

FCC Test Report

Report No.: RF160126E16

FCC ID: MQT-T103LE

Test Model: xAPT-103LE

Series Model: xCE_T103LE

Received Date: Feb. 22, 2016

Test Date: Mar. 01 to 07, 2016

Issued Date: Mar. 23, 2016

Applicant: XAC AUTOMATION CORP.

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A D T

Release Control Record

Issue No.	Description	Date Issued
RF160126E16	Original release.	Mar. 23, 2016



A D T

1 Certificate of Conformity

Product: Terminal

Brand: XAC

Test Model: xAPT-103LE

Series Model: xCE_T103LE

Sample Status: ENGINEERING SAMPLE

Applicant: XAC AUTOMATION CORP.

Test Date: Mar. 01 to 07, 2016

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10: 2013

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 :  , **Date:** Mar. 23, 2016
Elsie Hsu / Specialist

Approved by :  , **Date:** Mar. 23, 2016
May Chen / 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 -15.02dB at 23.12891MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 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	No antenna connector is used.

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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.37 dB
Radiated Emissions above 1 GHz	1GHz ~6GHz	3.65 dB
	6GHz ~ 18GHz	3.88 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Terminal
Brand	XAC
Test Model	xAPT-103LE
Series Model	xCE_T103LE
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 12V from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 150Mbps
Operating Frequency	2.412 ~ 2.462GHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	802.11b: 73.79mW 802.11g: 87.297mW 802.11n (HT20): 85.704mW 802.11n (HT40): 85.507mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

- The EUT has two model names which are identical to each other in all aspects except for the following table:

Brand	Model Name	Description
XAC	xAPT-103LE	For marketing requirement
	xCE_T103LE	

From the above models, model: **xAPT-103LE** was selected as representative model for the test and its data was recorded in this report.

- The EUT power needs to be supplied from one power adapter (test only not sale together), the information is as below table:

Brand	Model No.	Spec.
DELTA	ADP-36PH B	AC I/P: 100-240V, 50-60Hz, 1A DC O/P: 12V, 3A DC output cable(Unshielded, 1.8m with one core)

- The antenna provided to the EUT, please refer to the following table:

Transmitter Circuit	Brand	Model No.	Antenna Type	Antenna Connector	Gain(dBi)	Frequency (MHz)
Chain (0)	HUN-PAI	M30-005++-000	PIFA	NA	1.5	2400-2500
Chain (1)					2.9	

NOTE: 1. Chain (0) -- Tx & Rx / Chain (1) -- Rx

4. The EUT incorporates a SISO function.

MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	1TX	1RX(Diversity)
802.11g	6 ~ 54Mbps	1TX	1RX(Diversity)
802.11n (HT20) & 802.11n (HT40)	MCS 0~7	1TX	1RX(Diversity)

5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

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 $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where RE $\geq$ 1G: Radiated Emission above 1GHz & Bandedge Measurement
 RE<1G: Radiated Emission below 1GHz
 PLC: Power Line Conducted Emission
 APCM: Antenna Port Conducted Measurement

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

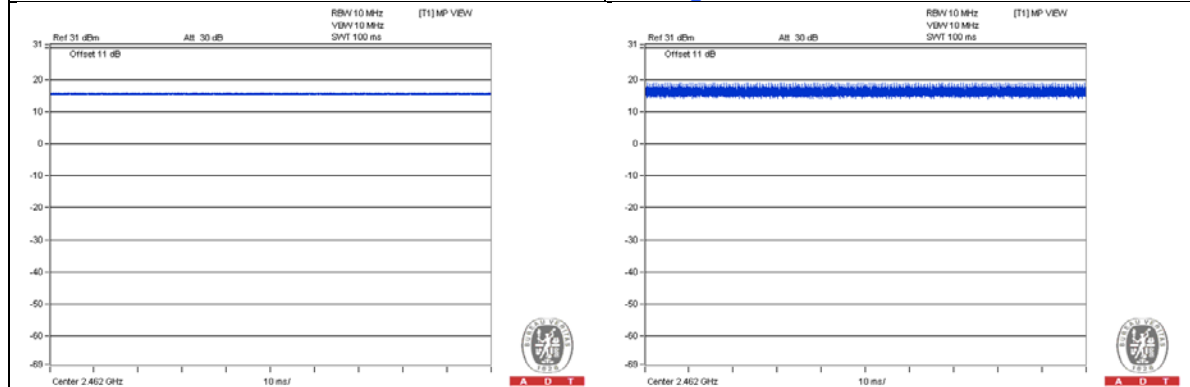
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY	TEST LOCATION
RE $\geq$ 1G	23deg. C, 63%RH	120Vac, 60Hz	Jyunchun Lin	2
RE<1G	21deg. C, 64%RH	120Vac, 60Hz	Jyunchun Lin	2
PLC	20deg. C, 64%RH	120Vac, 60Hz	Timmy Hu	2
APCM	20deg. C, 64%RH	120Vac, 60Hz	Anderson Chen	1

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is 100 %, duty factor is not required.

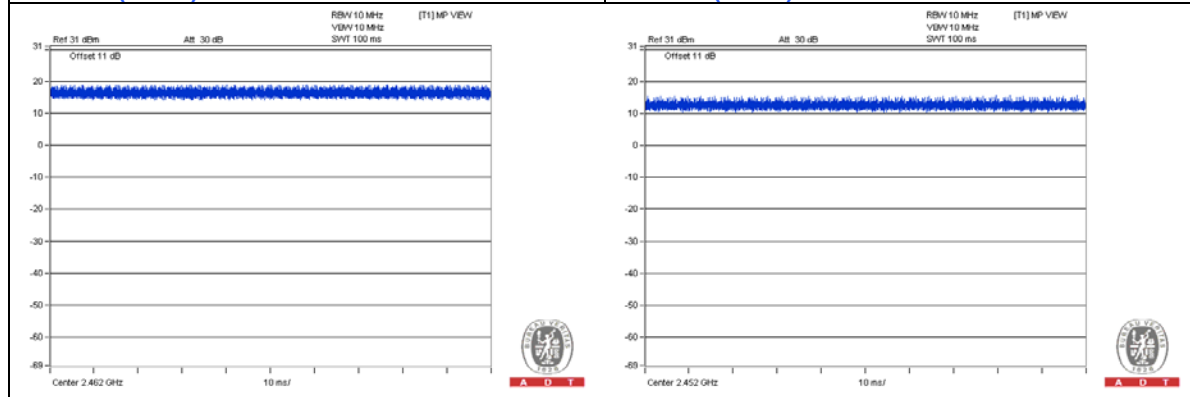
802.11b

802.11g



802.11n (HT20)

802.11n (HT40)



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.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	iPod shuffle	Apple	MC749TA/A	CC4DMFJUDFDM	NA	Provided by Lab
B.	iPod shuffle	Apple	MC749TA/A	CC4DN25WDFDM	NA	Provided by Lab
C.	DELL Notebook	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab
D.	ADAPTER	DELTA	ADP-36PH B	NA	NA	Supplied by Client

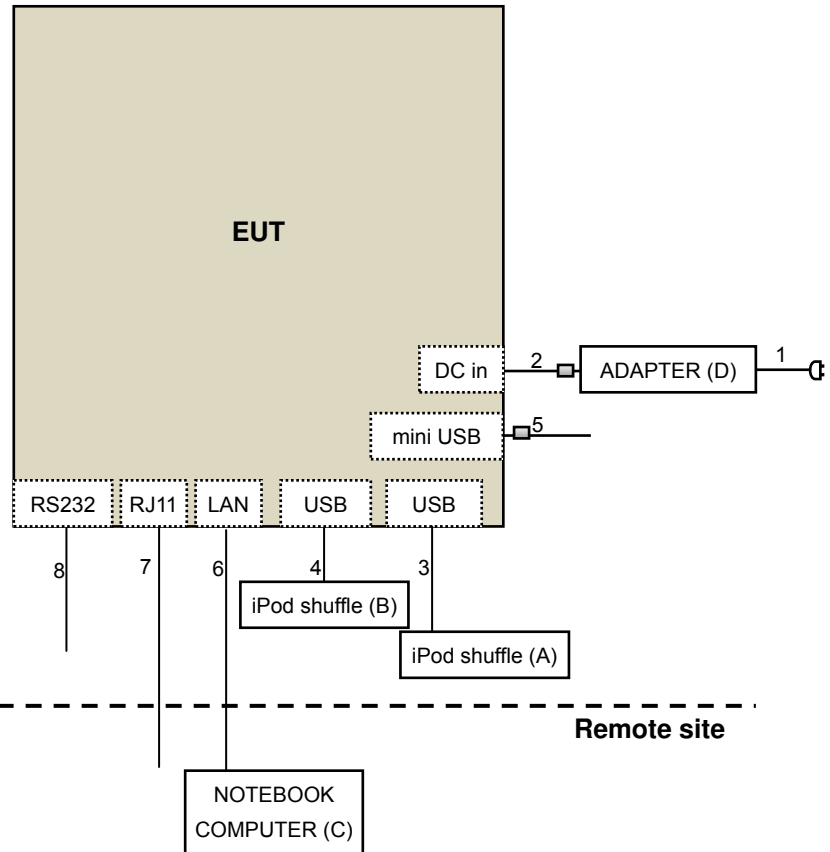
Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	AC	1	0.9	No	0	Supplied by Client
2.	DC	1	1.8	No	1	Supplied by Client
3.	USB	1	0.1	Yes	0	Provided by Lab
4.	USB	1	0.1	Yes	0	Provided by Lab
5.	Mini USB	1	2	Yes	1	Supplied by Client
6.	RJ45	1	10	No	0	Provided by Lab
7.	RJ11	1	10	No	0	Provided by Lab
8.	RS232	1	1.8	No	0	Supplied by Client

Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)

KDB 558074 D01 DTS Meas Guidance v03r05

ANSI C63.10-2013

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

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 20dB 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 20dB under any condition of modulation.

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 24, 2015	July 23, 2016
Pre-Amplifier ^(*) Emci	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna ^(*) Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
Rf Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-03	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna Schwarzbeck	VULB 9168	9168-360	Jan. 04, 2016	Jan. 03, 2017
Rf Cable	8D-FB	CHGCAB-001-1 CHGCAB-001-2	Oct. 03, 2015	Oct. 02, 2016
	RF-141	CHGCAB-004	Oct. 03, 2015	Oct. 02, 2016
Horn_Antenna Aisi	AIH.8018	0000320091110	Jan. 19, 2016	Jan. 18, 2017
Pre-Amplifier Agilent	8449B	3008A02578	June 23, 2015	June 22, 2016
Rf Cable	NA	131205 131216 131217 SNMY23684/4	Jan. 15, 2016	Jan. 14, 2017
Spectrum Analyzer Agilent	E4446A	MY48250254	Nov. 25, 2015	Nov. 24, 2016
Pre-Amplifier Spacek Labs	SLKKA-48-6	9K16	Dec. 11, 2015	Dec. 10, 2016
Horn_Antenna Schwarzbeck	BBHA 9170	9170-424	Jan. 18, 2016	Jan. 17, 2017
Rf Cable	SUCOFLEX 102	36442/2 36434/2	Dec. 10, 2015	Dec.09, 2016
Software	ADT_Radiated_ V8.7.07	NA	NA	NA
Antenna Tower & Turn Table Ct	NA	NA	NA	NA
Power Meter Anritsu	ML2495A	1014008	Apr. 28, 2015	Apr. 27, 2016
Power Sensor Anritsu	MA2411B	0917122	Apr. 28, 2015	Apr. 27, 2016
Spectrum Analyzer R&S	FSP40	100060	May 08, 2015	May 07, 2016

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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Loop antenna was used for all emissions below 30 MHz.
4. The test was performed in 966 Chamber No. G.
5. The FCC Site Registration No. is 966073.
6. The VCCI Site Registration No. is G-137.
7. The CANADA Site Registration No. is IC 7450H-2.
- 8 Tested Date: Mar. 02 to 07, 2016

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) 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:

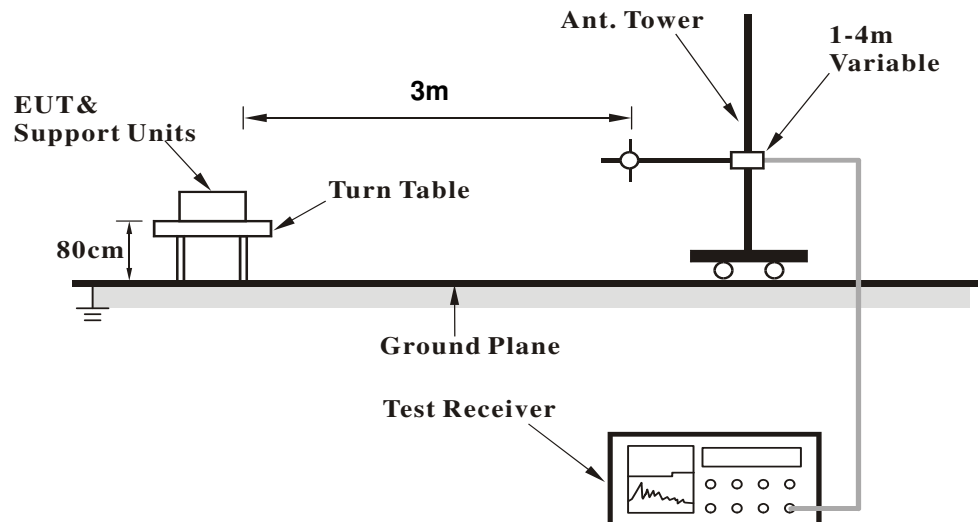
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. 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 ($10 \log(1/\text{duty cycle})$).
4. 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.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

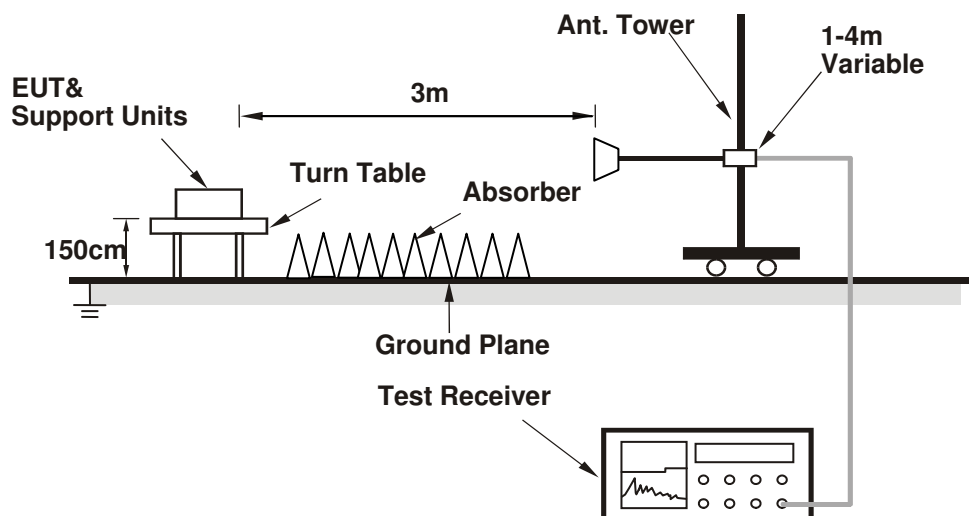
No deviation.

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

- Connected the EUT with the support unit C (Notebook Computer) which is placed on remote site.
- Contorlling software (Realtak 11n8188EUS USB WLAN MP Diagnositc Program 0.0024.20120822) has been activated to set the EUT on specific status.

4.1.7 Test Results

ABOVE 1GHz 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	60.0 PK	74.0	-14.0	1.06 H	207	59.38	0.62
2	2390.00	53.6 AV	54.0	-0.4	1.06 H	207	52.98	0.62
3	*2412.00	109.9 PK			1.06 H	207	109.18	0.72
4	*2412.00	106.4 AV			1.06 H	207	105.68	0.72
5	4824.00	55.7 PK	74.0	-18.3	1.88 H	211	46.42	9.28
6	4824.00	50.5 AV	54.0	-3.5	1.88 H	211	41.22	9.28
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	57.6 PK	74.0	-16.4	1.62 V	200	56.98	0.62
2	2390.00	51.4 AV	54.0	-2.6	1.62 V	200	50.78	0.62
3	*2412.00	107.1 PK			1.62 V	200	106.38	0.72
4	*2412.00	103.6 AV			1.62 V	200	102.88	0.72
5	4824.00	53.6 PK	74.0	-20.4	1.02 V	280	44.32	9.28
6	4824.00	45.7 AV	54.0	-8.3	1.02 V	280	36.42	9.28

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	49.1 PK	74.0	-24.9	1.87 H	238	48.48	0.62
2	2390.00	36.3 AV	54.0	-17.7	1.87 H	238	35.68	0.62
3	*2437.00	105.9 PK			1.87 H	239	105.10	0.80
4	*2437.00	102.5 AV			1.87 H	239	101.70	0.80
5	2483.50	50.1 PK	74.0	-23.9	1.87 H	238	49.15	0.95
6	2483.50	37.7 AV	54.0	-16.3	1.87 H	238	36.75	0.95
7	4874.00	56.9 PK	74.0	-17.1	1.50 H	203	47.50	9.40
8	4874.00	53.4 AV	54.0	-0.6	1.50 H	203	44.00	9.40
9	7311.00	57.6 PK	74.0	-16.4	1.50 H	203	41.22	16.38
10	7311.00	44.8 AV	54.0	-9.2	1.50 H	203	28.42	16.38

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	48.9 PK	74.0	-25.1	1.61 V	214	48.28	0.62
2	2390.00	36.1 AV	54.0	-17.9	1.61 V	214	35.48	0.62
3	*2437.00	103.1 PK			1.61 V	214	102.30	0.80
4	*2437.00	99.7 AV			1.61 V	214	98.90	0.80
5	2483.50	49.3 PK	74.0	-24.7	1.61 V	214	48.35	0.95
6	2483.50	37.2 AV	54.0	-16.8	1.61 V	214	36.25	0.95
7	4874.00	54.8 PK	74.0	-19.2	1.07 V	282	45.40	9.40
8	4874.00	48.6 AV	54.0	-5.4	1.07 V	282	39.20	9.40
9	7311.00	55.5 PK	74.0	-18.5	1.06 V	274	39.12	16.38
10	7311.00	41.9 AV	54.0	-12.1	1.06 V	274	25.52	16.38

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	107.3 PK			1.52 H	209	106.42	0.88
2	*2462.00	103.4 AV			1.52 H	209	102.52	0.88
3	2483.50	53.7 PK	74.0	-20.3	1.52 H	209	52.75	0.95
4	2483.50	41.6 AV	54.0	-12.4	1.52 H	209	40.65	0.95
5	4924.00	57.0 PK	74.0	-17.0	1.55 H	204	47.54	9.46
6	4924.00	53.6 AV	54.0	-0.4	1.55 H	204	44.14	9.46
7	7386.00	58.2 PK	74.0	-15.8	1.55 H	204	42.22	15.98
8	7386.00	44.9 AV	54.0	-9.1	1.55 H	204	28.92	15.98
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	104.5 PK			1.66 V	215	103.62	0.88
2	*2462.00	100.6 AV			1.66 V	215	99.72	0.88
3	2483.50	51.4 PK	74.0	-22.6	1.66 V	215	50.45	0.95
4	2483.50	40.0 AV	54.0	-14.0	1.66 V	215	39.05	0.95
5	4924.00	55.0 PK	74.0	-19.0	1.05 V	293	45.54	9.46
6	4924.00	48.9 AV	54.0	-5.1	1.05 V	293	39.44	9.46
7	7386.00	55.3 PK	74.0	-18.7	1.10 V	259	39.32	15.98
8	7386.00	41.9 AV	54.0	-12.1	1.10 V	259	25.92	15.98

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	69.2 PK	74.0	-4.8	1.07 H	203	68.58	0.62
2	2390.00	45.3 AV	54.0	-8.7	1.07 H	203	44.68	0.62
3	*2412.00	105.1 PK			1.07 H	203	104.38	0.72
4	*2412.00	95.8 AV			1.07 H	203	95.08	0.72
5	4824.00	50.2 PK	74.0	-23.8	1.71 H	190	40.92	9.28
6	4824.00	40.8 AV	54.0	-13.2	1.71 H	190	31.52	9.28
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	66.4 PK	74.0	-7.6	1.62 V	203	65.78	0.62
2	2390.00	42.6 AV	54.0	-11.4	1.62 V	203	41.98	0.62
3	*2412.00	102.3 PK			1.62 V	203	101.58	0.72
4	*2412.00	93.0 AV			1.62 V	203	92.28	0.72
5	4824.00	49.9 PK	74.0	-24.1	1.14 V	265	40.62	9.28
6	4824.00	40.6 AV	54.0	-13.4	1.14 V	265	31.32	9.28

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	62.3 PK	74.0	-11.7	1.00 H	339	61.68	0.62
2	2390.00	46.8 AV	54.0	-7.2	1.00 H	339	46.18	0.62
3	*2437.00	103.2 PK			1.00 H	339	102.40	0.80
4	*2437.00	93.8 AV			1.00 H	339	93.00	0.80
5	2483.50	61.4 PK	74.0	-12.6	1.00 H	339	60.45	0.95
6	2483.50	47.0 AV	54.0	-7.0	1.00 H	339	46.05	0.95
7	4874.00	50.9 PK	74.0	-23.1	1.68 H	194	41.50	9.40
8	4874.00	41.2 AV	54.0	-12.8	1.68 H	194	31.80	9.40
9	7311.00	54.9 PK	74.0	-19.1	1.54 H	215	38.52	16.38
10	7311.00	43.6 AV	54.0	-10.4	1.54 H	215	27.22	16.38

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	59.5 PK	74.0	-14.5	1.63 V	220	58.88	0.62
2	2390.00	44.1 AV	54.0	-9.9	1.63 V	220	43.48	0.62
3	*2437.00	100.4 PK			1.63 V	220	99.60	0.80
4	*2437.00	91.0 AV			1.63 V	220	90.20	0.80
5	2483.50	58.6 PK	74.0	-15.4	1.63 V	220	57.65	0.95
6	2483.50	44.3 AV	54.0	-9.7	1.63 V	220	43.35	0.95
7	4874.00	49.7 PK	74.0	-24.3	1.03 V	283	40.30	9.40
8	4874.00	40.6 AV	54.0	-13.4	1.03 V	283	31.20	9.40
9	7311.00	54.5 PK	74.0	-19.5	1.10 V	264	38.12	16.38
10	7311.00	43.3 AV	54.0	-10.7	1.10 V	264	26.92	16.38

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	102.5 PK			1.00 H	338	101.62	0.88
2	*2462.00	93.1 AV			1.00 H	338	92.22	0.88
3	2483.50	70.4 PK	74.0	-3.6	1.00 H	338	69.45	0.95
4	2483.50	49.1 AV	54.0	-4.9	1.00 H	338	48.15	0.95
5	4924.00	50.4 PK	74.0	-23.6	1.71 H	183	40.94	9.46
6	4924.00	40.7 AV	54.0	-13.3	1.71 H	183	31.24	9.46
7	7386.00	55.3 PK	74.0	-18.7	1.56 H	212	39.32	15.98
8	7386.00	44.0 AV	54.0	-10.0	1.56 H	212	28.02	15.98
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	99.7 PK			1.60 V	210	98.82	0.88
2	*2462.00	90.3 AV			1.60 V	210	89.42	0.88
3	2483.50	67.6 PK	74.0	-6.4	1.60 V	210	66.65	0.95
4	2483.50	46.4 AV	54.0	-7.6	1.60 V	210	45.45	0.95
5	4924.00	49.7 PK	74.0	-24.3	1.12 V	267	40.24	9.46
6	4924.00	40.4 AV	54.0	-13.6	1.12 V	267	30.94	9.46
7	7386.00	54.4 PK	74.0	-19.6	1.08 V	279	38.42	15.98
8	7386.00	43.2 AV	54.0	-10.8	1.08 V	279	27.22	15.98

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	66.4 PK	74.0	-7.6	1.00 H	341	65.78	0.62
2	2390.00	44.9 AV	54.0	-9.1	1.00 H	341	44.28	0.62
3	*2412.00	103.2 PK			1.00 H	341	102.48	0.72
4	*2412.00	93.7 AV			1.00 H	341	92.98	0.72
5	4824.00	50.5 PK	74.0	-23.5	1.70 H	191	41.22	9.28
6	4824.00	41.3 AV	54.0	-12.7	1.70 H	191	32.02	9.28

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	63.6 PK	74.0	-10.4	1.64 V	226	62.98	0.62
2	2390.00	42.2 AV	54.0	-11.8	1.64 V	226	41.58	0.62
3	*2412.00	100.4 PK			1.64 V	226	99.68	0.72
4	*2412.00	90.9 AV			1.64 V	226	90.18	0.72
5	4824.00	49.6 PK	74.0	-24.4	1.08 V	281	40.32	9.28
6	4824.00	40.4 AV	54.0	-13.6	1.08 V	281	31.12	9.28

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	64.3 PK	74.0	-9.7	1.00 H	339	63.68	0.62
2	2390.00	40.3 AV	54.0	-13.7	1.00 H	339	39.68	0.62
3	*2437.00	104.9 PK			1.00 H	339	104.10	0.80
4	*2437.00	94.7 AV			1.00 H	339	93.90	0.80
5	2483.50	63.2 PK	74.0	-10.8	1.00 H	339	62.25	0.95
6	2483.50	40.3 AV	54.0	-13.7	1.00 H	339	39.35	0.95
7	4874.00	50.0 PK	74.0	-24.0	1.76 H	181	40.60	9.40
8	4874.00	40.4 AV	54.0	-13.6	1.76 H	181	31.00	9.40
9	7311.00	54.8 PK	74.0	-19.2	1.52 H	220	38.42	16.38
10	7311.00	43.6 AV	54.0	-10.4	1.52 H	220	27.22	16.38

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	61.5 PK	74.0	-12.5	1.68 V	229	60.88	0.62
2	2390.00	37.5 AV	54.0	-16.5	1.68 V	229	36.88	0.62
3	*2437.00	102.1 PK			1.68 V	229	101.30	0.80
4	*2437.00	91.9 AV			1.68 V	229	91.10	0.80
5	2483.50	60.4 PK	74.0	-13.6	1.68 V	229	59.45	0.95
6	2483.50	37.4 AV	54.0	-16.6	1.68 V	229	36.45	0.95
7	4874.00	49.6 PK	74.0	-24.4	1.04 V	282	40.20	9.40
8	4874.00	40.4 AV	54.0	-13.6	1.04 V	282	31.00	9.40
9	7311.00	54.7 PK	74.0	-19.3	1.12 V	289	38.32	16.38
10	7311.00	43.2 AV	54.0	-10.8	1.12 V	289	26.82	16.38

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	102.8 PK			1.00 H	337	101.92	0.88
2	*2462.00	92.8 AV			1.00 H	337	91.92	0.88
3	2483.50	73.9 PK	74.0	-0.1	1.00 H	337	72.95	0.95
4	2483.50	51.1 AV	54.0	-2.9	1.00 H	337	50.15	0.95
5	4924.00	49.8 PK	74.0	-24.2	1.73 H	193	40.34	9.46
6	4924.00	40.3 AV	54.0	-13.7	1.73 H	193	30.84	9.46
7	7386.00	55.5 PK	74.0	-18.5	1.59 H	219	39.52	15.98
8	7386.00	44.1 AV	54.0	-9.9	1.59 H	219	28.12	15.98
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	100.0 PK			1.69 V	212	99.12	0.88
2	*2462.00	90.0 AV			1.69 V	212	89.12	0.88
3	2483.50	71.1 PK	74.0	-2.9	1.69 V	212	70.15	0.95
4	2483.50	48.3 AV	54.0	-5.7	1.69 V	212	47.35	0.95
5	4924.00	49.7 PK	74.0	-24.3	1.03 V	282	40.24	9.46
6	4924.00	40.5 AV	54.0	-13.5	1.03 V	282	31.04	9.46
7	7386.00	54.3 PK	74.0	-19.7	1.02 V	287	38.32	15.98
8	7386.00	43.2 AV	54.0	-10.8	1.02 V	287	27.22	15.98

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 (HT40)

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	66.8 PK	74.0	-7.2	1.00 H	339	66.18	0.62
2	2390.00	45.9 AV	54.0	-8.1	1.00 H	339	45.28	0.62
3	*2422.00	101.2 PK			1.00 H	339	100.45	0.75
4	*2422.00	91.2 AV			1.00 H	339	90.45	0.75
5	4844.00	50.7 PK	74.0	-23.3	1.67 H	187	41.38	9.32
6	4844.00	41.2 AV	54.0	-12.8	1.67 H	187	31.88	9.32
7	7266.00	55.3 PK	74.0	-18.7	1.57 H	223	38.74	16.56
8	7266.00	44.0 AV	54.0	-10.0	1.57 H	223	27.44	16.56
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	64.1 PK	74.0	-9.9	1.70 V	226	63.48	0.62
2	2390.00	43.1 AV	54.0	-10.9	1.70 V	226	42.48	0.62
3	*2422.00	98.4 PK			1.70 V	226	97.65	0.75
4	*2422.00	88.4 AV			1.70 V	226	87.65	0.75
5	4844.00	49.9 PK	74.0	-24.1	1.10 V	296	40.58	9.32
6	4844.00	40.5 AV	54.0	-13.5	1.10 V	296	31.18	9.32
7	7266.00	55.0 PK	74.0	-19.0	1.09 V	289	38.44	16.56
8	7266.00	43.5 AV	54.0	-10.5	1.09 V	289	26.94	16.56

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	61.4 PK	74.0	-12.6	1.00 H	338	60.78	0.62
2	2390.00	41.5 AV	54.0	-12.5	1.00 H	338	40.88	0.62
3	*2437.00	101.1 PK			1.00 H	338	100.30	0.80
4	*2437.00	90.8 AV			1.00 H	338	90.00	0.80
5	2483.50	66.2 PK	74.0	-7.8	1.00 H	338	65.25	0.95
6	2483.50	44.1 AV	54.0	-9.9	1.00 H	338	43.15	0.95
7	4874.00	50.3 PK	74.0	-23.7	1.67 H	201	40.90	9.40
8	4874.00	40.9 AV	54.0	-13.1	1.67 H	201	31.50	9.40
9	7311.00	54.6 PK	74.0	-19.4	1.58 H	225	38.22	16.38
10	7311.00	43.4 AV	54.0	-10.6	1.58 H	225	27.02	16.38

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	58.6 PK	74.0	-15.4	1.71 V	204	57.98	0.62
2	2390.00	38.9 AV	54.0	-15.1	1.71 V	204	38.28	0.62
3	*2437.00	98.3 PK			1.71 V	204	97.50	0.80
4	*2437.00	88.0 AV			1.71 V	204	87.20	0.80
5	2483.50	63.4 PK	74.0	-10.6	1.71 V	204	62.45	0.95
6	2483.50	41.4 AV	54.0	-12.6	1.71 V	204	40.45	0.95
7	4874.00	49.7 PK	74.0	-24.3	1.07 V	278	40.30	9.40
8	4874.00	40.6 AV	54.0	-13.4	1.07 V	278	31.20	9.40
9	7311.00	54.2 PK	74.0	-19.8	1.01 V	272	37.82	16.38
10	7311.00	43.2 AV	54.0	-10.8	1.01 V	272	26.82	16.38

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 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	100.9 PK			1.00 H	338	100.06	0.84
2	*2452.00	90.7 AV			1.00 H	338	89.86	0.84
3	2483.50	71.2 PK	74.0	-2.8	1.00 H	338	70.25	0.95
4	2483.50	51.8 AV	54.0	-2.2	1.00 H	338	50.85	0.95
5	4904.00	50.3 PK	74.0	-23.7	1.70 H	185	40.85	9.45
6	4904.00	41.1 AV	54.0	-12.9	1.70 H	185	31.65	9.45
7	7356.00	54.7 PK	74.0	-19.3	1.57 H	211	38.56	16.14
8	7356.00	43.7 AV	54.0	-10.3	1.57 H	211	27.56	16.14
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	98.1 PK			1.64 V	204	97.26	0.84
2	*2452.00	87.9 AV			1.64 V	204	87.06	0.84
3	2483.50	68.5 PK	74.0	-5.5	1.64 V	204	67.55	0.95
4	2483.50	49.1 AV	54.0	-4.9	1.64 V	204	48.15	0.95
5	4904.00	49.4 PK	74.0	-24.6	1.02 V	269	39.95	9.45
6	4904.00	40.3 AV	54.0	-13.7	1.02 V	269	30.85	9.45
7	7356.00	54.5 PK	74.0	-19.5	1.04 V	283	38.36	16.14
8	7356.00	43.4 AV	54.0	-10.6	1.04 V	283	27.26	16.14

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.

BELOW 1GHz WORST-CASE DATA

802.11g

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	Below 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	176.01	40.1 QP	43.5	-3.5	1.50 H	331	48.95	-8.90
2	240.01	44.0 QP	46.0	-2.0	1.00 H	116	53.11	-9.15
3	373.33	40.8 QP	46.0	-5.2	1.00 H	111	45.48	-4.64
4	400.01	41.0 QP	46.0	-5.0	2.50 H	132	45.06	-4.06
5	655.99	39.3 QP	46.0	-6.7	1.50 H	198	37.54	1.74
6	800.03	39.2 QP	46.0	-6.8	1.00 H	66	34.92	4.27
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	62.98	36.7 QP	40.0	-3.3	1.00 V	84	45.69	-8.98
2	160.00	40.1 QP	43.5	-3.4	1.00 V	360	47.69	-7.63
3	240.01	40.9 QP	46.0	-5.1	1.00 V	278	50.08	-9.15
4	399.98	40.7 QP	46.0	-5.3	1.50 V	260	44.75	-4.06
5	431.99	39.9 QP	46.0	-6.1	1.50 V	264	42.72	-2.80
6	500.01	40.2 QP	46.0	-5.8	1.00 V	111	41.71	-1.49

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

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.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	100375	May 06, 2015	May 05, 2016
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 01, 2015	Aug. 31, 2016
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 11, 2015	June 10, 2016
RF Cable	5D-FB	COCCAB-001	Mar. 09, 2015	Mar. 08, 2016
50 ohms Terminator	N/A	EMC-03	Sep. 23, 2015	Sep. 22, 2016
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2015	Sep. 30, 2016
Software BVADT	BVADT_Cond_ V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
- 3 The VCCI Con C Registration No. is C-3611.
- 4 Tested Date: Mar. 01, 2016

4.2.3 Test Procedures

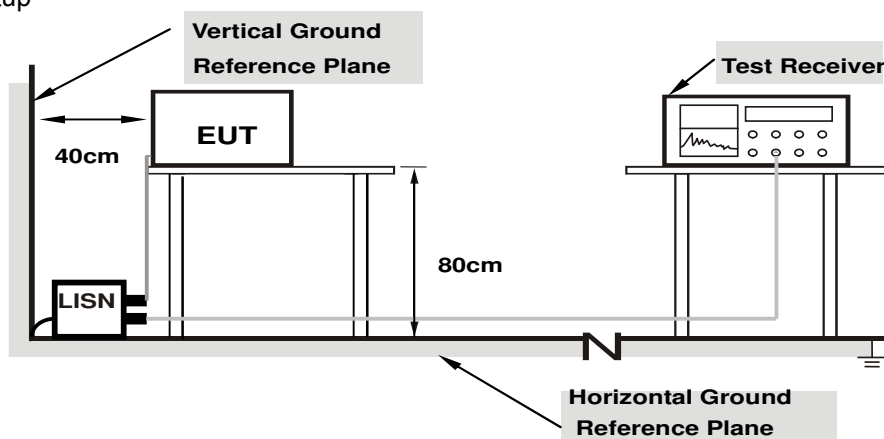
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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) was 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.

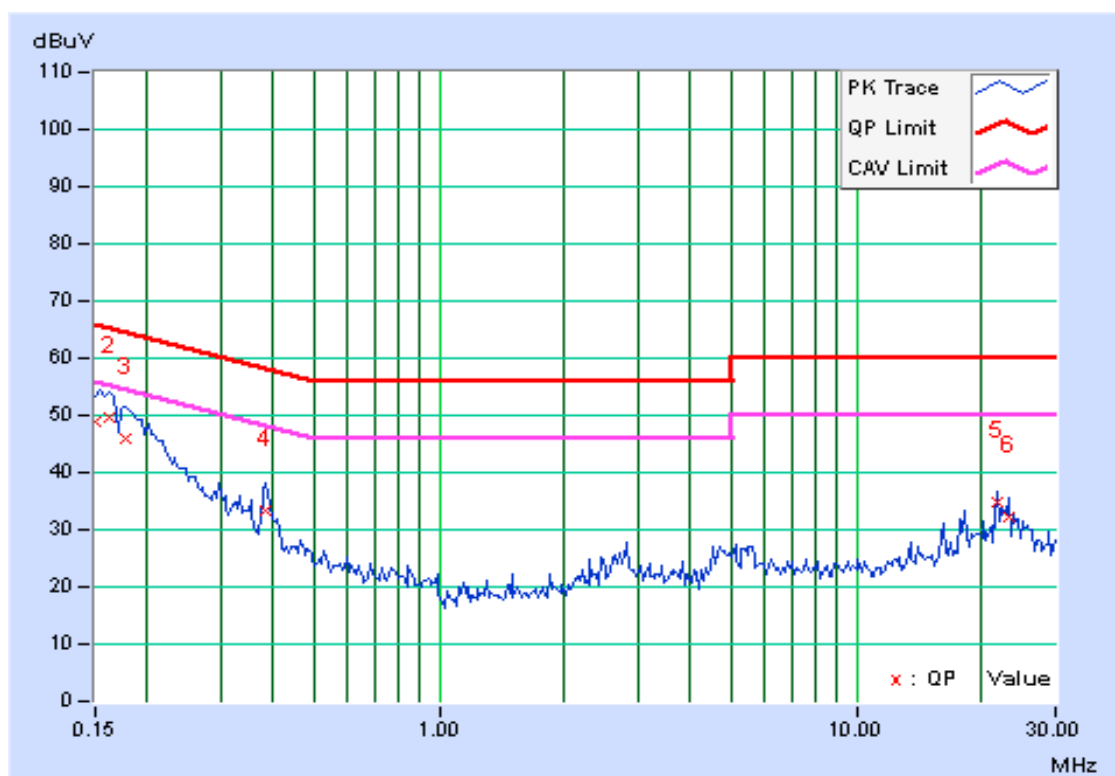
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.26	38.47	21.77	48.73	32.03	66.00	56.00	-17.27	-23.97
2	0.16172	10.25	39.21	21.65	49.46	31.90	65.38	55.38	-15.91	-23.47
3	0.17734	10.24	35.85	18.54	46.09	28.78	64.61	54.61	-18.52	-25.83
4	0.38438	10.24	23.06	12.89	33.30	23.13	58.18	48.18	-24.89	-25.06
5	21.66406	10.94	24.05	19.30	34.99	30.24	60.00	50.00	-25.01	-19.76
6	23.07031	10.96	21.33	19.68	32.29	30.64	60.00	50.00	-27.71	-19.36

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.

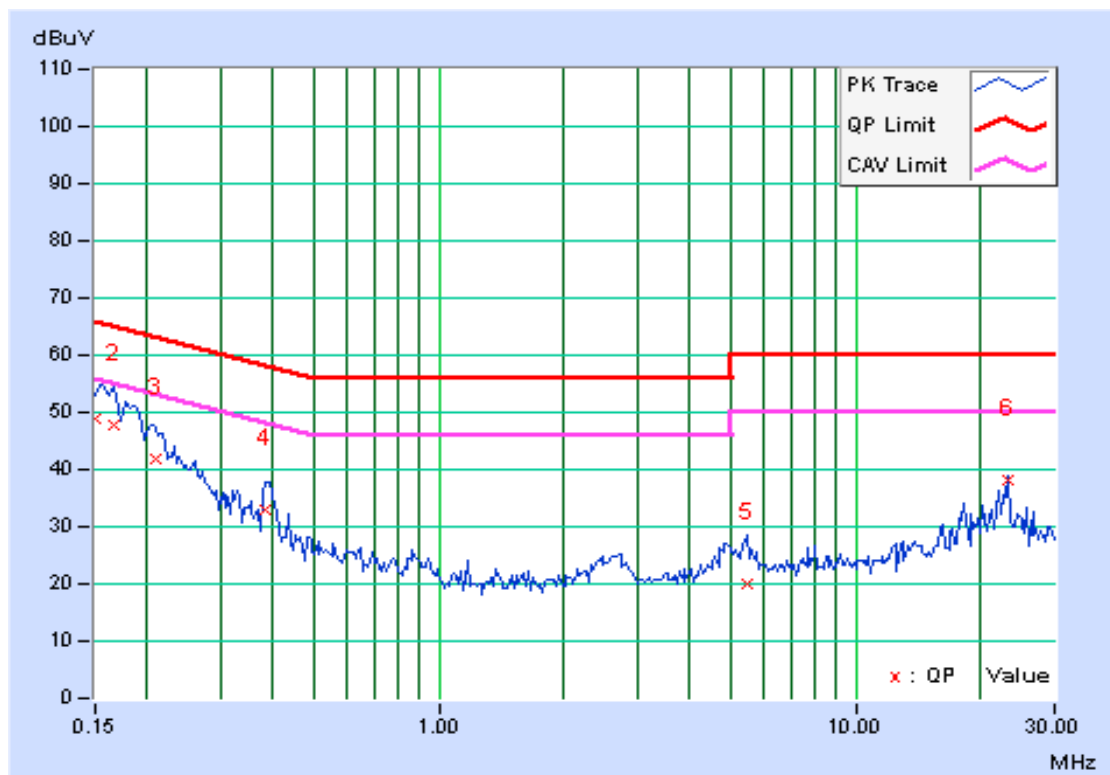


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.24	38.53	21.89	48.77	32.13	66.00	56.00	-17.23	-23.87
2	0.16562	10.23	37.54	19.11	47.77	29.34	65.18	55.18	-17.41	-25.84
3	0.20859	10.20	31.55	18.24	41.75	28.44	63.26	53.26	-21.51	-24.82
4	0.38438	10.22	22.92	14.48	33.14	24.70	58.18	48.18	-25.05	-23.49
5	5.47266	10.42	9.67	2.92	20.09	13.34	60.00	50.00	-39.91	-36.66
6	23.12891	10.98	27.14	24.00	38.12	34.98	60.00	50.00	-21.88	-15.02

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.

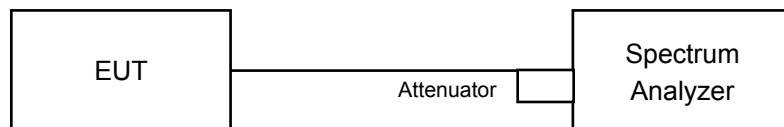


4.3 6dB Bandwidth Measurement

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

- 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
1	2412	9.59	0.5	PASS
6	2437	10.09	0.5	PASS
11	2462	10.09	0.5	PASS

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.64	0.5	PASS
6	2437	16.63	0.5	PASS
11	2462	16.60	0.5	PASS

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.87	0.5	Pass
6	2437	17.85	0.5	Pass
11	2462	17.86	0.5	Pass

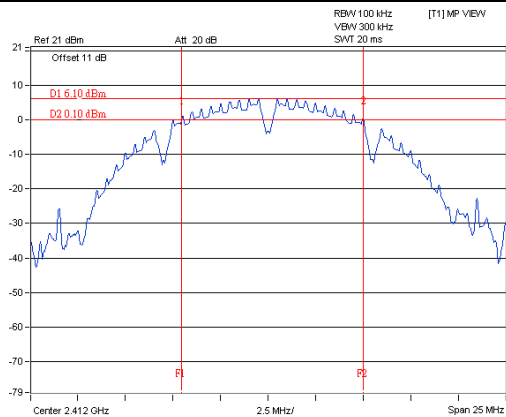
802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	36.50	0.5	Pass
6	2437	36.50	0.5	Pass
9	2452	36.50	0.5	Pass

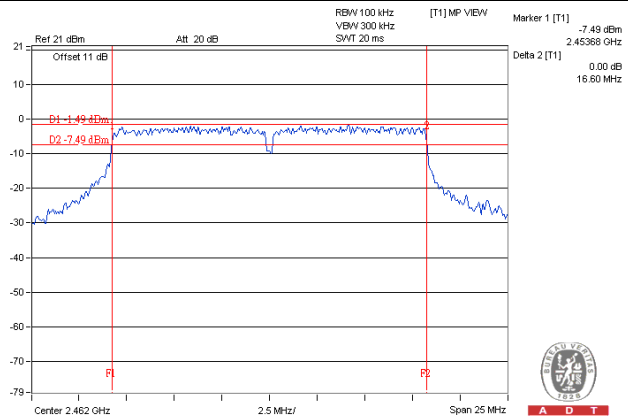
Spectrum Plot of Worst Value

802.11b / CH 1

802.11g / CH 11



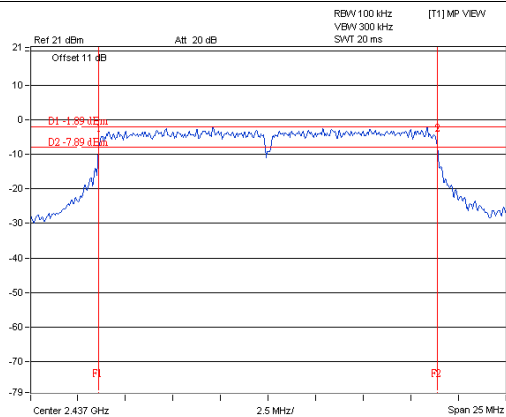
A D T



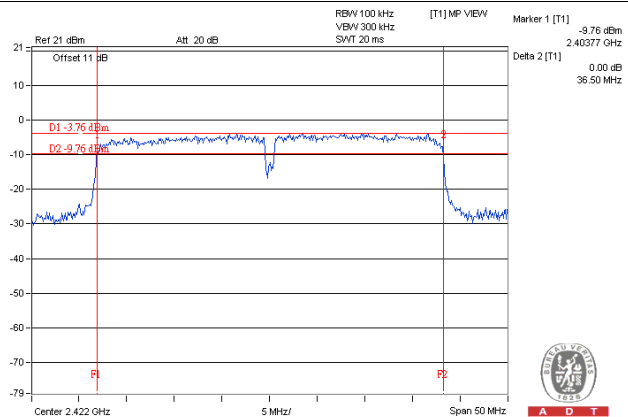
A D T

802.11n (HT20) / CH 6

802.11n (HT40) / CH 3



A D T



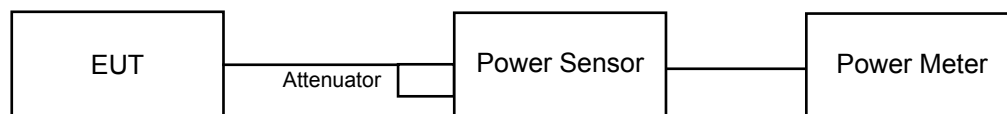
A D T

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)

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

A peak / average power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak / 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 PEAK POWER

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	73.79	18.68	30	Pass
6	2437	59.293	17.73	30	Pass
11	2462	46.989	16.72	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	85.901	19.34	30	Pass
6	2437	87.297	19.41	30	Pass
11	2462	84.723	19.28	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	84.723	19.28	30	Pass
6	2437	85.704	19.33	30	Pass
11	2462	84.918	19.29	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
3	2422	85.114	19.30	30	Pass
6	2437	85.31	19.31	30	Pass
9	2452	85.507	19.32	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	48.641	16.87
6	2437	30.549	14.85
11	2462	23.714	13.75

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	18.75	12.73
6	2437	19.011	12.79
11	2462	17.783	12.50

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	18.408	12.65
6	2437	18.493	12.67
11	2462	17.865	12.52

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	17.906	12.53
6	2437	18.03	12.56
9	2452	17.498	12.43

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

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set the VBW $\geq 3 \times \text{RBW}$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.

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

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-12.66	8	Pass
6	2437	-14.52	8	Pass
11	2462	-14.54	8	Pass

802.11g

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-16.17	8	Pass
6	2437	-15.50	8	Pass
11	2462	-15.13	8	Pass

802.11n (HT20)

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-16.15	8	Pass
6	2437	-15.66	8	Pass
11	2462	-14.89	8	Pass

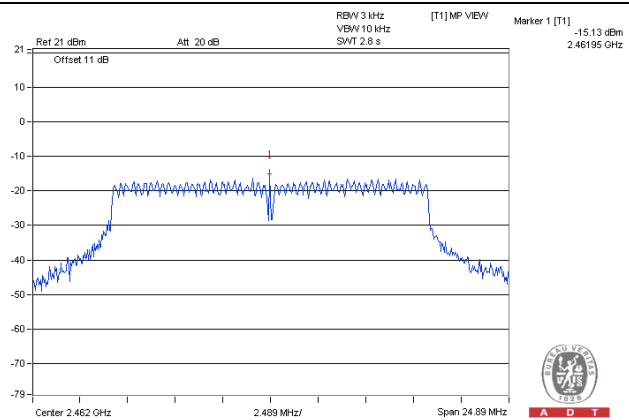
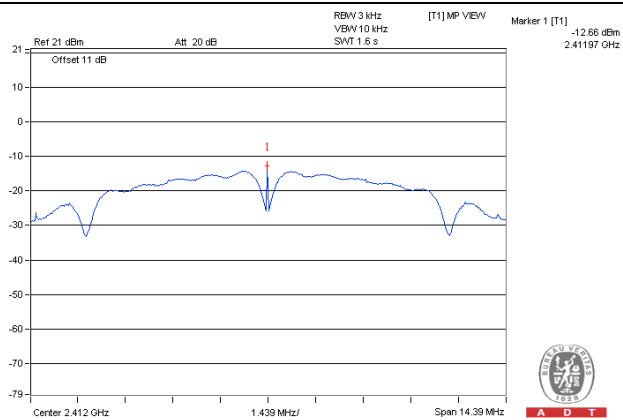
802.11n (HT40)

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	PASS /FAIL
3	2422	-15.99	8	PASS
6	2437	-15.77	8	PASS
9	2452	-15.40	8	PASS

Spectrum Plot of Worst Value

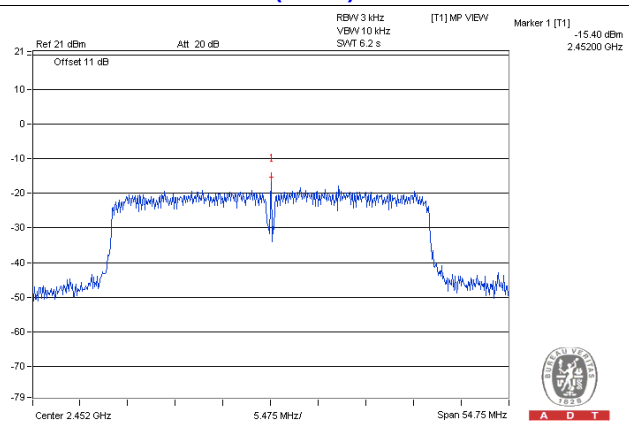
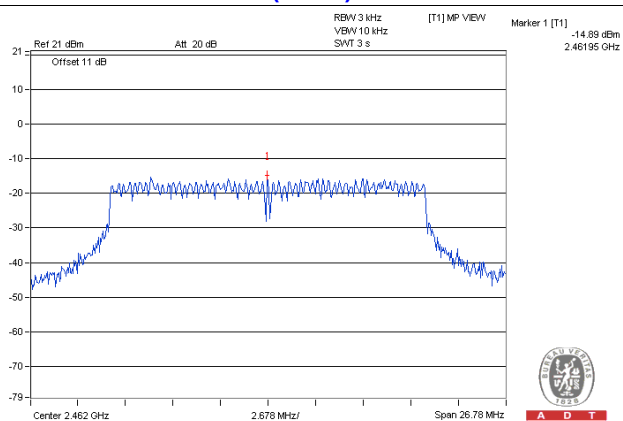
802.11b / CH 1

802.11g / CH 11



802.11n (HT20) / CH 11

802.11n (HT40) / CH 11

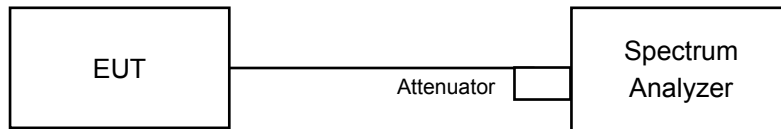


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 20dB 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

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Detector = peak.
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

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

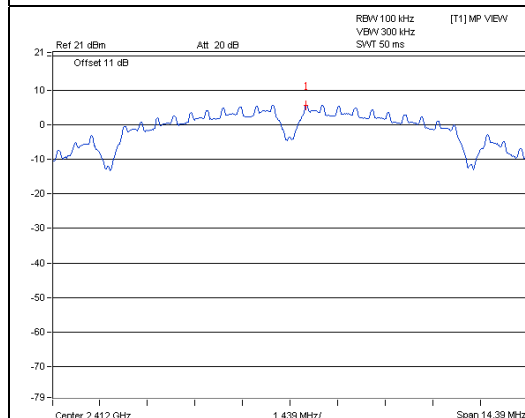
Same as Item 4.3.6

4.6.7 Test Results

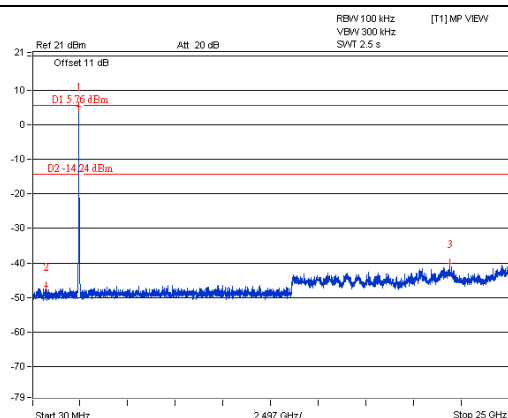
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

CH 1

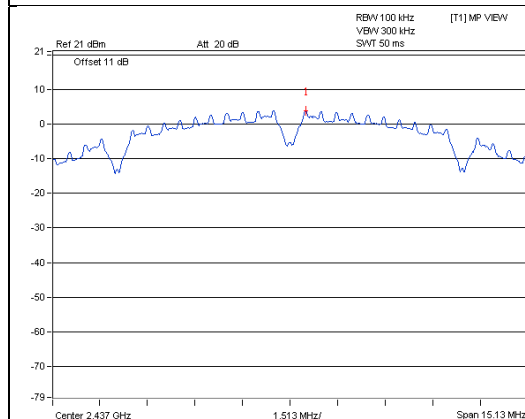


A D T

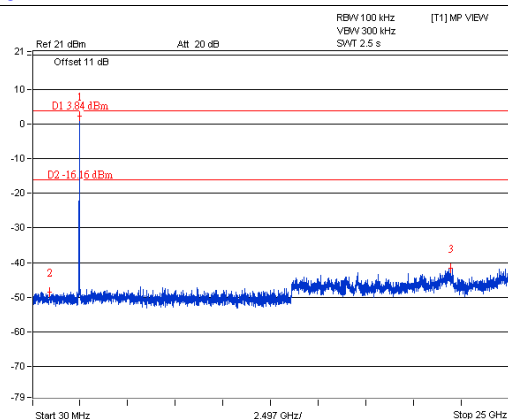


A D T

CH 6

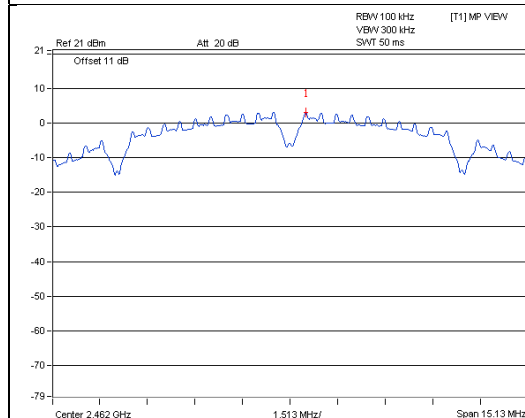


A D T

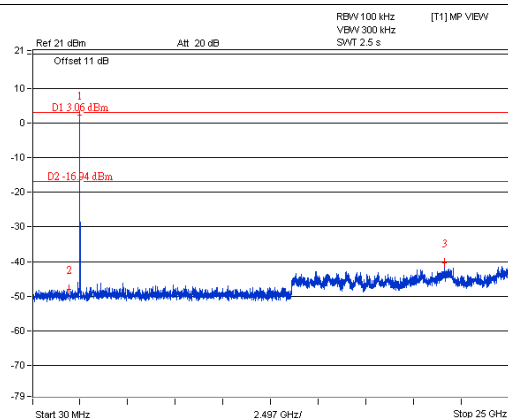


A D T

CH 11

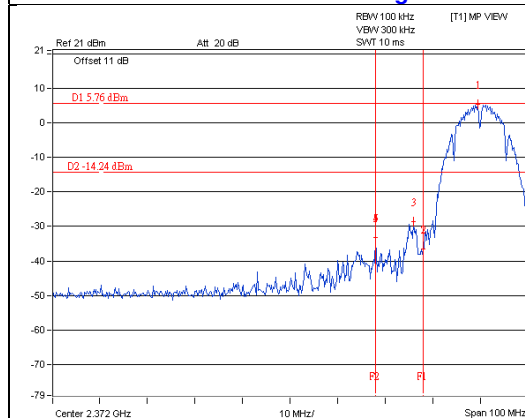


A D T



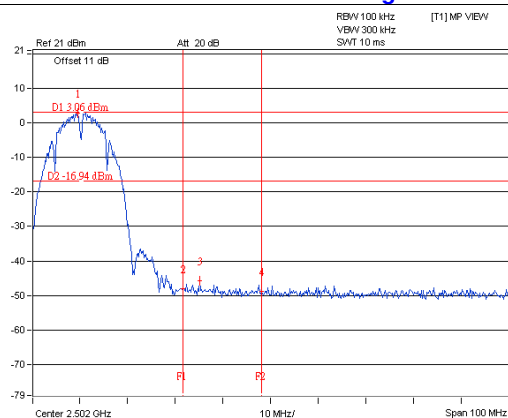
A D T

CH 1 Band edge



A D T

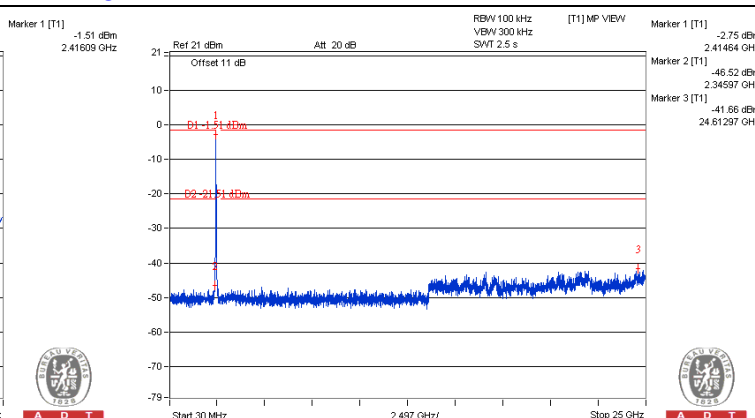
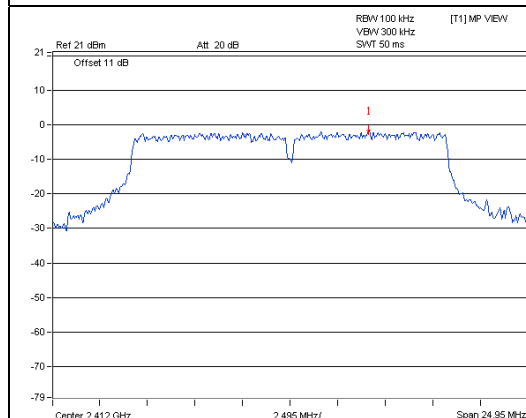
CH 11 Band edge



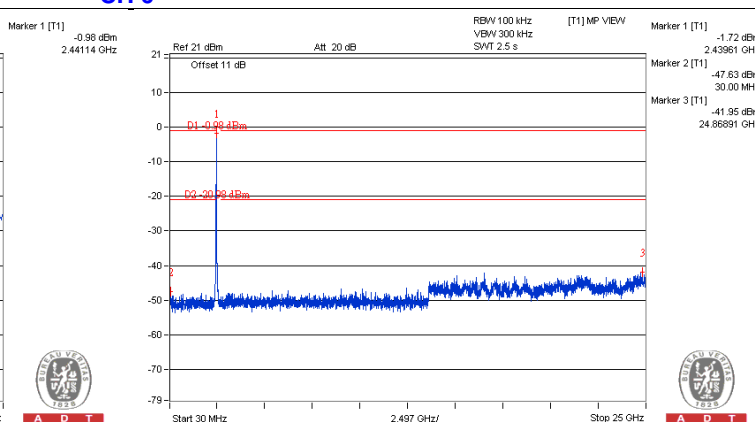
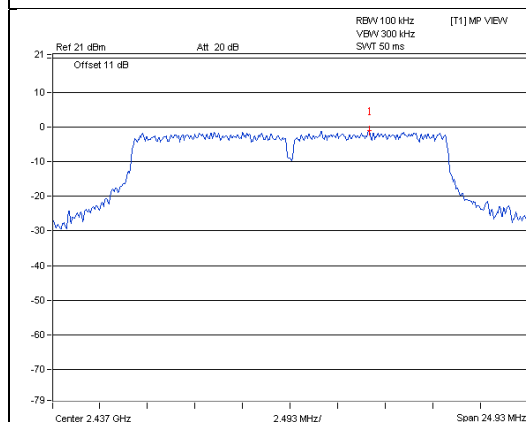
A D T

802.11g

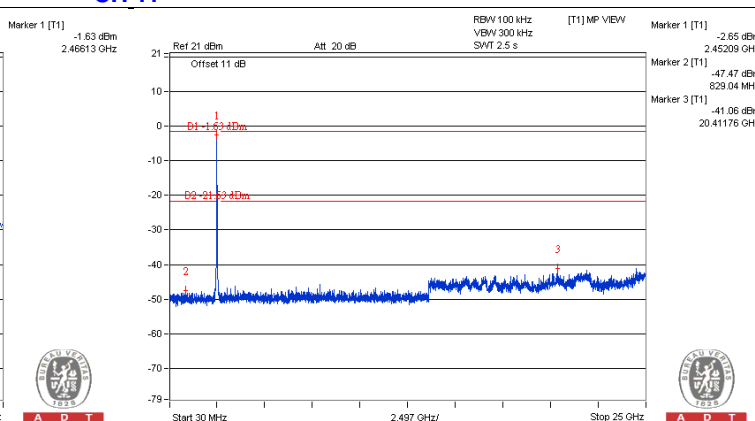
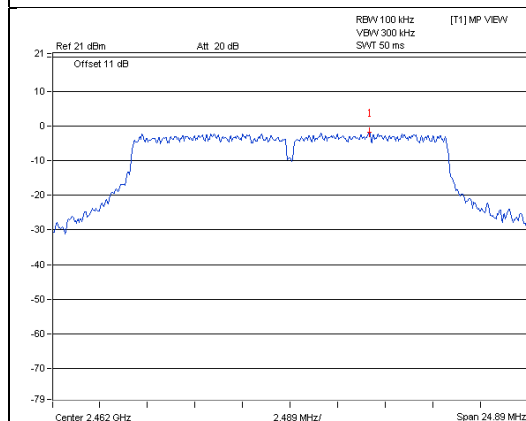
CH 1



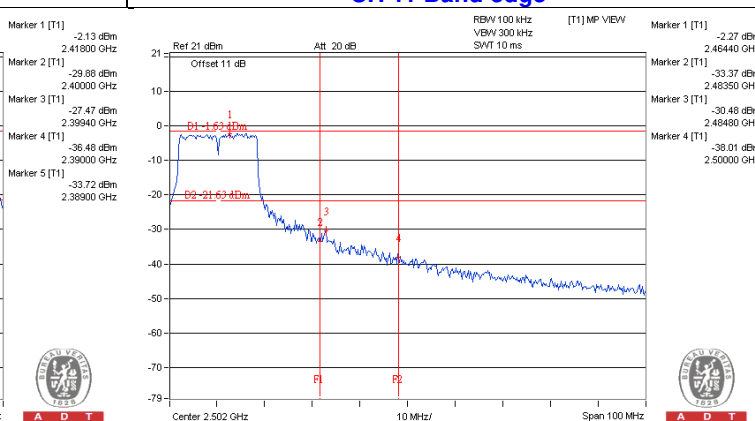
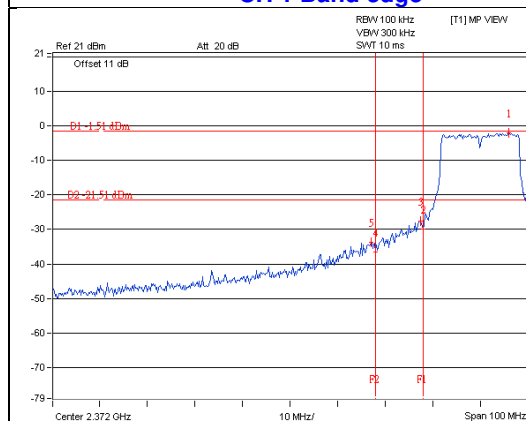
CH 6



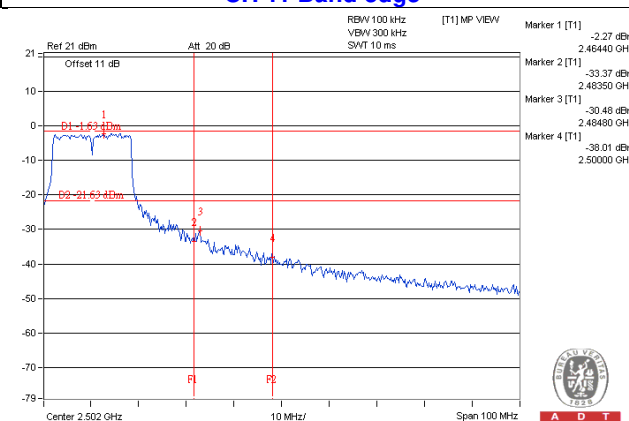
CH 11



CH 1 Band edge

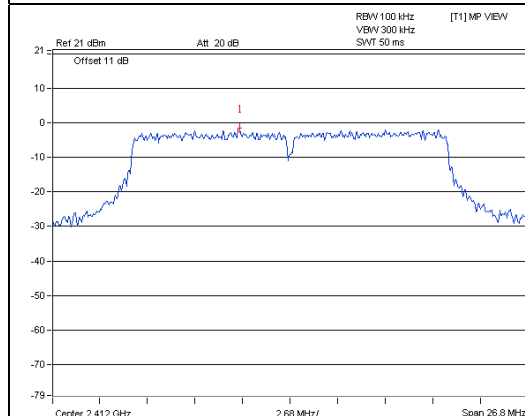


CH 11 Band edge

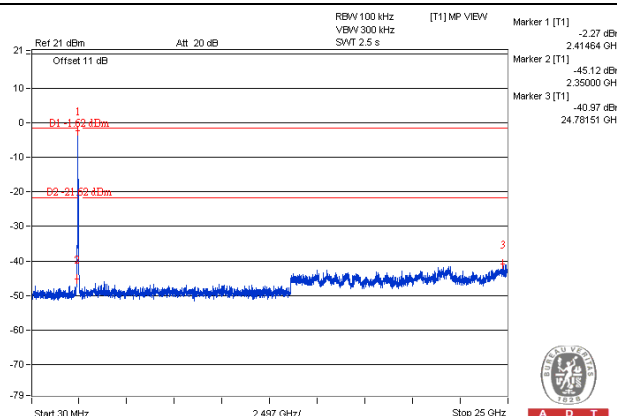


802.11n (HT20)

CH 1

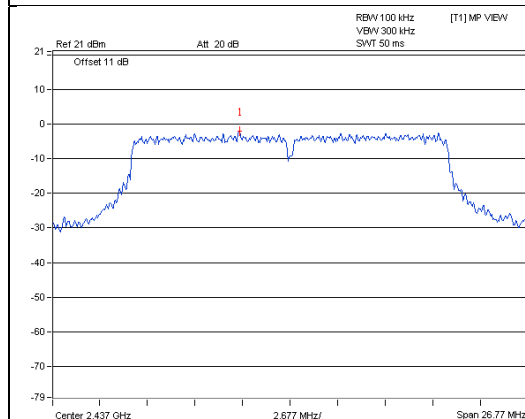


A D T

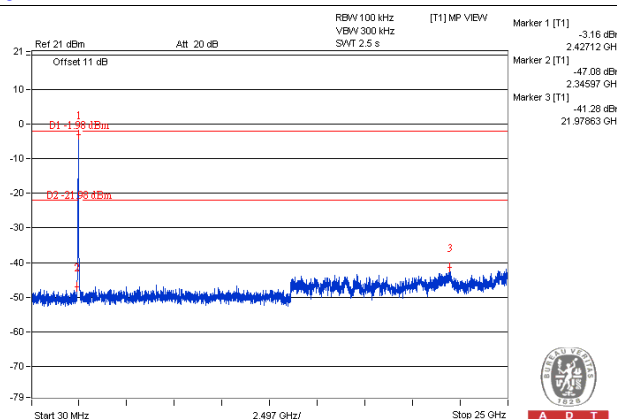


A D T

CH 6

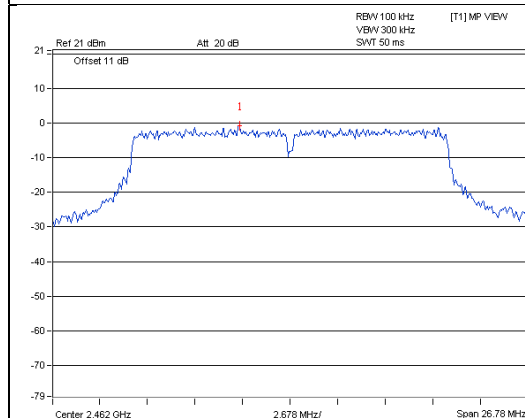


A D T

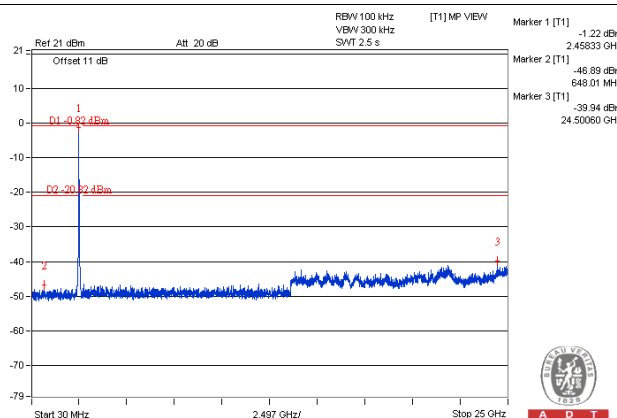


A D T

CH 11

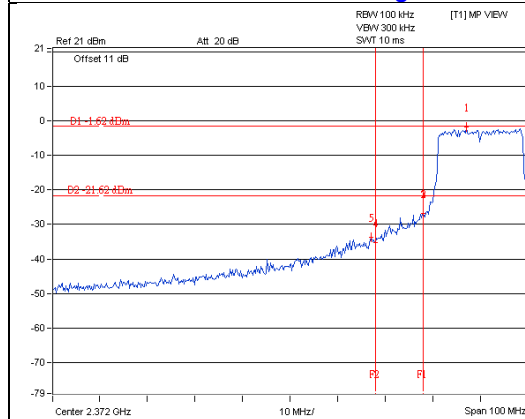


A D T



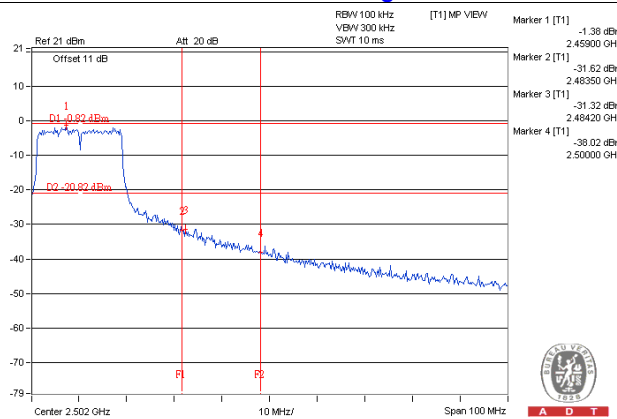
A D T

CH 1 Band edge



A D T

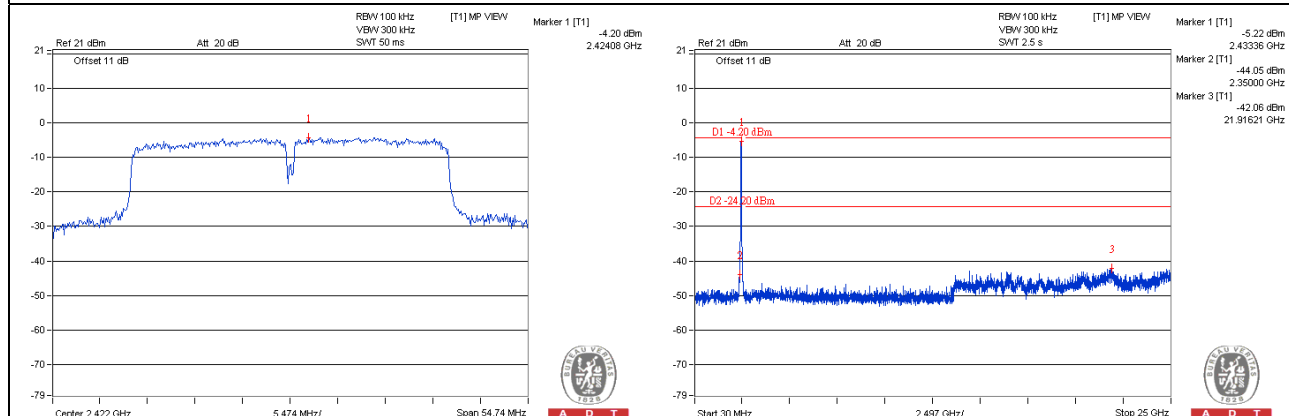
CH 11 Band edge



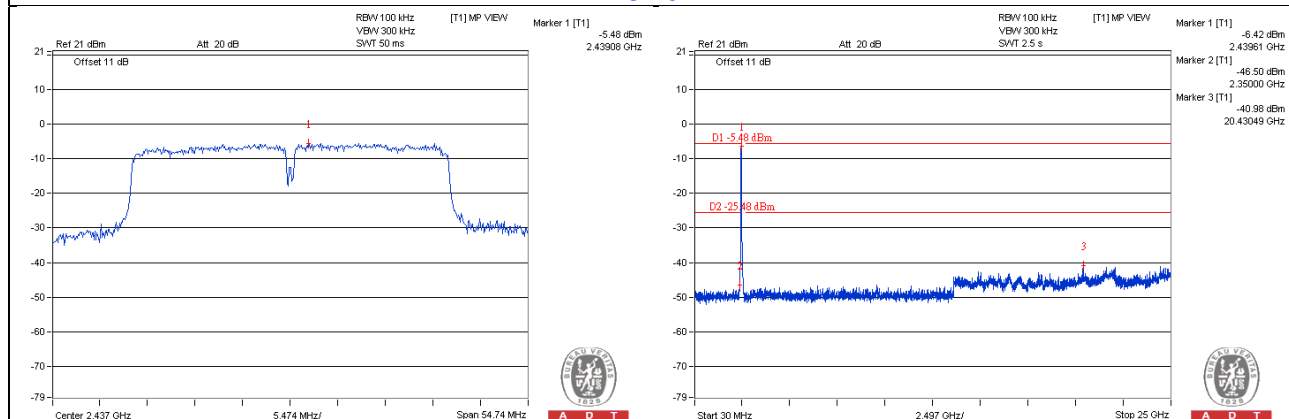
A D T

802.11n (HT40)

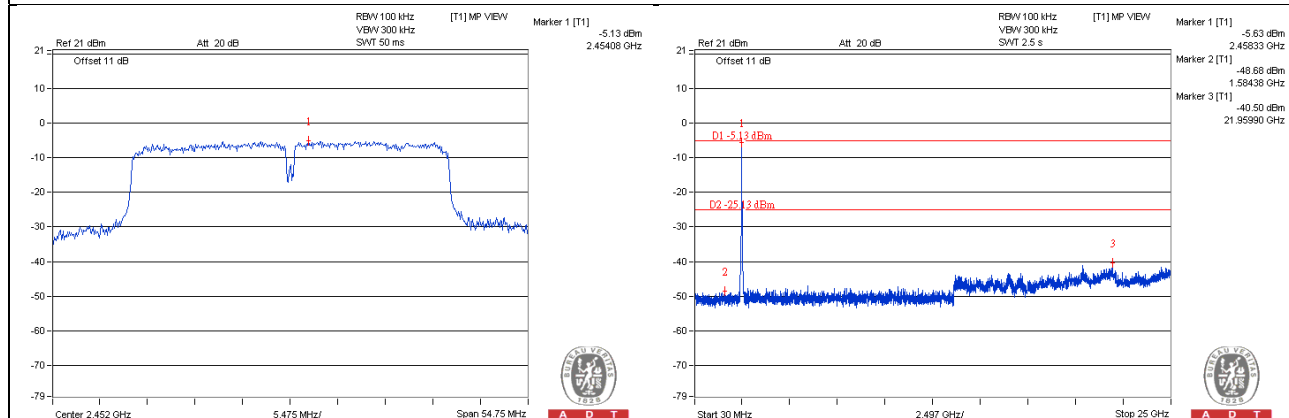
CH 3



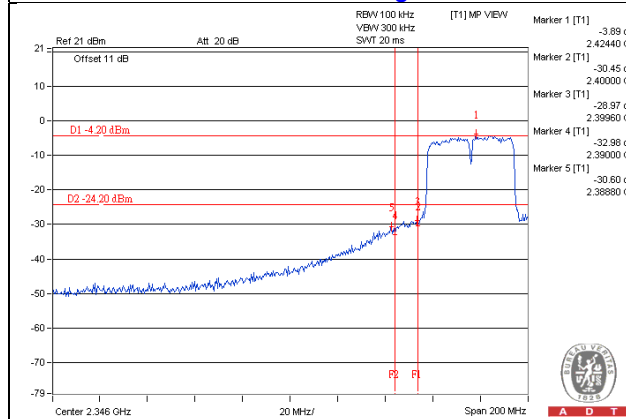
CH 6



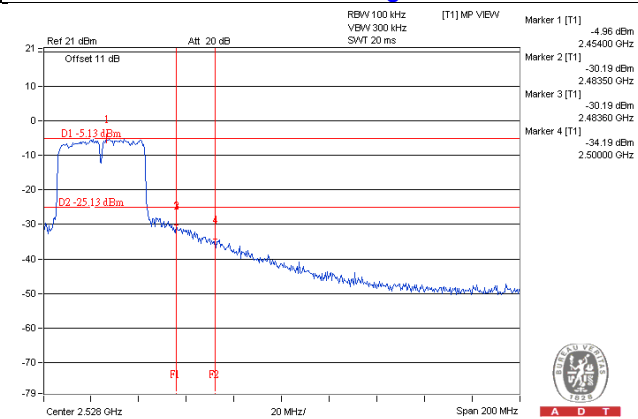
CH 9



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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