FCC TEST REPORT
(WLAN 15.247)

REPORT NO.:	RF140213E02A
MODEL NO.:	Infobox1
FCC ID:	2ACLF-INFOBOX1
RECEIVED:	June 09, 2014
TESTED:	June 18 to 24, 2014
ISSUED:	June 03, 2015
APPLICANT:	i-Spy Digital Limited
ADDRESS:	Rotterdam House, 116 Quayside, Newcastle-upon-Tyne, NE1 3DY. UK
ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
LAB ADDRESS :	No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.
TEST LOCATION (1):	No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.
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Testing Laboratory
2022

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Table of Contents

RELEASE CONTROL RECORD 4
1. CERTIFICATION 5
2. SUMMARY OF TEST RESULTS 6
2.1 MEASUREMENT UNCERTAINTY 7
3. GENERAL INFORMATION 8
3.1 GENERAL DESCRIPTION OF EUT (WLAN) 8
3.2 DESCRIPTION OF TEST MODES 10
3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL 11
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS 13
3.4 DUTY CYCLE OF TEST SIGNAL 14
3.5 DESCRIPTION OF SUPPORT UNITS 15
3.6 CONFIGURATION OF SYSTEM UNDER TEST 16
4. TEST TYPES AND RESULTS 17
4.1 CONDUCTED EMISSION MEASUREMENT 17
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT 17
4.1.2 TEST INSTRUMENTS 17
4.1.3 TEST PROCEDURES 18
4.1.4 DEVIATION FROM TEST STANDARD 18
4.1.5 TEST SETUP 18
4.1.6 EUT OPERATING CONDITIONS 19
4.1.7 TEST RESULTS 20
4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT 22
4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT 22
4.2.2 TEST INSTRUMENTS 23
4.2.3 TEST PROCEDURES 24
4.2.4 DEVIATION FROM TEST STANDARD 24
4.2.5 TEST SETUP 25
4.2.6 EUT OPERATING CONDITIONS 25
4.2.7 TEST RESULTS 26
4.3 6DB BANDWIDTH MEASUREMENT 36
4.3.1 LIMITS OF 6DB BANDWIDTH MEASUREMENT 36
4.3.2 TEST INSTRUMENTS 36
4.3.3 TEST PROCEDURE 36
4.3.4 DEVIATION FROM TEST STANDARD 36
4.3.5 TEST SETUP 36
4.3.6 EUT OPERATING CONDITIONS 36
4.3.7 TEST RESULTS 37
4.4 CONDUCTED OUTPUT POWER MEASUREMENT 39

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT 39
4.4.2 TEST INSTRUMENTS 39
4.4.3 TEST PROCEDURES 39
4.4.4 DEVIATION FROM TEST STANDARD 39
4.4.5 TEST SETUP 39
4.4.6 EUT OPERATING CONDITIONS 40
4.4.7 TEST RESULTS 41
4.5 POWER SPECTRAL DENSITY MEASUREMENT 43
4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT 43
4.5.2 TEST INSTRUMENTS 43
4.5.3 TEST PROCEDURE 43
4.5.4 DEVIATION FROM TEST STANDARD 43
4.5.5 TEST SETUP 43
4.5.6 EUT OPERATING CONDITION 43
4.5.7 TEST RESULTS 44
4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT 46
4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT 46
4.6.2 TEST INSTRUMENTS 46
4.6.3 TEST PROCEDURE 46
4.6.4 DEVIATION FROM TEST STANDARD 47
4.6.5 TEST SETUP 47
4.6.6 EUT OPERATING CONDITION 47
4.6.7 TEST RESULTS 47
5. PHOTOGRAPHS OF THE TEST CONFIGURATION 51
6. INFORMATION ON THE TESTING LABORATORIES 52
7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB 53

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140213E02A	Original release	June 03, 2015

1. CERTIFICATION

PRODUCT:	DVB-T2 OTT STB
BRAND NAME:	Infotu.be™ Messenger
MODEL NO.:	Infobox1
TEST SAMPLE:	MASS-PRODUCTION
APPLICANT:	i-Spy Digital Limited
TESTED:	June 18 to 24, 2014
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)** ANSI C63.10-2009

The above equipment (Model: Infobox1) 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 : Phoenix Huang , **Date:** June 03, 2015
(Phoenix Huang, Specialist)

Approved By : _____ , **Date:** June 03, 2015
(May Chen, Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -7.36dB at 0.17734MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.2dB at 7386.00MHz
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

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:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Conducted emissions	2.86 dB
Radiated emissions (30MHz-1GHz)	5.37 dB
Radiated emissions (1GHz -6GHz)	3.65 dB
Radiated emissions (6GHz -18GHz)	3.88 dB
Radiated emissions (18GHz -40GHz)	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT (WLAN)

PRODUCT	DVB-T2 OTT STB
MODEL NO.	Infobox1
POWER SUPPLY	12Vdc from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS,OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 72.2Mbps
OPERATING FREQUENCY	2.412 ~ 2.462GHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (HT20)
MAXIMUM OUTPUT POWER	802.11b: 59.02mW 802.11g: 182.81mW 802.11n (HT20): 158.489mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	HDMI Cable (shielded, 1.5m) × 2 AV to AV Cable (unshielded, 2.0m) × 1
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter × 1

NOTE:

1. There are Bluetooth 2.1 EDR and WLAN technology used for the EUT.
2. Bluetooth 2.1 EDR technology and WLAN technology can not transmit at same time.
3. The antenna provided to the EUT, please refer to the following table:

Brand	Model	Ant. Gain (dBi)	Frequency range (GHz to GHz)	Ant. Type	Connecter Type
Unictron	AA055	2	2.4~2.5	Chip	NA

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

Brand	Model No.	Spec.
Atechoem	ADS0248-W 120150	Input: 100-240V, 0.6A, 50/60Hz Output: 12.0V, 1.5A DC output cable(1.5m, unshielded)

5. The EUT incorporates a SISO function.

MODULATION MODE	Data Rate (MCS)	Tx/Rx FUNCTION
802.11b	1 ~ 11Mbps	1TX / 1RX
802.11g	6 ~ 54Mbps	1TX / 1RX
802.11n (HT20)	MCS 0~7	1TX / 1RX

6. The above EUT information was declared by the 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, 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
	PLC	RE < 1G	RE ≥ 1G	APCM	OB	
-	√	√	√	√	√	-

Where **PLC:** Power Line Conducted Emission **RE < 1G:** Radiated Emission below 1GHz

RE ≥ 1G: Radiated Emission above 1GHz **APCM:** Antenna Port Conducted Measurement

OB: Conducted Out-Band Emission Measurement

POWER LINE CONDUCTED EMISSION TEST:

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

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

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

RADIATED EMISSION TEST (BELOW 1 GHz):

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

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

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

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

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

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

ANTENNA PORT CONDUCTED MEASUREMENT:

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

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

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

CONDUCTED OUT-BAND EMISSION MEASUREMENT:

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

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

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

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	26deg. C, 65%RH	120Vac, 60Hz	Ping Liu
RE<1G	24deg. C, 68%RH	120Vac, 60Hz	Robert Cheng
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Chilin Lin
OB	25deg. C, 60%RH	120Vac, 60Hz	Chilin Lin

3.3 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)

558074 D01 DTS Meas Guidance v03r02

ANSI C63.10-2009

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

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

3.4 DUTY CYCLE OF TEST SIGNAL

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

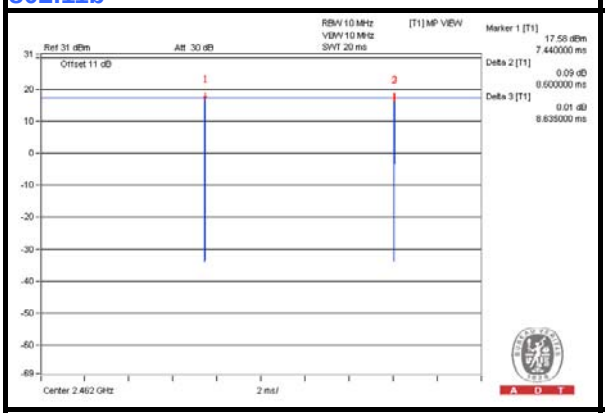
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle = 8.6 ms/8.635 ms = 0.996

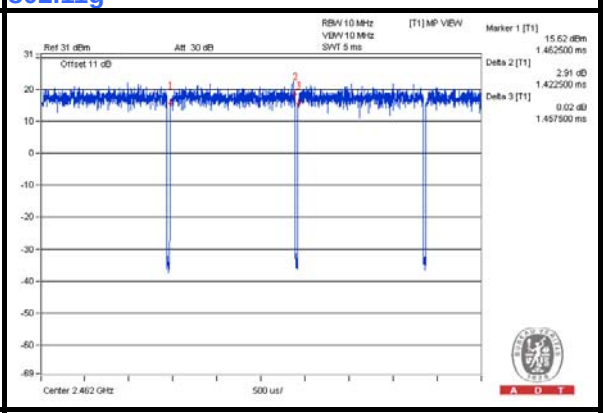
802.11g: Duty cycle = 1.4225 ms/1.4575 ms = 0.976, Duty factor = 10 * log(1/0.976) = 0.1

802.11n (HT20): Duty cycle = 1.33125 ms/1.36625 ms= 0.974, Duty factor = 10 * log(1/0.974) = 0.1

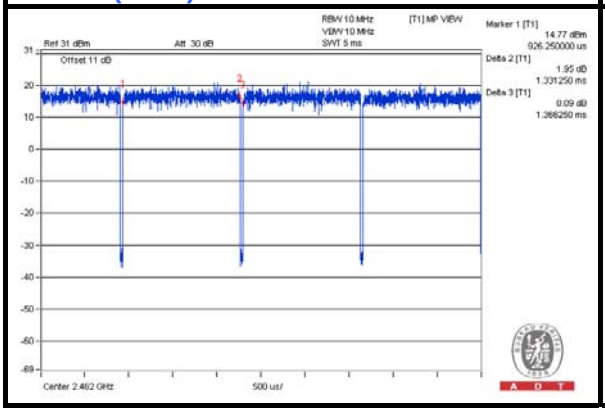
802.11b



802.11g



802.11n (HT20)



3.5 DESCRIPTION OF SUPPORT UNITS

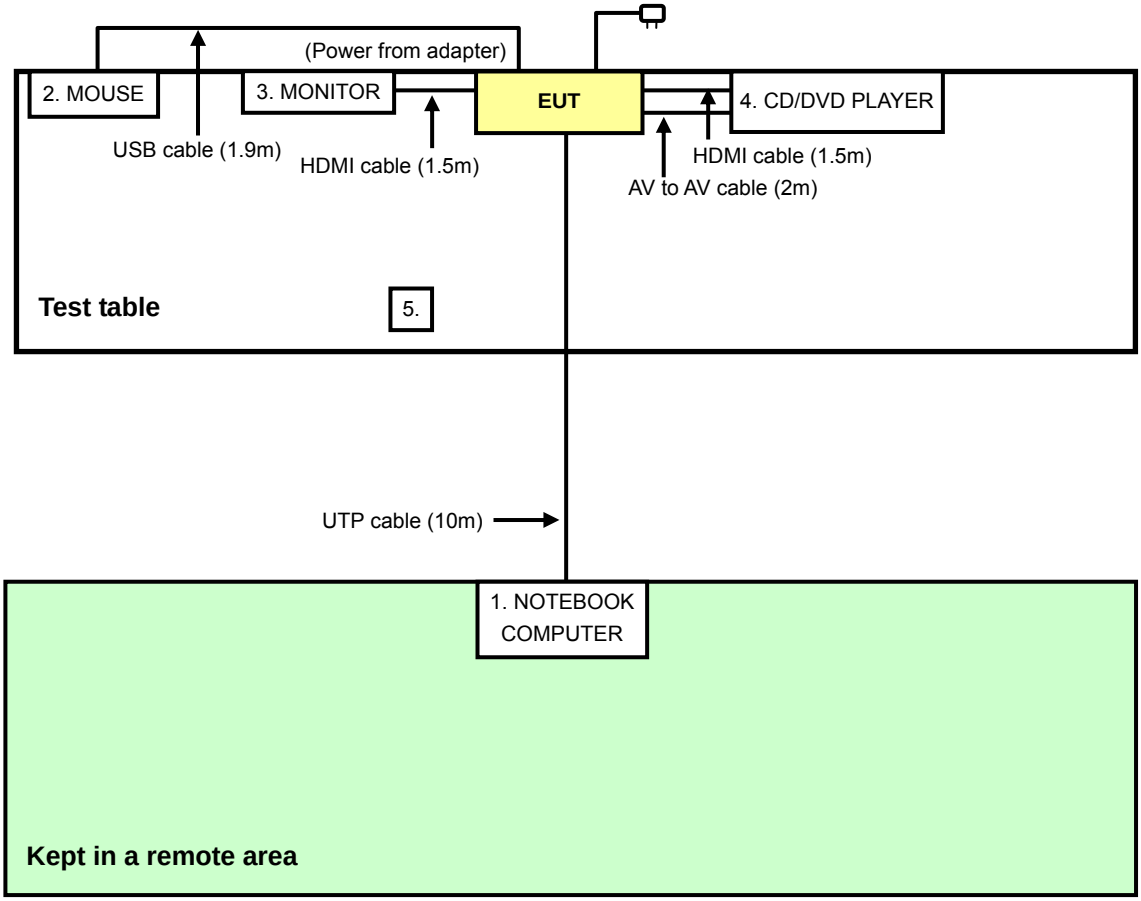
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
2	MOUSE	Agilent	NA	NA	NA
3	MONITOR	DELL	U2410F	CNOJ257M7287 29AG14ML	FCC DoC
4	CD/DVD PLAYER	SONY	DVP-NS718HP	1004056	NA
5	Remote Control	Infotu.be™ Messenger	NA	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP Cable, 10m
2	USB Cable, 1.8m
3	HDMI Cable, shielded, 1.5m
4	HDMI Cable, shielded, 1.5m / AV to AV Cable, unshielded, 2m
5	NA

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

3.6 CONFIGURATION OF SYSTEM UNDER TEST



Note: Support unit 5 is Remote Control.

4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	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 0.50 MHz.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 12, 2013	Sep. 11, 2014
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100071	Nov. 13, 2013	Nov. 12, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10 , 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 24, 2013	Sep. 23, 2014
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2013	Sep. 30, 2014
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 Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: June 18, 2014

4.1.3 TEST PROCEDURES

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

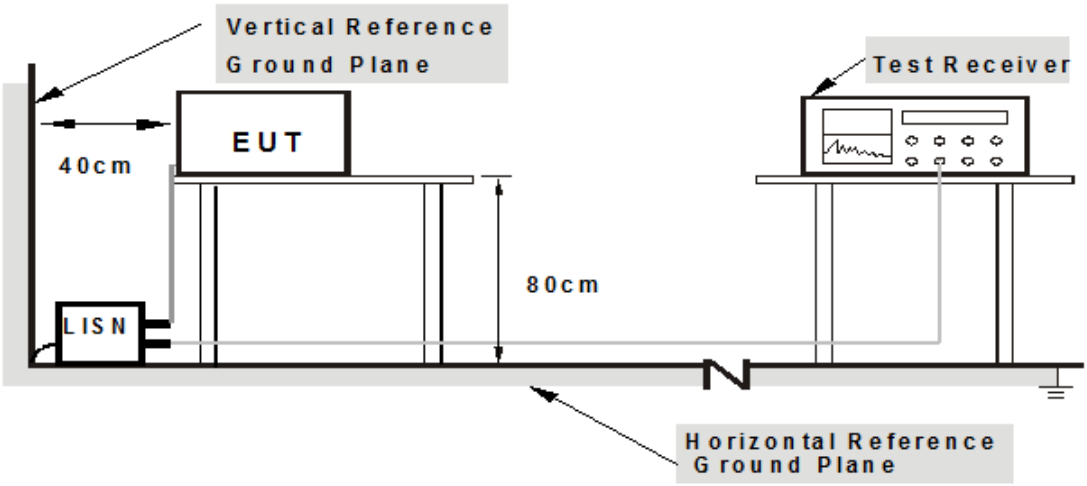
NOTE:

1. The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit 1 (Notebook Computer) which is placed in a remote area.
2. The communication partner run test program “HyperTerminal paste command” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

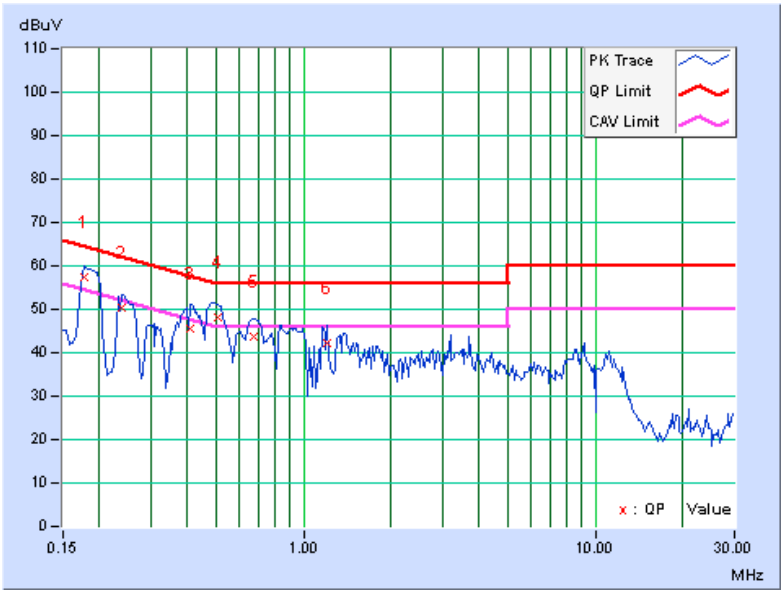
4.1.7 TEST RESULTS

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.17734**	**0.07**	**57.18**	**45.00**	**57.25**	**45.07**	**64.61**	**54.61**	**-7.36**	**-9.54**
2	0.23984	0.07	50.25	38.67	50.32	38.74	62.10	52.10	-11.78	-13.36
3	0.40781	0.09	45.51	30.80	45.60	30.89	57.69	47.69	-12.09	-16.80
4	0.50938	0.10	47.90	35.86	48.00	35.96	56.00	46.00	-8.00	-10.04
5	0.67734	0.11	43.63	31.72	43.74	31.83	56.00	46.00	-12.26	-14.17
6	1.20313	0.14	41.93	32.40	42.07	32.54	56.00	46.00	-13.93	-13.46

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

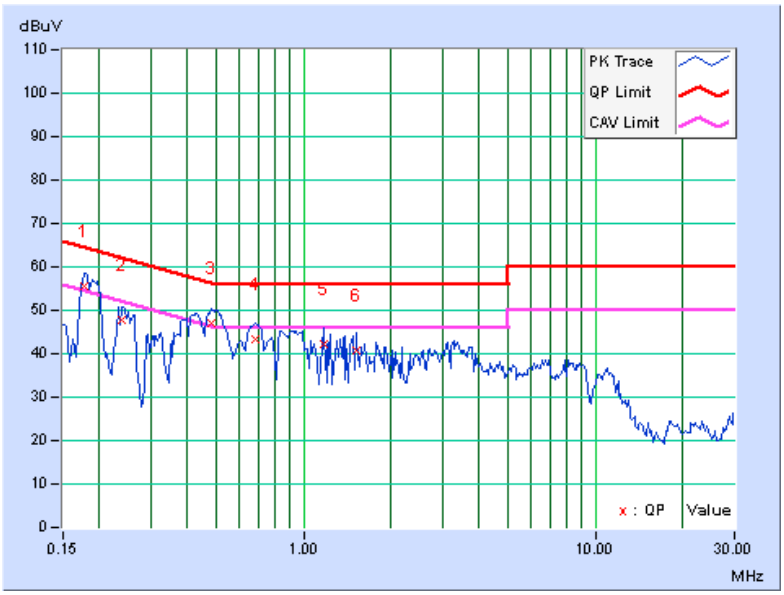


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17734	0.07	55.61	43.76	55.68	43.83	64.61	54.61	-8.93	-10.78
2	0.23984	0.07	47.85	37.20	47.92	37.27	62.10	52.10	-14.18	-14.83
3	0.48594	0.10	46.92	36.07	47.02	36.17	56.24	46.24	-9.22	-10.07
4	0.68516	0.11	43.37	31.15	43.48	31.26	56.00	46.00	-12.52	-14.74
5	1.16797	0.14	42.05	32.71	42.19	32.85	56.00	46.00	-13.81	-13.15
6	1.51563	0.16	40.63	31.38	40.79	31.54	56.00	46.00	-15.21	-14.46

REMARKS:

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



4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.2.1 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.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 21,2014	Jan. 20,2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 05, 2013	Oct. 04, 2014
Spectrum Analyzer R&S	FSV40	100964	July 15, 2013	July 14, 2014
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 18, 2013	Nov. 17, 2014
Pre-Amplifier Agilent	8449B	3008A02578	June 25, 2013	June 24, 2014
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5 The VCCI Site Registration No. is G-137.
6 The CANADA Site Registration No. is IC 7450H-2.
7 Tested Date: June 18 to 19, 2014

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters 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:

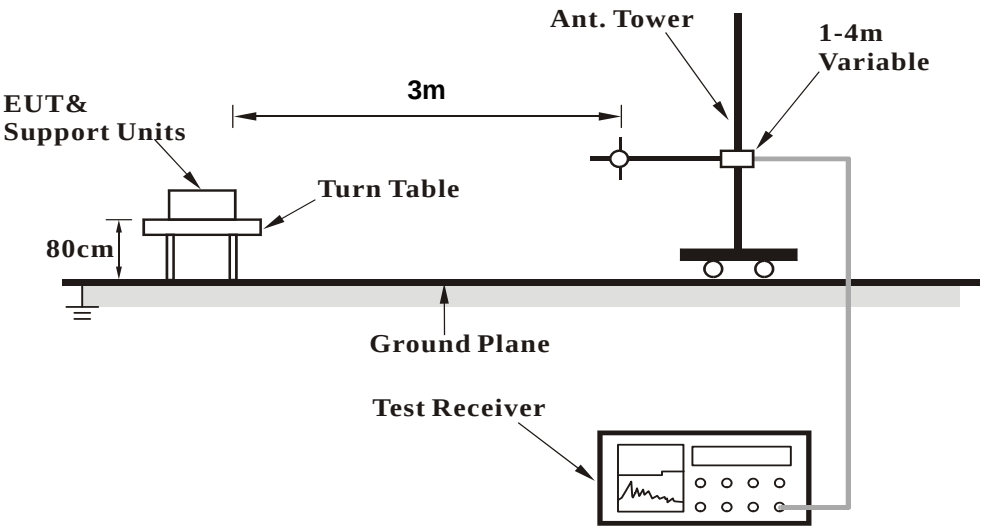
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.2.4 DEVIATION FROM TEST STANDARD

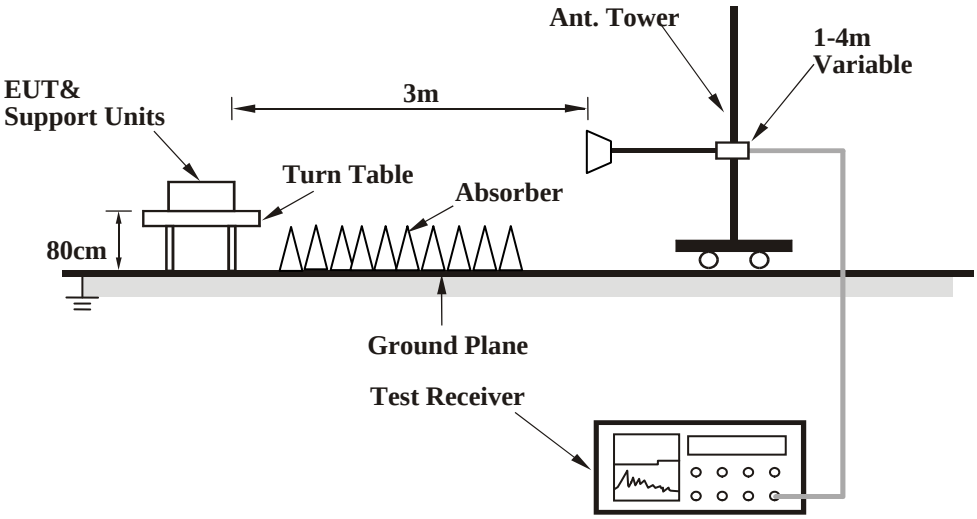
No deviation

4.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11g

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	Below 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	108.04	35.5 QP	43.5	-8.0	1.50 H	315	51.96	-16.50
2	135.00	34.2 QP	43.5	-9.3	2.00 H	53	48.21	-13.97
3	162.02	40.3 QP	43.5	-3.2	1.50 H	360	53.67	-13.38
4	188.98	37.7 QP	43.5	-5.8	2.00 H	29	53.43	-15.69
5	299.22	36.5 QP	46.0	-9.5	1.00 H	67	48.91	-12.39
6	550.02	36.2 QP	46.0	-9.8	1.50 H	335	42.59	-6.39
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	50.47	32.3 QP	40.0	-7.7	1.00 V	187	45.84	-13.56
2	135.00	38.5 QP	43.5	-5.0	1.00 V	59	52.48	-13.97
3	172.83	39.2 QP	43.5	-4.3	1.00 V	221	53.20	-14.03
4	400.01	37.5 QP	46.0	-8.5	1.00 V	206	47.22	-9.73
5	597.16	39.7 QP	46.0	-6.3	1.00 V	205	44.72	-4.99
6	799.65	40.8 QP	46.0	-5.2	1.00 V	206	42.17	-1.40

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

ABOVE 1GHz DATA

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	53.7 PK	74.0	-20.3	1.39 H	82	22.05	31.65
2	2390.00	46.8 AV	54.0	-7.2	1.39 H	82	15.15	31.65
3	*2412.00	100.9 PK			1.39 H	82	69.17	31.73
4	*2412.00	97.5 AV			1.39 H	82	65.77	31.73
5	4824.00	46.4 PK	74.0	-27.6	1.44 H	204	7.51	38.89
6	4824.00	37.0 AV	54.0	-17.0	1.44 H	204	-1.89	38.89
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	47.3 PK	74.0	-26.7	1.00 V	187	15.65	31.65
2	2390.00	36.7 AV	54.0	-17.3	1.00 V	187	5.05	31.65
3	*2412.00	90.8 PK			1.00 V	187	59.07	31.73
4	*2412.00	87.3 AV			1.00 V	187	55.57	31.73
5	4824.00	48.3 PK	74.0	-25.7	1.00 V	168	9.41	38.89
6	4824.00	39.0 AV	54.0	-15.0	1.00 V	168	0.11	38.89

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	102.4 PK			1.38 H	122	70.58	31.82
2	*2437.00	99.8 AV			1.38 H	122	67.98	31.82
3	4874.00	46.4 PK	74.0	-27.6	1.01 H	118	7.35	39.05
4	4874.00	35.1 AV	54.0	-18.9	1.01 H	118	-3.95	39.05
5	7311.00	54.7 PK	74.0	-19.3	1.00 H	215	8.28	46.42
6	7311.00	41.1 AV	54.0	-12.9	1.00 H	215	-5.32	46.42
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	91.1 PK			1.00 V	175	59.28	31.82
2	*2437.00	87.7 AV			1.00 V	175	55.88	31.82
3	4874.00	46.7 PK	74.0	-27.3	1.70 V	134	7.65	39.05
4	4874.00	38.4 AV	54.0	-15.6	1.70 V	134	-0.65	39.05
5	7311.00	54.1 PK	74.0	-19.9	1.00 V	33	7.68	46.42
6	7311.00	41.0 AV	54.0	-13.0	1.00 V	33	-5.42	46.42

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	98.3 PK			1.42 H	82	66.39	31.91
2	*2462.00	93.9 AV			1.42 H	82	61.99	31.91
3	2483.50	48.4 PK	74.0	-25.6	1.42 H	82	16.41	31.99
4	2483.50	37.6 AV	54.0	-16.4	1.42 H	82	5.61	31.99
5	4924.00	46.9 PK	74.0	-27.1	1.44 H	203	7.69	39.21
6	4924.00	37.2 AV	54.0	-16.8	1.44 H	203	-2.01	39.21
7	7386.00	59.5 PK	74.0	-14.5	1.48 H	360	13.05	46.45
8	**7386.00**	**53.8 AV**	**54.0**	**-0.2**	**1.48 H**	**360**	**7.35**	**46.45**

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	94.2 PK			1.01 V	186	62.29	31.91
2	*2462.00	87.3 AV			1.01 V	186	55.39	31.91
3	4924.00	47.9 PK	74.0	-26.1	1.00 V	153	8.69	39.21
4	4924.00	38.8 AV	54.0	-15.2	1.00 V	153	-0.41	39.21
5	7386.00	56.5 PK	74.0	-17.5	2.00 V	8	10.05	46.45
6	7386.00	48.8 AV	54.0	-5.2	2.00 V	8	2.35	46.45

REMARKS:

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

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.3 PK	74.0	-6.7	1.40 H	84	35.65	31.65
2	2390.00	50.6 AV	54.0	-3.4	1.40 H	84	18.95	31.65
3	*2412.00	102.6 PK			1.40 H	84	70.87	31.73
4	*2412.00	91.5 AV			1.40 H	84	59.77	31.73
5	4824.00	46.8 PK	74.0	-27.2	1.39 H	206	7.91	38.89
6	4824.00	37.0 AV	54.0	-17.0	1.39 H	206	-1.89	38.89
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.0 PK	74.0	-18.0	1.06 V	190	24.35	31.65
2	2390.00	48.1 AV	54.0	-5.9	1.06 V	190	16.45	31.65
3	*2412.00	93.5 PK			1.06 V	190	61.77	31.73
4	*2412.00	83.0 AV			1.06 V	190	51.27	31.73
5	4824.00	47.3 PK	74.0	-26.7	1.06 V	143	8.41	38.89
6	4824.00	38.6 AV	54.0	-15.4	1.06 V	143	-0.29	38.89

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	99.8 PK			1.37 H	83	67.98	31.82
2	*2437.00	89.1 AV			1.37 H	83	57.28	31.82
3	4874.00	46.8 PK	74.0	-27.2	1.43 H	211	7.75	39.05
4	4874.00	37.2 AV	54.0	-16.8	1.43 H	211	-1.85	39.05
5	7311.00	59.8 PK	74.0	-14.2	1.41 H	357	13.38	46.42
6	7311.00	47.0 AV	54.0	-7.0	1.41 H	357	0.58	46.42
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	93.7 PK			1.10 V	188	61.88	31.82
2	*2437.00	83.0 AV			1.10 V	188	51.18	31.82
3	4874.00	47.3 PK	74.0	-26.7	1.00 V	155	8.25	39.05
4	4874.00	38.5 AV	54.0	-15.5	1.00 V	155	-0.55	39.05
5	7311.00	56.5 PK	74.0	-17.5	1.49 V	13	10.08	46.42
6	7311.00	48.6 AV	54.0	-5.4	1.49 V	13	2.18	46.42

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	99.4 PK			1.42 H	83	67.49	31.91
2	*2462.00	88.1 AV			1.42 H	83	56.19	31.91
3	2483.50	58.2 PK	74.0	-15.8	1.42 H	83	26.21	31.99
4	2483.50	41.7 AV	54.0	-12.3	1.42 H	83	9.71	31.99
5	4924.00	46.4 PK	74.0	-27.6	1.48 H	205	7.19	39.21
6	4924.00	37.0 AV	54.0	-17.0	1.48 H	205	-2.21	39.21
7	7386.00	60.0 PK	74.0	-14.0	1.44 H	360	13.55	46.45
8	7386.00	47.2 AV	54.0	-6.8	1.44 H	360	0.75	46.45
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	93.6 PK			1.03 V	181	61.69	31.91
2	*2462.00	83.1 AV			1.03 V	181	51.19	31.91
3	2483.50	56.2 PK	74.0	-17.8	1.03 V	181	24.21	31.99
4	2483.50	48.5 AV	54.0	-5.5	1.03 V	181	16.51	31.99
5	4924.00	47.3 PK	74.0	-26.7	1.00 V	146	8.09	39.21
6	4924.00	38.4 AV	54.0	-15.6	1.00 V	146	-0.81	39.21
7	7386.00	55.7 PK	74.0	-18.3	1.58 V	24	9.25	46.45
8	7386.00	48.1 AV	54.0	-5.9	1.58 V	24	1.65	46.45

REMARKS:

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

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.2 PK	74.0	-9.8	1.42 H	84	32.55	31.65
2	2390.00	49.6 AV	54.0	-4.4	1.42 H	84	17.95	31.65
3	*2412.00	100.6 PK			1.42 H	84	68.87	31.73
4	*2412.00	90.3 AV			1.42 H	84	58.57	31.73
5	4824.00	47.3 PK	74.0	-26.7	1.49 H	191	8.41	38.89
6	4824.00	37.3 AV	54.0	-16.7	1.49 H	191	-1.59	38.89
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	55.8 PK	74.0	-18.2	1.06 V	188	24.15	31.65
2	2390.00	48.1 AV	54.0	-5.9	1.06 V	188	16.45	31.65
3	*2412.00	94.0 PK			1.06 V	188	62.27	31.73
4	*2412.00	83.4 AV			1.06 V	188	51.67	31.73
5	4824.00	47.8 PK	74.0	-26.2	1.07 V	161	8.91	38.89
6	4824.00	38.7 AV	54.0	-15.3	1.07 V	161	-0.19	38.89

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	97.8 PK			1.42 H	85	65.98	31.82
2	*2437.00	87.7 AV			1.42 H	85	55.88	31.82
3	4874.00	47.0 PK	74.0	-27.0	1.45 H	215	7.95	39.05
4	4874.00	37.6 AV	54.0	-16.4	1.45 H	215	-1.45	39.05
5	7311.00	59.9 PK	74.0	-14.1	1.43 H	348	13.48	46.42
6	7311.00	47.6 AV	54.0	-6.4	1.43 H	348	1.18	46.42
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	93.5 PK			1.08 V	190	61.68	31.82
2	*2437.00	82.8 AV			1.08 V	190	50.98	31.82
3	4874.00	47.2 PK	74.0	-26.8	1.05 V	148	8.15	39.05
4	4874.00	38.0 AV	54.0	-16.0	1.05 V	148	-1.05	39.05
5	7311.00	56.5 PK	74.0	-17.5	1.54 V	33	10.08	46.42
6	7311.00	48.9 AV	54.0	-5.1	1.54 V	33	2.48	46.42

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	97.0 PK			1.42 H	84	65.09	31.91
2	*2462.00	86.8 AV			1.42 H	84	54.89	31.91
3	2483.50	55.3 PK	74.0	-18.7	1.42 H	84	23.31	31.99
4	2483.50	40.2 AV	54.0	-13.8	1.42 H	84	8.21	31.99
5	4924.00	47.2 PK	74.0	-26.8	1.43 H	212	7.99	39.21
6	4924.00	37.7 AV	54.0	-16.3	1.43 H	212	-1.51	39.21
7	7386.00	59.5 PK	74.0	-14.5	1.43 H	346	13.05	46.45
8	7386.00	47.2 AV	54.0	-6.8	1.43 H	346	0.75	46.45
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	93.8 PK			1.05 V	192	61.89	31.91
2	*2462.00	83.1 AV			1.05 V	192	51.19	31.91
3	2483.50	55.9 PK	74.0	-18.1	1.05 V	192	23.91	31.99
4	2483.50	48.3 AV	54.0	-5.7	1.05 V	192	16.31	31.99
5	4924.00	47.5 PK	74.0	-26.5	1.04 V	166	8.29	39.21
6	4924.00	38.4 AV	54.0	-15.6	1.04 V	166	-0.81	39.21
7	7386.00	56.8 PK	74.0	-17.2	1.87 V	10	10.35	46.45
8	7386.00	48.7 AV	54.0	-5.3	1.87 V	10	2.25	46.45

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.

4.3 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 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 15, 2013	July 14, 2014

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. Tested date : June 24, 2014

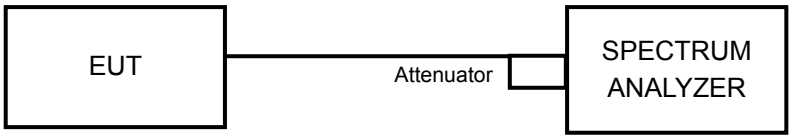
4.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100kHz.
2. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. 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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



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 RESULTS

802.11b

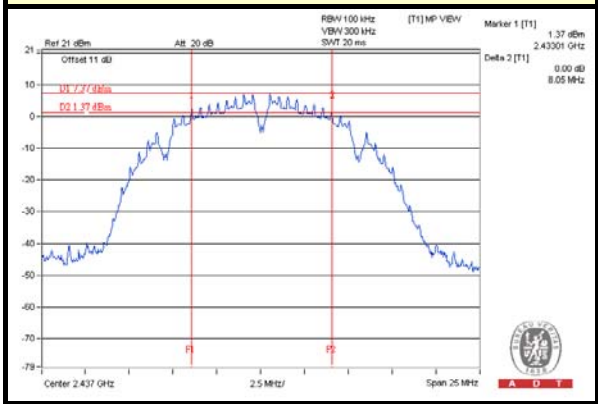
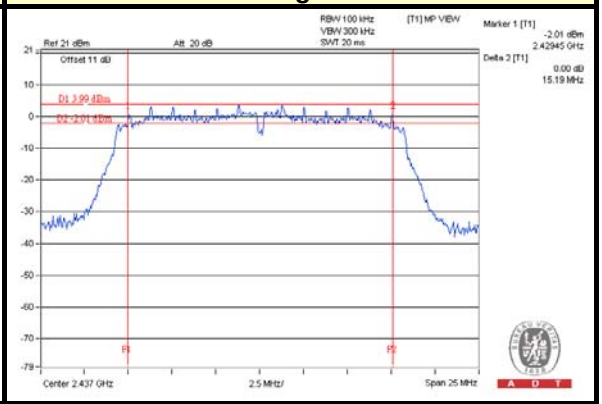
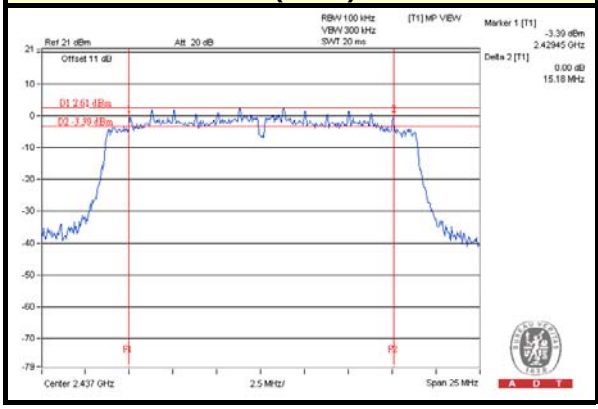
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	8.10	0.5	PASS
6	2437	8.05	0.5	PASS
11	2462	8.09	0.5	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.39	0.5	PASS
6	2437	15.19	0.5	PASS
11	2462	15.34	0.5	PASS

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.98	0.5	PASS
6	2437	15.18	0.5	PASS
11	2462	15.23	0.5	PASS

SPECTRUM PLOT OF WORST VALUE	
802.11b / CH6	**802.11g / CH6**
	
802.11n (HT20) / CH6	
	

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 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power meter Anritsu	ML2495A	1014008	Apr. 30, 2014	Apr. 29, 2015
Power sensor Anritsu	MA2411B	0917122	Apr. 30, 2014	Apr. 29, 2015

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. Tested date : June 24, 2014

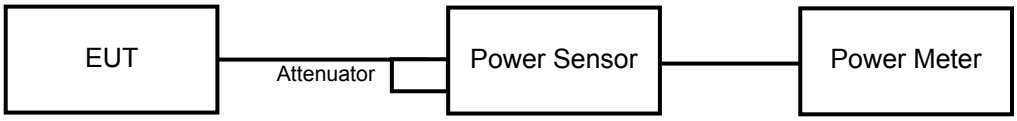
4.4.3 TEST PROCEDURES

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

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.7 TEST RESULTS

FOR PEAK POWER

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	54.954	17.40	30	PASS
6	2437	59.02	17.71	30	PASS
11	2462	54.2	17.34	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	182.81	22.62	30	PASS
6	2437	164.437	22.16	30	PASS
11	2462	166.725	22.22	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	158.489	22.00	30	PASS
6	2437	144.877	21.61	30	PASS
11	2462	114.551	20.59	30	PASS

FOR AVERAGE POWER

802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	28.119	14.49
6	2437	28.708	14.58
11	2462	28.119	14.49

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	23.388	13.69
6	2437	21.928	13.41
11	2462	22.909	13.60

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	18.621	12.70
6	2437	17.947	12.54
11	2462	16.788	12.25

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 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 15, 2013	July 14, 2014

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. Tested date : June 24, 2014

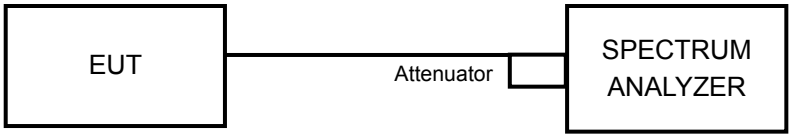
4.5.3 TEST PROCEDURE

1. Set the RBW = 3 kHz, VBW =10 kHz, Detector = peak.
2. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
3. Use the peak marker function to determine the maximum amplitude level.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.5.7 TEST RESULTS

802.11b

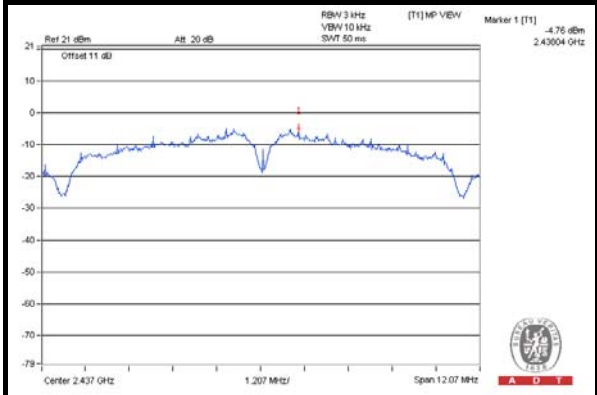
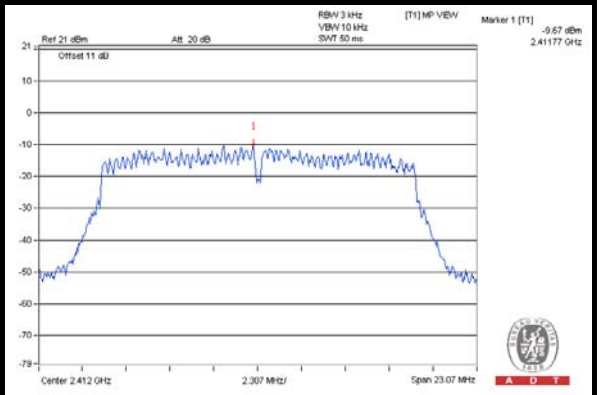
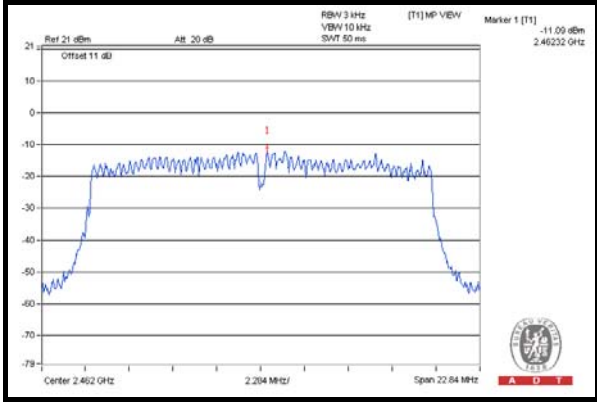
CHANNEL	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-6.01	8	PASS
6	2437	-4.76	8	PASS
11	2462	-6.90	8	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-9.67	8	PASS
6	2437	-9.88	8	PASS
11	2462	-10.32	8	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-11.60	8	PASS
6	2437	-11.78	8	PASS
11	2462	-11.09	8	PASS

SPECTRUM PLOT OF WORST VALUE	
802.11b / CH6	**802.11g / CH1**
	
802.11n (HT20) / CH11	
	

4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 15, 2013	July 14, 2014

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. Tested date : June 24, 2014

4.6.3 TEST PROCEDURE

Measurement Procedure - Reference Level

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

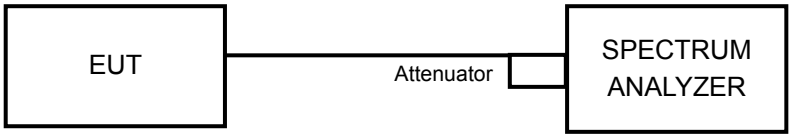
Measurement Procedure –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

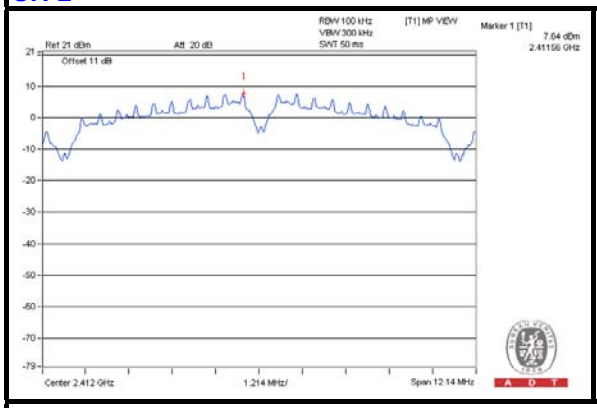
Same as Item 4.3.6

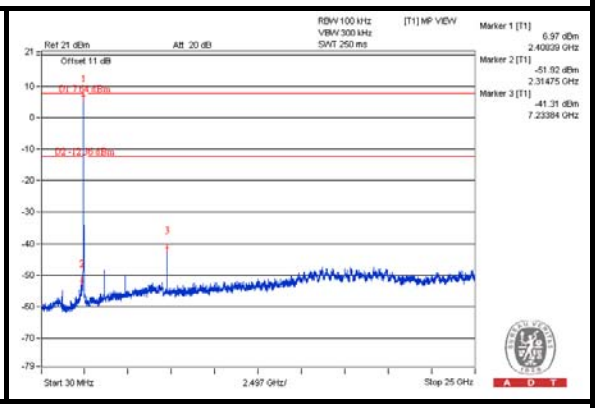
4.6.7 TEST RESULTS

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.

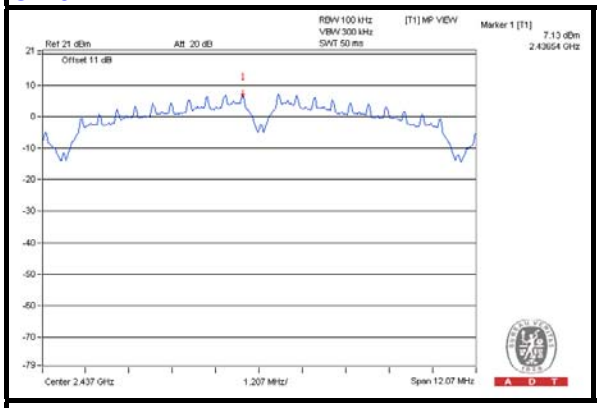
802.11b

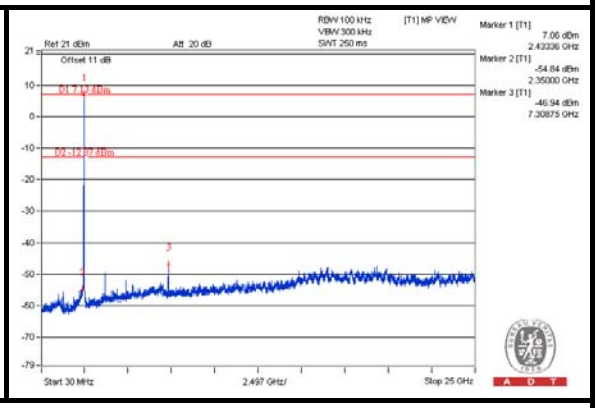
CH 1



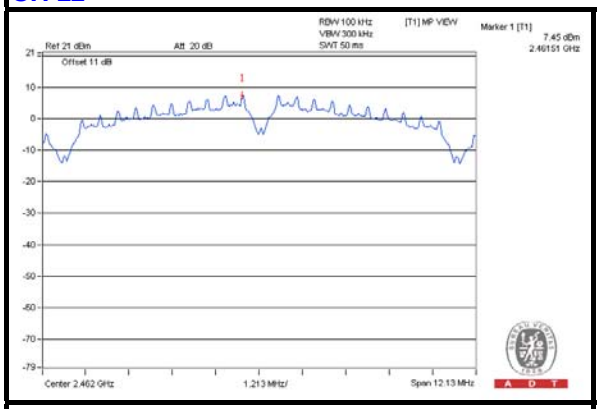


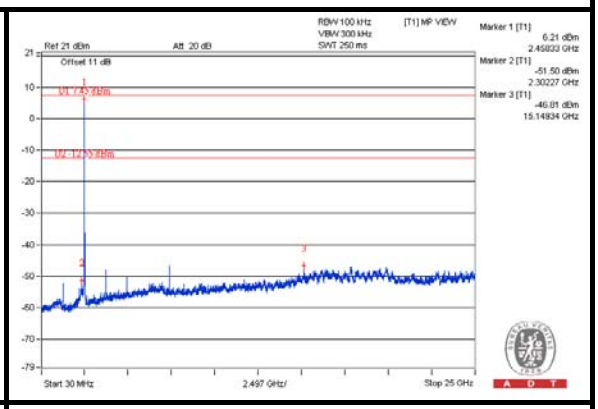
CH 6



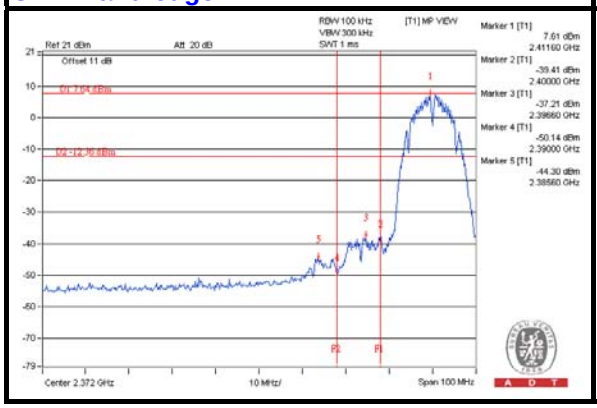


CH 11

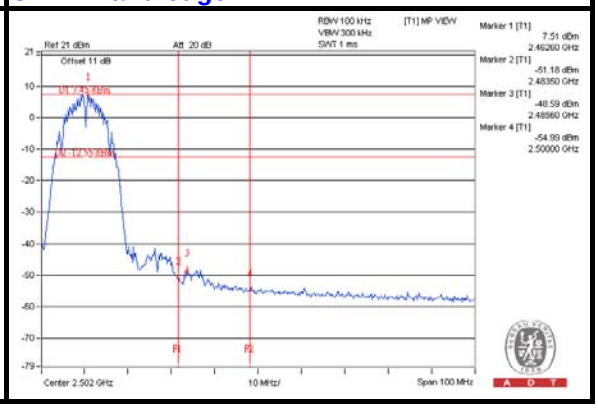




CH 1 Band edge

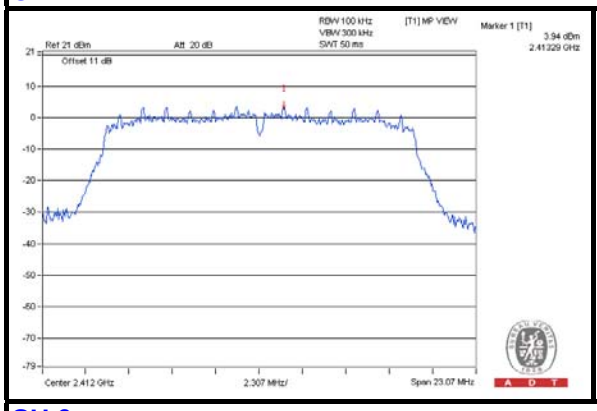


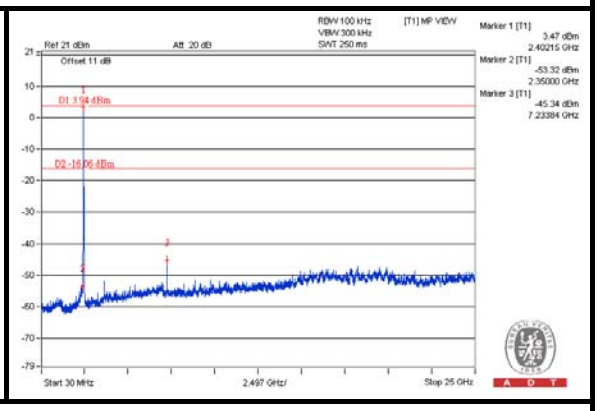
CH 11 Band edge



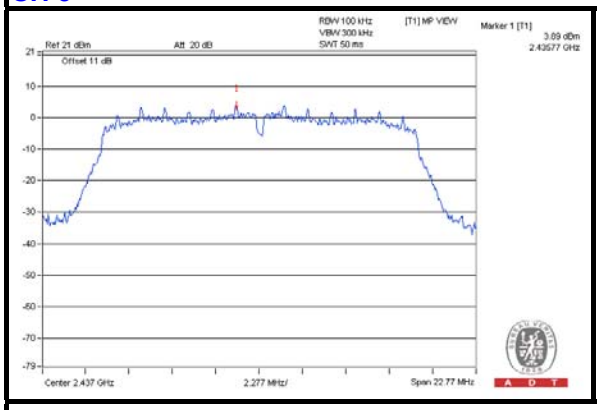
802.11g

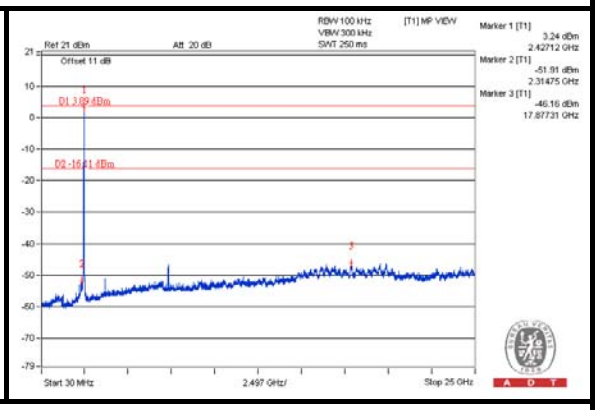
CH 1



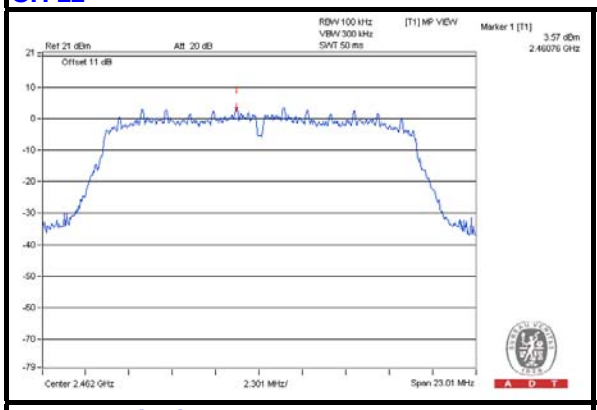


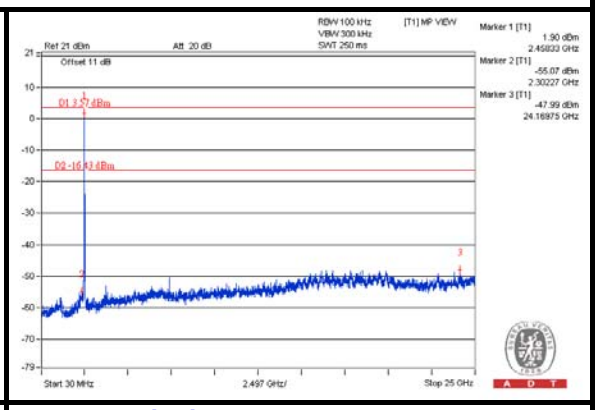
CH 6



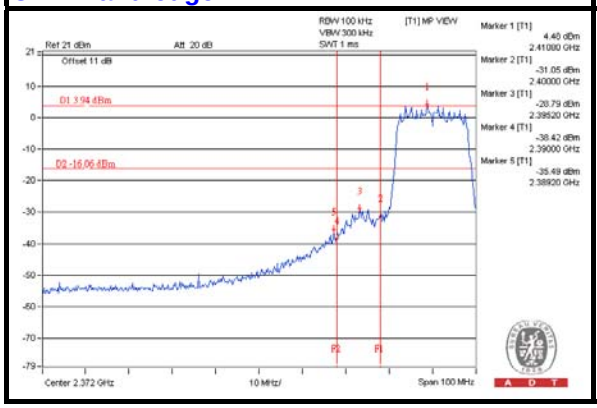


CH 11

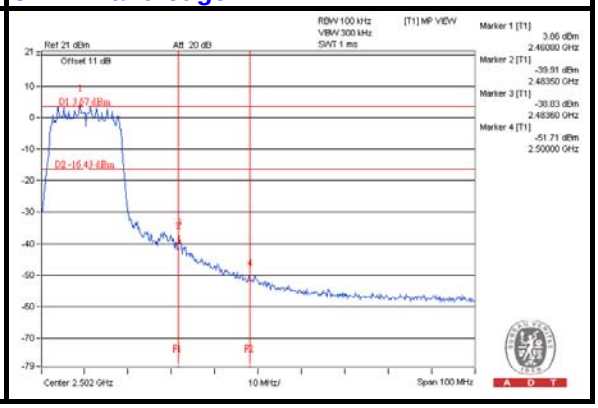




CH 1 Band edge

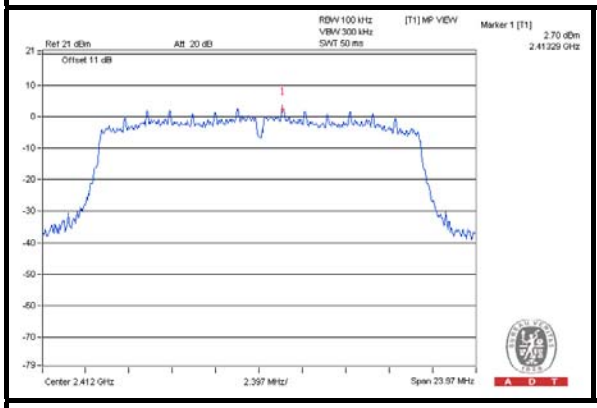


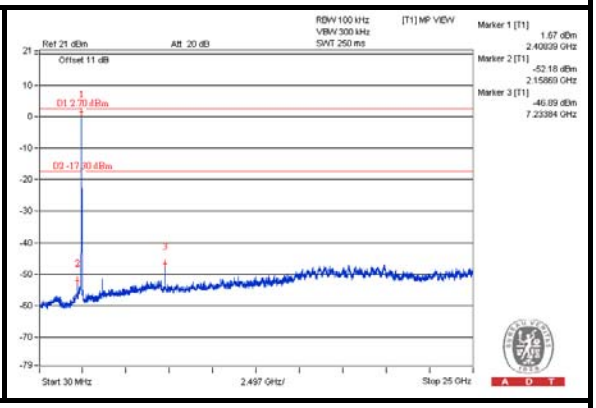
CH 11 Band edge



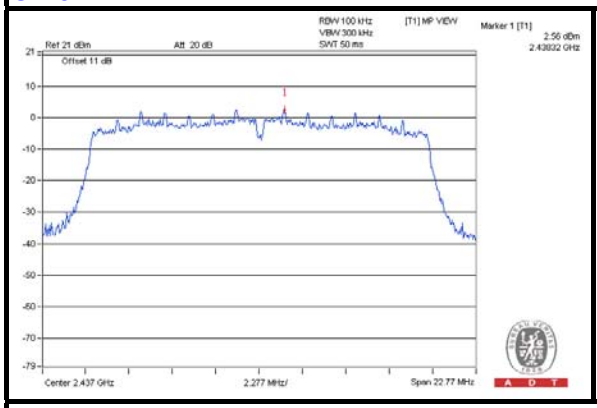
802.11n (HT20)

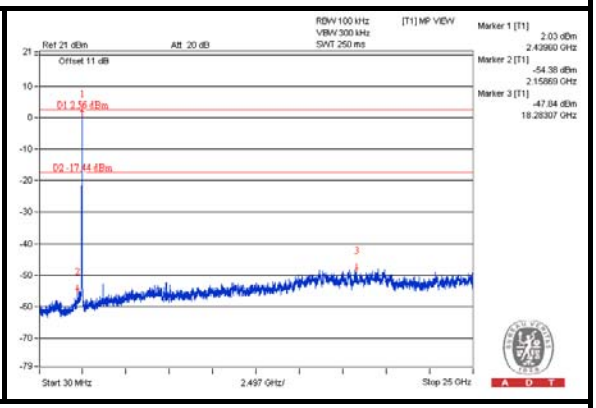
CH 1





CH 6





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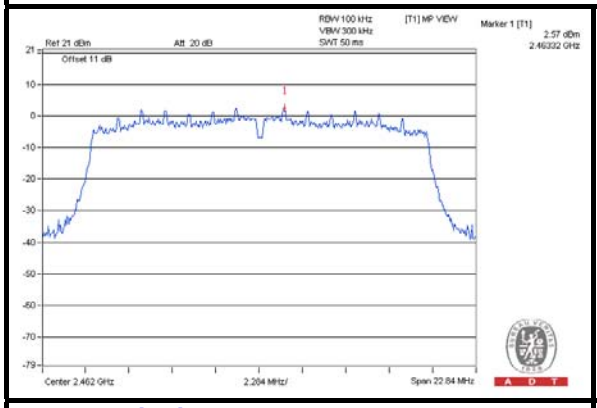
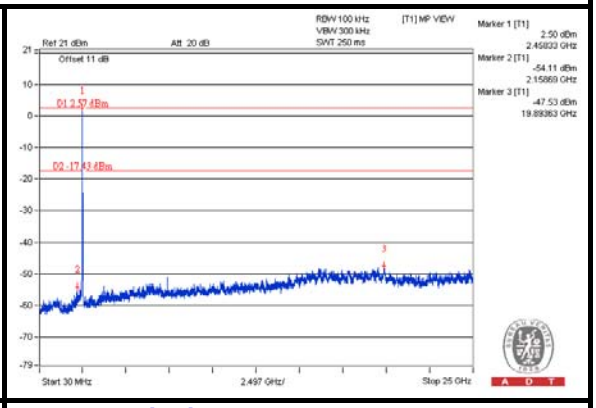
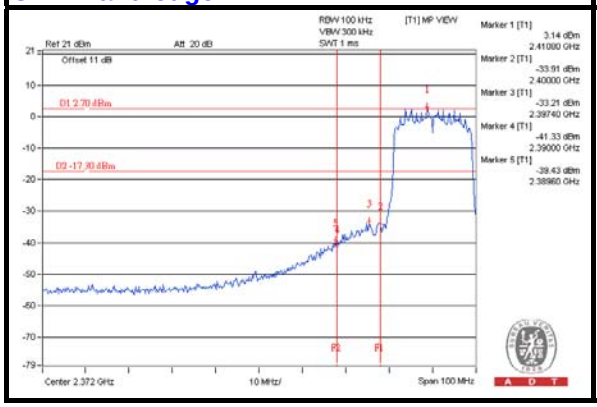
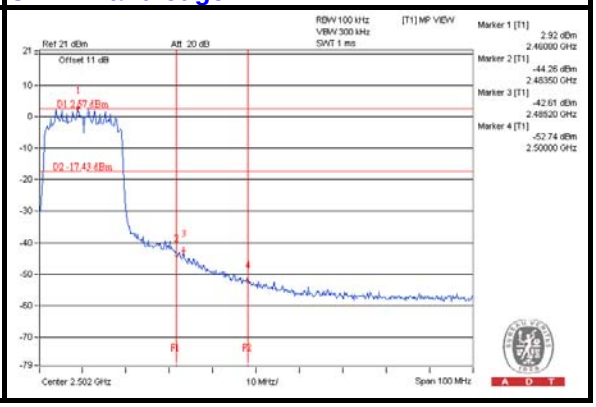




CH 1 Band edge



CH 11 Band edge



5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6. 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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The address and road map of all our labs can be found in our web site also.

7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

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