FCC TEST REPORT (15.407)

REPORT NO.:	RF960622H02
MODEL NO.:	LA-5137C2
RECEIVED:	June 22, 2007
TESTED:	July 05 to 10, 2007
ISSUED:	June 12, 2007

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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No. 2177-01

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1. CERTIFICATION

PRODUCT:	802.11a/b/g Compact Flash Radio Card
BRAND NAME:	Symbol Technologies Inc.
MODEL NO.:	LA-5137C2
TEST SAMPLE:	ENGINEERING SAMPLE
TESTED:	July 05 to 10, 2007
APPLICANT:	Symbol Technologies Inc.
STANDARDS:	FCC Part 15, Subpart E (Section 15.407) ANSI C63.4-2003

The above equipment (Model: LA-5137C2) 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 : _____ , **DATE:** June 12, 2007
(Midoli Peng, Specialist)

TECHNICAL ACCEPTANCE : _____ , **DATE:** June 12, 2007
Responsible for RF
(Hank Chung, Deputy Manager)

APPROVED BY : _____ , **DATE:** June 12, 2007
(May Chen, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart E (Section 15.407)			
Standard Section	**Test Type**	**Result**	**Remark**
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is –18.01dB at 0.158MHz
15.407(b/1/2/3)(b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 40000MHz	PASS	Meet the requirement of limit. Minimum passing margin is –1.02dB at 5350.00MHz
15.407(a/1/2/3)	Peak Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.

NOTE:

1. The EUT was operating in 2.412 ~ 2.462GHz, 5.15~5.35GHz, 5.47~5.725GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 5.15~5.35GHz and 5.47~5.725GHz. For the 2.412 ~ 2.462GHz and 5.725 ~ 5.850GHz 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	2.41 dB
Radiated emissions (30MHz-1GHz)	3.89 dB
Radiated emissions (1GHz -18GHz)	2.21 dB
Radiated emissions (18GHz -40GHz)	1.88 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	802.11a/b/g Compact Flash Radio Card
MODEL NO.	LA-5137C2
FCC ID	H9PLA5137C2
POWER SUPPLY	DC 3.3 V +/-5% from host equipment
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 and 5.50 ~ 5.70GHz
	For 15.247 802.11b & 802.11g: 2412 ~ 2462MHz 802.11a: 5.745 ~ 5.825GHz
NUMBER OF CHANNEL	For 15.407 802.11a (5.15 ~ 5.35GHz):8 802.11a (5.47 ~ 5.725GHz):11
	For 15.247 802.11b & 802.11g: 11 802.11a (5.725 ~ 5.850GHz):5
CHANNEL SPACING	802.11b & 802.11g: 5MHz 802.11a: 20MHz
OUTPUT POWER	For 802.11b: 91.201mW For 802.11g: 100.000mW For 802.11a (FCC15.247): 63.096mW For 802.11a (FCC15.407): 36.392mW
DATA CABLE	NA
ANTENNA TYPE	Please see note 2 (on next page)
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT operates in both the 5GHz and 2.4GHz Bands and compatibility with 802.11a and 802.11b, 802.11g technology.

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

Model No.	Frequency	Gain (dBi)	Antenna Type	Antenna Connector	Cable loss	Net gain (dBi)
ML-2452-APA2-01	2.4GHz	3	Dipole	R-SMA	0.9dB	2.1
	5GHz	4			1.5dB	2.5

3. 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 5150MHz ~ 5350MHz bands:

Eight channels are provided to this EUT.

Channel	Frequency
1	5180 MHz
2	5200 MHz
3	5220 MHz
4	5240 MHz
5	5260 MHz
6	5280 MHz
7	5300 MHz
8	5320 MHz

Operated in 5470MHz ~ 5725MHz bands:

Eleven channels are provided to this EUT.

Channel	Frequency
9	5500 MHz
10	5520 MHz
11	5540 MHz
12	5560 MHz
13	5580 MHz
14	5600 MHz
15	5620 MHz
16	5640 MHz
17	5660 MHz
18	5680 MHz
19	5700 MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

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

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

Power Line Conducted Emission Test:

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

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

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	1 to 19	19	OFDM	BPSK	6

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)
802.11a	1 to 19	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)
802.11a	1 to 19	1, 4, 5, 8, 9, 14, 19	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)
802.11a	1 to 19	1, 8, 9, 19	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)
802.11a	1 to 19	1, 4, 5, 8, 9, 14, 19	OFDM	BPSK	6

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is an 802.11a/b/g Compact Flash Radio Card and 802.11a/b/g Compact Flash Radio Card. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)

ANSI C63.4-2003

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

3.4 DESCRIPTION OF SUPPORT UNITS

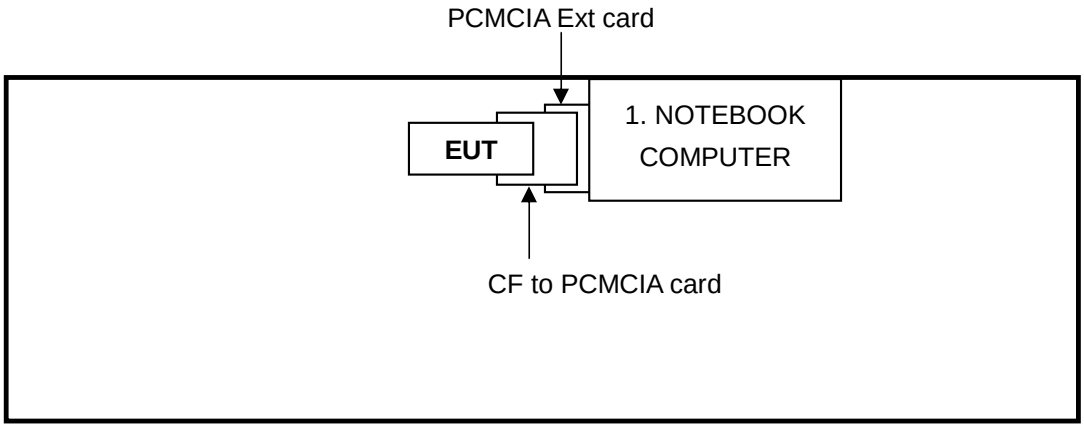
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	IBM	2372	9949APL	FCC DoC
2	PCMCIA Ext Card	USI	NA	NA	NA
3	CF to PCMCIA Card	USI	NA	NA	NA

No.	Signal cable description
1	NA
2	NA
3	NA

Note: 1. All power cords of the above support units are unshielded (1.8m).

3.5 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver	ESCS 30	847124/029	Mar. 01, 2008
Line-Impedance Stabilization Network(for EUT)	ENV-216	100071	Nov. 26, 2007
Line-Impedance Stabilization Network(for Peripheral)	ESH3-Z5	848773/004	Oct. 26, 2007
RF Cable (JETBAO)	RG233/U	Cable_CB_01	Dec. 09, 2007
Terminator	50	2	Oct. 30, 2007
Software	ADT_Cond_V7.3.2	NA	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 test was performed in ADT Shielded Room No. B.
3. The VCCI Con B Registration No. is C-2193.

4.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs

b. provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

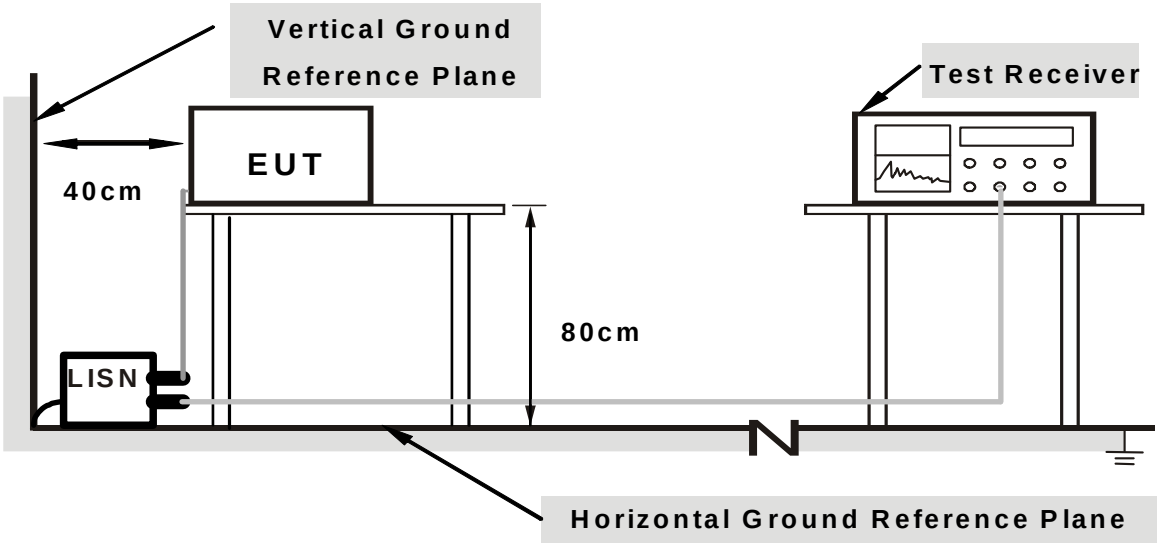
c. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

d. The frequency range from 150kHz to 30MHz was searched. Emission level under (Limit – 20dB) was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

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

4.1.6 EUT OPERATING CONDITIONS

a. Connect the EUT with the support unit 1 (Notebook computer) and placed it on the testing table.

b. The support unit 1 (Notebook computer) ran a test program “cTxRx 3.0.1.1” to enable EUT under transmission condition continuously.

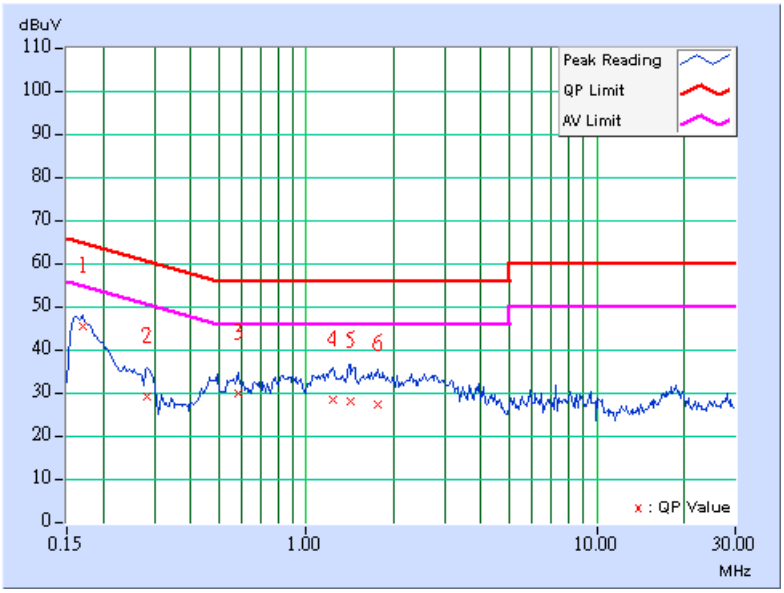
4.1.7 TEST RESULTS

Conducted Worst-Case Data

MODULATION TYPE	BPSK	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**TRANSFER RATE**	6Mbps
ENVIRONMENTAL CONDITIONS	26deg. C, 58%RH, 960hPa	**PHASE**	Line (L)
TESTED BY	Wen Yu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.170	0.40	45.12	-	45.52	-	64.98	54.98	-19.46	-
2	0.283	0.40	28.76	-	29.16	-	60.73	50.73	-31.57	-
3	0.584	0.40	29.54	-	29.94	-	56.00	46.00	-26.06	-
4	1.240	0.42	28.21	-	28.63	-	56.00	46.00	-27.37	-
5	1.416	0.44	27.55	-	27.99	-	56.00	46.00	-28.01	-
6	1.767	0.48	27.10	-	27.58	-	56.00	46.00	-28.42	-

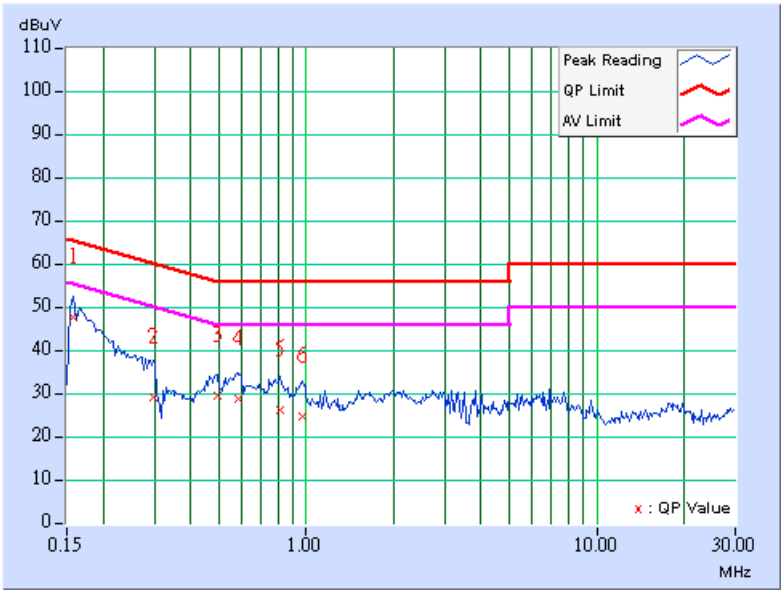
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



MODULATION TYPE	BPSK	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**TRANSFER RATE**	6Mbps
ENVIRONMENTAL CONDITIONS	26deg. C, 58%RH, 960hPa	**PHASE**	Neutral (N)
TESTED BY	Wen Yu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.158**	**0.20**	**47.37**	**-**	**47.57**	**-**	**65.58**	**55.58**	**-18.01**	**-**
2	0.298	0.20	28.87	-	29.07	-	60.29	50.29	-31.22	-
3	0.494	0.22	29.17	-	29.39	-	56.10	46.10	-26.72	-
4	0.584	0.23	28.74	-	28.97	-	56.00	46.00	-27.03	-
5	0.810	0.27	25.86	-	26.13	-	56.00	46.00	-29.87	-
6	0.970	0.30	24.42	-	24.72	-	56.00	46.00	-31.28	-

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



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 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.

4.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

Frequencies (MHz)	**EIRP Limit (dBm)**	**Equivalent Field Strength at 3m (dBμV/m)** *note 3
5150~5250	-27	68.3
5250~5350	-27	68.3
5470~5725	-27	68.3
5725~5825	-27 *note 1	68.3
	-17 *note 2	78.3

NOTE:

1. For frequencies 10MHz or greater above or below the band edge.
2. All emissions within the frequency range from the band edge to 10MHz above or below the band edge.
3. The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

4.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 03, 2008
HP Pre_Amplifier	8449B	3008A01922	Sep. 18, 2007
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Sep. 20, 2007
CHASE Broadband Antenna	VULB9168	138	Dec. 10, 2007
Schwarzbeck Horn_Antenna	BBHA9120	D124	Jan. 01, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 04, 2008
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 08, 2009
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 08, 2009
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.

4.2.4 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. 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.

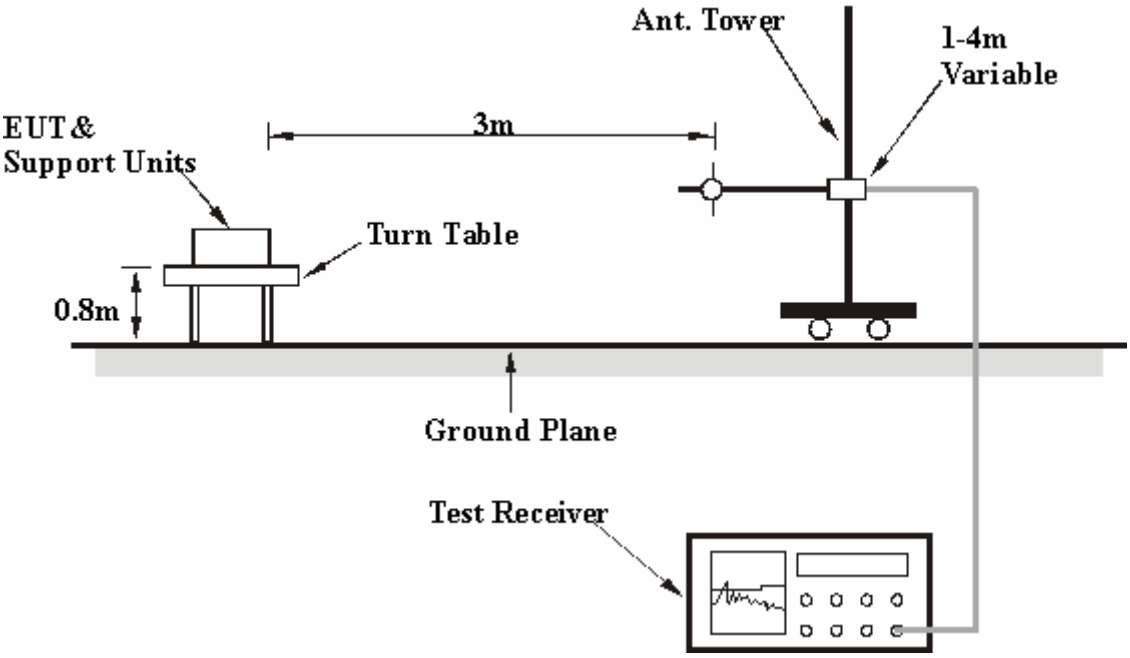
NOTE:

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.

4.2.5 DEVIATION FROM TEST STANDARD

No deviation

4.2.6 TEST SETUP



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

4.2.7 EUT OPERATING CONDITION

Same as 4.1.6

4.2.8 TEST RESULTS

Below 1GHz Worst-Case Data

MODE	Channel 1	**FREQUENCY RANGE**	Below 1000MHz
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	21deg. C, 66%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	81.46	32.74 QP	40.00	-7.26	1.02 H	41	22.85	9.89
2	200.41	35.41 QP	43.50	-8.09	1.13 H	264	23.79	11.62
3	288.21	38.65 QP	46.00	-7.35	1.12 H	206	22.39	16.26
4	499.86	33.85 QP	46.00	-12.15	1.42 H	351	12.09	21.76
5	800.24	35.89 QP	46.00	-10.11	1.25 H	247	8.33	27.56
6	880.14	41.12 QP	46.00	-4.88	1.00 H	178	12.45	28.67
7	959.87	36.77 QP	46.00	-9.23	1.00 H	341	6.88	29.89

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	79.75	35.99 QP	40.00	-4.01	1.00 V	143	25.79	10.20
2	199.95	31.00 QP	43.50	-12.50	1.00 V	135	19.40	11.60
3	500.11	34.12 QP	46.00	-11.88	1.00 V	145	12.36	21.76
4	666.87	31.45 QP	46.00	-14.55	1.58 V	287	6.16	25.29
5	800.14	35.27 QP	46.00	-10.73	1.26 V	254	7.71	27.56
6	960.00	34.62 QP	46.00	-11.38	1.43 V	257	4.73	29.89

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

802.11a OFDM modulation

MODE	Channel 1	**FREQUENCY RANGE**	1 ~ 40 GHz
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	#5150.00	56.22 PK	74.00	-17.78	1.60 H	232	19.98	36.24
2	#5150.00	43.35 AV	54.00	-10.65	1.60 H	232	7.11	36.24
3	*5180.00	99.20 PK			1.60 H	232	62.92	36.28
4	*5180.00	88.50 AV			1.60 H	232	52.22	36.28
5	10360.00	59.30 PK	88.30	-29.00	1.85 H	4	13.40	45.90
6	10360.00	45.70 AV	68.30	-22.60	1.85 H	4	-0.20	45.90
7	#15540.00	67.00 PK	74.00	-7.00	1.50 H	135	19.02	47.98
8	#15540.00	51.80 AV	54.00	-2.20	1.50 H	135	3.82	47.98

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	#5150.00	68.92 PK	74.00	-5.08	1.37 V	178	32.68	36.24
2	#5150.00	52.93 AV	54.00	-1.07	1.37 V	178	16.69	36.24
3	*5180.00	113.30 PK			1.35 V	195	77.02	36.28
4	*5180.00	102.60 AV			1.35 V	195	66.32	36.28
5	10360.00	62.00 PK	88.30	-26.30	1.70 V	5	16.10	45.90
6	10360.00	48.80 AV	68.30	-19.50	1.70 V	5	2.90	45.90
7	#15540.00	66.40 PK	74.00	-7.60	1.32 V	140	18.42	47.98
8	#15540.00	52.00 AV	54.00	-2.00	1.32 V	140	4.02	47.98

NOTE: 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.

MODE	Channel 4	**FREQUENCY RANGE**	1 ~ 40 GHz
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	*5240.00	99.00 PK			1.60 H	230	62.65	36.35
2	*5240.00	88.20 AV			1.60 H	230	51.85	36.35
3	10480.00	60.10 PK	88.30	-28.20	1.62 H	350	13.99	46.11
4	10480.00	46.30 AV	68.30	-22.00	1.62 H	350	0.19	46.11
5	#15720.00	66.00 PK	74.00	-8.00	1.58 H	105	18.26	47.74
6	#15720.00	51.90 AV	54.00	-2.10	1.58 H	105	4.16	47.74

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	*5240.00	112.80 PK			1.32 V	190	76.45	36.35
2	*5240.00	102.00 AV			1.32 V	190	65.65	36.35
3	10480.00	64.60 PK	88.30	-23.70	1.70 V	180	18.49	46.11
4	10480.00	51.10 AV	68.30	-17.20	1.70 V	180	4.99	46.11
5	#15720.00	66.60 PK	74.00	-7.40	1.08 V	335	18.86	47.74
6	#15720.00	51.40 AV	54.00	-2.60	1.08 V	335	3.66	47.74

NOTE: 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.

MODE	Channel 5	**FREQUENCY RANGE**	1 ~ 40 GHz
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	*5260.00	99.00 PK			1.54 H	235	62.63	36.37
2	*5260.00	88.40 AV			1.54 H	235	52.03	36.37
3	10520.00	59.40 PK	88.30	-28.90	1.45 H	55	13.23	46.17
4	10520.00	47.40 AV	68.30	-20.90	1.45 H	55	1.23	46.17
5	#15780.00	66.40 PK	74.00	-7.60	1.45 H	105	18.73	47.67
6	#15780.00	52.00 AV	54.00	-2.00	1.45 H	105	4.33	47.67

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	*5260.00	113.50 PK			1.32 V	182	77.13	36.37
2	*5260.00	102.50 AV			1.32 V	182	66.13	36.37
3	10520.00	59.90 PK	88.30	-28.40	1.65 V	50	13.73	46.17
4	10520.00	46.90 AV	68.30	-21.40	1.65 V	50	0.73	46.17
5	#15780.00	65.60 PK	74.00	-8.40	1.32 V	133	17.93	47.67
6	#15780.00	51.80 AV	54.00	-2.20	1.32 V	133	4.13	47.67

NOTE: 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.

MODE	Channel 8	**FREQUENCY RANGE**	1 ~ 40 GHz
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	*5320.00	101.20 PK			1.58 H	210	64.76	36.44
2	*5320.00	88.60 AV			1.58 H	210	52.16	36.44
3	#5350.00	56.34 PK	74.00	-17.66	1.65 H	210	19.86	36.48
4	#5350.00	43.11 AV	54.00	-10.89	1.65 H	210	6.63	36.48
5	#10640.00	58.40 PK	74.00	-15.60	1.66 H	193	12.11	46.29
6	#10640.00	45.50 AV	54.00	-8.50	1.66 H	193	-0.79	46.29
7	#15690.00	66.30 PK	74.00	-7.70	1.62 H	156	18.52	47.78
8	#15690.00	51.70 AV	54.00	-2.30	1.62 H	156	3.92	47.78

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	*5320.00	113.30 PK			1.10 V	1	76.86	36.44
2	*5320.00	102.40 AV			1.10 V	1	65.96	36.44
3	#5350.00	68.28 PK	74.00	-5.72	1.10 V	0	31.80	36.48
4	**#5350.00**	**52.98 AV**	**54.00**	**-1.02**	**1.10 V**	**0**	**16.50**	**36.48**
5	#10640.00	59.20 PK	74.00	-14.80	1.05 V	30	12.91	46.29
6	#10640.00	46.40 AV	54.00	-7.60	1.05 V	30	0.11	46.29
7	#15690.00	66.00 PK	74.00	-8.00	1.10 V	330	18.57	47.43
8	#15690.00	52.00 AV	54.00	-2.00	1.10 V	330	4.57	47.43

NOTE: 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.

MODE	Channel 9	**FREQUENCY RANGE**	1 ~ 40 GHz
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	#5460.00	55.88 PK	74.00	-18.12	1.36 H	255	19.27	36.61
2	#5460.00	43.33 AV	54.00	-10.67	1.36 H	255	6.72	36.61
3	5470.00	66.60 PK	88.30	-21.70	1.30 H	258	29.98	36.62
4	5470.00	54.40 AV	68.30	-13.90	1.30 H	258	17.78	36.62
5	*5500.00	102.70 PK			1.30 H	258	66.04	36.66
6	*5500.00	90.40 AV			1.30 H	258	53.74	36.66
7	#11000.00	63.00 PK	74.00	-11.00	1.63 H	8	16.35	46.65
8	#11000.00	48.30 AV	54.00	-5.70	1.63 H	8	1.65	46.65
9	16500.00	64.50 PK	88.30	-23.80	1.68 H	66	16.23	48.27
10	16500.00	50.60 AV	68.30	-17.70	1.68 H	66	2.33	48.27

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	#5460.00	68.36 PK	74.00	-5.64	1.10 V	25	31.75	36.61
2	#5460.00	52.85 AV	54.00	-1.15	1.10 V	25	16.24	36.61
3	5470.00	77.60 PK	88.30	-10.70	1.02 V	4	40.98	36.62
4	5470.00	61.90 AV	68.30	-6.40	1.02 V	4	25.28	36.62
5	*5500.00	114.30 PK			1.07 V	2	77.64	36.66
6	*5500.00	103.30 AV			1.07 V	2	66.64	36.66
7	#11000.00	66.00 PK	74.00	-8.00	1.57 V	355	19.35	46.65
8	#11000.00	52.00 AV	54.00	-2.00	1.57 V	355	5.35	46.65
9	16500.00	65.30 PK	88.30	-23.00	1.17 V	70	17.03	48.27
10	16500.00	52.17 AV	68.30	-16.13	1.17 V	70	3.90	48.27

NOTE: 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.

MODE	Channel 14	**FREQUENCY RANGE**	1 ~ 40 GHz
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%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	*5600.00	102.20 PK			1.30 H	255	65.30	36.90
2	*5600.00	90.20 AV			1.30 H	255	53.30	36.90
3	#11200.00	64.70 PK	74.00	-9.30	1.62 H	38	17.90	46.80
4	#11200.00	50.70 AV	54.00	-3.30	1.62 H	38	3.90	46.80
5	16800.00	67.80 PK	88.30	-20.50	1.65 H	202	18.31	49.49
6	16800.00	53.30 AV	68.30	-15.00	1.65 H	202	3.81	49.49

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	*5600.00	114.00 PK			1.06 V	5	77.10	36.90
2	*5600.00	103.00 AV			1.06 V	5	66.10	36.90
3	#11200.00	65.63 PK	74.00	-8.37	1.80 V	76	18.83	46.80
4	#11200.00	51.87 AV	54.00	-2.13	1.80 V	76	5.07	46.80
5	16800.00	68.80 PK	88.30	-19.50	1.13 V	92	19.31	49.49
6	16800.00	54.60 AV	68.30	-13.70	1.13 V	92	5.11	49.49

NOTE: 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.

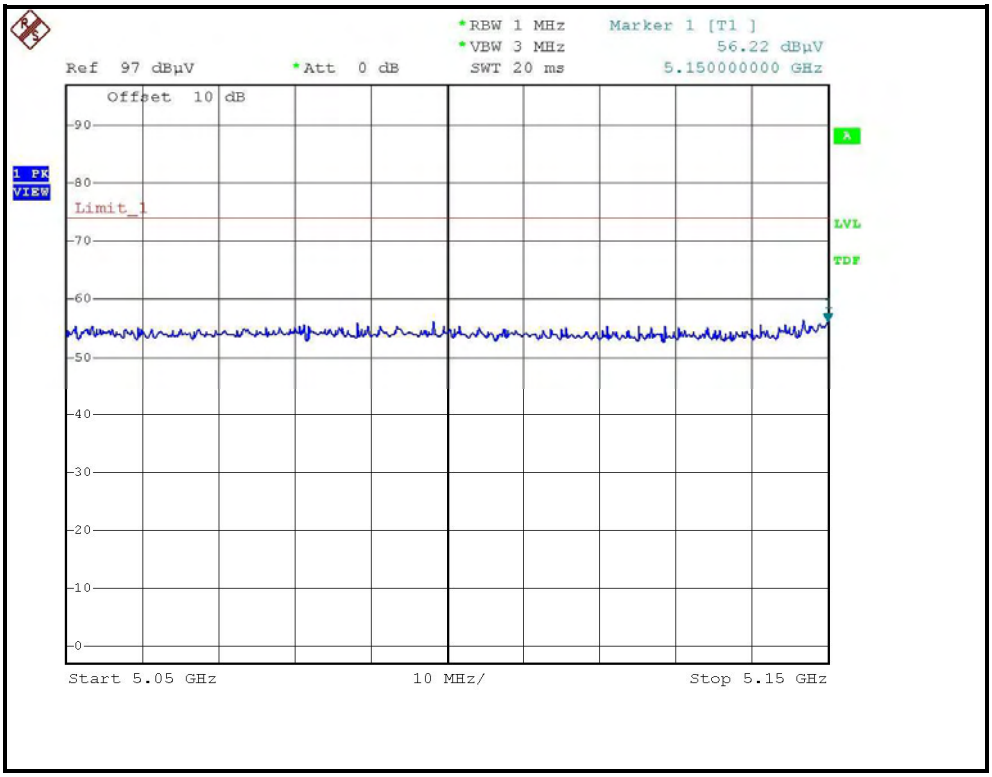
MODE	Channel 19	**FREQUENCY RANGE**	1 ~ 40 GHz
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%RH, 960hPa	**TESTED BY**	Sky Liao

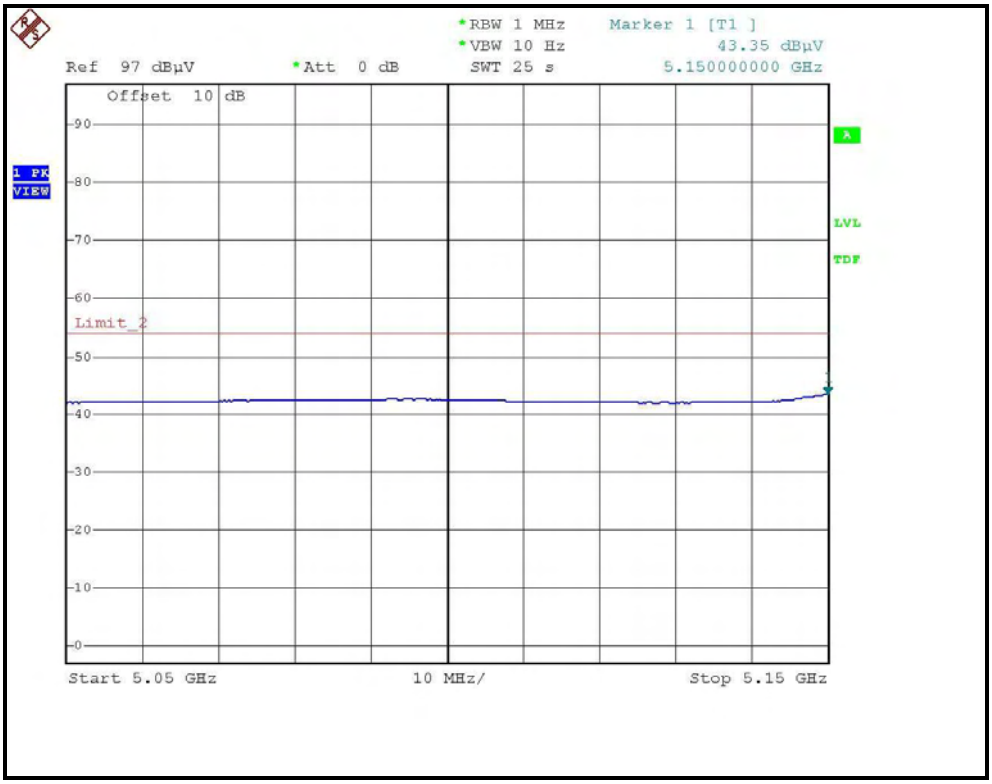
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5700.00	101.80 PK			1.26 H	258	64.65	37.15
2	*5700.00	88.00 AV			1.26 H	258	50.85	37.15
3	5725.00	66.50 PK	88.30	-21.80	1.26 H	258	29.29	37.21
4	5725.00	55.10 AV	68.30	-13.20	1.26 H	258	17.89	37.21
5	#11400.00	64.16 PK	74.00	-9.84	1.60 H	133	17.21	46.95
6	#11400.00	50.55 AV	54.00	-3.45	1.60 H	133	3.60	46.95
7	17100.00	69.10 PK	88.30	-19.20	1.55 H	180	18.46	50.64
8	17100.00	55.10 AV	68.30	-13.20	1.55 H	180	4.46	50.64

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	*5700.00	113.20 PK			1.04 V	4	76.05	37.15
2	*5700.00	102.50 AV			1.04 V	4	65.35	37.15
3	5725.00	77.70 PK	88.30	-10.60	1.02 V	21	40.49	37.21
4	5725.00	63.60 AV	68.30	-4.70	1.02 V	21	26.39	37.21
5	#11400.00	64.90 PK	74.00	-9.10	1.70 V	210	17.95	46.95
6	#11400.00	51.60 AV	54.00	-2.40	1.70 V	210	4.65	46.95
7	17100.00	68.70 PK	88.30	-19.60	1.11 V	95	18.06	50.64
8	17100.00	54.80 AV	68.30	-13.50	1.11 V	95	4.16	50.64

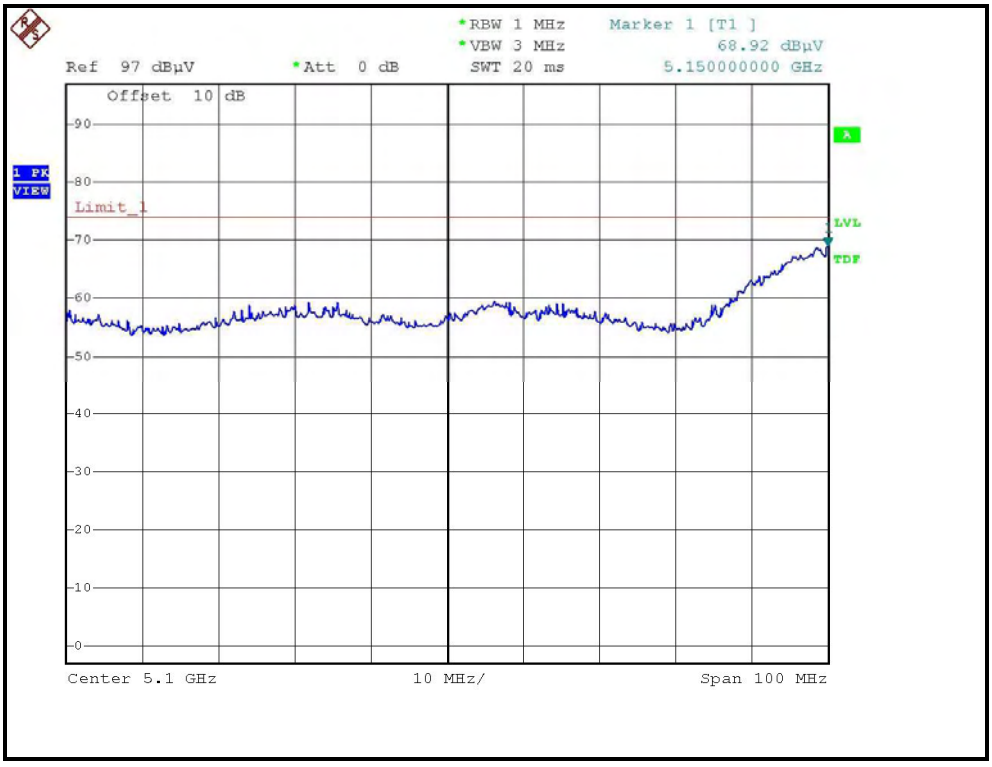
NOTE: 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value
5. "*" : Fundamental frequency
6. "#"The radiated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

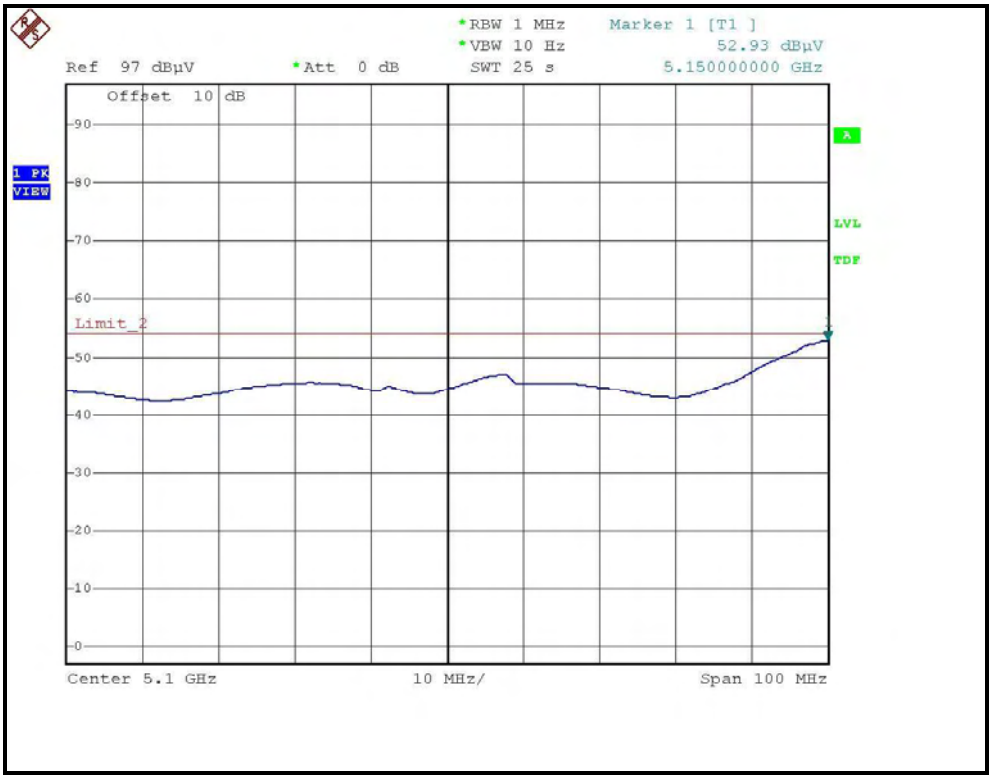
RESTRICTED BANDEDGE (802.11a MODE, CH1, HORIZONTAL)



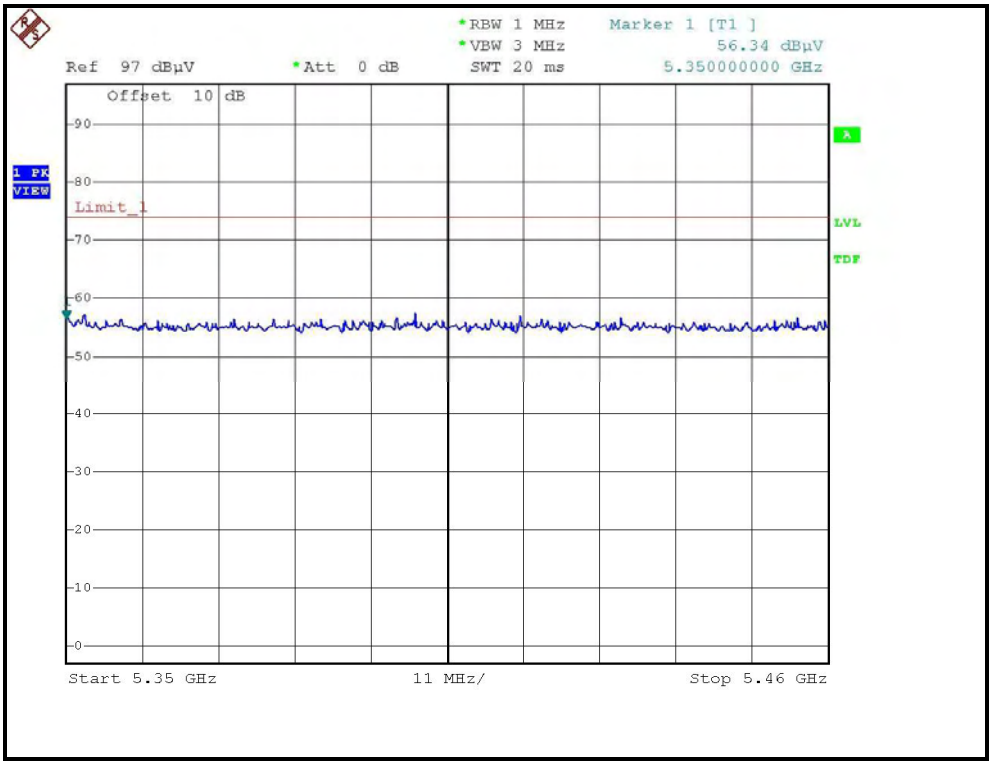


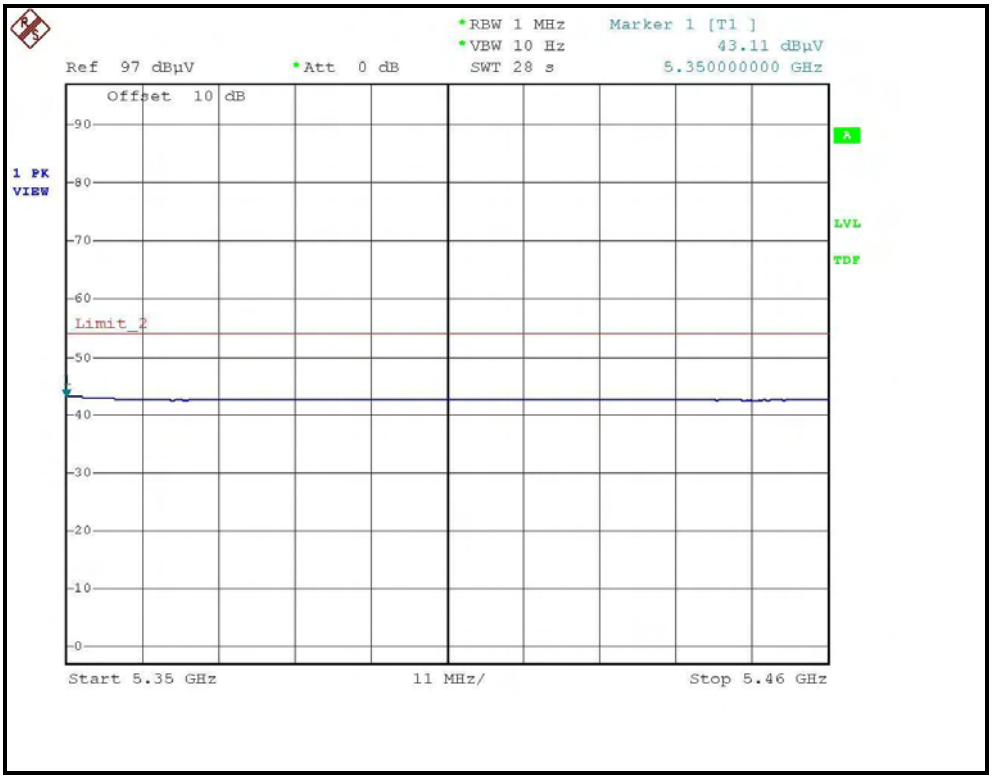
RESTRICTED BANDEDGE (802.11a MODE, CH1, VERTICAL)



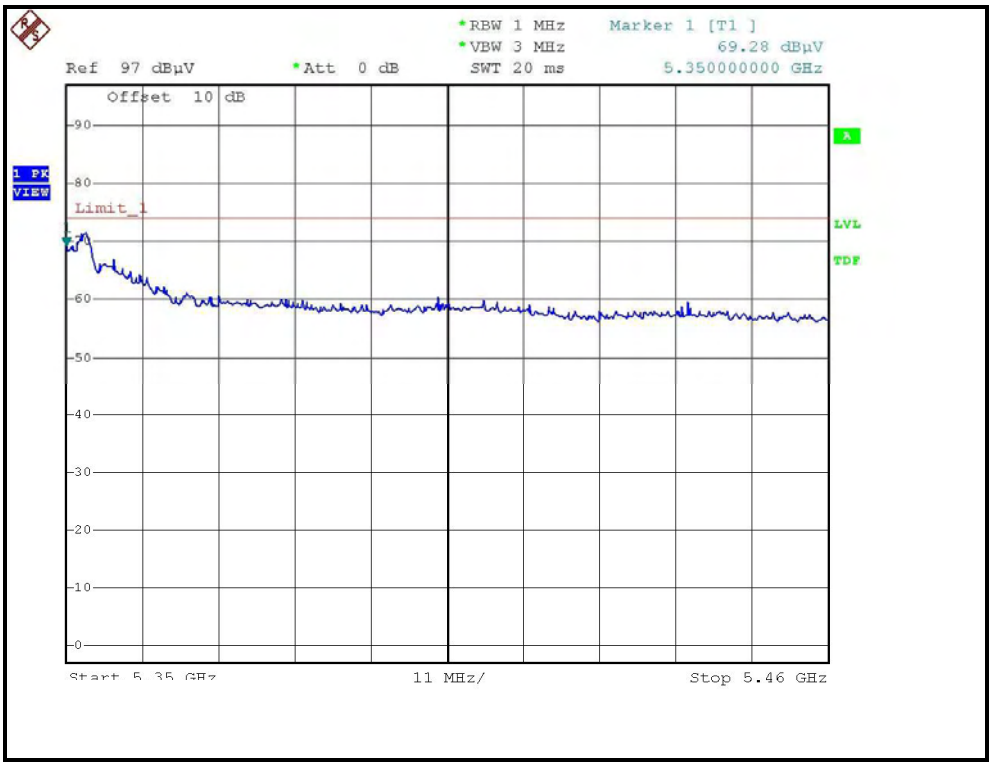


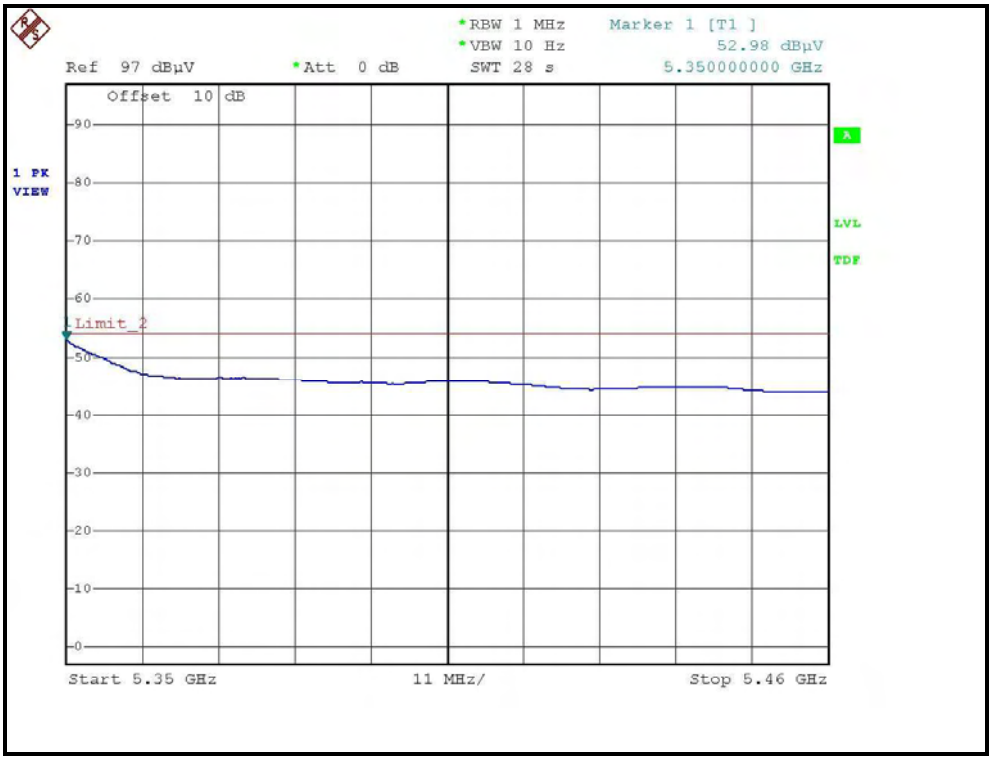
RESTRICTED BANDEDGE (802.11a MODE, CH8, HORIZONTAL)





RESTRICTED BANDEDGE (802.11a MODE, CH8, VERTICAL)





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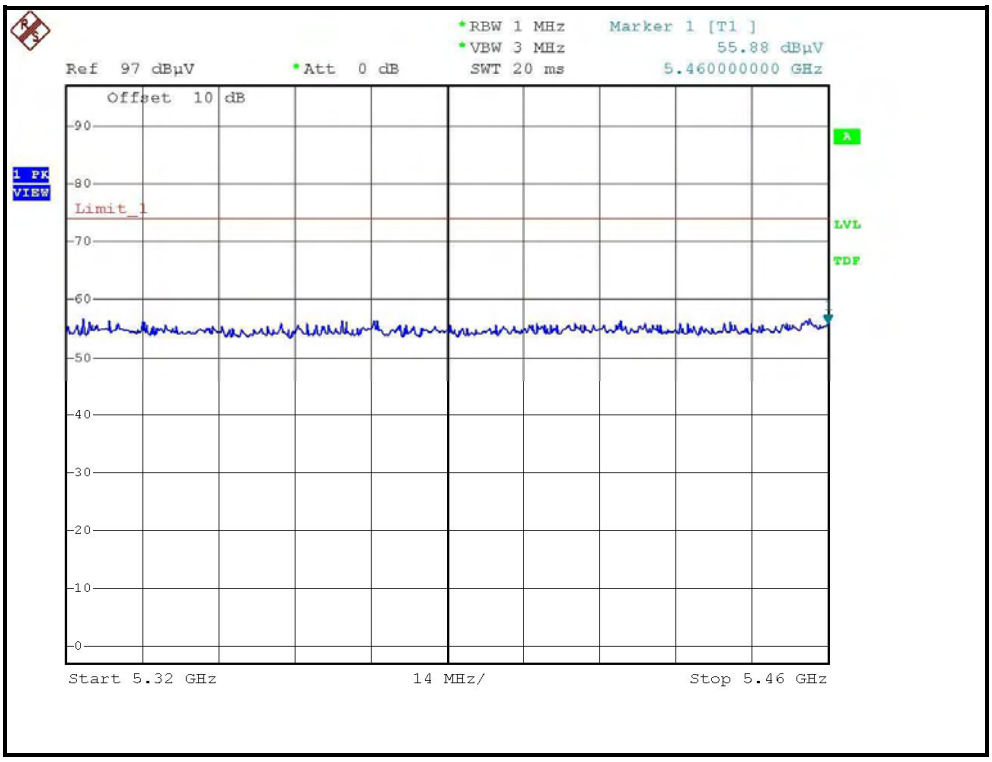
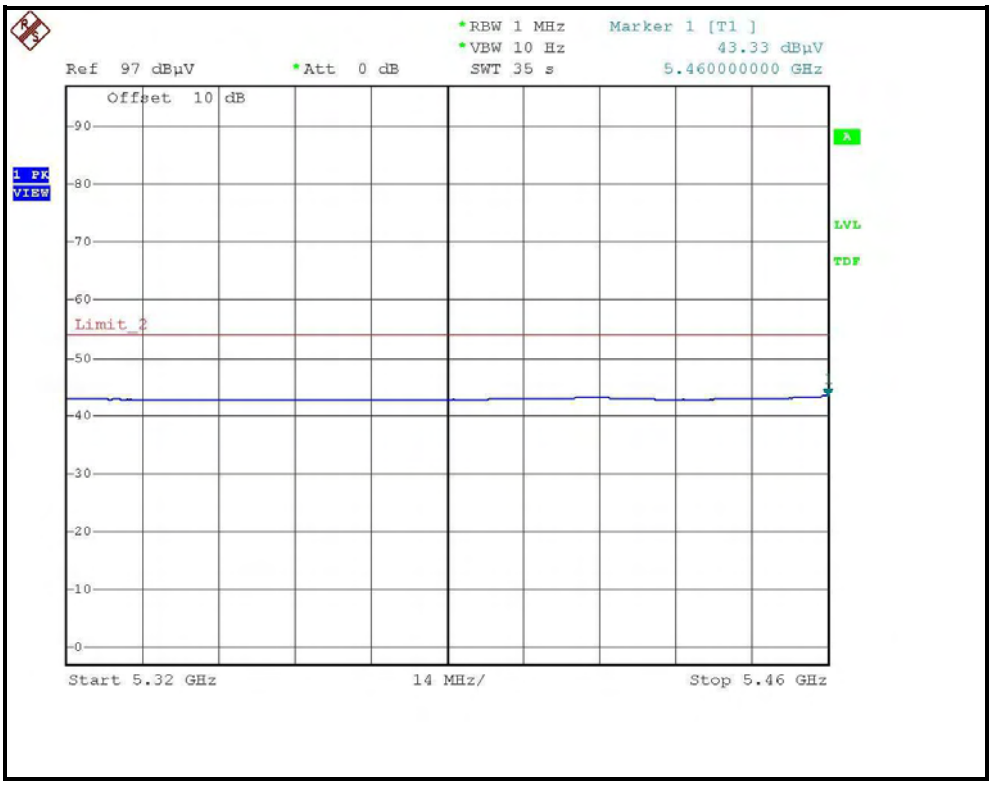
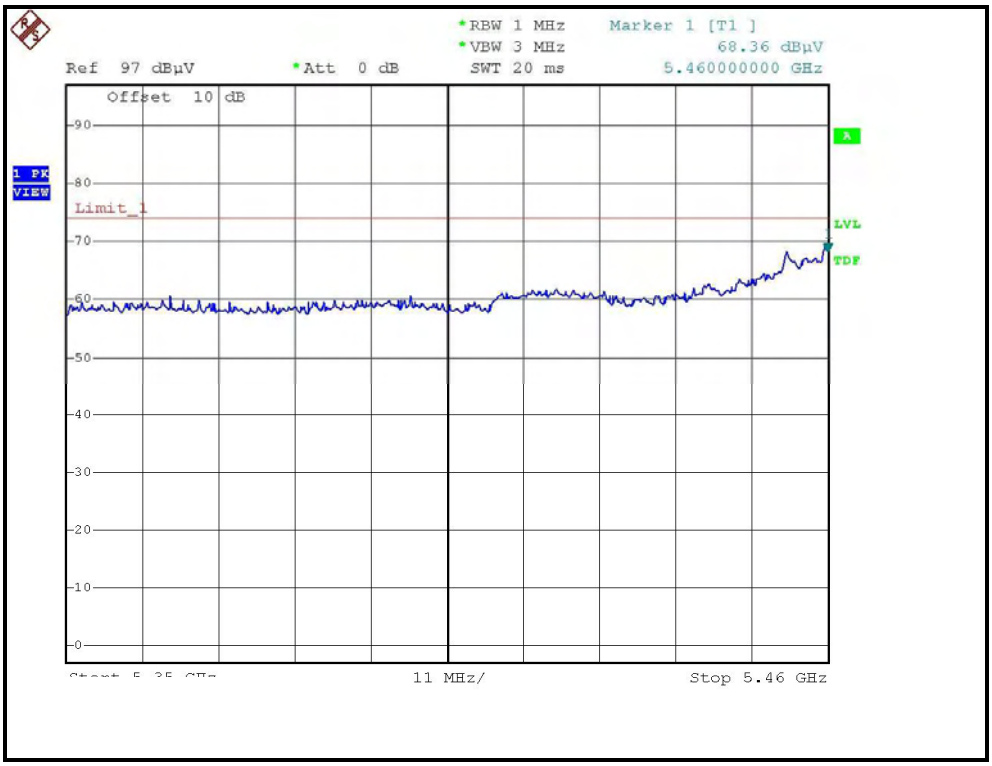
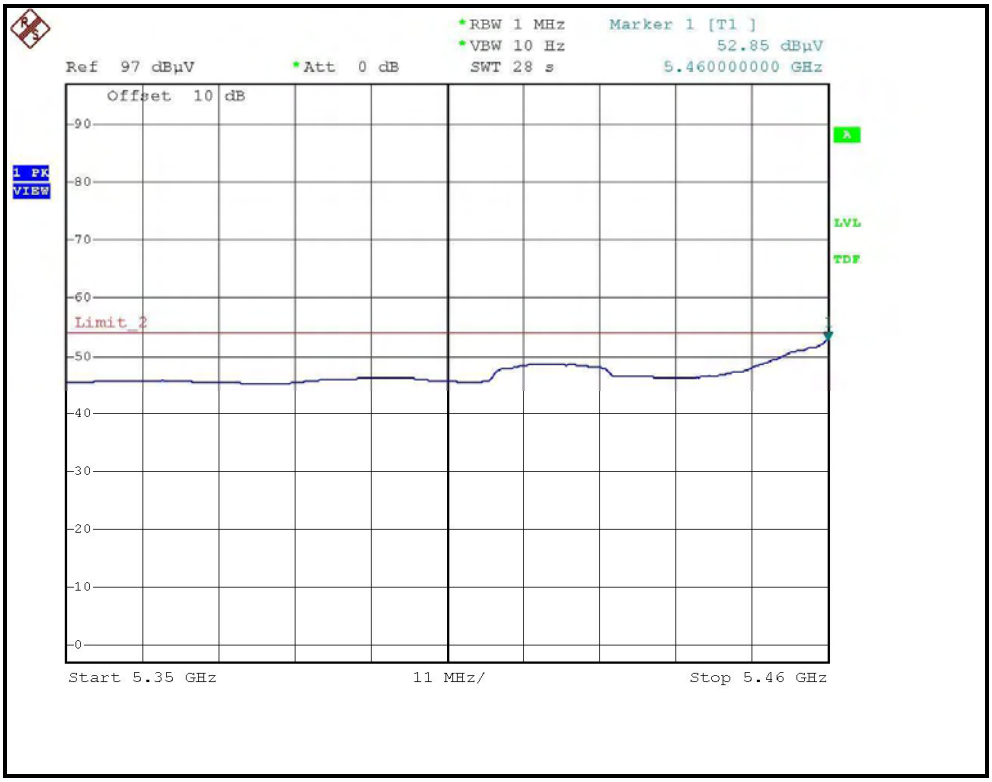




RESTRICTED BANDEDGE (802.11a MODE, CH9, VERTICAL)





4.3 PEAK TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

Frequency Band	Limit
5.15 – 5.25GHz	The lesser of 50mW (17dBm) or 4dBm + 10logB
5.25 – 5.35GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.47 – 5.725GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.725 – 5.825GHz	The lesser of 1W (30dBm) or 17dBm + 10logB

NOTE: Where B is the 26dB emission bandwidth in MHz.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ADVANTEST SPECTRUM ANALYZER	U3772	160100280	April. 10.2008

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.

4.3.3 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set span to encompass the entire emission bandwidth of the signal.
3. Set RBW to 1MHz, VBW to 300kHz.
4. Using the spectrum analyzer's channel power measurement function to measure the output power.

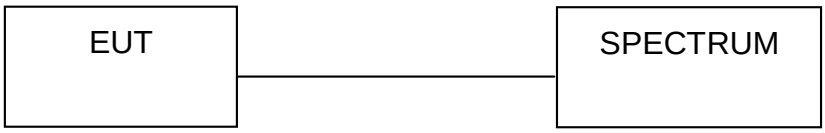
NOTE:
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

4.3.7 TEST RESULTS

802.11a OFDM modulation

MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	27deg.C, 53%RH, 960hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER OUTPUT (mW)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5180	14.21	26.363	17	31.20	PASS
4	5240	13.64	23.121	17	26.45	PASS
5	5260	14.1	25.704	24	29.80	PASS
8	5320	13.44	22.080	24	25.80	PASS
9	5500	15.61	36.392	24	38.45	PASS
14	5600	15.55	35.892	24	40.65	PASS
19	5700	15.43	34.914	24	36.75	PASS

NOTE: The 26dBc Occupied Bandwidth plot, please refer to the following pages.

Peak Power Output:

CH1

CH4

CH5


CHPOW
REF 20.00 dBm
DL 14.10 dBm
MKR 5.25740 GHz
10.0 dB/ *A PwAvg Smpl B Blank Smpl C Blank Auto 2.69 dBm LOF
WIN WIDTH
29.80 MHz
CENTER 5.26000 GHz
SLIDE 100 / 100
SPAN 50.00 MHz
RBW 1 MHz
VBW 3 MHz
SWP 20 ms
ATT 30 dB
Channel Power
Channel Power 14.10 dBm
Power Spectral Density -60.65 dBm/Hz

CH8


CHPOW
REF 20.00 dBm
DL 13.44 dBm
MKR 5.31690 GHz
10.0 dB/ *A PwAvg Smpl B Blank Smpl C Blank Auto 2.31 dBm LOF
MARKER
5.31690 GHz
CENTER 5.32000 GHz
SLIDE 100 / 100
SPAN 50.00 MHz
RBW 1 MHz
VBW 3 MHz
SWP 20 ms
ATT 30 dB
Channel Power
Channel Power 13.44 dBm
Power Spectral Density -60.68 dBm/Hz

CH9


CHPOW
REF 20.00 dBm
DL 15.61 dBm
MKR 5.49675 GHz
10.0 dB/ *A PwAvg Smpl B Blank Smpl C Blank Auto
4.70 dBm
LOF
MARKER
5.49675 GHz
CENTER 5.50000 GHz
SLIDE 100 / 100
SPAN 50.00 MHz
RBW 1 MHz
VBW 3 MHz
SWP 20 ms
ATT 30 dB
Channel Power
Channel Power 15.61 dBm
Power Spectral Density -60.24 dBm/Hz

CH14

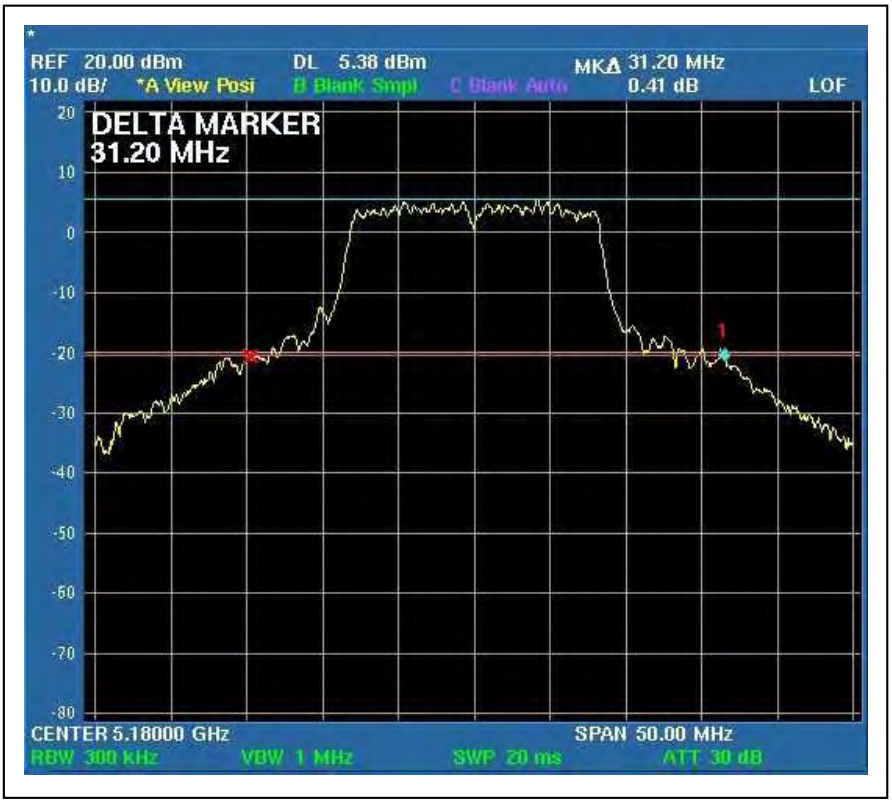

CHPOW
REF 20.00 dBm
DL 15.55 dBm
MKR 5.60375 GHz
10.0 dB/ *A PwAvg Smpl B Blank Smpl C Blank Auto
4.53 dBm
LOF
MARKER
5.60375 GHz
CENTER 5.60000 GHz
SLIDE 100 / 100
SPAN 50.00 MHz
RBW 1 MHz
VBW 3 MHz
SWP 20 ms
ATT 30 dB
Channel Power
Channel Power 15.55 dBm
Power Spectral Density -60.54 dBm/Hz

CH19

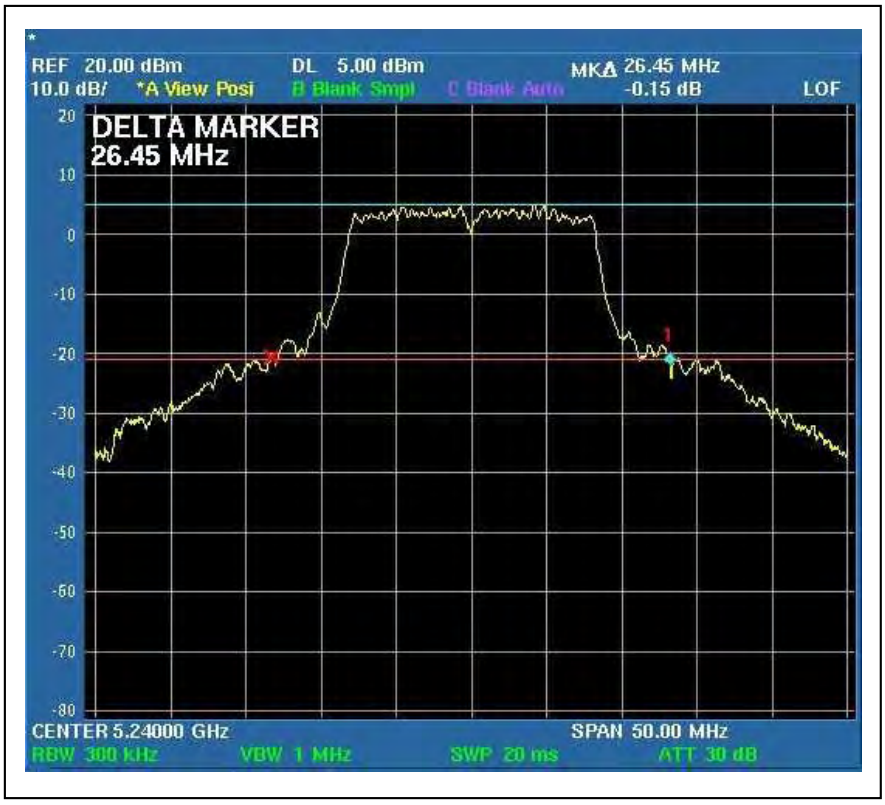

CHPOW
REF 20.00 dBm
DL 15.43 dBm
MKR 5.69840 GHz
10.0 dB/
*A PwAvg Smpl
B Blank Smpl
C Blank Auto
4.14 dBm
LOF
WIN WIDTH
36.75 MHz
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
CENTER 5.70000 GHz
SLIDE 100 / 100
SPAN 50.00 MHz
RBW 1 MHz
VBW 3 MHz
SWP 20 ms
ATT 30 dB
Channel Power
Channel Power 15.43 dBm
Power Spectral Density -60.23 dBm/Hz

26dB Occupied Bandwidth:

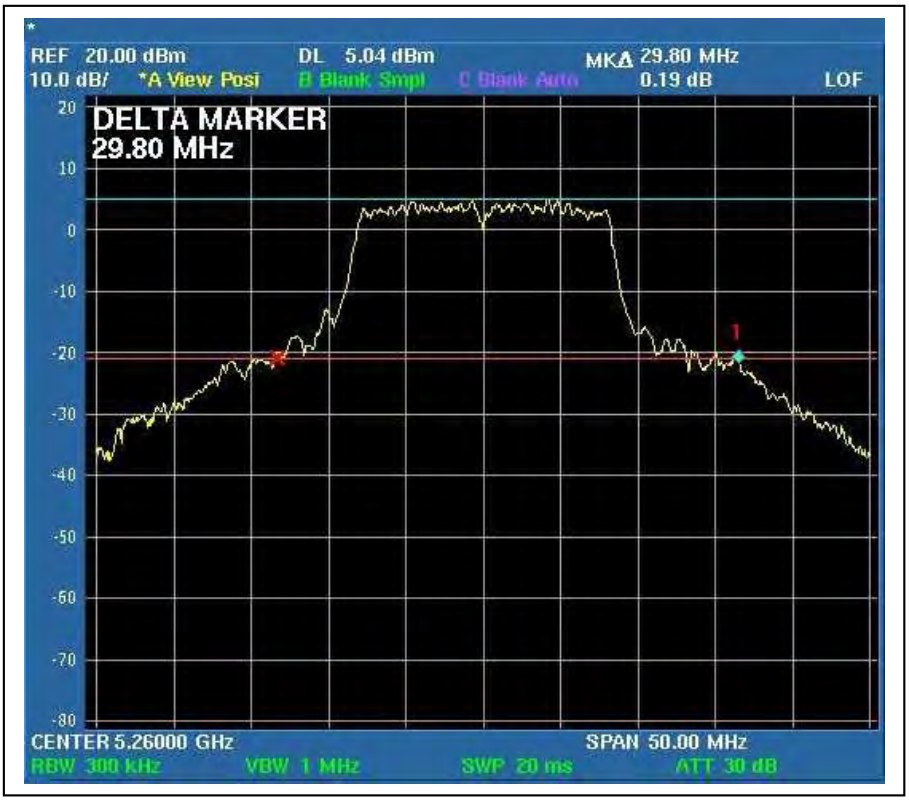
CH1



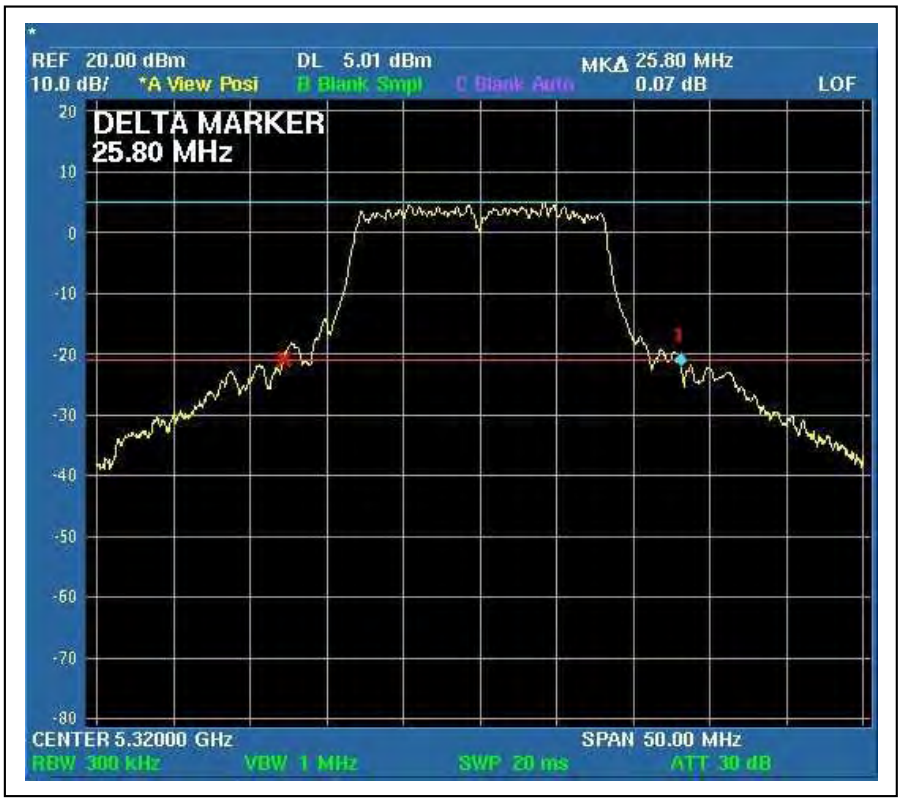
CH4



CH5


REF 20.00 dBm
DL 5.04 dBm
MKΔ 29.80 MHz
10.0 dB/ *A View Posi
B Blank Smpl
C Blank Auto
0.19 dB
LOF
DELTA MARKER
29.80 MHz
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
CENTER 5.26000 GHz
SPAN 50.00 MHz
RBW 300 kHz
VBW 1 MHz
SWP 20 ms
ATT 30 dB

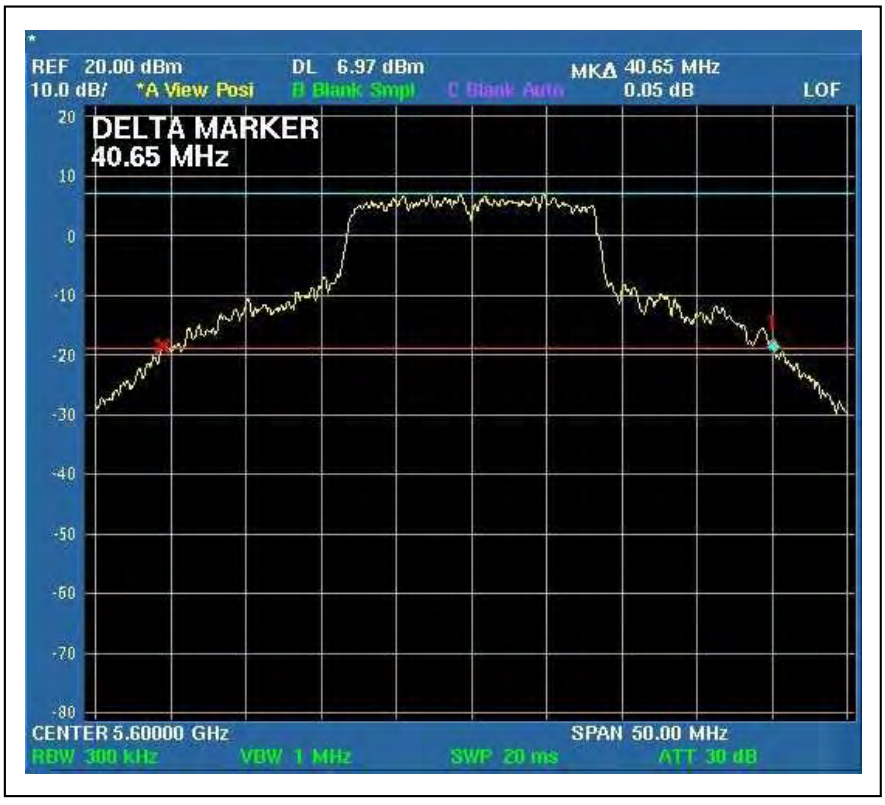
CH8


REF 20.00 dBm
DL 5.01 dBm
MKΔ 25.80 MHz
10.0 dB/ *A View Posi
B Blank Smpl
C Blank Auto
0.07 dB
LOF
DELTA MARKER
25.80 MHz
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
CENTER 5.32000 GHz
SPAN 50.00 MHz
RBW 300 kHz
VBW 1 MHz
SWP 20 ms
ATT 30 dB

CH9


REF 20.00 dBm
DL 7.06 dBm
MKΔ 38.45 MHz
10.0 dB/ *A View Posi
B Blank Smpl
C Blank Auto
0.05 dB
LOF
DELTA MARKER
38.45 MHz
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
CENTER 5.50000 GHz
SPAN 50.00 MHz
RBW 300 kHz
VBW 1 MHz
SWP 20 ms
ATT 30 dB

CH14


REF 20.00 dBm
DL 6.97 dBm
MKΔ 40.65 MHz
10.0 dB/ *A View Posi
B Blank Smpl
C Blank Auto
0.05 dB
LOF
DELTA MARKER
40.65 MHz
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
CENTER 5.60000 GHz
SPAN 50.00 MHz
RBW 300 kHz
VBW 1 MHz
SWP 20 ms
ATT 30 dB

CH19


REF 20.00 dBm
DL 6.47 dBm
MKΔ 36.75 MHz
10.0 dB/
*A View Posi
B Blank Smpl
C Blank Auto
0.01 dB
LOF
DELTA MARKER
36.75 MHz
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
CENTER 5.70000 GHz
SPAN 50.00 MHz
RBW 300 kHz
VBW 1 MHz
SWP 20 ms
ATT 30 dB

4.4 PEAK POWER EXCURSION MEASUREMENT

4.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

Frequency Band	Limit
5.15 – 5.25 GHz	13dB
5.25 – 5.35 GHz	13dB
5.47 – 5.725GHz	13dB
5.725 – 5.825 GHz	13dB

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ADVANTEST SPECTRUM ANALYZER	U3772	160100280	April. 10.2008

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.

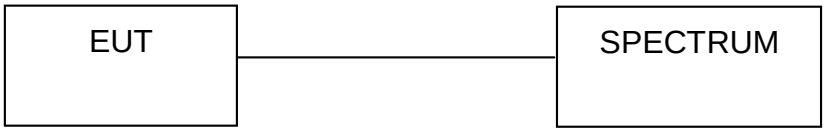
4.4.3 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set the spectrum bandwidth span to view the entire spectrum.
3. Using peak detector and Max-hold function for Trace 1 (RB=1MHz, VB=3MHz) and 2 (RB=1MHz, VB=300KHz).
4. The largest difference between Trace 1 and Trace 2 in any 1MHz band on any frequency was recorded.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

4.4.7 TEST RESULTS

802.11a OFDM modulation

MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	19deg.C, 60%RH, 960hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5180	8.1	13	PASS
4	5240	8.4	13	PASS
5	5260	7.7	13	PASS
8	5320	7.88	13	PASS
9	5500	8.25	13	PASS
14	5600	8.55	13	PASS
19	5700	8.31	13	PASS

CH1

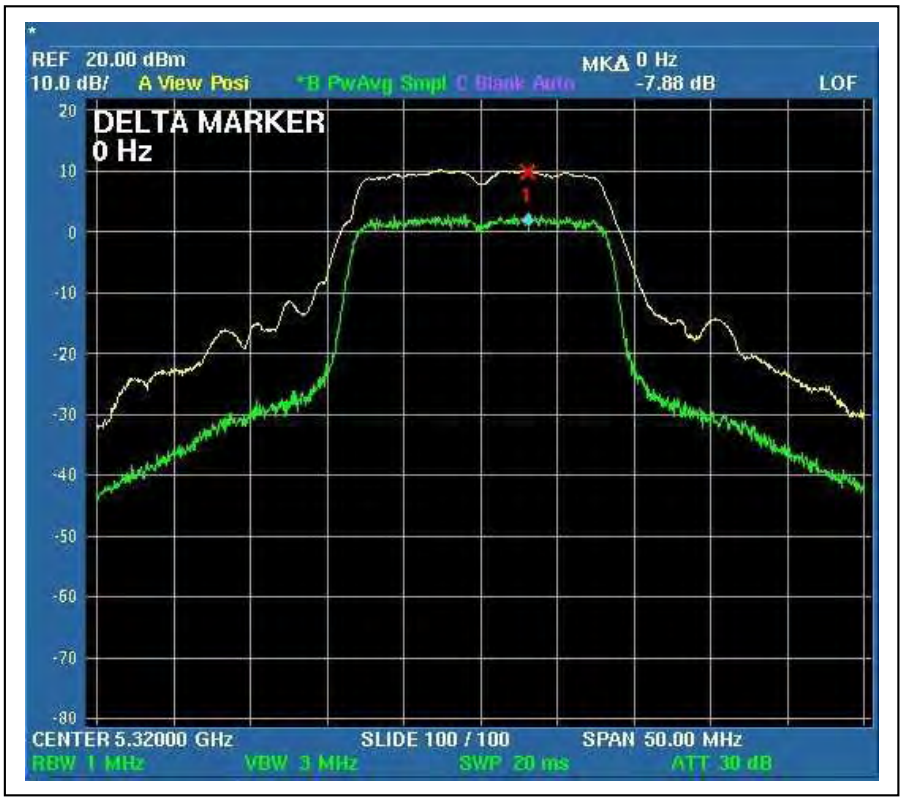
CH4


REF 20.00 dBm
MKΔ 0 Hz
10.0 dB/ A View Posi *B PwAvg Smpl C Blank Auto -8.40 dB LOF
DELTA MARKER
0 Hz
CENTER 5.24000 GHz SLIDE 100 / 100 SPAN 50.00 MHz
RBW 1 MHz VBW 3 MHz SWP 20 ms ATT 30 dB

CH5


REF 20.00 dBm
MKΔ 0 Hz
10.0 dB/ A View Posi *B PwAvg Smpl C Blank Auto -7.70 dB LOF
DELTA MARKER
0 Hz
CENTER 5.26000 GHz SLIDE 100 / 100 SPAN 50.00 MHz
RBW 1 MHz VBW 3 MHz SWP 20 ms ATT 30 dB

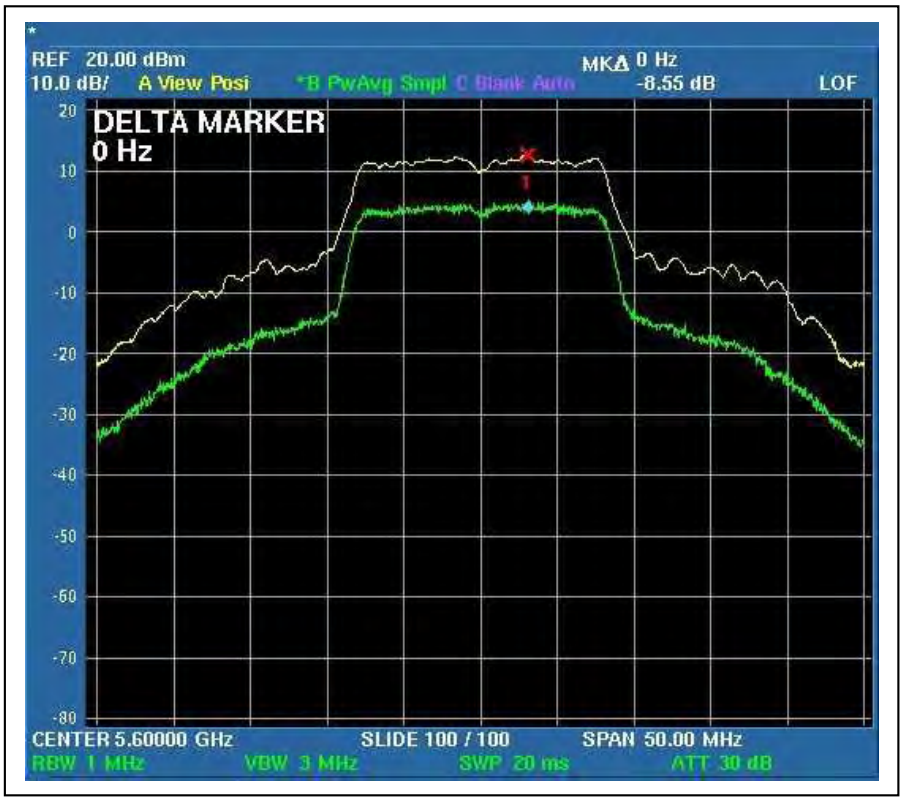
CH8


REF 20.00 dBm
MKΔ 0 Hz
10.0 dB/ A View Posi *B PwAvg Smpl C Blank Auto -7.88 dB LOF
DELTA MARKER
0 Hz
CENTER 5.32000 GHz SLIDE 100 / 100 SPAN 50.00 MHz
RBW 1 MHz VBW 3 MHz SWP 20 ms ATT 30 dB

CH9


REF 20.00 dBm
MKΔ 0 Hz
10.0 dB/ A View Posi *B PwAvg Smpl C Blank Auto -8.25 dB LOF
DELTA MARKER
0 Hz
CENTER 5.50000 GHz SLIDE 100 / 100 SPAN 50.00 MHz
RBW 1 MHz VBW 3 MHz SWP 20 ms ATT 30 dB

CH14


REF 20.00 dBm
MKΔ 0 Hz
10.0 dB/ A View Posi *B PwAvg Smpl C Blank Auto -8.55 dB LOF
DELTA MARKER
0 Hz
CENTER 5.60000 GHz SLIDE 100 / 100 SPAN 50.00 MHz
RBW 1 MHz VBW 3 MHz SWP 20 ms ATT 30 dB

CH19


REF 20.00 dBm
MKΔ 0 Hz
10.0 dB/ A View Posi *B PwAvg Smpl C Blank Auto -8.31 dB LOF
DELTA MARKER
0 Hz
CENTER 5.70000 GHz SLIDE 100 / 100 SPAN 50.00 MHz
RBW 1 MHz VBW 3 MHz SWP 20 ms ATT 30 dB

4.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Frequency Band	Limit
5.15 ~ 5.25GHz	4dBm
5.25 ~ 5.35GHz	11dBm
5.47 – 5.725GHz	11dBm
5.725 ~ 5.825GHz	17dBm

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ADVANTEST SPECTRUM ANALYZER	U3772	160100280	April. 10.2008

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.

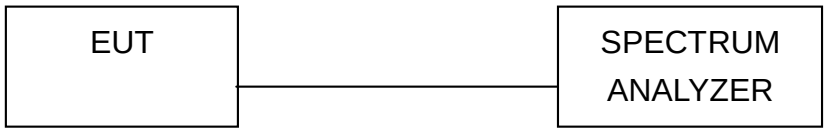
4.5.3 TEST PROCEDURES

1. The transmitter output was connected to the spectrum analyzer.
2. Set RBW=1MHz, VBW=3MHz. The PPSD is the highest level found across the emission in any 1MHz band.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

Same as 4.3.6

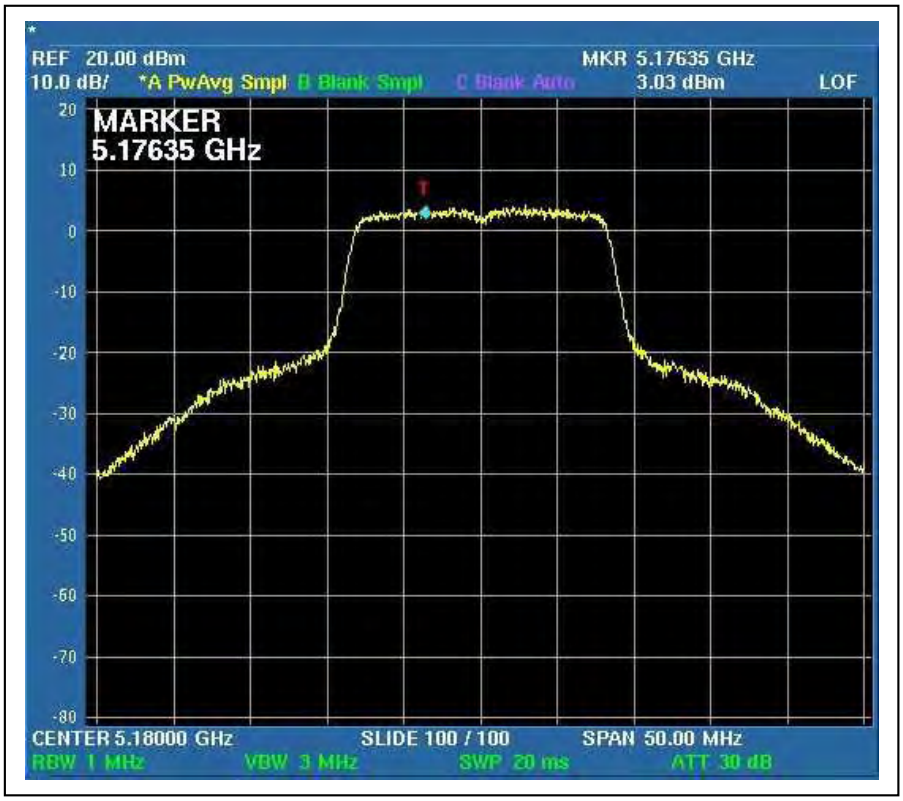
4.5.7 TEST RESULTS

802.11a OFDM modulation

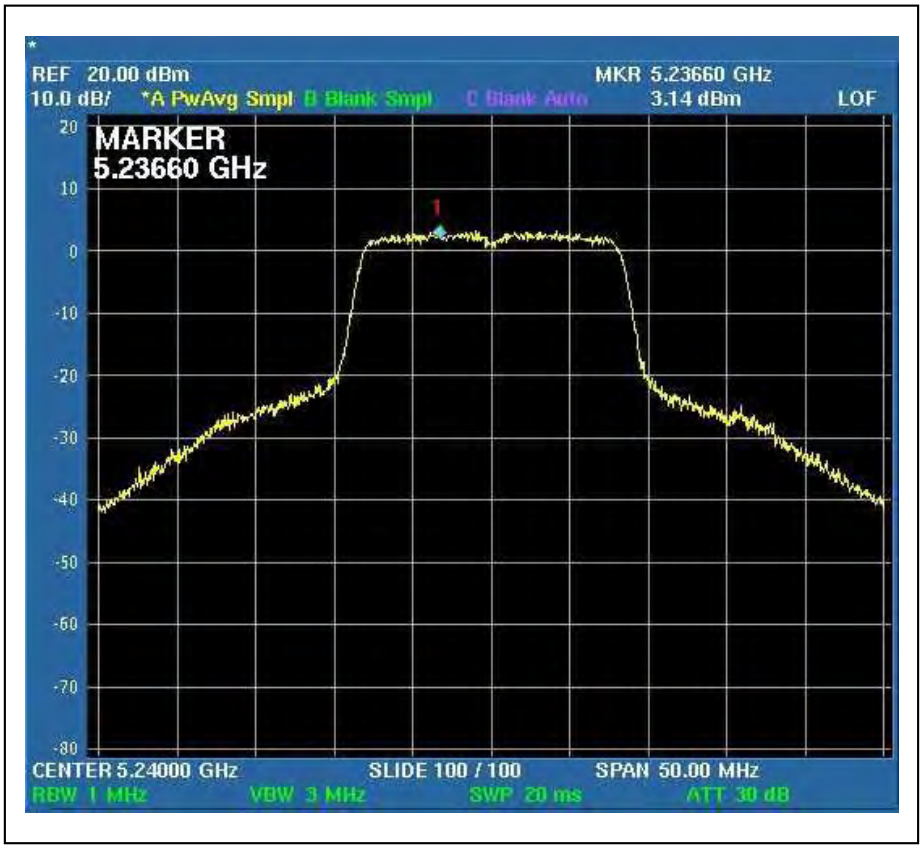
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	27deg.C, 53%RH, 960hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	3.03	4	PASS
4	5240	3.14	4	PASS
5	5260	3.29	11	PASS
8	5320	2.91	11	PASS
9	5500	5.27	11	PASS
14	5600	4.61	11	PASS
19	5700	4.87	11	PASS

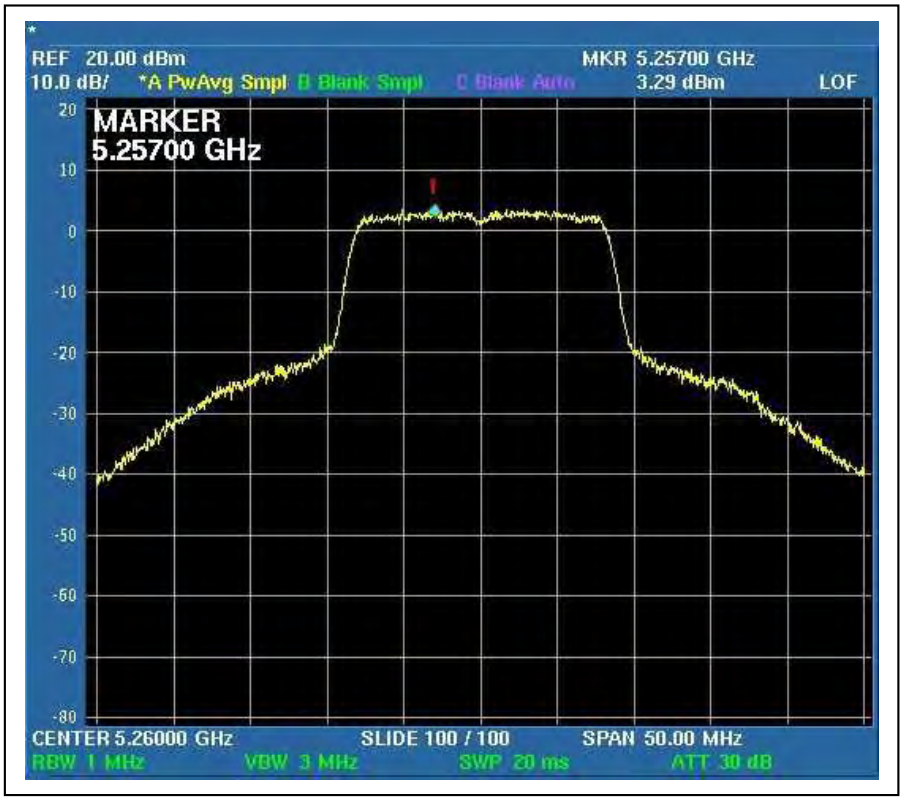
CH1



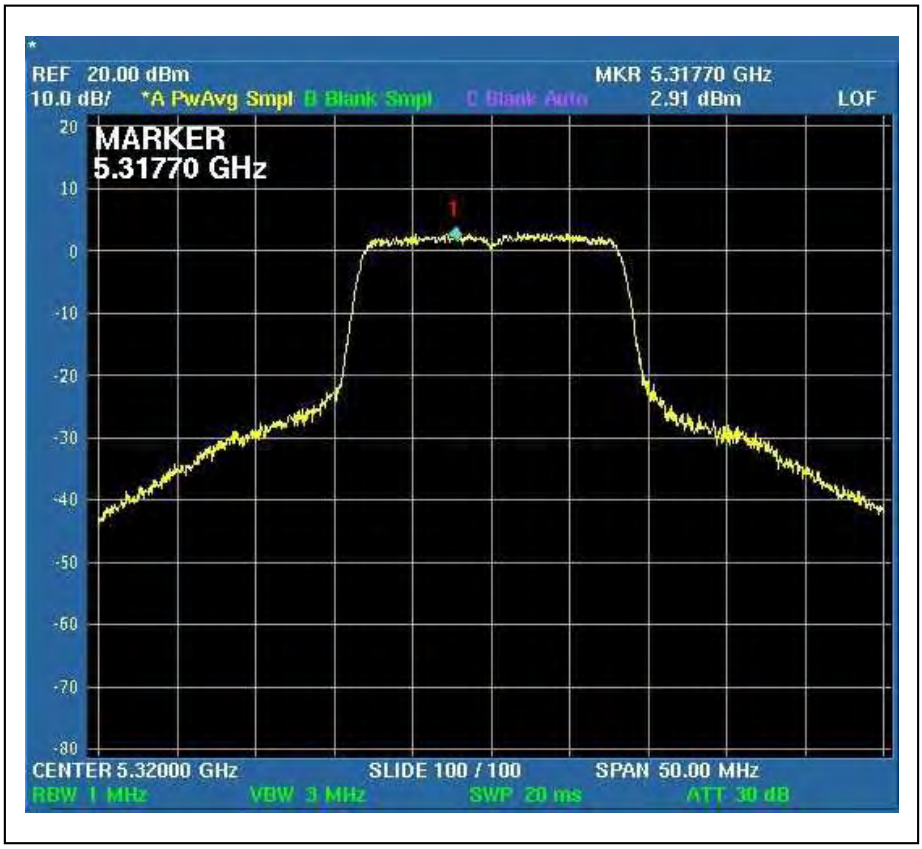
CH4


REF 20.00 dBm
MKR 5.23660 GHz
10.0 dB/ *A PwAvg Smpl B Blank Smpl C Blank Auto
3.14 dBm
LOF
MARKER
5.23660 GHz
CENTER 5.24000 GHz
SLIDE 100 / 100
SPAN 50.00 MHz
RBW 1 MHz
VBW 3 MHz
SWP 20 ms
ATT 30 dB

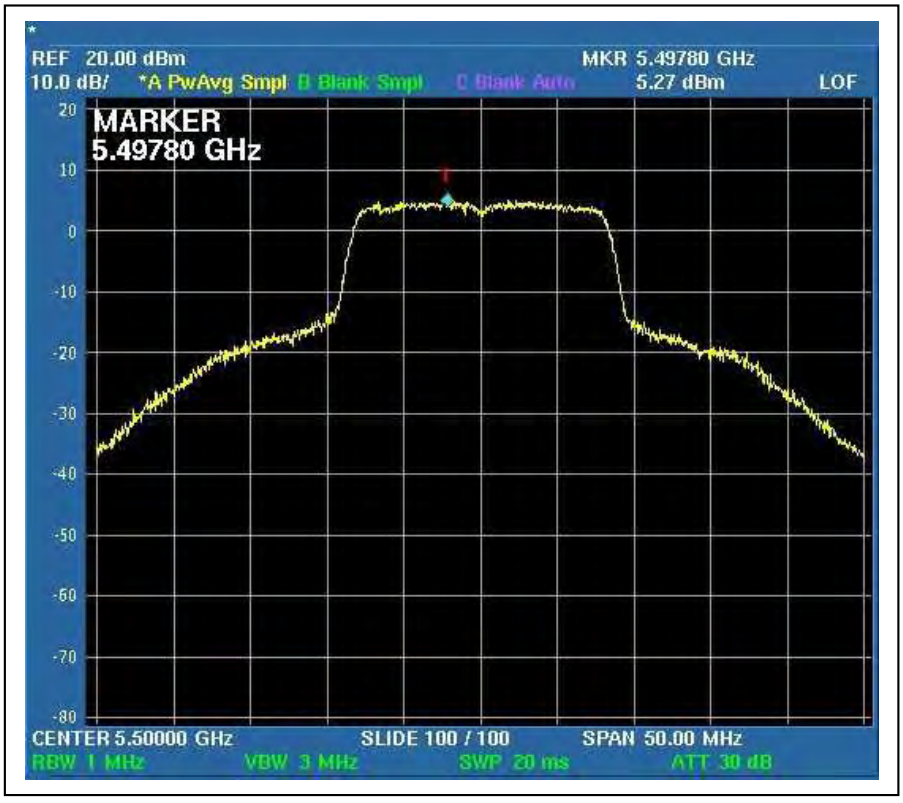
CH5


REF 20.00 dBm
MKR 5.25700 GHz
10.0 dB/ *A PwAvg Smpl B Blank Smpl C Blank Auto
3.29 dBm
LOF
MARKER
5.25700 GHz
CENTER 5.26000 GHz
SLIDE 100 / 100
SPAN 50.00 MHz
RBW 1 MHz
VBW 3 MHz
SWP 20 ms
ATT 30 dB

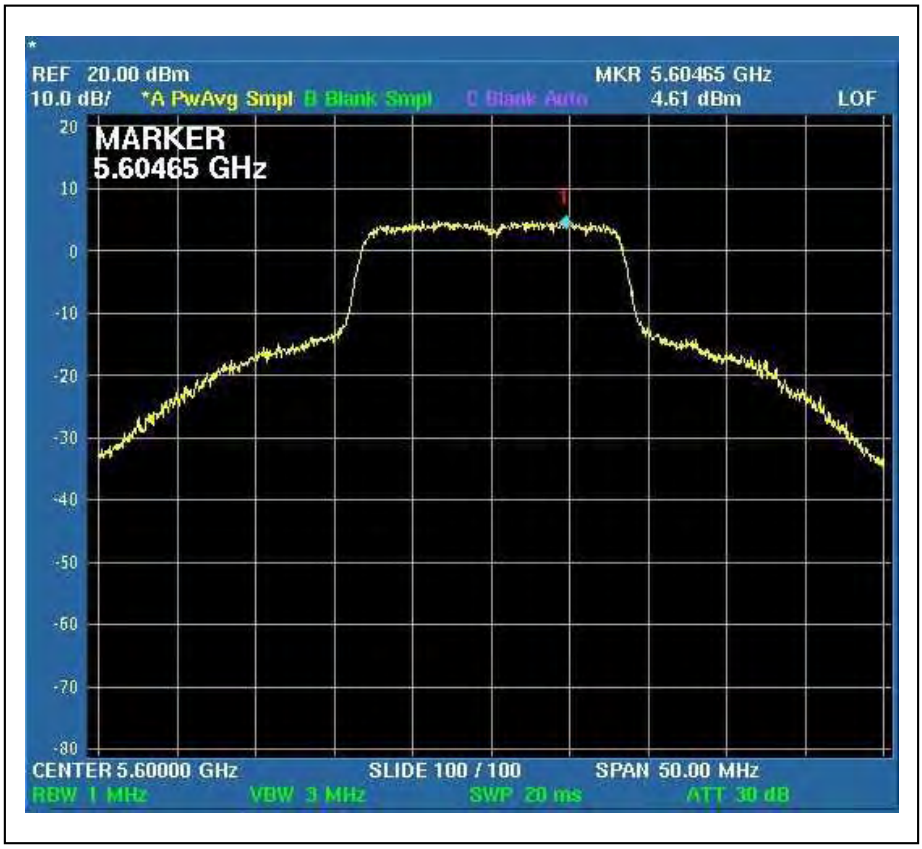
CH8


REF 20.00 dBm
MKR 5.31770 GHz
10.0 dB/ *A PwAvg Smpl B Blank Smpl C Blank Auto 2.91 dBm LOF
MARKER
5.31770 GHz
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
CENTER 5.32000 GHz SLIDE 100 / 100 SPAN 50.00 MHz
RBW 1 MHz VBW 3 MHz SWP 20 ms ATT 30 dB

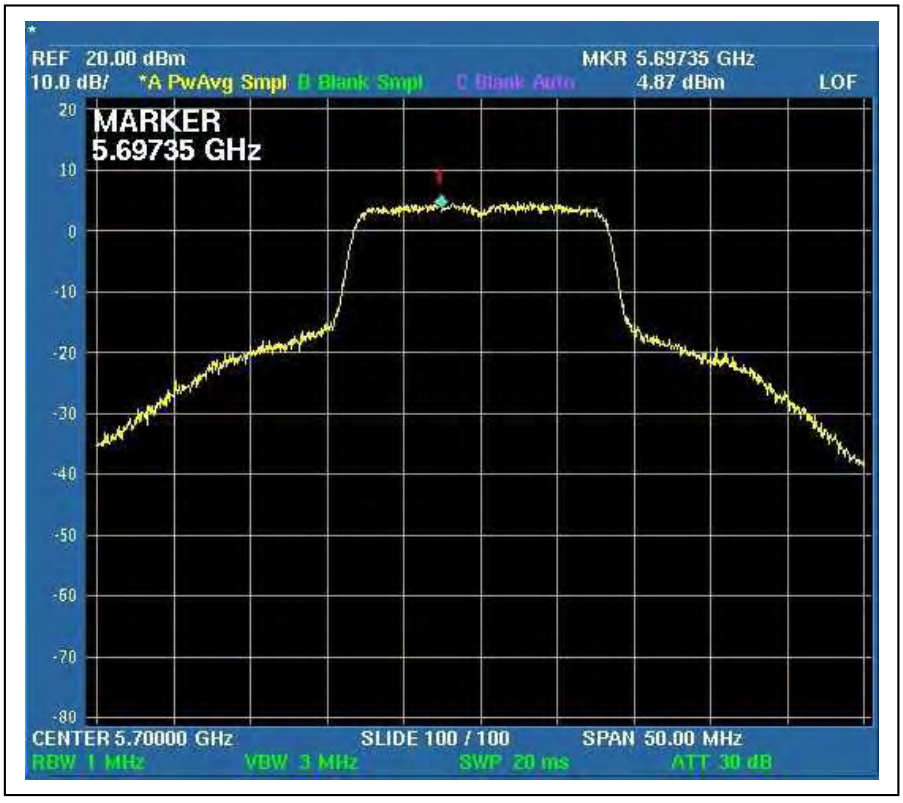
CH9


REF 20.00 dBm
MKR 5.49780 GHz
10.0 dB/ *A PwAvg Smpl B Blank Smpl C Blank Auto 5.27 dBm LOF
MARKER
5.49780 GHz
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
CENTER 5.50000 GHz SLIDE 100 / 100 SPAN 50.00 MHz
RBW 1 MHz VBW 3 MHz SWP 20 ms ATT 30 dB

CH14


REF 20.00 dBm
MKR 5.60465 GHz
10.0 dB/ *A PwAvg Smpl B Blank Smpl C Blank Auto
4.61 dBm
LOF
MARKER
5.60465 GHz
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
CENTER 5.60000 GHz
SLIDE 100 / 100
SPAN 50.00 MHz
RBW 1 MHz
VBW 3 MHz
SWP 20 ms
ATT 30 dB

CH19


REF 20.00 dBm
MKR 5.69735 GHz
10.0 dB/ *A PwAvg Smpl B Blank Smpl C Blank Auto
4.87 dBm
LOF
MARKER
5.69735 GHz
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
CENTER 5.70000 GHz
SLIDE 100 / 100
SPAN 50.00 MHz
RBW 1 MHz
VBW 3 MHz
SWP 20 ms
ATT 30 dB

4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within +/- 0.02% of the operating frequency over a temperature variation of –30 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2008

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.

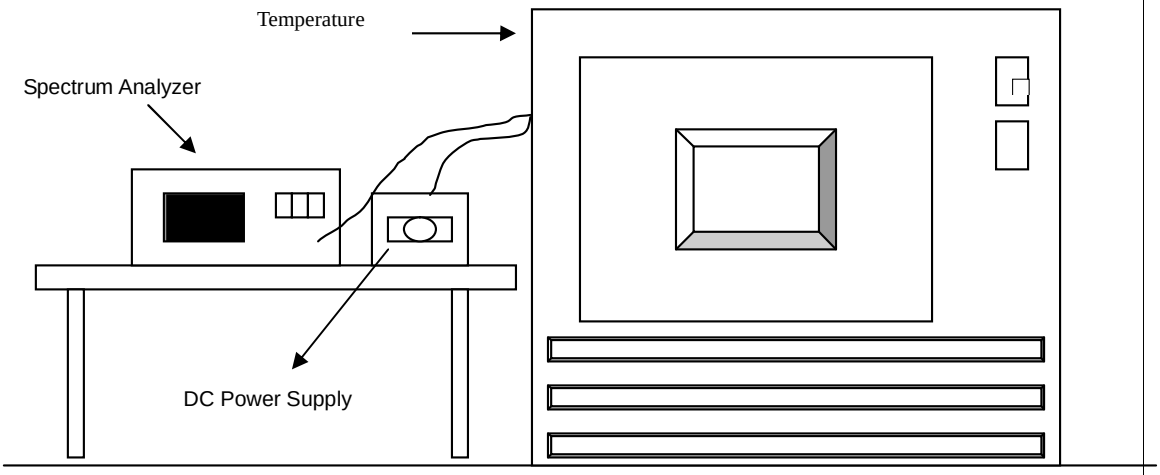
4.6.3 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

4.6.7 TEST RESULTS

Operating frequency: 5320MHz				Limit : ± 0.01%			
Temp. (℃)	Power supply (VAC)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	126.5	5320.0295	0.000555	5320.0273	0.000513	5320.0215	0.000404
	110	5320.0279	0.000524	5320.0259	0.000487	5320.0187	0.000352
	93.5	5320.0275	0.000517	5320.0263	0.000494	5320.0195	0.000367
40	126.5	5320.0357	0.000671	5320.0345	0.000648	5320.0299	0.000562
	110	5320.0345	0.000648	5320.0349	0.000656	5320.0327	0.000615
	93.5	5320.0349	0.000656	5320.0347	0.000652	5320.0321	0.000603
30	126.5	5320.0157	0.000295	5320.0145	0.000273	5320.0092	0.000173
	110	5320.0145	0.000273	5320.0135	0.000254	5320.0086	0.000162
	93.5	5320.0153	0.000288	5320.0141	0.000265	5320.0089	0.000167
20	126.5	5319.9893	0.000201	5319.9909	0.000171	5319.9877	0.000231
	110	5319.9903	0.000182	5319.9909	0.000171	5319.9885	0.000216
	93.5	5319.9937	0.000118	5319.9947	0.000100	5319.9916	0.000158
10	126.5	5320.0268	0.000504	5320.0241	0.000453	5320.0167	0.000314
	110	5320.0254	0.000477	5320.0264	0.000496	5320.0217	0.000408
	93.5	5320.0262	0.000492	5320.0241	0.000453	5320.0171	0.000321
0	126.5	5320.0339	0.000637	5320.0322	0.000605	5320.0260	0.000489
	110	5320.0339	0.000637	5320.0324	0.000609	5320.0275	0.000517
	93.5	5320.0315	0.000592	5320.0303	0.000570	5320.0251	0.000472
-10	126.5	5319.9963	0.000070	5319.9949	0.000096	5319.9897	0.000194
	110	5319.9975	0.000047	5319.9959	0.000077	5319.9911	0.000167
	93.5	5319.9957	0.000081	5319.9954	0.000086	5319.9929	0.000133
-20	126.5	5320.0149	0.000280	5320.0134	0.000252	5320.0088	0.000165
	110	5320.0147	0.000276	5320.0135	0.000254	5320.0086	0.000162
	93.5	5320.0155	0.000291	5320.0154	0.000289	5320.0121	0.000227
-30	126.5	5320.0126	0.000237	5320.0125	0.000235	5320.0101	0.000190
	110	5320.0103	0.000194	5320.0105	0.000197	5320.0081	0.000152
	93.5	5320.0107	0.000201	5320.0111	0.000209	5320.0079	0.000148

4.7 BAND EDGES MEASUREMENT

4.7.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2008

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.

4.7.2 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 1MHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

4.7.3 EUT OPERATING CONDITION

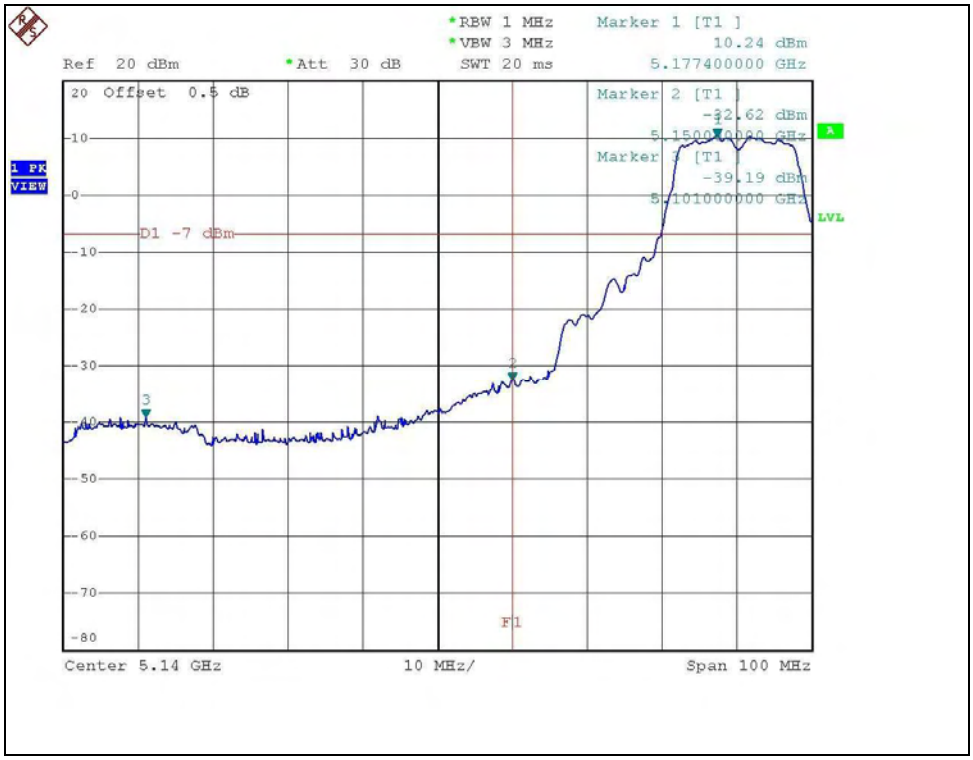
The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

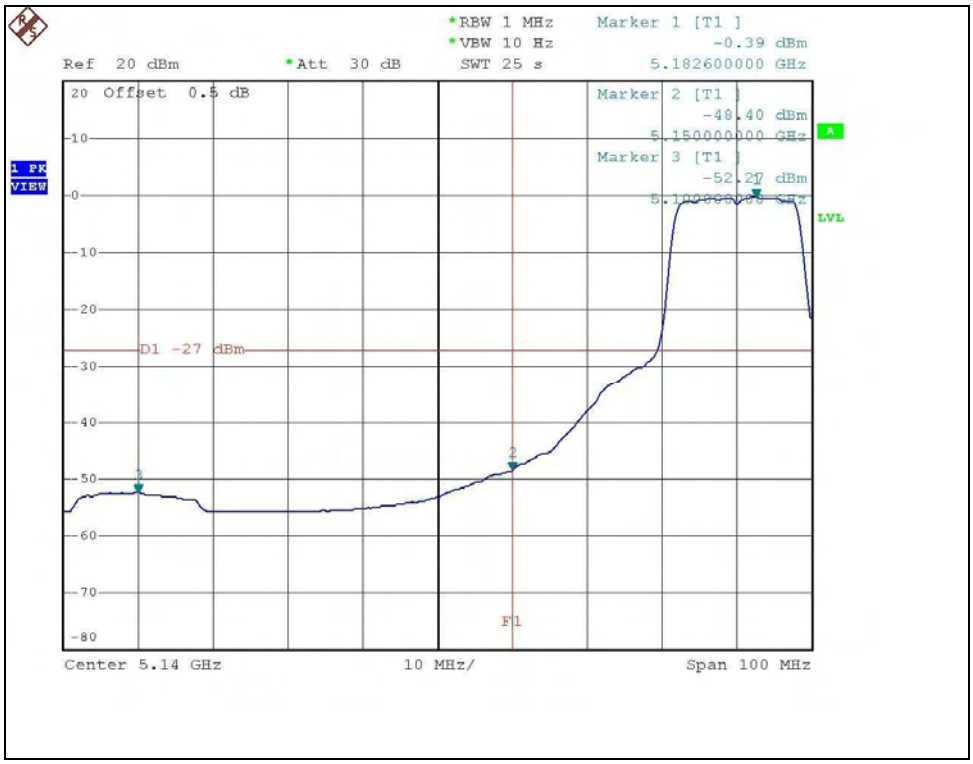
4.7.4 TEST RESULTS

For signals in the restricted bands above and below the 5.15 to 5.35GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was applied to the average and peak filed strength of the intentional signal made on the OATS to calculate the field strength of the unintentional signals.

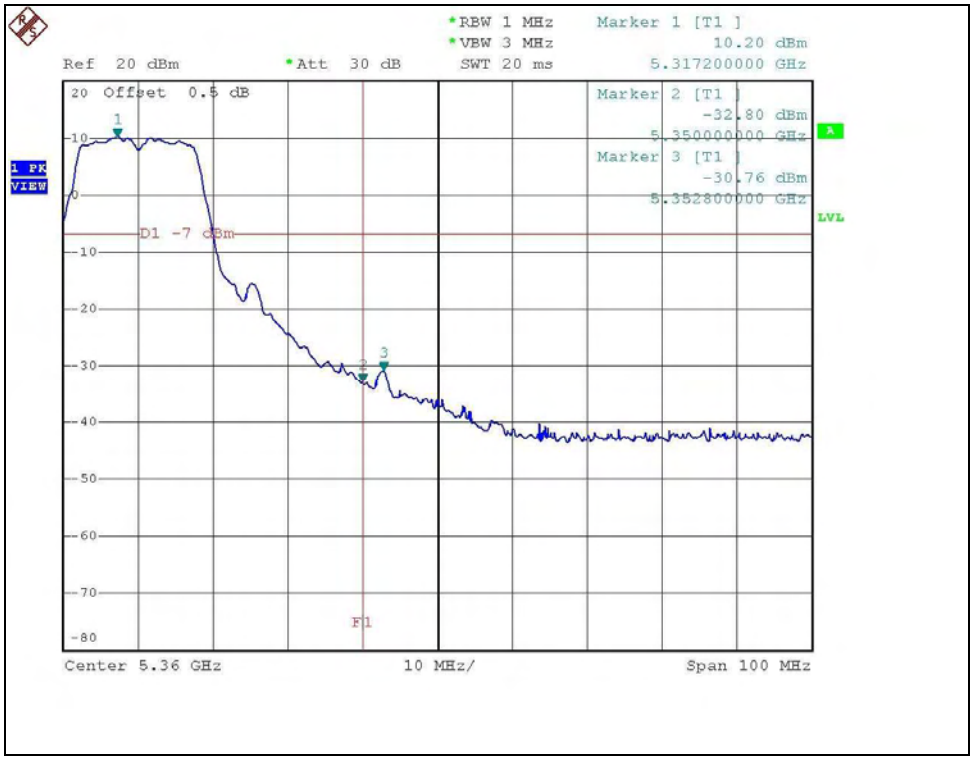
The spectrum plots (Peak RBW=1MHz, VBW=3MHz; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

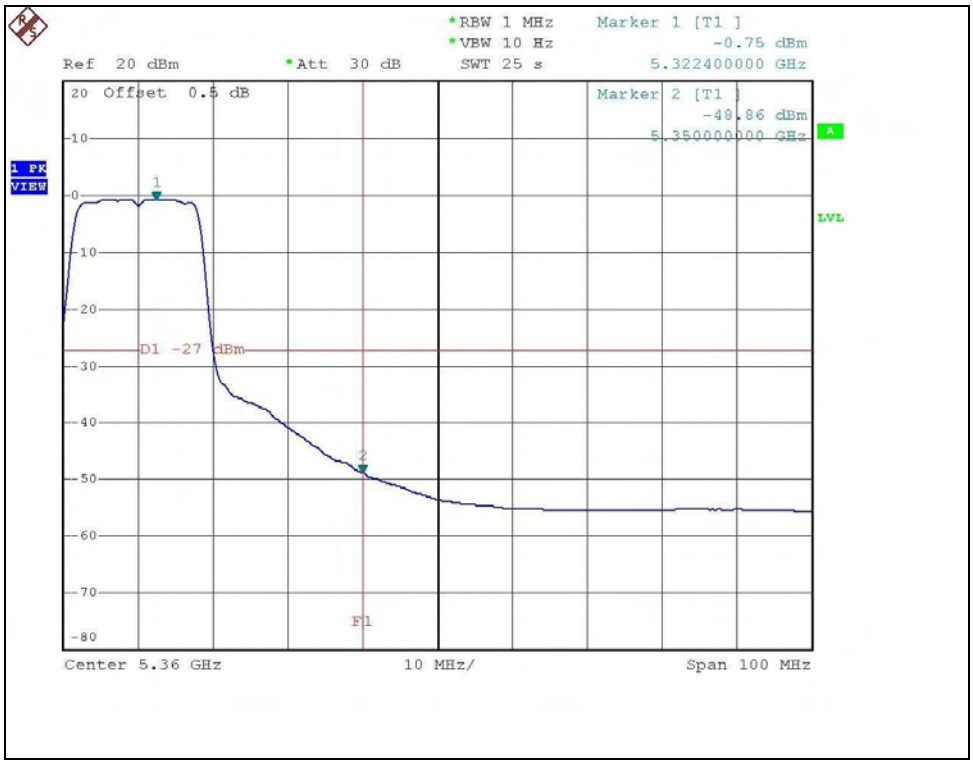
802.11a OFDM modulation(CH 1: 5180MHz)





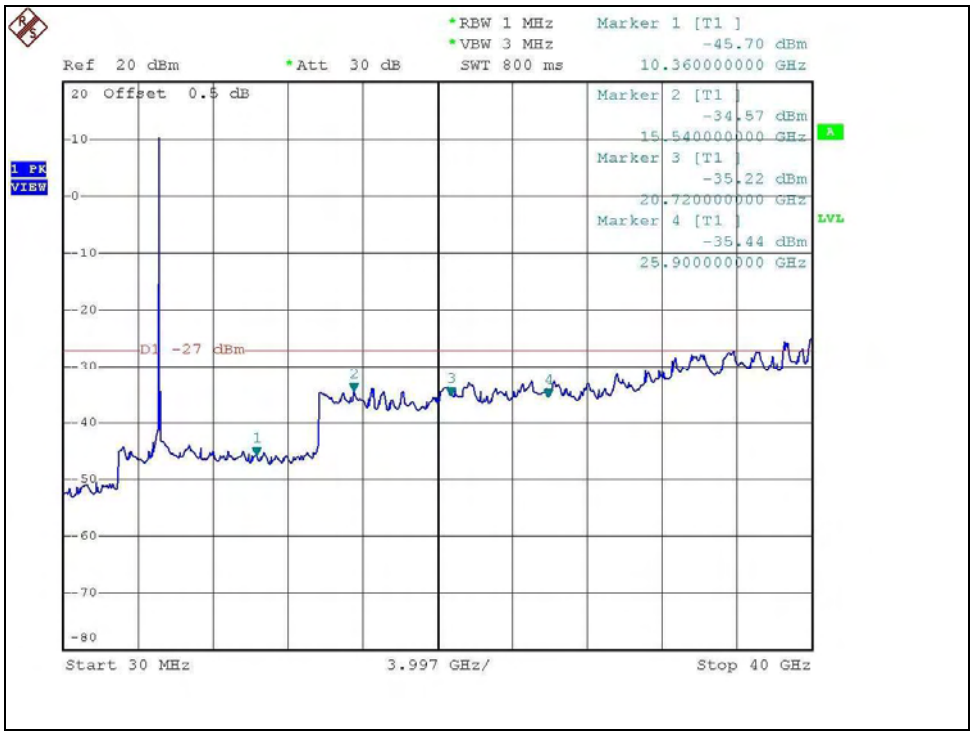
802.11a OFDM modulation (CH 8: 5320MHz)



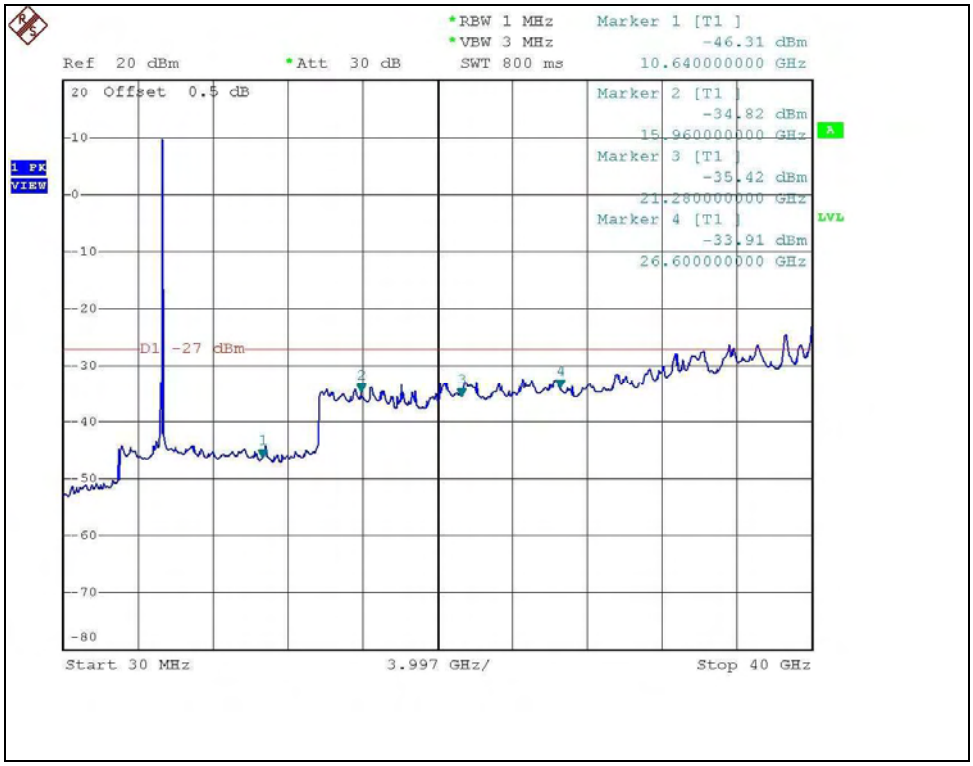


802.11a 10th conducted Harmonic

CH 1



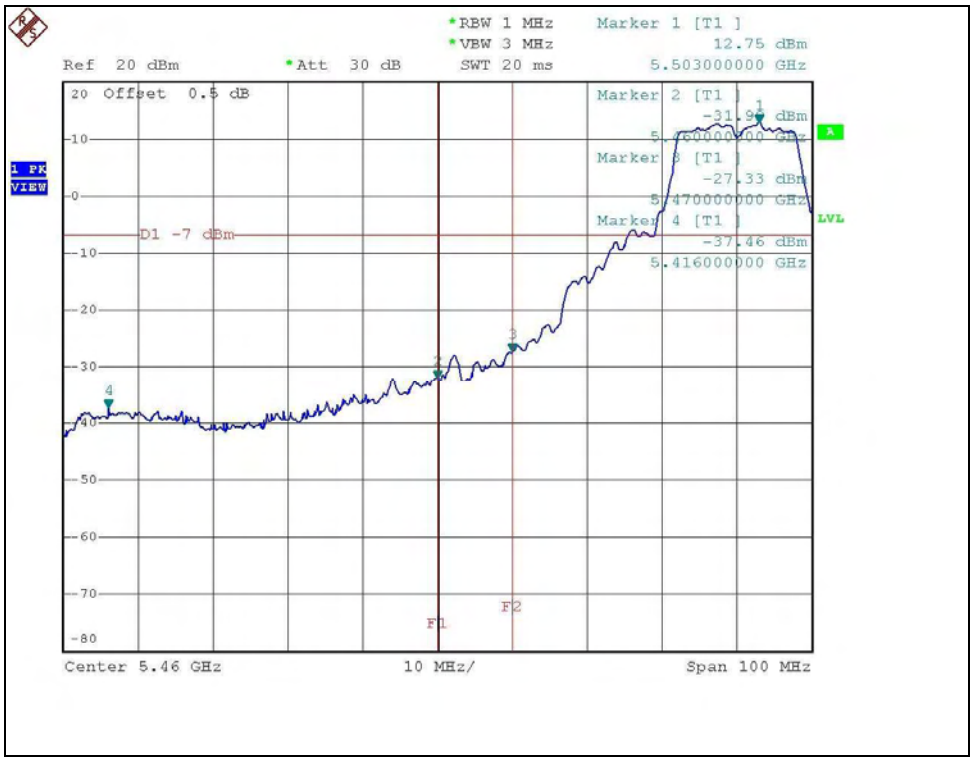
CH 8

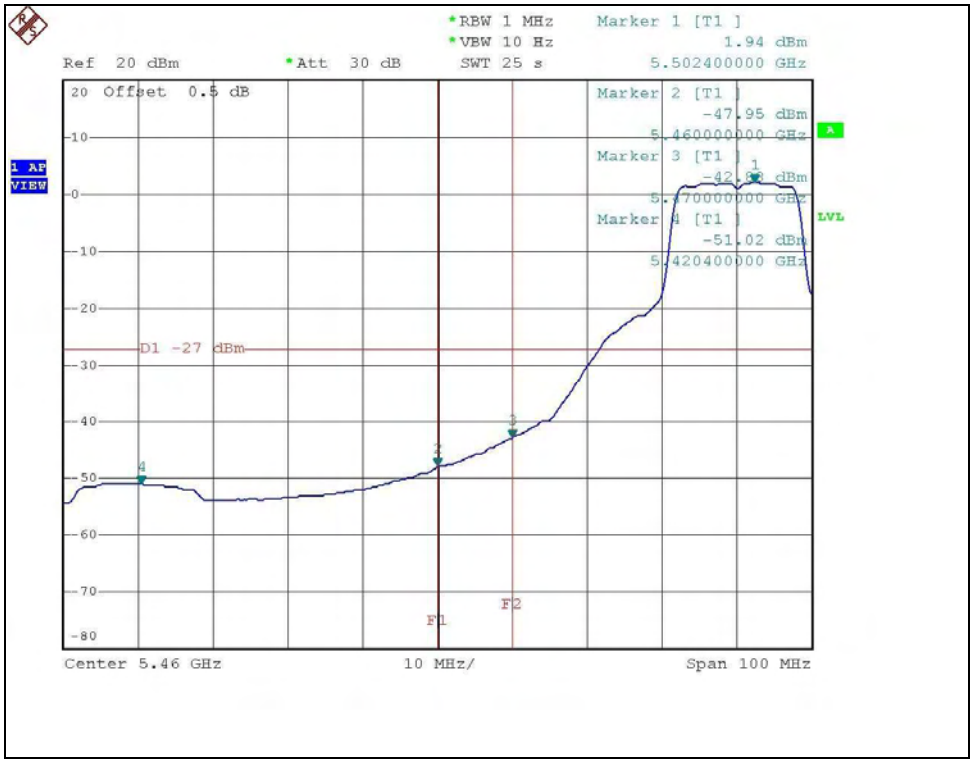


For signals in the restricted bands above and below the 5.47 to 5.725GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was applied to the average and peak filed strength of the intentional signal made on the OATS to calculate the field strength of the unintentional signals.

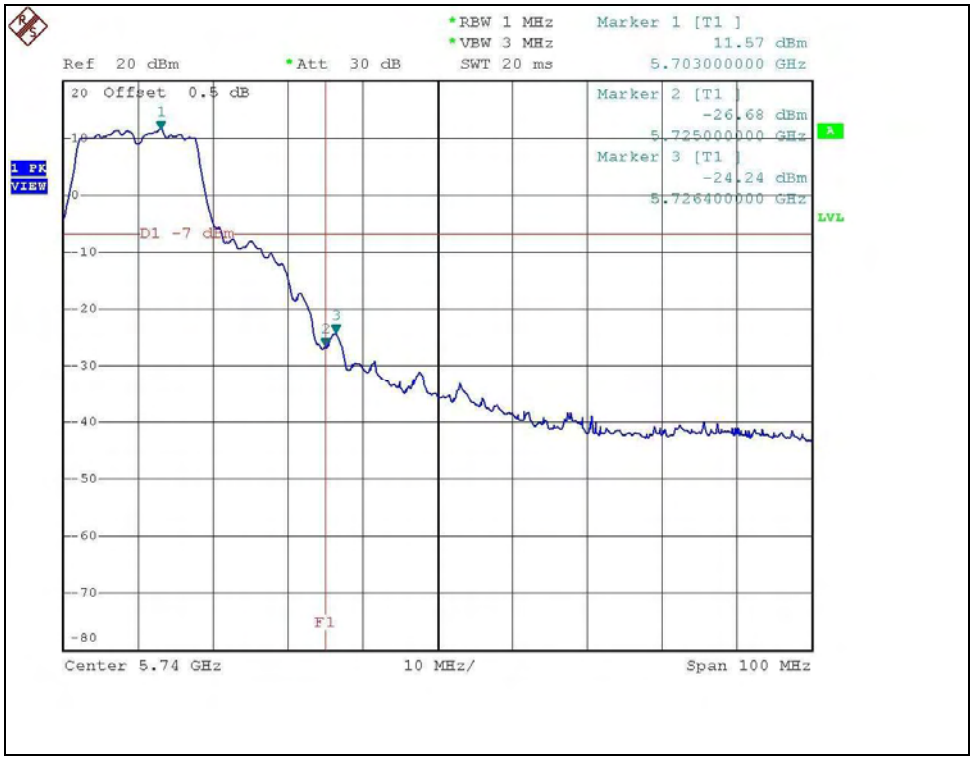
The spectrum plots (Peak RBW=1MHz, VBW=3MHz; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

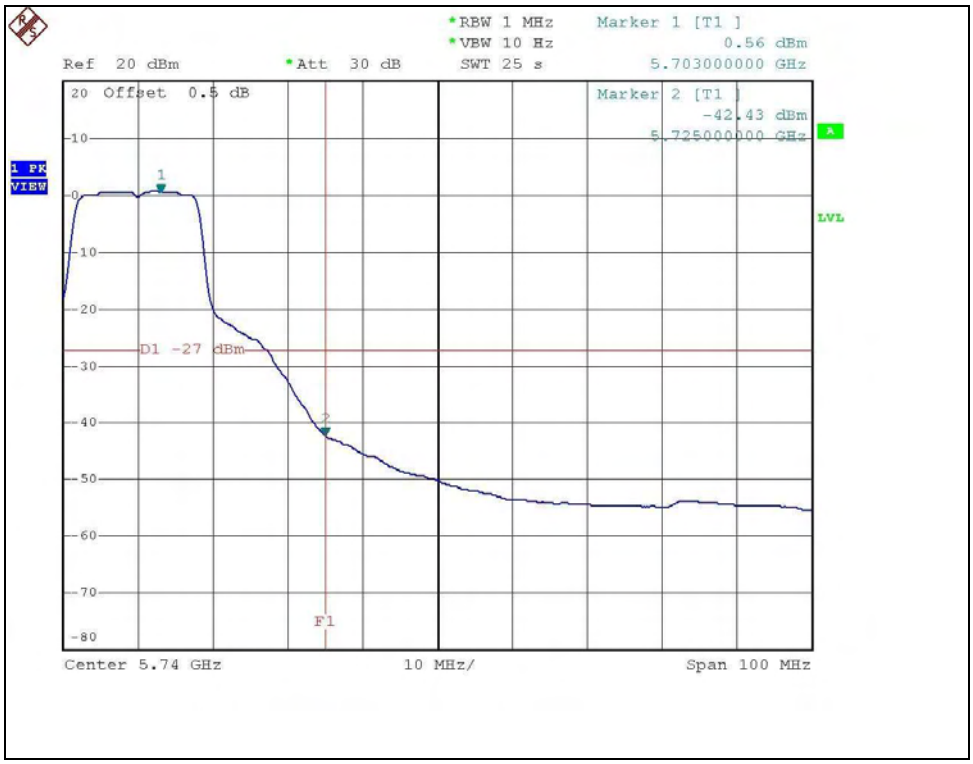
802.11a OFDM modulation(CH 9: 5500MHz)





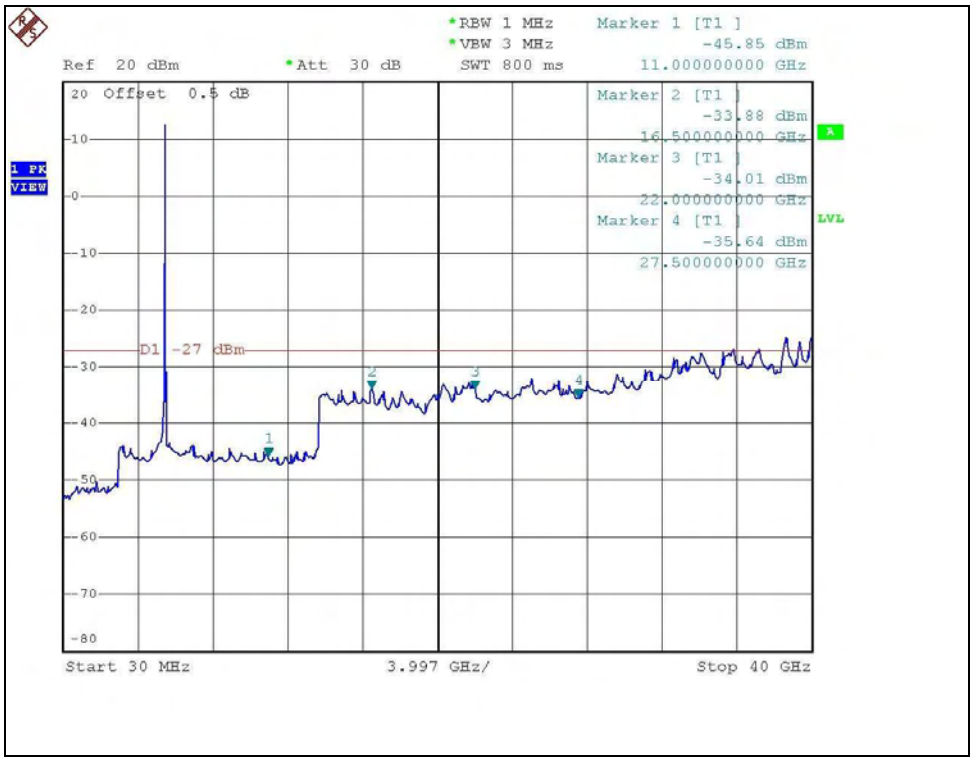
802.11a OFDM modulation (CH 19: 5700MHz)



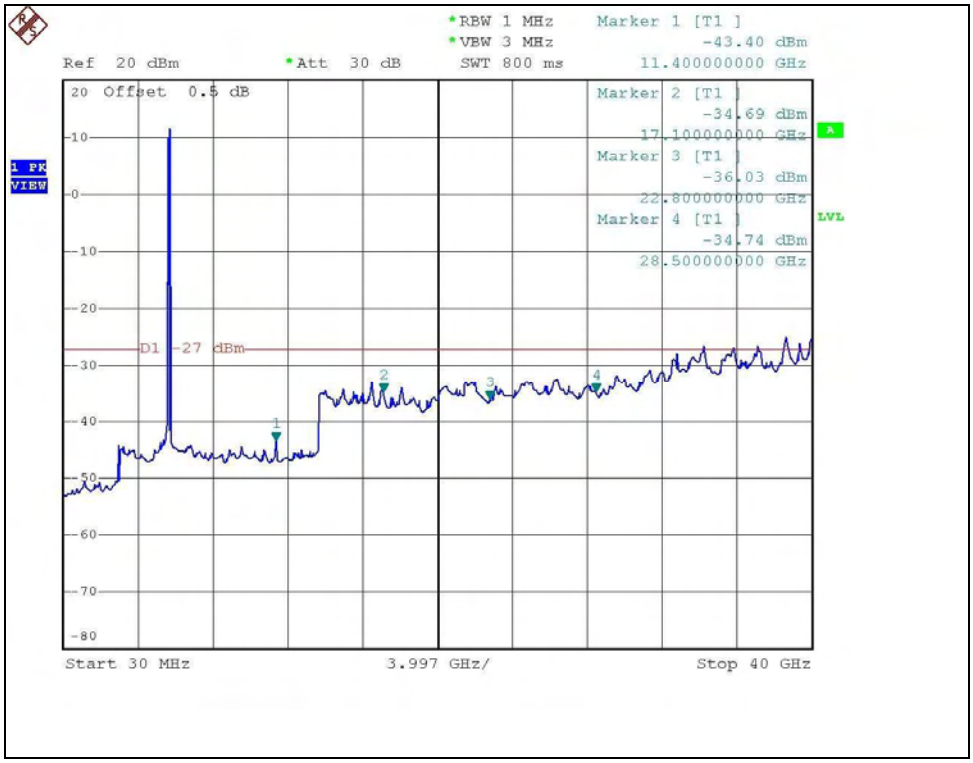


802.11a 10th conducted Harmonic

CH 9



CH 19



4.8 ANTENNA REQUIREMENT

4.8.1 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 15.407(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.

4.8.2 ANTENNA CONNECTED CONSTRUCTION

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

Model No.	Frequency	Gain (dBi)	Antenna Type	Antenna Connector	Cable loss	Net gain (dBi)
ML-2452-APA2-01	2.4GHz	3	Dipole	R-SMA	0.9dB	2.1
	5GHz	4			1.5dB	2.5

5. 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, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	TAF, BSMI, NCC
Netherlands	Telefication
Singapore	PSB , 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

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

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