

**ESTECH Co., Ltd.**Rm 1015, World Venture Center II,
426-5 Gasan-dong, Guncheon-gu,
Seoul, 158-803, Korea**Electromagnetic
Interference
Test Report****Test Report for IC & FCC**

IC : 1693B-61A

FCC ID : HD56110GP

Report Number		ESTF151308-003		
Applicant	Company name	HONEYWELL INTERNATIONAL INC		
	Address	9680 OLD BAILES RD FORT MILL SC 29707 UNITED STATES		
	Telephone	1 31555 46387		
Product	Product name	Mobile Computer		
	Model No.	Dolphin 6110	Manufacturer	HONEYWELL INTERNATIONAL INC
	Serial No.	NONE	Country of origin	CHINA
Test date	2013-07-10 ~ 2013-08-03		Date of issue	3-Aug-13
Testing location	ESTECH Co., Ltd. 97-1, Hooeok-ri, Majang-myeon, Icheon-si, Gyeonggi-do, Korea			
Standard	FCC PART 15 Subpart C (15.247):2010 , ANSI C 63.4(2009) , KDB 558074 D01(2013) , IC RSS-210(2010)			
Measurement facility registration number		915135	IC Number	4475B-2
Tested by	Engineer S.D.Hong		(Signature)	
Reviewed by	Engineering Manager J.M.Yang		(Signature)	
Abbreviation	OK, Pass = Passed, Fail = Failed, N/A = not applicable			
* Note - The EUT worst data is 1D Scanner. - This test report is not permitted to copy partly without our permission - This test result is dependent on only equipment to be used - This test result based on a single evaluation of one sample of the above mentioned				

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1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report.

ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.

ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test Lab.

Corporation Name : ESTECH Co., Ltd.

Head Office : Rm 1015, World Venture Center II, 426-5, Gasan-dong, Geumcheon-gu, Seoul, Korea

EMC/Telecom/Safety Test Lab : 97-1, Hooeok-ri, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

1.3 Official Qualification(s)

KCC : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecommunication

KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC requirements

FCC : Conformity Assessment Body(CAB) with registration number 659627 under APEC TEL MRA between the RRA and the FCC

VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

2. Description of EUT

2.1 Summary of Equipment Under Test (WLAN)

Modulation Type	: WLAN(DSSS, OFDM)
Transfer Rate	: up to 65 Mbps
Number of Channel	: 2.4 GHz : 11 ch , 5 GHz : 5 ch
PEAK Output Power	: 802.11a:0.078 W , 802.11b: 0.060 W, 802.11g: 0.192 W : 802.11n(2.4 GHz) : 0.179 W , 802.11n(5 GHz) : 0.078 W
Rating	: INPUT : (100 – 240)Va.c , (50 / 60)Hz , 21~34VA 0.4 A : OUTPUT : 5.0 Vd.c. , 2.0 A
Receipt Date	: 3-Jul-13
X-tal list(s) or Frequencies generated	: The highest operating frequency is 5825 MHz(WLAN) : XTAL : 32.768 kHz , OSC : 26 MHz , WLAN : 5825 MHz

2.2 General descriptions of EUT

Operating System	Microsoft Windows Embedded Handheld 6.5
Development Environment	Honeywell SDK for Windows Embedded Handheld 6.5
Application Software	Honeywell Power Tools and Demos
Processor	TI OMAP3715 800MHz
Memory	512 MB RAM X 512 MB Flash
Expansion Memory	User accessible Micro SD memory card slot with SDIO support. Please check current price guide for available qualified card options.
Display	240x320. 262,144 Color Transmissive TFT
Backlight	LED
Engine	56XX 2D imager engine with laser aimer or N4313-TTL 1D laser engine
Keypad	28-key shifted alpha numeric with backlit keys
Voice communication	Voice-over-IP and Push-to-Talk ready
Audio	Built-in microphone and speaker, stereo headset jack
Communication Interface	High speed USB 2.0 (480 Mbps) from cradle (or I/O cable); RS232 (115 Kbps) from cradle.
Battery	2200mAh - Li-ion battery 3.7V 3300mAh - Li-Ion battery 3.7V (includes extended battery door)
Expected Hours of Operation	2200mAh battery pack: 10 hours (with scan every 2 seconds) Battery life varies with application and use case.
Charging	5V/2A input through bottom access or USB/Serial connector
Expected Charge Time	2200mAh - 6 hours for a fully depleted battery 3300mAh - 9 hours for a fully depleted battery
Charging Peripherals	AC wall adapter and Charger (KSAS0100500200D5)/Communication Cable HomeBase—single-bay terminal charge/communicate eBase—single-bay terminal charge/communicate (via Ethernet connection) Quad Charger—four-slot battery pack charger (DSA-0421S-03 1)
WPAN (standard)	Bluetooth Class II (10 m) v2.1 Enhanced Data Rate (EDR) with on-board antenna. BQB certified
WLAN	Dual Mode 802.11a/b/g/n (11 Mbps/54 Mbps) with internal antenna

2.2 General descriptions of EUT

WLAN Security	OPEN, WEP, 802.1x, WPA-PSK/EAP, WPA2-PSK/EAP, EAP-LEAP, EAP-TLS, EAP-TTLS, EAP-PEAP, EAP-FAST, CCKM
Operating Temperature	14° to 122°F (-10° to 50°C)
Charging Temperature	32° to 113°F (0° to 45°C)
Storage Temperature	-4° to 158°F (-20° to 70°C)
Humidity	95% humidity, non-condensing
Construction	High impact resistant PC/ABS housings Magnesium alloy internal chassis with component shock mounts
Drop	4 ft. (1.2m) multiple drops to concrete, all axis, across operating temperature range
Tumble	500 3.3 ft (1.0m) tumbles (1000 drops)
ESD	Air: ± 15k Vdc Direct: ± 8k Vdc
Environmental Sealing	IP54 rating
Dimensions	175 mm long x 66 mm wide x 26.8 mm deep (6.8" x 2.60" x 1.06")
Weight	250 g (8.8 oz) including standard battery pack
Scanner / Decode Capabilities	56XX 2D Imager with Adaptus Technology and Laser Aimer. Decodes all standard 1D, 2D, Postal, and OCR codes. N4313-TTL 1D laser scanner. Decodes all standard 1D codes.

3. Test Standards

Test Standard : FCC PART 15 Subpart C (15.247) : 2010 & IC RSS-210 Issue8 : 2010

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Method : ANSI C 63.4 (2009) & KDB558074 D01(2013)

This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain devices that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment. These methods apply to the measurement of individual units or systems comprised of multiple units.

Summary of Test Results

Applied Standard : 47 CFR Part 15 Subpart C & RSS 210-Part I and II					remark
Standard	IC Standard	Test Type	Result	Remark	Limit
15.207	RSS-Gen 7.2.2	AC Power Conducted Emission	Pass	Meet the requirement	
15.205 & 15.209	A8.5	Restricted band / Intentional Radiated Emission	Pass	Meet the requirement	
15.247(a)(2)	A8.2(a)	6 dB Bandwidth	Pass	Meet the requirement	Min. 500 kHz
	RSS-Gen 4.6.1	99 % Bandwidth			
15.247(b)(3)	A8.4(4)	Maximum Peak/average output power	Pass	Meet the requirement	Max. 30 dBm
15.247(c)	A8.5	Transmitter Radiated Emission	Pass	Meet the requirement	Table 15.209
15.247(e)	A8.2(b)	Power Spectral Density	Pass	Meet the requirement	Max. 8 dBm
15.247(d)	A8.5	Band Edge Measurement	Pass	Meet the requirement	20 dB less
15.107	RSS-Gen 7.2.2	Receiver conducted Emission	Pass	Meet the requirement	
15.109	RSS-Gen 7.2.3.2	Receiver radiated emission	Pass	Meet the requirement	

4. Measurement Condition

4.1 EUT Operation(For 802.11a and 802.11b and 802.11g and 802.11n)

a. Channel

Ch.	Frequency	Ch.	Frequency
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

b. Measurement Channel : WLAN: Low(2412 MHz), Middle(2437 MHz),High(2462 MHz)
 ,Low(5745 MHz),Middle(5785 MHz),High(5825 MHz)

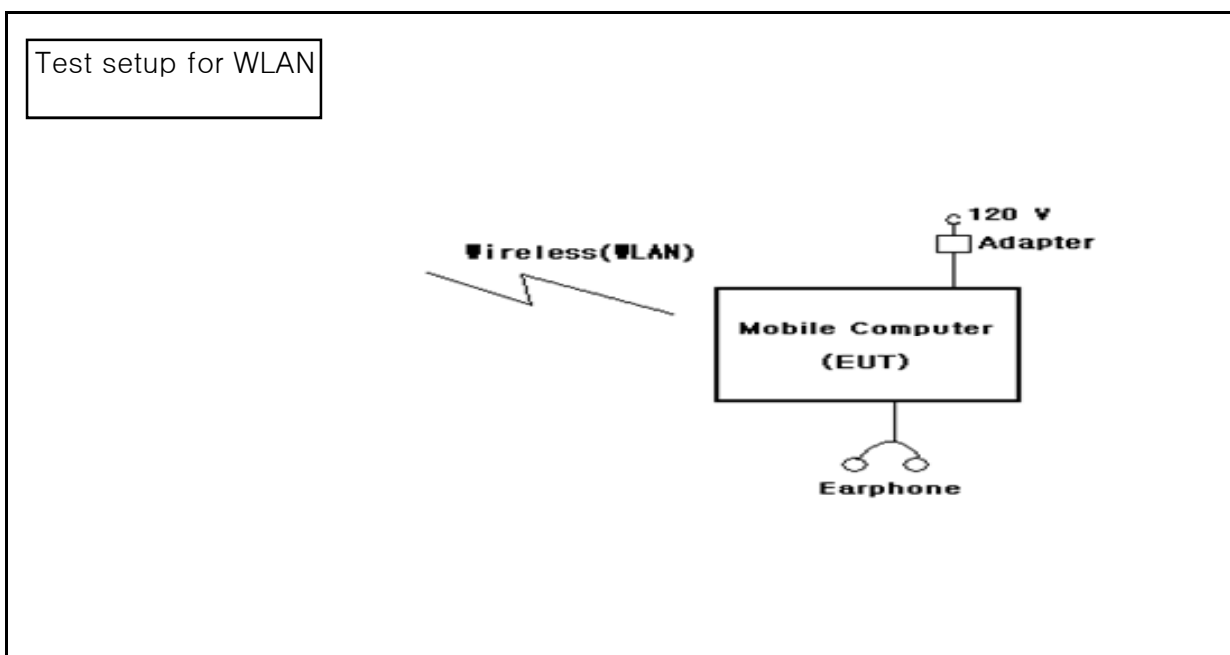
c. Test Mode : Continuous Output, DSSS, OFDM

d. Test rate : the worst case of rate 802.11b(1 Mbps) , 802.11g (6 Mbps),
 802.11n-5 GHz (6.5 Mbps)
 802.11a (6Mbps) , 802.11n-2.4 GHz (6.5Mbps)

4.2 EUT Operation.

- * The EUT was in the following operation mode during all testing
- * The operational conditions of the EUT was determined by the manufacturer according to the typical use of the EUT with respect to the expected highest level of emission
- * Execute a RF test program to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- *. Test Mode: Mobile Computer 1D Scanner : battery 2200 mAh + battery 3300 mAh.
Mobile Computer 2D Scanner : battery 2200 mAh + battery 3300 mAh.
- * The worst data were recorded 1D scanner the results after testing each of the 1D scanner and 2D scanner.
- *. Transmit mode and receive mode was each test.
- *. Highest frequency of the EUT is above 1 GHz, the measurement shall be made up to 10 th the highest frequency or 40 GHz, But the EUT wasn't Detected from 3th any other spurings and harmonic emissions.

4.3 Configuration and Peripherals



4.4 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
Mobile Computer	Dolphin 6110	NONE	HONEYWELL INTERNATIONAL INC	EUT
Adapter	KSAS0100500200D5	NONE	Kuantech(BeiHai) Co., Ltd.	
Earphone	NONE	NONE	SAMSUNG	

4.5 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
Mobile Computer	Power	Adapter	—	2.0	Unshielded	
Mobile Computer	Head Phone	Earphone	—	1.0	Unshielded	

5. DTS bandwidth

5.1 Test procedure

558074 D01 DTS Meas Guidance v03 8.2 Option 2 :The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW ≥ 3 RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

5.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- . RBW= 100 KHz
- . VBW= 1 MHz
- . Span= 40 MHz
- . Sweep= suitable duration based on the EUT specification.

Limits : FCC § 15.247(a)(2) , IC RSS-210 A8.2(a)

6dB Bandwidth Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US42041281	2013-09-11
RF Cable	Length: 6cm	—	
—Spectrum Analyzer <=> EUT	Loss: 0.5dB	—	

5.3 Measurement results

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	DSSS	ENVIRONMENTAL CONDITION	24 °C, 44 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

(802.11b)

Channel Frequency (MHz)	Emission bandwidth	Bandwidth at 6dB below(MHz)	Minimum Limit (MHz)	PASS/FAIL
2412	13.89	9.08	0.5	PASS
2437	13.91	8.60	0.5	PASS
2462	13.96	9.05	0.5	PASS

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	OFDM	ENVIRONMENTAL CONDITION	24 °C, 44 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

(802.11g)

Channel Frequency (MHz)	Emission bandwidth	Bandwidth at 6dB below(MHz)	Minimum Limit (MHz)	PASS/FAIL
2412	16.35	15.44	0.5	PASS
2437	16.38	15.79	0.5	PASS
2462	16.39	15.01	0.5	PASS

(802.11n)

Channel Frequency (MHz)	Emission bandwidth	Bandwidth at 6dB below(MHz)	Minimum Limit (MHz)	PASS/FAIL
2412	17.56	13.89	0.5	PASS
2437	17.55	16.76	0.5	PASS
2462	17.56	15.04	0.5	PASS

(802.11a)

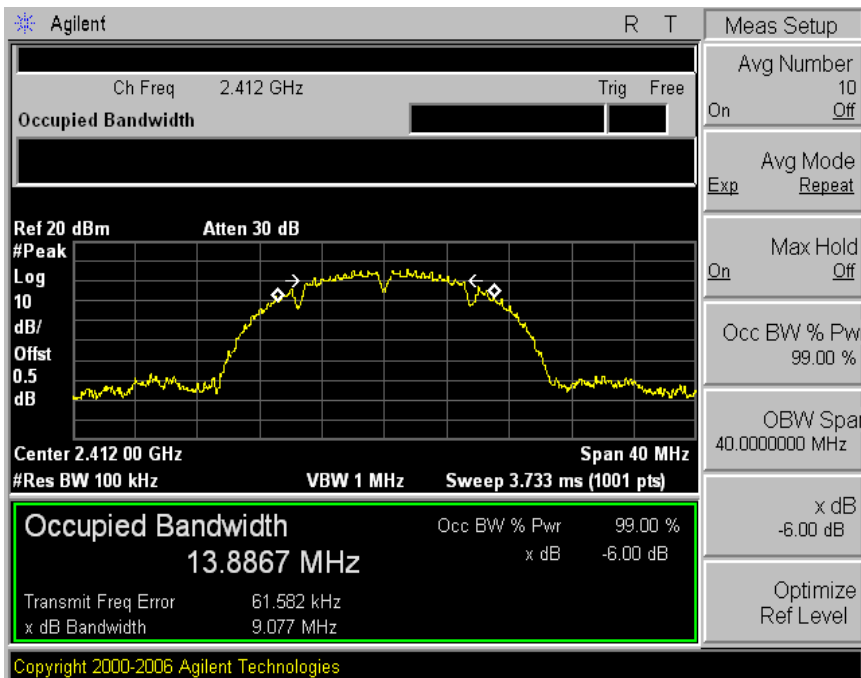
Channel Frequency (MHz)	Emission bandwidth	Bandwidth at 6dB below(MHz)	Minimum Limit (MHz)	PASS/FAIL
5745	16.38	15.73	0.5	PASS
5785	16.38	16.39	0.5	PASS
5825	16.36	16.36	0.5	PASS

(802.11n)

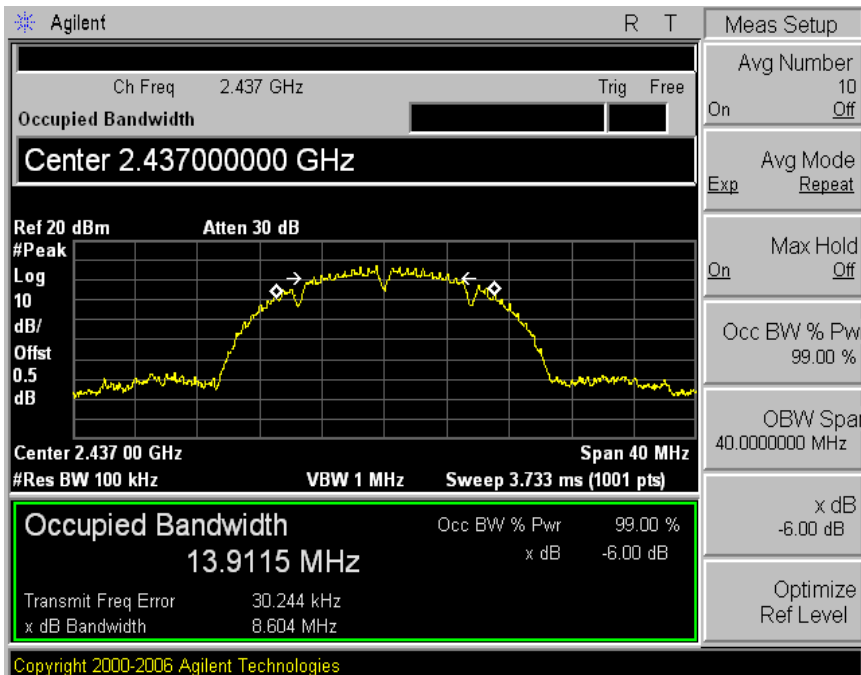
Channel Frequency (MHz)	Emission bandwidth	Bandwidth at 6dB below(MHz)	Minimum Limit (MHz)	PASS/FAIL
5745	17.58	15.49	0.5	PASS
5785	17.58	15.13	0.5	PASS
5825	17.54	16.88	0.5	PASS

5.4 Trace data

CCK (802.11b-1ch)



CCK (802.11b-6ch)





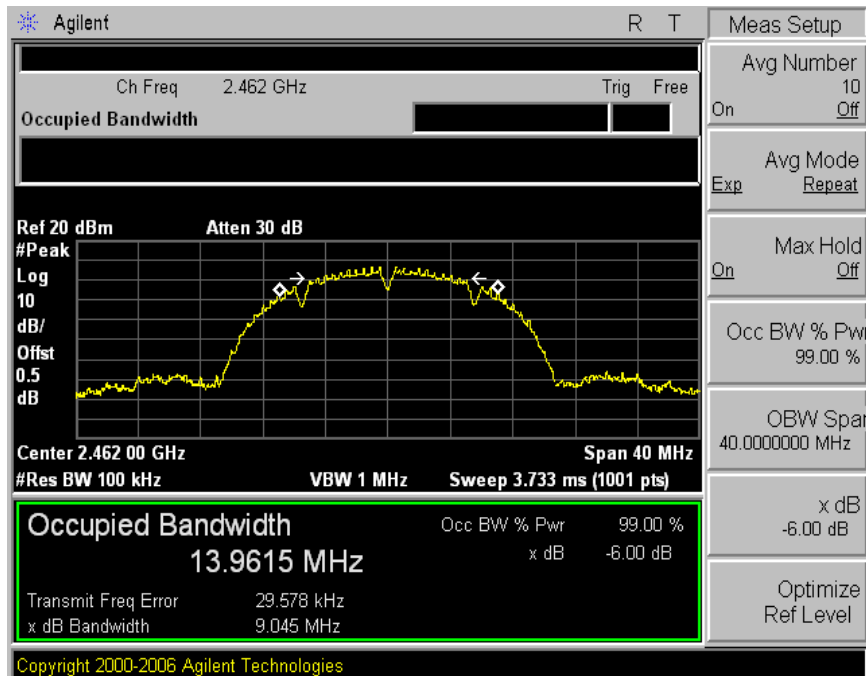
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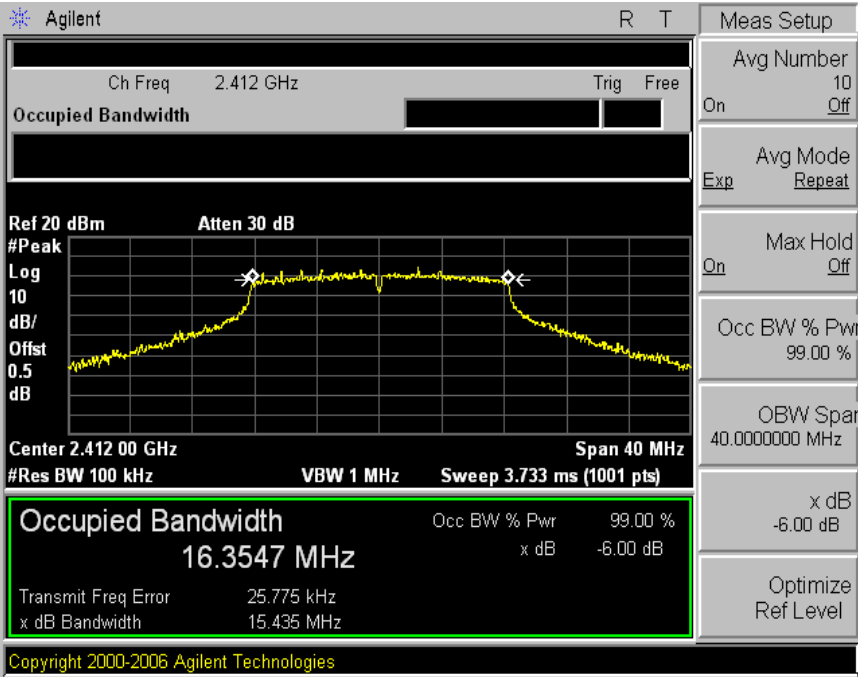


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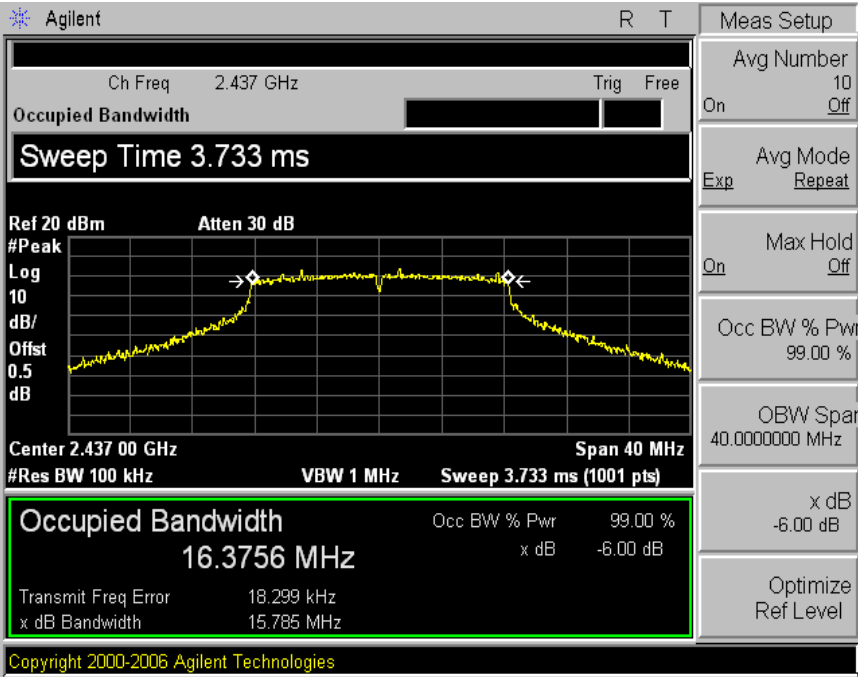
CCK (802.11b-11ch)



5.4 Trace data
OFDM (802.11g-1ch)



OFDM (802.11g-6ch)





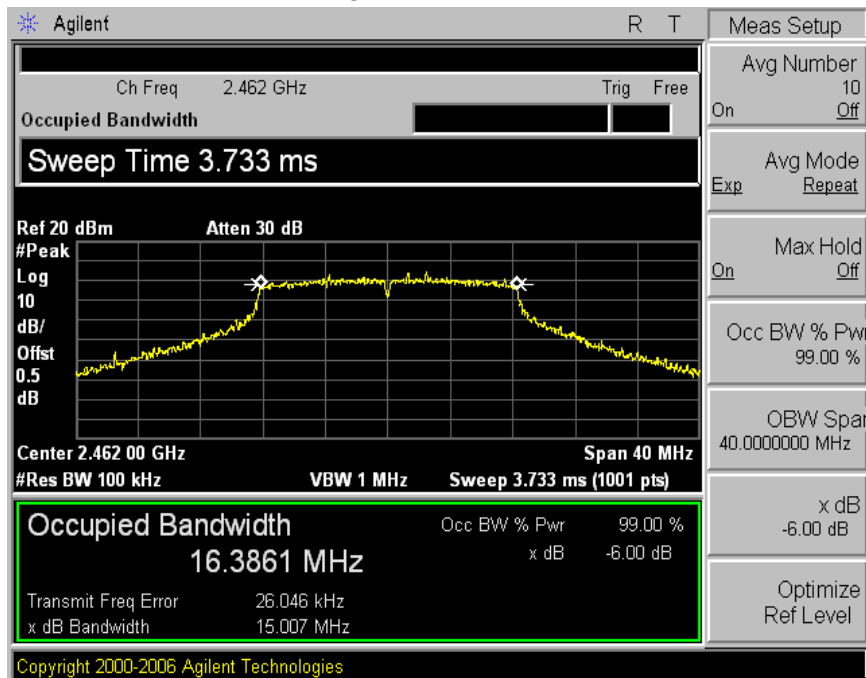
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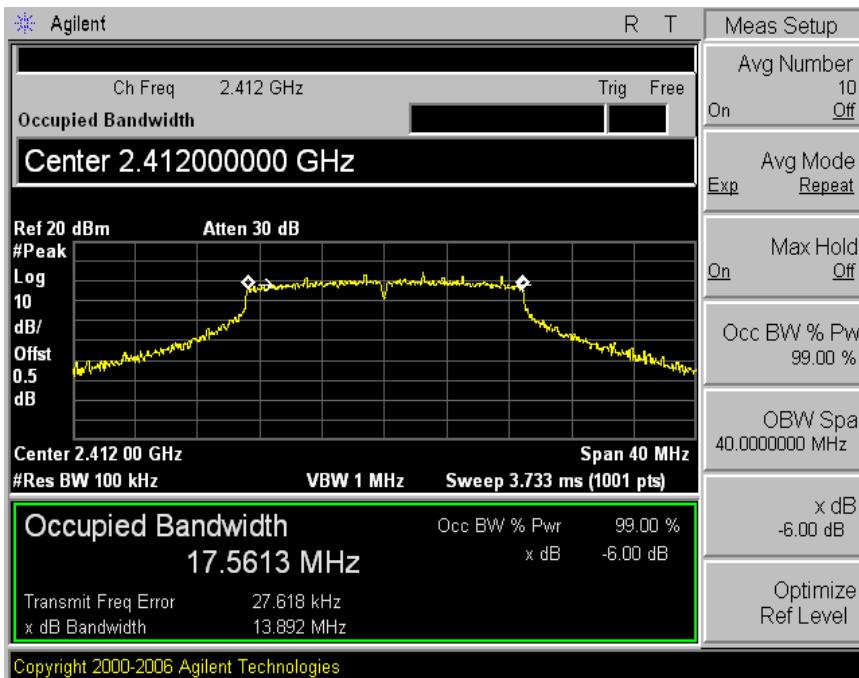
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OFDM (802.11g-11ch)

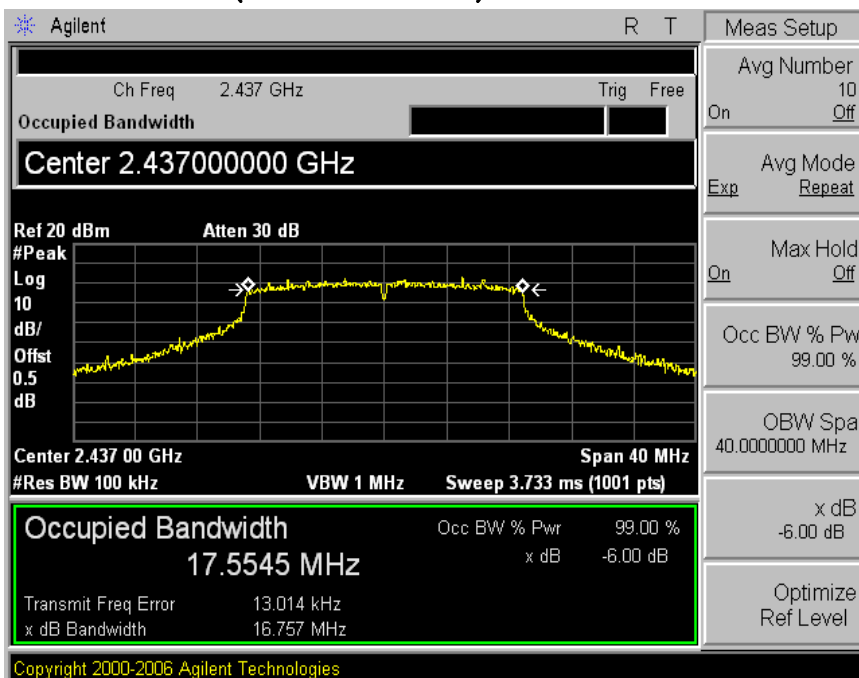


5.4 Trace data

OFDM (802.11n-1ch)



OFDM (802.11n-6ch)





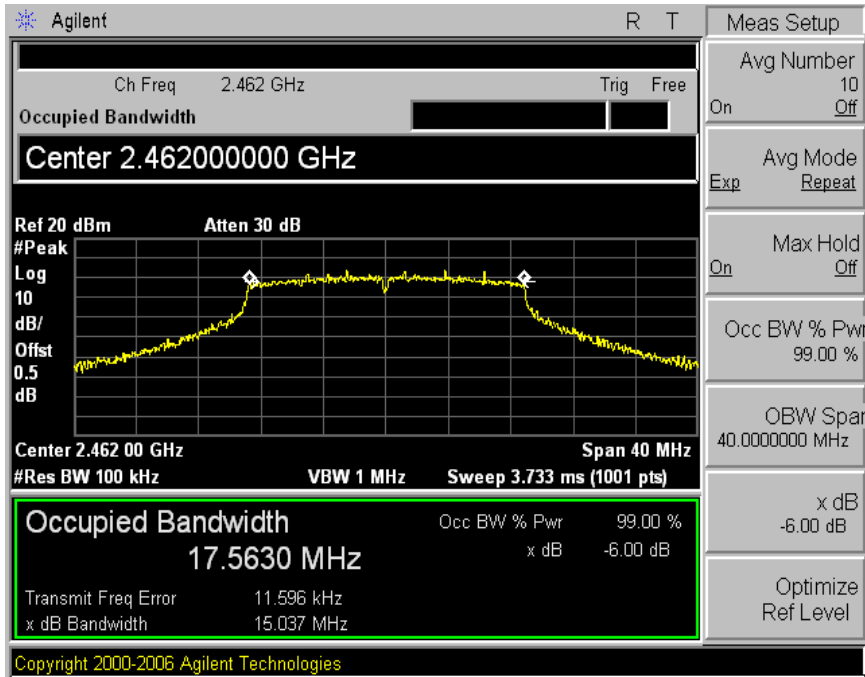
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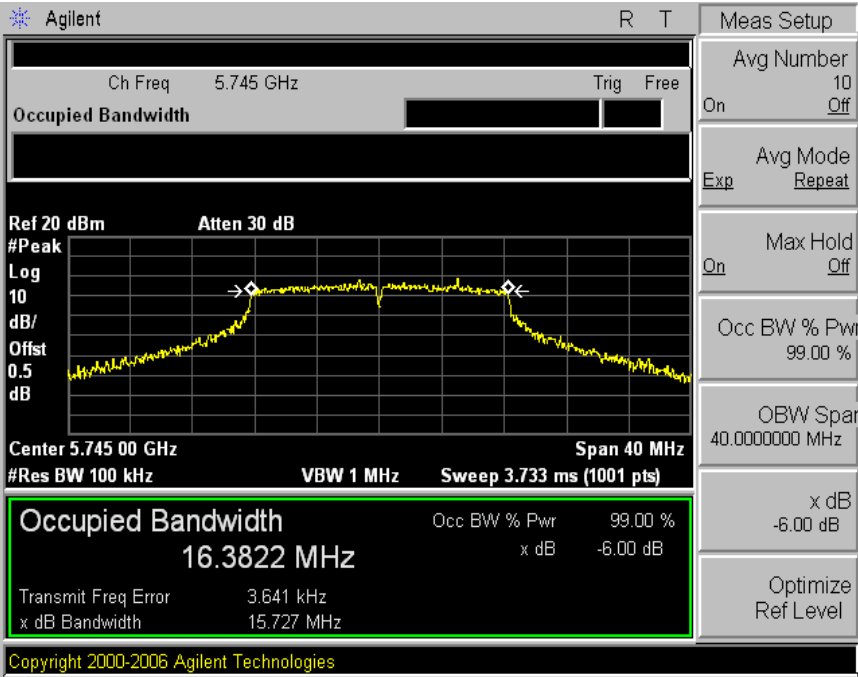


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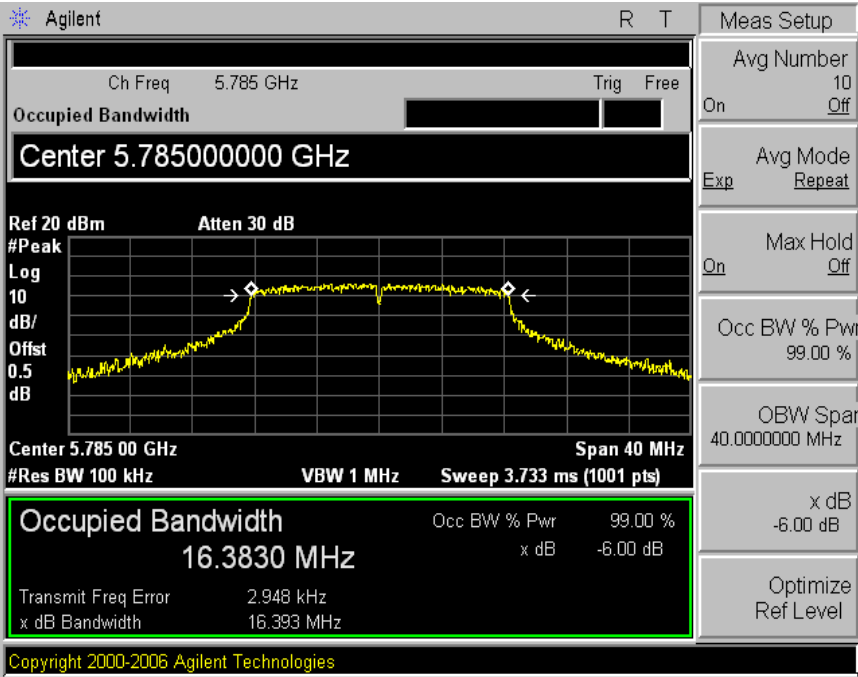
OFDM (802.11n-11ch)



5.4 Trace data
CCK (802.11a-149ch)



CCK (802.11a-157ch)





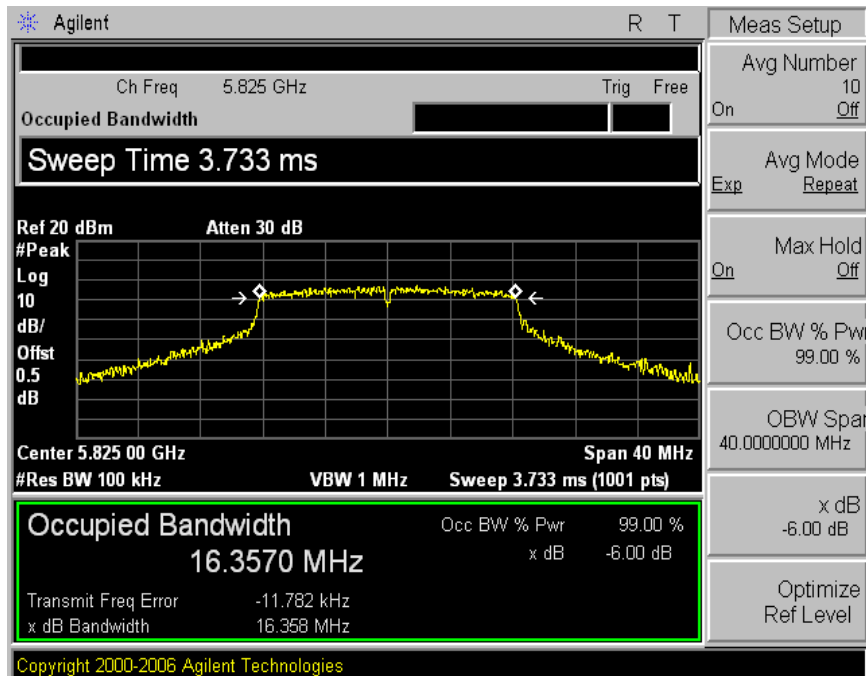
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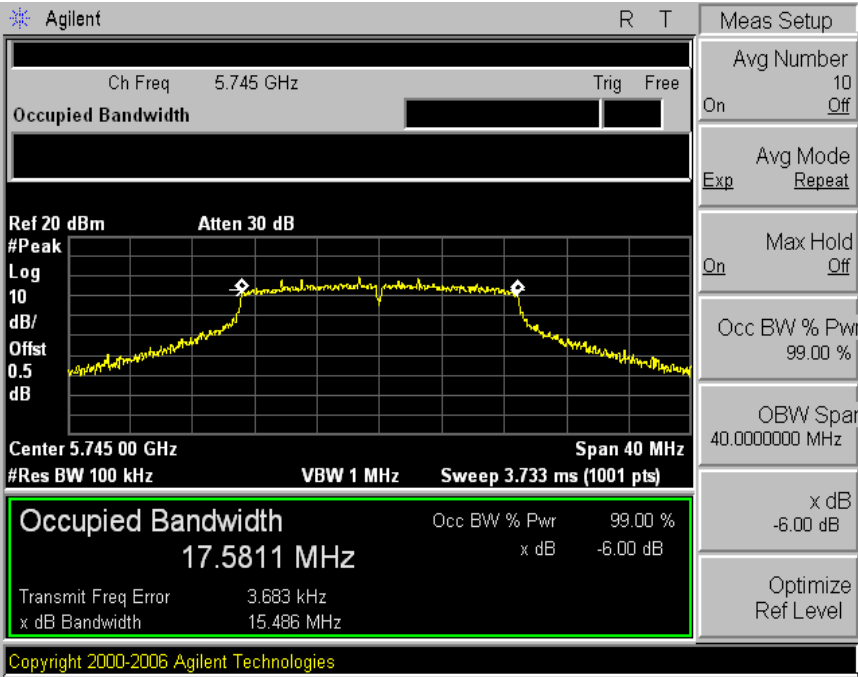


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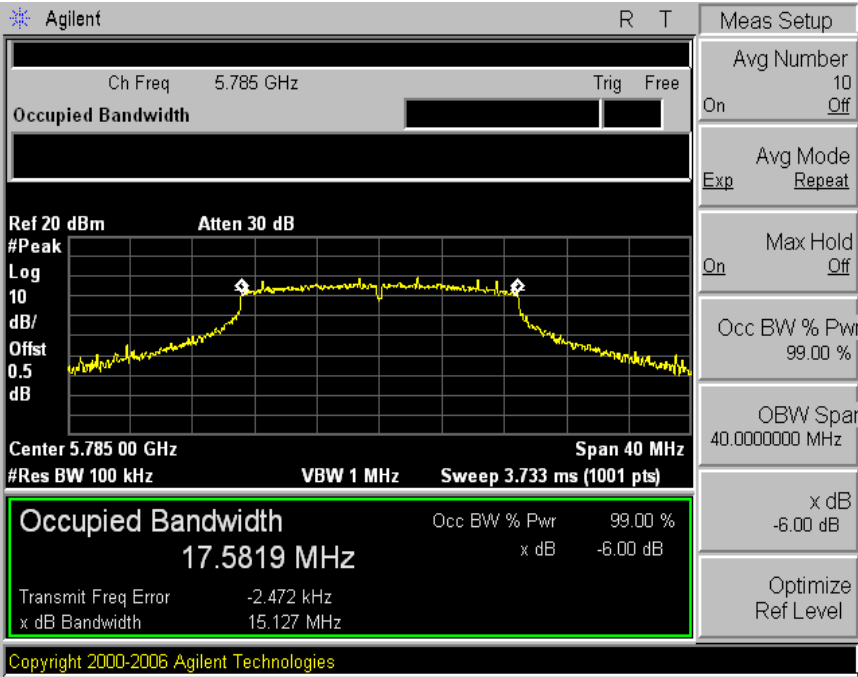
CCK (802.11a-165ch)



5.4 Trace data
OFDM (802.11n-149ch)



OFDM (802.11n-157ch)





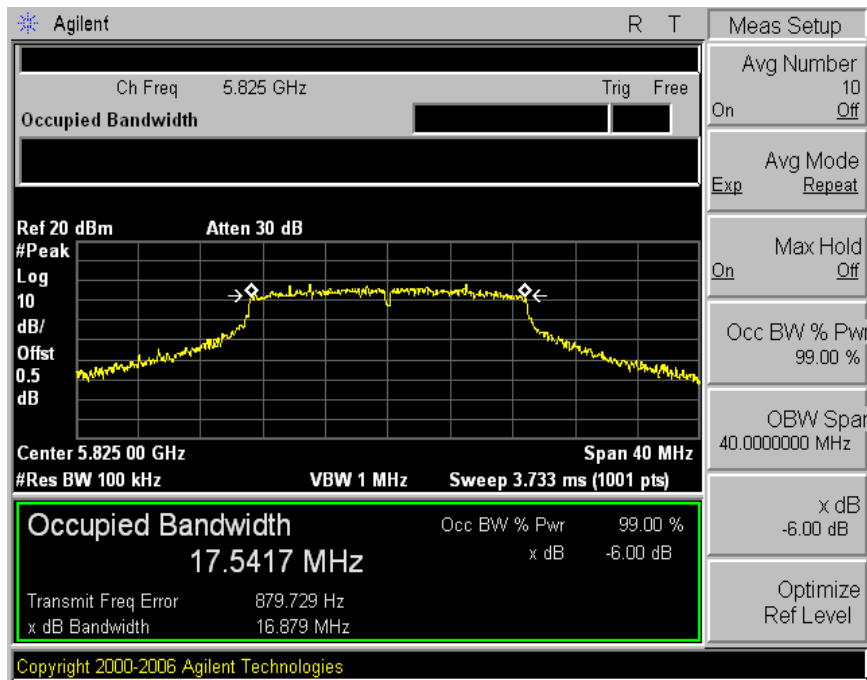
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OFDM (802.11n-165ch)



6. Maximum peak conducted output power

6.1 Test procedure

KDB 558074 D01 DTS Meas Guidance V03r01 9.1.2 Integrated band power method

6.2 Test instruments and measurement setup

- Set the RBW = 1 MHz.
- Set the VBW ≥ 3 RBW
- Set the span $\geq 1.5 \times$ DTS bandwidth.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function,

Limits : FCC § 15.247 , IC RSS-210 A8.4

Maximum Peak Output Power Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	FSV40	100939	2014-01-26
RF Cable	Length: 6cm	—	
-Spectrum Analyzer <=> EUT	Loss: 0.5 dB	—	

6.3 Measurement results

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	DSSS	ENVIRONMENTAL CONDITION	24 °C, 43 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

(802.11b)

CHANNEL	Channel frequency (MHz)	Conducted Power Output(dBm)			Limit[1W] (dBm)	PASS/FAIL
		Detector	(dBm)	(W)		
1	2412	PEAK	17.31	0.054	30.0	PASS
6	2437	PEAK	17.39	0.055	30.0	PASS
11	2462	PEAK	17.75	0.060	30.0	PASS

(802.11g)

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	OFDM	ENVIRONMENTAL CONDITION	24 °C, 43 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

CHANNEL	Channel Frequency (MHz)	Conducted Power Output(dBm)			Limit[1W] (dBm)	PASS/FAIL
		Detector	(dBm)	(W)		
1	2412	PEAK	22.33	0.171	30.0	PASS
6	2437	PEAK	22.68	0.185	30.0	PASS
11	2462	PEAK	22.83	0.192	30.0	PASS

(802.11n)

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	OFDM	ENVIRONMENTAL CONDITION	24 °C, 43 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

CHANNEL	Channel Frequency (MHz)	Conducted Power Output(dBm)			Limit[1W] (dBm)	PASS/FAIL
		Detector	(dBm)	(W)		
1	2412	PEAK	21.75	0.150	30.0	PASS
6	2437	PEAK	22.52	0.179	30.0	PASS
11	2462	PEAK	22.49	0.177	30.0	PASS

(802.11a)

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	OFDM	ENVIRONMENTAL CONDITION	24 °C, 43 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

CHANNEL	Channel Frequency (MHz)	Conducted Power Output(dBm)			Limit[1W] (dBm)	PASS/FAIL
		Detector	(dBm)	(W)		
149	5745	PEAK	18.80	0.076	30.0	PASS
157	5785	PEAK	18.93	0.078	30.0	PASS
165	5825	PEAK	18.22	0.066	30.0	PASS

(802.11n)

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	OFDM	ENVIRONMENTAL CONDITION	24 °C, 43 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

CHANNEL	Channel Frequency (MHz)	Conducted Power Output(dBm)			Limit[1W] (dBm)	PASS/FAIL
		Detector	(dBm)	(W)		
149	5745	PEAK	18.50	0.071	30.0	PASS
157	5785	PEAK	18.91	0.078	30.0	PASS
165	5825	PEAK	18.21	0.066	30.0	PASS

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7. Maximum conducted (average) output power

7.1 Test procedure

KDB 558074 D01 DTS Meas Guidance V03r01 9.2.2.4 Method AVGSA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction)

7.2 Test instruments and measurement setup

- a) Measure the duty cycle, x , of the transmitter output signal as described in 6.0.
- b) Set span to at least 1.5 times the OBW.
- c) Set RBW = 1–5% of the OBW, not to exceed 1 MHz.
- d) Set VBW $\geq 3 \times$ RBW.
- e) Number of points in sweep $\geq 2 \times$ span / RBW. (This gives bin-to-bin spacing $\leq$ RBW/2, so that narrowband signals are not lost between frequency bins.)
- f) Sweep time = auto.
- g) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
- h) Do not use sweep triggering. Allow the sweep to “free run”.
- i) Trace average at least 100 traces in power averaging (i.e., RMS) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the on and off periods of the transmitter.
- j) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
- k) Add $10 \log (1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add $10 \log (1/0.25) = 6$ dB if the duty cycle is 25 %.

Maximum Peak Output Power Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	4440A	US42041281	2013-09-11
RF Cable	Length: 6cm	–	
–Spectrum Analyzer $\Leftrightarrow$ EUT	Loss: 0.5 dB	–	

7.3 Measurement results

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	DSSS	ENVIRONMENTAL CONDITION	24 °C, 43 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

(802.11b)

CHANNEL	Channel frequency (MHz)	Conducted Power Output(dBm)			Measured + Duty Cycle(dBm)	Measured + Duty Cycle(mW)
		Detector	(dBm)	Duty Cycle		
1	2412	AVG	14.99	0.503	15.493	35.426
6	2437	AVG	15.03	0.503	15.533	35.754
11	2462	AVG	14.98	0.503	15.483	35.344

(802.11g)

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	OFDM	ENVIRONMENTAL CONDITION	24 °C, 43 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

CHANNEL	Channel frequency (MHz)	Conducted Power Output(dBm)			Measured + Duty Cycle(dBm)	Measured + Duty Cycle(mW)
		Detector	(dBm)	Duty Cycle		
1	2412	AVG	15.15	2.389	17.539	56.737
6	2437	AVG	14.96	2.389	17.349	54.309
11	2462	AVG	14.96	2.389	17.349	54.309

(802.11n)

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	OFDM	ENVIRONMENTAL CONDITION	24 °C, 43 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

CHANNEL	Channel frequency (MHz)	Conducted Power Output(dBm)			Measured + Duty Cycle(dBm)	Measured + Duty Cycle(mW)
		Detector	(dBm)	Duty Cycle		
1	2412	AVG	14.69	2.301	16.991	50.015
6	2437	AVG	14.95	2.301	17.251	53.101
11	2462	AVG	14.93	2.301	17.231	52.857

(802.11a)

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	OFDM	ENVIRONMENTAL CONDITION	24 °C, 43 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

CHANNEL	Channel frequency (MHz)	Conducted Power Output(dBm)			Measured + Duty Cycle(dBm)	Measured + Duty Cycle(mW)
		Detector	(dBm)	Duty Cycle		
149	5745	AVG	9.71	2.163	11.873	15.393
157	5785	AVG	10.17	2.163	12.333	17.112
165	5825	AVG	9.47	2.163	11.633	14.565

(802.11n)

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	OFDM	ENVIRONMENTAL CONDITION	24 °C, 43 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

CHANNEL	Channel frequency (MHz)	Conducted Power Output(dBm)			Measured + Duty Cycle(dBm)	Measured + Duty Cycle(mW)
		Detector	(dBm)	Duty Cycle		
149	5745	AVG	9.91	2.302	12.212	16.641
157	5785	AVG	10.18	2.302	12.482	17.708
165	5825	AVG	9.62	2.302	11.922	15.566



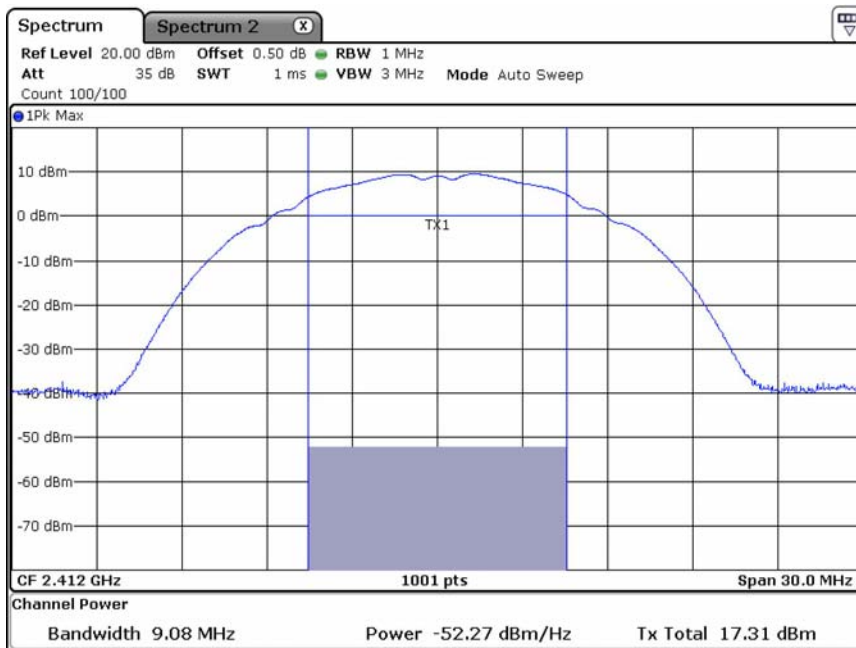
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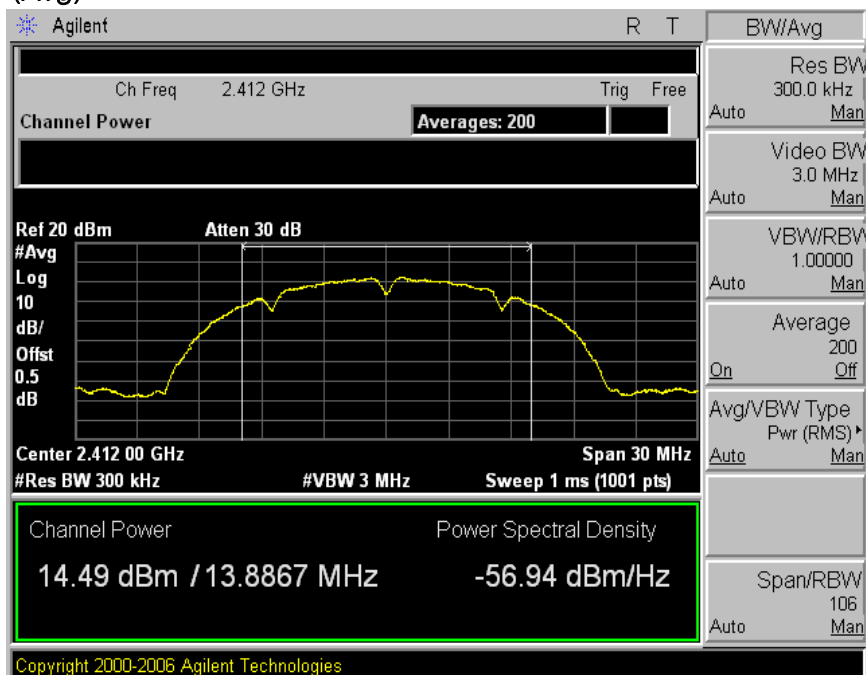


Electromagnetic Interference Test Report

6.4 Trace data CCK (802.11b-1ch) (Peak)



(Avg)





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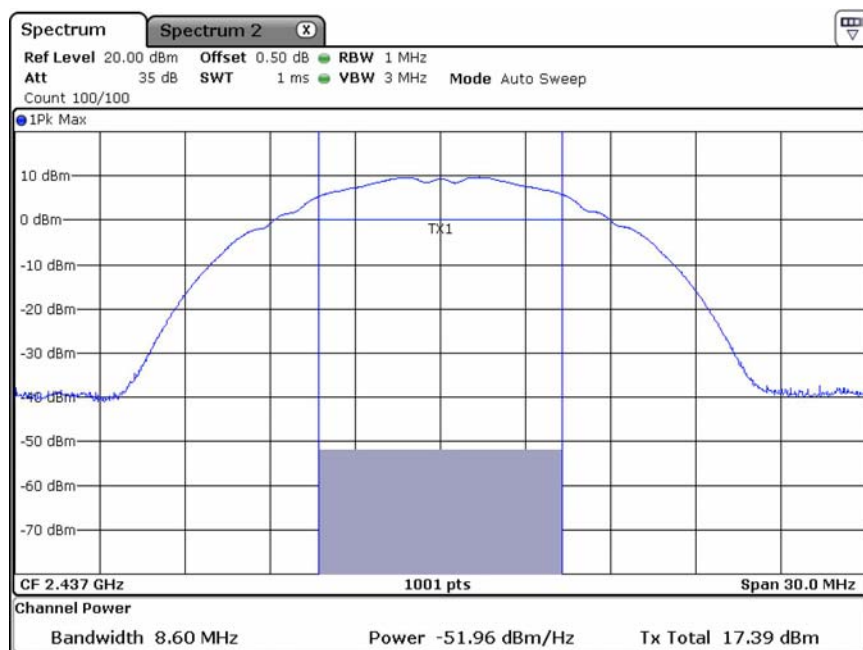
No. 1015, World Venture Center II,
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Seoul, 158-809, Korea



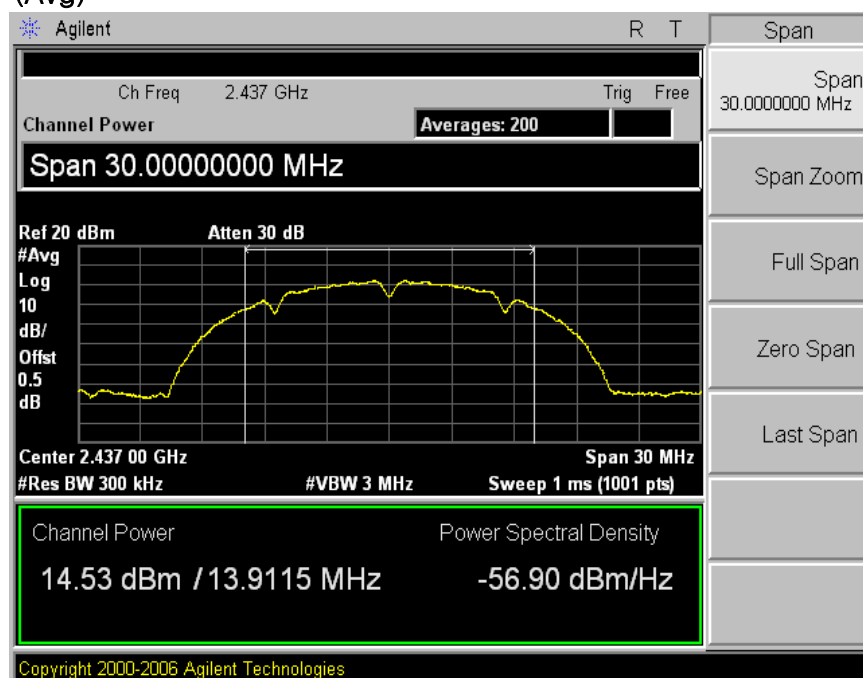
**Electromagnetic
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CCK (802.11b-6ch)

(Peak)



(Avg)





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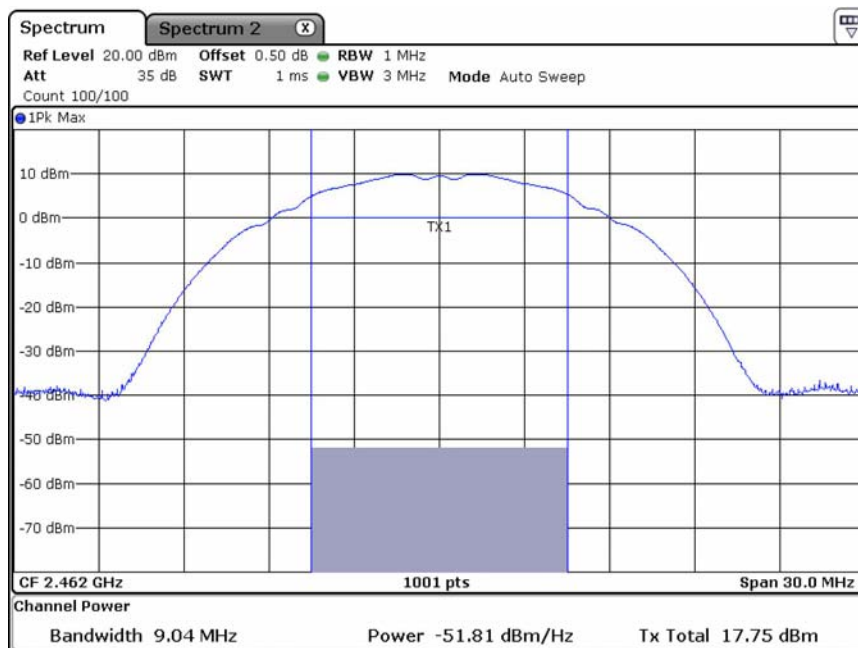
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CCK (802.11b-11ch)

(Peak)



(Avg)





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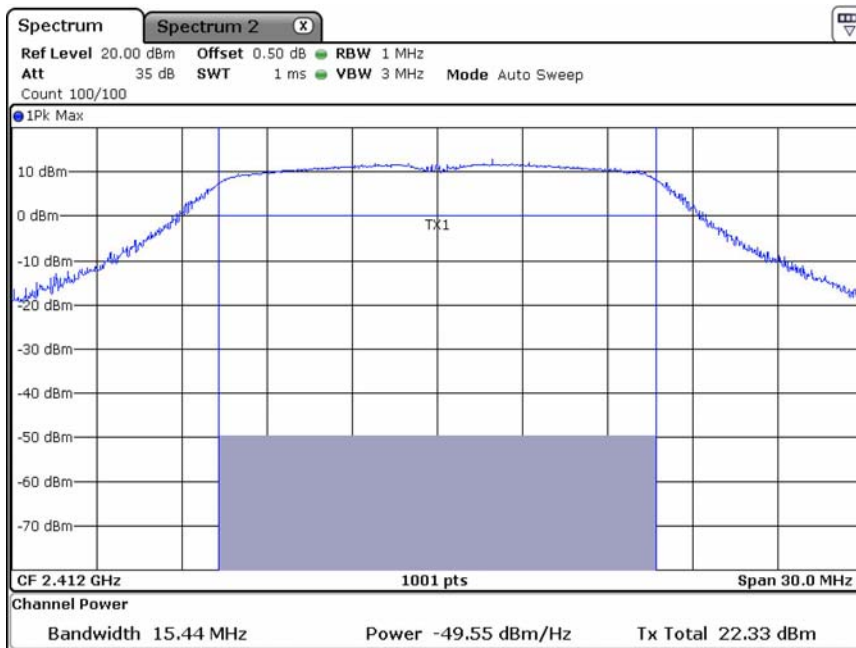
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426-5 Gasan-dong, Guncheon-gu,
Seoul, 158-803, Korea



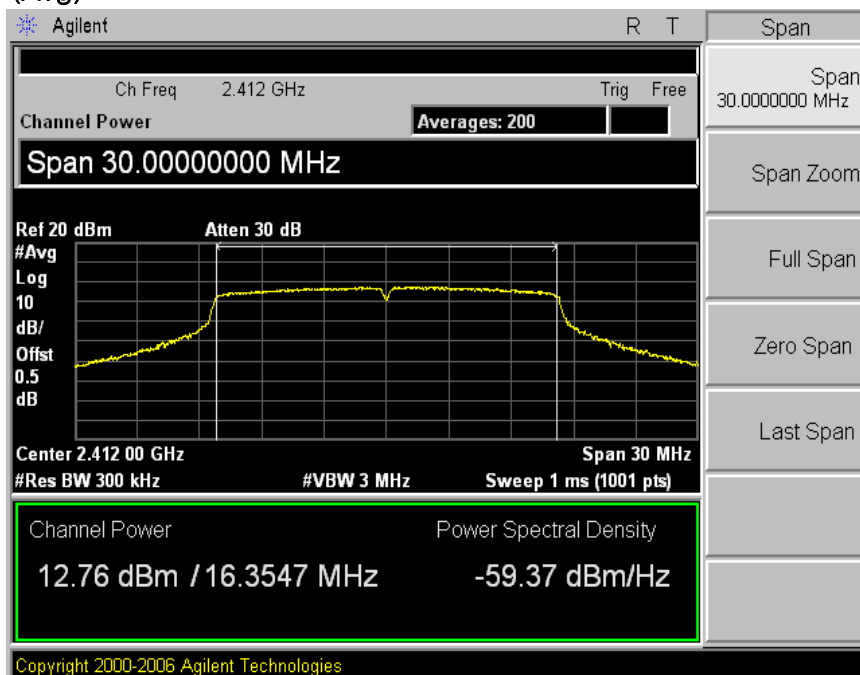
**Electromagnetic
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OFDM (802.11g-1ch)

(Peak)



(Avg)





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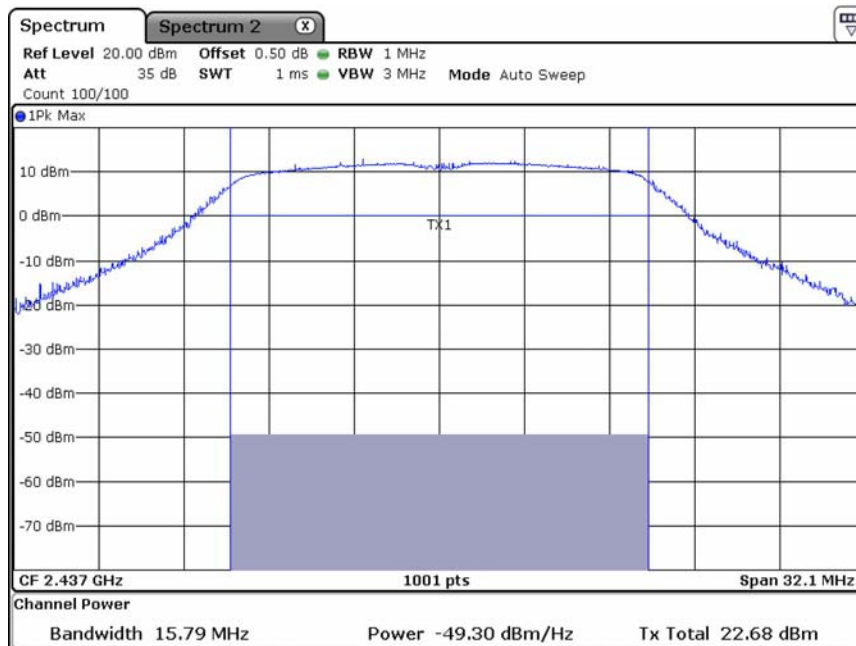
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Electromagnetic Interference Test Report

OFDM (802.11g-6ch)

(Peak)



(Avg)





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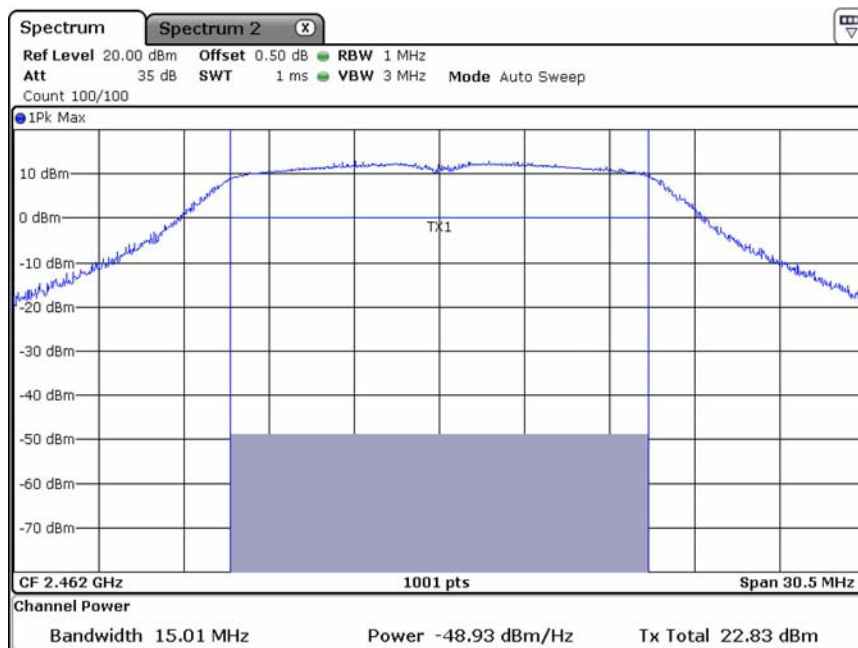
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Seoul, 158-803, Korea



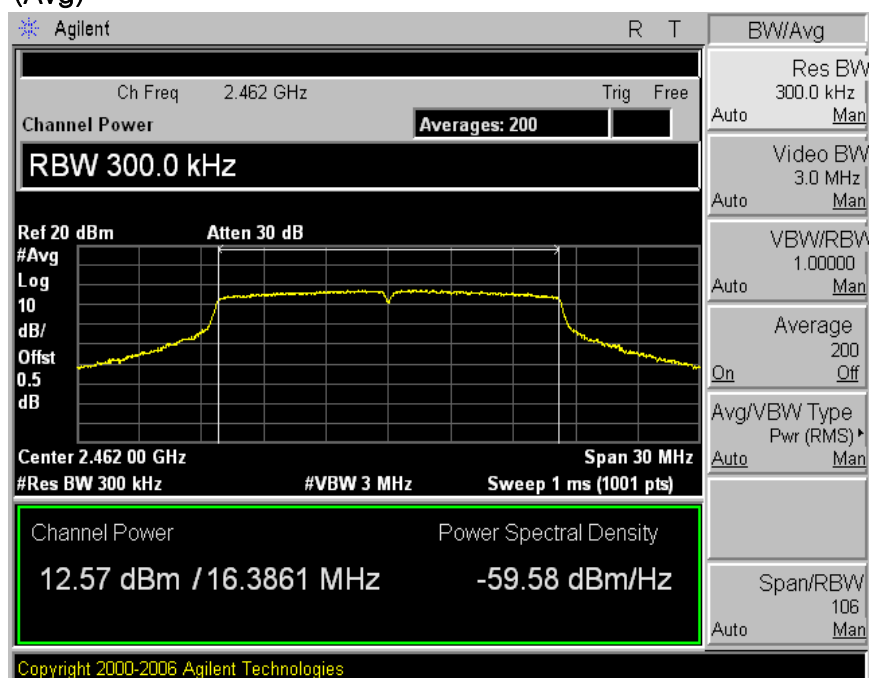
**Electromagnetic
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OFDM (802.11g-11ch)

(Peak)



(Avg)





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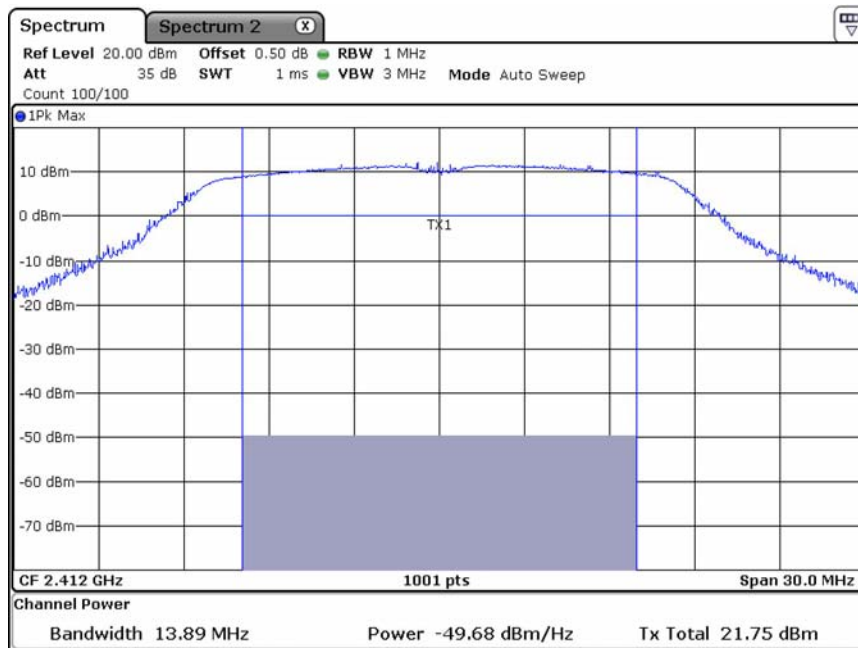
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Seoul, 150-803, Korea



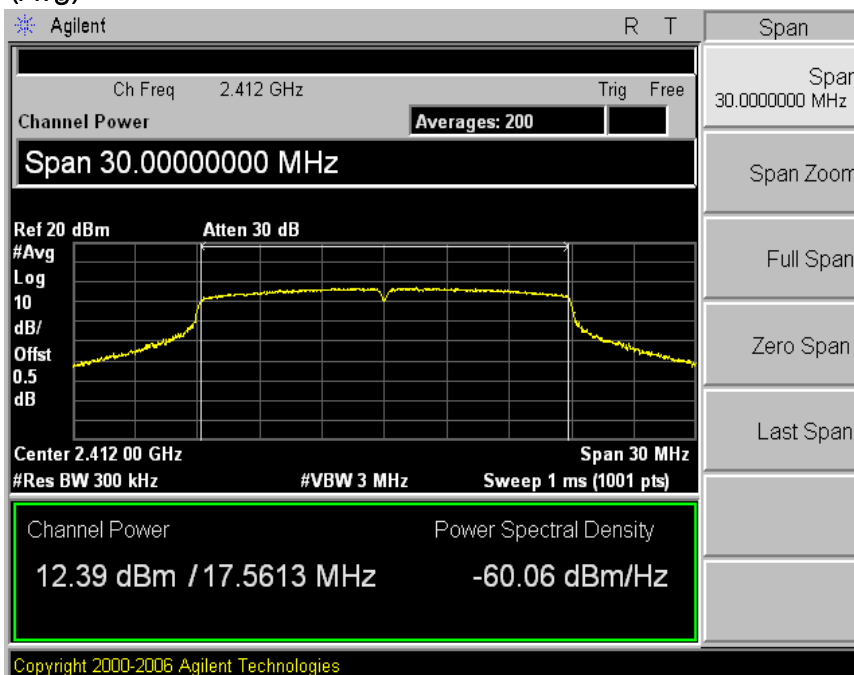
**Electromagnetic
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OFDM (802.11n-1ch)

(Peak)



(Avg)





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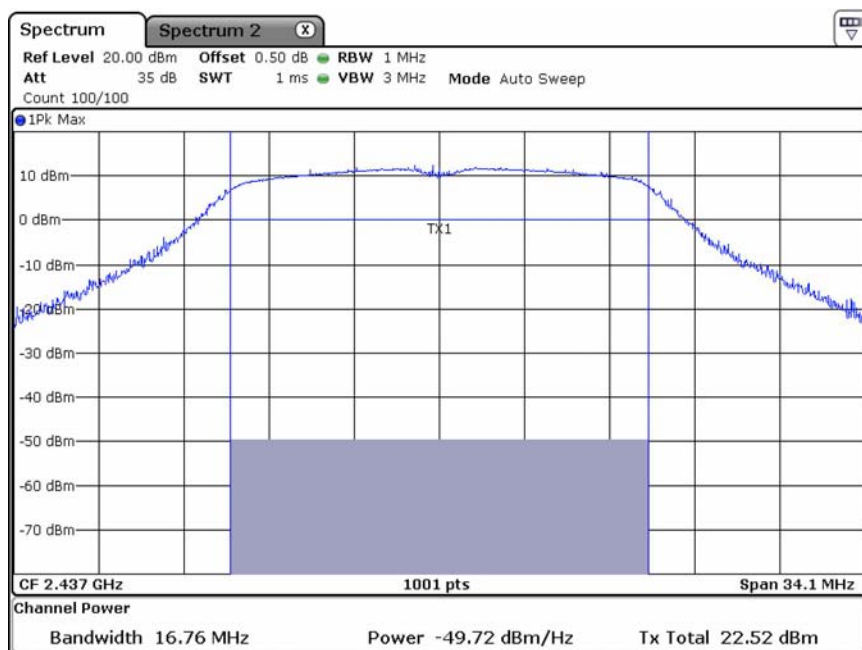
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Seoul, 158-803, Korea



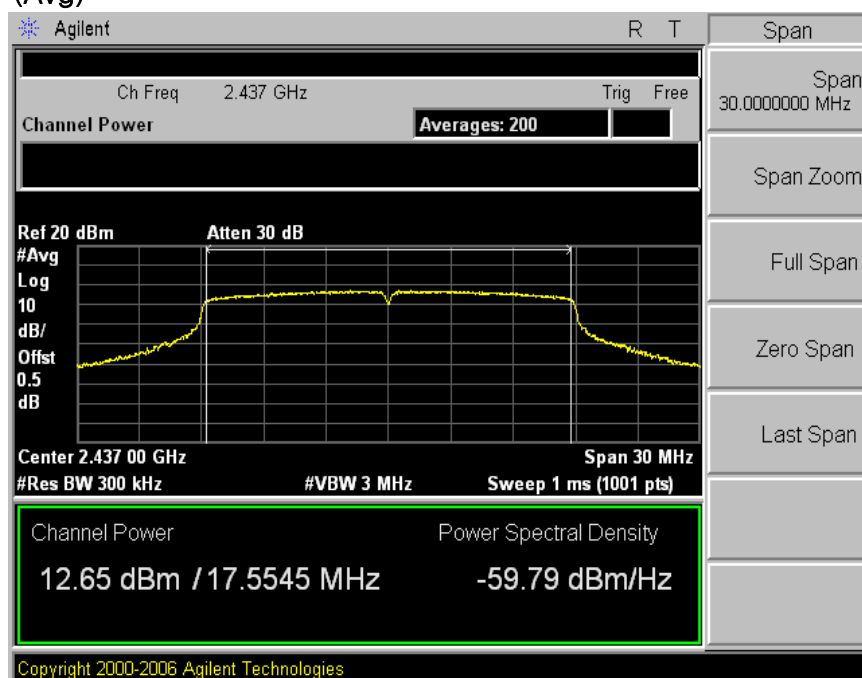
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OFDM (802.11n-6ch)

(Peak)



(Avg)





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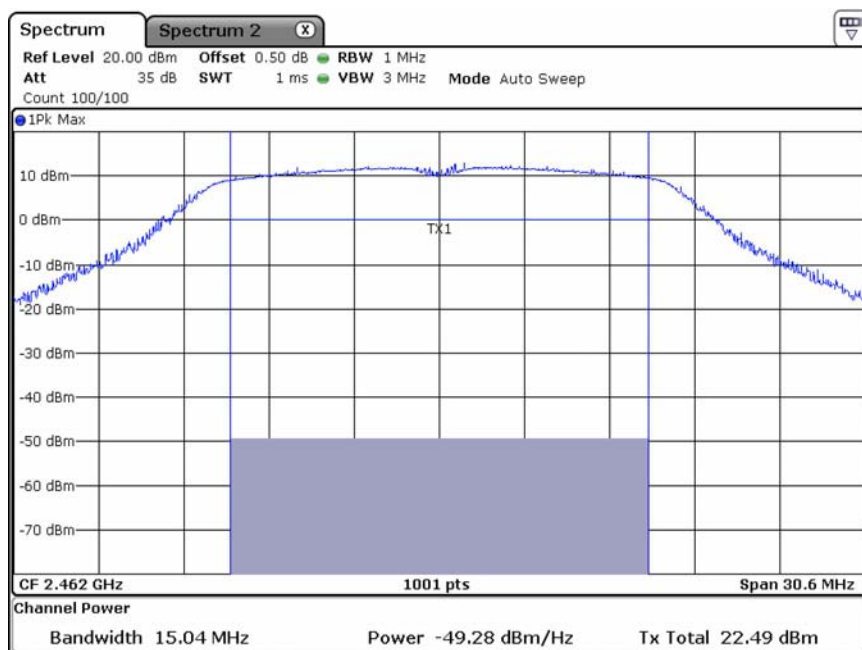
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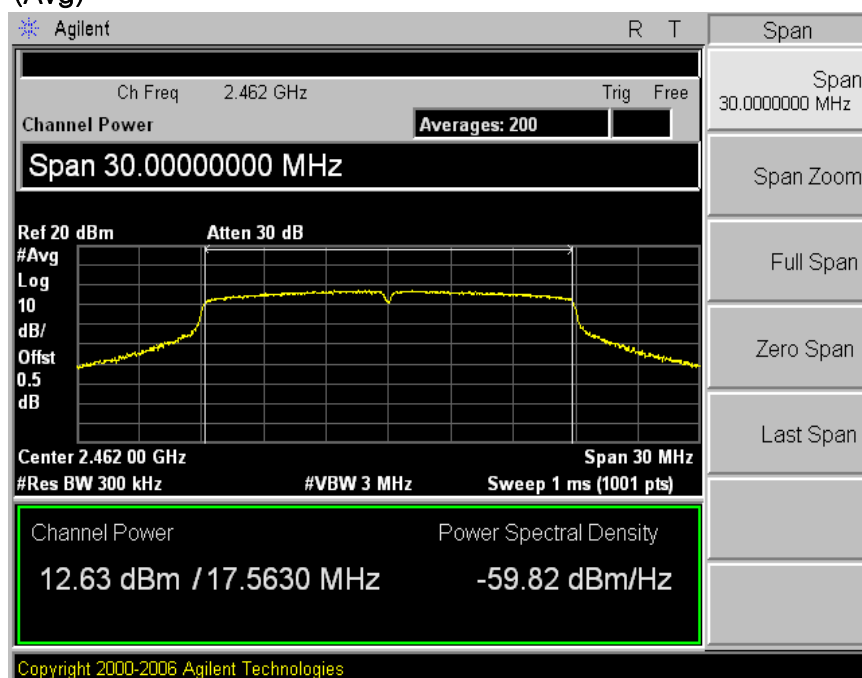
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OFDM (802.11n-11ch)

(Peak)



(Avg)





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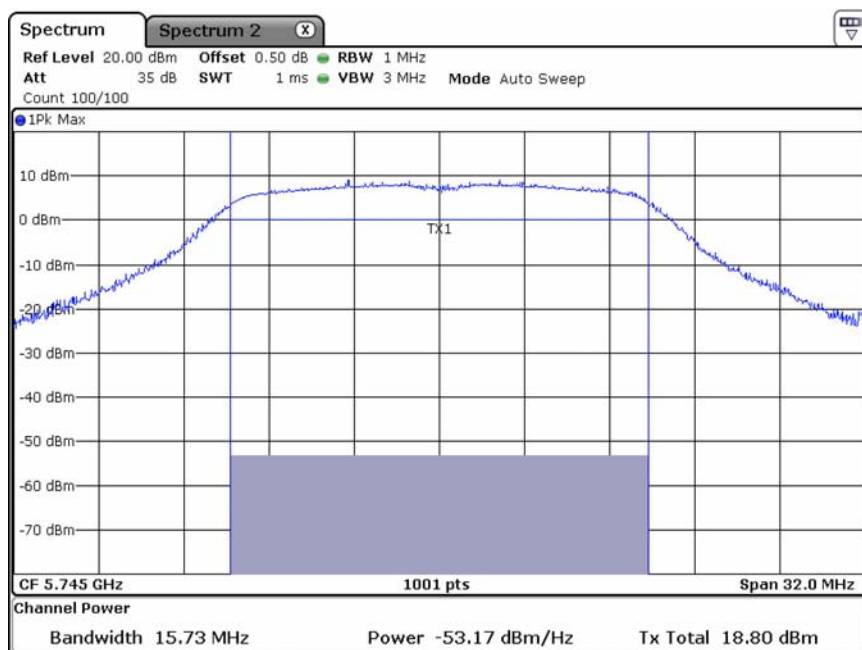
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**Electromagnetic
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OFDM (802.11a-149ch)

(Peak)



(Avg)





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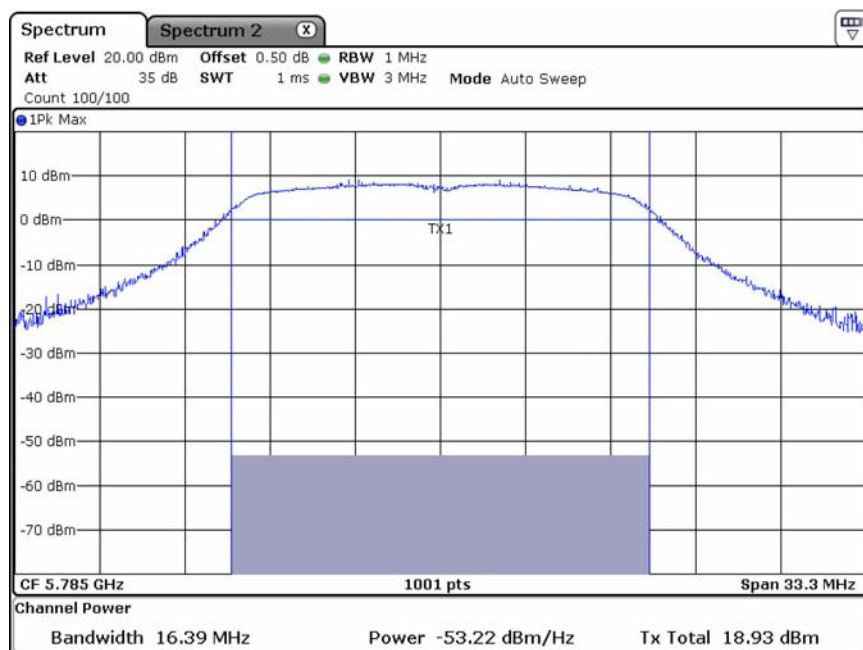
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Electromagnetic Interference Test Report

OFDM (802.11a-157ch)

(Peak)



(Avg)





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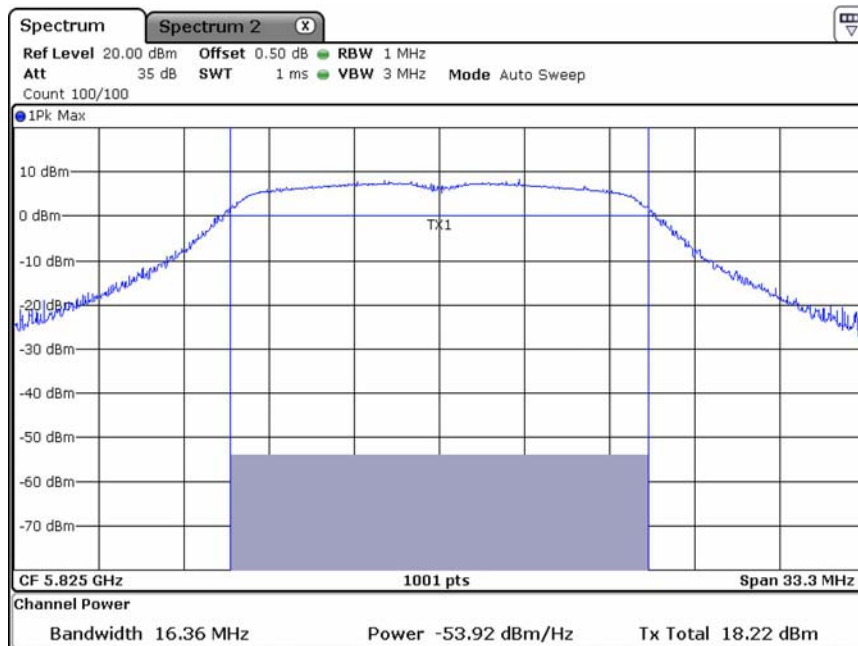
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426-5 Gasan-dong, Guncheon-gu,
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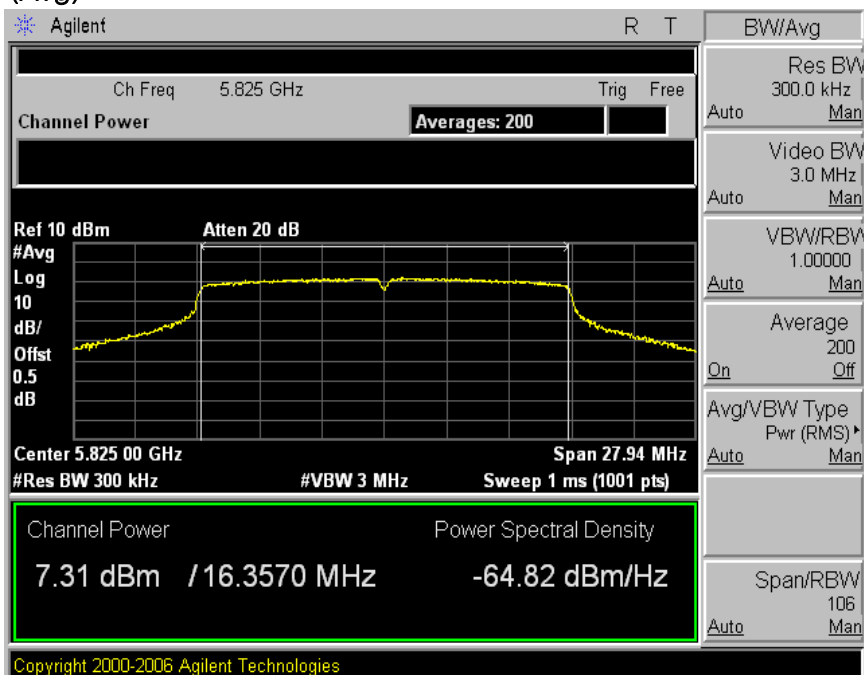
**Electromagnetic
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OFDM (802.11a-165ch)

(Peak)



(Avg)





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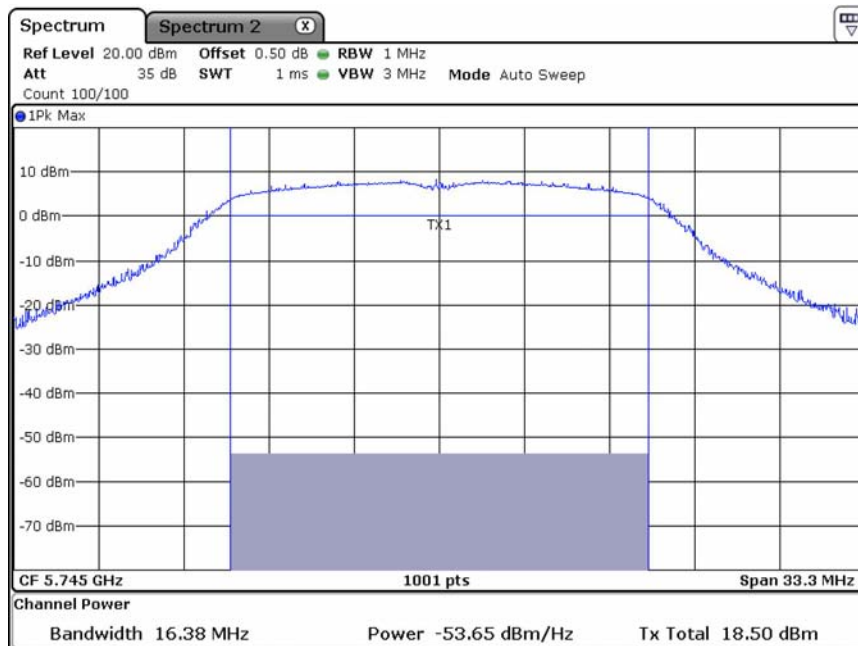
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Electromagnetic Interference Test Report

OFDM (802.11n-149ch)

(Peak)



(Avg)





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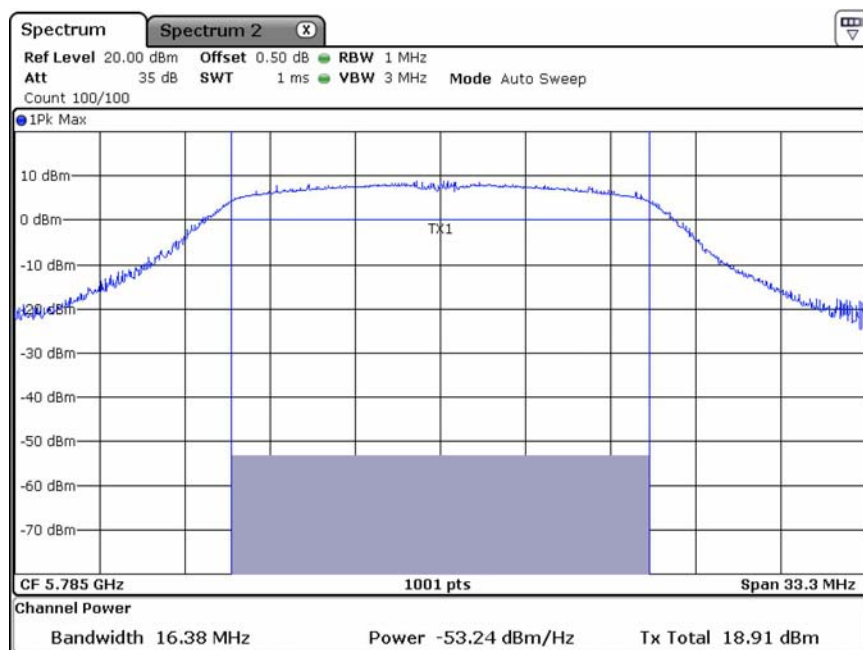
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OFDM (802.11n-157ch)

(Peak)



(Avg)





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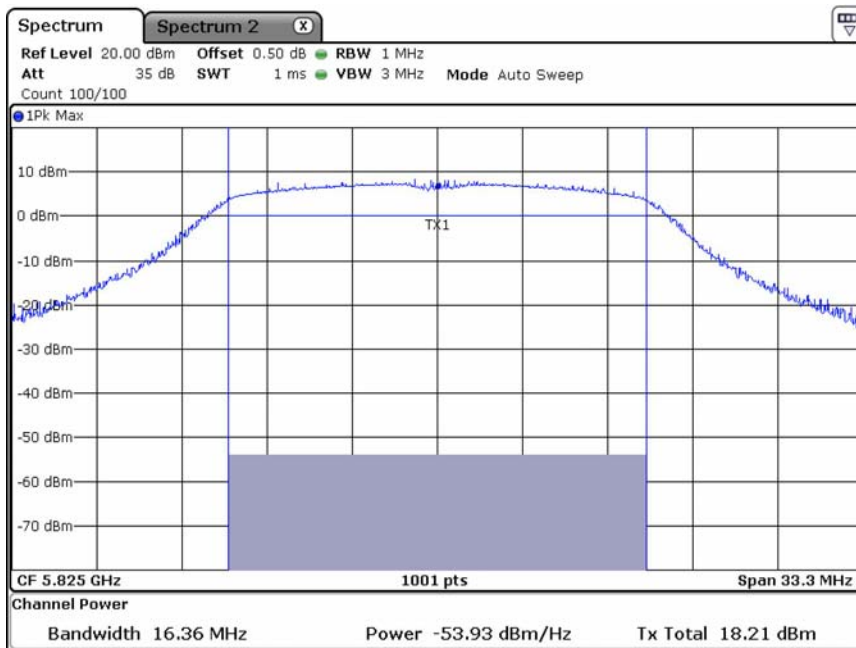
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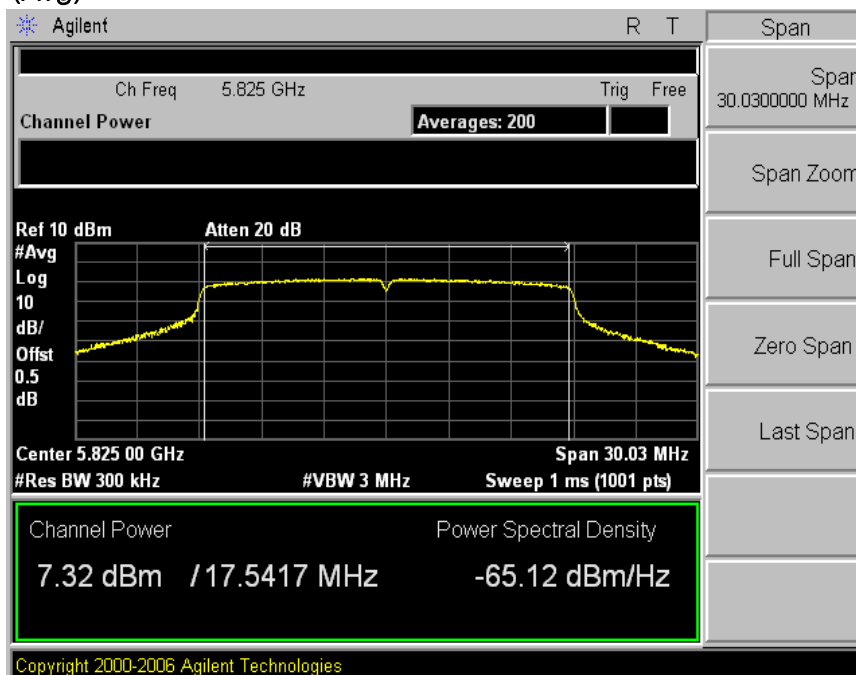
**Electromagnetic
Interference
Test Report**

OFDM (802.11n-165ch)

(Peak)



(Avg)



8. Maximum power spectral density level in the fundamental emission

8.1 Test procedure

KDB 558074 D01 DTS Meas Guidance V03r01 10.2 Method PKPSD (peak PSD)

8.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set the VBW $\geq 3 \text{ RBW}$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.
- If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Limits FCC § 15.247 , IC RSS-210 A8.2

The peak power density Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E440A	US42041281	2013-09-11
RF Cable	Length: 6cm	—	
—Spectrum Analyzer <=> EUT	Loss: 0.4 dB	—	

8.3 Measurement results

802.11b

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	DSSS	ENVIRONMENTAL CONDITION	23 °C , 43 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

CHANNEL	Channel Frequency (MHz)	Measured Power Spectral Density (dBm)	Maximum Permissible Power Density (dBm/3kHz)	Margin
1	2412	-6.26	8.0	14.26
6	2437	-7.55	8.0	15.55
11	2462	-7.47	8.0	15.47

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EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	DSSS	ENVIRONMENTAL CONDITION	23 °C, 43 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

802.11a

CHANNEL	Channel Frequency (MHz)	Measured Power Spectral Density (dBm)	Maximum Permissible Power Density (dBm/3kHz)	Margin
1	2412	-10.75	8.0	18.75
6	2437	-10.55	8.0	18.55
11	2462	-9.25	8.0	17.25

802.11n

CHANNEL	Channel Frequency (MHz)	Measured Power Spectral Density (dBm)	Maximum Permissible Power Density (dBm/3kHz)	Margin
1	2412	-10.63	8.0	18.63
6	2437	-8.91	8.0	16.91
11	2462	-10.01	8.0	18.01

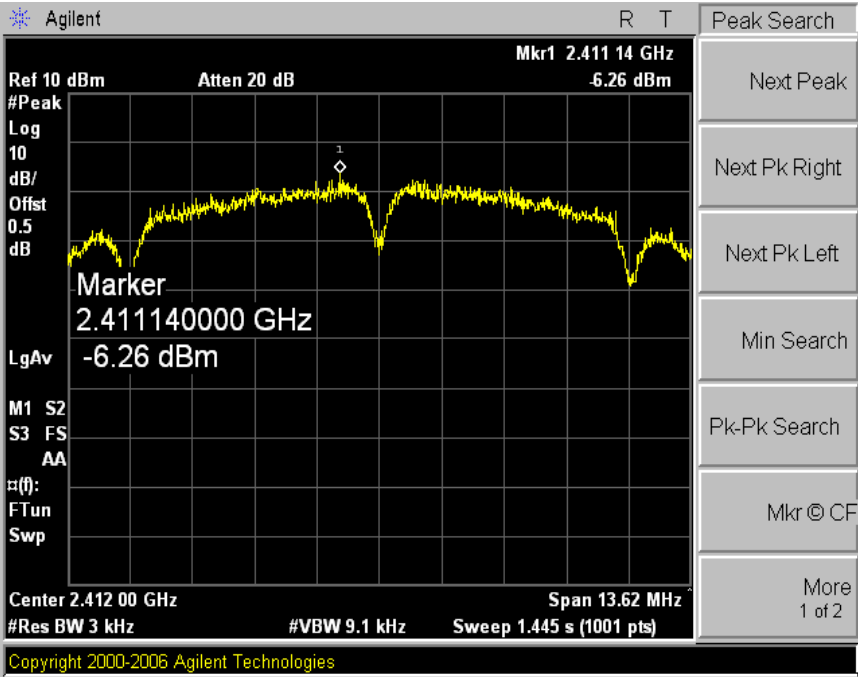
802.11a

CHANNEL	Channel Frequency (MHz)	Measured Power Spectral Density (dBm)	Maximum Permissible Power Density (dBm/3kHz)	Margin
149	5745	-14.72	8.0	22.72
157	5785	-15.48	8.0	23.48
165	5825	-14.69	8.0	22.69

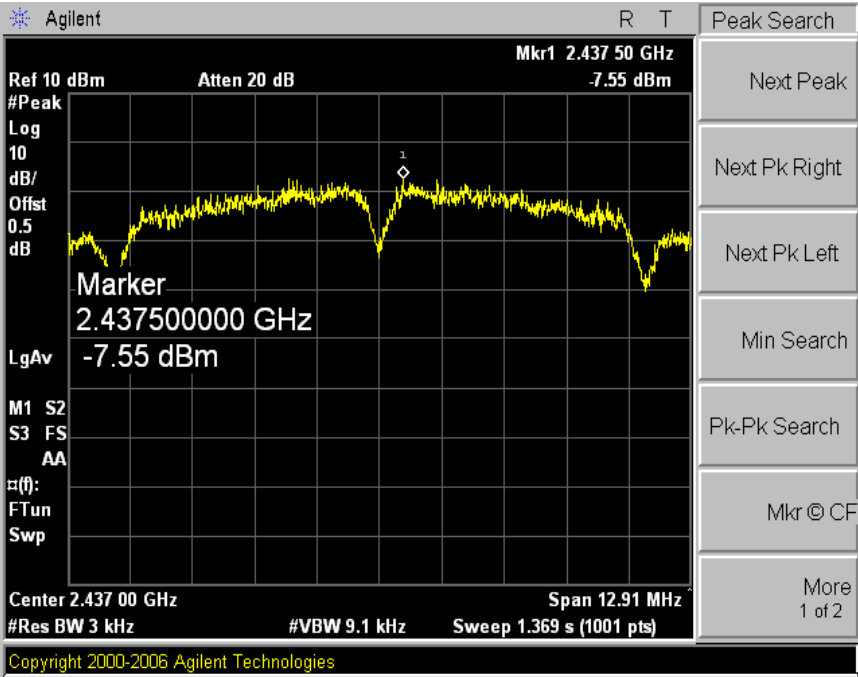
802.11n

CHANNEL	Channel Frequency (MHz)	Measured Power Spectral Density (dBm)	Maximum Permissible Power Density (dBm/3kHz)	Margin
149	5745	-15.01	8.0	23.01
157	5785	-15.20	8.0	23.20
165	5825	-15.34	8.0	23.34

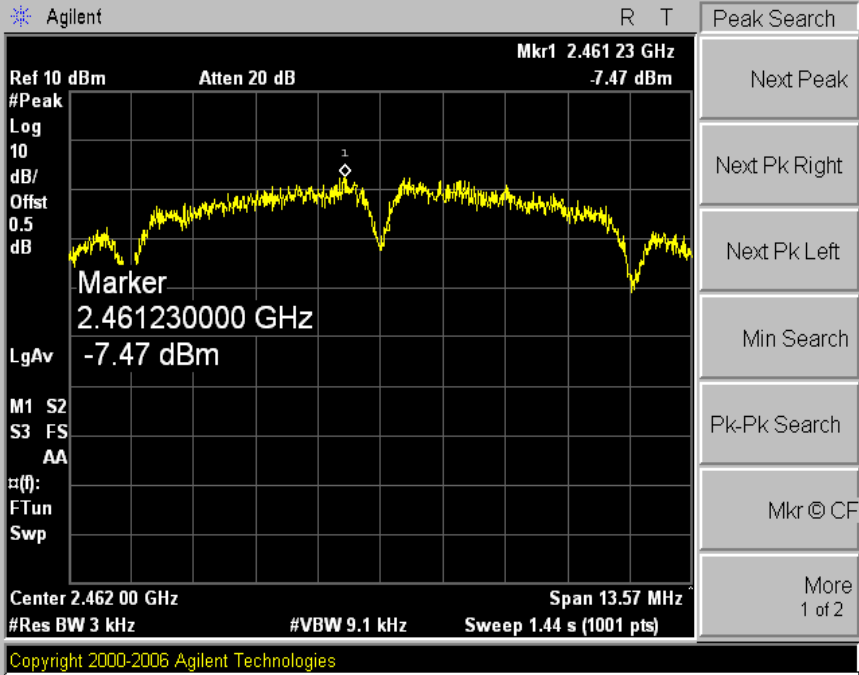
8.4 Trace data
CCK (802.11b-1ch)



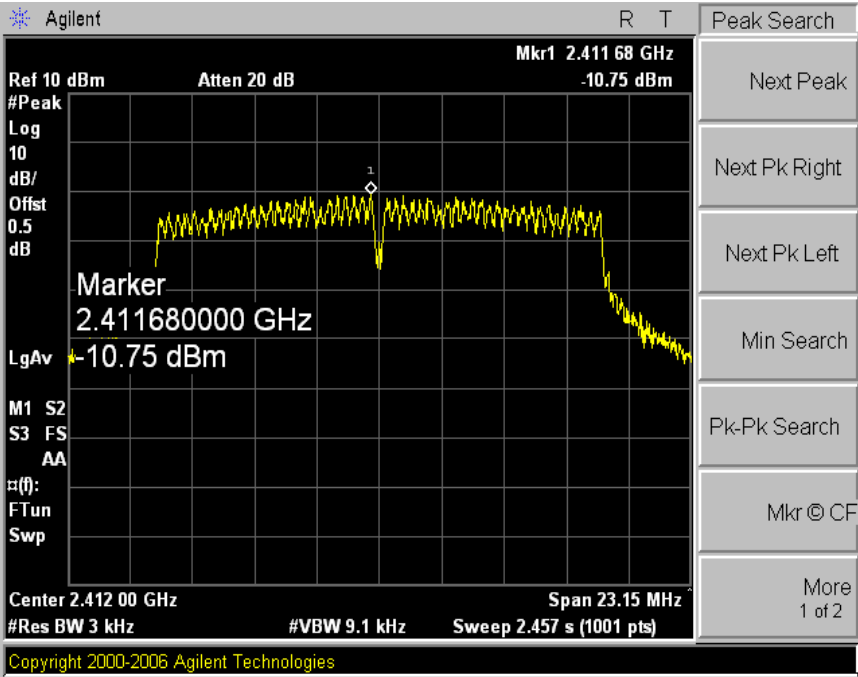
CCK (802.11b-6ch)



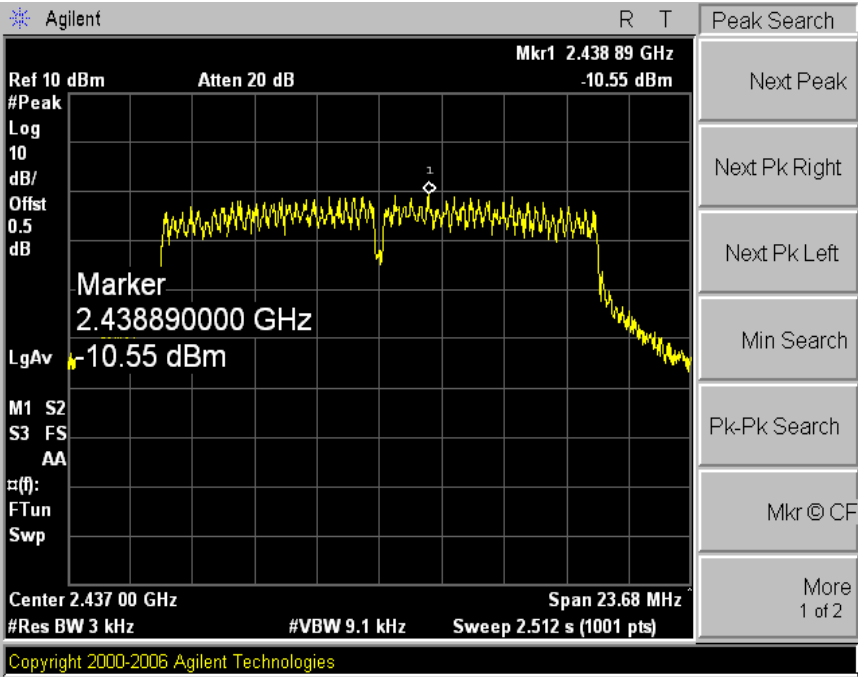
CCK (802.11b-11ch)



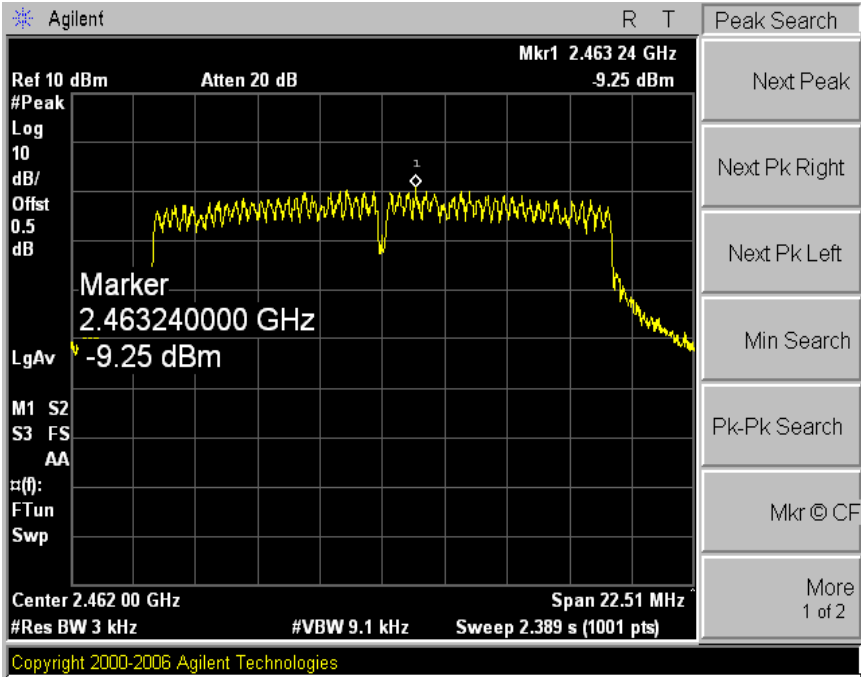
8.4 Trace data
OFDM (802.11g-1ch)



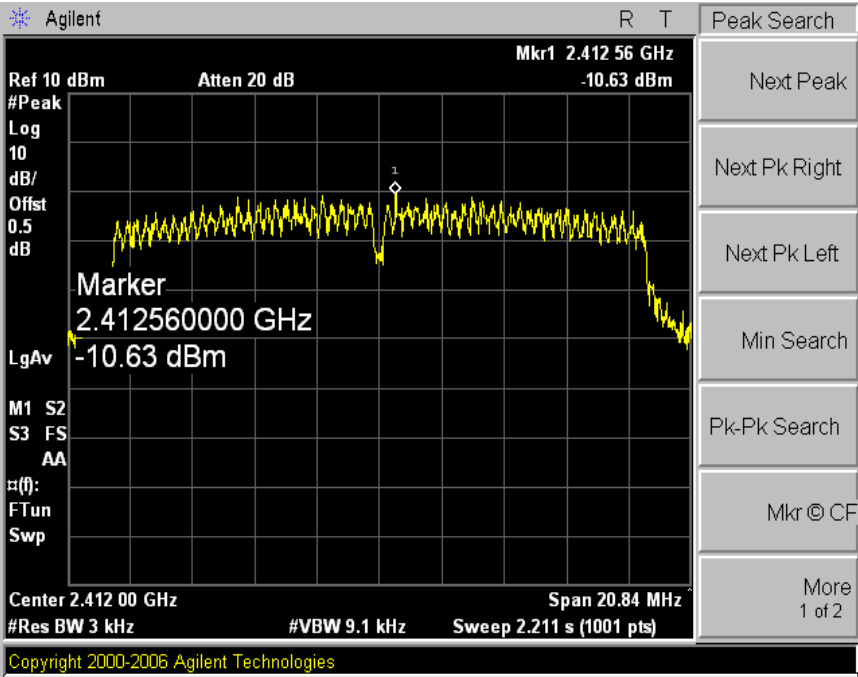
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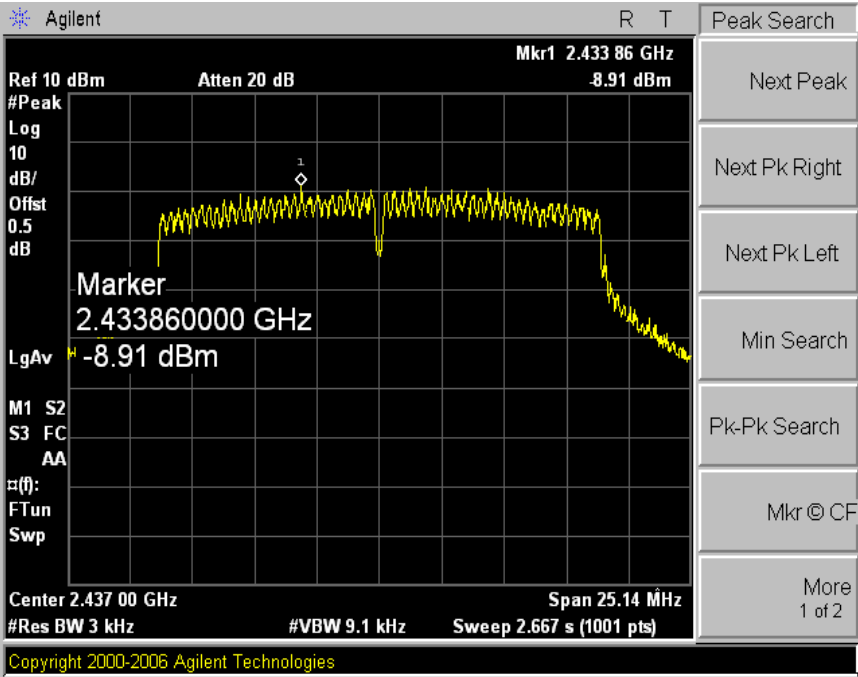
OFDM (802.11g-11ch)



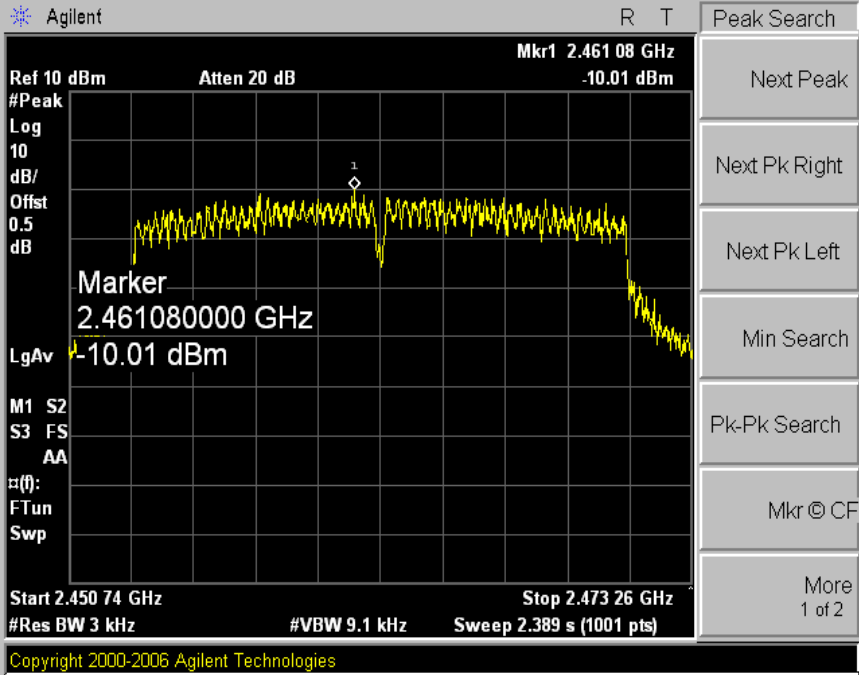
8.4 Trace data
OFDM (802.11n-1ch)



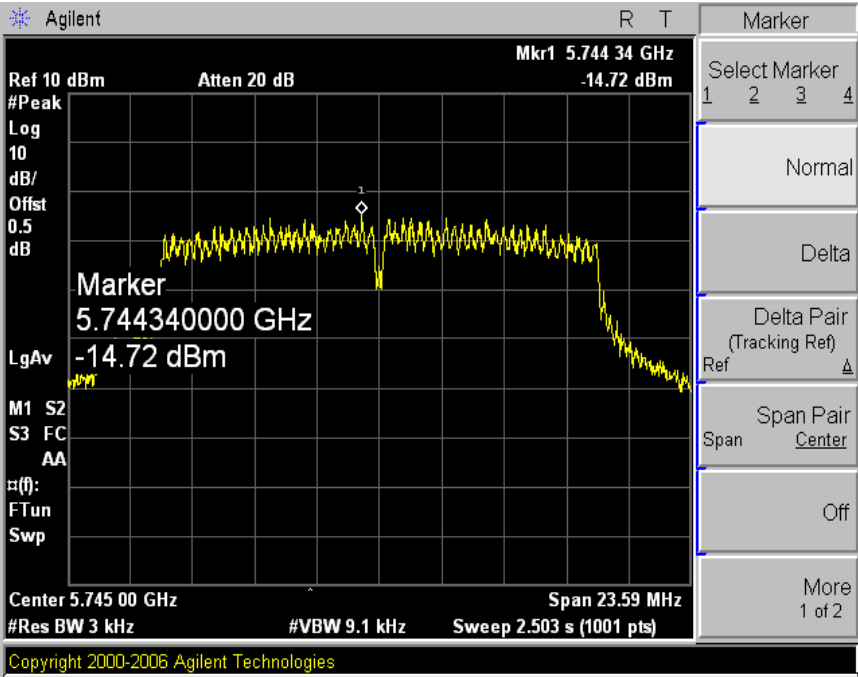
OFDM (802.11n-6ch)



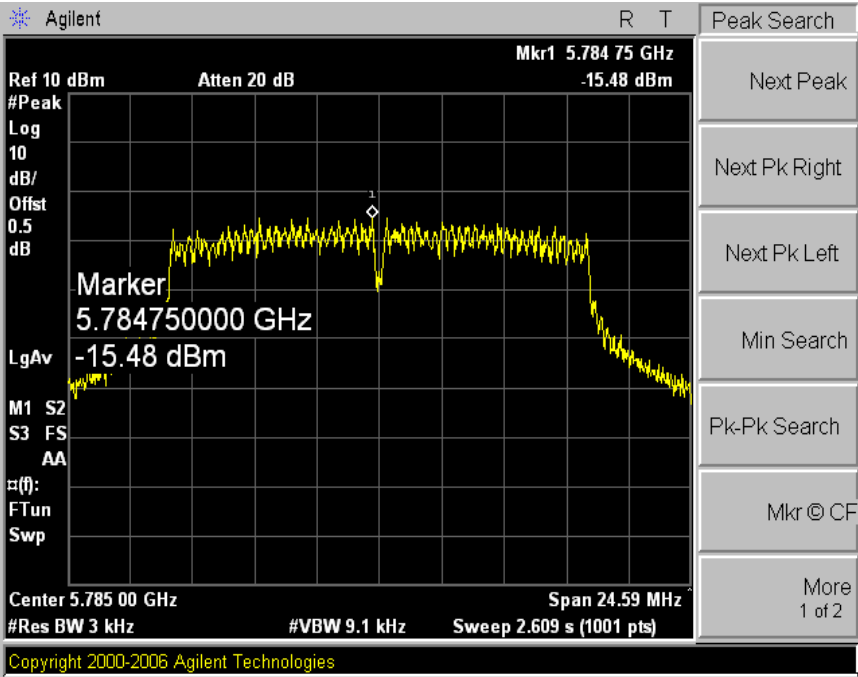
OFDM (802.11n-11ch)



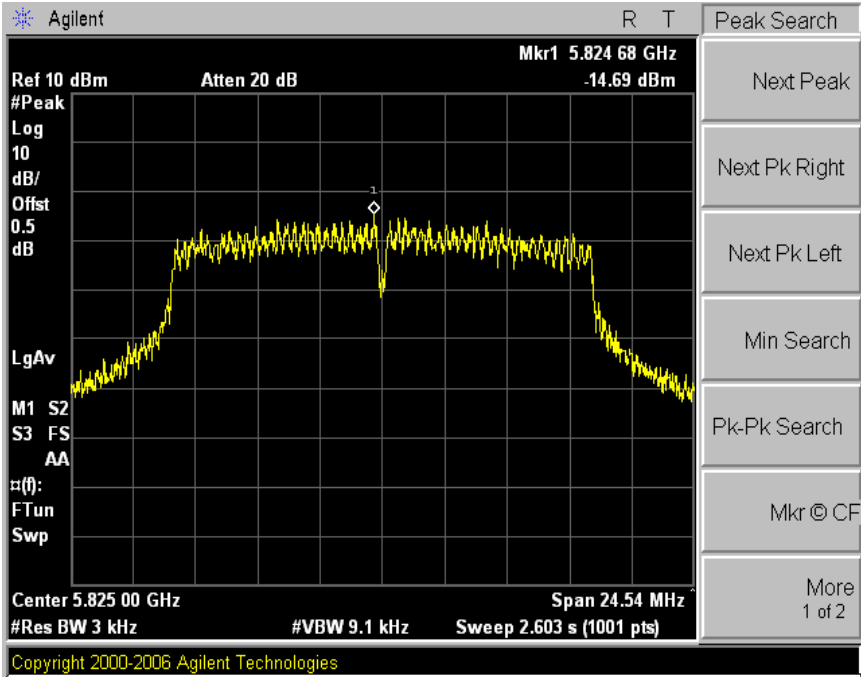
8.4 Trace data
OFDM (802.11a-149ch)



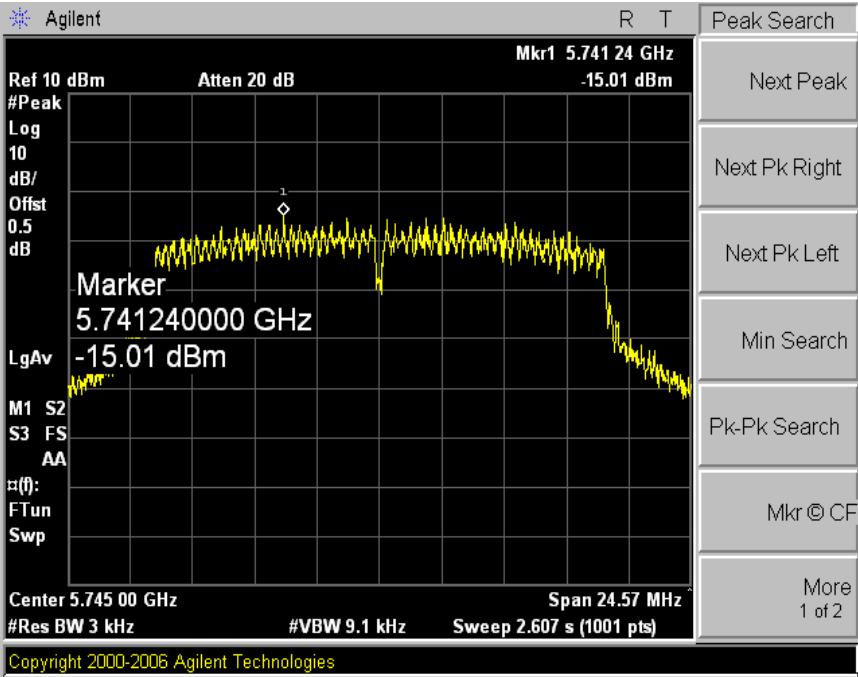
OFDM (802.11a-157ch)



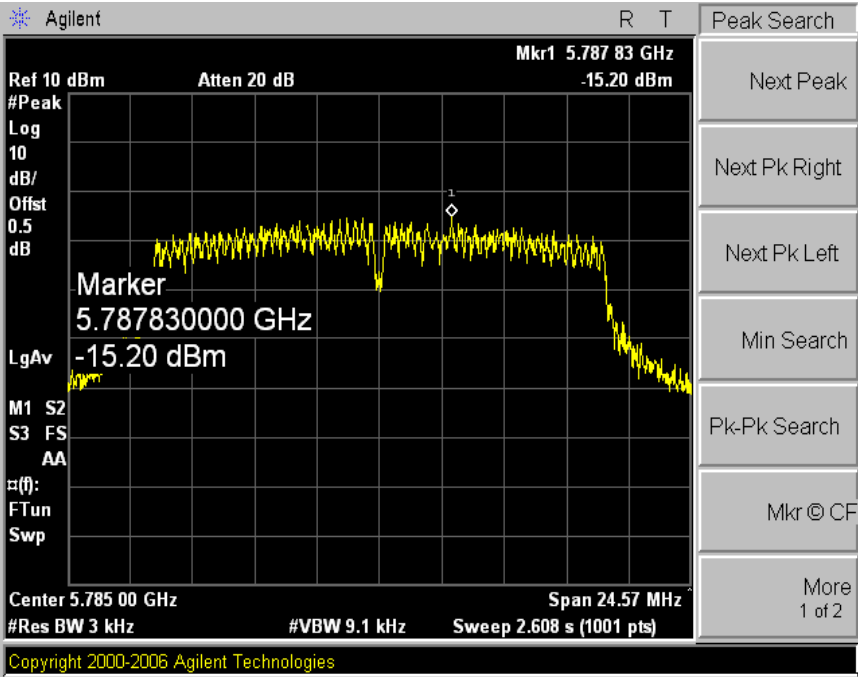
OFDM (802.11a-165ch)



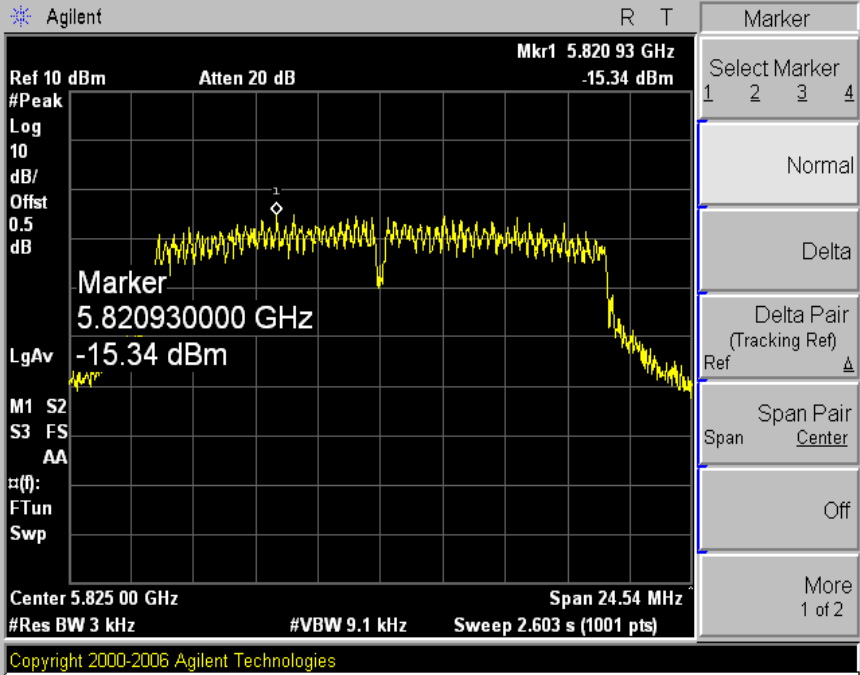
8.4 Trace data
OFDM (802.11n-149ch)



OFDM (802.11n-157ch)



OFDM (802.11n-165ch)



9. Emissions in non-restricted frequency bands

9.1 Test procedure

KDB 558074 D01 DTS Meas Guidance V03r01 11.0 Emissions in non-restricted frequency

9.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- Set the center frequency and span to encompass frequency range to be measured.
- Set the RBW = 100 kHz)
- Set the VBW $\geq 3 \times$ RBW)
- Detector = peak.
- Ensure that the number of measurement points $\geq$ span/RBW
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

Limits FCC § 15.247 , IC RSS-210 A8.5

Band Edge&Out of Emission Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US42041281	2013-09-11
Spectrum Analyzer	FSV40	100939	2014-01-26
RF Cable	Length: 6cm		—
-Spectrum Analyzer <=> EUT	Loss: 1.5dB		—

9.3 Measurement results of band-edge & out of emission

802.11b

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	DSSS	ENVIRONMENTAL CONDITION	23 °C, 43 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

CHANNEL	Channel Frequency (MHz)	limit	PASS/FAIL
1	2412	20dBc	PASS
11	2462	20dBc	PASS

9.3 Measurement results of band-edge & out of emission

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	DSSS	ENVIRONMENTAL CONDITION	23 °C, 43 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

802.11b

CHANNEL	Channel Frequency (MHz)	limit	PASS/FAIL
1	2412	20dBc	PASS
11	2462	20dBc	PASS

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	OFDM	ENVIRONMENTAL CONDITION	23 °C, 43 % R.H.
INPUT POWER	120 Va.c., 60 Hz		

802.11g

CHANNEL	Channel Frequency (MHz)	limit	PASS/FAIL
1	2412	20dBc	PASS
11	2462	20dBc	PASS

802.11n

CHANNEL	Channel Frequency (MHz)	limit	PASS/FAIL
1	2412	20dBc	PASS
11	2462	20dBc	PASS

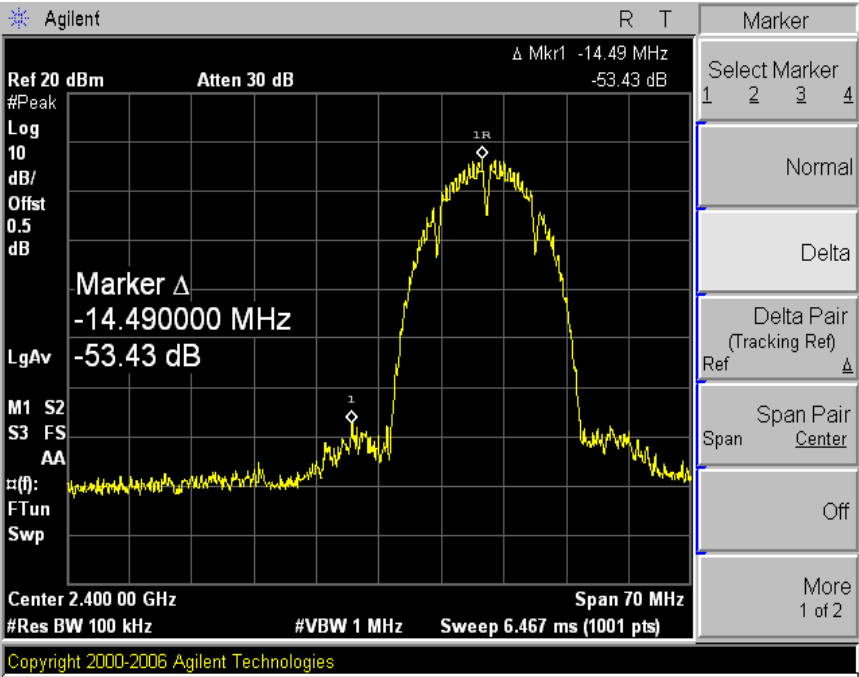
802.11a

CHANNEL	Channel Frequency (MHz)	limit	PASS/FAIL
149	5745	20dBc	PASS
165	5825	20dBc	PASS

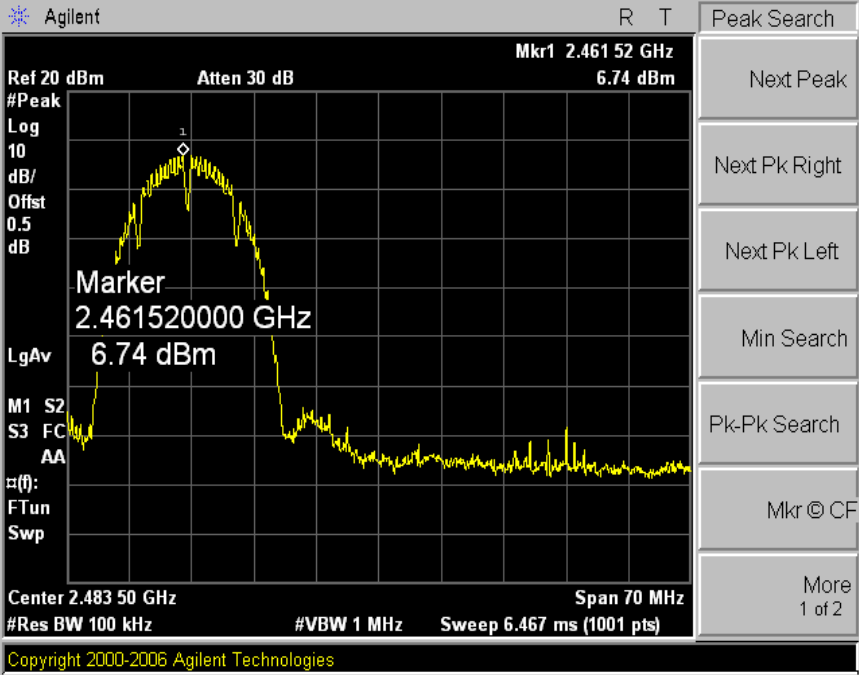
802.11n

CHANNEL	Channel Frequency (MHz)	limit	PASS/FAIL
149	5745	20dBc	PASS
165	5825	20dBc	PASS

9.4 Trace data of band-edge & Out of Emission
CCK (802.11b-1ch)



CCK (802.11b-11ch)





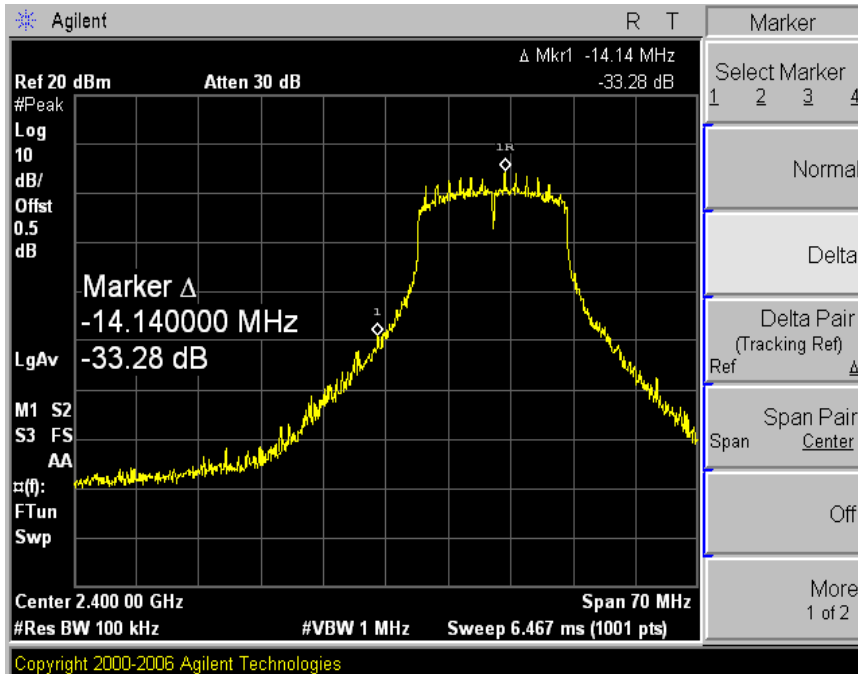
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Seoul, 158-808, Korea

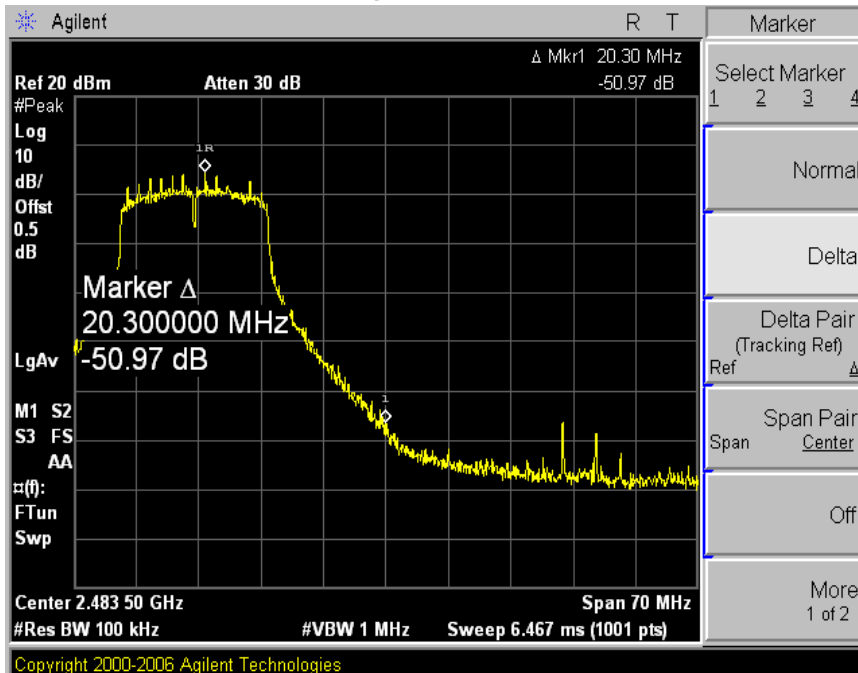


**Electromagnetic
Interference
Test Report**

OFDM (802.11g-1ch)



OFDM (802.11g-11ch)





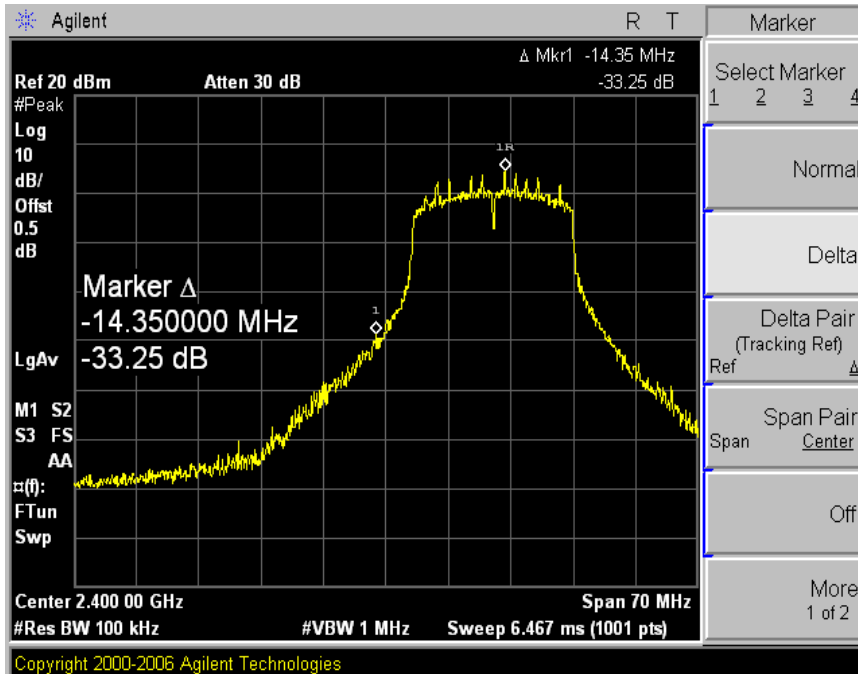
ESTECH Co., Ltd.

Rm. 1015, World Venture Center II,
426-5 Gasan-dong, Guncheon-gu,
Seoul, 158-808, Korea

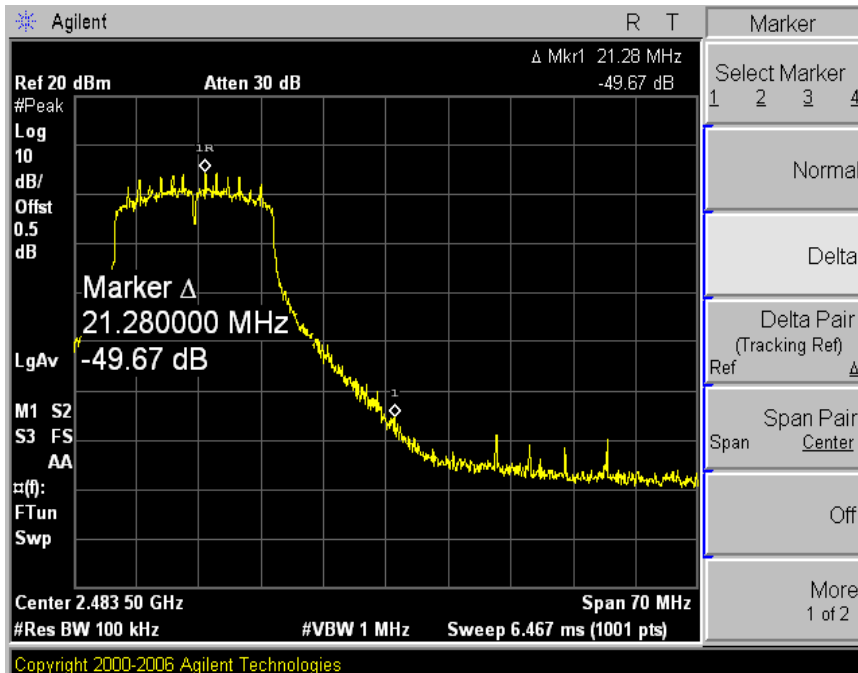


**Electromagnetic
Interference
Test Report**

OFDM (802.11n-1ch)



OFDM (802.11n-11ch)





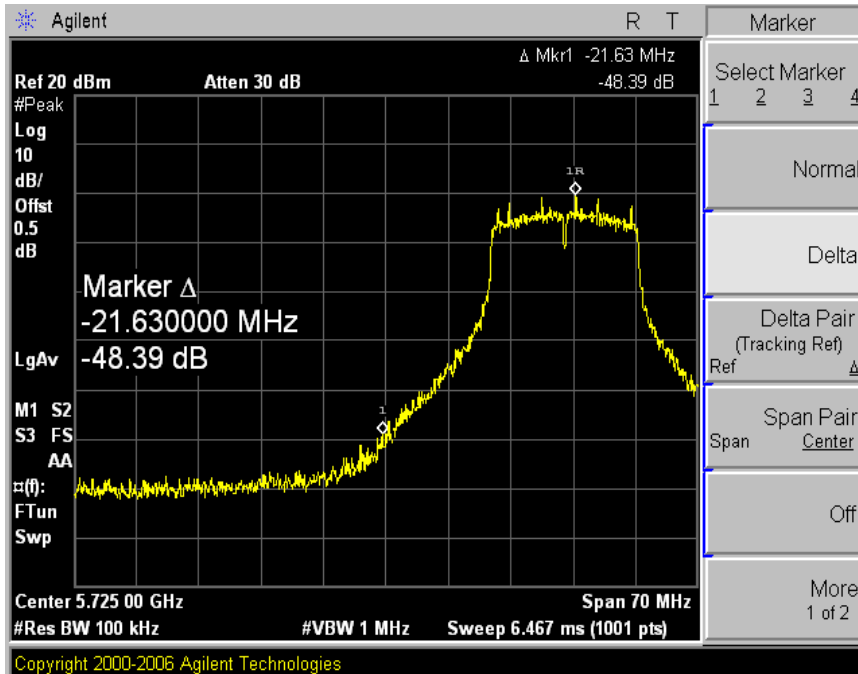
ESTECH Co., Ltd.

Rm. 1015, World Venture Center II,
426-5 Gasan-dong, Guncheon-gu,
Seoul, 158-808, Korea

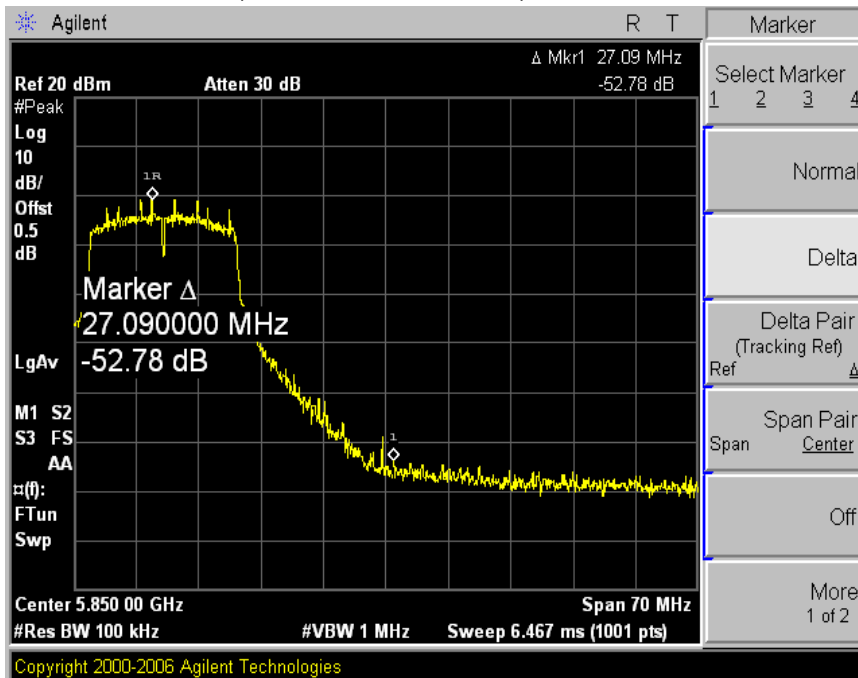


**Electromagnetic
Interference
Test Report**

OFDM (802.11a-149ch)



OFDM (802.11a-165ch)





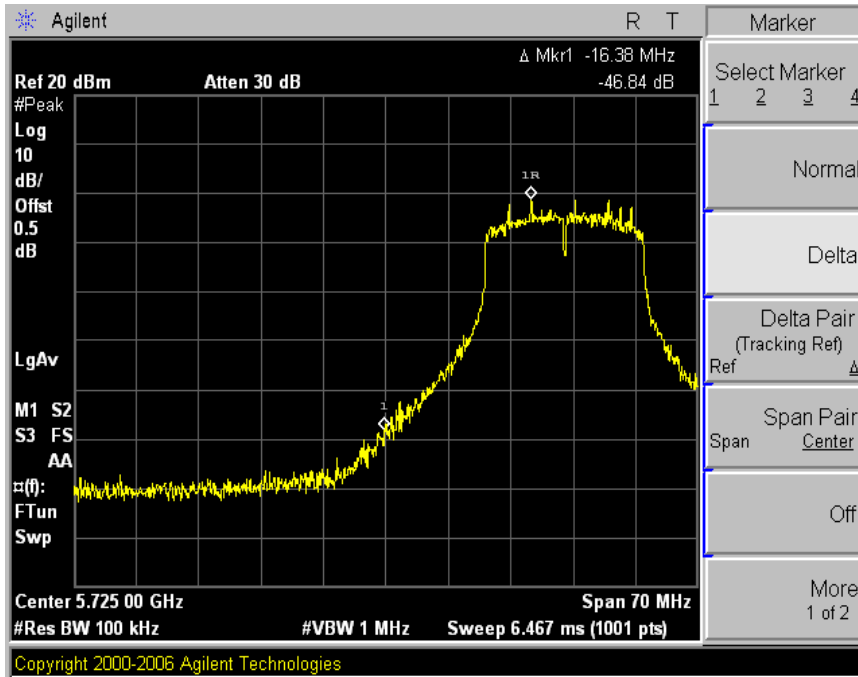
ESTECH Co., Ltd.

Rm. 1015, World Venture Center II,
426-5 Gasan-dong, Guncheon-gu,
Seoul, 158-808, Korea

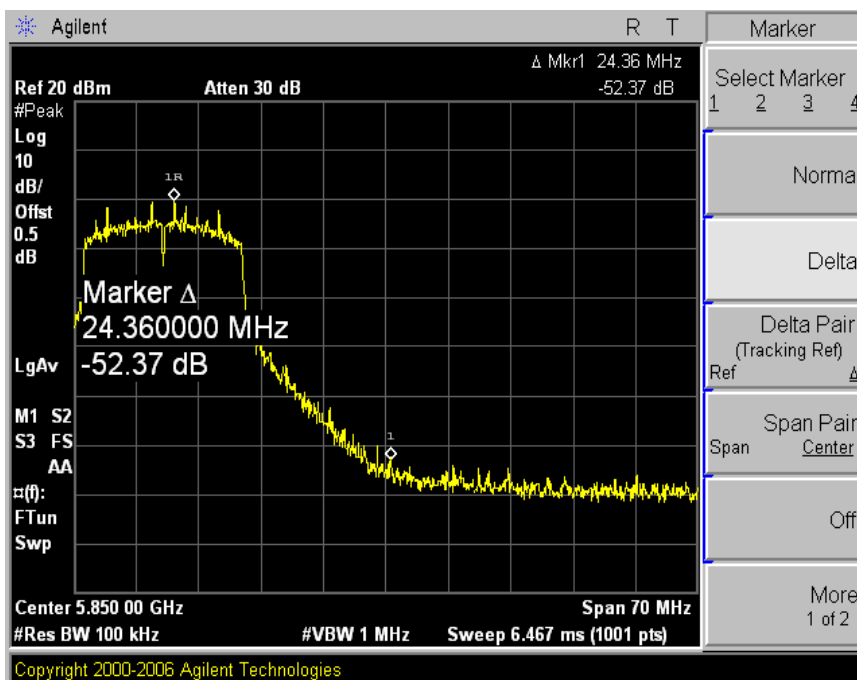


**Electromagnetic
Interference
Test Report**

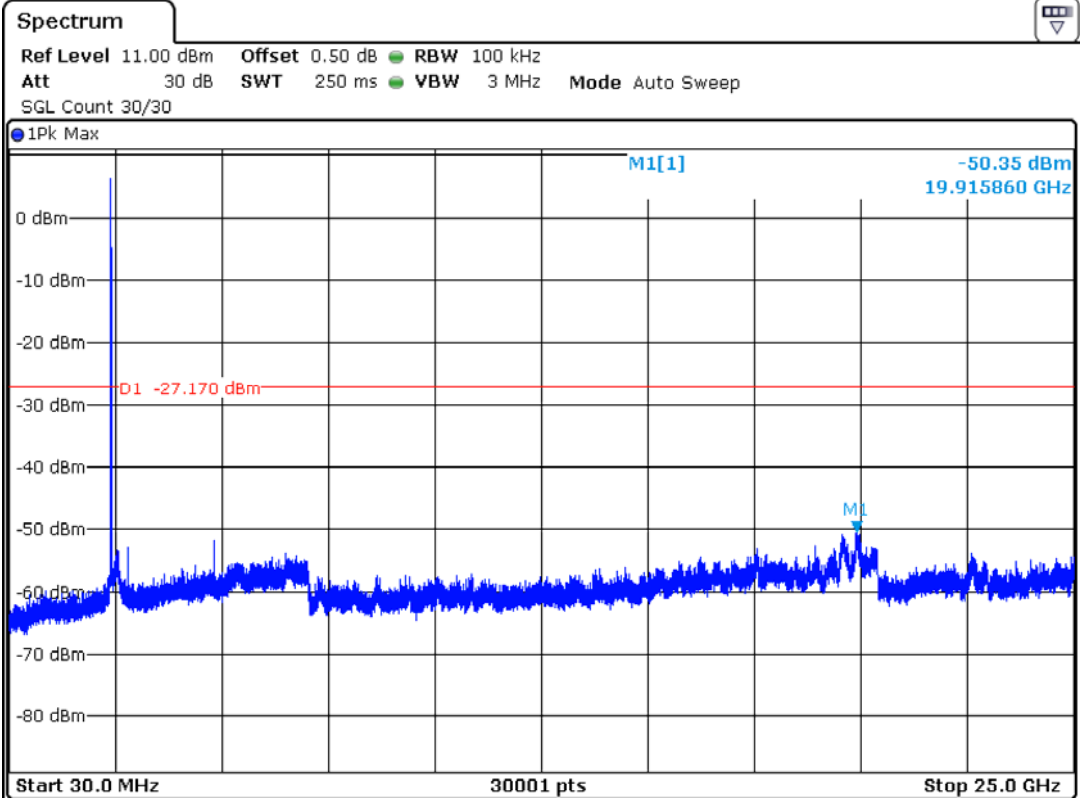
OFDM (802.11n-149ch)



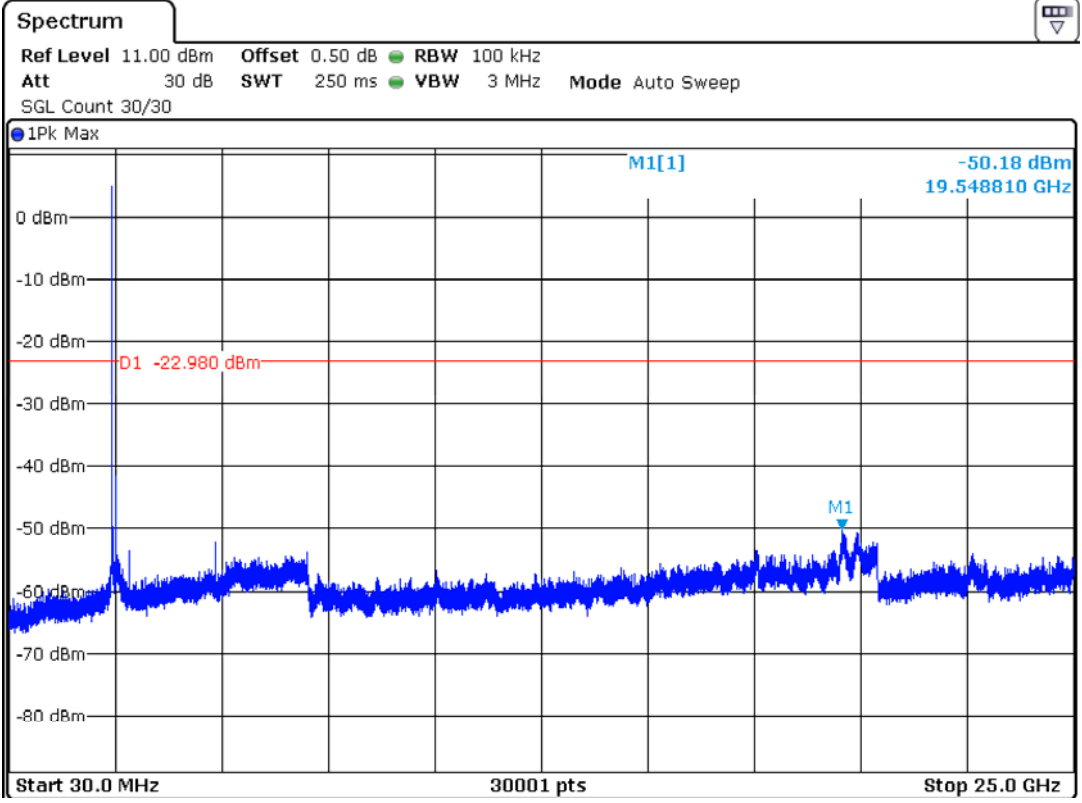
OFDM (802.11n-165ch)



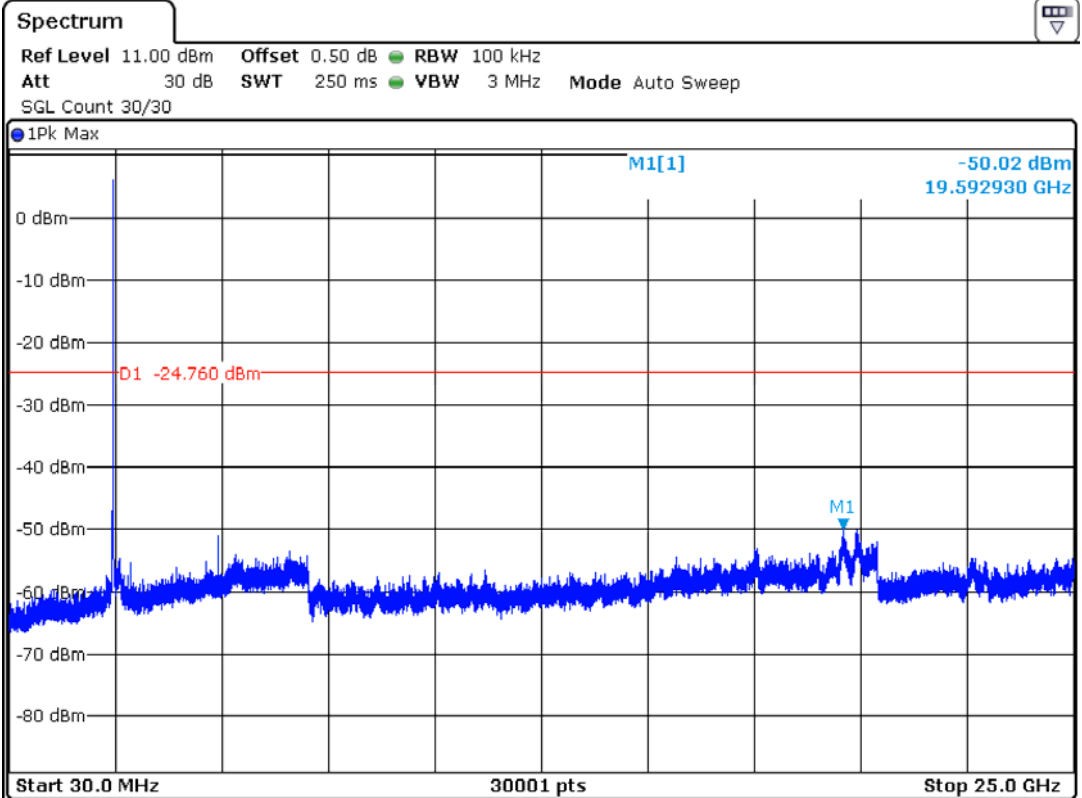
CCK (802.11b-1ch)



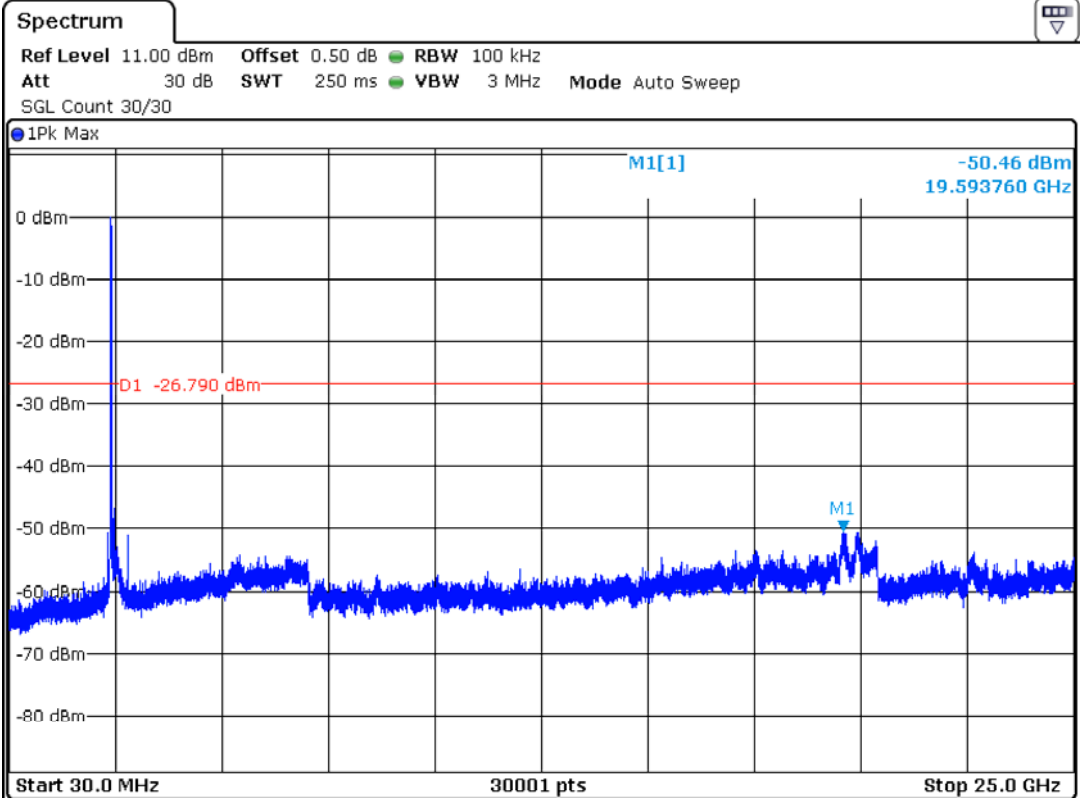
CCK (802.11b-6ch)



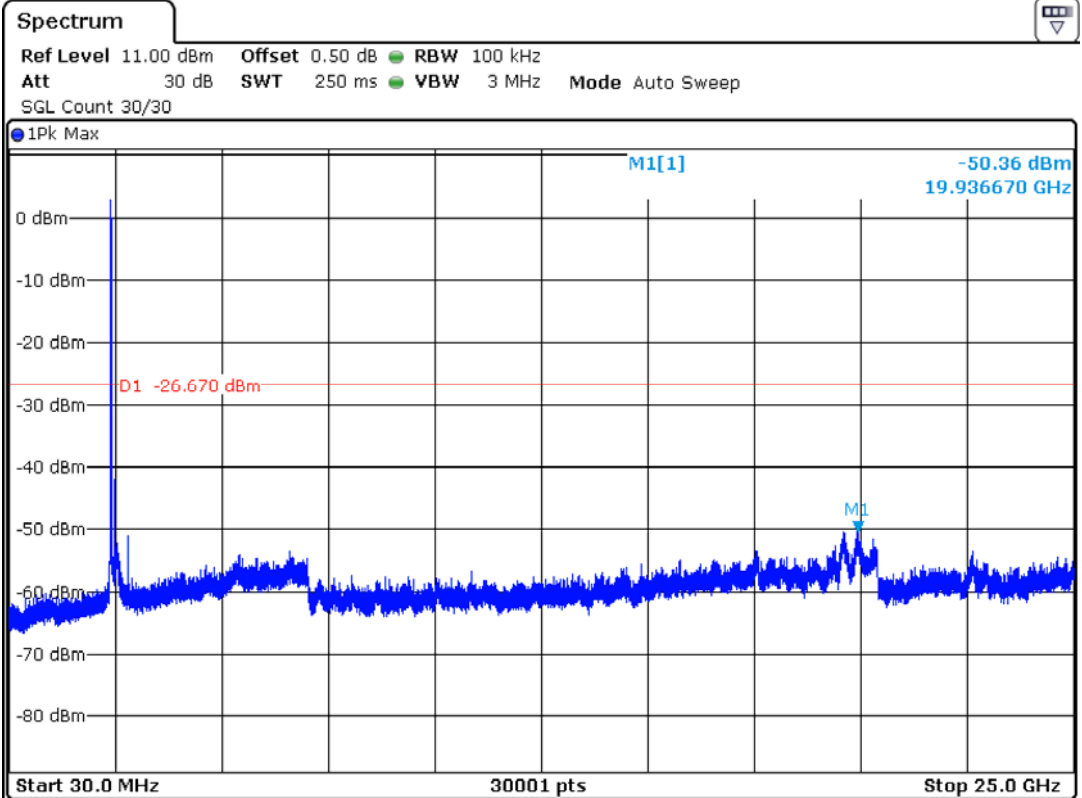
CCK (802.11b-11ch)



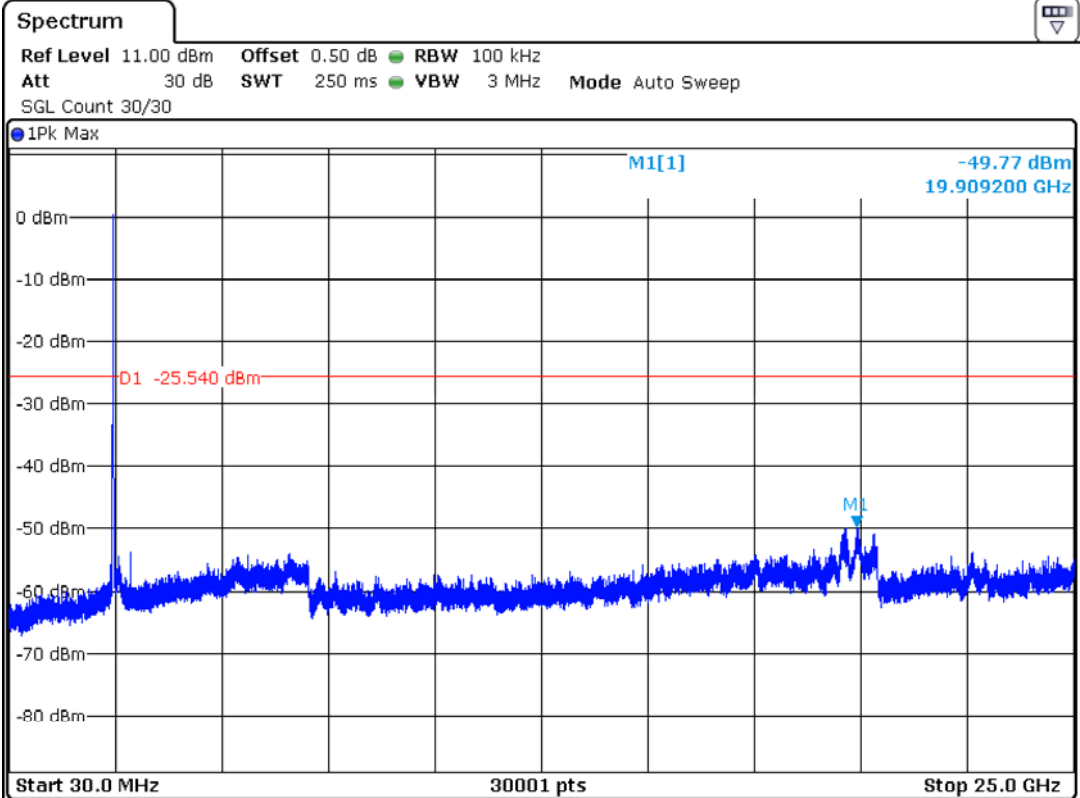
OFDM (802.11g-1ch)

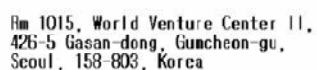


OFDM (802.11g-6ch)

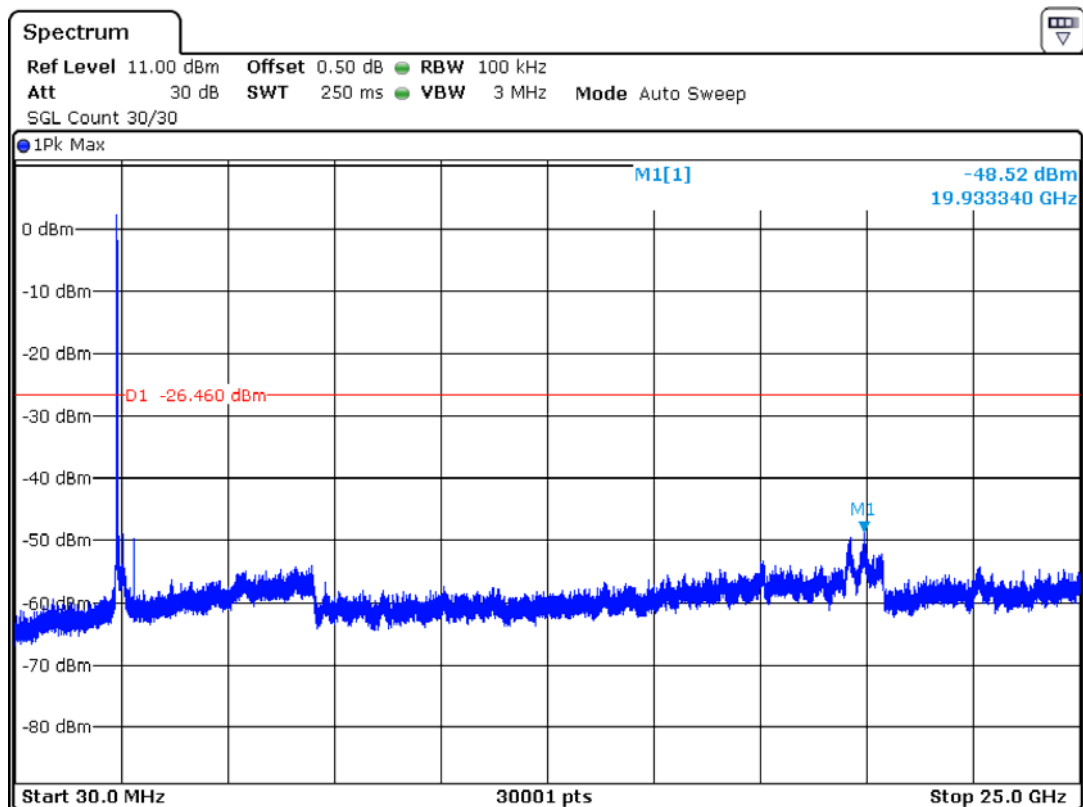


OFDM (802.11g-11ch)

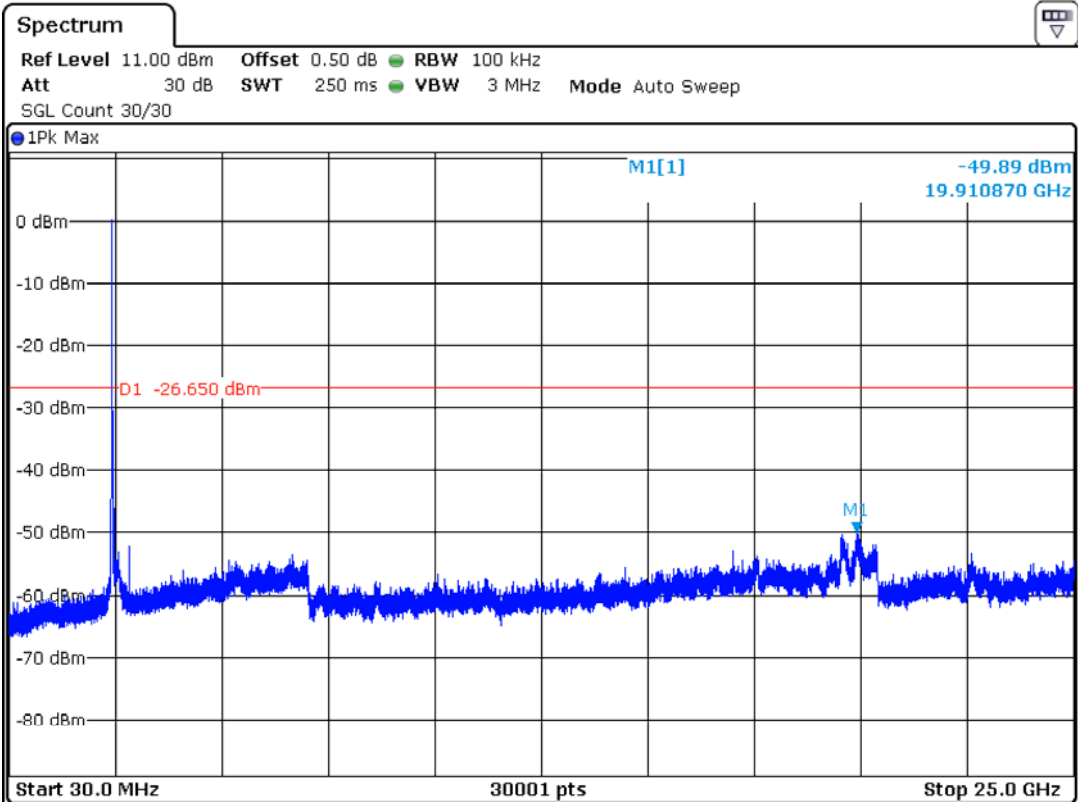




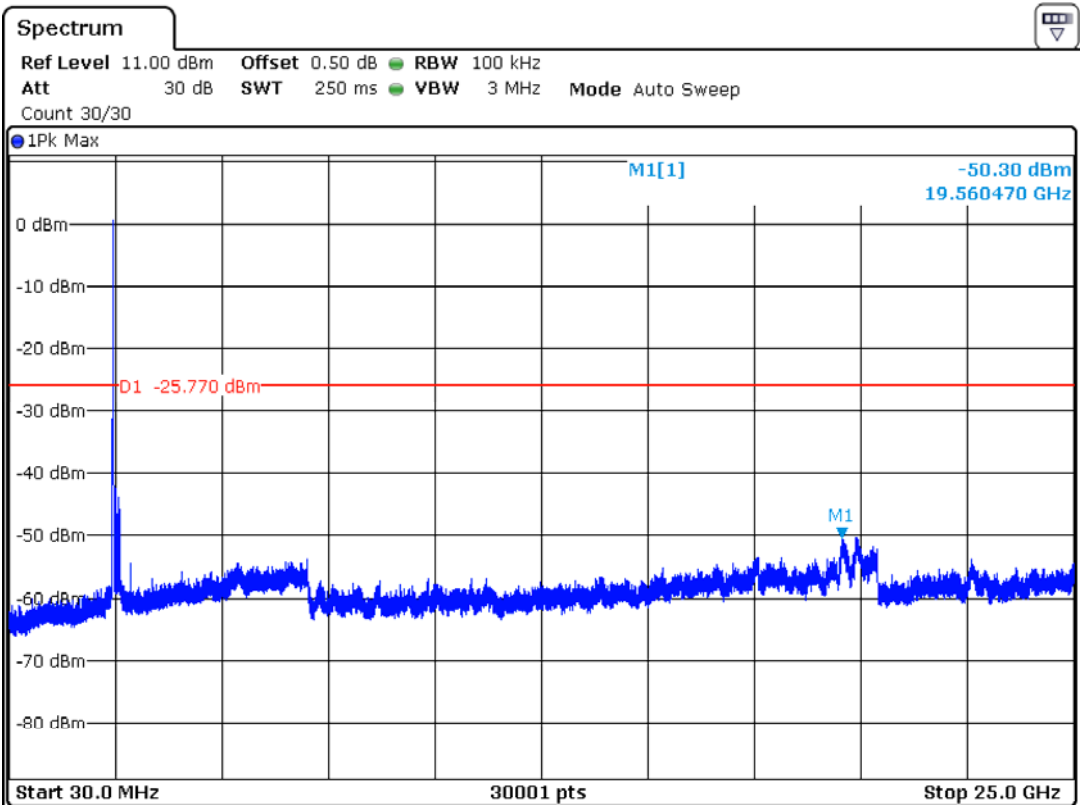
Electromagnetic Interference Test Report



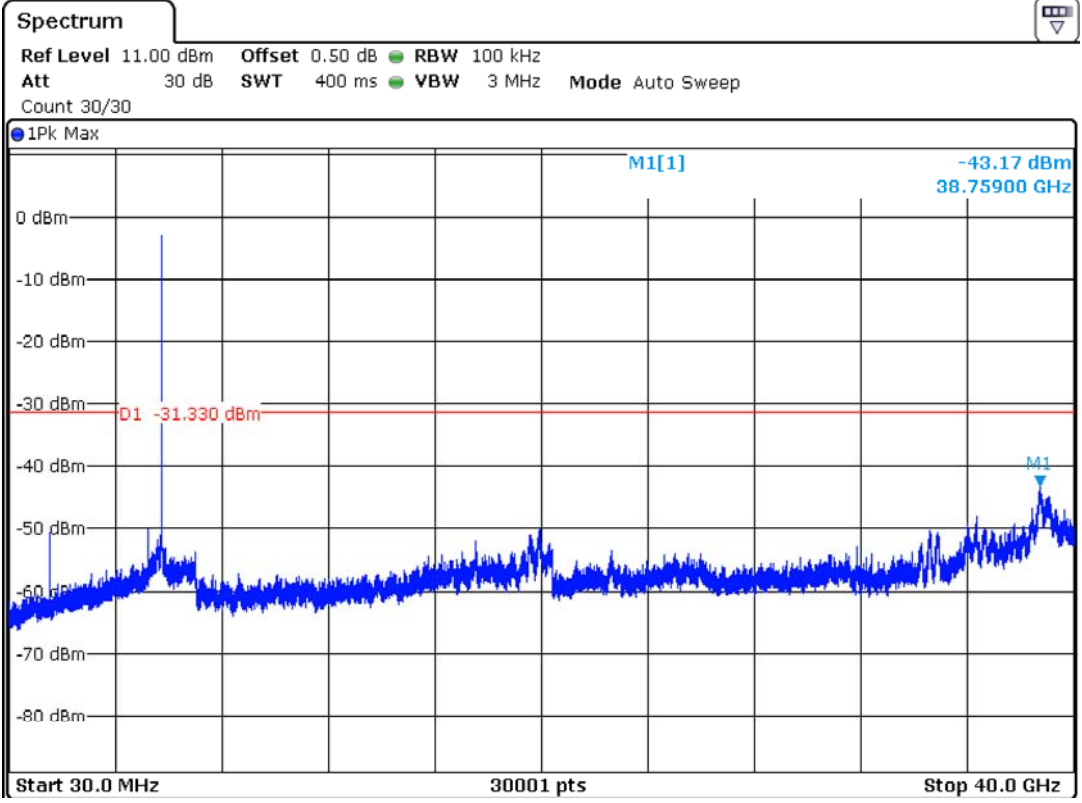
OFDM (802.11n-6ch)



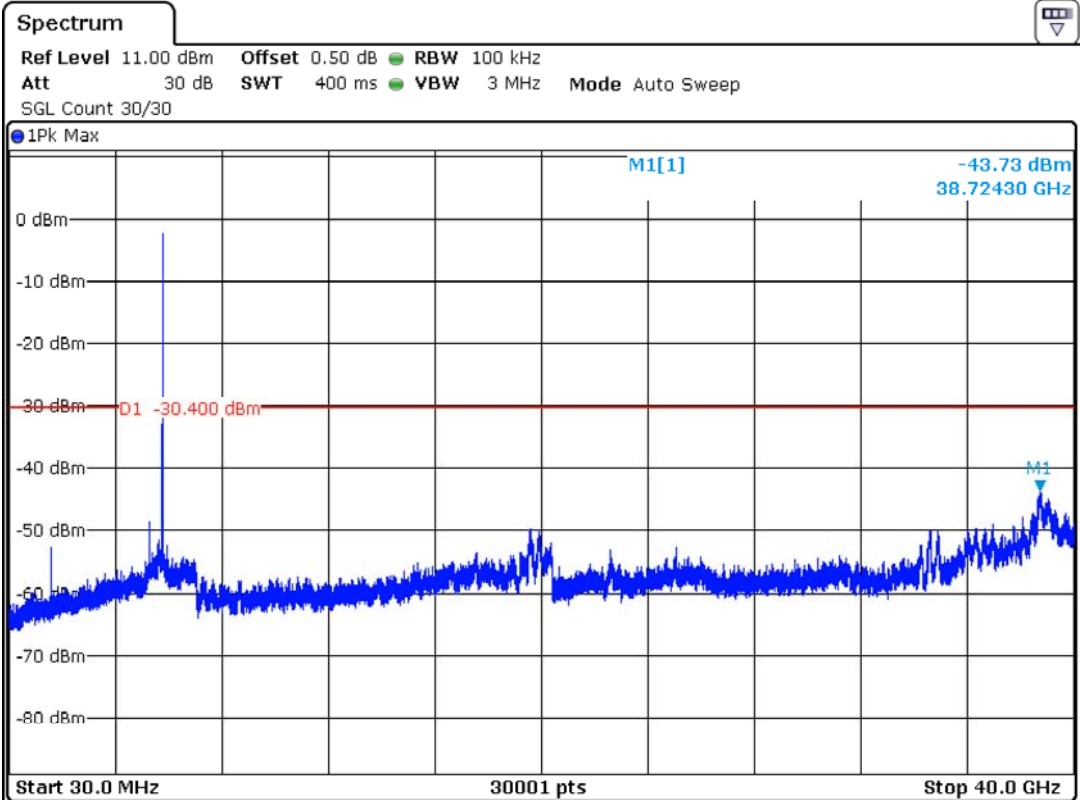
OFDM (802.11n-11ch)



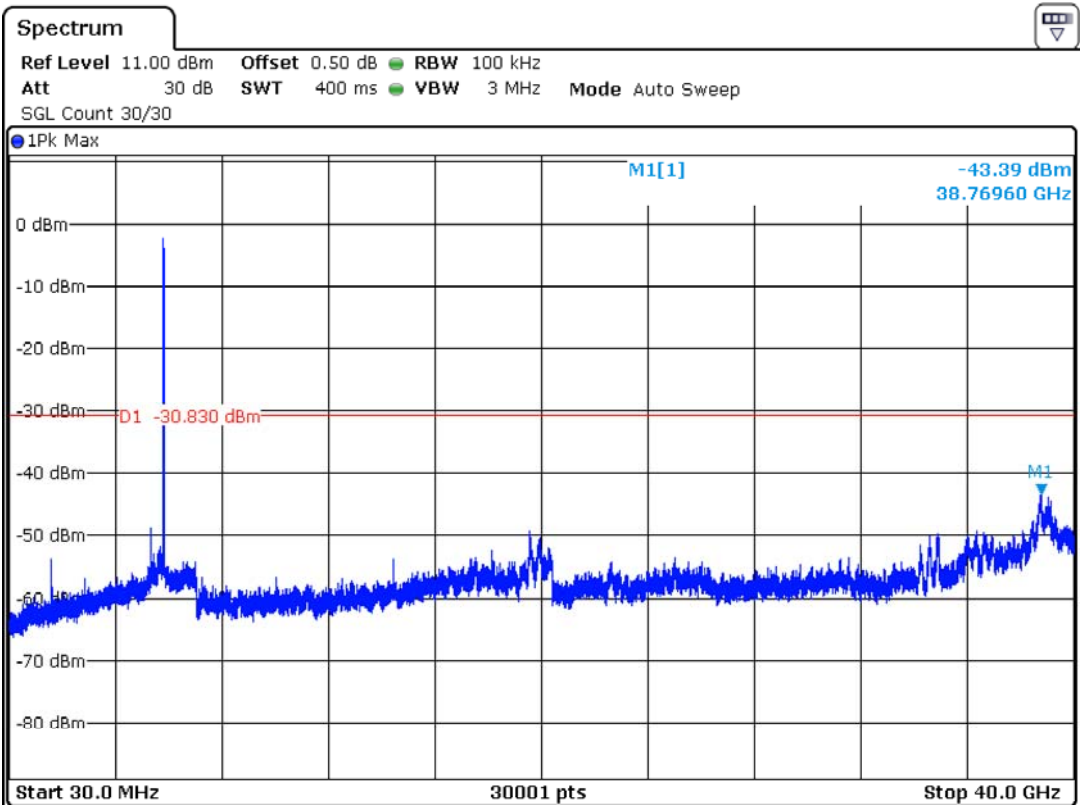
OFDM (802.11a-149ch)



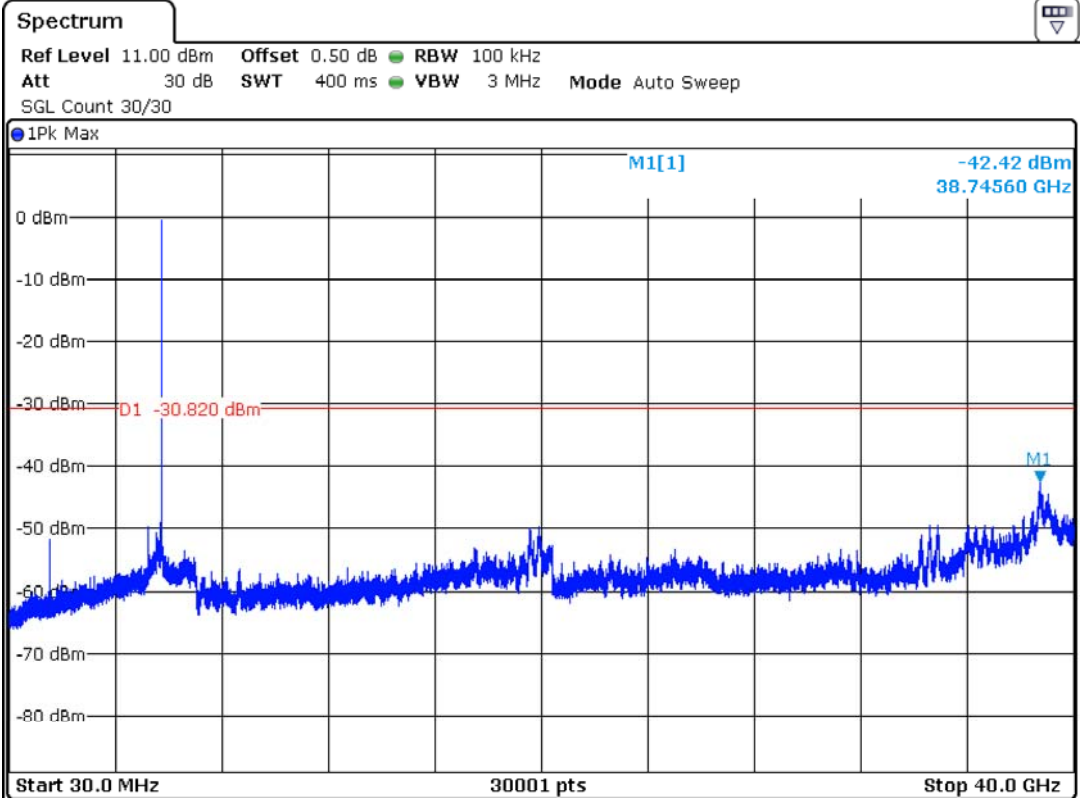
OFDM (802.11a-157ch)



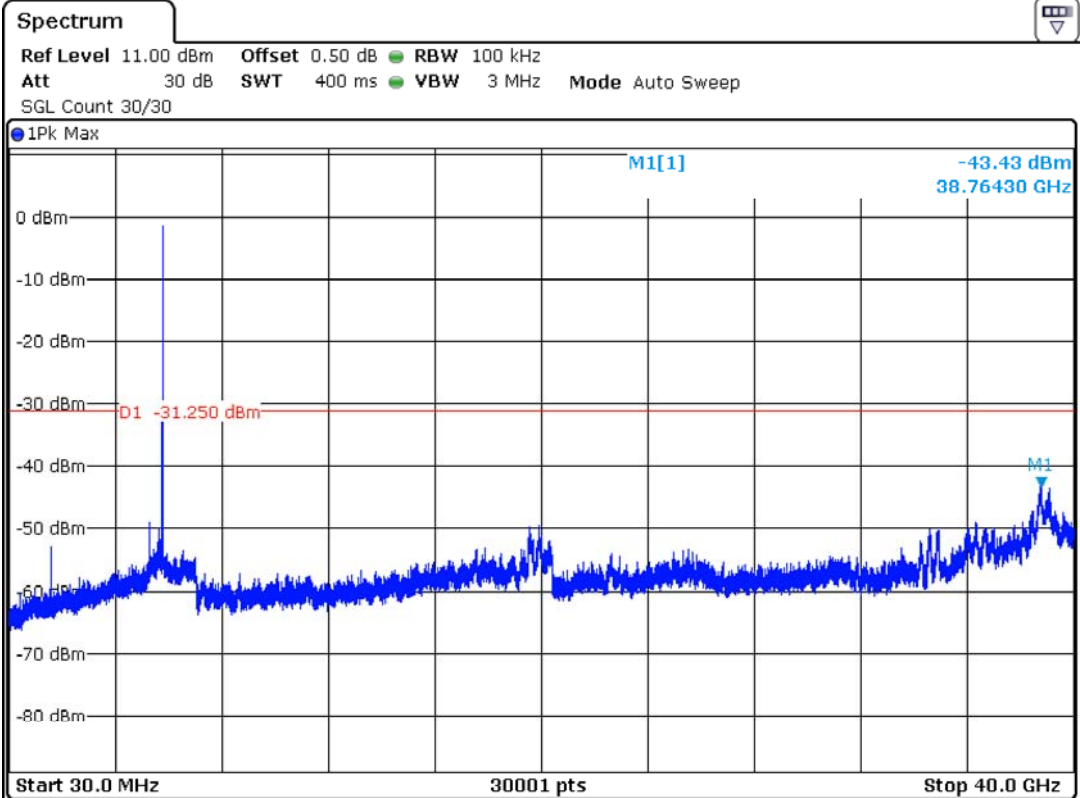
OFDM (802.11a-165ch)



OFDM (802.11n-149ch)



OFDM (802.11n-157ch)



OFDM (802.11n-165ch)

