
-36.72 dBm
38.960780 GHz
Marker 3 [T1]
-36.78 dBm
31.606300 GHz
Marker 4 [T1]
-37.14 dBm
39.840120 GHz
Start 30 MHz
3.997 GHz/
Stop 40 GHz

5.6 ANTENNA REQUIREMENT

5.6.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
And according to FCC 47 CFR Section 15.247(a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

5.6.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is PIFA Antenna without Connector. The maximum Gain of the antenna is 4.08dBi.

6. INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC, UL
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	TAF, BSMI, NCC
Netherlands	Telefication
Singapore	GOST-ASIA(MOU)
Russia	CERTIS(MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also

7.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 ---