FCC TEST REPORT (15.407)

REPORT NO.:	RF120117C11A
MODEL NO.:	WMTA-155AN
FCC ID:	X3XWMTA-155
RECEIVED:	Jun. 28, 2012
TESTED:	Jul. 13 ~ Aug. 17, 2012
ISSUED:	Aug. 22, 2012

APPLICANT:	ELMO COMPANY, LIMITED
ADDRESS:	6-14, MEIZEN-CHO, MIZUHO-KU NAGOYA, 467-8567, JAPAN.

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
LAB ADDRESS:	No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, 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.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

TABLE OF CONTENTS

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF120117C11A	Original release	Aug. 22, 2012

1. CERTIFICATION

PRODUCT: WHDI Tx Module
MODEL: WMTA-155AN
BRAND: ELMO
APPLICANT: ELMO COMPANY, LIMITED
TESTED: Jul. 13 ~ Aug. 17, 2012
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: **FCC Part 15, Subpart E (Section 15.407)**
ANSI C63.10-2009

The above equipment (model: WMTA-155AN) 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 : Polly Chien / Specialist , **DATE :** Aug. 22, 2012

APPROVED BY : Gary Chang / Technical Manager , **DATE :** Aug. 22, 2012

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -9.37dB at 0.52109MHz.
15.407(b/1/2/3)(b)(6)	Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.1dB at 168.06MHz.
15.407(a/1/2)	Peak Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.34 dB
	200MHz ~1000MHz	3.35 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	WHDI Tx Module
MODEL NO.	WMTA-155AN
POWER SUPPLY	5.0Vdc (Host equipment)
MODULATION TYPE	OFDM
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	Downlink: OFDM 16-QAM / 1 Mbps Uplink: OOK / 100 Kbps
OPERATING FREQUENCY	5260 ~ 5320MHz & 5500 ~ 5680MHz
NUMBER OF CHANNEL	5260 ~ 5320MHz: 4 for WHDI (20MHz) 2 for WHDI (40MHz) 5500 ~ 5680MHz: 6 for WHDI (20MHz) 3 for WHDI (40MHz)
OUTPUT POWER	4.3mW for 5260 ~ 5320MHz 4.5mW for 5500 ~ 5680MHz
ANTENNA TYPE	Integral Printed antenna with 2dBi gain
ANTENNA CONNECTOR	NA
DATA CABLE	HDMI
I/O PORTS	NA
ACCESSORY DEVICES	NA

NOTE:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report to the original report no.: RF120117C11-1. The difference compared with the original report is adding frequency band from 5.26 to 5.32GHz and 5.50 to 5.68GHz by software.
2. The EUT provides two completed transmitters and one receiver.

MODULATION MODE	TX FUNCTION
WHDI (20MHz)	2TX
WHDI (40MHz)	2TX

3. The EUT has disabled the 5600-5650MHz band by S/W to avoid 5600-5650MHz.
4. 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

FOR 5260 ~ 5320MHz

4 channels are provided for WHDI (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for WHDI (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
54	5270 MHz	62	5310 MHz

FOR 5500 ~ 5680MHz

6 channels are provided for WHDI (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
100	5500 MHz	112	5560 MHz
104	5520 MHz	132	5660 MHz
108	5540 MHz	136	5680 MHz

3 channels are provided for WHDI (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
102	5510 MHz	134	5670 MHz
110	5550 MHz		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

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

RADIATED EMISSION TEST (ABOVE 1GHz):

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

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Kbps)
WHDI (20MHz)	5260-5320	52 to 64	52, 60, 64	OFDM	100
WHDI (40MHz)		54 to 62	54, 62	OFDM	100
WHDI (20MHz)	5500-5680	100 to 136	100, 112, 136	OFDM	100
WHDI (40MHz)		102 to 134	102, 110, 134	OFDM	100

RADIATED EMISSION TEST (BELOW 1GHz):

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

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Kbps)
WHDI (20MHz)	5260-5320	52 to 64	52	OFDM	100
WHDI (20MHz)	5500-5680	100 to 136	100	OFDM	100

POWER LINE CONDUCTED EMISSION TEST:

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

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Kbps)
WHDI (20MHz)	5260-5320	52 to 64	52	OFDM	100
WHDI (20MHz)	5500-5680	100 to 136	100	OFDM	100

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

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

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

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Kbps)
WHDI (20MHz)	5260-5320	52 to 64	52, 60, 64	OFDM	100
WHDI (40MHz)		54 to 62	54, 62	OFDM	100
WHDI (20MHz)	5500-5680	100 to 136	100, 112, 136	OFDM	100
WHDI (40MHz)		102 to 134	102, 110, 134	OFDM	100

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Haru Yang
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Haru Yang
PLC	22deg. C, 60%RH	120Vac, 60Hz	Pon Tsai
APCM	28deg. C, 68%RH	120Vac, 60Hz	Felix Soong

3.3 DUTY CYCLE OF TEST SIGNAL

Test tool can set the EUT to transmit at > 98 % duty cycle.

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.

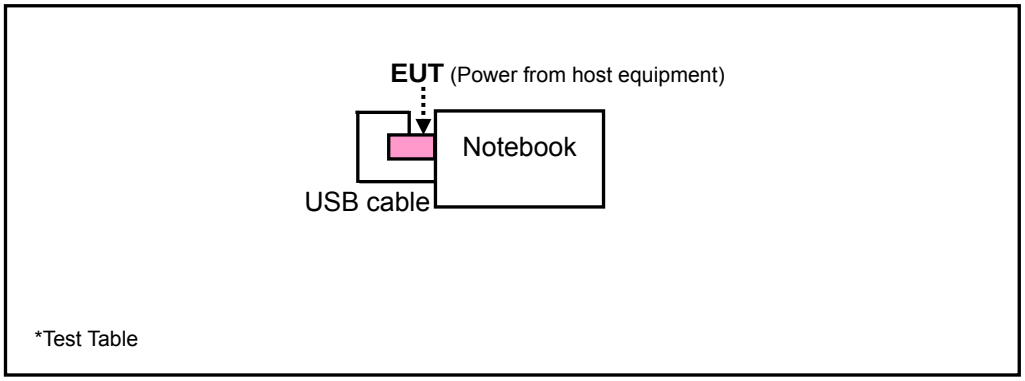
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	E5420	33MLMQ1	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	0.4m USB cable without core.

NOTE:

1. All power cords of the above support units are non-shielded (1.8m).
2. The 0.4m USB cable was provided by the client.

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart E (15.407)
789033 D01 General UNII Test Procedures v01r01
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.

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

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

4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBμV/m)
PK	PK
-27	68.3

NOTE: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts).

4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100212	Aug. 06, 2012	Aug. 05, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Feb. 03, 2012	Feb. 02, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 06, 2012	Apr. 05, 2013
HORN Antenna SCHWARZBECK	9120D	209	Aug. 25, 2011	Aug. 24, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 11, 2012	Jul. 10, 2013
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier Agilent	8447D	2944A10633	Oct. 29, 2011	Oct. 28, 2012
Preamplifier Agilent	8449B	3008A01964	Oct. 29, 2011	Oct. 28, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250723/4	Aug. 30, 2011	Aug. 29, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6+309224/4	Aug. 30, 2011	Aug. 29, 2012
Software ADT.	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100	TT93021703	NA	NA
Turn Table Controller ADT.	SC100	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 29, 2011	Oct. 28, 2012
High Speed Peak Power Meter	ML2495A	0842014	Apr. 28, 2012	Apr. 27, 2013
Power Sensor	MA2411B	0738404	Apr. 28, 2012	Apr. 27, 2013

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 calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in HwaYa Chamber 3.
4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
5. The FCC Site Registration No. is 988962.
6. The IC Site Registration No. is IC 7450F-3.

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

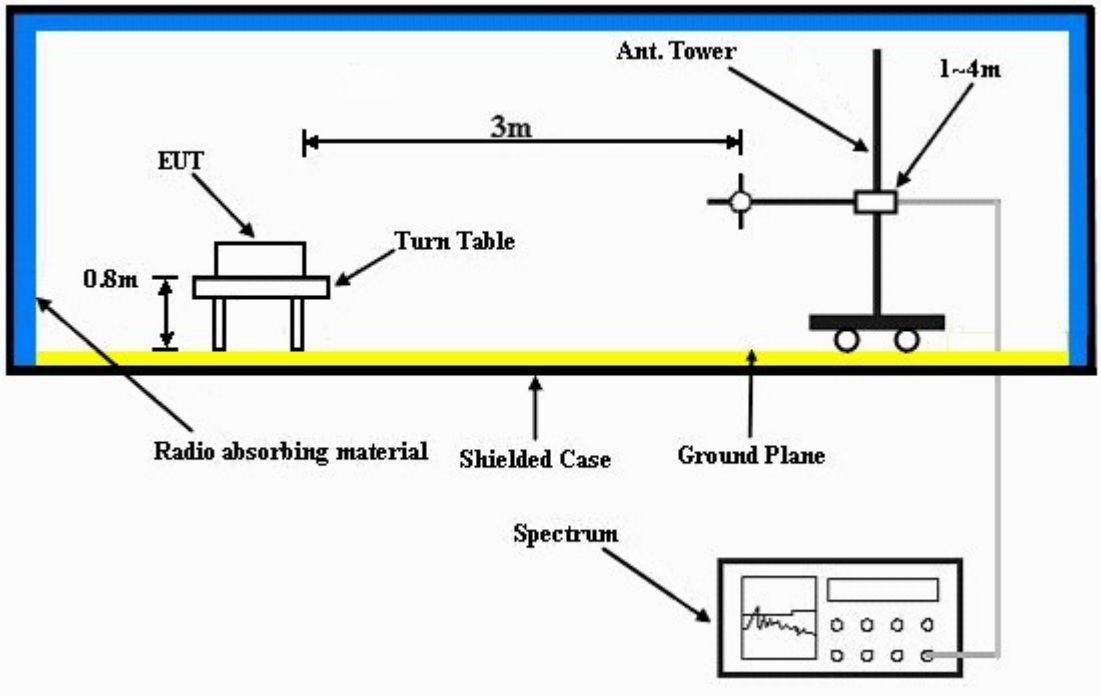
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) 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. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 1kHz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 DEVIATION FROM TEST STANDARD

No deviation.

4.1.6 TEST SETUP



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

4.1.7 EUT OPERATING CONDITION

a. Plugged the EUT to notebook.
b. Set the EUT under transmitting condition continuously at specific channel frequency.

4.1.8 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA: WHDI (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 52	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	5150.00	58.9 PK	74.0	-15.1	1.00 H	343	21.10	37.80
2	5150.00	45.1 AV	54.0	-8.9	1.00 H	343	7.30	37.80
3	*5260.00	101.5 PK			1.00 H	343	63.50	38.00
4	*5260.00	85.6 AV			1.00 H	343	47.60	38.00
5	#10520.00	58.6 PK	68.3	-9.7	1.00 H	155	9.00	49.60
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	5150.00	59.1 PK	74.0	-14.9	1.06 V	218	21.30	37.80
2	5150.00	44.9 AV	54.0	-9.1	1.06 V	218	7.10	37.80
3	*5260.00	100.1 PK			1.06 V	218	62.10	38.00
4	*5260.00	84.5 AV			1.06 V	218	46.50	38.00
5	#10520.00	59.3 PK	68.3	-9.0	1.00 V	284	9.70	49.60

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 60	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	*5300.00	101.8 PK			1.00 H	351	63.80	38.00
2	*5300.00	85.7 AV			1.00 H	351	47.70	38.00
3	5350.00	58.5 PK	74.0	-15.5	1.00 H	351	20.40	38.10
4	5350.00	45.2 AV	54.0	-8.8	1.00 H	351	7.10	38.10
5	10600.00	58.5 PK	74.0	-15.5	1.00 H	146	8.90	49.60
6	10600.00	46.7 AV	54.0	-7.3	1.00 H	146	-2.90	49.60
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	*5300.00	100.3 PK			1.05 V	217	62.30	38.00
2	*5300.00	84.2 AV			1.05 V	217	46.20	38.00
3	5350.00	48.4 PK	74.0	-25.6	1.05 V	217	10.30	38.10
4	5350.00	45.0 AV	54.0	-9.0	1.05 V	217	6.90	38.10
5	10600.00	59.1 PK	74.0	-14.9	1.00 V	276	9.50	49.60
6	10600.00	47.3 AV	54.0	-6.7	1.00 V	276	-2.30	49.60

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 64	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	*5320.00	102.6 PK			1.00 H	344	64.50	38.10
2	*5320.00	86.4 AV			1.00 H	344	48.30	38.10
3	5350.00	58.8 PK	74.0	-15.2	1.00 H	344	20.70	38.10
4	5350.00	45.1 AV	54.0	-8.9	1.00 H	344	7.00	38.10
5	10640.00	58.8 PK	74.0	-15.2	1.00 H	142	9.20	49.60
6	10640.00	47.1 AV	54.0	-6.9	1.00 H	142	-2.50	49.60
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	*5320.00	100.2 PK			1.19 V	220	62.10	38.10
2	*5320.00	83.9 AV			1.19 V	220	45.80	38.10
3	5350.00	58.6 PK	74.0	-15.4	1.19 V	220	20.50	38.10
4	5350.00	44.9 AV	54.0	-9.1	1.19 V	220	6.80	38.10
5	10640.00	59.4 PK	74.0	-14.6	1.00 V	285	9.80	49.60
6	10640.00	47.5 AV	54.0	-6.5	1.00 V	285	-2.10	49.60

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 100	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	5460.00	58.3 PK	74.0	-15.7	1.00 H	223	20.00	38.30
2	5460.00	45.5 AV	54.0	-8.5	1.00 H	223	7.20	38.30
3	#5470.00	59.3 PK	68.3	-9.0	1.00 H	223	21.00	38.30
4	*5500.00	103.0 PK			1.00 H	223	64.60	38.40
5	*5500.00	86.6 AV			1.00 H	223	48.20	38.40
6	11000.00	59.7 PK	74.0	-14.3	1.00 H	158	9.40	50.30
7	11000.00	48.0 AV	54.0	-6.0	1.00 H	158	-2.30	50.30
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	5460.00	58.8 PK	74.0	-15.2	1.00 V	295	20.50	38.30
2	5460.00	45.3 AV	54.0	-8.7	1.00 V	295	7.00	38.30
3	#5470.00	58.9 PK	68.3	-9.4	1.00 V	295	20.60	38.30
4	*5500.00	100.9 PK			1.00 V	295	62.50	38.40
5	*5500.00	84.7 AV			1.00 V	295	46.30	38.40
6	11000.00	60.4 PK	74.0	-13.6	1.00 V	297	10.10	50.30
7	11000.00	48.3 AV	54.0	-5.7	1.00 V	297	-2.00	50.30

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.
6. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 112	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	5460.00	58.6 PK	74.0	-15.4	1.09 H	219	20.30	38.30
2	5460.00	45.3 AV	54.0	-8.7	1.09 H	219	7.00	38.30
3	*5560.00	101.9 PK			1.09 H	219	63.50	38.40
4	*5560.00	86.0 AV			1.09 H	219	47.60	38.40
5	11120.00	59.4 PK	74.0	-14.6	1.00 H	136	9.30	50.10
6	11120.00	47.6 AV	54.0	-6.4	1.00 H	136	-2.50	50.10
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	5460.00	58.2 PK	74.0	-15.8	1.00 V	297	19.90	38.30
2	5460.00	45.2 AV	54.0	-8.8	1.00 V	297	6.90	38.30
3	*5560.00	100.7 PK			1.00 V	297	62.30	38.40
4	*5560.00	84.2 AV			1.00 V	297	45.80	38.40
5	11120.00	59.9 PK	74.0	-14.1	1.00 V	304	9.80	50.10
6	11120.00	47.9 AV	54.0	-6.1	1.00 V	304	-2.20	50.10

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 136	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	*5680.00	101.1 PK			1.10 H	283	62.40	38.70
2	*5680.00	84.5 AV			1.10 H	283	45.80	38.70
3	#5725.00	59.1 PK	68.3	-9.2	1.10 H	283	20.30	38.80
4	11360.00	59.2 PK	74.0	-14.8	1.00 H	172	9.10	50.10
5	11360.00	47.5 AV	54.0	-6.5	1.00 H	172	-2.60	50.10
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	*5680.00	100.0 PK			1.10 V	296	61.30	38.70
2	*5680.00	83.6 AV			1.10 V	296	44.90	38.70
3	#5725.00	58.6 PK	68.3	-9.7	1.10 V	296	19.80	38.80
4	11360.00	59.7 PK	74.0	-14.3	1.00 V	280	9.60	50.10
5	11360.00	47.8 AV	54.0	-6.2	1.00 V	280	-2.30	50.10

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.
6. "#":The radiated frequency is out the restricted band.

WHDI (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 54	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	5150.00	58.7 PK	74.0	-15.3	1.00 H	338	20.90	37.80
2	5150.00	44.8 AV	54.0	-9.2	1.00 H	338	7.00	37.80
3	*5270.00	94.9 PK			1.00 H	338	56.90	38.00
4	*5270.00	80.7 AV			1.00 H	338	42.70	38.00
5	#10540.00	58.8 PK	68.3	-9.5	1.00 H	129	9.20	49.60
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	5150.00	58.5 PK	74.0	-15.5	1.07 V	219	20.70	37.80
2	5150.00	44.6 AV	54.0	-9.4	1.07 V	219	6.80	37.80
3	*5270.00	93.6 PK			1.07 V	219	55.60	38.00
4	*5270.00	79.8 AV			1.07 V	219	41.80	38.00
5	#10540.00	59.4 PK	68.3	-8.9	1.00 V	271	9.80	49.60

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 62	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	*5310.00	95.6 PK			1.00 H	340	57.60	38.00
2	*5310.00	81.3 AV			1.00 H	340	43.30	38.00
3	5350.00	58.7 PK	74.0	-15.3	1.00 H	340	20.60	38.10
4	5350.00	44.9 AV	54.0	-9.1	1.00 H	340	6.80	38.10
5	10620.00	58.8 PK	74.0	-15.2	1.00 H	167	9.20	49.60
6	10620.00	46.8 AV	54.0	-7.2	1.00 H	167	-2.80	49.60
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	*5310.00	93.4 PK			1.19 V	217	55.40	38.00
2	*5310.00	79.5 AV			1.19 V	217	41.50	38.00
3	5350.00	57.8 PK	74.0	-16.2	1.19 V	217	19.70	38.10
4	5350.00	44.5 AV	54.0	-9.5	1.19 V	217	6.40	38.10
5	10620.00	59.2 PK	74.0	-14.8	1.00 V	267	9.60	49.60
6	10620.00	47.2 AV	54.0	-6.8	1.00 V	267	-2.40	49.60

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 102	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	5460.00	58.3 PK	74.0	-15.7	1.05 H	267	20.00	38.30
2	5460.00	44.9 AV	54.0	-9.1	1.05 H	267	6.60	38.30
3	#5470.00	58.4 PK	68.3	-9.9	1.05 H	267	20.10	38.30
4	*5510.00	96.2 PK			1.05 H	267	57.80	38.40
5	*5510.00	81.7 AV			1.05 H	267	43.30	38.40
6	11020.00	59.7 PK	74.0	-14.3	1.00 H	166	9.50	50.20
7	11020.00	47.8 AV	54.0	-6.2	1.00 H	166	-2.40	50.20
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	5460.00	58.5 PK	74.0	-15.5	1.00 V	298	20.20	38.30
2	5460.00	44.8 AV	54.0	-9.2	1.00 V	298	6.50	38.30
3	#5470.00	58.5 PK	68.3	-9.8	1.00 V	298	20.20	38.30
4	*5510.00	94.6 PK			1.00 V	298	56.20	38.40
5	*5510.00	80.3 AV			1.00 V	298	41.90	38.40
6	11020.00	60.1 PK	74.0	-13.9	1.00 V	324	9.90	50.20
7	11020.00	48.1 AV	54.0	-5.9	1.00 V	324	-2.10	50.20

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 110	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	5460.00	58.8 PK	74.0	-15.2	1.15 H	280	20.50	38.30
2	5460.00	45.4 AV	54.0	-8.6	1.15 H	280	7.10	38.30
3	*5550.00	96.3 PK			1.15 H	280	57.90	38.40
4	*5550.00	81.9 AV			1.15 H	280	43.50	38.40
5	11100.00	59.2 PK	74.0	-14.8	1.00 H	178	9.20	50.00
6	11100.00	47.2 AV	54.0	-6.8	1.00 H	178	-2.80	50.00
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	5460.00	58.5 PK	74.0	-15.5	1.00 V	297	20.20	38.30
2	5460.00	45.1 AV	54.0	-8.9	1.00 V	297	6.80	38.30
3	*5550.00	93.8 PK			1.00 V	297	55.40	38.40
4	*5550.00	79.6 AV			1.00 V	297	41.20	38.40
5	11100.00	59.8 PK	74.0	-14.2	1.00 V	291	9.80	50.00
6	11100.00	47.8 AV	54.0	-6.2	1.00 V	291	-2.20	50.00

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 134	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	*5670.00	96.4 PK			1.12 H	268	57.80	38.60
2	*5670.00	81.9 AV			1.12 H	268	43.30	38.60
3	#5725.00	59.5 PK	68.3	-8.8	1.12 H	268	20.70	38.80
4	11340.00	59.3 PK	74.0	-14.7	1.00 H	184	9.10	50.20
5	11340.00	47.5 AV	54.0	-6.5	1.00 H	184	-2.70	50.20
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	*5670.00	94.1 PK			1.00 V	333	55.50	38.60
2	*5670.00	79.7 AV			1.00 V	333	41.10	38.60
3	#5725.00	59.7 PK	68.3	-8.6	1.00 V	333	20.90	38.80
4	11340.00	59.7 PK	74.0	-14.3	1.00 V	299	9.50	50.20
5	11340.00	47.8 AV	54.0	-6.2	1.00 V	299	-2.40	50.20

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.

BELOW 1GHz WORST-CASE DATA：WHDI (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 52	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	119.34	38.1 QP	43.5	-5.4	1.50 H	13	26.30	11.80
2	**168.06**	**42.4 QP**	**43.5**	**-1.1**	**1.49 H**	**29**	**28.80**	**13.60**
3	315.71	28.6 QP	46.0	-17.4	1.00 H	275	13.20	15.40
4	587.91	32.0 QP	46.0	-14.0	1.75 H	306	10.10	21.90
5	797.89	34.0 QP	46.0	-12.0	1.00 H	310	8.40	25.60
6	902.89	37.0 QP	46.0	-9.0	1.75 H	15	10.20	26.80
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	31.84	34.9 QP	40.0	-5.1	1.00 V	123	22.90	12.00
2	167.94	40.7 QP	43.5	-2.8	1.24 V	16	27.10	13.60
3	399.31	28.2 QP	46.0	-17.8	1.24 V	15	10.70	17.50
4	585.97	32.9 QP	46.0	-13.1	1.00 V	9	11.10	21.80
5	797.89	34.8 QP	46.0	-11.2	1.24 V	151	9.20	25.60
6	949.55	39.3 QP	46.0	-6.7	1.00 V	128	12.00	27.30

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 100	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	119.34	38.1 QP	43.5	-5.4	1.74 H	201	26.30	11.80
2	167.95	42.3 QP	43.5	-1.2	1.83 H	36	28.70	13.60
3	399.31	28.5 QP	46.0	-17.5	1.00 H	164	11.00	17.50
4	587.91	30.8 QP	46.0	-15.2	1.50 H	295	8.90	21.90
5	799.84	33.9 QP	46.0	-12.1	1.50 H	14	8.30	25.60
6	904.83	34.2 QP	46.0	-11.8	1.74 H	25	7.40	26.80
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	31.84	35.2 QP	40.0	-4.8	1.00 V	233	23.20	12.00
2	167.94	38.4 QP	43.5	-5.1	1.75 V	91	24.80	13.60
3	397.37	25.6 QP	46.0	-20.4	1.00 V	138	8.10	17.50
4	589.86	34.5 QP	46.0	-11.5	1.00 V	17	12.60	21.90
5	797.89	35.3 QP	46.0	-10.7	1.25 V	140	9.70	25.60
6	949.55	39.3 QP	46.0	-6.7	1.00 V	114	12.00	27.30

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 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

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	100289	Nov. 19, 2011	Nov. 18, 2012
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 29, 2011	Dec. 28, 2012
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 30, 2011	Dec. 29, 2012
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 06, 2012	Jul. 05, 2013
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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

2. The test was performed in HwaYa Shielded Room 2.

3. The VCCI Site Registration No. is C-2047.

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.

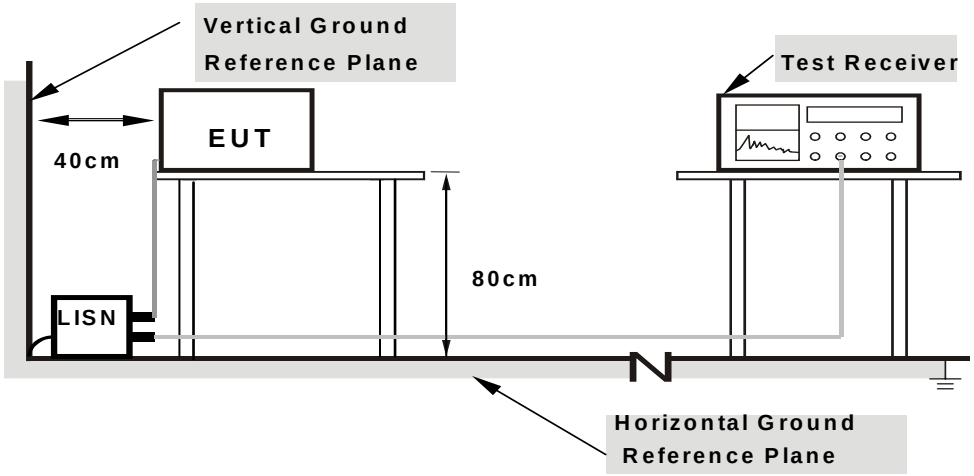
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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 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.

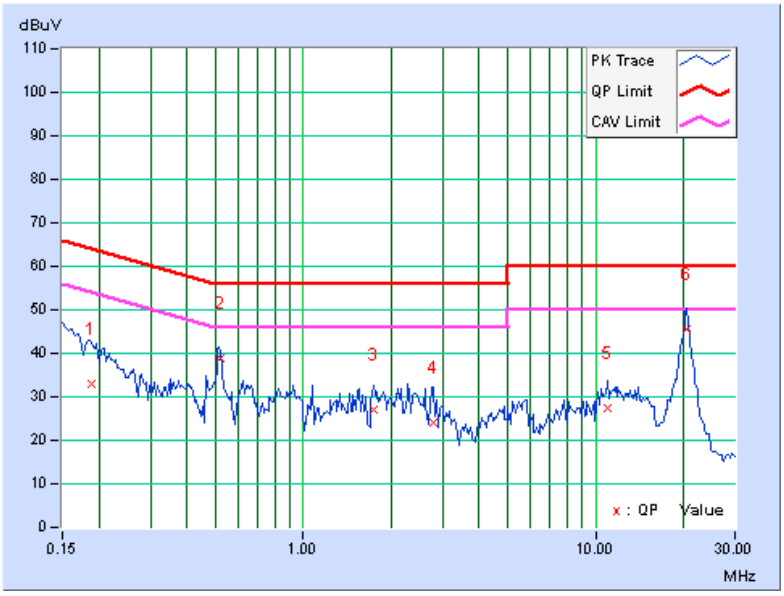
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA：WHDI (20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz
CHANNEL	Channel 52		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18906	0.17	32.92	19.16	33.09	19.33	64.08	54.08	-30.99	-34.75
2	**0.52109**	**0.21**	**38.55**	**36.42**	**38.76**	**36.63**	**56.00**	**46.00**	**-17.24**	**-9.37**
3	1.73828	0.28	26.88	18.98	27.16	19.26	56.00	46.00	-28.84	-26.74
4	2.78906	0.34	23.91	15.23	24.25	15.57	56.00	46.00	-31.75	-30.43
5	10.92969	0.50	27.05	18.65	27.55	19.15	60.00	50.00	-32.45	-30.85
6	20.56250	0.72	44.73	37.97	45.45	38.69	60.00	50.00	-14.55	-11.31

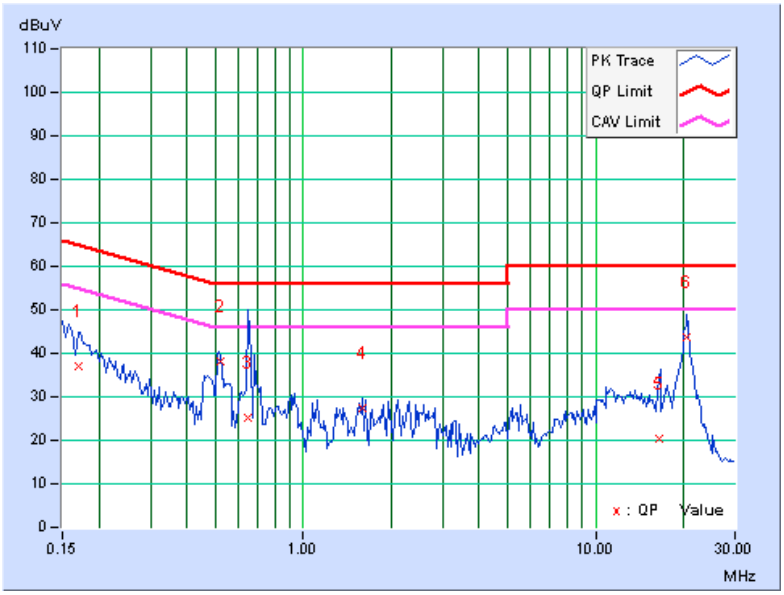
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading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



PHASE	Line 2	6dB BANDWIDTH	9kHz
CHANNEL	Channel 52		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.16	36.97	18.15	37.13	18.31	64.98	54.98	-27.85	-36.67
2	0.52109	0.18	37.95	35.45	38.13	35.63	56.00	46.00	-17.87	-10.37
3	0.65000	0.18	24.84	17.94	25.02	18.12	56.00	46.00	-30.98	-27.88
4	1.59766	0.24	27.17	16.44	27.41	16.68	56.00	46.00	-28.59	-29.32
5	16.50391	0.73	19.57	12.44	20.30	13.17	60.00	50.00	-39.70	-36.83
6	20.38281	0.82	42.99	35.51	43.81	36.33	60.00	50.00	-16.19	-13.67

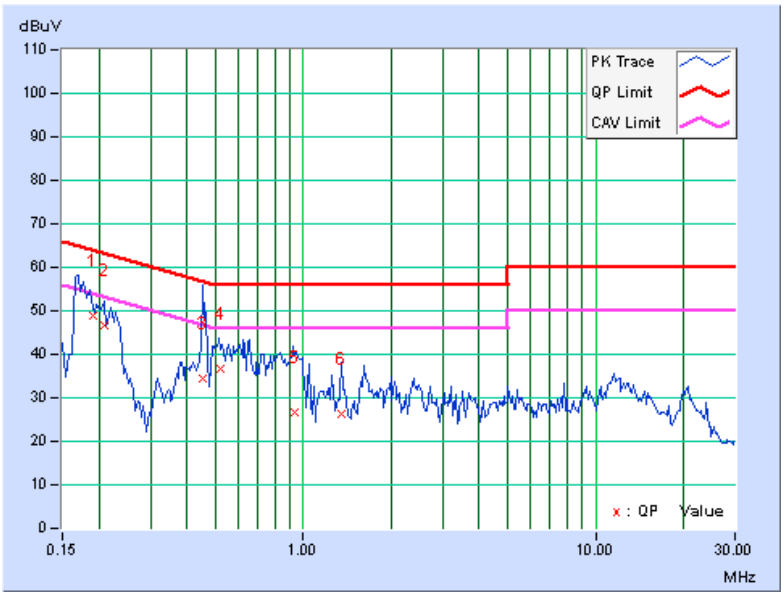
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading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



PHASE	Line 1	6dB BANDWIDTH	9kHz
CHANNEL	Channel 100		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19184	0.17	48.85	33.14	49.02	33.31	63.96	53.96	-14.94	-20.65
2	0.20859	0.17	46.51	31.60	46.68	31.77	63.26	53.26	-16.58	-21.49
3	0.45469	0.20	34.17	13.40	34.37	13.60	56.79	46.79	-22.42	-33.19
4	0.52362	0.21	36.52	31.85	36.73	32.06	56.00	46.00	-19.27	-13.94
5	0.93906	0.23	26.43	18.40	26.66	18.63	56.00	46.00	-29.34	-27.37
6	1.35938	0.26	25.89	18.89	26.15	19.15	56.00	46.00	-29.85	-26.85

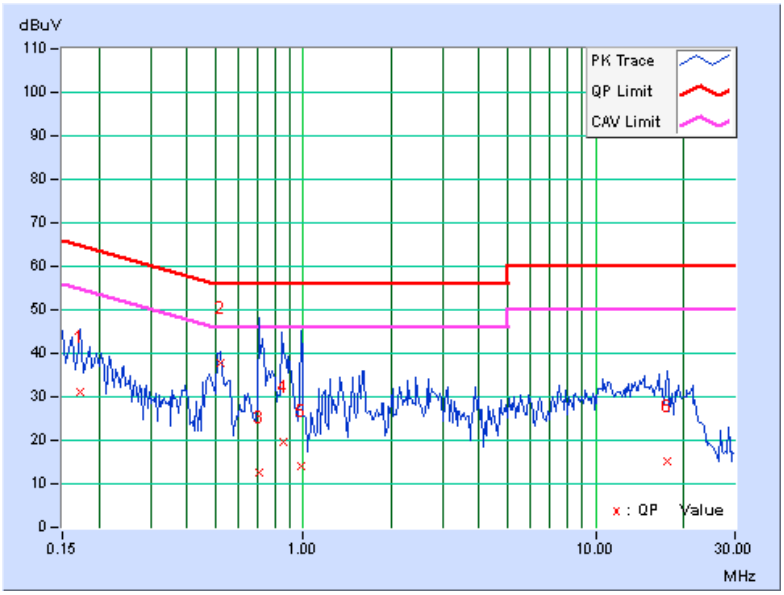
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading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



PHASE	Line 2	6dB BANDWIDTH	9kHz
CHANNEL	Channel 100		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17344	0.16	31.09	19.46	31.25	19.62	64.79	54.79	-33.54	-35.17
2	0.52109	0.18	37.62	35.51	37.80	35.69	56.00	46.00	-18.20	-10.31
3	0.70469	0.19	12.29	5.83	12.48	6.02	56.00	46.00	-43.52	-39.98
4	0.85313	0.19	19.47	14.34	19.66	14.53	56.00	46.00	-36.34	-31.47
5	0.97813	0.19	13.97	8.75	14.16	8.94	56.00	46.00	-41.84	-37.06
6	17.62500	0.76	14.39	8.30	15.15	9.06	60.00	50.00	-44.85	-40.94

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



4.3 PEAK TRANSMIT POWER MEASUREMENT

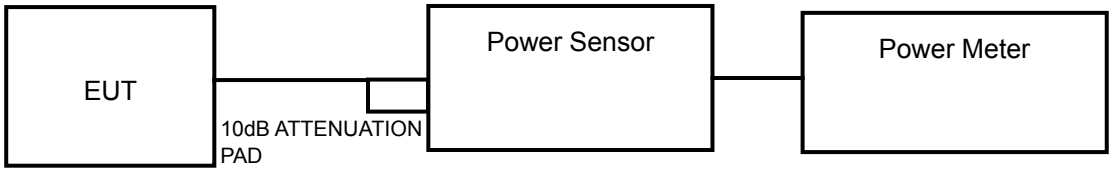
4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

FREQUENCY BAND	LIMIT
5.250 ~ 5.350GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.470 ~ 5.725GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB

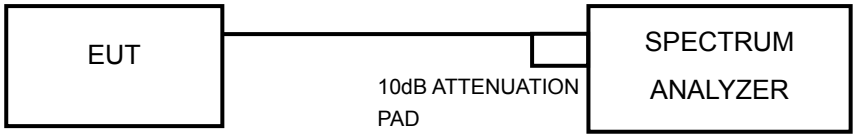
NOTE: Where B is the 26dB emission bandwidth in MHz.

4.3.2 TEST SETUP

FOR POWER OUTPUT MEASUREMENT



FOR 26dB BANDWIDTH



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.3.4 TEST PROCEDURE

FOR AVERAGE POWER MEASUREMENT

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

FOR 26dB BANDWIDTH

1) Set RBW = approximately 1% of the emission bandwidth.
2) Set the VBW > RBW.
3) Detector = Peak.
4) Trace mode = max hold.
5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

POWER OUTPUT:

WHDI (20MHz)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
52	5260	3.91	2.69	4.3	6.4	24	PASS
60	5300	3.86	2.54	4.2	6.3	24	PASS
64	5320	3.94	2.57	4.3	6.3	24	PASS
100	5500	4.09	2.82	4.5	6.5	24	PASS
112	5560	3.58	2.21	4.0	6.0	24	PASS
136	5680	2.62	1.95	3.4	5.3	24	PASS

WHDI (40MHz)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
54	5270	2.83	2.24	3.6	5.6	24	PASS
62	5310	2.81	2.15	3.6	5.5	24	PASS
102	5510	3.29	1.55	3.6	5.5	24	PASS
110	5550	3.18	1.92	3.6	5.6	24	PASS
134	5670	2.96	2.16	3.6	5.6	24	PASS

26dB BANDWIDTH:

WHDI (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (dBm)		PASS / FAIL
		CHAIN 0	CHAIN 1	
52	5260	19.69	19.66	PASS
60	5300	19.67	19.68	PASS
64	5320	19.72	19.66	PASS
100	5500	19.67	19.66	PASS
112	5560	19.69	19.66	PASS
136	5680	19.70	19.65	PASS

WHDI (40MHz)

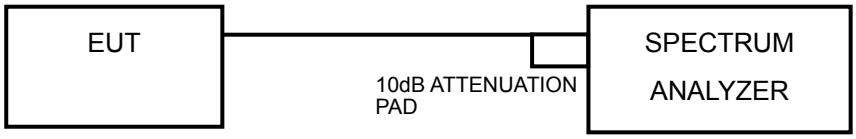
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (dBm)		PASS / FAIL
		CHAIN 0	CHAIN 1	
54	5270	40.83	40.70	PASS
62	5310	40.59	40.68	PASS
102	5510	40.71	40.57	PASS
110	5550	40.71	40.58	PASS
134	5670	40.71	40.70	PASS

4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

FREQUENCY BAND	LIMIT
5.250 ~ 5.350GHz	11dBm
5.470 ~ 5.725GHz	11dBm

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.4.4 TEST PROCEDURES

Using method SA-1 alternative

1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
3) Sweep time = 26 second.
4) Perform a single sweep.
5) Record the max value

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6.

4.4.7 TEST RESULTS

WHDI (20MHz)

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
52	5260	-7.97	-9.86	-5.899	11	PASS
60	5300	-8.34	-9.36	-6.032	11	PASS
64	5320	-8.23	-9.35	-5.954	11	PASS
100	5500	-9.49	-9.65	-6.704	11	PASS
112	5560	-9.80	-10.53	-7.241	11	PASS
136	5680	-11.05	-12.20	-8.785	11	PASS

NOTE: Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

WHDI (40MHz)

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
54	5270	-10.86	-12.47	-8.605	11	PASS
62	5310	-11.05	-12.50	-8.732	11	PASS
102	5510	-12.03	-13.44	-9.734	11	PASS
110	5550	-12.14	-13.61	-9.939	11	PASS
134	5670	-12.30	-14.46	-10.237	11	PASS

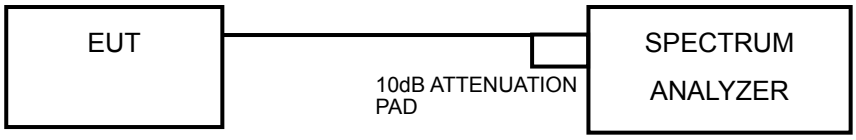
NOTE: Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

4.5 PEAK POWER EXCURSION MEASUREMENT

4.5.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

Shall not exceed 13 dB.

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.5.4 TEST PROCEDURE

1) Set RBW = 1 MHz, VBW ≥ 3 MHz, Detector = peak.
2) Trace mode = max-hold. Allow the sweeps to continue until the trace stabilizes.
3) Use the peak search function to find the peak of the spectrum.
4) Measure the PPSD.
5) Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

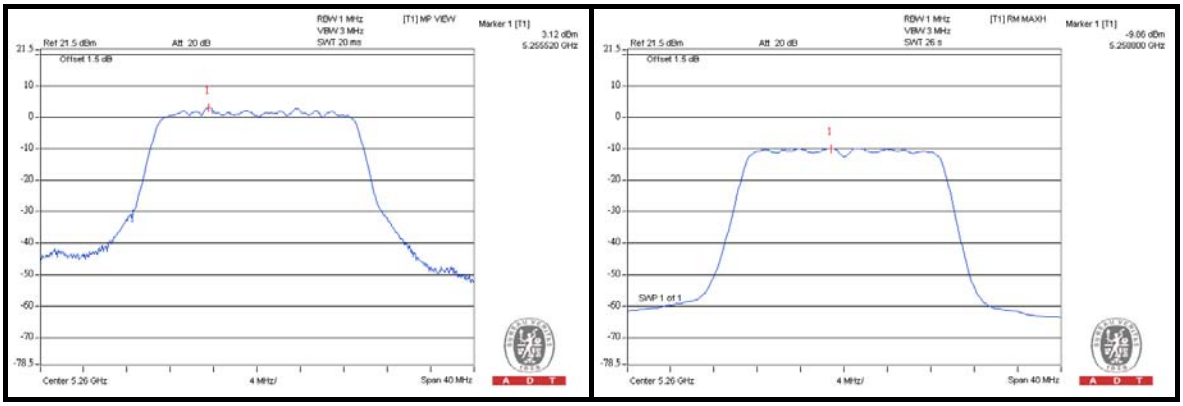
4.5.6 EUT OPERATING CONDITIONS

Same as 4.2.6

4.5.7 TEST RESULTS

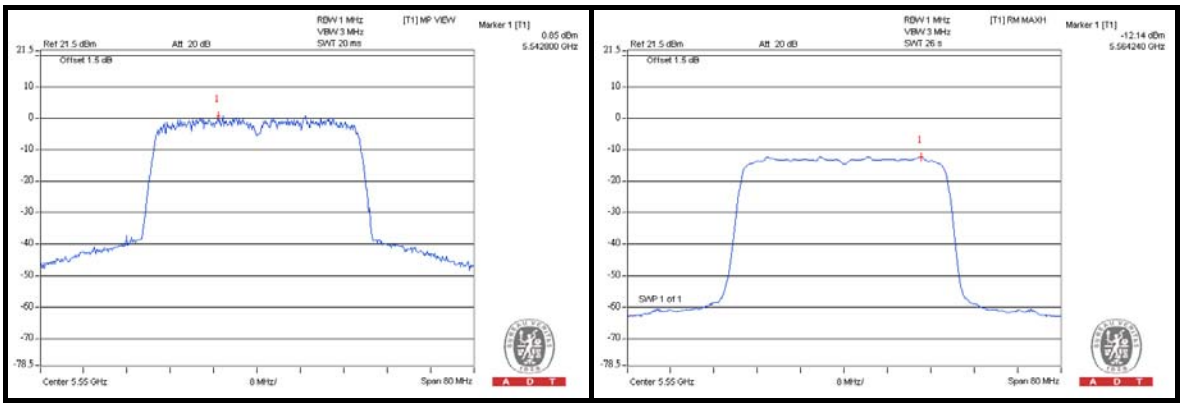
WHDI (20MHz)

CHAN.	CHAN. FREQ. (MHz)	PEAK VALUE (dBm)		PPSD (dBm)		PEAK EXCURSION (dB)		LIMIT (dB)	PASS/ FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
52	5260	4.25	3.12	-7.97	-9.86	12.22	12.98	13	PASS
60	5300	3.94	3.57	-8.34	-9.36	12.28	12.93	13	PASS
64	5320	3.72	3.60	-8.23	-9.35	11.95	12.95	13	PASS
100	5500	3.00	3.29	-9.49	-9.65	12.49	12.94	13	PASS
112	5560	2.71	2.38	-9.80	-10.53	12.51	12.91	13	PASS
136	5680	1.55	0.76	-11.05	-12.20	12.60	12.96	13	PASS



WHDI (40MHz)

CHAN.	CHAN. FREQ. (MHz)	PEAK VALUE (dBm)		PPSD (dBm)		PEAK EXCURSION (dB)		LIMIT (dB)	PASS/ FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
54	5270	2.06	0.50	-10.86	-12.47	12.92	12.97	13	PASS
62	5310	1.90	0.48	-11.05	-12.50	12.95	12.98	13	PASS
102	5510	0.83	-0.46	-12.03	-13.44	12.86	12.98	13	PASS
110	5550	0.85	-0.68	-12.14	-13.61	12.99	12.93	13	PASS
134	5670	0.62	-1.52	-12.30	-14.46	12.92	12.94	13	PASS

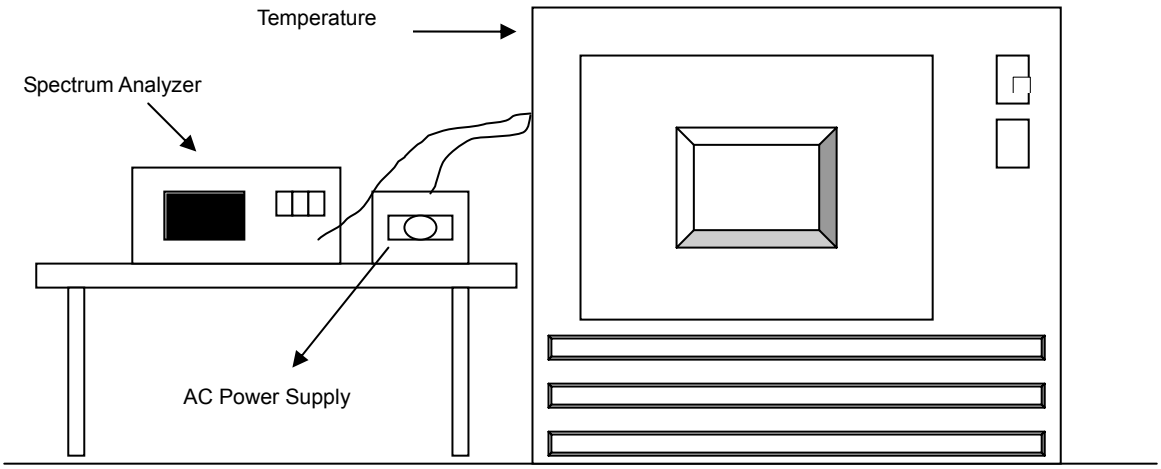


4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency of the carrier signal shall be maintained within band of operation

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.6.4 TEST PROCEDURE

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.

b. Turn the EUT on and couple its output to a spectrum analyzer.

c. Turn the EUT off and set the chamber to the highest temperature specified.

d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.

e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.

f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Set the EUT transmit at un-modulation mode to test frequency stability.

4.6.7 TEST RESULTS

FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5320MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
50	110.0	5320.014628	2.750	5320.014532	2.732	5320.014319	2.692	5320.014350	2.697
40	110.0	5320.015080	2.835	5320.015294	2.875	5320.015225	2.862	5320.014720	2.767
30	110.0	5320.016043	3.016	5320.016174	3.040	5320.016854	3.168	5320.016259	3.056
20	110.0	5320.017614	3.311	5320.017942	3.373	5320.017605	3.309	5320.017663	3.320
10	110.0	5320.018779	3.530	5320.019459	3.658	5320.018614	3.499	5320.019081	3.587
0	110.0	5320.017744	3.335	5320.017425	3.275	5320.017370	3.265	5320.017640	3.316
-10	110.0	5320.016414	3.085	5320.016552	3.111	5320.015872	2.983	5320.015969	3.002
-20	110.0	5320.015494	2.912	5320.015516	2.917	5320.015370	2.889	5320.015402	2.895
-30	110.0	5320.014653	2.754	5320.014296	2.687	5320.014411	2.709	5320.014490	2.724

FREQUEMCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5320MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	93.5	5320.016890	3.175	5320.016739	3.146	5320.016533	3.108	5320.016450	3.092
	110.0	5320.017186	3.230	5320.016664	3.132	5320.016699	3.139	5320.017210	3.235
	126.5	5320.019021	3.575	5320.018926	3.558	5320.018845	3.542	5320.018813	3.536

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
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 modifications were made to the EUT by the lab during the test.

---END---