

FCC Test Report

Report No.: RF150126C16

FCC ID: TE7WA901NDV4

Test Model: TL-WA901ND

Received Date: Jan. 26, 2015

Test Date: Feb. 02 ~ Jun. 03, 2015

Issued Date: Jun. 03, 2015

Applicant: TP-LINK TECHNOLOGIES CO., LTD.

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Release Control Record

Issue No.	Description	Date Issued
RF150126C16	Original release	Jun. 03, 2015

1 Certificate of Conformity

Product: 450Mbps Wireless N Access Point

Brand: TP-LINK

Test Model: TL-WA901ND

Sample Status: PROTOTYPE

Applicant: TP-LINK TECHNOLOGIES CO., LTD.

Test Date: Feb. 02 ~ Jun. 03, 2015

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10: 2009

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Polly Chien, **Date:** Jun. 03, 2015
Polly Chien / Specialist

Approved by : Ken Liu, **Date:** Jun. 03, 2015
Ken Liu / Senior Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -20.01dB at 0.51328MHz
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.2dB at 2386.00MHz, 2390.00MHz, 2483.50MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is R-SMA not a standard connector.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expended Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.86 dB
	200MHz ~1000MHz	3.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	450Mbps Wireless N Access Point
Brand	TP-LINK
Test Model	TL-WA901ND
Status of EUT	PROTOTYPE
Power Supply Rating	12Vdc (Adapter)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 450.0Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7
Output Power	762.091mW
Antenna Type	Omni-Directional antenna with 5dBi gain
Antenna Connector	R-SMA
Accessory Device	Adapter
Data Cable Supplied	NA

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides 3 completed transmitters and 3 receivers.

Modulation Mode	TX Function
802.11b	3TX
802.11g	3TX
802.11n (HT20)	3TX
802.11n (HT40)	3TX

2. The EUT consumes power from the following adapter.

Brand	TP-LINK TECHNOLOGIES CO., LTD.
Model	T120100-2B1
Input Power	100-240Vac, 50/60 Hz, 0.3A
Output Power	12Vdc, 1A
Power Line	1.5m cable without core attached on adapter

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

Channel	Frequency	Channel	Frequency
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

7 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO					DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	OP	
-	√	√	√	√	√	-

Where **RE≥1G**: Radiated Emission above 1GHz & Bandedge Measurement

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

OP: Conducted Output Power Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

Radiated Emission Test (Above 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	7.2
-	802.11n (HT40)	3 to 9	3, 4, 6, 8, 9	OFDM	BPSK	15.0

Radiated Emission Test (Below 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (HT20)	1 to 11	6	OFDM	BPSK	7.2

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (HT20)	1 to 11	6	OFDM	BPSK	7.2

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

Conducted Output Power Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	7.2
-	802.11n (HT40)	3 to 9	3, 4, 6, 8, 9	OFDM	BPSK	15.0

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	16deg. C, 70%RH	120Vac, 60Hz	Alan Wu
RE<1G	16deg. C, 70%RH	120Vac, 60Hz	Nick Hsu
PLC	18deg. C, 69%RH	120Vac, 60Hz	Nick Hsu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Leo Tsai
OP	25deg. C, 60%RH	120Vac, 60Hz	Leo Tsai

3.3 Duty Cycle of Test Signal

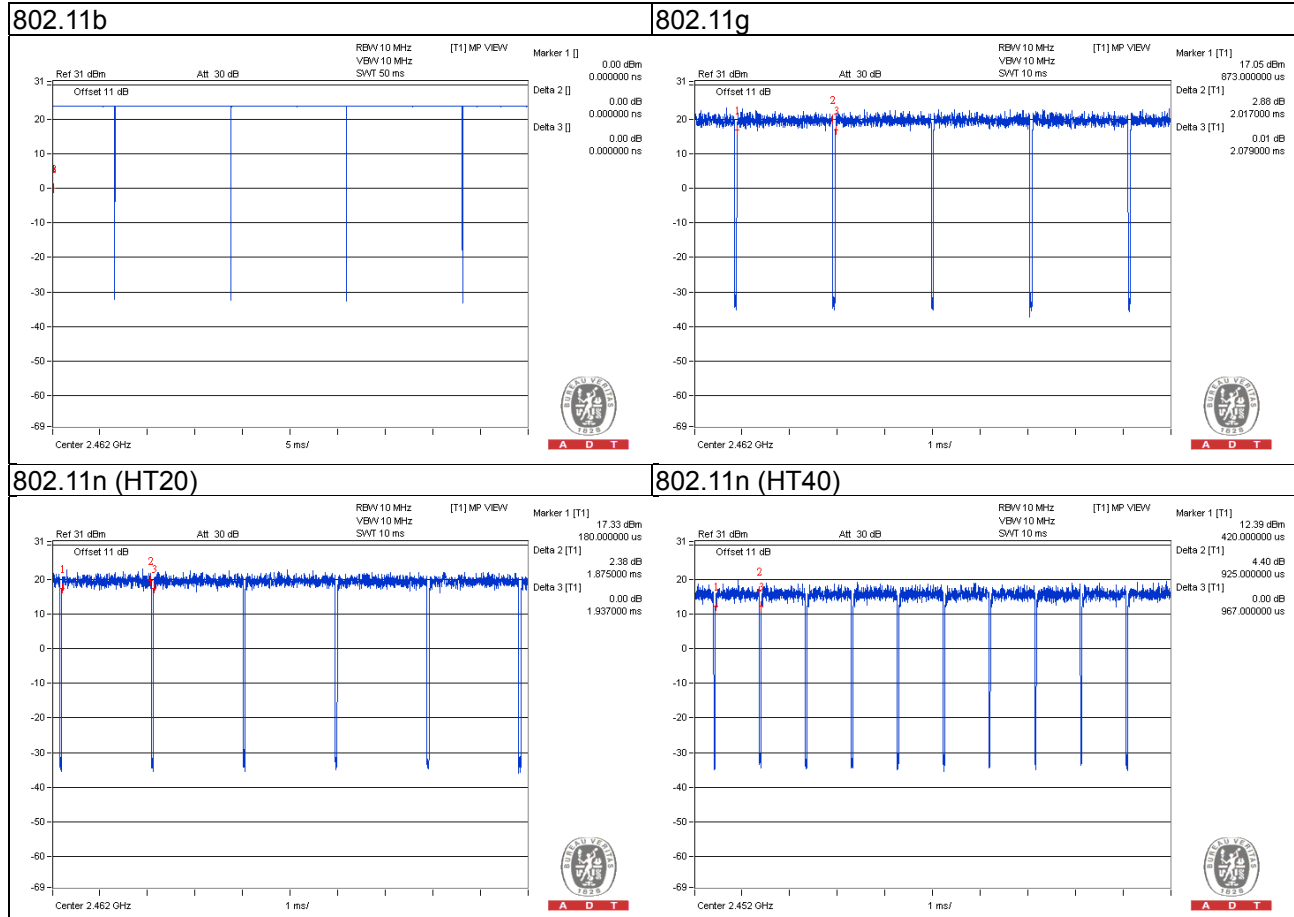
802.11b: Duty cycle of test signal is > 98 %

Duty cycle of test signal is < 98%, duty factor shall be considered.

802.11g: Duty cycle = $2.017/2.079 = 0.970$, Duty factor = $10 * \log(1/0.970) = 0.13$

802.11n (HT20): Duty cycle = $1.875/1.937 = 0.968$, Duty factor = $10 * \log(1/0.968) = 0.14$

802.11n (HT40): Duty cycle = $0.925/0.967 = 0.957$, Duty factor = $10 * \log(1/0.957) = 0.19$



3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

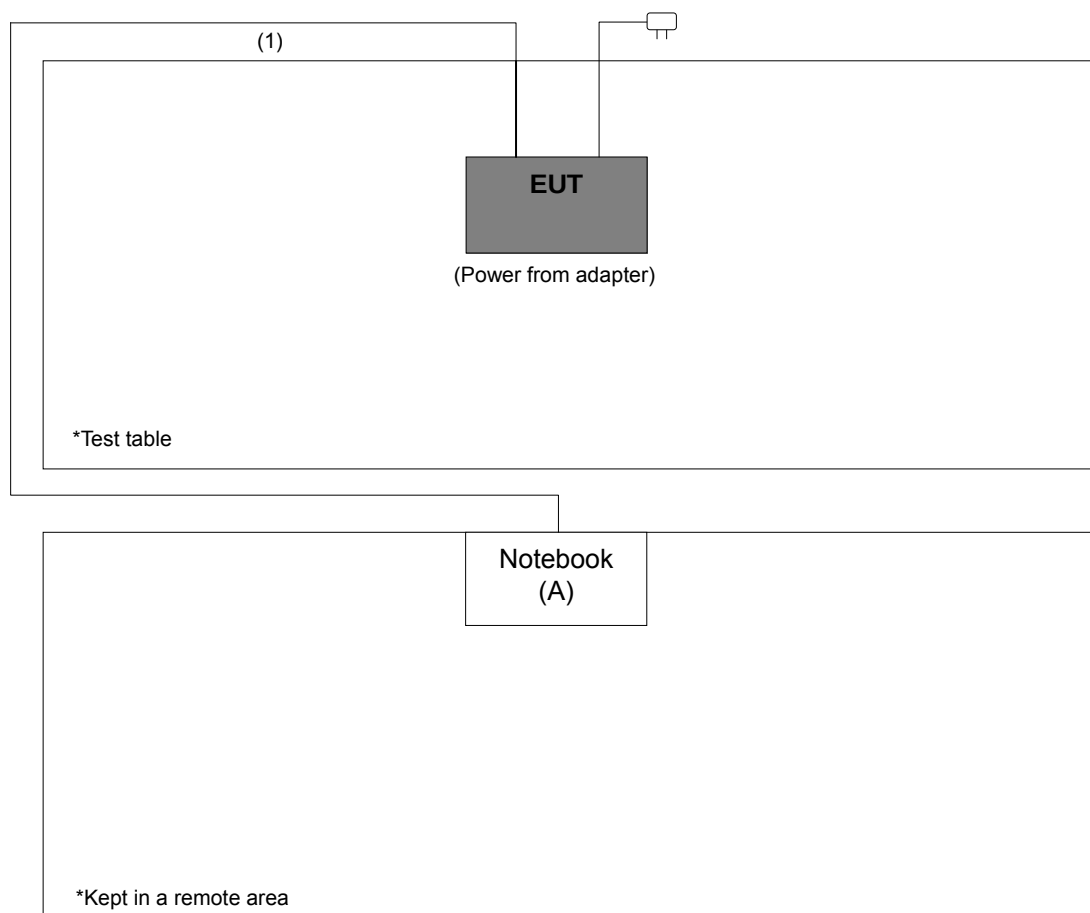
No.	Product	Brand	Model No.	Serial No.	FCC ID
A	Notebook	DELL	D531	CN-0XM006-48643 -81U-2610	QDS-BRCM1020

No.	Signal Cable Description Of The Above Support Units
1	3m RJ45 Cable.

Note:

1. All power cords of the above support units are non-shielded (1.8 m).
2. Item A acted as a communication partner to transfer data.

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specification of the EUT declared by the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.247)

558074 D01 DTS Meas Guidance v03r02

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10: 2009

All test items have been performed and recorded as per the above standards.

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC).
The test report has been issued separately.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 30dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Dec. 01, 2014	Nov. 30, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Aug. 29, 2014	Aug. 28, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Feb. 27, 2014	Feb. 26, 2015
			Feb. 06, 2015	Feb. 05, 2016
HORN Antenna SCHWARZBECK	9120D	9120D-1169	Aug. 26, 2014	Aug. 25, 2015
			Feb. 09, 2015	Feb. 08, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 17, 2014	Feb. 16, 2015
			Feb. 09, 2015	Feb. 08, 2016
Preamplifier Agilent	8449B	3008A01911	Aug. 09, 2014	Aug. 08, 2015
Preamplifier Agilent	8447D	2944A10638	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	248780/4 309222/4 274092/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable Worken	8D-FB	Cable-CH9-01	Aug. 11, 2014	Aug. 10, 2015
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	NA	NA	NA
High Speed Power Meter	ML2495A	0824011	Jul. 26, 2014	Jul. 25, 2015
Power Sensor	MA2411B	0738171	Jul. 26, 2014	Jul. 25, 2015

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 3.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 988962.
5. The IC Site Registration No. is IC 7450F-3.

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

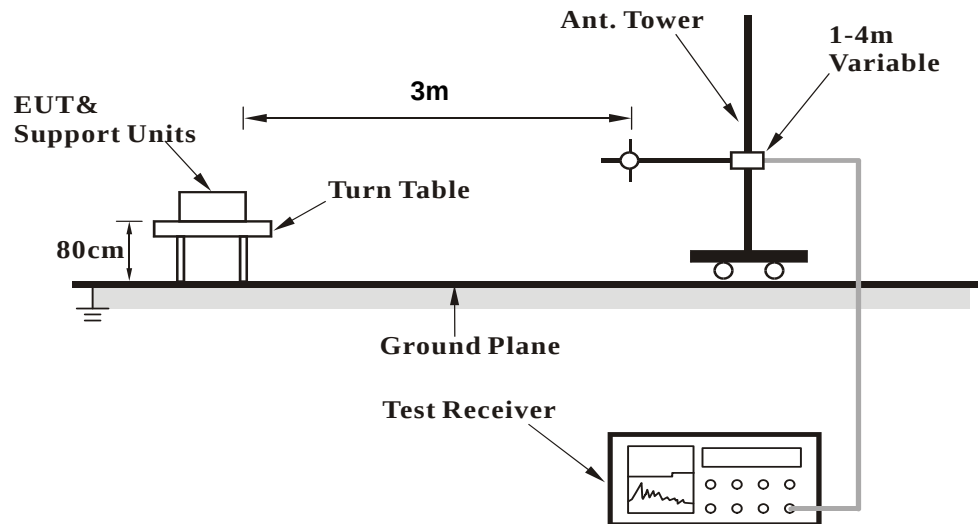
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
6. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

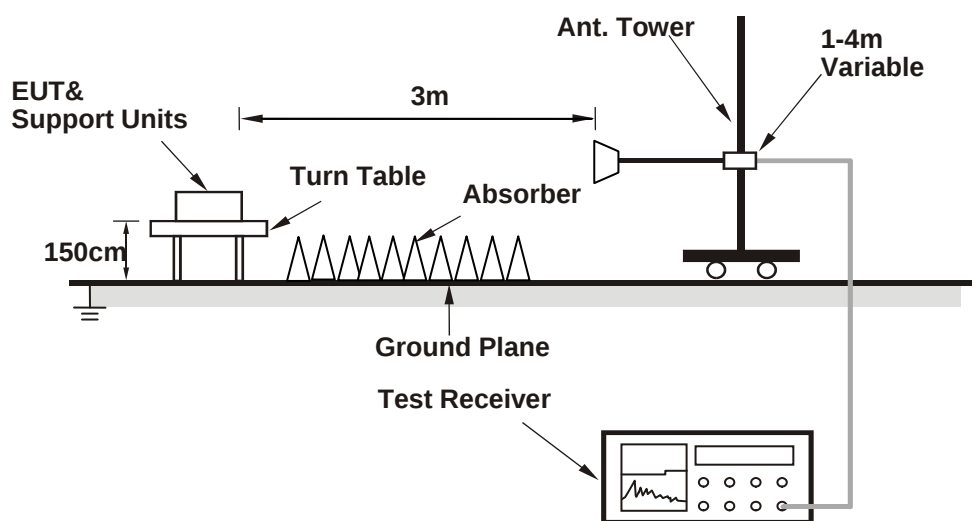
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- Prepared a notebook to act as a communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The communication partner sent data to EUT by command "PING".

4.1.7 Test Results

Above 1GHz Worst-Case Data:

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.7 PK	74.0	-18.3	1.36 H	269	56.60	-0.90
2	2390.00	45.1 AV	54.0	-8.9	1.36 H	269	46.00	-0.90
3	*2412.00	100.6 PK			1.01 H	36	101.40	-0.80
4	*2412.00	98.4 AV			1.01 H	36	99.20	-0.80
5	4824.00	53.9 PK	74.0	-20.1	1.81 H	213	47.60	6.30
6	4824.00	49.1 AV	54.0	-4.9	1.81 H	213	42.80	6.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.1 PK	74.0	-7.9	1.19 V	168	34.00	32.10
2	2390.00	53.6 AV	54.0	-0.4	1.19 V	168	21.50	32.10
3	*2412.00	119.9 PK			1.17 V	171	87.70	32.20
4	*2412.00	116.3 AV			1.17 V	171	84.10	32.20
5	4824.00	56.4 PK	74.0	-17.6	1.65 V	245	51.20	5.20
6	4824.00	53.5 AV	54.0	-0.5	1.65 V	245	48.30	5.20

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	101.4 PK			1.04 H	33	102.10	-0.70
2	*2437.00	99.3 AV			1.04 H	33	100.00	-0.70
3	4874.00	53.9 PK	74.0	-20.1	1.87 H	222	47.60	6.30
4	4874.00	50.4 AV	54.0	-3.6	1.87 H	222	44.10	6.30
5	7311.00	42.6 PK	74.0	-31.4	1.00 H	46	30.40	12.20
6	7311.00	32.0 AV	54.0	-22.0	1.00 H	46	19.80	12.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	121.6 PK			1.58 V	173	89.40	32.20
2	*2437.00	117.6 AV			1.58 V	173	85.40	32.20
3	4874.00	56.0 PK	74.0	-18.0	2.24 V	314	50.80	5.20
4	4874.00	52.6 AV	54.0	-1.4	2.24 V	314	47.40	5.20
5	7311.00	60.2 PK	74.0	-13.8	2.43 V	301	48.50	11.70
6	7311.00	53.5 AV	54.0	-0.5	2.43 V	301	41.80	11.70

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	101.4 PK			1.00 H	31	102.30	-0.90
2	*2462.00	98.9 AV			1.00 H	31	99.80	-0.90
3	2483.50	57.2 PK	74.0	-16.8	1.43 H	69	58.00	-0.80
4	2483.50	47.1 AV	54.0	-6.9	1.43 H	69	47.90	-0.80
5	4924.00	53.4 PK	74.0	-20.6	1.81 H	231	47.00	6.40
6	4924.00	49.3 AV	54.0	-4.7	1.81 H	231	42.90	6.40
7	7386.00	42.1 PK	74.0	-31.9	1.00 H	29	30.00	12.10
8	7386.00	31.1 AV	54.0	-22.9	1.00 H	29	19.00	12.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	120.8 PK			1.43 V	168	88.50	32.30
2	*2462.00	117.1 AV			1.43 V	168	84.80	32.30
3	2483.50	62.2 PK	74.0	-11.8	1.00 V	218	29.90	32.30
4	2483.50	52.7 AV	54.0	-1.3	1.00 V	218	20.40	32.30
5	4924.00	56.9 PK	74.0	-17.1	2.11 V	197	51.60	5.30
6	4924.00	53.4 AV	54.0	-0.6	2.11 V	197	48.10	5.30
7	7386.00	60.4 PK	74.0	-13.6	2.40 V	35	48.80	11.60
8	7386.00	53.4 AV	54.0	-0.6	2.40 V	35	41.80	11.60

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.1 PK	74.0	-17.9	1.02 H	23	23.10	33.00
2	2390.00	45.2 AV	54.0	-8.8	1.02 H	23	12.20	33.00
3	*2412.00	103.4 PK			1.19 H	204	70.30	33.10
4	*2412.00	93.2 AV			1.19 H	204	60.10	33.10
5	4824.00	43.4 PK	74.0	-30.6	1.45 H	299	42.10	1.30
6	4824.00	34.2 AV	54.0	-19.8	1.45 H	299	32.90	1.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	73.3 PK	74.0	-0.7	1.00 V	184	41.20	32.10
2	2390.00	51.3 AV	54.0	-2.7	1.00 V	184	19.20	32.10
3	*2412.00	117.9 PK			1.48 V	180	85.70	32.20
4	*2412.00	108.3 AV			1.48 V	180	76.10	32.20
5	4824.00	52.1 PK	74.0	-21.9	1.73 V	209	46.90	5.20
6	4824.00	38.5 AV	54.0	-15.5	1.73 V	209	33.30	5.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 2	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.7 PK	74.0	-12.3	1.10 H	210	28.70	33.00
2	2390.00	50.1 AV	54.0	-3.9	1.10 H	210	17.10	33.00
3	*2417.00	102.1 PK			1.10 H	210	68.90	33.20
4	*2417.00	93.5 AV			1.10 H	210	60.30	33.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2386.00	71.5 PK	74.0	-2.5	1.83 V	158	38.50	33.00
2	2386.00	53.8 AV	54.0	-0.2	1.83 V	158	20.80	33.00
3	*2417.00	118.1 PK			1.86 V	170	84.90	33.20
4	*2417.00	108.1 AV			1.86 V	170	74.90	33.20

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.8 PK	74.0	-17.2	1.14 H	37	23.60	33.20
2	2390.00	45.9 AV	54.0	-8.1	1.04 H	37	12.70	33.20
3	*2437.00	109.4 PK			1.24 H	63	76.00	33.40
4	*2437.00	99.5 AV			1.21 H	28	66.10	33.40
5	2483.50	59.8 PK	74.0	-14.2	1.24 H	63	26.40	33.40
6	2483.50	45.7 AV	54.0	-8.3	1.02 H	69	12.30	33.40
7	4874.00	54.6 PK	74.0	-19.4	1.51 H	69	48.30	6.30
8	4874.00	41.9 AV	54.0	-12.1	1.51 H	69	35.60	6.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.5 PK	74.0	-6.5	1.18 V	202	35.40	32.10
2	2390.00	53.8 AV	54.0	-0.2	1.18 V	202	21.70	32.10
3	*2437.00	123.2 PK			1.10 V	212	91.00	32.20
4	*2437.00	113.8 AV			1.10 V	212	81.60	32.20
5	4874.00	58.6 PK	74.0	-15.4	2.50 V	356	53.40	5.20
6	4874.00	44.9 AV	54.0	-9.1	2.50 V	356	39.70	5.20
7	7311.00	63.3 PK	74.0	-10.7	2.33 V	295	51.60	11.70
8	7311.00	49.9 AV	54.0	-4.1	2.33 V	295	38.20	11.70

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 10	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2457.00	103.4 PK			1.49 H	19	70.00	33.40
2	*2457.00	93.9 AV			1.49 H	19	60.50	33.40
3	2483.50	60.9 PK	74.0	-13.1	1.49 H	20	27.50	33.40
4	2483.50	50.3 AV	54.0	-3.7	1.49 H	20	16.90	33.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2457.00	117.4 PK			1.67 V	15	84.00	33.40
2	*2457.00	108.4 AV			1.67 V	15	75.00	33.40
3	2484.90	67.8 PK	74.0	-6.2	1.25 V	162	34.30	33.50
4	2484.90	53.0 AV	54.0	-1.0	1.25 V	162	19.50	33.50

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	101.3 PK			1.10 H	248	67.90	33.40
2	*2462.00	92.6 AV			1.10 H	248	59.20	33.40
3	2483.50	57.1 PK	74.0	-16.9	1.07 H	59	23.70	33.40
4	2483.50	45.2 AV	54.0	-8.8	1.07 H	59	11.80	33.40
5	4924.00	47.6 PK	74.0	-26.4	1.45 H	291	46.10	1.50
6	4924.00	33.5 AV	54.0	-20.5	1.45 H	291	32.00	1.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	116.1 PK			1.13 V	180	83.80	32.30
2	*2462.00	106.1 AV			1.13 V	180	73.80	32.30
3	2483.50	73.3 PK	74.0	-0.7	1.09 V	144	41.00	32.30
4	2483.50	49.7 AV	54.0	-4.3	1.09 V	144	17.40	32.30
5	4924.00	51.9 PK	74.0	-22.1	2.13 V	195	46.60	5.30
6	4924.00	38.1 AV	54.0	-15.9	2.13 V	195	32.80	5.30

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11n (HT20)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.1 PK	74.0	-17.9	1.14 H	5	23.10	33.00
2	2390.00	45.2 AV	54.0	-8.8	1.14 H	5	12.20	33.00
3	*2412.00	101.4 PK			1.00 H	209	68.30	33.10
4	*2412.00	92.7 AV			1.00 H	209	59.60	33.10
5	4824.00	47.2 PK	74.0	-26.8	1.41 H	219	45.90	1.30
6	4824.00	35.1 AV	54.0	-18.9	1.41 H	219	33.80	1.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	73.0 PK	74.0	-1.0	1.00 V	200	40.90	32.10
2	2390.00	53.7 AV	54.0	-0.3	1.00 V	200	21.60	32.10
3	*2412.00	119.5 PK			1.60 V	190	87.30	32.20
4	*2412.00	109.5 AV			1.60 V	190	77.30	32.20
5	4824.00	52.4 PK	74.0	-21.6	1.74 V	208	47.20	5.20
6	4824.00	38.8 AV	54.0	-15.2	1.74 V	208	33.60	5.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 2	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.7 PK	74.0	-12.3	1.24 H	200	28.70	33.00
2	2390.00	50.5 AV	54.0	-3.5	1.24 H	200	17.50	33.00
3	*2417.00	100.9 PK			1.24 H	188	67.70	33.20
4	*2417.00	90.1 AV			1.24 H	188	56.90	33.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.6 PK	74.0	-1.4	1.26 V	7	39.60	33.00
2	2390.00	53.0 AV	54.0	-1.0	1.26 V	7	20.00	33.00
3	*2417.00	118.2 PK			1.24 V	18	85.00	33.20
4	*2417.00	108.3 AV			1.24 V	18	75.10	33.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.1 PK	74.0	-14.9	1.21 H	56	26.10	33.00
2	2390.00	47.3 AV	54.0	-6.7	1.21 H	56	14.30	33.00
3	*2437.00	120.3 PK			1.13 H	209	87.00	33.30
4	*2437.00	110.5 AV			1.13 H	209	77.20	33.30
5	2483.50	57.2 PK	74.0	-16.8	1.45 H	298	23.80	33.40
6	2483.50	47.3 AV	54.0	-6.7	1.45 H	298	13.90	33.40
7	4874.00	45.2 PK	74.0	-28.8	1.45 H	298	43.80	1.40
8	4874.00	37.1 AV	54.0	-16.9	1.45 H	298	35.70	1.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.3 PK	74.0	-7.7	1.00 V	180	34.20	32.10
2	2390.00	53.2 AV	54.0	-0.8	1.00 V	180	21.10	32.10
3	*2437.00	125.6 PK			1.66 V	176	93.40	32.20
4	*2437.00	115.7 AV			1.66 V	176	83.50	32.20
5	4874.00	59.4 PK	74.0	-14.6	2.42 V	354	54.20	5.20
6	4874.00	45.6 AV	54.0	-8.4	2.42 V	354	40.40	5.20
7	7311.00	63.9 PK	74.0	-10.1	2.24 V	298	52.20	11.70
8	7311.00	50.8 AV	54.0	-3.2	2.24 V	298	39.10	11.70

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 10	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2457.00	107.6 PK			1.19 H	41	74.20	33.40
2	*2457.00	97.5 AV			1.19 H	41	64.10	33.40
3	2483.50	63.5 PK	74.0	-10.5	1.20 H	40	30.10	33.40
4	2483.50	50.1 AV	54.0	-3.9	1.20 H	40	16.70	33.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2457.00	119.8 PK			1.32 V	198	86.40	33.40
2	*2457.00	110.0 AV			1.32 V	198	76.60	33.40
3	2483.50	70.5 PK	74.0	-3.5	1.18 V	212	37.10	33.40
4	2483.50	53.7 AV	54.0	-0.3	1.18 V	212	20.30	33.40

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	101.4 PK			1.11 H	207	68.00	33.40
2	*2462.00	93.3 AV			1.11 H	207	59.90	33.40
3	2483.50	57.1 PK	74.0	-16.9	1.03 H	63	23.70	33.40
4	2483.50	44.9 AV	54.0	-9.1	1.03 H	63	11.50	33.40
5	4924.00	49.2 PK	74.0	-24.8	1.43 H	283	47.70	1.50
6	4924.00	34.3 AV	54.0	-19.7	1.43 H	283	32.80	1.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	118.5 PK			1.92 V	160	86.20	32.30
2	*2462.00	108.2 AV			1.92 V	160	75.90	32.30
3	2483.50	73.5 PK	74.0	-0.5	1.92 V	171	41.20	32.30
4	2483.50	51.6 AV	54.0	-2.4	1.92 V	171	19.30	32.30
5	4924.00	52.3 PK	74.0	-21.7	2.06 V	198	47.00	5.30
6	4924.00	38.4 AV	54.0	-15.6	2.06 V	198	33.10	5.30

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.

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CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.1 PK	74.0	-17.9	1.13 H	204	23.10	33.00
2	2390.00	44.8 AV	54.0	-9.2	1.13 H	204	11.80	33.00
3	*2422.00	100.3 PK			1.11 H	204	67.10	33.20
4	*2422.00	91.6 AV			1.11 H	204	58.40	33.20
5	4824.00	48.5 PK	74.0	-25.5	1.42 H	283	47.20	1.30
6	4824.00	34.2 AV	54.0	-19.8	1.42 H	283	32.90	1.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.2 PK	74.0	-3.8	1.03 V	170	38.10	32.10
2	2390.00	53.6 AV	54.0	-0.4	1.03 V	170	21.50	32.10
3	*2422.00	109.5 PK			1.00 V	175	77.30	32.20
4	*2422.00	99.7 AV			1.00 V	175	67.50	32.20
5	4844.00	51.0 PK	74.0	-23.0	1.70 V	198	45.80	5.20
6	4844.00	37.2 AV	54.0	-16.8	1.70 V	198	32.00	5.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 4	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.1 PK	74.0	-8.9	1.50 H	25	32.10	33.00
2	2390.00	52.6 AV	54.0	-1.4	1.50 H	25	19.60	33.00
3	*2427.00	98.7 PK			1.50 H	20	65.50	33.20
4	*2427.00	90.5 AV			1.50 H	20	57.30	33.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.4 PK	74.0	-6.6	1.11 V	257	34.40	33.00
2	2390.00	53.3 AV	54.0	-0.7	1.11 V	257	20.30	33.00
3	*2427.00	114.2 PK			1.39 V	349	81.00	33.20
4	*2427.00	103.6 AV			1.39 V	349	70.40	33.20

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	98.4 PK			1.14 H	30	65.10	33.30
2	*2437.00	96.2 AV			1.14 H	30	62.90	33.30
3	4874.00	49.2 PK	74.0	-24.8	1.42 H	236	47.80	1.40
4	4874.00	36.4 AV	54.0	-17.6	1.42 H	236	35.00	1.40
5	7311.00	54.2 PK	74.0	-19.8	1.06 H	28	46.50	7.70
6	7311.00	41.3 AV	54.0	-12.7	1.06 H	28	33.60	7.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.4 PK	74.0	-5.6	1.00 V	287	36.30	32.10
2	2390.00	53.8 AV	54.0	-0.2	1.00 V	287	21.70	32.10
3	*2437.00	115.6 PK			1.00 V	204	83.40	32.20
4	*2437.00	105.9 AV			1.00 V	204	73.70	32.20
5	2483.50	71.6 PK	74.0	-2.4	1.00 V	189	39.30	32.30
6	2483.50	51.9 AV	54.0	-2.1	1.00 V	189	19.60	32.30
7	4874.00	52.7 PK	74.0	-21.3	1.77 V	347	47.50	5.20
8	4874.00	39.0 AV	54.0	-15.0	1.77 V	347	33.80	5.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 8	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2447.00	100.9 PK			1.46 H	26	67.60	33.30
2	*2447.00	91.9 AV			1.46 H	26	58.60	33.30
3	2483.50	62.3 PK	74.0	-11.7	1.46 H	26	28.90	33.40
4	2483.50	51.1 AV	54.0	-2.9	1.46 H	26	17.70	33.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2447.00	113.0 PK			2.38 V	165	79.70	33.30
2	*2447.00	103.4 AV			2.38 V	165	70.10	33.30
3	2483.50	68.3 PK	74.0	-5.7	2.38 V	73	34.90	33.40
4	2483.50	53.5 AV	54.0	-0.5	2.38 V	73	20.10	33.40

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	103.4 PK			1.12 H	204	104.20	-0.80
2	*2452.00	94.2 AV			1.12 H	204	95.00	-0.80
3	2483.50	59.2 PK	74.0	-14.8	1.06 H	64	60.00	-0.80
4	2483.50	46.3 AV	54.0	-7.7	1.06 H	64	47.10	-0.80
5	4904.00	53.1 PK	74.0	-20.9	1.06 H	55	46.90	6.20
6	4904.00	49.4 AV	54.0	-4.6	1.06 H	55	43.20	6.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	111.5 PK			1.00 V	156	79.30	32.20
2	*2452.00	101.6 AV			1.00 V	156	69.40	32.20
3	2483.50	73.8 PK	74.0	-0.2	1.00 V	194	41.50	32.30
4	2483.50	53.2 AV	54.0	-0.8	1.00 V	194	20.90	32.30
5	4904.00	51.2 PK	74.0	-22.8	2.12 V	194	46.00	5.20
6	4904.00	37.7 AV	54.0	-16.3	2.12 V	194	32.50	5.20

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.

Below 1GHz Worst-Case Data:

802.11n (HT20)

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	57.12	32.0 QP	40.0	-8.0	1.99 H	291	46.70	-14.70
2	97.95	35.4 QP	43.5	-8.1	1.99 H	124	54.50	-19.10
3	199.05	39.8 QP	43.5	-3.7	1.49 H	295	56.60	-16.80
4	399.31	32.7 QP	46.0	-13.3	1.00 H	129	43.20	-10.50
5	875.67	39.3 QP	46.0	-6.7	1.00 H	217	40.50	-1.20
6	1000.10	46.7 QP	54.0	-7.3	1.49 H	143	45.90	0.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	39.62	34.9 QP	40.0	-5.1	1.00 V	9	50.10	-15.20
2	59.06	37.0 QP	40.0	-3.0	1.00 V	357	51.80	-14.80
3	69.00	37.4 QP	40.0	-2.6	1.07 V	21	53.50	-16.10
4	97.95	38.0 QP	43.5	-5.5	1.00 V	121	57.10	-19.10
5	399.31	36.1 QP	46.0	-9.9	1.00 V	136	46.60	-10.50
6	875.67	40.5 QP	46.0	-5.5	1.00 V	97	41.70	-1.20

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Apr. 24, 2014	Apr. 23, 2015
			Apr. 27, 2015	Apr. 26, 2016
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 30, 2014	Dec. 29, 2015
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 10, 2014	Jul. 09, 2015
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 2.
3. The VCCI Site Registration No. is C-2047.

4.2.3 Test Procedures

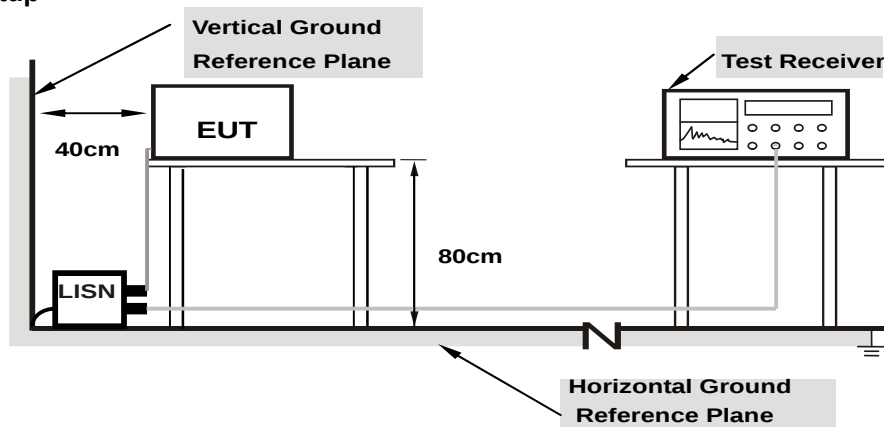
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

Same as 4.1.6.

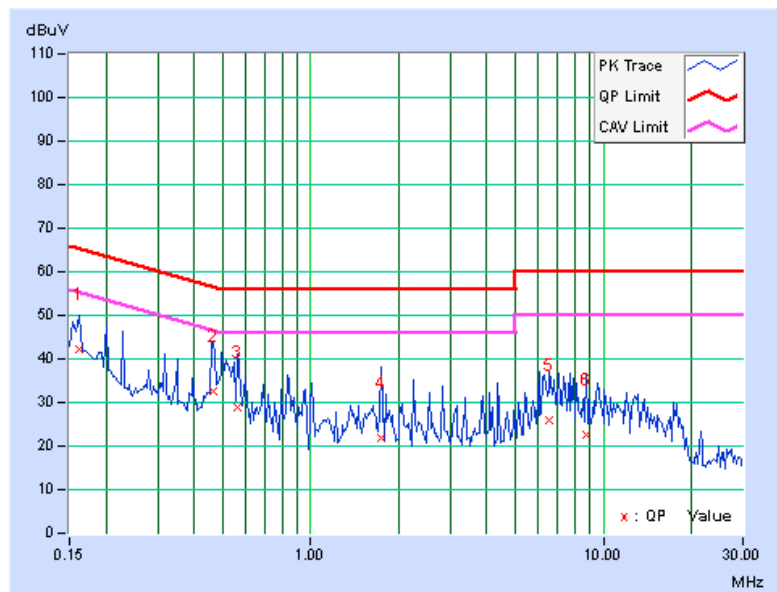
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	0.20	42.10	30.28	42.30	30.48	65.38	55.38	-23.08	-24.90
2	0.46250	0.21	32.47	23.94	32.68	24.15	56.65	46.65	-23.97	-22.50
3	0.56406	0.23	28.53	17.11	28.76	17.34	56.00	46.00	-27.24	-28.66
4	1.74609	0.34	21.57	10.70	21.91	11.04	56.00	46.00	-34.09	-34.96
5	6.55469	0.46	25.39	17.53	25.85	17.99	60.00	50.00	-34.15	-32.01
6	8.73047	0.49	22.09	15.42	22.58	15.91	60.00	50.00	-37.42	-34.09

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

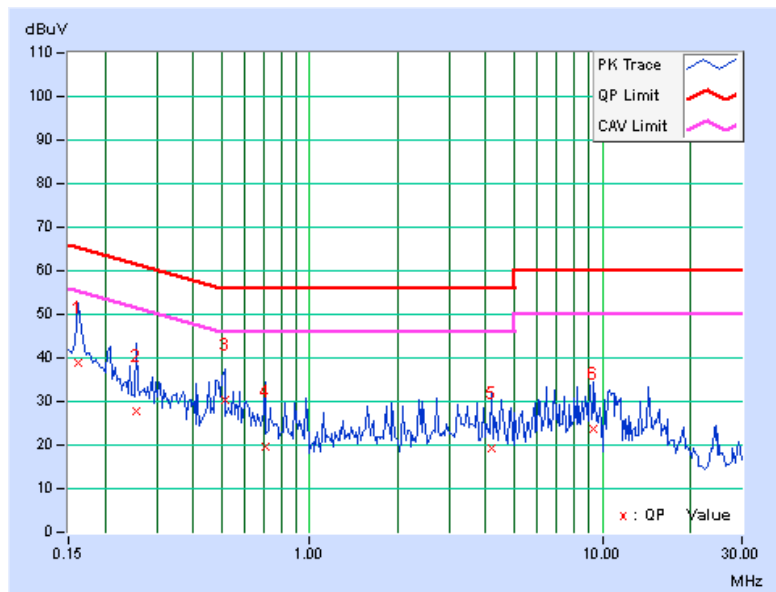


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	0.21	38.64	27.64	38.85	27.85	65.38	55.38	-26.53	-27.53
2	0.25547	0.23	27.44	18.19	27.67	18.42	61.58	51.58	-33.91	-33.16
3	0.51328	0.26	30.17	25.73	30.43	25.99	56.00	46.00	-25.57	-20.01
4	0.70469	0.28	19.33	13.10	19.61	13.38	56.00	46.00	-36.39	-32.62
5	4.21094	0.46	18.85	12.42	19.31	12.88	56.00	46.00	-36.69	-33.12
6	9.35547	0.56	23.30	18.25	23.86	18.81	60.00	50.00	-36.14	-31.19

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

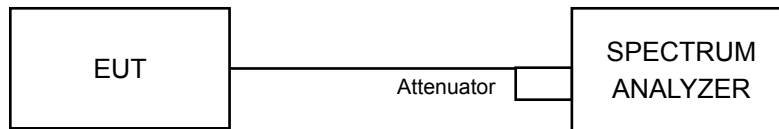


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

558074 D01 DTS Meas Guidance v03r02 section 8.1

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	7.06	7.07	7.08	0.5	Pass
6	2437	7.06	7.07	7.10	0.5	Pass
11	2462	6.59	7.05	7.06	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	15.19	15.17	15.19	0.5	Pass
6	2437	15.17	15.14	15.16	0.5	Pass
11	2462	15.16	15.16	15.14	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	15.16	15.39	15.17	0.5	Pass
6	2437	15.17	15.15	15.16	0.5	Pass
11	2462	15.19	15.17	15.33	0.5	Pass

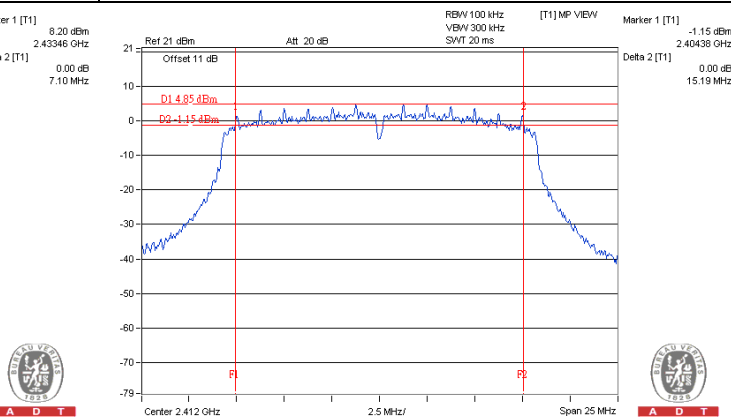
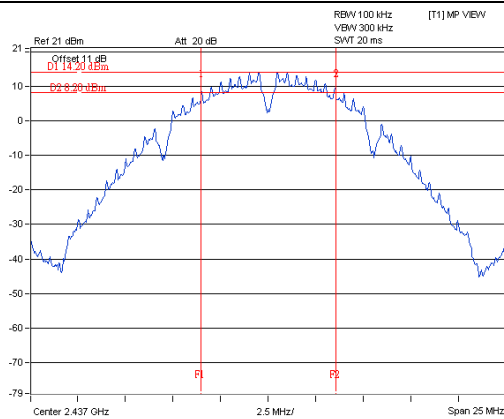
802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1	CHAIN 2		
3	2422	35.10	33.86	33.85	0.5	Pass
6	2437	35.03	33.85	33.93	0.5	Pass
9	2452	35.09	33.92	33.88	0.5	Pass

Spectrum Plot of Worst Value

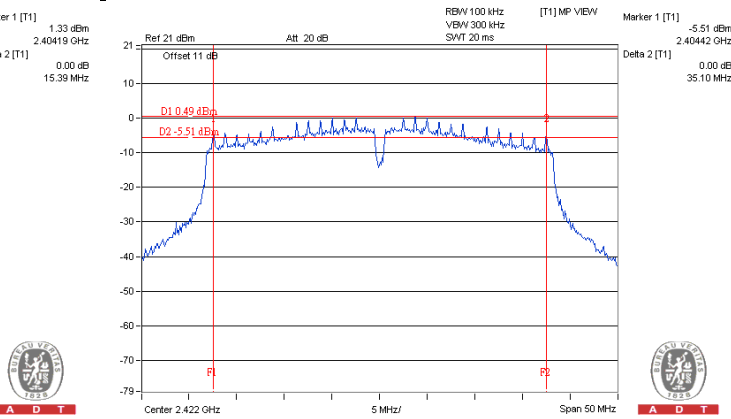
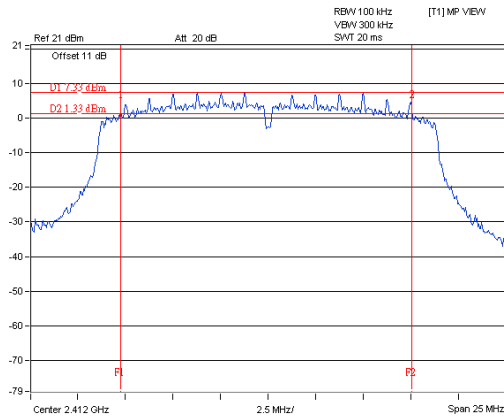
802.11b_CHAIN 2/ CH6

802.11g_CHAIN 0/ CH1



802.11n (HT20)_CHAIN 1/ CH1

802.11n (HT40)_CHAIN 0/ CH3



4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

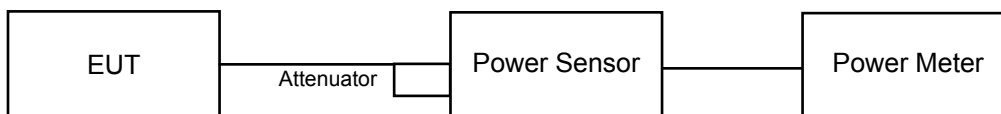
Array Gain = 0 dB (i.e., no array gain) for $NANT \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;

Array Gain = $5 \log(NANT/NSS)$ dB or 3 dB, whichever is less for 20-MHz channel widths with $NANT \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(NANT/NSS)$ dB.

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

558074 D01 DTS Meas Guidance v03r02 section 9.2.3.2

An average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor. Record the power level.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

FOR AVERAGE POWER

802.11b

Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	21.27	21.94	21.33	426.114	26.30	30	Pass
6	2437	21.39	22.36	21.35	446.366	26.50	30	Pass
11	2462	20.79	21.66	21.30	401.401	26.04	30	Pass

802.11g

Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	16.16	16.86	24.66	382.249	25.82	30	Pass
2	2417	23.32	23.81	23.96	704.105	28.48	30	Pass
6	2437	23.43	24.08	23.54	702.096	28.46	30	Pass
10	2457	23.35	23.89	23.71	696.141	28.43	30	Pass
11	2462	15.33	16.15	15.86	113.877	20.56	30	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	16.86	17.75	17.33	162.170	22.10	30	Pass
2	2417	23.26	24.01	24.21	727.237	28.62	30	Pass
6	2437	23.57	24.06	24.47	762.091	28.82	30	Pass
10	2457	23.37	24.12	24.16	736.111	28.67	30	Pass
11	2462	15.60	16.67	16.24	124.833	20.96	30	Pass

802.11n (HT40)

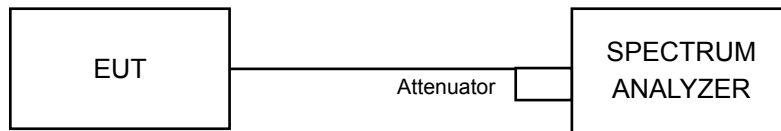
Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
3	2422	12.80	13.56	13.61	64.715	18.11	30	Pass
4	2427	18.60	19.78	19.76	262.128	24.19	30	Pass
6	2437	18.89	19.76	19.51	261.401	24.17	30	Pass
8	2447	18.56	19.94	19.41	257.704	24.11	30	Pass
9	2452	13.85	15.21	14.45	85.316	19.31	30	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

558074 D01 DTS Meas Guidance v03r02 section 10.3

For AVG. power (duty cycle $\geq 98\%$)

- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set VBW $\geq 3 \times \text{RBW}$.
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span/RBW}$.
- Sweep time = auto couple.
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.

For AVG. power (duty cycle $< 98\%$)

- Measure the duty cycle (x).
- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set VBW $\geq 3 \times \text{RBW}$.
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span/RBW}$.
- Sweep time = auto couple.
- Do not use sweep triggering. Allow sweep to "free run".
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.
- Add $10 \log (1/x)$, where x is the duty cycle measured in step (a), to the measured PSD to compute the average PSD during the actual transmission time.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-5.13	4.77	-0.36	4.23	Pass
	6	2437	-5.31	4.77	-0.54	4.23	Pass
	11	2462	-6.10	4.77	-1.33	4.23	Pass
1	1	2412	-4.95	4.77	-0.18	4.23	Pass
	6	2437	-4.11	4.77	0.66	4.23	Pass
	11	2462	-4.05	4.77	0.72	4.23	Pass
2	1	2412	-4.88	4.77	-0.11	4.23	Pass
	6	2437	-5.30	4.77	-0.53	4.23	Pass
	11	2462	-5.11	4.77	-0.34	4.23	Pass

NOTE: Directional gain = 5dBi + 10log(3) = 9.77 dBi > 6dBi , so the power density limit shall be reduced to 8-(9.77-6) = 4.23dBm.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD w/o duty factor (dBm)	Duty factor	Total PSD (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-14.39	4.77	-9.62	0.13	-9.49	4.23	Pass
	6	2437	-6.59	4.77	-1.82	0.13	-1.69	4.23	Pass
	11	2462	-14.40	4.77	-9.63	0.13	-9.50	4.23	Pass
1	1	2412	-12.81	4.77	-8.04	0.13	-7.91	4.23	Pass
	6	2437	-5.78	4.77	-1.01	0.13	-0.88	4.23	Pass
	11	2462	-13.36	4.77	-8.59	0.13	-8.46	4.23	Pass
2	1	2412	-12.01	4.77	-7.24	0.13	-7.11	4.23	Pass
	6	2437	-6.01	4.77	-1.24	0.13	-1.11	4.23	Pass
	11	2462	-13.35	4.77	-8.58	0.13	-8.45	4.23	Pass

NOTE: Directional gain = 5dBi + 10log(3) = 9.77 dBi > 6dBi , so the power density limit shall be reduced to 8-(9.77-6) = 4.23dBm.

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD w/o duty factor (dBm)	Duty factor	Total PSD (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-13.05	4.77	-8.28	0.14	-8.14	4.23	Pass
	6	2437	-7.17	4.77	-2.40	0.14	-2.26	4.23	Pass
	11	2462	-14.69	4.77	-9.92	0.14	-9.78	4.23	Pass
1	1	2412	-12.24	4.77	-7.47	0.14	-7.33	4.23	Pass
	6	2437	-6.01	4.77	-1.24	0.14	-1.10	4.23	Pass
	11	2462	-13.09	4.77	-8.32	0.14	-8.18	4.23	Pass
2	1	2412	-12.46	4.77	-7.69	0.14	-7.55	4.23	Pass
	6	2437	-5.64	4.77	-0.87	0.14	-0.73	4.23	Pass
	11	2462	-13.72	4.77	-8.95	0.14	-8.81	4.23	Pass

NOTE: Directional gain = 5dBi + 10log(3) = 9.77 dBi > 6dBi , so the power density limit shall be reduced to 8-(9.77-6) = 4.23dBm.

802.11n (HT40)

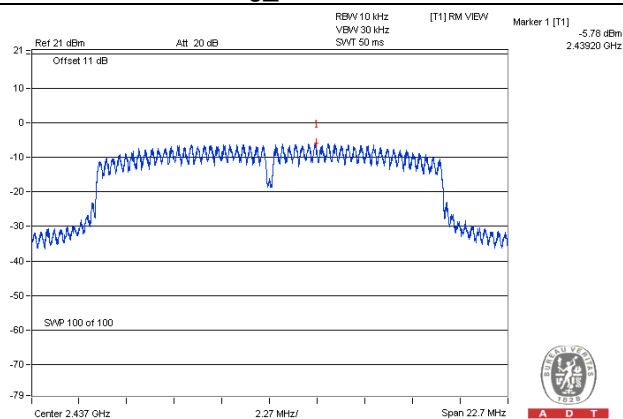
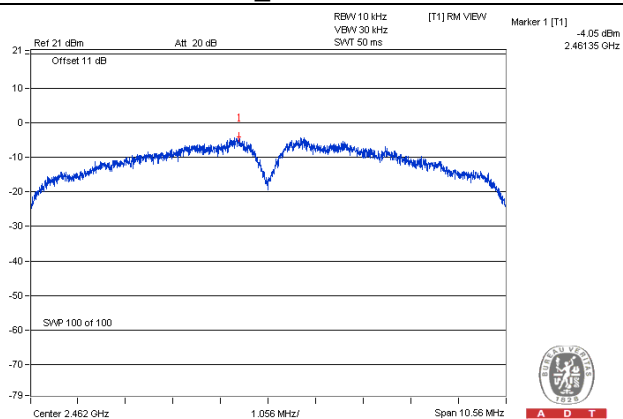
TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD w/o duty factor (dBm)	Duty factor	Total PSD (dBm)	Limit (dBm)	PASS /FAIL
0	3	2422	-19.21	4.77	-14.44	0.19	-14.25	4.23	Pass
	6	2437	-13.20	4.77	-8.43	0.19	-8.24	4.23	Pass
	9	2452	-18.45	4.77	-13.68	0.19	-13.49	4.23	Pass
1	3	2422	-18.39	4.77	-13.62	0.19	-13.43	4.23	Pass
	6	2437	-11.93	4.77	-7.16	0.19	-6.97	4.23	Pass
	9	2452	-16.36	4.77	-11.59	0.19	-11.40	4.23	Pass
2	3	2422	-18.38	4.77	-13.61	0.19	-13.42	4.23	Pass
	6	2437	-12.04	4.77	-7.27	0.19	-7.08	4.23	Pass
	9	2452	-17.10	4.77	-12.33	0.19	-12.14	4.23	Pass

NOTE: Directional gain = 5dBi + 10log(3) = 9.77 dBi > 6dBi , so the power density limit shall be reduced to 8-(9.77-6) = 4.23dBm.

Spectrum Plot of Worst Value

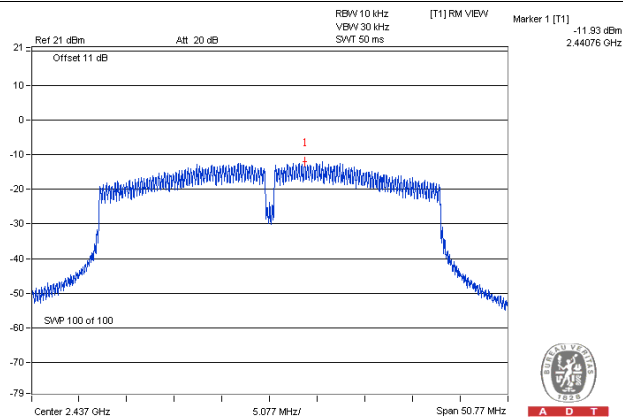
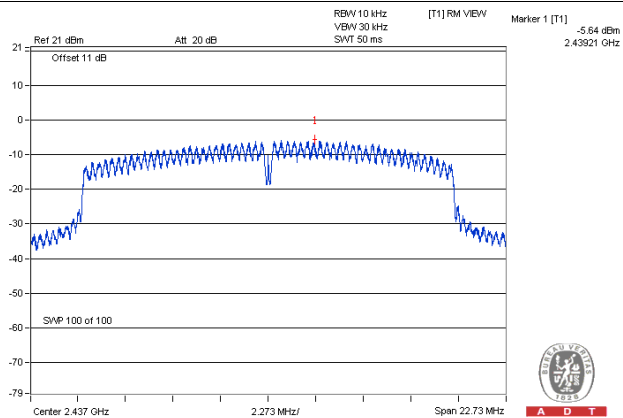
802.11b_CHAIN 1/ CH11

802.11g_CHAIN 1/ CH6



802.11n (HT20)_CHAIN 2/ CH6

802.11n (HT40)_CHAIN 1/ CH6

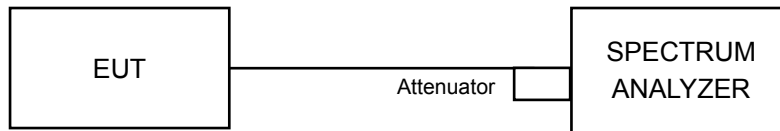


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

558074 D01 DTS Meas Guidance v03r02 section 11.2

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Detector = average.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOB

558074 D01 DTS Meas Guidance v03r02 section 11.3

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Ensure that the number of measurement points $\geq$ span/RBW
4. According to measurement points to set differ measurement span.
5. Detector = peak.
6. Trace Mode = max hold.
7. Sweep = auto couple.

4.6.5 Deviation from Test Standard

No deviation.

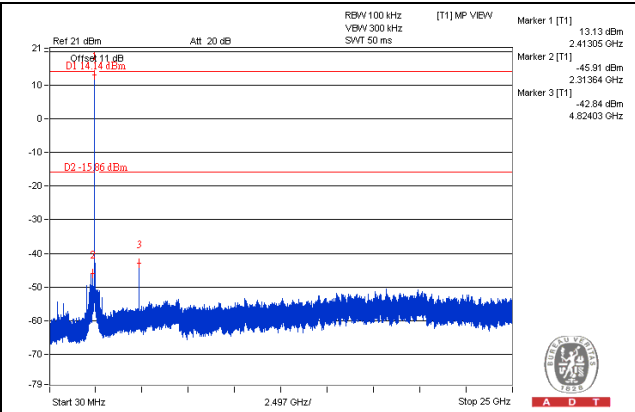
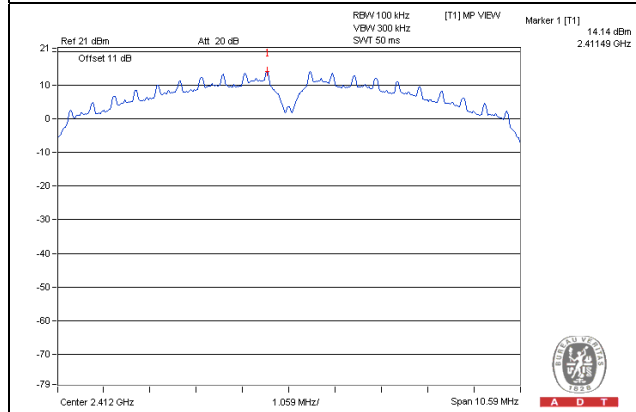
4.6.6 EUT Operating Condition

Same as Item 4.3.6

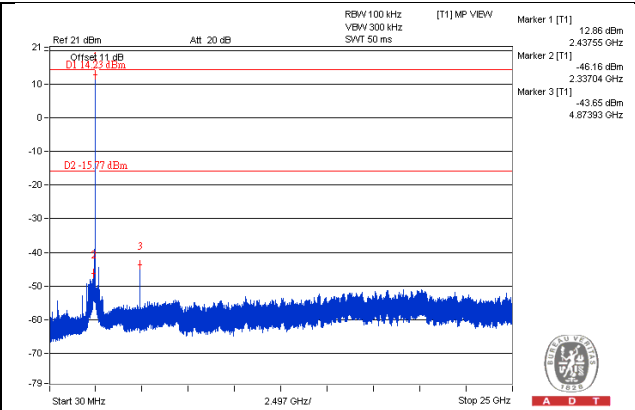
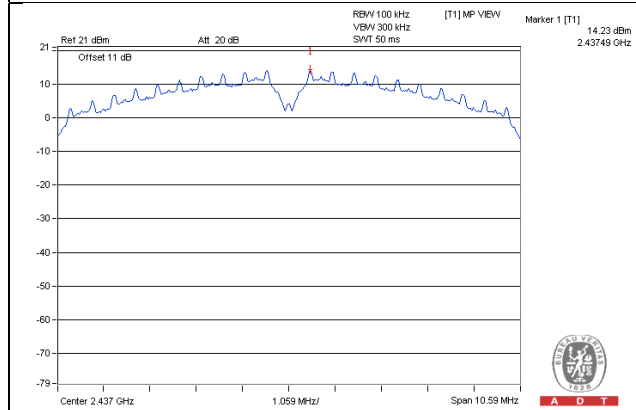
4.6.7 Test Results

802.11b CHAIN 0

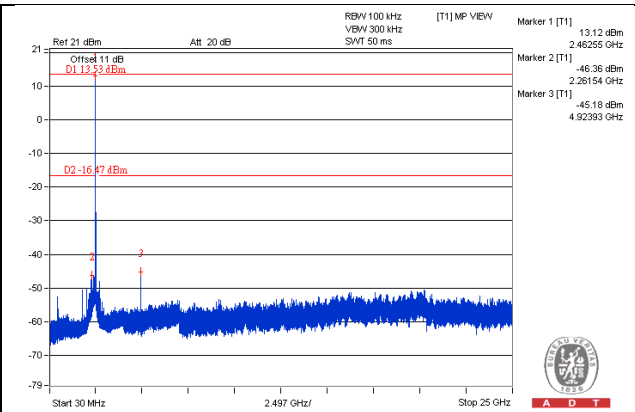
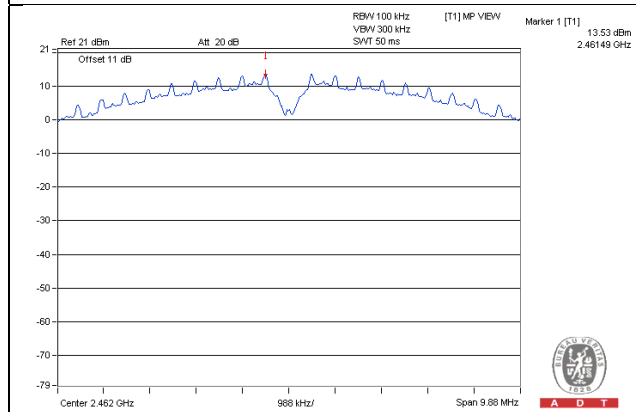
CH 1



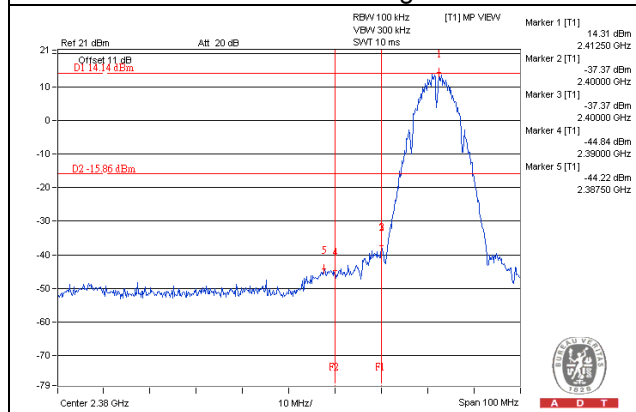
CH 6



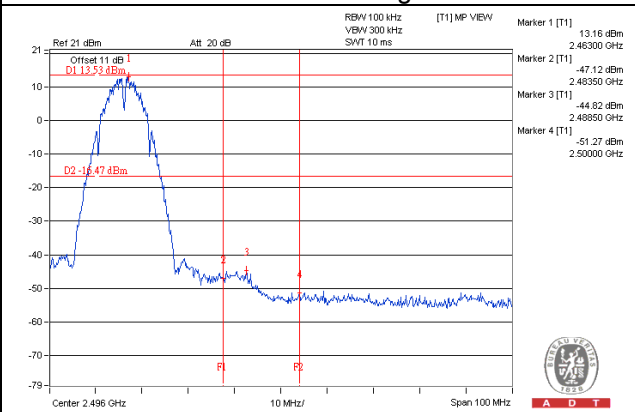
CH 11



CH 1 Band edge

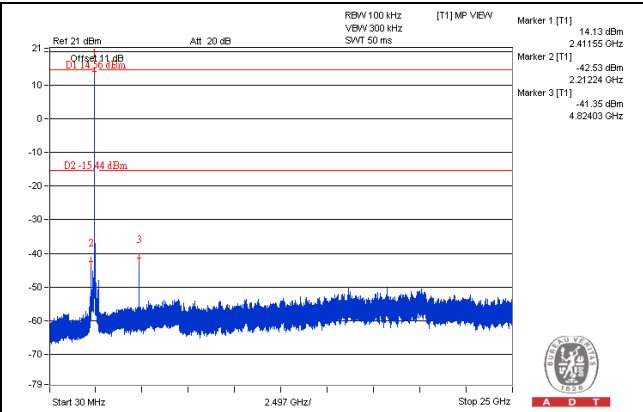
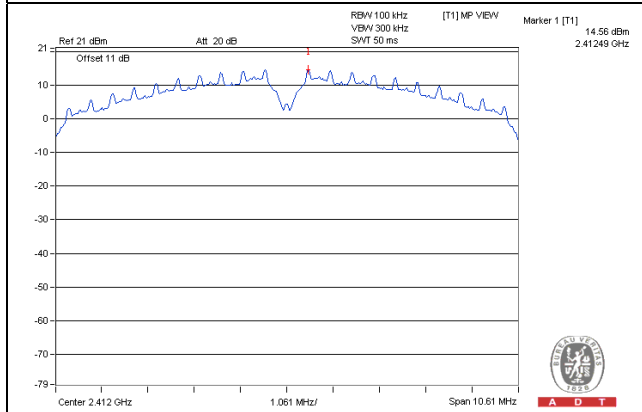


CH 11 Band edge

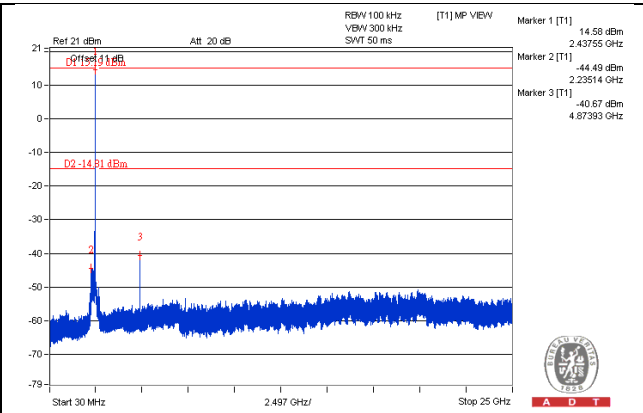
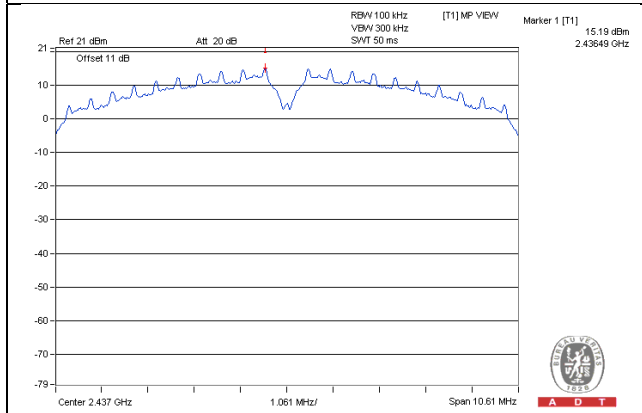


CHAIN 1

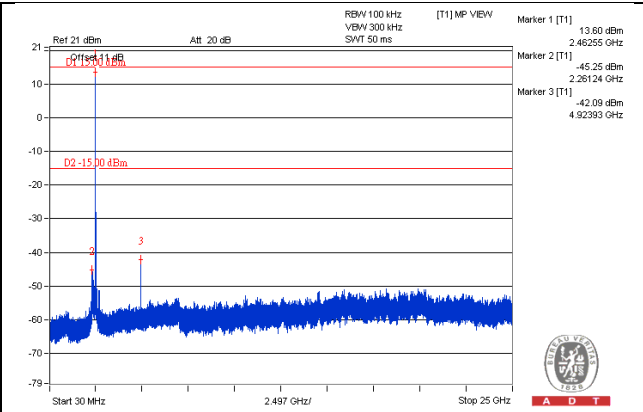
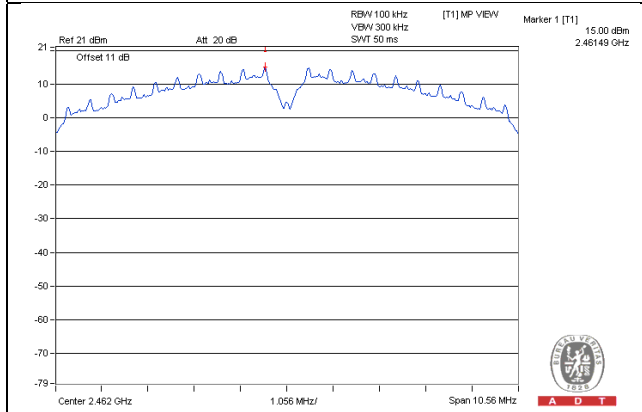
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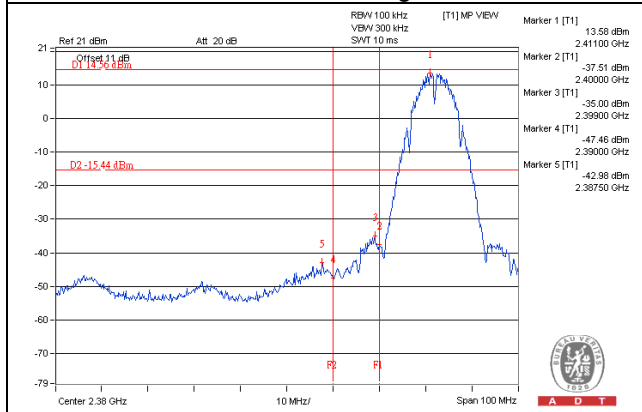
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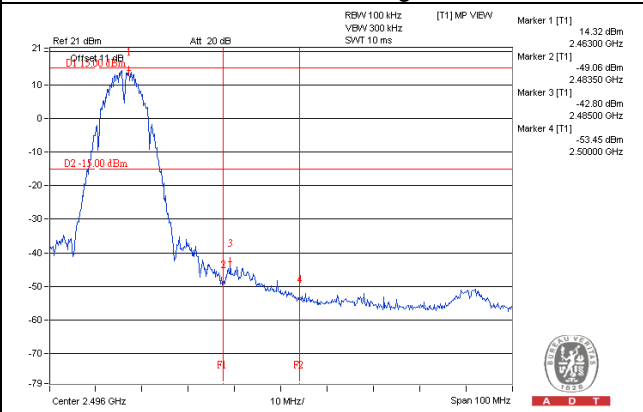
CH 11



CH 1 Band edge

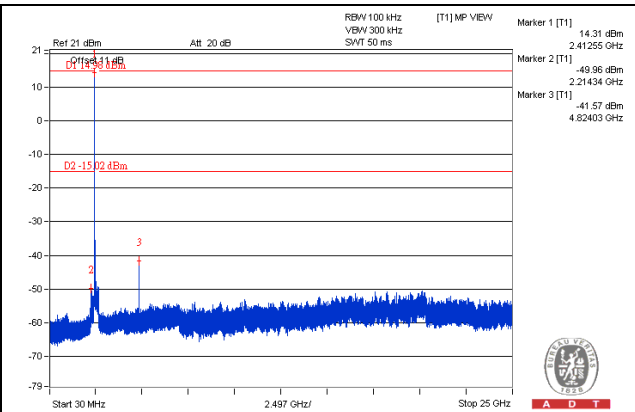
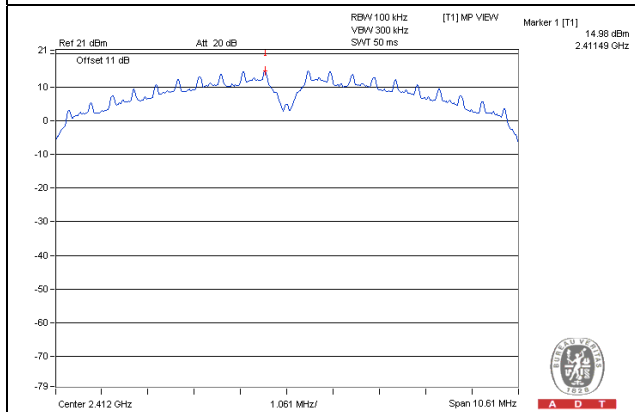


CH 11 Band edge

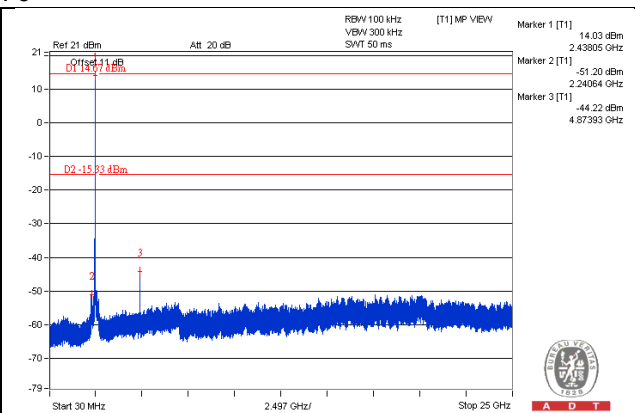
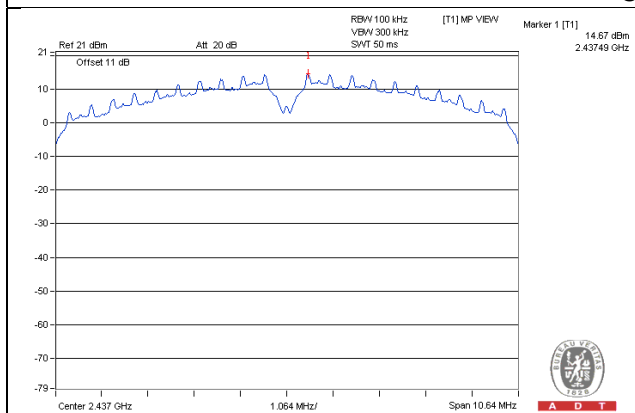


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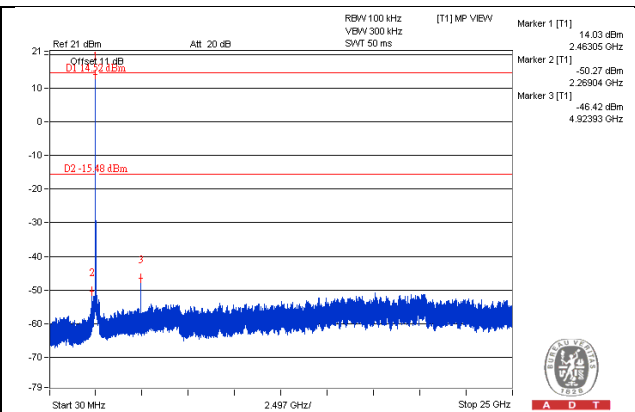
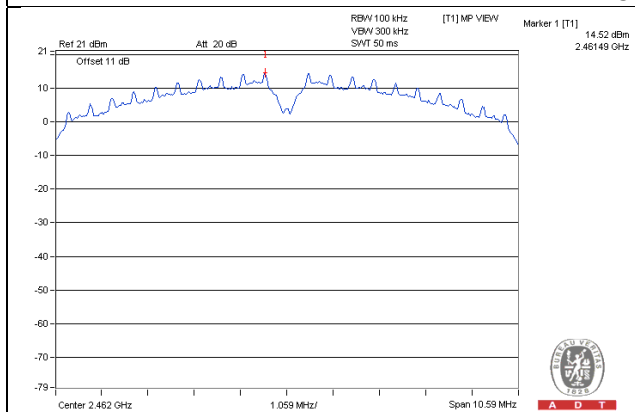
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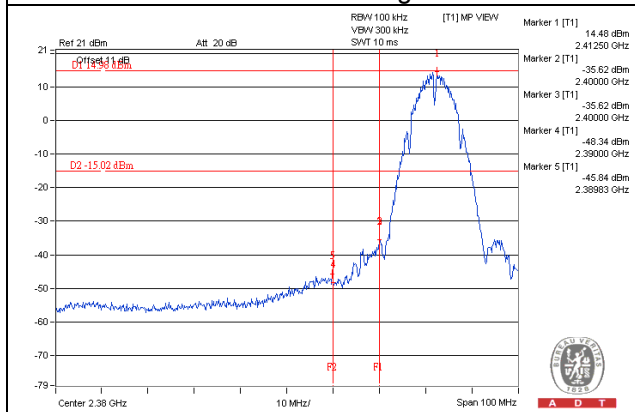
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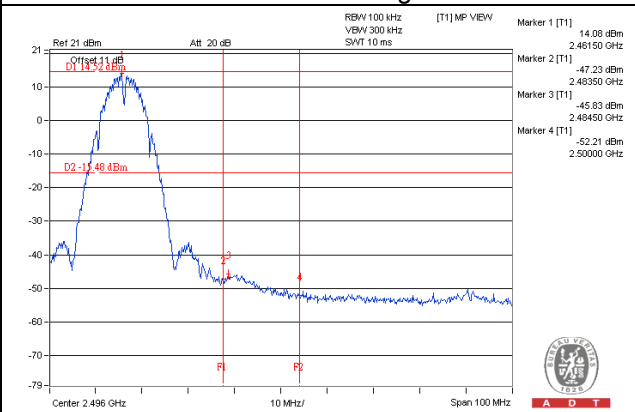
CH 11



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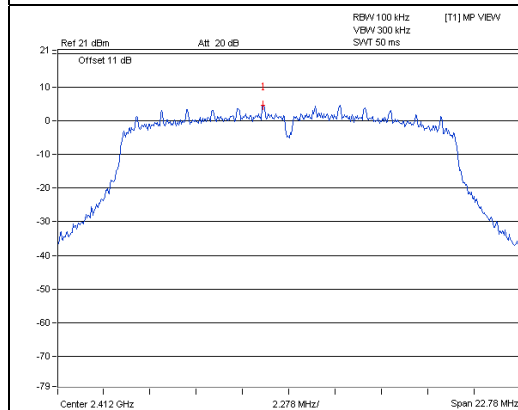


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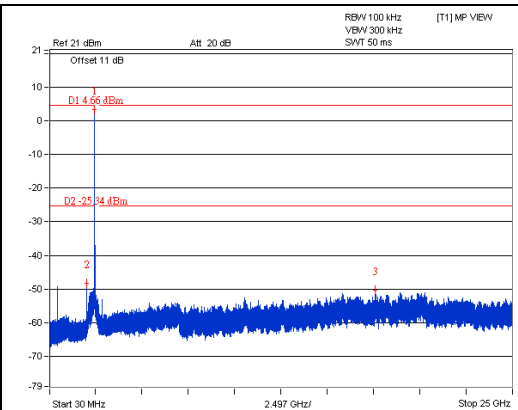


802.11g_CHAIN 0

CH 1

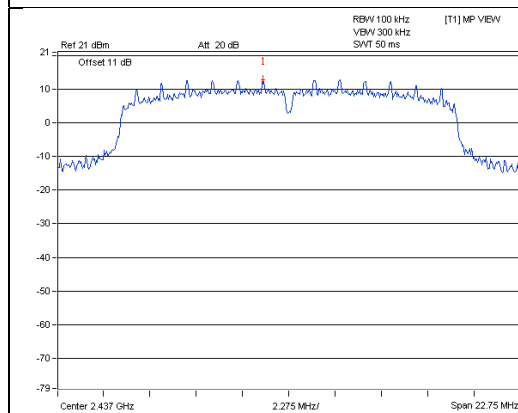


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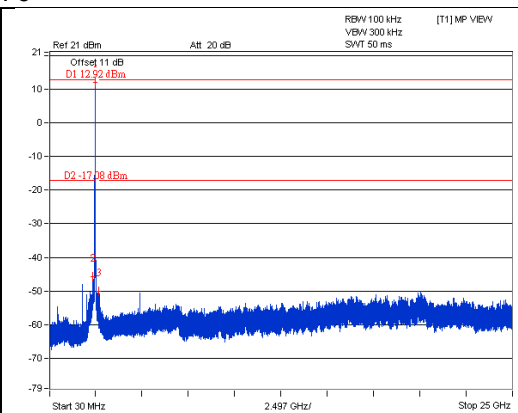


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CH 6

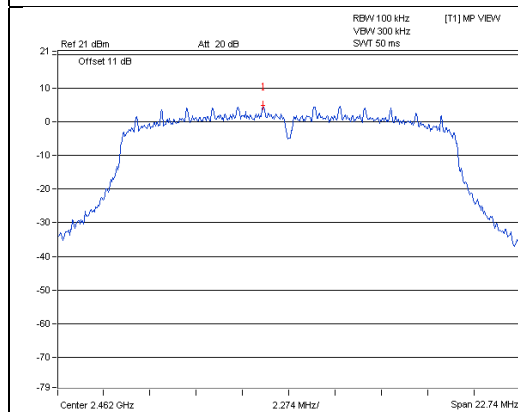


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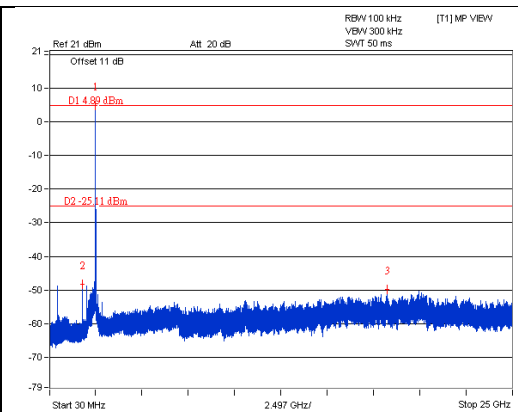


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CH 11

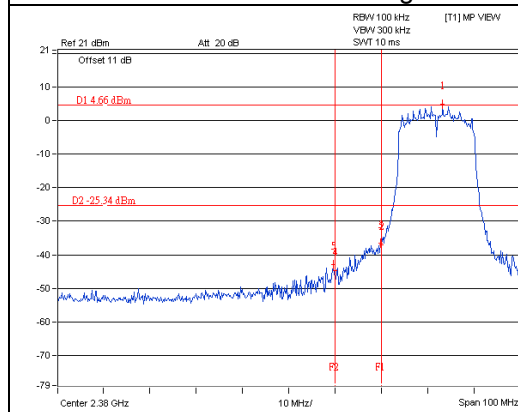


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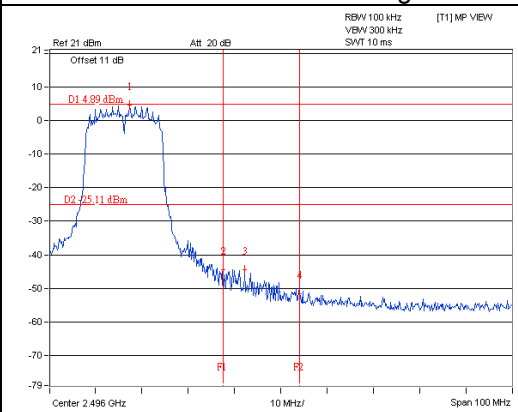
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CH 1 Band edge



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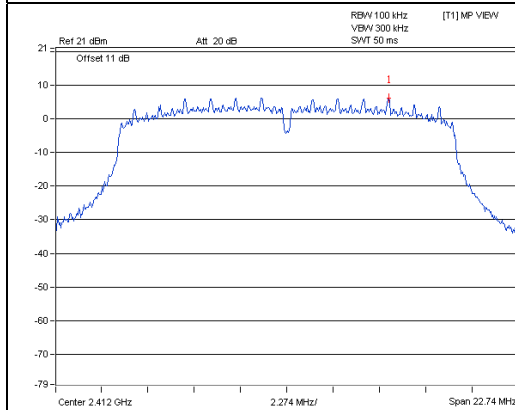
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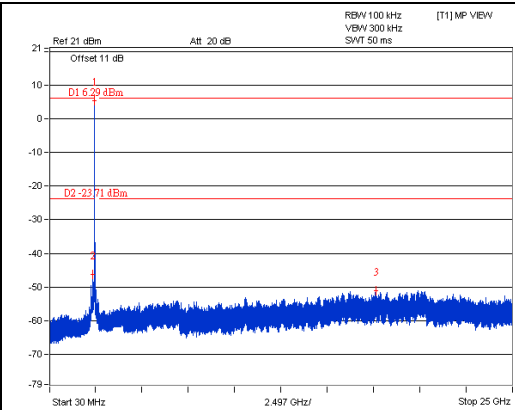
A D T

CHAIN 1

CH 1

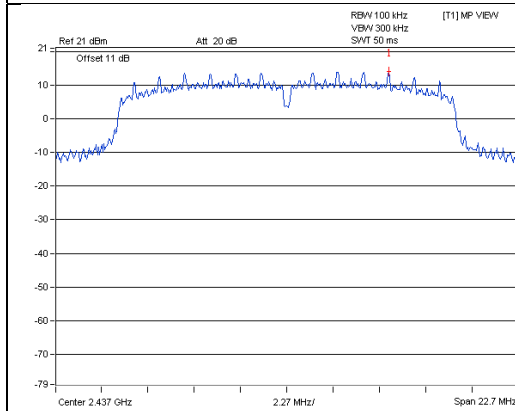


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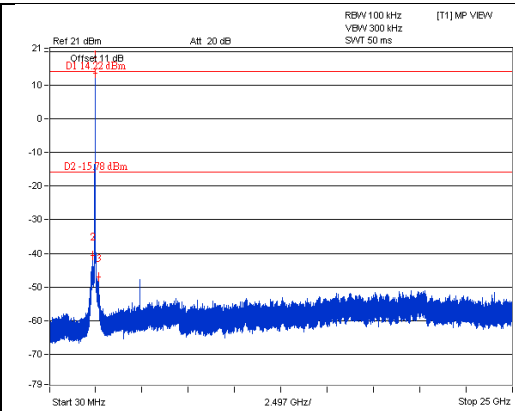


A D T

CH 6

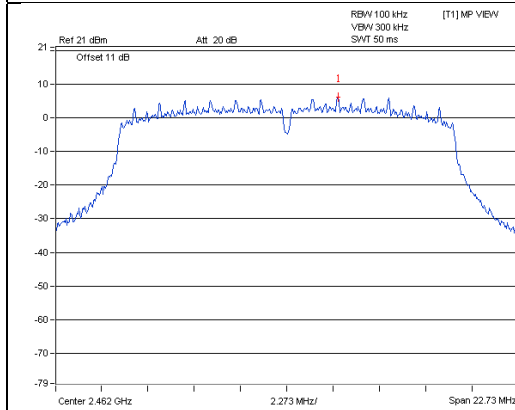


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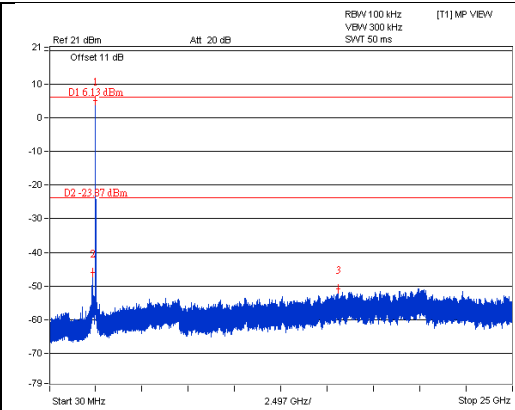


A D T

CH 11

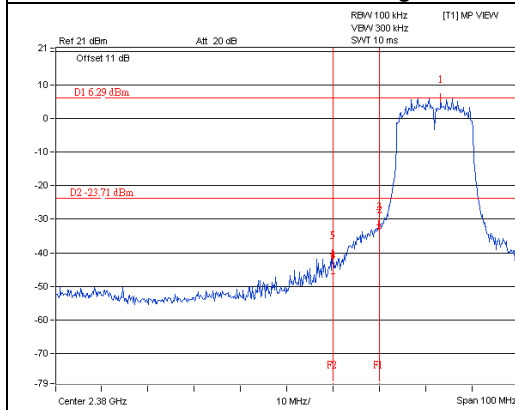


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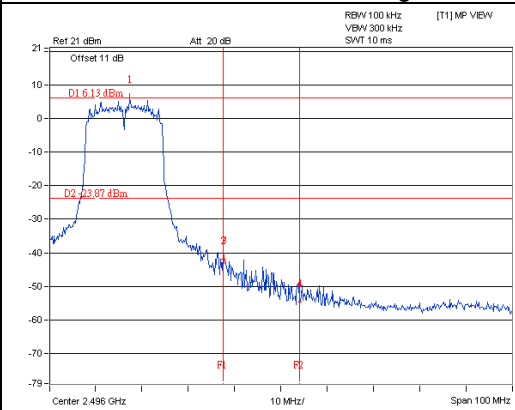
A D T

CH 1 Band edge



A D T

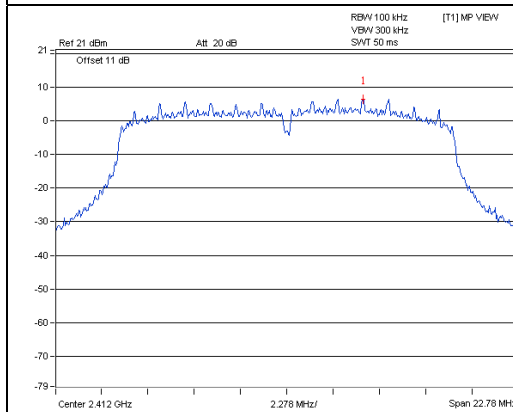
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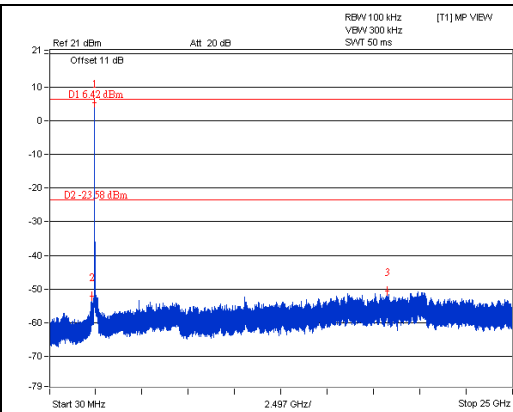
A D T

CHAIN 2

CH 1

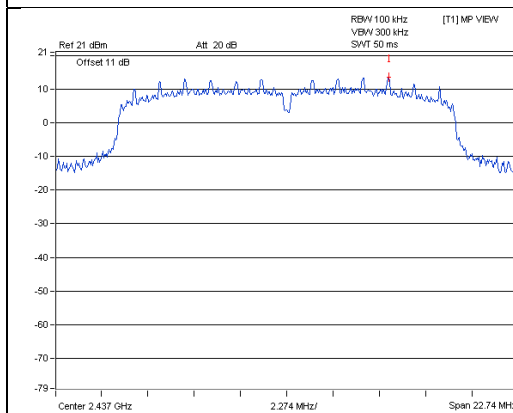


A D T

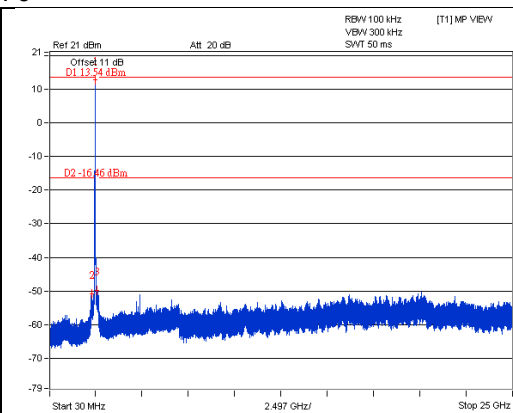


A D T

CH 6

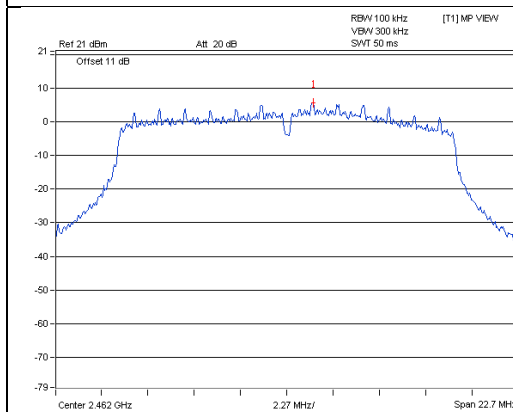


A D T

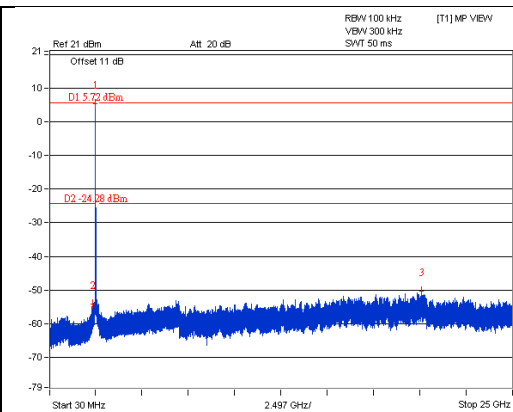


A D T

CH 11

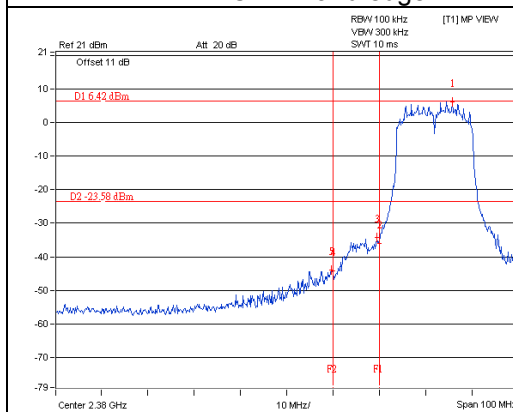


A D T



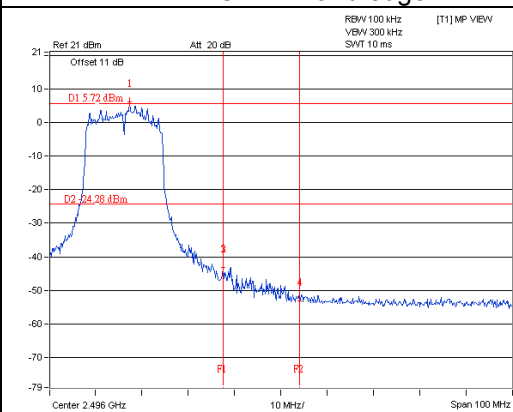
A D T

CH 1 Band edge



A D T

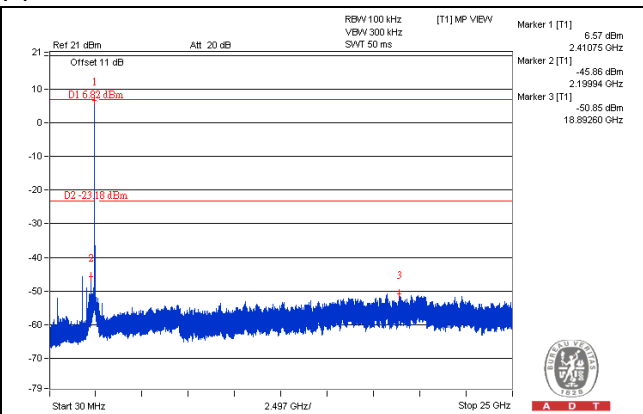
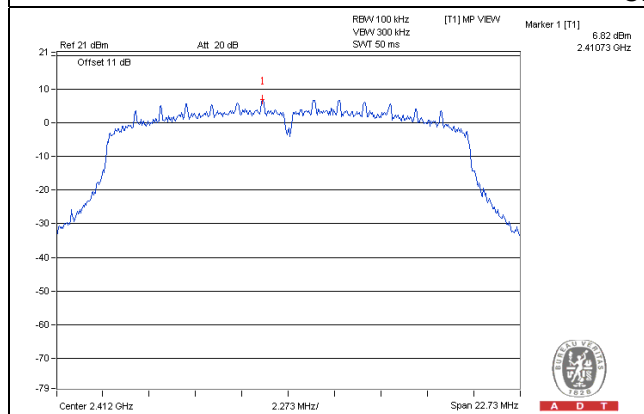
CH 11 Band edge



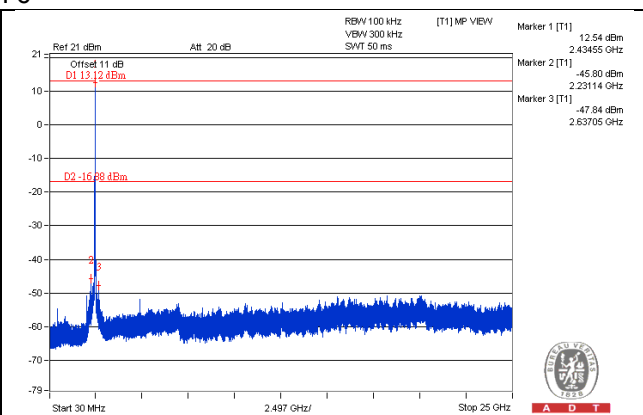
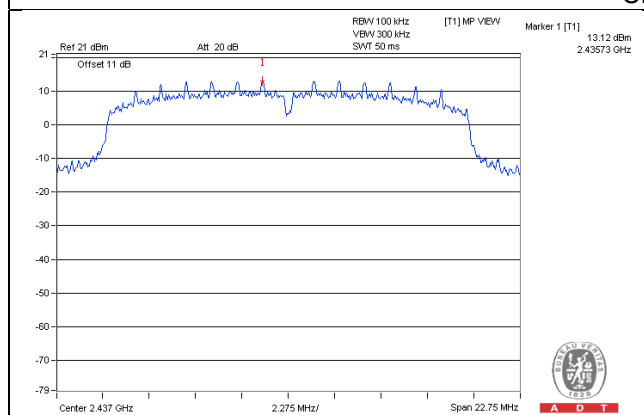
A D T

802.11n (HT20)_CHAIN 0

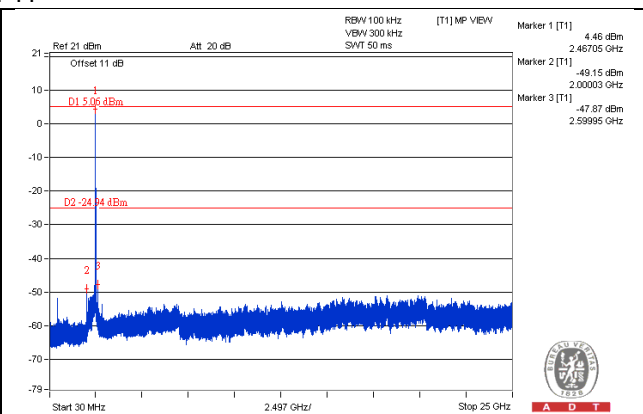
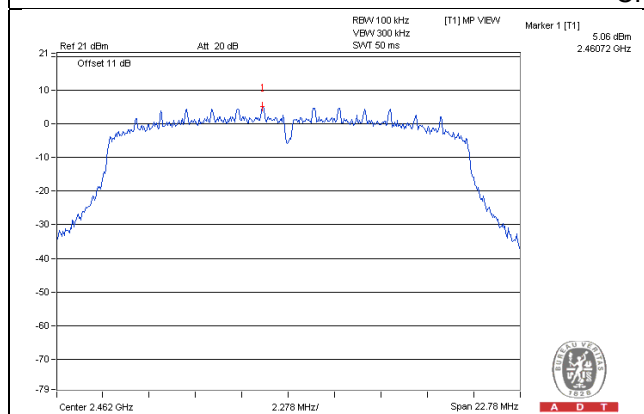
CH 1



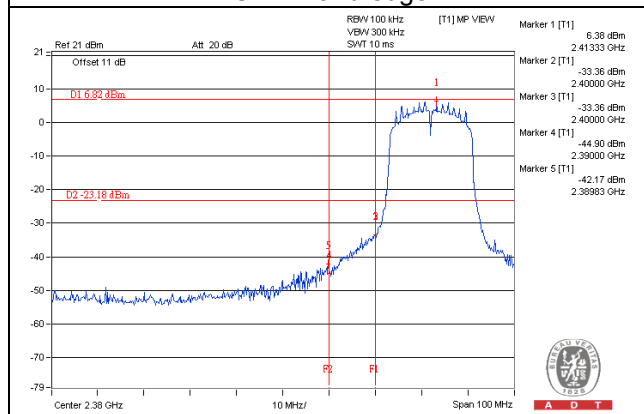
CH 6



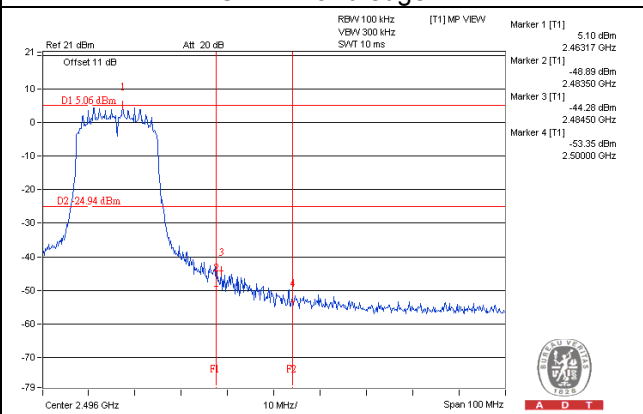
CH 11



CH 1 Band edge

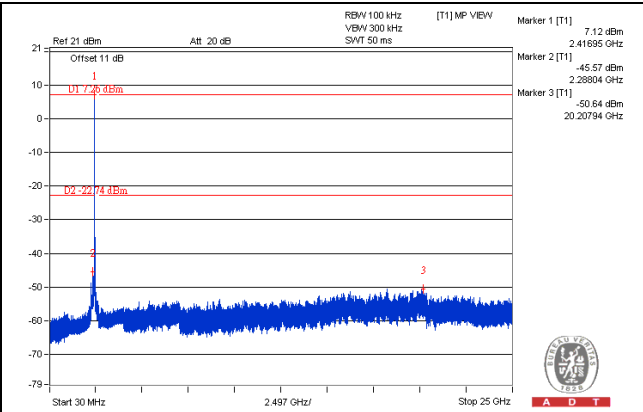
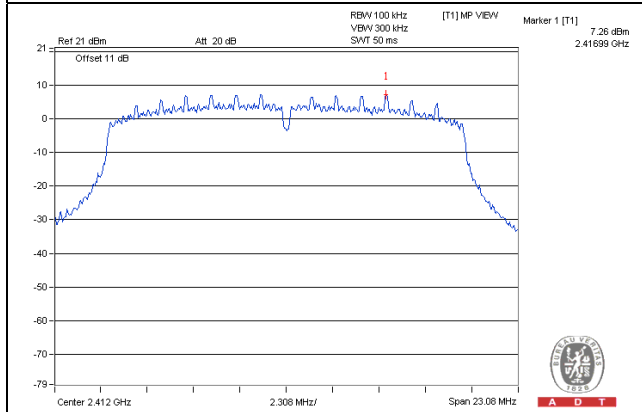


CH 11 Band edge

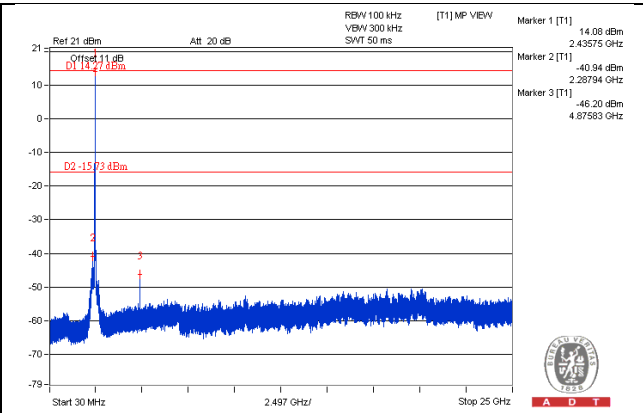
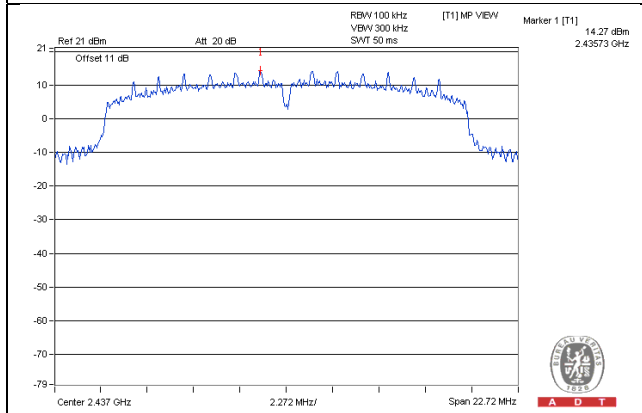


CHAIN 1

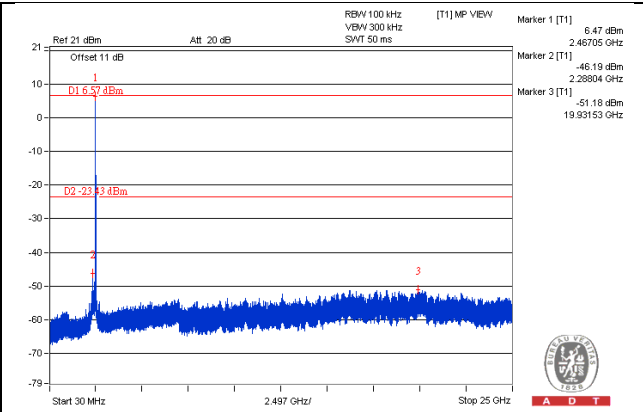
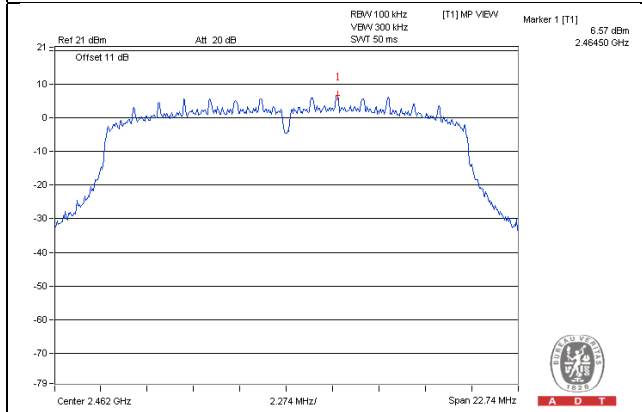
CH 1



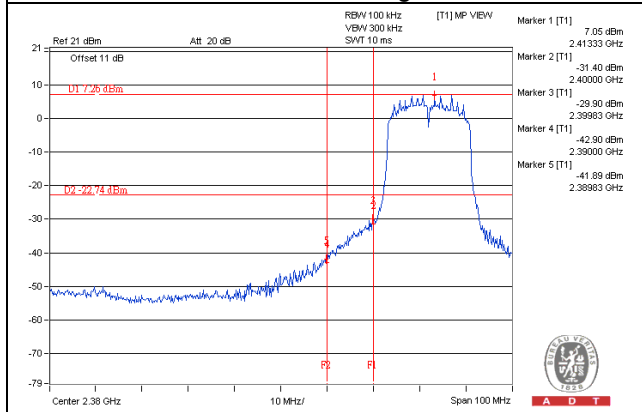
CH 6



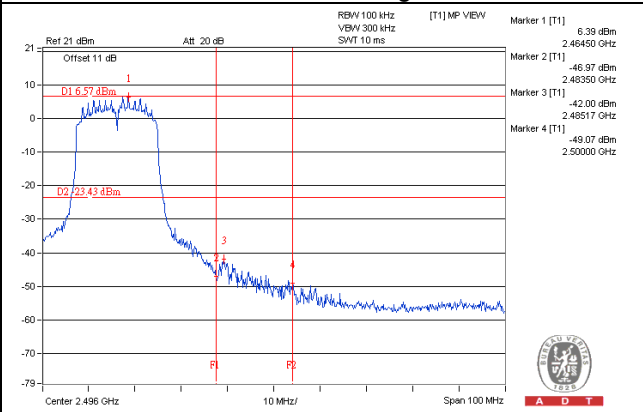
CH 11



CH 1 Band edge

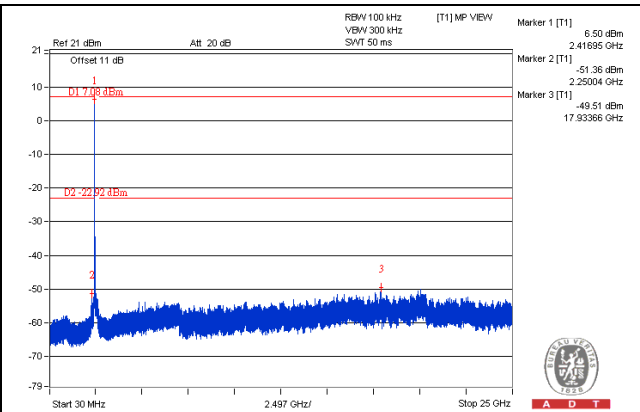
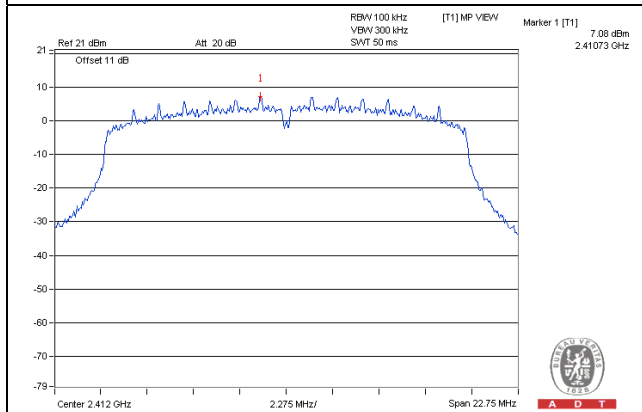


CH 11 Band edge

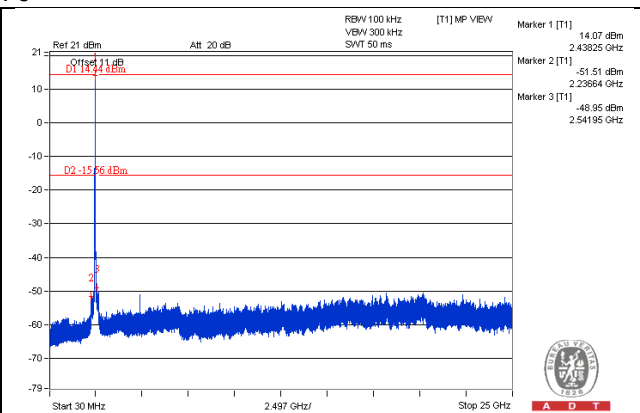
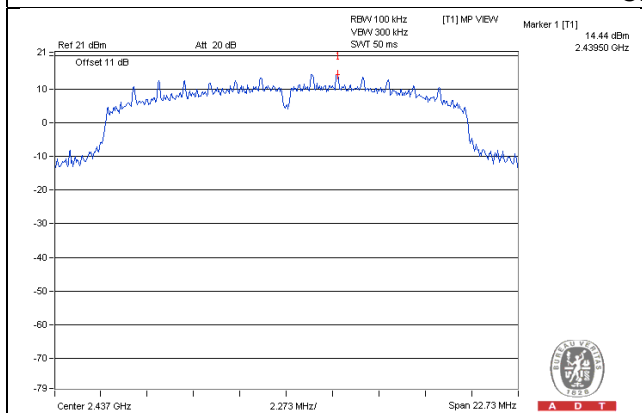


CHAIN 2

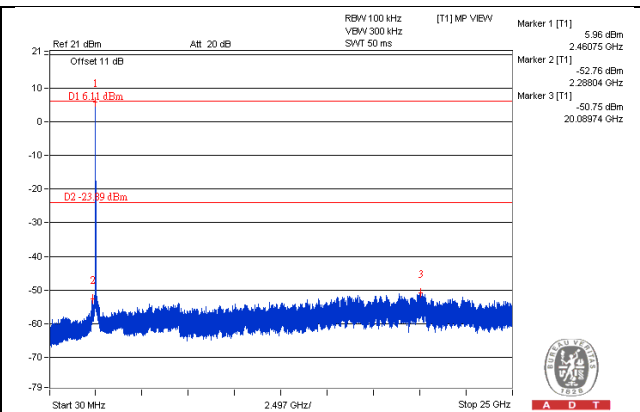
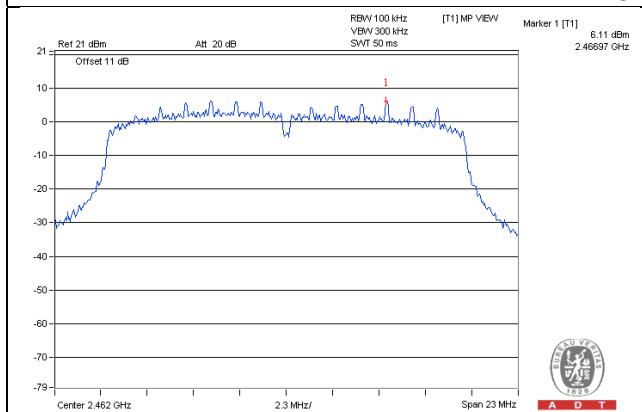
CH 1



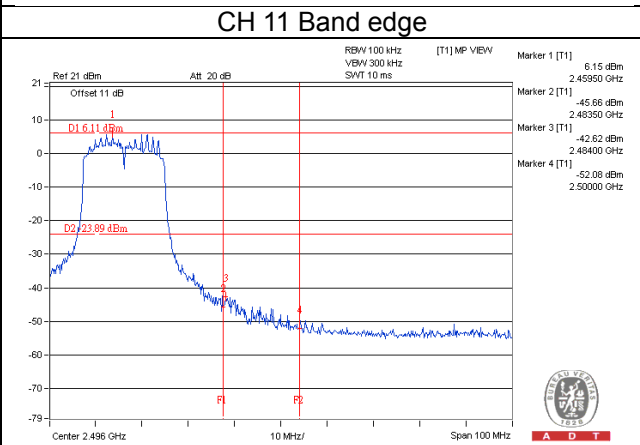
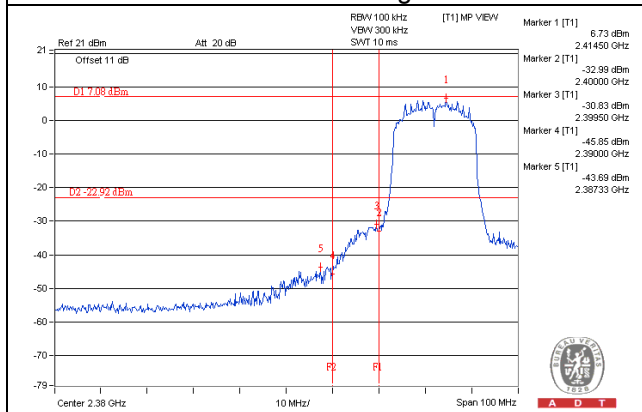
CH 6



CH 11

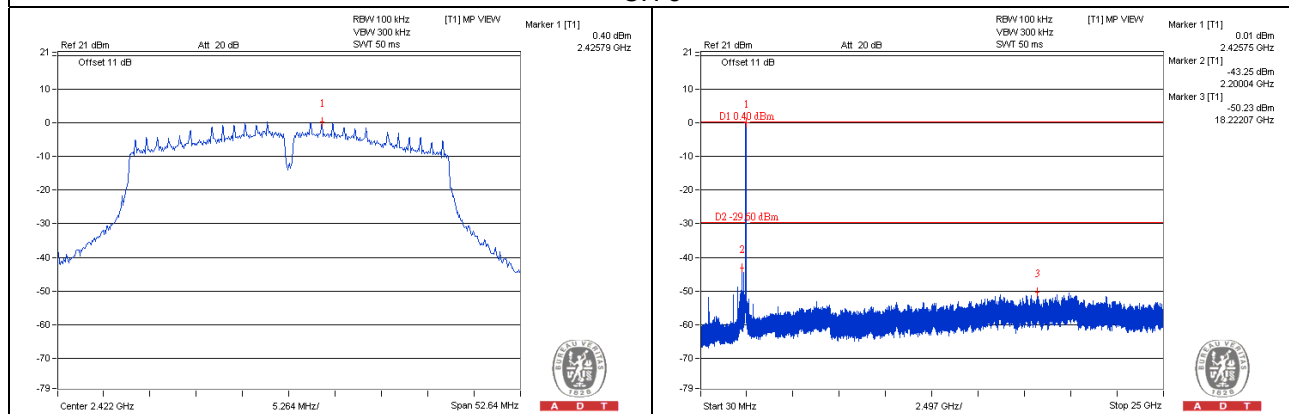


CH 1 Band edge

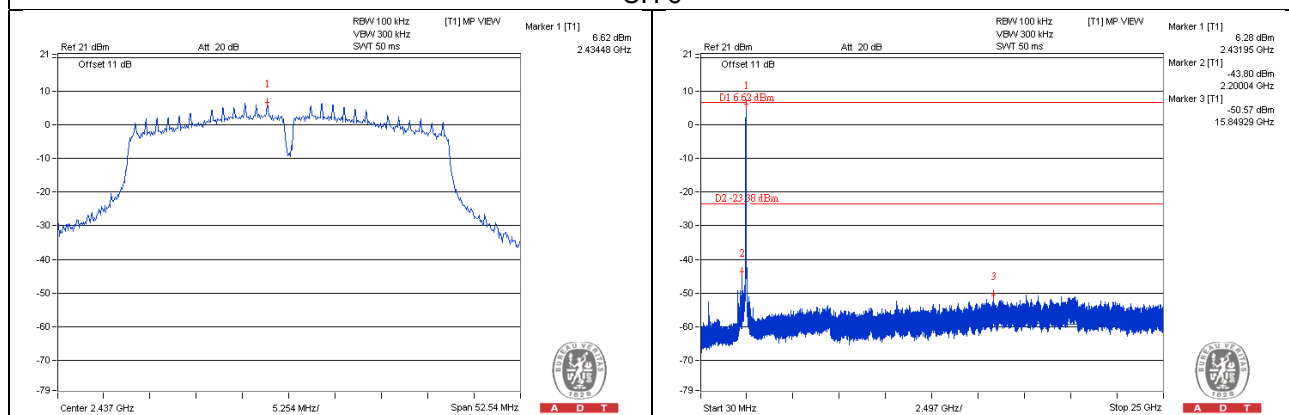


802.11n (HT40)_CHAIN 0

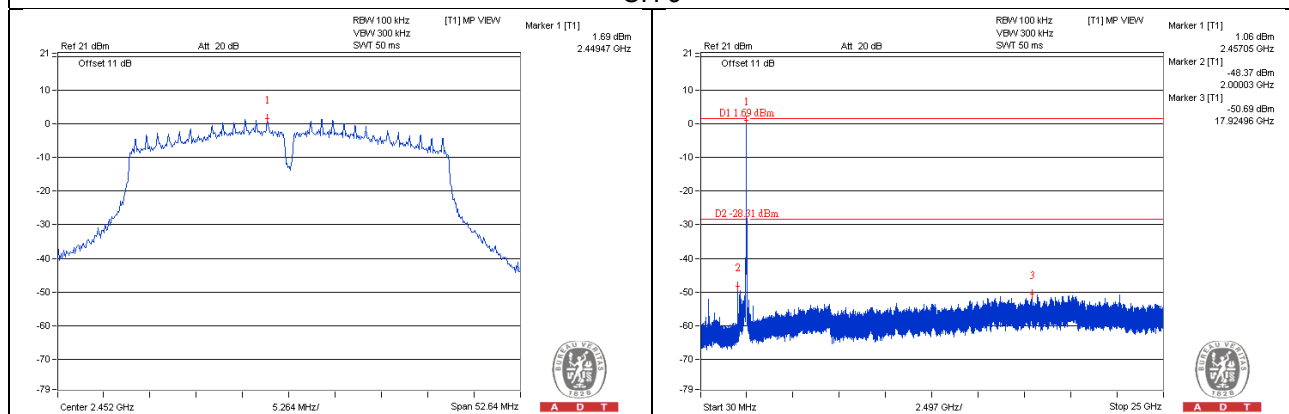
CH 3



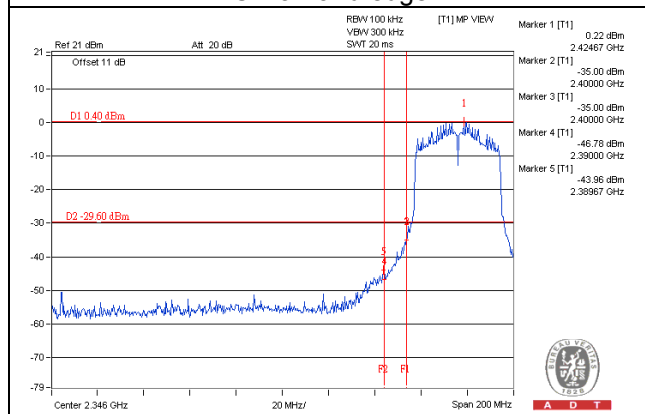
CH 6



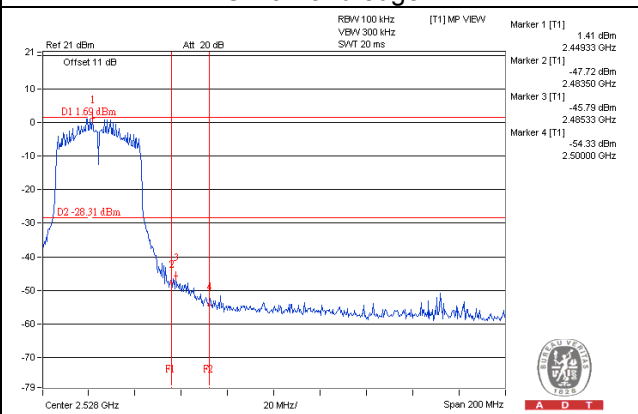
CH 9



CH 3 Band edge

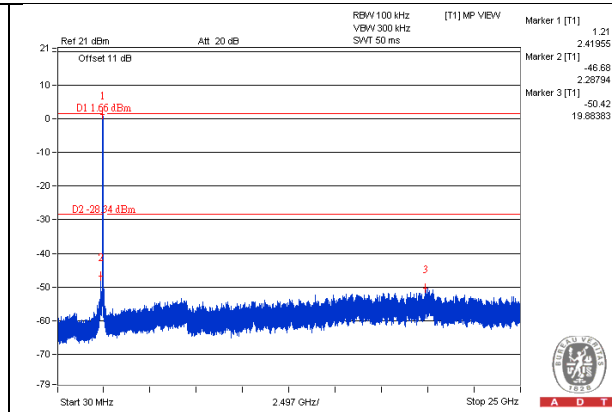
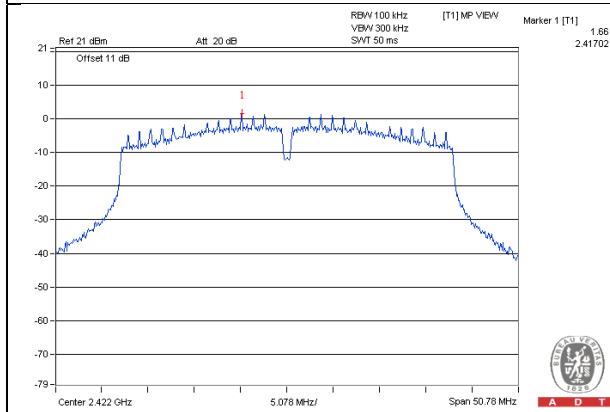


CH 9 Band edge

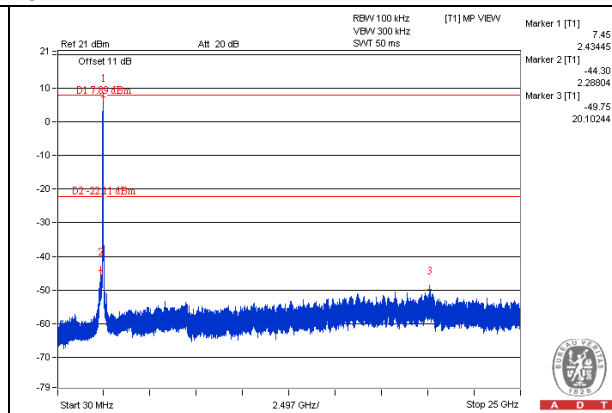
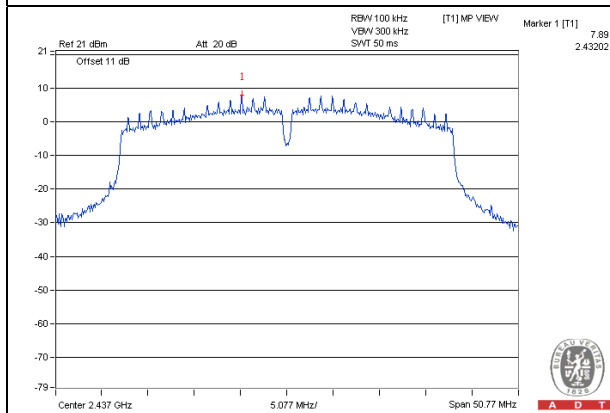


CHAIN 1

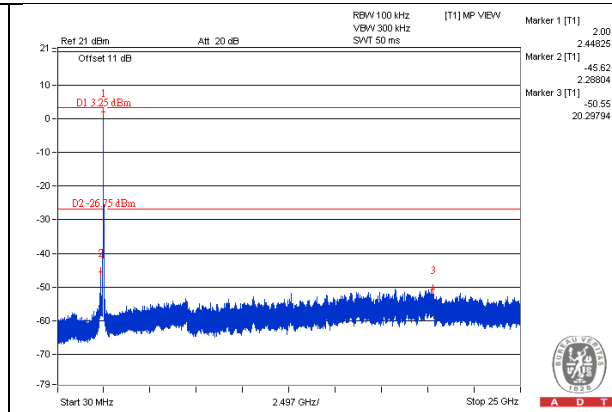
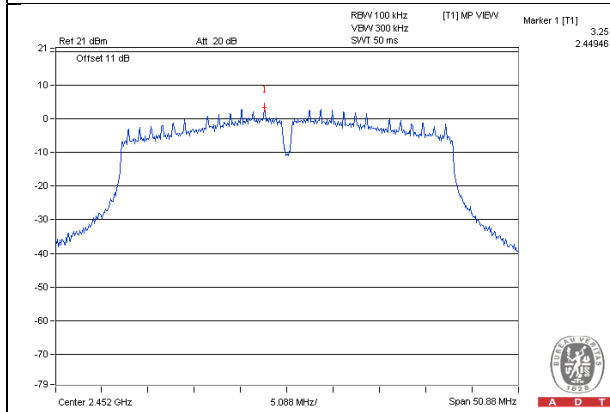
CH 3



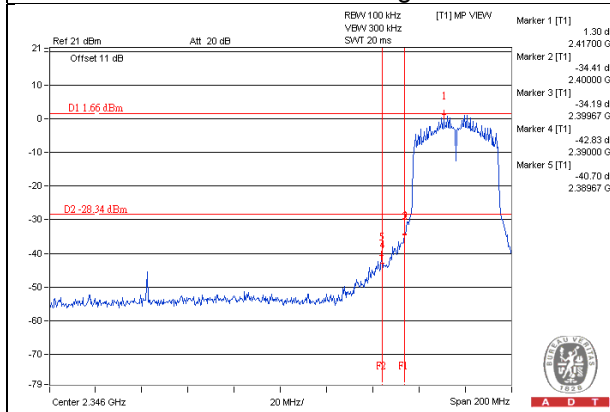
CH 6



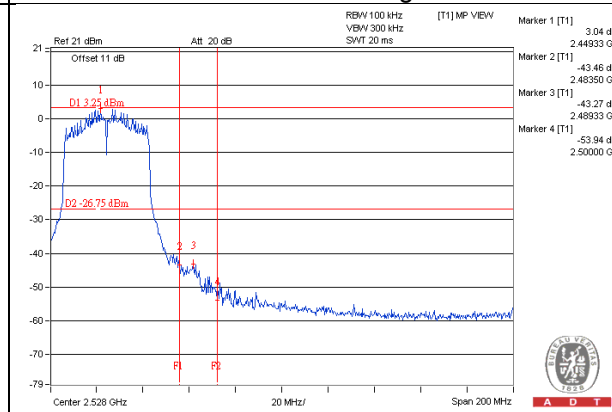
CH 9



CH 3 Band edge

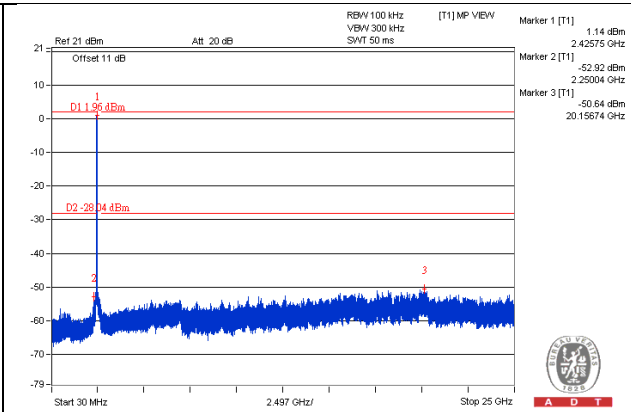
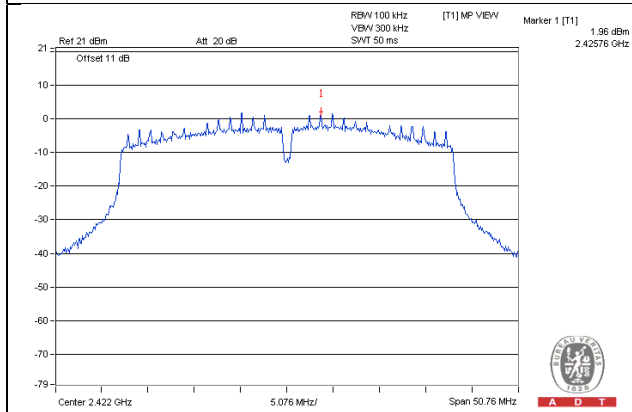


CH 9 Band edge

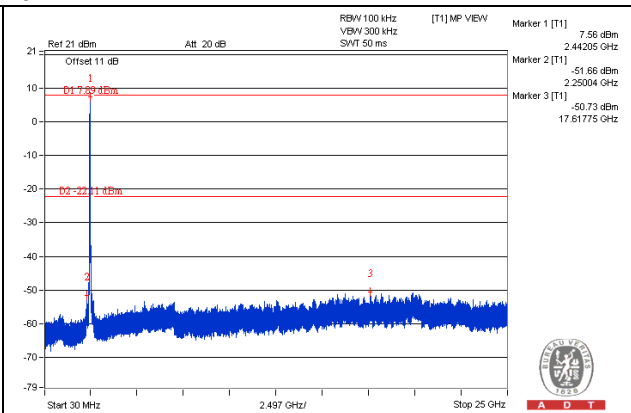
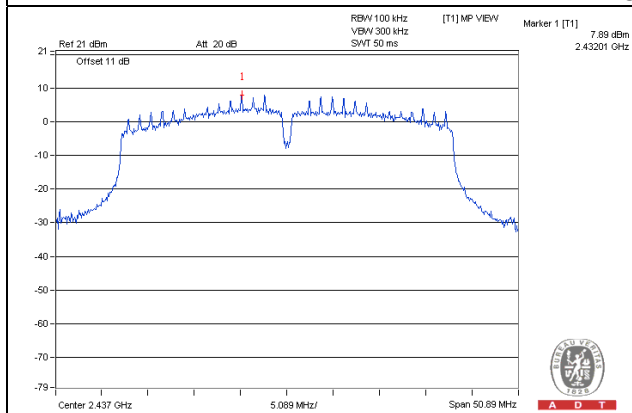


CHAIN 2

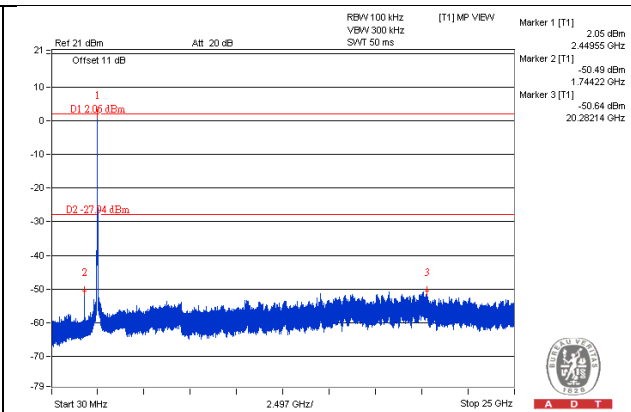
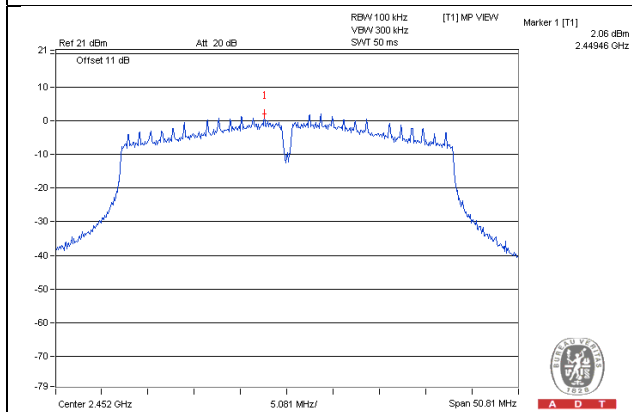
CH 3



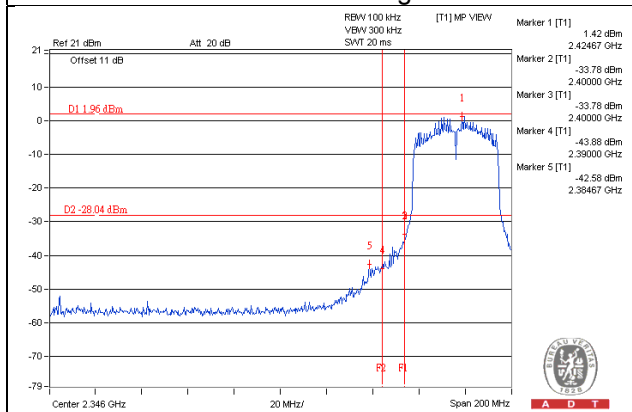
CH 6



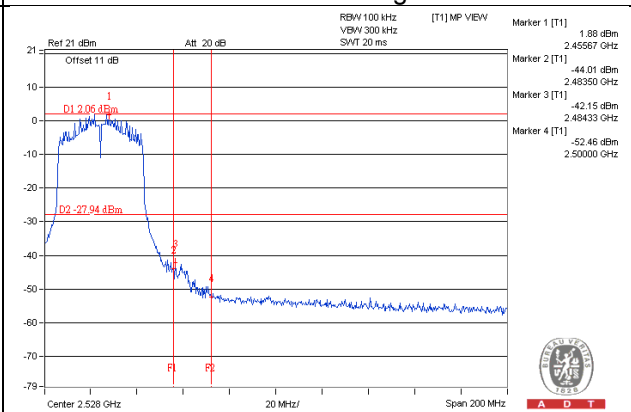
CH 9



CH 3 Band edge



CH 9 Band edge



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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