

FCC Test Report

Report No.: RF160315E11

FCC ID: UXX-S3A616A

Test Model: S3A616A

Series Model: S3A617A, S3A621A, S3A622A

Received Date: Mar. 16, 2016

Test Date: Mar. 21 to 28, 2016

Issued Date: Apr. 14, 2016

Applicant: Cradlepoint, Inc

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

Release Control Record

Issue No.	Description	Date Issued
RF160315E11	Original release.	Apr. 14, 2016



A D T

1 Certificate of Conformity

Product: Integrated Broadband Router
Brand: cradlepoint
Test Model: S3A616A
Series Model: S3A617A, S3A621A, S3A622A
Sample Status: ENGINEERING SAMPLE
Applicant: Cradlepoint, Inc
Test Date: Mar. 21 to 28, 2016
Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10: 2013

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

Prepared by : Wendy Wu , **Date:** Apr. 14, 2016
Wendy Wu / Specialist

Approved by : May Chen , **Date:** Apr. 14, 2016
May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2390.00MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -4.59dB at 0.39256MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is R-SMA and 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	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.37 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.65 dB
	6GHz ~ 18GHz	3.88 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Integrated Broadband Router
Brand	cradlepoint
Test Model	S3A616A
Series Model	S3A617A, S3A621A, S3A622A
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 12V from power adapter or DC 9-33V from power supply
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 300Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	617.674mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. There are WLAN, 3G/LTE and GPS technology used for the EUT. The EUT inside has one 3G/LTE module which FCC ID: N7NHL7588.
2. EUT could be applied with 3G/LTE Dock device (contains FCC ID: N7NMC7455).
3. The EUT has four model names, which are identical to each other in all aspects except for different hardware and the following table:

Brand	Model No.	Marketing name	WiFi Function	3G/LTE module
cradlepoint	S3A616A	IBR600B-LP4	V	V
	S3A617A	IBR600B-NM	V	-
	S3A621A	IBR650B-LP4	-	V
	S3A622A	IBR650B-NM	-	-

From the above models, and model: **S3A616A** was selected as representative model for the test and its data was recorded in this report.

4. The emission of the simultaneous operation (2.4GHz, 3G and LTE) has been evaluated and non-compliance was found.
5. The EUT needed to be supplied with a power adapter and following two different model names could be chosen:

No.	Brand	Model No.	Spec.
1	HON-KWANG	HK-AB-120A150-US6	Input: 90-264V, 0.8A, 47-63Hz Output: 12V, 1.5A DC output cable(2m, unshielded)
2	TEN PAO	S024AMM1200150	Input: 90-264V, 0.6A, 47-63Hz Output: 12V, 1.5A DC output cable(2m, unshielded)

Note: From the above modes, the worst radiated test was found in **Adapter 2**. Therefore only the test data of the modes were recorded in this report.

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

WLAN							
Ant. Set	Transmitter Circuit	Ant. Gain (dBi)	Cable Loss (dB)	Frequency range (MHz to MHz)	Ant. Type	Connector Type	Cable Length (mm)
1	Chain (0)	5	-	2400~2500	Dipole	R-SMA	-
2	Chain (1)	5	1	2400~2500	Dipole	R-SMA	100
LTE							
Ant. Set	Transmitter Circuit	Ant. Gain (dBi)	Frequency range (MHz to MHz)		Ant. Type	Connector Type	
1	Chain (0)	3.47	690~2300		Dipole	SMA	
		1	2300~2320				
		3.47	2320~2700				
	Chain (1)	3.47	690~2300				
		1	2300~2320				
		3.47	2320~2700				
2	Chain (0)	3	690~2300		Dipole	SMA	
		1	2300~2320				
		3	2320~2700				
	Chain (1)	3	690~2300				
		1	2300~2320				
		3	2320~2700				

Note: For WLAN: 1TX configuration mode will fix transmission on Chain (0).

Note: For WLAN: 1TX configuration mode will fix transmission on Chain (0).

7. The EUT incorporates a MIMO function.

MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	1TX Fixed Chan 0	2RX
802.11g	6 ~ 54Mbps	1TX Fixed Chan 0	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX

8. EUT has been pre-tested under following pre-test modes.

Pre-test Mode	Power
Mode A	Adapter 1
Mode B	Adapter 2
Mode C	DC power cable (4 pin)
Mode D	DC power cable (15 pin)
Mode E	Power from Dock

Note: From the above modes, the radiated emission worse case was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.

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

3.2 Description of Test Modes

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

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

7 channels are provided for 802.11n (HT40):

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	APCM	
1	-	-	√	-	Adapter 1
2	√	√	√	√	Adapter 2
3	-	-	√	-	DC power cable (4 pin)
4	-	-	√	-	DC power cable (15 pin)
5	-	-	√	-	Power from Dock

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

Radiated Emission Test (Above 1GHz):

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

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

Radiated Emission Test (Below 1GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

Power Line Conducted Emission Test:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

Antenna Port Conducted Measurement:

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

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

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY	TEST LOCATION
RE $\geq$ 1G	22deg. C, 62%RH	120Vac, 60Hz	Jyunchun Lin	1
RE<1G	23deg. C, 64%RH	120Vac, 60Hz	Jyunchun Lin	1
PLC	23deg. C, 64%RH	120Vac, 60Hz	Jyunchun Lin	1
APCM	20deg. C, 64%RH	120Vac, 60Hz	Anderson Chen	1

3.3 Duty Cycle of Test Signal

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

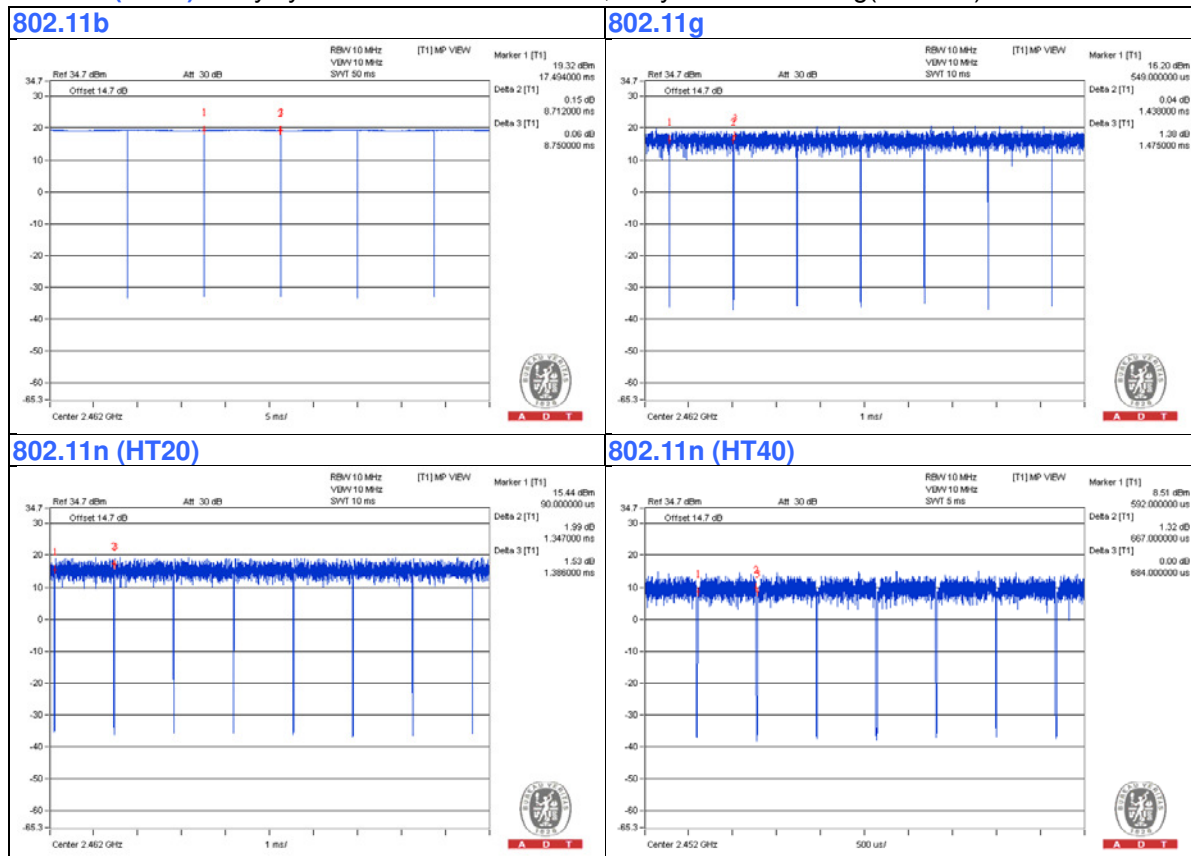
If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11b: Duty cycle = $8.712/8.75 = 0.996$

802.11g: Duty cycle = $1.438/1.475 = 0.975$, Duty factor = $10 * \log(1/0.975) = 0.1$

802.11n (HT20): Duty cycle = $1.347/1.386 = 0.972$, Duty factor = $10 * \log(1/0.972) = 0.1$

802.11n (HT40): Duty cycle = $0.667/0.684 = 0.975$, Duty factor = $10 * \log(1/0.975) = 0.1$



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	iPod shuffle	Apple	MC749TA/A	CC4DMFJUDFDM	NA	Provided by Lab
B.	Notebook computer	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab
C.	Notebook computer	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
D.	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab
E.	Dock	cradlepoint	170700-000	NA	N7NMC7455	Supplied by Client
F.	DC power supply	Topward	6603D	795551	NA	Provided by Lab

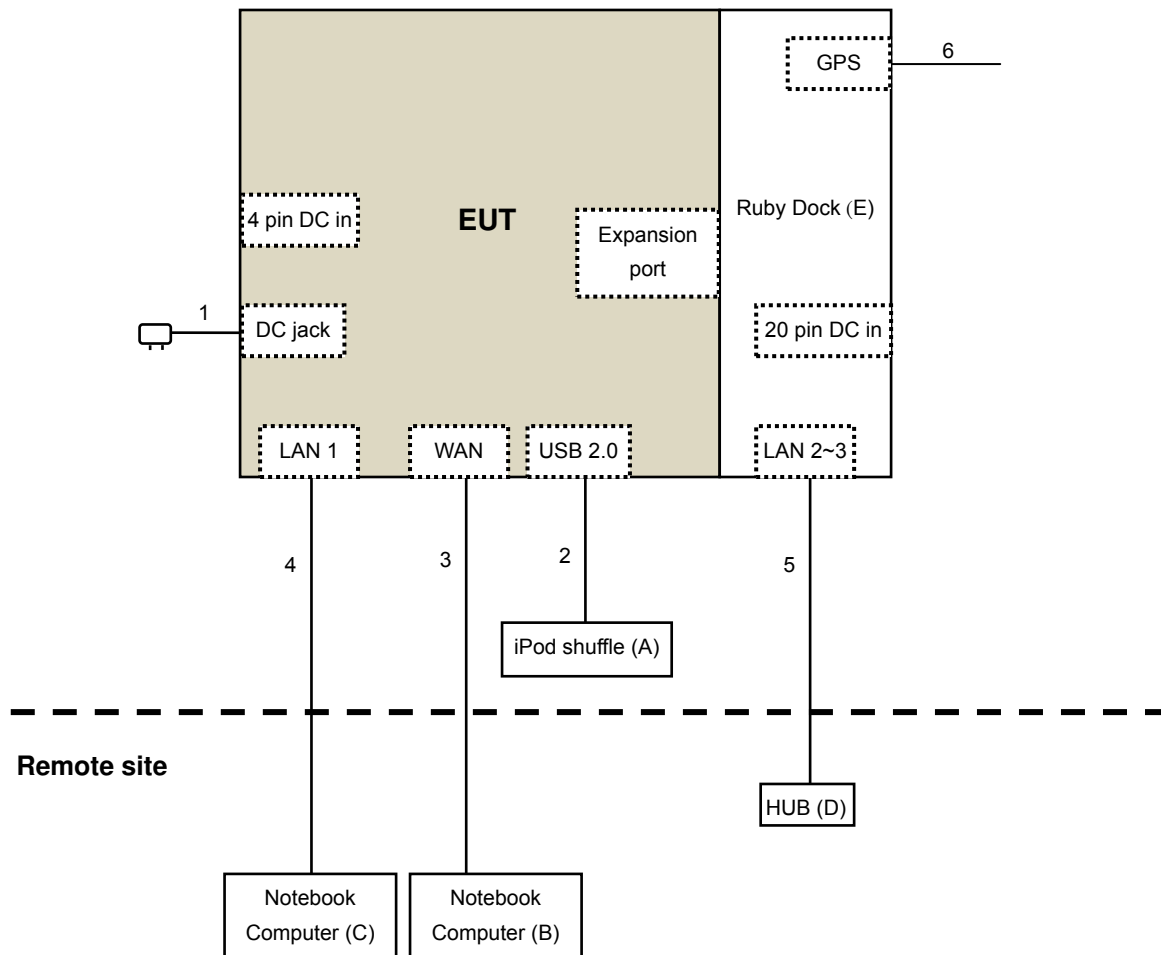
Note:

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

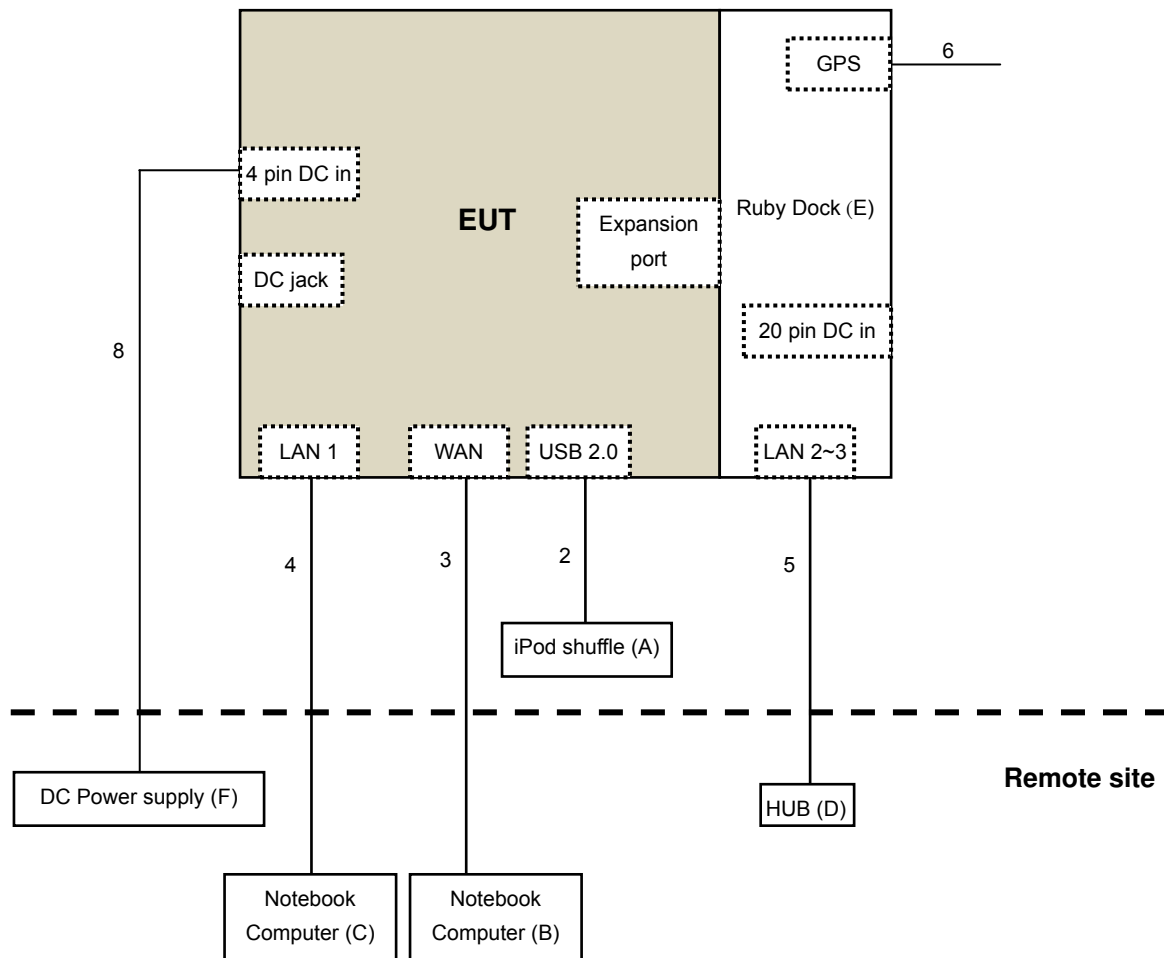
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC cable	1	2	No	0	Supplied by Client
2.	USB	1	0.1	Yes	0	Provided by Lab
3.	RJ45	1	10	No	0	Provided by Lab
4.	RJ45	1	10	No	0	Provided by Lab
5.	RJ45	2	10	No	0	Provided by Lab
6.	GPS	1	3	No	0	Provided by Lab
7.	DC cable (15 pin)	1	2	No	0	Supplied by Client
8.	DC cable (4 pin)	1	2	No	0	Supplied by Client
9.	DC cable (20 pin)	1	2	No	0	Supplied by Client

3.4.1 Configuration of System under Test

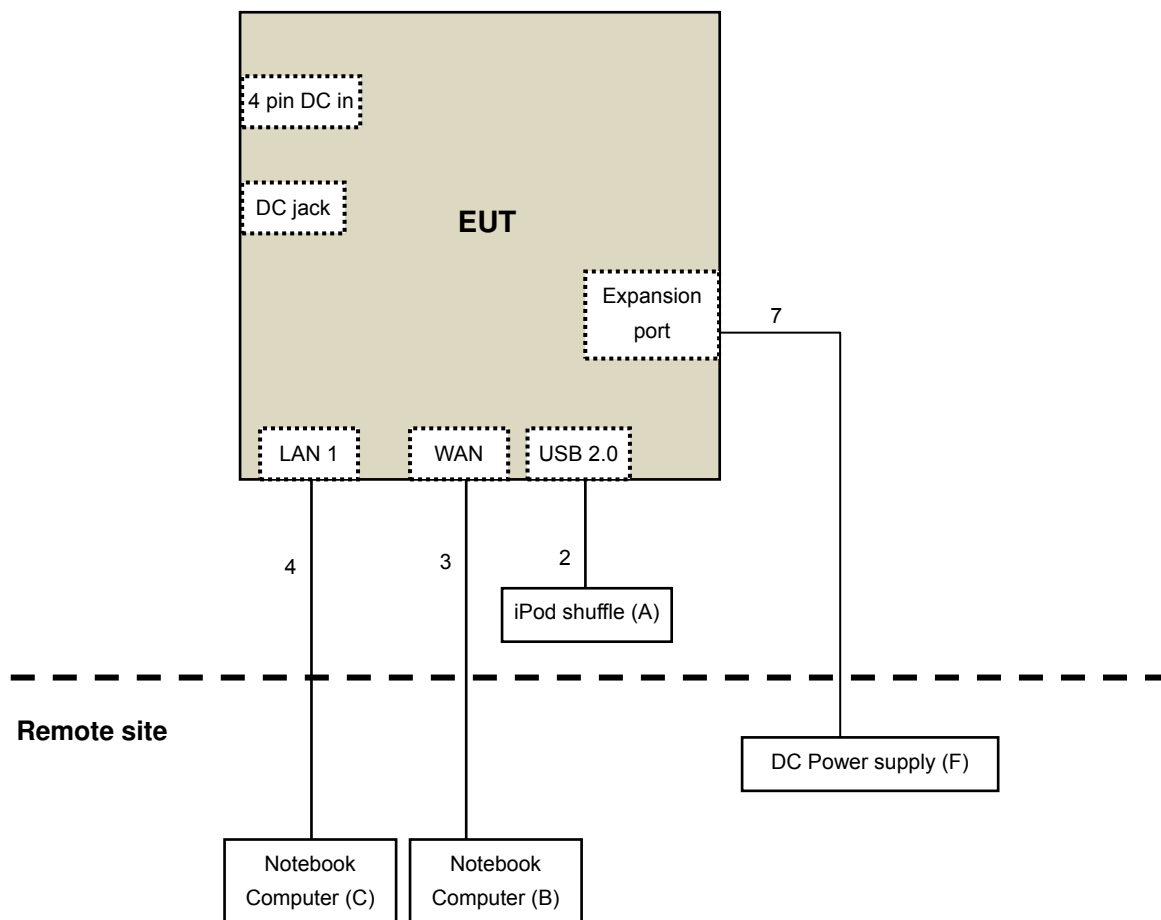
Adapter Mode:



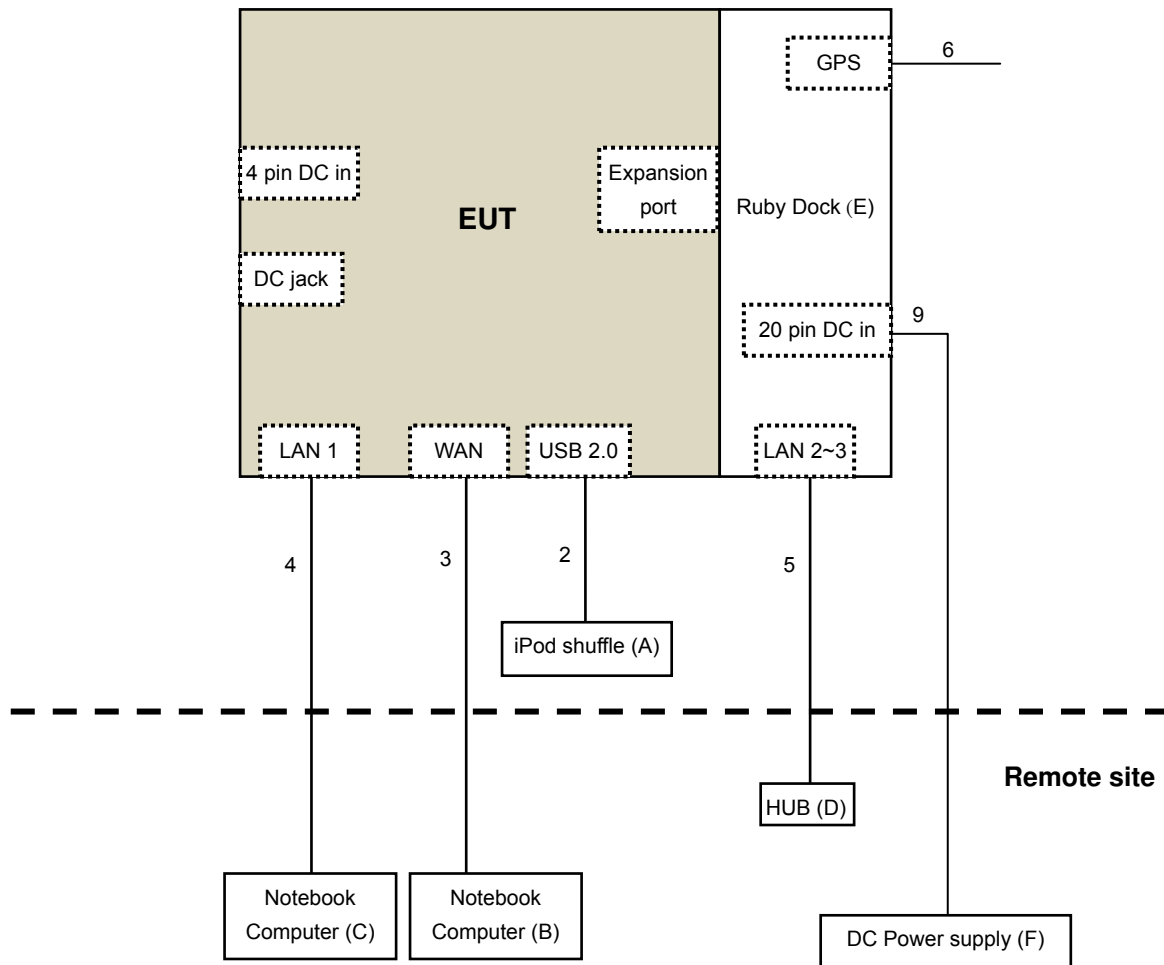
DC power cable (4 pin)



DC power cable (15 pin):



Power from Dock



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)

KDB 558074 D01 DTS Meas Guidance v03r04

KDB 662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2013

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 24, 2015	July 23, 2016
Pre-Amplifier ^(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna ^(*) Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-03	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D-FB	CHGCAB-001-1 CHGCAB-001-2	Oct. 03, 2015	Oct. 02, 2016
	RF-141	CHGCAB-004	Oct. 03, 2015	Oct. 02, 2016
Horn_Antenna AISI	AIH.8018	0000320091110	Jan. 19, 2016	Jan. 18, 2017
Pre-Amplifier Agilent	8449B	3008A02578	June 23, 2015	June 22, 2016
RF Cable	NA	131205 131216 131217 SNMY23684/4	Jan. 15, 2016	Jan. 14, 2017
Spectrum Analyzer Agilent	E4446A	MY48250254	Nov. 25, 2015	Nov. 24, 2016
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 11, 2015	Dec. 10, 2016
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Jan. 18, 2016	Jan. 17, 2017
RF Cable	SUCOFLEX 102	36442/2 36434/2	Dec. 10, 2015	Dec.09, 2016
Software	ADT_Radiated_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA
Boresight Antenna Fixture	NA	NA	NA	NA
Spectrum analyzer R&S	FSP 40	100060	May 08, 2015	May 07, 2016
Power meter Anritsu	ML2495A	1014008	Apr. 28, 2015	Apr. 27, 2016
Power sensor Anritsu	MA2411B	0917122	Apr. 28, 2015	Apr. 27, 2016

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Loop antenna was used for all emissions below 30 MHz.
4. The test was performed in 966 Chamber No. G.
5. The FCC Site Registration No. is 966073.
7. The CANADA Site Registration No. is IC 7450H-2.
8. Tested Date: Mar. 21 to 22, 2016

4.1.3 Test Procedures

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

Note:

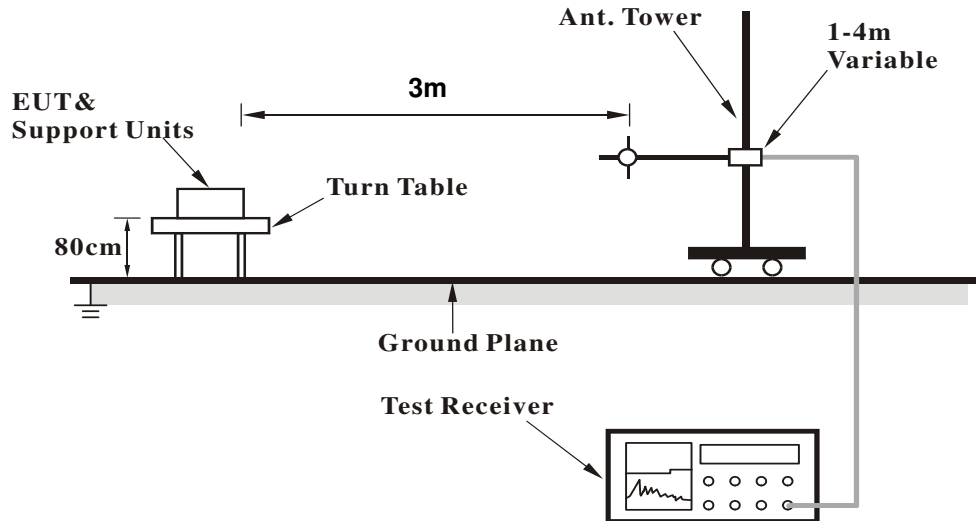
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

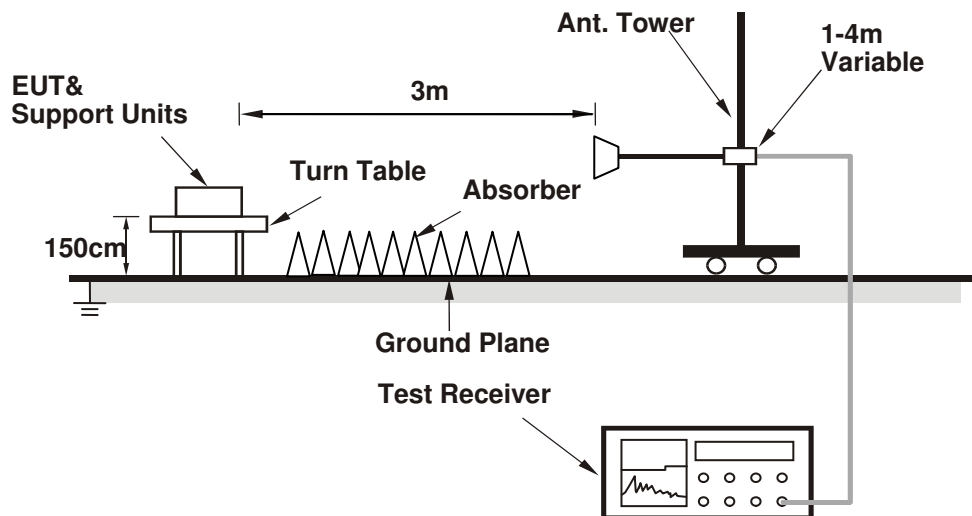
No deviation.

4.1.5 Test Setup

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

- Connect the EUT with the support units B~C (Notebook Computer) which are placed on table in remote site.
- The communication partner run test program "MT7620 QAV1.0.6.0" to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	49.1 PK	74.0	-24.9	1.45 H	272	48.48	0.62
2	2390.00	37.2 AV	54.0	-16.8	1.45 H	272	36.58	0.62
3	*2412.00	99.6 PK			1.45 H	272	98.88	0.72
4	*2412.00	95.2 AV			1.45 H	272	94.48	0.72
5	4824.00	52.5 PK	74.0	-21.5	1.65 H	213	43.22	9.28
6	4824.00	43.3 AV	54.0	-10.7	1.65 H	213	34.02	9.28
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	56.7 PK	74.0	-17.3	1.62 V	0	56.08	0.62
2	2390.00	43.6 AV	54.0	-10.4	1.62 V	0	42.98	0.62
3	*2412.00	114.3 PK			1.62 V	0	113.58	0.72
4	*2412.00	110.8 AV			1.62 V	0	110.08	0.72
5	4824.00	57.3 PK	74.0	-16.7	1.88 V	253	48.02	9.28
6	4824.00	53.6 AV	54.0	-0.4	1.88 V	253	44.32	9.28

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	109.7 PK			1.50 H	270	108.90	0.80
2	*2437.00	96.1 AV			1.50 H	270	95.30	0.80
3	4874.00	52.4 PK	74.0	-21.6	1.67 H	222	43.00	9.40
4	4874.00	43.2 AV	54.0	-10.8	1.67 H	222	33.80	9.40
5	7311.00	56.9 PK	74.0	-17.1	1.71 H	201	40.52	16.38
6	7311.00	44.2 AV	54.0	-9.8	1.71 H	201	27.82	16.38
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	115.4 PK			1.73 V	13	114.60	0.80
2	*2437.00	111.6 AV			1.73 V	13	110.80	0.80
3	4874.00	57.2 PK	74.0	-16.8	2.01 V	220	47.80	9.40
4	4874.00	53.6 AV	54.0	-0.4	2.01 V	220	44.20	9.40
5	7311.00	57.5 PK	74.0	-16.5	2.01 V	220	41.12	16.38
6	7311.00	44.9 AV	54.0	-9.1	2.01 V	220	28.52	16.38

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	108.7 PK			1.44 H	278	107.82	0.88
2	*2462.00	95.9 AV			1.44 H	278	95.02	0.88
3	2483.50	51.1 PK	74.0	-22.9	1.44 H	278	50.15	0.95
4	2483.50	38.1 AV	54.0	-15.9	1.44 H	278	37.15	0.95
5	4924.00	52.6 PK	74.0	-21.4	1.66 H	237	43.14	9.46
6	4924.00	43.6 AV	54.0	-10.4	1.66 H	237	34.14	9.46
7	7386.00	56.8 PK	74.0	-17.2	1.70 H	211	40.82	15.98
8	7386.00	44.2 AV	54.0	-9.8	1.70 H	211	28.22	15.98

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	114.4 PK			1.98 V	0	113.52	0.88
2	*2462.00	110.4 AV			1.98 V	0	109.52	0.88
3	2483.50	55.4 PK	74.0	-18.6	1.98 V	0	54.45	0.95
4	2483.50	43.3 AV	54.0	-10.7	1.98 V	0	42.35	0.95
5	4924.00	57.0 PK	74.0	-17.0	1.86 V	219	47.54	9.46
6	4924.00	53.5 AV	54.0	-0.5	1.86 V	219	44.04	9.46
7	7386.00	57.6 PK	74.0	-16.4	1.86 V	219	41.62	15.98
8	7386.00	44.5 AV	54.0	-9.5	1.86 V	219	28.52	15.98

REMARKS:

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

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.7 PK	74.0	-18.3	1.68 H	261	55.08	0.62
2	2390.00	40.9 AV	54.0	-13.1	1.68 H	261	40.28	0.62
3	*2412.00	102.1 PK			1.68 H	261	101.38	0.72
4	*2412.00	91.3 AV			1.68 H	261	90.58	0.72
5	4824.00	52.1 PK	74.0	-21.9	1.72 H	227	42.82	9.28
6	4824.00	39.2 AV	54.0	-14.8	1.72 H	227	29.92	9.28
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	71.1 PK	74.0	-2.9	1.59 V	11	70.48	0.62
2	2390.00	53.5 AV	54.0	-0.5	1.59 V	11	52.88	0.62
3	*2412.00	117.1 PK			1.59 V	11	116.38	0.72
4	*2412.00	105.5 AV			1.59 V	11	104.78	0.72
5	4824.00	56.3 PK	74.0	-17.7	1.94 V	240	47.02	9.28
6	4824.00	43.5 AV	54.0	-10.5	1.94 V	240	34.22	9.28

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.2 PK	74.0	-18.8	1.47 H	266	54.58	0.62
2	2390.00	40.4 AV	54.0	-13.6	1.47 H	266	39.78	0.62
3	*2437.00	107.1 PK			1.47 H	266	106.30	0.80
4	*2437.00	97.1 AV			1.47 H	266	96.30	0.80
5	2483.50	55.6 PK	74.0	-18.4	1.47 H	266	54.65	0.95
6	2483.50	41.0 AV	54.0	-13.0	1.47 H	266	40.05	0.95
7	4874.00	56.2 PK	74.0	-17.8	1.73 H	221	46.80	9.40
8	4874.00	44.5 AV	54.0	-9.5	1.73 H	221	35.10	9.40
9	7311.00	56.7 PK	74.0	-17.3	1.67 H	198	40.32	16.38
10	7311.00	44.3 AV	54.0	-9.7	1.67 H	198	27.92	16.38

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.6 PK	74.0	-3.4	1.77 V	0	69.98	0.62
2	2390.00	53.0 AV	54.0	-1.0	1.77 V	0	52.38	0.62
3	*2437.00	122.1 PK			1.77 V	0	121.30	0.80
4	*2437.00	111.3 AV			1.77 V	0	110.50	0.80
5	2483.50	71.0 PK	74.0	-3.0	1.77 V	0	70.05	0.95
6	2483.50	53.6 AV	54.0	-0.4	1.77 V	0	52.65	0.95
7	4874.00	61.3 PK	74.0	-12.7	1.90 V	251	51.90	9.40
8	4874.00	49.3 AV	54.0	-4.7	1.90 V	251	39.90	9.40
9	7311.00	58.4 PK	74.0	-15.6	1.90 V	250	42.02	16.38
10	7311.00	45.2 AV	54.0	-8.8	1.90 V	250	28.82	16.38

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	100.3 PK			1.48 H	260	99.42	0.88
2	*2462.00	90.2 AV			1.48 H	260	89.32	0.88
3	2483.50	58.1 PK	74.0	-15.9	1.48 H	260	57.15	0.95
4	2483.50	41.3 AV	54.0	-12.7	1.48 H	260	40.35	0.95
5	4924.00	51.7 PK	74.0	-22.3	1.70 H	213	42.24	9.46
6	4924.00	38.9 AV	54.0	-15.1	1.70 H	213	29.44	9.46
7	7386.00	56.5 PK	74.0	-17.5	1.70 H	222	40.52	15.98
8	7386.00	43.8 AV	54.0	-10.2	1.70 H	222	27.82	15.98
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	115.3 PK			1.73 V	15	114.42	0.88
2	*2462.00	104.4 AV			1.73 V	15	103.52	0.88
3	2483.50	73.5 PK	74.0	-0.5	1.73 V	15	72.55	0.95
4	2483.50	53.6 AV	54.0	-0.4	1.73 V	15	52.65	0.95
5	4924.00	54.4 PK	74.0	-19.6	1.98 V	236	44.94	9.46
6	4924.00	41.6 AV	54.0	-12.4	1.98 V	236	32.14	9.46
7	7386.00	57.8 PK	74.0	-16.2	1.85 V	256	41.82	15.98
8	7386.00	44.9 AV	54.0	-9.1	1.85 V	256	28.92	15.98

REMARKS:

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

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.6 PK	74.0	-16.4	1.80 H	328	56.98	0.62
2	2390.00	41.4 AV	54.0	-12.6	1.80 H	328	40.78	0.62
3	*2412.00	104.2 PK			1.80 H	328	103.48	0.72
4	*2412.00	91.3 AV			1.80 H	328	90.58	0.72
5	4824.00	52.0 PK	74.0	-22.0	1.71 H	227	42.72	9.28
6	4824.00	39.3 AV	54.0	-14.7	1.71 H	227	30.02	9.28
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	73.9 PK	74.0	-0.1	1.80 V	0	73.28	0.62
2	2390.00	53.9 AV	54.0	-0.1	1.80 V	0	53.28	0.62
3	*2412.00	118.6 PK			1.80 V	0	117.88	0.72
4	*2412.00	105.2 AV			1.80 V	0	104.48	0.72
5	4824.00	56.2 PK	74.0	-17.8	1.92 V	254	46.92	9.28
6	4824.00	43.7 AV	54.0	-10.3	1.92 V	254	34.42	9.28

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.2 PK	74.0	-17.8	1.47 H	261	55.58	0.62
2	2390.00	38.7 AV	54.0	-15.3	1.47 H	261	38.08	0.62
3	*2437.00	111.8 PK			1.47 H	261	111.00	0.80
4	*2437.00	98.3 AV			1.47 H	261	97.50	0.80
5	2483.50	56.3 PK	74.0	-17.7	1.47 H	261	55.35	0.95
6	2483.50	41.1 AV	54.0	-12.9	1.47 H	261	40.15	0.95
7	4874.00	56.0 PK	74.0	-18.0	1.67 H	207	46.60	9.40
8	4874.00	44.1 AV	54.0	-9.9	1.67 H	207	34.70	9.40
9	7311.00	56.9 PK	74.0	-17.1	1.73 H	216	40.52	16.38
10	7311.00	44.2 AV	54.0	-9.8	1.73 H	216	27.82	16.38

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.5 PK	74.0	-1.5	1.79 V	0	71.88	0.62
2	2390.00	51.2 AV	54.0	-2.8	1.79 V	0	50.58	0.62
3	*2437.00	126.2 PK			1.79 V	0	125.40	0.80
4	*2437.00	112.2 AV			1.79 V	0	111.40	0.80
5	2483.50	72.6 PK	74.0	-1.4	1.79 V	0	71.65	0.95
6	2483.50	53.6 AV	54.0	-0.4	1.79 V	0	52.65	0.95
7	4874.00	61.3 PK	74.0	-12.7	1.89 V	257	51.90	9.40
8	4874.00	49.3 AV	54.0	-4.7	1.89 V	257	39.90	9.40
9	7311.00	58.8 PK	74.0	-15.2	1.86 V	261	42.42	16.38
10	7311.00	45.5 AV	54.0	-8.5	1.86 V	261	29.12	16.38

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.8 PK			1.40 H	271	103.92	0.88
2	*2462.00	92.3 AV			1.40 H	271	91.42	0.88
3	2483.50	57.5 PK	74.0	-16.5	1.40 H	271	56.55	0.95
4	2483.50	40.8 AV	54.0	-13.2	1.40 H	271	39.85	0.95
5	4924.00	53.2 PK	74.0	-20.8	1.70 H	237	43.74	9.46
6	4924.00	40.1 AV	54.0	-13.9	1.70 H	237	30.64	9.46
7	7386.00	57.0 PK	74.0	-17.0	1.67 H	205	41.02	15.98
8	7386.00	44.7 AV	54.0	-9.3	1.67 H	205	28.72	15.98
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	119.1 PK			1.70 V	0	118.22	0.88
2	*2462.00	106.2 AV			1.70 V	0	105.32	0.88
3	2483.50	73.8 PK	74.0	-0.2	1.70 V	0	72.85	0.95
4	2483.50	53.3 AV	54.0	-0.7	1.70 V	0	52.35	0.95
5	4924.00	56.9 PK	74.0	-17.1	1.91 V	261	47.44	9.46
6	4924.00	44.5 AV	54.0	-9.5	1.91 V	261	35.04	9.46
7	7386.00	58.4 PK	74.0	-15.6	1.94 V	245	42.42	15.98
8	7386.00	45.0 AV	54.0	-9.0	1.94 V	245	29.02	15.98

REMARKS:

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

802.11n (HT40)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.6 PK	74.0	-16.4	1.42 H	259	56.98	0.62
2	2390.00	41.5 AV	54.0	-12.5	1.42 H	259	40.88	0.62
3	*2422.00	100.5 PK			1.42 H	259	99.75	0.75
4	*2422.00	86.5 AV			1.42 H	259	85.75	0.75
5	4844.00	52.5 PK	74.0	-21.5	1.70 H	231	43.18	9.32
6	4844.00	39.6 AV	54.0	-14.4	1.70 H	231	30.28	9.32
7	7266.00	56.6 PK	74.0	-17.4	1.71 H	225	40.04	16.56
8	7266.00	44.2 AV	54.0	-9.8	1.71 H	225	27.64	16.56
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	73.8 PK	74.0	-0.2	1.60 V	5	73.18	0.62
2	2390.00	53.9 AV	54.0	-0.1	1.60 V	5	53.28	0.62
3	*2422.00	114.8 PK			1.60 V	5	114.05	0.75
4	*2422.00	100.4 AV			1.60 V	5	99.65	0.75
5	4844.00	55.8 PK	74.0	-18.2	1.92 V	250	46.48	9.32
6	4844.00	43.0 AV	54.0	-11.0	1.92 V	250	33.68	9.32
7	7266.00	58.5 PK	74.0	-15.5	1.88 V	265	41.94	16.56
8	7266.00	45.4 AV	54.0	-8.6	1.88 V	265	28.84	16.56

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.5 PK	74.0	-16.5	1.39 H	285	56.88	0.62
2	2390.00	40.7 AV	54.0	-13.3	1.39 H	285	40.08	0.62
3	*2437.00	103.6 PK			1.39 H	285	102.80	0.80
4	*2437.00	90.3 AV			1.39 H	285	89.50	0.80
5	2483.50	53.8 PK	74.0	-20.2	1.39 H	285	52.85	0.95
6	2483.50	38.1 AV	54.0	-15.9	1.39 H	285	37.15	0.95
7	4874.00	51.8 PK	74.0	-22.2	1.68 H	238	42.40	9.40
8	4874.00	39.1 AV	54.0	-14.9	1.68 H	238	29.70	9.40
9	7311.00	57.2 PK	74.0	-16.8	1.70 H	209	40.82	16.38
10	7311.00	44.6 AV	54.0	-9.4	1.70 H	209	28.22	16.38

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	73.7 PK	74.0	-0.3	1.65 V	0	73.08	0.62
2	2390.00	53.1 AV	54.0	-0.9	1.65 V	0	52.48	0.62
3	*2437.00	117.9 PK			1.65 V	0	117.10	0.80
4	*2437.00	104.2 AV			1.65 V	0	103.40	0.80
5	2483.50	70.1 PK	74.0	-3.9	1.65 V	0	69.15	0.95
6	2483.50	49.6 AV	54.0	-4.4	1.65 V	0	48.65	0.95
7	4874.00	56.1 PK	74.0	-17.9	1.92 V	242	46.70	9.40
8	4874.00	43.5 AV	54.0	-10.5	1.92 V	242	34.10	9.40
9	7311.00	58.5 PK	74.0	-15.5	1.87 V	238	42.12	16.38
10	7311.00	45.1 AV	54.0	-8.9	1.87 V	238	28.72	16.38

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	100.8 PK			1.51 H	265	99.96	0.84
2	*2452.00	87.9 AV			1.51 H	265	87.06	0.84
3	2483.50	54.0 PK	74.0	-20.0	1.51 H	265	53.05	0.95
4	2483.50	38.5 AV	54.0	-15.5	1.51 H	265	37.55	0.95
5	4904.00	52.1 PK	74.0	-21.9	1.67 H	211	42.65	9.45
6	4904.00	38.9 AV	54.0	-15.1	1.67 H	211	29.45	9.45
7	7356.00	56.2 PK	74.0	-17.8	1.75 H	206	40.06	16.14
8	7356.00	43.8 AV	54.0	-10.2	1.75 H	206	27.66	16.14
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	115.1 PK			1.69 V	0	114.26	0.84
2	*2452.00	101.8 AV			1.69 V	0	100.96	0.84
3	2483.50	70.5 PK	74.0	-3.5	1.69 V	0	69.55	0.95
4	2483.50	53.6 AV	54.0	-0.4	1.69 V	0	52.65	0.95
5	4904.00	55.7 PK	74.0	-18.3	1.96 V	241	46.25	9.45
6	4904.00	43.1 AV	54.0	-10.9	1.96 V	241	33.65	9.45
7	7356.00	58.6 PK	74.0	-15.4	1.94 V	246	42.46	16.14
8	7356.00	45.6 AV	54.0	-8.4	1.94 V	246	29.46	16.14

REMARKS:

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

Below 1GHz Data:

802.11n (HT20)

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	87.55	28.1 QP	40.0	-11.9	2.50 H	296	42.00	-13.91
2	140.58	31.1 QP	43.5	-12.4	2.50 H	250	39.27	-8.13
3	160.03	29.5 QP	43.5	-14.0	2.00 H	281	37.14	-7.63
4	250.00	35.7 QP	46.0	-10.3	1.00 H	244	44.43	-8.73
5	625.00	37.9 QP	46.0	-8.1	1.50 H	42	36.25	1.61
6	875.02	39.5 QP	46.0	-6.5	1.00 H	71	33.99	5.47
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	36.69	34.4 QP	40.0	-5.7	1.00 V	197	43.28	-8.93
2	90.50	34.0 QP	43.5	-9.5	1.00 V	270	47.72	-13.74
3	250.00	38.4 QP	46.0	-7.6	1.00 V	352	47.11	-8.73
4	375.01	32.8 QP	46.0	-13.2	1.50 V	129	37.38	-4.59
5	625.00	37.7 QP	46.0	-8.3	1.00 V	324	36.05	1.61
6	875.02	42.7 QP	46.0	-3.3	1.00 V	46	37.27	5.47

REMARKS:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

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

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	100375	May 06, 2015	May 05, 2016
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 01, 2015	Aug. 31, 2016
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 11, 2015	June 10, 2016
RF Cable	5D-FB	COCCAB-001	Mar. 08, 2016	Mar. 07, 2017
50 ohms Terminator	N/A	EMC-03	Sep. 23, 2015	Sep. 22, 2016
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2015	Sep. 30, 2016
50 ohms Terminator	E1-011315	13	Dec. 11 2015	Dec. 10 2016
Software BVADT	BVADT_Cond_ V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date:Mar. 24, 2016

4.2.3 Test Procedures

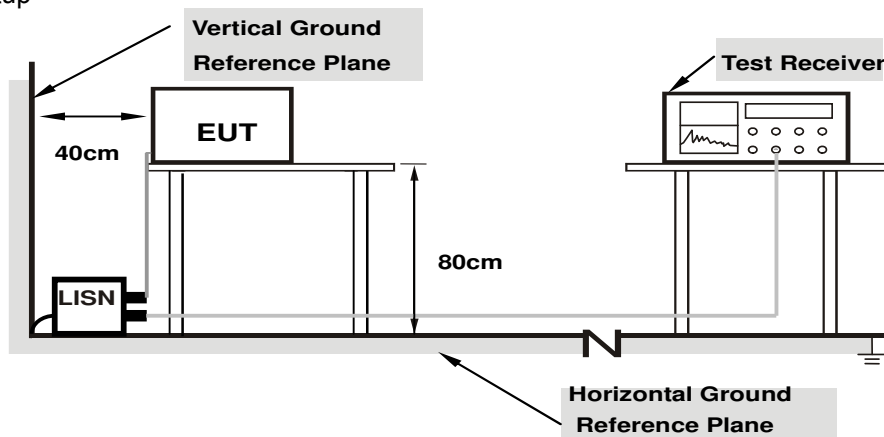
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

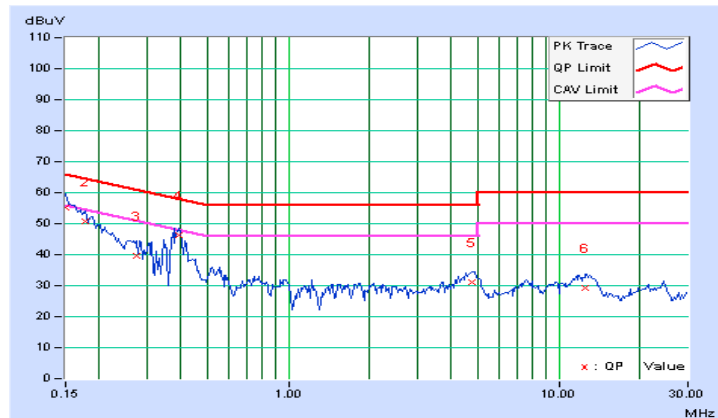
4.2.7 Test Results (Mode 1)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
		(dB)								
1	0.15000	10.44	44.67	30.52	55.11	40.96	66.00	56.00	-10.89	-15.04
2	0.17734	10.42	40.31	25.13	50.73	35.55	64.61	54.61	-13.88	-19.06
3	0.27500	10.41	29.06	17.64	39.47	28.05	60.97	50.97	-21.49	-22.91
4	0.39256	10.43	35.77	32.99	46.20	43.42	58.01	48.01	-11.81	-4.59
5	4.78906	10.67	20.62	15.06	31.29	25.73	56.00	46.00	-24.71	-20.27
6	12.55078	11.09	18.34	13.60	29.43	24.69	60.00	50.00	-30.57	-25.31

REMARKS:

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

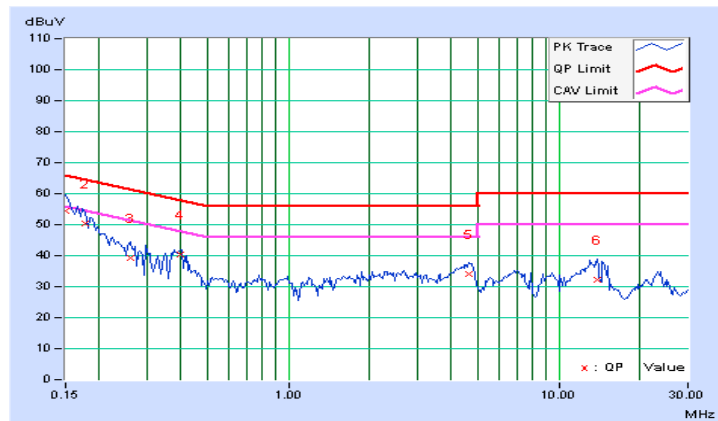


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.44	43.98	28.87	54.42	39.31	66.00	56.00	-11.58	-16.69
2	0.17734	10.45	39.96	23.44	50.41	33.89	64.61	54.61	-14.20	-20.72
3	0.25938	10.46	28.79	16.03	39.25	26.49	61.45	51.45	-22.20	-24.96
4	0.39609	10.48	30.01	28.59	40.49	39.07	57.93	47.93	-17.45	-8.87
5	4.66406	10.75	23.30	18.38	34.05	29.13	56.00	46.00	-21.95	-16.87
6	13.82031	11.18	20.95	16.47	32.13	27.65	60.00	50.00	-27.87	-22.35

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-



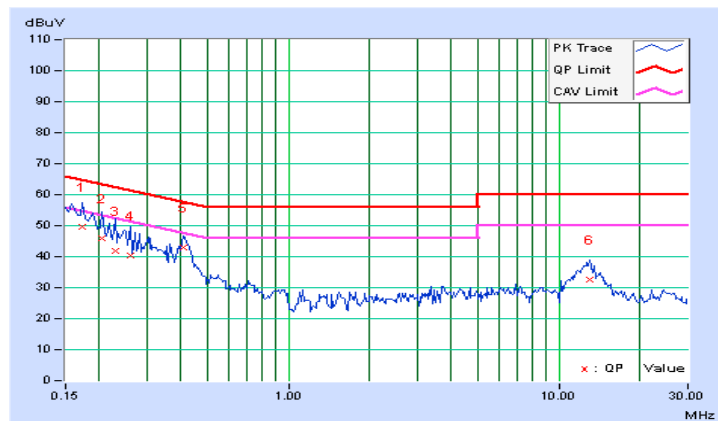
4.2.8 Test Results (Mode 2)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17344	10.42	39.05	24.44	49.47	34.86	64.79	54.79	-15.32	-19.93
2	0.20469	10.40	35.43	20.62	45.83	31.02	63.42	53.42	-17.59	-22.40
3	0.22812	10.40	31.59	18.53	41.99	28.93	62.52	52.52	-20.52	-23.58
4	0.25938	10.41	29.97	16.48	40.38	26.89	61.45	51.45	-21.07	-24.56
5	0.40781	10.43	32.58	22.50	43.01	32.93	57.69	47.69	-14.68	-14.76
6	13.02734	11.12	21.30	12.39	32.42	23.51	60.00	50.00	-27.58	-26.49

REMARKS:

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

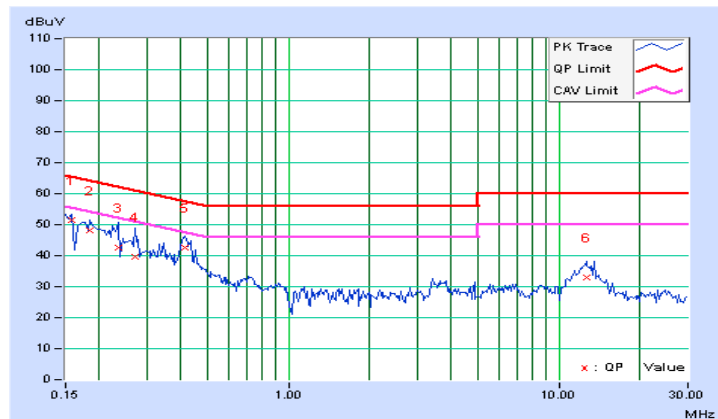


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.45	41.06	26.79	51.51	37.24	65.58	55.58	-14.07	-18.34
2	0.18516	10.45	37.72	23.20	48.17	33.65	64.25	54.25	-16.08	-20.60
3	0.23594	10.46	32.06	19.08	42.52	29.54	62.24	52.24	-19.72	-22.70
4	0.27109	10.46	29.05	14.73	39.51	25.19	61.08	51.08	-21.57	-25.89
5	0.41172	10.48	32.16	23.95	42.64	34.43	57.61	47.61	-14.97	-13.18
6	12.63281	11.11	21.97	14.37	33.08	25.48	60.00	50.00	-26.92	-24.52

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-



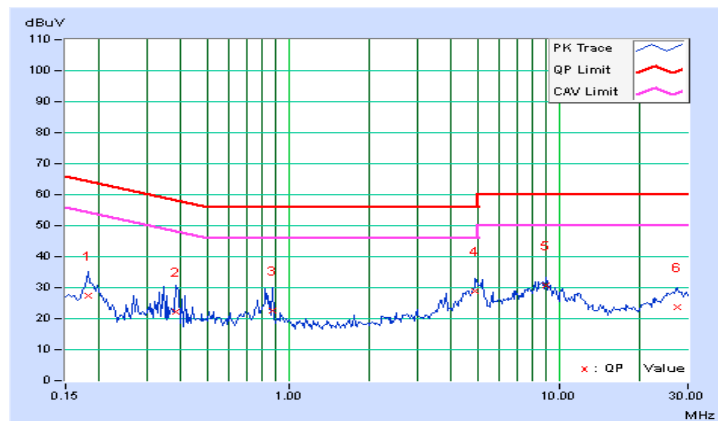
4.2.9 Test Results (Mode 3)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18125	10.30	17.06	11.30	27.36	21.60	64.43	54.43	-37.07	-32.83
2	0.38438	10.30	12.03	9.08	22.33	19.38	58.18	48.18	-35.86	-28.81
3	0.87266	10.24	12.25	9.09	22.49	19.33	56.00	46.00	-33.51	-26.67
4	4.90625	10.45	18.27	11.79	28.72	22.24	56.00	46.00	-27.28	-23.76
5	8.97266	10.52	20.13	17.09	30.65	27.61	60.00	50.00	-29.35	-22.39
6	27.48828	11.13	12.65	7.71	23.78	18.84	60.00	50.00	-36.22	-31.16

REMARKS:

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

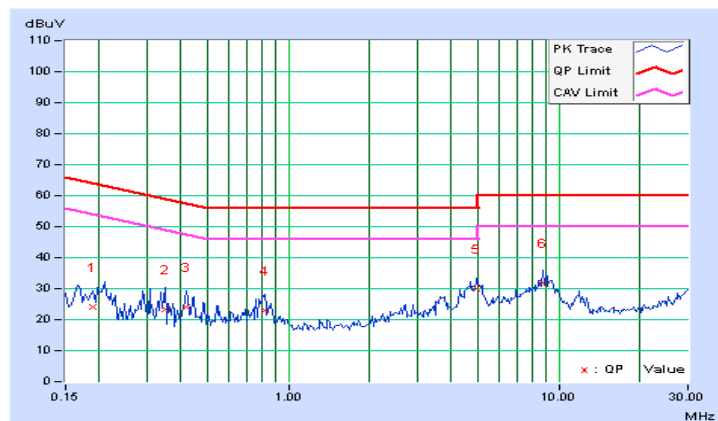


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18834	10.27	13.86	6.72	24.13	16.99	64.11	54.11	-39.98	-37.12
2	0.34922	10.27	13.03	6.90	23.30	17.17	58.98	48.98	-35.68	-31.81
3	0.41953	10.28	13.64	8.78	23.92	19.06	57.46	47.46	-33.54	-28.40
4	0.81406	10.24	12.77	8.35	23.01	18.59	56.00	46.00	-32.99	-27.41
5	4.96484	10.46	19.61	12.62	30.07	23.08	56.00	46.00	-25.93	-22.92
6	8.70313	10.53	21.18	17.54	31.71	28.07	60.00	50.00	-28.29	-21.93

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-



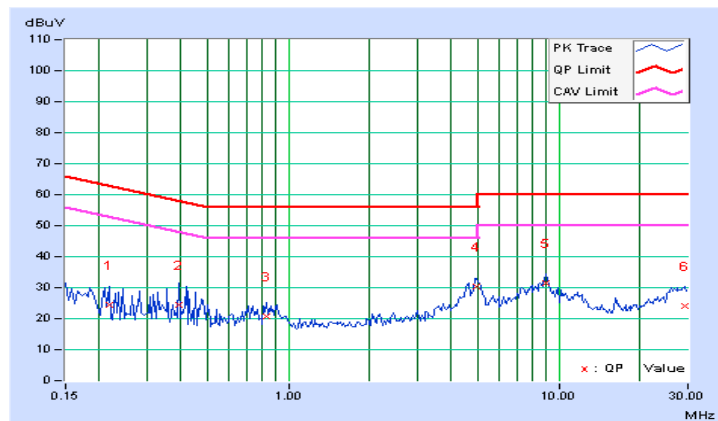
4.2.10 Test Results (Mode 4)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.21641	10.26	14.18	8.03	24.44	18.29	62.96	52.96	-38.51	-34.66
2	0.39219	10.28	14.34	8.96	24.62	19.24	58.02	48.02	-33.40	-28.78
3	0.82969	10.24	10.58	-8.95	20.82	1.29	56.00	46.00	-35.18	-44.71
4	4.95313	10.46	19.86	13.33	30.32	23.79	56.00	46.00	-25.68	-22.21
5	8.98047	10.53	20.99	19.01	31.52	29.54	60.00	50.00	-28.48	-20.46
6	29.12109	11.22	12.74	6.86	23.96	18.08	60.00	50.00	-36.04	-31.92

REMARKS:

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

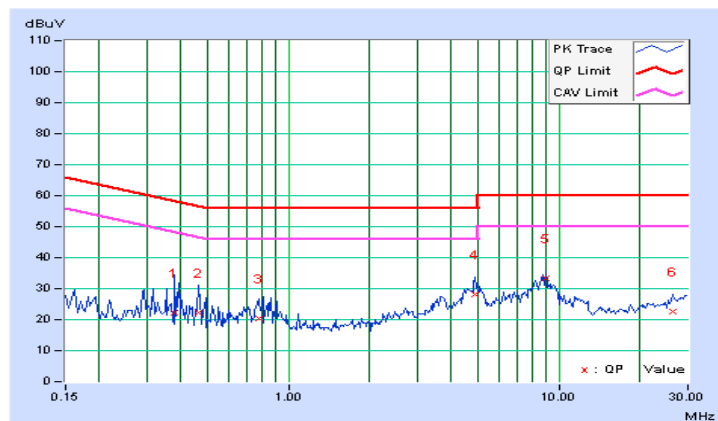


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.38047	10.28	11.97	8.54	22.25	18.82	58.27	48.27	-36.02	-29.45
2	0.46641	10.27	11.82	8.79	22.09	19.06	56.58	46.58	-34.48	-27.51
3	0.77500	10.24	10.02	7.95	20.26	18.19	56.00	46.00	-35.74	-27.81
4	4.89844	10.46	17.68	11.48	28.14	21.94	56.00	46.00	-27.86	-24.06
5	8.97656	10.53	22.88	18.39	33.41	28.92	60.00	50.00	-26.59	-21.08
6	26.39063	11.08	11.52	6.66	22.60	17.74	60.00	50.00	-37.40	-32.26

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-



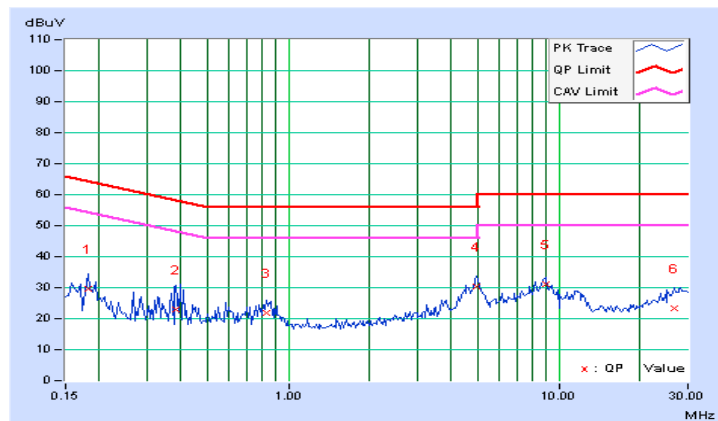
4.2.11 Test Results (Mode 5)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18125	10.30	19.35	11.42	29.65	21.72	64.43	54.43	-34.78	-32.71
2	0.38438	10.30	12.54	9.06	22.84	19.36	58.18	48.18	-35.35	-28.83
3	0.83359	10.25	11.78	8.67	22.03	18.92	56.00	46.00	-33.97	-27.08
4	4.95313	10.45	20.02	13.65	30.47	24.10	56.00	46.00	-25.53	-21.90
5	8.98047	10.52	20.61	18.61	31.13	29.13	60.00	50.00	-28.87	-20.87
6	26.64844	11.09	12.24	8.47	23.33	19.56	60.00	50.00	-36.67	-30.44

REMARKS:

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

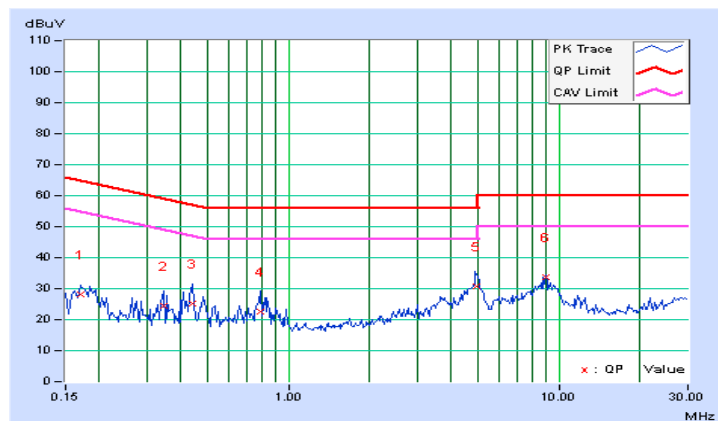


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	10.29	17.91	10.44	28.20	20.73	64.98	54.98	-36.79	-34.26
2	0.34531	10.27	14.13	7.94	24.40	18.21	59.07	49.07	-34.67	-30.86
3	0.44297	10.28	14.74	8.85	25.02	19.13	57.01	47.01	-31.99	-27.88
4	0.79063	10.24	12.25	7.79	22.49	18.03	56.00	46.00	-33.51	-27.97
5	4.93906	10.46	20.14	16.10	30.60	26.56	56.00	46.00	-25.40	-19.44
6	8.97856	10.53	23.10	21.26	33.63	31.79	60.00	50.00	-26.37	-18.21

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-

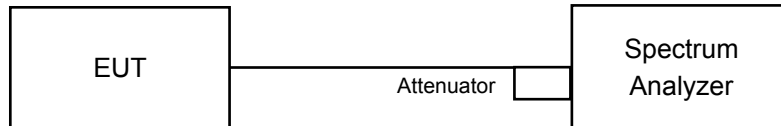


4.3 6dB Bandwidth Measurement

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 Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	9.63	0.5	Pass
6	2437	9.60	0.5	Pass
11	2462	9.64	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.36	0.5	Pass
6	2437	16.34	0.5	Pass
11	2462	16.36	0.5	Pass

802.11n (HT20)

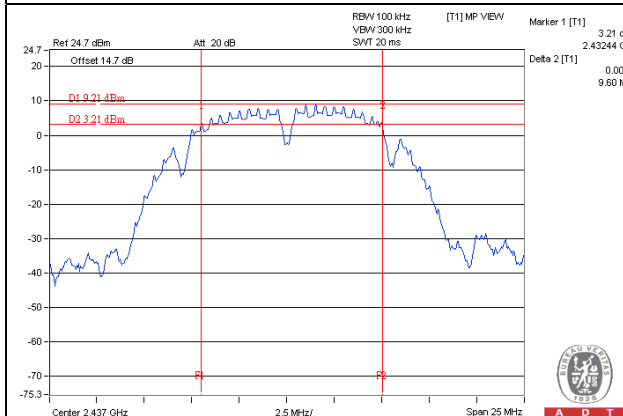
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.74	16.41	0.5	Pass
6	2437	16.72	16.71	0.5	Pass
11	2462	16.96	16.57	0.5	Pass

802.11n (HT40)

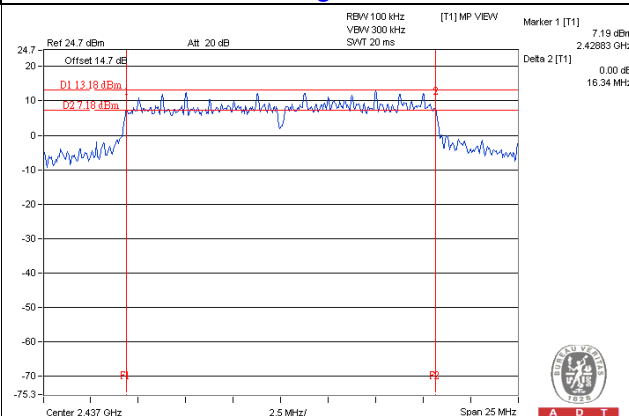
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.92	36.13	0.5	Pass
6	2437	35.25	35.25	0.5	Pass
9	2452	35.75	35.57	0.5	Pass

Spectrum Plot of Worst Value

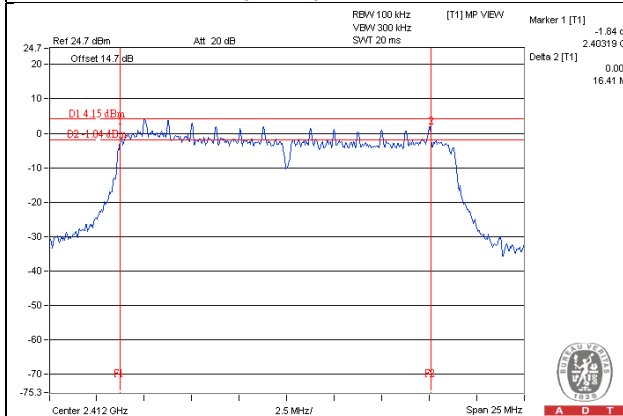
802.11b : CH6



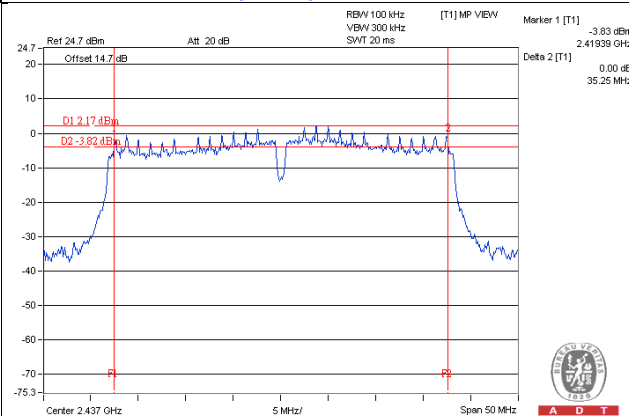
802.11g : CH6



802.11n (HT20) / Chain 1 : CH1



802.11n (HT40) / Chain 1 : CH6



4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

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

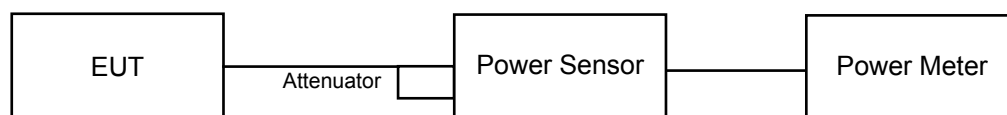
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

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

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

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

FOR PEAK POWER

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	107.399	20.31	30	Pass
6	2437	151.008	21.79	30	Pass
11	2462	129.122	21.11	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	188.799	22.76	30	Pass
6	2437	309.742	24.91	30	Pass
11	2462	157.036	21.96	30	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	21.54	21.60	287.105	24.58	30	Pass
6	2437	24.29	25.43	617.674	27.91	30	Pass
11	2462	21.21	21.92	287.727	24.59	30	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	19.50	20.22	194.321	22.89	30	Pass
6	2437	21.66	22.00	305.044	24.84	30	Pass
9	2452	20.20	20.38	213.857	23.30	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	48.417	16.85
6	2437	72.611	18.61
11	2462	50.816	17.06

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	40.644	16.09
6	2437	187.068	22.72
11	2462	29.648	14.72

802.11n (HT20)

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	13.35	13.43	43.656	16.40
6	2437	21.36	22.15	300.832	24.78
11	2462	13.81	13.47	46.277	16.65

802.11n (HT40)

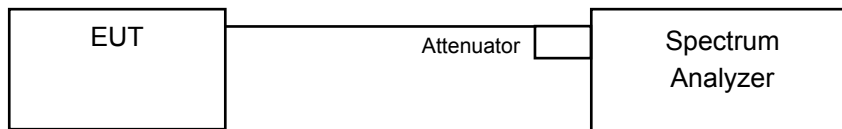
Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
3	2422	11.36	11.91	29.201	14.65
6	2437	14.67	14.97	60.714	17.83
9	2452	12.70	13.12	39.133	15.93

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 analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set the VBW $\geq 3 \times \text{RBW}$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating 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	-8.36	8.00	Pass
6	2437	-6.93	8.00	Pass
11	2462	-8.18	8.00	Pass

802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-10.93	8.00	Pass
6	2437	-3.79	8.00	Pass
11	2462	-12.23	8.00	Pass

802.11n (HT20)

Tx chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-13.98	3.01	-10.97	5.99	Pass
	6	2437	-5.36	3.01	-2.35	5.99	Pass
	11	2462	-11.67	3.01	-8.66	5.99	Pass
1	1	2412	-13.31	3.01	-10.30	5.99	Pass
	6	2437	-4.97	3.01	-1.96	5.99	Pass
	11	2462	-13.14	3.01	-10.13	5.99	Pass

Note: Directional gain = 5dBi + 10log(2) = 8.01dBi > 6dBi , so the power density limit shall be reduced to 8-(8.01-6) = 5.99dBm.

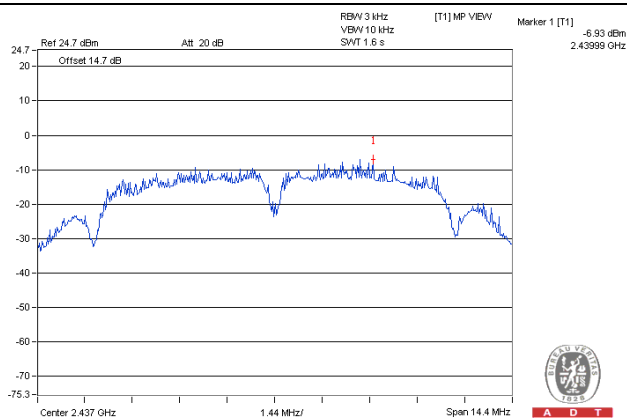
802.11n (HT40)

Tx chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	3	2422	-17.31	3.01	-14.30	5.99	Pass
	6	2437	-14.52	3.01	-11.51	5.99	Pass
	9	2452	-15.86	3.01	-12.85	5.99	Pass
1	3	2422	-15.55	3.01	-12.54	5.99	Pass
	6	2437	-13.46	3.01	-10.45	5.99	Pass
	9	2452	-16.56	3.01	-13.55	5.99	Pass

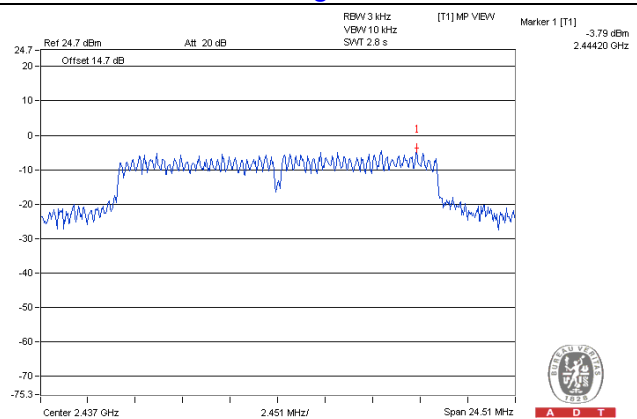
Note: Directional gain = 5dBi + 10log(2) = 9.97dBi > 6dBi , so the power density limit shall be reduced to 8-(8.01-6) = 5.99dBm.

Spectrum Plot of Worst Value

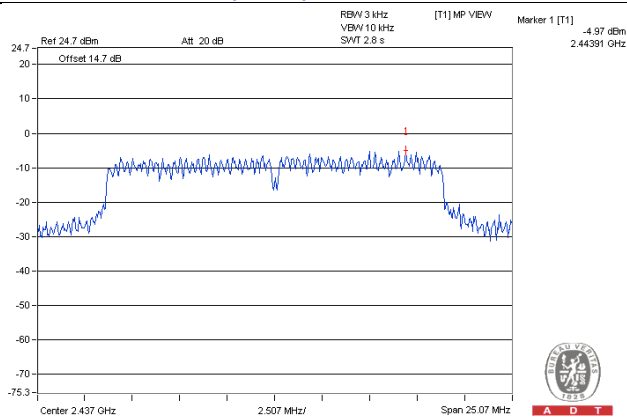
802.11b : CH6



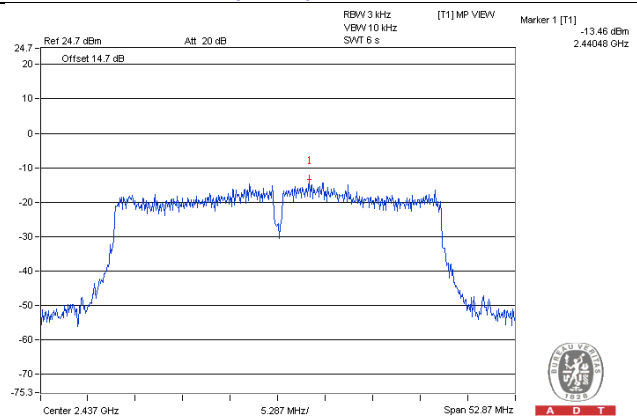
802.11g : CH6



802.11n (HT20) / Chain 1 : CH6



802.11n (HT40) / Chain 1 : CH6

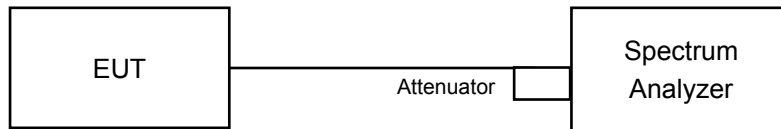


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOB

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

Same as Item 4.3.6

4.6.7 Test Results

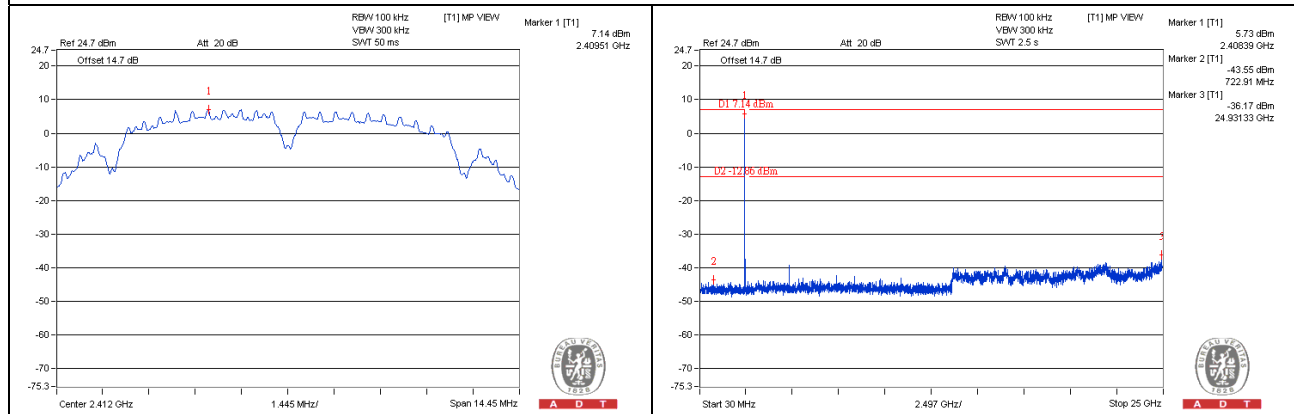
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



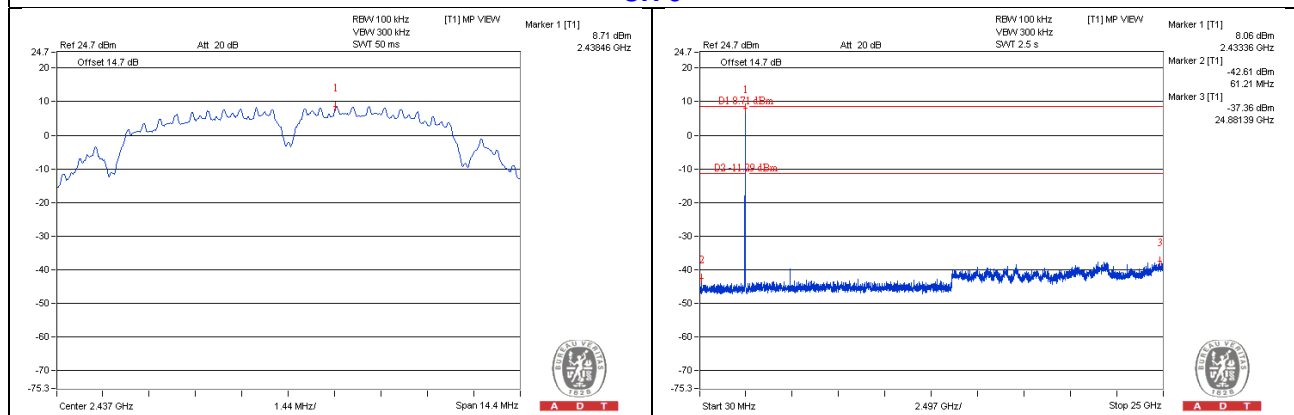
A D T

802.11b

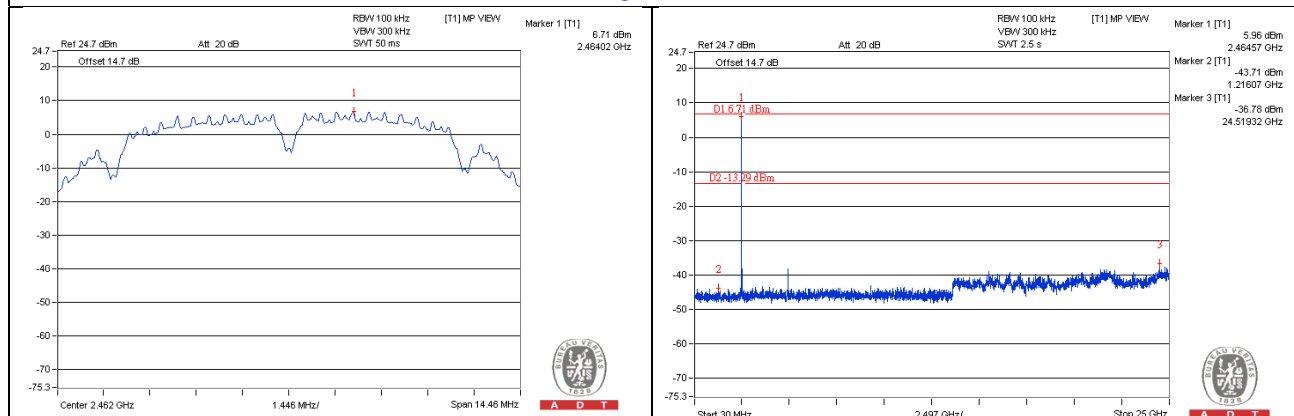
CH 1



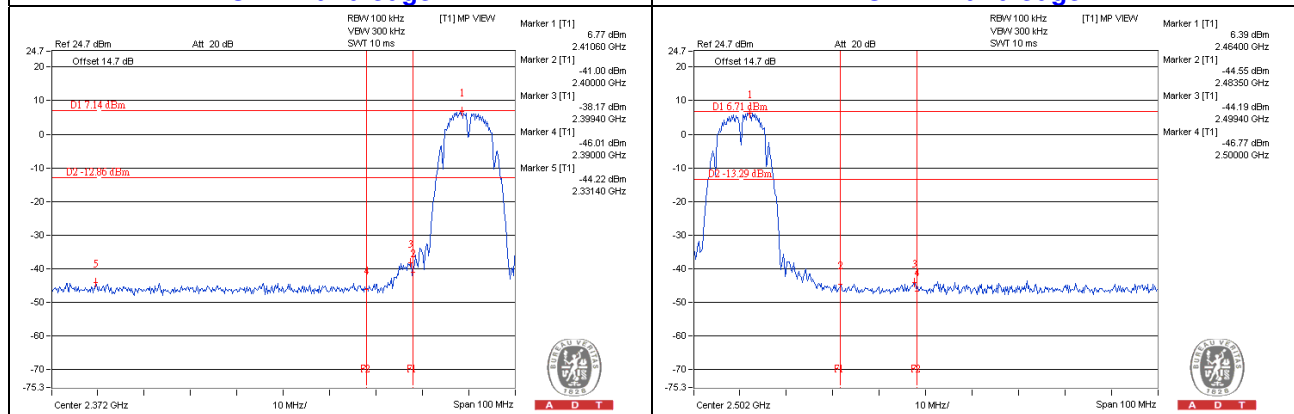
CH 6



CH 11

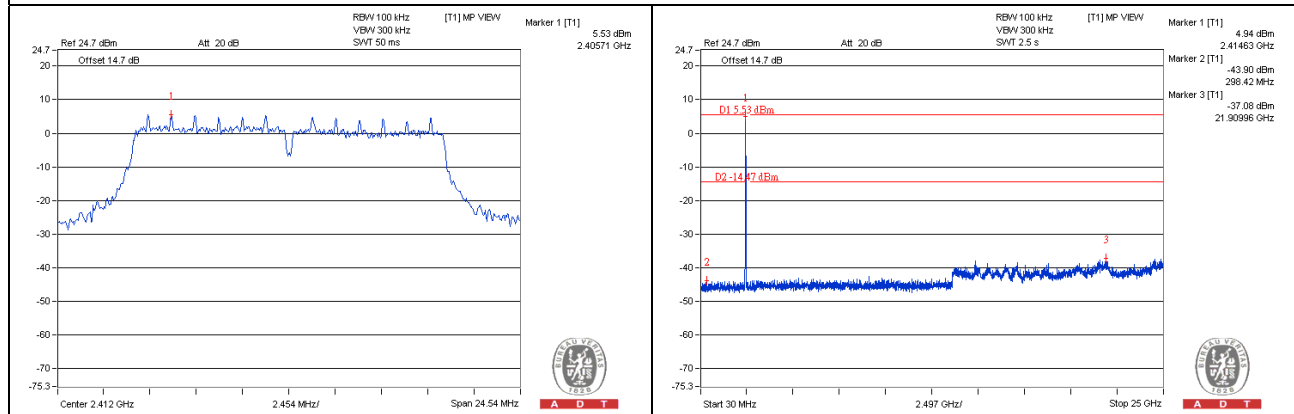


CH 1 Band edge

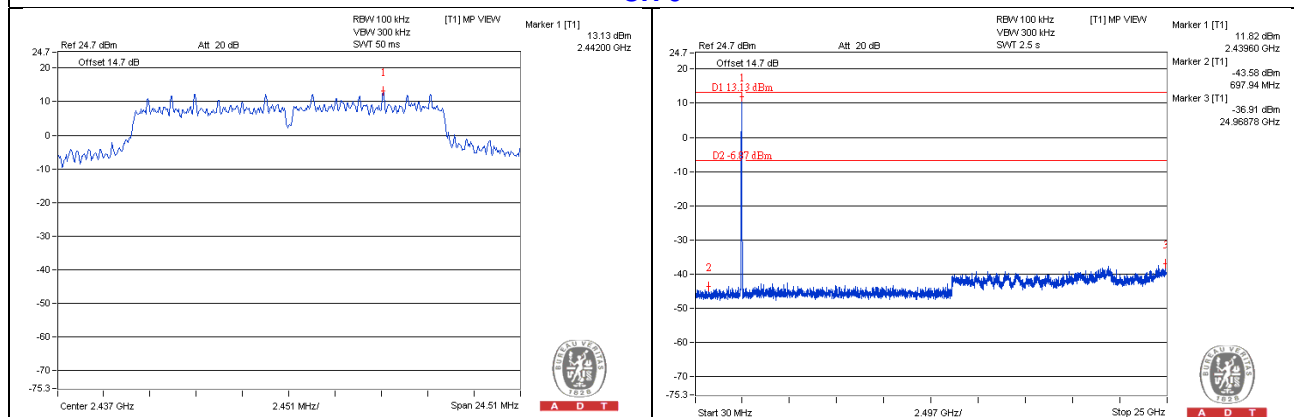


802.11g

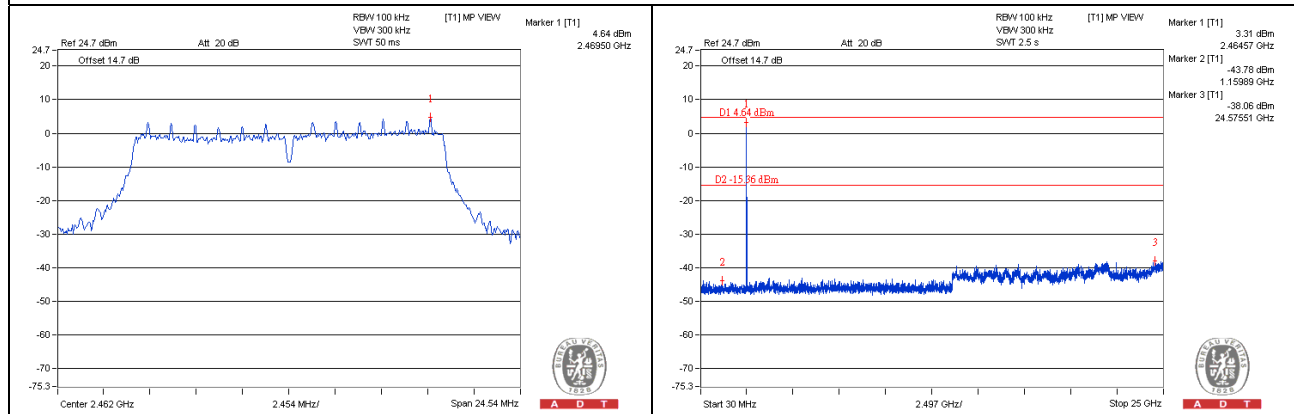
CH 1



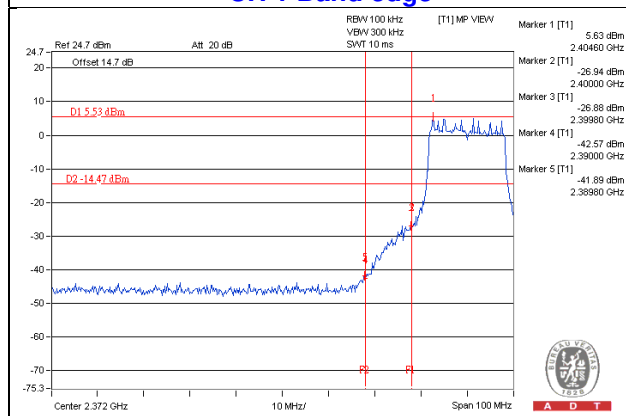
CH 6



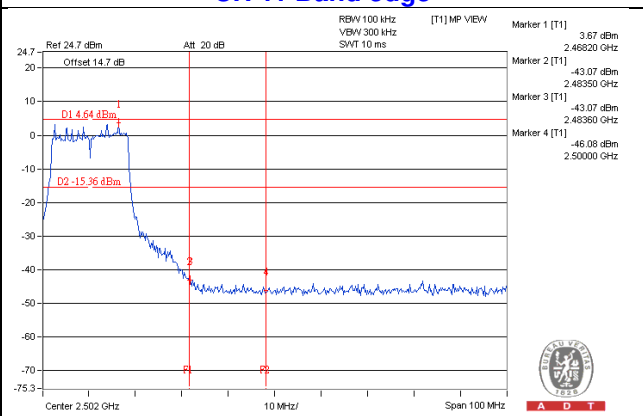
CH 11



CH 1 Band edge

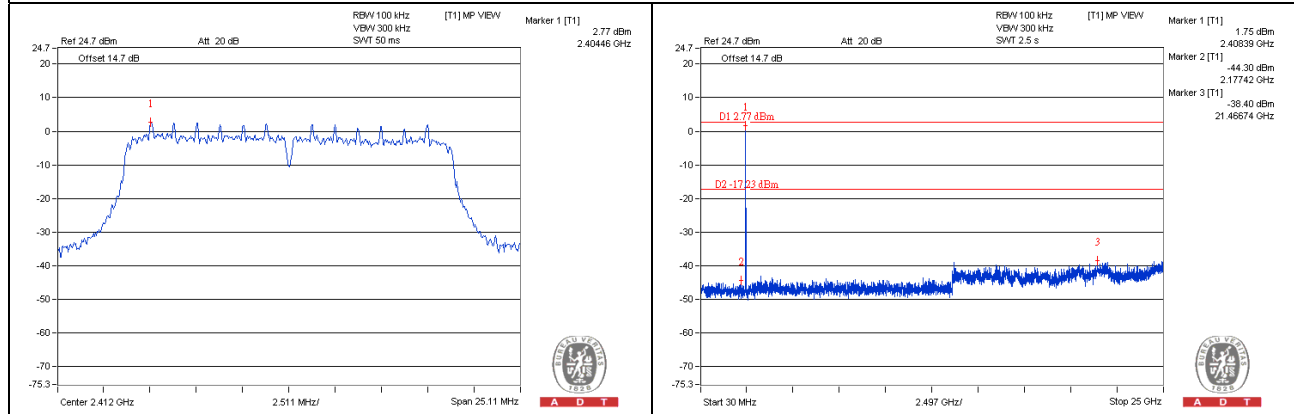


CH 11 Band edge

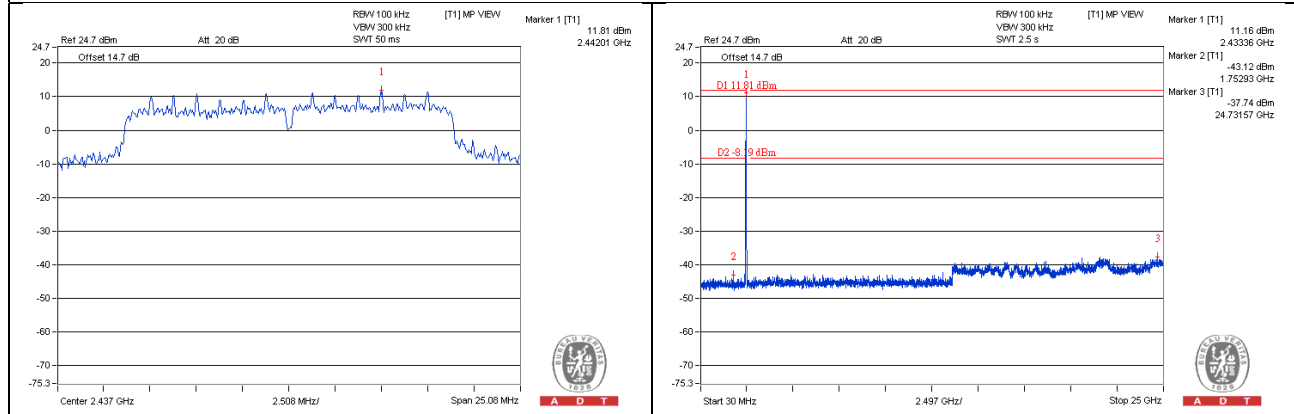


802.11n (HT20) Chain 0

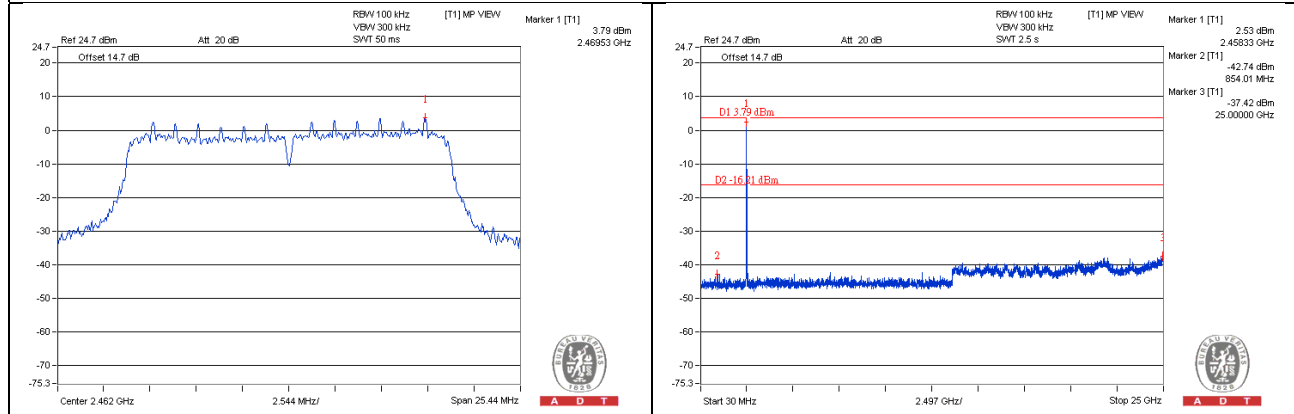
CH 1



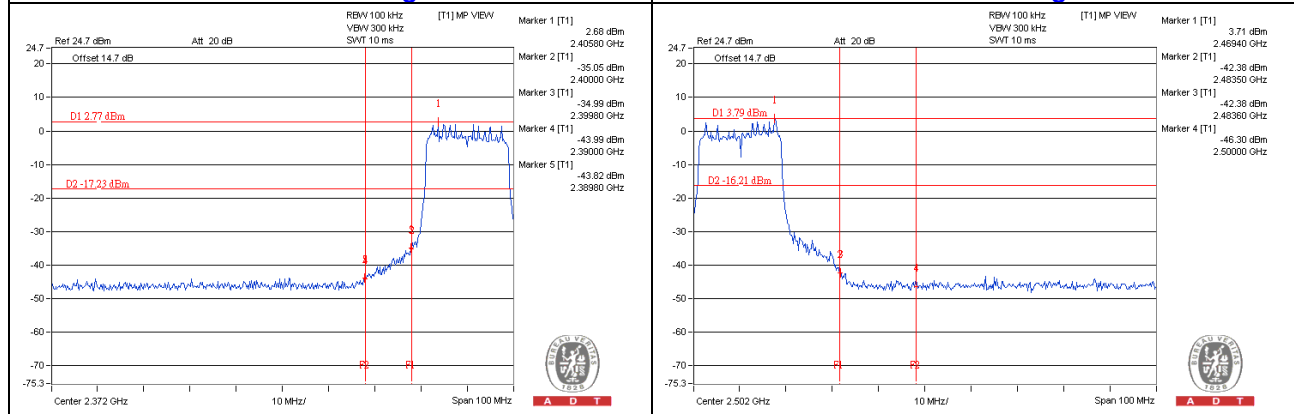
CH 6



CH 11

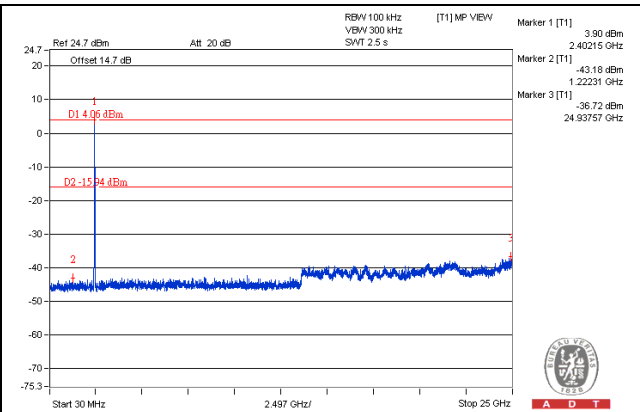
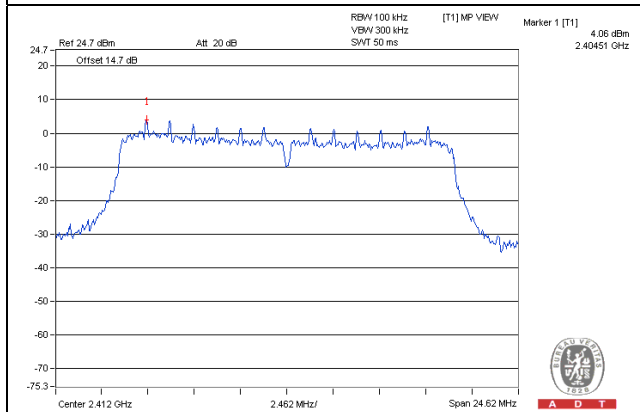


CH 1 Band edge

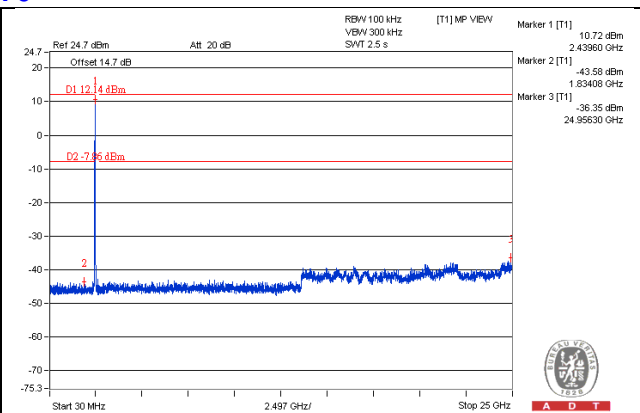
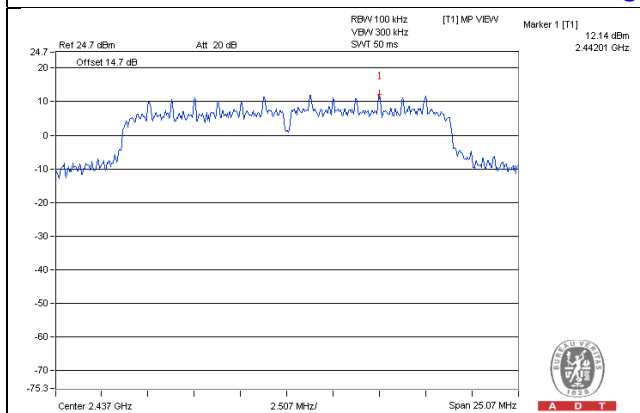


Chain 1

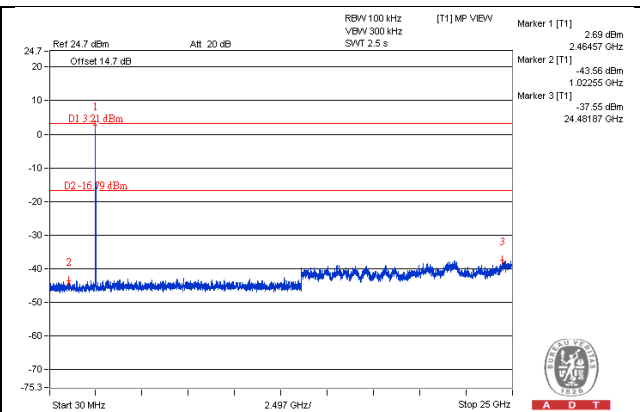
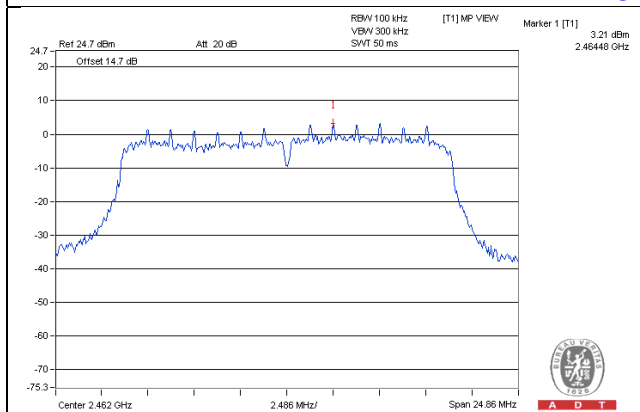
CH 1



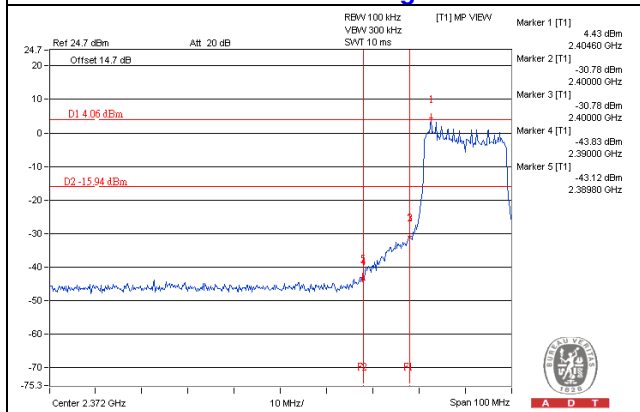
CH 6



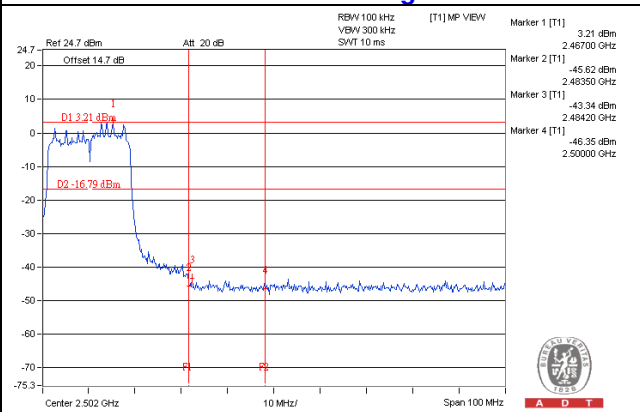
CH 11



CH 1 Band edge

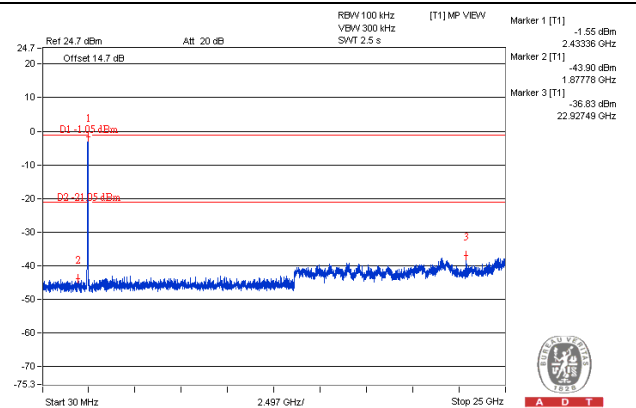
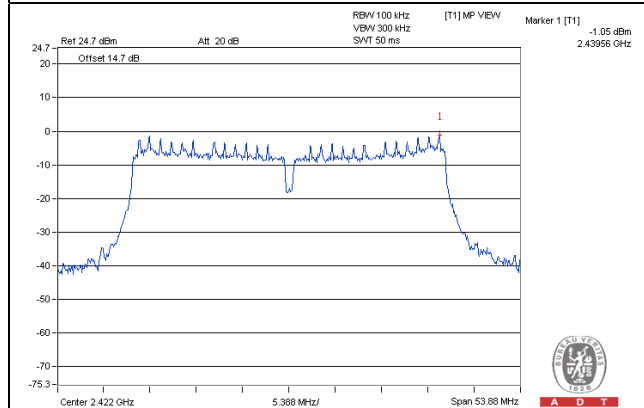


CH 11 Band edge

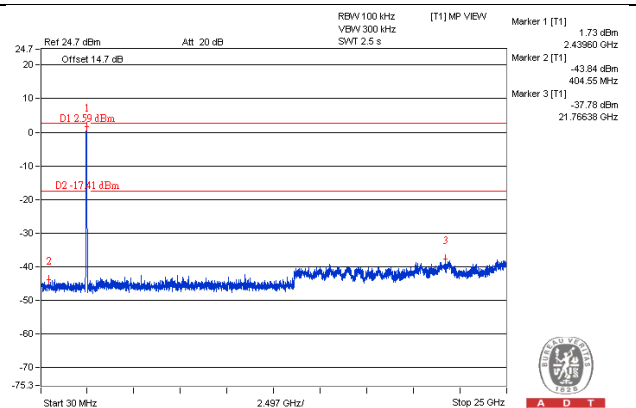
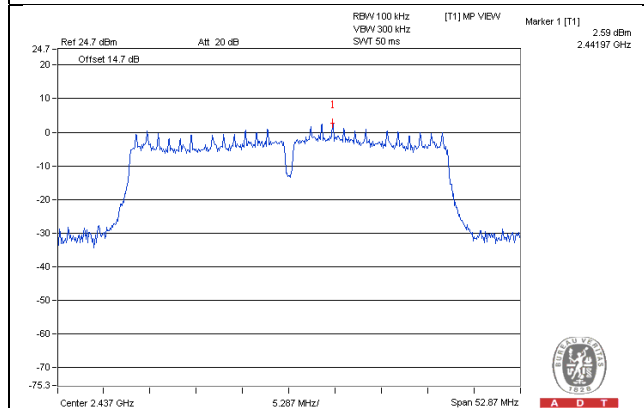


802.11n (HT40) Chain 0

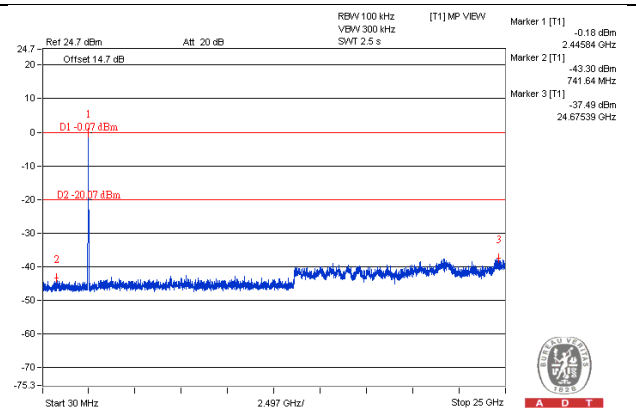
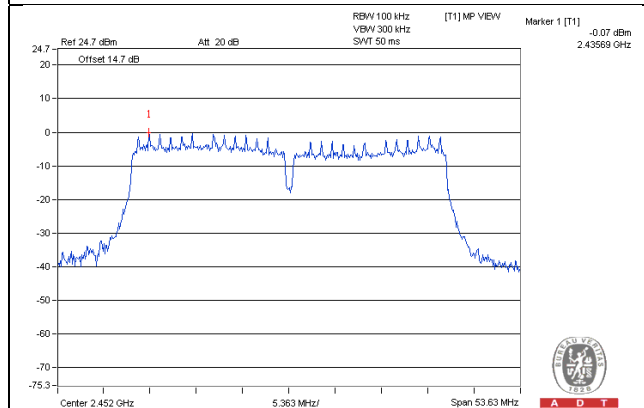
CH 3



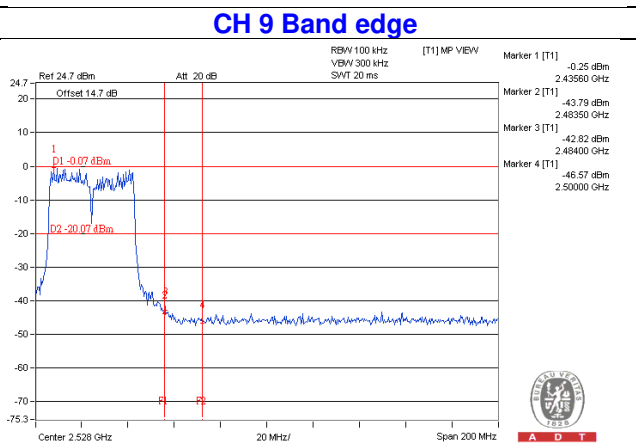
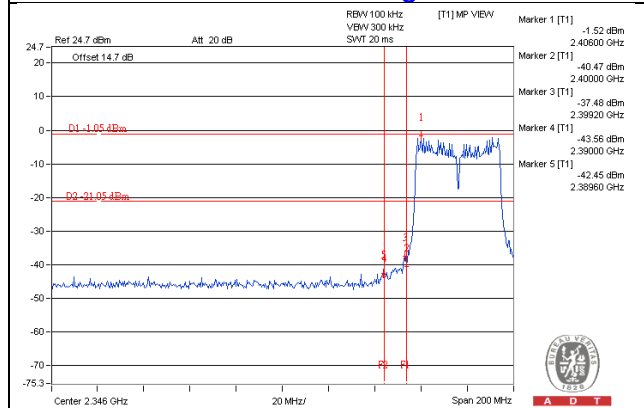
CH 6



CH 9

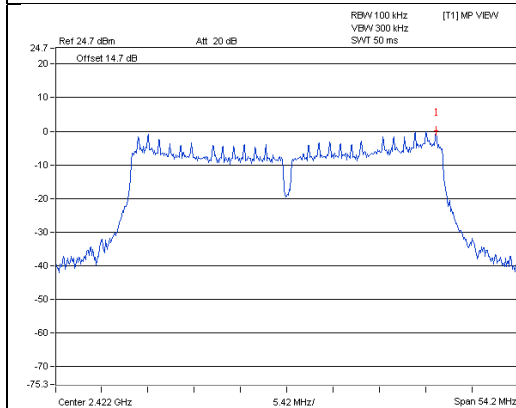


CH 3 Band edge

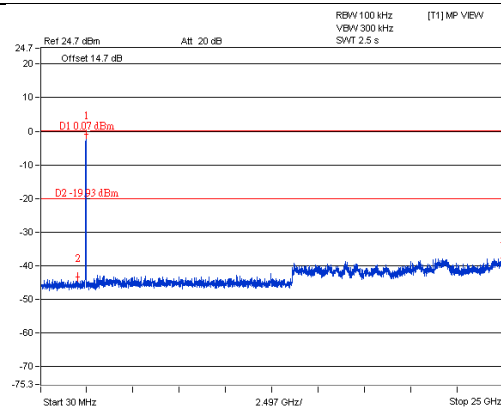


Chain 1

CH 3

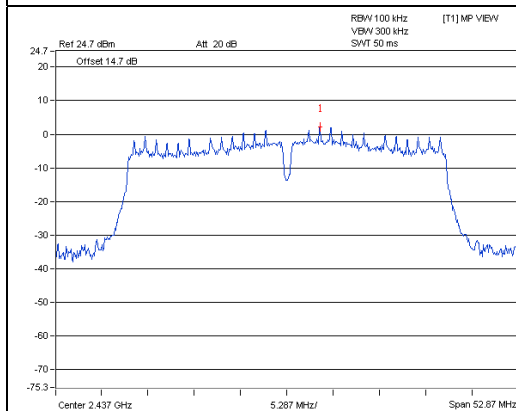


A D T

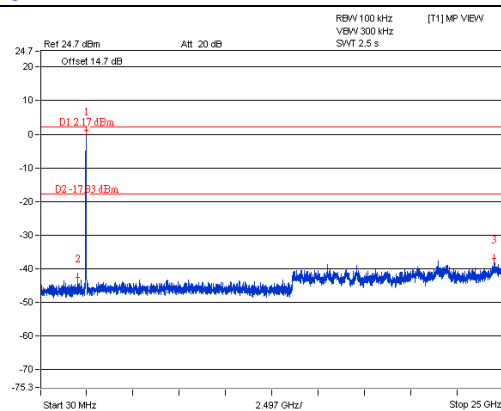


A D T

CH 6

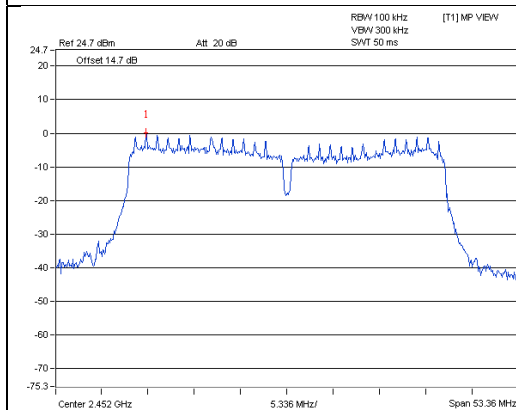


A D T

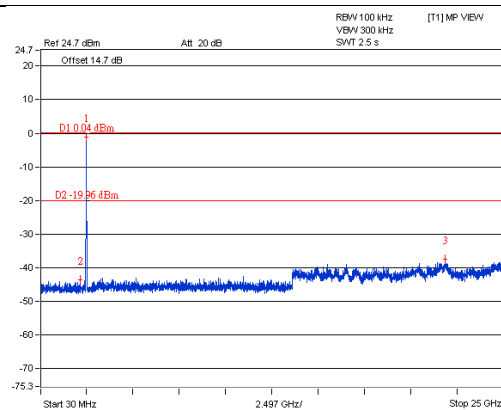


A D T

CH 9

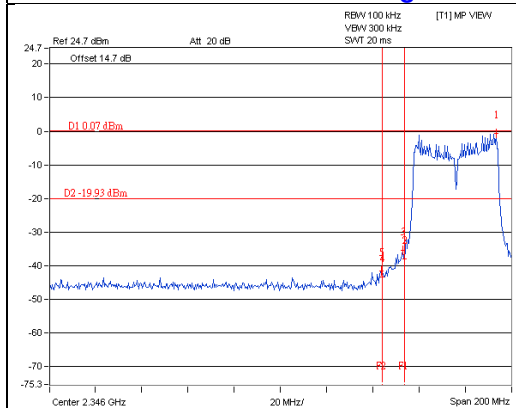


A D T



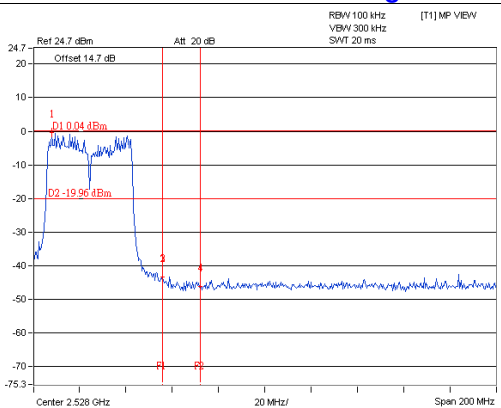
A D T

CH 3 Band edge



A D T

CH 9 Band edge



A D T

5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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