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FCC TEST REPORT (15.247)

REPORT NO.: RF110607C27

MODEL NO.: SWW1890R /27, SWW1810R /27
(refer to item 3.1 for more details)

FCC ID: YG7ZRF32200

RECEIVED: Jun. 02, 2011

TESTED: Jun. 16 ~ Jun. 27, 2011

ISSUED: Jul. 07, 2011

APPLICANT: Zinwell Corporation

ADDRESS: 7F., No.512, Yuanshan Rd., Zhonghe Dist., New Taipei City 235, Taiwan (R.O.C.)

ISSUED BY: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang, Taipei Hsien 244, Taiwan, R.O.C.

TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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Testing Laboratory
2021



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TABLE OF CONTENTS

RELEASE CONTROL RECORD.....	4
1. CERTIFICATION.....	5
2. SUMMARY OF TEST RESULTS	6
2.1 MEASUREMENT UNCERTAINTY.....	6
3. GENERAL INFORMATION.....	7
3.1 GENERAL DESCRIPTION OF EUT	7
3.2 DESCRIPTION OF TEST MODES	9
3.2.1 CONFIGURATION OF SYSTEM UNDER TEST	10
3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL	11
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS	13
3.4 DESCRIPTION OF SUPPORT UNITS	13
4. TEST TYPES AND RESULTS	14
4.1 RADIATED EMISSION MEASUREMENT	14
4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT.....	14
4.1.2 TEST INSTRUMENTS.....	15
4.1.3 TEST PROCEDURES	16
4.1.4 DEVIATION FROM TEST STANDARD.....	16
4.1.5 TEST SETUP.....	17
4.1.6 EUT OPERATING CONDITIONS	17
4.1.7 TEST RESULTS	18
4.2 CONDUCTED EMISSION MEASUREMENT	26
4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT.....	26
4.2.2 TEST INSTRUMENTS.....	26
4.2.3 TEST PROCEDURES	27
4.2.4 DEVIATION FROM TEST STANDARD.....	27
4.2.5 TEST SETUP.....	28
4.2.6 EUT OPERATING CONDITIONS	28
4.2.7 TEST RESULTS	29
4.3 6DB BANDWIDTH MEASUREMENT	35
4.3.1 LIMITS OF 6DB BANDWIDTH MEASUREMENT	35
4.3.2 TEST INSTRUMENTS.....	35
4.3.3 TEST PROCEDURE.....	35
4.3.4 DEVIATION FROM TEST STANDARD.....	36
4.3.5 TEST SETUP.....	36
4.3.6 EUT OPERATING CONDITIONS	36
4.3.7 TEST RESULTS	37
4.4 MAXIMUM OUTPUT POWER.....	39



A D T

4.4.1	LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT.....	39
4.4.2	INSTRUMENTS.....	39
4.4.3	TEST PROCEDURE.....	39
4.4.4	DEVIATION FROM TEST STANDARD.....	39
4.4.5	TEST SETUP.....	40
4.4.6	EUT OPERATING CONDITIONS.....	40
4.4.7	TEST RESULTS.....	40
4.5	POWER SPECTRAL DENSITY MEASUREMENT.....	41
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT.....	41
4.5.2	TEST INSTRUMENTS.....	41
4.5.3	TEST PROCEDURE.....	41
4.5.4	DEVIATION FROM TEST STANDARD.....	42
4.5.5	TEST SETUP.....	42
4.5.6	EUT OPERATING CONDITION.....	42
4.5.7	TEST RESULTS.....	43
4.6	BAND EDGES MEASUREMENT.....	45
4.6.1	LIMITS OF BAND EDGES MEASUREMENT.....	45
4.6.2	TEST INSTRUMENTS.....	45
4.6.3	TEST PROCEDURE.....	45
4.6.4	DEVIATION FROM TEST STANDARD.....	45
4.6.5	EUT OPERATING CONDITION.....	46
4.6.6	TEST RESULTS.....	46
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	53
6.	INFORMATION ON THE TESTING LABORATORIES.....	54
7.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	55



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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	N/A	Jul. 07, 2011



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1. CERTIFICATION

PRODUCT: Wireless HD Net Connect Receiver, Wireless HD AV Connect Receiver (refer to item 3.1 for more details)

MODEL: SWW1890R /27, SWW1810R /27 (refer to item 3.1 for more details)

BRAND: PHILIPS (refer to item 3.1 for more details)

APPLICANT: Zinwell Corporation

TESTED: Jun. 16 ~ Jun. 27, 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: SWW1890R /27, SWW1810R /27, WHD100R, WHD200R) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY :  , DATE : Jul. 07, 2011
Joanna Wang / Senior Specialist

APPROVED BY :  , DATE : Jul. 07, 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 -4.77dB at 14.988MHz.
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -2.0dB at 142.67MHz.
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	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	2.44dB
Radiated emissions	30MHz ~ 200MHz	2.93dB
	200MHz ~1000MHz	2.95dB
	1GHz ~ 18GHz	2.26dB
	18GHz ~ 40GHz	1.94dB

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	Wireless HD Net Connect Receiver, Wireless HD AV Connect Receiver (refer to NOTE for more details)
MODEL NO.	SWW1890R /27, SWW1810R /27 (refer to NOTE for more details)
FCC ID	YG7ZRF32200
POWER SUPPLY	5Vdc
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	100Kbps transmission, 1Gbps reception
OPERATING FREQUENCY	5745 ~ 5805MHz
NUMBER OF CHANNEL	4 for WHDI (20MHz) 2 for WHDI (40MHz)
OUTPUT POWER	660.7mW
ANTENNA TYPE	Printed antenna with 6.2dBi gain x 2 (1TX, 2RX) Chip antenna with 6.2dBi gain x 3 (3RX)
ANTENNA CONNECTOR	NA
I/O PORTS	Refer to user's manual
DATA CABLE	1.5m shielded HDMI cable with one core 1.0m IR cable without core
ACCESSORY DEVICES	Adapter

NOTE:

- The following models are provided to this EUT.

BRAND	MODEL	HDMI OUT	USB PORT	IR IN	DESCRIPTION
PHILIPS	SWW1890R /27	√	X	X	Wireless HD Net Connect Receiver
	SWW1810R /27	√	X	√	Wireless HD AV Connect Receiver
ZINWELL	WHD100R	√	√	X	Wireless HD Net Connect Receiver
	WHD200R	√	√	X	Wireless HD AV Connect Receiver

BRAND	PHILIPS		ZINWELL	
MODEL	SWW1890R /27	SWW1810R /27	WHD100R	WHD200R
IR receiver	X	X	√	√
IR external board + IR extender board	X	√	X	X
IR Sensor Extender	X	√	X	X
Power Adapter	3.5mm DC Jack Output: 5Vdc, 2A	3.5mm DC Jack Output: 5Vdc, 2A	Mini USB Output: 5Vdc, 1.5A	Mini USB Output: 5Vdc, 1.5A
HDMI (Output) cable	With 1 core	With 1 core	With 1 core	With 1 core



2. The EUT is a Wireless HD Net Connect Receiver, Wireless HD AV Connect Receiver. The test data are separated into following test reports.

	TEST STANDARD	REFERENCE REPORT
WHDI (20MHz), WHDI (40MHz) (5745~5805MHz)	FCC Part 15, Subpart C (Section 15.247)	RF110607C27
WHDI (20MHz), WHDI (40MHz) (5180~5240MHz)	FCC Part 15, Subpart E (Section 15.407)	RF110607C27-1

3. The EUT incorporates a MIMO function. Physically, the EUT provides one completed transmitter and five receivers.

MODULATION MODE	TX FUNCTION
WHDI (20MHz)	1TX
WHDI (40MHz)	1TX

4. The frequency bands used in this EUT are listed as follows:

FREQUENCY BAND (MHz)	5180~5240	5745~5805
WHDI (20MHz)	√	√
WHDI (40MHz)	√	√

5. The EUT was powered by the following adapters:

ADAPTER 1 (FOR PHILIPS)	
BRAND	SINO-AMERICAN
MODEL	SA110C-05S-A
INPUT POWER	100-240Vac, 50-60Hz, 0.3A
OUTPUT POWER	5Vdc, 2A, 10W
POWER LINE	DC 1.5m shielded cable with one core

ADAPTER 2 (FOR ZINWELL)	
BRAND	SINO-AMERICAN
MODEL	SA110C-05S-A
INPUT POWER	100-240Vac, 50-60Hz, 0.3A
OUTPUT POWER	5Vdc, 1.5A, 7.5W
POWER LINE	DC 1.5m shielded USB cable with one core

6. 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

4 channels are provided for WHDI (20MHz):

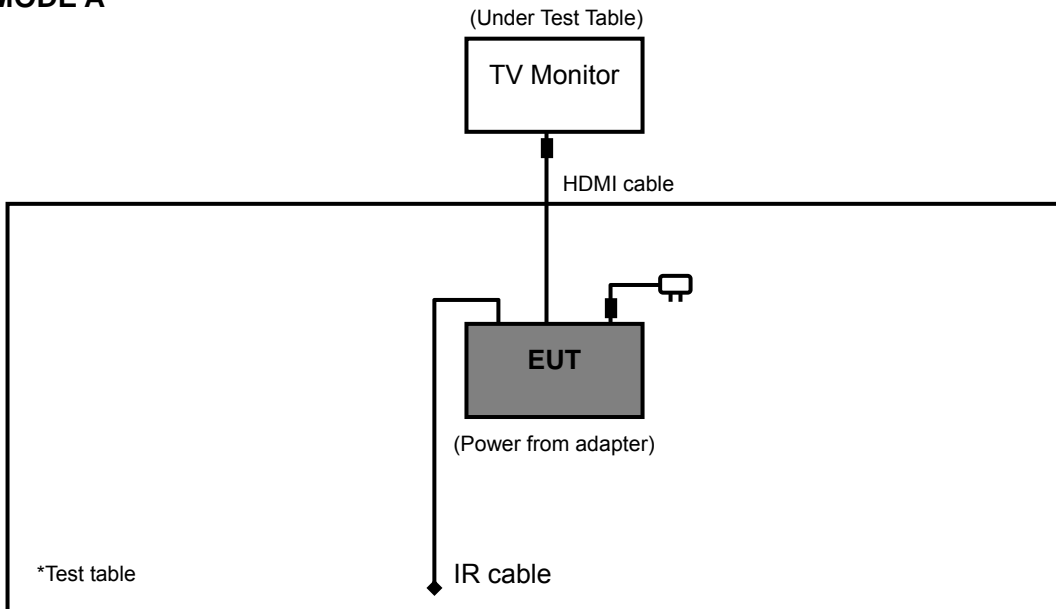
CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	157	5785MHz
153	5765MHz	161	5805MHz

2 channels are provided for WHDI (40MHz):

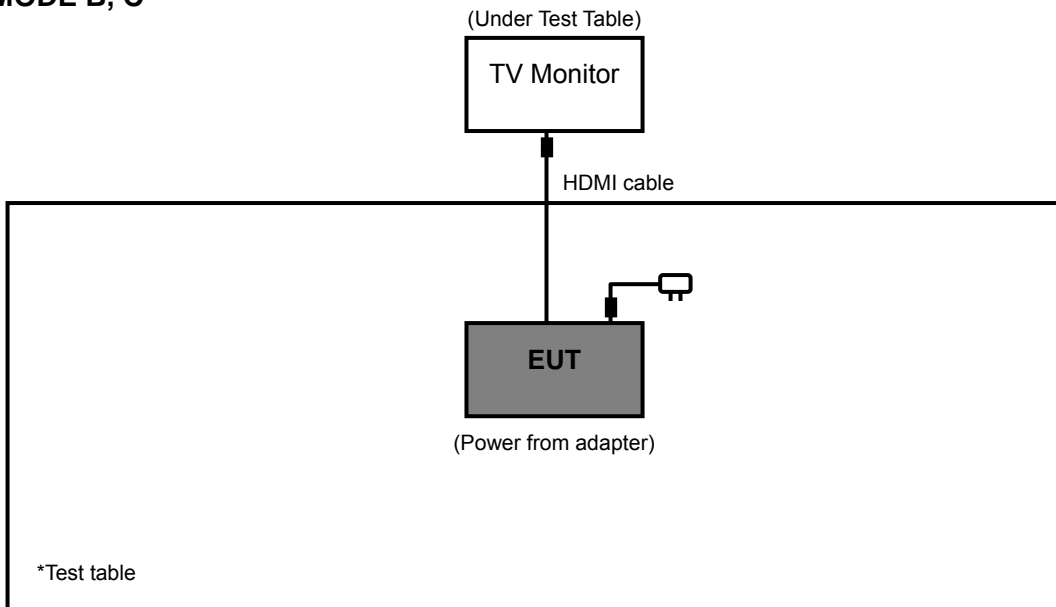
CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

TEST MODE A



TEST MODE B, C



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE \geq 1G	RE $<$ 1G	PLC	APCM	
A	√	√	√	√	PHILIPS sample with IR cable
B	-	√	√	-	PHILIPS sample without IR cable
C	-	√	√	-	ZINWELL sample

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

NOTE: “-” means no effect.

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (kbps)
A	WHDI (20MHz)	149 to 161	149, 157, 161	OFDM	100
A	WHDI (40MHz)	151 to 159	151, 159	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (kbps)
A, B, C	WHDI (20MHz)	149 to 161	161	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (kbps)
A, B, C	WHDI (20MHz)	149 to 161	161	OFDM	100



BANDEDGE MEASUREMENT:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (kbps)
A	WHDI (20MHz)	149 to 161	149, 161	OFDM	100
A	WHDI (40MHz)	151 to 159	151, 159	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (kbps)
A	WHDI (20MHz)	149 to 161	149, 157, 161	OFDM	100
A	WHDI (40MHz)	151 to 159	151, 159	OFDM	100

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	26deg. C, 68%RH, 1005 hPa,	120Vac, 60Hz	Frank Wang
RE<1G	26deg. C, 68%RH, 1005 hPa	120Vac, 60Hz	Frank Wang
PLC	25deg. C, 68%RH, 1000 hPa	120Vac, 60Hz	Sun Lin
APCM	26deg. C, 68%RH, 1003 hPa	120Vac, 60Hz	Frank Wang



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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	TV MONITOR	SANYO	SMF32KE5	NA	NA

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

NOTE:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item 1 was under test table during test.



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4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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



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4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Aug. 04, 2010	Aug. 03, 2011
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Jul. 09, 2010	Jul. 08, 2011
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Apr. 12, 2011	Apr. 11, 2012
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	3008A01910	Sep. 09, 2010	Sep. 08, 2011
Preamplifier Agilent	8447D	2944A10638	Nov. 03, 2010	Nov. 02, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295013/4 283403/4	Sep 03, 2010	Sep 03, 2011
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 20, 2010	Aug. 19, 2011
Software	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	NA	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	07026401	Aug. 25, 2010	Aug. 24, 2011

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 9.

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 460141.

5. The IC Site Registration No. is IC 7450F-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 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

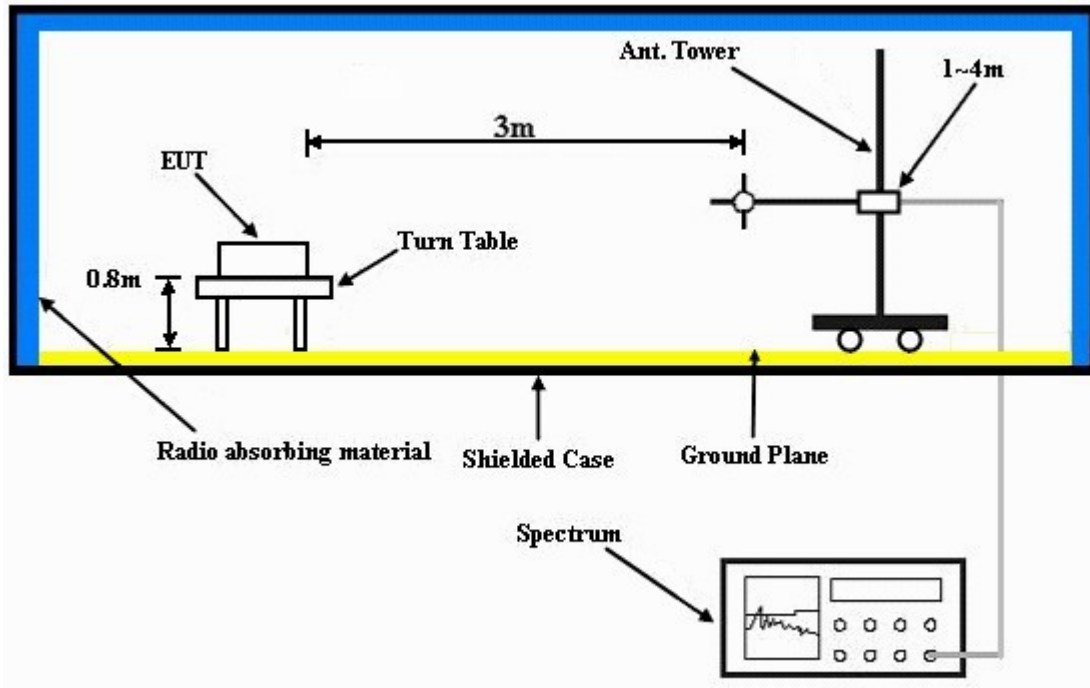
NOTE:

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



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

4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on the testing table.
- b. The EUT sent messages to the TV monitor, which is acted as a communication partner.



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4.1.7 TEST RESULTS

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 68%RH 1005 hPa	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	#5725.00	65.0 PK	87.9	-22.9	1.30 H	275	25.60	39.40
2	#5725.00	47.2 AV	75.2	-28.0	1.30 H	275	7.80	39.40
3	*5745.00	107.9 PK			1.30 H	275	68.50	39.40
4	*5745.00	95.2 AV			1.30 H	275	55.80	39.40
5	11490.00	60.4 PK	74.0	-13.6	1.00 H	356	10.00	50.40
6	11490.00	48.6 AV	54.0	-5.4	1.00 H	356	-1.80	50.40

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	69.7 PK	91.4	-21.7	1.05 V	334	30.30	39.40
2	#5725.00	52.8 AV	78.1	-25.3	1.05 V	334	13.40	39.40
3	*5745.00	111.4 PK			1.05 V	335	72.00	39.40
4	*5745.00	98.1 AV			1.05 V	335	58.70	39.40
5	11490.00	58.9 PK	74.0	-15.1	1.02 V	12	8.50	50.40
6	11490.00	47.8 AV	54.0	-6.2	1.02 V	12	-2.60	50.40

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. The limit value is defined as per 15.247.
 7. "#":The radiated frequency is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 68%RH 1005 hPa	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	*5785.00	108.3 PK			1.00 H	115	68.80	39.50
2	*5785.00	95.3 AV			1.00 H	115	55.80	39.50
3	11570.00	61.0 PK	74.0	-13.0	1.40 H	245	10.70	50.30
4	11570.00	50.0 AV	54.0	-4.0	1.40 H	245	-0.30	50.30
5	#17355.00	64.2 PK	88.3	-24.1	1.00 H	65	10.20	54.00
6	#17355.00	50.9 AV	75.3	-24.4	1.00 H	65	-3.10	54.00
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	*5785.00	110.8 PK			1.00 V	135	71.30	39.50
2	*5785.00	98.2 AV			1.00 V	135	58.70	39.50
3	11570.00	60.5 PK	74.0	-13.5	1.16 V	176	10.20	50.30
4	11570.00	49.8 AV	54.0	-4.2	1.16 V	176	-0.50	50.30
5	#17355.00	64.0 PK	90.8	-26.8	1.00 V	355	10.00	54.00
6	#17355.00	50.7 AV	78.2	-27.5	1.00 V	355	-3.30	54.00

- 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.
 6. The limit value is defined as per 15.247.
 7. "#":The radiated frequency is out the restricted band.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 161	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 68%RH 1005 hPa	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	*5805.00	108.6 PK			1.28 H	108	69.10	39.50
2	*5805.00	95.7 AV			1.28 H	108	56.20	39.50
3	#5850.00	52.5 PK	88.6	-36.1	1.28 H	108	12.90	39.60
4	#5850.00	37.3 AV	75.7	-38.4	1.28 H	108	-2.30	39.60
5	11610.00	62.9 PK	74.0	-11.1	1.02 H	120	12.70	50.20
6	11610.00	48.2 AV	54.0	-5.8	1.02 H	120	-2.00	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	*5805.00	111.9 PK			1.02 V	162	72.40	39.50
2	*5805.00	99.0 AV			1.02 V	162	59.50	39.50
3	#5850.00	55.0 PK	91.9	-36.9	1.02 V	161	15.40	39.60
4	#5850.00	39.3 AV	79.0	-39.7	1.02 V	161	-0.30	39.60
5	11610.00	60.3 PK	74.0	-13.7	1.47 V	185	10.10	50.20
6	11610.00	49.8 AV	54.0	-4.2	1.47 V	185	-0.40	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 limit value is defined as per 15.247.
 7. "#":The radiated frequency is out the restricted band.



A D T

WHDI (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 68%RH 1005 hPa	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	#5725.00	67.8 PK	86.2	-18.4	1.00 H	54	28.40	39.40
2	#5725.00	54.8 AV	72.8	-18.0	1.00 H	54	15.40	39.40
3	*5755.00	106.2 PK			1.00 H	54	66.80	39.40
4	*5755.00	92.8 AV			1.00 H	54	53.40	39.40
5	11510.00	59.9 PK	74.0	-14.1	1.50 H	238	9.50	50.40
6	11510.00	48.2 AV	54.0	-5.8	1.50 H	238	-2.20	50.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	73.5 PK	88.3	-14.8	1.05 V	160	34.10	39.40
2	#5725.00	58.9 AV	74.8	-15.9	1.05 V	160	19.50	39.40
3	*5755.00	108.3 PK			1.05 V	160	68.90	39.40
4	*5755.00	94.8 AV			1.05 V	160	55.40	39.40
5	11510.00	60.8 PK	74.0	-13.2	1.05 V	182	10.40	50.40
6	11510.00	48.5 AV	54.0	-5.5	1.05 V	182	-1.90	50.40

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. The limit value is defined as per 15.247.
 7. "#":The radiated frequency is out the restricted band.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 159	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 68%RH 1005 hPa	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	*5795.00	106.0 PK			1.22 H	115	66.50	39.50
2	*5795.00	93.3 AV			1.22 H	115	53.80	39.50
3	#5850.00	55.1 PK	86.0	-30.9	1.22 H	115	15.50	39.60
4	#5850.00	41.1 AV	73.3	-32.2	1.22 H	115	1.50	39.60
5	11590.00	59.1 PK	74.0	-14.9	1.40 H	235	8.80	50.30
6	11590.00	48.1 AV	54.0	-5.9	1.40 H	235	-2.20	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	*5795.00	108.9 PK			1.00 V	135	69.40	39.50
2	*5795.00	95.4 AV			1.00 V	135	55.90	39.50
3	#5850.00	60.2 PK	88.9	-28.7	1.00 V	135	20.60	39.60
4	#5850.00	44.7 AV	75.4	-30.7	1.00 V	135	5.10	39.60
5	11590.00	59.7 PK	74.0	-14.3	1.02 V	182	9.40	50.30
6	11590.00	48.7 AV	54.0	-5.3	1.02 V	182	-1.60	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 limit value is defined as per 15.247.
 7. “#”:The radiated frequency is out the restricted band.



A D T

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 161	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 68%RH 1005 hPa	TESTED BY	Frank Wang
TEST MODE	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	142.67	41.2 QP	43.5	-2.3	2.00 H	85	26.30	14.90
2	379.87	36.6 QP	46.0	-9.4	2.00 H	262	18.60	18.00
3	459.59	37.9 QP	46.0	-8.1	2.00 H	238	17.60	20.30
4	519.86	36.0 QP	46.0	-10.0	1.50 H	169	14.20	21.80
5	599.58	41.8 QP	46.0	-4.2	1.50 H	358	18.10	23.70
6	840.67	37.1 QP	46.0	-8.9	1.00 H	334	9.10	28.00

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	142.67	40.9 QP	43.5	-2.6	1.00 V	10	26.00	14.90
2	379.87	36.4 QP	46.0	-9.6	1.50 V	142	18.40	18.00
3	420.70	37.7 QP	46.0	-8.3	1.00 V	160	18.50	19.20
4	479.03	40.0 QP	46.0	-6.0	1.00 V	109	19.20	20.80
5	599.58	34.0 QP	46.0	-12.0	1.00 V	199	10.30	23.70
6	799.84	33.2 QP	46.0	-12.8	1.50 V	247	5.80	27.40

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 161	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 68%RH 1005 hPa	TESTED BY	Frank Wang
TEST MODE	B		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	142.67	40.8 QP	43.5	-2.7	2.00 H	148	25.90	14.90
2	379.87	38.2 QP	46.0	-7.8	1.00 H	268	20.20	18.00
3	420.70	37.9 QP	46.0	-8.1	2.00 H	73	18.70	19.20
4	500.42	36.1 QP	46.0	-9.9	1.50 H	160	14.70	21.40
5	580.13	31.7 QP	46.0	-14.3	1.50 H	193	8.50	23.20
6	799.84	34.2 QP	46.0	-11.8	1.00 H	196	6.80	27.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	27.1 QP	40.0	-12.9	1.00 V	52	14.30	12.80
2	142.67	35.7 QP	43.5	-7.8	1.00 V	238	20.80	14.90
3	379.87	40.0 QP	46.0	-6.0	1.00 V	307	22.00	18.00
4	420.70	38.9 QP	46.0	-7.1	1.00 V	316	19.70	19.20
5	500.42	37.8 QP	46.0	-8.2	1.50 V	10	16.40	21.40
6	881.50	30.3 QP	46.0	-15.7	1.00 V	118	1.90	28.40

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 161	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 68%RH 1005 hPa	TESTED BY	Frank Wang
TEST MODE	C		

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	142.67	41.5 QP	43.5	-2.0	2.00 H	325	26.60	14.90
2	405.15	39.0 QP	46.0	-7.0	2.00 H	256	20.20	18.80
3	479.03	41.4 QP	46.0	-4.6	1.50 H	310	20.60	20.80
4	599.58	38.2 QP	46.0	-7.8	1.50 H	61	14.50	23.70
5	840.67	40.7 QP	46.0	-5.3	1.50 H	307	12.70	28.00
6	881.50	43.5 QP	46.0	-2.5	1.50 H	298	15.10	28.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	142.67	40.9 QP	43.5	-2.6	1.00 V	10	26.00	14.90
2	399.31	39.5 QP	46.0	-6.5	1.00 V	124	20.90	18.60
3	440.14	39.6 QP	46.0	-6.4	1.00 V	160	19.90	19.70
4	479.03	38.5 QP	46.0	-7.5	1.00 V	331	17.70	20.80
5	840.67	36.3 QP	46.0	-9.7	1.00 V	253	8.30	28.00
6	899.00	40.4 QP	46.0	-5.6	1.50 V	280	11.70	28.70

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

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 0.50MHz.
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. 23, 2010	Nov. 22, 2011
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 30, 2010	Dec. 29, 2011
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 06, 2011	Jan. 05, 2012
LISN ROHDE & SCHWARZ	ESH3-Z5	100311	Jul. 08, 2010	Jul. 07, 2011
V-LISN SCHWARZBECK	NNBL 8226-2	8226-142	Jul. 12, 2010	Jul. 11, 2011
LISN ROHDE & SCHWARZ	ENV216	100072	Jun. 10, 2011	Jun. 09, 2012
Software ADT	ADT_Cond_ V7.3.7	NA	NA	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 2.
3. The VCCI Site Registration No. is C-2047.



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4.2.3 TEST PROCEDURES

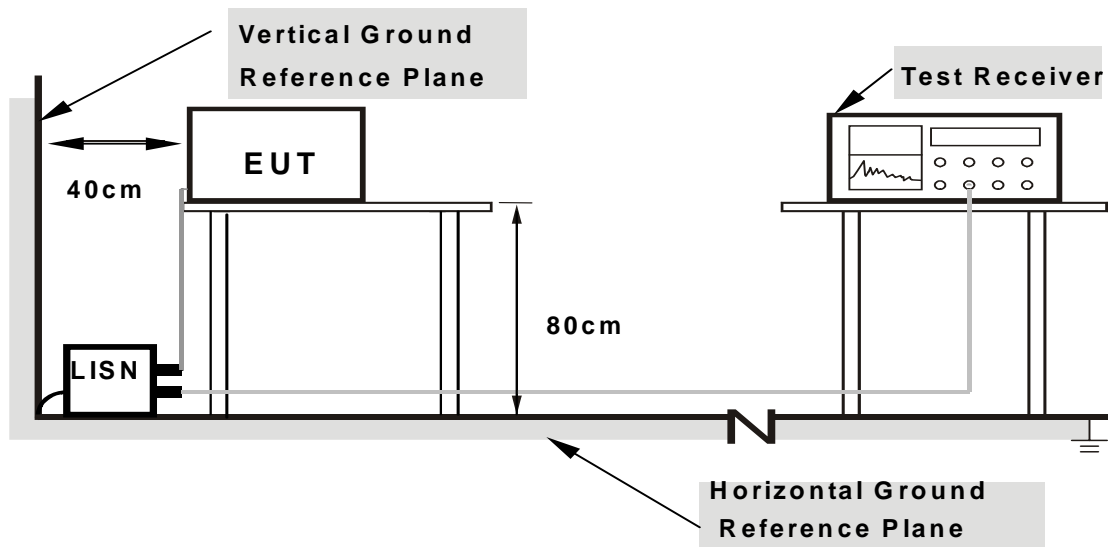
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

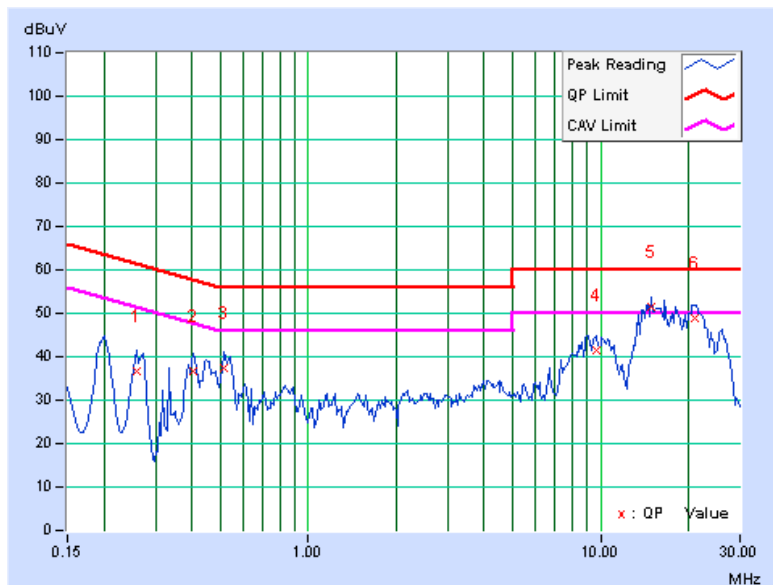
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA :

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	0.259	0.16	36.55	-	36.71	-	61.45	51.45	-24.75	-
2	0.404	0.17	36.50	-	36.67	-	57.77	47.77	-21.10	-
3	0.513	0.17	37.20	-	37.37	-	56.00	46.00	-18.63	-
4	9.703	0.55	41.01	-	41.56	-	60.00	50.00	-18.44	-
5	14.988	0.87	50.73	44.36	51.60	45.23	60.00	50.00	-8.40	-4.77
6	20.914	1.16	47.60	-	48.76	-	60.00	50.00	-11.24	-

- 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.



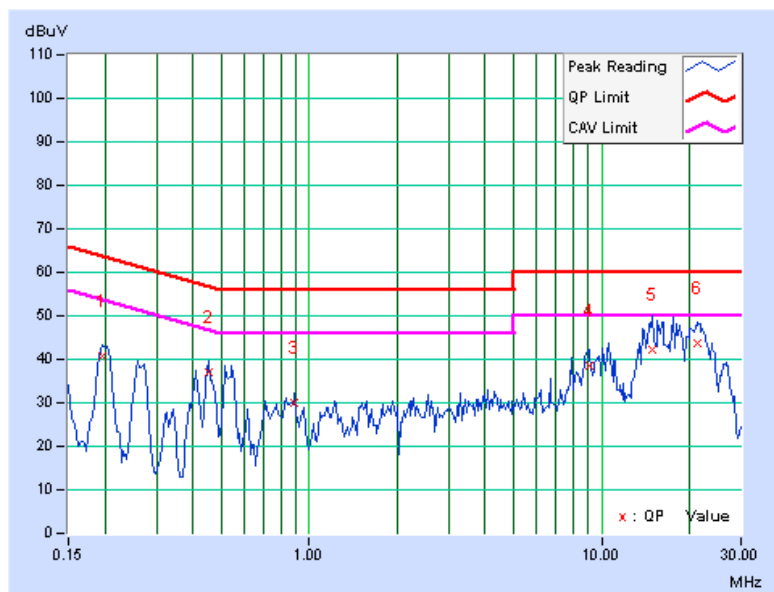


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PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	A		

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	(dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.17	40.58	-	40.75	-	63.74	53.74	-22.99	-
2	0.451	0.19	36.99	-	37.18	-	56.86	46.86	-19.68	-
3	0.888	0.21	29.96	-	30.17	-	56.00	46.00	-25.83	-
4	9.098	0.47	37.97	-	38.44	-	60.00	50.00	-21.56	-
5	14.910	0.73	41.42	-	42.15	-	60.00	50.00	-17.85	-
6	21.215	0.95	42.90	-	43.85	-	60.00	50.00	-16.15	-

- 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.



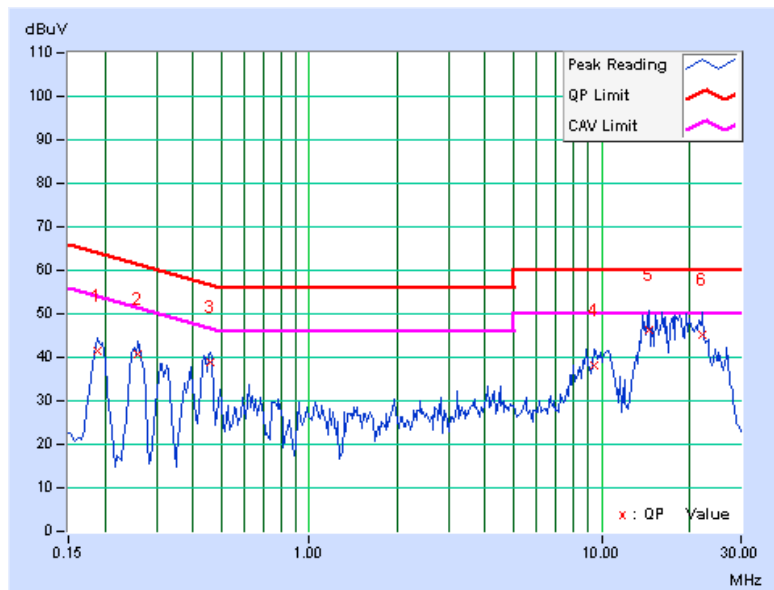


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PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	B		

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	0.189	0.15	41.19	-	41.34	-	64.08	54.08	-22.74	-
2	0.259	0.16	40.57	-	40.73	-	61.45	51.45	-20.73	-
3	0.459	0.17	38.72	-	38.89	-	56.72	46.72	-17.83	-
4	9.406	0.54	37.63	-	38.17	-	60.00	50.00	-21.83	-
5	14.500	0.84	45.47	-	46.31	-	60.00	50.00	-13.69	-
6	22.207	1.18	44.10	-	45.28	-	60.00	50.00	-14.72	-

- 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.



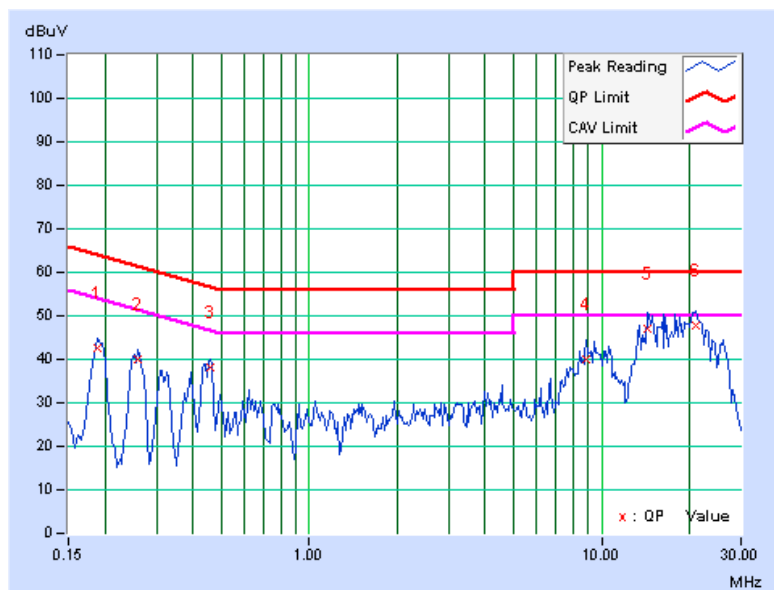


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PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	B		

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	0.189	0.17	42.34	-	42.51	-	64.08	54.08	-21.57	-
2	0.259	0.18	39.93	-	40.11	-	61.45	51.45	-21.35	-
3	0.459	0.19	37.85	-	38.04	-	56.72	46.72	-18.68	-
4	8.902	0.47	39.46	-	39.93	-	60.00	50.00	-20.07	-
5	14.402	0.70	46.19	-	46.89	-	60.00	50.00	-13.11	-
6	21.004	0.94	47.00	-	47.94	-	60.00	50.00	-12.06	-

- 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.



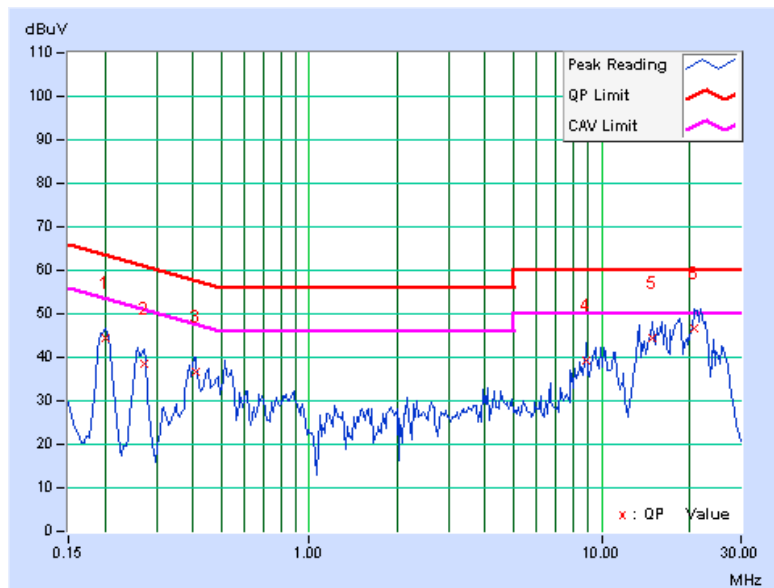


A D T

PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	C		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.201	0.15	44.32	-	44.47	-	63.58	53.58	-19.11	-
2	0.271	0.16	38.20	-	38.36	-	61.08	51.08	-22.73	-
3	0.408	0.17	36.66	-	36.83	-	57.69	47.69	-20.86	-
4	8.910	0.52	38.91	-	39.43	-	60.00	50.00	-20.57	-
5	14.891	0.86	43.60	-	44.46	-	60.00	50.00	-15.54	-
6	20.695	1.15	45.53	-	46.68	-	60.00	50.00	-13.32	-

- 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.



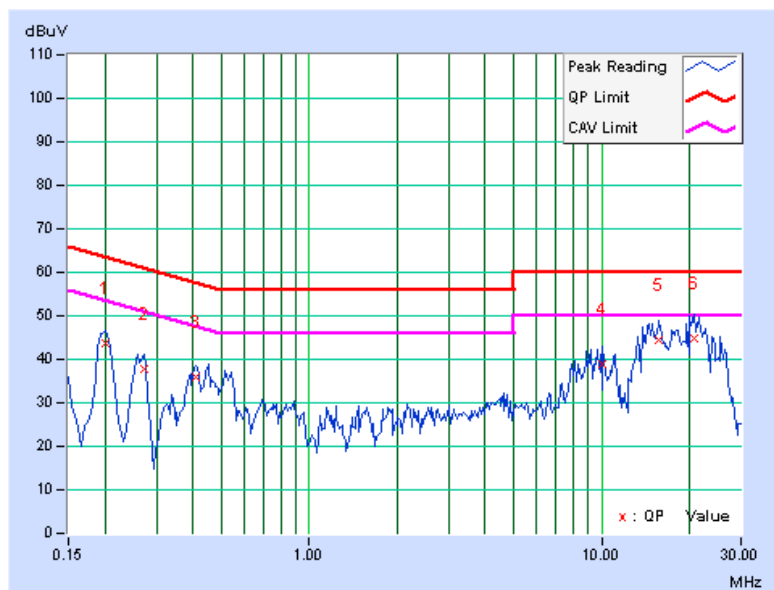


A D T

PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	C		

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	0.201	0.17	43.43	-	43.60	-	63.58	53.58	-19.98	-
2	0.271	0.18	37.78	-	37.96	-	61.08	51.08	-23.13	-
3	0.408	0.19	35.63	-	35.82	-	57.69	47.69	-21.87	-
4	10.109	0.51	38.51	-	39.02	-	60.00	50.00	-20.98	-
5	15.695	0.76	43.69	-	44.45	-	60.00	50.00	-15.55	-
6	20.684	0.94	43.95	-	44.89	-	60.00	50.00	-15.11	-

- 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 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.3.2 TEST INSTRUMENTS

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

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

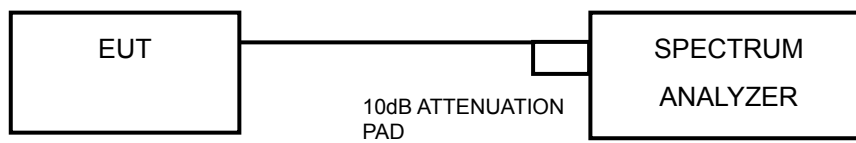
4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

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



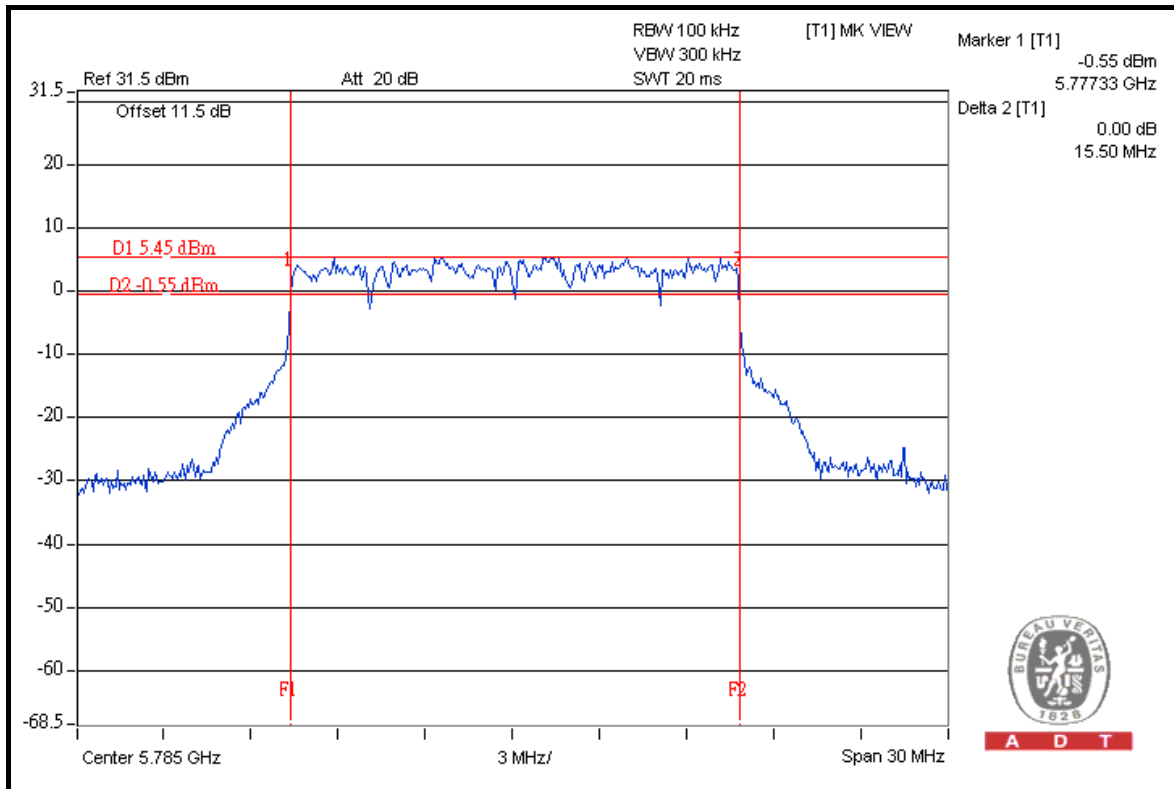
A D T

4.3.7 TEST RESULTS

WHDI (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	15.47	0.5	PASS
157	5785	15.50	0.5	PASS
161	5805	15.49	0.5	PASS

CH 157



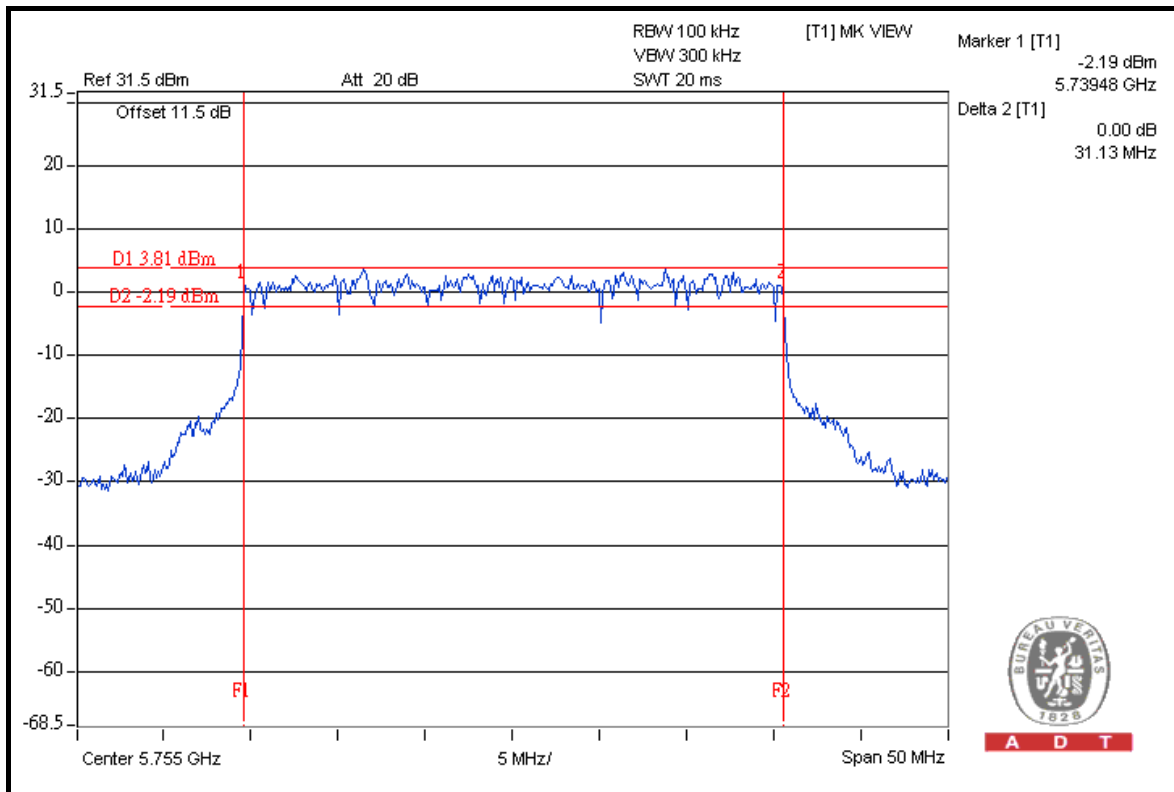


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WHDI (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
151	5755	31.13	0.5	PASS
159	5795	31.07	0.5	PASS

CH 151





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4.4 MAXIMUM OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

The Maximum Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
High Speed Peak Power Meter	ML2495A	0824011	Aug. 02, 2010	Aug. 01, 2011
Power Sensor	MA2411B	0738171	Aug. 02, 2010	Aug. 01, 2011

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. Measurement Bandwidth of ML2495A is 65MHz greater than 6dB bandwidth of emission.

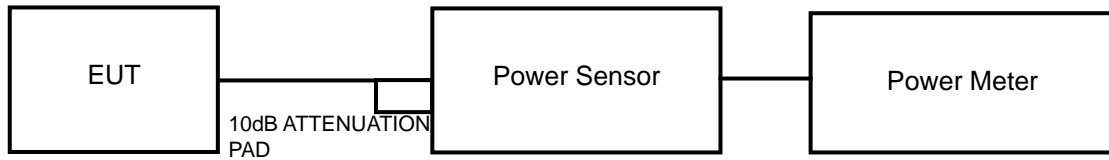
4.4.3 TEST PROCEDURE

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

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

4.4.7 TEST RESULTS

WHDI (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
149	5745	631.0	28.0	30	PASS
157	5785	562.3	27.5	30	PASS
161	5805	660.7	28.2	30	PASS

WHDI (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
151	5755	602.6	27.8	30	PASS
159	5795	631.0	28.0	30	PASS



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4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

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

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

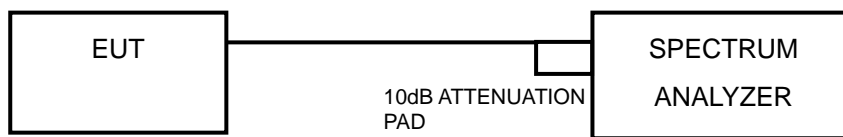
4.5.3 TEST PROCEDURE

1. Set RBW = 3 kHz /VBW > 9 kHz and sweep time to Automatic.
2. Detector use peak mode and a video trigger with the trigger level set to enable triggering only on full power pulses.
3. Trace average 100 traces in power averaging mode. The power spectral density was measured and recorded.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6.



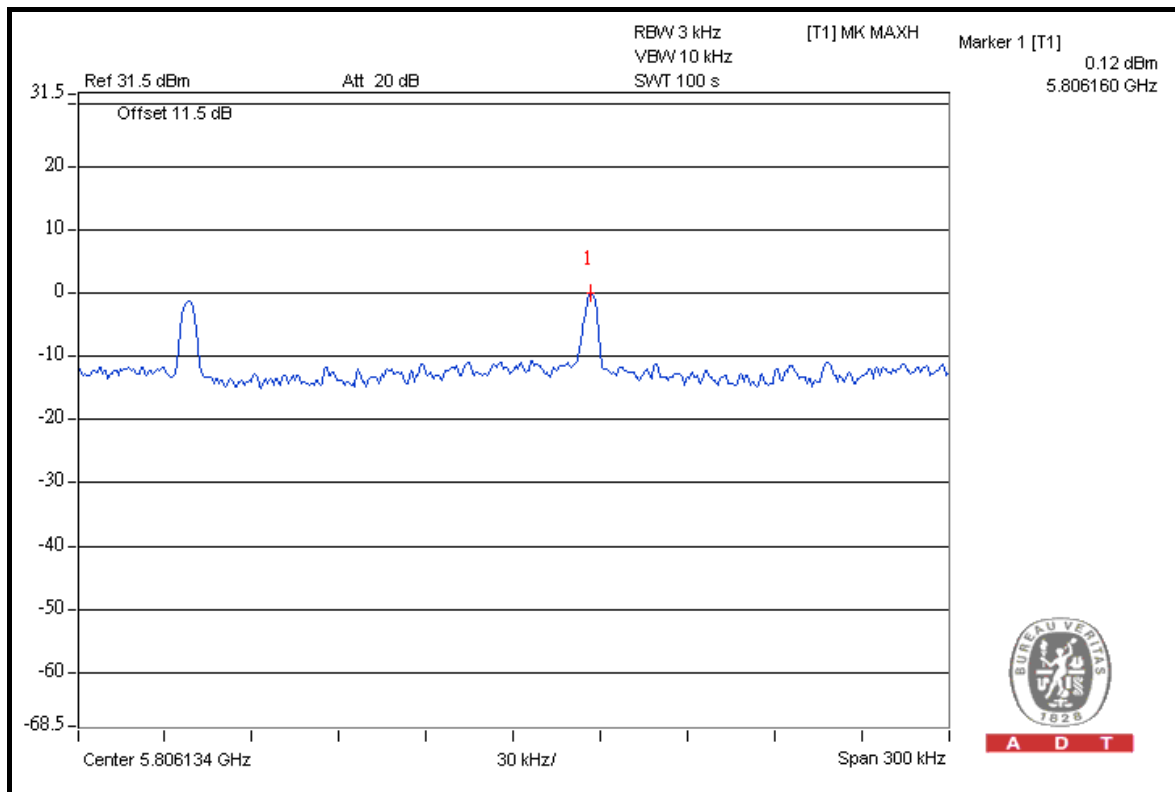
A D T

4.5.7 TEST RESULTS

WHDI (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
149	5745	0.1	8	PASS
157	5785	-0.3	8	PASS
161	5805	0.1	8	PASS

CH 161



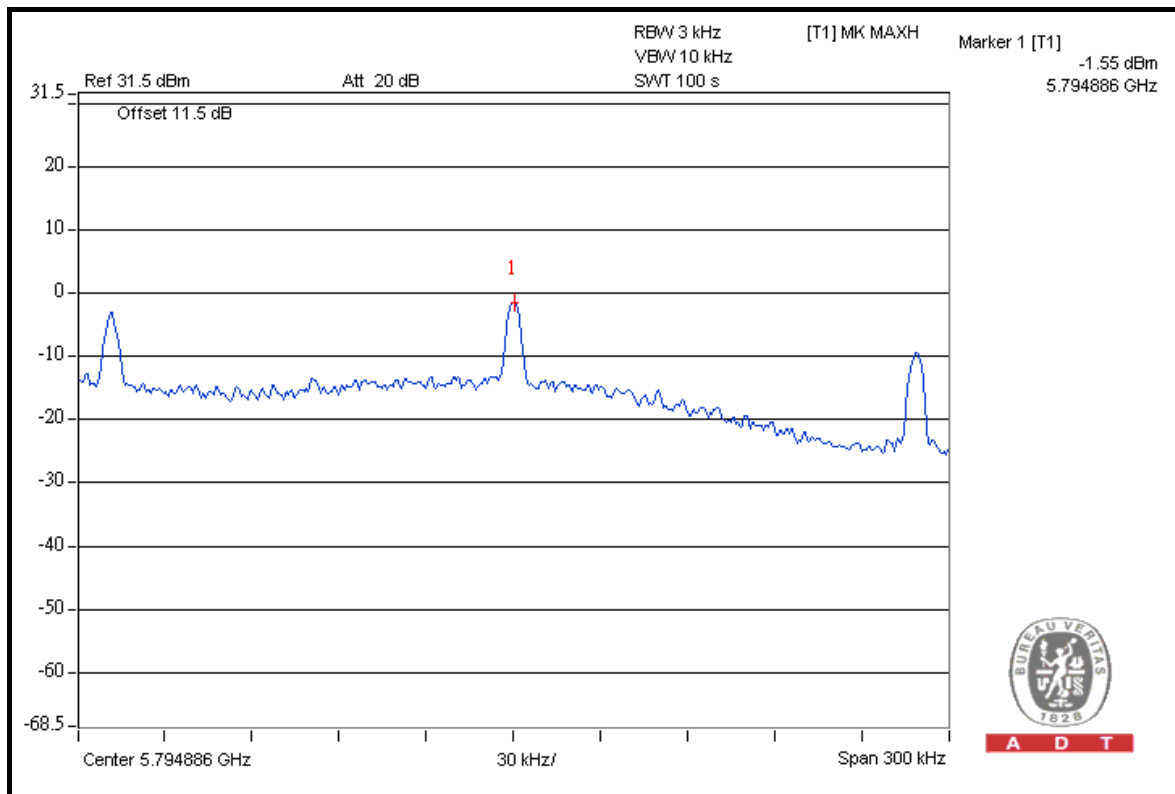


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WHDI (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
151	5755	-1.5	8	PASS
159	5795	-1.6	8	PASS

CH 159





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4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

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

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

4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low loss cable. Set both RBW and VBW of spectrum analyzer to 100kHz and 300kHz with suitable frequency span including 100MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (Peak RBW = 100kHz, VBW = 300kHz; Average RBW = 1MHz, VBW = 10Hz) are attached on the following pages.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation.



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4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6.

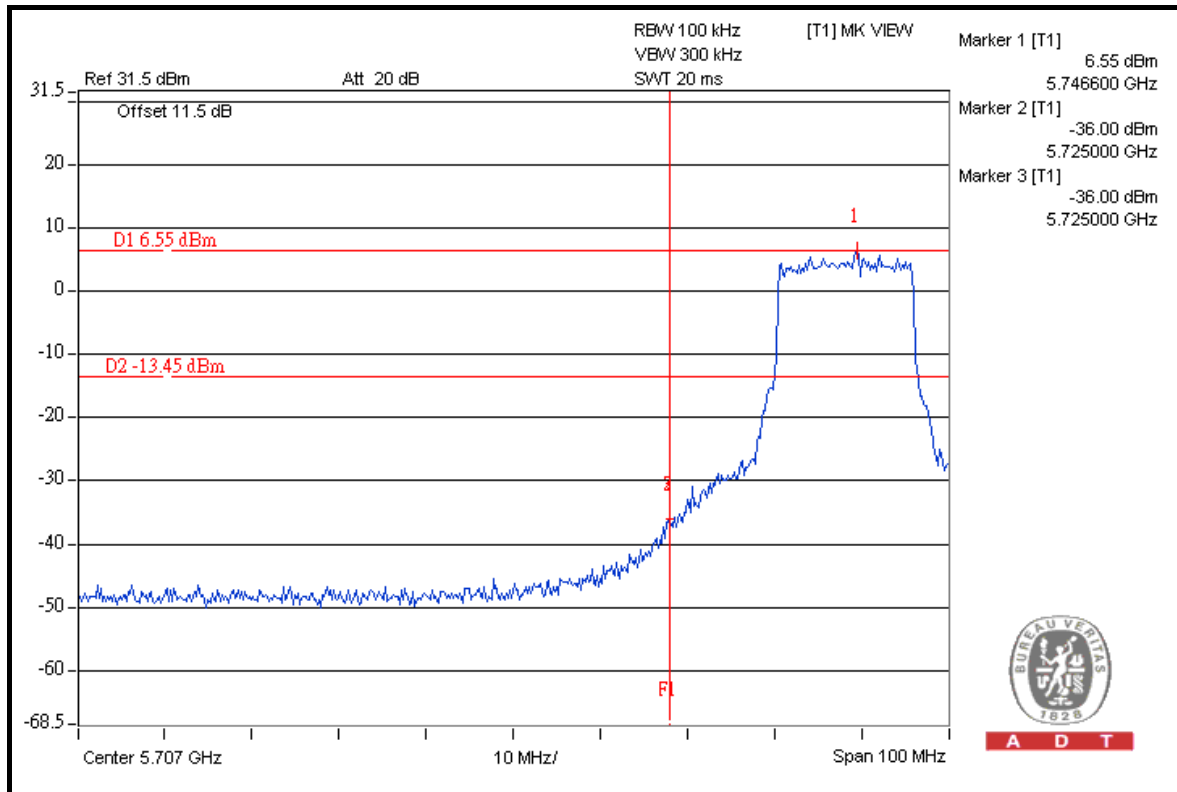
4.6.6 TEST RESULTS

The spectrum plots are attached on the following pages. 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).

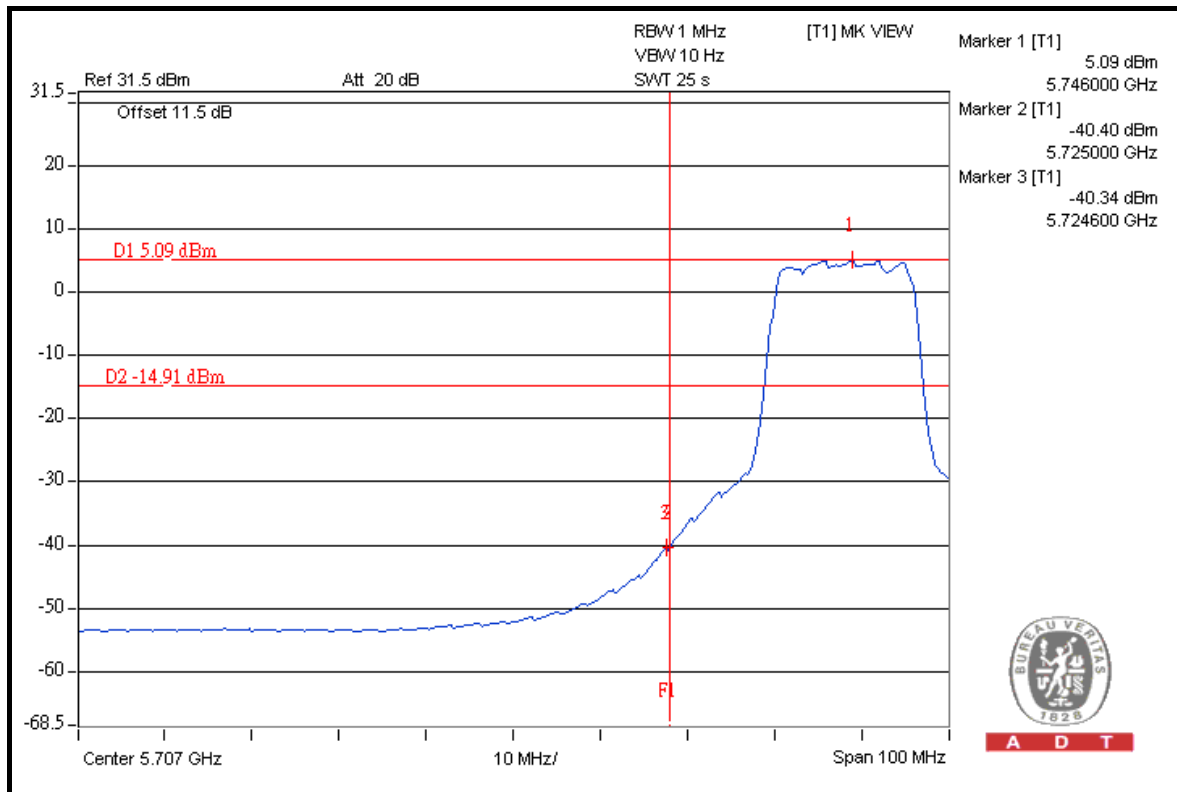


A D T

WHDI (20MHz)



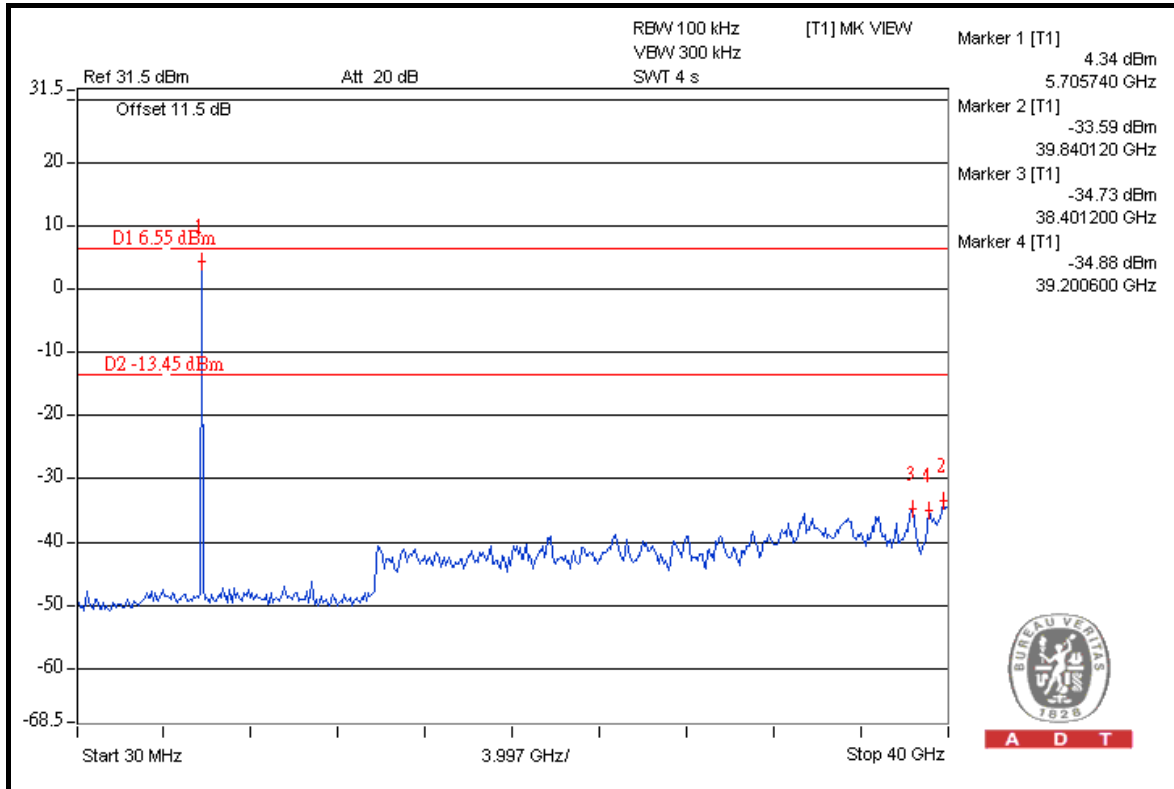
A D T



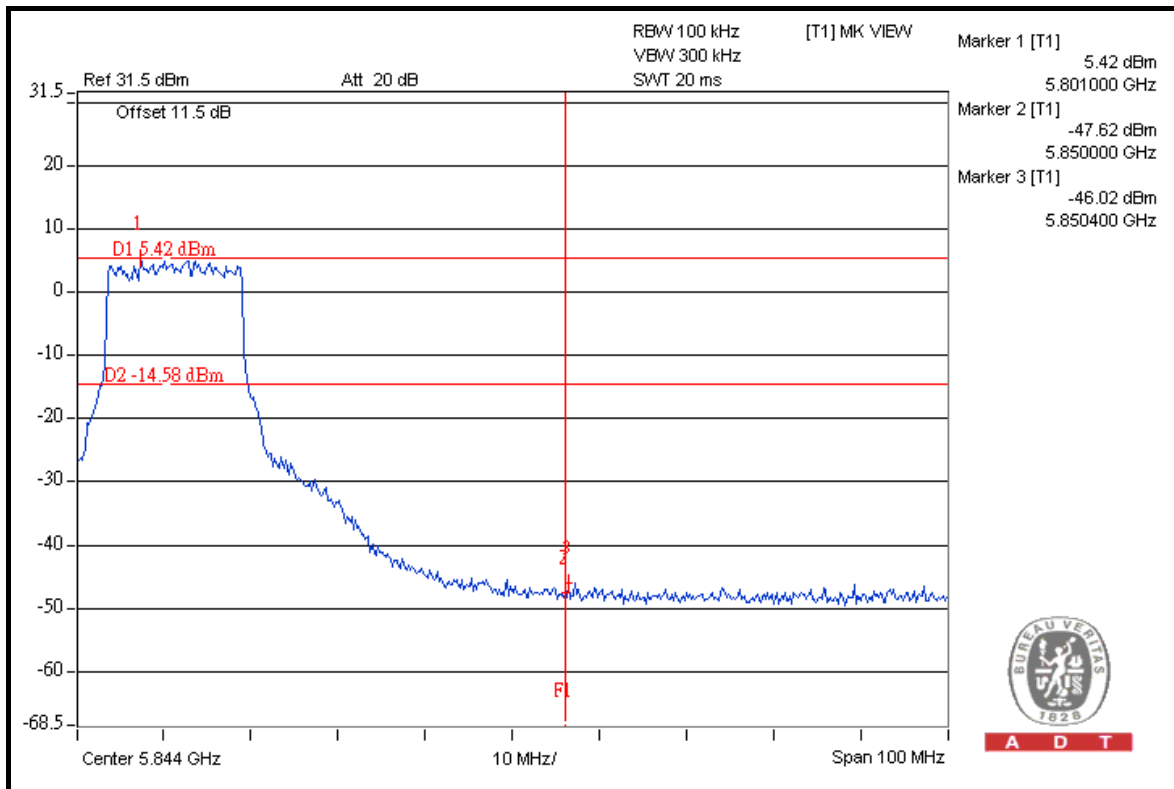
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A D T



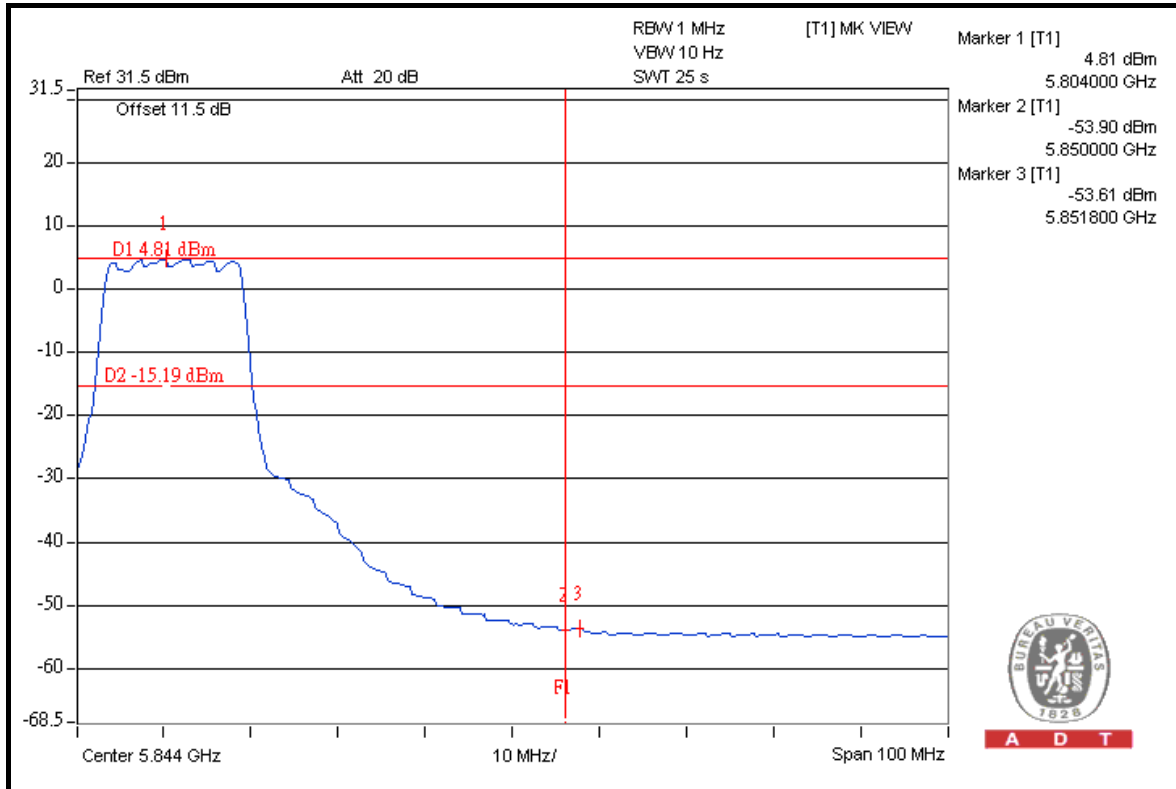
A D T



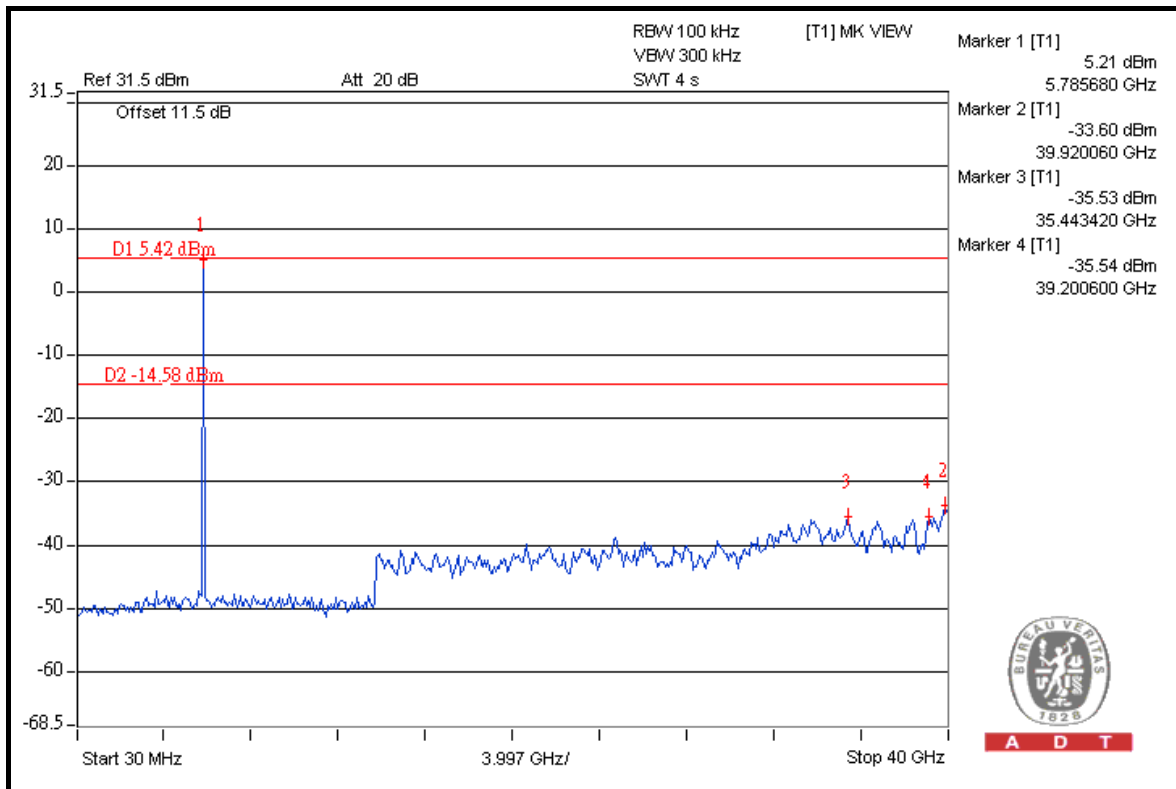
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A D T



A D T

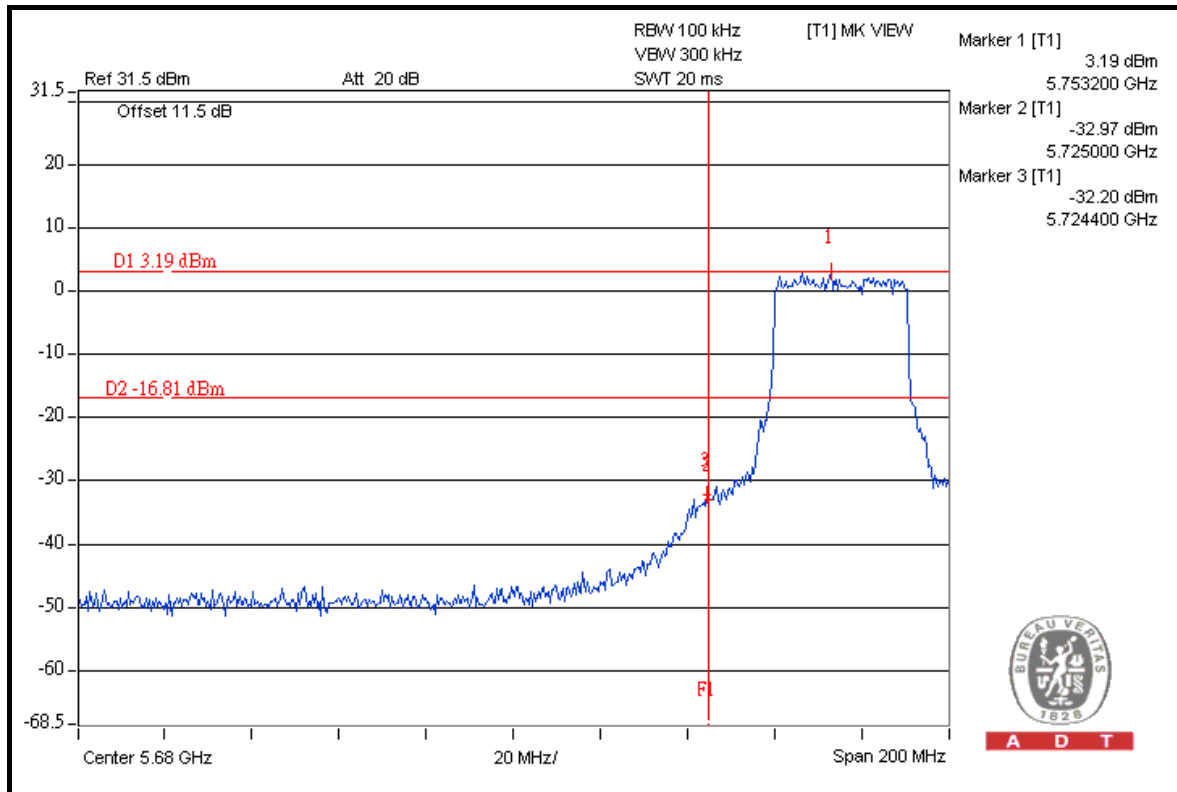


A D T

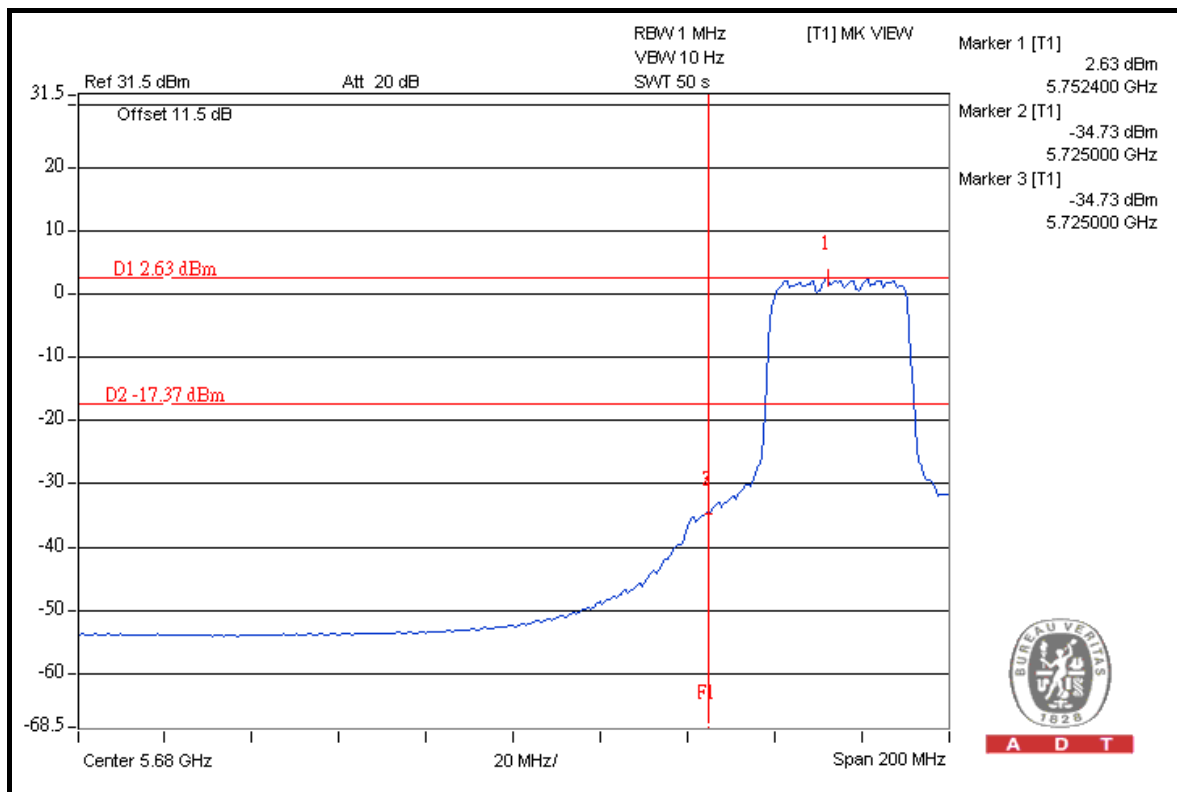


A D T

WHDI (40MHz)



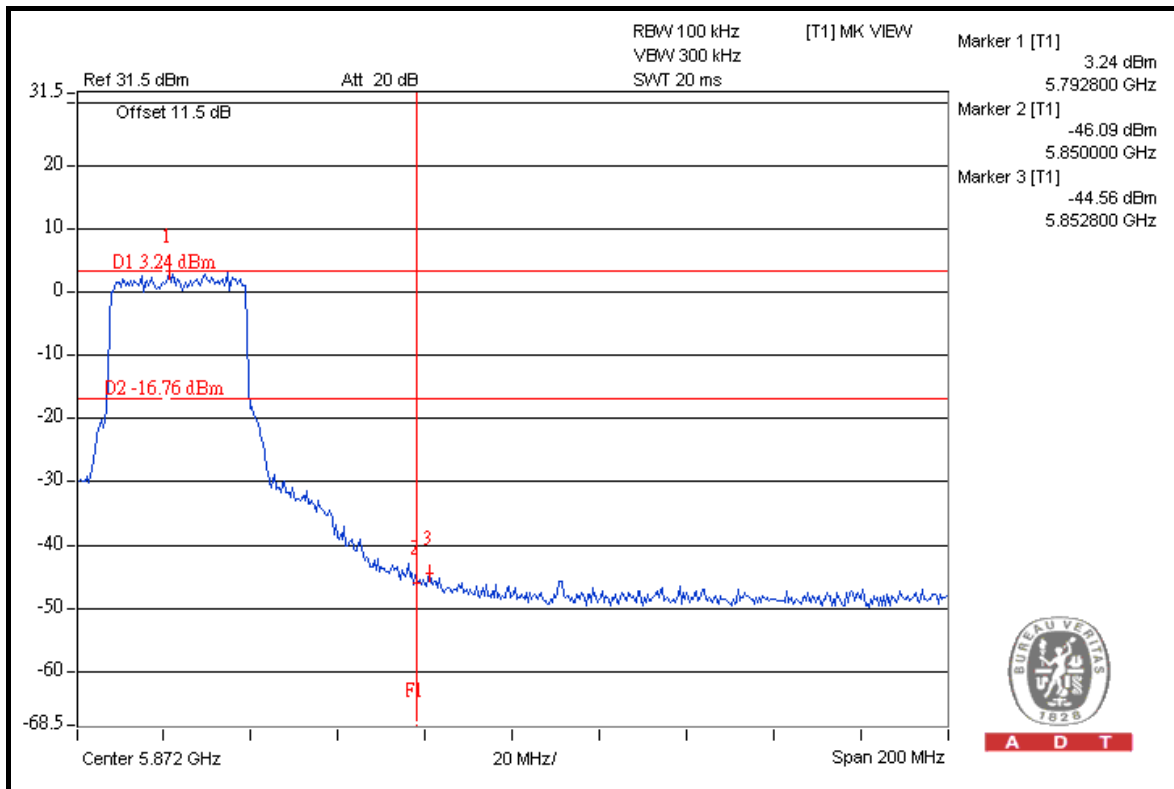
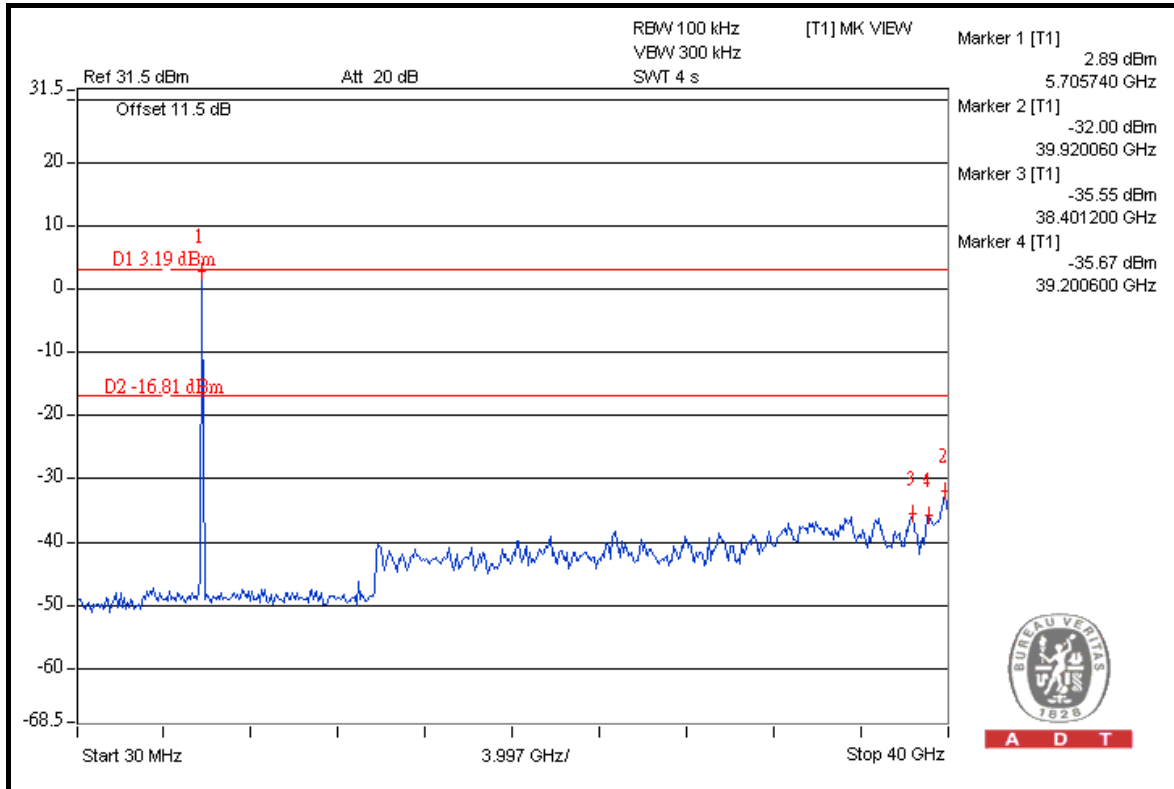
A D T



A D T

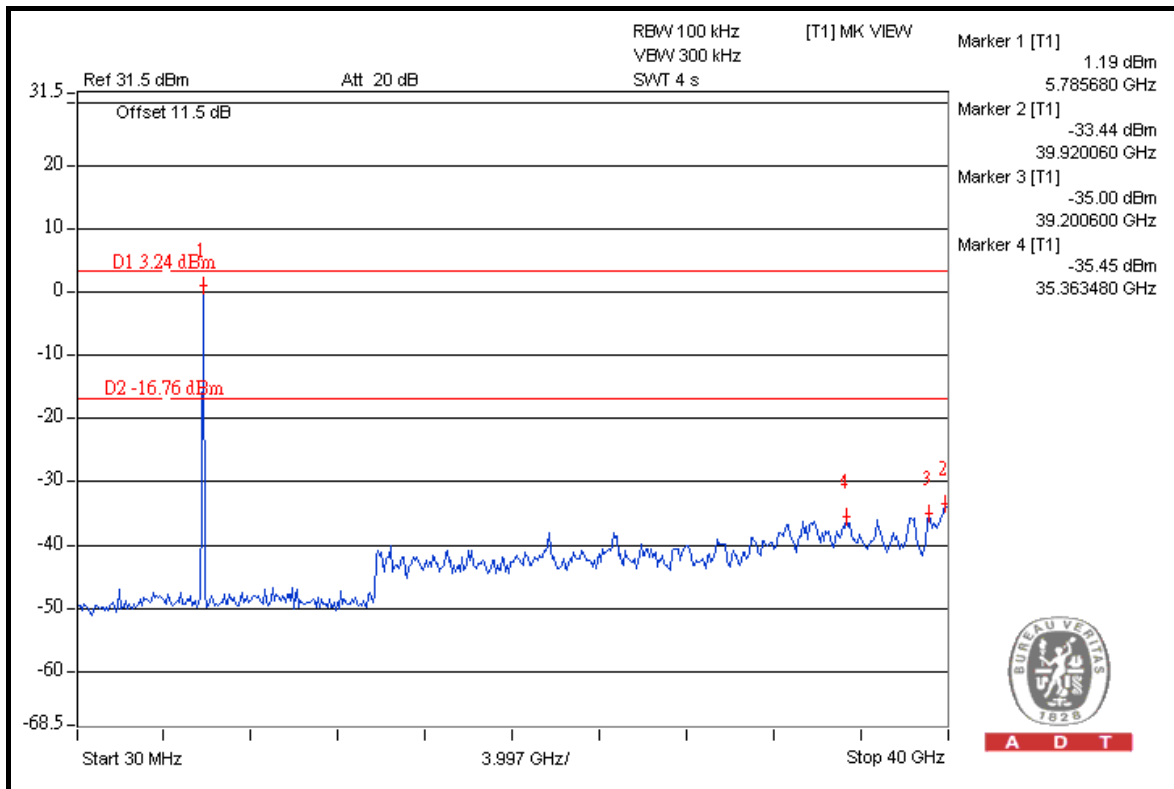
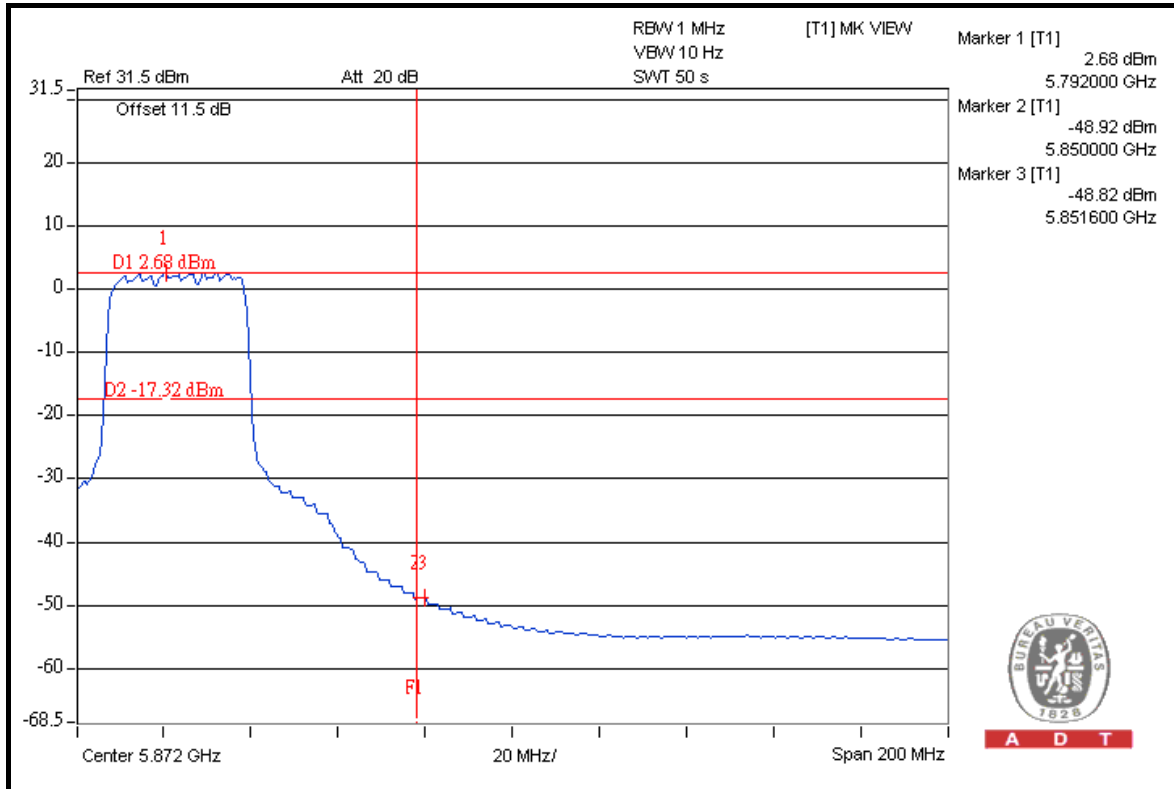


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5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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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: <http://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

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.



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

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

---END---