

FCC Test Report

Report No.: RF151001D01

FCC ID: P279962MSEC

Test Model: 9962 Multi-Standard Enterprise Cell

Series Model: 9962 Multi-Standard Enterprise Cellxxxxx (where "x" is blank, number or any characters)

Received Date: Oct. 5, 2015

Test Date: Oct. 27 ~ 29, 2015

Issued Date: Nov. 19, 2015

Applicant: Sercomm Corp.

Address: 8F, No. 3-1, YuangQu St., NanKang, Taipei 115, Taiwan, R.O.C. (NanKang Software Park)

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

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)



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A D T

Release Control Record

Issue No.	Description	Date Issued
RF151001D01	Original release.	Nov. 19, 2015



1 Certificate of Conformity

Product: 9962 Multi-Standard AP; Metro Cell Indoor

Brand: Alcatel-Lucent

Test Model: 9962 Multi-Standard Enterprise Cell

Series Model: 9962 Multi-Standard Enterprise Cellxxxxx (where "x" is blank, number or any characters)

Sample Status: Engineering sample

Applicant: Sercomm Corp.

Test Date: Oct. 27 ~ 29, 2015

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 :

Annie Chang

Date:

Nov. 19, 2015

Annie Chang / Senior Specialist

Approved by :

Rex Lai

Date:

Nov. 19, 2015

Rex Lai / Assistant 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 -10.41dB at 0.41017MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.1dB at 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is IPEX not a standard connector.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.78 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	4.00 dB
Radiated Emissions above 1 GHz	Above 1GHz	3.36 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	9962 Multi-Standard AP; Metro Cell Indoor
Brand	Alcatel-Lucent
Test Model	9962 Multi-Standard Enterprise Cell
Series Model	9962 Multi-Standard Enterprise Cellxxxxx (where “x” is blank, number or any characters)
Model Difference	Marketing purpose
Status of EUT	Engineering sample
Power Supply Rating	48Vdc from Adapter or 55Vdc from PoE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11/ 5.5/ 2/ 1Mbps 802.11g: 54/ 48/ 36/ 24/ 18/ 12/ 9/ 6Mbps 802.11n: up to 300Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
Output Power	993.2mW
Antenna Type	Dipole antenna with 5.70dBi gain
Antenna Connector	IPEX Conector
Accessory Device	Adapter
Data Cable Supplied	GPS cable (10m)

Note:

- The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	TX Function
802.11b	2TX
802.11g	2TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX

2. The EUT uses following adapter or PoE:

Item	Brand	Model No.	Rating
Adapter 1	AmpowerTek	AU60AA-00	AC I/P: 100-240V, 50-60Hz, 1.5A DC O/P: 48V, 1.25A Non-shielded AC 3-Pin cable (1.5m) Non-shielded DC cable (1.2m) with one ferrite core
Adapter 2	LEI	NU60-S48012 5-I2	AC I/P: 100-240V, 50-60Hz, 1.4A DC O/P: 48V, 1.25A Non-shielded AC 3-Pin cable (1.5m) Non-shielded DC cable (1.2m) with one ferrite core
PoE	Microsemi	PD-9601G/AC	AC I/P: 100-240V, 50-60Hz, 1.35A DC O/P: 55V, 1.75A

After pre-tested, adapter 1 was the worst case, therefore, only its test data was recorded in the report.

3. 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 2 axis. The worst case was found when positioned on **Z-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.

EUT CONFIGURE MODE	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	13
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	27

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11g	1 to 11	11	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11g	1 to 11	11	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.

EUT CONFIGURE MODE	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	13
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	27

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE\geq1G	25deg. C, 68%RH	120Vac, 60Hz	Dalen Dai
RE$<$1G	25deg. C, 68%RH	120Vac, 60Hz	Dalen Dai
PLC	18deg. C, 63%RH	120Vac, 60Hz	T.H. Tseng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Saxon Lee

3.3 Duty Cycle of Test Signal

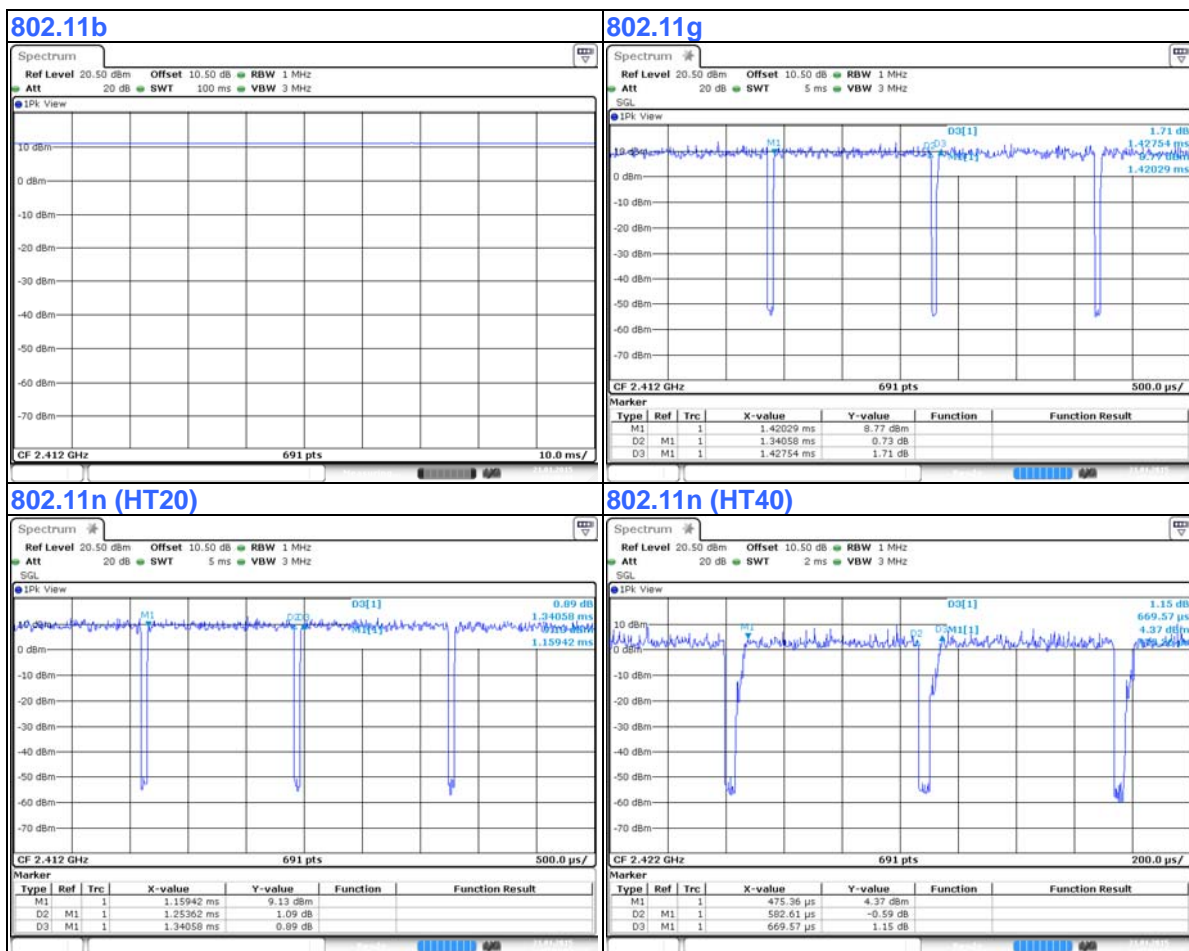
If duty cycle of test signal is $\geq 98\%$, duty factor is not required.
 If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11b: Duty cycle = Duty cycle of test signal is 100 %

802.11g: Duty cycle = $1.340/1.427 = 0.939$, Duty factor = $10 * \log(1/0.939) = 0.27$

802.11n (HT20): Duty cycle = $1.253/1.340 = 0.935$, Duty factor = $10 * \log(1/0.935) = 0.29$

802.11n (HT40): Duty cycle = $0.582/0.669 = 0.870$, Duty factor = $10 * \log(1/0.870) = 0.60$



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 PC	DELL	PP04X	JV9ZZ1S	FCC DoC Approved	Provided by Lab
B.	Notebook PC	DELL	PP04X	1W9ZZ1S	FCC DoC Approved	Provided by Lab
C.	Notebook PC	SONY	SVS151A12P	275548477001024	FCC DoC Approved	Provided by Lab
D.	Notebook PC	SONY	SVS151A12P	275548477001087	FCC DoC Approved	Provided by Lab
E.	Universal Radio Communication Tester	R&S	CMU200	117260	N/A	Provided by Lab
F.	LTE simulator	Anritsu	LTE Band 11 & 18	N/A	N/A	Provided by Lab
G.	GPS simulator	PENDULUM	GSG-5	200447	N/A	Provided by Lab
H.	HORN Antenna	ETS	3117	00123980	N/A	Provided by Lab
I.	Notebook PC	DELL	E6530	9331GV1	FCC DoC Approved	Provided by Lab

Note:

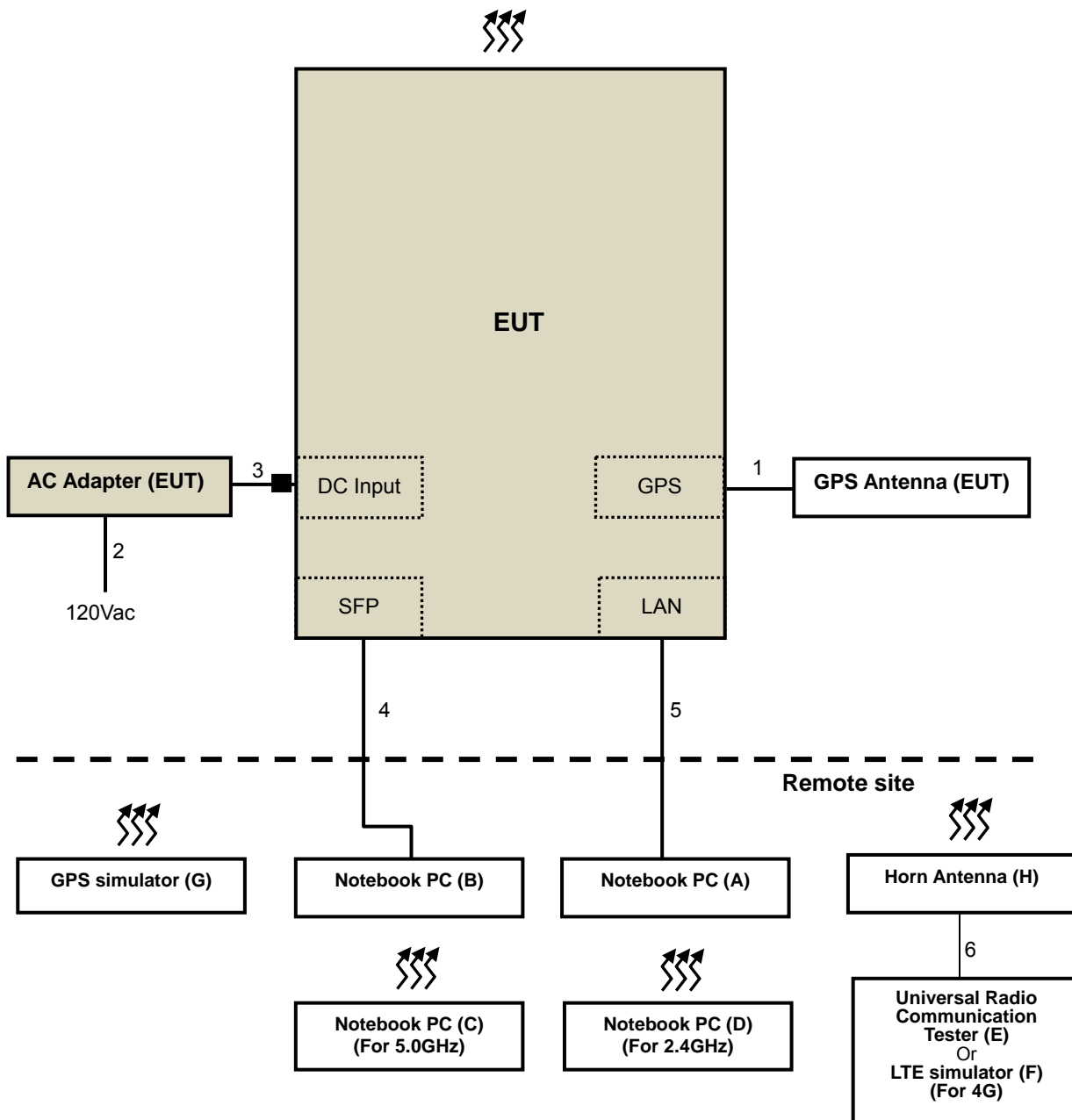
1. All power cords of the above support units are non-shielded (1.8m).
2. Items A-I acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Antenna cable	1	8	Y	0	Supplied by client
2.	AC Power Cord	1	1.5	N	0	Supplied by client
3.	DC cable	1	1.2	N	1	Supplied by client
4.	SFP to LAN cable	1	10	N	0	Provided by Lab
5.	LAN cable	2	10	N	0	Provided by Lab
6.	Coaxial cable	1	10	Y	0	Provided by Lab

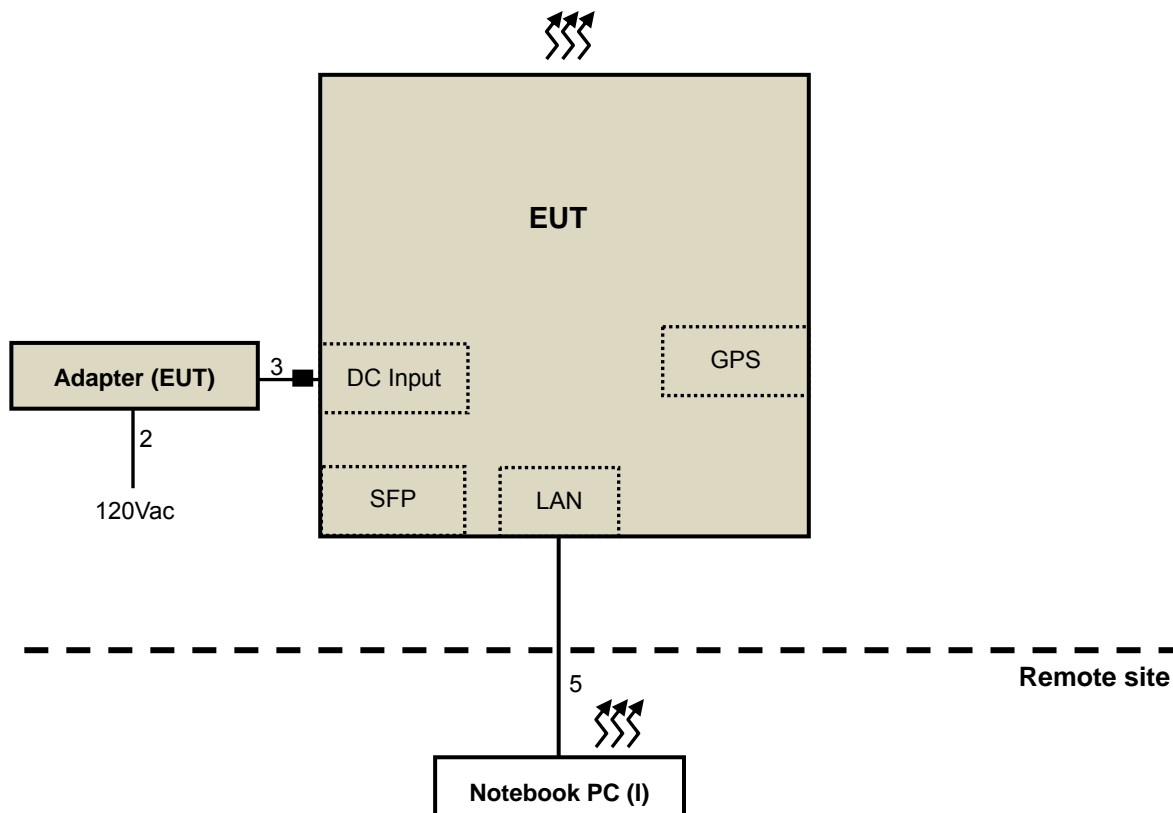
Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test

For Conducted test & Radiated up to 1GHz test:



For Radiated above 1GHz test:



3.5 General Description of Applied Standards

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

- FCC Part 15, Subpart C (15.247)**
- 558074 D01 DTS Meas Guidance v03r03**
- 662911 D01 Multiple Transmitter Output v02r01**
- ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 26, 2015	Feb. 25, 2016
HP Preamplifier	8449B	3008A01201	Feb. 26, 2015	Feb. 25, 2016
MITEQ Preamplifier	AMF-6F-260400-3 3-8P	892164	Mar. 01, 2015	Feb. 28, 2016
Agilent Spectrum	E4446A	MY51100009	May 30, 2015	May 29, 2016
Agilent TEST RECEIVER	N9038A	MY51210129	Jan. 20, 2015	Jan. 19, 2016
Schwarzbeck Antenna	VULB 9168	139	Feb. 04, 2015	Feb. 03, 2016
Schwarzbeck Antenna	VHBA 9123	480	May 29, 2015	May 28, 2017
Schwarzbeck Horn Antenna	BBHA-9170	212	Feb. 09, 2015	Feb. 08, 2016
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Feb. 10, 2015	Feb. 09, 2016
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15. 9.4	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF104	CABLE-CH6	Aug. 15, 2015	Aug. 14, 2016
SUHNER RF cable With 3dB PAD	SF102	Cable-CH8-3.6m	Aug. 15, 2015	Aug. 14, 2016
EMCO Horn Antenna	3115	00028257	Feb. 05, 2015	Feb. 04, 2016
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 23, 2015	Sep. 22, 2016
Anritsu Power Sensor	MA2411B	0738404	Apr. 21, 2015	Apr. 20, 2016
Anritsu Power Meter	ML2495A	0842014	Apr. 21, 2015	Apr. 20, 2016
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 14, 2015	Jul. 13, 2016

- NOTE:**
1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
 2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 3. The test was performed in Chamber No. 6.
 4. The Industry Canada Reference No. IC 7450E-6.
 5. The FCC Site Registration No. is 447212.

4.1.3 Test Procedures

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

Note:

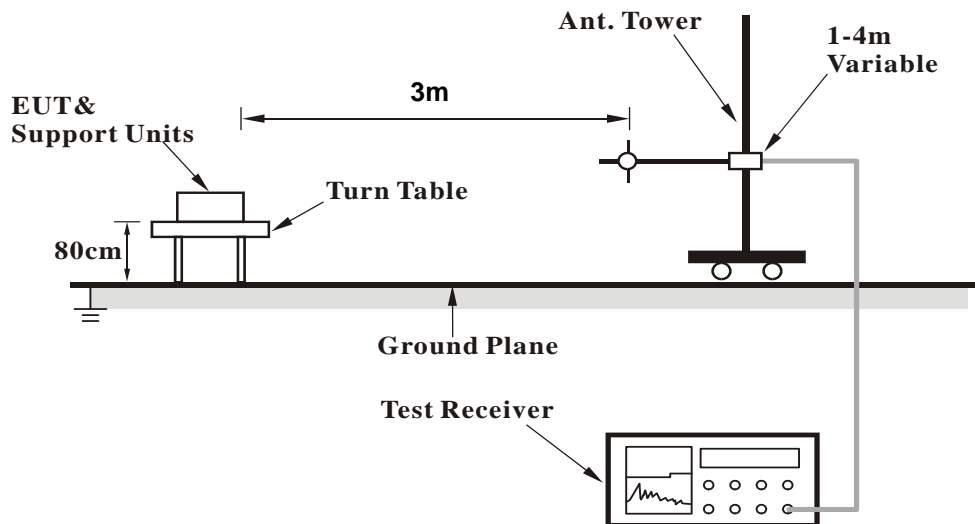
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
4. 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 ($10 \log(1/\text{duty cycle})$).
5. 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.
6. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

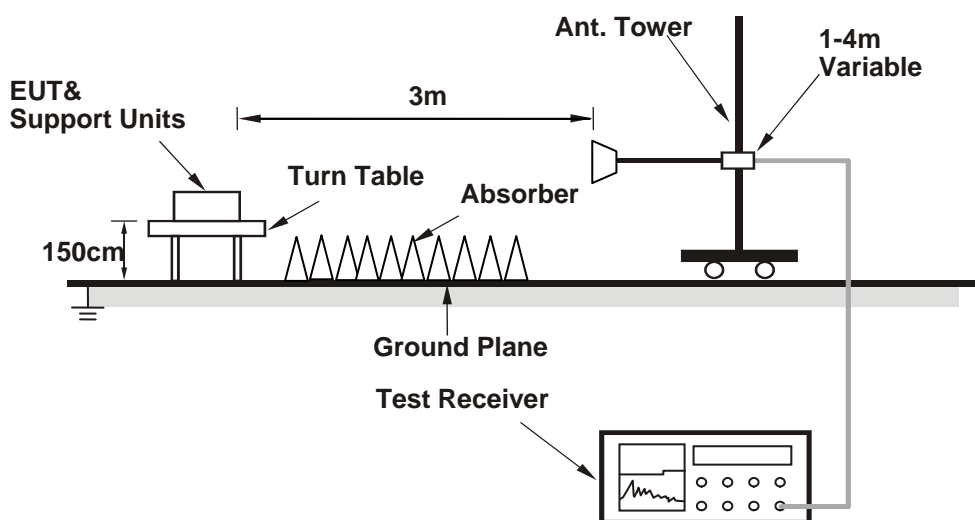
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- Prepared notebook to act as communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.



4.1.7 Test Results

ABOVE 1GHz DATA

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.9 PK	74.0	-13.1	1.00 H	41	64.79	-3.88
2	2390.00	46.7 AV	54.0	-7.3	1.00 H	41	50.54	-3.88
3	*2412.00	99.6 PK			1.00 H	41	103.37	-3.78
4	*2412.00	96.2 AV			1.00 H	41	100.02	-3.78
5	4824.00	56.6 PK	74.0	-17.4	1.75 H	290	53.89	2.70
6	4824.00	52.8 AV	54.0	-1.2	1.75 H	290	50.09	2.70
7	#7236.00	56.0 PK	79.6	-23.6	1.75 H	317	46.57	9.43
8	#7236.00	43.4 AV	76.2	-32.9	1.75 H	317	33.95	9.43

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	61.2 PK	74.0	-12.8	1.62 V	343	65.04	-3.88
2	2390.00	48.0 AV	54.0	-6.0	1.62 V	343	51.88	-3.88
3	*2412.00	108.9 PK			1.62 V	343	112.72	-3.78
4	*2412.00	105.2 AV			1.62 V	343	108.98	-3.78
5	4824.00	49.6 PK	74.0	-24.5	1.25 V	173	46.85	2.70
6	4824.00	44.2 AV	54.0	-9.8	1.25 V	173	41.53	2.70
7	#7236.00	56.0 PK	88.9	-33.0	1.21 V	17	46.52	9.43
8	#7236.00	39.6 AV	85.2	-45.6	1.21 V	17	30.13	9.43

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 radiated frequency is out of the restricted band.



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	101.6 PK			1.09 H	29	105.24	-3.67
2	*2437.00	97.8 AV			1.09 H	29	101.47	-3.67
3	4874.00	54.8 PK	74.0	-19.3	1.35 H	317	51.95	2.80
4	4874.00	52.8 AV	54.0	-1.2	1.35 H	317	49.97	2.80
5	7311.00	53.4 PK	74.0	-20.6	1.20 H	284	43.85	9.51
6	7311.00	43.7 AV	54.0	-10.3	1.20 H	284	34.19	9.51
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	111.1 PK			1.01 V	315	114.77	-3.67
2	*2437.00	107.6 AV			1.01 V	315	111.28	-3.67
3	4874.00	48.2 PK	74.0	-25.8	1.00 V	21	45.39	2.80
4	4874.00	41.0 AV	54.0	-13.0	1.00 V	21	38.21	2.80
5	7311.00	54.1 PK	74.0	-19.9	1.19 V	135	44.59	9.51
6	7311.00	41.1 AV	54.0	-12.9	1.19 V	135	31.57	9.51

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	101.9 PK			1.54 H	48	105.45	-3.58
2	*2462.00	98.3 AV			1.54 H	48	101.91	-3.58
3	2483.50	62.4 PK	74.0	-11.6	1.54 H	48	65.87	-3.50
4	2483.50	47.6 AV	54.0	-6.4	1.54 H	48	51.06	-3.50
5	4924.00	54.0 PK	74.0	-20.0	1.73 H	298	51.13	2.87
6	4924.00	52.7 AV	54.0	-1.4	1.73 H	298	49.78	2.87
7	7386.00	54.8 PK	74.0	-19.2	1.31 H	237	45.03	9.74
8	7386.00	42.2 AV	54.0	-11.8	1.31 H	237	32.44	9.74

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	110.3 PK			1.93 V	352	113.91	-3.58
2	*2462.00	106.6 AV			1.93 V	352	110.21	-3.58
3	2483.50	63.4 PK	74.0	-10.6	1.93 V	352	66.94	-3.50
4	2483.50	49.3 AV	54.0	-4.7	1.93 V	352	52.76	-3.50
5	4924.00	52.4 PK	74.0	-21.6	1.00 V	273	49.53	2.87
6	4924.00	46.7 AV	54.0	-7.3	1.00 V	273	43.87	2.87
7	7386.00	54.4 PK	74.0	-19.6	1.27 V	209	44.62	9.74
8	7386.00	40.7 AV	54.0	-13.4	1.27 V	209	30.91	9.74

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	62.5 PK	74.0	-11.5	1.00 H	45	66.37	-3.88
2	2390.00	48.7 AV	54.0	-5.4	1.00 H	45	52.53	-3.88
3	*2412.00	112.7 PK			1.00 H	46	116.48	-3.78
4	*2412.00	102.5 AV			1.00 H	46	106.31	-3.78
5	4804.00	64.0 PK	74.0	-10.0	1.43 H	275	61.34	2.66
6	4804.00	52.4 AV	54.0	-1.6	1.43 H	275	49.78	2.66
7	#7236.00	65.4 PK	92.7	-27.3	1.27 H	76	55.96	9.43
8	#7236.00	49.1 AV	82.5	-33.4	1.27 H	76	39.67	9.43

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.7 PK	74.0	-7.3	1.61 V	323	70.62	-3.88
2	2390.00	51.0 AV	54.0	-3.0	1.61 V	323	54.86	-3.88
3	*2412.00	118.6 PK			1.61 V	323	122.41	-3.78
4	*2412.00	108.7 AV			1.61 V	323	112.44	-3.78
5	4824.00	57.2 PK	74.0	-16.8	1.32 V	351	54.51	2.70
6	4824.00	44.5 AV	54.0	-9.6	1.32 V	351	41.75	2.70
7	#7236.00	64.5 PK	98.6	-34.2	1.32 V	9	55.03	9.43
8	#7236.00	48.1 AV	88.7	-40.5	1.32 V	9	38.69	9.43

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 radiated frequency is out of the restricted band.



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	113.2 PK			1.71 H	46	116.84	-3.67
2	*2437.00	102.9 AV			1.71 H	46	106.61	-3.67
3	4874.00	66.7 PK	74.0	-7.3	1.79 H	296	63.92	2.80
4	4874.00	52.4 AV	54.0	-1.6	1.79 H	296	49.57	2.80
5	7311.00	61.0 PK	74.0	-13.0	1.26 H	48	51.48	9.51
6	7311.00	46.2 AV	54.0	-7.9	1.26 H	48	36.64	9.51
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	121.0 PK			1.63 V	25	124.62	-3.67
2	*2437.00	111.2 AV			1.63 V	25	114.82	-3.67
3	4874.00	58.6 PK	74.0	-15.4	1.65 V	36	55.76	2.80
4	4874.00	44.7 AV	54.0	-9.3	1.65 V	36	41.93	2.80
5	7311.00	60.4 PK	74.0	-13.6	1.50 V	2	50.88	9.51
6	7311.00	45.8 AV	54.0	-8.3	1.50 V	2	36.24	9.51

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	112.3 PK			1.06 H	105	115.92	-3.58
2	*2462.00	102.1 AV			1.06 H	105	105.67	-3.58
3	2483.50	63.3 PK	74.0	-10.7	1.06 H	105	66.81	-3.50
4	2483.50	49.2 AV	54.0	-4.8	1.06 H	105	52.69	-3.50
5	4924.00	66.6 PK	74.0	-7.4	1.71 H	291	63.72	2.87
6	4924.00	52.5 AV	54.0	-1.5	1.71 H	291	49.66	2.87
7	7386.00	66.0 PK	74.0	-8.0	1.17 H	289	56.28	9.74
8	7386.00	48.9 AV	54.0	-5.1	1.17 H	289	39.12	9.74

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	119.6 PK			1.48 V	25	123.19	-3.58
2	*2462.00	99.9 AV			1.48 V	25	103.48	-3.58
3	2483.50	65.9 PK	74.0	-8.1	1.48 V	25	69.42	-3.50
4	2483.50	49.3 AV	54.0	-4.7	1.48 V	25	52.78	-3.50
5	4924.00	59.1 PK	74.0	-14.9	1.00 V	212	56.23	2.87
6	4924.00	45.3 AV	54.0	-8.7	1.00 V	212	42.39	2.87
7	7386.00	62.2 PK	74.0	-11.8	1.16 V	323	52.42	9.74
8	7386.00	47.6 AV	54.0	-6.4	1.16 V	323	37.86	9.74

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 (20MHz)

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	62.1 PK	74.0	-12.0	1.00 H	44	65.93	-3.88
2	2390.00	47.5 AV	54.0	-6.5	1.00 H	44	51.41	-3.88
3	*2412.00	111.8 PK			1.00 H	44	115.59	-3.78
4	*2412.00	100.5 AV			1.00 H	44	104.28	-3.78
5	4824.00	67.1 PK	74.0	-6.9	1.87 H	297	64.37	2.70
6	4824.00	52.7 AV	54.0	-1.3	1.87 H	297	49.97	2.70
7	#7236.00	63.6 PK	91.8	-28.2	1.45 H	174	54.17	9.43
8	#7236.00	47.4 AV	80.5	-33.2	1.45 H	174	37.92	9.43

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	65.8 PK	74.0	-8.2	1.80 V	3	69.71	-3.88
2	2390.00	49.7 AV	54.0	-4.3	1.80 V	3	53.59	-3.88
3	*2412.00	119.2 PK			1.80 V	3	123.02	-3.78
4	*2412.00	108.9 AV			1.80 V	3	112.67	-3.78
5	4824.00	60.1 PK	74.0	-13.9	1.73 V	246	57.37	2.70
6	4824.00	48.7 AV	54.0	-5.3	1.73 V	246	45.99	2.70
7	#7236.00	64.7 PK	99.2	-34.5	1.56 V	2	55.29	9.43
8	#7236.00	47.9 AV	88.9	-41.0	1.56 V	2	38.46	9.43

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 radiated frequency is out of the restricted band.



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	111.5 PK			1.00 H	45	115.17	-3.67
2	*2437.00	100.3 AV			1.00 H	45	103.97	-3.67
3	4874.00	68.2 PK	74.0	-5.9	1.85 H	294	65.35	2.80
4	4874.00	52.1 AV	54.0	-1.9	1.85 H	294	49.27	2.80
5	7311.00	63.6 PK	74.0	-10.4	1.34 H	57	54.13	9.51
6	7311.00	46.4 AV	54.0	-7.6	1.34 H	57	36.89	9.51
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	120.1 PK			1.65 V	11	123.73	-3.67
2	*2437.00	109.3 AV			1.65 V	11	112.94	-3.67
3	4874.00	60.7 PK	74.0	-13.3	1.29 V	281	57.88	2.80
4	4874.00	48.9 AV	54.0	-5.1	1.29 V	281	46.12	2.80
5	7311.00	64.6 PK	74.0	-9.4	1.54 V	357	55.07	9.51
6	7311.00	47.1 AV	54.0	-6.9	1.54 V	357	37.58	9.51

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	110.3 PK			1.53 H	54	113.83	-3.58
2	*2462.00	99.4 AV			1.53 H	54	102.94	-3.58
3	2483.50	61.8 PK	74.0	-12.2	1.53 H	54	65.34	-3.50
4	2483.50	48.7 AV	54.0	-5.3	1.53 H	54	52.17	-3.50
5	4924.00	68.5 PK	74.0	-5.5	1.46 H	275	65.61	2.87
6	4924.00	52.4 AV	54.0	-1.6	1.46 H	275	49.51	2.87
7	7386.00	64.1 PK	74.0	-9.9	1.17 H	217	54.39	9.74
8	7386.00	48.3 AV	54.0	-5.7	1.17 H	217	38.55	9.74

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	119.1 PK			1.77 V	0	122.63	-3.58
2	*2462.00	108.7 AV			1.77 V	0	112.28	-3.58
3	2483.50	69.2 PK	74.0	-4.8	1.77 V	0	72.72	-3.50
4	2483.50	50.5 AV	54.0	-3.5	1.77 V	0	53.97	-3.50
5	4924.00	59.6 PK	74.0	-14.4	1.60 V	214	56.71	2.87
6	4924.00	46.2 AV	54.0	-7.8	1.60 V	214	43.29	2.87
7	7386.00	63.9 PK	74.0	-10.1	1.33 V	261	54.16	9.74
8	7386.00	47.3 AV	54.0	-6.7	1.33 V	261	37.59	9.74

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 (40MHz)

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	62.2 PK	74.0	-11.8	1.34 H	53	66.04	-3.88
2	2390.00	47.8 AV	54.0	-6.2	1.34 H	53	51.72	-3.88
3	*2422.00	109.6 PK			1.34 H	53	113.37	-3.73
4	*2422.00	99.3 AV			1.34 H	53	103.06	-3.73
5	4844.00	66.2 PK	74.0	-7.8	1.96 H	313	63.48	2.73
6	4844.00	52.2 AV	54.0	-1.8	1.96 H	313	49.47	2.73
7	#7236.00	63.8 PK	89.6	-25.8	1.33 H	261	54.36	9.43
8	#7236.00	48.0 AV	79.3	-31.3	1.33 H	261	38.59	9.43

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	72.5 PK	74.0	-1.5	1.75 V	340	76.34	-3.88
2	2390.00	52.7 AV	54.0	-1.3	1.75 V	340	56.57	-3.88
3	*2422.00	118.6 PK			1.75 V	340	122.37	-3.73
4	*2422.00	108.9 AV			1.75 V	340	112.58	-3.73
5	4844.00	58.9 PK	74.0	-15.1	1.75 V	208	56.16	2.73
6	4844.00	39.8 AV	54.0	-14.2	1.75 V	208	37.08	2.73
7	7266.00	63.7 PK	74.0	-10.3	1.67 V	13	54.25	9.45
8	7266.00	46.6 AV	54.0	-7.4	1.67 V	13	37.18	9.45

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 radiated frequency is out of the restricted band.



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	108.7 PK			1.14 H	109	112.35	-3.67
2	*2437.00	98.4 AV			1.14 H	109	102.04	-3.67
3	4874.00	66.5 PK	74.0	-7.5	1.80 H	291	63.74	2.80
4	4874.00	52.1 AV	54.0	-1.9	1.80 H	291	49.28	2.80
5	7311.00	64.1 PK	74.0	-9.9	1.52 H	223	54.62	9.51
6	7311.00	47.7 AV	54.0	-6.3	1.52 H	223	38.19	9.51
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	118.0 PK			1.75 V	340	121.63	-3.67
2	*2437.00	107.6 AV			1.75 V	340	111.28	-3.67
3	4874.00	60.3 PK	74.0	-13.7	1.38 V	215	57.46	2.80
4	4874.00	47.4 AV	54.0	-6.6	1.38 V	215	44.61	2.80
5	7311.00	62.7 PK	74.0	-11.3	1.19 V	58	53.16	9.51
6	7311.00	46.8 AV	54.0	-7.2	1.19 V	58	37.25	9.51

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	110.0 PK			1.70 H	47	113.63	-3.61
2	*2452.00	99.7 AV			1.70 H	47	103.27	-3.61
3	2483.50	65.8 PK	74.0	-8.2	1.70 H	47	69.28	-3.50
4	2483.50	50.1 AV	54.0	-3.9	1.70 H	47	53.64	-3.50
5	4904.00	67.0 PK	74.0	-7.0	1.83 H	295	64.12	2.85
6	4904.00	52.8 AV	54.0	-1.2	1.83 H	295	49.95	2.85
7	7356.00	65.3 PK	74.0	-8.7	1.64 H	198	55.68	9.64
8	7356.00	48.4 AV	54.0	-5.6	1.64 H	198	38.75	9.64

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	118.4 PK			1.74 V	339	122.05	-3.61
2	*2452.00	107.9 AV			1.74 V	339	111.49	-3.61
3	2483.50	71.0 PK	74.0	-3.0	1.74 V	339	74.54	-3.50
4	2483.50	52.9 AV	54.0	-1.1	1.74 V	339	56.38	-3.50
5	4904.00	60.1 PK	74.0	-13.9	1.32 V	25	57.26	2.85
6	4904.00	47.4 AV	54.0	-6.6	1.32 V	25	44.59	2.85
7	7356.00	63.8 PK	74.0	-10.3	1.53 V	141	54.11	9.64
8	7356.00	47.3 AV	54.0	-6.7	1.53 V	141	37.67	9.64

REMARKS:

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

BELOW 1GHz WORST-CASE DATA: 802.11g

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	80.63	24.6 QP	40.0	-15.4	1.52 H	245	42.85	-18.28
2	167.93	26.7 QP	43.5	-16.8	1.06 H	271	40.35	-13.62
3	359.87	42.9 QP	46.0	-3.1	1.79 H	360	54.03	-11.15
4	600.02	39.8 QP	46.0	-6.2	1.00 H	291	46.07	-6.23
5	680.01	40.9 QP	46.0	-5.1	1.66 H	342	46.08	-5.19
6	799.99	38.0 QP	46.0	-8.0	1.75 H	66	40.89	-2.91

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	32.22	33.4 QP	40.0	-6.6	1.64 V	0	48.89	-15.48
2	164.64	29.8 QP	43.5	-13.7	1.50 V	155	43.17	-13.39
3	359.87	39.9 QP	46.0	-6.1	1.88 V	27	51.04	-11.15
4	456.46	37.4 QP	46.0	-8.6	1.06 V	196	46.50	-9.10
5	600.05	39.0 QP	46.0	-7.0	1.29 V	344	45.27	-6.23
6	799.99	41.6 QP	46.0	-4.4	1.00 V	0	44.52	-2.91

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.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	838251/021	Oct. 26, 2015	Oct. 25, 2016
ROHDE & SCHWARZ Artificial Mains Network (For EUT)	ENV216	101195	Apr. 27, 2015	Apr. 26, 2016
LISN With Adapter (for EUT)	AD10	C03Ada-002	Apr. 27, 2015	Apr. 26, 2016
EMCO L.I.S.N. (For peripherals)	3825/2	9504-2359	Jul. 27, 2015	Jul. 26, 2016
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 06, 2015	May 05, 2016
Software	Cond_V7.3.7	NA	NA	NA
RF cable (JYEBAO) With10dB PAD	5D-FB	Cable-C03.01	Sep. 23, 2015	Sep. 22, 2016
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-300	Jan. 19, 2015	Jan. 18, 2016
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-301	Jan. 29, 2015	Jan. 28, 2016
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 20, 2014	Nov. 19, 2015
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 20, 2014	Nov. 19, 2015

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in Shielded Room No. 3.

3. The VCCI Site Registration No. C-274.

4.2.3 Test Procedures

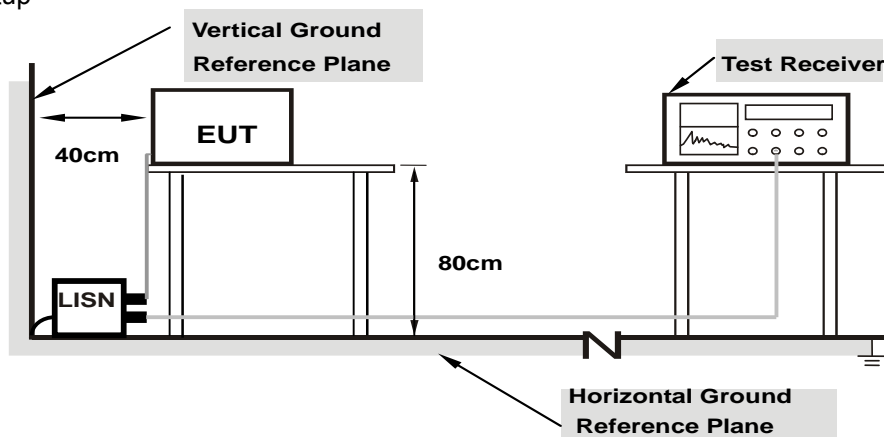
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

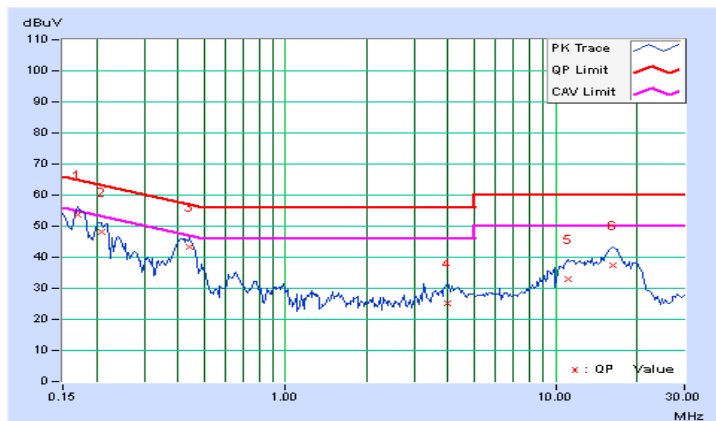
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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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	0.17091	9.66	43.89	31.68	53.55	41.34	64.92	54.92	-11.36	-13.57
2	0.20859	9.66	38.53	28.02	48.19	37.68	63.26	53.26	-15.07	-15.58
3	0.44297	9.66	33.67	26.29	43.33	35.95	57.01	47.01	-13.68	-11.06
4	3.98828	9.70	15.63	8.53	25.33	18.23	56.00	46.00	-30.67	-27.77
5	11.09766	9.83	23.30	16.50	33.13	26.33	60.00	50.00	-26.87	-23.67
6	16.24609	9.91	27.40	20.32	37.31	30.23	60.00	50.00	-22.69	-19.77

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

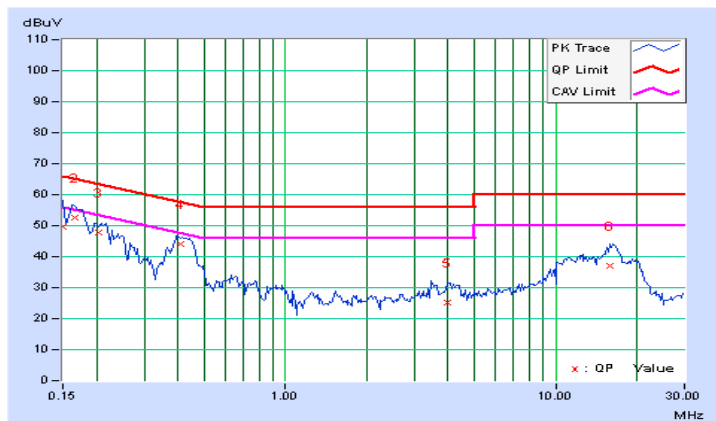


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.66	39.80	17.26	49.46	26.92	66.00	56.00	-16.54	-29.08
2	0.16562	9.66	42.83	25.43	52.49	35.09	65.18	55.18	-12.69	-20.09
3	0.20469	9.66	38.13	28.00	47.79	37.66	63.42	53.42	-15.63	-15.76
4	0.41017	9.66	34.38	27.57	44.04	37.23	57.64	47.64	-13.60	-10.41
5	3.96484	9.70	15.32	8.00	25.02	17.70	56.00	46.00	-30.98	-28.30
6	15.87891	9.91	27.27	20.15	37.18	30.06	60.00	50.00	-22.82	-19.94

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

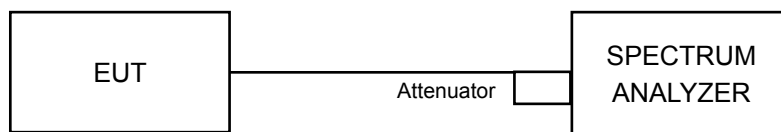


4.3 6dB Bandwidth Measurement

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.

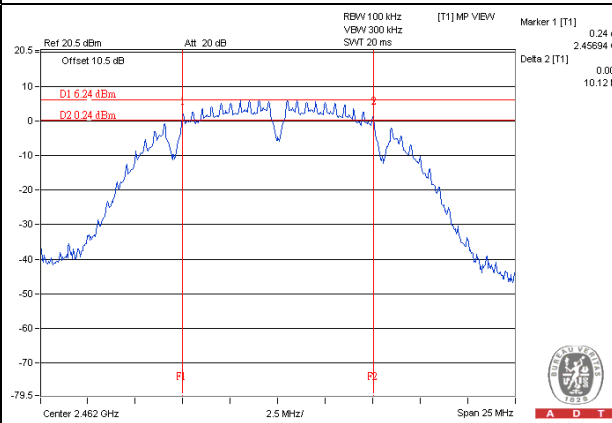


4.3.7 Test Result

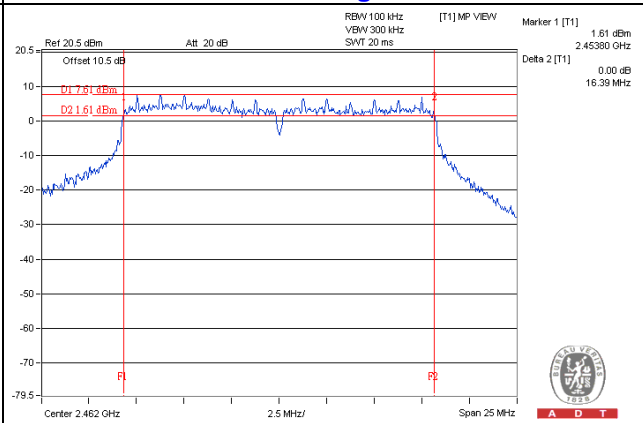
Channel	Frequency (MHz)	6db Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1		
802.11b					
1	2412	10.11	10.12	0.5	PASS
6	2437	10.11	10.10	0.5	PASS
11	2462	10.12	10.12	0.5	PASS
802.11g					
1	2412	16.36	16.14	0.5	PASS
6	2437	16.36	16.38	0.5	PASS
11	2462	16.37	16.39	0.5	PASS
802.11n (HT20)					
1	2412	17.57	17.36	0.5	PASS
6	2437	17.62	17.57	0.5	PASS
11	2462	17.37	17.39	0.5	PASS
802.11n (HT40)					
3	2422	36.39	35.91	0.5	PASS
6	2437	35.86	36.37	0.5	PASS
9	2452	35.85	35.83	0.5	PASS

Spectrum Plot of Worst Value

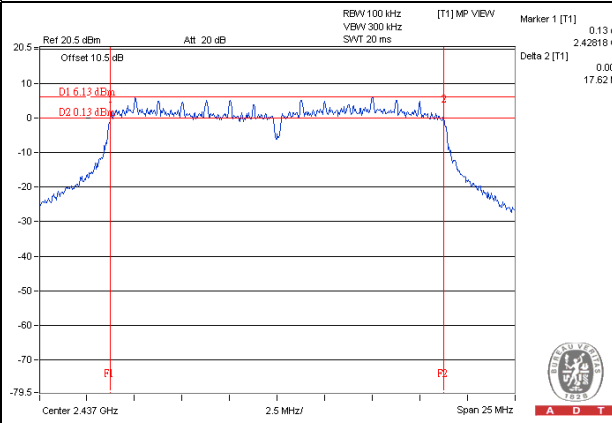
802.11b



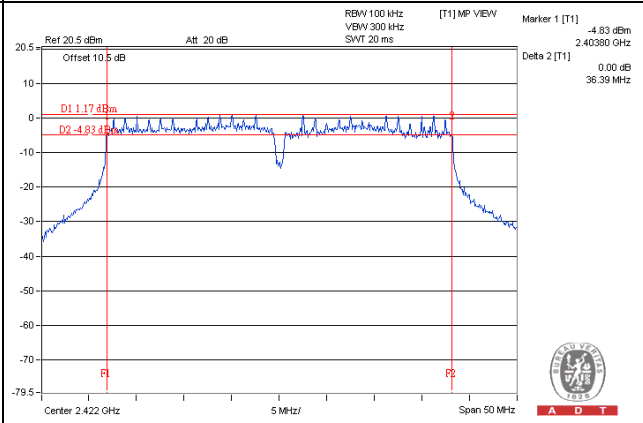
802.11g



802.11n (HT20)



802.11n (HT40)



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,

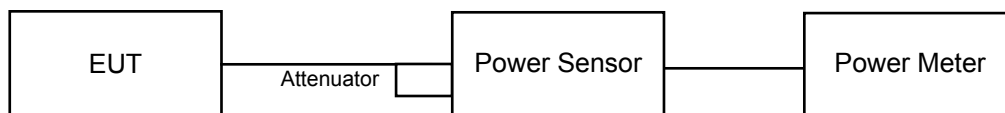
Array Gain = 0 dB (i.e., no array gain) for $NANT \leq 4$;

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

Array Gain = $5 \log(NANT/NSS)$ dB or 3 dB, whichever is less for 20-MHz channel widths with $NANT \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(NANT/NSS)$ 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

Chan.	Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
802.11b							
1	2412	16.14	17.08	92.2	19.65	30	Pass
6	2437	22.08	22.52	340.1	25.32	30	Pass
11	2462	18.56	19.21	155.1	21.91	30	Pass
802.11g							
1	2412	26.80	27.07	988.0	29.95	30	Pass
6	2437	26.71	26.97	966.6	29.85	30	Pass
11	2462	26.99	26.93	993.2	29.97	30	Pass
802.11n (HT20)							
1	2412	25.13	25.51	681.5	28.33	30	Pass
6	2437	26.09	26.03	807.3	29.07	30	Pass
11	2462	25.97	25.90	784.4	28.95	30	Pass
802.11n (HT40)							
3	2422	24.26	25.93	658.4	28.19	30	Pass
6	2437	26.09	26.03	807.3	29.07	30	Pass
9	2452	25.49	26.08	759.5	28.81	30	Pass

FOR AVERAGE POWER

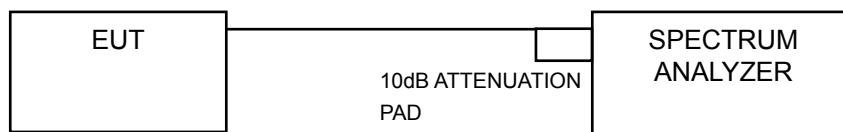
Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
802.11b					
1	2412	13.54	14.49	50.7	17.05
6	2437	19.52	19.89	187.0	22.72
11	2462	16.17	16.46	85.7	19.33
802.11g					
1	2412	18.72	19.19	157.5	21.97
6	2437	18.62	19.10	154.1	21.88
11	2462	19.37	19.32	172.0	22.36
802.11n (HT20)					
1	2412	17.08	17.33	105.1	20.22
6	2437	17.59	18.17	123.0	20.90
11	2462	17.34	17.76	113.9	20.57
802.11n (HT40)					
3	2422	15.57	17.68	94.7	19.76
6	2437	17.59	18.17	123.0	20.90
9	2452	19.04	17.33	134.2	21.28

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

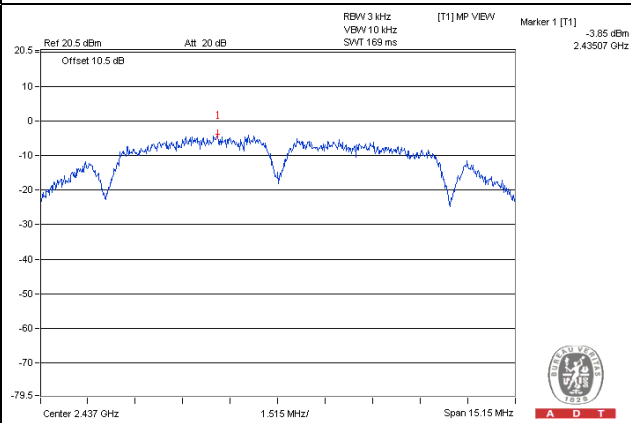
4.5.7 Test Results

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
802.11b							
0	1	2412	-10.88	3.01	-7.87	5.29	Pass
	6	2437	-4.35	3.01	-1.34	5.29	Pass
	11	2462	-8.37	3.01	-5.36	5.29	Pass
1	1	2412	-10.33	3.01	-7.32	5.29	Pass
	6	2437	-3.85	3.01	-0.84	5.29	Pass
	11	2462	-8.51	3.01	-5.50	5.29	Pass
802.11g							
0	1	2412	-5.73	3.01	-2.72	5.29	Pass
	6	2437	-6.24	3.01	-3.23	5.29	Pass
	11	2462	-5.99	3.01	-2.98	5.29	Pass
1	1	2412	-4.89	3.01	-1.88	5.29	Pass
	6	2437	-7.00	3.01	-3.99	5.29	Pass
	11	2462	-5.35	3.01	-2.34	5.29	Pass
802.11n (HT20)							
0	1	2412	-8.97	3.01	-5.96	5.29	Pass
	6	2437	-8.82	3.01	-5.81	5.29	Pass
	11	2462	-9.06	3.01	-6.05	5.29	Pass
1	1	2412	-9.01	3.01	-6.00	5.29	Pass
	6	2437	-7.49	3.01	-4.48	5.29	Pass
	11	2462	-9.93	3.01	-6.92	5.29	Pass
802.11n (HT40)							
0	3	2422	-13.36	3.01	-10.35	5.29	Pass
	6	2437	-9.87	3.01	-6.86	5.29	Pass
	9	2452	-10.35	3.01	-7.34	5.29	Pass
1	3	2422	-11.40	3.01	-8.39	5.29	Pass
	6	2437	-10.11	3.01	-7.10	5.29	Pass
	9	2452	-10.34	3.01	-7.33	5.29	Pass

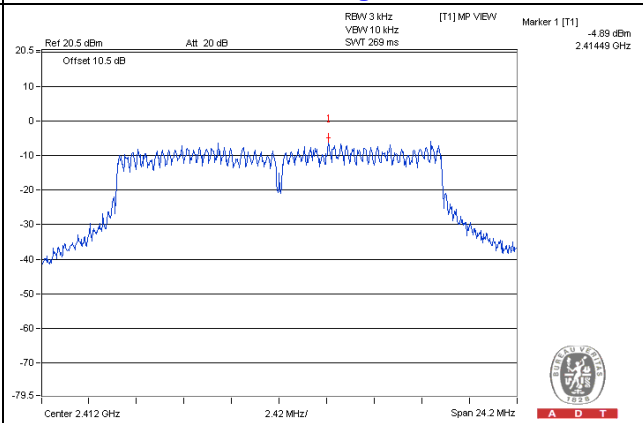
NOTE: Directional gain = 5.7dBi + 10log(2) = 8.71dBi > 6dBi , so the power density limit shall be reduced to 8-(8.71-6) = 5.29dBm.

Spectrum Plot of Worst Value

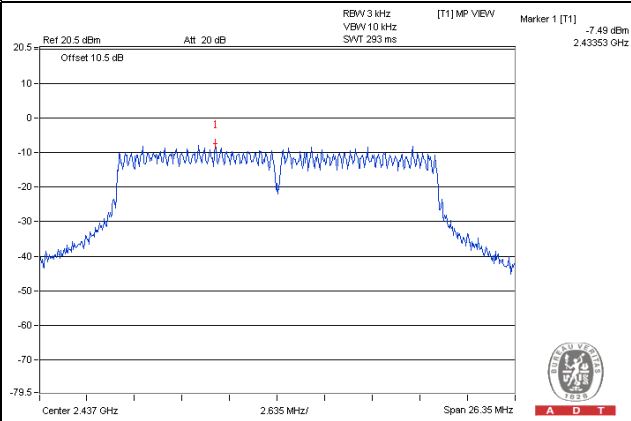
802.11b



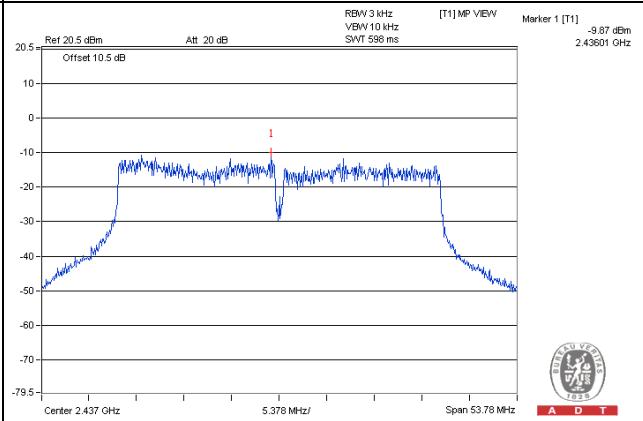
802.11g



802.11n (HT20)



802.11n (HT40)

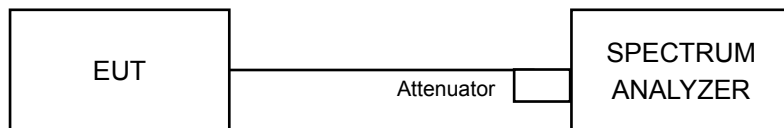


4.6 Conducted Out of Band Emission Measurement

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

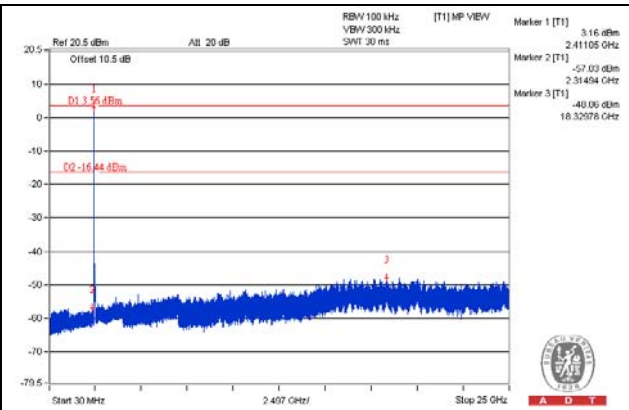
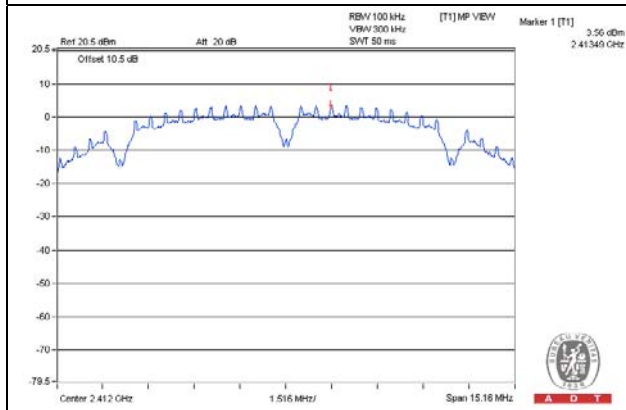
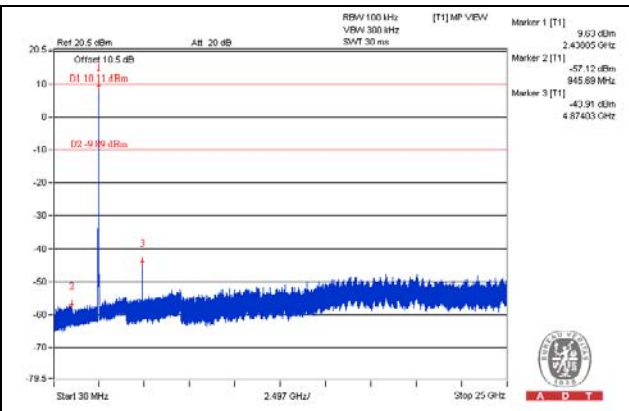
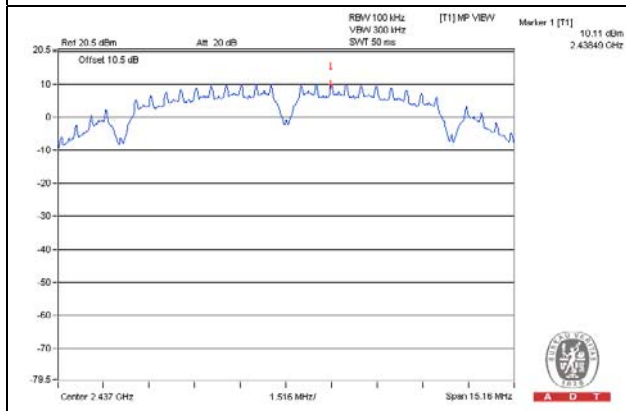
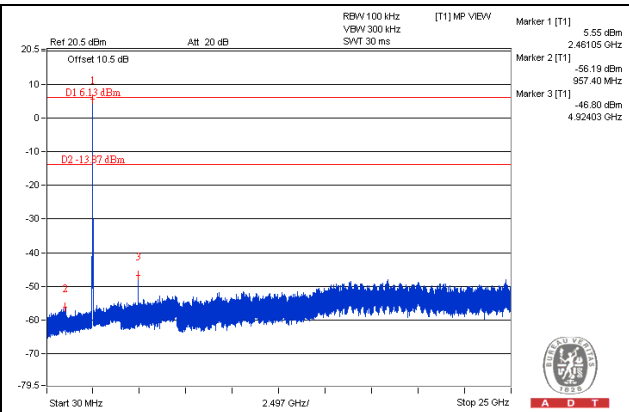
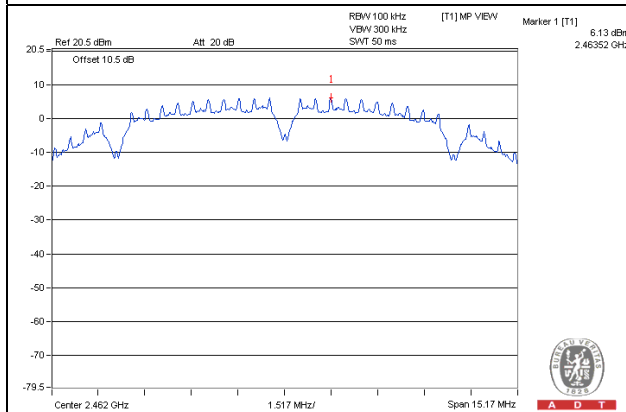
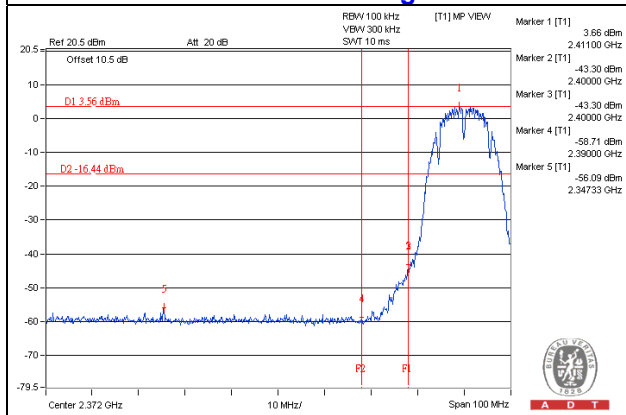
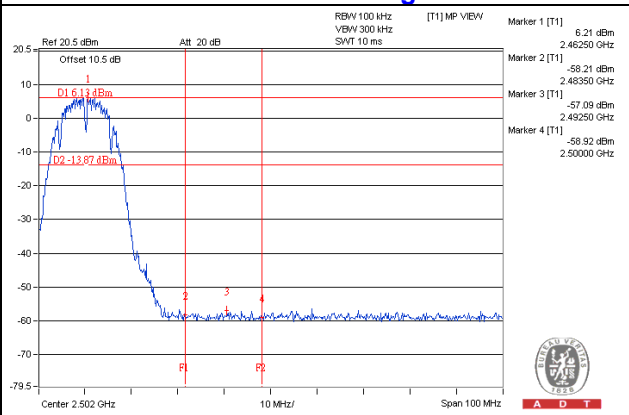
No deviation.

4.6.6 EUT Operating Condition

Same as Item 4.3.6

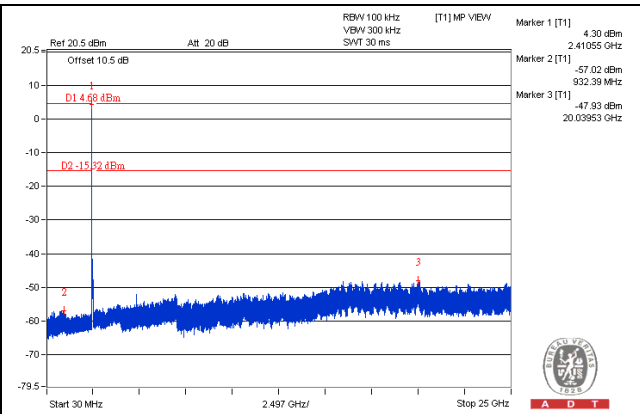
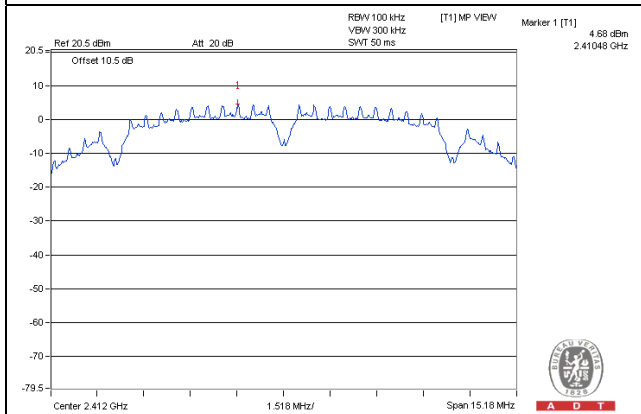
4.6.7 Test Results

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.

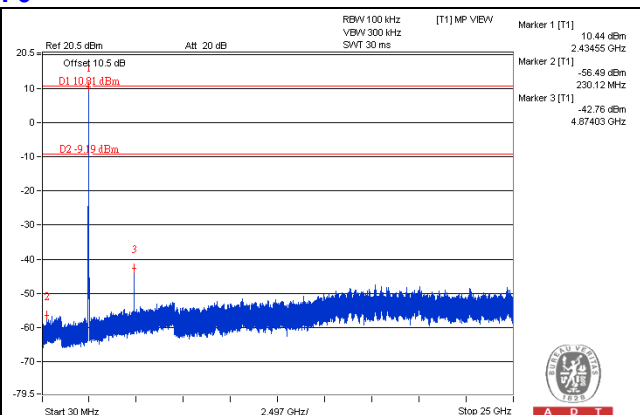
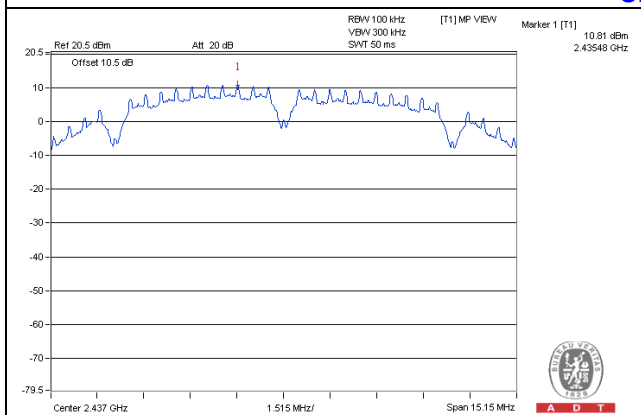
802.11b: CHAIN 0
CH 1

CH 6

CH 11

CH 1 Band edge

CH 11 Band edge


CHAIN 1

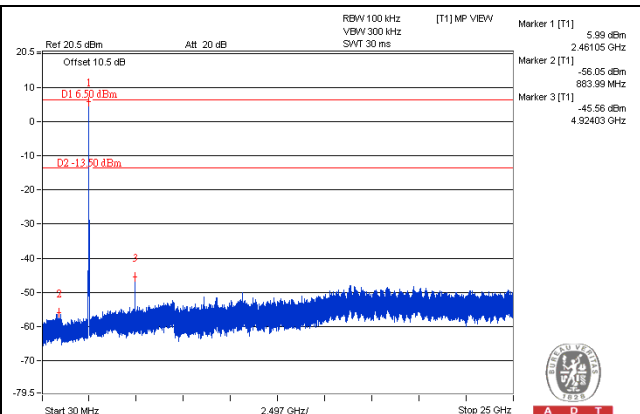
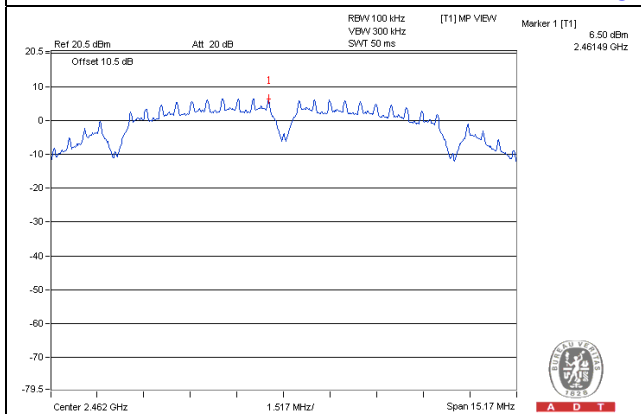
CH 1



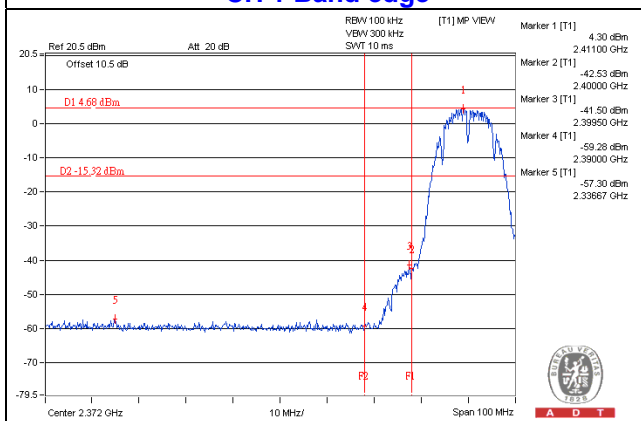
CH 6



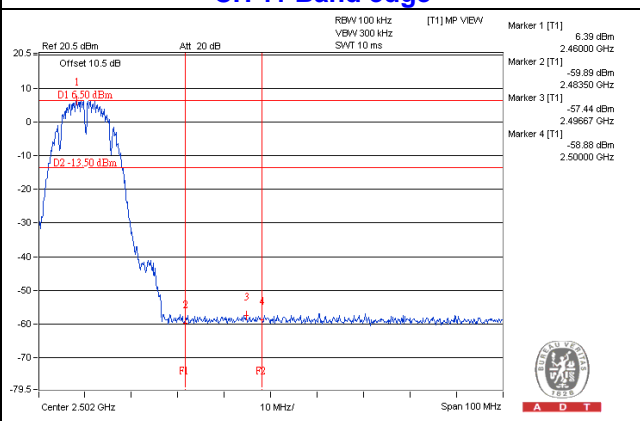
CH 11



CH 1 Band edge

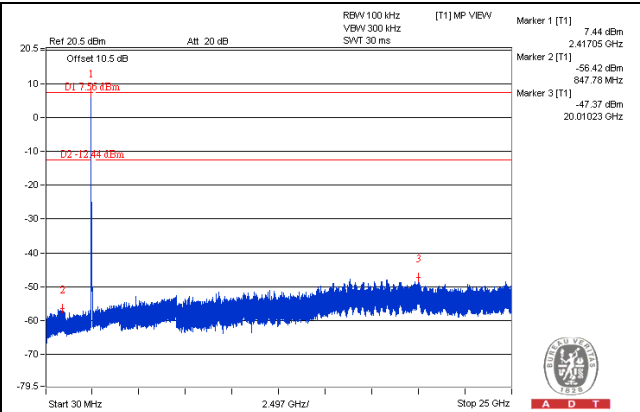
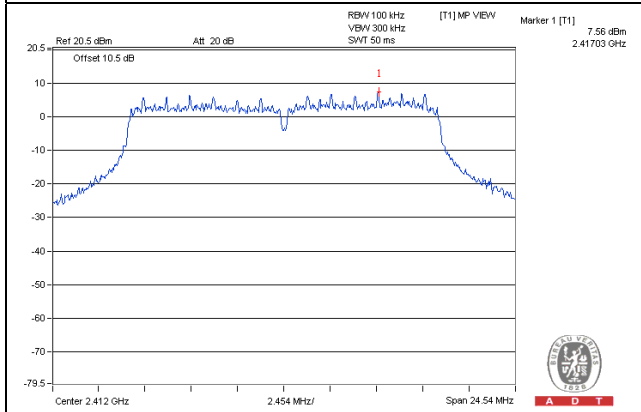


CH 11 Band edge

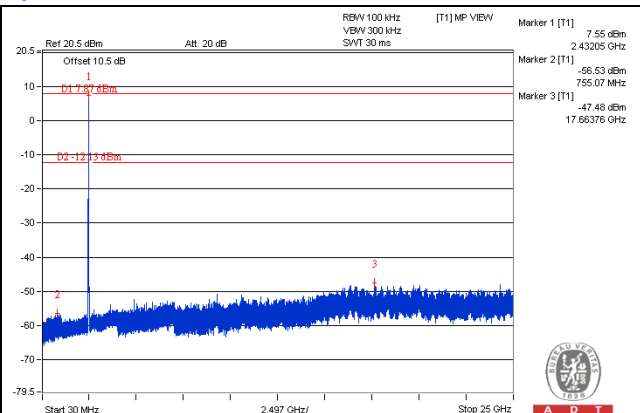
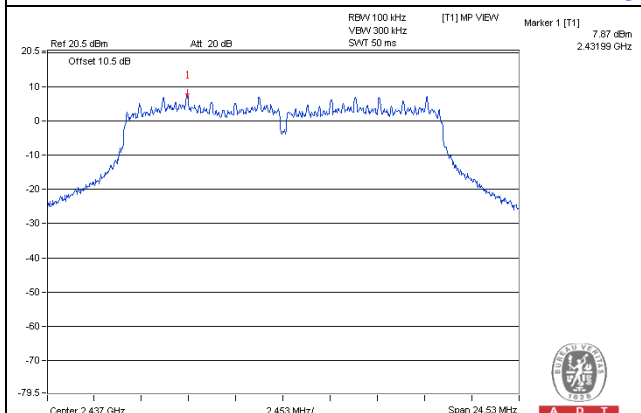


802.11g: CHAIN 0

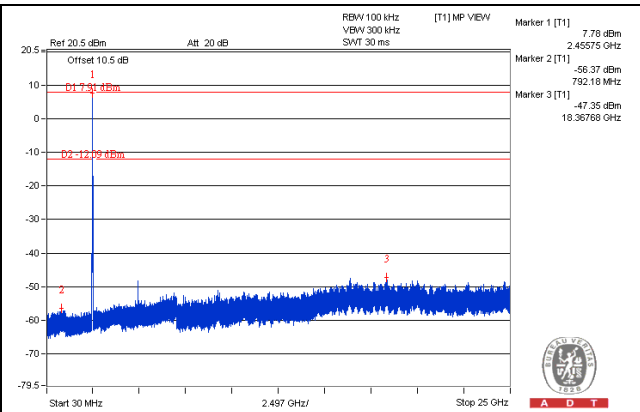
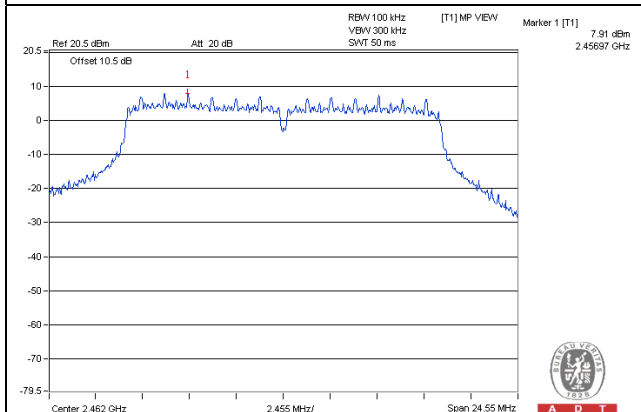
CH 1



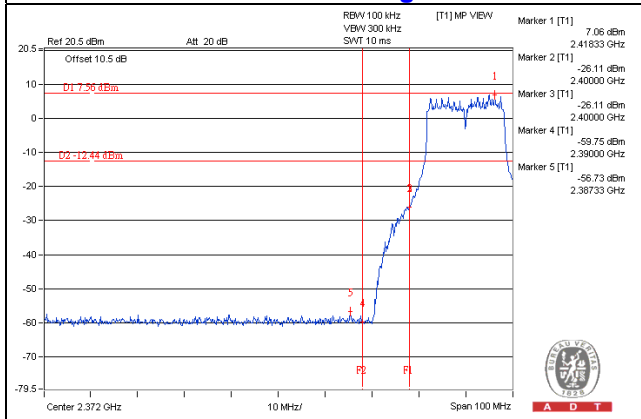
CH 6



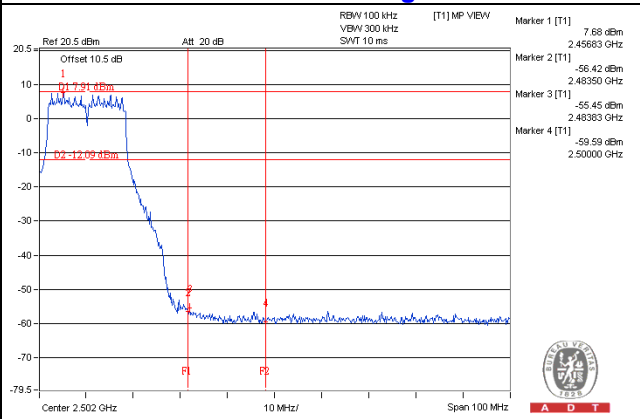
CH 11



CH 1 Band edge

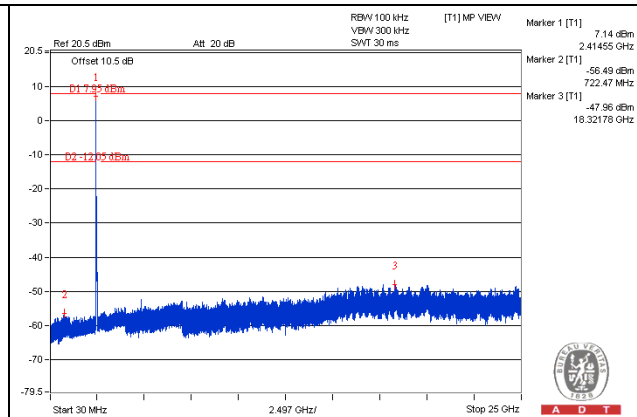
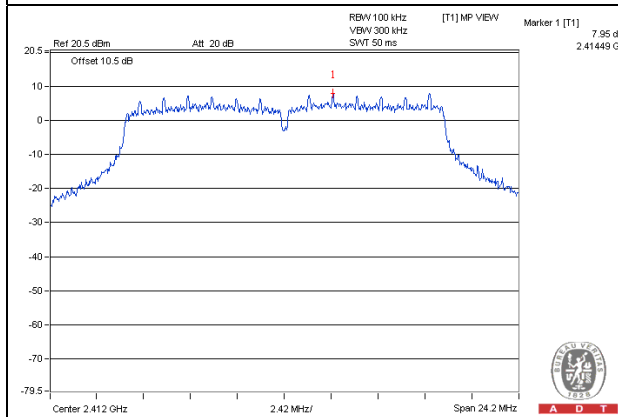


CH 11 Band edge

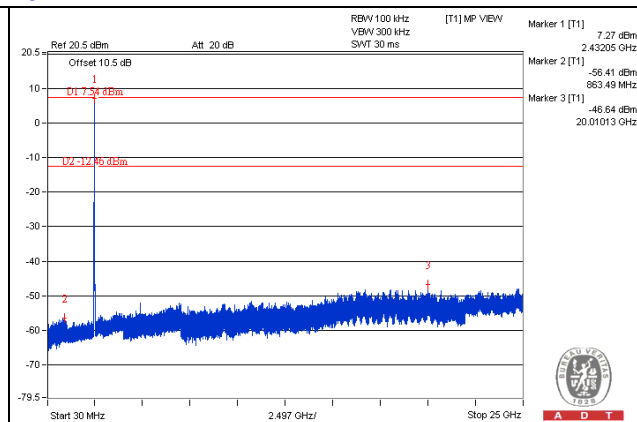
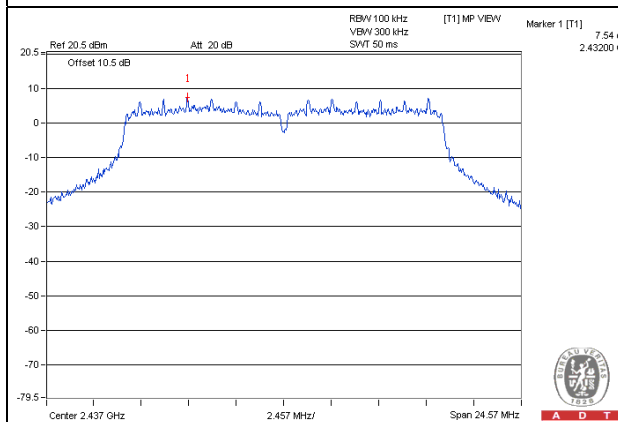


CHAIN 1

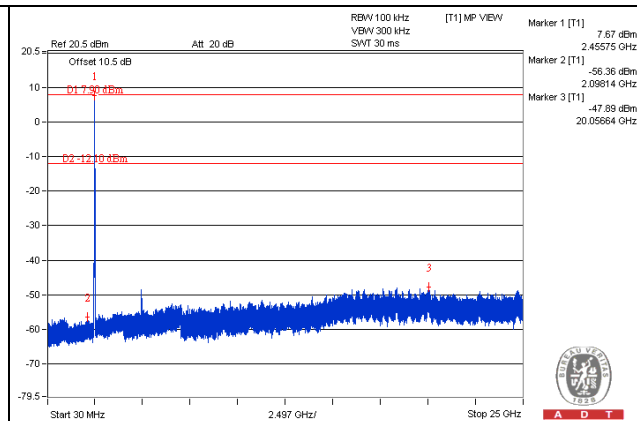
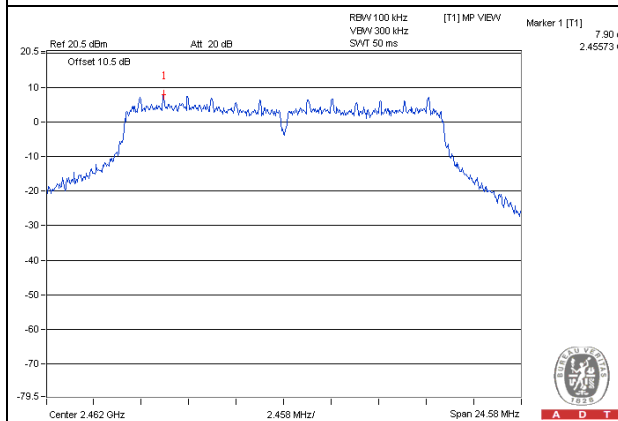
CH 1



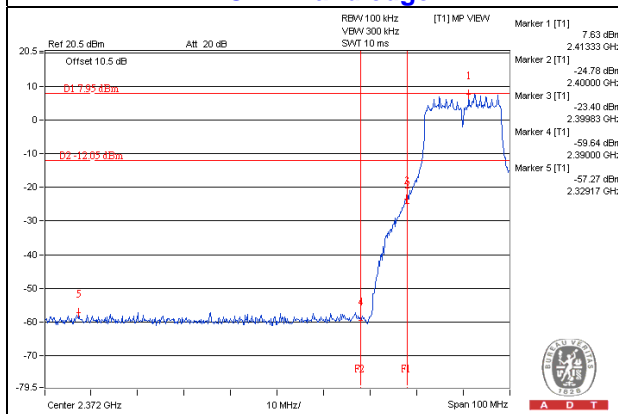
CH 6



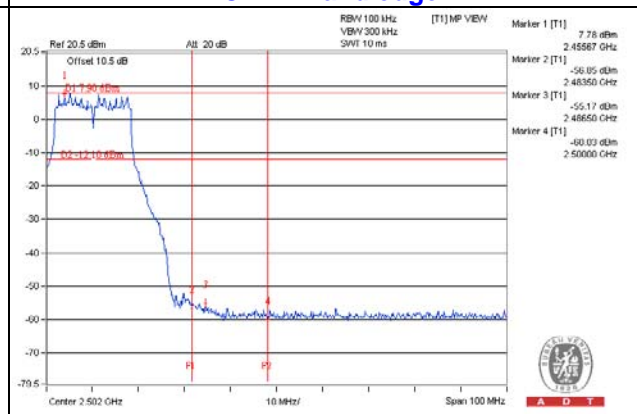
CH 11



CH 1 Band edge

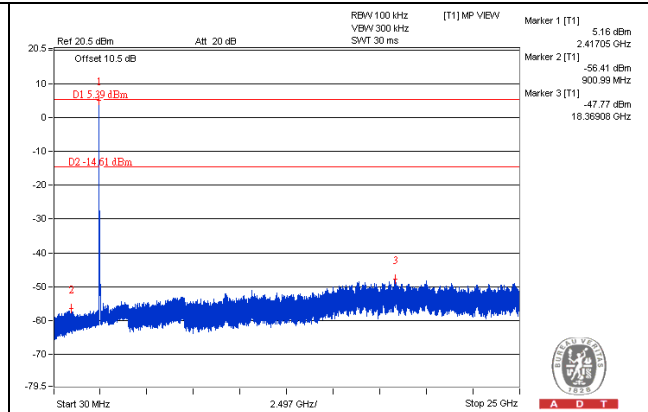
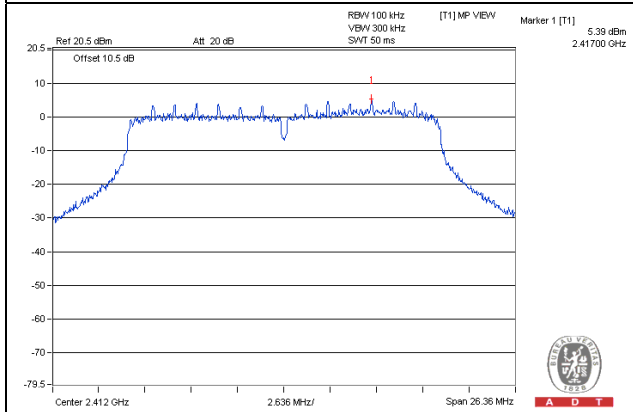


CH 11 Band edge

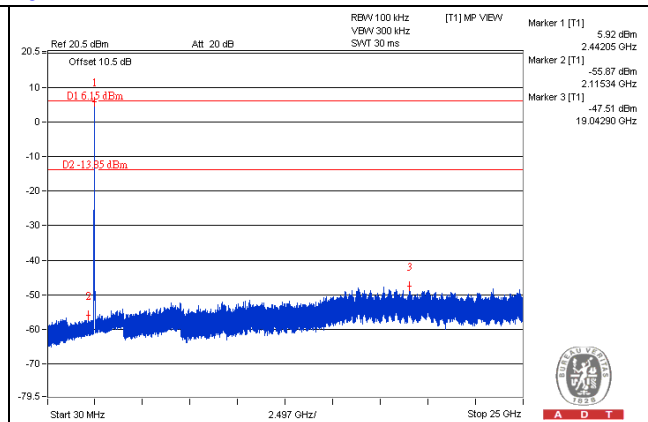
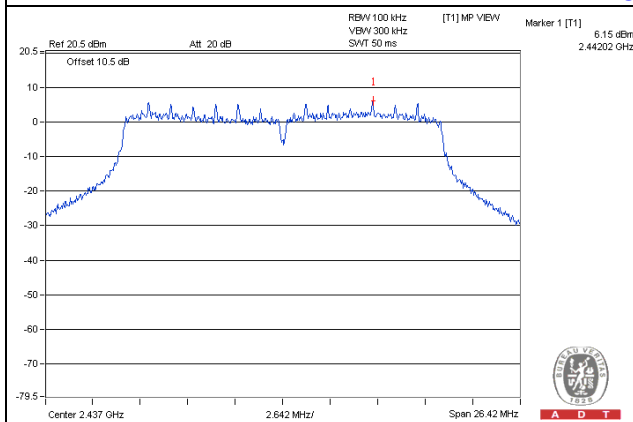


802.11n (HT20): CHAIN 0

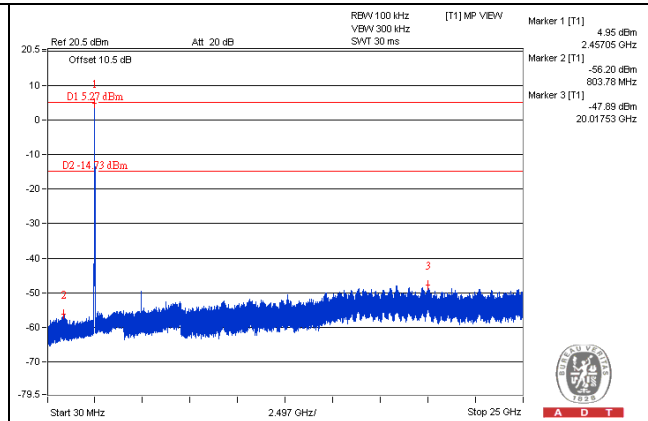
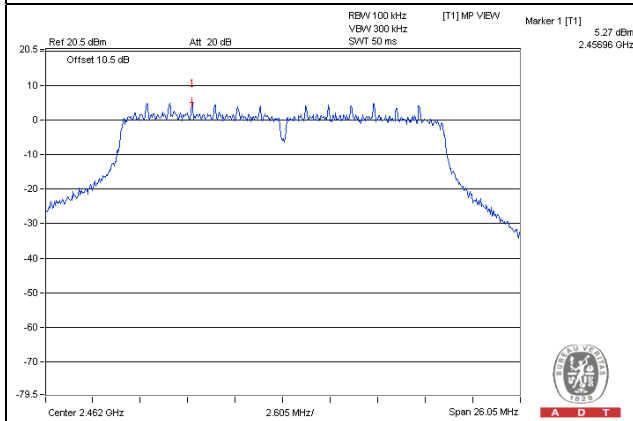
CH 1



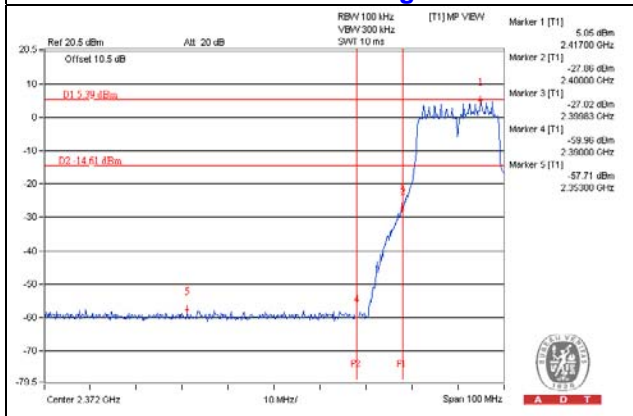
CH 6



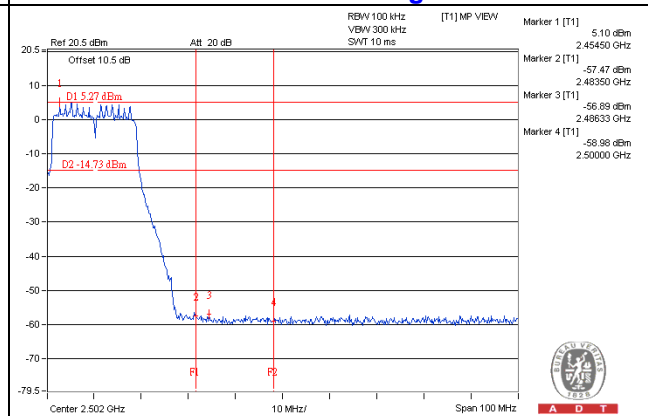
CH 11



CH 1 Band edge

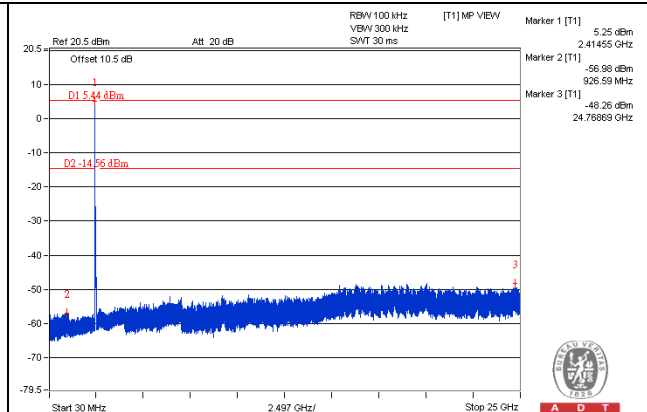
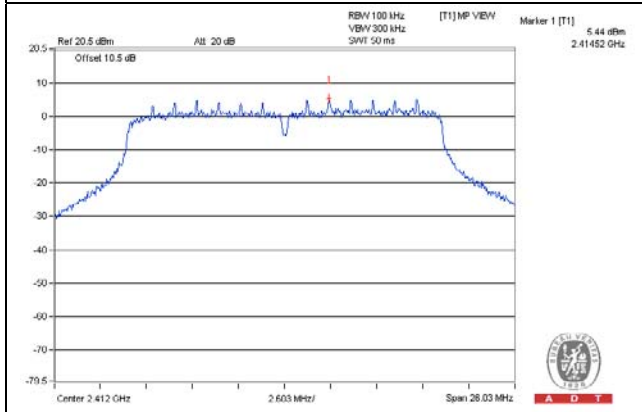


CH 11 Band edge

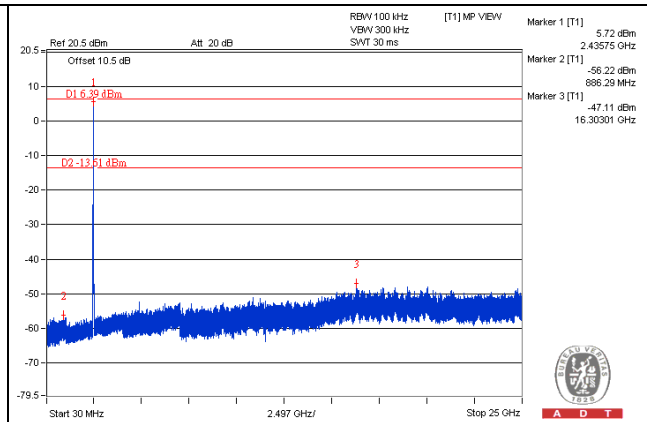
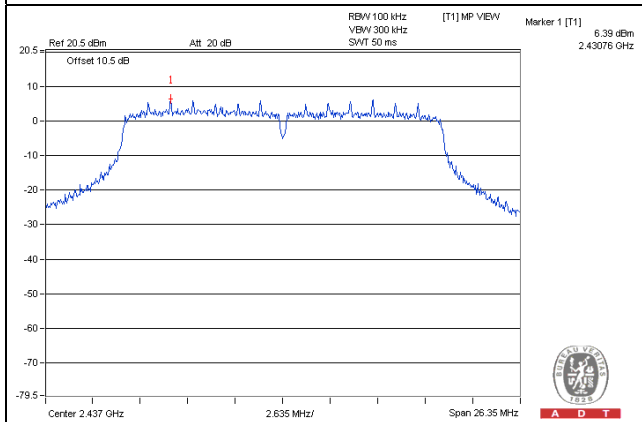


CHAIN 1

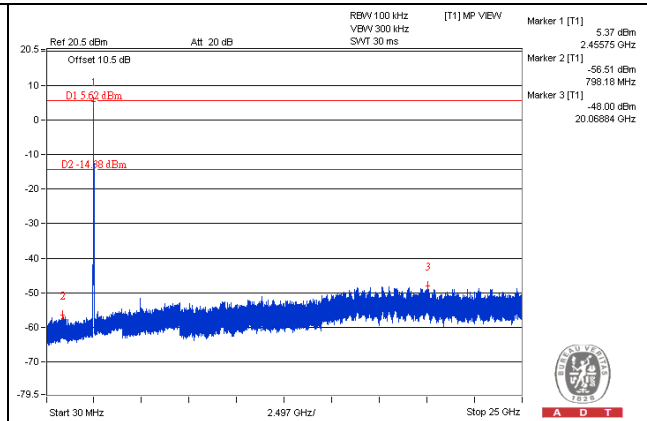
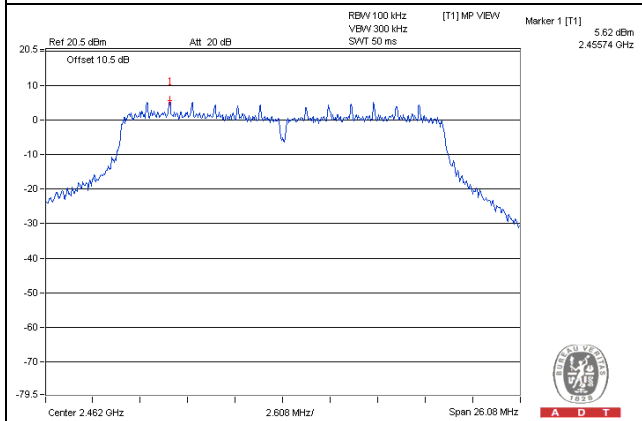
CH 1



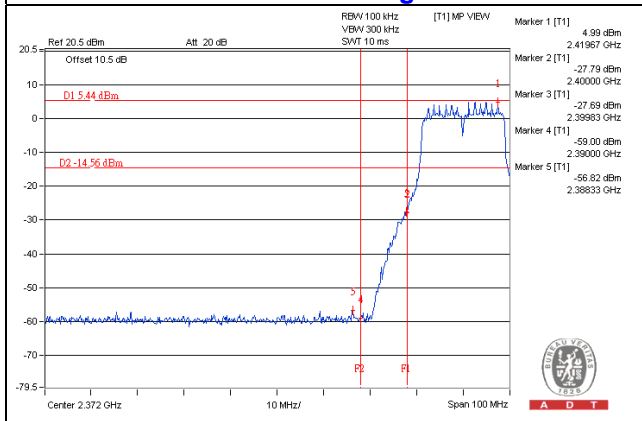
CH 6



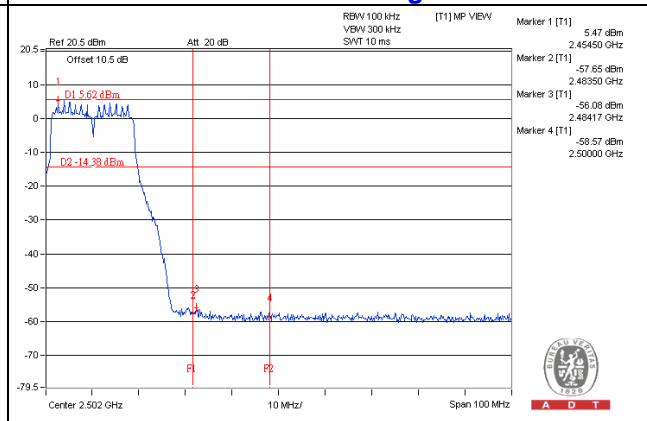
CH 11



CH 1 Band edge

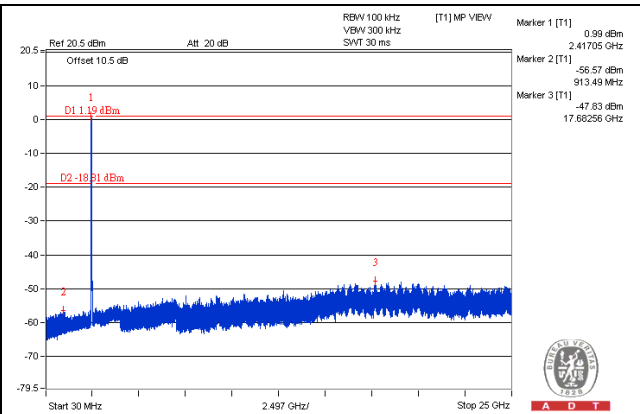
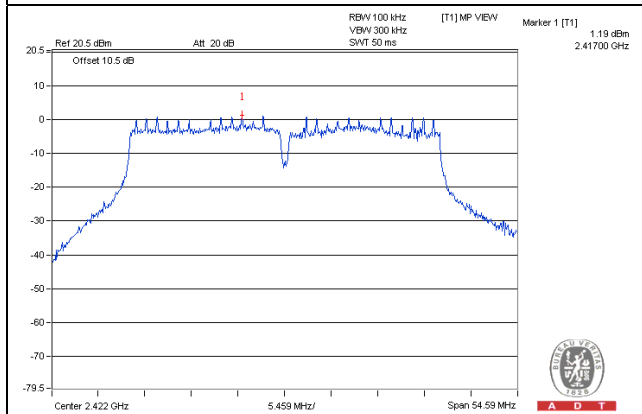


CH 11 Band edge

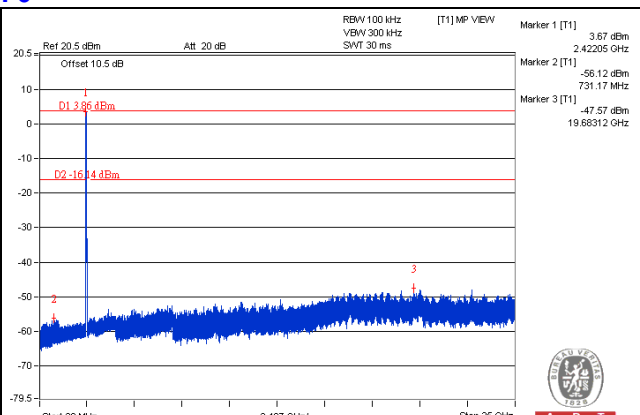
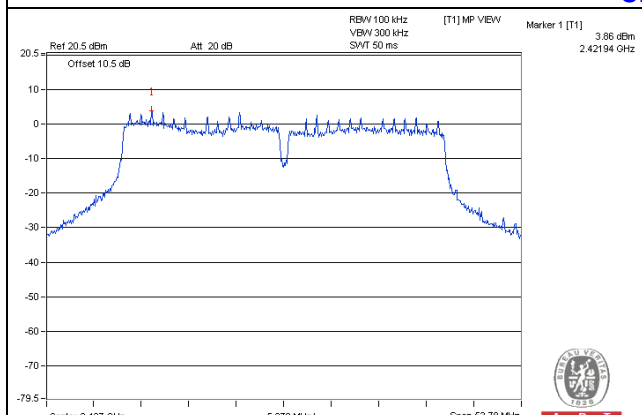


802.11n (HT40): CHAN 0

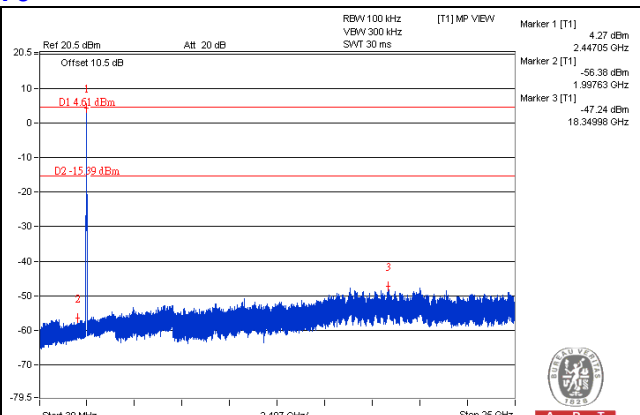
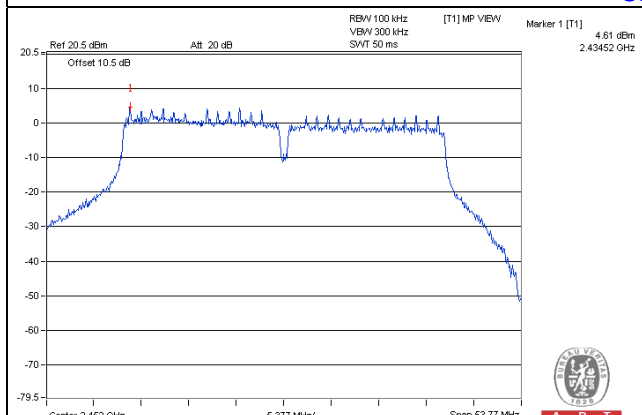
CH 3



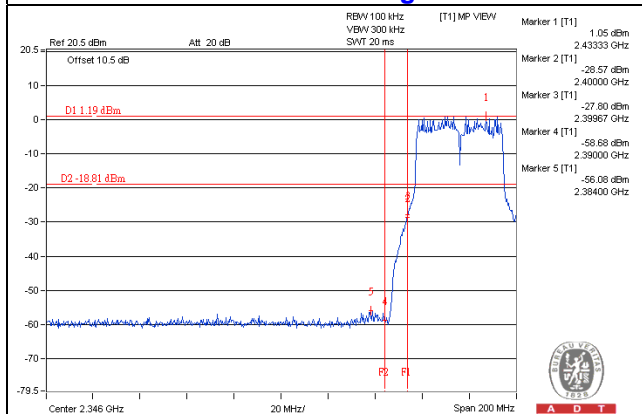
CH 6



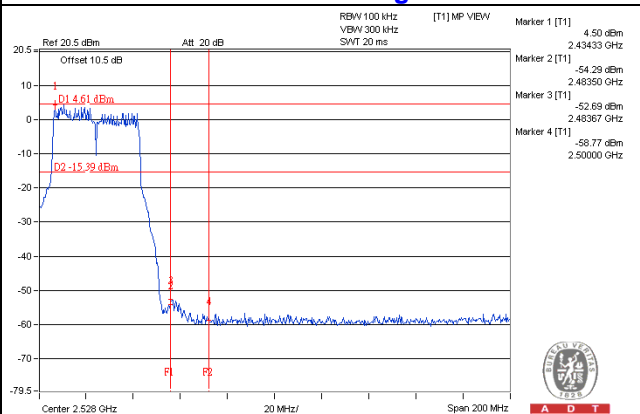
CH 9



CH 3 Band edge

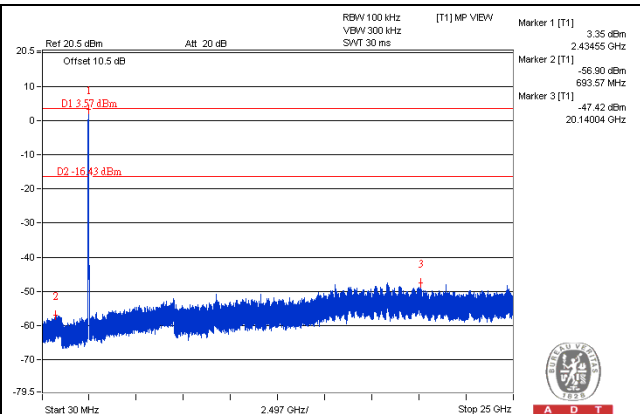
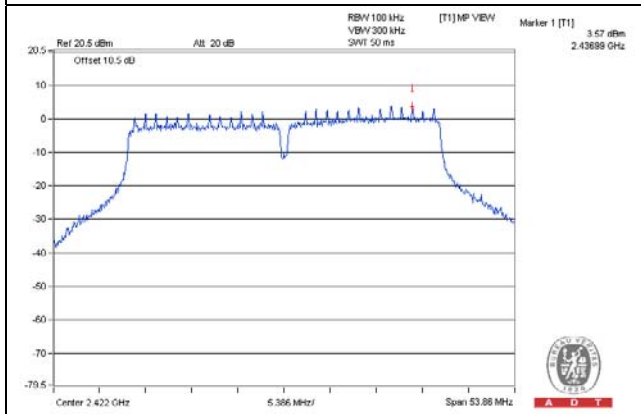


CH 9 Band edge

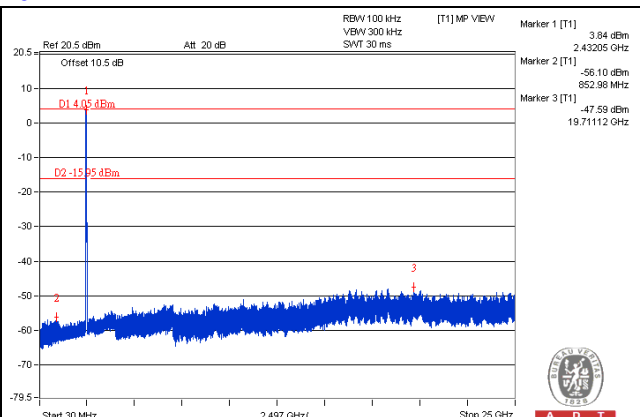
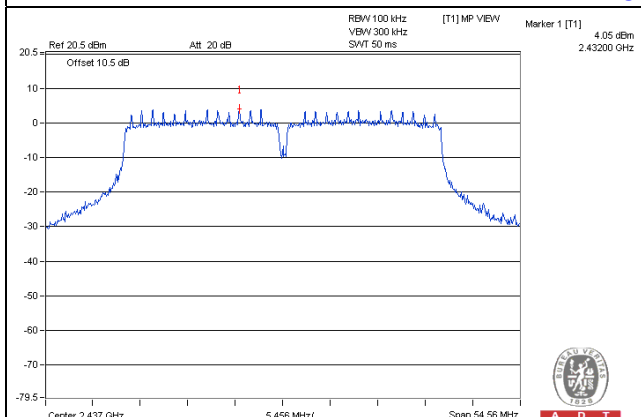


CHAIN 1

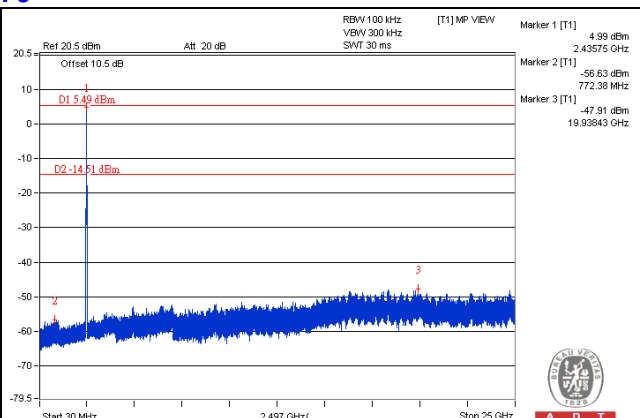
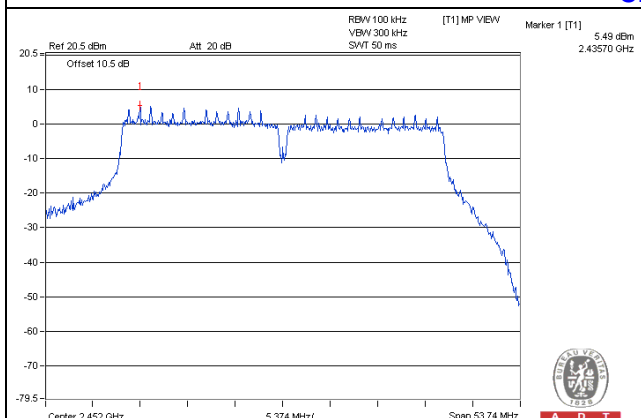
CH 3



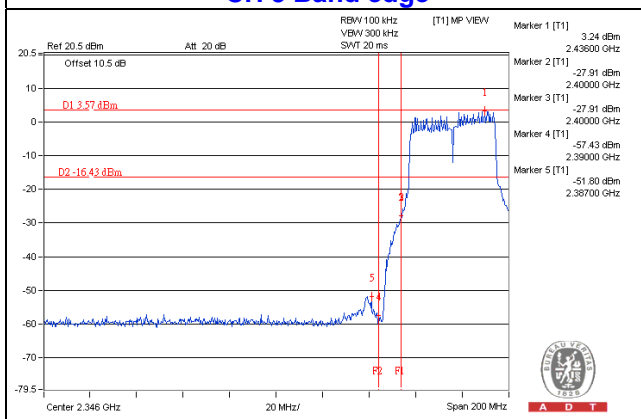
CH 6



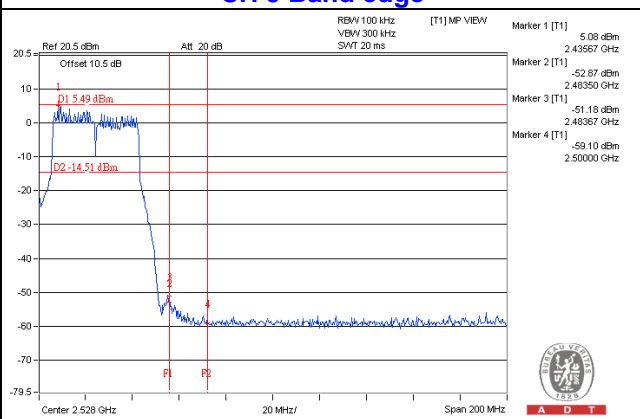
CH 9



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:

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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