Report No.:	RF190403E09
FCC ID:	KA2CS8330LHA1
Test Model:	DCS-8330LH
Received Date:	Apr. 03, 2019
Test Date:	June 15, 2019
Issued Date:	Sep. 05, 2019

Applicant:	D-Link Corporation
Address:	No.289, Xinhu 3rd Rd., Neihu District, Tapei City 11494, Taiwan

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
RF190403E09	Original release.	Sep. 05, 2019

1 Certificate of Conformity

Product:	Smart Full HD Wi-Fi Camera
Brand:	D-Link
Test Model:	DCS-8330LH
Sample Status:	ENGINEERING SAMPLE
Applicant:	D-Link Corporation
Test Date:	June 15, 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:** Sep. 05, 2019

Wendy Wu / Specialist

Approved by : _____ , **Date:** Sep. 05, 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 -10.49dB 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.
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.

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	1.8 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	4.9 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	4.9 dB
	18GHz ~ 40GHz	5.2 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (WLAN)

Product	Smart Full HD Wi-Fi Camera
Brand	D-Link
Test Model	DCS-8330LH
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	5Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 72.2Mbps
Operating Frequency	2.412MHz ~ 2.462MHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7
Output Power	351.56mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. There are WLAN, Bluetooth and Zigbee technology used for the EUT.
2. Simultaneously transmission condition.

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

3. The EUT must be supplied with a power adapter as following table:

No.	Brand	Model No.	Spec.
1	APD	WB-10N05FU	AC Input: 100-240Vac, 0.4A, 50-60Hz DC Output: 5V, 2A DC Output Cable: 3m unshielded

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

Antenna No.	Brand	Model No.	Antenna Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
1 (WLAN+BT)	CHANGSHU HONGBO TELECOMMUNICATION TECHNOLOGY CO.,LTD.	290-20427	2.68	2.4~2.5	FPCB	i-pex(MHF)	57
2 (Zigbee)		290-20392	2.33	2.4~2.5	FPCB	i-pex(MHF)	75.5

5. The EUT incorporates a SISO function:

MODULATION MODE	TX & RX CONFIGURATION	
802.11b	1TX	1RX
802.11g	1TX	1RX
802.11n (HT20)	1TX	1RX
802.11n (HT40)	1TX	1RX

6. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

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

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

7 channels are provided for 802.11n (HT40):

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

NOTE:

1. The EUT had been pre-tested on the positioned of each of stand-up type and wall-mount. The worst case was found when positioned on stand-up type.

Radiated Emission Test (Above 1GHz):

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

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

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

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

Power Line Conducted Emission Test:

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

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

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

Antenna Port Conducted Measurement:

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

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

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

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

Test Condition:

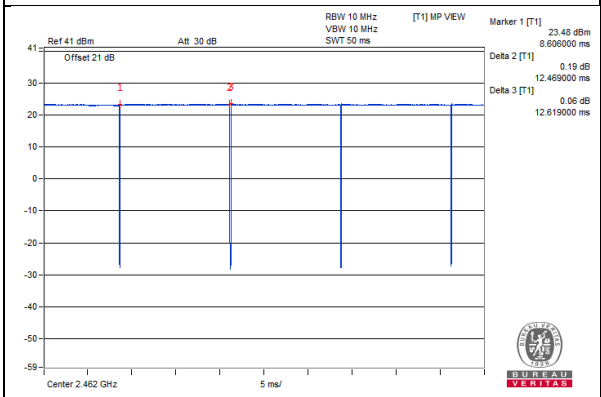
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	22deg. C, 65%RH	120Vac, 60Hz	Robert Cheng
RE<1G	21deg. C, 68%RH	120Vac, 60Hz	Robert Cheng
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	24deg. C, 66%RH	120Vac, 60Hz	Jyunchun Lin

3.3 Duty Cycle of Test Signal

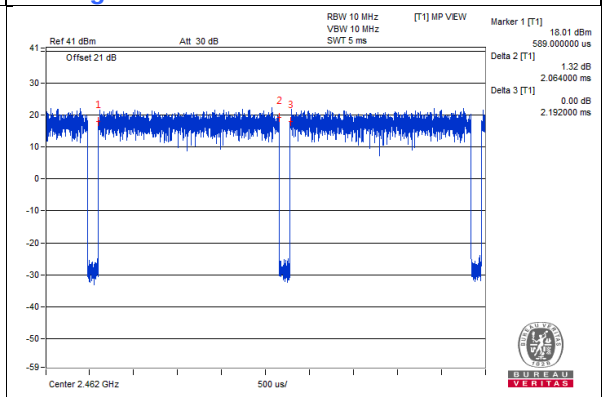
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle = 12.469 ms/12.619 ms = 0.988
802.11g: Duty cycle = 2.064 ms/2.192 ms = 0.942, Duty factor = 10 * log(1/Duty cycle) = 0.26
802.11n (HT20): Duty cycle = 1.918 ms/2.069 ms = 0.927, Duty factor = 10 * log(1/Duty cycle) = 0.33
802.11n (HT40): Duty cycle = 0.944 ms/1.062 ms = 0.889, Duty factor = 10 * log(1/Duty cycle) = 0.51

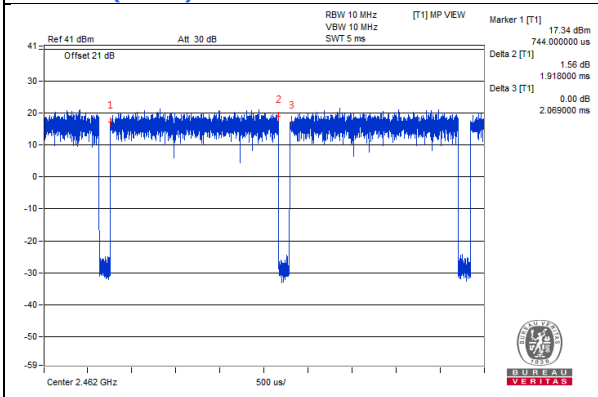
802.11b



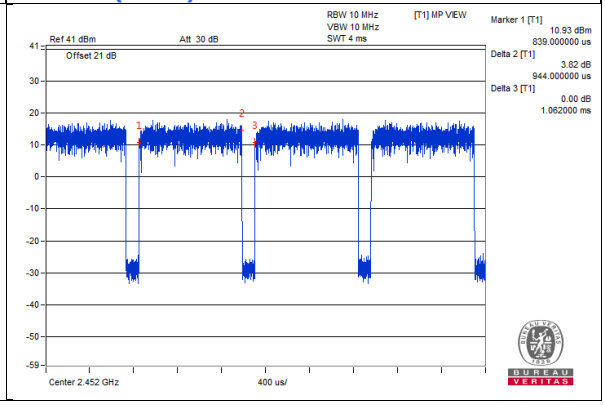
802.11g



802.11n (HT20)



802.11n (HT40)



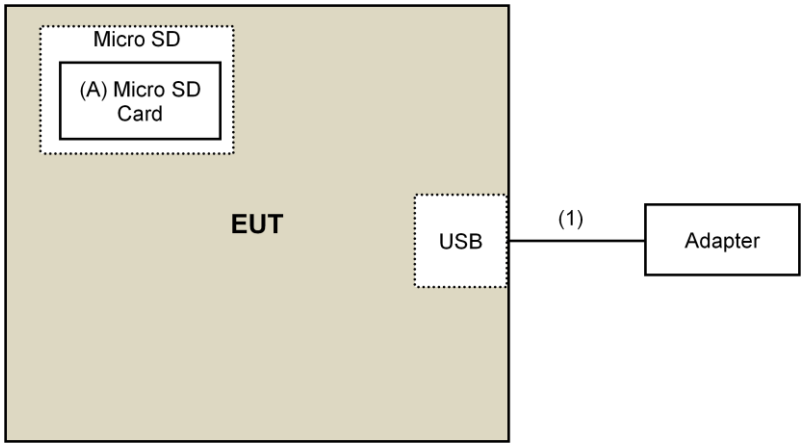
3.4 Description of Support Units

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.	Micro SD Card	TRANSCND	TS8GUSDHC10	NA	NA	Provided by Lab

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	3	No	0	Supplied by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
KDB 558074 D01 15.247 Meas Guidance v05r02
ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 05, 2018	July 04, 2019
Pre-Amplifier EMCI	EMC001340	980142	Jan. 25, 2019	Jan. 24, 2020
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. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-2	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-3	Mar. 19, 2019	Mar. 18, 2020
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 EMCI	EMC12630SE	980385	Aug. 16, 2018	Aug. 15, 2019
RF Cable	EMC104-SM-SM-1200	160923	Jan. 28, 2019	Jan. 27, 2020
RF Cable	104 RF cable	131215	Jan. 10, 2019	Jan. 09, 2020
RF Cable	EMC104-SM-SM-6000	180418	May 03, 2019	May 02, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 25, 2018	Nov. 24, 2019
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
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 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020

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. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: June 15, 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:

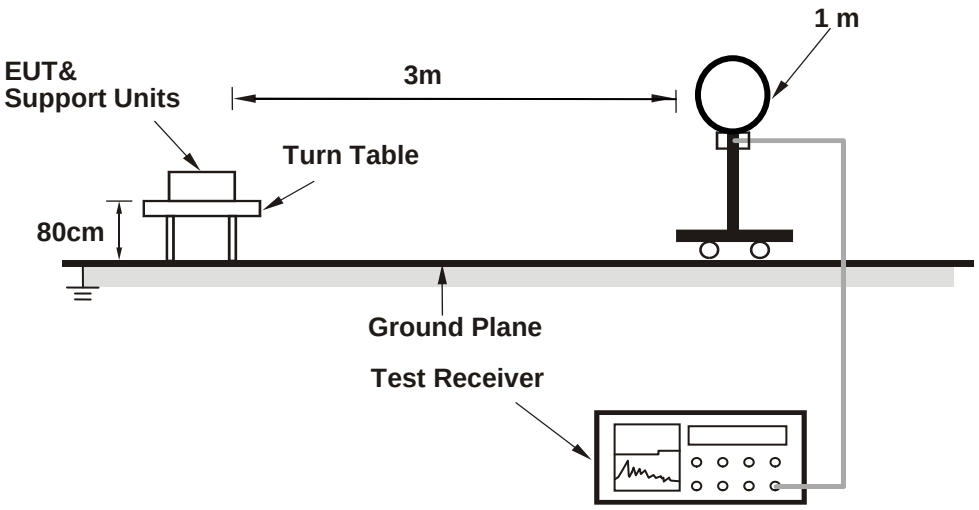
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

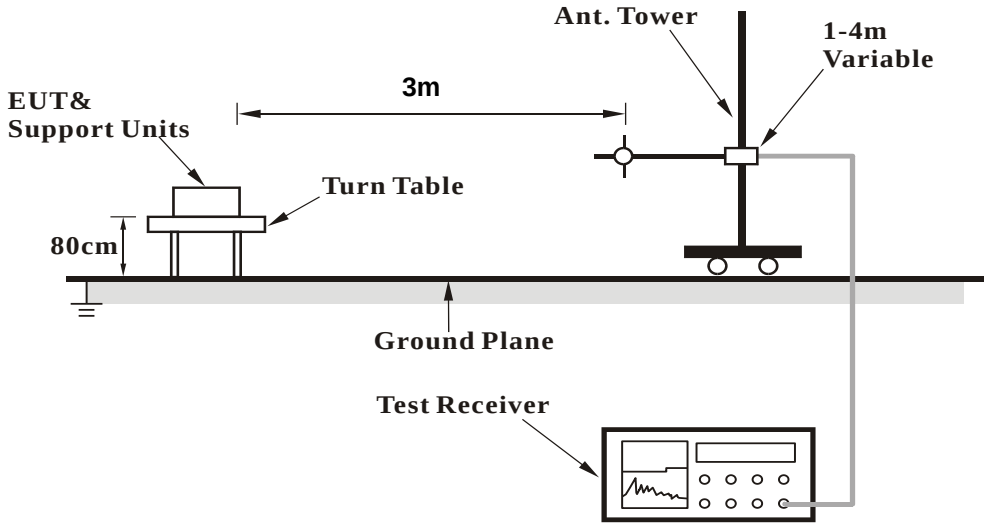
No deviation.

4.1.5 Test Setup

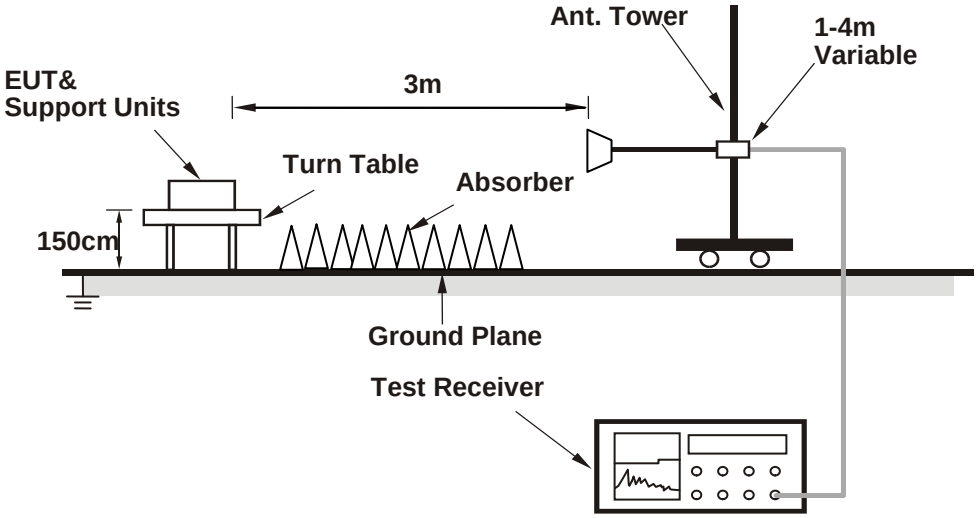
For Radiated emission below 30MHz



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. Placed the EUT on the testing table.
b. Controlling software (Tera Term paste DCS-8330LH_Wifi 2.4G) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

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	56.4 PK	74.0	-17.6	1.67 H	211	58.0	-1.6
2	2390.00	47.4 AV	54.0	-6.6	1.67 H	211	49.0	-1.6
3	*2412.00	103.6 PK			1.67 H	211	105.3	-1.7
4	*2412.00	101.5 AV			1.67 H	211	103.2	-1.7
5	4824.00	52.6 PK	74.0	-21.4	2.25 H	15	50.3	2.3
6	4824.00	51.7 AV	54.0	-2.3	2.25 H	15	49.4	2.3
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	57.2 PK	74.0	-16.8	1.23 V	140	58.8	-1.6
2	2390.00	49.1 AV	54.0	-4.9	1.23 V	140	50.7	-1.6
3	*2412.00	104.7 PK			1.23 V	140	106.4	-1.7
4	*2412.00	102.3 AV			1.23 V	140	104.0	-1.7
5	4824.00	45.1 PK	74.0	-28.9	1.11 V	196	42.8	2.3
6	4824.00	42.7 AV	54.0	-11.3	1.11 V	196	40.4	2.3

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 other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	104.9 PK			1.64 H	217	106.7	-1.8
2	*2437.00	102.8 AV			1.64 H	217	104.6	-1.8
3	4874.00	53.1 PK	74.0	-20.9	2.32 H	339	50.7	2.4
4	4874.00	52.2 AV	54.0	-1.8	2.32 H	339	49.8	2.4
5	7311.00	54.7 PK	74.0	-19.3	2.08 H	327	45.5	9.2
6	7311.00	51.0 AV	54.0	-3.0	2.08 H	327	41.8	9.2
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	*2437.00	106.2 PK			1.20 V	134	108.0	-1.8
2	*2437.00	103.6 AV			1.20 V	134	105.4	-1.8
3	4874.00	48.5 PK	74.0	-25.5	1.03 V	322	46.1	2.4
4	4874.00	46.5 AV	54.0	-7.5	1.03 V	322	44.1	2.4
5	7311.00	50.8 PK	74.0	-23.2	1.40 V	151	41.6	9.2
6	7311.00	45.3 AV	54.0	-8.7	1.40 V	151	36.1	9.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	105.8 PK			1.50 H	195	107.6	-1.8
2	*2462.00	103.3 AV			1.50 H	195	105.1	-1.8
3	2483.50	70.3 PK	74.0	-3.7	1.50 H	195	72.0	-1.7
4	2483.50	48.5 AV	54.0	-5.5	1.50 H	195	50.2	-1.7
5	4924.00	54.2 PK	74.0	-19.8	2.34 H	334	51.7	2.5
6	4924.00	53.3 AV	54.0	-0.7	2.34 H	334	50.8	2.5
7	7386.00	54.7 PK	74.0	-19.3	2.11 H	320	45.3	9.4
8	7386.00	51.2 AV	54.0	-2.8	2.11 H	320	41.8	9.4
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	*2462.00	108.1 PK			1.23 V	279	109.9	-1.8
2	*2462.00	105.7 AV			1.23 V	279	107.5	-1.8
3	2483.50	73.1 PK	74.0	-0.9	1.23 V	279	74.8	-1.7
4	2483.50	50.8 AV	54.0	-3.2	1.23 V	279	52.5	-1.7
5	4924.00	48.2 PK	74.0	-25.8	1.01 V	317	45.7	2.5
6	4924.00	46.4 AV	54.0	-7.6	1.01 V	317	43.9	2.5
7	7386.00	50.3 PK	74.0	-23.7	1.37 V	155	40.9	9.4
8	7386.00	44.9 AV	54.0	-9.1	1.37 V	155	35.5	9.4

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	62.9 PK	74.0	-11.1	1.63 H	212	64.5	-1.6
2	2390.00	48.1 AV	54.0	-5.9	1.63 H	212	49.7	-1.6
3	*2412.00	105.2 PK			1.63 H	212	106.9	-1.7
4	*2412.00	96.2 AV			1.63 H	212	97.9	-1.7
5	4824.00	47.2 PK	74.0	-26.8	2.29 H	341	44.9	2.3
6	4824.00	35.3 AV	54.0	-18.7	2.29 H	341	33.0	2.3
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	64.7 PK	74.0	-9.3	1.51 V	322	66.3	-1.6
2	2390.00	49.0 AV	54.0	-5.0	1.51 V	322	50.6	-1.6
3	*2412.00	106.2 PK			1.51 V	322	107.9	-1.7
4	*2412.00	97.2 AV			1.51 V	322	98.9	-1.7
5	4824.00	42.5 PK	74.0	-31.5	1.04 V	323	40.2	2.3
6	4824.00	31.3 AV	54.0	-22.7	1.04 V	323	29.0	2.3

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 other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	104.3 PK			1.65 H	218	106.1	-1.8
2	*2437.00	97.5 AV			1.65 H	218	99.3	-1.8
3	4874.00	46.5 PK	74.0	-27.5	2.30 H	336	44.1	2.4
4	4874.00	34.9 AV	54.0	-19.1	2.30 H	336	32.5	2.4
5	7311.00	45.5 PK	74.0	-28.5	2.15 H	318	36.3	9.2
6	7311.00	34.3 AV	54.0	-19.7	2.15 H	318	25.1	9.2
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	*2437.00	107.5 PK			1.21 V	134	109.3	-1.8
2	*2437.00	98.4 AV			1.21 V	134	100.2	-1.8
3	4874.00	42.0 PK	74.0	-32.0	1.00 V	330	39.6	2.4
4	4874.00	31.1 AV	54.0	-22.9	1.00 V	330	28.7	2.4
5	7311.00	43.7 PK	74.0	-30.3	1.39 V	170	34.5	9.2
6	7311.00	31.8 AV	54.0	-22.2	1.39 V	170	22.6	9.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	105.2 PK			1.64 H	198	107.0	-1.8
2	*2462.00	98.6 AV			1.64 H	198	100.4	-1.8
3	2483.50	70.6 PK	74.0	-3.4	1.64 H	198	72.3	-1.7
4	2483.50	50.3 AV	54.0	-3.7	1.64 H	198	52.0	-1.7
5	4924.00	46.6 PK	74.0	-27.4	2.32 H	334	44.1	2.5
6	4924.00	34.9 AV	54.0	-19.1	2.32 H	334	32.4	2.5
7	7386.00	45.2 PK	74.0	-28.8	2.09 H	306	35.8	9.4
8	7386.00	33.9 AV	54.0	-20.1	2.09 H	306	24.5	9.4
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	*2462.00	109.2 PK			2.09 V	321	111.0	-1.8
2	*2462.00	99.5 AV			2.09 V	321	101.3	-1.8
3	2483.50	71.8 PK	74.0	-2.2	2.09 V	321	73.5	-1.7
4	2483.50	53.6 AV	54.0	-0.4	2.09 V	321	55.3	-1.7
5	4924.00	41.7 PK	74.0	-32.3	1.00 V	329	39.2	2.5
6	4924.00	30.8 AV	54.0	-23.2	1.00 V	329	28.3	2.5
7	7386.00	43.8 PK	74.0	-30.2	1.42 V	148	34.4	9.4
8	7386.00	31.8 AV	54.0	-22.2	1.42 V	148	22.4	9.4

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	66.1 PK	74.0	-7.9	1.67 H	225	67.7	-1.6
2	2390.00	52.8 AV	54.0	-1.2	1.67 H	225	54.4	-1.6
3	*2412.00	104.8 PK			1.67 H	225	106.5	-1.7
4	*2412.00	97.1 AV			1.67 H	225	98.8	-1.7
5	4824.00	47.6 PK	74.0	-26.4	2.33 H	344	45.3	2.3
6	4824.00	35.7 AV	54.0	-18.3	2.33 H	344	33.4	2.3
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	67.7 PK	74.0	-6.3	2.20 V	319	69.3	-1.6
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**2.20 V**	**319**	**55.5**	**-1.6**
3	*2412.00	105.8 PK			2.20 V	319	107.5	-1.7
4	*2412.00	98.0 AV			2.20 V	319	99.7	-1.7
5	4824.00	42.0 PK	74.0	-32.0	1.00 V	312	39.7	2.3
6	4824.00	31.0 AV	54.0	-23.0	1.00 V	312	28.7	2.3

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 other emission levels were very low against the limit.
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	1.71 H	210	57.8	-1.6
2	2390.00	44.8 AV	54.0	-9.2	1.71 H	210	46.4	-1.6
3	*2437.00	109.2 PK			1.71 H	210	111.0	-1.8
4	*2437.00	101.3 AV			1.71 H	210	103.1	-1.8
5	2483.50	57.2 PK	74.0	-16.8	1.71 H	210	58.9	-1.7
6	2483.50	45.3 AV	54.0	-8.7	1.71 H	210	47.0	-1.7
7	4874.00	47.0 PK	74.0	-27.0	2.31 H	343	44.6	2.4
8	4874.00	35.4 AV	54.0	-18.6	2.31 H	343	33.0	2.4
9	7311.00	45.1 PK	74.0	-28.9	2.06 H	306	35.9	9.2
10	7311.00	33.5 AV	54.0	-20.5	2.06 H	306	24.3	9.2
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	57.6 PK	74.0	-16.4	2.15 V	321	59.2	-1.6
2	2390.00	46.2 AV	54.0	-7.8	2.15 V	321	47.8	-1.6
3	*2437.00	110.3 PK			2.15 V	321	112.1	-1.8
4	*2437.00	102.1 AV			2.15 V	321	103.9	-1.8
5	2483.50	59.6 PK	74.0	-14.4	2.15 V	321	61.3	-1.7
6	2483.50	47.3 AV	54.0	-6.7	2.15 V	321	49.0	-1.7
7	4874.00	42.0 PK	74.0	-32.0	1.00 V	310	39.6	2.4
8	4874.00	30.9 AV	54.0	-23.1	1.00 V	310	28.5	2.4
9	7311.00	43.5 PK	74.0	-30.5	1.37 V	168	34.3	9.2
10	7311.00	31.6 AV	54.0	-22.4	1.37 V	168	22.4	9.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	106.2 PK			1.61 H	226	108.0	-1.8
2	*2462.00	98.1 AV			1.61 H	226	99.9	-1.8
3	2483.50	66.2 PK	74.0	-7.8	1.61 H	226	67.9	-1.7
4	2483.50	52.8 AV	54.0	-1.2	1.61 H	226	54.5	-1.7
5	4924.00	46.0 PK	74.0	-28.0	2.35 H	319	43.5	2.5
6	4924.00	34.6 AV	54.0	-19.4	2.35 H	319	32.1	2.5
7	7386.00	45.0 PK	74.0	-29.0	2.06 H	334	35.6	9.4
8	7386.00	33.8 AV	54.0	-20.2	2.06 H	334	24.4	9.4
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	*2462.00	107.4 PK			2.11 V	321	109.2	-1.8
2	*2462.00	99.2 AV			2.11 V	321	101.0	-1.8
3	2483.50	67.5 PK	74.0	-6.5	2.11 V	321	69.2	-1.7
4	2483.50	53.7 AV	54.0	-0.3	2.11 V	321	55.4	-1.7
5	4924.00	42.5 PK	74.0	-31.5	1.00 V	311	40.0	2.5
6	4924.00	31.4 AV	54.0	-22.6	1.00 V	311	28.9	2.5
7	7386.00	43.8 PK	74.0	-30.2	1.36 V	142	34.4	9.4
8	7386.00	32.1 AV	54.0	-21.9	1.36 V	142	22.7	9.4

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	65.5 PK	74.0	-8.5	1.72 H	205	67.1	-1.6
2	2390.00	52.7 AV	54.0	-1.3	1.72 H	205	54.3	-1.6
3	*2422.00	103.8 PK			1.72 H	205	105.5	-1.7
4	*2422.00	94.1 AV			1.72 H	205	95.8	-1.7
5	4844.00	41.9 PK	74.0	-32.1	2.38 H	344	39.7	2.2
6	4844.00	30.1 AV	54.0	-23.9	2.38 H	344	27.9	2.2
7	7266.00	42.2 PK	74.0	-31.8	2.17 H	335	33.2	9.0
8	7266.00	30.8 AV	54.0	-23.2	2.17 H	335	21.8	9.0
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	66.9 PK	74.0	-7.1	2.12 V	321	68.5	-1.6
2	2390.00	53.6 AV	54.0	-0.4	2.12 V	321	55.2	-1.6
3	*2422.00	104.7 PK			2.12 V	321	106.4	-1.7
4	*2422.00	95.2 AV			2.12 V	321	96.9	-1.7
5	4844.00	40.5 PK	74.0	-33.5	1.00 V	311	38.3	2.2
6	4844.00	28.4 AV	54.0	-25.6	1.00 V	311	26.2	2.2
7	7266.00	42.7 PK	74.0	-31.3	1.42 V	170	33.7	9.0
8	7266.00	31.0 AV	54.0	-23.0	1.42 V	170	22.0	9.0

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	60.2 PK	74.0	-13.8	1.65 H	197	61.8	-1.6
2	2390.00	46.2 AV	54.0	-7.8	1.65 H	197	47.8	-1.6
3	*2437.00	105.9 PK			1.65 H	197	107.7	-1.8
4	*2437.00	96.2 AV			1.65 H	197	98.0	-1.8
5	2483.50	63.5 PK	74.0	-10.5	1.65 H	197	65.2	-1.7
6	2483.50	49.8 AV	54.0	-4.2	1.65 H	197	51.5	-1.7
7	4874.00	42.1 PK	74.0	-31.9	2.32 H	327	39.7	2.4
8	4874.00	30.3 AV	54.0	-23.7	2.32 H	327	27.9	2.4
9	7311.00	42.4 PK	74.0	-31.6	2.17 H	332	33.2	9.2
10	7311.00	30.7 AV	54.0	-23.3	2.17 H	332	21.5	9.2
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	63.1 PK	74.0	-10.9	2.16 V	321	64.7	-1.6
2	2390.00	48.1 AV	54.0	-5.9	2.16 V	321	49.7	-1.6
3	*2437.00	107.3 PK			2.16 V	321	109.1	-1.8
4	*2437.00	97.3 AV			2.16 V	321	99.1	-1.8
5	2483.50	65.6 PK	74.0	-8.4	2.16 V	321	67.3	-1.7
6	2483.50	51.2 AV	54.0	-2.8	2.16 V	321	52.9	-1.7
7	4874.00	40.4 PK	74.0	-33.6	1.05 V	303	38.0	2.4
8	4874.00	28.5 AV	54.0	-25.5	1.05 V	303	26.1	2.4
9	7311.00	43.2 PK	74.0	-30.8	1.41 V	161	34.0	9.2
10	7311.00	31.4 AV	54.0	-22.6	1.41 V	161	22.2	9.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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			1.12 H	166	104.6	-1.8
2	*2452.00	93.6 AV			1.12 H	166	95.4	-1.8
3	2483.50	67.6 PK	74.0	-6.4	1.12 H	166	69.3	-1.7
4	2483.50	51.6 AV	54.0	-2.4	1.12 H	166	53.3	-1.7
5	4904.00	42.4 PK	74.0	-31.6	2.30 H	315	39.9	2.5
6	4904.00	30.4 AV	54.0	-23.6	2.30 H	315	27.9	2.5
7	7356.00	42.3 PK	74.0	-31.7	2.12 H	318	33.1	9.2
8	7356.00	30.7 AV	54.0	-23.3	2.12 H	318	21.5	9.2
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	*2452.00	103.7 PK			1.45 V	323	105.5	-1.8
2	*2452.00	94.9 AV			1.45 V	323	96.7	-1.8
3	2483.50	69.9 PK	74.0	-4.1	1.45 V	323	71.6	-1.7
4	2483.50	53.8 AV	54.0	-0.2	1.45 V	323	55.5	-1.7
5	4904.00	40.4 PK	74.0	-33.6	1.02 V	313	37.9	2.5
6	4904.00	28.0 AV	54.0	-26.0	1.02 V	313	25.5	2.5
7	7356.00	43.0 PK	74.0	-31.0	1.37 V	160	33.8	9.2
8	7356.00	31.3 AV	54.0	-22.7	1.37 V	160	22.1	9.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

Below 1GHz Data:

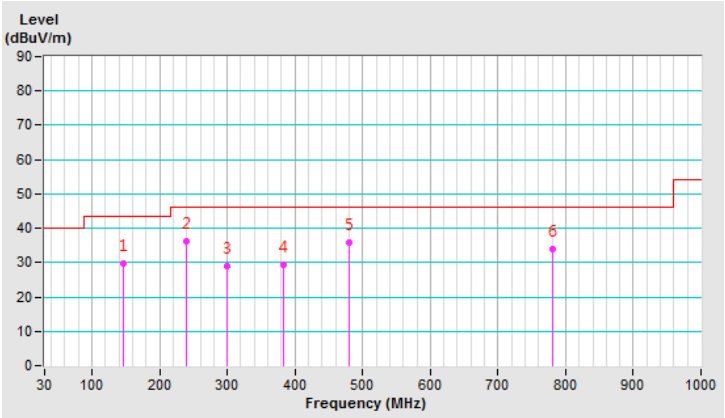
802.11n (HT20)

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	146.40	29.8 QP	43.5	-13.7	1.06 H	54	37.7	-7.9
2	240.00	36.1 QP	46.0	-9.9	1.12 H	315	45.0	-8.9
3	300.00	29.1 QP	46.0	-16.9	1.45 H	30	36.1	-7.0
4	384.00	29.5 QP	46.0	-16.5	1.38 H	65	34.2	-4.7
5	479.98	35.8 QP	46.0	-10.2	1.85 H	48	38.0	-2.2
6	780.20	33.9 QP	46.0	-12.1	1.65 H	87	29.7	4.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. 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.

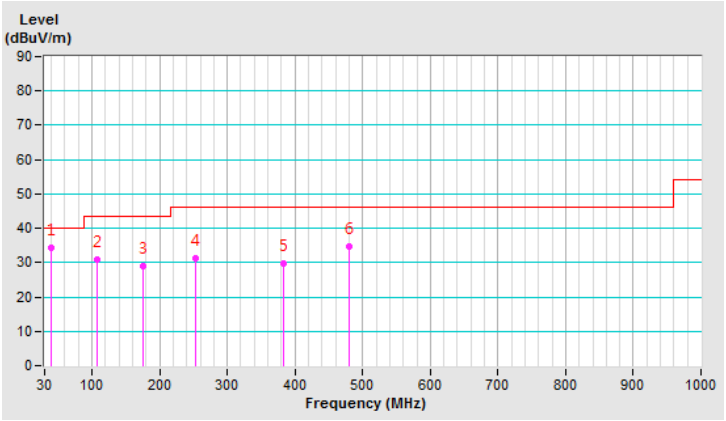


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	39.34	34.4 QP	40.0	-5.6	1.11 V	65	43.0	-8.6
2	107.55	30.9 QP	43.5	-12.6	1.32 V	9	41.8	-10.9
3	175.18	29.0 QP	43.5	-14.5	1.47 V	118	37.7	-8.7
4	253.05	31.4 QP	46.0	-14.6	1.56 V	109	40.0	-8.6
5	384.00	29.8 QP	46.0	-16.2	1.02 V	12	34.5	-4.7
6	480.01	34.6 QP	46.0	-11.4	2.11 V	12	36.7	-2.1

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. 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	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
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. 14, 2019	Mar. 13, 2020
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

NOTE:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3 Tested Date: June 15, 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.

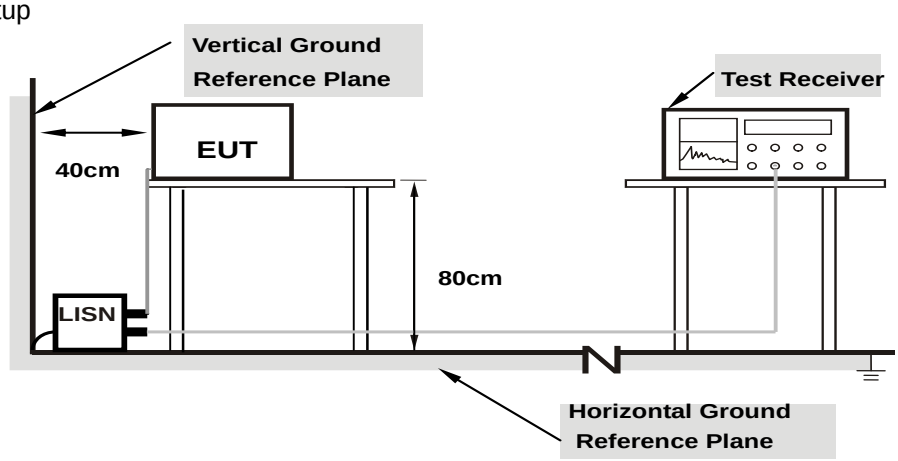
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

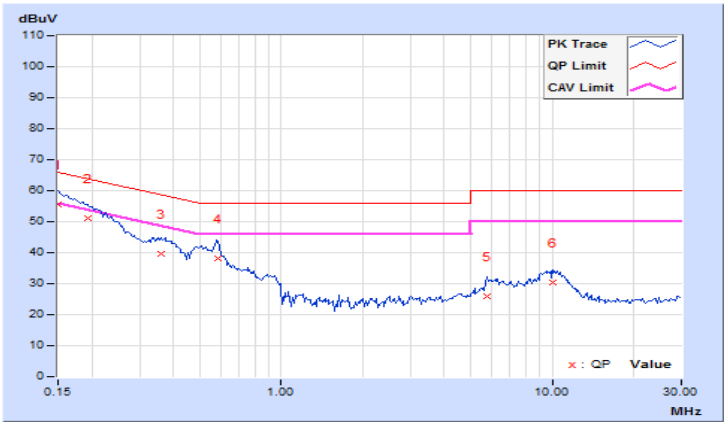
4.2.7 Test Results

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

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**10.03**	**45.48**	**29.25**	**55.51**	**39.28**	**66.00**	**56.00**	**-10.49**	**-16.72**
2	0.19297	10.05	40.96	25.47	51.01	35.52	63.91	53.91	-12.90	-18.39
3	0.36094	10.07	29.53	15.16	39.60	25.23	58.71	48.71	-19.11	-23.48
4	0.58750	10.10	28.17	19.10	38.27	29.20	56.00	46.00	-17.73	-16.80
5	5.75781	10.43	15.54	7.61	25.97	18.04	60.00	50.00	-34.03	-31.96
6	10.00391	10.70	19.70	9.96	30.40	20.66	60.00	50.00	-29.60	-29.34

Remarks:

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

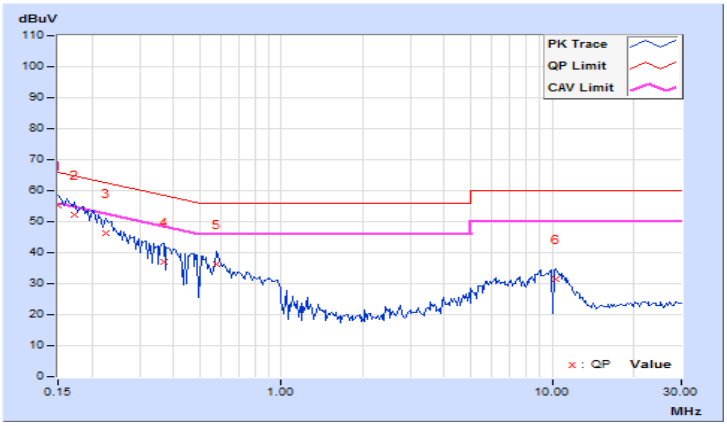


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.94	45.16	28.69	55.10	38.63	66.00	56.00	-10.90	-17.37
2	0.17344	9.94	42.38	26.18	52.32	36.12	64.79	54.79	-12.47	-18.67
3	0.22422	9.95	36.51	21.06	46.46	31.01	62.66	52.66	-16.20	-21.65
4	0.36875	9.98	27.09	11.33	37.07	21.31	58.53	48.53	-21.46	-27.22
5	0.57578	9.99	26.44	13.47	36.43	23.46	56.00	46.00	-19.57	-22.54
6	10.26563	10.55	20.93	7.03	31.48	17.58	60.00	50.00	-28.52	-32.42

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

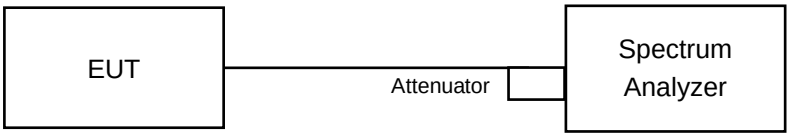


4.3 6dB Bandwidth Measurement

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. Detector = peak.
e. Sweep = auto couple.
f. 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

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	10.11	0.5	PASS
6	2437	10.11	0.5	PASS
11	2462	10.11	0.5	PASS

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.44	0.5	PASS
6	2437	16.42	0.5	PASS
11	2462	16.41	0.5	PASS

802.11n (HT20)

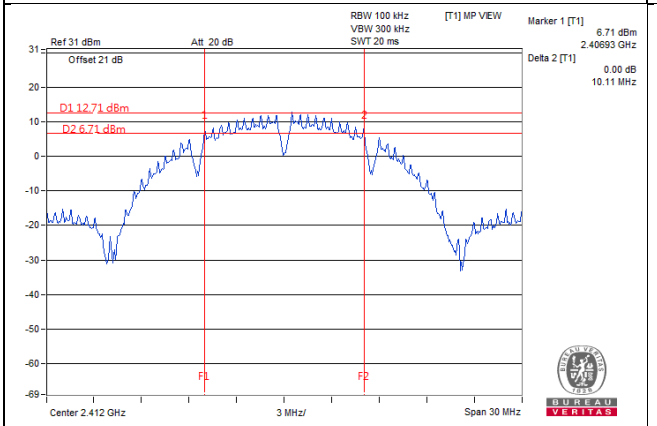
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.62	0.5	Pass
6	2437	17.61	0.5	Pass
11	2462	17.65	0.5	Pass

802.11n (HT40)

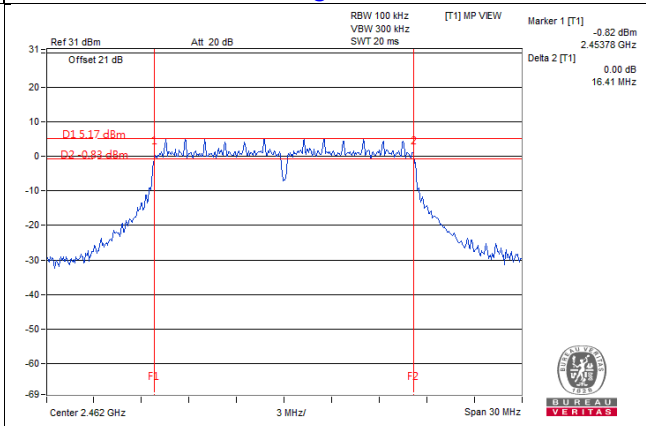
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	35.28	0.5	Pass
6	2437	35.39	0.5	Pass
9	2452	35.46	0.5	Pass

Spectrum Plot of Worst Value

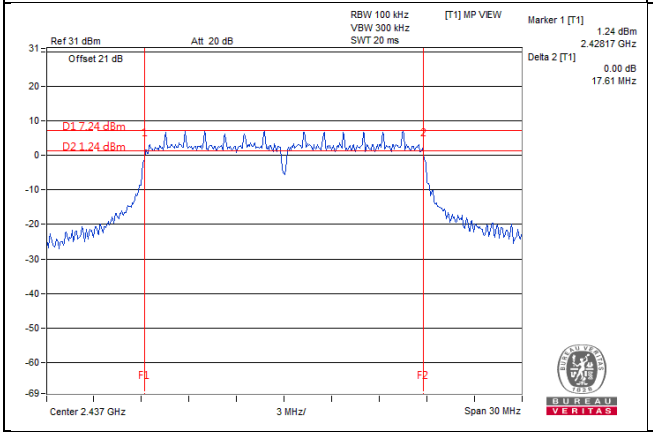
802.11b : CH1



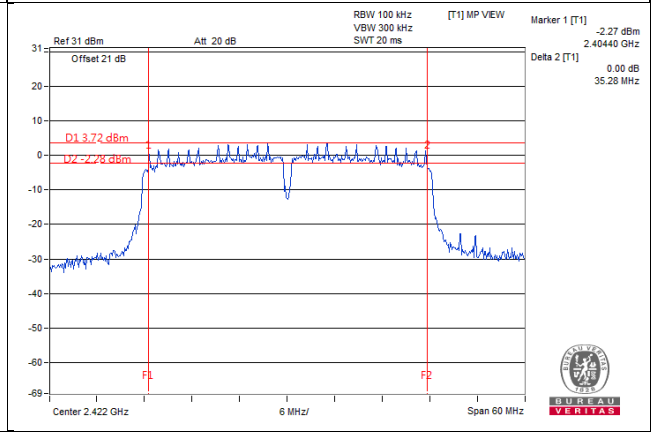
802.11g : CH11



802.11n (HT20): CH6



802.11n (HT40): CH3

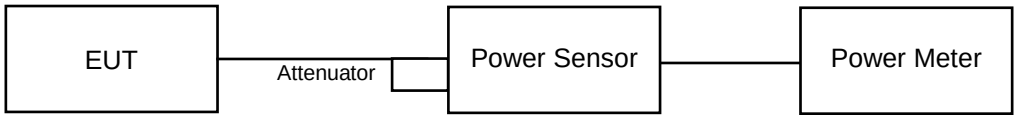


4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

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

FOR PEAK POWER

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	184.077	22.65	30	Pass
6	2437	195.884	22.92	30	Pass
11	2462	200.447	23.02	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	322.849	25.09	30	Pass
6	2437	338.065	25.29	30	Pass
11	2462	274.789	24.39	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	314.051	24.97	30	Pass
6	2437	351.56	25.46	30	Pass
11	2462	263.633	24.21	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
3	2422	285.759	24.56	30	Pass
6	2437	314.051	24.97	30	Pass
9	2452	239.332	23.79	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	125.314	20.98
6	2437	137.404	21.38
11	2462	145.211	21.62

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	74.817	18.74
6	2437	80.168	19.04
11	2462	53.951	17.32

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	63.241	18.01
6	2437	77.804	18.91
11	2462	44.259	16.46

802.11n (HT40)

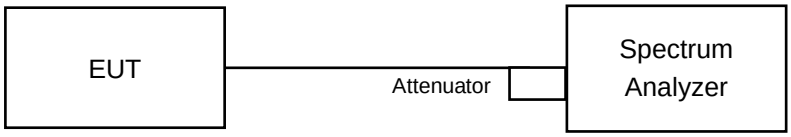
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	58.479	17.67
6	2437	65.464	18.16
9	2452	37.67	15.76

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-1.90	8	Pass
6	2437	-2.43	8	Pass
11	2462	-1.70	8	Pass

802.11g

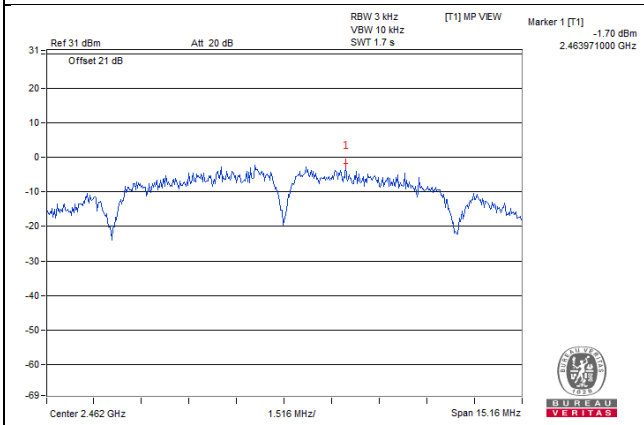
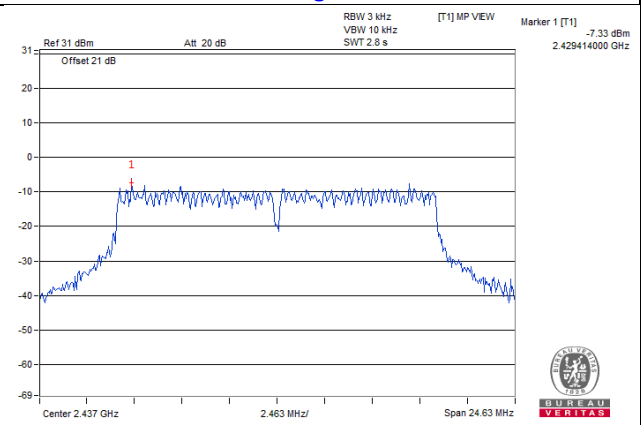
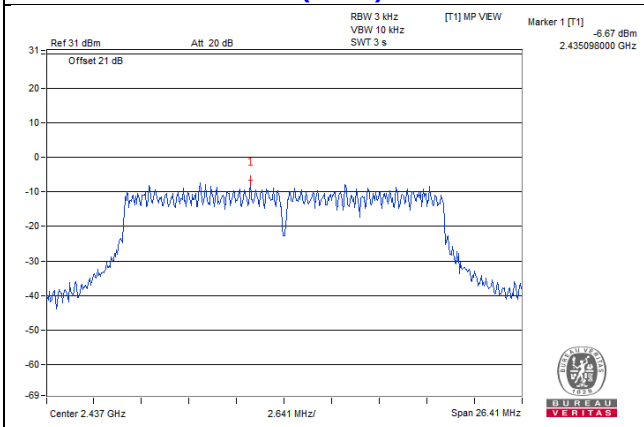
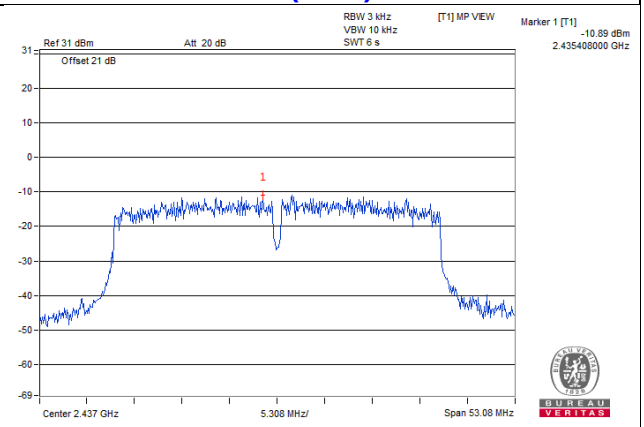
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-7.67	8	Pass
6	2437	-7.33	8	Pass
11	2462	-9.83	8	Pass

802.11n (HT20)

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-9.18	8	Pass
6	2437	-6.67	8	Pass
11	2462	-10.06	8	Pass

802.11n (HT40)

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
3	2422	-11.18	8	Pass
6	2437	-10.89	8	Pass
9	2452	-13.18	8	Pass

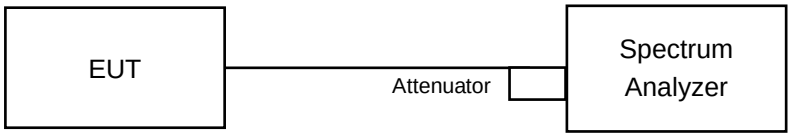
Spectrum Plot of Worst Value	
802.11b : CH11	**802.11g : CH6**
	
802.11n (HT20): CH6	**802.11n (HT40) : CH6**
	

4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

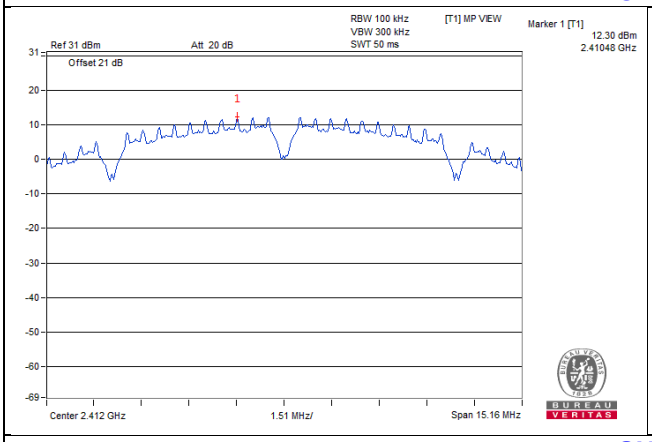
Same as Item 4.3.6

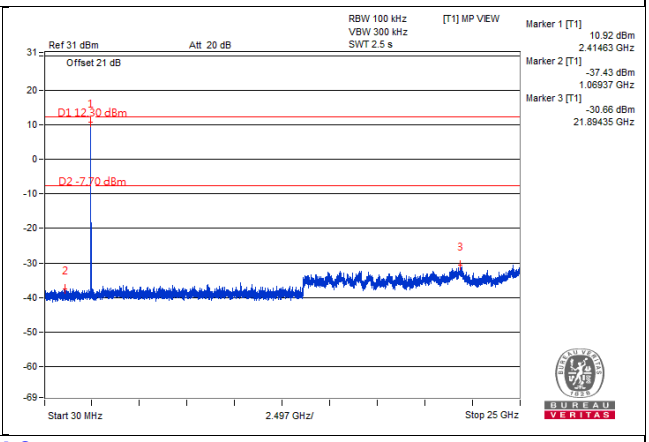
4.6.7 Test Results

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

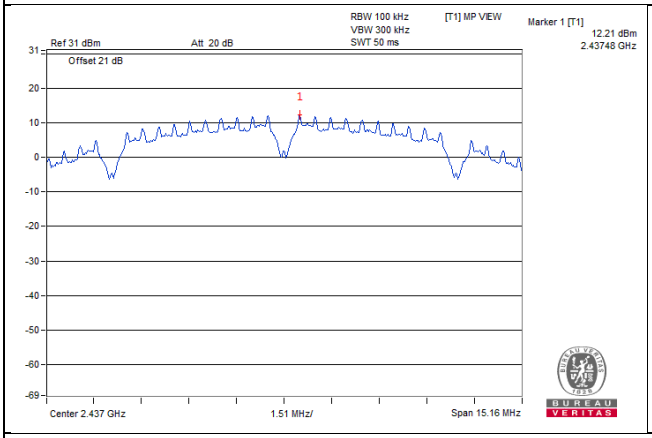
802.11b

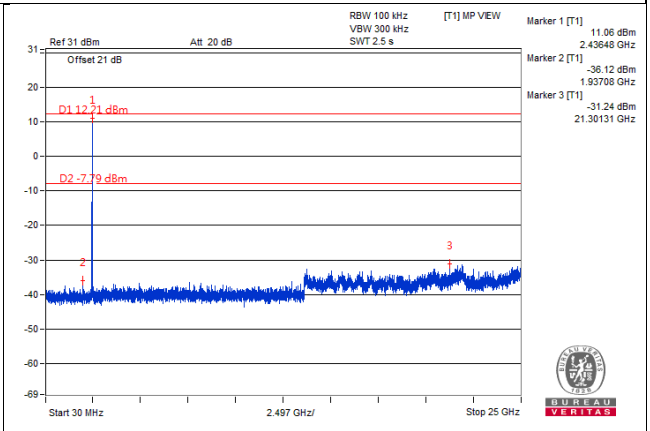
CH 1



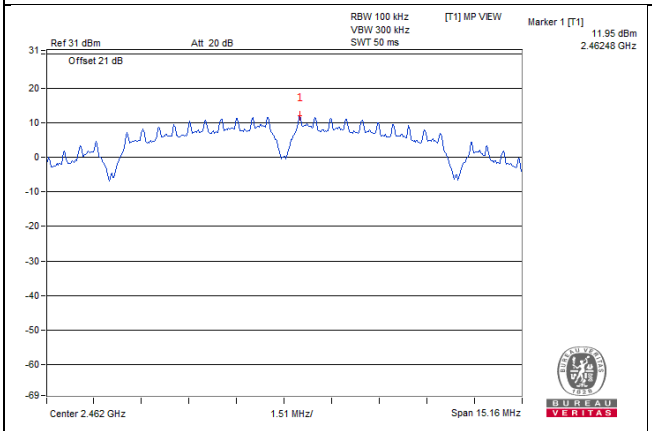


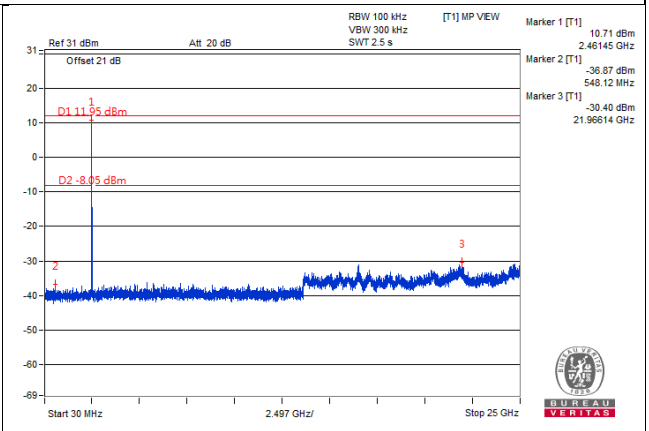
CH 6



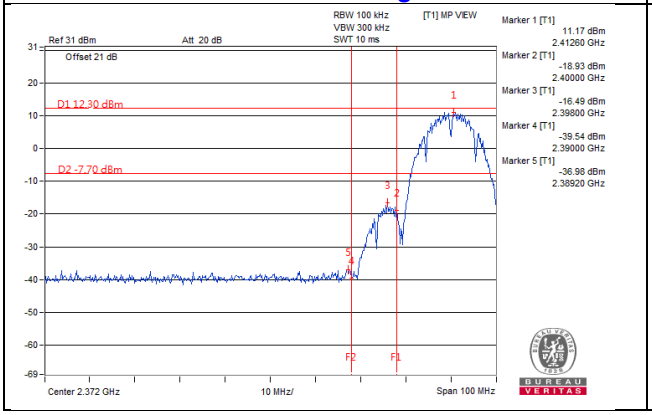


CH 11

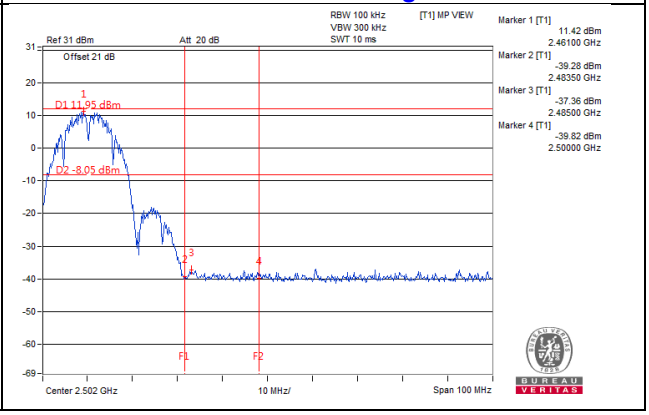




CH 1 Band edge

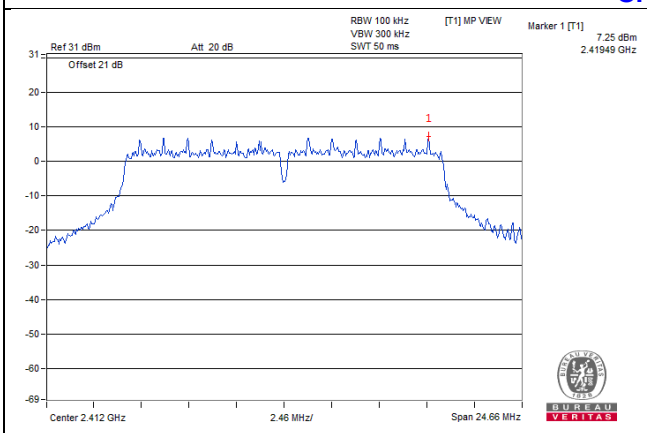


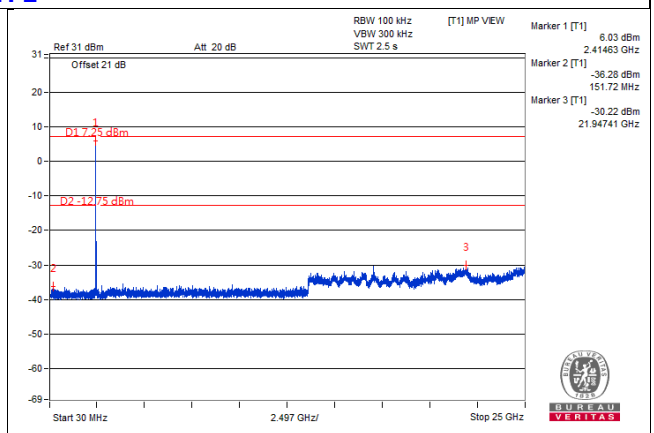
CH 11 Band edge



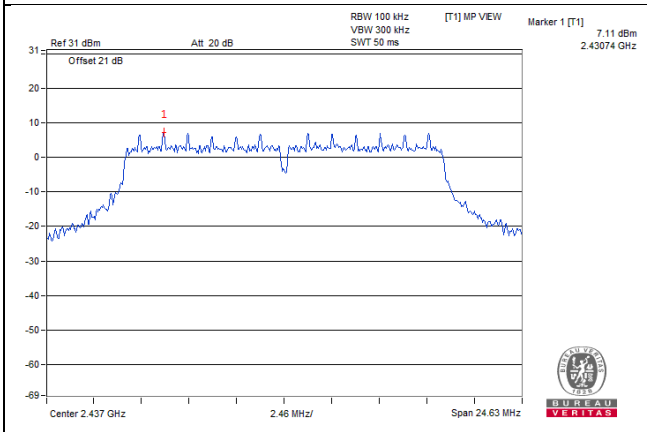
802.11g

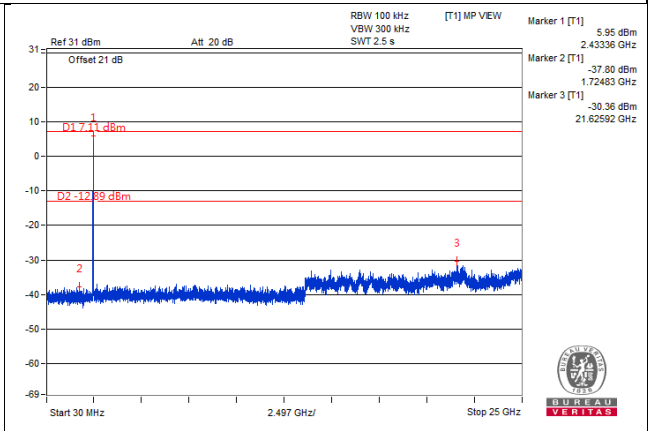
CH 1



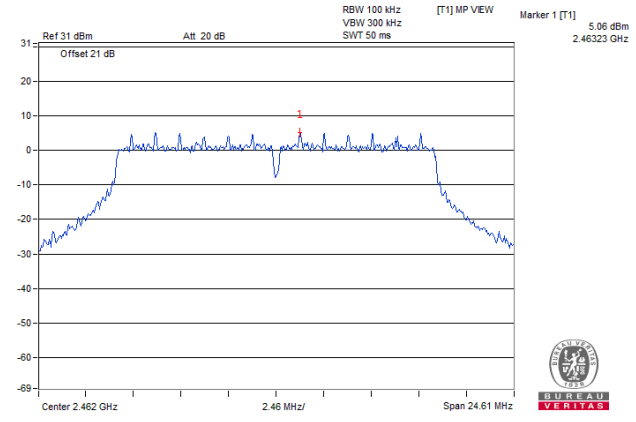


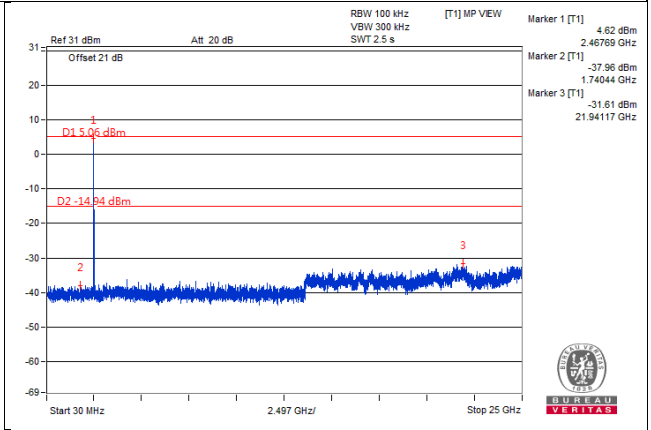
CH 6



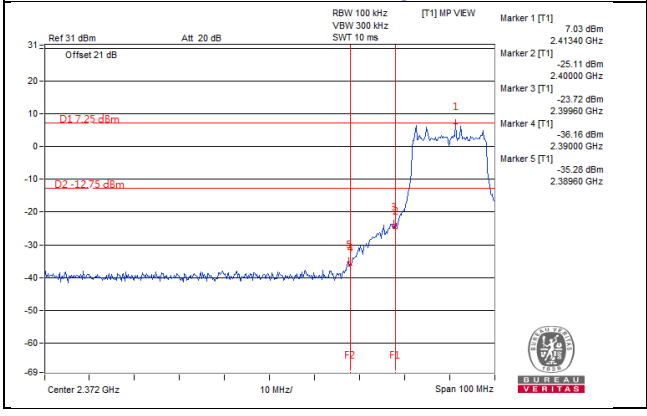


CH 11

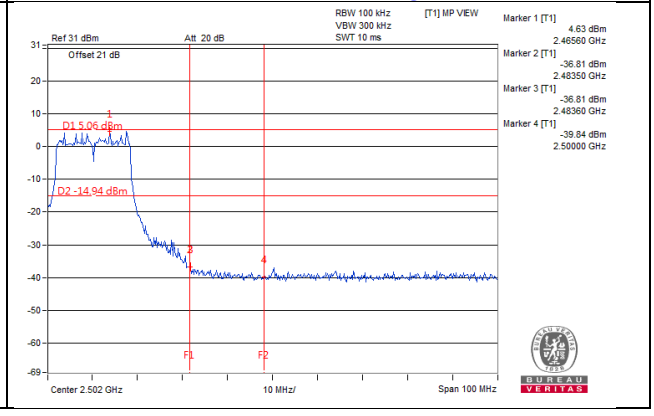




CH 1 Band edge

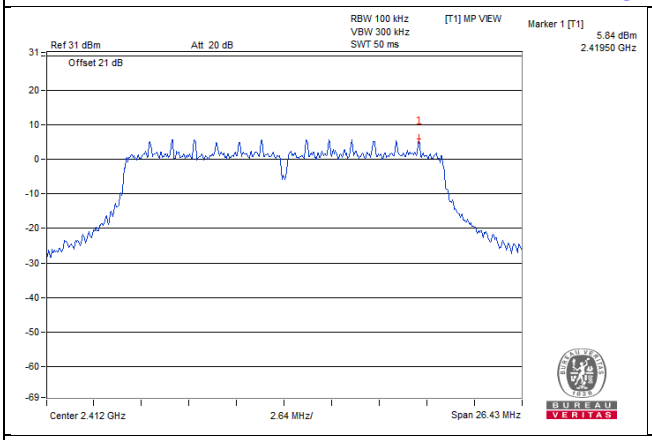


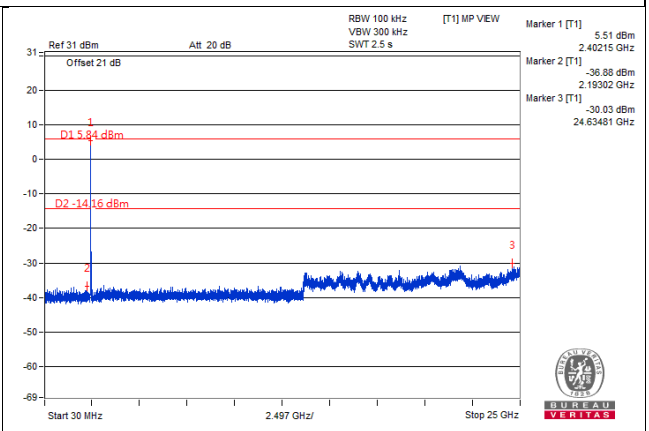
CH 11 Band edge



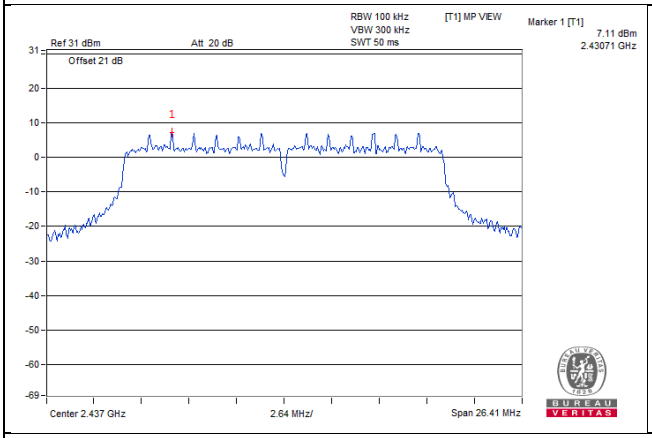
802.11n (HT20)

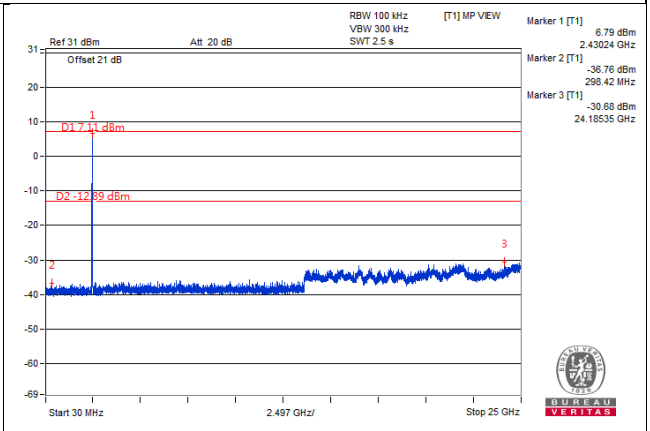
CH 1



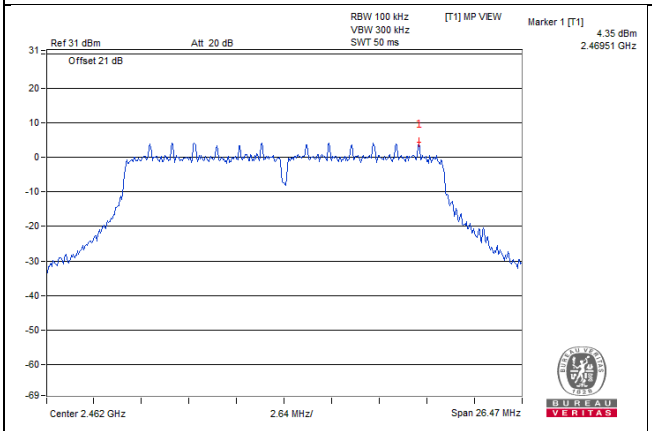


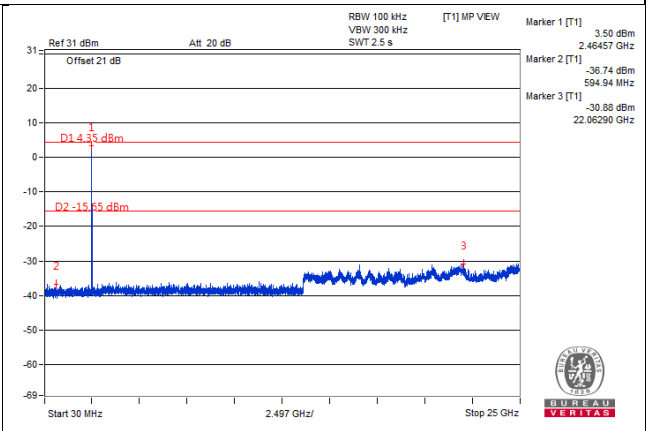
CH 6



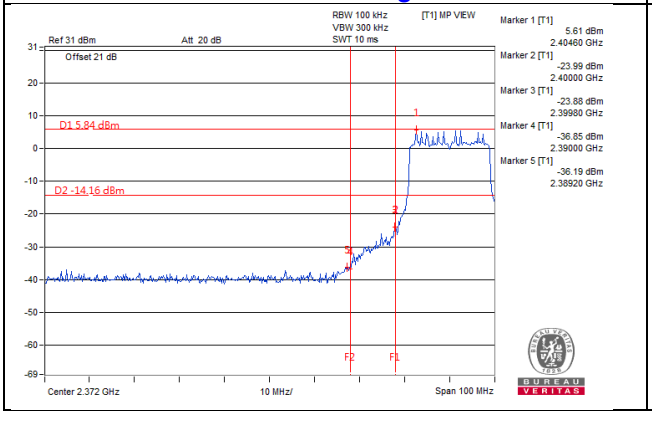


CH 11

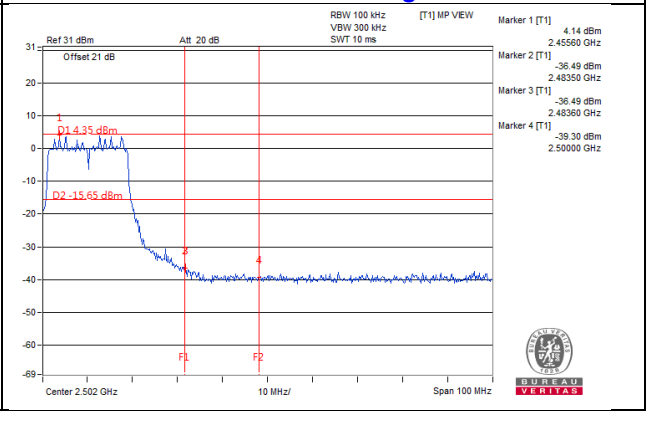




CH 1 Band edge

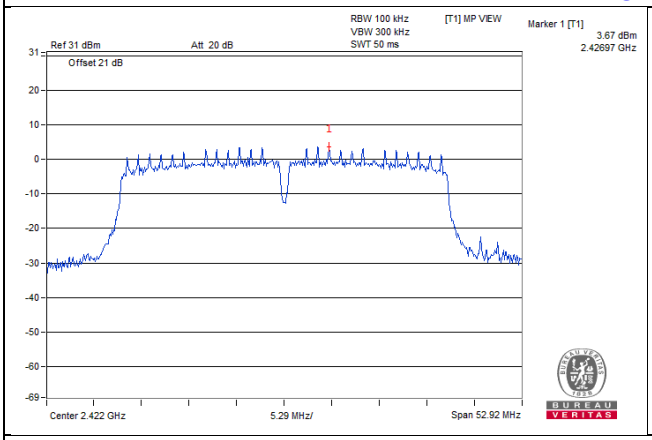


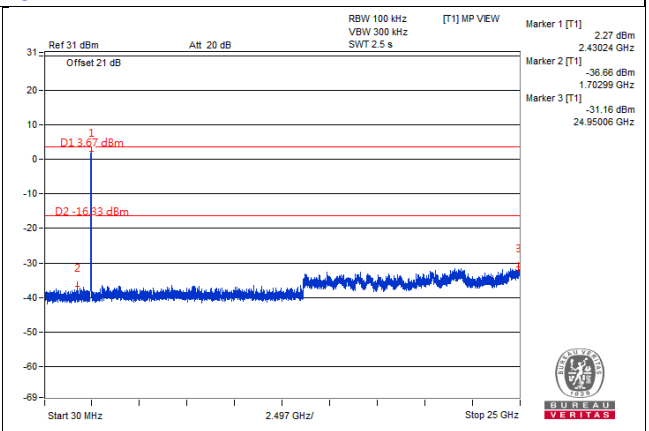
CH 11 Band edge



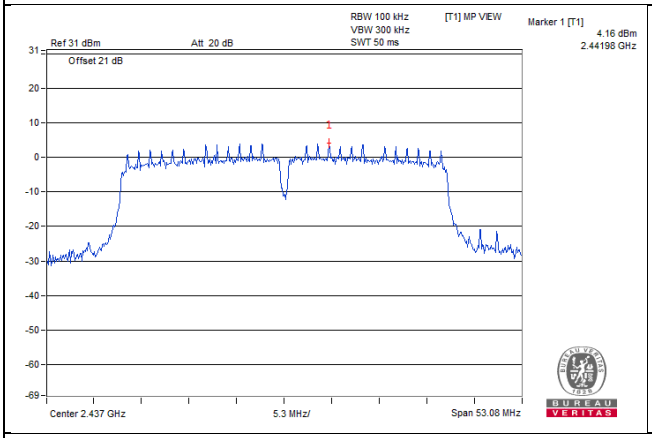
802.11n (HT40)

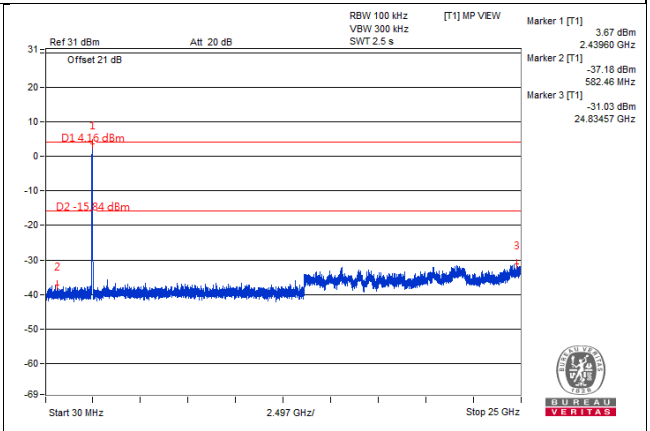
CH 3



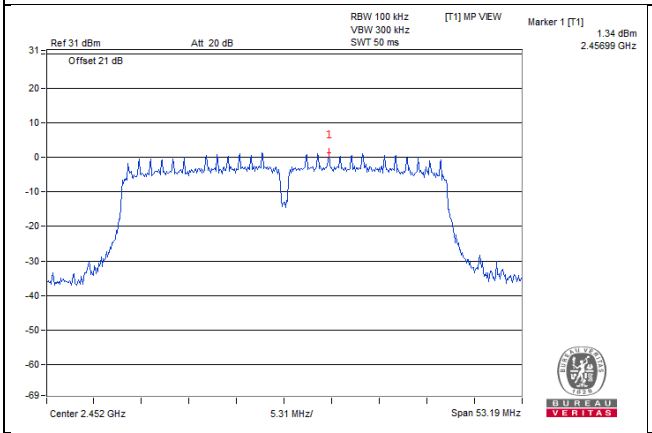


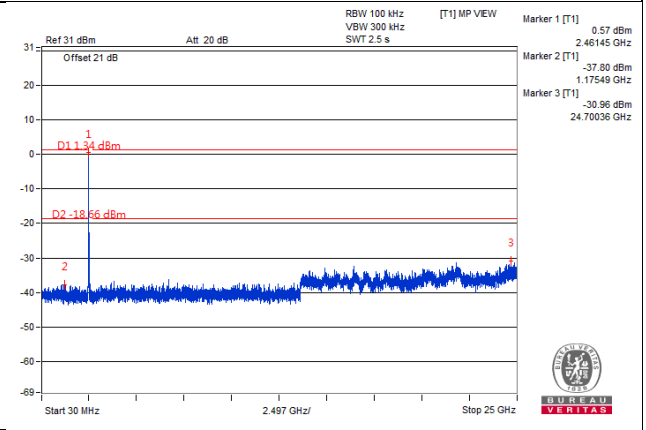
CH 6



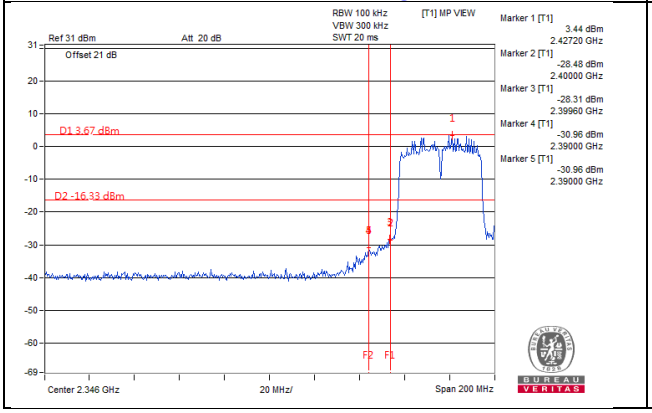


CH 9

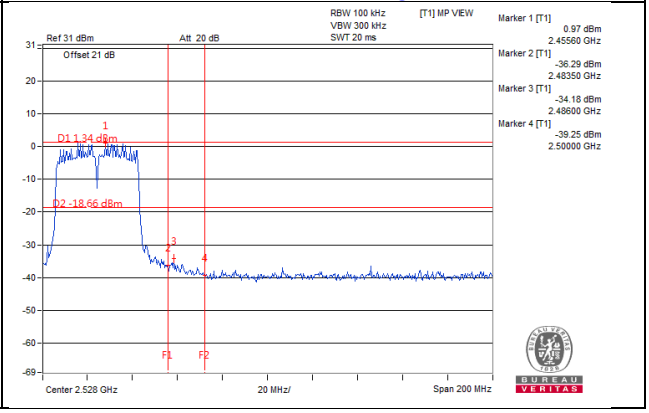




CH 3 Band edge



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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