

FCC Test Report

Report No.: RF160706E06

FCC ID: ZMYDSL2401HNAT1CC

Test Model: DSL-2401HNA-T1CC

Received Date: July 06, 2016

Test Date: July 20 to 28, 2016

Issued Date: Sep. 20, 2016

Applicant: MitraStar Technology Corporation

Address: No. 6, Innovation Rd II, Hsinchu Science Park, Hsinchu 30076, Taiwan

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan R.O.C.

Test Location (1): E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan R.O.C.

Test Location (2): No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin
Chu Hsien 307, Taiwan R.O.C.



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

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	7
3.2 Description of Test Modes	10
3.2.1 Test Mode Applicability and Tested Channel Detail	11
3.3 Duty Cycle of Test Signal	13
3.4 Description of Support Units	14
3.4.1 Configuration of System under Test	15
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.....	19
4.1.4 Deviation from Test Standard	19
4.1.5 Test Setup.....	20
4.1.6 EUT Operating Conditions.....	20
4.1.7 Test Results	21
4.2 Conducted Emission Measurement	34
4.2.1 Limits of Conducted Emission Measurement	34
4.2.2 Test Instruments	34
4.2.3 Test Procedures.....	35
4.2.4 Deviation from Test Standard	35
4.2.5 Test Setup.....	35
4.2.6 EUT Operating Conditions.....	35
4.2.7 Test Results	36
4.3 6dB Bandwidth Measurement	38
4.3.1 Limits of 6dB Bandwidth Measurement	38
4.3.2 Test Setup.....	38
4.3.3 Test Instruments	38
4.3.4 Test Procedure	38
4.3.5 Deviation from Test Standard	38
4.3.6 EUT Operating Conditions.....	38
4.3.7 Test Result.....	39
4.4 Conducted Output Power Measurement.....	41
4.4.1 Limits of Conducted Output Power Measurement	41
4.4.2 Test Setup.....	41
4.4.3 Test Instruments	41
4.4.4 Test Procedures.....	41
4.4.5 Deviation from Test Standard	41
4.4.6 EUT Operating Conditions.....	41
4.4.7 Test Results	42
4.5 Power Spectral Density Measurement.....	44
4.5.1 Limits of Power Spectral Density Measurement	44
4.5.2 Test Setup.....	44
4.5.3 Test Instruments	44
4.5.4 Test Procedure	44
4.5.5 Deviation from Test Standard	44
4.5.6 EUT Operating Condition	44

4.5.7 Test Results	45
4.6 Conducted Out of Band Emission Measurement	48
4.6.1 Limits of Conducted Out of Band Emission Measurement.....	48
4.6.2 Test Setup.....	48
4.6.3 Test Instruments	48
4.6.4 Test Procedure	48
4.6.5 Deviation from Test Standard	48
4.6.6 EUT Operating Condition	48
4.6.7 Test Results	48
5 Pictures of Test Arrangements.....	57
Appendix – Information on the Testing Laboratories	58

Release Control Record

Issue No.	Description	Date Issued
RF160706E06	Original release.	Sep. 20, 2016

1 Certificate of Conformity

Product: VDSL IAD

Brand: MitraStar

Test Model: DSL-2401HNA-T1CC

Sample Status: ENGINEERING SAMPLE

Applicant: MitraStar Technology Corporation

Test Date: July 20 to 28, 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 : Wendy Wu , **Date:** Sep. 20, 2016
Wendy Wu / Specialist

Approved by : May Chen , **Date:** Sep. 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 -10.56dB at 24.00000MHz.
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 4924.00MHz, 2390.00MHz, 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	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	5.13 dB
	1GHz ~ 6GHz	3.40 dB
Radiated Emissions above 1 GHz	6GHz ~ 18GHz	3.73 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	VDSL IAD
Brand	MitraStar
Test Model	DSL-2401HNA-T1CC
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC12V from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733.3Mbps
Operating Frequency	2.4GHz: 2.412GHz ~ 2.462GHz 5GHz: 5.18GHz ~ 5.24GHz, 5.745GHz ~ 5.825GHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	2.4GHz: 532.235mW 5GHz: 5.18GHz ~ 5.24GHz: CDD Mode: 348.899mW Beamforming Mode: 348.899mW 5.745GHz ~ 5.825GHz: CDD Mode: 413.705mW Beamforming Mode: 413.705mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	RJ-11 cable (unshielded, 1.5m) x 1 RJ-45 cable (unshielded, 1.5m) x 1

Note:

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

Brand	Model No.	Spec.
UMEC	UP0181D-12PA	Input: 100-240Vac, 50-60Hz, 0.4A Output: 12Vdc, 1.5A DC output cable (Unshielded, 1.5m)

2. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (2.4GHz)	WLAN (5GHz)

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

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

2.4GHz band								
Antenna Set.	Chain No.	Brand	Model	Antenna Gain(dBi)	Frequency range (GHz ~ GHz)	Antenna Type	Connector Type	Cable Length (mm)
1	Chain 0	Whayu	65-031-240136B	2.7	2.4~2.4835	PCB	NA	202
	Chain 1		65-031-240141B	3	2.4~2.4835		NA	75
5GHz band								
Antenna Set.	Chain No.	Brand	Model	Antenna Gain(dBi)	Frequency range (GHz ~ GHz)	Antenna Type	Connector Type	Cable Length (mm)
1	Chain 0	Whayu	65-031-240137B	3.4	5.15~5.85	PCB	i-pex(MHF)	90
	Chain 1		65-031-240138B	3.3	5.15~5.85		i-pex(MHF)	115
	Chain 2		65-031-240139B	3.4	5.15~5.85		i-pex(MHF)	181
	Chain 3		65-031-240140B	3.4	5.15~5.85		i-pex(MHF)	200

4. The EUT incorporates a MIMO function.

2.4GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	2TX	2RX
802.11g	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
5GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	4TX	4RX
802.11n (HT20)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11n (HT40)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11ac (VHT20)	MCS0~8 Nss=1	2TX	2RX
	MCS0~8 Nss=2	2TX	2RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~8 Nss=4	4TX	4RX
802.11ac (VHT40)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX
802.11ac (VHT80)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX

Note:

1. All of modulation mode support beamforming function except 802.11a modulation mode and 2.4GHz band.

5. The power setting are list as below:

Modulation Mode	Frequency (MHz)	Power Setting
802.11b	2412	1E
	2437	1C
	2462	1B
802.11g	2412	20
	2437	2F
	2462	1D
802.11n(HT20)	2412	1B
	2437	2F
	2462	1E
802.11n(HT40)	2422	13
	2437	1E
	2452	17

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

3.2 Description of Test Modes

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

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

7 channels are provided for 802.11n (HT40):

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE \geq 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

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

Radiated Emission Test (Above 1GHz):

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

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

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

Radiated Emission Test (Below 1GHz):

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

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

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

Power Line Conducted Emission Test:

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

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

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

Antenna Port Conducted Measurement:

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

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

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE \geq 1G	22deg. C, 69%RH	120Vac, 60Hz	Russell Yeh
RE $<$ 1G	22deg. C, 69%RH	120Vac, 60Hz	Robert Cheng
PLC	23deg. C, 62%RH	120Vac, 60Hz	Jyunchun Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

3.3 Duty Cycle of Test Signal

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

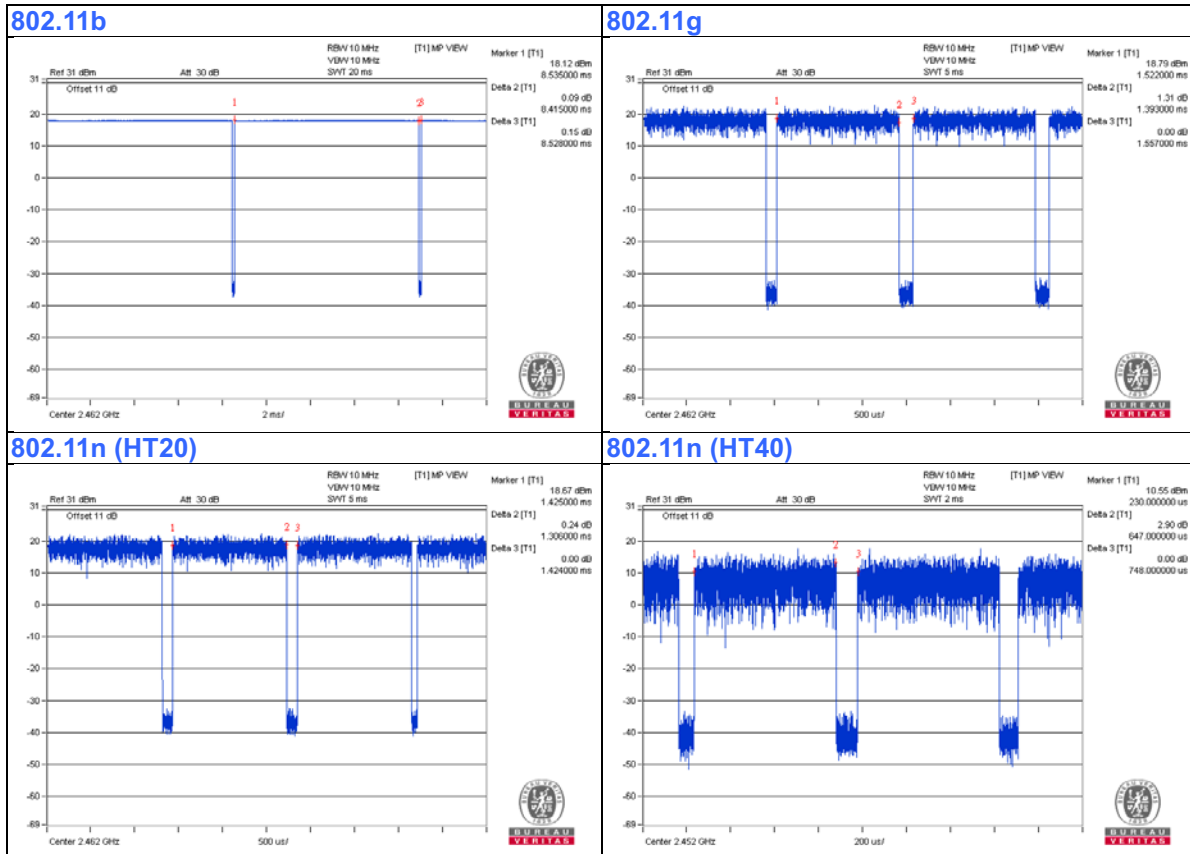
If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11b: Duty cycle = $8.415/8.528 = 0.987$

802.11g: Duty cycle = $1.393/1.557 = 0.895$, Duty factor = $10 * \log(1/0.895) = 0.5$

802.11n (HT20): Duty cycle = $1.306/1.424 = 0.917$, Duty factor = $10 * \log(1/0.917) = 0.4$

802.11n (HT40): Duty cycle = $0.647/0.748 = 0.865$, Duty factor = $10 * \log(1/0.865) = 0.6$



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.

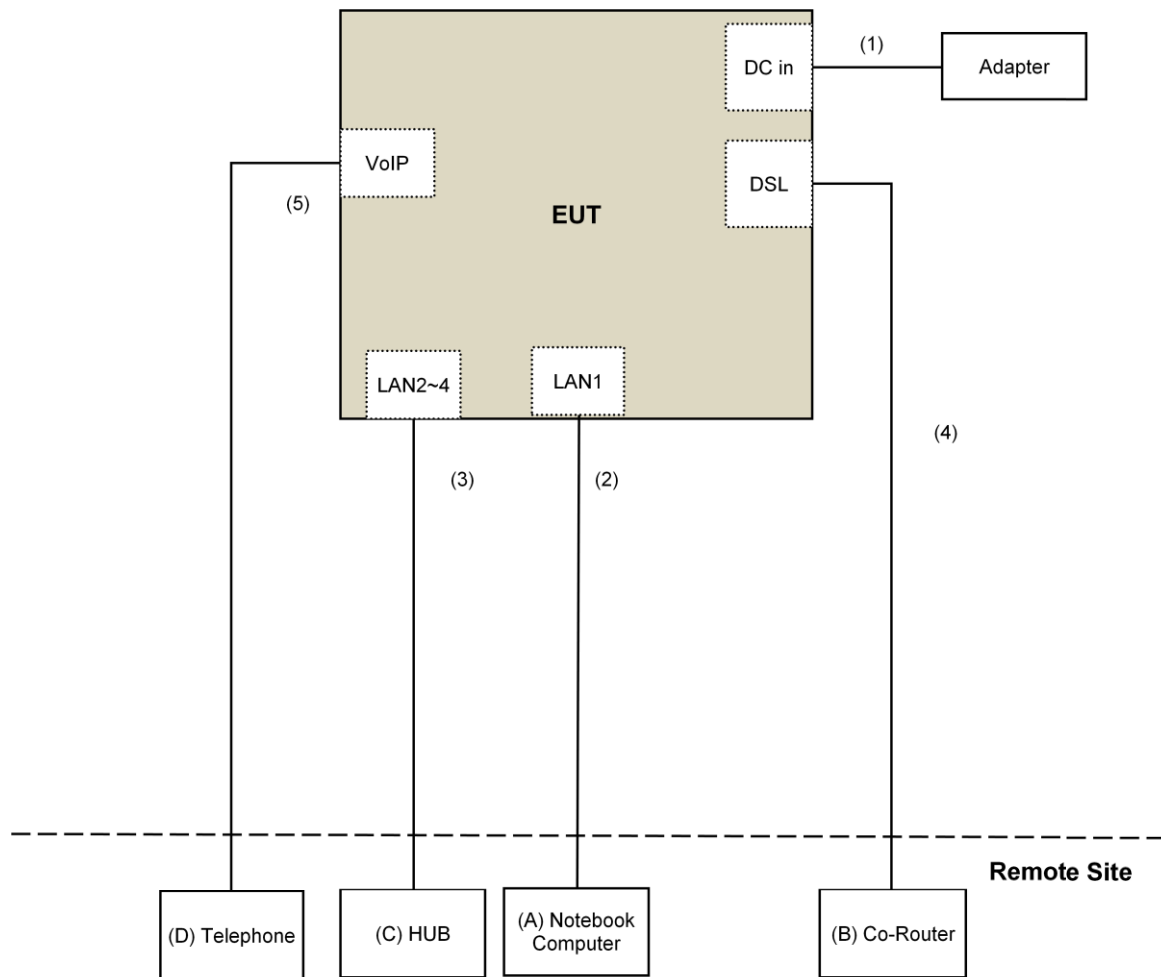
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook Computer	DELL	E6440	H7LYQ32	FCC DoC	Provided by Lab
B.	Co-Router	ZyXEL	IES-1000	S08024701597	FCC DoC	Provided by Lab
C.	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab
D.	Telephone	DAISHO	DS-03	N/A	N/A	Provided by Lab

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.	DC Cable	1	1.5	No	0	Supplied by client
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	3	10	No	0	Provided by Lab
4.	RJ-11 Cable	1	10	No	0	Provided by Lab
5.	RJ-11 Cable	1	10	No	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
KDB 558074 D01 DTS Meas Guidance v03r05
KDB 662911 D01 Multiple Transmitter Output v02r01
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 Agilent	N9038A	MY50010156	Aug. 12, 2015	Aug. 11, 2016
Pre-Amplifier ^(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna ^(*) Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 07, 2016	May 06, 2017
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-156	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 02, 2016	Apr. 01, 2017
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Jan. 20, 2016	Jan. 19, 2017
Pre-Amplifier Agilent	8449B	3008A02465	Apr. 05, 2016	Apr. 04, 2017
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	150317 150321 150322	Mar. 30, 2016	Mar. 29, 2017
Test Receiver Keysight	N9038A	MY54450088	July 20, 2016	July 19, 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_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Spectrum Analyzer R&S	FSP40	100060	May 11, 2016	May 10, 2017
Power meter Anritsu	ML2495A	1014008	May 5, 2016	May 4, 2017
Power sensor Anritsu	MA2411B	0917122	May 5, 2016	May 4, 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. The test was performed in 966 Chamber No. 3.
4. The FCC Site Registration No. is 147459
5. Loop antenna was used for all emissions below 30 MHz.
6. The CANADA Site Registration No. is 20331-1
8. Tested Date: July 27 to 28, 2016

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

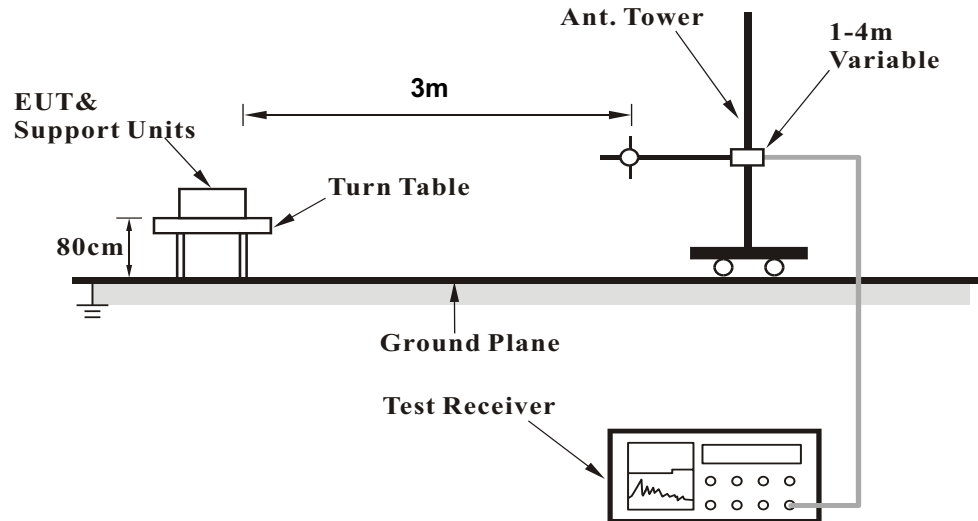
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

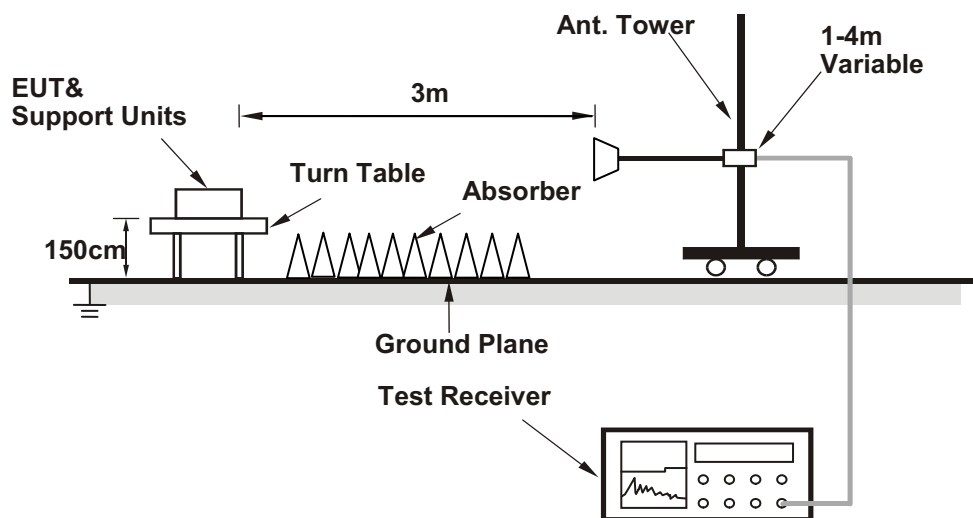
No deviation.

4.1.5 Test 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

- Connected the EUT with the Notebook Computer which is placed on remote site.
- Contorlling software (QATool Dbg.exe [Ver 0.0.0.71]) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2387.00	49.3 PK	74.0	-24.7	2.75 H	316	53.6	-4.3
2	2387.00	37.7 AV	54.0	-16.3	2.75 H	316	42.0	-4.3
3	*2412.00	103.1 PK			2.75 H	316	107.2	-4.1
4	*2412.00	101.1 AV			2.75 H	316	105.2	-4.1
5	4824.00	55.1 PK	74.0	-18.9	1.99 H	294	52.8	2.3
6	4824.00	53.5 AV	54.0	-0.5	1.99 H	294	51.2	2.3

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2387.00	56.7 PK	74.0	-17.3	1.07 V	221	61.0	-4.3
2	2387.00	47.6 AV	54.0	-6.4	1.07 V	221	51.9	-4.3
3	*2412.00	113.3 PK			1.07 V	221	117.4	-4.1
4	*2412.00	110.9 AV			1.07 V	221	115.0	-4.1
5	4824.00	49.5 PK	74.0	-24.5	1.68 V	360	47.2	2.3
6	4824.00	45.9 AV	54.0	-8.1	1.68 V	360	43.6	2.3

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	*2437.00	102.7 PK			2.81 H	308	106.7	-4.0
2	*2437.00	100.6 AV			2.81 H	308	104.6	-4.0
3	4874.00	55.1 PK	74.0	-18.9	2.12 H	293	52.6	2.5
4	4874.00	53.7 AV	54.0	-0.3	2.12 H	293	51.2	2.5
5	7311.00	48.3 PK	74.0	-25.7	1.94 H	326	39.4	8.9
6	7311.00	35.3 AV	54.0	-18.7	1.94 H	326	26.4	8.9

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	*2437.00	112.7 PK			1.09 V	218	116.7	-4.0
2	*2437.00	110.1 AV			1.09 V	218	114.1	-4.0
3	4874.00	49.8 PK	74.0	-24.2	1.66 V	360	47.3	2.5
4	4874.00	46.1 AV	54.0	-7.9	1.66 V	360	43.6	2.5
5	7311.00	46.3 PK	74.0	-27.7	1.99 V	360	37.4	8.9
6	7311.00	33.3 AV	54.0	-20.7	1.99 V	360	24.4	8.9

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	102.2 PK			2.76 H	330	106.3	-4.1
2	*2462.00	99.9 AV			2.76 H	330	104.0	-4.1
3	2487.70	49.1 PK	74.0	-24.9	2.76 H	330	53.1	-4.0
4	2487.70	37.3 AV	54.0	-16.7	2.76 H	330	41.3	-4.0
5	4924.00	55.7 PK	74.0	-18.3	1.99 H	290	53.2	2.5
6	4924.00	53.9 AV	54.0	-0.1	1.99 H	290	51.4	2.5
7	7386.00	48.2 PK	74.0	-25.8	1.91 H	338	38.9	9.3
8	7386.00	35.1 AV	54.0	-18.9	1.91 H	338	25.8	9.3

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	111.9 PK			1.07 V	221	116.0	-4.1
2	*2462.00	109.1 AV			1.07 V	221	113.2	-4.1
3	2487.70	57.8 PK	74.0	-16.2	1.07 V	221	61.8	-4.0
4	2487.70	46.6 AV	54.0	-7.4	1.07 V	221	50.6	-4.0
5	4924.00	49.4 PK	74.0	-24.6	1.70 V	360	46.9	2.5
6	4924.00	45.9 AV	54.0	-8.1	1.70 V	360	43.4	2.5
7	7386.00	46.2 PK	74.0	-27.8	1.94 V	360	36.9	9.3
8	7386.00	33.2 AV	54.0	-20.8	1.94 V	360	23.9	9.3

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	68.1 PK	74.0	-5.9	2.33 H	360	72.3	-4.2
2	2390.00	51.0 AV	54.0	-3.0	2.33 H	360	55.2	-4.2
3	*2412.00	109.2 PK			2.33 H	360	113.3	-4.1
4	*2412.00	97.2 AV			2.33 H	360	101.3	-4.1
5	4824.00	53.2 PK	74.0	-20.8	2.15 H	291	50.9	2.3
6	4824.00	39.6 AV	54.0	-14.4	2.15 H	291	37.3	2.3

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	73.9 PK	74.0	-0.1	1.11 V	213	78.1	-4.2
2	2390.00	53.5 AV	54.0	-0.5	1.11 V	213	57.7	-4.2
3	*2412.00	116.3 PK			1.11 V	212	120.4	-4.1
4	*2412.00	104.5 AV			1.11 V	212	108.6	-4.1
5	4824.00	44.3 PK	74.0	-29.7	1.64 V	360	42.0	2.3
6	4824.00	32.1 AV	54.0	-21.9	1.64 V	360	29.8	2.3

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.
6. The resolution bandwidth of test receiver is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) for Average detection (AV). Emission AV measured by RBW/VBW= 1MHz/1kHz

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.1 PK	74.0	-17.9	2.73 H	322	60.3	-4.2
2	2390.00	42.4 AV	54.0	-11.6	2.73 H	322	46.6	-4.2
3	*2437.00	110.2 PK			2.73 H	322	114.2	-4.0
4	*2437.00	99.8 AV			2.73 H	322	103.8	-4.0
5	2483.50	56.9 PK	74.0	-17.1	2.73 H	322	60.9	-4.0
6	2483.50	42.9 AV	54.0	-11.1	2.73 H	322	46.9	-4.0
7	4874.00	59.1 PK	74.0	-14.9	1.99 H	294	56.6	2.5
8	4874.00	45.7 AV	54.0	-8.3	1.99 H	294	43.2	2.5
9	7311.00	52.4 PK	74.0	-21.6	1.90 H	337	43.5	8.9
10	7311.00	38.4 AV	54.0	-15.6	1.90 H	337	29.5	8.9

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	2390.00	61.1 PK	74.0	-12.9	1.09 V	213	65.3	-4.2
2	2390.00	47.1 AV	54.0	-6.9	1.09 V	213	51.3	-4.2
3	*2437.00	118.1 PK			1.09 V	213	122.1	-4.0
4	*2437.00	107.2 AV			1.09 V	213	111.2	-4.0
5	2483.50	62.3 PK	74.0	-11.7	1.09 V	213	66.3	-4.0
6	2483.50	47.9 AV	54.0	-6.1	1.09 V	213	51.9	-4.0
7	4874.00	49.2 PK	74.0	-24.8	1.72 V	360	46.7	2.5
8	4874.00	36.9 AV	54.0	-17.1	1.72 V	360	34.4	2.5
9	7311.00	49.2 PK	74.0	-24.8	1.79 V	351	40.3	8.9
10	7311.00	36.7 AV	54.0	-17.3	1.79 V	351	27.8	8.9

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.
- The resolution bandwidth of test receiver is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) for Average detection (AV). Emission AV measured by RBW/VBW= 1MHz/1kHz

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	107.2 PK			2.77 H	303	111.3	-4.1
2	*2462.00	95.1 AV			2.77 H	303	99.2	-4.1
3	2483.50	67.7 PK	74.0	-6.3	2.77 H	303	71.7	-4.0
4	2483.50	50.8 AV	54.0	-3.2	2.77 H	303	54.8	-4.0
5	4924.00	52.8 PK	74.0	-21.2	2.11 H	283	50.3	2.5
6	4924.00	38.7 AV	54.0	-15.3	2.11 H	283	36.2	2.5
7	7386.00	49.5 PK	74.0	-24.5	1.95 H	334	40.2	9.3
8	7386.00	33.4 AV	54.0	-20.6	1.95 H	334	24.1	9.3

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	114.7 PK			1.08 V	214	118.8	-4.1
2	*2462.00	102.6 AV			1.08 V	214	106.7	-4.1
3	2483.50	70.7 PK	74.0	-3.3	1.08 V	214	74.7	-4.0
4	2483.50	53.6 AV	54.0	-0.4	1.08 V	214	57.6	-4.0
5	4924.00	43.5 PK	74.0	-30.5	1.64 V	360	41.0	2.5
6	4924.00	31.4 AV	54.0	-22.6	1.64 V	360	28.9	2.5
7	7386.00	43.1 PK	74.0	-30.9	1.94 V	360	33.8	9.3
8	7386.00	31.1 AV	54.0	-22.9	1.94 V	360	21.8	9.3

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.
- The resolution bandwidth of test receiver is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) for Average detection (AV). Emission AV measured by RBW/VBW= 1MHz/1kHz

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	68.6 PK	74.0	-5.4	2.72 H	331	72.8	-4.2
2	2390.00	51.3 AV	54.0	-2.7	2.72 H	331	55.5	-4.2
3	*2412.00	105.8 PK			2.72 H	331	109.9	-4.1
4	*2412.00	93.4 AV			2.72 H	331	97.5	-4.1
5	4824.00	52.3 PK	74.0	-21.7	2.16 H	281	50.0	2.3
6	4824.00	38.3 AV	54.0	-15.7	2.16 H	281	36.0	2.3

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.5 PK	74.0	-3.5	1.08 V	214	74.7	-4.2
2	2390.00	53.9 AV	54.0	-0.1	1.08 V	214	58.1	-4.2
3	*2412.00	113.0 PK			1.08 V	214	117.1	-4.1
4	*2412.00	100.6 AV			1.08 V	214	104.7	-4.1
5	4824.00	42.9 PK	74.0	-31.1	1.73 V	360	40.6	2.3
6	4824.00	30.9 AV	54.0	-23.1	1.73 V	360	28.6	2.3

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.
- The resolution bandwidth of test receiver is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) for Average detection (AV). Emission AV measured by RBW/VBW= 1MHz/1kHz

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.4 PK	74.0	-17.6	2.76 H	314	60.6	-4.2
2	2390.00	42.8 AV	54.0	-11.2	2.76 H	314	47.0	-4.2
3	*2437.00	100.4 PK			2.76 H	314	104.4	-4.0
4	*2437.00	99.7 AV			2.76 H	314	103.7	-4.0
5	2483.50	57.0 PK	74.0	-17.0	2.76 H	314	61.0	-4.0
6	2483.50	43.1 AV	54.0	-10.9	2.76 H	314	47.1	-4.0
7	4874.00	59.0 PK	74.0	-15.0	2.08 H	308	56.5	2.5
8	4874.00	45.8 AV	54.0	-8.2	2.08 H	308	43.3	2.5
9	7311.00	52.2 PK	74.0	-21.8	1.99 H	324	43.3	8.9
10	7311.00	38.4 AV	54.0	-15.6	1.99 H	324	29.5	8.9

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	2390.00	61.7 PK	74.0	-12.3	1.04 V	219	65.9	-4.2
2	2390.00	47.4 AV	54.0	-6.6	1.04 V	219	51.6	-4.2
3	*2437.00	117.9 PK			1.10 V	217	121.9	-4.0
4	*2437.00	107.0 AV			1.10 V	217	111.0	-4.0
5	2483.50	64.2 PK	74.0	-9.8	1.08 V	225	68.2	-4.0
6	2483.50	48.2 AV	54.0	-5.8	1.08 V	225	52.2	-4.0
7	4874.00	49.3 PK	74.0	-24.7	1.74 V	360	46.8	2.5
8	4874.00	36.8 AV	54.0	-17.2	1.74 V	360	34.3	2.5
9	7311.00	49.2 PK	74.0	-24.8	1.96 V	360	40.3	8.9
10	7311.00	36.5 AV	54.0	-17.5	1.96 V	360	27.6	8.9

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.
- The resolution bandwidth of test receiver is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) for Average detection (AV). Emission AV measured by RBW/VBW= 1MHz/1kHz

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	107.3 PK			2.78 H	318	111.4	-4.1
2	*2462.00	95.1 AV			2.78 H	318	99.2	-4.1
3	2483.50	68.6 PK	74.0	-5.4	2.78 H	318	72.6	-4.0
4	2483.50	51.2 AV	54.0	-2.8	2.78 H	318	55.2	-4.0
5	4924.00	52.8 PK	74.0	-21.2	2.13 H	283	50.3	2.5
6	4924.00	38.8 AV	54.0	-15.2	2.13 H	283	36.3	2.5
7	7386.00	49.6 PK	74.0	-24.4	1.95 H	322	40.3	9.3
8	7386.00	33.4 AV	54.0	-20.6	1.95 H	322	24.1	9.3

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	114.6 PK			1.07 V	213	118.7	-4.1
2	*2462.00	102.2 AV			1.07 V	213	106.3	-4.1
3	2483.50	72.3 PK	74.0	-1.7	1.07 V	213	76.3	-4.0
4	2483.50	53.9 AV	54.0	-0.1	1.07 V	213	57.9	-4.0
5	4924.00	43.1 PK	74.0	-30.9	1.74 V	360	40.6	2.5
6	4924.00	31.2 AV	54.0	-22.8	1.74 V	360	28.7	2.5
7	7386.00	43.5 PK	74.0	-30.5	1.95 V	350	34.2	9.3
8	7386.00	31.4 AV	54.0	-22.6	1.95 V	350	22.1	9.3

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.
- The resolution bandwidth of test receiver is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) for Average detection (AV). Emission AV measured by RBW/VBW= 1MHz/1kHz

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	67.9 PK	74.0	-6.1	2.80 H	310	72.1	-4.2
2	2390.00	50.9 AV	54.0	-3.1	2.80 H	310	55.1	-4.2
3	*2422.00	98.9 PK			2.80 H	310	103.0	-4.1
4	*2422.00	89.9 AV			2.80 H	310	94.0	-4.1
5	4844.00	42.8 PK	74.0	-31.2	2.10 H	287	40.5	2.3
6	4844.00	30.1 AV	54.0	-23.9	2.10 H	287	27.8	2.3
7	7266.00	42.5 PK	74.0	-31.5	1.99 H	321	33.7	8.8
8	7266.00	29.4 AV	54.0	-24.6	1.99 H	321	20.6	8.8

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	70.8 PK	74.0	-3.2	1.08 V	209	75.0	-4.2
2	2390.00	53.8 AV	54.0	-0.2	1.08 V	209	58.0	-4.2
3	*2422.00	106.1 PK			1.08 V	209	110.2	-4.1
4	*2422.00	97.1 AV			1.08 V	209	101.2	-4.1
5	4844.00	42.2 PK	74.0	-31.8	1.69 V	360	39.9	2.3
6	4844.00	29.7 AV	54.0	-24.3	1.69 V	360	27.4	2.3
7	7266.00	42.5 PK	74.0	-31.5	1.99 V	360	33.7	8.8
8	7266.00	29.2 AV	54.0	-24.8	1.99 V	360	20.4	8.8

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.
- The resolution bandwidth of test receiver is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) for Average detection (AV). Emission AV measured by $RBW/VBW = 1\text{MHz}/3\text{kHz}$

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	68.4 PK	74.0	-5.6	2.71 H	314	72.6	-4.2
2	2390.00	51.0 AV	54.0	-3.0	2.71 H	314	55.2	-4.2
3	*2437.00	102.6 PK			2.71 H	314	106.6	-4.0
4	*2437.00	95.1 AV			2.71 H	314	99.1	-4.0
5	2483.50	67.9 PK	74.0	-6.1	2.71 H	314	71.9	-4.0
6	2483.50	50.8 AV	54.0	-3.2	2.71 H	314	54.8	-4.0
7	4874.00	42.2 PK	74.0	-31.8	2.15 H	282	39.7	2.5
8	4874.00	29.7 AV	54.0	-24.3	2.15 H	282	27.2	2.5
9	7311.00	42.0 PK	74.0	-32.0	1.98 H	332	33.1	8.9
10	7311.00	29.0 AV	54.0	-25.0	1.98 H	332	20.1	8.9

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	2390.00	68.6 PK	74.0	-5.4	1.05 V	208	72.8	-4.2
2	2390.00	53.9 AV	54.0	-0.1	1.05 V	208	58.1	-4.2
3	*2437.00	110.2 PK			1.05 V	208	114.2	-4.0
4	*2437.00	102.4 AV			1.05 V	208	106.4	-4.0
5	2483.50	68.1 PK	74.0	-5.9	1.05 V	208	72.1	-4.0
6	2483.50	53.7 AV	54.0	-0.3	1.05 V	208	57.7	-4.0
7	4874.00	43.9 PK	74.0	-30.1	1.64 V	360	41.4	2.5
8	4874.00	30.8 AV	54.0	-23.2	1.64 V	360	28.3	2.5
9	7311.00	43.2 PK	74.0	-30.8	1.94 V	360	34.3	8.9
10	7311.00	30.1 AV	54.0	-23.9	1.94 V	360	21.2	8.9

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.
- The resolution bandwidth of test receiver is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) for Average detection (AV). Emission AV measured by RBW/VBW= 1MHz/3kHz

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	100.3 PK			2.76 H	316	104.4	-4.1
2	*2452.00	92.1 AV			2.76 H	316	96.2	-4.1
3	2483.50	68.4 PK	74.0	-5.6	2.76 H	316	72.4	-4.0
4	2483.50	51.2 AV	54.0	-2.8	2.76 H	316	55.2	-4.0
5	4904.00	42.1 PK	74.0	-31.9	2.09 H	289	39.6	2.5
6	4904.00	29.7 AV	54.0	-24.3	2.09 H	289	27.2	2.5
7	7356.00	42.4 PK	74.0	-31.6	1.93 H	340	33.2	9.2
8	7356.00	29.1 AV	54.0	-24.9	1.93 H	340	19.9	9.2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	107.8 PK			1.07 V	202	111.9	-4.1
2	*2452.00	99.6 AV			1.07 V	202	103.7	-4.1
3	2483.50	72.2 PK	74.0	-1.8	1.07 V	202	76.2	-4.0
4	2483.50	53.6 AV	54.0	-0.4	1.07 V	202	57.6	-4.0
5	4904.00	41.7 PK	74.0	-32.3	1.69 V	360	39.2	2.5
6	4904.00	29.3 AV	54.0	-24.7	1.69 V	360	26.8	2.5
7	7356.00	42.4 PK	74.0	-31.6	2.03 V	360	33.2	9.2
8	7356.00	28.9 AV	54.0	-25.1	2.03 V	360	19.7	9.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. The resolution bandwidth of test receiver is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) for Average detection (AV). Emission AV measured by $RBW/VBW = 1\text{MHz}/3\text{kHz}$

Below 1GHz Data:

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	250.00	31.3 QP	46.0	-14.7	1.00 H	91	40.8	-9.5
2	320.01	34.9 QP	46.0	-11.1	1.00 H	8	41.7	-6.8
3	375.00	37.4 QP	46.0	-8.6	1.00 H	340	42.9	-5.5
4	480.01	34.7 QP	46.0	-11.3	2.00 H	0	37.6	-2.9
5	625.00	36.4 QP	46.0	-9.6	1.50 H	333	36.0	0.4
6	874.99	37.5 QP	46.0	-8.5	1.50 H	45	33.8	3.7

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	43.80	33.5 QP	40.0	-6.5	1.00 V	348	41.9	-8.4
2	104.74	30.8 QP	43.5	-12.7	1.00 V	259	43.0	-12.2
3	143.32	28.9 QP	43.5	-14.6	1.00 V	43	37.6	-8.7
4	375.00	36.7 QP	46.0	-9.3	1.00 V	31	42.2	-5.5
5	625.00	37.1 QP	46.0	-8.9	1.50 V	6	36.7	0.4
6	875.02	38.1 QP	46.0	-7.9	1.00 V	358	34.4	3.7

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	847124/029	Oct. 23, 2015	Oct. 22, 2016
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 28, 2015	Oct. 27, 2016
RF Cable	5D-FB	COACAB-002	Mar. 04, 2016	Mar. 03, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 20, 2016	June 19, 2017
Software BVADT	BVADT_Cond_ V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 1.
3. Tested Date: July 20, 2016

4.2.3 Test Procedures

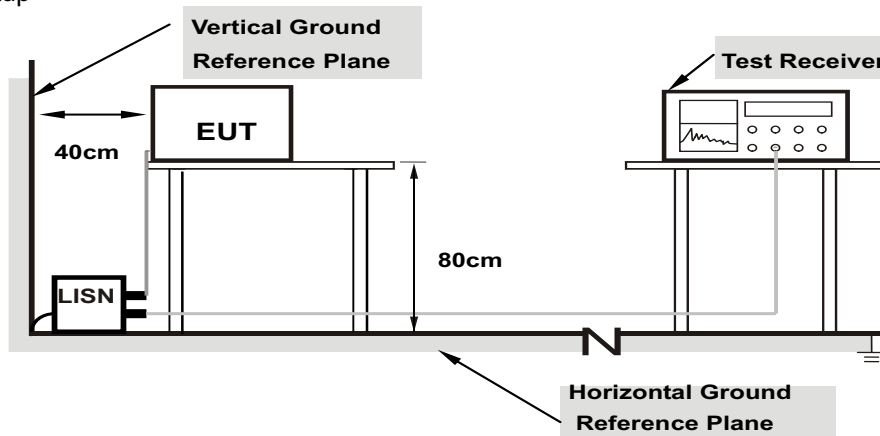
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

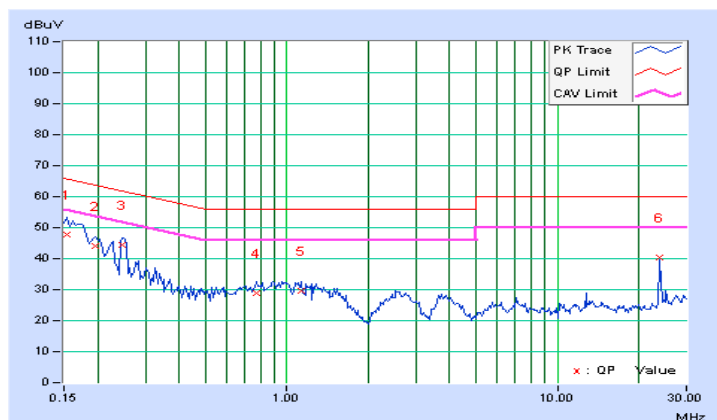
4.2.7 Test Results

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

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	10.21	37.70	26.15	47.91	36.36	65.79	55.79	-17.88	-19.43
2	0.19687	10.22	33.85	24.39	44.07	34.61	63.74	53.74	-19.67	-19.13
3	0.24766	10.22	34.21	29.01	44.43	39.23	61.84	51.84	-17.41	-12.61
4	0.77109	10.24	18.74	11.80	28.98	22.04	56.00	46.00	-27.02	-23.96
5	1.12891	10.27	19.46	14.41	29.73	24.68	56.00	46.00	-26.27	-21.32
6	24.00000	11.43	29.01	28.01	40.44	39.44	60.00	50.00	-19.56	-10.56

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.

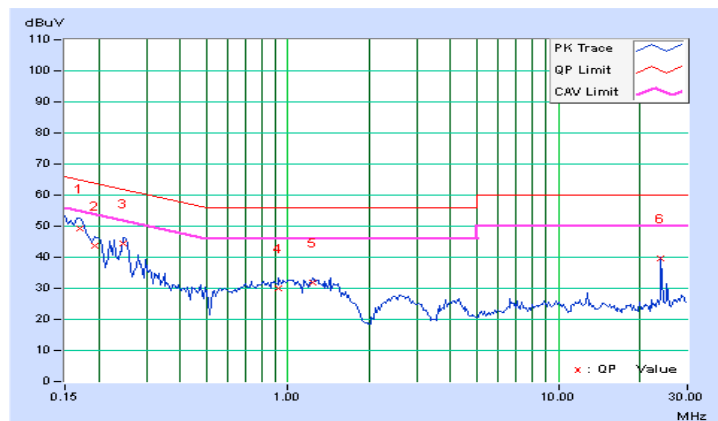


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

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	0.16953	10.20	38.98	29.26	49.18	39.46	64.98	54.98	-15.81	-15.53
2	0.19297	10.21	33.56	22.55	43.77	32.76	63.91	53.91	-20.14	-21.15
3	0.24766	10.21	34.23	29.29	44.44	39.50	61.84	51.84	-17.40	-12.34
4	0.92734	10.24	19.78	14.86	30.02	25.10	56.00	46.00	-25.98	-20.90
5	1.23047	10.25	21.48	14.98	31.73	25.23	56.00	46.00	-24.27	-20.77
6	24.00000	11.13	28.55	28.25	39.68	39.38	60.00	50.00	-20.32	-10.62

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.

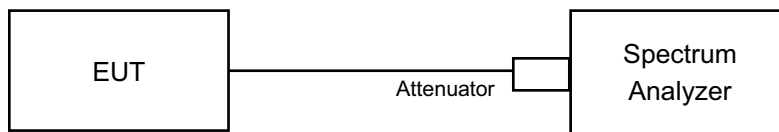


4.3 6dB Bandwidth Measurement

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
		CHAIN 0	CHAIN 1		
1	2412	10.09	10.08	0.5	PASS
6	2437	10.08	10.08	0.5	PASS
11	2462	10.08	9.14	0.5	PASS

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1		
1	2412	15.17	15.17	0.5	PASS
6	2437	15.18	15.17	0.5	PASS
11	2462	15.17	15.17	0.5	PASS

802.11n (HT20)

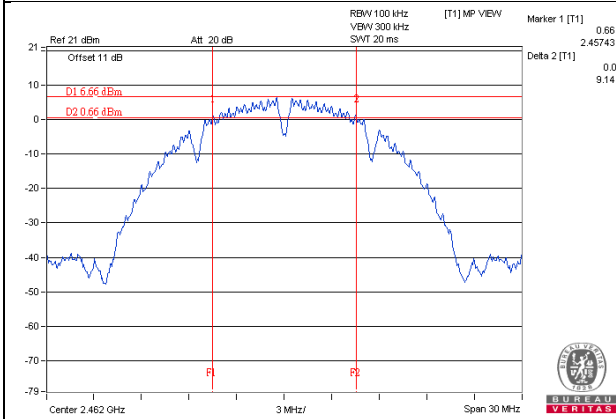
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1		
1	2412	15.16	15.16	0.5	Pass
6	2437	15.17	15.17	0.5	Pass
11	2462	15.17	15.15	0.5	Pass

802.11n (HT40)

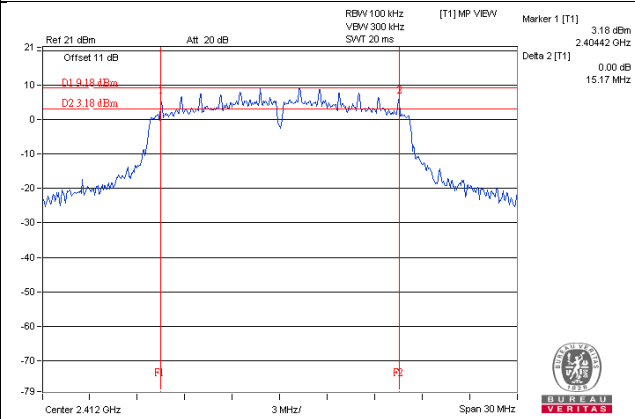
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1		
3	2422	35.12	35.14	0.5	Pass
6	2437	35.09	35.12	0.5	Pass
9	2452	35.17	35.17	0.5	Pass

Spectrum Plot of Worst Value

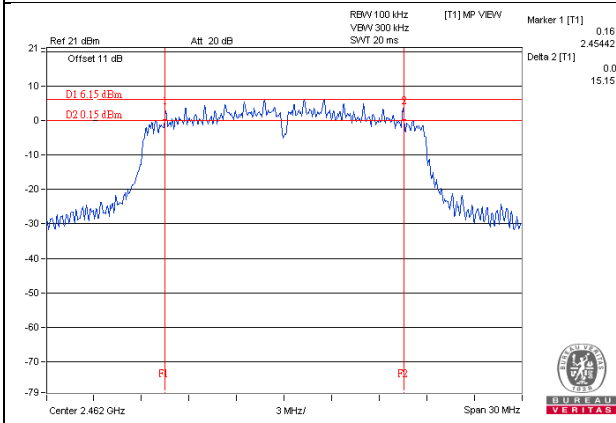
802.11b / Chain 1 : CH11



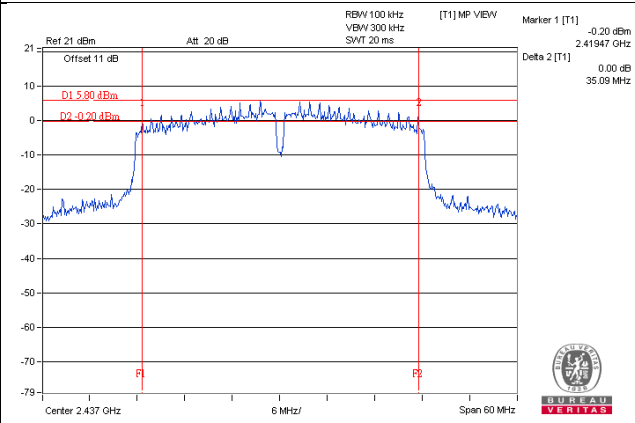
802.11g / Chain 0 : CH1



802.11n (HT20) / Chain 1 : CH11



802.11n (HT40) / Chain 0 : CH6



4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

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

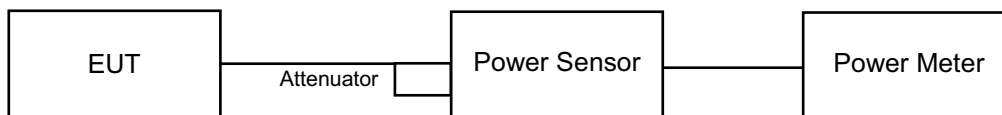
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

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

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

Chan.	Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	20.45	19.34	196.818	22.94	30	Pass
6	2437	19.52	18.32	157.456	21.97	30	Pass
11	2462	19.06	17.84	141.352	21.50	30	Pass

802.11g

Chan.	Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	23.56	23.42	446.772	26.50	30	Pass
6	2437	24.33	24.17	532.235	27.26	30	Pass
11	2462	22.69	22.26	354.047	25.49	30	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	23.14	22.21	372.404	25.71	30	Pass
6	2437	24.33	24.13	529.84	27.24	30	Pass
11	2462	22.95	22.46	373.44	25.72	30	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	20.47	19.28	196.152	22.93	30	Pass
6	2437	23.14	22.56	386.365	25.87	30	Pass
9	2452	21.25	20.31	240.751	23.82	30	Pass

FOR AVERAGE POWER
802.11b

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	18.75	17.54	131.743	21.20
6	2437	17.81	16.63	106.421	20.27
11	2462	17.34	15.92	93.284	19.70

802.11g

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	18.76	17.61	132.839	21.23
6	2437	21.44	20.94	263.481	24.21
11	2462	17.19	16.13	93.38	19.70

802.11n (HT20)

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	16.54	15.54	80.892	19.08
6	2437	21.33	20.93	259.711	24.14
11	2462	17.34	16.64	100.332	20.01

802.11n (HT40)

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
3	2422	13.15	11.93	36.25	15.59
6	2437	17.83	16.97	110.448	20.43
9	2452	14.68	13.74	53.035	17.25

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

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-6.74	3.01	-3.73	8	Pass
	6	2437	-7.94	3.01	-4.93	8	Pass
	11	2462	-9.88	3.01	-6.87	8	Pass
1	1	2412	-7.92	3.01	-4.91	8	Pass
	6	2437	-9.84	3.01	-6.83	8	Pass
	11	2462	-9.46	3.01	-6.45	8	Pass

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.86\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-7.47	3.01	-4.46	8	Pass
	6	2437	-4.59	3.01	-1.58	8	Pass
	11	2462	-9.76	3.01	-6.75	8	Pass
1	1	2412	-9.47	3.01	-6.46	8	Pass
	6	2437	-6.47	3.01	-3.46	8	Pass
	11	2462	-10.64	3.01	-7.63	8	Pass

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.86\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-9.67	3.01	-6.66	8	Pass
	6	2437	-5.27	3.01	-2.26	8	Pass
	11	2462	-8.52	3.01	-5.51	8	Pass
1	1	2412	-10.66	3.01	-7.65	8	Pass
	6	2437	-5.57	3.01	-2.56	8	Pass
	11	2462	-9.59	3.01	-6.58	8	Pass

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.86\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

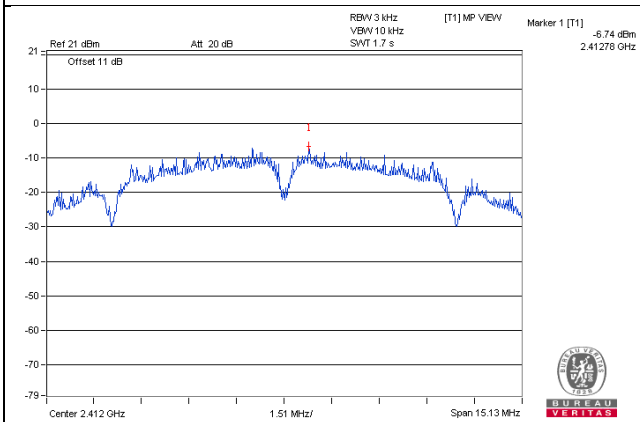
802.11n (HT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	3	2412	-16.30	3.01	-13.29	8	Pass
	6	2437	-9.07	3.01	-6.06	8	Pass
	9	2462	-13.12	3.01	-10.11	8	Pass
1	3	2412	-15.92	3.01	-12.91	8	Pass
	6	2437	-11.64	3.01	-8.63	8	Pass
	9	2462	-13.95	3.01	-10.94	8	Pass

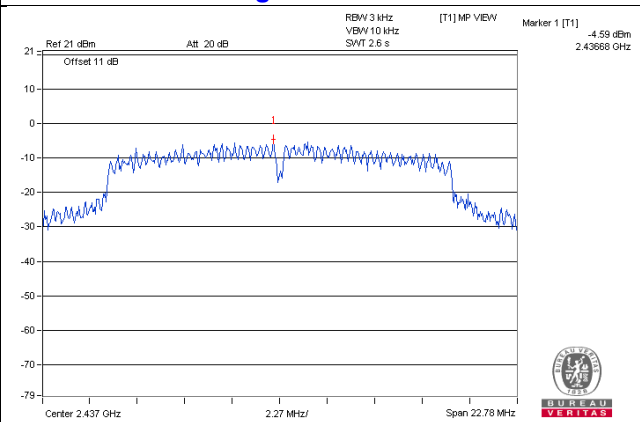
NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$ = 5.86dBi < 6dBi , so the power density limit shall not be reduced.

Spectrum Plot of Worst Value

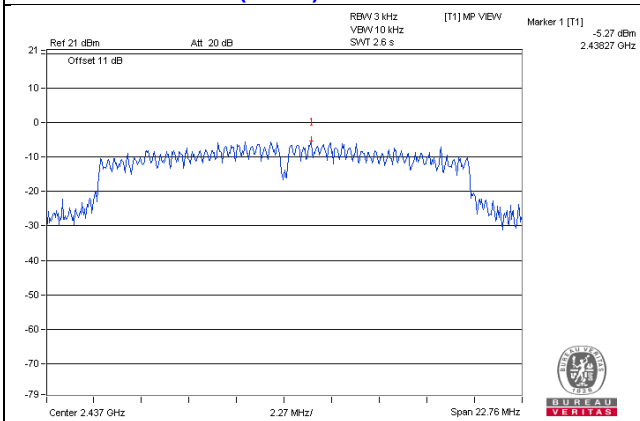
802.11b / Chain 0 : CH1



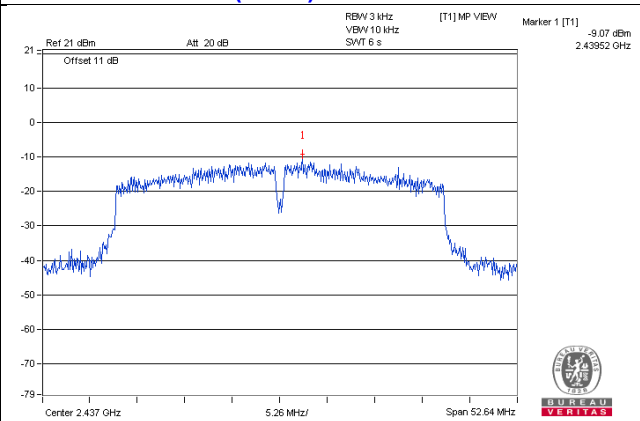
802.11g / Chain 0 : CH6



802.11n (HT20) / Chain 0 : CH6



802.11n (HT40) / Chain 0 : CH6

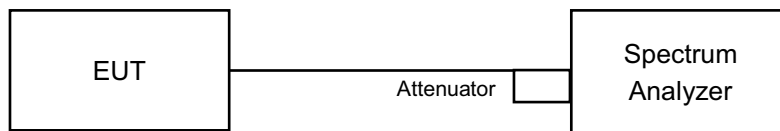


4.6 Conducted Out of Band Emission Measurement

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 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

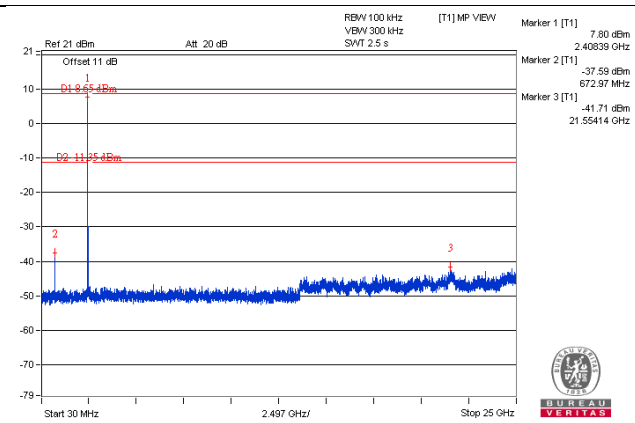
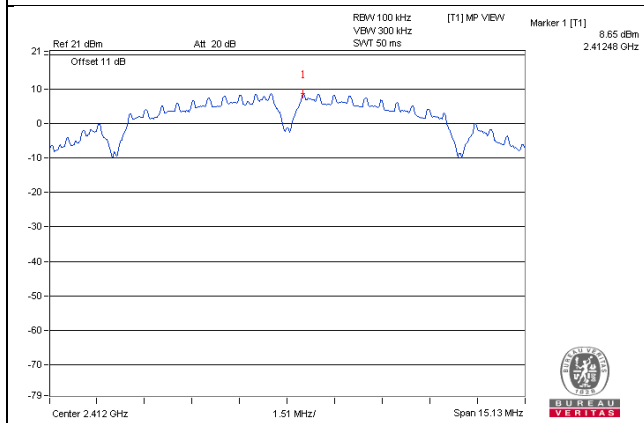
Same as Item 4.3.6

4.6.7 Test Results

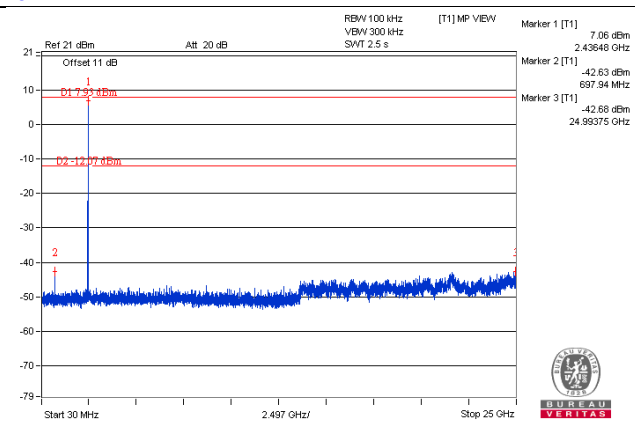
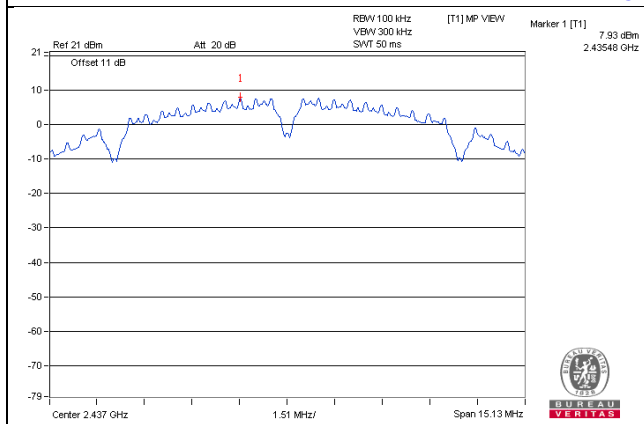
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b - CHAIN 0

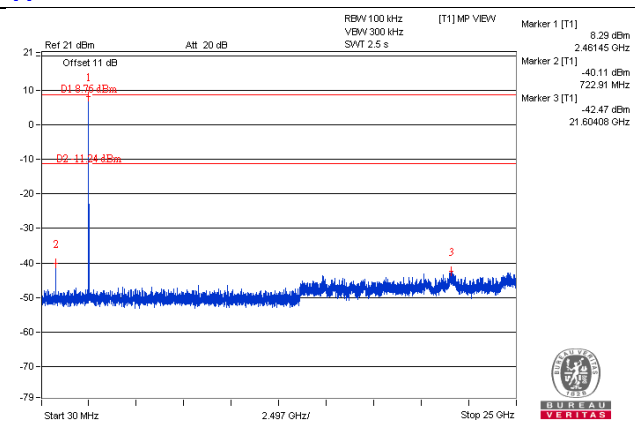
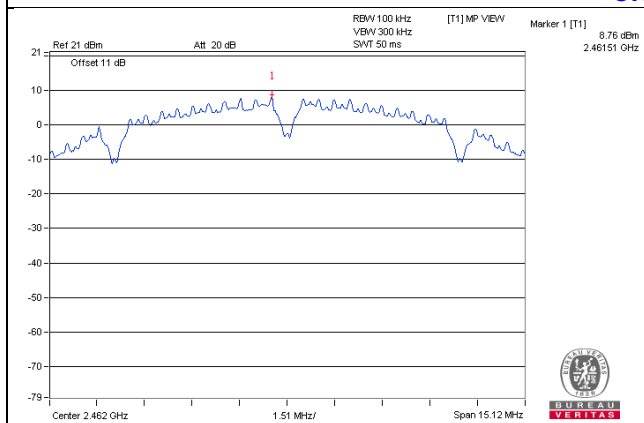
CH 1



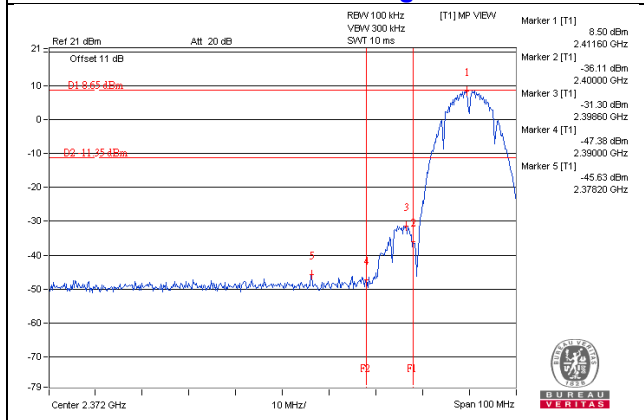
CH 6



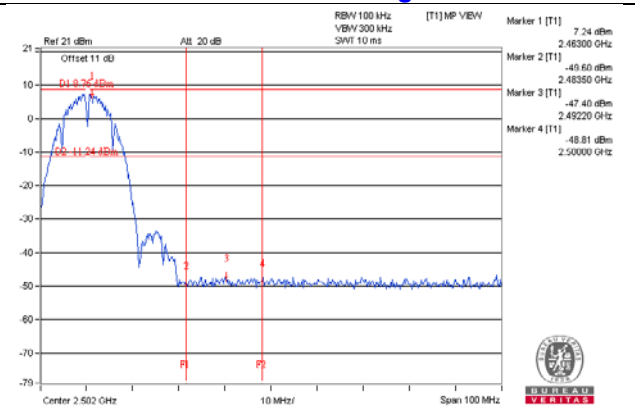
CH 11



CH 1 Band edge

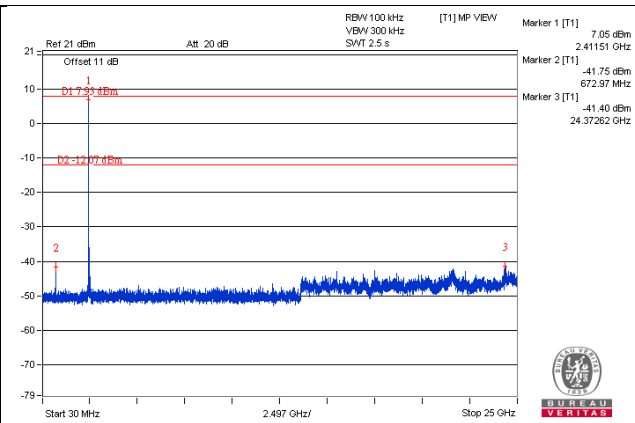
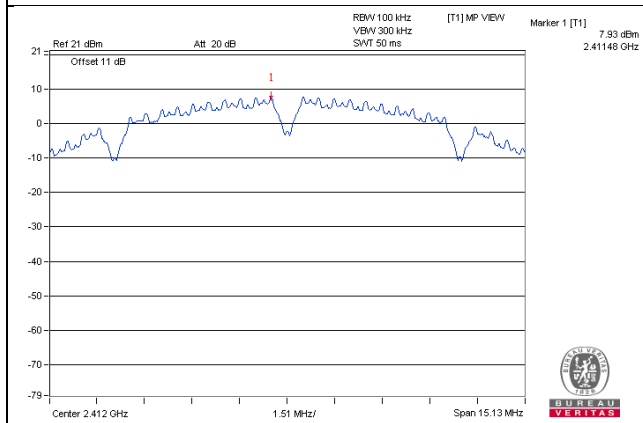


CH 11 Band edge

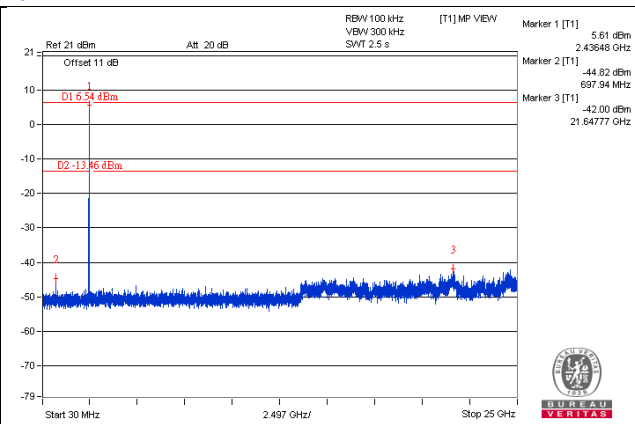
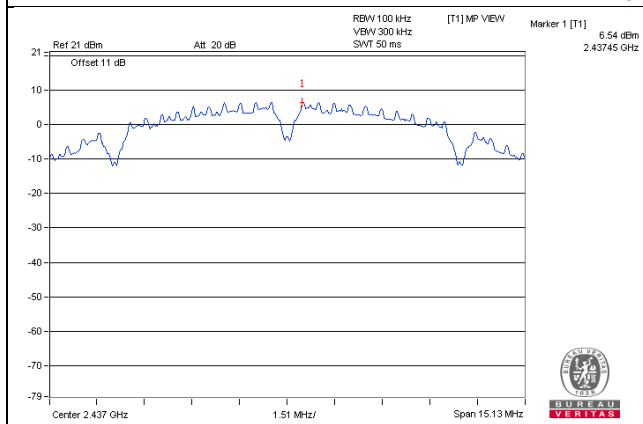


CHAIN 1

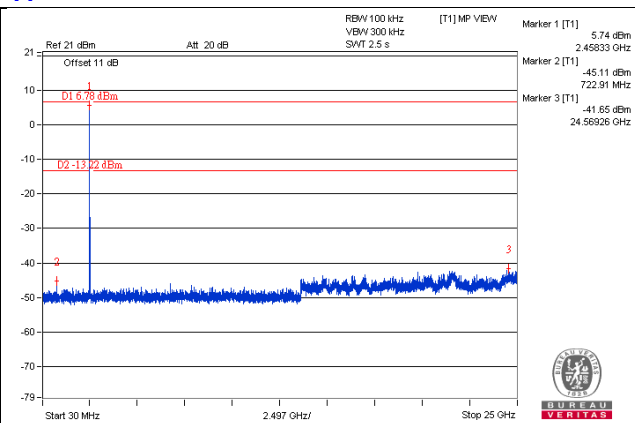
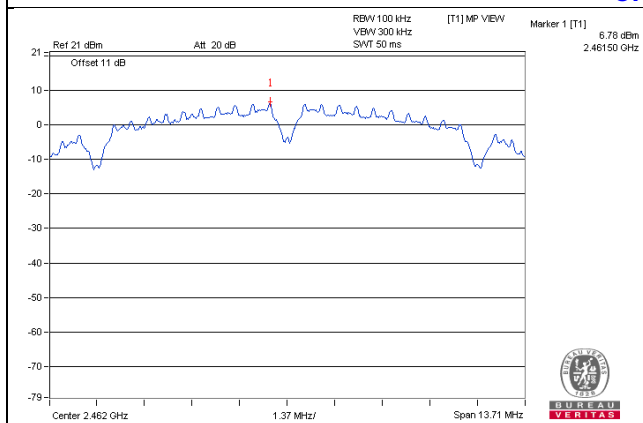
CH 1



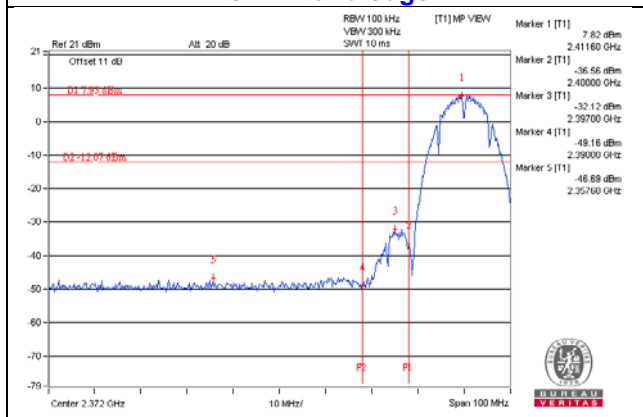
CH 6



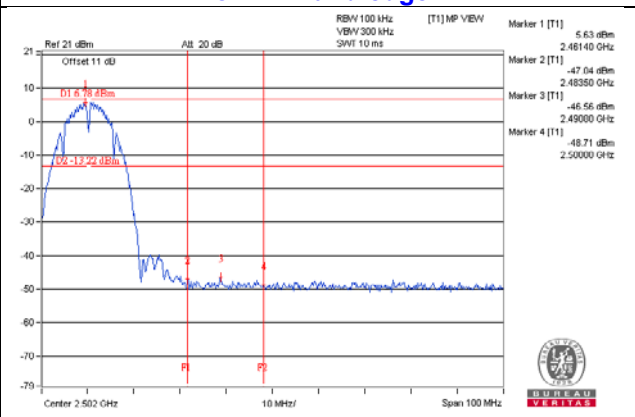
CH 11



CH 1 Band edge

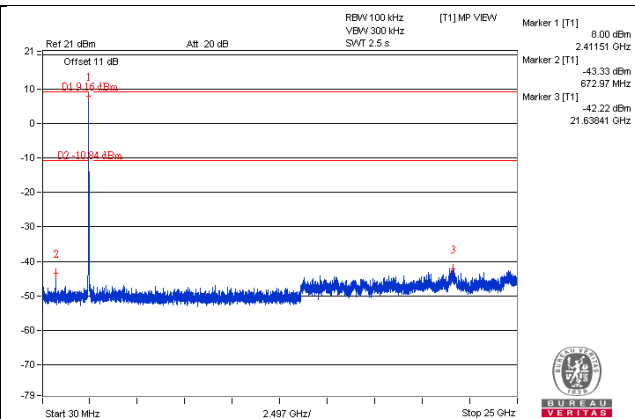
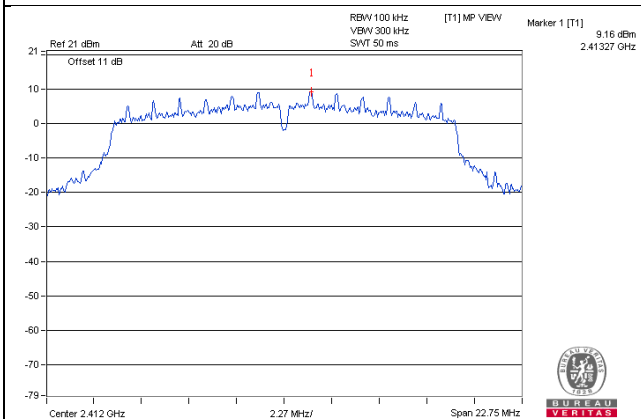


CH 11 Band edge

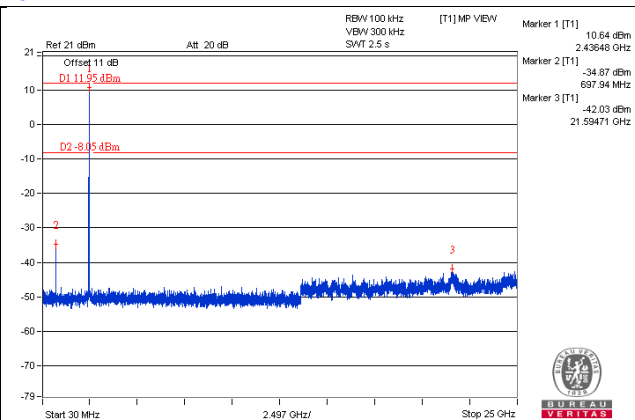
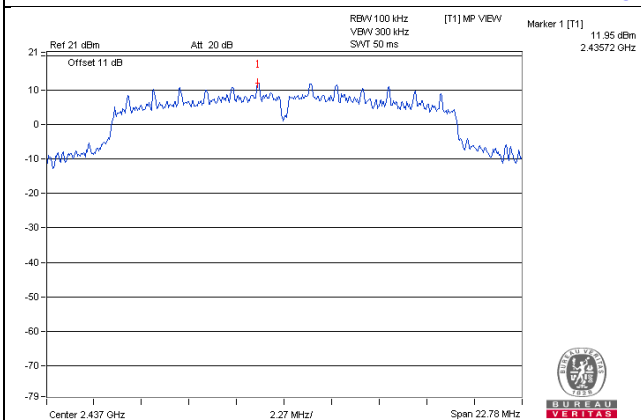


802.11g - CHAIN 0

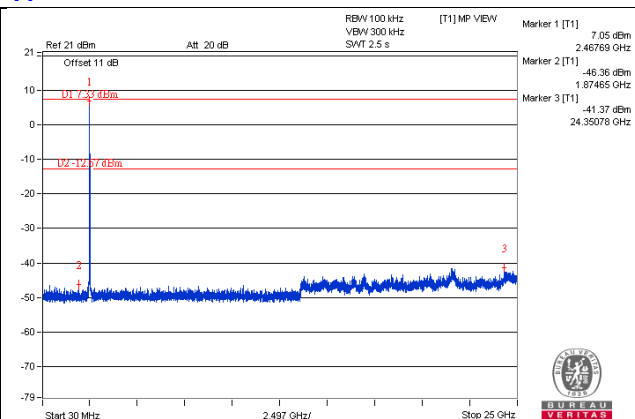
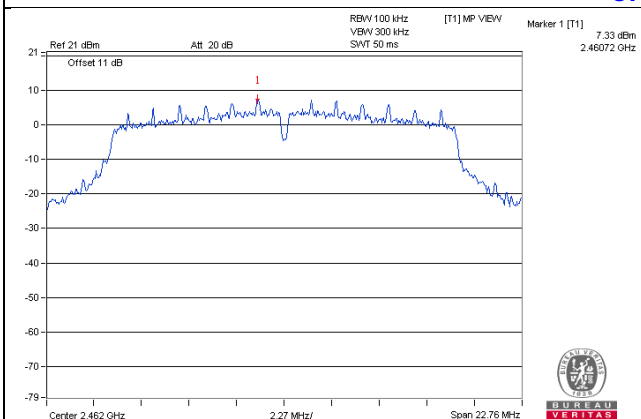
CH 1



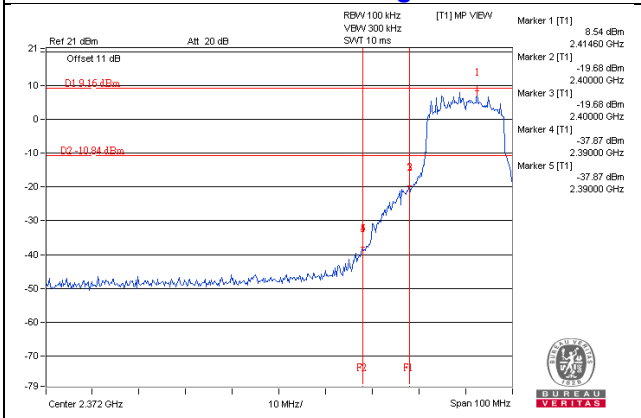
CH 6



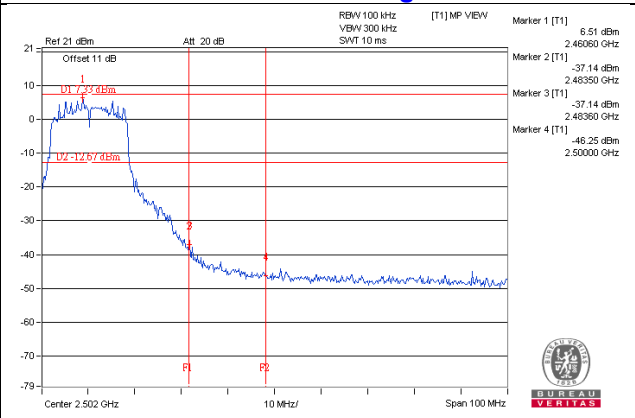
CH 11



CH 1 Band edge

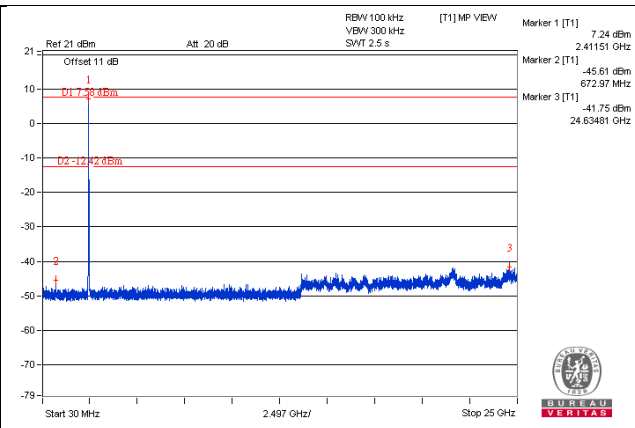
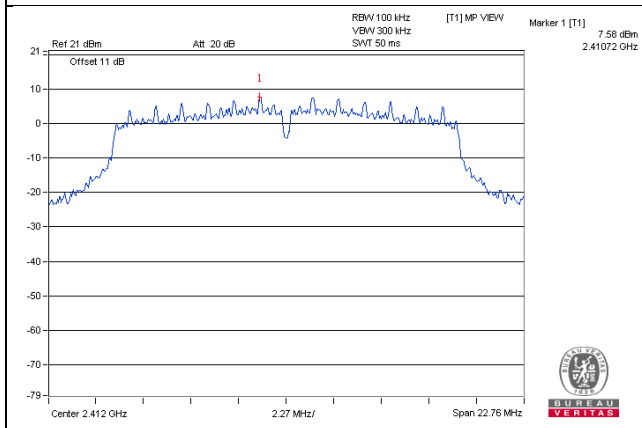


CH 11 Band edge

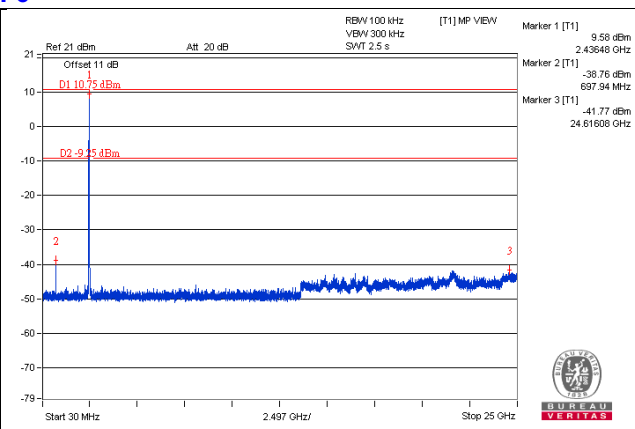
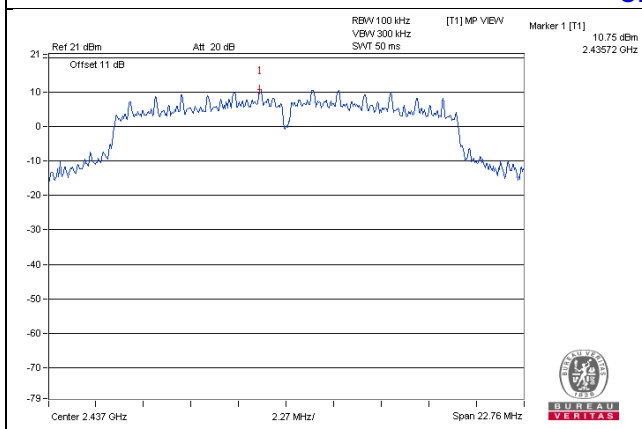


CHAIN 1

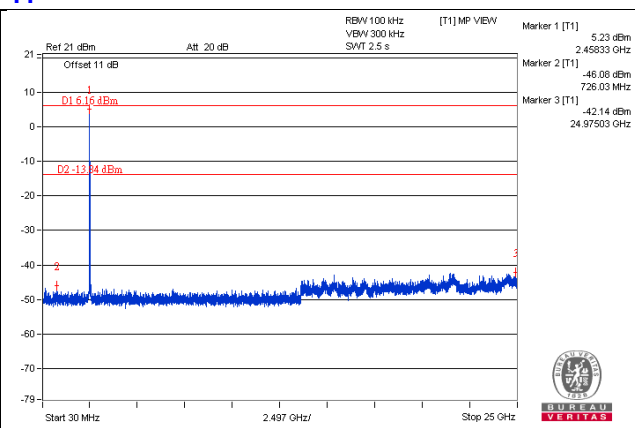
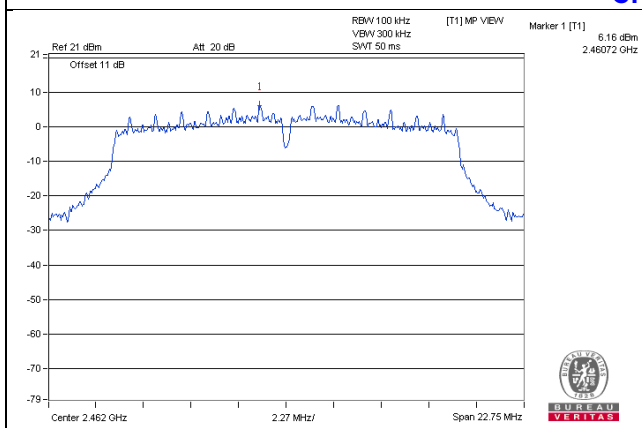
CH 1



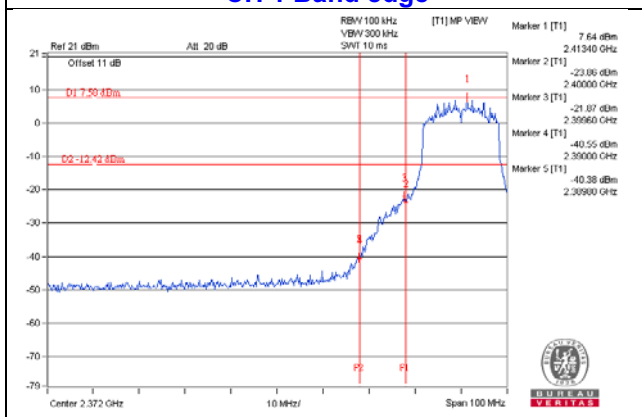
CH 6



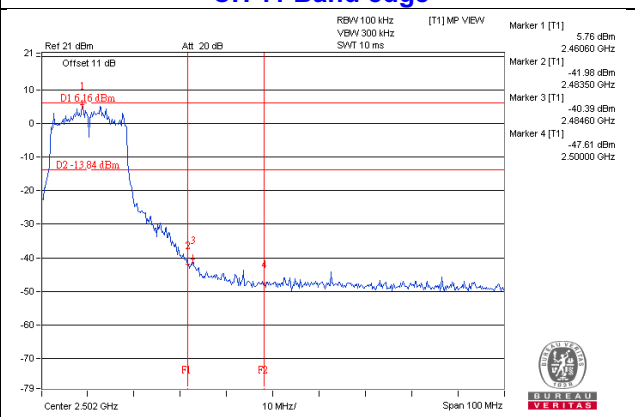
CH 11



CH 1 Band edge

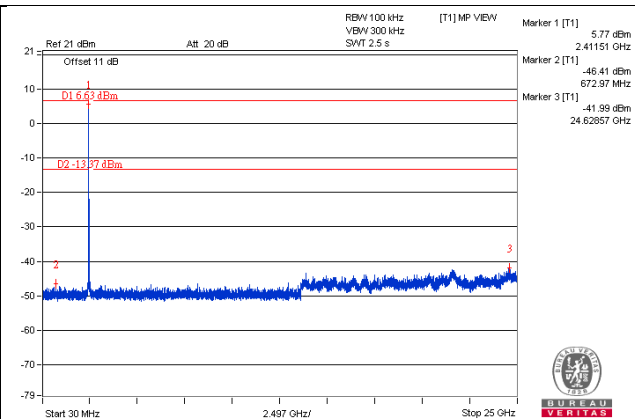
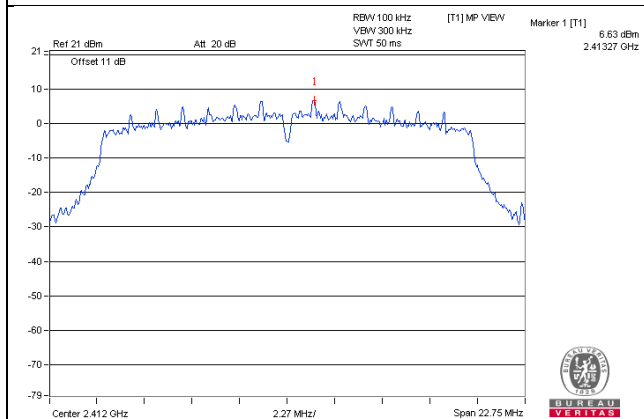


CH 11 Band edge

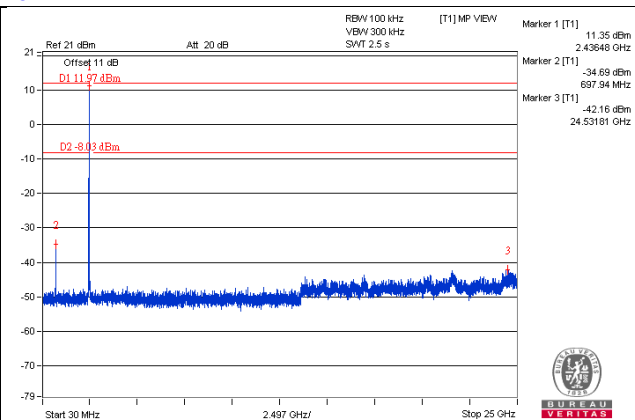
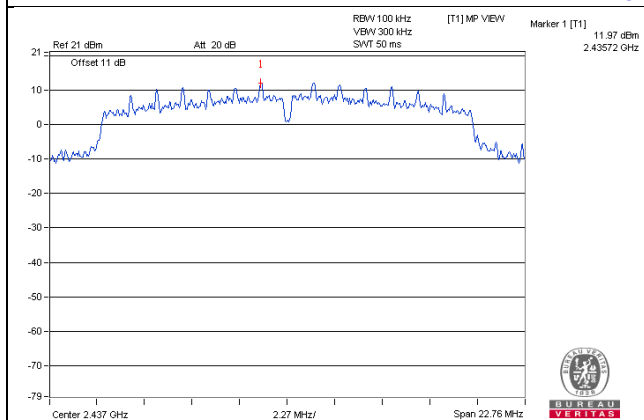


802.11n (HT20) - CHAIN 0

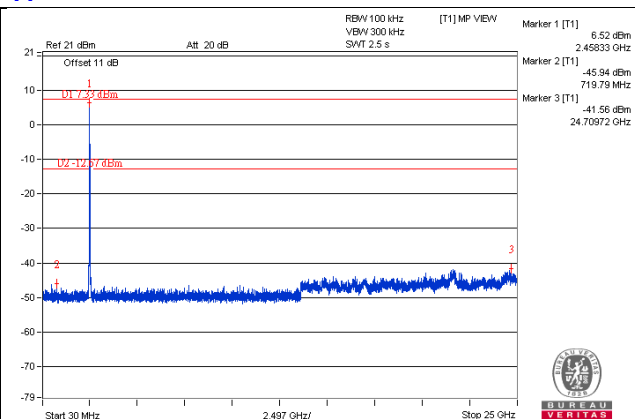
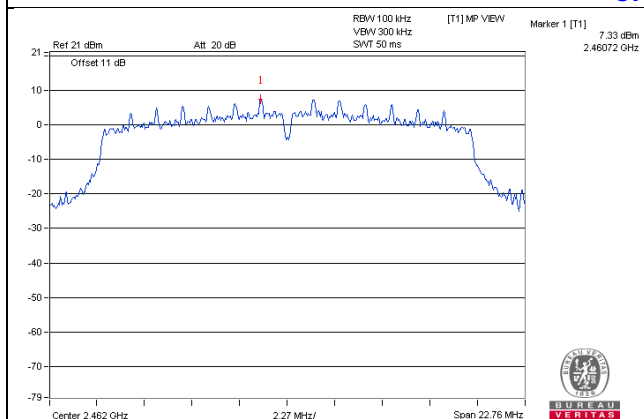
CH 1



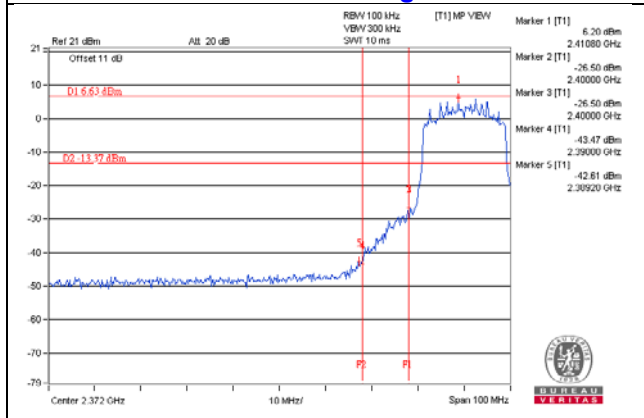
CH 6



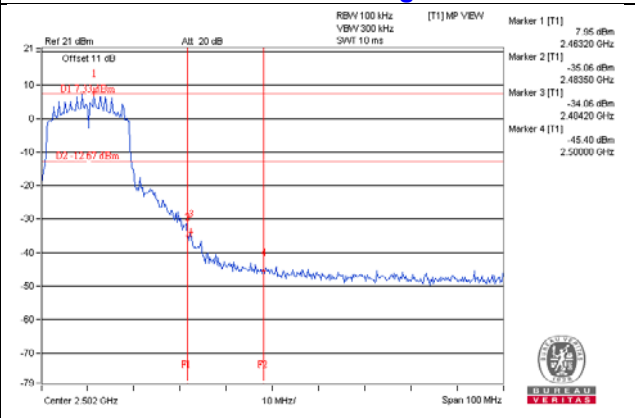
CH 11



CH 1 Band edge

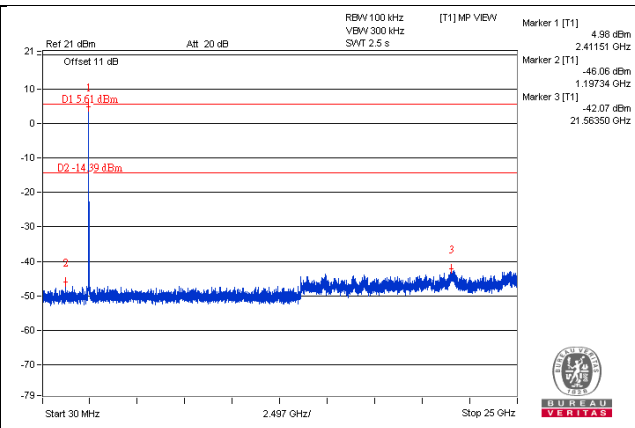
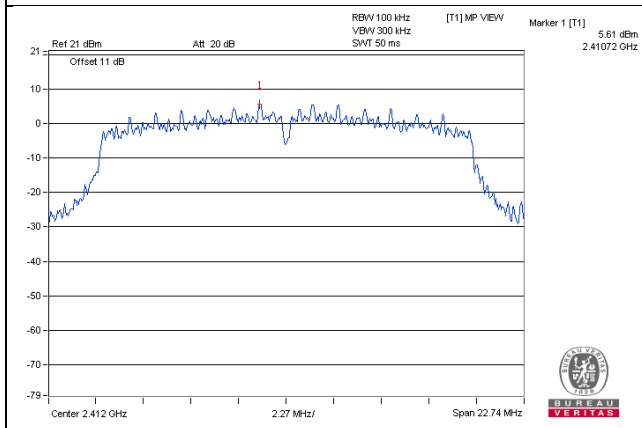


CH 11 Band edge

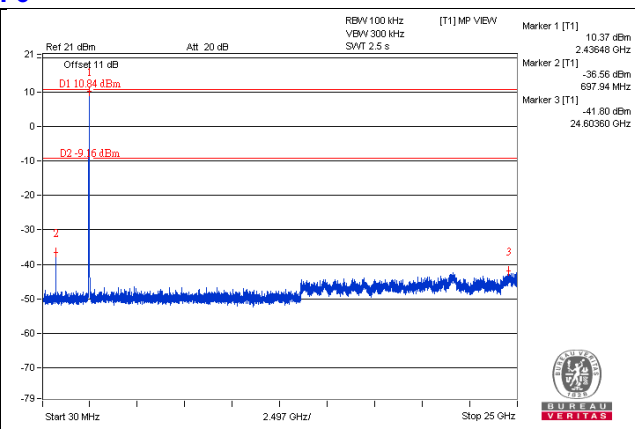
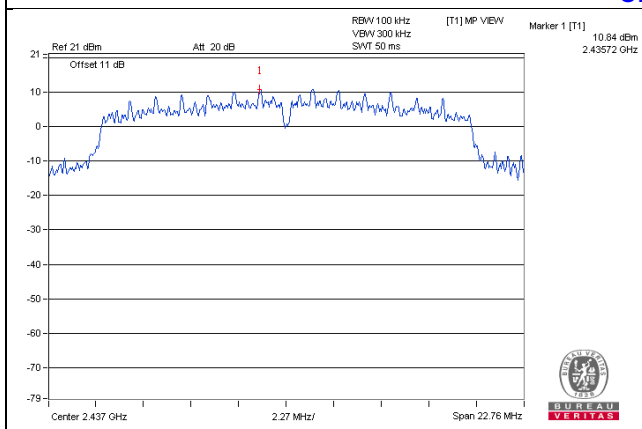


CHAIN 1

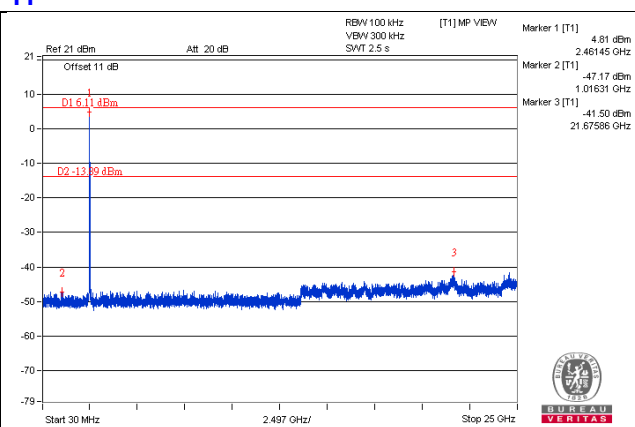
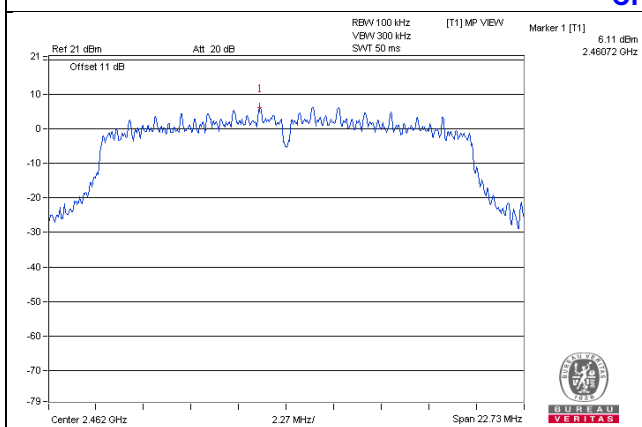
CH 1



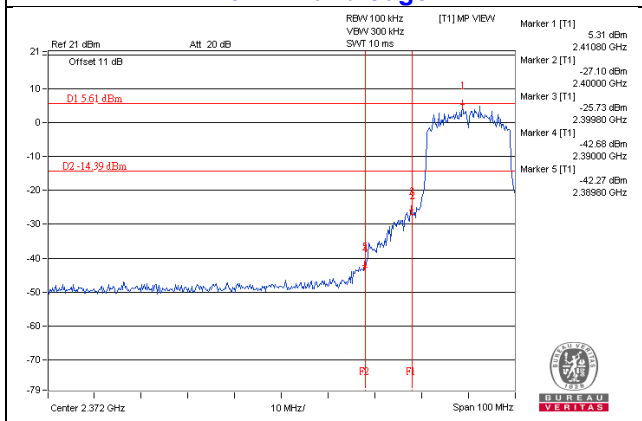
CH 6



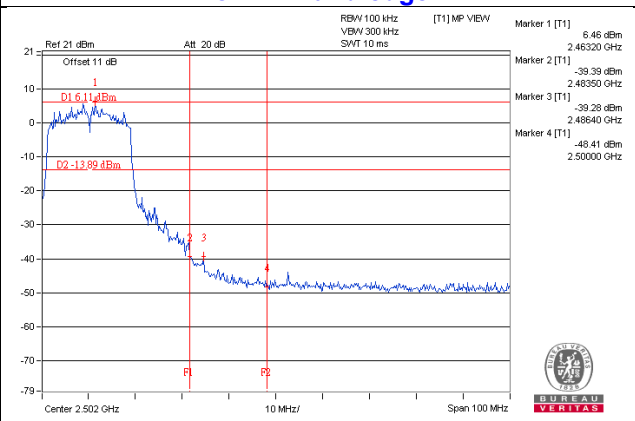
CH 11



CH 1 Band edge

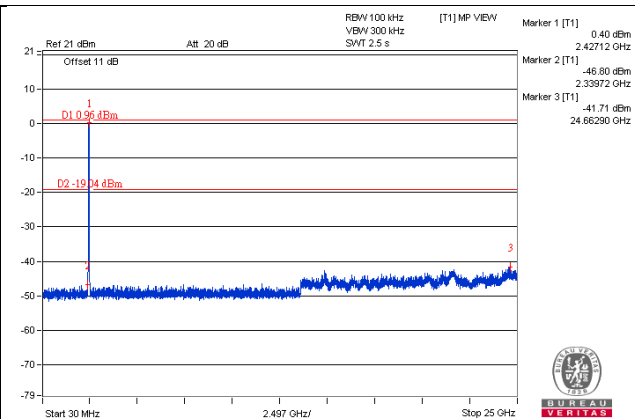
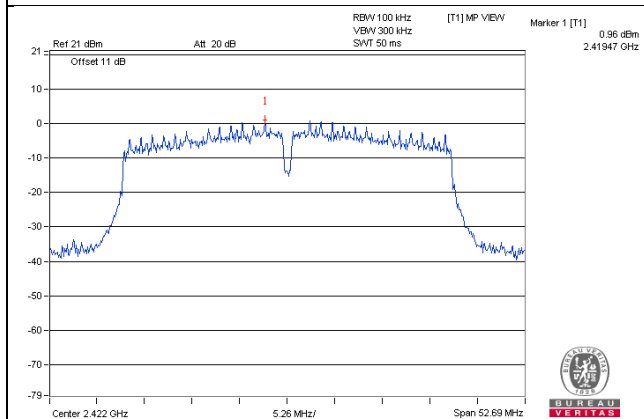


CH 11 Band edge

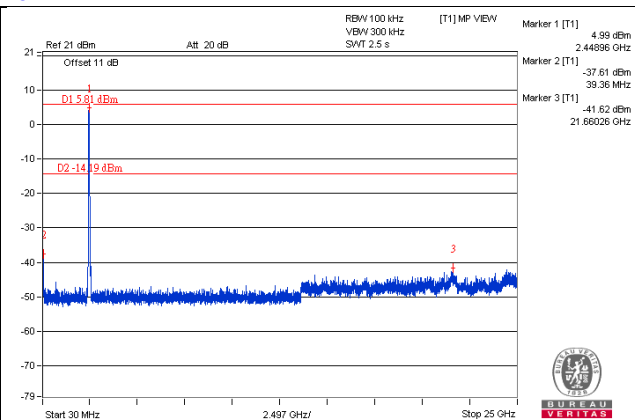
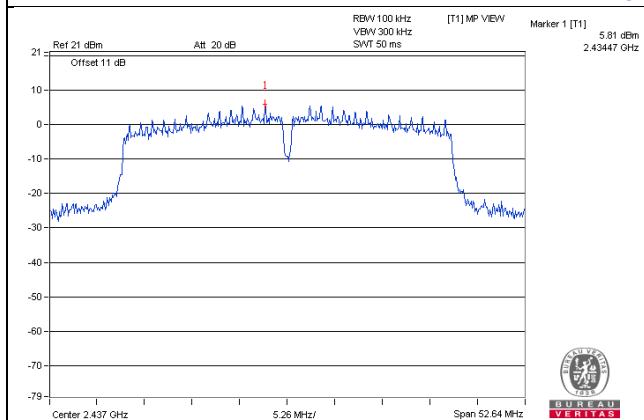


802.11n (HT40) - CHAIN 0

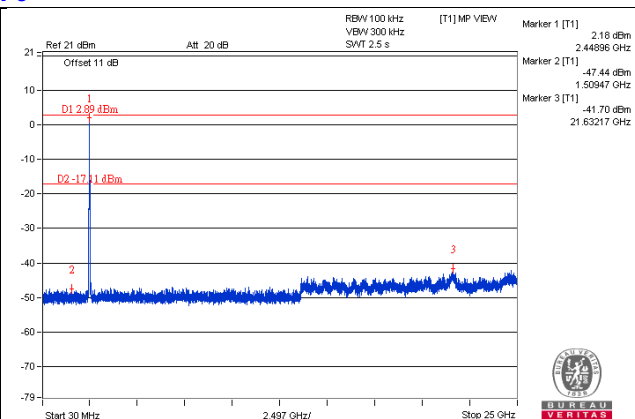
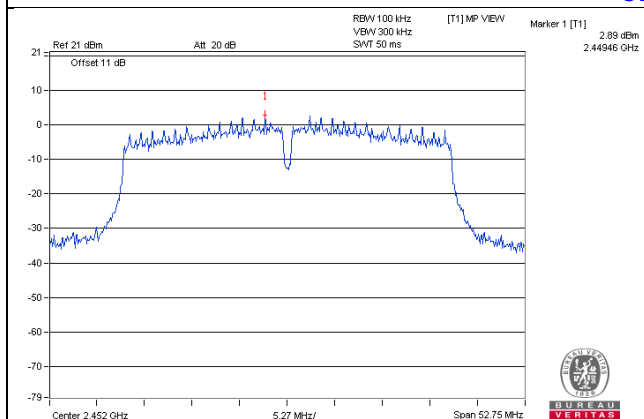
CH 3



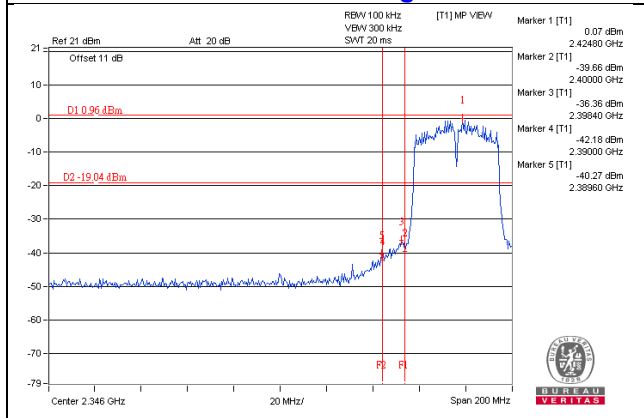
CH 6



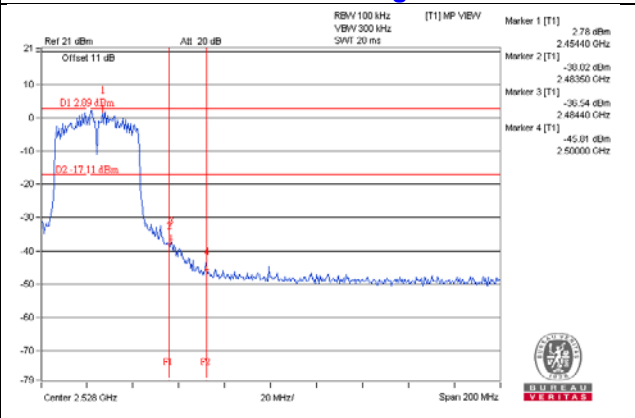
CH 9



CH 3 Band edge

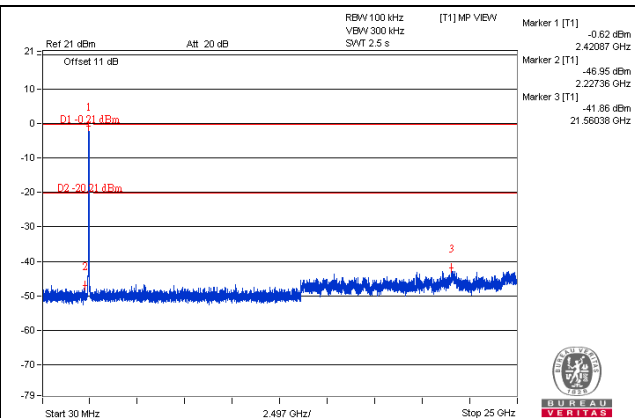
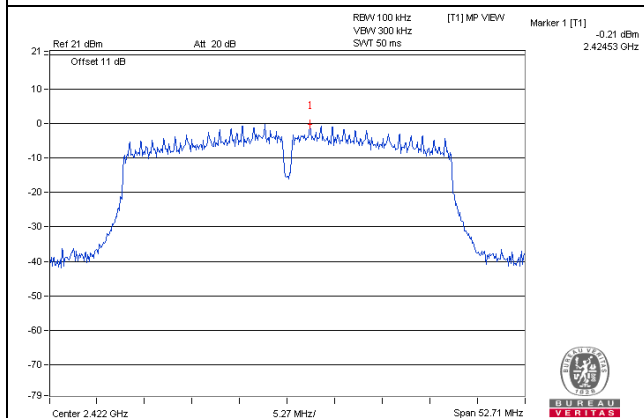


CH 9 Band edge

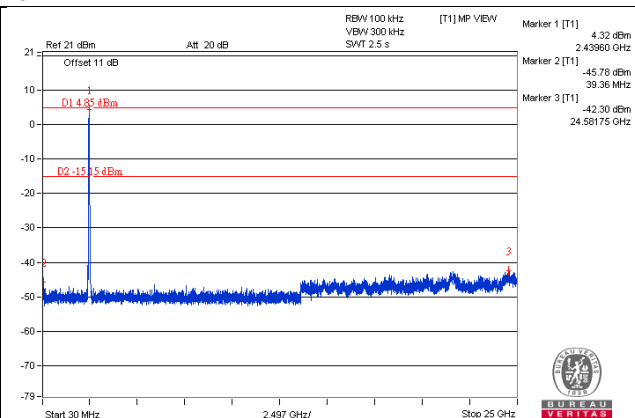
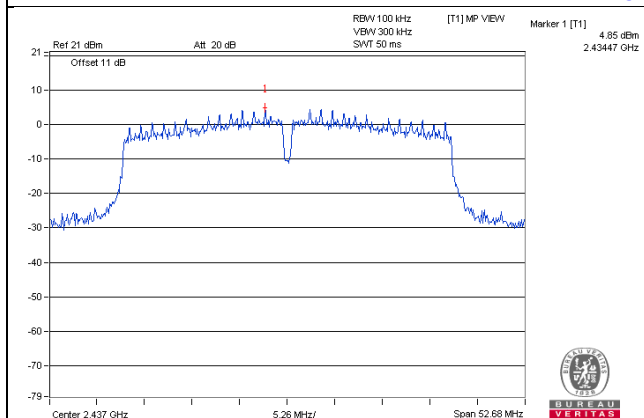


CHAIN 1

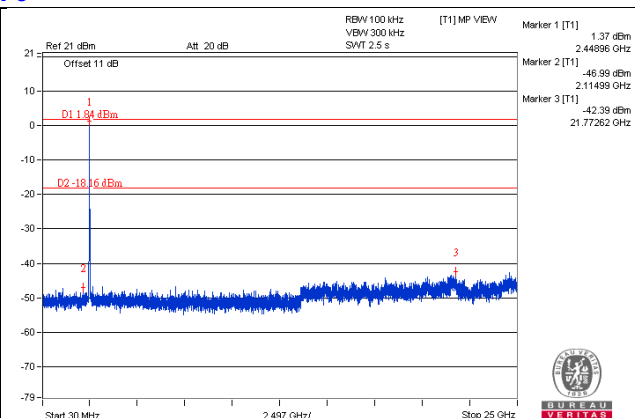
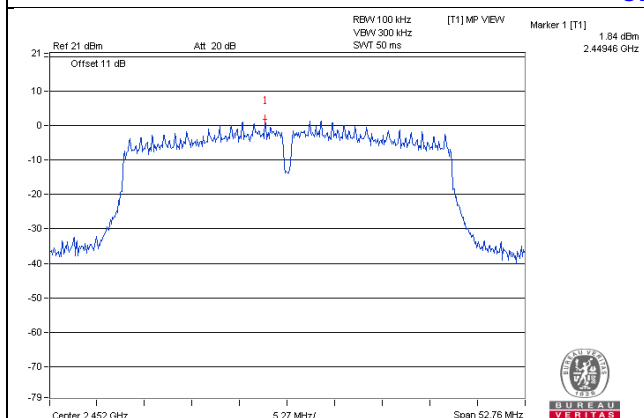
CH 3



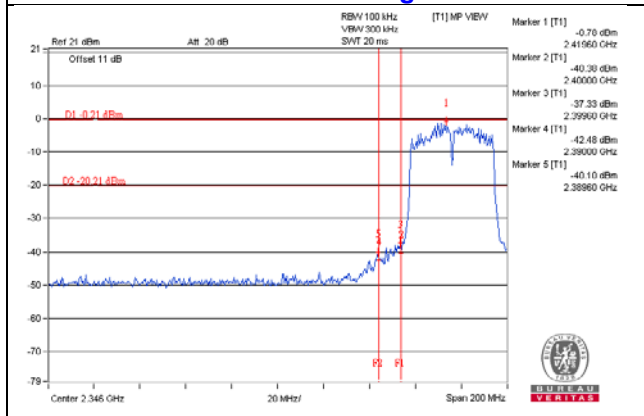
CH 6



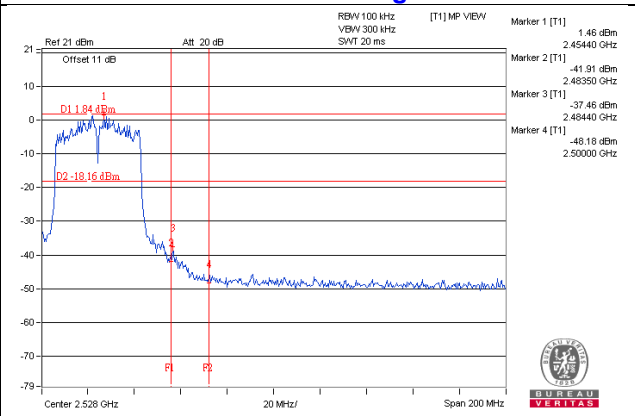
CH 9



CH 3 Band edge



CH 9 Band edge



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: 886-3-6668565

Fax: 886-3-6668323

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.

--- END ---