FCC Test Report (WLAN)

Report No.:	RF190111E01
FCC ID:	MQT-FD150
Test Model:	FD150
Series Model:	xCL_WT-50
Received Date:	Jan. 11, 2019
Test Date:	Feb. 11 to 15, 2019
Issued Date:	Feb. 23, 2019
Applicant:	XAC AUTOMATION CORP.
Address:	4F, No. 30, INDUSTRY E. RD. IX, SCIENCE-BASED INDUSTRIAL PARK,HSINCHU,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
RF190111E01	Original release.	Feb. 23, 2019

1 Certificate of Conformity

Product:	Terminal
Brand:	XAC,First Data
Test Model:	FD150
Series Model:	xCL_WT-50
Sample Status:	ENGINEERING SAMPLE
Applicant:	XAC AUTOMATION CORP.
Test Date:	Feb. 11 to 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:** Feb. 23, 2019

Cindy Hsin / Specialist

Approved by : _____ , **Date:** Feb. 23, 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 -15.19dB at 0.15781MHz.
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 2483.50MHz, 2390.00MHz, 4824.00MHz.
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	No antenna connector is used.

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	5.1 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	5.0 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	Terminal
Brand	XAC,First Data
Test Model	FD150
Series Model	xCL_WT-50
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc 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 150Mbps
Operating Frequency	2.412 ~ 2.462GHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7
Output Power	159.588mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1 (option)
Cable Supplied	NA

Note:

1. WLAN and NFC technology can't transmit at same time.
2. All models are listed as below.

Brand	Model	Remark
XAC	xCL_WT-50	Different appearance For marketing purpose
First Data	FD150	
From the above models, model: **FD150** was selected as representative model for the test and its data was recorded in this report.		

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

Brand	Model No.	Spec.
DELTA	ADP-36PH B	Input: 100-240Vac, 1A, 50-60Hz Output: 12Vdc, 3A AC Intput cable: Unshielded, 1m DC Output cable: Unshielded, 1.8m with one core

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

WLAN					
Brand	Model	Antenna Net Gain (dBi)	Frequency range (MHz)	Antenna Type	Connector Type
ACX	AT3216	1.5	2400~2500	Chip	none
NFC					
Brand	Model	Antenna Net Gain (dBi)	Frequency range (MHz)	Antenna Type	Connector Type
XAC	FD100GT	13	13.56	Wire	none

5. The EUT incorporates a SISO function.

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

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)
802.11g	1 to 11	1	OFDM	BPSK	6

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)
802.11g	1 to 11	1	OFDM	BPSK	6

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

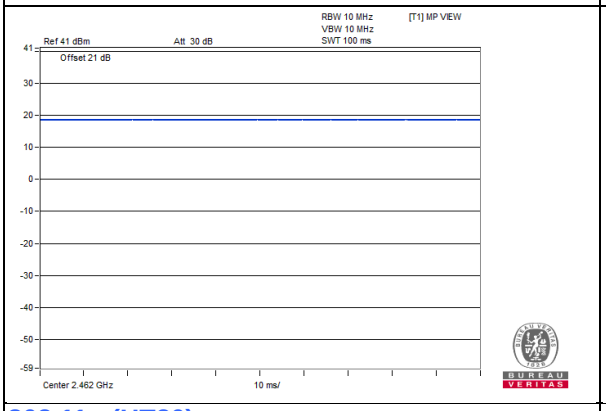
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	21deg. C, 64%RH	120Vac, 60Hz	Rober Cheng
RE<1G	22deg. C, 71%RH	120Vac, 60Hz	Rober Cheng
PLC	24deg. C, 76%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

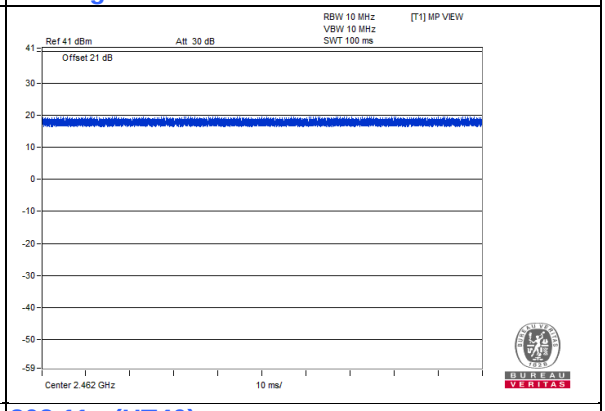
3.3 Duty Cycle of Test Signal

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

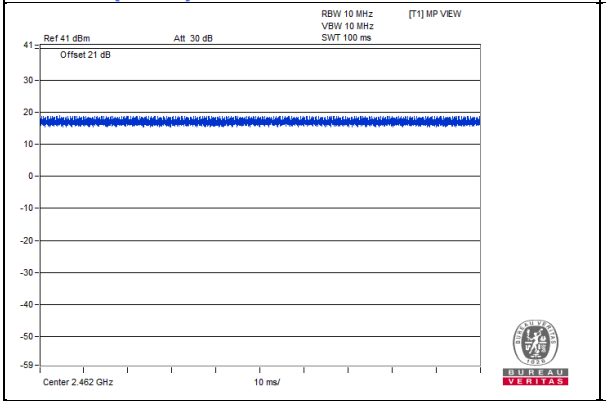
802.11b



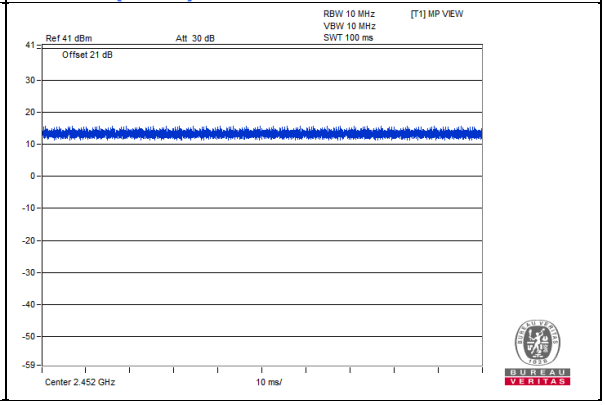
802.11g



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.	SAM Card	NA	NA	NA	NA	Supplied by client
B.	SAM Card	NA	NA	NA	NA	Supplied by client
C.	iPod	Apple	MC749TA/A	CC4DN25WDFDM	NA	Provided by Lab
D.	Laptop	DELL	P66F	CQNLPC2	FCC DoC	Provided by Lab
E.	Telephone	DAISHO	DS-03	NA	NA	Provided by Lab
F.	Easy Card	NA	NA	NA	NA	Provided by Lab

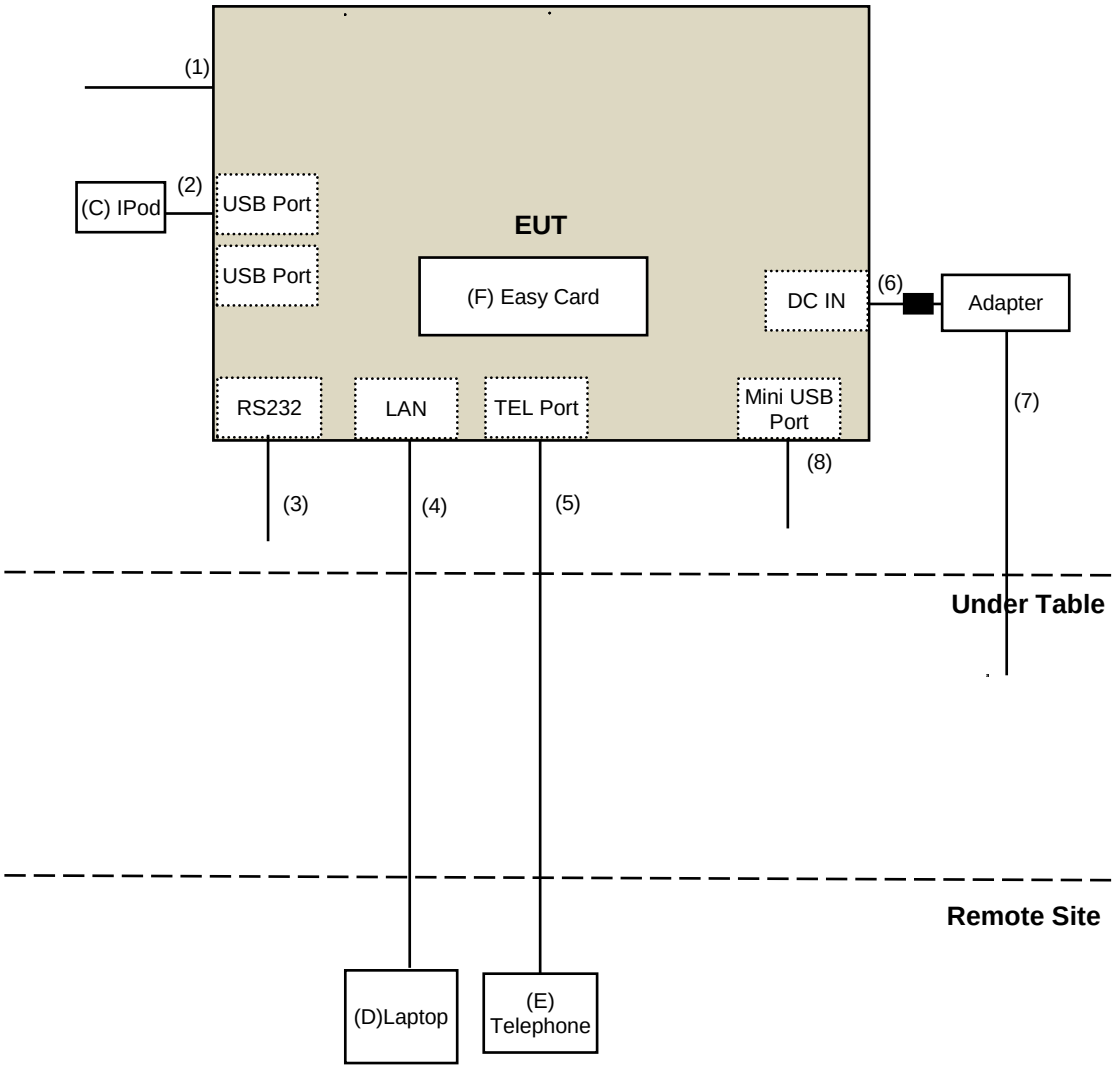
Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable	1	0.3	Yes	0	Supplied by client (for RF Setup)
2.	USB Cable	1	0.1	Yes	0	Provided by Lab
3.	RS232 Cable	1	1.6	No	0	Supplied by client
4.	RJ-45 Cable	1	10	No	0	Provided by Lab
5.	RJ-11 Cable	1	1.8	No	0	Provided by Lab
6.	DC Cable	1	1.8	No	1	Supplied by client
7.	AC Cable	1	1	No	0	Supplied by client
8.	Mini USB Cable	1	1.1	Yes	0	Provided by Lab

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

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 v05
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 Agilent	N9038A	MY50010156	July 12, 2018	July 11, 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-05	May 05, 2018	May 04, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 22, 2018	Nov. 21, 2019
RF Cable	8D	966-3-1	Mar. 20, 2018	Mar. 19, 2019
RF Cable	8D	966-3-2	Mar. 20, 2018	Mar. 19, 2019
RF Cable	8D	966-3-3	Mar. 20, 2018	Mar. 19, 2019
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 27, 2018	Sep. 26, 2019
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC104-SM-SM-1200	160922	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC104-SM-SM-2000	180601	June 12, 2018	June 11, 2019
RF Cable	EMC104-SM-SM-6000	180602	June 12, 2018	June 11, 2019
Spectrum Analyzer Keysight	N9030A	MY54490679	July 23, 2018	July 22, 2019
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
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 20, 2018	June 19, 2019
Power meter Anritsu	ML2495A	1014008	May 09, 2018	May 08, 2019
Power sensor Anritsu	MA2411B	0917122	May 09, 2018	May 08, 2019

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. The CANADA Site Registration No. is 20331-1
4. Loop antenna was used for all emissions below 30 MHz.
5. Tested Date: Feb. 13, 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:

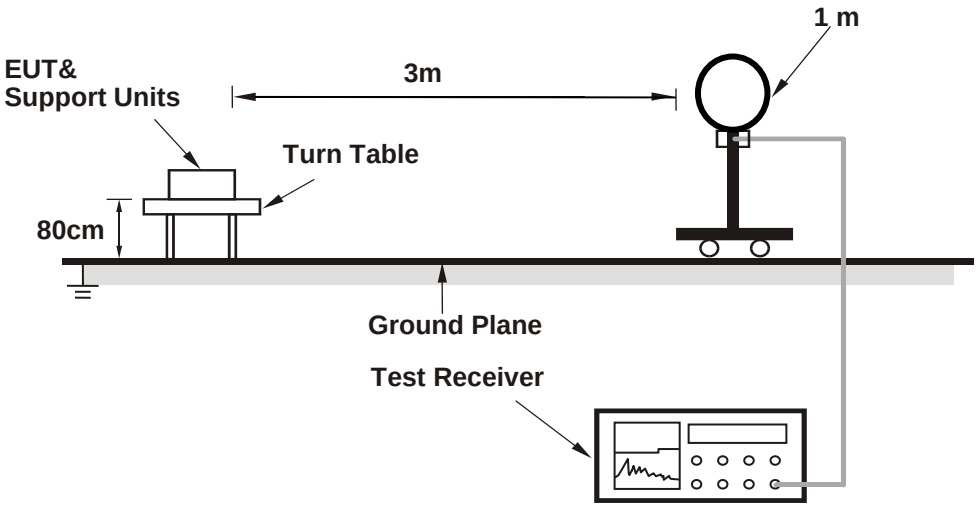
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

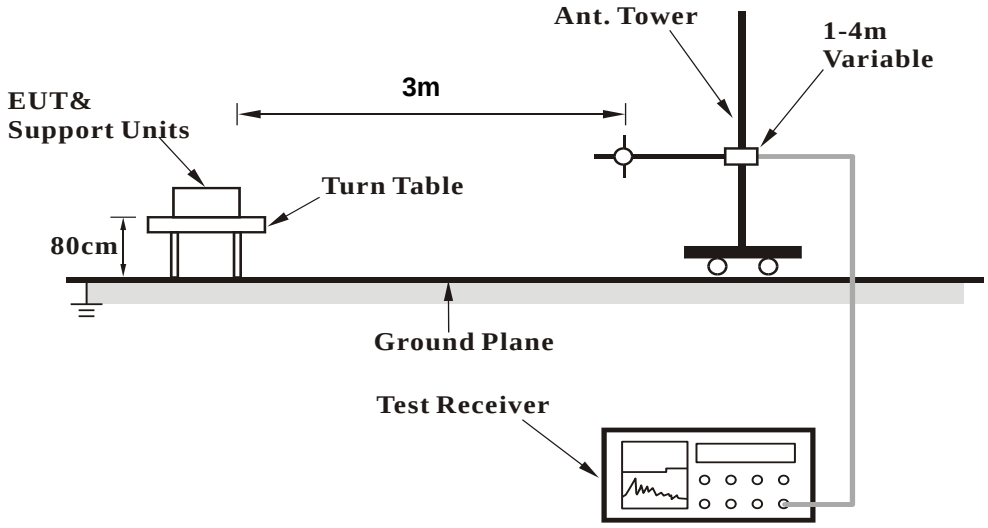
No deviation.

4.1.5 Test Setup

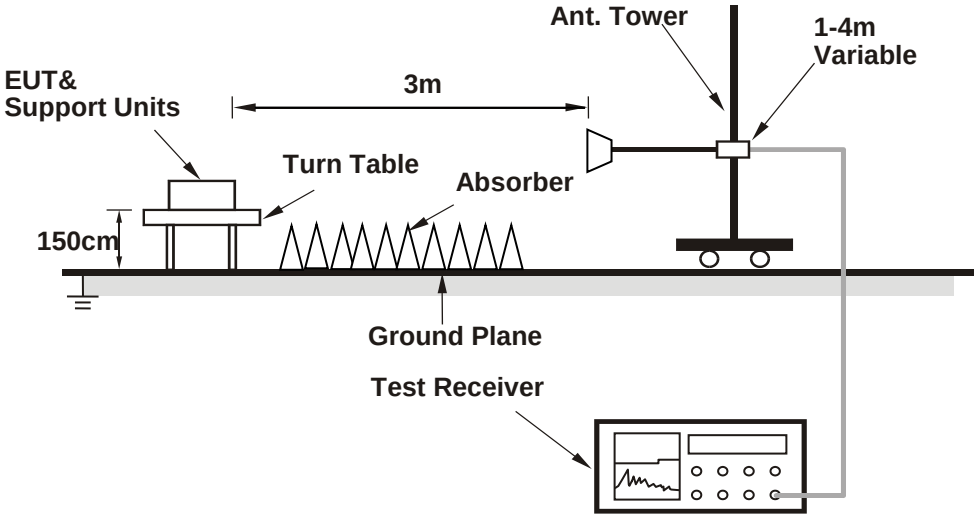
For Radiated emission below 30MHz



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 (Realtek 11n 8188EUS USB WLAN MP Diagnostic Program (0.0024.20120822)) 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	56.4 PK	74.0	-17.6	1.33 H	334	58.5	-2.1
2	2390.00	44.0 AV	54.0	-10.0	1.33 H	334	46.1	-2.1
3	*2412.00	105.0 PK			1.33 H	334	107.1	-2.1
4	*2412.00	102.5 AV			1.33 H	334	104.6	-2.1
5	4824.00	51.1 PK	74.0	-22.9	1.45 H	67	49.0	2.1
6	4824.00	49.8 AV	54.0	-4.2	1.45 H	67	47.7	2.1
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	56.0 PK	74.0	-18.0	1.46 V	243	58.1	-2.1
2	2390.00	43.0 AV	54.0	-11.0	1.46 V	243	45.1	-2.1
3	*2412.00	100.9 PK			1.46 V	243	103.0	-2.1
4	*2412.00	98.5 AV			1.46 V	243	100.6	-2.1
5	4824.00	55.1 PK	74.0	-18.9	2.26 V	360	53.0	2.1
6	**4824.00**	**53.9 AV**	**54.0**	**-0.1**	**2.26 V**	**360**	**51.8**	**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. 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	*2437.00	102.9 PK			1.24 H	334	105.2	-2.3
2	*2437.00	100.9 AV			1.24 H	334	103.2	-2.3
3	4874.00	50.5 PK	74.0	-23.5	1.44 H	78	48.4	2.1
4	4874.00	49.3 AV	54.0	-4.7	1.44 H	78	47.2	2.1
5	7311.00	43.2 PK	74.0	-30.8	1.63 H	125	35.2	8.0
6	7311.00	31.1 AV	54.0	-22.9	1.63 H	125	23.1	8.0
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	*2437.00	99.2 PK			1.46 V	234	101.5	-2.3
2	*2437.00	97.0 AV			1.46 V	234	99.3	-2.3
3	4874.00	54.6 PK	74.0	-19.4	2.19 V	360	52.5	2.1
4	4874.00	53.4 AV	54.0	-0.6	2.19 V	360	51.3	2.1
5	7311.00	44.2 PK	74.0	-29.8	1.17 V	291	36.2	8.0
6	7311.00	33.4 AV	54.0	-20.6	1.17 V	291	25.4	8.0

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 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	102.6 PK			1.37 H	333	104.9	-2.3
2	*2462.00	100.4 AV			1.37 H	333	102.7	-2.3
3	2483.50	57.2 PK	74.0	-16.8	1.37 H	333	59.6	-2.4
4	2483.50	43.5 AV	54.0	-10.5	1.37 H	333	45.9	-2.4
5	4924.00	51.1 PK	74.0	-22.9	1.47 H	73	48.8	2.3
6	4924.00	49.8 AV	54.0	-4.2	1.47 H	73	47.5	2.3
7	7386.00	42.8 PK	74.0	-31.2	1.65 H	120	34.7	8.1
8	7386.00	30.8 AV	54.0	-23.2	1.65 H	120	22.7	8.1
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	99.3 PK			1.47 V	242	101.6	-2.3
2	*2462.00	96.8 AV			1.47 V	242	99.1	-2.3
3	2483.50	56.3 PK	74.0	-17.7	1.47 V	242	58.7	-2.4
4	2483.50	43.4 AV	54.0	-10.6	1.47 V	242	45.8	-2.4
5	4924.00	54.8 PK	74.0	-19.2	2.21 V	360	52.5	2.3
6	4924.00	53.3 AV	54.0	-0.7	2.21 V	360	51.0	2.3
7	7386.00	44.4 PK	74.0	-29.6	1.15 V	302	36.3	8.1
8	7386.00	33.4 AV	54.0	-20.6	1.15 V	302	25.3	8.1

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	71.2 PK	74.0	-2.8	1.19 H	346	73.3	-2.1
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.19 H**	**346**	**56.0**	**-2.1**
3	*2412.00	104.2 PK			1.19 H	346	106.3	-2.1
4	*2412.00	95.1 AV			1.19 H	346	97.2	-2.1
5	4824.00	49.6 PK	74.0	-24.4	1.47 H	108	47.5	2.1
6	4824.00	37.9 AV	54.0	-16.1	1.47 H	108	35.8	2.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.5 PK	74.0	-4.5	1.43 V	243	71.6	-2.1
2	2390.00	51.0 AV	54.0	-3.0	1.43 V	243	53.1	-2.1
3	*2412.00	102.0 PK			1.43 V	243	104.1	-2.1
4	*2412.00	93.1 AV			1.43 V	243	95.2	-2.1
5	4824.00	54.6 PK	74.0	-19.4	2.12 V	360	52.5	2.1
6	4824.00	41.7 AV	54.0	-12.3	2.12 V	360	39.6	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. 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	61.1 PK	74.0	-12.9	1.50 H	340	63.2	-2.1
2	2390.00	47.3 AV	54.0	-6.7	1.50 H	340	49.4	-2.1
3	*2437.00	104.9 PK			1.50 H	340	107.2	-2.3
4	*2437.00	95.8 AV			1.50 H	340	98.1	-2.3
5	2483.50	61.0 PK	74.0	-13.0	1.50 H	340	63.4	-2.4
6	2483.50	46.4 AV	54.0	-7.6	1.50 H	340	48.8	-2.4
7	4874.00	55.1 PK	74.0	-18.9	1.48 H	88	53.0	2.1
8	4874.00	42.2 AV	54.0	-11.8	1.48 H	88	40.1	2.1
9	7311.00	44.5 PK	74.0	-29.5	1.70 H	127	36.5	8.0
10	7311.00	32.0 AV	54.0	-22.0	1.70 H	127	24.0	8.0
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	59.8 PK	74.0	-14.2	1.51 V	228	61.9	-2.1
2	2390.00	42.9 AV	54.0	-11.1	1.51 V	228	45.0	-2.1
3	*2437.00	102.2 PK			1.51 V	228	104.5	-2.3
4	*2437.00	93.2 AV			1.51 V	228	95.5	-2.3
5	2483.50	58.0 PK	74.0	-16.0	1.51 V	228	60.4	-2.4
6	2483.50	42.0 AV	54.0	-12.0	1.51 V	228	44.4	-2.4
7	4874.00	58.9 PK	74.0	-15.1	2.10 V	360	56.8	2.1
8	4874.00	45.8 AV	54.0	-8.2	2.10 V	360	43.7	2.1
9	7311.00	44.2 PK	74.0	-29.8	1.65 V	124	36.2	8.0
10	7311.00	31.6 AV	54.0	-22.4	1.65 V	124	23.6	8.0

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 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	103.7 PK			1.52 H	353	106.0	-2.3
2	*2462.00	94.5 AV			1.52 H	353	96.8	-2.3
3	2483.50	69.2 PK	74.0	-4.8	1.52 H	353	71.6	-2.4
4	**2483.50**	**53.9 AV**	**54.0**	**-0.1**	**1.52 H**	**353**	**56.3**	**-2.4**
5	4924.00	49.6 PK	74.0	-24.4	1.51 H	95	47.3	2.3
6	4924.00	37.8 AV	54.0	-16.2	1.51 H	95	35.5	2.3
7	7386.00	44.2 PK	74.0	-29.8	1.68 H	120	36.1	8.1
8	7386.00	31.8 AV	54.0	-22.2	1.68 H	120	23.7	8.1
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	101.3 PK			1.45 V	237	103.6	-2.3
2	*2462.00	92.1 AV			1.45 V	237	94.4	-2.3
3	2483.50	69.6 PK	74.0	-4.4	1.45 V	237	72.0	-2.4
4	2483.50	51.1 AV	54.0	-2.9	1.45 V	237	53.5	-2.4
5	4924.00	54.9 PK	74.0	-19.1	2.08 V	360	52.6	2.3
6	4924.00	41.7 AV	54.0	-12.3	2.08 V	360	39.4	2.3
7	7386.00	44.2 PK	74.0	-29.8	1.69 V	119	36.1	8.1
8	7386.00	31.7 AV	54.0	-22.3	1.69 V	119	23.6	8.1

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	73.5 PK	74.0	-0.5	1.17 H	345	75.6	-2.1
2	2390.00	53.3 AV	54.0	-0.7	1.17 H	345	55.4	-2.1
3	*2412.00	103.7 PK			1.17 H	345	105.8	-2.1
4	*2412.00	94.3 AV			1.17 H	345	96.4	-2.1
5	4824.00	49.6 PK	74.0	-24.4	1.50 H	85	47.5	2.1
6	4824.00	38.0 AV	54.0	-16.0	1.50 H	85	35.9	2.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.7 PK	74.0	-4.3	1.45 V	255	71.8	-2.1
2	2390.00	50.9 AV	54.0	-3.1	1.45 V	255	53.0	-2.1
3	*2412.00	101.8 PK			1.45 V	255	103.9	-2.1
4	*2412.00	92.0 AV			1.45 V	255	94.1	-2.1
5	4824.00	55.2 PK	74.0	-18.8	2.16 V	360	53.1	2.1
6	4824.00	41.9 AV	54.0	-12.1	2.16 V	360	39.8	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. 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	61.5 PK	74.0	-12.5	1.49 H	344	63.6	-2.1
2	2390.00	47.7 AV	54.0	-6.3	1.49 H	344	49.8	-2.1
3	*2437.00	104.7 PK			1.49 H	344	107.0	-2.3
4	*2437.00	94.9 AV			1.49 H	344	97.2	-2.3
5	2483.50	61.1 PK	74.0	-12.9	1.49 H	344	63.5	-2.4
6	2483.50	46.2 AV	54.0	-7.8	1.49 H	344	48.6	-2.4
7	4874.00	55.0 PK	74.0	-19.0	1.47 H	83	52.9	2.1
8	4874.00	42.0 AV	54.0	-12.0	1.47 H	83	39.9	2.1
9	7311.00	44.6 PK	74.0	-29.4	1.65 H	143	36.6	8.0
10	7311.00	31.9 AV	54.0	-22.1	1.65 H	143	23.9	8.0
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	59.8 PK	74.0	-14.2	1.51 V	254	61.9	-2.1
2	2390.00	43.2 AV	54.0	-10.8	1.51 V	254	45.3	-2.1
3	*2437.00	102.0 PK			1.51 V	254	104.3	-2.3
4	*2437.00	92.1 AV			1.51 V	254	94.4	-2.3
5	2483.50	58.1 PK	74.0	-15.9	1.51 V	254	60.5	-2.4
6	2483.50	42.2 AV	54.0	-11.8	1.51 V	254	44.6	-2.4
7	4874.00	58.7 PK	74.0	-15.3	2.16 V	360	56.6	2.1
8	4874.00	45.6 AV	54.0	-8.4	2.16 V	360	43.5	2.1
9	7311.00	43.6 PK	74.0	-30.4	1.63 V	135	35.6	8.0
10	7311.00	31.3 AV	54.0	-22.7	1.63 V	135	23.3	8.0

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 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	103.2 PK			1.19 H	345	105.5	-2.3
2	*2462.00	93.2 AV			1.19 H	345	95.5	-2.3
3	2483.50	70.5 PK	74.0	-3.5	1.19 H	345	72.9	-2.4
4	2483.50	53.2 AV	54.0	-0.8	1.19 H	345	55.6	-2.4
5	4924.00	50.3 PK	74.0	-23.7	1.56 H	111	48.0	2.3
6	4924.00	38.3 AV	54.0	-15.7	1.56 H	111	36.0	2.3
7	7386.00	44.6 PK	74.0	-29.4	1.68 H	108	36.5	8.1
8	7386.00	32.2 AV	54.0	-21.8	1.68 H	108	24.1	8.1
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	101.2 PK			1.42 V	238	103.5	-2.3
2	*2462.00	91.0 AV			1.42 V	238	93.3	-2.3
3	2483.50	68.1 PK	74.0	-5.9	1.42 V	238	70.5	-2.4
4	2483.50	51.3 AV	54.0	-2.7	1.42 V	238	53.7	-2.4
5	4924.00	55.2 PK	74.0	-18.8	2.10 V	360	52.9	2.3
6	4924.00	42.1 AV	54.0	-11.9	2.10 V	360	39.8	2.3
7	7386.00	44.5 PK	74.0	-29.5	1.69 V	116	36.4	8.1
8	7386.00	31.9 AV	54.0	-22.1	1.69 V	116	23.8	8.1

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	71.3 PK	74.0	-2.7	1.20 H	344	73.4	-2.1
2	2390.00	53.8 AV	54.0	-0.2	1.20 H	344	55.9	-2.1
3	*2422.00	99.8 PK			1.20 H	344	102.0	-2.2
4	*2422.00	90.0 AV			1.20 H	344	92.2	-2.2
5	4844.00	46.1 PK	74.0	-27.9	1.53 H	80	44.0	2.1
6	4844.00	34.4 AV	54.0	-19.6	1.53 H	80	32.3	2.1
7	7266.00	44.4 PK	74.0	-29.6	1.59 H	153	36.2	8.2
8	7266.00	32.0 AV	54.0	-22.0	1.59 H	153	23.8	8.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.3 PK	74.0	-4.7	1.40 V	230	71.4	-2.1
2	2390.00	50.8 AV	54.0	-3.2	1.40 V	230	52.9	-2.1
3	*2422.00	97.2 PK			1.40 V	230	99.4	-2.2
4	*2422.00	87.8 AV			1.40 V	230	90.0	-2.2
5	4844.00	49.2 PK	74.0	-24.8	2.24 V	360	47.1	2.1
6	4844.00	36.8 AV	54.0	-17.2	2.24 V	360	34.7	2.1
7	7266.00	43.6 PK	74.0	-30.4	1.63 V	126	35.4	8.2
8	7266.00	30.8 AV	54.0	-23.2	1.63 V	126	22.6	8.2

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.6 PK	74.0	-3.4	1.22 H	345	72.7	-2.1
2	2390.00	53.7 AV	54.0	-0.3	1.22 H	345	55.8	-2.1
3	*2437.00	102.5 PK			1.22 H	345	104.8	-2.3
4	*2437.00	92.5 AV			1.22 H	345	94.8	-2.3
5	2483.50	68.3 PK	74.0	-5.7	1.22 H	345	70.7	-2.4
6	2483.50	53.3 AV	54.0	-0.7	1.22 H	345	55.7	-2.4
7	4874.00	49.8 PK	74.0	-24.2	1.47 H	73	47.7	2.1
8	4874.00	36.2 AV	54.0	-17.8	1.47 H	73	34.1	2.1
9	7311.00	44.6 PK	74.0	-29.4	1.64 H	155	36.6	8.0
10	7311.00	31.9 AV	54.0	-22.1	1.64 H	155	23.9	8.0
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	67.3 PK	74.0	-6.7	1.50 V	247	69.4	-2.1
2	2390.00	50.2 AV	54.0	-3.8	1.50 V	247	52.3	-2.1
3	*2437.00	100.0 PK			1.50 V	247	102.3	-2.3
4	*2437.00	90.1 AV			1.50 V	247	92.4	-2.3
5	2483.50	66.5 PK	74.0	-7.5	1.50 V	247	68.9	-2.4
6	2483.50	49.8 AV	54.0	-4.2	1.50 V	247	52.2	-2.4
7	4874.00	51.8 PK	74.0	-22.2	2.21 V	360	49.7	2.1
8	4874.00	39.4 AV	54.0	-14.6	2.21 V	360	37.3	2.1
9	7311.00	43.7 PK	74.0	-30.3	1.60 V	121	35.7	8.0
10	7311.00	31.1 AV	54.0	-22.9	1.60 V	121	23.1	8.0

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 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	99.4 PK			1.21 H	344	101.7	-2.3
2	*2452.00	89.4 AV			1.21 H	344	91.7	-2.3
3	2483.50	69.2 PK	74.0	-4.8	1.21 H	344	71.6	-2.4
4	2483.50	53.8 AV	54.0	-0.2	1.21 H	344	56.2	-2.4
5	4904.00	46.1 PK	74.0	-27.9	1.55 H	76	43.9	2.2
6	4904.00	34.4 AV	54.0	-19.6	1.55 H	76	32.2	2.2
7	7356.00	45.0 PK	74.0	-29.0	1.60 H	159	36.9	8.1
8	7356.00	32.4 AV	54.0	-21.6	1.60 H	159	24.3	8.1
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	97.2 PK			1.51 V	231	99.5	-2.3
2	*2452.00	87.1 AV			1.51 V	231	89.4	-2.3
3	2483.50	67.2 PK	74.0	-6.8	1.51 V	231	69.6	-2.4
4	2483.50	51.0 AV	54.0	-3.0	1.51 V	231	53.4	-2.4
5	4904.00	49.6 PK	74.0	-24.4	2.23 V	360	47.4	2.2
6	4904.00	37.2 AV	54.0	-16.8	2.23 V	360	35.0	2.2
7	7356.00	43.1 PK	74.0	-30.9	1.62 V	136	35.0	8.1
8	7356.00	30.4 AV	54.0	-23.6	1.62 V	136	22.3	8.1

REMARKS:

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

Below 1GHz Data:

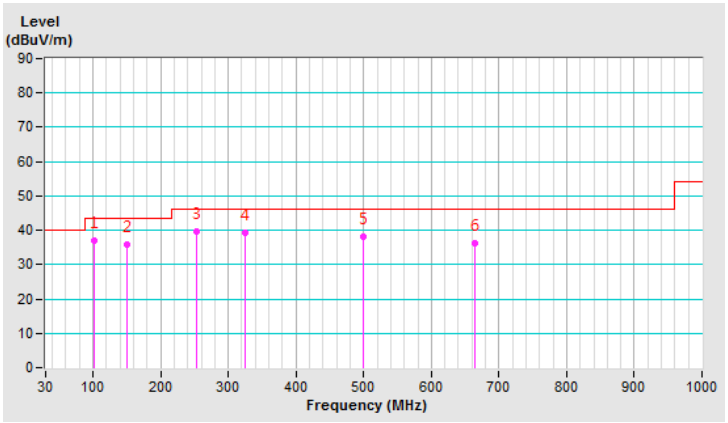
802.11g

CHANNEL	TX Channel 1	**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	101.90	37.0 QP	43.5	-6.5	2.00 H	100	49.2	-12.2
2	150.21	35.9 QP	43.5	-7.6	1.00 H	64	43.9	-8.0
3	252.95	39.6 QP	46.0	-6.4	1.00 H	84	48.4	-8.8
4	324.10	39.4 QP	46.0	-6.6	1.00 H	298	45.7	-6.3
5	500.04	38.1 QP	46.0	-7.9	2.00 H	360	40.1	-2.0
6	664.02	36.1 QP	46.0	-9.9	2.00 H	360	35.0	1.1

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 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.

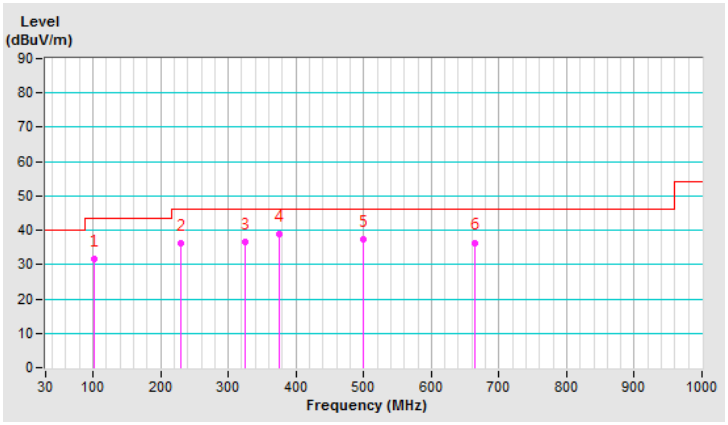


CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	101.88	31.6 QP	43.5	-11.9	2.00 V	37	43.8	-12.2
2	229.24	36.2 QP	46.0	-9.8	1.00 V	158	46.3	-10.1
3	324.10	36.5 QP	46.0	-9.5	2.00 V	182	42.8	-6.3
4	375.00	38.7 QP	46.0	-7.3	2.00 V	360	43.9	-5.2
5	500.04	37.4 QP	46.0	-8.6	3.00 V	0	39.4	-2.0
6	664.02	36.4 QP	46.0	-9.6	2.00 V	360	35.3	1.1

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 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: Feb. 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.

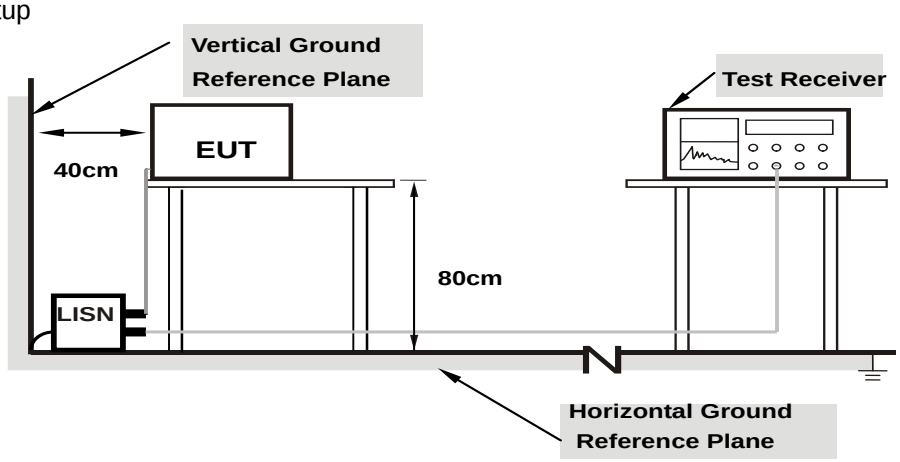
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

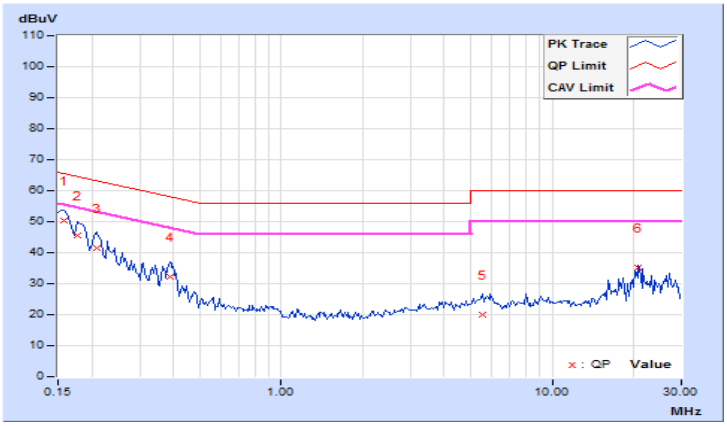
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.02	40.34	22.25	50.36	32.27	65.58	55.58	-15.22	-23.31
2	0.17734	10.03	35.54	17.50	45.57	27.53	64.61	54.61	-19.04	-27.08
3	0.20859	10.04	31.33	14.41	41.37	24.45	63.26	53.26	-21.89	-28.81
4	0.38828	10.07	22.01	13.50	32.08	23.57	58.10	48.10	-26.02	-24.53
5	5.57031	10.32	9.81	1.15	20.13	11.47	60.00	50.00	-39.87	-38.53
6	20.80859	11.08	24.16	22.15	35.24	33.23	60.00	50.00	-24.76	-16.77

REMARKS:

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

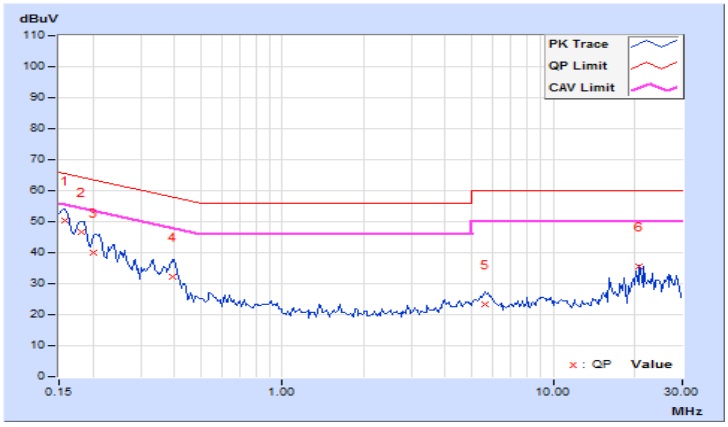


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	**0.15781**	**9.93**	**40.46**	**22.74**	**50.39**	**32.67**	**65.58**	**55.58**	**-15.19**	**-22.91**
2	0.18125	9.94	36.64	19.26	46.58	29.20	64.43	54.43	-17.85	-25.23
3	0.20078	9.94	30.19	13.19	40.13	23.13	63.58	53.58	-23.45	-30.45
4	0.39609	9.96	22.15	13.71	32.11	23.67	57.93	47.93	-25.82	-24.26
5	5.61328	10.19	13.04	3.45	23.23	13.64	60.00	50.00	-36.77	-36.36
6	20.80859	10.88	24.52	22.32	35.40	33.20	60.00	50.00	-24.60	-16.80

REMARKS:

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

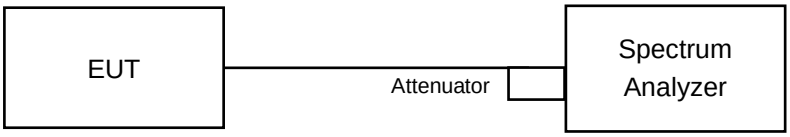


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation fromTest Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	10.13	0.5	Pass
6	2437	10.12	0.5	Pass
11	2462	10.11	0.5	Pass

802.11g

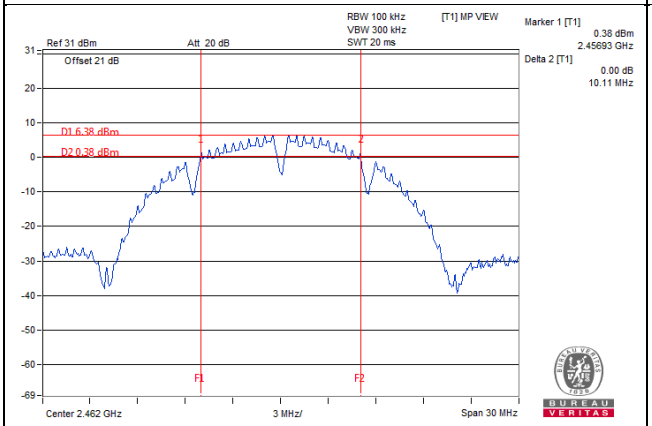
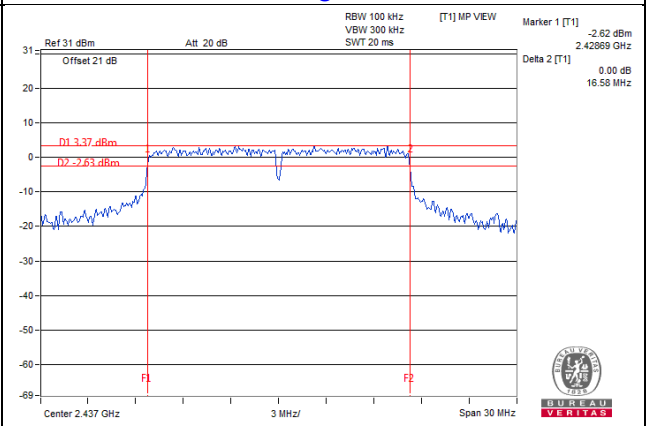
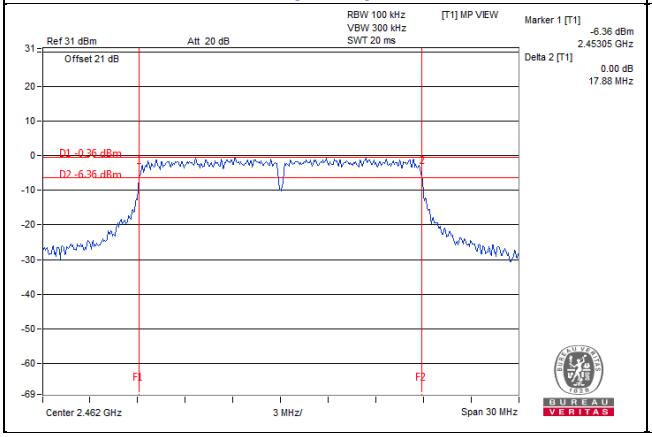
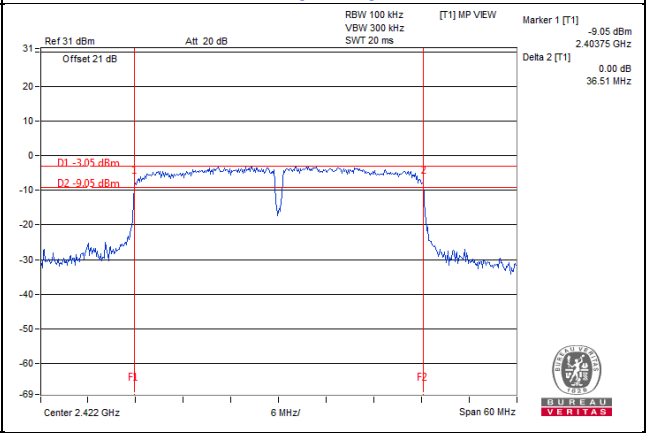
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.61	0.5	Pass
6	2437	16.58	0.5	Pass
11	2462	16.62	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.89	0.5	Pass
6	2437	17.90	0.5	Pass
11	2462	17.88	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	36.51	0.5	Pass
6	2437	36.53	0.5	Pass
9	2452	36.52	0.5	Pass

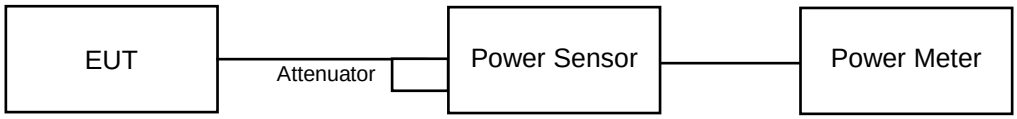
Spectrum Plot of Worst Value	
802.11b / CH11	**802.11g / CH6**
	
802.11n (HT20) / CH11	**802.11n (HT40) / CH3**
	

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	112.46	20.51	30.00	Pass
6	2437	79.616	19.01	30.00	Pass
11	2462	72.611	18.61	30.00	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	159.588	22.03	30.00	Pass
6	2437	155.597	21.92	30.00	Pass
11	2462	123.027	20.90	30.00	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	148.936	21.73	30.00	Pass
6	2437	152.405	21.83	30.00	Pass
11	2462	100.462	20.02	30.00	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
3	2422	126.474	21.02	30.00	Pass
6	2437	143.549	21.57	30.00	Pass
9	2452	100.231	20.01	30.00	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	71.121	18.52
6	2437	49.659	16.96
11	2462	45.92	16.62

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	36.559	15.63
6	2437	55.081	17.41
11	2462	31.117	14.93

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	34.995	15.44
6	2437	53.456	17.28
11	2462	25.177	14.01

802.11n (HT40)

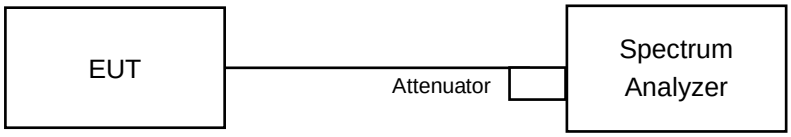
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	27.416	14.38
6	2437	40.926	16.12
9	2452	21.038	13.23

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	-11.80	8.00	Pass
6	2437	-13.52	8.00	Pass
11	2462	-13.81	8.00	Pass

802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-13.29	8.00	Pass
6	2437	-11.40	8.00	Pass
11	2462	-14.02	8.00	Pass

802.11n (HT20)

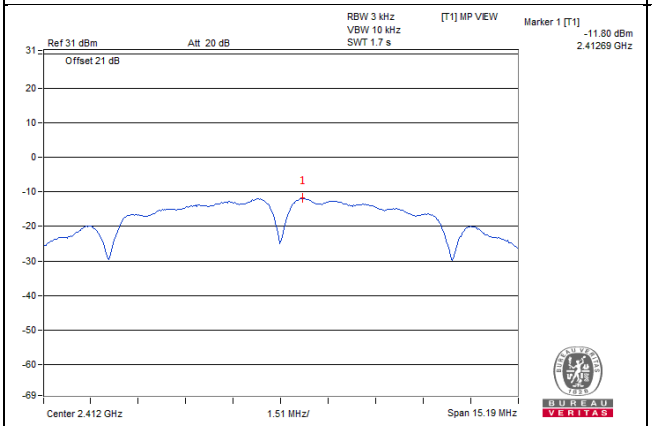
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-13.35	8.00	Pass
6	2437	-10.89	8.00	Pass
11	2462	-14.75	8.00	Pass

802.11n (HT40)

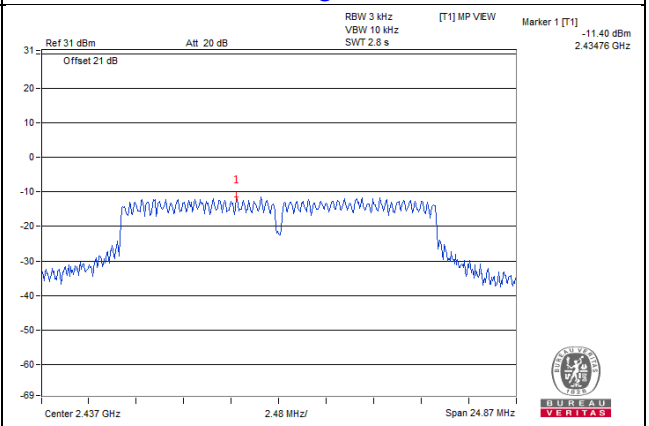
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
3	2422	-16.01	8.00	Pass
6	2437	-12.53	8.00	Pass
9	2452	-15.45	8.00	Pass

Spectrum Plot of Worst Value

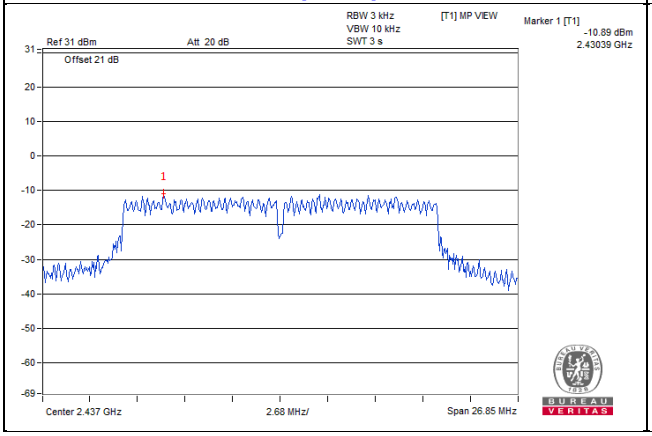
802.11b / CH1



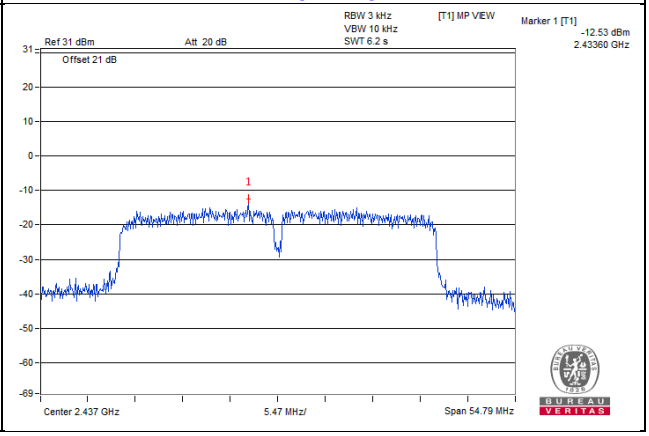
802.11g / CH6



802.11n (HT20) / CH6



802.11n (HT40) / CH6

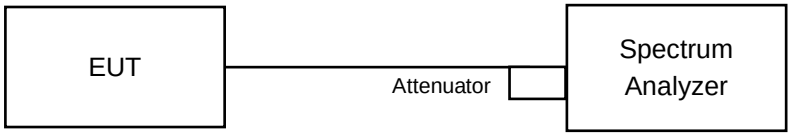


4.6 Conducted Out of Band Emission Measurement

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

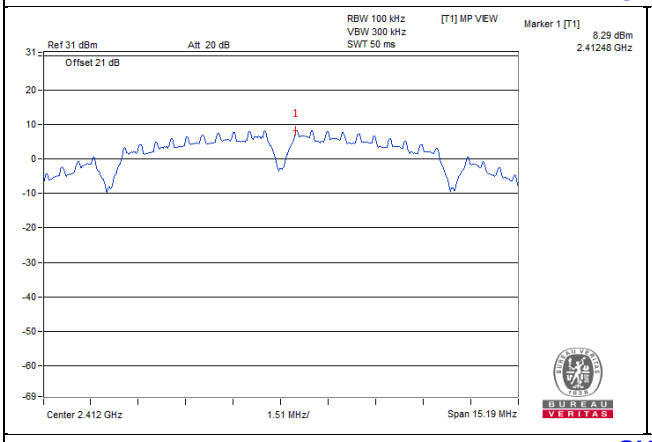
Same as Item 4.3.6

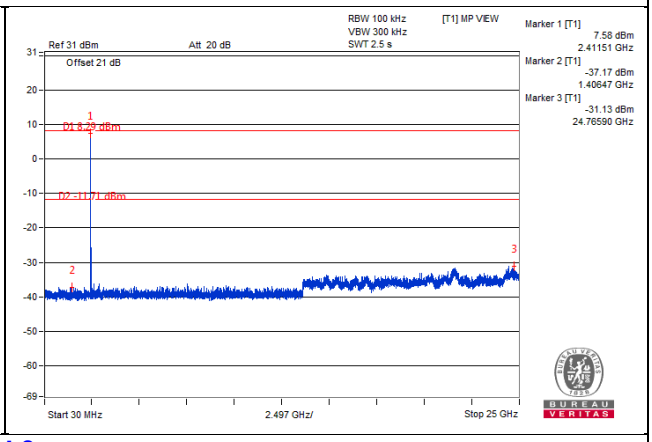
4.6.7 Test Results

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

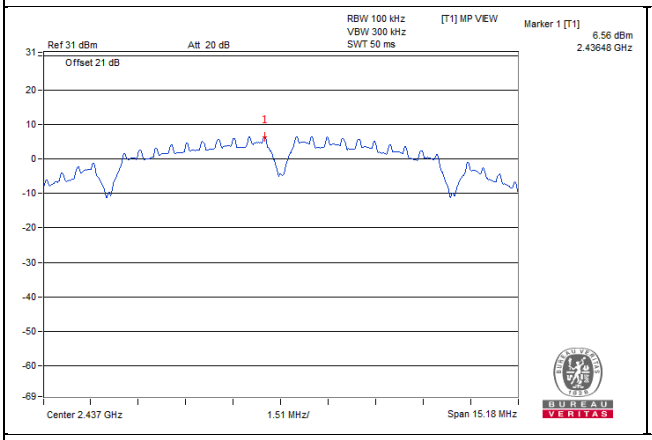
802.11b

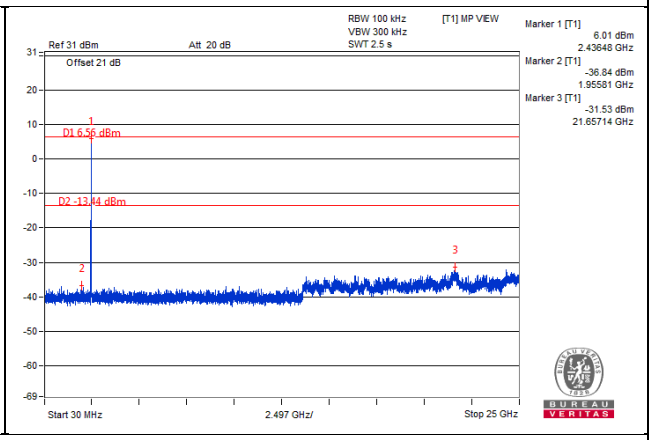
CH 1



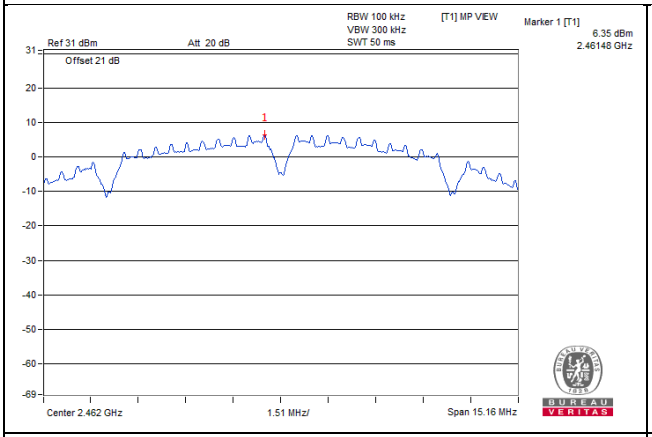


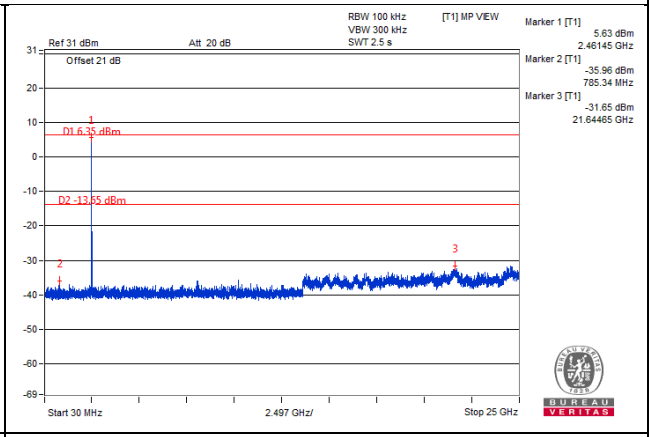
CH 6



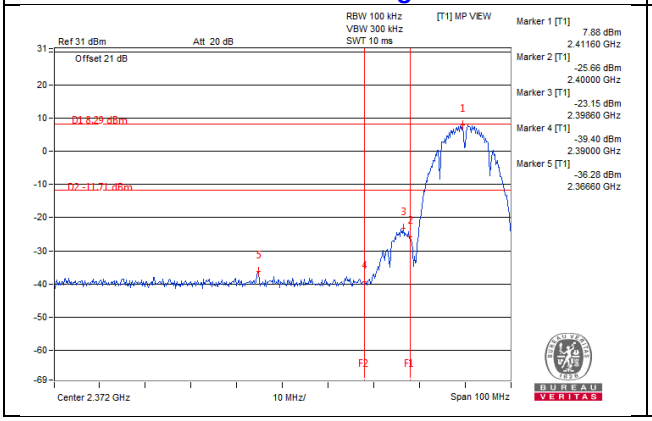


CH 11

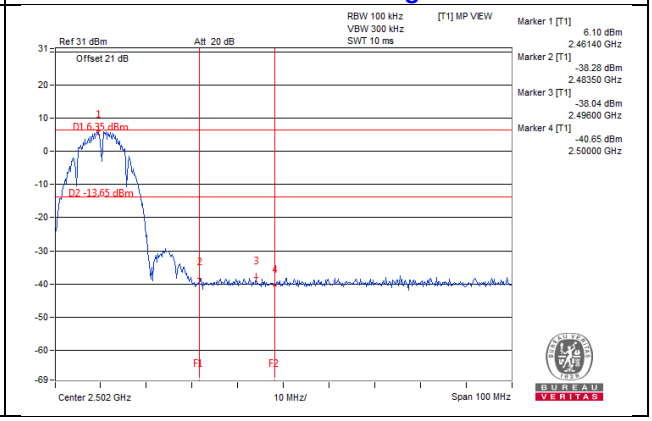




CH 1 Band edge

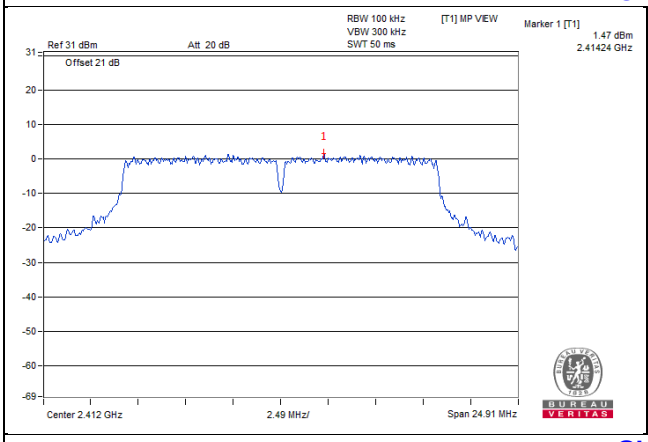


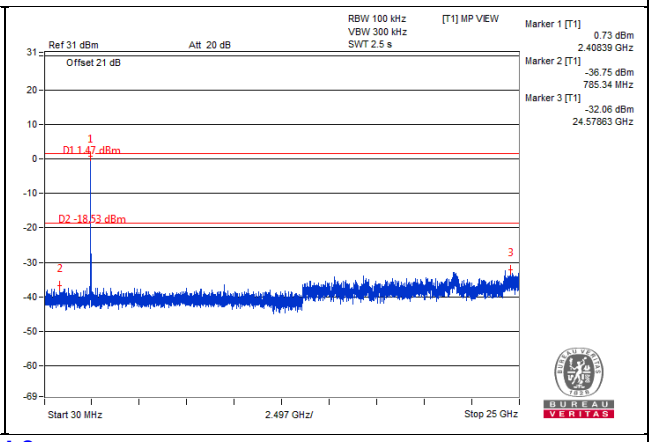
CH 11 Band edge



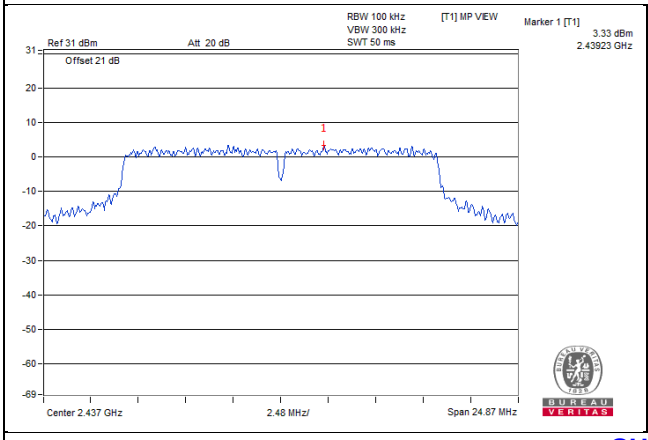
802.11g

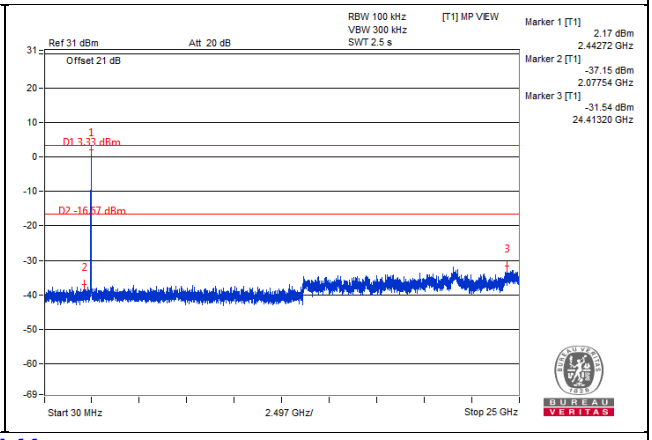
CH 1



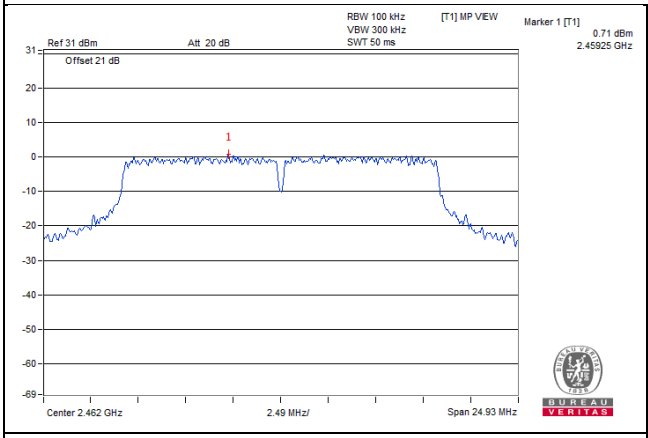


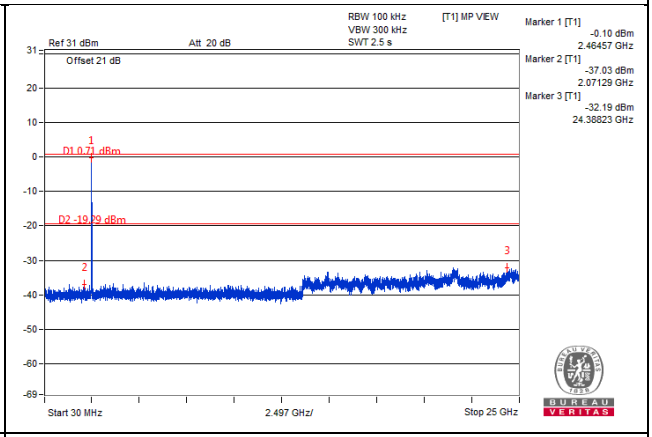
CH 6



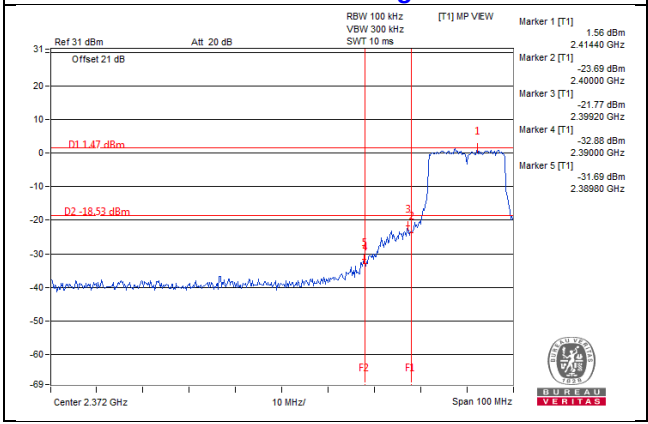


CH 11

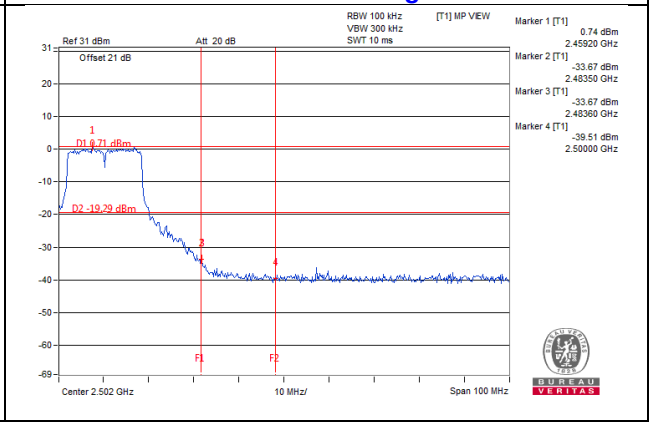




CH 1 Band edge

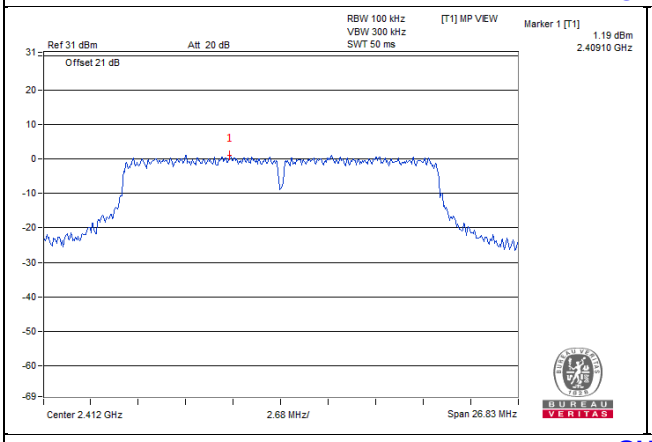


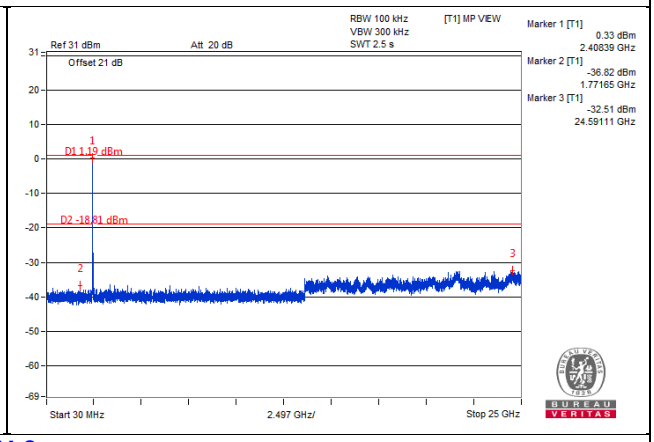
CH 11 Band edge



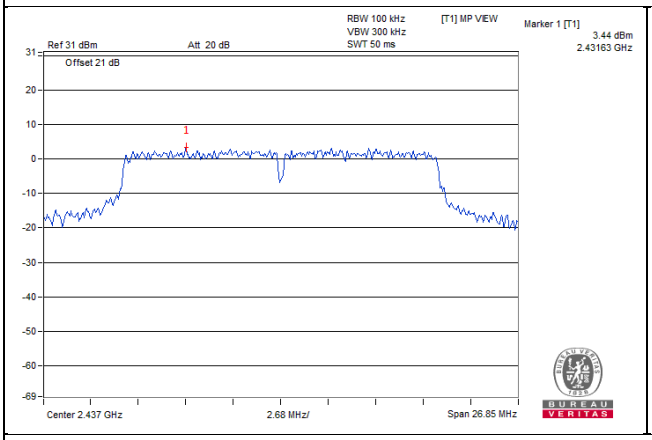
802.11n (HT20)

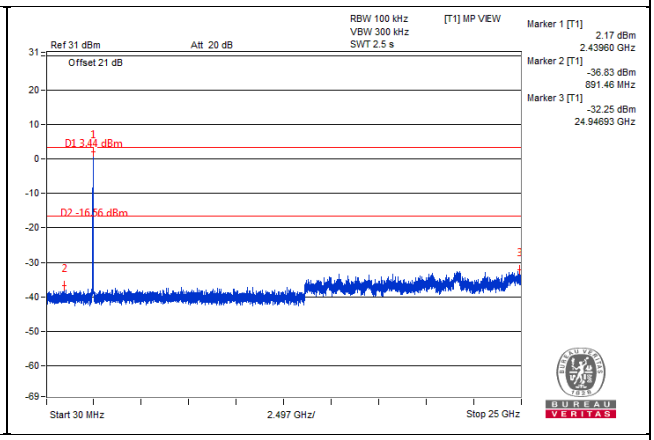
CH 1



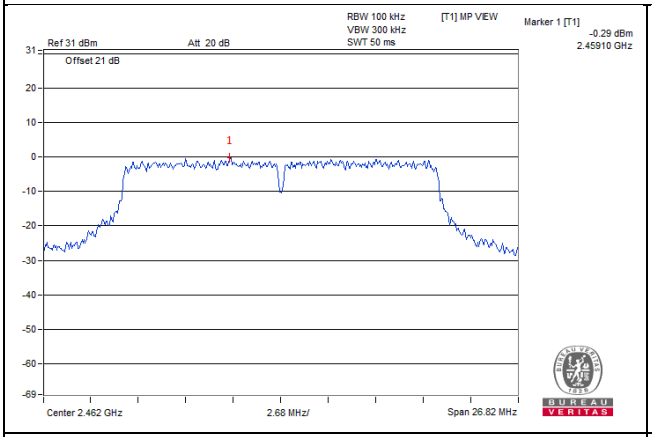


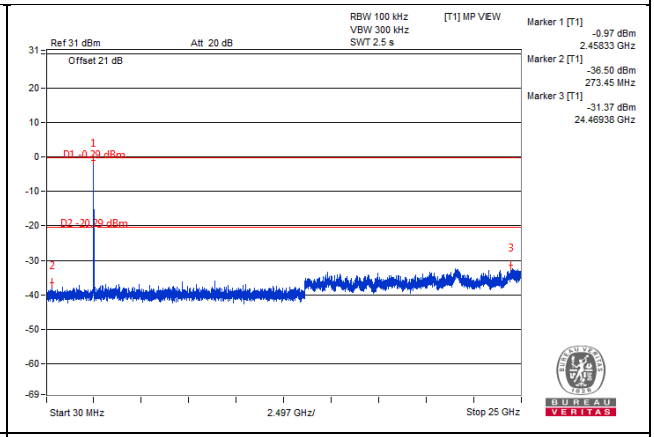
CH 6



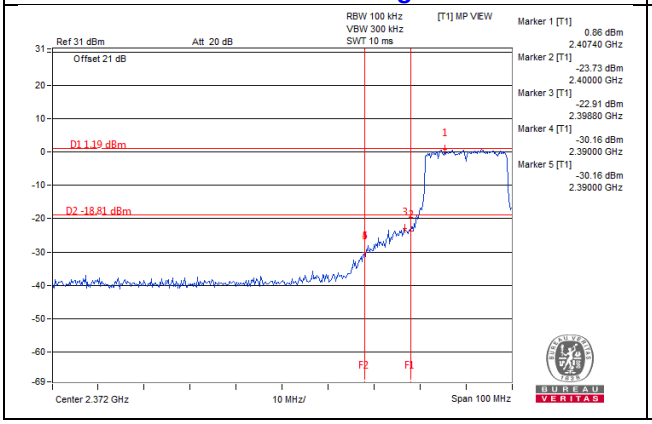


CH 11

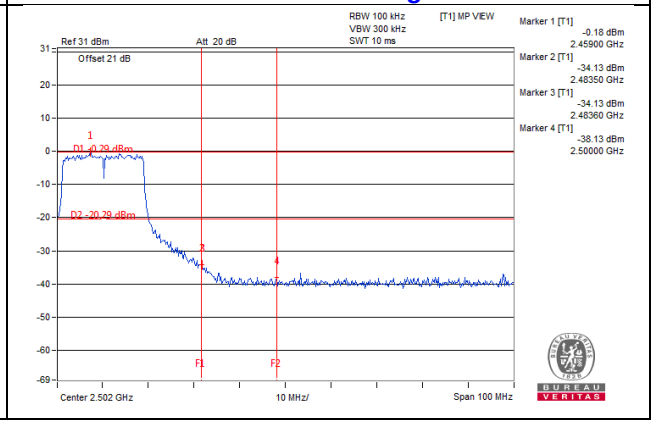




CH 1 Band edge

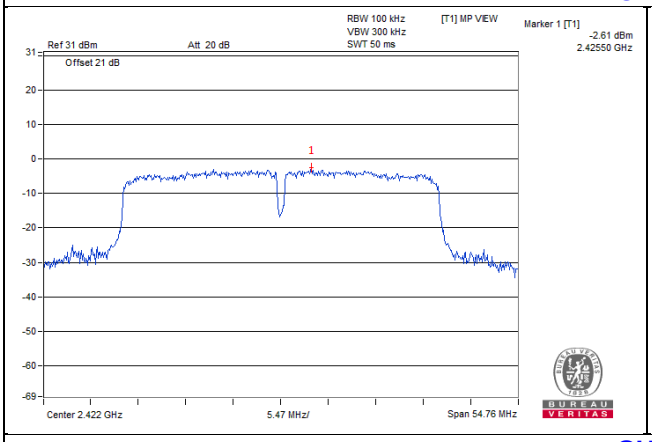


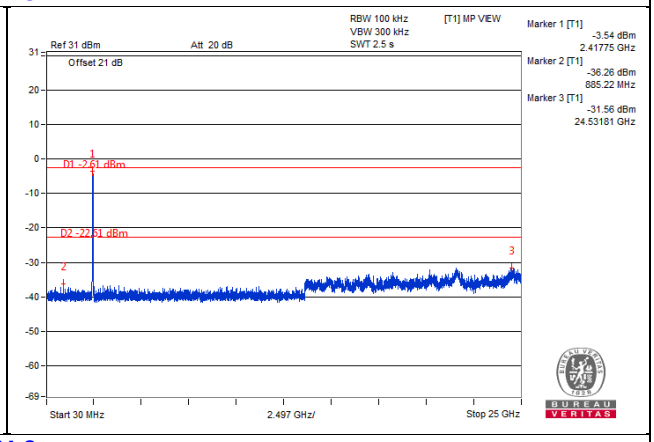
CH 11 Band edge



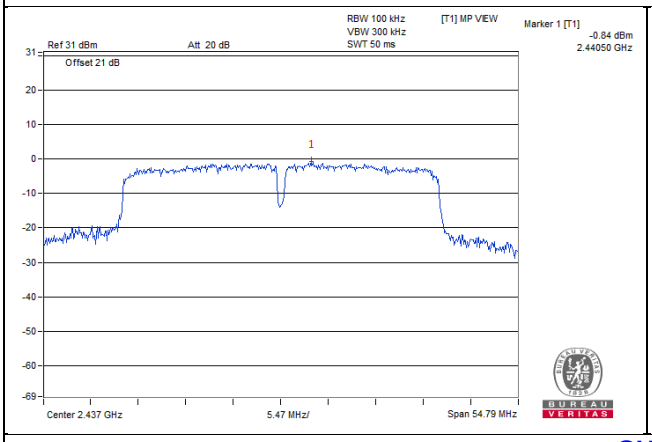
802.11n (HT40)

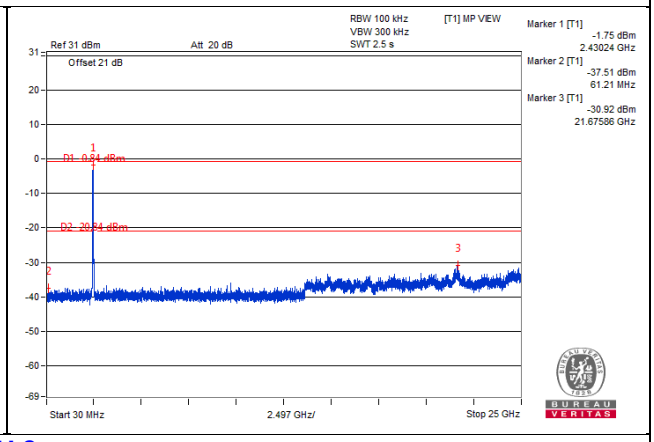
CH 3



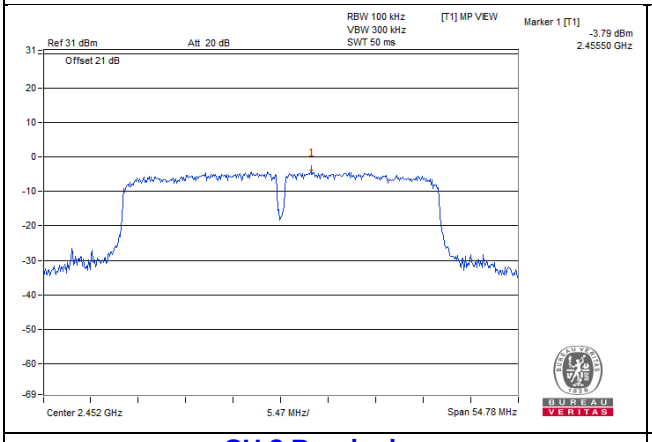


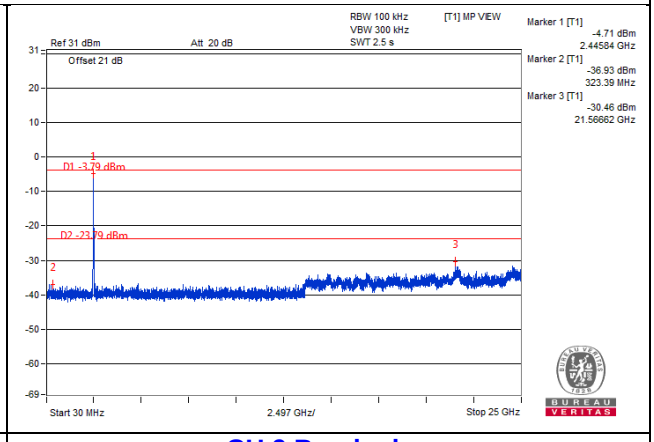
CH 6



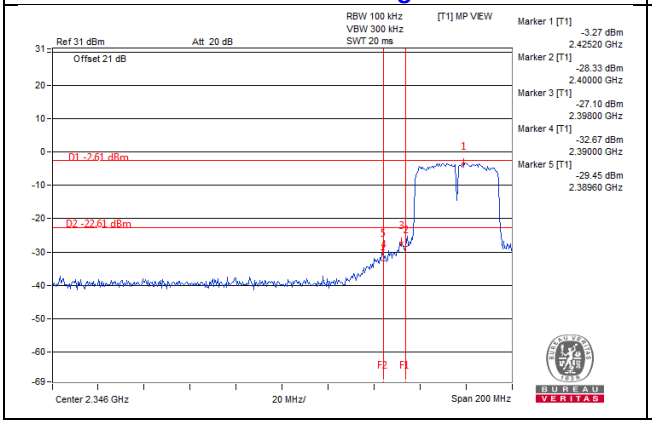


CH 9

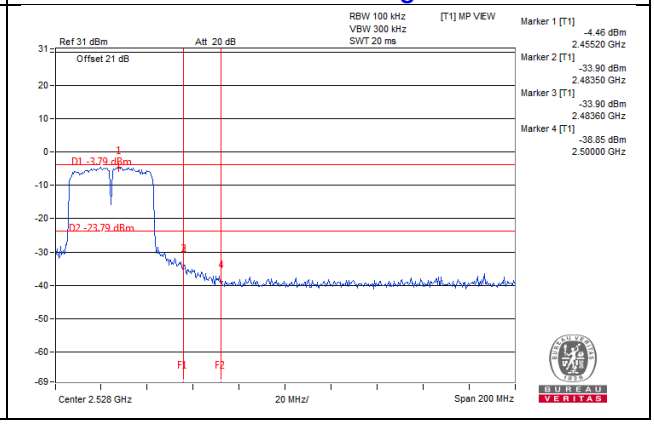




CH 3 Band edge



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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