Report No.:	RF180731E06
FCC ID:	PKRNVWR1000
Test Model:	R1000
Received Date:	July 31, 2018
Test Date:	Aug. 03 to 04, 2018
Issued Date:	Aug. 22, 2018
Applicant:	Novatel Wireless, Inc.
Address:	9605 Scranton Road Suite 300, San Diego, CA 92121 United States
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
RF180731E06	Original release.	Aug. 22, 2018

1 Certificate of Conformity

Product:	4G LTE Wireless Router
Brand:	Inseego
Test Model:	R1000
Sample Status:	ENGINEERING SAMPLE
Applicant:	Novatel Wireless, Inc.
Test Date:	Aug. 03 to 04, 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 : Wendy Wu , **Date:** Aug. 22, 2018

Wendy Wu / Specialist

Approved by : , **Date:** Aug. 22, 2018

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -13.98dB at 0.15000MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2390.00MHz, 2483.50MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	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	5.33 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.10 dB
	6GHz ~ 18GHz	4.85 dB
	18GHz ~ 40GHz	5.24 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	4G LTE Wireless Router
Brand	Inseego
Test Model	R1000
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 54V from power adapter (full function) or DC 4.5V from battery (only LTE work)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20/40 in 2.4GHz
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 1733.3Mbps
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), VHT20: 11 802.11n (HT40), VHT40: 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	**2.4GHz** **CDD Mode:** 789.866mW **Beamforming Mode:** 686.883mW **5GHz:** **CDD Mode:** **5.18 ~ 5.24GHz:** 519.069mW **5.745 ~ 5.825GHz:** 948.281mW **Beamforming Mode:** **5.18 ~ 5.24GHz:** 519.069mW **5.745 ~ 5.825GHz:** 463.521mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x1
Data Cable Supplied	Adapter Power Cord x 1 (Unshielded, 1.8m), Ethernet Cable x 1 (Unshielded, 1m)

Note:

1. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3	Radio 4
WLAN - 2TX (2.4GHz)	WLAN - 2TX (5GHz Low Band)	WLAN - 4TX (5GHz High Band)	WWAN

2. Simultaneously transmission condition.

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

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

Antenna No.	Model	Antenna Net. Gain(dBi)	Frequency range	Antenna Type	Connecter Type	Cable Length
WiFi_1	C037-511493	2.8	2.4~2.4835GHz	PCB	i-pex(MHF)	100mm
		3.05	5.15~5.35GHz			
WiFi_2	C037-511494	4.41	2.4~2.4835GHz	PCB	i-pex(MHF)	60mm
		4.14	5.15~5.35GHz			
WiFi_DB_1	290-20358	2.79	5.47~5.725GHz	PCB	i-pex(MHF)	160mm
		2.62	5.725~5.85GHz			
WiFi_DB_3	290-20359	4.27	5.47~5.725GHz	PCB	i-pex(MHF)	65mm
		3.7	5.725~5.85GHz			
WiFi_DB_2+ WiFi_DB_4+ GPS	290-20357	3.52	5.47~5.725GHz	PCB	i-pex(MHF)	115mm (DB_2)
		3.45	5.725~5.85GHz			
		2.99	5.47~5.725GHz			105mm (DB_4)
		3	5.725~5.85GHz			
		4.58	1575MHz			230mm (GPS)
LTE	C037-511495	2.9	1850 -1910MHz	PCB	i-pex(MHF)	130mm
		2.98	1710-1755MHz			
		0.25	777-787MHz			

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

Brand	Model No.	Spec.
Leader	UNA3-6540240-I1	Input: 100-240Vac, 2.0A, 50/60Hz Output: 54V, 2.4A

5. Power suppied from batteries condition only support WWAN function.

6. 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
VHT20	MCS0~8 Nss=1	2TX	2RX
	MCS0~8 Nss=2	2TX	2RX
VHT40	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX
5GHz Band (Low 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
5GHz Band (High band)			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	4TX	4RX
802.11n (HT20)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11n (HT40)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11ac (VHT20)	MCS0~8 Nss=1	4TX	4RX
	MCS0~8 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~8 Nss=4	4TX	4RX
802.11ac (VHT40)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX
802.11ac (VHT80)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX

Note:

1. All of modulation mode support beamforming function except and 802.11a/b/g modulation mode.
2. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)
3. 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.

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20), VHT20:

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

7 channels are provided for 802.11n (HT40), VHT40:

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

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

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
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
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
Beamforming Mode (output power only)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
VHT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
VHT40	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

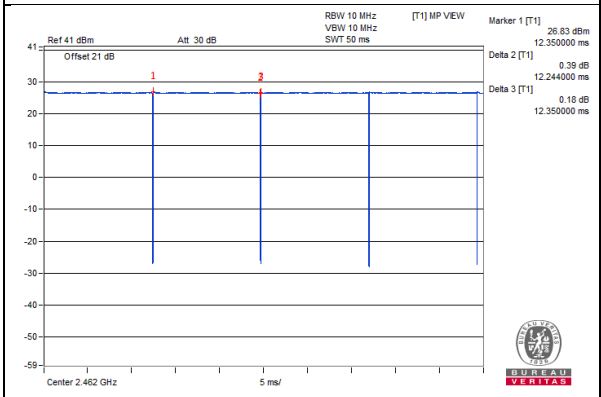
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	22deg. C, 67%RH	120Vac, 60Hz	Steven Chaing
RE<1G	21deg. C, 62%RH	120Vac, 60Hz	Steven Chaing
PLC	25deg. C, 65%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

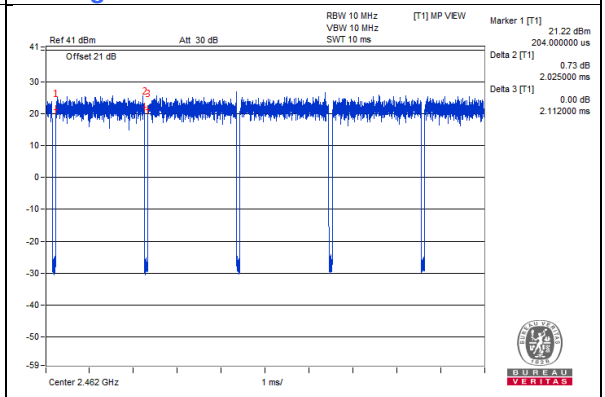
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle = 12.244/12.35 = 0.991
802.11g: Duty cycle = 2.025/2.112 = 0.959, Duty factor = 10 * log(1/0.959) = 0.18
802.11n (HT20): Duty cycle = 4.95/5.047 = 0.981
802.11n (HT40): Duty cycle = 2.404/2.493 = 0.964, Duty factor = 10 * log(1/0.964) = 0.16

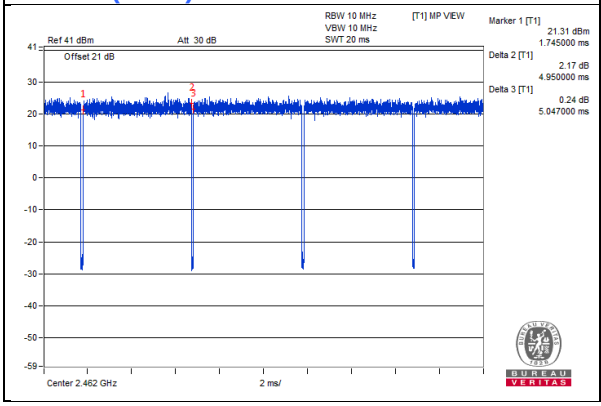
802.11b



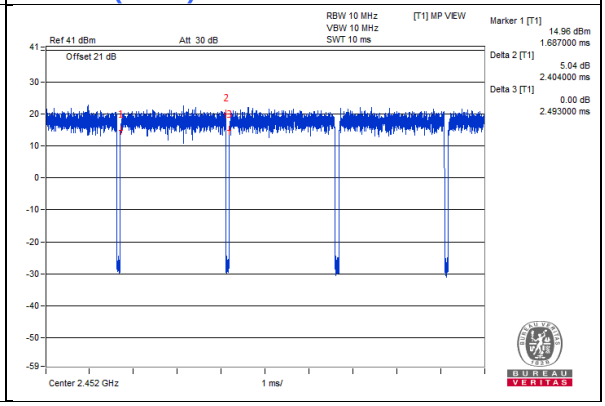
802.11g



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.

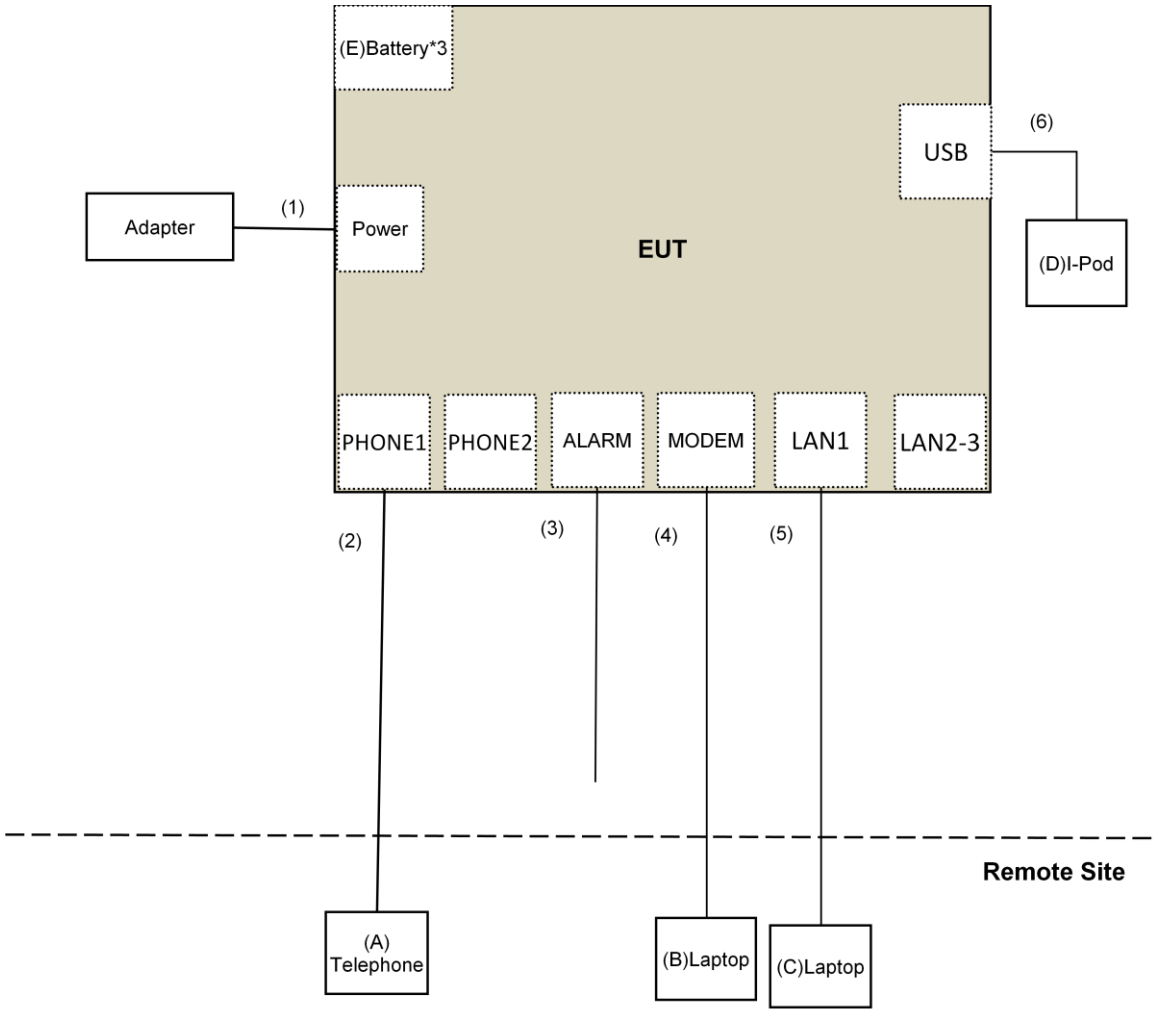
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Telephone	WONDER	WD-303	7C17KA 04011	NA	Provided by Lab
B.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
C.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
D.	iPod	Apple	MD778TA/A	CC4JL03FF4T1	NA	Provided by Lab
E.	Battery	Duracell	AA	NA	NA	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.4	No	0	Supplied by client
2.	RJ-11 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab
4.	RJ-45 Cable	1	10	No	0	Provided by Lab
5.	RJ-45 Cable	1	10	No	0	Provided by Lab
6.	USB Cable	1	0.1	Yes	0	Provided by Lab

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 Keysight	N9038A	MY54450088	July 05, 2018	July 04, 2019
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	Jan. 15, 2018	Jan. 14, 2019
RF Cable	NA	LOOPCAB-002	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 09, 2017	Nov. 08, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-4-1	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-2	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-3	Mar. 21, 2018	Mar. 20, 2019
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier Mini-Circuits	ZVA-183-S+	AMP-ZVA-03	May 10, 2018	May 09, 2019
RF Cable	EMC104-SM-SM-1200	160923	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-2000	150318	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-5000	150321	Jan. 29, 2018	Jan. 28, 2019
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160925	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	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. 4.
4. The CANADA Site Registration No. is 20331-2
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Aug. 03 to 04, 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:

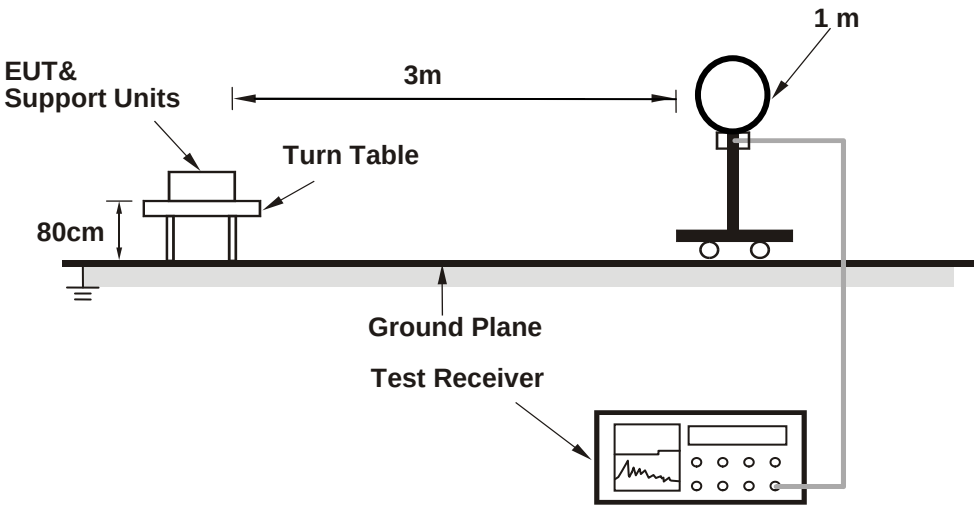
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

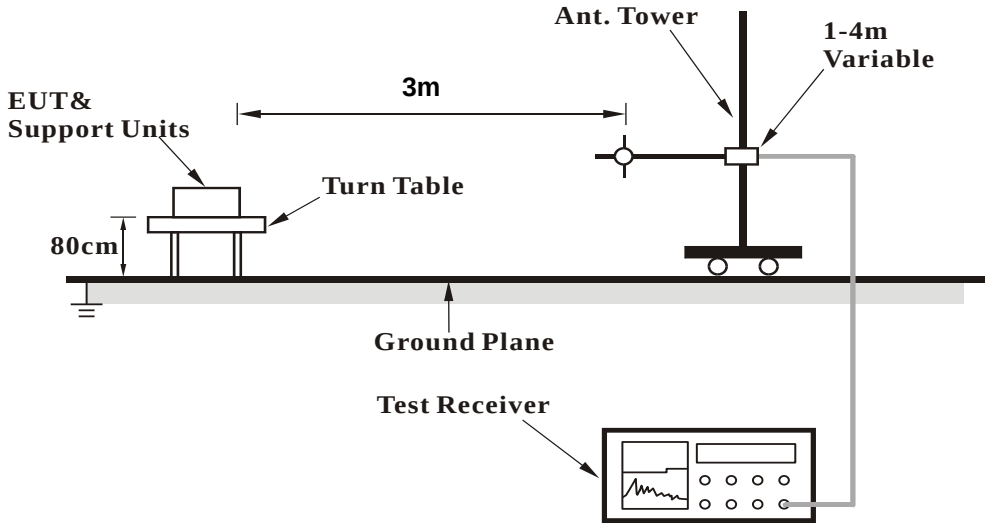
No deviation.

4.1.5 Test Setup

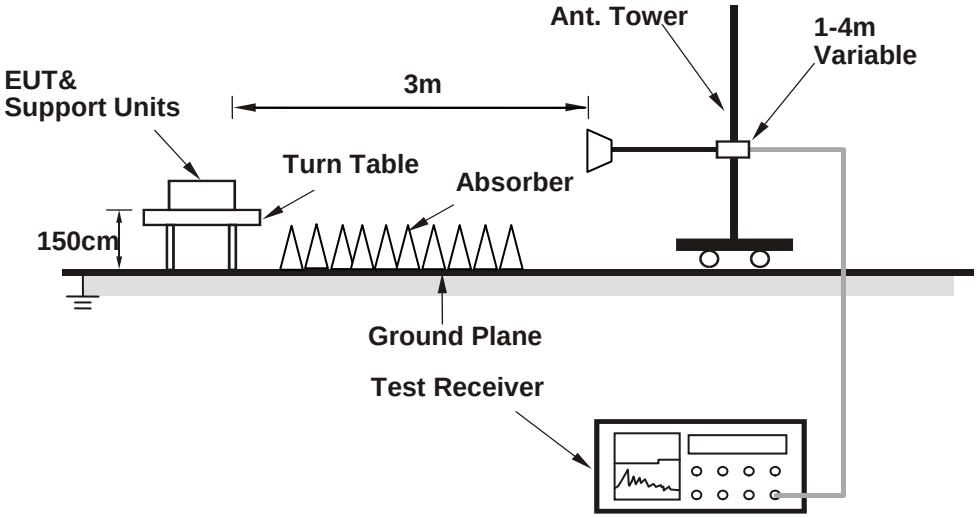
For Radiated emission below 30MHz



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 (QDRT 4.8.00055) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.5 PK	74.0	-15.5	2.25 H	11	60.7	-2.2
2	2390.00	52.4 AV	54.0	-1.6	2.25 H	11	54.6	-2.2
3	*2412.00	113.6 PK			2.25 H	11	116.0	-2.4
4	*2412.00	112.3 AV			2.25 H	11	114.7	-2.4
5	4824.00	51.0 PK	74.0	-23.0	1.99 H	201	49.2	1.8
6	4824.00	42.4 AV	54.0	-11.6	1.99 H	201	40.6	1.8
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	60.8 PK	74.0	-13.2	1.93 V	81	63.0	-2.2
2	2390.00	53.8 AV	54.0	-0.2	1.93 V	81	56.0	-2.2
3	*2412.00	115.6 PK			1.93 V	81	118.0	-2.4
4	*2412.00	114.0 AV			1.93 V	81	116.4	-2.4
5	4824.00	43.7 PK	74.0	-30.3	1.58 V	121	41.9	1.8
6	4824.00	40.1 AV	54.0	-13.9	1.58 V	121	38.3	1.8

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	56.5 PK	74.0	-17.5	2.19 H	4	58.7	-2.2
2	2390.00	45.2 AV	54.0	-8.8	2.19 H	4	47.4	-2.2
3	*2437.00	116.8 PK			2.19 H	4	119.4	-2.6
4	*2437.00	115.1 AV			2.19 H	4	117.7	-2.6
5	2483.50	57.6 PK	74.0	-16.4	2.19 H	4	60.0	-2.4
6	2483.50	43.7 AV	54.0	-10.3	2.19 H	4	46.1	-2.4
7	4874.00	51.3 PK	74.0	-22.7	1.96 H	200	49.3	2.0
8	4874.00	42.4 AV	54.0	-11.6	1.96 H	200	40.4	2.0
9	7311.00	46.4 PK	74.0	-27.6	1.17 H	163	38.0	8.4
10	7311.00	36.0 AV	54.0	-18.0	1.17 H	163	27.6	8.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.3 PK	74.0	-16.7	1.96 V	78	59.5	-2.2
2	2390.00	46.3 AV	54.0	-7.7	1.96 V	78	48.5	-2.2
3	*2437.00	118.6 PK			1.96 V	78	121.2	-2.6
4	*2437.00	116.8 AV			1.96 V	78	119.4	-2.6
5	2483.50	57.4 PK	74.0	-16.6	1.96 V	78	59.8	-2.4
6	2483.50	44.5 AV	54.0	-9.5	1.96 V	78	46.9	-2.4
7	4874.00	44.4 PK	74.0	-29.6	1.62 V	120	42.4	2.0
8	4874.00	40.6 AV	54.0	-13.4	1.62 V	120	38.6	2.0
9	7311.00	50.7 PK	74.0	-23.3	1.68 V	95	42.3	8.4
10	7311.00	43.5 AV	54.0	-10.5	1.68 V	95	35.1	8.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	113.8 PK			2.28 H	15	116.4	-2.6
2	*2462.00	112.6 AV			2.28 H	15	115.2	-2.6
3	2483.50	58.3 PK	74.0	-15.7	2.28 H	15	60.7	-2.4
4	2483.50	52.3 AV	54.0	-1.7	2.28 H	15	54.7	-2.4
5	4924.00	50.5 PK	74.0	-23.5	1.92 H	184	48.5	2.0
6	4924.00	41.9 AV	54.0	-12.1	1.92 H	184	39.9	2.0
7	7386.00	46.9 PK	74.0	-27.1	1.14 H	169	38.3	8.6
8	7386.00	36.2 AV	54.0	-17.8	1.14 H	169	27.6	8.6
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	*2462.00	115.9 PK			1.94 V	0	118.5	-2.6
2	*2462.00	114.2 AV			1.94 V	0	116.8	-2.6
3	2483.50	59.9 PK	74.0	-14.1	1.94 V	0	62.3	-2.4
4	2483.50	53.8 AV	54.0	-0.2	1.94 V	0	56.2	-2.4
5	4924.00	44.5 PK	74.0	-29.5	1.67 V	113	42.5	2.0
6	4924.00	40.6 AV	54.0	-13.4	1.67 V	113	38.6	2.0
7	7386.00	50.9 PK	74.0	-23.1	1.73 V	111	42.3	8.6
8	7386.00	43.6 AV	54.0	-10.4	1.73 V	111	35.0	8.6

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.

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	63.9 PK	74.0	-10.1	2.19 H	9	66.1	-2.2
2	2390.00	51.7 AV	54.0	-2.3	2.19 H	9	53.9	-2.2
3	*2412.00	114.1 PK			2.19 H	358	116.5	-2.4
4	*2412.00	103.7 AV			2.19 H	358	106.1	-2.4
5	4824.00	40.0 PK	74.0	-34.0	1.95 H	209	38.2	1.8
6	4824.00	32.2 AV	54.0	-21.8	1.95 H	209	30.4	1.8
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	1.88 V	6	69.1	-2.2
2	2390.00	53.6 AV	54.0	-0.4	1.88 V	6	55.8	-2.2
3	*2412.00	116.3 PK			1.88 V	6	118.7	-2.4
4	*2412.00	105.1 AV			1.88 V	6	107.5	-2.4
5	4824.00	38.3 PK	74.0	-35.7	1.56 V	125	36.5	1.8
6	4824.00	30.8 AV	54.0	-23.2	1.56 V	125	29.0	1.8

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	56.2 PK	74.0	-17.8	2.21 H	357	58.4	-2.2
2	2390.00	43.5 AV	54.0	-10.5	2.21 H	357	45.7	-2.2
3	*2437.00	118.9 PK			2.21 H	357	121.5	-2.6
4	*2437.00	108.5 AV			2.21 H	357	111.1	-2.6
5	2483.50	56.8 PK	74.0	-17.2	2.21 H	357	59.2	-2.4
6	2483.50	44.1 AV	54.0	-9.9	2.21 H	357	46.5	-2.4
7	4874.00	40.3 PK	74.0	-33.7	1.95 H	195	38.3	2.0
8	4874.00	32.4 AV	54.0	-21.6	1.95 H	195	30.4	2.0
9	7311.00	45.2 PK	74.0	-28.8	1.08 H	168	36.8	8.4
10	7311.00	35.4 AV	54.0	-18.6	1.08 H	168	27.0	8.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.4 PK	74.0	-14.6	1.79 V	19	61.6	-2.2
2	2390.00	46.9 AV	54.0	-7.1	1.79 V	19	49.1	-2.2
3	*2437.00	120.6 PK			1.79 V	19	123.2	-2.6
4	*2437.00	110.0 AV			1.79 V	19	112.6	-2.6
5	2483.50	64.8 PK	74.0	-9.2	1.79 V	19	67.2	-2.4
6	2483.50	51.2 AV	54.0	-2.8	1.79 V	19	53.6	-2.4
7	4874.00	38.6 PK	74.0	-35.4	1.62 V	111	36.6	2.0
8	4874.00	31.1 AV	54.0	-22.9	1.62 V	111	29.1	2.0
9	7311.00	44.2 PK	74.0	-29.8	1.74 V	127	35.8	8.4
10	7311.00	34.2 AV	54.0	-19.8	1.74 V	127	25.8	8.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	113.5 PK			2.22 H	2	116.1	-2.6
2	*2462.00	102.2 AV			2.22 H	2	104.8	-2.6
3	2483.50	63.4 PK	74.0	-10.6	2.22 H	2	65.8	-2.4
4	2483.50	51.5 AV	54.0	-2.5	2.22 H	2	53.9	-2.4
5	4924.00	40.5 PK	74.0	-33.5	1.98 H	196	38.5	2.0
6	4924.00	32.7 AV	54.0	-21.3	1.98 H	196	30.7	2.0
7	7386.00	45.4 PK	74.0	-28.6	1.09 H	162	36.8	8.6
8	7386.00	35.8 AV	54.0	-18.2	1.09 H	162	27.2	8.6
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	*2462.00	115.0 PK			1.86 V	4	117.6	-2.6
2	*2462.00	103.7 AV			1.86 V	4	106.3	-2.6
3	2483.50	71.3 PK	74.0	-2.7	1.86 V	4	73.7	-2.4
4	**2483.50**	**53.9 AV**	**54.0**	**-0.1**	**1.86 V**	**4**	**56.3**	**-2.4**
5	4924.00	38.4 PK	74.0	-35.6	1.56 V	112	36.4	2.0
6	4924.00	30.7 AV	54.0	-23.3	1.56 V	112	28.7	2.0
7	7386.00	43.8 PK	74.0	-30.2	1.71 V	118	35.2	8.6
8	7386.00	33.8 AV	54.0	-20.2	1.71 V	118	25.2	8.6

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.

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	62.1 PK	74.0	-11.9	2.29 H	10	64.3	-2.2
2	2390.00	50.8 AV	54.0	-3.2	2.29 H	10	53.0	-2.2
3	*2412.00	114.3 PK			2.29 H	10	116.7	-2.4
4	*2412.00	103.7 AV			2.29 H	10	106.1	-2.4
5	4824.00	40.2 PK	74.0	-33.8	1.98 H	198	38.4	1.8
6	4824.00	32.4 AV	54.0	-21.6	1.98 H	198	30.6	1.8
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	67.2 PK	74.0	-6.8	1.83 V	5	69.4	-2.2
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.83 V**	**5**	**56.1**	**-2.2**
3	*2412.00	116.5 PK			1.83 V	5	118.9	-2.4
4	*2412.00	105.1 AV			1.83 V	5	107.5	-2.4
5	4824.00	38.2 PK	74.0	-35.8	1.57 V	116	36.4	1.8
6	4824.00	30.7 AV	54.0	-23.3	1.57 V	116	28.9	1.8

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) 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	57.2 PK	74.0	-16.8	2.24 H	14	59.4	-2.2
2	2390.00	44.6 AV	54.0	-9.4	2.24 H	14	46.8	-2.2
3	*2437.00	108.7 PK			2.24 H	14	111.3	-2.6
4	*2437.00	108.0 AV			2.24 H	14	110.6	-2.6
5	2483.50	58.3 PK	74.0	-15.7	2.24 H	14	60.7	-2.4
6	2483.50	45.1 AV	54.0	-8.9	2.24 H	14	47.5	-2.4
7	4874.00	39.7 PK	74.0	-34.3	1.98 H	210	37.7	2.0
8	4874.00	32.0 AV	54.0	-22.0	1.98 H	210	30.0	2.0
9	7311.00	45.3 PK	74.0	-28.7	1.05 H	183	36.9	8.4
10	7311.00	35.5 AV	54.0	-18.5	1.05 H	183	27.1	8.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.8 PK	74.0	-14.2	1.79 V	10	62.0	-2.2
2	2390.00	47.4 AV	54.0	-6.6	1.79 V	10	49.6	-2.2
3	*2437.00	120.1 PK			1.79 V	10	122.7	-2.6
4	*2437.00	109.6 AV			1.79 V	10	112.2	-2.6
5	2483.50	64.4 PK	74.0	-9.6	1.79 V	10	66.8	-2.4
6	2483.50	50.7 AV	54.0	-3.3	1.79 V	10	53.1	-2.4
7	4874.00	38.5 PK	74.0	-35.5	1.62 V	117	36.5	2.0
8	4874.00	30.8 AV	54.0	-23.2	1.62 V	117	28.8	2.0
9	7311.00	44.5 PK	74.0	-29.5	1.70 V	141	36.1	8.4
10	7311.00	34.7 AV	54.0	-19.3	1.70 V	141	26.3	8.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	113.7 PK			2.26 H	17	116.3	-2.6
2	*2462.00	102.4 AV			2.26 H	17	105.0	-2.6
3	2483.50	62.3 PK	74.0	-11.7	2.26 H	17	64.7	-2.4
4	2483.50	51.2 AV	54.0	-2.8	2.26 H	17	53.6	-2.4
5	4924.00	40.0 PK	74.0	-34.0	1.92 H	204	38.0	2.0
6	4924.00	32.3 AV	54.0	-21.7	1.92 H	204	30.3	2.0
7	7386.00	45.2 PK	74.0	-28.8	1.13 H	184	36.6	8.6
8	7386.00	35.1 AV	54.0	-18.9	1.13 H	184	26.5	8.6
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	*2462.00	115.1 PK			1.83 V	7	117.7	-2.6
2	*2462.00	103.8 AV			1.83 V	7	106.4	-2.6
3	2483.50	71.4 PK	74.0	-2.6	1.83 V	7	73.8	-2.4
4	**2483.50**	**53.9 AV**	**54.0**	**-0.1**	**1.83 V**	**7**	**56.3**	**-2.4**
5	4924.00	38.6 PK	74.0	-35.4	1.60 V	103	36.6	2.0
6	4924.00	30.9 AV	54.0	-23.1	1.60 V	103	28.9	2.0
7	7386.00	44.1 PK	74.0	-29.9	1.69 V	133	35.5	8.6
8	7386.00	34.2 AV	54.0	-19.8	1.69 V	133	25.6	8.6

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.

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	61.5 PK	74.0	-12.5	2.24 H	5	63.7	-2.2
2	2390.00	50.2 AV	54.0	-3.8	2.24 H	5	52.4	-2.2
3	*2422.00	108.6 PK			2.24 H	5	111.1	-2.5
4	*2422.00	99.8 AV			2.24 H	5	102.3	-2.5
5	4844.00	40.0 PK	74.0	-34.0	1.97 H	196	38.2	1.8
6	4844.00	32.2 AV	54.0	-21.8	1.97 H	196	30.4	1.8
7	7266.00	45.2 PK	74.0	-28.8	1.08 H	181	37.0	8.2
8	7266.00	35.6 AV	54.0	-18.4	1.08 H	181	27.4	8.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.8 PK	74.0	-6.2	1.99 V	6	70.0	-2.2
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.99 V**	**6**	**56.1**	**-2.2**
3	*2422.00	110.4 PK			1.99 V	6	112.9	-2.5
4	*2422.00	101.4 AV			1.99 V	6	103.9	-2.5
5	4844.00	38.9 PK	74.0	-35.1	1.61 V	101	37.1	1.8
6	4844.00	31.3 AV	54.0	-22.7	1.61 V	101	29.5	1.8
7	7266.00	44.0 PK	74.0	-30.0	1.79 V	138	35.8	8.2
8	7266.00	33.9 AV	54.0	-20.1	1.79 V	138	25.7	8.2

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.1 PK	74.0	-10.9	2.23 H	13	65.3	-2.2
2	2390.00	47.5 AV	54.0	-6.5	2.23 H	13	49.7	-2.2
3	*2437.00	110.0 PK			2.23 H	13	112.6	-2.6
4	*2437.00	101.3 AV			2.23 H	13	103.9	-2.6
5	2483.50	60.8 PK	74.0	-13.2	2.23 H	13	63.2	-2.4
6	2483.50	51.0 AV	54.0	-3.0	2.23 H	13	53.4	-2.4
7	4874.00	40.0 PK	74.0	-34.0	1.90 H	207	38.0	2.0
8	4874.00	32.2 AV	54.0	-21.8	1.90 H	207	30.2	2.0
9	7311.00	45.9 PK	74.0	-28.1	1.09 H	162	37.5	8.4
10	7311.00	35.8 AV	54.0	-18.2	1.09 H	162	27.4	8.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.9 PK	74.0	-10.1	1.99 V	8	66.1	-2.2
2	2390.00	49.3 AV	54.0	-4.7	1.99 V	8	51.5	-2.2
3	*2437.00	112.0 PK			1.99 V	8	114.6	-2.6
4	*2437.00	103.0 AV			1.99 V	8	105.6	-2.6
5	2483.50	67.5 PK	74.0	-6.5	1.99 V	8	69.9	-2.4
6	**2483.50**	**53.9 AV**	**54.0**	**-0.1**	**1.99 V**	**8**	**56.3**	**-2.4**
7	4874.00	38.4 PK	74.0	-35.6	1.57 V	109	36.4	2.0
8	4874.00	30.7 AV	54.0	-23.3	1.57 V	109	28.7	2.0
9	7311.00	44.2 PK	74.0	-29.8	1.75 V	113	35.8	8.4
10	7311.00	34.1 AV	54.0	-19.9	1.75 V	113	25.7	8.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	108.8 PK			2.27 H	19	111.4	-2.6
2	*2452.00	100.1 AV			2.27 H	19	102.7	-2.6
3	2483.50	61.4 PK	74.0	-12.6	2.27 H	19	63.8	-2.4
4	2483.50	51.8 AV	54.0	-2.2	2.27 H	19	54.2	-2.4
5	4904.00	40.6 PK	74.0	-33.4	1.95 H	199	38.6	2.0
6	4904.00	32.9 AV	54.0	-21.1	1.95 H	199	30.9	2.0
7	7356.00	44.8 PK	74.0	-29.2	1.08 H	163	36.2	8.6
8	7356.00	35.2 AV	54.0	-18.8	1.08 H	163	26.6	8.6
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	*2452.00	111.5 PK			1.92 V	8	114.1	-2.6
2	*2452.00	102.0 AV			1.92 V	8	104.6	-2.6
3	2483.50	69.7 PK	74.0	-4.3	1.92 V	8	72.1	-2.4
4	**2483.50**	**53.9 AV**	**54.0**	**-0.1**	**1.92 V**	**8**	**56.3**	**-2.4**
5	4904.00	38.9 PK	74.0	-35.1	1.65 V	95	36.9	2.0
6	4904.00	31.2 AV	54.0	-22.8	1.65 V	95	29.2	2.0
7	7356.00	44.1 PK	74.0	-29.9	1.72 V	112	35.5	8.6
8	7356.00	33.9 AV	54.0	-20.1	1.72 V	112	25.3	8.6

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.

Below 1GHz Data:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	125.01	31.3 QP	43.5	-12.2	1.50 H	78	40.7	-9.4
2	249.97	34.6 QP	46.0	-11.4	1.00 H	68	43.5	-8.9
3	480.03	27.4 QP	46.0	-18.6	2.00 H	94	29.6	-2.2
4	720.62	29.8 QP	46.0	-16.2	1.00 H	112	27.8	2.0
5	816.48	31.9 QP	46.0	-14.1	2.00 H	243	27.9	4.0
6	935.28	34.4 QP	46.0	-11.6	1.00 H	57	28.4	6.0
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	42.32	32.7 QP	40.0	-7.3	1.00 V	145	40.7	-8.0
2	125.01	37.5 QP	43.5	-6.0	1.00 V	288	46.9	-9.4
3	250.02	30.9 QP	46.0	-15.1	2.00 V	36	39.8	-8.9
4	480.01	28.5 QP	46.0	-17.5	1.00 V	230	30.7	-2.2
5	821.76	32.0 QP	46.0	-14.0	1.50 V	360	27.9	4.1
6	948.93	33.6 QP	46.0	-12.4	1.50 V	251	27.5	6.1

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: Aug. 03, 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.

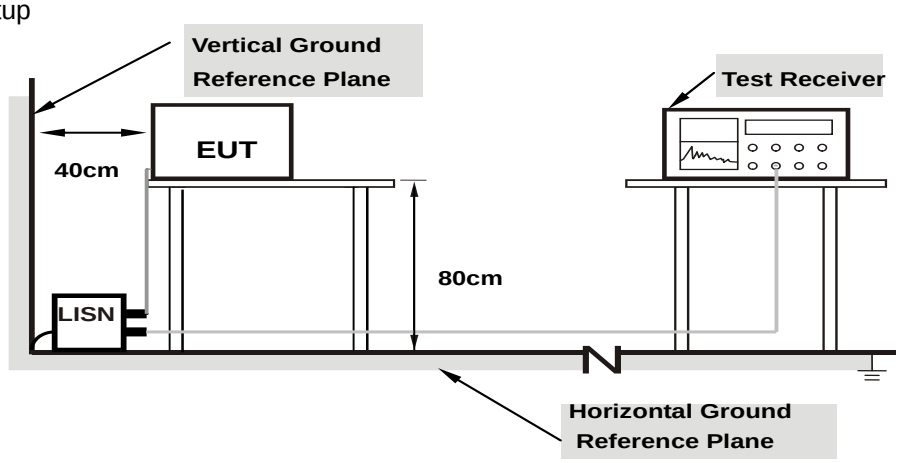
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

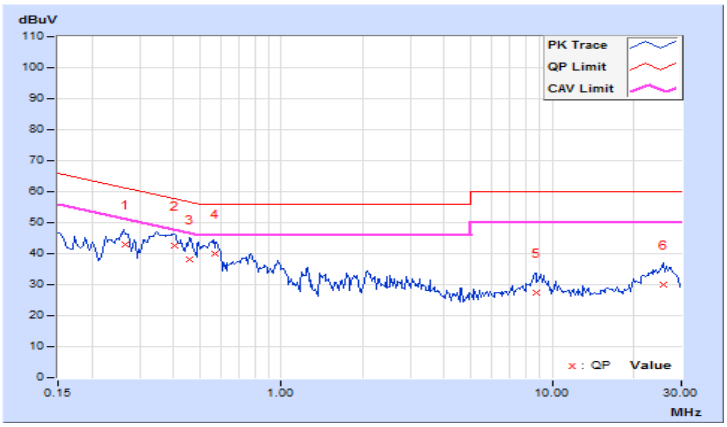
4.2.7 Test Results

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	0.26466	10.08	32.80	20.65	42.88	30.73	61.28	51.28	-18.40	-20.55
2	0.40209	10.11	32.35	17.46	42.46	27.57	57.81	47.81	-15.35	-20.24
3	0.46084	10.11	28.16	13.73	38.27	23.84	56.68	46.68	-18.41	-22.84
4	0.56719	10.12	29.84	19.92	39.96	30.04	56.00	46.00	-16.04	-15.96
5	8.72150	10.48	16.96	11.18	27.44	21.66	60.00	50.00	-32.56	-28.34
6	25.63050	11.16	18.89	12.46	30.05	23.62	60.00	50.00	-29.95	-26.38

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.

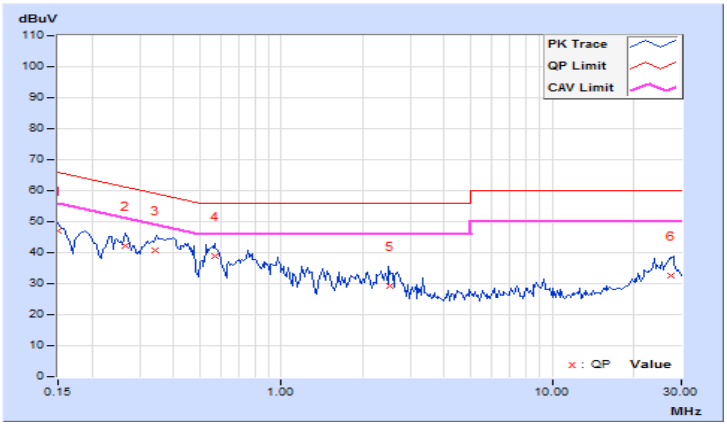


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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**	**9.94**	**37.27**	**32.08**	**47.21**	**42.02**	**66.00**	**56.00**	**-18.79**	**-13.98**
2	0.26719	9.97	32.23	20.33	42.20	30.30	61.20	51.20	-19.00	-20.90
3	0.34294	9.99	30.72	23.17	40.71	33.16	59.13	49.13	-18.42	-15.97
4	0.56797	10.01	28.78	19.06	38.79	29.07	56.00	46.00	-17.21	-16.93
5	2.51037	10.09	19.23	11.02	29.32	21.11	56.00	46.00	-26.68	-24.89
6	27.30575	10.95	21.79	15.71	32.74	26.66	60.00	50.00	-27.26	-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.

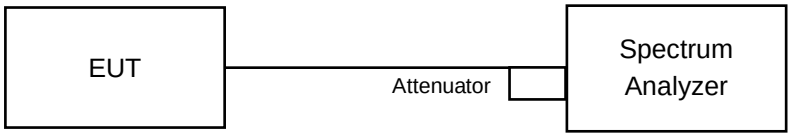


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation fromTest Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	8.10	9.04	0.5	Pass
6	2437	10.04	10.09	0.5	Pass
11	2462	8.11	9.10	0.5	Pass

802.11g

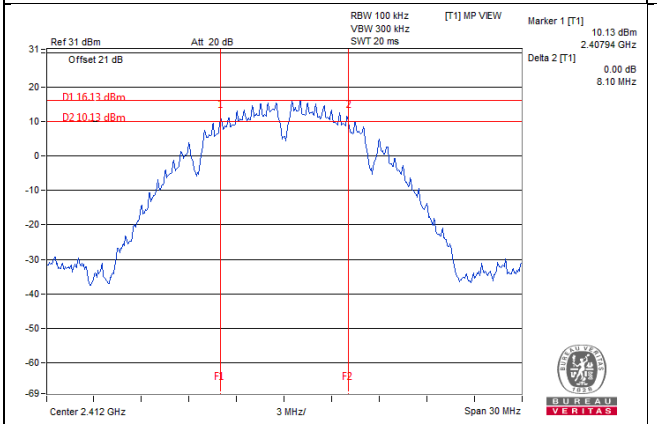
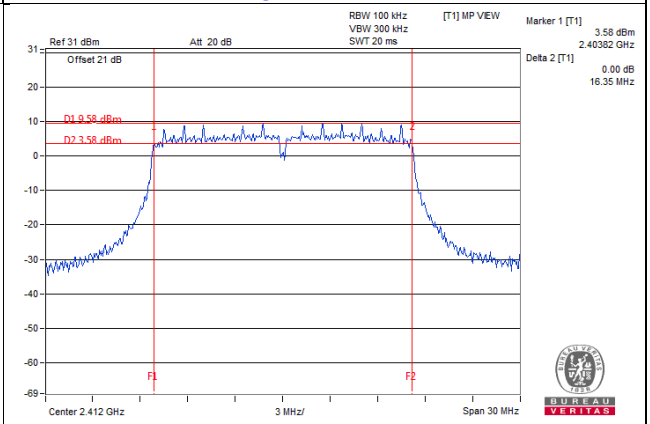
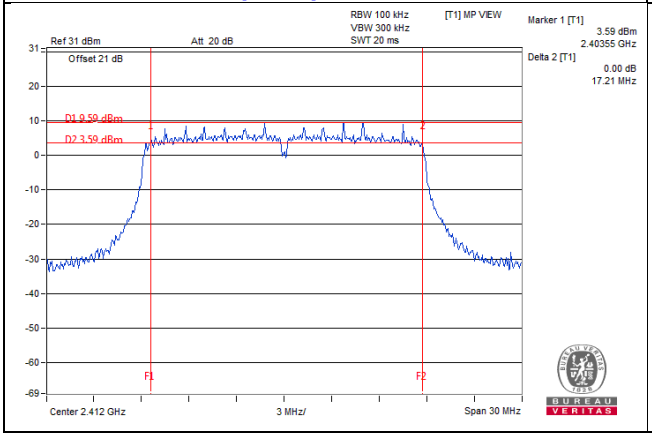
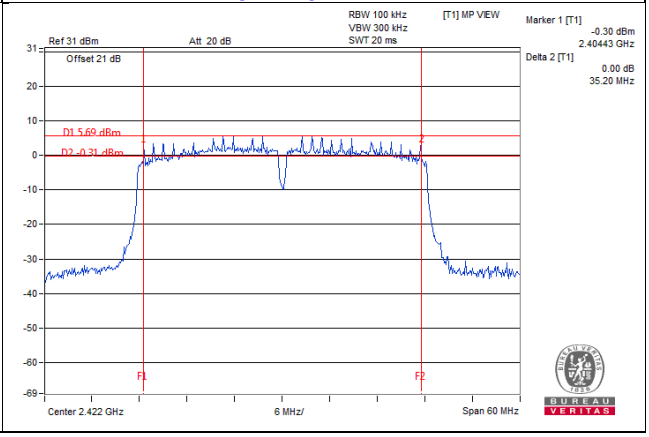
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.35	16.36	0.5	Pass
6	2437	16.36	16.40	0.5	Pass
11	2462	16.38	16.39	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.21	17.55	0.5	Pass
6	2437	17.63	17.27	0.5	Pass
11	2462	17.62	17.61	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.33	35.20	0.5	Pass
6	2437	35.85	35.38	0.5	Pass
9	2452	35.22	35.34	0.5	Pass

Spectrum Plot of Worst Value	
802.11b / Chain 0 : CH1	**802.11g / Chain 0 : CH1**
	
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

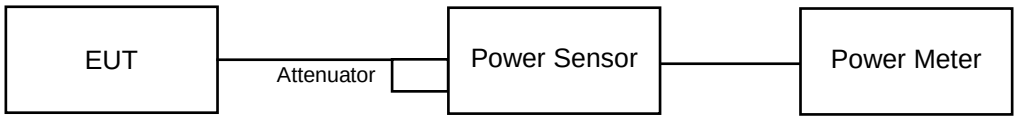
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	24.77	25.10	623.51	27.95	30.00	Pass
6	2437	25.92	26.01	789.866	28.98	30.00	Pass
11	2462	23.96	25.22	581.546	27.65	30.00	Pass

802.11g

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	20.18	20.49	216.176	23.35	30.00	Pass
6	2437	25.33	25.63	706.788	28.49	30.00	Pass
11	2462	19.02	20.47	191.228	22.82	30.00	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	20.12	20.37	211.695	23.26	30.00	Pass
6	2437	25.18	25.53	686.883	28.37	30.00	Pass
11	2462	19.21	20.45	194.285	22.88	30.00	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	18.57	19.17	154.549	21.89	30.00	Pass
6	2437	20.47	20.65	227.574	23.57	30.00	Pass
9	2452	18.52	19.52	160.657	22.06	30.00	Pass

Beamforming Mode

VHT20

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	20.12	20.37	211.695	23.26	29.35	Pass
6	2437	25.18	25.53	686.883	28.37	29.35	Pass
11	2462	19.21	20.45	194.285	22.88	29.35	Pass

Note: 1. Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 6.65dBi > 6dBi , so the power limit shall be reduced to 30-(6.65-6) = 29.35dBm.

VHT40

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	18.57	19.17	154.549	21.89	29.35	Pass
6	2437	20.47	20.65	227.574	23.57	29.35	Pass
9	2452	18.52	19.52	160.657	22.06	29.35	Pass

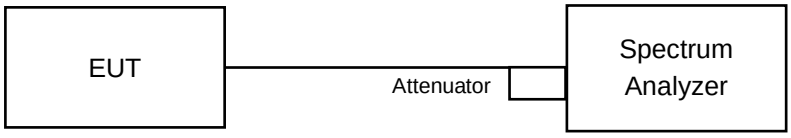
Note: 1. Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 6.65dBi > 6dBi , so the power limit shall be reduced to 30-(6.65-6) = 29.35dBm.

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)

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)

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

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	-6.94	3.01	-3.93	7.35	Pass
	6	2437	-5.84	3.01	-2.83	7.35	Pass
	11	2462	-6.64	3.01	-3.63	7.35	Pass
1	1	2412	-5.49	3.01	-2.48	7.35	Pass
	6	2437	-5.26	3.01	-2.25	7.35	Pass
	11	2462	-5.85	3.01	-2.84	7.35	Pass

Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 6.65dBi > 6dBi, so the power density limit shall be reduced to 8-(6.65-6) = 7.35dBm.

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	-9.83	3.01	0.18	-6.64	7.35	Pass
	6	2437	-8.12	3.01	0.18	-4.93	7.35	Pass
	11	2462	-9.07	3.01	0.18	-5.88	7.35	Pass
1	1	2412	-12.16	3.01	0.18	-8.97	7.35	Pass
	6	2437	-8.32	3.01	0.18	-5.13	7.35	Pass
	11	2462	-7.99	3.01	0.18	-4.80	7.35	Pass

Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 6.65dBi > 6dBi, so the power density limit shall be reduced to 8-(6.65-6) = 7.35dBm.

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

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	-8.09	3.01	-5.08	7.35	Pass
	6	2437	-8.11	3.01	-5.10	7.35	Pass
	11	2462	-7.28	3.01	-4.27	7.35	Pass
1	1	2412	-12.22	3.01	-9.21	7.35	Pass
	6	2437	-7.87	3.01	-4.86	7.35	Pass
	11	2462	-6.78	3.01	-3.77	7.35	Pass

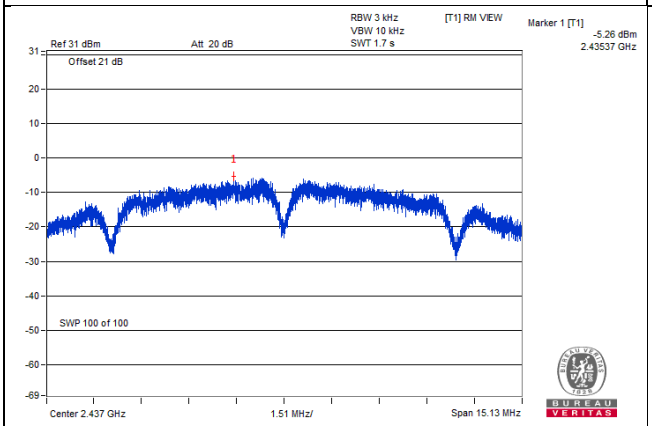
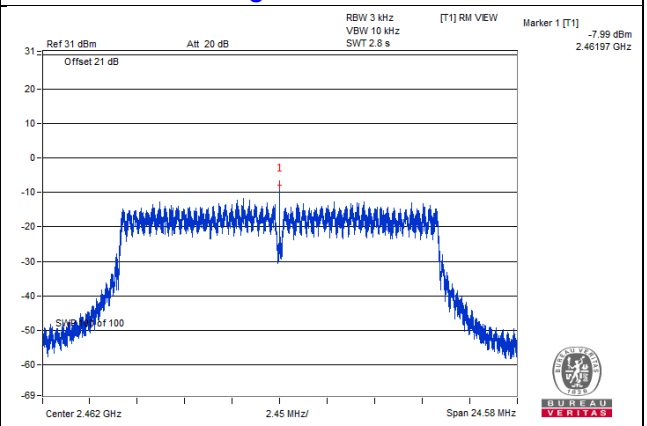
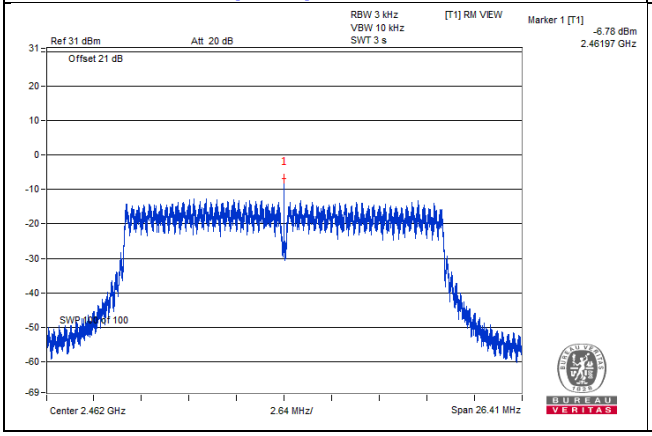
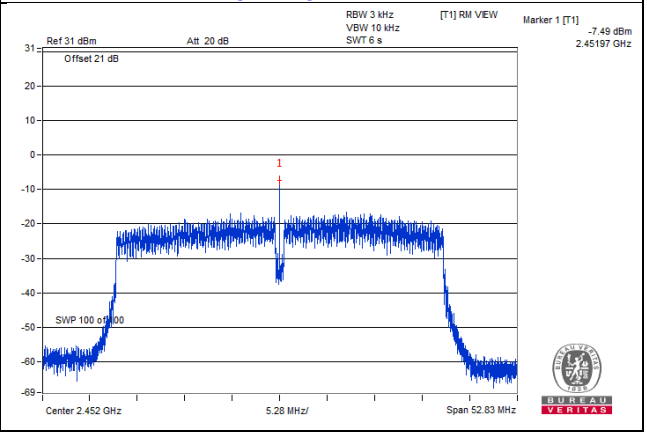
Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 6.65dBi > 6dBi, so the power density limit shall be reduced to 8-(6.65-6) = 7.35dBm.

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	-11.20	3.01	0.16	-8.03	7.35	Pass
	6	2437	-8.03	3.01	0.16	-4.86	7.35	Pass
	9	2452	-7.49	3.01	0.16	-4.32	7.35	Pass
1	3	2422	-15.00	3.01	0.16	-11.83	7.35	Pass
	6	2437	-10.96	3.01	0.16	-7.79	7.35	Pass
	9	2452	-10.37	3.01	0.16	-7.20	7.35	Pass

Note: 1. Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 6.65dBi > 6dBi, so the power density limit shall be reduced to 8-(6.65-6) = 7.35dBm.

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

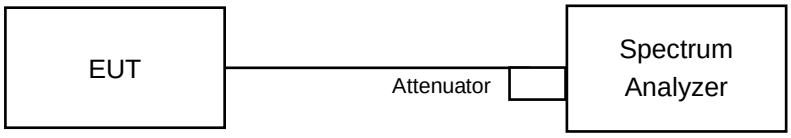
Spectrum Plot of Worst Value	
802.11b / Chain 1 : CH6	**802.11g / Chain 1 : CH11**
	
802.11n (HT20) / Chain 1 : CH11	**802.11n (HT40) / Chain 0 : CH9**
	

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

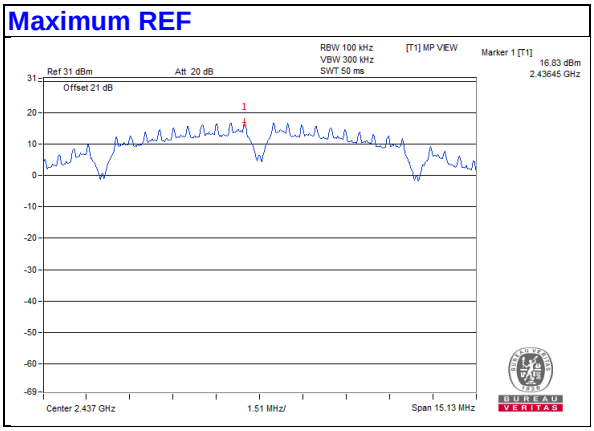
Same as Item 4.3.6

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.

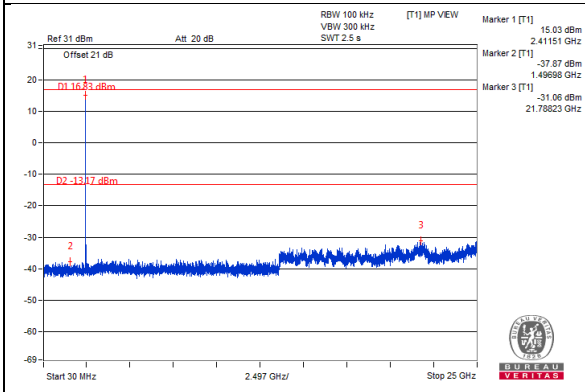
802.11b

Maximum REF

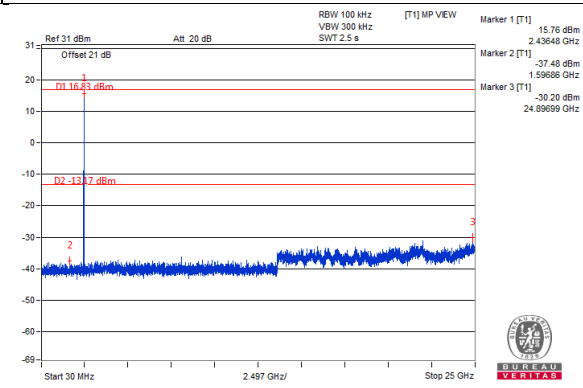


Chain 0

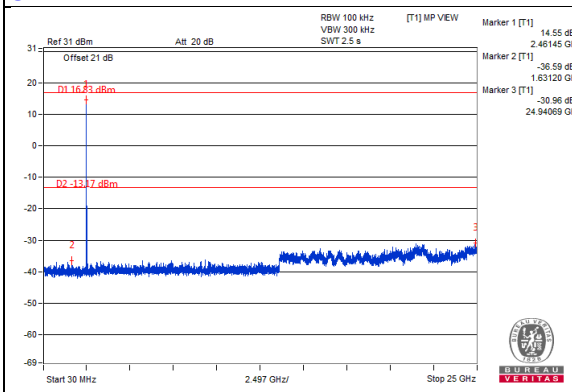
CH 1



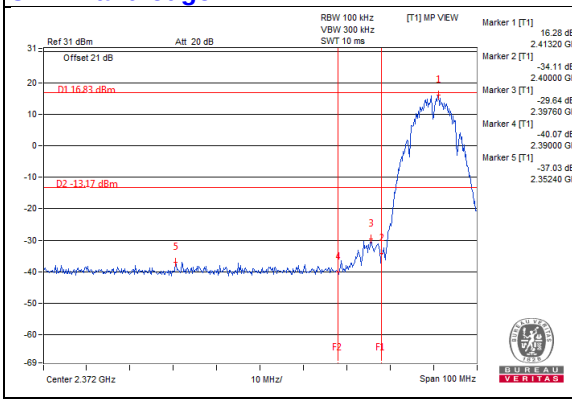
CH 6



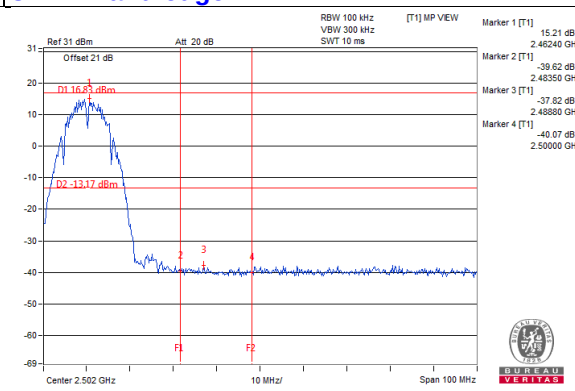
CH 11



CH 1 Band edge

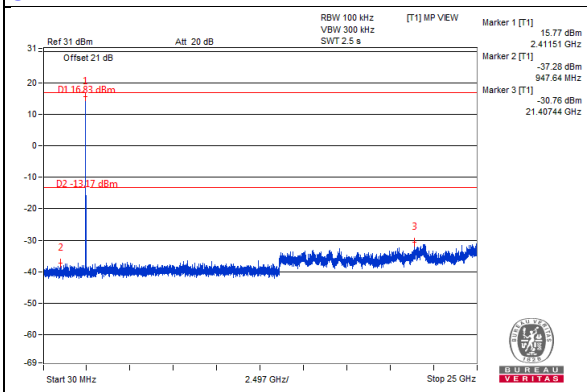


CH 11 Band edge

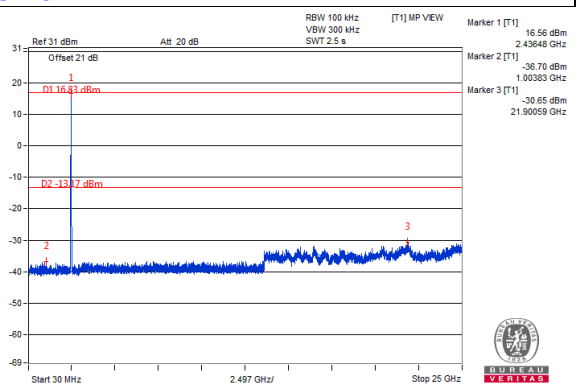


Chain 1

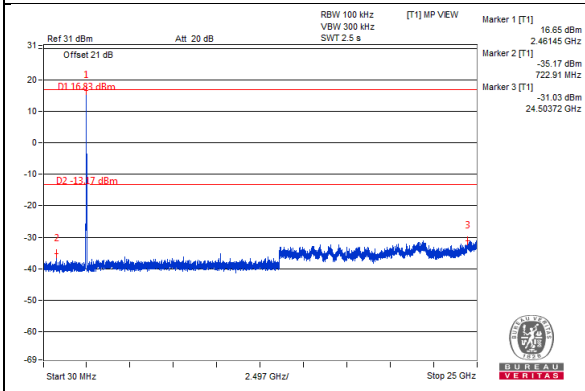
CH 1



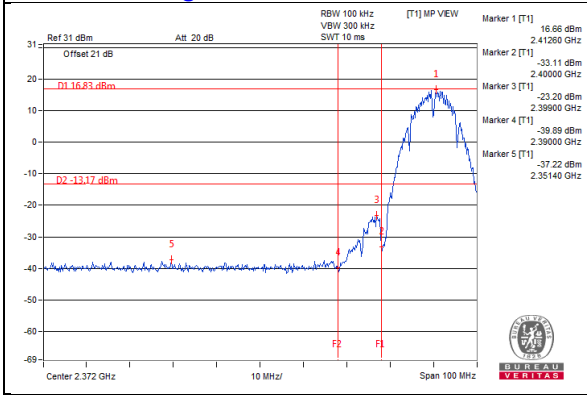
CH 6



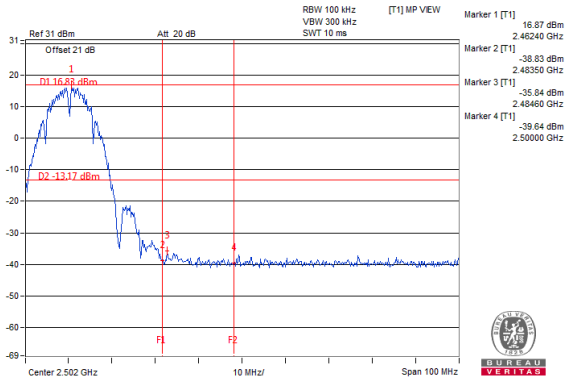
CH 11



CH 1 Band edge

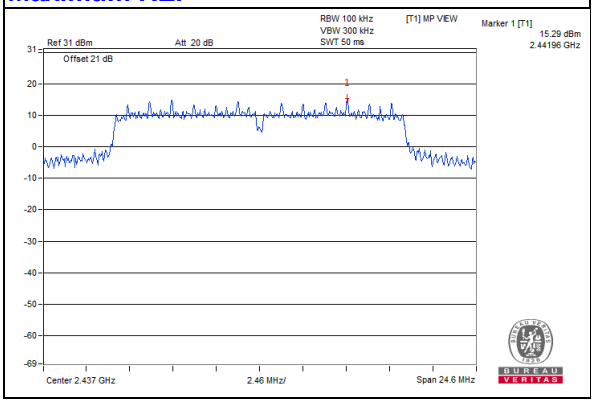


CH 11 Band edge



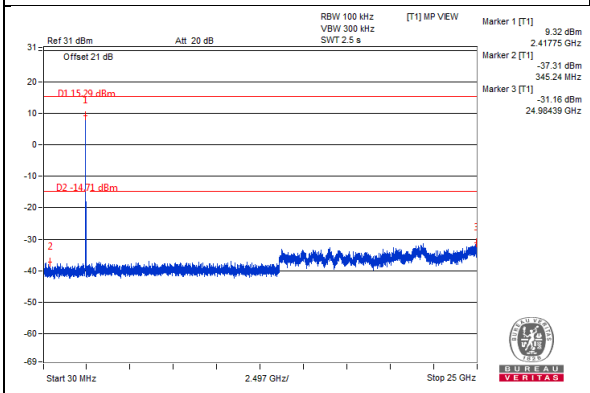
802.11g

Maximum REF

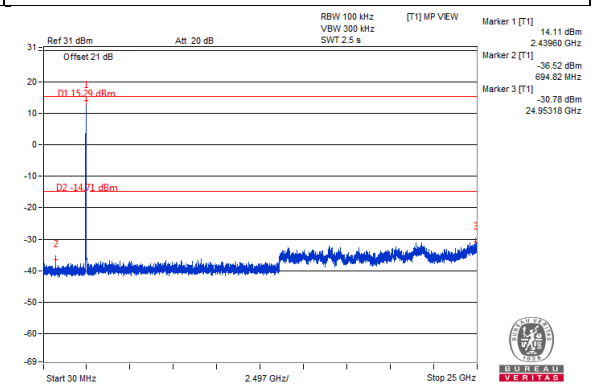


Chain 0

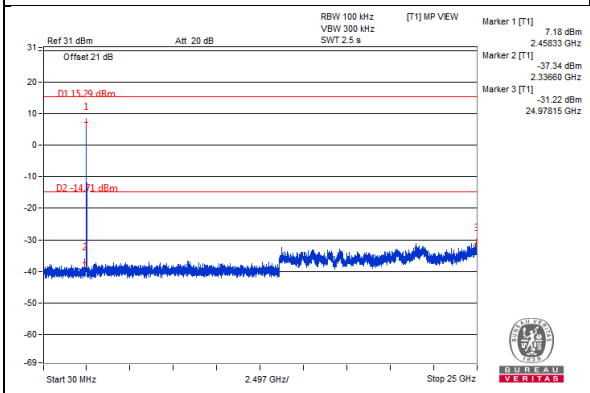
CH 1



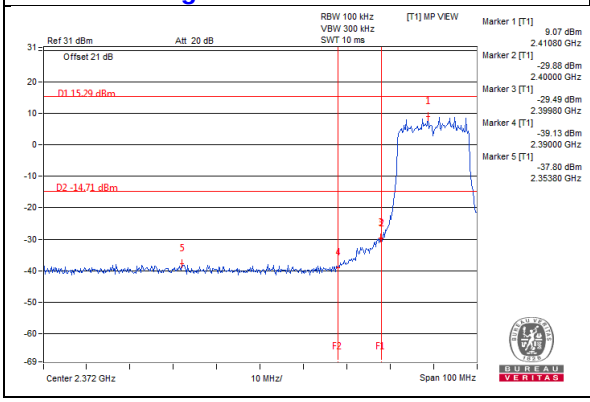
CH 6



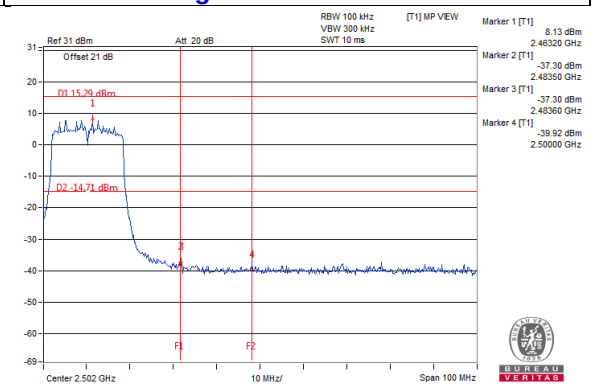
CH 11



CH 1 Band edge

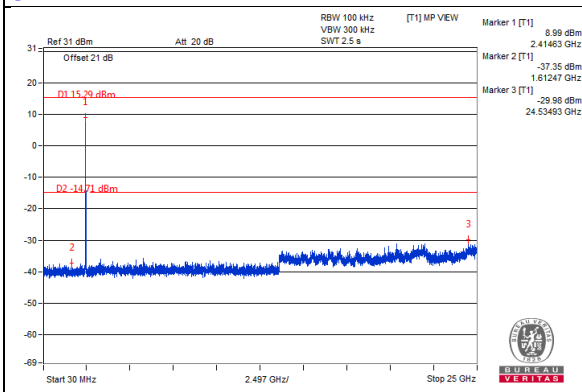


CH 11 Band edge

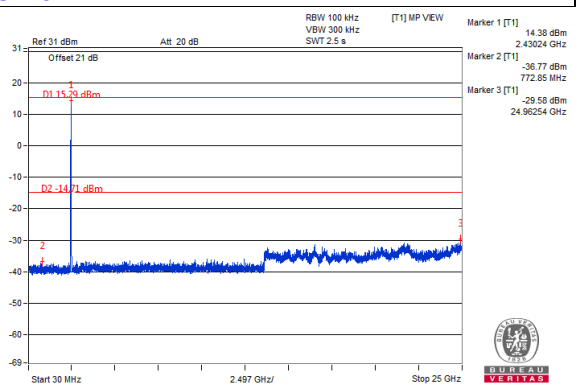


Chain 1

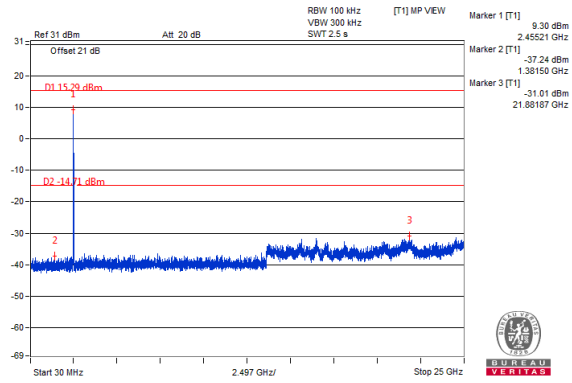
CH 1



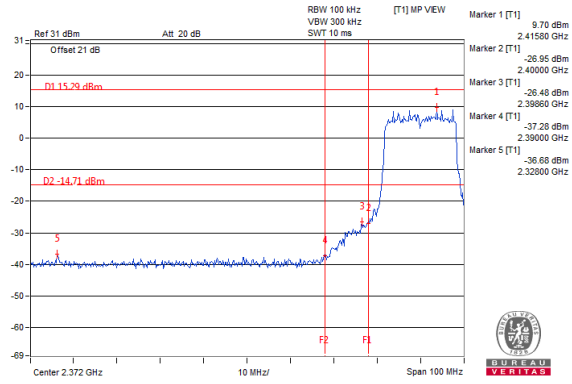
CH 6



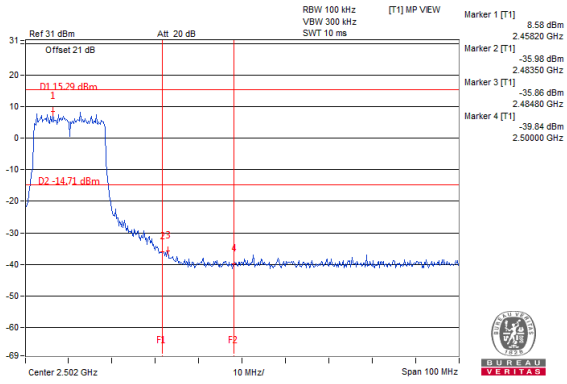
CH 11



CH 1 Band edge

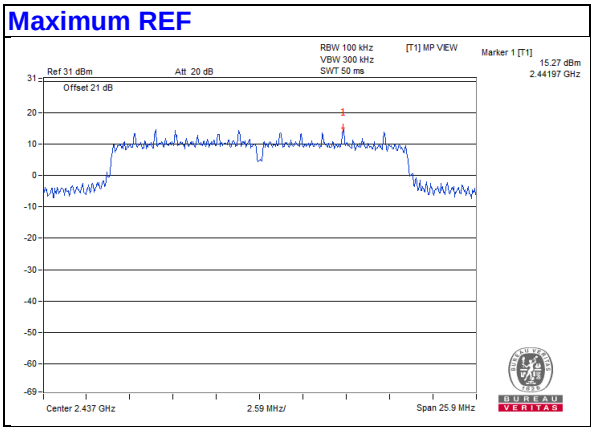


CH 11 Band edge



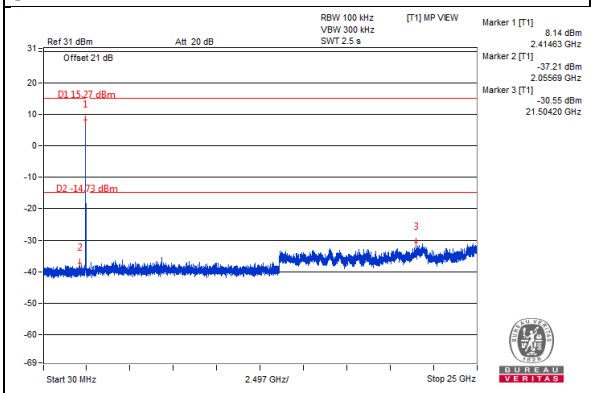
802.11n (HT20)

Maximum REF

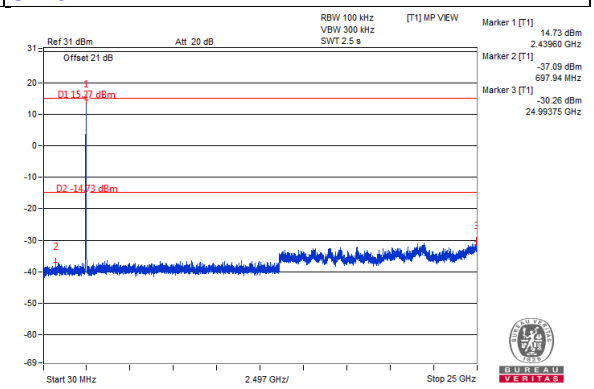


Chain 0

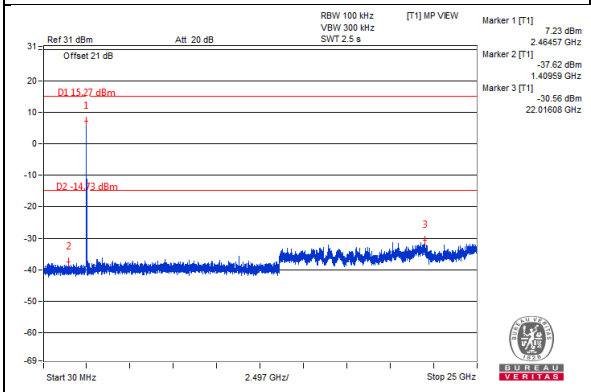
CH 1



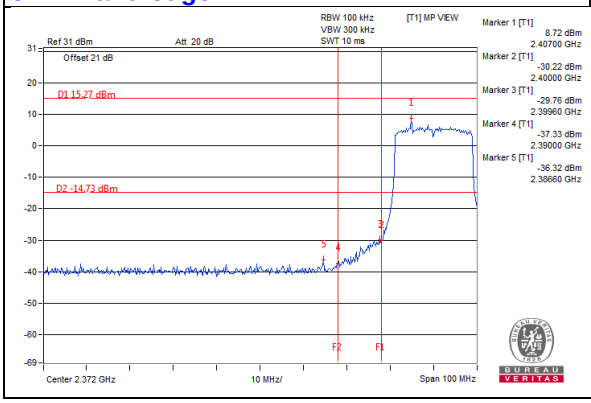
CH 6



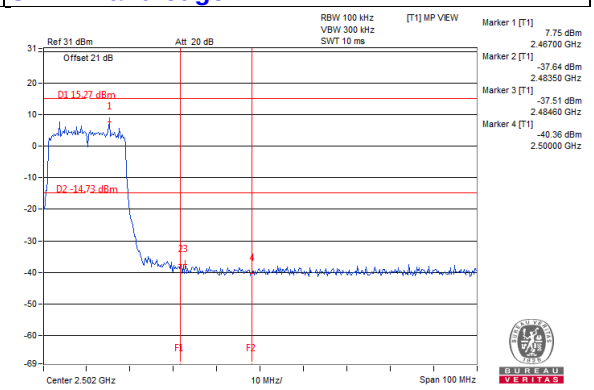
CH 11



CH 1 Band edge

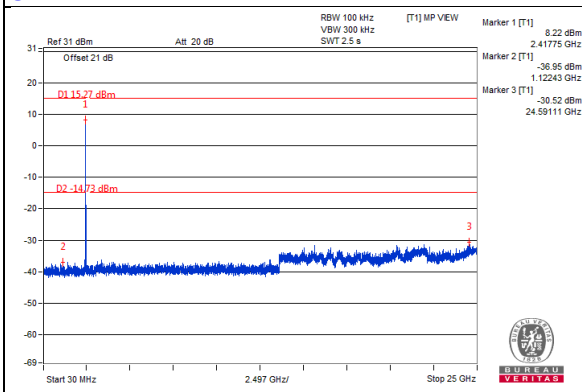


CH 11 Band edge

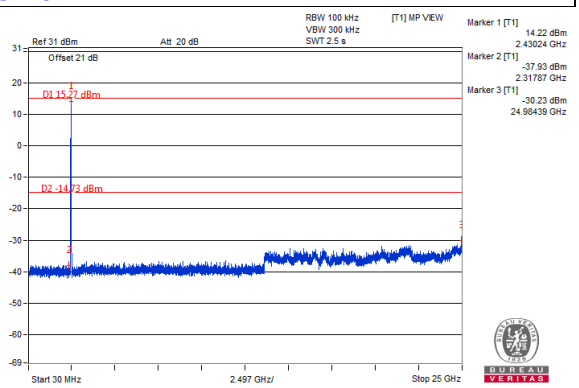


Chain 1

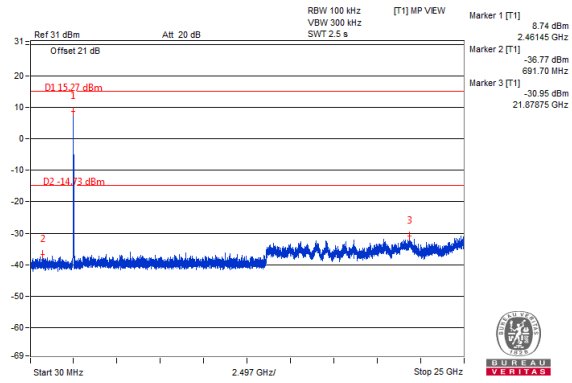
CH 1



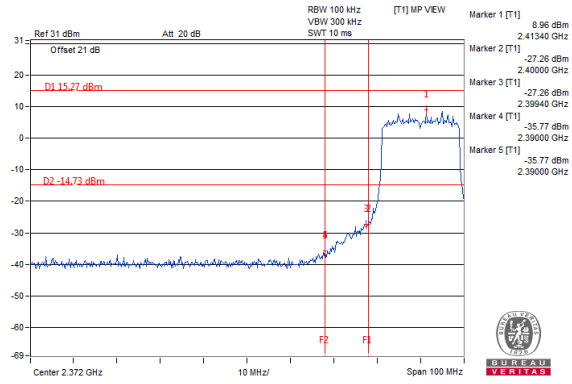
CH 6



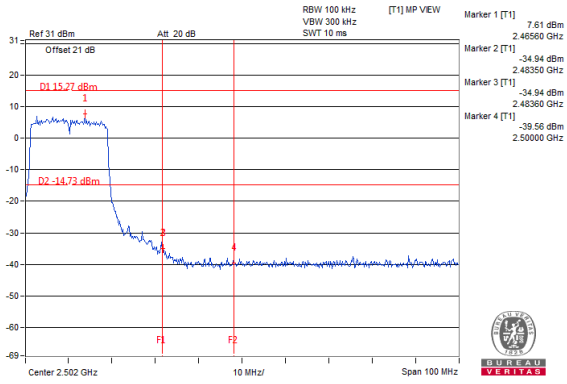
CH 11



CH 1 Band edge

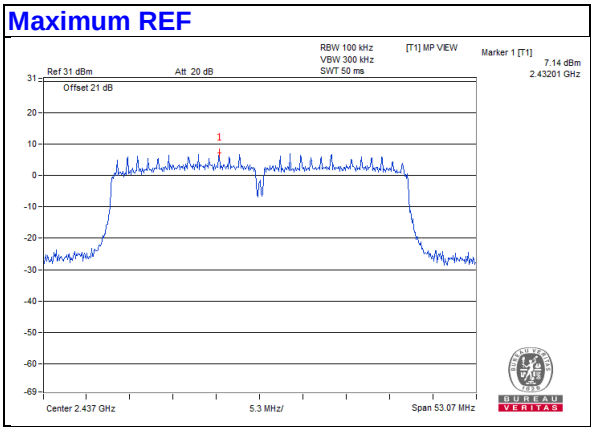


CH 11 Band edge



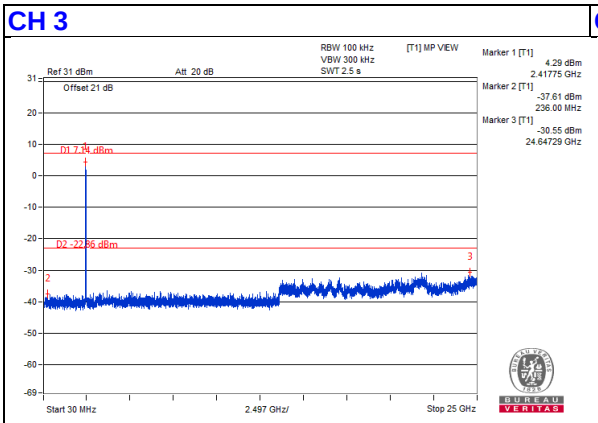
802.11n (HT40)

Maximum REF

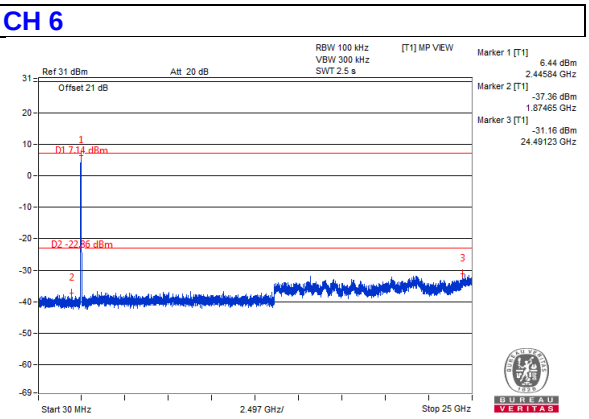


Chain 0

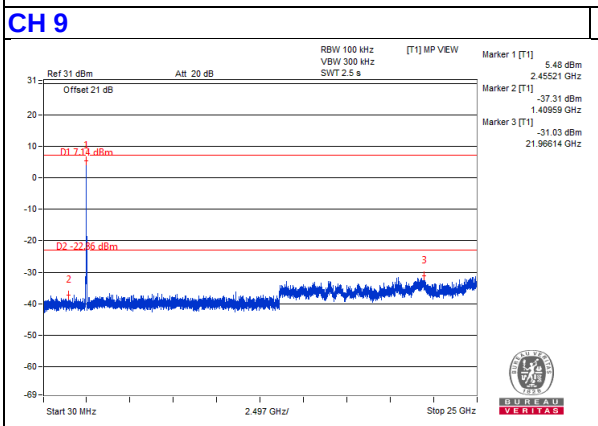
CH 3



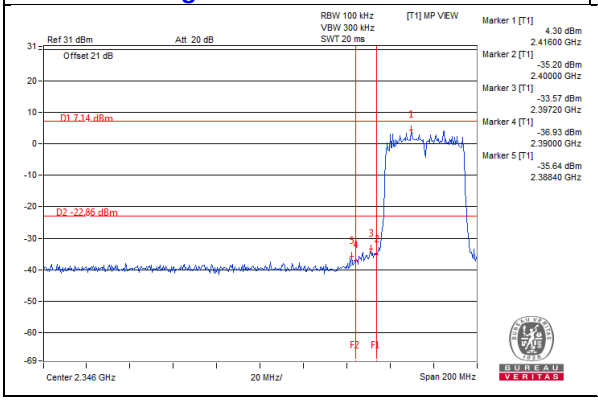
CH 6



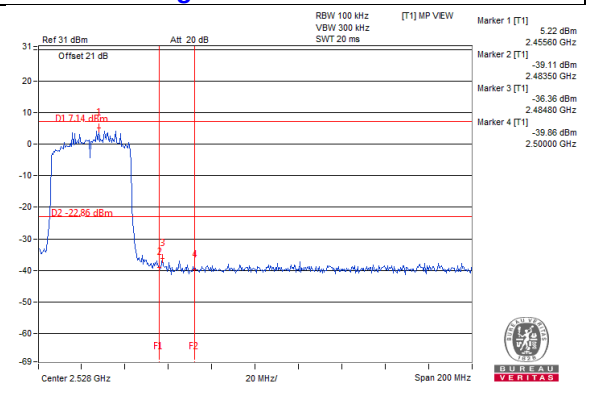
CH 9



CH 3 Band edge

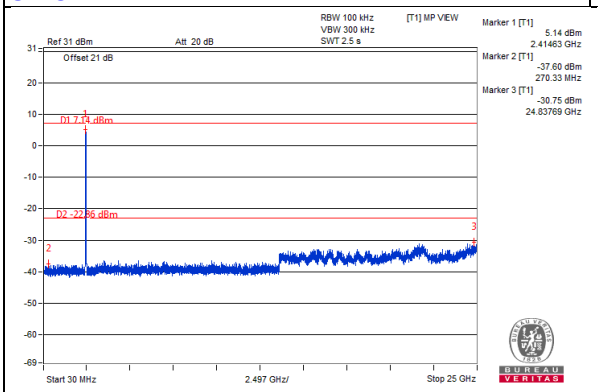


CH 9 Band edge

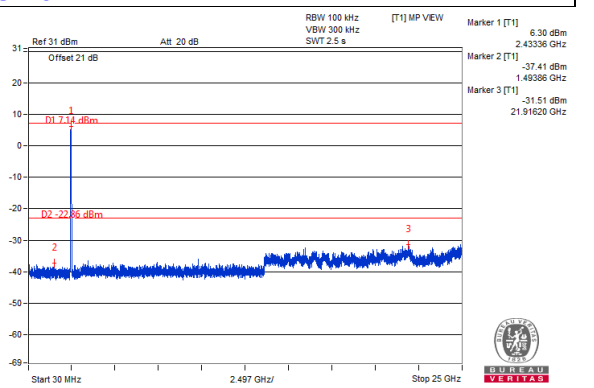


Chain 1

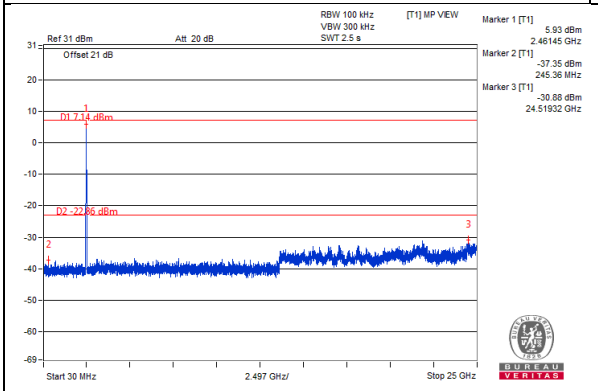
CH 3



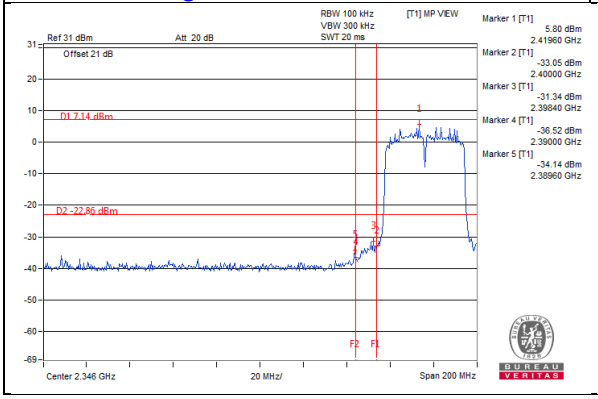
CH 6



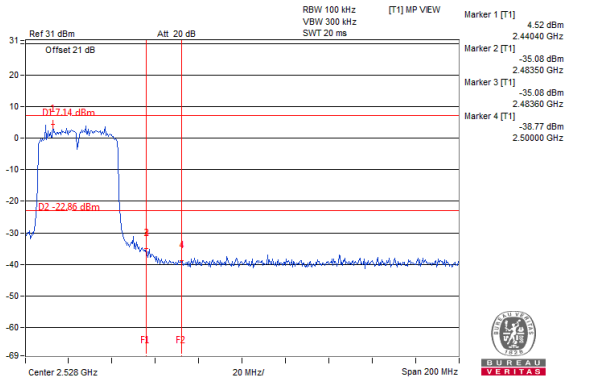
CH 9



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 ---