

FCC Test Report

Report No.: RF161012C04-3

FCC ID: ZOQVT-400

Test Model: VT-400

Received Date: Oct. 12, 2016

Test Date: Oct. 20, 2016 ~ Oct. 27, 2016

Issued Date: Nov. 04, 2016

Applicant: Verizon Telematics Inc.

Address: 2002 Summit Blvd, Suite 1800 Atlanta, GA 30319

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

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Release Control Record

Issue No.	Description	Date Issued
RF161012C04-3	Original Release	Nov. 04, 2016

1 Certificate of Conformity

Product: OBD2 LTE/3G/GPS/WIFI/BT tracker

Brand: Verizon Telematics Inc.

Test Model: VT-400

Sample Status: Identical Prototype

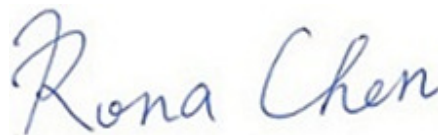
Applicant: Verizon Telematics Inc.

Test Date: Oct. 20, 2016 ~ Oct. 27, 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 :

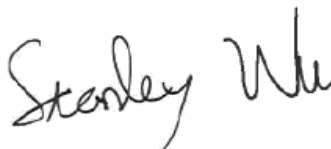


Date:

Nov. 04, 2016

Rona Chen / Specialist

Approved by :



Date:

Nov. 04, 2016

Stanley Wu / Assistant Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	N/A	Without AC power port of the EUT.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -9.81 dB at 2483.52 MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6 dB 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:

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	OBD2 LTE/3G/GPS/WIFI/BT tracker
Brand	Verizon Telematics Inc.
Test Model	VT-400
Status of EUT	Identical Prototype
Power Supply Rating	12.0 Vdc (DC Power Supply)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: up to MCS7
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	74.64 mW
Antenna Type	Chip antenna with 2.5 dBi gain
Antenna Connector	N/A
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. The EUT provides 1 completed transmitter and 1 receiver.

Modulation Mode	TX Function
802.11b	1TX
802.11g	1TX
802.11n (HT20)	1TX
802.11n (HT40)	1TX

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

7 channels are provided for 802.11n (HT40):

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	-	√	-

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

NOTE: 1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.
2. "-" means no effect.

Radiated Emission Test (Above 1 GHz):

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

Radiated Emission Test (Below 1 GHz):

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11n (HT40)	1 to 11	9	OFDM	BPSK	MCS0

Bandedge Measurement:

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 11	OFDM	BPSK	MCS0
-	802.11n (HT40)	3 to 9	3, 9	OFDM	BPSK	MCS0

Antenna Port Conducted Measurement:

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65 % RH	12 Vdc	Getaz Yang
RE<1G	25 deg. C, 65 % RH	12 Vdc	Getaz Yang
APCM	25 deg. C, 65 % RH	12 Vdc	Carlos Chen

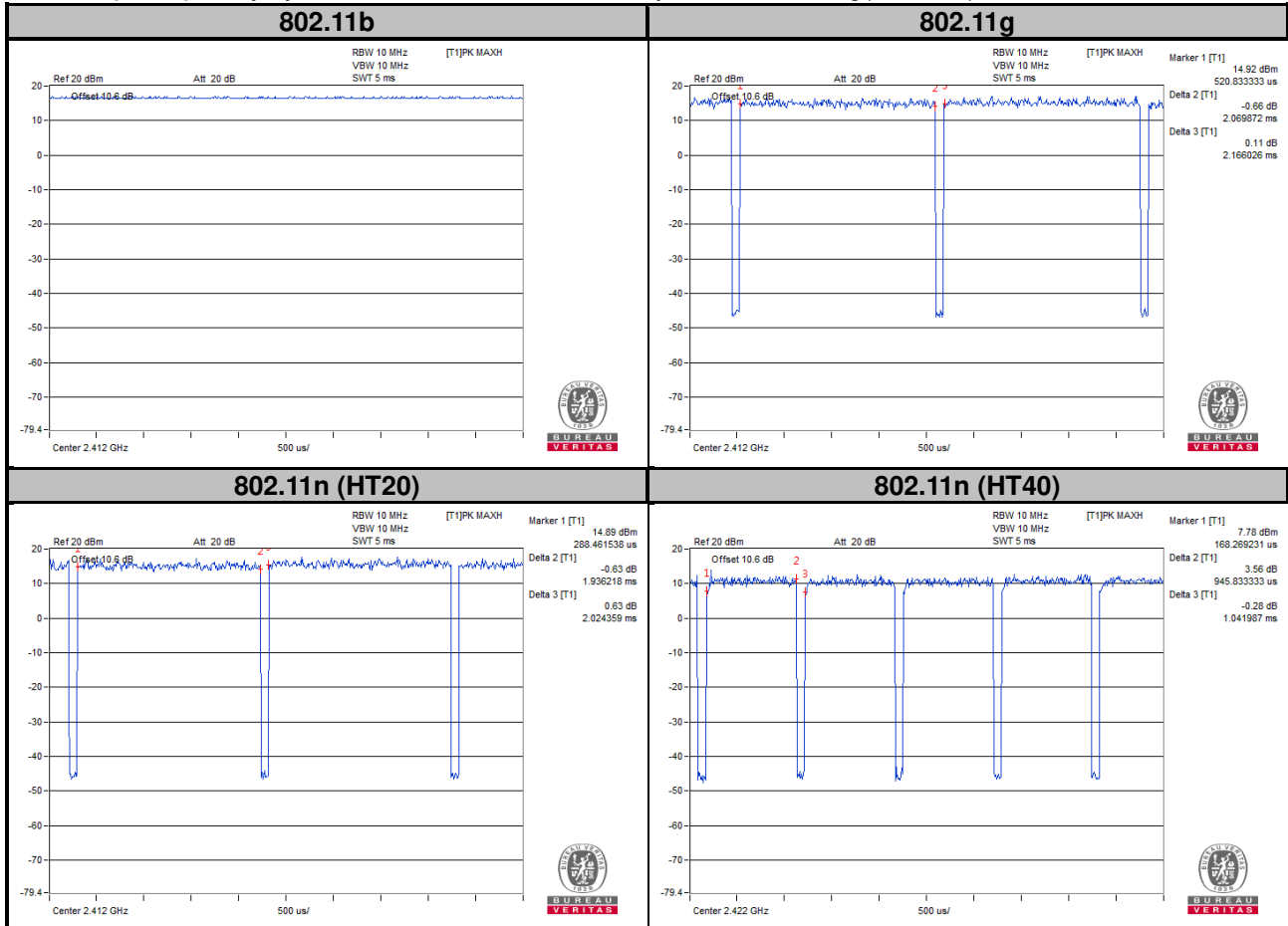
3.3 Duty Cycle of Test Signal

802.11b: Duty cycle of test signal is 100 %, , duty factor is not required.

802.11g: Duty cycle = $2.070/2.166 = 0.956$, Duty factor = $10 * \log(1/0.956) = 0.20$

802.11n (HT20): Duty cycle = $1.936/2.024 = 0.957$, Duty factor = $10 * \log(1/0.957) = 0.19$

802.11n (HT40): Duty cycle = $0.946/1.042 = 0.908$, Duty factor = $10 * \log(1/0.908) = 0.42$



3.4 Description of Support Units

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

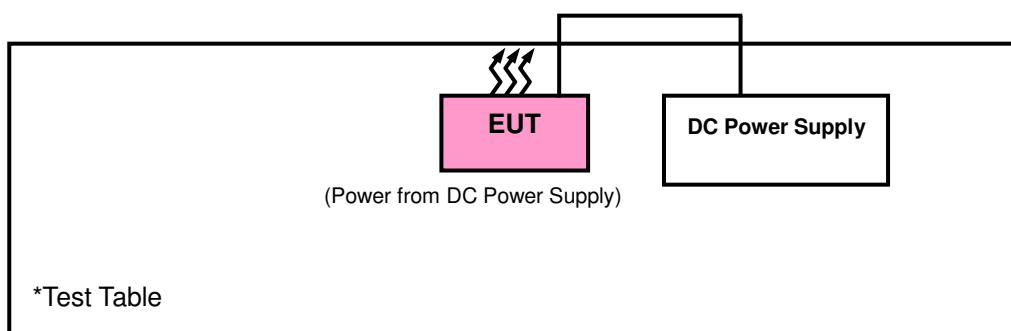
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	DC Power Supply	Topward	33010D	807748	N/A

No.	Signal Cable Description Of The Above Support Units
1.	N/A

Note:

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

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)

558074 D01 DTS Meas Guidance v03r05

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 20 dB 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 1000 MHz, 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 20 dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Jan. 21, 2016	Jan. 20, 2017
Test Receiver Agilent	N9038A	MY52260177	Jan. 21, 2016	Jan. 20, 2017
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2015	Dec. 16, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 04, 2016	Jan. 03, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Jan. 08, 2016	Jan. 07, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier EMCI	EMC 012645	980115	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 184045	980116	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 330H	980112	Dec. 28, 2015	Dec. 27, 2016
Power Meter Anritsu	ML2495A	1232002	Sep. 08, 2016	Sep. 07, 2017
Power Sensor Anritsu	MA2411B	1207325	Sep. 08, 2016	Sep. 07, 2017
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 11, 2016	Oct. 10, 2017
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 11, 2016	Oct. 10, 2017
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 11, 2016	Oct. 10, 2017
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Fixed Attenuator Mini-Circuits	BW-N10W5+	N/A	Jul. 08, 2016	Jul. 07, 2017

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The FCC Site Registration No. is 690701.
5. The IC Site Registration No. is IC7450F-10.

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1 GHz) / 1.5 meters (for above 1 GHz) 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 detected 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:

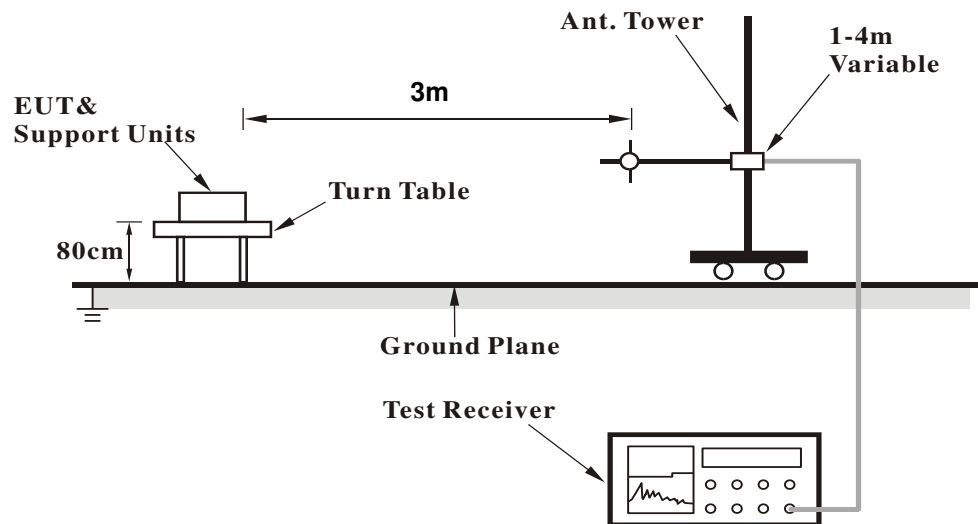
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360 KHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1/T for RMS Average (Duty cycle < 98 %) for Peak detection at frequency above 1 GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

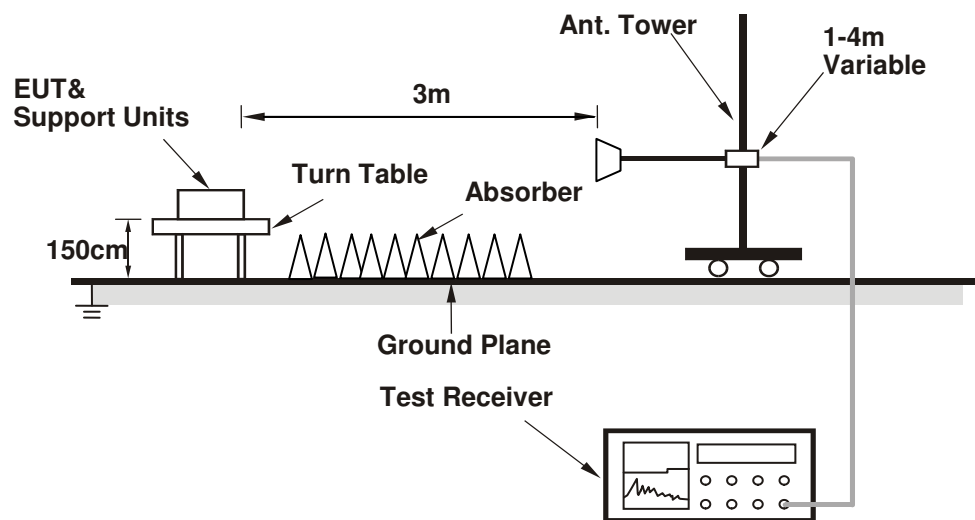
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1 GHz>



<Frequency Range above 1 GHz>



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

4.1.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1 GHz Data :

802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2386.68	57.74	64.25	74	-16.26	26.91	4.08	37.5	128	5	Peak
2388.57	40.58	47.09	54	-13.42	26.91	4.08	37.5	128	5	Average
2412	98.73	105.2			26.96	4.09	37.52	128	5	Average
2412	101.64	108.11			26.96	4.09	37.52	128	5	Peak
4824	35.74	51.04	54	-18.26	30.99	6.79	53.08	163	205	Average
4824	44.1	59.4	74	-29.9	30.99	6.79	53.08	163	205	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2371.92	57.02	63.59	74	-16.98	26.86	4.07	37.5	100	272	Peak
2389.83	42.67	49.2	54	-11.33	26.91	4.08	37.52	100	272	Average
2412	99.71	106.18			26.96	4.09	37.52	100	272	Average
2412	102.81	109.28			26.96	4.09	37.52	100	272	Peak
4824	35.7	51	54	-18.3	30.99	6.79	53.08	160	277	Average
4824	42.7	58	74	-31.3	30.99	6.79	53.08	160	277	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2379.21	57.53	64.1	74	-16.47	26.86	4.07	37.5	112	4	Peak
2389.65	37.86	44.37	54	-16.14	26.91	4.08	37.5	112	4	Average
2437	98.52	104.8			27.06	4.12	37.46	112	4	Average
2437	101.57	107.85			27.06	4.12	37.46	112	4	Peak
2483.64	39.46	45.48	54	-14.54	27.15	4.15	37.32	112	4	Average
2488.96	58.39	64.35	74	-15.61	27.2	4.16	37.32	112	4	Peak
4874	35.11	50.25	54	-18.89	31.06	6.85	53.05	162	203	Average
4874	45.83	60.97	74	-28.17	31.06	6.85	53.05	162	203	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2380.47	56.92	63.48	74	-17.08	26.86	4.08	37.5	100	268	Peak
2389.11	39.16	45.67	54	-14.84	26.91	4.08	37.5	100	268	Average
2437	100.39	106.67			27.06	4.12	37.46	100	268	Average
2437	103.48	109.76			27.06	4.12	37.46	100	268	Peak
2483.56	39.07	45.09	54	-14.93	27.15	4.15	37.32	100	268	Average
2484.04	57.28	63.3	74	-16.72	27.15	4.15	37.32	100	268	Peak
4874	35.12	50.26	54	-18.88	31.06	6.85	53.05	160	275	Average
4874	45.06	60.2	74	-28.94	31.06	6.85	53.05	160	275	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	98.66	104.82			27.1	4.13	37.39	110	4	Average
2462	101.81	107.97			27.1	4.13	37.39	110	4	Peak
2483.52	41.14	47.16	54	-12.86	27.15	4.15	37.32	110	4	Average
2498.36	58.34	64.23	74	-15.66	27.2	4.16	37.25	110	4	Peak
4924	35.56	50.59	54	-18.44	31.12	6.88	53.03	159	201	Average
4924	43.02	58.05	74	-30.98	31.12	6.88	53.03	159	201	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	98.98	105.14			27.1	4.13	37.39	100	268	Average
2462	101.85	108.01			27.1	4.13	37.39	100	268	Peak
2483.56	41.25	47.27	54	-12.75	27.15	4.15	37.32	100	268	Average
2484.2	57.5	63.52	74	-16.5	27.15	4.15	37.32	100	268	Peak
4924	35.7	50.73	54	-18.3	31.12	6.88	53.03	162	281	Average
4924	42.44	57.47	74	-31.56	31.12	6.88	53.03	162	281	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

802.11g

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2383.44	57.23	63.79	74	-16.77	26.86	4.08	37.5	114	3	Peak
2389.56	41.15	47.66	54	-12.85	26.91	4.08	37.5	114	3	Average
2412	94.82	101.29			26.96	4.09	37.52	114	3	Average
2412	101.99	108.46			26.96	4.09	37.52	114	3	Peak
4824	35.29	50.59	54	-18.71	30.99	6.79	53.08	160	198	Average
4824	43.65	58.95	74	-30.35	30.99	6.79	53.08	160	198	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.57	57.4	63.91	74	-16.6	26.91	4.08	37.5	100	273	Peak
2389.83	40.14	46.67	54	-13.86	26.91	4.08	37.52	100	273	Average
2412	95.23	101.7			26.96	4.09	37.52	100	273	Average
2412	102.69	109.16			26.96	4.09	37.52	100	273	Peak
4824	35.28	50.58	54	-18.72	30.99	6.79	53.08	163	279	Average
4824	43.55	58.85	74	-30.45	30.99	6.79	53.08	163	279	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2362.74	57.37	63.98	74	-16.63	26.81	4.07	37.49	111	4	Peak
2389.65	39.25	45.76	54	-14.75	26.91	4.08	37.5	111	4	Average
2437	94.07	100.35			27.06	4.12	37.46	111	4	Average
2437	101.91	108.19			27.06	4.12	37.46	111	4	Peak
2483.68	41.41	47.43	54	-12.59	27.15	4.15	37.32	111	4	Average
2485.72	57.53	63.55	74	-16.47	27.15	4.15	37.32	111	4	Peak
4874	35.55	50.69	54	-18.45	31.06	6.85	53.05	163	200	Average
4874	44.93	60.07	74	-29.07	31.06	6.85	53.05	163	200	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.57	57.48	63.99	74	-16.52	26.91	4.08	37.5	101	267	Peak
2389.92	41.45	47.98	54	-12.55	26.91	4.08	37.52	101	267	Average
2437	95.27	101.55			27.06	4.12	37.46	101	267	Average
2437	102.73	109.01			27.06	4.12	37.46	101	267	Peak
2483.52	40.74	46.76	54	-13.26	27.15	4.15	37.32	101	267	Average
2488.44	58.64	64.6	74	-15.36	27.2	4.16	37.32	101	267	Peak
4874	34.94	50.08	54	-19.06	31.06	6.85	53.05	160	276	Average
4874	43.76	58.9	74	-30.24	31.06	6.85	53.05	160	276	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	93.12	99.28			27.1	4.13	37.39	110	4	Average
2462	101.24	107.4			27.1	4.13	37.39	110	4	Peak
2483.6	43.28	49.3	54	-10.72	27.15	4.15	37.32	110	4	Average
2488.8	58.51	64.47	74	-15.49	27.2	4.16	37.32	110	4	Peak
4924	35.76	50.79	54	-18.24	31.12	6.88	53.03	163	199	Average
4924	43.04	58.07	74	-30.96	31.12	6.88	53.03	163	199	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	94.63	100.79			27.1	4.13	37.39	100	266	Average
2462	102.44	108.6			27.1	4.13	37.39	100	266	Peak
2483.52	42.7	48.72	54	-11.3	27.15	4.15	37.32	100	267	Average
2490.4	57.86	63.82	74	-16.14	27.2	4.16	37.32	100	267	Peak
4924	34.95	49.98	54	-19.05	31.12	6.88	53.03	160	275	Average
4924	43.49	58.52	74	-30.51	31.12	6.88	53.03	160	275	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2377.59	56.68	63.25	74	-17.32	26.86	4.07	37.5	128	5	Peak
2389.47	40.65	47.16	54	-13.35	26.91	4.08	37.5	128	5	Average
2412	94.82	101.29			26.96	4.09	37.52	128	5	Average
2412	101.6	108.07			26.96	4.09	37.52	128	5	Peak
4824	35.05	50.35	54	-18.95	30.99	6.79	53.08	159	209	Average
4824	45.24	60.54	74	-28.76	30.99	6.79	53.08	159	209	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2333.31	57.51	64.22	74	-16.49	26.72	4.04	37.47	100	278	Peak
2389.92	42.51	49.04	54	-11.49	26.91	4.08	37.52	100	278	Average
2412	95.38	101.85			26.96	4.09	37.52	100	278	Average
2412	102.58	109.05			26.96	4.09	37.52	100	278	Peak
4824	35.55	50.85	54	-18.45	30.99	6.79	53.08	162	281	Average
4824	43.28	58.58	74	-30.72	30.99	6.79	53.08	162	281	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2350.14	57.17	63.84	74	-16.83	26.77	4.05	37.49	128	6	Peak
2389.65	39.58	46.09	54	-14.42	26.91	4.08	37.5	128	6	Average
2437	94.22	100.5			27.06	4.12	37.46	128	6	Average
2437	101.87	108.15			27.06	4.12	37.46	128	6	Peak
2483.6	40.57	46.59	54	-13.43	27.15	4.15	37.32	128	6	Average
2485.8	58.02	64.04	74	-15.98	27.15	4.15	37.32	128	6	Peak
4874	35.08	50.22	54	-18.92	31.06	6.85	53.05	163	200	Average
4874	42.18	57.32	74	-31.82	31.06	6.85	53.05	163	200	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2378.76	57.03	63.6	74	-16.97	26.86	4.07	37.5	100	275	Peak
2389.83	41.55	48.08	54	-12.45	26.91	4.08	37.52	100	275	Average
2437	95.67	101.95			27.06	4.12	37.46	100	275	Average
2437	103.08	109.36			27.06	4.12	37.46	100	275	Peak
2483.6	41.02	47.04	54	-12.98	27.15	4.15	37.32	100	275	Average
2489.2	57.59	63.55	74	-16.41	27.2	4.16	37.32	100	275	Peak
4874	35.05	50.19	54	-18.95	31.06	6.85	53.05	160	280	Average
4874	42.88	58.02	74	-31.12	31.06	6.85	53.05	160	280	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	94.17	100.33			27.1	4.13	37.39	126	7	Average
2462	102.04	108.2			27.1	4.13	37.39	126	7	Peak
2483.8	43.31	49.33	54	-10.69	27.15	4.15	37.32	126	7	Average
2489.56	58.31	64.27	74	-15.69	27.2	4.16	37.32	126	7	Peak
4924	35.9	50.93	54	-18.1	31.12	6.88	53.03	162	202	Average
4924	43.46	58.49	74	-30.54	31.12	6.88	53.03	162	202	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	95.3	101.46			27.1	4.13	37.39	100	269	Average
2462	102.31	108.47			27.1	4.13	37.39	100	269	Peak
2483.52	42.92	48.94	54	-11.08	27.15	4.15	37.32	100	269	Average
2484.2	58.88	64.9	74	-15.12	27.15	4.15	37.32	100	269	Peak
4924	35.27	50.3	54	-18.73	31.12	6.88	53.03	160	275	Average
4924	43.1	58.13	74	-30.9	31.12	6.88	53.03	160	275	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 3	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.2	61.18	67.69	74	-12.82	26.91	4.08	37.5	127	6	Peak
2389.83	38.47	45	54	-15.53	26.91	4.08	37.52	127	6	Average
2422	89.25	95.59			27.01	4.11	37.46	127	6	Average
2422	98.25	104.59			27.01	4.11	37.46	127	6	Peak
2483.52	38.2	44.22	54	-15.8	27.15	4.15	37.32	127	6	Average
2487.12	57.57	63.59	74	-16.43	27.15	4.15	37.32	127	6	Peak
4844	35.08	50.31	54	-18.92	31.01	6.82	53.06	162	200	Average
4844	44.01	59.24	74	-29.99	31.01	6.82	53.06	162	200	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.84	63.13	69.64	74	-10.87	26.91	4.08	37.5	100	254	Peak
2389.92	40.49	47.02	54	-13.51	26.91	4.08	37.52	100	254	Average
2422	90.48	96.82			27.01	4.11	37.46	100	254	Average
2422	99.12	105.46			27.01	4.11	37.46	100	254	Peak
2483.52	38.11	44.13	54	-15.89	27.15	4.15	37.32	100	254	Average
2497.68	57.68	63.57	74	-16.32	27.2	4.16	37.25	100	254	Peak
4844	34.99	50.22	54	-19.01	31.01	6.82	53.06	160	277	Average
4844	43.93	59.16	74	-30.07	31.01	6.82	53.06	160	277	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2422 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.47	39.51	46.02	54	-14.49	26.91	4.08	37.5	127	6	Average
2389.83	58.54	65.07	74	-15.46	26.91	4.08	37.52	127	6	Peak
2437	90.92	97.2			27.06	4.12	37.46	127	6	Average
2437	99.4	105.68			27.06	4.12	37.46	127	6	Peak
2483.52	41.48	47.5	54	-12.52	27.15	4.15	37.32	127	6	Average
2486.8	58.62	64.64	74	-15.38	27.15	4.15	37.32	127	6	Peak
4874	34.98	50.12	54	-19.02	31.06	6.85	53.05	162	201	Average
4874	42.97	58.11	74	-31.03	31.06	6.85	53.05	162	201	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.74	59.29	65.8	74	-14.71	26.91	4.08	37.5	100	277	Peak
2389.92	41.27	47.8	54	-12.73	26.91	4.08	37.52	100	277	Average
2437	91.74	98.02			27.06	4.12	37.46	100	277	Average
2437	100.18	106.46			27.06	4.12	37.46	100	277	Peak
2483.52	41.86	47.88	54	-12.14	27.15	4.15	37.32	100	277	Average
2488.68	58.56	64.52	74	-15.44	27.2	4.16	37.32	100	277	Peak
4874	35.08	50.22	54	-18.92	31.06	6.85	53.05	160	271	Average
4874	42.19	57.33	74	-31.81	31.06	6.85	53.05	160	271	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 9	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2370.03	56.8	63.37	74	-17.2	26.86	4.07	37.5	127	6	Peak
2389.92	38.2	44.73	54	-15.8	26.91	4.08	37.52	127	6	Average
2452	91.17	97.37			27.06	4.13	37.39	127	6	Average
2452	99.55	105.75			27.06	4.13	37.39	127	6	Peak
2483.52	44	50.02	54	-10	27.15	4.15	37.32	127	6	Average
2486.96	62.5	68.52	74	-11.5	27.15	4.15	37.32	127	6	Peak
4904	34.27	49.32	54	-19.73	31.1	6.88	53.03	162	201	Average
4904	42.72	57.77	74	-31.28	31.1	6.88	53.03	162	201	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2383.89	58.77	65.33	74	-15.23	26.86	4.08	37.5	100	253	Peak
2389.92	40.15	46.68	54	-13.85	26.91	4.08	37.52	100	253	Average
2452	91.55	97.75			27.06	4.13	37.39	100	253	Average
2452	99.72	105.92			27.06	4.13	37.39	100	253	Peak
2483.52	44.19	50.21	54	-9.81	27.15	4.15	37.32	100	253	Average
2486.36	61.88	67.9	74	-12.12	27.15	4.15	37.32	100	253	Peak
4904	34.17	49.22	54	-19.83	31.1	6.88	53.03	161	274	Average
4904	43.18	58.23	74	-30.82	31.1	6.88	53.03	161	274	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2452 MHz: Fundamental frequency.

9 kHz ~ 30 MHz DATA:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz WORST-CASE DATA:

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 9	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
43.58	17.66	34.51	40	-22.34	13.59	0.67	31.11	125	306	Peak
115.36	17.32	37.52	43.5	-26.18	10.55	1.12	31.87	105	231	Peak
146.4	15.57	33.46	43.5	-27.93	12.58	1.15	31.62	135	162	Peak
365.62	18.74	34.35	46	-27.26	14.52	1.81	31.94	107	243	Peak
525.67	21.3	32.89	46	-24.7	17.91	2.14	31.64	136	196	Peak
663.41	24.29	33.44	46	-21.71	20.37	2.38	31.9	127	184	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
35.82	26.84	44.34	40	-13.16	12.94	0.61	31.05	128	166	Peak
111.48	18.68	39.24	43.5	-24.82	10.18	1.11	31.85	109	139	Peak
148.34	15.36	33.2	43.5	-28.14	12.64	1.14	31.62	132	86	Peak
341.37	17.64	33.78	46	-28.36	13.94	1.74	31.82	105	265	Peak
505.3	21.69	33.75	46	-24.31	17.44	2.1	31.6	120	160	Peak
590.66	23.78	34.3	46	-22.22	19.39	2.24	32.15	125	80	Peak

Remarks:

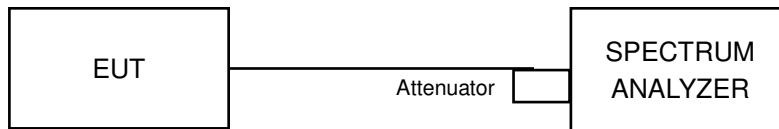
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value

4.2 6 dB Bandwidth Measurement

4.2.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

- Set resolution bandwidth (RBW) = 100 kHz
- 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

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Conditions

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

4.2.7 Test Result

802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	8.12	0.5	Pass
6	2437	8.10	0.5	Pass
11	2462	7.60	0.5	Pass

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.18	0.5	Pass
6	2437	15.20	0.5	Pass
11	2462	15.36	0.5	Pass

802.11n (HT20)

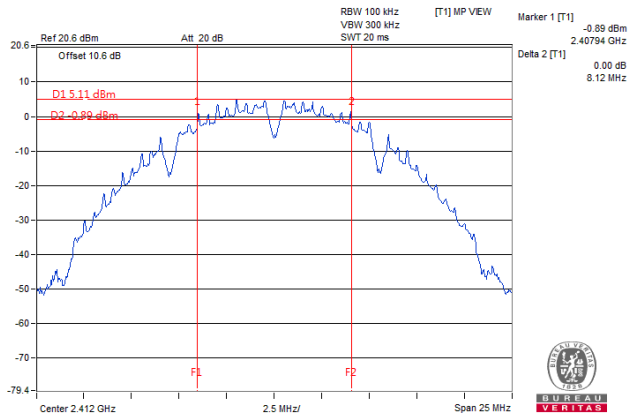
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.17	0.5	Pass
6	2437	15.18	0.5	Pass
11	2462	15.46	0.5	Pass

802.11n (HT40)

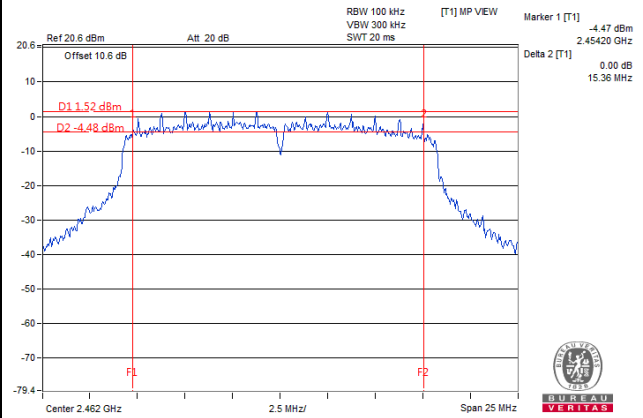
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	35.15	0.5	Pass
6	2437	35.21	0.5	Pass
9	2452	35.19	0.5	Pass

Spectrum Plot of Worst Value

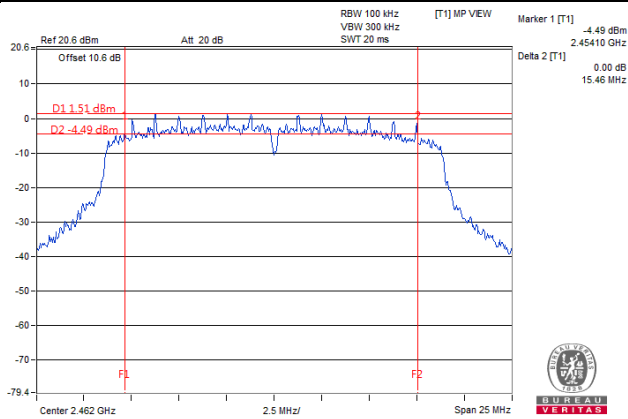
802.11b



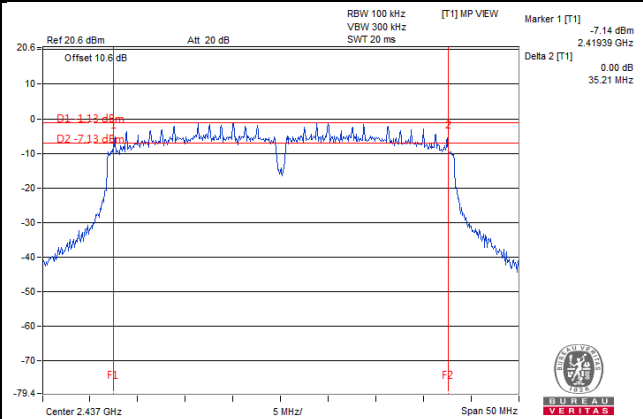
802.11g



802.11n (HT20)



802.11n (HT40)

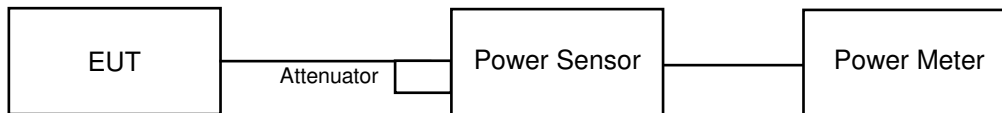


4.3 Conducted Output Power Measurement

4.3.1 Limits of Conducted Output Power Measurement

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

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 Procedures

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Results

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	44.87	16.52	30	Pass
6	2437	45.60	16.59	30	Pass
11	2462	38.55	15.86	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	71.78	18.56	30	Pass
6	2437	72.61	18.61	30	Pass
11	2462	58.48	17.67	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	70.31	18.47	30	Pass
6	2437	73.11	18.64	30	Pass
11	2462	63.83	18.05	30	Pass

802.11n (HT40)

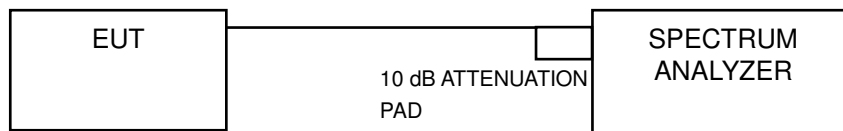
Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
3	2422	59.70	17.76	30	Pass
6	2437	74.64	18.73	30	Pass
9	2452	68.55	18.36	30	Pass

4.4 Power Spectral Density Measurement

4.4.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8 dBm.

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 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.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Condition

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

4.4.7 Test Results

802.11b

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-12.76	8	Pass
6	2437	-12.56	8	Pass
11	2462	-13.19	8	Pass

802.11g

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-14.51	8	Pass
6	2437	-14.38	8	Pass
11	2462	-15.49	8	Pass

802.11n (HT20)

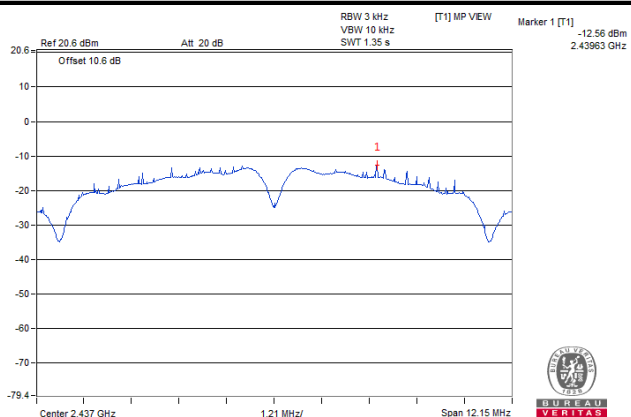
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-14.45	8	Pass
6	2437	-14.26	8	Pass
11	2462	-14.70	8	Pass

802.11n (HT40)

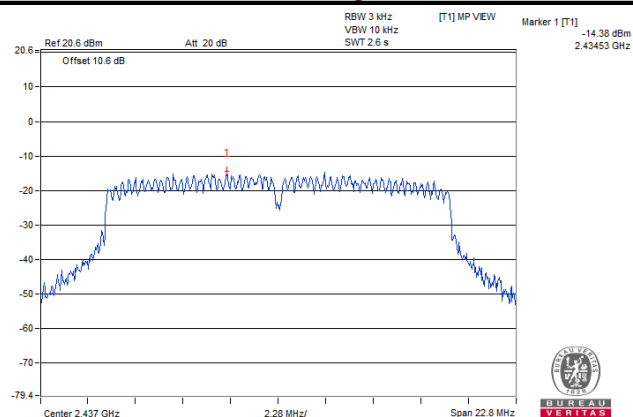
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
3	2422	-16.82	8	Pass
6	2437	-17.63	8	Pass
9	2452	-17.27	8	Pass

Spectrum Plot of Worst Value

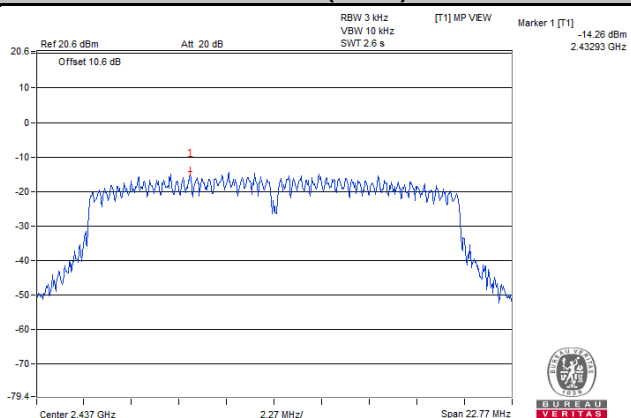
802.11b



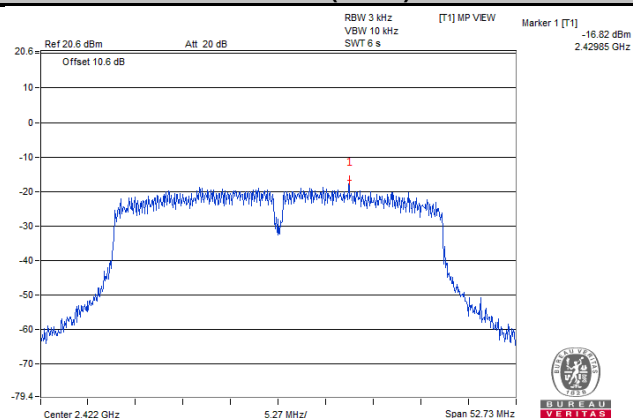
802.11g



802.11n (HT20)



802.11n (HT40)

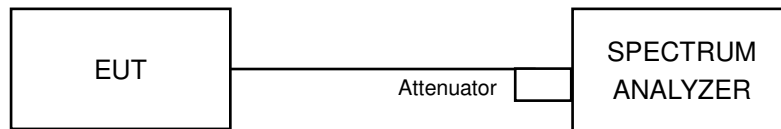


4.5 Conducted Out of Band Emission Measurement

4.5.1 Limits of Conducted Out of Band Emission Measurement

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

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

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.

4.5.5 Deviation from Test Standard

No deviation.

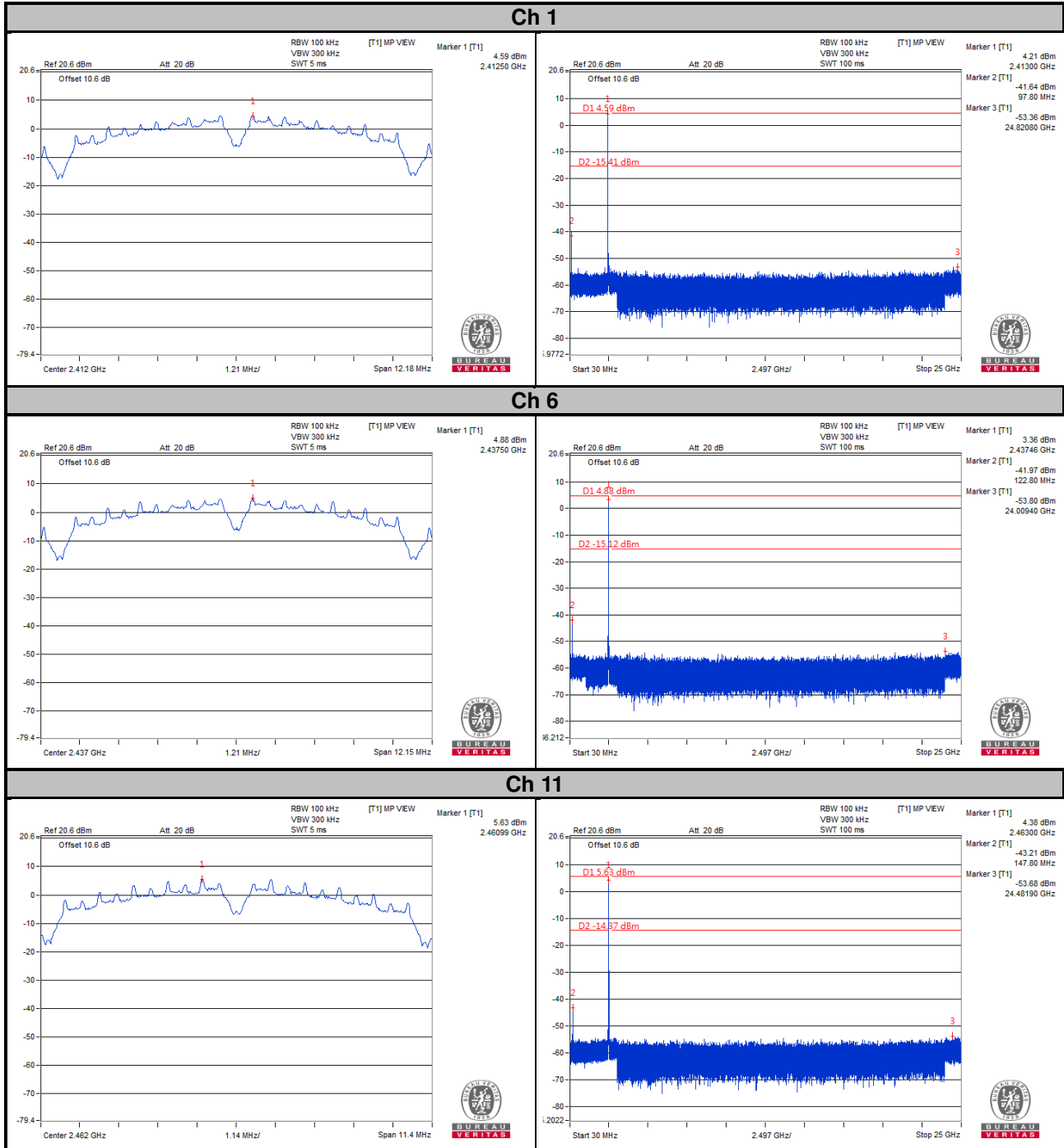
4.5.6 EUT Operating Condition

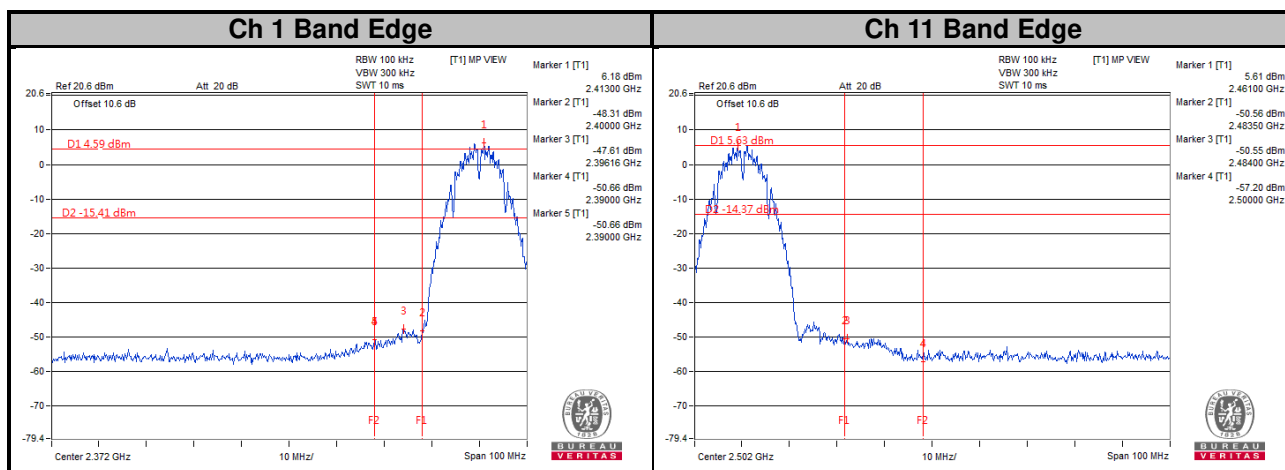
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.5.7 Test Results

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

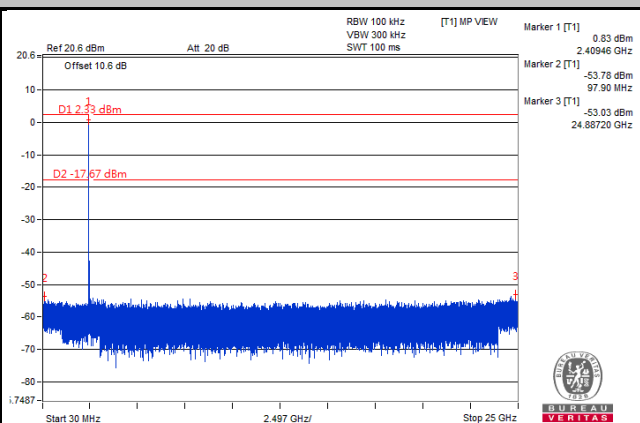
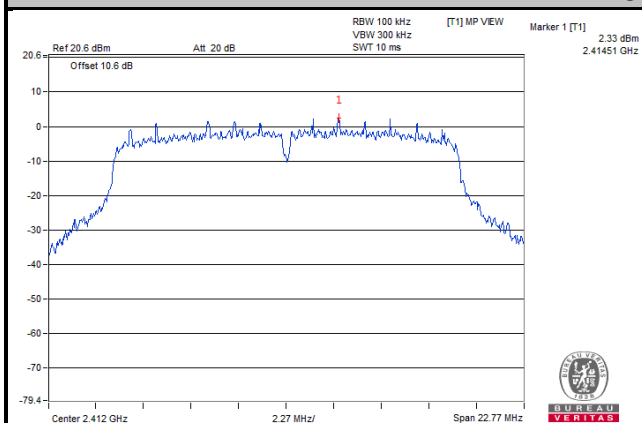
802.11b



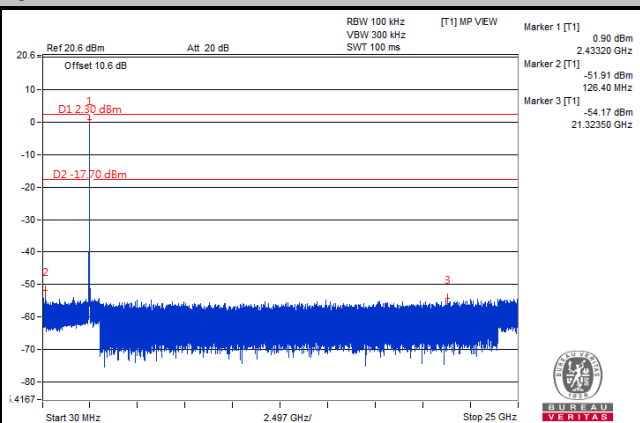
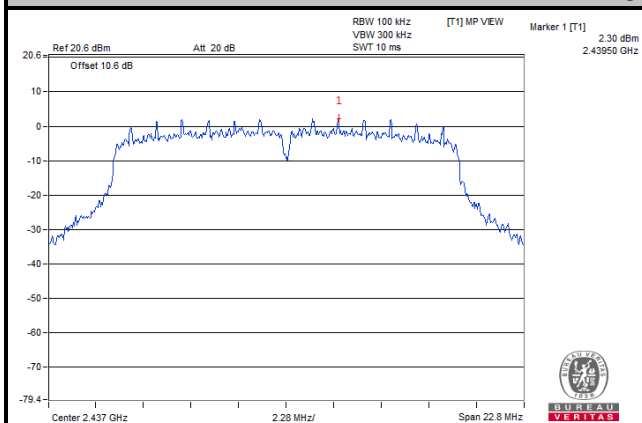


802.11g

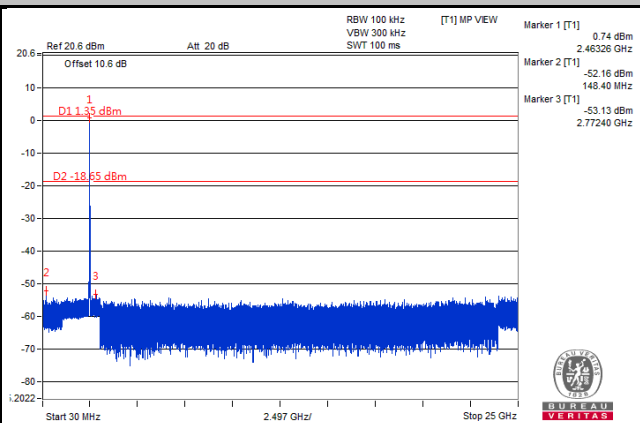
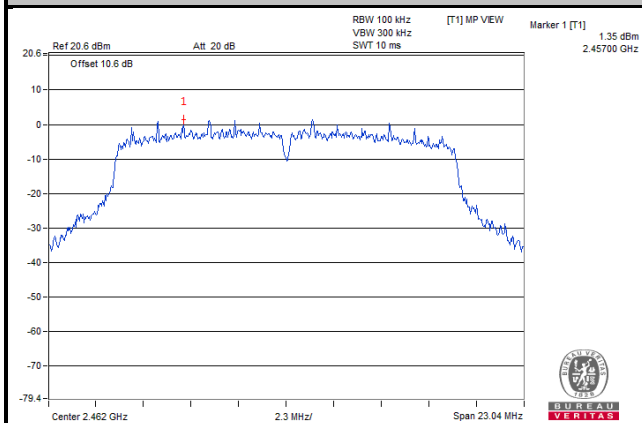
Ch 1

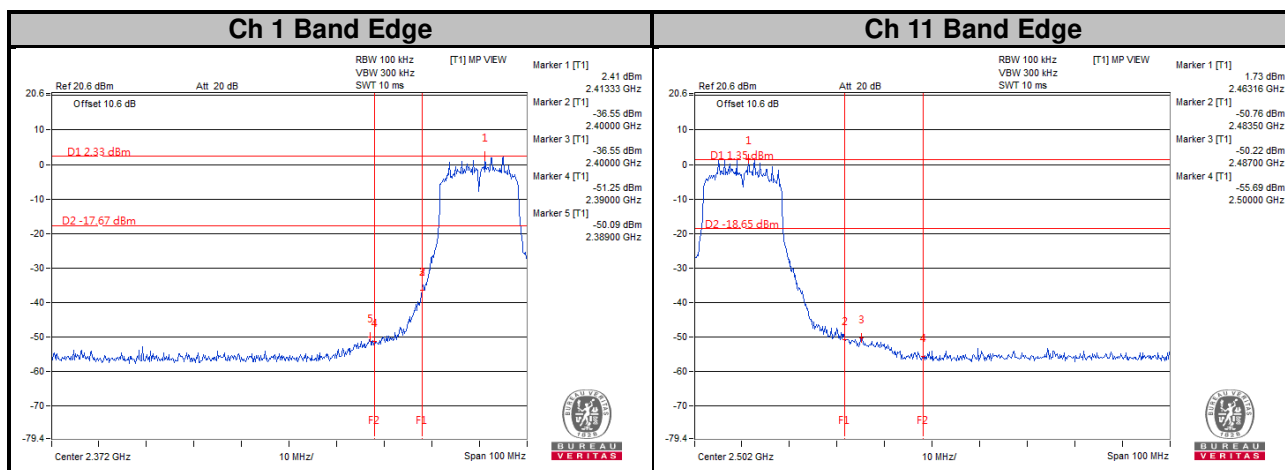


Ch 6



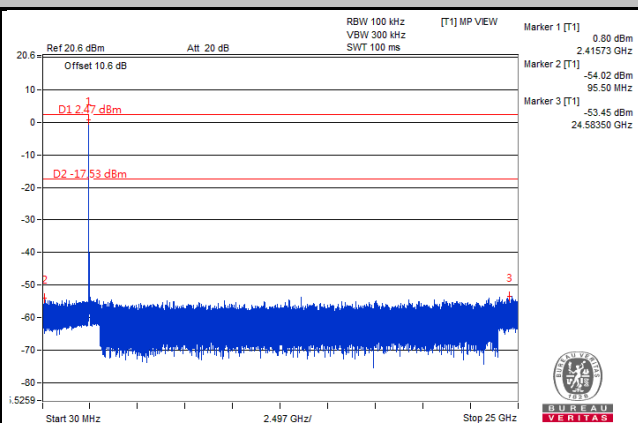
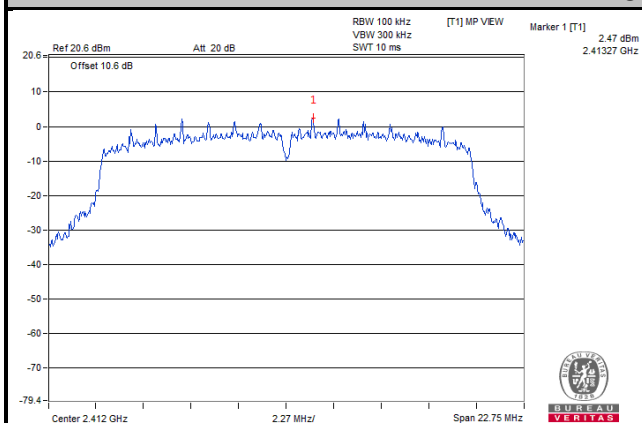
Ch 11



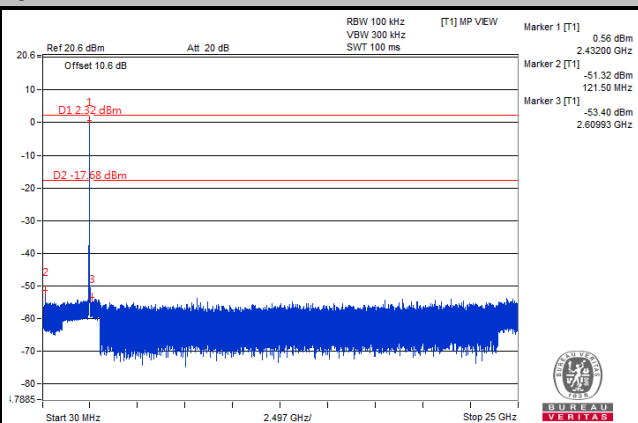
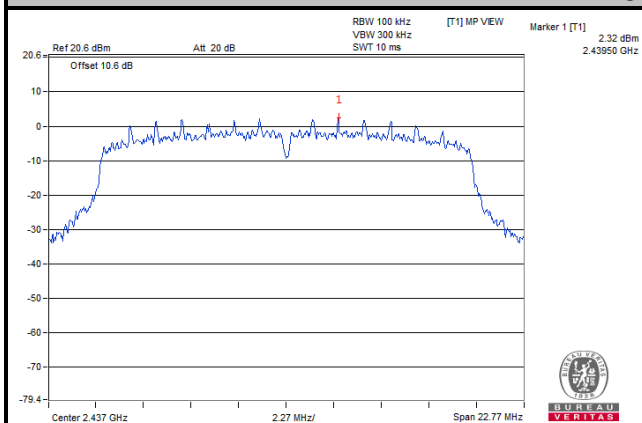


802.11n (HT20)

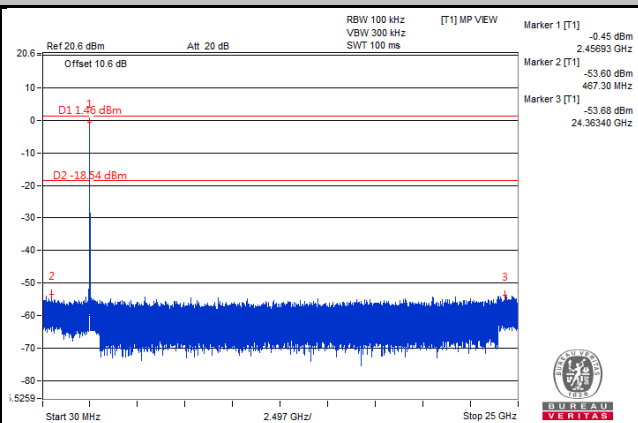
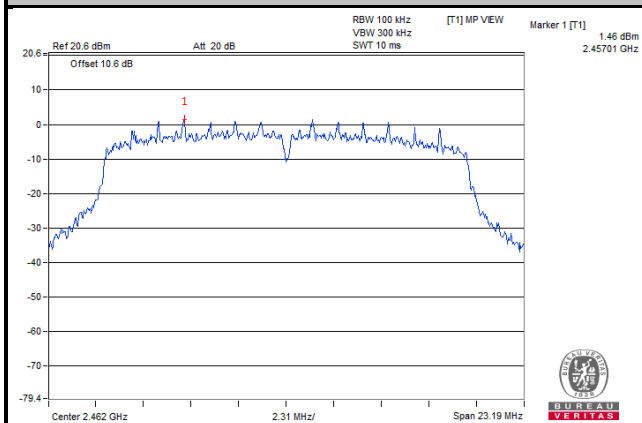
Ch 1

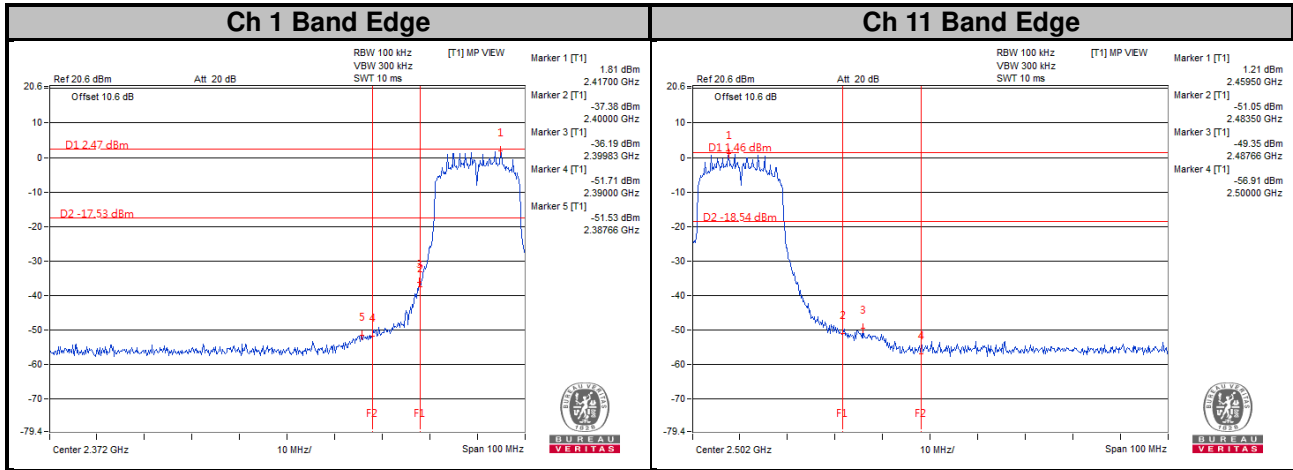


Ch 6



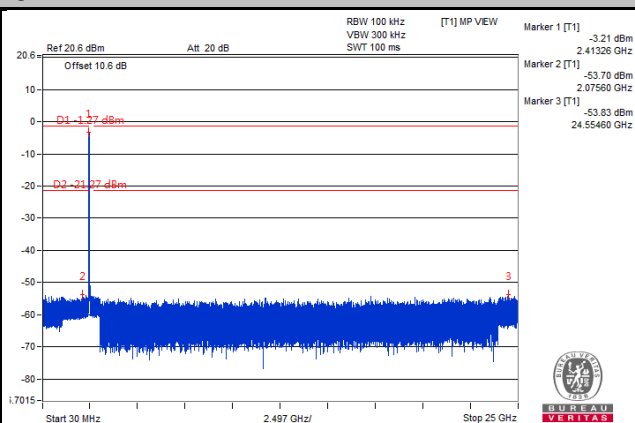
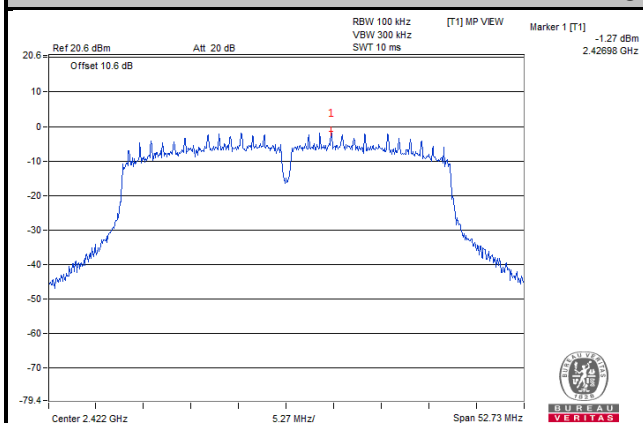
Ch 11



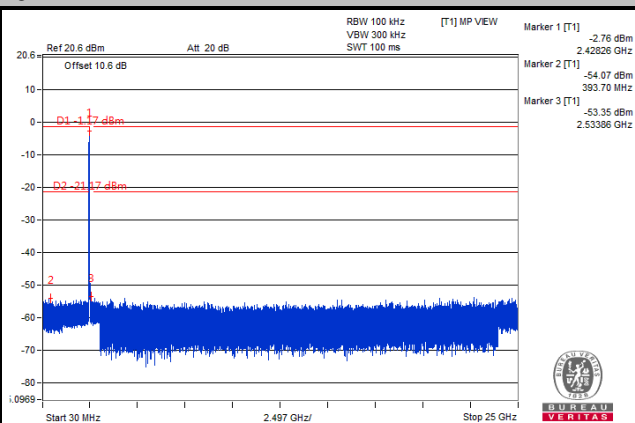
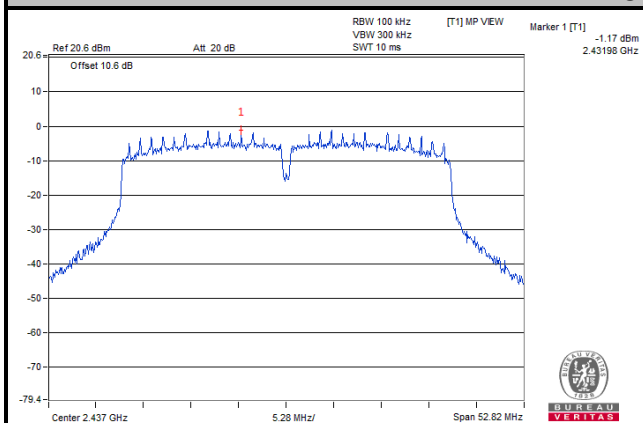


802.11n (HT40)

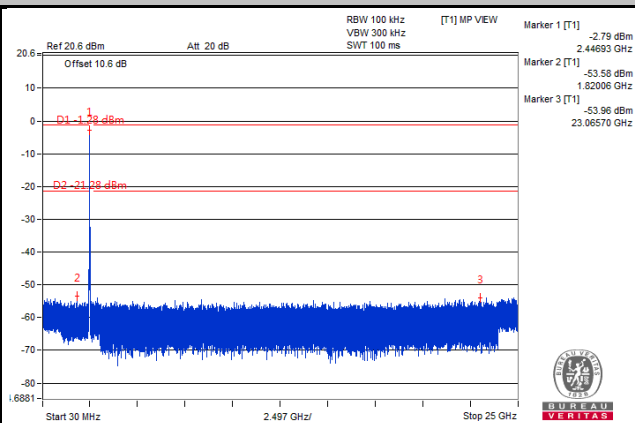
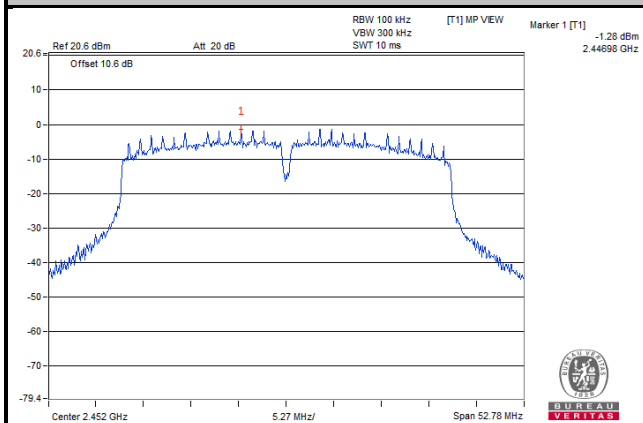
Ch 3

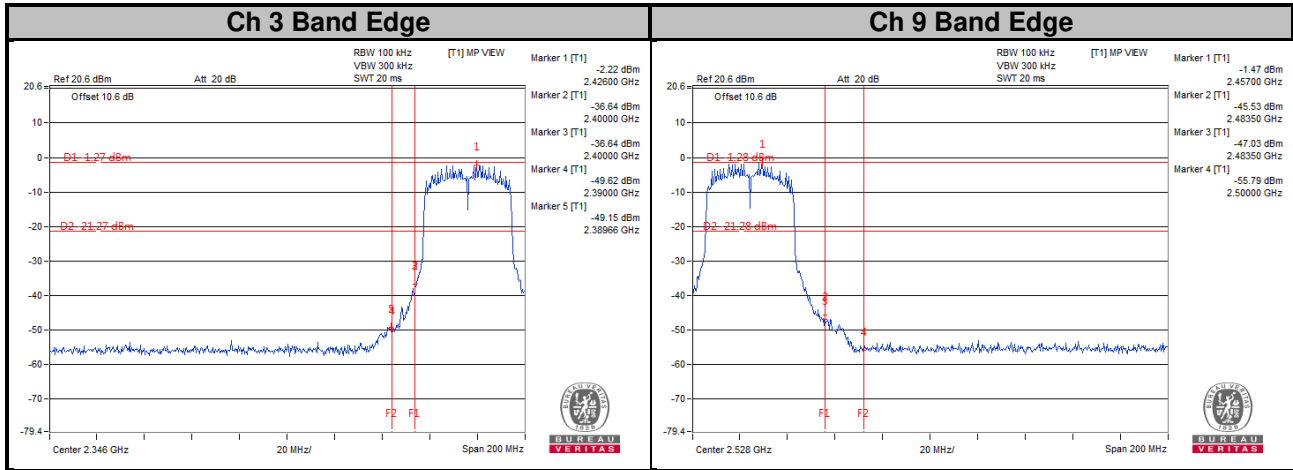


Ch 6



Ch 9





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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