FCC TEST REPORT

REPORT NO. :	RF990701C10
MODEL NO. :	SD-3100
FCC ID:	SUFSD3100
RECEIVED :	Jul. 01, 2010
TESTED :	Jul. 29 ~ Aug. 26, 2010
ISSUED :	Sep. 03, 2010

APPLICANT :	Teraoka Weigh-System Pte Ltd.
ADDRESS :	4, Leng Kee Road, #05-02/03/04/05/11, SIS Building, Singapore 159088

ISSUED BY :	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
LAB ADDRESS :	No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang, Taipei Hsien 244, Taiwan, R.O.C.
TEST LOCATION :	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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1. CERTIFICATION

PRODUCT:	ESL SD CARD
MODEL NO.:	SD-3100
BRAND:	DIGI
APPLICANT:	Teraoka Weigh-System Pte Ltd.
TESTED:	Jul. 29 ~ Aug. 26, 2010
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	**FCC Part 15, Subpart C (Section 15.249)**
	ANSI C63.4-2003

The above equipment (model: SD-3100) have 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	: Polly Chien / Specialist	**, DATE :**	Sep. 03, 2010
TECHNICAL ACCEPTANCE Responsible for RF	: Long Chen / Senior Engineer	**, DATE :**	Sep. 03, 2010
APPROVED BY	: Gary Chang / Assistant Manager	**, DATE :**	Sep. 03, 2010

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.249)			
STANDARD PARAGRAPH	**TEST TYPE**	**RESULT**	**REMARK**
15.207	Conducted Emission Test	NA	Power supply is 3.3Vdc from SD slot of the PDA.
15.209 15.249 15.249 (d)	Radiated Emission Test Band Edge Measurement Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -5.0dB at 4820.00MHz.

2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.19 dB
	200MHz ~1000MHz	3.21 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	ESL SD CARD
MODEL NO.	SD-3100
FCC ID	SUFSD3100
POWER SUPPLY	3.3Vdc
MODULATION TYPE	**Radio 1:** TX: MSK, RX: FSK **Radio 2:** TX: FSK, RX: MSK
TRANSFER RATE	Up to 500 kbps (FSK –1.2kps, MSK –500kps)
OPERATING FREQUENCY	2410MHz ~ 2480MHz
NUMBER OF CHANNEL	20
ANTENNA TYPE	Chip antenna with 1dBi gain
ANTENNA CONNECTOR	NA
DATA CABLE	NA
I/O PORT	NA
ACCESSORY DEVICES	NA

NOTE:

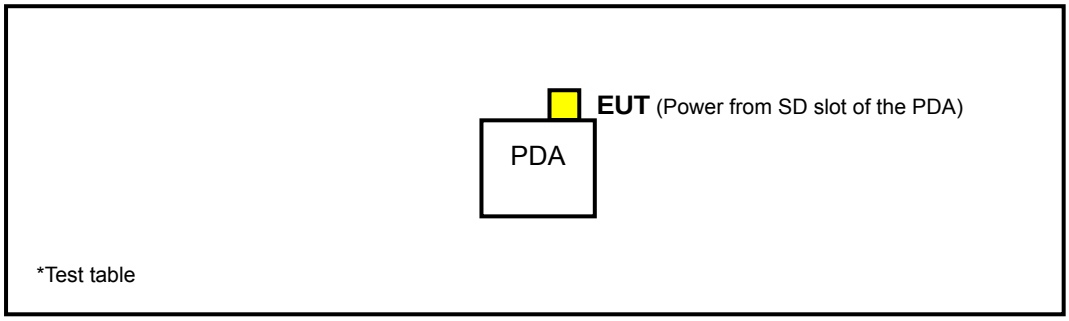
1. Radio 1 and Radio 2 can not transmit at the same time.
2. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

20 channels are provided to this EUT.

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
1	2410	6	2435	11	2451	16	2463
2	2415	7	2440	12	2453	17	2465
3	2420	8	2445	13	2455	18	2470
4	2425	9	2447	14	2459	19	2475
5	2430	10	2449	15	2460	20	2480

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	BM	
A	√	√	NOTE	√	Radio 1
B	√	√	NOTE	√	Radio 2

Where **RE<1G:** Radiated Emission below 1GHz **RE≥1G:** Radiated Emission above 1GHz

BM: Bandedge Measurement

NOTE: No need to concern of Conducted Emission due to the EUT is powered from SD slot of the PDA.

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	AXIS
A	1 to 20	1, 7, 20	MSK	X
B	1 to 20	1, 7, 20	FSK	Z

RADIATED EMISSION TEST (BELOW 1 GHz):

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	AXIS
A	1 to 20	1	MSK	X
B	1 to 20	20	FSK	Z

BANDEDGE MEASUREMENT:

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	AXIS
A	1 to 20	1, 20	MSK	X
B	1 to 20	1, 20	FSK	Z

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	28deg. C, 68%RH, 1007 hPa (Test mode A)	3.3Vdc	Sun Lin
	25deg. C, 65%RH, 1010 hPa (Test mode B)	3.3Vdc	Brad Wu
RE<1G	28deg. C, 68%RH, 1007 hPa	3.3Vdc	Sun Lin
BM	28deg. C, 68%RH, 1007 hPa	3.3Vdc	Sun 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 (Section 15.249)

ANSI C63.4-2003

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	PDA	Unitech	PA500	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

NOTE:
1. All power cords of the above support units are non shielded (1.8m).
2. Item 1 was provided by the client.

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209, 15.249 as following:

15.209 Limit		
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
15.249 Limit		
Fundamental Frequency	**Field Strength of Fundamental (millivolts/meter)**	**Field Strength of Harmonics (microvolts/meter)**
902 ~ 928 MHz	50	500
2400 ~ 2483.5 MHz	50	500
5725 ~ 5875 MHz	50	500
24 ~ 24.25 GHz	250	2500

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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Dec. 29, 2009	Dec. 28, 2010
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jan. 11, 2010	Jan. 10, 2011
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Apr. 28, 2010	Apr. 27, 2011
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-408	Jan. 05, 2010	Jan. 04, 2011
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Dec. 25, 2009	Dec. 24, 2010
Preamplifier Agilent	8449B	3008A01961	Nov. 04, 2009	Nov. 03, 2010
Preamplifier Agilent	8447D	2944A10738	Nov. 04, 2009	Nov. 03, 2010
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	274041/4	Aug. 21, 2010	Aug. 20, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	283397/4	Aug. 21, 2010	Aug. 20, 2011
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table ADT.	TT100.	TT93021704	NA	NA
Turn Table Controller ADT.	SC100.	SC93021704	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 4.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 988962.

5. The IC Site Registration No. is IC7450F-4.

4.1.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. 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 lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

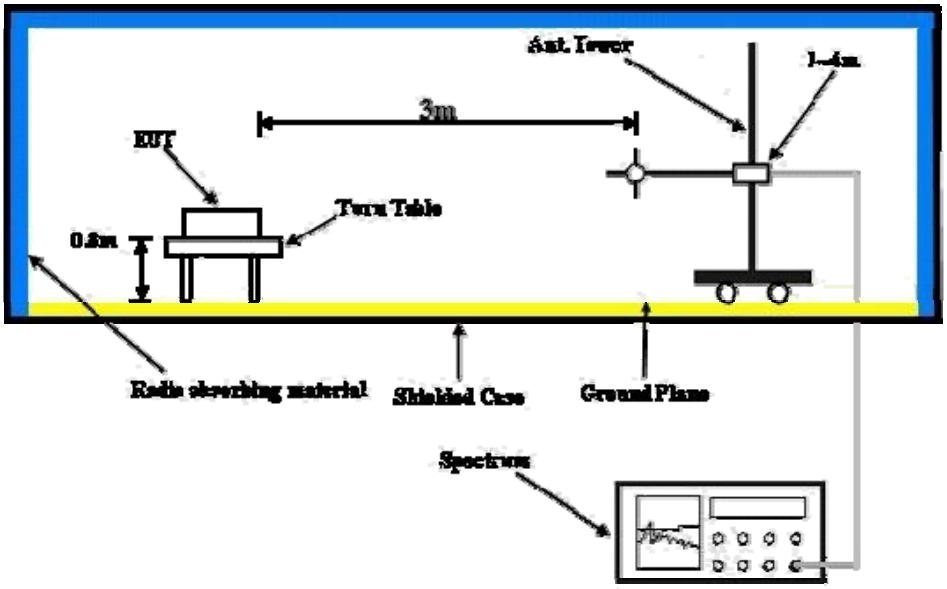
NOTE:

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 of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. Average value measurement for Radio 1 is RBW=1MHz, VBW=10Hz. Since test signal of Radio1 is continuous wave (100 % duty cycle).
   Average value for Radio 2 is PEAK value + 20 Log (Duty cycle).
   Since test signal of Radio 2 is pulse signal (16.8 % duty cycle).
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



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

4.1.6 EUT OPERATING CONDITIONS

a. Plugged EUT into the PDA and placed on the testing table.
b. Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 TEST RESULTS

ABOVE 1GHz DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	**FREQUENCY RANGE**	1 ~ 25GHz
INPUT POWER	3.3Vdc	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 68%RH 1007 hPa	**TESTED BY**	Sun Lin
TEST MODE	**A**		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	42.8 PK	74.0	-31.2	1.37 H	199	9.30	33.50
2	2390.00	30.9 AV	54.0	-23.1	1.37 H	199	-2.60	33.50
3	2398.00	34.8 PK	74.0	-39.2	1.37 H	199	1.30	33.50
4	2398.00	30.9 AV	54.0	-23.1	1.37 H	199	-2.60	33.50
5	2400.00	36.9 PK	74.0	-37.1	1.37 H	199	3.40	33.50
6	2400.00	33.1 AV	54.0	-20.9	1.37 H	199	-0.40	33.50
7	*2410.00	73.2 PK	114.0	-40.8	1.37 H	199	39.60	33.60
8	*2410.00	71.5 AV	94.0	-22.5	1.37 H	199	37.90	33.60
9	4820.00	53.9 PK	74.0	-20.1	1.00 H	163	13.90	40.00
10	**4820.00**	**49.0 AV**	**54.0**	**-5.0**	**1.00 H**	**163**	**9.00**	**40.00**

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	3.3Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 68%RH 1007 hPa	TESTED BY	Sun Lin
TEST MODE	A		

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	42.8 PK	74.0	-31.2	1.02 V	247	9.30	33.50
2	2390.00	30.8 AV	54.0	-23.2	1.02 V	247	-2.70	33.50
3	2398.00	36.8 PK	74.0	-37.2	1.02 V	247	3.30	33.50
4	2398.00	31.2 AV	54.0	-22.8	1.02 V	247	-2.30	33.50
5	2400.00	38.8 PK	74.0	-35.2	1.02 V	247	5.30	33.50
6	2400.00	33.5 AV	54.0	-20.5	1.02 V	247	0.00	33.50
7	*2410.00	66.8 PK	114.0	-47.2	1.02 V	247	33.20	33.60
8	*2410.00	65.3 AV	94.0	-28.7	1.02 V	247	31.70	33.60
9	4820.00	52.8 PK	74.0	-21.2	1.00 V	128	12.80	40.00
10	4820.00	45.8 AV	54.0	-8.2	1.00 V	128	5.80	40.00

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	3.3Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 68%RH 1007 hPa	TESTED BY	Sun Lin
TEST MODE	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2440.00	72.8 PK	114.0	-41.2	1.28 H	177	39.10	33.70
2	*2440.00	70.7 AV	94.0	-23.3	1.28 H	177	37.00	33.70
3	4880.00	53.8 PK	74.0	-20.2	1.03 H	210	13.70	40.10
4	4880.00	48.7 AV	54.0	-5.3	1.03 H	210	8.60	40.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2440.00	66.5 PK	114.0	-47.5	1.02 V	235	32.80	33.70
2	*2440.00	65.0 AV	94.0	-29.0	1.02 V	235	31.30	33.70
3	4880.00	52.3 PK	74.0	-21.7	1.00 V	133	12.20	40.10
4	4880.00	45.7 AV	54.0	-8.3	1.00 V	133	5.60	40.10

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 20	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	3.3Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 68%RH 1007 hPa	TESTED BY	Sun Lin
TEST MODE	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	72.3 PK	114.0	-41.7	1.38 H	187	38.50	33.80
2	*2480.00	70.1 AV	94.0	-23.9	1.38 H	187	36.30	33.80
3	2483.50	40.8 PK	74.0	-33.2	1.38 H	187	7.00	33.80
4	2483.50	37.2 AV	54.0	-16.8	1.38 H	187	3.40	33.80
5	2485.50	35.7 PK	74.0	-38.3	1.38 H	187	1.80	33.90
6	2485.50	32.1 AV	54.0	-21.9	1.38 H	187	-1.80	33.90
7	4960.00	53.4 PK	74.0	-20.6	1.04 H	213	13.10	40.30
8	4960.00	48.7 AV	54.0	-5.3	1.04 H	213	8.40	40.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	66.2 PK	114.0	-47.8	1.08 V	268	32.40	33.80
2	*2480.00	64.7 AV	94.0	-29.3	1.08 V	268	30.90	33.80
3	2483.50	38.8 PK	74.0	-35.2	1.08 V	268	5.00	33.80
4	2483.50	33.9 AV	54.0	-20.1	1.08 V	268	0.10	33.80
5	2485.50	34.9 PK	74.0	-39.1	1.08 V	268	1.00	33.90
6	2485.50	30.4 AV	54.0	-23.6	1.08 V	268	-3.50	33.90
7	4960.00	52.5 PK	74.0	-21.5	1.01 V	153	12.20	40.30
8	4960.00	45.8 AV	54.0	-8.2	1.01 V	153	5.50	40.30

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	3.3Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1010 hPa	TESTED BY	Brad Wu
TEST MODE	B		

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	29.5 PK	74.0	-44.5	1.14 V	3	-2.80	32.30
2	2390.00	21.6 AV	54.0	-32.4	1.14 V	3	-10.70	32.30
3	2398.00	33.8 PK	74.0	-40.2	1.14 V	3	1.50	32.30
4	2398.00	21.3 AV	54.0	-32.7	1.14 V	3	-11.00	32.30
5	2400.00	35.1 PK	74.0	-38.9	1.14 V	3	2.80	32.30
6	2400.00	23.6 AV	54.0	-30.4	1.14 V	3	-8.70	32.30
7	*2410.00	78.7 PK	114.0	-35.3	1.14 V	3	46.40	32.30
8	*2410.00	63.2 AV	94.0	-30.8	1.14 V	3	30.90	32.30
9	4820.00	57.0 PK	74.0	-17.0	1.05 V	261	18.60	38.40
10	4820.00	41.5 AV	54.0	-12.5	1.05 V	261	3.10	38.40

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. 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 (16.8 ms / 100 ms) = -15.5 dB
Please see page 21 for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	**FREQUENCY RANGE**	1 ~ 25GHz
INPUT POWER	3.3Vdc	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1010 hPa	**TESTED BY**	Brad Wu
TEST MODE	**B**		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	35.8 PK	74.0	-38.2	1.15 H	36	3.50	32.30
2	2390.00	28.0 AV	54.0	-26.0	1.15 H	36	-4.30	32.30
3	2398.00	40.1 PK	74.0	-33.9	1.15 H	36	7.80	32.30
4	2398.00	28.1 AV	54.0	-25.9	1.15 H	36	-4.20	32.30
5	2400.00	42.2 PK	74.0	-31.8	1.15 H	36	9.90	32.30
6	2400.00	30.3 AV	54.0	-23.7	1.15 H	36	-2.00	32.30
7	*2410.00	86.9 PK	114.0	-27.1	1.15 H	36	54.60	32.30
8	*2410.00	71.4 AV	94.0	-22.6	1.15 H	36	39.10	32.30
9	4820.00	62.5 PK	74.0	-11.5	1.15 H	180	24.10	38.40
10	4820.00	47.0 AV	54.0	-7.0	1.15 H	180	8.60	38.40

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. 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 (16.8 ms / 100 ms) = -15.5 dB
Please see page 21 for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	3.3Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1010 hPa	TESTED BY	Brad Wu
TEST MODE	B		

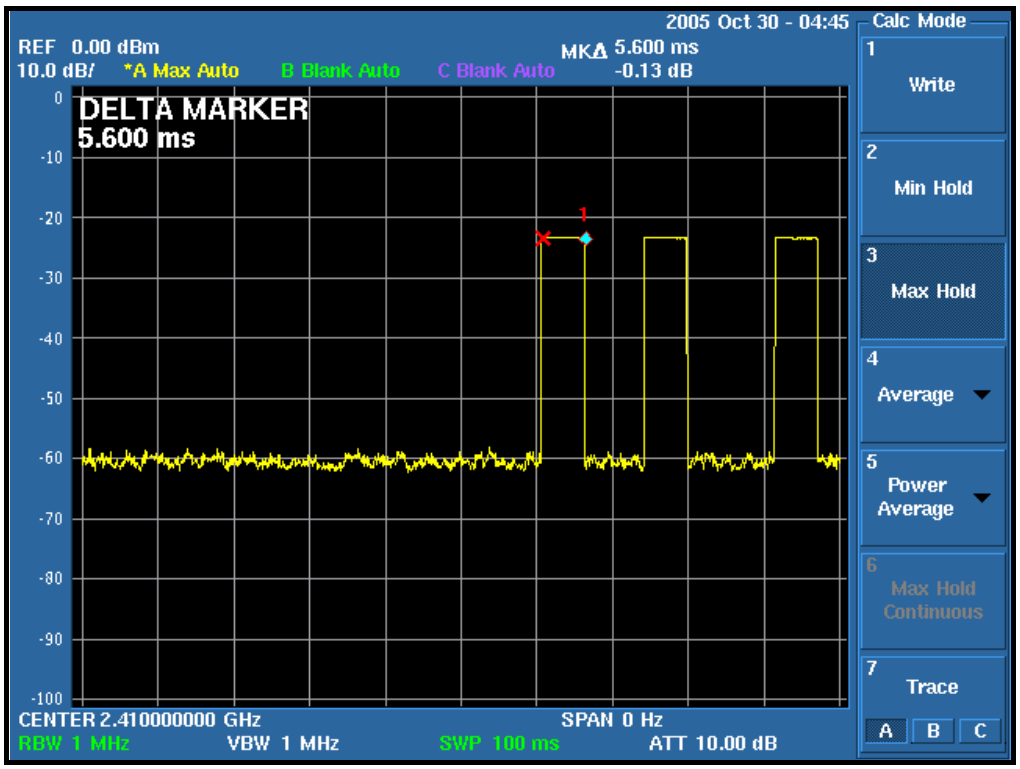
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2440.00	87.2 PK	114.0	-26.8	1.15 H	38	54.70	32.50
2	*2440.00	71.7 AV	94.0	-22.3	1.15 H	38	39.20	32.50
3	4880.00	60.6 PK	74.0	-13.4	1.12 H	210	22.10	38.50
4	4880.00	45.1 AV	54.0	-8.9	1.12 H	210	6.60	38.50
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	79.0 PK	114.0	-35.0	1.15 V	4	46.50	32.50
2	*2440.00	63.5 AV	94.0	-30.5	1.15 V	4	31.00	32.50
3	4880.00	58.2 PK	74.0	-15.8	1.18 V	174	19.70	38.50
4	4880.00	42.7 AV	54.0	-11.3	1.18 V	174	4.20	38.50

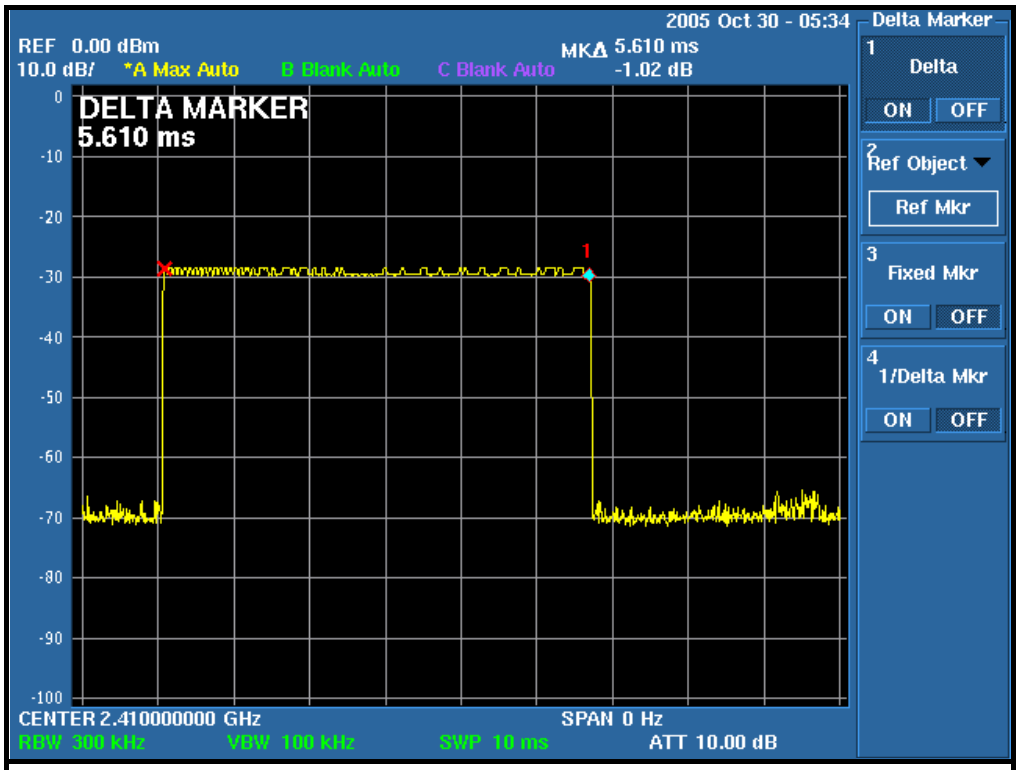
REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. 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 (16.8 ms / 100 ms) = -15.5 dB
Please see page 21 for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 20	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	3.3Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1010 hPa	TESTED BY	Brad Wu
TEST MODE	B		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	87.4 PK	114.0	-26.6	1.00 H	39	54.80	32.60
2	*2480.00	71.9 AV	94.0	-22.1	1.00 H	39	39.30	32.60
3	2483.50	47.8 PK	74.0	-26.2	1.00 H	39	15.20	32.60
4	2483.50	36.9 AV	54.0	-17.1	1.00 H	39	4.30	32.60
5	2485.50	42.9 PK	74.0	-31.1	1.12 H	54	10.30	32.60
6	2485.50	31.8 AV	54.0	-22.2	1.12 H	54	-0.80	32.60
7	4960.00	59.3 PK	74.0	-14.7	1.00 H	225	20.60	38.70
8	4960.00	43.8 AV	54.0	-10.2	1.00 H	225	5.10	38.70
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	79.2 PK	114.0	-34.8	1.13 V	5	46.60	32.60
2	*2480.00	63.7 AV	94.0	-30.3	1.13 V	5	31.10	32.60
3	2483.50	41.6 PK	74.0	-32.4	1.13 V	5	9.00	32.60
4	2483.50	30.1 AV	54.0	-23.9	1.13 V	5	-2.50	32.60
5	2485.50	36.5 PK	74.0	-37.5	1.13 V	5	3.90	32.60
6	2485.50	25.4 AV	54.0	-28.6	1.13 V	5	-7.20	32.60
7	4960.00	58.0 PK	74.0	-16.0	1.10 V	231	19.30	38.70
8	4960.00	42.5 AV	54.0	-11.5	1.10 V	231	3.80	38.70

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. 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 (16.8 ms / 100 ms) = -15.5 dB
Please see page 21 for plotted duty.





20 log (Duty cycle) = 20 log (16.8 ms / 100 ms) = -15.5 dB

BELOW 1GHz WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	3.3Vdc	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	28deg. C, 68%RH 1007 hPa	TESTED BY	Sun Lin
TEST MODE	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	158.22	21.9 QP	43.5	-21.6	1.25 H	157	7.60	14.30
2	331.26	25.7 QP	46.0	-20.3	1.00 H	232	9.40	16.30
3	525.69	29.0 QP	46.0	-17.0	1.50 H	217	7.60	21.40
4	644.30	30.1 QP	46.0	-15.9	1.25 H	133	6.30	23.80
5	760.95	30.9 QP	46.0	-15.1	1.00 H	220	5.20	25.70
6	838.72	32.8 QP	46.0	-13.2	1.00 H	268	5.60	27.20
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	158.22	23.4 QP	43.5	-20.1	1.00 V	319	9.10	14.30
2	370.15	24.5 QP	46.0	-21.5	1.75 V	67	7.20	17.30
3	465.42	26.4 QP	46.0	-19.6	1.00 V	295	6.50	19.90
4	525.69	28.3 QP	46.0	-17.7	1.00 V	154	6.90	21.40
5	644.30	28.4 QP	46.0	-17.6	1.25 V	181	4.60	23.80
6	799.84	30.8 QP	46.0	-15.2	1.25 V	292	4.40	26.40

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 20	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	3.3Vdc	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	28deg. C, 68%RH 1007 hPa	TESTED BY	Sun Lin
TEST MODE	B		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	43.51	16.1 QP	40.0	-23.9	1.75 H	145	2.00	14.10
2	158.22	22.4 QP	43.5	-21.1	1.75 H	118	8.10	14.30
3	331.26	25.7 QP	46.0	-20.3	1.00 H	91	9.40	16.30
4	447.92	25.9 QP	46.0	-20.1	2.25 H	241	6.50	19.40
5	525.69	27.6 QP	46.0	-18.4	1.50 H	229	6.20	21.40
6	799.84	33.9 QP	46.0	-12.1	1.00 H	253	7.50	26.40
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	43.51	17.0 QP	40.0	-23.0	1.00 V	10	2.90	14.10
2	99.89	17.2 QP	43.5	-26.3	1.50 V	10	7.70	9.50
3	152.39	16.5 QP	43.5	-27.0	1.00 V	145	1.90	14.60
4	253.49	20.8 QP	46.0	-25.2	2.00 V	142	7.40	13.40
5	566.52	24.5 QP	46.0	-21.5	1.00 V	172	2.10	22.40
6	683.18	25.2 QP	46.0	-20.8	1.00 V	250	0.90	24.30

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

4.2 BAND EDGES MEASUREMENT

4.2.1 LIMITS OF BAND EDGES MEASUREMENT

Below –50dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100040	Jul. 17, 2010	Jul. 16, 2011

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

4.2.3 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 100 kHz and 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.
The spectrum plots are attached on the following pages.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

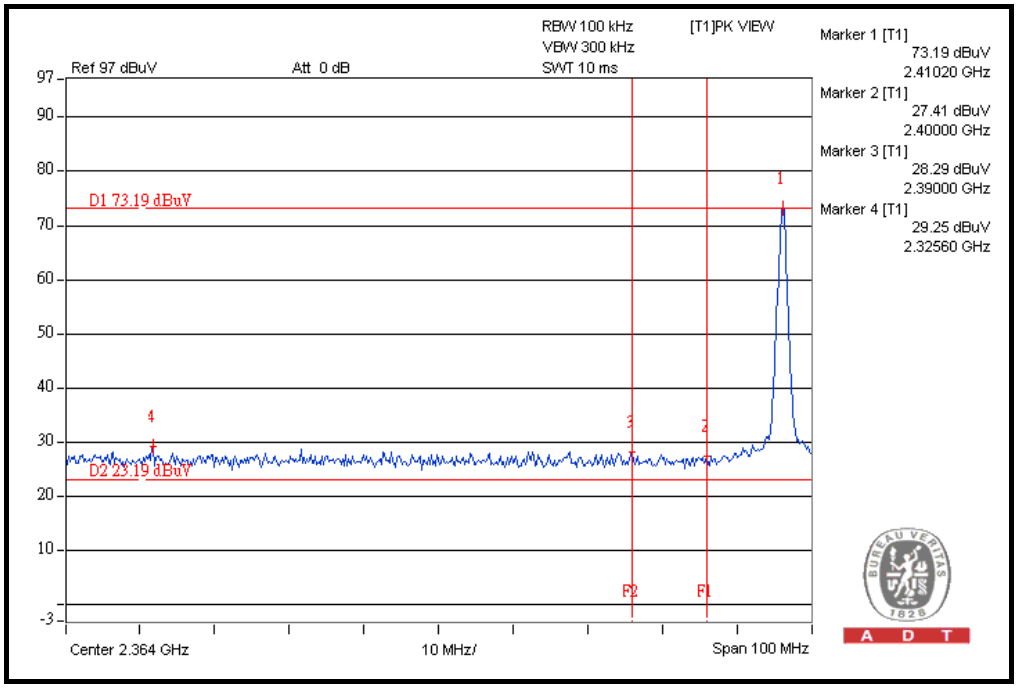
4.2.5 EUT OPERATING CONDITION

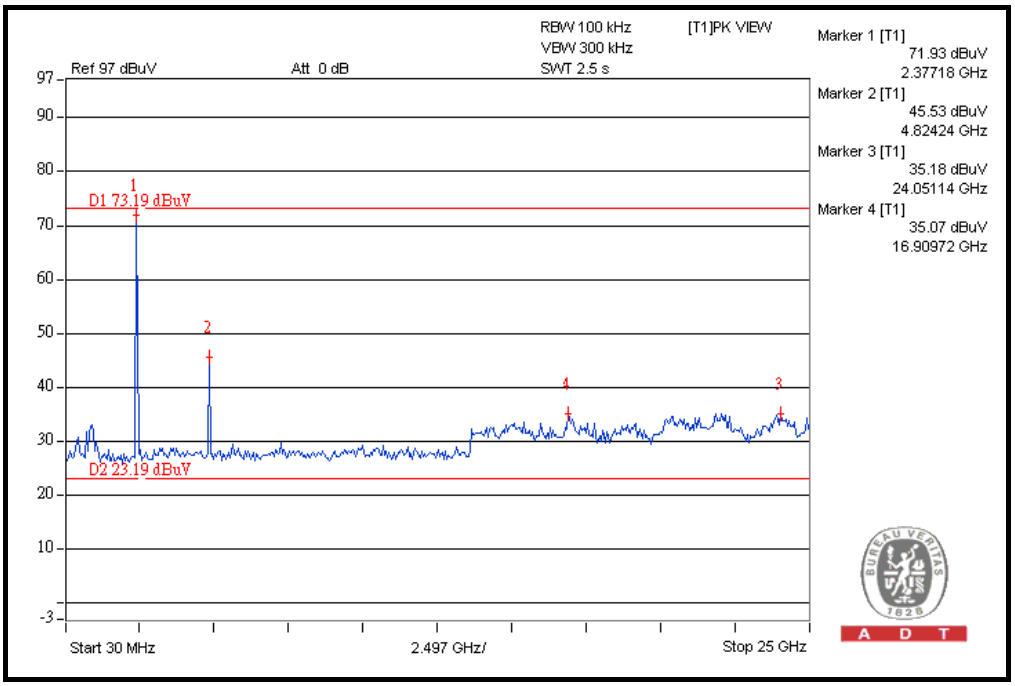
The software provided by client to enable the EUT under transmission condition continuously at lowest and highest channel frequencies individually.

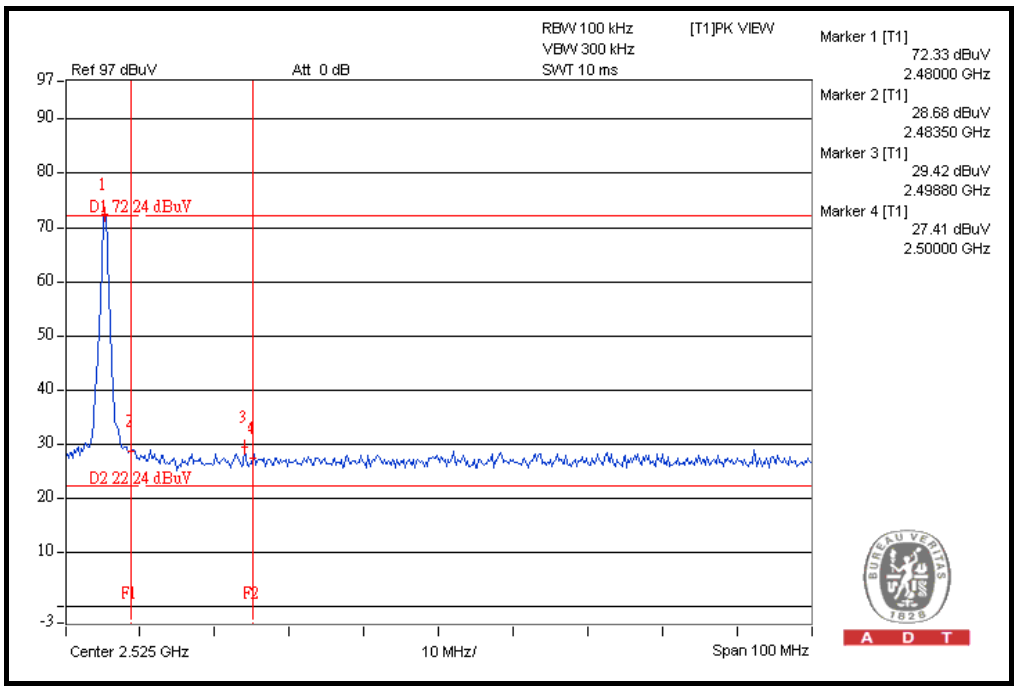
4.2.6 TEST RESULTS

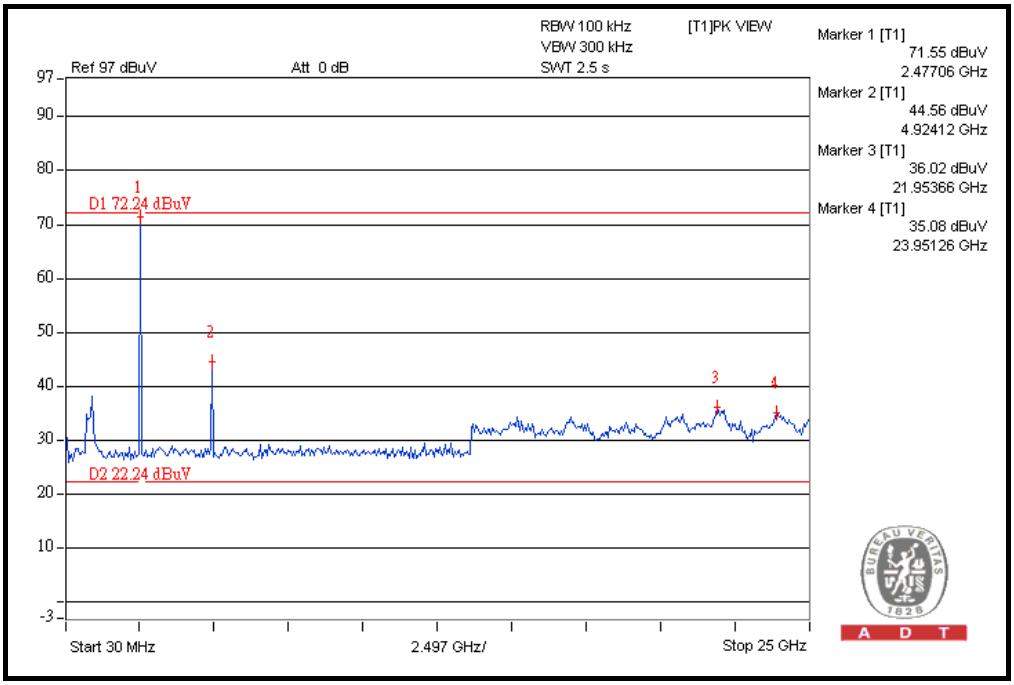
The spectrum plots are attached on the following images. D1 line indicates the highest level, and D2 line indicates the 50dB offset below D1. It shows compliance with the requirement in part 15.249 (d).

TEST MODE A

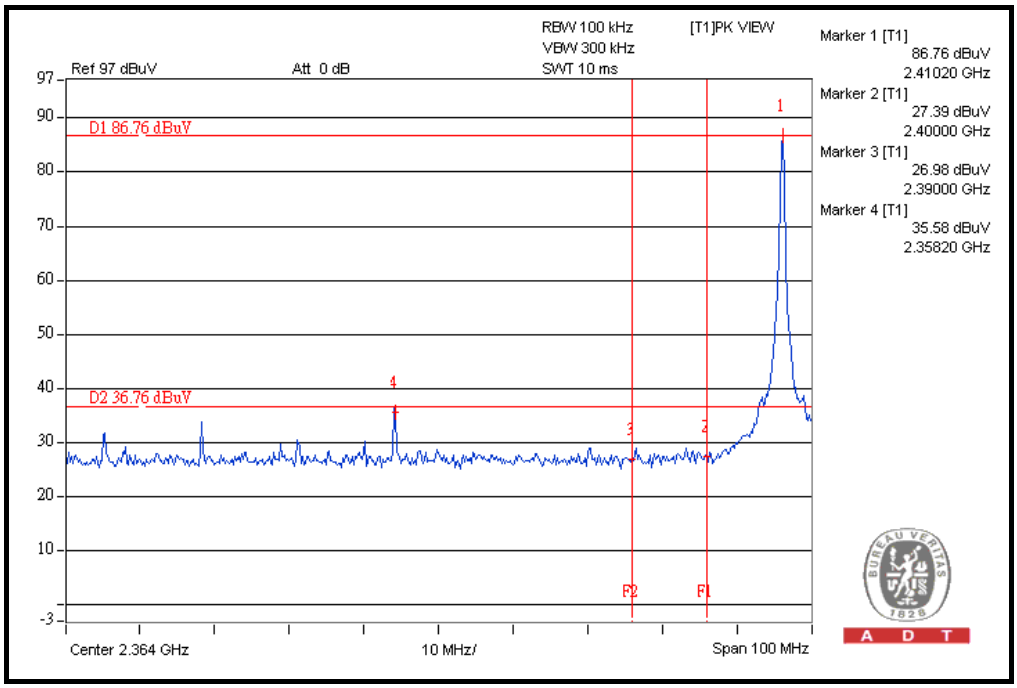


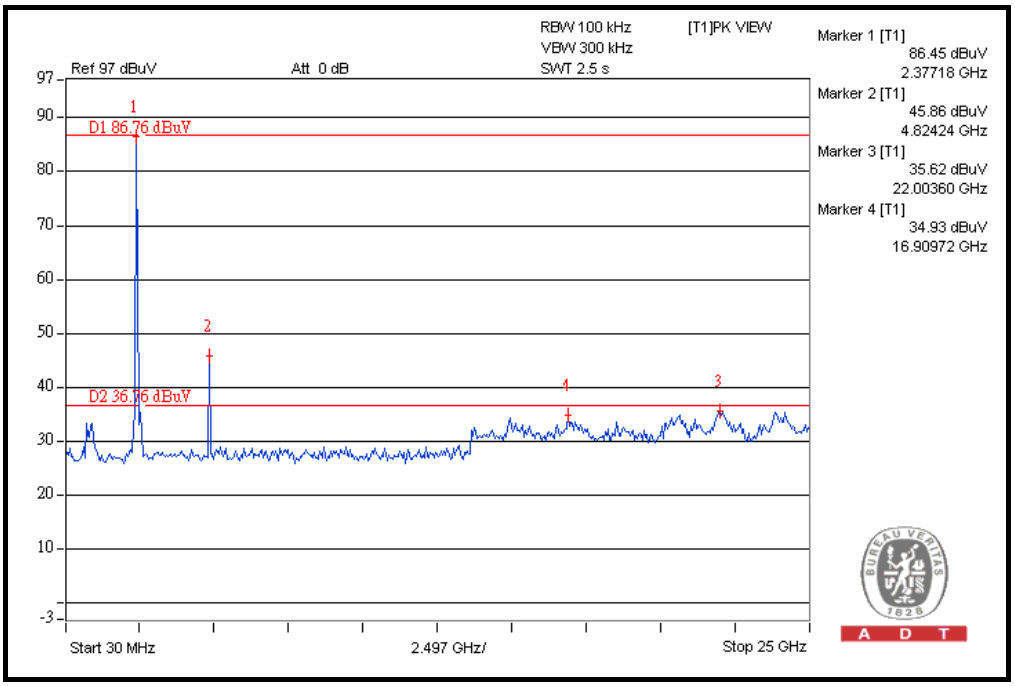


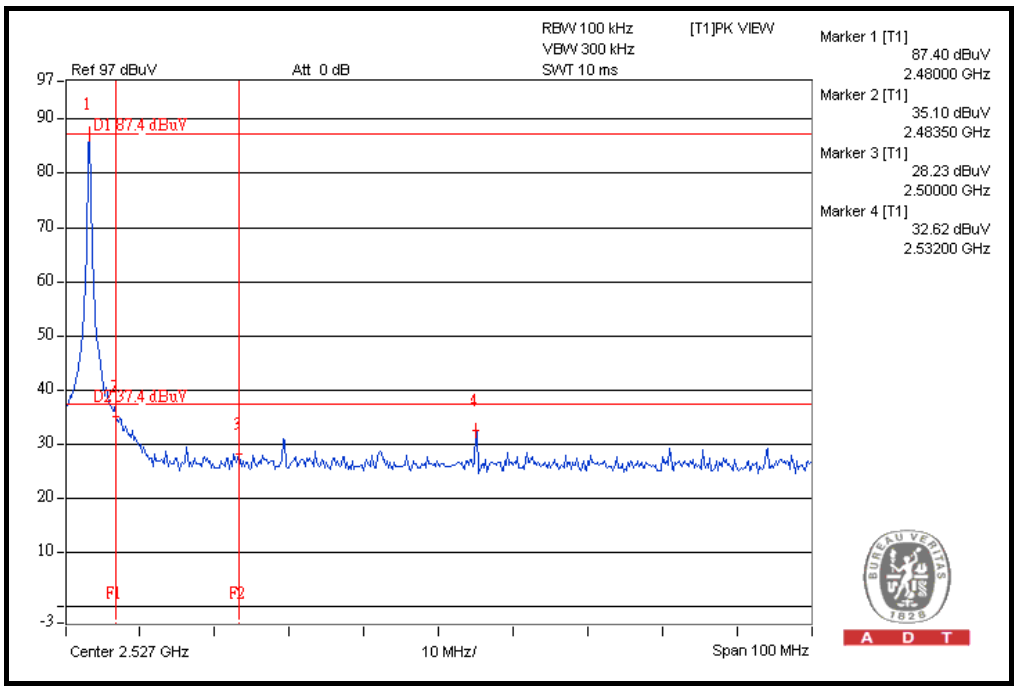

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1]PK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
72.33 dBuV
2.48000 GHz
Marker 2 [T1]
28.68 dBuV
2.48350 GHz
Marker 3 [T1]
29.42 dBuV
2.49880 GHz
Marker 4 [T1]
27.41 dBuV
2.50000 GHz
D1 72.24 dBuV
D2 22.24 dBuV
F1
F2
Center 2.525 GHz
10 MHz/
Span 100 MHz

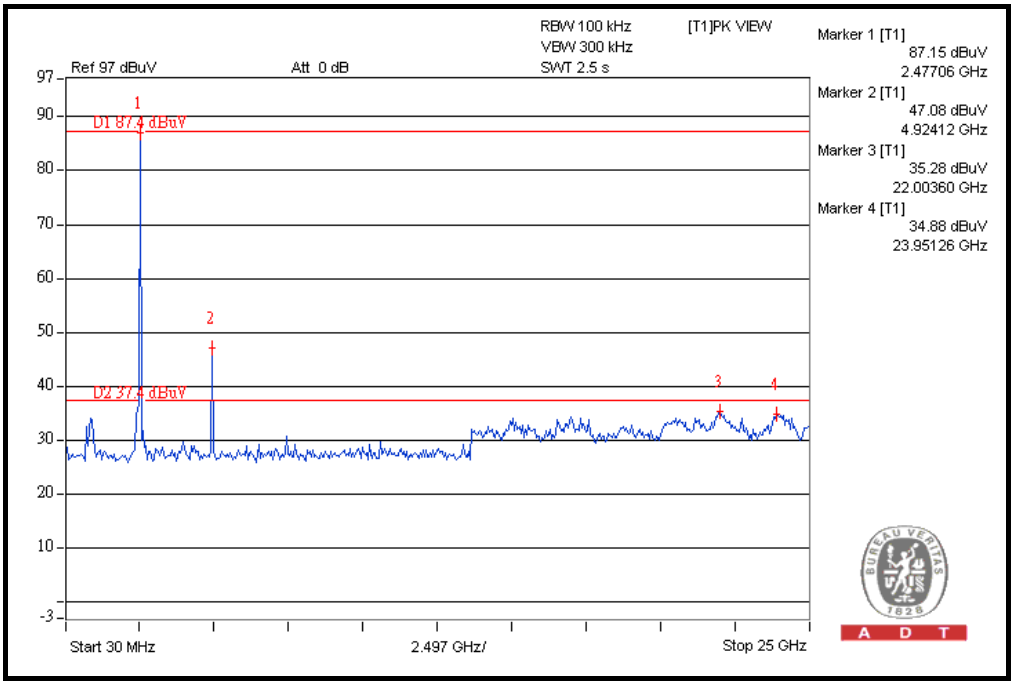

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1]PK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
71.55 dBuV
2.47706 GHz
Marker 2 [T1]
44.56 dBuV
4.92412 GHz
Marker 3 [T1]
36.02 dBuV
21.95366 GHz
Marker 4 [T1]
35.08 dBuV
23.95126 GHz
D1 72.24 dBuV
D2 22.24 dBuV
Start 30 MHz
2.497 GHz/
Stop 25 GHz

TEST MODE B


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1]PK VIEW
Ref 97 dBuV
Att 0 dB
D1 86.76 dBuV
D2 36.76 dBuV
Marker 1 [T1]
86.76 dBuV
2.41020 GHz
Marker 2 [T1]
27.39 dBuV
2.40000 GHz
Marker 3 [T1]
26.98 dBuV
2.39000 GHz
Marker 4 [T1]
35.58 dBuV
2.35820 GHz
Center 2.364 GHz
10 MHz/
Span 100 MHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1]PK VIEW
Ref 97 dBuV
Att 0 dB
D1 86.76 dBuV
D2 36.76 dBuV
Marker 1 [T1]
86.45 dBuV
2.37718 GHz
Marker 2 [T1]
45.86 dBuV
4.82424 GHz
Marker 3 [T1]
35.62 dBuV
22.00360 GHz
Marker 4 [T1]
34.93 dBuV
16.90972 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1]PK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
87.40 dBuV
2.48000 GHz
Marker 2 [T1]
35.10 dBuV
2.48350 GHz
Marker 3 [T1]
28.23 dBuV
2.50000 GHz
Marker 4 [T1]
32.62 dBuV
2.53200 GHz
D1 87.4 dBuV
D2 37.4 dBuV
F1
F2
Center 2.527 GHz
10 MHz/
Span 100 MHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1]PK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
87.15 dBuV
2.47706 GHz
Marker 2 [T1]
47.08 dBuV
4.92412 GHz
Marker 3 [T1]
35.28 dBuV
22.00360 GHz
Marker 4 [T1]
34.88 dBuV
23.95126 GHz
D1 87.4 dBuV
D2 37.4 dBuV
Start 30 MHz
2.497 GHz/
Stop 25 GHz

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.

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: 886-2-26051924

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.

7. 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.

--- END ---