

FCC Test Report (WLAN)

Report No.: RF160705E11A

FCC ID: N5C90172201

Test Model: IC722

Received Date: Sep. 14, 2016

Test Date: Sep. 29 to Oct. 12, 2016

Issued Date: Oct. 20, 2016

Applicant: StarVedia Technology Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Table of Contents

Release Control Record	4
1 Certificate of Conformity	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information	7
3.1 General Description of EUT (WLAN)	7
3.2 Description of Test Modes	9
3.2.1 Test Mode Applicability and Tested Channel Detail	10
3.3 Duty Cycle of Test Signal	12
3.4 Description of Support Units	13
3.4.1 Configuration of System under Test	14
3.5 General Description of Applied Standards	16
4 Test Types and Results	17
4.1 Radiated Emission and Bandedge Measurement	17
4.1.1 Limits of Radiated Emission and Bandedge Measurement	17
4.1.2 Test Instruments	18
4.1.3 Test Procedures	20
4.1.4 Deviation from Test Standard	20
4.1.5 Test Setup	21
4.1.6 EUT Operating Conditions	22
4.1.7 Test Results	23
4.2 Conducted Emission Measurement	36
4.2.1 Limits of Conducted Emission Measurement	36
4.2.2 Test Instruments	36
4.2.3 Test Procedures	37
4.2.4 Deviation from Test Standard	37
4.2.5 Test Setup	37
4.2.6 EUT Operating Conditions	37
4.2.7 Test Results	38
4.3 6dB Bandwidth Measurement	40
4.3.1 Limits of 6dB Bandwidth Measurement	40
4.3.2 Test Setup	40
4.3.3 Test Instruments	40
4.3.4 Test Procedure	40
4.3.5 Deviation from Test Standard	40
4.3.6 EUT Operating Conditions	40
4.3.7 Test Result	41
4.4 Conducted Output Power Measurement	43
4.4.1 Limits of Conducted Output Power Measurement	43
4.4.2 Test Setup	43
4.4.3 Test Instruments	43
4.4.4 Test Procedures	43
4.4.5 Deviation from Test Standard	43
4.4.6 EUT Operating Conditions	43
4.4.7 Test Results	44
4.5 Power Spectral Density Measurement	46
4.5.1 Limits of Power Spectral Density Measurement	46
4.5.2 Test Setup	46
4.5.3 Test Instruments	46
4.5.4 Test Procedure	46
4.5.5 Deviation from Test Standard	46
4.5.6 EUT Operating Condition	46

4.5.7 Test Results	47
4.6 Conducted Out of Band Emission Measurement	49
4.6.1 Limits of Conducted Out of Band Emission Measurement.....	49
4.6.2 Test Setup.....	49
4.6.3 Test Instruments	49
4.6.4 Test Procedure	49
4.6.5 Deviation from Test Standard	49
4.6.6 EUT Operating Condition	49
4.6.7 Test Results	50
5 Pictures of Test Arrangements.....	55
Appendix – Information on the Testing Laboratories	56

Release Control Record

Issue No.	Description	Date Issued
RF160705E11A	Original release.	Oct. 20, 2016

1 Certificate of Conformity

Product: Full HD IP CAM

Brand: StarVedia

Test Model: IC722

Sample Status: ENGINEERING SAMPLE

Applicant: StarVedia Technology Inc.

Test Date: Sep. 29 to Oct. 12, 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. 20, 2016
Midoli Peng / Specialist

Approved by : May Chen , **Date:** Oct. 20, 2016
May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -4.94dB at 0.44688MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 4824.00MHz & 4874.00MHz.
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	Expanded Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.83 dB
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	Full HD IP CAM
Brand	StarVedia
Test Model	IC722
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 5V from adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 150Mbps
Operating Frequency	2.412 ~ 2.462GHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	229.615mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. The EUT incorporate WLAN and Z-Wave wireless function in device.
2. Simultaneously transmission condition.

Condition	Technology	
1	WLAN	Z-Wave

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

3. The EUT must be supplied with a power adapter as following table:

Brand	Model No.	Spec.
MASS POWER	NBS12E050150UV	Input: 100-240V, 0.3A, 50/60Hz Output: 5V, 1.5A DC power cable (unshielded, 3.0m)

4. When LAN port is connected to Host unit, the EUT WiFi function will be disabled.
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
802.11n (HT40)	MCS 0~7	1TX	1RX

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

WLAN Antenna					
Brand	Model	Gain (dBi)	Antenna Type	Connector Type	Frequency range (MHz to MHz)
NA	NA	2.2	Dipole	NA	2400~2483.5
Z-Wave Antenna					
Brand	Model	Gain (dBi)	Antenna Type	Connector Type	Frequency range (MHz)
NA	NA	-20.41	Helical	NA	868~928

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		

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

Radiated Emission Test (Above 1GHz):

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

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

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	6	DSSS	DBPSK	1

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)
802.11b	1 to 11	6	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

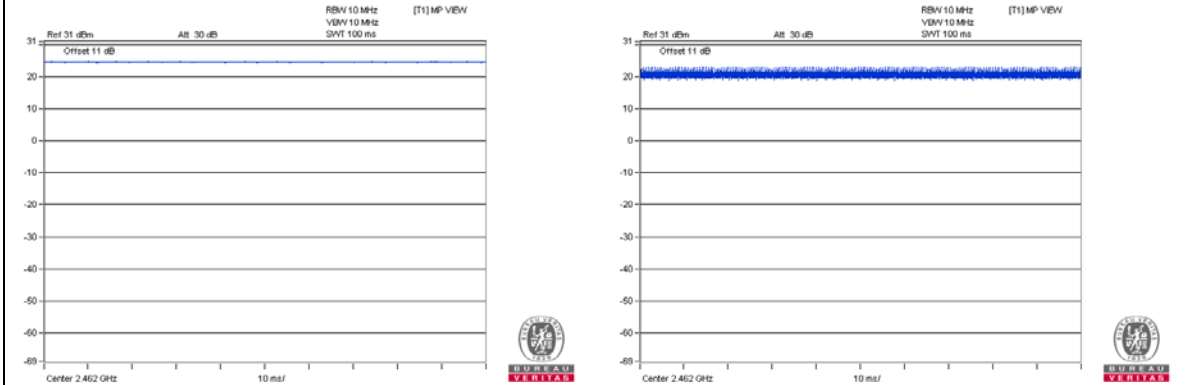
Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE \geq 1G	25deg. C, 73%RH	120Vac, 60Hz	Andy Ho
RE $<$ 1G	25deg. C, 62%RH	120Vac, 60Hz	Jyunchun Lin
PLC	25deg. C, 75%RH	120Vac, 60Hz	Barry Lee
APCM	25deg. C, 60%RH	120Vac, 60Hz	Tim Ho

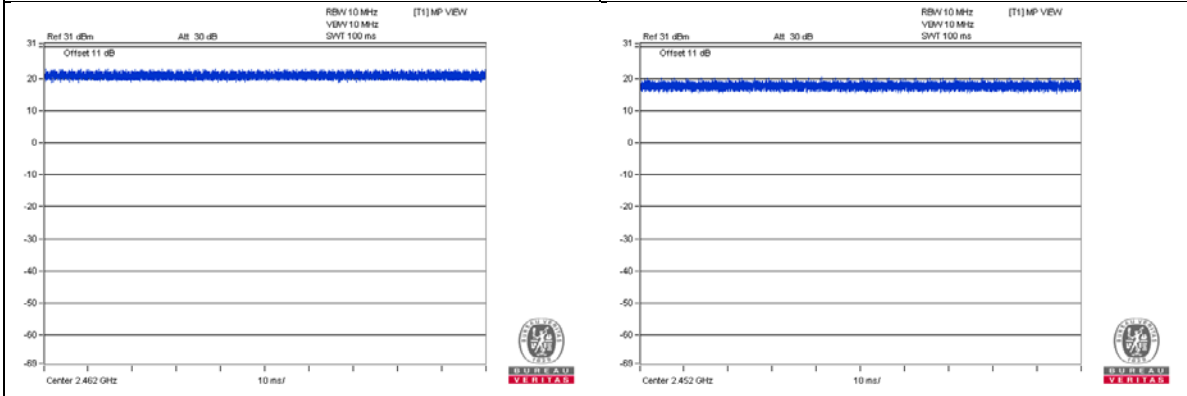
3.3 Duty Cycle of Test Signal

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

802.11b **802.11g**



802.11n (HT20) **802.11n (HT40)**



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
B	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab
C	microSD	Sandisk 16GB	NA	NA	NA	Provided by Lab

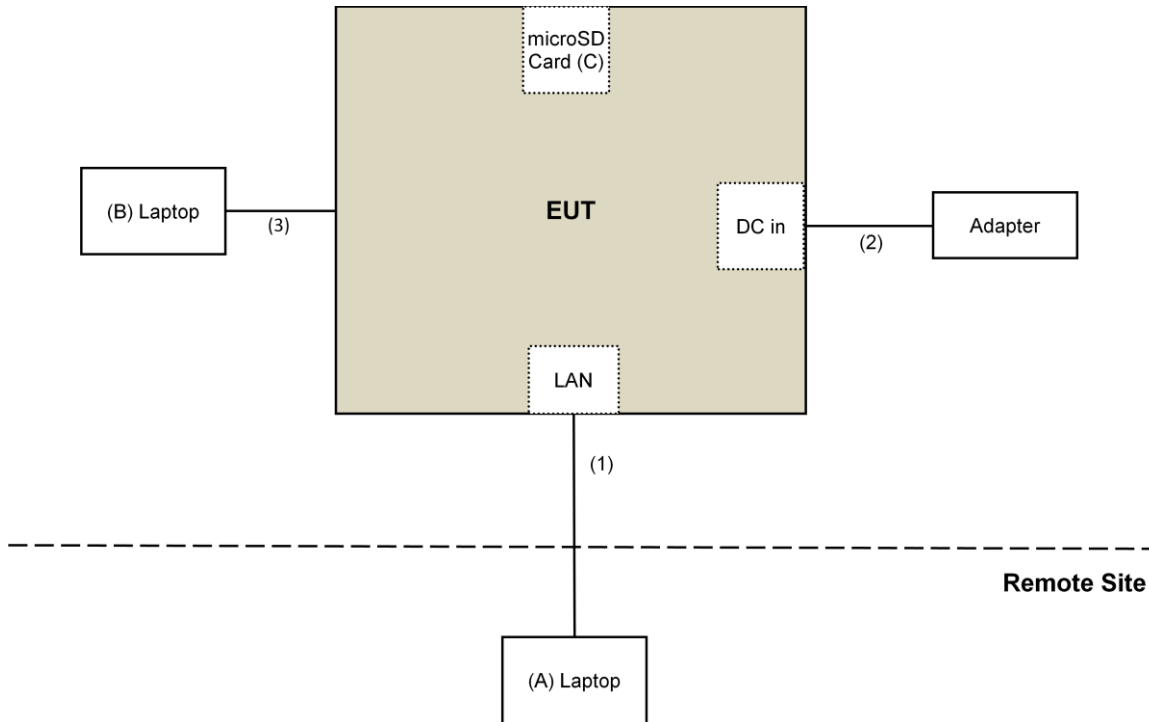
Note:

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

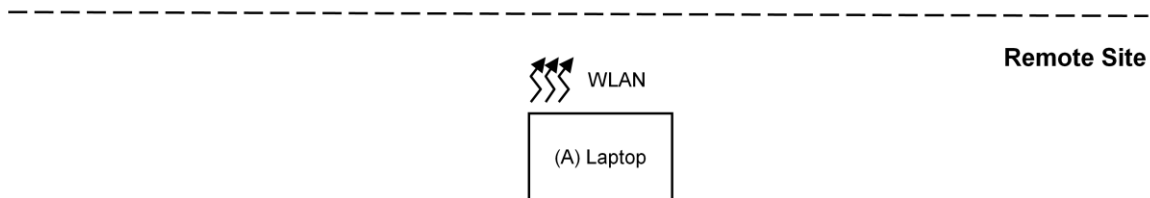
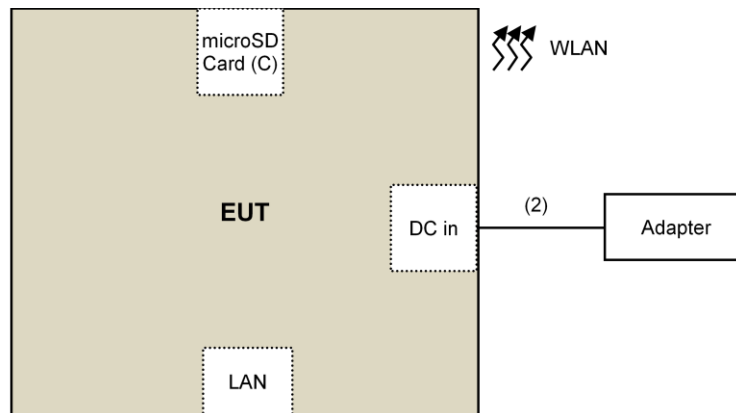
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	1.8	No	0	Provided by Lab
2.	DC Cable	1	3.0	No	0	Supplied by client
3.	Console Cable	1	0.6	No	0	Supplied by client (For RF setup)

3.4.1 Configuration of System under Test

For Radiated emission (above 1GHz)



For Conducted emission & Radiated emission (below 1GHz)



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.

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 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: Oct. 07 to 12, 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:

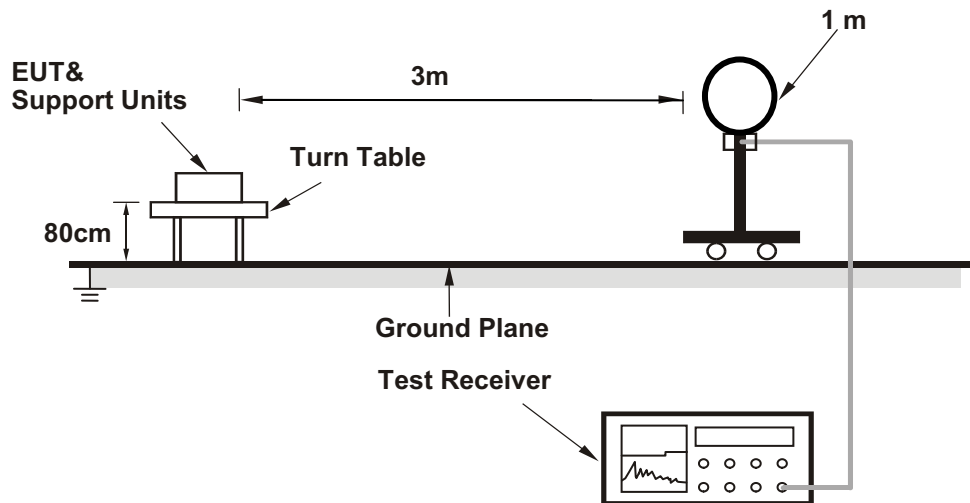
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

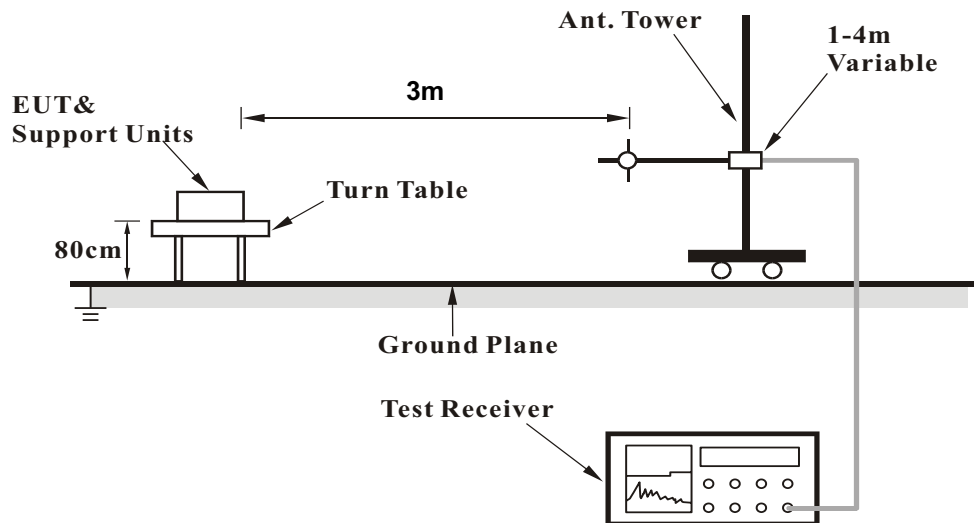
No deviation.

4.1.5 Test Setup

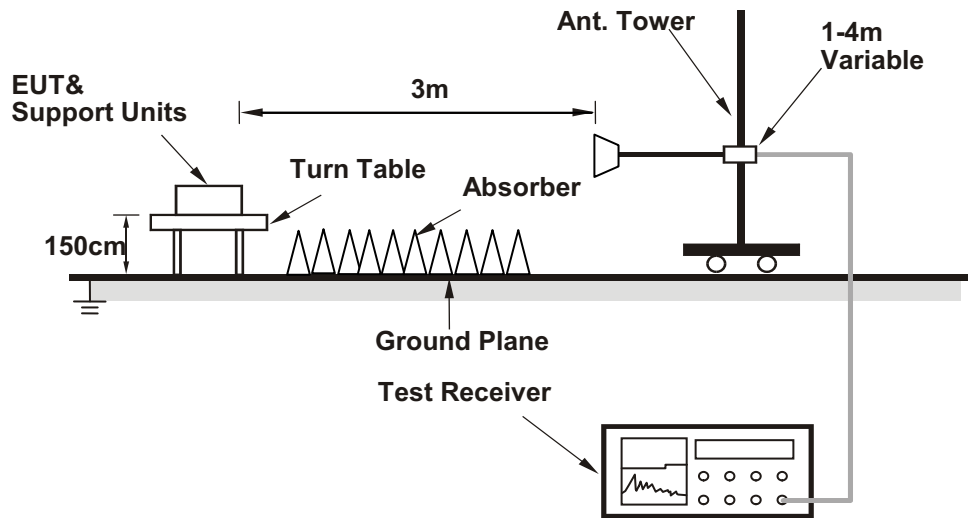
For Radiated emission below 30MHz



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

For above 1GHz:

1. Connect the EUT with the support unit B (Laptop) which is placed on test table.
2. Controlling software (MT7601USB.exe[V 1.0.9.0]) has been activated to set the EUT on specific status.

For below 1GHz:

1. Support unit A (Laptop) runs a test program "Ping.exe" to communicate with EUT via wireless continuously.

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	55.4 PK	74.0	-18.6	2.94 H	154	61.1	-5.7
2	2390.00	50.4 AV	54.0	-3.6	2.94 H	154	56.1	-5.7
3	*2412.00	106.6 PK			2.94 H	150	112.2	-5.6
4	*2412.00	104.3 AV			2.94 H	150	109.9	-5.6
5	4824.00	53.0 PK	74.0	-21.0	2.47 H	236	52.2	0.8
6	4824.00	50.3 AV	54.0	-3.7	2.47 H	236	49.5	0.8

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	50.2 PK	74.0	-23.8	3.90 V	85	55.9	-5.7
2	2390.00	44.8 AV	54.0	-9.2	3.90 V	85	50.5	-5.7
3	*2412.00	101.9 PK			3.90 V	85	107.5	-5.6
4	*2412.00	99.3 AV			3.90 V	85	104.9	-5.6
5	4824.00	55.2 PK	74.0	-18.8	1.05 V	200	54.4	0.8
6	4824.00	53.9 AV	54.0	-0.1	1.05 V	200	53.1	0.8

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	48.0 PK	74.0	-26.0	2.37 H	153	53.7	-5.7
2	2390.00	35.9 AV	54.0	-18.1	2.37 H	153	41.6	-5.7
3	*2437.00	107.1 PK			2.37 H	153	112.6	-5.5
4	*2437.00	104.9 AV			2.37 H	153	110.4	-5.5
5	2483.50	49.5 PK	74.0	-24.5	2.37 H	153	55.0	-5.5
6	2483.50	36.1 AV	54.0	-17.9	2.37 H	153	41.6	-5.5
7	4874.00	52.7 PK	74.0	-21.3	2.44 H	248	51.8	0.9
8	4874.00	50.2 AV	54.0	-3.8	2.44 H	248	49.3	0.9
9	7311.00	50.3 PK	74.0	-23.7	3.61 H	139	42.9	7.4
10	7311.00	45.1 AV	54.0	-8.9	3.61 H	139	37.7	7.4

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	47.9 PK	74.0	-26.1	3.94 V	88	53.6	-5.7
2	2390.00	35.7 AV	54.0	-18.3	3.94 V	88	41.4	-5.7
3	*2437.00	102.4 PK			3.94 V	88	107.9	-5.5
4	*2437.00	99.8 AV			3.94 V	88	105.3	-5.5
5	2483.50	49.1 PK	74.0	-24.9	3.94 V	88	54.6	-5.5
6	2483.50	35.9 AV	54.0	-18.1	3.94 V	88	41.4	-5.5
7	4874.00	55.4 PK	74.0	-18.6	1.57 V	186	54.5	0.9
8	4874.00	53.9 AV	54.0	-0.1	1.57 V	186	53.0	0.9
9	7311.00	50.9 PK	74.0	-23.1	1.61 V	183	43.5	7.4
10	7311.00	46.0 AV	54.0	-8.0	1.61 V	183	38.6	7.4

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	107.7 PK			1.50 H	166	113.1	-5.4
2	*2462.00	105.7 AV			1.50 H	166	111.1	-5.4
3	2483.50	59.2 PK	74.0	-14.8	1.50 H	166	64.7	-5.5
4	2483.50	53.6 AV	54.0	-0.4	1.50 H	166	59.1	-5.5
5	4924.00	52.7 PK	74.0	-21.3	2.38 H	234	51.6	1.1
6	4924.00	50.4 AV	54.0	-3.6	2.38 H	234	49.3	1.1
7	7386.00	50.6 PK	74.0	-23.4	3.66 H	151	43.0	7.6
8	7386.00	45.2 AV	54.0	-8.8	3.66 H	151	37.6	7.6

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	103.0 PK			4.00 V	91	108.4	-5.4
2	*2462.00	100.6 AV			4.00 V	91	106.0	-5.4
3	2483.50	54.6 PK	74.0	-19.4	4.00 V	91	60.1	-5.5
4	2483.50	48.0 AV	54.0	-6.0	4.00 V	91	53.5	-5.5
5	4924.00	53.9 PK	74.0	-20.1	1.50 V	153	52.8	1.1
6	4924.00	52.1 AV	54.0	-1.9	1.50 V	153	51.0	1.1
7	7386.00	51.2 PK	74.0	-22.8	1.56 V	174	43.6	7.6
8	7386.00	46.1 AV	54.0	-7.9	1.56 V	174	38.5	7.6

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	63.6 PK	74.0	-10.4	2.66 H	144	69.3	-5.7
2	2390.00	46.1 AV	54.0	-7.9	2.66 H	144	51.8	-5.7
3	*2412.00	105.3 PK			2.66 H	144	110.9	-5.6
4	*2412.00	95.8 AV			2.66 H	144	101.4	-5.6
5	4824.00	58.9 PK	74.0	-15.1	2.38 H	239	58.1	0.8
6	4824.00	47.0 AV	54.0	-7.0	2.38 H	239	46.2	0.8

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.9 PK	74.0	-15.1	4.00 V	94	64.6	-5.7
2	2390.00	41.1 AV	54.0	-12.9	4.00 V	94	46.8	-5.7
3	*2412.00	100.5 PK			4.00 V	94	106.1	-5.6
4	*2412.00	90.7 AV			4.00 V	94	96.3	-5.6
5	4824.00	57.9 PK	74.0	-16.1	1.49 V	177	57.1	0.8
6	4824.00	47.1 AV	54.0	-6.9	1.49 V	177	46.3	0.8

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	48.5 PK	74.0	-25.5	1.50 H	144	54.2	-5.7
2	2390.00	35.1 AV	54.0	-18.9	1.50 H	144	40.8	-5.7
3	*2437.00	105.7 PK			1.50 H	144	111.2	-5.5
4	*2437.00	95.9 AV			1.50 H	144	101.4	-5.5
5	2483.50	55.0 PK	74.0	-19.0	1.50 H	144	60.5	-5.5
6	2483.50	36.8 AV	54.0	-17.2	1.50 H	144	42.3	-5.5
7	4874.00	58.6 PK	74.0	-15.4	2.36 H	230	57.7	0.9
8	4874.00	46.6 AV	54.0	-7.4	2.36 H	230	45.7	0.9
9	7311.00	56.4 PK	74.0	-17.6	3.65 H	154	49.0	7.4
10	7311.00	45.0 AV	54.0	-9.0	3.65 H	154	37.6	7.4

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	4.00 V	95	53.9	-5.7
2	2390.00	35.0 AV	54.0	-19.0	4.00 V	95	40.7	-5.7
3	*2437.00	100.9 PK			4.00 V	95	106.4	-5.5
4	*2437.00	90.8 AV			4.00 V	95	96.3	-5.5
5	2483.50	54.6 PK	74.0	-19.4	4.00 V	95	60.1	-5.5
6	2483.50	36.4 AV	54.0	-17.6	4.00 V	95	41.9	-5.5
7	4874.00	58.6 PK	74.0	-15.4	1.44 V	165	57.7	0.9
8	4874.00	47.6 AV	54.0	-6.4	1.44 V	165	46.7	0.9
9	7311.00	52.9 PK	74.0	-21.1	1.52 V	158	45.5	7.4
10	7311.00	41.9 AV	54.0	-12.1	1.52 V	158	34.5	7.4

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	106.8 PK			1.08 H	162	112.2	-5.4
2	*2462.00	97.0 AV			1.08 H	162	102.4	-5.4
3	2483.50	73.2 PK	74.0	-0.8	1.08 H	162	78.7	-5.5
4	2483.50	52.7 AV	54.0	-1.3	1.08 H	162	58.2	-5.5
5	4924.00	58.4 PK	74.0	-15.6	2.39 H	228	57.3	1.1
6	4924.00	46.3 AV	54.0	-7.7	2.39 H	228	45.2	1.1
7	7386.00	56.1 PK	74.0	-17.9	3.71 H	164	48.5	7.6
8	7386.00	44.8 AV	54.0	-9.2	3.71 H	164	37.2	7.6

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	102.0 PK			4.00 V	97	107.4	-5.4
2	*2462.00	92.0 AV			4.00 V	97	97.4	-5.4
3	2483.50	68.5 PK	74.0	-5.5	4.00 V	97	74.0	-5.5
4	2483.50	47.7 AV	54.0	-6.3	4.00 V	97	53.2	-5.5
5	4924.00	58.8 PK	74.0	-15.2	1.41 V	171	57.7	1.1
6	4924.00	47.6 AV	54.0	-6.4	1.41 V	171	46.5	1.1
7	7386.00	53.1 PK	74.0	-20.9	1.47 V	163	45.5	7.6
8	7386.00	42.0 AV	54.0	-12.0	1.47 V	163	34.4	7.6

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	67.7 PK	74.0	-6.3	1.42 H	153	73.4	-5.7
2	2390.00	46.5 AV	54.0	-7.5	1.42 H	153	52.2	-5.7
3	*2412.00	105.1 PK			1.42 H	153	110.7	-5.6
4	*2412.00	95.1 AV			1.42 H	153	100.7	-5.6
5	4824.00	57.9 PK	74.0	-16.1	2.31 H	248	57.1	0.8
6	4824.00	45.9 AV	54.0	-8.1	2.31 H	248	45.1	0.8

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	62.9 PK	74.0	-11.1	3.96 V	99	68.6	-5.7
2	2390.00	41.5 AV	54.0	-12.5	3.96 V	99	47.2	-5.7
3	*2412.00	100.3 PK			3.96 V	99	105.9	-5.6
4	*2412.00	90.0 AV			3.96 V	99	95.6	-5.6
5	4824.00	58.8 PK	74.0	-15.2	1.42 V	174	58.0	0.8
6	4824.00	47.6 AV	54.0	-6.4	1.42 V	174	46.8	0.8

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	52.6 PK	74.0	-21.4	2.40 H	146	58.3	-5.7
2	2390.00	37.7 AV	54.0	-16.3	2.40 H	146	43.4	-5.7
3	*2437.00	106.1 PK			2.40 H	146	111.6	-5.5
4	*2437.00	95.8 AV			2.40 H	146	101.3	-5.5
5	2483.50	52.0 PK	74.0	-22.0	2.40 H	146	57.5	-5.5
6	2483.50	37.1 AV	54.0	-16.9	2.40 H	146	42.6	-5.5
7	4874.00	57.9 PK	74.0	-16.1	2.35 H	243	57.0	0.9
8	4874.00	45.9 AV	54.0	-8.1	2.35 H	243	45.0	0.9
9	7311.00	55.9 PK	74.0	-18.1	3.67 H	176	48.5	7.4
10	7311.00	44.5 AV	54.0	-9.5	3.67 H	176	37.1	7.4

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	3.95 V	109	53.7	-5.7
2	2390.00	34.2 AV	54.0	-19.8	3.95 V	109	39.9	-5.7
3	*2437.00	101.4 PK			3.95 V	109	106.9	-5.5
4	*2437.00	90.7 AV			3.95 V	109	96.2	-5.5
5	2483.50	47.3 PK	74.0	-26.7	3.95 V	109	52.8	-5.5
6	2483.50	34.1 AV	54.0	-19.9	3.95 V	109	39.6	-5.5
7	4874.00	59.5 PK	74.0	-14.5	1.44 V	163	58.6	0.9
8	4874.00	48.0 AV	54.0	-6.0	1.44 V	163	47.1	0.9
9	7311.00	53.5 PK	74.0	-20.5	1.42 V	149	46.1	7.4
10	7311.00	42.2 AV	54.0	-11.8	1.42 V	149	34.8	7.4

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	105.2 PK			1.19 H	153	110.6	-5.4
2	*2462.00	95.3 AV			1.19 H	153	100.7	-5.4
3	2483.50	71.1 PK	74.0	-2.9	1.19 H	153	76.6	-5.5
4	2483.50	48.6 AV	54.0	-5.4	1.19 H	153	54.1	-5.5
5	4924.00	57.7 PK	74.0	-16.3	2.38 H	258	56.6	1.1
6	4924.00	45.8 AV	54.0	-8.2	2.38 H	258	44.7	1.1
7	7386.00	55.6 PK	74.0	-18.4	3.72 H	164	48.0	7.6
8	7386.00	44.4 AV	54.0	-9.6	3.72 H	164	36.8	7.6

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	100.4 PK			3.93 V	94	105.8	-5.4
2	*2462.00	90.3 AV			3.93 V	94	95.7	-5.4
3	2483.50	66.3 PK	74.0	-7.7	3.93 V	94	71.8	-5.5
4	2483.50	43.8 AV	54.0	-10.2	3.93 V	94	49.3	-5.5
5	4924.00	59.8 PK	74.0	-14.2	1.41 V	150	58.7	1.1
6	4924.00	48.4 AV	54.0	-5.6	1.41 V	150	47.3	1.1
7	7386.00	54.0 PK	74.0	-20.0	1.44 V	164	46.4	7.6
8	7386.00	42.5 AV	54.0	-11.5	1.44 V	164	34.9	7.6

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	65.8 PK	74.0	-8.2	1.09 H	160	71.5	-5.7
2	2390.00	48.2 AV	54.0	-5.8	1.09 H	160	53.9	-5.7
3	*2422.00	101.4 PK			1.09 H	160	106.9	-5.5
4	*2422.00	91.7 AV			1.09 H	160	97.2	-5.5
5	4844.00	58.0 PK	74.0	-16.0	2.40 H	245	57.2	0.8
6	4844.00	46.2 AV	54.0	-7.8	2.40 H	245	45.4	0.8
7	7266.00	55.4 PK	74.0	-18.6	3.71 H	154	47.9	7.5
8	7266.00	44.2 AV	54.0	-9.8	3.71 H	154	36.7	7.5

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	3.97 V	90	66.7	-5.7
2	2390.00	43.2 AV	54.0	-10.8	3.97 V	90	48.9	-5.7
3	*2422.00	96.6 PK			3.97 V	90	102.1	-5.5
4	*2422.00	86.7 AV			3.97 V	90	92.2	-5.5
5	4844.00	59.6 PK	74.0	-14.4	1.41 V	139	58.8	0.8
6	4844.00	48.2 AV	54.0	-5.8	1.41 V	139	47.4	0.8
7	7266.00	53.5 PK	74.0	-20.5	1.49 V	176	46.0	7.5
8	7266.00	42.3 AV	54.0	-11.7	1.49 V	176	34.8	7.5

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.3 PK	74.0	-12.7	1.50 H	164	67.0	-5.7
2	2390.00	43.6 AV	54.0	-10.4	1.50 H	164	49.3	-5.7
3	*2437.00	102.0 PK			1.50 H	164	107.5	-5.5
4	*2437.00	92.4 AV			1.50 H	164	97.9	-5.5
5	2483.50	67.4 PK	74.0	-6.6	1.50 H	164	72.9	-5.5
6	2483.50	46.3 AV	54.0	-7.7	1.50 H	164	51.8	-5.5
7	4874.00	57.9 PK	74.0	-16.1	2.37 H	230	57.0	0.9
8	4874.00	46.2 AV	54.0	-7.8	2.37 H	230	45.3	0.9
9	7311.00	55.5 PK	74.0	-18.5	3.68 H	145	48.1	7.4
10	7311.00	44.0 AV	54.0	-10.0	3.68 H	145	36.6	7.4

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	56.6 PK	74.0	-17.4	3.91 V	90	62.3	-5.7
2	2390.00	38.9 AV	54.0	-15.1	3.91 V	90	44.6	-5.7
3	*2437.00	97.2 PK			3.91 V	90	102.7	-5.5
4	*2437.00	87.4 AV			3.91 V	90	92.9	-5.5
5	2483.50	62.7 PK	74.0	-11.3	3.91 V	90	68.2	-5.5
6	2483.50	41.7 AV	54.0	-12.3	3.91 V	90	47.2	-5.5
7	4874.00	59.6 PK	74.0	-14.4	1.44 V	135	58.7	0.9
8	4874.00	48.3 AV	54.0	-5.7	1.44 V	135	47.4	0.9
9	7311.00	53.1 PK	74.0	-20.9	1.43 V	190	45.7	7.4
10	7311.00	41.8 AV	54.0	-12.2	1.43 V	190	34.4	7.4

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	101.4 PK			1.50 H	170	106.9	-5.5
2	*2452.00	92.2 AV			1.50 H	170	97.7	-5.5
3	2483.50	73.1 PK	74.0	-0.9	1.50 H	170	78.6	-5.5
4	2483.50	52.8 AV	54.0	-1.2	1.50 H	170	58.3	-5.5
5	4904.00	57.6 PK	74.0	-16.4	2.33 H	233	56.6	1.0
6	4904.00	46.0 AV	54.0	-8.0	2.33 H	233	45.0	1.0
7	7356.00	55.7 PK	74.0	-18.3	3.70 H	135	48.1	7.6
8	7356.00	43.9 AV	54.0	-10.1	3.70 H	135	36.3	7.6

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	96.6 PK			3.88 V	86	102.1	-5.5
2	*2452.00	87.2 AV			3.88 V	86	92.7	-5.5
3	2483.50	68.4 PK	74.0	-5.6	3.88 V	86	73.9	-5.5
4	2483.50	48.0 AV	54.0	-6.0	3.88 V	86	53.5	-5.5
5	4904.00	59.6 PK	74.0	-14.4	1.39 V	125	58.6	1.0
6	4904.00	48.1 AV	54.0	-5.9	1.39 V	125	47.1	1.0
7	7356.00	52.9 PK	74.0	-21.1	1.44 V	177	45.3	7.6
8	7356.00	41.8 AV	54.0	-12.2	1.44 V	177	34.2	7.6

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 6	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	63.17	27.5 QP	40.0	-12.5	3.00 H	121	37.1	-9.6
2	190.41	32.6 QP	43.5	-10.9	2.00 H	297	44.1	-11.5
3	300.00	38.8 QP	46.0	-7.2	1.00 H	245	46.9	-8.1
4	350.00	36.4 QP	46.0	-9.6	1.00 H	307	43.3	-6.9
5	400.03	44.5 QP	46.0	-1.5	1.00 H	284	49.9	-5.4
6	750.03	35.8 QP	46.0	-10.2	1.00 H	217	33.9	1.9

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	40.82	34.5 QP	40.0	-5.5	1.00 V	217	43.5	-9.0
2	63.30	36.2 QP	40.0	-3.8	1.00 V	214	45.8	-9.6
3	300.02	36.7 QP	46.0	-9.3	1.50 V	2	44.8	-8.1
4	400.01	41.3 QP	46.0	-4.7	1.50 V	158	46.7	-5.4
5	896.50	41.1 QP	46.0	-4.9	2.00 V	69	37.3	3.8
6	959.99	45.4 QP	46.0	-0.6	1.00 V	263	40.8	4.6

REMARKS:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	100375	May 09, 2016	May 08, 2017
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Aug. 31, 2016	Aug. 30, 2017
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 13, 2016	June 12, 2017
RF Cable	5D-FB	COACAB-002	Mar. 04, 2016	Mar. 03, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-003	Sep. 13, 2016	Sep. 12, 2017
50 ohms Terminator	N/A	04	Nov. 18, 2015	Nov. 17, 2016
50 ohms Terminator	50	3	Oct. 21, 2015	Oct. 20, 2016
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
- 3 The VCCI Con C Registration No. is C-3611.
- 4 Tested Date: Sep. 29, 2016

4.2.3 Test Procedures

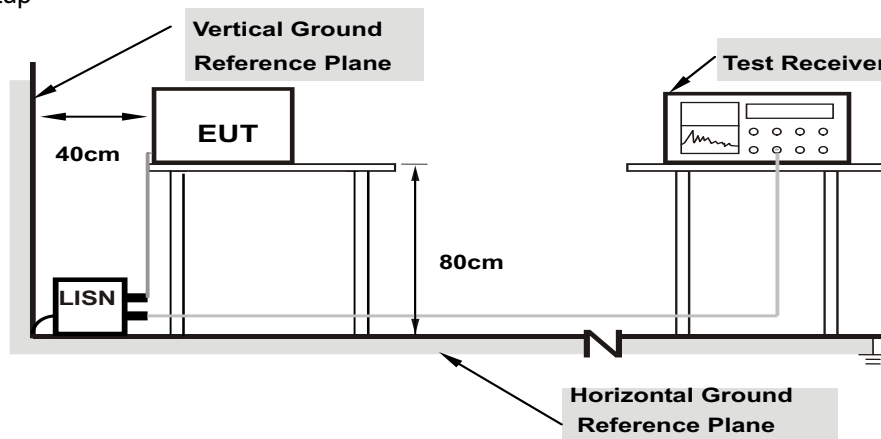
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. 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

1. Support unit A (Laptop) runs a test program "Ping.exe" to communicate with EUT via wireless continuously.

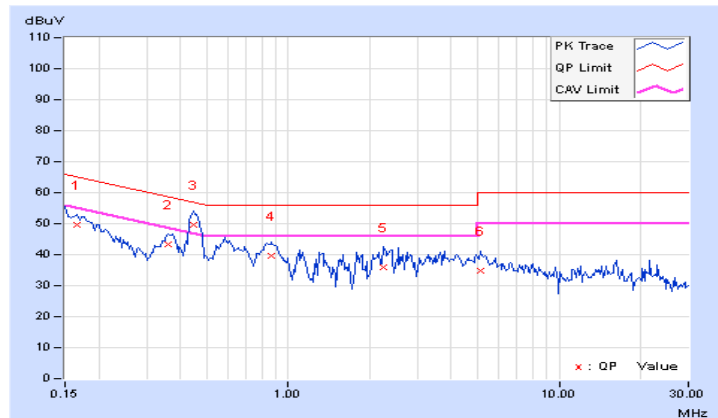
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	10.13	39.36	26.07	49.49	36.20	65.18	55.18	-15.69	-18.98
2	0.36094	10.11	33.07	25.95	43.18	36.06	58.71	48.71	-15.53	-12.65
3	0.44688	10.11	39.52	31.88	49.63	41.99	56.93	46.93	-7.30	-4.94
4	0.86875	10.12	29.44	23.14	39.56	33.26	56.00	46.00	-16.44	-12.74
5	2.25391	10.26	25.66	18.10	35.92	28.36	56.00	46.00	-20.08	-17.64
6	5.15234	10.33	24.66	18.22	34.99	28.55	60.00	50.00	-25.01	-21.45

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

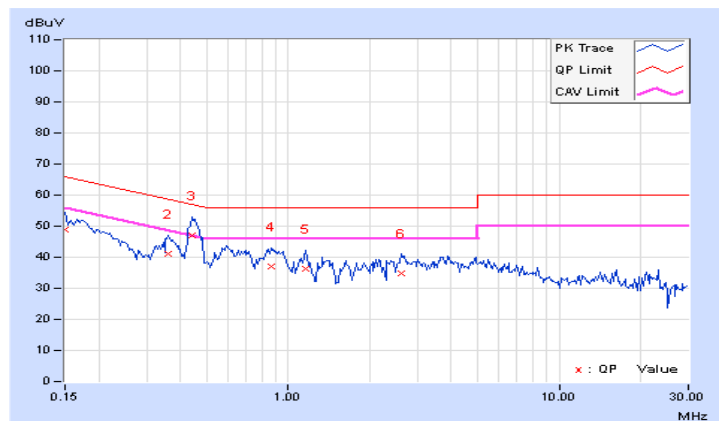


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.19	38.82	20.72	49.01	30.91	66.00	56.00	-16.99	-25.09
2	0.36094	10.09	31.18	23.22	41.27	33.31	58.71	48.71	-17.44	-15.40
3	0.44297	10.10	36.92	29.93	47.02	40.03	57.01	47.01	-9.99	-6.98
4	0.86875	10.18	26.88	21.00	37.06	31.18	56.00	46.00	-18.94	-14.82
5	1.16406	10.20	26.00	19.47	36.20	29.67	56.00	46.00	-19.80	-16.33
6	2.61719	10.21	24.48	18.19	34.69	28.40	56.00	46.00	-21.31	-17.60

Remarks:

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

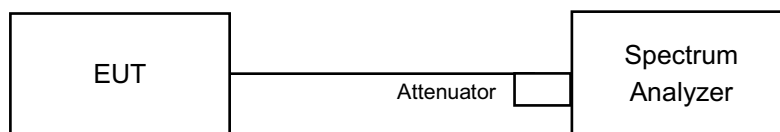


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

- 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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	10.13	0.5	PASS
6	2437	10.12	0.5	PASS
11	2462	10.10	0.5	PASS

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.66	0.5	PASS
6	2437	16.64	0.5	PASS
11	2462	16.68	0.5	PASS

802.11n (HT20)

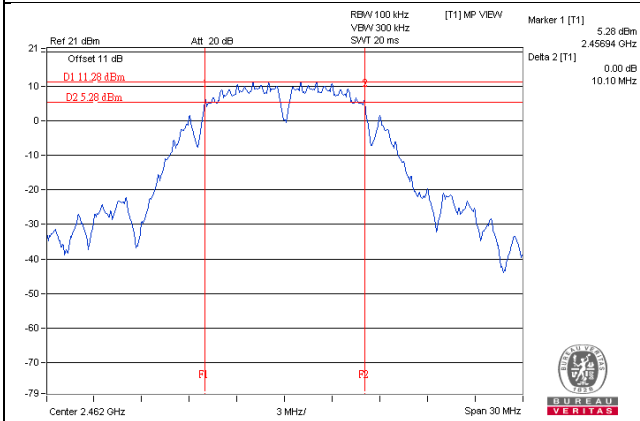
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.84	0.5	Pass
6	2437	17.80	0.5	Pass
11	2462	17.78	0.5	Pass

802.11n (HT40)

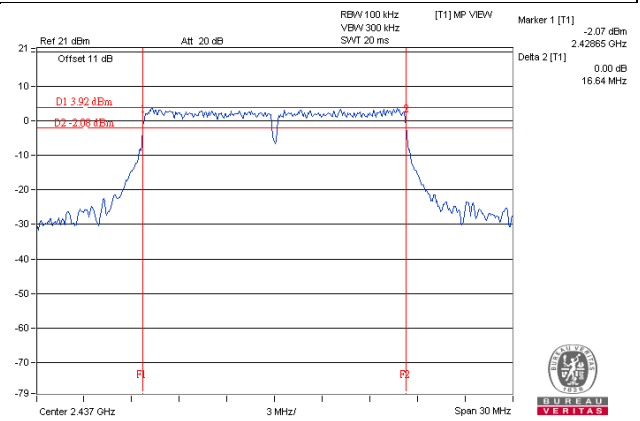
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	36.68	0.5	Pass
6	2437	36.68	0.5	Pass
9	2452	36.71	0.5	Pass

Spectrum Plot of Worst Value

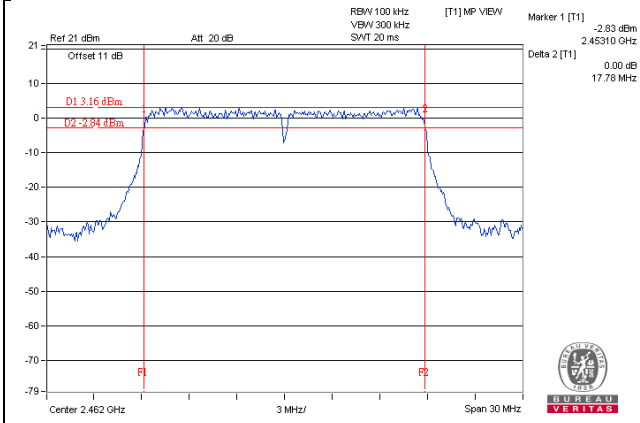
802.11b / CH11



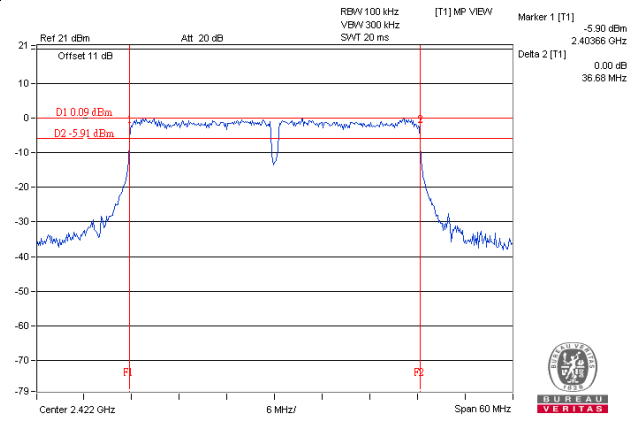
802.11g / CH6



802.11n (HT20) / CH11



802.11n (HT40) / CH3

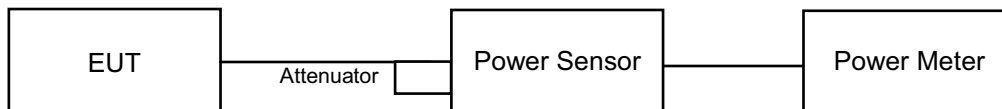


4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

FOR PEAK POWER

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	216.272	23.35	30	Pass
6	2437	229.615	23.61	30	Pass
11	2462	193.642	22.87	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	209.894	23.22	30	Pass
6	2437	200.909	23.03	30	Pass
11	2462	190.985	22.81	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	226.464	23.55	30	Pass
6	2437	229.087	23.60	30	Pass
11	2462	214.783	23.32	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
3	2422	221.309	23.45	30	Pass
6	2437	201.372	23.04	30	Pass
9	2452	202.768	23.07	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	106.17	20.26
6	2437	120.781	20.82
11	2462	99.312	19.97

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	37.584	15.75
6	2437	36.983	15.68
11	2462	33.884	15.30

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	34.198	15.34
6	2437	35.645	15.52
11	2462	34.356	15.36

802.11n (HT40)

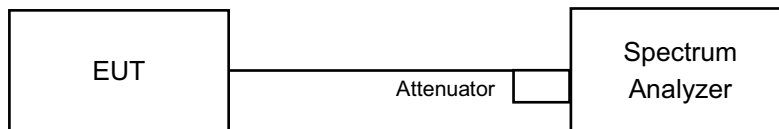
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	35.81	15.54
6	2437	34.914	15.43
9	2452	35.075	15.45

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

- 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.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-7.55	8	Pass
6	2437	-6.64	8	Pass
11	2462	-7.26	8	Pass

802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-11.10	8	Pass
6	2437	-10.48	8	Pass
11	2462	-11.01	8	Pass

802.11n (HT20)

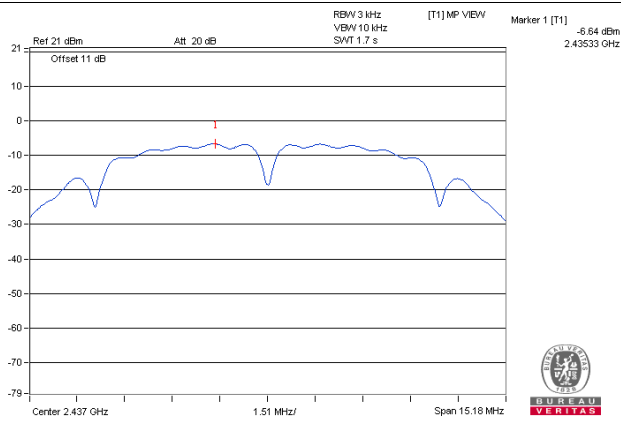
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-11.03	8	Pass
6	2437	-10.71	8	Pass
11	2462	-11.25	8	Pass

802.11n (HT40)

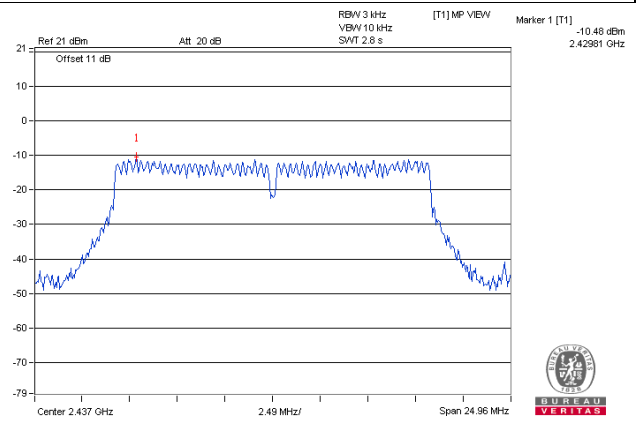
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
3	2422	-12.98	8	Pass
6	2437	-12.88	8	Pass
9	2452	-12.23	8	Pass

Spectrum Plot of Worst Value

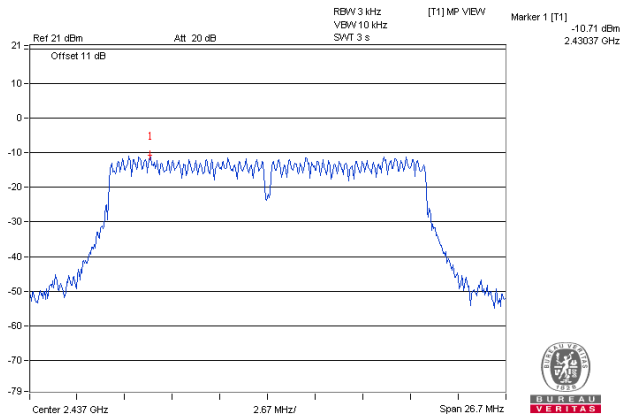
802.11b / CH6



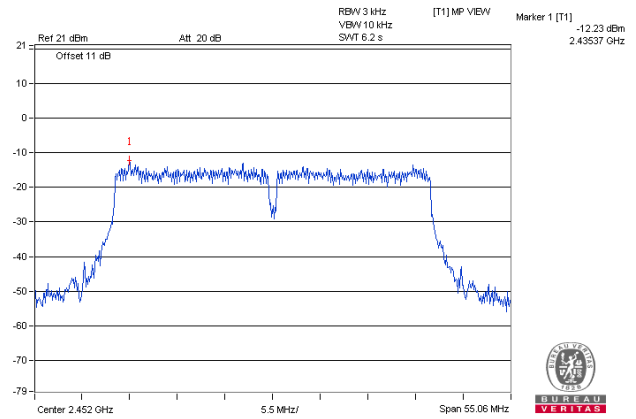
802.11g / CH6



802.11n (HT20) / CH6



802.11n (HT40) / CH9

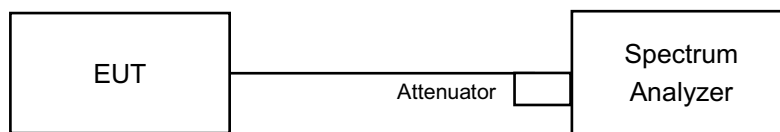


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOB

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

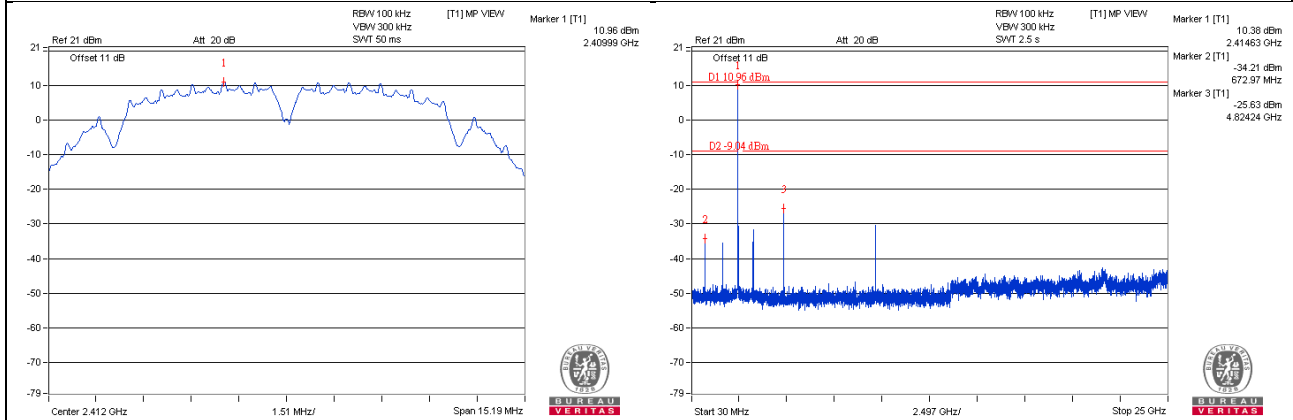
Same as Item 4.3.6

4.6.7 Test Results

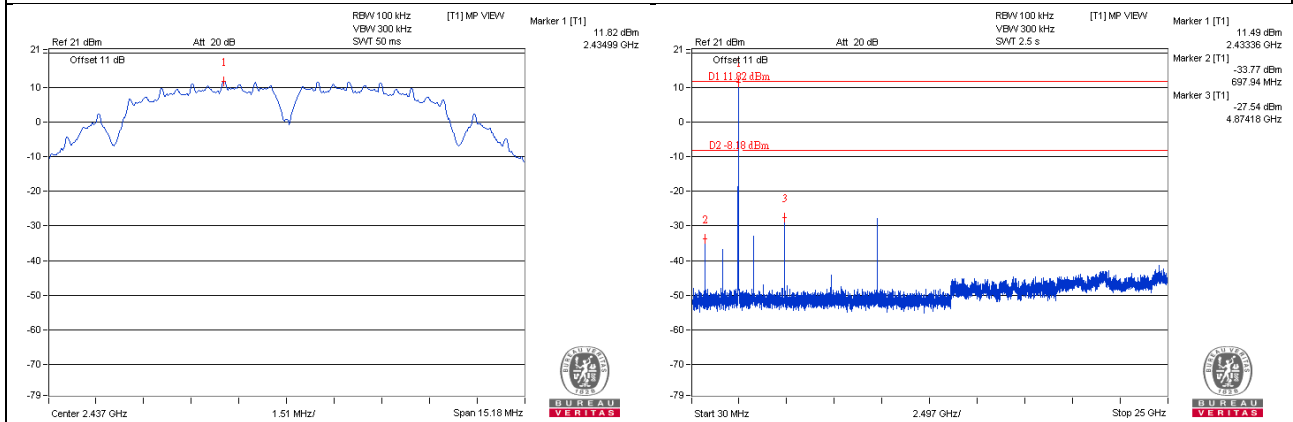
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

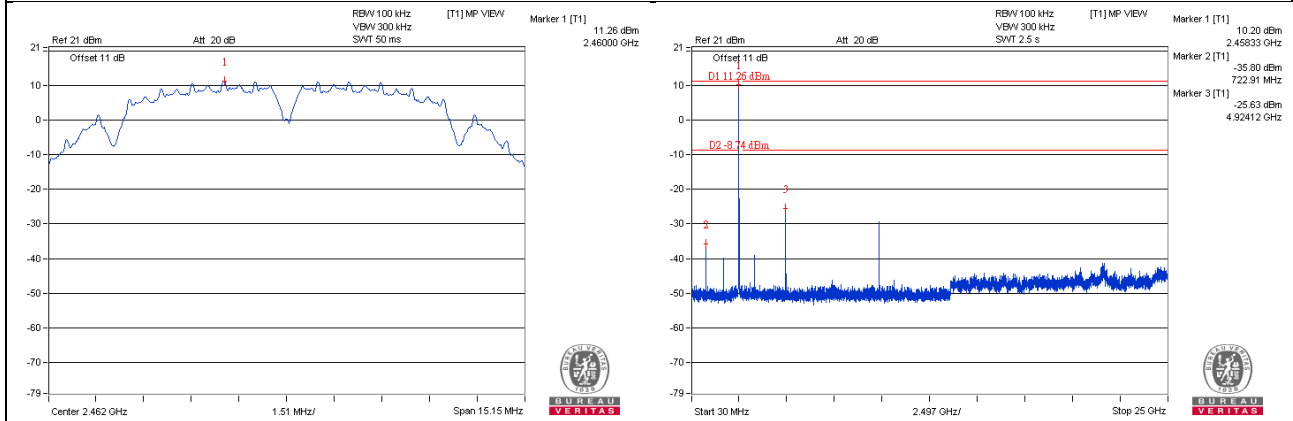
CH 1



CH 6

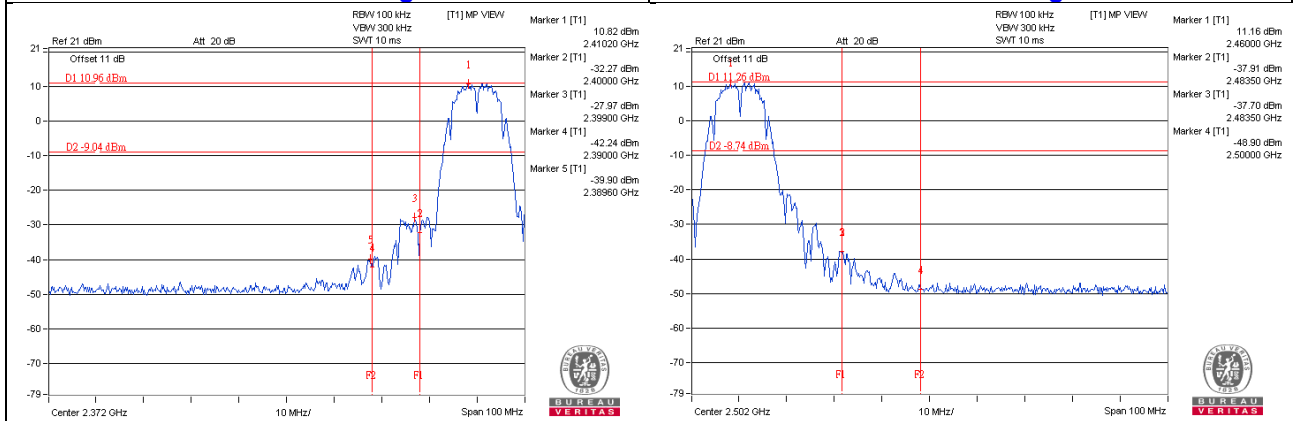


CH 11



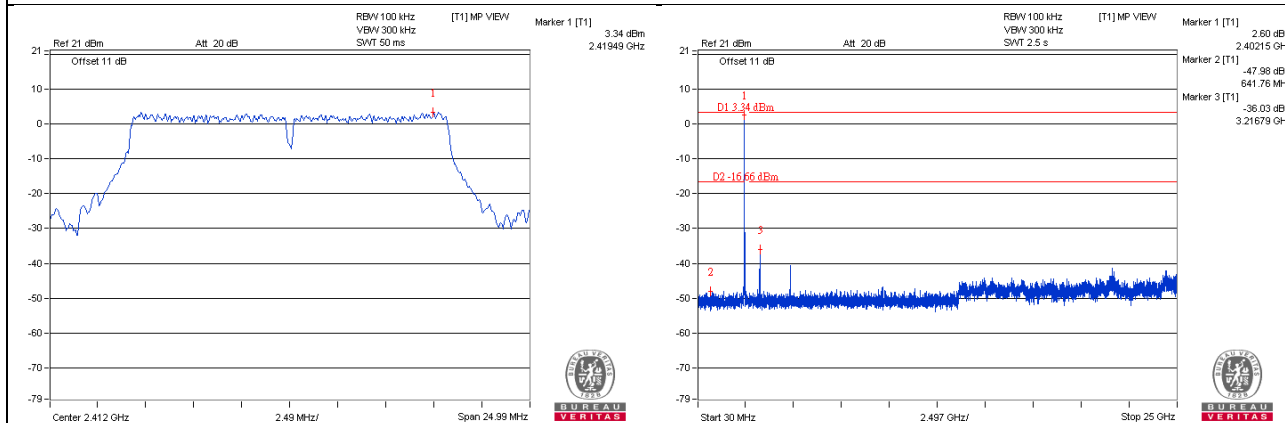
CH 1 Band edge

CH 11 Band edge

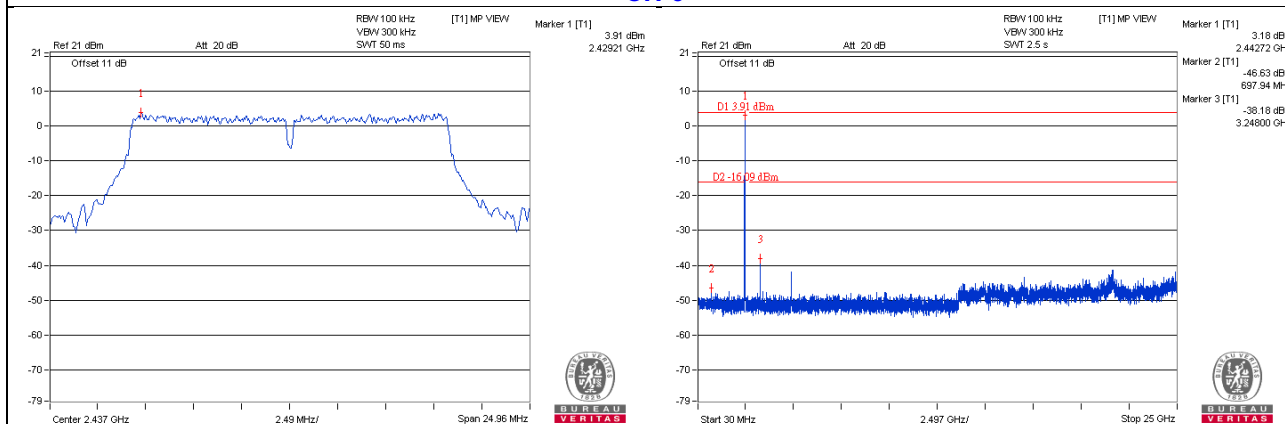


802.11g

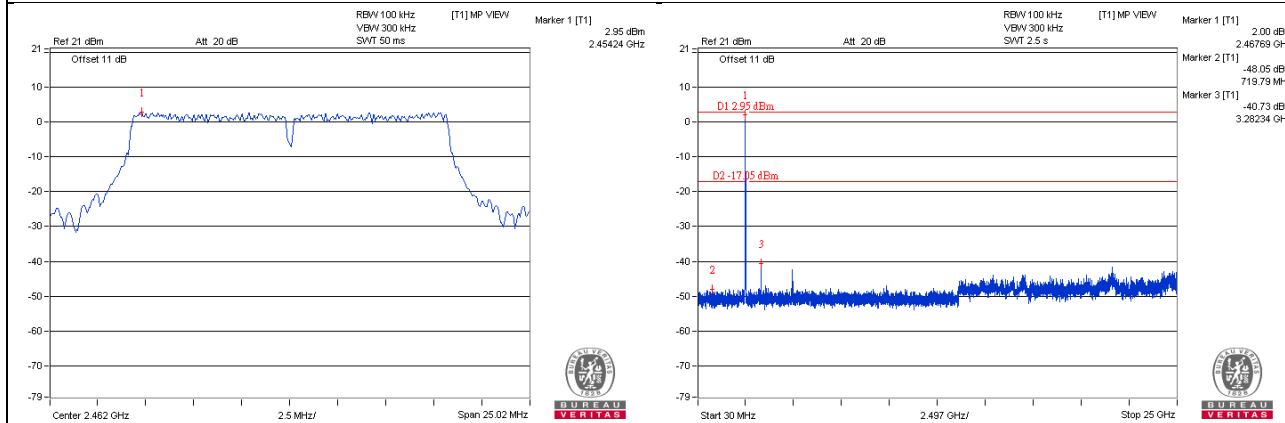
CH 1



CH 6

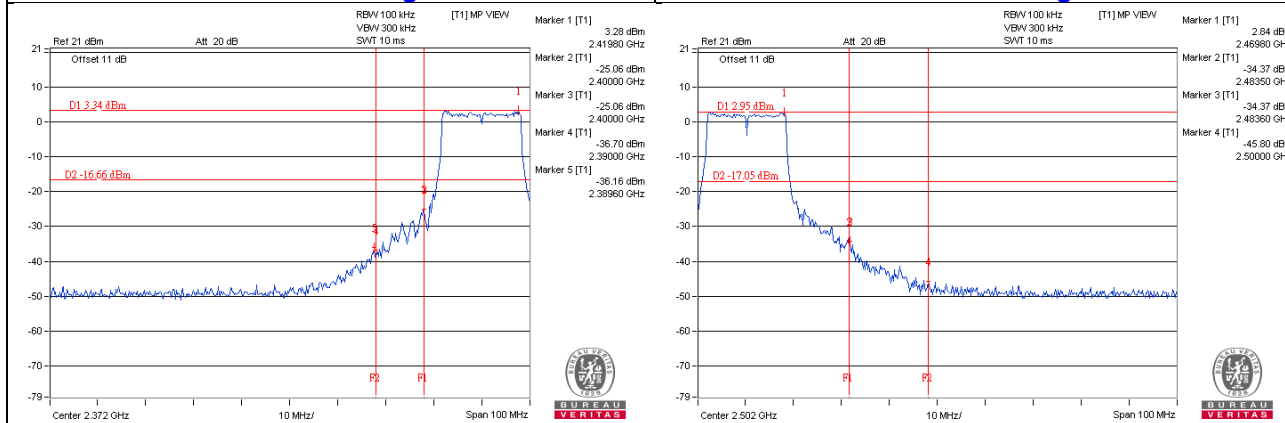


CH 11



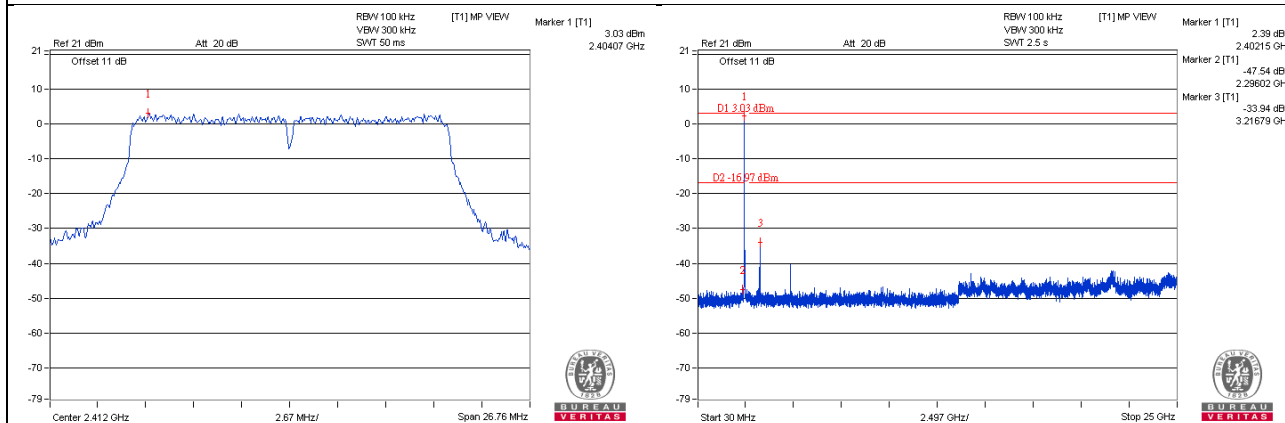
CH 1 Band edge

CH 11 Band edge

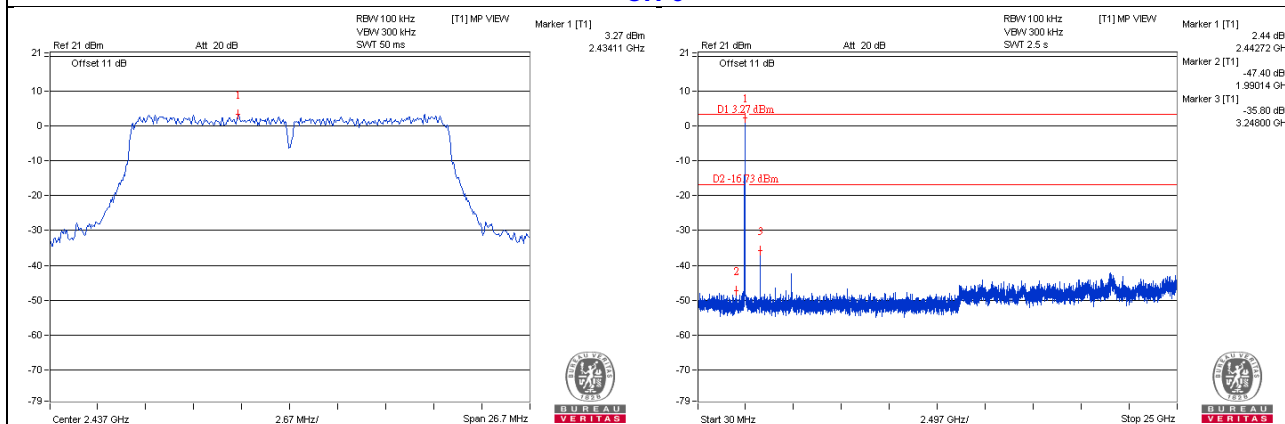


802.11n (HT20)

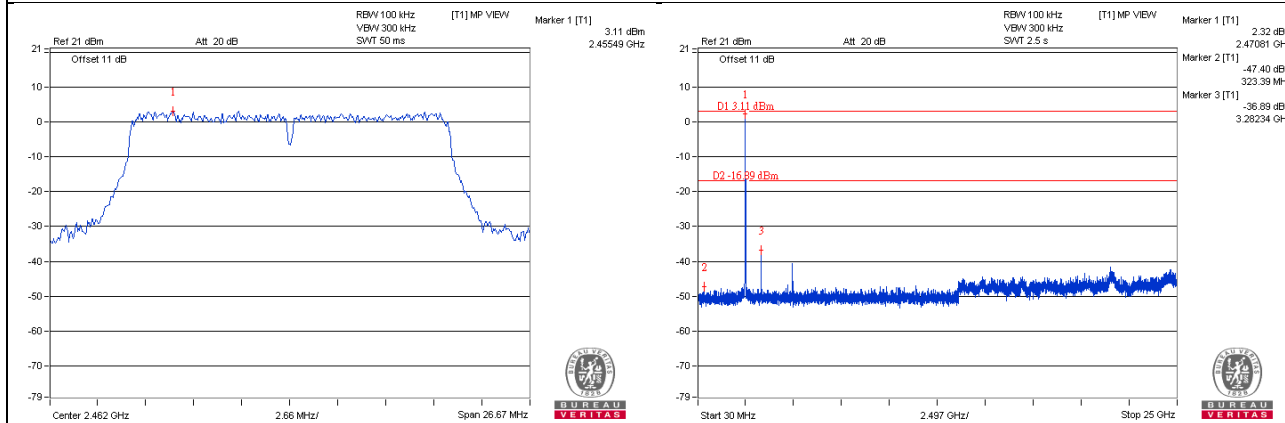
CH 1



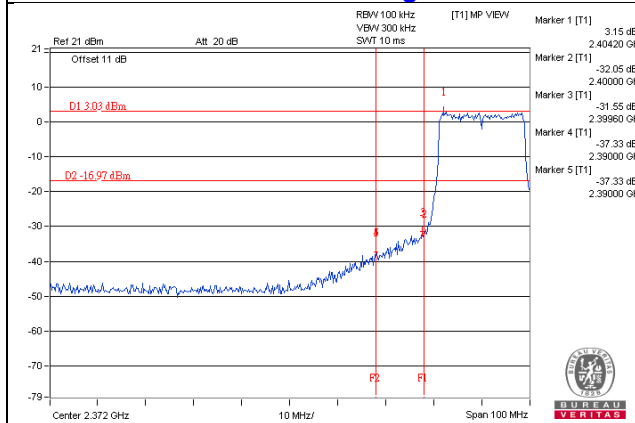
CH 6



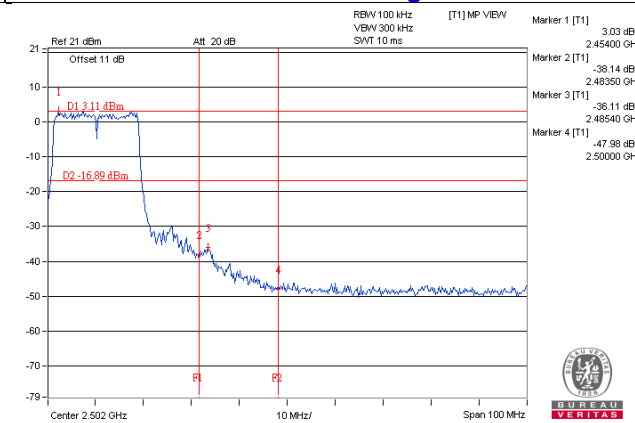
CH 11



CH 1 Band edge

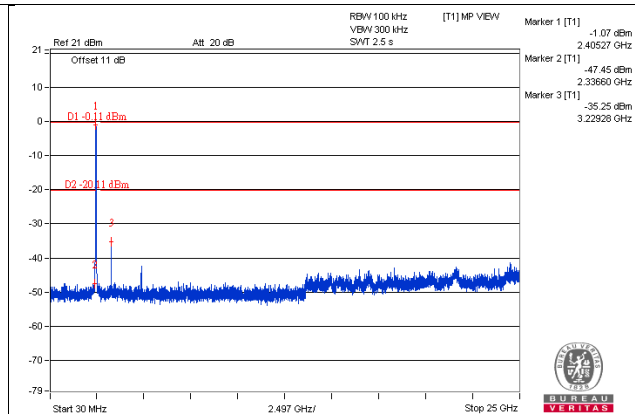
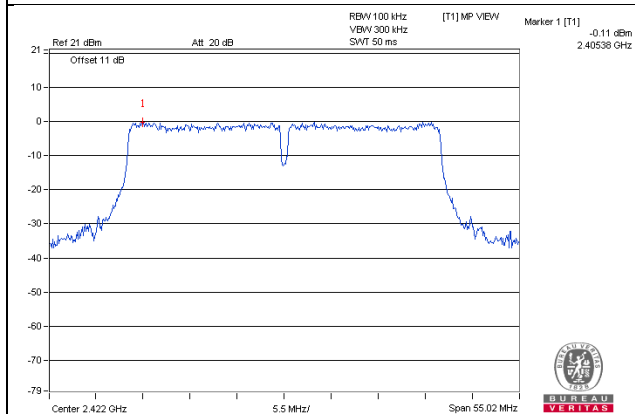


CH 11 Band edge

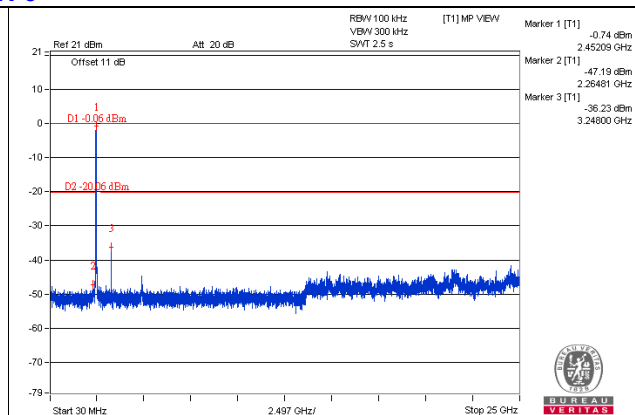
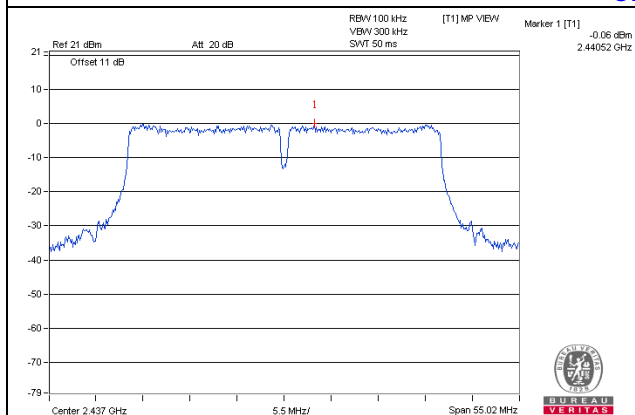


802.11n (HT40)

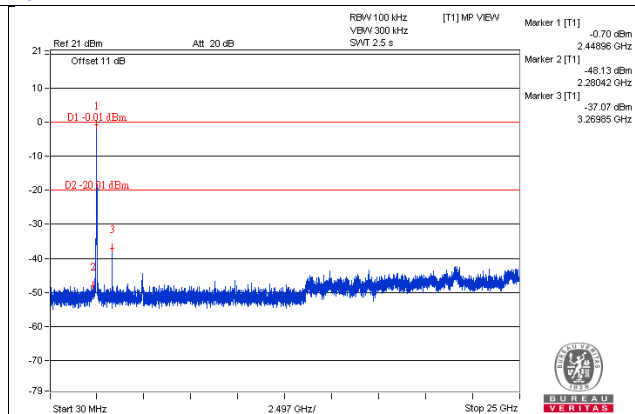
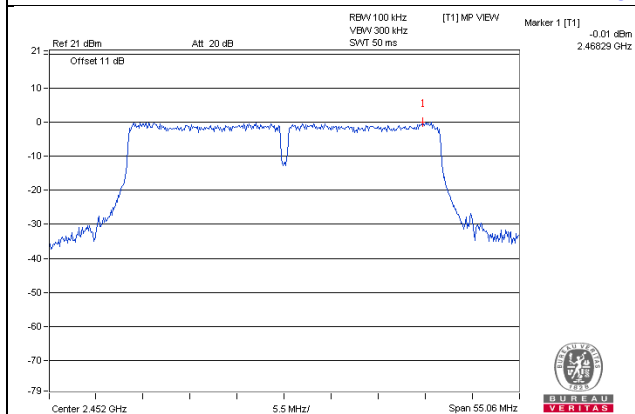
CH 3



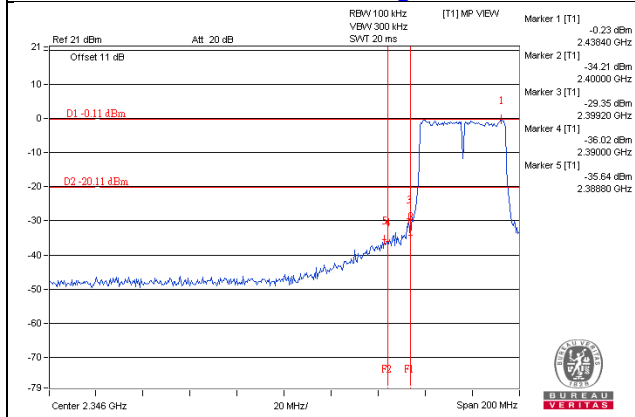
CH 6



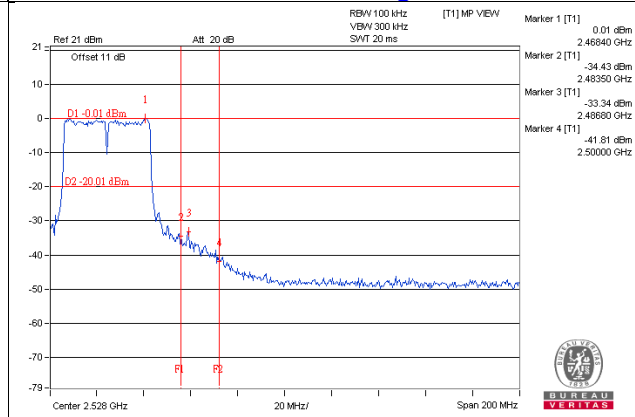
CH 9



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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