

FCC TEST REPORT

REPORT NO.: RF991220C05
MODEL NO.: INRD01u
FCC ID: EHA-INRD01U
RECEIVED: Dec. 20, 2010
TESTED: Dec. 31, 2010 ~ Jan. 05, 2011
ISSUED: Apr. 11, 2011

APPLICANT: Intermec Technologies Corporation

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ISSUED BY: Bureau Veritas Consumer Products Services
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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	NA	Apr. 11, 2011

1. CERTIFICATION

PRODUCT: RFID UHF Module

BRAND: Intermec

MODEL: INRD01u

APPLICANT: Intermec Technologies Corporation

TESTED: Dec. 31, 2010 ~ Jan. 05, 2011

TEST SAMPLE: ENGINEERING SAMPLE

STANDARDS: **FCC Part 15, Subpart C (Section 15.247),**
ANSI C63.4-2003
ANSI C63.10-2009

The above equipment (Model: INRD01u) 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 : Andrea Hsia , DATE : Apr. 11, 2011
Andrea Hsia / Specialist

APPROVED BY : Gary Chang , DATE : Apr. 11, 2011
Gary Chang / Assistant 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 AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -1.37dB at 2.266MHz.
15.247(a)(1)(i)	Number of Hopping Frequency Used Spec.: At least 50 channels	PASS	Meet the requirement of limit.
15.247(a)(1)(i)	Dwell Time on Each Channel Spec.: Max. 0.4 second within 20 second	PASS	Meet the requirement of limit.
15.247(a)(1)(i)	1. Hopping Channel Separation Spec.: Min. 25 kHz or 20 dB bandwidth, whichever is greater 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	PASS	Meet the requirement of limit.
15.247(b)(2)	Maximum Output Power Spec.: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -4.3dB at 358.48MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is MMCX (F) not a standard connector.

2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted Emission	150kHz~30MHz	2.44dB
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	RFID UHF Module
MODEL NO.	INRD01u
FCC ID	EHA-INRD01U
POWER SUPPLY	5Vdc
MODULATION TYPE	PR-ASK
TRANSFER RATE	80Kb/s
OPERATING FREQUENCY	902.75 ~ 927.25MHz
NUMBER OF CHANNEL	50
CHANNEL SPACING	500kHz
OUTPUT POWER	242.1mW
ANTENNA TYPE	Refer to Note
ANTENNA CONNECTOR	MMCX (F)
POWER LINE	NA
I/O PORT	NA
ACCESSORY DEVICES	NA

NOTE:

- There are three antennas for the EUT.

Ant No.	Part No.	Antenna Type	Antenna Connector	Gain (dBi)
1	PN-234-117-0001	Microstripe antenna "Coupler"	MMCX (F)	-18.71
2	PN1-971140-0001			-18.31
3	PN-234-079-0001			-19.96

* Antenna 1 & 2 were chosen for the final test.

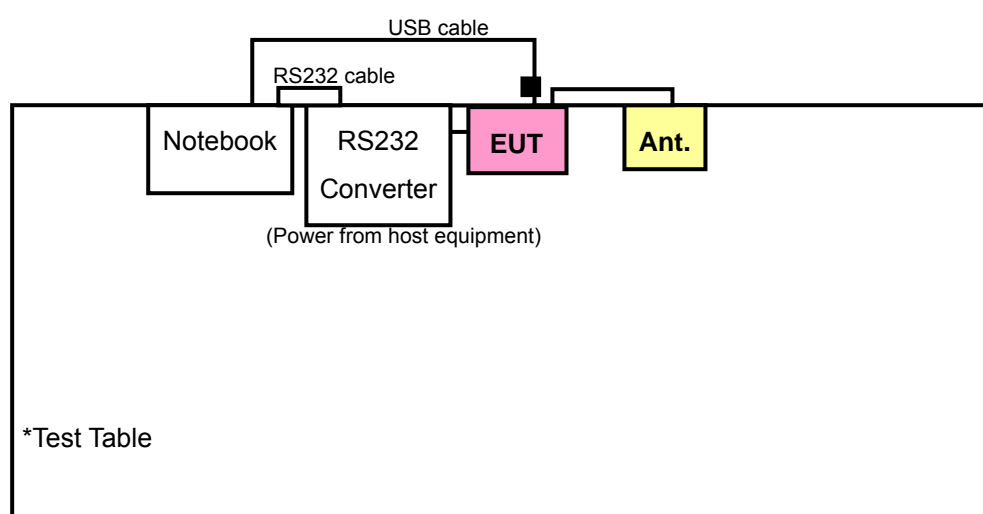
- The EUT has transmitter and receiver functions.
- The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

50 channels are provided to this EUT:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	902.75	17	911.25	34	919.75
1	903.25	18	911.75	35	920.25
2	903.75	19	912.25	36	920.75
3	904.25	20	912.75	37	921.25
4	904.75	21	913.25	38	921.75
5	905.25	22	913.75	39	922.25
6	905.75	23	914.25	40	922.75
7	906.25	24	914.75	41	923.25
8	906.75	25	915.25	42	923.75
9	907.25	26	915.75	46	924.25
10	907.75	27	916.25	44	924.75
11	908.25	28	916.75	45	925.25
12	908.75	29	917.25	49	925.75
13	909.25	30	917.75	47	926.25
14	909.75	31	918.25	48	926.75
15	910.25	32	918.75	49	927.25
16	910.75	33	919.25		

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 \geq 1G	RE $<$ 1G	PLC	APCM	
A	√	√	√	√	EUT tested with antenna 1
B	√	√	√	-	EUT tested with antenna 2

Where **RE \geq 1G**: Radiated Emission above 1GHz

PLC: Power Line Conducted Emission

NOTE: "-" means no effect.

RE $<$ 1G: Radiated Emission below 1GHz

APCM: Antenna Port Conducted Measurement

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Kbps)	ANT. AXIS
A	0 to 49	0, 25, 49	PR-ASK	80	Y
B	0 to 49	0, 25, 49	PR-ASK	80	X

RADIATED EMISSION TEST (BELOW 1 GHz):

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Kbps)	ANT. AXIS
A	0 to 49	0, 25, 49	PR-ASK	80	Y
B	0 to 49	0, 25, 49	PR-ASK	80	X

POWER LINE CONDUCTED EMISSION TEST:

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Kbps)
A & B	0 to 49	25	PR-ASK	80Kbps

ANTENNA PORT CONDUCTED MEASUREMENT:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Kbps)
A	0 to 49	0, 25, 49	PR-ASK	80Kbps

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE \geq 1G	23deg. C, 65%RH, 1012 hPa	120Vac, 60Hz	Frank Wang
RE<1G	23deg. C, 65%RH, 1012 hPa	120Vac, 60Hz	Frank Wang
	23deg. C, 65%RH, 1012 hPa	120Vac, 60Hz	Frank Wang
PLC	20deg. C, 60%RH, 1010 hPa	120Vac, 60Hz	Match Tsui
APCM	25deg. C, 66%RH, 1012 hPa	120Vac, 60Hz	Brad Wu

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)

ANSI C63.4-2003

ANSI C63.10-2009

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	NOTEBOOK	DELL	PP18L	33497605792	CXSMM01BRD02D330
2	RS232 Converter Board	NA	NA	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.8m USB cable with one core
2	1.8m RS232 cable

NOTE:

1. All power cords of the above support units are non-shielded (1.8 m).
2. Items 2 and the USB cable were provided by the client.

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a)

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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Dec. 27, 2010	Dec. 26, 2011
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 9120 D	9120D-209	Aug. 02, 2010	Aug. 01, 2011
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8449B	3008A01961	Nov. 02, 2010	Nov. 01, 2011
Preamplifier Agilent	8447D	2944A10738	Nov. 02, 2010	Nov. 01, 2011
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.

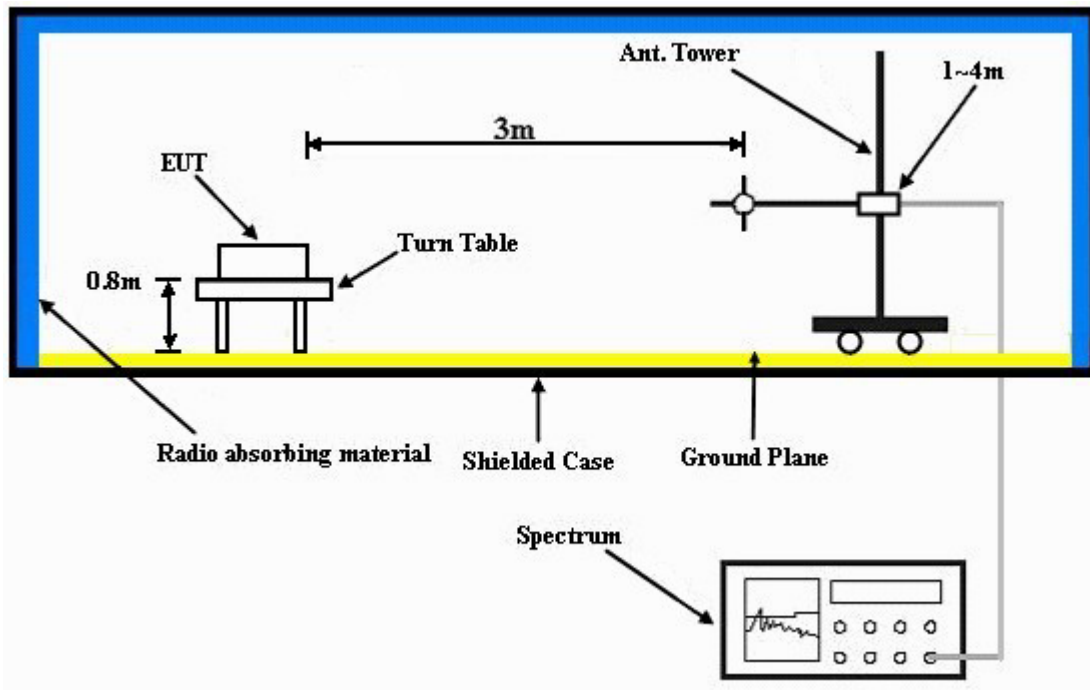
NOTE:

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 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. 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

- Placed the EUT on a testing table.
- Set the EUT under transmission condition continuously at specific channel frequency.
- The necessary accessories enable the system in full functions.

4.1.7 TEST RESULTS

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	Below 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH 1012 hPa	TEST MODE	A
TESTED BY	Frank Wang		

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	#902.00	25.8 PK	69.6	-43.8	1.58 H	264	-0.4	26.2
2	#902.00	13.6 AV	67.8	-54.2	1.58 H	264	-12.6	26.2
3	*902.75	89.6 PK			1.58 H	265	63.4	26.2
4	*902.75	87.8 AV			1.58 H	265	61.6	26.2
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	#902.00	25.6 PK	60.6	-35.0	1.06 V	241	-0.6	26.2
2	#902.00	13.4 AV	58.8	-45.4	1.06 V	241	-12.8	26.2
3	*902.75	80.6 PK			1.06 V	242	54.4	26.2
4	*902.75	78.8 AV			1.06 V	242	52.6	26.2

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 radiated frequency is out the restricted band.
7. The average value of fundamental frequency and harmonics is calculated by using formula as below
Average = Reading value of RBW=1MHz and VBW=10Hz + 20 log (duty cycle of normal operation)
20 log (duty cycle of normal operation) = 20 log (81 ms / 100 ms) = -1.8 dB
Therefore
Average=Reading value of RBW=1MHz and VBW=10Hz -1.8 dB
Please see page 27for plotted duty.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 25	FREQUENCY RANGE	Below 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH 1012 hPa	TEST MODE	A
TESTED BY	Frank Wang		

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	*915.25	88.8 PK			1.60 H	265	62.5	26.3
2	*915.25	87.0 AV			1.60 H	265	60.7	26.3
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	*915.25	81.3 PK			1.05 V	240	55.0	26.3
2	*915.25	79.5 AV			1.05 V	240	53.2	26.3

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * ” : Fundamental frequency
6. The average value of fundamental frequency and harmonics is calculated by using formula as below
Average = Reading value of RBW=1MHz and VBW=10Hz + 20 log (duty cycle of normal operation)
20 log (duty cycle of normal operation) = 20 log (81 ms / 100 ms) = -1.8 dB
Therefore
Average=Reading value of RBW=1MHz and VBW=10Hz -1.8 dB
Please see page 27for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 49	FREQUENCY RANGE	Below 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH 1012 hPa	TEST MODE	A
TESTED BY	Frank Wang		

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	*927.25	88.3 PK			1.57 H	266	61.9	26.4
2	*927.25	86.5 AV			1.57 H	266	60.1	26.4
3	#928.00	25.5 PK	68.3	-42.8	1.57 H	266	-0.9	26.4
4	#928.00	13.5AV	66.5	-53.0	1.57 H	266	-12.9	26.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*927.25	81.9 PK			1.01 V	240	55.5	26.4
2	*927.25	80.1 AV			1.01 V	240	53.7	26.4
3	#928.00	25.3 PK	61.9	-36.6	1.01 V	240	-1.1	26.4
4	#928.00	13.2 AV	60.1	-46.9	1.01 V	240	-13.2	26.4

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “ : Fundamental frequency
6. “ # ”: The radiated frequency is out the restricted band.
7. The average value of fundamental frequency and harmonics is calculated by using formula as below
Average = Reading value of RBW=1MHz and VBW=10Hz + 20 log (duty cycle of normal operation)
20 log (duty cycle of normal operation) = 20 log (81 ms / 100 ms) = -1.8 dB
Therefore
Average=Reading value of RBW=1MHz and VBW=10Hz -1.8 dB
Please see page 27for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	Below 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH 1012 hPa	TEST MODE	B
TESTED BY	Frank Wang		

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	#902.00	26.0 PK	75.9	-49.9	1.55 H	131	-0.2	26.2
2	#902.00	14.0 AV	74.1	-60.1	1.55 H	131	-12.2	26.2
3	*902.75	95.9 PK			1.55 H	131	69.7	26.2
4	*902.75	94.1 AV			1.55 H	131	67.9	26.2
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	#902.00	25.2 PK	69.1	-43.9	1.83 V	341	-1.0	26.2
2	#902.00	13.2 AV	67.3	-54.1	1.83 V	341	-13.0	26.2
3	*902.75	89.1 PK			1.83 V	341	62.9	26.2
4	*902.75	87.3 AV			1.83 V	341	61.1	26.2

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 radiated frequency is out the restricted band.
7. The average value of fundamental frequency and harmonics is calculated by using formula as below
Average = Reading value of RBW=1MHz and VBW=10Hz + 20 log (duty cycle of normal operation)
20 log (duty cycle of normal operation) = 20 log (81 ms / 100 ms) = -1.8 dB
Therefore
Average=Reading value of RBW=1MHz and VBW=10Hz -1.8 dB
Please see page 27for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 25	FREQUENCY RANGE	Below 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH 1012 hPa	TEST MODE	B
TESTED BY	Frank Wang		

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	*915.25	96.3 PK			1.50 H	132	70.0	26.3
2	*915.25	94.5 AV			1.50 H	132	68.2	26.3
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	*915.25	89.0 PK			1.72 V	340	62.7	26.3
2	*915.25	87.2 AV			1.72 V	340	60.9	26.3

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * ” : Fundamental frequency
6. The average value of fundamental frequency and harmonics is calculated by using formula as below
Average = Reading value of RBW=1MHz and VBW=10Hz + 20 log (duty cycle of normal operation)
20 log (duty cycle of normal operation) = 20 log (81 ms / 100 ms) = -1.8 dB
Therefore
Average=Reading value of RBW=1MHz and VBW=10Hz -1.8 dB
Please see page 27for plotted duty.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 49	FREQUENCY RANGE	Below 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH 1012 hPa	TEST MODE	B
TESTED BY	Frank Wang		

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	*927.25	94.6 PK			1.45 H	130	68.2	26.4
2	*927.25	82.8 AV			1.45 H	130	66.4	26.4
3	#928.00	25.6 PK	74.6	-49.0	1.45 H	130	-0.8	26.4
4	#928.00	13.4AV	62.8	-49.4	1.45 H	130	-13.0	26.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*927.25	88.2 PK			1.76 V	342	61.8	26.4
2	*927.25	86.4 AV			1.76 V	342	60.0	26.4
3	#928.00	25.2 PK	68.2	-43.0	1.76 V	342	-1.2	26.4
4	#928.00	13.2 AV	66.4	-53.2	1.76 V	342	-13.2	26.4

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * ” : Fundamental frequency
6. “ # ”: The radiated frequency is out the restricted band.
7. The average value of fundamental frequency and harmonics is calculated by using formula as below
Average = Reading value of RBW=1MHz and VBW=10Hz + 20 log (duty cycle of normal operation)
20 log (duty cycle of normal operation) = 20 log (81 ms / 100 ms) = -1.8 dB
Therefore
Average=Reading value of RBW=1MHz and VBW=10Hz -1.8 dB

Please see page 27for plotted duty.

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	23deg. C, 65%RH 1012 hPa	TEST MODE	A
TESTED BY	Frank Wang		

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	1805.50	45.8 PK	74.0	-28.2	1.00 H	34	17.1	28.7
2	1805.50	44.0 AV	54.0	-10.0	1.00 H	34	15.3	28.7
3	2708.25	39.4 PK	74.0	-34.6	1.00 H	14	7.9	31.5
4	2708.25	37.6 AV	54.0	-16.4	1.00 H	14	6.1	31.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	1805.50	47.9 PK	74.0	-26.1	1.03 V	348	19.2	28.7
2	1805.50	46.1 AV	54.0	-7.9	1.03 V	348	17.4	28.7
3	2708.25	38.8 PK	74.0	-35.2	1.00 V	170	7.3	31.5
4	2708.25	37.0 AV	54.0	-17.0	1.00 V	170	5.5	31.5

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. The average value of fundamental frequency and harmonics is calculated by using formula as below
Average = Reading value of RBW=1MHz and VBW=10Hz + 20 log (duty cycle of normal operation)
20 log (duty cycle of normal operation) = 20 log (81 ms / 100 ms) = -1.8 dB
Therefore
Average=Reading value of RBW=1MHz and VBW=10Hz -1.8 dB
Please see page 27for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 25	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH 1012 hPa	TEST MODE	A
TESTED BY	Frank Wang		

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	1830.50	46.4 PK	74.0	-27.6	1.21 H	334	17.7	28.7
2	1830.50	44.6 AV	54.0	-9.4	1.21 H	334	15.9	28.7
3	2745.75	39.0 PK	74.0	-35.0	1.00 H	257	7.3	31.7
4	2745.75	37.2 AV	54.0	-16.8	1.00 H	257	5.5	31.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	1830.50	49.3 PK	74.0	-24.7	1.00 V	347	20.6	28.7
2	1830.50	47.5 AV	54.0	-6.5	1.00 V	347	18.8	28.7
3	2745.75	38.4 PK	74.0	-35.6	1.13 V	11	6.7	31.7
4	2745.75	36.6 AV	54.0	-17.4	1.13 V	11	4.9	31.7

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. The average value of fundamental frequency and harmonics is calculated by using formula as below
Average = Reading value of RBW=1MHz and VBW=10Hz + 20 log (duty cycle of normal operation)
20 log (duty cycle of normal operation) = 20 log (81 ms / 100 ms) = -1.8 dB
Therefore
Average=Reading value of RBW=1MHz and VBW=10Hz -1.8 dB

Please see page 27for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 49	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH 1012 hPa	TEST MODE	A
TESTED BY	Frank Wang		

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	1854.50	45.7 PK	74.0	-28.3	1.05 H	340	16.9	28.8
2	1854.50	43.9 AV	54.0	-10.1	1.05 H	340	15.1	28.8
3	2781.75	39.8 PK	74.0	-34.2	1.00 H	57	8.0	31.8
4	2781.75	38.0 AV	54.0	-16.0	1.00 H	57	6.2	31.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	1854.50	46.3 PK	74.0	-27.7	1.00 V	349	17.5	28.8
2	1854.50	44.5 AV	54.0	-9.5	1.00 V	349	15.7	28.8
3	2781.75	39.1 PK	74.0	-34.9	1.00 V	34	7.3	31.8
4	2781.75	37.3 AV	54.0	-16.7	1.00 V	34	5.5	31.8

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 average value of fundamental frequency and harmonics is calculated by using formula as below
Average = Reading value of RBW=1MHz and VBW=10Hz + 20 log (duty cycle of normal operation)
20 log (duty cycle of normal operation) = 20 log (81 ms / 100 ms) = -1.8 dB
Therefore
Average=Reading value of RBW=1MHz and VBW=10Hz -1.8 dB

Please see page 27for plotted duty.

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	23deg. C, 65%RH 1012 hPa	TEST MODE	B
TESTED BY	Frank Wang		

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	1805.50	43.8 PK	74.0	-30.2	1.67 H	285	15.1	28.7
2	1805.50	42.0 AV	54.0	-12.0	1.67 H	285	13.3	28.7
3	2708.25	38.6 PK	74.0	-35.40	1.08 H	77	7.1	31.5
4	2708.25	36.8 AV	54.0	-17.20	1.08 H	77	5.3	31.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	1805.50	44.7 PK	74.0	-29.3	1.00 V	262	16.0	28.7
2	1805.50	42.9 AV	54.0	-11.1	1.00 V	262	14.2	28.7
3	2708.25	39.6 PK	74.0	-34.4	1.24 V	85	8.1	31.5
4	2708.25	37.8 AV	54.0	-16.2	1.24 V	85	6.3	31.5

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. The average value of fundamental frequency and harmonics is calculated by using formula as below
Average = Reading value of RBW=1MHz and VBW=10Hz + 20 log (duty cycle of normal operation)
20 log (duty cycle of normal operation) = 20 log (81 ms / 100 ms) = -1.8 dB
Therefore
Average=Reading value of RBW=1MHz and VBW=10Hz -1.8 dB
Please see page 27for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 25	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH 1012 hPa	TEST MODE	B
TESTED BY	Frank Wang		

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	1830.50	44.7 PK	74.0	-29.3	1.04 H	74	16.0	28.7
2	1830.50	42.9 AV	54.0	-11.1	1.04 H	74	14.2	28.7
3	2745.75	38.4 PK	74.0	-35.6	1.36 H	0	6.7	31.7
4	2745.75	36.6 AV	54.0	-17.4	1.36 H	0	4.9	31.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	1830.50	45.2 PK	74.0	-28.8	1.00 V	266	16.5	28.7
2	1830.50	43.4 AV	54.0	-10.6	1.00 V	266	14.7	28.7
3	2745.75	39.5 PK	74.0	-34.5	1.25 V	37	7.8	31.7
4	2745.75	37.7 AV	54.0	-16.3	1.25 V	37	6.0	31.7

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. The average value of fundamental frequency and harmonics is calculated by using formula as below
Average = Reading value of RBW=1MHz and VBW=10Hz + 20 log (duty cycle of normal operation)
20 log (duty cycle of normal operation) = 20 log (81 ms / 100 ms) = -1.8 dB
Therefore
Average=Reading value of RBW=1MHz and VBW=10Hz -1.8 dB
Please see page 27for plotted duty.

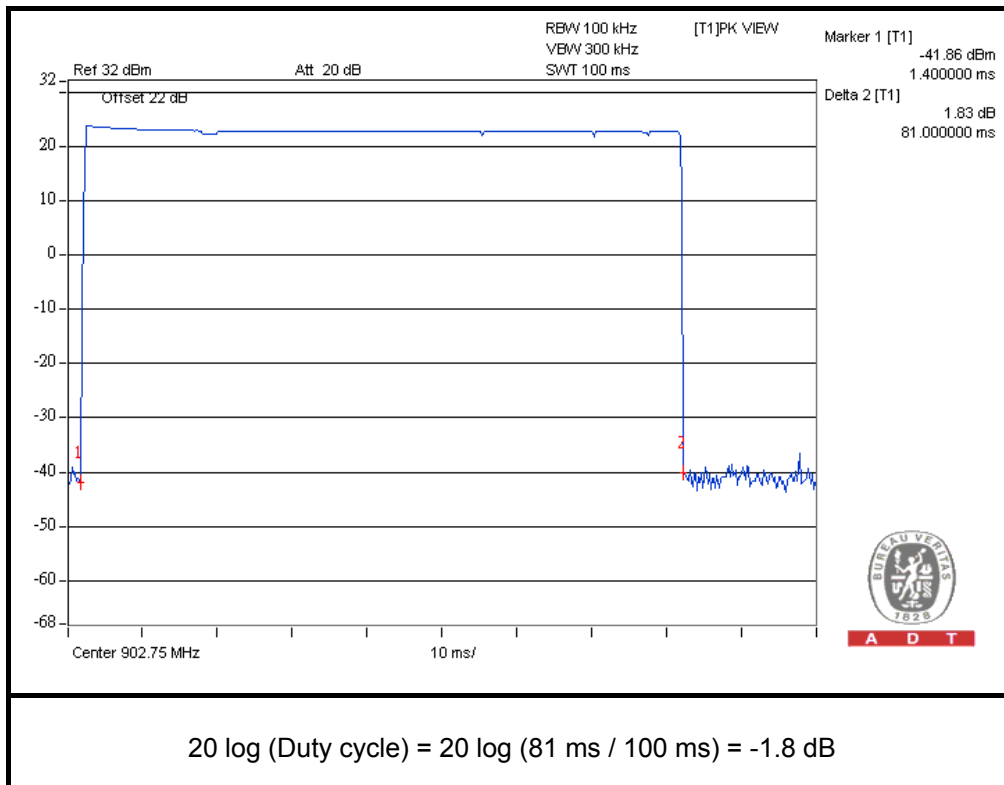
EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 49	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH 1012 hPa	TEST MODE	B
TESTED BY	Frank Wang		

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	1854.50	42.3 PK	74.0	-31.7	1.20 H	35	13.5	28.8
2	1854.50	40.5 AV	54.0	-35.5	1.20 H	35	11.7	28.8
3	2781.75	38.7 PK	74.0	-35.3	1.00 H	153	6.9	31.8
4	2781.75	36.9 AV	54.0	-17.1	1.00 H	153	5.1	31.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	1854.50	42.8 PK	74.0	-31.2	1.00 V	250	14.0	28.8
2	1854.50	41.0 AV	54.0	-13.0	1.00 V	250	12.2	28.8
3	2781.75	39.3 PK	74.0	-34.7	1.50 V	243	7.5	31.8
4	2781.75	37.5 AV	54.0	-16.5	1.50 V	243	5.7	31.8

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 average value of fundamental frequency and harmonics is calculated by using formula as below
Average = Reading value of RBW=1MHz and VBW=10Hz + 20 log (duty cycle of normal operation)
20 log (duty cycle of normal operation) = 20 log (81 ms / 100 ms) = -1.8 dB
Therefore
Average=Reading value of RBW=1MHz and VBW=10Hz -1.8 dB

Please see page 27for plotted duty.



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	23deg. C, 65%RH 1016 hPa	TEST MODE	A
TESTED BY	Brad Wu		

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	129.06	35.4 QP	43.5	-8.1	1.50 H	250	23.2	12.2
2	249.60	40.5 QP	46.0	-5.5	1.25 H	4	27.6	12.9
3	354.60	40.9 QP	46.0	-5.1	1.00 H	292	25.9	15.0
4	436.26	33.4 QP	46.0	-12.6	1.00 H	295	16.1	17.3
5	628.74	36.9 QP	46.0	-9.1	1.50 H	316	14.7	22.2
6	725.96	36.1 QP	46.0	-9.9	1.50 H	10	12.7	23.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	51.29	32.0 QP	40.0	-8.0	1.00 V	184	18.3	13.7
2	249.60	35.6 QP	46.0	-10.4	1.75 V	91	22.7	12.9
3	339.04	33.3 QP	46.0	-12.7	1.50 V	43	18.7	14.6
4	436.26	30.7 QP	46.0	-15.3	1.25 V	109	13.4	17.3
5	628.74	32.8 QP	46.0	-13.2	1.00 V	160	10.6	22.2
6	725.96	29.8 QP	46.0	-16.2	1.25 V	145	6.4	23.4

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 25	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH 1016 hPa	TEST MODE	A
TESTED BY	Brad Wu		

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	136.84	38.3 QP	43.5	-5.2	2.00 H	247	25.8	12.5
2	245.72	41.0 QP	46.0	-5.0	1.00 H	10	28.3	12.7
3	350.71	38.8 QP	46.0	-7.2	1.00 H	88	23.9	14.9
4	533.47	34.3 QP	46.0	-11.7	1.75 H	22	14.0	20.3
5	628.74	38.5 QP	46.0	-7.5	1.25 H	319	16.3	22.2
6	725.96	35.5 QP	46.0	-10.5	1.25 H	31	12.1	23.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	49.34	31.3 QP	40.0	-8.7	1.00 V	106	17.7	13.6
2	129.06	30.3 QP	43.5	-13.2	1.00 V	88	18.1	12.2
3	247.66	36.3 QP	46.0	-9.7	1.50 V	91	23.5	12.8
4	339.04	31.3 QP	46.0	-14.7	1.25 V	37	16.7	14.6
5	436.26	30.4 QP	46.0	-15.6	1.25 V	106	13.1	17.3
6	628.74	32.7 QP	46.0	-13.3	1.00 V	169	10.5	22.2

- 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 49	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH 1016 hPa	TEST MODE	A
TESTED BY	Brad Wu		

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	136.84	36.4 QP	43.5	-7.1	2.00 H	250	23.9	12.5
2	249.60	40.1 QP	46.0	-5.9	1.00 H	10	27.2	12.9
3	350.71	37.7 QP	46.0	-8.3	1.00 H	10	22.8	14.9
4	533.47	34.5 QP	46.0	-11.5	1.50 H	28	14.2	20.3
5	630.69	37.7 QP	46.0	-8.3	1.25 H	31	15.5	22.2
6	725.96	35.0 QP	46.0	-11.0	1.00 H	34	11.6	23.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	51.29	31.3 QP	40.0	-8.7	1.00 V	61	17.6	13.7
2	136.84	30.1 QP	40.0	-13.4	1.00 V	103	17.6	12.5
3	247.66	35.6 QP	43.5	-10.4	1.75 V	55	22.8	12.8
4	356.54	31.6 QP	46.0	-14.4	1.50 V	58	16.5	15.1
5	628.74	32.4 QP	46.0	-13.6	1.00 V	112	10.2	22.2
6	725.96	30.9 QP	46.0	-15.1	1.00 V	157	7.5	23.4

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH 1016 hPa	TEST MODE	B
TESTED BY	Brad Wu		

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	136.84	34.4 QP	43.5	-9.1	2.00 H	214	21.9	12.5
2	290.43	31.7 QP	46.0	-14.3	1.25 H	58	18.1	13.6
3	339.04	36.7 QP	46.0	-9.3	1.25 H	4	22.1	14.6
4	434.31	32.0 QP	46.0	-14.0	2.00 H	286	14.8	17.2
5	628.74	37.4 QP	46.0	-8.6	1.25 H	43	15.2	22.2
6	725.96	36.2 QP	46.0	-9.8	1.25 H	346	12.8	23.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	49.34	32.3 QP	40.0	-7.7	1.00 V	118	18.7	13.6
2	241.83	28.2 QP	46.0	-17.8	1.75 V	70	15.7	12.5
3	339.04	31.3 QP	46.0	-14.7	1.25 V	34	16.7	14.6
4	434.31	29.8 QP	46.0	-16.2	2.00 V	331	12.6	17.2
5	628.74	34.8 QP	46.0	-11.2	1.00 V	190	12.6	22.2
6	725.96	31.8 QP	46.0	-14.2	2.00 V	31	8.4	23.4

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 25	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH 1016 hPa	TEST MODE	B
TESTED BY	Brad Wu		

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	136.84	36.7 QP	43.5	-6.8	1.75 H	217	24.2	12.5
2	249.60	38.0 QP	46.0	-8.0	1.50 H	7	25.1	12.9
3	358.48	41.7 QP	46.0	-4.3	1.25 H	10	26.6	15.1
4	533.47	34.9 QP	46.0	-11.1	1.50 H	37	14.6	20.3
5	630.69	38.2 QP	46.0	-7.8	1.25 H	316	16.0	22.2
6	725.96	35.0 QP	46.0	-11.0	1.25 H	349	11.6	23.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	51.29	34.8 QP	40.0	-5.2	1.00 V	124	21.1	13.7
2	119.34	30.5 QP	43.5	-13.0	1.50 V	340	18.8	11.7
3	251.55	34.7 QP	46.0	-11.3	1.50 V	91	21.8	12.9
4	337.10	32.2 QP	46.0	-13.8	1.00 V	31	17.6	14.6
5	436.26	29.2 QP	46.0	-16.8	2.00 V	304	11.9	17.3
6	628.74	32.8 QP	46.0	-13.2	1.00 V	169	10.6	22.2

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 49	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH 1016 hPa	TEST MODE	B
TESTED BY	Brad Wu		

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	136.84	34.8 QP	43.5	-8.7	1.00 H	112	22.3	12.5
2	245.72	40.1 QP	46.0	-5.9	1.25 H	358	27.4	12.7
3	360.43	41.4 QP	46.0	-4.6	1.25 H	76	26.3	15.1
4	582.08	32.3 QP	46.0	-13.7	1.50 H	304	10.8	21.5
5	628.74	38.1 QP	46.0	-7.9	1.25 H	34	15.9	22.2
6	725.96	34.5 QP	46.0	-11.5	1.25 H	1	11.1	23.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	51.29	30.4 QP	40.0	-9.6	1.50 V	88	16.7	13.7
2	136.84	30.6 QP	40.0	-12.9	1.00 V	97	18.1	12.5
3	245.72	36.1 QP	43.5	-9.9	1.50 V	91	23.4	12.7
4	348.76	32.3 QP	46.0	-13.7	1.00 V	37	17.4	14.9
5	436.26	30.0 QP	46.0	-16.0	2.00 V	337	12.7	17.3
6	630.69	33.6 QP	46.0	-12.4	1.00 V	178	11.4	22.2

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

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	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.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 30, 2010	Nov. 29, 2011
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 30, 2010	Dec. 29, 2011
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Jun. 28, 2010	Jun. 27, 2011
V-LISN SCHWARZBECK	NNBL 8226-2	8226-142	Jul. 12, 2010	Jul. 11, 2011
Software ADT	ADT_Conc_ 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 HwaYa Shielded Room 1.
 3. The VCCI Site Registration No. is C-2040.

4.2.3 TEST PROCEDURES

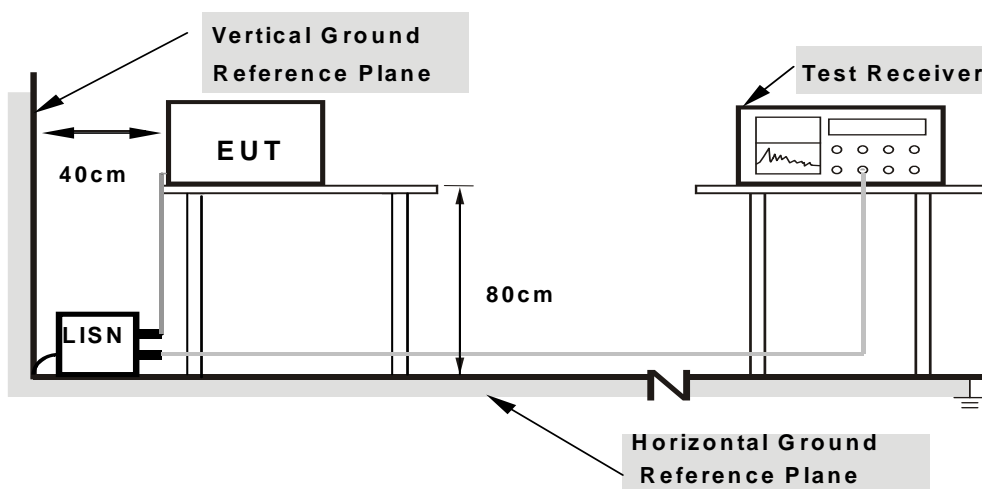
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

NOTE: 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



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

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

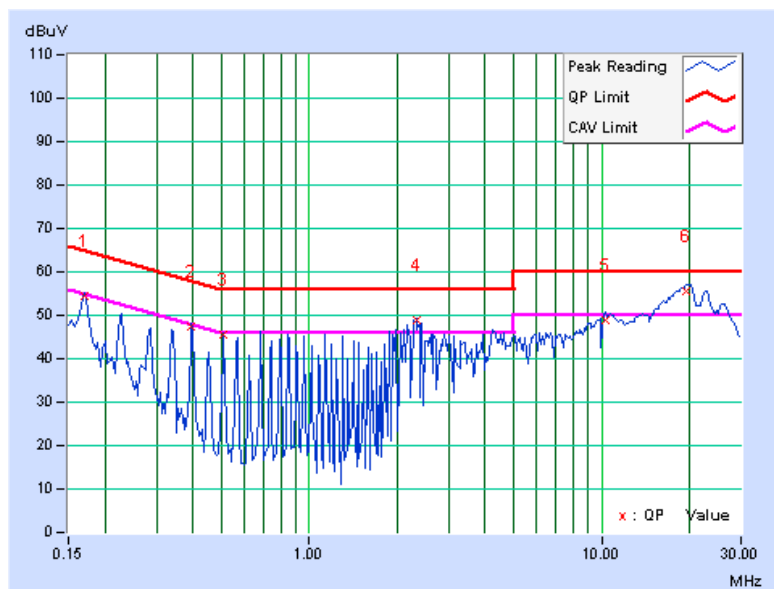
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA

PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.170	0.15	54.14	-	54.29	-	64.98	54.98	-10.70	-
2	0.396	0.17	47.30	-	47.47	-	57.93	47.93	-10.47	-
3	0.509	0.18	45.30	-	45.48	-	56.00	46.00	-10.52	-
4	2.324	0.30	48.50	44.30	48.80	44.60	56.00	46.00	-7.20	-1.40
5	10.259	0.66	48.32	-	48.98	-	60.00	50.00	-11.02	-
6	19.547	1.34	54.22	46.32	55.56	47.66	60.00	50.00	-4.44	-2.34

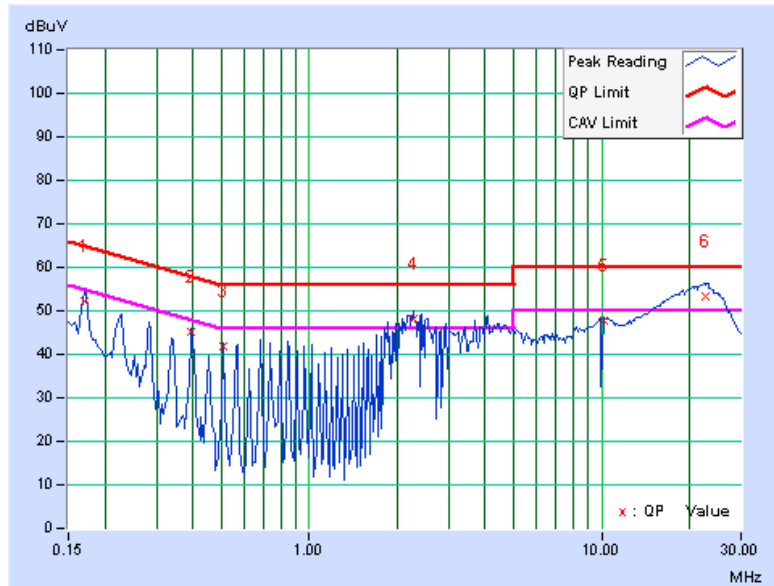
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.170	0.11	51.96	-	52.07	-	64.98	54.98	-12.92	-
2	0.396	0.13	45.02	-	45.15	-	57.93	47.93	-12.79	-
3	0.509	0.14	41.74	-	41.88	-	56.00	46.00	-14.12	-
4	2.266	0.25	48.00	44.38	48.25	44.63	56.00	46.00	-7.75	-1.37
5	10.128	0.47	47.30	-	47.77	-	60.00	50.00	-12.23	-
6	22.572	0.97	52.22	45.16	53.19	46.13	60.00	50.00	-6.81	-3.87

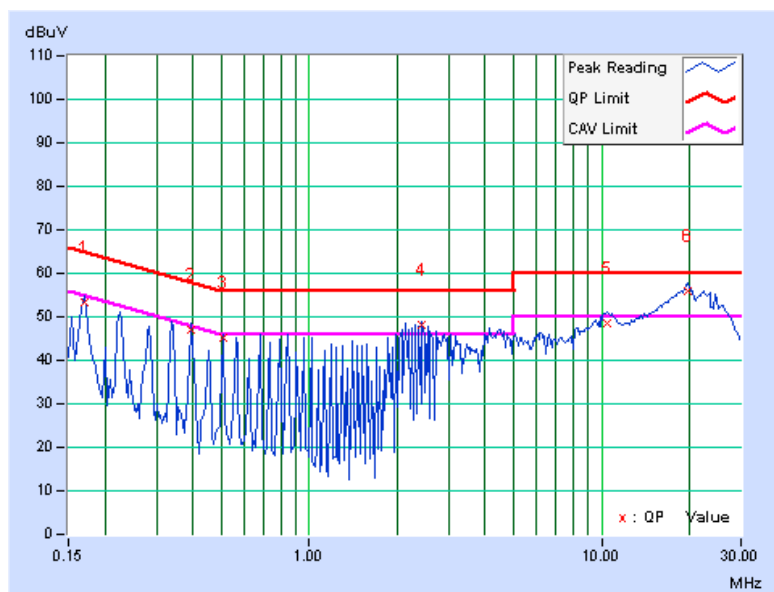
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	B		

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.170	0.15	53.02	-	53.17	-	64.98	54.98	-11.82	-
2	0.396	0.17	47.04	-	47.21	-	57.93	47.93	-10.73	-
3	0.506	0.18	45.10	-	45.28	-	56.00	46.00	-10.72	-
4	2.426	0.31	47.76	43.46	48.07	43.77	56.00	46.00	-7.93	-2.23
5	10.492	0.67	47.94	-	48.61	-	60.00	50.00	-11.39	-
6	19.680	1.36	54.50	47.26	55.86	48.62	60.00	50.00	-4.14	-1.38

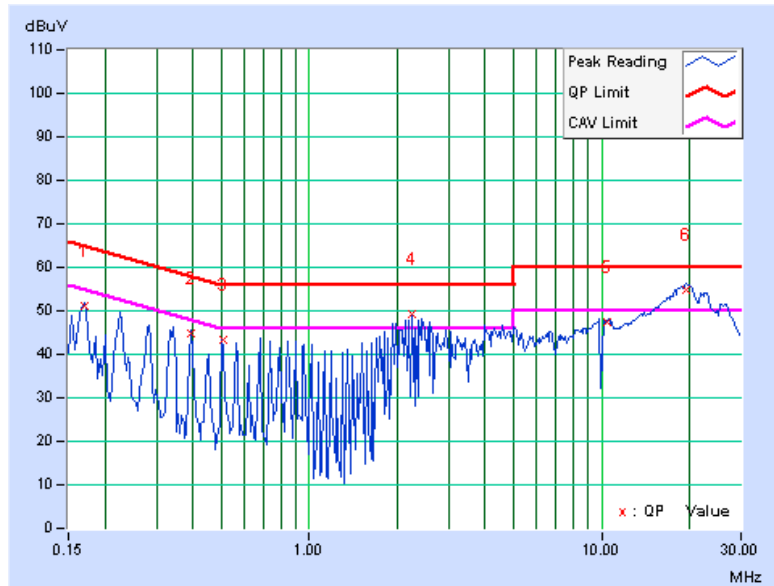
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	B		

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.170	0.11	50.96	-	51.07	-	64.98	54.98	-13.92	-
2	0.396	0.13	44.70	-	44.83	-	57.93	47.93	-13.11	-
3	0.507	0.14	43.04	-	43.18	-	56.00	46.00	-12.82	-
4	2.254	0.25	48.94	44.26	49.19	44.51	56.00	46.00	-6.81	-1.49
5	10.483	0.48	46.80	-	47.28	-	60.00	50.00	-12.72	-
6	19.383	0.91	53.92	47.64	54.83	48.55	60.00	50.00	-5.17	-1.45

- 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.



4.3 NUMBER OF HOPPING FREQUENCY USED

4.3.1 LIMIT OF HOPPING FREQUENCY USED

At least 50 channels frequencies, and should be equally spaced.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Jan. 11, 2010	Jan. 10, 2011

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

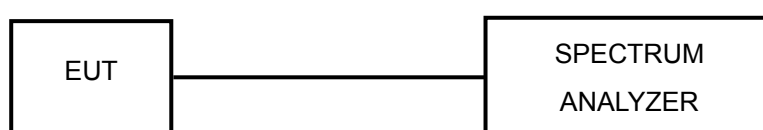
4.3.3 TEST PROCEDURES

- Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
- Set the SA on View mode and then plot the result on SA screen.
- Repeat above procedures until all frequencies measured were complete.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP

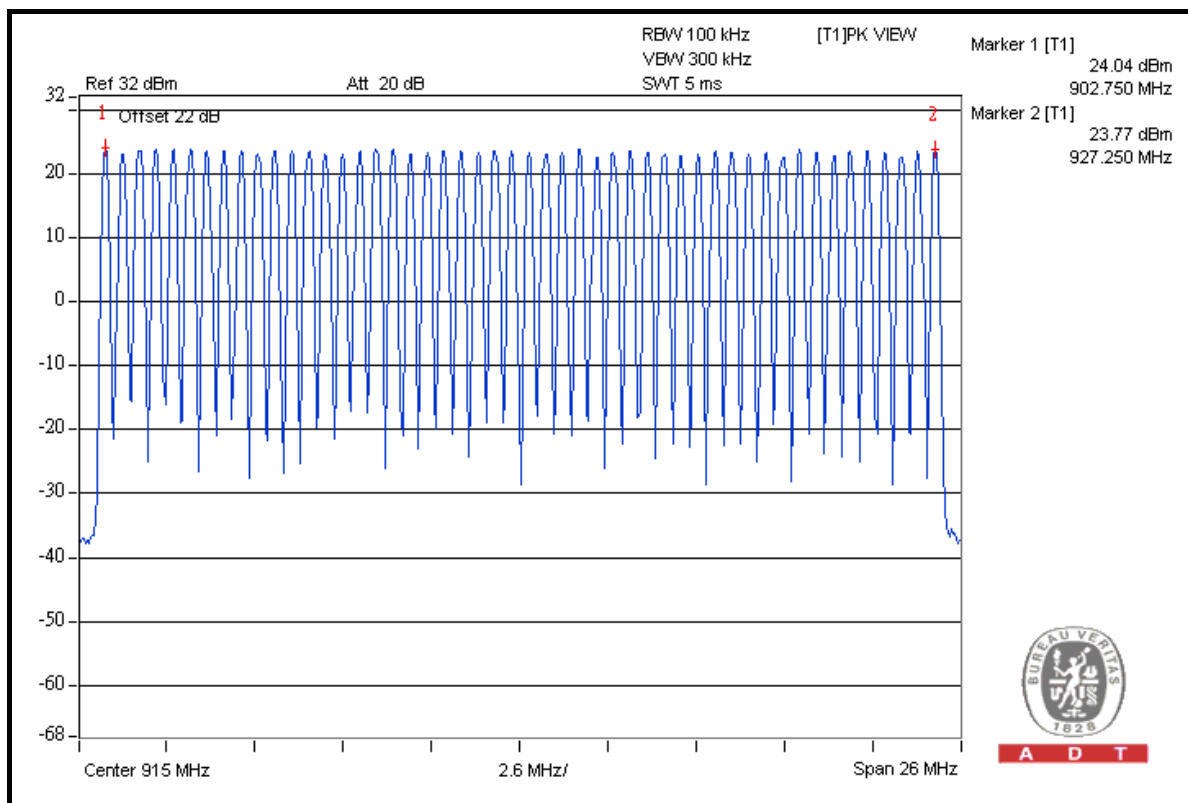


4.3.6 TEST RESULTS

There are 50 hopping frequencies in the hopping mode. Please refer to next page for the test result. On the plots, it shows that the hopping frequencies are equally spaced.



A D T



4.4 DWELL TIME ON EACH CHANNEL

4.4.1 LIMIT OF DWELL TIME USED

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period;

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Jan. 11, 2010	Jan. 10, 2011

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

4.4.3 TEST PROCEDURES

- Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
- Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
- Repeat above procedures until all different time-slot modes have been completed.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP

Same as 4.3.5.

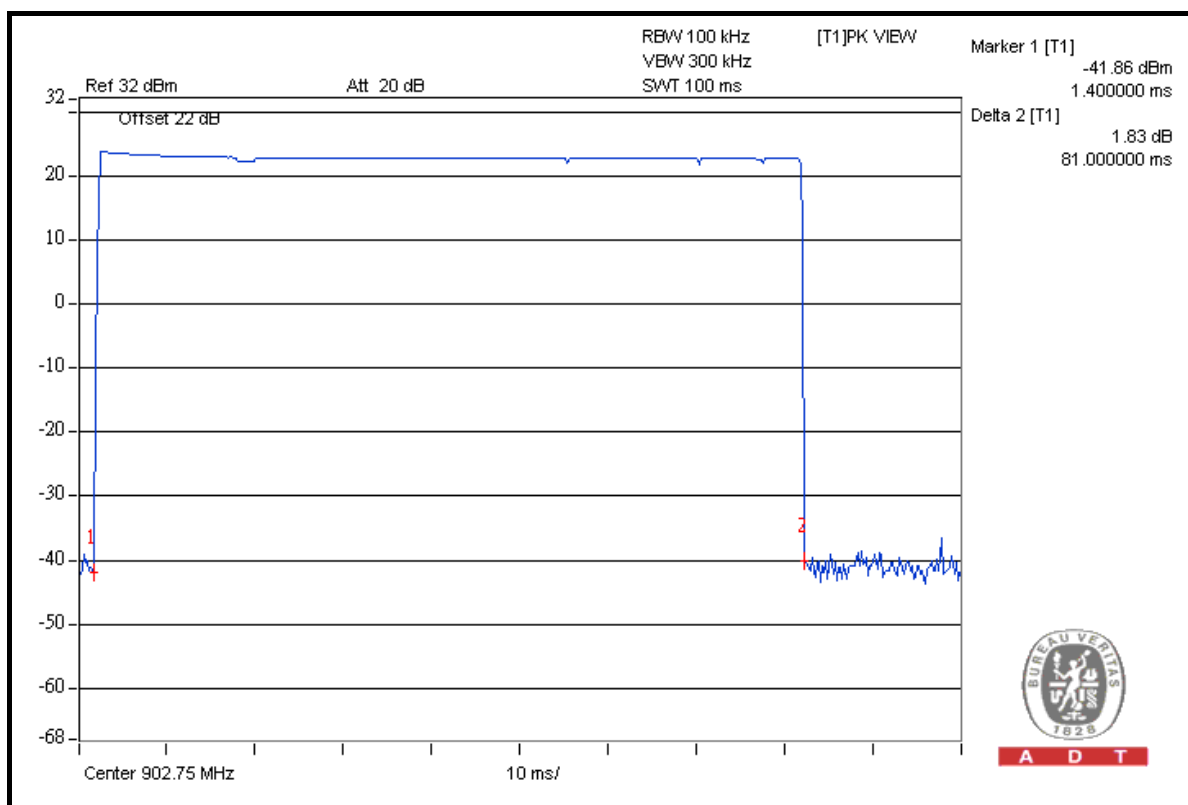
4.4.6 TEST RESULTS

Length of transmission time (ms)	TX Burst of 20s period	Result	Limit
81	4	324.0ms / 20s	400ms / 20s

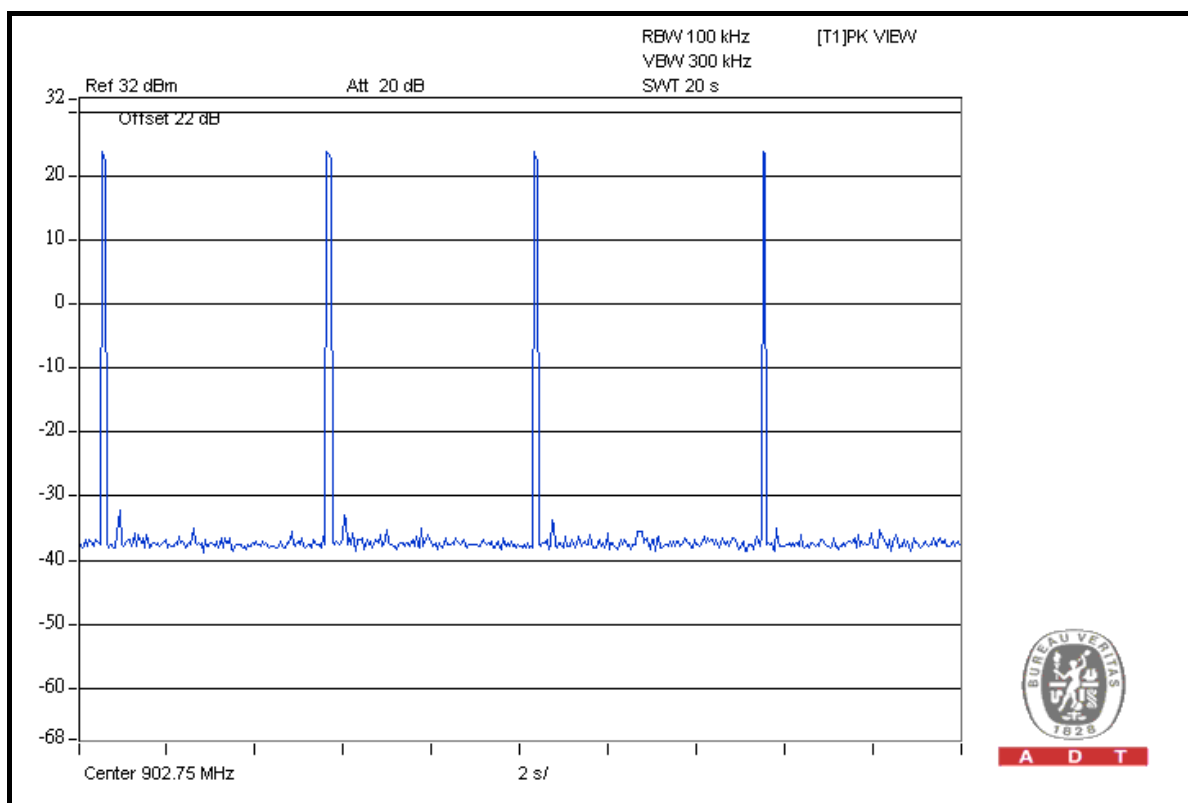
NOTE: Test plots of the transmitting time slot are shown on next page.



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4.5 CHANNEL BANDWIDTH

4.5.1 LIMITS OF CHANNEL BANDWIDTH

The 20 dB bandwidth of the hopping channel shall be less than 250 kHz.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Jan. 11, 2010	Jan. 10, 2011

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

4.5.3 TEST PROCEDURE

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 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.
- Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- Repeat above procedures until all frequencies measured were complete.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

4.5.5 TEST SETUP

Same as 4.3.5.

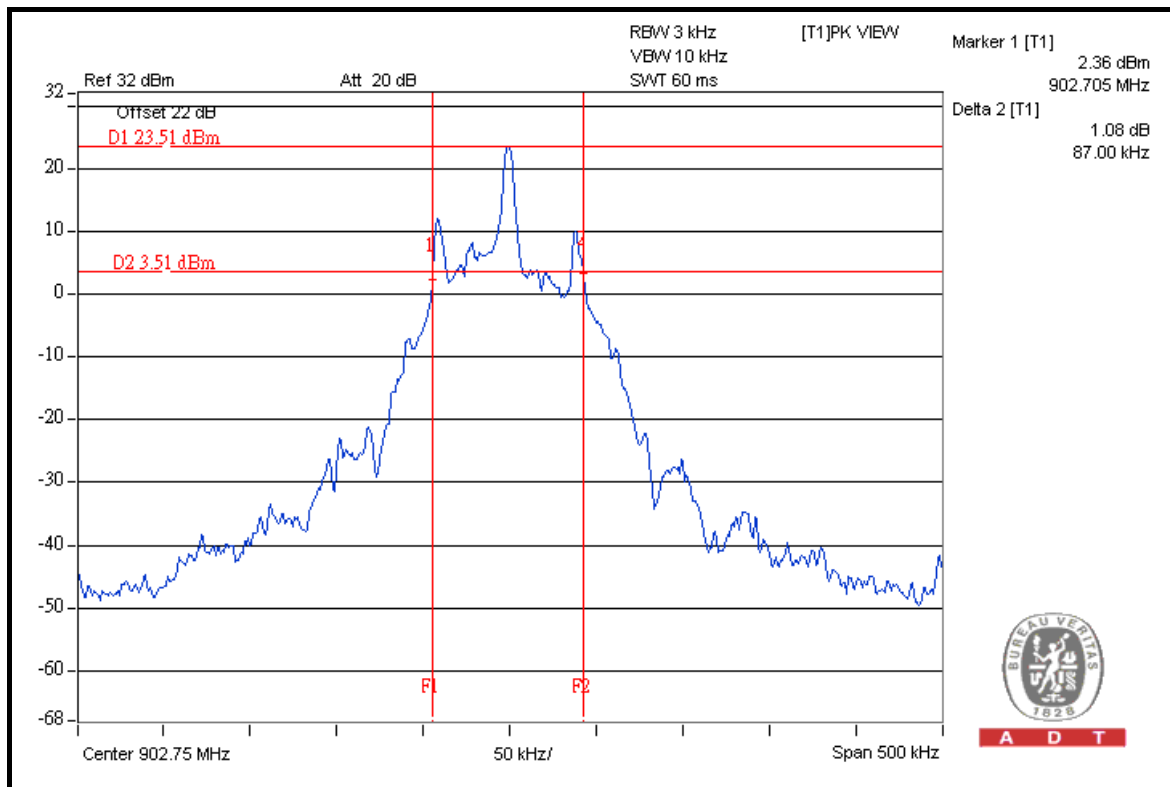
4.5.6 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.5.7 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (kHz)	LIMIT (kHz)
0	902.75	87	250
25	915.25	86	250
49	927.25	87	250

CH 0



4.6 HOPPING CHANNEL SEPARATION

4.6.1 LIMIT OF HOPPING CHANNEL SEPARATION

At least 25kHz or 20dB hopping channel bandwidth (whichever is greater).

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Jan. 11, 2010	Jan. 10, 2011

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

4.6.3 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.
3. By using the MaxHold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation.

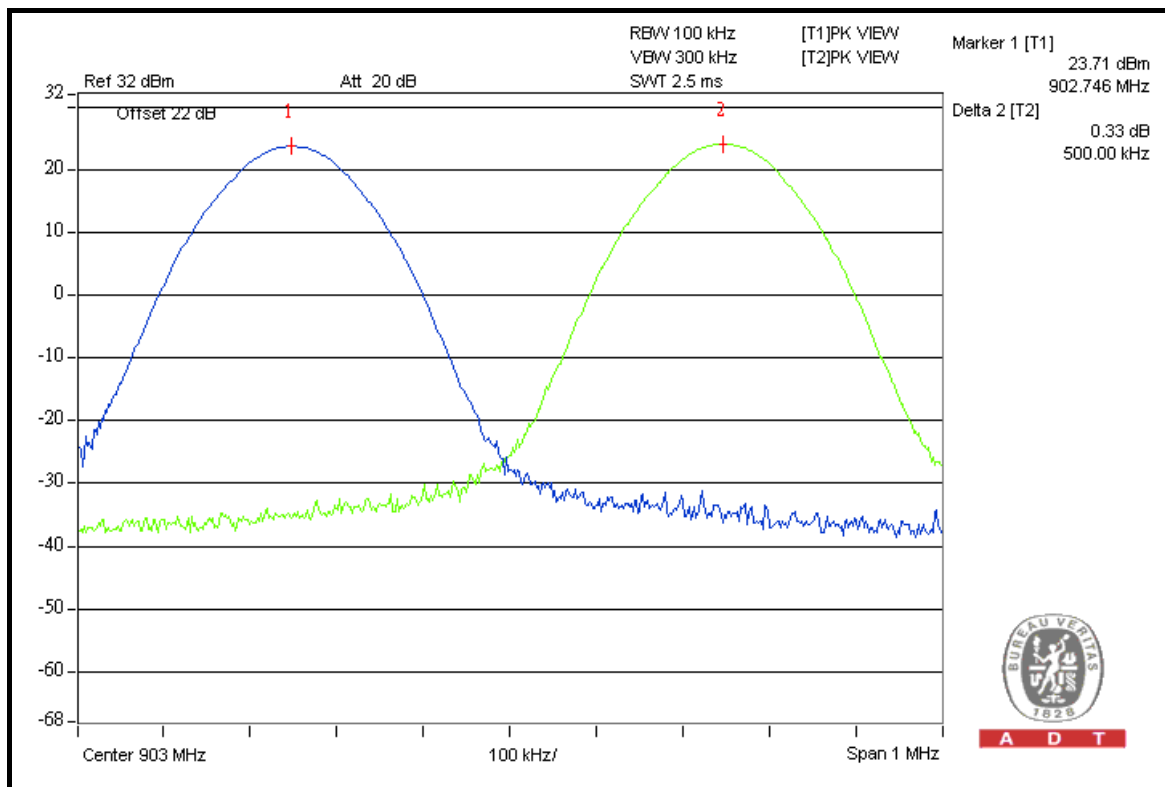
4.6.5 TEST SETUP

Same as 4.3.5

4.6.6 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	ADJACENT CHANNEL SEPARATION (kHz)	MINIMUM LIMIT (kHz)	PASS / FAIL
0	902.75	500	87	PASS
25	915.25	500	86	PASS
49	927.25	500	87	PASS

CH 0



4.7 MAXIMUM OUTPUT POWER

4.7.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

The Maximum Output Power Measurement is 30dBm.

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Jan. 11, 2010	Jan. 10, 2011

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

4.7.3 TEST PROCEDURES

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 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.
- The center frequency of the spectrum analyzer is set to the fundamental frequency and using 1MHz RBW and 3 MHz VBW.
- Measure the captured power within the band and recording the plot.
- Repeat above procedures until all frequencies required were complete.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP

Same as 4.3.5.

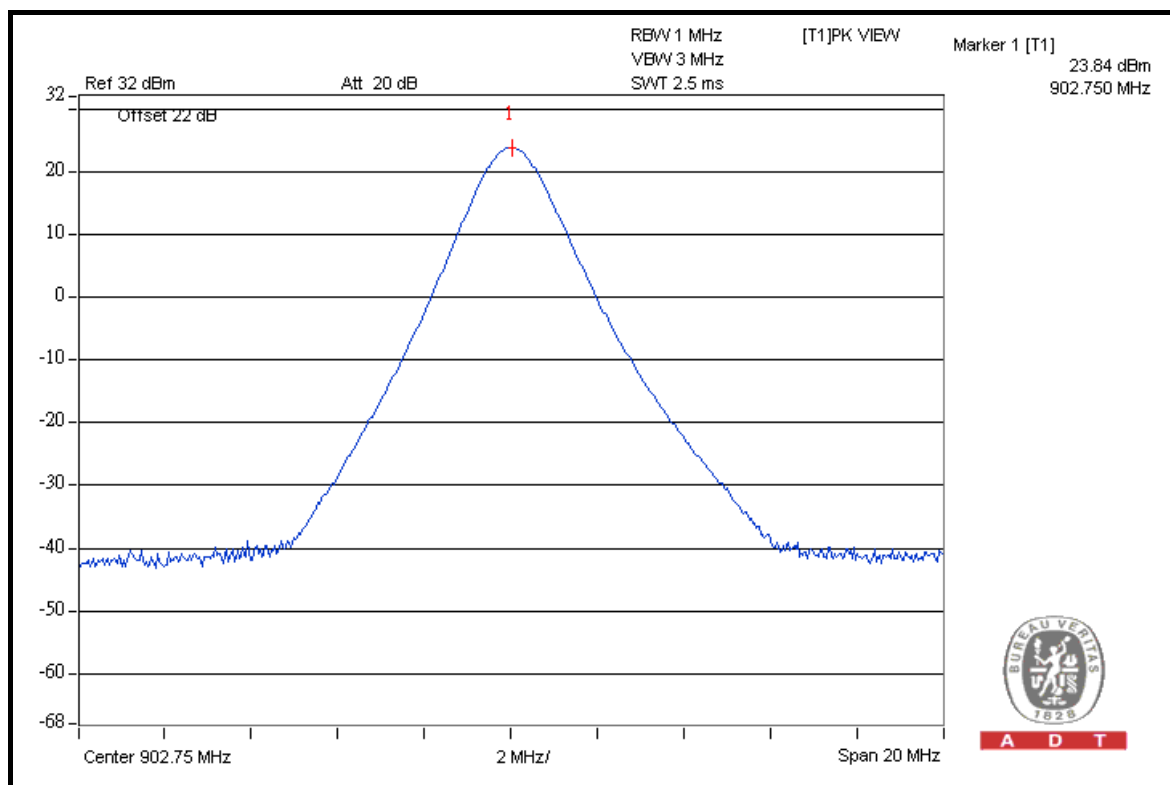
4.7.6 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.7.7 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER OUTPUT (mW)	POWER OUTPUT (dBm)	POWER LIMIT (dBm)	PASS/FAIL
0	902.75	242.1	23.84	30	PASS
25	915.25	238.8	23.78	30	PASS
49	927.25	237.7	23.76	30	PASS

CH 0



4.8 BAND EDGES MEASUREMENT

4.8.1 LIMITS OF BAND EDGES MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100KHz RBW).

4.8.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Jan. 11, 2010	Jan. 10, 2011

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

4.8.3 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 / 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

4.8.4 DEVIATION FROM TEST STANDARD

No deviation.

4.8.5 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest and highest channel frequencies individually.

4.8.6 TEST RESULTS

The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

TEST MODE A

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH OUT OF BAND (dBuV/m)	LIMIT (dBuV/m)
902.72 (PK)	89.6	61.09	28.51	69.6
902.72 (AV)	-	-	26.71	67.8

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH OUT OF BAND (dBuV/m)	LIMIT (dBuV/m)
927.25 (PK)	88.3	59.82	28.48	68.3
927.25 (AV)	-	-	26.68	66.5

TEST MODE B

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH OUT OF BAND (dBuV/m)	LIMIT (dBuV/m)
902.72 (PK)	95.9	61.09	34.81	75.9
902.72 (AV)	-	-	33.01	74.1

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH OUT OF BAND (dBuV/m)	LIMIT (dBuV/m)
927.25 (PK)	94.6	59.82	34.78	74.6
927.25 (AV)	-	-	32.98	72.8

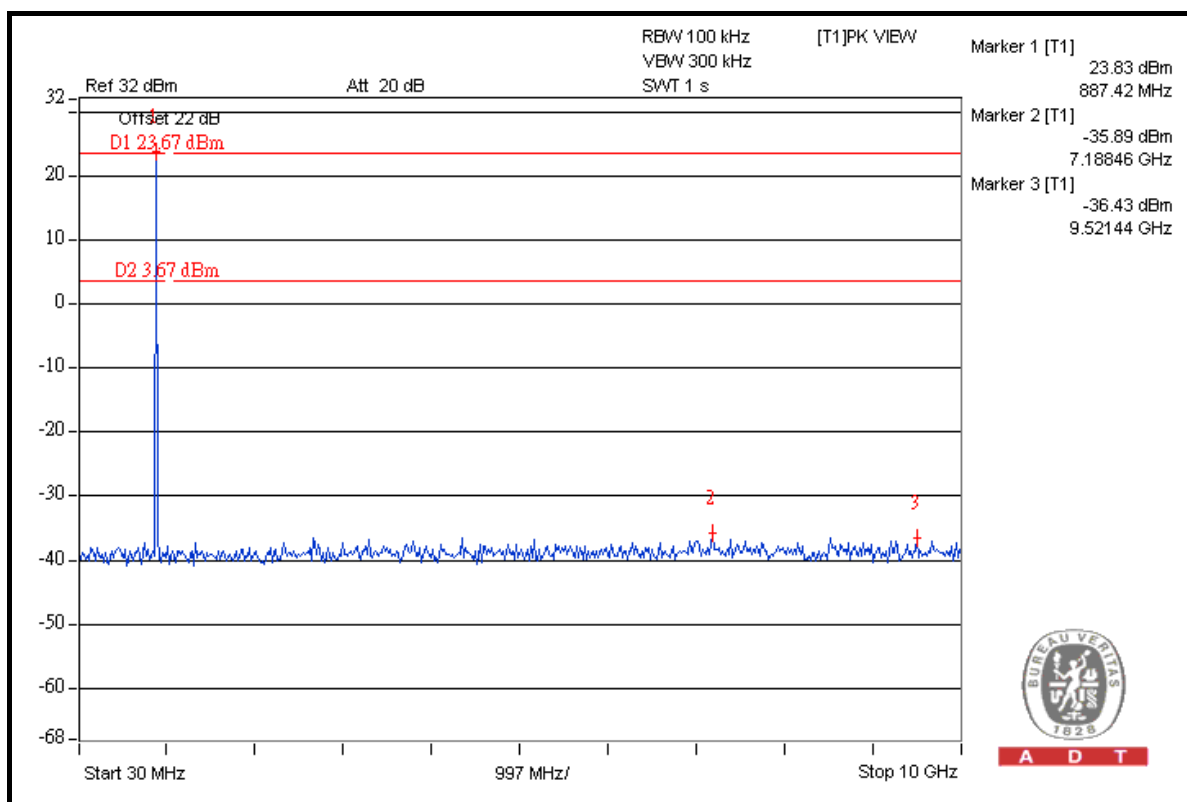
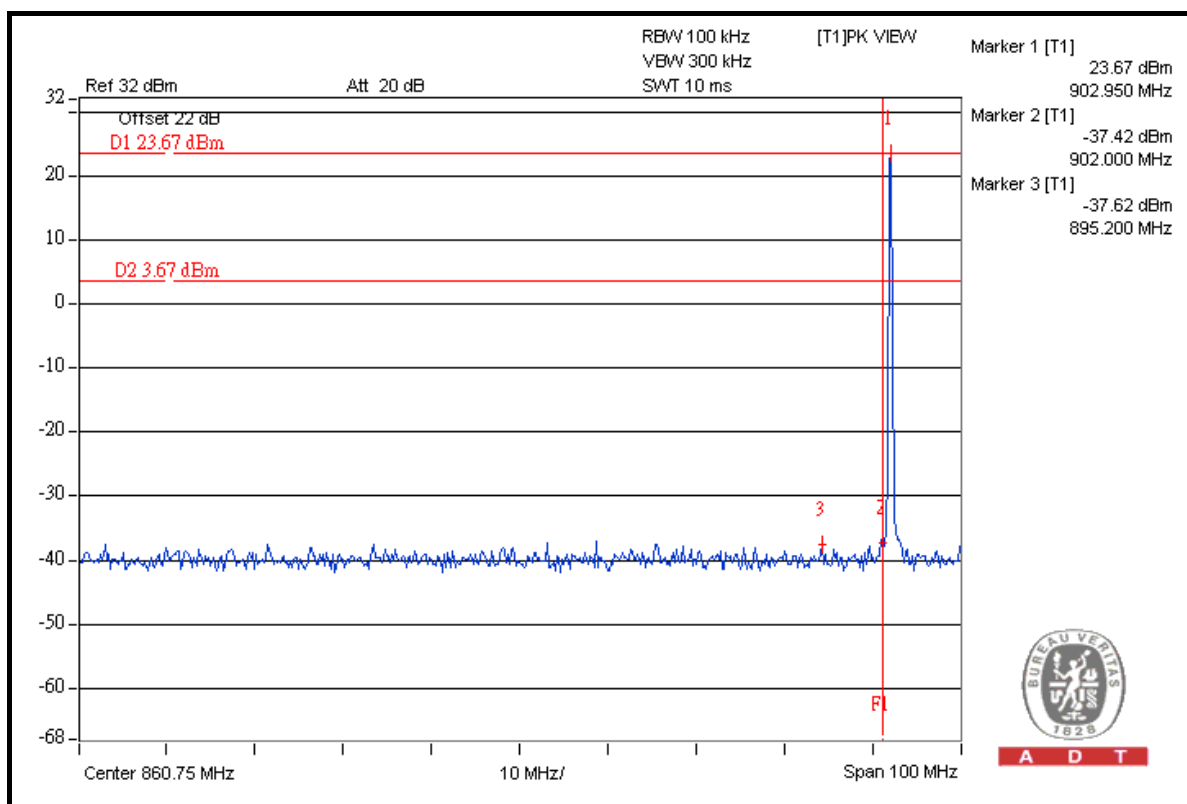
NOTE:

1. Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission. Please check following 2 pages.
2. Maximum field strength out of band (PK value) = Fundamental emission (PK value) – Delta.
3. Average value = Peak value + 20 Log (duty cycle) = Peak value – 1.8dB.
4. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:

$$20 \log (\text{Duty cycle}) = 20 \log (81 \text{ ms} / 100 \text{ ms}) = -1.8 \text{ dB}$$

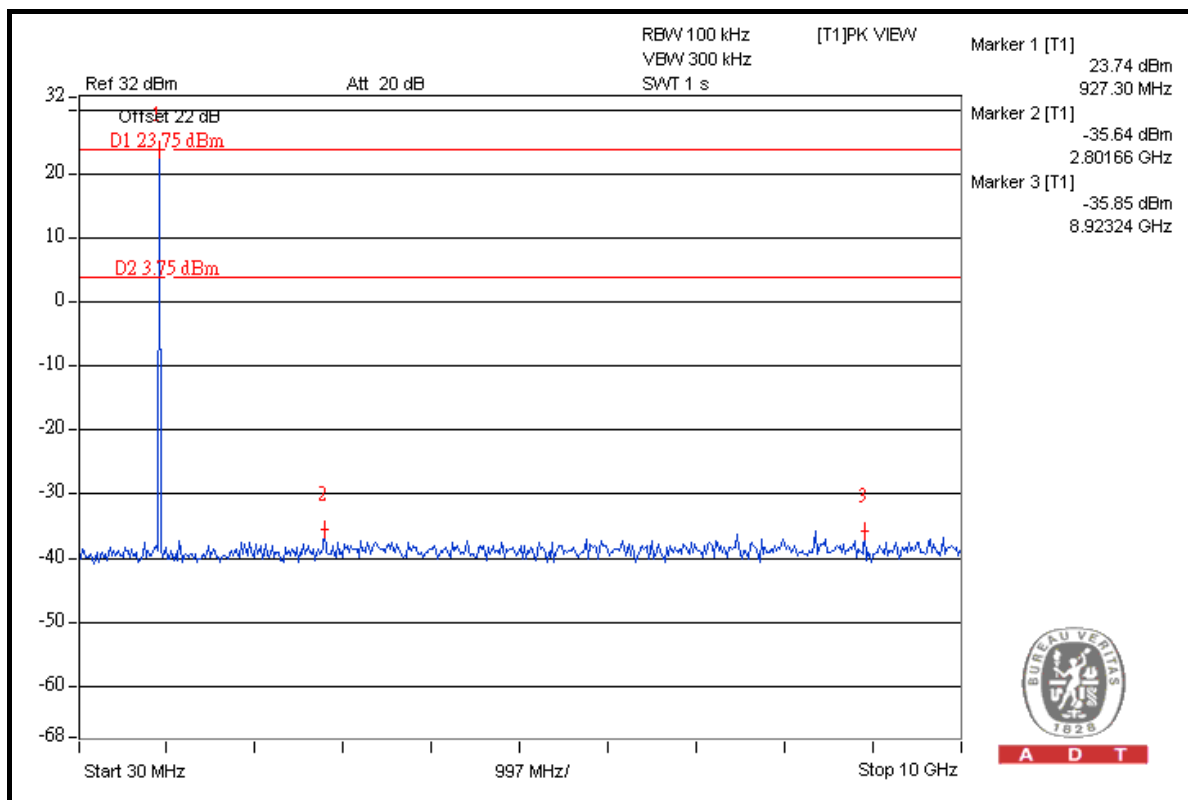
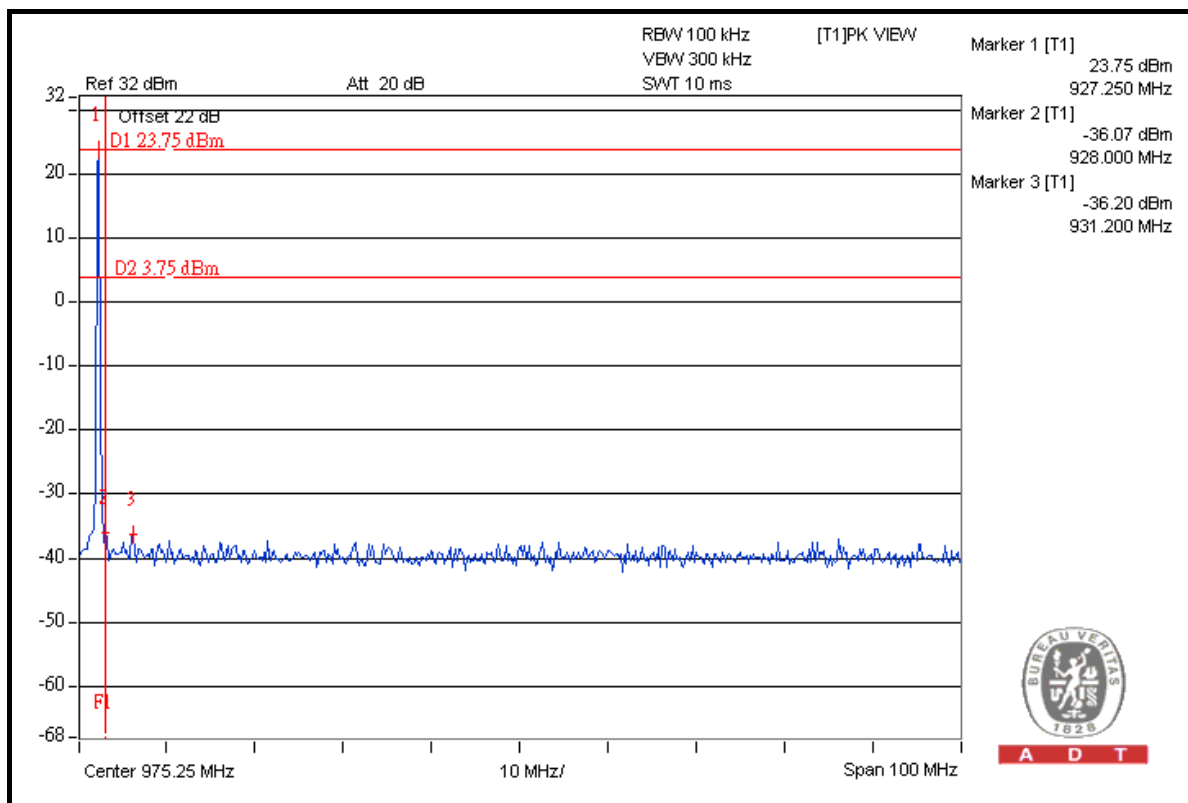


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5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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.

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