

Report No.: RF171024E05

FCC ID: KA2AP2680A1

Test Model: DAP-2680

Received Date: Oct. 24, 2017

Test Date: Nov. 14 to 28, 2017

Issued Date: Jan. 25, 2018

Applicant: D-Link Corporation

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF171024E05	Original release.	Jan. 25, 2018

1 Certificate of Conformity

Product: Wireless AC1750 Wave 2 Dual-Band PoE Access Point

Brand: D-Link

Test Model: DAP-2680

Sample Status: ENGINEERING SAMPLE

Applicant: D-Link Corporation

Test Date: Nov. 14 to 28, 2017

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10: 2013

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

Prepared by : Wendy Wu , **Date:** Jan. 25, 2018
Wendy Wu / Specialist

Approved by : May Chen , **Date:** Jan. 25, 2018
May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -18.10dB at 0.37266MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2390.00MHz, 2483.50MHz, 2386.00MHz.
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.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.30 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.16 dB
	6GHz ~ 18GHz	4.91 dB
	18GHz ~ 40GHz	5.30 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wireless AC1750 Wave 2 Dual-Band PoE Access Point
Brand	D-Link
Test Model	DAP-2680
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 12V from power adapter or DC 56V from PoE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 450Mbps 802.11ac: up to 1300Mbps
Operating Frequency	2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.18~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	2.4GHz: 779.921mW 5GHz: CDD Mode: 5.18 ~ 5.24GHz: 676.99mW 5.745 ~ 5.825GHz: 341.892mW Beamforming Mode: 5.18 ~ 5.24GHz: 504.877mW 5.745 ~ 5.825GHz: 275.89mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (2.4GHz)	WLAN (5GHz)

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

2. The EUT power needs to be supplied from power adapters or a PoE, the information is as below table:

Adapter			
No.	Brand	Model No.	Spec.
1	D-Link	WA-24Q12R	Input: 100-240Vac, 0.7A, 50-60Hz Output: 12V, 2.0A DC output cable: Unshielded 1.2m
2	D-Link	MU24-Y120200-A1	Input: 100-240Vac, 0.7A, 50/60Hz Output: 12V, 2.0A DC output cable: Unshielded 1.6m
PoE (Only for test not for sale)			
No.	Brand	Model No.	Spec.
1	PHIHONG	POE29U-560	Input: 100-240Vac, 0.8A, 50-60Hz Output: 56V, 0.536A

Note:

1. From the above adapters, the radiated emissions worse case was found in **PoE**. Therefore only the test data of the mode was recorded in this report.

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

Antenna No.	Model	Antenna Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
1	NYS3072	3.6	2.4~2.4835	PIFA	i-pex (MHF)	60
		4.2	5.15~5.85			
2	NYS3073	3.6	2.4~2.4835	PIFA	i-pex (MHF)	70
		4.2	5.15~5.85			
3	NYS3074	3.5	2.4~2.4835	PIFA	i-pex (MHF)	160
		4	5.15~5.85			

4. The EUT incorporates a MIMO function:

2.4GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	3TX	3RX
802.11g	6 ~ 54Mbps	3TX	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
5GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	3TX	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11ac (VHT20)	MCS 0~8, NSS=1	3TX	3RX
	MCS 0~8, NSS=2	3TX	3RX
	MCS 0~9, NSS=3	3TX	3RX
802.11ac (VHT40)	MCS 0~9, NSS=1	3TX	3RX
	MCS 0~9, NSS=2	3TX	3RX
	MCS 0~9, NSS=3	3TX	3RX
802.11ac (VHT80)	MCS 0~9, NSS=1	3TX	3RX
	MCS 0~9, NSS=2	3TX	3RX
	MCS 0~9, NSS=3	3TX	3RX

Note:

1. All of modulation mode support beamforming function except 802.11a and 2.4GHz modulation mode.

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

3.2 Description of Test Modes

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

Channel	Frequency	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 \geq 1G	RE $<$ 1G	PLC	APCM	
1	√	√	√	√	Power from PoE
2	-	-	√	-	Power from adapter 1
3	-	-	√	-	Power from adapter 2

Where **RE \geq 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 2 axis. The worst case was found when positioned on **Y-plane**.
 2. "-" means no effect.

Radiated Emission Test (Above 1GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

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)
802.11b	1 to 11	6	DSSS	DBPSK	1

Power Line Conducted Emission Test:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	6	DSSS	DBPSK	1

Antenna Port Conducted Measurement:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

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 \geq 1G	23deg. C, 65%RH	120Vac, 60Hz	Rey Chen
RE $<$ 1G	23deg. C, 68%RH	120Vac, 60Hz	Rey Chen
PLC	25deg. C, 68%RH	120Vac, 60Hz	Weiwei Lo
APCM	24deg. C, 65%RH	120Vac, 60Hz	Robert Cheng

3.3 Duty Cycle of Test Signal

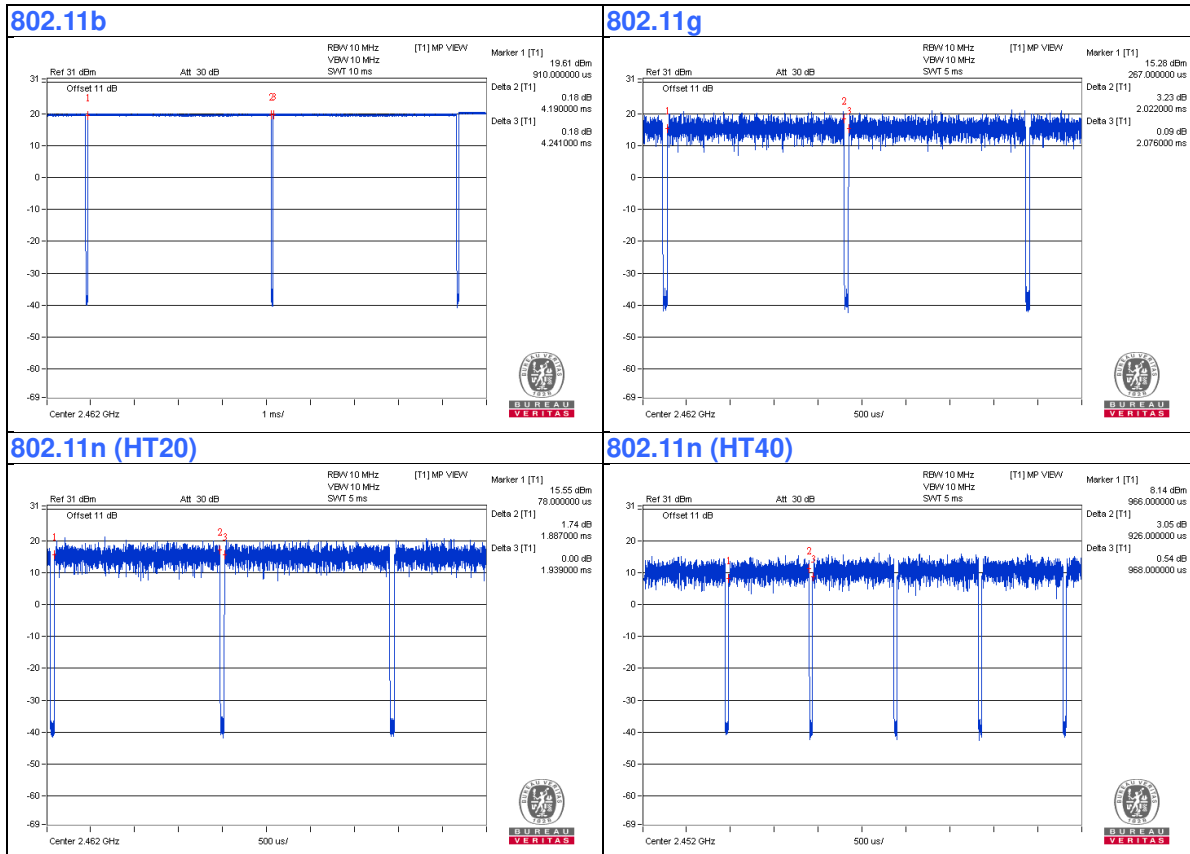
If duty cycle of test signal is $\geq 98\%$, duty factor is not required.
 If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11b: Duty cycle = $4.19/4.241 = 0.988$

802.11g: Duty cycle = $2.022/2.076 = 0.974$, Duty factor = $10 * \log(1/0.974) = 0.11$

802.11n (HT20): Duty cycle = $1.887/1.939 = 0.973$, Duty factor = $10 * \log(1/0.973) = 0.12$

802.11n (HT40): Duty cycle = $0.926/0.968 = 0.957$, Duty factor = $10 * \log(1/0.957) = 0.19$



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab
B.	PoE	PHIHONG	POE29U-560	NA	NA	Supplied by client

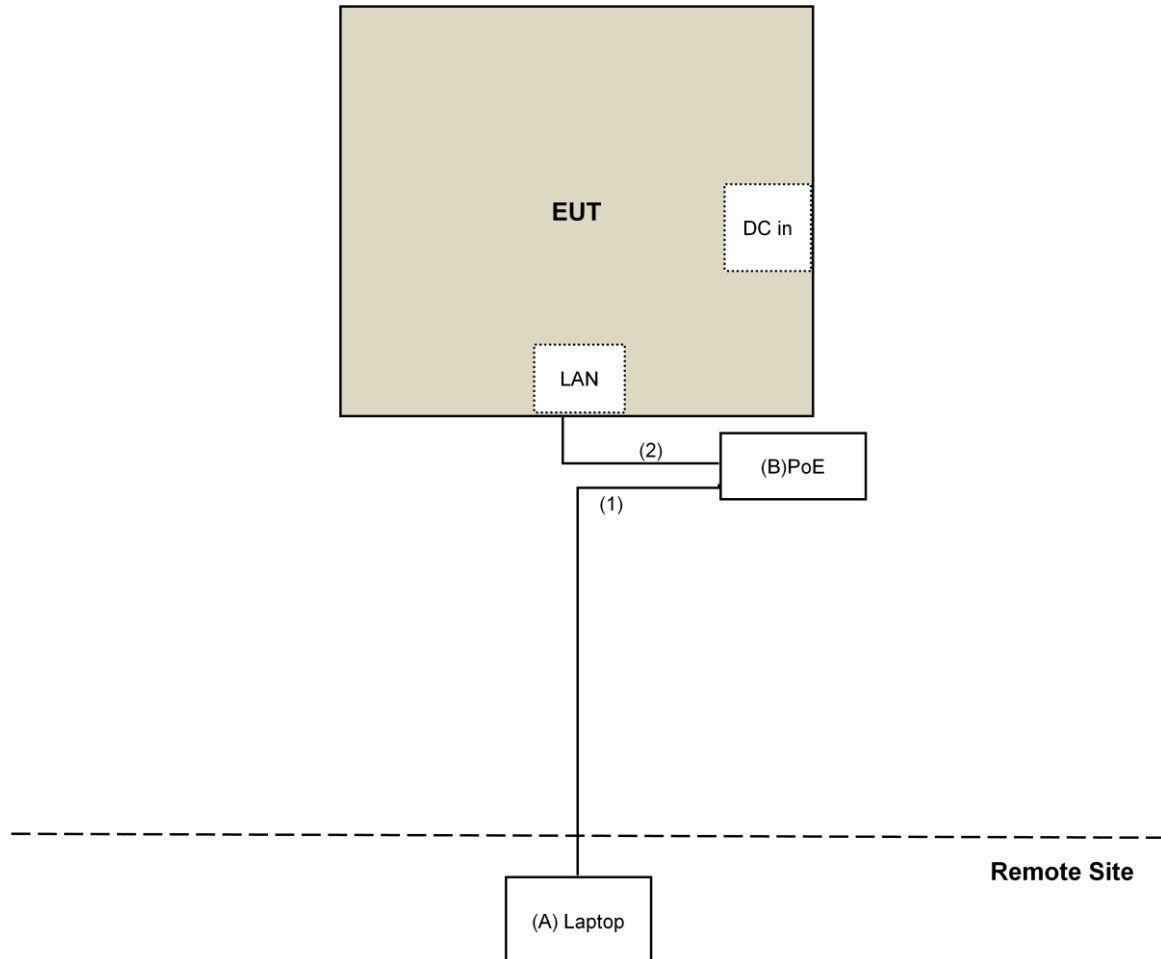
Note:

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

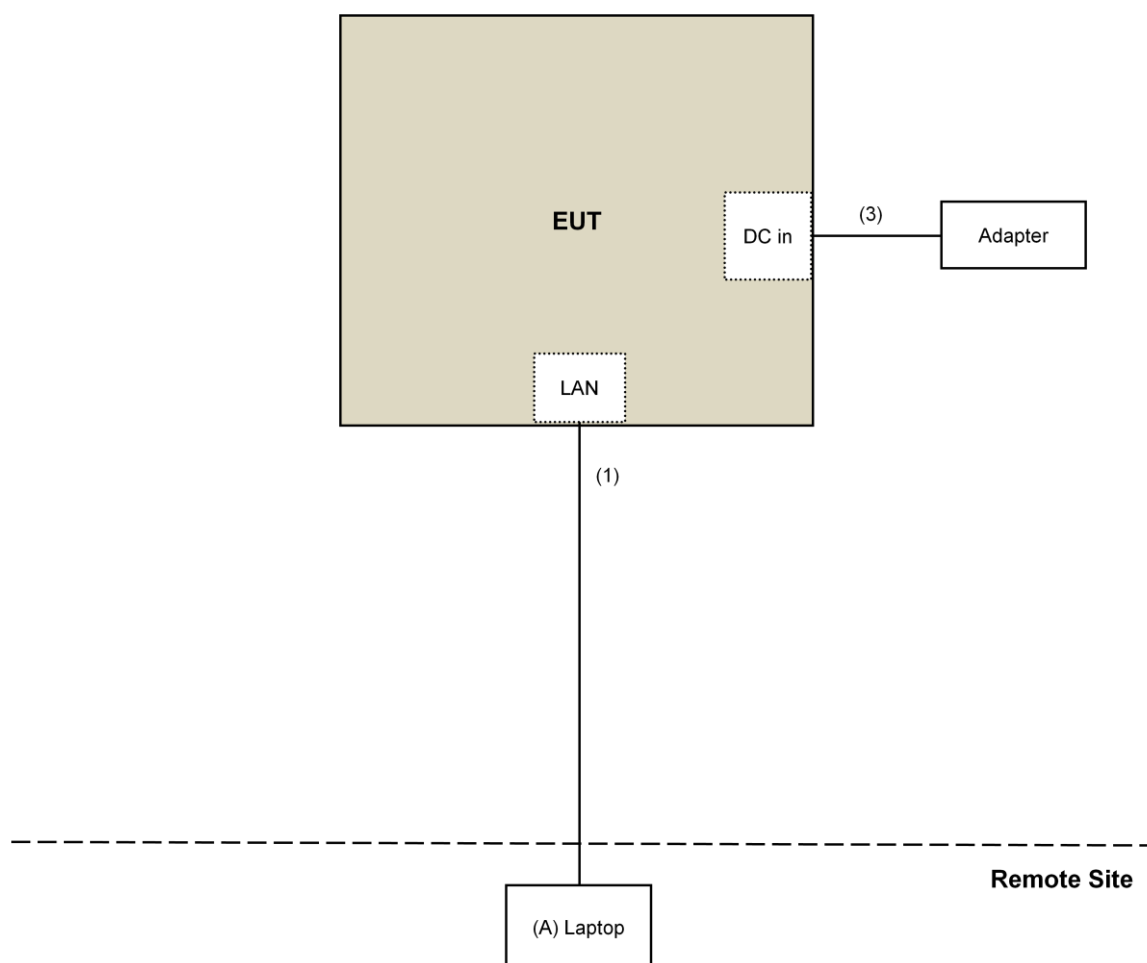
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	3	No	0	Provided by Lab
3.	DC Cable	1	1.6	No	0	Supplied by client
	DC Cable	1	1.2	No	0	Supplied by client

3.4.1 Configuration of System under Test

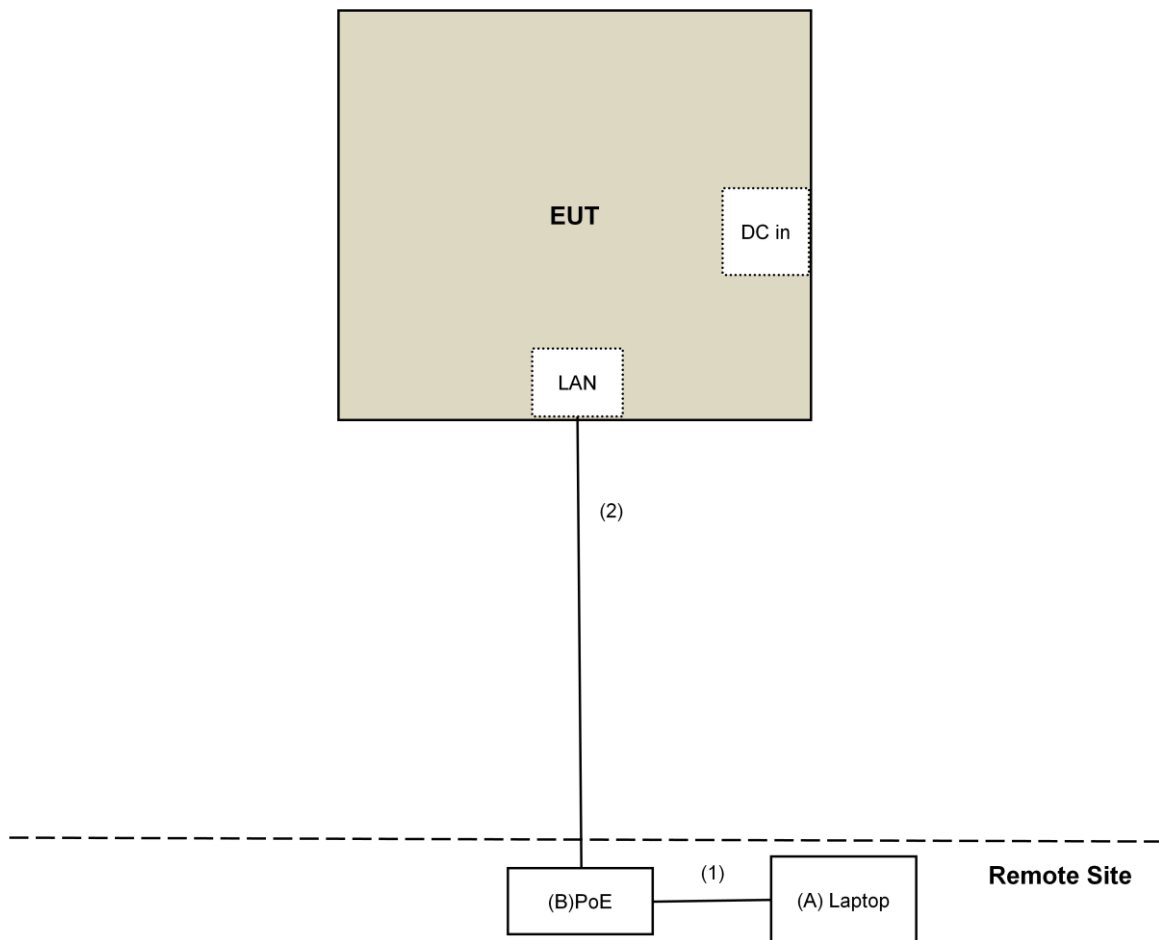
For Conducted Emission (PoE):



For Conducted Emission (Adapter):



For other test:



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
KDB 558074 D01 DTS Meas Guidance v04
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 08, 2017	July 07, 2018
Pre-Amplifier ^(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna ^(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 17, 2017	Jan. 16, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 09, 2017	Nov. 08, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Dec. 13, 2016	Dec. 12, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 27, 2016	Dec. 26, 2017
Pre-Amplifier EMCI	EMC12630SE	980385	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160923 150318 150321	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Pre-Amplifier EMCI	EMC184045SE	980387	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 15, 2016	Dec. 14, 2017
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 15, 2017	Jan. 14, 2018
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA
Spectrum Analyzer R&S	FSv40	100964	July 1, 2017	June 30, 2018
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 2018

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 4.
4. The CANADA Site Registration No. is 20331-2
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Nov. 14 to 20, 2017

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. Both X and Y axes 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 detect 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:

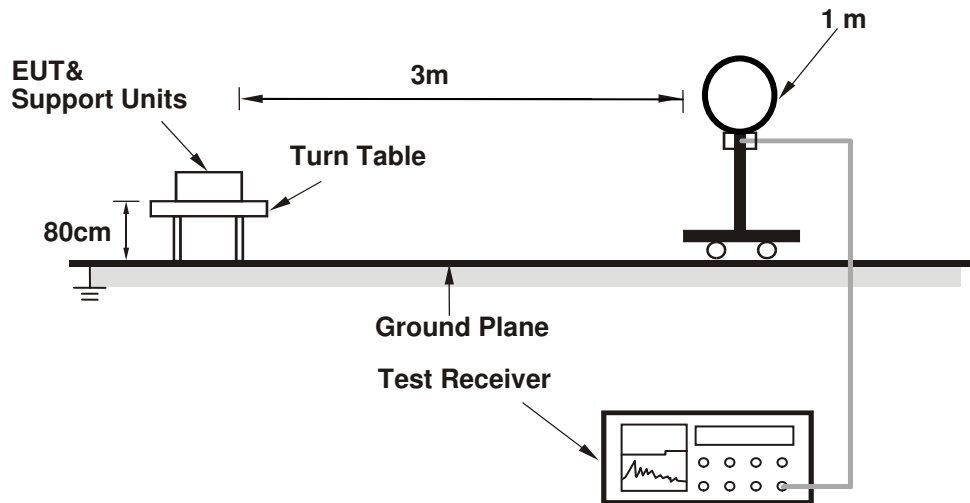
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

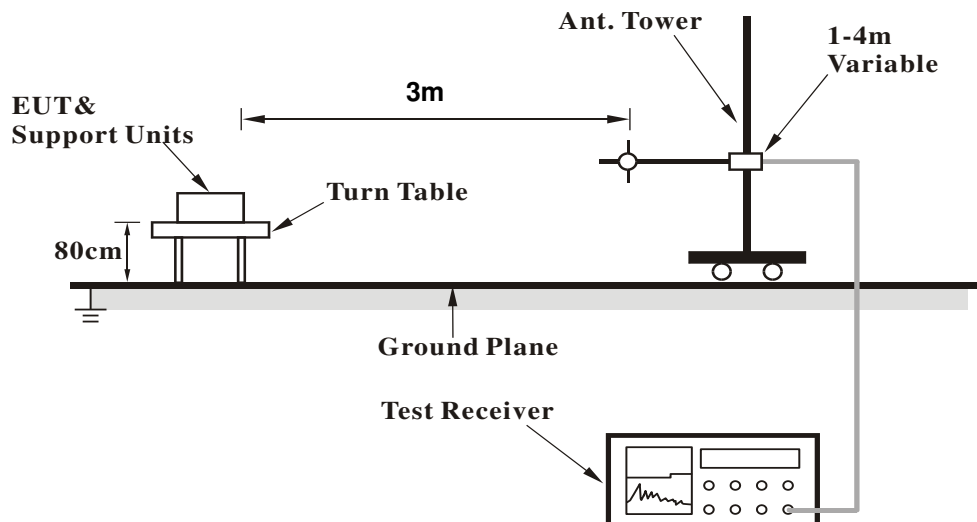
No deviation.

4.1.5 Test Setup

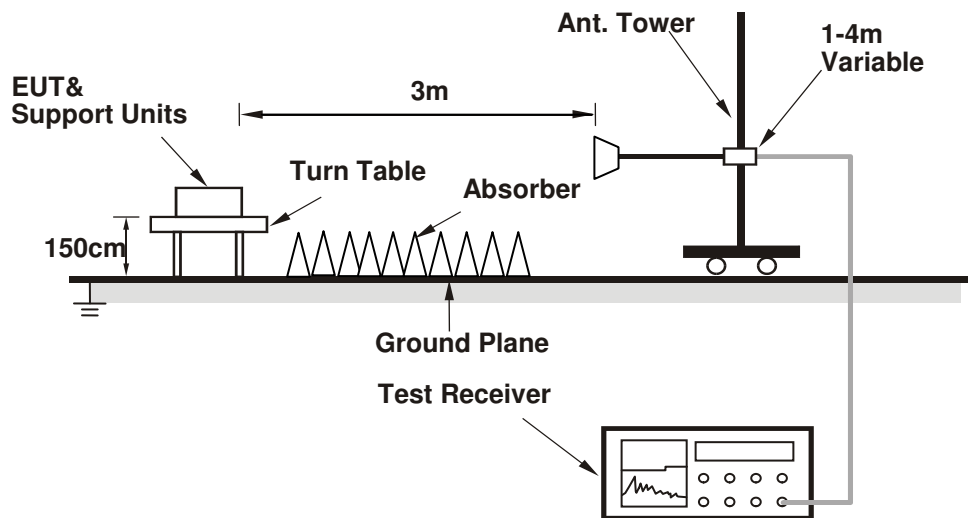
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

- a. Connected the EUT with the Laptop which is placed on remote site.
- b. Controlling software (DAP2680 QRCT Tool SOP.pptx) 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)
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	2386.00	64.9 PK	74.0	-9.1	1.06 H	74	66.5	-1.6
2	2386.00	53.9 AV	54.0	-0.1	1.06 H	74	55.5	-1.6
3	*2412.00	114.9 PK			1.06 H	74	116.4	-1.5
4	*2412.00	112.3 AV			1.06 H	74	113.8	-1.5
5	4824.00	47.3 PK	74.0	-26.7	1.59 H	149	44.3	3.0
6	4824.00	45.7 AV	54.0	-8.3	1.59 H	149	42.7	3.0
7	14472.00	54.4 PK	74.0	-19.6	1.15 H	217	37.2	17.2
8	14472.00	50.1 AV	54.0	-3.9	1.15 H	217	32.9	17.2

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	61.7 PK	74.0	-12.3	1.22 V	360	63.3	-1.6
2	2390.00	49.8 AV	54.0	-4.2	1.22 V	360	51.4	-1.6
3	*2412.00	113.2 PK			1.22 V	360	114.7	-1.5
4	*2412.00	109.5 AV			1.22 V	360	111.0	-1.5
5	4824.00	41.9 PK	74.0	-32.1	1.59 V	346	38.9	3.0
6	4824.00	40.8 AV	54.0	-13.2	1.59 V	346	37.8	3.0
7	14472.00	52.5 PK	74.0	-21.5	1.19 V	207	35.3	17.2
8	14472.00	49.6 AV	54.0	-4.4	1.19 V	207	32.4	17.2

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	2356.00	69.6 PK	74.0	-4.4	1.13 H	72	71.3	-1.7
2	2356.00	48.2 AV	54.0	-5.8	1.13 H	72	49.9	-1.7
3	*2437.00	119.3 PK			1.13 H	72	120.8	-1.5
4	*2437.00	117.6 AV			1.13 H	72	119.1	-1.5
5	2483.50	58.9 PK	74.0	-15.1	1.13 H	72	60.3	-1.4
6	2483.50	46.9 AV	54.0	-7.1	1.13 H	72	48.3	-1.4
7	4874.00	54.4 PK	74.0	-19.6	1.53 H	148	51.2	3.2
8	4874.00	53.6 AV	54.0	-0.4	1.53 H	148	50.4	3.2
9	7311.00	47.7 PK	74.0	-26.3	1.50 H	30	38.8	8.9
10	7311.00	39.9 AV	54.0	-14.1	1.50 H	30	31.0	8.9

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.4 PK	74.0	-7.6	1.25 V	360	68.0	-1.6
2	2390.00	44.1 AV	54.0	-9.9	1.25 V	360	45.7	-1.6
3	*2437.00	117.6 PK			1.25 V	360	119.1	-1.5
4	*2437.00	114.8 AV			1.25 V	360	116.3	-1.5
5	2483.50	55.7 PK	74.0	-18.3	1.25 V	360	57.1	-1.4
6	2483.50	42.8 AV	54.0	-11.2	1.25 V	360	44.2	-1.4
7	4874.00	49.0 PK	74.0	-25.0	1.63 V	341	45.8	3.2
8	4874.00	48.7 AV	54.0	-5.3	1.63 V	341	45.5	3.2
9	7311.00	51.7 PK	74.0	-22.3	1.22 V	131	42.8	8.9
10	7311.00	45.1 AV	54.0	-8.9	1.22 V	131	36.2	8.9

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	115.4 PK			1.14 H	73	116.8	-1.4
2	*2462.00	112.9 AV			1.14 H	73	114.3	-1.4
3	2483.50	61.6 PK	74.0	-12.4	1.14 H	73	63.0	-1.4
4	2483.50	53.9 AV	54.0	-0.1	1.14 H	73	55.3	-1.4
5	4924.00	47.2 PK	74.0	-26.8	1.55 H	164	43.9	3.3
6	4924.00	45.4 AV	54.0	-8.6	1.55 H	164	42.1	3.3
7	7386.00	45.6 PK	74.0	-28.4	1.56 H	30	36.5	9.1
8	7386.00	37.8 AV	54.0	-16.2	1.56 H	30	28.7	9.1

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	113.7 PK			1.20 V	360	115.1	-1.4
2	*2462.00	110.1 AV			1.20 V	360	111.5	-1.4
3	2483.50	58.4 PK	74.0	-15.6	1.20 V	360	59.8	-1.4
4	2483.50	49.8 AV	54.0	-4.2	1.20 V	360	51.2	-1.4
5	4924.00	42.1 PK	74.0	-31.9	1.65 V	331	38.8	3.3
6	4924.00	41.1 AV	54.0	-12.9	1.65 V	331	37.8	3.3
7	7386.00	49.6 PK	74.0	-24.4	1.26 V	120	40.5	9.1
8	7386.00	43.1 AV	54.0	-10.9	1.26 V	120	34.0	9.1

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)
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	67.5 PK	74.0	-6.5	1.07 H	61	69.1	-1.6
2	2390.00	53.9 AV	54.0	-0.1	1.07 H	61	55.5	-1.6
3	*2412.00	114.5 PK			1.07 H	61	116.0	-1.5
4	*2412.00	103.1 AV			1.07 H	61	104.6	-1.5
5	4824.00	50.6 PK	74.0	-23.4	1.64 H	162	47.6	3.0
6	4824.00	37.0 AV	54.0	-17.0	1.64 H	162	34.0	3.0

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	64.3 PK	74.0	-9.7	1.25 V	360	65.9	-1.6
2	2390.00	49.8 AV	54.0	-4.2	1.25 V	360	51.4	-1.6
3	*2412.00	112.8 PK			1.25 V	360	114.3	-1.5
4	*2412.00	100.3 AV			1.25 V	360	101.8	-1.5
5	4824.00	51.3 PK	74.0	-22.7	3.63 V	175	48.3	3.0
6	4824.00	38.7 AV	54.0	-15.3	3.63 V	175	35.7	3.0

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2389.00	70.4 PK	74.0	-3.6	1.03 H	57	72.0	-1.6
2	2389.00	53.5 AV	54.0	-0.5	1.03 H	57	55.1	-1.6
3	*2437.00	122.9 PK			1.03 H	57	124.4	-1.5
4	*2437.00	112.4 AV			1.03 H	57	113.9	-1.5
5	2484.00	65.2 PK	74.0	-8.8	1.03 H	57	66.6	-1.4
6	2484.00	50.3 AV	54.0	-3.7	1.03 H	57	51.7	-1.4
7	4874.00	50.4 PK	74.0	-23.6	1.67 H	169	47.2	3.2
8	4874.00	37.1 AV	54.0	-16.9	1.67 H	169	33.9	3.2
9	7311.00	46.1 PK	74.0	-27.9	1.99 H	304	37.2	8.9
10	7311.00	33.3 AV	54.0	-20.7	1.99 H	304	24.4	8.9

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2389.00	67.2 PK	74.0	-6.8	1.30 V	360	68.8	-1.6
2	2389.00	49.4 AV	54.0	-4.6	1.30 V	360	51.0	-1.6
3	*2437.00	121.2 PK			1.30 V	360	122.7	-1.5
4	*2437.00	109.6 AV			1.30 V	360	111.1	-1.5
5	2484.00	62.0 PK	74.0	-12.0	1.30 V	360	63.4	-1.4
6	2484.00	46.2 AV	54.0	-7.8	1.30 V	360	47.6	-1.4
7	4874.00	53.2 PK	74.0	-20.8	3.66 V	190	50.0	3.2
8	4874.00	40.6 AV	54.0	-13.4	3.66 V	190	37.4	3.2
9	7311.00	50.0 PK	74.0	-24.0	1.35 V	28	41.1	8.9
10	7311.00	37.0 AV	54.0	-17.0	1.35 V	28	28.1	8.9

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	115.5 PK			1.04 H	58	116.9	-1.4
2	*2462.00	104.8 AV			1.04 H	58	106.2	-1.4
3	2483.50	69.6 PK	74.0	-4.4	1.04 H	58	71.0	-1.4
4	2483.50	53.9 AV	54.0	-0.1	1.04 H	58	55.3	-1.4
5	4924.00	50.7 PK	74.0	-23.3	1.65 H	164	47.4	3.3
6	4924.00	37.5 AV	54.0	-16.5	1.65 H	164	34.2	3.3
7	7386.00	46.4 PK	74.0	-27.6	1.93 H	315	37.3	9.1
8	7386.00	33.7 AV	54.0	-20.3	1.93 H	315	24.6	9.1

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	113.8 PK			1.19 V	360	115.2	-1.4
2	*2462.00	102.0 AV			1.19 V	360	103.4	-1.4
3	2483.50	66.4 PK	74.0	-7.6	1.19 V	360	67.8	-1.4
4	2483.50	49.8 AV	54.0	-4.2	1.19 V	360	51.2	-1.4
5	4924.00	51.1 PK	74.0	-22.9	3.62 V	182	47.8	3.3
6	4924.00	38.8 AV	54.0	-15.2	3.62 V	182	35.5	3.3
7	7386.00	49.3 PK	74.0	-24.7	1.45 V	14	40.2	9.1
8	7386.00	36.2 AV	54.0	-17.8	1.45 V	14	27.1	9.1

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)
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	71.8 PK	74.0	-2.2	1.04 H	58	73.4	-1.6
2	2390.00	53.7 AV	54.0	-0.3	1.04 H	58	55.3	-1.6
3	*2412.00	114.7 PK			1.04 H	58	116.2	-1.5
4	*2412.00	103.4 AV			1.04 H	58	104.9	-1.5
5	4824.00	50.0 PK	74.0	-24.0	1.71 H	154	47.0	3.0
6	4824.00	36.9 AV	54.0	-17.1	1.71 H	154	33.9	3.0

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	68.6 PK	74.0	-5.4	1.19 V	360	70.2	-1.6
2	2390.00	49.6 AV	54.0	-4.4	1.19 V	360	51.2	-1.6
3	*2412.00	113.0 PK			1.19 V	360	114.5	-1.5
4	*2412.00	100.6 AV			1.19 V	360	102.1	-1.5
5	4824.00	51.6 PK	74.0	-22.4	3.71 V	197	48.6	3.0
6	4824.00	39.3 AV	54.0	-14.7	3.71 V	197	36.3	3.0

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2389.00	71.5 PK	74.0	-2.5	1.04 H	58	73.1	-1.6
2	2389.00	53.2 AV	54.0	-0.8	1.04 H	58	54.8	-1.6
3	*2437.00	123.5 PK			1.04 H	58	125.0	-1.5
4	*2437.00	112.9 AV			1.04 H	58	114.4	-1.5
5	2483.50	69.7 PK	74.0	-4.3	1.04 H	58	71.1	-1.4
6	2483.50	53.5 AV	54.0	-0.5	1.04 H	58	54.9	-1.4
7	4874.00	50.1 PK	74.0	-23.9	1.73 H	163	46.9	3.2
8	4874.00	36.7 AV	54.0	-17.3	1.73 H	163	33.5	3.2
9	7311.00	46.8 PK	74.0	-27.2	1.99 H	307	37.9	8.9
10	7311.00	33.7 AV	54.0	-20.3	1.99 H	307	24.8	8.9

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2389.00	68.3 PK	74.0	-5.7	1.30 V	360	69.9	-1.6
2	2389.00	49.1 AV	54.0	-4.9	1.30 V	360	50.7	-1.6
3	*2437.00	121.8 PK			1.30 V	360	123.3	-1.5
4	*2437.00	110.1 AV			1.30 V	360	111.6	-1.5
5	2483.50	66.5 PK	74.0	-7.5	1.30 V	360	67.9	-1.4
6	2483.50	49.4 AV	54.0	-4.6	1.30 V	360	50.8	-1.4
7	4874.00	52.7 PK	74.0	-21.3	3.65 V	191	49.5	3.2
8	4874.00	40.1 AV	54.0	-13.9	3.65 V	191	36.9	3.2
9	7311.00	50.6 PK	74.0	-23.4	1.32 V	22	41.7	8.9
10	7311.00	37.4 AV	54.0	-16.6	1.32 V	22	28.5	8.9

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	115.3 PK			1.58 H	54	116.7	-1.4
2	*2462.00	104.7 AV			1.58 H	54	106.1	-1.4
3	2483.50	68.9 PK	74.0	-5.1	1.58 H	54	70.3	-1.4
4	2483.50	53.9 AV	54.0	-0.1	1.58 H	54	55.3	-1.4
5	4924.00	50.7 PK	74.0	-23.3	1.61 H	153	47.4	3.3
6	4924.00	37.5 AV	54.0	-16.5	1.61 H	153	34.2	3.3
7	7386.00	45.8 PK	74.0	-28.2	1.97 H	318	36.7	9.1
8	7386.00	33.2 AV	54.0	-20.8	1.97 H	318	24.1	9.1

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	113.6 PK			1.18 V	360	115.0	-1.4
2	*2462.00	101.9 AV			1.18 V	360	103.3	-1.4
3	2483.50	65.7 PK	74.0	-8.3	1.18 V	360	67.1	-1.4
4	2483.50	49.8 AV	54.0	-4.2	1.18 V	360	51.2	-1.4
5	4924.00	51.9 PK	74.0	-22.1	3.71 V	193	48.6	3.3
6	4924.00	39.4 AV	54.0	-14.6	3.71 V	193	36.1	3.3
7	7386.00	49.0 PK	74.0	-25.0	1.43 V	25	39.9	9.1
8	7386.00	36.1 AV	54.0	-17.9	1.43 V	25	27.0	9.1

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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.9 PK	74.0	-9.1	1.46 H	74	66.5	-1.6
2	2390.00	52.8 AV	54.0	-1.2	1.46 H	74	54.4	-1.6
3	*2422.00	106.7 PK			1.46 H	74	108.3	-1.6
4	*2422.00	98.1 AV			1.46 H	74	99.7	-1.6
5	4844.00	49.8 PK	74.0	-24.2	1.72 H	173	46.7	3.1
6	4844.00	36.8 AV	54.0	-17.2	1.72 H	173	33.7	3.1
7	7266.00	46.7 PK	74.0	-27.3	2.02 H	319	37.8	8.9
8	7266.00	33.6 AV	54.0	-20.4	2.02 H	319	24.7	8.9

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.7 PK	74.0	-12.3	1.23 V	360	63.3	-1.6
2	2390.00	48.7 AV	54.0	-5.3	1.23 V	360	50.3	-1.6
3	*2422.00	105.0 PK			1.23 V	360	106.6	-1.6
4	*2422.00	95.3 AV			1.23 V	360	96.9	-1.6
5	4844.00	52.1 PK	74.0	-21.9	3.69 V	194	49.0	3.1
6	4844.00	39.3 AV	54.0	-14.7	3.69 V	194	36.2	3.1
7	7266.00	48.5 PK	74.0	-25.5	1.42 V	29	39.6	8.9
8	7266.00	35.6 AV	54.0	-18.4	1.42 V	29	26.7	8.9

REMARKS:

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

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	67.7 PK	74.0	-6.3	1.30 H	69	69.3	-1.6
2	2390.00	53.9 AV	54.0	-0.1	1.30 H	69	55.5	-1.6
3	*2437.00	111.1 PK			1.30 H	69	112.6	-1.5
4	*2437.00	102.1 AV			1.30 H	69	103.6	-1.5
5	2483.50	62.4 PK	74.0	-11.6	1.30 H	69	63.8	-1.4
6	2483.50	50.4 AV	54.0	-3.6	1.30 H	69	51.8	-1.4
7	4874.00	51.1 PK	74.0	-22.9	1.66 H	184	47.9	3.2
8	4874.00	37.7 AV	54.0	-16.3	1.66 H	184	34.5	3.2
9	7311.00	46.8 PK	74.0	-27.2	1.96 H	295	37.9	8.9
10	7311.00	33.8 AV	54.0	-20.2	1.96 H	295	24.9	8.9

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.5 PK	74.0	-9.5	1.23 V	360	66.1	-1.6
2	2390.00	49.8 AV	54.0	-4.2	1.23 V	360	51.4	-1.6
3	*2437.00	109.4 PK			1.23 V	360	110.9	-1.5
4	*2437.00	99.3 AV			1.23 V	360	100.8	-1.5
5	2483.50	59.2 PK	74.0	-14.8	1.23 V	360	60.6	-1.4
6	2483.50	46.3 AV	54.0	-7.7	1.23 V	360	47.7	-1.4
7	4874.00	52.9 PK	74.0	-21.1	3.71 V	193	49.7	3.2
8	4874.00	40.3 AV	54.0	-13.7	3.71 V	193	37.1	3.2
9	7311.00	50.3 PK	74.0	-23.7	1.38 V	30	41.4	8.9
10	7311.00	37.1 AV	54.0	-16.9	1.38 V	30	28.2	8.9

REMARKS:

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

CHANNEL	TX Channel 9	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	*2452.00	110.1 PK			1.13 H	73	111.6	-1.5
2	*2452.00	101.4 AV			1.13 H	73	102.9	-1.5
3	2483.50	64.7 PK	74.0	-9.3	1.13 H	73	66.1	-1.4
4	2483.50	53.8 AV	54.0	-0.2	1.13 H	73	55.2	-1.4
5	4904.00	49.8 PK	74.0	-24.2	1.67 H	182	46.6	3.2
6	4904.00	36.7 AV	54.0	-17.3	1.67 H	182	33.5	3.2
7	7356.00	45.8 PK	74.0	-28.2	2.00 H	295	36.7	9.1
8	7356.00	32.9 AV	54.0	-21.1	2.00 H	295	23.8	9.1

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	108.4 PK			1.24 V	360	109.9	-1.5
2	*2452.00	98.6 AV			1.24 V	360	100.1	-1.5
3	2483.50	61.5 PK	74.0	-12.5	1.24 V	360	62.9	-1.4
4	2483.50	49.7 AV	54.0	-4.3	1.24 V	360	51.1	-1.4
5	4904.00	51.9 PK	74.0	-22.1	3.66 V	172	48.7	3.2
6	4904.00	39.6 AV	54.0	-14.4	3.66 V	172	36.4	3.2
7	7356.00	49.0 PK	74.0	-25.0	1.42 V	22	39.9	9.1
8	7356.00	36.0 AV	54.0	-18.0	1.42 V	22	26.9	9.1

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:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	45.76	27.0 QP	40.0	-13.0	3.00 H	302	35.1	-8.1
2	98.41	38.7 QP	43.5	-4.8	2.00 H	273	51.4	-12.7
3	139.25	30.8 QP	43.5	-12.7	2.00 H	288	38.9	-8.1
4	289.91	28.0 QP	46.0	-18.0	1.00 H	271	35.7	-7.7
5	375.03	28.7 QP	46.0	-17.3	1.00 H	64	34.2	-5.5
6	425.01	33.0 QP	46.0	-13.0	1.00 H	145	37.1	-4.1

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	66.33	32.0 QP	40.0	-8.0	1.00 V	0	41.3	-9.3
2	98.46	32.9 QP	43.5	-10.6	2.00 V	212	45.6	-12.7
3	110.80	32.2 QP	43.5	-11.3	1.00 V	256	42.9	-10.7
4	139.25	29.1 QP	43.5	-14.4	1.00 V	214	37.2	-8.1
5	375.00	26.3 QP	46.0	-19.7	1.00 V	28	31.8	-5.5
6	425.01	28.9 QP	46.0	-17.1	1.00 V	0	33.0	-4.1

REMARKS:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Nov. 01, 2017	Oct. 31, 2018
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Nov. 15, 20167	Nov. 14, 2018
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 03, 2017	June 02, 2018
50 ohms Terminator	N/A	EMC-02	Sep. 22, 2017	Sep. 21, 2018
RF Cable	5D-FB	COCCAB-001	Sep. 29, 2017	Sep. 28, 2018
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 18, 2017	June 17, 2018
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 Shielded Room No. 1.
- 3 Tested Date: Nov. 28, 2017

4.2.3 Test Procedures

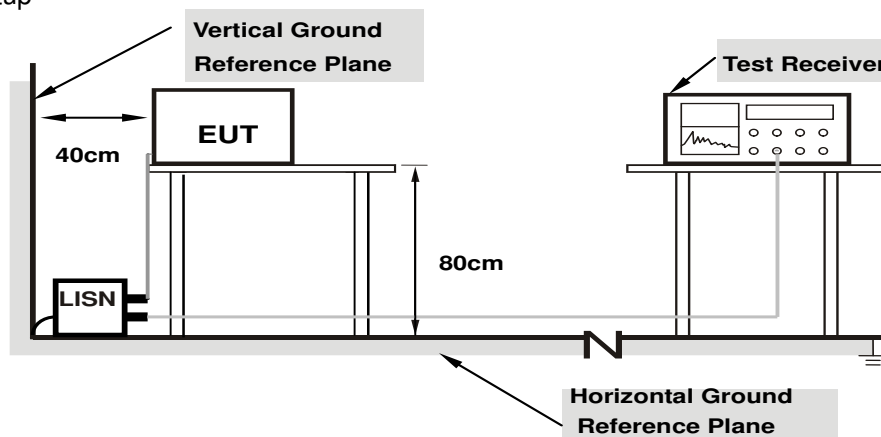
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

Same as 4.1.6.

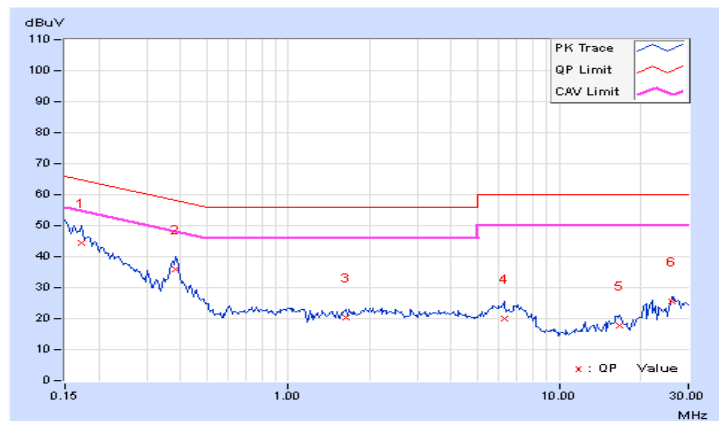
4.2.7 Test Results (Mode 1)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.17344	0.14	44.36	27.36	44.50	27.50	64.79	54.79	-20.29
2	0.38438	0.18	35.61	27.71	35.79	27.89	58.18	48.18	-22.39	-20.29
3	1.64063	0.21	20.03	15.18	20.24	15.39	56.00	46.00	-35.76	-30.61
4	6.26953	0.46	19.63	14.65	20.09	15.11	60.00	50.00	-39.91	-34.89
5	16.79688	1.13	16.50	9.77	17.63	10.90	60.00	50.00	-42.37	-39.10
6	26.04688	1.37	24.33	22.35	25.70	23.72	60.00	50.00	-34.30	-26.28

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.

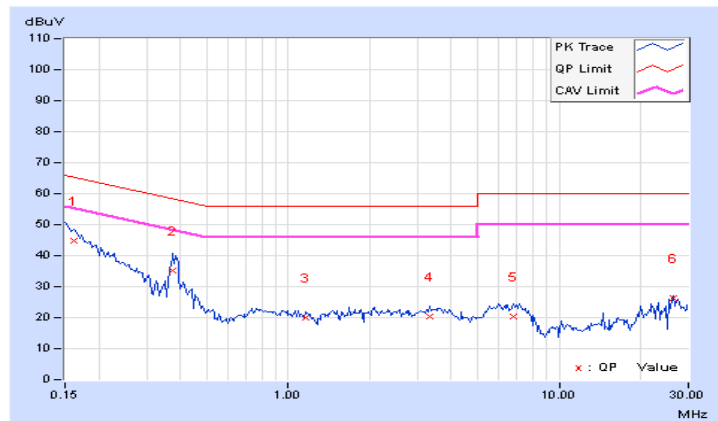


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	0.12	44.87	28.55	44.99	28.67	65.38	55.38	-20.39	-26.71
2	0.37656	0.16	34.98	27.51	35.14	27.67	58.35	48.35	-23.21	-20.68
3	1.15625	0.20	19.78	14.47	19.98	14.67	56.00	46.00	-36.02	-31.33
4	3.35156	0.26	19.98	15.10	20.24	15.36	56.00	46.00	-35.76	-30.64
5	6.74219	0.42	20.07	14.63	20.49	15.05	60.00	50.00	-39.51	-34.95
6	26.28906	1.00	25.24	24.59	26.24	25.59	60.00	50.00	-33.76	-24.41

REMARKS:

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



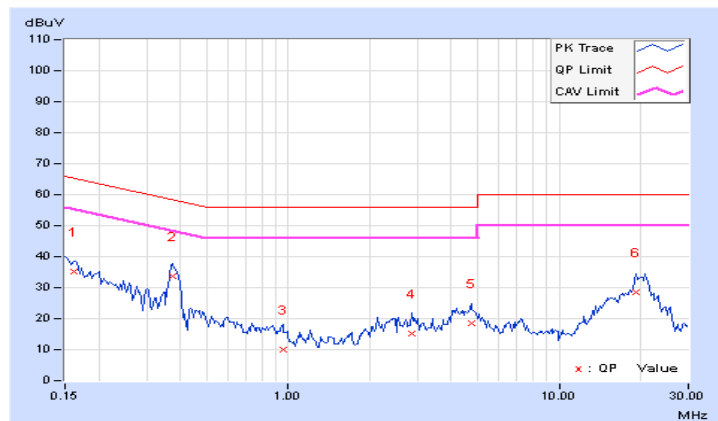
4.2.8 Test Results (Mode 2)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	
1	0.16172	0.15	35.14	23.93	35.29	24.08	65.38	55.38	-30.09	-31.30
2	0.37656	0.18	33.34	26.77	33.52	26.95	58.35	48.35	-24.83	-21.40
3	0.95469	0.24	9.94	5.28	10.18	5.52	56.00	46.00	-45.82	-40.48
4	2.85547	0.31	14.79	5.99	15.10	6.30	56.00	46.00	-40.90	-39.70
5	4.73828	0.46	17.93	10.21	18.39	10.67	56.00	46.00	-37.61	-35.33
6	19.30469	1.57	26.92	19.50	28.49	21.07	60.00	50.00	-31.51	-28.93

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.

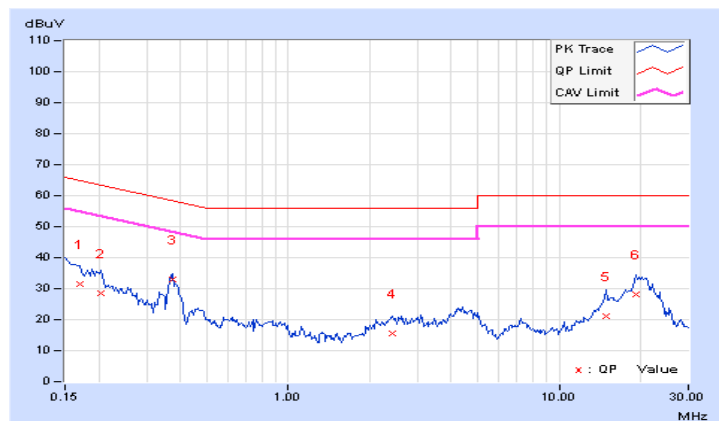


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.13	31.28	22.67	31.41	22.80	64.98	54.98	-33.57	-32.18
2	0.20469	0.11	28.25	20.52	28.36	20.63	63.42	53.42	-35.06	-32.79
3	0.37266	0.18	32.73	30.16	32.91	30.34	58.44	48.44	-25.53	-18.10
4	2.41016	0.29	15.09	7.85	15.38	8.14	56.00	46.00	-40.62	-37.86
5	15.00781	1.05	19.95	11.72	21.00	12.77	60.00	50.00	-39.00	-37.23
6	19.28516	1.28	26.89	19.37	28.17	20.65	60.00	50.00	-31.83	-29.35

REMARKS:

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



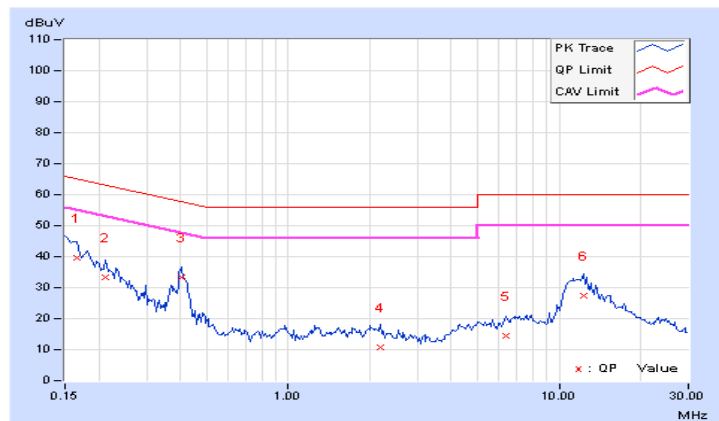
4.2.9 Test Results (Mode 3)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	
1	0.16562	0.15	39.36	25.23	39.51	25.38	65.18	55.18	-25.67	-29.80
2	0.21250	0.14	33.09	22.04	33.23	22.18	63.11	53.11	-29.88	-30.93
3	0.40391	0.19	32.96	28.65	33.15	28.84	57.77	47.77	-24.62	-18.93
4	2.19141	0.26	10.53	4.56	10.79	4.82	56.00	46.00	-45.21	-41.18
5	6.38672	0.58	13.93	6.02	14.51	6.60	60.00	50.00	-45.49	-43.40
6	12.32031	1.03	26.56	21.41	27.59	22.44	60.00	50.00	-32.41	-27.56

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.

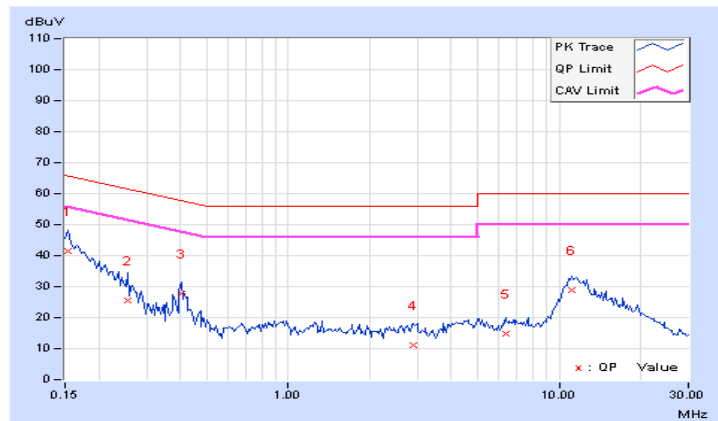


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.14	41.37	27.75	41.51	27.89	65.79	55.79	-24.28	-27.90
2	0.25547	0.13	25.36	14.10	25.49	14.23	61.58	51.58	-36.09	-37.35
3	0.40391	0.19	27.52	22.31	27.71	22.50	57.77	47.77	-30.06	-25.27
4	2.88281	0.29	10.83	6.02	11.12	6.31	56.00	46.00	-44.88	-39.69
5	6.34375	0.49	14.24	6.67	14.73	7.16	60.00	50.00	-45.27	-42.84
6	11.19922	0.83	28.23	23.04	29.06	23.87	60.00	50.00	-30.94	-26.13

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.

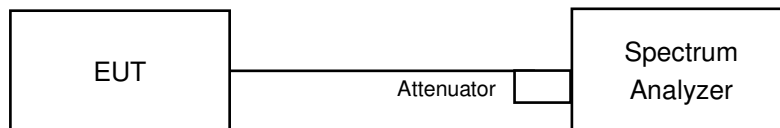


4.3 6dB Bandwidth Measurement

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) $\geq 3 \times$ RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
1	2412	10.12	10.16	10.14	0.5	PASS
6	2437	10.11	10.13	10.13	0.5	PASS
11	2462	10.15	10.12	10.13	0.5	PASS

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
1	2412	16.45	16.42	16.45	0.5	PASS
6	2437	16.40	16.41	16.42	0.5	PASS
11	2462	16.41	16.43	16.42	0.5	PASS

802.11n (HT20)

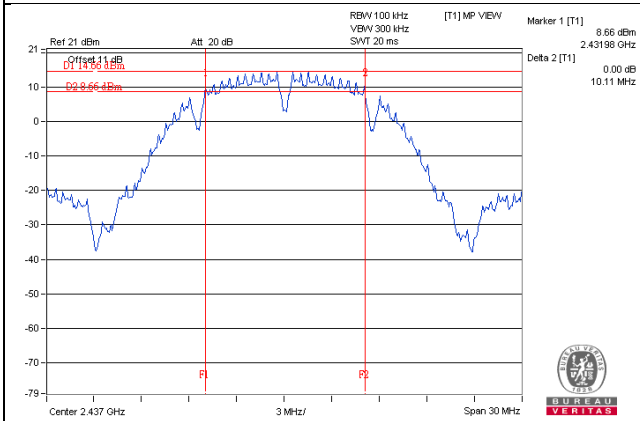
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
1	2412	17.64	17.63	17.63	0.5	Pass
6	2437	17.62	17.61	17.61	0.5	Pass
11	2462	17.63	17.64	16.43	0.5	Pass

802.11n (HT40)

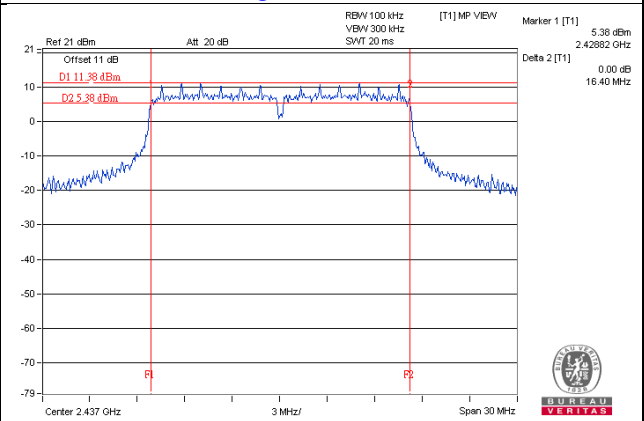
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
3	2422	35.28	35.24	35.27	0.5	Pass
6	2437	35.30	35.27	35.29	0.5	Pass
9	2452	35.28	35.27	35.29	0.5	Pass

Spectrum Plot of Worst Value

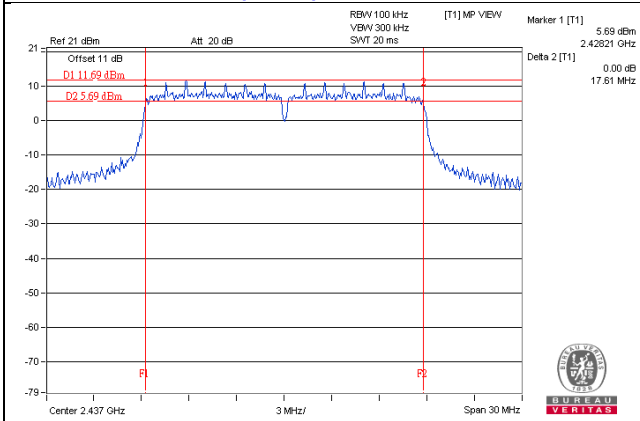
802.11b / Chain 0 : CH6



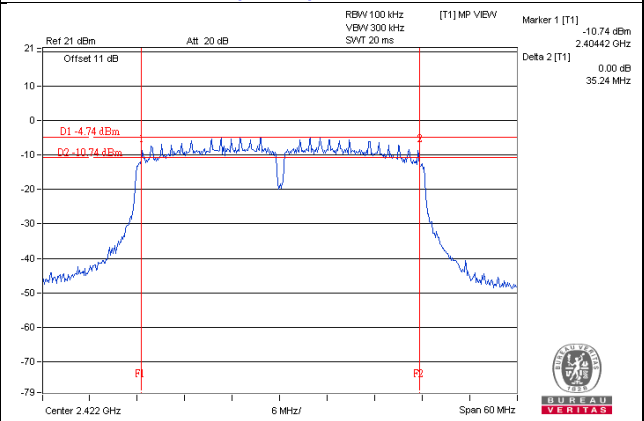
802.11g / Chain 0 : CH6



802.11n (HT20) / Chain 1 : CH6



802.11n (HT40) / Chain 1 : CH3



4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

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

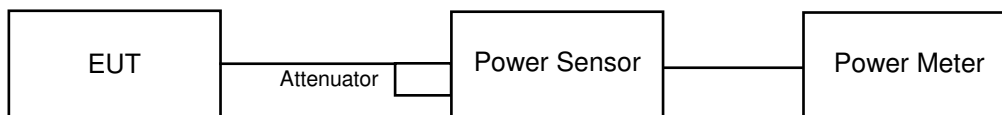
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

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

802.11b

Chan.	Chan. Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	18.21	17.50	18.33	190.533	22.80	30	Pass
6	2437	24.33	24.15	23.96	779.921	28.92	30	Pass
11	2462	17.53	17.54	17.25	166.466	22.21	30	Pass

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	12.78	11.70	12.48	51.459	17.11	30	Pass
6	2437	22.37	22.26	22.39	514.231	27.11	30	Pass
11	2462	14.60	15.03	15.23	94.025	19.73	30	Pass

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	13.40	12.14	12.97	58.061	17.64	30	Pass
6	2437	22.62	22.37	22.43	530.379	27.25	30	Pass
11	2462	14.64	14.63	14.84	88.626	19.48	30	Pass

802.11n (HT40)

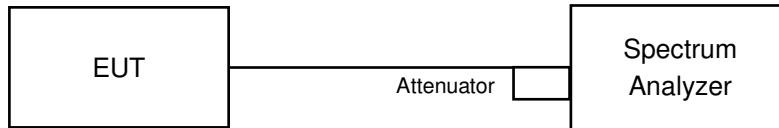
Chan.	Chan. Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
3	2422	10.42	9.04	9.64	28.236	14.51	30	Pass
6	2437	15.25	14.67	15.12	95.315	19.79	30	Pass
9	2452	13.15	12.85	12.23	56.64	17.53	30	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

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

802.11b

- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set VBW $\geq 3 \times \text{RBW}$.
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span}/\text{RBW}$.
- Sweep time = auto couple.
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.

802.11g, 802.11n (HT20), 802.11n (HT40)

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-12.83	4.77	-8.06	5.66	Pass
	6	2437	-7.30	4.77	-2.53	5.66	Pass
	11	2462	-13.20	4.77	-8.43	5.66	Pass
1	1	2412	-13.39	4.77	-8.62	5.66	Pass
	6	2437	-7.23	4.77	-2.46	5.66	Pass
	11	2462	-13.89	4.77	-9.12	5.66	Pass
2	1	2412	-13.36	4.77	-8.59	5.66	Pass
	6	2437	-7.43	4.77	-2.66	5.66	Pass
	11	2462	-13.70	4.77	-8.93	5.66	Pass

Note: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3]$ = 8.34dBi > 6dBi , so the power density limit shall be reduced to 8-(8.34-6) = 5.66dBm.

802.11g

TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/3kHz)	10 log (N=3) dB	Duty Factor (dB)	TOTAL PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-16.21	4.77	0.11	-11.33	5.66	Pass
	6	2437	-10.81	4.77	0.11	-5.93	5.66	Pass
	11	2462	-17.65	4.77	0.11	-12.77	5.66	Pass
1	1	2412	-19.94	4.77	0.11	-15.06	5.66	Pass
	6	2437	-10.51	4.77	0.11	-5.63	5.66	Pass
	11	2462	-17.87	4.77	0.11	-12.99	5.66	Pass
2	1	2412	-17.82	4.77	0.11	-12.94	5.66	Pass
	6	2437	-11.08	4.77	0.11	-6.20	5.66	Pass
	11	2462	-17.30	4.77	0.11	-12.42	5.66	Pass

Note: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3]$ = 8.34dBi > 6dBi , so the power density limit shall be reduced to 8-(8.34-6) = 5.66dBm.

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

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/3kHz)	10 log (N=3) dB	Duty Factor (dB)	TOTAL PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-18.21	4.77	0.12	-13.32	5.66	Pass
	6	2437	-10.26	4.77	0.12	-5.37	5.66	Pass
	11	2462	-18.57	4.77	0.12	-13.68	5.66	Pass
1	1	2412	-15.50	4.77	0.12	-10.61	5.66	Pass
	6	2437	-10.72	4.77	0.12	-5.83	5.66	Pass
	11	2462	-18.41	4.77	0.12	-13.52	5.66	Pass
2	1	2412	-19.81	4.77	0.12	-14.92	5.66	Pass
	6	2437	-11.11	4.77	0.12	-6.22	5.66	Pass
	11	2462	-17.75	4.77	0.12	-12.86	5.66	Pass

Note: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.34\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(8.34-6) = 5.66\text{dBm}$.

802.11n (HT40)

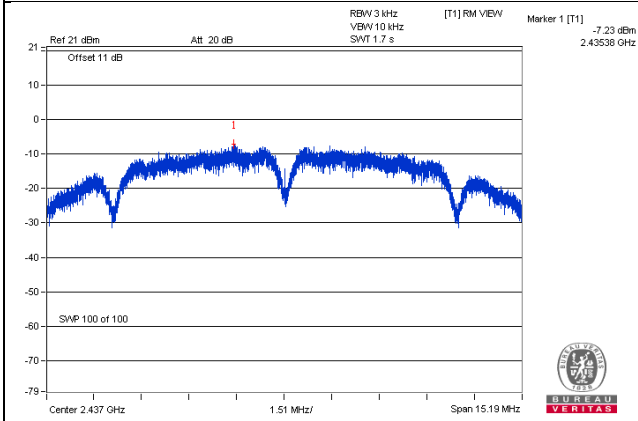
TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/3kHz)	10 log (N=3) dB	Duty Factor (dB)	TOTAL PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	3	2422	-25.35	4.77	0.19	-20.39	5.66	Pass
	6	2437	-18.27	4.77	0.19	-13.31	5.66	Pass
	9	2452	-19.31	4.77	0.19	-14.35	5.66	Pass
1	3	2422	-26.41	4.77	0.19	-21.45	5.66	Pass
	6	2437	-20.27	4.77	0.19	-15.31	5.66	Pass
	9	2452	-21.39	4.77	0.19	-16.43	5.66	Pass
2	3	2422	-26.58	4.77	0.19	-21.62	5.66	Pass
	6	2437	-19.67	4.77	0.19	-14.71	5.66	Pass
	9	2452	-23.23	4.77	0.19	-18.27	5.66	Pass

Note: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.34\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(8.34-6) = 5.66\text{dBm}$.

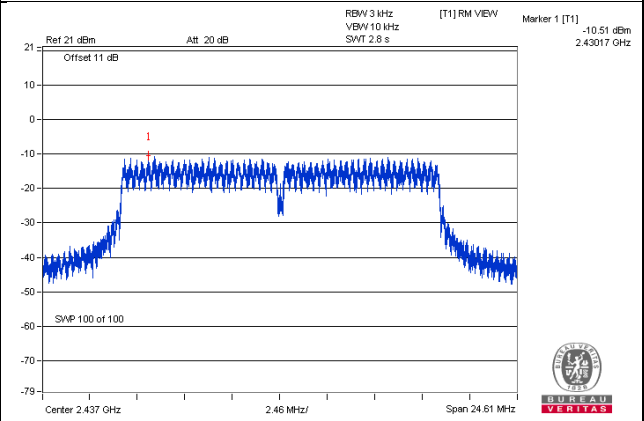
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

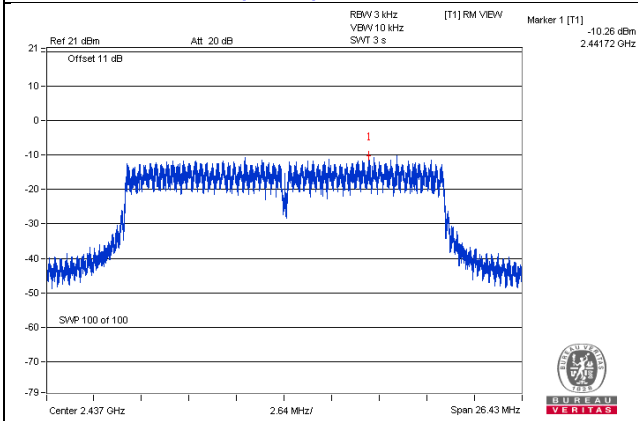
802.11b / Chain 1 : CH6



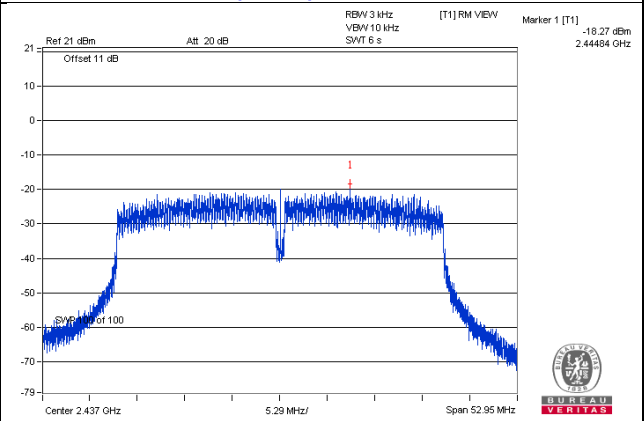
802.11g / Chain 1 : CH6



802.11n (HT20) / Chain 0 : CH6



802.11n (HT40) / Chain 0 : CH6

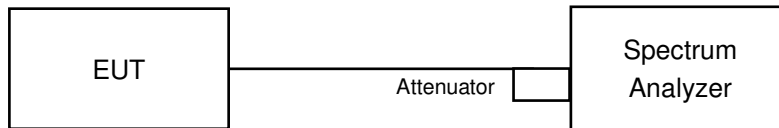


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW \geq 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 OOB

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

4.6.5 Deviation from Test Standard

No deviation.

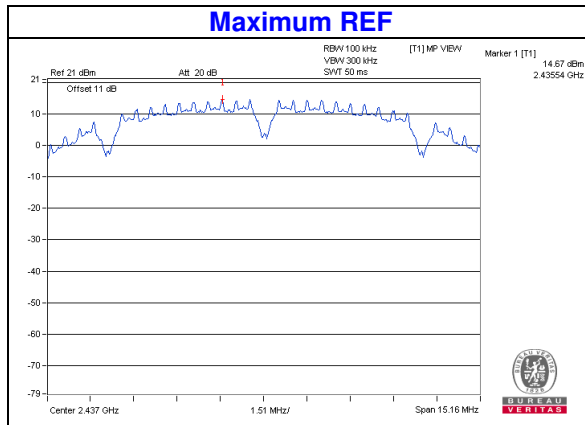
4.6.6 EUT Operating Condition

Same as Item 4.3.6

4.6.7 Test Results

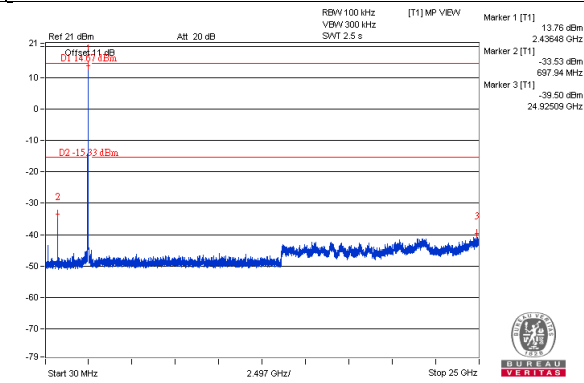
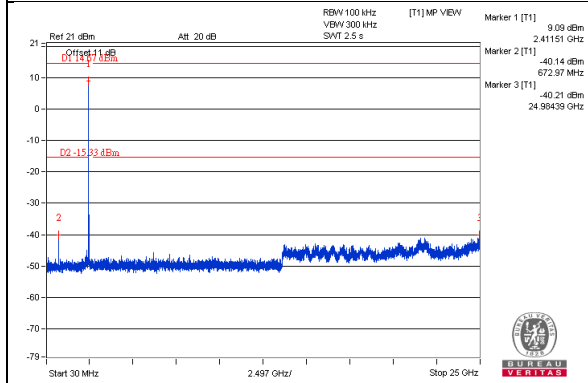
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b

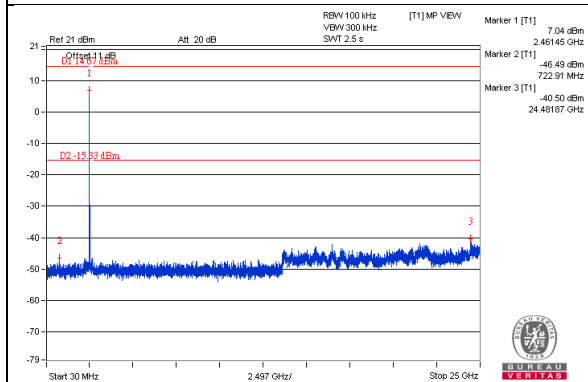


Chain 0

CH 1 **CH 6**

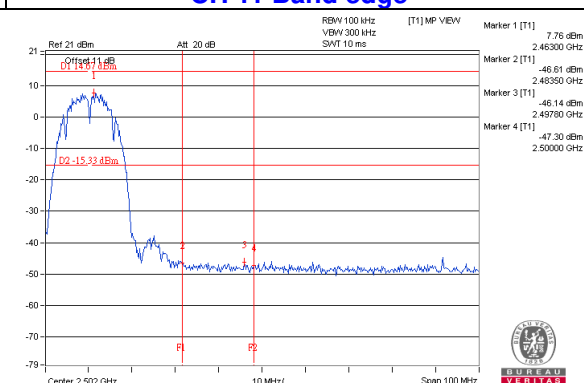
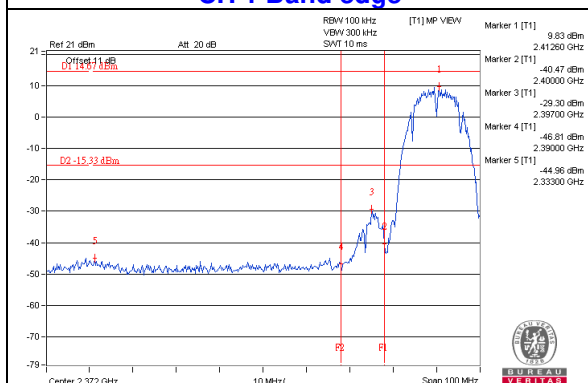


CH 11

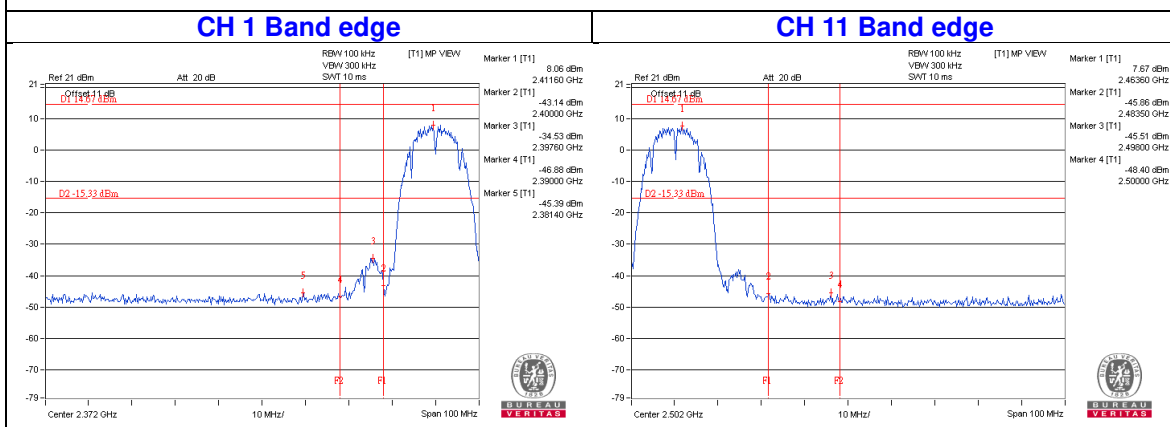
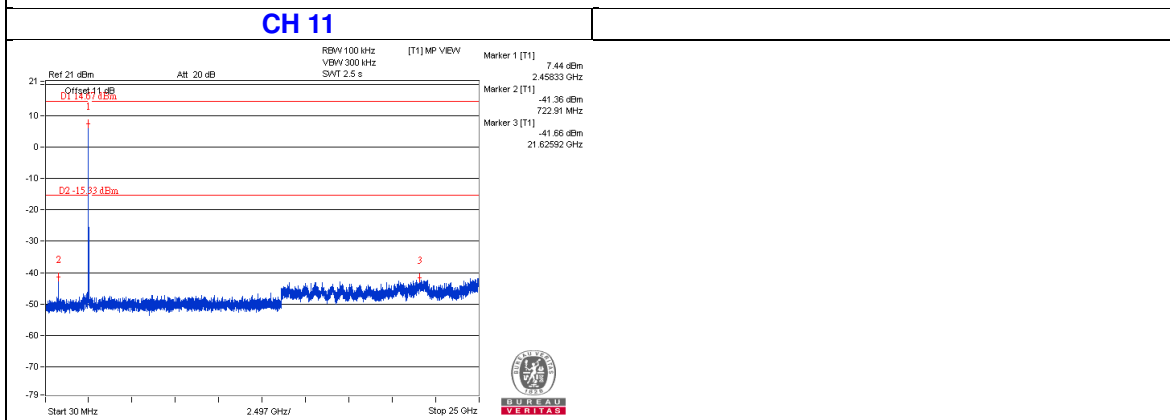
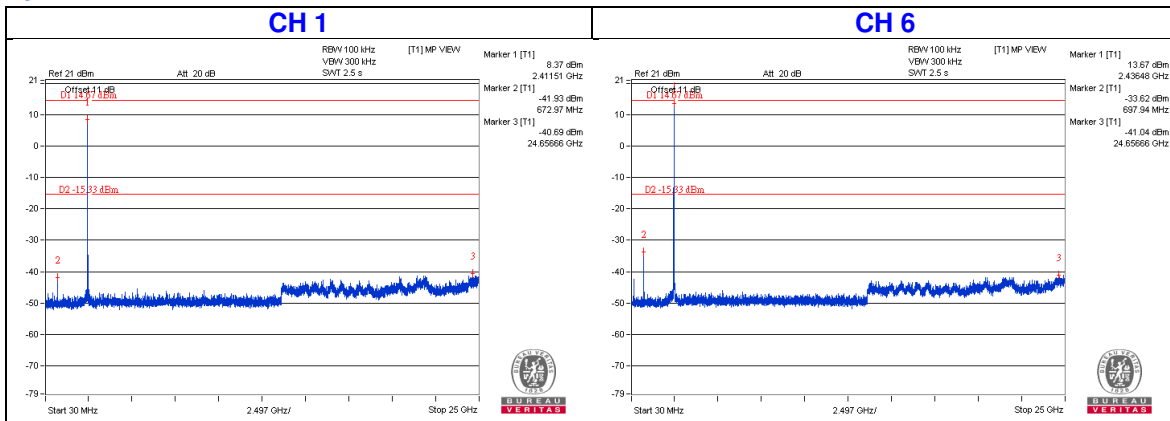


CH 11 Band edge

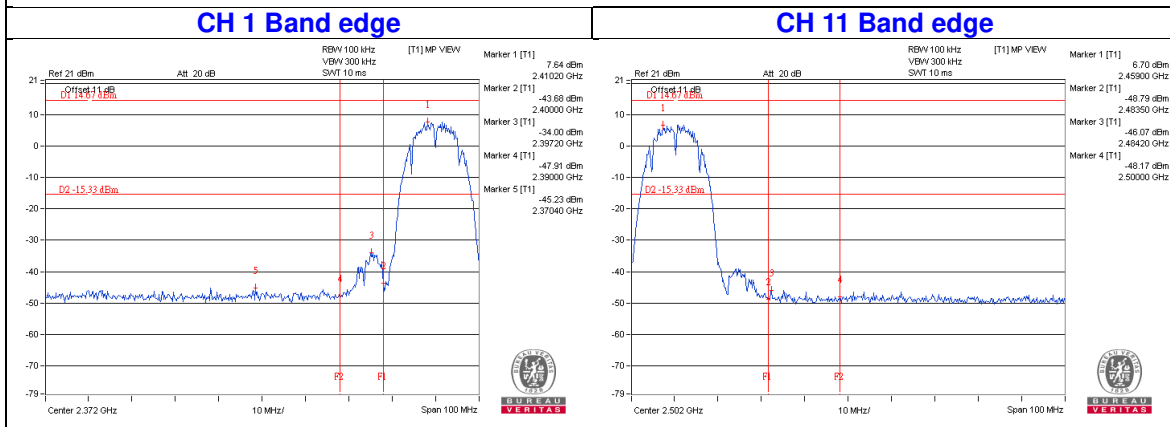
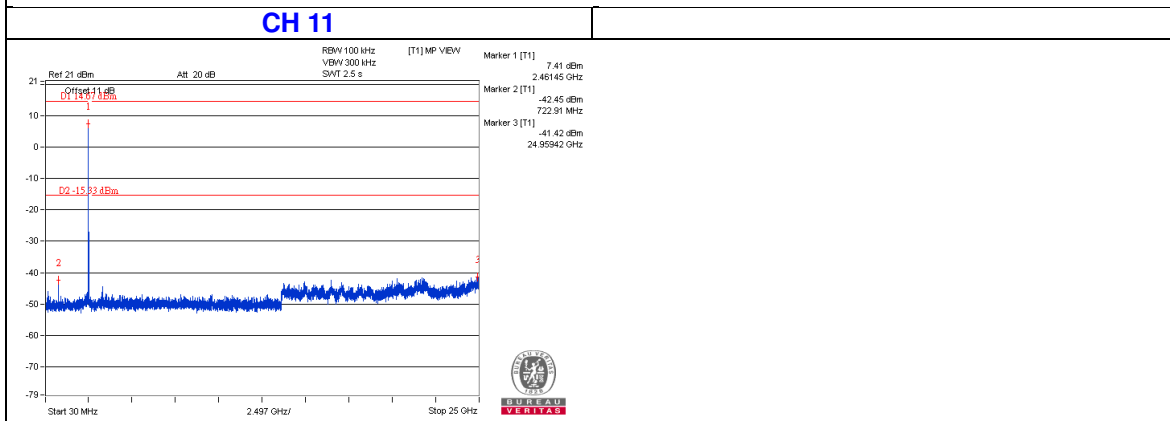
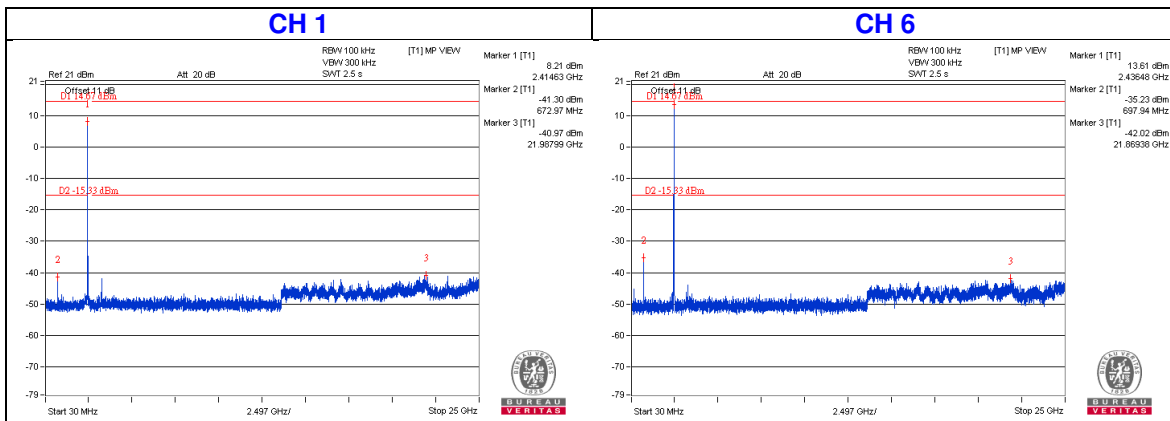
CH 11 Band edge



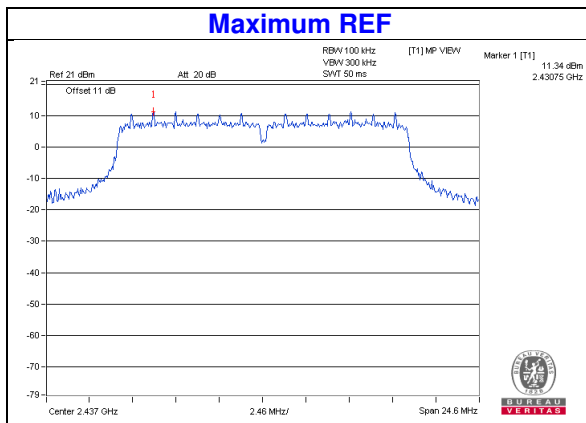
Chain 1



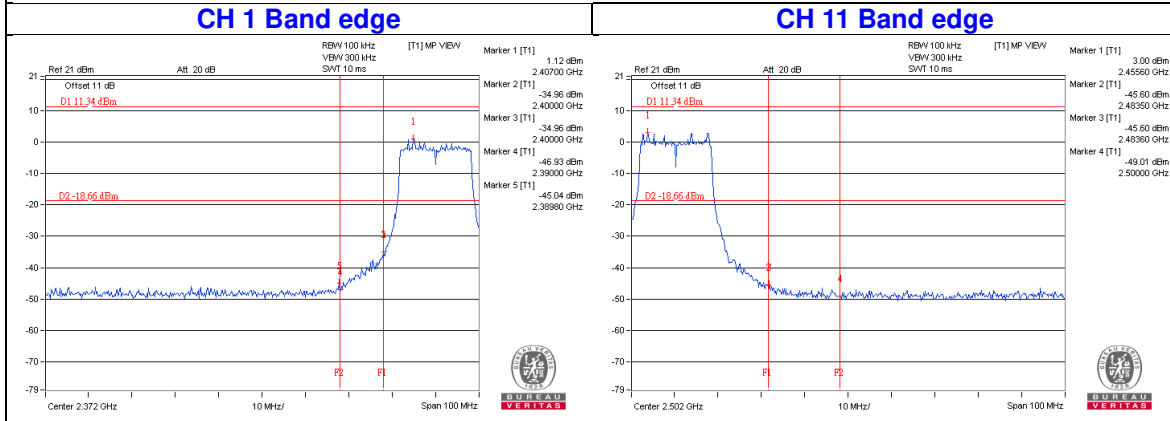
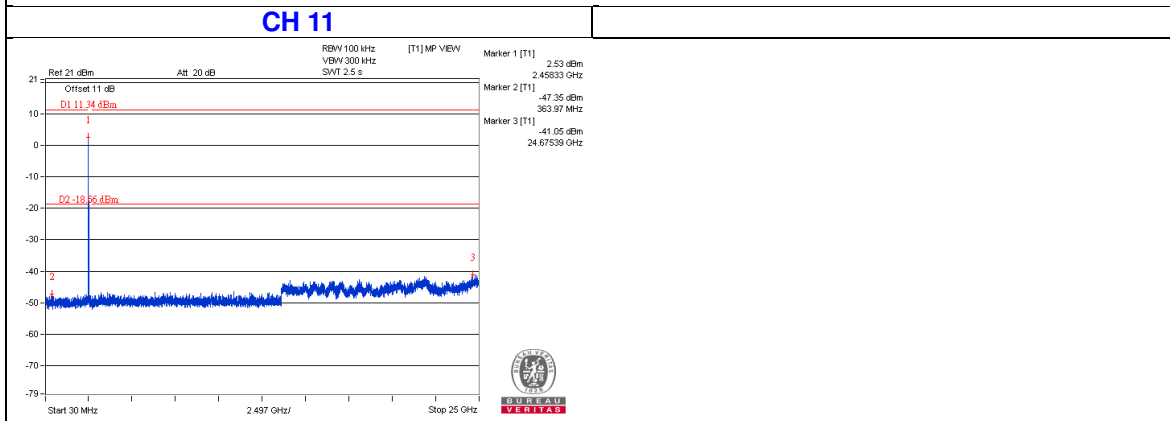
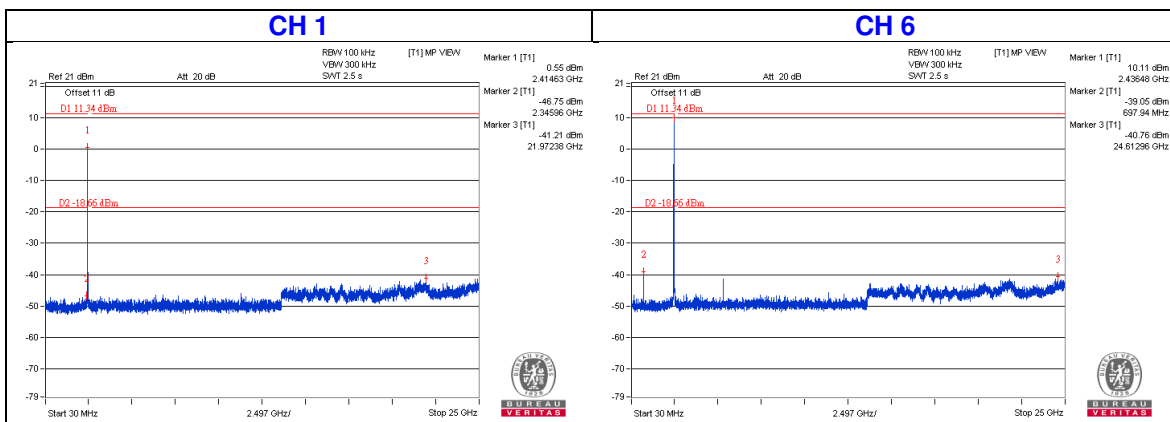
Chain 2



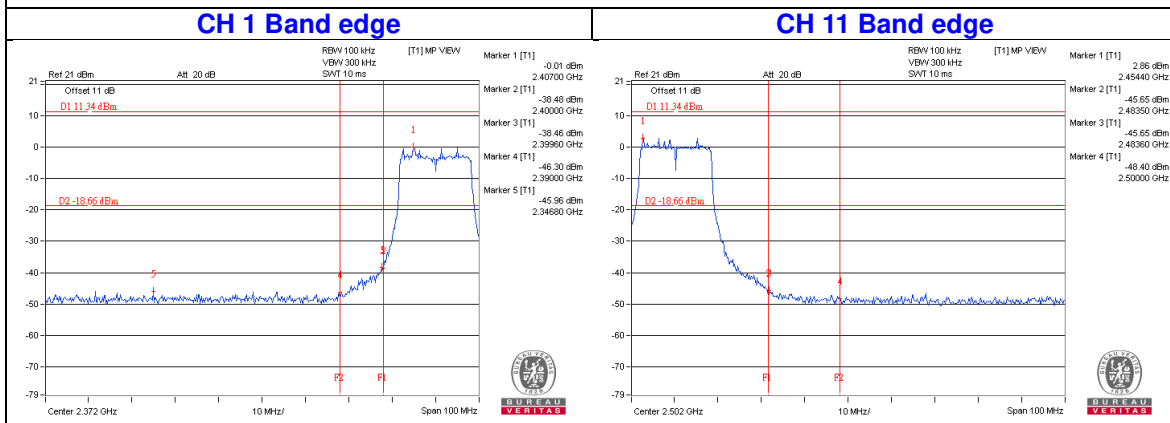
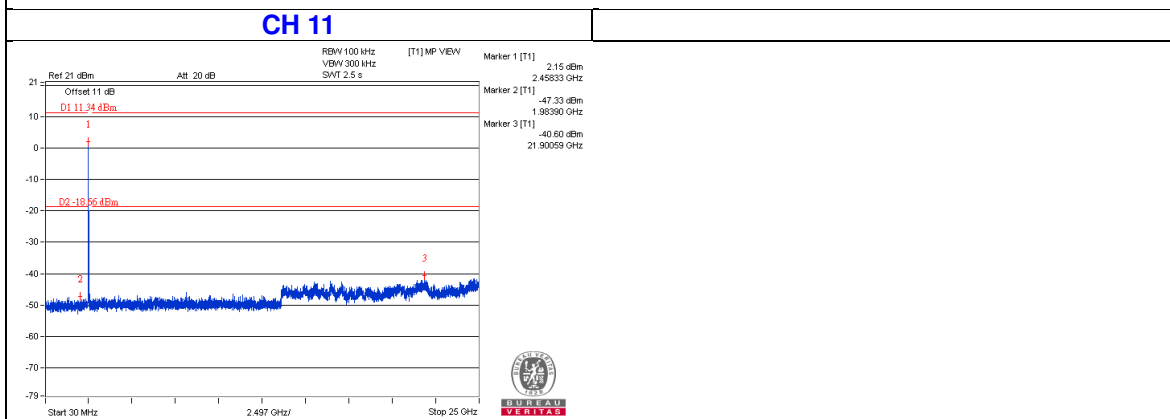
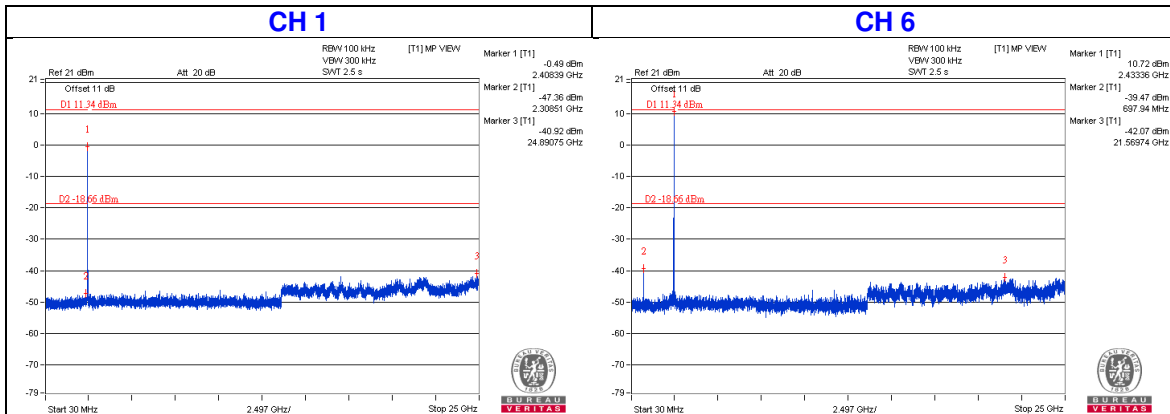
802.11g



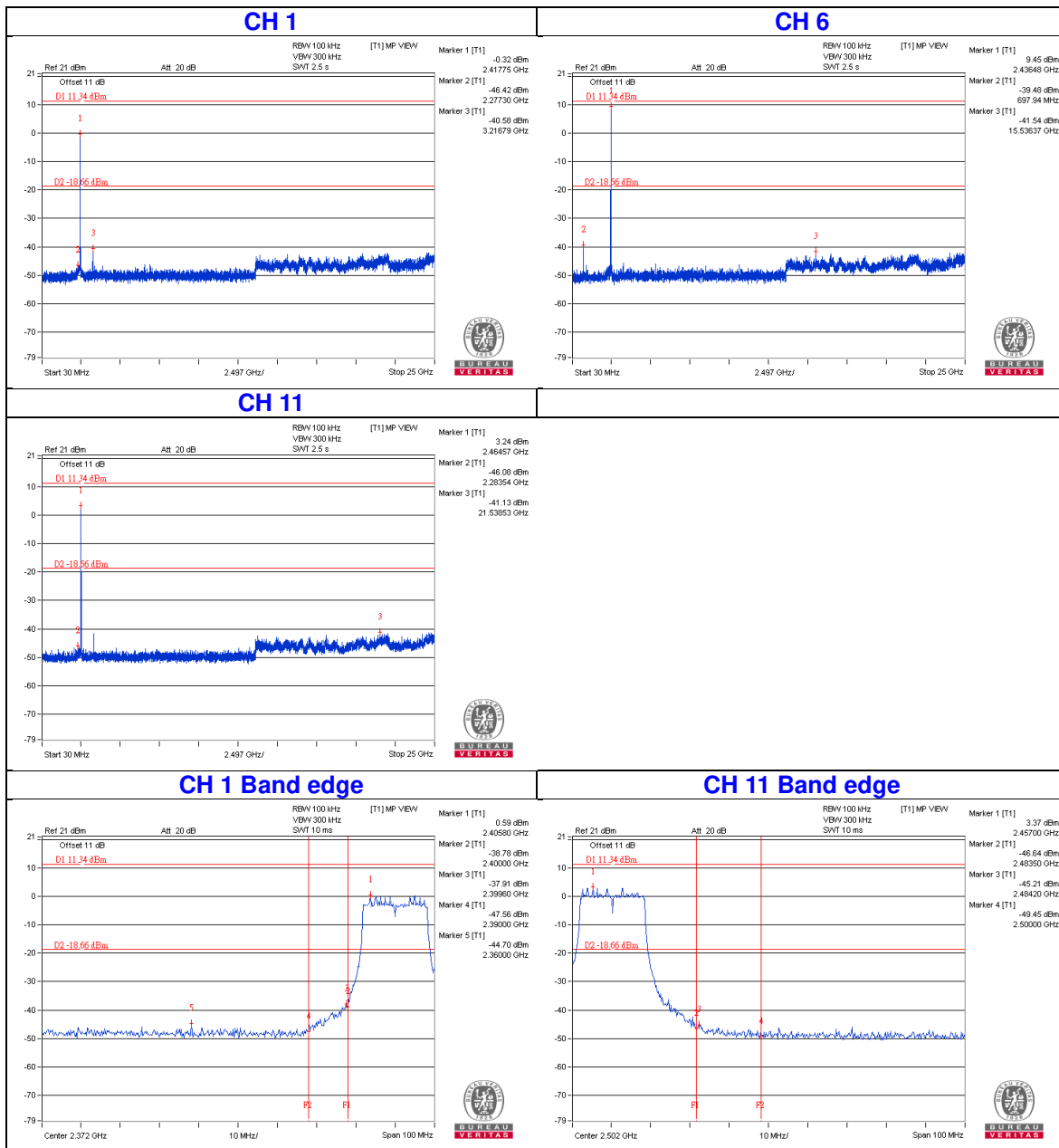
Chain 0



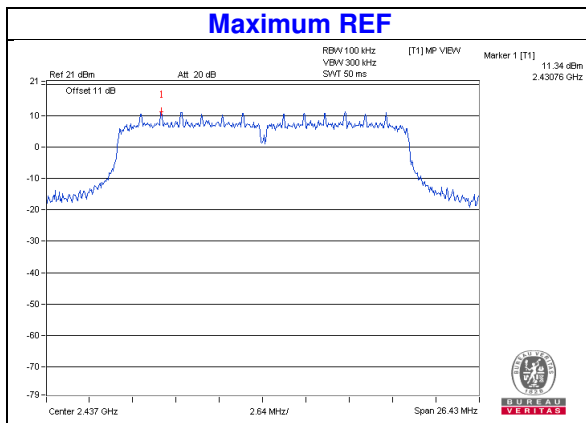
Chain 1



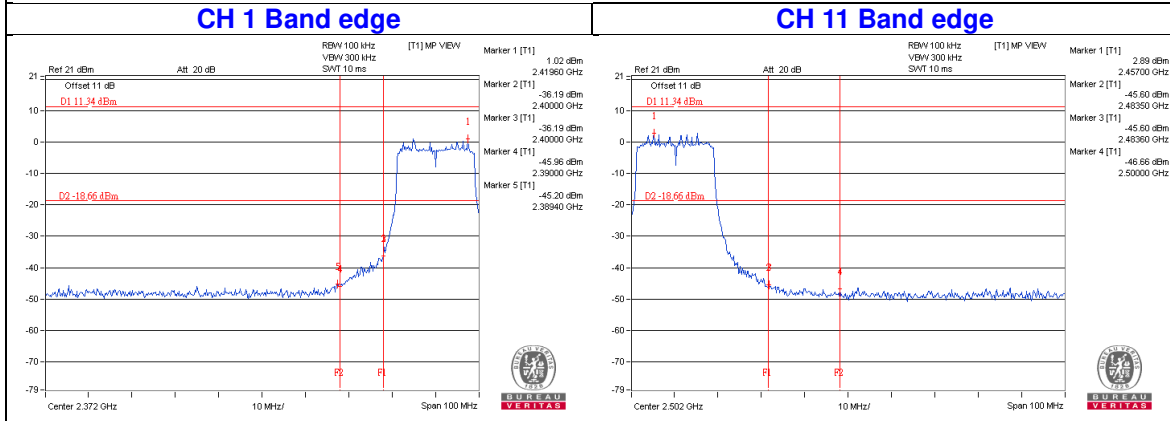
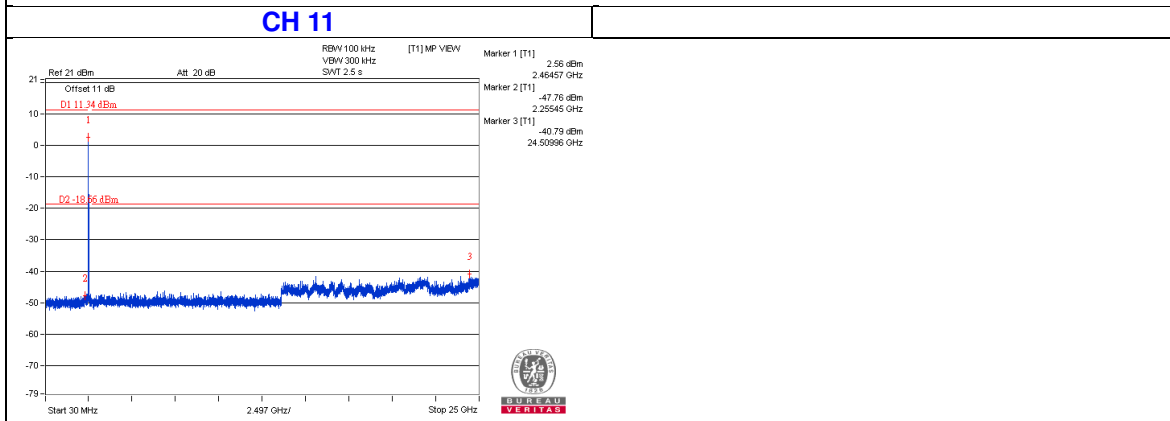
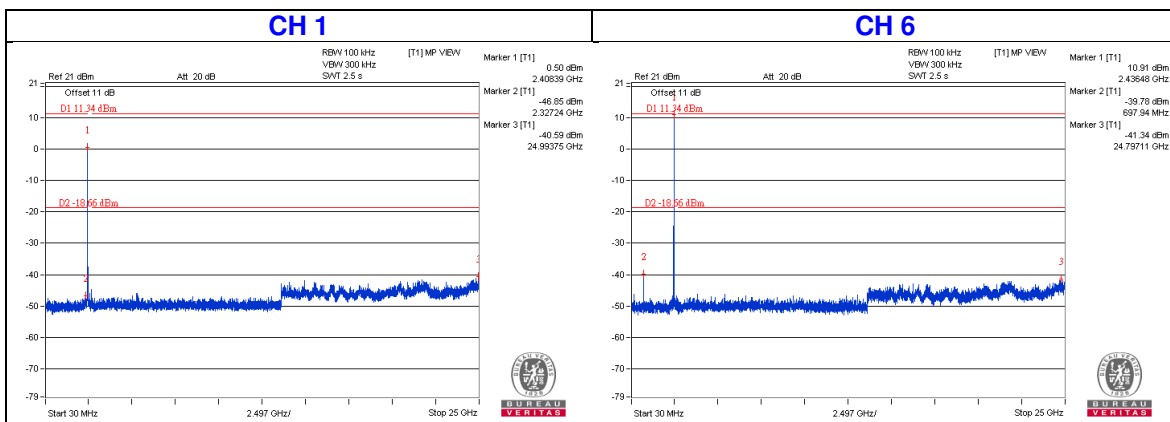
Chain 2



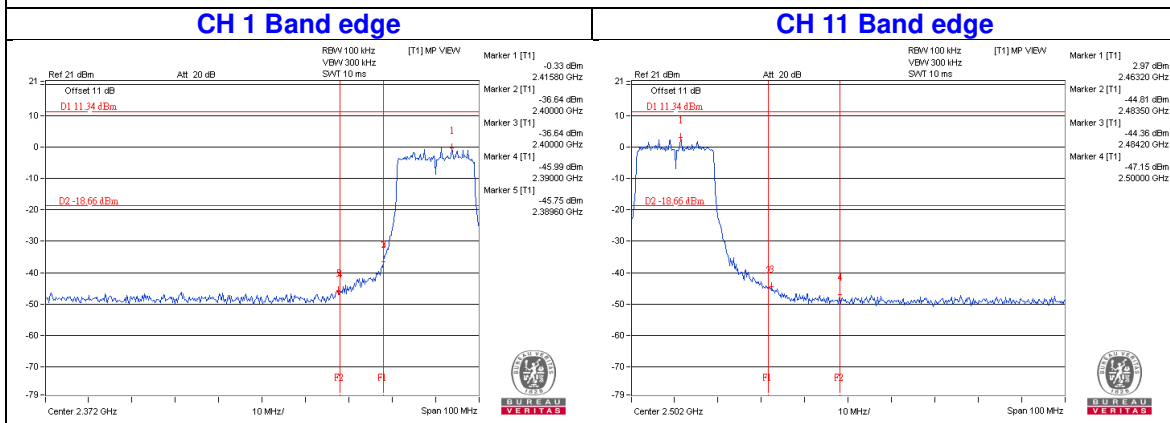
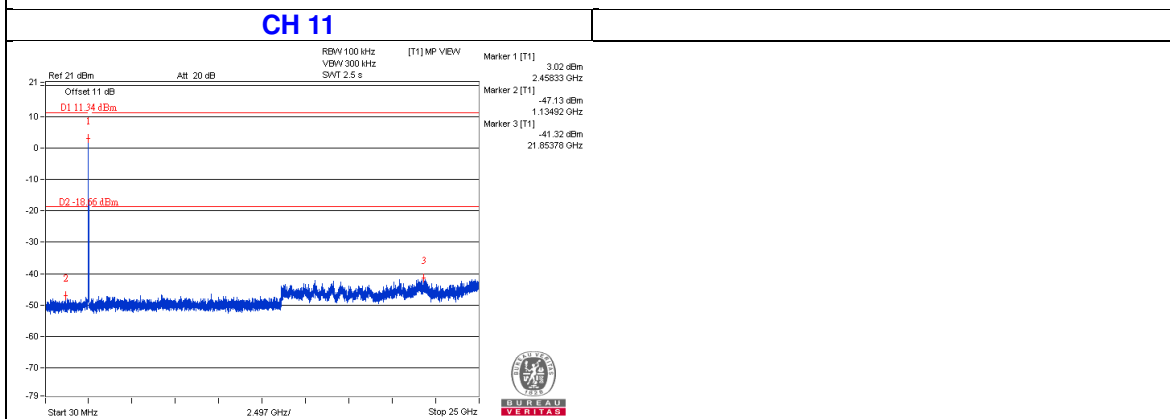
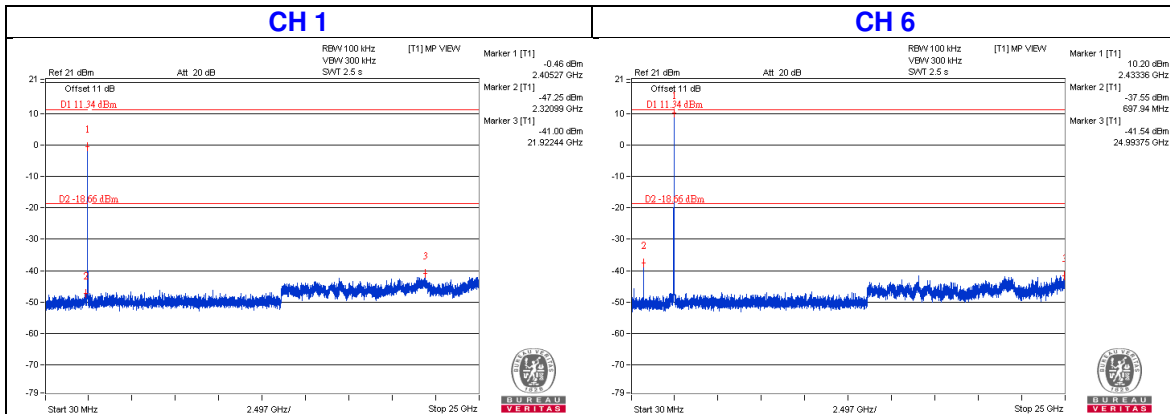
802.11n (HT20)



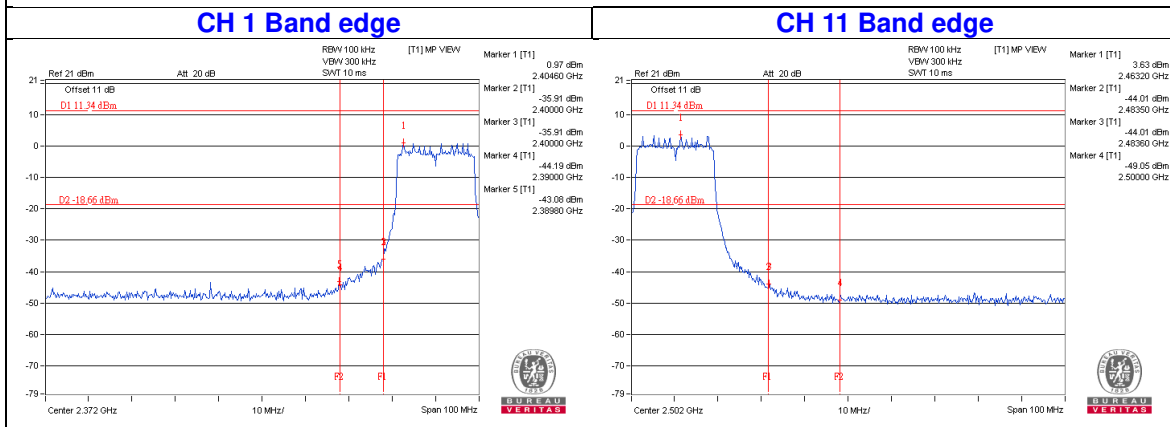
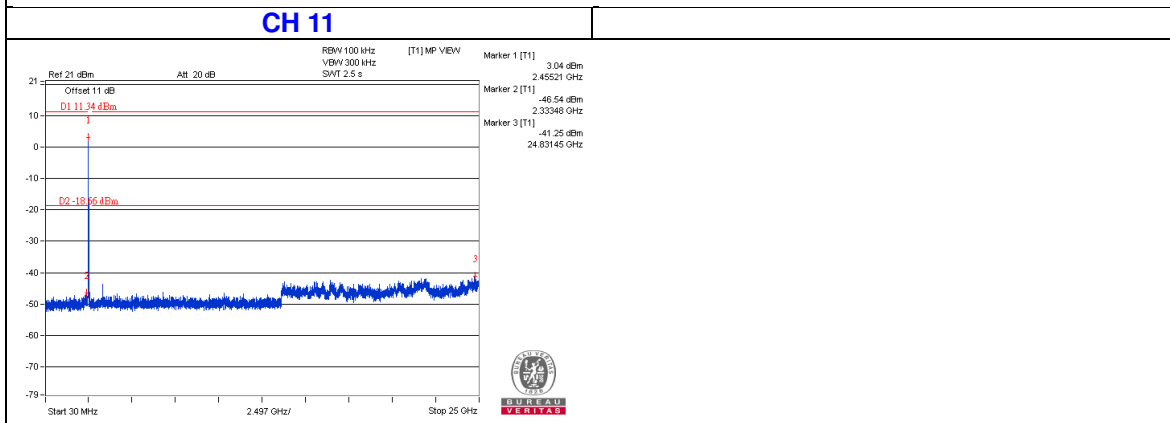
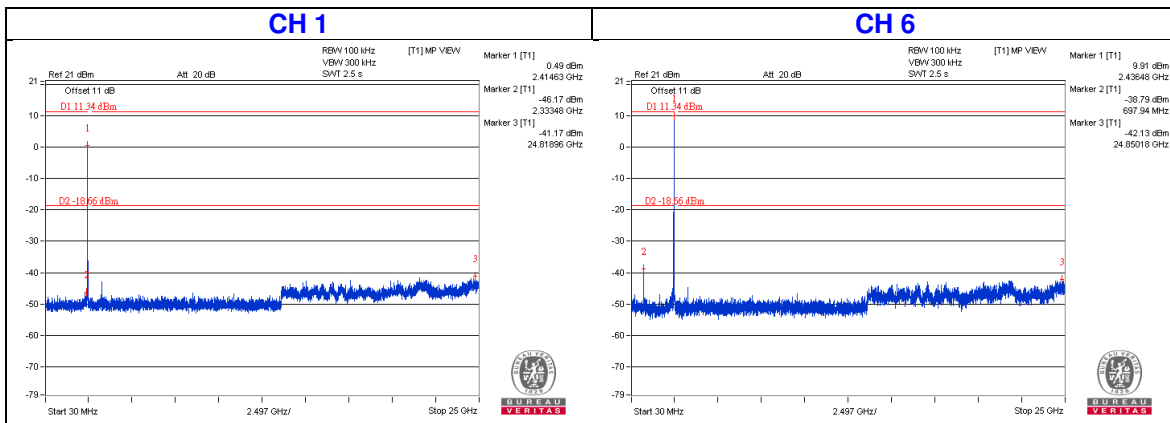
Chain 0



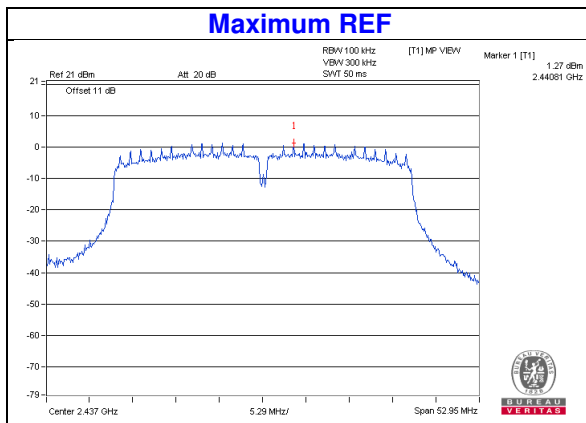
Chain 1



Chain 2

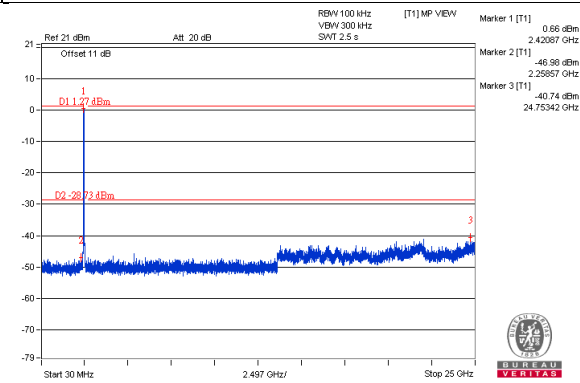
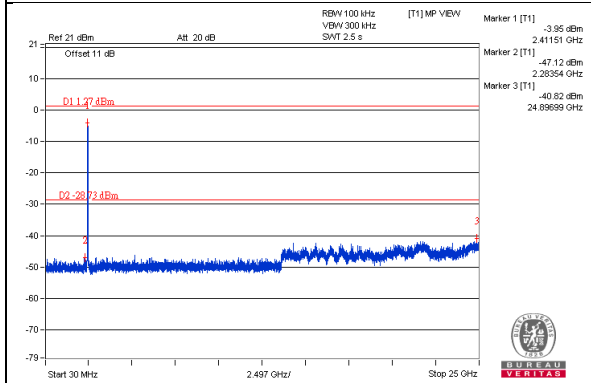


802.11n (HT40)

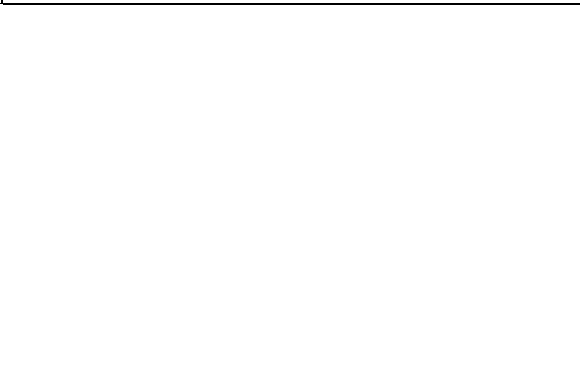
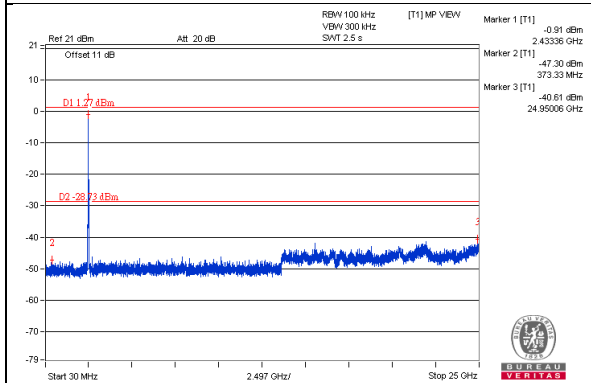


Chain 0

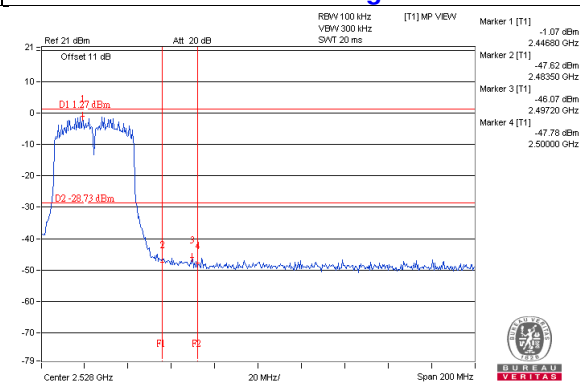
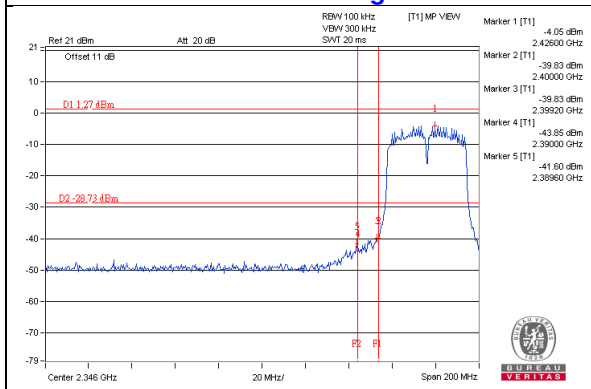
CH 3 CH 6



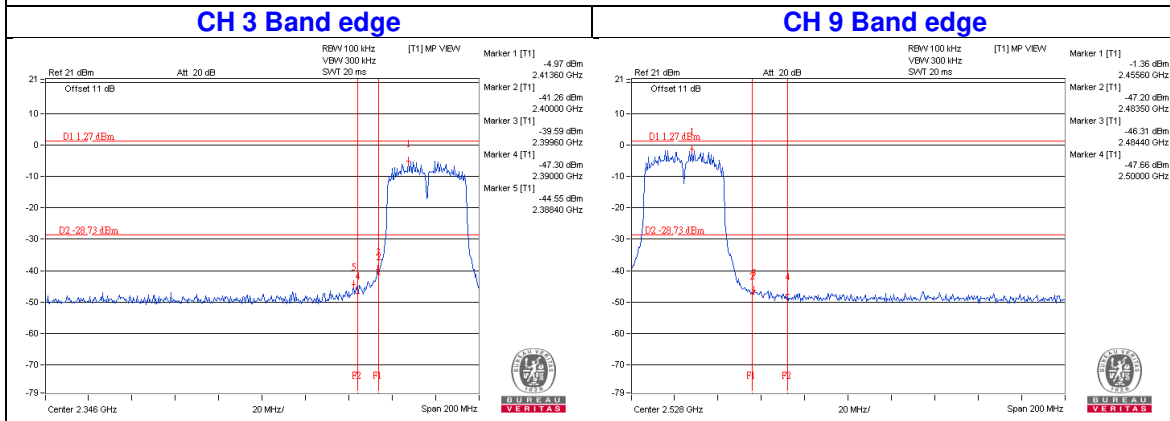
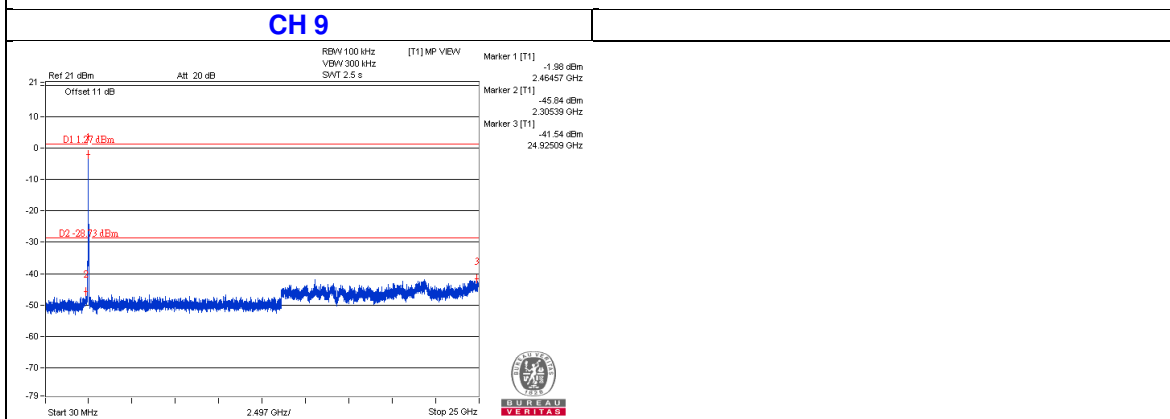
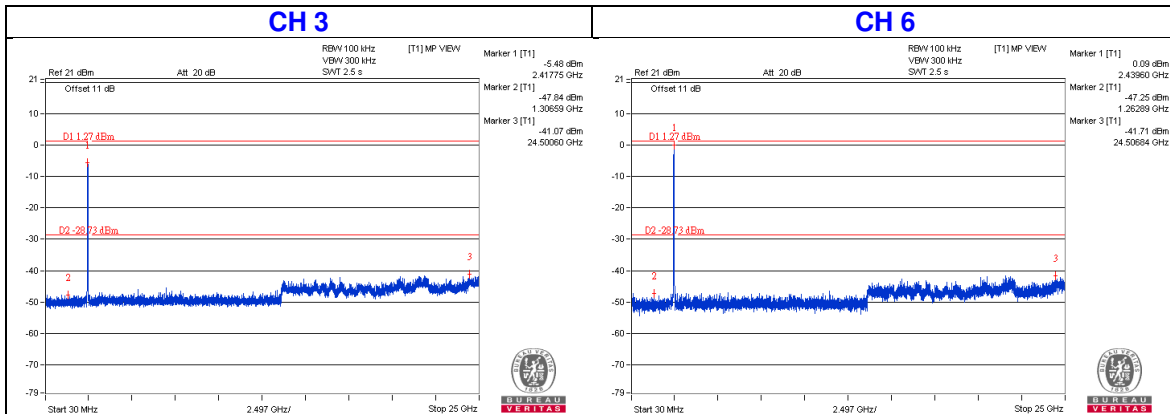
CH 9



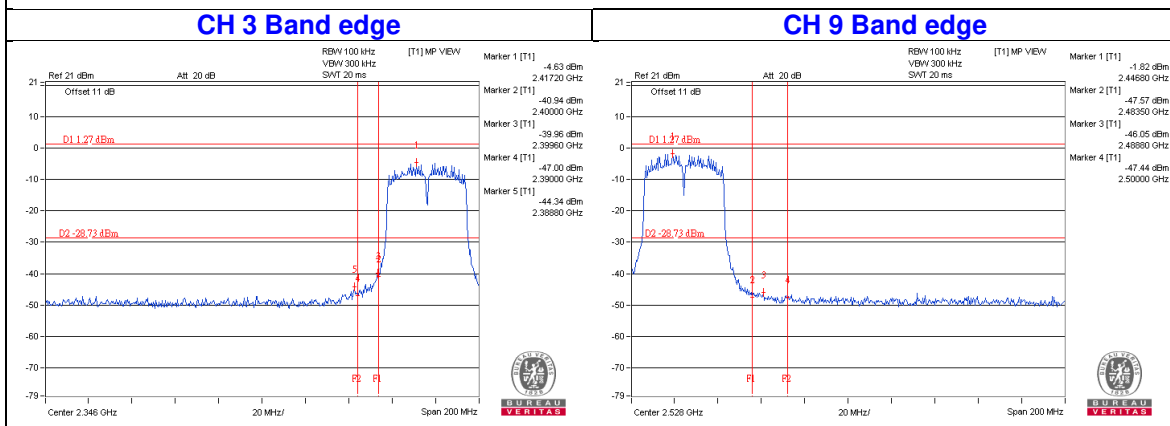
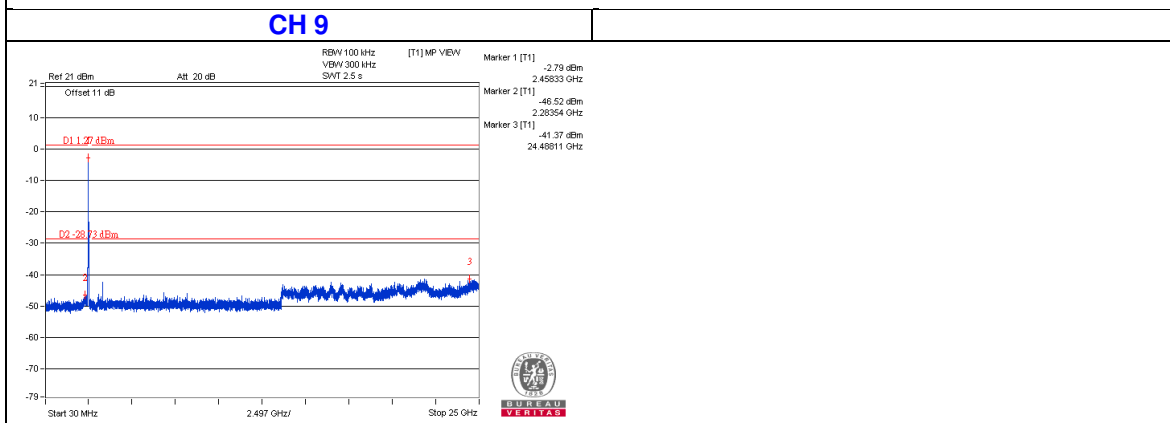
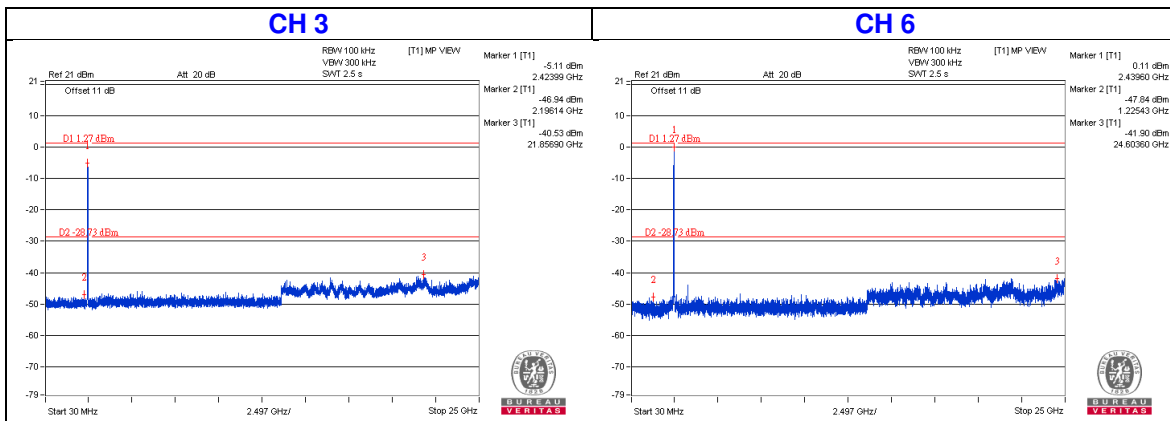
CH 3 Band edge



Chain 1



Chain 2



5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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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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