EMC
TEST REPORT

Report No. : **TS11020087-EME**
Model No. : **NVG2053**
Issued Date : **Mar. 11, 2011**

Applicant: **ZyXEL Communications Corporation**
No. 6, Innovation Rd II, Science-Based Industrial Park, Hsin-Chu, Taiwan

Test Method/ Standard: **CFR 47 FCC Part 15.247 & ANSI C63.4 2003**

Test By: **Intertek Testing Services Taiwan Ltd.**
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li, Shiang-Shan District, Hsinchu City, Taiwan

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These measurements were taken by: Sign on File
Terry Hsu / Engineer

The test report was reviewed by: Jimmy Yang

Name Jimmy Yang
Title Engineer

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1. Summary of Test Data

Test/Requirement Description	Applicable Rule	Result
Minimum 6 dB Bandwidth	15.247(a)(2)	Pass
Maximum Output Power	15.247(b)	Pass
Power Spectral Density	15.247(e)	Pass
RF Antenna Conducted Spurious	15.247(d)	Pass
Radiated Spurious Emission	15.247(d), 15.205, 15.209	Pass
Emission on the Band Edge	15.247(d)	Pass
AC Power Line Conducted Emission	15.207	Pass

2. General Information

Identification of the EUT

Product:	Wireless N Gigabit VoIP Gateway
Model No.:	NVG2053
FCC ID.:	I88NVG2053
Frequency Range:	1. 2412 MHz ~ 2462 MHz for 802.11b, 802.11g, 802.11n HT20 2. 2422 MHz ~ 2452 MHz for 802.11n HT40
Channel Number:	1. 11 channels for 2412 MHz ~ 2462 MHz 2. 7 channels for 2422 MHz ~ 2452 MHz
Rated Power:	DC 12 V from Adapter
Power Cord:	N/A
Data Cable:	RJ-45 UTP Cat.5 10 meter × 1
Sample Received:	Feb. 17, 2011
Test Date(s):	Feb. 23, 2011 ~ Mar. 10, 2011
Note 1:	This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
Note 2:	When determining the test conclusion, the Measurement Uncertainty of test has been considered.

Description of EUT

The EUT is a Wireless N Gigabit VoIP Gateway, and was defined as information technology equipment.

For more detail features, please refer to User's manual as file name “Installation guide.pdf”

Antenna description

(1) Antenna 1

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector.

Antenna Gain	: 2 dBi
Antenna Type	: Dipole antenna
Connector Type	: SMA reverse

(2) Antenna 2

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector.

Antenna Gain	: 2 dBi
Antenna Type	: Dipole antenna
Connector Type	: SMA reverse

Adapter information

The EUT will be supplied with a power supply from below list:

No.	Brand	Model no.	Specification
Adapter 1	Sunny	SYS1308-2412-W2	I/P: 100-240 Vac, 50-60 Hz, 1.0 A MAX O/P: +12 Vac, 1.5 A, 18 W MAX
Adapter 2	Ktec	KSAD1200150W1US	I/P: 100-240 Vac, 50/60 Hz, 0.4 A O/P: 12 Vac, 1.5 A

Operation mode

The EUT was supplied with 12 Vdc from adapter (Test voltage: 120Vac, 60Hz) and it was run in TX / RX mode that was controlled by “QA” program.

The EUT was transmitted continuously during the test.

All the antennas were verified, the worst case was antenna gain 2 dBi.

With individual verifying, the maximum output power was found out 1 Mbps data rate for 802.11b mode and 6 Mbps data rate for 802.11g mode, 6.5 Mbps data rate for 802.11n HT 20 mode and 13 Mbps data rate for 802.11n HT 40 mode. The final tests were executed under these conditions recorded in this report individually. Please refer the details below:

Chain 0: 802.11b channel 6	
Data rate (Mbps)	PK(dBm)
1	18.88
2	18.55
5.5	18.28
11	18.17

Chain 0: 802.11n HT20 channel 6	
Data rate (Mbps)	PK(dBm)
6.5	21.54
13	21.47
19.5	21.41
26	21.35
39	21.29
52	21.21
58.5	21.17
65	21.09

Chain 0: 802.11g channel 6	
Data rate (Mbps)	PK(dBm)
6	21.92
9	21.58
12	21.49
18	21.41
24	21.36
36	21.31
48	21.25
54	21.11

Chain 0: 802.11n HT40 channel 6	
Data rate (Mbps)	PK(dBm)
13	21.06
26	20.98
39	20.89
52	20.76
78	20.69
104	20.54
117	20.48
130	20.37

3. Maximum 6 dB Bandwidth

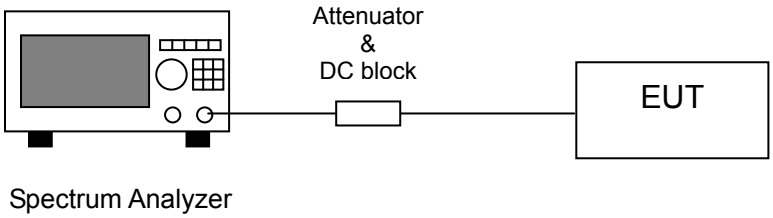
Name of Test	Maximum 6 dB Bandwidth
Base Standard	FCC 15.247 (a)(2)

Test Result: Complies
Measurement Data: See Table & plots below

Method of Measurement:

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.

Test Diagram:



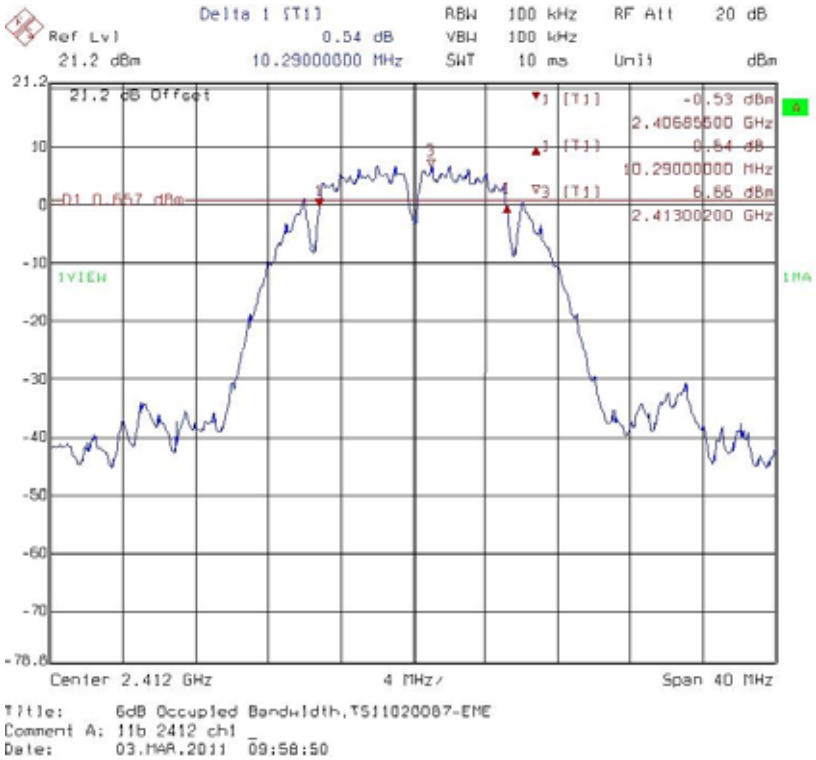
Note: The EUT was tested while in a continuous transmit mode and the worst case data rates are 1 Mbps data rate for 802.11b mode, 6 Mbps data rate for 802.11g mode, 6.5 Mbps data rate for 802.11n HT20 mode and 13 Mbps data rate for 802.11n HT40 mode. The EUT was tuned to a low, middle and high channel.

Table 1 Maximum 6 dB Bandwidth

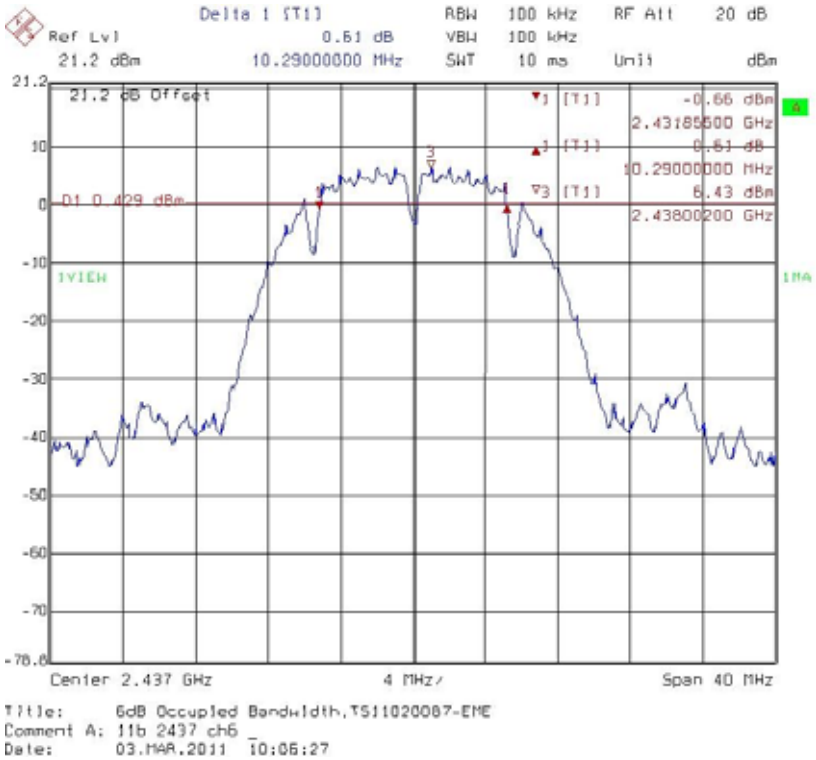
Mode	Channel	Frequency (MHz)	Bandwidth (MHz)	Min. Limit (MHz)	Pass/Fail
			DAC0		
802.11b	1	2412	10.29	0.5	Pass
	6	2437	10.29	0.5	Pass
	11	2462	10.29	0.5	Pass

Mode	Channel	Frequency (MHz)	Bandwidth (MHz)		Min. Limit (MHz)	Pass/Fail
			DAC0	DAC1		
802.11g	1	2412	16.53	16.53	0.5	Pass
	6	2437	16.605	16.53	0.5	Pass
	11	2462	16.53	16.605	0.5	Pass
802.11n HT20	1	2412	17.49	17.73	0.5	Pass
	6	2437	17.49	17.73	0.5	Pass
	11	2462	17.73	17.73	0.5	Pass
802.11n HT40	1	2422	36.57	35.925	0.5	Pass
	6	2437	36.57	35.925	0.5	Pass
	11	2452	36.57	35.925	0.5	Pass

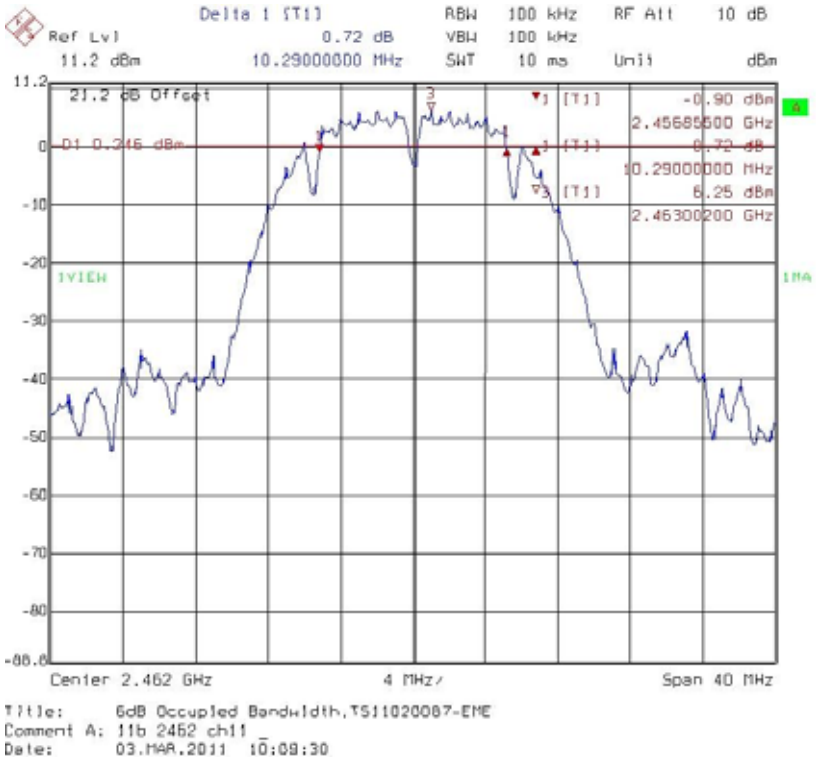
Chain 0: 6 dB Bandwidth @ 802.11b mode channel 1



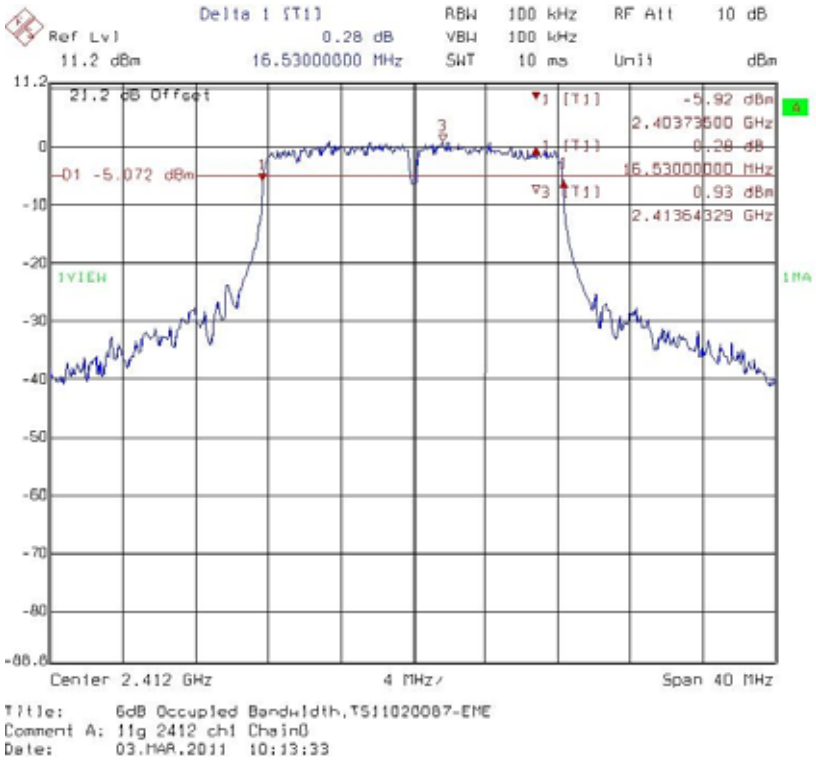
Chain 0: 6 dB Bandwidth @ 802.11b mode channel 6



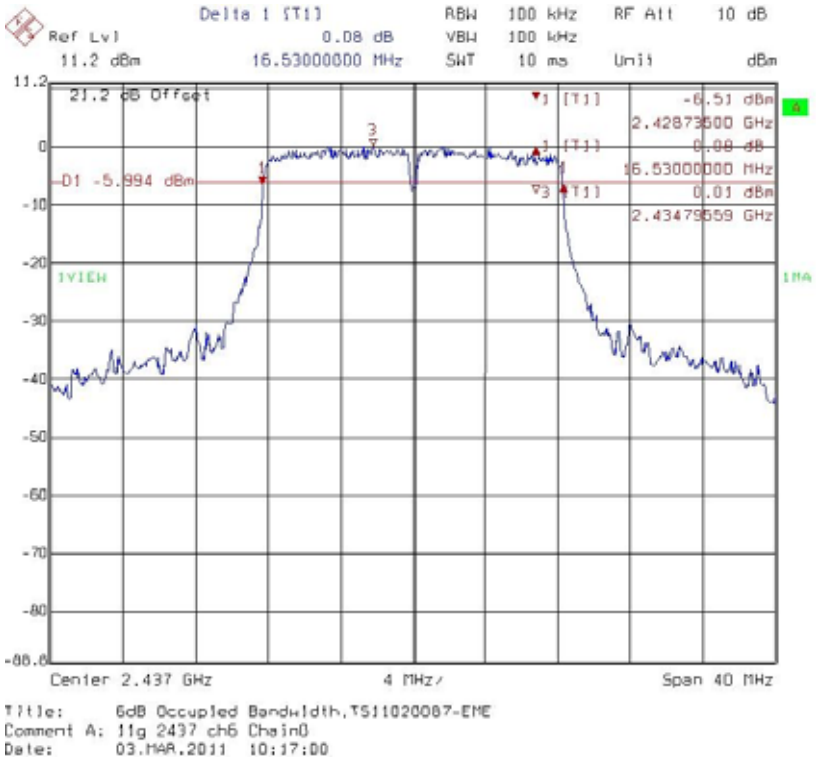
Chain 0: 6 dB Bandwidth @ 802.11b mode channel 11



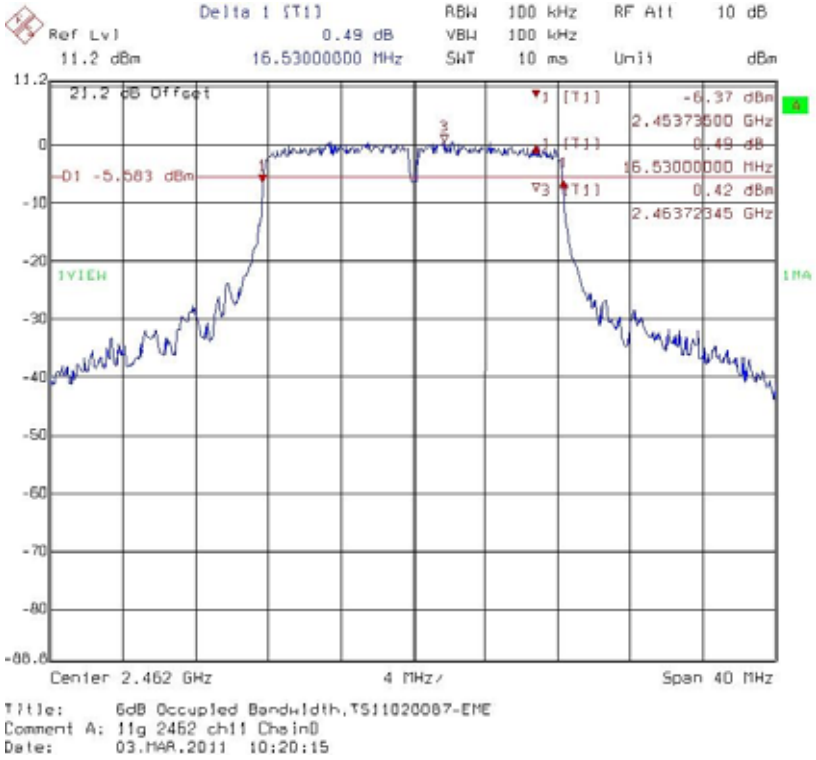
Chain 0: 6 dB Bandwidth @ 802.11g mode channel 1



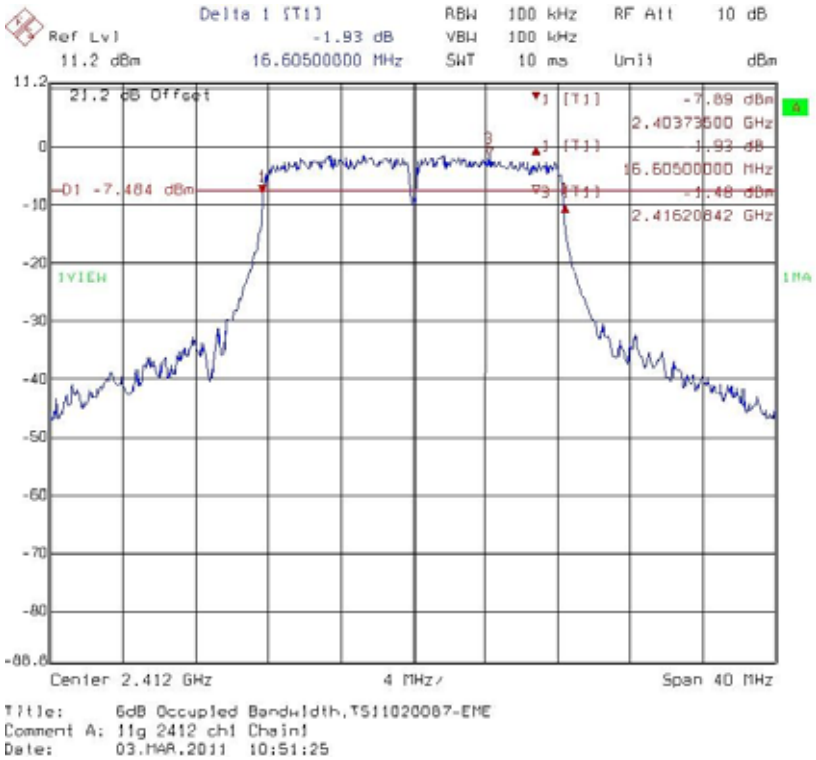
Chain 0: 6 dB Bandwidth @ 802.11g mode channel 6



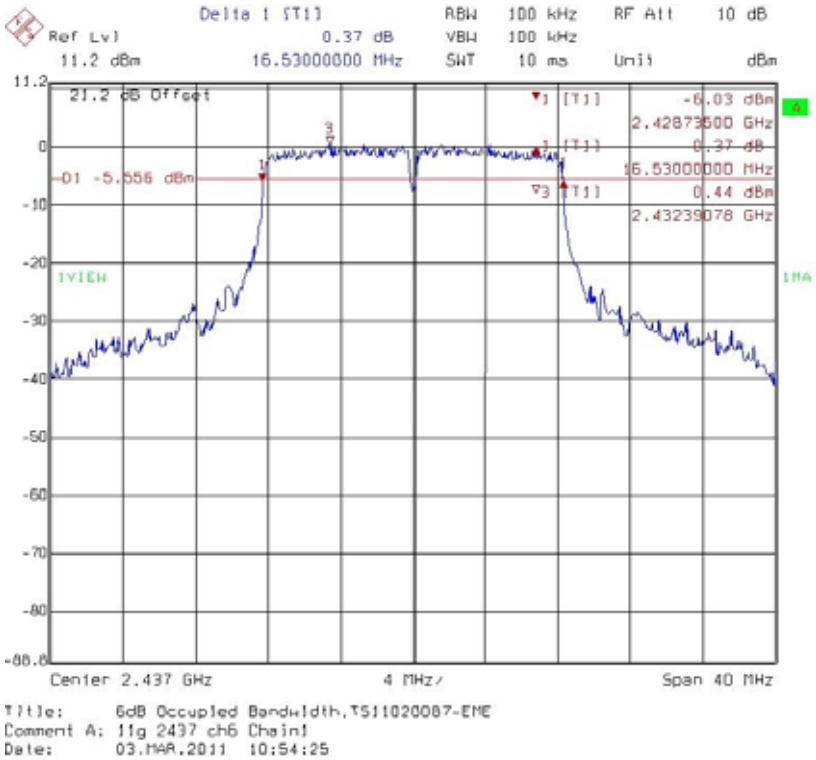
Chain 0: 6 dB Bandwidth @ 802.11g mode channel 11



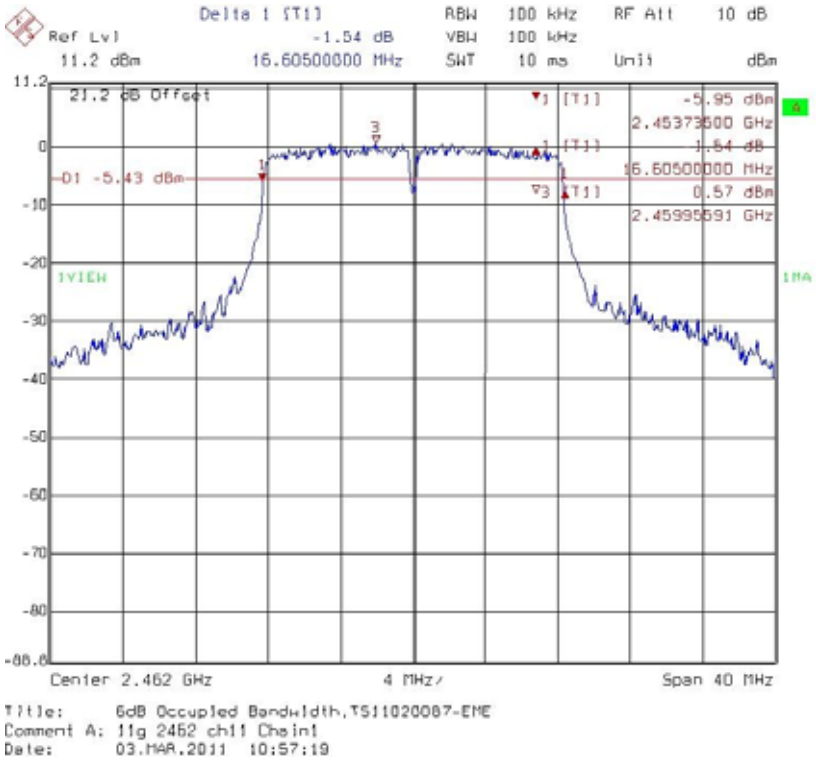
Chain 1: 6 dB Bandwidth @ 802.11g mode channel 1



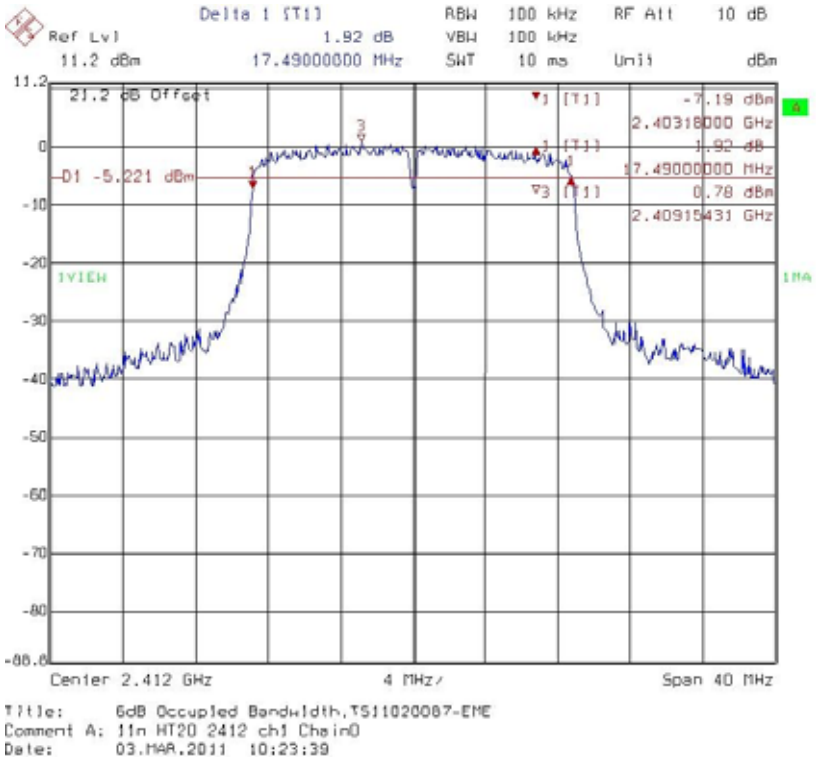
Chain 1: 6 dB Bandwidth @ 802.11g mode channel 6



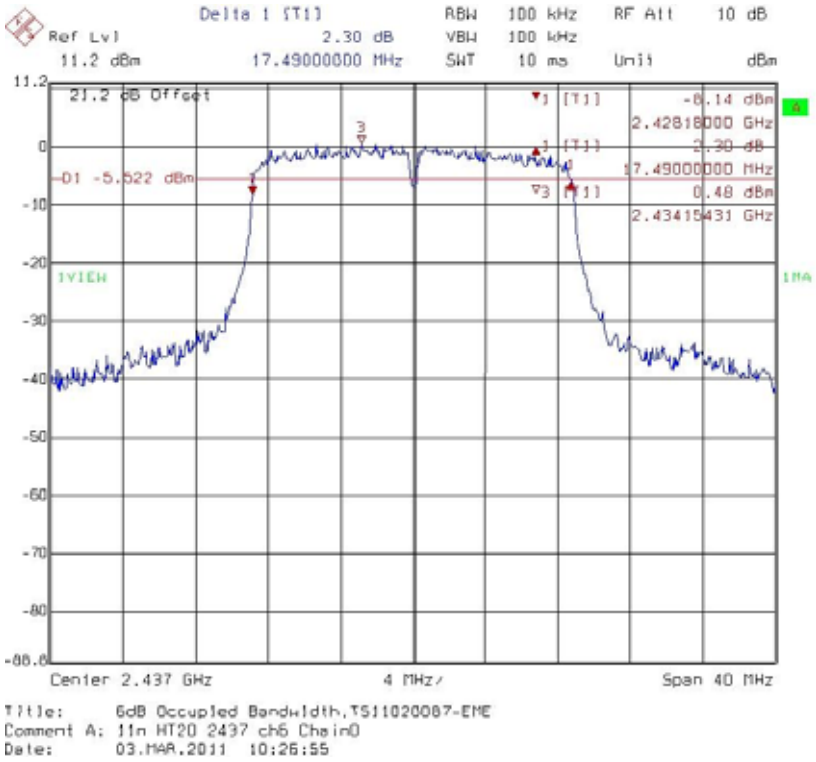
Chain 1: 6 dB Bandwidth @ 802.11g mode channel 11



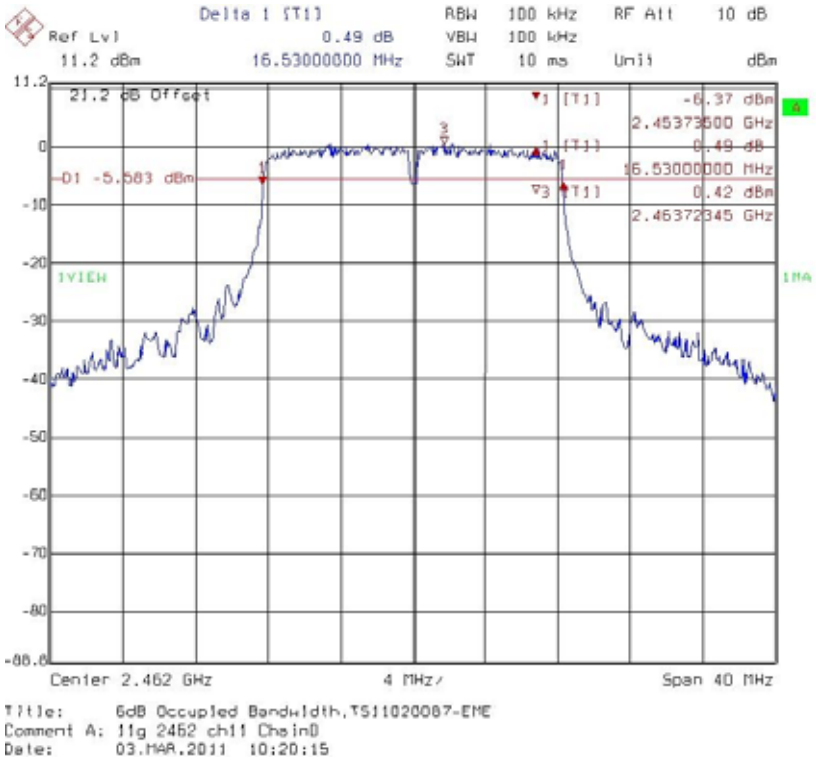
Chain 0: 6 dB Bandwidth @ 802.11n HT20 mode channel 1



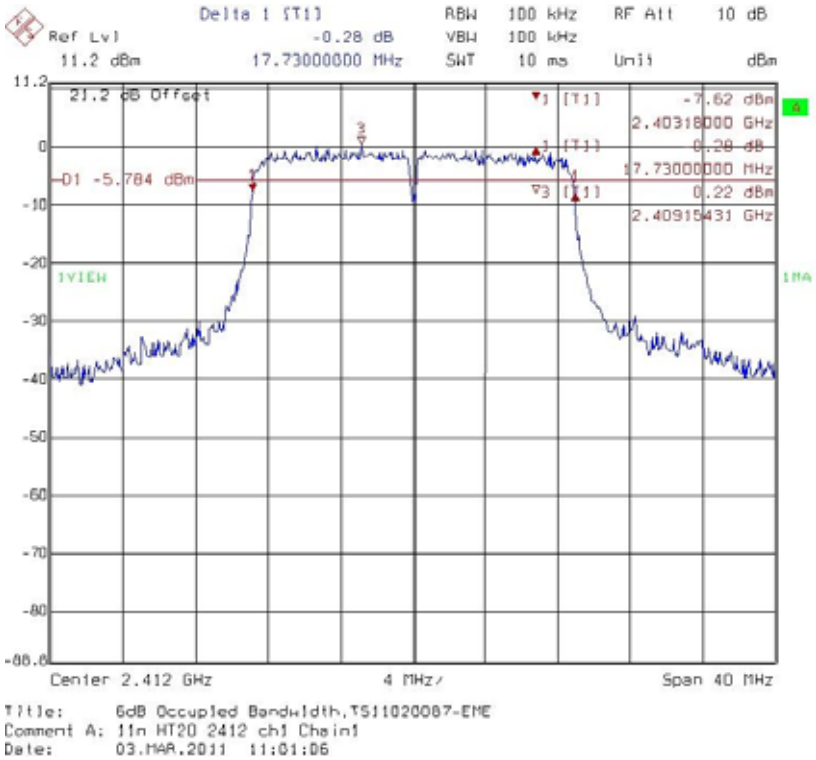
Chain 0: 6 dB Bandwidth @ 802.11n HT20 mode channel 6



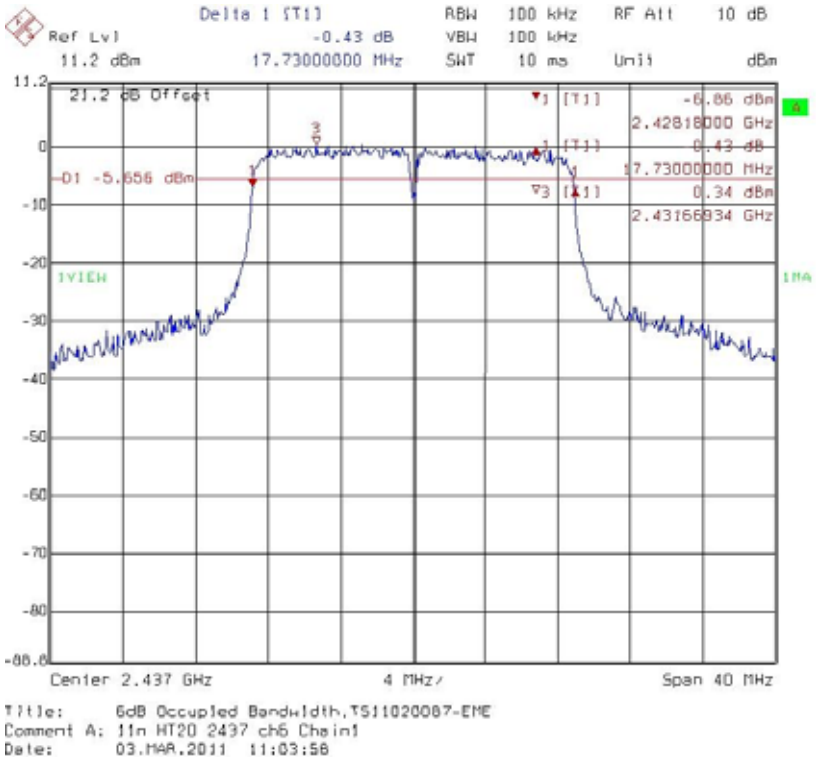
Chain 0: 6 dB Bandwidth @ 802.11n HT20 mode channel 11



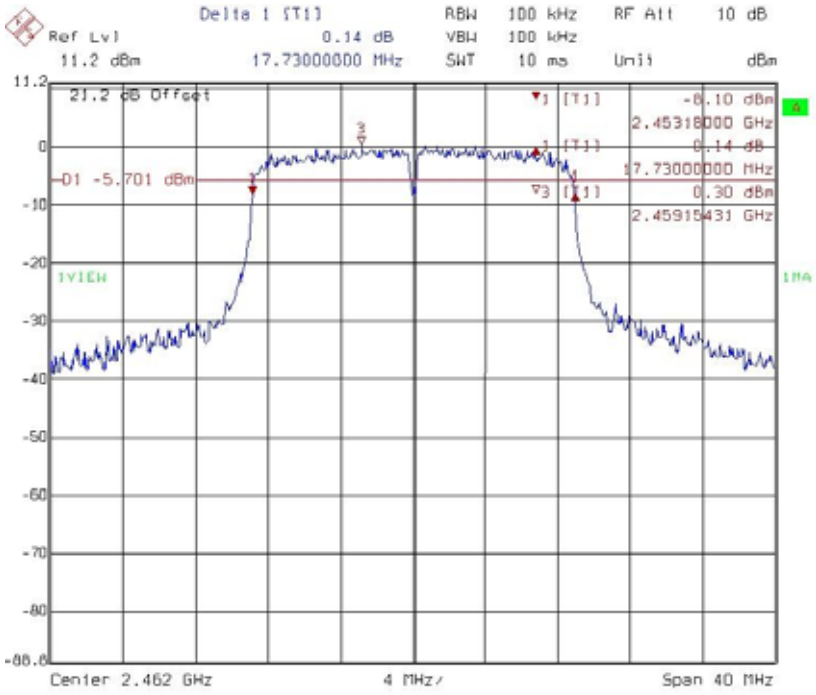
Chain 1: 6 dB Bandwidth @ 802.11n HT20 mode channel 1



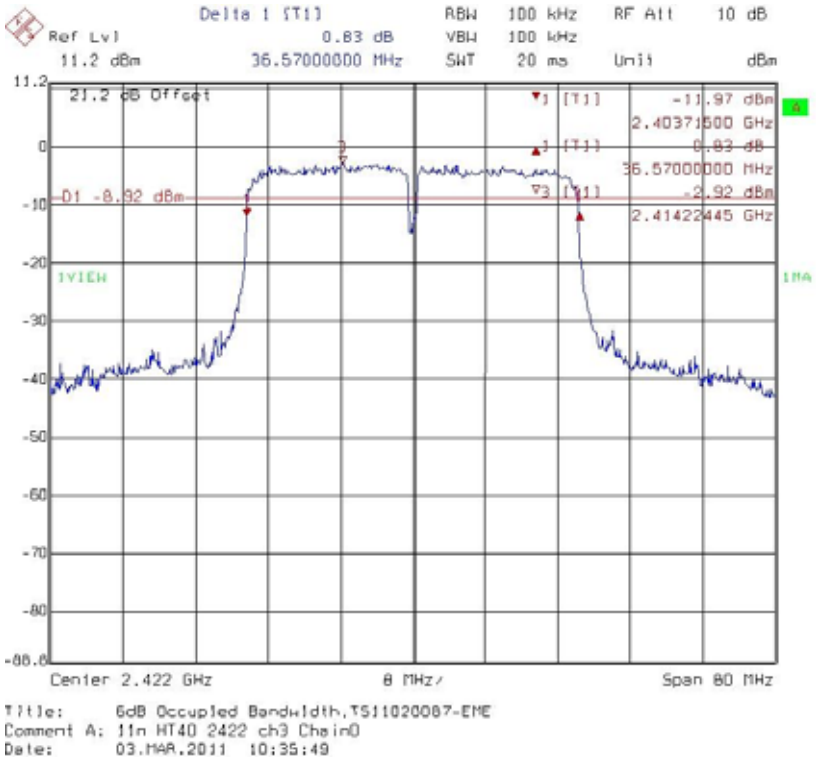
Chain 1: 6 dB Bandwidth @ 802.11n HT20 mode channel 6



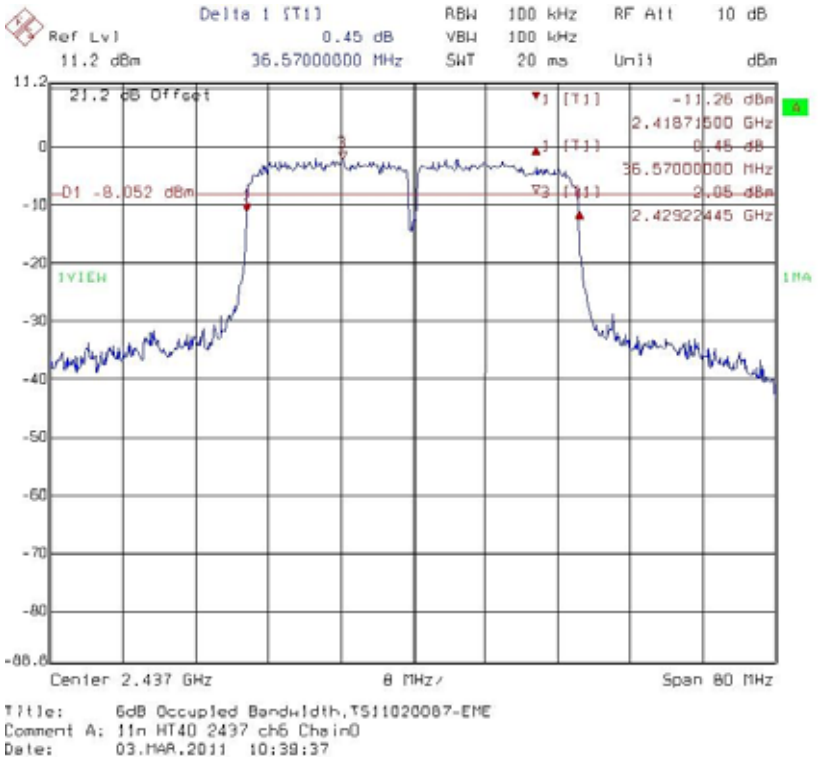
Chain 1: 6 dB Bandwidth @ 802.11n HT20 mode channel 11



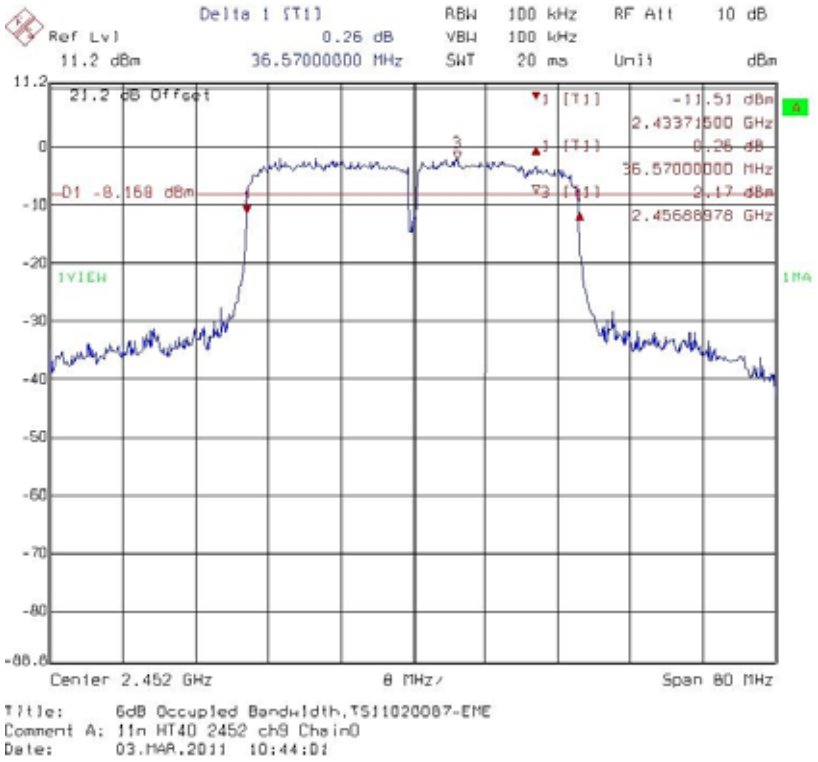
Chain 0: 6 dB Bandwidth @ 802.11n HT40 mode channel 3



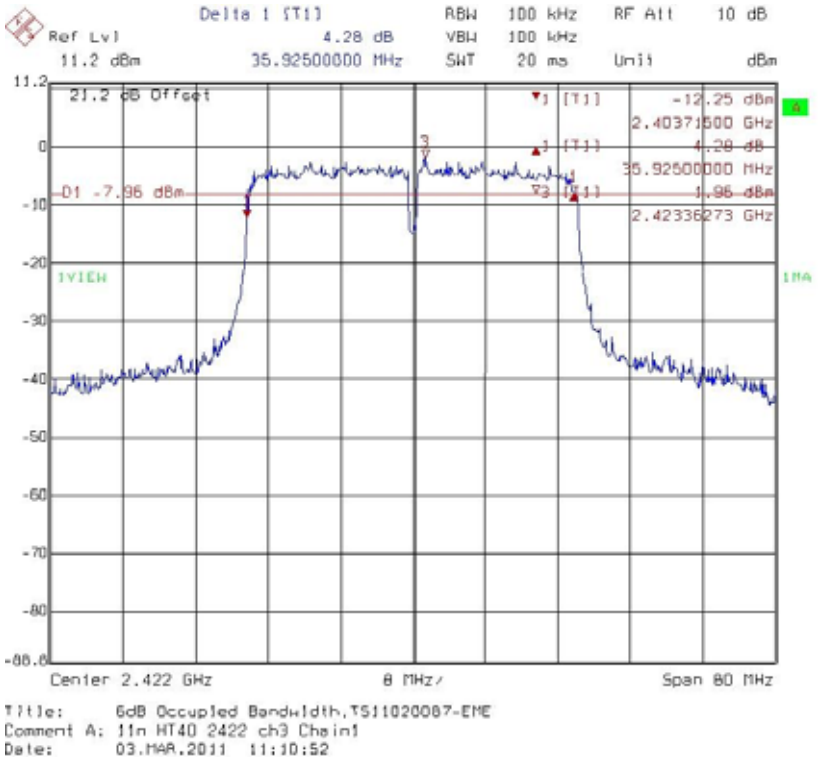
Chain 0: 6 dB Bandwidth @ 802.11n HT40 mode channel 6



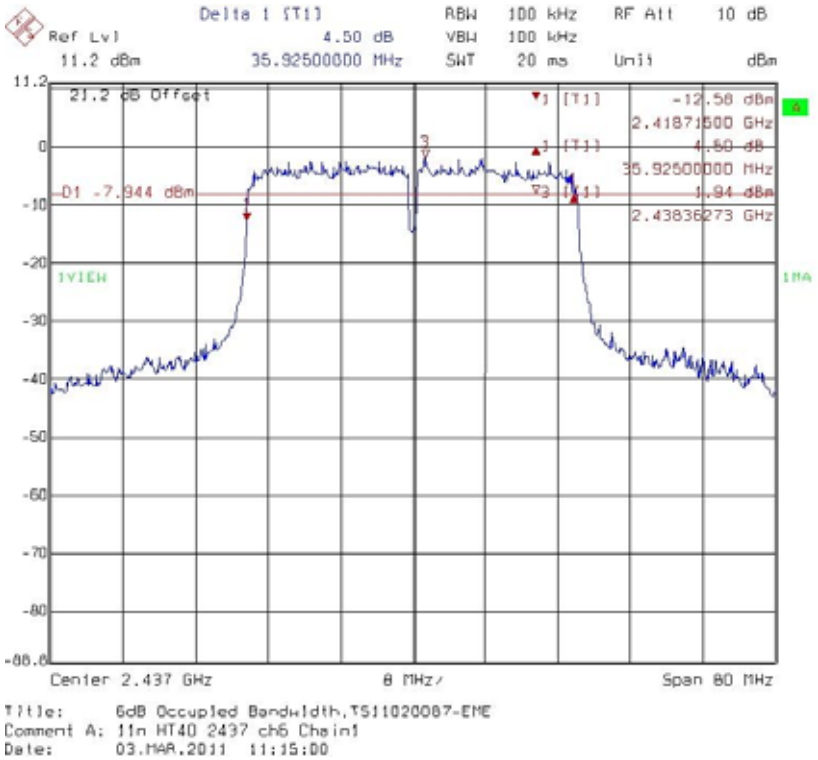
Chain 0: 6 dB Bandwidth @ 802.11n HT40 mode channel 9



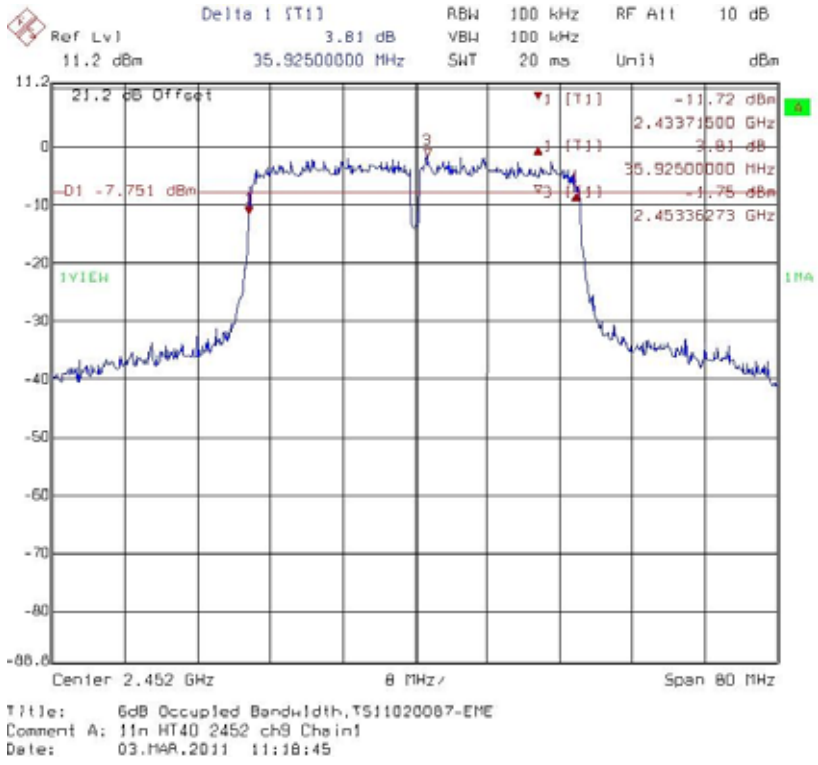
Chain 1: 6 dB Bandwidth @ 802.11n HT40 mode channel 3



Chain 1: 6 dB Bandwidth @ 802.11n HT40 mode channel 6



Chain 1: 6 dB Bandwidth @ 802.11n HT40 mode channel 9



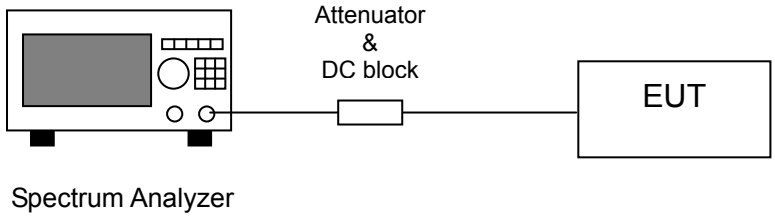
4. 99 % Occupied Bandwidth

Name of Test	99 % Occupied Bandwidth
Base Standard	None; for reporting purposes only

Test Result: Complies
Measurement Data: See Table & plots below

Method of Measurement:
Reference FCC document: KDB558074
A portion of the transmitted signal is coupled to a Spectrum Analyzer with a resolution bandwidth of at least 1 % of the bandwidth of the transmitted signal. The resolution bandwidth is chosen so as not to reduce the peak level of the measured waveform. The appropriate bandwidth mask is applied to the output waveform to verify compliance.

Test Diagram:



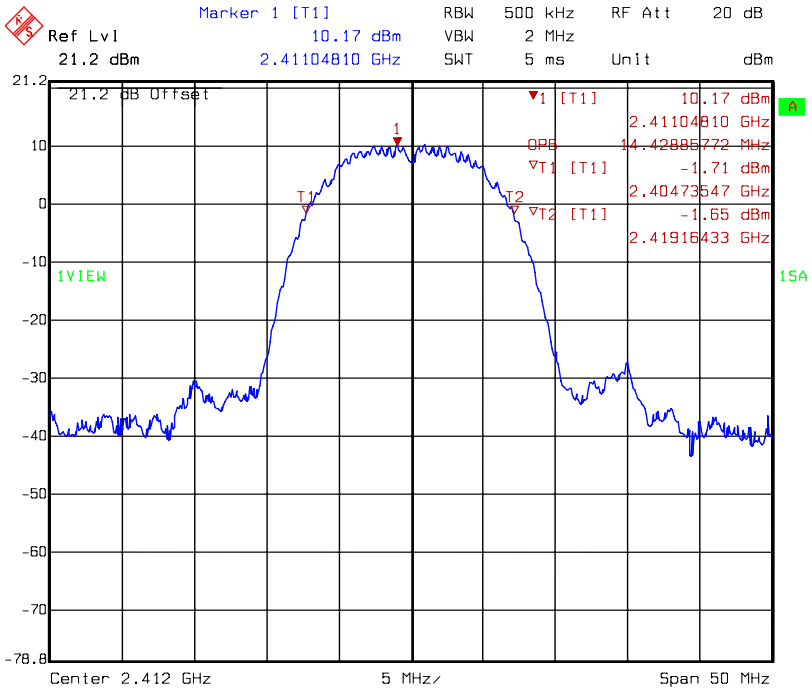
Note: The EUT was tested while in a continuous transmit mode and the worst case data rates are 1 Mbps data rate for 802.11b mode, 6 Mbps data rate for 802.11g mode, 6.5 Mbps data rate for 802.11n HT20 mode and 13 Mbps data rate for 802.11n HT40 mode. The EUT was tuned to a low, middle and high channel.

Table 2 99 % Occupied Bandwidth

Mode	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
802.11b	1	2412	14.43
	6	2437	14.53
	11	2462	14.43

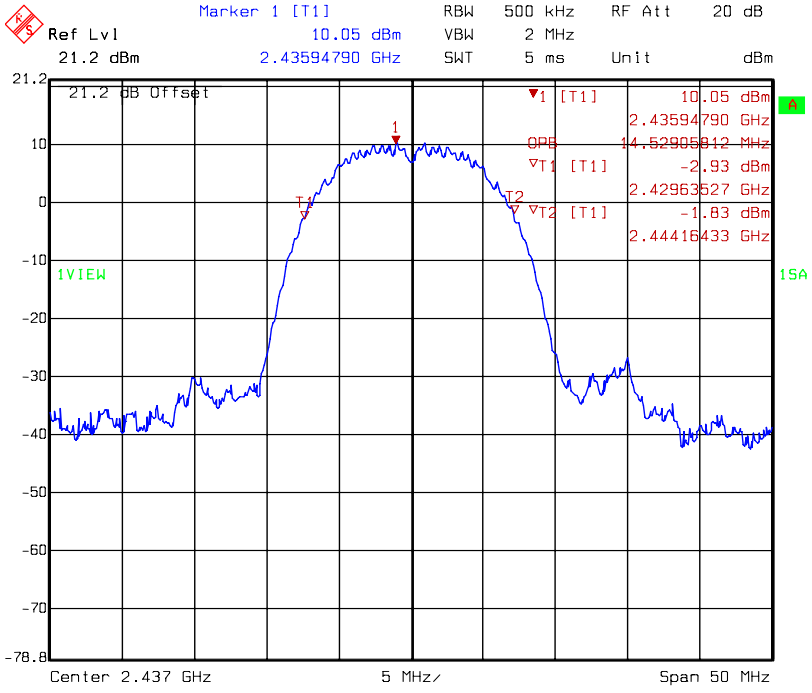
Mode	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
			DAC0	DAC1
802.11g	1	2412	16.83	16.93
	6	2437	16.83	16.83
	11	2462	16.93	17.03
802.11n HT20	1	2412	17.63	17.63
	6	2437	17.63	17.73
	11	2462	17.63	17.63
802.11n HT40	3	2422	36.07	36.47
	6	2437	36.07	36.07
	9	2452	36.27	36.07

Chain 0: 99 % Occupied Bandwidth @ 802.11b mode channel 1



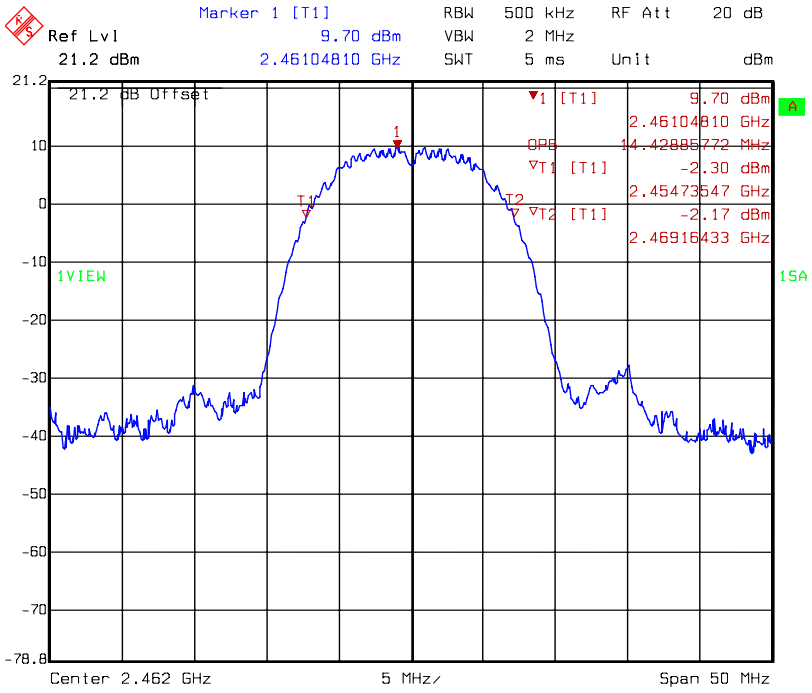
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11b 2412 ch1 _
Date: 03.MAR.2011 09:58:12

Chain 0: 99 % Occupied Bandwidth @ 802.11b mode channel 6



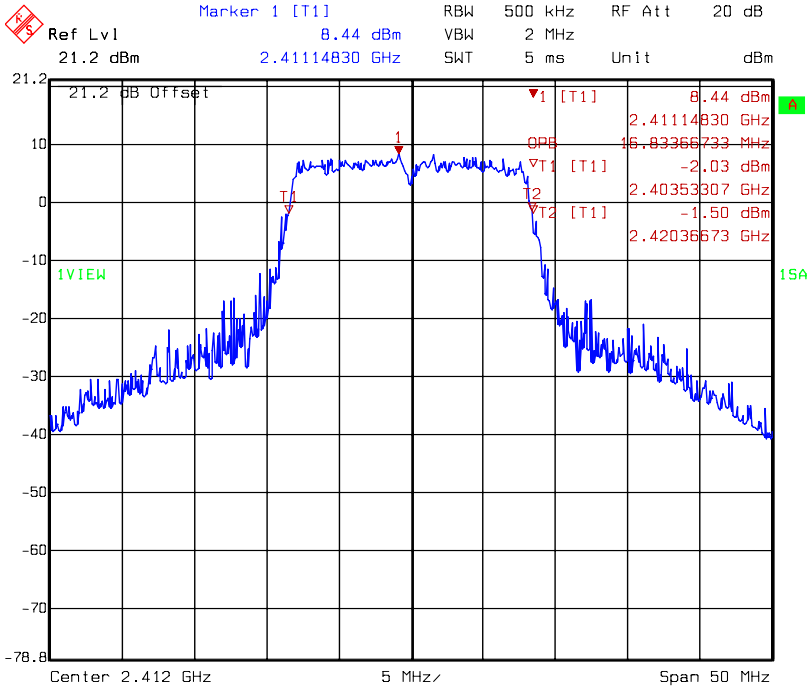
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11b 2437 ch6 _
Date: 03.MAR.2011 10:05:52

Chain 0: 99 % Occupied Bandwidth @ 802.11b mode channel 11



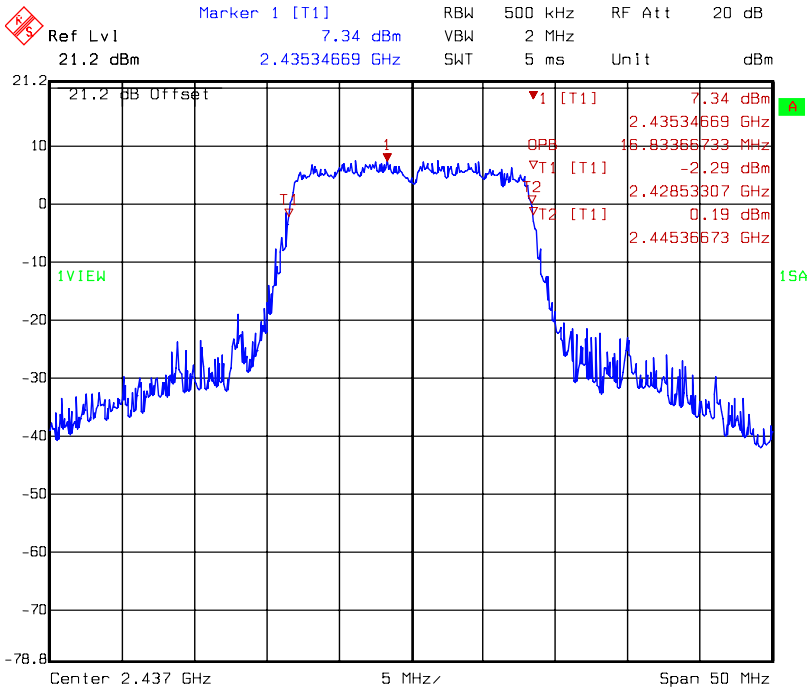
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11b 2462 ch11 _
Date: 03.MAR.2011 10:08:56

Chain 0: 99 % Occupied Bandwidth @ 802.11g mode channel 1



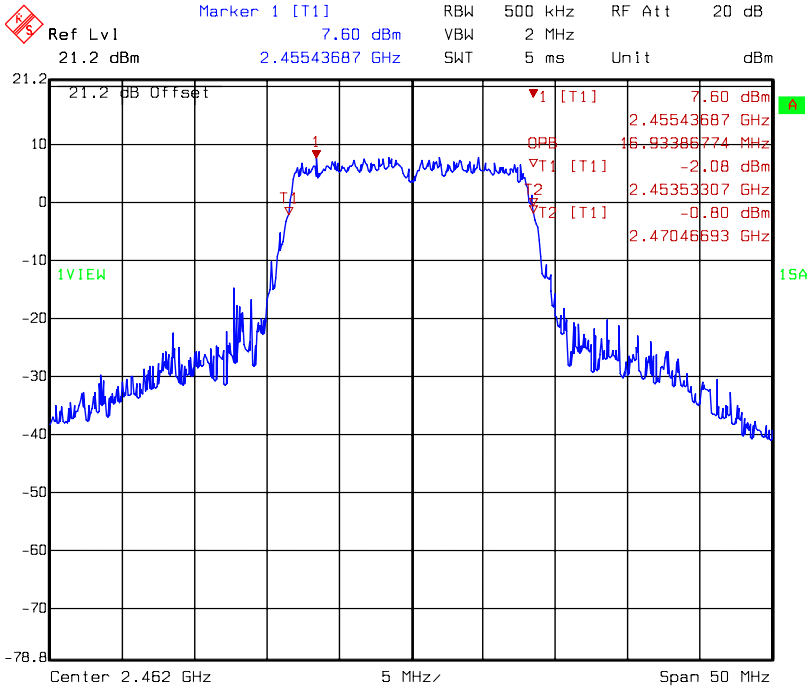
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11g 2412 ch1 Chain0
Date: 03.MAR.2011 10:12:45

Chain 0: 99 % Occupied Bandwidth @ 802.11g mode channel 6



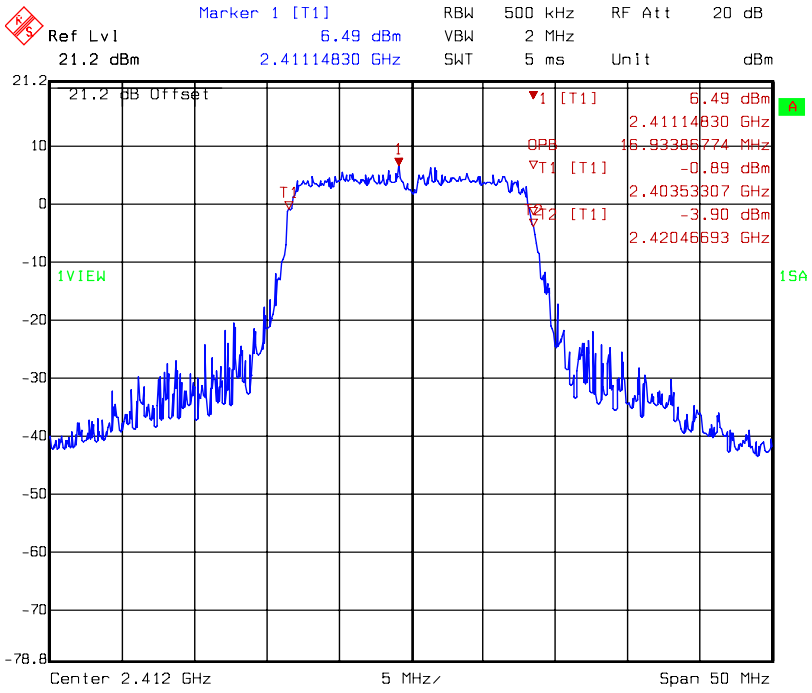
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11g 2437 ch6 Chain0
Date: 03.MAR.2011 10:16:12

Chain 0: 99 % Occupied Bandwidth @ 802.11g mode channel 11



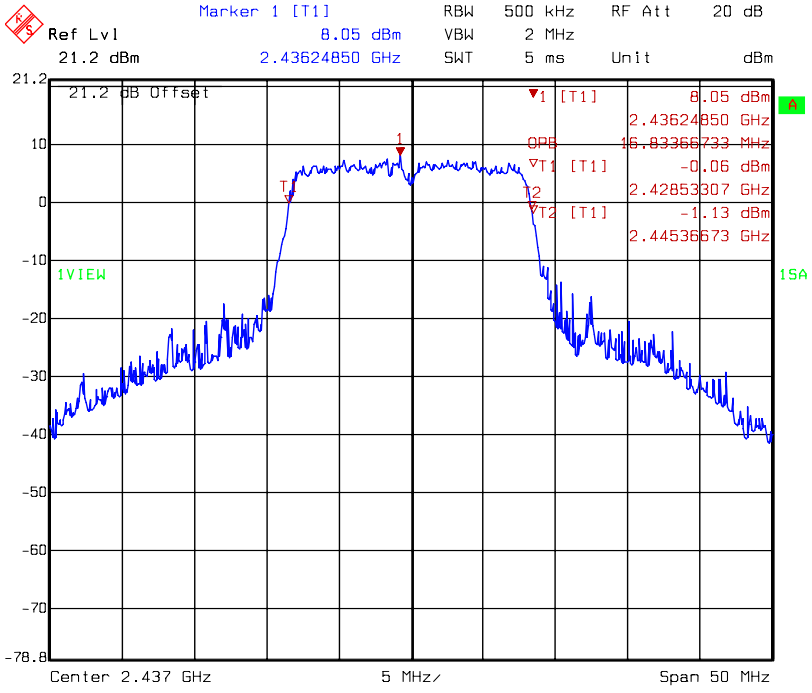
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11g 2462 ch11 Chain0
Date: 03.MAR.2011 10:19:27

Chain 1: 99 % Occupied Bandwidth @ 802.11g mode channel 1



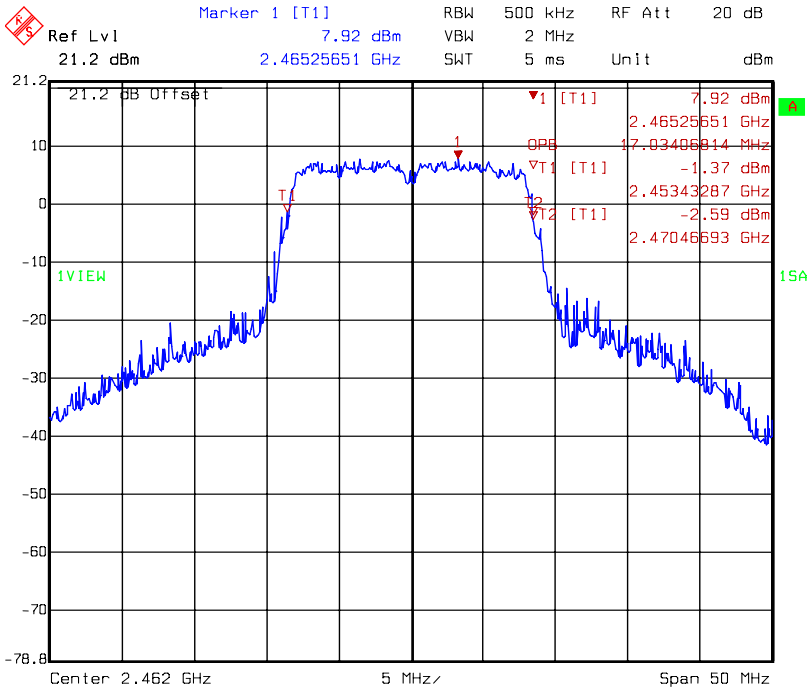
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11g 2412 ch1 Chain1
Date: 03.MAR.2011 10:50:37

Chain 1: 99 % Occupied Bandwidth @ 802.11g mode channel 6



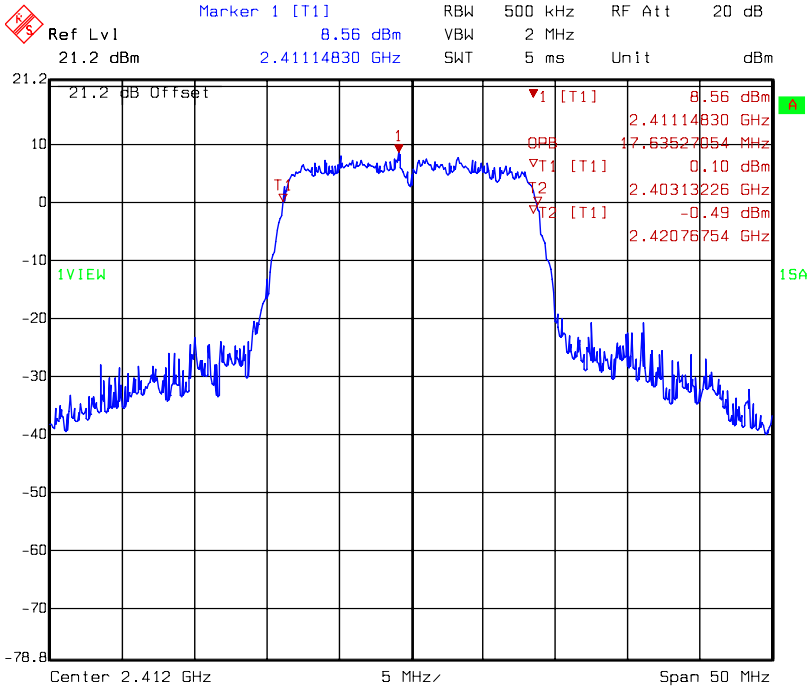
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11g 2437 ch6 Chain1
Date: 03.MAR.2011 10:53:37

Chain 1: 99 % Occupied Bandwidth @ 802.11g mode channel 11



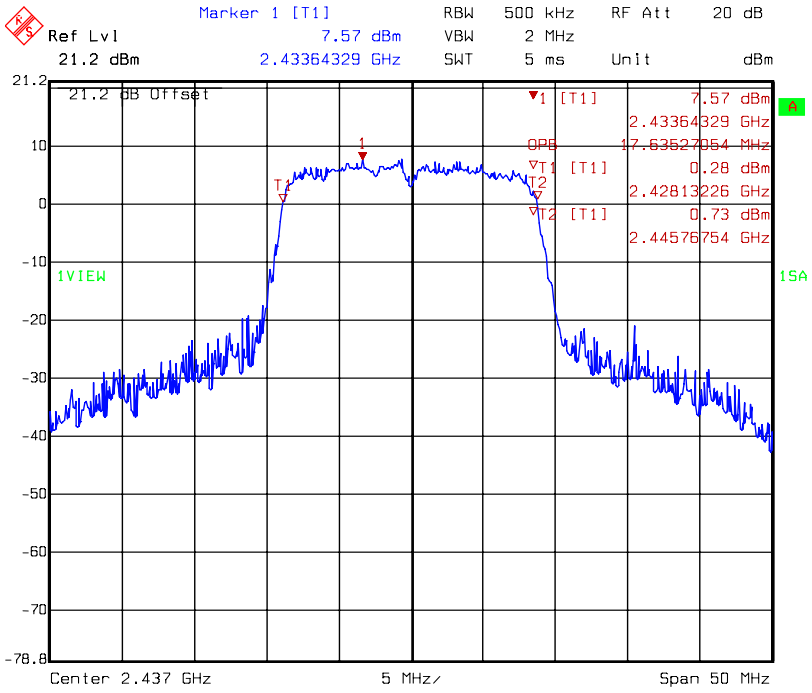
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11g 2462 ch11 Chain1
Date: 03.MAR.2011 10:56:31

Chain 0: 99 % Occupied Bandwidth @ 802.11n HT20 mode channel 1



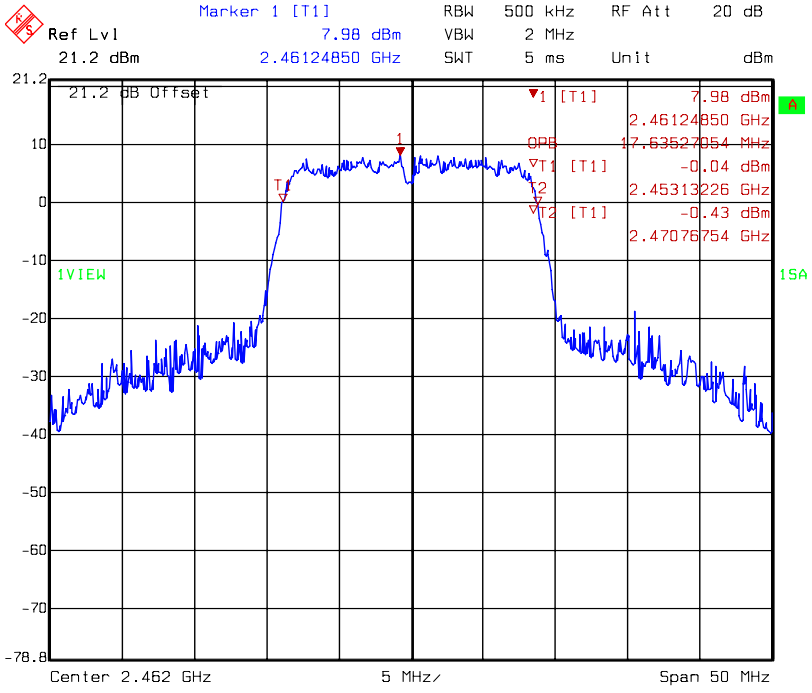
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11n HT20 2412 ch1 Chain0
Date: 03.MAR.2011 10:22:48

Chain 0: 99 % Occupied Bandwidth @ 802.11n HT20 mode channel 6



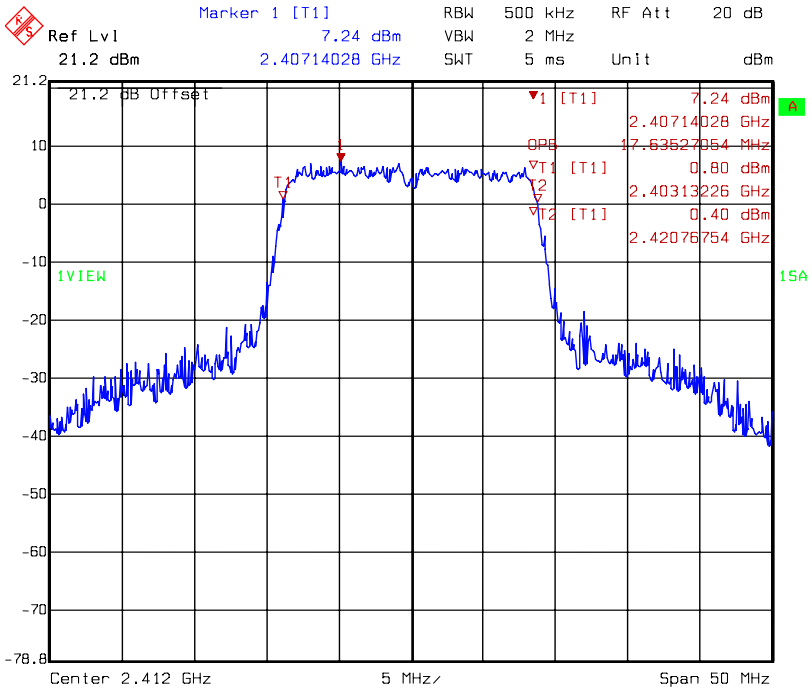
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11n HT20 2437 ch6 Chain0
Date: 03.MAR.2011 10:26:04

Chain 0: 99 % Occupied Bandwidth @ 802.11n HT20 mode channel 11



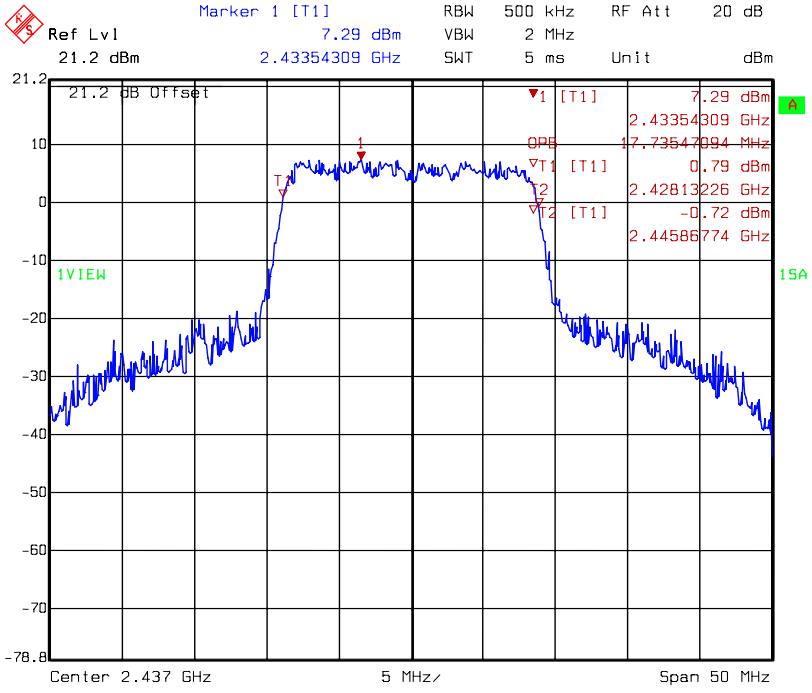
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11n HT20 2462 ch11 Chain0
Date: 03.MAR.2011 10:29:33

Chain 1: 99 % Occupied Bandwidth @ 802.11n HT20 mode channel 1



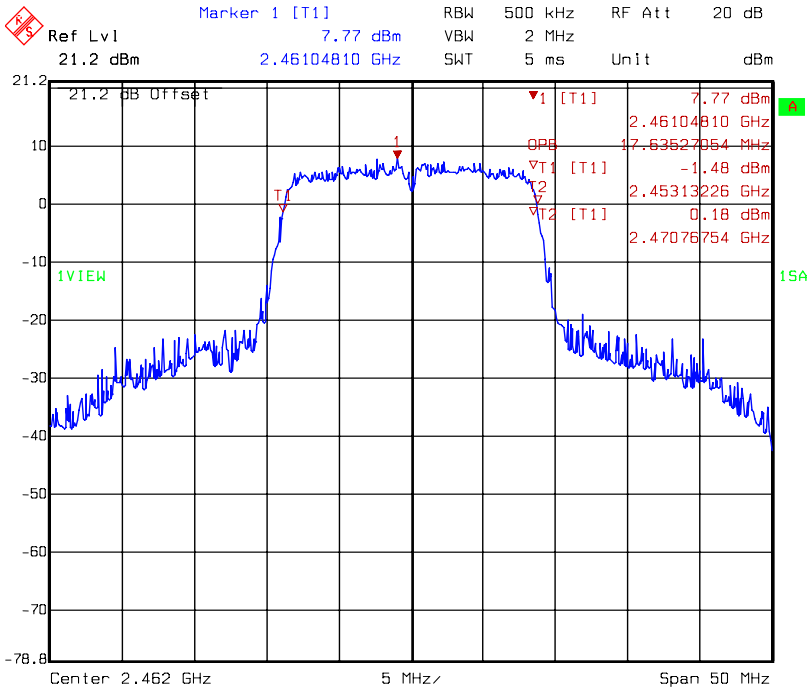
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11n HT20 2412 ch1 Chain1
Date: 03.MAR.2011 11:00:16

Chain 1: 99 % Occupied Bandwidth @ 802.11n HT20 mode channel 6



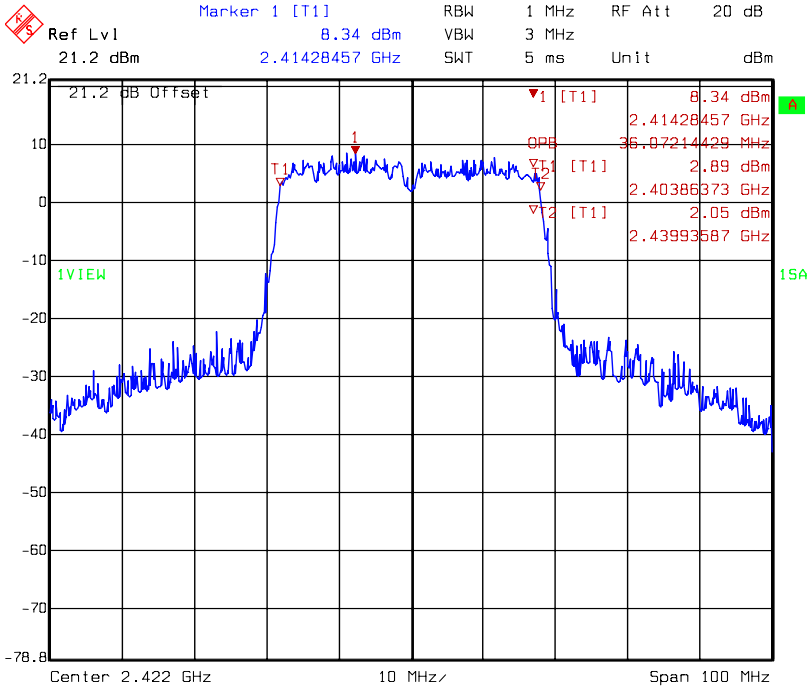
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11n HT20 2437 ch6 Chain1
Date: 03.MAR.2011 11:03:07

Chain 1: 99 % Occupied Bandwidth @ 802.11n HT20 mode channel 11



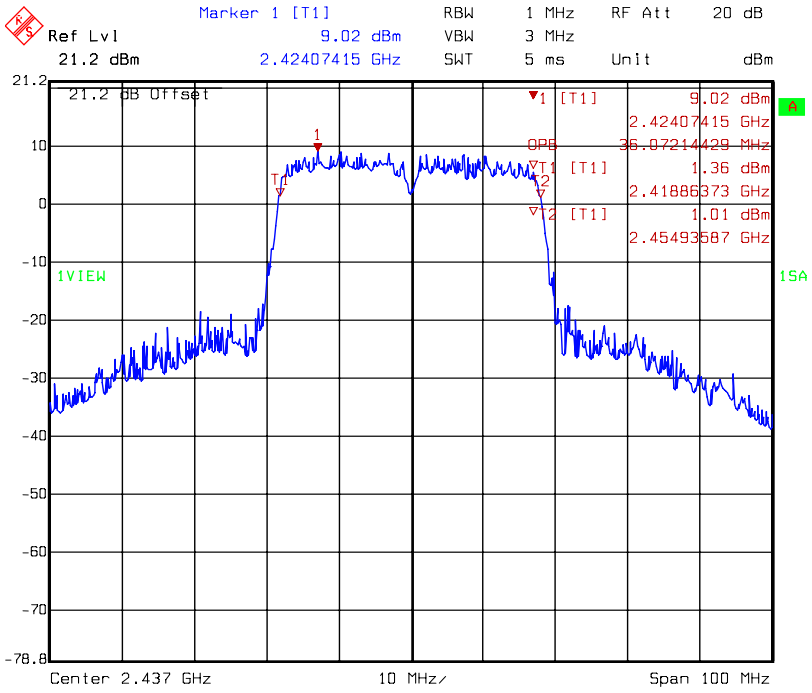
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11n HT20 2462 ch11 Chain1
Date: 03.MAR.2011 11:06:05

Chain 0 : 99 % Occupied Bandwidth @ 802.11n HT40 mode channel 3



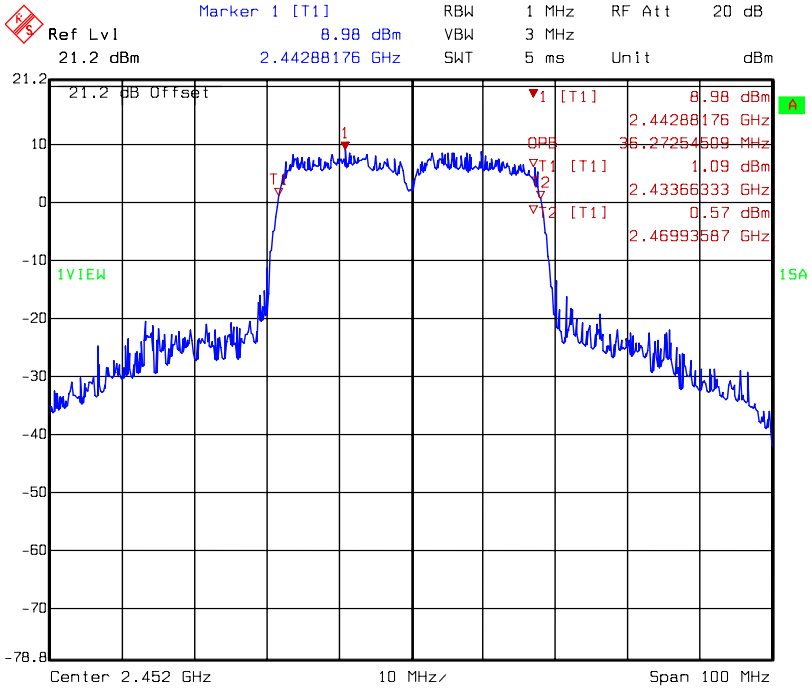
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11n HT40 2422 ch3 Chain0
Date: 03.MAR.2011 10:34:15

Chain 0: 99 % Occupied Bandwidth @ 802.11n HT40 mode channel 6



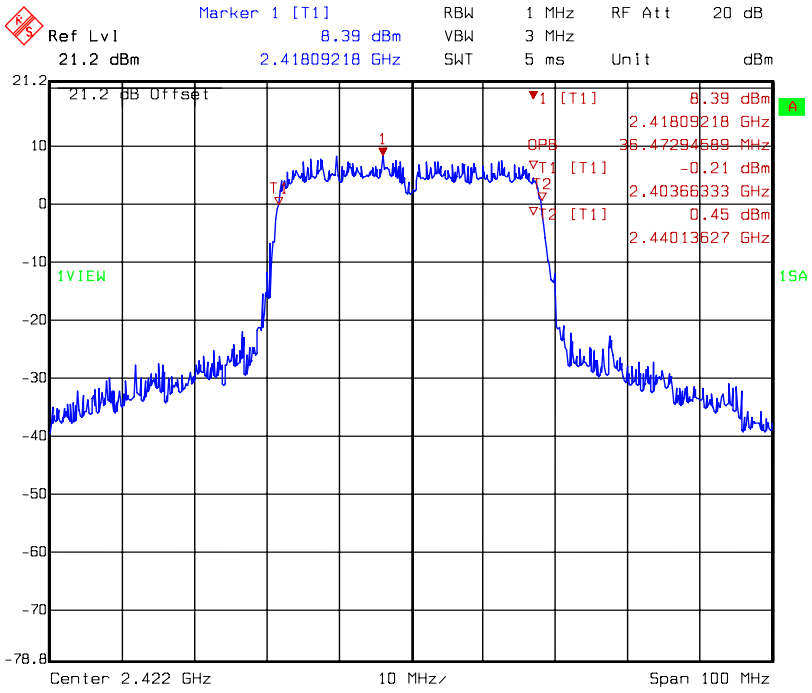
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11n HT40 2437 ch6 Chain0
Date: 03.MAR.2011 10:38:02

Chain 0: 99 % Occupied Bandwidth @ 802.11n HT40 mode channel 9



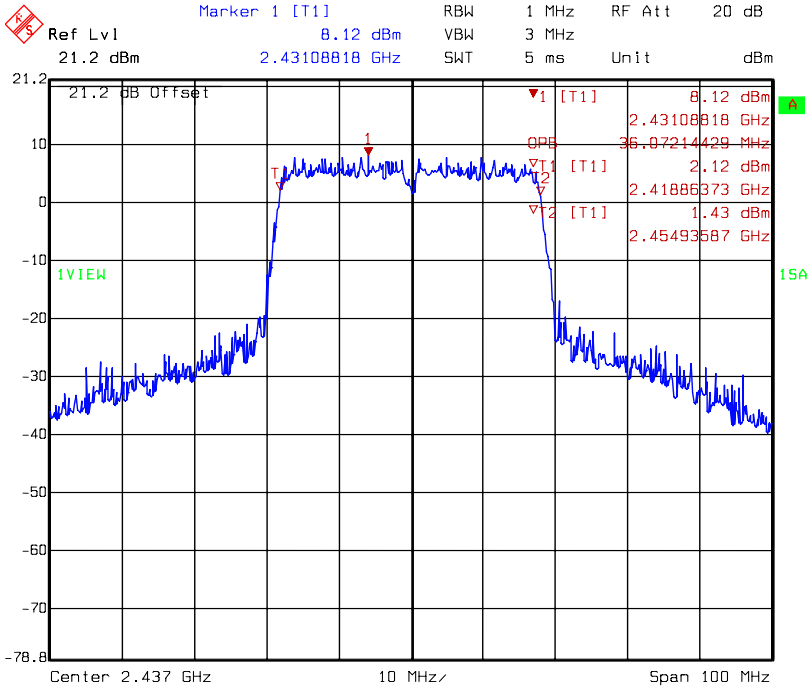
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11n HT40 2452 ch9 Chain0
Date: 03.MAR.2011 10:42:27

Chain 1: 99 % Occupied Bandwidth @ 802.11n HT40 mode channel 3



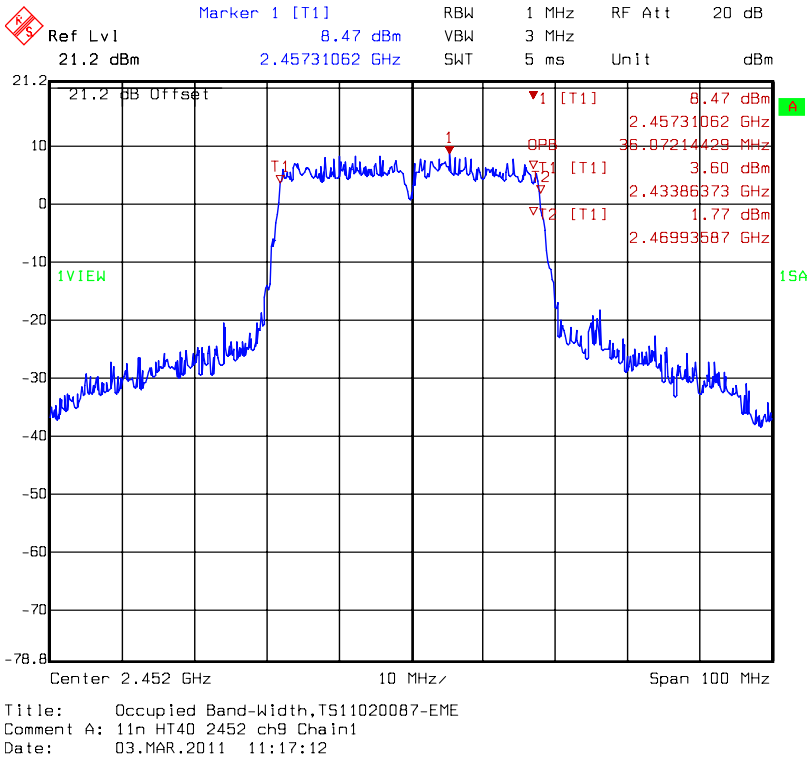
Title: Occupied Band-Width,TS11020087-EME
Comment A: 11n HT40 2422 ch3 Chain1
Date: 03.MAR.2011 11:09:19

Chain 1: 99 % Occupied Bandwidth @ 802.11n HT40 mode channel 6



Title: Occupied Band-Width,TS11020087-EME
Comment A: 11n HT40 2437 ch6 Chain1
Date: 03.MAR.2011 11:13:27

Chain 1: 99 % Occupied Bandwidth @ 802.11n HT40 mode channel 9



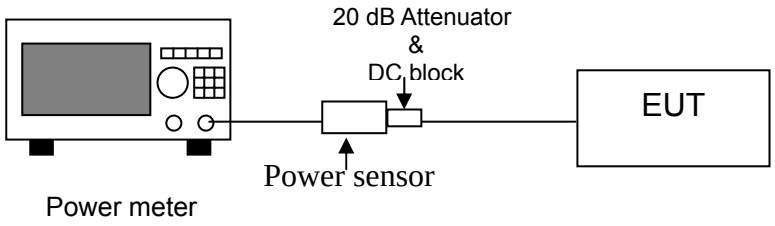
5. Maximum Output Power

Name of Test	Maximum output power
Base Standard	FCC 15.247(b)

Measurement Uncertainty: ±0.392 dB (k=2)
Test Result: Complies
Measurement Data: See Table below

Method of Measurement:
Reference FCC document: KDB558074
The power output was measured on the EUT using a 50 ohm SMA Cable connected to peak power meter via power sensor. Connect 20 dB attenuator and DC block at the input port of the power sensor. Measure conducted transmit power of at each antenna port ,besides another ports were terminated by 50 ohm and sum these power in linear power units,Power output was measured with the maximum rated input level.

Test Diagram:



Note 1: §15.247 (b) (4) Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note 2: §15.247 (b) (4) (ii) Systems operating in the 5725–5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

Table 3. Maximum output power

Mode	Channel	Frequency (MHz)	Output Power (dBm)	Total Power (mw)	Limit (dBm)	Margin (dB)
			PK			
			DAC0	PK		
802.11b	1	2412	18.88	77.27	30	-11.12
	6	2437	18.66	73.45	30	-11.34
	11	2462	18.64	73.11	30	-11.36
802.11g	1	2412	22.51	178.24	30	-7.49
	6	2437	22.03	159.59	30	-7.97
	11	2462	21.98	157.76	30	-8.02

Mode	Channel	Frequency (MHz)	Output Power (dBm)	Total Power (mw)	Limit (dBm)	Margin (dB)
			PK			
			DAC1	PK		
802.11g	1	2412	21.45	139.64	30	-8.55
	6	2437	21.58	143.88	30	-8.42
	11	2462	21.48	140.60	30	-8.52

Mode	Channel	Frequency (MHz)	Output Power (dBm)		Total Power		Limit (dBm)	Margin (dB)
			PK		PK			
			DAC0	DAC1	mw	dBm		
802.11n HT20	1	2412	22.15	20.06	265.45	24.24	30	-5.76
	6	2437	21.54	21.12	271.98	24.35	30	-5.65
	11	2462	21.8	19.97	250.67	23.99	30	-6.01
802.11n HT40	3	2422	21.15	20.02	230.78	23.63	30	-6.37
	6	2437	21.06	20.69	244.86	23.89	30	-6.11
	9	2452	21.25	19.47	221.86	23.46	30	-6.54

6. Power Spectral Density

Name of Test	Power Spectral Density
Base Standard	FCC 15.247(e)

Test Result: Complies
Measurement Data: See Table & plots below

Method of Measurement:
Reference FCC document: KDB558074
The power spectrum density was measured from the antenna port of the EUT using a 50 ohm spectrum analyzer. Locate and zoom in on emission peak(s) within the passband. Set RBW = 3 kHz, VBW >RBW, sweep= 500s. The peak level measured must be no greater than + 8 dBm. Power spectrum density was read directly and cable loss (1 dB)/external attenuator (20 dB) correction was added to the reading to obtain power at the EUT antenna terminals.

Test Diagram:

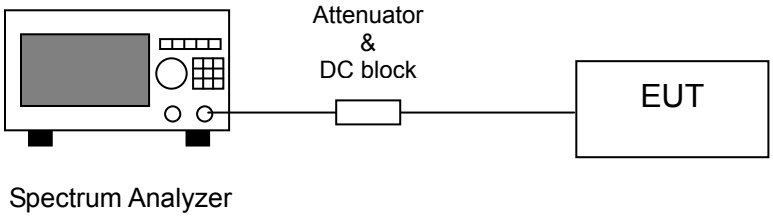


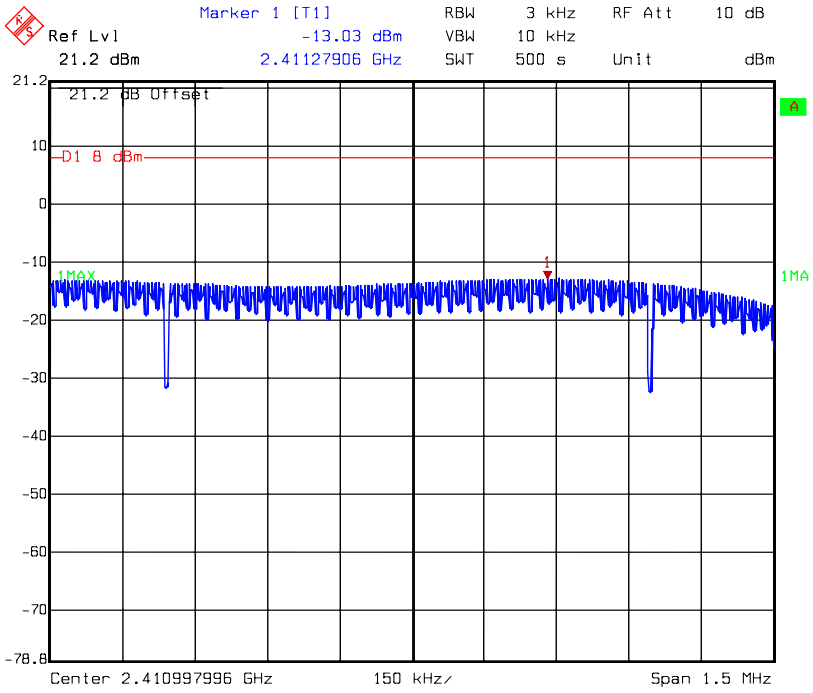
Table 4. Power Spectral Density

Mode	Channel	Frequency (MHz)	PSD(dBm)	Total PSD (mW)	Limit (dBm)	Margin (dB)
			DAC0			
802.11b	1	2412	-13.03	0.05	8	-21.03
	6	2437	-10.76	0.08	8	-18.76
	11	2462	-10.98	0.08	8	-18.98
802.11g	1	2412	-12.17	0.06	8	-20.17
	6	2437	-14.11	0.04	8	-22.11
	11	2462	-13.32	0.05	8	-21.32

Mode	Channel	Frequency (MHz)	PSD(dBm)	Total PSD (mW)	Limit (dBm)	Margin (dB)
			DAC1			
802.11g	1	2412	-15.67	0.03	8	-23.67
	6	2437	-13.09	0.05	8	-21.09
	11	2462	-13.74	0.04	8	-21.74

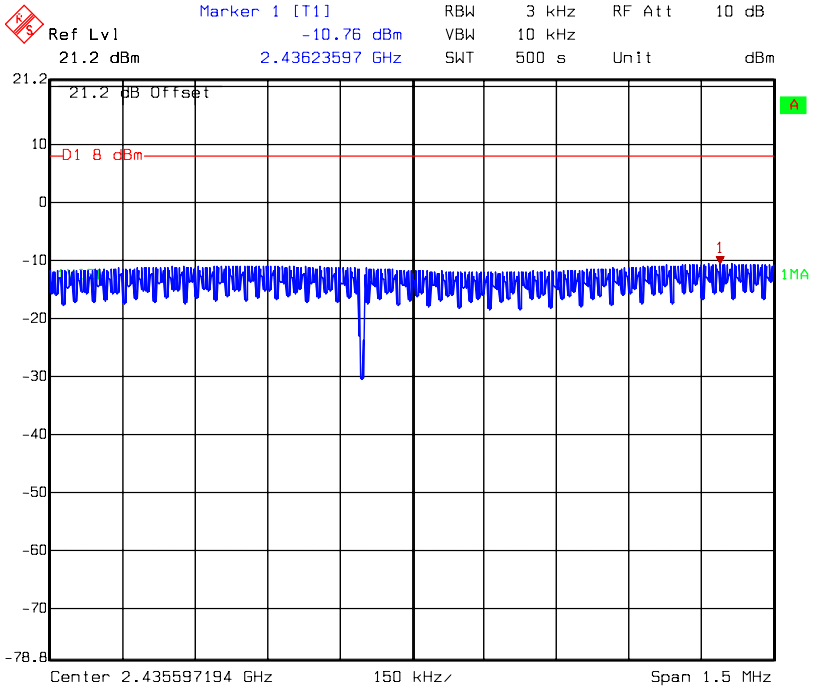
Mode	Channel	Frequency (MHz)	PSD(dBm)		Total PSD		Limit (dBm)	Margin (dB)
			DAC0	DAC1	mW	dBm		
802.11n HT20	1	2412	-12.84	-14.12	0.09	-10.42	8	-18.42
	6	2437	-13.56	-13.54	0.09	-10.54	8	-18.54
	11	2462	-12	-13.41	0.11	-9.64	8	-17.64
802.11n HT40	3	2422	-15.99	-17.17	0.04	-13.53	8	-21.53
	6	2437	-14.1	-16.89	0.06	-12.26	8	-20.26
	9	2452	-15.4	-17.02	0.05	-13.12	8	-21.12

Chain 0: Power Spectral Density @ 802.11b mode channel 1



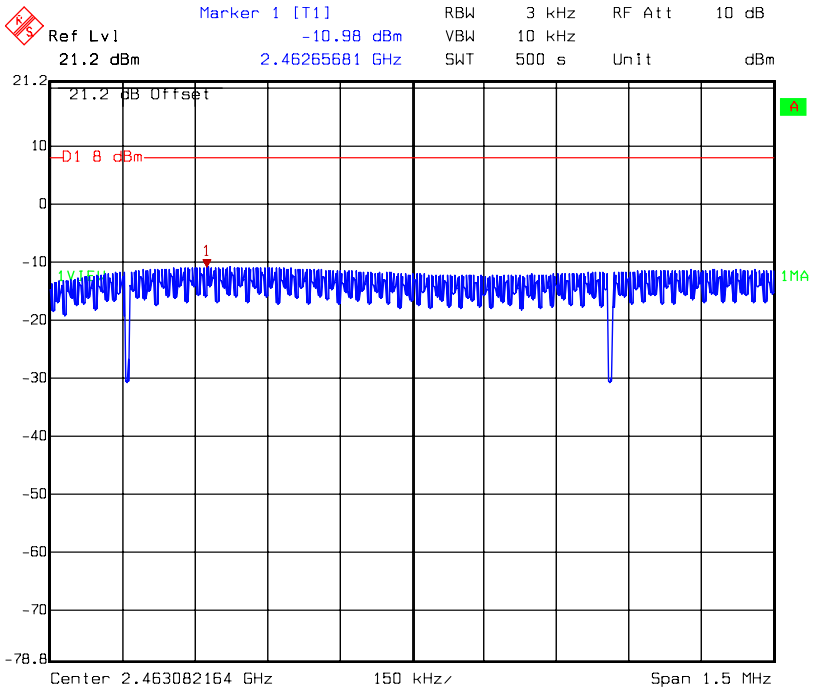
Title: Power Density,TS11020087-EME
Comment A: 11b 2412 ch1 _
Date: 09.MAR.2011 17:19:01

Chain 0: Power Spectral Density @ 802.11b mode channel 6



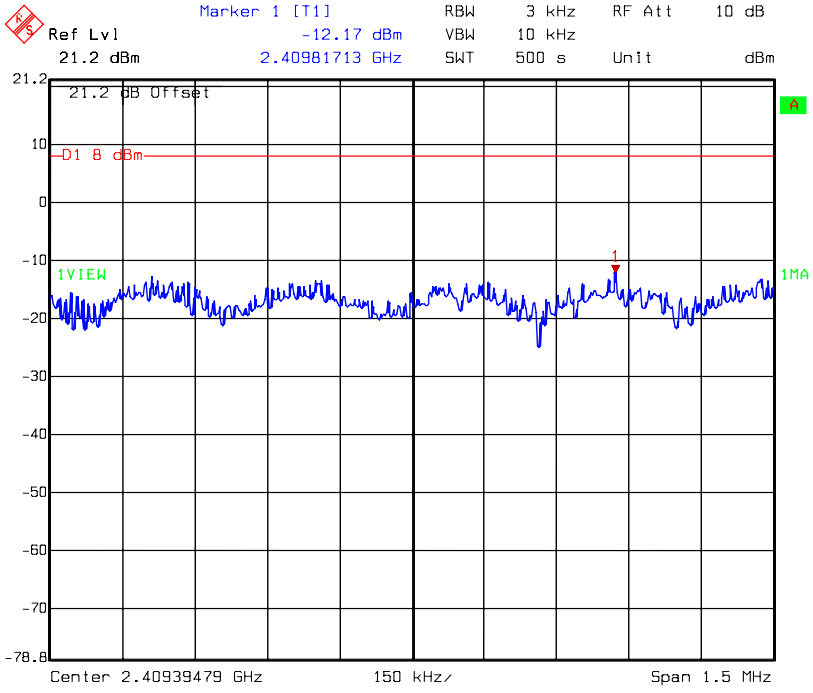
Title: Power Density,TS11020087-EME
Comment A: 11b 2437 ch6 _
Date: 03.MAR.2011 10:05:30

Chain 0: Power Spectral Density @ 802.11b mode channel 11



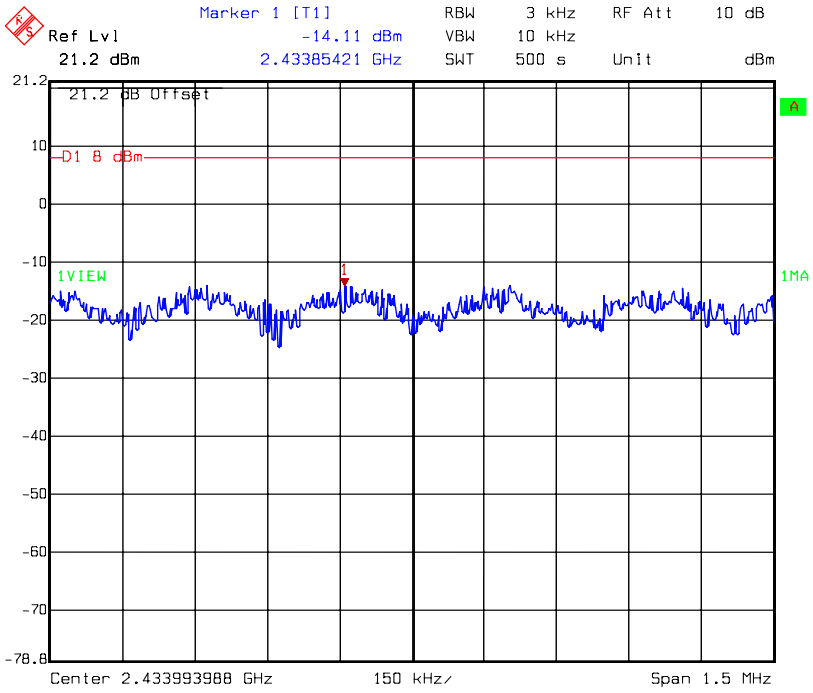
Title: Power Density,TS11020087-EME
Comment A: 11b 2462 ch11 _
Date: 03.MAR.2011 10:08:34

Chain 0: Power Spectral Density @ 802.11g mode channel 1



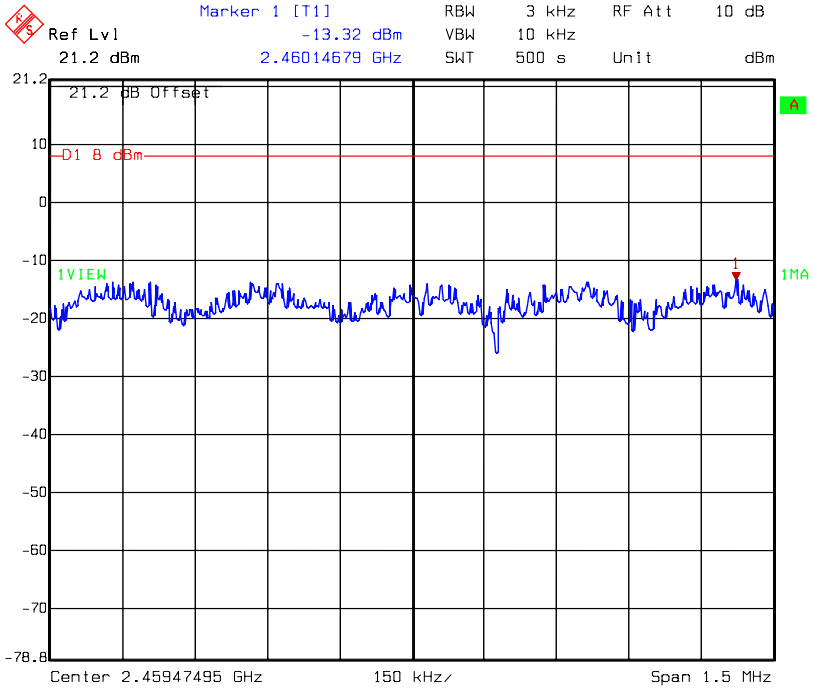
Title: Power Density,TS11020087-EME
Comment A: 11g 2412 ch1 Chain0
Date: 03.MAR.2011 10:12:23

Chain 0: Power Spectral Density @ 802.11g mode channel 6



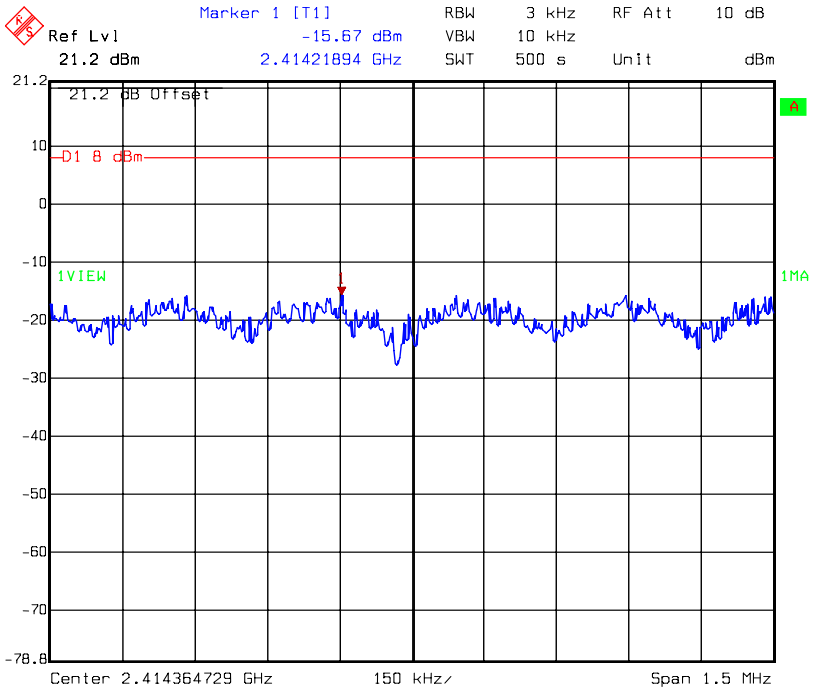
Title: Power Density,TS11020087-EME
Comment A: 11g 2437 ch6 Chain0
Date: 03.MAR.2011 10:15:50

Chain 0: Power Spectral Density @ 802.11g mode channel 11



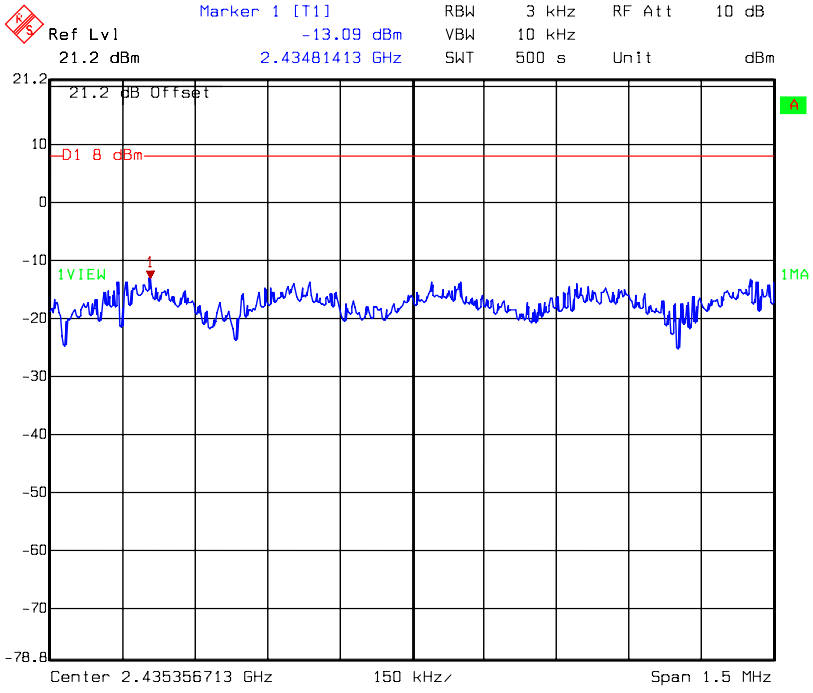
Title: Power Density,TS11020087-EME
Comment A: 11g 2462 ch11 Chain0
Date: 03.MAR.2011 10:19:05

Chain 1: Power Spectral Density @ 802.11g mode channel 1



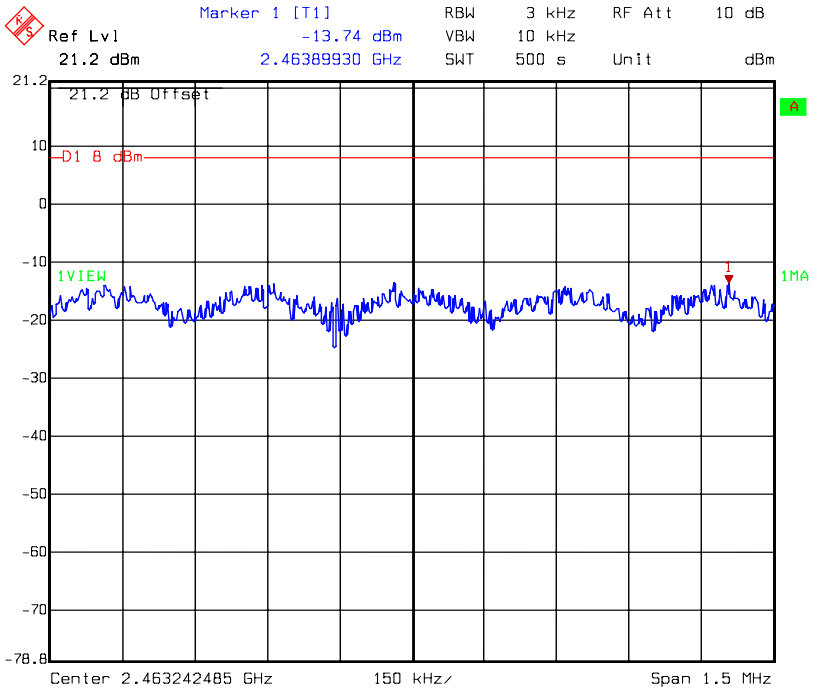
Title: Power Density,TS11020087-EME
Comment A: 11g 2412 ch1 Chain1
Date: 03.MAR.2011 10:50:15

Chain 1: Power Spectral Density @ 802.11g mode channel 6



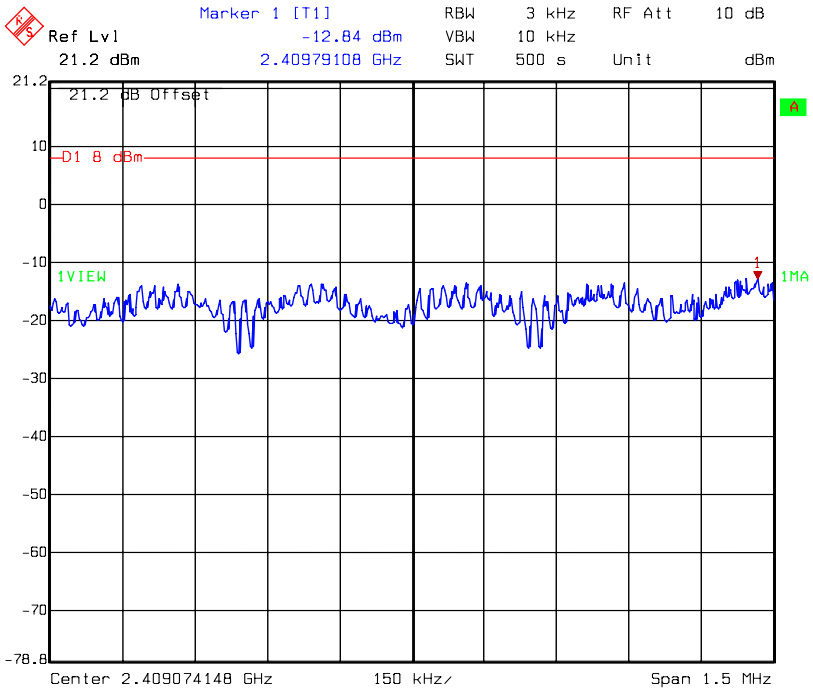
Title: Power Density,TS11020087-EME
Comment A: 11g 2437 ch6 Chain1
Date: 03.MAR.2011 10:53:15

Chain 1: Power Spectral Density @ 802.11g mode channel 11



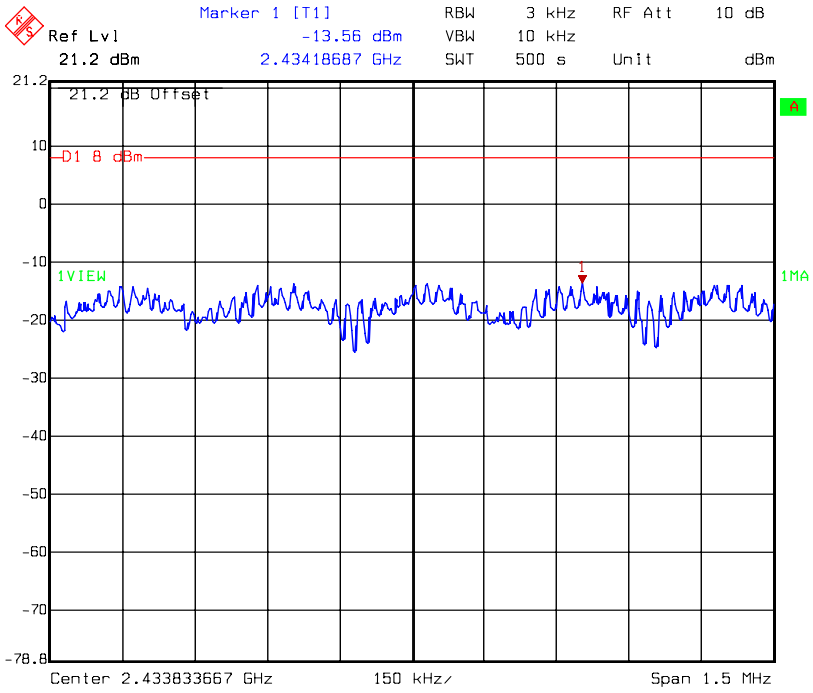
Title: Power Density,TS11020087-EME
Comment A: 11g 2462 ch11 Chain1
Date: 03.MAR.2011 10:56:09

Chain 0: Power Spectral Density @ 802.11n HT20 mode channel 1



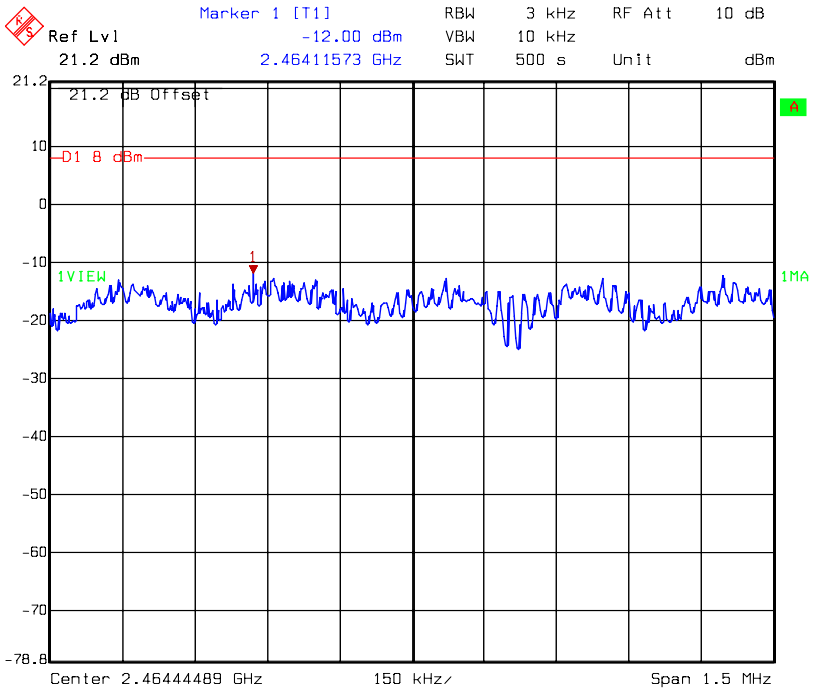
Title: Power Density,TS11020087-EME
Comment A: 11n HT20 2412 ch1 Chain0
Date: 03.MAR.2011 10:22:27

Chain 0: Power Spectral Density @ 802.11n HT20 mode channel 6



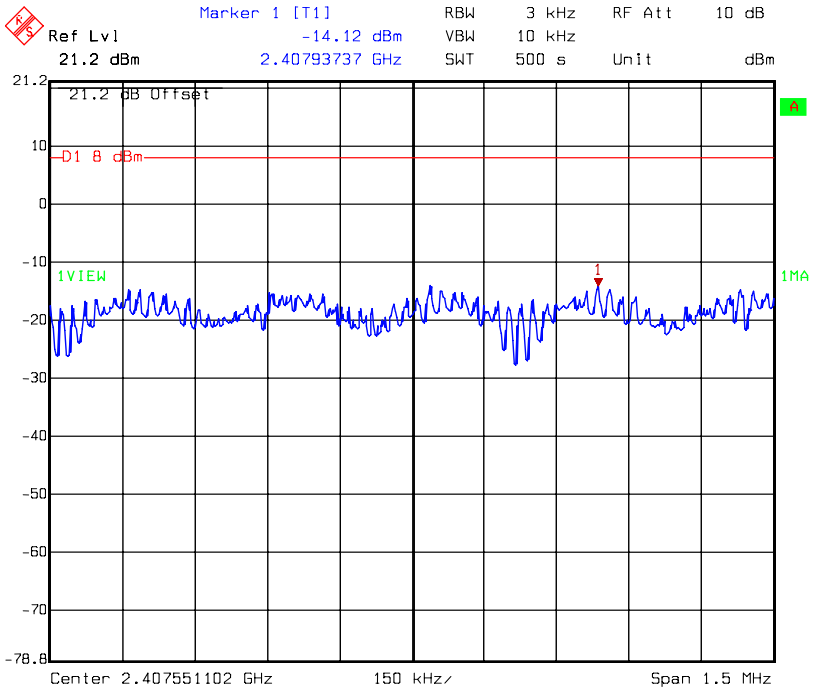
Title: Power Density,TS11020087-EME
Comment A: 11n HT20 2437 ch6 Chain0
Date: 03.MAR.2011 10:25:43

Chain 0: Power Spectral Density @ 802.11n HT20 mode channel 11



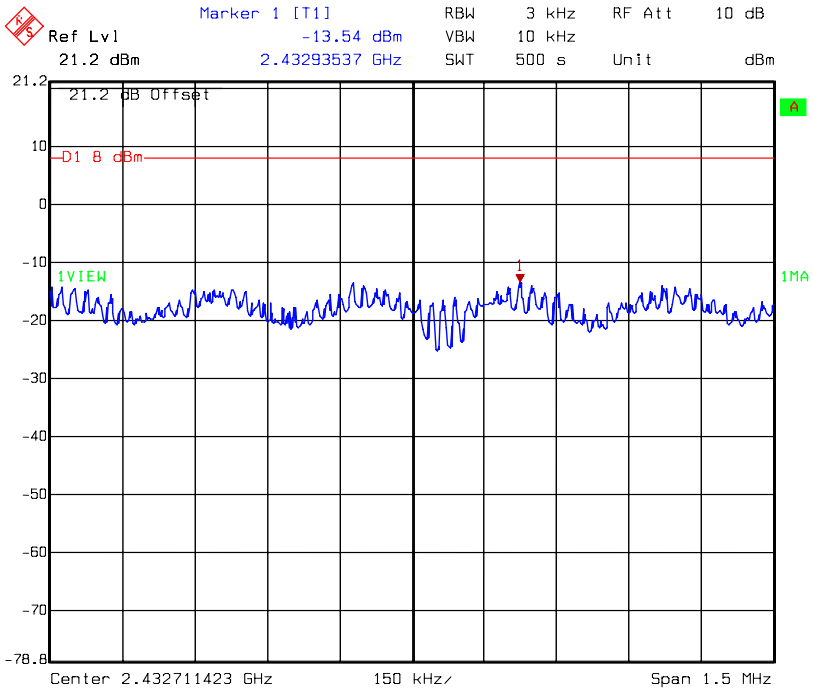
Title: Power Density,TS11020087-EME
Comment A: 11n HT20 2462 ch11 Chain0
Date: 03.MAR.2011 10:29:12

Chain 1: Power Spectral Density @ 802.11n HT20 mode channel 1



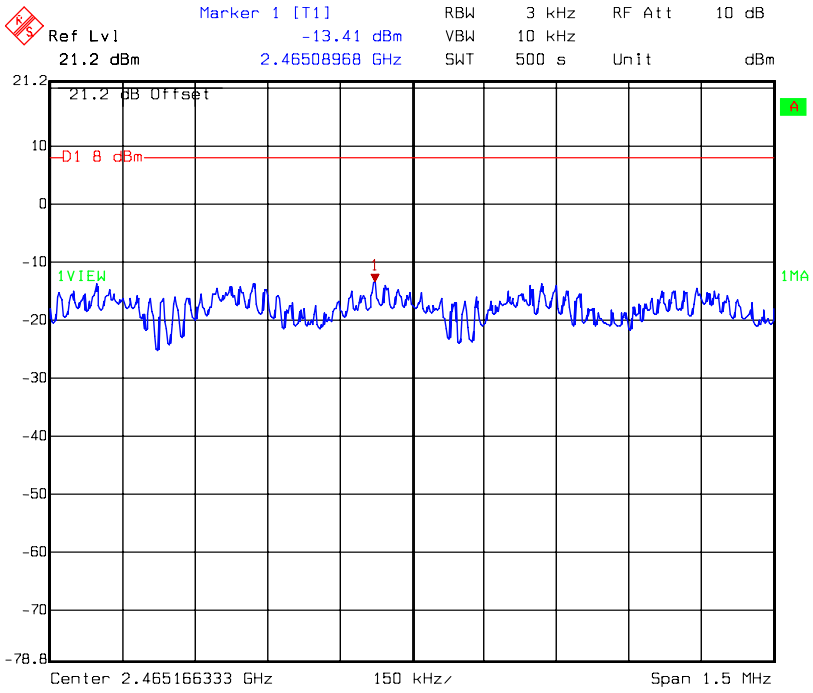
Title: Power Density,TS11020087-EME
Comment A: 11n HT20 2412 ch1 Chain1
Date: 03.MAR.2011 10:59:54

Chain 1: Power Spectral Density @ 802.11n HT20 mode channel 6



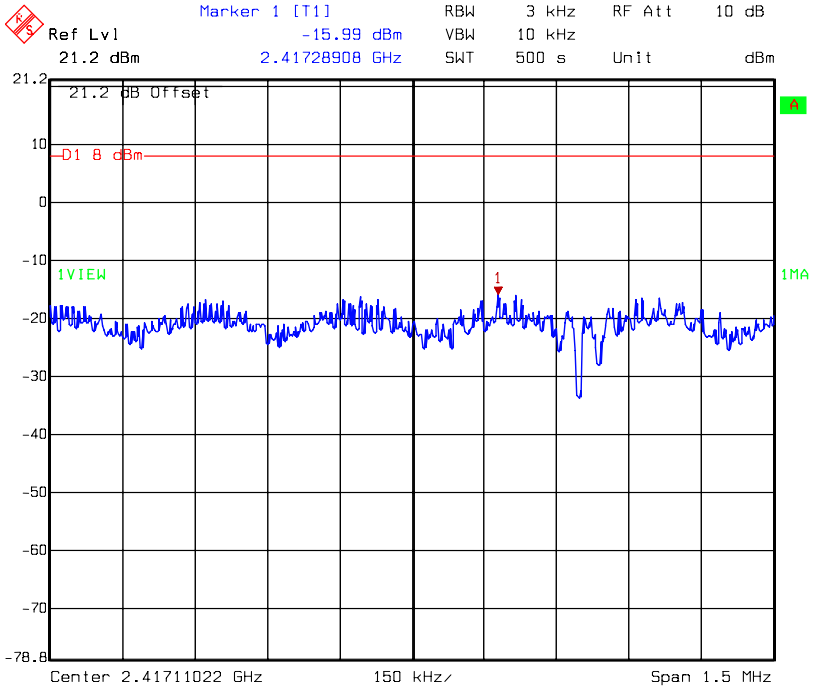
Title: Power Density,TS11020087-EME
Comment A: 11n HT20 2437 ch6 Chain1
Date: 03.MAR.2011 11:02:46

Chain 1: Power Spectral Density @ 802.11n HT20 mode channel 11



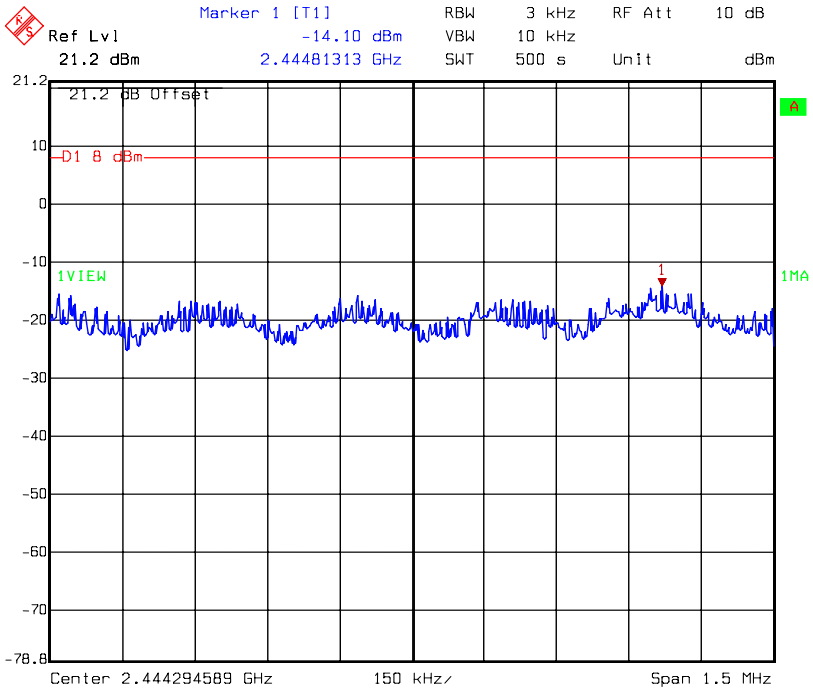
Title: Power Density,TS11020087-EME
Comment A: 11n HT20 2462 ch11 Chain1
Date: 03.MAR.2011 11:05:44

Chain 0: Power Spectral Density @ 802.11n HT40 mode channel 3



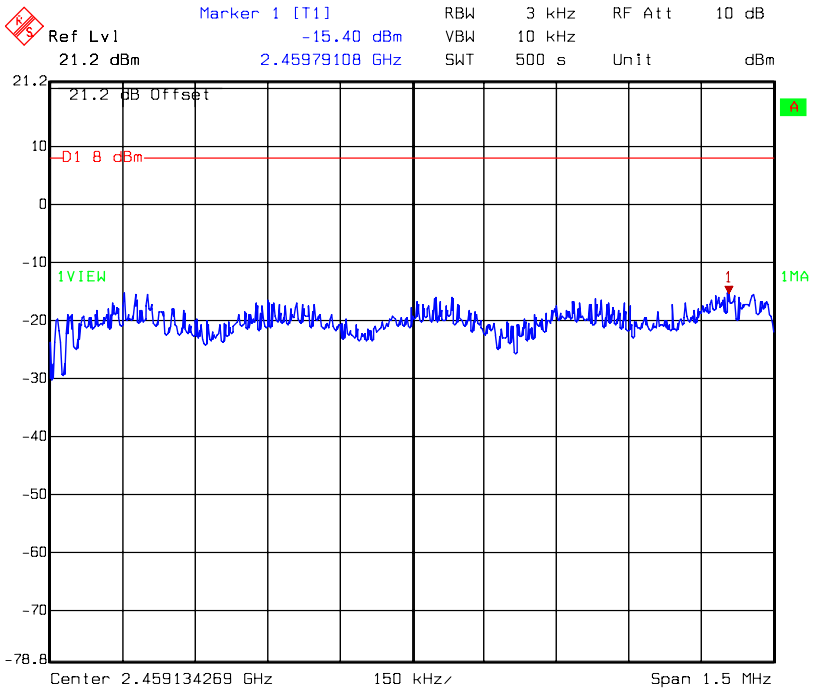
Title: Power Density,TS11020087-EME
Comment A: 11n HT40 2422 ch3 Chain0
Date: 03.MAR.2011 10:33:53

Chain 0: Power Spectral Density @ 802.11n HT40 mode channel 6



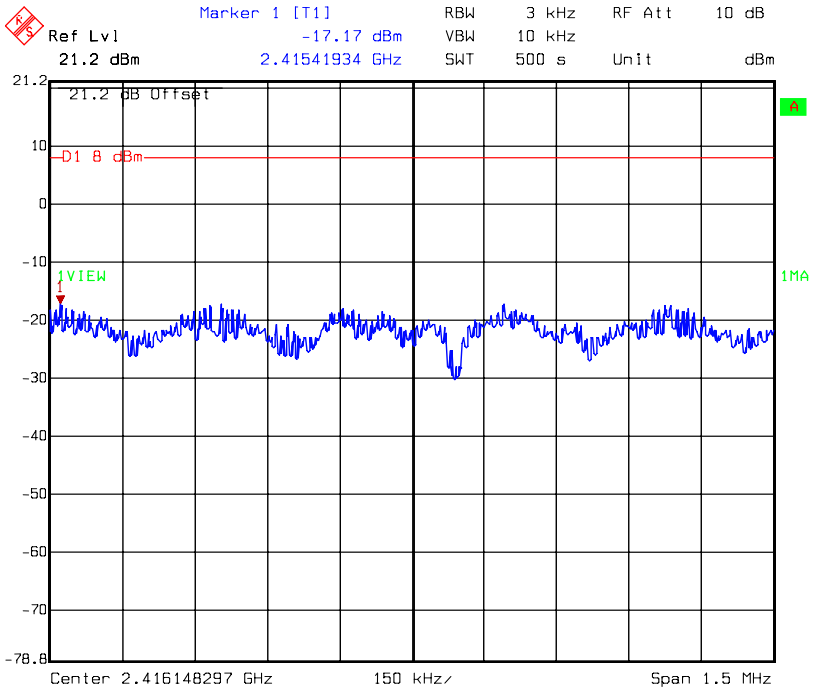
Title: Power Density,TS11020087-EME
Comment A: 11n HT40 2437 ch6 Chain0
Date: 03.MAR.2011 10:37:40

Chain 0: Power Spectral Density @ 802.11n HT40 mode channel 9



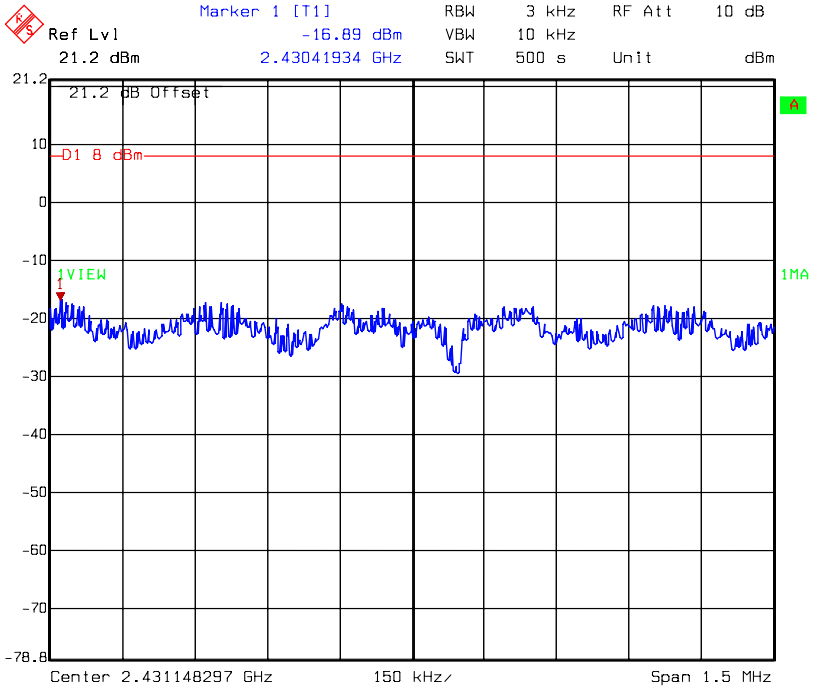
Title: Power Density,TS11020087-EME
Comment A: 11n HT40 2452 ch9 Chain0
Date: 03.MAR.2011 10:42:05

Chain 1: Power Spectral Density @ 802.11n HT40 mode channel 3



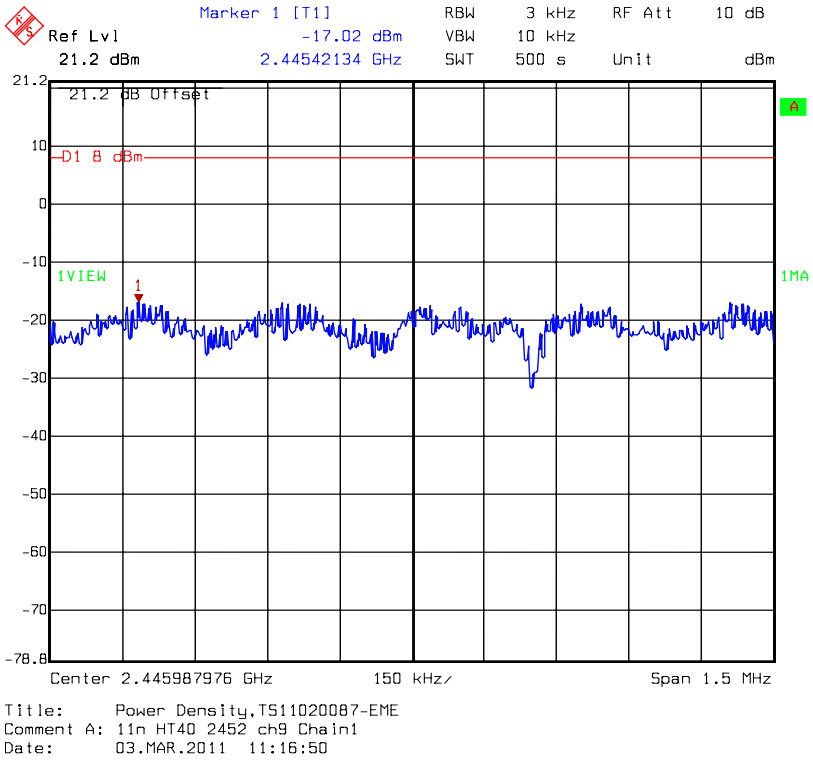
Title: Power Density,TS11020087-EME
Comment A: 11n HT40 2422 ch3 Chain1
Date: 03.MAR.2011 11:08:57

Chain 1: Power Spectral Density @ 802.11n HT40 mode channel 6



Title: Power Density,TS11020087-EME
Comment A: 11n HT40 2437 ch6 Chain1
Date: 03.MAR.2011 11:13:06

Chain 1: Power Spectral Density @ 802.11n HT40 mode channel 9



7. RF Antenna conducted Spurious

Name of Test	RF Antenna Conducted Spurious
Base Standard	FCC 15.247(d)

Test Result: Complies

Measurement Data: See plots below

Method of Measurement:

Reference FCC document: KDB558074

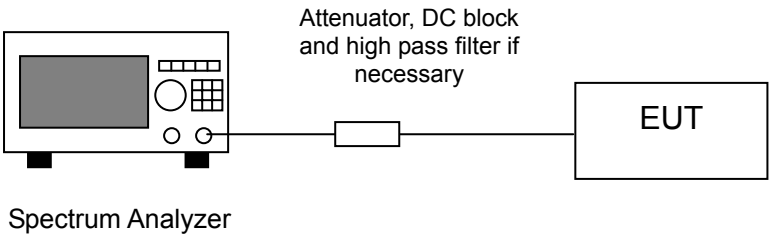
The measurements were performed from 30 MHz to 25 GHz(for 2.4G) and 30 MHz to 40

Method of Measurement:

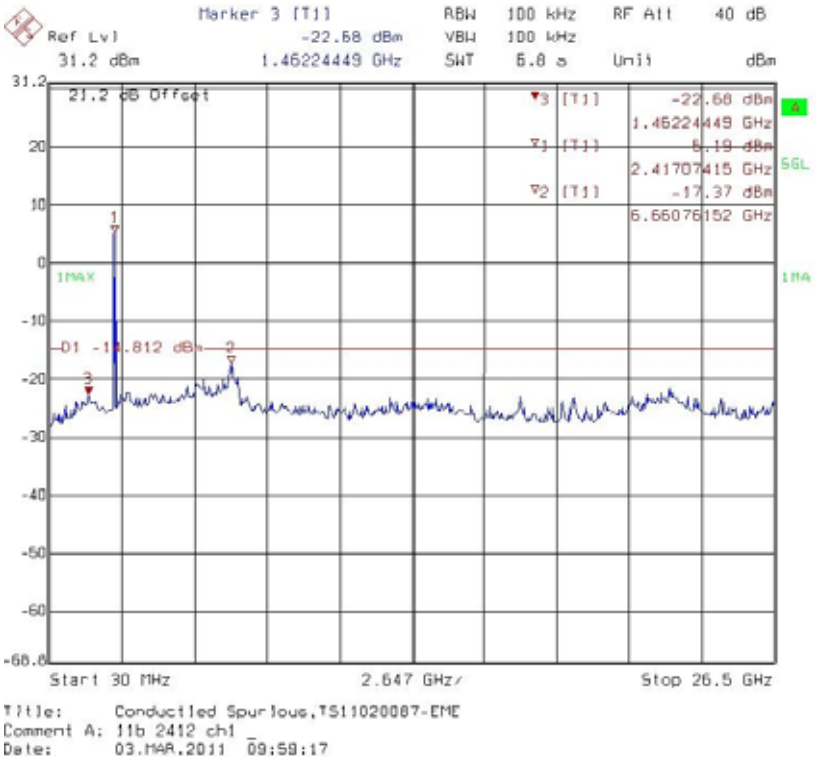
Reference FCC document: KDB558074

The measurements were performed from 30 MHz to 25 GHz RF antenna conducted per FCC 15.247 (d) was measured from the EUT antenna port using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 100 kHz. Harmonics and spurious noise must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. The table below is the results from the highest emission for each channel within the authorized band. This table was used to determine the spurious limits for each channel.

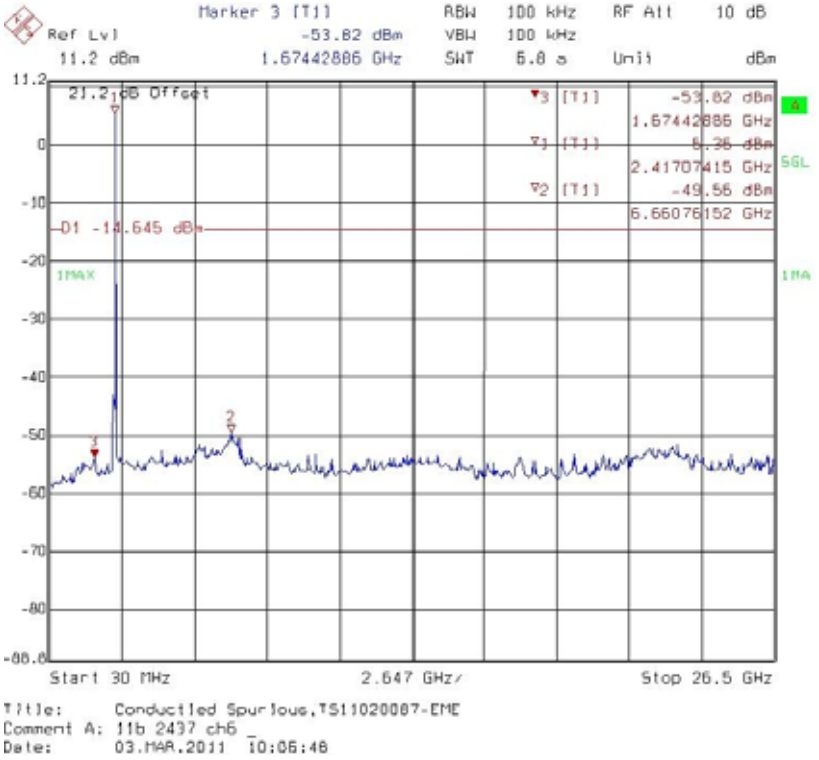
Test Diagram:



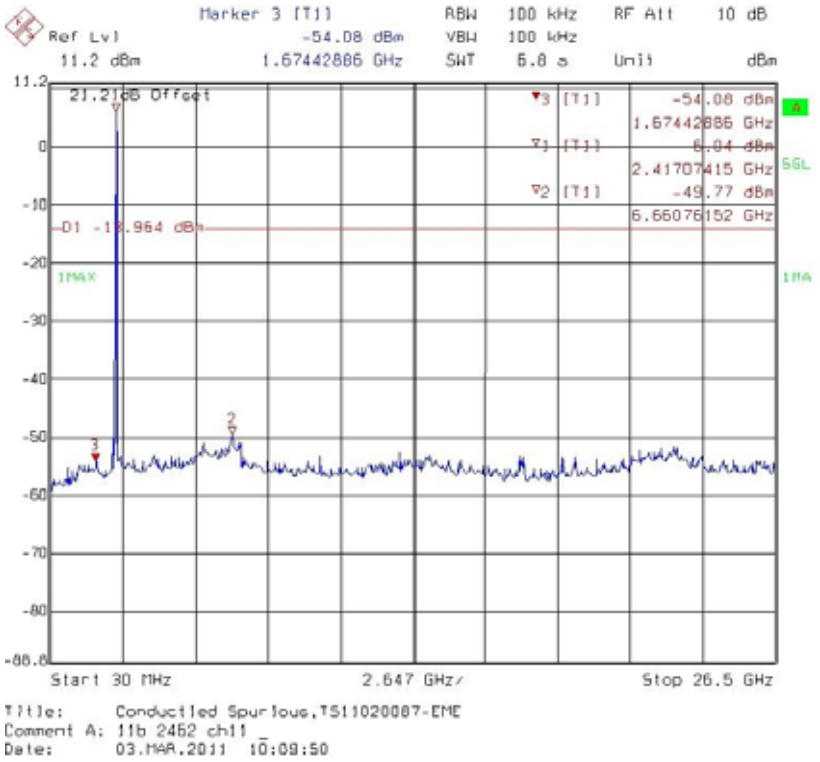
Chain 0: conducted spurious @ 802.11b mode channel 1



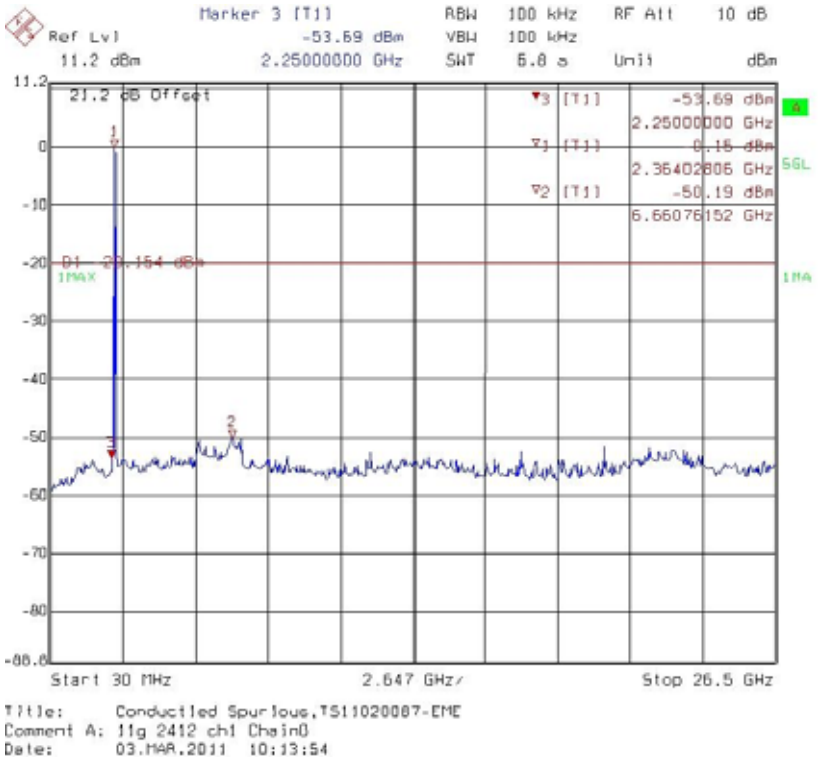
Chain 0: conducted spurious @ 802.11b mode channel 6



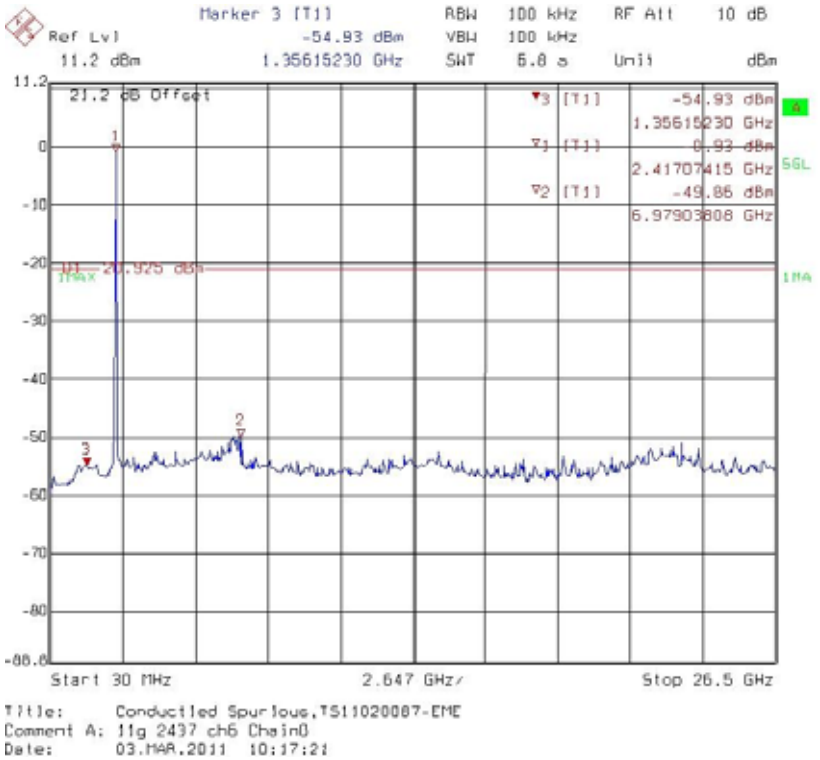
Chain 0: conducted spurious @ 802.11b mode channel 11



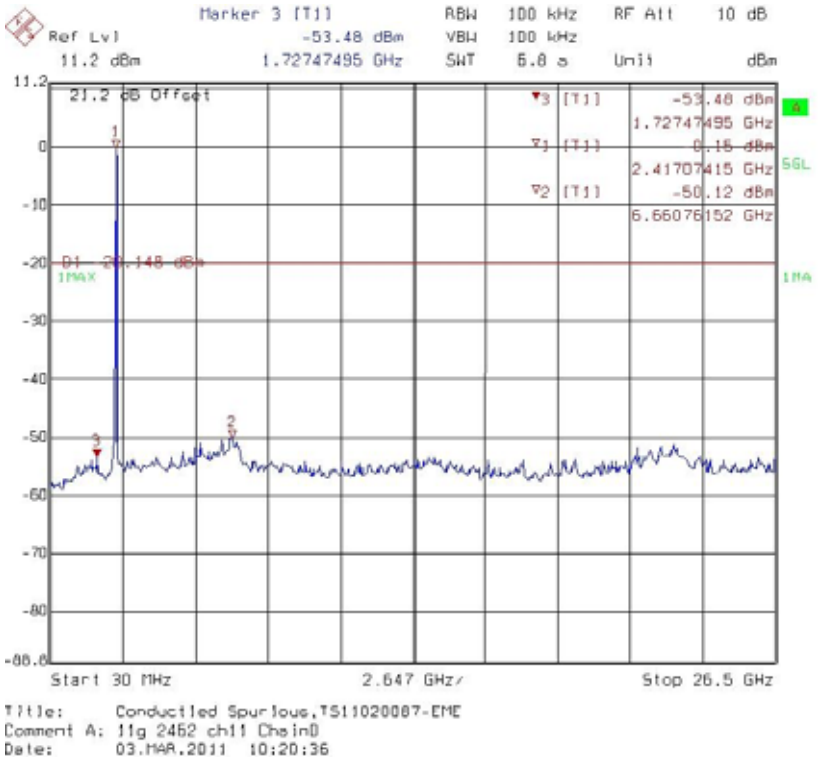
Chain 0: conducted spurious @ 802.11g mode channel 1



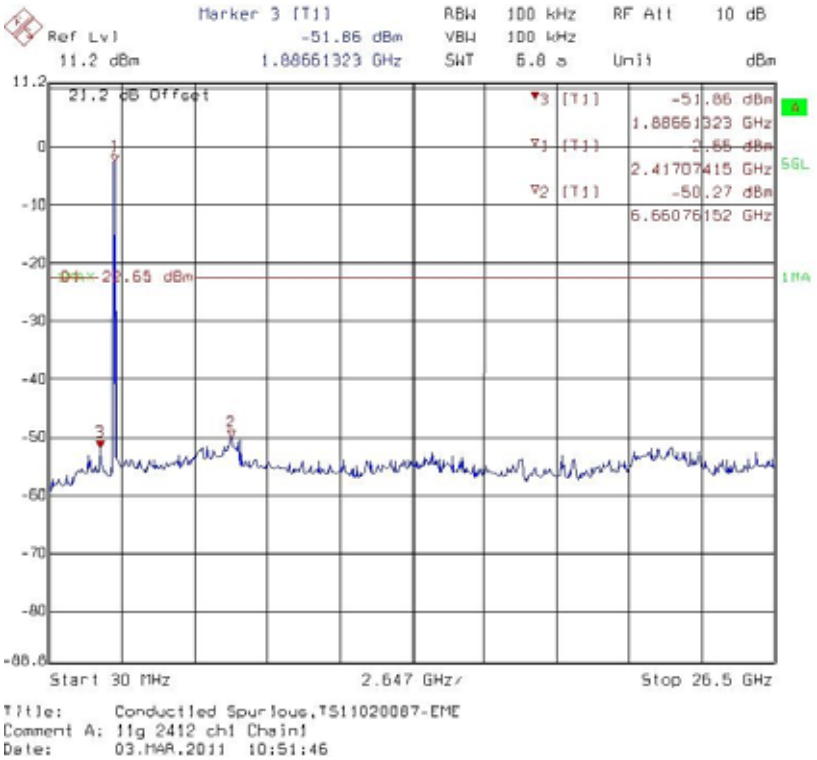
Chain 0: conducted spurious @ 802.11g mode channel 6



Chain 0: conducted spurious @ 802.11g mode channel 11

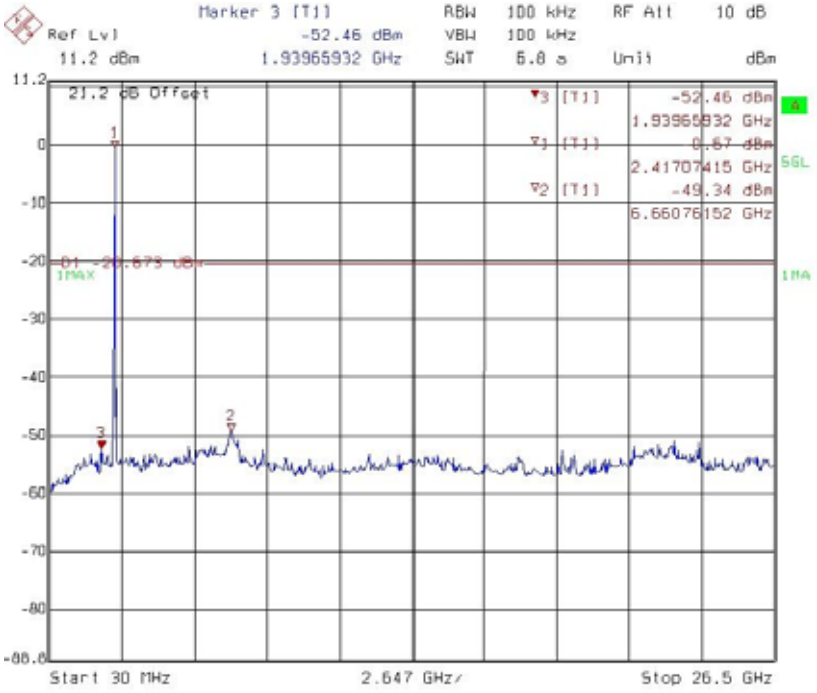


Chain 1: conducted spurious @ 802.11g mode channel 1



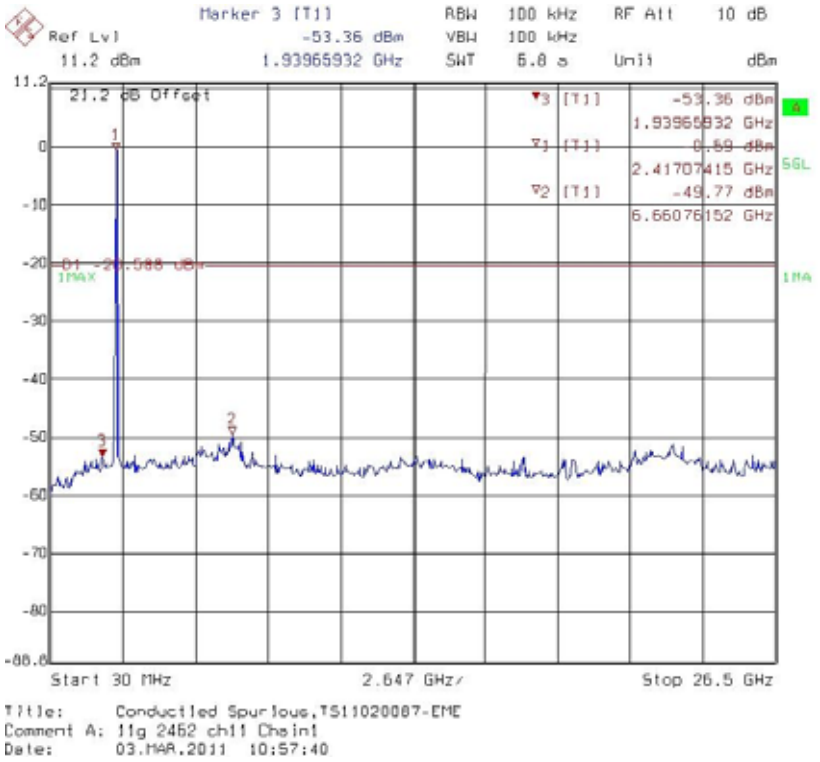
Title: Conducted Spurious,TS11020087-EME
Comment A: 11g 2412 ch1 Chain1
Date: 03.MAR.2011 10:51:46

Chain 1: conducted spurious @ 802.11g mode channel 6

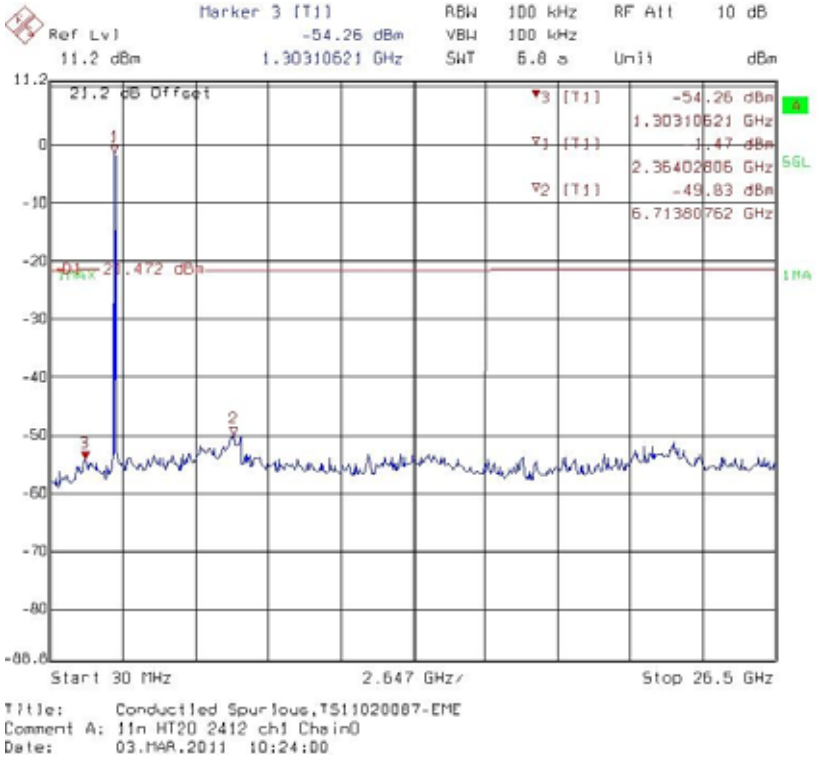


Title: Conducted Spurious,TS11020087-EME
Comment A: 11g 2437 ch6 Chain1
Date: 03.MAR.2011 10:54:46

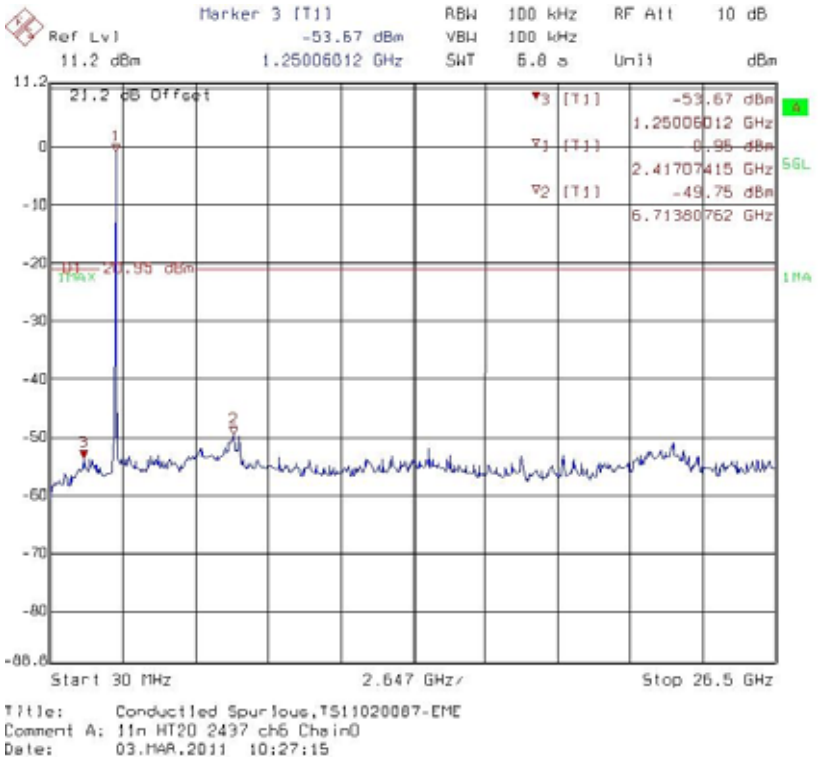
Chain 1: conducted spurious @ 802.11g mode channel 11



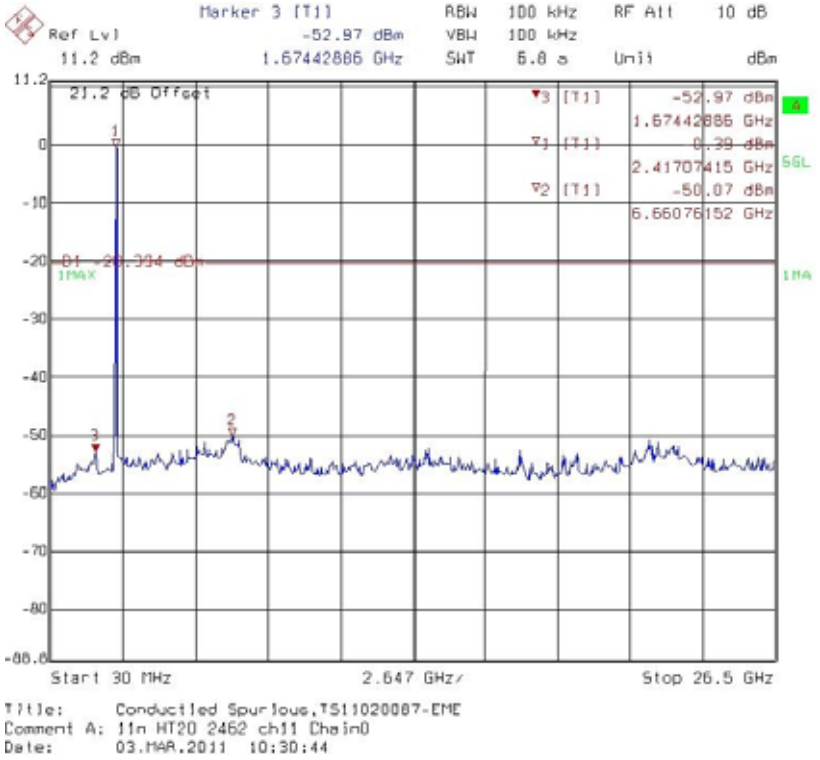
Chain 0: conducted spurious @ 802.11n HT20 mode channel 1



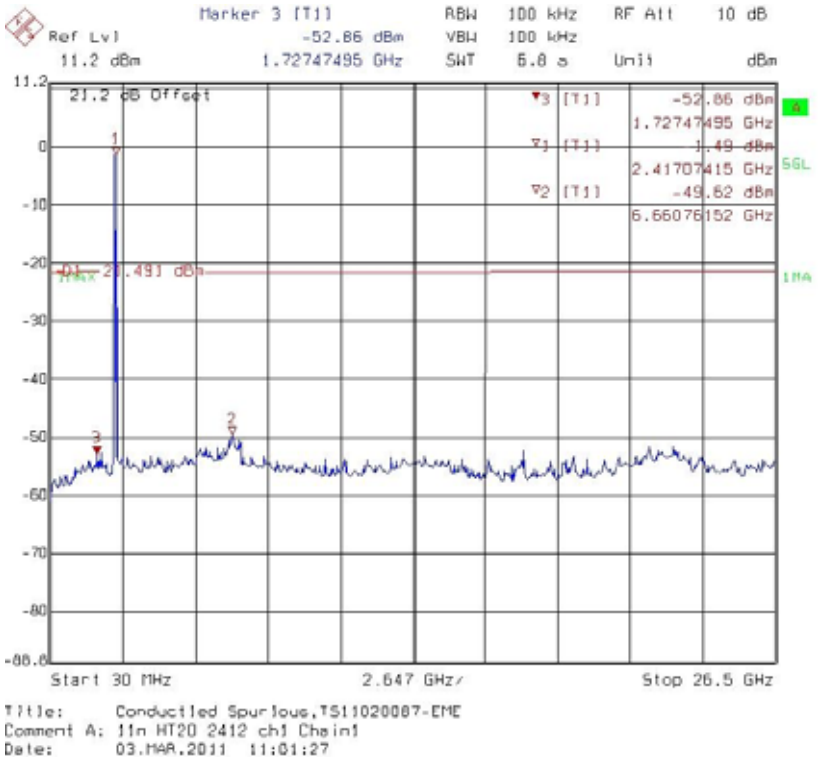
Chain 0: conducted spurious @ 802.11n HT20 mode channel 6



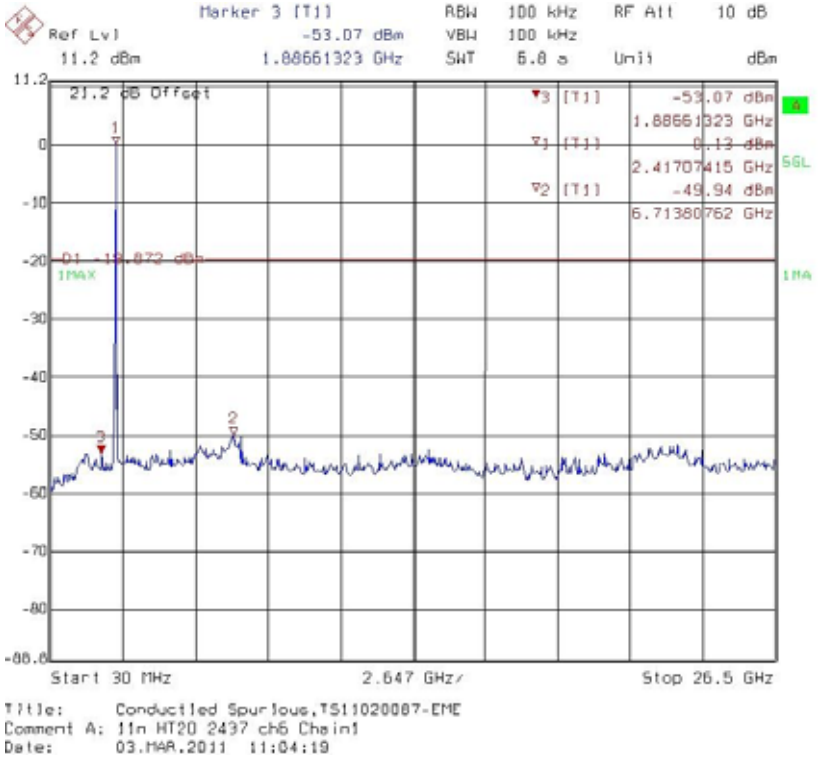
Chain 0: conducted spurious @ 802.11n HT20 mode channel 11



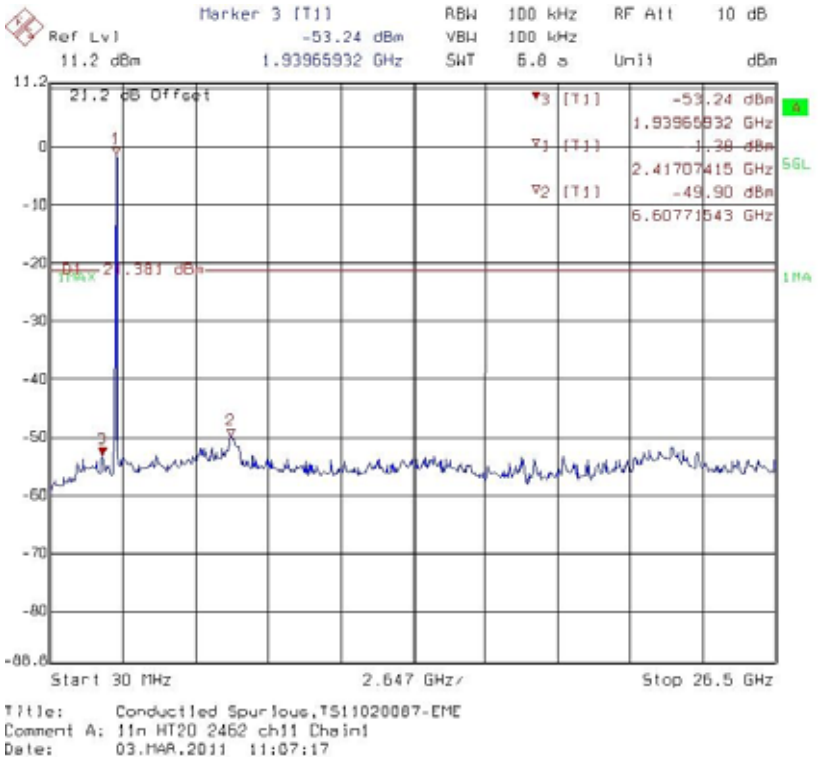
Chain 1: conducted spurious @ 802.11n HT20 mode channel 1



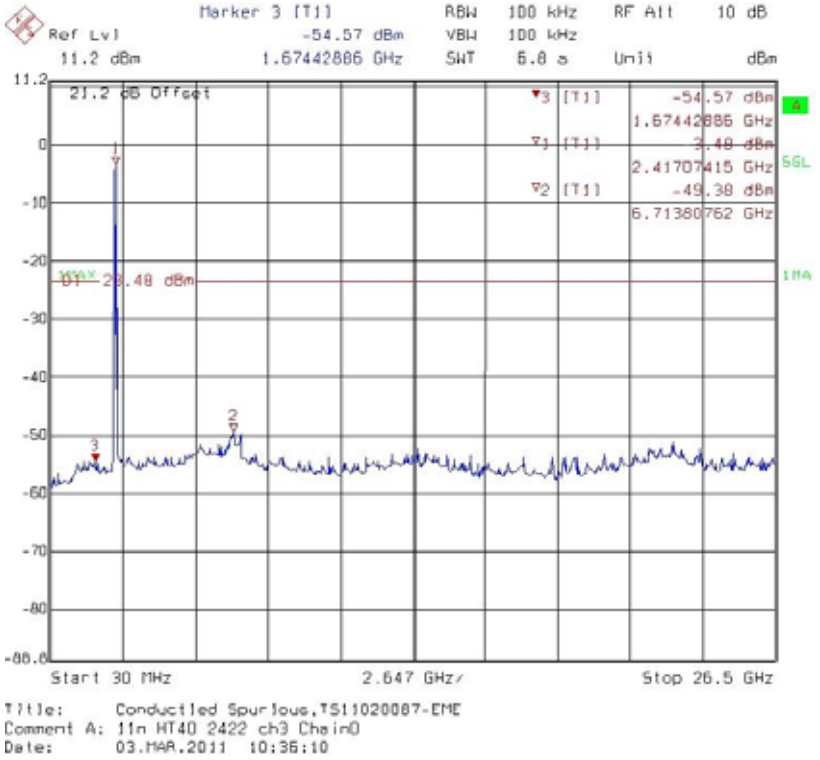
Chain 1: conducted spurious @ 802.11n HT20 mode channel 6



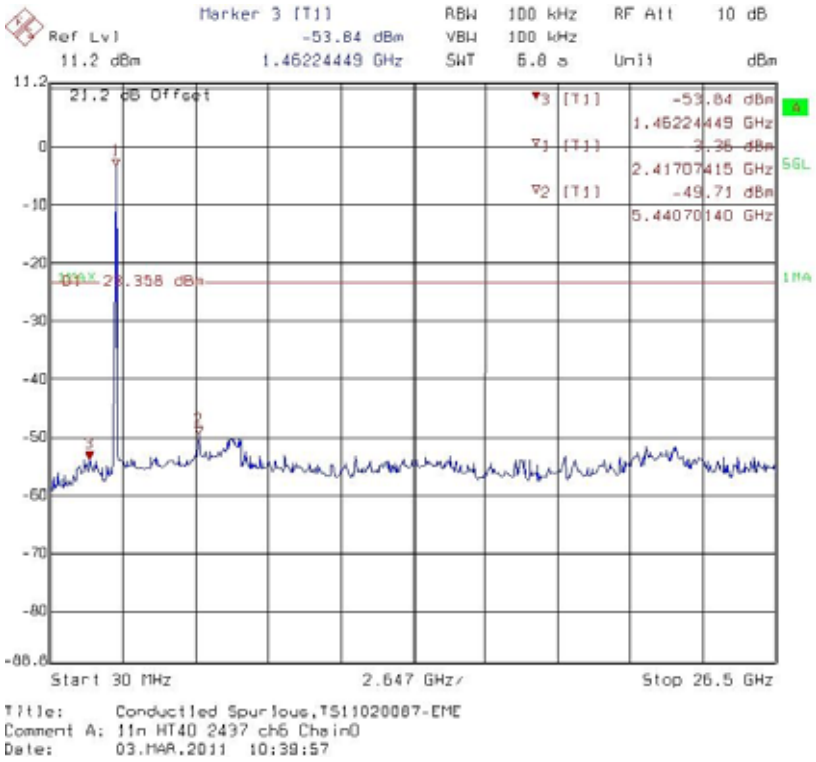
Chain 1: conducted spurious @ 802.11n HT20 mode channel 11



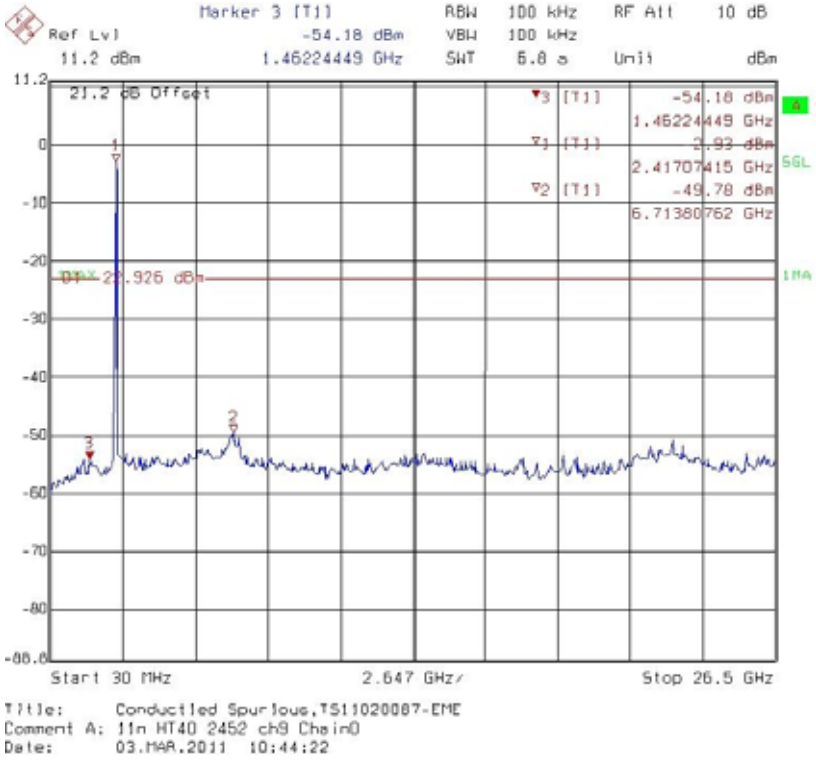
Chain 0: conducted spurious @ 802.11n HT40 mode channel 3



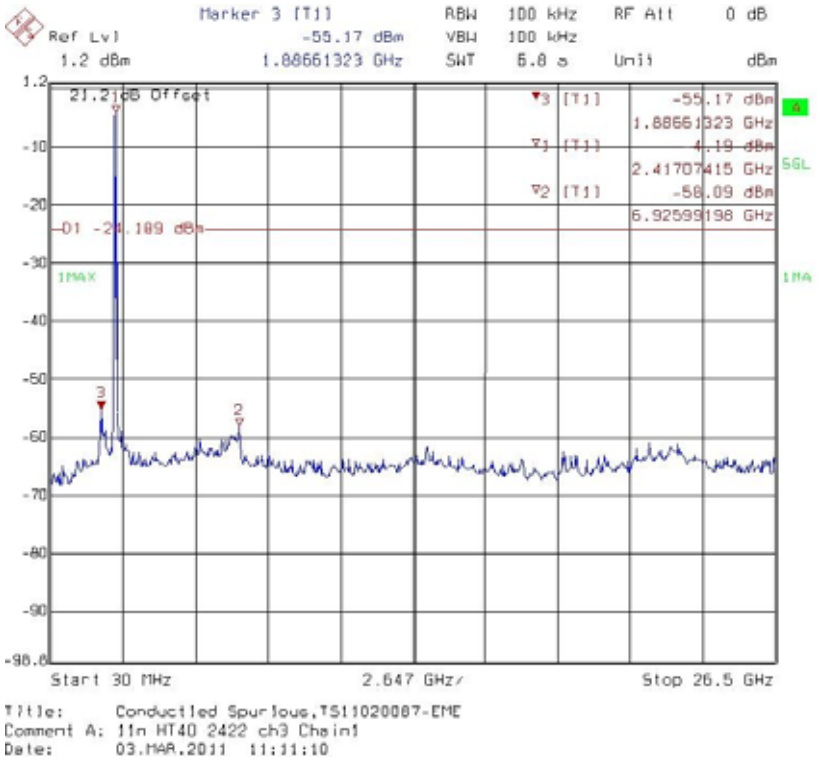
Chain 0: conducted spurious @ 802.11n HT40 mode channel 6



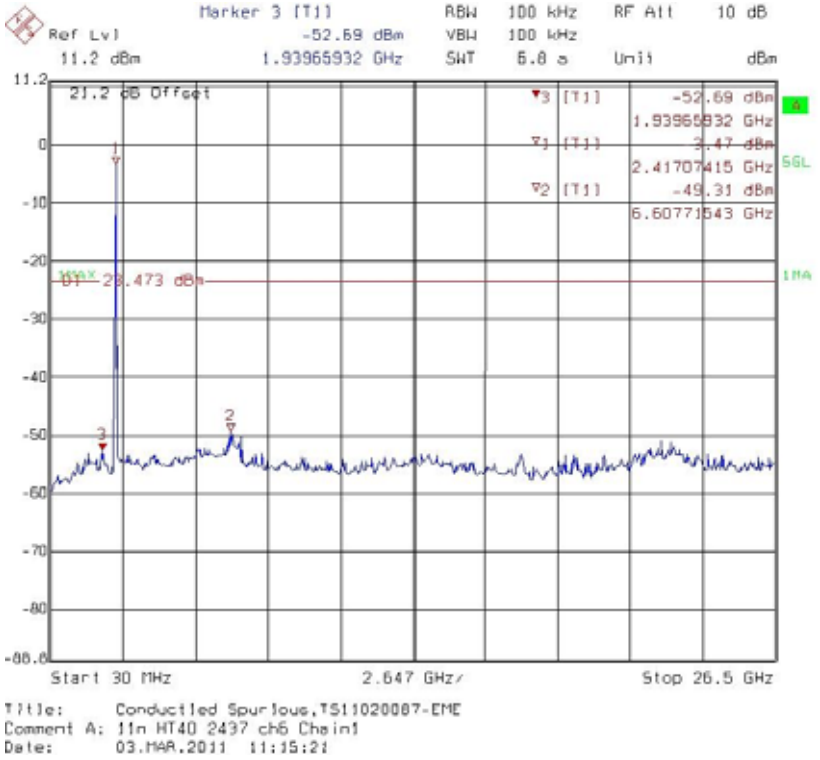
Chain 0: conducted spurious @ 802.11n HT40 mode channel 9



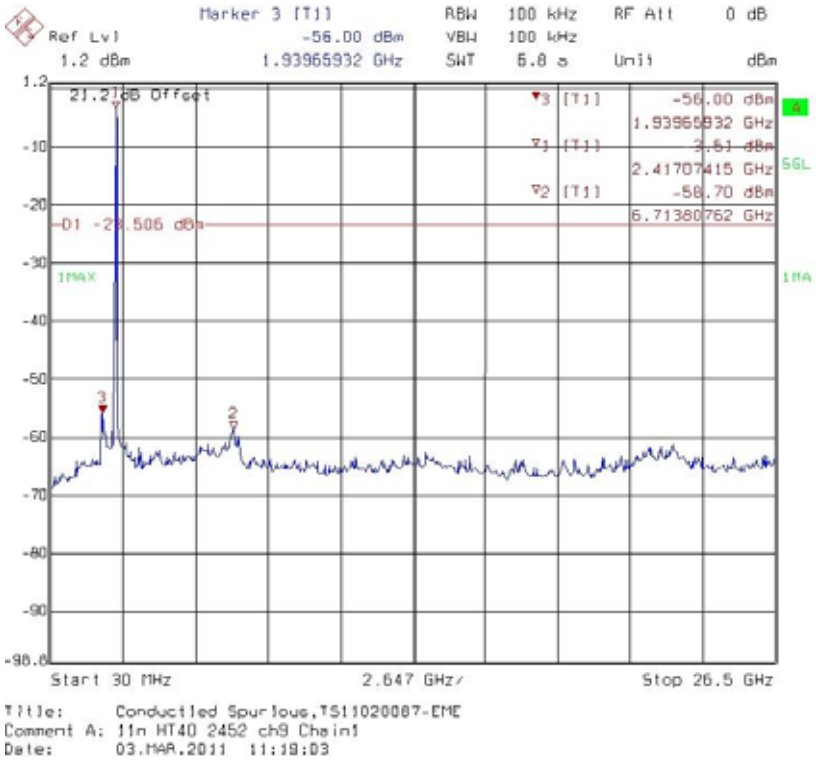
Chain 1: conducted spurious @ 802.11n HT40 mode channel 3



Chain 1: conducted spurious @ 802.11n HT40 mode channel 6



Chain 1: conducted spurious @ 802.11n HT40 mode channel 9



8. Radiated Spurious Emission

Name of Test	Radiated Spurious Emission
Base Standard	FCC 15.247(d), 15.209, 15.205

Test Result: Complies

Measurement Data: See Tables below

Method of Measurement:

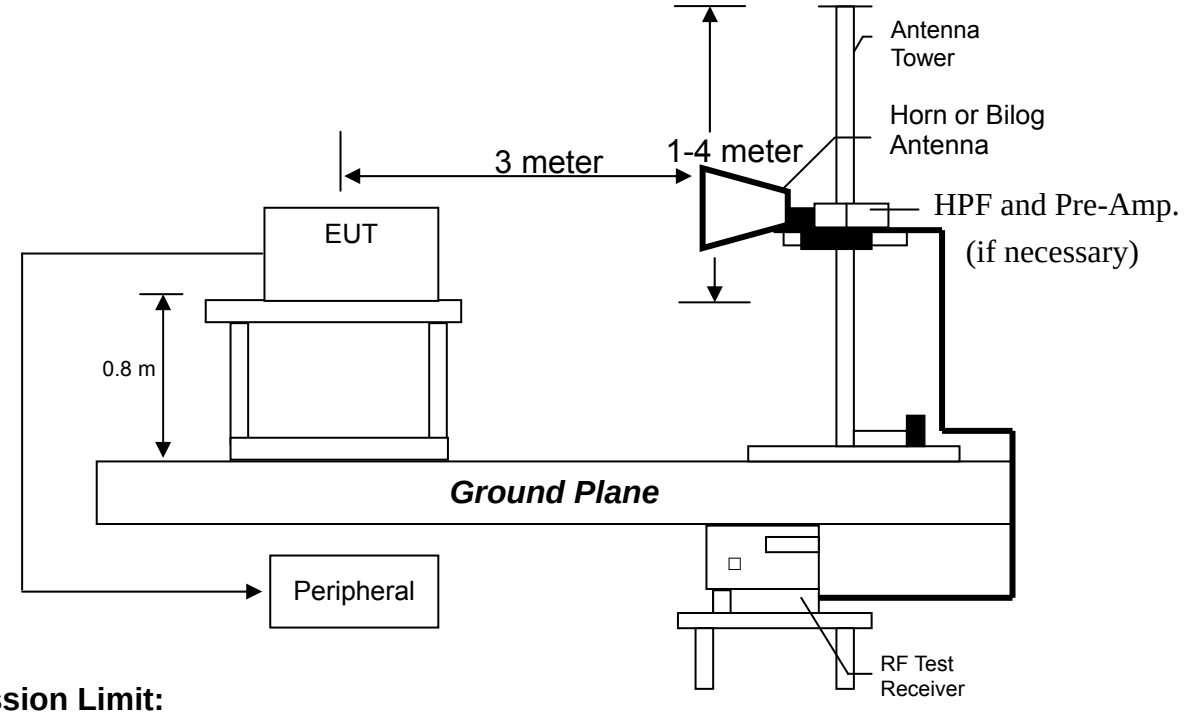
Reference FCC document: KDB558074, ANSI C63.4

The frequency range from 30 MHz to 1000 MHz using Bilog Antenna.
The frequency range over 1 GHz using Horn Antenna.

Radiated emissions were invested cover the frequency range from 30 MHz to 1000 MHz using a receiver RBW of 120 kHz record QP reading, and the frequency over 1 GHz using a spectrum analyzer RBW of 1 MHz and 10 Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1 MHz RBW/VBW) recorded also on the report. The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter. The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent 3 meters reading using inverse scaling with distance.

The EUT configuration please refer to the “Spurious set-up photo.pdf”.

Test Diagram:



Emission Limit:

The spurious Emission shall test through the 10th harmonic. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Frequency (MHz)	Limits (dBμV/m@ 3 meter)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Note: (1) The EUT was tested while in a continuous transmit mode and the worst case data rates are Mbps data rate for 802.11b mode, 6 Mbps data rate for 802.11g mode, 6.5 Mbps data rate for 802.11n HT20 mode and 13 Mbps data rate for 802.11n HT40 mode. The EUT was tuned to a low, middle and high channel.

(2) The EUT operating at 2.4 GHz ISM band. Frequency Range scanned from 30 MHz to 25 GHz.

Measurement results: frequencies equal to or less than 1 GHz

The test was performed on EUT under 802.11b, 802.11g and 802.11g continuously transmitting mode. The worst case occurred at 802.11b Tx channel 1.

EUT : NVG2053
Worst Case : 802.11b Tx at channel 1

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
V	31.94	QP	12.60	23.30	35.89	40.00	-4.11
V	125.06	QP	9.47	20.99	30.45	43.50	-13.05
V	374.35	QP	15.06	28.58	43.64	46.00	-2.36
V	499.48	QP	18.43	22.49	40.91	46.00	-5.09
V	624.61	QP	20.75	20.81	41.56	46.00	-4.44
V	749.74	QP	22.74	13.49	36.23	46.00	-9.77
H	233.70	QP	11.74	21.30	33.04	46.00	-12.96
H	329.73	QP	14.40	23.00	37.39	46.00	-8.61
H	374.35	QP	15.48	27.48	42.95	46.00	-3.05
H	499.48	QP	18.64	23.95	42.59	46.00	-3.41
H	624.61	QP	20.88	19.77	40.64	46.00	-5.36
H	920.46	QP	24.59	15.71	40.29	46.00	-5.71

Remark:

1. Corr. Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Corr. Factor

Measurement results: frequency above 1GHz

EUT : NVG2053
Test Condition : 802.11b Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3210	PK	V	33.8	36.24	43.45	45.89	54	-8.11
4824	PK	V	35.1	38.54	48.1	51.54	54	-2.46
3210	PK	H	33.8	36.24	41.85	44.29	54	-9.71
4824	PK	H	35.1	38.54	44.23	47.67	54	-6.33

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : NVG2053
Test Condition : 802.11b Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3240	PK	V	33.8	36.24	43.01	45.45	54	-8.55
4874	PK	V	35.1	38.54	46.58	50.02	54	-3.98
7311	PK	V	33	44.6	40.06	51.66	54	-2.34
9748	PK	V	32.7	49.3	37.76	54.36	74	-19.64
9748	AV	V	32.7	49.3	34.64	51.24	54	-2.76
4874	PK	H	35.1	38.54	41.89	45.33	54	-8.67

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : NVG2053
Test Condition : 802.11b Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3270	PK	V	33.8	36.24	42.4	44.84	54	-9.16
4924	PK	V	35.1	38.54	45.76	49.2	54	-4.80
7386	PK	V	33	44.6	39.66	51.26	74	-22.74
9848	PK	V	32.7	49.3	38.72	55.32	74	-18.68
9848	AV	V	32.7	49.3	35.25	51.85	54	-2.15
4924	PK	H	35.1	38.54	41.65	45.09	54	-8.91
7386	PK	H	33	44.6	38.85	50.45	54	-3.55

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the system noise floor.

EUT : NVG2053
Test Condition : 802.11g Tx at channel 1 (DAC0)

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3210	PK	V	33.8	36.24	42.57	45.01	54	-8.99
4824	PK	V	35.1	38.54	41.55	44.99	54	-9.01
4824	PK	H	35.1	38.54	38.49	41.93	54	-12.07

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : NVG2053
Test Condition : 802.11g Tx at channel 6 (DAC0)

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3240	PK	V	33.8	36.24	42.85	45.29	54	-8.71
4874	PK	V	35.1	38.54	43.28	46.72	54	-7.28
4980	PK	V	35.1	38.54	41.73	45.17	54	-8.83
3240	PK	H	33.8	36.24	40	42.44	54	-11.56
4874	PK	H	35.1	38.54	38.11	41.55	54	-12.45

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : NVG2053
Test Condition : 802.11g Tx at channel 11 (DAC0)

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3270	PK	V	33.8	36.24	43.06	45.5	54	-8.50
4924	PK	V	35.1	38.54	40.3	43.74	54	-10.26
4980	PK	V	35.1	38.54	42.19	45.63	54	-8.37
4924	PK	H	35.1	38.54	39.07	42.51	54	-11.49

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : NVG2053
Test Condition : 802.11g Tx at channel 1 (DAC1)

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3210	PK	V	33.8	36.24	42.11	44.55	54	-9.45
4824	PK	V	35.1	38.54	48.08	51.52	54	-2.48
4824	PK	H	35.1	38.54	45.73	49.17	54	-4.83

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : NVG2053
Test Condition : 802.11g Tx at channel 6 (DAC1)

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3240	PK	V	33.8	36.24	43.47	45.91	54	-8.09
4874	PK	V	35.1	38.54	51.37	54.81	74	-19.19
4874	AV	V	35.1	38.54	38.07	41.51	54	-12.49
3240	PK	H	33.8	36.24	41.17	43.61	54	-10.39
4874	PK	H	35.1	38.54	45.24	48.68	54	-5.32

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : NVG2053
Test Condition : 802.11g Tx at channel 11 (DAC1)

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3270	PK	V	33.8	36.24	42.91	45.35	54	-8.65
4924	PK	V	35.1	38.54	47.27	50.71	54	-3.29
3270	PK	H	33.8	36.24	41.13	43.57	54	-10.43
4924	PK	H	35.1	38.54	44.41	47.85	54	-6.15

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : NVG2053
Test Condition : 802.11n HT20 Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3210	PK	V	33.8	36.24	44.7	47.14	54	-6.86
4824	PK	V	35.1	38.54	47.12	50.56	54	-3.44
3210	PK	H	33.8	36.24	42.25	44.69	54	-9.31
4824	PK	H	35.1	38.54	45.48	48.92	54	-5.08
7236	PK	H	33	44.6	38.46	50.06	54	-3.94

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : NVG2053
Test Condition : 802.11n HT20 Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3240	PK	V	33.8	36.24	45.45	47.89	54	-6.11
4874	PK	V	35.1	38.54	51.25	54.69	74	-19.31
4874	AV	V	35.1	38.54	37.43	40.87	54	-13.13
7311	PK	V	33	44.6	38.29	49.89	54	-4.11
9748	PK	V	32.7	49.3	36.79	53.39	54	-0.61
3240	PK	H	33.8	36.24	41.67	44.11	54	-9.89
4874	PK	H	35.1	38.54	49.14	52.58	54	-1.42

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : NVG2053
Test Condition : 802.11n HT20 Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3270	PK	V	33.8	36.24	44.45	46.89	54	-7.11
4924	PK	V	35.1	38.54	47.35	50.79	54	-3.21
7386	PK	V	33	44.6	38.07	49.67	54	-4.33
9848	PK	V	32.7	49.3	36.07	52.67	54	-1.33
3270	PK	H	33.8	36.24	41.61	44.05	54	-9.95
4924	PK	H	35.1	38.54	44.93	48.37	54	-5.63

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : NVG2053
Test Condition : 802.11n HT40 Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3210	PK	V	33.8	36.24	45	47.44	54	-6.56
4844	PK	V	35.1	38.54	41.64	45.08	54	-8.92
3210	PK	H	33.8	36.24	42.35	44.79	54	-9.21
4844	PK	H	35.1	38.54	39.9	43.34	54	-10.66

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : NVG2053
Test Condition : 802.11n HT40 Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3240	PK	V	33.8	36.24	44.3	46.74	54	-7.26
4874	PK	V	35.1	38.54	47.05	50.49	54	-3.51
3240	PK	H	33.8	36.24	42.28	44.72	54	-9.28
4874	PK	H	35.1	38.54	40.08	43.52	54	-10.48

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : NVG2053
Test Condition : 802.11n HT40 Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3270	PK	V	33.8	36.24	45.35	47.79	54	-6.21
4904	PK	V	35.1	38.54	42.15	45.59	54	-8.41
3270	PK	H	33.8	36.24	40.93	43.37	54	-10.63
4904	PK	H	35.1	38.54	39.68	43.12	54	-10.88

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

9. Emission on Band Edge

Name of Test	Emission Band Edge
Base Standard	FCC 15.247(d)

Test Result: Complies

Measurement Data: See Tables & plots below

Method of Measurement:

Reference FCC document: KDB558074, ANSI C63.4

The frequency range from 30 MHz to 1000 MHz using Bilog Antenna.
The frequency range over 1 GHz using Horn Antenna.

Radiated emissions were invested cover the frequency range from 30 MHz to 1000 MHz using a receiver RBW of 120 kHz record QP reading, and the frequency over 1 GHz using a spectrum analyzer RBW of 1 MHz and 10 Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1 MHz RBW/VBW) recorded also on the report.

Test Mode: 802.11b mode

Channel	Measurement Freq.Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	65.90	74	-8.10
		AV	52.26	54	-1.74
11 (highest)	2483.5-2500	PK	60.26	74	-13.74
		AV	51.58	54	-2.42

Test Mode: 802.11g mode

Channel	Measurement Freq.Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	68.85	74	-5.15
		AV	52.43	54	-1.57
11 (highest)	2483.5-2500	PK	66.04	74	-7.96
		AV	50.58	54	-3.42

Test Mode: 802.11g mode: DAC 1

Channel	Measurement Freq.Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	63.64	74	-10.36
		AV	49.86	54	-4.14
11 (highest)	2483.5-2500	PK	69.94	74	-4.06
		AV	52.12	54	-1.88

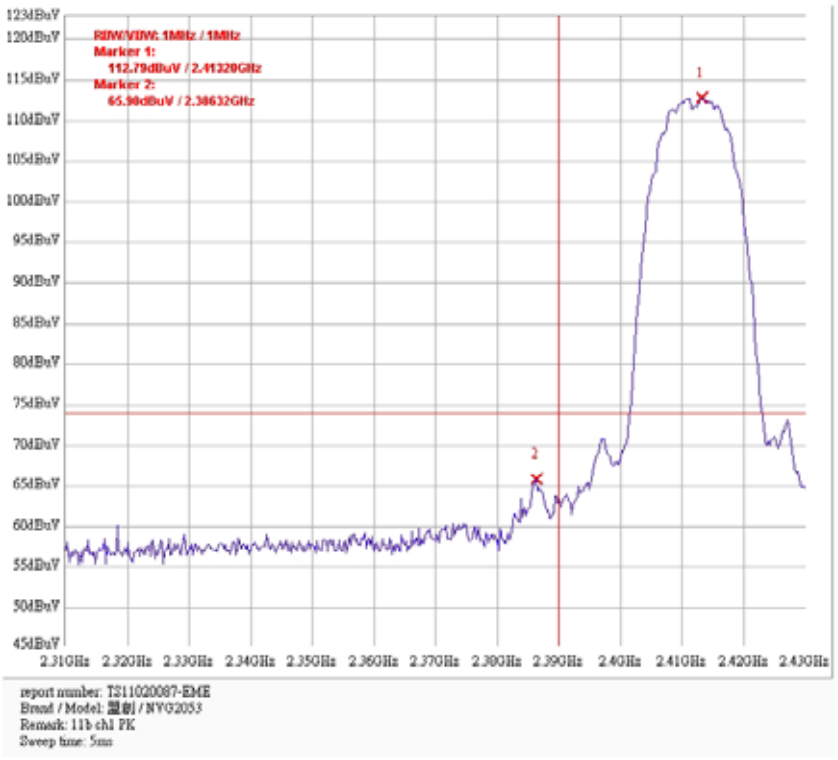
Test Mode: 802.11n HT20 mode

Channel	Measurement Freq.Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	60.85	74	-13.15
		AV	49.54	54	-4.46
11 (highest)	2483.5-2500	PK	62.61	74	-11.39
		AV	48.31	54	-5.69

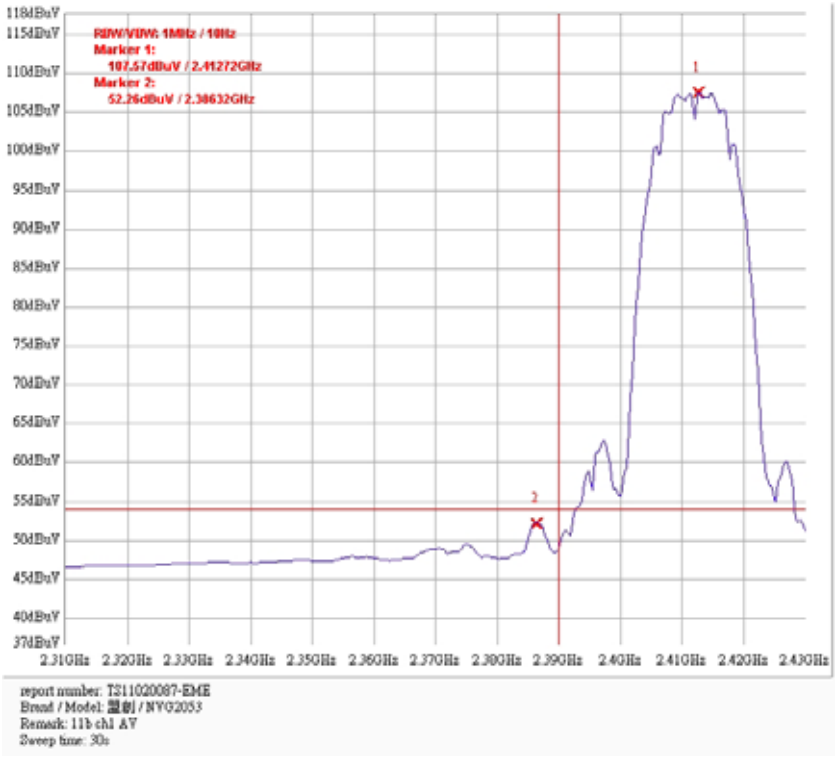
Test Mode: 802.11n HT40 mode

Channel	Measurement Freq.Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3 (lowest)	2310-2390	PK	64.80	74	-9.20
		AV	53.36	54	-0.64
9 (highest)	2483.5-2500	PK	62.43	74	-11.57
		AV	50.05	54	-3.95

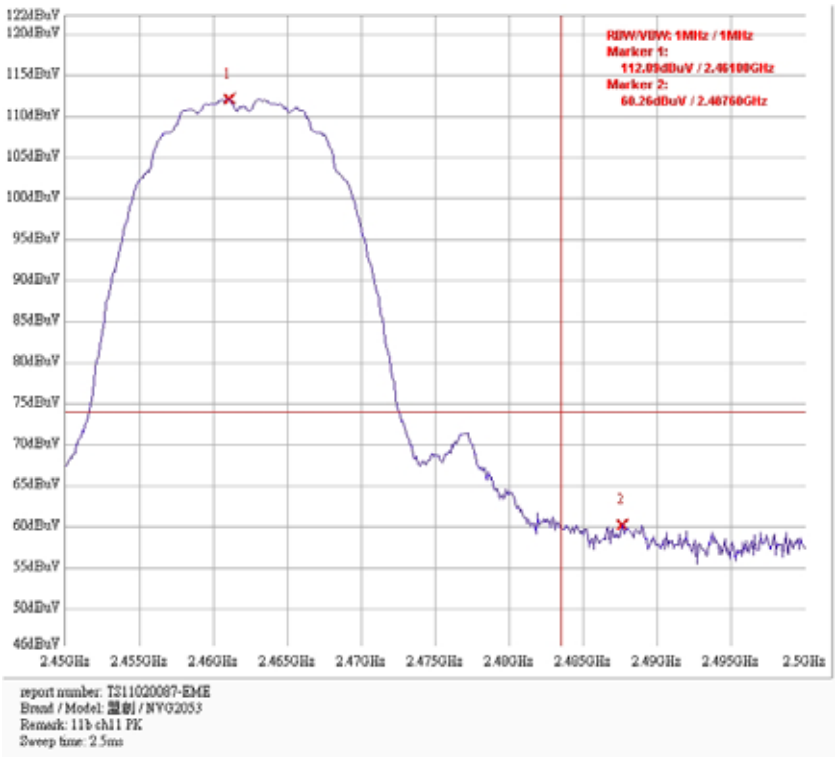
Band edge @ 802.11b mode channel 1 (PK)



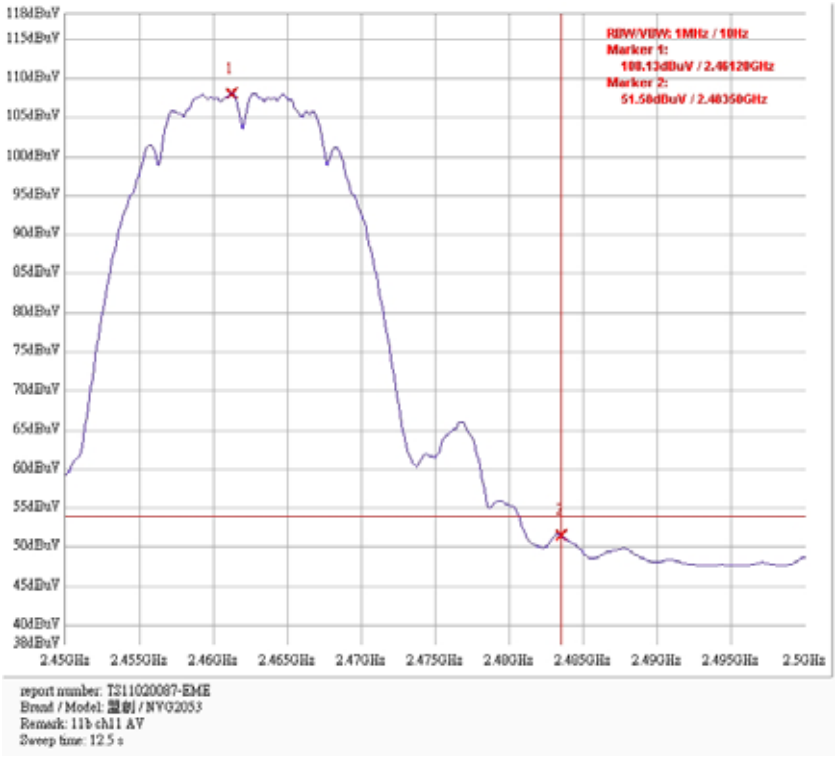
Band edge @ 802.11b mode channel 1 (AV)



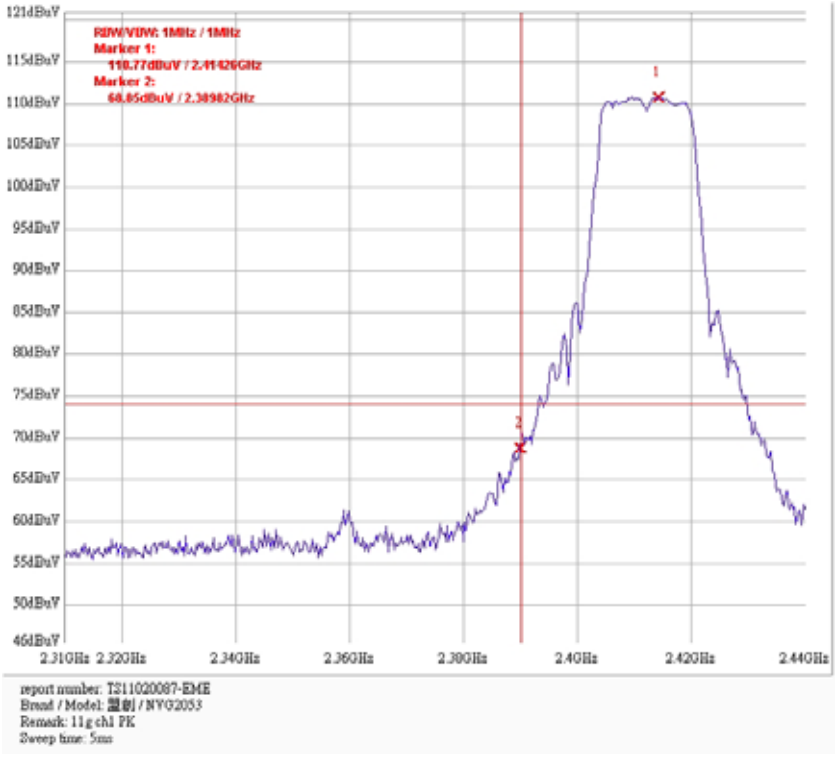
Band edge @ 802.11b mode channel 11 (PK)



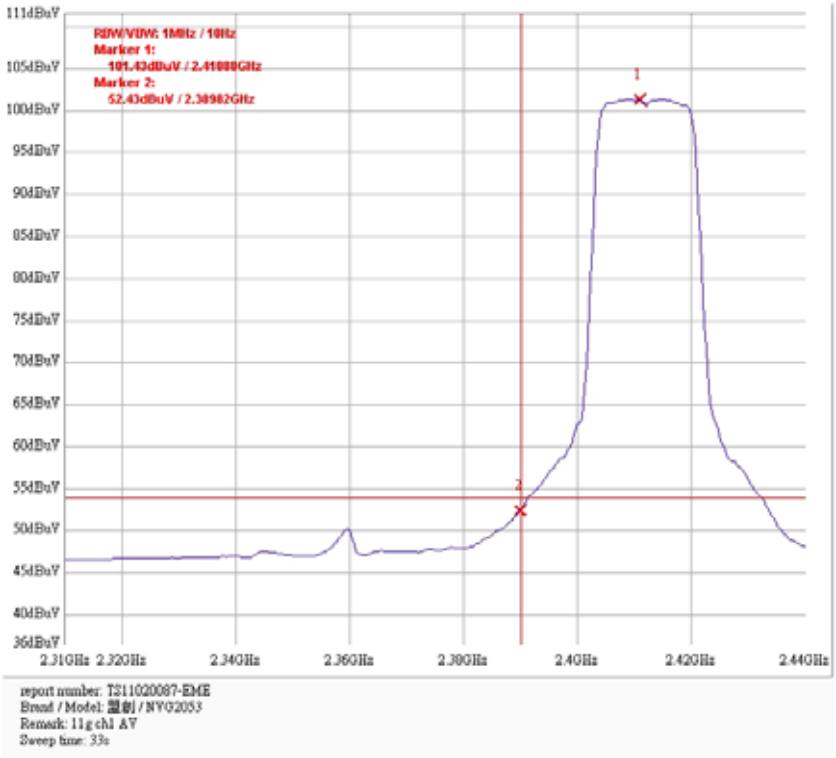
Band edge @ 802.11b mode channel 11 (AV)



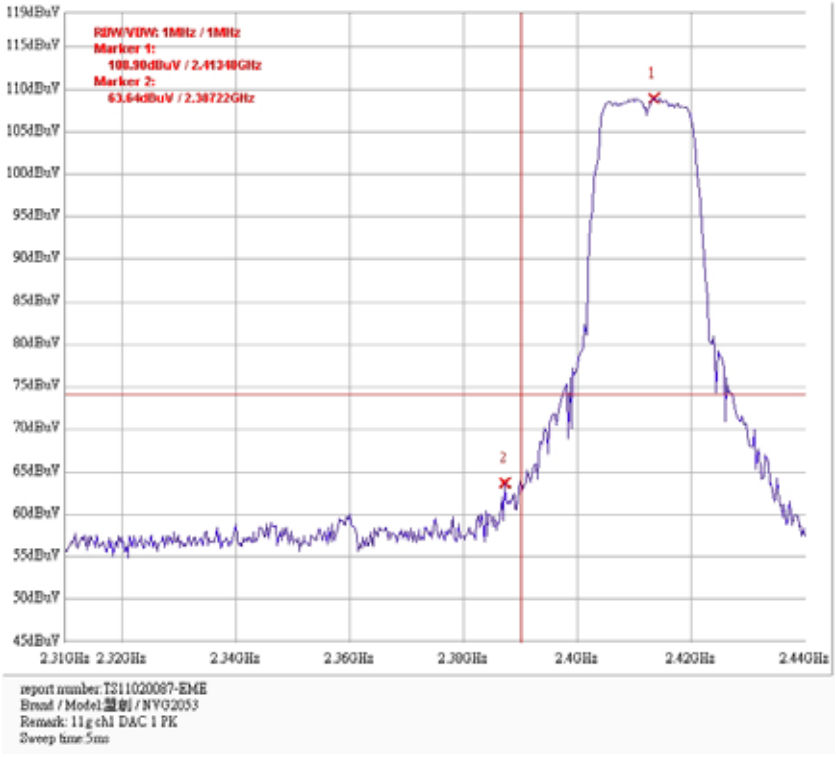
DAC 0: Band edge @ 802.11g mode channel 1 (PK)



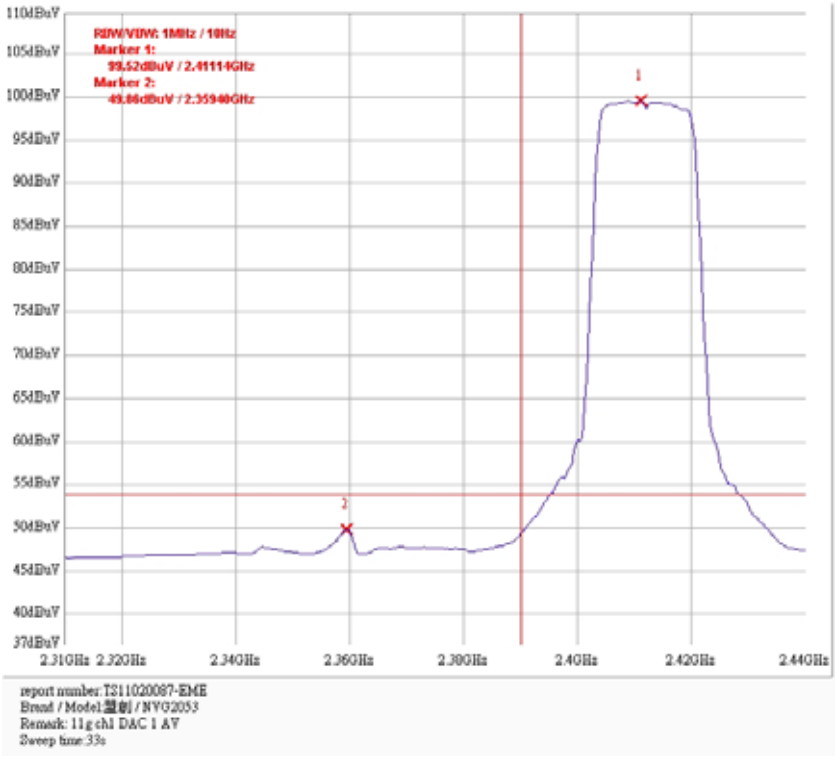
DAC 0: Band edge @ 802.11g mode channel 1 (AV)



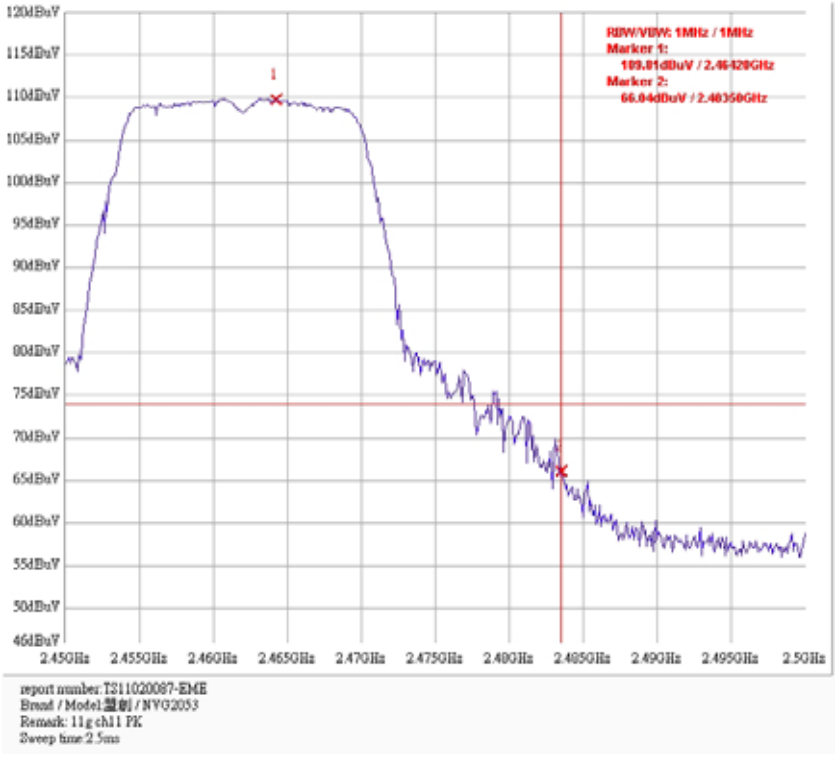
DAC 1: Band edge @ 802.11g mode channel 1 (PK)



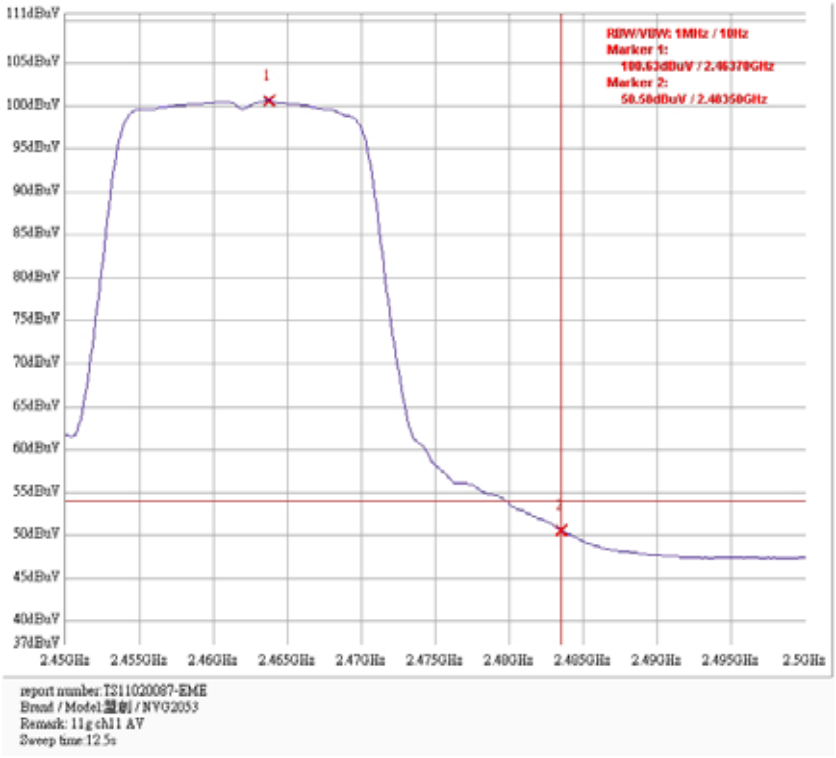
DAC 1: Band edge @ 802.11g mode channel 1 (AV)



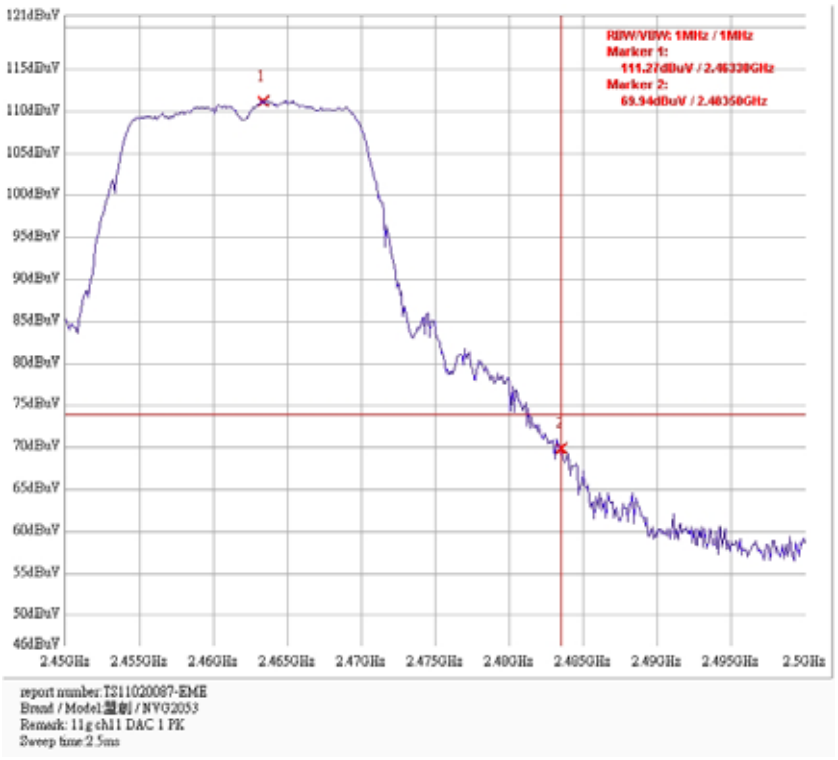
DAC 0: Band edge @ 802.11g mode channel 11 (PK)



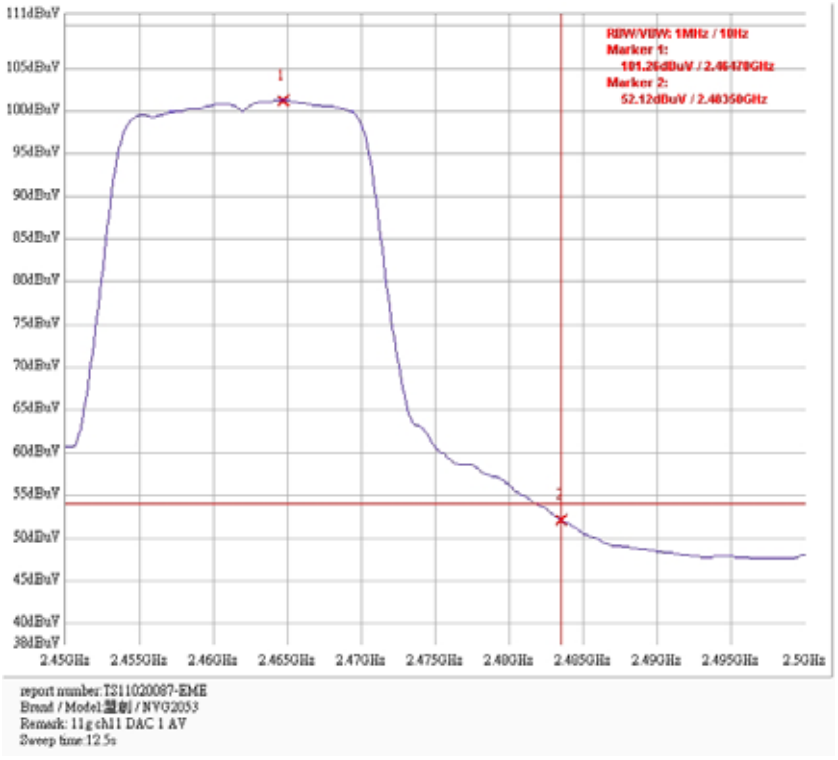
DAC 0: Band edge @ 802.11g mode channel 11 (AV)



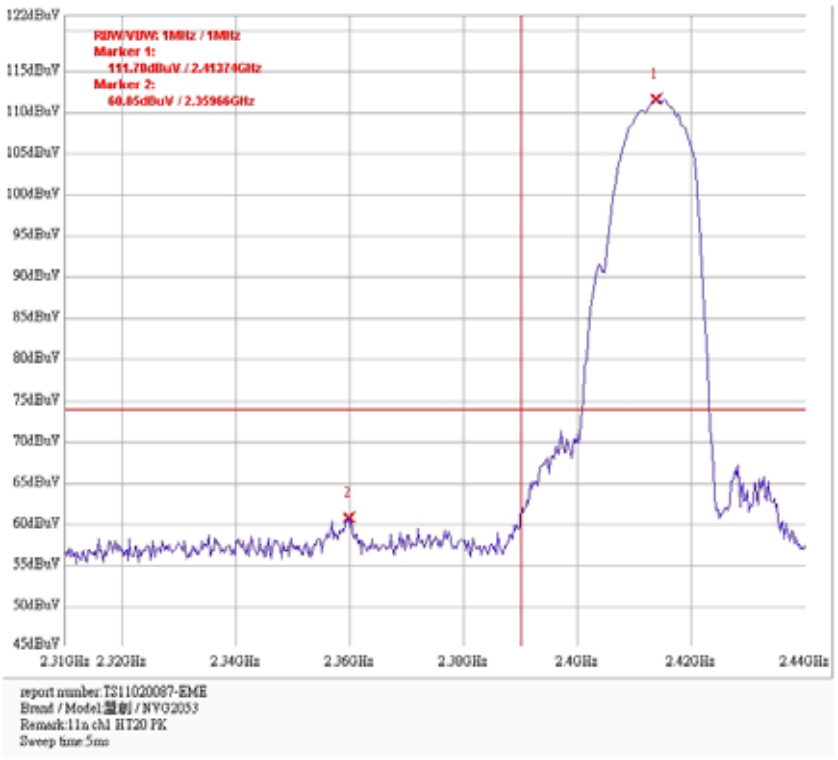
DAC 1: Band edge @ 802.11g mode channel 11 (PK)



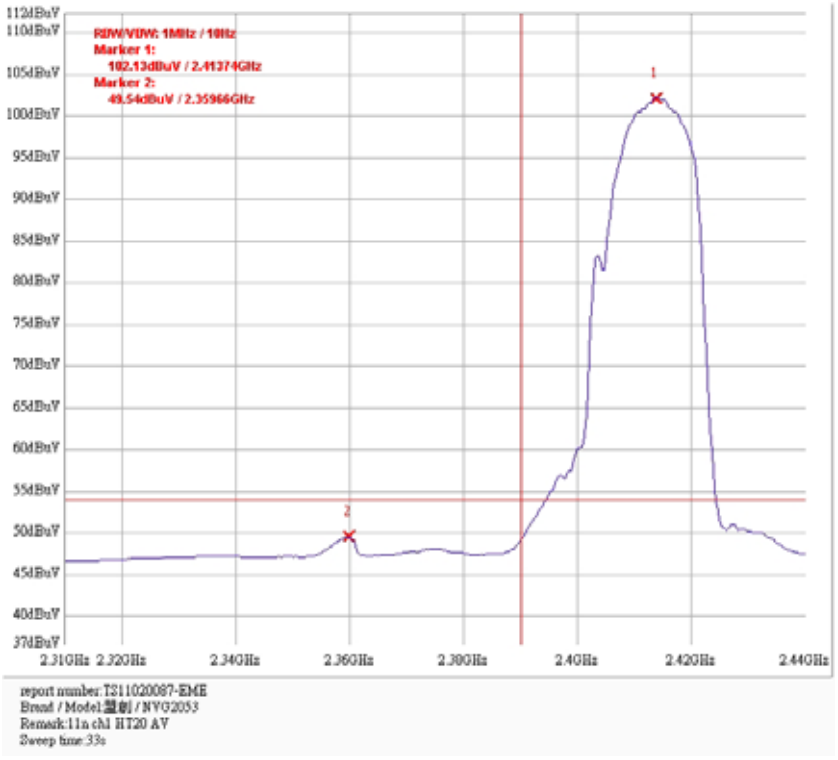
DAC 1: Band edge @ 802.11g mode channel 11 (AV)



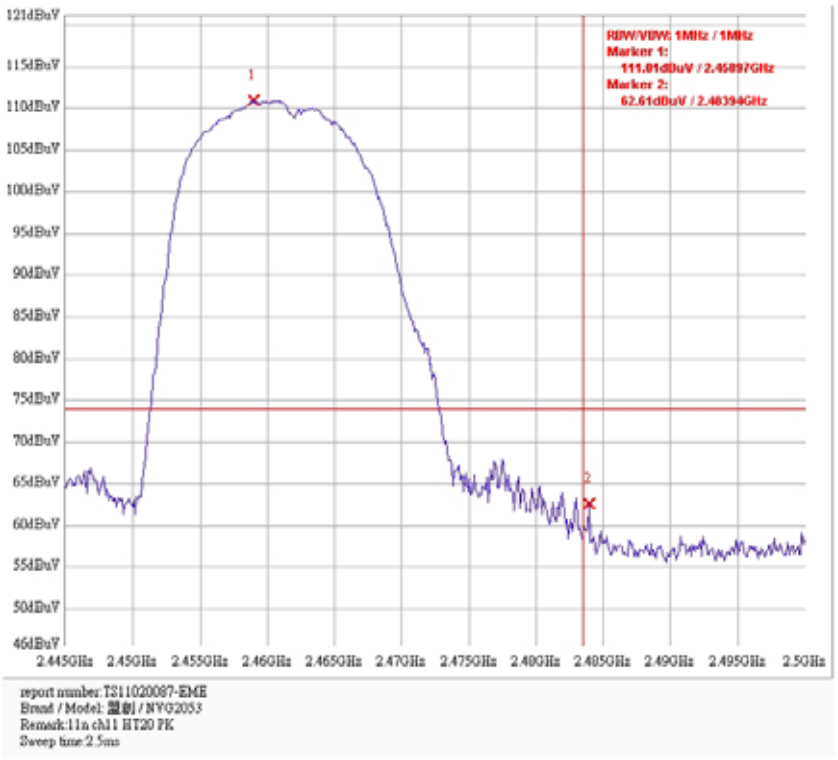
Band edge @ 802.11n HT20 mode channel 1 (PK)



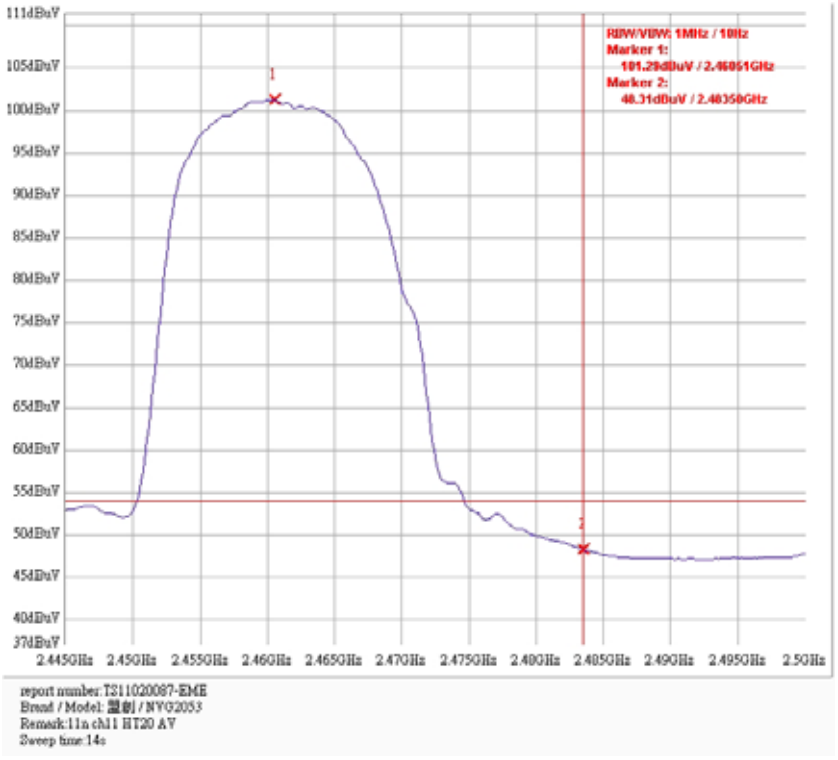
Band edge @ 802.11n HT20 mode channel 1 (AV)



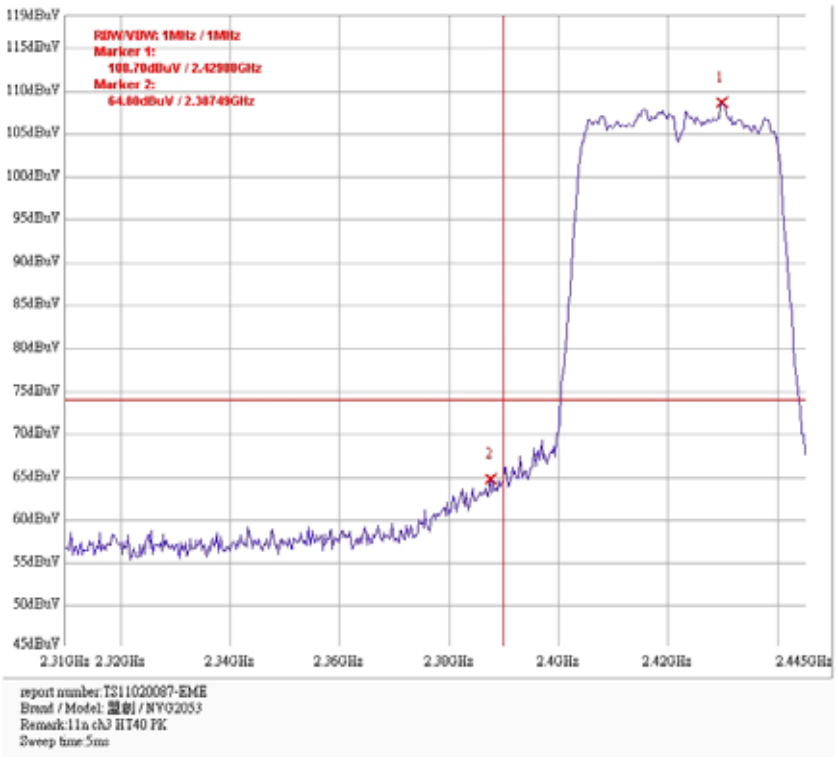
Band edge @ 802.11n HT20 mode channel 11 (PK)



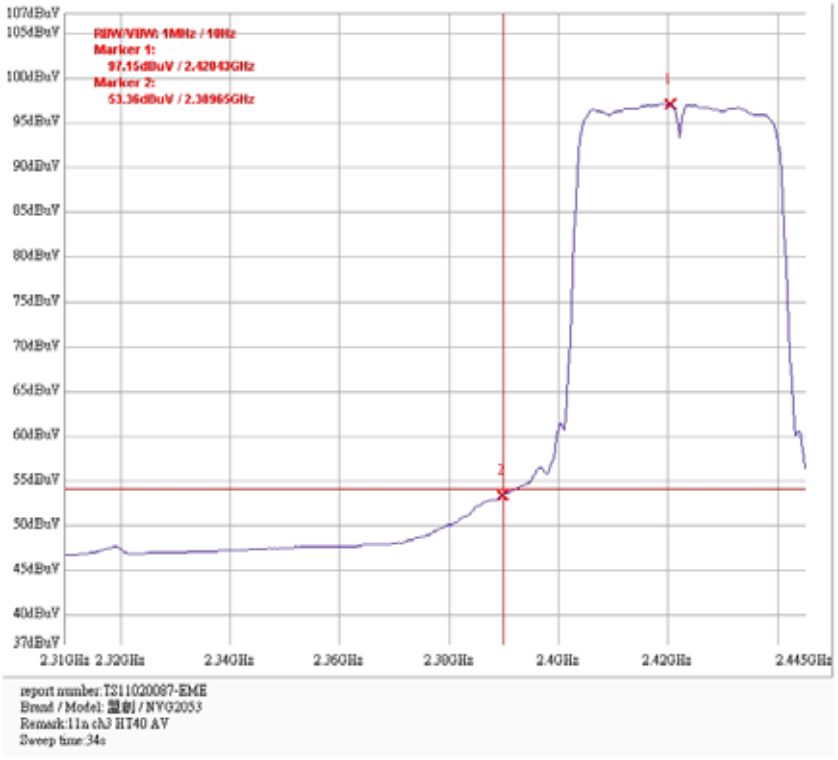
Band edge @ 802.11n HT20 mode channel 11 (AV)



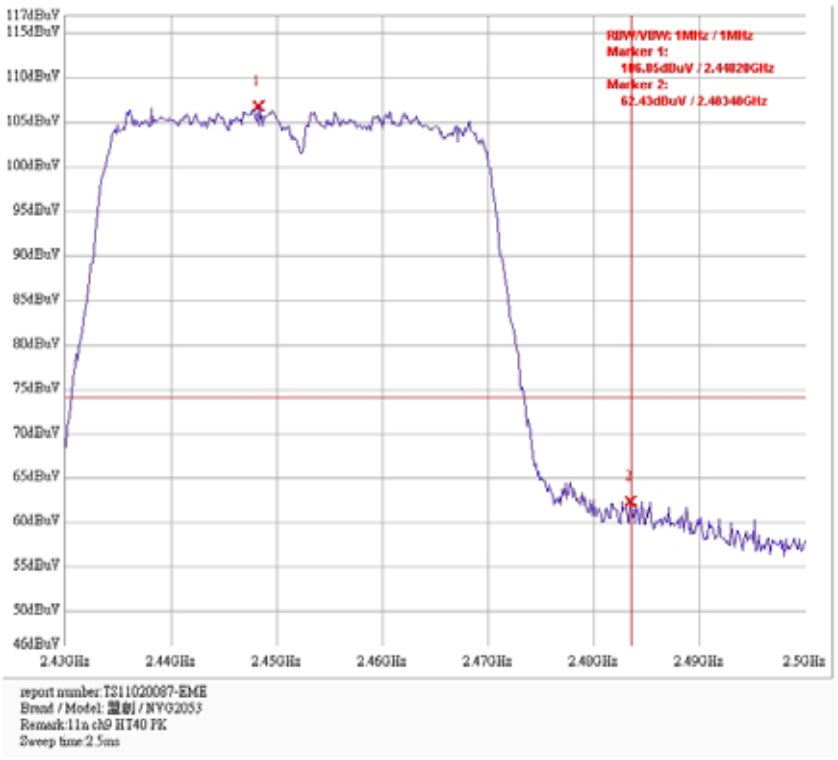
Band edge @ 802.11n HT40 mode channel 3 (PK)



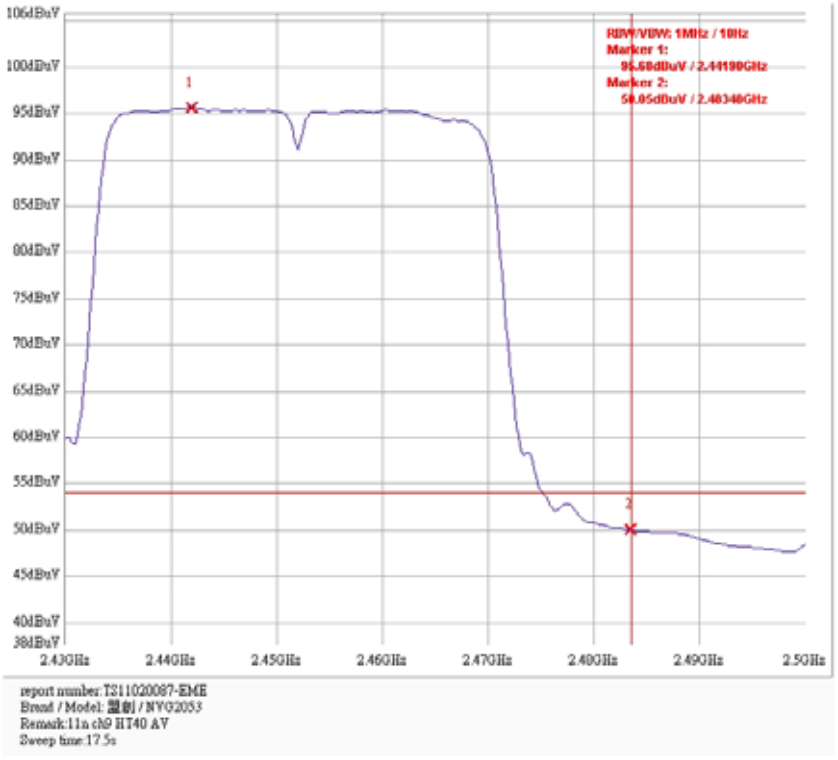
Band edge @ 802.11n HT40 mode channel 3 (AV)



Band edge @ 802.11n HT40 mode channel 9 (PK)



Band edge @ 802.11n HT40 mode channel 9 (AV)



10. AC power line conducted emission

Name of Test	AC power line conducted emission
Base Standard	FCC 15.207

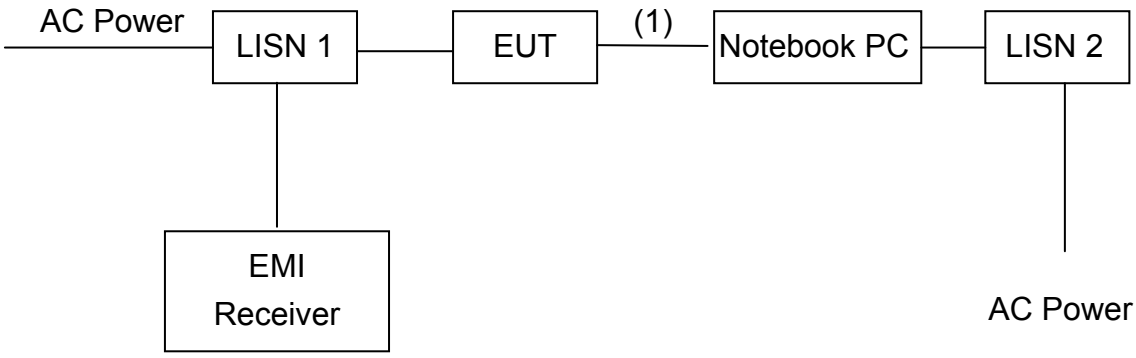
Test Result: Complies
Measurement Data: See Tables & plots below

Method of Measurement:
Reference FCC document: KDB558074, ANSI C63.4
The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50 ohm/50 uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm/ 50 uH coupling impedance with 50 ohm termination.

Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4/2003 on conducted measurement.
The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9kHz.

The EUT configuration please refer to the “Conducted set-up photo.pdf”.

Test Diagram:



(1) RJ-45 UTP Cat.5 10 meter

Emission Limit:

Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

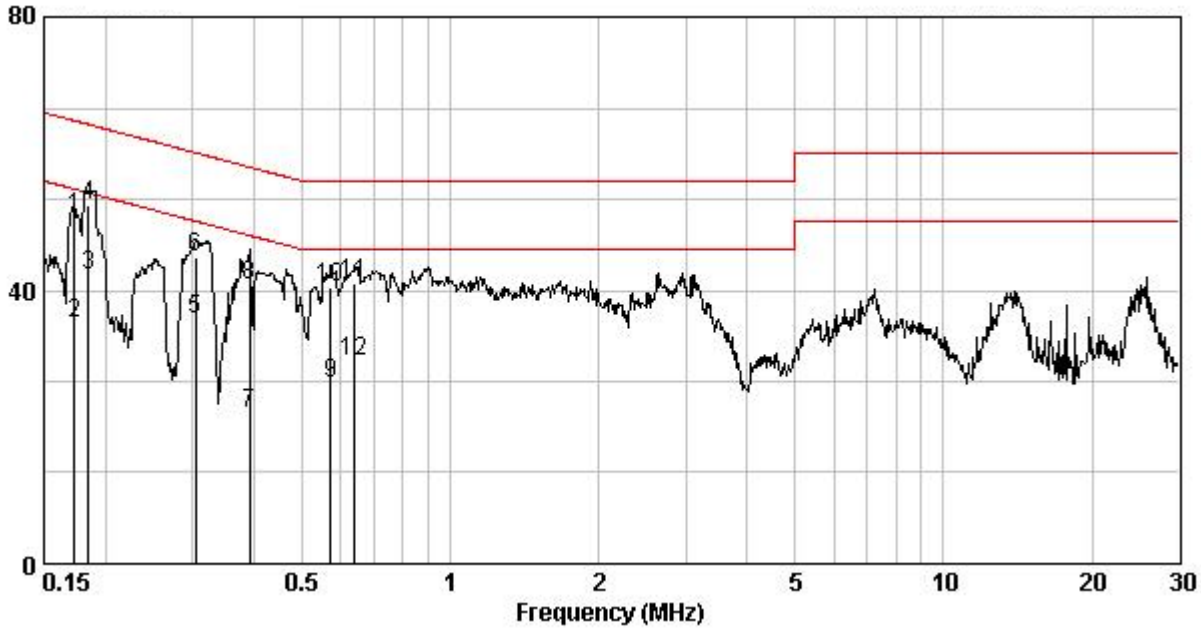
*Decreases with the logarithm of the frequency.

Note: The EUT was tested while in normal communication mode.

Phase	: Line
EUT	: NVG2053
Test Condition	: Continuously mode
Remark	: Adapter 1

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Av
0.173	0.80	50.71	64.81	35.18	54.81	-14.10	-19.63
0.184	0.80	52.31	64.28	42.30	54.28	-11.97	-11.98
0.305	0.37	44.72	60.10	35.80	50.10	-15.38	-14.30
0.391	0.12	40.72	58.03	22.06	48.03	-17.31	-25.97
0.573	0.12	40.53	56.00	26.40	46.00	-15.47	-19.60
0.641	0.14	41.06	56.00	29.69	46.00	-14.94	-16.31

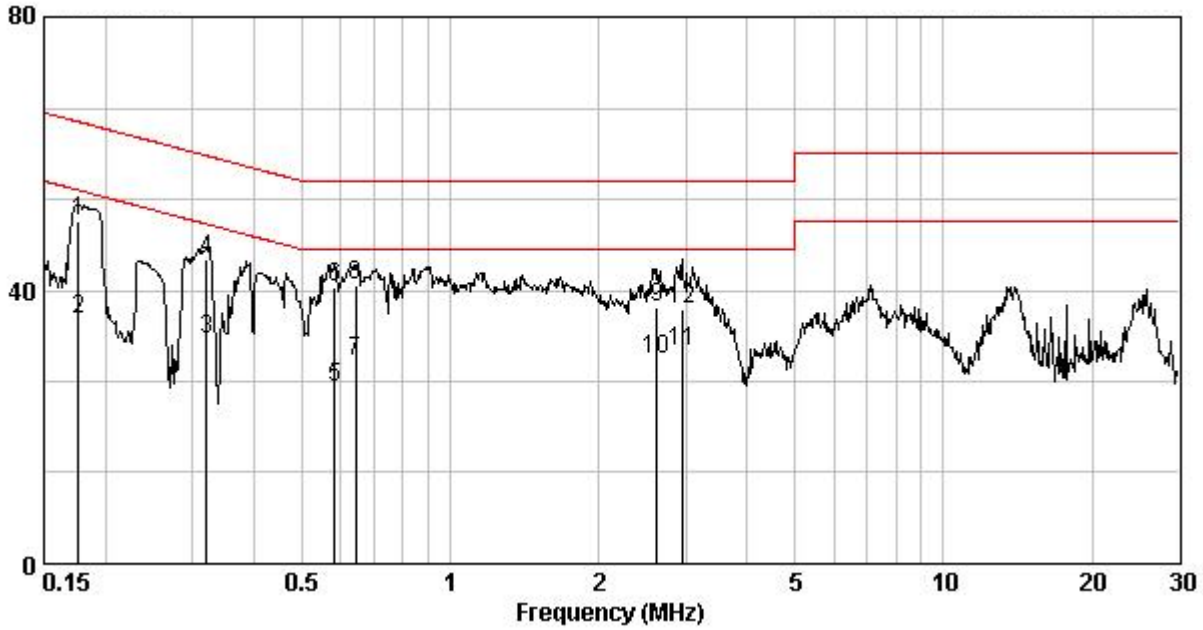
Remark:
1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



Phase	: Neutral
EUT	: NVG2053
Test Condition	: Continuously mode
Remark	: Adapter 1

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.176	0.10	50.03	64.68	35.68	54.68	-14.65	-19.00
0.320	0.10	44.44	59.71	32.76	49.71	-15.27	-16.95
0.582	0.12	40.43	56.00	25.91	46.00	-15.57	-20.09
0.644	0.14	40.72	56.00	29.62	46.00	-15.28	-16.38
2.622	0.17	37.60	56.00	29.80	46.00	-18.40	-16.20
2.946	0.20	37.25	56.00	30.94	46.00	-18.75	-15.06

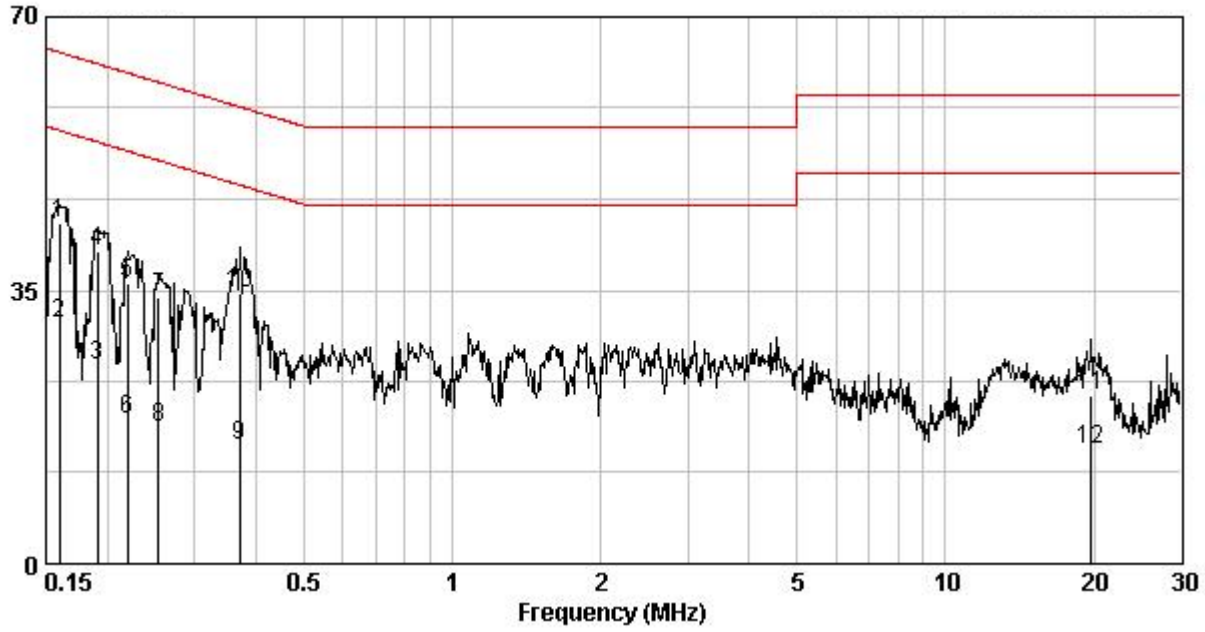
Remark:
1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



Phase	: Line
EUT	: NVG2053
Test Condition	: Continuously mode
Remark	: Adapter 2

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.160	0.80	43.61	65.47	30.88	55.47	-21.86	-24.59
0.190	0.80	40.00	64.02	25.30	54.02	-24.02	-28.72
0.220	0.70	35.80	62.83	18.42	52.83	-27.03	-34.41
0.253	0.56	34.01	61.64	17.47	51.64	-27.63	-34.17
0.371	0.18	34.57	58.47	15.07	48.47	-23.90	-33.40
19.740	0.99	21.52	60.00	14.74	50.00	-38.48	-35.26

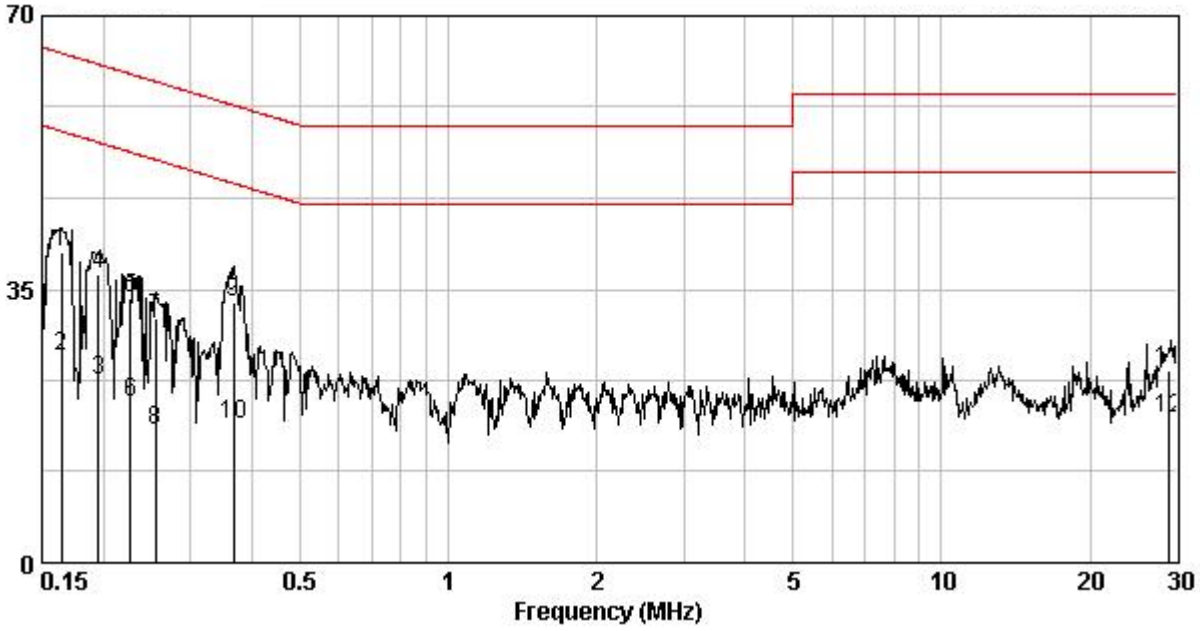
Remark:
1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



Phase	: Neutral
EUT	: NVG2053
Test Condition	: Continuously mode
Remark	: Adapter 2

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.164	0.10	39.86	65.25	26.52	55.25	-25.39	-28.73
0.195	0.10	36.80	63.80	23.35	53.80	-27.00	-30.45
0.227	0.10	33.86	62.57	20.39	52.57	-28.71	-32.18
0.255	0.10	31.29	61.60	16.94	51.60	-30.31	-34.66
0.367	0.10	33.25	58.56	17.59	48.56	-25.31	-30.97
28.908	0.70	24.69	60.00	18.37	50.00	-35.31	-31.63

Remark:
1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



APPENDICES

Appendix A: Test Equipment List

Equipment	Brand	Frequency range	Model No.	Last Cal.	Cal. interval
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	2010/9/3	1 year
EMI Test Receiver	Rohde & Schwarz	9kHz~3GHz	ESCI	2010/12/3	1 year
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	2010/8/16	1 year
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	20111/18	1 year
Horn Antenna	SCHWARZBECK	1GHz~18GHz	BBHA9120D	2010/8/31	2 years
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9168	2009/9/22	2 years
Turn Table	HDGmbH	N/A	DS 420S	N/A	N/A
Antenna Tower	HDGmbH	N/A	MA 240	N/A	N/A
Pre-Amplifier	MITER	100MHz~26.5GHz	AFS42-00102650	2009/10/27	2 years
LISN	Rohde & Schwarz	9KHz~30MHz	ESH3-Z5	2009/3/13	2 years
Power Meter	Anritsu	100kHz ~ 65GHz (video bandwith:65MHz)	2495A	2010/10/20	1 year
Power Senor	Anritsu	300MHz ~ 40GHz (video bandwith:50MHz)	2411B	2010/10/20	1 year

Note: The above equipments are within the valid calibration period.

Measurement Uncertainty:

Measurement uncertainty was calculated in accordance with TR 100 028-1.

Parameter	Uncertainty
Radiated Emission	±5.056 dB
Conducted Emission	±2.786 dB

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