

FCC Test Report (WLAN)

Report No.: RF160727E11

FCC ID: MQT-PRESTOA3

Test Model: PRESTO A3

Received Date: July 27, 2016

Test Date: Sep. 29 to Oct. 03, 2016

Issued Date: Oct. 25, 2016

Applicant: XAC AUTOMATION CORP.

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PARK,HSINCHU,TAIWAN

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Release Control Record

Issue No.	Description	Date Issued
RF160727E11	Original release.	Oct. 25, 2016

1 Certificate of Conformity

Product: Terminal

Brand: ElaCarte

Test Model: PRESTO A3

Sample Status: ENGINEERING SAMPLE

Applicant: XAC AUTOMATION CORP.

Test Date: Sep. 29 to Oct. 03, 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 : Midoli Peng , **Date:** Oct. 25, 2016
Midoli Peng / Specialist

Approved by : May Chen , **Date:** Oct. 25, 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	NA	Power supply is 3.7Vdc from battery
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.5dB 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	Antenna connector is HRS U.FL-LP(V)-040 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	Expanded Uncertainty (k=2) (\pm)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.19 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.43 dB
	6GHz ~ 18GHz	3.49 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 (WLAN)

Product	Terminal
Brand	ElaCarte
Test Model	PRESTO A3
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 3.7V from battery
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 150Mbps
Operating Frequency	For 15.407: 5.18~5.24GHz, 5.26~5.32GHz, 5.50~5.70GHz, 5.745~5.825GHz
	For 15.247: 2.412 ~ 2.462GHz
Number of Channel	For 15.407: 802.11a, 802.11n (HT20): 24 802.11n (HT40): 11
	For 15.247: 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7
Output Power	For 15.407: 5180-5240MHz : 14.791mW 5260-5320MHz : 19.861mW 5500-5700MHz : 19.409mW 5745-5825MHz : 21.429mW
	For 15.247: 115.611mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Battery x1 (option)
Data Cable Supplied	NA

Note:

1. The EUT could be supplied with 3.7V battery(option) as the following table:

Brand	Model No.	Spec.
Ela Carte	A2 Battery	DC 3.7V, 10800mA

2. There are WLAN, Bluetooth and RFID technology used for the EUT.

3. Simultaneously transmission condition.

Condition	Technology		
1	WLAN (2.4GHz)	Bluetooth	RFID
2	WLAN (5GHz)	Bluetooth	RFID

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

4. The antennas provided to the EUT, please refer to the following table:

WiFi/BT Antenna Spec.					
Brand	Model No.	Antenna Type	Antenna Connector	Gain(dBi)	
INPAQ	WA-P-LB-02-368	PCB	HRS U.FL-LP(V)-040	2.4GHz:4.23 5GHz:4.02	
RFID Antenna Spec.					
Brand	Model No.	Antenna Type	Antenna Connector	Gain(dBi)	Frequency range (MHz)
INPAQ	NF-C-F10-R0-083	PCB	ZIF	13	13.56

5. The EUT incorporates a SISO function.

2.4GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	1TX	1RX
802.11g	6 ~ 54Mbps	1TX	1RX
802.11n (HT20)	MCS 0~7	1TX	1RX
802.11n (HT40)	MCS 0~7	1TX	1RX
5GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	1TX	1RX
802.11n (HT20)	MCS 0~7	1TX	1RX
802.11n (HT40)	MCS 0~7	1TX	1RX

6. 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

NOTE: No need to concern of Conducted Emission due to the EUT is powered by battery.

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)
802.11b	1 to 11	1	DSSS	DBPSK	1

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
RE \geq 1G	24deg. C, 63%RH	DC 3.7V	Jyunchun Lin
RE $<$ 1G	24deg. C, 64%RH	DC 3.7V	Jyunchun Lin
APCM	25deg. C, 60%RH	DC 3.7V	Tim Ho

3.3 Duty Cycle of Test Signal

If duty cycle of test signal is $\geq 98\%$, duty factor is not required.

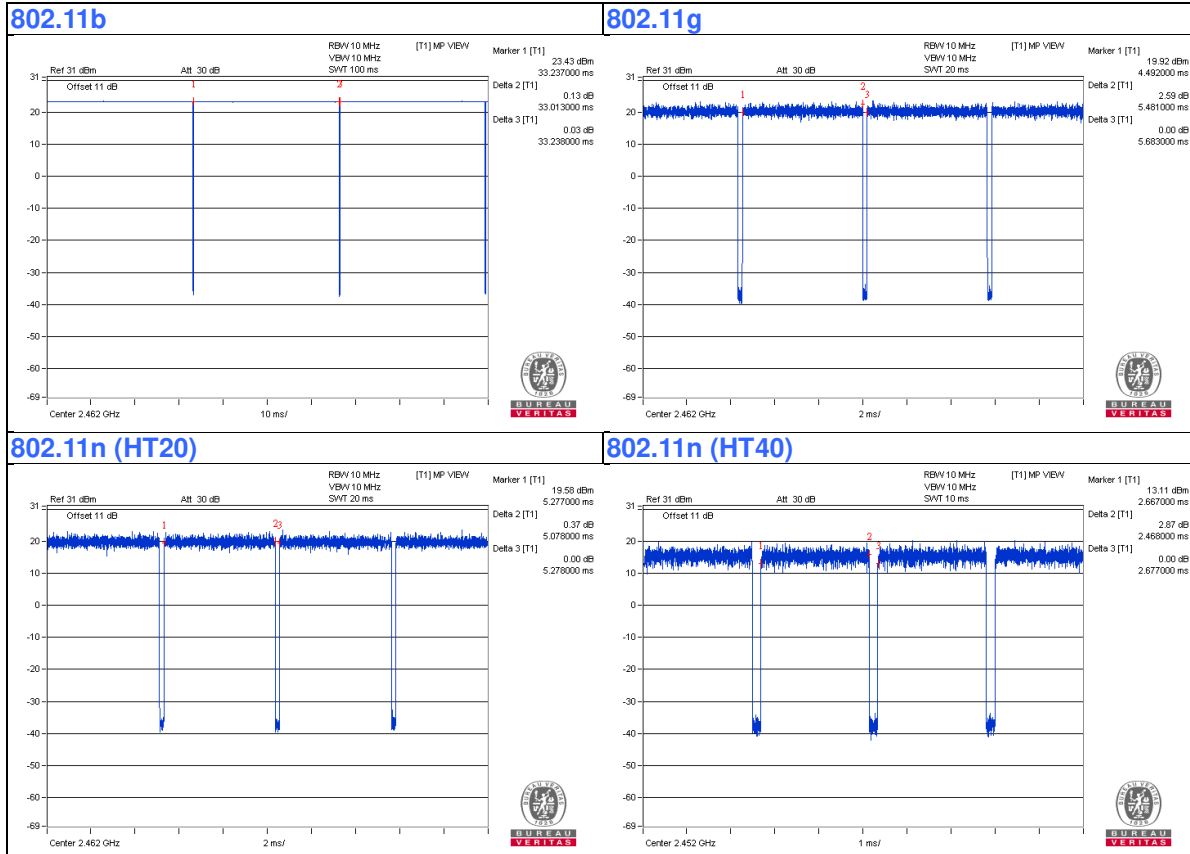
If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11b: Duty cycle = $33.013/33.238 = 0.993$

802.11g: Duty cycle = $5.481\text{ ms}/5.683\text{ ms} = 0.964$, Duty factor = $10 * \log(1/0.964) = 0.16$

802.11n (HT20): Duty cycle = $5.078\text{ ms}/5.278\text{ ms} = 0.962$, Duty factor = $10 * \log(1/0.962) = 0.17$

802.11n (HT40): Duty cycle = $2.468\text{ ms}/2.677\text{ ms} = 0.922$, Duty factor = $10 * \log(1/0.922) = 0.35$



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.

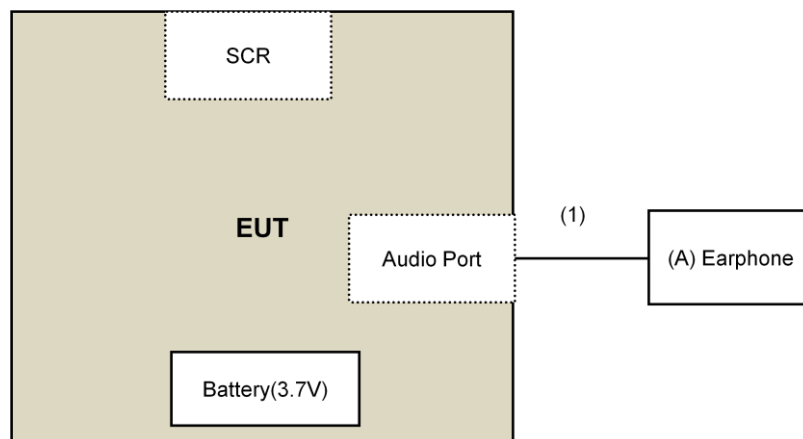
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Earphone	Hawk	HKC920	H003	FCC DoC	Provided by Lab

Note:

- 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.	Audio Cable	1	2.2	No	0	Provided by Lab

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 Keysight	N9038A	MY54450088	July 20, 2016	July 19, 2017
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-1000VH2 B	AMP-ZFL-01	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 02, 2016	Apr. 01, 2017
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Jan. 19, 2016	Jan. 18, 2017
Pre-Amplifier Agilent	8449B	3008A01922	Sep. 18, 2016	Sep. 17, 2017
RF Cable	EMC104-SM- SM-2000 EMC104-SM- SM-5000 EMC104-SM- SM-5000	150318 150323 150324	Mar. 30, 2016	Mar. 29, 2017
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Jan. 08, 2016	Jan. 07, 2017
RF Cable	SUCOFLEX 102	36432/2 36441/2	Jan. 16, 2016	Jan. 15, 2017
Software	ADT_Radiated _V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA
Spectrum Analyzer R&S	FSP40	100036	Jan. 27, 2016	Jan. 26, 2017
Power meter Anritsu	ML2495A	0824006	May 26, 2016	May 25, 2017
Power sensor Anritsu	MA2411B	0738172	May 26, 2016	May 25, 2017

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. 4.
5. The FCC Site Registration No. is 292998
6. The CANADA Site Registration No. is 20331-2
7. Tested Date: Sep. 29 to Oct. 03, 2016

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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. Both X and Y axes of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case 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.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 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:

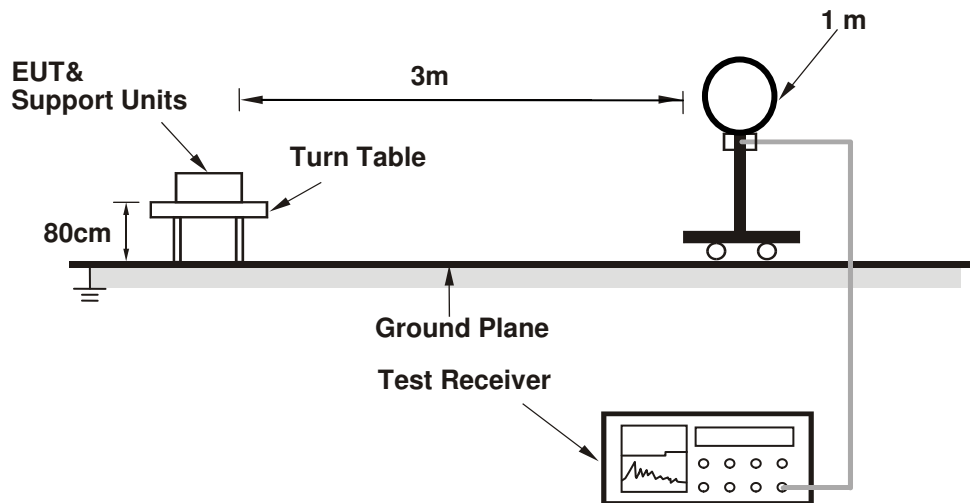
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
 3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
1. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

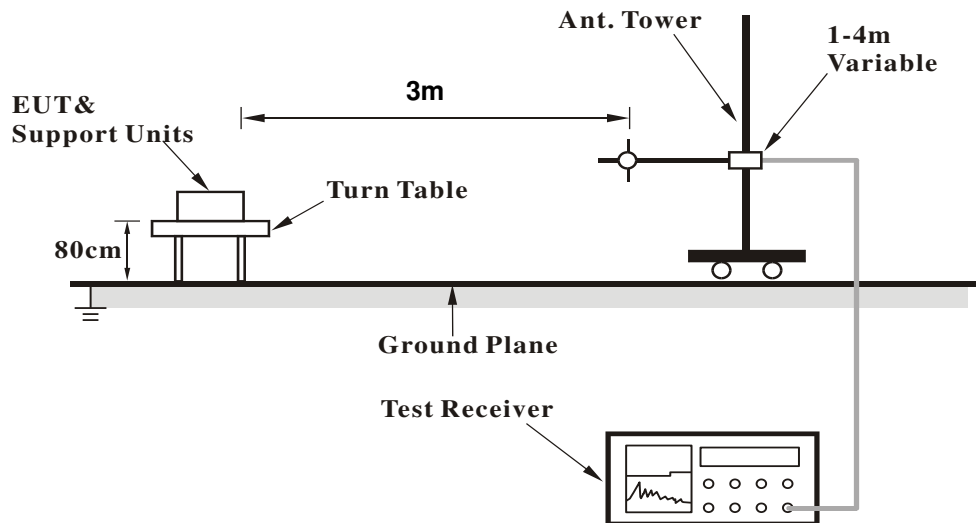
No deviation.

4.1.5 Test Setup

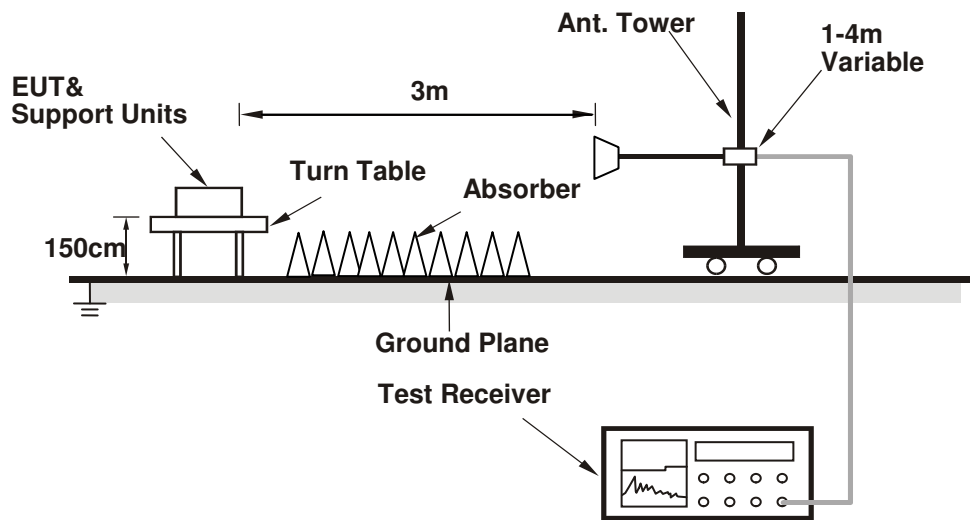
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

- a. The communication partner run test program "QRCT.exe Ver3.0.124.0" to enable EUT under transmission/receiving condition continuously at specific channel frequency.

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	53.2 PK	74.0	-20.8	1.08 H	240	58.6	-5.4
2	2390.00	47.8 AV	54.0	-6.2	1.08 H	240	53.2	-5.4
3	*2412.00	106.8 PK			1.08 H	240	112.1	-5.3
4	*2412.00	103.9 AV			1.08 H	240	109.2	-5.3
5	4824.00	44.4 PK	74.0	-29.6	1.41 H	216	43.2	1.2
6	4824.00	36.8 AV	54.0	-17.2	1.41 H	216	35.6	1.2

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	55.2 PK	74.0	-18.8	2.01 V	336	60.6	-5.4
2	2390.00	49.7 AV	54.0	-4.3	2.01 V	336	55.1	-5.4
3	*2412.00	107.8 PK			2.01 V	336	113.1	-5.3
4	*2412.00	105.4 AV			2.01 V	336	110.7	-5.3
5	4824.00	42.6 PK	74.0	-31.4	1.49 V	112	41.4	1.2
6	4824.00	31.5 AV	54.0	-22.5	1.49 V	112	30.3	1.2

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	48.3 PK	74.0	-25.7	1.60 H	246	53.7	-5.4
2	2390.00	34.8 AV	54.0	-19.2	1.60 H	246	40.2	-5.4
3	*2437.00	105.5 PK			1.60 H	246	110.7	-5.2
4	*2437.00	104.7 AV			1.60 H	246	109.9	-5.2
5	2483.50	48.1 PK	74.0	-25.9	1.60 H	246	53.3	-5.2
6	2483.50	34.9 AV	54.0	-19.1	1.60 H	246	40.1	-5.2
7	4874.00	44.2 PK	74.0	-29.8	1.40 H	225	42.9	1.3
8	4874.00	36.8 AV	54.0	-17.2	1.40 H	225	35.5	1.3
9	7311.00	48.2 PK	74.0	-25.8	1.39 H	275	40.2	8.0
10	7311.00	36.0 AV	54.0	-18.0	1.39 H	275	28.0	8.0

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	48.0 PK	74.0	-26.0	2.04 V	348	53.4	-5.4
2	2390.00	34.8 AV	54.0	-19.2	2.04 V	348	40.2	-5.4
3	*2437.00	108.5 PK			2.04 V	348	113.7	-5.2
4	*2437.00	105.8 AV			2.04 V	348	111.0	-5.2
5	2483.50	52.1 PK	74.0	-21.9	2.04 V	348	57.3	-5.2
6	2483.50	37.0 AV	54.0	-17.0	2.04 V	348	42.2	-5.2
7	4874.00	43.1 PK	74.0	-30.9	1.57 V	99	41.8	1.3
8	4874.00	32.1 AV	54.0	-21.9	1.57 V	99	30.8	1.3
9	7311.00	48.3 PK	74.0	-25.7	1.65 V	215	40.3	8.0
10	7311.00	36.7 AV	54.0	-17.3	1.65 V	215	28.7	8.0

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	107.2 PK			1.82 H	238	112.3	-5.1
2	*2462.00	104.7 AV			1.82 H	238	109.8	-5.1
3	2484.80	58.3 PK	74.0	-15.7	1.82 H	238	63.5	-5.2
4	2484.80	52.7 AV	54.0	-1.3	1.82 H	238	57.9	-5.2
5	4924.00	44.6 PK	74.0	-29.4	1.43 H	214	43.1	1.5
6	4924.00	37.2 AV	54.0	-16.8	1.43 H	214	35.7	1.5
7	7386.00	48.6 PK	74.0	-25.4	1.44 H	286	40.4	8.2
8	7386.00	36.2 AV	54.0	-17.8	1.44 H	286	28.0	8.2

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	107.2 PK			1.96 V	328	112.3	-5.1
2	*2462.00	104.9 AV			1.96 V	328	110.0	-5.1
3	2484.80	59.2 PK	74.0	-14.8	1.96 V	328	64.4	-5.2
4	2484.80	51.5 AV	54.0	-2.5	1.96 V	328	56.7	-5.2
5	4924.00	43.0 PK	74.0	-31.0	1.52 V	105	41.5	1.5
6	4924.00	32.0 AV	54.0	-22.0	1.52 V	105	30.5	1.5
7	7386.00	48.0 PK	74.0	-26.0	1.64 V	223	39.8	8.2
8	7386.00	36.3 AV	54.0	-17.7	1.64 V	223	28.1	8.2

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	66.2 PK	74.0	-7.8	1.05 H	200	71.6	-5.4
2	2390.00	47.3 AV	54.0	-6.7	1.05 H	200	52.7	-5.4
3	*2412.00	104.7 PK			1.05 H	200	110.0	-5.3
4	*2412.00	95.8 AV			1.05 H	200	101.1	-5.3
5	4824.00	45.2 PK	74.0	-28.8	1.38 H	202	44.0	1.2
6	4824.00	33.8 AV	54.0	-20.2	1.38 H	202	32.6	1.2

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	1.94 V	340	73.8	-5.4
2	2390.00	49.7 AV	54.0	-4.3	1.94 V	340	55.1	-5.4
3	*2412.00	108.2 PK			1.94 V	340	113.5	-5.3
4	*2412.00	97.3 AV			1.94 V	340	102.6	-5.3
5	4824.00	43.3 PK	74.0	-30.7	1.57 V	100	42.1	1.2
6	4824.00	32.4 AV	54.0	-21.6	1.57 V	100	31.2	1.2

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	48.2 PK	74.0	-25.8	1.01 H	199	53.6	-5.4
2	2390.00	34.9 AV	54.0	-19.1	1.01 H	199	40.3	-5.4
3	*2437.00	105.7 PK			1.01 H	199	110.9	-5.2
4	*2437.00	95.3 AV			1.01 H	199	100.5	-5.2
5	2483.50	47.5 PK	74.0	-26.5	1.01 H	199	52.7	-5.2
6	2483.50	34.6 AV	54.0	-19.4	1.01 H	199	39.8	-5.2
7	4874.00	45.5 PK	74.0	-28.5	1.39 H	229	44.2	1.3
8	4874.00	33.6 AV	54.0	-20.4	1.39 H	229	32.3	1.3
9	7311.00	49.2 PK	74.0	-24.8	1.45 H	286	41.2	8.0
10	7311.00	36.6 AV	54.0	-17.4	1.45 H	286	28.6	8.0

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	48.2 PK	74.0	-25.8	1.98 V	350	53.6	-5.4
2	2390.00	34.7 AV	54.0	-19.3	1.98 V	350	40.1	-5.4
3	*2437.00	107.8 PK			1.98 V	350	113.0	-5.2
4	*2437.00	96.8 AV			1.98 V	350	102.0	-5.2
5	2483.50	52.9 PK	74.0	-21.1	1.98 V	350	58.1	-5.2
6	2483.50	37.5 AV	54.0	-16.5	1.98 V	350	42.7	-5.2
7	4874.00	43.5 PK	74.0	-30.5	1.57 V	111	42.2	1.3
8	4874.00	32.5 AV	54.0	-21.5	1.57 V	111	31.2	1.3
9	7311.00	48.1 PK	74.0	-25.9	1.59 V	219	40.1	8.0
10	7311.00	36.1 AV	54.0	-17.9	1.59 V	219	28.1	8.0

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	105.4 PK			1.07 H	211	110.5	-5.1
2	*2462.00	95.0 AV			1.07 H	211	100.1	-5.1
3	2483.50	70.8 PK	74.0	-3.2	1.07 H	211	76.0	-5.2
4	2483.50	50.7 AV	54.0	-3.3	1.07 H	211	55.9	-5.2
5	4924.00	45.9 PK	74.0	-28.1	1.47 H	205	44.4	1.5
6	4924.00	34.1 AV	54.0	-19.9	1.47 H	205	32.6	1.5
7	7386.00	48.7 PK	74.0	-25.3	1.48 H	301	40.5	8.2
8	7386.00	36.1 AV	54.0	-17.9	1.48 H	301	27.9	8.2

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	107.2 PK			2.01 V	339	112.3	-5.1
2	*2462.00	96.5 AV			2.01 V	339	101.6	-5.1
3	2483.50	73.1 PK	74.0	-0.9	2.01 V	339	78.3	-5.2
4	2483.50	53.2 AV	54.0	-0.8	2.01 V	339	58.4	-5.2
5	4924.00	43.7 PK	74.0	-30.3	1.47 V	95	42.2	1.5
6	4924.00	32.4 AV	54.0	-21.6	1.47 V	95	30.9	1.5
7	7386.00	47.4 PK	74.0	-26.6	1.63 V	229	39.2	8.2
8	7386.00	35.8 AV	54.0	-18.2	1.63 V	229	27.6	8.2

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	66.2 PK	74.0	-7.8	1.05 H	202	71.6	-5.4
2	2390.00	47.4 AV	54.0	-6.6	1.05 H	202	52.8	-5.4
3	*2412.00	104.5 PK			1.05 H	202	109.8	-5.3
4	*2412.00	94.1 AV			1.05 H	202	99.4	-5.3
5	4824.00	46.0 PK	74.0	-28.0	1.46 H	200	44.8	1.2
6	4824.00	34.3 AV	54.0	-19.7	1.46 H	200	33.1	1.2

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	68.8 PK	74.0	-5.2	2.03 V	356	74.2	-5.4
2	2390.00	50.1 AV	54.0	-3.9	2.03 V	356	55.5	-5.4
3	*2412.00	106.7 PK			2.03 V	356	112.0	-5.3
4	*2412.00	95.9 AV			2.03 V	356	101.2	-5.3
5	4824.00	44.0 PK	74.0	-30.0	1.53 V	102	42.8	1.2
6	4824.00	32.5 AV	54.0	-21.5	1.53 V	102	31.3	1.2

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	48.6 PK	74.0	-25.4	1.03 H	212	54.0	-5.4
2	2390.00	35.1 AV	54.0	-18.9	1.03 H	212	40.5	-5.4
3	*2437.00	104.9 PK			1.03 H	212	110.1	-5.2
4	*2437.00	94.3 AV			1.03 H	212	99.5	-5.2
5	2483.50	46.8 PK	74.0	-27.2	1.03 H	212	52.0	-5.2
6	2483.50	34.1 AV	54.0	-19.9	1.03 H	212	39.3	-5.2
7	4874.00	46.1 PK	74.0	-27.9	1.45 H	211	44.8	1.3
8	4874.00	34.3 AV	54.0	-19.7	1.45 H	211	33.0	1.3
9	7311.00	48.6 PK	74.0	-25.4	1.45 H	291	40.6	8.0
10	7311.00	36.3 AV	54.0	-17.7	1.45 H	291	28.3	8.0

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	48.3 PK	74.0	-25.7	2.07 V	351	53.7	-5.4
2	2390.00	34.8 AV	54.0	-19.2	2.07 V	351	40.2	-5.4
3	*2437.00	106.7 PK			2.07 V	351	111.9	-5.2
4	*2437.00	96.0 AV			2.07 V	351	101.2	-5.2
5	2483.50	53.0 PK	74.0	-21.0	2.07 V	351	58.2	-5.2
6	2483.50	37.5 AV	54.0	-16.5	2.07 V	351	42.7	-5.2
7	4874.00	43.5 PK	74.0	-30.5	1.49 V	111	42.2	1.3
8	4874.00	32.1 AV	54.0	-21.9	1.49 V	111	30.8	1.3
9	7311.00	47.1 PK	74.0	-26.9	1.65 V	235	39.1	8.0
10	7311.00	35.3 AV	54.0	-18.7	1.65 V	235	27.3	8.0

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	103.6 PK			1.02 H	205	108.7	-5.1
2	*2462.00	93.7 AV			1.02 H	205	98.8	-5.1
3	2483.50	72.3 PK	74.0	-1.7	1.02 H	205	77.5	-5.2
4	2483.50	51.7 AV	54.0	-2.3	1.02 H	205	56.9	-5.2
5	4924.00	45.5 PK	74.0	-28.5	1.46 H	193	44.0	1.5
6	4924.00	34.0 AV	54.0	-20.0	1.46 H	193	32.5	1.5
7	7386.00	48.5 PK	74.0	-25.5	1.46 H	288	40.3	8.2
8	7386.00	36.0 AV	54.0	-18.0	1.46 H	288	27.8	8.2

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	106.0 PK			1.94 V	336	111.1	-5.1
2	*2462.00	95.2 AV			1.94 V	336	100.3	-5.1
3	2483.50	72.9 PK	74.0	-1.1	1.94 V	336	78.1	-5.2
4	2483.50	53.5 AV	54.0	-0.5	1.94 V	336	58.7	-5.2
5	4924.00	43.4 PK	74.0	-30.6	1.45 V	103	41.9	1.5
6	4924.00	31.9 AV	54.0	-22.1	1.45 V	103	30.4	1.5
7	7386.00	47.1 PK	74.0	-26.9	1.61 V	227	38.9	8.2
8	7386.00	35.2 AV	54.0	-18.8	1.61 V	227	27.0	8.2

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	64.5 PK	74.0	-9.5	1.00 H	252	69.9	-5.4
2	2390.00	48.2 AV	54.0	-5.8	1.00 H	252	53.6	-5.4
3	*2422.00	99.6 PK			1.00 H	252	104.8	-5.2
4	*2422.00	88.9 AV			1.00 H	252	94.1	-5.2
5	4844.00	46.1 PK	74.0	-27.9	1.41 H	195	44.9	1.2
6	4844.00	34.1 AV	54.0	-19.9	1.41 H	195	32.9	1.2
7	7266.00	48.8 PK	74.0	-25.2	1.49 H	272	40.7	8.1
8	7266.00	36.0 AV	54.0	-18.0	1.49 H	272	27.9	8.1

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	1.87 V	336	71.5	-5.4
2	2390.00	50.1 AV	54.0	-3.9	1.87 V	336	55.5	-5.4
3	*2422.00	101.7 PK			1.87 V	336	106.9	-5.2
4	*2422.00	90.2 AV			1.87 V	336	95.4	-5.2
5	4844.00	44.1 PK	74.0	-29.9	1.48 V	98	42.9	1.2
6	4844.00	32.5 AV	54.0	-21.5	1.48 V	98	31.3	1.2
7	7266.00	46.9 PK	74.0	-27.1	1.70 V	244	38.8	8.1
8	7266.00	35.1 AV	54.0	-18.9	1.70 V	244	27.0	8.1

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	58.3 PK	74.0	-15.7	1.00 H	237	63.7	-5.4
2	2390.00	40.2 AV	54.0	-13.8	1.00 H	237	45.6	-5.4
3	*2437.00	99.4 PK			1.00 H	237	104.6	-5.2
4	*2437.00	89.0 AV			1.00 H	237	94.2	-5.2
5	2483.50	63.9 PK	74.0	-10.1	1.00 H	237	69.1	-5.2
6	2483.50	47.8 AV	54.0	-6.2	1.00 H	237	53.0	-5.2
7	4874.00	46.1 PK	74.0	-27.9	1.51 H	189	44.8	1.3
8	4874.00	34.2 AV	54.0	-19.8	1.51 H	189	32.9	1.3
9	7311.00	48.0 PK	74.0	-26.0	1.45 H	273	40.0	8.0
10	7311.00	35.6 AV	54.0	-18.4	1.45 H	273	27.6	8.0

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	60.1 PK	74.0	-13.9	1.90 V	350	65.5	-5.4
2	2390.00	42.5 AV	54.0	-11.5	1.90 V	350	47.9	-5.4
3	*2437.00	101.9 PK			1.90 V	350	107.1	-5.2
4	*2437.00	90.0 AV			1.90 V	350	95.2	-5.2
5	2483.50	66.0 PK	74.0	-8.0	1.90 V	350	71.2	-5.2
6	2483.50	49.6 AV	54.0	-4.4	1.90 V	350	54.8	-5.2
7	4874.00	43.6 PK	74.0	-30.4	1.52 V	105	42.3	1.3
8	4874.00	32.1 AV	54.0	-21.9	1.52 V	105	30.8	1.3
9	7311.00	46.8 PK	74.0	-27.2	1.66 V	243	38.8	8.0
10	7311.00	35.0 AV	54.0	-19.0	1.66 V	243	27.0	8.0

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	99.7 PK			1.04 H	238	104.9	-5.2
2	*2452.00	89.0 AV			1.04 H	238	94.2	-5.2
3	2483.50	67.1 PK	74.0	-6.9	1.04 H	238	72.3	-5.2
4	2483.50	50.9 AV	54.0	-3.1	1.04 H	238	56.1	-5.2
5	4904.00	45.6 PK	74.0	-28.4	1.50 H	213	44.2	1.4
6	4904.00	33.7 AV	54.0	-20.3	1.50 H	213	32.3	1.4
7	7356.00	48.1 PK	74.0	-25.9	1.47 H	287	39.9	8.2
8	7356.00	35.5 AV	54.0	-18.5	1.47 H	287	27.3	8.2

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	102.1 PK			1.93 V	337	107.3	-5.2
2	*2452.00	90.5 AV			1.93 V	337	95.7	-5.2
3	2483.50	69.2 PK	74.0	-4.8	1.93 V	337	74.4	-5.2
4	2483.50	53.1 AV	54.0	-0.9	1.93 V	337	58.3	-5.2
5	4904.00	42.8 PK	74.0	-31.2	1.50 V	117	41.4	1.4
6	4904.00	31.6 AV	54.0	-22.4	1.50 V	117	30.2	1.4
7	7356.00	46.3 PK	74.0	-27.7	1.64 V	231	38.1	8.2
8	7356.00	34.8 AV	54.0	-19.2	1.64 V	231	26.6	8.2

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 Data:

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 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	58.13	24.8 QP	40.0	-15.2	1.50 H	322	33.8	-9.0
2	381.41	23.2 QP	46.0	-22.8	2.50 H	29	29.2	-6.0
3	431.99	25.2 QP	46.0	-20.8	2.00 H	241	29.4	-4.2
4	616.46	26.5 QP	46.0	-19.5	2.50 H	258	26.7	-0.2
5	836.63	29.6 QP	46.0	-16.4	1.50 H	137	26.7	2.9
6	923.15	30.3 QP	46.0	-15.7	2.50 H	333	26.0	4.3

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	61.69	27.7 QP	40.0	-12.3	1.00 V	0	37.2	-9.5
2	558.46	28.1 QP	46.0	-17.9	2.50 V	147	30.0	-1.9
3	615.76	29.6 QP	46.0	-16.4	1.00 V	194	29.8	-0.2
4	644.35	30.1 QP	46.0	-15.9	2.00 V	25	30.0	0.1
5	672.99	30.3 QP	46.0	-15.7	1.50 V	205	30.1	0.2
6	918.03	31.3 QP	46.0	-14.7	2.00 V	137	27.1	4.2

REMARKS:

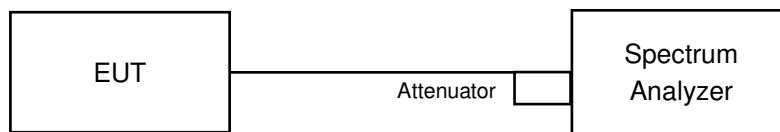
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 6dB Bandwidth Measurement

4.2.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

- a. Set resolution bandwidth (RBW) = 100kHz
- b. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. 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

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Conditions

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

4.2.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	7.64	0.5	Pass
6	2437	7.61	0.5	Pass
11	2462	7.61	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.46	0.5	Pass
6	2437	16.45	0.5	Pass
11	2462	16.40	0.5	Pass

802.11n (HT20)

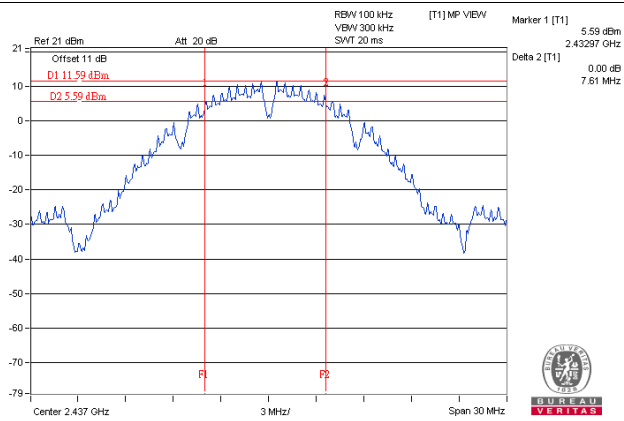
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.38	0.5	Pass
6	2437	17.68	0.5	Pass
11	2462	17.27	0.5	Pass

802.11n (HT40)

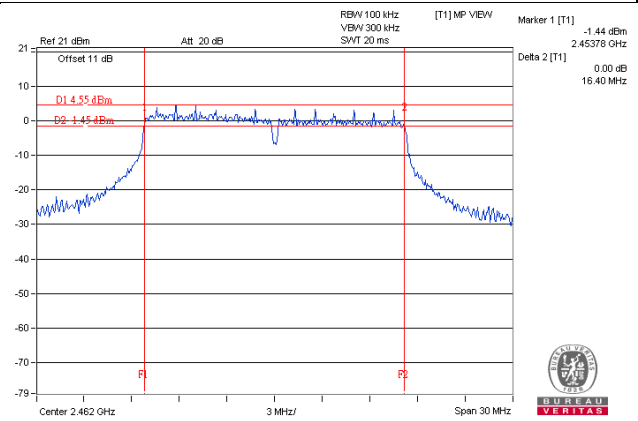
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	35.20	0.5	Pass
6	2437	35.38	0.5	Pass
9	2452	35.27	0.5	Pass

Spectrum Plot of Worst Value

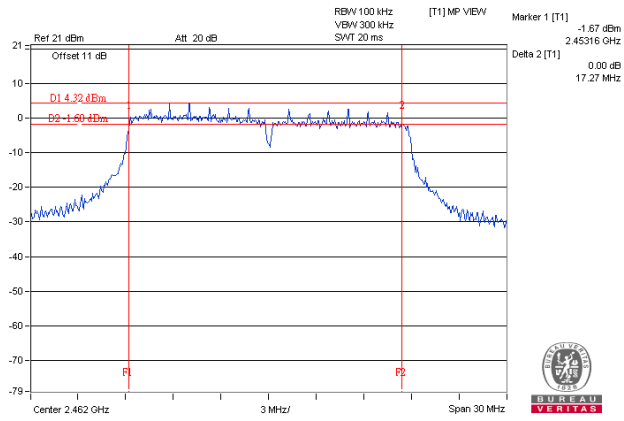
802.11b / CH6



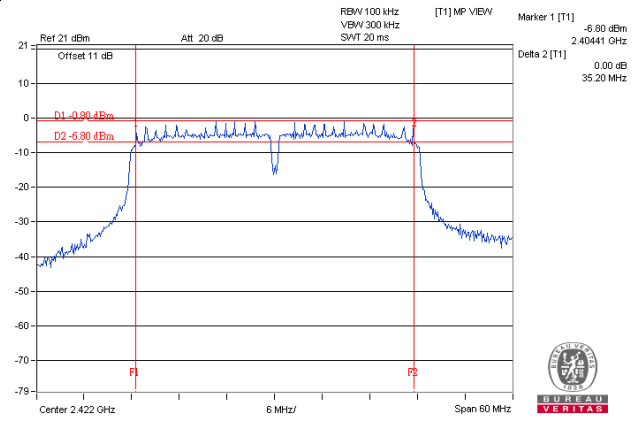
802.11g / CH11



802.11n (HT20) / CH11



802.11n (HT40) / CH3

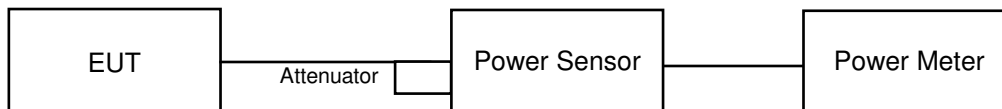


4.3 Conducted Output Power Measurement

4.3.1 Limits of Conducted Output Power Measurement

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

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 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.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

Same as Item 4.2.6.

4.3.7 Test Results

FOR PEAK POWER

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	109.648	20.40	30	Pass
6	2437	108.893	20.37	30	Pass
11	2462	104.472	20.19	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	115.08	20.61	30	Pass
6	2437	108.393	20.35	30	Pass
11	2462	115.611	20.63	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	105.439	20.23	30	Pass
6	2437	107.647	20.32	30	Pass
11	2462	100.693	20.03	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
3	2422	106.17	20.26	30	Pass
6	2437	95.06	19.78	30	Pass
9	2452	94.406	19.75	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	63.533	18.03
6	2437	59.841	17.77
11	2462	58.345	17.66

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	25.586	14.08
6	2437	26.122	14.17
11	2462	22.542	13.53

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	21.577	13.34
6	2437	21.928	13.41
11	2462	20.045	13.02

802.11n (HT40)

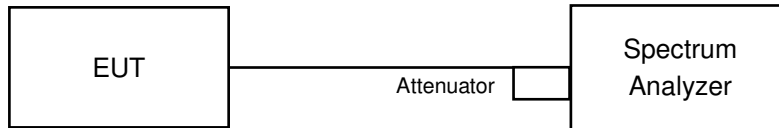
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	18.365	12.64
6	2437	15.922	12.02
9	2452	14.723	11.68

4.4 Power Spectral Density Measurement

4.4.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

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 Procedure

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Condition

Same as Item 4.2.6

4.4.7 Test Results

802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-2.30	8	Pass
6	2437	-3.69	8	Pass
11	2462	-3.72	8	Pass

802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-10.62	8	Pass
6	2437	-9.72	8	Pass
11	2462	-9.94	8	Pass

802.11n (HT20)

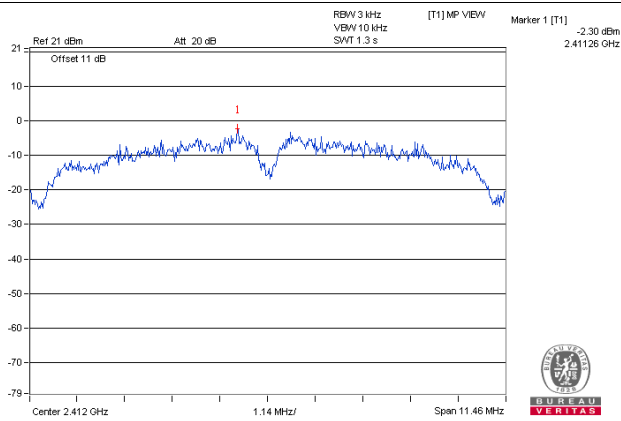
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-11.34	8	Pass
6	2437	-11.47	8	Pass
11	2462	-10.28	8	Pass

802.11n (HT40)

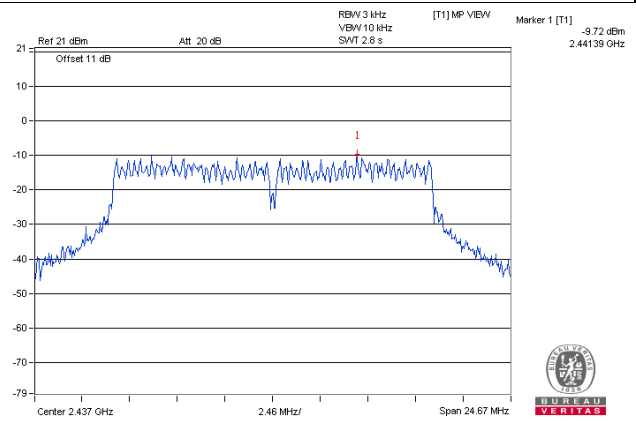
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
3	2422	-15.21	8	Pass
6	2437	-14.21	8	Pass
9	2452	-15.59	8	Pass

Spectrum Plot of Worst Value

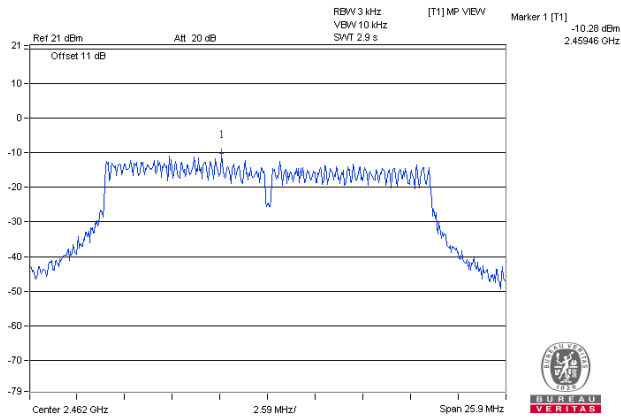
802.11b / CH1



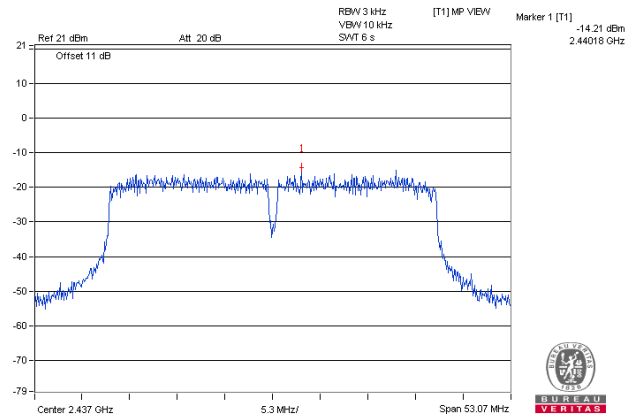
802.11g / CH6



802.11n (HT20) / CH11



802.11n (HT40) / CH6

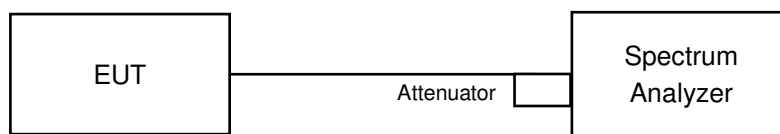


4.5 Conducted Out of Band Emission Measurement

4.5.1 Limits of Conducted Out of Band Emission Measurement

Below 20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

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

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.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

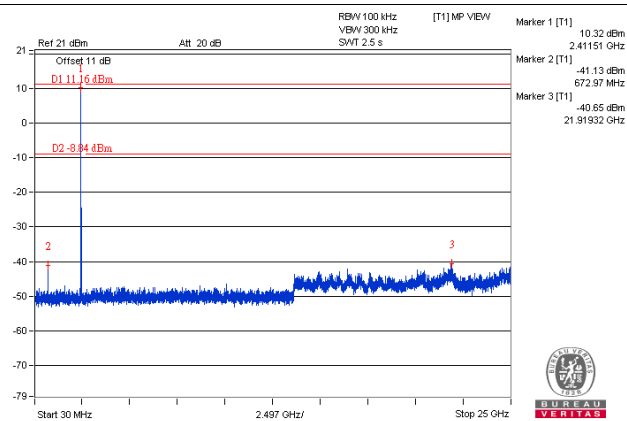
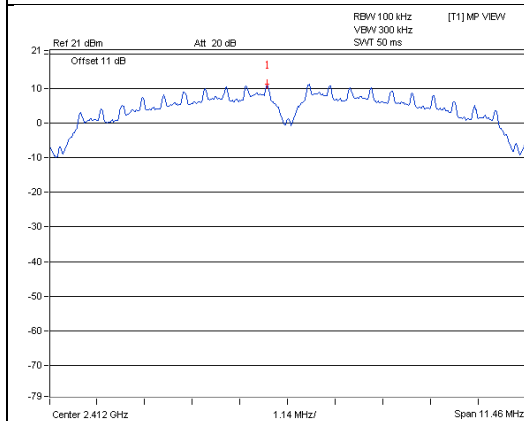
Same as Item 4.2.6

4.5.7 Test Results

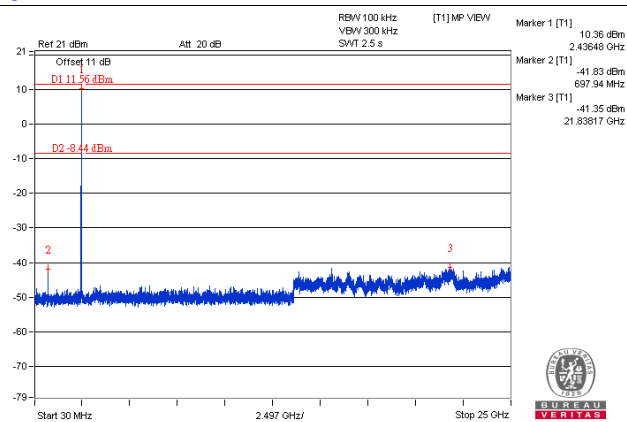
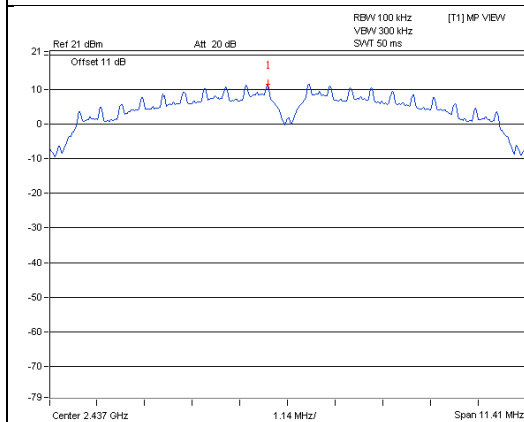
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

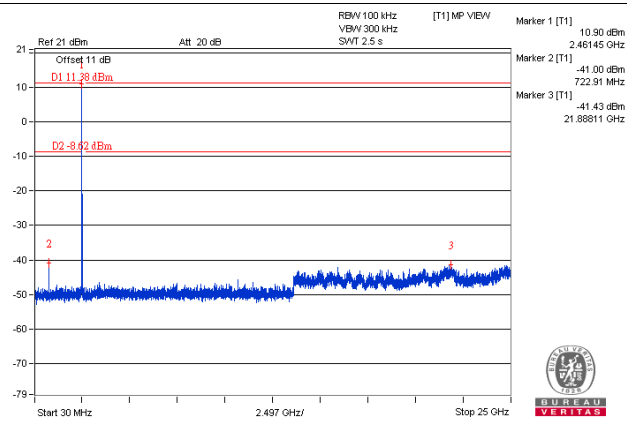
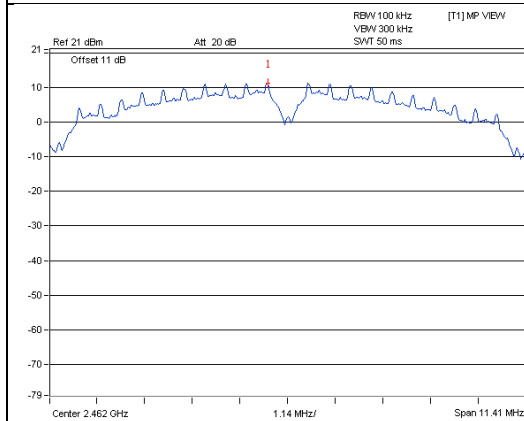
CH 1



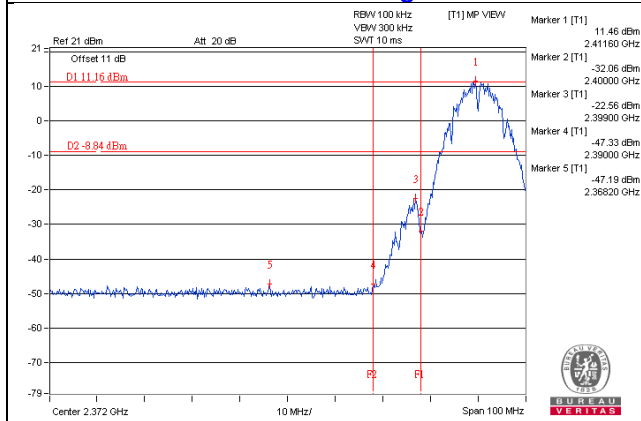
CH 6



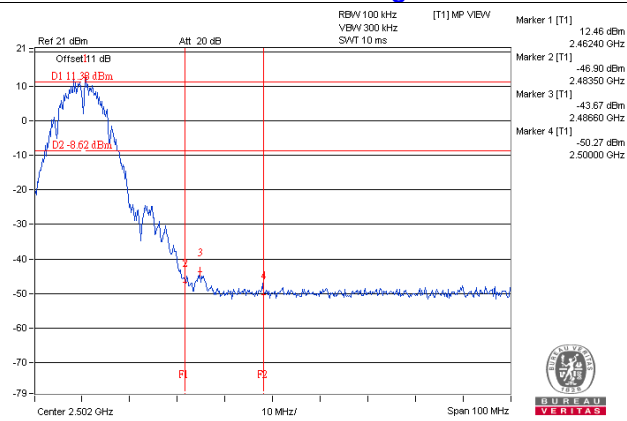
CH 11



CH 1 Band edge

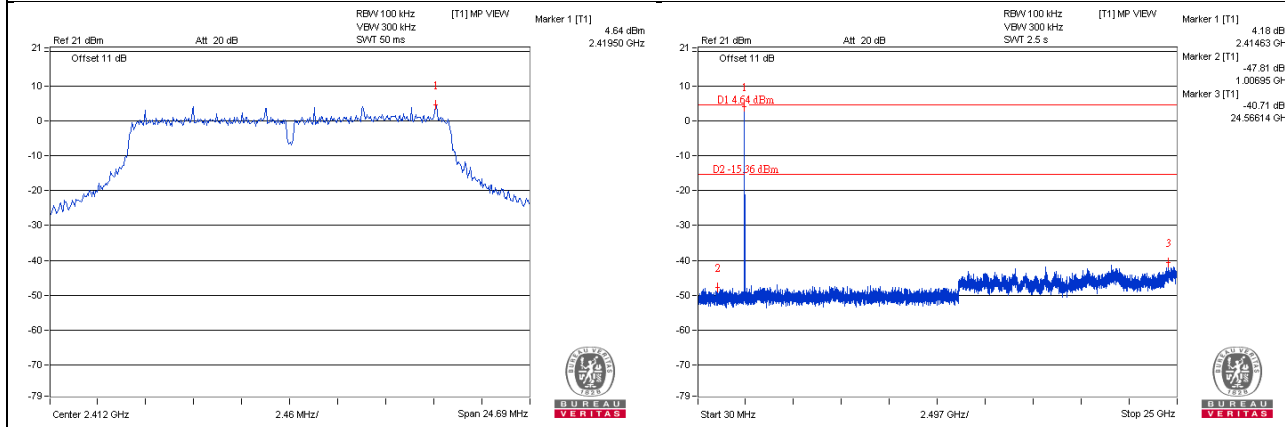


CH 11 Band edge

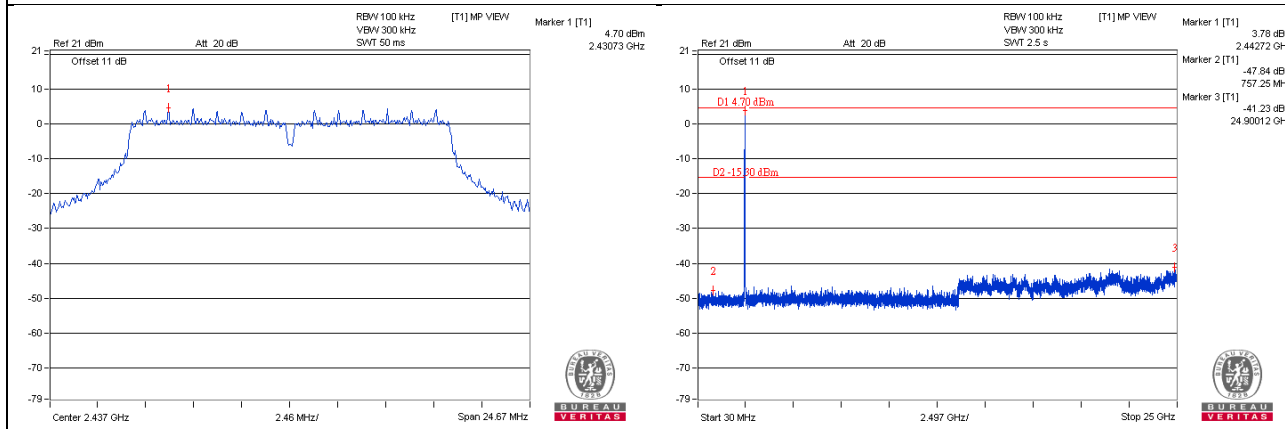


802.11g

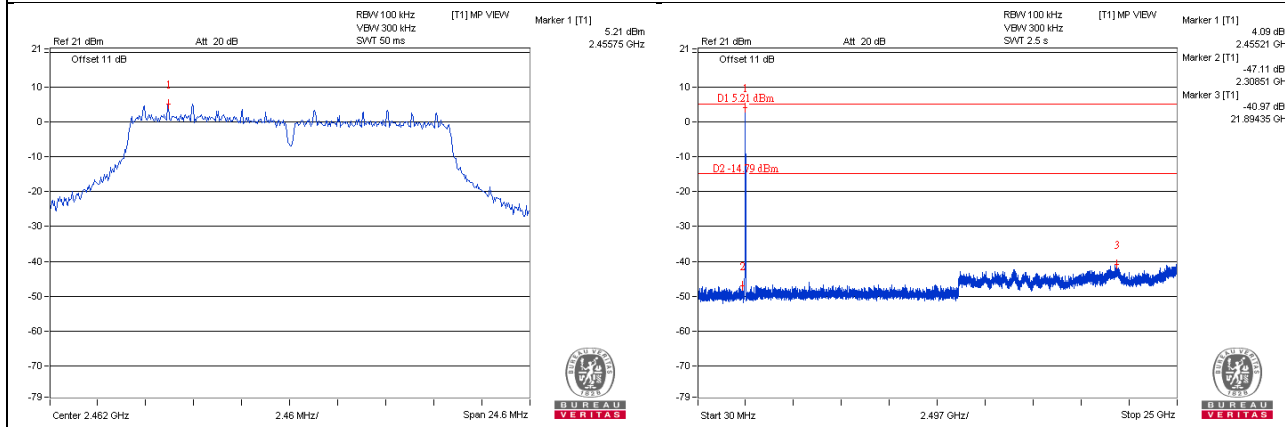
CH 1



CH 6

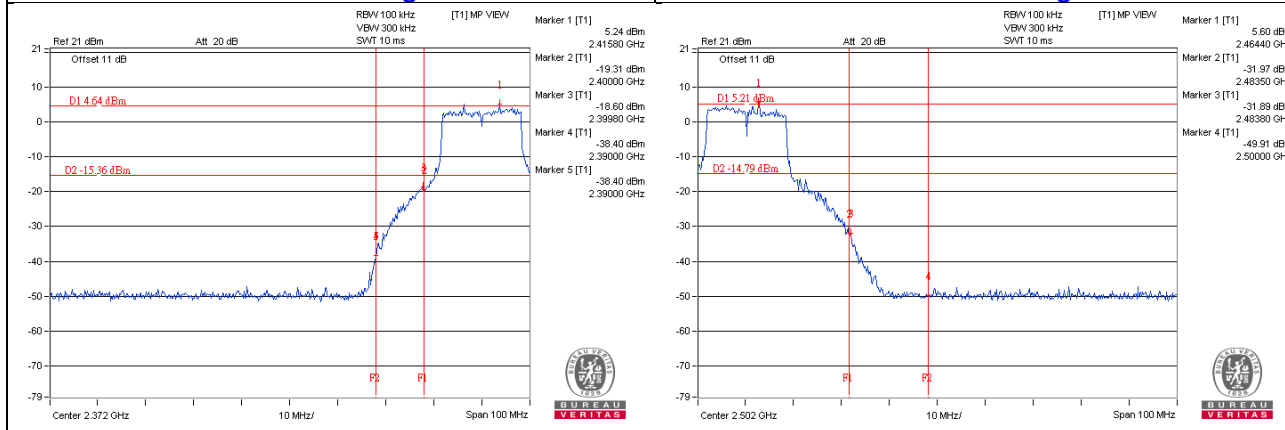


CH 11



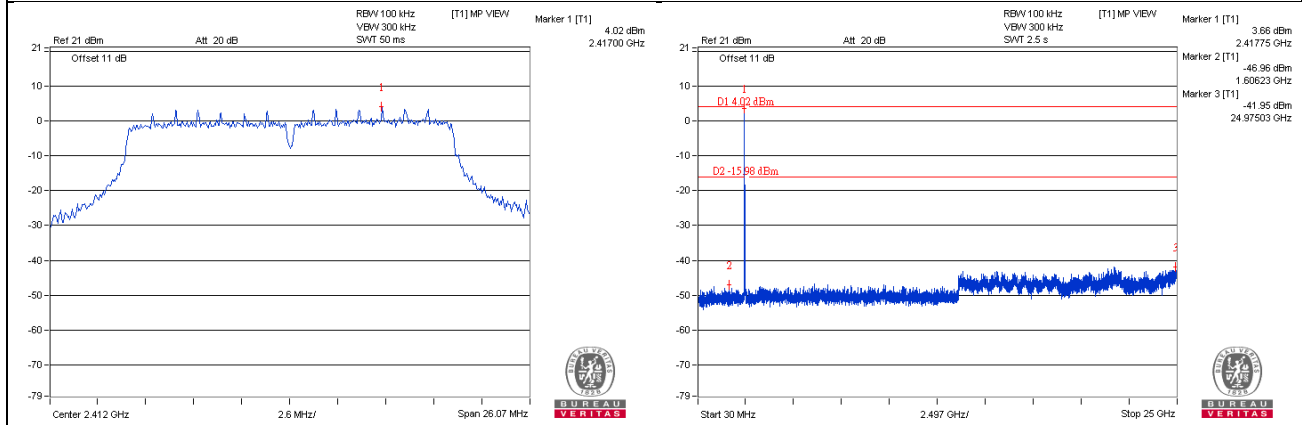
CH 1 Band edge

CH 11 Band edge

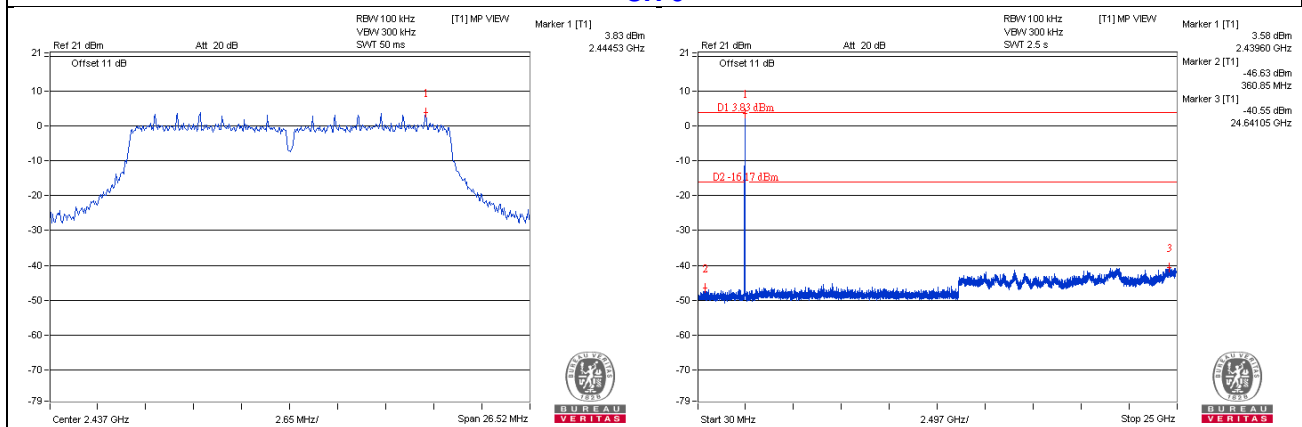


802.11n (HT20)

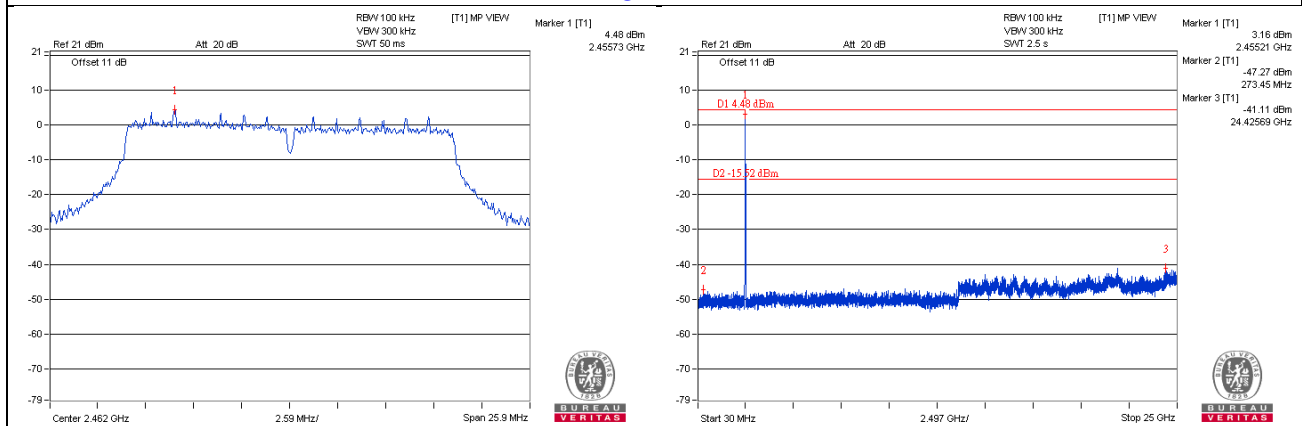
CH 1



CH 6

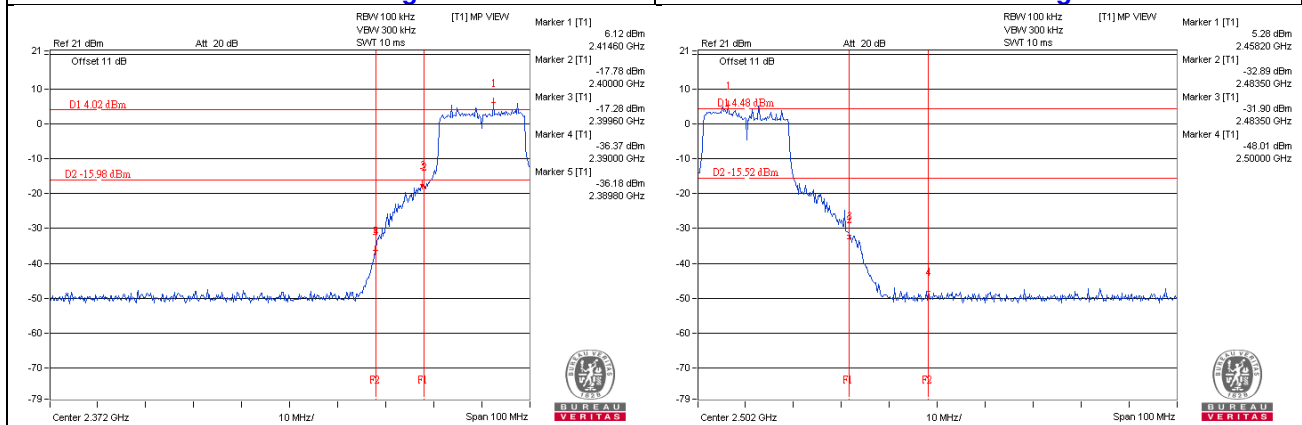


CH 11



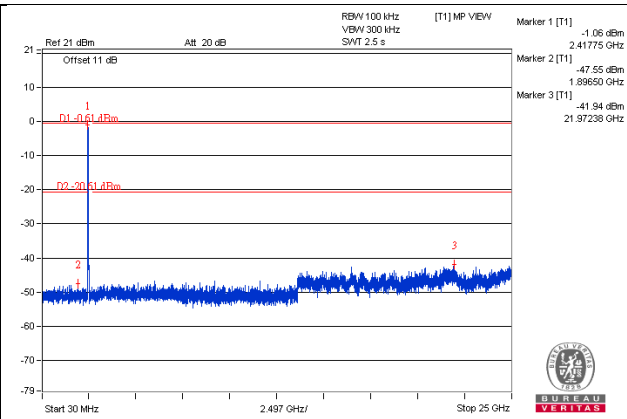
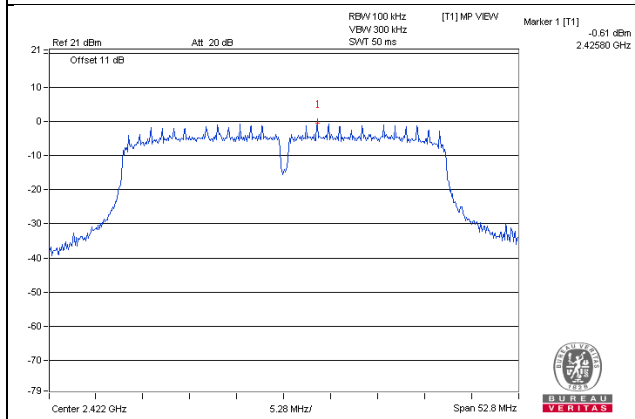
CH 1 Band edge

CH 11 Band edge

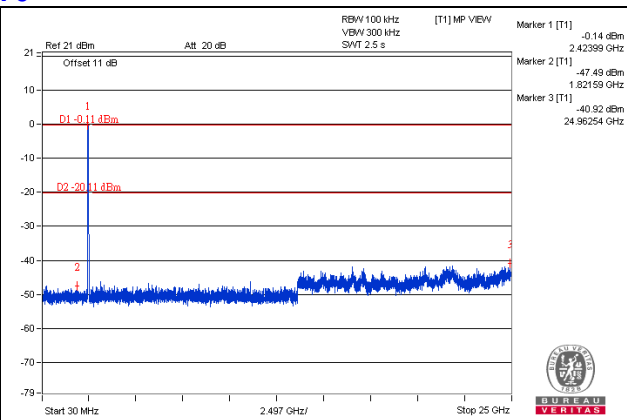
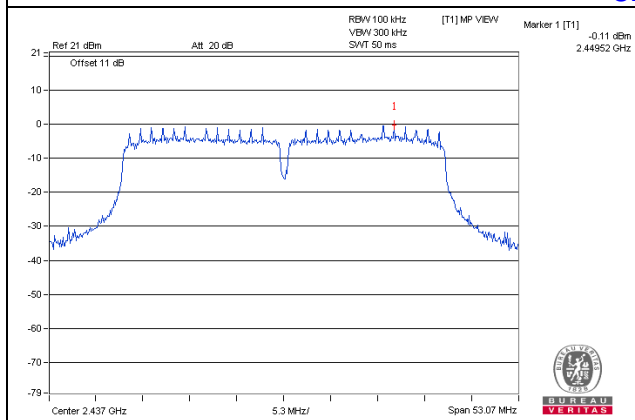


802.11n (HT40)

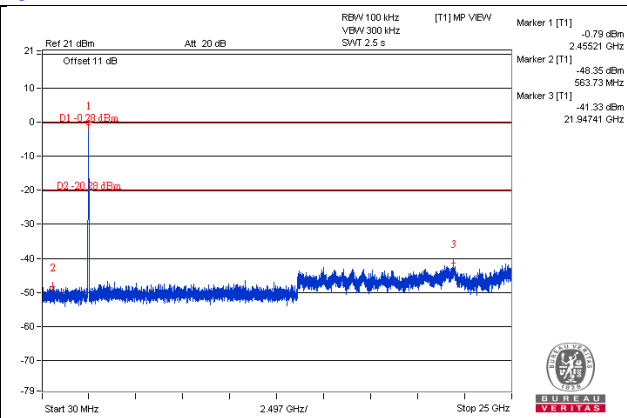
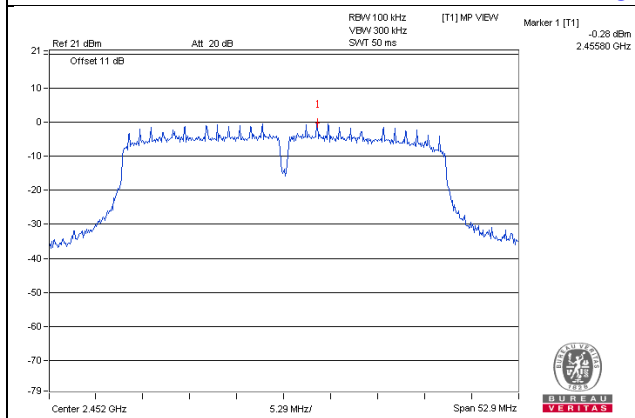
CH 3



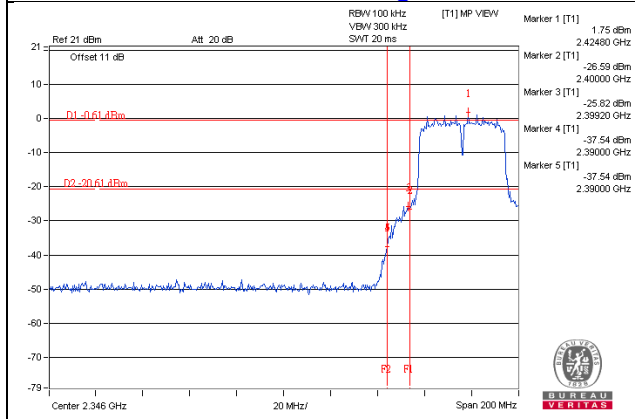
CH 6



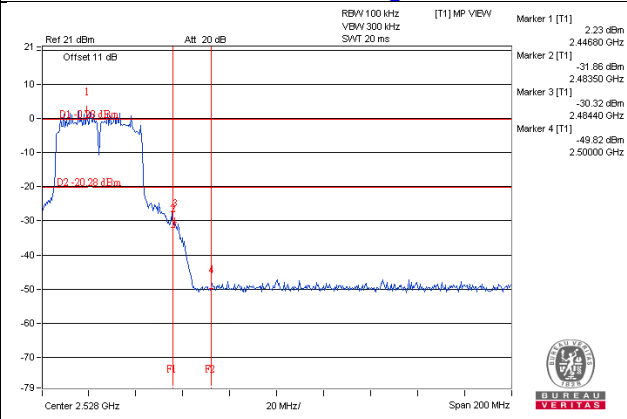
CH 9



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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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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