

FCC Test Report

Report No.: RF170508D01

FCC ID: 2ALJ3AP27X

Test Model: AP271

Received Date: May 8, 2017

Test Date: May 9 ~ Sep. 20, 2017

Issued Date: Nov. 16, 2017

Applicant: HAN Networks Co., Ltd.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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**FCC Registration /
Designation Number:** 198487 / TW2021



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Release Control Record

Issue No.	Description	Date Issued
RF170508D01	Original release.	Nov. 16, 2017

1 Certificate of Conformity

Product: HAN Access Point

Brand: HAN

Test Model: AP271

Sample Status: Engineering sample

Applicant: HAN Networks Co., Ltd.

Test Date: May 9 ~ Sep. 20, 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 : Annie Chang , **Date:** Nov. 16, 2017
Annie Chang / Senior Specialist

Approved by : Rex Lai , **Date:** Nov. 16, 2017
Rex Lai / Assistant 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 -9.28dB at 0.52882MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.98dB at 2390.00 MHz.
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 MMCX 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) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.77 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.38 dB
	30MHz ~ 1000MHz	5.54 dB
Radiated Emissions above 1 GHz	Above 1GHz	5.48 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	HAN Access Point
Brand	HAN
Test Model	AP271
Status of EUT	Engineering sample
Power Supply Rating	48Vdc from PoE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in VHT20/40 mode
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 400Mbps
Operating Frequency	2.412 ~ 2.462GHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (20MHz), VHT20 7 for 802.11n (40MHz), VHT40
Output Power	560.486mW
Antenna Type	Refer to note as below
Antenna Connector	Refer to note as below
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

- The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

Modulation Mode	TX Function
802.11b	2TX
802.11g	2TX
802.11n (20MHz)	2TX
802.11n (40MHz)	2TX
VHT20	2TX
VHT40	2TX

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

Chain No.	Antenna Type	Antenna Gain (dBi)	Connector Type
Chain 0	Omni	8.15	MMCX
Chain 1	Omni	8.46	

3. The directional gain table:

Max. Gain (dBi)
11.32
Note:
(i) If transmit signals are <i>correlated</i>, then $\text{Directional gain} = 10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{\text{ANT}}] \text{ dBi}$ [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

4. 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 (20MHz), VHT20:

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

7 channels are provided for 802.11n (40MHz), VHT40:

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

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where **RE≥1G**: Radiated Emission above 1GHz & Bandedge Measurement
RE<1G: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission
APCM: Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**

Radiated Emission Test (Above 1GHz):

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

CDD Mode						
EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
Beamforming_NSS1 Mode						
EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
Additional test						
EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11g	1 to 11	2, 10	OFDM	BPSK	6
-	802.11n (20MHz)	1 to 11	2, 10	OFDM	BPSK	6.5

Radiated Emission Test (Below 1GHz):

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

CDD Mode						
EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11g	1 to 11	11	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.

CDD Mode						
EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11g	1 to 11	11	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.

CDD Mode						
EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
Beamforming_NSS1 Mode (Output Power Only)						
EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
Additional test						
EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11g	1 to 11	2, 10	OFDM	BPSK	6
-	802.11n (20MHz)	1 to 11	2, 10	OFDM	BPSK	6.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	20deg. C, 67%RH	120Vac, 60Hz	Ian Chang
RE<1G	24deg. C, 68%RH	120Vac, 60Hz	Ian Chang
PLC	26deg. C, 77%RH	120Vac, 60Hz	Ian Chang
APCM	25deg. C, 76%RH	120Vac, 60Hz	Saxon Lee

3.3 Duty Cycle of Test Signal

If duty cycle of test signal is > 98%, duty factor is not required.

If duty cycle of test signal is < 98%, duty factor shall be considered.

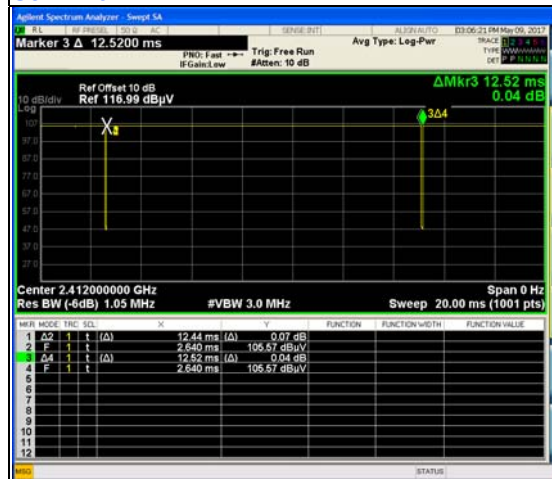
802.11b: Duty cycle = Duty cycle of test signal is 99.4 %.

802.11g: Duty cycle = $2.055/2.155 = 0.954$, Duty factor = $10 * \log(1/0.954) = 0.20$

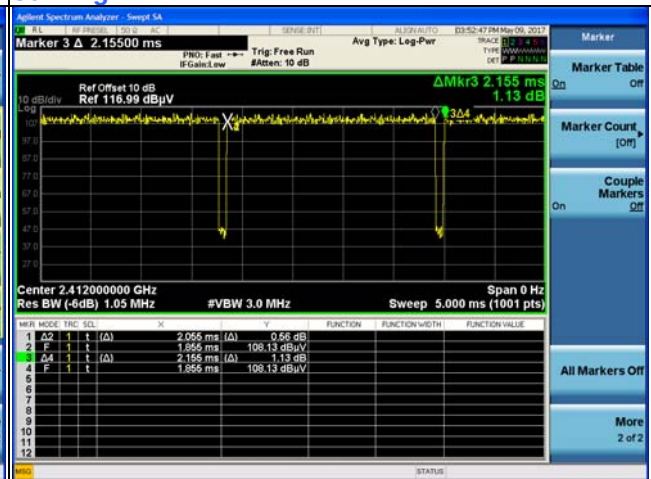
802.11n (20MHz): Duty cycle of test signal is 98.2 %.

802.11n (40MHz): Duty cycle = $2.40/2.52 = 0.952$, Duty factor = $10 * \log(1/0.952) = 0.21$

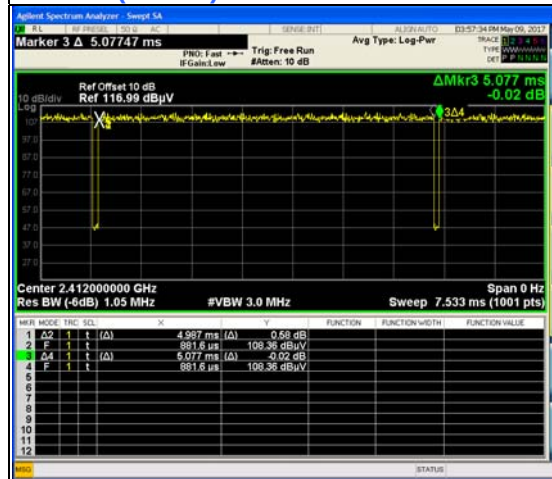
802.11b



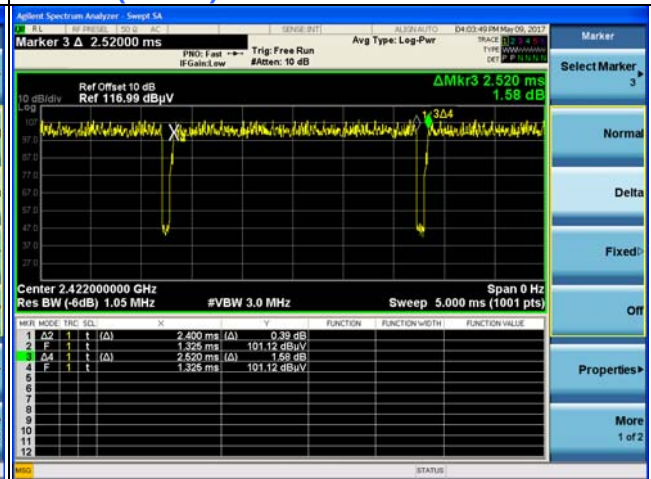
802.11g



802.11n (20MHz)



802.11n (40MHz)



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.	Notebook PC	DELL	E6530	9331GV1	FCC DoC Approved	Provided by Lab
B.	PoE Adapter	Microsemi	PD-3501G/AC	N/A	N/A	Supplied by client
C.	Load	N/A	N/A	N/A	N/A	Provided by Lab

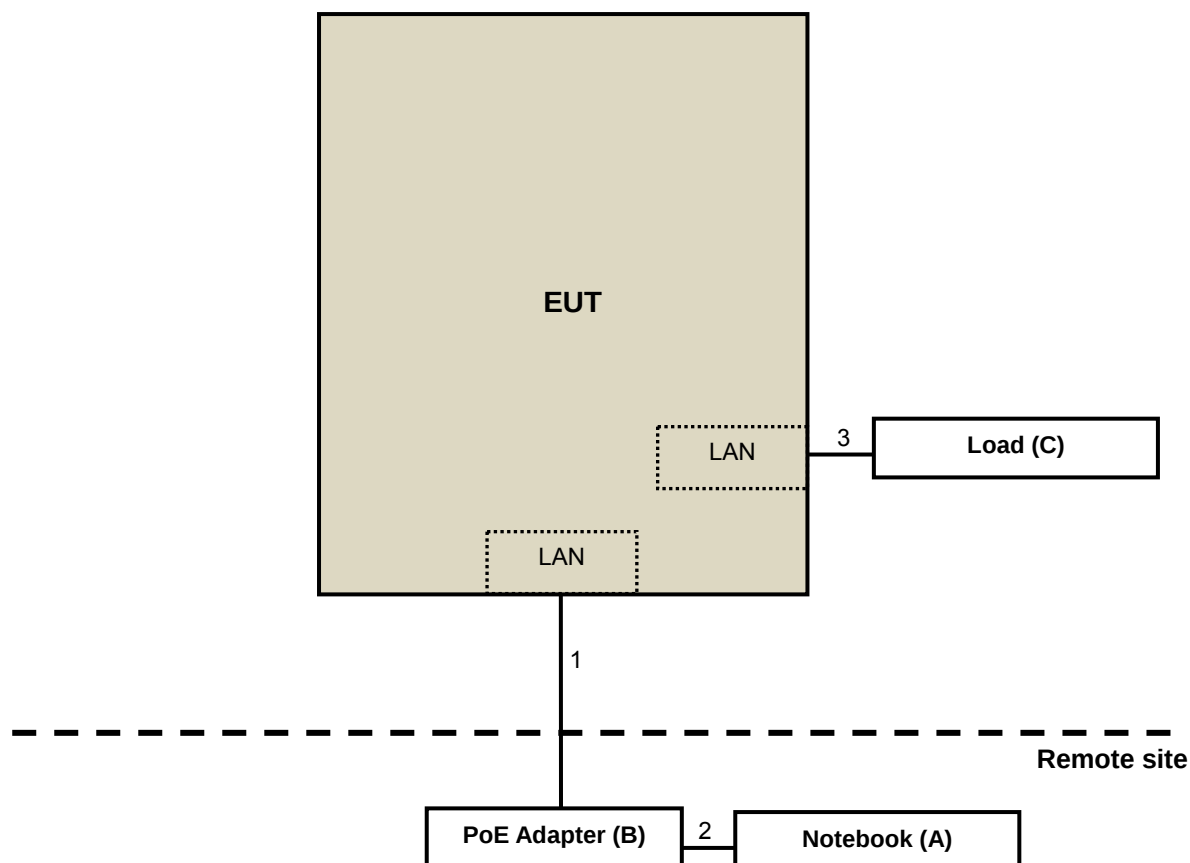
Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items A~B acted as communication partners to transfer data.
3. The rating of support unit B was as follows:
AC I/P: 100-240V, 50/60Hz, 0.43A
DC O/P: 48V, 0.35A

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	1.2	N	0	Provided by Lab
2.	LAN cable	1	10	N	0	Provided by Lab
3.	LAN cable	1	1.8	N	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 DTS Meas Guidance v04
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 21, 2017	Feb. 20, 2018
HP Preamplifier	8449B	3008A01201	Feb. 22, 2017	Feb. 21, 2018
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 21, 2017	Feb. 20, 2018
Agilent TEST RECEIVER	N9038A	MY51210129	Feb. 08, 2017	Feb. 07, 2018
Schwarzbeck Antenna	VULB 9168	139	Dec. 13, 2016	Dec. 12, 2017
Schwarzbeck Horn Antenna	BBHA-9170	212	Dec. 30, 2016	Dec. 29, 2017
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Dec. 27, 2016	Dec. 26, 2017
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.5	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF104	CABLE-CH6	Aug. 15, 2016	Aug. 14, 2017
			Aug. 14, 2017	Aug. 13, 2018
SUHNER RF cable With 3dB PAD	SF102	Cable-CH8-3.6m	Aug. 15, 2016	Aug. 14, 2017
			Aug. 14, 2017	Aug. 13, 2018
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	May 25, 2016	May 24, 2017
			May 31, 2017	May 30, 2018
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 26, 2016	Jul. 25, 2017
			Jul. 26, 2017	Jul. 25, 2018
Loop Antenna TESEQ	HLA 6121	45745	May 20, 2016	May 19, 2017
			May 19, 2017	May 18, 2018
EMCO Horn Antenna	3115	00028257	Dec. 15, 2016	Dec. 14, 2017
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 30, 2016	Sep. 29, 2017
Anritsu Power Sensor	MA2411B	0738404	Apr. 24, 2017	Apr. 23, 2018
Anritsu Power Meter	ML2495A	0842014	Apr. 24, 2017	Apr. 23, 2018

- NOTE:** 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.
4. The Industry Canada Reference No. IC 7450E-6.
5. The FCC Site Registration No. is 447212.

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:

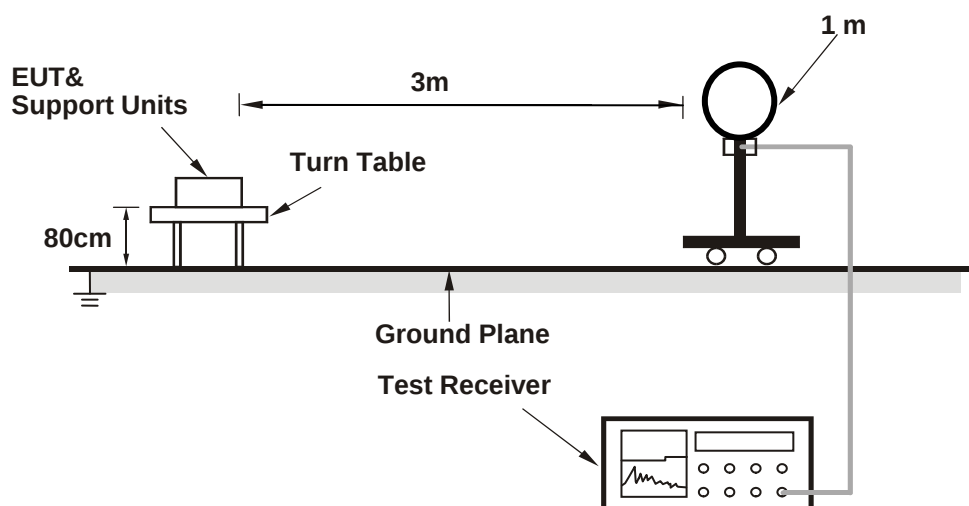
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

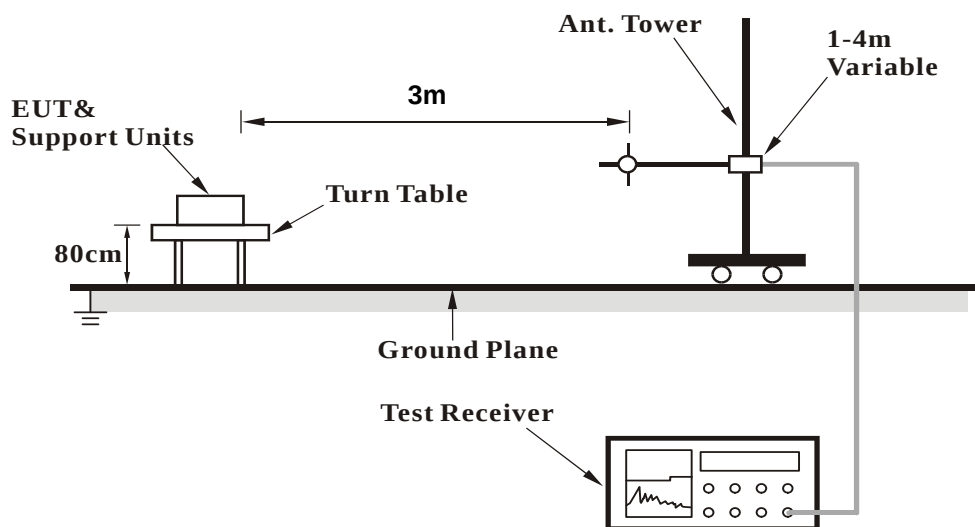
No deviation.

4.1.5 Test Setup

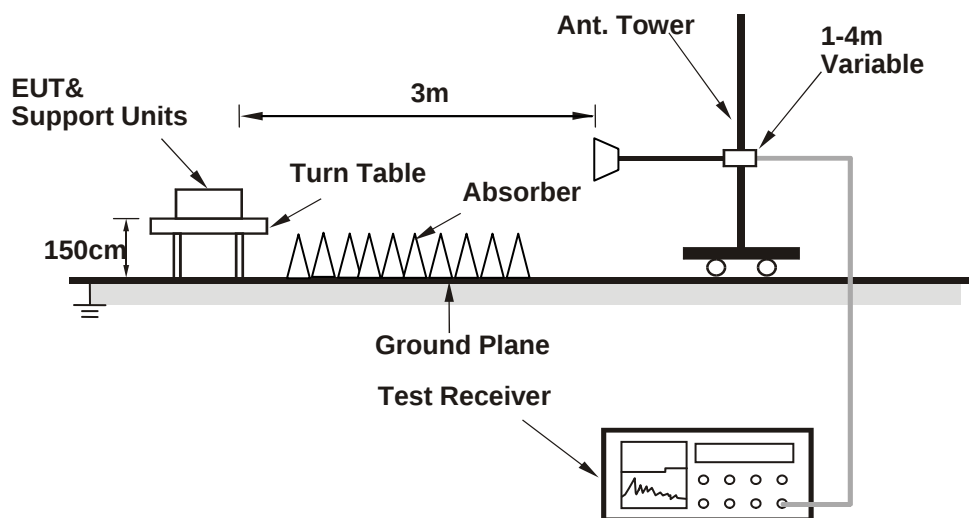
For Radiated emission below 30MHz



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

Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

ABOVE 1GHz DATA

CDD Mode

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	2390.00	61.70 PK	74.00	-12.30	2.05 H	290	62.29	-0.59
2	2390.00	53.02 AV	54.00	-0.98	2.05 H	290	53.61	-0.59
3	*2412.00	114.75 PK			2.05 H	290	115.20	-0.45
4	*2412.00	111.05 AV			2.05 H	290	111.50	-0.45
5	4824.00	46.29 PK	74.00	-27.71	1.46 H	123	39.37	6.92
6	4824.00	32.05 AV	54.00	-21.95	1.46 H	123	25.13	6.92
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	55.97 PK	74.00	-18.03	1.63 V	269	56.56	-0.59
2	2390.00	43.19 AV	54.00	-10.81	1.63 V	269	43.78	-0.59
3	*2412.00	113.18 PK			1.63 V	269	113.63	-0.45
4	*2412.00	109.49 AV			1.63 V	269	109.94	-0.45
5	4824.00	45.94 PK	74.00	-28.06	1.62 V	205	39.02	6.92
6	4824.00	31.78 AV	54.00	-22.22	1.62 V	205	24.86	6.92

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	*2437.00	115.19 PK			1.84 H	284	115.48	-0.29
2	*2437.00	111.43 AV			1.84 H	284	111.72	-0.29
3	4874.00	47.37 PK	74.00	-26.63	1.69 H	215	40.36	7.01
4	4874.00	33.52 AV	54.00	-20.48	1.69 H	215	26.51	7.01
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	113.25 PK			1.69 V	260	113.54	-0.29
2	*2437.00	109.57 AV			1.69 V	260	109.86	-0.29
3	4874.00	46.27 PK	74.00	-27.73	1.84 V	145	39.26	7.01
4	4874.00	32.32 AV	54.00	-21.68	1.84 V	145	25.31	7.01

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	115.38 PK			2.06 H	286	115.52	-0.14
2	*2462.00	111.34 AV			2.06 H	286	111.48	-0.14
3	2483.50	63.95 PK	74.00	-10.05	2.06 H	286	63.95	0.00
4	2483.50	52.81 AV	54.00	-1.19	2.06 H	286	52.81	0.00
5	4924.00	47.29 PK	74.00	-26.71	1.52 H	208	40.16	7.13
6	4924.00	33.45 AV	54.00	-20.55	1.52 H	208	26.32	7.13
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	113.12 PK			1.69 V	271	113.26	-0.14
2	*2462.00	109.51 AV			1.69 V	271	109.65	-0.14
3	2483.50	53.63 PK	74.00	-20.37	1.69 V	271	53.63	0.00
4	2483.50	48.96 AV	54.00	-5.04	1.69 V	271	48.96	0.00
5	4924.00	46.76 PK	74.00	-27.24	1.57 V	184	39.63	7.13
6	4924.00	32.56 AV	54.00	-21.44	1.57 V	184	25.43	7.13

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	71.15 PK	74.00	-2.85	2.07 H	286	71.74	-0.59
2	2390.00	52.90 AV	54.00	-1.10	2.07 H	286	53.49	-0.59
3	*2412.00	116.03 PK			2.07 H	286	116.48	-0.45
4	*2412.00	105.39 AV			2.07 H	286	105.84	-0.45
5	4824.00	47.43 PK	74.00	-26.57	1.82 H	236	40.51	6.92
6	4824.00	32.55 AV	54.00	-21.45	1.82 H	236	25.63	6.92
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	65.72 PK	74.00	-8.28	1.83 V	263	66.31	-0.59
2	2390.00	47.89 AV	54.00	-6.11	1.83 V	263	48.48	-0.59
3	*2412.00	113.95 PK			1.83 V	263	114.40	-0.45
4	*2412.00	103.14 AV			1.83 V	263	103.59	-0.45
5	4824.00	46.26 PK	74.00	-27.74	1.26 V	236	39.34	6.92
6	4824.00	31.61 AV	54.00	-22.39	1.26 V	236	24.69	6.92

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	*2437.00	121.21 PK			2.01 H	87	123.22	-2.01
2	*2437.00	109.81 AV			2.01 H	87	111.82	-2.01
3	4874.00	44.92 PK	74.00	-29.08	1.67 H	205	40.67	4.25
4	4874.00	30.89 AV	54.00	-23.11	1.67 H	205	26.64	4.25
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	119.33 PK			2.16 V	92	121.34	-2.01
2	*2437.00	107.64 AV			2.16 V	92	109.65	-2.01
3	4874.00	43.61 PK	74.00	-30.39	1.85 V	237	39.36	4.25
4	4874.00	29.92 AV	54.00	-24.08	1.85 V	237	25.67	4.25

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	117.14 PK			2.01 H	289	117.28	-0.14
2	*2462.00	106.41 AV			2.01 H	289	106.55	-0.14
3	2483.50	72.91 PK	74.00	-1.09	2.01 H	289	72.91	0.00
4	2483.50	52.36 AV	54.00	-1.64	2.01 H	289	52.36	0.00
5	4924.00	47.29 PK	74.00	-26.71	1.81 H	241	40.16	7.13
6	4924.00	32.49 AV	54.00	-21.51	1.81 H	241	25.36	7.13
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	115.32 PK			1.69 V	277	115.46	-0.14
2	*2462.00	104.70 AV			1.69 V	277	104.84	-0.14
3	2483.50	68.96 PK	74.00	-5.04	1.69 V	277	68.96	0.00
4	2483.50	48.96 AV	54.00	-5.04	1.69 V	277	48.96	0.00
5	4924.00	46.77 PK	74.00	-27.23	1.63 V	144	39.64	7.13
6	4924.00	32.01 AV	54.00	-21.99	1.63 V	144	24.88	7.13

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 (20MHz)

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	70.25 PK	74.00	-3.75	2.05 H	281	70.84	-0.59
2	2390.00	53.02 AV	54.00	-0.98	2.05 H	281	53.61	-0.59
3	*2412.00	116.74 PK			2.05 H	281	117.19	-0.45
4	*2412.00	104.27 AV			2.05 H	281	104.72	-0.45
5	4804.00	47.52 PK	74.00	-26.48	1.64 H	251	40.64	6.88
6	4804.00	33.73 AV	54.00	-20.27	1.64 H	251	26.85	6.88
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	69.08 PK	74.00	-4.92	1.82 V	263	69.67	-0.59
2	2390.00	51.63 AV	54.00	-2.37	1.82 V	263	52.22	-0.59
3	*2412.00	114.06 PK			1.82 V	263	114.51	-0.45
4	*2412.00	102.07 AV			1.82 V	263	102.52	-0.45
5	4824.00	46.27 PK	74.00	-27.73	1.52 V	134	39.35	6.92
6	4824.00	32.13 AV	54.00	-21.87	1.52 V	134	25.21	6.92

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	*2437.00	121.31 PK			1.53 H	87	123.32	-2.01
2	*2437.00	108.30 AV			1.53 H	87	110.31	-2.01
3	4874.00	45.19 PK	74.00	-28.81	1.84 H	205	40.94	4.25
4	4874.00	31.10 AV	54.00	-22.90	1.84 H	205	26.85	4.25
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	119.27 PK			1.92 V	97	121.28	-2.01
2	*2437.00	106.66 AV			1.92 V	97	108.67	-2.01
3	4874.00	43.54 PK	74.00	-30.46	1.67 V	228	39.29	4.25
4	4874.00	29.43 AV	54.00	-24.57	1.67 V	228	25.18	4.25

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	117.12 PK			2.15 H	280	117.26	-0.14
2	*2462.00	104.93 AV			2.15 H	280	105.07	-0.14
3	2483.50	70.81 PK	74.00	-3.19	2.15 H	280	70.81	0.00
4	2483.50	52.79 AV	54.00	-1.21	2.15 H	280	52.79	0.00
5	4924.00	47.70 PK	74.00	-26.30	2.15 H	280	40.57	7.13
6	4924.00	33.97 AV	54.00	-20.03	2.15 H	280	26.84	7.13
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	115.20 PK			1.78 V	265	115.34	-0.14
2	*2462.00	103.55 AV			1.78 V	265	103.69	-0.14
3	2483.50	68.64 PK	74.00	-5.36	1.78 V	265	68.64	0.00
4	2483.50	50.25 AV	54.00	-3.75	1.78 V	265	50.25	0.00
5	4924.00	46.77 PK	74.00	-27.23	1.88 V	206	39.64	7.13
6	4924.00	32.21 AV	54.00	-21.79	1.88 V	206	25.08	7.13

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 (40MHz)

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	67.21 PK	74.00	-6.79	1.90 H	282	67.80	-0.59
2	2390.00	52.70 AV	54.00	-1.30	1.90 H	282	53.29	-0.59
3	*2422.00	111.81 PK			1.90 H	282	112.20	-0.39
4	*2422.00	101.70 AV			1.90 H	282	102.09	-0.39
5	4844.00	47.78 PK	74.00	-26.22	1.18 H	298	40.82	6.96
6	4844.00	33.22 AV	54.00	-20.78	1.18 H	298	26.26	6.96
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	65.93 PK	74.00	-8.07	1.65 V	265	66.52	-0.59
2	2390.00	51.18 AV	54.00	-2.82	1.65 V	265	51.77	-0.59
3	*2422.00	109.05 PK			1.65 V	265	109.44	-0.39
4	*2422.00	99.11 AV			1.65 V	265	99.50	-0.39
5	4844.00	46.31 PK	74.00	-27.69	1.59 V	193	39.35	6.96
6	4844.00	32.61 AV	54.00	-21.39	1.59 V	193	25.65	6.96

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	67.36 PK	74.00	-6.64	2.04 H	88	69.67	-2.31
2	2390.00	48.23 AV	54.00	-5.77	2.04 H	88	50.54	-2.31
3	*2437.00	113.10 PK			2.04 H	88	115.11	-2.01
4	*2437.00	103.44 AV			2.04 H	88	105.45	-2.01
5	2483.50	69.85 PK	74.00	-4.15	2.04 H	88	71.56	-1.71
6	2483.50	52.77 AV	54.00	-1.23	2.04 H	88	54.48	-1.71
7	4874.00	44.27 PK	74.00	-29.73	1.27 H	236	40.02	4.25
8	4874.00	31.06 AV	54.00	-22.94	1.27 H	236	26.81	4.25
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.94 PK	74.00	-10.06	1.50 V	88	66.25	-2.31
2	2390.00	45.53 AV	54.00	-8.47	1.50 V	88	47.84	-2.31
3	*2437.00	111.23 PK			1.50 V	88	113.24	-2.01
4	*2437.00	100.68 AV			1.50 V	88	102.69	-2.01
5	2483.50	65.78 PK	74.00	-8.22	1.50 V	88	67.49	-1.71
6	2483.50	48.55 AV	54.00	-5.45	1.50 V	88	50.26	-1.71
7	4874.00	43.53 PK	74.00	-30.47	1.99 V	264	39.28	4.25
8	4874.00	29.59 AV	54.00	-24.41	1.99 V	264	25.34	4.25

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	113.80 PK			2.03 H	286	113.99	-0.19
2	*2452.00	103.82 AV			2.03 H	286	104.01	-0.19
3	2483.50	72.60 PK	74.00	-1.40	2.03 H	286	72.60	0.00
4	2483.50	52.44 AV	54.00	-1.56	2.03 H	286	52.44	0.00
5	4904.00	47.41 PK	74.00	-26.59	1.87 H	149	40.34	7.07
6	4904.00	33.45 AV	54.00	-20.55	1.87 H	149	26.38	7.07
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	110.44 PK			1.69 V	266	110.63	-0.19
2	*2452.00	100.39 AV			1.69 V	266	100.58	-0.19
3	2483.50	70.58 PK	74.00	-3.42	1.69 V	266	70.58	0.00
4	2483.50	50.16 AV	54.00	-3.84	1.69 V	266	50.16	0.00
5	4904.00	46.28 PK	74.00	-27.72	2.01 V	269	39.21	7.07
6	4904.00	32.91 AV	54.00	-21.09	2.01 V	269	25.84	7.07

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

Beamforming_NSS1 Mode

802.11n (20MHz)

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	69.10 PK	74.00	-4.90	2.13 H	4	71.00	-1.90
2	2390.00	52.98 AV	54.00	-1.02	2.13 H	4	54.88	-1.90
3	*2412.00	115.16 PK			2.13 H	4	116.92	-1.76
4	*2412.00	107.48 AV			2.13 H	4	109.24	-1.76
5	4824.00	45.49 PK	74.00	-28.51	2.16 H	154	40.32	5.17
6	4824.00	31.49 AV	54.00	-22.51	2.16 H	154	26.32	5.17
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	59.79 PK	74.00	-14.21	2.67 V	8	61.69	-1.90
2	2390.00	41.24 AV	54.00	-12.76	2.67 V	8	43.14	-1.90
3	*2412.00	110.57 PK			2.67 V	8	112.33	-1.76
4	*2412.00	101.28 AV			2.67 V	8	103.04	-1.76
5	4824.00	44.86 PK	74.00	-29.14	1.76 V	2	39.69	5.17
6	4824.00	31.01 AV	54.00	-22.99	1.76 V	2	25.84	5.17

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	*2437.00	117.29 PK			1.79 H	3	118.90	-1.61
2	*2437.00	108.35 AV			1.79 H	3	109.96	-1.61
3	4874.00	46.06 PK	74.00	-27.94	1.52 H	33	40.85	5.21
4	4874.00	32.03 AV	54.00	-21.97	1.52 H	33	26.82	5.21
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	113.24 PK			2.23 V	4	114.85	-1.61
2	*2437.00	103.65 AV			2.23 V	4	105.26	-1.61
3	4874.00	44.55 PK	74.00	-29.45	1.88 V	194	39.34	5.21
4	4874.00	31.02 AV	54.00	-22.98	1.88 V	194	25.81	5.21

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	117.27 PK			1.78 H	10	118.73	-1.46
2	*2462.00	107.26 AV			1.78 H	10	108.72	-1.46
3	2483.50	68.22 PK	74.00	-5.78	1.78 H	10	69.55	-1.33
4	2483.50	52.71 AV	54.00	-1.29	1.78 H	10	54.04	-1.33
5	4924.00	46.11 PK	74.00	-27.89	1.69 H	20	40.81	5.30
6	4924.00	31.38 AV	54.00	-22.62	1.69 H	20	26.08	5.30
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	113.19 PK			2.37 V	9	114.65	-1.46
2	*2462.00	103.42 AV			2.37 V	9	104.88	-1.46
3	2483.50	62.03 PK	74.00	-11.97	2.37 V	9	63.36	-1.33
4	2483.50	47.65 AV	54.00	-6.35	2.37 V	9	48.98	-1.33
5	4924.00	44.99 PK	74.00	-29.01	2.15 V	11	39.69	5.30
6	4924.00	30.64 AV	54.00	-23.36	2.15 V	11	25.34	5.30

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 (40MHz)

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	72.63 PK	74.00	-1.37	1.80 H	0	74.53	-1.90
2	2390.00	45.58 AV	54.00	-8.42	1.80 H	0	47.48	-1.90
3	*2422.00	114.98 PK			1.80 H	0	116.69	-1.71
4	*2422.00	107.94 AV			1.80 H	0	109.65	-1.71
5	4844.00	46.03 PK	74.00	-27.97	1.69 H	225	40.84	5.19
6	4844.00	31.57 AV	54.00	-22.43	1.69 H	225	26.38	5.19
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	61.77 PK	74.00	-12.23	1.70 V	345	63.67	-1.90
2	2390.00	41.94 AV	54.00	-12.06	1.70 V	345	43.84	-1.90
3	*2422.00	110.27 PK			1.70 V	345	111.98	-1.71
4	*2422.00	103.73 AV			1.70 V	345	105.44	-1.71
5	4844.00	44.83 PK	74.00	-29.17	2.14 V	157	39.64	5.19
6	4844.00	30.50 AV	54.00	-23.50	2.14 V	157	25.31	5.19

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	*2437.00	113.42 PK			2.09 H	0	115.03	-1.61
2	*2437.00	110.10 AV			2.09 H	0	111.71	-1.61
3	4874.00	45.78 PK	74.00	-28.22	1.99 H	228	40.57	5.21
4	4874.00	31.85 AV	54.00	-22.15	1.99 H	228	26.64	5.21
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	109.42 PK			1.62 V	13	111.03	-1.61
2	*2437.00	106.23 AV			1.62 V	13	107.84	-1.61
3	4874.00	44.44 PK	74.00	-29.56	2.06 V	141	39.23	5.21
4	4874.00	30.34 AV	54.00	-23.66	2.06 V	141	25.13	5.21

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	114.27 PK			1.77 H	13	115.78	-1.51
2	*2452.00	110.22 AV			1.77 H	13	111.73	-1.51
3	2483.50	72.52 PK	74.00	-1.48	1.77 H	13	73.85	-1.33
4	2483.50	47.50 AV	54.00	-6.50	1.77 H	13	48.83	-1.33
5	4904.00	45.58 PK	74.00	-28.42	1.55 H	21	40.34	5.24
6	4904.00	31.53 AV	54.00	-22.47	1.55 H	21	26.29	5.24
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	109.92 PK			1.64 V	3	111.43	-1.51
2	*2452.00	105.18 AV			1.64 V	3	106.69	-1.51
3	2483.50	68.63 PK	74.00	-5.37	1.64 V	3	69.96	-1.33
4	2483.50	42.83 AV	54.00	-11.17	1.64 V	3	44.16	-1.33
5	4904.00	44.60 PK	74.00	-29.40	1.98 V	17	39.36	5.24
6	4904.00	30.27 AV	54.00	-23.73	1.98 V	17	25.03	5.24

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 WORST-CASE DATA:

CDD Mode

802.11g

CHANNEL	TX Channel 11	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	35.09	32.02 QP	40.00	-7.98	1.64 H	0	42.64	-10.62
2	65.89	25.14 QP	40.00	-14.86	2.16 H	293	36.16	-11.02
3	107.41	24.44 QP	43.50	-19.06	2.54 H	129	37.29	-12.85
4	214.78	20.37 QP	43.50	-23.13	1.84 H	303	31.57	-11.20
5	421.01	23.93 QP	46.00	-22.07	1.36 H	317	28.79	-4.86
6	591.78	27.07 QP	46.00	-18.93	1.08 H	328	28.17	-1.10
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	30.45	37.81 QP	40.00	-2.19	1.06 V	180	48.76	-10.95
2	57.39	34.86 QP	40.00	-5.14	1.37 V	360	44.27	-9.41
3	98.77	35.64 QP	43.50	-7.86	1.55 V	240	49.49	-13.85
4	164.10	22.54 QP	43.50	-20.96	2.09 V	360	31.60	-9.06
5	212.60	21.50 QP	43.50	-22.00	2.57 V	161	32.74	-11.24
6	427.07	24.72 QP	46.00	-21.28	1.33 V	31	29.24	-4.52

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

Additional test
ABOVE 1GHz DATA
802.11g

CHANNEL	TX Channel 2	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	68.64 PK	74.00	-5.36	3.82 H	166	70.95	-2.31
2	2390.00	52.93 AV	54.00	-1.07	3.82 H	166	55.24	-2.31
3	*2417.00	115.99 PK			3.82 H	166	118.13	-2.14
4	*2417.00	105.12 AV			3.82 H	166	107.26	-2.14
5	4834.00	45.01 PK	74.00	-28.99	2.55 H	101	40.83	4.18
6	4834.00	31.06 AV	54.00	-22.94	2.55 H	101	26.88	4.18
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	64.97 PK	74.00	-9.03	1.51 V	224	67.28	-2.31
2	2390.00	46.60 AV	54.00	-7.40	1.51 V	224	48.91	-2.31
3	*2417.00	114.58 PK			1.51 V	224	116.72	-2.14
4	*2417.00	103.60 AV			1.51 V	224	105.74	-2.14
5	4834.00	43.36 PK	74.00	-30.64	3.66 V	81	39.18	4.18
6	4834.00	29.85 AV	54.00	-24.15	3.66 V	81	25.67	4.18

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 10	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	*2457.00	116.17 PK			3.89 H	159	118.04	-1.87
2	*2457.00	105.35 AV			3.89 H	159	107.22	-1.87
3	2483.50	70.61 PK	74.00	-3.39	3.89 H	159	72.32	-1.71
4	2483.50	52.83 AV	54.00	-1.17	3.89 H	159	54.54	-1.71
5	4914.00	45.08 PK	74.00	-28.92	2.71 H	92	40.79	4.29
6	4914.00	31.11 AV	54.00	-22.89	2.71 H	92	26.82	4.29
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	*2457.00	114.07 PK			1.47 V	208	115.94	-1.87
2	*2457.00	105.02 AV			1.47 V	208	106.89	-1.87
3	2483.50	68.07 PK	74.00	-5.93	1.47 V	208	69.78	-1.71
4	2483.50	47.82 AV	54.00	-6.18	1.47 V	208	49.53	-1.71
5	4914.00	43.51 PK	74.00	-30.49	3.57 V	88	39.22	4.29
6	4914.00	29.90 AV	54.00	-24.10	3.57 V	88	25.61	4.29

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 (20MHz)

CHANNEL	TX Channel 2	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	68.84 PK	74.00	-5.16	4.00 H	164	71.15	-2.31
2	2390.00	53.47 AV	54.00	-0.53	4.00 H	164	55.78	-2.31
3	*2417.00	117.13 PK			4.00 H	164	119.27	-2.14
4	*2417.00	105.06 AV			4.00 H	164	107.20	-2.14
5	4834.00	45.09 PK	74.00	-28.91	1.88 H	271	40.91	4.18
6	4834.00	31.00 AV	54.00	-23.00	1.88 H	271	26.82	4.18
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	67.72 PK	74.00	-6.28	1.44 V	221	70.03	-2.31
2	2390.00	52.30 AV	54.00	-1.70	1.44 V	221	54.61	-2.31
3	*2417.00	114.58 PK			1.44 V	221	116.72	-2.14
4	*2417.00	102.49 AV			1.44 V	221	104.63	-2.14
5	4834.00	43.85 PK	74.00	-30.15	3.58 V	92	39.67	4.18
6	4834.00	29.84 AV	54.00	-24.16	3.58 V	92	25.66	4.18

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 10	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	*2457.00	117.01 PK			4.00 H	164	118.88	-1.87
2	*2457.00	104.17 AV			4.00 H	164	106.04	-1.87
3	2483.50	71.62 PK	74.00	-2.38	4.00 H	164	73.33	-1.71
4	2483.50	52.98 AV	54.00	-1.02	4.00 H	164	54.69	-1.71
5	4914.00	44.96 PK	74.00	-29.04	2.77 H	115	40.67	4.29
6	4914.00	31.00 AV	54.00	-23.00	2.77 H	115	26.71	4.29
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	*2457.00	114.56 PK			1.69 V	201	116.43	-1.87
2	*2457.00	101.72 AV			1.69 V	201	103.59	-1.87
3	2483.50	69.41 PK	74.00	-4.59	1.69 V	201	71.12	-1.71
4	2483.50	50.57 AV	54.00	-3.43	1.69 V	201	52.28	-1.71
5	4914.00	43.97 PK	74.00	-30.03	3.67 V	72	39.68	4.29
6	4914.00	30.07 AV	54.00	-23.93	3.67 V	72	25.78	4.29

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.

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.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100276	Apr. 10, 2017	Apr. 9, 2018
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ENV216	101196	Apr. 20, 2017	Apr. 19, 2018
LISN With Adapter (for EUT)	AD10	C10Ada-002	Apr. 20, 2017	Apr. 19, 2018
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100218	Nov. 23, 2016	Nov. 22, 2017
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 9, 2017	May 8, 2018
Software	Cond_V7.3.7.4	NA	NA	NA
RF cable (JYEBAO) With 10dB PAD	5D-FB	Cable-C10.01	Feb. 14, 2017	Feb. 13, 2018
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-01-299	Jan. 18, 2017	Jan. 17, 2018
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 8, 2016	Nov. 7, 2017
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 8, 2016	Nov. 7, 2017

Notes: 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 Shielded Room No. 10.

3. The FCC Designation Number is TW2021.

4. Tested Date: May 16, 2017

4.2.3 Test Procedures

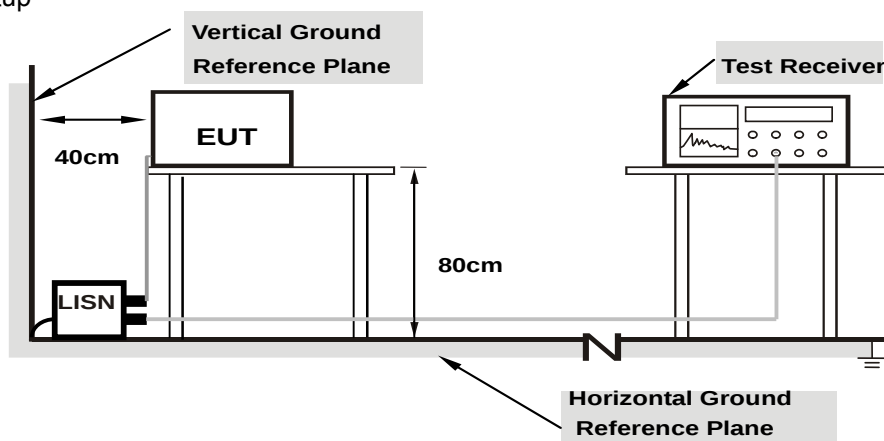
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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 item 4.1.6.

4.2.7 Test Results

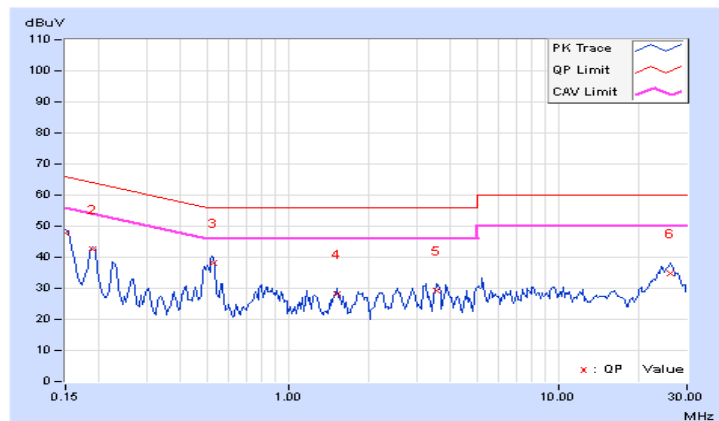
CDD Mode

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

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	0.15000	9.62	38.34	31.44	47.96	41.06	66.00	56.00	-18.04	-14.94
2	0.18906	9.62	32.94	25.99	42.56	35.61	64.08	54.08	-21.52	-18.47
3	0.52882	9.65	28.44	27.07	38.09	36.72	56.00	46.00	-17.91	-9.28
4	1.51563	9.71	18.33	13.36	28.04	23.07	56.00	46.00	-27.96	-22.93
5	3.53125	9.81	19.46	12.85	29.27	22.66	56.00	46.00	-26.73	-23.34
6	26.20703	10.10	24.88	19.04	34.98	29.14	60.00	50.00	-25.02	-20.86

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.

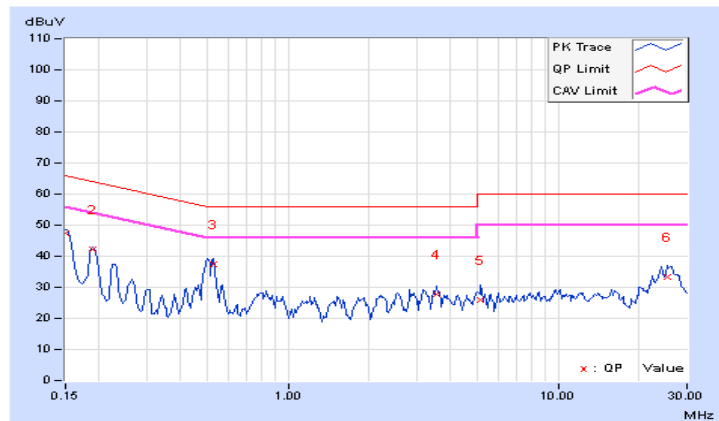


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	-----------------------------------

No	Freq. [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	0.15000	9.65	37.93	30.80	47.58	40.45	66.00	56.00	-18.42	-15.55
2	0.18906	9.64	32.62	25.53	42.26	35.17	64.08	54.08	-21.82	-18.91
3	0.52891	9.66	27.65	26.11	37.31	35.77	56.00	46.00	-18.69	-10.23
4	3.54688	9.82	17.88	11.11	27.70	20.93	56.00	46.00	-28.30	-25.07
5	5.15625	9.86	16.19	12.20	26.05	22.06	60.00	50.00	-33.95	-27.94
6	25.37109	10.31	23.08	17.17	33.39	27.48	60.00	50.00	-26.61	-22.52

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.

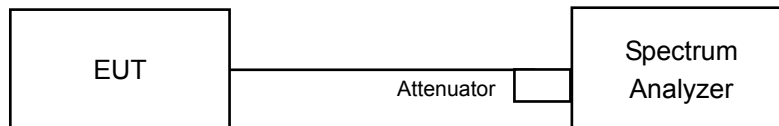


4.3 6dB Bandwidth Measurement

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

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

CDD Mode

802.11b

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

802.11g

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

802.11n (20MHz)

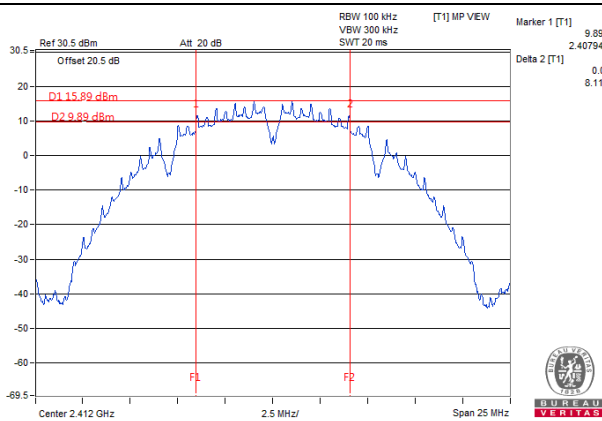
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.60	17.60	0.5	PASS
6	2437	17.61	17.23	0.5	PASS
11	2462	17.61	17.62	0.5	PASS

802.11n (40MHz)

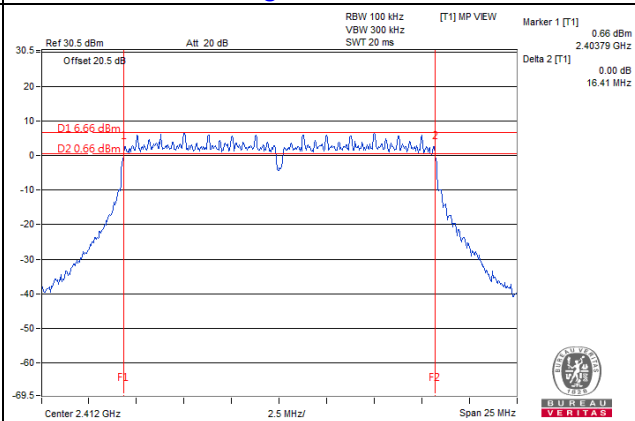
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.26	35.50	0.5	PASS
6	2437	35.24	35.20	0.5	PASS
9	2452	35.21	35.25	0.5	PASS

Spectrum Plot of Worst Value

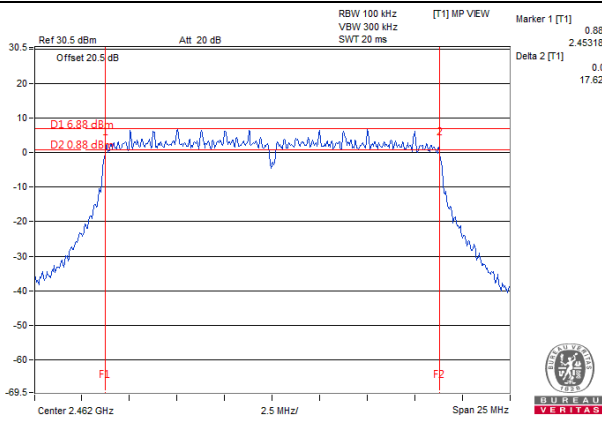
802.11b / Chain 0: CH1



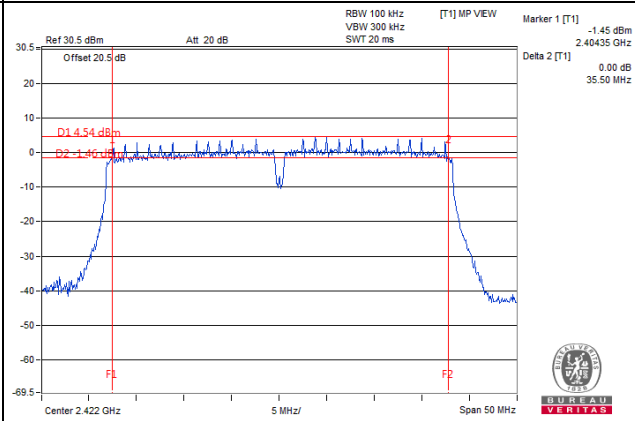
802.11g / Chain 0: CH1



802.11n (20MHz) / Chain 1: CH11



802.11n (40MHz) / 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,

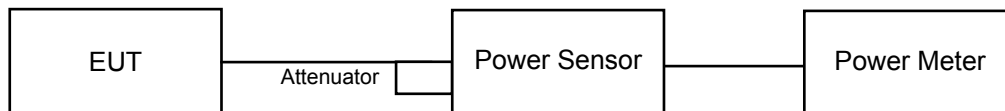
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

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

A 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

CDD Mode

802.11b

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	24.42	24.53	560.486	27.49	27.54	Pass
6	2437	24.48	24.40	555.966	27.45	27.54	Pass
11	2462	24.54	24.40	559.869	27.48	27.54	Pass

NOTE:

Antenna gain = 8.46dBi > 6dBi, so the Conducted Power limit shall be reduced to $30 - (8.46 - 6) = 27.54\text{dBm}$

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	18.56	18.68	145.569	21.63	27.54	Pass
2	2417	23.16	23.28	419.828	26.23	27.54	Pass
6	2437	24.13	24.32	529.217	27.24	27.54	Pass
10	2457	22.22	22.36	338.912	25.30	27.54	Pass
11	2462	18.24	18.15	131.994	21.21	27.54	Pass

NOTE:

Antenna gain = 8.46dBi > 6dBi, so the Conducted Power limit shall be reduced to $30 - (8.46 - 6) = 27.54\text{dBm}$

802.11n (20MHz)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	18.46	18.69	144.107	21.59	27.54	Pass
2	2417	24.13	24.31	528.595	27.23	27.54	Pass
6	2437	24.11	24.29	526.166	27.21	27.54	Pass
10	2457	22.67	22.78	374.598	25.74	27.54	Pass
11	2462	18.85	18.64	149.850	21.76	27.54	Pass

NOTE:

Antenna gain = 8.46dBi > 6dBi, so the Conducted Power limit shall be reduced to $30 - (8.46 - 6) = 27.54\text{dBm}$

802.11n (40MHz)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	18.57	18.99	151.195	21.80	27.54	Pass
6	2437	20.15	20.35	211.907	23.26	27.54	Pass
9	2452	18.47	18.56	142.086	21.53	27.54	Pass

NOTE:

Antenna gain = 8.46dBi > 6dBi, so the Conducted Power limit shall be reduced to $30 - (8.46 - 6) = 27.54$ dBm

Beamforming_NSS1 Mode

802.11n (20MHz)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	18.44	18.65	143.105	21.56	24.68	Pass
6	2437	19.35	19.53	175.842	22.45	24.68	Pass
11	2462	18.79	18.62	148.461	21.72	24.68	Pass

NOTE:

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / 2] = 11.32\text{dBi} > 6\text{dBi}$, so the Conducted Power limit shall be reduced to $30 - (11.32 - 6) = 24.68\text{dBm}$

802.11n (40MHz)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	18.48	18.87	147.559	21.69	24.68	Pass
6	2437	19.52	19.72	183.292	22.63	24.68	Pass
9	2452	18.47	18.49	140.939	21.49	24.68	Pass

NOTE:

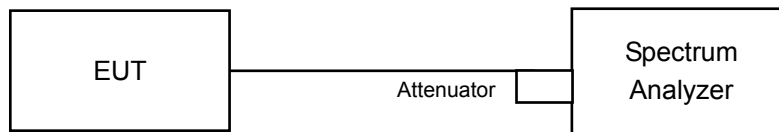
Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / 2] = 11.32\text{dBi} > 6\text{dBi}$, so the Conducted Power limit shall be reduced to $30 - (11.32 - 6) = 24.68\text{dBm}$

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

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 10 \text{ kHz}$.
- Set the VBW $\geq 3 \times \text{RBW}$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- 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

CDD Mode

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-2.14	3.01	0.87	2.68	Pass
	6	2437	-1.43	3.01	1.58	2.68	Pass
	11	2462	-2.10	3.01	0.91	2.68	Pass
1	1	2412	-1.42	3.01	1.59	2.68	Pass
	6	2437	-2.03	3.01	0.98	2.68	Pass
	11	2462	-1.35	3.01	1.66	2.68	Pass

NOTE:

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / 2] = 11.32\text{dBi} > 6\text{dBi}$, so the Power Spectral Density limit shall be reduced to $8 - (11.32 - 6) = 2.68\text{dBm}$.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-8.97	3.01	-5.96	2.68	Pass
	6	2437	-9.48	3.01	-6.47	2.68	Pass
	11	2462	-10.39	3.01	-7.38	2.68	Pass
1	1	2412	-9.19	3.01	-6.18	2.68	Pass
	6	2437	-8.52	3.01	-5.51	2.68	Pass
	11	2462	-9.77	3.01	-6.76	2.68	Pass

NOTE:

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / 2] = 11.32\text{dBi} > 6\text{dBi}$, so the Power Spectral Density limit shall be reduced to $8 - (11.32 - 6) = 2.68\text{dBm}$.

802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-9.12	3.01	-6.11	2.68	Pass
	6	2437	-9.24	3.01	-6.23	2.68	Pass
	11	2462	-9.23	3.01	-6.22	2.68	Pass
1	1	2412	-9.46	3.01	-6.45	2.68	Pass
	6	2437	-9.04	3.01	-6.03	2.68	Pass
	11	2462	-9.32	3.01	-6.31	2.68	Pass

NOTE:

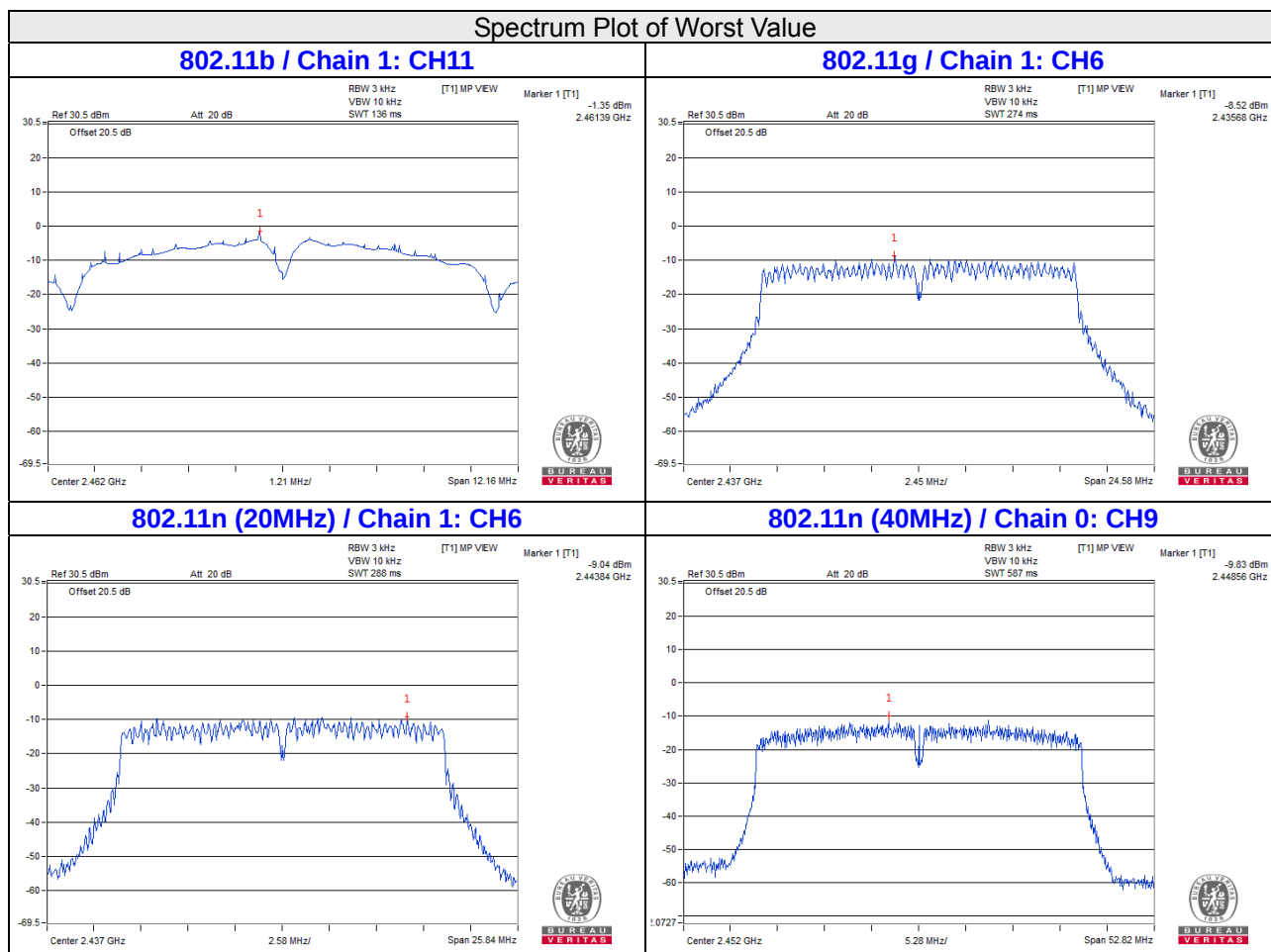
Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / 2] = 11.32\text{dBi} > 6\text{dBi}$, so the Power Spectral Density limit shall be reduced to $8 - (11.32 - 6) = 2.68\text{dBm}$.

802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	3	2422	-10.61	3.01	-7.60	2.68	Pass
	6	2437	-10.69	3.01	-7.68	2.68	Pass
	9	2452	-9.83	3.01	-6.82	2.68	Pass
1	3	2422	-11.34	3.01	-8.33	2.68	Pass
	6	2437	-11.52	3.01	-8.51	2.68	Pass
	9	2452	-11.29	3.01	-8.28	2.68	Pass

NOTE:

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / 2] = 11.32\text{dBi} > 6\text{dBi}$, so the Power Spectral Density limit shall be reduced to $8 - (11.32 - 6) = 2.68\text{dBm}$.

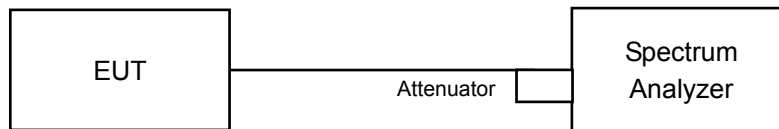


4.6 Conducted Out of Band Emission Measurement

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

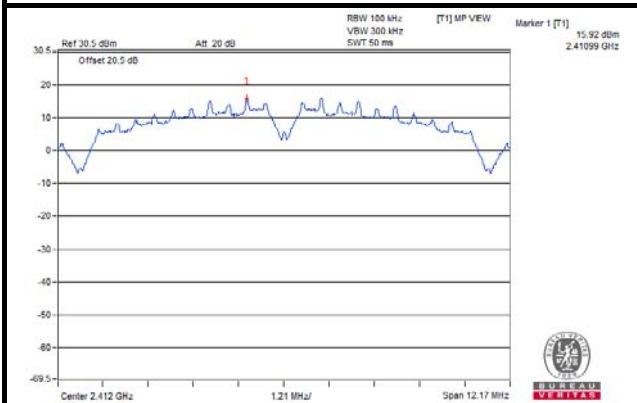
Same as Item 4.3.6

4.6.7 Test Results

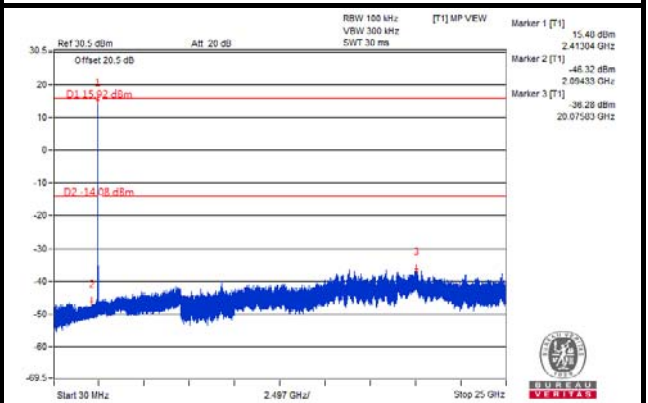
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

CDD Mode
802.11b: CHAIN 0

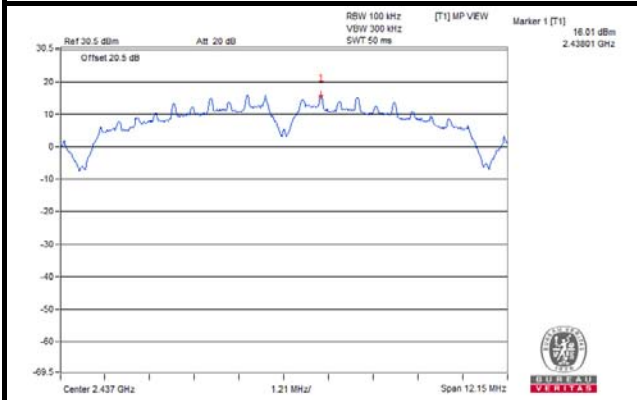
CH 1



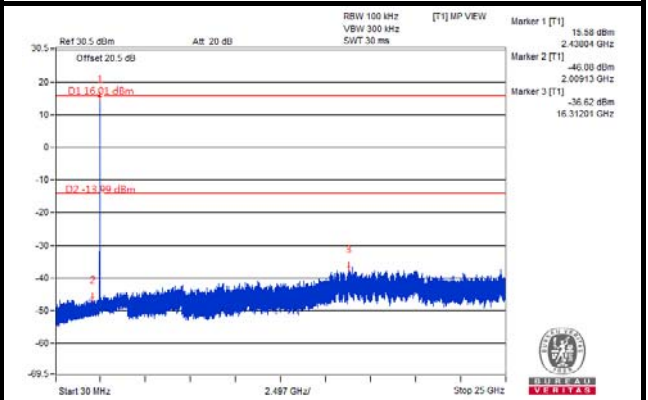
CH 1



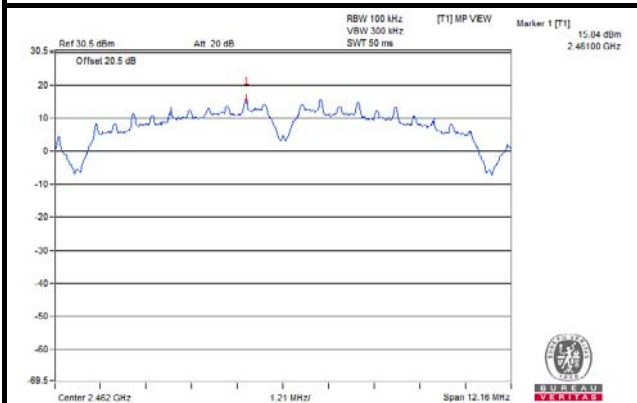
CH 6



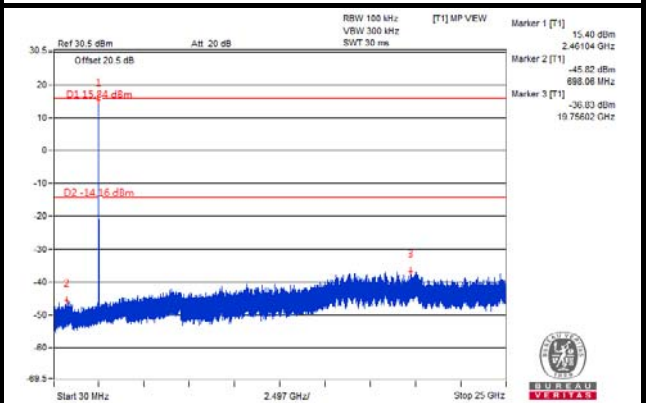
CH 6



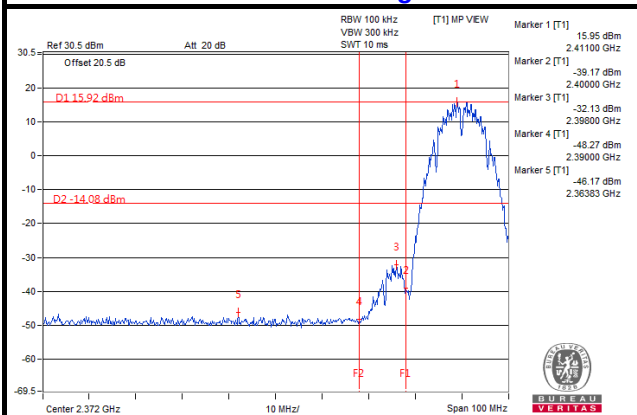
CH 11



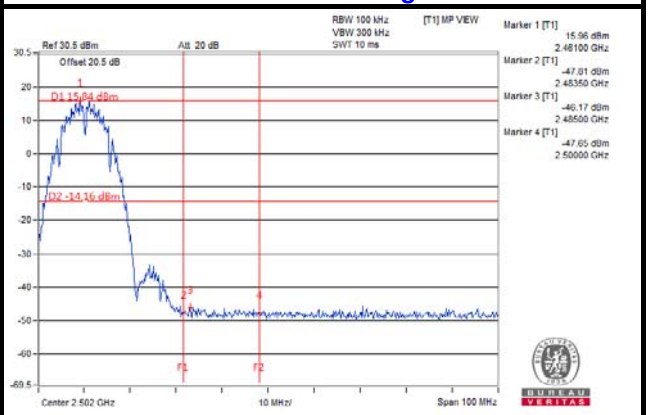
CH 11



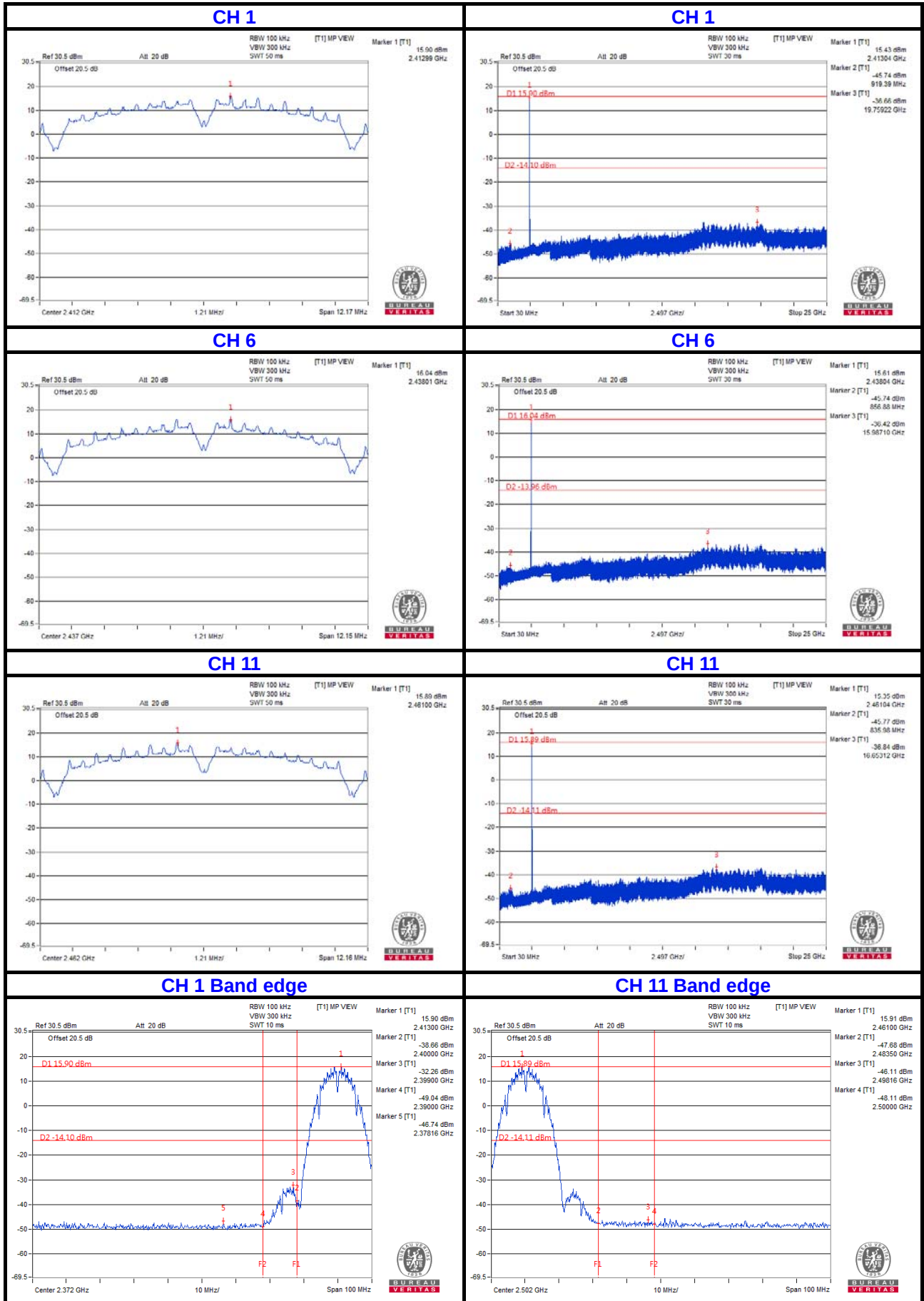
CH 1 Band edge



CH 11 Band edge

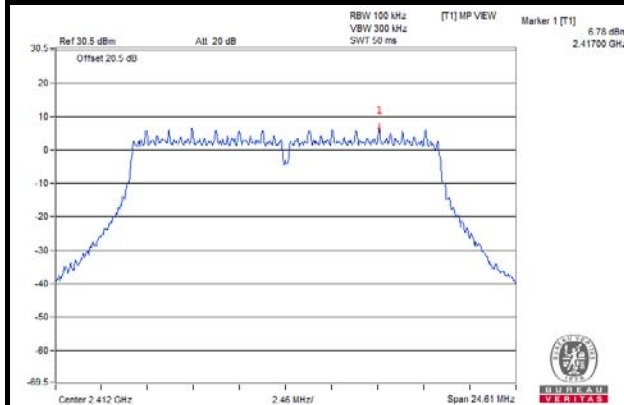


CHAIN 1

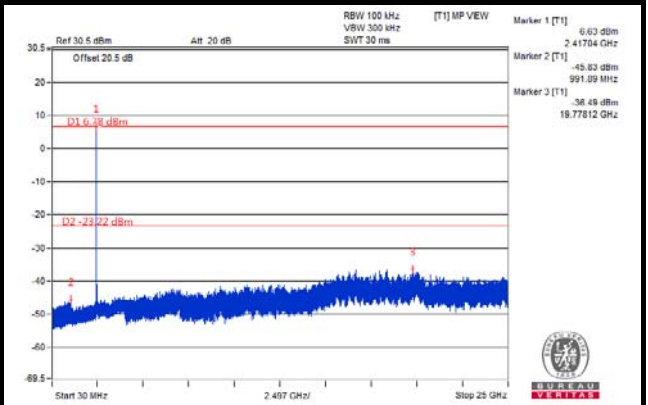


802.11g CHAIN 0

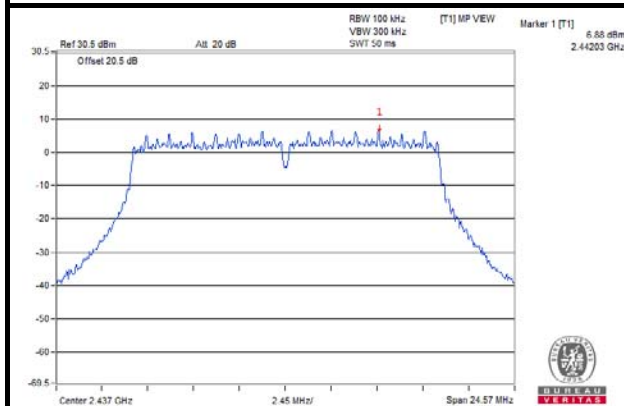
CH 1



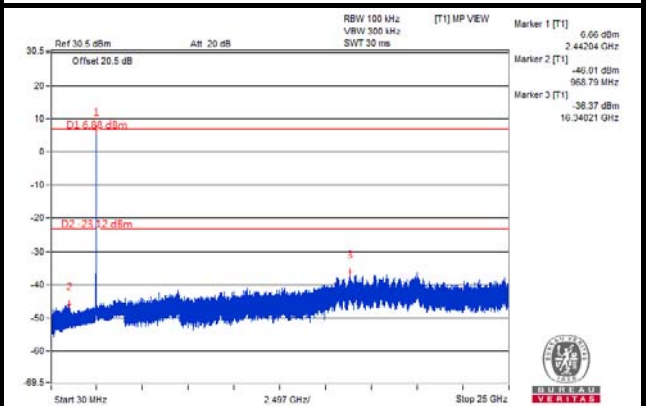
CH 1



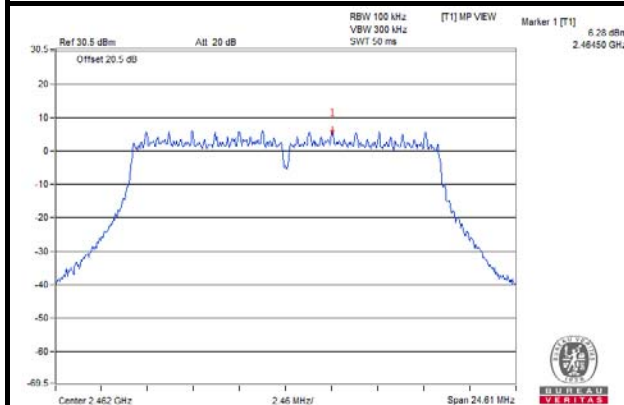
CH 6



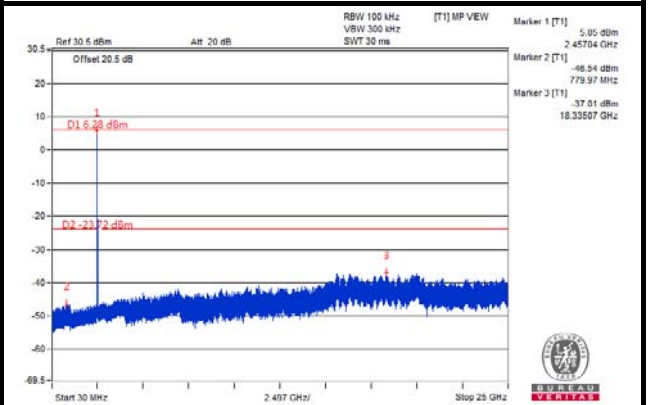
CH 6



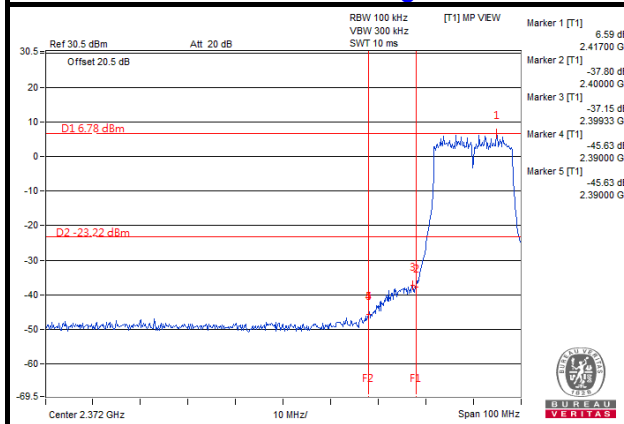
CH 11



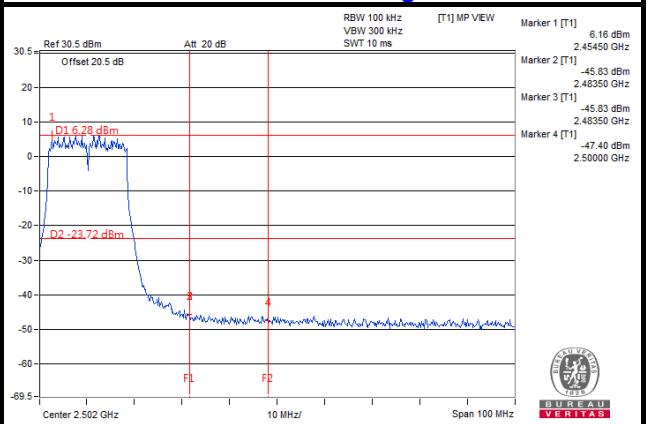
CH 11



CH 1 Band edge

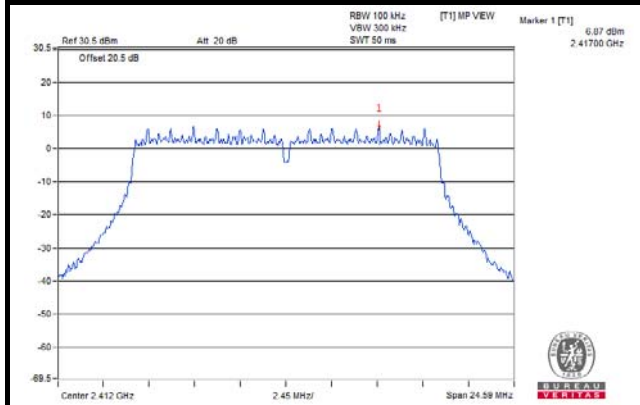


CH 11 Band edge

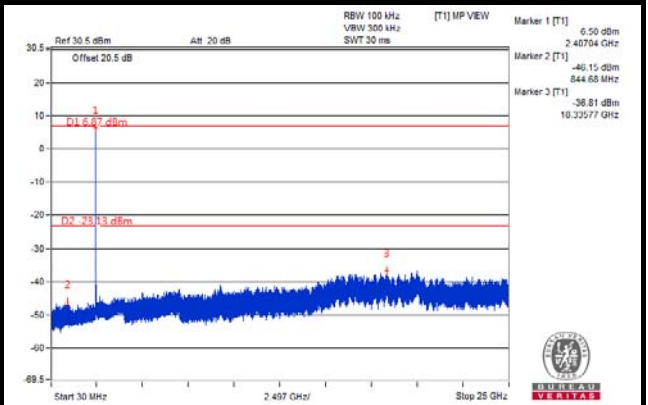


CHAIN 1

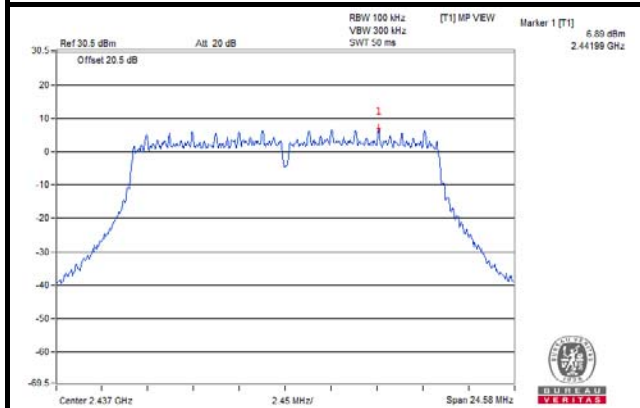
CH 1



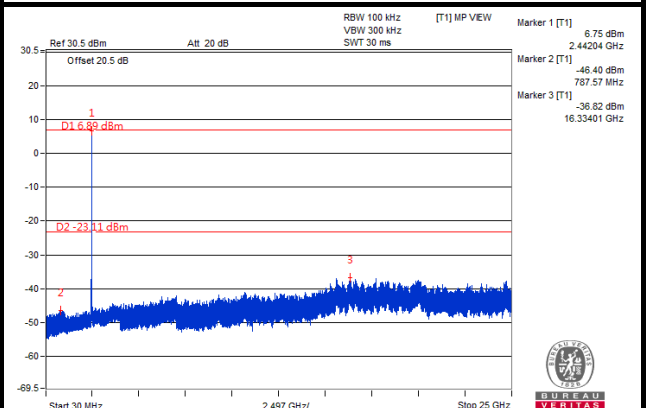
CH 1



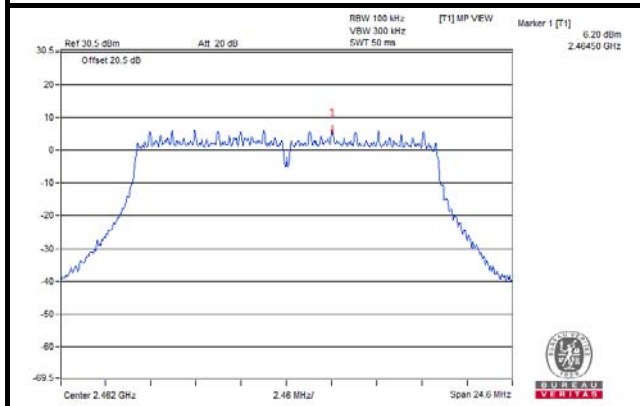
CH 6



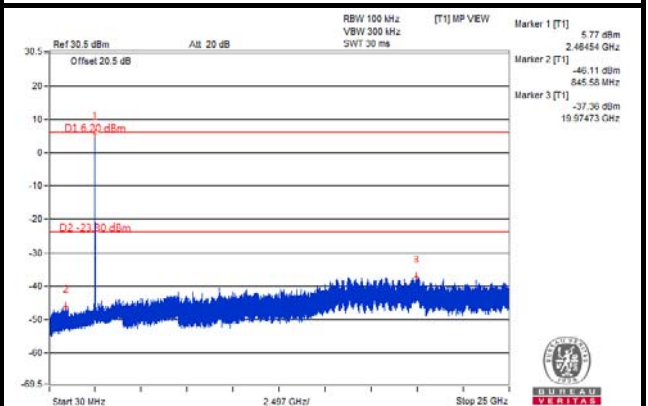
CH 6



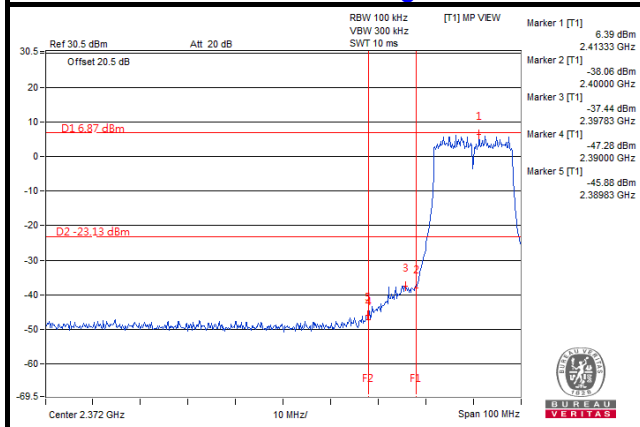
CH 11



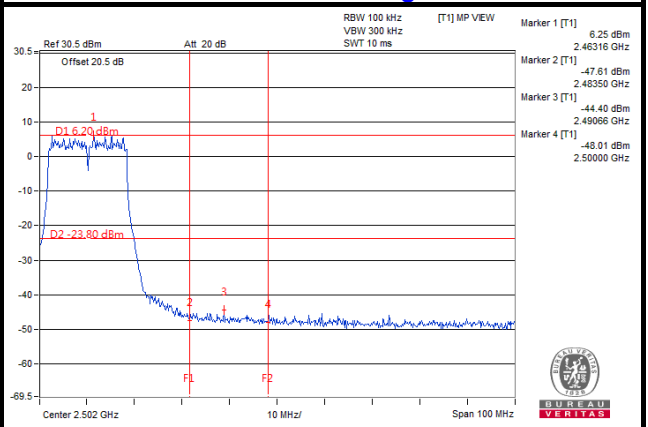
CH 11



CH 1 Band edge

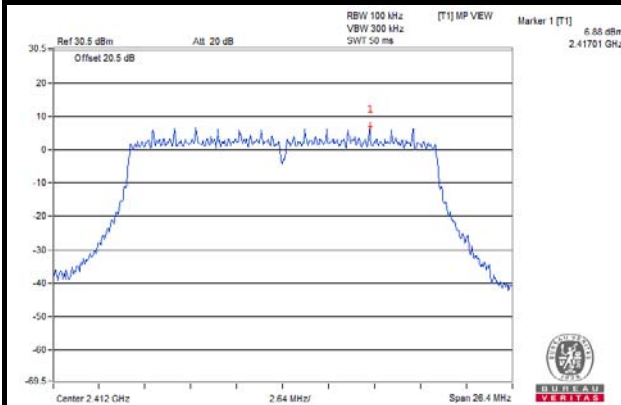


CH 11 Band edge

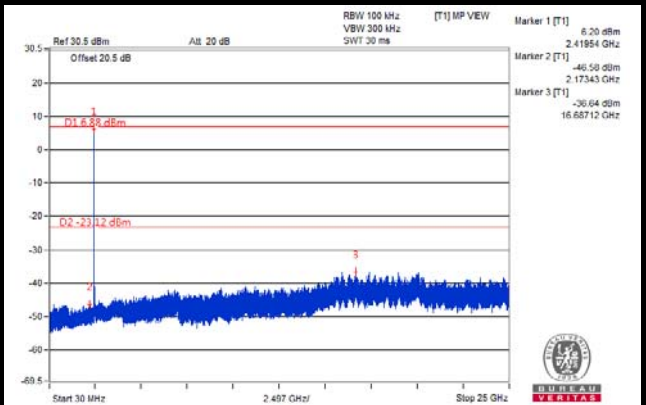


802.11n (20MHz): CHAIN 0

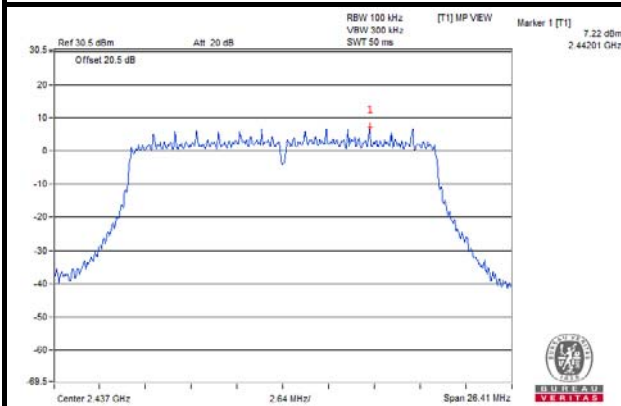
CH 1



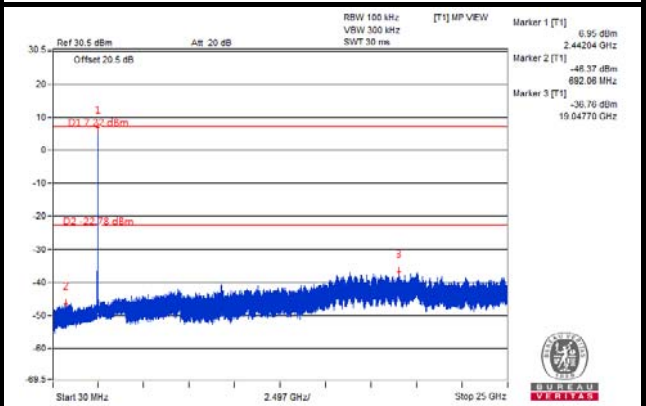
CH 1



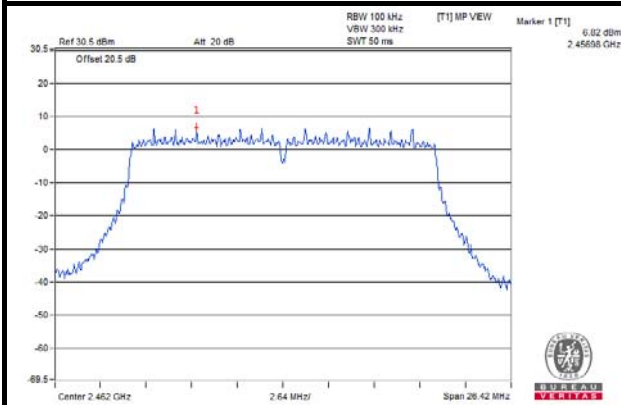
CH 6



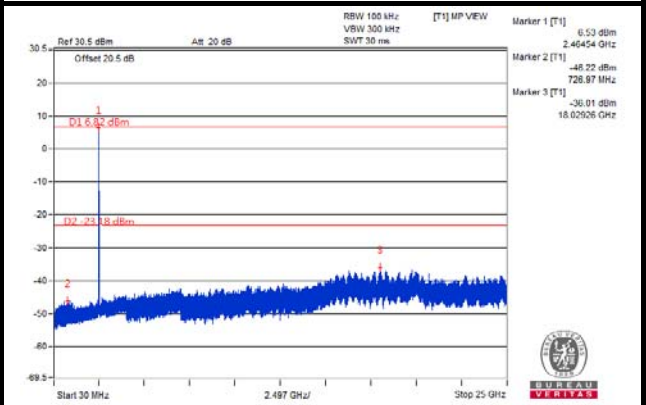
CH 6



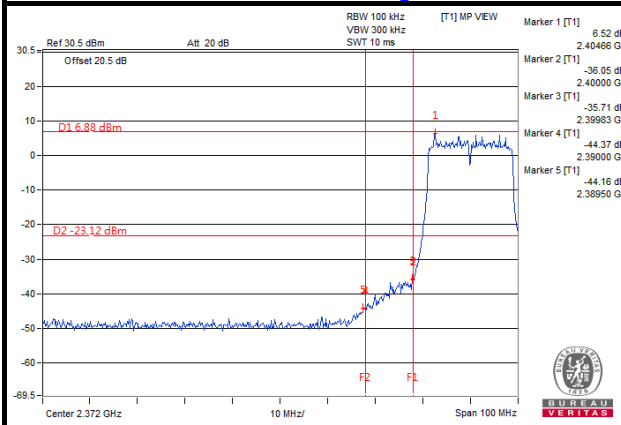
CH 11



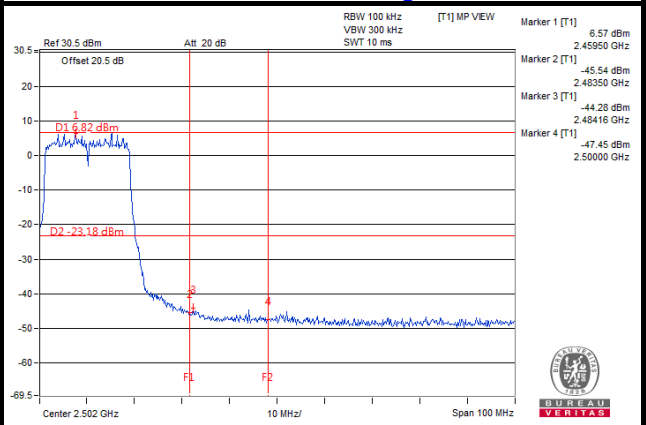
CH 11



CH 1 Band edge

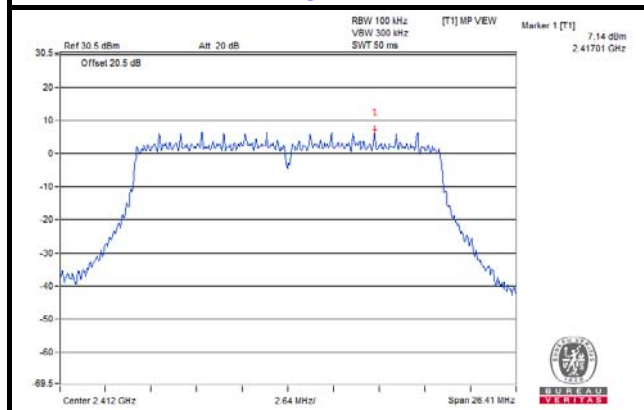


CH 11 Band edge

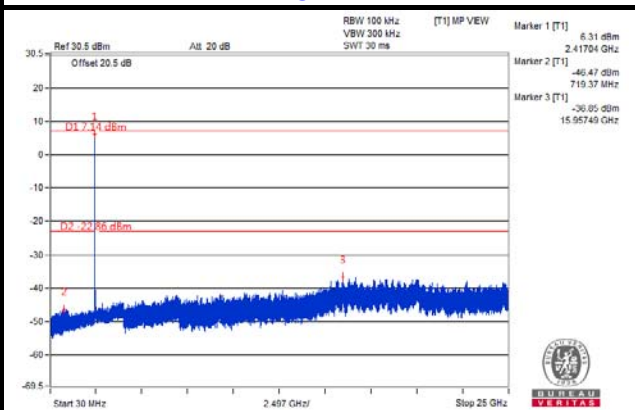


CHAIN 1

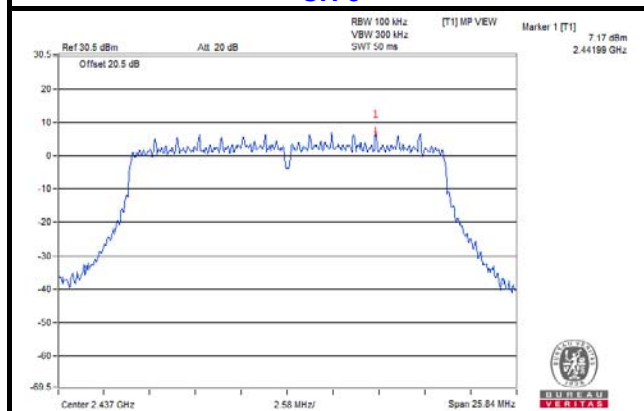
CH 1



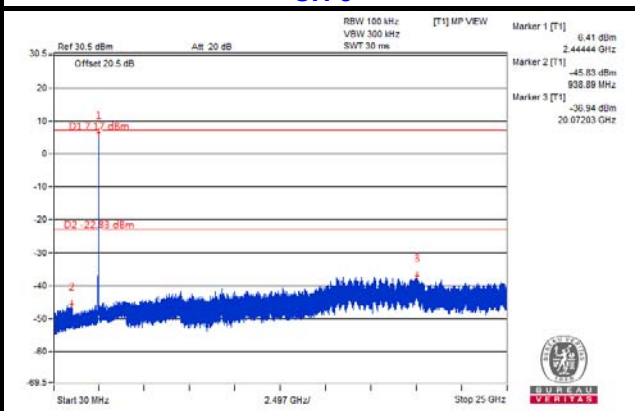
CH 1



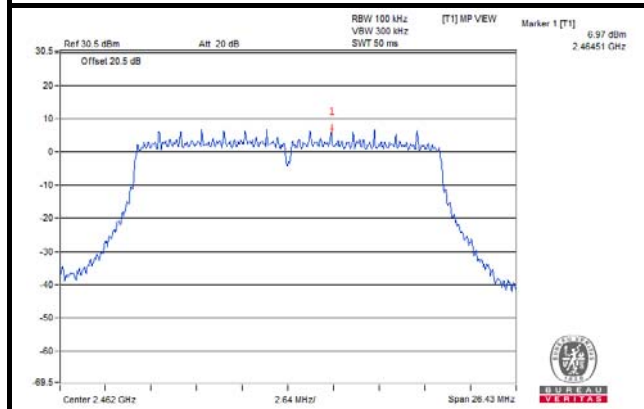
CH 6



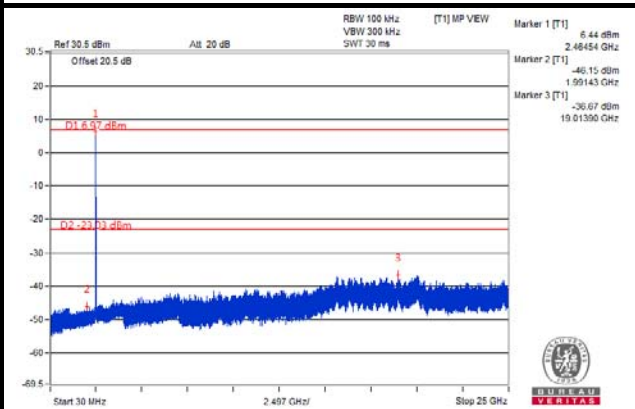
CH 6



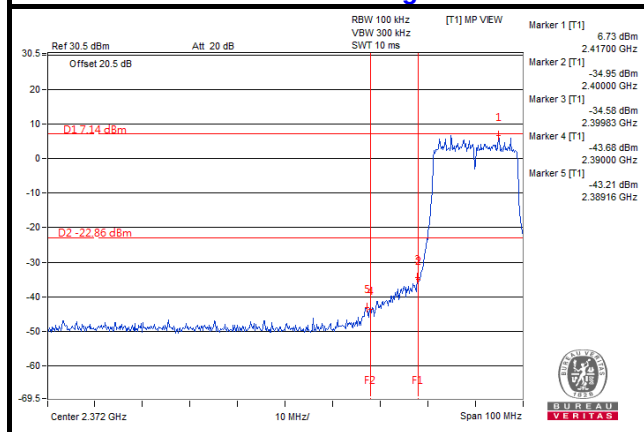
CH 11



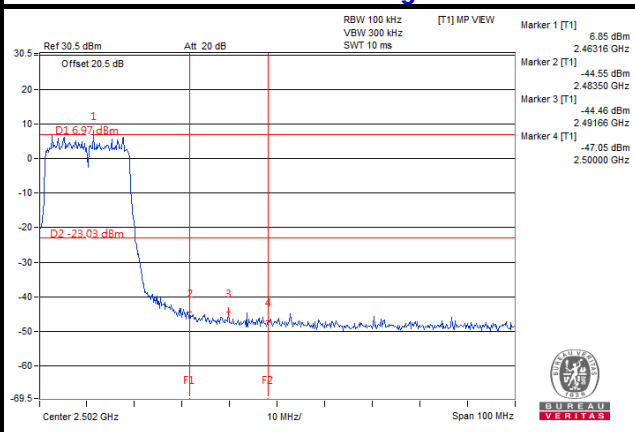
CH 11



CH 1 Band edge

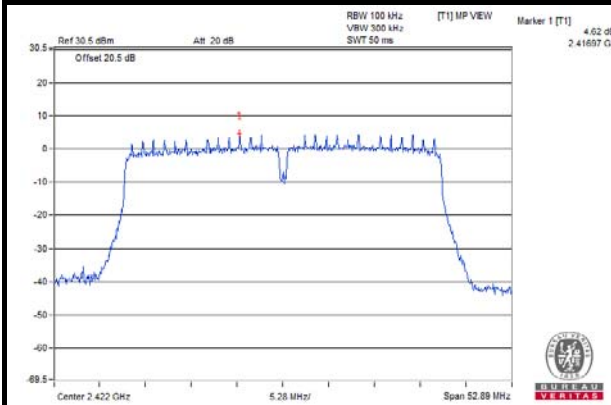


CH 11 Band edge

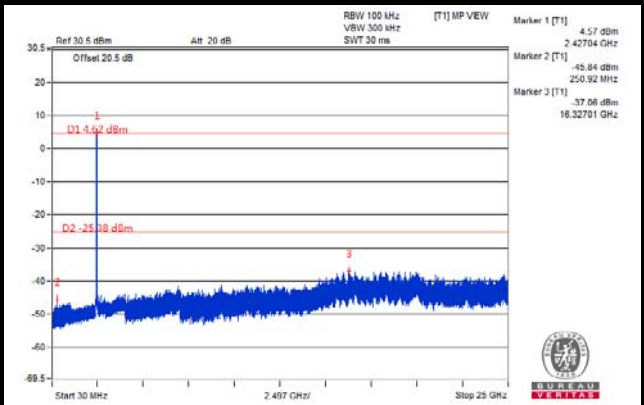


802.11n (40MHz): CHAIN 0

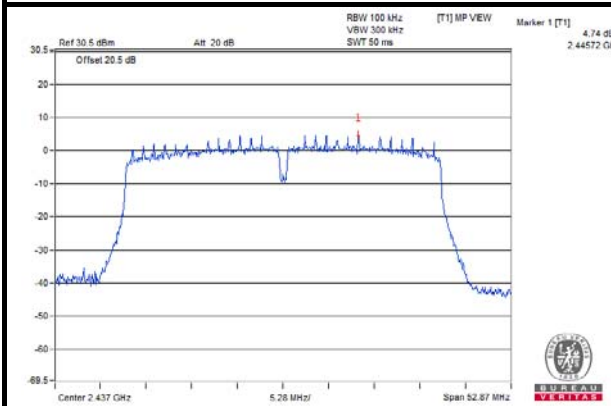
CH 3



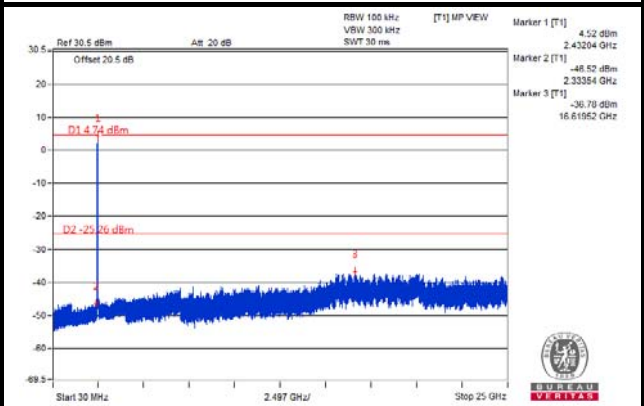
CH 3



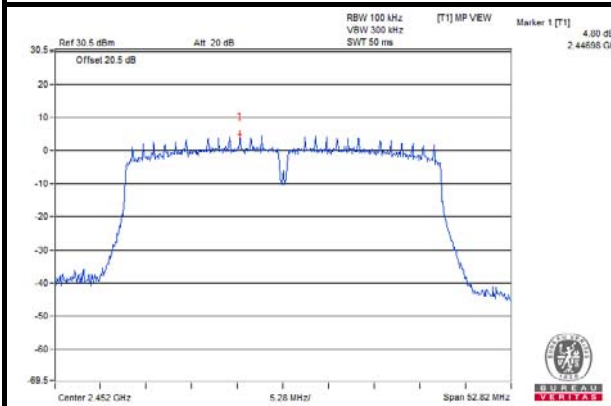
CH 6



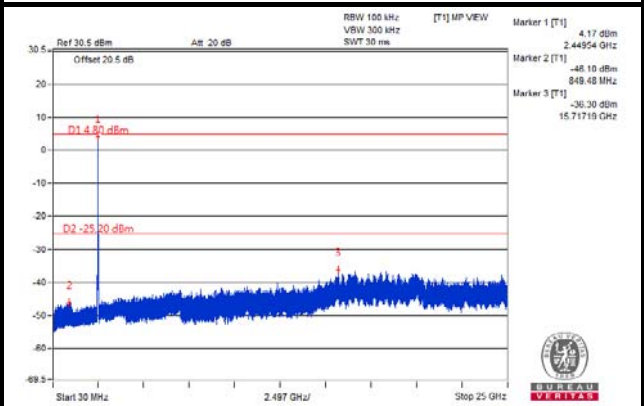
CH 6



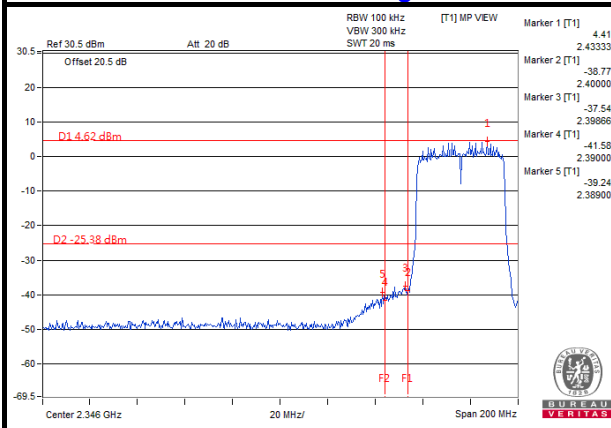
CH 9



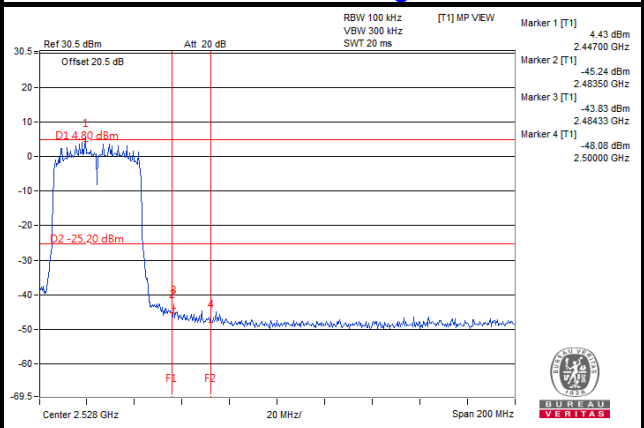
CH 9



CH 3 Band edge

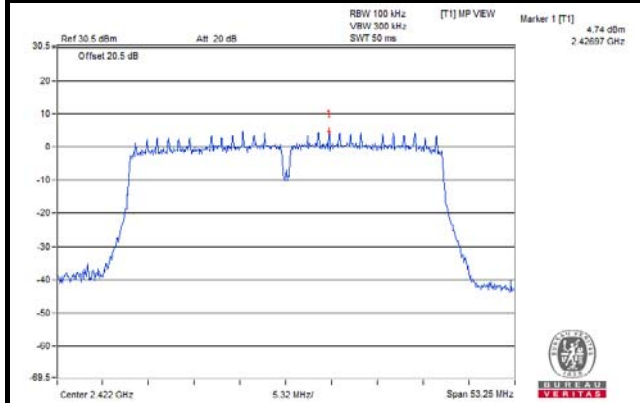


CH 9 Band edge

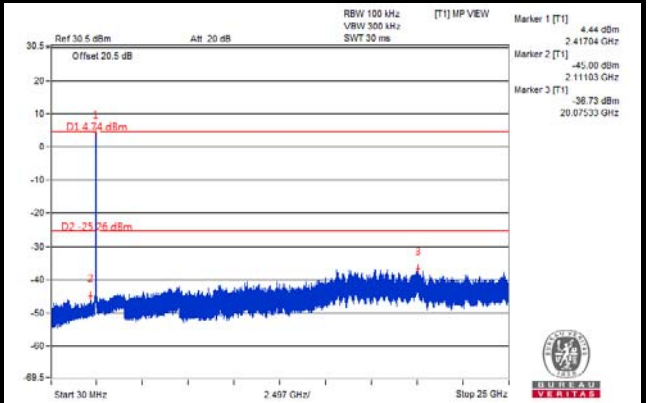


CHAIN 1

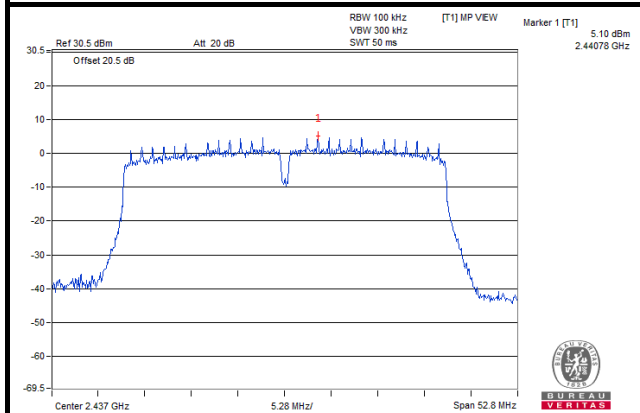
CH 3



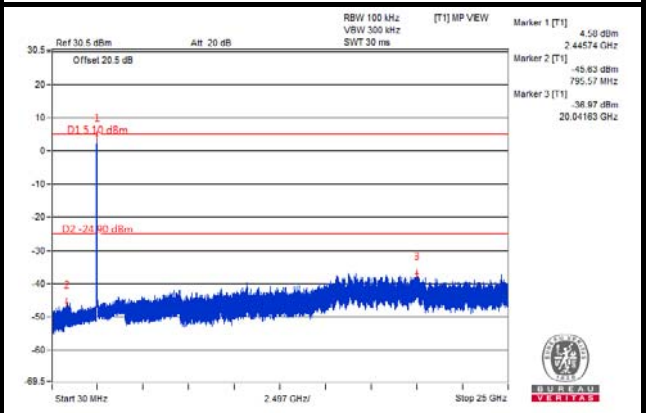
CH 3



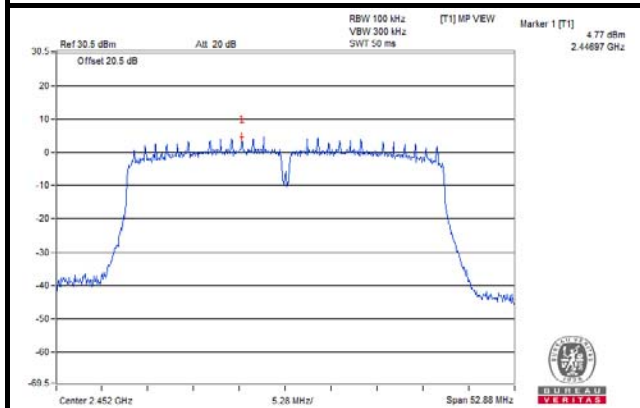
CH 6



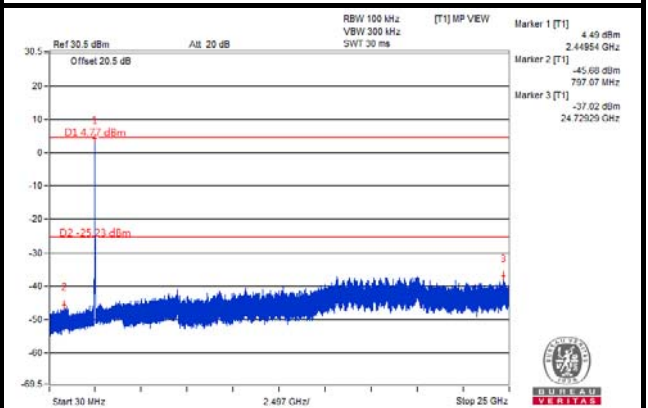
CH 6



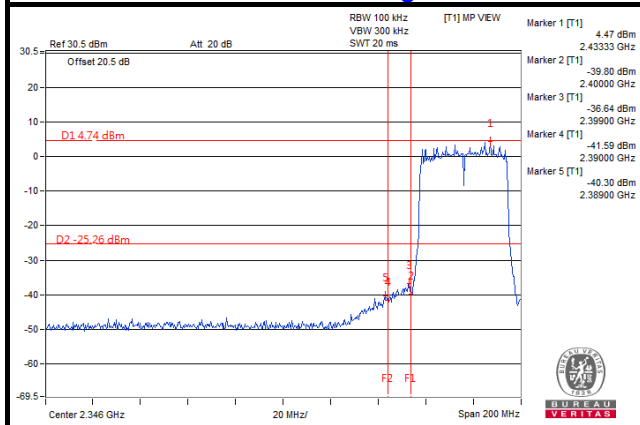
CH 9



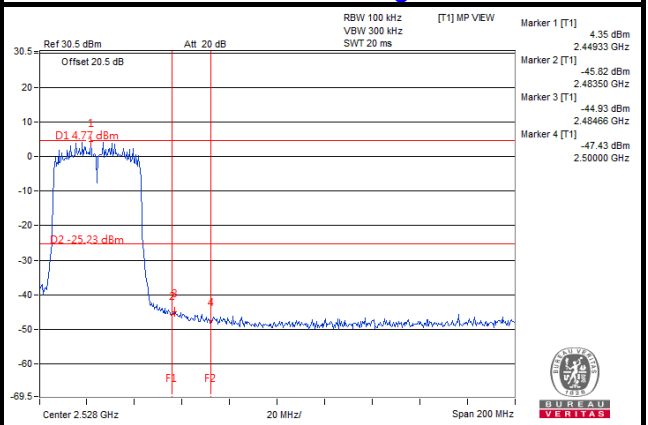
CH 9



CH 3 Band edge



CH 9 Band edge



5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved 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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