

FCC Test Report (WLAN)

Report No.: RF141112E01A R1

FCC ID: MQT-XCE200WU

Test Model: xCE-200WU-UH

Series Model: xCE-200WU-U

Received Date: Dec. 29, 2014

Test Date: Dec. 29, 2014 to Jan. 27, 2015

Issued Date: Apr. 10, 2015

Applicant: XAC AUTOMATION CORP.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Release Control Record

Issue No.	Description	Date Issued
RF141112E01A	Original release.	Feb. 16, 2015
RF141112E01A R1	1. Added the model names. 2. Modified the antenna model name and gain.	Apr. 10, 2015

1 Certificate of Conformity

Product: Terminal

Brand: XAC

Test Model: xCE-200WU-UH

Series Model: xCE-200WU-U

Sample Status: ENGINEERING SAMPLE

Applicant: XAC AUTOMATION CORP.

Test Date: Dec. 29, 2014 to Jan. 27, 2015

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

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

Prepared by : Phoenix Huang, **Date:** Apr. 10, 2015
Phoenix Huang / Specialist

Approved by : May Chen, **Date:** Apr. 10, 2015
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 -8.48dB at 0.59156MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.3dB at 2390.00MHz.
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) ($\pm$)
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 (WLAN)

Product	Terminal
Brand	XAC
Test Model	xCE-200WU-UH
Series Model	xCE-200WU-U
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc 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 802.11 g: up to 54Mbps 802.11n: up to 72.2Mbps
Operating Frequency	2.412 ~ 2.462GHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20)
Output Power	802.11b: 84.723mW 802.11g: 220.293mW 802.11n (HT20): 224.388mW
Antenna Type	Please see NOTE
Antenna Connector	Please see NOTE
Accessory Device	Adapter × 1 Handset × 1
Data Cable Supplied	NA

Note:

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

Brand Name	Model No.	Description
XAC	xCE-200WU-UH	With 3G (Voice+Data) function and has Handset.
	xCE-200WU-U	With 3G (Data) function.

From the above models, model: **xCE-200WU-UH** was selected as representative model for the test and its data was recorded in this report.

- WLAN, Bluetooth, GSM and WCDMA technology can transmit at same time.

- The EUT could be supplied with a power adapter as the following table:

Brand	Model No.	Spec.
LITEON	PA-1061-71	AC I/P: 100-240V, 50-60Hz, 1.5A AC input cable (Unshielded, 1.8m) DC O/P: 12V, 5A DC output cable(Unshielded, 1.05m, with one core)

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

GSM / WCDMA Antenna Spec.					
Brand	Model No.	Antenna Type	Antenna Connector	Gain(dBi)	Frequency (MHz)
Ethertronics Inc.	T-000084-01	FPCB	NA	0.14	850
				2.57	1900
WLAN / Bluetooth Antenna Spec.					
Brand	Model No.	Antenna Type	Antenna Connector	Gain(dBi)	Frequency (MHz)
ACX	AT8010-E2R9HAA	Chip	NA	2.5	2400-2500

5. The EUT incorporates a SISO function.

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

6. When EUT is under LAN mode, the EUT wireless function will be disabled.

7. 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		

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

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)
802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

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)
802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

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

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	25deg. C, 71%RH	120Vac, 60Hz	Robert Cheng
RE<1G	22deg. C, 68%RH	120Vac, 60Hz	Tim Ho
PLC	24deg. C, 55%RH	120Vac, 60Hz	Wythe Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

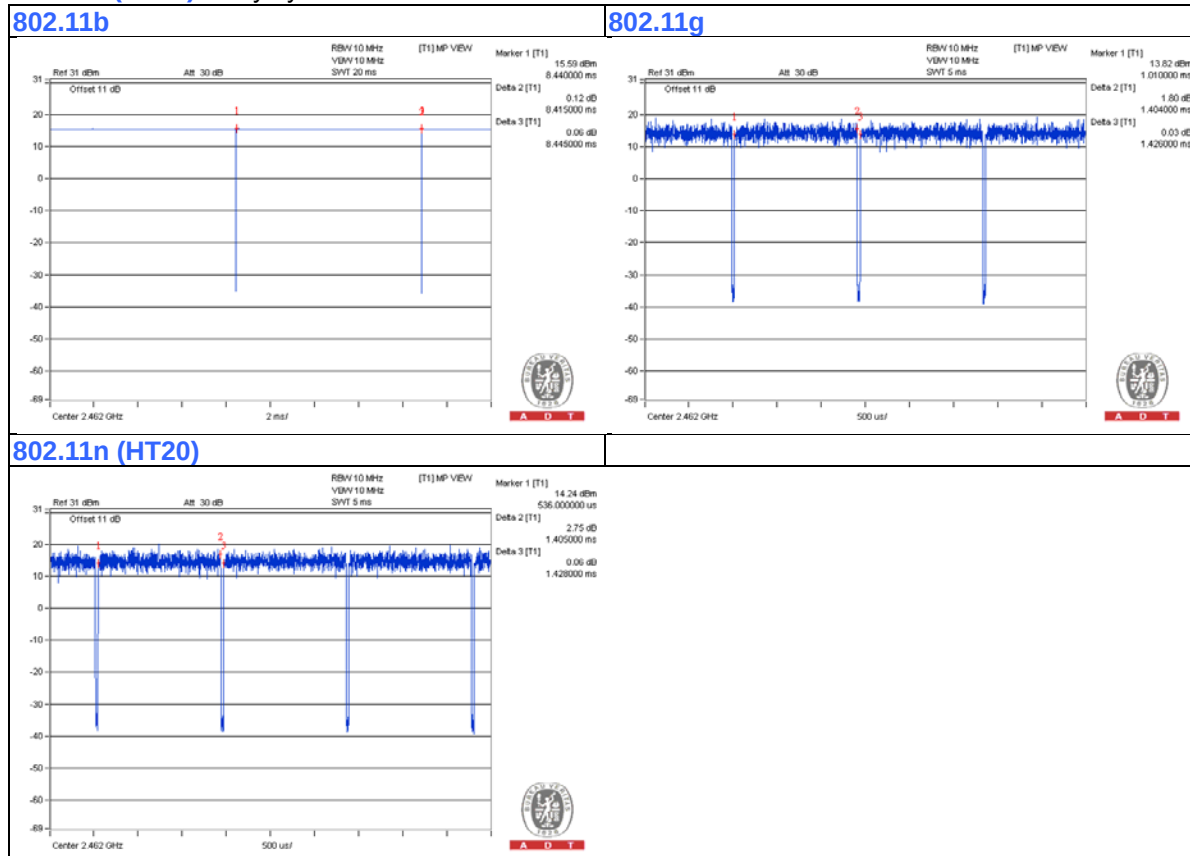
3.3 Duty Cycle of Test Signal

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

802.11b: Duty cycle = $8.415 \text{ ms} / 8.445 \text{ ms} = 0.996$

802.11g: Duty cycle = $1.404 \text{ ms} / 1.426 \text{ ms} = 0.985$

802.11n (HT20): Duty cycle = $1.405 \text{ ms} / 1.428 \text{ ms} = 0.984$



3.4 Description of Support Units

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

No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	iPod shuffle	Apple	MC749TA/A	CC4DMFKUDFDM	NA	Provided by Lab
B	iPod shuffle	Apple	MD778TA/A	CC4JMA9KF4T1	NA	Provided by Lab
C	iPod shuffle	Apple	MC749TA/A	CC4DN25WDFDM	NA	Provided by Lab
D	iPod shuffle	Apple	MC749TA/A	CC4DN29UDFDM	NA	Provided by Lab
E	Micro SD Card	Sandisk	2GB	NA	NA	Provided by Lab
F	SIM Card	NA	NA	NA	NA	Provided by Lab
G	Telephone Line Simulator	TELTONE	TLS-5C-01	250-00193-07	NA	Provided by Lab

NOTE:

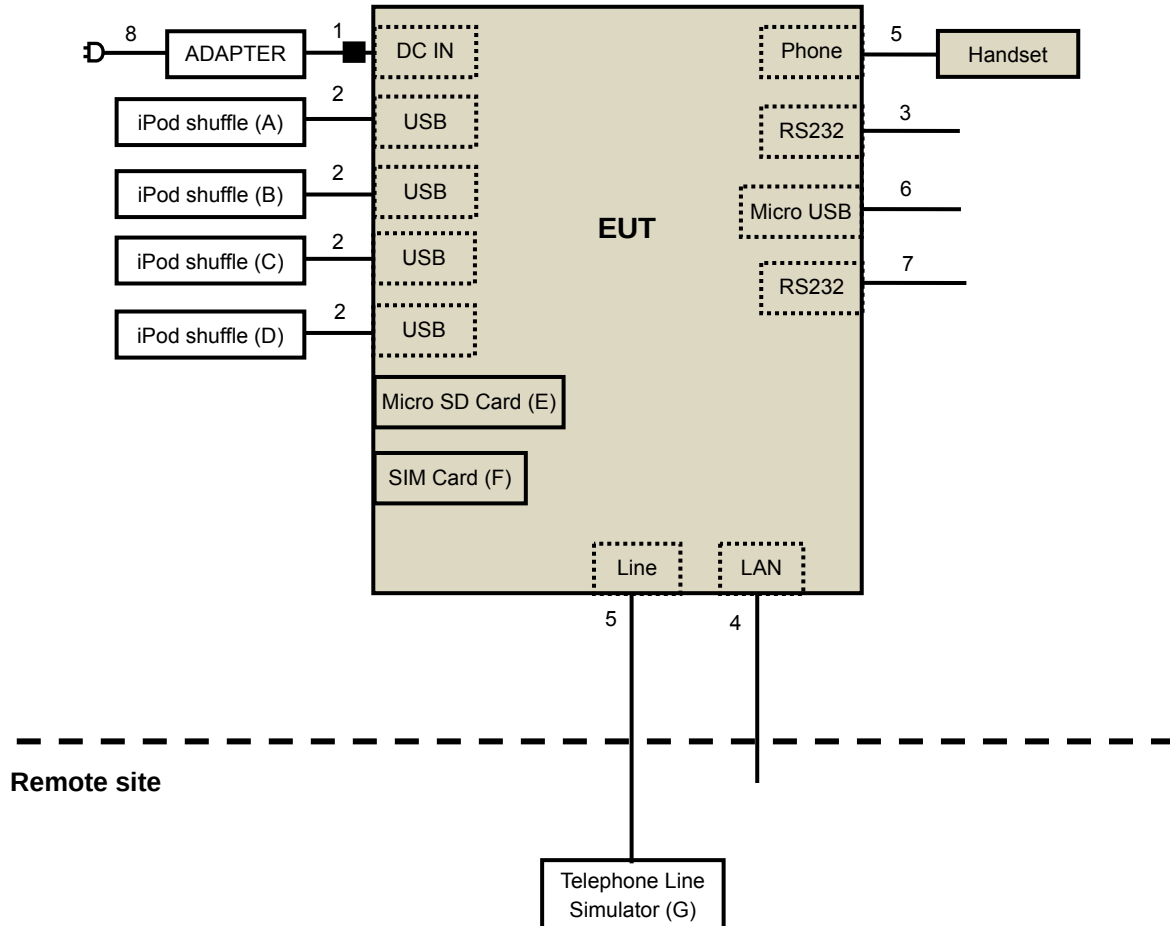
1. All power cords of the above support units are non-shielded (1.8 m).

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1	DC	1	1.05	No	1	Supplied by Client
2	USB	1	0.1	Yes	0	Provided by Lab
3	RS232	1	1.5	Yes	0	Supplied by Client
4	RJ-45	1	10	No	0	Provided by Lab
5	RJ-11	1	1.5	No	0	Provided by Lab
6	Micro USB	1	1.5	No	0	Provided by Lab
7	RS232	1	1.5	Yes	0	Supplied by Client
8	AC	1	1.8	No	0	Supplied by Client

NOTE:

1. 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)
558074 D01 DTS Meas Guidance v03r02
ANSI C63.10-2009

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

For Below 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	July 21, 2014	July 20, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 04, 2014	Oct. 03, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Aug. 27, 2014	Aug. 26, 2015
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131214 SNMY23684/4	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 17, 2014	Jan. 16, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Dec. 29, 2014

For Above 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	July 21,2014	July 20,2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 04, 2014	Oct. 03, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Aug. 27, 2014	Aug. 26, 2015
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131214 SNMY23684/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2015	Jan. 14, 2016
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Antenna Tower & Turn Table CT	NA	NA	NA	NA
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015
Power meter Anritsu	ML2495A	1014008	Apr. 30, 2014	Apr. 29, 2015
Power sensor Anritsu	MA2411B	0917122	Apr. 30, 2014	Apr. 29, 2015
Temperature & Humidity Chamber GIANTFORCE	GTH-150-40-S P-AR	MAA0812-008	Jan. 12, 2015	Jan. 11, 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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
- 5 The VCCI Site Registration No. is G-137.
- 6 The CANADA Site Registration No. is IC 7450H-2.
- 7 Tested Date: Jan. 19, 2015

4.1.3 Test Procedures

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

Note:

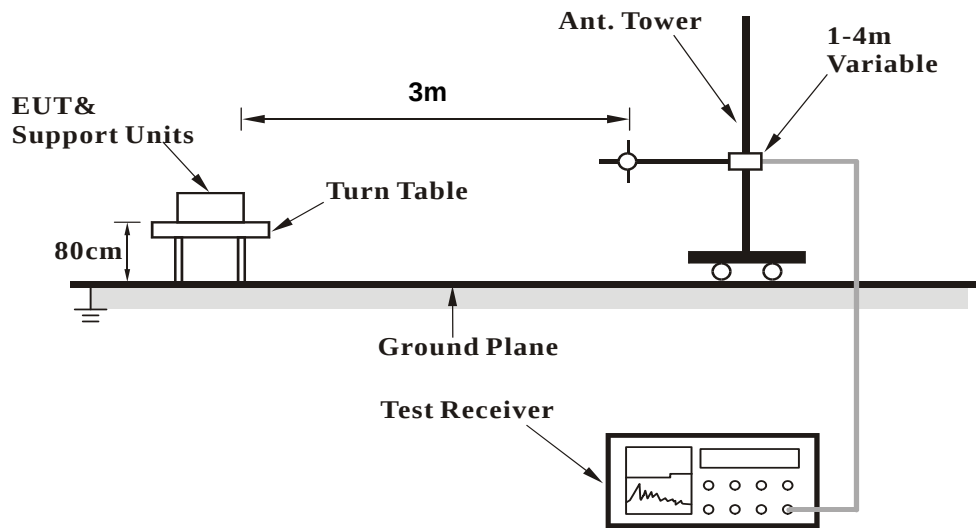
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

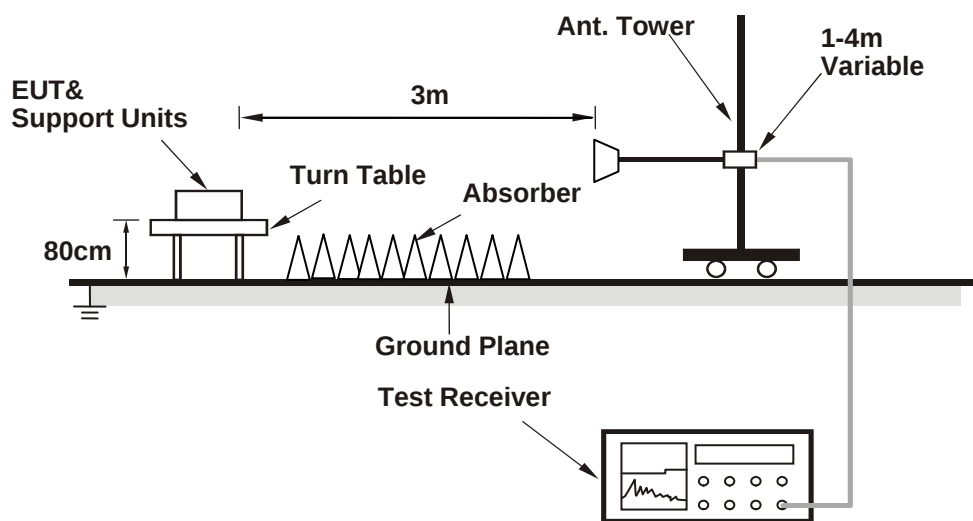
No deviation.

4.1.5 Test Setup

<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

1. The EUT which is placed on table.
2. The communication partner run test program "Hyper Terminal paste WiFi.txt" 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	61.8 PK	74.0	-12.2	1.58 H	143	64.27	-2.47
2	2390.00	53.6 AV	54.0	-0.4	1.58 H	143	56.07	-2.47
3	*2412.00	104.9 PK			1.38 H	144	107.27	-2.37
4	*2412.00	102.3 AV			1.38 H	144	104.67	-2.37
5	4824.00	48.6 PK	74.0	-25.4	1.28 H	146	42.89	5.71
6	4824.00	40.2 AV	54.0	-13.8	1.28 H	146	34.49	5.71
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	57.7 PK	74.0	-16.3	1.17 V	247	60.17	-2.47
2	2390.00	47.1 AV	54.0	-6.9	1.17 V	247	49.57	-2.47
3	*2412.00	99.2 PK			1.17 V	247	101.57	-2.37
4	*2412.00	96.2 AV			1.17 V	247	98.57	-2.37
5	4824.00	49.0 PK	74.0	-25.0	1.40 V	343	43.29	5.71
6	4824.00	38.0 AV	54.0	-16.0	1.40 V	343	32.29	5.71

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	60.7 PK	74.0	-13.3	1.19 H	141	63.17	-2.47
2	2390.00	48.9 AV	54.0	-5.1	1.19 H	141	51.37	-2.47
3	*2437.00	110.0 PK			1.19 H	141	112.25	-2.25
4	*2437.00	107.5 AV			1.19 H	141	109.75	-2.25
5	2483.50	60.9 PK	74.0	-13.1	1.19 H	141	62.93	-2.03
6	2483.50	48.7 AV	54.0	-5.3	1.19 H	141	50.73	-2.03
7	4874.00	48.4 PK	74.0	-25.6	1.30 H	132	42.50	5.90
8	4874.00	40.2 AV	54.0	-13.8	1.30 H	132	34.30	5.90
9	7311.00	53.2 PK	74.0	-20.8	1.21 H	135	40.03	13.17
10	7311.00	40.2 AV	54.0	-13.8	1.21 H	135	27.03	13.17

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	1.18 V	232	60.07	-2.47
2	2390.00	45.3 AV	54.0	-8.7	1.18 V	232	47.77	-2.47
3	*2437.00	104.0 PK			1.18 V	232	106.25	-2.25
4	*2437.00	101.2 AV			1.18 V	232	103.45	-2.25
5	2483.50	57.3 PK	74.0	-16.7	1.18 V	232	59.33	-2.03
6	2483.50	45.1 AV	54.0	-8.9	1.18 V	232	47.13	-2.03
7	4874.00	49.4 PK	74.0	-24.6	1.38 V	335	43.50	5.90
8	4874.00	38.1 AV	54.0	-15.9	1.38 V	335	32.20	5.90
9	7311.00	52.7 PK	74.0	-21.3	1.25 V	29	39.53	13.17
10	7311.00	40.5 AV	54.0	-13.5	1.25 V	29	27.33	13.17

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	106.9 PK			1.34 H	142	109.04	-2.14
2	*2462.00	104.4 AV			1.34 H	142	106.54	-2.14
3	2483.50	64.5 PK	74.0	-9.5	1.17 H	137	66.53	-2.03
4	2483.50	53.5 AV	54.0	-0.5	1.17 H	137	55.53	-2.03
5	4924.00	48.6 PK	74.0	-25.4	1.34 H	124	42.49	6.11
6	4924.00	40.4 AV	54.0	-13.6	1.34 H	124	34.29	6.11
7	7386.00	53.5 PK	74.0	-20.5	1.26 H	146	40.32	13.18
8	7386.00	40.4 AV	54.0	-13.6	1.26 H	146	27.22	13.18

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	100.2 PK			1.19 V	252	102.34	-2.14
2	*2462.00	98.1 AV			1.19 V	252	100.24	-2.14
3	2483.50	58.3 PK	74.0	-15.7	1.19 V	252	60.33	-2.03
4	2483.50	47.5 AV	54.0	-6.5	1.19 V	252	49.53	-2.03
5	4924.00	49.9 PK	74.0	-24.1	1.36 V	335	43.79	6.11
6	4924.00	38.5 AV	54.0	-15.5	1.36 V	335	32.39	6.11
7	7386.00	53.1 PK	74.0	-20.9	1.22 V	35	39.92	13.18
8	7386.00	40.8 AV	54.0	-13.2	1.22 V	35	27.62	13.18

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.

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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	66.3 PK	74.0	-7.7	1.37 H	145	68.77	-2.47
2	2390.00	53.7 AV	54.0	-0.3	1.37 H	145	56.17	-2.47
3	*2412.00	107.6 PK			1.37 H	145	109.97	-2.37
4	*2412.00	95.4 AV			1.37 H	145	97.77	-2.37
5	4824.00	47.8 PK	74.0	-26.2	1.29 H	134	42.09	5.71
6	4824.00	39.8 AV	54.0	-14.2	1.29 H	134	34.09	5.71
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	61.0 PK	74.0	-13.0	1.50 V	243	63.47	-2.47
2	2390.00	47.7 AV	54.0	-6.3	1.50 V	243	50.17	-2.47
3	*2412.00	101.4 PK			1.50 V	243	103.77	-2.37
4	*2412.00	90.5 AV			1.50 V	243	92.87	-2.37
5	4824.00	48.9 PK	74.0	-25.1	1.36 V	325	43.19	5.71
6	4824.00	37.8 AV	54.0	-16.2	1.36 V	325	32.09	5.71

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	61.7 PK	74.0	-12.3	1.34 H	144	64.17	-2.47
2	2390.00	47.1 AV	54.0	-6.9	1.34 H	144	49.57	-2.47
3	*2437.00	112.3 PK			1.34 H	144	114.55	-2.25
4	*2437.00	100.7 AV			1.34 H	144	102.95	-2.25
5	2483.50	63.0 PK	74.0	-11.0	1.34 H	144	65.03	-2.03
6	2483.50	46.8 AV	54.0	-7.2	1.34 H	144	48.83	-2.03
7	4874.00	48.9 PK	74.0	-25.1	1.30 H	121	43.00	5.90
8	4874.00	40.6 AV	54.0	-13.4	1.30 H	121	34.70	5.90
9	7311.00	52.9 PK	74.0	-21.1	1.16 H	131	39.73	13.17
10	7311.00	39.9 AV	54.0	-14.1	1.16 H	131	26.73	13.17

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	57.8 PK	74.0	-16.2	1.16 V	233	60.27	-2.47
2	2390.00	45.6 AV	54.0	-8.4	1.16 V	233	48.07	-2.47
3	*2437.00	106.1 PK			1.16 V	233	108.35	-2.25
4	*2437.00	94.2 AV			1.16 V	233	96.45	-2.25
5	2483.50	57.1 PK	74.0	-16.9	1.16 V	233	59.13	-2.03
6	2483.50	45.1 AV	54.0	-8.9	1.16 V	233	47.13	-2.03
7	4874.00	49.7 PK	74.0	-24.3	1.40 V	336	43.80	5.90
8	4874.00	38.2 AV	54.0	-15.8	1.40 V	336	32.30	5.90
9	7311.00	52.8 PK	74.0	-21.2	1.23 V	23	39.63	13.17
10	7311.00	40.7 AV	54.0	-13.3	1.23 V	23	27.53	13.17

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	109.4 PK			1.34 H	140	111.54	-2.14
2	*2462.00	97.7 AV			1.34 H	140	99.84	-2.14
3	2483.50	73.5 PK	74.0	-0.5	1.34 H	140	75.53	-2.03
4	2483.50	53.2 AV	54.0	-0.8	1.34 H	140	55.23	-2.03
5	4924.00	48.6 PK	74.0	-25.4	1.26 H	147	42.49	6.11
6	4924.00	40.3 AV	54.0	-13.7	1.26 H	147	34.19	6.11
7	7386.00	52.8 PK	74.0	-21.2	1.23 H	135	39.62	13.18
8	7386.00	39.8 AV	54.0	-14.2	1.23 H	135	26.62	13.18

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	103.1 PK			1.11 V	259	105.24	-2.14
2	*2462.00	91.2 AV			1.11 V	259	93.34	-2.14
3	2483.50	58.0 PK	74.0	-16.0	1.11 V	259	60.03	-2.03
4	2483.50	47.5 AV	54.0	-6.5	1.11 V	259	49.53	-2.03
5	4924.00	49.1 PK	74.0	-24.9	1.43 V	328	42.99	6.11
6	4924.00	37.8 AV	54.0	-16.2	1.43 V	328	31.69	6.11
7	7386.00	53.3 PK	74.0	-20.7	1.24 V	42	40.12	13.18
8	7386.00	40.9 AV	54.0	-13.1	1.24 V	42	27.72	13.18

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	67.2 PK	74.0	-6.8	1.34 H	143	69.67	-2.47
2	2390.00	53.5 AV	54.0	-0.5	1.34 H	143	55.97	-2.47
3	*2412.00	107.7 PK			1.34 H	143	110.07	-2.37
4	*2412.00	96.5 AV			1.34 H	143	98.87	-2.37
5	4824.00	49.0 PK	74.0	-25.0	1.29 H	147	43.29	5.71
6	4824.00	40.6 AV	54.0	-13.4	1.29 H	147	34.89	5.71

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	57.4 PK	74.0	-16.6	1.20 V	252	59.87	-2.47
2	2390.00	47.0 AV	54.0	-7.0	1.20 V	252	49.47	-2.47
3	*2412.00	101.2 PK			1.20 V	252	103.57	-2.37
4	*2412.00	90.3 AV			1.20 V	252	92.67	-2.37
5	4824.00	48.9 PK	74.0	-25.1	1.45 V	319	43.19	5.71
6	4824.00	37.8 AV	54.0	-16.2	1.45 V	319	32.09	5.71

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	52.8 PK	74.0	-21.2	1.34 H	143	55.27	-2.47
2	2390.00	46.8 AV	54.0	-7.2	1.34 H	143	49.27	-2.47
3	*2437.00	111.4 PK			1.34 H	143	113.65	-2.25
4	*2437.00	100.6 AV			1.34 H	143	102.85	-2.25
5	2483.50	62.2 PK	74.0	-11.8	1.34 H	143	64.23	-2.03
6	2483.50	46.8 AV	54.0	-7.2	1.34 H	143	48.83	-2.03
7	4874.00	48.4 PK	74.0	-25.6	1.34 H	135	42.50	5.90
8	4874.00	40.0 AV	54.0	-14.0	1.34 H	135	34.10	5.90
9	7311.00	53.3 PK	74.0	-20.7	1.19 H	146	40.13	13.17
10	7311.00	40.2 AV	54.0	-13.8	1.19 H	146	27.03	13.17

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	57.8 PK	74.0	-16.2	1.15 V	245	60.27	-2.47
2	2390.00	45.5 AV	54.0	-8.5	1.15 V	245	47.97	-2.47
3	*2437.00	105.2 PK			1.15 V	245	107.45	-2.25
4	*2437.00	94.3 AV			1.15 V	245	96.55	-2.25
5	2483.50	57.5 PK	74.0	-16.5	1.15 V	245	59.53	-2.03
6	2483.50	45.4 AV	54.0	-8.6	1.15 V	245	47.43	-2.03
7	4874.00	49.2 PK	74.0	-24.8	1.44 V	316	43.30	5.90
8	4874.00	38.1 AV	54.0	-15.9	1.44 V	316	32.20	5.90
9	7311.00	53.4 PK	74.0	-20.6	1.28 V	48	40.23	13.17
10	7311.00	41.3 AV	54.0	-12.7	1.28 V	48	28.13	13.17

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	108.6 PK			1.33 H	144	110.74	-2.14
2	*2462.00	97.5 AV			1.33 H	144	99.64	-2.14
3	2483.50	72.8 PK	74.0	-1.2	1.33 H	144	74.83	-2.03
4	2483.50	53.2 AV	54.0	-0.8	1.33 H	144	55.23	-2.03
5	4924.00	48.4 PK	74.0	-25.6	1.30 H	122	42.29	6.11
6	4924.00	40.5 AV	54.0	-13.5	1.30 H	122	34.39	6.11
7	7386.00	53.6 PK	74.0	-20.4	1.24 H	136	40.42	13.18
8	7386.00	40.4 AV	54.0	-13.6	1.24 H	136	27.22	13.18

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	102.3 PK			1.12 V	258	104.44	-2.14
2	*2462.00	91.4 AV			1.12 V	258	93.54	-2.14
3	2483.50	57.4 PK	74.0	-16.6	1.12 V	258	59.43	-2.03
4	2483.50	47.1 AV	54.0	-6.9	1.12 V	258	49.13	-2.03
5	4924.00	49.1 PK	74.0	-24.9	1.45 V	338	42.99	6.11
6	4924.00	37.9 AV	54.0	-16.1	1.45 V	338	31.79	6.11
7	7386.00	53.5 PK	74.0	-20.5	1.20 V	33	40.32	13.18
8	7386.00	41.3 AV	54.0	-12.7	1.20 V	33	28.12	13.18

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:

802.11n (HT20)

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	62.93	33.8 QP	40.0	-6.2	1.50 H	360	47.96	-14.13
2	101.88	36.1 QP	43.5	-7.4	2.00 H	269	53.19	-17.08
3	214.40	40.4 QP	43.5	-3.1	1.50 H	101	56.19	-15.83
4	318.24	38.0 QP	46.0	-8.0	1.00 H	82	49.38	-11.36
5	375.03	38.0 QP	46.0	-8.0	1.00 H	309	47.75	-9.78
6	875.02	38.9 QP	46.0	-7.1	1.00 H	147	38.63	0.31
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	62.25	36.9 QP	40.0	-3.1	1.00 V	298	50.91	-14.04
2	101.93	42.1 QP	43.5	-1.4	1.00 V	279	59.13	-17.06
3	142.91	37.0 QP	43.5	-6.6	1.50 V	0	50.04	-13.09
4	214.40	37.2 QP	43.5	-6.3	1.00 V	156	53.07	-15.83
5	375.03	34.9 QP	46.0	-11.1	1.00 V	358	44.67	-9.78
6	428.77	33.5 QP	46.0	-12.5	1.50 V	0	41.70	-8.21

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 ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ENV216	100071	Nov. 10, 2014	Nov. 09, 2015
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10, 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
Software ADT	BV ADT_Cond_V7.3.7. 3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Dec. 30, 2014

4.2.3 Test Procedures

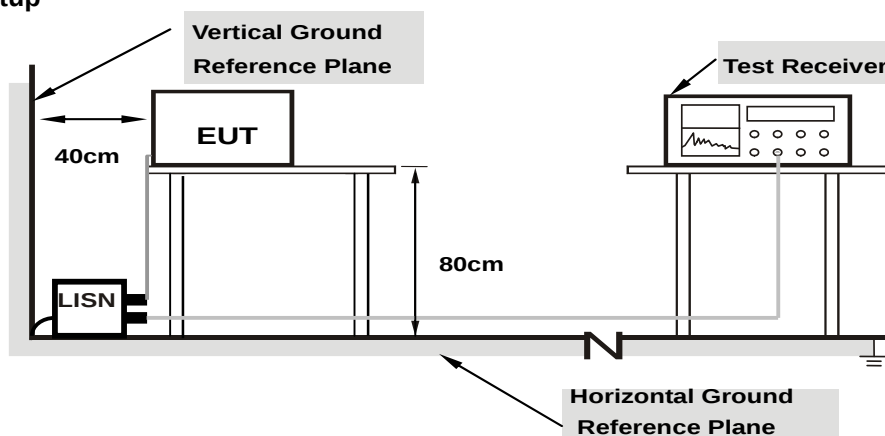
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

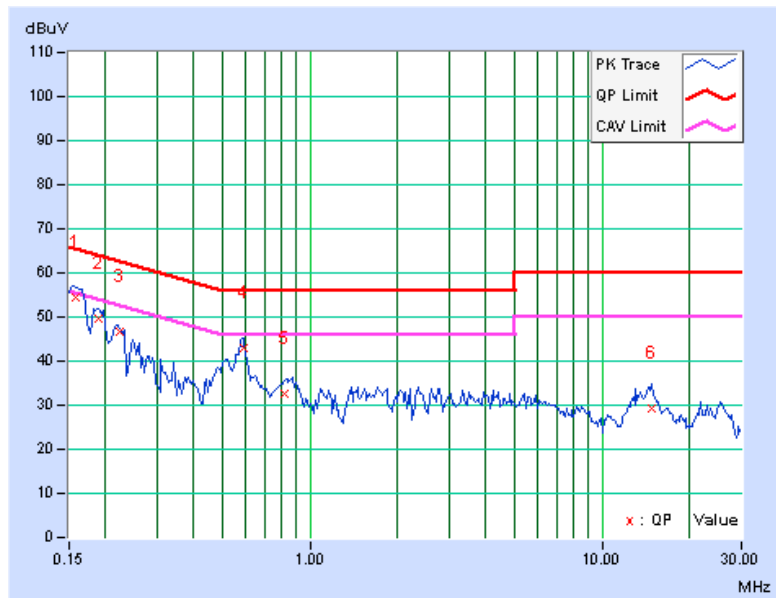
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)								
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15794	0.07	54.46	45.50	54.53	45.57	65.57	55.57	-11.05	-10.01
2	0.18945	0.07	49.52	39.87	49.59	39.94	64.06	54.06	-14.47	-14.12
3	0.22231	0.07	46.52	35.10	46.59	35.17	62.73	52.73	-16.14	-17.56
4	0.59156	0.10	42.78	37.42	42.88	37.52	56.00	46.00	-13.12	-8.48
5	0.82247	0.12	32.31	27.74	32.43	27.86	56.00	46.00	-23.57	-18.14
6	14.83746	0.58	28.57	22.40	29.15	22.98	60.00	50.00	-30.85	-27.02

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

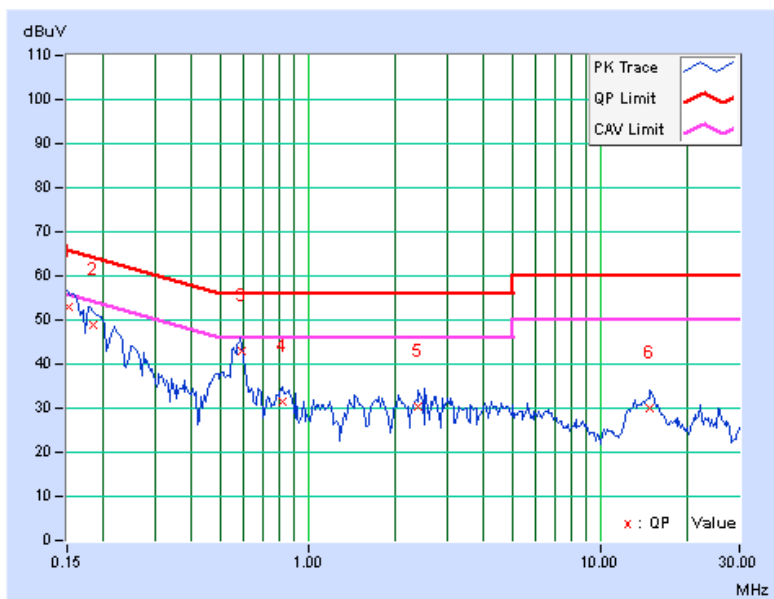


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15148	0.06	52.89	40.12	52.95	40.18	65.92	55.92	-12.96	-15.73
2	0.18510	0.06	49.01	37.10	49.07	37.16	64.25	54.25	-15.18	-17.09
3	0.59201	0.10	42.84	37.14	42.94	37.24	56.00	46.00	-13.06	-8.76
4	0.81623	0.12	31.20	25.89	31.32	26.01	56.00	46.00	-24.68	-19.99
5	2.39102	0.20	30.11	25.91	30.31	26.11	56.00	46.00	-25.69	-19.89
6	14.88100	0.61	29.54	24.01	30.15	24.62	60.00	50.00	-29.85	-25.38

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

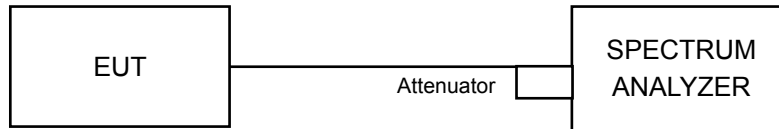


4.3 6dB Bandwidth Measurement

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 Procedures

- 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 Results

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	9.09	0.5	Pass
6	2437	9.11	0.5	Pass
11	2462	9.08	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.52	0.5	Pass
6	2437	15.69	0.5	Pass
11	2462	15.66	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.75	0.5	Pass
6	2437	15.70	0.5	Pass
11	2462	15.42	0.5	Pass

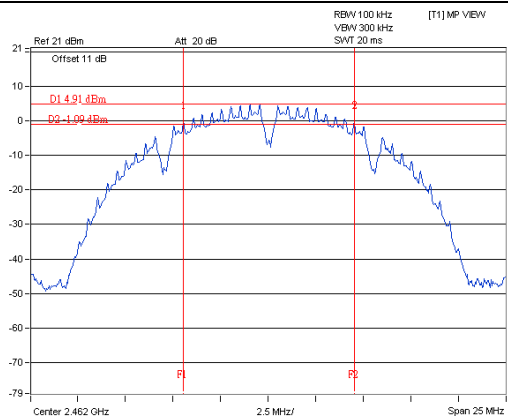


A D T

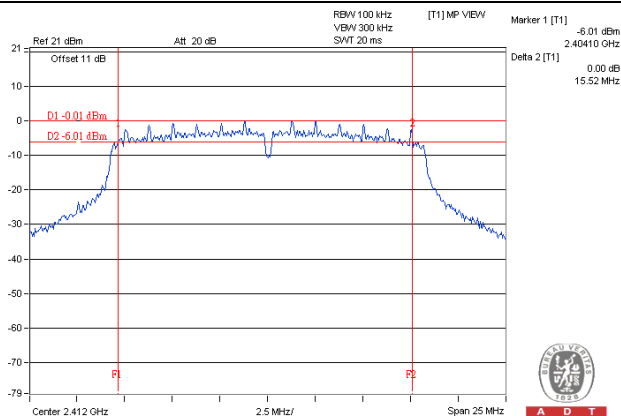
Spectrum Plot of Worst Value

802.11b / CH11

802.11g / CH1

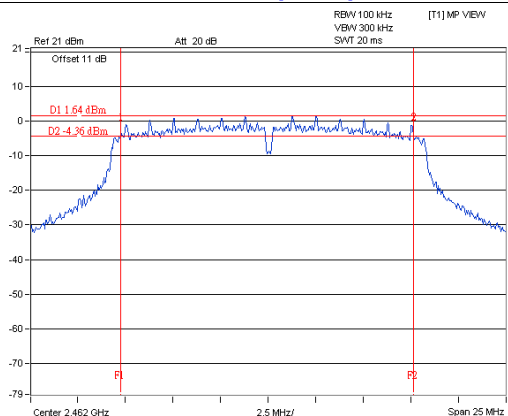


A D T



A D T

802.11n (HT20) / CH11



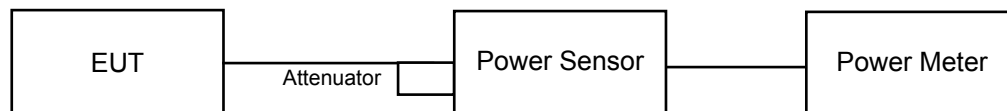
A D T

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

The 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	21.184	13.26	30	Pass
6	2437	84.723	19.28	30	Pass
11	2462	40.179	16.04	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	122.18	20.87	30	Pass
6	2437	220.293	23.43	30	Pass
11	2462	189.234	22.77	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	138.357	21.41	30	Pass
6	2437	224.388	23.51	30	Pass
11	2462	154.882	21.90	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	13.583	11.33
6	2437	52.119	17.17
11	2462	23.714	13.75

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	14.191	11.52
6	2437	37.497	15.74
11	2462	33.806	15.29

802.11n (HT20)

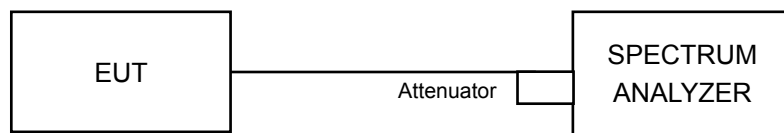
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	18.578	12.69
6	2437	37.757	15.77
11	2462	18.967	12.78

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 Procedures

- 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 Conditions

Same as Item 4.3.6

4.5.7 Test Results

802.11b

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-13.72	8	Pass
6	2437	-7.24	8	Pass
11	2462	-9.37	8	Pass

802.11g

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-13.20	8	Pass
6	2437	-9.13	8	Pass
11	2462	-13.38	8	Pass

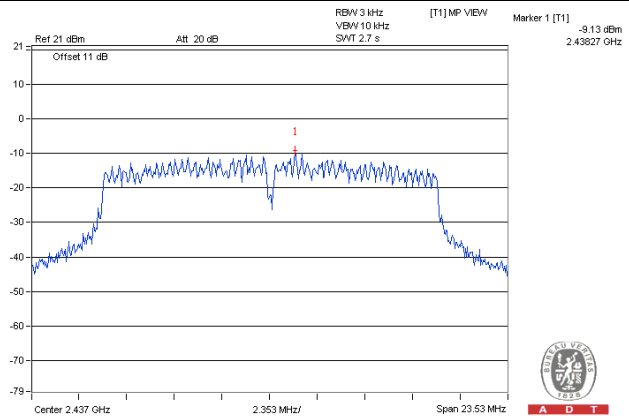
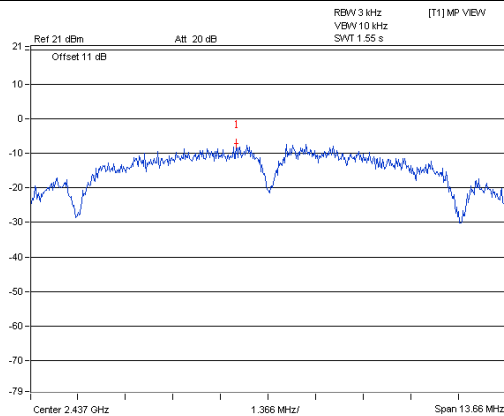
802.11n (HT20)

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-12.54	8	Pass
6	2437	-10.06	8	Pass
11	2462	-12.41	8	Pass

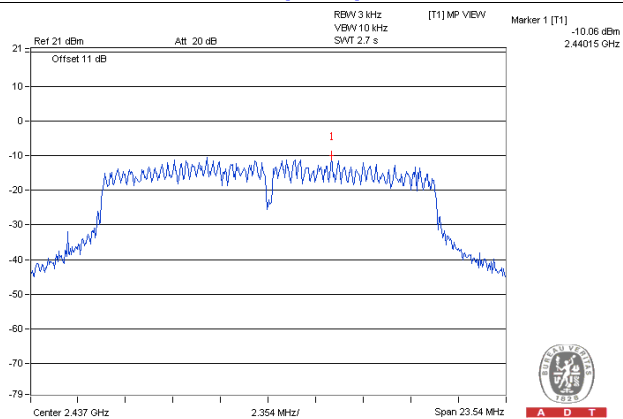
Spectrum Plot of Worst Value

802.11b / CH6

802.11g / CH6



802.11n (HT20) / CH6

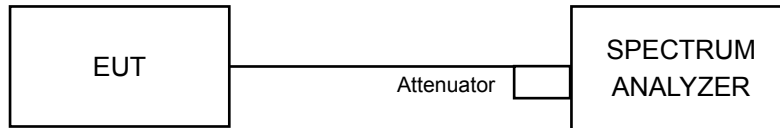


4.6 Conducted Out of Band Emission Measurement

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 Procedures

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 Conditions

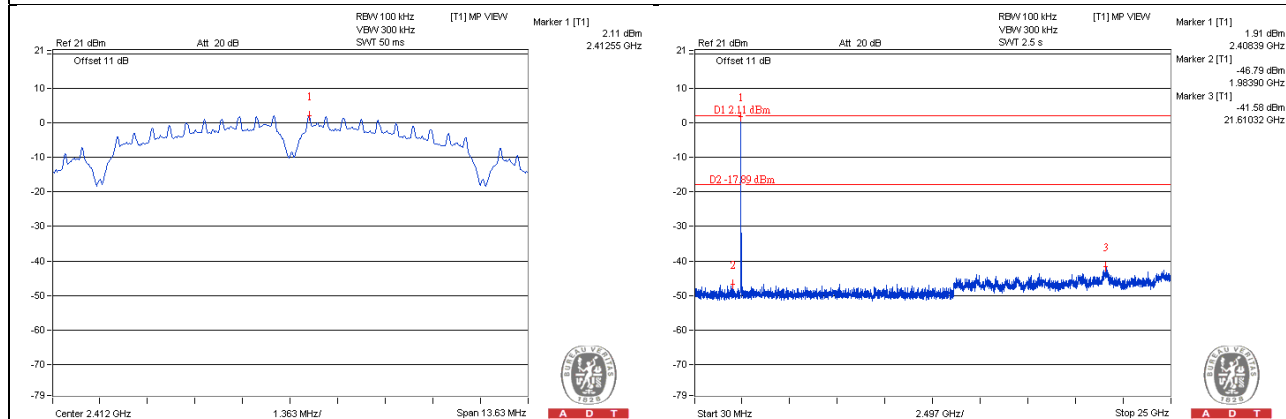
Same as Item 4.3.6

4.6.7 Test Results

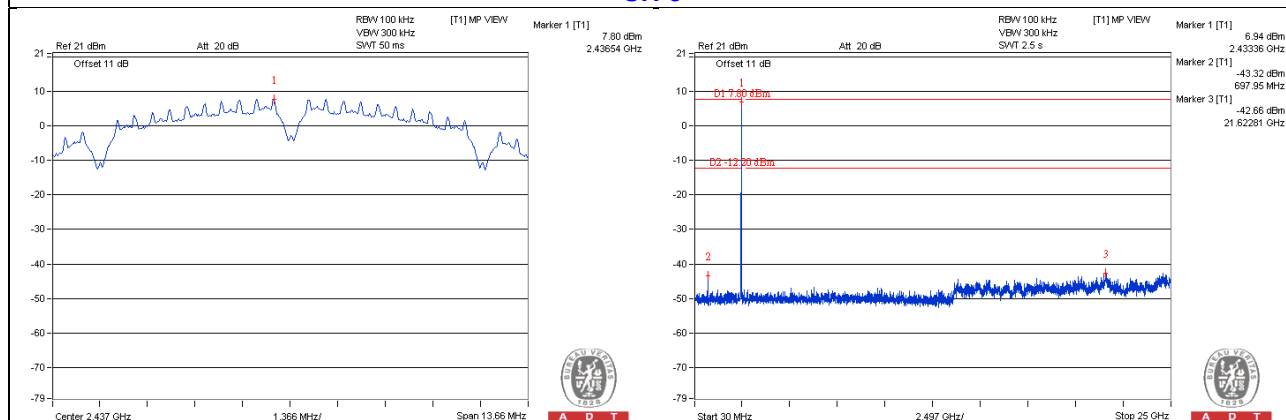
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

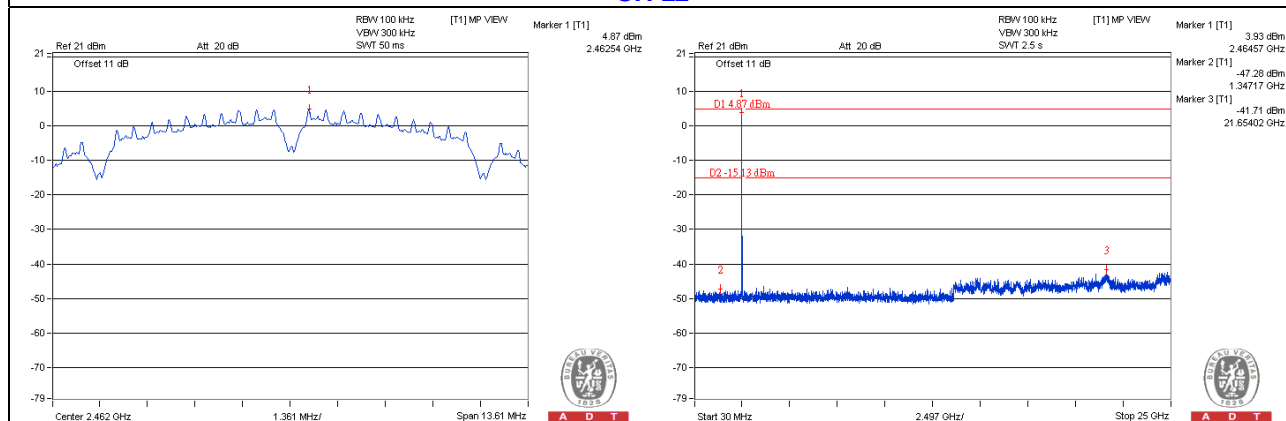
CH 1



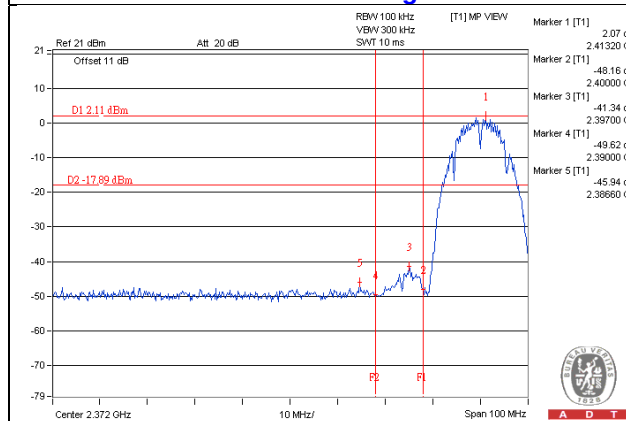
CH 6



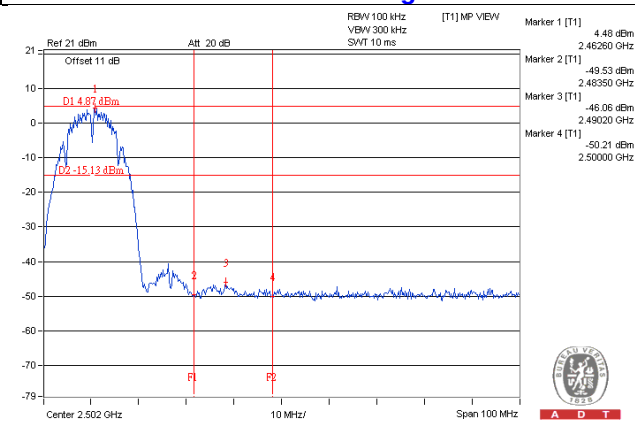
CH 11



CH 1 Band edge



CH 11 Band edge

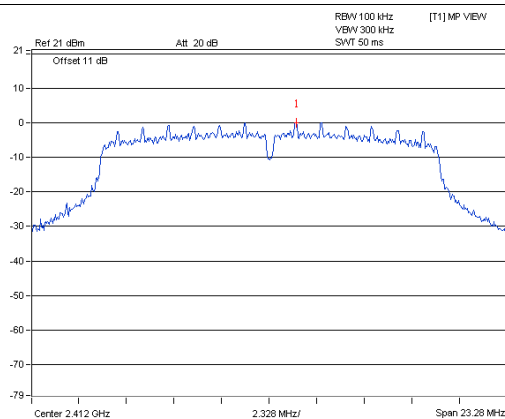




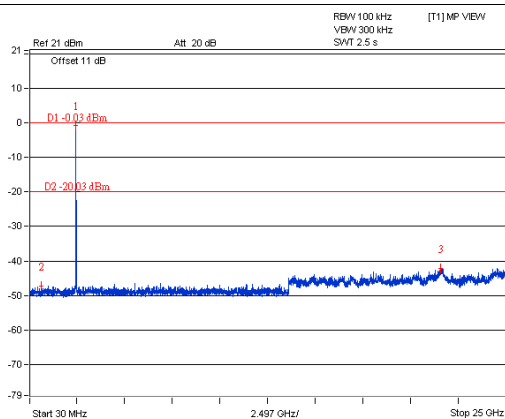
A D T

802.11g

CH 1

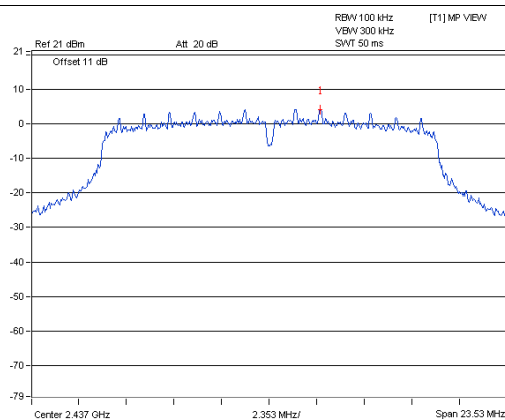


A D T

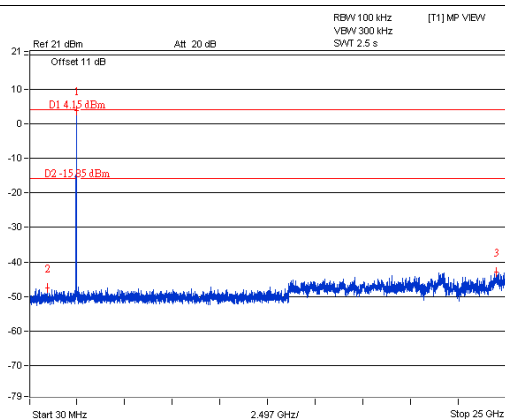


A D T

CH 6

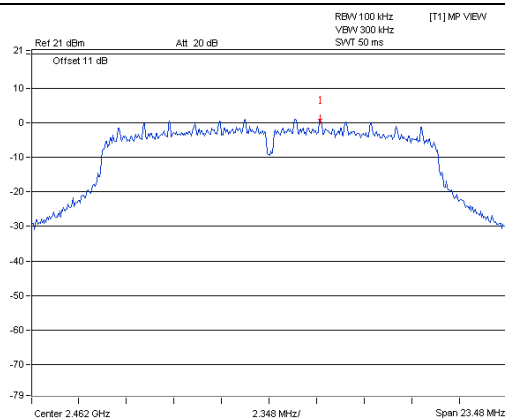


A D T

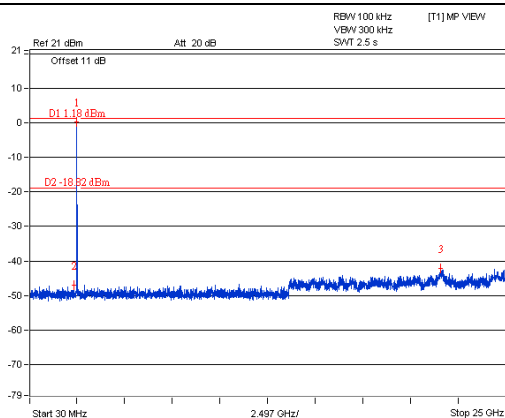


A D T

CH 11

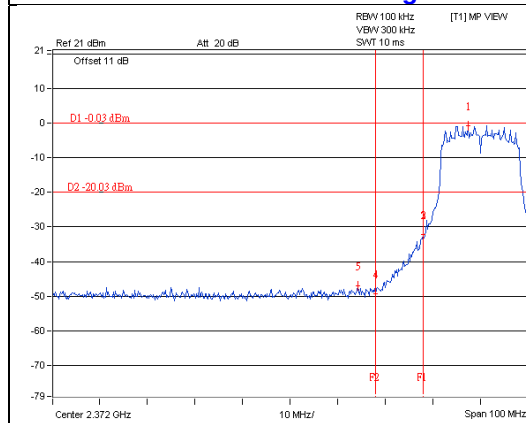


A D T



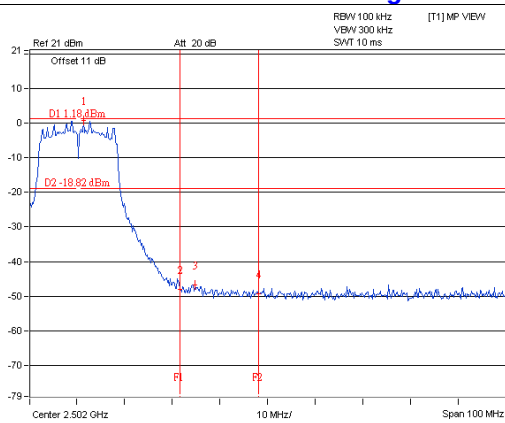
A D T

CH 1 Band edge



A D T

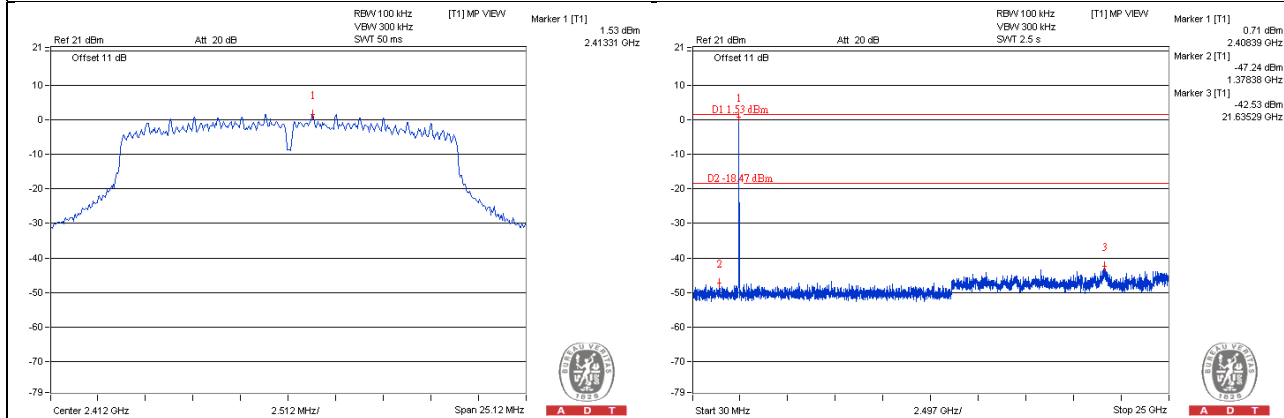
CH 11 Band edge



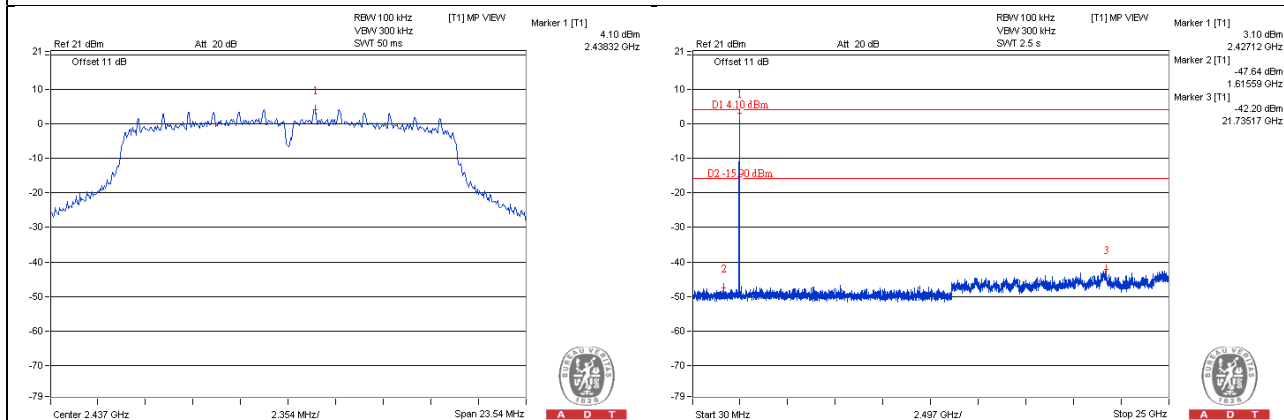
A D T

802.11n (HT20)

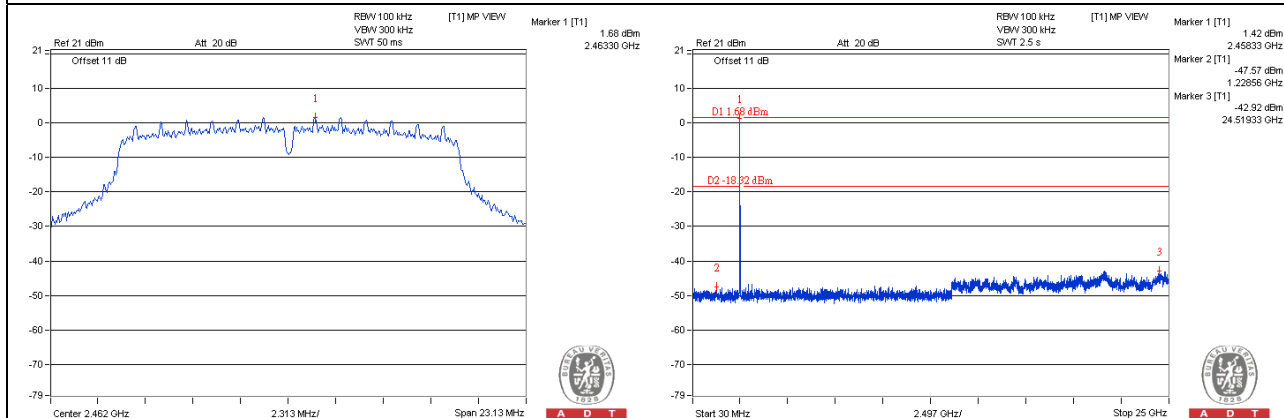
CH 1



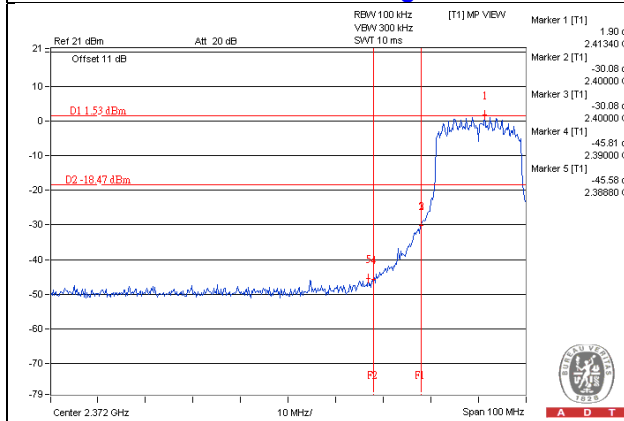
CH 6



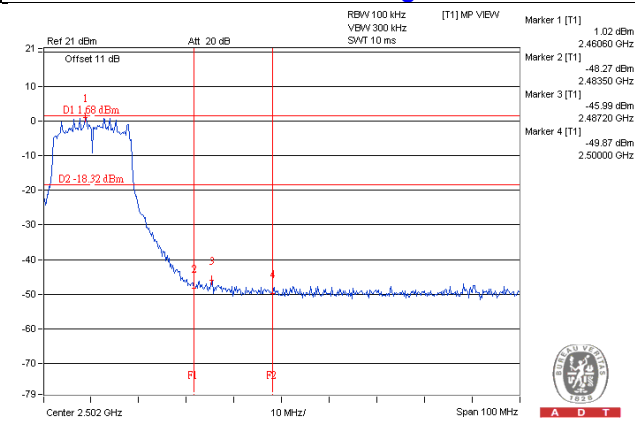
CH 11



CH 1 Band edge



CH 11 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:

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

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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