FCC Test Report (WLAN)

Report No.:	RF180614E09
FCC ID:	PY318100406
Test Model:	Otter
Received Date:	June 14, 2018
Test Date:	June 29 to July 10, 2018
Issued Date:	July 19, 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

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF180614E09	Original release.	July 19, 2018

1 Certificate of Conformity

Product:	WiFi Device
Brand:	NETGEAR
Test Model:	Otter
Sample Status:	ENGINEERING SAMPLE
Applicant:	NETGEAR, Inc.
Test Date:	June 29 to July 10, 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 : Phoenix Huang , **Date:** July 19, 2018

Phoenix Huang / Specialist

Approved by : , **Date:** July 19, 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 -21.41dB at 12.14453MHz.
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 2390.00MHz and 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex(MHF) not a standard connector.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.53 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.08 dB
	6GHz ~ 18GHz	4.98 dB
	18GHz ~ 40GHz	5.19 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (WLAN)

Product	WiFi Device
Brand	NETGEAR
Test Model	Otter
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	19Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	**2.412 ~ 2.462GHz** **CDD Mode:** 989.7mW **Beamforming Mode** 940.061mW **5.18 ~ 5.24GHz** **CDD Mode:** 907.203mW **Beamforming Mode** 869.426mW **5.745 ~ 5.825GHz** **CDD Mode:** 887.255mW **Beamforming Mode** 936.671mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x1
Data Cable Supplied	NA

Note:

1. There are WLAN and Bluetooth technology used for the EUT. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3
WLAN (2.4GHz) + WLAN (5GHz HB)	WLAN (5GHz LB)	Bluetooth

2. Simultaneously transmission condition.

Condition	Technology
1	WLAN (2.4GHz) + WLAN (5GHz) + Bluetooth
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.	

3. The EUT could be supplied from a power adapter as following table:

No.	Brand	Model No.	P/N	Spec.
1	NETGEAR	AD2003F10	332-11039-01	Input: 100-120Vac, 1.5A, 50/60Hz Output: 19V, 3.16A DC output cable (unshielded, 1.8m)
2	NETGEAR	2ABS060K 1 NJ	332-11043-01	Input: 100-120Vac, 1.7A, 50/60Hz Output: 19V, 3.16A DC output cable (unshielded, 1.8m)
Note: From the above models, the worst radiated emission test was found in **Adapter 2**. Therefore only the test data of the modes were recorded in this report.				

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

For WLAN					
Antenna No.	Ant. Gain (dBi) (include cable loss)	Frequency range (GHz)	Antenna Type	Connecter Type	Cable Length (mm)
Dual band (Black)	3.46	2.4 ~ 2.4835	Dipole	i-pex(MHF)	214
	2.99	5.15~5.25			
	2.99	5.25~5.35			
Dual band (Red)	2.73	2.4 ~ 2.4835	Dipole	i-pex(MHF)	156
	2.44	5.15~5.25			
	2.44	5.25~5.35			
5G Antenna (Blue)	3.31	5.47~5.725	Dipole	i-pex(MHF)	125
	2.65	5.725~5.85			
5G Antenna (Yellow)	2.26	5.47~5.725	Dipole	i-pex(MHF)	70
	3.24	5.725~5.85			
For Bluetooth					
Antenna No.	Ant. Gain (dBi) (include cable loss)	Frequency range (GHz)	Antenna Type	Connecter Type	Cable Length (mm)
Antenna (White)	3.32	2.4 ~ 2.5	PIFA	i-pex(MHF)	200

5. The EUT incorporates a MIMO function.

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	2TX	2RX
802.11g	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT20)	MCS0~8 Nss=1	2TX	2RX
	MCS0~8 Nss=2	2TX	2RX
802.11ac (VHT40)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX
802.11ac (VHT80)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX

Note:
1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.

6. 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≥1G	RE<1G	PLC	APCM	
1	√	√	√	√	With Adapter 2
2	-	-	√	-	With Adapter 1

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: "-"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.

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

Radiated Emission Test (Below 1GHz):

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

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

CDD Mode					
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.

CDD Mode					
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.

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

Test Condition:

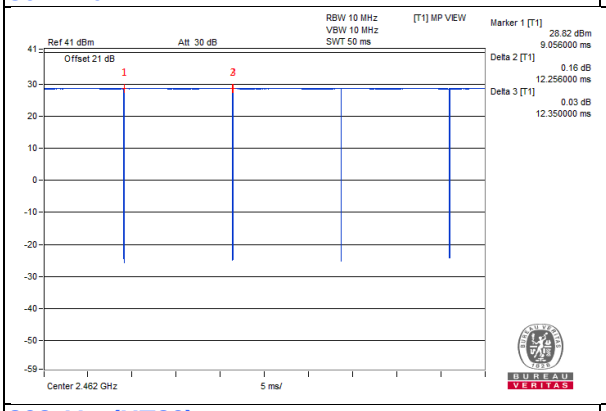
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	22deg. C, 67%RH	120Vac, 60Hz	Andy Ho
RE<1G	22deg. C, 68%RH	120Vac, 60Hz	Andy Ho
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
	23deg. C, 74%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

3.3 Duty Cycle of Test Signal

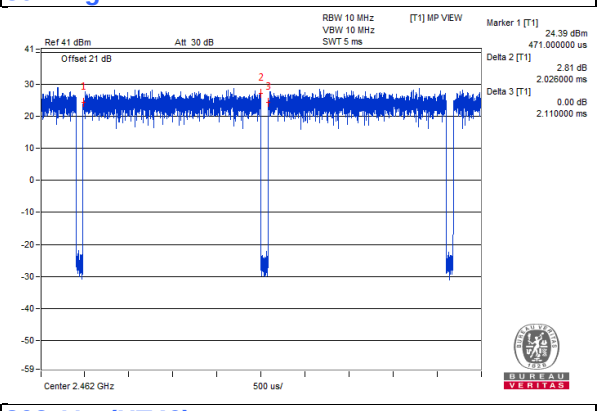
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle = 12.256 ms/12.35 ms = 0.992
802.11g: Duty cycle = 2.026 ms/2.11 ms = 0.96, Duty factor = 10 * log (1/Duty cycle) = 0.18
802.11n (HT20): Duty cycle = 4.955 ms/5.043 ms = 0.983
802.11n (HT40): Duty cycle = 2.405 ms/2.492 ms = 0.965, Duty factor = 10 * log (1/Duty cycle) = 0.15

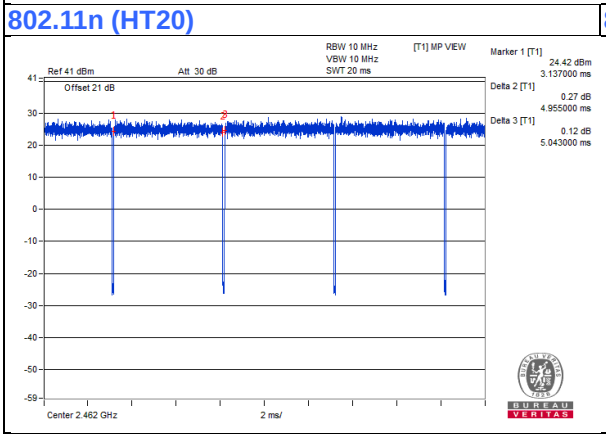
802.11b



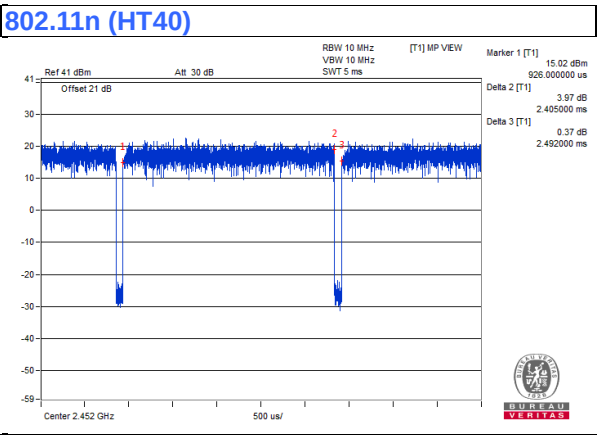
802.11g



802.11n (HT20)



802.11n (HT40)



3.4 Description of Support Units

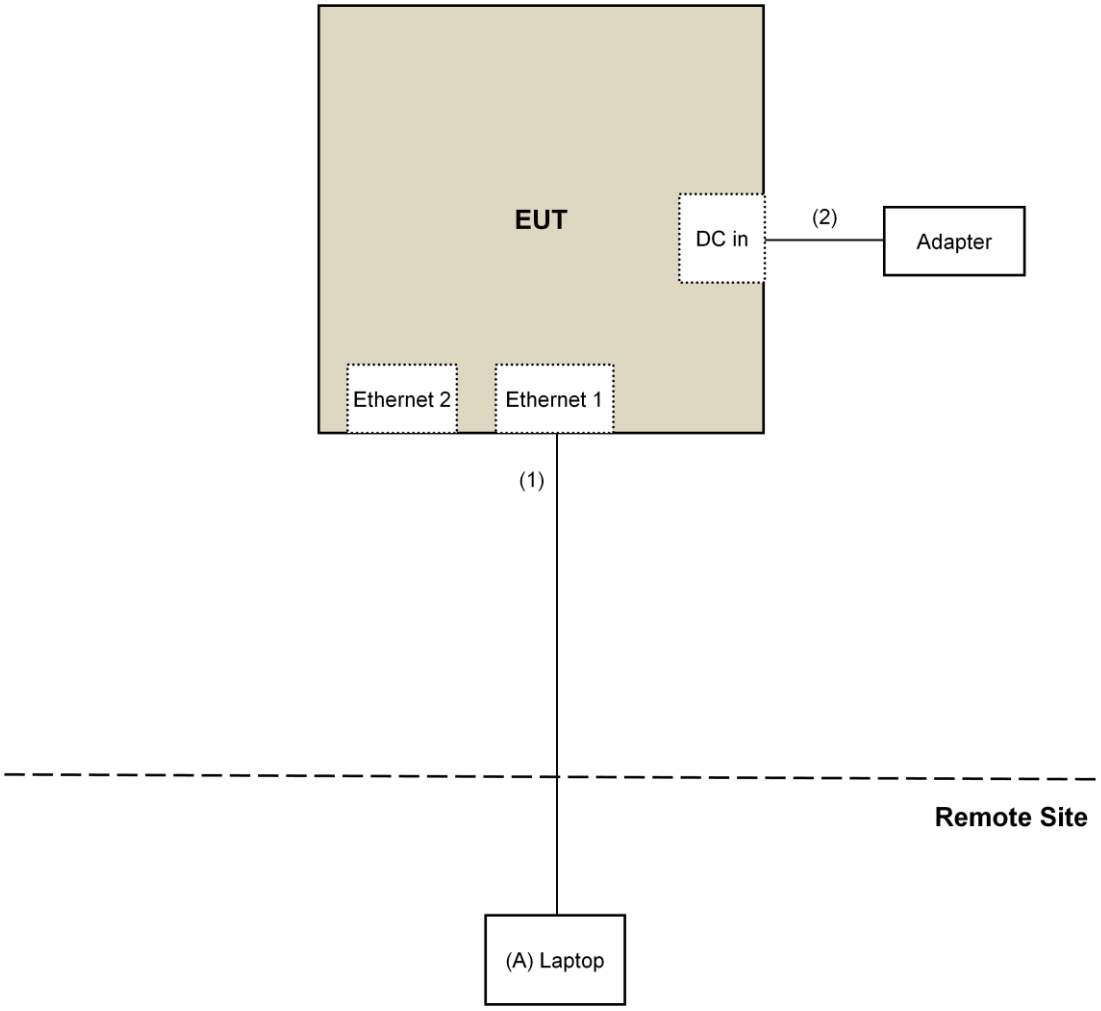
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	B92T3R1	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.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	DC Cable	1	1.8	No	0	Supplied by client

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)
KDB 558074 D01 DTS Meas Guidance v04
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

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

Note:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	July 12, 2017	July 11, 2018
Pre-Amplifier EMCI	EMC001340	980142	Feb. 09, 2018	Feb. 08, 2019
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 05, 2018	May 04, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-3-1 966-3-2 966-3-3	Mar. 20, 2018	Mar. 19, 2019
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160922 150317 150322	Jan. 29, 2018	Jan. 28, 2019
Spectrum Analyzer Keysight	N9030A	MY54490679	July 25, 2017	July 24, 2018
Pre-Amplifier EMCI	EMC184045SE	980386	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160924	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 20, 2018	June 19, 2019
Power meter Anritsu	ML2495A	1014008	May 09, 2018	May 08, 2019
Power sensor Anritsu	MA2411B	0917122	May 09, 2018	May 08, 2019

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. The test was performed in 966 Chamber No. 3.
4. The CANADA Site Registration No. is 20331-1
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: July 04 to 10, 2018

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. Parallel, perpendicular, and ground-parallel orientations 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:

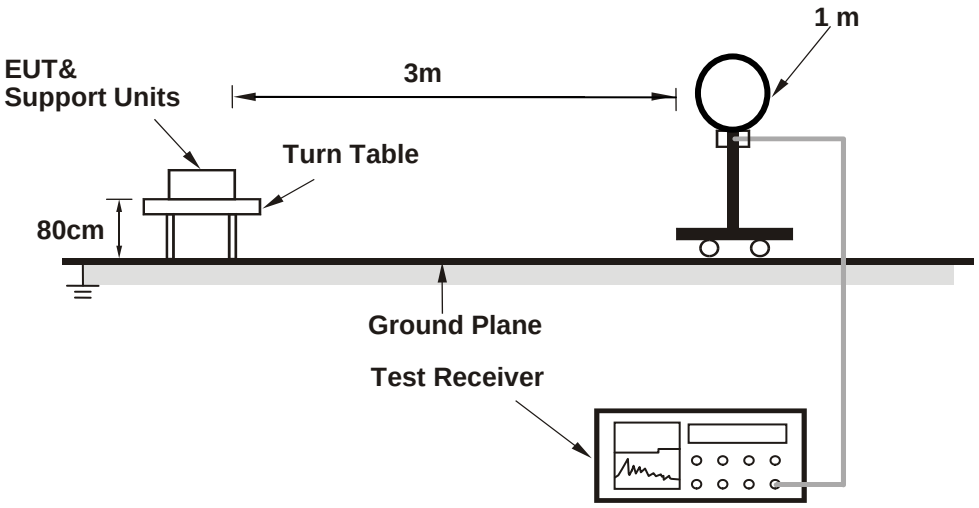
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

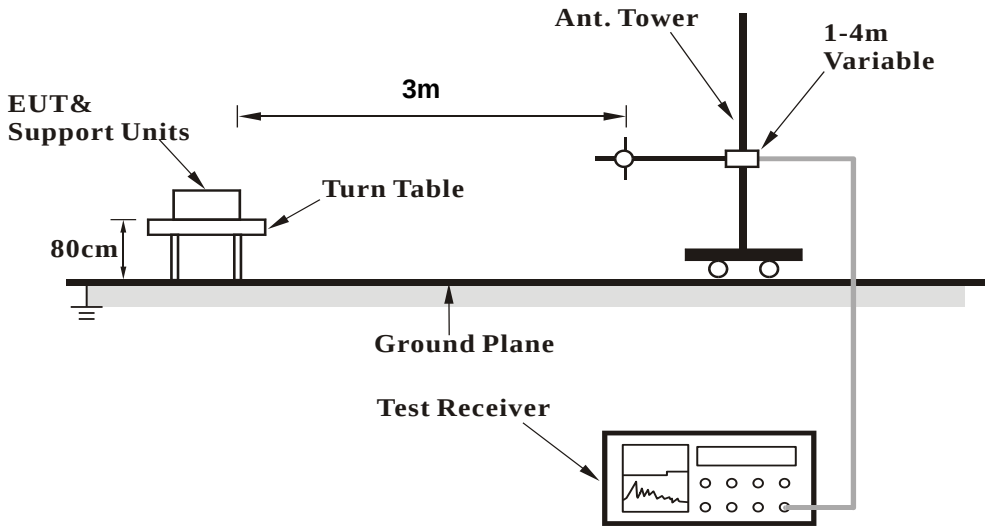
No deviation.

4.1.5 Test Setup

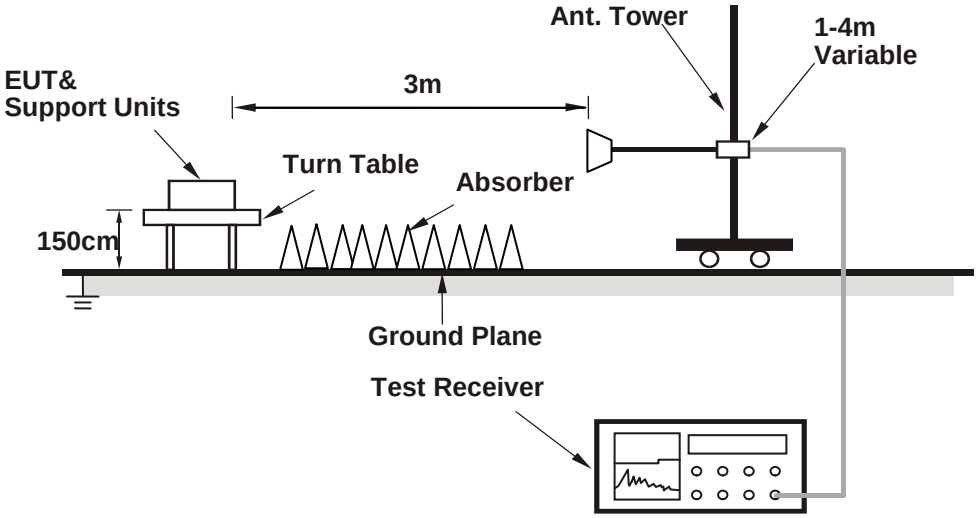
For Radiated emission below 30MHz



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. Connected the EUT with the Laptop which is placed on remote site.
b. Controlling software (QDART-Connectivity (1.0.40)) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data：

CDD Mode

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	2383.70	56.2 PK	74.0	-17.8	2.73 H	323	58.9	-2.7
2	2383.70	49.3 AV	54.0	-4.7	2.73 H	323	52.0	-2.7
3	2390.00	55.1 PK	74.0	-18.9	2.73 H	323	57.8	-2.7
4	2390.00	46.4 AV	54.0	-7.6	2.73 H	323	49.1	-2.7
5	*2412.00	110.5 PK			2.73 H	323	113.2	-2.7
6	*2412.00	108.1 AV			2.73 H	323	110.8	-2.7
7	4824.00	50.6 PK	74.0	-23.4	2.73 H	134	49.0	1.6
8	4824.00	49.0 AV	54.0	-5.0	2.73 H	134	47.4	1.6
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	2383.70	59.5 PK	74.0	-14.5	1.31 V	193	62.2	-2.7
2	2383.70	52.6 AV	54.0	-1.4	1.31 V	193	55.3	-2.7
3	2390.00	56.2 PK	74.0	-17.8	1.31 V	193	58.9	-2.7
4	2390.00	47.2 AV	54.0	-6.8	1.31 V	193	49.9	-2.7
5	*2412.00	119.8 PK			1.31 V	193	122.5	-2.7
6	*2412.00	117.5 AV			1.31 V	193	120.2	-2.7
7	4824.00	54.4 PK	74.0	-19.6	1.32 V	164	52.8	1.6
8	4824.00	52.1 AV	54.0	-1.9	1.32 V	164	50.5	1.6

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	2379.20	54.8 PK	74.0	-19.2	2.70 H	319	57.4	-2.6
2	2379.20	41.5 AV	54.0	-12.5	2.70 H	319	44.1	-2.6
3	2390.00	56.4 PK	74.0	-17.6	2.70 H	319	59.1	-2.7
4	2390.00	42.3 AV	54.0	-11.7	2.70 H	319	45.0	-2.7
5	*2437.00	110.1 PK			2.70 H	319	113.1	-3.0
6	*2437.00	107.9 AV			2.70 H	319	110.9	-3.0
7	2483.50	55.2 PK	74.0	-18.8	2.70 H	319	58.2	-3.0
8	2483.50	41.8 AV	54.0	-12.2	2.70 H	319	44.8	-3.0
9	2484.20	54.5 PK	74.0	-19.5	2.70 H	319	57.5	-3.0
10	2484.20	41.3 AV	54.0	-12.7	2.70 H	319	44.3	-3.0
11	4874.00	51.2 PK	74.0	-22.8	2.72 H	136	49.6	1.6
12	4874.00	49.4 AV	54.0	-4.6	2.72 H	136	47.8	1.6
13	7311.00	52.2 PK	74.0	-21.8	1.43 H	262	44.5	7.7
14	7311.00	48.3 AV	54.0	-5.7	1.43 H	262	40.6	7.7
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	2379.20	57.2 PK	74.0	-16.8	1.38 V	180	59.8	-2.6
2	2379.20	44.7 AV	54.0	-9.3	1.38 V	180	47.3	-2.6
3	2390.00	51.9 PK	74.0	-22.1	1.38 V	180	54.6	-2.7
4	2390.00	43.3 AV	54.0	-10.7	1.38 V	180	46.0	-2.7
5	*2437.00	120.2 PK			1.38 V	180	123.2	-3.0
6	*2437.00	117.7 AV			1.38 V	180	120.7	-3.0
7	2483.50	55.1 PK	74.0	-18.9	1.38 V	180	58.1	-3.0
8	2483.50	44.5 AV	54.0	-9.5	1.38 V	180	47.5	-3.0
9	2484.20	57.5 PK	74.0	-16.5	1.38 V	180	60.5	-3.0
10	2484.20	45.2 AV	54.0	-8.8	1.38 V	180	48.2	-3.0
11	4874.00	54.1 PK	74.0	-19.9	1.37 V	164	52.5	1.6
12	4874.00	52.8 AV	54.0	-1.2	1.37 V	164	51.2	1.6
13	7311.00	56.6 PK	74.0	-17.4	1.35 V	200	48.9	7.7
14	7311.00	52.7 AV	54.0	-1.3	1.35 V	200	45.0	7.7

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	109.9 PK			2.73 H	305	112.9	-3.0
2	*2462.00	107.5 AV			2.73 H	305	110.5	-3.0
3	2483.50	54.8 PK	74.0	-19.2	2.73 H	305	57.8	-3.0
4	2483.50	42.4 AV	54.0	-11.6	2.73 H	305	45.4	-3.0
5	2490.30	55.2 PK	74.0	-18.8	2.73 H	305	58.1	-2.9
6	2490.30	48.4 AV	54.0	-5.6	2.73 H	305	51.3	-2.9
7	4924.00	50.4 PK	74.0	-23.6	2.70 H	143	48.7	1.7
8	4924.00	48.4 AV	54.0	-5.6	2.70 H	143	46.7	1.7
9	7386.00	51.8 PK	74.0	-22.2	1.49 H	254	43.9	7.9
10	7386.00	47.7 AV	54.0	-6.3	1.49 H	254	39.8	7.9
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	120.4 PK			1.20 V	180	123.4	-3.0
2	*2462.00	117.9 AV			1.20 V	180	120.9	-3.0
3	2483.50	58.0 PK	74.0	-16.0	1.20 V	180	61.0	-3.0
4	2483.50	45.8 AV	54.0	-8.2	1.20 V	180	48.8	-3.0
5	2490.30	59.3 PK	74.0	-14.7	1.20 V	180	62.2	-2.9
6	2490.30	52.0 AV	54.0	-2.0	1.20 V	180	54.9	-2.9
7	4924.00	53.4 PK	74.0	-20.6	1.46 V	171	51.7	1.7
8	4924.00	51.6 AV	54.0	-2.4	1.46 V	171	49.9	1.7
9	7386.00	54.3 PK	74.0	-19.7	1.76 V	175	46.4	7.9
10	7386.00	51.5 AV	54.0	-2.5	1.76 V	175	43.6	7.9

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	65.8 PK	74.0	-8.2	2.72 H	297	68.5	-2.7
2	2390.00	49.4 AV	54.0	-4.6	2.72 H	297	52.1	-2.7
3	*2412.00	106.9 PK			2.72 H	297	109.6	-2.7
4	*2412.00	97.0 AV			2.72 H	297	99.7	-2.7
5	4824.00	45.6 PK	74.0	-28.4	2.64 H	166	44.0	1.6
6	4824.00	34.1 AV	54.0	-19.9	2.64 H	166	32.5	1.6
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	70.2 PK	74.0	-3.8	1.29 V	172	72.9	-2.7
2	2390.00	53.7 AV	54.0	-0.3	1.29 V	172	56.4	-2.7
3	*2412.00	118.0 PK			1.29 V	172	120.7	-2.7
4	*2412.00	107.0 AV			1.29 V	172	109.7	-2.7
5	4824.00	47.7 PK	74.0	-26.3	1.45 V	156	46.1	1.6
6	4824.00	36.3 AV	54.0	-17.7	1.45 V	156	34.7	1.6

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	61.9 PK	74.0	-12.1	2.72 H	309	64.6	-2.7
2	2390.00	43.9 AV	54.0	-10.1	2.72 H	309	46.6	-2.7
3	*2437.00	110.2 PK			2.72 H	309	113.2	-3.0
4	*2437.00	100.0 AV			2.72 H	309	103.0	-3.0
5	2483.50	60.7 PK	74.0	-13.3	2.72 H	309	63.7	-3.0
6	2483.50	43.8 AV	54.0	-10.2	2.72 H	309	46.8	-3.0
7	4874.00	45.4 PK	74.0	-28.6	2.67 H	140	43.8	1.6
8	4874.00	34.3 AV	54.0	-19.7	2.67 H	140	32.7	1.6
9	7311.00	51.0 PK	74.0	-23.0	1.47 H	257	43.3	7.7
10	7311.00	38.2 AV	54.0	-15.8	1.47 H	257	30.5	7.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.1 PK	74.0	-7.9	1.06 V	243	68.8	-2.7
2	2390.00	48.2 AV	54.0	-5.8	1.06 V	243	50.9	-2.7
3	*2437.00	121.0 PK			1.06 V	243	124.0	-3.0
4	*2437.00	109.8 AV			1.06 V	243	112.8	-3.0
5	2483.50	64.8 PK	74.0	-9.2	1.06 V	243	67.8	-3.0
6	2483.50	48.0 AV	54.0	-6.0	1.06 V	243	51.0	-3.0
7	4874.00	48.4 PK	74.0	-25.6	1.50 V	166	46.8	1.6
8	4874.00	37.0 AV	54.0	-17.0	1.50 V	166	35.4	1.6
9	7311.00	53.1 PK	74.0	-20.9	1.13 V	200	45.4	7.7
10	7311.00	40.0 AV	54.0	-14.0	1.13 V	200	32.3	7.7

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	108.7 PK			2.70 H	310	111.7	-3.0
2	*2462.00	98.0 AV			2.70 H	310	101.0	-3.0
3	2483.50	66.9 PK	74.0	-7.1	2.70 H	310	69.9	-3.0
4	2483.50	49.7 AV	54.0	-4.3	2.70 H	310	52.7	-3.0
5	4924.00	45.3 PK	74.0	-28.7	2.69 H	151	43.6	1.7
6	4924.00	33.8 AV	54.0	-20.2	2.69 H	151	32.1	1.7
7	7386.00	50.6 PK	74.0	-23.4	1.44 H	241	42.7	7.9
8	7386.00	37.9 AV	54.0	-16.1	1.44 H	241	30.0	7.9
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	119.5 PK			1.07 V	244	122.5	-3.0
2	*2462.00	107.9 AV			1.07 V	244	110.9	-3.0
3	2483.50	71.1 PK	74.0	-2.9	1.07 V	244	74.1	-3.0
4	**2483.50**	**53.9 AV**	**54.0**	**-0.1**	**1.07 V**	**244**	**56.9**	**-3.0**
5	4924.00	47.4 PK	74.0	-26.6	1.50 V	178	45.7	1.7
6	4924.00	36.1 AV	54.0	-17.9	1.50 V	178	34.4	1.7
7	7386.00	53.3 PK	74.0	-20.7	1.18 V	188	45.4	7.9
8	7386.00	40.1 AV	54.0	-13.9	1.18 V	188	32.2	7.9

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.

Beamforming Mode

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	65.6 PK	74.0	-8.4	2.69 H	306	68.3	-2.7
2	2390.00	49.5 AV	54.0	-4.5	2.69 H	306	52.2	-2.7
3	*2412.00	107.7 PK			2.69 H	306	110.4	-2.7
4	*2412.00	96.9 AV			2.69 H	306	99.6	-2.7
5	4824.00	45.1 PK	74.0	-28.9	2.59 H	159	43.5	1.6
6	4824.00	33.9 AV	54.0	-20.1	2.59 H	159	32.3	1.6
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	69.9 PK	74.0	-4.1	1.32 V	183	72.6	-2.7
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.32 V**	**183**	**56.6**	**-2.7**
3	*2412.00	117.8 PK			1.32 V	183	120.5	-2.7
4	*2412.00	106.8 AV			1.32 V	183	109.5	-2.7
5	4824.00	47.2 PK	74.0	-26.8	1.50 V	156	45.6	1.6
6	4824.00	36.0 AV	54.0	-18.0	1.50 V	156	34.4	1.6

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	2390.00	62.0 PK	74.0	-12.0	2.66 H	299	64.7	-2.7
2	2390.00	44.1 AV	54.0	-9.9	2.66 H	299	46.8	-2.7
3	*2437.00	110.9 PK			2.66 H	299	113.9	-3.0
4	*2437.00	99.7 AV			2.66 H	299	102.7	-3.0
5	2483.50	60.6 PK	74.0	-13.4	2.66 H	299	63.6	-3.0
6	2483.50	43.3 AV	54.0	-10.7	2.66 H	299	46.3	-3.0
7	4874.00	45.4 PK	74.0	-28.6	2.72 H	124	43.8	1.6
8	4874.00	34.1 AV	54.0	-19.9	2.72 H	124	32.5	1.6
9	7311.00	51.0 PK	74.0	-23.0	1.46 H	268	43.3	7.7
10	7311.00	38.3 AV	54.0	-15.7	1.46 H	268	30.6	7.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.2 PK	74.0	-7.8	1.04 V	252	68.9	-2.7
2	2390.00	48.4 AV	54.0	-5.6	1.04 V	252	51.1	-2.7
3	*2437.00	121.0 PK			1.04 V	252	124.0	-3.0
4	*2437.00	109.5 AV			1.04 V	252	112.5	-3.0
5	2483.50	64.8 PK	74.0	-9.2	1.04 V	252	67.8	-3.0
6	2483.50	47.6 AV	54.0	-6.4	1.04 V	252	50.6	-3.0
7	4874.00	48.0 PK	74.0	-26.0	1.47 V	163	46.4	1.6
8	4874.00	36.8 AV	54.0	-17.2	1.47 V	163	35.2	1.6
9	7311.00	53.1 PK	74.0	-20.9	1.19 V	213	45.4	7.7
10	7311.00	40.1 AV	54.0	-13.9	1.19 V	213	32.4	7.7

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	109.6 PK			2.64 H	288	112.6	-3.0
2	*2462.00	97.9 AV			2.64 H	288	100.9	-3.0
3	2483.50	66.6 PK	74.0	-7.4	2.64 H	288	69.6	-3.0
4	2483.50	49.7 AV	54.0	-4.3	2.64 H	288	52.7	-3.0
5	4924.00	45.0 PK	74.0	-29.0	2.75 H	137	43.3	1.7
6	4924.00	33.6 AV	54.0	-20.4	2.75 H	137	31.9	1.7
7	7386.00	50.0 PK	74.0	-24.0	1.43 H	247	42.1	7.9
8	7386.00	37.4 AV	54.0	-16.6	1.43 H	247	29.5	7.9
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	119.5 PK			1.02 V	254	122.5	-3.0
2	*2462.00	107.7 AV			1.02 V	254	110.7	-3.0
3	2483.50	70.8 PK	74.0	-3.2	1.02 V	254	73.8	-3.0
4	2483.50	53.8 AV	54.0	-0.2	1.02 V	254	56.8	-3.0
5	4924.00	47.5 PK	74.0	-26.5	1.44 V	179	45.8	1.7
6	4924.00	36.3 AV	54.0	-17.7	1.44 V	179	34.6	1.7
7	7386.00	52.6 PK	74.0	-21.4	1.17 V	202	44.7	7.9
8	7386.00	39.6 AV	54.0	-14.4	1.17 V	202	31.7	7.9

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 (HT40)

CHANNEL	TX Channel 3	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	62.5 PK	74.0	-11.5	2.65 H	297	65.2	-2.7
2	2390.00	49.3 AV	54.0	-4.7	2.65 H	297	52.0	-2.7
3	*2422.00	101.0 PK			2.65 H	297	103.9	-2.9
4	*2422.00	92.1 AV			2.65 H	297	95.0	-2.9
5	4844.00	43.0 PK	74.0	-31.0	2.75 H	130	41.4	1.6
6	4844.00	31.6 AV	54.0	-22.4	2.75 H	130	30.0	1.6
7	7266.00	48.6 PK	74.0	-25.4	1.41 H	258	40.8	7.8
8	7266.00	36.1 AV	54.0	-17.9	1.41 H	258	28.3	7.8
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	66.9 PK	74.0	-7.1	1.25 V	181	69.6	-2.7
2	2390.00	53.7 AV	54.0	-0.3	1.25 V	181	56.4	-2.7
3	*2422.00	111.2 PK			1.25 V	181	114.1	-2.9
4	*2422.00	101.9 AV			1.25 V	181	104.8	-2.9
5	4844.00	46.5 PK	74.0	-27.5	1.41 V	149	44.9	1.6
6	4844.00	35.8 AV	54.0	-18.2	1.41 V	149	34.2	1.6
7	7266.00	51.1 PK	74.0	-22.9	1.27 V	211	43.3	7.8
8	7266.00	37.7 AV	54.0	-16.3	1.27 V	211	29.9	7.8

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 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	64.0 PK	74.0	-10.0	2.64 H	282	66.7	-2.7
2	2390.00	49.4 AV	54.0	-4.6	2.64 H	282	52.1	-2.7
3	*2437.00	104.1 PK			2.64 H	282	107.1	-3.0
4	*2437.00	94.6 AV			2.64 H	282	97.6	-3.0
5	2483.50	65.4 PK	74.0	-8.6	2.64 H	282	68.4	-3.0
6	2483.50	48.8 AV	54.0	-5.2	2.64 H	282	51.8	-3.0
7	4874.00	43.2 PK	74.0	-30.8	2.73 H	131	41.6	1.6
8	4874.00	32.2 AV	54.0	-21.8	2.73 H	131	30.6	1.6
9	7311.00	49.2 PK	74.0	-24.8	1.41 H	253	41.5	7.7
10	7311.00	36.8 AV	54.0	-17.2	1.41 H	253	29.1	7.7
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	68.3 PK	74.0	-5.7	1.10 V	250	71.0	-2.7
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.10 V**	**250**	**56.6**	**-2.7**
3	*2437.00	114.2 PK			1.10 V	250	117.2	-3.0
4	*2437.00	104.5 AV			1.10 V	250	107.5	-3.0
5	2483.50	69.6 PK	74.0	-4.4	1.10 V	250	72.6	-3.0
6	2483.50	53.1 AV	54.0	-0.9	1.10 V	250	56.1	-3.0
7	4874.00	45.9 PK	74.0	-28.1	1.43 V	150	44.3	1.6
8	4874.00	35.4 AV	54.0	-18.6	1.43 V	150	33.8	1.6
9	7311.00	51.3 PK	74.0	-22.7	1.23 V	205	43.6	7.7
10	7311.00	38.1 AV	54.0	-15.9	1.23 V	205	30.4	7.7

REMARKS:

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

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK) 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	*2452.00	101.7 PK			2.66 H	300	104.7	-3.0
2	*2452.00	91.5 AV			2.66 H	300	94.5	-3.0
3	2483.50	64.8 PK	74.0	-9.2	2.66 H	300	67.8	-3.0
4	2483.50	49.2 AV	54.0	-4.8	2.66 H	300	52.2	-3.0
5	4904.00	43.5 PK	74.0	-30.5	2.70 H	143	41.8	1.7
6	4904.00	32.5 AV	54.0	-21.5	2.70 H	143	30.8	1.7
7	7356.00	49.5 PK	74.0	-24.5	1.49 H	245	41.6	7.9
8	7356.00	36.8 AV	54.0	-17.2	1.49 H	245	28.9	7.9
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	*2452.00	111.8 PK			1.34 V	186	114.8	-3.0
2	*2452.00	101.3 AV			1.34 V	186	104.3	-3.0
3	2483.50	69.1 PK	74.0	-4.9	1.34 V	186	72.1	-3.0
4	2483.50	53.5 AV	54.0	-0.5	1.34 V	186	56.5	-3.0
5	4904.00	46.3 PK	74.0	-27.7	1.46 V	153	44.6	1.7
6	4904.00	35.6 AV	54.0	-18.4	1.46 V	153	33.9	1.7
7	7356.00	51.2 PK	74.0	-22.8	1.19 V	207	43.3	7.9
8	7356.00	38.0 AV	54.0	-16.0	1.19 V	207	30.1	7.9

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:

CDD Mode

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	125.06	38.5 QP	43.5	-5.0	3.00 H	264	47.8	-9.3
2	270.33	32.4 QP	46.0	-13.6	4.00 H	250	40.4	-8.0
3	466.50	37.8 QP	46.0	-8.2	2.50 H	117	40.5	-2.7
4	570.29	33.6 QP	46.0	-12.4	2.00 H	341	34.3	-0.7
5	760.01	26.8 QP	46.0	-19.2	1.00 H	360	23.4	3.4
6	780.01	26.6 QP	46.0	-19.4	1.00 H	360	22.9	3.7
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	38.22	28.8 QP	40.0	-11.2	1.00 V	0	37.3	-8.5
2	270.33	42.0 QP	46.0	-4.0	1.00 V	360	50.0	-8.0
3	344.28	39.4 QP	46.0	-6.6	1.00 V	261	45.2	-5.8
4	491.72	41.9 QP	46.0	-4.1	1.00 V	179	44.1	-2.2
5	760.00	42.7 QP	46.0	-3.3	1.50 V	71	39.3	3.4
6	766.66	31.1 QP	46.0	-14.9	1.00 V	360	27.5	3.6

REMARKS:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	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 04, 2018	June 03, 2019
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
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 16, 2018	Mar. 15, 2019
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 Conduction 1.
3 Tested Date: June 29 to July 04, 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.

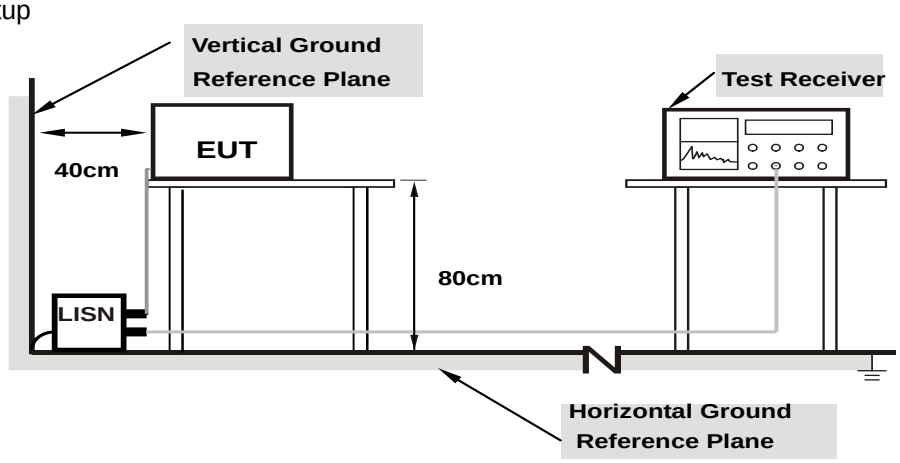
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

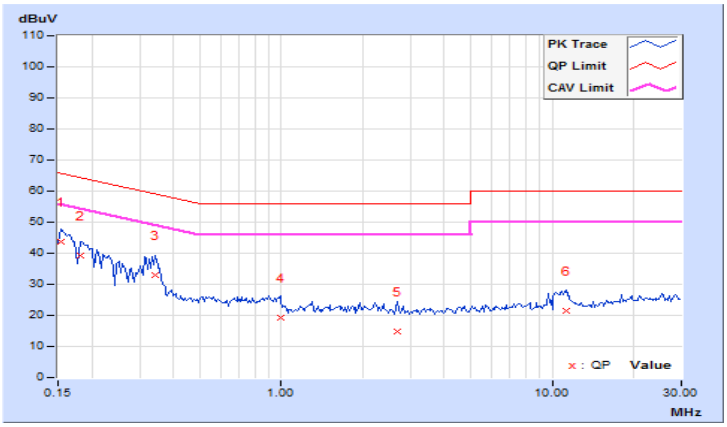
4.2.7 Test Results (Mode 1)

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	0.15391	10.05	33.59	13.53	43.64	23.58	65.79	55.79	-22.15	-32.21
2	0.18125	10.06	29.16	10.06	39.22	20.12	64.43	54.43	-25.21	-34.31
3	0.34141	10.11	22.85	14.34	32.96	24.45	59.17	49.17	-26.21	-24.72
4	0.99375	10.17	9.07	1.72	19.24	11.89	56.00	46.00	-36.76	-34.11
5	2.67188	10.26	4.40	-2.57	14.66	7.69	56.00	46.00	-41.34	-38.31
6	11.21875	10.80	10.66	0.72	21.46	11.52	60.00	50.00	-38.54	-38.48

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

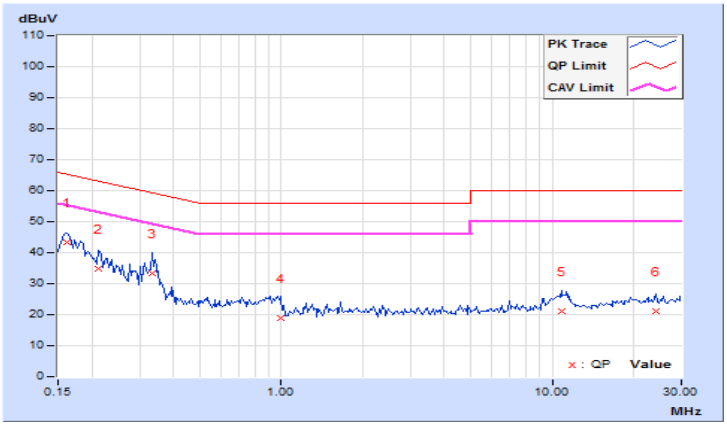


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.16172	9.96	33.33	14.50	43.29	24.46	65.38	55.38	-22.09	-30.92
2	0.21250	9.97	24.73	8.15	34.70	18.12	63.11	53.11	-28.41	-34.99
3	0.33359	10.00	23.29	14.13	33.29	24.13	59.36	49.36	-26.07	-25.23
4	0.98984	10.04	8.82	1.68	18.86	11.72	56.00	46.00	-37.14	-34.28
5	10.79688	10.59	10.64	0.64	21.23	11.23	60.00	50.00	-38.77	-38.77
6	24.12891	11.21	10.07	2.38	21.28	13.59	60.00	50.00	-38.72	-36.41

Remarks:

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



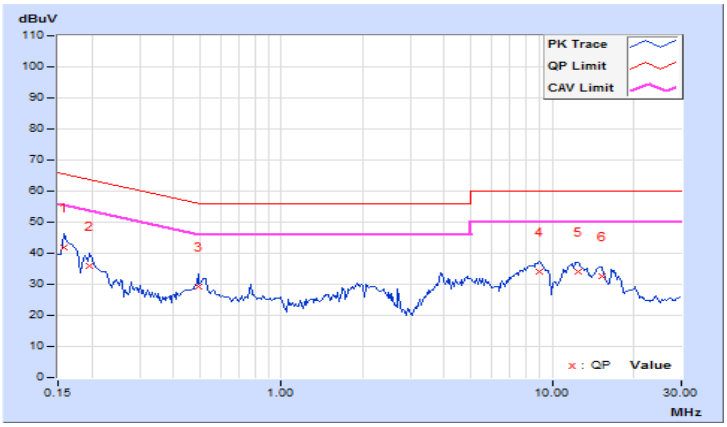
4.2.8 Test Results (Mode 2)

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	10.05	31.64	15.81	41.69	25.86	65.58	55.58	-23.89	-29.72
2	0.19687	10.07	25.82	11.81	35.89	21.88	63.74	53.74	-27.85	-31.86
3	0.49375	10.13	19.25	10.75	29.38	20.88	56.10	46.10	-26.72	-25.22
4	9.00000	10.65	23.27	17.67	33.92	28.32	60.00	50.00	-26.08	-21.68
5	12.48828	10.88	23.22	17.47	34.10	28.35	60.00	50.00	-25.90	-21.65
6	15.21094	11.07	21.38	15.59	32.45	26.66	60.00	50.00	-27.55	-23.34

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

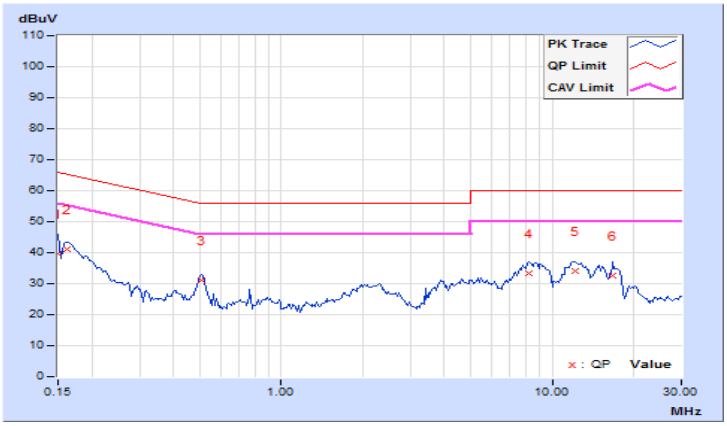


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	29.57	9.90	39.52	19.85	66.00	56.00	-26.48	-36.15
2	0.16172	9.96	31.33	16.21	41.29	26.17	65.38	55.38	-24.09	-29.21
3	0.50547	10.02	21.13	13.35	31.15	23.37	56.00	46.00	-24.85	-22.63
4	8.23047	10.44	22.82	16.99	33.26	27.43	60.00	50.00	-26.74	-22.57
5	**12.14453**	**10.68**	**23.37**	**17.91**	**34.05**	**28.59**	**60.00**	**50.00**	**-25.95**	**-21.41**
6	16.80469	10.98	21.54	16.25	32.52	27.23	60.00	50.00	-27.48	-22.77

Remarks:

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

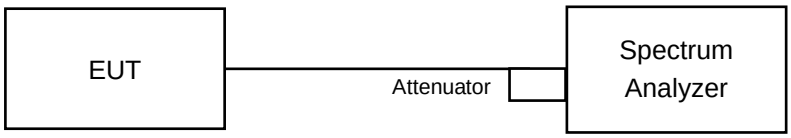


4.3 6dB Bandwidth Measurement

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 from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

CDD Mode

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	8.09	8.11	0.5	Pass
6	2437	8.07	8.13	0.5	Pass
11	2462	8.10	8.61	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.44	16.44	0.5	Pass
6	2437	16.38	16.39	0.5	Pass
11	2462	16.38	16.39	0.5	Pass

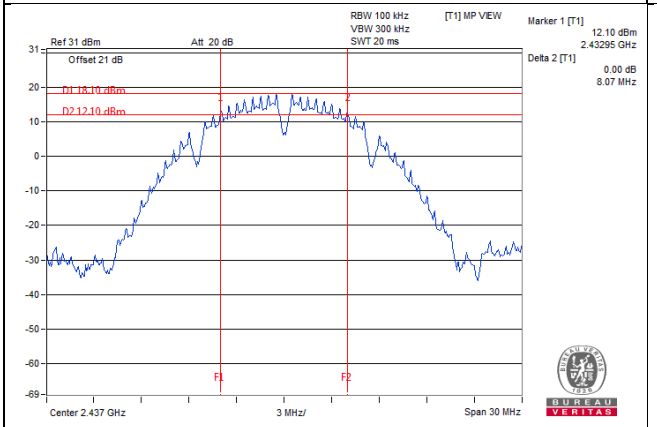
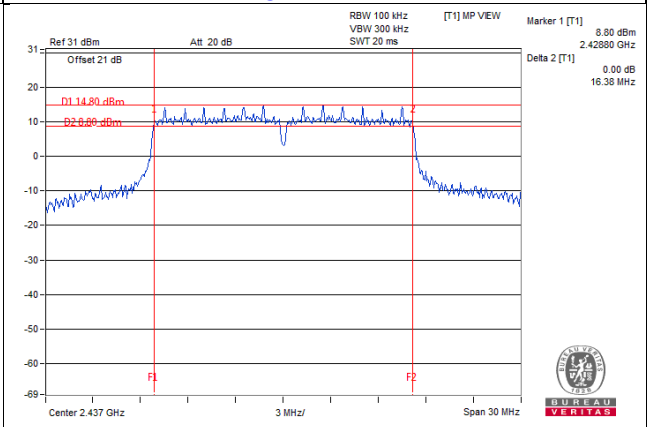
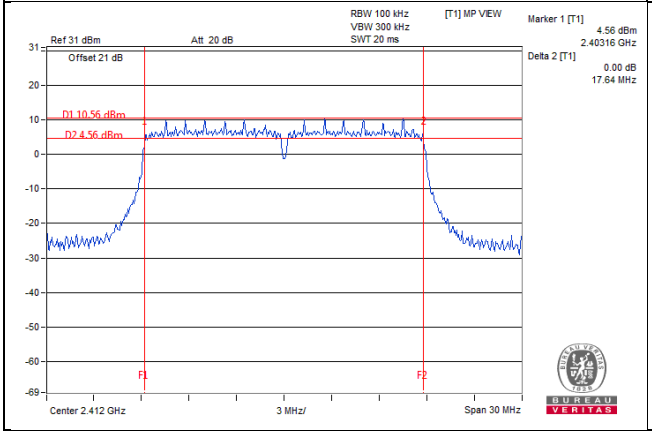
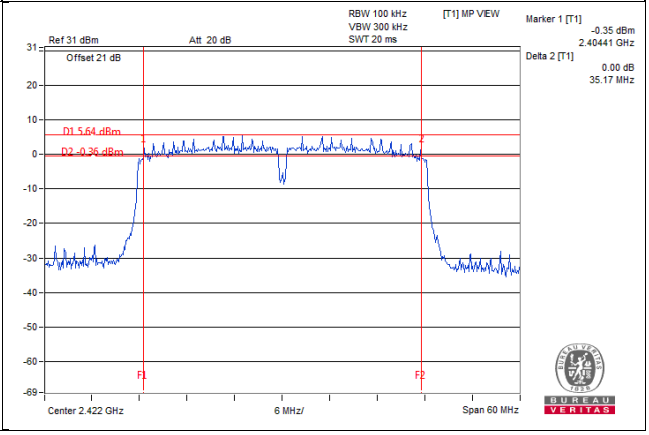
Beamforming Mode

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.64	17.65	0.5	Pass
6	2437	17.66	17.66	0.5	Pass
11	2462	17.66	17.66	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.24	35.17	0.5	Pass
6	2437	35.42	35.40	0.5	Pass
9	2452	35.45	35.45	0.5	Pass

Spectrum Plot of Worst Value	
802.11b_Chain 0 / CH6	**802.11g_Chain 0 / CH6**
	
802.11n (HT20) _Chain 0 / CH1	**802.11n (HT40) _Chain 1 / CH3**
	

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

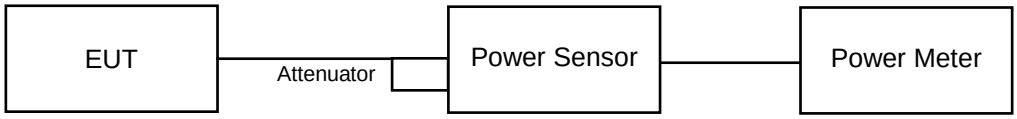
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

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

CDD Mode

802.11b

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	26.10	27.17	928.575	29.68	30	Pass
6	2437	26.36	27.46	989.7	29.96	30	Pass
11	2462	26.15	27.48	971.856	29.88	30	Pass

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	23.27	24.43	489.656	26.90	30	Pass
6	2437	26.10	27.37	953.138	29.79	30	Pass
11	2462	23.07	24.39	477.557	26.79	30	Pass

Beamforming Mode

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	22.16	23.12	369.553	25.68	29.89	Pass
6	2437	26.04	27.31	940.061	29.73	29.89	Pass
11	2462	22.03	24.28	427.505	26.31	29.89	Pass

Note: 1. The directional gain = 10 log[(10$^{Chain0/20}$ + 10 $^{Chain1/20}$)^2 / 2] = 6.11dBi > 6dBi , so the power limit shall be reduced to 30-(6.11-6) = 29.89dBm.

802.11n (HT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	18.86	19.68	169.81	22.30	29.89	Pass
6	2437	22.06	22.97	358.847	25.55	29.89	Pass
9	2452	19.63	19.88	189.108	22.77	29.89	Pass

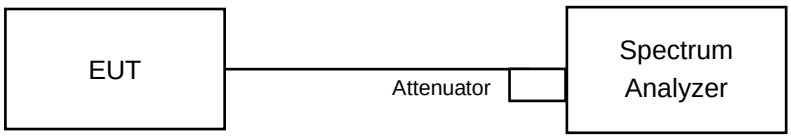
Note: 1. The directional gain = 10 log[(10$^{Chain0/20}$ + 10 $^{Chain1/20}$)^2 / 2] = 6.11dBi > 6dBi , so the power limit shall be reduced to 30-(6.11-6) = 29.89dBm.

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

For 802.11b, 802.11n (HT20) test:

a. Set instrument center frequency to DTS channel center frequency.
b. Set span to at least 1.5 times the OBW.
c. Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz. .
d. Set VBW ≥3 x RBW.
e. Detector = power averaging (RMS) or sample detector (when RMS not available).
f. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g. Sweep time = auto couple.
h. Employ trace averaging (RMS) mode over a minimum of 100 traces.
i. Use the peak marker function to determine the maximum amplitude level.

For 802.11g, 802.11n (HT40) test:

a. Measure the duty cycle (x).
b. Set instrument center frequency to DTS channel center frequency.
c. Set span to at least 1.5 times the OBW.
d. Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz..
e. Set VBW ≥3 x RBW.
f. Detector = power averaging (RMS) or sample detector (when RMS not available).
g. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
h. Sweep time = auto couple.
i. Do not use sweep triggering. Allow sweep to “free run”.
j. Employ trace averaging (RMS) mode over a minimum of 100 traces.
k. Use the peak marker function to determine the maximum amplitude level.
l. Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time.

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

CDD Mode

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-4.44	3.01	-1.43	7.89	Pass
	6	2437	-4.73	3.01	-1.72	7.89	Pass
	11	2462	-5.12	3.01	-2.11	7.89	Pass
1	1	2412	-2.87	3.01	0.14	7.89	Pass
	6	2437	-3.67	3.01	-0.66	7.89	Pass
	11	2462	-2.26	3.01	0.75	7.89	Pass

Note: 1. The directional gain = 10 log[($10^{Chain0/20}$ + $10^{Chain1/20}$)^2 / 2] = 6.11dBi > 6dBi , so the power density limit shall be reduced to 8-(6.11-6) = 7.89dBm.

802.11g

TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	TOTAL PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-9.70	3.01	0.18	-6.51	7.89	Pass
	6	2437	-7.21	3.01	0.18	-4.02	7.89	Pass
	11	2462	-10.21	3.01	0.18	-7.02	7.89	Pass
1	1	2412	-8.63	3.01	0.18	-5.44	7.89	Pass
	6	2437	-6.55	3.01	0.18	-3.36	7.89	Pass
	11	2462	-9.55	3.01	0.18	-6.36	7.89	Pass

Note: 1. The directional gain = 10 log[($10^{Chain0/20}$ + $10^{Chain1/20}$)^2 / 2] = 6.11dBi > 6dBi , so the power density limit shall be reduced to 8-(6.11-6) = 7.89dBm.

2. Refer to section 3.3 for duty cycle spectrum plot.

Beamforming Mode

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-12.28	3.01	-9.27	7.89	Pass
	6	2437	-6.76	3.01	-3.75	7.89	Pass
	11	2462	-10.44	3.01	-7.43	7.89	Pass
1	1	2412	-10.44	3.01	-7.43	7.89	Pass
	6	2437	-6.24	3.01	-3.23	7.89	Pass
	11	2462	-8.32	3.01	-5.31	7.89	Pass

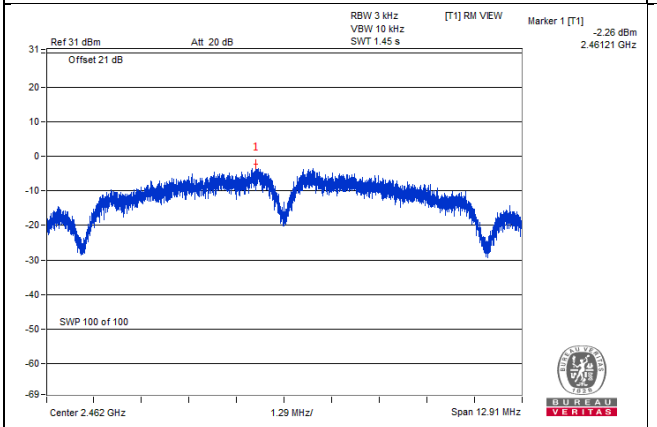
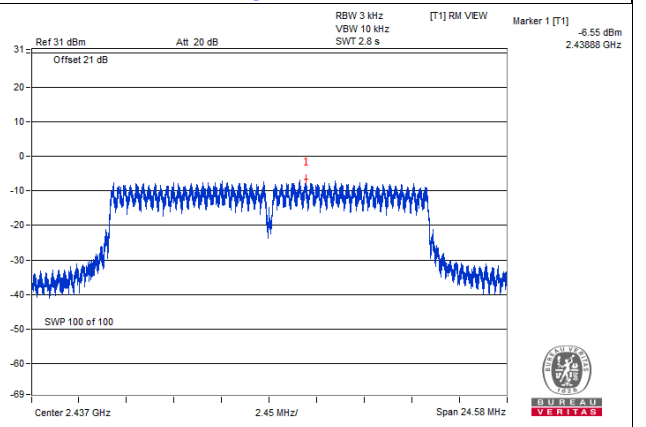
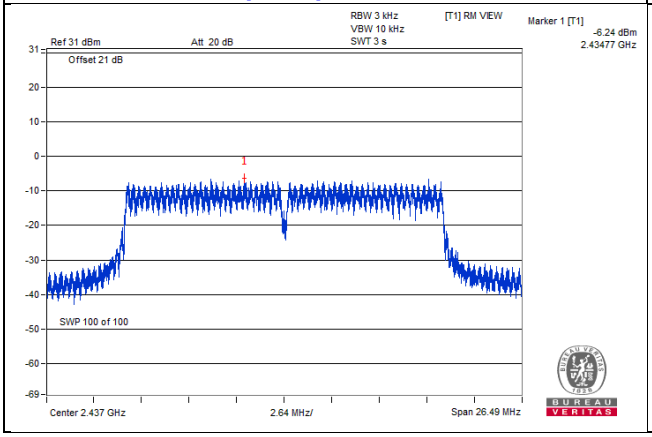
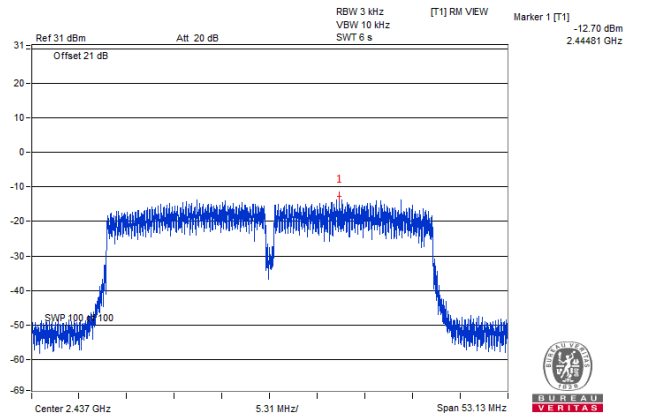
Note: 1. The directional gain = 10 log[(10$^{Chain0/20}$ + 10$^{Chain1/20}$)^2 / 2] = 6.11dBi > 6dBi , so the power density limit shall be reduced to 8-(6.11-6) = 7.89dBm.

802.11n (HT40)

TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	TOTAL PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	3	2422	-17.10	3.01	0.15	-13.94	7.89	Pass
	6	2437	-12.70	3.01	0.15	-9.54	7.89	Pass
	9	2452	-16.54	3.01	0.15	-13.38	7.89	Pass
1	3	2422	-16.75	3.01	0.15	-13.59	7.89	Pass
	6	2437	-12.75	3.01	0.15	-9.59	7.89	Pass
	9	2452	-14.84	3.01	0.15	-11.68	7.89	Pass

Note: 1. The directional gain = 10 log[(10$^{Chain0/20}$ + 10$^{Chain1/20}$)^2 / 2] = 6.11dBi > 6dBi , so the power density limit shall be reduced to 8-(6.11-6) = 7.89dBm.

2. Refer to section 3.3 for duty cycle spectrum plot.

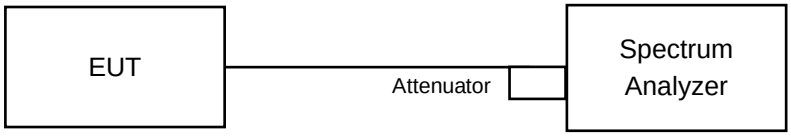
Spectrum Plot of Worst Value	
802.11b_Chain 1 / CH11	**802.11g_Chain 1 / CH6**
	
802.11n (HT20)_Chain 1 / CH6	**802.11n (HT40)_Chain 0 / CH6**
	

4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 30dB 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

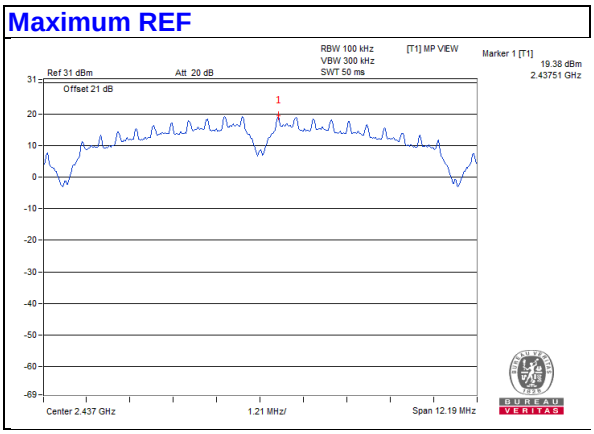
Same as Item 4.3.6

4.6.7 Test Results

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

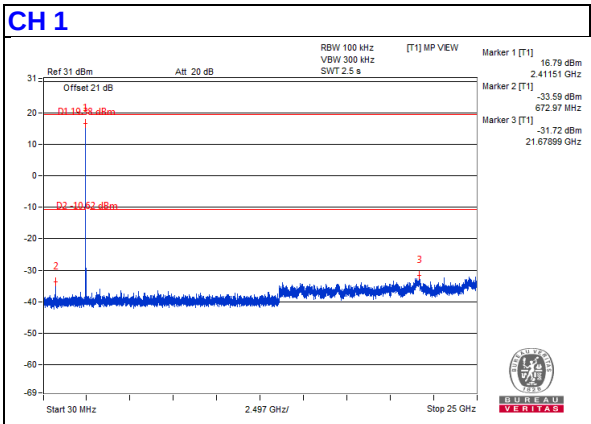
CDD Mode
802.11b

Maximum REF

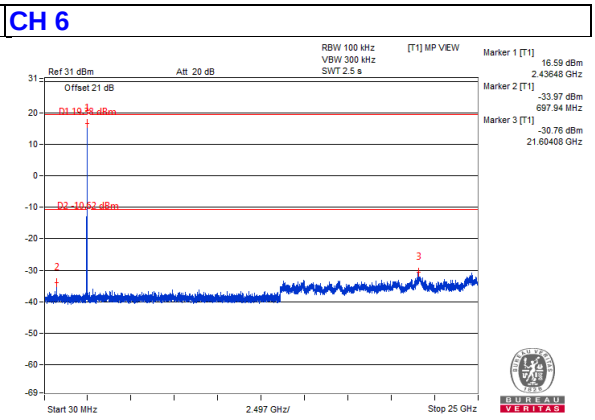


Chain 0

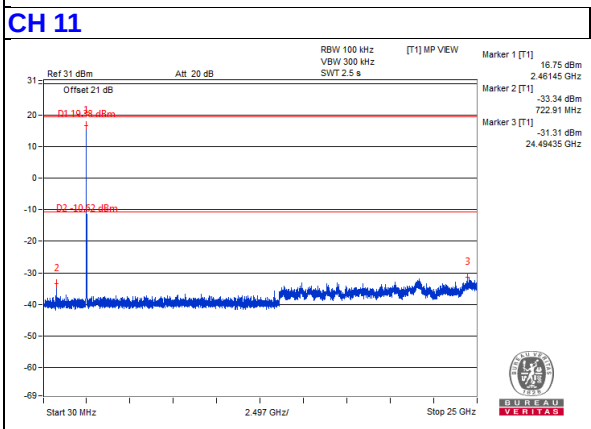
CH 1



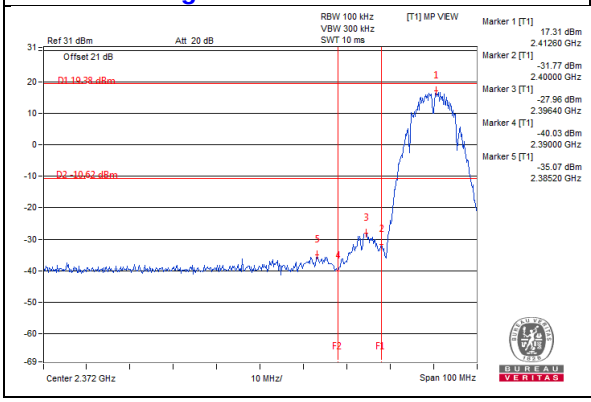
CH 6



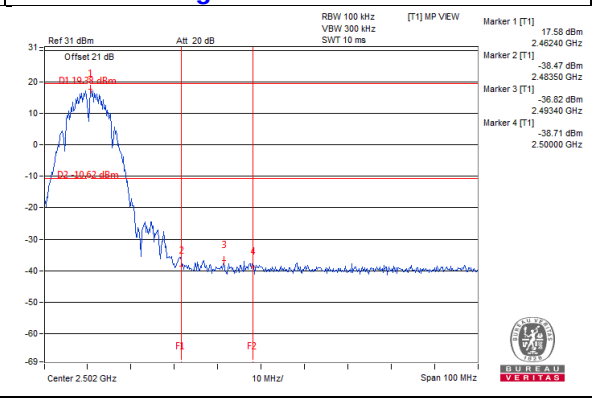
CH 11



CH 1 Band edge

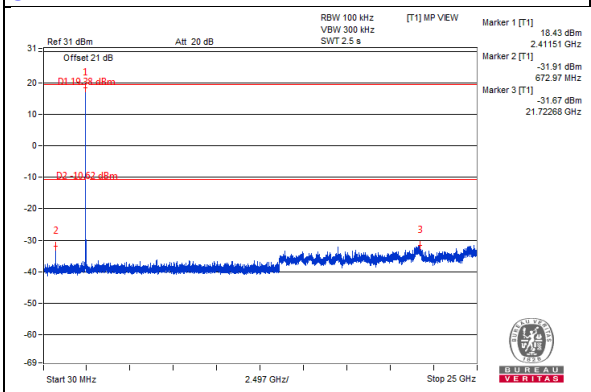


CH 11 Band edge

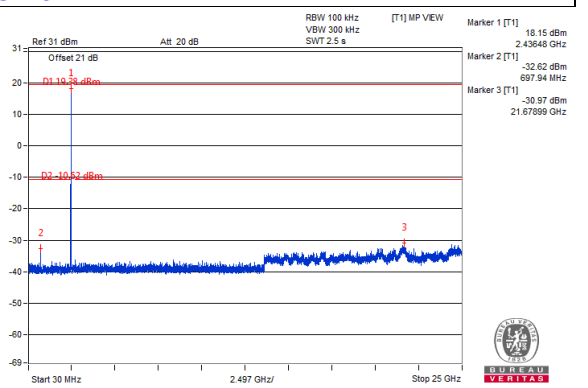


Chain 1

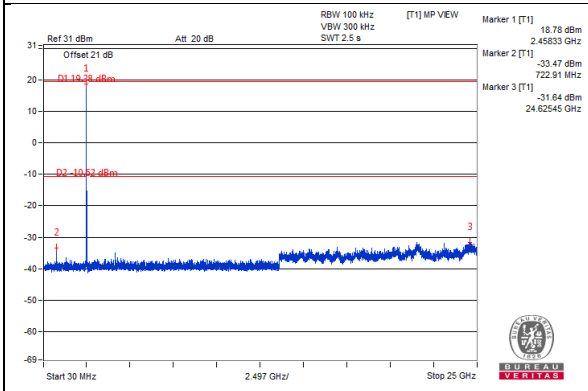
CH 1



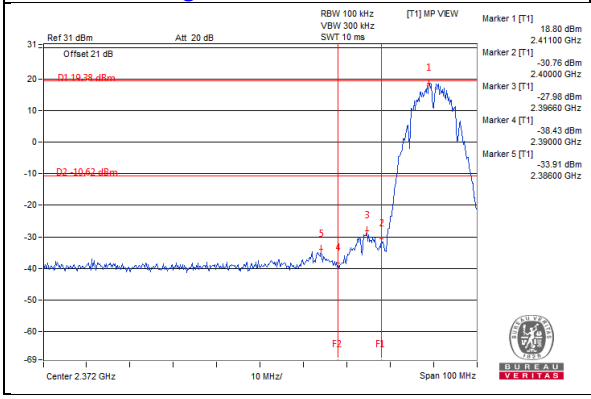
CH 6



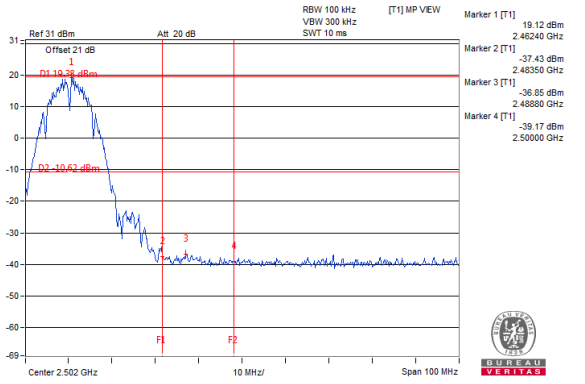
CH 11



CH 1 Band edge

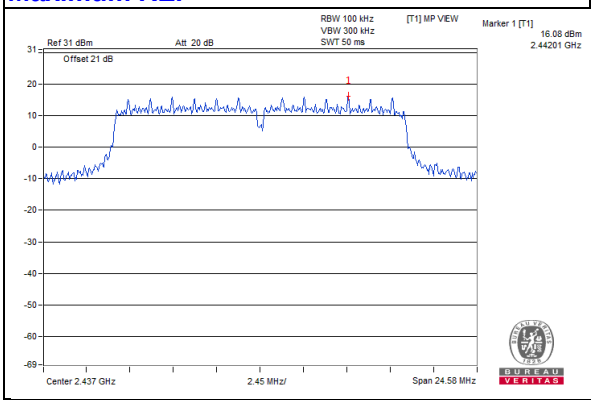


CH 11 Band edge



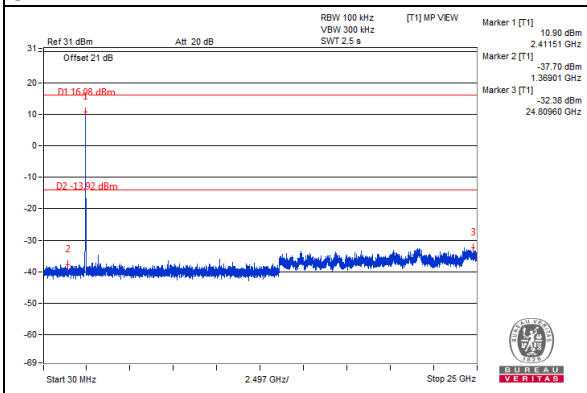
802.11g

Maximum REF

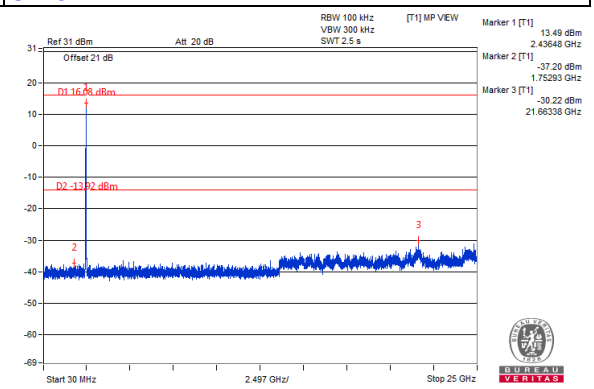


Chain 0

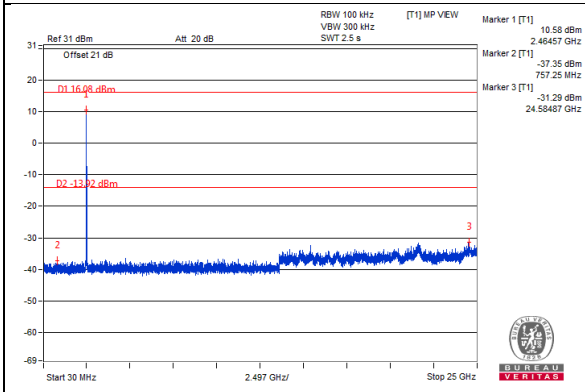
CH 1



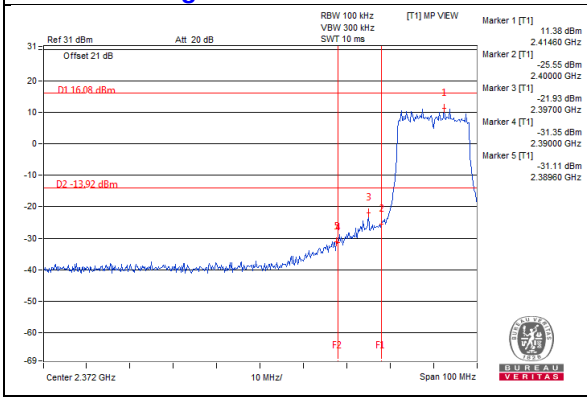
CH 6



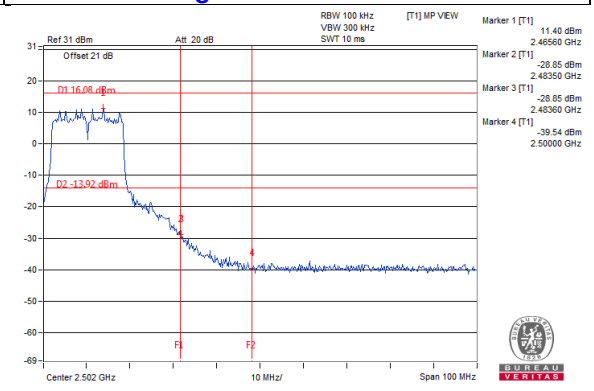
CH 11



CH 1 Band edge

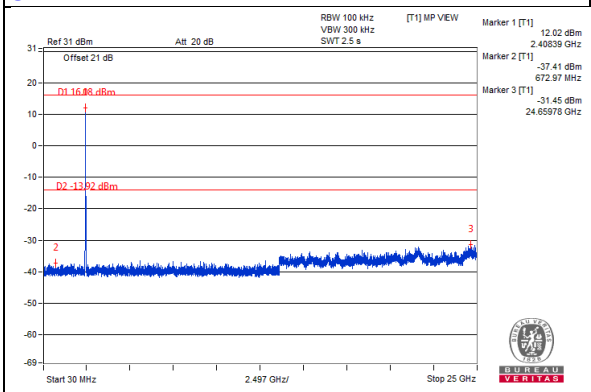


CH 11 Band edge

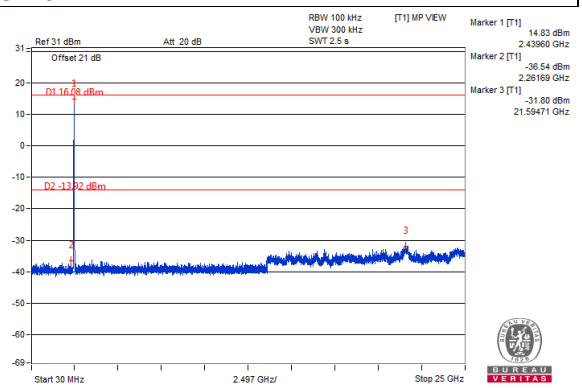


Chain 1

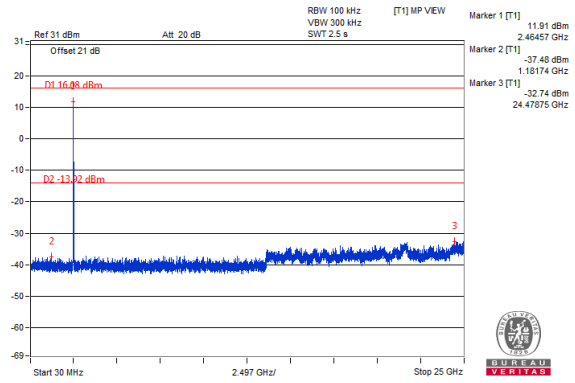
CH 1



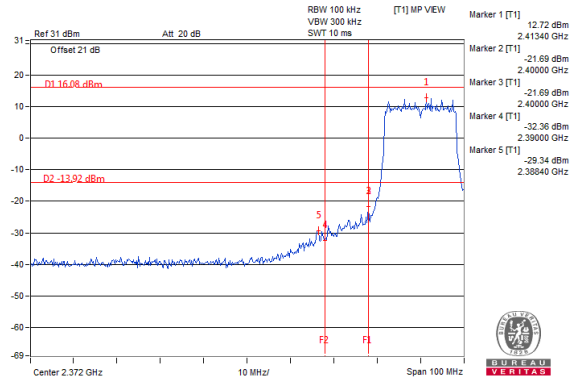
CH 6



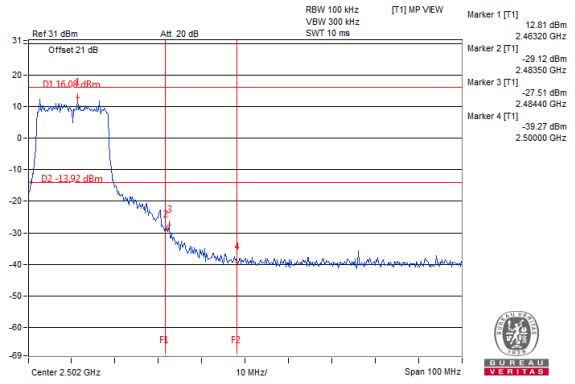
CH 11



CH 1 Band edge



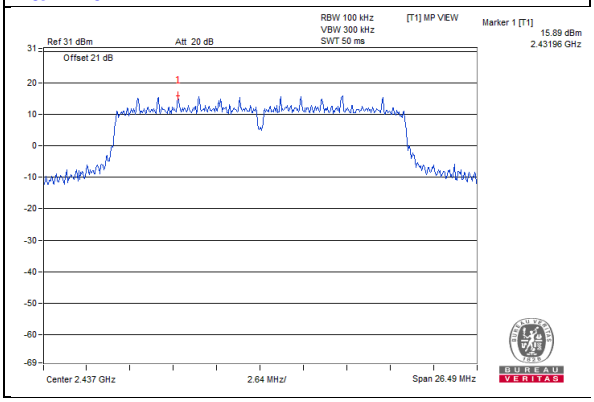
CH 11 Band edge



Beamforming Mode

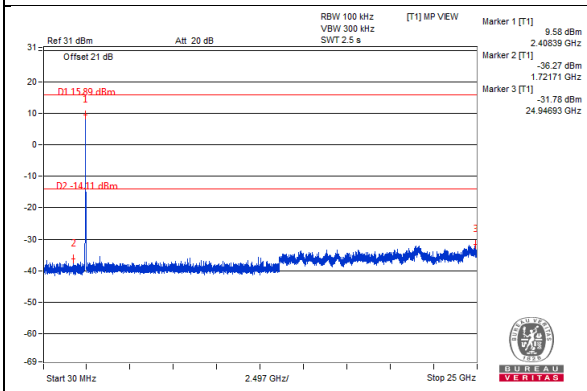
802.11n (HT20)

Maximum REF

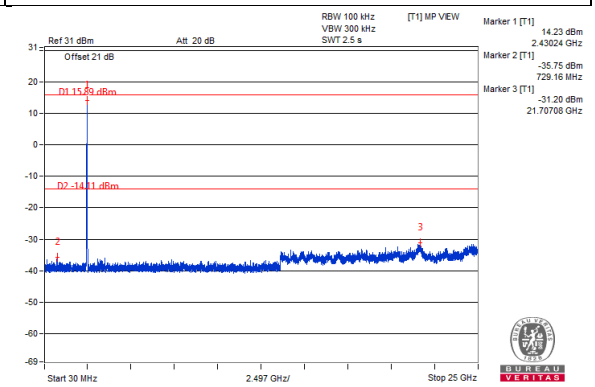


Chain 0

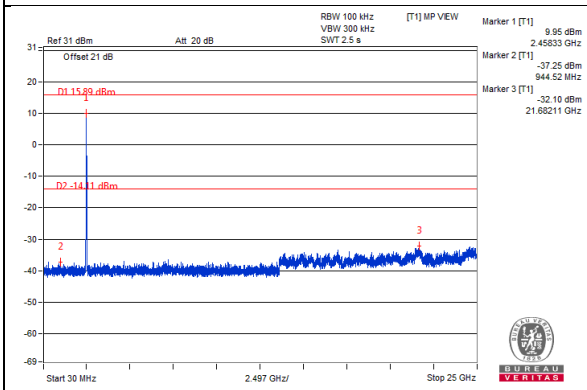
CH 1



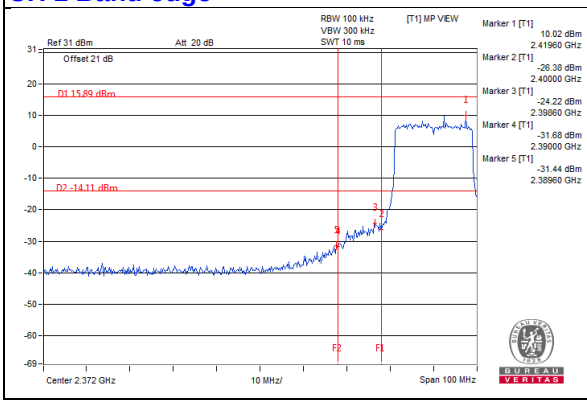
CH 6



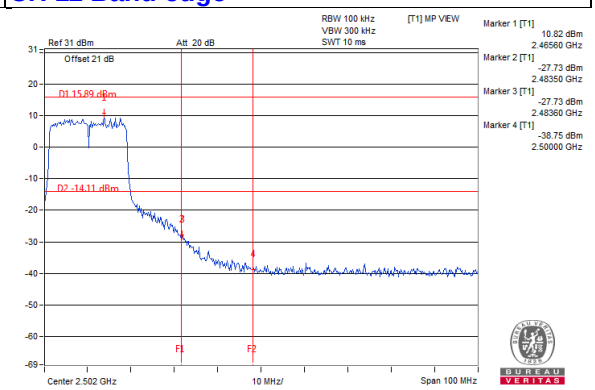
CH 11



CH 1 Band edge

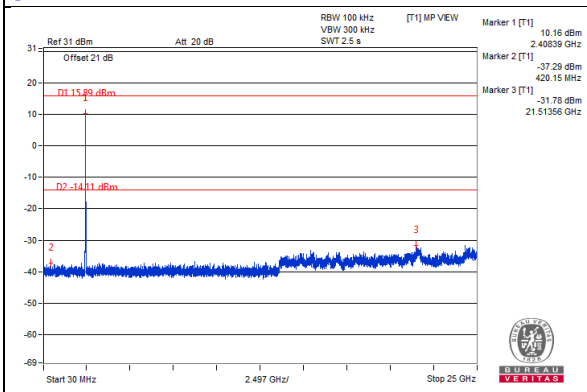


CH 11 Band edge

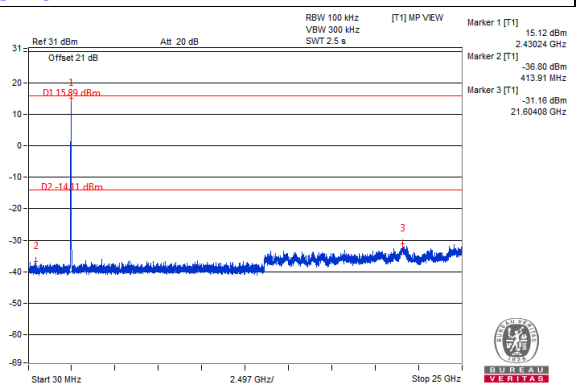


Chain 1

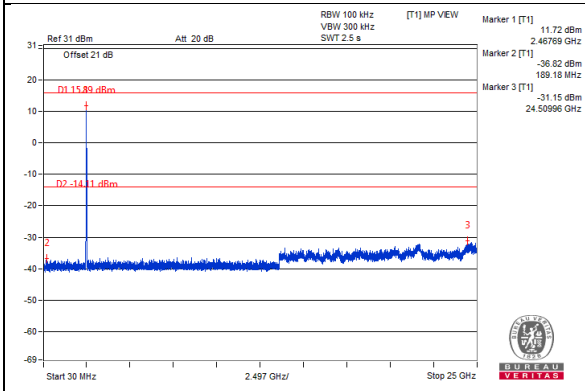
CH 1



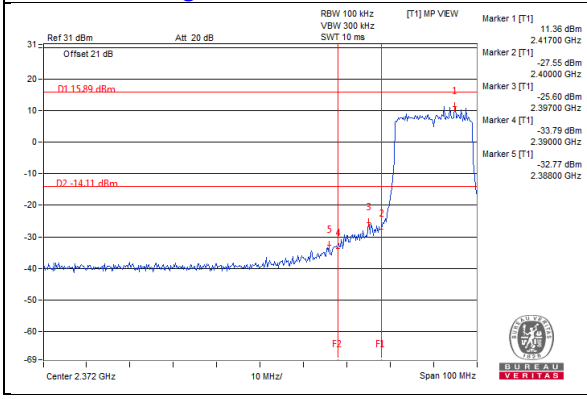
CH 6



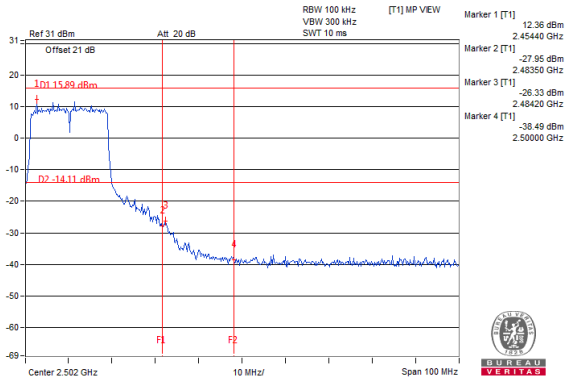
CH 11



CH 1 Band edge

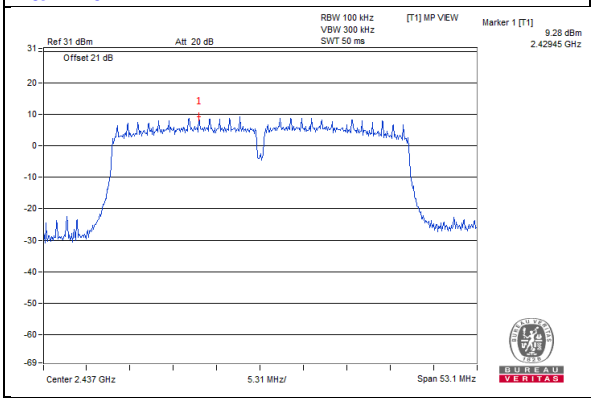


CH 11 Band edge



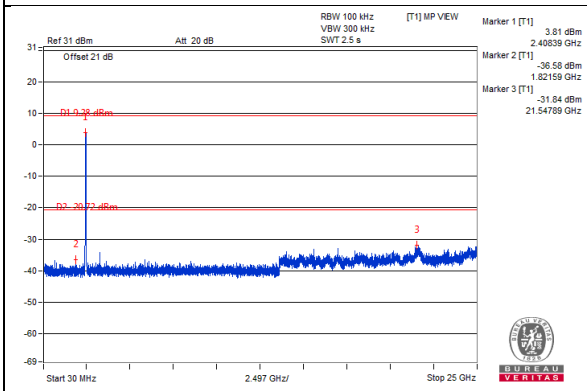
802.11n (HT40)

Maximum REF

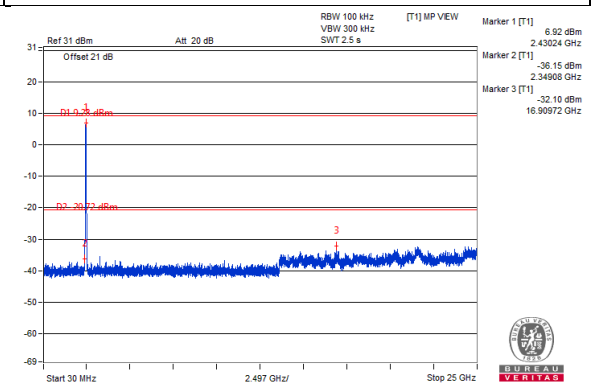


Chain 0

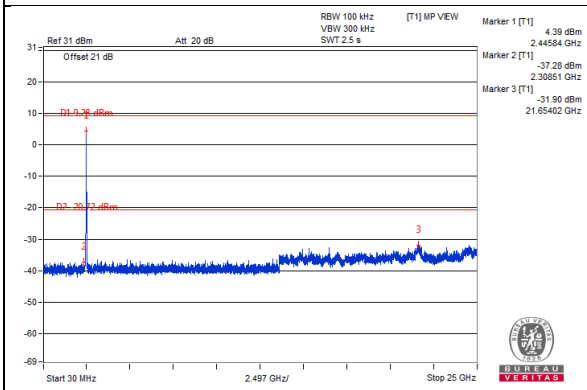
CH 3



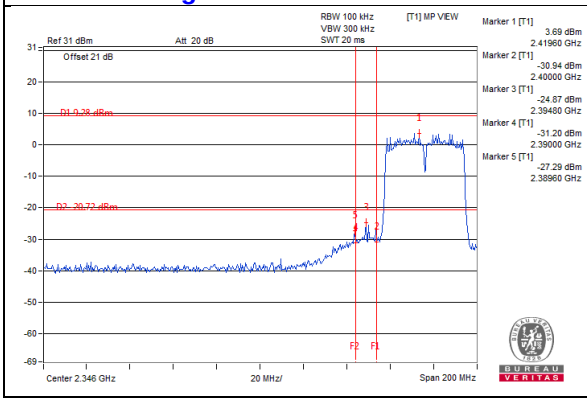
CH 6



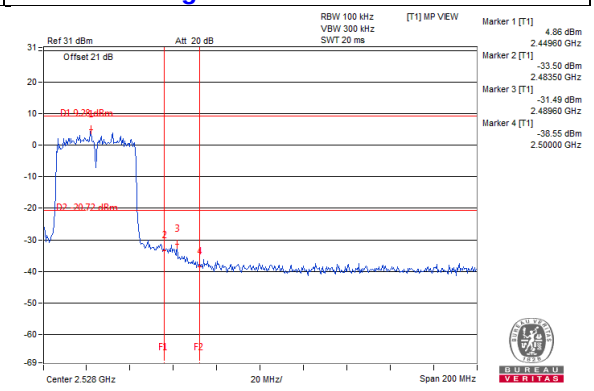
CH 9



CH 3 Band edge

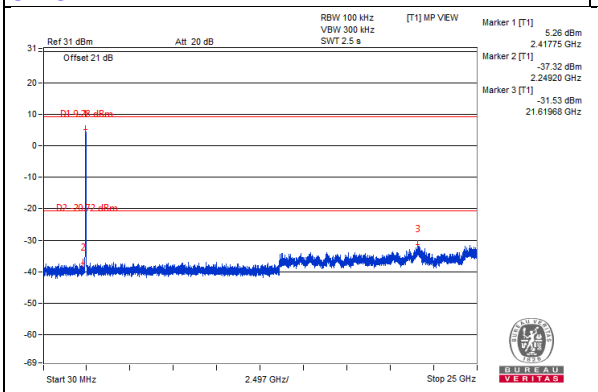


CH 9 Band edge

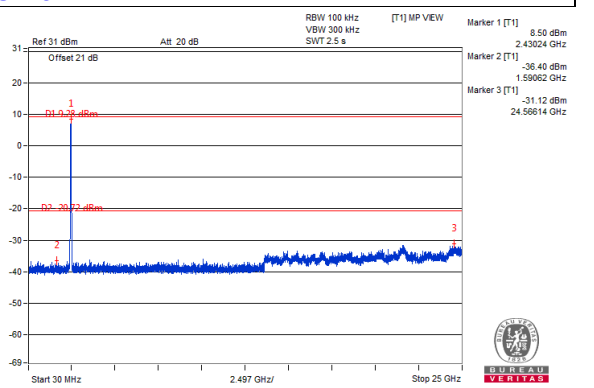


Chain 1

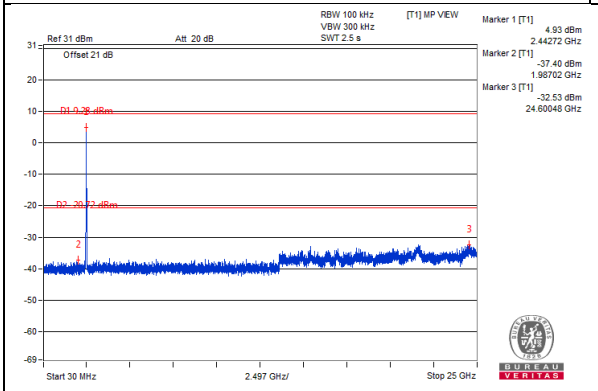
CH 3



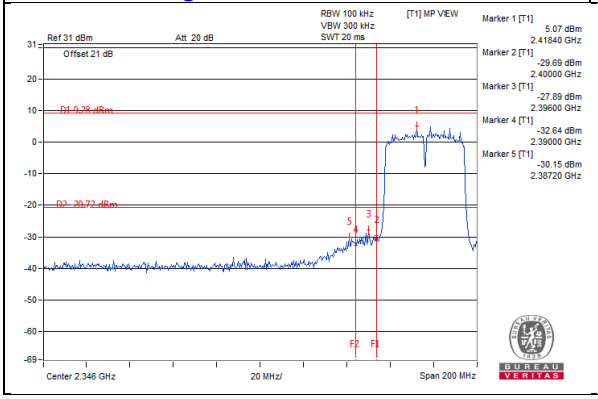
CH 6



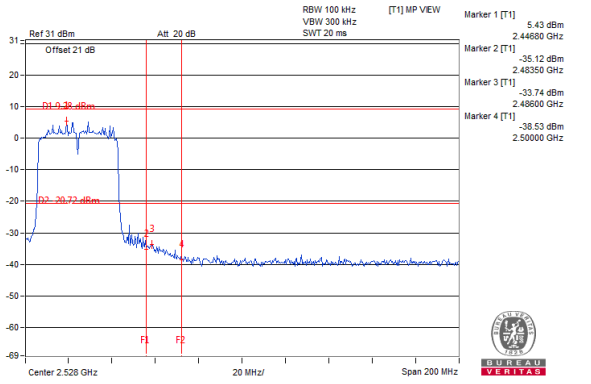
CH 9



CH 3 Band edge



CH 9 Band edge



5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

Linkou EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

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.

--- END ---