



# SPORTON International Inc.

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## FCC RADIO TEST REPORT

Applicant's company	<b>PEGATRON CORPORATION</b>
Applicant Address	5F, NO. 76, LIGONG ST., BEITOU DISTRICT, TAIPEI CITY 112 Taiwan
FCC ID	<b>VUIDPC3829M</b>
Manufacturer's company	<b>MAINTEK COMPUTER</b>
Manufacturer Address	233 Jinfeng Rd., Suzhou, Jiangsu, PRC

Product Name	Wireless cable modem
Brand Name	Cisco
Model No.	DPC3829MXXXX (X = 0~9 and A~Z or blank)
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Oct. 18, 2013
Final Test Date	Dec. 17, 2013
Submission Type	Original Equipment

### Statement

Test result included is only for the IEEE 802.11n, IEEE 802.11b/g part and IEEE 802.11a/ac (5725 ~ 5850MHz) of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2009, 47 CFR FCC Part 15 Subpart C, KDB 558074 D01 v03r01 and KDB 662911 D01 v02**.

The test equipment used to perform the test is calibrated and traceable to NML/ROC.



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# History of This Test Report



Report No.: FR3O2828AA

Certificate No.: CB10212074

## 1. CERTIFICATE OF COMPLIANCE

Product Name : Wireless cable modem  
Brand Name : Cisco  
Model No. : DPC3829MXXXX (X = 0~9 and A~Z or blank)  
Applicant : PEGATRON CORPORATION  
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart C § 15.247

Sportun International as requested by the applicant to evaluate the EMC performance of the product sample received on Oct. 18, 2013 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

A handwritten signature in black ink, appearing to read "Sam Chen".

Sam Chen

SPORTON INTERNATIONAL INC.



## 2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.207	AC Power Line Conducted Emissions	Complies	13.22dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	0.07 dB
4.3	15.247(e)	Power Spectral Density	Complies	4.20 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.13 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.06 dB
4.7	15.203	Antenna Requirements	Complies	-

### 3. GENERAL INFORMATION

#### 3.1. Product Details

##### IEEE 802.11n/ac

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From Internal Power
Modulation	see the below table for IEEE 802.11n/ac
Data Modulation	For 802.11n: OFDM (BPSK / QPSK / 16QAM / 64QAM) For 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n/ac
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	<u>For 2.4GHz Band:</u> 11 for 20MHz bandwidth ; 7 for 40MHz bandwidth <u>For 5GHz Band:</u> 5 for 20MHz bandwidth ; 2 for 40MHz bandwidth ; 1 for 80MHz bandwidth
Channel Band Width (99%)	<u>For 2.4GHz Band:</u> MCS0 (20MHz): 17.28 MHz ; MCS0 (40MHz): 36.16 MHz <u>For 5GHz Band:</u> 802.11ac MCS0/Nss1 (20MHz): 22.56 MHz ; 802.11ac MCS0/Nss1 (40MHz): 43.84 MHz ; 802.11ac MCS0/Nss1 (80MHz): 76.16 MHz
Maximum Conducted Output Power	<u>For 2.4GHz Band:</u> MCS0 (20MHz): 29.93 dBm ; MCS0 (40MHz): 22.43 dBm <u>For 5GHz Band:</u> 802.11ac MCS0/Nss1 (20MHz): 28.69 dBm ; 802.11ac MCS0/Nss1 (40MHz): 28.94 dBm ; 802.11ac MCS0/Nss1 (80MHz): 26.45 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

### 802.11a/b/g

Items	Description
Product Type	WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From Internal Power
Modulation	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11a/g
Data Modulation	DSSS (BPSK / QPSK / CCK) ; OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	DSSS (1/ 2/ 5.5/11) ; OFDM (6/9/12/18/24/36/48/54)
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	11b/g: 11 ; 11a: 5
Channel Band Width (99%)	11b: 10.16 MHz ; 11g: 38.40 MHz ; 11a: 37.12 MHz
Maximum Conducted Output Power	11b: 24.37 dBm ; 11g: 25.58 dBm ; 11a: 25.95 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

### Antenna and Bandwidth

Antenna	Single (TX)	Three (TX)		
Band width Mode	20 MHz	20 MHz	40 MHz	80 MHz
IEEE 802.11a	V	X	X	X
IEEE 802.11b	V	X	X	X
IEEE 802.11g	V	X	X	X
IEEE 802.11n	X	V	V	X
IEEE 802.11ac	X	V	V	V

### IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	3	MCS0-23
802.11n (HT40)	3	MCS0-23
802.11ac (VHT20)	3	MCS 0-9/Nss1-3
802.11ac (VHT40)	3	MCS 0-9/Nss1-3
802.11ac (VHT80)	3	MCS 0-9/Nss1-3

Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput).  
Then EUT support HT20 and HT40.

Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). Then EUT support VHT20, VHT40 and VHT80.

Note 3: Modulation modes consist of below configuration:  
11a: IEEE 802.11a, HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac

### 3.2. Accessories

Others
Power Cable: Non-Shielded, 1.5m
RJ-45 Cable: Non-Shielded, 1.2m

### 3.3. Table for Filed Antenna

For Hong Lin:

Ant.	Chain	Brand	Model Name	P/N	Antenna Type	Connector	Gain (dBi)	
							2.4GHz	5GHz
1	1	Hong Lin	DPC-3829MAD	290-30103	PCB Antenna	I-PEX	3.90	2.98
2	2	Hong Lin	DPC3829MAD	290-30102	PCB Antenna	I-PEX	3.79	2.98
3	3	Hong Lin	DPC-3829MAD	290-30101	PCB Antenna	I-PEX	3.09	2.94

For WANSIIH:

Ant.	Chain	Brand	Model Name	P/N	Antenna Type	Connector	Gain (dBi)	
							2.4GHz	5GHz
1	1	WANSIIH	WPB279	UC3WFI0122	PCB Antenna	I-PEX	2.32	2.39
2	2	WANSIIH	WPB287	UC3WFI0121	PCB Antenna	I-PEX	2.51	2.49
3	3	WANSIIH	WPB296	UC3WFI0120	PCB Antenna	I-PEX	2.75	2.46

Note: The EUT has 2 sets antennas.

Because Hong Lin's antennas and WANSIIH's antennas are the same type antennas, only the higher gain antennas "Hong Lin's antennas" was tested and recorded in the report.

According to the above antennas, there are three antennas will transit simultaneously (one is Horizontal and the others are Vertical), so array gain only add  $10\log(2)$ .

<For 2.4GHz Band>

For IEEE 802.11b/g mode (1TX/1RX):

Only Chain 1 could transmit/receive simultaneously.

For IEEE 802.11n mode (3TX/3RX):

Chain 1, Chain 2 and Chain 3 could transmit/receive simultaneously.

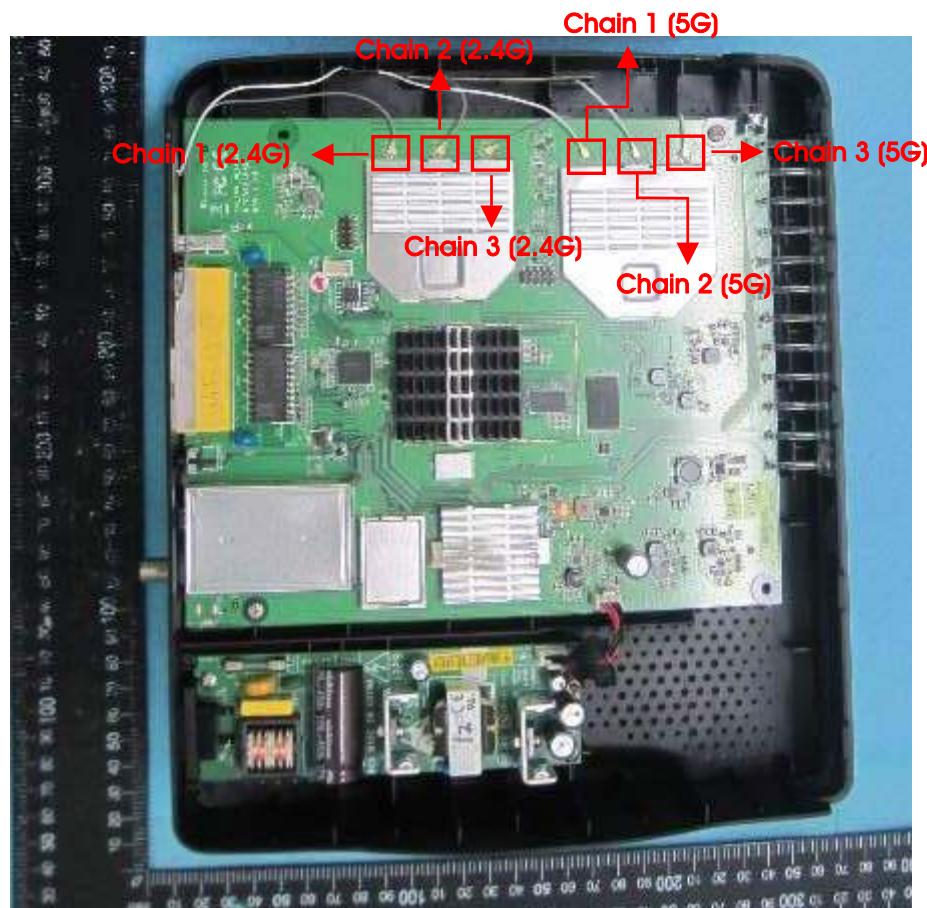
<For 5GHz Band>

For IEEE 802.11a mode (1TX/1RX):

Only Chain 1 could transmit/receive simultaneously.

For IEEE 802.11n/ac mode (3TX/3RX):

Chain 1, Chain 2 and Chain 3 could transmit/receive simultaneously.



### 3.4. Table for Carrier Frequencies

#### For 2.4GHz Band:

There are two bandwidth systems.

For 20MHz bandwidth systems, use Channel 1~Channel 11.

For 40MHz bandwidth systems, use Channel 3~Channel 9.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400~2483.5MHz	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	-	-

#### For 5GHz Band:

There are three bandwidth systems.

For 20MHz bandwidth systems, use Channel 149, 153, 157, 161, 165.

For 40MHz bandwidth systems, use Channel 151, 159.

For 80MHz bandwidth systems, use Channel 155.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5725~5850 MHz Band 4	149	5745 MHz	157	5785 MHz
	151	5755 MHz	159	5795 MHz
	153	5765 MHz	161	5805 MHz
	155	5775 MHz	165	5825 MHz

### 3.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

**For 2.4GHz Band:**

Test Items	Mode	Data Rate	Channel	Chain
AC Power Line Conducted Emissions	CTX	-	-	-
Maximum Conducted Output Power	11n 20MHz	MCS0	1/6/11	1+2+3
	11n 40MHz	MCS0	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Power Spectral Density	11n 20MHz	MCS0	1/6/11	1+2+3
	11n 40MHz	MCS0	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
6dB Spectrum Bandwidth	11n 20MHz	MCS0	1/6/11	1+2+3
	11n 40MHz	MCS0	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Radiated Emissions Below 1GHz	CTX	-	-	-
Radiated Emissions Above 1GHz	11n 20MHz	MCS0	1/6/11	1+2+3
	11n 40MHz	MCS0	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Band Edge Emissions	11n 20MHz	MCS0	1/6/11	1+2+3
	11n 40MHz	MCS0	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1

**For 5GHz Band:**

Test Items	Mode	Data Rate	Channel	Chain
AC Power Line Conducted Emissions	CTX	-	-	-
Maximum Conducted Output Power	11ac 20MHz	MCS0/Nss1	149/157/165	1+2+3
	11ac 40MHz	MCS0/Nss1	151/159	1+2+3
	11ac 80MHz	MCS0/Nss1	155	1+2+3
	11a/BPSK	6 Mbps	149/157/165	1
Power Spectral Density	11ac 20MHz	MCS0/Nss1	149/157/165	1+2+3
	11ac 40MHz	MCS0/Nss1	151/159	1+2+3
	11ac 80MHz	MCS0/Nss1	155	1+2+3
	11a/BPSK	6 Mbps	149/157/165	1
6dB Spectrum Bandwidth	11ac 20MHz	MCS0/Nss1	149/157/165	1+2+3
	11ac 40MHz	MCS0/Nss1	151/159	1+2+3
	11ac 80MHz	MCS0/Nss1	155	1+2+3
	11a/BPSK	6 Mbps	149/157/165	1
Radiated Emissions Below 1GHz	CTX	-	-	-
Radiated Emissions Above 1GHz	11ac 20MHz	MCS0/Nss1	149/157/165	1+2+3
	11ac 40MHz	MCS0/Nss1	151/159	1+2+3
	11ac 80MHz	MCS0/Nss1	155	1+2+3
	11a/BPSK	6 Mbps	149/157/165	1
Band Edge Emissions	11ac 20MHz	MCS0/Nss1	149/157/165	1+2+3
	11ac 40MHz	MCS0/Nss1	151/159	1+2+3
	11ac 80MHz	MCS0/Nss1	155	1+2+3
	11a/BPSK	6 Mbps	149/157/165	1

The following test modes were performed for all tests:

**For Conducted Emission test:**

Mode 1. Stand of EUT (CTX) with 2.4GHz

Mode 2. Stand of EUT (CTX) with 5GHz

Mode 1 is the worst case, so it was selected to record in this test report.

**For Radiated Emission test<Below 1GHz>:**

Mode 1. Stand of EUT (CTX) with 2.4GHz

Mode 2. Stand of EUT (CTX) with 5GHz

Mode 1 is the worst case, so it was selected to record in this test report.

**For Radiated Emission test<Above 1GHz>:**

Mode 1: Stand of EUT (CTX) + Power Line

**For MPE and Co-location test**

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Maximum Permissible Exposure (Please refer to Sporton test report: FA3O2828) and Co-location (please refer to Appendix B) tests are added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

**3.6. Table for Testing Locations**

Test Site Location				
Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D
CO01-CB	Conduction	Hsin Chu	262045	IC 4086D
TH01-CB	OVEN Room	Hsin Chu	-	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC).

**3.7. Table for Supporting Units**

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC

### 3.8. Table for Parameters of Test Software Setting

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

**For 2.4GHz Band**

#### Power Parameters of IEEE 802.11n MCS0 20MHz

Test Software Version	Manual Tool Version 2.0.0.9		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 20MHz	30	11	28

#### Power Parameters of IEEE 802.11n MCS0 40MHz

Test Software Version	Manual Tool Version 2.0.0.9		
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 40MHz	32	26	30

#### Power Parameters of IEEE 802.11b/g

Test Software Version	Manual Tool Version 2.0.0.9		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	15	15	14
IEEE 802.11g	26	10	26

#### For 5GHz Band

#### Power Parameters of IEEE 802.11ac MCS0/Nss1 20MHz

Test Software Version	Manual Tool Version 2.0.0.9		
Frequency	5745 MHz	5785 MHz	5825 MHz
MCS0/Nss1 20MHz	88	86	93

#### Power Parameters of IEEE 802.11ac MCS0/Nss1 40MHz

Test Software Version	Manual Tool Version 2.0.0.9		
Frequency	5755 MHz	5795 MHz	
MCS0/Nss1 40MHz	84	94	

#### Power Parameters of IEEE 802.11ac MCS0/Nss1 80MHz

Test Software Version	Manual Tool Version 2.0.0.9		
Frequency	5775 MHz		
MCS0/Nss1 80MHz	86		

#### Power Parameters of IEEE 802.11a

Test Software Version	Manual Tool Version 2.0.0.9		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	96	100	100



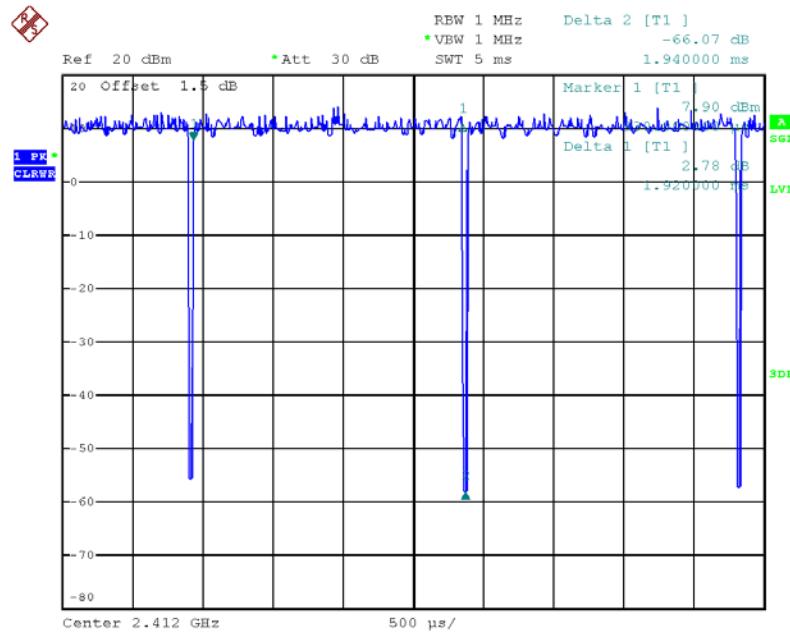
### 3.9. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

### 3.10. Duty Cycle

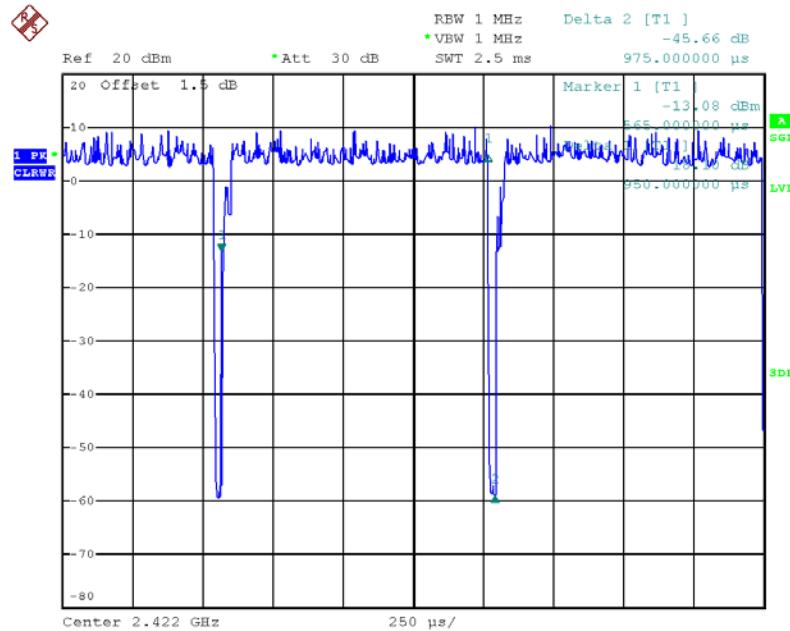
For 2.4GHz Band:

**IEEE 802.11n MCS0 20MHz**



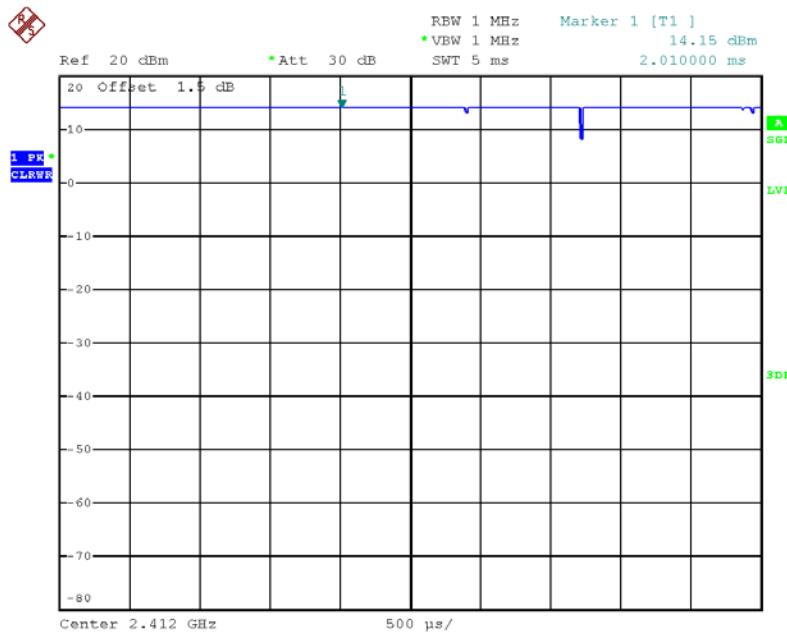
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**IEEE 802.11n MCS0 40MHz**



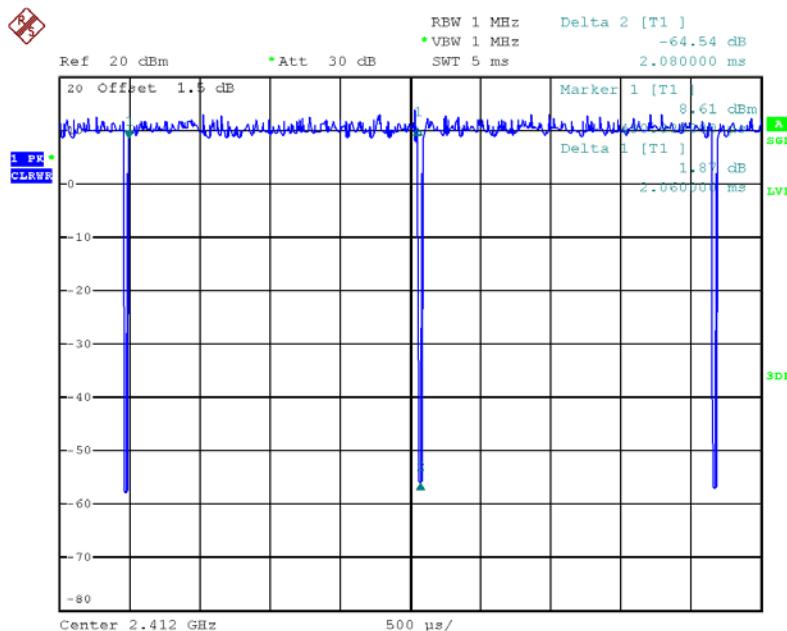
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### IEEE 802.11b



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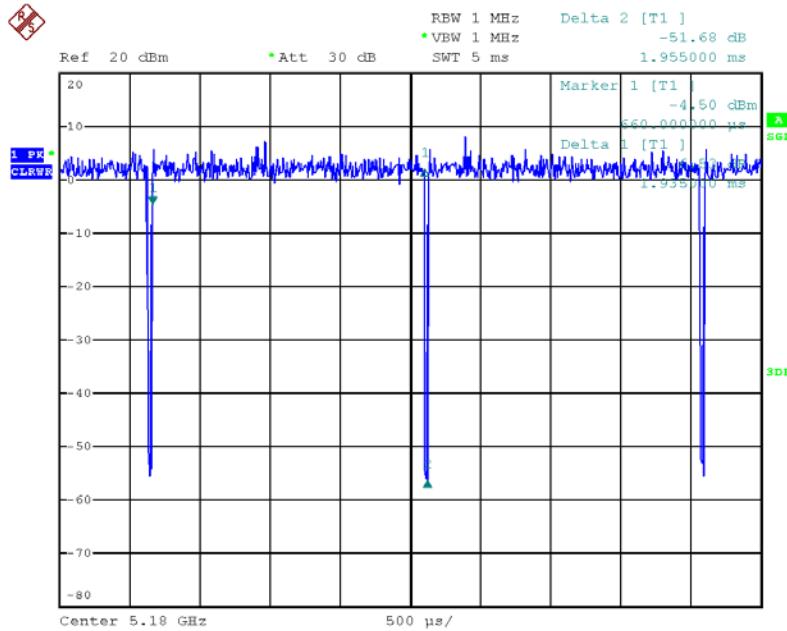
### IEEE 802.11g



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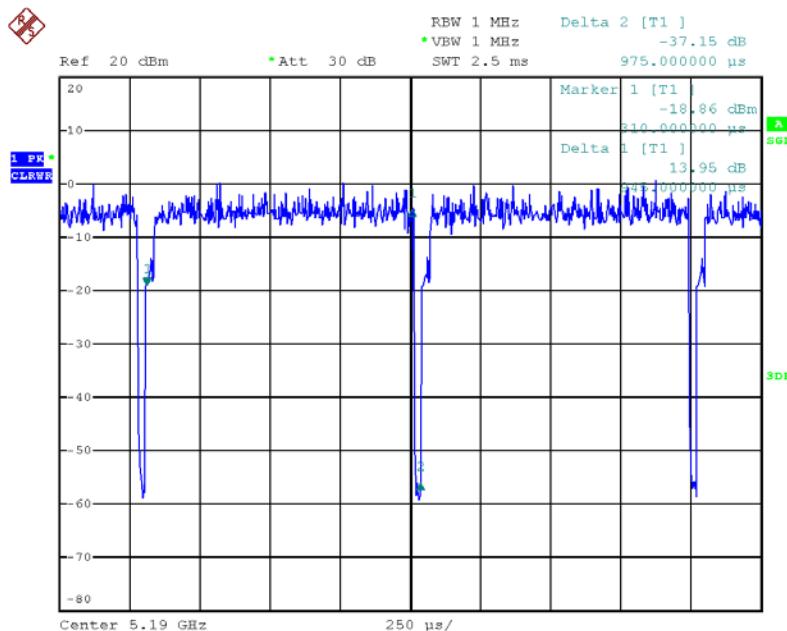
**For 5GHz Band:**

**IEEE 802.11ac MCS0/Nss1 20MHz**

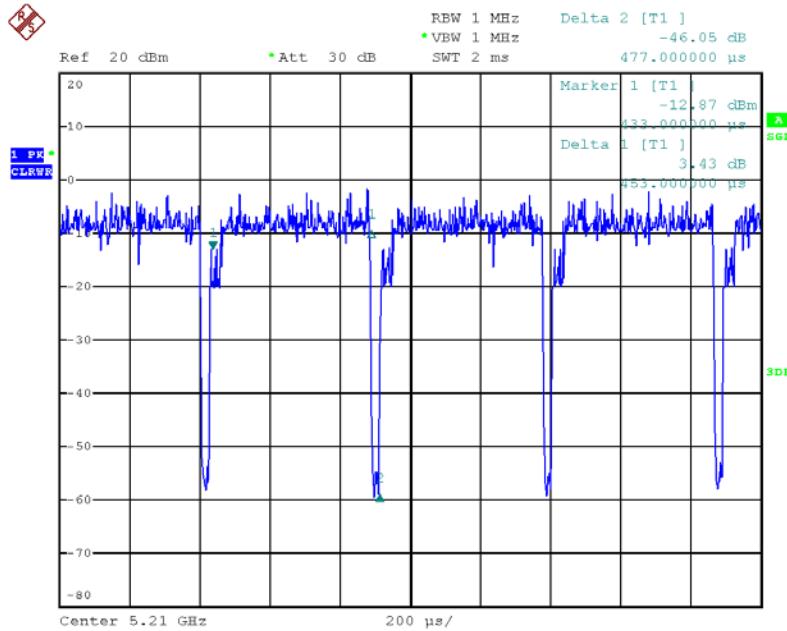


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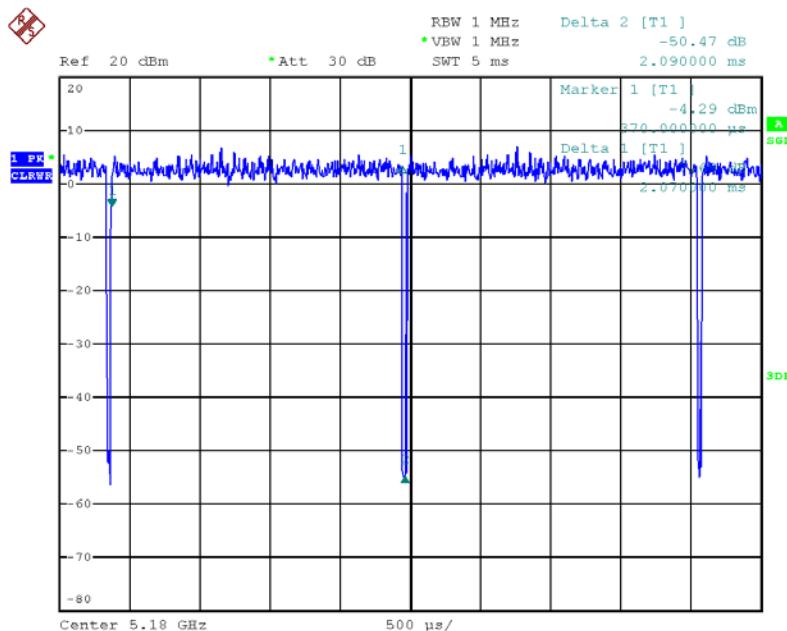
**IEEE 802.11ac MCS0/Nss1 40MHz**



Date: 12.DEC.2013 17:56:33

**IEEE 802.11ac MCS0/Nss1 80MHz**


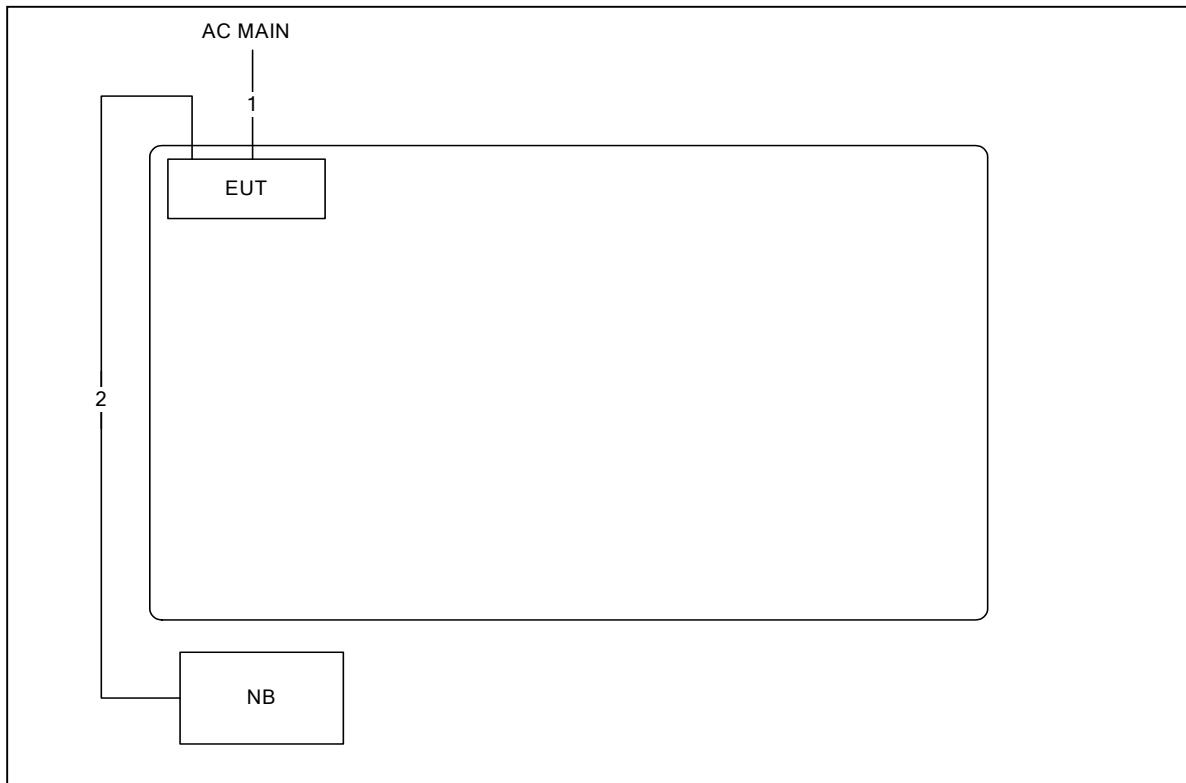
Date: 12.DEC.2013 17:57:42

**IEEE 802.11a**


Date: 12.DEC.2013 17:54:12

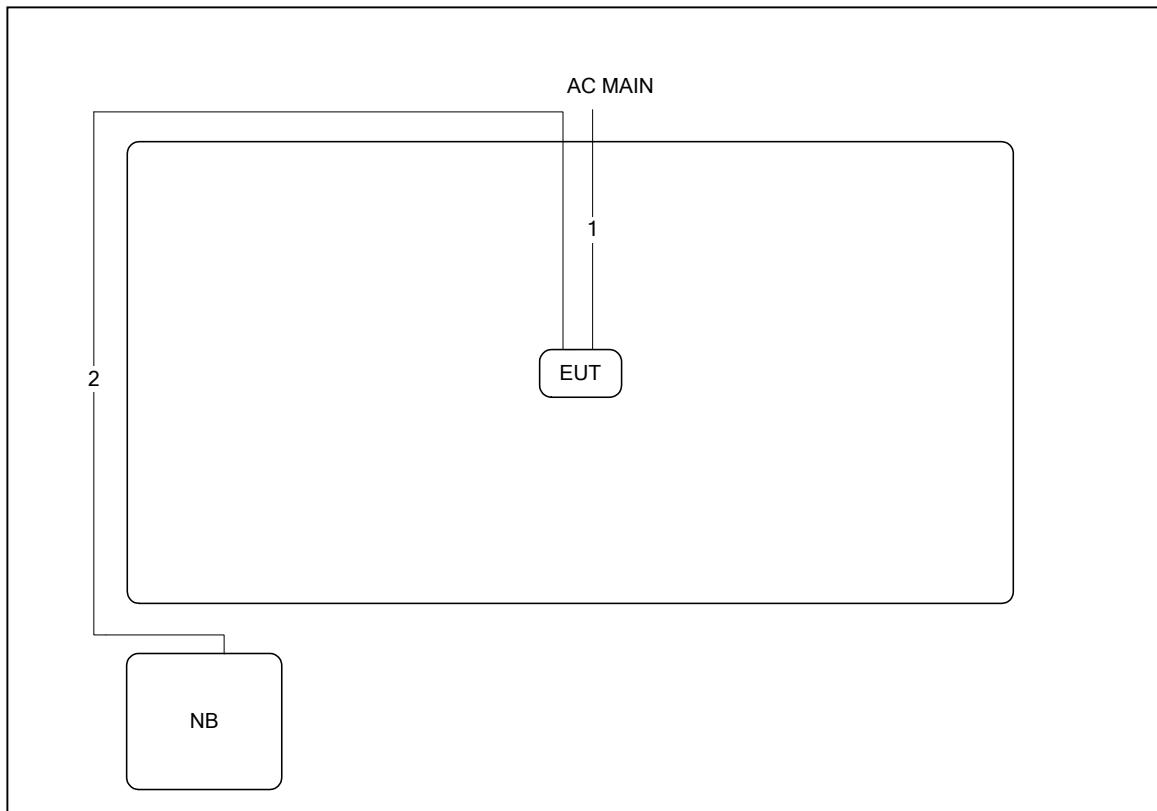
### 3.11. Test Configurations

#### 3.11.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shield	Length(m)
1	Power cable	No	1.5m
2	RJ-45 cable	No	1.2m

### 3.11.2. Radiation Emissions Test Configuration



Item	Connection	Shield	Length(m)
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m

## 4. TEST RESULT

### 4.1. AC Power Line Conducted Emissions Measurement

#### 4.1.1. Limit

For this product which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

#### 4.1.2. Measuring Instruments and Setting

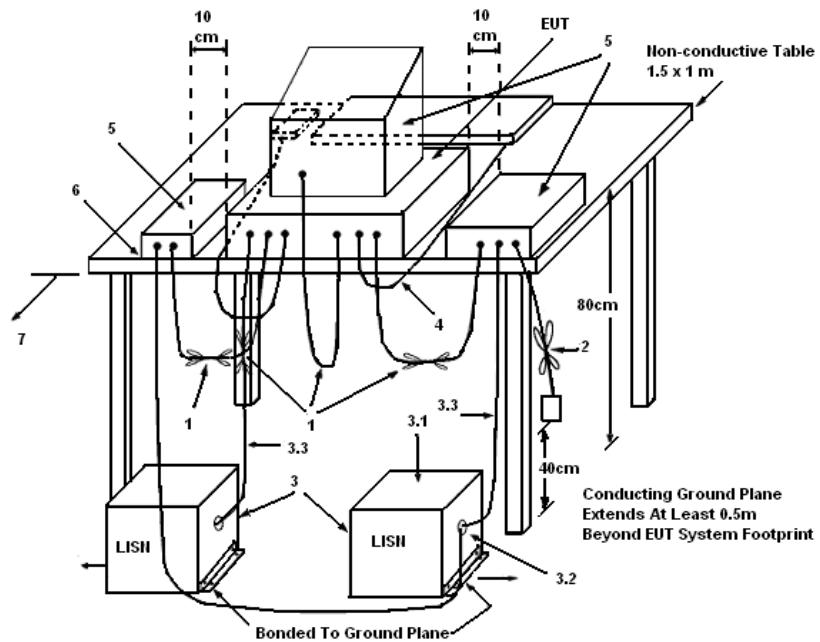
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

#### 4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

#### 4.1.4. Test Setup Layout



##### LEGEND:

- (1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- (2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- (3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in  $50 \Omega$ . LISN can be placed on top of, or immediately beneath, reference ground plane.
  - (3.1) All other equipment powered from additional LISN(s).
  - (3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
  - (3.3) LISN at least 80 cm from nearest part of EUT chassis.
- (4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
- (5) Non-EUT components of EUT system being tested.
- (6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
- (7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

#### 4.1.5. Test Deviation

There is no deviation with the original standard.

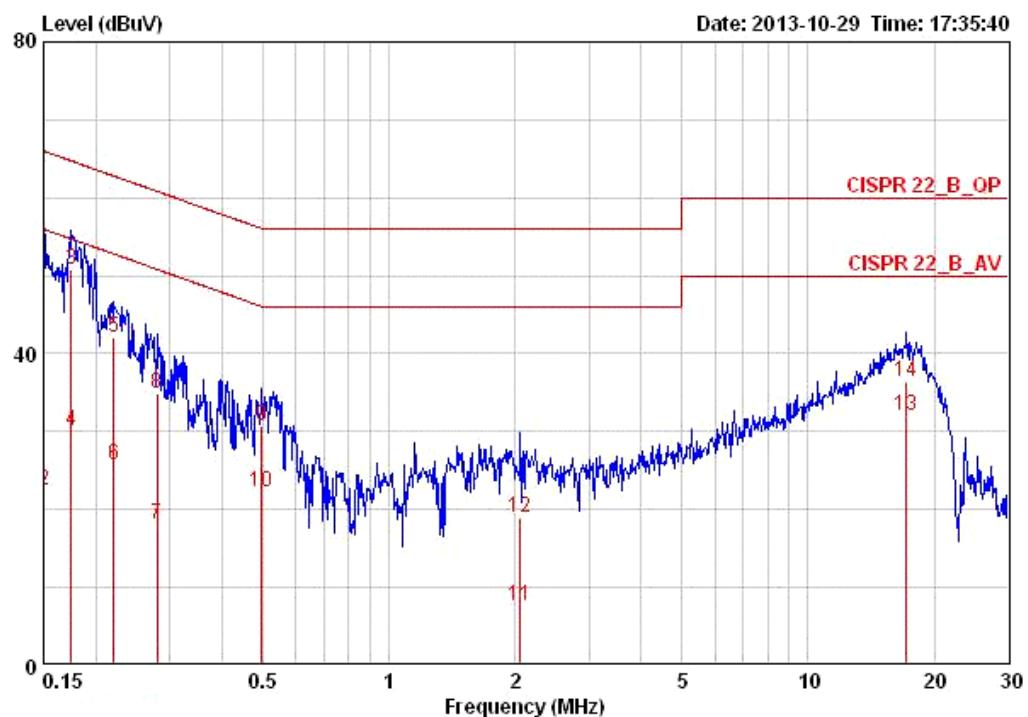
#### 4.1.6. EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.



#### 4.1.7. Results of AC Power Line Conducted Emissions Measurement

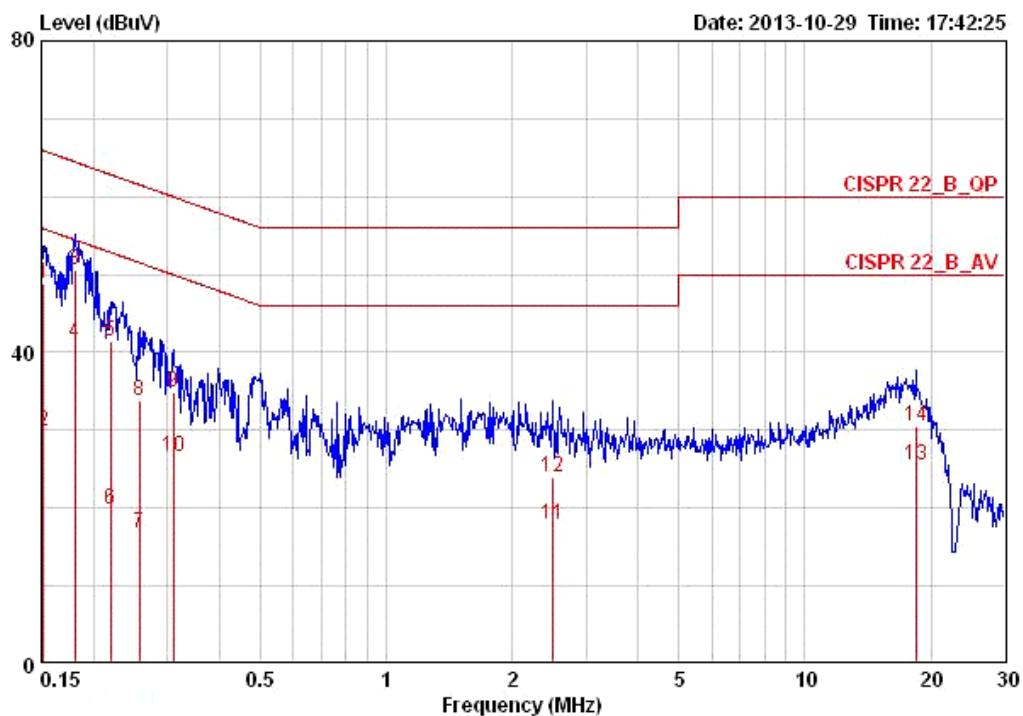
Temperature	24°C	Humidity	51%
Test Engineer	Da Teng	Phase	Line
Configuration	CTX	Test Mode	Mode 1



Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
MHz	dBuV	dB	dBuV	dBuV	dB	dB		
0.15000	50.12	-15.88	66.00	49.78	0.16	0.18	LINE	QP
0.15000	22.55	-33.45	56.00	22.21	0.16	0.18	LINE	AVERAGE
0.17491	50.81	-13.91	64.72	50.47	0.15	0.19	LINE	QP
0.17491	30.11	-24.61	54.72	29.77	0.15	0.19	LINE	AVERAGE
0.22083	42.07	-20.72	62.79	41.72	0.15	0.20	LINE	QP
0.22083	25.72	-27.07	52.79	25.37	0.15	0.20	LINE	AVERAGE
0.28029	18.15	-32.66	50.81	17.80	0.15	0.20	LINE	AVERAGE
0.28029	34.89	-25.92	60.81	34.54	0.15	0.20	LINE	QP
0.49673	30.73	-25.32	56.05	30.38	0.15	0.20	LINE	QP
0.49673	22.31	-23.74	46.05	21.96	0.15	0.20	LINE	AVERAGE
2.055	7.58	-38.42	46.00	7.16	0.19	0.23	LINE	AVERAGE
2.055	19.04	-36.96	56.00	18.62	0.19	0.23	LINE	QP
17.199	32.03	-17.97	50.00	31.15	0.44	0.44	LINE	AVERAGE
17.199	36.50	-23.50	60.00	35.62	0.44	0.44	LINE	QP



Temperature	24°C	Humidity	51%
Test Engineer	Da Teng	Phase	Neutral
Configuration	CTX	Test Mode	Mode 1



Freq	Level	Over	Limit	Read	LISN	Cable	Loss Pol/Phase	Remark	
		Limit	Line	Level	Factor				
MHz	dBuV	dB	dBuV	dBuV	dB	dB			
1	0.15160	48.75	-17.16	65.91	48.49	0.08	0.18	NEUTRAL	QP
2	0.15160	29.76	-26.15	55.91	29.50	0.08	0.18	NEUTRAL	AVERAGE
3 @	0.18056	50.59	-13.87	64.46	50.32	0.08	0.19	NEUTRAL	QP
4 @	0.18056	41.24	-13.22	54.46	40.97	0.08	0.19	NEUTRAL	AVERAGE
5	0.21967	41.36	-21.47	62.83	41.08	0.08	0.20	NEUTRAL	QP
6	0.21967	19.74	-33.09	52.83	19.46	0.08	0.20	NEUTRAL	AVERAGE
7	0.25751	16.76	-34.75	51.51	16.48	0.08	0.20	NEUTRAL	AVERAGE
8	0.25751	33.75	-27.76	61.51	33.47	0.08	0.20	NEUTRAL	QP
9	0.30998	34.98	-24.99	59.97	34.70	0.08	0.20	NEUTRAL	QP
10	0.30998	26.52	-23.45	49.97	26.24	0.08	0.20	NEUTRAL	AVERAGE
11	2.500	17.90	-28.10	46.00	17.54	0.12	0.24	NEUTRAL	AVERAGE
12	2.500	24.08	-31.92	56.00	23.72	0.12	0.24	NEUTRAL	QP
13	18.426	25.45	-24.55	50.00	24.59	0.37	0.49	NEUTRAL	AVERAGE
14	18.426	30.46	-29.54	60.00	29.60	0.37	0.49	NEUTRAL	QP

**Note:**

Level = Read Level + LISN Factor + Cable Loss

## 4.2. Maximum Conducted Output Power Measurement

### 4.2.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for output power is 30dBm. The limit has to be reduced by the amount in dB that the gain of the antenna exceeds 6dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi. 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 output power.

### 4.2.2. Measuring Instruments and Setting

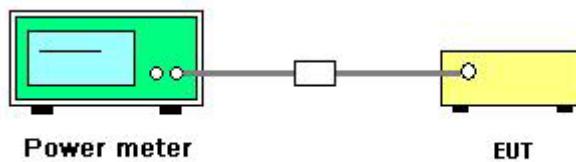
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	Average

### 4.2.3. Test Procedures

1. Test procedures refer KDB 558074 D01 v03r01 section 9.2.2 Measurement using a power meter (PM).
2. This procedure provides an alternative for determining the RMS output power using a broadband RF average power meter with a thermocouple detector.

### 4.2.4. Test Setup Layout



### 4.2.5. Test Deviation

There is no deviation with the original standard.

### 4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.2.7. Test Result of Maximum Conducted Output Power

<b>Temperature</b>	25°C	<b>Humidity</b>	63%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11n/ac
<b>Test Date</b>	Dec. 17, 2013		

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 + Chain 3

<b>Channel</b>	<b>Frequency</b>	<b>Conducted Power (dBm)</b>				<b>Max. Limit (dBm)</b>	<b>Result</b>
		<b>Chain 1</b>	<b>Chain 2</b>	<b>Chain 3</b>	<b>Total</b>		
1	2412 MHz	15.49	17.93	15.54	21.25	30.00	Complies
6	2437 MHz	23.99	26.57	24.47	29.93	30.00	Complies
11	2462 MHz	14.69	18.01	16.02	21.23	30.00	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 + Chain 3

<b>Channel</b>	<b>Frequency</b>	<b>Conducted Power (dBm)</b>				<b>Max. Limit (dBm)</b>	<b>Result</b>
		<b>Chain 1</b>	<b>Chain 2</b>	<b>Chain 3</b>	<b>Total</b>		
3	2422 MHz	13.91	16.59	14.23	19.85	30.00	Complies
6	2437 MHz	16.21	19.14	17.09	22.43	30.00	Complies
9	2452 MHz	13.74	16.76	14.92	20.09	30.00	Complies

For 5GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 20MHz / Chain 1 + Chain 2 + Chain 3

<b>Channel</b>	<b>Frequency</b>	<b>Conducted Power (dBm)</b>				<b>Max. Limit (dBm)</b>	<b>Result</b>
		<b>Chain 1</b>	<b>Chain 2</b>	<b>Chain 3</b>	<b>Total</b>		
149	5745 MHz	22.39	23.35	22.16	27.44	30.00	Complies
157	5785 MHz	21.98	22.89	21.32	26.88	30.00	Complies
165	5825 MHz	23.42	24.63	23.61	28.69	30.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 40MHz / Chain 1 + Chain 2 + Chain 3

<b>Channel</b>	<b>Frequency</b>	<b>Conducted Power (dBm)</b>				<b>Max. Limit (dBm)</b>	<b>Result</b>
		<b>Chain 1</b>	<b>Chain 2</b>	<b>Chain 3</b>	<b>Total</b>		
151	5755 MHz	21.44	22.49	20.88	26.43	30.00	Complies
159	5795 MHz	23.68	24.92	23.79	28.94	30.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 80MHz / Chain 1 + Chain 2 + Chain 3

<b>Channel</b>	<b>Frequency</b>	<b>Conducted Power (dBm)</b>				<b>Max. Limit (dBm)</b>	<b>Result</b>
		<b>Chain 1</b>	<b>Chain 2</b>	<b>Chain 3</b>	<b>Total</b>		
155	5775 MHz	21.71	22.51	20.61	26.45	30.00	Complies

<b>Temperature</b>	25°C	<b>Humidity</b>	63%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11a/b/g
<b>Test Date</b>	Dec. 17, 2013		

**Configuration IEEE 802.11b / Chain 1**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	24.37	30.00	Complies
6	2437 MHz	23.84	30.00	Complies
11	2462 MHz	23.82	30.00	Complies

**Configuration IEEE 802.11g / Chain 1**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	18.46	30.00	Complies
6	2437 MHz	25.58	30.00	Complies
11	2462 MHz	17.49	30.00	Complies

**Configuration IEEE 802.11a / Chain 1**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	24.65	30.00	Complies
157	5785 MHz	25.95	30.00	Complies
165	5825 MHz	25.73	30.00	Complies

## 4.3. Power Spectral Density Measurement

### 4.3.1. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

### 4.3.2. Measuring Instruments and Setting

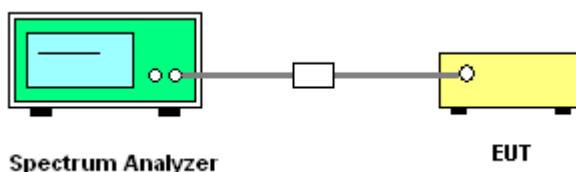
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Set the span to 1.5 times the DTS channel bandwidth.
RBW	$3 \text{ kHz} \leq \text{RBW} \leq 100\text{kHz}$
VBW	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto couple

### 4.3.3. Test Procedures

1. Test procedures refer KDB 558074 D01 v03r01 section 10.2 Method PKPSD (peak PSD) and KDB 662911 D01 v02 section In-Band Power Spectral Density (PSD) Measurements option (b) Measure and sum spectral maximal across the outputs.
2. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
3. Ensure that the number of measurement points in the sweep  $\geq 2 \times \text{span/RBW}$  (use of a greater number of measurement points than this minimum requirement is recommended).
4. Use the peak marker function to determine the maximum level in any 3 kHz band segment within the fundamental EBW.
5. The resulting PSD level must be  $\leq 8 \text{ dBm}$ .

### 4.3.4. Test Setup Layout





#### 4.3.5. Test Deviation

There is no deviation with the original standard.

#### 4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.3.7. Test Result of Power Spectral Density

Temperature	25°C	Humidity	63%
Test Engineer	David Tseng	Configurations	IEEE 802.11n/ac

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
1	2412 MHz	-9.73	-7.80	-9.65	-4.19	8.00	Complies
6	2437 MHz	-1.86	0.90	-2.88	3.80	8.00	Complies
11	2462 MHz	-9.65	-9.36	-12.36	-5.49	8.00	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
3	2422 MHz	-13.93	-13.14	-15.81	-9.38	8.00	Complies
6	2437 MHz	-11.53	-9.99	-12.84	-6.53	8.00	Complies
9	2452 MHz	-12.87	-11.39	-14.64	-8.00	8.00	Complies

For 5GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 20MHz / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
149	5745 MHz	-5.23	-3.26	-2.82	1.12	8.00	Complies
157	5785 MHz	-5.63	-2.50	-3.11	1.22	8.00	Complies
165	5825 MHz	-2.26	-1.19	-1.51	3.14	8.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 40MHz / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
151	5755 MHz	-9.13	-6.53	-5.73	-2.13	8.00	Complies
159	5795 MHz	-5.60	-3.68	-3.45	0.63	8.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 80MHz / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
155	5775 MHz	-11.33	-9.19	-8.92	-4.92	8.00	Complies

<b>Temperature</b>	25°C	<b>Humidity</b>	63%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11a/b/g

**Configuration IEEE 802.11b / Chain 1**

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
1	2412 MHz	0.98	8.00	Complies
6	2437 MHz	-0.02	8.00	Complies
11	2462 MHz	-1.64	8.00	Complies

**Configuration IEEE 802.11g / Chain 1**

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
1	2412 MHz	-8.61	8.00	Complies
6	2437 MHz	-1.35	8.00	Complies
11	2462 MHz	-10.39	8.00	Complies

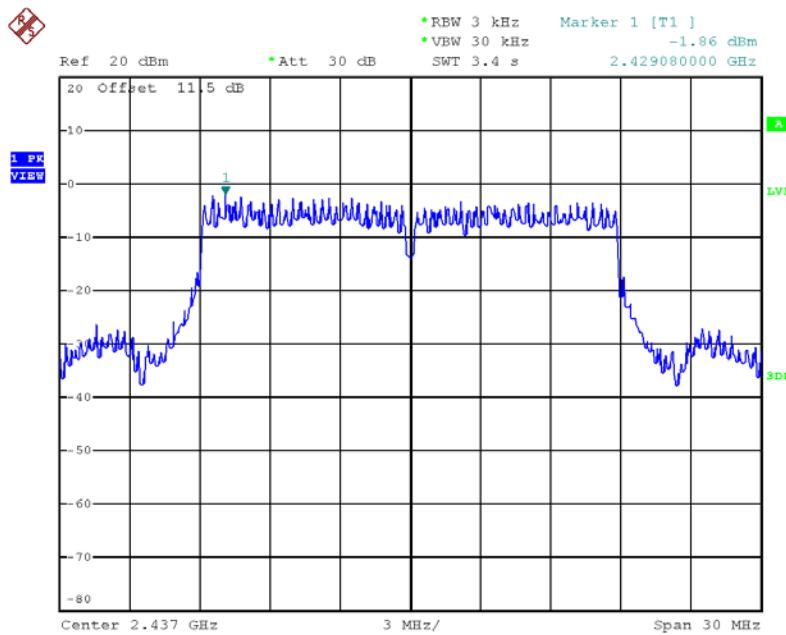
**Configuration IEEE 802.11a / Chain 1**

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
149	5745 MHz	-1.16	8.00	Complies
157	5785 MHz	-0.50	8.00	Complies
165	5825 MHz	-0.72	8.00	Complies

Note: All the test values were listed in the report.

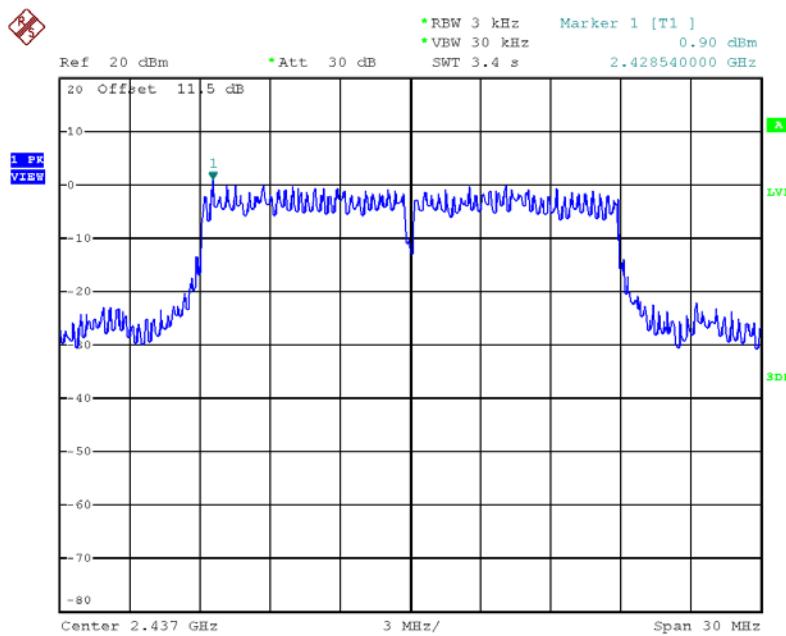
For plots, only the channel with worse result was shown.

### Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / 2437 MHz / Chain 1



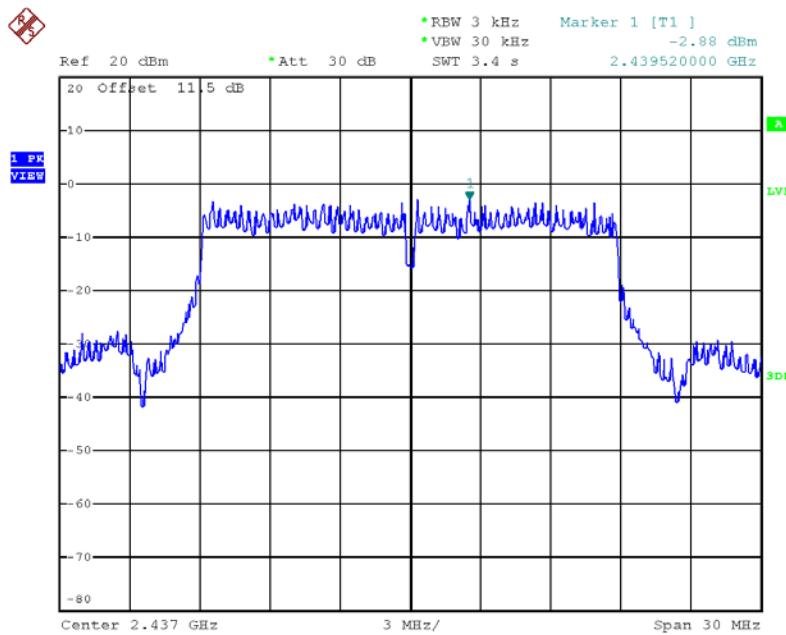
Date: 12.DEC.2013 11:54:36

### Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / 2437 MHz / Chain 2



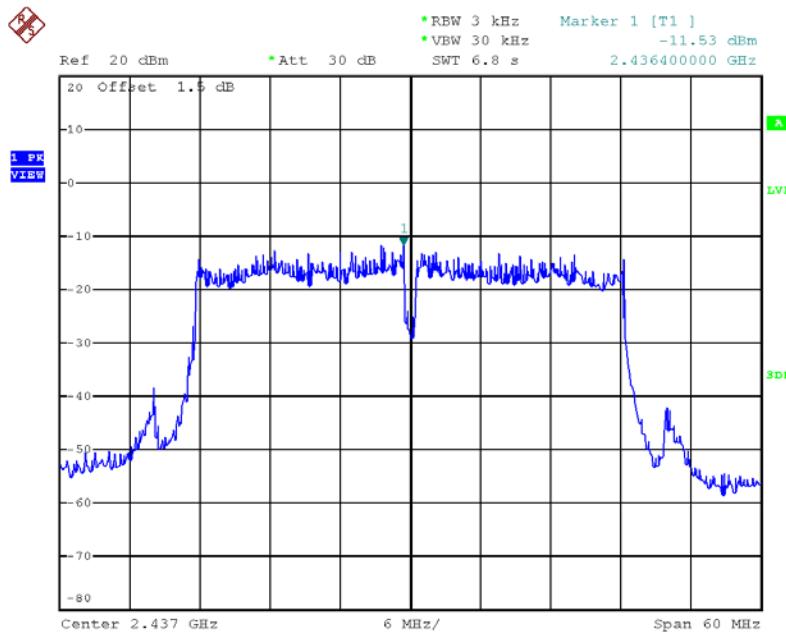
Date: 12.DEC.2013 11:52:44

### Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / 2437 MHz / Chain 3

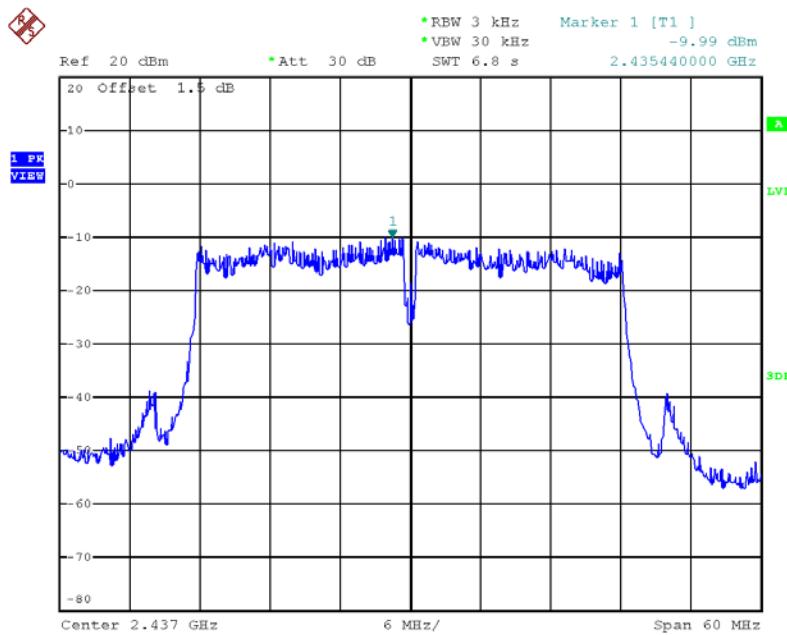


Date: 12.DEC.2013 11:53:36

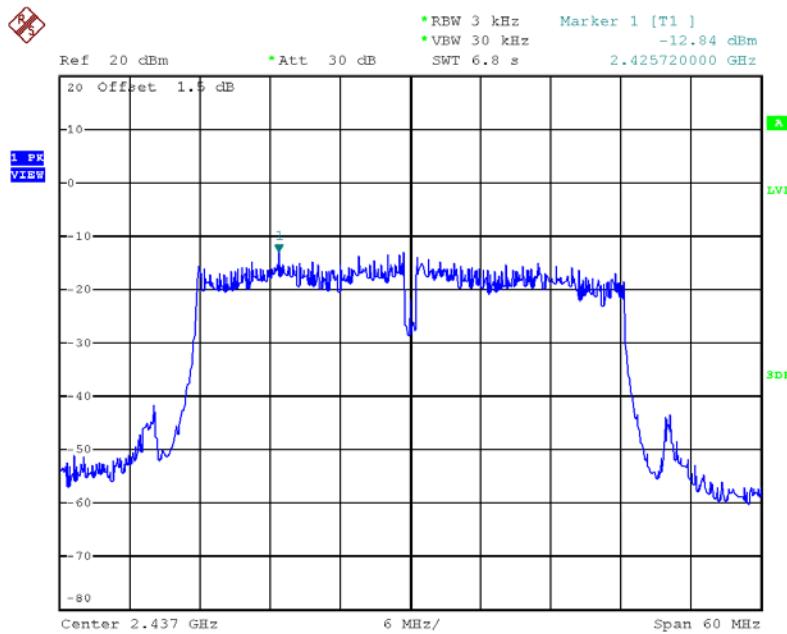
### Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / 2437 MHz / Chain 1



Date: 12.DEC.2013 12:05:20

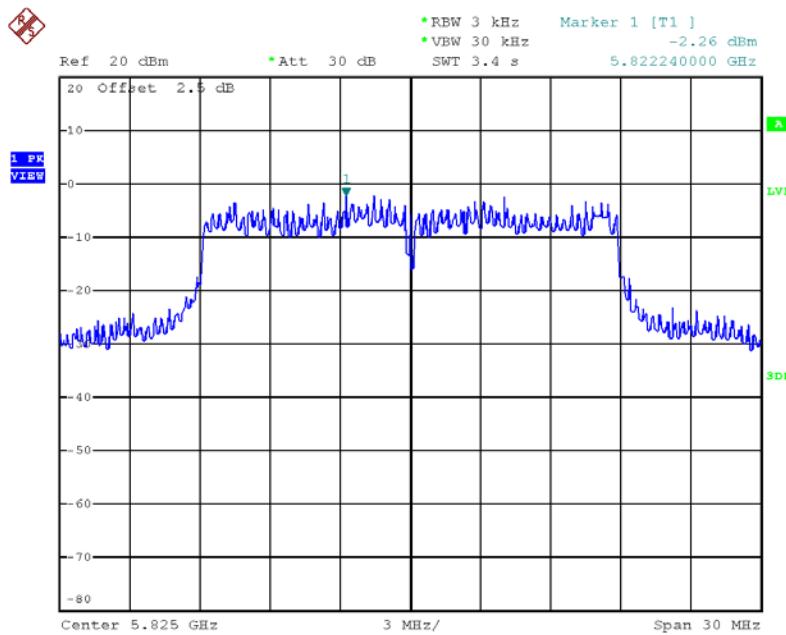
**Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / 2437 MHz / Chain 2**


Date: 12.DEC.2013 12:03:32

**Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / 2437 MHz / Chain 3**


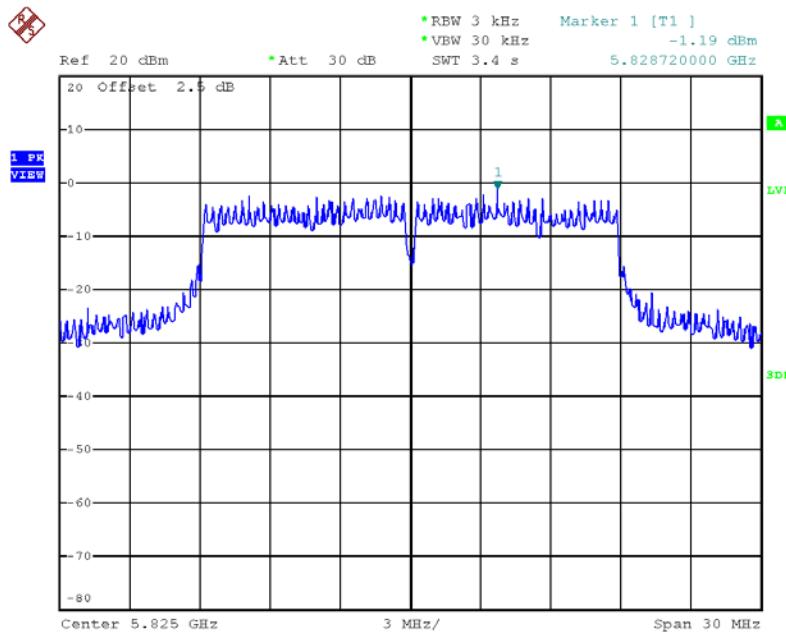
Date: 12.DEC.2013 12:04:27

### Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / 5825 MHz / Chain 1

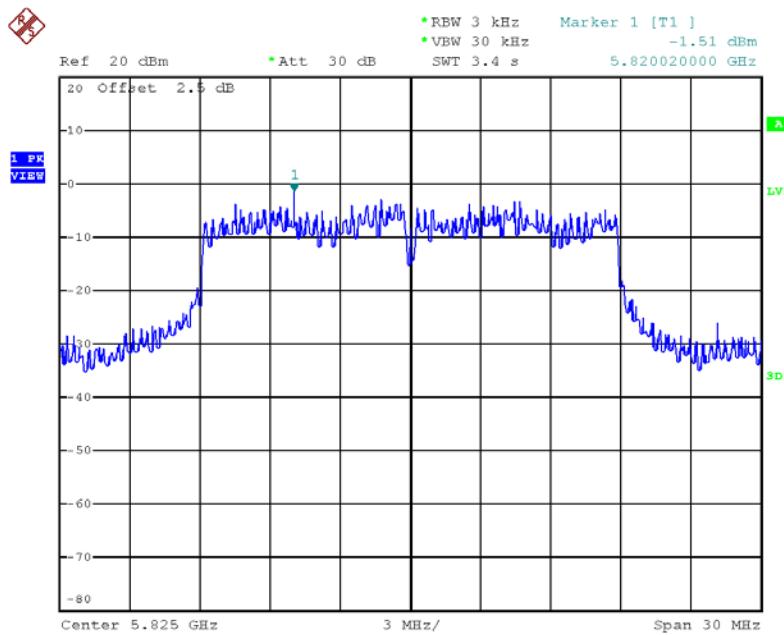


Date: 12.DEC.2013 14:53:52

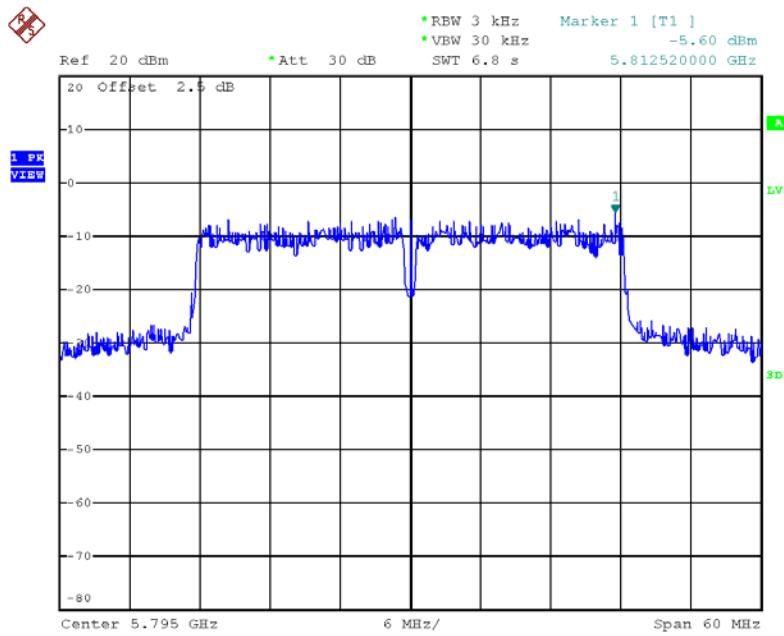
### Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / 5825 MHz / Chain 2



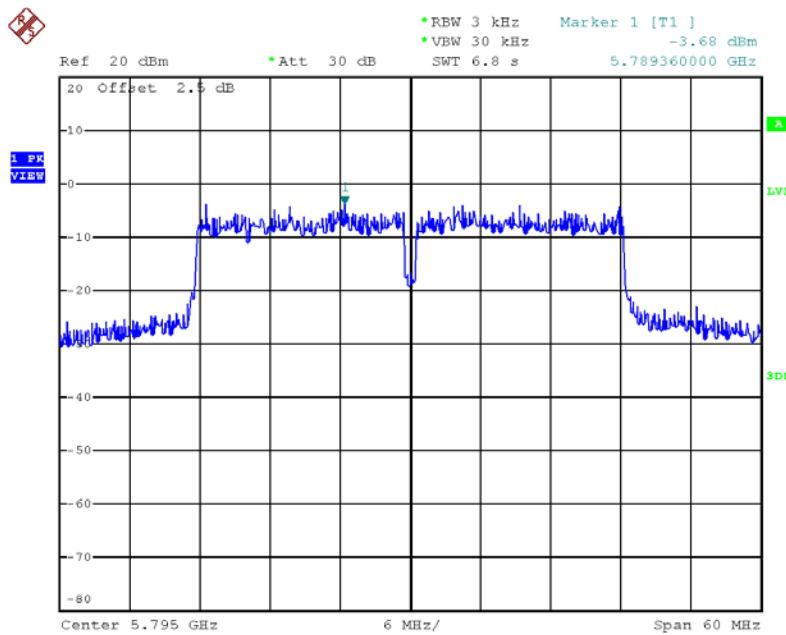
Date: 12.DEC.2013 14:58:29

**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / 5825 MHz / Chain 3**


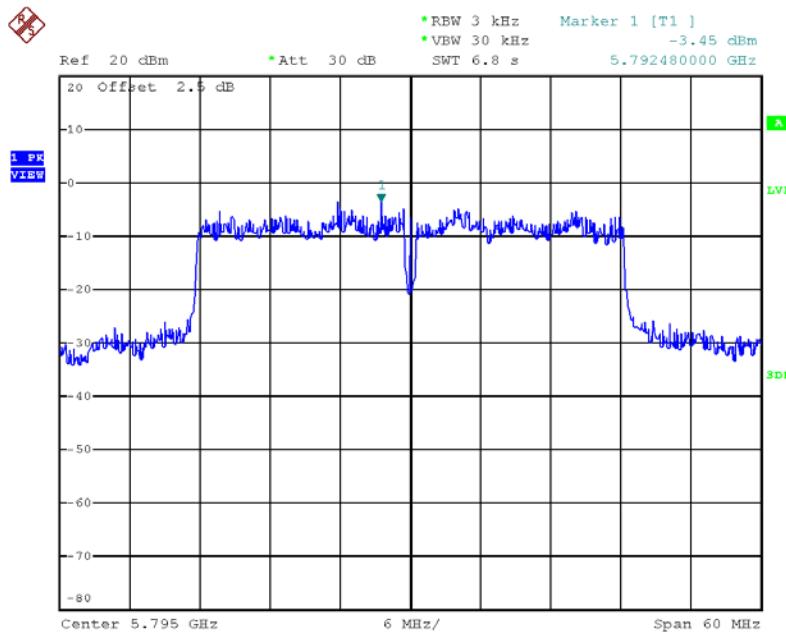
Date: 12.DEC.2013 14:52:29

**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / 5795 MHz / Chain 1**


Date: 12.DEC.2013 15:03:15

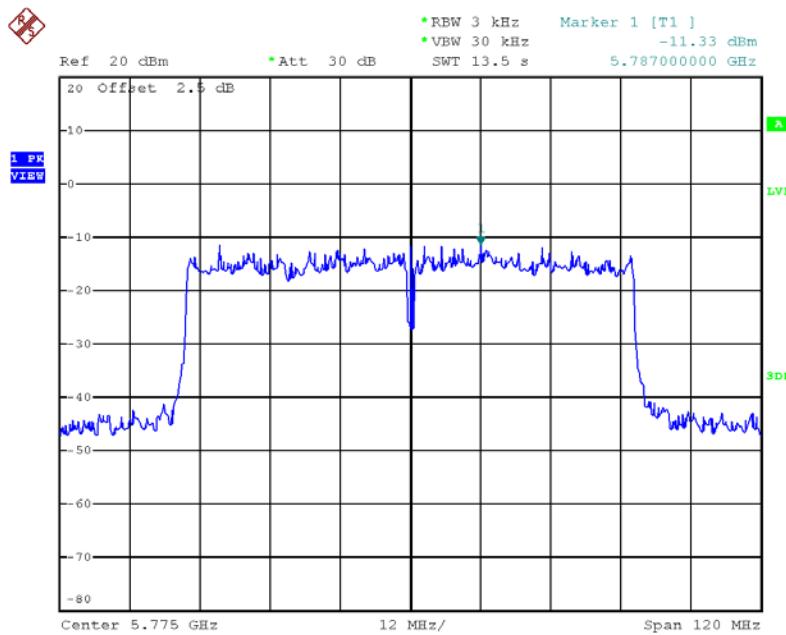
**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / 5795 MHz / Chain 2**


Date: 12.DEC.2013 15:01:32

**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / 5795 MHz / Chain 3**


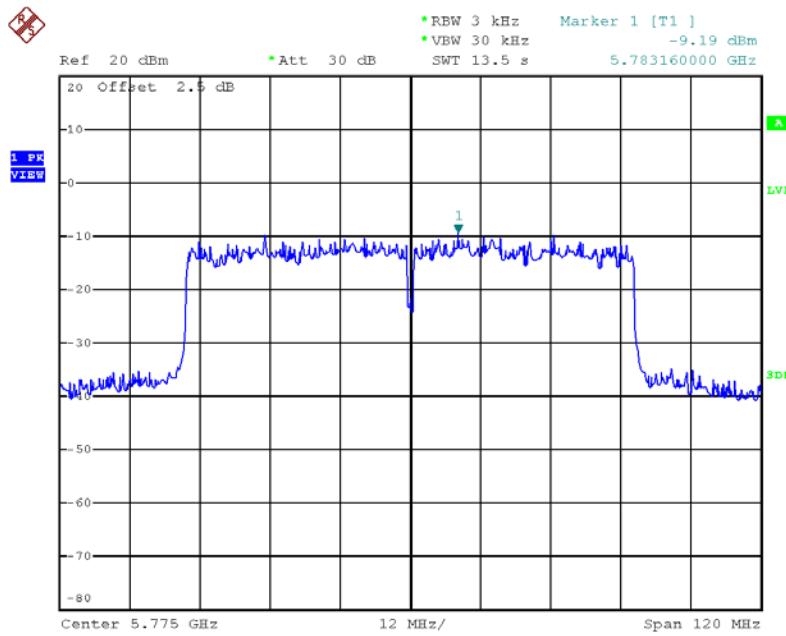
Date: 12.DEC.2013 15:08:13

### Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / 5775 MHz / Chain 1



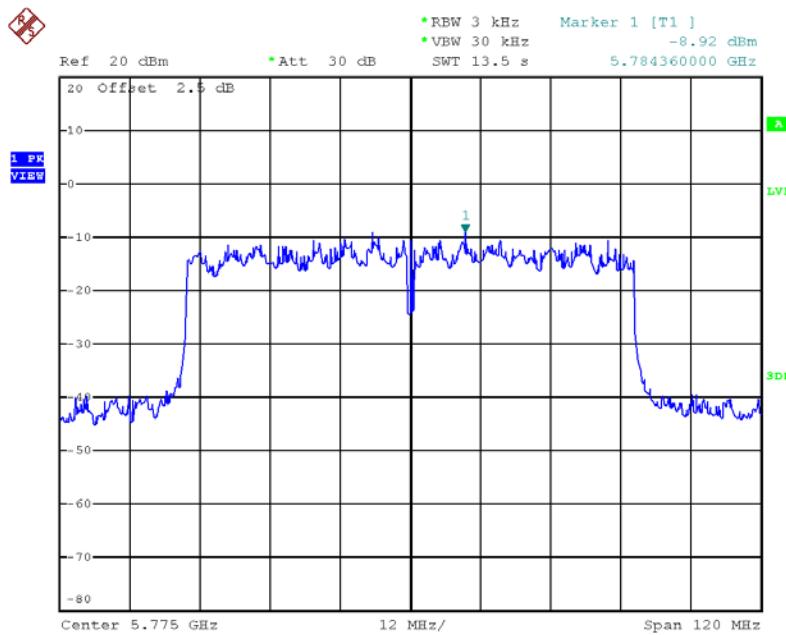
Date: 12.DEC.2013 15:18:00

### Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / 5775 MHz / Chain 2



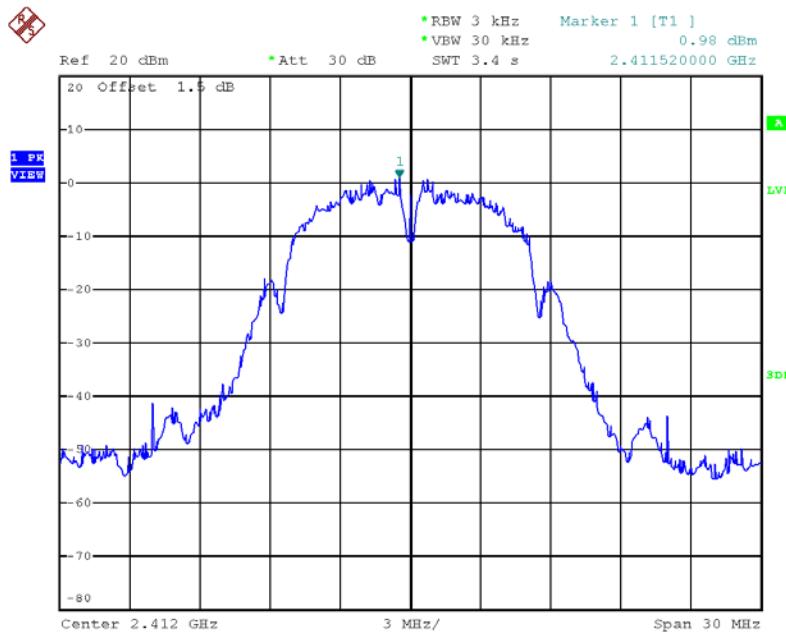
Date: 12.DEC.2013 15:13:58

### Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / 5775 MHz / Chain 3



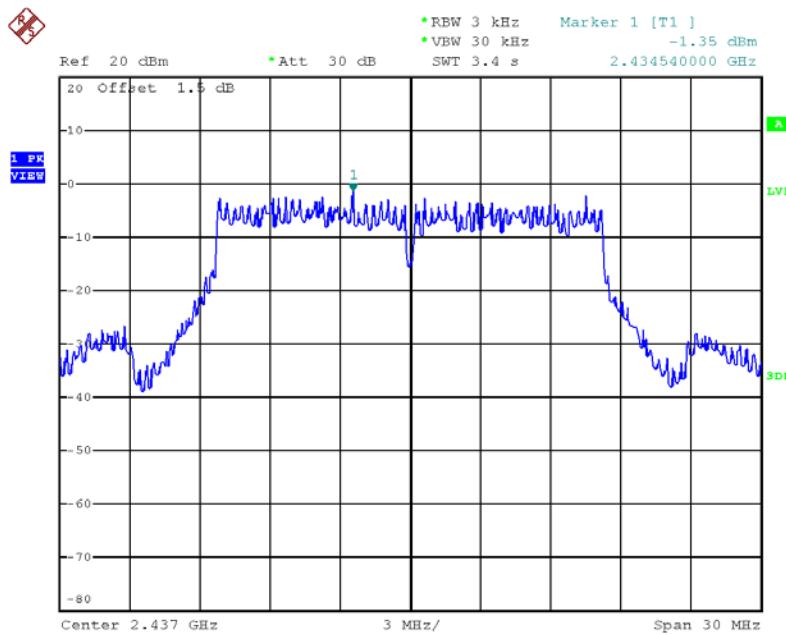
Date: 12.DEC.2013 15:12:06

### Power Density Plot on Configuration IEEE 802.11b / 2412 MHz / Chain 1



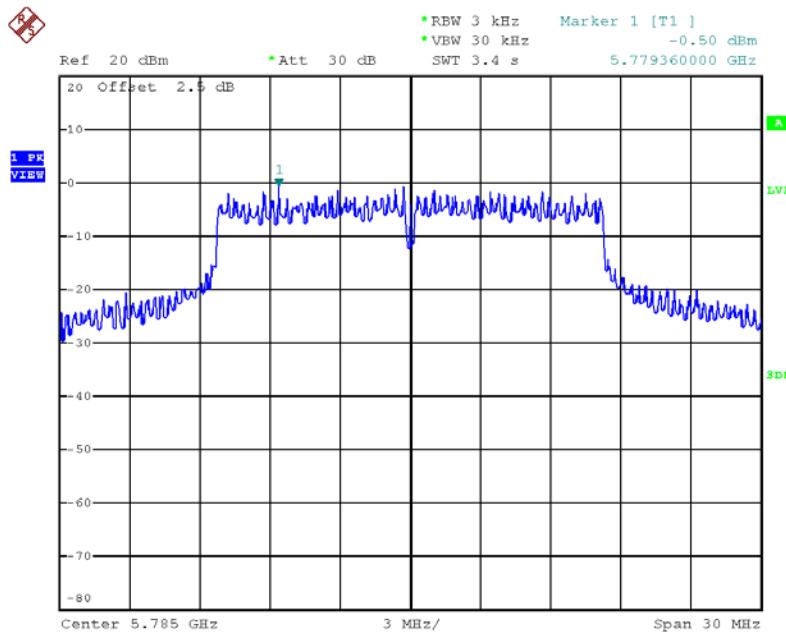
Date: 12.DEC.2013 11:36:05

### Power Density Plot on Configuration IEEE 802.11g / 2437 MHz / Chain 1



Date: 12.DEC.2013 11:43:47

### Power Density Plot on Configuration IEEE 802.11a / 5785 MHz / Chain 1



Date: 12.DEC.2013 14:45:38

#### 4.4. 6dB Spectrum Bandwidth Measurement

##### 4.4.1. Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

##### 4.4.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	100kHz
VBW	$\geq 3 \times RBW$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

##### 4.4.3. Test Procedures

###### For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB 558074 D01 v03r01 for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 8.0 DTS 6-dB signal bandwidth option 1.
3. Multiple antenna system was performed in accordance with KDB 662911 D01 v02 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

##### 4.4.4. Test Setup Layout

###### For Radiated 6dB Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.5.4.

##### 4.4.5. Test Deviation

There is no deviation with the original standard.

##### 4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.4.7. Test Result of 6dB Spectrum Bandwidth

<b>Temperature</b>	25°C	<b>Humidity</b>	63%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11n/ac

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	13.52	17.12	500	Complies
6	2437 MHz	11.76	17.28	500	Complies
11	2462 MHz	15.04	17.12	500	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	30.40	36.16	500	Complies
6	2437 MHz	31.20	35.84	500	Complies
9	2452 MHz	32.64	35.84	500	Complies

**For 5GHz Band**
**Configuration IEEE 802.11ac MCS0/Nss1 20MHz / Chain 1 + Chain 2 + Chain 3**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	17.60	18.24	500	Complies
157	5785 MHz	15.84	17.76	500	Complies
165	5825 MHz	15.68	22.56	500	Complies

**Configuration IEEE 802.11ac MCS0/Nss1 40MHz / Chain 1 + Chain 2 + Chain 3**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
151	5755 MHz	35.20	36.48	500	Complies
159	5795 MHz	32.32	43.84	500	Complies

**Configuration IEEE 802.11ac MCS0/Nss1 80MHz / Chain 1 + Chain 2 + Chain 3**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
155	5775 MHz	75.20	76.16	500	Complies

<b>Temperature</b>	25°C	<b>Humidity</b>	63%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11a/b/g

**Configuration IEEE 802.11b / Chain 1**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	8.08	10.16	500	Complies
6	2437 MHz	7.60	10.16	500	Complies
11	2462 MHz	8.08	10.16	500	Complies

**Configuration IEEE 802.11g / Chain 1**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.56	16.64	500	Complies
6	2437 MHz	16.48	38.40	500	Complies
11	2462 MHz	16.32	16.64	500	Complies

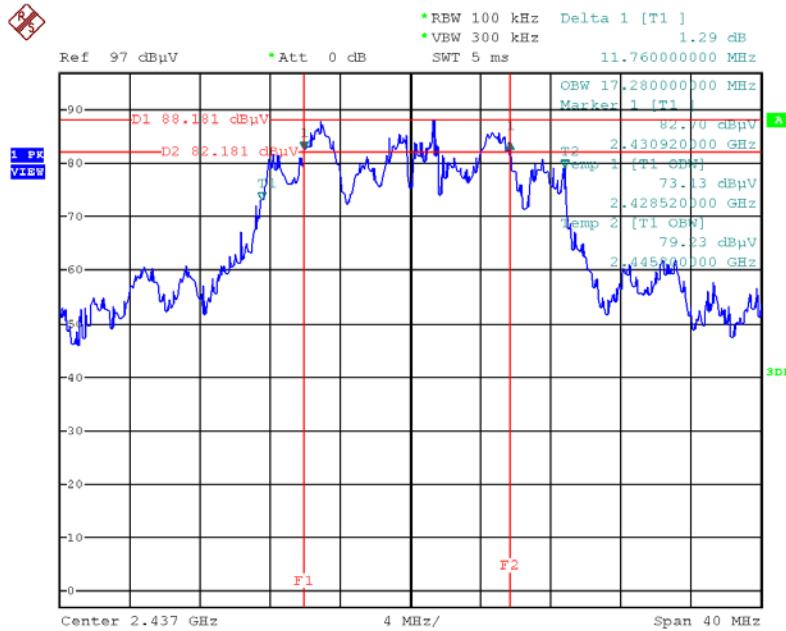
**Configuration IEEE 802.11a / Chain 1**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	16.32	25.44	500	Complies
157	5785 MHz	16.32	37.12	500	Complies
165	5825 MHz	16.32	35.36	500	Complies

Note: All the test values were listed in the report.

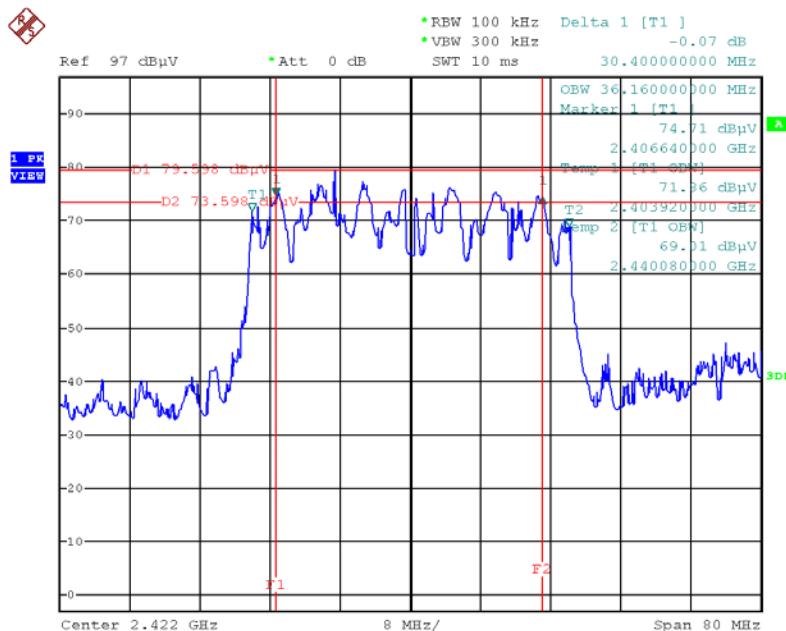
For plots, only the channel with worse result was shown.

### 6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / 2437 MHz / Chain 1 + Chain 2 + Chain 3



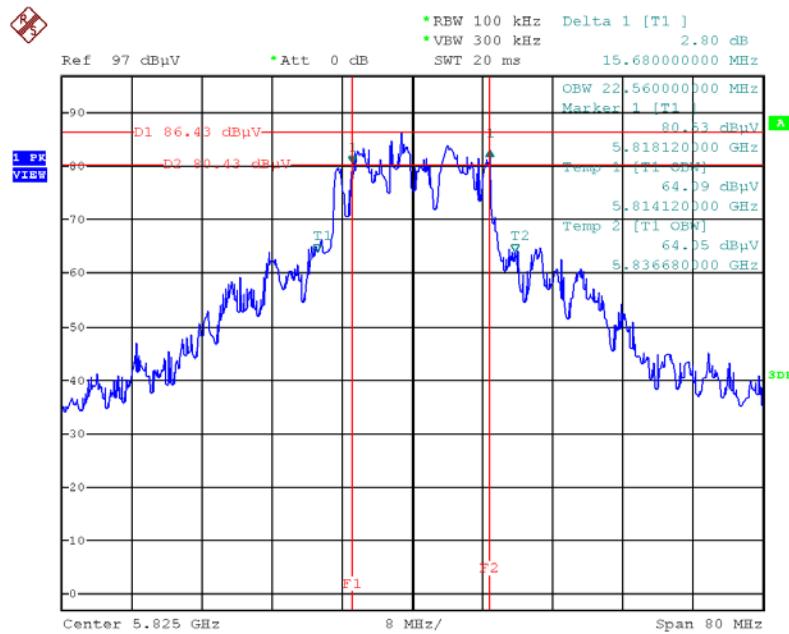
Date: 12.DEC.2013 12:37:44

### 6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / 2422 MHz / Chain 1 + Chain 2 + Chain 3



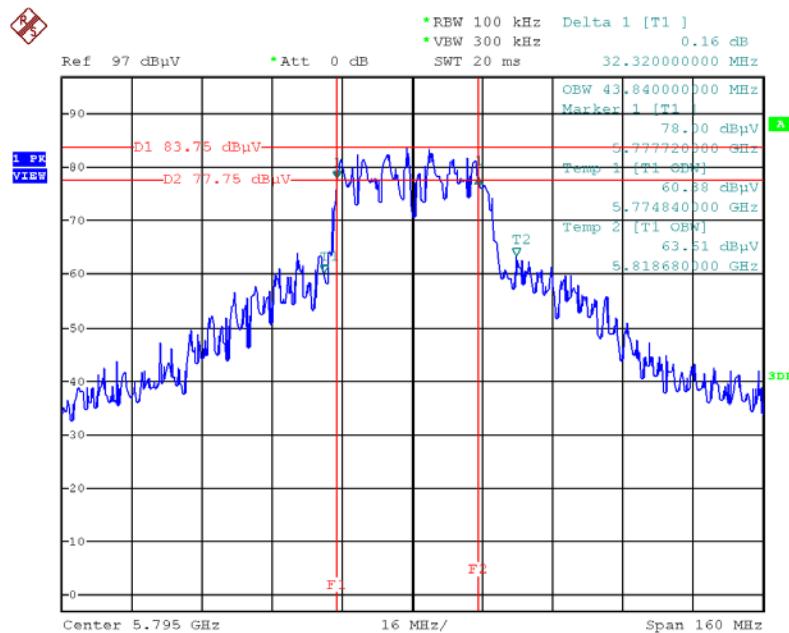
Date: 12.DEC.2013 12:41:17

### 6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / 5825 MHz / Chain 1 + Chain 2 + Chain 3



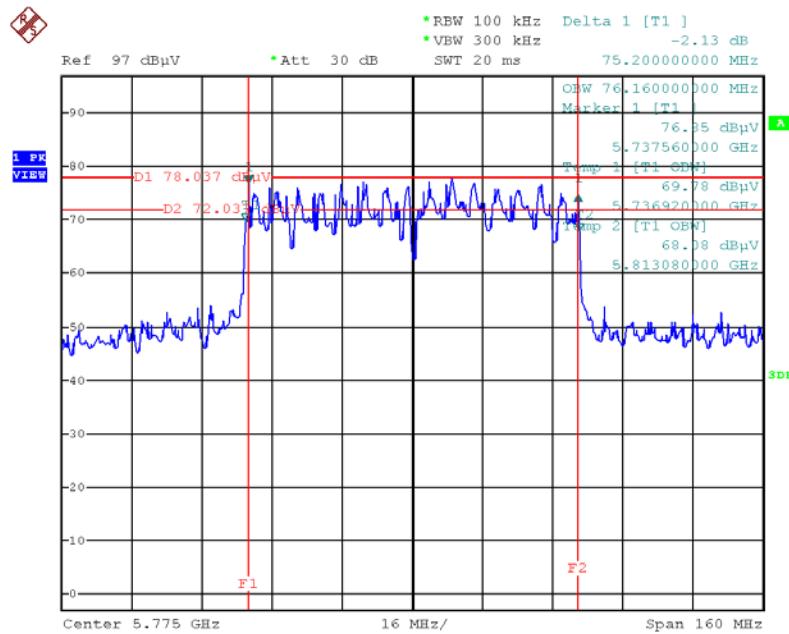
Date: 12.DEC.2013 14:31:57

### 6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / 5795 MHz / Chain 1 + Chain 2 + Chain 3



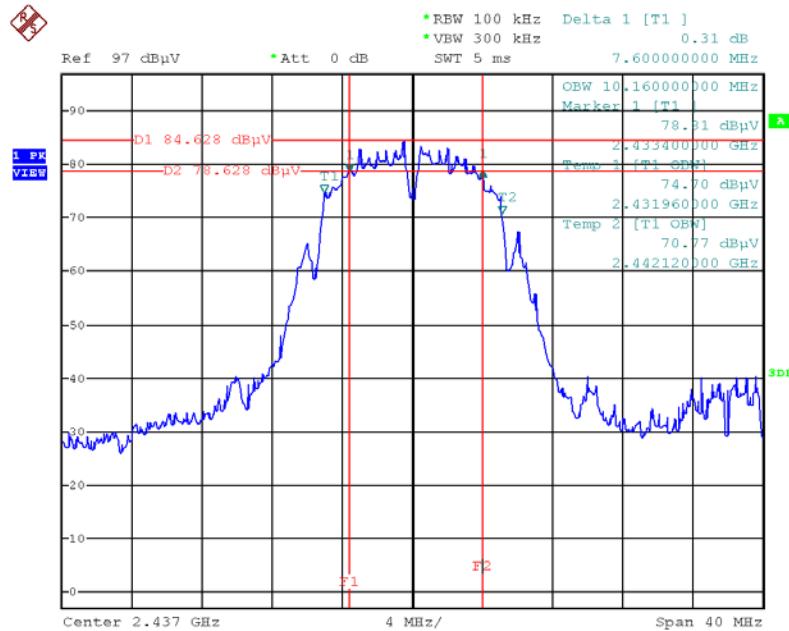
Date: 12.DEC.2013 14:34:36

### 6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / 5775 MHz / Chain 1 + Chain 2 + Chain 3



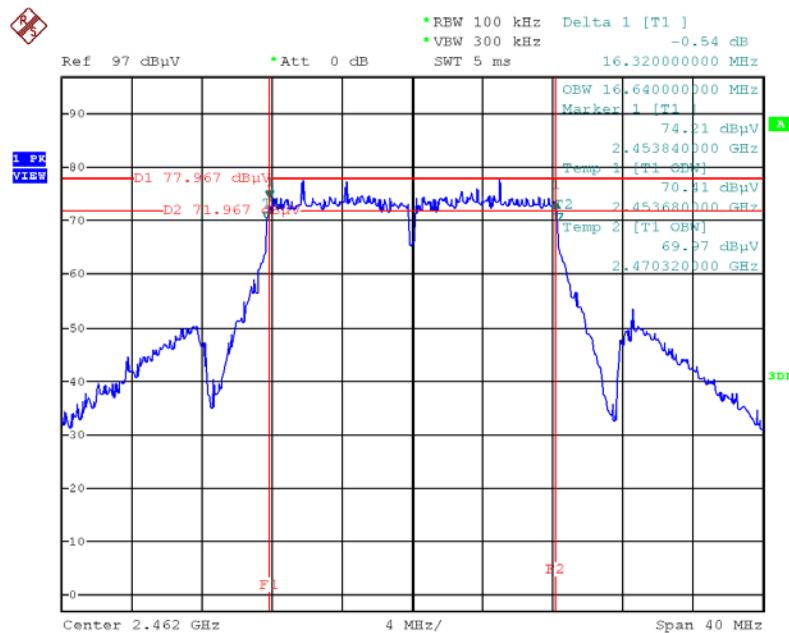
Date: 12.DEC.2013 14:36:35

### 6 dB Bandwidth Plot on Configuration IEEE 802.11b / 2437 MHz / Chain 1



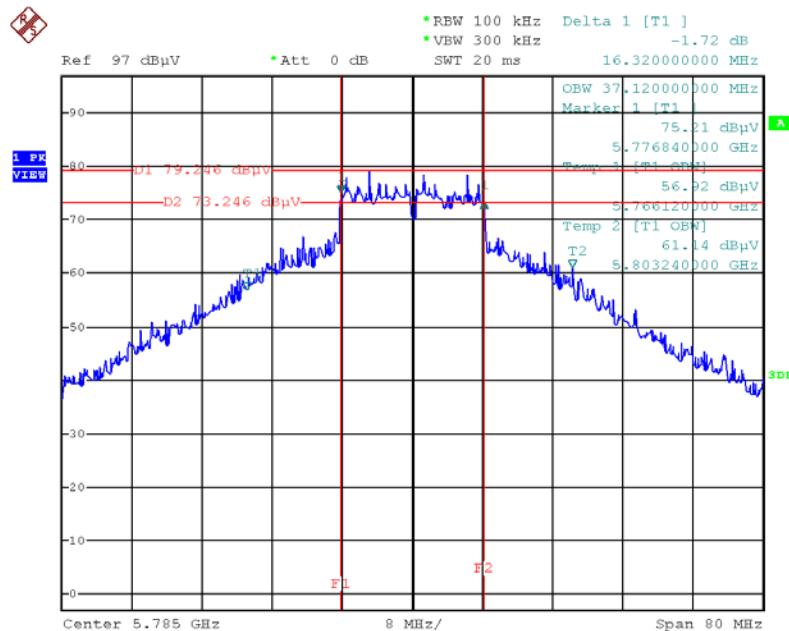
Date: 12.DEC.2013 12:28:49

### 6 dB Bandwidth Plot on Configuration IEEE 802.11g / 2462 MHz / Chain 1



Date: 12.DEC.2013 12:33:28

### 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5785 MHz / Chain 1



Date: 12.DEC.2013 14:24:53

## 4.5. Radiated Emissions Measurement

### 4.5.1. Limit

30dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

### 4.5.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1GHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 10Hz for Average
RBW / VBW (Emission in non-restricted band)	100kHz / 300kHz for peak

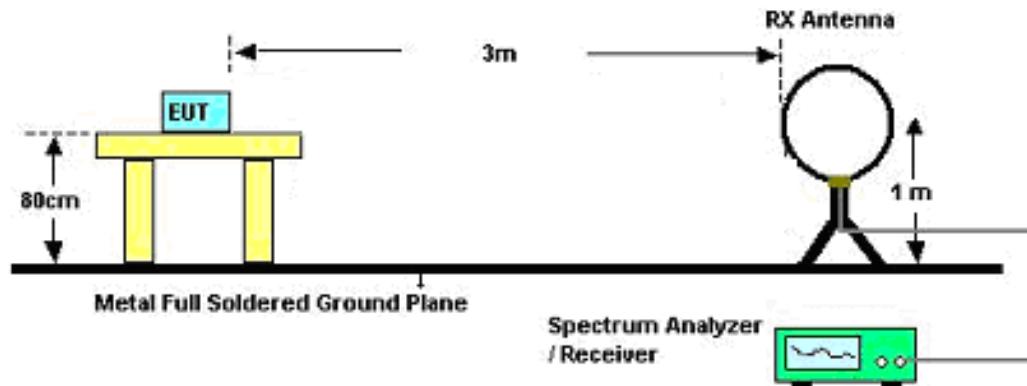
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1GHz / RBW 120kHz for QP

#### 4.5.3. Test Procedures

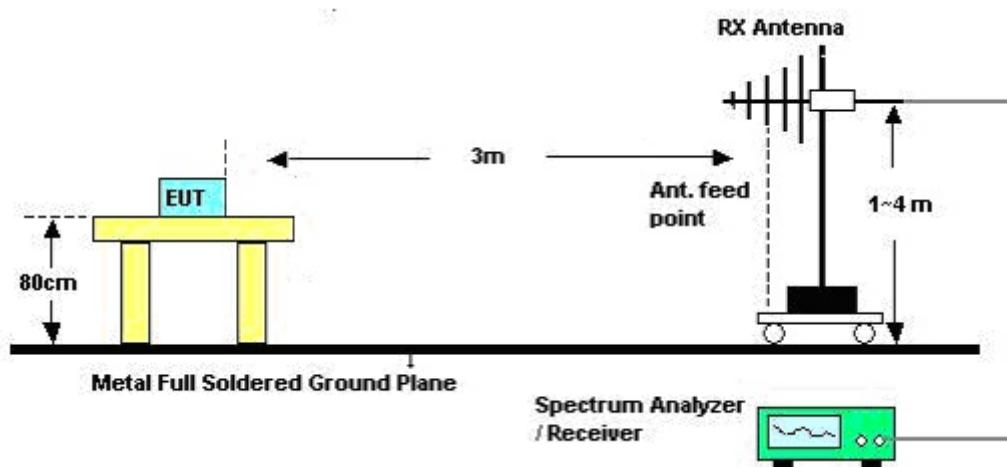
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

#### 4.5.4. Test Setup Layout

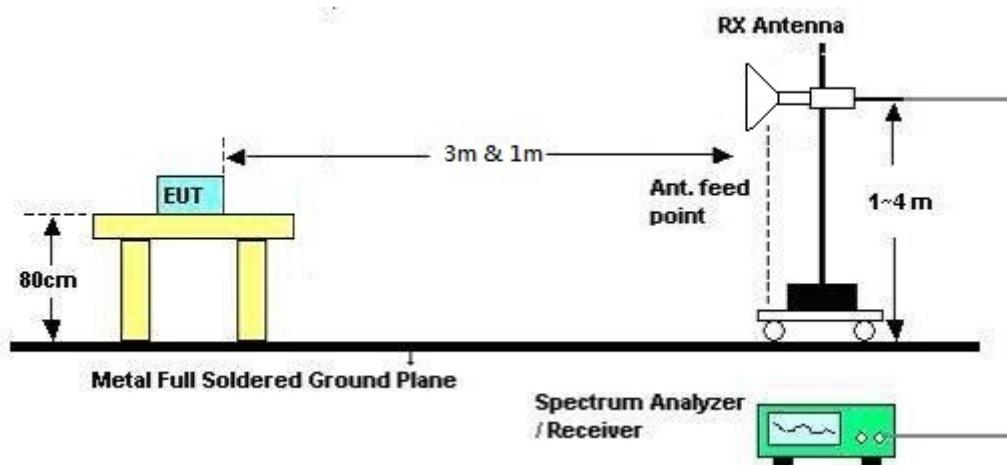
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz





#### 4.5.5. Test Deviation

There is no deviation with the original standard.

#### 4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



#### 4.5.7. Results of Radiated Emissions (9kHz~30MHz)

Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	CTX
Test Date	Oct. 31, 2013	Test Mode	Mode 1

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB);

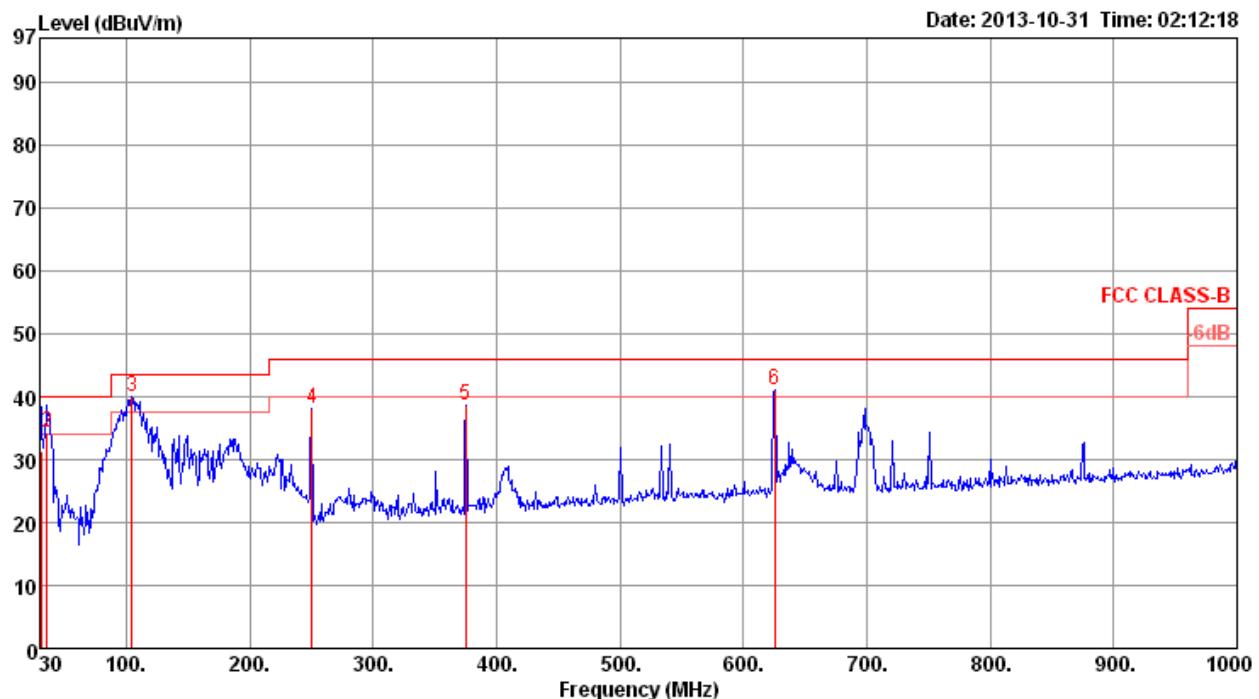
Limit line = specific limits (dBuV) + distance extrapolation factor.



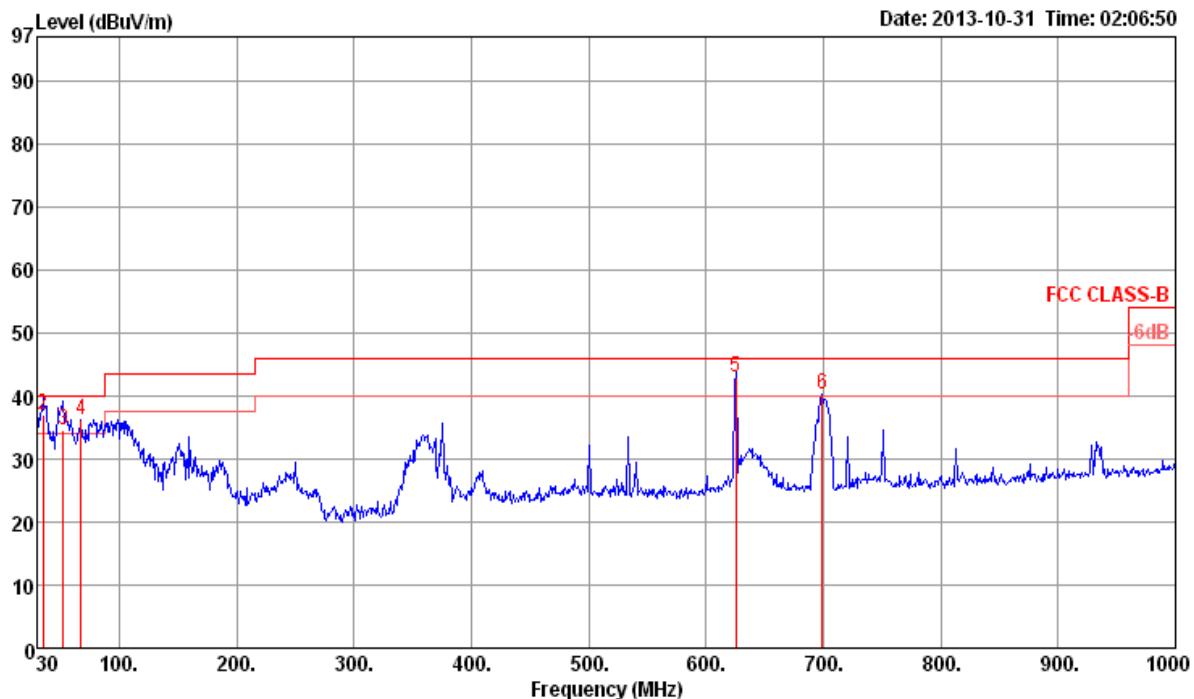
#### **4.5.8. Results of Radiated Emissions (30MHz~1GHz)**

Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	CTX
Test Mode	Mode 1		

### **Horizontal**



Freq	Level	Limit Line	Over Limit	Read Level	Cable Antenna Preamp				A/Pos	T/Pos	Pol/Phase
					Loss	Factor	Factor	Remark			
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	30.94	31.42	40.00	-8.58	40.37	0.63	18.22	27.80	QP	120	276 HORIZONTAL
2	35.82	34.21	40.00	-5.79	45.83	0.69	15.49	27.80	QP	101	6 HORIZONTAL
3	104.69	39.95	43.50	-3.55	54.96	1.20	11.36	27.57	Peak	125	0 HORIZONTAL
4	250.19	38.15	46.00	-7.85	50.60	1.78	12.77	27.00	Peak	125	0 HORIZONTAL
5	375.32	38.60	46.00	-7.40	48.43	2.20	15.40	27.43	Peak	125	0 HORIZONTAL
6	625.58	41.20	46.00	-4.80	47.52	2.90	18.85	28.07	Peak	125	0 HORIZONTAL

***Vertical***


Freq	Level	Limit	Over	Read	CableAntenna Preamp			A/Pos	T/Pos	Pol/Phase
					Line	Limit	Level			
MHz	dBuV/m	dBuV/m	dB	dBuV				cm	deg	
1	30.00	36.27	40.00	-3.73	44.70	0.61	18.76	27.80 Peak	400	0 VERTICAL
2	34.85	36.98	40.00	-3.02	48.00	0.70	16.08	27.80 QP	100	360 VERTICAL
3	52.31	34.48	40.00	-5.52	53.23	0.86	8.18	27.79 QP	100	2 VERTICAL
4	67.83	36.19	40.00	-3.81	56.28	0.97	6.67	27.73 Peak	400	0 VERTICAL
5	625.58	43.04	46.00	-2.96	49.36	2.90	18.85	28.07 QP	100	232 VERTICAL
6	699.30	40.24	46.00	-5.76	46.05	3.10	19.09	28.00 Peak	400	0 VERTICAL

**Note:**

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.



#### 4.5.9. Results for Radiated Emissions (1GHz~10<sup>th</sup> Harmonic)

Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 20MHz CH 1 / Chain 1 + Chain 2 + Chain 3
Test Date	Oct. 26, 2013		

##### Horizontal

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			dB	dBuV	dB		cm	deg	
1	4824.97	43.33	54.00	-10.67	39.27	5.87	33.39	35.20	Average	100	279	HORIZONTAL
2	4825.19	58.99	74.00	-15.01	54.93	5.87	33.39	35.20	Peak	100	279	HORIZONTAL

##### Vertical

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			dB	dBuV	dB		cm	deg	
1	4825.35	49.99	74.00	-24.01	45.93	5.87	33.39	35.20	Peak	100	263	VERTICAL
2	4825.36	36.63	54.00	-17.37	32.57	5.87	33.39	35.20	Average	100	263	VERTICAL



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 20MHz CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Oct. 26, 2013		

**Horizontal**

Freq	Level	Limit		Over Limit	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			Loss	Factor	Factor			
1	4874.72	66.73	74.00	-7.27	62.53	5.92	33.48	35.20	Peak	100	277 HORIZONTAL
2	4875.12	53.28	54.00	-0.72	49.08	5.92	33.48	35.20	Average	100	277 HORIZONTAL

**Vertical**

Freq	Level	Limit		Over Limit	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			Loss	Factor	Factor			
1	4875.20	57.44	74.00	-16.56	53.24	5.92	33.48	35.20	Peak	100	259 VERTICAL
2	4875.36	44.28	54.00	-9.72	40.08	5.92	33.48	35.20	Average	100	259 VERTICAL



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 20MHz CH 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Oct. 26, 2013		

**Horizontal**

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			dB	dBuV	dB		cm	deg	
1	4925.02	41.91	54.00	-12.09	37.56	5.97	33.58	35.20	Average	100	278	HORIZONTAL
2	4925.31	57.66	74.00	-16.34	53.31	5.97	33.58	35.20	Peak	100	278	HORIZONTAL

**Vertical**

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			dB	dBuV	dB		cm	deg	
1	4925.40	48.51	74.00	-25.49	44.16	5.97	33.58	35.20	Peak	100	259	VERTICAL
2	4925.56	34.82	54.00	-19.18	30.47	5.97	33.58	35.20	Average	100	259	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 40MHz CH 3 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Oct. 26, 2013		

**Horizontal**

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			dB	dBuV	dB		cm	deg	
1	4845.04	37.29	54.00	-16.71	33.19	5.88	33.42	35.20	Average	100	279	HORIZONTAL
2	4845.23	52.18	74.00	-21.82	48.08	5.88	33.42	35.20	Peak	100	279	HORIZONTAL

**Vertical**

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			dB	dBuV	dB		cm	deg	
1	4844.43	46.28	74.00	-27.72	42.18	5.88	33.42	35.20	Peak	100	265	VERTICAL
2	4845.23	33.24	54.00	-20.76	29.14	5.88	33.42	35.20	Average	100	265	VERTICAL



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 40MHz CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Oct. 26, 2013		

**Horizontal**

Freq	Level	Limit		Over Line	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		
1	4873.14	42.47	54.00	-11.53	38.27	5.92	33.48	35.20	Average	100	278 HORIZONTAL
2	4873.34	57.26	74.00	-16.74	53.06	5.92	33.48	35.20	Peak	100	278 HORIZONTAL

**Vertical**

Freq	Level	Limit		Over Line	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		
1	4875.40	35.97	54.00	-18.03	31.77	5.92	33.48	35.20	Average	100	258 VERTICAL
2	4875.49	49.43	74.00	-24.57	45.23	5.92	33.48	35.20	Peak	100	258 VERTICAL



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 40MHz CH 9 / Chain 1 + Chain 2 + Chain 3
Test Date	Oct. 26, 2013		

**Horizontal**

Freq	Level	Limit		Over Limit	Read Level	Cable			Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			dB	dBuV	dB	dB/m	dB	dB	cm	deg	
1	4904.63	54.34	74.00	-19.66	50.08	5.95	33.51	35.20	Peak			100	278	HORIZONTAL
2	4905.07	38.66	54.00	-15.34	34.37	5.95	33.54	35.20	Average			100	278	HORIZONTAL

**Vertical**

Freq	Level	Limit		Over Limit	Read Level	Cable			Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			dB	dBuV	dB	dB/m	dB	dB	cm	deg	
1	4904.99	47.53	74.00	-26.47	43.24	5.95	33.54	35.20	Peak			100	260	VERTICAL
2	4905.31	33.95	54.00	-20.05	29.66	5.95	33.54	35.20	Average			100	260	VERTICAL



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11ac MCS0/Nss1 20MHz CH 149 / Chain 1 + Chain 2 + Chain 3
Test Date	Oct. 19, 2013		

**Horizontal**

Freq	Level	Limit		Over Line	Read Level	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm		
1	11487.24	49.42	54.00	-4.58	36.08	9.09	39.10	34.85	100	342	HORIZONTAL	Average
2	11487.24	57.51	74.00	-16.49	44.17	9.09	39.10	34.85	100	342	HORIZONTAL	Peak

**Vertical**

Freq	Level	Limit		Over Line	Read Level	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm		
1	11488.02	65.81	74.00	-8.19	52.47	9.09	39.10	34.85	138	265	VERTICAL	Peak
2	11492.58	53.83	54.00	-0.17	40.49	9.09	39.10	34.85	138	265	VERTICAL	Average



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11ac MCS0/Nss1 20MHz CH 157 / Chain 1 + Chain 2 + Chain 3
Test Date	Oct. 19, 2013		

**Horizontal**

Freq	Level	Limit		Over Line	Read Limit	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11571.78	48.92	54.00	-5.08	35.65	9.11	39.01	34.85	100	186	HORIZONTAL	Average
2	11571.78	58.48	74.00	-15.52	45.21	9.11	39.01	34.85	100	186	HORIZONTAL	Peak

**Vertical**

Freq	Level	Limit		Over Line	Read Limit	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11571.78	67.04	74.00	-6.96	53.77	9.11	39.01	34.85	100	281	VERTICAL	Peak
2	11572.32	53.69	54.00	-0.31	40.42	9.11	39.01	34.85	100	281	VERTICAL	Average



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11ac MCS0/Nss1 20MHz CH 165 / Chain 1 + Chain 2 + Chain 3
Test Date	Dec. 11, 2013		

**Horizontal**

Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor		cm	deg	
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg
1	11650.24	67.53	74.00	-6.47	58.81	5.16	38.86	35.30	Peak	100	233 HORIZONTAL
2	11650.48	53.01	54.00	-0.99	44.29	5.16	38.86	35.30	Average	100	233 HORIZONTAL

**Vertical**

Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor		cm	deg	
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg
1	11646.88	68.48	74.00	-5.52	59.76	5.16	38.86	35.30	Peak	100	253 VERTICAL
2	11647.12	53.87	54.00	-0.13	45.15	5.16	38.86	35.30	Average	100	253 VERTICAL



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11ac MCS0/Nss1 40MHz CH 151 / Chain 1 + Chain 2 + Chain 3
Test Date	Oct. 19, 2013		

**Horizontal**

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
		Line	dBuV/m			dB	dBuV	dB	dB/m	dB	cm	
1	11511.64	48.53	54.00	-5.47	35.18	9.10	39.10	34.85	100	235	HORIZONTAL	Average
2	11512.04	61.21	74.00	-12.79	47.86	9.10	39.10	34.85	100	235	HORIZONTAL	Peak

**Vertical**

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
		Line	dBuV/m			dB	dBuV	dB	dB/m	dB	cm	
1	11507.54	67.21	74.00	-6.79	53.86	9.10	39.10	34.85	139	266	VERTICAL	Peak
2	11512.48	53.32	54.00	-0.68	39.97	9.10	39.10	34.85	139	266	VERTICAL	Average



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11ac MCS0/Nss1 40MHz CH 159 / Chain 1 + Chain 2 + Chain 3
Test Date	Oct. 19, 2013		

**Horizontal**

Freq	Level	Limit		Over Line	Read Level	Cable	Antenna	Preamplifier	A/Pos	T/Pos	Pol/Phase	Remark
		dBuV/m	dBuV/m			dB	dBuV	dB	dB/m	dB		
1	11586.74	49.07	54.00	-4.93	35.84	9.11	38.97	34.85	100	209	HORIZONTAL	Average
2	11591.86	61.05	74.00	-12.95	47.82	9.11	38.97	34.85	100	209	HORIZONTAL	Peak

**Vertical**

Freq	Level	Limit		Over Line	Read Level	Cable	Antenna	Preamplifier	A/Pos	T/Pos	Pol/Phase	Remark
		dBuV/m	dBuV/m			dB	dBuV	dB	dB/m	dB		
1	11587.28	53.71	54.00	-0.29	40.48	9.11	38.97	34.85	100	281	VERTICAL	Average
2	11592.06	67.16	74.00	-6.84	53.93	9.11	38.97	34.85	100	281	VERTICAL	Peak



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11ac MCS0/Nss1 80MHz CH 155 / Chain 1 + Chain 2 + Chain 3
Test Date	Oct. 19, 2013		

**Horizontal**

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamplifier	A/Pos	T/Pos	Pol/Phase	Remark
		Line	dBuV/m			dB	dBuV	dB	dB/m	dB	cm	
1	11552.30	57.49	74.00	-16.51	44.23	9.10	39.01	34.85	100	233	HORIZONTAL	Peak
2	11556.36	48.67	54.00	-5.33	35.41	9.10	39.01	34.85	100	233	HORIZONTAL	Average

**Vertical**

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamplifier	A/Pos	T/Pos	Pol/Phase	Remark
		Line	dBuV/m			dB	dBuV	dB	dB/m	dB	cm	
1	11542.44	52.68	54.00	-1.32	39.37	9.10	39.06	34.85	100	282	VERTICAL	Average
2	11547.38	62.93	74.00	-11.07	49.62	9.10	39.06	34.85	100	282	VERTICAL	Peak



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11b CH 1 / Chain 1
Test Date	Oct. 26, 2013		

**Horizontal**

Freq	Level	Limit		Over Limit	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dB			dBuV	dB	dB/m			
1	4823.92	56.53	74.00	-17.47	52.47	5.87	33.39	35.20	Peak	100	276 HORIZONTAL
2	4823.97	53.72	54.00	-0.28	49.66	5.87	33.39	35.20	Average	100	276 HORIZONTAL

**Vertical**

Freq	Level	Limit		Over Limit	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dB			dBuV	dB	dB/m			
1	4823.97	49.83	54.00	-4.17	45.77	5.87	33.39	35.20	Average	100	287 VERTICAL
2	4824.07	53.33	74.00	-20.67	49.27	5.87	33.39	35.20	Peak	100	287 VERTICAL



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11b CH 6 / Chain 1
Test Date	Oct. 26, 2013		

**Horizontal**

Freq	Level	Limit		Over Line	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		
1	4873.93	56.21	74.00	-17.79	52.01	5.92	33.48	35.20	Peak	100	267 HORIZONTAL
2	4873.97	53.44	54.00	-0.56	49.24	5.92	33.48	35.20	Average	100	267 HORIZONTAL

**Vertical**

Freq	Level	Limit		Over Line	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		
1	4873.96	54.10	74.00	-19.90	49.90	5.92	33.48	35.20	Peak	100	287 VERTICAL
2	4873.99	49.73	54.00	-4.27	45.53	5.92	33.48	35.20	Average	100	287 VERTICAL



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11b CH 11 / Chain 1
Test Date	Oct. 26, 2013		

**Horizontal**

Freq	Level	Limit		Over Limit	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dB			dBuV	dB	dB/m			
MHz	dBuV/m	dBuV/m	dB	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4923.98	53.45	54.00	-0.55	49.10	5.97	33.58	35.20	Average	100	267 HORIZONTAL
2	4924.00	56.04	74.00	-17.96	51.69	5.97	33.58	35.20	Peak	100	267 HORIZONTAL

**Vertical**

Freq	Level	Limit		Over Limit	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dB			dBuV	dB	dB/m			
MHz	dBuV/m	dBuV/m	dB	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4923.93	52.86	74.00	-21.14	48.51	5.97	33.58	35.20	Peak	100	285 VERTICAL
2	4923.99	48.54	54.00	-5.46	44.19	5.97	33.58	35.20	Average	100	285 VERTICAL



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11g CH 1 / Chain 1
Test Date	Oct. 26, 2013		

**Horizontal**

Freq	Level	Limit		Over Line	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		dB	dBuV/m			dB	dBuV	dB			
1	4824.48	33.70	54.00	-20.30	29.64	5.87	33.39	35.20	Average	100	273 HORIZONTAL
2	4825.72	48.20	74.00	-25.80	44.14	5.87	33.39	35.20	Peak	100	273 HORIZONTAL

**Vertical**

Freq	Level	Limit		Over Line	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		dB	dBuV/m			dB	dBuV	dB			
1	4823.08	32.68	54.00	-21.32	28.62	5.87	33.39	35.20	Average	100	287 VERTICAL
2	4827.40	45.01	74.00	-28.99	40.95	5.87	33.39	35.20	Peak	100	287 VERTICAL



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11g CH 6 / Chain 1
Test Date	Oct. 26, 2013		

**Horizontal**

Freq	Level	Limit		Over Limit	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			Loss	Factor	Factor			
1	4873.34	55.42	74.00	-18.58	51.22	5.92	33.48	35.20	Peak	100	276 HORIZONTAL
2	4873.90	40.64	54.00	-13.36	36.44	5.92	33.48	35.20	Average	100	276 HORIZONTAL

**Vertical**

Freq	Level	Limit		Over Limit	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			Loss	Factor	Factor			
1	4869.88	52.21	74.00	-21.79	48.04	5.92	33.45	35.20	Peak	100	287 VERTICAL
2	4874.78	36.98	54.00	-17.02	32.78	5.92	33.48	35.20	Average	100	287 VERTICAL



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11g CH 11 / Chain 1
Test Date	Oct. 26, 2013		

**Horizontal**

Freq	Level	Limit		Over Limit	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			Loss	Factor	Factor			
1	4925.13	47.05	74.00	-26.95	42.70	5.97	33.58	35.20	Peak	100	274 HORIZONTAL
2	4926.16	33.45	54.00	-20.55	29.10	5.97	33.58	35.20	Average	100	274 HORIZONTAL

**Vertical**

Freq	Level	Limit		Over Limit	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			Loss	Factor	Factor			
1	4923.08	32.82	54.00	-21.18	28.47	5.97	33.58	35.20	Average	100	292 VERTICAL
2	4924.72	44.77	74.00	-29.23	40.42	5.97	33.58	35.20	Peak	100	292 VERTICAL



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11a CH 149 / Chain 1
Test Date	Oct. 19, 2013		

**Horizontal**

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
		Line	dBuV/m			dB	dBuV	dB	dB/m	dB	cm	
1	11486.44	51.28	54.00	-2.72	37.94	9.09	39.10	34.85	100	272	HORIZONTAL	Average
2	11486.44	58.18	74.00	-15.82	44.84	9.09	39.10	34.85	100	272	HORIZONTAL	Peak

**Vertical**

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
		Line	dBuV/m			dB	dBuV	dB	dB/m	dB	cm	
1	11490.36	64.68	74.00	-9.32	51.34	9.09	39.10	34.85	100	214	VERTICAL	Peak
2	11492.74	51.76	54.00	-2.24	38.42	9.09	39.10	34.85	100	214	VERTICAL	Average



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11a CH 157 / Chain 1
Test Date	Oct. 19, 2013		

**Horizontal**

Freq	Level	Limit		Over Line	Read Limit	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11569.88	47.38	54.00	-6.62	34.11	9.11	39.01	34.85	100	262	HORIZONTAL	Average
2	11569.88	53.93	74.00	-20.07	40.66	9.11	39.01	34.85	100	262	HORIZONTAL	Peak

**Vertical**

Freq	Level	Limit		Over Line	Read Limit	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11569.88	52.58	54.00	-1.42	39.31	9.11	39.01	34.85	100	280	VERTICAL	Average
2	11569.88	62.16	74.00	-11.84	48.89	9.11	39.01	34.85	100	280	VERTICAL	Peak



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11a CH 165 / Chain 1
Test Date	Oct. 26, 2013		

**Horizontal**

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
		Line	dBuV/m			dB	dBuV	dB	dB/m	dB	cm	
1	11649.58	48.16	54.00	-5.84	34.97	9.11	38.93	34.85	100	284	HORIZONTAL	Average
2	11653.44	57.60	74.00	-16.40	44.45	9.11	38.89	34.85	100	284	HORIZONTAL	Peak

**Vertical**

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
		Line	dBuV/m			dB	dBuV	dB	dB/m	dB	cm	
1	11645.94	62.71	74.00	-11.29	49.52	9.11	38.93	34.85	100	253	VERTICAL	Peak
2	11646.20	50.49	54.00	-3.51	37.30	9.11	38.93	34.85	100	253	VERTICAL	Average

**Note:**

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

## 4.6. Emissions Measurement

### 4.6.1. Limit

30dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

### 4.6.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1 MHz / 10Hz for Average
RBW / VBW (Emission in non-restricted band)	100 kHz / 300 kHz for Peak

### 4.6.3. Test Procedures

#### For Radiated band edges Measurement:

1. The test procedure is the same as section 4.5.3, only the frequency range investigated is limited to 100MHz around band edges.

#### For Radiated Out of Band Emission Measurement:

1. Test was performed in accordance with KDB 558074 D01 v03r01 for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 10.1 Unwanted Emissions into Non-Restricted Frequency Bands Measurement Procedure
2. The radiated emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.  
Only worst data of each operating mode is presented.

#### 4.6.4. Test Setup Layout

For Radiated band edges Measurement:

This test setup layout is the same as that shown in section 4.5.4.

For Radiated Out of Band Emission Measurement:

This test setup layout is the same as that shown in section 4.5.4.

#### 4.6.5. Test Deviation

There is no deviation with the original standard.

#### 4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.6.7. Test Result of Band Edge and Fundamental Emissions

<b>Temperature</b>	25°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 20MHz CH 1, 6, 11 / Chain 1 + Chain 2 + Chain 3
<b>Test date</b>	Oct. 26, 2013		

##### Channel 1

Freq	Level	Limit		Over Limit	Read Level	CableAntenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dB			dBuV	dB	dB/m			
		MHz	dBuV/m	dBuV/m	dB				cm	deg	
1	2388.60	69.83	74.00	-4.17	37.69	4.09	28.05	0.00 Peak	136	92	HORIZONTAL
2	2389.20	53.77	54.00	-0.23	21.63	4.09	28.05	0.00 Average	136	92	HORIZONTAL
3	2409.00	111.95			79.75	4.11	28.09	0.00 Peak	136	92	HORIZONTAL
4	2413.60	101.03			68.83	4.11	28.09	0.00 Average	136	92	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2412 MHz.

##### Channel 6

Freq	Level	Limit		Over Limit	Read Level	CableAntenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dB			dBuV	dB	dB/m			
		MHz	dBuV/m	dBuV/m	dB				cm	deg	
1	2388.80	52.90	54.00	-1.10	20.76	4.09	28.05	0.00 Average	112	93	HORIZONTAL
2	2390.00	65.90	74.00	-8.10	33.76	4.09	28.05	0.00 Peak	112	93	HORIZONTAL
3	2429.00	109.78			77.53	4.12	28.13	0.00 Average	112	93	HORIZONTAL
4	2433.80	120.96			88.71	4.12	28.13	0.00 Peak	112	93	HORIZONTAL
5	2483.50	51.45	54.00	-2.55	19.03	4.16	28.26	0.00 Average	112	93	HORIZONTAL
6	2483.50	65.14	74.00	-8.86	32.72	4.16	28.26	0.00 Peak	112	93	HORIZONTAL

Item 1, 2 are the fundamental frequency at 2437 MHz.

##### Channel 11

Freq	Level	Limit		Over Limit	Read Level	CableAntenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dB			dBuV	dB	dB/m			
		MHz	dBuV/m	dBuV/m	dB				cm	deg	
1	2458.20	111.82			79.46	4.14	28.22	0.00 Peak	110	94	HORIZONTAL
2	2458.60	101.63			69.27	4.14	28.22	0.00 Average	110	94	HORIZONTAL
3	2483.50	53.94	54.00	-0.06	21.52	4.16	28.26	0.00 Average	110	94	HORIZONTAL
4	2483.50	65.39	74.00	-8.61	32.97	4.16	28.26	0.00 Peak	110	94	HORIZONTAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

<b>Temperature</b>	25°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 40MHz CH 3, 6, 9 / Chain 1 + Chain 2 + Chain 3
<b>Test date</b>	Oct. 26, 2013		

**Channel 3**

Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor				
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2388.00	68.03	74.00	-5.97	35.89	4.09	28.05	0.00 Peak	100	134	VERTICAL
2	2388.40	53.79	54.00	-0.21	21.65	4.09	28.05	0.00 Average	100	134	VERTICAL
3	2418.40	96.03			63.79	4.11	28.13	0.00 Average	100	134	VERTICAL
4	2418.40	106.69			74.45	4.11	28.13	0.00 Peak	100	134	VERTICAL

Item 3, 4 are the fundamental frequency at 2422 MHz.

**Channel 6**

Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor				
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2390.00	53.78	54.00	-0.22	21.64	4.09	28.05	0.00 Average	128	84	HORIZONTAL
2	2390.00	66.11	74.00	-7.89	33.97	4.09	28.05	0.00 Peak	128	84	HORIZONTAL
3	2424.60	111.01			78.76	4.12	28.13	0.00 Peak	128	84	HORIZONTAL
4	2438.60	99.28			66.97	4.13	28.18	0.00 Average	128	84	HORIZONTAL
5	2483.50	51.05	54.00	-2.95	18.63	4.16	28.26	0.00 Average	128	84	HORIZONTAL
6	2483.50	61.01	74.00	-12.99	28.59	4.16	28.26	0.00 Peak	128	84	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2437 MHz.

**Channel 9**

Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor				
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2451.20	98.16			65.81	4.13	28.22	0.00 Average	125	295	VERTICAL
2	2451.20	108.29			75.94	4.13	28.22	0.00 Peak	125	295	VERTICAL
3	2486.30	53.86	54.00	-0.14	21.40	4.16	28.30	0.00 Average	125	295	VERTICAL
4	2486.70	69.71	74.00	-4.29	37.25	4.16	28.30	0.00 Peak	125	295	VERTICAL

Item 1, 2 are the fundamental frequency at 2452 MHz.

**Note:**

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.



Temperature	25°C	Humidity	62%
Test Engineer	Magic Lai	Configurations	IEEE 802.11b CH 1, 6, 11 / Chain 1
Test Date	Oct. 26, 2013		

### Channel 1

Freq	Level	Limit		Over Limit	Read Level	Cable			Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			dBuV	dB	dB/m						
1	2390.00	53.49	54.00	-0.51	21.35	4.09	28.05	0.00	Average	138	312	VERTICAL		
2	2390.00	63.05	74.00	-10.95	30.91	4.09	28.05	0.00	Peak	138	312	VERTICAL		
3	2411.20	111.71			79.51	4.11	28.09	0.00	Average	138	312	VERTICAL		
4	2413.00	115.64			83.44	4.11	28.09	0.00	Peak	138	312	VERTICAL		

Item 3, 4 are the fundamental frequency at 2412 MHz.

### Channel 6

Freq	Level	Limit		Over Limit	Read Level	Cable			Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			dBuV	dB	dB/m						
1	2386.40	61.59	74.00	-12.41	29.45	4.09	28.05	0.00	Peak	124	312	VERTICAL		
2	2387.60	48.66	54.00	-5.34	16.52	4.09	28.05	0.00	Average	124	312	VERTICAL		
3	2436.20	111.33			79.03	4.12	28.18	0.00	Average	124	312	VERTICAL		
4	2436.20	115.28			82.98	4.12	28.18	0.00	Peak	124	312	VERTICAL		
5	2500.00	49.39	54.00	-4.61	16.92	4.17	28.30	0.00	Average	124	312	VERTICAL		
6	2500.00	59.63	74.00	-14.37	27.16	4.17	28.30	0.00	Peak	124	312	VERTICAL		

Item 3, 4 are the fundamental frequency at 2437 MHz.

### Channel 11

Freq	Level	Limit		Over Limit	Read Level	Cable			Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			dBuV	dB	dB/m						
1	2462.80	112.14			79.78	4.14	28.22	0.00	Average	133	310	VERTICAL		
2	2463.00	116.30			83.94	4.14	28.22	0.00	Peak	133	310	VERTICAL		
3	2483.50	53.85	54.00	-0.15	21.43	4.16	28.26	0.00	Average	133	310	VERTICAL		
4	2483.50	63.81	74.00	-10.19	31.39	4.16	28.26	0.00	Peak	133	310	VERTICAL		

Item 1, 2 are the fundamental frequency at 2462 MHz.

<b>Temperature</b>	25°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11g CH 1, 6, 11 / Chain 1
<b>Test Date</b>	Oct. 26, 2013		

### Channel 1

Freq	Level	Limit		Over Limit	Read Level	Cable Loss Factor			Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			dB	dBuV	dB	dB/m	dB				
1	2390.00	53.51	54.00	-0.49	21.37	4.09	28.05	0.00	Average	139	314	VERTICAL		
2	2390.00	67.25	74.00	-6.75	35.11	4.09	28.05	0.00	Peak	139	314	VERTICAL		
3	2415.40	99.85			67.65	4.11	28.09	0.00	Average	139	314	VERTICAL		
4	2417.80	110.54			78.30	4.11	28.13	0.00	Peak	139	314	VERTICAL		

Item 3, 4 are the fundamental frequency at 2412 MHz.

### Channel 6

Freq	Level	Limit		Over Limit	Read Level	Cable Loss Factor			Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			dBuV	dB	dB/m	dB					
1	2389.20	51.24	54.00	-2.76	19.10	4.09	28.05	0.00	Average	123	311	VERTICAL		
2	2390.00	64.35	74.00	-9.65	32.21	4.09	28.05	0.00	Peak	123	311	VERTICAL		
3	2433.40	106.93			74.68	4.12	28.13	0.00	Average	123	311	VERTICAL		
4	2435.00	118.19			85.89	4.12	28.18	0.00	Peak	123	311	VERTICAL		
5	2483.50	51.99	54.00	-2.01	19.57	4.16	28.26	0.00	Average	123	311	VERTICAL		
6	2484.70	69.38	74.00	-4.62	36.96	4.16	28.26	0.00	Peak	123	311	VERTICAL		

Item 3, 4 are the fundamental frequency at 2437 MHz.

### Channel 11

Freq	Level	Limit		Over Limit	Read Level	Cable Loss Factor			Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			dBuV	dB	dB/m	dB					
1	2466.60	100.80			68.44	4.14	28.22	0.00	Average	134	313	VERTICAL		
2	2467.60	111.01			78.65	4.14	28.22	0.00	Peak	134	313	VERTICAL		
3	2483.50	53.86	54.00	-0.14	21.44	4.16	28.26	0.00	Average	134	313	VERTICAL		
4	2484.30	67.35	74.00	-6.65	34.93	4.16	28.26	0.00	Peak	134	313	VERTICAL		

Item 1, 2 are the fundamental frequency at 2462 MHz.

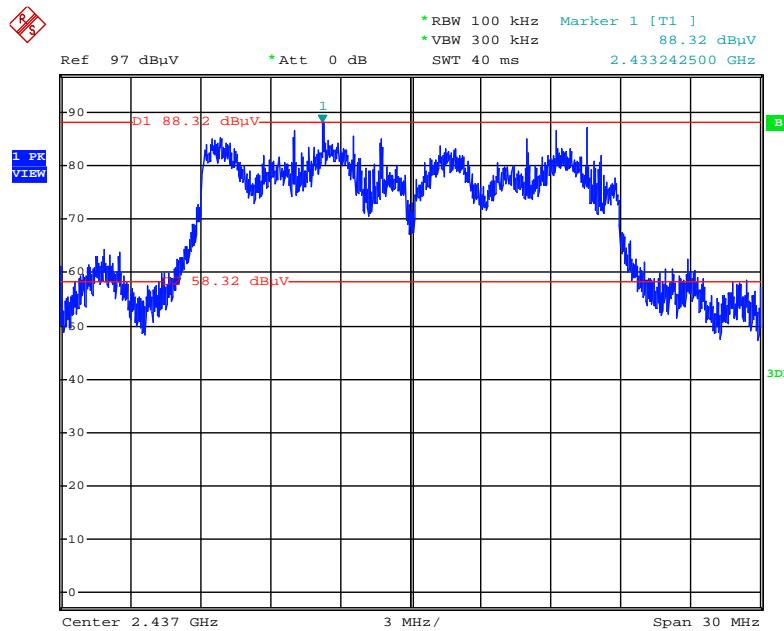
### Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

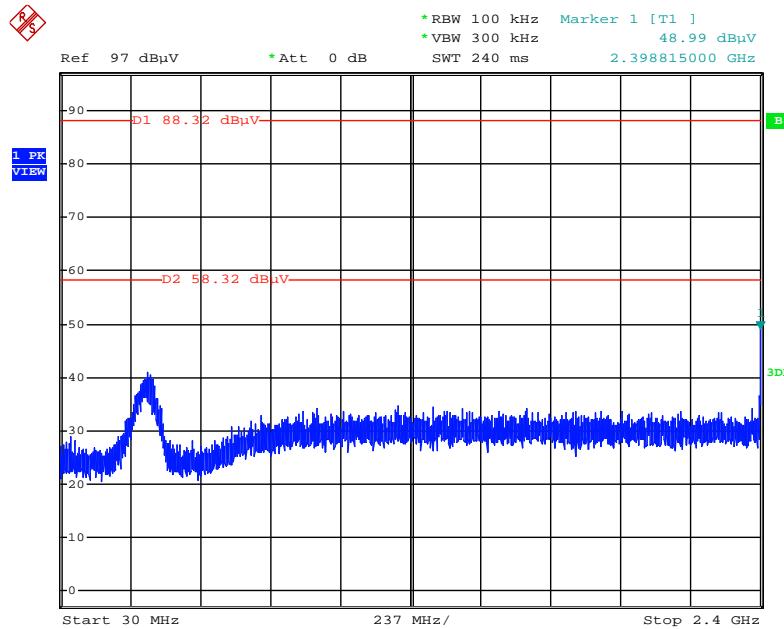
**For Emission not in Restricted Band**

**Plot on Configuration IEEE 802.11n MCS0 20MHz / Reference Level**



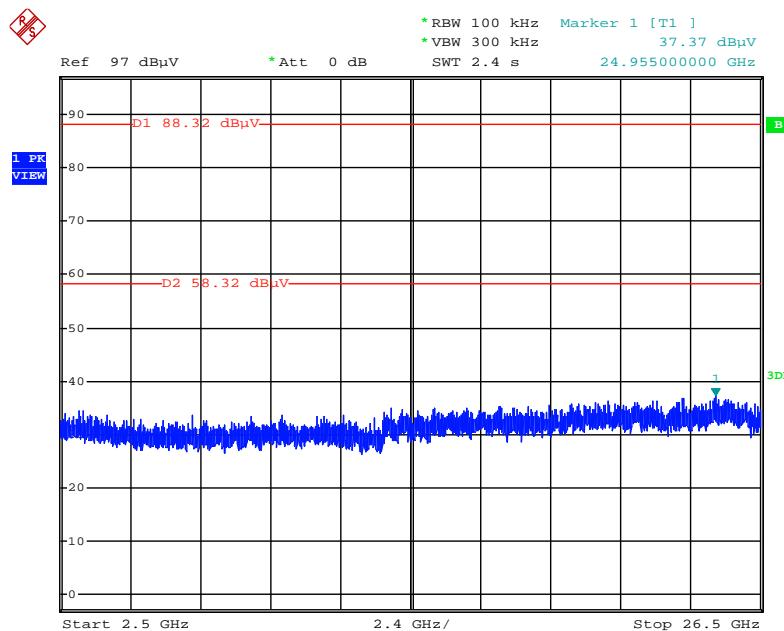
Date: 26.OCT.2013 16:27:04

**Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 1 / 30MHz~2400MHz (down 30dBc)**



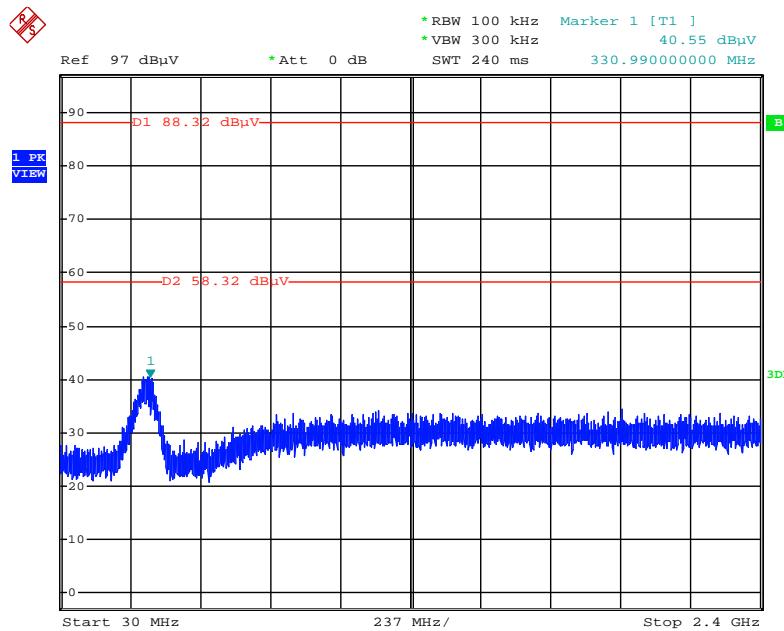
Date: 26.OCT.2013 16:28:07

### Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 1 / 2500MHz~26500MHz (down 30dBc)



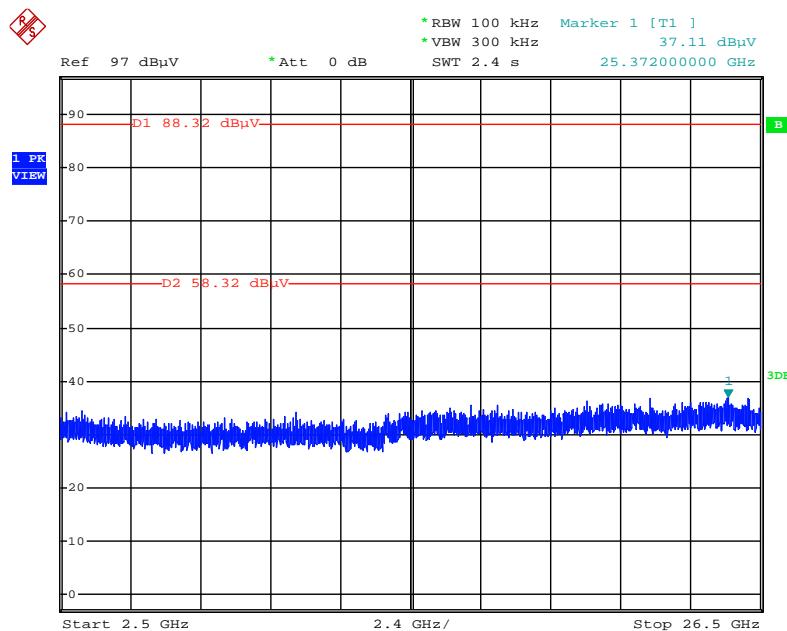
Date: 26.OCT.2013 16:28:27

### Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 11 / 30MHz~2400MHz (down 30dBc)



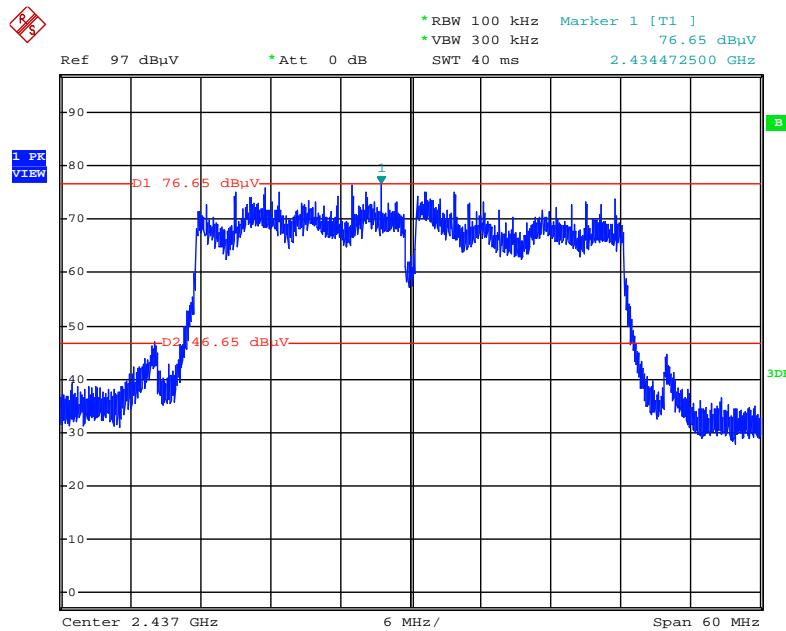
Date: 26.OCT.2013 16:29:47

## Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 11 / 2500MHz~26500MHz (down 30dBc)



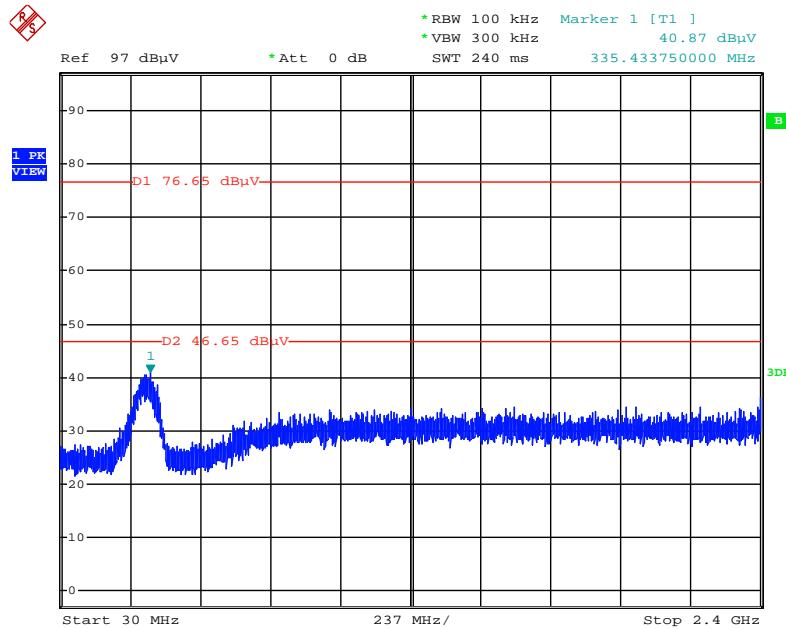
Date: 26.OCT.2013 16:29:34

### Plot on Configuration IEEE 802.11n MCS0 40MHz / Reference Level



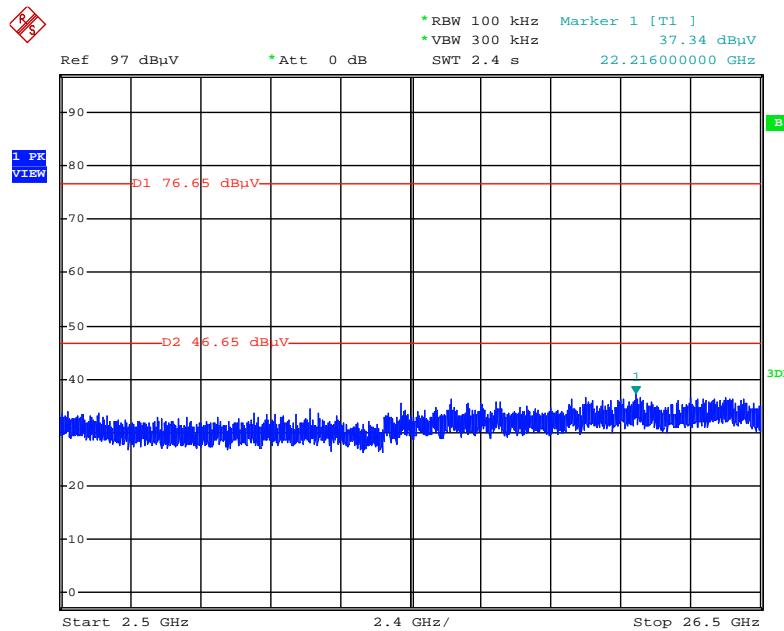
Date: 26.OCT.2013 16:31:29

### Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 3 / 30MHz~2400MHz (down 30dBc)



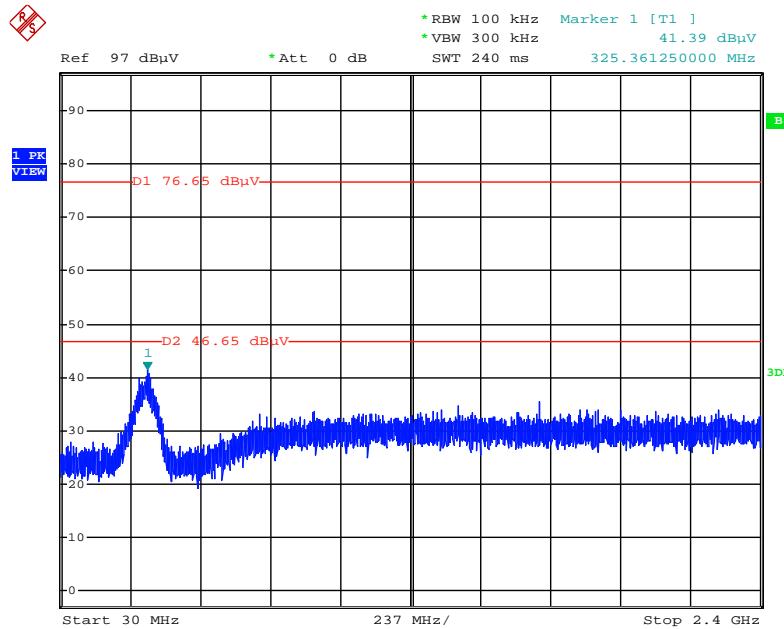
Date: 26.OCT.2013 16:32:41

### Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 3 / 2500MHz~26500MHz (down 30dBc)



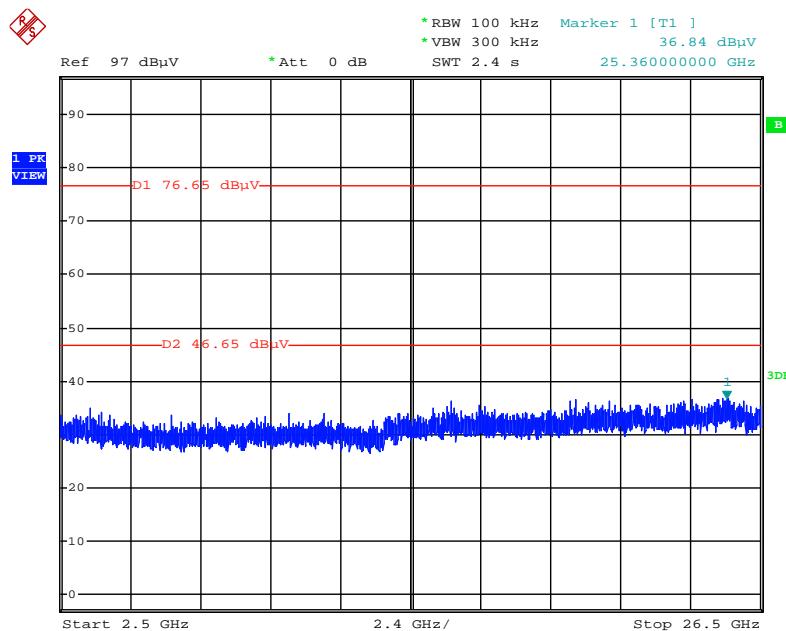
Date: 26.OCT.2013 16:34:38

### Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 9 / 30MHz~2400MHz (down 30dBc)



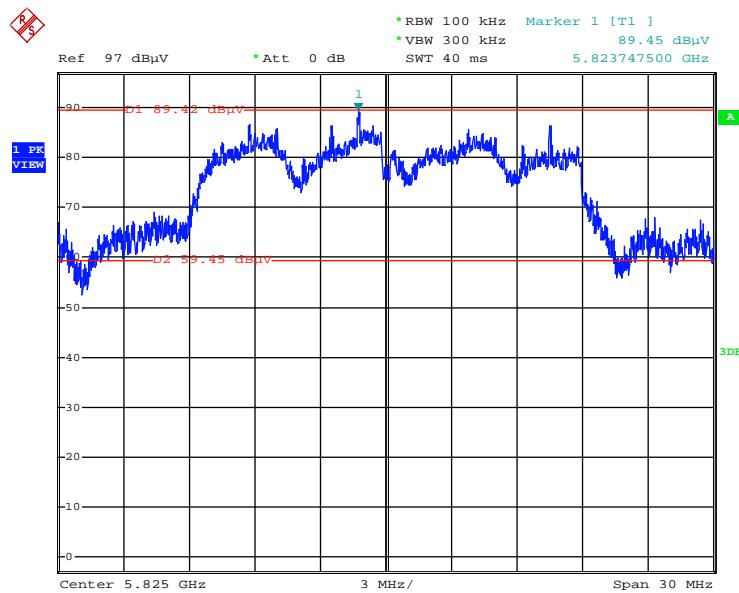
Date: 26.OCT.2013 16:35:30

## Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 9 / 2500MHz~26500MHz (down 30dBc)



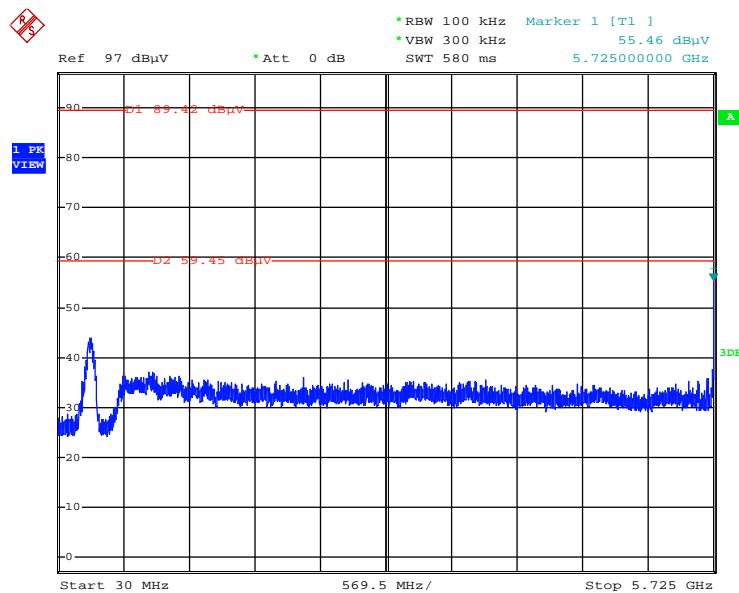
Date: 26.OCT.2013 16:35:19

### Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / Reference Level



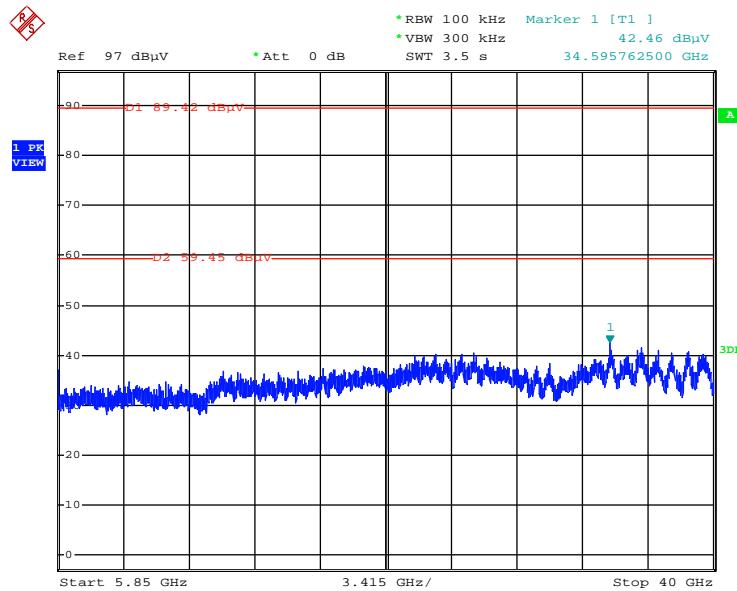
Date: 11.DEC.2013 19:51:11

### Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / CH 149 / 30MHz~5725MHz (down 30dBc)



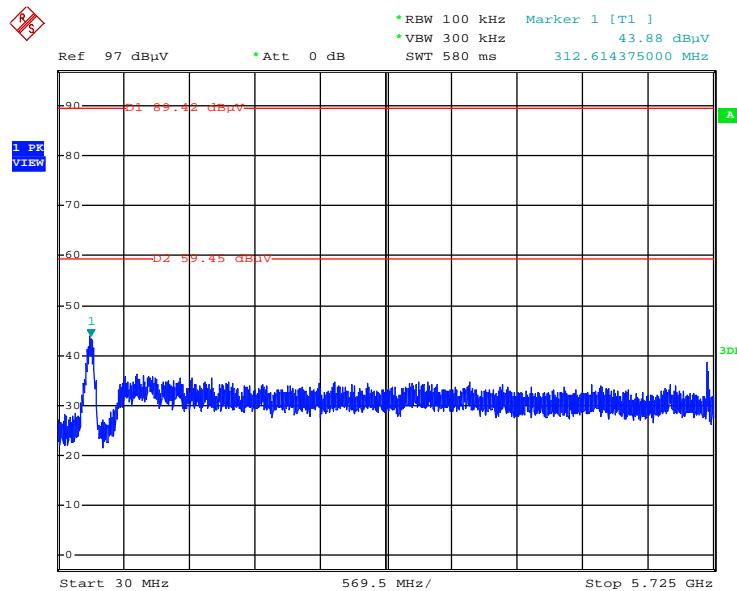
Date: 11.DEC.2013 19:54:42

### Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / CH 149 / 5850MHz~40000MHz (down 30dBc)



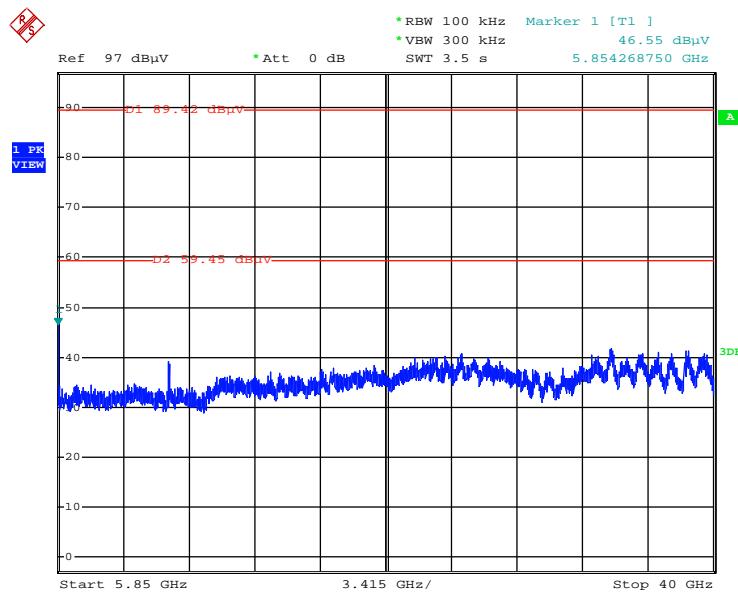
Date: 11.DEC.2013 19:55:17

### Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / CH 165 / 30MHz~5725MHz (down 30dBc)



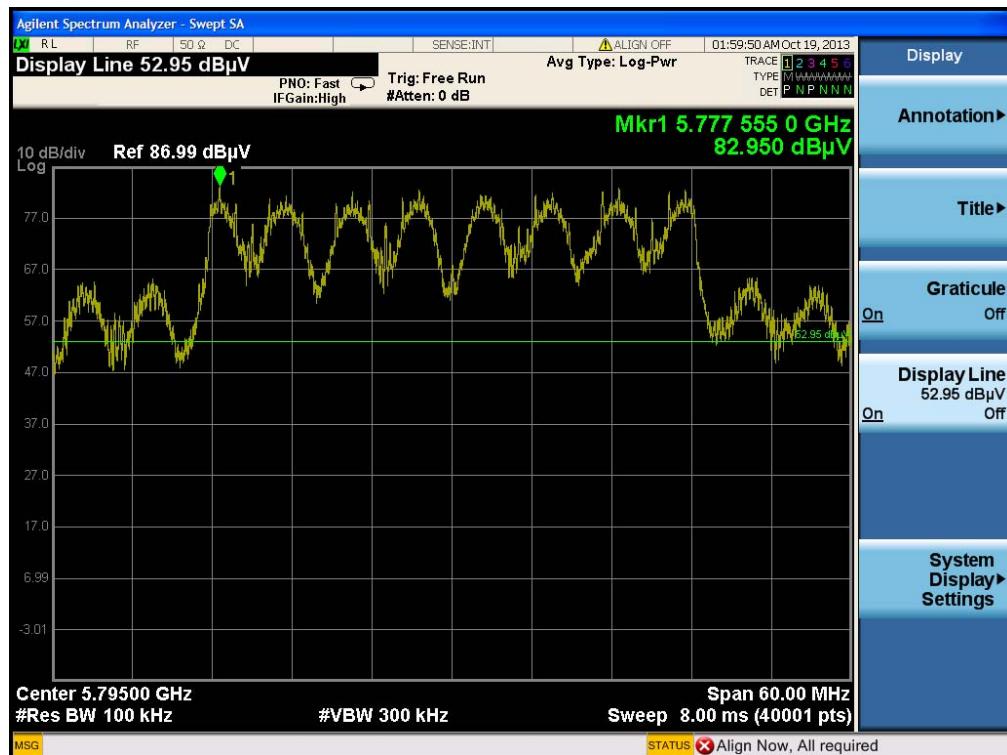
Date: 11.DEC.2013 19:51:53

## Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / CH 165 / 5850MHz~40000MHz (down 30dBc)

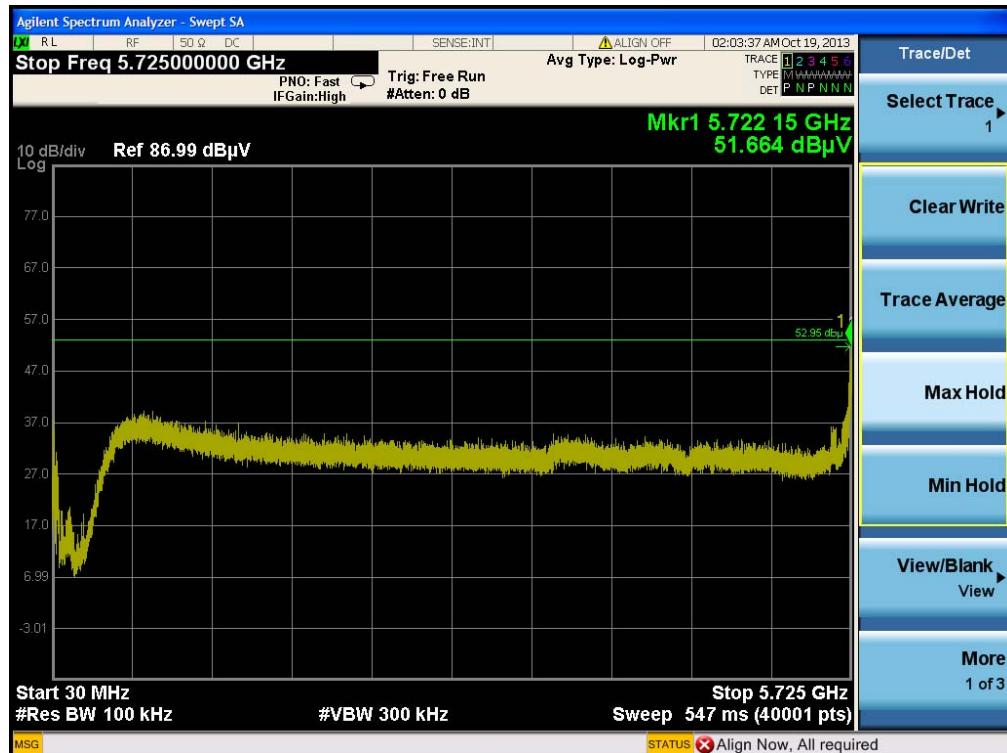


Date: 11.DEC.2013 19:52:59

## Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / Reference Level



## Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / CH 151 / 30MHz~5725MHz (down 30dBc)



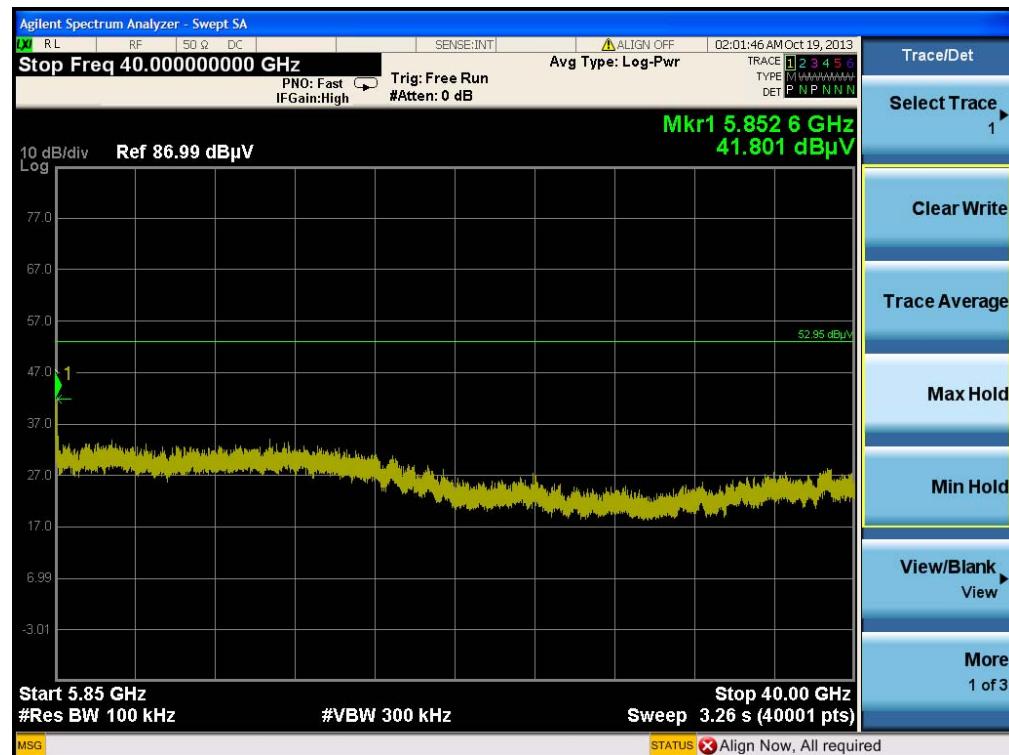
### Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / CH 151 / 5850MHz~40000MHz (down 30dBc)



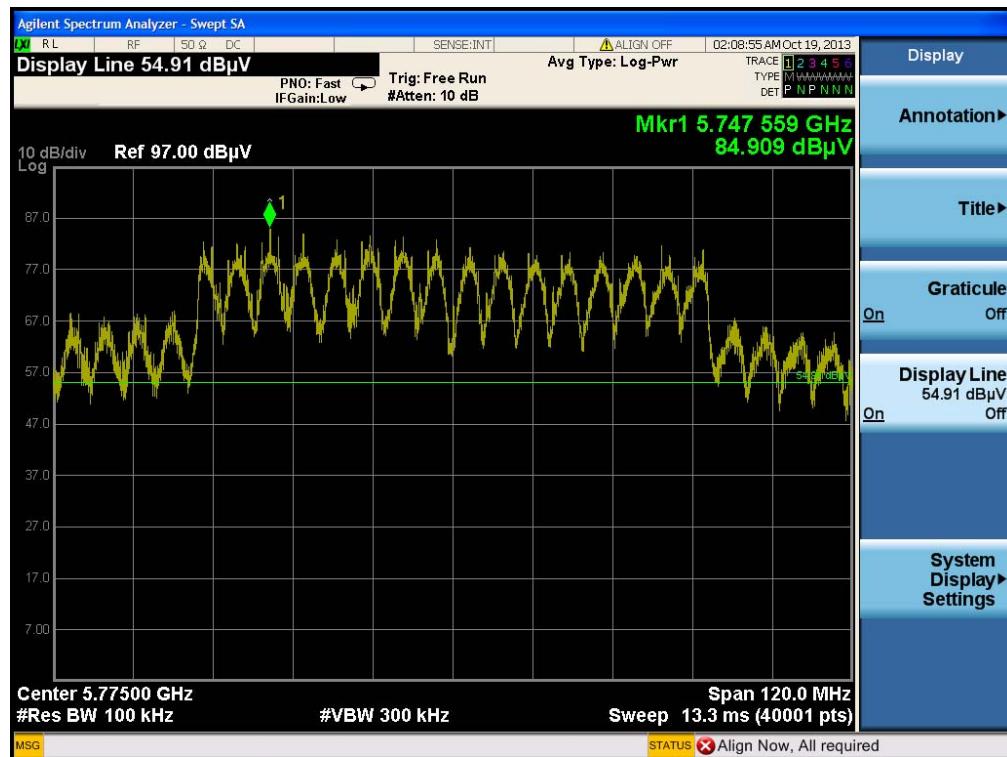
### Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / CH 159 / 30MHz~5725MHz (down 30dBc)



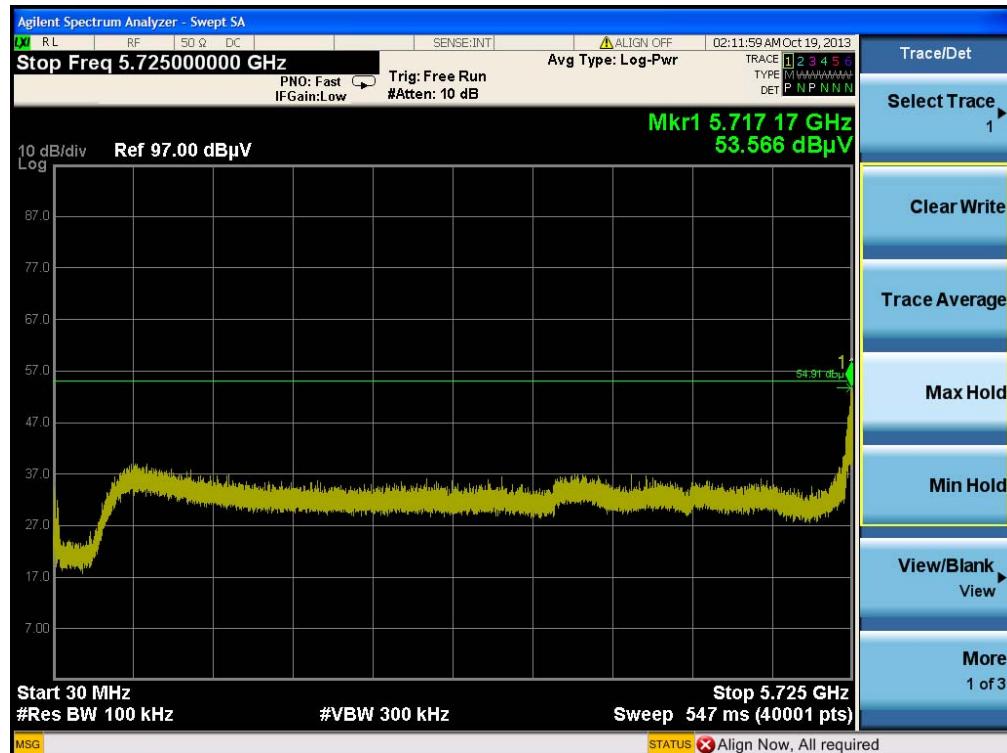
### Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / CH 159 / 5850MHz~40000MHz (down 30dBc)



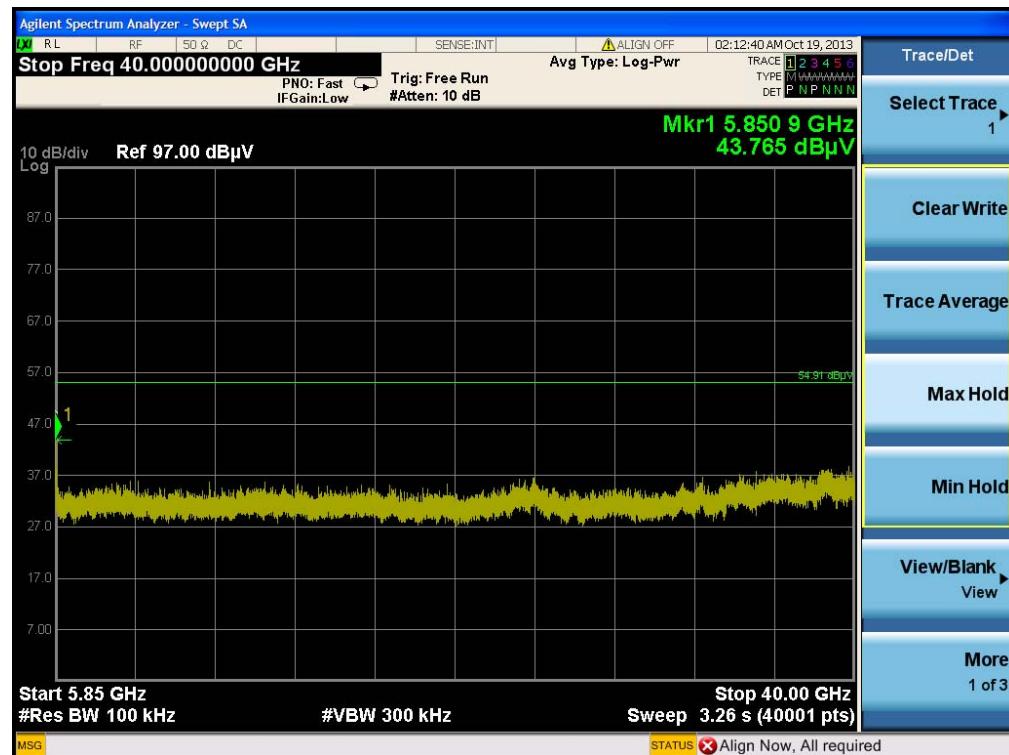
## Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / Reference Level



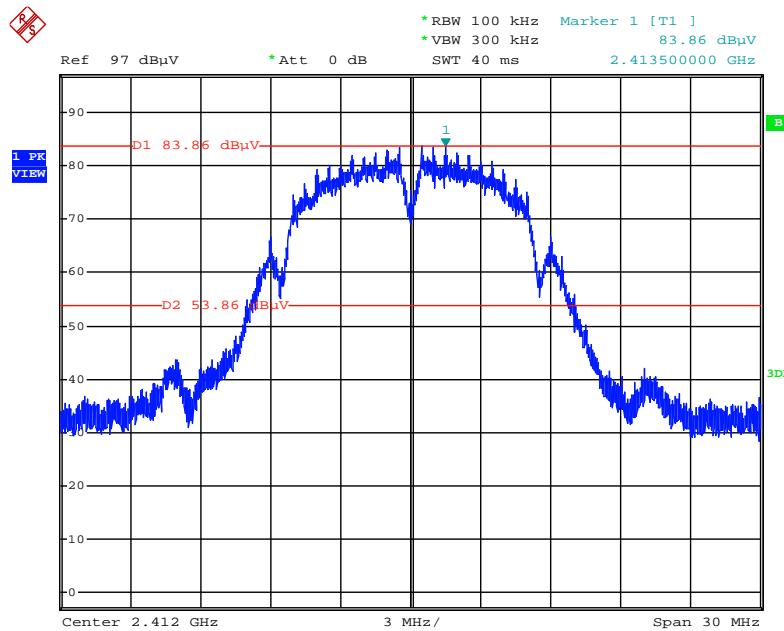
## Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / CH 155 / 30MHz~5725MHz (down 30dBc)



### Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / CH 155 / 5850MHz~40000MHz (down 30dBc)

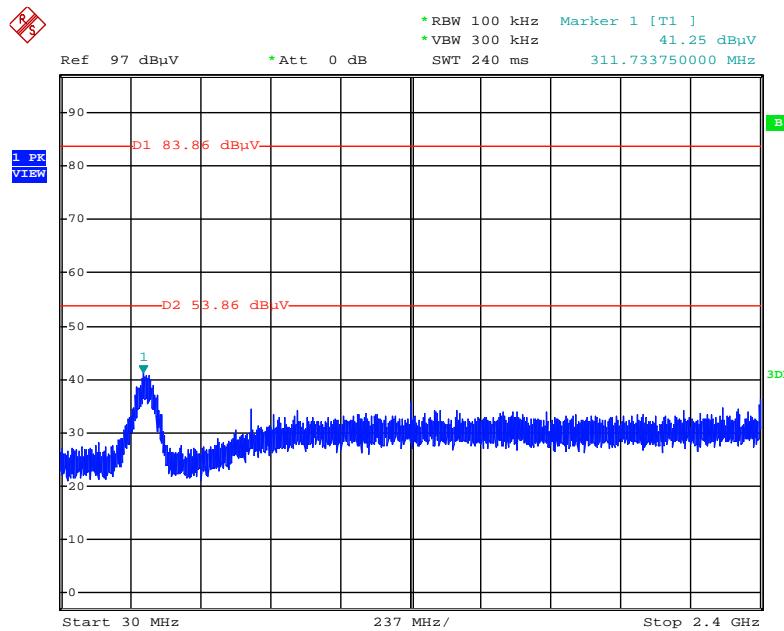


### Plot on Configuration IEEE 802.11b / Reference Level



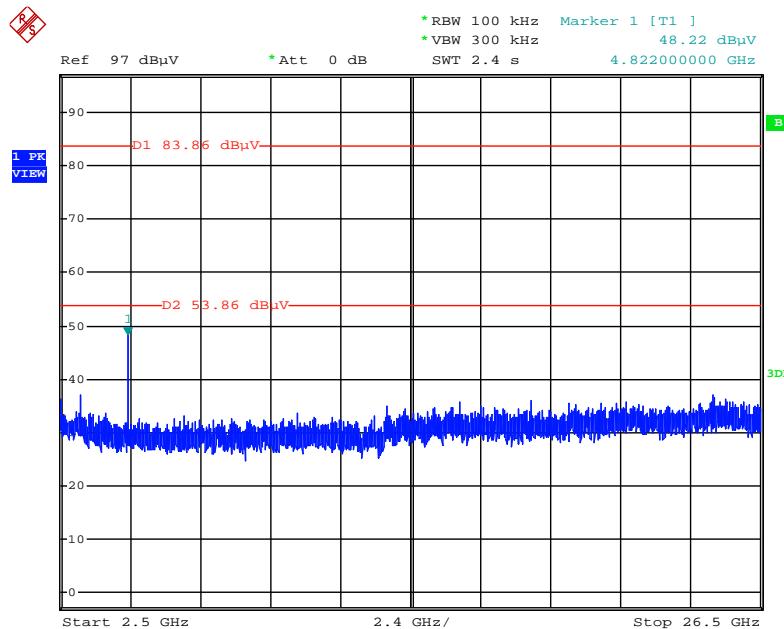
Date: 26.OCT.2013 17:20:05

### Plot on Configuration IEEE 802.11b / CH 1 / 30MHz~2400MHz (down 30dBc)



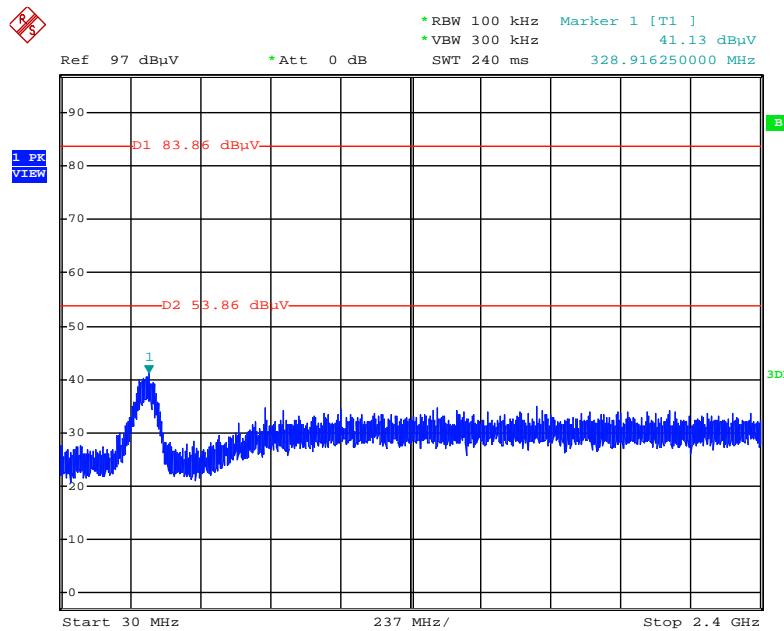
Date: 26.OCT.2013 17:20:30

### Plot on Configuration IEEE 802.11b / CH 1 / 2500MHz~26500MHz (down 30dBc)



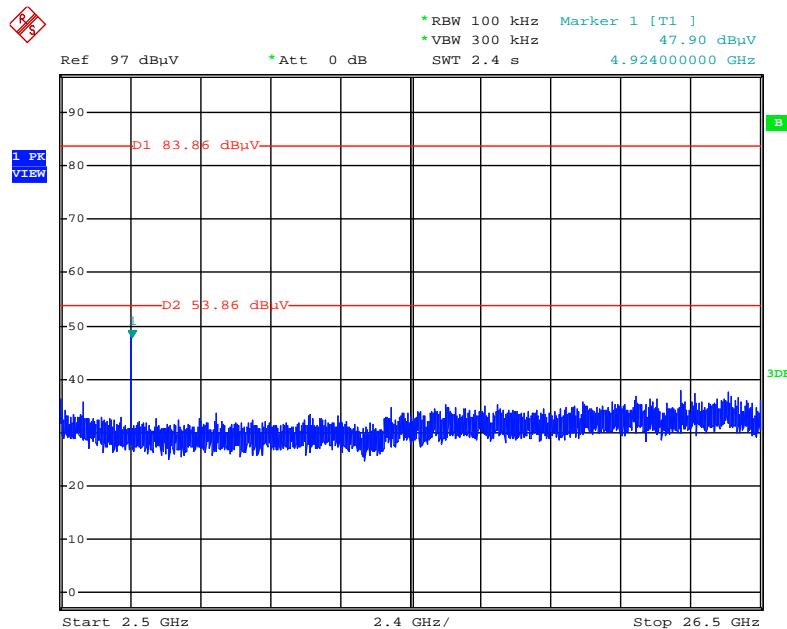
Date: 26.OCT.2013 17:24:12

### Plot on Configuration IEEE 802.11b / CH 11 / 30MHz~2400MHz (down 30dBc)



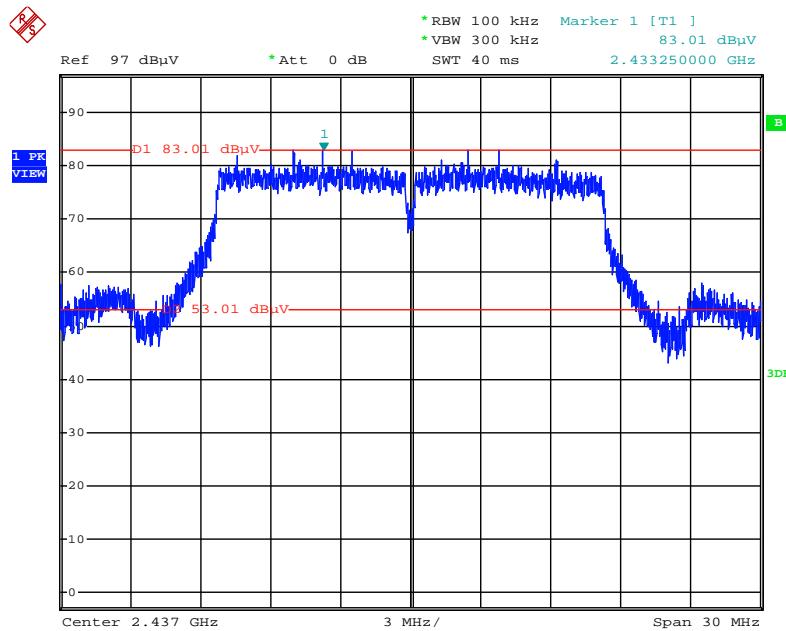
Date: 26.OCT.2013 17:22:12

## Plot on Configuration IEEE 802.11b / CH 11 / 2500MHz~26500MHz (down 30dBc)



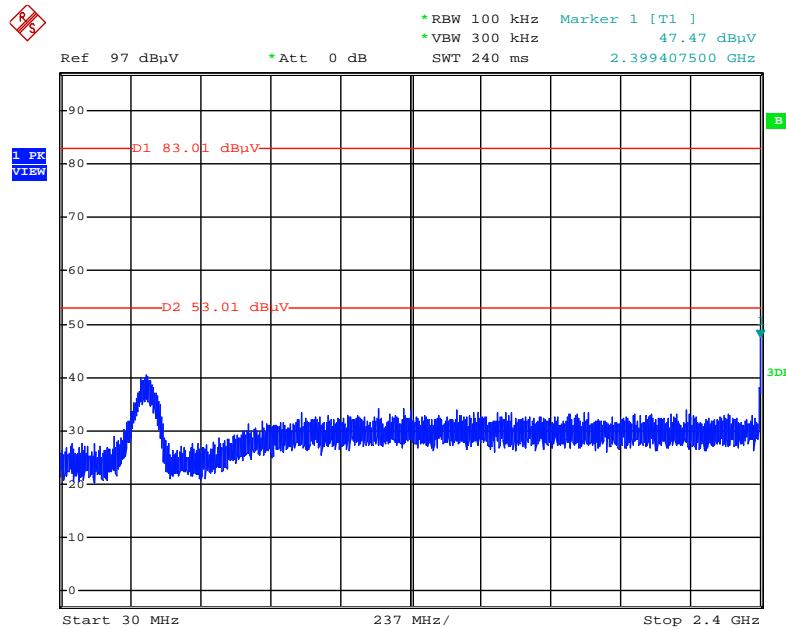
Date: 26.OCT.2013 17:23:09

### Plot on Configuration IEEE 802.11g / Reference Level

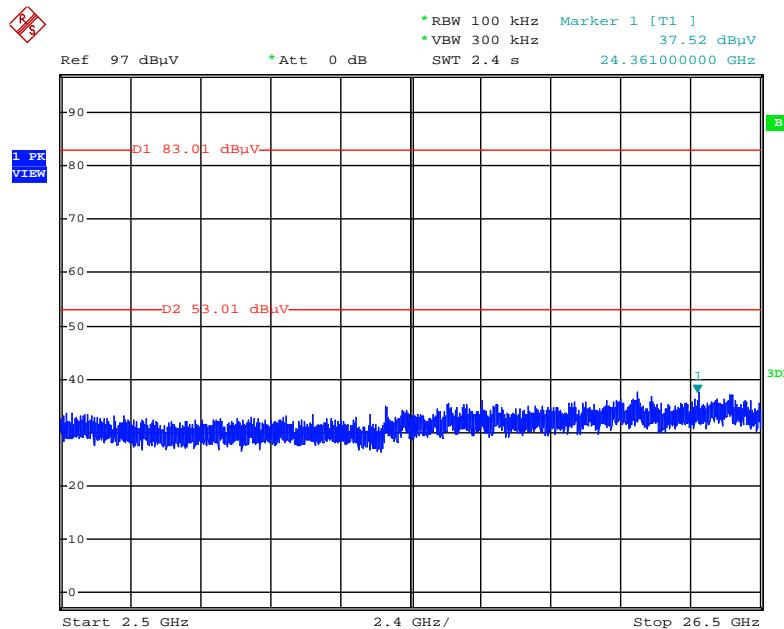


Date: 26.OCT.2013 16:21:55

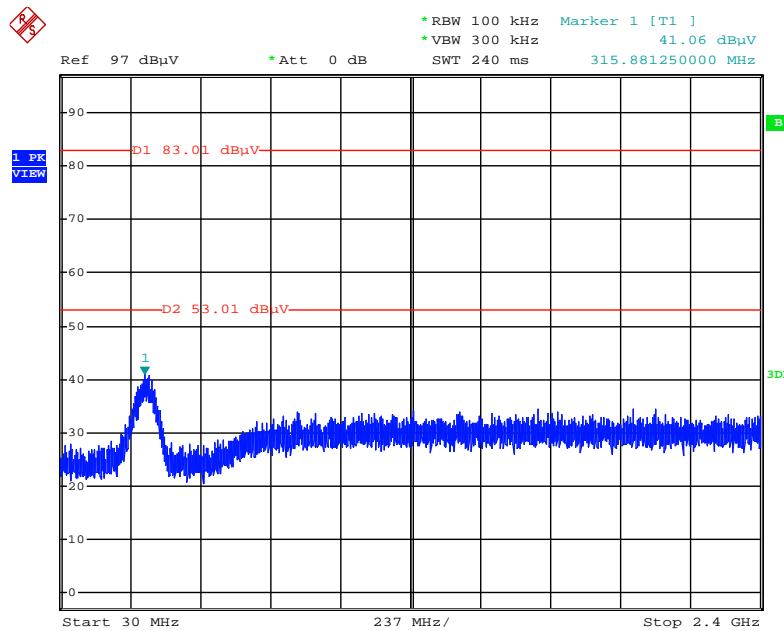
### Plot on Configuration IEEE 802.11g / CH 1 / 30MHz~2400MHz (down 30dBc)



Date: 26.OCT.2013 16:22:40

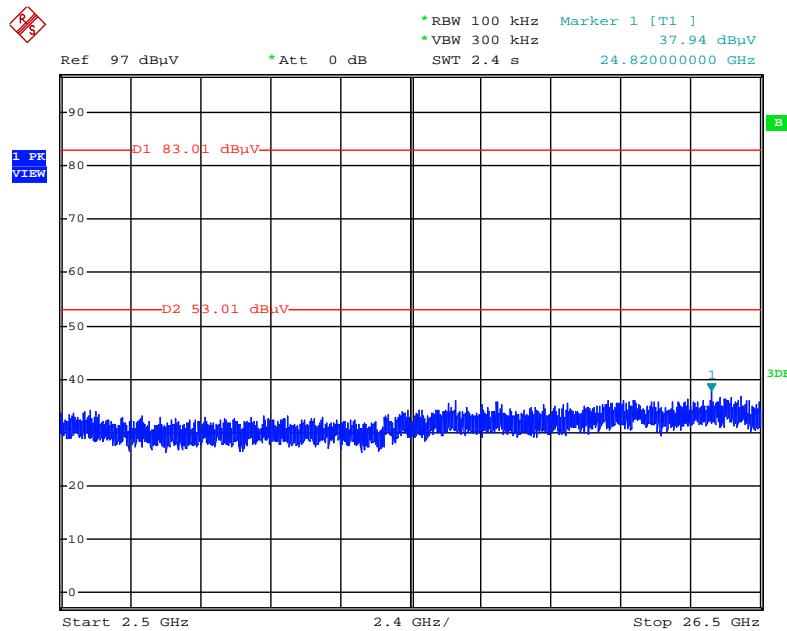
**Plot on Configuration IEEE 802.11g / CH 1 / 2500MHz~26500MHz (down 30dBc)**


Date: 26.OCT.2013 16:23:11

**Plot on Configuration IEEE 802.11g / CH 11 / 30MHz~2400MHz (down 30dBc)**


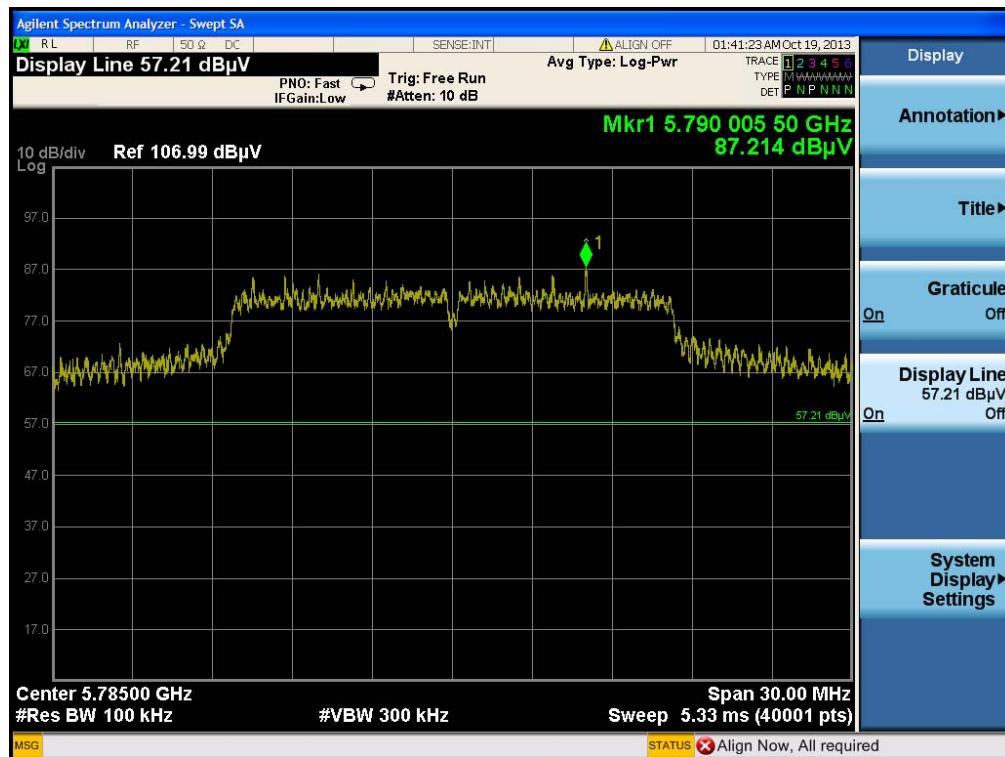
Date: 26.OCT.2013 16:24:41

## Plot on Configuration IEEE 802.11g / CH 11 / 2500MHz~26500MHz (down 30dBc)

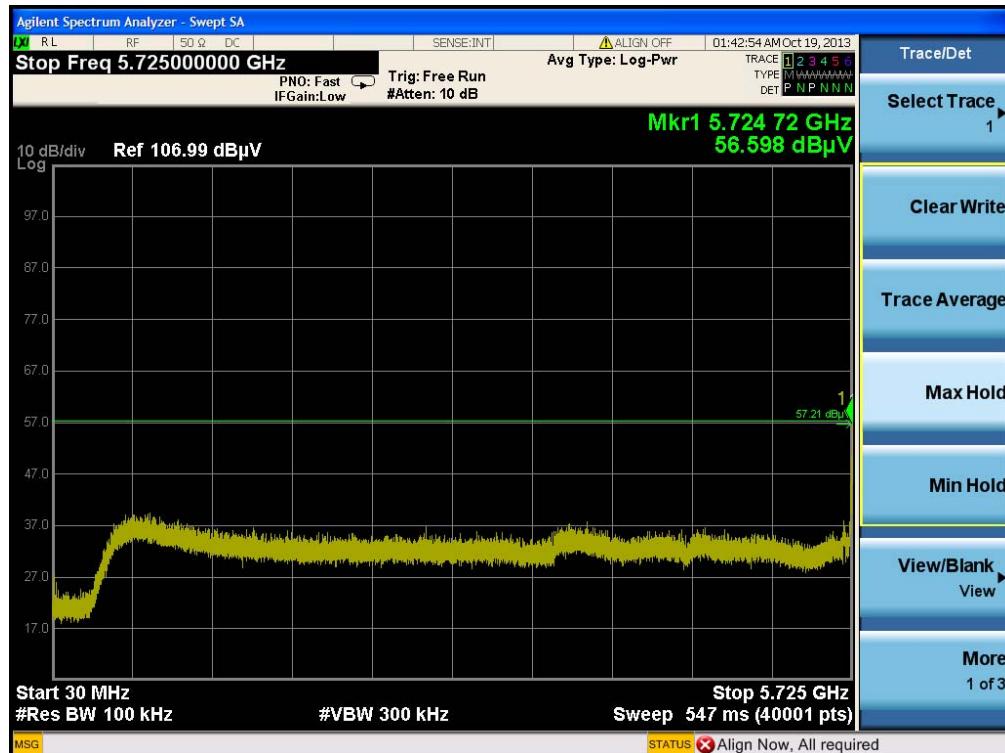


Date: 26.OCT.2013 16:24:27

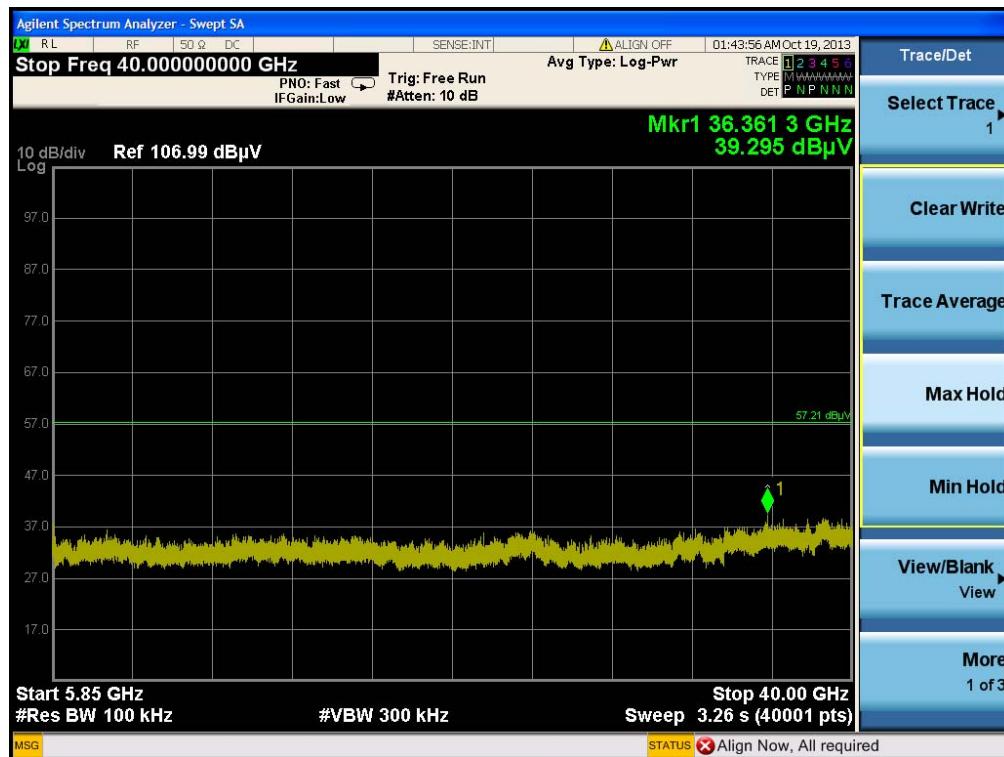
### Plot on Configuration IEEE 802.11a / Reference Level



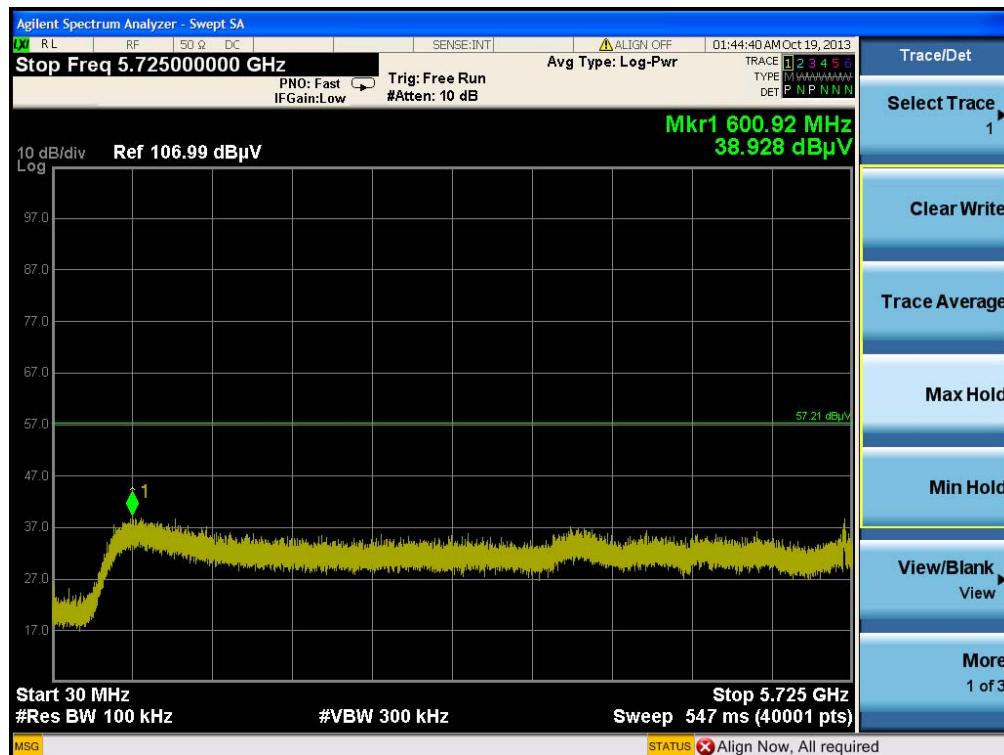
### Plot on Configuration IEEE 802.11a / CH 149 / 30MHz~5725MHz (down 30dBc)



### Plot on Configuration IEEE 802.11a / CH 149 / 5850MHz~40000MHz (down 30dBc)



### Plot on Configuration IEEE 802.11a / CH 165 / 30MHz~5725MHz (down 30dBc)



### Plot on Configuration IEEE 802.11a / CH 165 / 5850MHz~40000MHz (down 30dBc)



## 4.7. Antenna Requirements

### 4.7.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

### 4.7.2. Antenna Connector Construction

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

## 5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Apr. 12, 2013	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Nov. 26, 2012	Conduction (CO01-CB)
V- LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Jul. 17, 2013	Conduction (CO01-CB)
Impulsbegrenzer Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz~30MHz	Feb. 21, 2013	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	0.15MHz~30MHz	Dec. 04, 2012	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	-	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Apr. 16, 2013	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Nov. 05, 2012*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 27, 2012	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 01, 2013	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Nov. 23, 2012	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBECK	BBHA 9170	9170-507	15MHz ~ 40GHz	Jan. 14, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 27, 2012	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 12, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02660	1GHz ~ 26.5GHz	May 17, 2013	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26.5GHz ~ 40GHz	Oct. 24, 2012	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26.5GHz ~ 40GHz	Oct. 23, 2013	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Nov. 27, 2012	Radiation (03CH01-CB)
Spectrum Analyzer	Rohde&Schwarz	FSV30	101026	9kHz ~ 30GHz	Nov. 15, 2013	Radiation (03CH01-CB)
Spectrum Analyzer	Agilent	N9038A	MY52260140	9kHz ~ 8 GHz	Dec. 25, 2012	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Nov. 26, 2012	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9 kHz ~ 2.75 GHz	Apr. 12, 2013	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N.C.R	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz – 26.5 GHz	Nov. 18, 2012	Radiation (03CH01-CB)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	High Cable-1	N/A	1 GHz – 26.5 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz – 26.5 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
Signal analyzer	R&S	FSV40	100979	9kHz~40GHz	Nov. 29, 2013	Conducted (TH01-CB)
RF Power Divider	Woken	2 Way	0120A02056002D	2GHz ~ 18GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Power Divider	Woken	3 Way	MDC2366	2GHz ~ 18GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Power Divider	Woken	4 Way	0120A04056002D	2GHz ~ 18GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.

\*\* Calibration Interval of instruments listed above is two years.

NCR means Non-Calibration required.

## 6. MEASUREMENT UNCERTAINTY

### Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	0.026	dB	normal(k=2)	0.013
Cable loss	0.002	dB	normal(k=2)	0.001
AMN/LISN specification	1.200	dB	normal(k=2)	0.600
Mismatch				
Receiver VSWR 1=	-0.080	dB	U-shaped	0.060
AMN/LISN VSWR 2=				
Combined standard uncertainty $U_c(y)$				1.2
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$				2.4

### Uncertainty of Radiated Emission Measurement (30MHz ~ 1,000MHz)

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	$\pm 0.173$	dB	K=1	0.086
Cable loss	$\pm 0.174$	dB	K=2	0.087
Antenna gain	$\pm 0.169$	dB	K=2	0.084
Site imperfection	$\pm 0.433$	dB	Triangular	0.214
Pre-amplifier gain	$\pm 0.366$	dB	K=2	0.183
Transmitter antenna	$\pm 1.200$	dB	Rectangular	0.600
Signal generator	$\pm 0.461$	dB	Rectangular	0.231
Mismatch	$\pm 0.080$	dB	U-shape	0.040
Spectrum analyzer	$\pm 0.500$	dB	Rectangular	0.250
Combined standard uncertainty $U_c(y)$				1.778
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$				3.555

**Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)**

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	±0.191	dB	K=1	0.095
Cable loss	±0.169	dB	K=2	0.084
Antenna gain	±0.191	dB	K=2	0.096
Site imperfection	±0.582	dB	Triangular	0.291
Pre-amplifier gain	±0.304	dB	K=2	0.152
Transmitter antenna	±1.200	dB	Rectangular	0.600
Signal generator	±0.461	dB	Rectangular	0.231
Mismatch	±0.080	dB	U-shape	0.040
Spectrum analyzer	±0.500	dB	Rectangular	0.250
Combined standard uncertainty Uc(y)				1.839
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)				3.678

**Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)**

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	±0.186	dB	K=1	0.093
Cable loss	±0.167	dB	K=2	0.083
Antenna gain	±0.190	dB	K=2	0.095
Site imperfection	±0.488	dB	Triangular	0.244
Pre-amplifier gain	±0.269	dB	K=2	0.134
Transmitter antenna	±1.200	dB	Rectangular	0.600
Signal generator	±0.461	dB	Rectangular	0.231
Mismatch	±0.080	dB	U-shape	0.040
Spectrum analyzer	±0.500	dB	Rectangular	0.250
Combined standard uncertainty Uc(y)				1.771
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)				3.541

**Uncertainty of Conducted Emission Measurement**

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Cable loss	$\pm 0.038$	dB	K=2	0.019
Attenuator	$\pm 0.047$	dB	K=2	0.024
Power Meter specification	$\pm 0.300$	dB	Triangular	0.150
Power Sensor specification	$\pm 0.300$	dB	Rectangular	0.150
Signal generator	$\pm 0.461$	dB	Rectangular	0.231
Mismatch	$\pm 0.080$	dB	U-shape	0.040
Spectrum analyzer	$\pm 0.500$	dB	Rectangular	0.250
Combined standard uncertainty $U_c(y)$				0.863
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$				1.726