Report No.:	RF190122E03
FCC ID:	PKRISGSKR3MD8800
Test Model:	SKR3MD8800
Received Date:	Jan. 14, 2019
Test Date:	Jan. 19 to 26, 2019
Issued Date:	Mar. 06, 2019
Applicant:	Inseego Corp.
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

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Release Control Record

Issue No.	Description	Date Issued
RF190122E03	Original release.	Mar. 06, 2019

1 Certificate of Conformity

Product:	4G LTE Wireless Router
Brand:	Inseego
Test Model:	SKR3MD8800
Sample Status:	ENGINEERING SAMPLE
Applicant:	Inseego Corp.
Test Date:	Jan. 19 to 26, 2019
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10: 2013

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

Prepared by : _____ , **Date:** Mar. 06, 2019

Phoenix Huang / Specialist

Approved by : _____ , **Date:** Mar. 06, 2019

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 -12.52dB at 0.43516MHz.
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.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is R-SMA not a standard connector.

Note:
Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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	4.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.12 dB
	6GHz ~ 18GHz	4.86 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 (WLAN)

Product	4G LTE Wireless Router
Brand	Inseego
Test Model	SKR3MD8800
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc ~ 24Vdc
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode 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 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), 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	**2.412 ~ 2.462GHz** **CDD Mode:** 608.881mW **Beamforming Mode:** 516.453mW **5.18 ~ 5.24GHz** **CDD Mode:** 323.377mW **Beamforming Mode:** 310.293mW **5.745 ~ 5.825GHz** **CDD Mode:** 524.248mW **Beamforming Mode:** 481.695mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3
WLAN (2.4GHz + 5GHz)	Bluetooth + GPS	WWAN

2. Simultaneously transmission condition.

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

3. The antennas and antenna RF cables (option) provided to the EUT, please refer to the following table:

Antenna No.	Brand Name	Model Name	Antenna Gain (dBi)	Frequency Range	Antenna Type	Antenna Connector Type
WLAN_1	RF link	RF21S00506AX1	4.11	2.4~2.4835GHz	Dipole	R-SMA
			6.12	5.15~5.85GHz		
WLAN_2	M.gear	C037-511343-A	4.11	2.4~2.4835GHz	Dipole	R-SMA
			6.12	5.15~5.85GHz		
BT_ANT	RF link	RF21S00506AX1	4.11	2,402~2,480GHz	Dipole	R-SMA
WWAN_1_1	-	SWX-614XRSXX-999	2.1	1850 MHz to 1910 MHz	Dipole	SMA
			1.8	1710 MHz to 1755 MHz		
			1.8	824 MHz to 849 MHz		
			2.7	2500 MHz to 2570 MHz		
			0.4	777 MHz to 787 MHz		
			0.4	788 MHz to 798 MHz		
			1.8	1710 MHz to 1780 MHz		
WWAN_1_2	-	SWX-614XRSXX-999	2.1	1850 MHz to 1910 MHz	Dipole	SMA
			1.8	1710 MHz to 1755 MHz		
			1.8	824 MHz to 849 MHz		
			2.7	2500 MHz to 2570 MHz		
			0.4	777 MHz to 787 MHz		
			0.4	788 MHz to 798 MHz		
			1.8	1710 MHz to 1780 MHz		
GPS_ANT	-	-	2.4	1575.4	Dipole	SMA

Antenna RF Cable (Option)			
For WLAN & BT	Cable Loss (dB)	Frequency Range	Cable Connector Type
	3.5	1850 MHz to 1910 MHz	R-SMA
	3.5	1710 MHz to 1755 MHz	
	2.5	824 MHz to 849 MHz	
	4.5	2.4~2.4835 GHz	
	4.5	2500 MHz to 2570 MHz	
	2.5	777 MHz to 787 MHz	
	2.5	788 MHz to 798 MHz	
	3.5	1710 MHz to 1780 MHz	
	4.5	3550 MHz to 3700 MHz	
	6.93	5.15~5.85GHz	
For WWAN & GPS	Cable Loss (dB)	Frequency Range	Cable Connector Type
	3.5	1850 MHz to 1910 MHz	SMA
	3.5	1710 MHz to 1755 MHz	
	2.5	824 MHz to 849 MHz	
	4.5	2.4~2.4835 GHz	
	4.5	2500 MHz to 2570 MHz	
	2.5	777 MHz to 787 MHz	
	2.5	788 MHz to 798 MHz	
	3.5	1710 MHz to 1780 MHz	
	4.5	3550 MHz to 3700 MHz	
	6.93	5.15~5.85GHz	

4. The EUT was pre-tested under the following modes:

For Radiated Emission test	
Pre-test Mode	Description
Mode A	EUT (X plane) without antenna cable: 12Vdc power from adapter
Mode B	EUT (Y plane) without antenna cable: 12Vdc power from power supply
Mode C	EUT (X plane) without antenna cable: 24Vdc power from power supply
Mode D	**EUT (Y plane) without antenna cable: 24Vdc power from power supply**
Mode E	EUT (Y plane) with antenna cable: 24Vdc power from power supply
From the above modes, the worst case was found in **Mode D**. Therefore only the test data of the mode was recorded in this report.	
For AC Power Conducted Emission test	
Pre-test Mode	Description
Mode F	**12Vdc power from adapter**
Mode G	12Vdc power from power supply
Mode H	24Vdc power from power supply
From the above modes, the worst case was found in **Mode F**. Therefore only the test data of the mode was recorded in this report.	

5. The EUT incorporates a MIMO function.

2.4GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11b	2TX	2RX
802.11g	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
VHT20	2TX	2RX
VHT40	2TX	2RX
5GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11a	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
802.11ac (VHT20)	2TX	2RX
802.11ac (VHT40)	2TX	2RX
802.11ac (VHT80)	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.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

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), VHT20:

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), VHT40:

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	
-	√	√	√	√	-

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: The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **Y-plane**.

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
VHT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
VHT40	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
VHT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
VHT40	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:

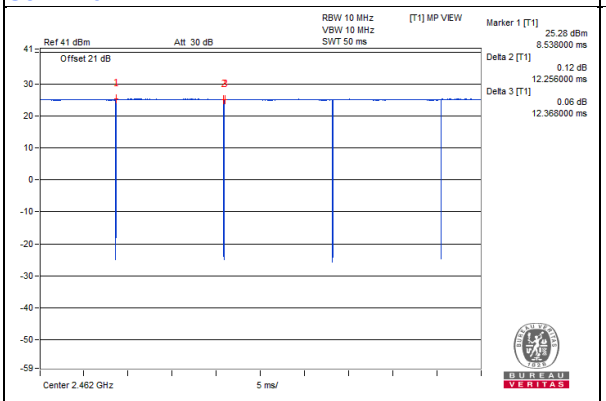
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	22deg. C, 67%RH	120Vac, 60Hz	Steven Chiang
RE<1G	22deg. C, 69%RH	120Vac, 60Hz	Steven Chiang
PLC	23deg. C, 74%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Junchun Lin

3.3 Duty Cycle of Test Signal

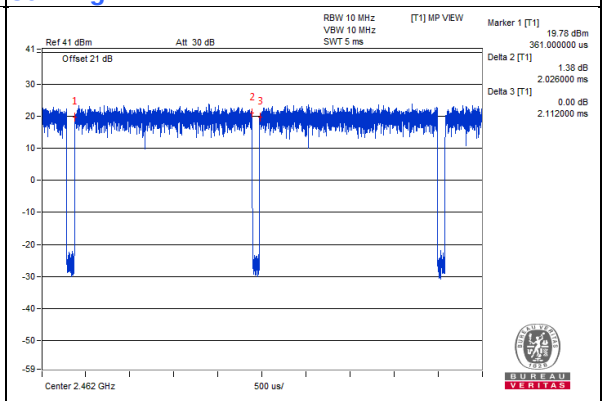
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle = 12.256 ms/12.368 ms = 0.991
802.11g: Duty cycle = 2.026 ms/2.112 ms = 0.959, Duty factor = 10 * log (1/Duty cycle) = 0.18
VHT20: Duty cycle = 4.947 ms/5.047 ms = 0.98
VHT40: Duty cycle = 2.401 ms/2.491 ms = 0.964, Duty factor = 10 * log (1/Duty cycle) = 0.16

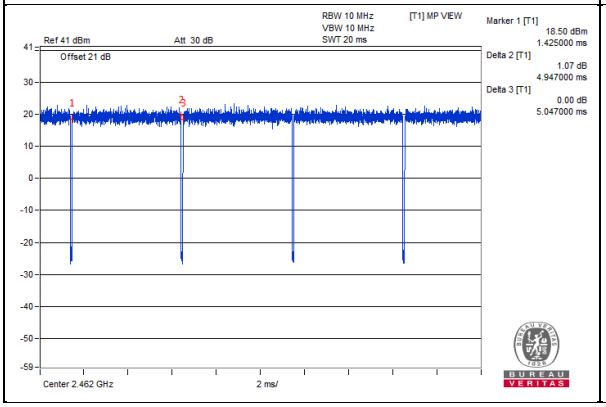
802.11b



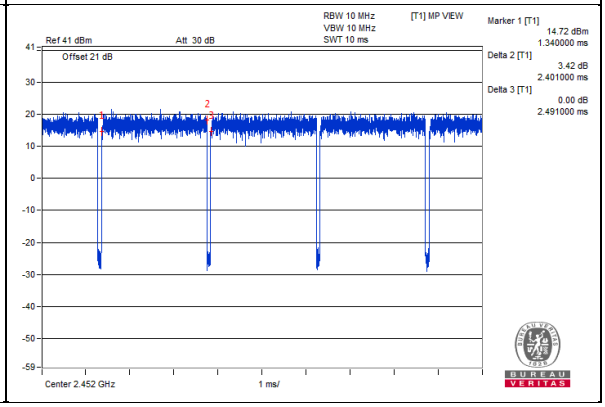
802.11g



VHT20



VHT40



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.	DC Power Supply	GOOD WILL INSTRUMENT CO., LTD.	GPC-3030D	7700087	NA	Provided by Lab
B.	PoE Load	Luxul	XAP-1440	NA	NA	Supplied by client
C.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
D.	iPod	Apple	MD778TA/A	CC4JMH7LF4T1	NA	Provided by Lab
E.	SIM Card	R&S	CRT-Z3	NA	NA	Provided by Lab
F.	Adapter	CWT	2ABF060F	NA	NA	Supplied by client

Note:

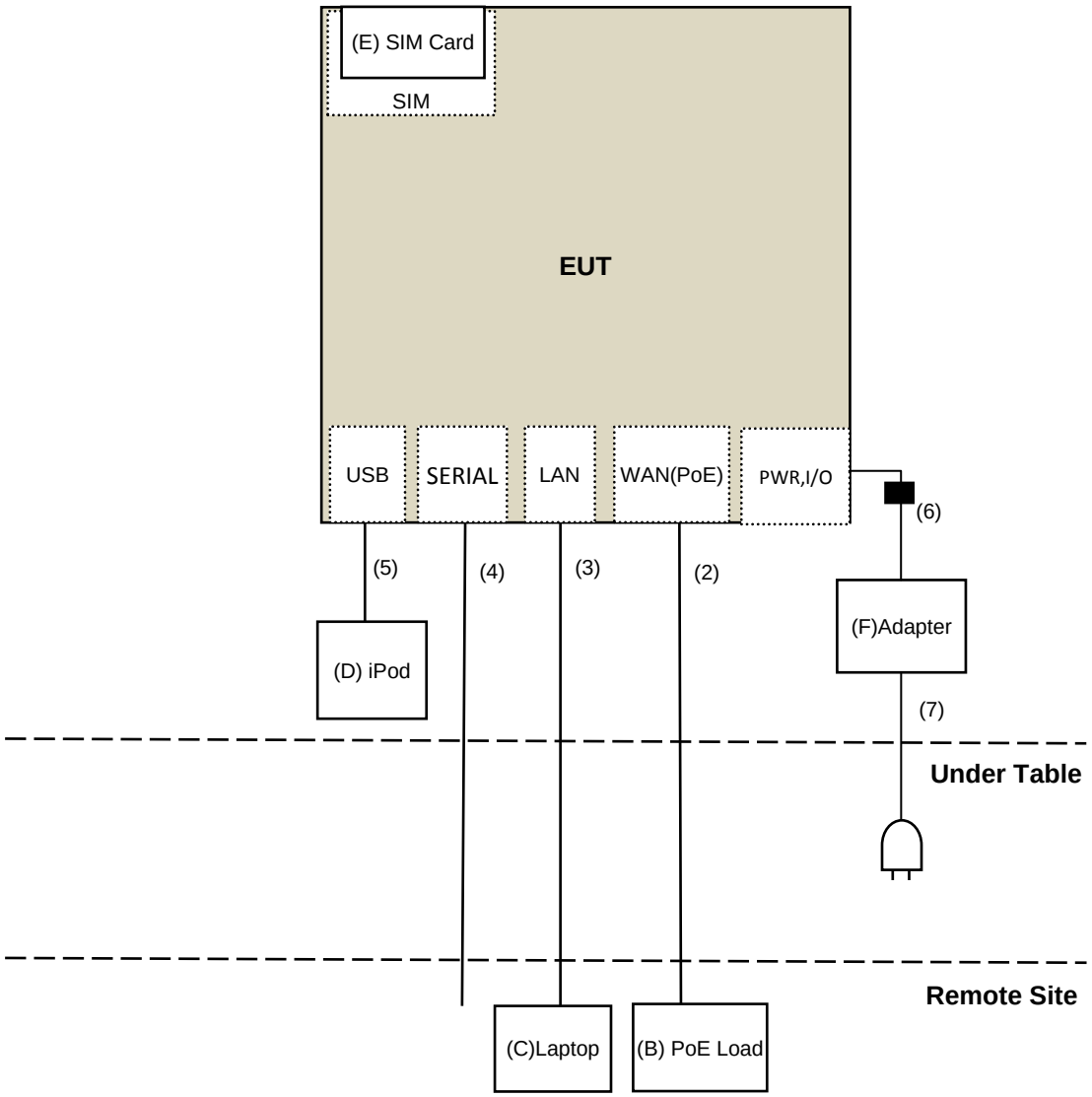
1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.4	No	0	Supplied by client
2.	RJ-45 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.	USB Cable	1	0.1	Yes	0	Provided by Lab
6.	DC Cable	1	1.2	No	1	Supplied by client
7.	AC Cable	1	0.8	No	0	Supplied by client

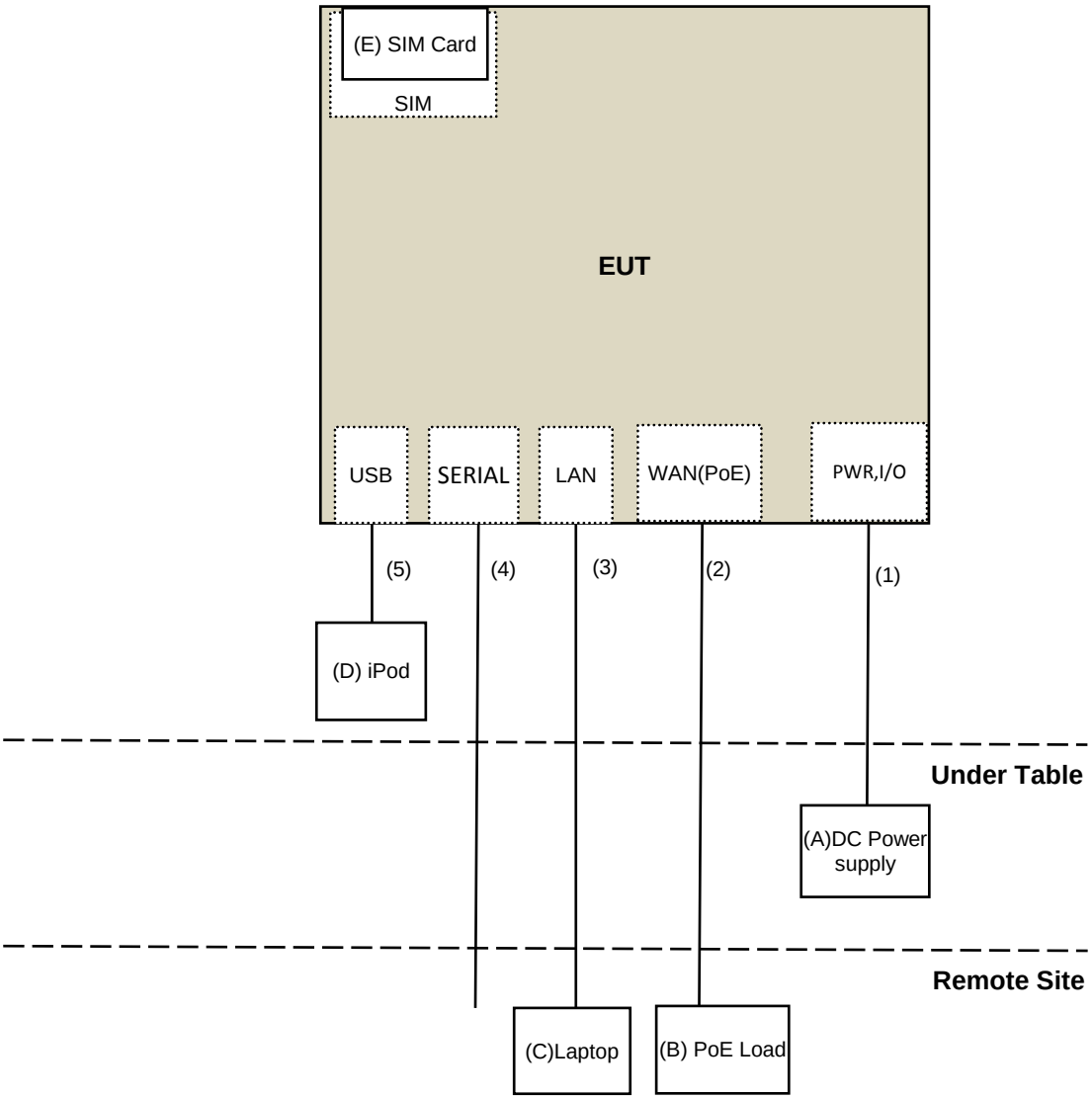
Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test

For Power Line Conducted Emission test:



For other 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 15.247 Meas Guidance v05
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	269	Sep. 07, 2018	Sep. 06, 2019
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Oct. 30, 2018	Oct. 29, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 22, 2018	Nov. 21, 2019
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	Sep. 27, 2018	Sep. 26, 2019
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 25, 2018	Nov. 24, 2019
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	Nov. 25, 2018	Nov. 24, 2019
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
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 16, 2018	Apr. 15, 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 test was performed in 966 Chamber No. 4.
3. The CANADA Site Registration No. is 20331-2
4. Tested Date: Jan. 19 to 26, 2019

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:

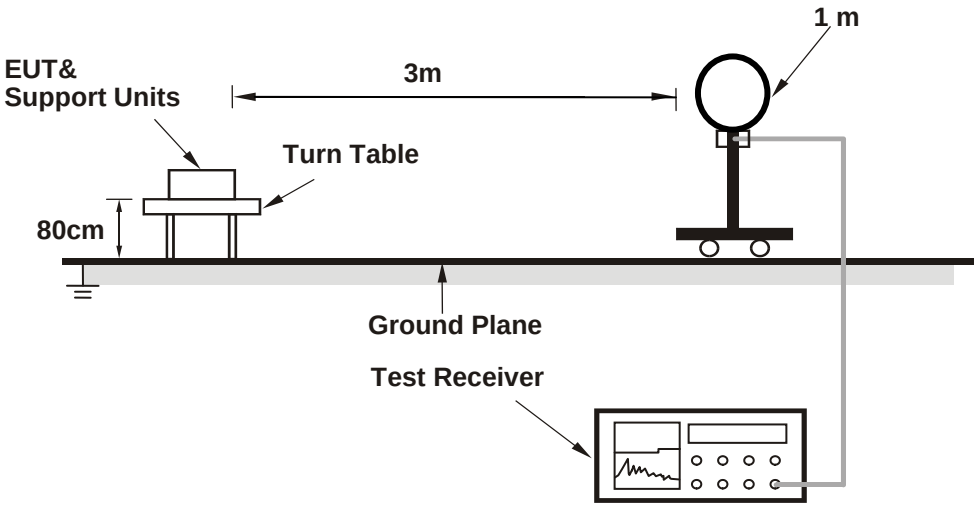
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

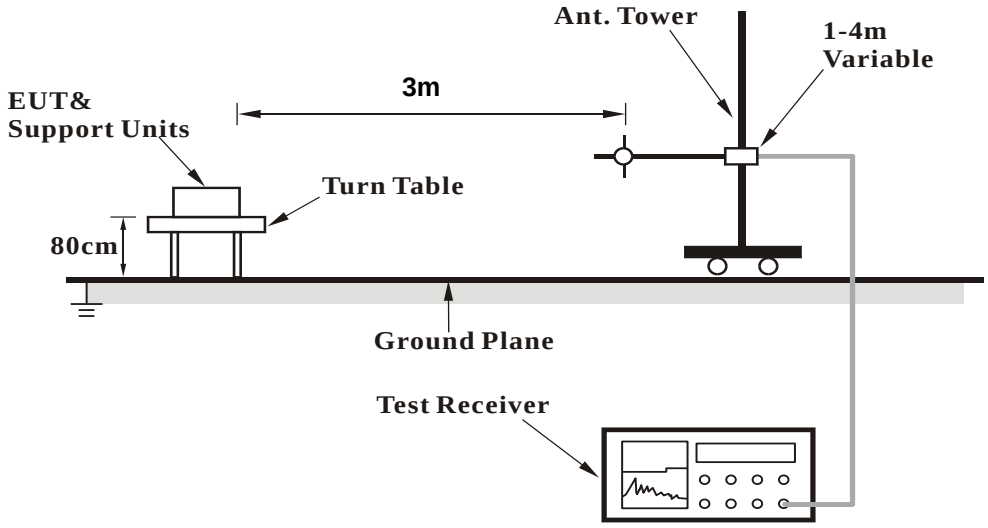
No deviation.

4.1.5 Test Setup

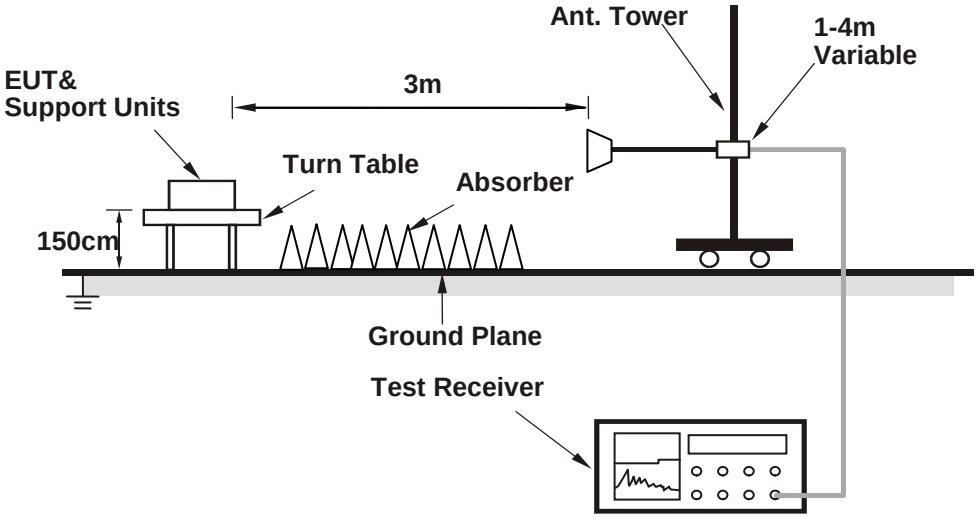
For Radiated emission below 30MHz



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 (1.0.38)) 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	56.2 PK	74.0	-17.8	1.08 H	120	58.2	-2.0
2	2390.00	45.6 AV	54.0	-8.4	1.08 H	120	47.6	-2.0
3	*2412.00	106.4 PK			1.08 H	120	108.5	-2.1
4	*2412.00	104.4 AV			1.08 H	120	106.5	-2.1
5	4824.00	45.7 PK	74.0	-28.3	1.92 H	300	43.7	2.0
6	4824.00	42.8 AV	54.0	-11.2	1.92 H	300	40.8	2.0
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	2390.00	60.6 PK	74.0	-13.4	2.44 V	147	62.6	-2.0
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**2.44 V**	**147**	**55.9**	**-2.0**
3	*2412.00	113.1 PK			2.44 V	147	115.2	-2.1
4	*2412.00	111.1 AV			2.44 V	147	113.2	-2.1
5	4824.00	54.7 PK	74.0	-19.3	1.06 V	346	52.7	2.0
6	4824.00	53.7 AV	54.0	-0.3	1.06 V	346	51.7	2.0

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	54.7 PK	74.0	-19.3	1.05 H	146	56.7	-2.0
2	2390.00	44.2 AV	54.0	-9.8	1.05 H	146	46.2	-2.0
3	*2437.00	109.3 PK			1.05 H	146	111.5	-2.2
4	*2437.00	107.2 AV			1.05 H	146	109.4	-2.2
5	2483.50	53.2 PK	74.0	-20.8	1.05 H	146	55.4	-2.2
6	2483.50	41.4 AV	54.0	-12.6	1.05 H	146	43.6	-2.2
7	4874.00	41.8 PK	74.0	-32.2	1.88 H	303	39.8	2.0
8	4874.00	38.6 AV	54.0	-15.4	1.88 H	303	36.6	2.0
9	7311.00	43.3 PK	74.0	-30.7	2.00 H	329	34.8	8.5
10	7311.00	31.7 AV	54.0	-22.3	2.00 H	329	23.2	8.5
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	59.1 PK	74.0	-14.9	2.16 V	154	61.1	-2.0
2	2390.00	52.5 AV	54.0	-1.5	2.16 V	154	54.5	-2.0
3	*2437.00	116.0 PK			2.16 V	154	118.2	-2.2
4	*2437.00	113.9 AV			2.16 V	154	116.1	-2.2
5	2483.50	57.6 PK	74.0	-16.4	2.16 V	154	59.8	-2.2
6	2483.50	49.7 AV	54.0	-4.3	2.16 V	154	51.9	-2.2
7	4874.00	50.8 PK	74.0	-23.2	1.29 V	183	48.8	2.0
8	4874.00	49.5 AV	54.0	-4.5	1.29 V	183	47.5	2.0
9	7311.00	43.7 PK	74.0	-30.3	1.67 V	55	35.2	8.5
10	7311.00	32.4 AV	54.0	-21.6	1.67 V	55	23.9	8.5

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			1.00 H	133	111.8	-2.2
2	*2462.00	107.4 AV			1.00 H	133	109.6	-2.2
3	2483.50	55.1 PK	74.0	-18.9	1.00 H	133	57.3	-2.2
4	2483.50	44.7 AV	54.0	-9.3	1.00 H	133	46.9	-2.2
5	4924.00	45.4 PK	74.0	-28.6	1.91 H	303	43.4	2.0
6	4924.00	42.6 AV	54.0	-11.4	1.91 H	303	40.6	2.0
7	7386.00	44.2 PK	74.0	-29.8	1.99 H	329	35.6	8.6
8	7386.00	31.7 AV	54.0	-22.3	1.99 H	329	23.1	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	116.3 PK			2.16 V	154	118.5	-2.2
2	*2462.00	114.1 AV			2.16 V	154	116.3	-2.2
3	2483.50	59.5 PK	74.0	-14.5	2.16 V	154	61.7	-2.2
4	2483.50	53.0 AV	54.0	-1.0	2.16 V	154	55.2	-2.2
5	4924.00	54.4 PK	74.0	-19.6	1.26 V	185	52.4	2.0
6	4924.00	53.5 AV	54.0	-0.5	1.26 V	185	51.5	2.0
7	7386.00	44.6 PK	74.0	-29.4	1.44 V	17	36.0	8.6
8	7386.00	32.4 AV	54.0	-21.6	1.44 V	17	23.8	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	66.0 PK	74.0	-8.0	1.12 H	114	68.0	-2.0
2	2390.00	45.3 AV	54.0	-8.7	1.12 H	114	47.3	-2.0
3	*2412.00	105.7 PK			1.12 H	114	107.8	-2.1
4	*2412.00	95.1 AV			1.12 H	114	97.2	-2.1
5	4824.00	45.5 PK	74.0	-28.5	1.63 H	233	43.5	2.0
6	4824.00	33.3 AV	54.0	-20.7	1.63 H	233	31.3	2.0
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	2390.00	70.4 PK	74.0	-3.6	2.21 V	328	72.4	-2.0
2	2390.00	53.6 AV	54.0	-0.4	2.21 V	328	55.6	-2.0
3	*2412.00	112.4 PK			2.21 V	328	114.5	-2.1
4	*2412.00	101.8 AV			2.21 V	328	103.9	-2.1
5	4824.00	51.9 PK	74.0	-22.1	1.51 V	360	49.9	2.0
6	4824.00	40.5 AV	54.0	-13.5	1.51 V	360	38.5	2.0

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	61.7 PK	74.0	-12.3	1.09 H	136	63.7	-2.0
2	2390.00	38.8 AV	54.0	-15.2	1.09 H	136	40.8	-2.0
3	*2437.00	111.1 PK			1.09 H	136	113.3	-2.2
4	*2437.00	101.3 AV			1.09 H	136	103.5	-2.2
5	2483.50	65.6 PK	74.0	-8.4	1.09 H	136	67.8	-2.2
6	2483.50	41.1 AV	54.0	-12.9	1.09 H	136	43.3	-2.2
7	4874.00	47.5 PK	74.0	-26.5	1.57 H	243	45.5	2.0
8	4874.00	35.2 AV	54.0	-18.8	1.57 H	243	33.2	2.0
9	7311.00	47.4 PK	74.0	-26.6	1.48 H	125	38.9	8.5
10	7311.00	34.9 AV	54.0	-19.1	1.48 H	125	26.4	8.5
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	2.12 V	330	68.1	-2.0
2	2390.00	47.1 AV	54.0	-6.9	2.12 V	330	49.1	-2.0
3	*2437.00	117.8 PK			2.12 V	330	120.0	-2.2
4	*2437.00	108.0 AV			2.12 V	330	110.2	-2.2
5	2483.50	70.0 PK	74.0	-4.0	2.12 V	330	72.2	-2.2
6	2483.50	49.4 AV	54.0	-4.6	2.12 V	330	51.6	-2.2
7	4874.00	54.6 PK	74.0	-19.4	1.52 V	360	52.6	2.0
8	4874.00	42.9 AV	54.0	-11.1	1.52 V	360	40.9	2.0
9	7311.00	45.8 PK	74.0	-28.2	1.53 V	360	37.3	8.5
10	7311.00	33.2 AV	54.0	-20.8	1.53 V	360	24.7	8.5

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	108.1 PK			1.13 H	131	110.3	-2.2
2	*2462.00	97.3 AV			1.13 H	131	99.5	-2.2
3	2483.50	66.6 PK	74.0	-7.4	1.13 H	131	68.8	-2.2
4	2483.50	45.4 AV	54.0	-8.6	1.13 H	131	47.6	-2.2
5	4924.00	45.8 PK	74.0	-28.2	1.63 H	228	43.8	2.0
6	4924.00	33.4 AV	54.0	-20.6	1.63 H	228	31.4	2.0
7	7386.00	45.6 PK	74.0	-28.4	1.52 H	118	37.0	8.6
8	7386.00	32.9 AV	54.0	-21.1	1.52 H	118	24.3	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	114.8 PK			2.16 V	325	117.0	-2.2
2	*2462.00	104.0 AV			2.16 V	325	106.2	-2.2
3	2483.50	71.0 PK	74.0	-3.0	2.16 V	325	73.2	-2.2
4	2483.50	53.7 AV	54.0	-0.3	2.16 V	325	55.9	-2.2
5	4924.00	52.2 PK	74.0	-21.8	1.48 V	359	50.2	2.0
6	4924.00	40.5 AV	54.0	-13.5	1.48 V	359	38.5	2.0
7	7386.00	43.5 PK	74.0	-30.5	1.57 V	360	34.9	8.6
8	7386.00	30.9 AV	54.0	-23.1	1.57 V	360	22.3	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.

VHT20

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	1.03 H	109	67.8	-2.0
2	2390.00	45.3 AV	54.0	-8.7	1.03 H	109	47.3	-2.0
3	*2412.00	104.6 PK			1.03 H	109	106.7	-2.1
4	*2412.00	93.0 AV			1.03 H	109	95.1	-2.1
5	4824.00	45.7 PK	74.0	-28.3	1.65 H	220	43.7	2.0
6	4824.00	33.2 AV	54.0	-20.8	1.65 H	220	31.2	2.0
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	2390.00	70.2 PK	74.0	-3.8	2.15 V	327	72.2	-2.0
2	2390.00	53.6 AV	54.0	-0.4	2.15 V	327	55.6	-2.0
3	*2412.00	111.3 PK			2.15 V	327	113.4	-2.1
4	*2412.00	99.7 AV			2.15 V	327	101.8	-2.1
5	4824.00	52.0 PK	74.0	-22.0	1.51 V	360	50.0	2.0
6	4824.00	40.4 AV	54.0	-13.6	1.51 V	360	38.4	2.0

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	60.1 PK	74.0	-13.9	1.12 H	109	62.1	-2.0
2	2390.00	42.5 AV	54.0	-11.5	1.12 H	109	44.5	-2.0
3	*2437.00	111.4 PK			1.12 H	109	113.6	-2.2
4	*2437.00	100.2 AV			1.12 H	109	102.4	-2.2
5	2483.50	59.6 PK	74.0	-14.4	1.12 H	109	61.8	-2.2
6	2483.50	37.7 AV	54.0	-16.3	1.12 H	109	39.9	-2.2
7	4874.00	46.9 PK	74.0	-27.1	1.58 H	227	44.9	2.0
8	4874.00	34.8 AV	54.0	-19.2	1.58 H	227	32.8	2.0
9	7311.00	47.3 PK	74.0	-26.7	1.49 H	122	38.8	8.5
10	7311.00	35.0 AV	54.0	-19.0	1.49 H	122	26.5	8.5
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	64.5 PK	74.0	-9.5	2.48 V	324	66.5	-2.0
2	2390.00	50.8 AV	54.0	-3.2	2.48 V	324	52.8	-2.0
3	*2437.00	118.1 PK			2.48 V	324	120.3	-2.2
4	*2437.00	106.9 AV			2.48 V	324	109.1	-2.2
5	2483.50	64.0 PK	74.0	-10.0	2.48 V	324	66.2	-2.2
6	2483.50	46.0 AV	54.0	-8.0	2.48 V	324	48.2	-2.2
7	4874.00	51.0 PK	74.0	-23.0	1.25 V	174	49.0	2.0
8	4874.00	49.5 AV	54.0	-4.5	1.25 V	174	47.5	2.0
9	7311.00	43.5 PK	74.0	-30.5	1.65 V	47	35.0	8.5
10	7311.00	32.2 AV	54.0	-21.8	1.65 V	47	23.7	8.5

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.6 PK			1.13 H	134	108.8	-2.2
2	*2462.00	94.6 AV			1.13 H	134	96.8	-2.2
3	2483.50	64.9 PK	74.0	-9.1	1.13 H	134	67.1	-2.2
4	2483.50	45.3 AV	54.0	-8.7	1.13 H	134	47.5	-2.2
5	4924.00	45.4 PK	74.0	-28.6	1.65 H	237	43.4	2.0
6	4924.00	33.4 AV	54.0	-20.6	1.65 H	237	31.4	2.0
7	7386.00	45.4 PK	74.0	-28.6	1.58 H	100	36.8	8.6
8	7386.00	32.8 AV	54.0	-21.2	1.58 H	100	24.2	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	113.3 PK			2.20 V	324	115.5	-2.2
2	*2462.00	101.3 AV			2.20 V	324	103.5	-2.2
3	2483.50	69.3 PK	74.0	-4.7	2.20 V	324	71.5	-2.2
4	2483.50	53.6 AV	54.0	-0.4	2.20 V	324	55.8	-2.2
5	4924.00	52.3 PK	74.0	-21.7	1.51 V	360	50.3	2.0
6	4924.00	40.7 AV	54.0	-13.3	1.51 V	360	38.7	2.0
7	7386.00	43.7 PK	74.0	-30.3	1.52 V	360	35.1	8.6
8	7386.00	31.2 AV	54.0	-22.8	1.52 V	360	22.6	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.

VHT40

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	67.3 PK	74.0	-6.7	1.05 H	122	69.3	-2.0
2	2390.00	45.2 AV	54.0	-8.8	1.05 H	122	47.2	-2.0
3	*2422.00	103.1 PK			1.05 H	122	105.2	-2.1
4	*2422.00	93.1 AV			1.05 H	122	95.2	-2.1
5	4844.00	45.3 PK	74.0	-28.7	1.62 H	247	43.4	1.9
6	4844.00	33.0 AV	54.0	-21.0	1.62 H	247	31.1	1.9
7	7266.00	45.6 PK	74.0	-28.4	1.51 H	126	37.1	8.5
8	7266.00	32.9 AV	54.0	-21.1	1.51 H	126	24.4	8.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	71.7 PK	74.0	-2.3	2.24 V	324	73.7	-2.0
2	2390.00	53.5 AV	54.0	-0.5	2.24 V	324	55.5	-2.0
3	*2422.00	109.8 PK			2.24 V	324	111.9	-2.1
4	*2422.00	99.8 AV			2.24 V	324	101.9	-2.1
5	4844.00	52.2 PK	74.0	-21.8	1.57 V	360	50.3	1.9
6	4844.00	40.7 AV	54.0	-13.3	1.57 V	360	38.8	1.9
7	7266.00	43.0 PK	74.0	-31.0	1.62 V	360	34.5	8.5
8	7266.00	30.9 AV	54.0	-23.1	1.62 V	360	22.4	8.5

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	53.6 PK	74.0	-20.4	1.08 H	125	55.6	-2.0
2	2390.00	35.6 AV	54.0	-18.4	1.08 H	125	37.6	-2.0
3	*2437.00	102.6 PK			1.08 H	125	104.8	-2.2
4	*2437.00	92.5 AV			1.08 H	125	94.7	-2.2
5	2483.50	66.9 PK	74.0	-7.1	1.08 H	125	69.1	-2.2
6	2483.50	45.3 AV	54.0	-8.7	1.08 H	125	47.5	-2.2
7	4874.00	46.8 PK	74.0	-27.2	1.58 H	234	44.8	2.0
8	4874.00	34.8 AV	54.0	-19.2	1.58 H	234	32.8	2.0
9	7311.00	47.3 PK	74.0	-26.7	1.43 H	117	38.8	8.5
10	7311.00	34.9 AV	54.0	-19.1	1.43 H	117	26.4	8.5
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	58.0 PK	74.0	-16.0	2.27 V	360	60.0	-2.0
2	2390.00	43.9 AV	54.0	-10.1	2.27 V	360	45.9	-2.0
3	*2437.00	109.3 PK			2.27 V	360	111.5	-2.2
4	*2437.00	99.2 AV			2.27 V	360	101.4	-2.2
5	2483.50	71.3 PK	74.0	-2.7	2.27 V	360	73.5	-2.2
6	2483.50	53.6 AV	54.0	-0.4	2.27 V	360	55.8	-2.2
7	4874.00	51.8 PK	74.0	-22.2	1.49 V	360	49.8	2.0
8	4874.00	40.1 AV	54.0	-13.9	1.49 V	360	38.1	2.0
9	7311.00	44.0 PK	74.0	-30.0	1.56 V	360	35.5	8.5
10	7311.00	31.4 AV	54.0	-22.6	1.56 V	360	22.9	8.5

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	102.8 PK			1.08 H	135	105.0	-2.2
2	*2452.00	93.0 AV			1.08 H	135	95.2	-2.2
3	2483.50	67.0 PK	74.0	-7.0	1.08 H	135	69.2	-2.2
4	2483.50	45.2 AV	54.0	-8.8	1.08 H	135	47.4	-2.2
5	4904.00	45.3 PK	74.0	-28.7	1.65 H	231	43.3	2.0
6	4904.00	33.2 AV	54.0	-20.8	1.65 H	231	31.2	2.0
7	7356.00	45.0 PK	74.0	-29.0	1.59 H	118	36.5	8.5
8	7356.00	32.5 AV	54.0	-21.5	1.59 H	118	24.0	8.5
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	109.5 PK			2.26 V	340	111.7	-2.2
2	*2452.00	99.7 AV			2.26 V	340	101.9	-2.2
3	2483.50	71.4 PK	74.0	-2.6	2.26 V	340	73.6	-2.2
4	2483.50	53.5 AV	54.0	-0.5	2.26 V	340	55.7	-2.2
5	4904.00	52.2 PK	74.0	-21.8	1.55 V	360	50.2	2.0
6	4904.00	40.7 AV	54.0	-13.3	1.55 V	360	38.7	2.0
7	7356.00	43.8 PK	74.0	-30.2	1.59 V	360	35.3	8.5
8	7356.00	31.7 AV	54.0	-22.3	1.59 V	360	23.2	8.5

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:

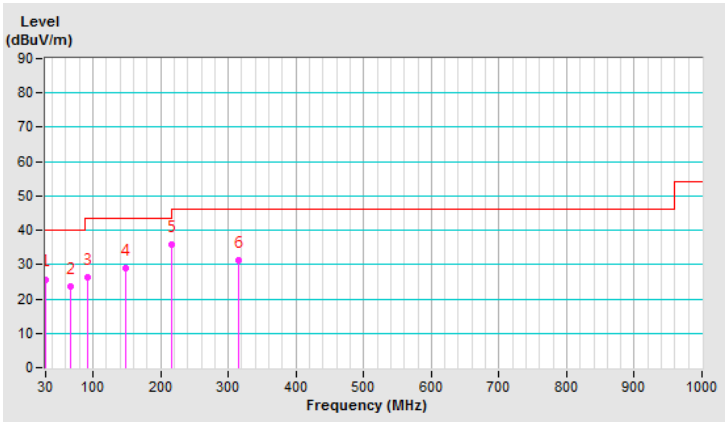
802.11b

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	30.85	25.7 QP	40.0	-14.3	1.00 H	28	35.4	-9.7
2	66.96	23.6 QP	40.0	-16.4	1.00 H	360	33.2	-9.6
3	91.16	26.4 QP	43.5	-17.1	2.00 H	70	39.5	-13.1
4	147.59	29.0 QP	43.5	-14.5	1.50 H	290	36.9	-7.9
5	216.39	35.8 QP	46.0	-10.2	1.00 H	315	46.2	-10.4
6	315.40	31.1 QP	46.0	-14.9	1.00 H	54	37.7	-6.6

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. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

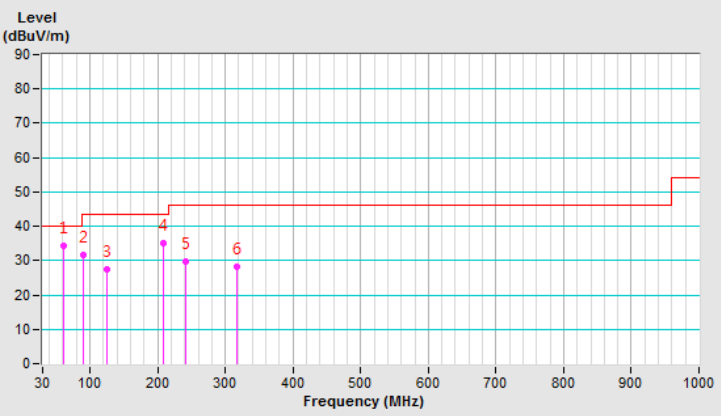


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	60.75	34.4 QP	40.0	-5.6	1.00 V	250	43.5	-9.1
2	89.66	31.7 QP	43.5	-11.8	2.00 V	221	45.1	-13.4
3	125.01	27.6 QP	43.5	-15.9	1.50 V	1	37.0	-9.4
4	209.38	34.9 QP	43.5	-8.6	1.00 V	94	45.3	-10.4
5	241.39	29.6 QP	46.0	-16.4	1.00 V	140	38.6	-9.0
6	316.93	28.3 QP	46.0	-17.7	1.00 V	40	34.9	-6.6

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. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



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	Oct. 24, 2018	Oct. 23, 2019
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 22, 2018	Oct. 21, 2019
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 04, 2018	June 03, 2019
50 ohms Terminator	N/A	3	Oct. 22, 2018	Oct. 21, 2019
RF Cable	5D-FB	COCCAB-001	Sep. 28, 2018	Sep. 27, 2019
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: Jan. 23, 2019

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.

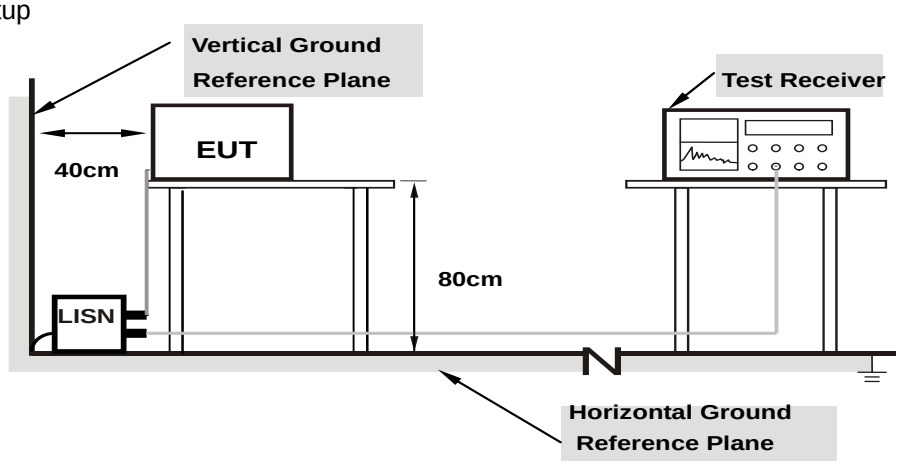
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

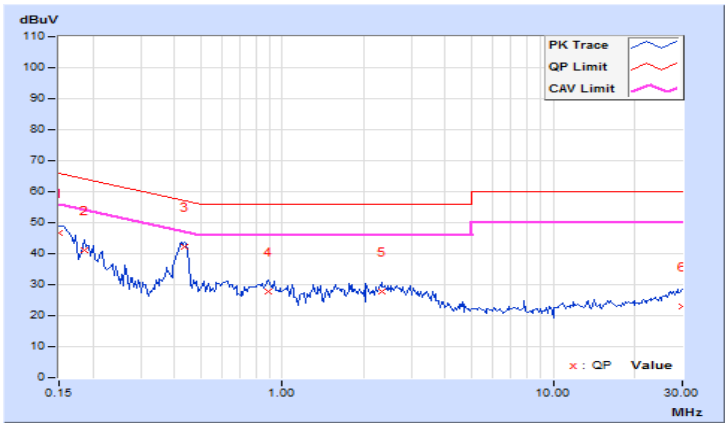
4.2.7 Test Results

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	0.15000	10.02	36.81	22.23	46.83	32.25	66.00	56.00	-19.17	-23.75
2	0.18516	10.03	31.25	19.07	41.28	29.10	64.25	54.25	-22.97	-25.15
3	**0.43516**	**10.07**	**32.03**	**24.56**	**42.10**	**34.63**	**57.15**	**47.15**	**-15.05**	**-12.52**
4	0.88828	10.10	17.69	8.84	27.79	18.94	56.00	46.00	-28.21	-27.06
5	2.32031	10.17	17.64	10.48	27.81	20.65	56.00	46.00	-28.19	-25.35
6	30.00000	11.23	11.74	6.24	22.97	17.47	60.00	50.00	-37.03	-32.53

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

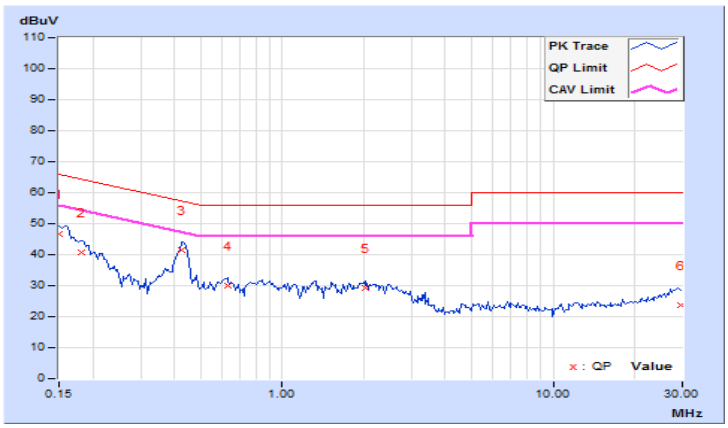


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	9.93	36.75	22.04	46.68	31.97	66.00	56.00	-19.32	-24.03
2	0.18125	9.94	30.83	17.86	40.77	27.80	64.43	54.43	-23.66	-26.63
3	0.42734	9.96	31.63	24.78	41.59	34.74	57.30	47.30	-15.71	-12.56
4	0.62656	9.97	20.20	11.60	30.17	21.57	56.00	46.00	-25.83	-24.43
5	2.03516	10.04	19.18	11.56	29.22	21.60	56.00	46.00	-26.78	-24.40
6	29.45313	10.97	12.58	7.18	23.55	18.15	60.00	50.00	-36.45	-31.85

Remarks:

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

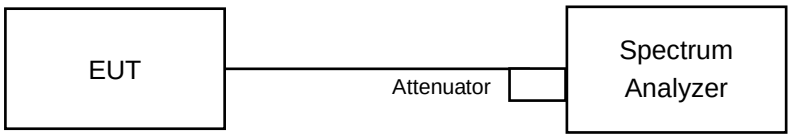


4.3 6dB Bandwidth Measurement

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	9.11	9.62	0.5	Pass
6	2437	9.11	9.62	0.5	Pass
11	2462	9.09	9.61	0.5	Pass

802.11g

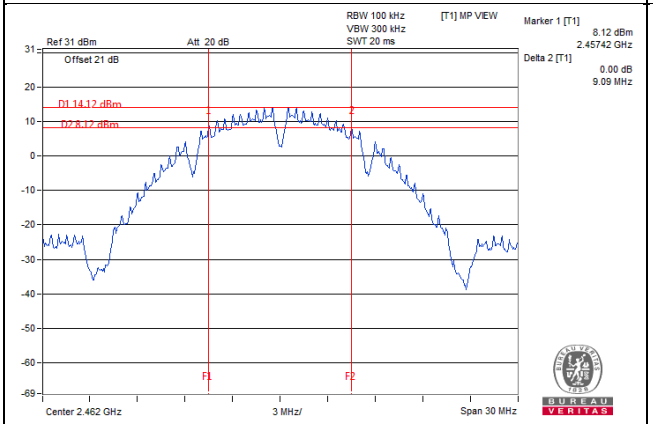
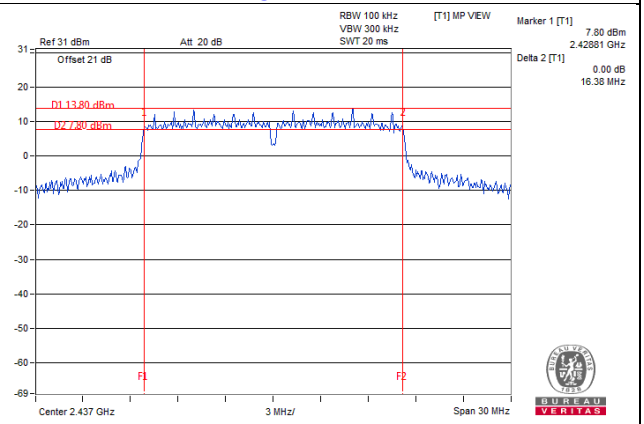
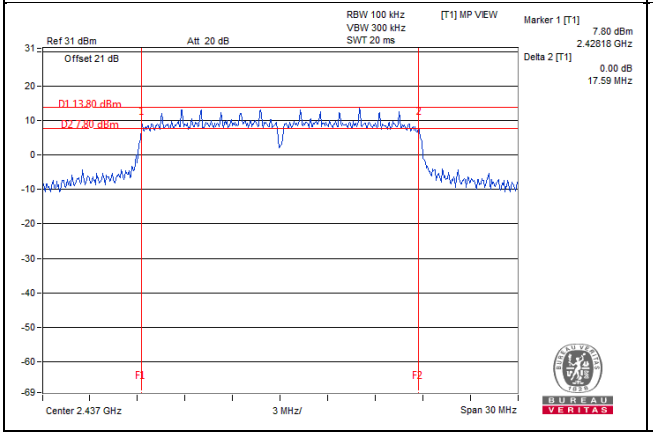
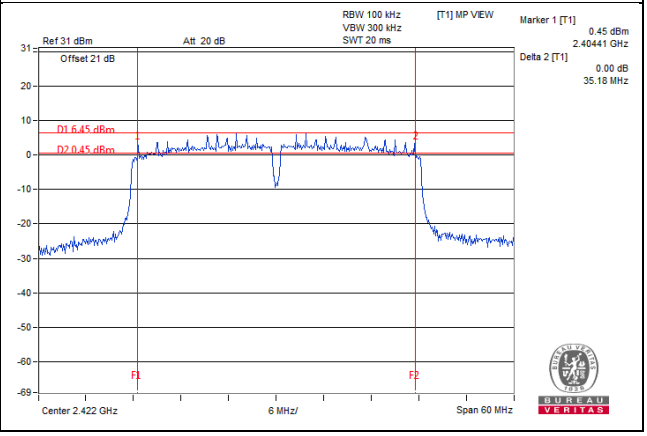
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.41	16.39	0.5	Pass
6	2437	16.38	16.40	0.5	Pass
11	2462	16.39	16.39	0.5	Pass

VHT20

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.63	17.59	0.5	Pass
6	2437	17.59	17.65	0.5	Pass
11	2462	17.66	17.67	0.5	Pass

VHT40

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.18	35.18	0.5	Pass
6	2437	35.33	35.46	0.5	Pass
9	2452	35.47	35.23	0.5	Pass

Spectrum Plot of Worst Value	
802.11b_Chain 0 / CH11	**802.11g_Chain 0 / CH6**
	
VHT20_Chain 0 / CH6	**VHT40_Chain 0 / CH3**
	

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

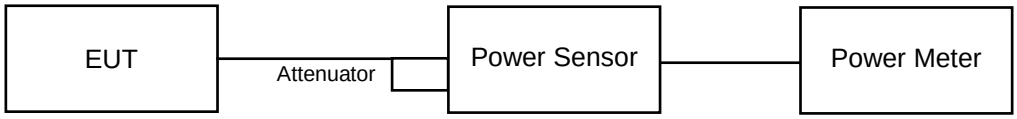
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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	24.78	24.80	602.603	27.80	30	Pass
6	2437	24.85	24.82	608.881	27.85	30	Pass
11	2462	22.96	23.36	414.467	26.17	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	20.46	20.55	224.674	23.52	30	Pass
6	2437	24.14	24.08	515.277	27.12	30	Pass
11	2462	18.15	18.52	136.434	21.35	30	Pass

VHT20

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	19.91	19.97	197.261	22.95	30	Pass
6	2437	24.13	24.11	516.453	27.13	30	Pass
11	2462	16.53	16.91	94.069	19.73	30	Pass

VHT40

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	20.04	20.14	204.201	23.10	30	Pass
6	2437	17.88	18.11	126.09	21.01	30	Pass
9	2452	17.51	17.94	118.594	20.74	30	Pass

Beamforming Mode

VHT20

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	19.91	19.97	197.261	22.95	28.88	Pass
6	2437	24.13	24.11	516.453	27.13	28.88	Pass
11	2462	16.53	16.91	94.069	19.73	28.88	Pass

Note: The directional gain = 4.11dBi + 10log(2) = 7.12dBi > 6dBi , so the power limit shall be reduced to 30-(7.12-6) = 28.88dBm.

VHT40

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	20.04	20.14	204.201	23.10	28.88	Pass
6	2437	17.88	18.11	126.09	21.01	28.88	Pass
9	2452	17.51	17.94	118.594	20.74	28.88	Pass

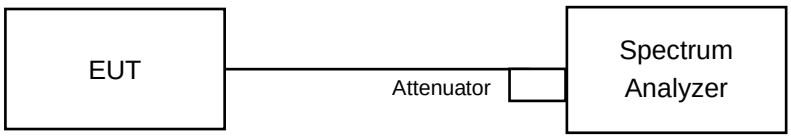
Note: The directional gain = 4.11dBi + 10log(2) = 7.12dBi > 6dBi , so the power limit shall be reduced to 30-(7.12-6) = 28.88dBm.

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, VHT20

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, VHT40

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	-5.93	3.01	-2.92	6.88	Pass
	6	2437	-6.42	3.01	-3.41	6.88	Pass
	11	2462	-8.10	3.01	-5.09	6.88	Pass
1	1	2412	-6.44	3.01	-3.43	6.88	Pass
	6	2437	-6.68	3.01	-3.67	6.88	Pass
	11	2462	-7.80	3.01	-4.79	6.88	Pass

Note: 1. The directional gain = 4.11dBi + 10log(2) = 7.12dBi > 6dBi , so the power density limit shall be reduced to 8-(7.12-6) = 6.88dBm.

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	-10.97	3.01	0.18	-7.78	6.88	Pass
	6	2437	-8.71	3.01	0.18	-5.52	6.88	Pass
	11	2462	-14.86	3.01	0.18	-11.67	6.88	Pass
1	1	2412	-10.02	3.01	0.18	-6.83	6.88	Pass
	6	2437	-9.18	3.01	0.18	-5.99	6.88	Pass
	11	2462	-13.94	3.01	0.18	-10.75	6.88	Pass

Note: 1. The directional gain = 4.11dBi + 10log(2) = 7.12dBi > 6dBi , so the power density limit shall be reduced to 8-(7.12-6) = 6.88dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

VHT20

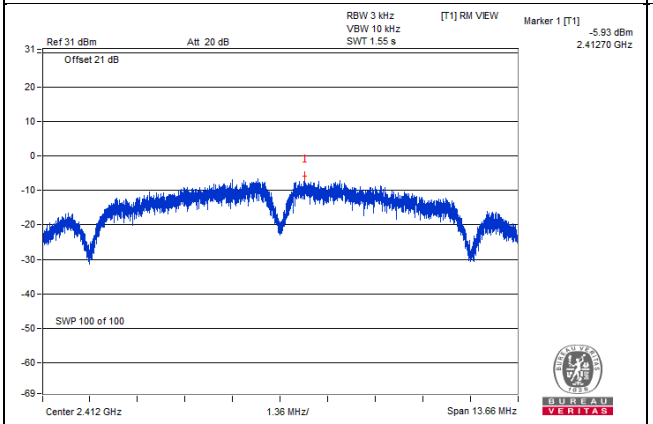
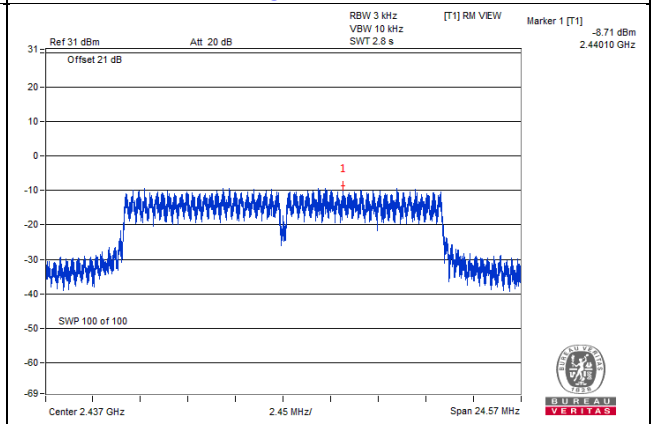
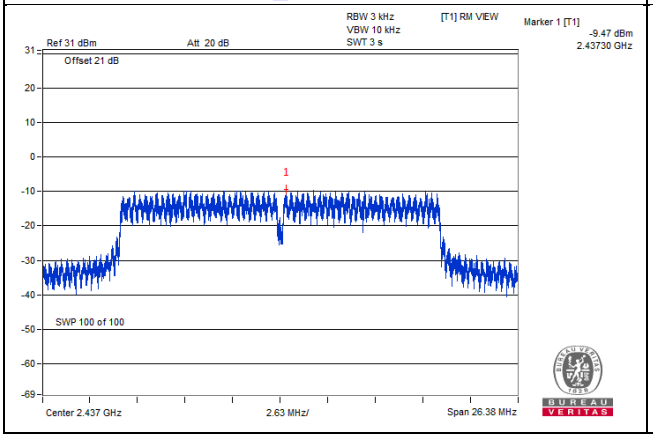
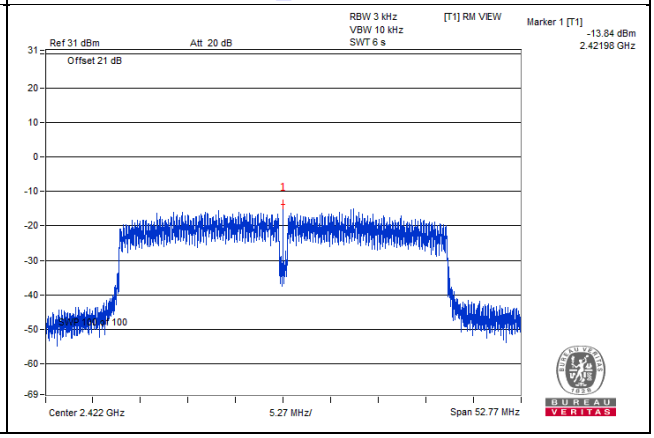
TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-13.31	3.01	-10.30	6.88	Pass
	6	2437	-9.47	3.01	-6.46	6.88	Pass
	11	2462	-16.76	3.01	-13.75	6.88	Pass
1	1	2412	-12.77	3.01	-9.76	6.88	Pass
	6	2437	-9.48	3.01	-6.47	6.88	Pass
	11	2462	-16.06	3.01	-13.05	6.88	Pass

Note: 1. The directional gain = 4.11dBi + 10log(2) = 7.12dBi > 6dBi , so the power density limit shall be reduced to 8-(7.12-6) = 6.88dBm.

VHT40

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	-15.64	3.01	0.16	-12.47	6.88	Pass
	6	2437	-17.24	3.01	0.16	-14.07	6.88	Pass
	9	2452	-16.81	3.01	0.16	-13.64	6.88	Pass
1	3	2422	-13.84	3.01	0.16	-10.67	6.88	Pass
	6	2437	-17.44	3.01	0.16	-14.27	6.88	Pass
	9	2452	-17.92	3.01	0.16	-14.75	6.88	Pass

Note: 1. The directional gain = 4.11dBi + 10log(2) = 7.12dBi > 6dBi , so the power density limit shall be reduced to 8-(7.12-6) = 6.88dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

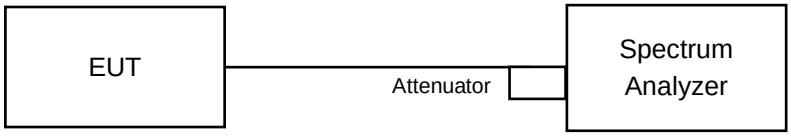
Spectrum Plot of Worst Value	
802.11b_Chain 0 / CH1	**802.11g_Chain 0 / CH6**
	
VHT20_Chain 0 / CH6	**VHT40_Chain 1 / CH3**
	

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

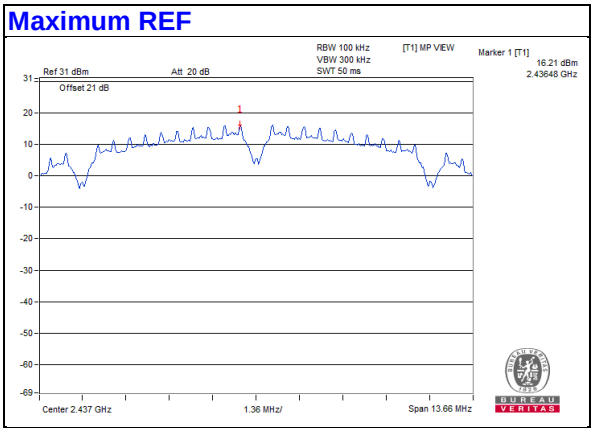
Same as Item 4.3.6

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.

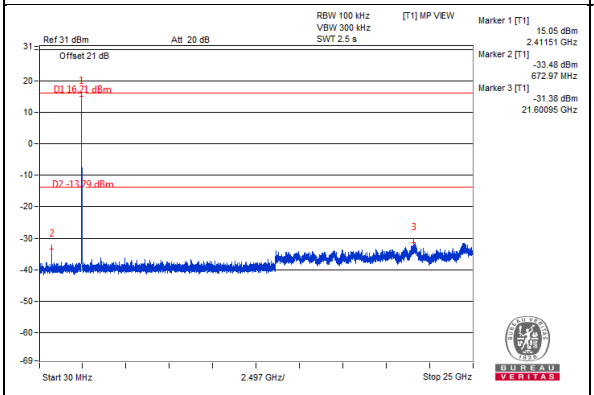
802.11b

Maximum REF

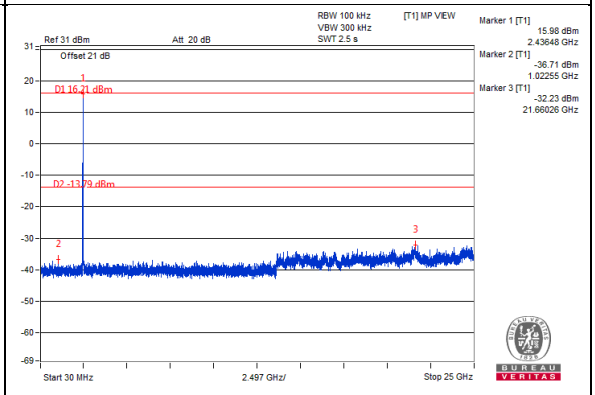


Chain 0

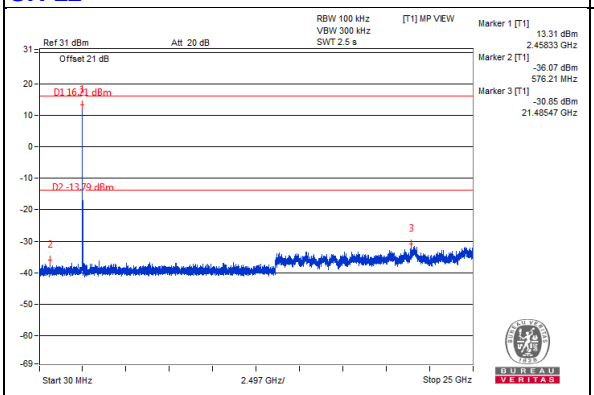
CH 1



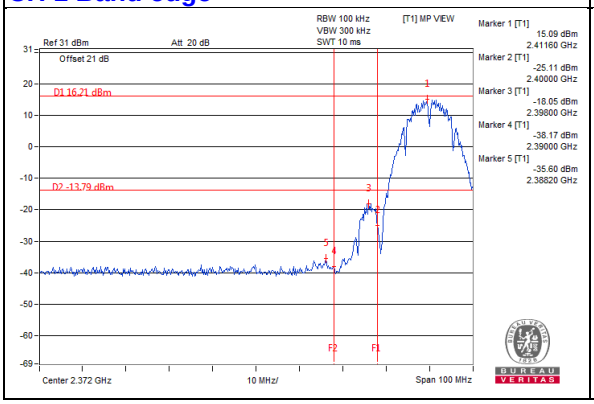
CH 6



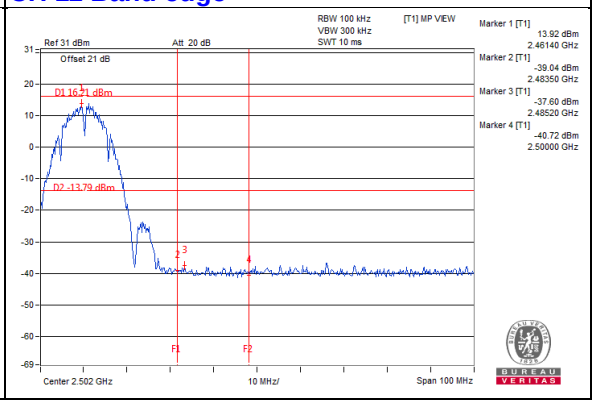
CH 11



CH 1 Band edge

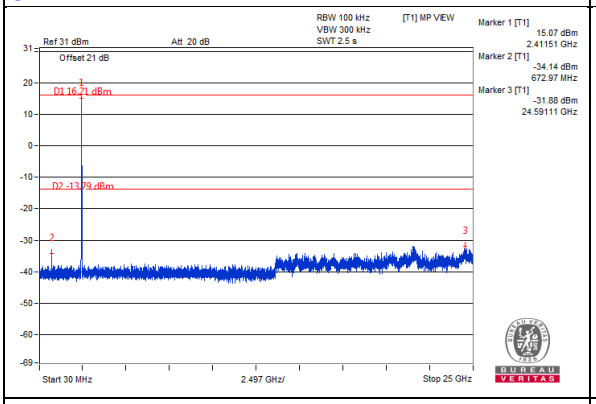


CH 11 Band edge

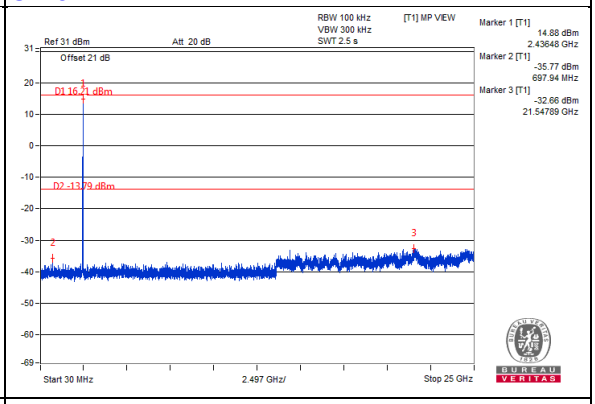


Chain 1

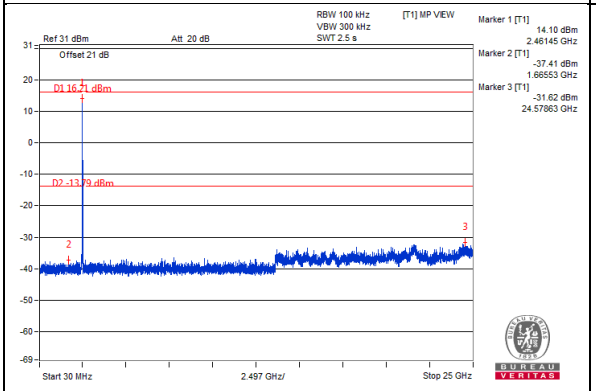
CH 1



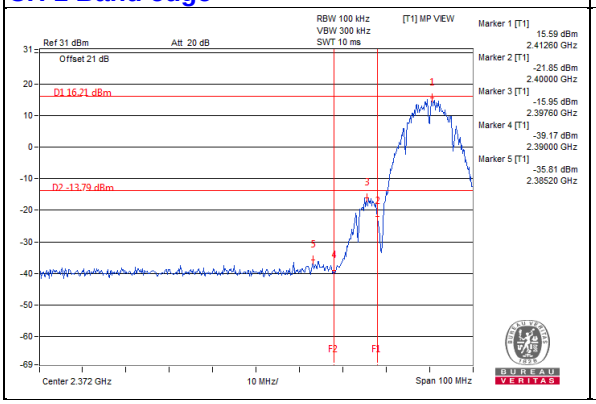
CH 6



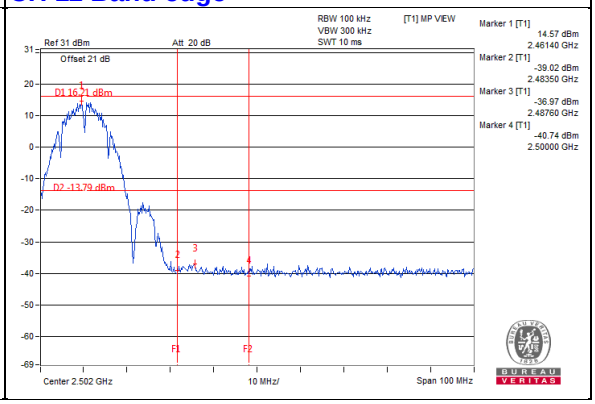
CH 11



CH 1 Band edge

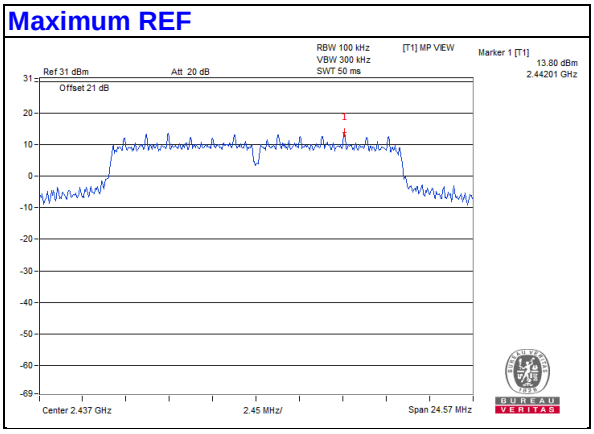


CH 11 Band edge



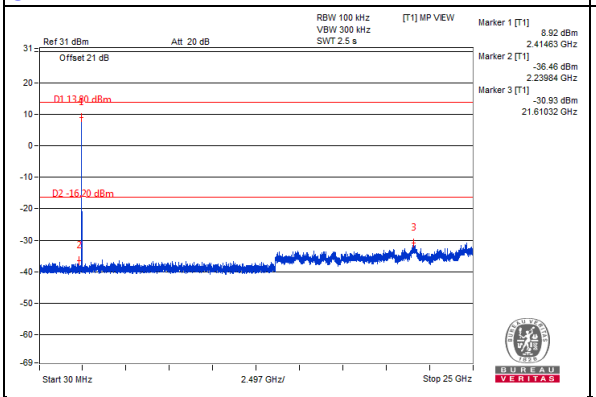
802.11g

Maximum REF

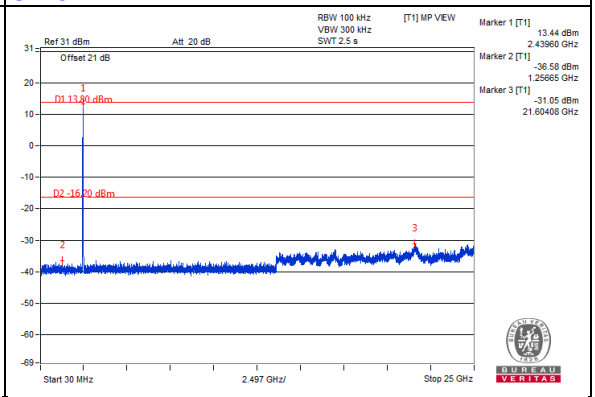


Chain 0

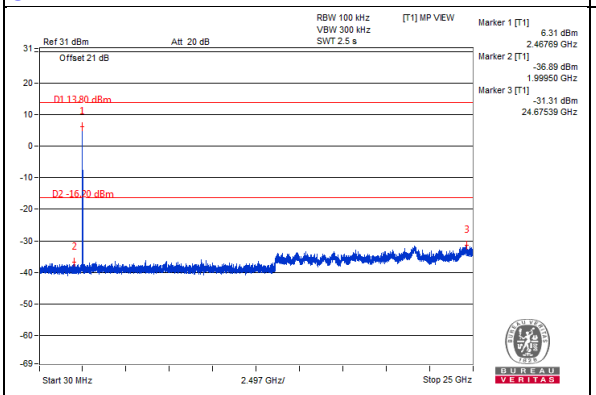
CH 1



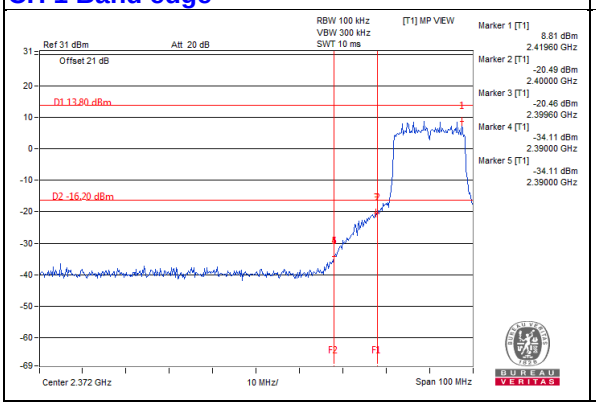
CH 6



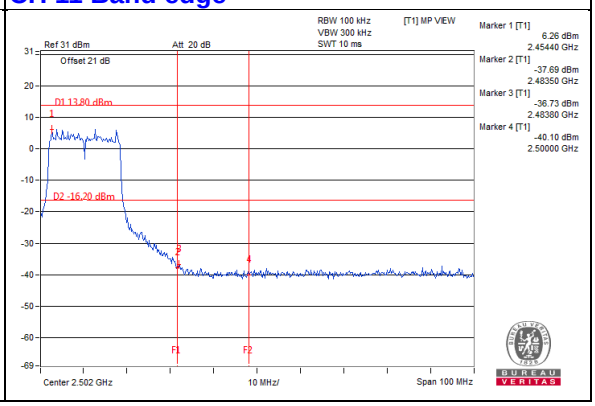
CH 11



CH 1 Band edge

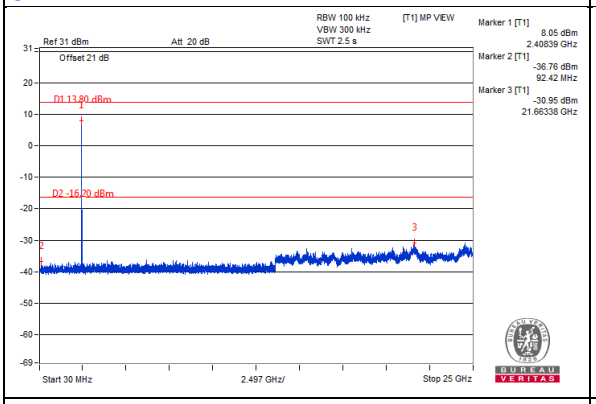


CH 11 Band edge

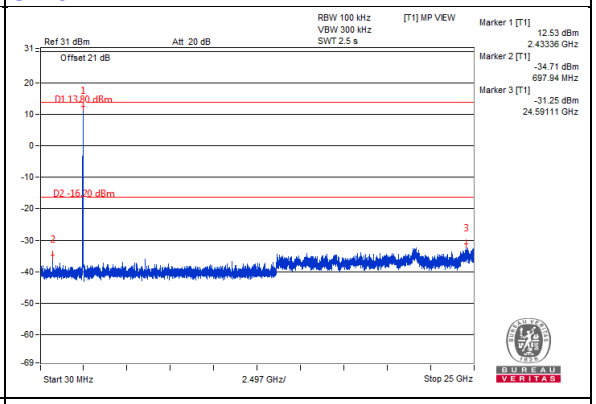


Chain 1

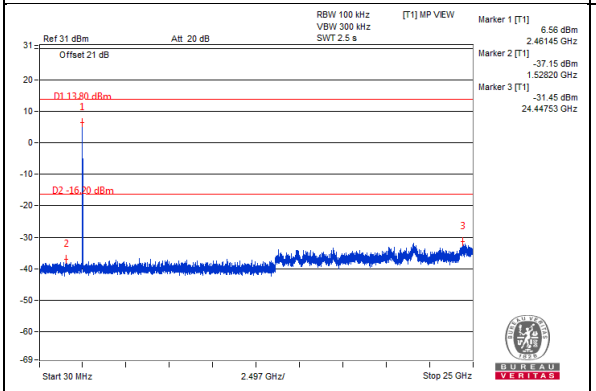
CH 1



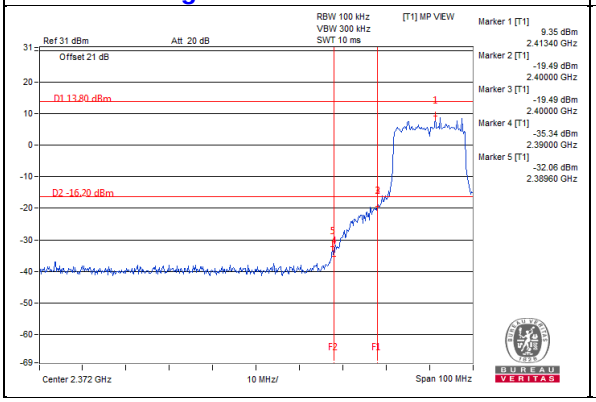
CH 6



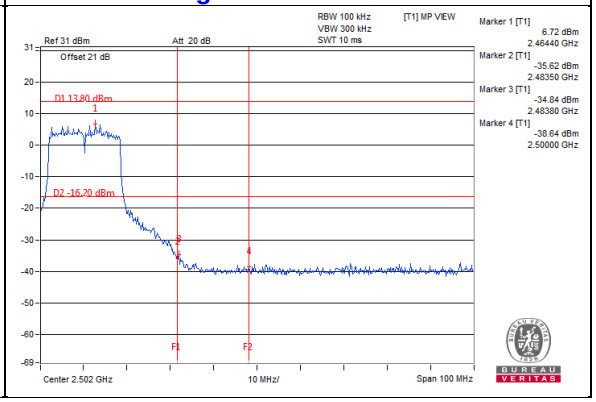
CH 11



CH 1 Band edge

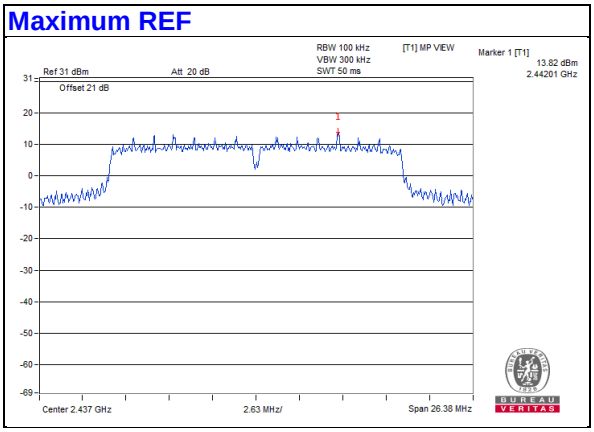


CH 11 Band edge



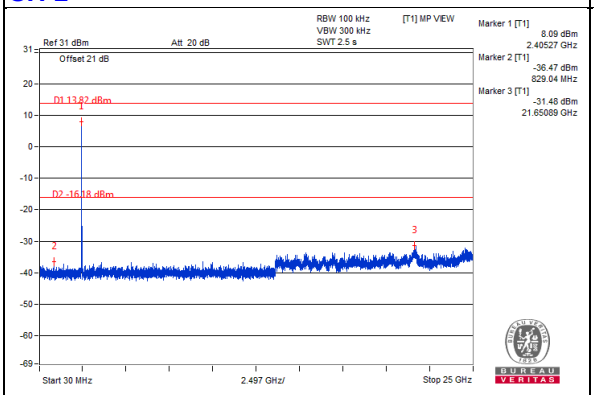
802.11n (HT20)

Maximum REF

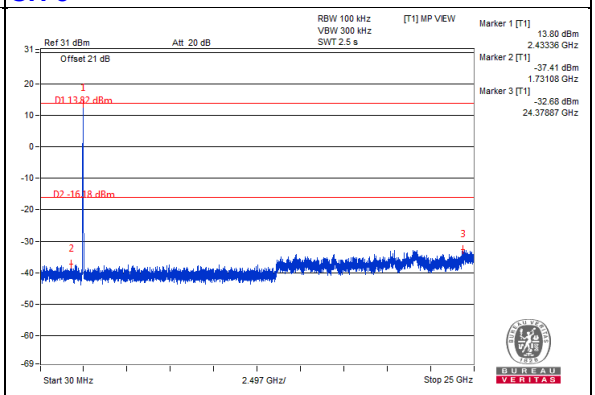


Chain 0

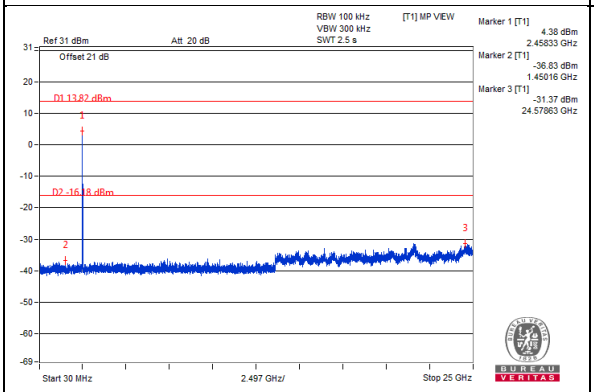
CH 1



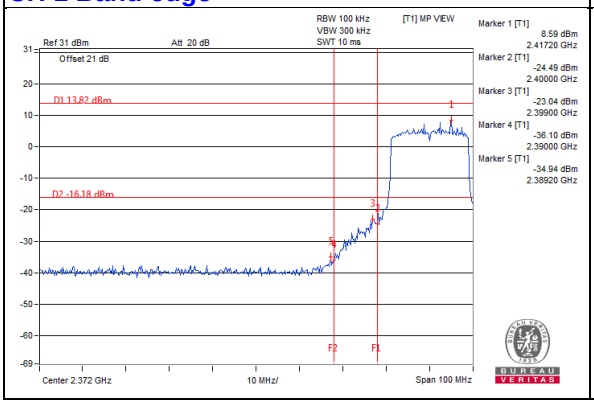
CH 6



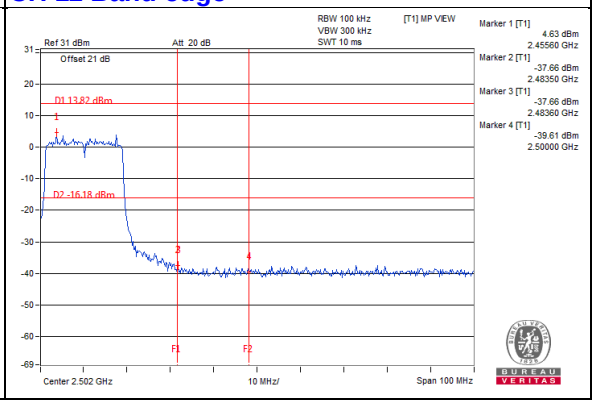
CH 11



CH 1 Band edge

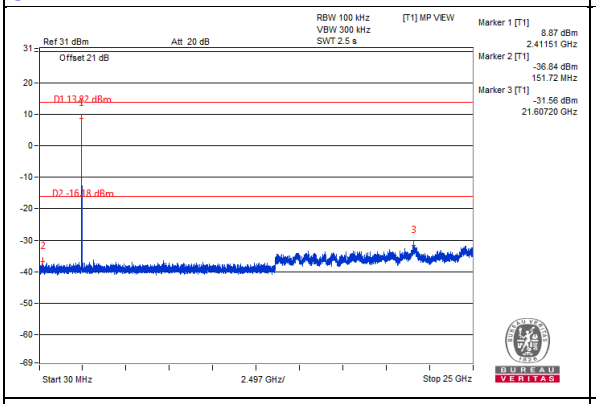


CH 11 Band edge

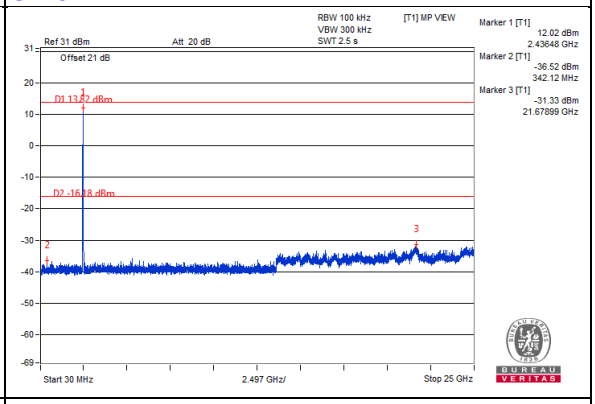


Chain 1

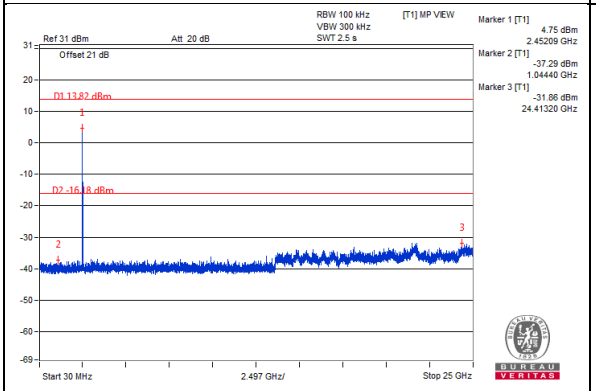
CH 1



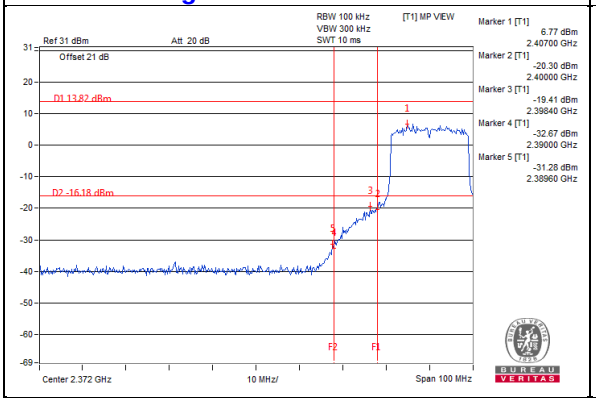
CH 6



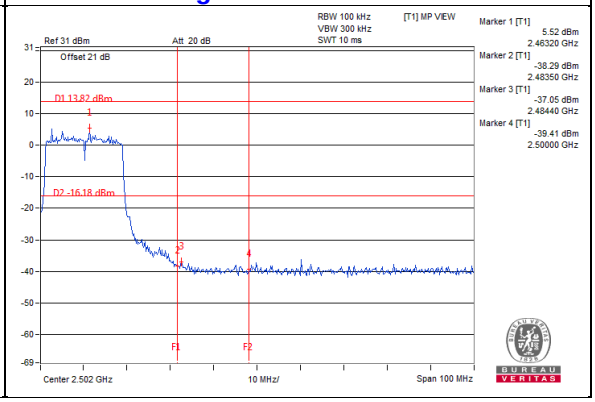
CH 11



CH 1 Band edge

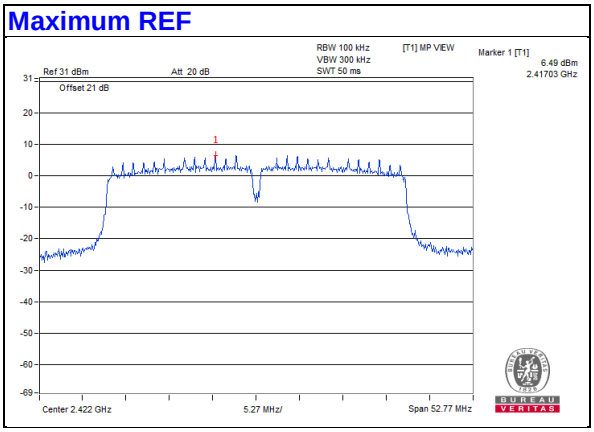


CH 11 Band edge



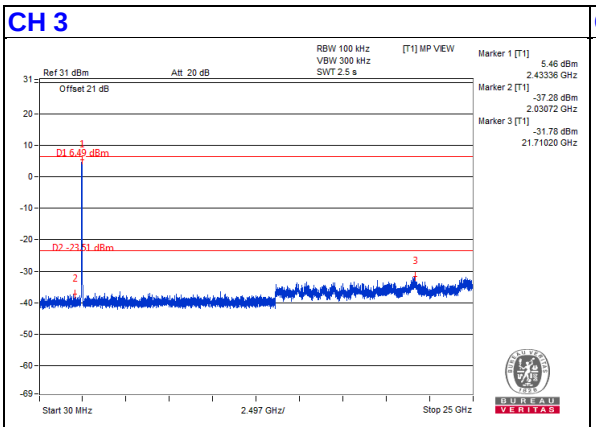
802.11n (HT40)

Maximum REF

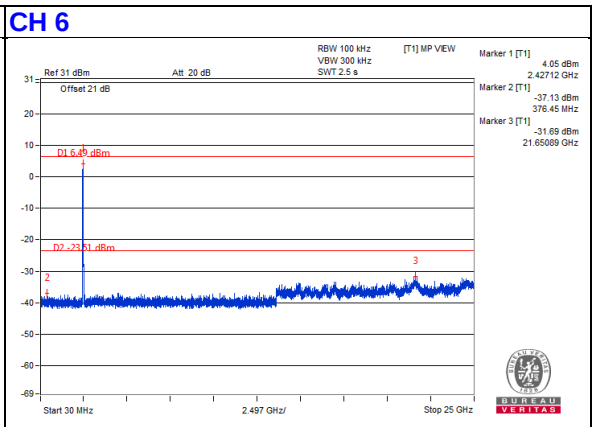


Chain 0

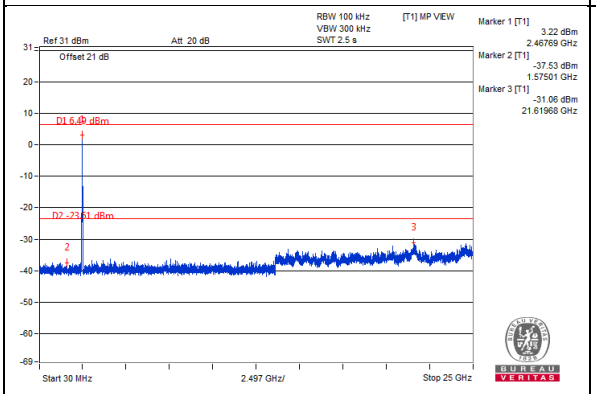
CH 3



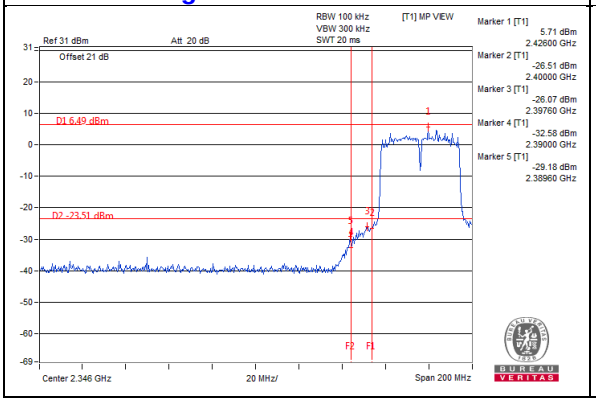
CH 6



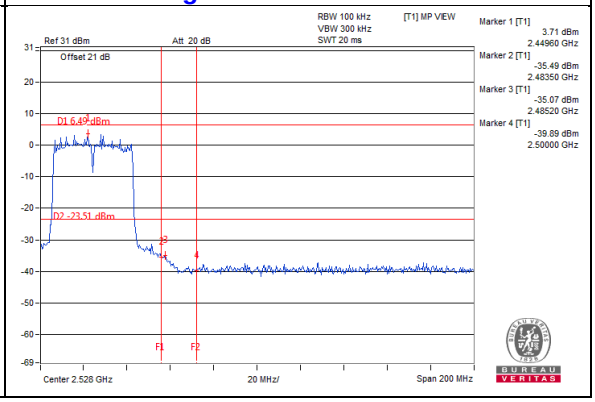
CH 9



CH 3 Band edge

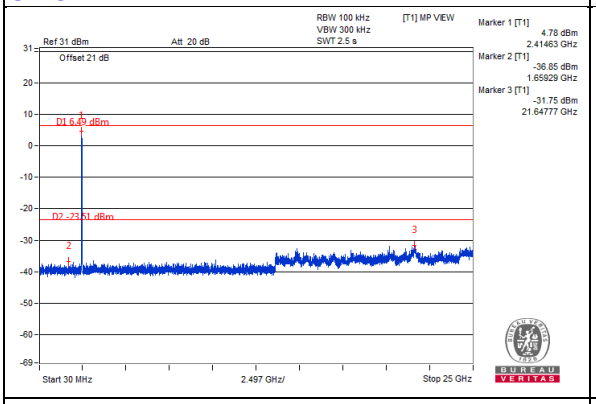


CH 9 Band edge

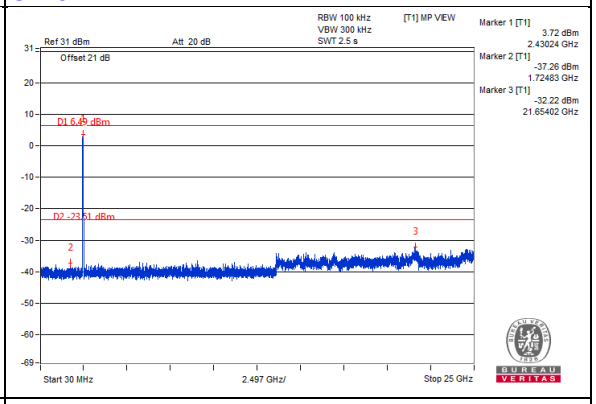


Chain 1

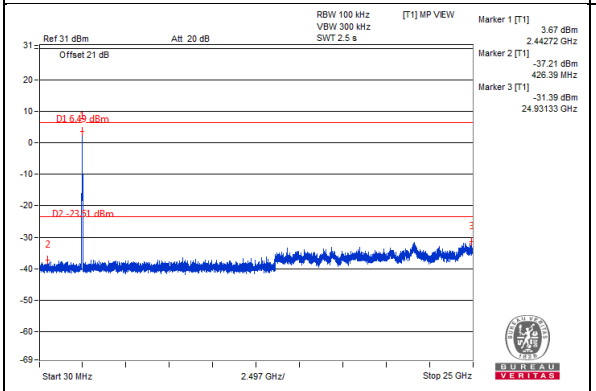
CH 3



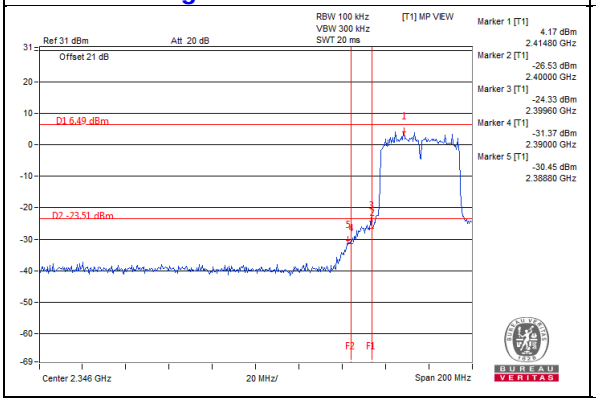
CH 6



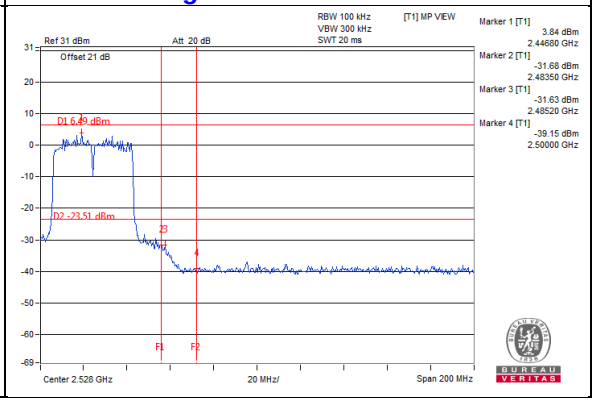
CH 9



CH 3 Band edge



CH 9 Band edge



5 Pictures of Test Arrangements

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

Appendix – Information of the Testing Laboratories

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

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

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Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

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