

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	Nov. 23, 2006
Agilent SIGNAL GENERATOR	E8257C	MY43320668	Dec. 07, 2006
TEKTRONIX OSCILLOSCOPE	TDS380	B016335	Jun. 22, 2006
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.

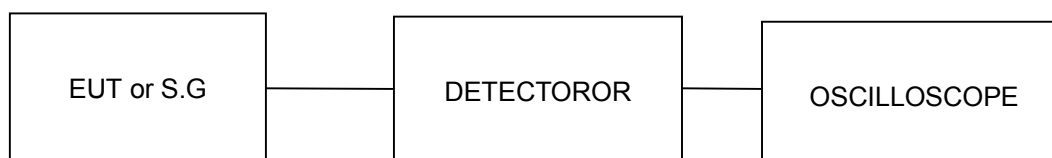
4.4.3 TEST PROCEDURES

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	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 971hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	97.724	19.90	30	PASS
6	2437	102.329	20.10	30	PASS
11	2462	93.325	19.70	30	PASS

802.11g OFDM MODULATION:

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 971hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	102.329	20.10	30	PASS
6	2437	112.202	20.50	30	PASS
11	2462	102.329	20.10	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	20deg.C, 60%RH, 971hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	81.28	81.28	19.1	19.1	162.566	22.1	30	PASS
6	2437	91.20	87.10	19.6	19.4	178.297	22.5	30	PASS
11	2462	107.15	77.62	20.3	18.9	184.777	22.7	30	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	20deg.C, 60%RH, 971hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	81.28	100.00	19.1	20.0	181.283	22.6	30	PASS
6	2437	91.20	77.62	19.6	18.9	168.826	22.3	30	PASS
11	2462	107.15	27.54	20.3	14.4	134.694	21.3	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	27deg.C, 60%RH, 971hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2422	98.17	99.54	19.92	19.98	197.715	23.0	30	PASS
4	2437	97.95	99.54	19.91	19.98	197.490	23.0	30	PASS
7	2452	98.40	99.08	19.93	19.96	197.484	23.0	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	27deg.C, 60%RH, 971hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2422	98.17	97.27	19.92	19.88	195.450	22.9	30	PASS
4	2437	97.95	99.08	19.91	19.96	197.032	22.9	30	PASS
7	2452	98.40	97.50	19.93	19.89	195.900	22.9	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	Nov. 23, 2006

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

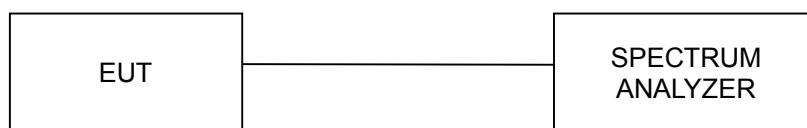
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

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

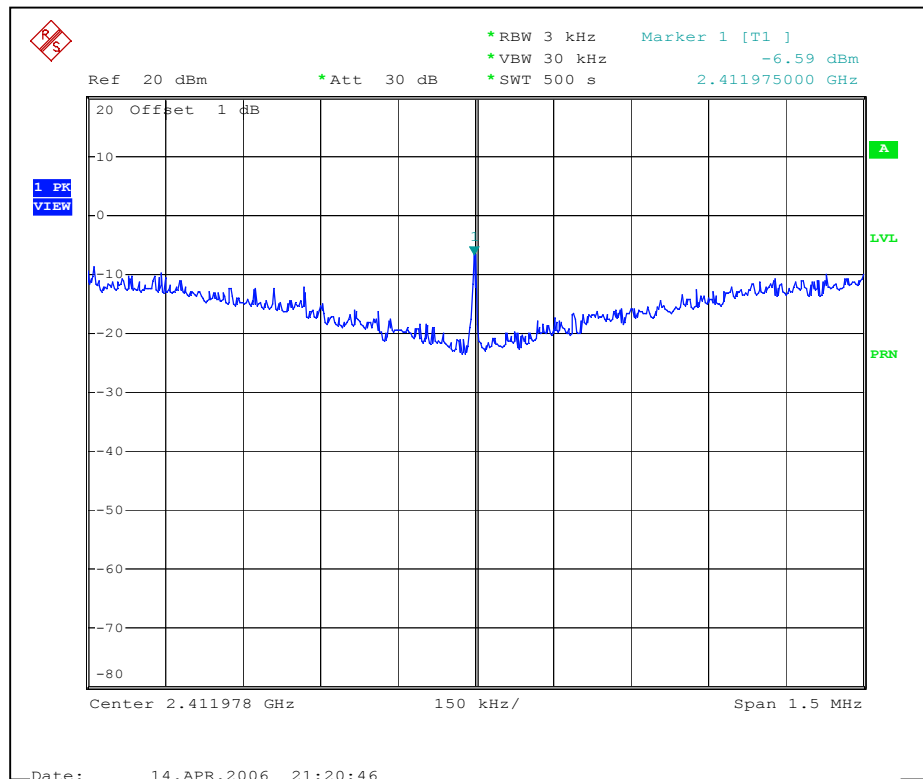
4.5.7 TEST RESULTS

802.11b DSSS MODULATION:

MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 971hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	2412	-6.59	8	PASS
6	2437	-6.71	8	PASS
11	2462	-7.25	8	PASS

CH1

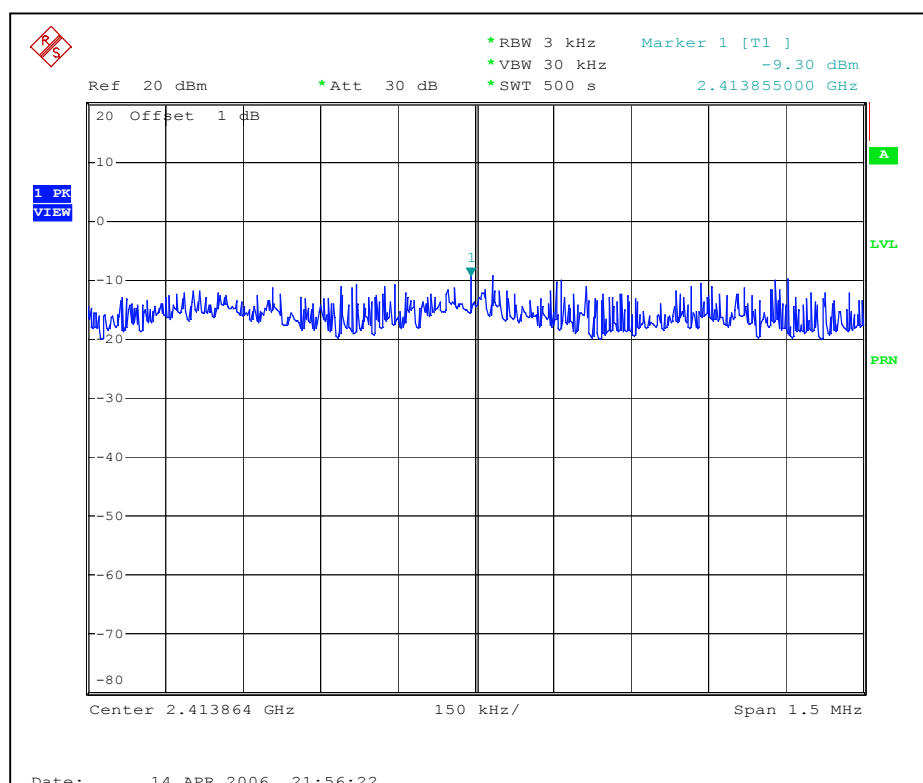


802.11g OFDM MODULATION:

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 971hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	2412	-9.30	8	PASS
6	2437	-9.23	8	PASS
11	2462	-9.15	8	PASS

CH1

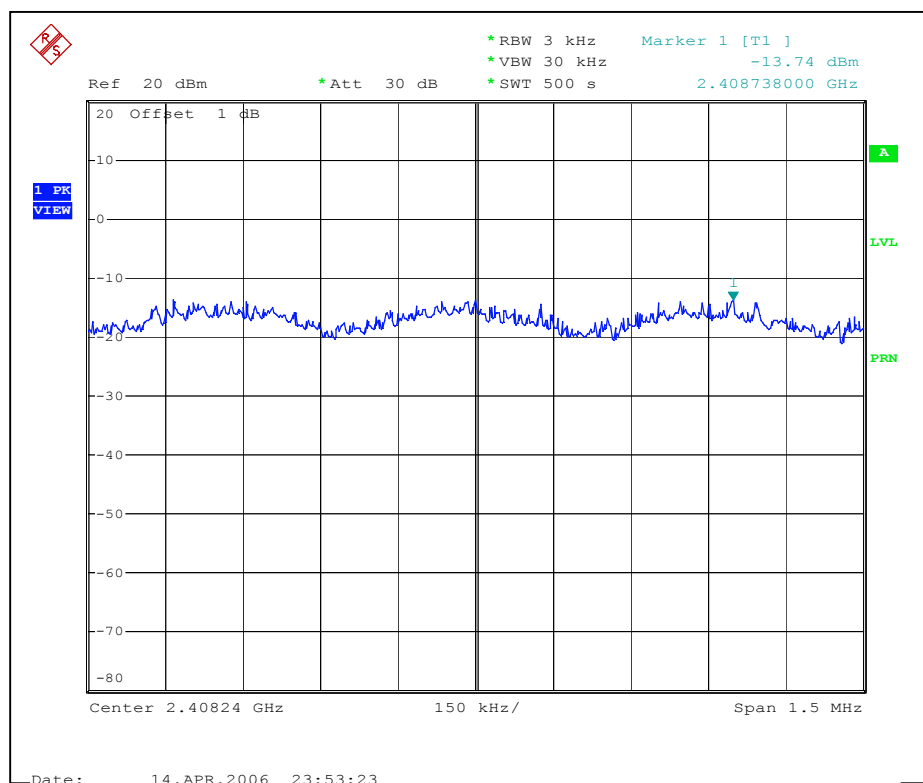


DRAFT 802.11n (20MHz) OFDM MODULATION: DUAL TX: (ANTENNA 1 AND 3)

MODULATION TYPE	BPSK	TRANSFER RATE	6.5Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 971hPa
TESTED BY	Wen Yu		

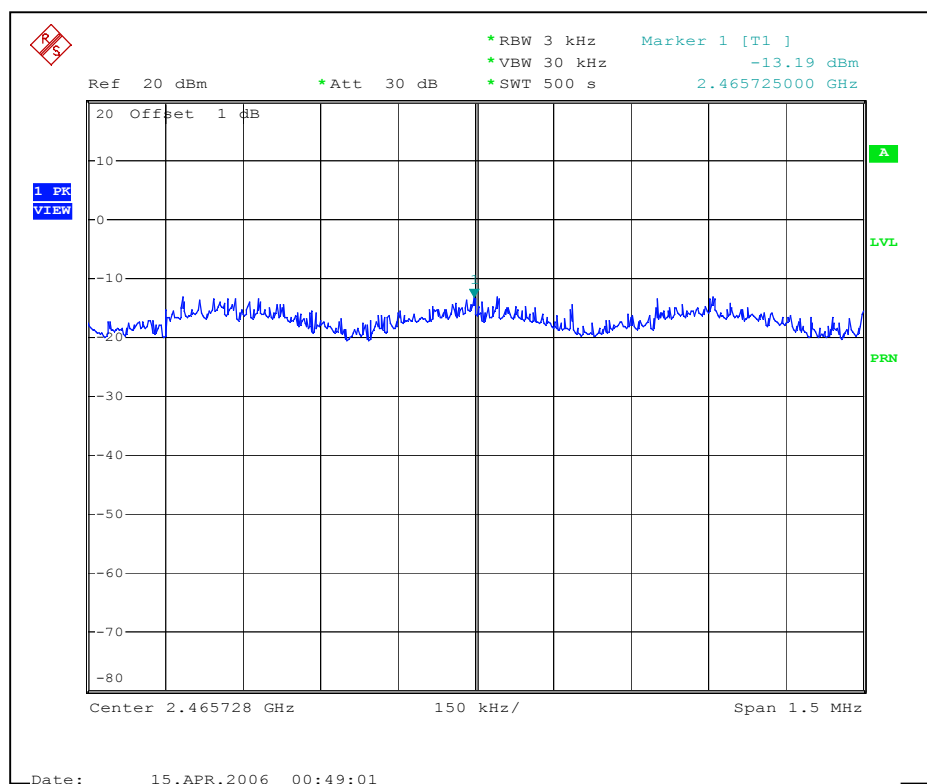
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	-13.74	-12.57	8	PASS
6	2437	-12.24	-11.98	8	PASS
11	2462	-11.09	-13.19	8	PASS

FOR CHAIN 0: CH1





CH11

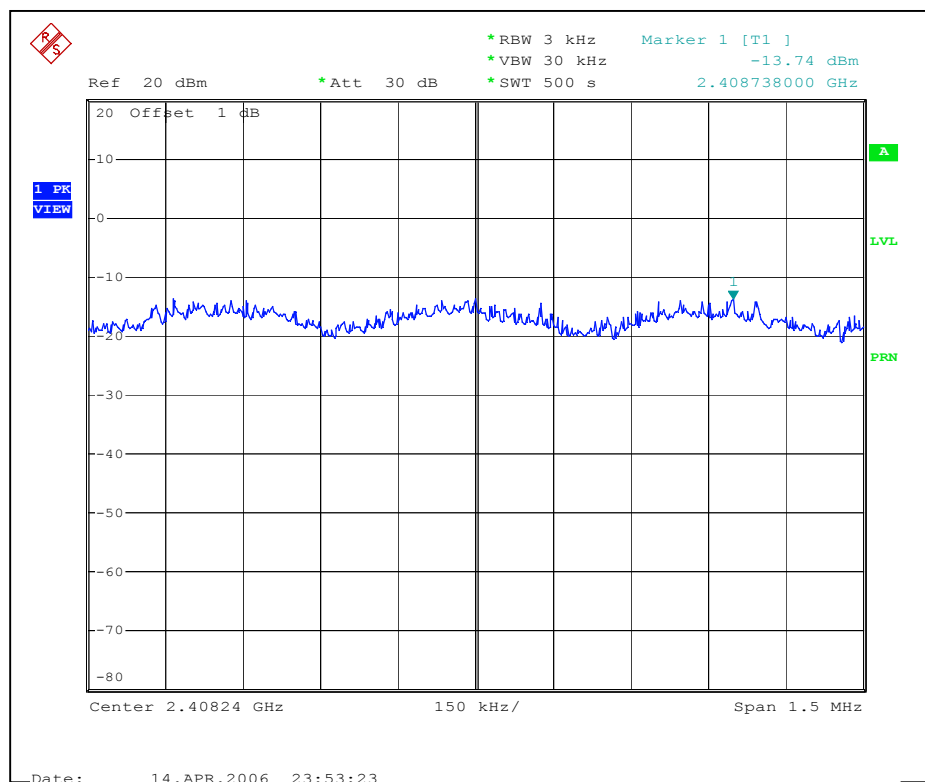


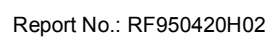
DRAFT 802.11n (20MHz) OFDM MODULATION: DUAL TX: (ANTENNA 1 AND 2)

MODULATION TYPE	BPSK	TRANSFER RATE	6.5Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 971hPa
TESTED BY	Wen Yu		

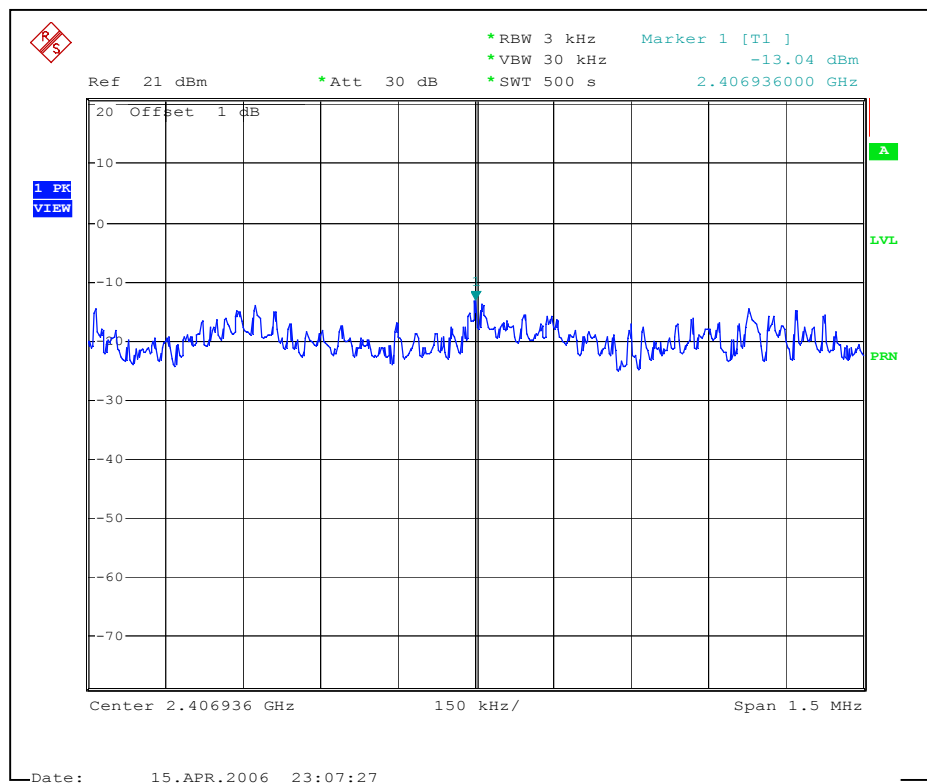
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	-13.74	-13.04	8	PASS
6	2437	-12.24	-12.30	8	PASS
11	2462	-11.09	-16.72	8	PASS

FOR CHAIN 0: CH1

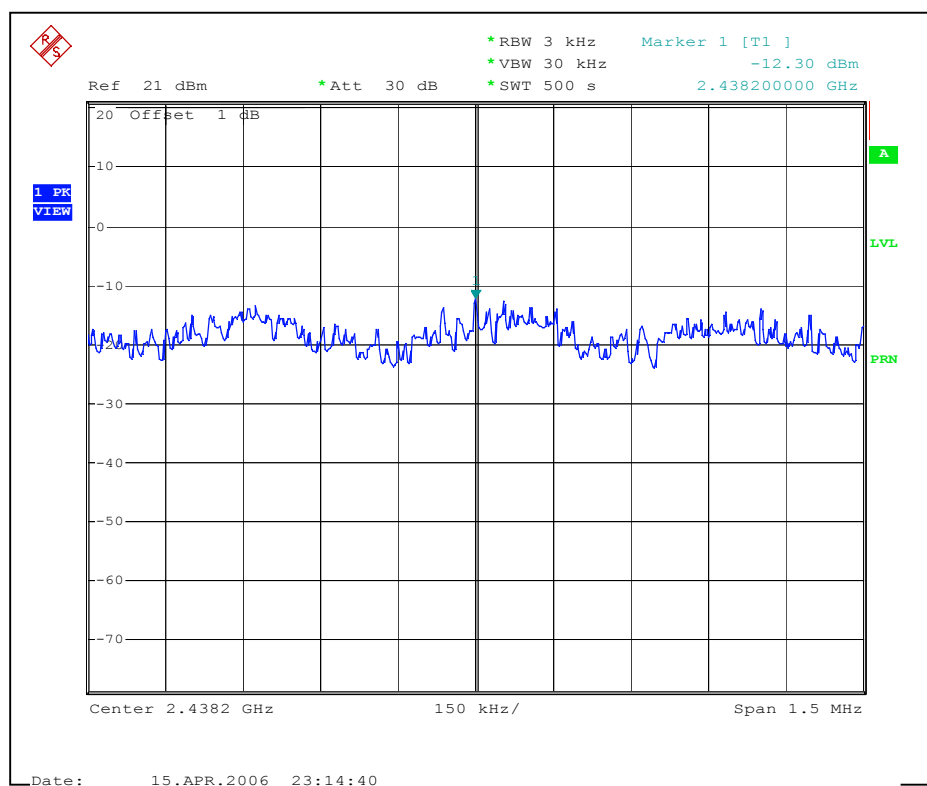




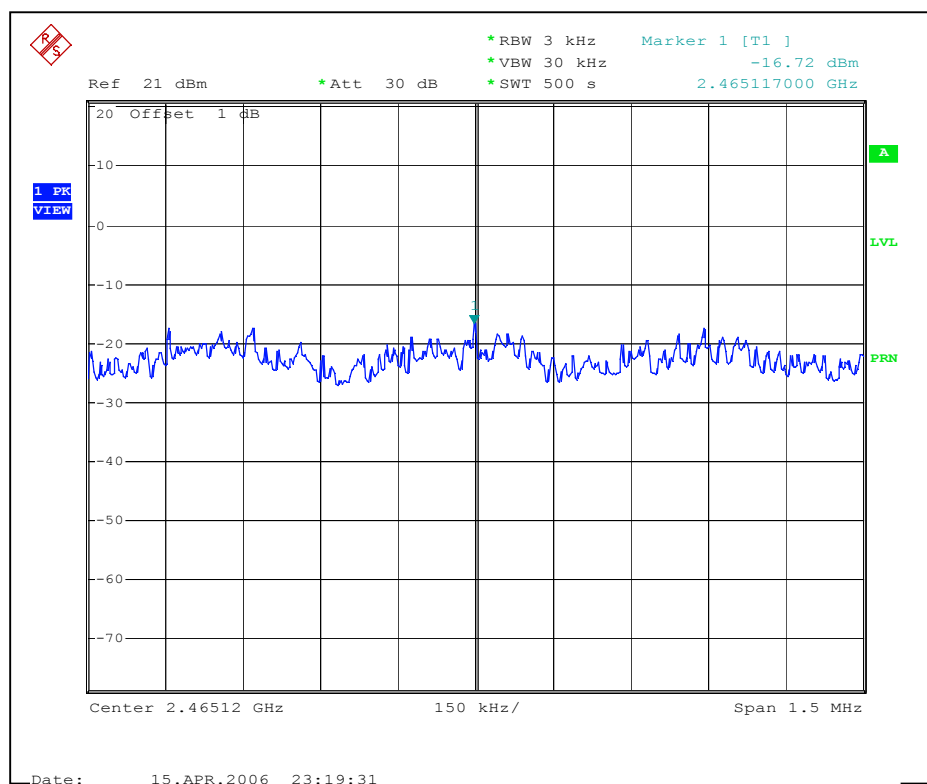
FOR CHAIN 1: CH1



CH6



CH11

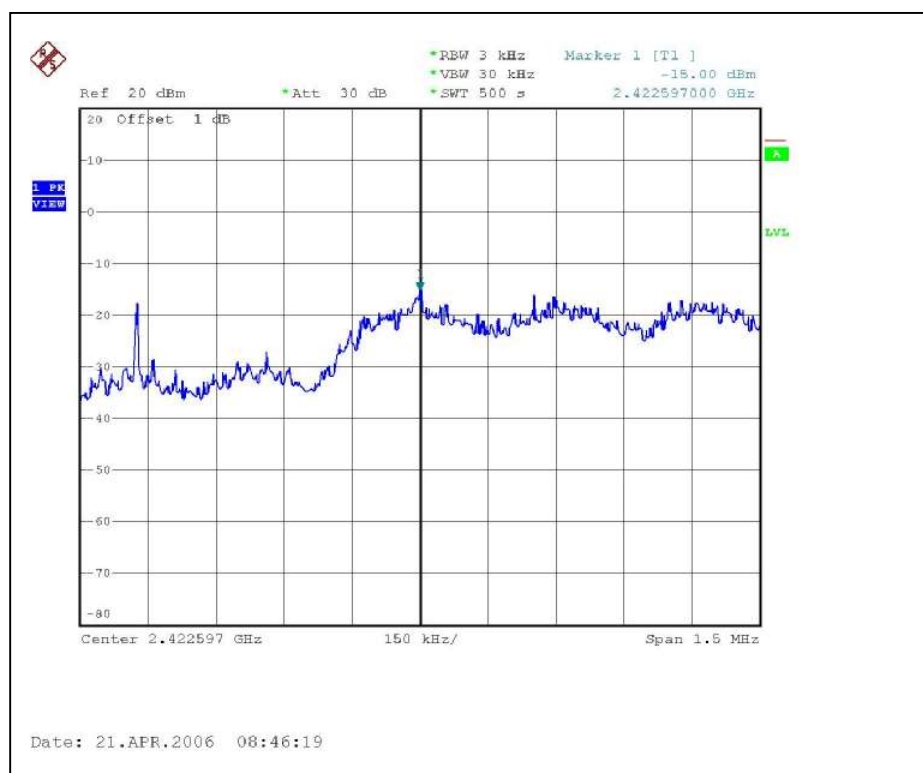


DRAFT 802.11n (40MHz) OFDM MODULATION: DUAL TX: (ANTENNA 1 AND 3)

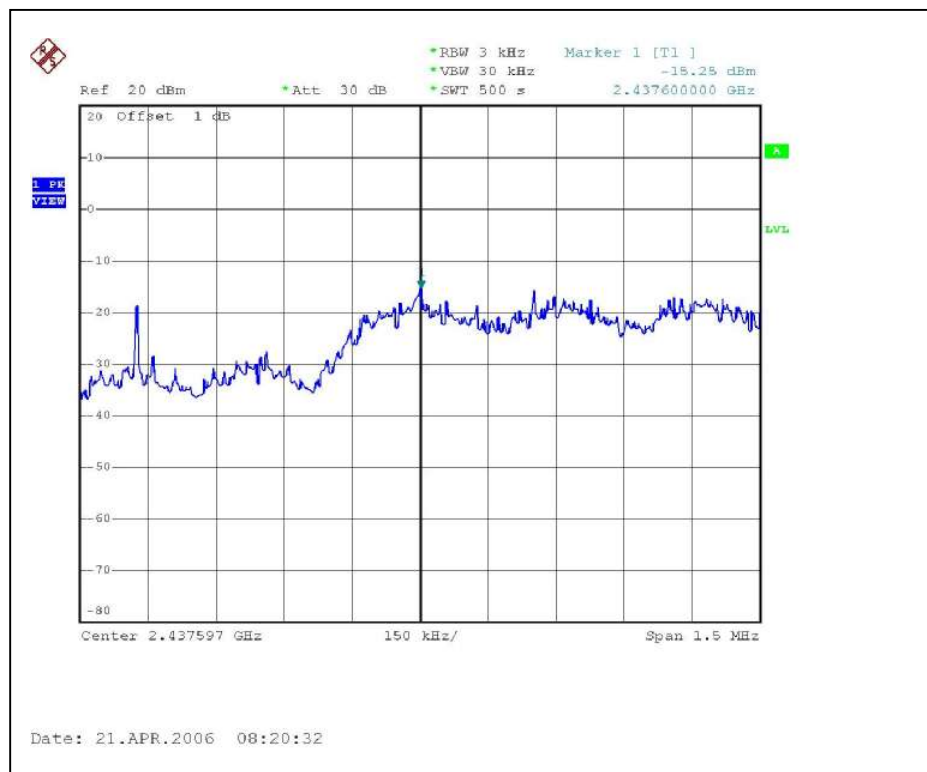
MODULATION TYPE	BPSK	TRANSFER RATE	13.5Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	27deg.C, 60%RH, 971hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2422	-15.00	-14.56	8	PASS
4	2437	-15.25	-14.77	8	PASS
7	2452	-14.97	-15.70	8	PASS

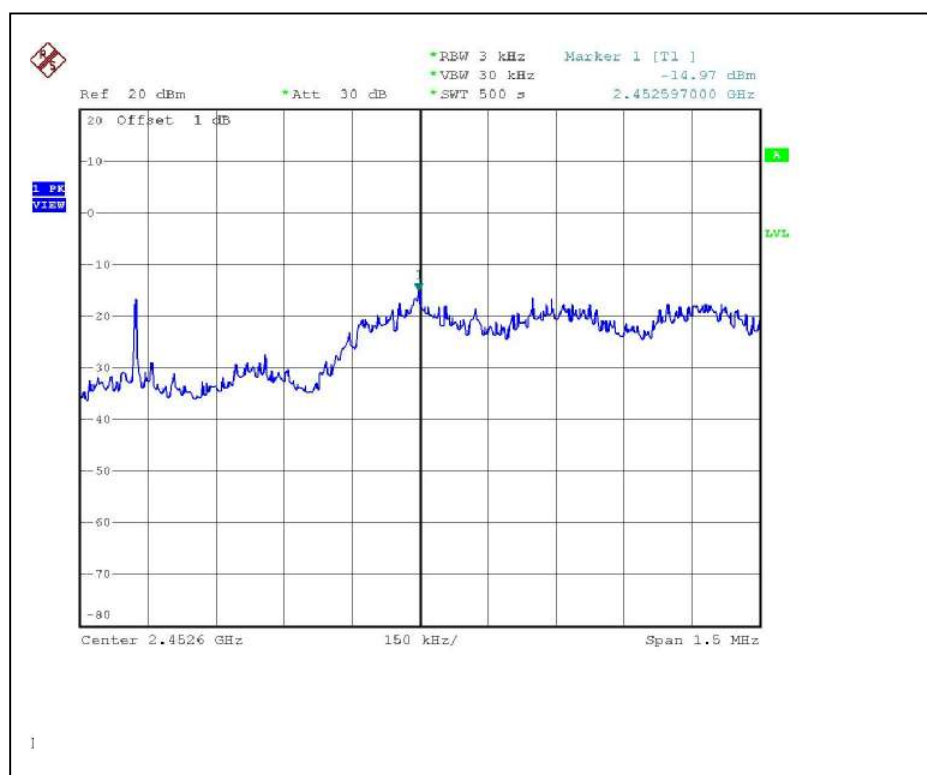
FOR CHAIN 0: CH1



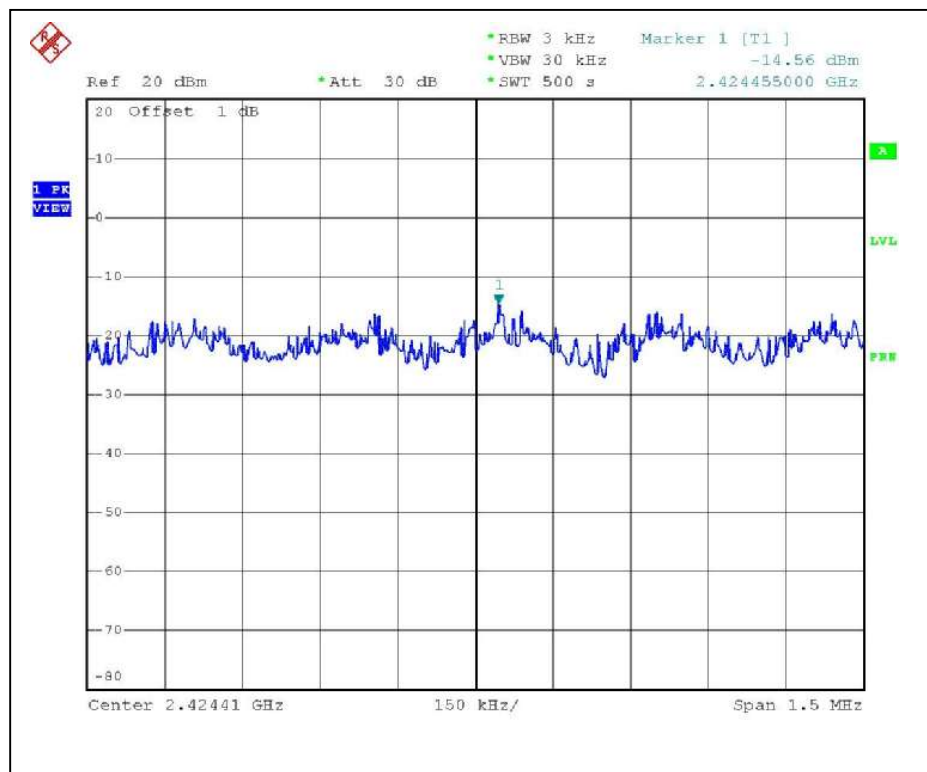
CH4



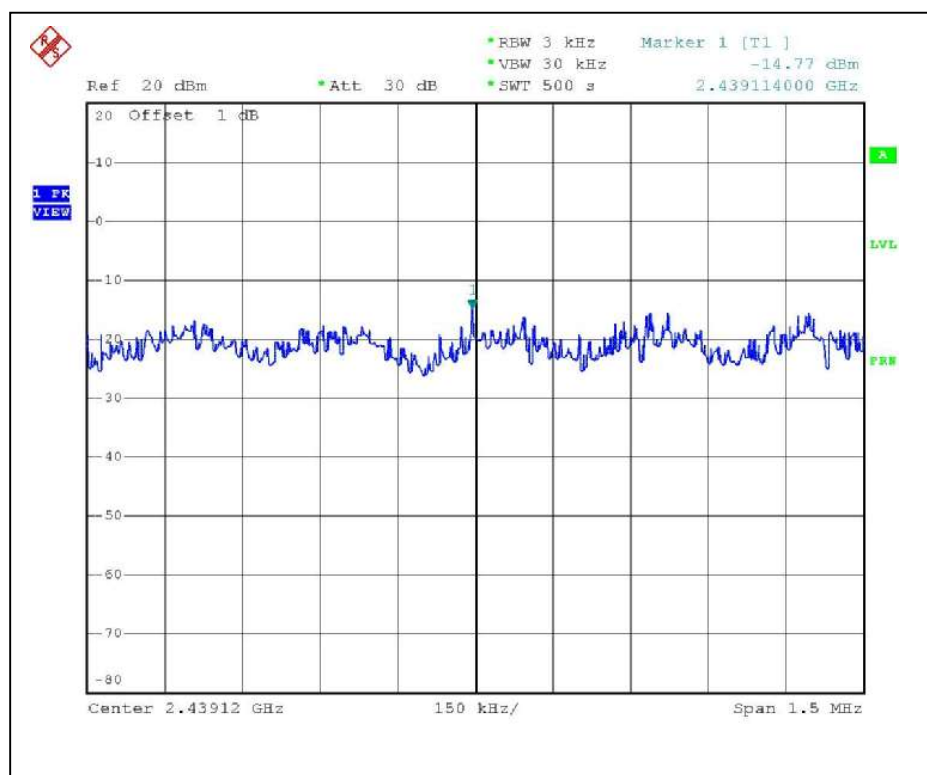
CH7



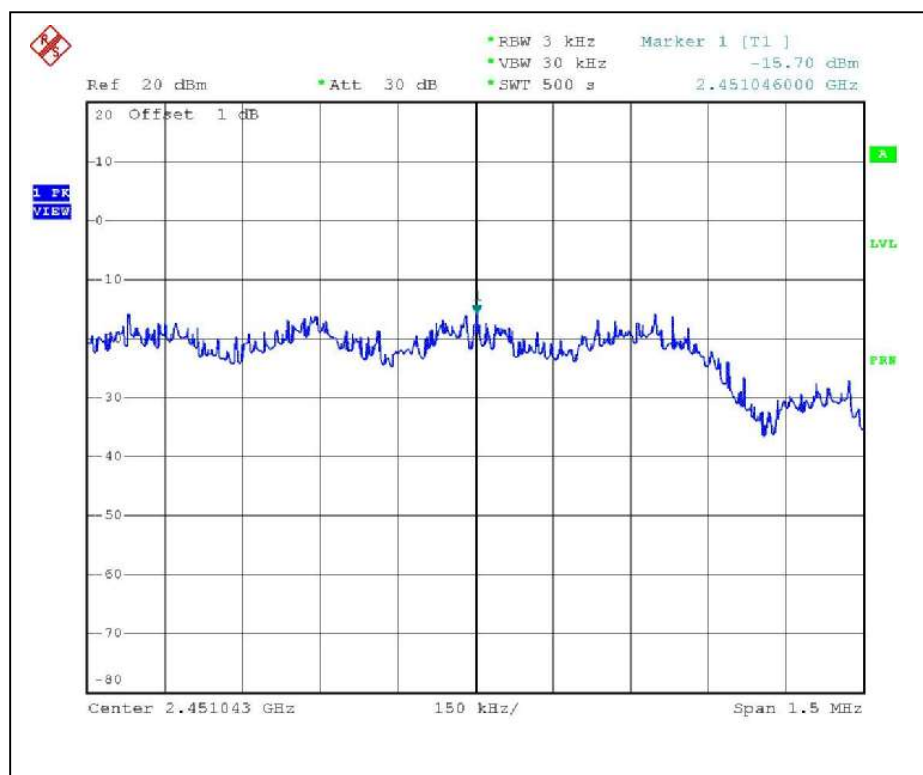
FOR CHAIN 1: CH1



CH4



CH7

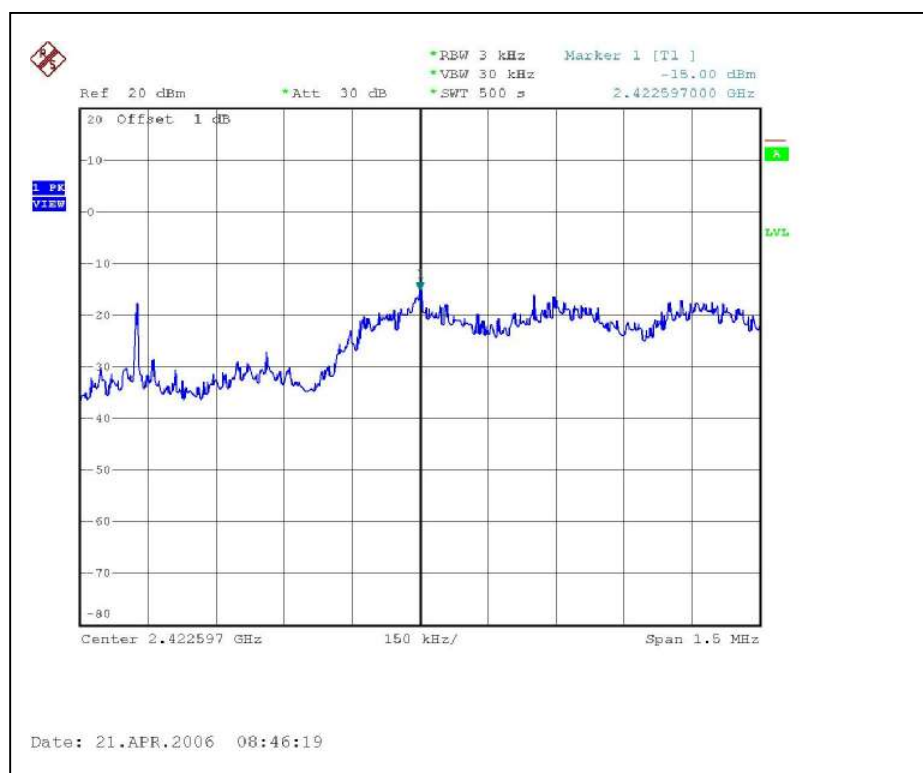


DRAFT 802.11n (40MHz) OFDM MODULATION: DUAL TX: (ANTENNA 1 AND 2)

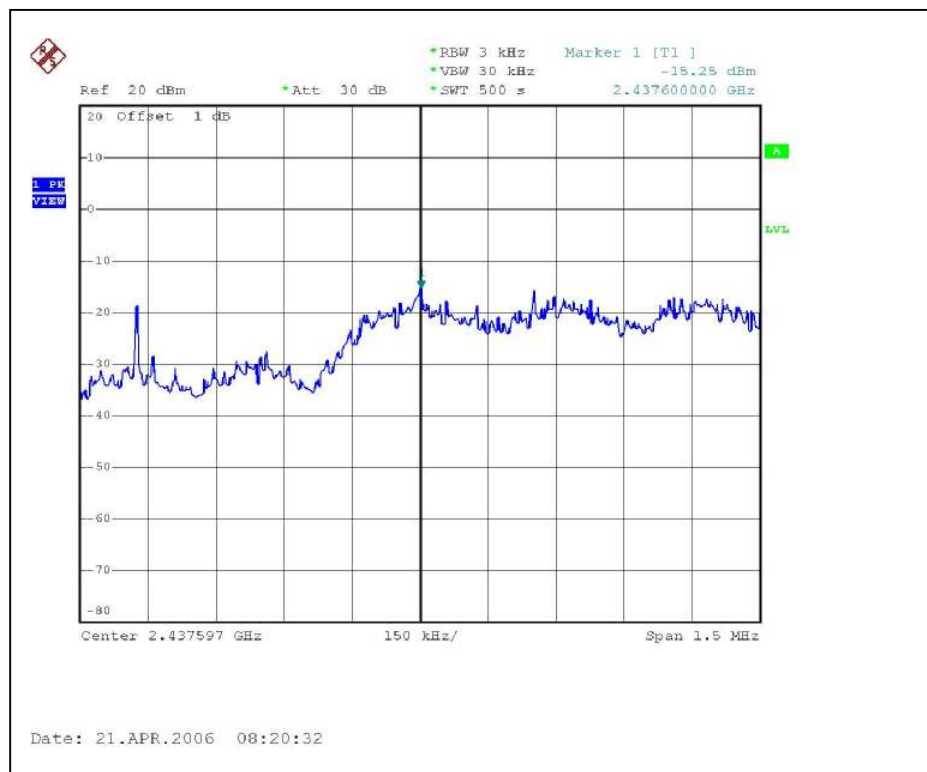
MODULATION TYPE	BPSK	TRANSFER RATE	13.5Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	27deg.C, 60%RH, 971hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2422	-15.00	-15.24	8	PASS
4	2437	-15.25	-15.20	8	PASS
7	2452	-14.97	-15.07	8	PASS

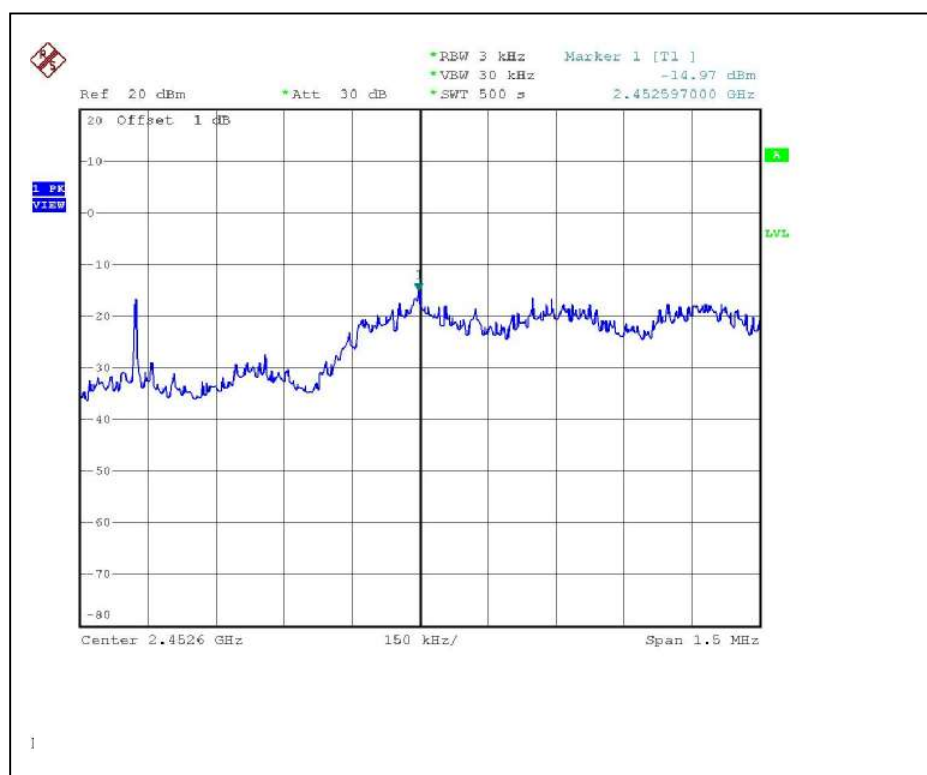
FOR CHAIN 0: CH1



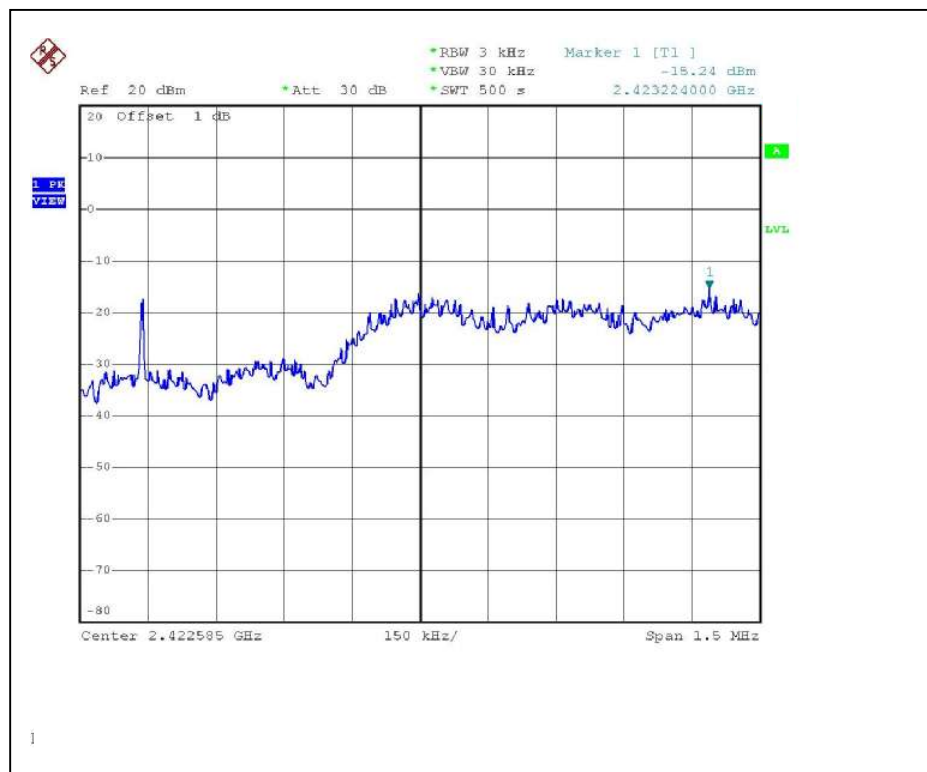
CH4



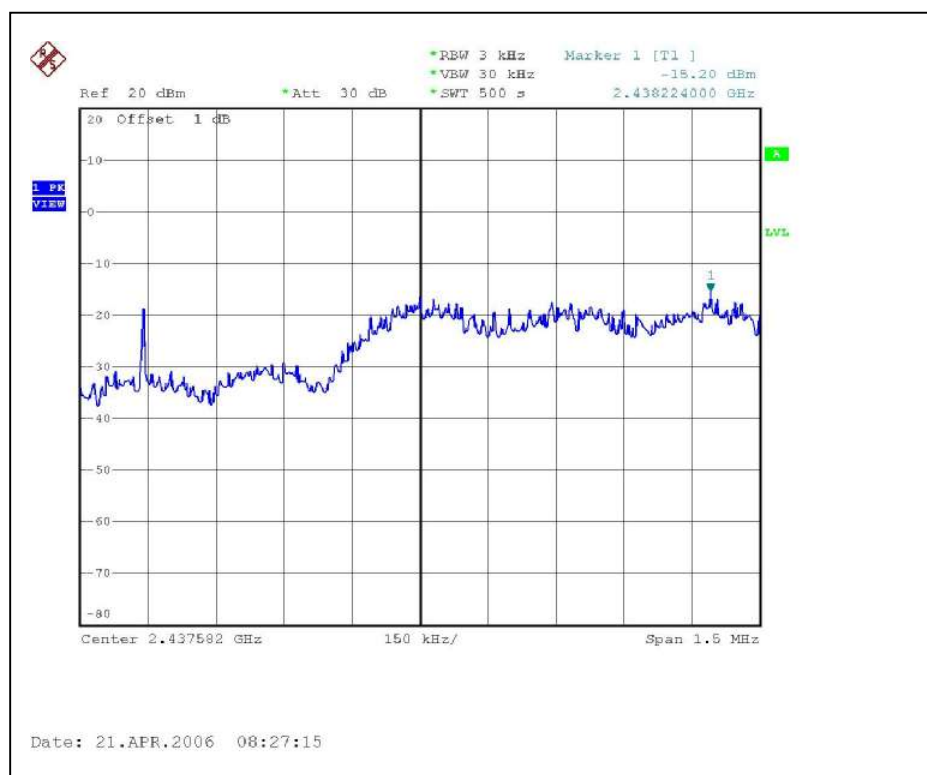
CH7



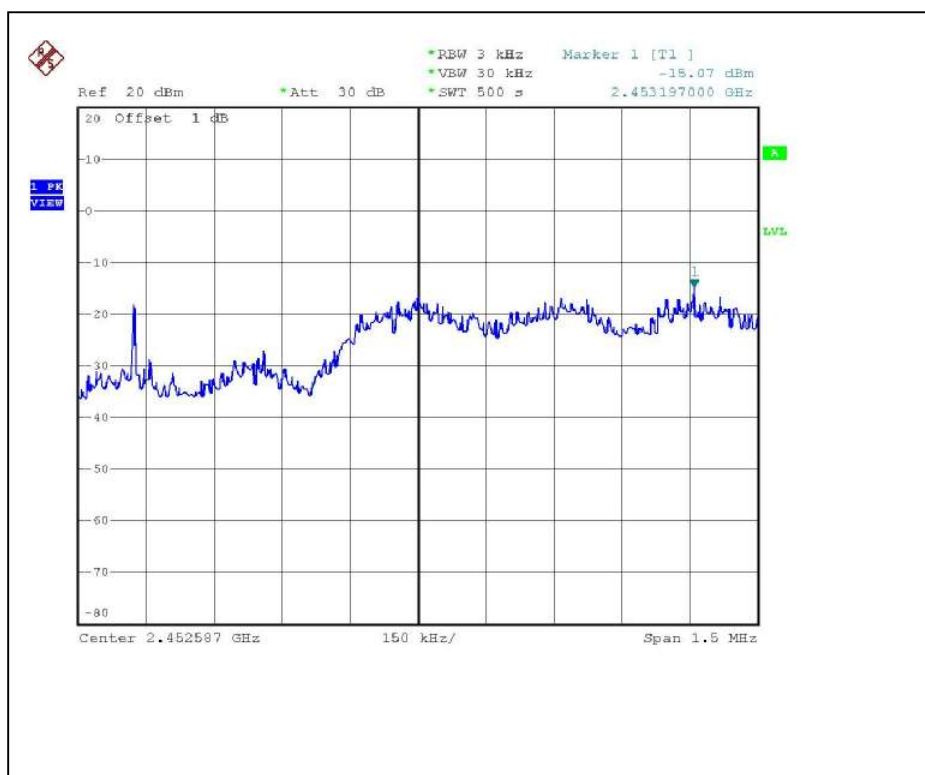
FOR CHAIN 1: CH1



CH4



CH7



4.6 CONDUCTED EMISSION AND BAND EDGES MEASUREMENT

4.6.1 LIMITS OF CONDUCTED EMISSION AND BAND EDGES MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Nov. 23, 2006

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.

4.6.3 TEST PROCEDURE

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

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

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 EUT OPERATING CONDITION

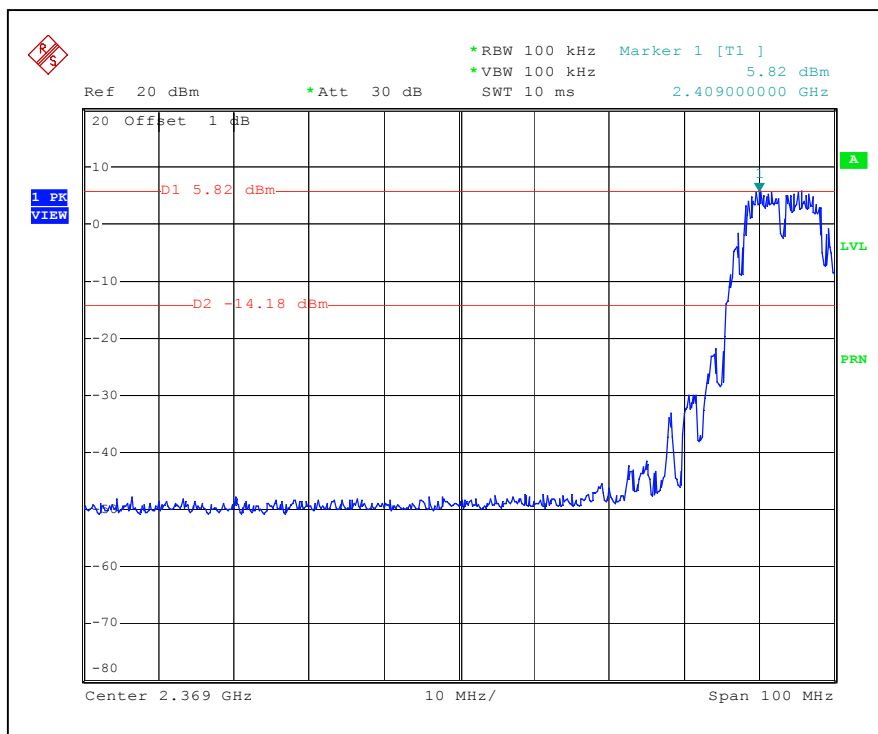
Same as Item 4.3.6

4.6.6 TEST RESULTS

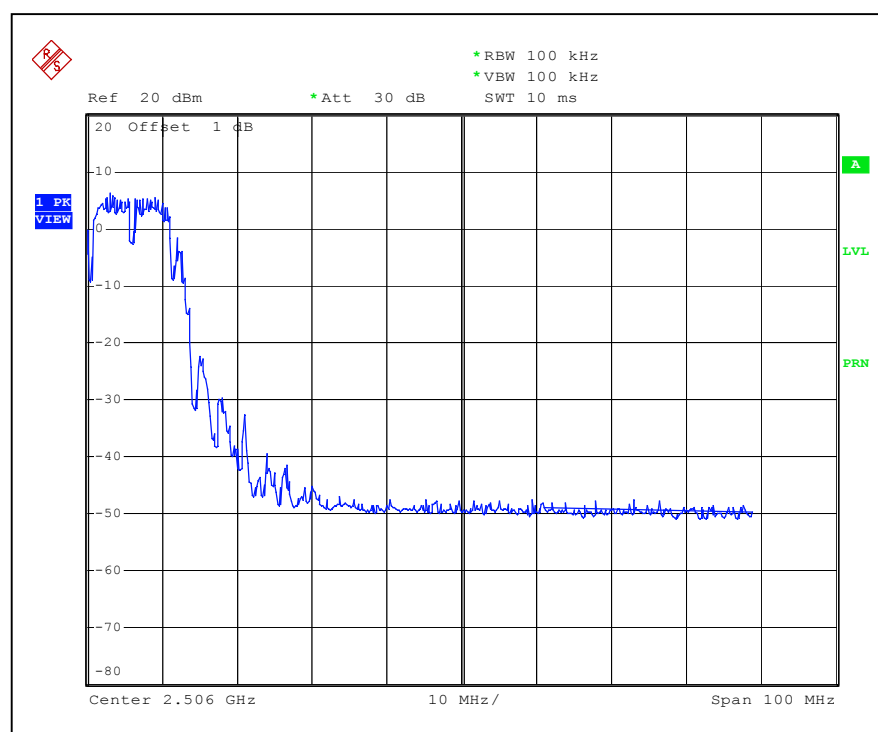
The spectrum plots are attached on the following 12 images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

802.11b DSSS MODULATION:

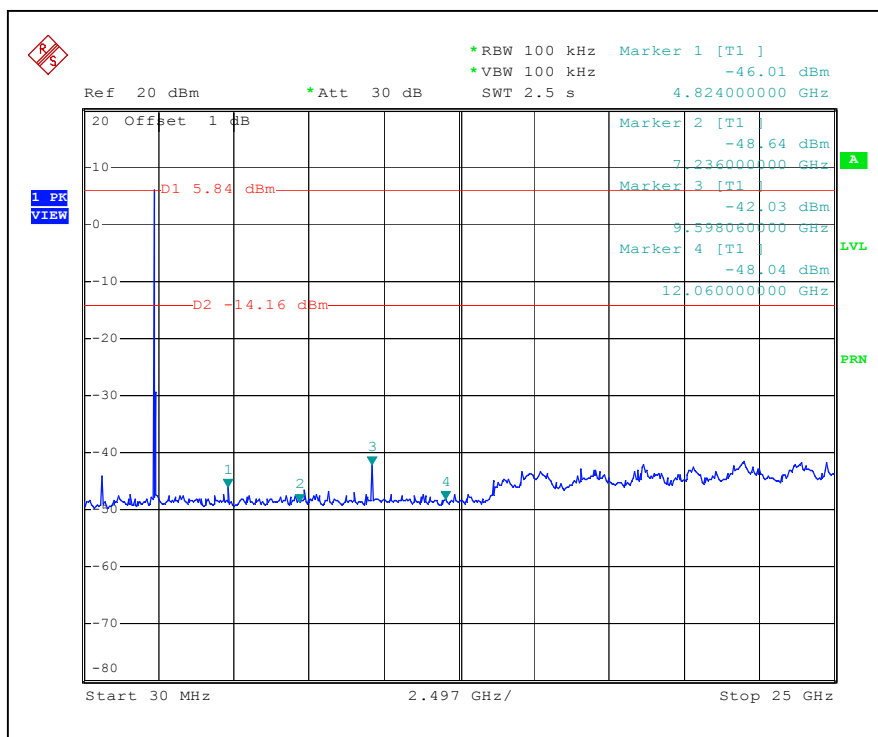
CH1



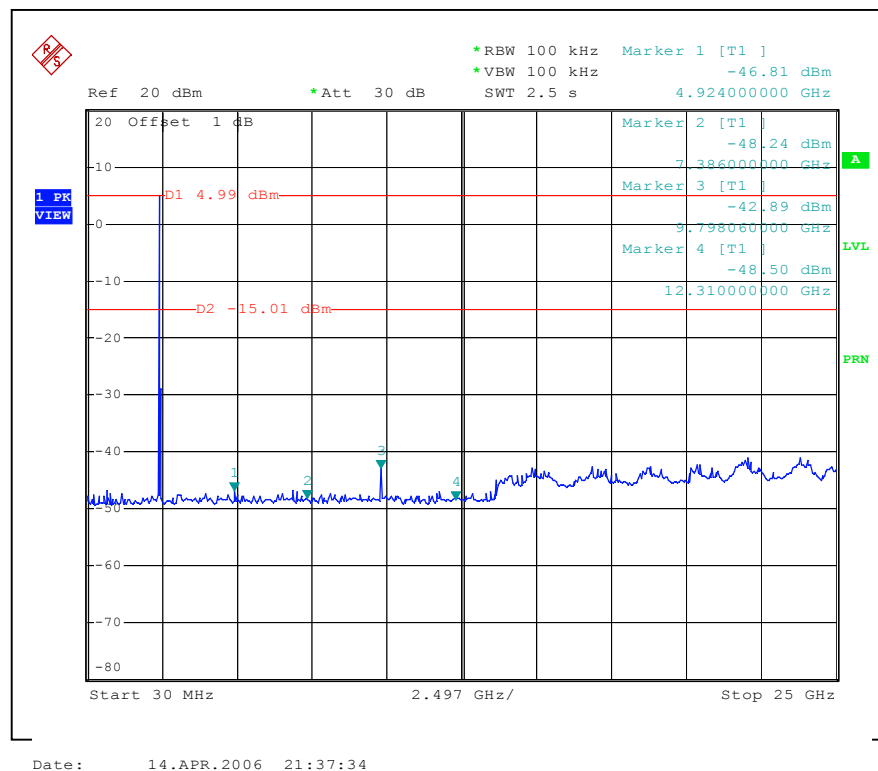
CH11 Date: 14.APR.2006 21:25:48



CH1

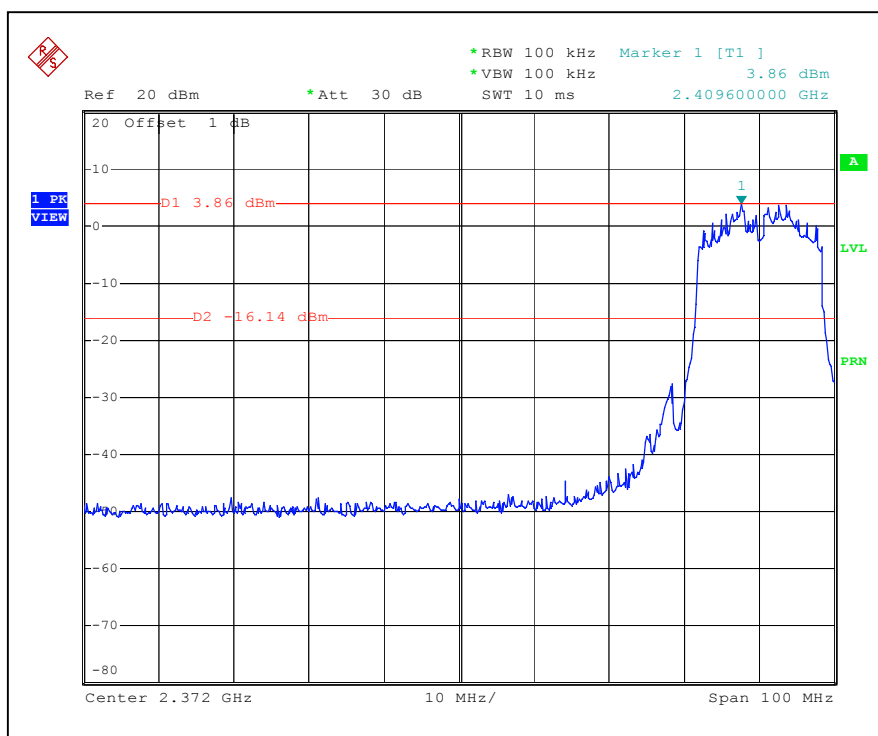


CH11 Date: 14.APR.2006 21:24:06

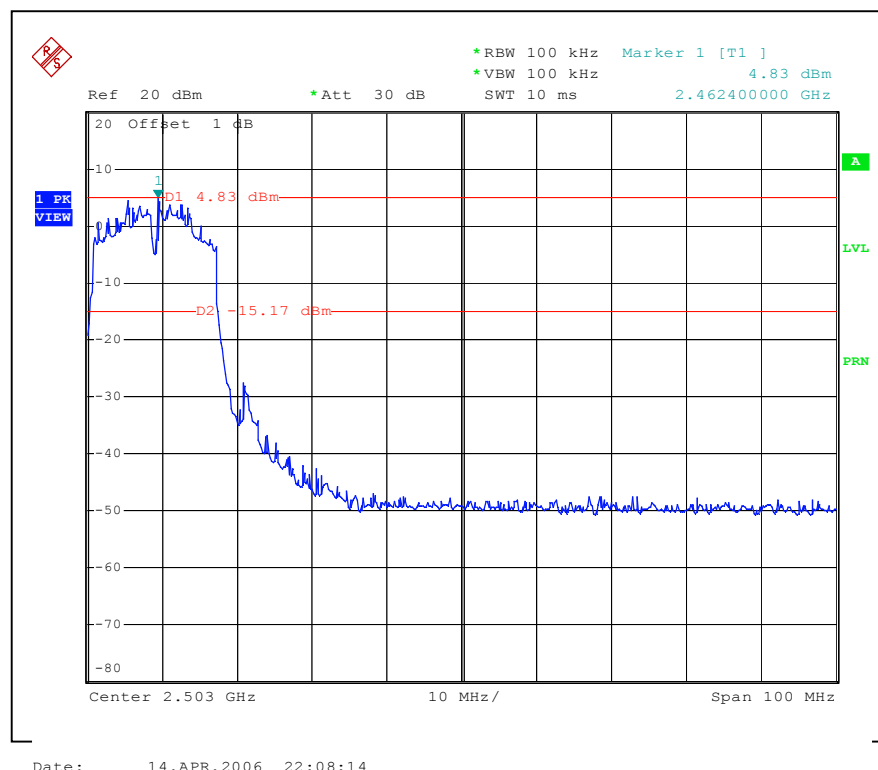


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802.11g OFDM MODULATION: CH1

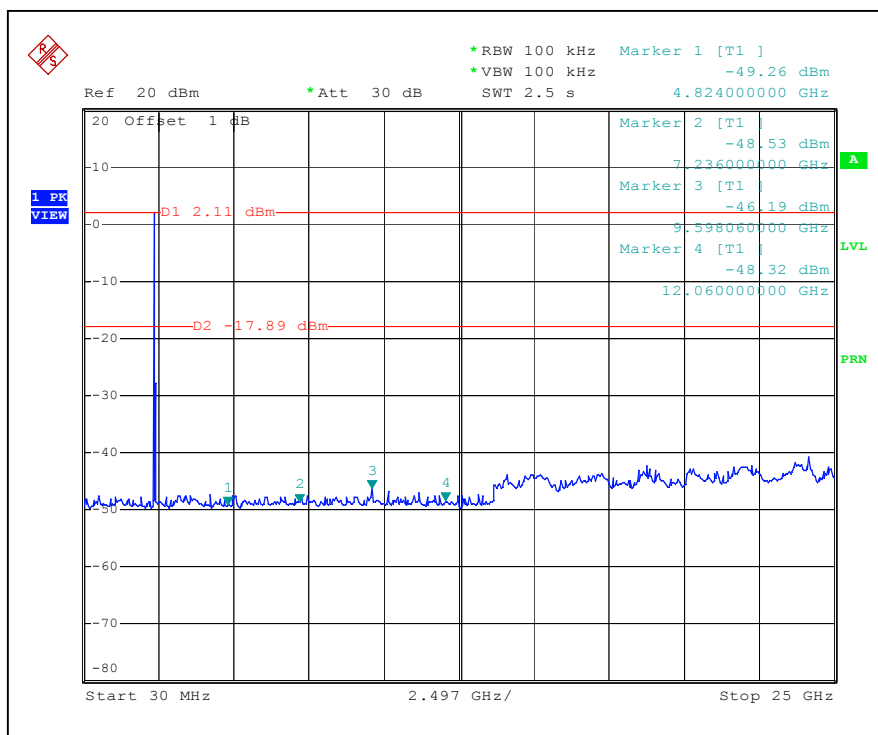


CH11 Date: 14.APR.2006 21:59:54

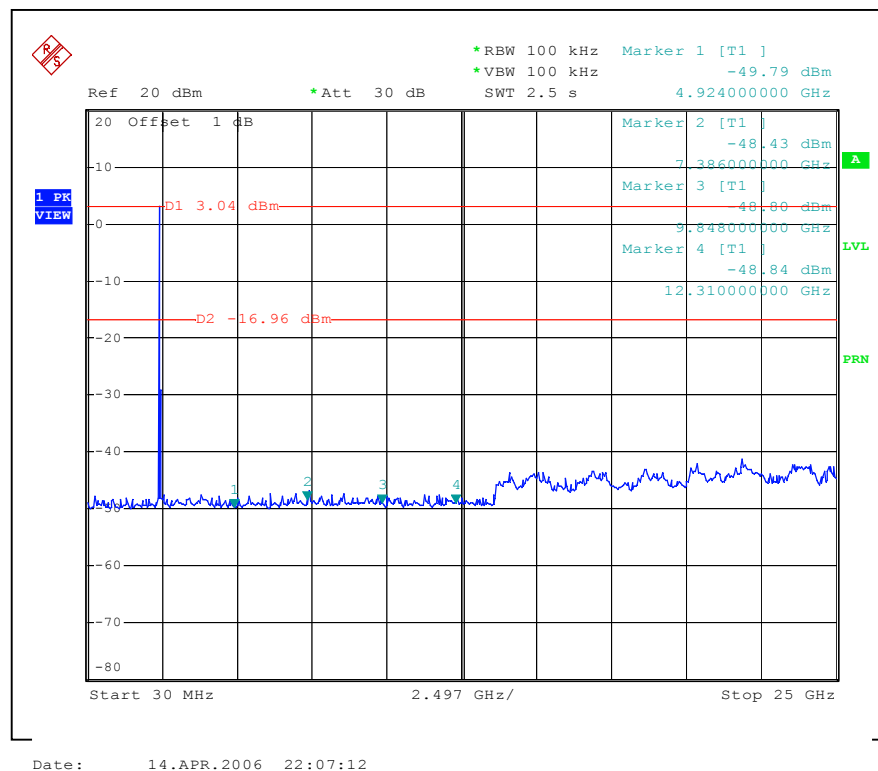


Date: 14.APR.2006 22:08:14

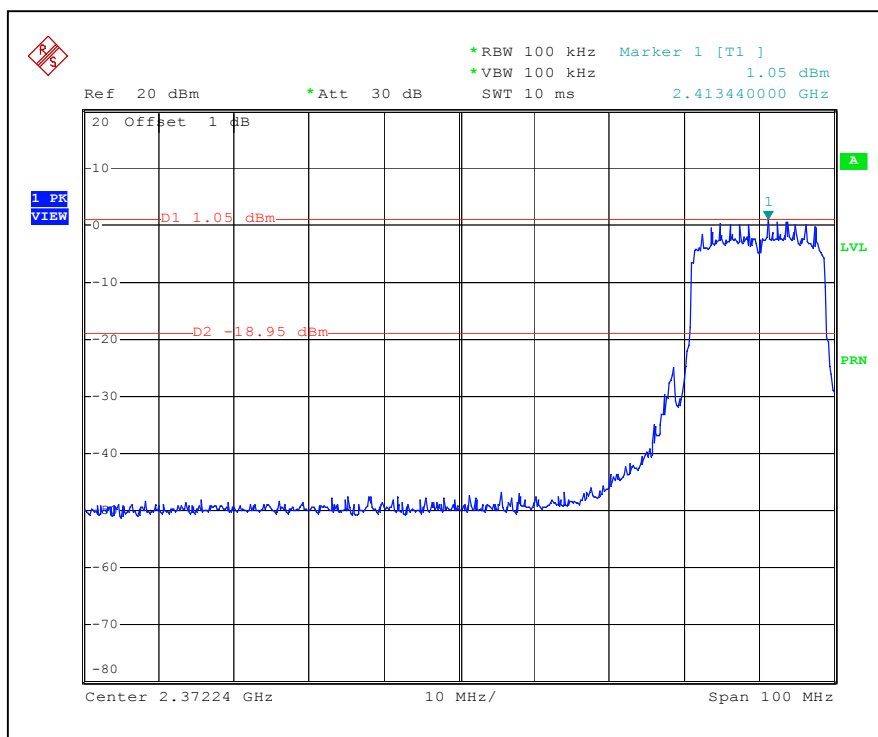
CH1



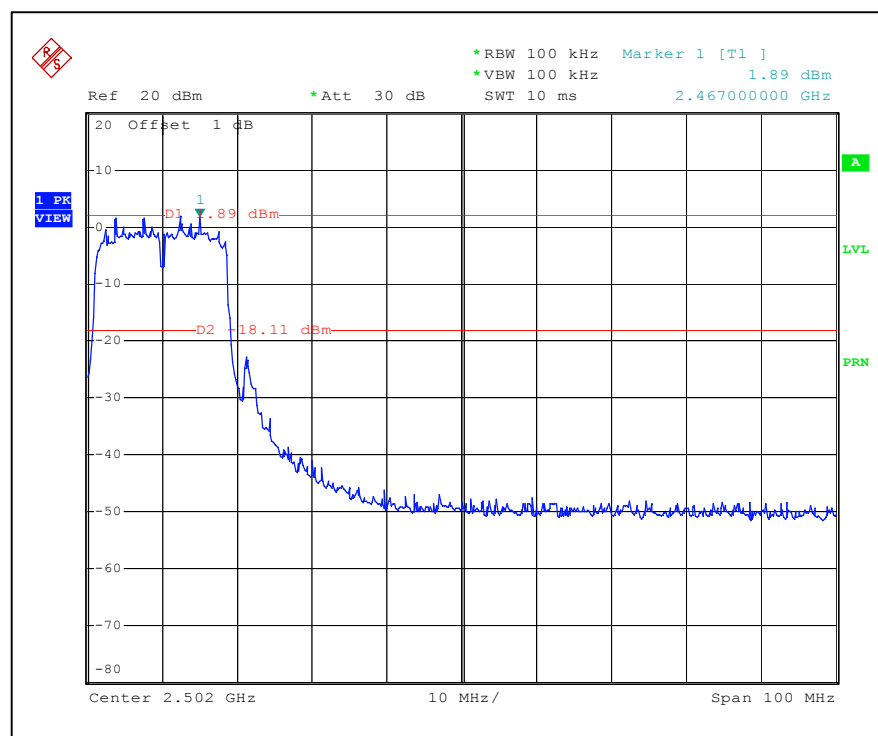
CH11 Date: 14.APR.2006 22:03:36



DRAFT 802.11n (20MHz) OFDM MODULATION: DUAL TX: (ANTENNA 1 AND 3) **FOR CHAIN 0:CH1**

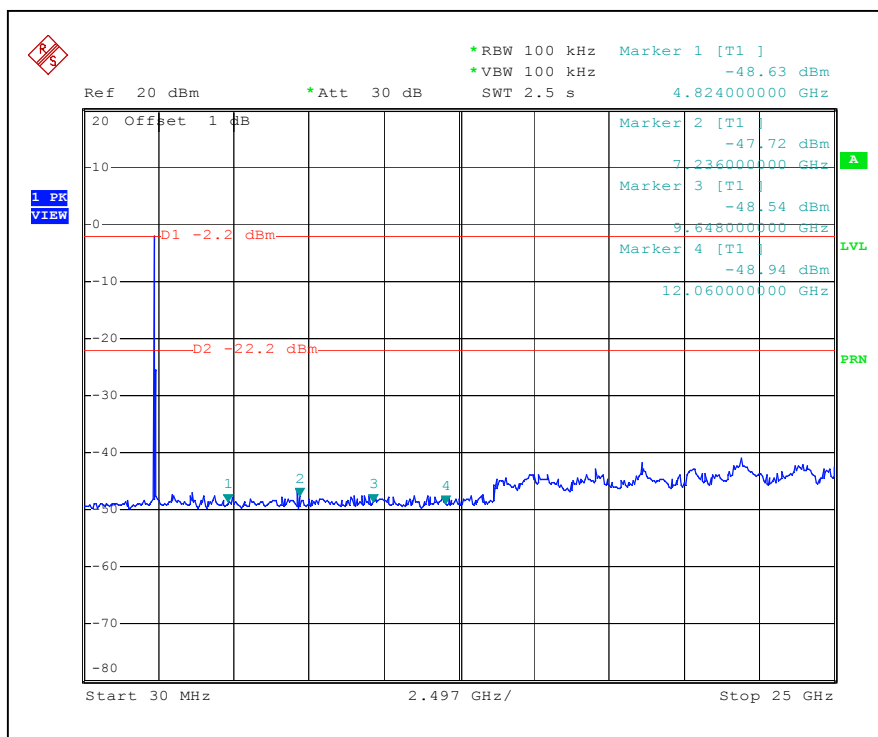


CH11 Date: 14.APR.2006 23:54:41

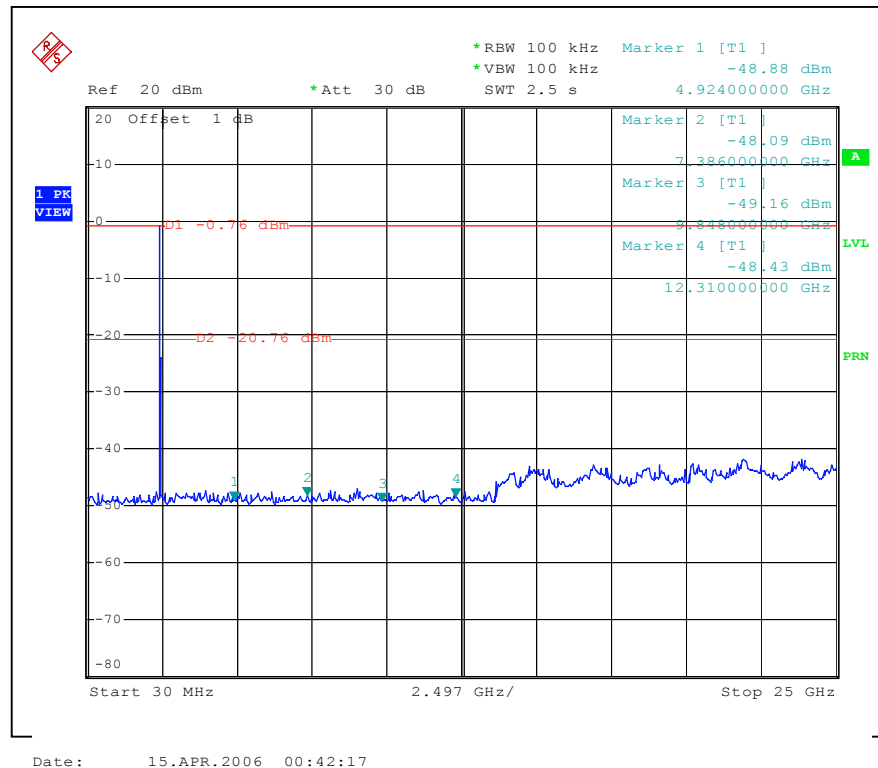


Date: 15.APR.2006 00:43:19

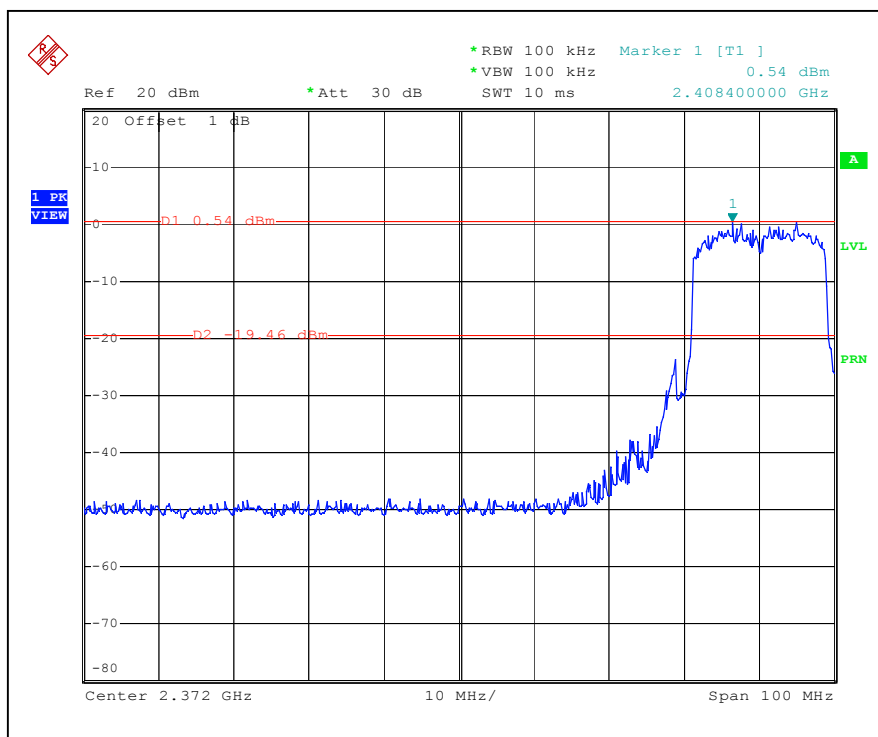
CH1



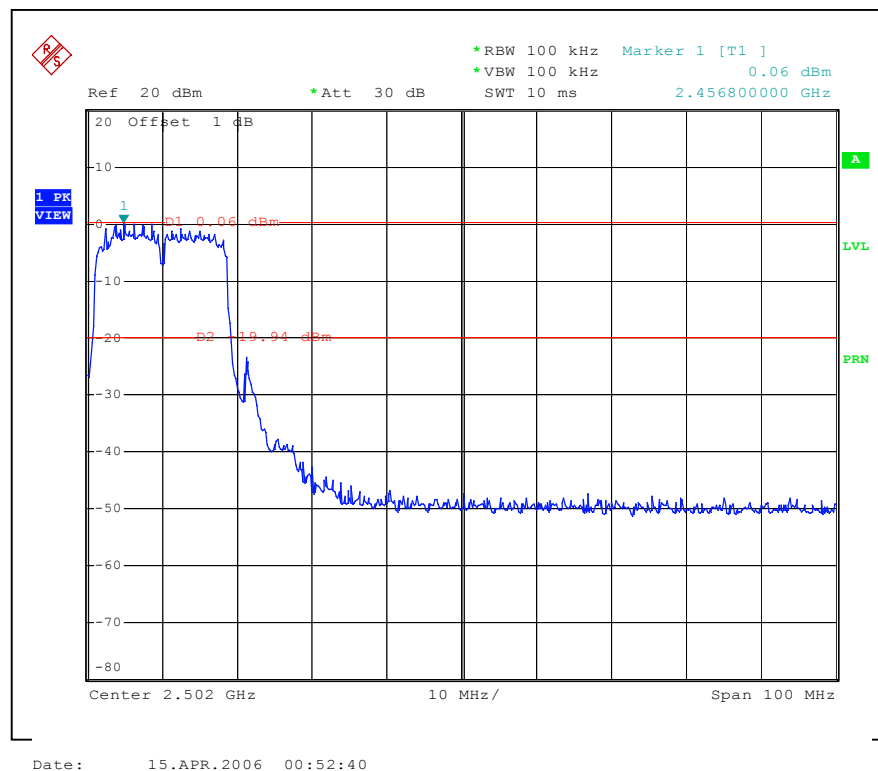
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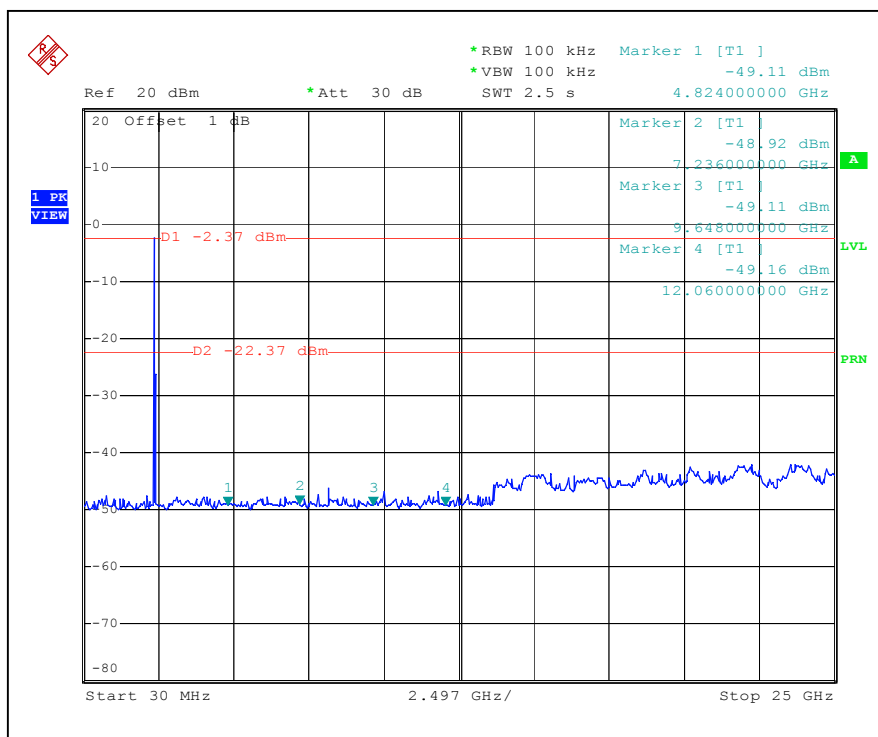
FOR CHAIN 1:CH1



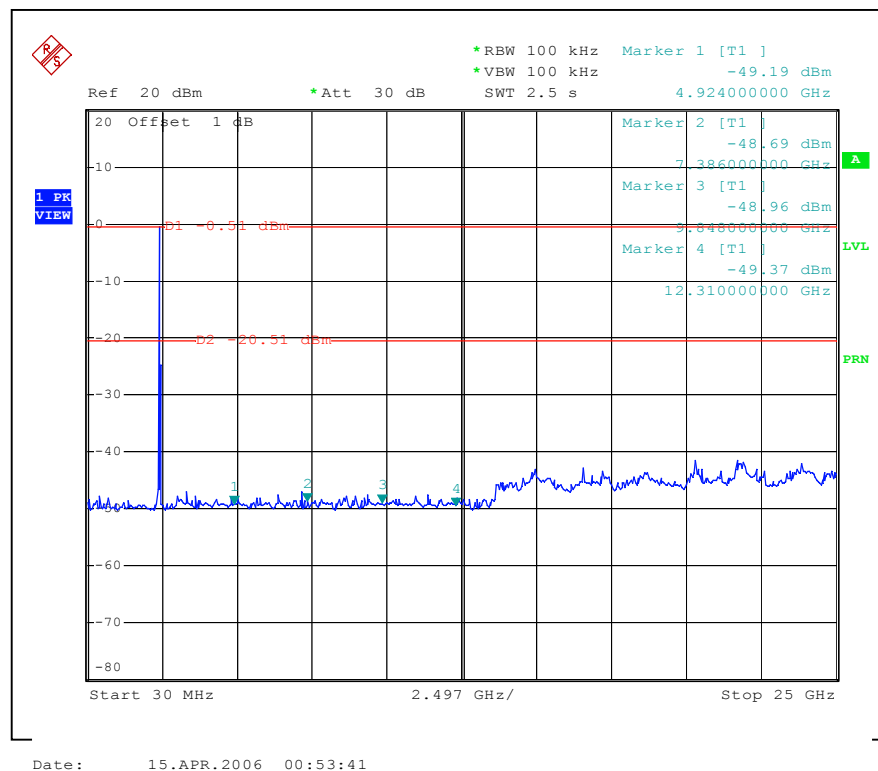
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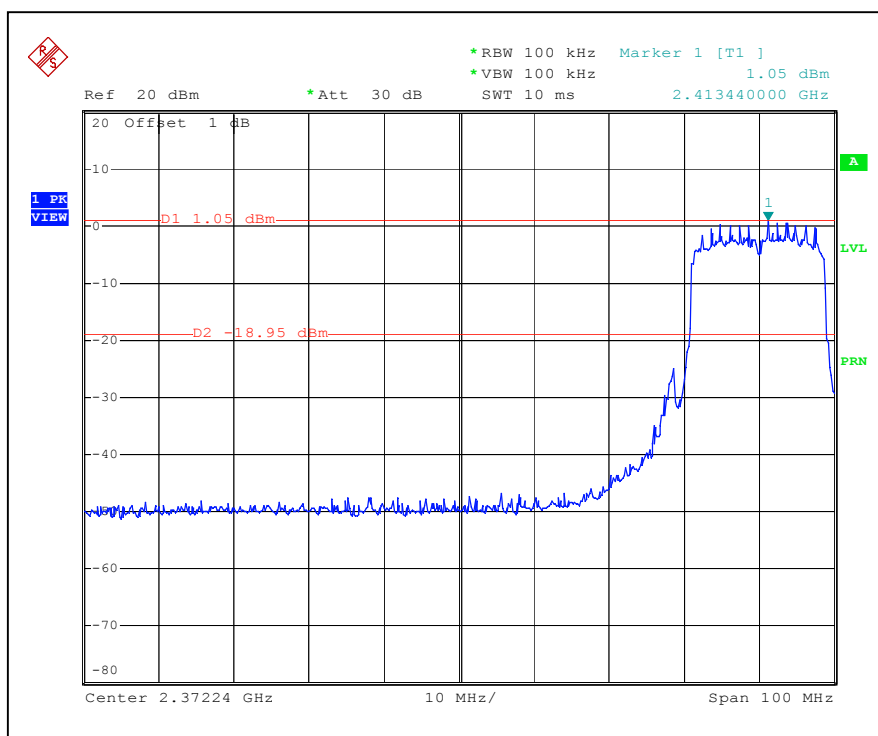
CH1



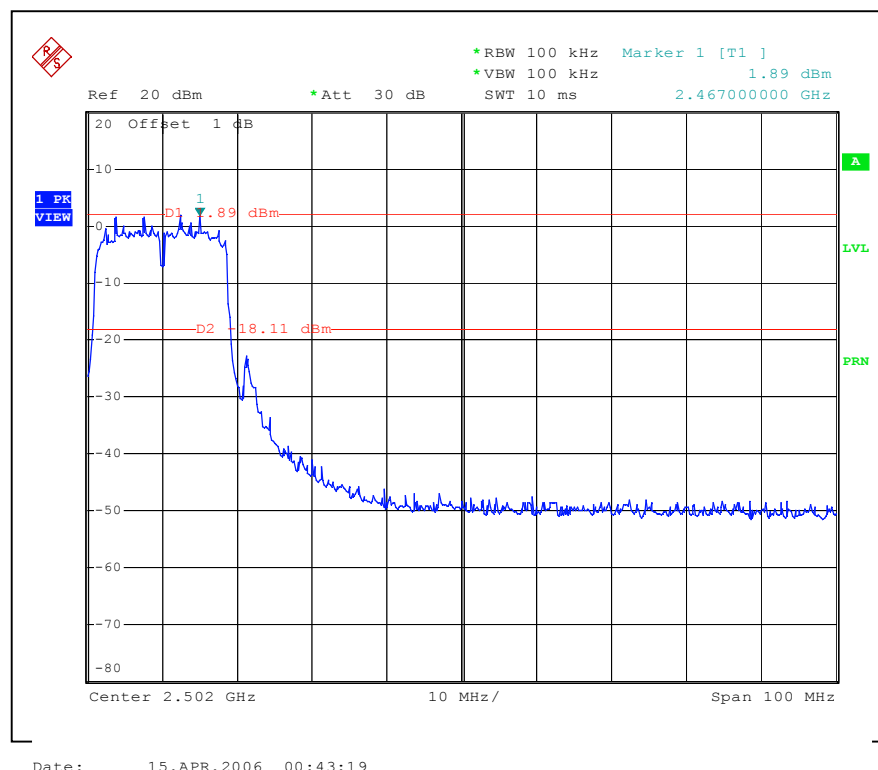
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DRAFT 802.11n (20MHz) OFDM MODULATION: DUAL TX: (ANTENNA 1 AND 2) **FOR CHAIN 0:CH1**

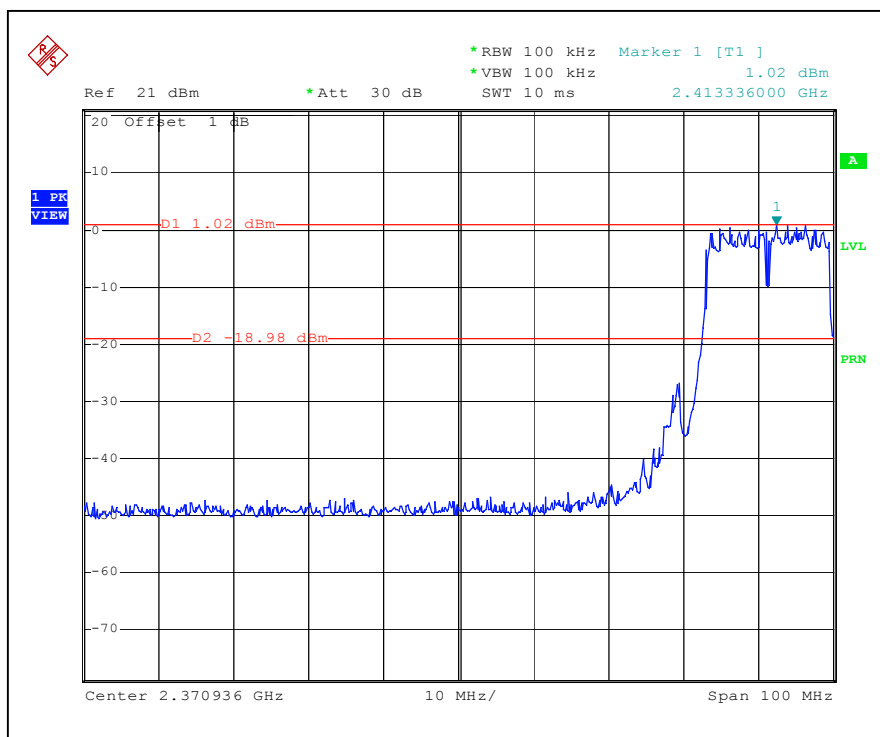


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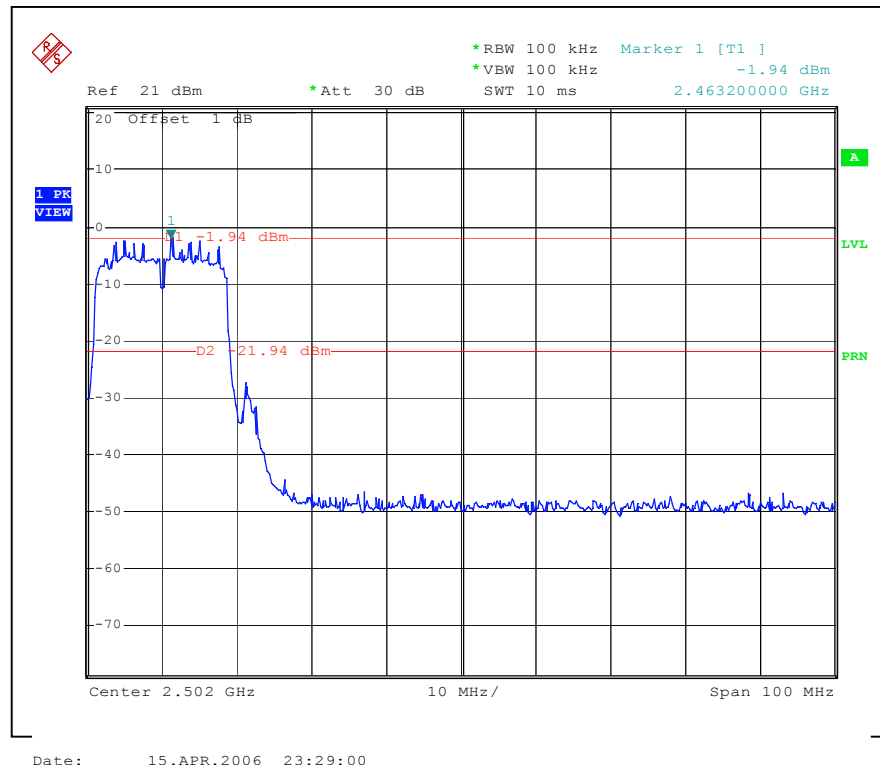


Date: 15.APR.2006 00:43:19

FOR CHAIN 1:CH1

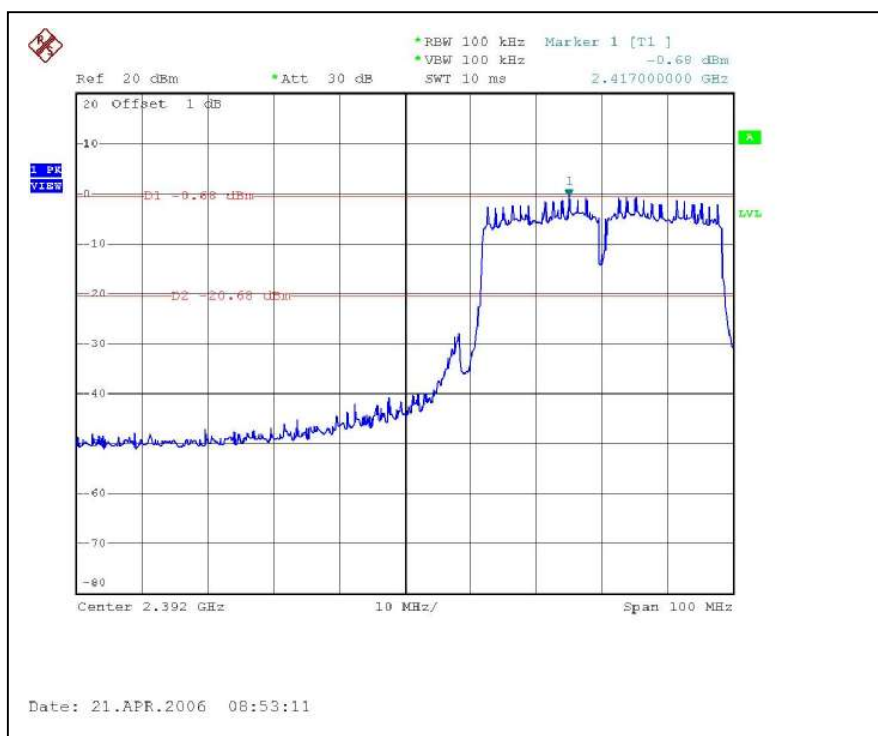


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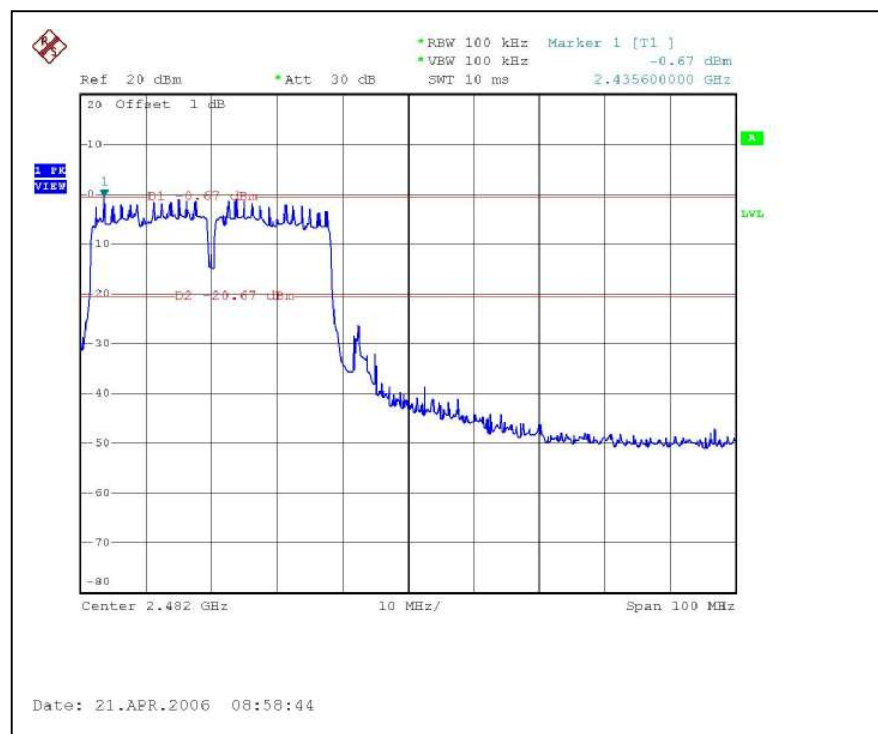


Date: 15.APR.2006 23:29:00

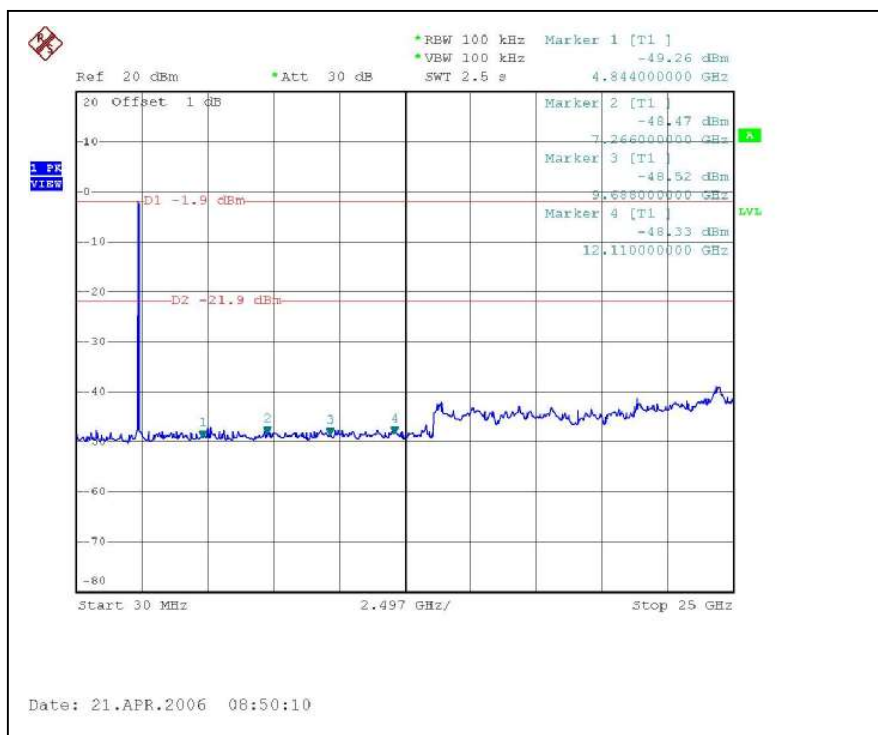
DRAFT 802.11n (40MHz) OFDM MODULATION: DUAL TX: (ANTENNA 1 AND 3) FOR CHAIN 0:CH1



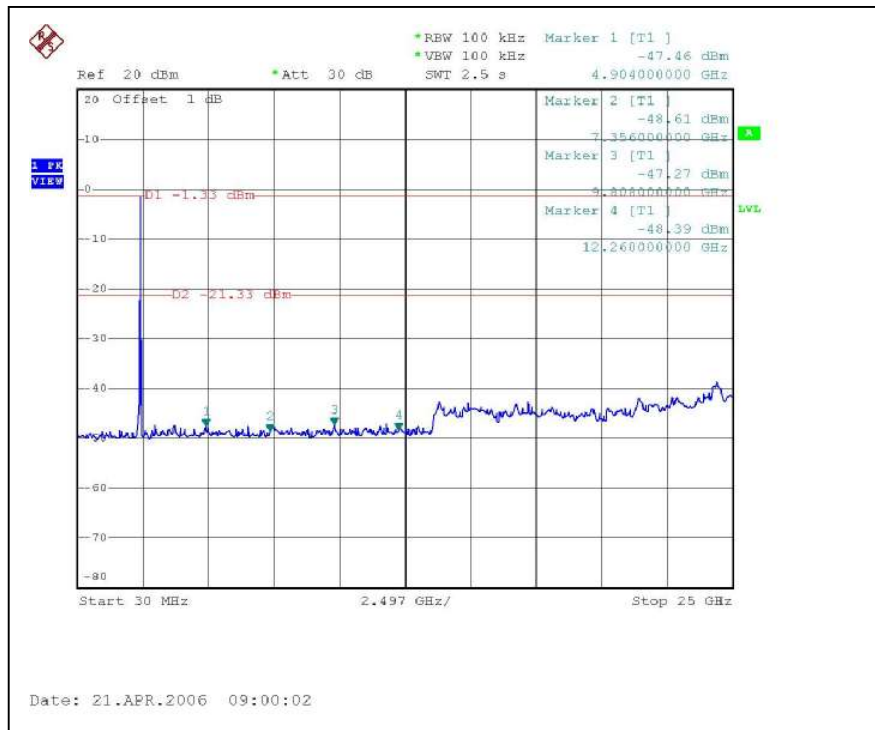
CH7



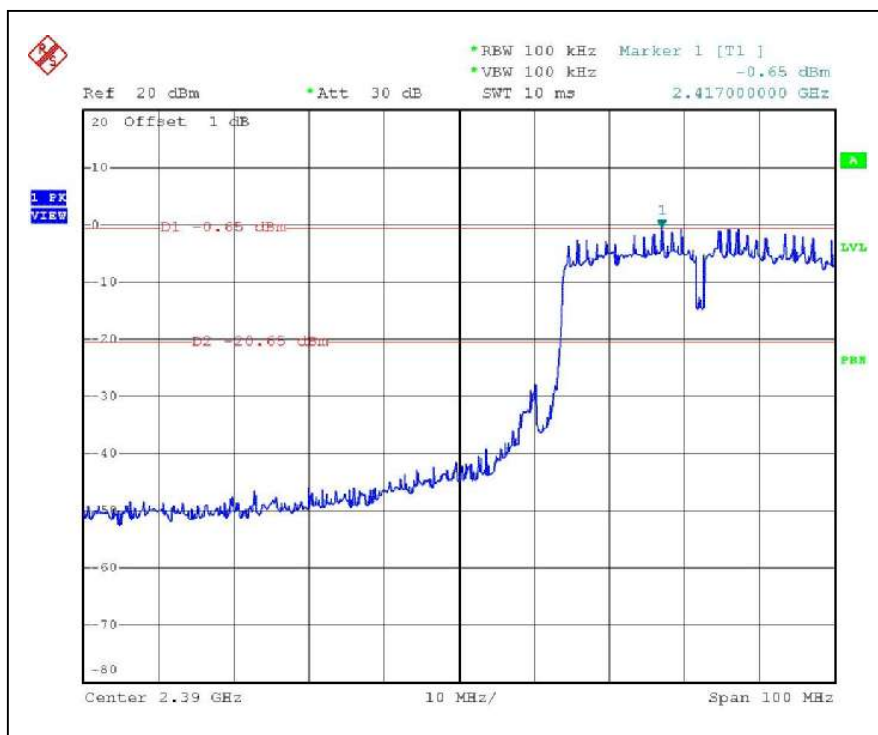
CH1



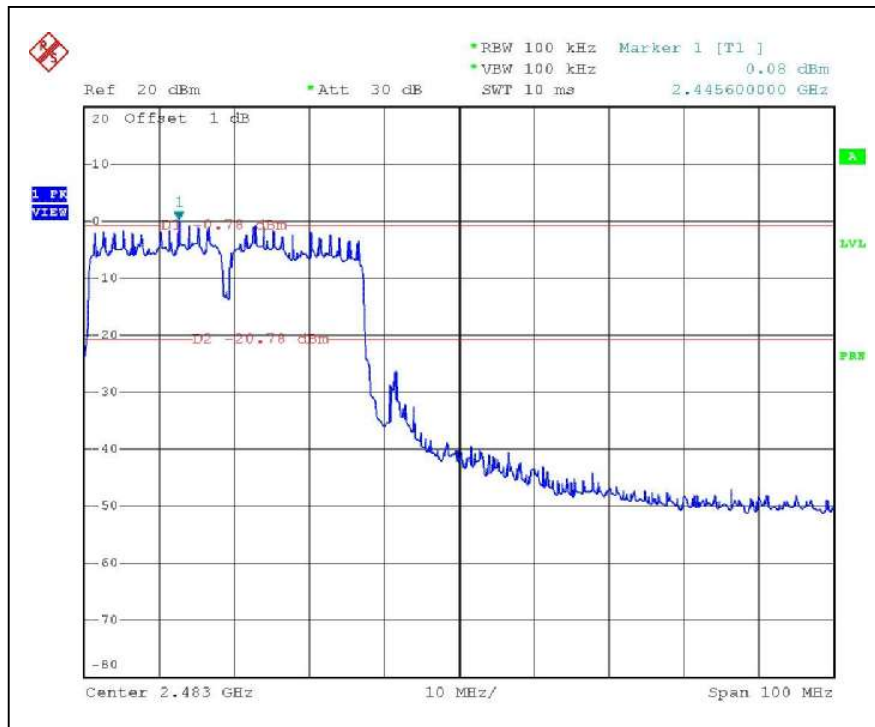
CH7



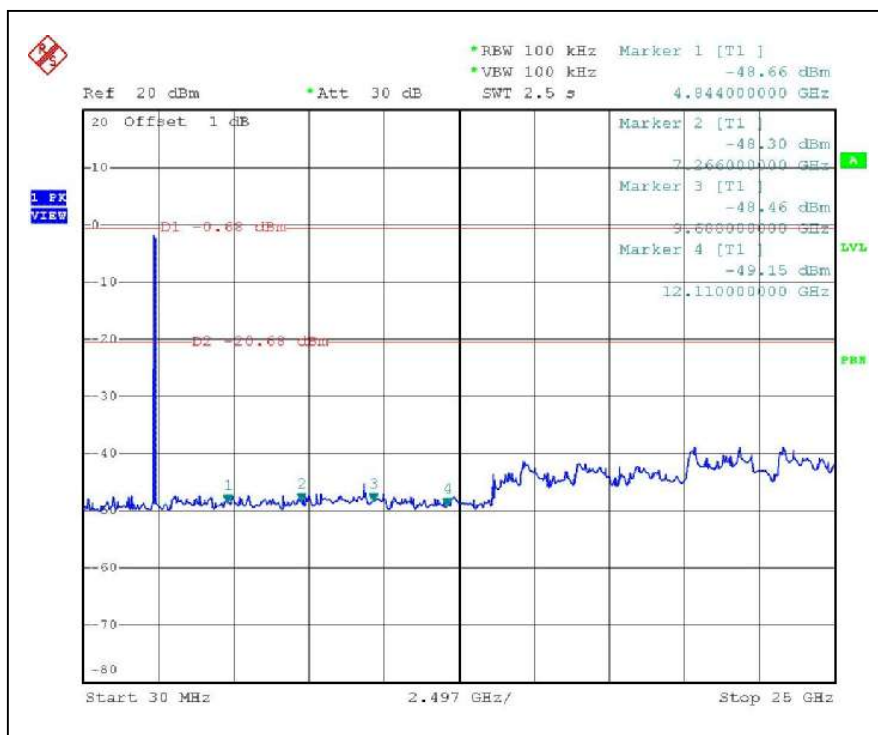
FOR CHAIN 1:CH1



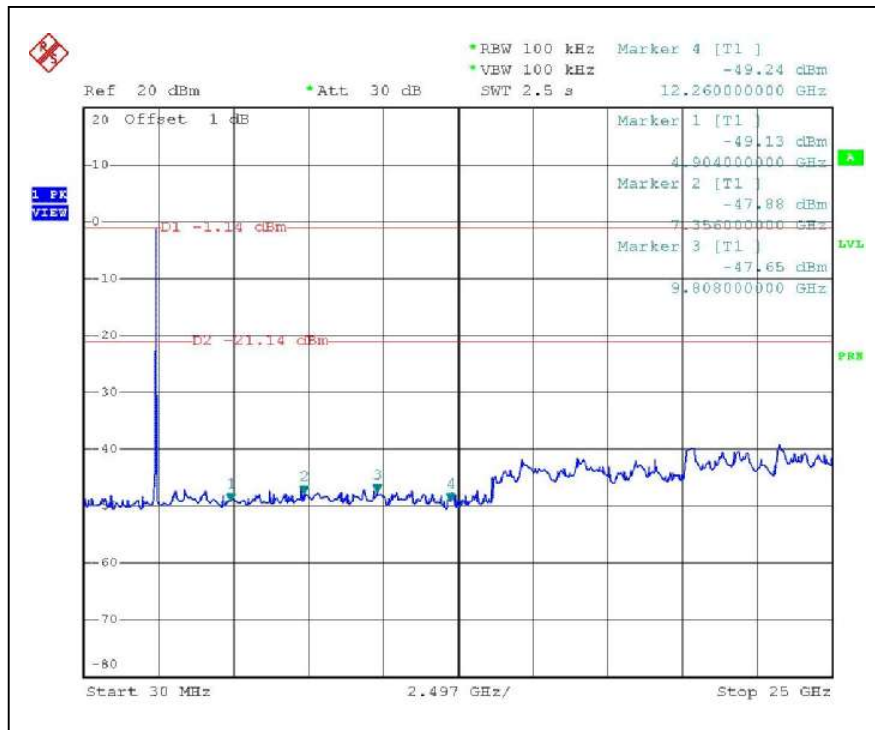
CH7



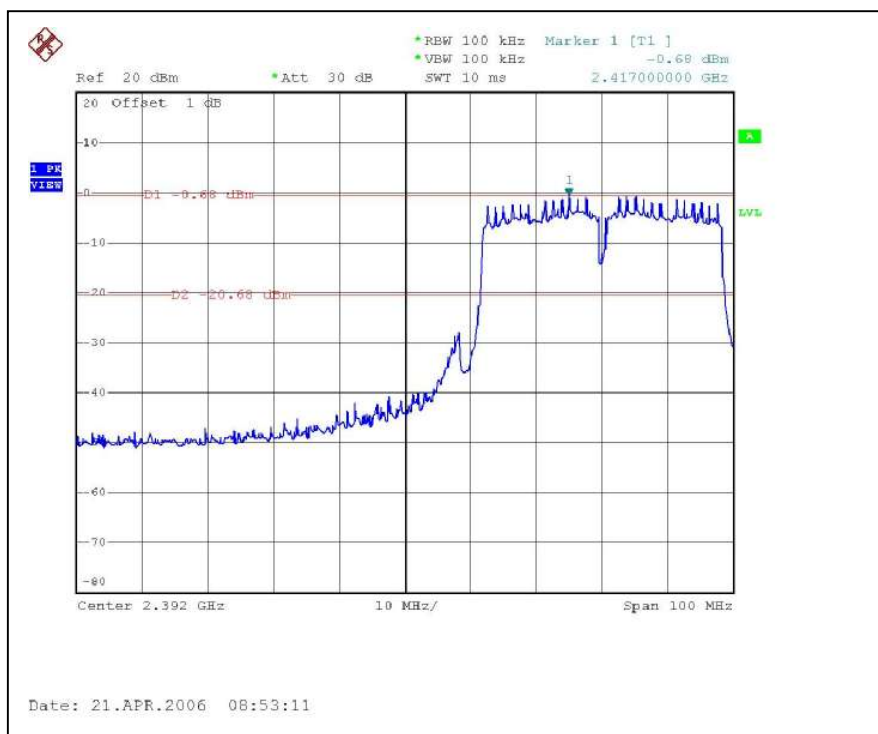
CH1



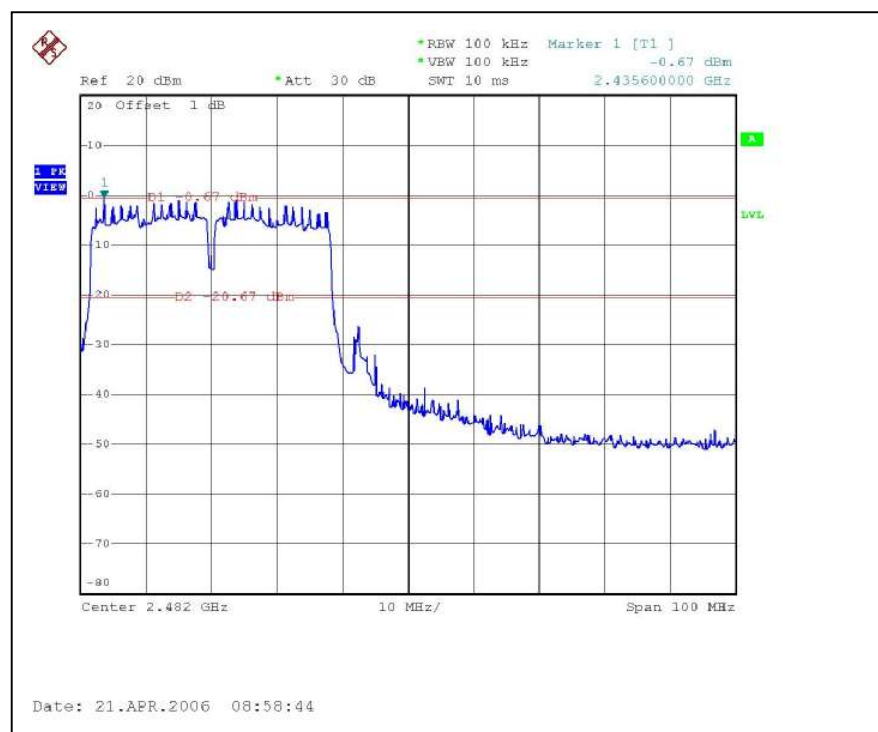
CH7



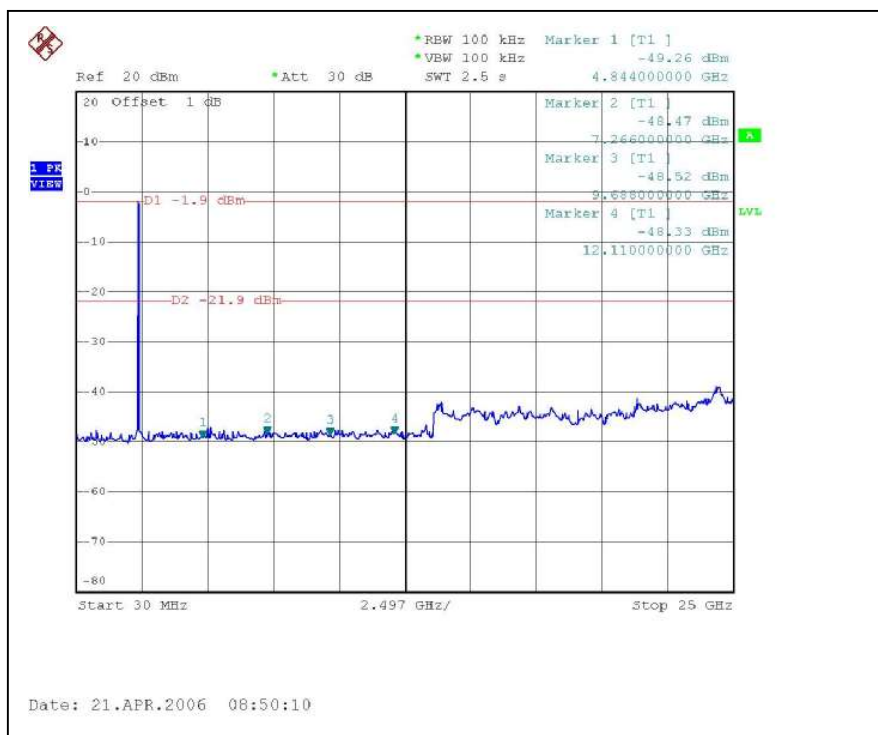
DRAFT 802.11n (40MHz) OFDM MODULATION: DUAL TX: (ANTENNA 1 AND 2) FOR CHAIN 0:CH1



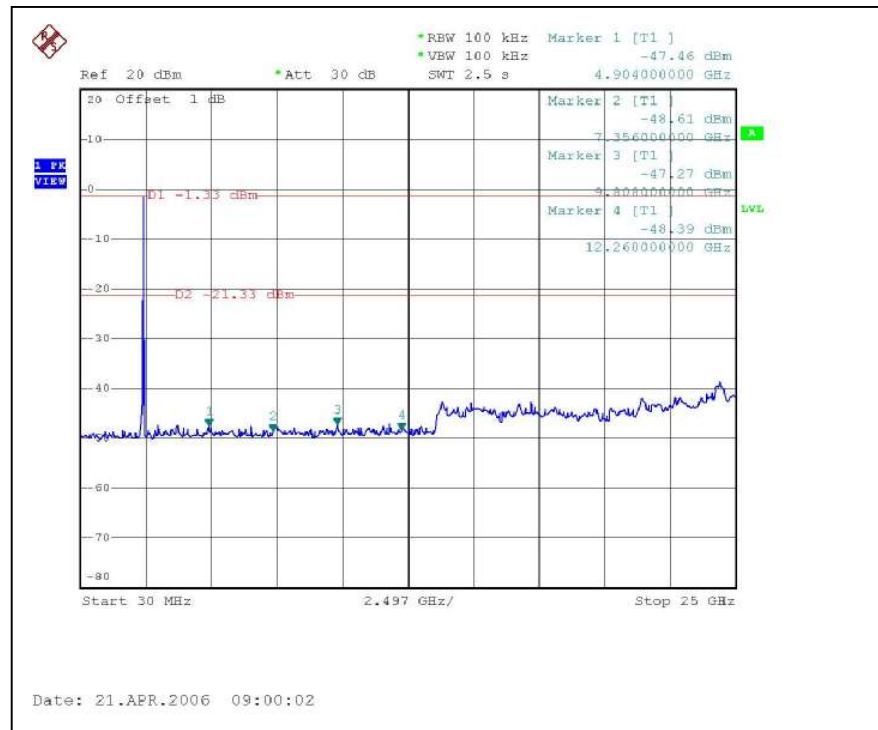
CH7



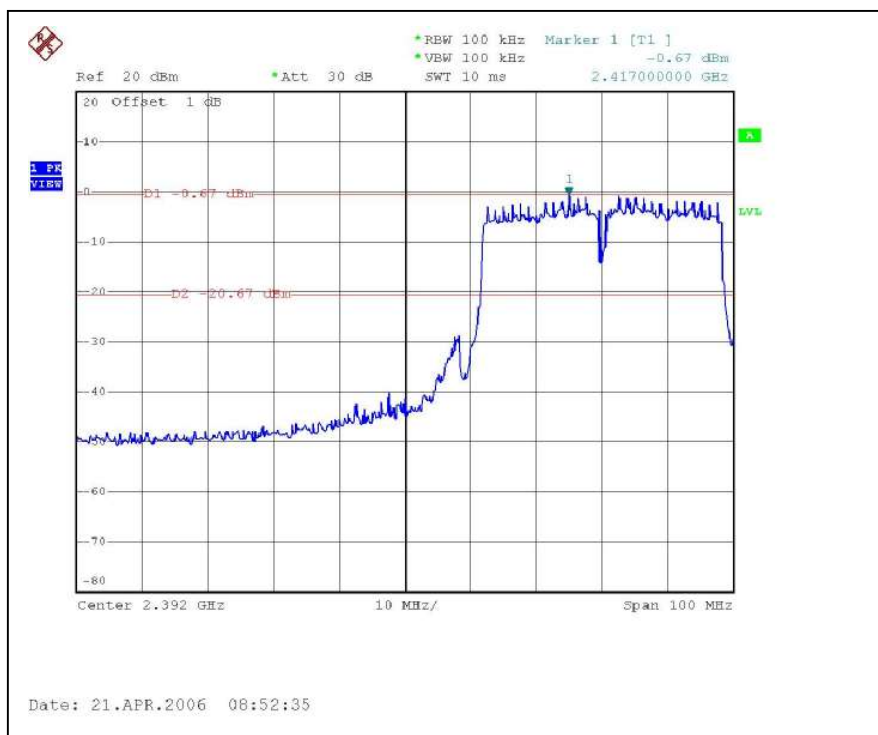
CH1



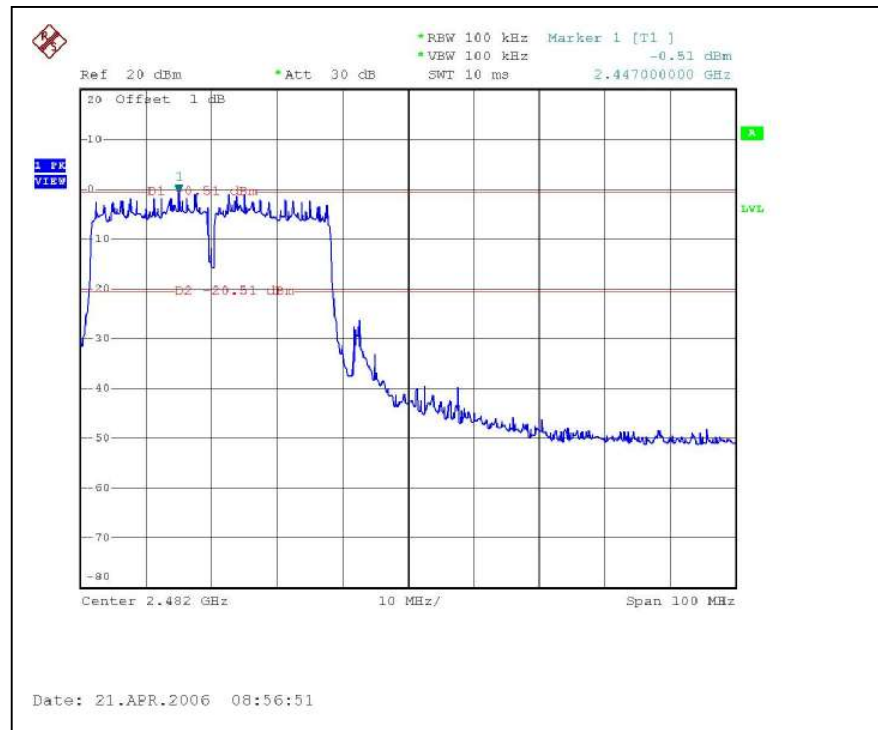
CH7



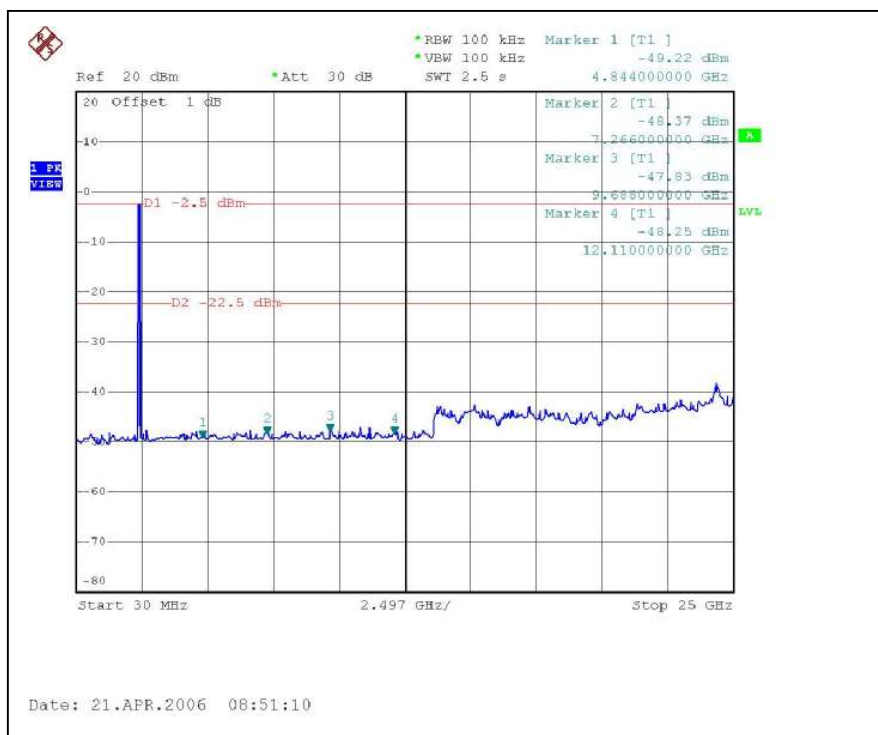
FOR CHAIN 1:CH1



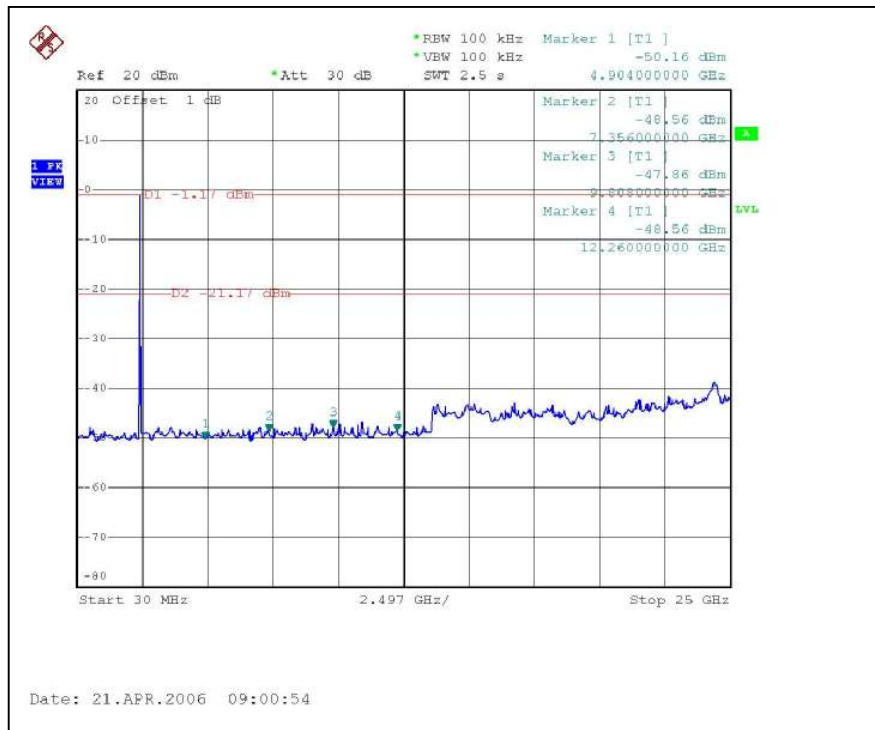
CH7



CH1



CH7



4.7 ANTENNA REQUIREMENT

4.7.1 STANDARD APPLICABLE

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

4.7.2 ANTENNA CONNECTED CONSTRUCTION

The antennas used in this product are as below.

No.	Gain (dBi)	Antenna Type	Antenna Connector
1	2.0	Dipole	NA
2	1.8	PCB monopole	NA
3	2.0	Dipole	NA

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.	CNLA, BSMI, DGT
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.

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.