FCC TEST REPORT

REPORT NO.:	RF980622H08
MODEL NO.:	O-R0002
RECEIVED:	June 22, 2009
TESTED:	June 23 to 25, 2009
ISSUED:	July 06, 2009
APPLICANT:	Logitech Inc. - Canada
ADDRESS:	2355 Skymark Avenue, Suite 200 Mississauga, ON Canada L4W 4Y6
ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
LAB LOCATION:	No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

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1 CERTIFICATION

PRODUCT :	Blaster Receiver
BRAND NAME :	Logitech
MODEL NO. :	O-R0002
TESTED:	June 23 to 25, 2009
APPLICANT :	Logitech Inc. - Canada
TEST ITEM:	R&D SAMPLE
STANDARDS :	47 CFR Part 15, Subpart C (Section 15.247) ANSI C63.4-2003

The above equipment (Model: O-R0002) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : _____ , **DATE:** July 06, 2009
(Claire Kuan, Specialist)

TECHNICAL ACCEPTANCE : _____ , **DATE:** July 06, 2009
Responsible for RF
(Hank Chung, Deputy Manager)

APPROVED BY : _____ , **DATE:** July 06, 2009
(May Chen, Deputy Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	**Test Type and Limit**	**Result**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is –16.65dB at 0.318 MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit
15.247(c)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is –2.95 dB at 2381.4 MHz
15.247(d)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit
15.247(c)	Conducted Out-Band Emission Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.

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	2.44 dB
Radiated emissions (30MHz-1GHz)	3.94 dB
Radiated emissions (1GHz ~18GHz)	2.49 dB
Radiated emissions (18GHz ~20GHz)	2.70 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Blaster Receiver
MODEL NO.	O-R0002
FCC ID	TOB-OR0002
POWER SUPPLY	DC 5.5V from power adapter
MODULATION TYPE	O-QPSK
CARRIER FREQUENCY OF EACH CHANNEL	2405MHz ~ 2480MHz
NUMBER OF CHANNEL	16
OUTPUT POWER	1.932mW
ANTENNA TYPE	PCB printed quarter wave antenna (Antenna Gain : 2.91dBi)
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	Power adapter Mini Blaster IR Cable (Shielded, 2.57m) x 2

NOTE:

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

Brand:	Logitech
Model No.:	KSAA0550080W1US
Input power :	100-240V 50/60Hz 0.18A
Output power :	5.5V 0.8A

2. 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

Sixteen channels are provided to this EUT.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2405	4	2425	8	2445	12	2465
1	2410	5	2430	9	2450	13	2470
2	2415	6	2435	10	2455	14	2475
3	2420	7	2440	11	2460	15	2480

NOTE:

1. Below 1 GHz, the channel 0, 7, and 15 were pre-tested in chamber. The channel 0, worst case one, was chosen for final test.
2. Above 1 GHz, the channel 0, 7, and 15 were tested individually.

3.3 TEST MODE APPLICABLITY AND TESTED CHANNEL DETAIL:

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
-	√	√	√	√	NA

Where PLC: Power Line Conducted Emission RE<1G: Radiated Emission below 1GHz
RE≥1G: Radiated Emission above 1GHz APCM: Antenna Port Conducted 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.

Available Channel	Tested Channel	Modulation Type	Data Rate (Mbps)
0 to 15	0	O-QPSK	0.25

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.

Available Channel	Tested Channel	Modulation Type	Data Rate (Mbps)
0 to 15	0	O-QPSK	0.25

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.

Available Channel	Tested Channel	Modulation Type	Data Rate (Mbps)
0 to 15	0, 7, 15	O-QPSK	0.25

Bandedge 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.

Available Channel	Tested Channel	Modulation Type	Data Rate (Mbps)
0 to 15	0, 15	O-QPSK	0.25

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.

Available Channel	Tested Channel	Modulation Type	Data Rate (Mbps)
0 to 15	0, 7, 15	O-QPSK	0.25

3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

47 CFR Part 15, Subpart C. (15.247)
ANSI C63.4 : 2003

All tests 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 47 CFR Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

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.

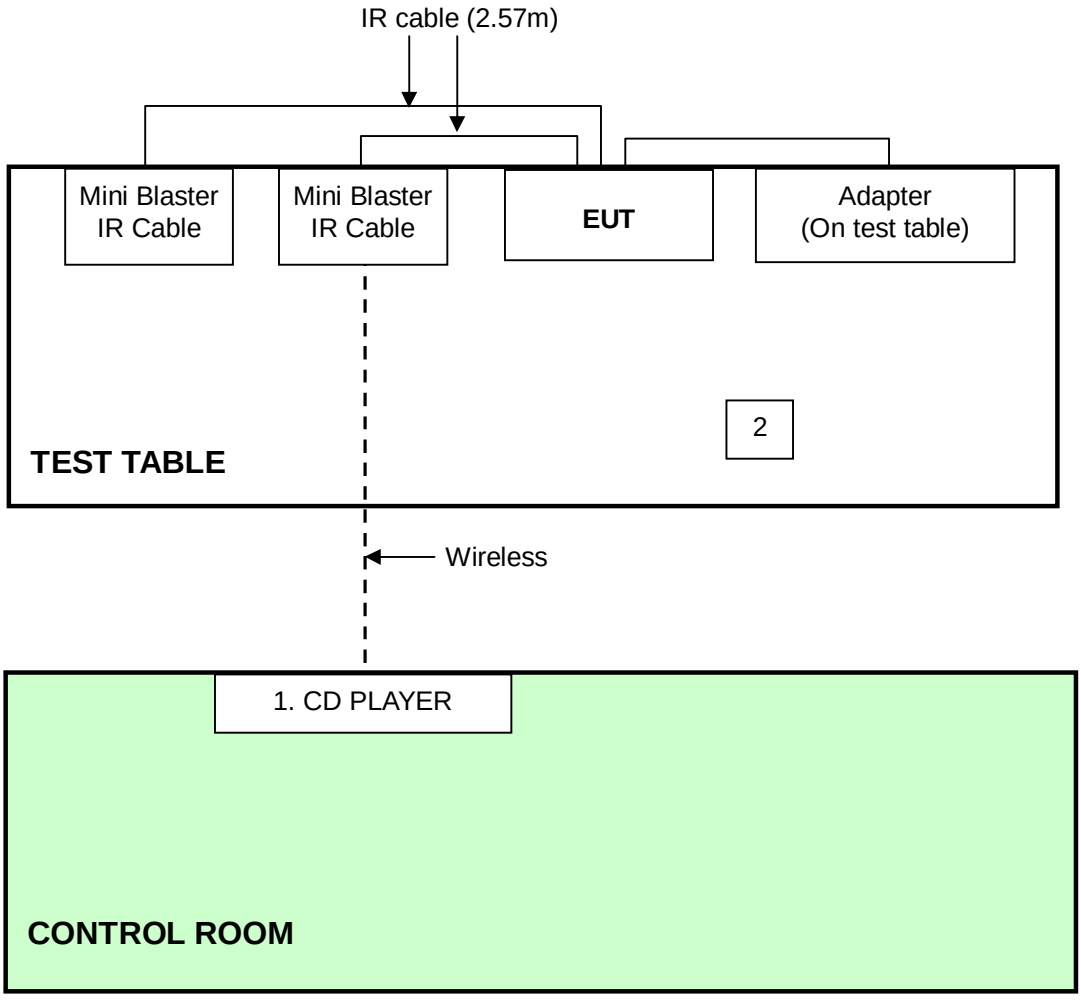
No.	Product	Brand	Model No.	Serial No.	FCC ID
1	CD PLAYER	PHILIPS	MCM240/21T	NA	NA
2	Remote control H900	Logitech	N-R0001	NA	NA

No.	Signal cable description
1	NA
2	NA

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

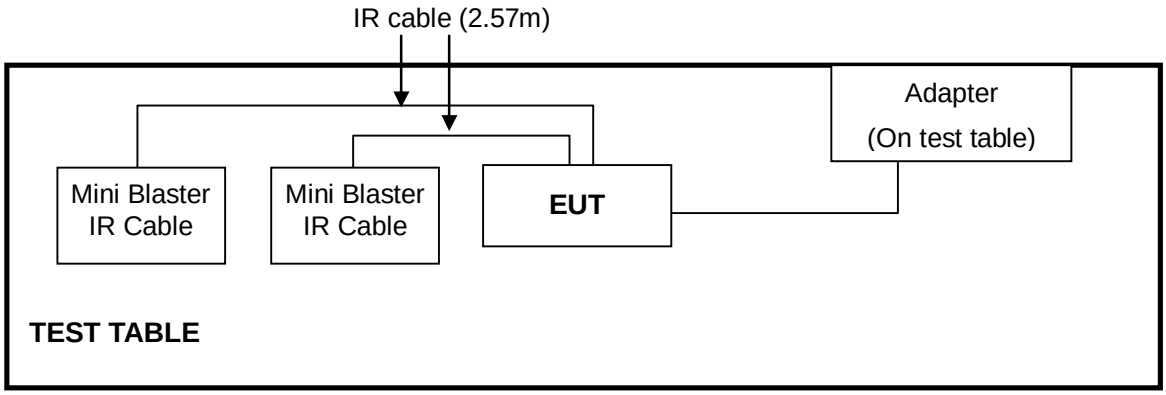
3.6 CONFIGURATION OF SYSTEM UNDER TEST

For Conducted test:



NOTE: 1. Item 2 is the remote control of the EUT.

For radiated test:



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 0.5-5 5-30	66 to 56 56 60	56 to 46 46 50

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. All emanations from a class B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	100287	Mar. 05, 2009	Mar. 04, 2010
Line-Impedance Stabilization Network (for EUT)	KNW-407	8-1395-12	May 04, 2009	May 03, 2010
Line-Impedance Stabilization Network (for Peripheral)	ENV-216	100072	June 08, 2009	June 07, 2010
RF Cable (JYEBAO)	5DFB	COACAB-001	Dec 15, 2008	Dec 14, 2009
50 ohms Terminator	50	3	Nov. 05, 2008	Nov. 04, 2009
Software	BV ADT_Cond_V7.3.7	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. A.
3 The VCCI Con A Registration No. is C-817.

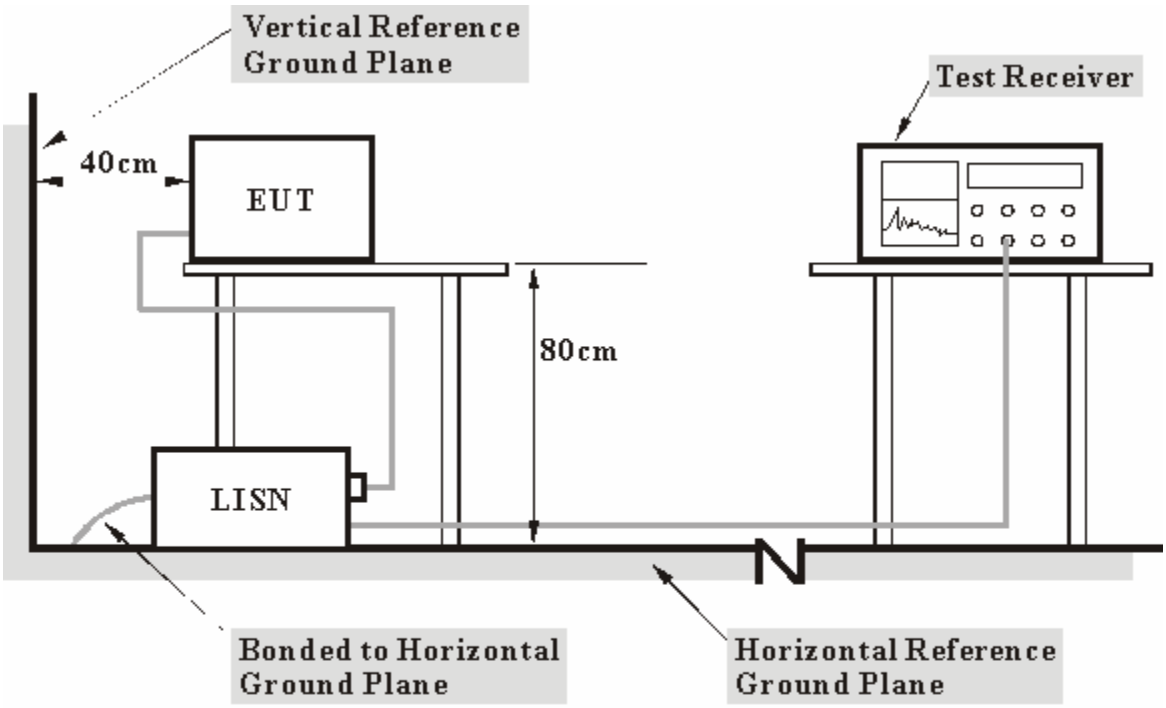
4.1.3 TEST PROCEDURES

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

b. Both lines of the power mains connected to the EUT/HOST were checked for maximum conducted interference.

c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

4.1.4 TEST SETUP



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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

4.1.5 DEVIATION FROM TEST STANDARD

No deviation

4.1.6 EUT OPERATING CONDITIONS

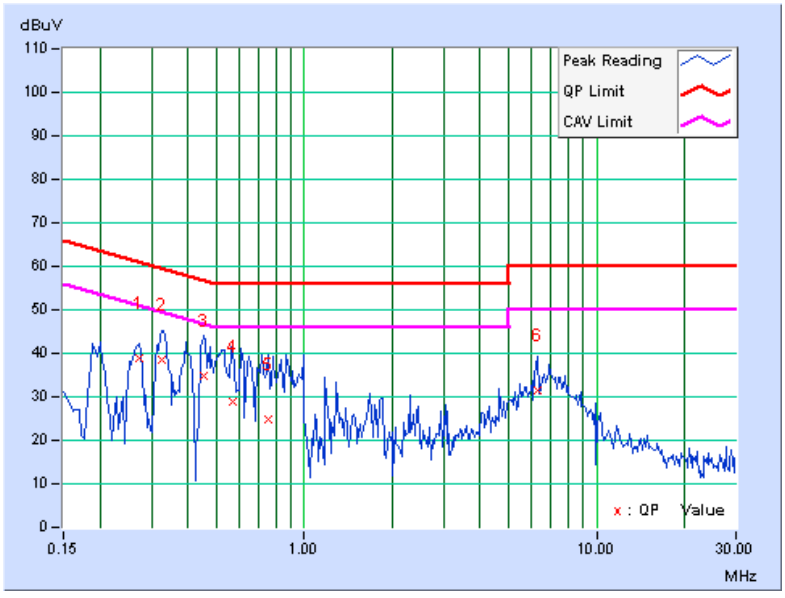
1. Turn on the power of EUT.
2. The EUT under typical use condition.
3. The EUT communicate with CD Player via Mini Blaster IR Cable.

4.1.7 TEST RESULTS

TEST MODE	Mode 1	PHASE	Line (L)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25 deg. C, 60 % RH, 965 hPa	TESTED BY	Max Tseng

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.271	0.14	38.89	-	39.03	-	61.08	51.08	-22.06	-
2	0.326	0.11	38.23	-	38.34	-	59.56	49.56	-21.21	-
3	0.451	0.08	34.92	-	35.00	-	56.86	46.86	-21.86	-
4	0.568	0.07	28.88	-	28.95	-	56.00	46.00	-27.05	-
5	0.752	0.07	24.87	-	24.94	-	56.00	46.00	-31.06	-
6	6.270	0.17	31.16	-	31.33	-	60.00	50.00	-28.67	-

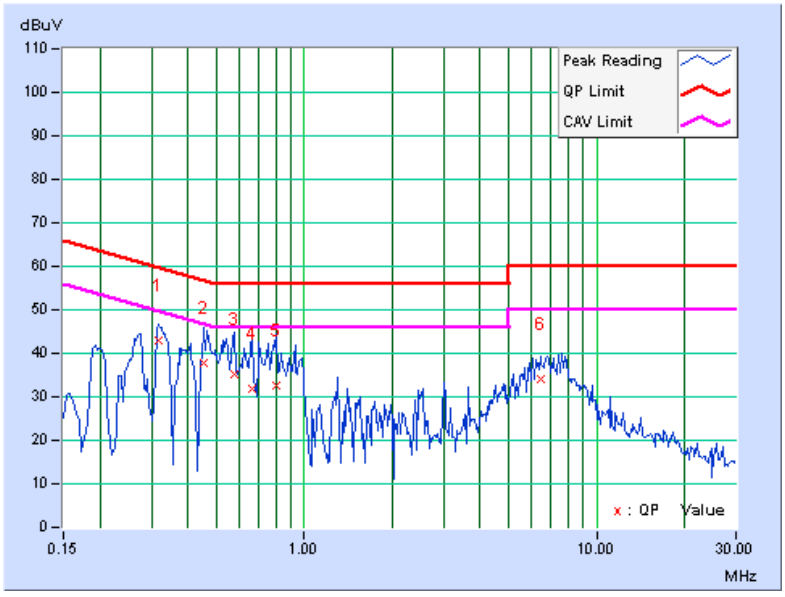
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



TEST MODE	Mode 1	**PHASE**	Neutral (N)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	25 deg. C, 60 % RH, 965 hPa	**TESTED BY**	Max Tseng

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.318**	**0.13**	**42.98**	**-**	**43.11**	**-**	**59.76**	**49.76**	**-16.65**	**-**
2	0.455	0.09	37.70	-	37.79	-	56.79	46.79	-19.00	-
3	0.580	0.09	35.12	-	35.21	-	56.00	46.00	-20.79	-
4	0.666	0.09	31.72	-	31.81	-	56.00	46.00	-24.19	-
5	0.798	0.08	32.55	-	32.63	-	56.00	46.00	-23.37	-
6	6.422	0.20	33.77	-	33.97	-	60.00	50.00	-26.03	-

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

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. As shown in 15.35(b), 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
ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100036	Dec. 09, 2008	Dec. 08, 2009
HP Pre_Amplifier	8449B	3008A01923	Nov. 10, 2008	Nov. 09, 2009
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Sep. 09, 2008	Sep. 08, 2009
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	April 29, 2009	April 28, 2010
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 09, 2008	Dec. 08, 2009
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 22, 2009	Jan. 21, 2010
R&S Loop Antenna	HFH2-Z2	100070	Jan. 14, 2008	Jan. 13, 2010
RF Switches	EMH-011	08009	Oct. 07, 2008	Oct. 06, 2009
RF CABLE (Chaintek)	Sucoflex 106	28077	Aug. 15, 2008	Aug. 14, 2009
RF Cable	8DFB	STCCAB-30M-1GHz	Oct. 07, 2008	Oct. 06, 2009
Software	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	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, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: FSP40) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 7450G-3.

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. 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 antenna is a broadband antenna, and its height 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.

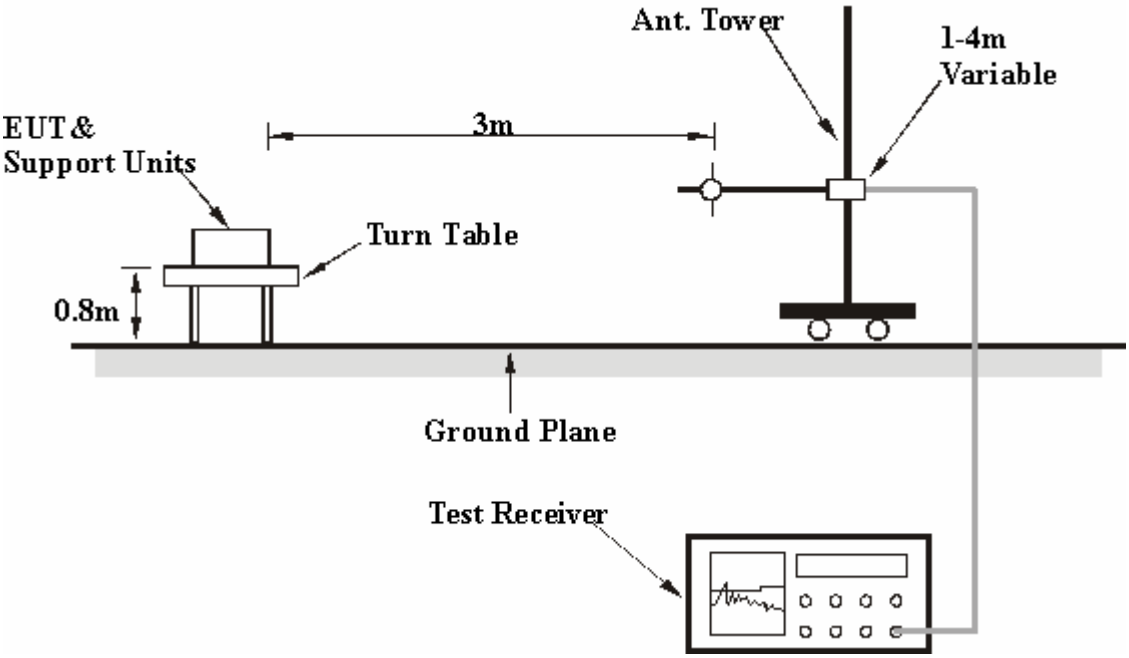
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.2.4 TEST SETUP



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

4.2.5 DEVIATION FROM TEST STANDARD

No deviation

4.2.6 EUT OPERATING CONDITIONS

1. Turn on the power of EUT.
2. The EUT under typical use condition.

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25.0deg. C, 55.0%RH 965hPa	TESTED BY	Frank Liu

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	114.42	30.42 QP	43.50	-13.08	1.59 H	88	18.45	11.97
2	171.64	27.85 QP	43.50	-15.65	1.59 H	240	12.72	15.13
3	247.91	29.00 QP	46.00	-17.00	1.00 H	20	14.83	14.17
4	296.00	22.64 QP	46.00	-23.36	1.00 H	9	6.06	16.58
5	353.20	26.89 QP	46.00	-19.11	1.00 H	271	8.68	18.21
6	419.60	23.03 QP	46.00	-22.97	1.00 H	42	2.95	20.08
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	57.21	33.52 QP	40.00	-6.48	1.34 V	19	19.83	13.69
2	190.92	29.71 QP	43.50	-13.79	1.00 V	4	16.76	12.95
3	238.38	28.33 QP	46.00	-17.67	1.00 V	234	14.51	13.82
4	267.00	28.52 QP	46.00	-17.48	1.00 V	58	13.39	15.13
5	353.20	25.39 QP	46.00	-20.61	1.00 V	75	7.18	18.21
6	627.25	29.51 QP	46.00	-16.49	1.00 V	168	4.20	25.31

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.

ABOVE 1GHz DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25.0deg. C, 55.0%RH 965hPa	TESTED BY	Frank Liu

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	2381.40	65.05 PK	74.00	-8.95	1.44 H	347	34.80	30.25
2	**2381.40**	**51.05 AV**	**54.00**	**-2.95**	**1.44 H**	**347**	**20.80**	**30.25**
3	*2405.00	97.72 PK			1.46 H	6	67.38	30.34
4	*2405.00	83.72 AV			1.46 H	6	53.38	30.34
5	4810.00	50.08 PK	74.00	-23.92	1.50 H	187	13.33	36.75
6	4810.00	36.08 AV	54.00	-17.92	1.50 H	187	-0.67	36.75
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	2381.40	63.47 PK	74.00	-10.53	1.46 V	272	33.22	30.25
2	2381.40	49.47 AV	54.00	-4.53	1.46 V	272	19.22	30.25
3	*2405.00	93.50 PK			1.46 V	195	63.16	30.34
4	*2405.00	79.50 AV			1.46 V	195	49.16	30.34
5	4810.00	49.67 PK	74.00	-24.33	1.46 V	295	12.92	36.75
6	4810.00	35.67 AV	54.00	-18.33	1.46 V	295	-1.08	36.75

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. The limit value is defined as per 15.247
6. " * " : Fundamental frequency
7. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula: 20 log (Duty cycle) = 20 log (2.4 ms / 12.2 ms) = -14 dB

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25.0deg. C, 55.0%RH 965hPa	TESTED BY	Frank Liu

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	*2440.00	97.26 PK			1.44 H	7	66.79	30.47
2	*2440.00	83.26 AV			1.44 H	7	52.79	30.47
3	4880.00	50.40 PK	74.00	-23.60	1.68 H	172	13.46	36.94
4	4880.00	36.40 AV	54.00	-17.60	1.68 H	172	-0.54	36.94
5	7320.00	52.60 PK	74.00	-21.40	1.06 H	73	9.47	43.13
6	7320.00	38.60 AV	54.00	-15.40	1.06 H	73	-4.53	43.13
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2440.00	97.10 PK			1.02 V	213	66.63	30.47
2	*2440.00	83.10 AV			1.02 V	213	52.63	30.47
3	4880.00	48.30 PK	74.00	-25.70	1.35 V	86	11.36	36.94
4	4880.00	34.30 AV	54.00	-19.70	1.35 V	86	-2.64	36.94
5	7320.00	51.70 PK	74.00	-22.30	1.28 V	137	8.57	43.13
6	7320.00	37.70 AV	54.00	-16.30	1.28 V	137	-5.43	43.13

REMARKS:

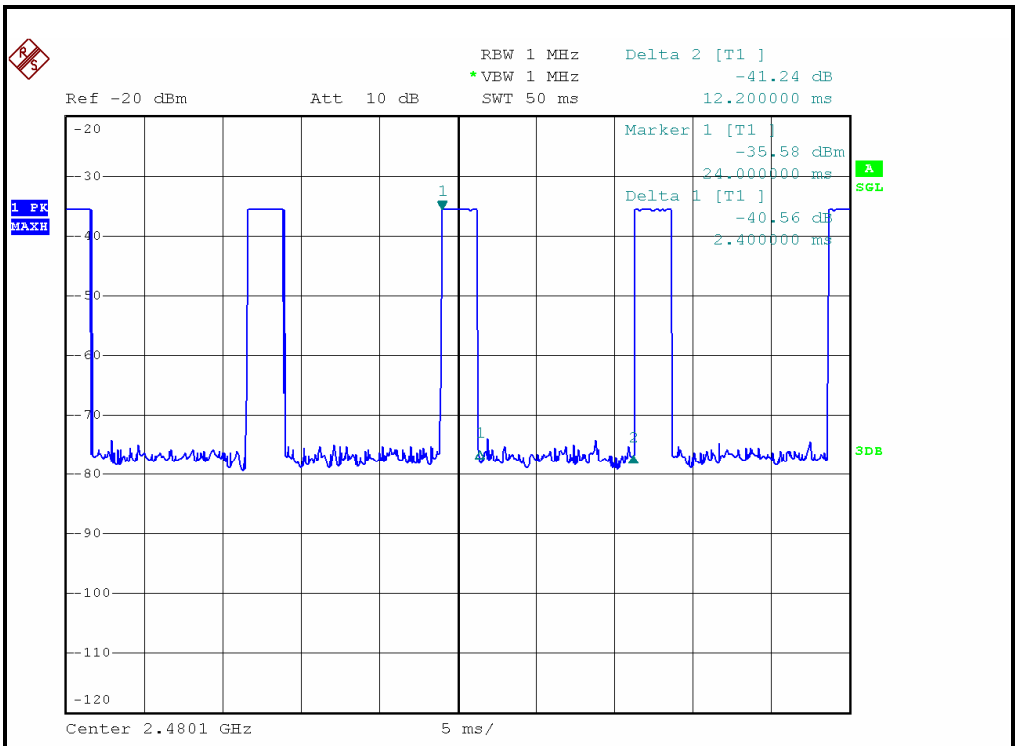
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. The limit value is defined as per 15.247
6. " * " : Fundamental frequency
7. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula: 20 log (Duty cycle) = 20 log (2.4 ms / 12.2 ms) = -14 dB

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 15	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25.0deg. C, 55.0%RH 965hPa	TESTED BY	Frank Liu

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	*2480.00	96.87 PK			1.07 H	357	66.25	30.62
2	*2480.00	82.87 AV			1.07 H	357	52.25	30.62
3	2484.80	60.35 PK	74.00	-13.65	1.07 H	357	29.72	30.63
4	2484.80	46.35 AV	54.00	-7.65	1.07 H	357	15.72	30.63
5	4960.00	51.30 PK	74.00	-22.70	1.54 H	173	14.15	37.15
6	4960.00	37.30 AV	54.00	-16.70	1.54 H	173	0.15	37.15
7	7440.00	52.90 PK	74.00	-21.10	1.07 H	26	9.78	43.12
8	7440.00	38.90 AV	54.00	-15.10	1.07 H	26	-4.22	43.12
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	*2480.00	96.30 PK			1.07 V	203	65.68	30.62
2	*2480.00	82.30 AV			1.07 V	203	51.68	30.62
3	2484.80	59.78 PK	74.00	-14.22	1.05 V	208	29.15	30.63
4	2484.80	45.78 AV	54.00	-8.22	1.05 V	208	15.15	30.63
5	4960.00	48.12 PK	74.00	-25.88	1.34 V	79	10.97	37.15
6	4960.00	34.12 AV	54.00	-19.88	1.34 V	79	-3.03	37.15
7	7440.00	51.30 PK	74.00	-22.70	1.19 V	144	8.18	43.12
8	7440.00	37.30 AV	54.00	-16.70	1.19 V	144	-5.82	43.12

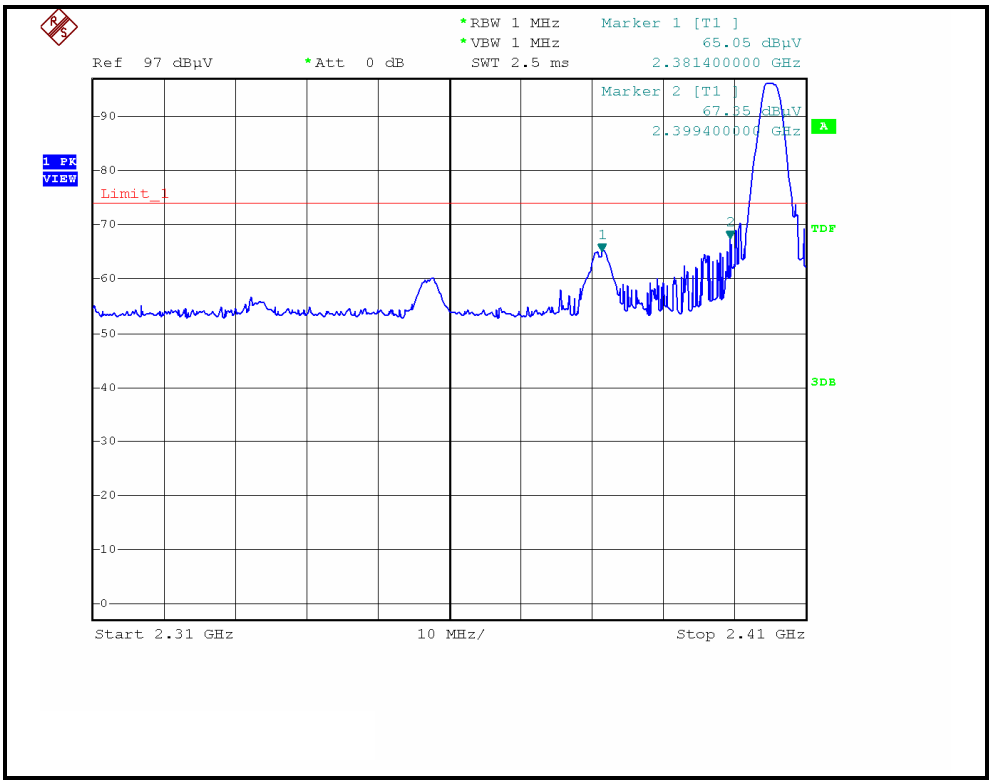
REMARKS:

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. The limit value is defined as per 15.247
6. " * " : Fundamental frequency
7. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula: 20 log (Duty cycle) = 20 log (2.4 ms / 12.2 ms) = -14 dB

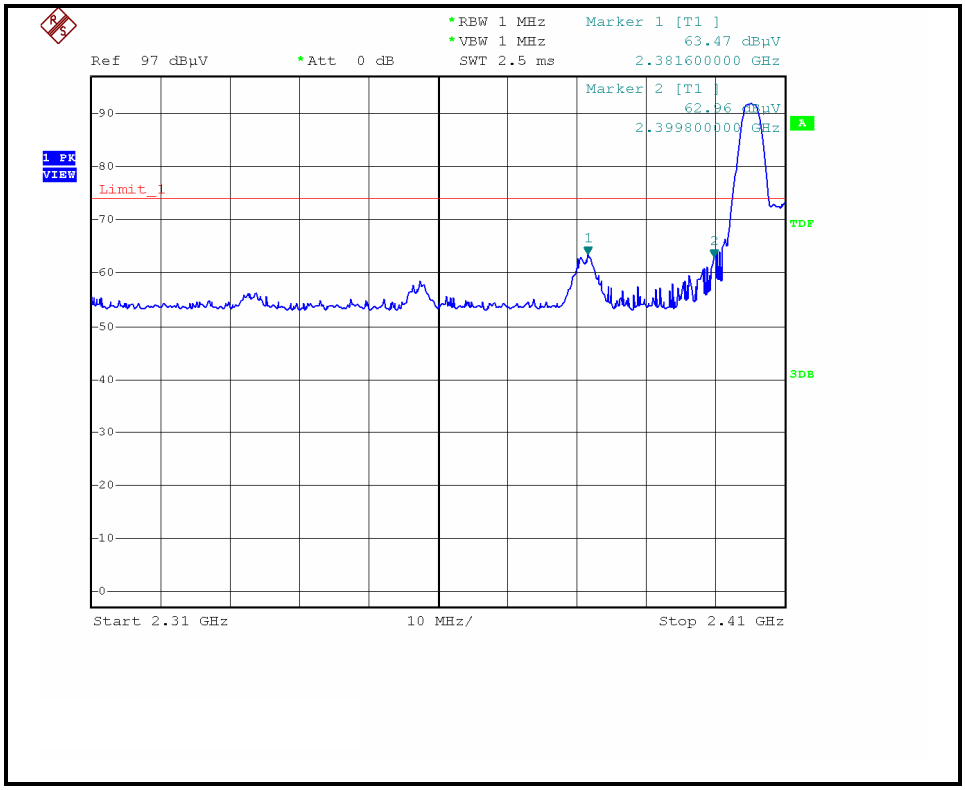


20 log (Duty cycle) = 20 log (2.4 ms / 12.2 ms) = -14 dB

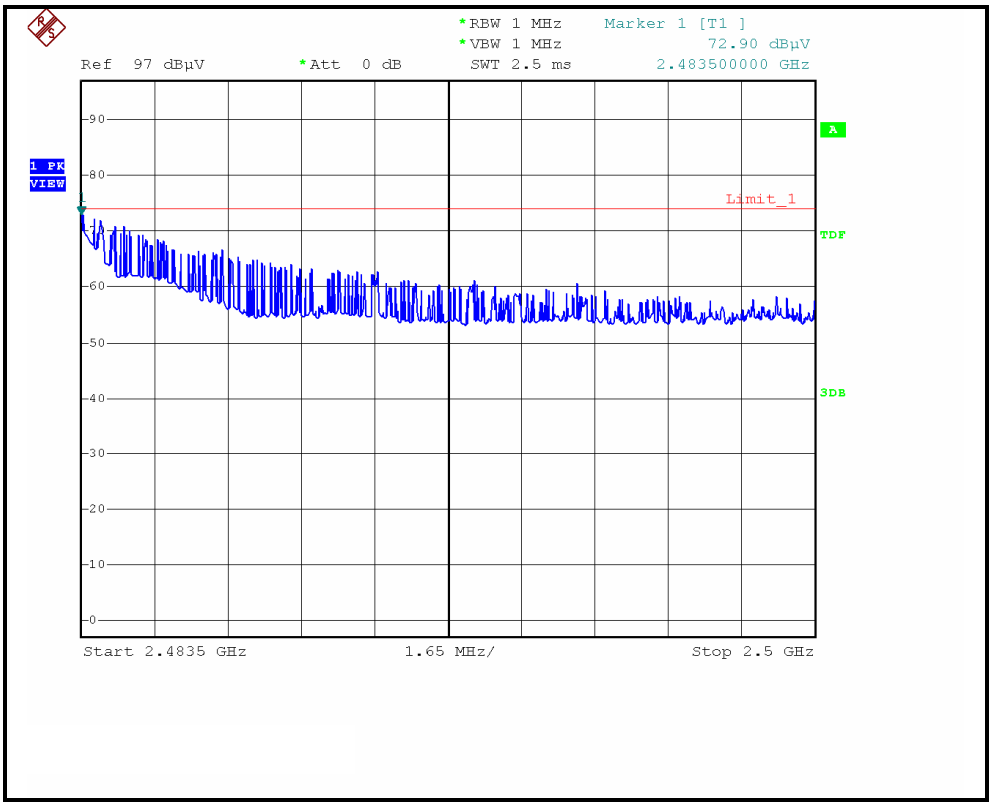
RESTRICTED BANDEDGE (CH0, HORIZONTAL)



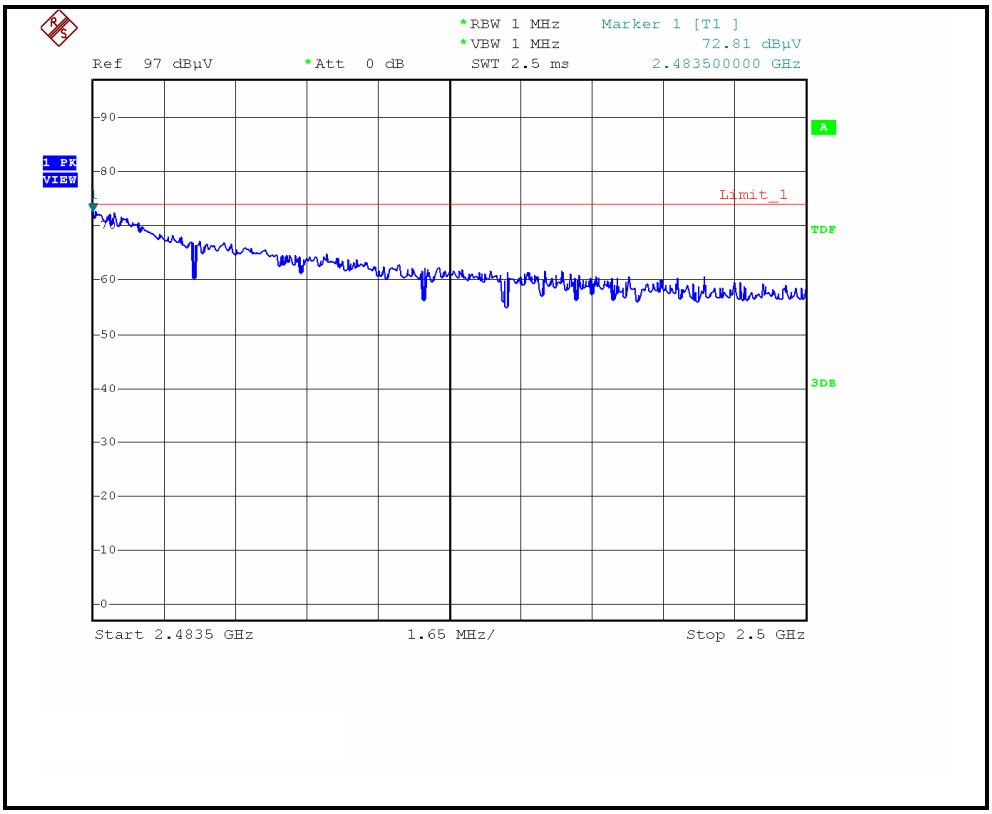
RESTRICTED BANDEDGE (CH0, VERTICAL)



RESTRICTED BANDEDGE (CH15, HORIZONTAL)



RESTRICTED BANDEDGE (CH15, VERTICAL)



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
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 09, 2008	Dec. 08, 2009

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 kHz RBW and 100 kHz VBW. The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.

4.3.4 TEST SETUP

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

4.3.5 EUT OPERATING CONDITIONS

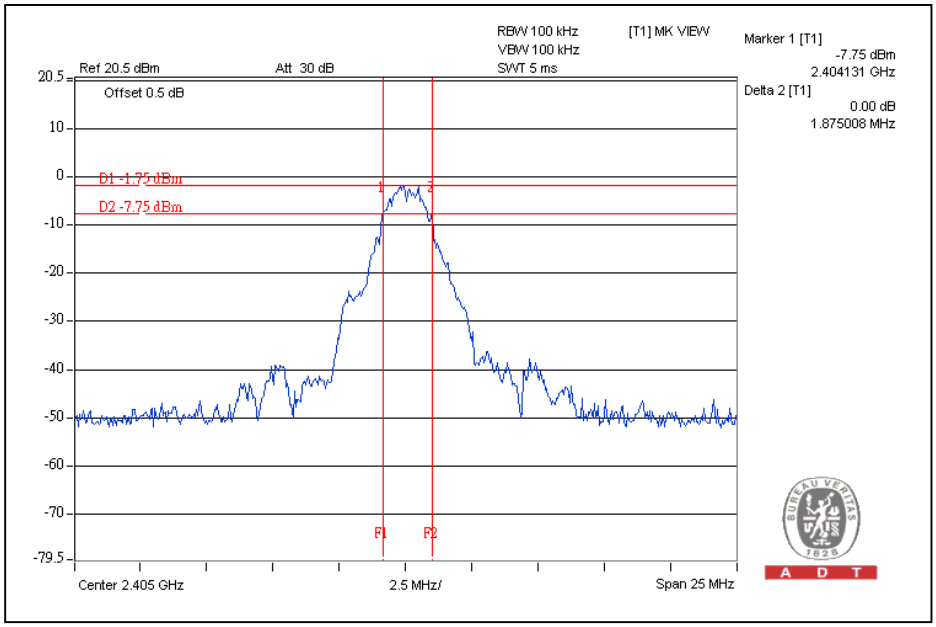
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.6 TEST RESULTS

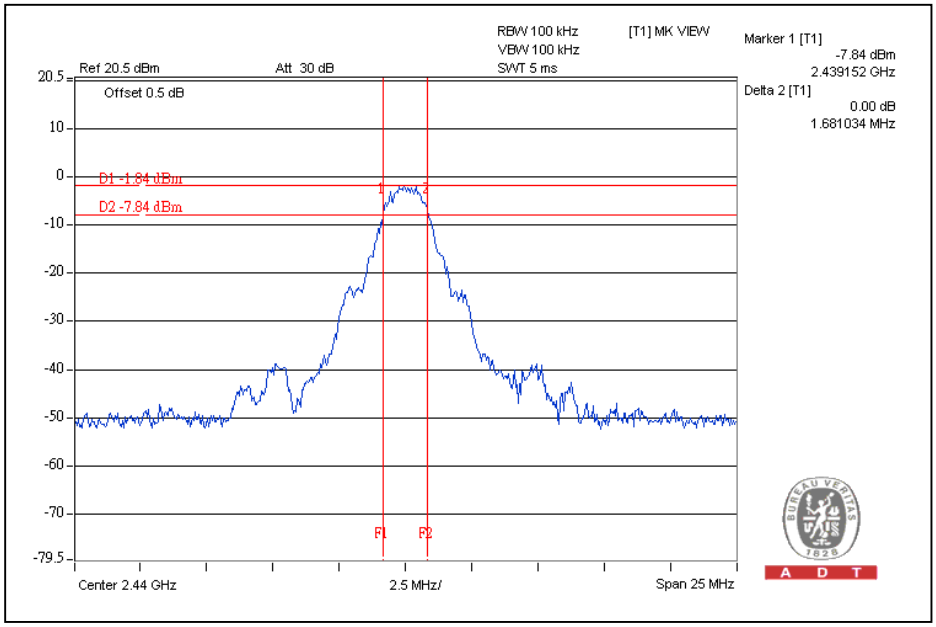
MODULATION TYPE	O-QPSK	TRANSFER RATE	0.25Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965hPa
TESTED BY	Eric Lee		

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
0	2405	1.875	0.5	PASS
7	2440	1.681	0.5	PASS
15	2480	1.717	0.5	PASS

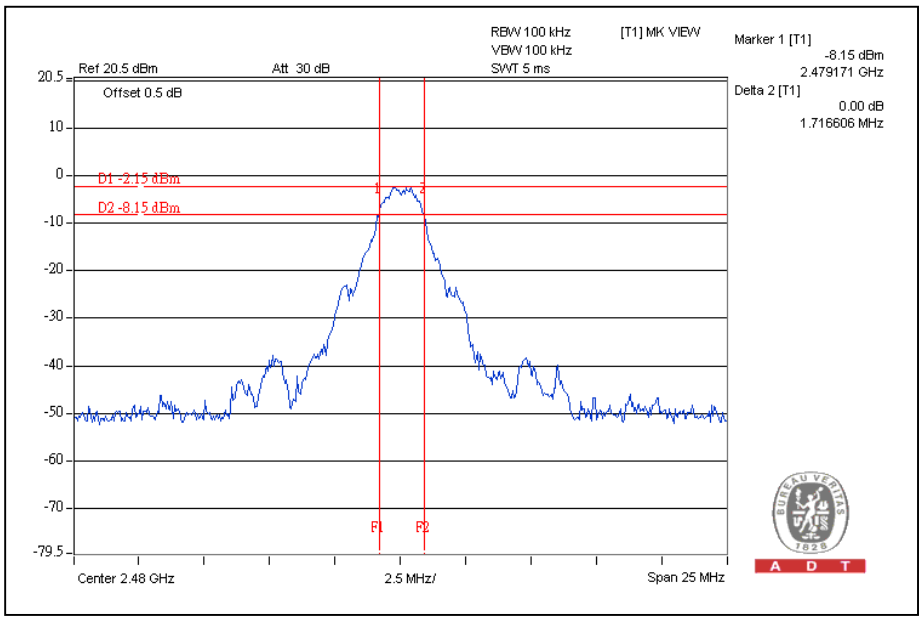
CH0


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-7.75 dBm
2.404131 GHz
Delta 2 [T1]
0.00 dB
1.875008 MHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 -1.75 dBm
D2 -7.75 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
F1
F2
Center 2.405 GHz
2.5 MHz/
Span 25 MHz

CH7


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-7.84 dBm
2.439152 GHz
Delta 2 [T1]
0.00 dB
1.681034 MHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 -1.84 dBm
D2 -7.84 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
F1
F2
Center 2.44 GHz
2.5 MHz/
Span 25 MHz

CH15


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-8.15 dBm
2.479171 GHz
Delta 2 [T1]
0.00 dB
1.716606 MHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
D1 -2.15 dBm
D2 -8.15 dBm
1
2
F1
F2
Center 2.48 GHz
2.5 MHz/
Span 25 MHz

4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 TEST INSTRUMENTS

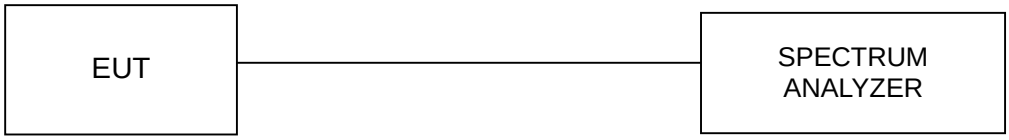
Description & Manufacturer	Model no.	Serial No.	Calibrated date	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 09, 2008	Aug. 08, 2009

NOTE:
The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.4.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3 MHz RBW and 10 MHz VBW.
4. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
5. Repeat above procedures until all frequencies measured were complete.

4.4.4 TEST SETUP



4.4.5 DEVIATION FROM TEST STANDARD

No deviation

4.4.6 EUT OPERATING CONDITIONS

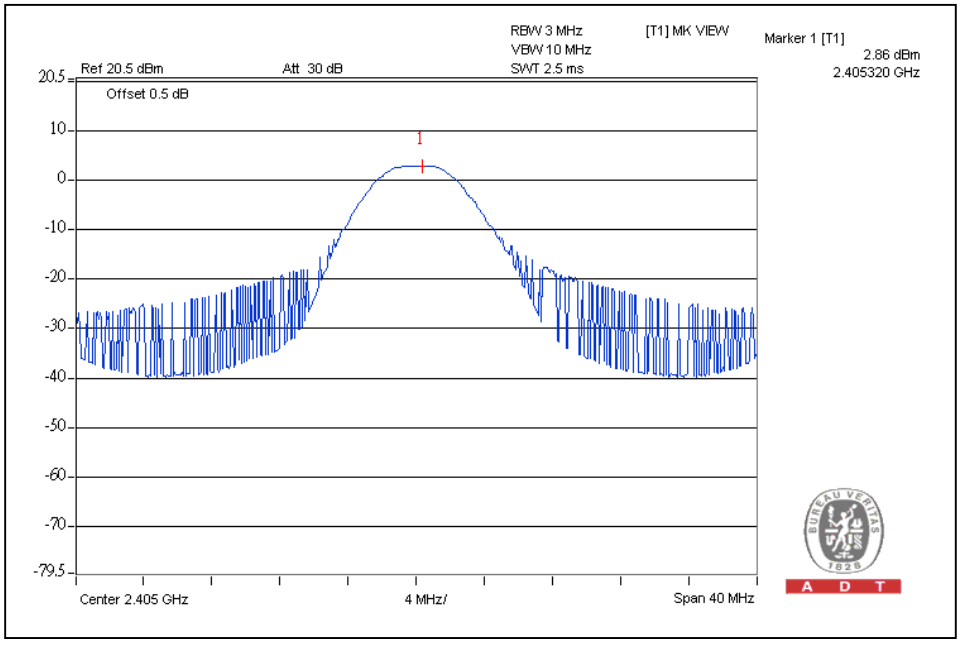
Same as Item 4.3.5

4.4.7 TEST RESULTS

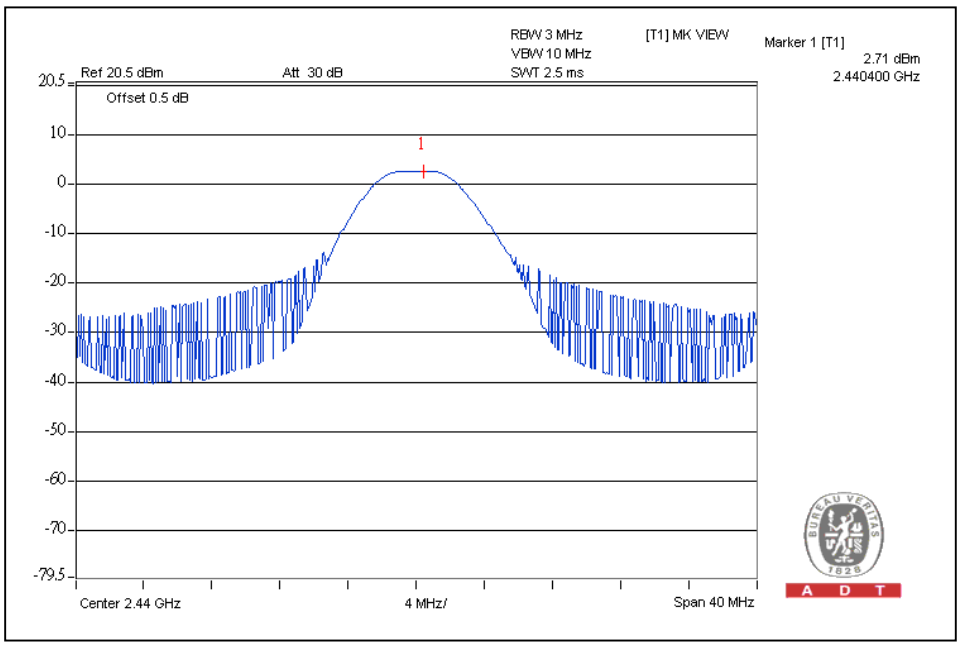
MODULATION TYPE	O-QPSK	TRANSFER RATE	0.25Mbps
INPUT POWER	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 966hPa
TESTED BY	Eric Lee		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2405	1.932	2.86	30	PASS
7	2440	1.866	2.71	30	PASS
15	2480	1.932	2.86	30	PASS

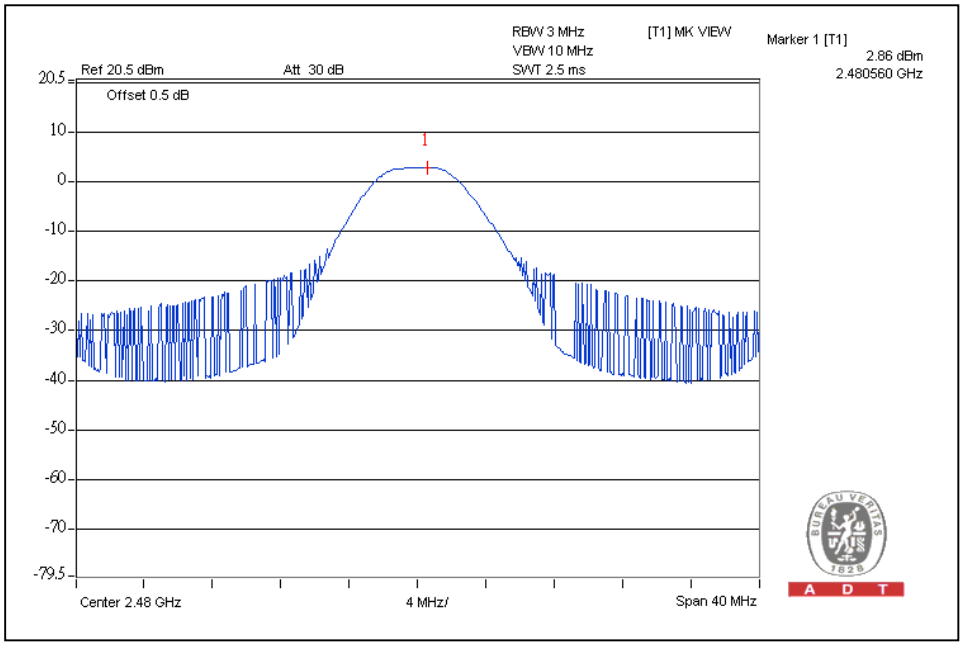
Channel 0



Channel 7



Channel 15



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
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 09, 2008	Dec. 08, 2009

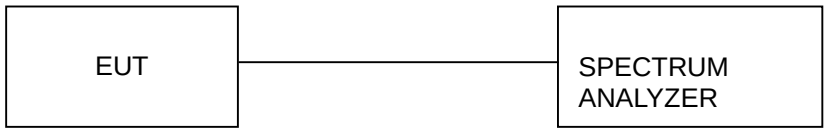
NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 30 kHz VBW, set sweep time=span/3kHz. The power spectral density was measured and recorded.
The sweep time is allowed to be longer than span/3KHz for a full response of the mixer in the spectrum analyzer.

4.5.4 TEST SETUP



4.5.5 EUT OPERATING CONDITIONS

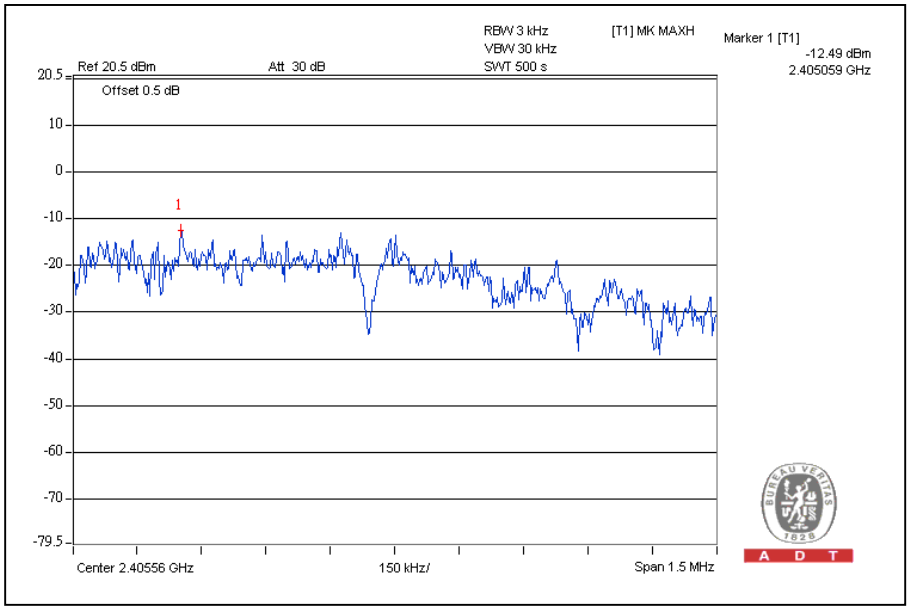
Same as 4.3.5

4.5.6 TEST RESULTS

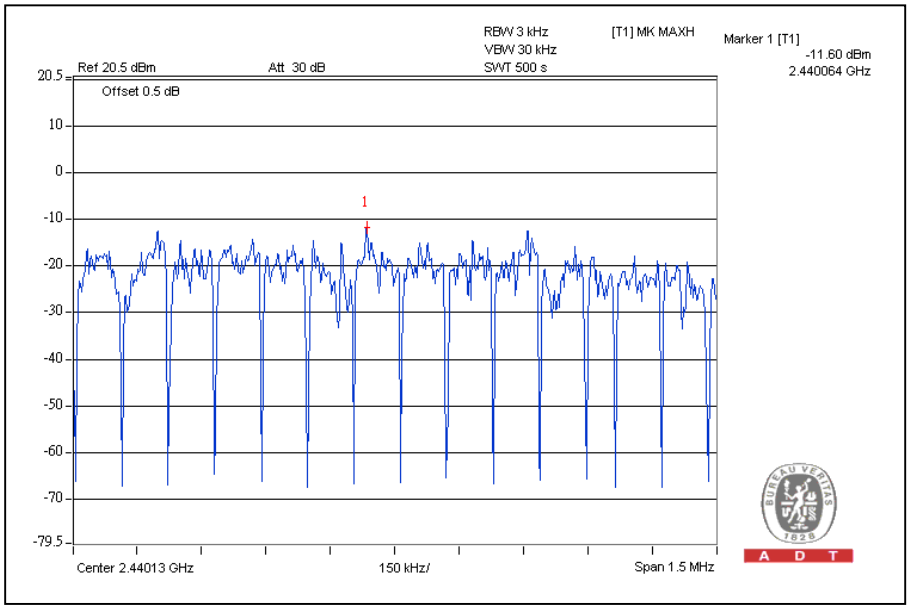
MODULATION TYPE	O-QPSK	TRANSFER RATE	0.25Mbps
INPUT POWER	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965hPa
TESTED BY	Eric Lee		

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 KHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
0	2405	-12.49	8	PASS
7	2440	-11.60	8	PASS
15	2480	-12.67	8	PASS

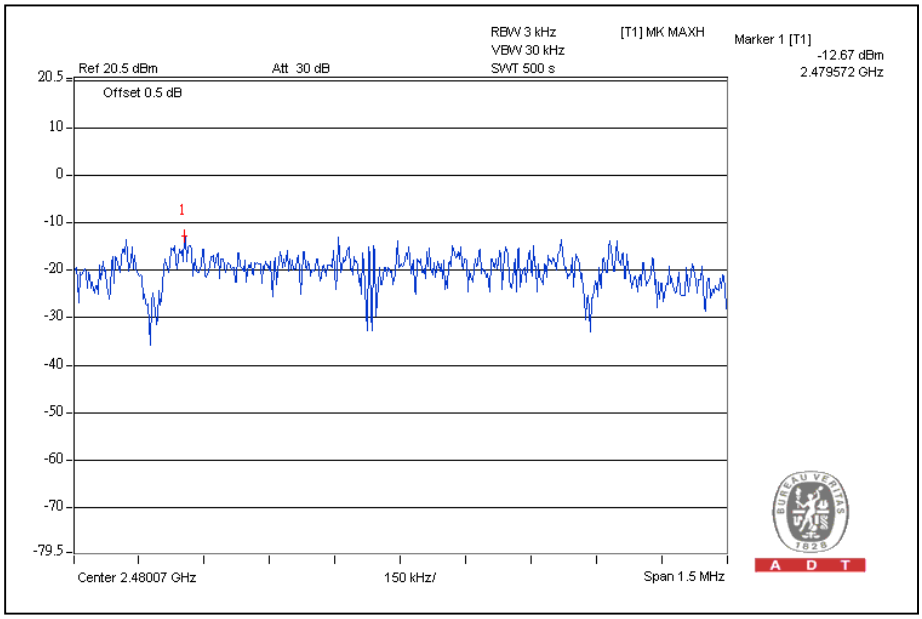
CH0


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-12.49 dBm
2.405059 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.40556 GHz
150 kHz/
Span 1.5 MHz

CH7


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-11.60 dBm
2.440064 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.44013 GHz
150 kHz/
Span 1.5 MHz

CH15


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-12.67 dBm
2.479572 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
1
Center 2.48007 GHz
150 kHz/
Span 1.5 MHz

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
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 09, 2008	Dec. 08, 2009

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (RBW = VBW = 100kHz) are attached on the following pages.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

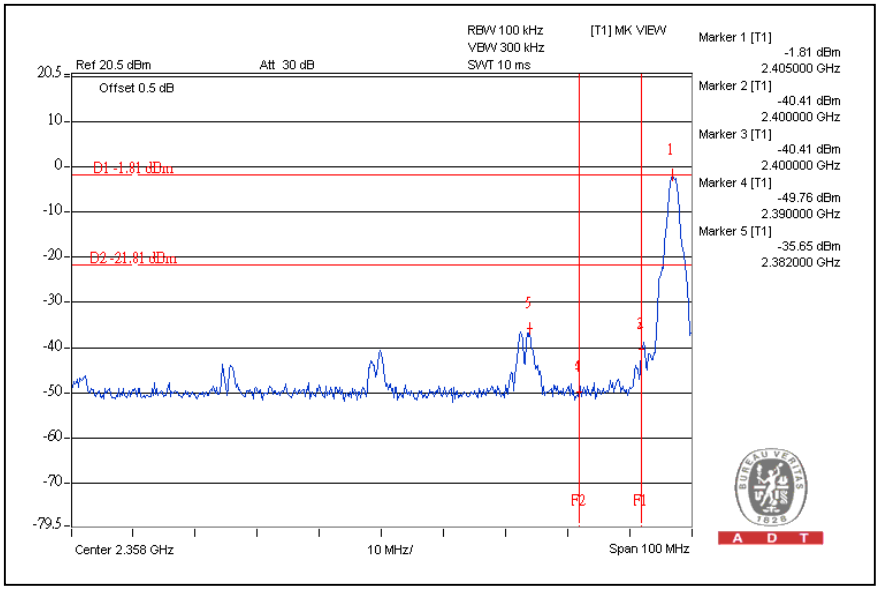
4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.5

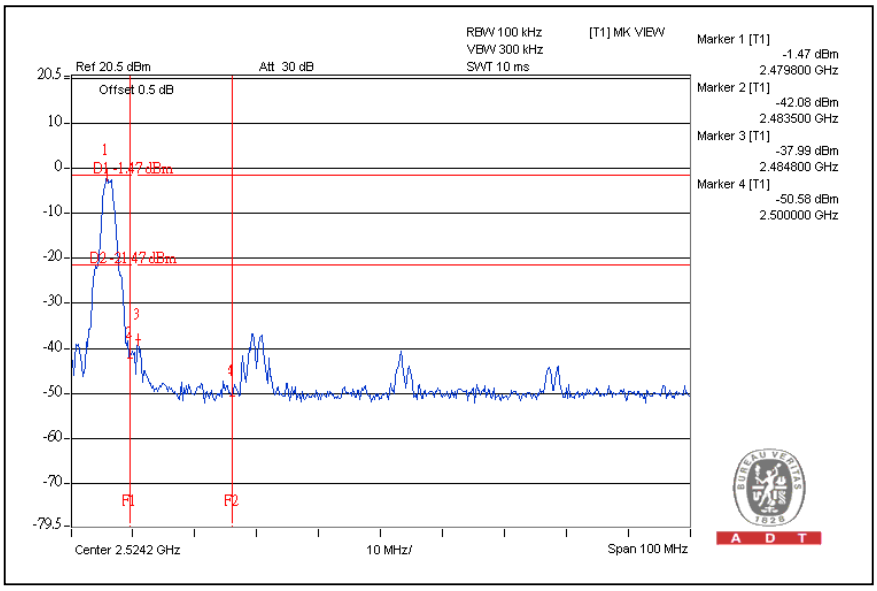
4.6.6 TEST RESULTS

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 in part 15.247(d).

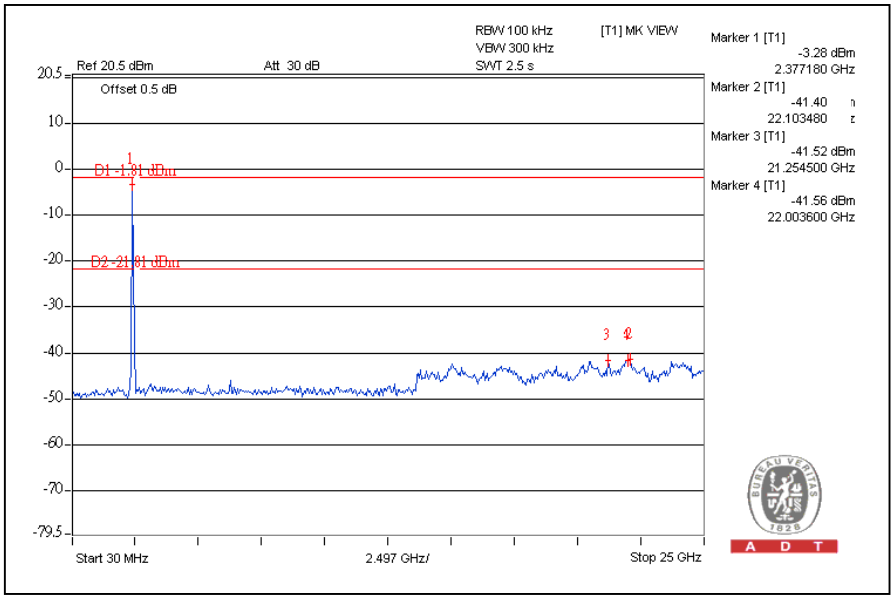
CH0


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MK VIEW
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 -1.81 dBm
D2 -21.81 dBm
Marker 1 [T1]
-1.81 dBm
2.405000 GHz
Marker 2 [T1]
-40.41 dBm
2.400000 GHz
Marker 3 [T1]
-40.41 dBm
2.400000 GHz
Marker 4 [T1]
-49.76 dBm
2.390000 GHz
Marker 5 [T1]
-35.65 dBm
2.382000 GHz
F1
F2
Center 2.358 GHz
10 MHz/
Span 100 MHz

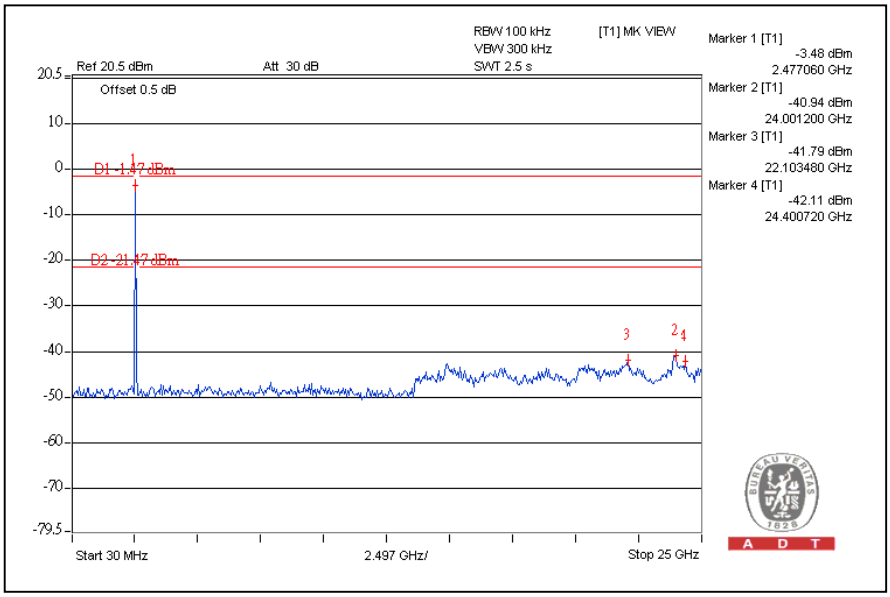
CH15


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MK VIEW
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 -1.47 dBm
D2 -21.47 dBm
Marker 1 [T1]
-1.47 dBm
2.479800 GHz
Marker 2 [T1]
-42.08 dBm
2.483500 GHz
Marker 3 [T1]
-37.99 dBm
2.484800 GHz
Marker 4 [T1]
-50.58 dBm
2.500000 GHz
F1
F2
Center 2.5242 GHz
10 MHz/
Span 100 MHz

CH0


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 -1.81 dBm
D2 -21.81 dBm
Marker 1 [T1]
-3.28 dBm
2.377180 GHz
Marker 2 [T1]
-41.40
22.103480
Marker 3 [T1]
-41.52 dBm
21.254500 GHz
Marker 4 [T1]
-41.56 dBm
22.003600 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH15


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 -1.47 dBm
D2 -21.47 dBm
Marker 1 [T1]
-3.48 dBm
2.477060 GHz
Marker 2 [T1]
-40.94 dBm
24.001200 GHz
Marker 3 [T1]
-41.79 dBm
22.103480 GHz
Marker 4 [T1]
-42.11 dBm
24.400720 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

4.7 ANTENNA REQUIREMENT

4.7.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.7.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is PCB Printed quarter wave antenna without connector. The maximum Gain of the antenna is 2.91dBi

5 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 by the following approval agencies according to ISO/IEC 17025.

USA	FCC, NVLAP
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA, CSA
R.O.C.	TAF, BSMI, NCC
Netherlands	Telefication
Singapore	GOST-ASIA(MOU)
Russia	CERTIS(MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.
If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

Web Site: www.adt.com.tw

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

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

No any modifications are made to the EUT by the lab during the test.

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