FCC Test Report

Report No.:	RF160630E01G
FCC ID:	PY316200349
Test Model:	VMC4030
Received Date:	Sep. 28, 2017
Test Date:	Nov. 30, 2017; Mar. 30, 2018
Issued Date:	Apr. 30, 2018
Applicant:	NETGEAR, Inc.
Address:	350 East Plumeria Drive San Jose, CA 95134
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

Testing Laboratory
2022

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Release Control Record

Issue No.	Description	Date Issued
RF160630E01G	Original release.	Apr. 30, 2018

1 Certificate of Conformity

Product:	Arlo Pro
Brand:	NETGEAR
Test Model:	VMC4030
Sample Status:	ENGINEERING SAMPLE
Applicant:	NETGEAR, Inc.
Test Date:	Nov. 30, 2017; Mar. 30, 2018
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 : Mary Ko , **Date:** Apr. 30, 2018

Mary Ko / Specialist

Approved by : , **Date:** Apr. 30, 2018

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 -13.34dB at 0.15000MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2385.00MHz, 2390.00MHz, 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.30 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.16 dB
	6GHz ~ 18GHz	4.91 dB
	18GHz ~ 40GHz	5.30 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Arlo Pro
Brand	NETGEAR
Test Model	VMC4030
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	5Vdc or 9Vdc from power adapter or 7.2Vdc from battery
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 72Mbps
Operating Frequency	2.412GHz ~ 2.462GHz
Number of Channel	11
Output Power	314.775mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	USB cable x 1 (unshielded, 2m)

Note:

1. This report is prepared for FCC Class II change. The difference compared with the Report No.: RF160630E01 design is as the following:
   - ◆ Changed main board - WiFi antenna and WiFi design.

Original

Antenna Set.	Brand	Model	Antenna Gain (dBi)	Frequency range (GHz to GHz)	Antenna Type	Connector Type	Cable Loss (db)	Cable Length (mm)
1	Master Wave	98P4ZMIPF000	1.24	2.4~2.4835	Metal	i-pex(MHF)	NA	31+/-5
			0.62	2.4~2.4835	Metal	i-pex(MHF)	NA	45+/-5

Newly

Antenna Set.	Brand	Model	Antenna Gain (dBi)	Frequency range (GHz to GHz)	Antenna Type	Connector Type	Cable Loss (db)	Cable Length (mm)
1	Master Wave	902P00197N0	1.94	2.4~2.4835	PIFA	NA	NA	NA
		902P00196N0	1.94	2.4~2.4835	PIFA	NA	NA	NA

- ◆ Changed sensor board PCB structure.
  (a) Added NMOS for IR-LED light leakage issue.
  (b) SB PCB from HDI to none HDI process.
  (c) Replaced the 0 ohm resistor by short footprint.
  (d) Replaced the 2nd Lens vendor.
- ◆ Changed IR-LED board.
  (a) Replaced the 0 ohm resistor by short footprint.
- ◆ Changed MIC-FPC.
- ◆ ME:
  (a) New Front Cover and Battery Battery holder for 6 screw reduction and V6 SMT Pro2 Antenna.

◆ Added one new adapter as following table:

Original				
Adapter				
No.	Brand	Model No.	P/N	Spec.
1	NETGEAR	AD2085320	332-10893-01	Input: 100-240Vac, 0.3A, 50/60Hz Output: 5V or 9V, 1.1A or 1.8A
Battery				
No	Brand	Model No.	P/N	Spec.
1	NETGEAR	A-1	308-10029-01	7.2Vdc, 2440mAh
Newly				
Adapter				
No.	Brand	Model No.	P/N	Spec.
2	NETGEAR	AD2090321	332-11052-01	Input: 100-240Vac, 0.5A, 50/60Hz Output: 5V or 9V, 1.1A or 1.3A
Note: For radiated emission test, the EUT was pre-tested with above adapters and battery, the worst case was found in adapter 1. Therefore only the test data of the adapter 1 was recorded in this report.				

2. According to above conditions, all test items need to be performed. And all data was verified to meet the requirements.
3. The EUT incorporates a SISO function.

MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1~11Mbps	1TX diversity	1RX diversity
802.11g	6~54Mbps	1TX diversity	1RX diversity
802.11n (HT20)	MCS 0~7	1TX diversity	1RX diversity

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

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		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
1	√	√	√	√	With adapter 1
2	-	-	√	-	With Notebook
3	-	-	√	-	With adapter 2

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement **RE<1G:** Radiated Emission below 1GHz

PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: 1. In the original report, the EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **X-plane (below 1GHz) and Y-plane (above 1GHz)**.

2. "-"means no effect.

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

Radiated Emission Test (Below 1GHz):

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	6	DSSS	DBPSK	1

Power Line Conducted Emission Test:

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	6	DSSS	DBPSK	1

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

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

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

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

Test Condition:

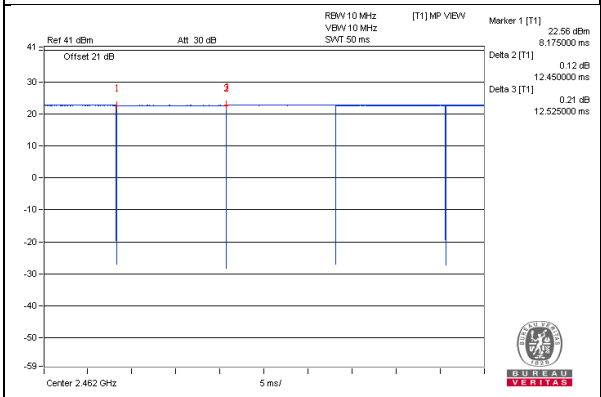
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	23deg. C, 71%RH	120Vac, 60Hz	Weiwei Lo
RE<1G	22deg. C, 65%RH	120Vac, 60Hz	Eason Tseng
PLC	24deg. C, 76%RH 25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

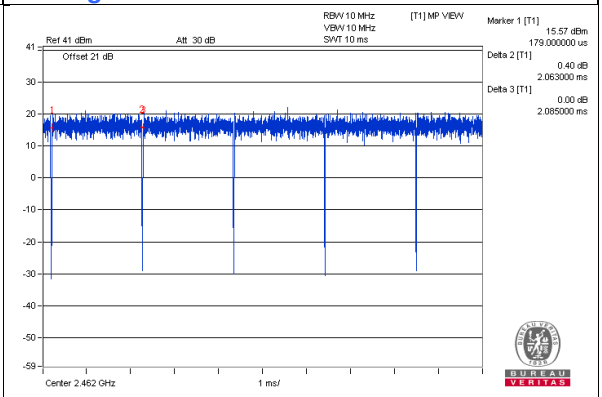
If duty cycle of test signal is ≥ 98 %, duty factor is not required.

802.11b: Duty cycle = 12.45/12.525 = 0.994
802.11g: Duty cycle = 2.063/2.085 = 0.989
802.11n (HT20): Duty cycle = 1.916/1.942 = 0.987

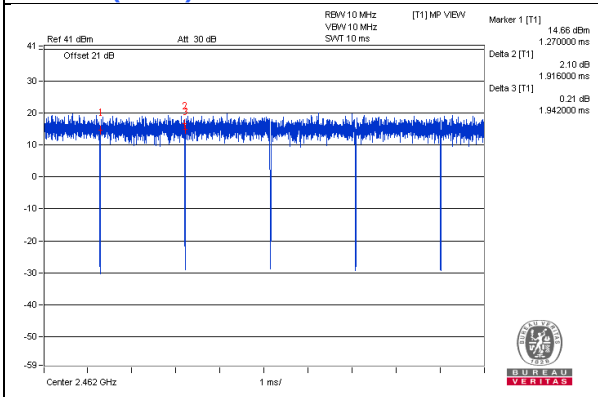
802.11b



802.11g



802.11n (HT20)



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5430	4YV4VY1	FCC DoC	Provided by lab

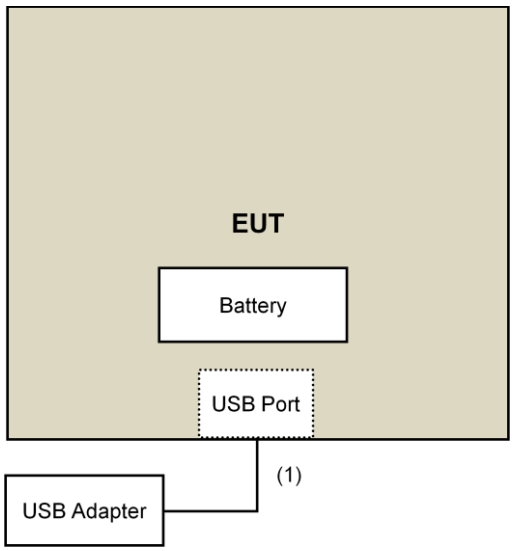
Note:

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

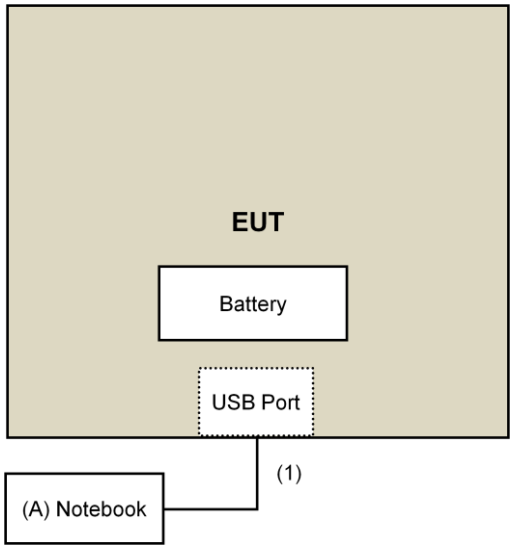
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable	1	2	No	0	Supplied by client

3.4.1 Configuration of System under Test

Adapter Mode:



Notebook Mode:



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 v04
ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 08, 2017	July 07, 2018
Pre-Amplifier(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 17, 2017	Jan. 16, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 09, 2017	Nov. 08, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Dec. 13, 2016	Dec. 12, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 27, 2016	Dec. 26, 2017
Pre-Amplifier EMCI	EMC12630SE	980385	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160923 150318 150321	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Pre-Amplifier EMCI	EMC184045SE	980387	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 15, 2016	Dec. 14, 2017
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 15, 2017	Jan. 14, 2018
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA
Spectrum Analyzer R&S	FSV40	100964	July 1, 2017	June 30, 2018
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 2018

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Loop antenna was used for all emissions below 30 MHz.
4. The test was performed in 966 Chamber No. 4.
5. The CANADA Site Registration No. is 20331-2
6. Tested Date: Nov. 30, 2017

4.1.3 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Both X and Y axes of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detects 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:

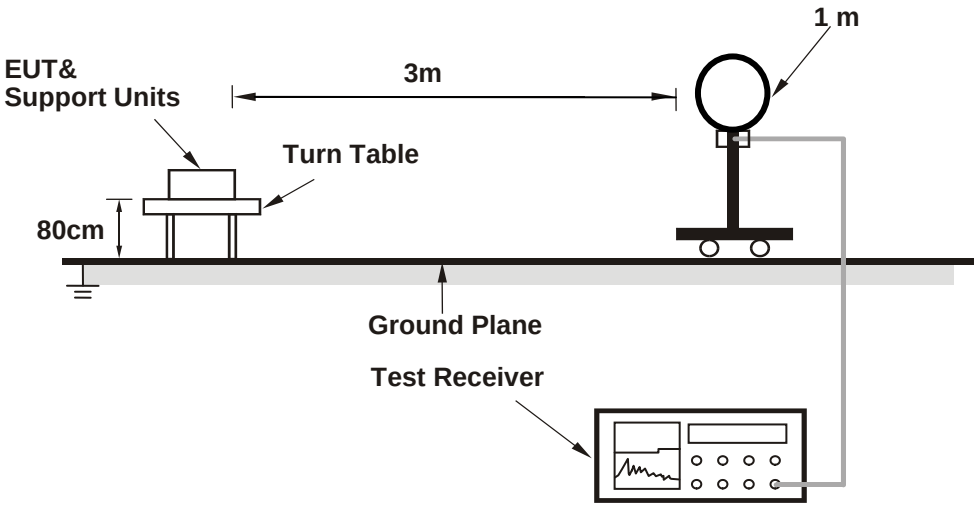
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

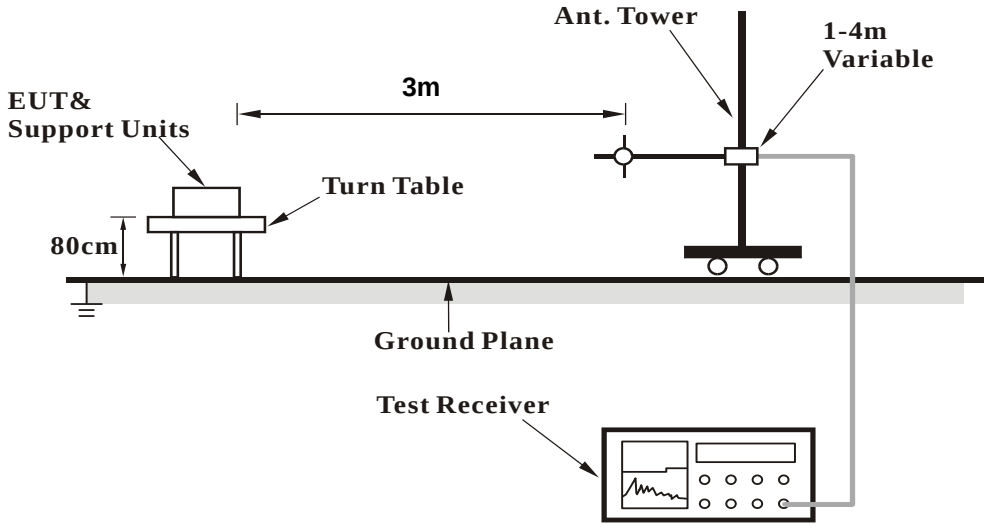
No deviation.

4.1.5 Test Setup

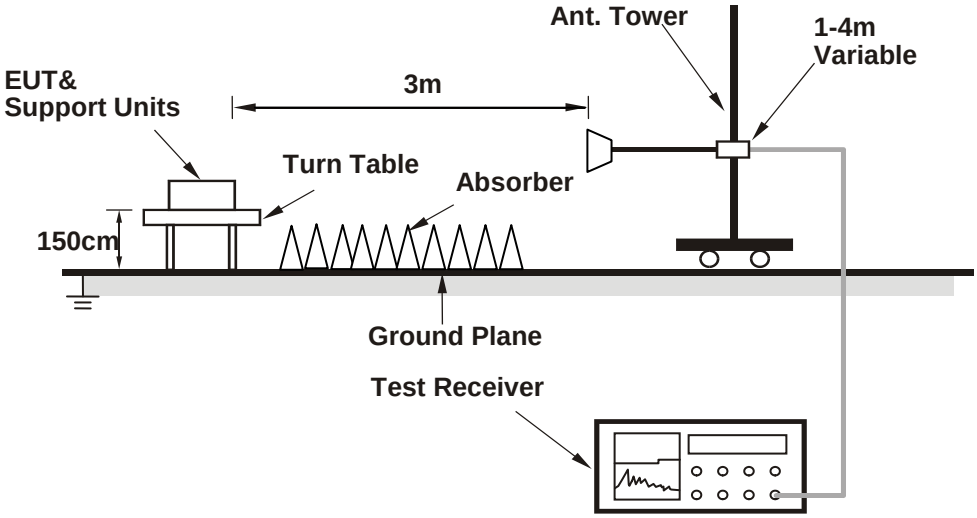
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

a. Placed the EUT on the testing table.
b. Controlling software (Run PuTTY.exe paste tx_command) has been activated to set the EUT on specific status.

4.1.7 Test Results (Mode 1)

Above 1GHz Data：

802.11b

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

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	2385.00	62.3 PK	74.0	-11.7	1.14 H	315	63.6	-1.3
2	**2385.00**	**53.9 AV**	**54.0**	**-0.1**	**1.14 H**	**315**	**55.2**	**-1.3**
3	*2412.00	110.0 PK			1.14 H	315	111.1	-1.1
4	*2412.00	107.8 AV			1.14 H	315	108.9	-1.1
5	4824.00	47.2 PK	74.0	-26.8	1.09 H	22	44.0	3.2
6	4824.00	42.9 AV	54.0	-11.1	1.09 H	22	39.7	3.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2385.00	60.0 PK	74.0	-14.0	2.78 V	129	61.3	-1.3
2	2385.00	49.8 AV	54.0	-4.2	2.78 V	129	51.1	-1.3
3	*2412.00	106.7 PK			2.78 V	129	107.8	-1.1
4	*2412.00	104.5 AV			2.78 V	129	105.6	-1.1
5	4824.00	44.2 PK	74.0	-29.8	1.01 V	314	41.0	3.2
6	4824.00	39.0 AV	54.0	-15.0	1.01 V	314	35.8	3.2

REMARKS:

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

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

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	110.6 PK			1.14 H	317	111.8	-1.2
2	*2437.00	108.4 AV			1.14 H	317	109.6	-1.2
3	2485.00	52.1 PK	74.0	-21.9	1.14 H	317	53.1	-1.0
4	2485.00	50.9 AV	54.0	-3.1	1.14 H	317	51.9	-1.0
5	4874.00	46.5 PK	74.0	-27.5	1.00 H	12	43.2	3.3
6	4874.00	42.4 AV	54.0	-11.6	1.00 H	12	39.1	3.3
7	7311.00	51.8 PK	74.0	-22.2	1.00 H	140	42.0	9.8
8	7311.00	47.3 AV	54.0	-6.7	1.00 H	140	37.5	9.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	107.3 PK			2.78 V	136	108.5	-1.2
2	*2437.00	105.1 AV			2.78 V	136	106.3	-1.2
3	2485.00	49.8 PK	74.0	-24.2	2.78 V	136	50.8	-1.0
4	2485.00	46.8 AV	54.0	-7.2	2.78 V	136	47.8	-1.0
5	4874.00	44.1 PK	74.0	-29.9	1.00 V	310	40.8	3.3
6	4874.00	38.7 AV	54.0	-15.3	1.00 V	310	35.4	3.3
7	7311.00	50.6 PK	74.0	-23.4	1.09 V	134	40.8	9.8
8	7311.00	45.2 AV	54.0	-8.8	1.09 V	134	35.4	9.8

REMARKS:

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

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

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	110.7 PK			1.10 H	316	111.8	-1.1
2	*2462.00	108.4 AV			1.10 H	316	109.5	-1.1
3	2488.00	60.2 PK	74.0	-13.8	1.10 H	316	61.2	-1.0
4	2488.00	53.6 AV	54.0	-0.4	1.10 H	316	54.6	-1.0
5	4924.00	46.2 PK	74.0	-27.8	1.00 H	27	42.7	3.5
6	4924.00	42.4 AV	54.0	-11.6	1.00 H	27	38.9	3.5
7	7386.00	51.9 PK	74.0	-22.1	1.03 H	148	42.0	9.9
8	7386.00	47.4 AV	54.0	-6.6	1.03 H	148	37.5	9.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	107.4 PK			2.75 V	124	108.5	-1.1
2	*2462.00	105.1 AV			2.75 V	124	106.2	-1.1
3	2488.00	57.9 PK	74.0	-16.1	2.75 V	124	58.9	-1.0
4	2488.00	49.5 AV	54.0	-4.5	2.75 V	124	50.5	-1.0
5	4924.00	44.1 PK	74.0	-29.9	1.00 V	320	40.6	3.5
6	4924.00	39.0 AV	54.0	-15.0	1.00 V	320	35.5	3.5
7	7386.00	50.7 PK	74.0	-23.3	1.13 V	144	40.8	9.9
8	7386.00	45.0 AV	54.0	-9.0	1.13 V	144	35.1	9.9

REMARKS:

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

802.11g

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

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	73.0 PK	74.0	-1.0	1.14 H	316	74.3	-1.3
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.14 H**	**316**	**55.2**	**-1.3**
3	*2412.00	107.2 PK			1.14 H	316	108.3	-1.1
4	*2412.00	96.6 AV			1.14 H	316	97.7	-1.1
5	4824.00	42.3 PK	74.0	-31.7	1.03 H	24	39.1	3.2
6	4824.00	29.0 AV	54.0	-25.0	1.03 H	24	25.8	3.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.7 PK	74.0	-3.3	2.70 V	114	72.0	-1.3
2	2390.00	49.8 AV	54.0	-4.2	2.70 V	114	51.1	-1.3
3	*2412.00	103.9 PK			2.70 V	114	105.0	-1.1
4	*2412.00	93.3 AV			2.70 V	114	94.4	-1.1
5	4824.00	38.3 PK	74.0	-35.7	1.05 V	306	35.1	3.2
6	4824.00	25.9 AV	54.0	-28.1	1.05 V	306	22.7	3.2

REMARKS:

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

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	67.8 PK	74.0	-6.2	1.16 H	316	69.1	-1.3
2	2390.00	50.5 AV	54.0	-3.5	1.16 H	316	51.8	-1.3
3	*2437.00	113.5 PK			1.16 H	316	114.7	-1.2
4	*2437.00	102.7 AV			1.16 H	316	103.9	-1.2
5	2483.50	73.8 PK	74.0	-0.2	1.16 H	316	74.8	-1.0
6	2483.50	51.4 AV	54.0	-2.6	1.16 H	316	52.4	-1.0
7	4874.00	41.8 PK	74.0	-32.2	1.00 H	10	38.5	3.3
8	4874.00	28.5 AV	54.0	-25.5	1.00 H	10	25.2	3.3
9	7311.00	52.5 PK	74.0	-21.5	1.00 H	140	42.7	9.8
10	7311.00	38.4 AV	54.0	-15.6	1.00 H	140	28.6	9.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.5 PK	74.0	-8.5	2.67 V	104	66.8	-1.3
2	2390.00	46.4 AV	54.0	-7.6	2.67 V	104	47.7	-1.3
3	*2437.00	110.2 PK			2.67 V	104	111.4	-1.2
4	*2437.00	99.4 AV			2.67 V	104	100.6	-1.2
5	2483.50	71.5 PK	74.0	-2.5	2.67 V	104	72.5	-1.0
6	2483.50	47.3 AV	54.0	-6.7	2.67 V	104	48.3	-1.0
7	4874.00	38.9 PK	74.0	-35.1	1.00 V	300	35.6	3.3
8	4874.00	26.4 AV	54.0	-27.6	1.00 V	300	23.1	3.3
9	7311.00	50.2 PK	74.0	-23.8	1.10 V	133	40.4	9.8
10	7311.00	36.9 AV	54.0	-17.1	1.10 V	133	27.1	9.8

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	107.7 PK			1.14 H	316	108.8	-1.1
2	*2462.00	96.8 AV			1.14 H	316	97.9	-1.1
3	2483.50	73.7 PK	74.0	-0.3	1.14 H	316	74.7	-1.0
4	2483.50	52.0 AV	54.0	-2.0	1.14 H	316	53.0	-1.0
5	4924.00	41.3 PK	74.0	-32.7	1.03 H	5	37.8	3.5
6	4924.00	28.0 AV	54.0	-26.0	1.03 H	5	24.5	3.5
7	7386.00	52.5 PK	74.0	-21.5	1.00 H	128	42.6	9.9
8	7386.00	38.5 AV	54.0	-15.5	1.00 H	128	28.6	9.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.4 PK			2.70 V	88	105.5	-1.1
2	*2462.00	93.5 AV			2.70 V	88	94.6	-1.1
3	2483.50	71.4 PK	74.0	-2.6	2.70 V	88	72.4	-1.0
4	2483.50	47.9 AV	54.0	-6.1	2.70 V	88	48.9	-1.0
5	4924.00	38.9 PK	74.0	-35.1	1.06 V	316	35.4	3.5
6	4924.00	26.5 AV	54.0	-27.5	1.06 V	316	23.0	3.5
7	7386.00	50.3 PK	74.0	-23.7	1.09 V	128	40.4	9.9
8	7386.00	37.2 AV	54.0	-16.8	1.09 V	128	27.3	9.9

REMARKS:

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

802.11n (HT20)

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

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**	**73.9 PK**	**74.0**	**-0.1**	**1.14 H**	**316**	**75.2**	**-1.3**
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.14 H**	**316**	**55.2**	**-1.3**
3	*2412.00	107.6 PK			1.14 H	316	108.7	-1.1
4	*2412.00	95.7 AV			1.14 H	316	96.8	-1.1
5	4824.00	41.5 PK	74.0	-32.5	1.00 H	17	38.3	3.2
6	4824.00	28.6 AV	54.0	-25.4	1.00 H	17	25.4	3.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	71.6 PK	74.0	-2.4	2.67 V	100	72.9	-1.3
2	2390.00	49.8 AV	54.0	-4.2	2.67 V	100	51.1	-1.3
3	*2412.00	104.3 PK			2.67 V	100	105.4	-1.1
4	*2412.00	92.4 AV			2.67 V	100	93.5	-1.1
5	4824.00	39.0 PK	74.0	-35.0	1.00 V	315	35.8	3.2
6	4824.00	26.6 AV	54.0	-27.4	1.00 V	315	23.4	3.2

REMARKS:

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

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	67.9 PK	74.0	-6.1	1.16 H	316	69.2	-1.3
2	2390.00	50.2 AV	54.0	-3.8	1.16 H	316	51.5	-1.3
3	*2437.00	112.6 PK			1.16 H	316	113.8	-1.2
4	*2437.00	102.0 AV			1.16 H	316	103.2	-1.2
5	2483.50	73.7 PK	74.0	-0.3	1.16 H	316	74.7	-1.0
6	2483.50	51.3 AV	54.0	-2.7	1.16 H	316	52.3	-1.0
7	4874.00	42.0 PK	74.0	-32.0	1.04 H	6	38.7	3.3
8	4874.00	28.9 AV	54.0	-25.1	1.04 H	6	25.6	3.3
9	7311.00	52.3 PK	74.0	-21.7	1.04 H	131	42.5	9.8
10	7311.00	38.1 AV	54.0	-15.9	1.04 H	131	28.3	9.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.6 PK	74.0	-8.4	2.62 V	114	66.9	-1.3
2	2390.00	46.1 AV	54.0	-7.9	2.62 V	114	47.4	-1.3
3	*2437.00	109.3 PK			2.62 V	114	110.5	-1.2
4	*2437.00	98.7 AV			2.62 V	114	99.9	-1.2
5	2483.50	71.4 PK	74.0	-2.6	2.62 V	114	72.4	-1.0
6	2483.50	47.2 AV	54.0	-6.8	2.62 V	114	48.2	-1.0
7	4874.00	39.1 PK	74.0	-34.9	1.03 V	311	35.8	3.3
8	4874.00	26.7 AV	54.0	-27.3	1.03 V	311	23.4	3.3
9	7311.00	50.3 PK	74.0	-23.7	1.10 V	137	40.5	9.8
10	7311.00	37.0 AV	54.0	-17.0	1.10 V	137	27.2	9.8

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.5 PK			1.12 H	316	107.6	-1.1
2	*2462.00	95.4 AV			1.12 H	316	96.5	-1.1
3	2483.50	67.6 PK	74.0	-6.4	1.12 H	316	68.6	-1.0
4	**2483.50**	**53.9 AV**	**54.0**	**-0.1**	**1.12 H**	**316**	**54.9**	**-1.0**
5	4924.00	42.5 PK	74.0	-31.5	1.09 H	6	39.0	3.5
6	4924.00	29.2 AV	54.0	-24.8	1.09 H	6	25.7	3.5
7	7386.00	52.5 PK	74.0	-21.5	1.08 H	131	42.6	9.9
8	7386.00	38.1 AV	54.0	-15.9	1.08 H	131	28.2	9.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	103.2 PK			2.57 V	104	104.3	-1.1
2	*2462.00	92.1 AV			2.57 V	104	93.2	-1.1
3	2483.50	65.3 PK	74.0	-8.7	2.57 V	104	66.3	-1.0
4	2483.50	49.8 AV	54.0	-4.2	2.57 V	104	50.8	-1.0
5	4924.00	38.7 PK	74.0	-35.3	1.05 V	325	35.2	3.5
6	4924.00	26.3 AV	54.0	-27.7	1.05 V	325	22.8	3.5
7	7386.00	50.8 PK	74.0	-23.2	1.09 V	147	40.9	9.9
8	7386.00	37.3 AV	54.0	-16.7	1.09 V	147	27.4	9.9

REMARKS:

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

Below 1GHz Data:

802.11b

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	59.95	30.1 QP	40.0	-9.9	3.00 H	221	38.6	-8.5
2	245.15	25.1 QP	46.0	-20.9	2.00 H	123	34.6	-9.5
3	322.38	32.1 QP	46.0	-13.9	1.00 H	274	38.9	-6.8
4	577.59	27.7 QP	46.0	-18.3	3.00 H	45	28.7	-1.0
5	740.57	30.6 QP	46.0	-15.4	2.50 H	35	28.6	2.0
6	862.04	33.1 QP	46.0	-12.9	1.00 H	32	29.7	3.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	67.89	29.9 QP	40.0	-10.1	2.50 V	214	39.4	-9.5
2	266.31	30.1 QP	46.0	-15.9	1.00 V	61	38.8	-8.7
3	341.29	33.2 QP	46.0	-12.8	1.50 V	189	39.5	-6.3
4	600.15	30.2 QP	46.0	-15.8	2.50 V	24	30.3	-0.1
5	774.59	31.9 QP	46.0	-14.1	1.50 V	198	29.7	2.2
6	861.53	31.9 QP	46.0	-14.1	1.00 V	32	28.5	3.4

REMARKS:

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

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.	Date Of Calibration	Due Date Of Calibration
Test Receiver R&S	ESCS 30	847124/029	Nov. 01, 2017	Oct. 31, 2018
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Nov. 15, 2017	Nov. 14, 2018
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 03, 2017	June 02, 2018
50 ohms Terminator	N/A	EMC-02	Sep. 22, 2017	Sep. 21, 2018
RF Cable	5D-FB	COCCAB-001	Sep. 29, 2017	Sep. 28, 2018
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 18, 2017	June 17, 2018
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:
1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 1.
3. Tested Date: Nov. 30, 2017; Mar. 30, 2018

4.2.3 Test Procedures

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

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

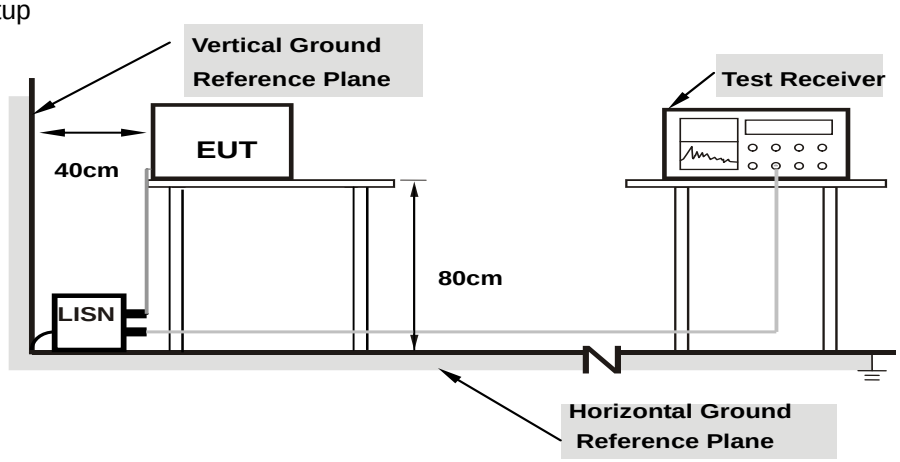
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

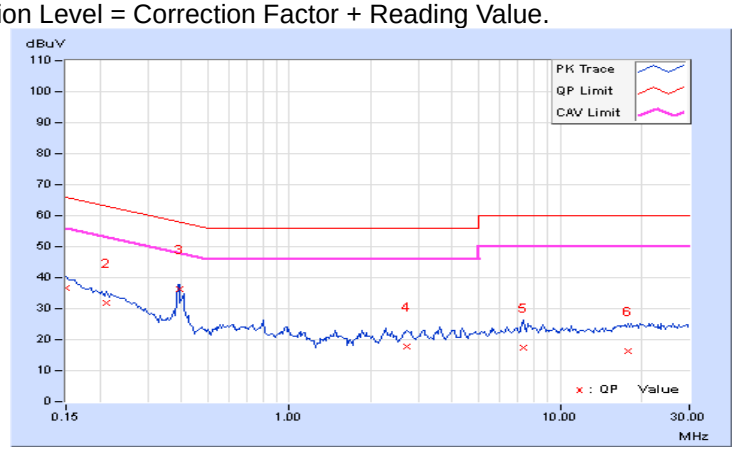
4.2.7 Test Results (Mode 1)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.09	26.55	12.93	36.64	23.02	66.00	56.00	-29.36	-32.98
2	0.21250	10.07	21.77	7.76	31.84	17.83	63.11	53.11	-31.27	-35.28
3	0.39219	10.12	26.13	21.75	36.25	31.87	58.02	48.02	-21.77	-16.15
4	2.70703	10.24	7.66	5.33	17.90	15.57	56.00	46.00	-38.10	-30.43
5	7.31641	10.60	6.88	4.15	17.48	14.75	60.00	50.00	-42.52	-35.25
6	17.76953	11.42	4.70	2.35	16.12	13.77	60.00	50.00	-43.88	-36.23

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.

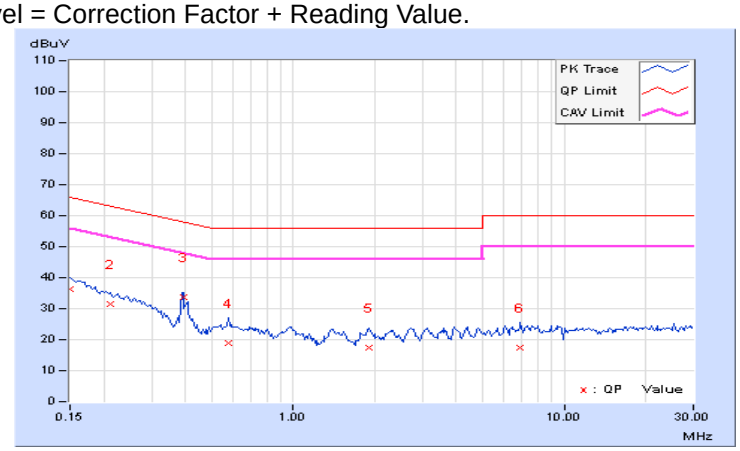


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.08	26.37	12.44	36.45	22.52	66.00	56.00	-29.55	-33.48
2	0.21250	10.05	21.61	5.53	31.66	15.58	63.11	53.11	-31.45	-37.53
3	0.39219	10.12	23.55	20.52	33.67	30.64	58.02	48.02	-24.35	-17.38
4	0.57578	10.12	8.81	2.93	18.93	13.05	56.00	46.00	-37.07	-32.95
5	1.91406	10.20	7.34	3.84	17.54	14.04	56.00	46.00	-38.46	-31.96
6	6.91406	10.48	6.98	4.67	17.46	15.15	60.00	50.00	-42.54	-34.85

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.



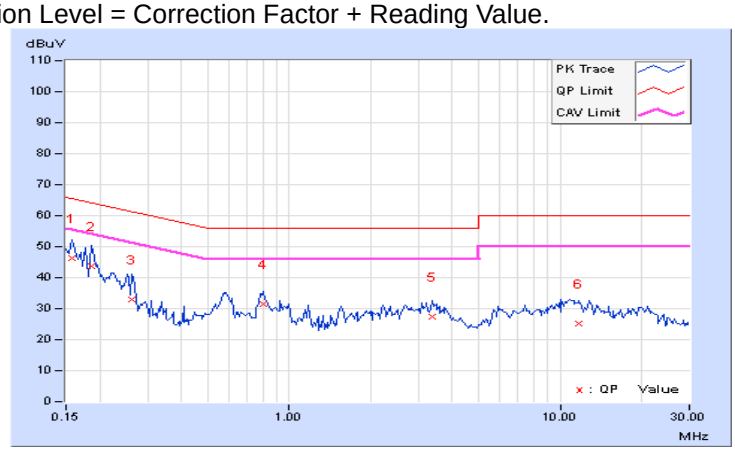
4.2.8 Test Results (Mode 2)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.07	36.06	21.67	46.13	31.74	65.58	55.58	-19.45	-23.84
2	0.18516	10.06	33.62	20.20	43.68	30.26	64.25	54.25	-20.57	-23.99
3	0.26328	10.08	22.94	9.47	33.02	19.55	61.33	51.33	-28.31	-31.78
4	0.80625	10.14	21.18	9.26	31.32	19.40	56.00	46.00	-24.68	-26.60
5	3.37891	10.24	17.20	12.01	27.44	22.25	56.00	46.00	-28.56	-23.75
6	11.74609	10.74	14.49	9.23	25.23	19.97	60.00	50.00	-34.77	-30.03

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.

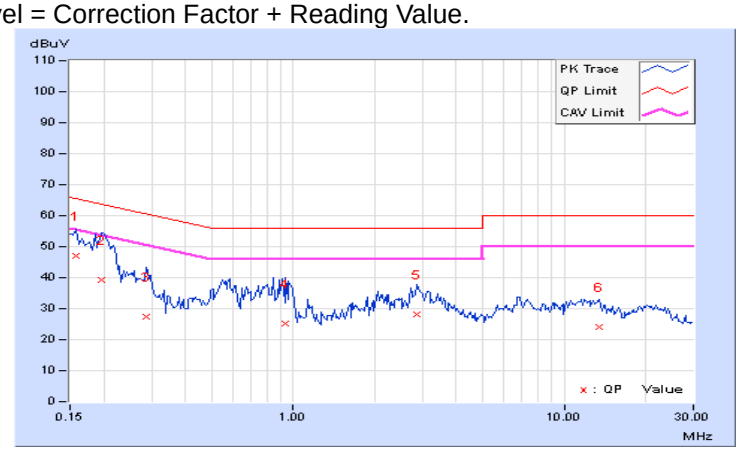


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.06	37.13	22.67	47.19	32.73	65.58	55.58	-18.39	-22.85
2	0.19687	10.03	29.41	18.31	39.44	28.34	63.74	53.74	-24.30	-25.40
3	0.28672	10.06	17.29	8.47	27.35	18.53	60.62	50.62	-33.27	-32.09
4	0.93906	10.12	15.21	9.77	25.33	19.89	56.00	46.00	-30.67	-26.11
5	2.84375	10.19	18.10	12.79	28.29	22.98	56.00	46.00	-27.71	-23.02
6	13.49609	10.73	13.20	6.68	23.93	17.41	60.00	50.00	-36.07	-32.59

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.



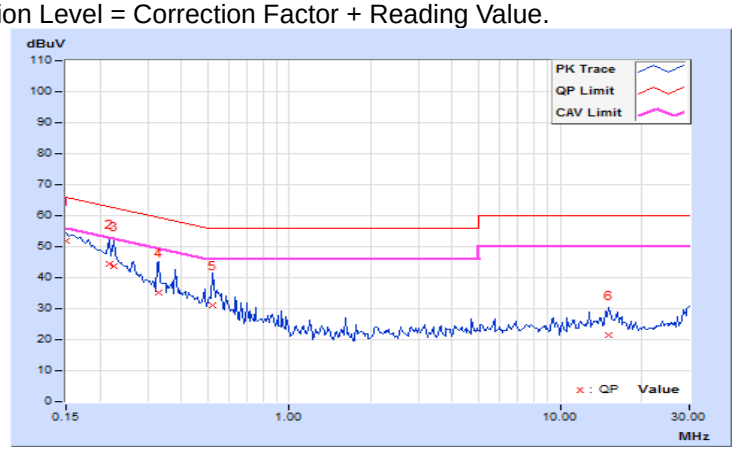
4.2.9 Test Results (Mode 3)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.05	41.67	27.56	51.72	37.61	66.00	56.00	-14.28	-18.39
2	0.21641	10.07	34.27	20.93	44.34	31.00	62.96	52.96	-18.62	-21.96
3	0.22422	10.08	33.62	20.12	43.70	30.20	62.66	52.66	-18.96	-22.46
4	0.32969	10.10	25.05	13.45	35.15	23.55	59.46	49.46	-24.31	-25.91
5	0.52109	10.13	20.91	12.65	31.04	22.78	56.00	46.00	-24.96	-23.22
6	15.11328	11.07	10.24	3.36	21.31	14.43	60.00	50.00	-38.69	-35.57

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.

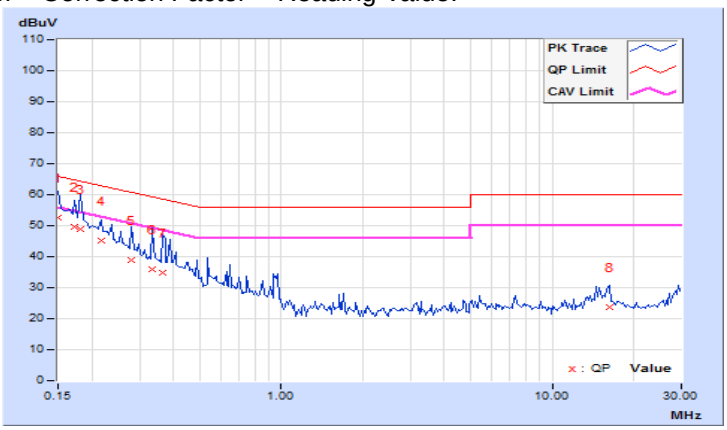


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**9.95**	**42.71**	**27.85**	**52.66**	**37.80**	**66.00**	**56.00**	**-13.34**	**-18.20**
2	0.17344	9.96	39.81	25.15	49.77	35.11	64.79	54.79	-15.02	-19.68
3	0.18125	9.96	38.94	24.44	48.90	34.40	64.43	54.43	-15.53	-20.03
4	0.21641	9.97	35.12	20.34	45.09	30.31	62.96	52.96	-17.87	-22.65
5	0.27891	9.99	28.98	14.48	38.97	24.47	60.85	50.85	-21.88	-26.38
6	0.33359	10.00	25.86	11.79	35.86	21.79	59.36	49.36	-23.50	-27.57
7	0.36484	10.01	24.97	10.61	34.98	20.62	58.62	48.62	-23.64	-28.00
8	16.20703	10.94	12.94	5.14	23.88	16.08	60.00	50.00	-36.12	-33.92

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.

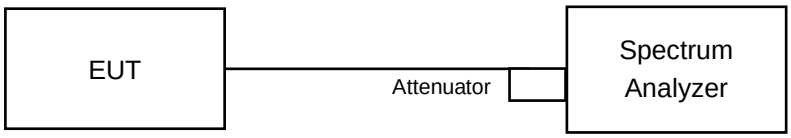


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation fromTest 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 (Mode 1)

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	8.10	0.5	Pass
6	2437	9.07	0.5	Pass
11	2462	9.55	0.5	Pass

802.11g

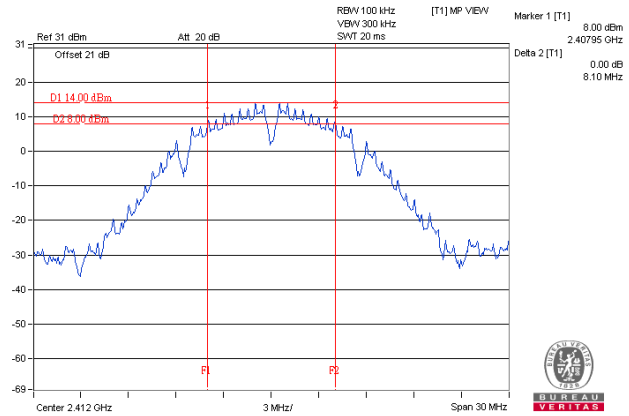
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.50	0.5	Pass
6	2437	16.48	0.5	Pass
11	2462	16.57	0.5	Pass

802.11n (HT20)

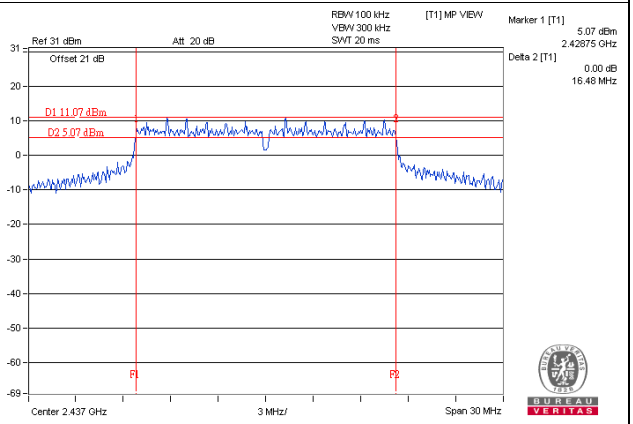
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.69	0.5	Pass
6	2437	17.72	0.5	Pass
11	2462	17.73	0.5	Pass

Spectrum Plot of Worst Value

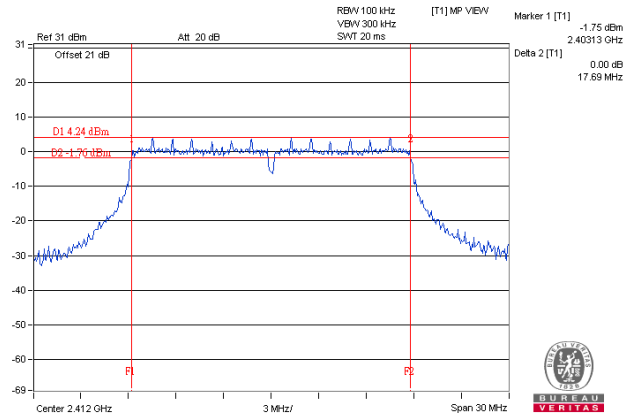
802.11b : CH1



802.11g : CH6



802.11n (HT20) : CH1

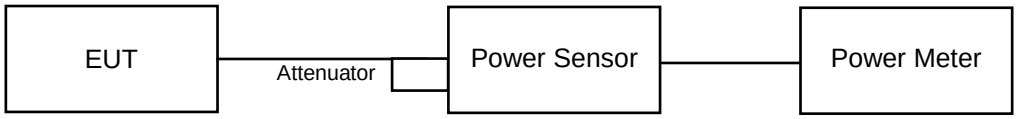


4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results (Mode 1)

FOR PEAK POWER

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	230.144	23.62	30	Pass
6	2437	268.534	24.29	30	Pass
11	2462	238.781	23.78	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	218.776	23.40	30	Pass
6	2437	295.801	24.71	30	Pass
11	2462	193.642	22.87	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	172.982	22.38	30	Pass
6	2437	314.775	24.98	30	Pass
11	2462	157.761	21.98	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	138.995	21.43
6	2437	205.116	23.12
11	2462	144.544	21.60

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	44.463	16.48
6	2437	162.93	22.12
11	2462	43.053	16.34

802.11n (HT20)

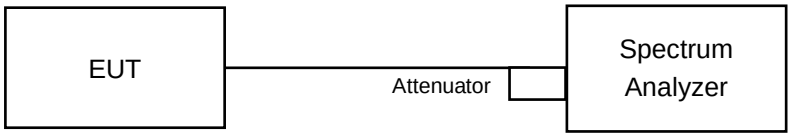
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	41.879	16.22
6	2437	165.959	22.20
11	2462	32.734	15.15

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm in any 3 kHz.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

a. Set analyzer center frequency to DTS channel center frequency.
b. Set the span to 1.5 times the DTS bandwidth.
c. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d. Set the VBW ≥ 3 × RBW.
e. Detector = peak.
f. Sweep time = auto couple.
g. Trace mode = max hold.
h. Allow trace to fully stabilize.
i. Use the peak marker function to determine the maximum amplitude level within the RBW.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results (Mode 1)

802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-1.07	8	Pass
6	2437	0.15	8	Pass
11	2462	-0.68	8	Pass

802.11g

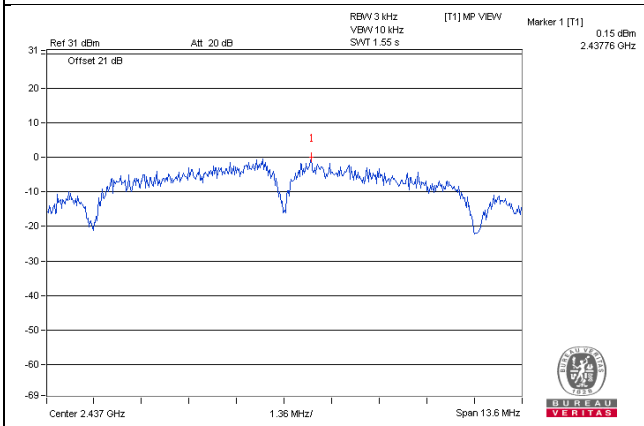
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-8.30	8	Pass
6	2437	-3.92	8	Pass
11	2462	-11.16	8	Pass

802.11n (HT20)

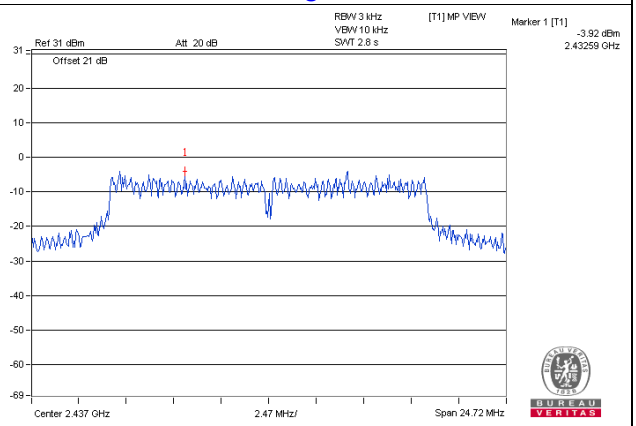
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-10.07	8	Pass
6	2437	-4.72	8	Pass
11	2462	-11.12	8	Pass

Spectrum Plot of Worst Value

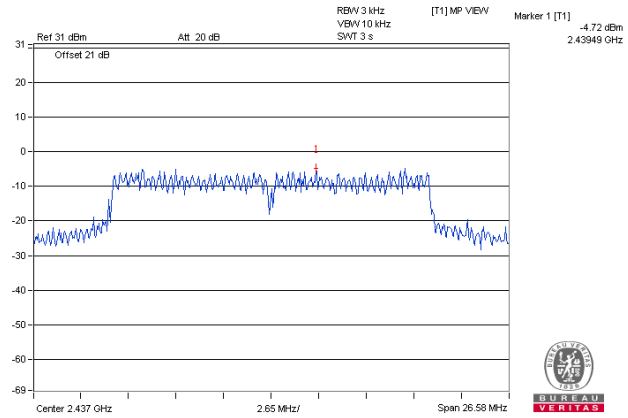
802.11b : CH6



802.11g : CH6



802.11n (HT20) : CH6

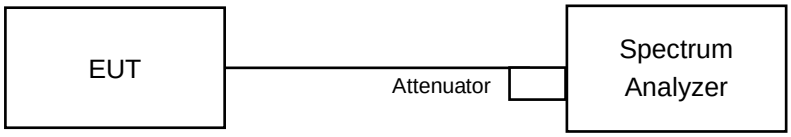


4.6 Conducted Out of Band Emission Measurement

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 ≥ 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 OOBE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 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

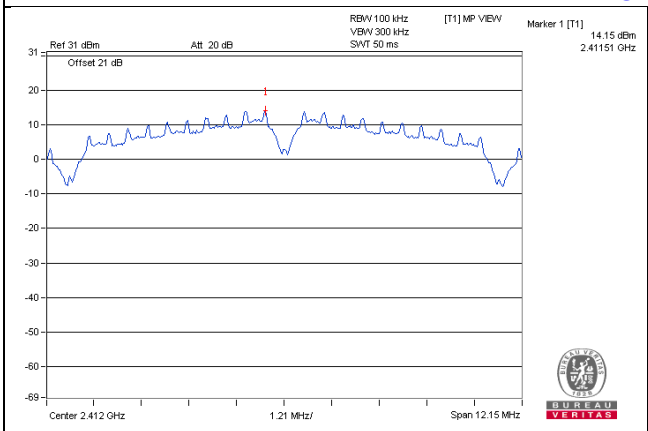
Same as Item 4.3.6

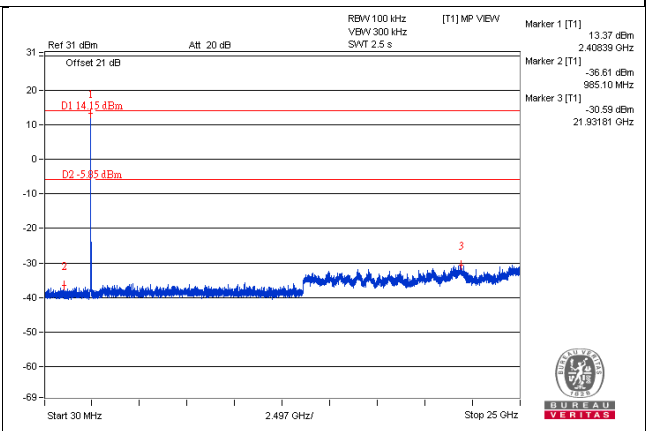
4.6.7 Test Results (Mode 1)

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

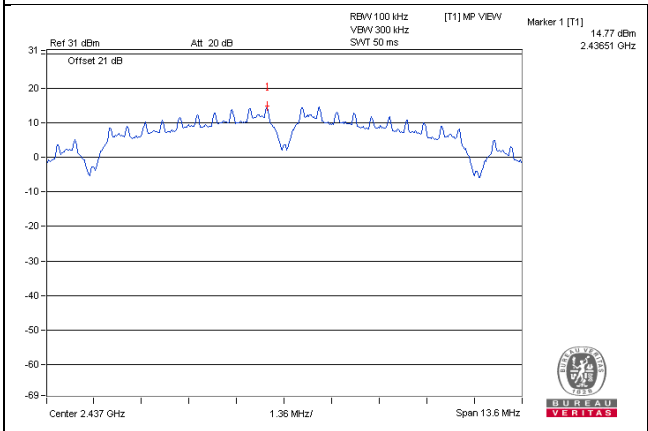
802.11b

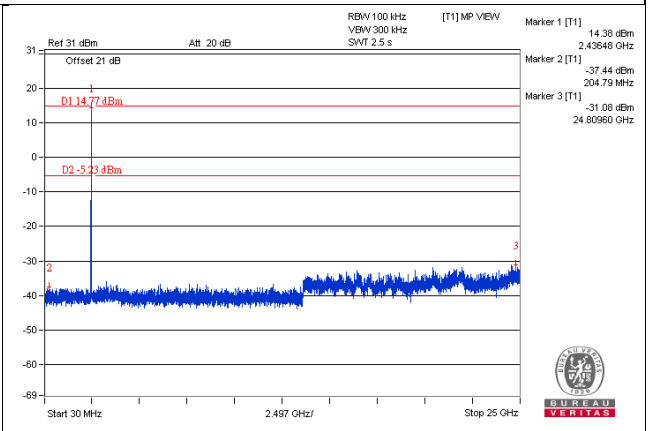
CH 1



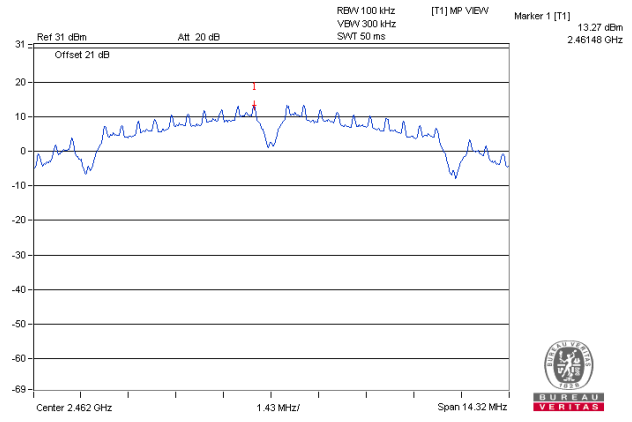


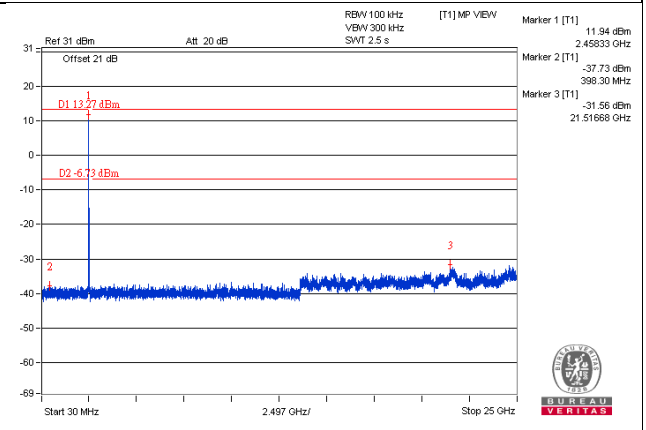
CH 6



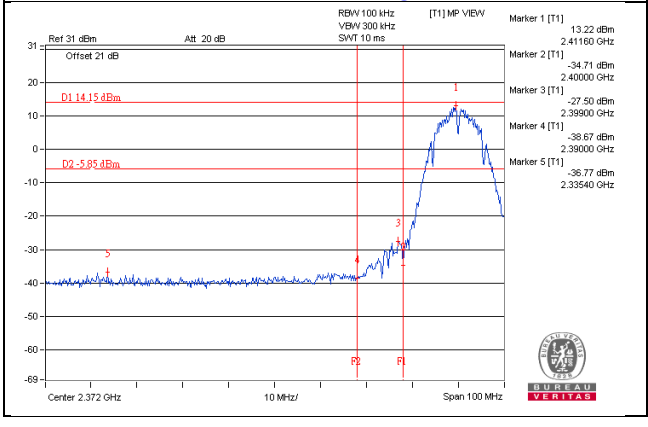


CH 11

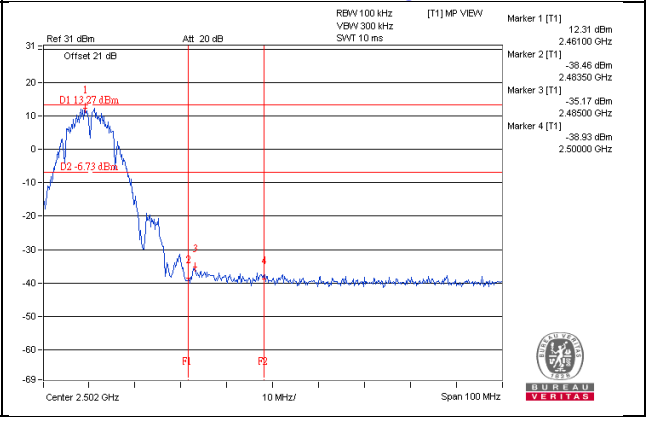




CH 1 Band edge

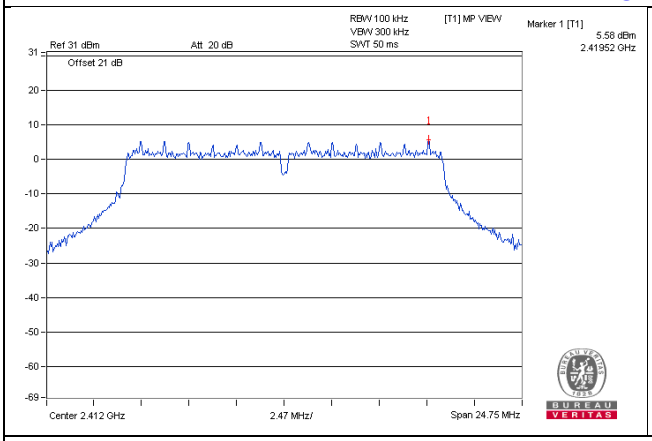


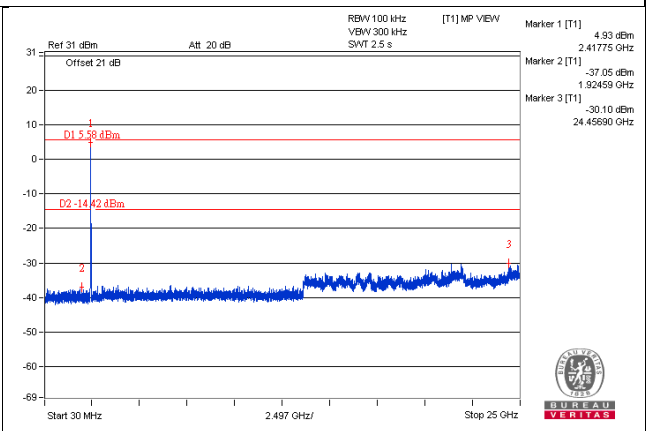
CH 11 Band edge



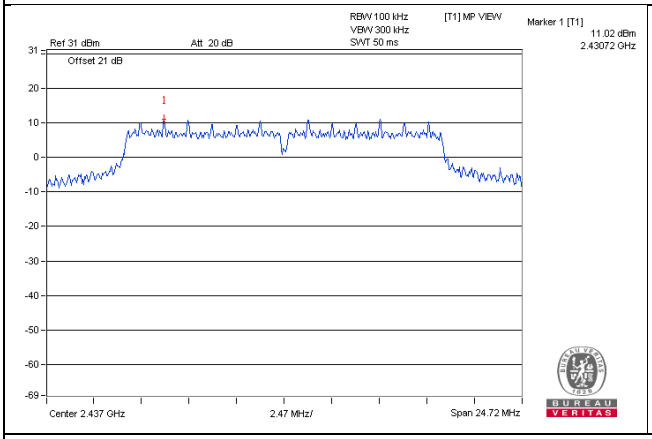
802.11g

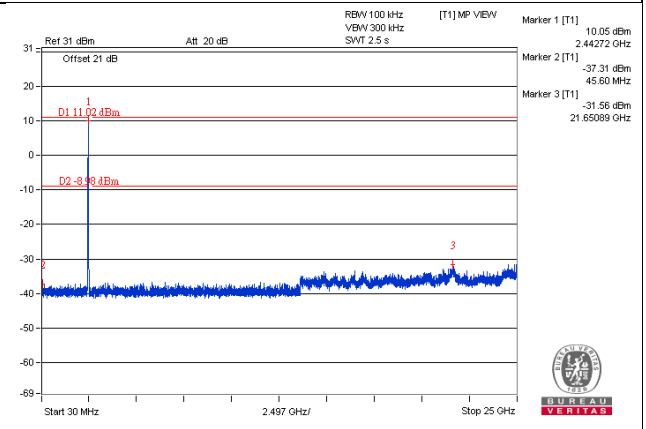
CH 1



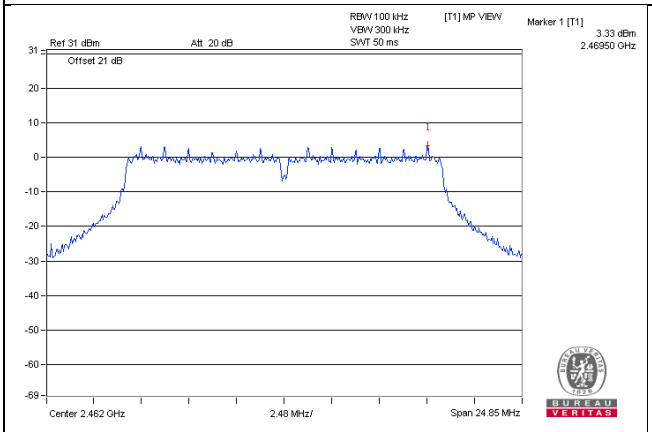


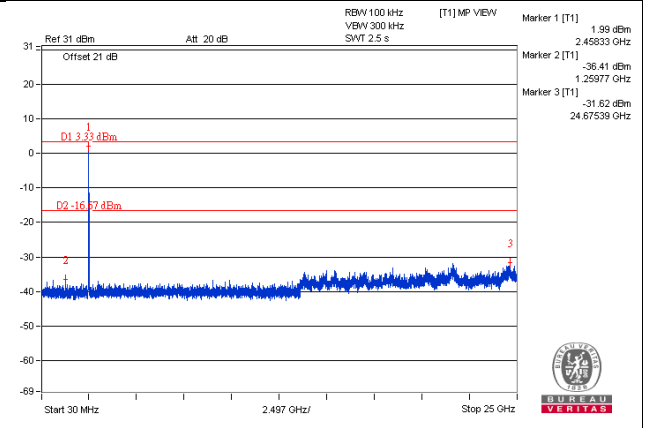
CH 6



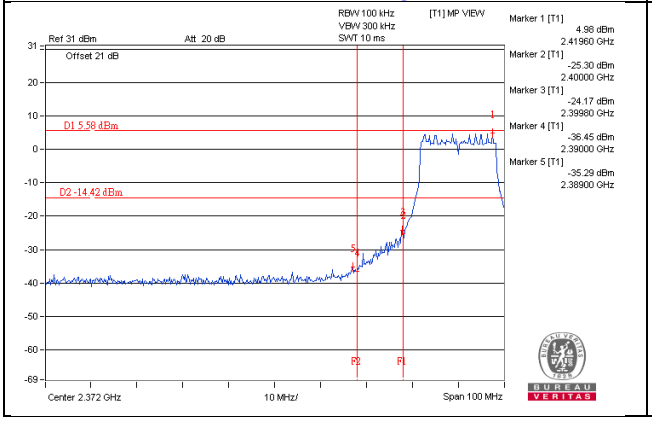


CH 11

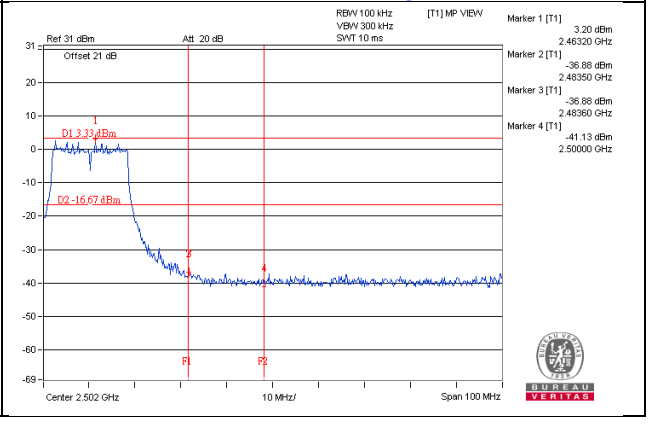




CH 1 Band edge

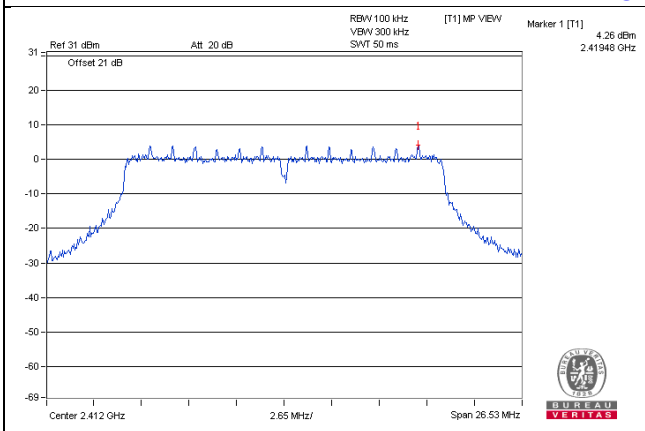


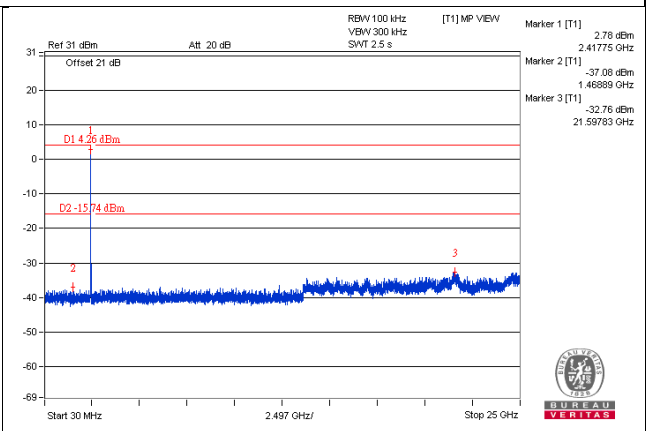
CH 11 Band edge



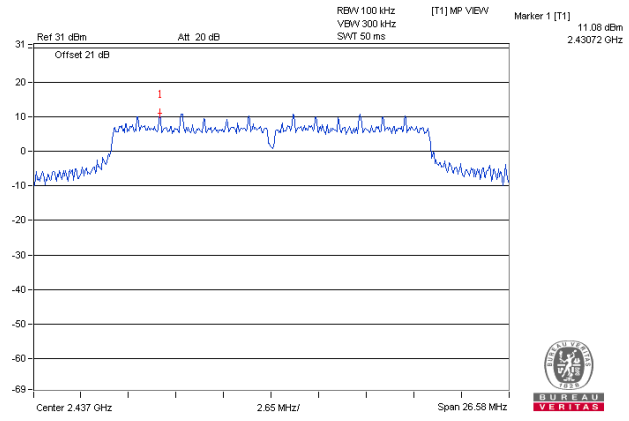
802.11n (HT20)

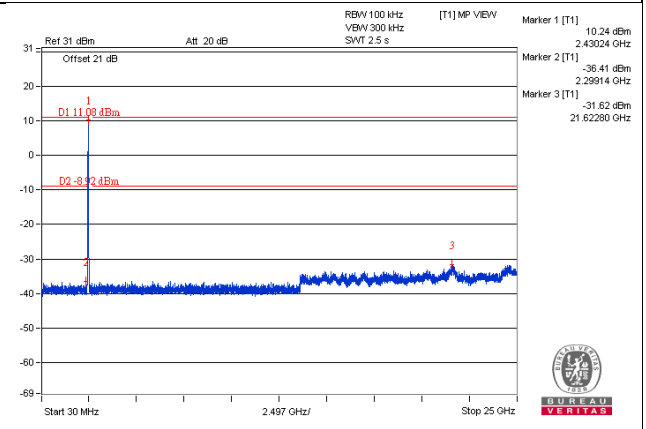
CH 1



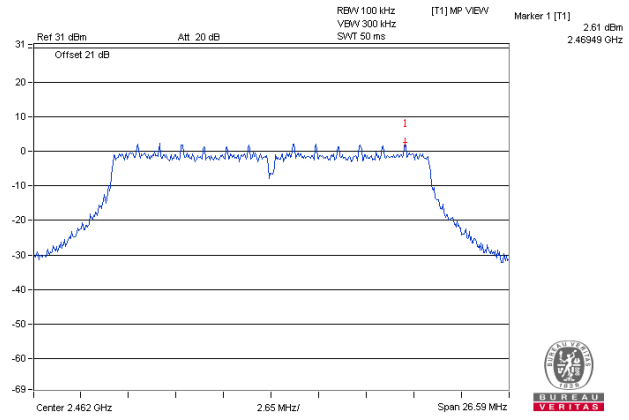


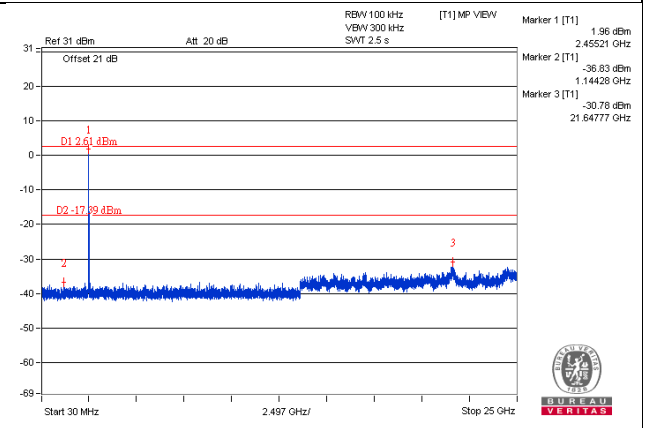
CH 6



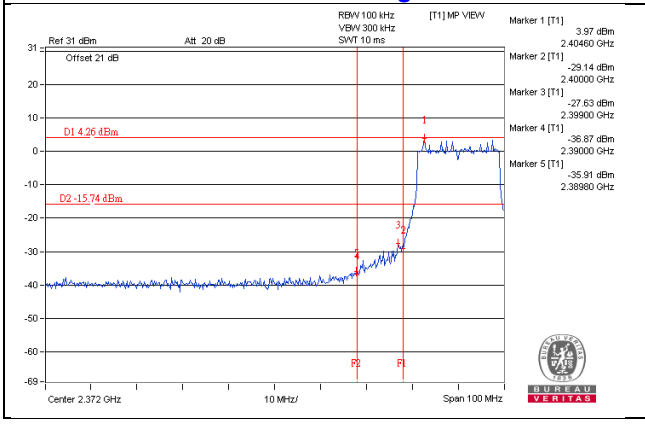


CH 11

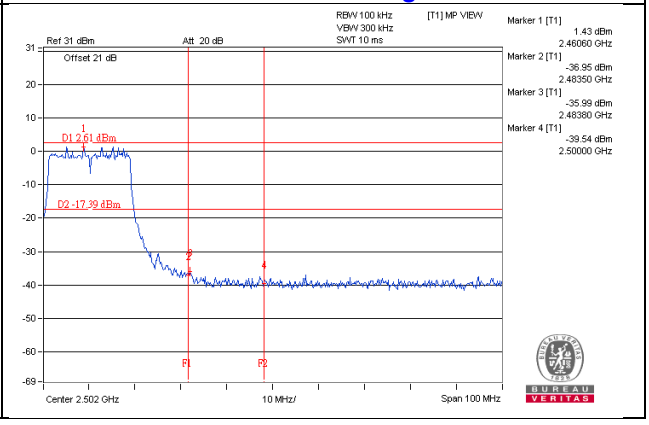




CH 1 Band edge



CH 11 Band edge



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 FCC recognized accredited test firms and accredited 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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