

FCC TEST REPORT (15.247)

REPORT NO.: RF130318C03

MODEL NO.: AT-TQ2450

FCC ID: RSL-TQ2450

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ISSUED: Oct. 17, 2013

APPLICANT: Allied Telesis R&D Center K.K.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130318C03	Original release.	Oct. 17, 2013



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1. CERTIFICATION

PRODUCT: IEEE 802.11a/b/g/n WIRELESS LAN ACCESS POINT

MODEL NO.: AT-TQ2450

BRAND:  **Allied Telesis**

APPLICANT: Allied Telesis R&D Center K.K.

TESTED: Mar. 21 ~ Oct. 02, 2013

TEST SAMPLE: ENGINEERING SAMPLE

STANDARDS: FCC Part 15, Subpart C (Section 15.247)

ANSI C63.10-2009

The above equipment (model: AT-TQ2450) 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 :  , **DATE :** Oct. 17, 2013
Suntee Liu / Specialist

APPROVED BY :  , **DATE :** Oct. 17, 2013
Ken Liu / Senior Manager

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -14.27dB at 16.53906MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2483.50MHz.
15.247(d)	Band Edge Measurement	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 SMA Plug Reverse 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	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.34 dB
	200MHz ~1000MHz	3.35 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.



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3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	IEEE 802.11a/b/g/n WIRELESS LAN ACCESS POINT
MODEL NO.	AT-TQ2450
POWER SUPPLY	12Vdc (Adapter) 55Vdc (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 802.11a/g: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps
OPERATING FREQUENCY	2.4GHz: 2400 ~ 2483.5MHz 5.0GHz: 5725 ~ 5825MHz
NUMBER OF CHANNEL	2.4GHz: 802.11b, 802.11g, 802.11n (20MHz): 11 802.11n (40MHz): 7 5.0GHz: 802.11a, 802.11n (20MHz): 5 802.11n (40MHz): 2
OUTPUT POWER	2.4GHz: 726.156mW 5.0GHz: 417.412mW
ANTENNA TYPE	2.4GHz: Dipole antenna with 2dBi gain 5.0GHz: Dipole antenna with 2dBi gain
ANTENNA CONNECTOR	SMA Plug Reverse
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Adapter

NOTE:

1. The EUT incorporates a MIMO function. The EUT provides 2 completed transmitters and 2 receivers.

MODULATION MODE	TX FUNCTION	DESCRIPTION
802.11b	1TX	Chain 0
802.11g	2TX	Chain 0 / 1
802.11a	2TX	Chain 0 / 1
802.11n (20MHz)	2TX	Chain 0 / 1
802.11n (40MHz)	2TX	Chain 0 / 1

2. The EUT consumes power from the following adapter.

Brand	CWT
Model	KPL-040F
Input Power	100-240Vac, 50/60Hz, 1.7A
Output Power	12Vdc, 3.33A
Power Line	1.25m cable with 1 core attached on adapter 1.8m AC cable without core

3. The EUT consumes power from the following POE (support unit only).

Brand	PowerDsine™
Model	9001G-40/SP
Input Power	100-240Vac, 50-60Hz, 1.5A
Output Power	55Vdc, 0.73A

4. 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

FOR 2.4GHz:

11 channels are provided for 802.11b, 802.11g, 802.11n (20MHz):

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 (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

FOR 5.0GHz (5725 ~ 5825MHz):

5 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

FOR 2.4GHz:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Power from adapter
B	-	√	√	-	Power from POE

Where **RE≥1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

NOTE 1: “-” means no effect.

NOTE 2: The EUT had been pre-tested on the positioned of X-plane and Z-plane. 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)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
A	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

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)
A, B	802.11n (20MHz)	1 to 11	6	OFDM	BPSK	7.2

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)
A, B	802.11n (20MHz)	1 to 11	6	OFDM	BPSK	7.2

BANDEDGE MEASUREMENT:

- ☒ 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)
A	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
A	802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2
A	802.11n (40MHz)	3 to 9	3, 9	OFDM	BPSK	15.0

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)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
A	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	15.0



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TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	22deg. C, 72%RH	120Vac, 60Hz	Martin Lee
RE<1G	22deg. C, 72%RH	120Vac, 60Hz	Martin Lee
PLC	20deg. C, 70%RH	120Vac, 60Hz	Martin Lee
APCM	25deg. C, 60%RH	120Vac, 60Hz	Frank Liu

FOR 5.0GHz (5725 ~ 5825MHz):

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Power from adapter
B	-	√	√	-	Power from POE

Where **RE≥1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

NOTE 1: “-” means no effect.

NOTE 2: The EUT had been pre-tested on the positioned of X-plane and Z-plane. 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)
A	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
A	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

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)
A, B	802.11a	149 to 165	157	OFDM	BPSK	6.0

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)
A, B	802.11a	149 to 165	157	OFDM	BPSK	6.0

BANDEDGE MEASUREMENT:

- ☒ 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)
A	802.11a	149 to 165	149, 165	OFDM	BPSK	6.0
A	802.11n (20MHz)	149 to 165	149, 165	OFDM	BPSK	7.2
A	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

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)
A	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
A	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	22deg. C, 72%RH	120Vac, 60Hz	Martin Lee
RE<1G	24deg. C, 67%RH	120Vac, 60Hz	Martin Lee
PLC	20deg. C, 70%RH	120Vac, 60Hz	Martin Lee
APCM	25deg. C, 60%RH	120Vac, 60Hz	Frank Liu

3.3 DUTY CYCLE OF TEST SIGNAL

For 2.4GHz Band:

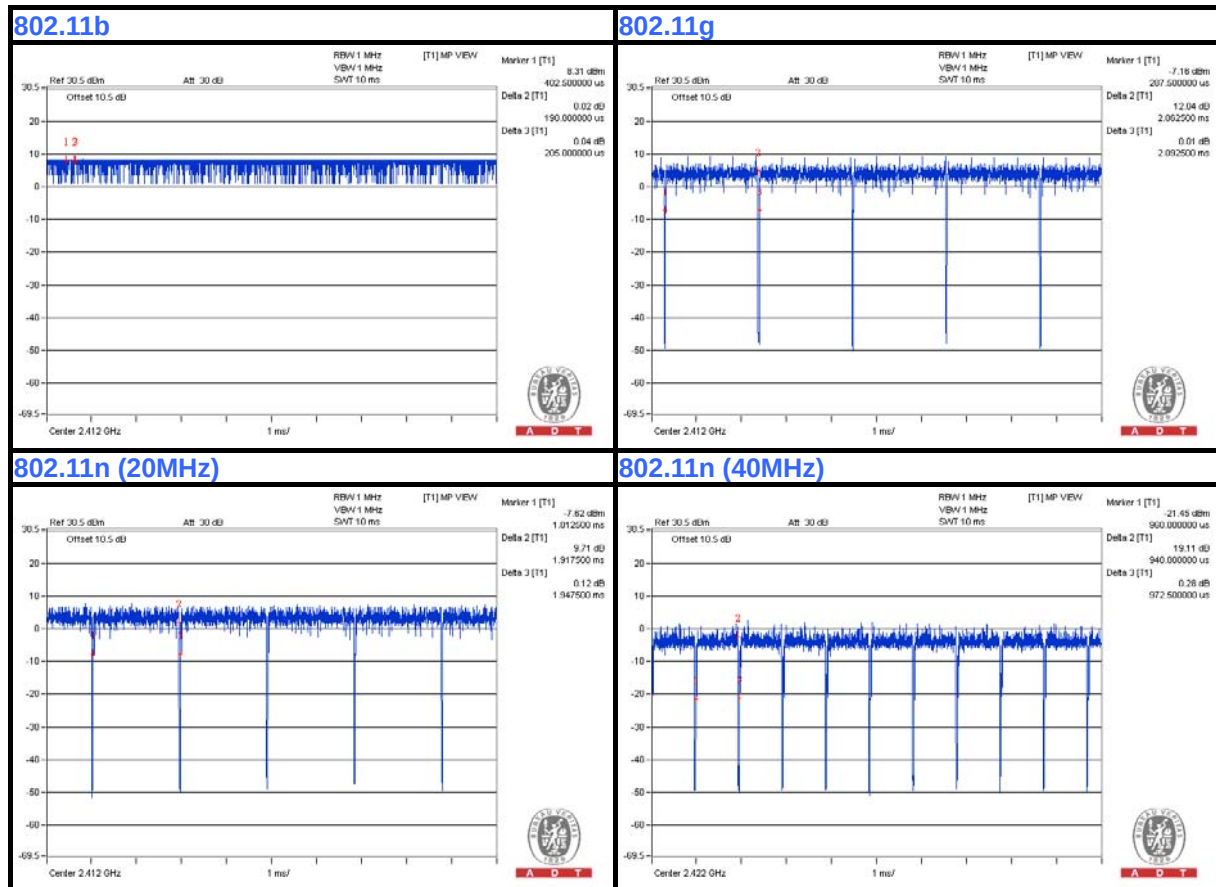
If duty cycle is < 98%, duty factor shall be considered.

802.11b: Duty cycle of test signal is > 98 %, duty factor is not required.

802.11g: Duty cycle of test signal is > 98 %, duty factor is not required.

802.11n (20MHz): Duty cycle of test signal is > 98 %, duty factor is not required.

802.11n (40MHz): Duty cycle = $0.940/0.972 = 0.967$, Duty factor = $10 * \log(1/0.967) = 0.15$



For 5GHz Band:

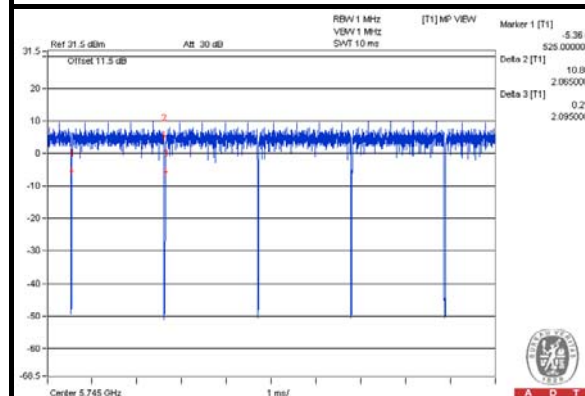
If duty cycle is < 98%, duty factor shall be considered.

802.11a: Duty cycle of test signal is > 98 %, duty factor is not required.

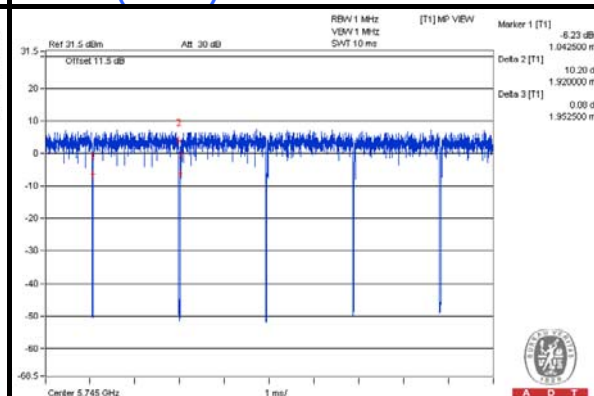
802.11n (20MHz): Duty cycle of test signal is > 98 %, duty factor is not required.

802.11n (40MHz): Duty cycle = $0.945/0.975 = 0.969$, Duty factor = $10 * \log(1/0.969) = 0.14$

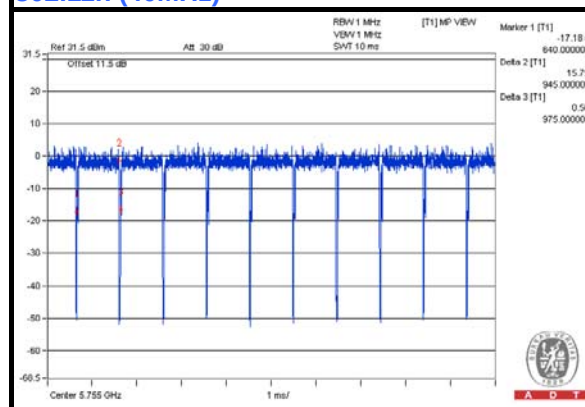
802.11a



802.11n (20MHz)



802.11n (40MHz)



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3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	D820	21498926752	FCC DoC Approved
2	POE	NA	AIR-PWRINJ1 500-2	NA	NA

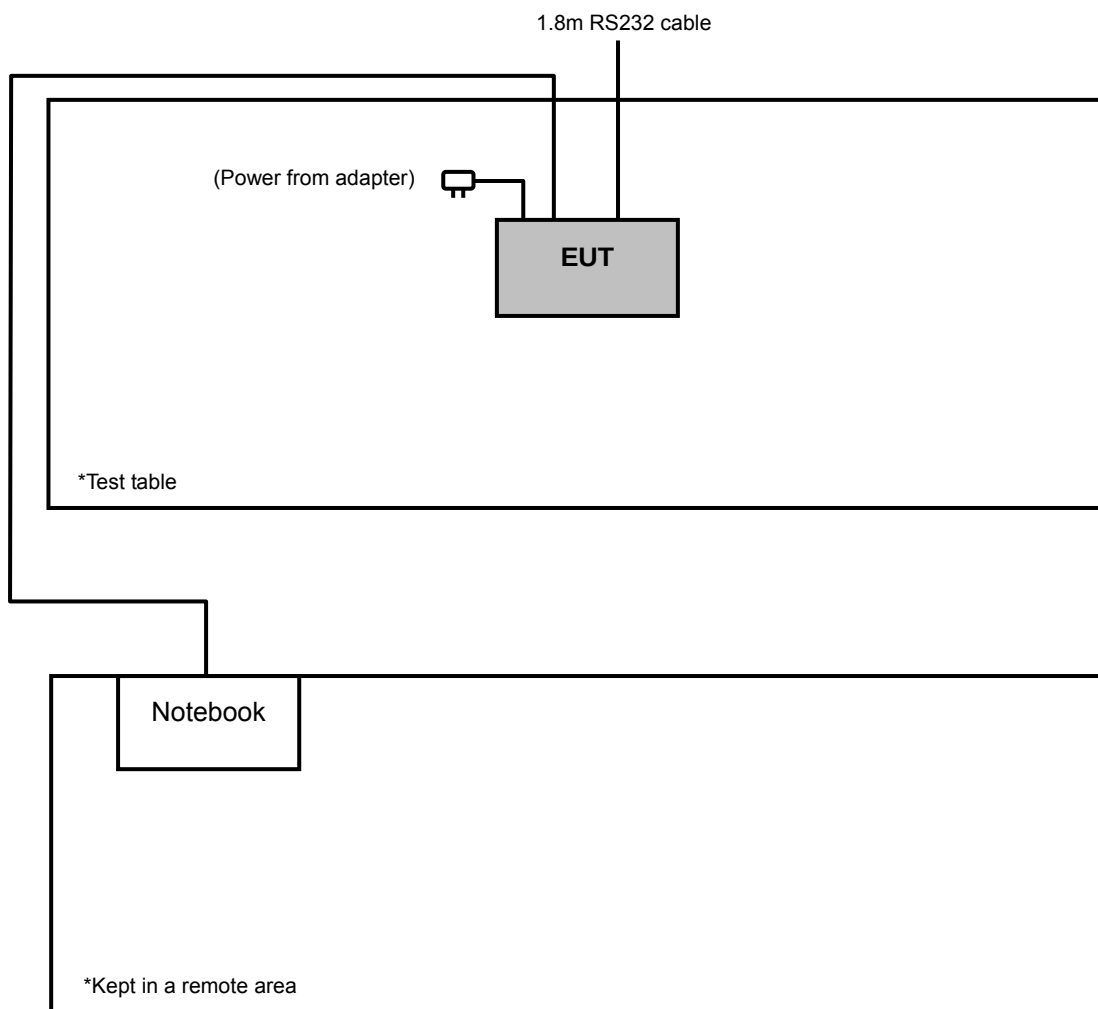
NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m RJ45 UTP cable
2	10m RJ45 UTP cable

NOTE:

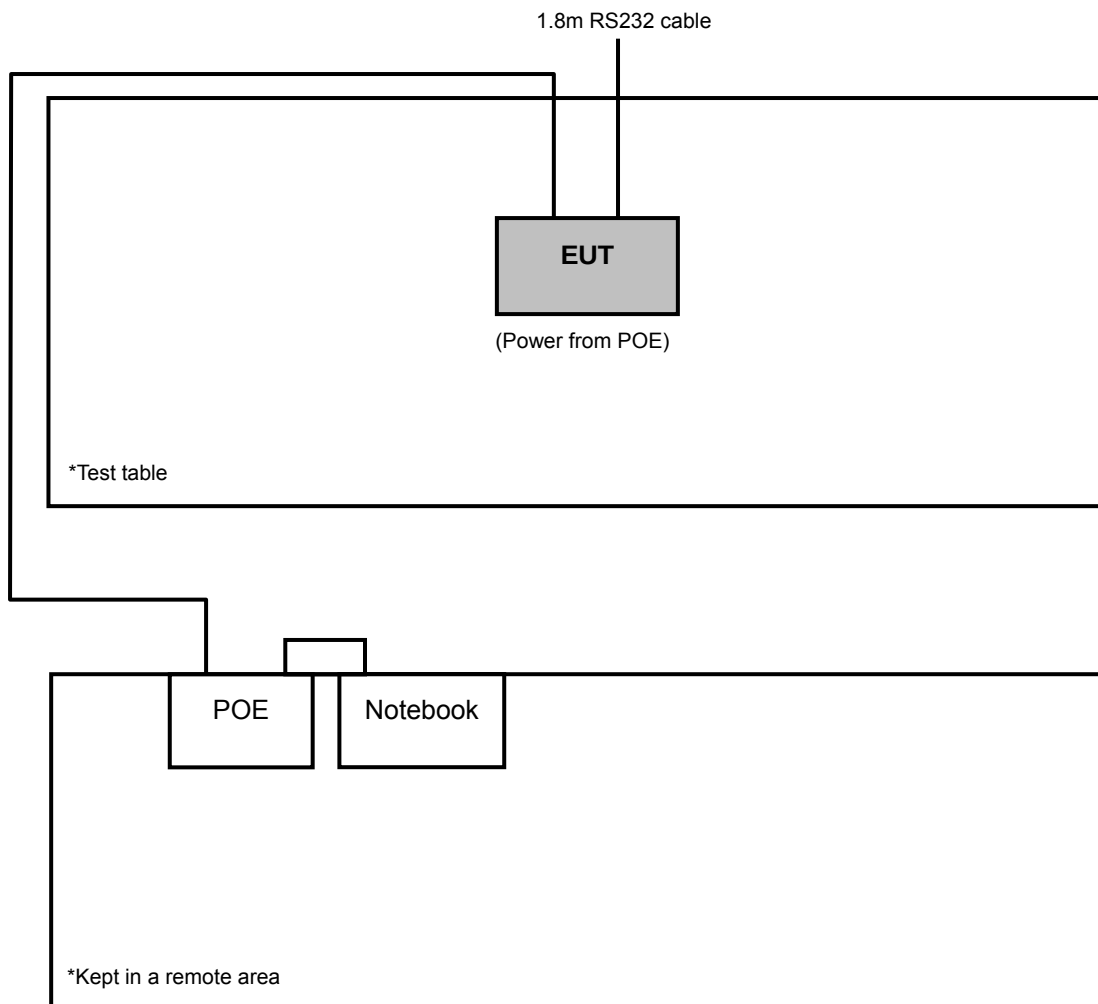
1. All power cords of the above support units are non-shielded (1.8m).
2. Items 1-2 acted as communication partners to transfer data.

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST

Test mode A



Test mode B





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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 v03r01

662911 D01 Multiple Transmitter Output v02

ANSI C63.10-2009

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It 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 (FOR 2.4GHz BAND)

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.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Nov. 16, 2012	Nov. 15, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jan. 28, 2013	Jan. 27, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Apr. 03, 2012	Apr. 02, 2013
			Mar. 22, 2013	Mar. 21, 2014
HORN Antenna SCHWARZBECK	BBHA 9120 D	209	Sep. 13, 2012	Sep. 12, 2013
			Sep. 12, 2013	Sep. 11, 2014
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 16, 2012	Jul. 15, 2013
			Jul. 15, 2013	Jul. 14, 2014
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier Agilent	8449B	3008A01911	Oct. 25, 2012	Oct. 24, 2013
Preamplifier Agilent	8447D	2944A10638	Oct. 25, 2012	Oct. 24, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309222/4 248780/4 274392/4	Aug. 23, 2012	Aug. 22, 2013
			Aug. 22, 2013	Aug. 21, 2014
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 12, 2012	Aug. 11, 2013
			Aug. 11, 2013	Aug. 10, 2014
Software	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	NA	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 25, 2012	Oct. 24, 2013
High Speed Peak Power Meter	ML2495A	0824011	Jul. 30, 2012	Jul. 29, 2013
			Jul. 29, 2013	Jul. 28, 2014
Power Sensor	MA2411B	0738171	Jul. 30, 2012	Jul. 29, 2013
			Jul. 29, 2013	Jul. 28, 2014

- 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 loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in HwaYa Chamber 9.
4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
5. The FCC Site Registration No. is 215374.
6. The IC Site Registration No. is IC 7450F-9.

4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. 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 antenna is a broadband antenna, and its height 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

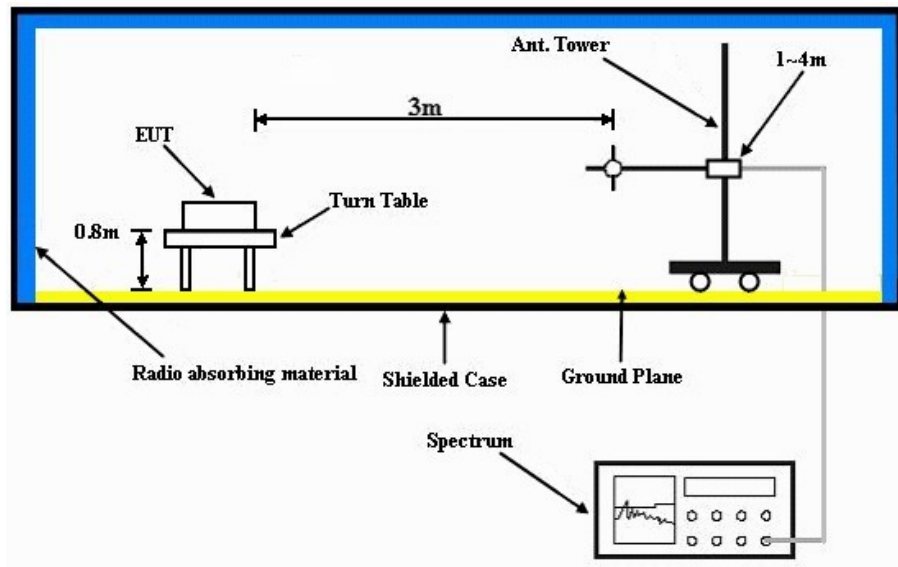
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

4.1.4 DEVIATION FROM TEST STANDARD

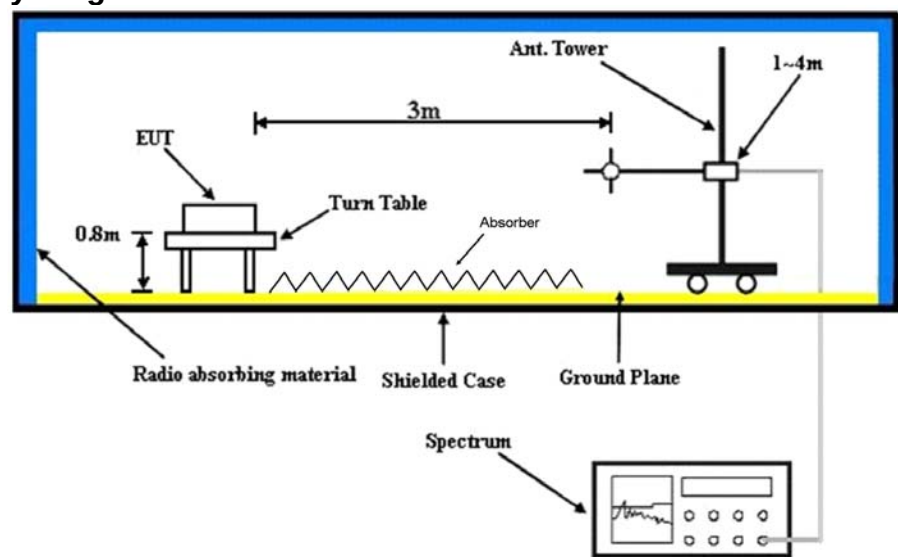
No deviation.

4.1.5 TEST SETUP

Frequency range 30MHz~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

- a. Placed the EUT on the testing table.
- b. Prepared a notebook to act as a communication partner and placed it outside of testing area.
- c. 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.
- d. The communication partners sent data to EUT by command "PING".
- e. The necessary accessories enabled the system in full functions.



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4.1.7 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA :

802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.1 PK	74.0	-12.9	1.61 H	97	29.10	32.00
2	2390.00	49.1 AV	54.0	-4.9	1.61 H	97	17.10	32.00
3	*2412.00	112.6 PK			1.61 H	97	80.60	32.00
4	*2412.00	108.2 AV			1.61 H	97	76.20	32.00
5	4824.00	48.7 PK	74.0	-25.3	1.46 H	76	9.90	38.80
6	4824.00	38.1 AV	54.0	-15.9	1.46 H	76	-0.70	38.80
7	7236.00	53.4 PK	74.0	-20.6	1.22 H	45	10.50	42.90
8	7236.00	42.0 AV	54.0	-12.0	1.22 H	45	-0.90	42.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.0 PK	74.0	-18.0	1.11 V	306	24.00	32.00
2	2390.00	45.8 AV	54.0	-8.2	1.11 V	306	13.80	32.00
3	*2412.00	98.7 PK			1.11 V	306	66.70	32.00
4	*2412.00	94.2 AV			1.11 V	306	62.20	32.00
5	4824.00	47.4 PK	74.0	-26.6	1.16 V	156	8.60	38.80
6	4824.00	37.3 AV	54.0	-16.7	1.16 V	156	-1.50	38.80
7	7236.00	51.6 PK	74.0	-22.4	1.25 V	44	8.70	42.90
8	7236.00	38.7 AV	54.0	-15.3	1.25 V	44	-4.20	42.90

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	111.8 PK			1.58 H	100	79.70	32.10
2	*2437.00	107.3 AV			1.58 H	100	75.20	32.10
3	4874.00	48.7 PK	74.0	-25.3	1.48 H	75	9.80	38.90
4	4874.00	37.8 AV	54.0	-16.2	1.48 H	75	-1.10	38.90
5	7311.00	53.8 PK	74.0	-20.2	1.20 H	47	10.60	43.20
6	7311.00	42.6 AV	54.0	-11.4	1.20 H	47	-0.60	43.20
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	97.7 PK			1.53 V	133	65.60	32.10
2	*2437.00	93.8 AV			1.53 V	133	61.70	32.10
3	4874.00	47.2 PK	74.0	-26.8	1.24 V	155	8.30	38.90
4	4874.00	37.0 AV	54.0	-17.0	1.24 V	155	-1.90	38.90
5	7311.00	51.2 PK	74.0	-22.8	1.26 V	47	8.00	43.20
6	7311.00	38.9 AV	54.0	-15.1	1.26 V	47	-4.30	43.20

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	111.7 PK			1.54 H	113	79.60	32.10
2	*2462.00	107.8 AV			1.54 H	113	75.70	32.10
3	2483.50	62.0 PK	74.0	-12.0	1.54 H	113	29.80	32.20
4	2483.50	50.0 AV	54.0	-4.0	1.54 H	113	17.80	32.20
5	4924.00	48.9 PK	74.0	-25.1	1.32 H	46	9.90	39.00
6	4924.00	38.9 AV	54.0	-15.1	1.32 H	46	-0.10	39.00
7	7386.00	54.2 PK	74.0	-19.8	1.22 H	50	10.80	43.40
8	7386.00	43.2 AV	54.0	-10.8	1.22 H	50	-0.20	43.40
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	98.7 PK			1.32 V	135	66.60	32.10
2	*2462.00	94.6 AV			1.32 V	135	62.50	32.10
3	2483.50	58.0 PK	74.0	-16.0	1.32 V	135	25.80	32.20
4	2483.50	47.4 AV	54.0	-6.6	1.32 V	135	15.20	32.20
5	4924.00	47.9 PK	74.0	-26.1	1.12 V	157	8.90	39.00
6	4924.00	38.2 AV	54.0	-15.8	1.12 V	157	-0.80	39.00
7	7386.00	52.3 PK	74.0	-21.7	1.28 V	44	8.90	43.40
8	7386.00	38.7 AV	54.0	-15.3	1.28 V	44	-4.70	43.40

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



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802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	72.2 PK	74.0	-1.8	1.33 H	110	40.20	32.00
2	2390.00	52.4 AV	54.0	-1.6	1.33 H	110	20.40	32.00
3	*2412.00	113.2 PK			1.33 H	110	81.20	32.00
4	*2412.00	103.3 AV			1.33 H	110	71.30	32.00
5	4824.00	47.2 PK	74.0	-26.8	1.03 H	65	8.40	38.80
6	4824.00	34.8 AV	54.0	-19.2	1.03 H	65	-4.00	38.80
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	61.9 PK	74.0	-12.1	1.39 V	74	29.90	32.00
2	2390.00	47.3 AV	54.0	-6.7	1.39 V	74	15.30	32.00
3	*2412.00	101.9 PK			1.36 V	74	69.90	32.00
4	*2412.00	92.0 AV			1.36 V	74	60.00	32.00
5	4824.00	47.9 PK	74.0	-26.1	1.00 V	244	9.10	38.80
6	4824.00	35.2 AV	54.0	-18.8	1.00 V	244	-3.60	38.80

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.9 PK	74.0	-15.1	1.31 H	110	26.90	32.00
2	2390.00	47.4 AV	54.0	-6.6	1.31 H	110	15.40	32.00
3	*2437.00	114.3 PK			1.31 H	110	82.20	32.10
4	*2437.00	104.4 AV			1.31 H	110	72.30	32.10
5	2483.50	60.4 PK	74.0	-13.6	1.31 H	110	28.20	32.20
6	2483.50	48.5 AV	54.0	-5.5	1.31 H	110	16.30	32.20
7	4874.00	47.3 PK	74.0	-26.7	1.05 H	66	8.40	38.90
8	4874.00	34.5 AV	54.0	-19.5	1.05 H	66	-4.40	38.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.4 PK	74.0	-18.6	1.57 V	132	23.40	32.00
2	2390.00	46.0 AV	54.0	-8.0	1.57 V	132	14.00	32.00
3	*2437.00	104.8 PK			1.57 V	132	72.70	32.10
4	*2437.00	94.7 AV			1.57 V	132	62.60	32.10
5	2483.50	57.4 PK	74.0	-16.6	1.57 V	132	25.20	32.20
6	2483.50	46.0 AV	54.0	-8.0	1.57 V	132	13.80	32.20
7	4874.00	46.5 PK	74.0	-27.5	1.44 V	52	7.60	38.90
8	4874.00	34.2 AV	54.0	-19.8	1.44 V	52	-4.70	38.90

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	113.1 PK			1.53 H	99	81.00	32.10
2	*2462.00	103.0 AV			1.53 H	99	70.90	32.10
3	2483.50	71.2 PK	74.0	-2.8	1.53 H	99	39.00	32.20
4	2483.50	52.2 AV	54.0	-1.8	1.53 H	99	20.00	32.20
5	4924.00	47.7 PK	74.0	-26.3	1.05 H	66	8.70	39.00
6	4924.00	35.2 AV	54.0	-18.8	1.05 H	66	-3.80	39.00
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	101.7 PK			1.57 V	132	69.60	32.10
2	*2462.00	91.6 AV			1.57 V	132	59.50	32.10
3	2483.50	60.5 PK	74.0	-13.5	1.57 V	132	28.30	32.20
4	2483.50	47.1 AV	54.0	-6.9	1.57 V	132	14.90	32.20
5	4924.00	48.5 PK	74.0	-25.5	1.00 V	225	9.50	39.00
6	4924.00	36.9 AV	54.0	-17.1	1.00 V	225	-2.10	39.00

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



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802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	72.1 PK	74.0	-1.9	1.35 H	107	40.10	32.00
2	2390.00	52.2 AV	54.0	-1.8	1.35 H	107	20.20	32.00
3	*2412.00	112.9 PK			1.35 H	107	80.90	32.00
4	*2412.00	102.0 AV			1.35 H	107	70.00	32.00
5	4824.00	47.3 PK	74.0	-26.7	1.22 H	55	8.50	38.80
6	4824.00	34.5 AV	54.0	-19.5	1.22 H	55	-4.30	38.80
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	1.38 V	75	29.70	32.00
2	2390.00	47.2 AV	54.0	-6.8	1.38 V	75	15.20	32.00
3	*2412.00	101.7 PK			1.38 V	75	69.70	32.00
4	*2412.00	92.1 AV			1.38 V	75	60.10	32.00
5	4824.00	48.2 PK	74.0	-25.8	1.02 V	254	9.40	38.80
6	4824.00	36.2 AV	54.0	-17.8	1.02 V	254	-2.60	38.80

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	-11.9	1.31 H	98	30.10	32.00
2	2390.00	47.6 AV	54.0	-6.4	1.31 H	98	15.60	32.00
3	*2437.00	113.1 PK			1.31 H	98	81.00	32.10
4	*2437.00	103.9 AV			1.31 H	98	71.80	32.10
5	2483.50	61.1 PK	74.0	-12.9	1.31 H	98	28.90	32.20
6	2483.50	49.1 AV	54.0	-4.9	1.31 H	98	16.90	32.20
7	4874.00	47.2 PK	74.0	-26.8	1.06 H	99	8.30	38.90
8	4874.00	34.5 AV	54.0	-19.5	1.06 H	99	-4.40	38.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.4 PK	74.0	-18.6	1.55 V	130	23.40	32.00
2	2390.00	45.8 AV	54.0	-8.2	1.55 V	130	13.80	32.00
3	*2437.00	103.7 PK			1.55 V	130	71.60	32.10
4	*2437.00	93.8 AV			1.55 V	130	61.70	32.10
5	2483.50	57.2 PK	74.0	-16.8	1.55 V	130	25.00	32.20
6	2483.50	46.1 AV	54.0	-7.9	1.55 V	130	13.90	32.20
7	4874.00	46.6 PK	74.0	-27.4	1.63 V	55	7.70	38.90
8	4874.00	34.0 AV	54.0	-20.0	1.63 V	55	-4.90	38.90

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	110.5 PK			1.32 H	105	78.40	32.10
2	*2462.00	100.9 AV			1.32 H	105	68.80	32.10
3	2483.50	70.7 PK	74.0	-3.3	1.08 H	98	38.50	32.20
4	2483.50	53.0 AV	54.0	-1.0	1.08 H	98	20.80	32.20
5	4924.00	46.9 PK	74.0	-27.1	1.45 H	55	7.90	39.00
6	4924.00	35.7 AV	54.0	-18.3	1.45 H	55	-3.30	39.00
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	101.1 PK			1.12 V	208	69.00	32.10
2	*2462.00	90.1 AV			1.12 V	208	58.00	32.10
3	2483.50	64.5 PK	74.0	-9.5	1.12 V	208	32.30	32.20
4	2483.50	48.1 AV	54.0	-5.9	1.12 V	208	15.90	32.20
5	4924.00	48.2 PK	74.0	-25.8	1.06 V	66	9.20	39.00
6	4924.00	36.5 AV	54.0	-17.5	1.06 V	66	-2.50	39.00

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



A D T

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	1.60 H	82	36.40	32.00
2	2390.00	52.9 AV	54.0	-1.1	1.60 H	82	20.90	32.00
3	*2422.00	107.7 PK			1.60 H	82	75.60	32.10
4	*2422.00	97.6 AV			1.60 H	82	65.50	32.10
5	4844.00	47.0 PK	74.0	-27.0	1.32 H	55	8.20	38.80
6	4844.00	34.7 AV	54.0	-19.3	1.32 H	55	-4.10	38.80
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	61.3 PK	74.0	-12.7	1.58 V	132	29.30	32.00
2	2390.00	48.0 AV	54.0	-6.0	1.58 V	132	16.00	32.00
3	*2422.00	95.3 PK			1.58 V	132	63.20	32.10
4	*2422.00	85.8 AV			1.58 V	132	53.70	32.10
5	4844.00	47.6 PK	74.0	-26.4	1.05 V	44	8.80	38.80
6	4844.00	34.6 AV	54.0	-19.4	1.05 V	44	-4.20	38.80

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	1.32 H	107	36.10	32.00
2	2390.00	51.1 AV	54.0	-2.9	1.32 H	107	19.10	32.00
3	*2437.00	109.0 PK			1.33 H	98	76.90	32.10
4	*2437.00	100.0 AV			1.33 H	98	67.90	32.10
5	2483.50	67.0 PK	74.0	-7.0	1.32 H	107	34.80	32.20
6	2483.50	53.0 AV	54.0	-1.0	1.32 H	107	20.80	32.20
7	4874.00	47.5 PK	74.0	-26.5	1.02 H	255	8.60	38.90
8	4874.00	34.5 AV	54.0	-19.5	1.02 H	255	-4.40	38.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.3 PK	74.0	-16.7	1.00 V	358	25.30	32.00
2	2390.00	46.4 AV	54.0	-7.6	1.00 V	358	14.40	32.00
3	*2437.00	99.4 PK			1.00 V	358	67.30	32.10
4	*2437.00	89.3 AV			1.00 V	358	57.20	32.10
5	2483.50	59.1 PK	74.0	-14.9	1.00 V	358	26.90	32.20
6	2483.50	47.4 AV	54.0	-6.6	1.00 V	358	15.20	32.20
7	4874.00	47.3 PK	74.0	-26.7	1.05 V	55	8.40	38.90
8	4874.00	34.5 AV	54.0	-19.5	1.05 V	55	-4.40	38.90

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	106.3 PK			1.54 H	99	74.20	32.10
2	*2452.00	96.0 AV			1.54 H	99	63.90	32.10
3	2483.50	65.4 PK	74.0	-8.6	1.54 H	99	33.20	32.20
4	2483.50	52.9 AV	54.0	-1.1	1.54 H	99	20.70	32.20
5	4904.00	46.8 PK	74.0	-27.2	1.24 H	5	7.90	38.90
6	4904.00	34.3 AV	54.0	-19.7	1.24 H	5	-4.60	38.90
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	93.9 PK			1.54 V	132	61.80	32.10
2	*2452.00	84.7 AV			1.54 V	132	52.60	32.10
3	2483.50	59.8 PK	74.0	-14.2	1.54 V	132	27.60	32.20
4	2483.50	47.0 AV	54.0	-7.0	1.54 V	132	14.80	32.20
5	4904.00	47.4 PK	74.0	-26.6	1.11 V	11	8.50	38.90
6	4904.00	34.2 AV	54.0	-19.8	1.11 V	11	-4.70	38.90

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



A D T

BELOW 1GHz WORST-CASE DATA : 802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 67%RH	TESTED BY	Martin Lee
TEST MODE	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	62.98	37.6 QP	40.0	-2.4	1.69 H	100	24.70	12.90
2	86.26	36.6 QP	40.0	-3.4	1.00 H	195	28.20	8.40
3	262.80	35.9 QP	46.0	-10.1	1.20 H	16	22.40	13.50
4	522.76	38.0 QP	46.0	-8.0	1.77 H	190	17.40	20.60
5	749.74	43.3 QP	46.0	-2.7	1.55 H	287	19.10	24.20
6	875.84	40.9 QP	46.0	-5.1	1.00 H	135	14.80	26.10
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	59.10	37.1 QP	40.0	-2.9	1.44 V	133	23.90	13.20
2	62.98	37.8 QP	40.0	-2.2	1.57 V	156	24.90	12.90
3	299.66	37.8 QP	46.0	-8.2	1.65 V	60	22.90	14.90
4	625.58	40.5 QP	46.0	-5.5	2.25 V	46	17.90	22.60
5	705.12	44.4 QP	46.0	-1.6	1.87 V	16	21.00	23.40
6	749.74	44.9 QP	46.0	-1.1	1.65 V	279	20.70	24.20

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 67%RH	TESTED BY	Martin Lee
TEST MODE	B		

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	86.26	36.6 QP	40.0	-3.4	1.54 H	122	28.20	8.40
2	299.66	37.9 QP	46.0	-8.1	1.44 H	87	23.00	14.90
3	625.58	42.5 QP	46.0	-3.5	1.63 H	36	19.90	22.60
4	718.70	41.9 QP	46.0	-4.1	1.77 H	49	18.20	23.70
5	749.74	41.4 QP	46.0	-4.6	1.05 H	332	17.20	24.20
6	875.84	41.0 QP	46.0	-5.0	1.96 H	216	14.90	26.10
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	31.94	37.8 QP	40.0	-2.2	1.00 V	58	25.60	12.20
2	88.55	40.9 QP	43.5	-2.6	1.25 V	77	32.80	8.10
3	299.66	42.5 QP	46.0	-3.5	1.24 V	65	27.60	14.90
4	336.52	40.1 QP	46.0	-5.9	1.24 V	45	24.30	15.80
5	720.64	43.5 QP	46.0	-2.5	1.14 V	13	19.80	23.70
6	875.84	40.4 QP	46.0	-5.6	1.85 V	120	14.30	26.10

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).
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 OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	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.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Nov. 09, 2012	Nov. 08, 2013
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 28, 2012	Dec. 27, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 21, 2012	Dec. 20, 2013
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 18, 2012	Jul. 17, 2013
			Jul. 17, 2013	Jul. 16, 2014
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 2.
3. The VCCI Site Registration No. is C-2047.

4.2.3 TEST PROCEDURES

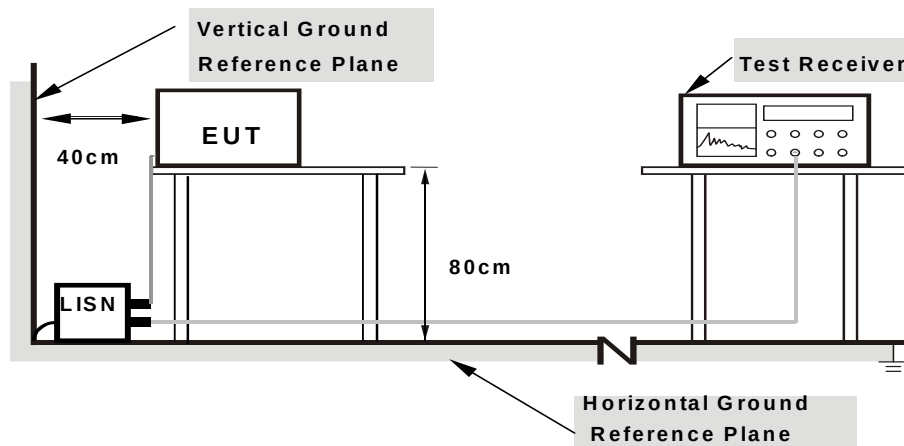
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



- Note:**
- Support units were connected to second LISN.
 - Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

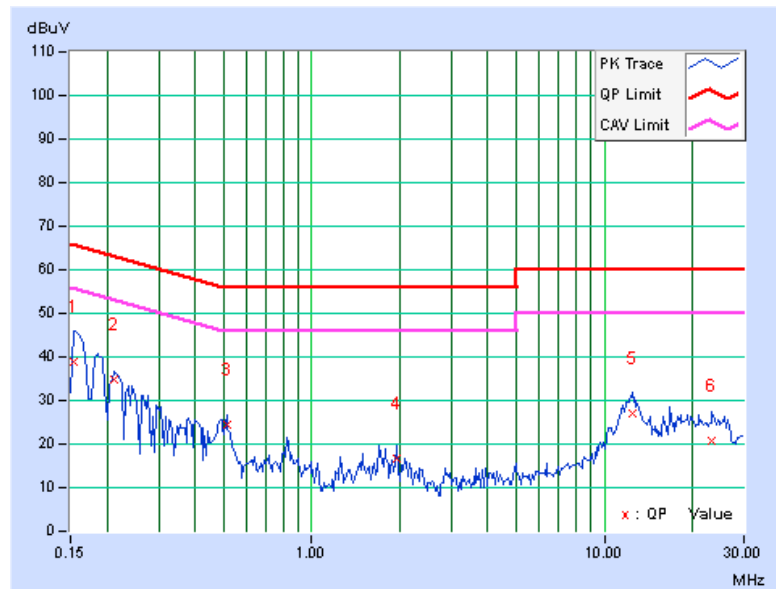
CONDUCTED WORST-CASE DATA : 802.11n (20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	A		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.13	38.71	18.63	38.84	18.76	65.79	55.79	-26.95	-37.03
2	0.21250	0.14	34.55	20.93	34.69	21.07	63.11	53.11	-28.41	-32.03
3	0.51328	0.19	24.09	16.23	24.28	16.42	56.00	46.00	-31.72	-29.58
4	1.95703	0.25	16.51	8.85	16.76	9.10	56.00	46.00	-39.24	-36.90
5	12.51563	0.77	26.34	21.93	27.11	22.70	60.00	50.00	-32.89	-27.30
6	23.35938	1.22	19.66	14.50	20.88	15.72	60.00	50.00	-39.12	-34.28

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.

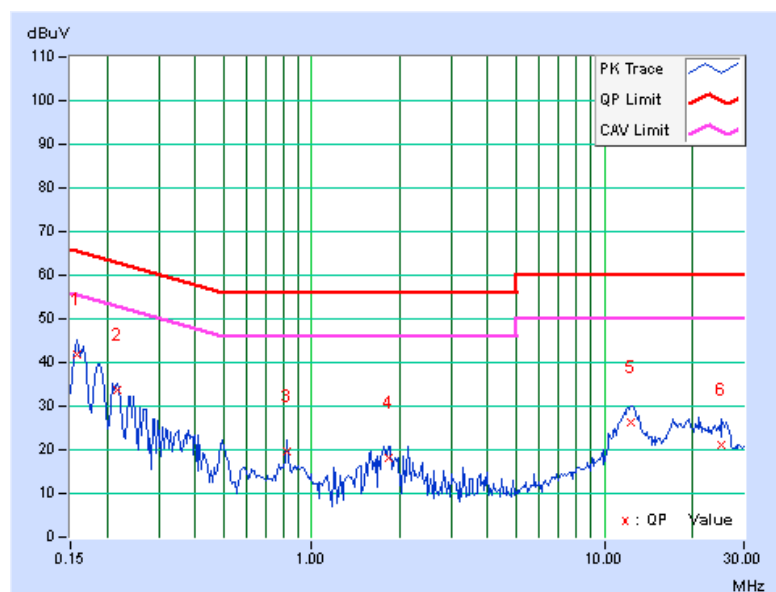


PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	A		

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	0.15781	0.15	41.87	26.88	42.02	27.03	65.58	55.58	-23.56	-28.55
2	0.21641	0.15	33.64	20.06	33.79	20.21	62.96	52.96	-29.16	-32.74
3	0.82578	0.22	19.55	18.79	19.77	19.01	56.00	46.00	-36.23	-26.99
4	1.83203	0.25	17.92	10.58	18.17	10.83	56.00	46.00	-37.83	-35.17
5	12.35938	0.63	25.57	21.11	26.20	21.74	60.00	50.00	-33.80	-28.26
6	25.04688	0.96	20.26	15.00	21.22	15.96	60.00	50.00	-38.78	-34.04

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.

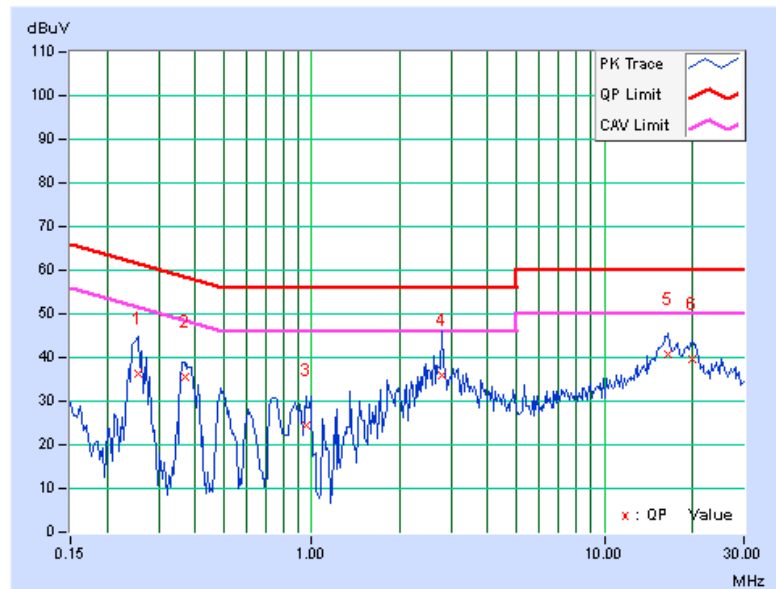


PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.25547	0.15	36.33	28.81	36.48	28.96	61.58	51.58	-25.10	-22.62
2	0.36875	0.17	35.25	20.11	35.42	20.28	58.53	48.53	-23.11	-28.25
3	0.95469	0.22	24.10	16.17	24.32	16.39	56.00	46.00	-31.68	-29.61
4	2.77734	0.30	35.80	24.80	36.10	25.10	56.00	46.00	-19.90	-20.90
5	16.53906	0.97	39.73	34.76	40.70	35.73	60.00	50.00	-19.30	-14.27
6	20.08203	1.14	38.45	33.45	39.59	34.59	60.00	50.00	-20.41	-15.41

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.

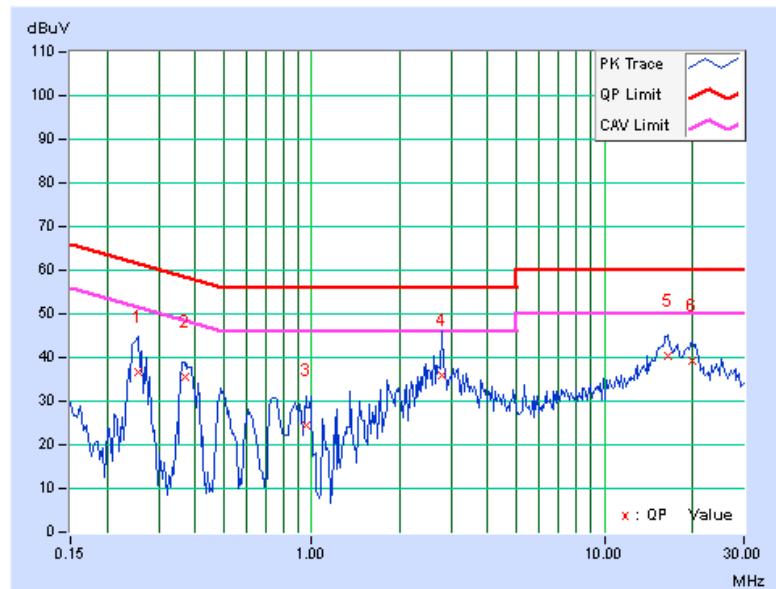


PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	B		

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	0.25547	0.16	36.33	28.81	36.49	28.97	61.58	51.58	-25.09	-22.61
2	0.36875	0.18	35.25	20.11	35.43	20.29	58.53	48.53	-23.10	-28.24
3	0.95469	0.23	24.10	16.17	24.33	16.40	56.00	46.00	-31.67	-29.60
4	2.77734	0.29	35.80	24.80	36.09	25.09	56.00	46.00	-19.91	-20.91
5	16.53906	0.77	39.73	34.76	40.50	35.53	60.00	50.00	-19.50	-14.47
6	20.08203	0.88	38.45	33.45	39.33	34.33	60.00	50.00	-20.67	-15.67

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.

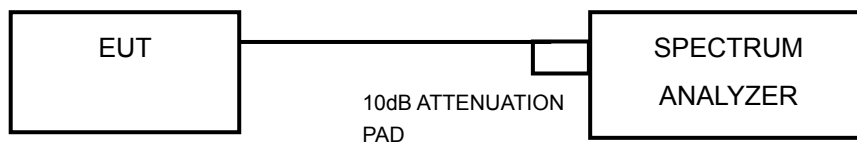


4.3 6dB BANDWIDTH MEASUREMENT

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

- Set resolution bandwidth (RBW) = 100kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	8.14	0.5	PASS
6	2437	8.09	0.5	PASS
11	2462	8.10	0.5	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.44	16.49	0.5	PASS
6	2437	16.45	16.46	0.5	PASS
11	2462	16.44	16.49	0.5	PASS

802.11n (20MHz)

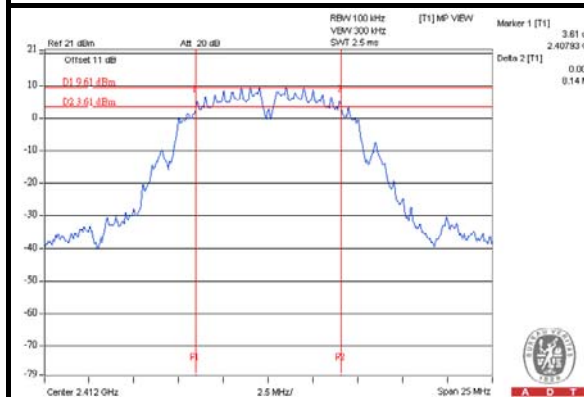
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.64	17.66	0.5	PASS
6	2437	17.63	17.64	0.5	PASS
11	2462	17.65	17.67	0.5	PASS

802.11n (40MHz)

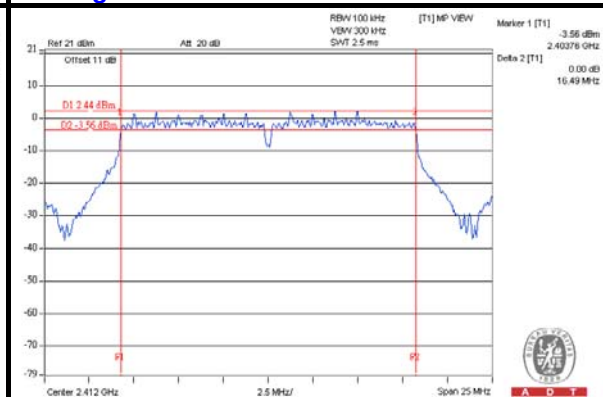
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	36.46	36.26	0.5	PASS
6	2437	36.45	36.38	0.5	PASS
9	2452	36.45	36.42	0.5	PASS

SPECTRUM PLOT OF WORST VALUE

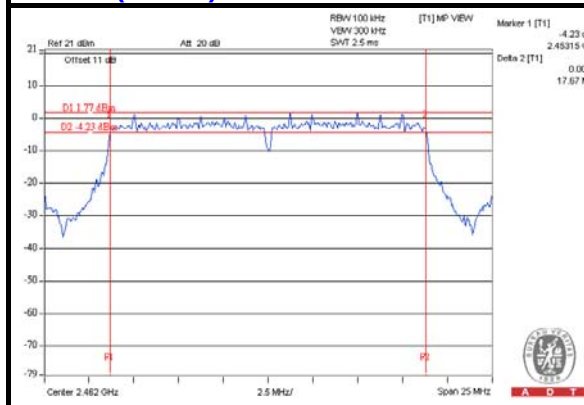
802.11b



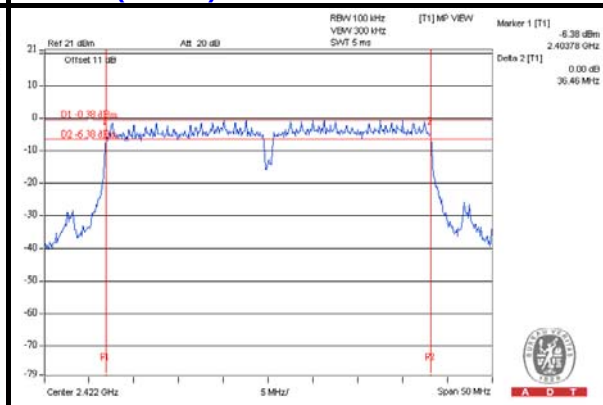
802.11g



802.11n (20MHz)



802.11n (40MHz)



4.4 CONDUCTED OUTPUT POWER

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 v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

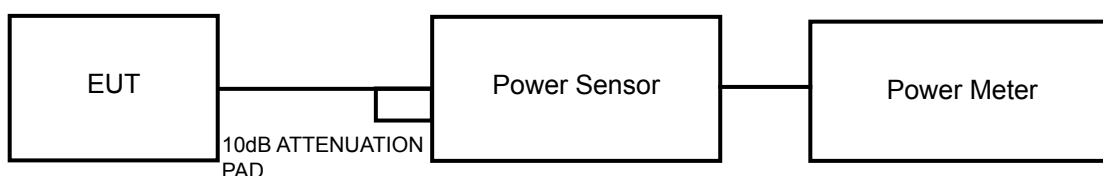
Array Gain = 0 dB (i.e., no array gain) for $NANT \leq 4$;

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 peak power level.

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

4.4.7 TEST RESULTS

FOR PEAK POWER

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	162.181	22.10	30	PASS
6	2437	169.824	22.30	30	PASS
11	2462	173.780	22.40	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	23.52	23.45	446.214	26.50	30	PASS
6	2437	25.70	25.30	710.379	28.51	30	PASS
11	2462	23.62	23.32	444.927	26.48	30	PASS

802.11n (20MHz)

CHAN.	FREQ. (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	23.42	23.33	435.064	26.39	30	PASS
6	2437	25.60	25.60	726.156	28.61	30	PASS
11	2462	23.24	22.57	391.580	25.93	30	PASS

802.11n (40MHz)

CHAN.	FREQ. (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	22.62	22.71	369.448	25.68	30	PASS
6	2437	23.96	23.91	494.923	26.95	30	PASS
9	2452	21.65	21.25	279.570	24.46	30	PASS

FOR AVERAGE POWER

802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	74.131	18.70
6	2437	72.444	18.60
11	2462	70.795	18.50

802.11g

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
1	2412	14.81	14.78	60.330	17.81
6	2437	18.10	18.00	127.661	21.06
11	2462	14.85	14.71	60.129	17.79

802.11n (20MHz)

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
1	2412	14.85	14.71	60.129	17.79
6	2437	18.20	18.30	133.677	21.26
11	2462	13.82	13.97	49.045	16.91

802.11n (40MHz)

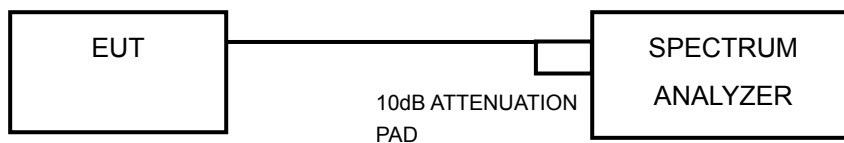
CHAN.	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
3	2422	14.34	14.23	53.649	17.30
6	2437	16.45	16.34	87.210	19.41
9	2452	13.45	12.94	41.810	16.21

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

- Set the RBW = 3 kHz, VBW = 10 kHz, Detector = peak.
- Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6.

4.5.7 TEST RESULTS

802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	4.15	8	PASS
6	2437	3.40	8	PASS
11	2462	4.15	8	PASS

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	-13.97	3.01	-10.96	8	PASS
	6	2437	-9.89	3.01	-6.88	8	PASS
	11	2462	-13.60	3.01	-10.59	8	PASS
1	1	2412	-14.11	3.01	-11.10	8	PASS
	6	2437	-8.88	3.01	-5.87	8	PASS
	11	2462	-13.99	3.01	-10.98	8	PASS

NOTE:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the limit no need to reduced.

802.11n (20MHz)

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	-12.10	3.01	-9.09	8	PASS
	6	2437	-9.15	3.01	-6.14	8	PASS
	11	2462	-13.57	3.01	-10.56	8	PASS
1	1	2412	-12.40	3.01	-9.39	8	PASS
	6	2437	-9.39	3.01	-6.38	8	PASS
	11	2462	-13.27	3.01	-10.26	8	PASS

NOTE:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the limit no need to reduced.

802.11n (40MHz)

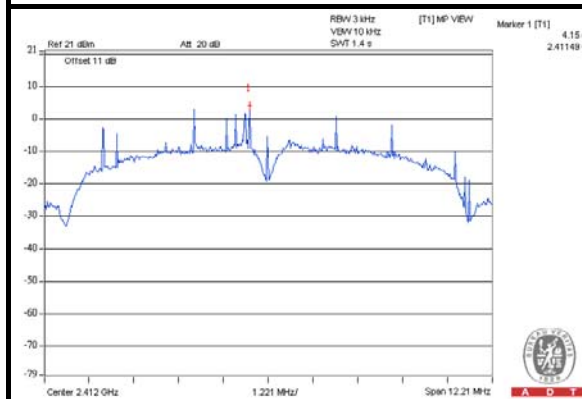
TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Duty Factor	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	3	2422	-15.56	3.01	0.15	-12.40	8	PASS
	6	2437	-10.84	3.01	0.15	-7.68	8	PASS
	9	2452	-15.47	3.01	0.15	-12.31	8	PASS
1	3	2422	-16.06	3.01	0.15	-12.90	8	PASS
	6	2437	-12.78	3.01	0.15	-9.62	8	PASS
	9	2452	-16.74	3.01	0.15	-13.58	8	PASS

NOTE:

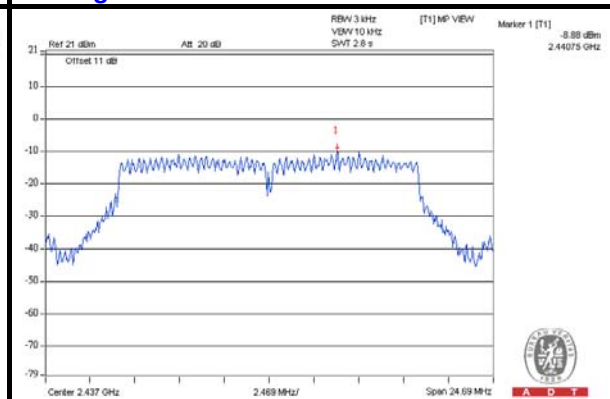
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

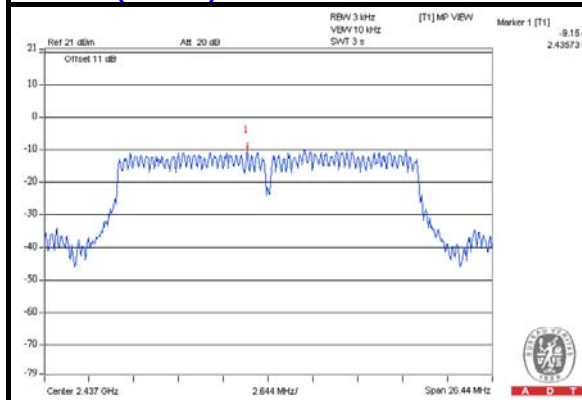
802.11b



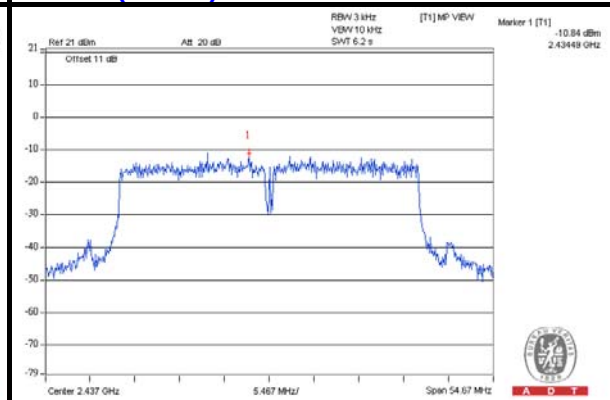
802.11g



802.11n (20MHz)



802.11n (40MHz)

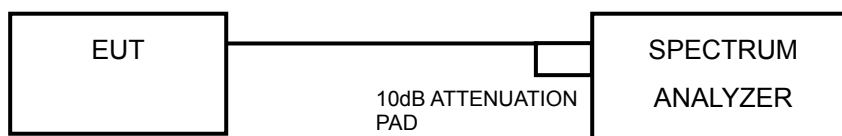


4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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. Set span to encompass the spectrum to be examined.
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

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 conducted emission test is performed on each TX port of operating mode without summing or adding $10\log(N)$ since the limit is relative emission limit.

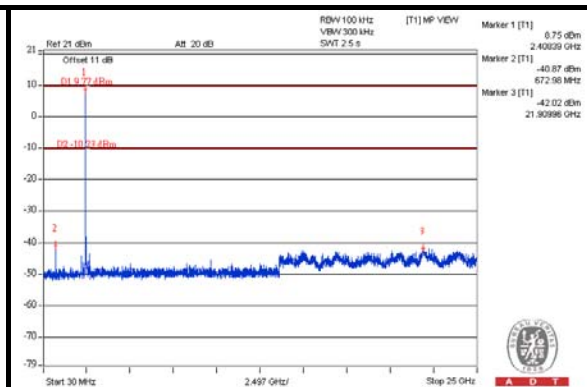
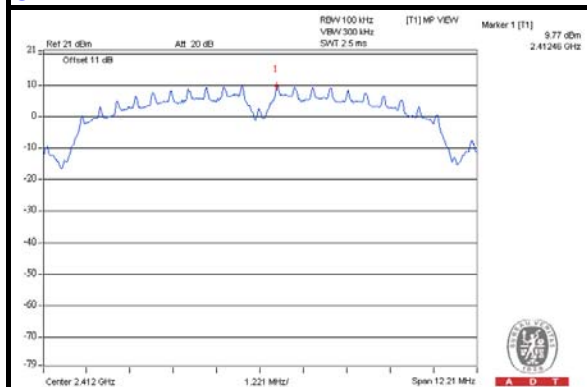
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



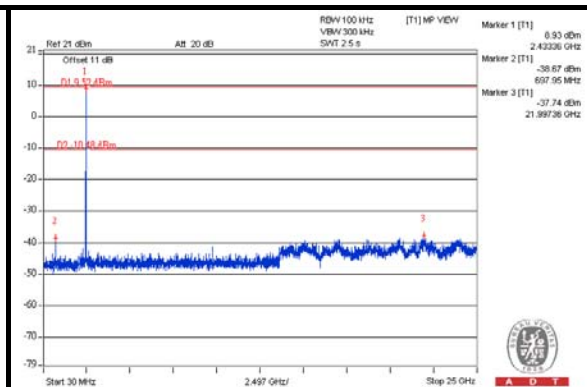
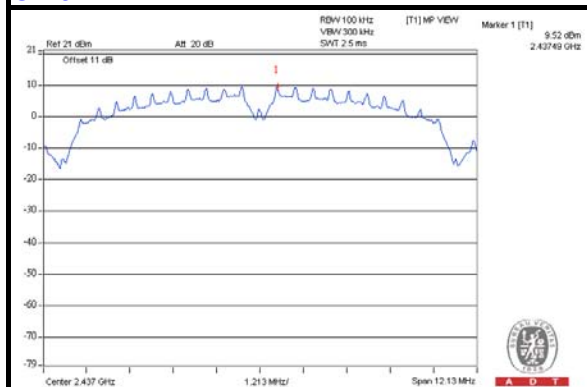
A D T

802.11b

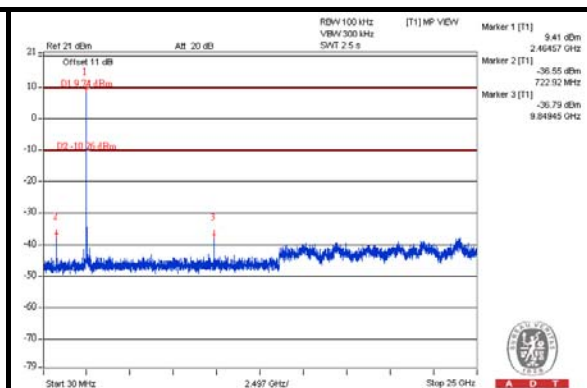
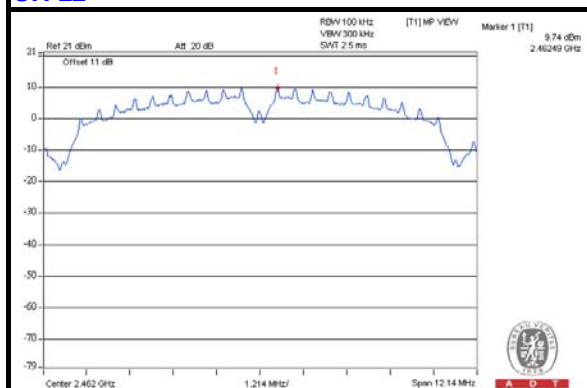
CH 1



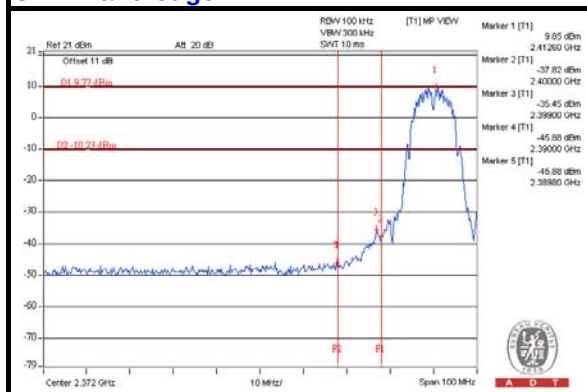
CH 6



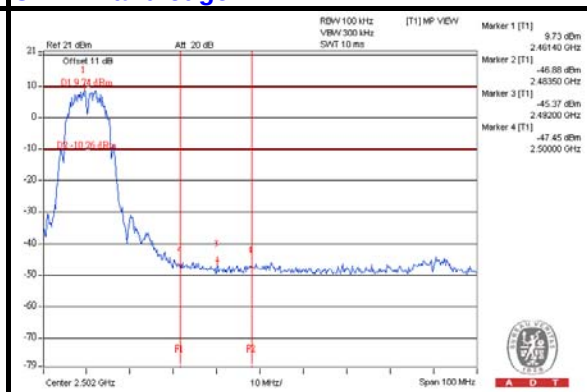
CH 11



CH 1 Band edge



CH 11 Band edge

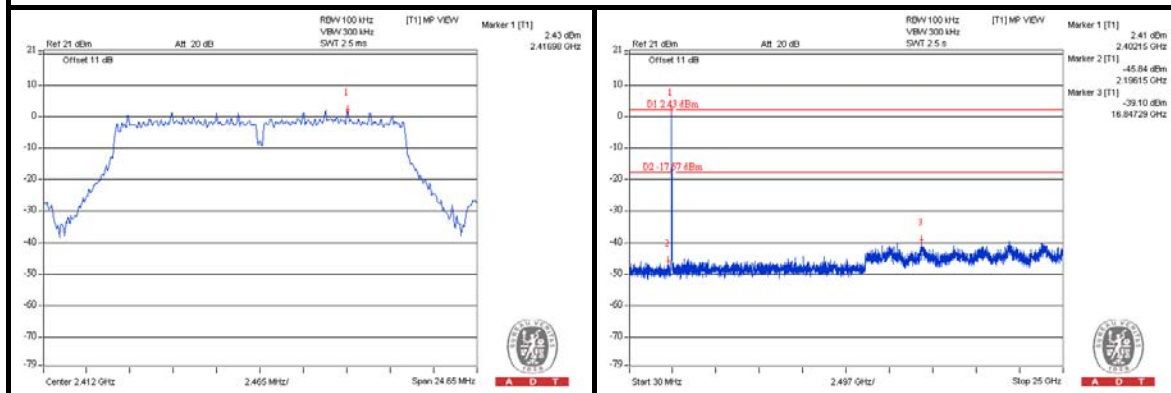




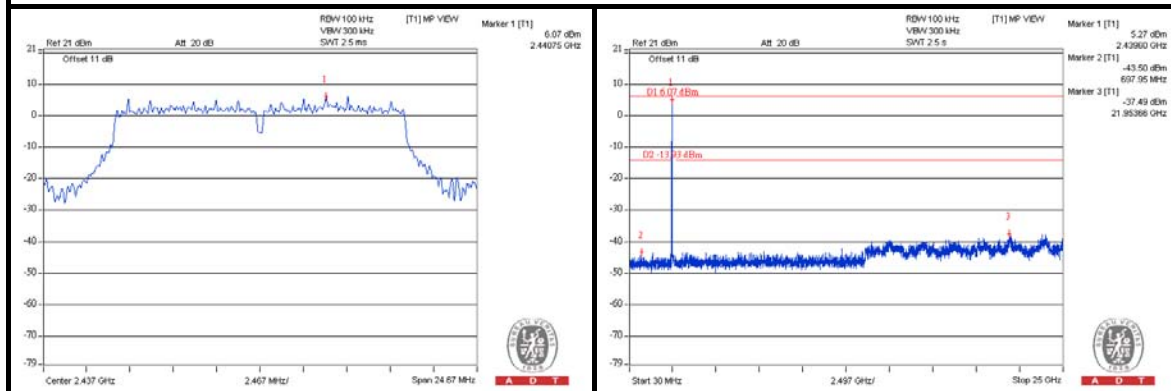
A D T

802.11g CHAIN 0

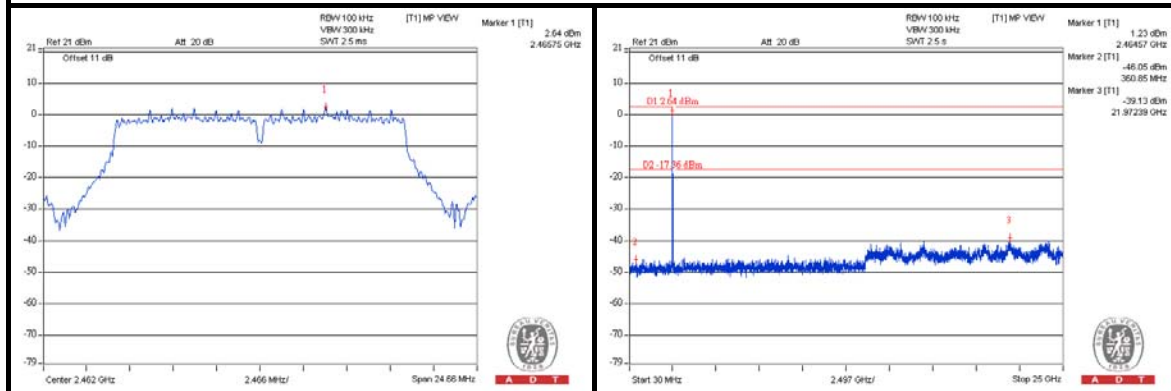
CH 1



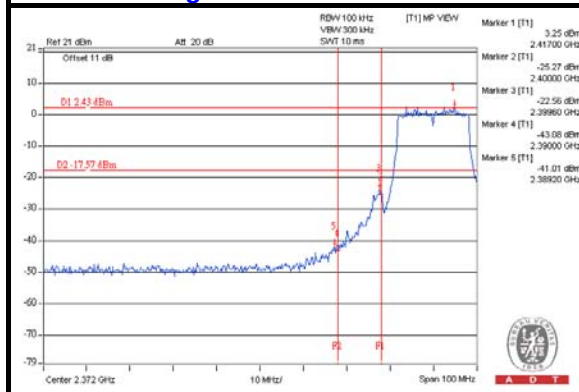
CH 6



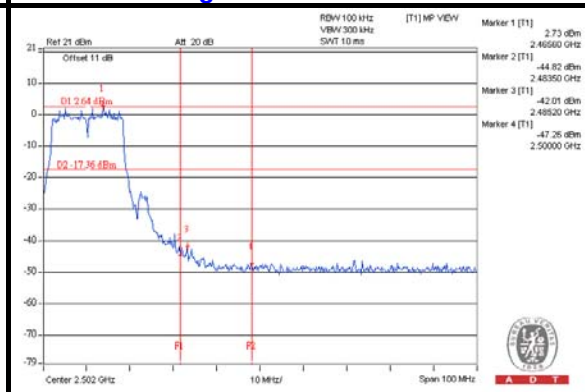
CH 11



CH 1 Band edge



CH 11 Band edge

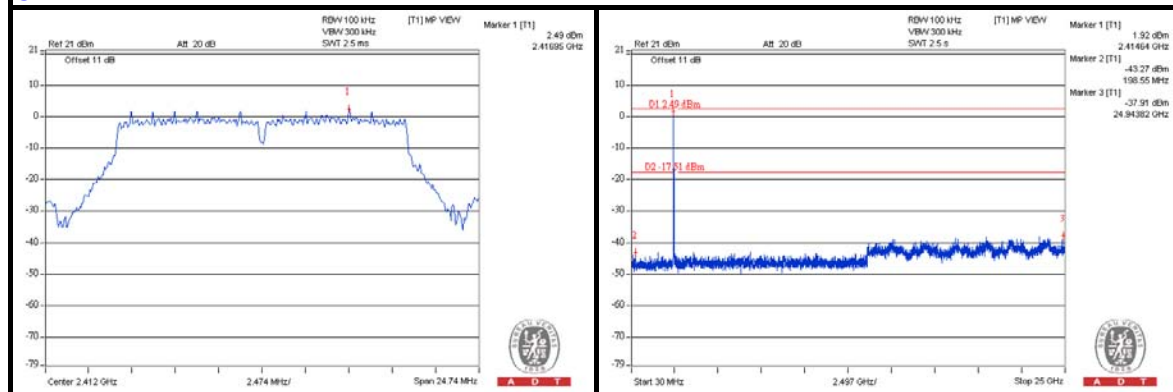




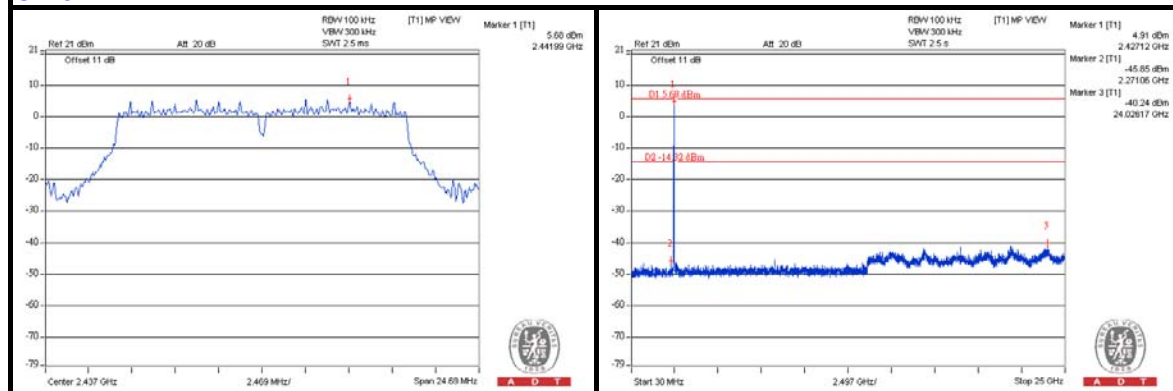
A D T

CHAIN 1

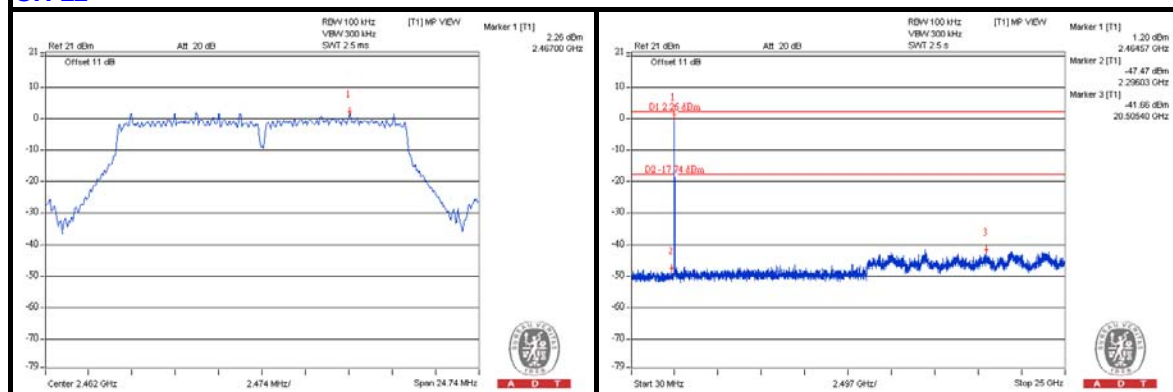
CH 1



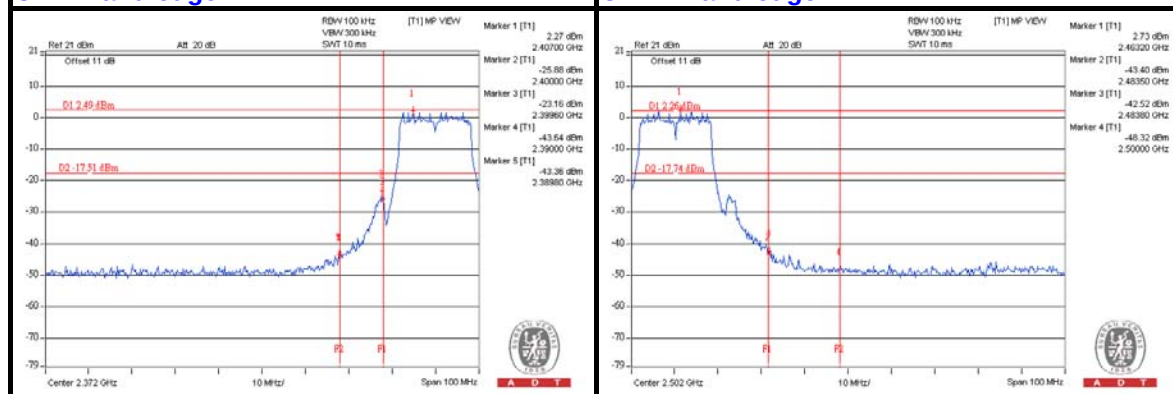
CH 6



CH 11



CH 1 Band edge



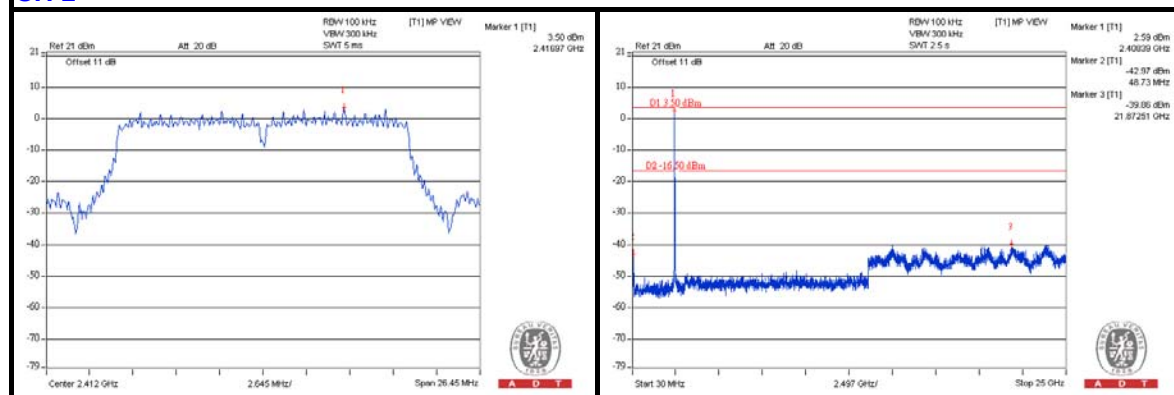


A D T

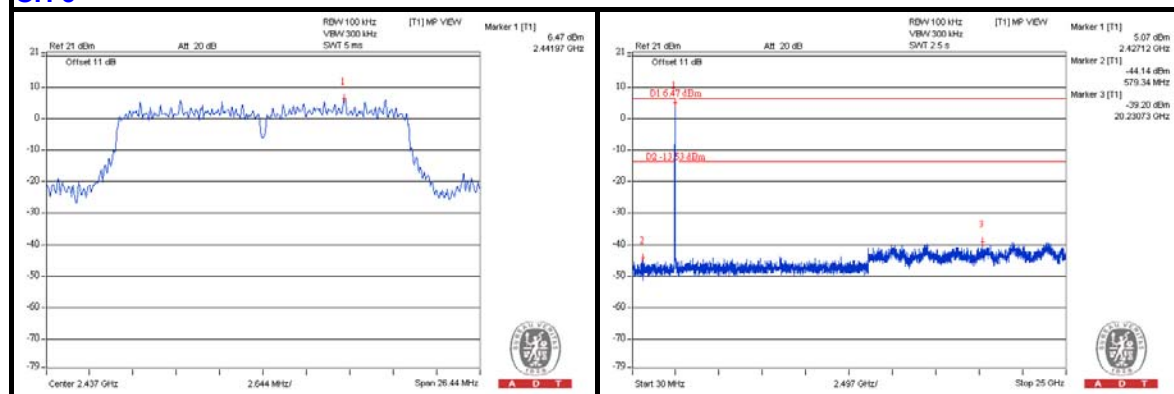
802.11n (20MHz)

CHAIN 0

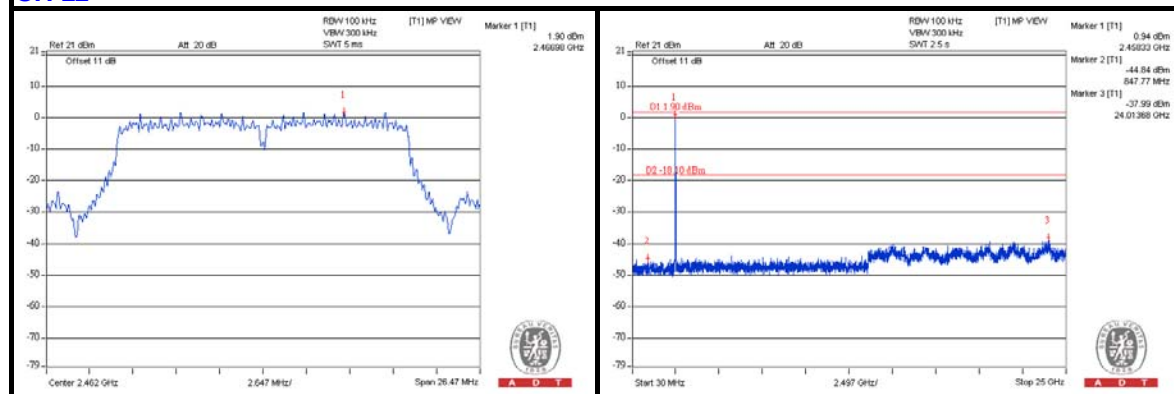
CH 1



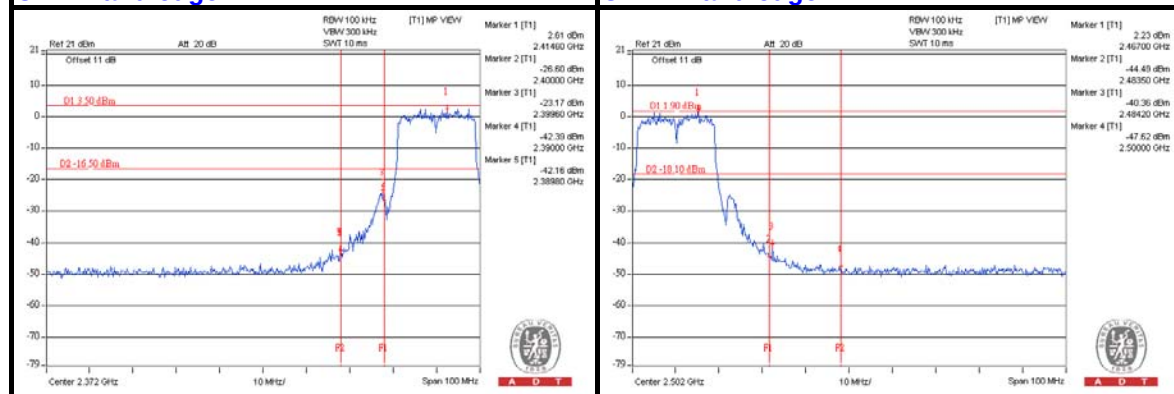
CH 6



CH 11



CH 1 Band edge

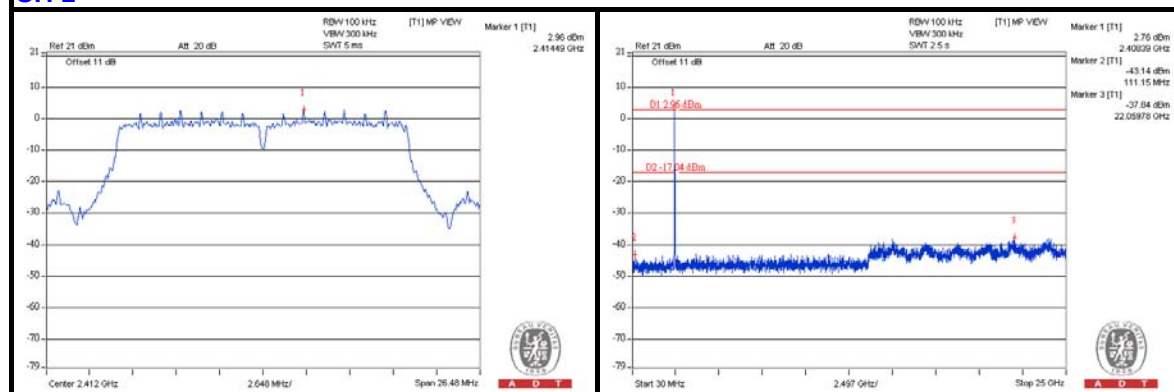




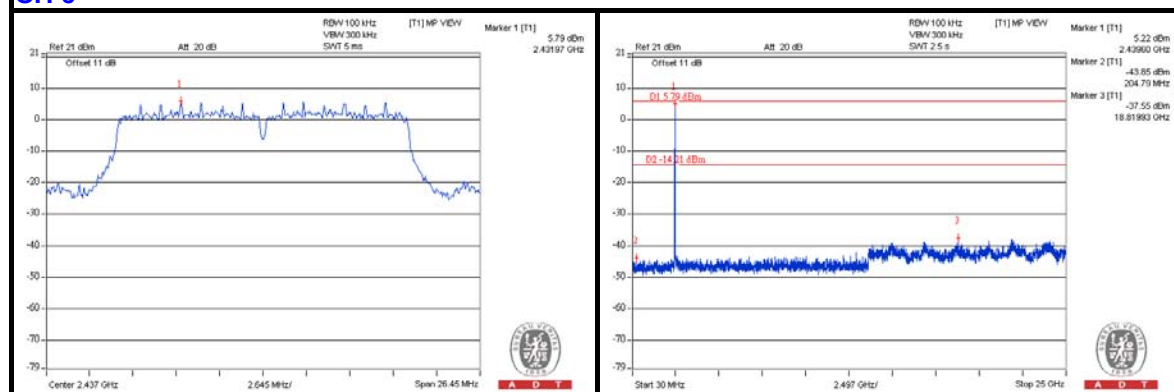
A D T

CHAIN 1

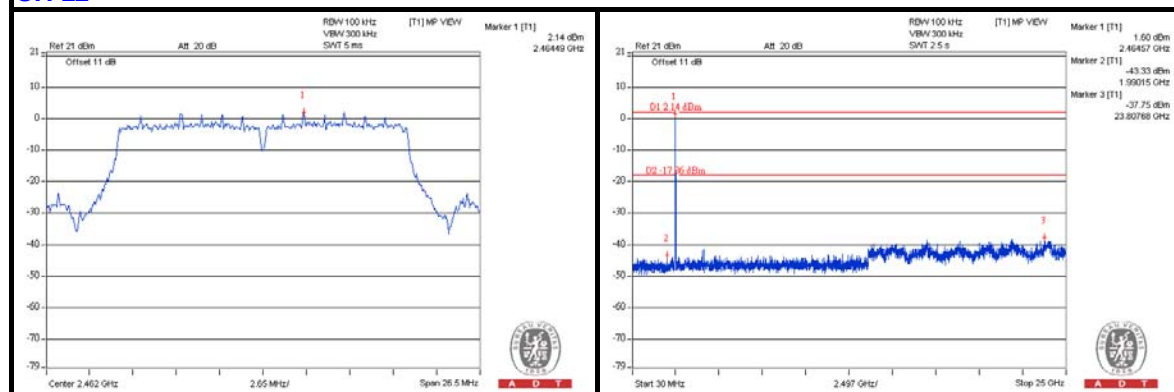
CH 1



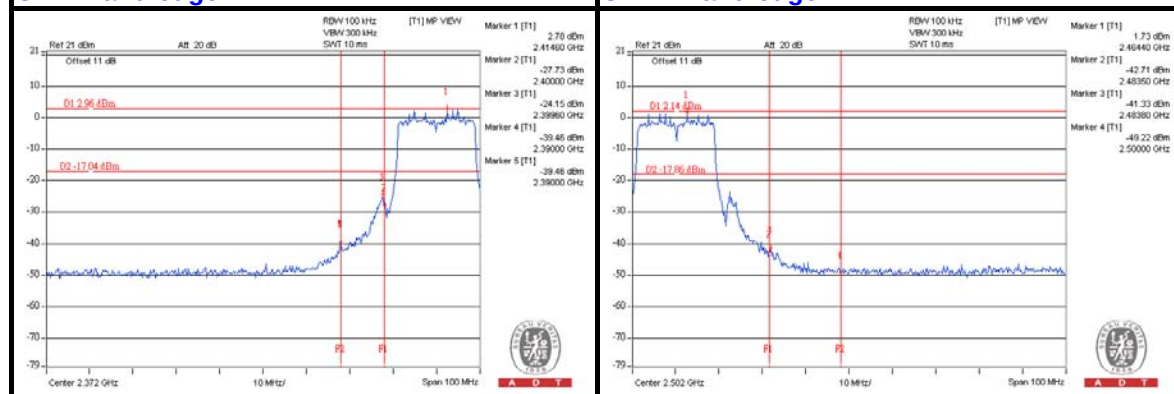
CH 6



CH 11



CH 1 Band edge



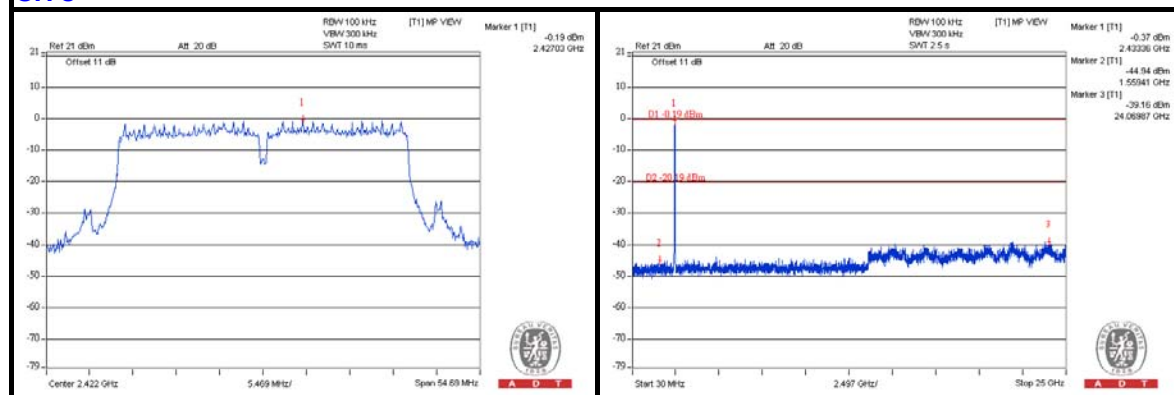


A D T

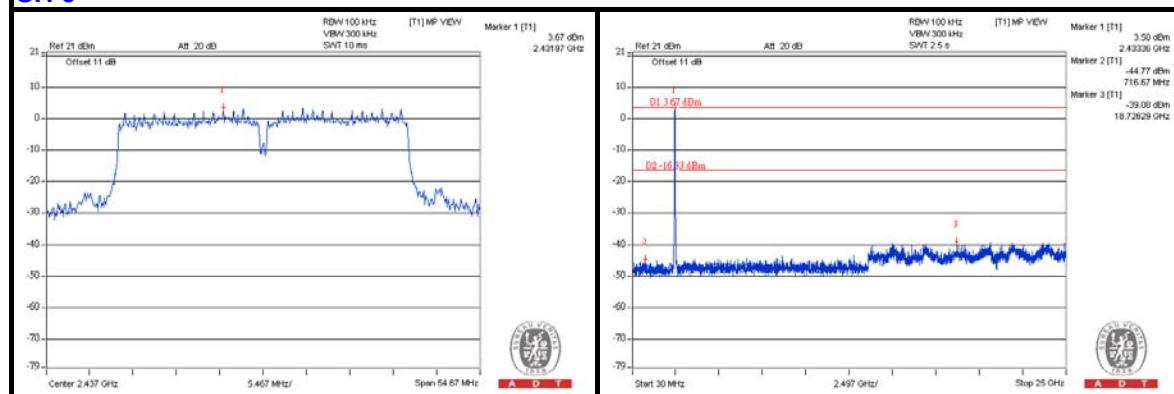
802.11n (40MHz)

CHAIN 0

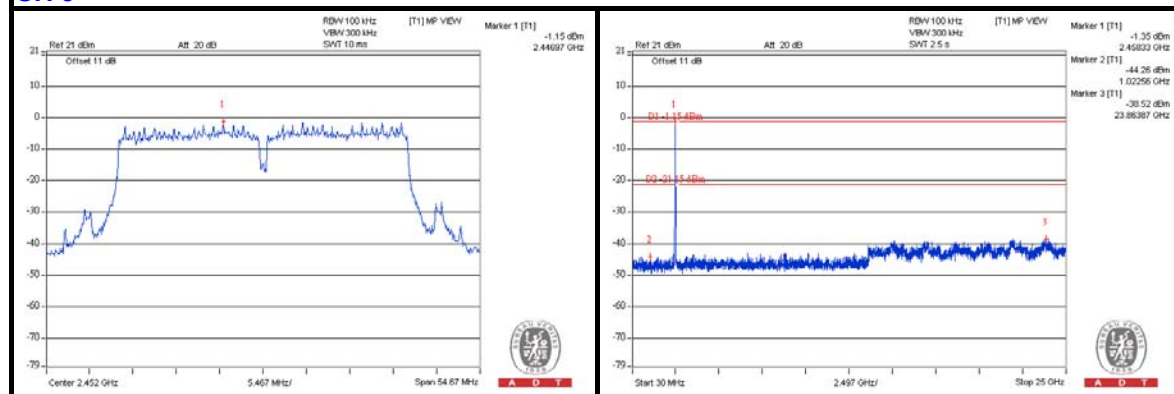
CH 3



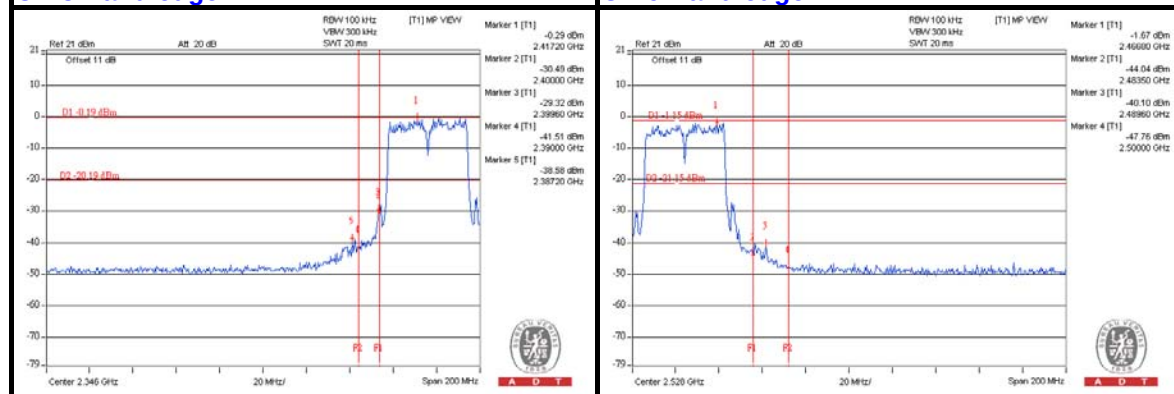
CH 6



CH 9



CH 3 Band edge

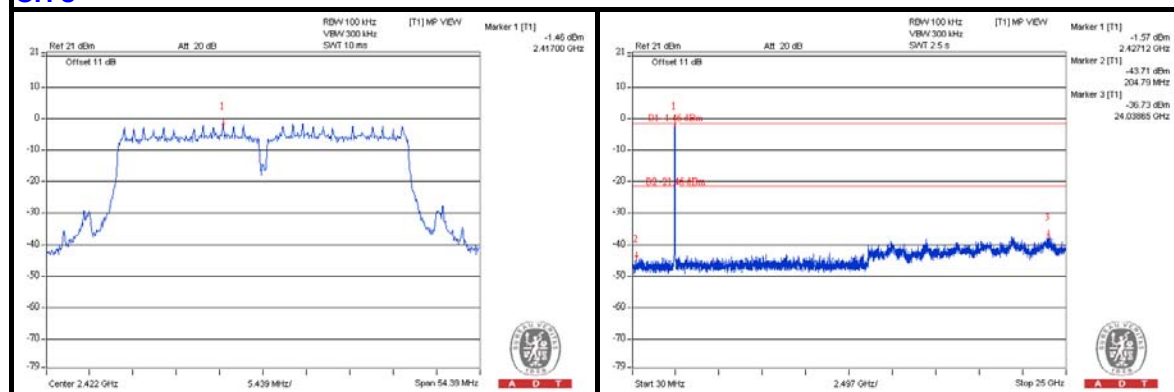




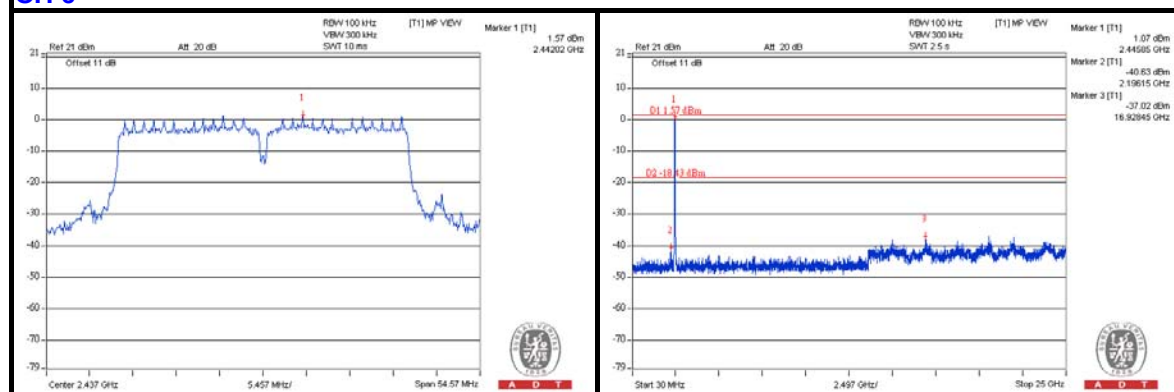
A D T

CHAIN 1

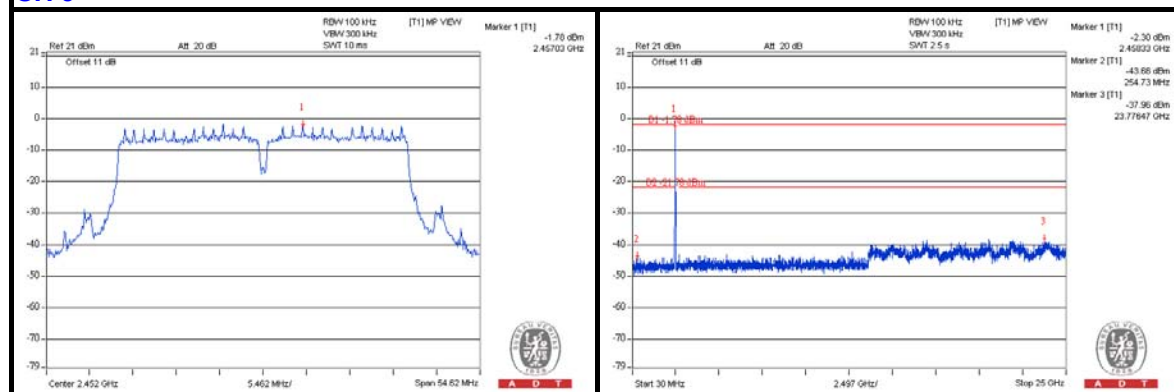
CH 3



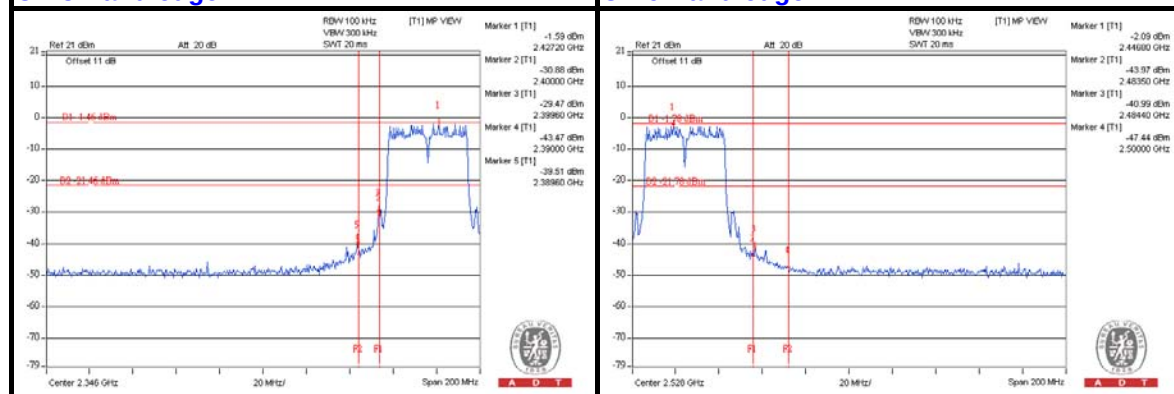
CH 6



CH 9



CH 3 Band edge



5. TEST TYPES AND RESULTS (FOR 5.0GHz BAND)

5.1 RADIATED EMISSION MEASUREMENT

5.1.1 LIMITS OF RADIATED EMISSION 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.



A D T

5.1.2 TEST INSTRUMENTS

Same as item 4.1.2.

5.1.3 TEST PROCEDURES

Same as item 4.1.3.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation.

5.1.5 TEST SETUP

Same as item 4.1.5.

5.1.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.

5.1.7 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA :

802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	#5725.00	75.6 PK	92.0	-16.4	1.54 H	90	35.30	40.30
2	#5725.00	65.6 AV	82.0	-16.4	1.54 H	90	25.30	40.30
3	*5745.00	112.0 PK			1.54 H	90	71.70	40.30
4	*5745.00	102.0 AV			1.54 H	90	61.70	40.30
5	11490.00	63.1 PK	74.0	-10.9	1.56 H	115	14.70	48.40
6	11490.00	50.5 AV	54.0	-3.5	1.56 H	115	2.10	48.40
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	#5725.00	66.9 PK	83.3	-16.4	1.56 V	163	26.60	40.30
2	#5725.00	56.7 AV	73.1	-16.4	1.56 V	163	16.40	40.30
3	*5745.00	103.3 PK			1.56 V	163	63.00	40.30
4	*5745.00	93.1 AV			1.56 V	163	52.80	40.30
5	11490.00	58.7 PK	74.0	-15.3	1.55 V	197	10.30	48.40
6	11490.00	46.8 AV	54.0	-7.2	1.55 V	197	-1.60	48.40

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).
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.
7. The limit value is defined as per 15.247.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	*5785.00	112.3 PK			1.56 H	91	72.00	40.30
2	*5785.00	103.0 AV			1.56 H	91	62.70	40.30
3	11570.00	64.3 PK	74.0	-9.7	1.36 H	45	15.90	48.40
4	11570.00	51.8 AV	54.0	-2.2	1.36 H	45	3.40	48.40
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	*5785.00	104.1 PK			1.56 V	160	63.80	40.30
2	*5785.00	93.8 AV			1.56 V	160	53.50	40.30
3	11570.00	59.2 PK	74.0	-14.8	1.54 V	200	10.80	48.40
4	11570.00	47.2 AV	54.0	-6.8	1.54 V	200	-1.20	48.40

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The limit value is defined as per 15.247.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	*5825.00	111.3 PK			1.53 H	89	70.90	40.40
2	*5825.00	100.7 AV			1.53 H	89	60.30	40.40
3	#5850.00	71.8 PK	91.3	-19.5	1.53 H	89	31.40	40.40
4	#5850.00	61.2 AV	80.7	-19.5	1.53 H	89	20.80	40.40
5	11650.00	64.2 PK	74.0	-9.8	1.12 H	302	15.70	48.50
6	11650.00	52.3 AV	54.0	-1.7	1.12 H	302	3.80	48.50
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	*5825.00	102.2 PK			1.09 V	94	61.80	40.40
2	*5825.00	92.2 AV			1.09 V	94	51.80	40.40
3	#5850.00	62.7 PK	82.2	-19.5	1.07 V	94	22.30	40.40
4	#5850.00	52.7 AV	72.2	-19.5	1.07 V	94	12.30	40.40
5	11650.00	59.8 PK	74.0	-14.2	1.11 V	308	11.30	48.50
6	11650.00	47.9 AV	54.0	-6.1	1.11 V	308	-0.60	48.50

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).
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.
7. The limit value is defined as per 15.247.



A D T

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	#5725.00	73.9 PK	89.7	-15.8	1.29 H	88	33.60	40.30
2	#5725.00	63.7 AV	79.5	-15.8	1.29 H	88	23.40	40.30
3	*5745.00	109.7 PK			1.29 H	88	69.40	40.30
4	*5745.00	99.5 AV			1.29 H	88	59.20	40.30
5	11490.00	65.3 PK	74.0	-8.7	1.23 H	289	16.90	48.40
6	11490.00	51.1 AV	54.0	-2.9	1.23 H	289	2.70	48.40
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	#5725.00	65.2 PK	81.0	-15.8	1.38 V	279	24.90	40.30
2	#5725.00	54.8 AV	70.6	-15.8	1.38 V	279	14.50	40.30
3	*5745.00	101.0 PK			1.00 V	279	60.70	40.30
4	*5745.00	90.6 AV			1.00 V	279	50.30	40.30
5	11490.00	59.9 PK	74.0	-14.1	1.25 V	118	11.50	48.40
6	11490.00	48.1 AV	54.0	-5.9	1.25 V	118	-0.30	48.40

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).
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.
7. The limit value is defined as per 15.247.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	*5785.00	110.6 PK			1.51 H	95	70.30	40.30
2	*5785.00	101.1 AV			1.51 H	95	60.80	40.30
3	11570.00	63.8 PK	74.0	-10.2	1.29 H	327	15.40	48.40
4	11570.00	50.8 AV	54.0	-3.2	1.29 H	327	2.40	48.40
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	*5785.00	103.6 PK			1.42 V	159	63.30	40.30
2	*5785.00	93.5 AV			1.42 V	159	53.20	40.30
3	11570.00	62.3 PK	74.0	-11.7	1.41 V	58	13.90	48.40
4	11570.00	49.0 AV	54.0	-5.0	1.41 V	58	0.60	48.40

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The limit value is defined as per 15.247.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	*5825.00	110.5 PK			1.52 H	90	70.10	40.40
2	*5825.00	101.2 AV			1.52 H	90	60.80	40.40
3	#5850.00	73.5 PK	90.5	-17.0	1.52 H	90	33.10	40.40
4	#5850.00	64.2 AV	81.2	-17.0	1.52 H	90	23.80	40.40
5	11650.00	64.0 PK	74.0	-10.0	1.55 H	118	15.50	48.50
6	11650.00	50.7 AV	54.0	-3.3	1.55 H	118	2.20	48.50
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	*5825.00	104.6 PK			1.78 V	161	64.20	40.40
2	*5825.00	94.2 AV			1.78 V	161	53.80	40.40
3	#5850.00	67.6 PK	84.6	-17.0	1.78 V	161	27.20	40.40
4	#5850.00	57.2 AV	74.2	-17.0	1.78 V	161	16.80	40.40
5	11650.00	59.2 PK	74.0	-14.8	1.10 V	307	10.70	48.50
6	11650.00	47.2 AV	54.0	-6.8	1.10 V	307	-1.30	48.50

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).
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.
7. The limit value is defined as per 15.247.



A D T

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	#5725.00	76.7 PK	87.4	-10.7	1.51 H	91	36.40	40.30
2	#5725.00	66.8 AV	77.5	-10.7	1.51 H	91	26.50	40.30
3	*5755.00	107.4 PK			1.57 H	91	67.10	40.30
4	*5755.00	97.5 AV			1.57 H	91	57.20	40.30
5	11510.00	59.4 PK	74.0	-14.6	1.16 H	329	11.00	48.40
6	11510.00	48.4 AV	54.0	-5.6	1.16 H	329	0.00	48.40
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	#5725.00	69.2 PK	79.9	-10.7	1.17 V	219	28.90	40.30
2	#5725.00	59.8 AV	70.5	-10.7	1.17 V	219	19.50	40.30
3	*5755.00	99.9 PK			1.17 V	219	59.60	40.30
4	*5755.00	90.5 AV			1.17 V	219	50.20	40.30
5	11510.00	58.0 PK	74.0	-16.0	1.20 V	36	9.60	48.40
6	11510.00	46.9 AV	54.0	-7.1	1.20 V	36	-1.50	48.40

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).
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.
7. The limit value is defined as per 15.247.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 159	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH	TESTED BY	Martin Lee

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	*5795.00	107.0 PK			1.28 H	292	66.60	40.40
2	*5795.00	97.0 AV			1.28 H	292	56.60	40.40
3	#5850.00	68.6 PK	87.0	-18.4	1.28 H	292	28.20	40.40
4	#5850.00	58.6 AV	77.0	-18.4	1.28 H	292	18.20	40.40
5	11590.00	59.2 PK	74.0	-14.8	1.22 H	45	10.80	48.40
6	11590.00	48.8 AV	54.0	-5.2	1.22 H	45	0.40	48.40
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	*5795.00	99.5 PK			1.16 V	220	59.10	40.40
2	*5795.00	90.0 AV			1.16 V	220	49.60	40.40
3	#5850.00	61.1 PK	79.5	-18.4	1.16 V	220	20.70	40.40
4	#5850.00	51.6 AV	70.0	-18.4	1.16 V	220	11.20	40.40
5	11590.00	58.2 PK	74.0	-15.8	1.36 V	75	9.80	48.40
6	11590.00	46.6 AV	54.0	-7.4	1.36 V	75	-1.80	48.40

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).
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.
7. The limit value is defined as per 15.247.



A D T

BELOW 1GHz WORST-CASE DATA : 802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 67%RH	TESTED BY	Martin Lee
TEST MODE	A		

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	61.04	34.7 QP	40.0	-5.3	1.36 H	27	21.60	13.10
2	72.68	36.3 QP	40.0	-3.7	1.49 H	81	24.90	11.40
3	348.16	39.9 QP	46.0	-6.1	1.77 H	185	23.80	16.10
4	625.58	36.2 QP	46.0	-9.8	1.65 H	57	13.60	22.60
5	749.74	42.8 QP	46.0	-3.2	1.20 H	305	18.60	24.20
6	875.84	40.1 QP	46.0	-5.9	1.11 H	255	14.00	26.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	61.04	37.7 QP	40.0	-2.3	1.24 V	132	24.60	13.10
2	62.98	37.9 QP	40.0	-2.1	1.35 V	109	25.00	12.90
3	136.70	34.2 QP	43.5	-9.3	1.45 V	25	21.40	12.80
4	336.52	38.7 QP	46.0	-7.3	1.50 V	49	22.90	15.80
5	522.76	38.6 QP	46.0	-7.4	2.41 V	174	18.00	20.60
6	749.74	43.0 QP	46.0	-3.0	1.00 V	314	18.80	24.20
7	875.84	42.9 QP	46.0	-3.1	1.87 V	19	16.80	26.10

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 67%RH	TESTED BY	Martin Lee
TEST MODE	B		

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	95.96	36.7 QP	43.5	-6.8	1.36 H	274	28.20	8.50
2	158.04	36.4 QP	43.5	-7.1	2.14 H	194	22.60	13.80
3	249.22	38.4 QP	46.0	-7.6	1.00 H	148	25.50	12.90
4	480.08	32.1 QP	46.0	-13.9	1.77 H	20	12.60	19.50
5	625.58	43.0 QP	46.0	-3.0	1.96 H	48	20.40	22.60
6	749.74	39.9 QP	46.0	-6.1	2.00 H	334	15.70	24.20
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	30.00	38.6 QP	40.0	-1.4	1.00 V	12	26.40	12.20
2	84.32	38.1 QP	40.0	-1.9	1.88 V	130	29.40	8.70
3	95.96	39.2 QP	43.5	-4.3	1.54 V	237	30.70	8.50
4	299.66	41.5 QP	46.0	-4.5	1.77 V	114	26.60	14.90
5	625.58	40.8 QP	46.0	-5.2	1.96 V	106	18.20	22.60
6	749.74	40.4 QP	46.0	-5.6	2.14 V	261	16.20	24.20
7	875.84	40.7 QP	46.0	-5.3	1.78 V	72	14.60	26.10

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

5.2 CONDUCTED EMISSION MEASUREMENT

5.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	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.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

5.2.2 TEST INSTRUMENTS

Same as item 4.2.2.

5.2.3 TEST PROCEDURES

Same as item 4.2.3.

5.2.4 DEVIATION FROM TEST STANDARD

No deviation.

5.2.5 TEST SETUP

Same as item 4.2.5.

5.2.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.

5.2.7 TEST RESULTS

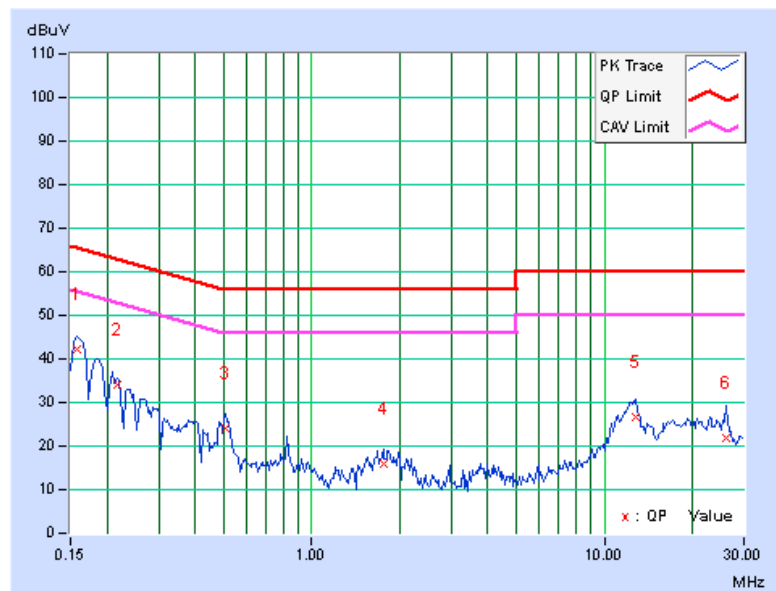
CONDUCTED WORST-CASE DATA : 802.11a

PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.13	41.93	26.70	42.06	26.83	65.58	55.58	-23.52	-28.75
2	0.21641	0.14	33.98	21.52	34.12	21.66	62.96	52.96	-28.83	-31.29
3	0.50938	0.19	24.00	23.28	24.19	23.47	56.00	46.00	-31.81	-22.53
4	1.75781	0.24	15.82	8.43	16.06	8.67	56.00	46.00	-39.94	-37.33
5	12.76172	0.78	26.03	21.46	26.81	22.24	60.00	50.00	-33.19	-27.76
6	26.00391	1.27	20.70	15.43	21.97	16.70	60.00	50.00	-38.03	-33.30

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.

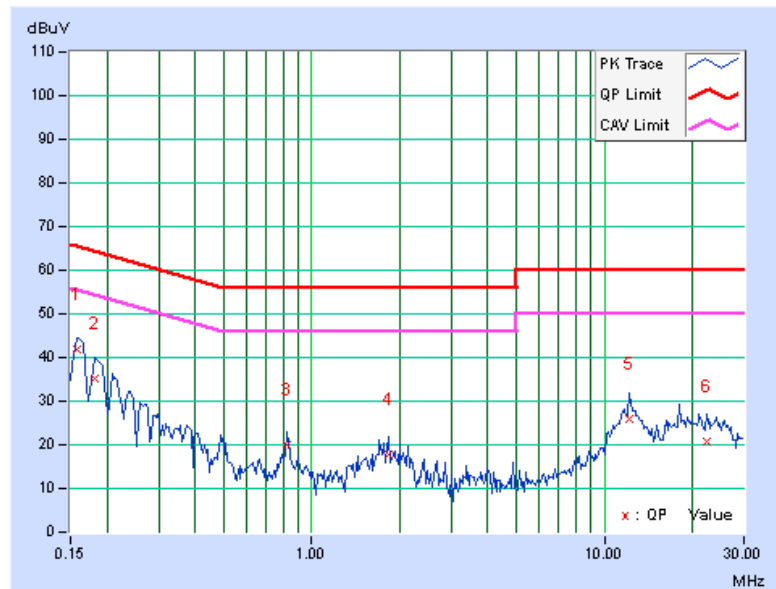


PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.15	41.59	26.54	41.74	26.69	65.58	55.58	-23.84	-28.89
2	0.18125	0.15	35.02	15.73	35.17	15.88	64.43	54.43	-29.26	-38.55
3	0.82578	0.22	19.90	19.00	20.12	19.22	56.00	46.00	-35.88	-26.78
4	1.84375	0.26	17.66	10.18	17.92	10.44	56.00	46.00	-38.08	-35.56
5	12.12891	0.62	25.45	20.31	26.07	20.93	60.00	50.00	-33.93	-29.07
6	22.29297	0.91	19.95	14.51	20.86	15.42	60.00	50.00	-39.14	-34.58

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.

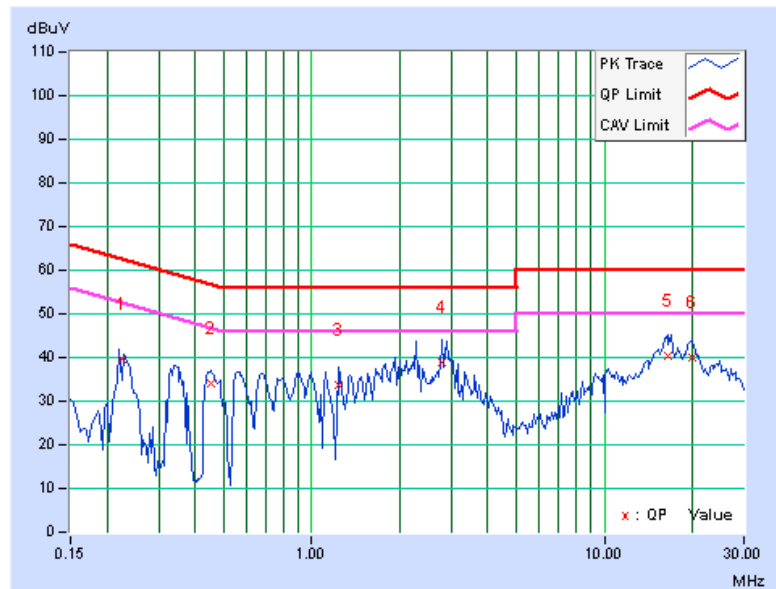


PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22413	0.14	39.36	31.68	39.50	31.82	62.66	52.66	-23.16	-20.84
2	0.45469	0.18	33.77	29.74	33.95	29.92	56.79	46.79	-22.84	-16.87
3	1.23047	0.23	33.48	24.57	33.71	24.80	56.00	46.00	-22.29	-21.20
4	2.80469	0.30	38.48	27.89	38.78	28.19	56.00	46.00	-17.22	-17.81
5	16.48047	0.96	39.58	34.63	40.54	35.59	60.00	50.00	-19.46	-14.41
6	20.05469	1.14	38.85	33.85	39.99	34.99	60.00	50.00	-20.01	-15.01

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.

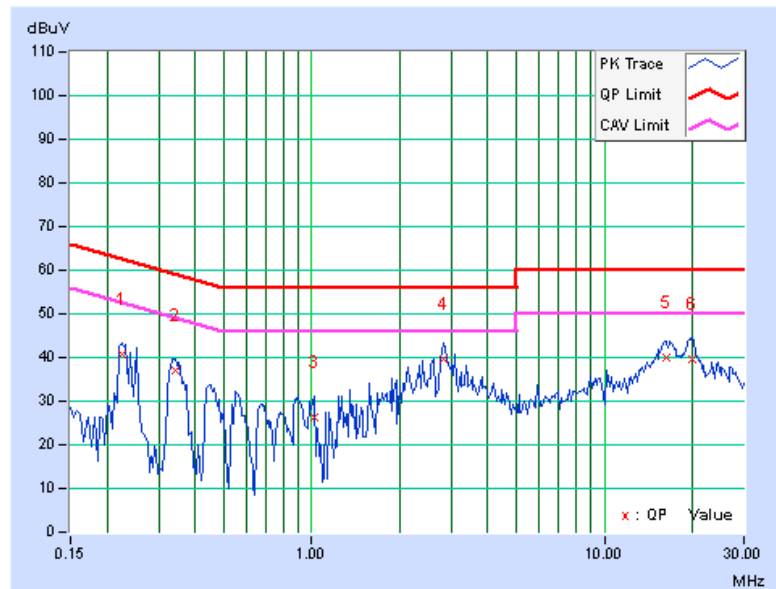


PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22422	0.15	40.67	28.05	40.82	28.20	62.66	52.66	-21.84	-24.46
2	0.34141	0.18	36.71	32.77	36.89	32.95	59.17	49.17	-22.28	-16.22
3	1.01563	0.23	26.12	16.52	26.35	16.75	56.00	46.00	-29.65	-29.25
4	2.82031	0.30	39.37	29.47	39.67	29.77	56.00	46.00	-16.33	-16.23
5	16.20313	0.75	39.36	34.30	40.11	35.05	60.00	50.00	-19.89	-14.95
6	20.00000	0.88	38.91	33.93	39.79	34.81	60.00	50.00	-20.21	-15.19

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.



5.3 6dB BANDWIDTH MEASUREMENT

5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

5.3.2 TEST SETUP

Same as item 4.3.2.

5.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.3.4 TEST PROCEDURE

Same as item 4.3.4.

5.3.5 DEVIATION FROM TEST STANDARD

No deviation.

5.3.6 EUT OPERATING CONDITIONS

Same as item 4.3.6.

5.3.7 TEST RESULTS

802.11a

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	16.41	16.38	0.5	PASS
157	5785	16.43	16.39	0.5	PASS
165	5825	16.42	16.39	0.5	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	17.65	17.33	0.5	PASS
157	5785	17.64	17.61	0.5	PASS
165	5825	17.64	17.62	0.5	PASS

802.11n (40MHz)

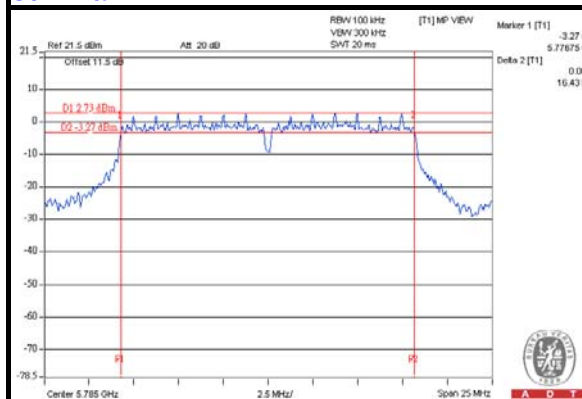
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
151	5755	35.52	36.09	0.5	PASS
159	5795	35.88	36.09	0.5	PASS



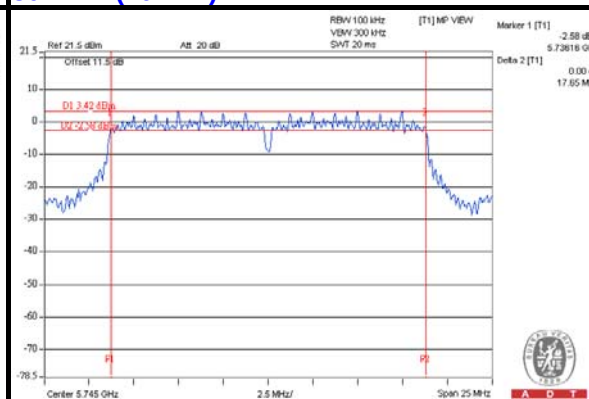
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SPECTRUM PLOT OF WORST VALUE

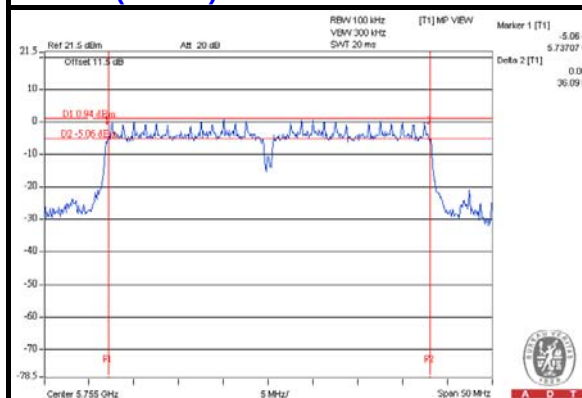
802.11a



802.11n (20MHz)



802.11n (40MHz)



5.4 CONDUCTED OUTPUT POWER

5.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 5725 –5850 MHz bands: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output v01r02 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.

5.4.2 TEST SETUP

Same as Item 4.4.2.

5.4.3 INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.4.4 TEST PROCEDURES

Same as Item 4.4.4.

5.4.5 DEVIATION FROM TEST STANDARD

No deviation.

5.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

5.4.7 TEST RESULTS

FOR PEAK POWER

802.11a

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
149	5745	22.97	23.14	404.216	26.07	30	PASS
157	5785	23.14	23.25	417.412	26.21	30	PASS
165	5825	22.85	23.00	392.278	25.94	30	PASS

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
149	5745	22.36	22.49	349.606	25.44	30	PASS
157	5785	22.58	23.14	387.197	25.88	30	PASS
165	5825	22.69	23.08	389.016	25.90	30	PASS

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
151	5755	22.85	22.39	366.132	25.64	30	PASS
159	5795	22.86	22.43	368.182	25.66	30	PASS

**A D T****FOR AVERAGE POWER****802.11a**

CHANNEL	FREQUENCY (MHz)	AVG. POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
149	5745	15.10	15.40	67.033	18.26
157	5785	15.30	16.10	74.622	18.73
165	5825	15.10	15.30	66.243	18.21

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	AVG. POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
149	5745	15.00	15.40	66.297	18.21
157	5785	15.40	16.10	75.412	18.77
165	5825	15.80	16.00	77.830	18.91

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	AVG. POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
151	5755	15.90	15.70	76.059	18.81
159	5795	16.10	15.90	79.643	19.01

5.5 POWER SPECTRAL DENSITY MEASUREMENT

5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

5.5.2 TEST SETUP

Same as item 4.5.2.

5.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.5.4 TEST PROCEDURE.

Same as item 4.5.4.

5.5.5 DEVIATION FROM TEST STANDARD

No deviation.

5.5.6 EUT OPERATING CONDITION

Same as item 4.3.6.

5.5.7 TEST RESULTS

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-13.95	3.01	-10.94	8	PASS
	157	5785	-13.40	3.01	-10.39	8	PASS
	165	5825	-13.65	3.01	-10.64	8	PASS
1	149	5745	-12.27	3.01	-9.26	8	PASS
	157	5785	-11.55	3.01	-8.54	8	PASS
	165	5825	-12.14	3.01	-9.13	8	PASS

NOTE:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the limit no need to reduced.

802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-13.37	3.01	-10.36	8	PASS
	157	5785	-12.23	3.01	-9.22	8	PASS
	165	5825	-10.69	3.01	-7.68	8	PASS
1	149	5745	-11.14	3.01	-8.13	8	PASS
	157	5785	-11.26	3.01	-8.25	8	PASS
	165	5825	-10.77	3.01	-7.76	8	PASS

NOTE:

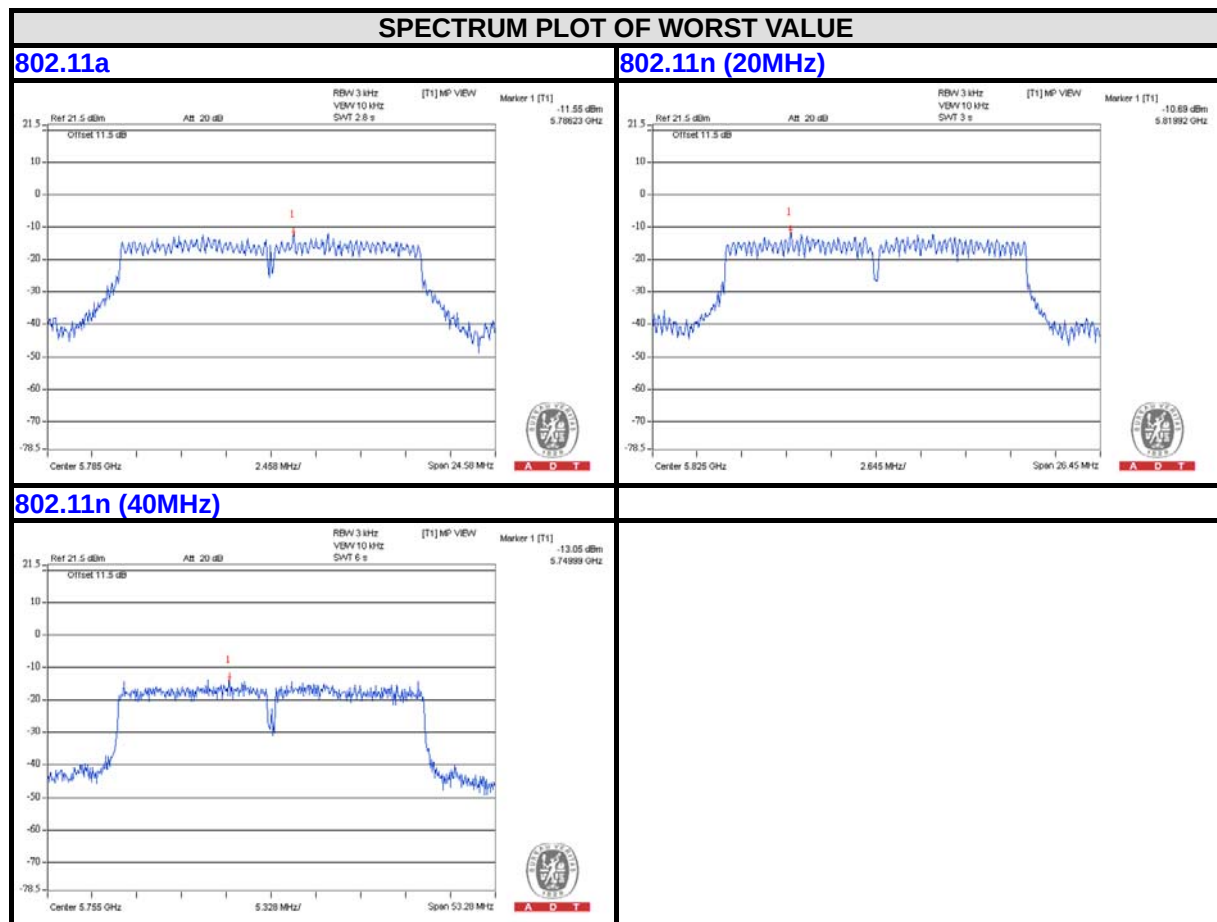
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the limit no need to reduced.

802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Duty Factor	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	151	5755	-13.05	3.01	0.14	-9.90	8	
	159	5795	-14.68	3.01	0.14	-11.53	8	
1	151	5755	-14.97	3.01	0.14	-11.82	8	
	159	5795	-15.04	3.01	0.14	-11.89	8	

NOTE:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.



5.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

5.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

5.6.2 TEST SETUP

Same as Item 4.6.2.

5.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.6.4 TEST PROCEDURE

Same as Item 4.6.4.

5.6.5 DEVIATION FROM TEST STANDARD

No deviation.

5.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6.

5.6.7 TEST RESULTS

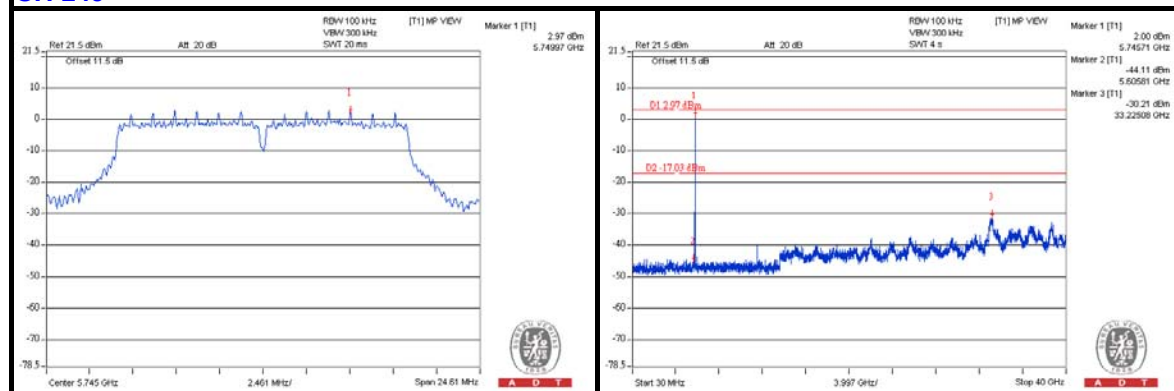
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.

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.

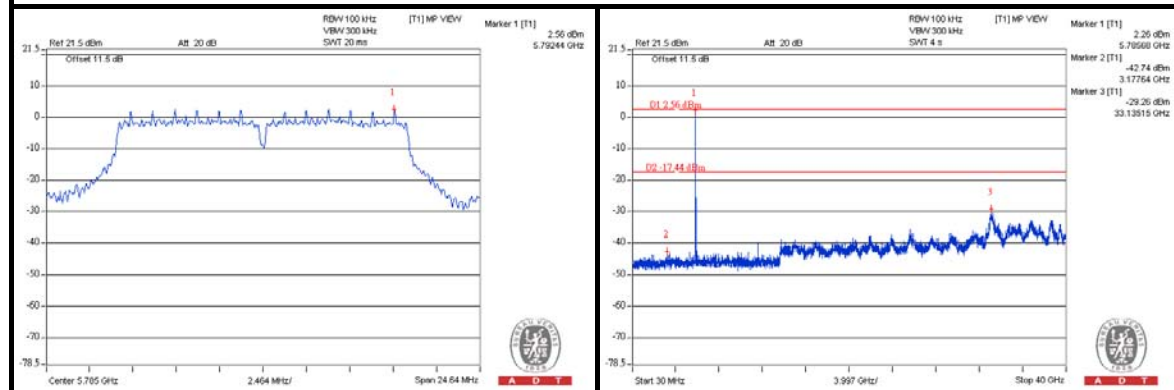


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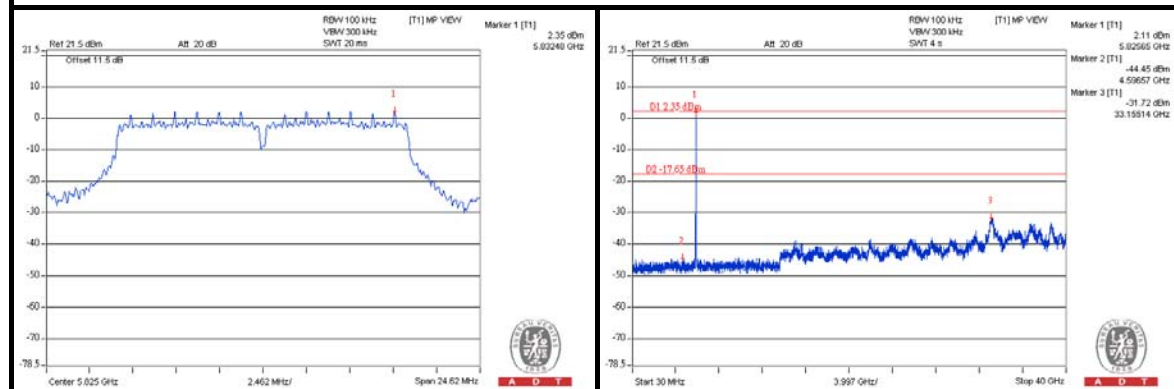
802.11a
CHAIN 0
CH 149



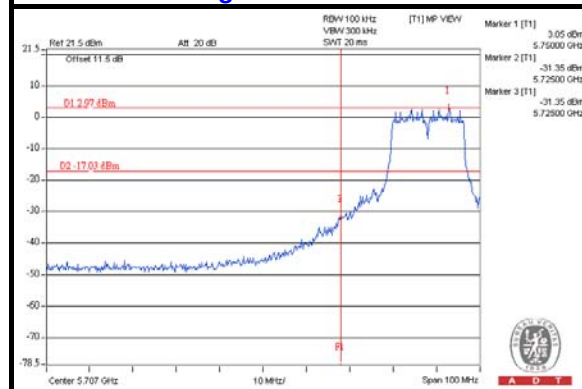
CH 157



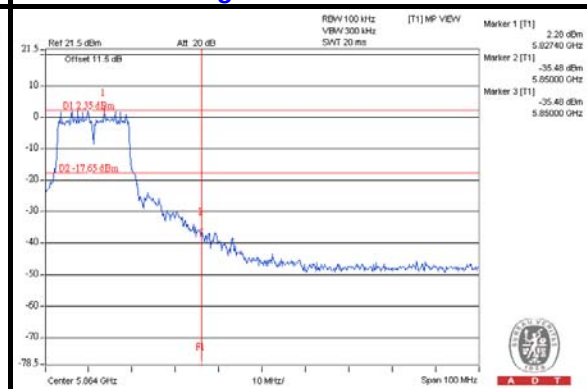
CH 165



CH 149 Band edge



CH 165 Band edge

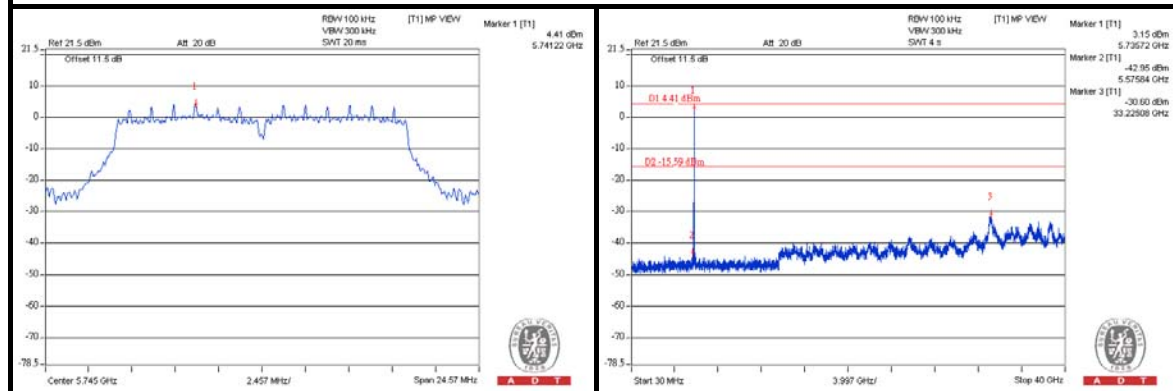




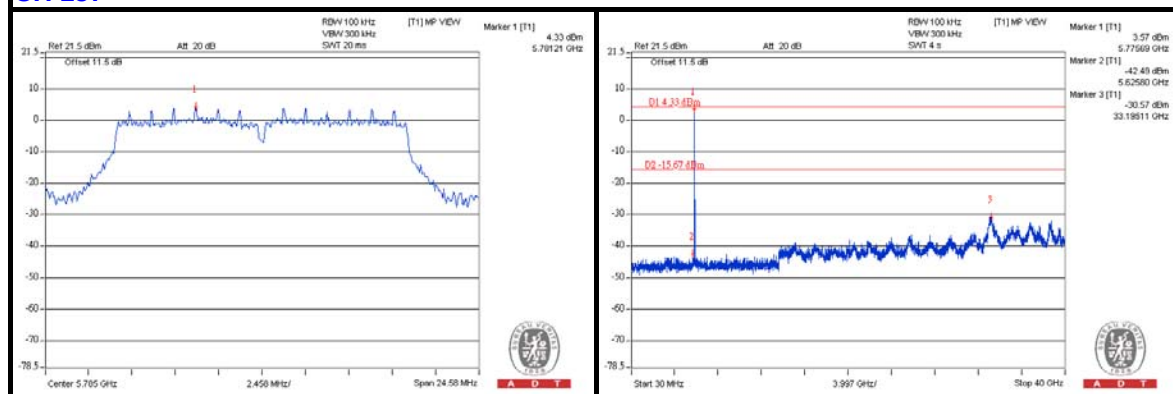
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CHAIN 1

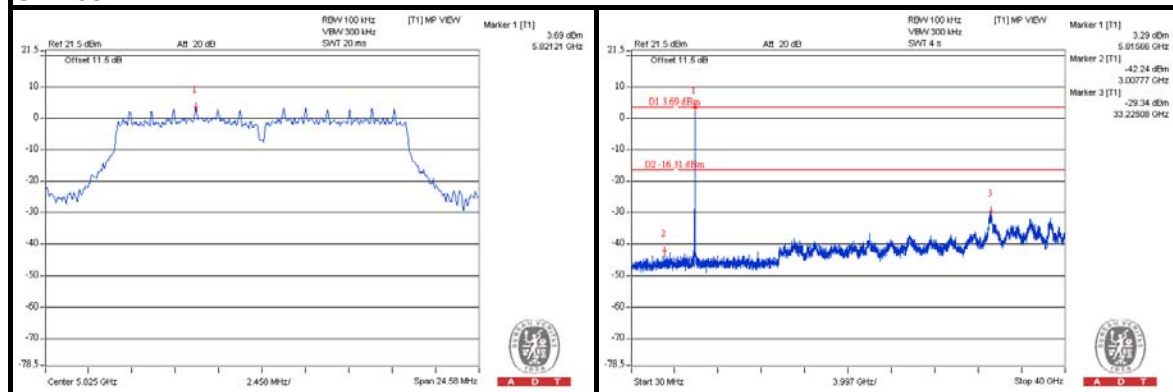
CH 149



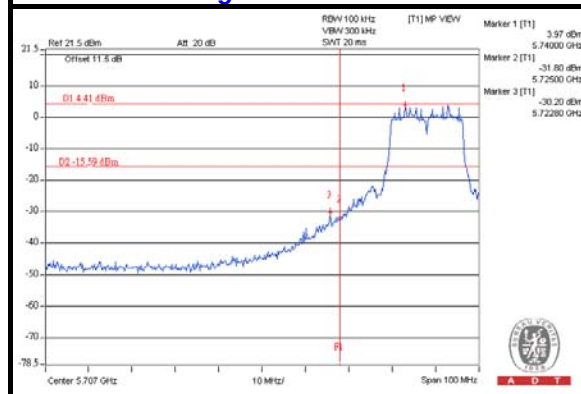
CH 157



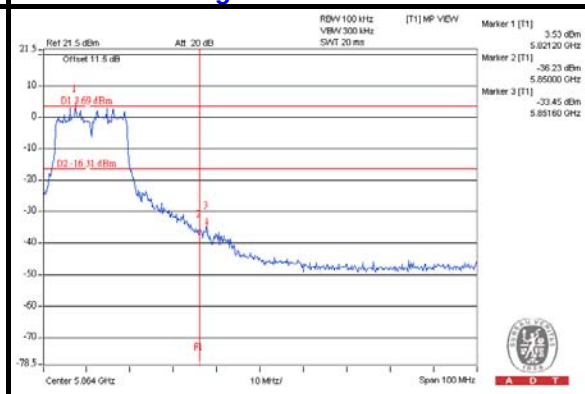
CH 165



CH 149 Band edge



CH 165 Band edge

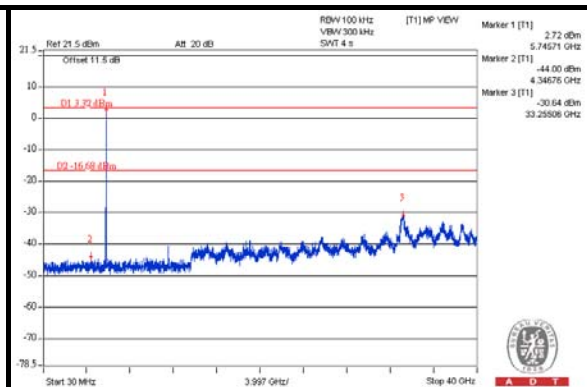
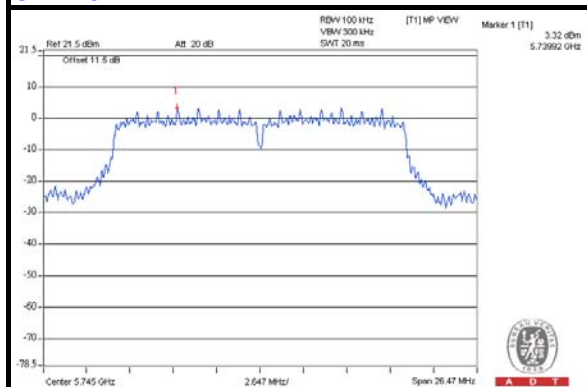




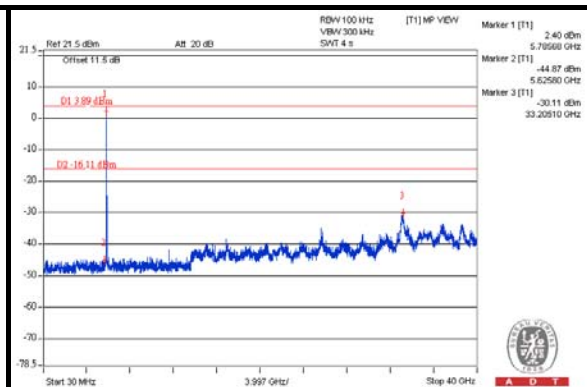
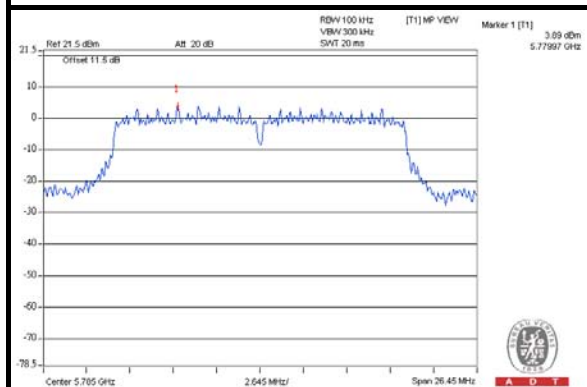
A D T

802.11n (20MHz) CHAIN 0

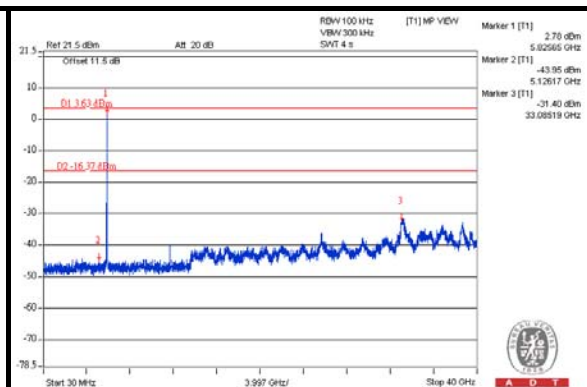
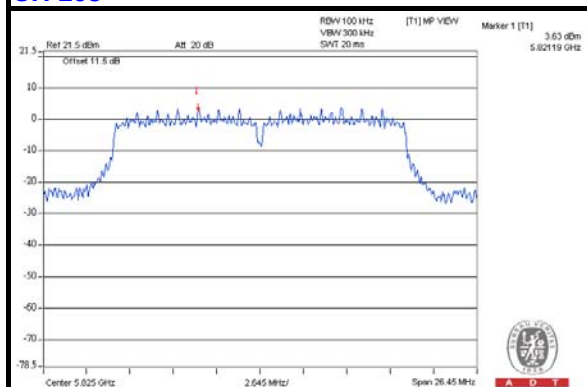
CH 149



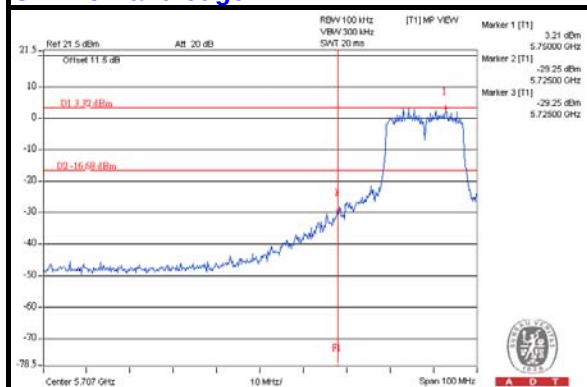
CH 157



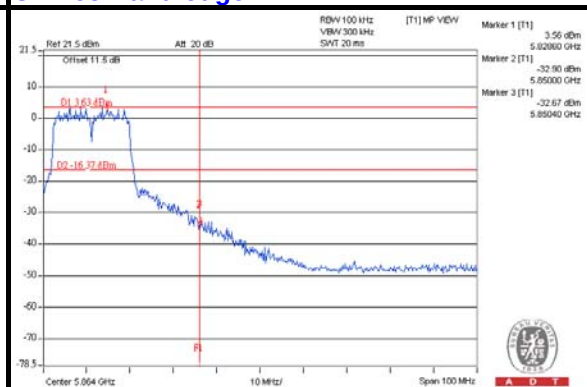
CH 165



CH 149 Band edge



CH 165 Band edge

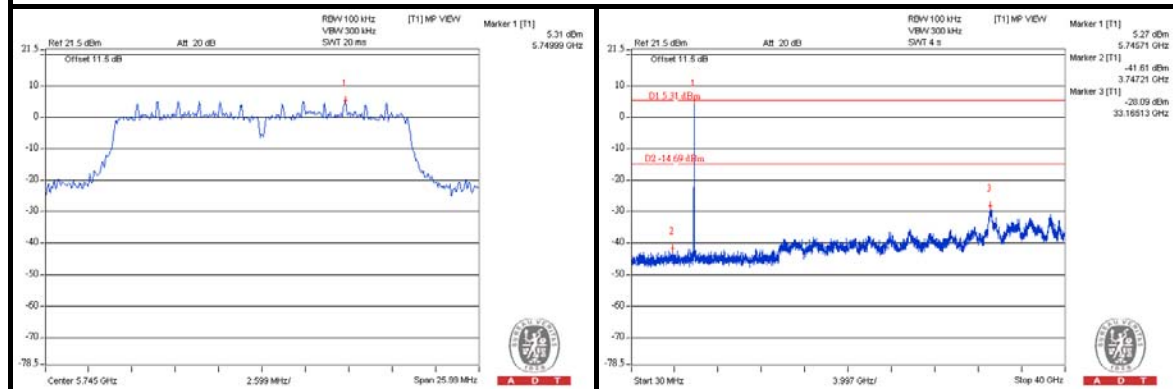




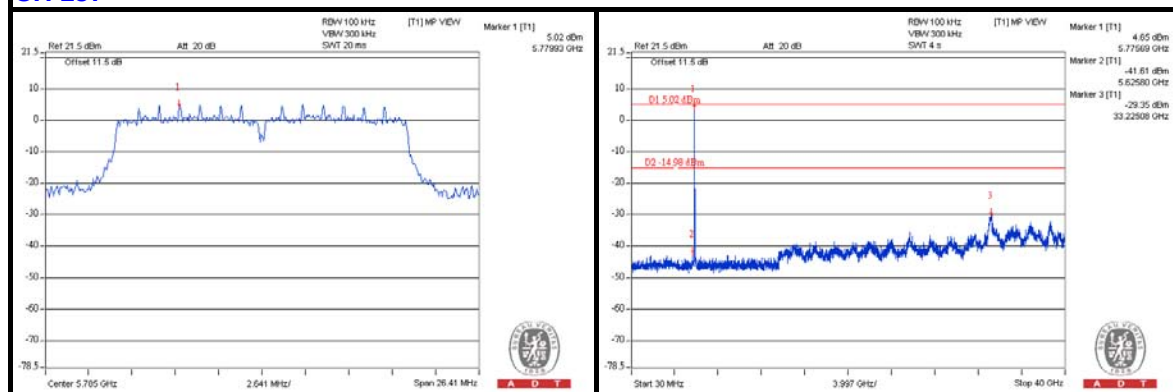
A D T

CHAIN 1

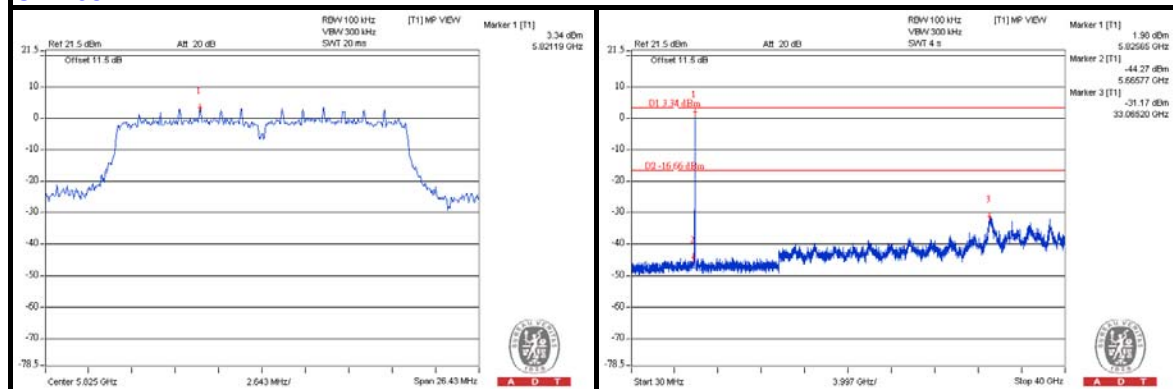
CH 149



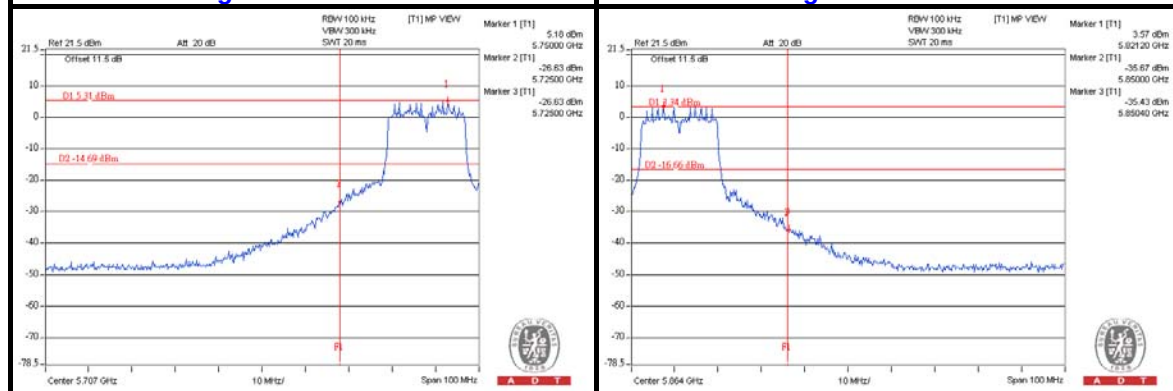
CH 157



CH 165



CH 149 Band edge

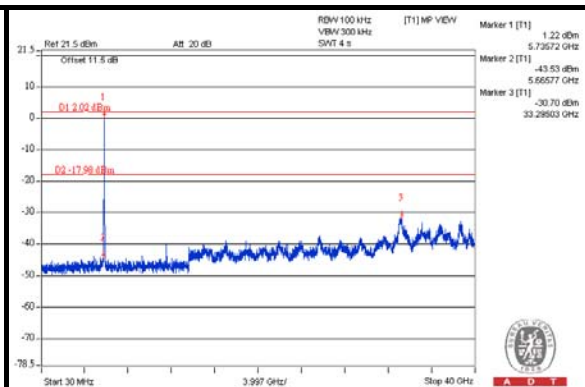
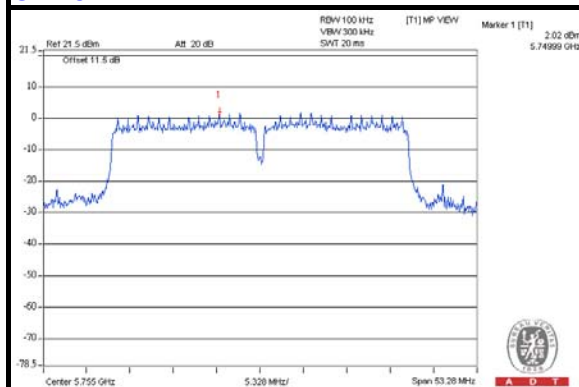




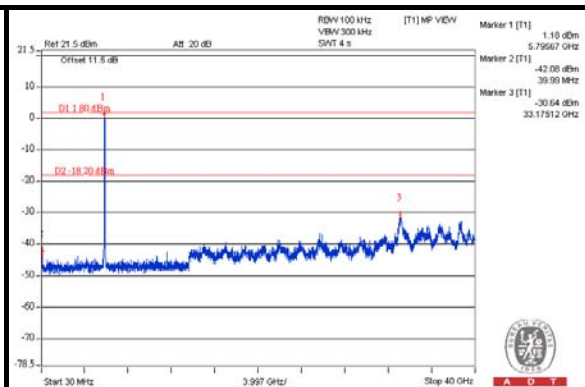
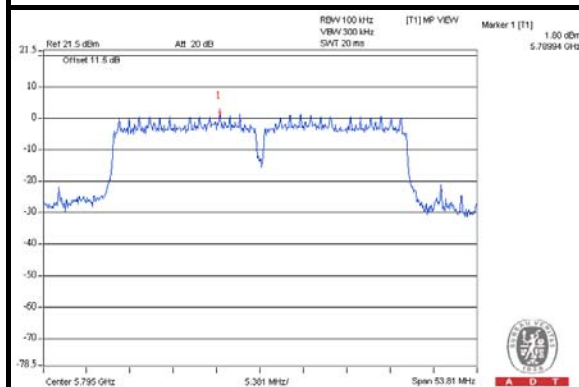
A D T

802.11n (40MHz) CHAIN 0

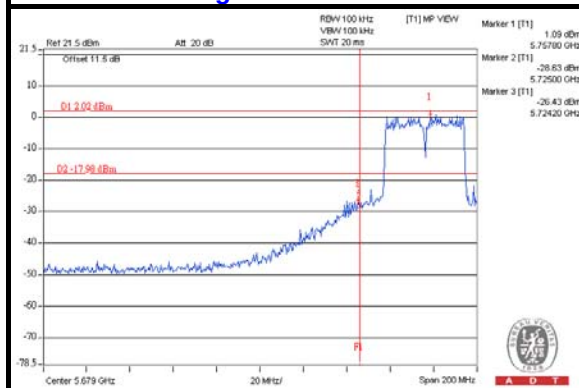
CH 151



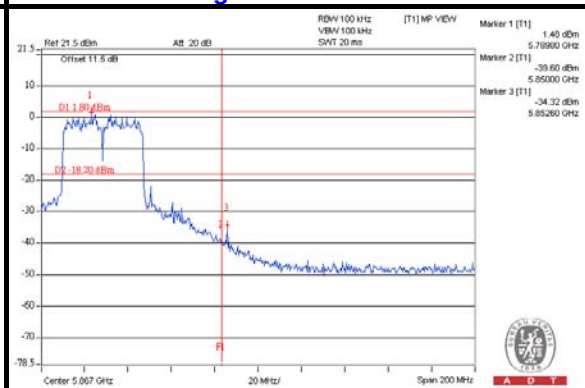
CH 159



CH 151 Band edge



CH 159 Band edge

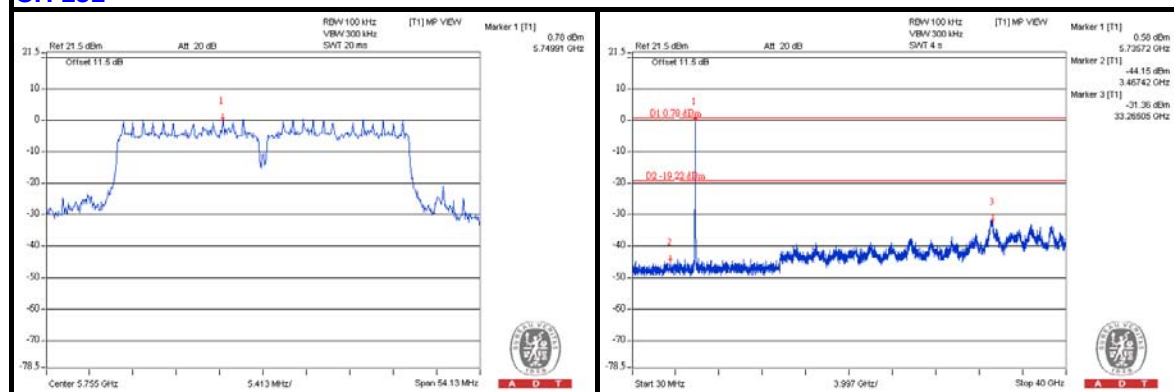




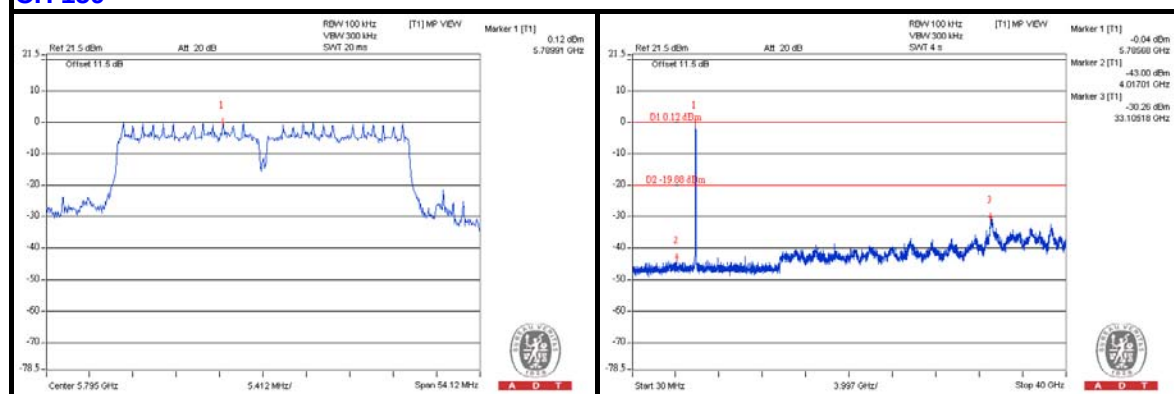
A D T

CHAIN 1

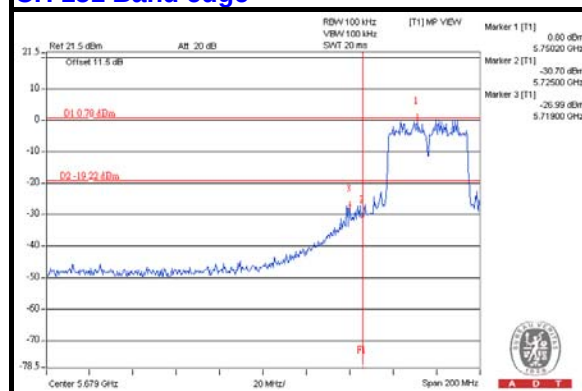
CH 151



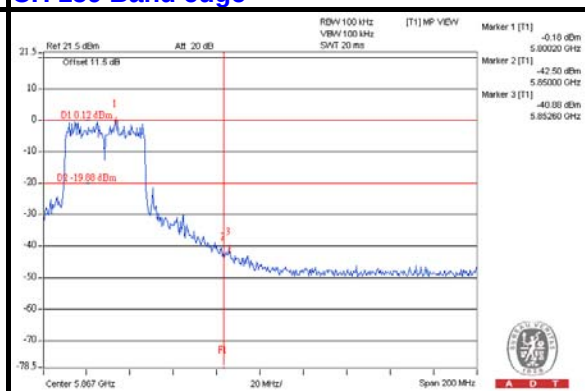
CH 159



CH 151 Band edge



CH 159 Band edge





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6. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



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7. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.bureauveritas-adt.com

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



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8. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---