

FCC Test Report

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FCC ID: H8N-PCT5230

Test Model: ADR1776

Received Date: Jun. 21, 2016

Test Date: Jul. 28 ~ Aug. 23, 2016

Issued Date: Aug. 25, 2016

Applicant: ASKEY COMPUTER CORP.

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Release Control Record

Issue No.	Description	Date Issued
RF160621C08	Original release.	Aug. 25, 2016

1 Certificate of Conformity

Product: Smart Phone

Brand: Turbonet

Test Model: ADR1776

Sample Status: Engineering sample

Applicant: ASKEY COMPUTER CORP.

Test Date: Jul. 28 ~ Aug. 23, 2016

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 : Celine Chou , **Date:** Aug. 25, 2016
Celine Chou / Specialist

Approved by : Ken Liu , **Date:** Aug. 25, 2016
Ken Liu / Senior 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 -13.69dB at 2.44517MHz
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.1dB at 2483.50MHz.
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 Spring 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	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.63 dB
	200MHz ~ 1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Smart Phone
Brand	Turbonet
Test Model	ADR1776
Sample Status	Engineering sample
Power Supply Rating	3.8Vdc (Battery) 5Vdc or 9Vdc (Adapter or host equipment) 9Vdc (Adapter)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
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 72.2Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	11
Output Power	174.582mW
Antenna Type	Embedded antenna with 2.62dBi gain
Antenna Connector	Spring
Accessory Device	Refer to Note for more details
Data Cable Supplied	Refer to Note for more details

Note:

1. The EUT provides 1 completed transmitter and 1 receiver.

Modulation Mode	TX Function
802.11b	1TX
802.11g	1TX
802.11n (HT20)	1TX

2. The EUT contains following accessory devices and data cable.

Item	Brand	Model	Specification
Battery	FUJI	492005	3.8Vdc, 11.21Wh or 2950mAh
USB cable	N/A	N/A	0.95m shielded cable without core
Adapter	DELTA Electronics, INC.	ADP-18GW B	I/P: 100-240Vac, 0.5A, 50-60Hz O/P: 5Vdc, 2A charger 9Vdc, 2A fast charger

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		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	√	√	Powered by adapter
B	-	√	√	-	Powered by host equipment
C	-	√	-	-	Powered by EUT

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 3 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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (HT20)	1 to 11	1, 6, 11	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B, C	802.11b	1 to 11	1	DSSS	DBPSK	1.0

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1	DSSS	DBPSK	1.0

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE _≥ 1G	25deg. C, 69%RH	120Vac, 60Hz	Bond Tseng
RE _{<} 1G	25deg. C, 69%RH	120Vac, 60Hz	Tank Wu
PLC	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
APCM	25deg. C, 60%RH	120Vac, 60Hz	Frank Liu

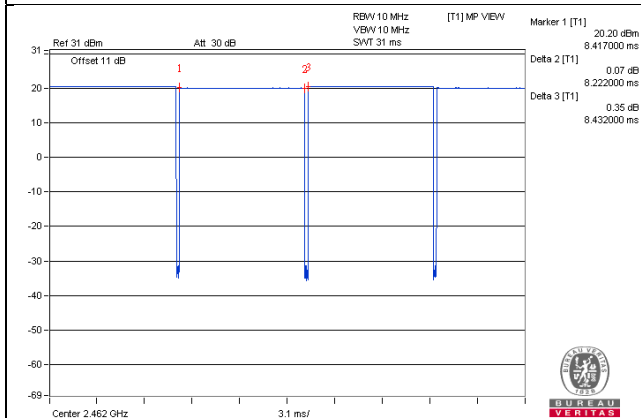
3.3 Duty Cycle of Test Signal

802.11b: Duty cycle = $8.222/8.432 = 0.975$, Duty factor = $10 * \log(1/0.975) = 0.11$

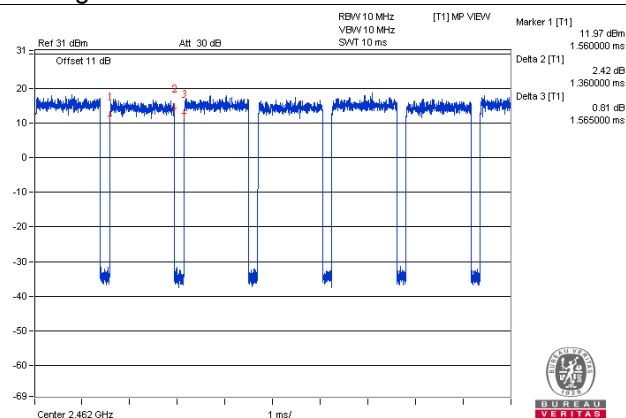
802.11g: Duty cycle = $1.360/1.565 = 0.869$, Duty factor = $10 * \log(1/0.869) = 0.61$

802.11n (HT20): Duty cycle = $1.267/1.495 = 0.847$, Duty factor = $10 * \log(1/0.847) = 0.72$

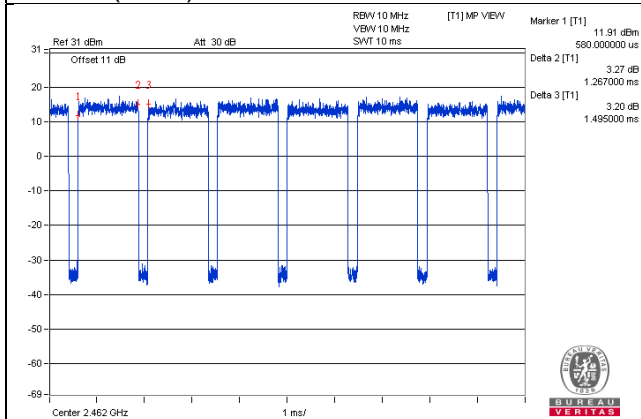
802.11b



802.11g



802.11n (HT20)



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.

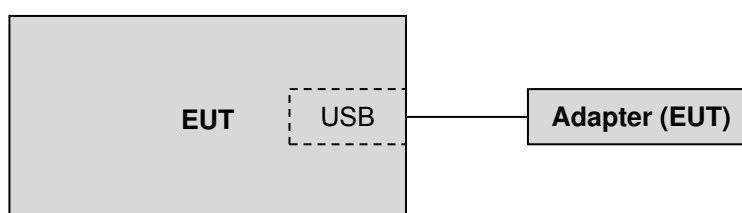
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5430	2RL3YW1	FCC DoC Approved	-

Note:

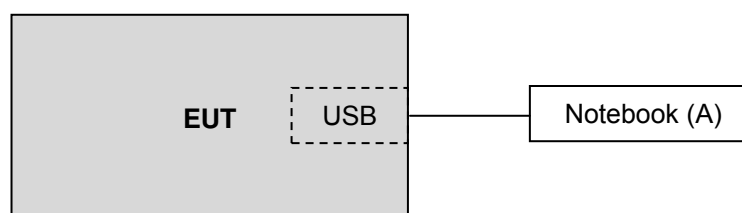
1. All power cords of the above support units are non-shielded (1.8m).
2. Items A acted as communication partners to transfer data.

3.4.1 Configuration of System under Test

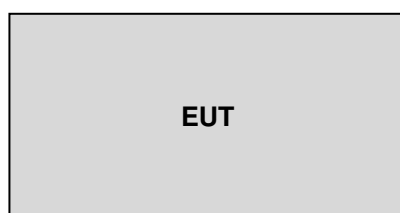
Test Mode A



Test Mode B



Test Mode C



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 v03r05

ANSI C63.10-2013

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

Note: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It 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 20dB below the highest level of the desired power:

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

Note:

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Dec. 23, 2015	Dec. 22, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Apr. 19, 2016	Apr. 18, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Jan. 18, 2016	Jan. 17, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Jan. 08, 2016	Jan. 07, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Jan. 18, 2016	Jan. 17, 2017
Preamplifier Agilent	8449B	3008A01911	Aug. 09, 2015	Aug. 08, 2016
			Aug. 09, 2016	Aug. 08, 2017
Preamplifier Agilent	8447D	2944A10638	Aug. 09, 2015	Aug. 08, 2016
			Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-02(309222 +248780)	Aug. 09, 2015	Aug. 08, 2016
			Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-03(274092)	Aug. 09, 2015	Aug. 08, 2016
			Aug. 09, 2016	Aug. 08, 2017
RF signal cable Woken	8D-FB	Cable-CH9-01	Aug. 09, 2015	Aug. 08, 2016
			Aug. 09, 2016	Aug. 08, 2017
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
High Speed Peak Power Meter	ML2495A	0824011	Jul. 09, 2015	Jul. 08, 2016
			Jul. 09, 2016	Jul. 08, 2017
Power Sensor	MA2411B	0738171	Jul. 09, 2015	Jul. 08, 2016
			Jul. 09, 2016	Jul. 08, 2017

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 9.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 215374.
5. The IC Site Registration No. is IC 7450F-9.

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 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:

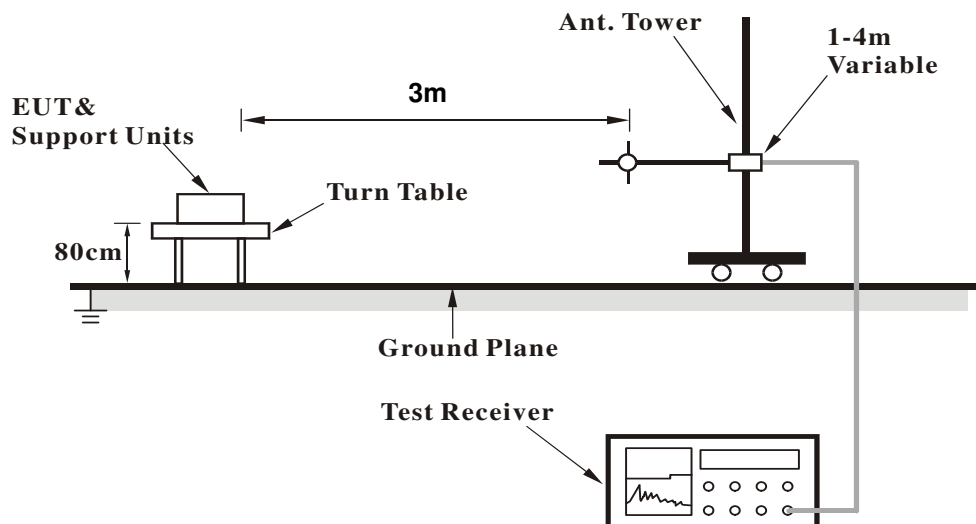
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

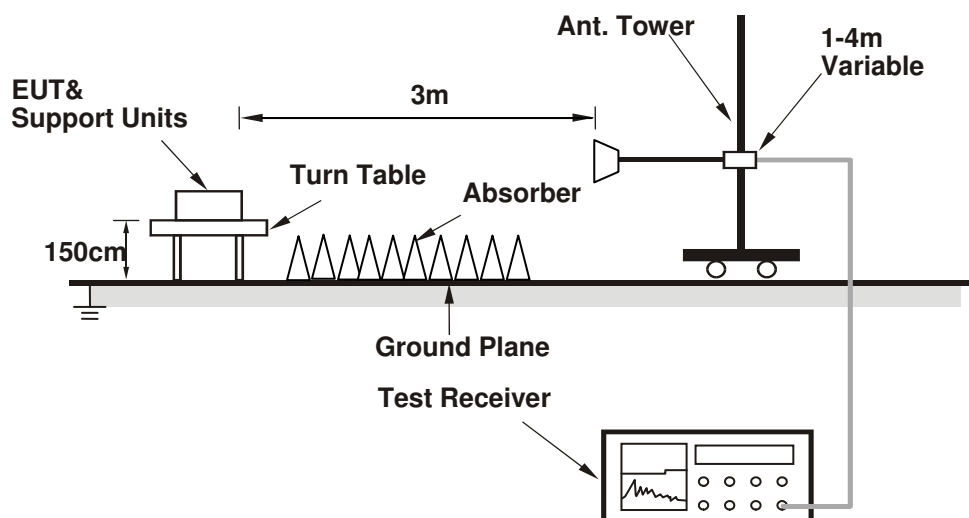
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range 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 worst-Case data:

802.11b

CHANNEL	TX Channel 1	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	61.4 PK	74.0	-12.6	1.63 H	152	26.6	34.8
2	2390.00	52.6 AV	54.0	-1.4	1.63 H	152	17.8	34.8
3	*2412.00	106.1 PK			1.63 H	152	71.2	34.9
4	*2412.00	102.2 AV			1.63 H	152	67.3	34.9
5	4824.00	51.0 PK	74.0	-23.0	1.18 H	195	46.6	4.4
6	4824.00	40.5 AV	54.0	-13.5	1.18 H	195	36.1	4.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.1 PK	74.0	-13.9	1.52 V	148	25.3	34.8
2	2390.00	49.6 AV	54.0	-4.4	1.52 V	148	14.8	34.8
3	*2412.00	101.4 PK			1.52 V	148	66.5	34.9
4	*2412.00	98.4 AV			1.52 V	148	63.5	34.9
5	4824.00	49.9 PK	74.0	-24.1	1.52 V	206	45.5	4.4
6	4824.00	39.9 AV	54.0	-14.1	1.52 V	206	35.5	4.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	60.6 PK	74.0	-13.4	1.60 H	152	25.8	34.8
2	2390.00	51.3 AV	54.0	-2.7	1.60 H	152	16.5	34.8
3	*2437.00	106.1 PK			1.60 H	152	71.1	35.0
4	*2437.00	102.4 AV			1.60 H	152	67.4	35.0
5	2483.50	60.3 PK	74.0	-13.7	1.60 H	152	25.1	35.2
6	2483.50	50.1 AV	54.0	-3.9	1.60 H	152	14.9	35.2
7	4874.00	49.8 PK	74.0	-24.2	1.50 H	220	45.3	4.5
8	4874.00	41.4 AV	54.0	-12.6	1.50 H	220	36.9	4.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.1 PK	74.0	-14.9	1.50 V	146	24.3	34.8
2	2390.00	50.3 AV	54.0	-3.7	1.50 V	146	15.5	34.8
3	*2437.00	103.2 PK			1.50 V	146	68.2	35.0
4	*2437.00	99.2 AV			1.50 V	146	64.2	35.0
5	2483.50	60.3 PK	74.0	-13.7	1.50 V	146	25.1	35.2
6	2483.50	50.0 AV	54.0	-4.0	1.50 V	146	14.8	35.2
7	4874.00	49.3 PK	74.0	-24.7	1.50 V	25	44.8	4.5
8	4874.00	36.5 AV	54.0	-17.5	1.50 V	25	32.0	4.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	105.8 PK			1.61 H	327	70.6	35.2
2	*2462.00	102.0 AV			1.61 H	327	66.8	35.2
3	2483.50	62.7 PK	74.0	-11.3	1.61 H	327	27.5	35.2
4	2483.50	52.8 AV	54.0	-1.2	1.61 H	327	17.6	35.2
5	4924.00	50.5 PK	74.0	-23.5	3.14 H	52	45.8	4.7
6	4924.00	36.9 AV	54.0	-17.1	3.14 H	52	32.2	4.7
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	103.0 PK			1.97 V	262	67.8	35.2
2	*2462.00	99.2 AV			1.97 V	262	64.0	35.2
3	2483.50	61.3 PK	74.0	-12.7	1.97 V	262	26.1	35.2
4	2483.50	50.5 AV	54.0	-3.5	1.97 V	262	15.3	35.2
5	4924.00	49.8 PK	74.0	-24.2	2.00 V	245	45.1	4.7
6	4924.00	35.7 AV	54.0	-18.3	2.00 V	245	31.0	4.7

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)
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	70.8 PK	74.0	-3.2	1.20 H	147	36.0	34.8
2	2390.00	52.8 AV	54.0	-1.2	1.20 H	147	18.0	34.8
3	*2412.00	105.9 PK			1.20 H	147	71.0	34.9
4	*2412.00	95.6 AV			1.20 H	147	60.7	34.9
5	4824.00	50.8 PK	74.0	-23.2	1.78 H	83	46.4	4.4
6	4824.00	36.6 AV	54.0	-17.4	1.78 H	83	32.2	4.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.6 PK	74.0	-9.4	1.56 V	88	29.8	34.8
2	2390.00	49.9 AV	54.0	-4.1	1.56 V	88	15.1	34.8
3	*2412.00	101.9 PK			1.56 V	88	67.0	34.9
4	*2412.00	91.2 AV			1.56 V	88	56.3	34.9
5	4824.00	50.3 PK	74.0	-23.7	1.13 V	251	45.9	4.4
6	4824.00	36.5 AV	54.0	-17.5	1.13 V	251	32.1	4.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	107.7 PK			1.25 H	145	72.7	35.0
2	*2437.00	96.8 AV			1.25 H	145	61.8	35.0
3	2489.00	60.7 PK	74.0	-13.3	1.25 H	145	25.5	35.2
4	2489.00	48.8 AV	54.0	-5.2	1.25 H	145	13.6	35.2
5	4874.00	51.2 PK	74.0	-22.8	1.73 H	85	46.7	4.5
6	4874.00	36.9 AV	54.0	-17.1	1.73 H	85	32.4	4.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	103.5 PK			1.62 V	72	68.5	35.0
2	*2437.00	92.5 AV			1.62 V	72	57.5	35.0
3	2489.00	60.5 PK	74.0	-13.5	1.62 V	72	25.3	35.2
4	2489.00	48.2 AV	54.0	-5.8	1.62 V	72	13.0	35.2
5	4874.00	50.8 PK	74.0	-23.2	1.09 V	243	46.3	4.5
6	4874.00	36.7 AV	54.0	-17.3	1.09 V	243	32.2	4.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	104.3 PK			1.25 H	147	69.1	35.2
2	*2462.00	93.4 AV			1.25 H	147	58.2	35.2
3	2483.50	71.2 PK	74.0	-2.8	1.25 H	147	36.0	35.2
4	2483.50	52.9 AV	54.0	-1.1	1.25 H	147	17.7	35.2
5	4924.00	50.8 PK	74.0	-23.2	1.69 H	78	46.1	4.7
6	4924.00	36.7 AV	54.0	-17.3	1.69 H	78	32.0	4.7
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	100.0 PK			1.63 V	91	64.8	35.2
2	*2462.00	89.2 AV			1.63 V	91	54.0	35.2
3	2483.50	66.4 PK	74.0	-7.6	1.63 V	91	31.2	35.2
4	2483.50	50.0 AV	54.0	-4.0	1.63 V	91	14.8	35.2
5	4924.00	50.5 PK	74.0	-23.5	1.20 V	249	45.8	4.7
6	4924.00	36.4 AV	54.0	-17.6	1.20 V	249	31.7	4.7

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)
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	69.2 PK	74.0	-4.8	1.28 H	146	34.4	34.8
2	2390.00	52.8 AV	54.0	-1.2	1.28 H	146	18.0	34.8
3	*2412.00	104.9 PK			1.28 H	146	70.0	34.9
4	*2412.00	94.5 AV			1.28 H	146	59.6	34.9
5	4824.00	50.4 PK	74.0	-23.6	1.66 H	101	46.0	4.4
6	4824.00	36.4 AV	54.0	-17.6	1.66 H	101	32.0	4.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.4 PK	74.0	-9.6	1.48 V	79	29.6	34.8
2	2390.00	49.6 AV	54.0	-4.4	1.48 V	79	14.8	34.8
3	*2412.00	101.2 PK			1.48 V	79	66.3	34.9
4	*2412.00	90.8 AV			1.48 V	79	55.9	34.9
5	4824.00	50.2 PK	74.0	-23.8	1.23 V	261	45.8	4.4
6	4824.00	36.1 AV	54.0	-17.9	1.23 V	261	31.7	4.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	107.4 PK			1.02 H	147	72.4	35.0
2	*2437.00	96.7 AV			1.02 H	147	61.7	35.0
3	2488.00	61.4 PK	74.0	-12.6	1.02 H	147	26.2	35.2
4	2488.00	49.2 AV	54.0	-4.8	1.02 H	147	14.0	35.2
5	4874.00	50.8 PK	74.0	-23.2	1.59 H	87	46.3	4.5
6	4874.00	36.6 AV	54.0	-17.4	1.59 H	87	32.1	4.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	103.0 PK			1.55 V	68	68.0	35.0
2	*2437.00	92.3 AV			1.55 V	68	57.3	35.0
3	2488.00	60.8 PK	74.0	-13.2	1.55 V	68	25.6	35.2
4	2488.00	48.5 AV	54.0	-5.5	1.55 V	68	13.3	35.2
5	4874.00	50.2 PK	74.0	-23.8	1.16 V	248	45.7	4.5
6	4874.00	36.1 AV	54.0	-17.9	1.16 V	248	31.6	4.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	104.1 PK			1.04 H	145	68.9	35.2
2	*2462.00	93.0 AV			1.04 H	145	57.8	35.2
3	2483.50	70.0 PK	74.0	-4.0	1.04 H	145	34.8	35.2
4	2483.50	52.9 AV	54.0	-1.1	1.04 H	145	17.7	35.2
5	4924.00	50.6 PK	74.0	-23.4	1.59 H	98	45.9	4.7
6	4924.00	36.4 AV	54.0	-17.6	1.59 H	98	31.7	4.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	99.9 PK			1.53 V	86	64.7	35.2
2	*2462.00	89.2 AV			1.53 V	86	54.0	35.2
3	2483.50	65.4 PK	74.0	-8.6	1.53 V	86	30.2	35.2
4	2483.50	50.0 AV	54.0	-4.0	1.53 V	86	14.8	35.2
5	4924.00	50.3 PK	74.0	-23.7	1.19 V	256	45.6	4.7
6	4924.00	36.1 AV	54.0	-17.9	1.19 V	256	31.4	4.7

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)
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:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	28.9 QP	40.0	-11.1	1.49 H	13	44.5	-15.6
2	57.16	25.3 QP	40.0	-14.7	2.00 H	67	39.6	-14.3
3	88.20	23.2 QP	43.5	-20.3	2.00 H	197	42.5	-19.3
4	136.70	24.2 QP	43.5	-19.3	1.25 H	83	38.5	-14.3
5	179.38	26.4 QP	43.5	-17.1	1.49 H	76	40.7	-14.3
6	495.60	29.1 QP	46.0	-16.9	1.00 H	141	35.7	-6.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	33.88	32.8 QP	40.0	-7.2	1.51 V	114	48.2	-15.4
2	57.16	32.8 QP	40.0	-7.2	2.00 V	353	47.1	-14.3
3	86.26	29.2 QP	40.0	-10.8	1.51 V	245	48.1	-18.9
4	152.22	19.7 QP	43.5	-23.8	1.25 V	149	33.1	-13.4
5	179.38	19.5 QP	43.5	-24.0	1.00 V	144	33.8	-14.3
6	497.54	27.7 QP	46.0	-18.3	2.00 V	119	34.2	-6.5

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	25.3 QP	40.0	-14.7	1.99 H	262	40.9	-15.6
2	51.34	20.0 QP	40.0	-20.0	1.99 H	15	33.9	-13.9
3	59.10	22.6 QP	40.0	-17.4	1.24 H	89	36.9	-14.3
4	148.34	19.4 QP	43.5	-24.1	1.00 H	109	32.7	-13.3
5	192.96	23.3 QP	43.5	-20.2	1.24 H	165	39.0	-15.7
6	937.92	35.6 QP	46.0	-10.4	1.00 H	355	31.8	3.8
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	30.00	34.6 QP	40.0	-5.4	1.01 V	11	50.2	-15.6
2	53.28	23.8 QP	40.0	-16.2	1.01 V	10	37.7	-13.9
3	66.86	23.3 QP	40.0	-16.7	1.25 V	129	38.8	-15.5
4	165.80	18.2 QP	43.5	-25.3	1.25 V	97	31.6	-13.4
5	685.72	29.7 QP	46.0	-16.3	1.50 V	346	31.8	-2.1
6	963.14	36.0 QP	54.0	-18.0	1.01 V	311	31.4	4.6

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	28.1 QP	40.0	-11.9	1.54 H	348	43.7	-15.6
2	39.70	27.2 QP	40.0	-12.8	1.00 H	269	41.9	-14.7
3	51.34	24.3 QP	40.0	-15.7	1.00 H	10	38.2	-13.9
4	148.34	17.9 QP	43.5	-25.6	1.54 H	70	31.2	-13.3
5	639.16	28.2 QP	46.0	-17.8	2.00 H	7	31.2	-3.0
6	976.72	36.3 QP	54.0	-17.7	1.54 H	10	31.3	5.0
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	30.00	32.3 QP	40.0	-7.7	1.25 V	265	47.9	-15.6
2	51.34	20.7 QP	40.0	-19.3	1.00 V	358	34.6	-13.9
3	68.80	17.6 QP	40.0	-22.4	1.00 V	293	33.2	-15.6
4	154.16	18.8 QP	43.5	-24.7	1.25 V	337	32.1	-13.3
5	635.28	28.5 QP	46.0	-17.5	1.00 V	309	31.5	-3.0
6	953.44	35.7 QP	46.0	-10.3	1.50 V	208	31.4	4.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2015	Dec. 25, 2016
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 28, 2016	Jul. 27, 2017
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

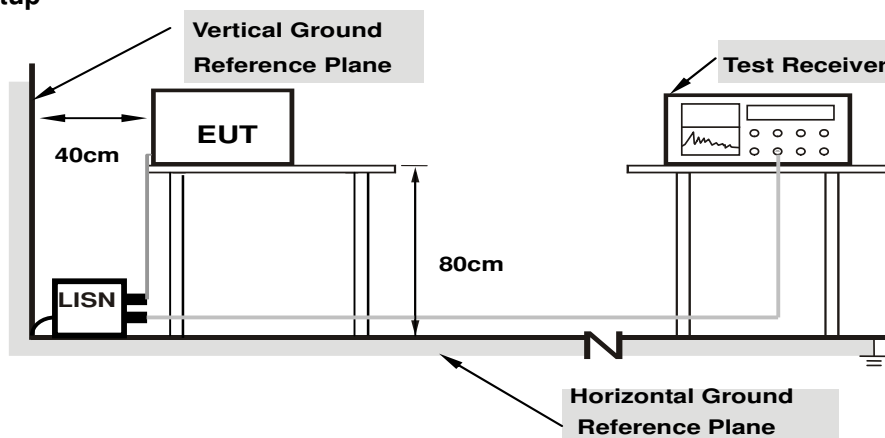
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

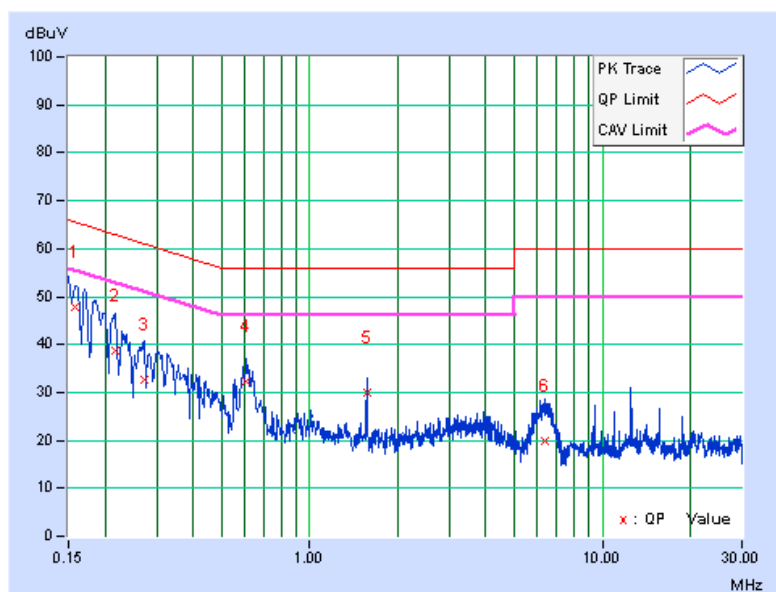
4.2.7 Test Results

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15802	10.08	37.83	20.24	47.91	30.32	65.57	55.57	-17.66	-25.25
2	0.21621	10.09	28.72	15.95	38.81	26.04	62.96	52.96	-24.15	-26.92
3	0.27120	10.11	22.45	11.32	32.56	21.43	61.08	51.08	-28.52	-29.65
4	0.60737	10.21	22.02	15.78	32.23	25.99	56.00	46.00	-23.77	-20.01
5	1.56933	10.34	19.62	14.53	29.96	24.87	56.00	46.00	-26.04	-21.13
6	6.38254	10.59	9.26	3.09	19.85	13.68	60.00	50.00	-40.15	-36.32

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.

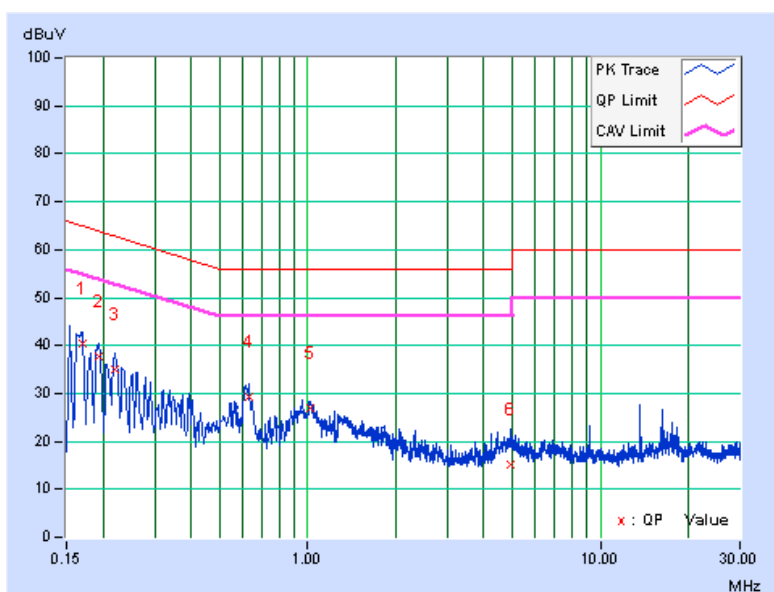


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16955	10.08	30.46	18.01	40.54	28.09	64.98	54.98	-24.44	-26.89
2	0.19305	10.08	27.73	15.53	37.81	25.61	63.90	53.90	-26.09	-28.29
3	0.22024	10.10	25.01	12.14	35.11	22.24	62.81	52.81	-27.70	-30.57
4	0.62702	10.26	18.91	11.98	29.17	22.24	56.00	46.00	-26.83	-23.76
5	1.01531	10.29	16.77	11.20	27.06	21.49	56.00	46.00	-28.94	-24.51
6	4.96712	10.63	4.50	-0.68	15.13	9.95	56.00	46.00	-40.87	-36.05

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.

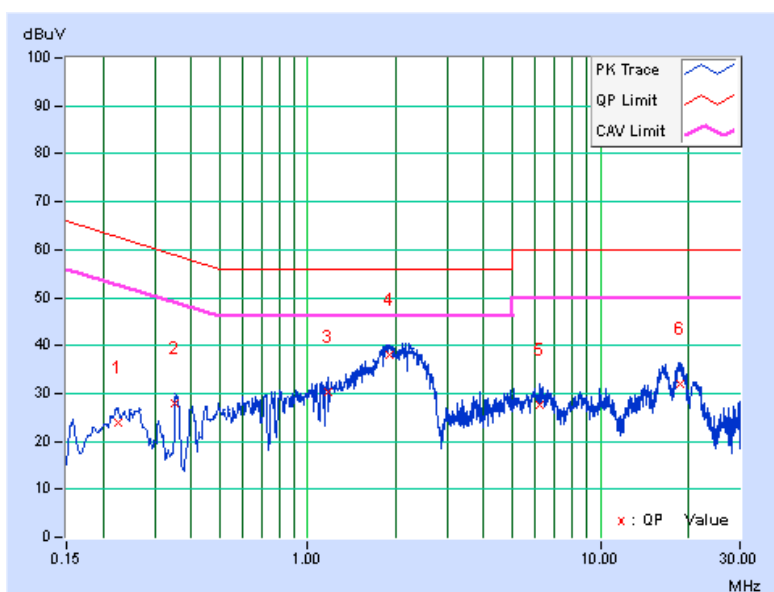


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22434	10.04	13.94	7.50	23.98	17.54	62.66	52.66	-38.68	-35.12
2	0.35332	10.10	17.88	14.03	27.98	24.13	58.88	48.88	-30.90	-24.75
3	1.17833	10.21	20.16	11.31	30.37	21.52	56.00	46.00	-25.63	-24.48
4	1.89386	10.26	27.93	19.24	38.19	29.50	56.00	46.00	-17.81	-16.50
5	6.21050	10.53	17.20	10.18	27.73	20.71	60.00	50.00	-32.27	-29.29
6	18.63648	11.27	20.85	15.05	32.12	26.32	60.00	50.00	-27.88	-23.68

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.

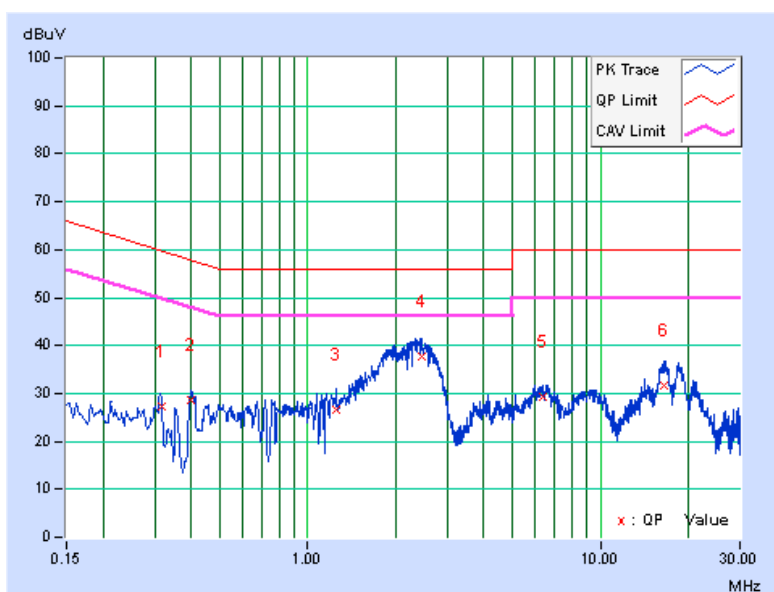


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.31813	10.09	17.19	11.99	27.28	22.08	59.76	49.76	-32.48	-27.68
2	0.39844	10.13	18.55	15.16	28.68	25.29	57.89	47.89	-29.21	-22.60
3	1.25262	10.23	16.37	11.34	26.60	21.57	56.00	46.00	-29.40	-24.43
4	2.44517	10.31	27.29	22.00	37.60	32.31	56.00	46.00	-18.40	-13.69
5	6.33171	10.57	18.65	10.73	29.22	21.30	60.00	50.00	-30.78	-28.70
6	16.50553	11.22	20.29	15.38	31.51	26.60	60.00	50.00	-28.49	-23.40

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.

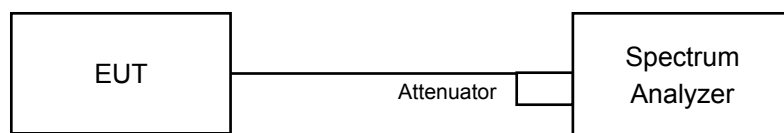


4.3 6dB Bandwidth Measurement

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

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	9.02	0.5	Pass
6	2437	8.58	0.5	Pass
11	2462	9.56	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.37	0.5	Pass
6	2437	16.36	0.5	Pass
11	2462	16.36	0.5	Pass

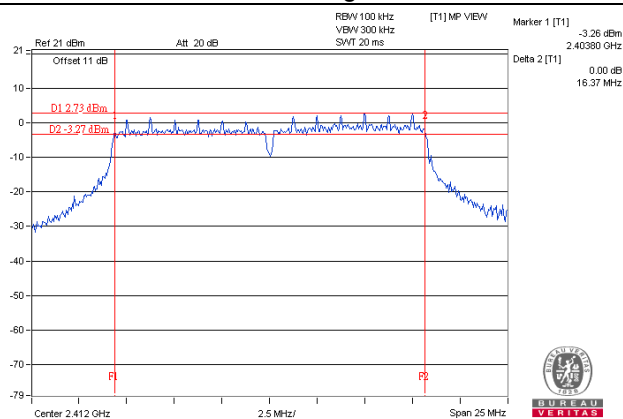
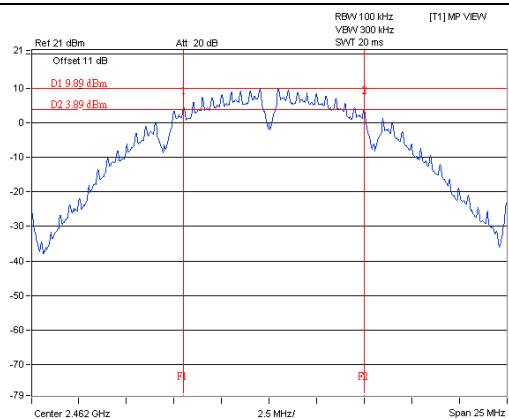
802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.36	0.5	Pass
6	2437	17.22	0.5	Pass
11	2462	17.34	0.5	Pass

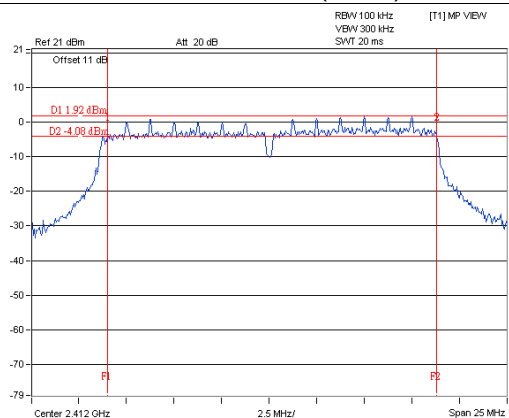
Spectrum Plot of Worst Value

802.11b

802.11g



802.11n (HT20)

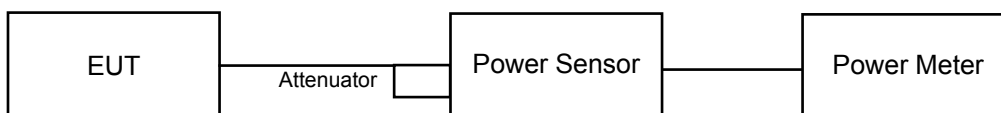


4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

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

Peak Power

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	93.972	19.73	30	Pass
6	2437	123.880	20.93	30	Pass
11	2462	106.905	20.29	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	105.196	20.22	30	Pass
6	2437	133.968	21.27	30	Pass
11	2462	92.045	19.64	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	174.582	22.42	30	Pass
6	2437	164.816	22.17	30	Pass
11	2462	112.460	20.51	30	Pass

Average Power

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	56.364	17.51
6	2437	74.131	18.70
11	2462	65.766	18.18

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	22.751	13.57
6	2437	23.714	13.75
11	2462	14.962	11.75

802.11n (HT20)

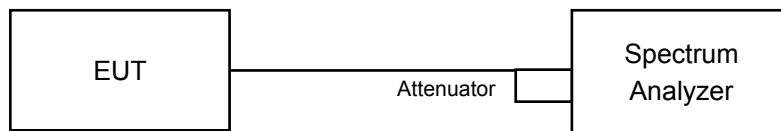
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	18.793	12.74
6	2437	19.143	12.82
11	2462	11.967	10.78

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: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- 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

802.11b

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-5.97	8.00	Pass
6	2437	-4.32	8.00	Pass
11	2462	-4.22	8.00	Pass

802.11g

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-12.93	8.00	Pass
6	2437	-11.40	8.00	Pass
11	2462	-13.27	8.00	Pass

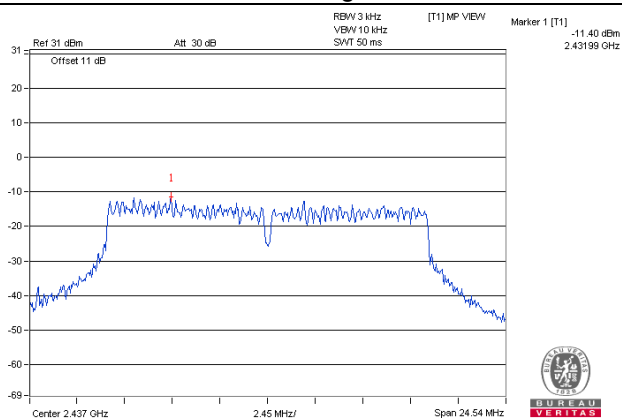
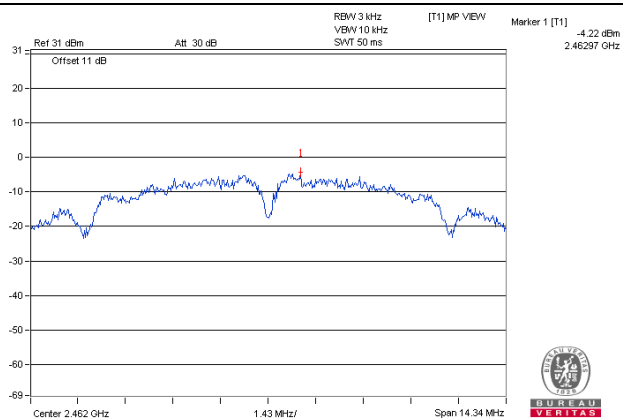
802.11n (HT20)

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-12.74	8.00	Pass
6	2437	-11.90	8.00	Pass
11	2462	-15.88	8.00	Pass

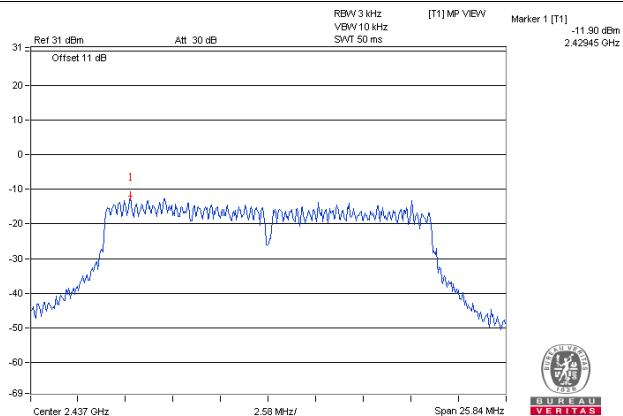
Spectrum Plot of Worst Value

802.11b

802.11g



802.11n (HT20)

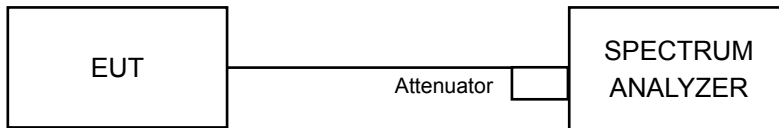


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

- Set the RBW = 100 kHz.
- Set the VBW $\geq$ 300 kHz.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOB

- Set RBW = 100 kHz.
- Set VBW $\geq$ 300 kHz.
- Ensure that the number of measurement points $\geq$ span/RBW
- According to measurement points to set differ measurement span.
- Detector = peak.
- Trace Mode = max hold.
- Sweep = auto couple.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

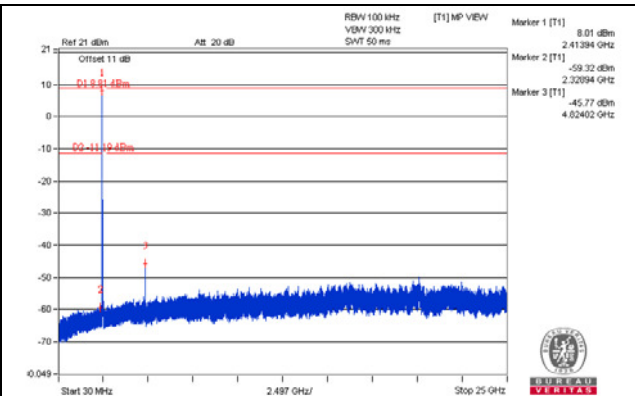
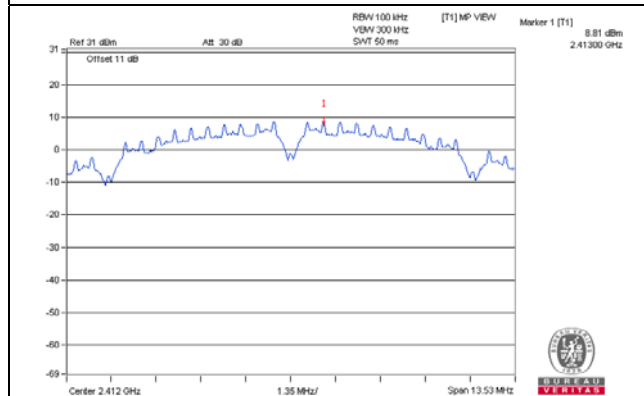
Same as Item 4.3.6

4.6.7 Test Results

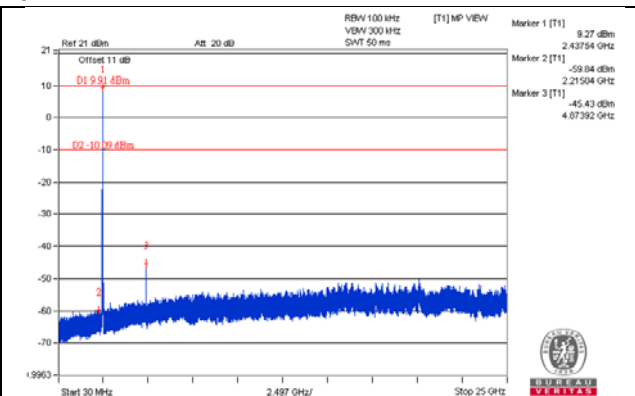
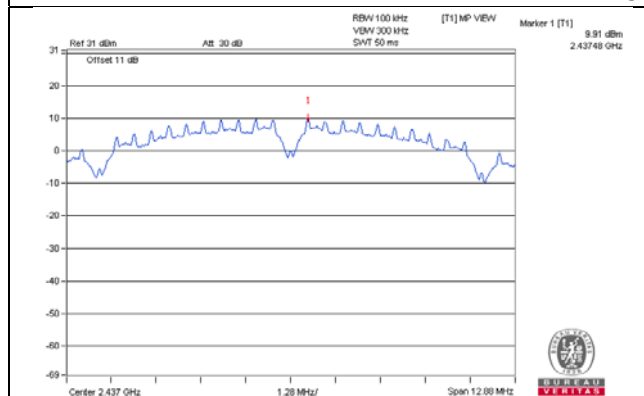
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

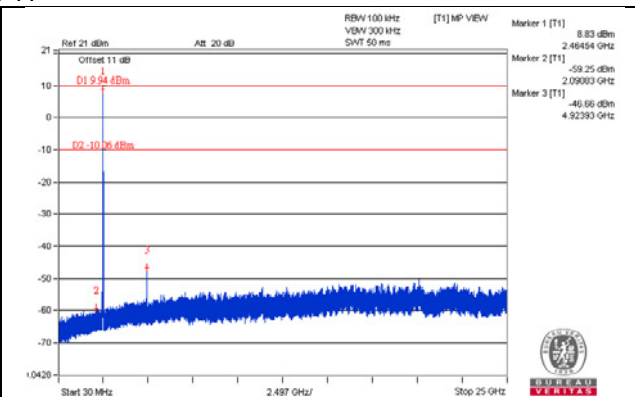
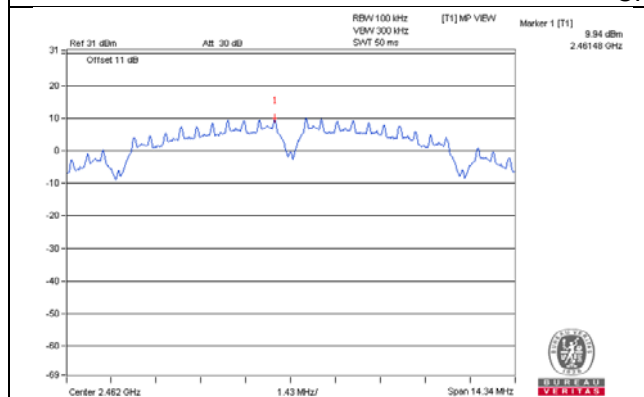
CH 1



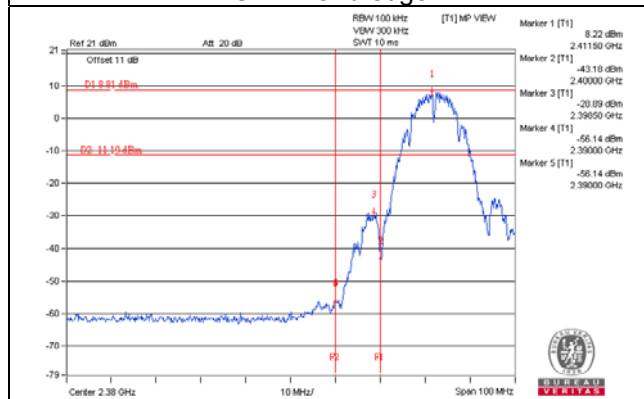
CH 6



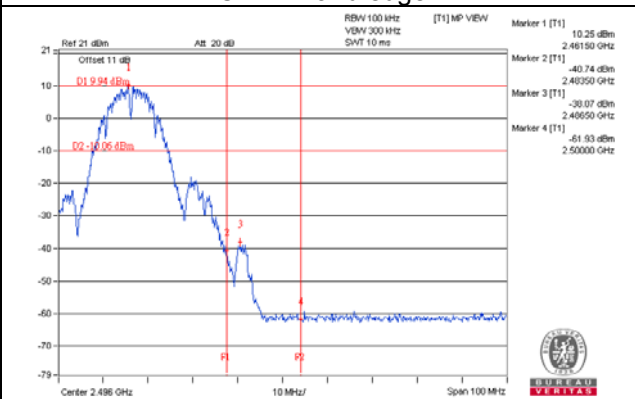
CH 11



CH 1 Band edge

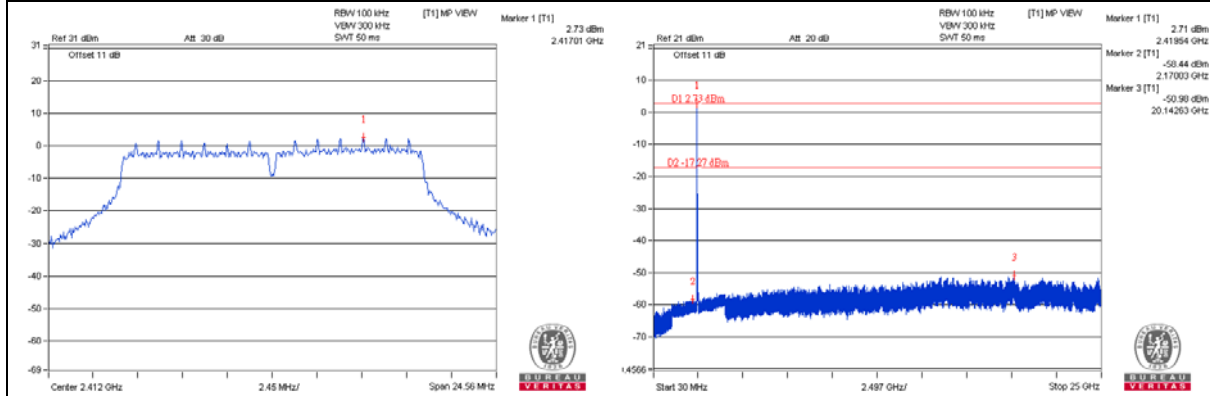


CH 11 Band edge

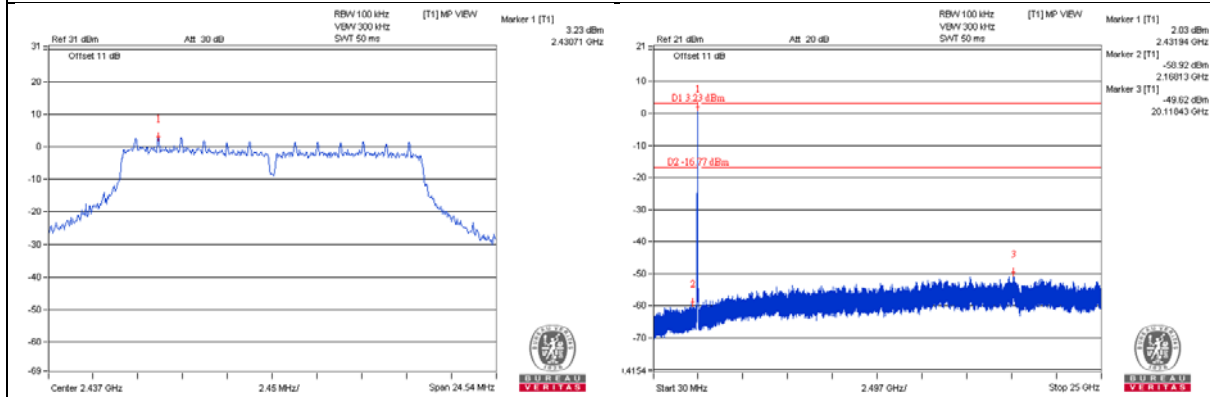


802.11g

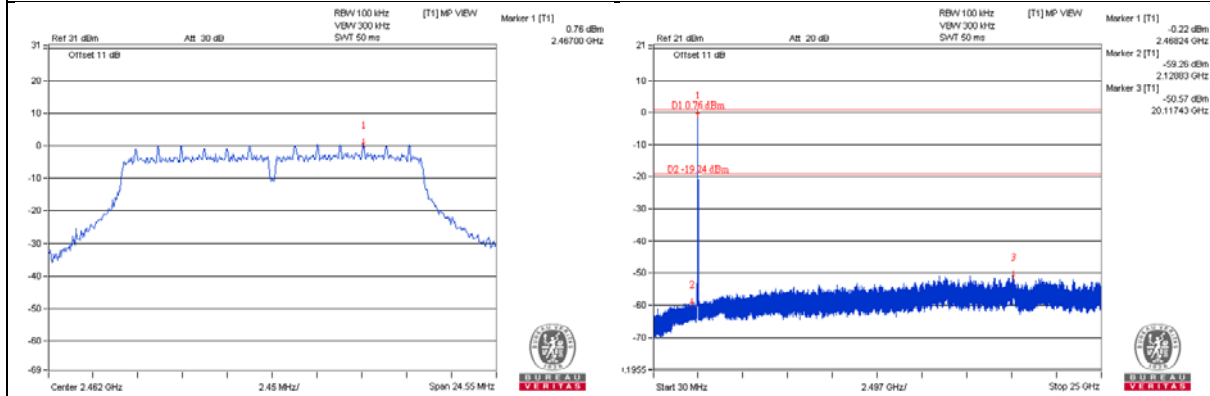
CH 1



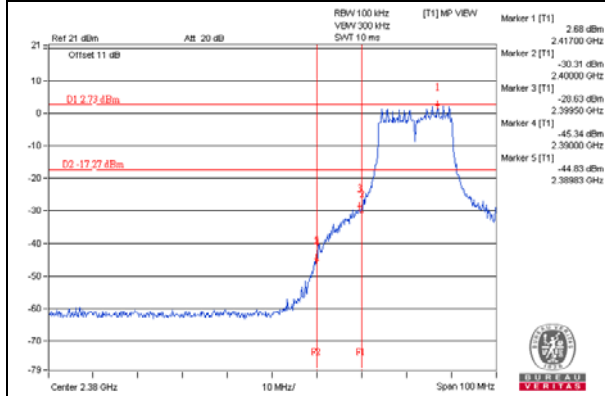
CH 6



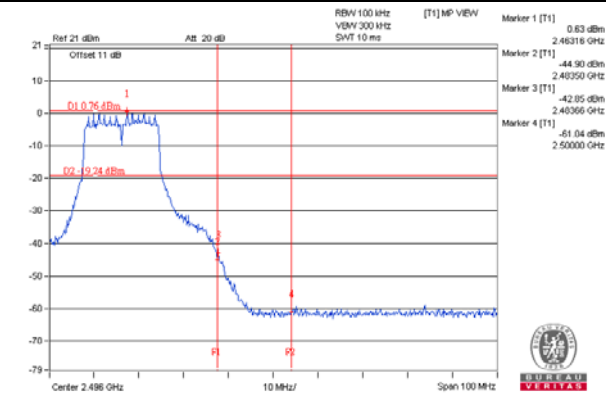
CH 11



CH 1 Band edge

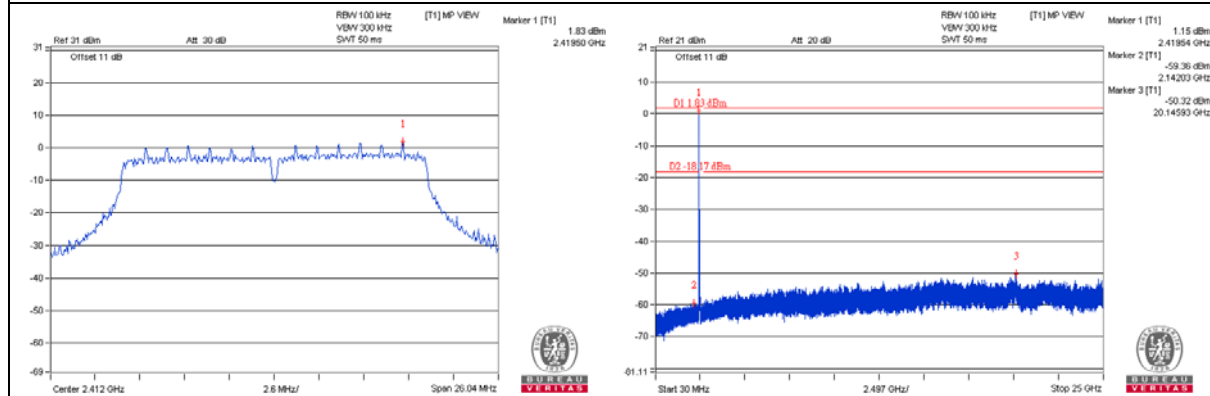


CH 11 Band edge

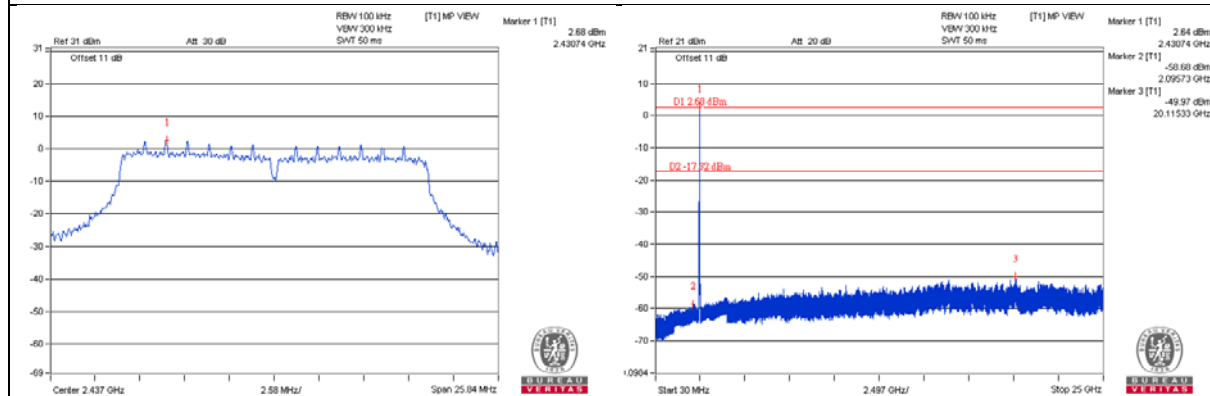


802.11n (HT20)

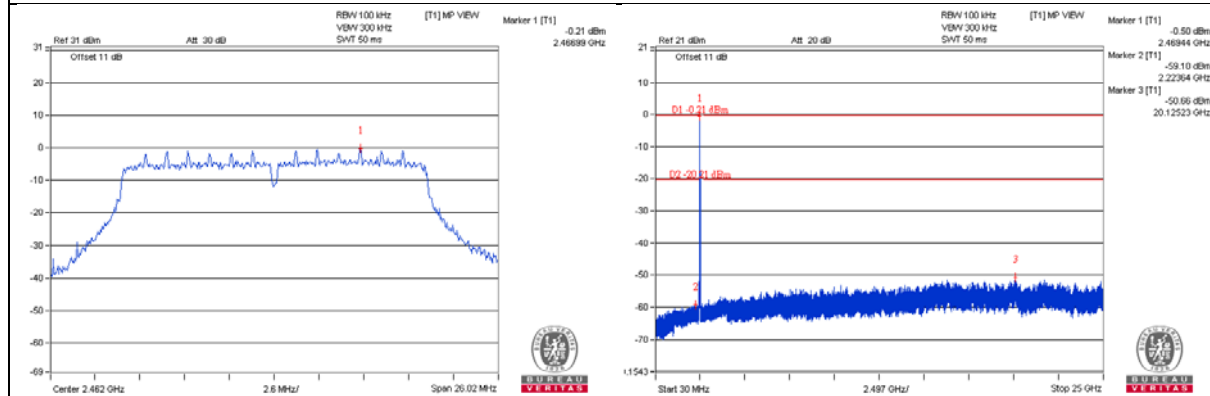
CH 1



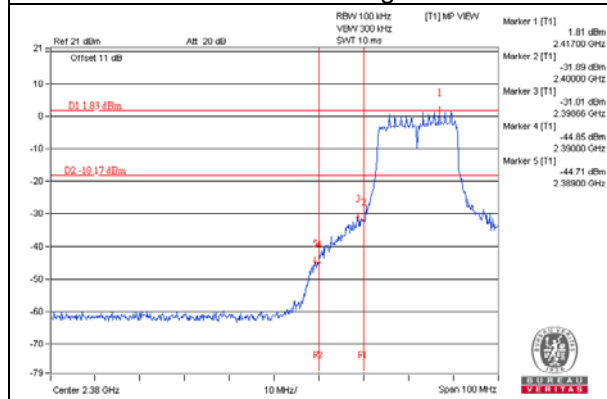
CH 6



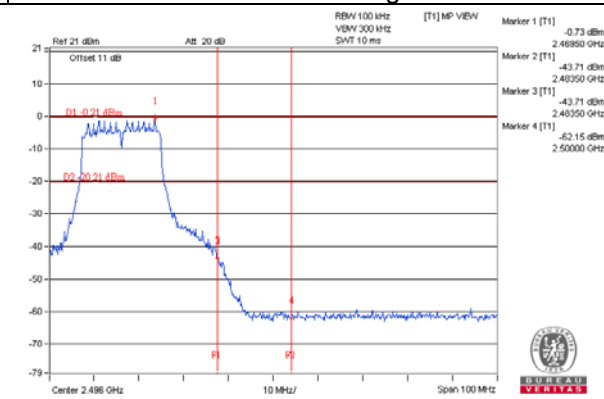
CH 11



CH 1 Band edge



CH 11 Band edge



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:

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

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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