

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 22, 2007

NOTE:

1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.

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

4.3.3 TEST PROCEDURE

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation



4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

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



4.3.7 TEST RESULTS

802.11b DSSS MODULATION:

MODULATION TYPE	ССК	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa
TESTED BY	Sky Liao		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.64	0.5	PASS
6	2437	11.20	0.5	PASS
11	2462	11.28	0.5	PASS









802.11g OFDM MODULATION / DUAL TX: (ANTENNA 1 AND 2)

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa
TESTED BY	Sky Liao		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.32	16.40	0.5	PASS
6	2437	16.32	16.32	0.5	PASS
11	2462	16.32	16.32	0.5	PASS











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802.11g OFDM MODULATION / DUAL TX: (ANTENNA 1 AND 3)

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa
TESTED BY	Sky Liao		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz) MINI		MINIMUM I IMIT (MH7)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.32	16.32	0.5	PASS
6	2437	16.32	16.32	0.5	PASS
11	2462	16.32	16.32	0.5	PASS

















DRAFT 802.11n (20MHz) OFDM MODULATION / DUAL TX: (ANTENNA 1 AND 2)

MODULATION TYPE	BPSK	TRANSFER RATE	6.5Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa
TESTED BY	Sky Liao	-	_

CHANNEL	CHANNEL FREQUENCY	6dB BANDWIDTH (MHz)		MINIMUM LIMIT	PASS / FAIL
	(MHz)	CHAIN 0	CHAIN 1	()	
1	2412	17.04	16.64	0.5	PASS
6	2437	17.04	16.96	0.5	PASS
11	2462	17.12	16.88	0.5	PASS

















DRAFT 802.11n (20MHz) OFDM MODULATION / DUAL TX: (ANTENNA 1 AND 3)

MODULATION TYPE	BPSK	TRANSFER RATE	6.5Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa
TESTED BY	Sky Liao	-	_

CHANNEL	CHANNEL FREQUENCY	6dB BANDWIDTH (MHz)		MINIMUM LIMIT	PASS / FAIL
	(MHz)	CHAIN 0	CHAIN 1	(2)	
1	2412	17.04	16.96	0.5	PASS
6	2437	17.04	16.72	0.5	PASS
11	2462	17.12	16.96	0.5	PASS

















DRAFT 802.11n (40MHz) OFDM MODULATION / DUAL TX: (ANTENNA 1 AND 2)

MODULATION TYPE	BPSK	TRANSFER RATE	13.5Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa
TESTED BY	Sky Liao	-	_

CHANNEL	CHANNEL FREQUENCY	6dB BAN (M	IDWIDTH Hz)	MINIMUM LIMIT (MHz)	PASS / FAIL
	(MHz)	CHAIN 0	CHAIN 1	(
1	2422	35.68	35.68	0.5	PASS
4	2437	35.68	35.84	0.5	PASS
7	2452	35.84	35.20	0.5	PASS

















DRAFT 802.11n (40MHz) OFDM MODULATION: DUAL TX: (ANTENNA 1 AND 3)

MODULATION TYPE	BPSK	TRANSFER RATE	13.5Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa
TESTED BY	Sky Liao	-	

CHANNEL	CHANNEL FREQUENCY	6dB BAN (M	IDWIDTH Hz)	MINIMUM LIMIT (MHz)	PASS / FAIL
	(MHz)	CHAIN 0	CHAIN 1	(
1	2422	35.68	35.68	0.5	PASS
4	2437	35.68	35.52	0.5	PASS
7	2452	35.84	35.20	0.5	PASS













CH7 Ø *REW 100 kHz Delta 1 [T1] *VEW 100 kHz 0.98 dB SWT 10 ms 35.20000000 MHz Ref 20 dBm *Att 30 dB 20 Öffset 1 [T1 1 Marker diB 99 dB GH 4344n 00 1 PK VIEW Jonuan within mb Juli Juli May Marked and VI. .41 -10 My un which which runder F2 F1 Span 80 MHz Center 2.452 GHz 8 MHz/ 9



4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 22, 2007
Agilent SIGNAL GENERATOR	E8257C	MY43320668	Dec. 28, 2007
TEKTRONIX OSCILLOSCOPE	TDS380	B016335	July 14, 2007
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.

4.4.3 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.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation



4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6



4.4.7 TEST RESULTS

802.11b DSSS MODULATION:

MODULATION TYPE	ССК	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa
TESTED BY	Sky Liao		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	72.444	18.60	30	PASS
6	2437	79.433	19.00	30	PASS
11	2462	54.954	17.40	30	PASS



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MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps							
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa							
TESTED BY	Sky Liao	-	-							

802.11g OFDM MODULATION / DUAL TX: (ANTENNA 1 AND 2)

CHANNEL	CHANNEL FREQUENCY	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK	TOTAL PEAK	PEAK POWER	PASS /
	(MHz)	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	POWER (mW)	POWER LIMIT (dBm) (dBm)	FAIL	
1	2412	67.61	57.54	18.30	17.60	125.152	21.0	30	PASS
6	2437	67.61	57.54	18.30	17.60	125.152	21.0	30	PASS
11	2462	63.10	53.70	18.00	17.30	116.799	20.7	30	PASS

802.11g OFDM MODULATION / DUAL TX: (ANTENNA 1 AND 3)

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa
TESTED BY	Sky Liao	-	-

CHANNEL	CHANNEL FREQUENCY	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK	TOTAL PEAK	PEAK POWER	PASS/
	(MHz)	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	(mW)	(dBm)	(dBm)	FAIL
1	2412	67.61	56.23	18.30	17.50	123.842	20.9	30	PASS
6	2437	67.61	56.23	18.30	17.50	123.842	20.9	30	PASS
11	2462	63.10	50.12	18.00	17.00	113.214	20.5	30	PASS



DRAFT 802.11n (20MHz) OFDM MODULATION / DUAL TX: (ANTENNA 1 AND 2)MODULATION TYPEBPSKTRANSFER RATE6.5MbpsINPUT POWER
(SYSTEM)120Vac, 60 HzENVIRONMENTAL
CONDITIONS18deg.C, 64%RH,
971hPaTESTED BYSky Liao

CHANNEL		CHANNEL FREQUENCY	PEAK F OUTPU	POWER T (mW)	PEAK F OUTPU	POWER T (dBm)	TOTAL PEAK	TOTAL PEAK	PEAK POWER	PASS /
		(MHz)	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	(mW)	N) (dBm)	(dBm)	FAIL
	1	2412	63.10	63.10	18.00	18.00	126.191	21.0	30	PASS
	6	2437	63.10	63.10	18.00	18.00	126.191	21.0	30	PASS
	11	2462	56.23	50.12	17.50	17.00	106.353	20.3	30	PASS

DRAFT 802.11n (20MHz) OFDM MODULATION / DUAL TX: (ANTENNA 1 AND 3)

MODULATION TYPE	BPSK	TRANSFER RATE	6.5Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa
TESTED BY	Sky Liao		

CHANNEL	CHANNEL FREQUENCY	PEAK POWER OUTPUT (mW)		PEAK POWER TOTA OUTPUT (dBm) PEA		PEAK POWER OUTPUT (dBm)		TOTAL PEAK	TOTAL PEAK	PEAK POWER	PASS /
	(MHz)	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	(mW)	(dBm)	(dBm)	FAIL		
1	2412	63.10	89.13	18.00	19.50	152.221	21.8	30	PASS		
6	2437	63.10	89.13	18.00	19.50	152.221	21.8	30	PASS		
11	2462	56.23	63.10	17.50	18.00	119.330	20.8	30	PASS		



DRAFT 802.11n (40MHz) OFDM MODULATION / DUAL TX: (ANTENNA 1 AND 2)

MODULATION TYPE	BPSK	TRANSFER RATE	13.5Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa
TESTED BY	Sky Liao		

CHANNEL	CHANNEL FREQUENCY	PEAK F OUTPU	POWER T (mW)	R PEAK POWER /) OUTPUT (dBm)				PEAK POWER	PASS /
()	(MHz)	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	(mW)	(dBm)	(dBm)	FAIL
1	2422	57.54	57.54	17.60	17.60	115.088	20.6	30	PASS
4	2437	57.54	57.54	17.60	17.60	115.088	20.6	30	PASS
7	2452	39.81	41.69	16.00	16.20	81.498	19.1	30	PASS

DRAFT 802.11n (40MHz) OFDM MODULATION / DUAL TX: (ANTENNA 1 AND 3)

MODULATION TYPE	BPSK	TRANSFER RATE	13.5Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa
TESTED BY	Sky Liao		

CHANNEL	CHANNEL FREQUENCY	PEAK F OUTPU	PEAK POWER OUTPUT (mW)		POWER TOTAL JT (dBm) PEAK		TOTAL PEAK	PEAK POWER	PASS /
	(MHz)	CHAIN 0	IN 0 CHAIN 1 CHAIN 0 CHAIN 1	(mW) (dBm)	(dBm)	FAIL			
1	2422	57.54	63.10	17.60	18.00	120.640	20.8	30	PASS
4	2437	57.54	63.10	17.60	18.00	120.640	20.8	30	PASS
7	2452	39.81	38.02	16.00	15.80	77.830	18.9	30	PASS



4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 22, 2007

NOTE:

1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.

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

4.5.3 TEST PROCEDURE

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

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

4.5.4 DEVIATION FROM TEST STANDARD

No deviation



4.5.5 TEST SETUP

4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6



4.5.7 TEST RESULTS

802.11b DSSS MODULATION:

MODULATION TYPE	ССК	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa
TESTED BY	Sky Liao	-	

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	2412	-7.43	8	PASS
6	2437	-6.13	8	PASS
11	2462	-8.10	8	PASS









802.11g OFDM MODULATION / DUAL TX: (ANTENNA 1 AND 2)

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa
TESTED BY	Sky Liao	-	

CHANNEL	CHANNEL FREQUENCY	RF POWER LEVEL IN 3kHz BW (dBm)			PASS / FAIL	
	(MHz)	CHAIN 0	CHAIN 1	LIMIT (abm)		
1	2412	-10.30	-11.22	8	PASS	
6	2437	-9.50	-11.14	8	PASS	
11	2462	-11.44	-12.14	8	PASS	

















802.11g OFDM MODULATION / DUAL TX: (ANTENNA 1 AND 3)

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg.C, 64%RH, 971hPa
TESTED BY	Sky Liao		

CHANNEL	CHANNEL FREQUENCY	RF POWER L BW (LEVEL IN 3kHz / (dBm) MAXIMUM		PASS / FAIL	
	(MHz)	CHAIN 0	CHAIN 1	LIWIT (abm)		
1	2412	-10.30	-11.96	8	PASS	
6	2437	-9.50	-11.81	8	PASS	
11	2462	-11.44	-11.82	8	PASS	













