



RADIO TEST REPORT

REPORT NO.: RJ960622L18

MODEL NO.: SDC-CF10G

RECEIVED: Jul. 09, 2007

TESTED: Jul. 15, 2007

ISSUED: Aug. 01, 2007

APPLICANT: Summit Data Communications, Inc.

ADDRESS: 526 South Main Street Suite 411, Akron, Ohio,
44311 United States

ISSUED BY: Advance Data Technology Corporation

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang
244, Taipei Hsien, Taiwan, R.O.C.

TEST LOCATION: No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei
Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

TESTING LABORATORY STATUS:

Advance Data Technology Corporation has been holding the following status after having been assessed according to the provisions of ISO/IEC 17025:

Telefication Listed Testing Laboratory:

listed by Telefication B.V., Edisonstraat 12A, 6902 PK Zevenaar, The Netherlands
(Certificate No: L127 dated 19 September 2003) for testing the following test standards:

- RCR STD - 33 REV. 3.0 June 1997
- ARIB STD - T66 Version 2.1 March 2003
- ARIB STD - T71 Version 1.0 December 2000

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1 CERTIFICATION

PRODUCT : SDC-CF10G 802.11g Compact Flash Module with Antenna Connectors

MODEL NO. : SDC-CF10G

BRAND NAME : Summit

APPLICANT : Summit Data Communications, Inc.

TESTED DATE : Jul. 15, 2007

TEST ITEM: ENGINEERING SAMPLE

STANDARDS : RCR STD-33

The above equipment (Model: SDC-CF10G) has been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions herein specified.

PREPARED BY : Andrea Hsia , **DATE :** Aug. 01, 2007
Andrea Hsia / Specialist

TECHNICAL
ACCEPTANCE : Stanely Hsu , **DATE :** Aug. 01, 2007
Responsible for RF Stanely Hsu / Senior Engineer

APPROVED BY : Gary Chang , **DATE :** Aug. 01, 2007
Gary Chang / Deputy Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

Radio Reg. Article reference	RCR STD-33 Ref.	Report reference	Parameter	Test Result (Note 1)
OPERATING FREQUENCY 2471 TO 2497MHz				
49.20(2); a	3.7-1	3.4	High Frequency/modulation section cannot be opened easily	C
49.20(2); b	3.1	3.1	Communication method	C
49.20(2); c	3.2-4a.	3.1	Spread Spectrum method	C
49.20(2); d	3.2-1	5.5	Antenna power	C
49.20(2); e	3.6-2	3.5.2	Absolute gain of transmitting antenna	C
49.20(2); f	3.2-8	5.3	Diffusion bandwidth	C
49.20(2); g	3.2-9	5.3	Spreading factor	C
49.20(2); h	3.5-2	--	Interference immunity function	C
NOTE 1: C = Conform NC = Not Conform NT = Not Tested NA = Not Applicable				

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

ITEM	UNCERTAINTY
Occupied Bandwidth	491.896Hz
Spurious emissions	3.508dB
Output power density	2.889dB
Adjacent Channel Leakage Power	1.35dB
Out of band radiated power	3.93dB
Frequency Tolerance	6805.18 Hz
Burst length	0.01%

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

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	SDC-CF10G 802.11g Compact Flash Module with Antenna Connectors
MODEL NO.	SDC-CF10G
TYPE OF EQUIPMENT	Data transmission equipment operating in the 2.4GHz ISM band using spread spectrum techniques
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	IEEE 802.11b: 11/5.5/2/1Mbps IEEE 802.11g: 54/48/36/24/18/12/9/6Mbps
FREQUENCY RANGE	2471.0MHz ~ 2497.0MHz 2400.0MHz ~ 2483.5MHz
NUMBER OF CHANNEL	802.11b: 14 802.11g: 13
RATED RF OUTPUT POWER DENSITY	802.11b: 7.50mW/MHz (channel 14)
CONDUCTED RF OUTPUT POWER DENSITY	802.11b: 7.26mW/MHz (channel 14)
RADIATED RF OUTPUT POWER DENSITY	802.11b: 12.049mW/MHz (channel 14)
ANTENNA TYPE	Refer to Note 2 for detail antennas

NOTE:

1. This report only covers the data of channel 14.
2. The EUT have four combinations of antenna type. Please refer to following table

NO.	MODEL NO	ANTENNA TYPE	ANTENNA GAIN	ANTENNA CONNECTOR
1	0328	Dipole	2.2dBi	UFL
2	153180-0001	Dipole	2.2dBi	R-TNC
3	156476-0001	Printed	0dBi	UFL
4	2450AT42A100	Chip chamber	0dBi	UFL

3. The EUT operates in the 2.4GHz frequency spectrum with throughput of up to 54Mbps.
4. The EUT complies with IEEE 802.11g standards, and backwards compatible with IEEE 802.11b products.
5. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST CHANNELS

IEEE 802.11b:

CHANNEL	TRANSMITTER	RECEIVER
14	2484 MHz	2484 MHz

NOTE: By means of test software (4318CF_Mtgtest2_0_0_1 Broadcom) provided by manufacture, the power levels during the tests were set according to the following codes:

IEEE 802.11b:

CHANNEL	POWER SETTING
14	18

3.3 TEST CONDITIONS

TEST CONDITIONS	VOLTAGE (Vdc)
V_{normal}	3.30
$V_{+10\%}$	3.63
$V_{-10\%}$	2.97

3.4 ASSEMBLY

The EUT is constructed as an SDC-CF10G 802.11g Compact Flash Module with Antenna Connectors that is constructed as a standalone unit. The EUT used a kind of particular screw, and the housing consists of two metal parts that is the special structure designed by manufacturer. Separating the two parts (i.e operating of the housing) was only possible by means of brute force.

3.5 ANTENNA SPECIFICATIONS

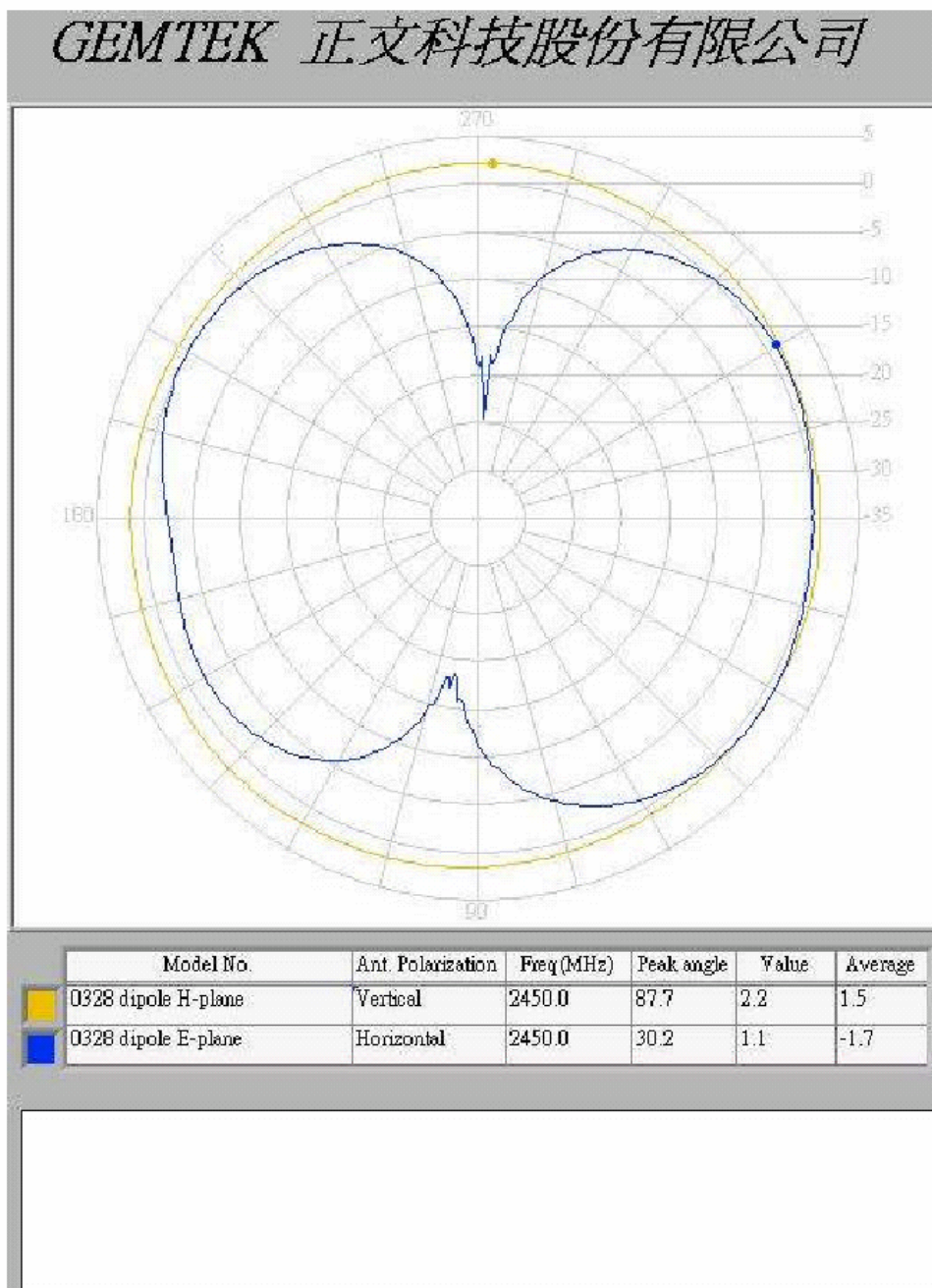
3.5.1 ANTENNA GAIN

Antenna	Antenna type	Antenna Gain (dBi)
1	Dipole	2.2
2	Dipole	2.2
3	Printed	0
4	Chip chamber	0

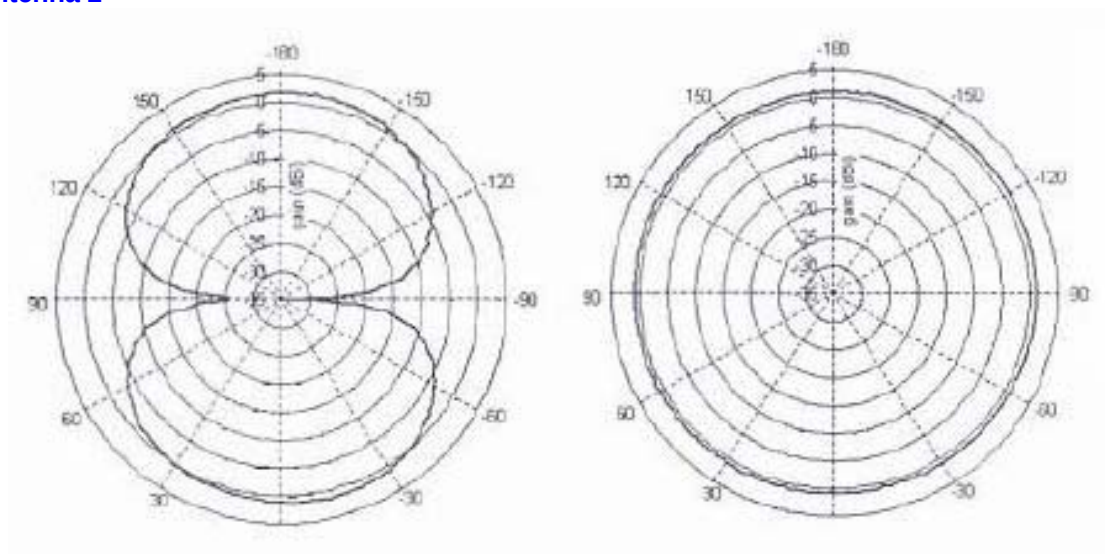
3.5.2 ANTENNA PATTERN

Antenna 1

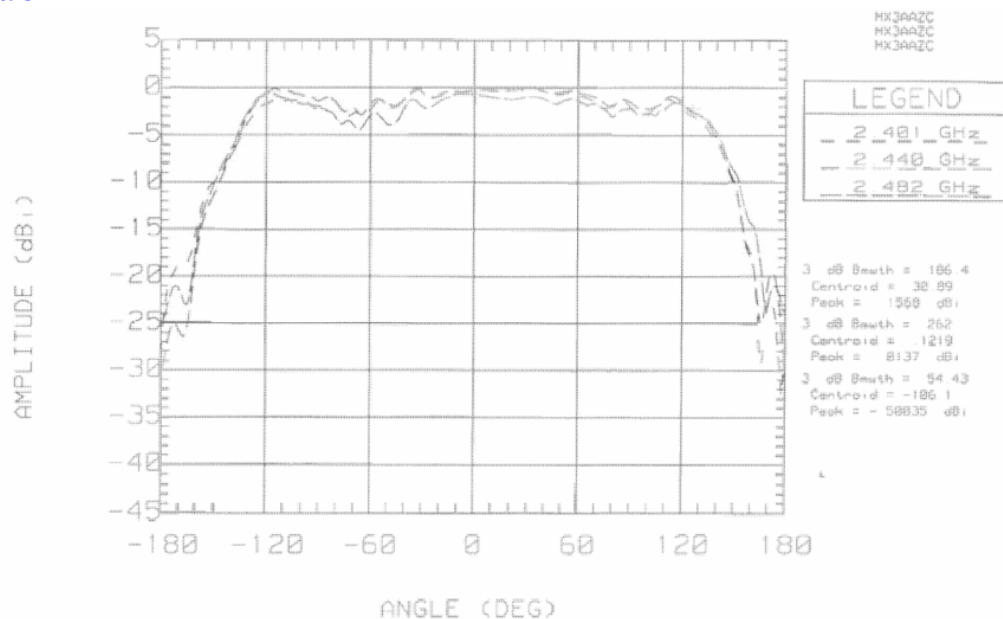
Antenna spec for 2.2 dBi (520x710x16M jpeg)



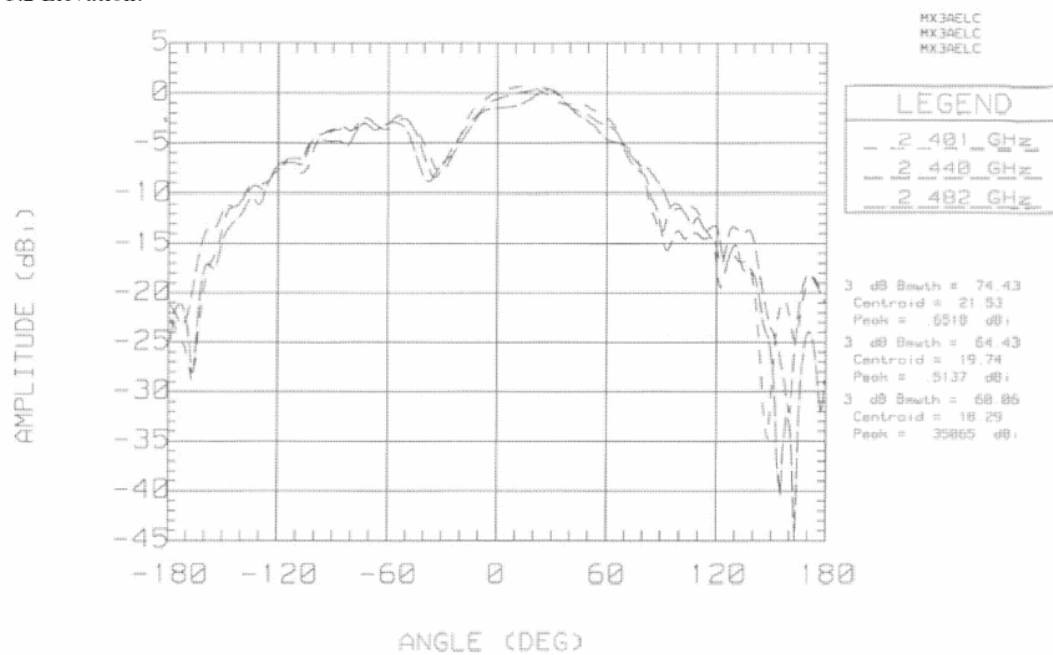
Antenna 2



Antenna 3



3.2 Elevation:



13 Jun 2008 06:52:16

Antenna 4

"High Frequency Ceramic Solutions"

2.45 GHz Antenna

P/N 2450AT42A100

Detail Specification: 09/03/03

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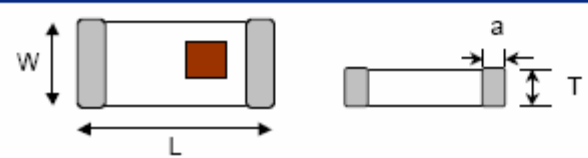
General Specifications

Part Number	2450AT42A100
Frequency Range	2400 - 2500 Mhz
Peak Gain	0 dBi typ. (XZ-V)
Average Gain	-1 dBi typ. (XZ-V)
Return Loss	9.5 dB min.

Input Power	3 Watts max.
Impedance	50 Ω
Operating Temperature	-40 to +85°C
Reel Quantity	2,000

No.	Function	Terminal Configuration
1	Feeding Point	
2	NC	

Mechanical Dimensions

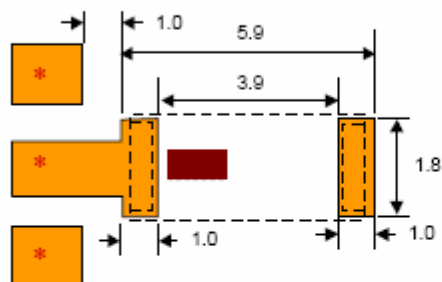
	In	mm	
L	0.197 $\pm$ 0.008	5.00 $\pm$ 0.20	
W	0.079 $\pm$ 0.008	2.00 $\pm$ 0.20	
T	0.043 $\pm$ 0.008	1.10 $\pm$ 0.20	
a	0.020 $\pm$ 0.012	0.50 $\pm$ 0.30	

Mounting Considerations

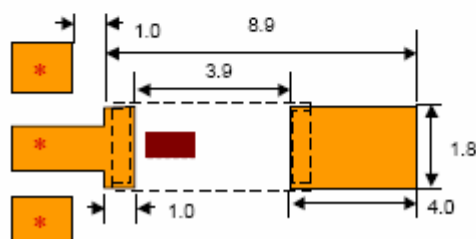
Mount these devices with brown mark facing up. Units: mm

Line width should be designed to provide 50 Ω impedance matching characteristics.

a) Without Matching Circuits



b) With Matching Circuits



"High Frequency Ceramic Solutions"

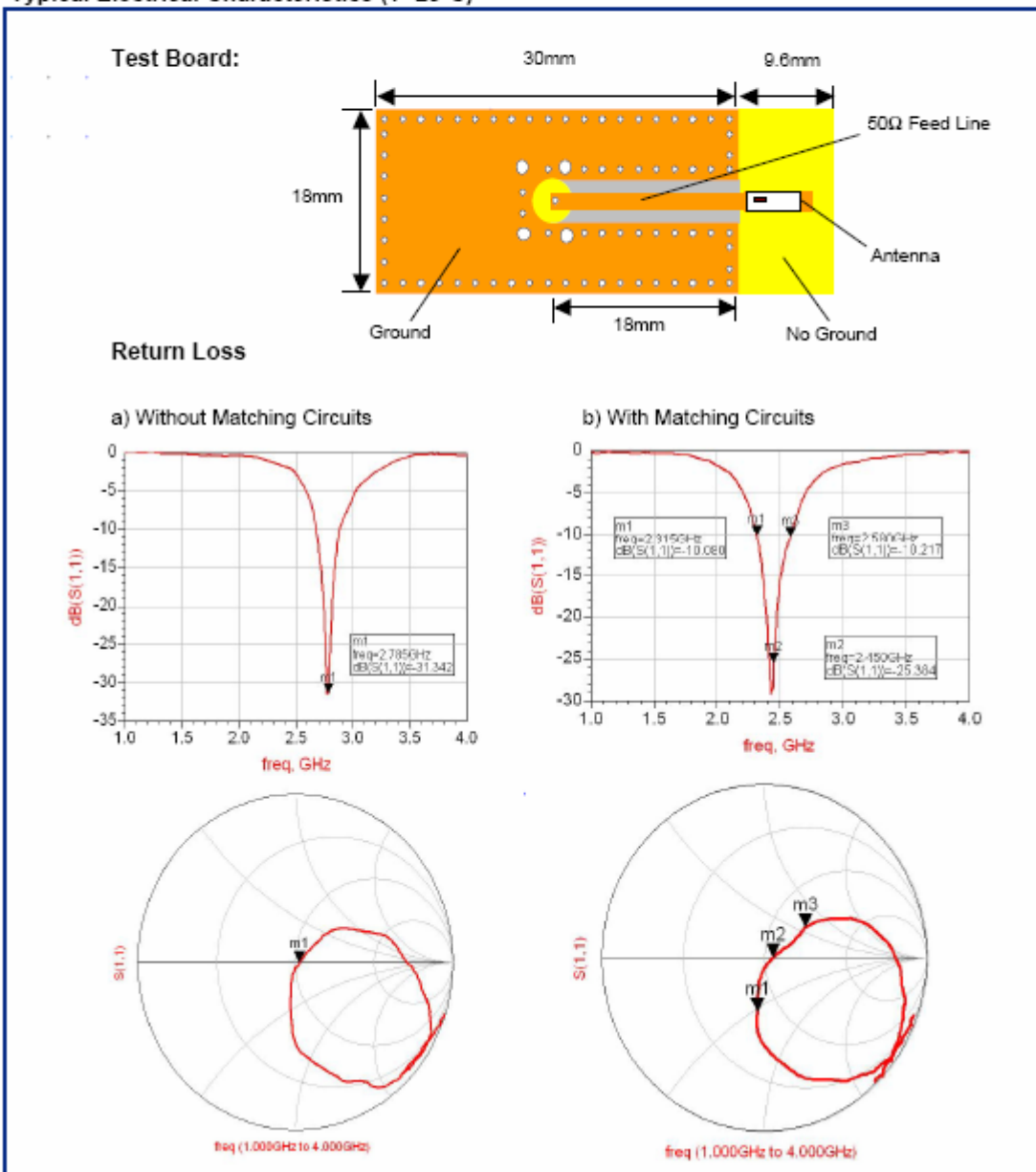
2.45 GHz Antenna

Detail Specification: 09/03/03

P/N 2450AT42A100

Page 2 of 3

Typical Electrical Characteristics (T=25°C)



"High Frequency Ceramic Solutions"

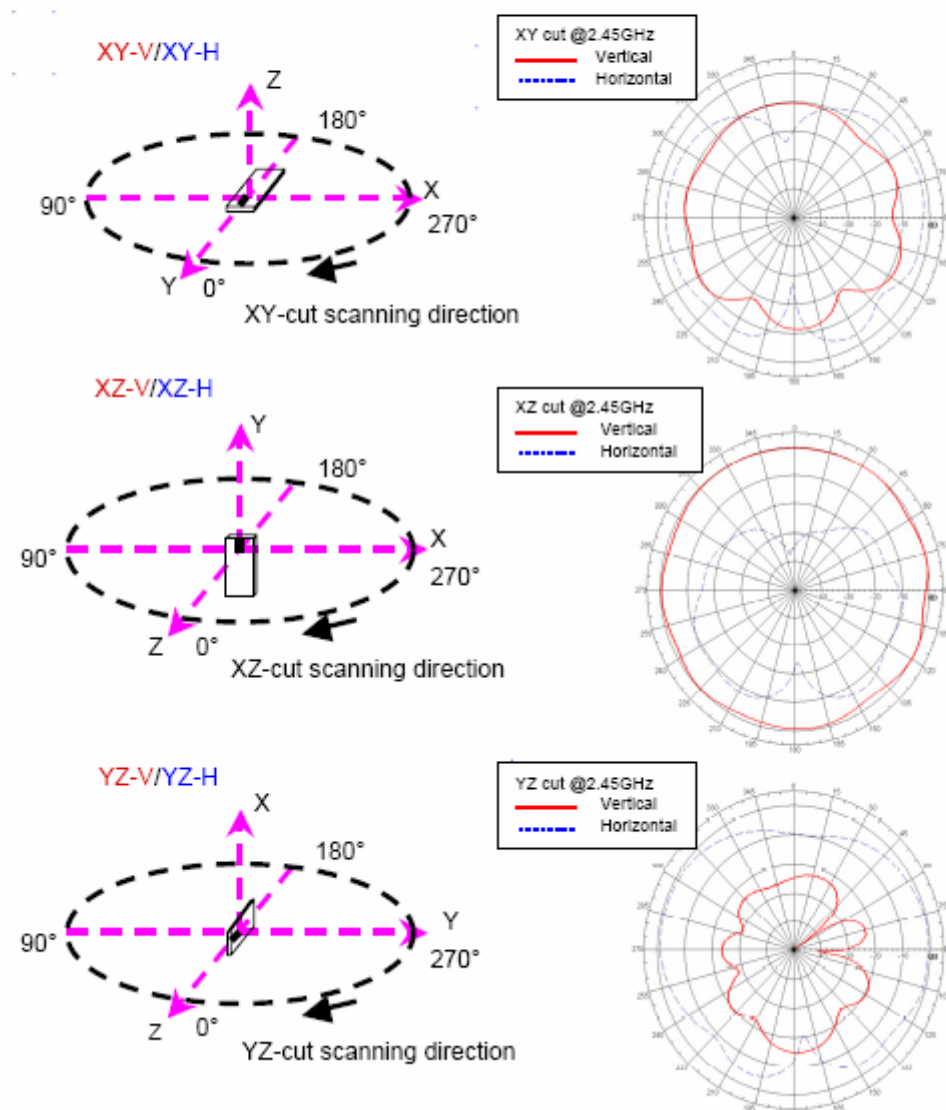
2.45 GHz Antenna

Detail Specification: 09/03/03

P/N 2450AT42A100

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Typical Radiation Patterns



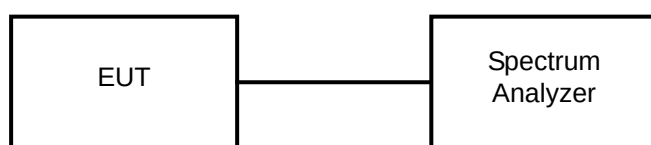
4 TEST RESULTS

4.1 FREQUENCY TOLERANCE MEASUREMENT

4.1.1 LIMITS OF FREQUENCY TOLERANCE MEASUREMENT

Tolerance of frequency shall be +/- 50ppm

4.1.2 TEST SETUP



4.1.3 TEST RESULTS

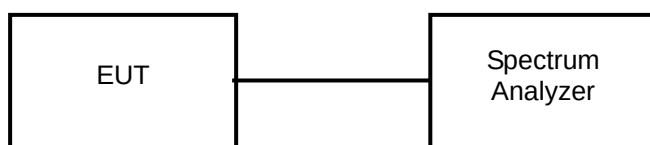
ENVIRONMENTAL CONDITIONS		26 deg.C, 60% RH 991 hPa					
Channel	Frequency (MHz)	Voltage normal		Voltage +10%		Voltage -10%	
		Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)
14	2484	2483.98564	-5.781	2483.98532	-5.910	2483.98514	-5.982

4.2 OCCUPIED BANDWIDTH MEASUREMENT (99% POWER BANDWIDTH)

4.2.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

Occupied bandwidth shall be 26MHz or less.

4.2.2 TEST SETUP

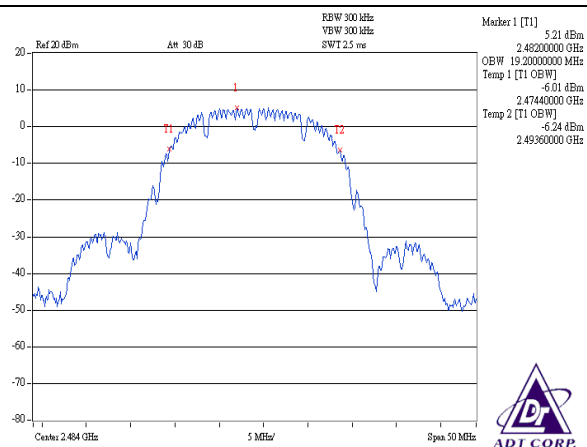


4.2.3 TEST RESULTS

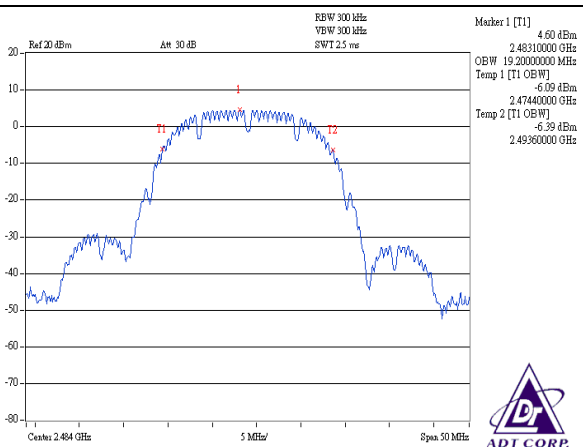
ENVIRONMENTAL CONDITIONS		26 deg.C, 60% RH 991 hPa		
Channel	Frequency (MHz)	Voltage _{normal}	Voltage _{+10%}	Voltage _{-10%}
		Occupied bandwidth (MHz)	Occupied bandwidth (MHz)	Occupied bandwidth (MHz)
14	2484	19.20	19.20	19.20
Measurement uncertainty		± 206.50 Hz		

NOTE: For the test plots please refer to the below pages.

V_{normal}



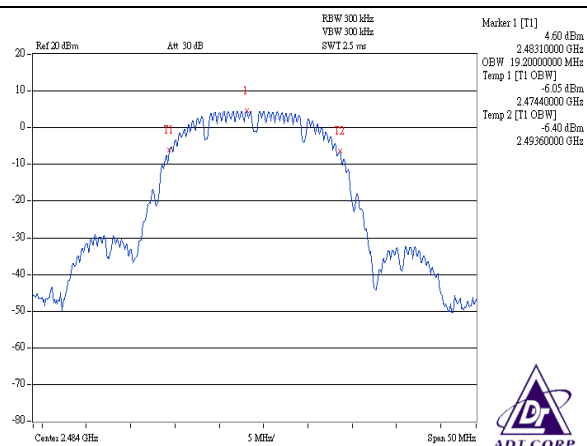
V_{+10%}



Channel 14

Channel 14

V_{-10%}



Channel 14

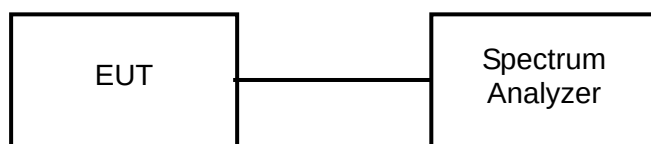
Measurement uncertainty: ± 206.50 Hz

4.3 SPREADING BANDWIDTH MEASUREMENT (90% POWER BANDWIDTH)

4.3.1 LIMITS OF SPREADING BANDWIDTH AND SPREADING FACTOR

ITEM	LIMIT	REMARK
SPREADING BANDWIDTH	$\geq 500\text{kHz}$	-
SPREADING FACTOR	≥ 10	Operating frequency 2471 to 2497MHz

4.3.2 TEST SETUP



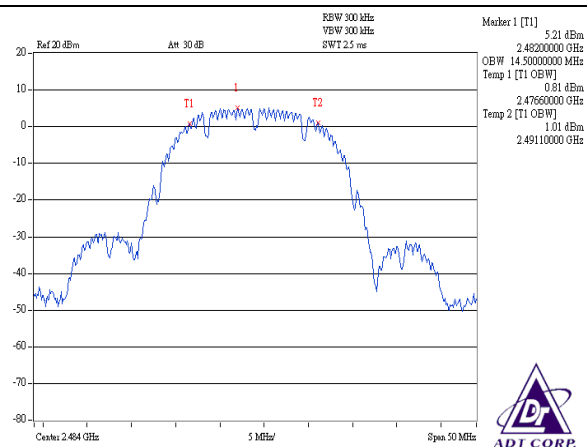
4.3.3 TEST RESULTS

ENVIRONMENTAL CONDITIONS		26 deg.C, 60% RH 991 hPa					
Channel	Frequency (MHz)	Voltage _{normal}		Voltage _{+10%}		Voltage _{-10%}	
		Occupied bandwidth (MHz)	Spreading factor	Occupied bandwidth (MHz)	Spreading factor	Occupied bandwidth (MHz)	Spreading factor
14	2484	14.500	10.545	14.500	10.545	14.500	10.545
Measurement uncertainty		$\pm 206.50 \text{ Hz}$					

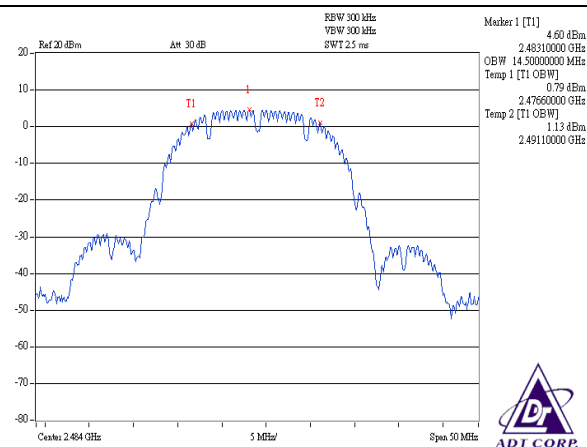
NOTE 1: For the test plots please refer to the below pages.

NOTE 2: Spreading Factor: 90% channel power bandwidth / 1.375.

V_{normal}



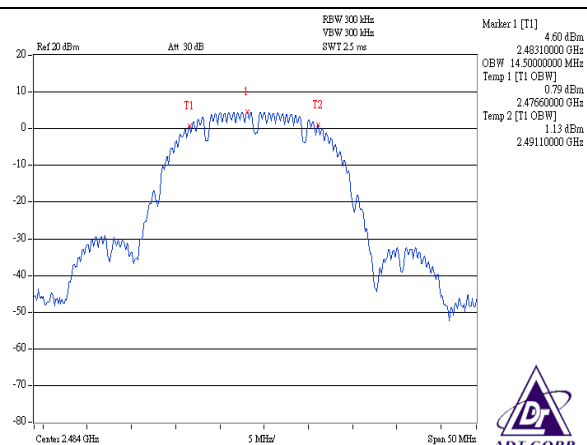
V_{+10%}



Channel 14

Channel 14

V_{-10%}



Channel 14

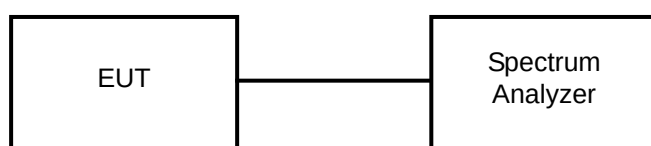
Measurement uncertainty: ± 206.50 Hz

4.4 SPURIOUS EMISSIONS FOR TRANSMITTER MEASUREMENT

4.4.1 LIMITS OF SPURIOUS EMISSIONS

FREQUENCIES (MHz)	LIMIT
Operating frequency 2471 to 2497MHz	
$2497.0 < f \leq 2510.0$	$\leq 25\mu\text{W}$
All other frequencies	$\leq 2.5\mu\text{W}$

4.4.2 TEST SETUP

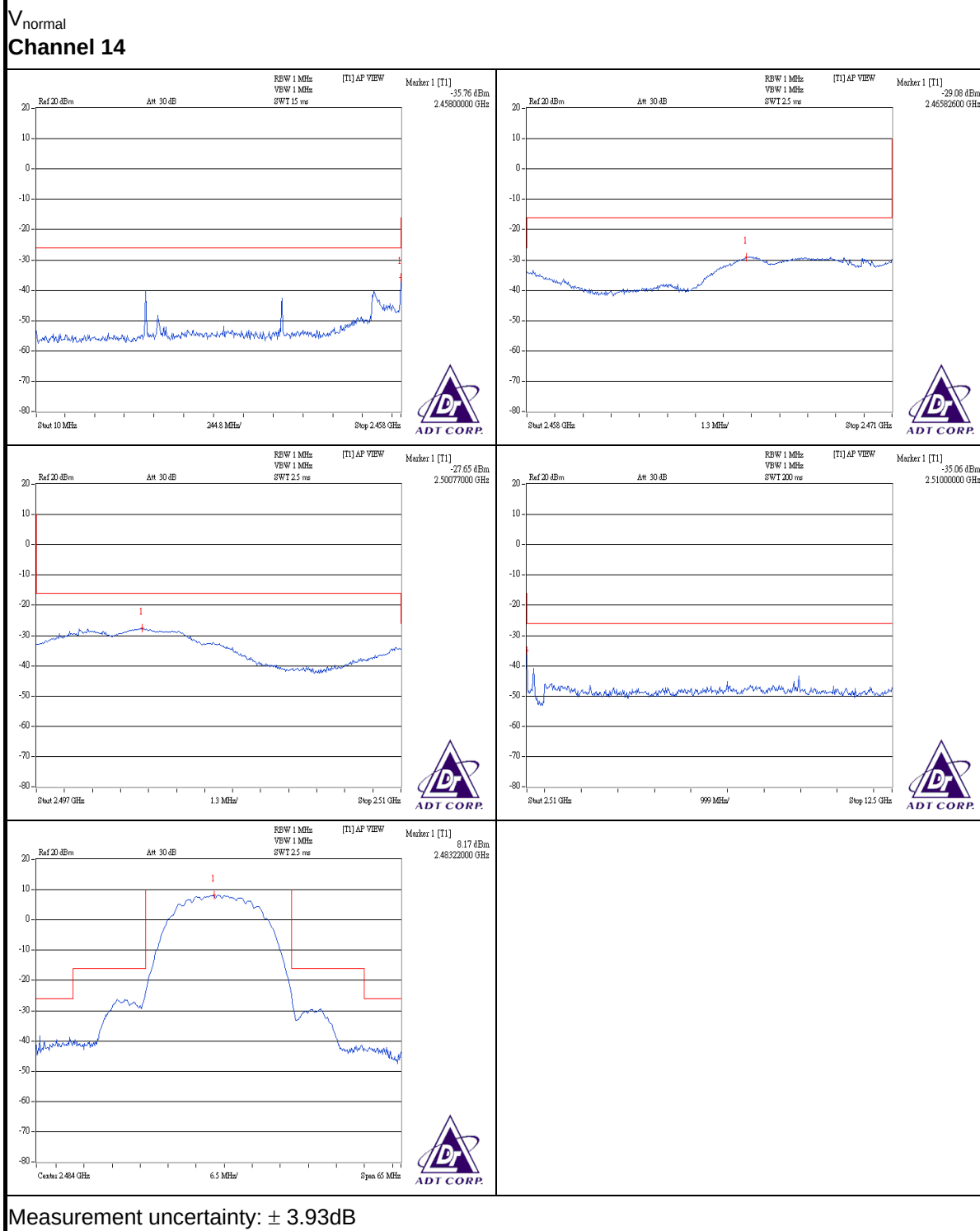


4.4.3 SUMMARY OF TEST RESULT

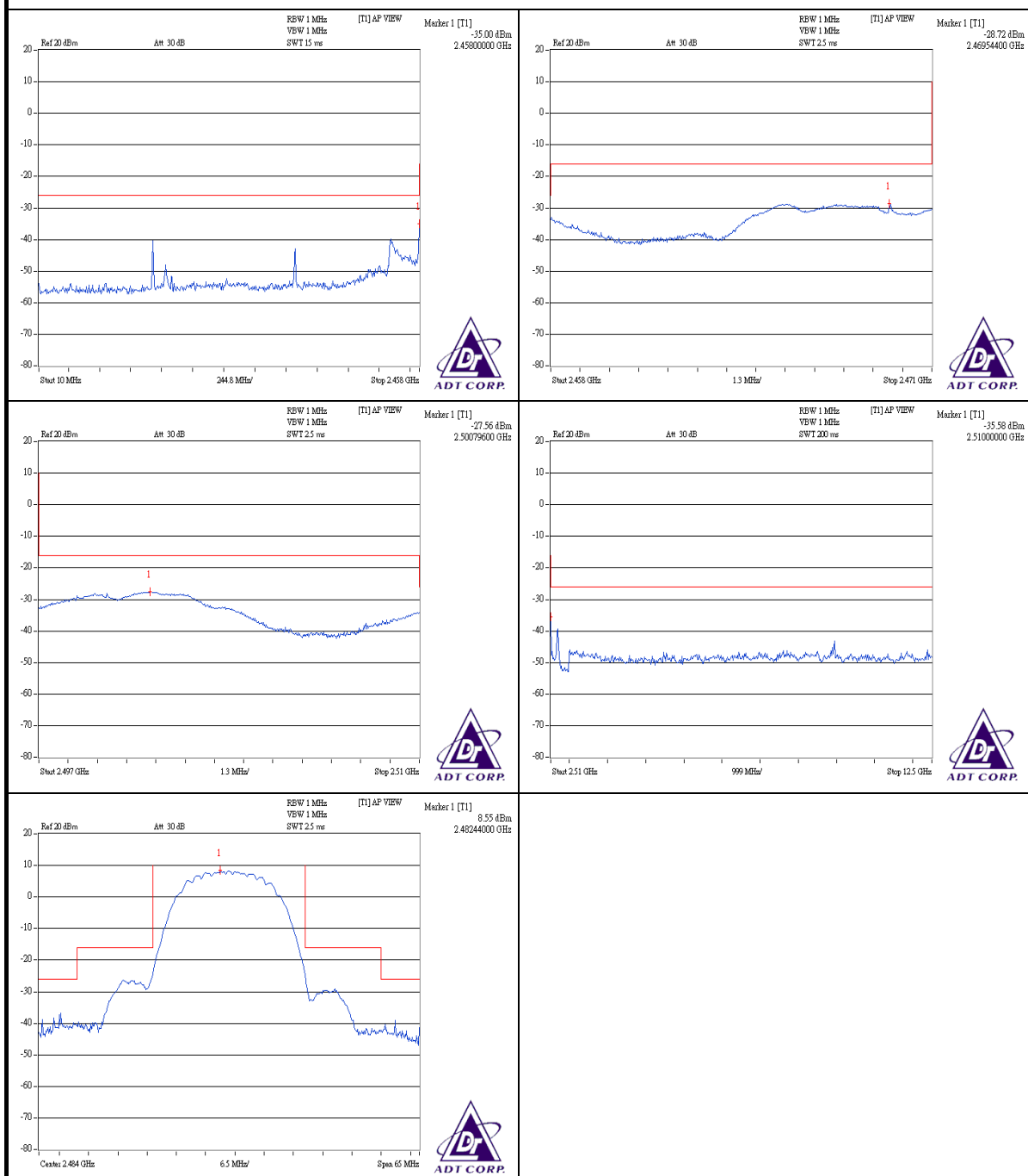
TEST CHANNEL		CH 14 (2484MHz)		LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE. VALUE		
V _{normal}	10.0MHz to 2383.70MHz	2458.000	0.265416uW	2.5uW	PASS
	2387.0MHz to 2400.0MHz	2465.826	1.237213uW	25uW	PASS
	2483.5MHz to 2496.5MHz	2500.770	1.716982uW	25uW	PASS
	2496.5MHz to 8000.0MHz	2510.000	0.311928uW	2.5uW	PASS
V _{+10%}	10.0MHz to 2383.70MHz	2458.000	0.316254uW	2.5uW	PASS
	2387.0MHz to 2400.0MHz	2469.544	1.343245uW	25uW	PASS
	2483.5MHz to 2496.5MHz	2500.796	1.752746uW	25uW	PASS
	2496.5MHz to 8000.0MHz	2510.000	0.276399uW	2.5uW	PASS
V _{-10%}	10.0MHz to 2383.70MHz	2458.000	0.326812uW	2.5uW	PASS
	2387.0MHz to 2400.0MHz	2465.956	1.401147uW	25uW	PASS
	2483.5MHz to 2496.5MHz	2500.744	1.830924uW	25uW	PASS
	2496.5MHz to 8000.0MHz	2510.000	0.342319uW	2.5uW	PASS

NOTE: 1. The worst value in each frequency range v.s. each channel has been marked by boldface.
2. The spectrum plots are attached on the following pages.

4.4.4 TEST RESULTS

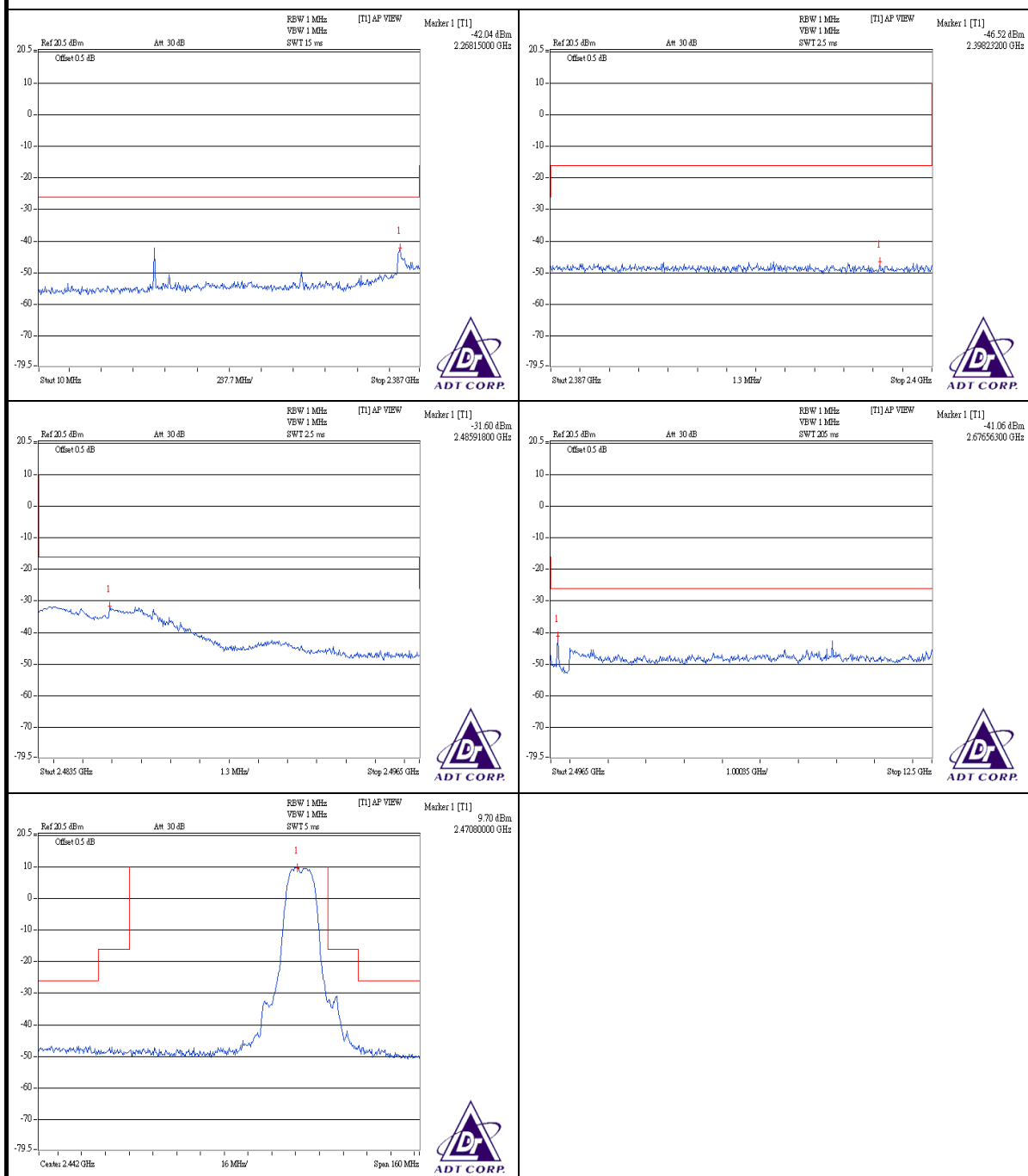


V_{+10%}
Channel 14



Measurement uncertainty: $\pm 3.93\text{dB}$

V-10% Channel 14



Measurement uncertainty: ± 3.93 dB

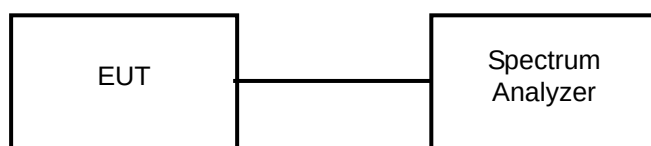
4.5 ANTENNA POWER MEASUREMENT

4.5.1 LIMITS OF ANTENNA POWER

Antenna power shall be 10mW/MHz or less.

Tolerance of antenna power shall be +20% (upper value) and –80% (lower value).

4.5.2 TEST SETUP



4.5.3 TEST RESULTS

ENVIRONMENTAL CONDITIONS	26 deg.C, 60% RH 991 hPa	
TEST CONDITION	CONDUCTED RF OUTPUT POWER DENSITY (mW/MHz)	
	CHANNEL 14 2484MHz	MAX. LIMIT (mW/MHz)
Normal Voltage	6.82	10
Normal Voltage +10%	7.26	10
Normal Voltage -10%	6.47	10
Rated power	7.50mW	
Tolerance of antenna power	0.70mW ~ 4.20mW	
Measurement uncertainty	± 1.11dB	

Note: Output Power Tolerance (%) = $\{(7.26-7.50)/7.50\} \times 100 = -3.20$ (%).

ANTENNA 1 & 2: DIPOLE ANTENNA WITH ANTENNA GAIN: 2.2dBi

ENVIRONMENTAL CONDITIONS	26 deg.C, 60% RH 991 hPa	
TEST CONDITION	RADIATED RF OUTPUT POWER DENSITY (mW/MHz)	
	CHANNEL 14 2484MHz	MAX. LIMIT (MW/MHz)
Normal Voltage	11.318	16.368
Normal Voltage +10%	12.049	16.368
Normal Voltage -10%	10.738	16.368
Measurement uncertainty	± 1.11dB	

NOTE: The value of radiated RF output densities are "calculated" values.

ANTENNA 3 & 4: DIPOLE ANTENNA WITH ANTENNA GAIN: 0dBi

ENVIRONMENTAL CONDITIONS	26 deg.C, 60% RH 991 hPa	
TEST CONDITION	RADIATED RF OUTPUT POWER DENSITY (mW/MHz)	
	CHANNEL 14 2484MHz	MAX. LIMIT (MW/MHz)
Normal Voltage	6.820	16.368
Normal Voltage +10%	7.260	16.368
Normal Voltage -10%	6.470	16.368
Measurement uncertainty	$\pm 1.11\text{dB}$	

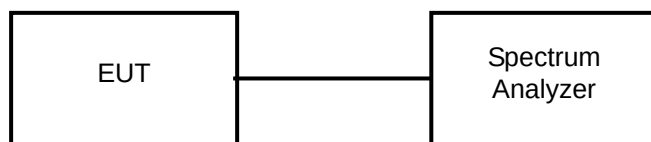
NOTE: The value of radiated RF output densities are "calculated" values.

4.6 SPURIOUS EMISSIONS FOR RECEIVER

4.6.1 LIMITS OF SPURIOUS EMISSIONS FOR RECEIVER

FREQUENCIES (MHz)	LIMIT
Below 1GHz	$\leq 4\text{nW}$ (-54dBm)
Above 1GHz	$\leq 20\text{nW}$ (-47dBm)

4.6.2 TEST SETUP



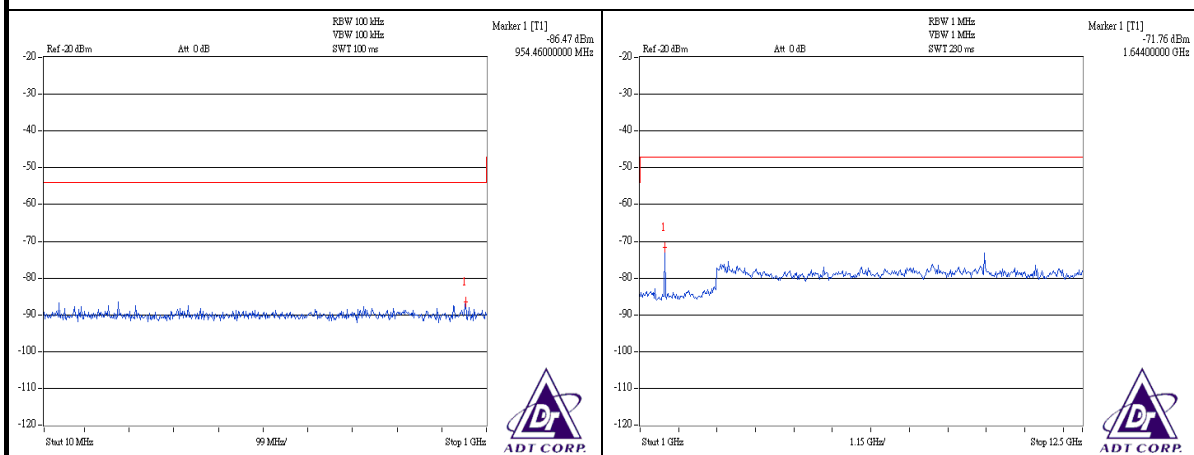
4.6.3 SUMMARY OF TEST RESULT

TEST CHANNEL		CH 14 (2484MHz)		LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE. VALUE		
V_{normal}	below 1GHz	954.460	0.002252nW	4nW	PASS
	above 1GHz	1644.000	0.066730nW	20nW	PASS
V+10%	below 1GHz	332.740	0.002032nW	4nW	PASS
	above 1GHz	1644.000	0.066782nW	20nW	PASS
V-10%	below 1GHz	332.740	0.001939nW	4nW	PASS
	above 1GHz	1644.000	0.068654nW	20nW	PASS

NOTE: The spectrum plots are attached on the following pages.

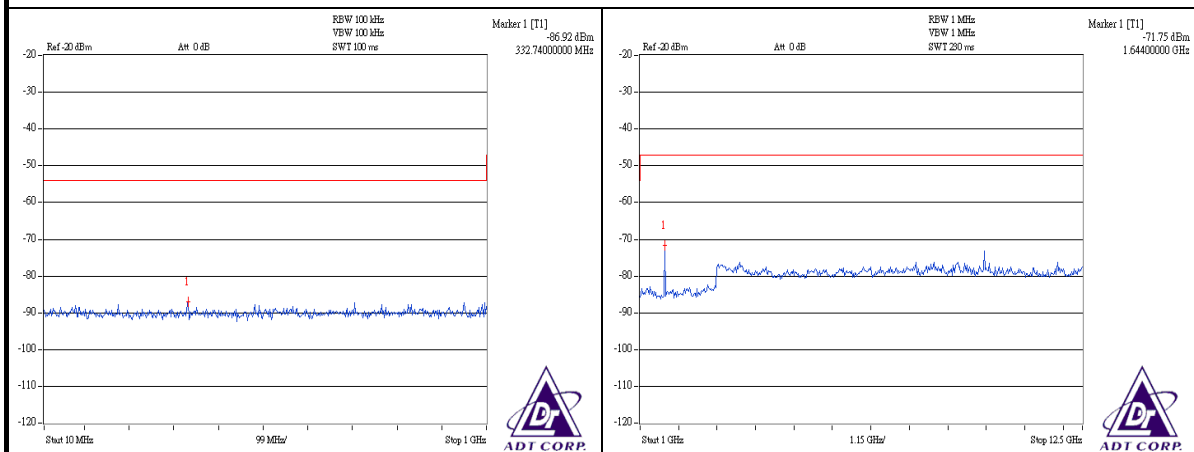
4.6.4 TEST RESULTS

V_{normal}



Channel 14

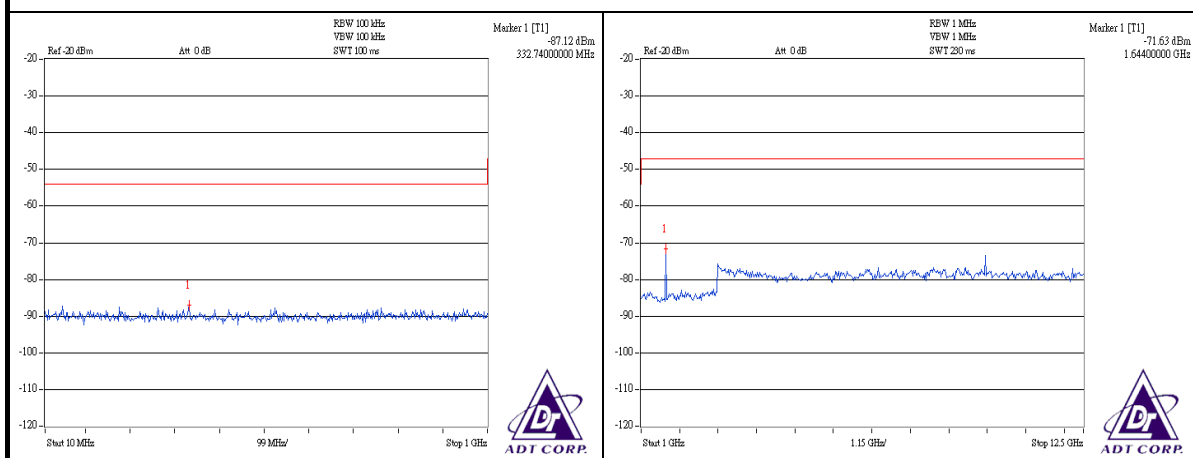
V_{+10%}



Channel 14

Measurement uncertainty: ± 3.93 dB

V-10%



Channel 14

Measurement uncertainty: ± 3.93 dB

5 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
SPECTRUM ANALYZER	FSP40	100040	Jun. 28, 2008
SIGNAL GENERATOR / Agilent	E8257C	MY43320668	Dec. 28, 2007
TEKTRONIX OSCILLOSCOPE	TDS 1012	C019167	Jan. 15, 2008
NARDA DETECTOR	4503A	FSCM99899	NA
PK PWR MTR SINGLE	E4416A	GB41291763	May 27, 2008
Peak and Average Power Sensor	E9327A	US40441181	May 27, 2008

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

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, 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: 886-2-26051924

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.