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FCC TEST REPORT (15.247)

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MODEL NO.: DIR-835

FCC ID: KA2IR835A1

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ISSUED: Oct. 05, 2011

APPLICANT: D-Link Corporation

ADDRESS: 17595 Mt. Herrmann, Fountain Valley, CA 92708,
U.S.A.

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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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	NA	Oct. 05, 2011



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1. CERTIFICATION

PRODUCT: Wireless N750 Dual-Band Router

MODEL: DIR-835

BRAND: D-Link

APPLICANT: D-Link Corporation

TESTED: Aug. 31 ~ Sep. 30, 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: DIR-835) 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 : Ivy Lin **DATE:** Oct. 05, 2011
Ivy Lin / Specialist

APPROVED BY : Gary Chang **DATE:** Oct. 05, 2011
Gary Chang / Technical 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 -6.21dB at 27.559MHz.
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 -1.0dB at 4874.00MHz, 5000.00MHz & 5080.00MHz.
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	Antenna connector is R-SMA not a standard connector.

2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 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	Wireless N750 Dual-Band Router
MODEL NO.	DIR-835
FCC ID	KA2IR835A1
POWER SUPPLY	12Vdc (adapter)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 450.0Mbps
OPERATING FREQUENCY	2.4GHz: 2412 ~ 2462MHz 5.0GHz: 5745 ~ 5825MHz
NUMBER OF CHANNEL	2.4GHz: 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) 5.0GHz: 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
OUTPUT POWER	647.2mW for 2412 ~ 2462MHz 812.9mW for 5745 ~ 5825MHz
ANTENNA TYPE	2.4GHz: Dipole antenna with 2dBi gain 5.0GHz: Dipole antenna with 2dBi gain
ANTENNA CONNECTOR	R-SMA
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Adapter

NOTE:

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

Frequency Band (MHz)	2412~2462	5180~5240	5745~5825
802.11b	√		
802.11g	√		
802.11a		√	√
802.11n (20MHz)	√	√	√
802.11n (40MHz)	√	√	√

2. The EUT incorporates a MIMO function. Physically, the EUT provides three completed transmitters and three receivers.

MODULATION MODE	TX FUNCTION	
	2.4GHz band	5GHz band
802.11b	1TX	-
802.11g	2TX	-
802.11a	-	3TX
802.11n (20MHz)	2TX	3TX
802.11n (40MHz)	2TX	3TX

3. The EUT consumes power from the following adapters:

ADAPTER 1	
BRAND:	D-Link
MODEL:	CG2412-B
INPUT:	100-120Vac, 0.5A, 50-60Hz
OUTPUT:	+12Vdc, 2A
POWER LINE:	1.8m non-shielded cable without core

ADAPTER 2	
BRAND:	D-Link
MODEL:	CG2412-B IW
INPUT:	100-120Vac, 0.6A, 50-60Hz
OUTPUT:	+12Vdc, 2A
POWER LINE:	1.8m non-shielded cable without core

ADAPTER 3	
BRAND:	D-Link
MODEL:	CG2412-B
INPUT:	100-240Vac, 0.5A, 50-60Hz
OUTPUT:	+12Vdc, 2A
POWER LINE:	1.8m non-shielded cable without core

ADAPTER 4	
BRAND:	D-Link
MODEL:	CG2412-B IW
INPUT:	100-240Vac, 0.6A, 50-60Hz
OUTPUT:	+12Vdc, 2A
POWER LINE:	1.8m non-shielded cable without core

*After radiated emission pre-testing, adapter 2 is the worst case for final test.

*After conducted emission pre-testing, adapter 4 is the worst case for final test.

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 2.4GHz:

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

7 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2422MHz	5	2442MHz
2	2427MHz	6	2447MHz
3	2432MHz	7	2452MHz
4	2437MHz		

FOR 5.0GHz (5745 ~ 5825MHz):

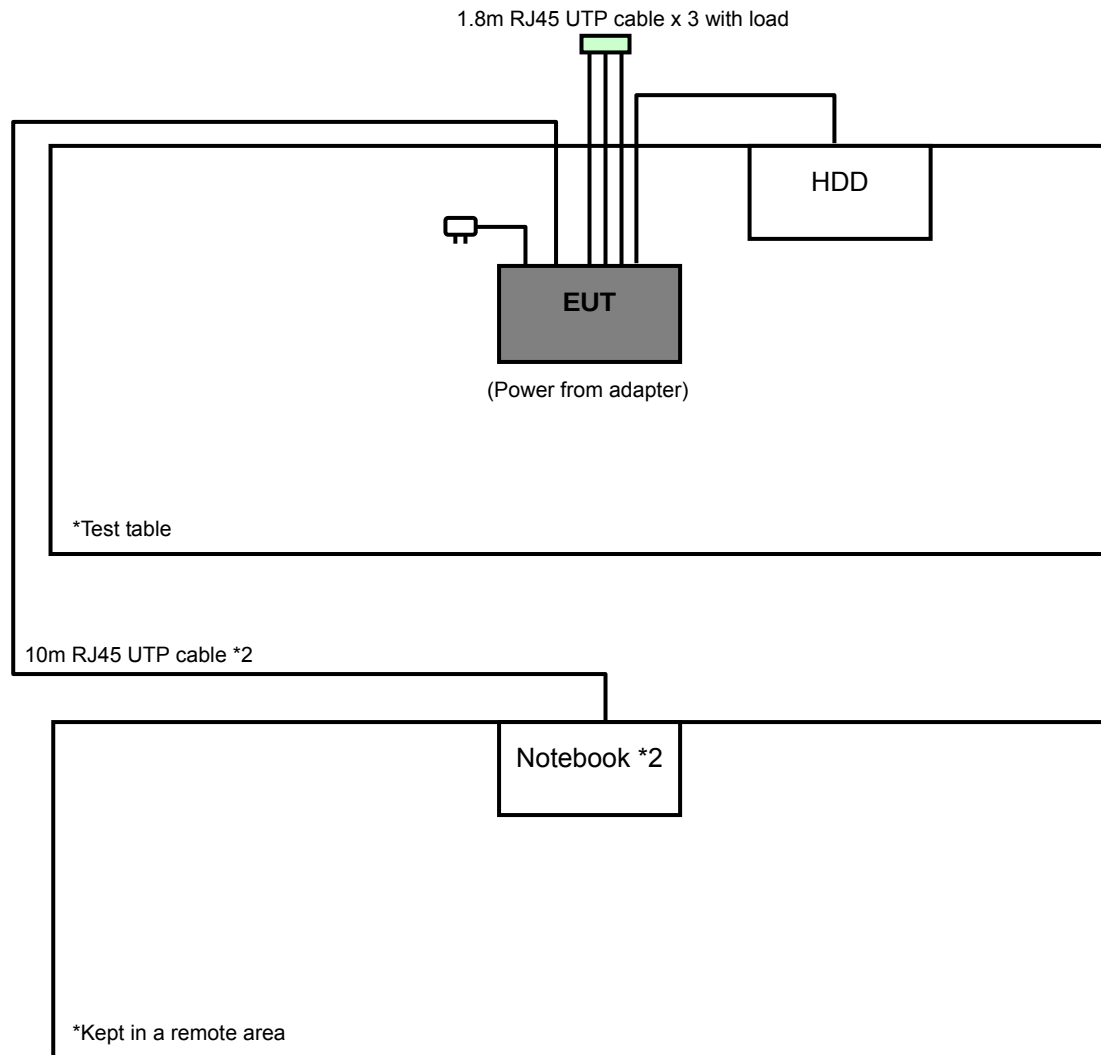
5 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

FOR 2.4GHz:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE $\geq$ 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 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	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	15.0

RADIATED EMISSION TEST (BELOW 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations 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	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	1 to 11	6	OFDM	BPSK	7.2

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	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	1 to 11	6	OFDM	BPSK	7.2

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	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	1 to 7	1, 7	OFDM	BPSK	15.0

ANTENNA PORT CONDUCTED MEASUREMENT:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	15.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	25deg. C, 65%RH	120Vac, 60Hz	Sun Lin
RE<1G	25deg. C, 68%RH	120Vac, 60Hz	Sun Lin
PLC	26deg. C, 67%RH	120Vac, 60Hz	Cody Chang
APCM	25deg. C, 65%RH	120Vac, 60Hz	Sun Lin

FOR 5.745 ~ 5.825GHz:

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

Where **PLC**: Power Line Conducted Emission **RE<1G**: Radiated Emission below 1GHz
RE≥1G: Radiated Emission above 1GHz **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 and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGUR E MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

RADIATED EMISSION TEST (BELOW 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations 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	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	149 to 165	149	OFDM	BPSK	7.2

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	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	149 to 165	149	OFDM	BPSK	7.2

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	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

ANTENNA PORT CONDUCTED MEASUREMENT:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE _≥ 1G	25deg. C, 68%RH	120Vac, 60Hz	Sun Lin
RE _{<} 1G	25deg. C, 68%RH	120Vac, 60Hz	Sun Lin
PLC	26deg. C, 67%RH	120Vac, 60Hz	Cody Chang
APCM	25deg. C, 65%RH	120Vac, 60Hz	Sun Lin

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (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	EXTERNAL HARD DISK	TERASYS	F12-UF	A0100222-4A60004	FCC DoC Approved
2	NOTEBOOK	DELL	PP18L	33497605792	CXSMM01BRD02D 330
3	NOTEBOOK	DELL	E5410	1HC2XM1	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.5 m shielded cable, terminated with USB connector, w/o core.
2	10m RJ45 UTP cable without core.
3	10m RJ45 UTP cable without core.

NOTE:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item 2 ~ 3 acted communication partners to transfer data.

4. TEST TYPES AND RESULTS (FOR 2.4GHz BAND)

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a). Other emissions shall be at least 20dB below the highest level of the desired power.

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100744	Apr. 19, 2011	Apr. 18, 2012
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jan. 06, 2011	Jan. 05, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Apr. 12, 2011	Apr. 11, 2012
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Sep. 06, 2011	Sep. 05, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8449B	3008A01911	Nov. 03, 2010	Nov. 02, 2011
Preamplifier Agilent	8447D	2944A10638	Nov. 03, 2010	Nov. 02, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295013/4 283403/4	Aug. 19, 2011	Aug. 18, 2012
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 13, 2011	Aug. 12, 2012
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

- 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.

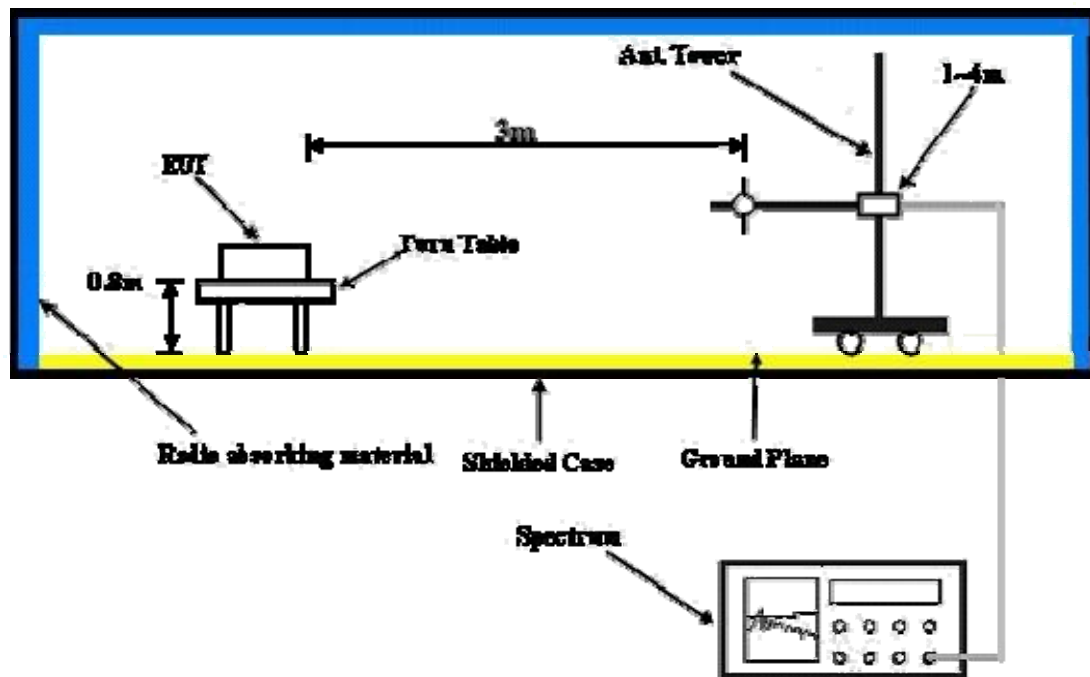
NOTE:

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 100kHz and video bandwidth is 300kHz 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.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



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

4.1.6 EUT OPERATING CONDITIONS

- Placed the EUT on the testing table.
- Prepared notebooks to act as communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and run a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The communication partner sent data to EUT by command "PING".
- The communication partner read and wrote with the HDD via EUT.

4.1.7 TEST RESULTS

802.11b

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

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	2386.00	56.1 PK	74.0	-17.9	1.00 H	4	25.10	31.00
2	2386.00	46.7 AV	54.0	-7.3	1.00 H	4	15.70	31.00
3	*2412.00	99.4 PK			1.00 H	4	68.30	31.10
4	*2412.00	95.5 AV			1.00 H	4	64.40	31.10
5	4824.00	52.5 PK	74.0	-21.5	1.48 H	103	15.30	37.20
6	4824.00	49.8 AV	54.0	-4.2	1.48 H	103	12.60	37.20
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	2386.00	61.3 PK	74.0	-12.7	1.00 V	209	30.30	31.00
2	2386.00	52.7 AV	54.0	-1.3	1.00 V	209	21.70	31.00
3	*2412.00	112.7 PK			1.00 V	192	81.60	31.10
4	*2412.00	108.7 AV			1.00 V	192	77.60	31.10
5	4824.00	51.4 PK	74.0	-22.6	1.28 V	317	14.20	37.20
6	4824.00	51.0 AV	54.0	-3.0	1.28 V	317	13.80	37.20

- 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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

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	*2437.00	99.1 PK			1.02 H	15	67.90	31.20
2	*2437.00	95.0 AV			1.02 H	15	63.80	31.20
3	4874.00	52.8 PK	74.0	-21.2	1.42 H	127	15.50	37.30
4	4874.00	50.1 AV	54.0	-3.9	1.42 H	127	12.80	37.30
5	7311.00	52.2 PK	74.0	-21.8	1.54 H	352	9.10	43.10
6	7311.00	49.7 AV	54.0	-4.3	1.54 H	352	6.60	43.10
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	*2437.00	112.5 PK			1.01 V	228	81.30	31.20
2	*2437.00	108.2 AV			1.01 V	228	77.00	31.20
3	4874.00	55.5 PK	74.0	-18.5	1.01 V	325	18.20	37.30
4	4874.00	53.0 AV	54.0	-1.0	1.01 V	325	15.70	37.30
5	7311.00	59.6 PK	74.0	-14.4	1.72 V	109	16.50	43.10
6	7311.00	52.3 AV	54.0	-1.7	1.72 V	109	9.20	43.10

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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

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	*2462.00	98.5 PK			1.02 H	7	67.20	31.30
2	*2462.00	94.6 AV			1.02 H	7	63.30	31.30
3	2483.50	55.7 PK	74.0	-18.3	1.00 H	8	24.30	31.40
4	2483.50	46.8 AV	54.0	-7.2	1.00 H	8	15.40	31.40
5	4924.00	52.7 PK	74.0	-21.3	1.47 H	358	15.30	37.40
6	4924.00	50.2 AV	54.0	-3.8	1.47 H	358	12.80	37.40
7	7386.00	50.8 PK	74.0	-23.2	1.46 H	298	7.50	43.30
8	7386.00	41.5 AV	54.0	-12.5	1.46 H	298	-1.80	43.30
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	*2462.00	112.2 PK			1.09 V	199	80.90	31.30
2	*2462.00	107.8 AV			1.09 V	199	76.50	31.30
3	2483.50	62.0 PK	74.0	-12.0	1.09 V	192	30.60	31.40
4	2483.50	52.5 AV	54.0	-1.5	1.09 V	192	21.10	31.40
5	4924.00	55.0 PK	74.0	-19.0	1.13 V	328	17.60	37.40
6	4924.00	52.2 AV	54.0	-1.8	1.13 V	328	14.80	37.40
7	7386.00	57.8 PK	74.0	-16.2	1.59 V	112	14.50	43.30
8	7386.00	51.9 AV	54.0	-2.1	1.59 V	112	8.60	43.30

- 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.

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.9 PK	74.0	-16.1	1.00 H	224	25.90	32.00
2	2390.00	47.7 AV	54.0	-6.3	1.00 H	224	15.70	32.00
3	*2412.00	103.0 PK			1.00 H	224	71.00	32.00
4	*2412.00	91.9 AV			1.00 H	224	59.90	32.00
5	4824.00	44.0 PK	74.0	-30.0	1.04 H	228	5.50	38.50
6	4824.00	31.9 AV	54.0	-22.1	1.04 H	228	-6.60	38.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.2 PK	74.0	-4.8	1.20 V	23	37.20	32.00
2	2390.00	52.2 AV	54.0	-1.8	1.20 V	23	20.20	32.00
3	*2412.00	110.6 PK			1.20 V	23	78.60	32.00
4	*2412.00	99.5 AV			1.20 V	23	67.50	32.00
5	4824.00	46.4 PK	74.0	-27.6	1.63 V	352	7.90	38.50
6	4824.00	35.6 AV	54.0	-18.4	1.63 V	352	-2.90	38.50

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

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	2360.00	57.1 PK	74.0	-16.9	1.11 H	104	25.30	31.80
2	2360.00	47.2 AV	54.0	-6.8	1.11 H	104	15.40	31.80
3	2390.00	57.1 PK	74.0	-16.9	1.05 H	221	25.10	32.00
4	2390.00	47.2 AV	54.0	-6.8	1.05 H	221	15.20	32.00
5	*2437.00	107.4 PK			1.15 H	305	75.30	32.10
6	*2437.00	96.1 AV			1.15 H	305	64.00	32.10
7	4874.00	42.5 PK	74.0	-31.5	1.22 H	169	3.90	38.60
8	4874.00	31.2 AV	54.0	-22.8	1.22 H	169	-7.40	38.60
9	7311.00	48.4 PK	74.0	-25.6	1.44 H	10	3.50	44.90
10	7311.00	38.3 AV	54.0	-15.7	1.44 H	10	-6.60	44.90
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	2360.00	62.7 PK	74.0	-11.3	1.14 V	201	30.90	31.80
2	2360.00	52.2 AV	54.0	-1.8	1.14 V	201	20.40	31.80
3	2390.00	62.4 PK	74.0	-11.6	1.20 V	151	30.40	32.00
4	2390.00	51.5 AV	54.0	-2.5	1.20 V	151	19.50	32.00
5	*2437.00	114.6 PK			1.22 V	52	82.50	32.10
6	*2437.00	103.5 AV			1.22 V	52	71.40	32.10
7	4874.00	52.5 PK	74.0	-21.5	1.12 V	258	13.90	38.60
8	4874.00	37.1 AV	54.0	-16.9	1.12 V	258	-1.50	38.60
9	7311.00	66.0 PK	74.0	-8.0	1.88 V	41	21.10	44.90
10	7311.00	51.8 AV	54.0	-2.2	1.88 V	41	6.90	44.90

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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

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	2360.00	57.6 PK	74.0	-16.4	1.23 H	247	25.80	31.80
2	2360.00	47.7 AV	54.0	-6.3	1.23 H	247	15.90	31.80
3	*2462.00	103.4 PK			1.27 H	215	71.20	32.20
4	*2462.00	91.7 AV			1.27 H	215	59.50	32.20
5	2483.50	57.2 PK	74.0	-16.8	1.27 H	215	24.90	32.30
6	2483.50	47.5 AV	54.0	-6.5	1.27 H	215	15.20	32.30
7	4924.00	47.6 PK	74.0	-26.4	1.17 H	269	8.80	38.80
8	4924.00	41.2 AV	54.0	-12.8	1.17 H	269	2.40	38.80
9	7386.00	47.5 PK	74.0	-26.5	1.22 H	100	2.50	45.00
10	7386.00	41.3 AV	54.0	-12.7	1.22 H	100	-3.70	45.00
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	2360.00	62.0 PK	74.0	-12.0	1.15 V	191	30.20	31.80
2	2360.00	52.4 AV	54.0	-1.6	1.15 V	191	20.60	31.80
3	*2462.00	110.9 PK			1.13 V	2	78.70	32.20
4	*2462.00	100.1 AV			1.13 V	2	67.90	32.20
5	2483.50	59.8 PK	74.0	-14.2	1.13 V	2	27.50	32.30
6	2483.50	49.5 AV	54.0	-4.5	1.13 V	2	17.20	32.30
7	4924.00	48.5 PK	74.0	-25.5	1.34 V	350	9.70	38.80
8	4924.00	40.8 AV	54.0	-13.2	1.34 V	350	2.00	38.80
9	7386.00	55.3 PK	74.0	-18.7	1.75 V	58	10.30	45.00
10	7386.00	47.2 AV	54.0	-6.8	1.75 V	58	2.20	45.00

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.



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802.11n (20MHz)

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

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	2360.00	57.7 PK	74.0	-16.3	1.07 H	199	25.90	31.80
2	2360.00	47.3 AV	54.0	-6.7	1.07 H	199	15.50	31.80
3	2390.00	62.0 PK	74.0	-12.0	1.00 H	214	30.00	32.00
4	2390.00	47.8 AV	54.0	-6.2	1.00 H	214	15.80	32.00
5	*2412.00	101.8 PK			1.00 H	214	69.80	32.00
6	*2412.00	90.7 AV			1.00 H	214	58.70	32.00
7	4824.00	43.5 PK	74.0	-30.5	1.31 H	92	5.00	38.50
8	4824.00	33.4 AV	54.0	-20.6	1.31 H	92	-5.10	38.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2360.00	65.8 PK	74.0	-8.2	1.25 V	177	34.00	31.80
2	2360.00	52.1 AV	54.0	-1.9	1.25 V	177	20.30	31.80
3	2390.00	67.4 PK	74.0	-6.6	1.18 V	199	35.40	32.00
4	2390.00	52.5 AV	54.0	-1.5	1.18 V	199	20.50	32.00
5	*2412.00	109.4 PK			1.15 V	176	77.40	32.00
6	*2412.00	98.3 AV			1.15 V	176	66.30	32.00
7	4824.00	46.5 PK	74.0	-27.5	1.28 V	328	8.00	38.50
8	4824.00	35.3 AV	54.0	-18.7	1.28 V	328	-3.20	38.50

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

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	2200.00	56.0 PK	74.0	-18.0	1.00 H	205	24.70	31.30
2	2200.00	45.9 AV	54.0	-8.1	1.00 H	205	14.60	31.30
3	2360.00	57.8 PK	74.0	-16.2	1.07 H	213	26.00	31.80
4	2360.00	48.0 AV	54.0	-6.0	1.07 H	213	16.20	31.80
5	2390.00	57.6 PK	74.0	-16.4	1.00 H	217	25.60	32.00
6	2390.00	47.8 AV	54.0	-6.2	1.00 H	217	15.80	32.00
7	*2437.00	109.1 PK			1.00 H	217	77.00	32.10
8	*2437.00	97.5 AV			1.00 H	217	65.40	32.10
9	4874.00	43.6 PK	74.0	-30.4	1.28 H	245	5.00	38.60
10	4874.00	32.3 AV	54.0	-21.7	1.28 H	245	-6.30	38.60
11	7311.00	49.4 PK	74.0	-24.6	1.58 H	43	4.50	44.90
12	7311.00	39.2 AV	54.0	-14.8	1.58 H	43	-5.70	44.90
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	2200.00	60.2 PK	74.0	-13.8	1.00 V	224	28.90	31.30
2	2200.00	51.2 AV	54.0	-2.8	1.00 V	224	19.90	31.30
3	2360.00	63.3 PK	74.0	-10.7	1.17 V	167	31.50	31.80
4	2360.00	52.6 AV	54.0	-1.4	1.17 V	167	20.80	31.80
5	2390.00	63.6 PK	74.0	-10.4	1.13 V	183	31.60	32.00
6	2390.00	52.4 AV	54.0	-1.6	1.13 V	183	20.40	32.00
7	*2437.00	116.2 PK			1.13 V	183	84.10	32.10
8	*2437.00	105.2 AV			1.13 V	183	73.10	32.10
9	4874.00	53.4 PK	74.0	-20.6	1.08 V	354	14.80	38.60
10	4874.00	37.7 AV	54.0	-16.3	1.08 V	354	-0.90	38.60
11	7311.00	66.8 PK	74.0	-7.2	1.92 V	57	21.90	44.90
12	7311.00	52.7 AV	54.0	-1.3	1.92 V	57	7.80	44.90

- 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.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

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	2360.00	57.6 PK	74.0	-16.4	1.00 H	228	25.80	31.80
2	2360.00	47.5 AV	54.0	-6.5	1.00 H	228	15.70	31.80
3	*2462.00	103.1 PK			1.00 H	218	70.90	32.20
4	*2462.00	91.7 AV			1.00 H	218	59.50	32.20
5	2483.50	57.5 PK	74.0	-16.5	1.07 H	223	25.20	32.30
6	2483.50	47.1 AV	54.0	-6.9	1.07 H	223	14.80	32.30
7	4924.00	43.7 PK	74.0	-30.3	1.22 H	107	4.90	38.80
8	4924.00	33.8 AV	54.0	-20.2	1.22 H	107	-5.00	38.80
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	2320.00	62.1 PK	74.0	-11.9	1.00 V	176	30.40	31.70
2	2320.00	52.8 AV	54.0	-1.2	1.00 V	176	21.10	31.70
3	*2462.00	111.3 PK			1.13 V	176	79.10	32.20
4	*2462.00	100.8 AV			1.13 V	176	68.60	32.20
5	2483.50	72.8 PK	74.0	-1.2	1.13 V	187	40.50	32.30
6	2483.50	52.3 AV	54.0	-1.7	1.13 V	187	20.00	32.30
7	4924.00	49.8 PK	74.0	-24.2	1.18 V	18	11.00	38.80
8	4924.00	35.3 AV	54.0	-18.7	1.18 V	18	-3.50	38.80

- 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.



A D T

802.11n (40MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.8 PK	74.0	-16.2	1.00 H	227	25.80	32.00
2	2390.00	47.7 AV	54.0	-6.3	1.00 H	227	15.70	32.00
3	*2422.00	95.3 PK			1.00 H	228	63.20	32.10
4	*2422.00	83.8 AV			1.00 H	228	51.70	32.10
5	4844.00	44.1 PK	74.0	-29.9	1.51 H	72	5.60	38.50
6	4844.00	32.3 AV	54.0	-21.7	1.51 H	72	-6.20	38.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.7 PK	74.0	-6.3	1.12 V	187	35.70	32.00
2	2390.00	52.5 AV	54.0	-1.5	1.12 V	187	20.50	32.00
3	*2422.00	104.7 PK			1.12 V	175	72.60	32.10
4	*2422.00	93.2 AV			1.12 V	175	61.10	32.10
5	4844.00	46.1 PK	74.0	-27.9	1.05 V	23	7.60	38.50
6	4844.00	33.3 AV	54.0	-20.7	1.05 V	23	-5.20	38.50

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



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.4 PK	74.0	-11.6	1.00 H	227	30.40	32.00
2	2390.00	47.7 AV	54.0	-6.3	1.00 H	227	15.70	32.00
3	*2437.00	98.9 PK			1.00 H	225	66.80	32.10
4	*2437.00	87.6 AV			1.00 H	225	55.50	32.10
5	4874.00	44.3 PK	74.0	-29.7	1.03 H	122	5.70	38.60
6	4874.00	32.3 AV	54.0	-21.7	1.03 H	122	-6.30	38.60
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	2390.00	67.4 PK	74.0	-6.6	1.15 V	153	35.40	32.00
2	2390.00	52.6 AV	54.0	-1.4	1.15 V	153	20.60	32.00
3	*2437.00	108.5 PK			1.12 V	172	76.40	32.10
4	*2437.00	96.9 AV			1.12 V	172	64.80	32.10
5	4874.00	46.5 PK	74.0	-27.5	1.35 V	228	7.90	38.60
6	4874.00	35.4 AV	54.0	-18.6	1.35 V	228	-3.20	38.60

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.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

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	*2452.00	98.3 PK			1.00 H	214	66.10	32.20
2	*2452.00	86.5 AV			1.00 H	214	54.30	32.20
3	2483.50	58.3 PK	74.0	-15.7	1.00 H	214	26.00	32.30
4	2483.50	50.0 AV	54.0	-4.0	1.00 H	214	17.70	32.30
5	4904.00	43.2 PK	74.0	-30.8	1.02 H	58	4.50	38.70
6	4904.00	33.8 AV	54.0	-20.2	1.02 H	58	-4.90	38.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	107.2 PK			1.12 V	207	75.00	32.20
2	*2452.00	95.8 AV			1.12 V	207	63.60	32.20
3	2483.50	65.8 PK	74.0	-8.2	1.12 V	210	33.50	32.30
4	2483.50	52.5 AV	54.0	-1.5	1.12 V	210	20.20	32.30
5	4904.00	46.2 PK	74.0	-27.8	1.21 V	168	7.50	38.70
6	4904.00	35.7 AV	54.0	-18.3	1.21 V	168	-3.00	38.70

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



A D T

BELOW 1GHz WORST-CASE DATA : 802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Sun Lin

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	107.67	33.8 QP	43.5	-9.7	1.50 H	268	24.20	9.60
2	125.17	37.9 QP	43.5	-5.6	1.50 H	157	25.90	12.00
3	187.39	32.3 QP	43.5	-11.2	1.50 H	133	21.40	10.90
4	375.98	31.7 QP	46.0	-14.3	1.00 H	163	15.30	16.40
5	500.42	36.9 QP	46.0	-9.1	1.50 H	148	17.20	19.70
6	626.80	38.5 QP	46.0	-7.5	1.00 H	157	16.10	22.40
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	39.62	35.6 QP	40.0	-4.4	1.00 V	10	22.90	12.70
2	78.51	37.6 QP	40.0	-2.4	1.00 V	184	27.90	9.70
3	125.17	37.1 QP	43.5	-6.4	1.00 V	214	25.10	12.00
4	375.98	31.0 QP	46.0	-15.0	1.00 V	202	14.60	16.40
5	500.42	39.2 QP	46.0	-6.8	1.00 V	163	19.50	19.70
6	626.80	40.2 QP	46.0	-5.8	2.00 V	7	17.80	22.40

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.

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. 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	100312	Jul. 07, 2011	Jul. 06, 2012
V-LISN SCHWARZBECK	NNBL 8226-2	8226-142	Jun. 30, 2011	Jun. 29, 2012
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.

4.2.3 TEST PROCEDURES

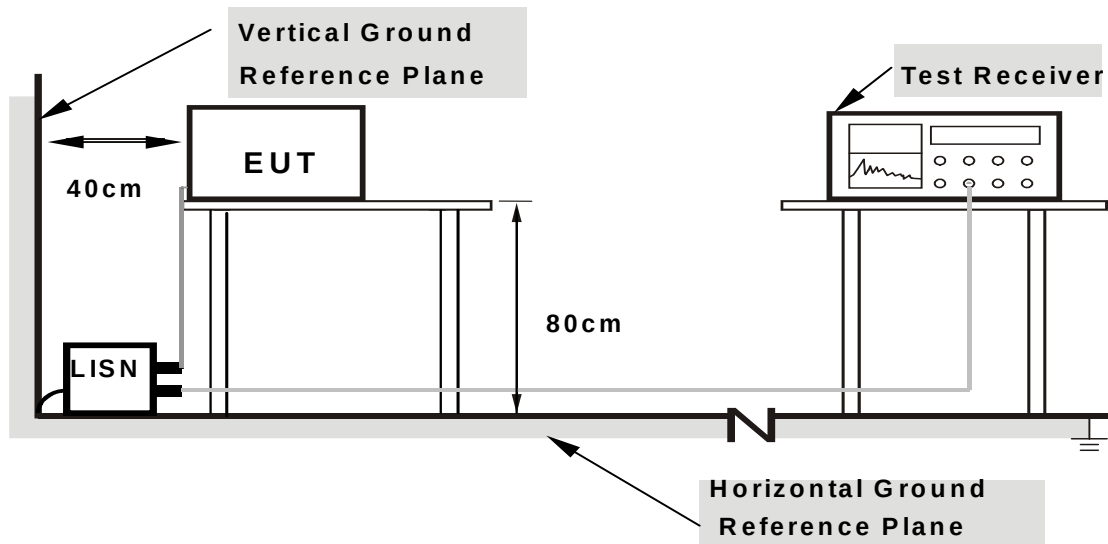
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

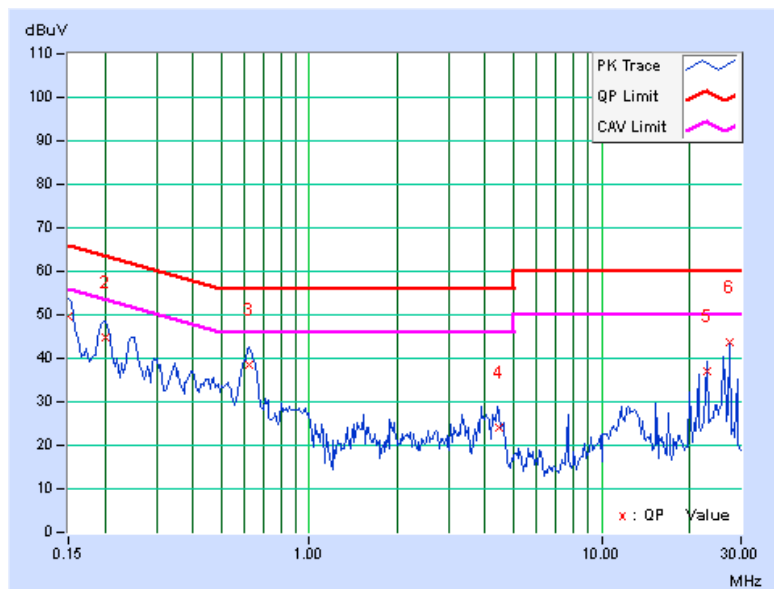
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA : 802.11n (20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	(dB)	(dB)
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.15	49.30	41.68	49.45	41.83	66.00	56.00	-16.55	-14.17
2	0.201	0.15	44.74	39.00	44.89	39.15	63.58	53.58	-18.69	-14.43
3	0.624	0.18	38.43	33.94	38.61	34.12	56.00	46.00	-17.39	-11.88
4	4.440	0.34	23.78	13.20	24.12	13.54	56.00	46.00	-31.88	-32.46
5	22.966	1.19	35.89	35.78	37.08	36.97	60.00	50.00	-22.92	-13.03
6	27.569	1.26	42.36	42.04	43.62	43.30	60.00	50.00	-16.38	-6.70

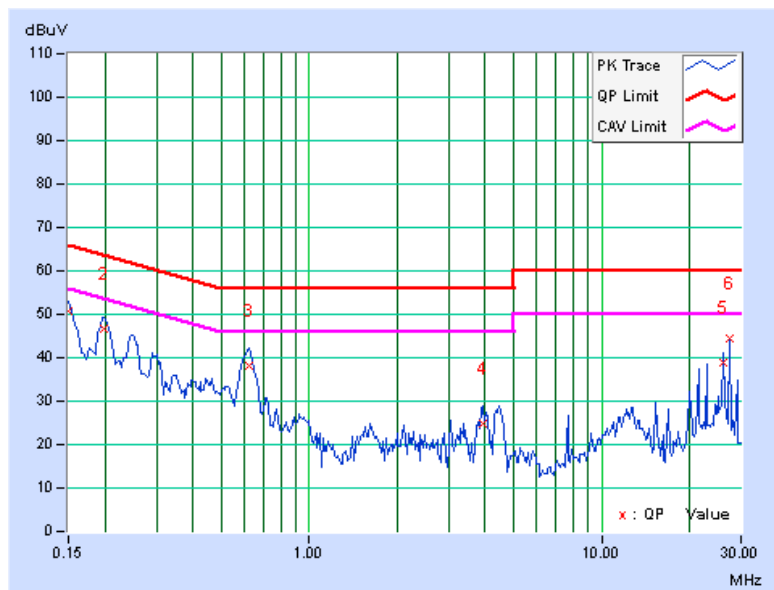
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.16	50.55	42.39	50.71	42.55	66.00	56.00	-15.29	-13.45
2	0.199	0.17	46.33	40.00	46.50	40.17	63.63	53.63	-17.13	-13.46
3	0.625	0.20	38.00	33.37	38.20	33.57	56.00	46.00	-17.80	-12.43
4	3.910	0.32	24.44	14.63	24.76	14.95	56.00	46.00	-31.24	-31.05
5	26.027	1.06	37.87	37.61	38.93	38.67	60.00	50.00	-21.07	-11.33
6	27.559	1.08	43.23	42.71	44.31	43.79	60.00	50.00	-15.69	-6.21

- 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 0.5 MHz.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
R&S SPECTRUM ANALYZER	FSP40	100039	Jan. 11, 2011	Jan. 10, 2012

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

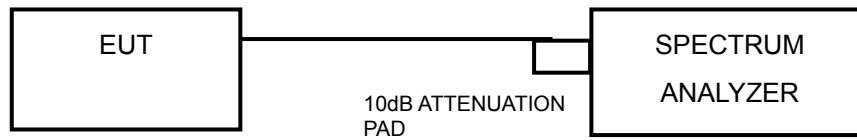
4.3.3 TEST PROCEDURE

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

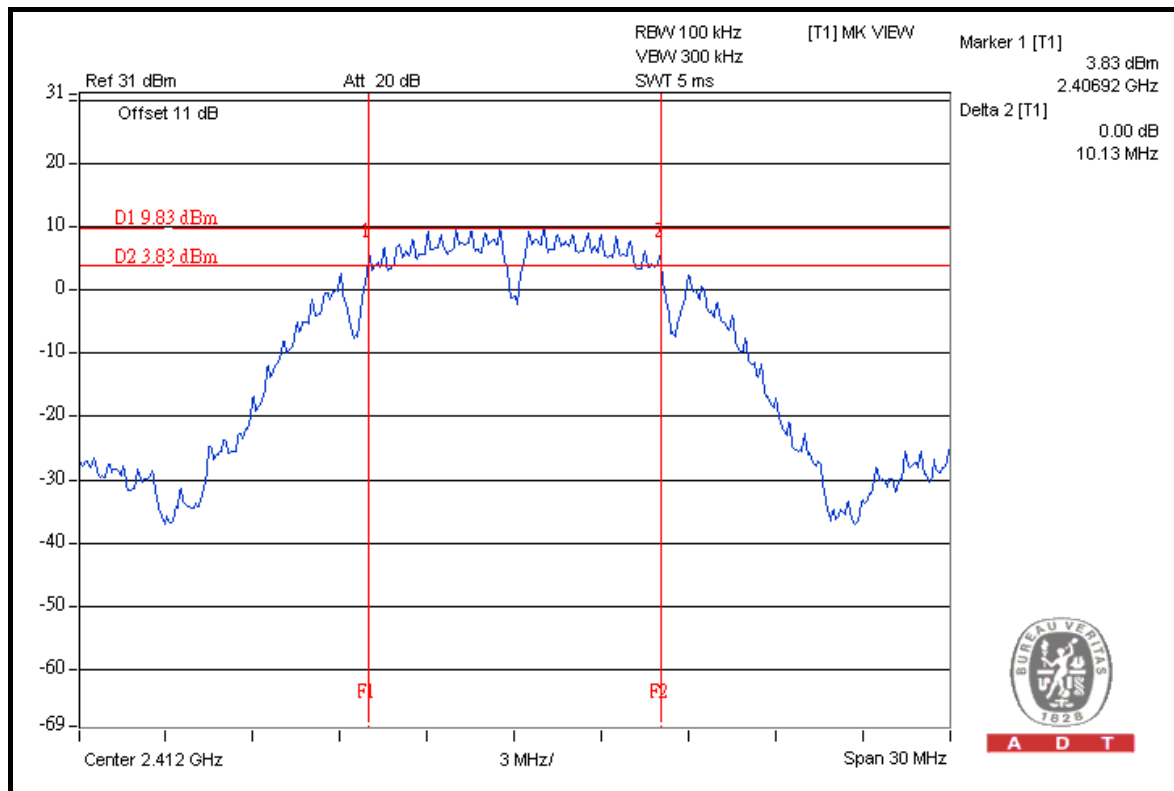
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.13	0.5	PASS
6	2437	10.12	0.5	PASS
11	2462	10.10	0.5	PASS

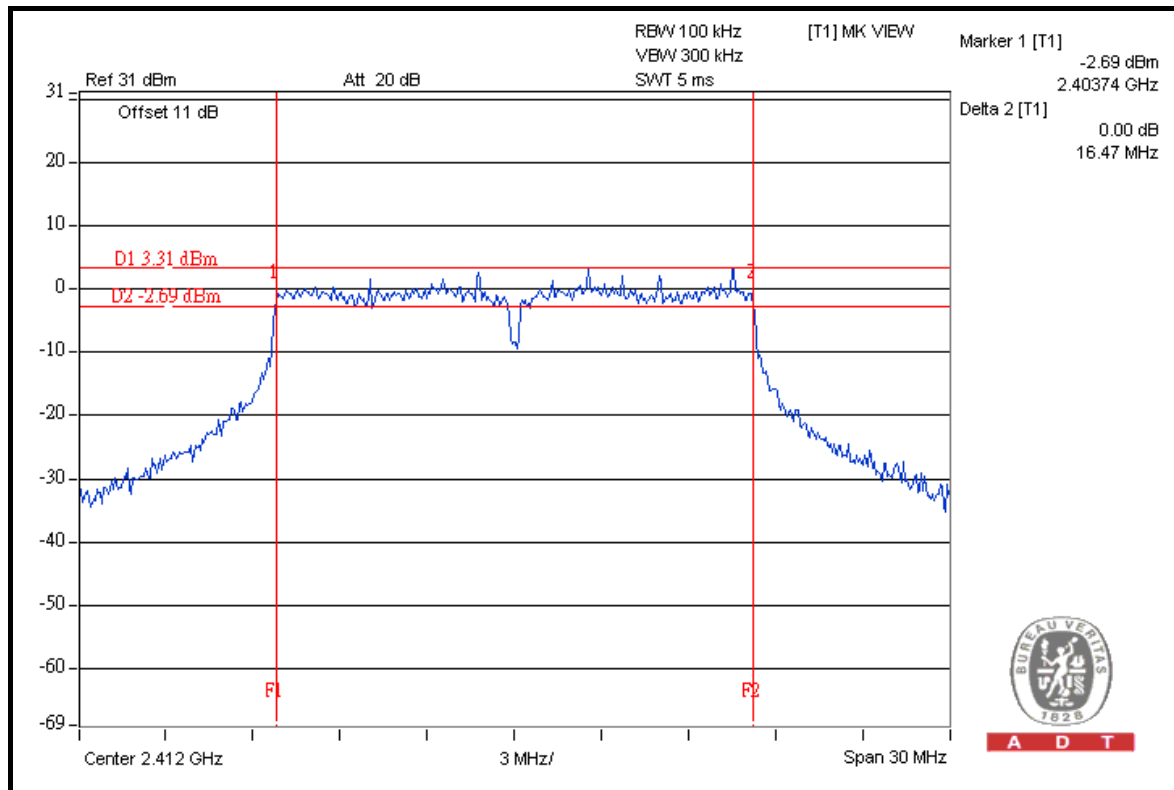
CH 1



802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.47	16.44	0.5	PASS
6	2437	16.03	16.40	0.5	PASS
11	2462	16.44	16.43	0.5	PASS

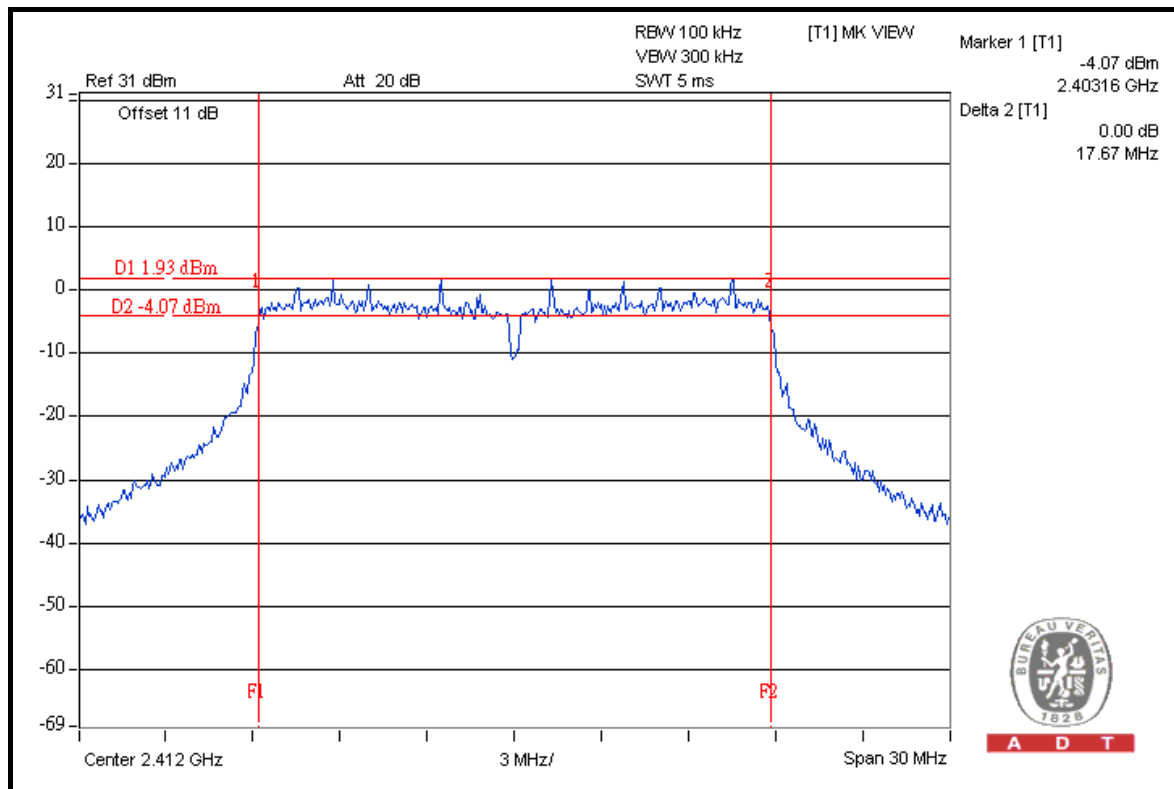
FOR CHAIN 0: CH 1



802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.67	17.66	0.5	PASS
6	2437	17.60	17.64	0.5	PASS
11	2462	17.59	17.64	0.5	PASS

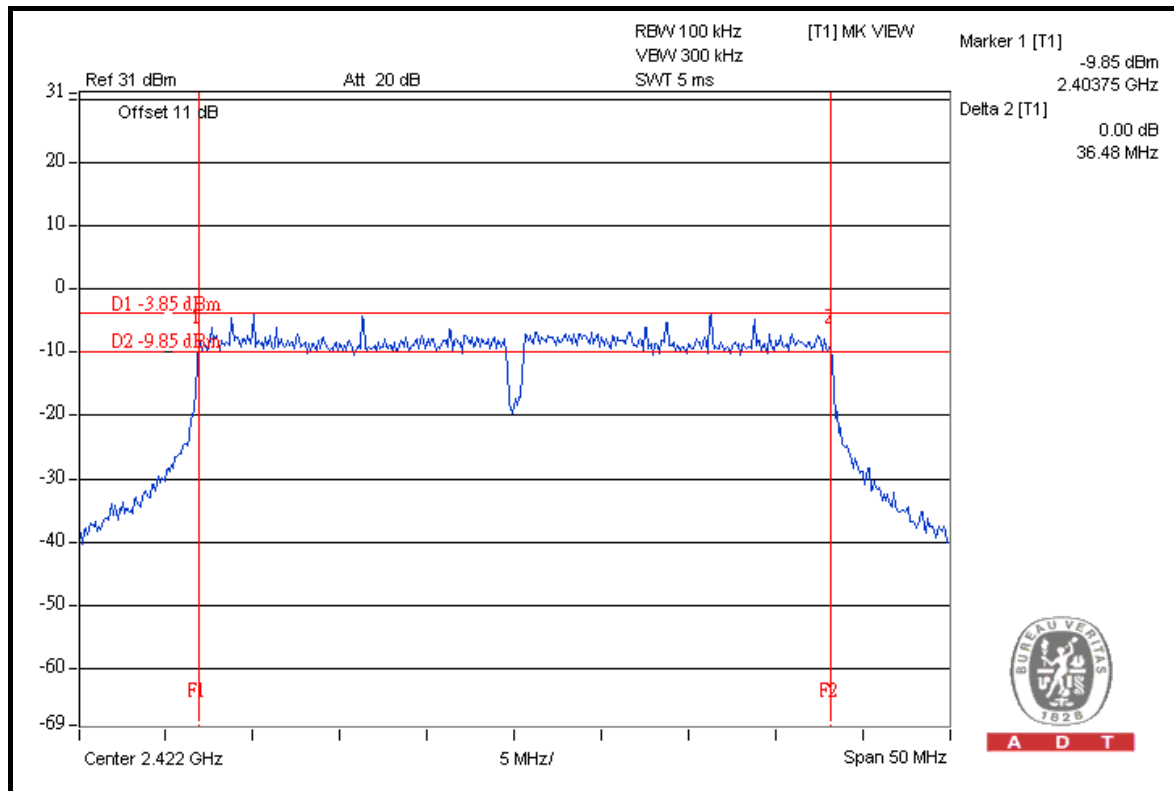
FOR CHAIN 0: CH 1



802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2422	36.48	36.43	0.5	PASS
4	2437	36.06	36.41	0.5	PASS
7	2452	34.79	36.30	0.5	PASS

FOR CHAIN 0: CH 1



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. 04, 2011	Aug. 03, 2012
Power Sensor	MA2411B	0738171	Aug. 04, 2011	Aug. 03, 2012

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.

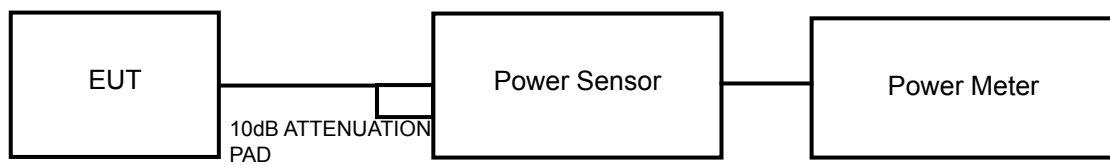
4.4.3 TEST PROCEDURES

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

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER OUTPUT (mW)	POWER OUTPUT (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	204.174	23.1	30	PASS
6	2437	186.209	22.7	30	PASS
11	2462	177.828	22.5	30	PASS

802.11g

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	23.2	23.3	422.7	26.3	30	PASS
6	2437	24.7	24.2	558.1	27.5	30	PASS
11	2462	23.2	23.2	417.9	26.2	30	PASS

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	21.5	23.4	360.0	25.6	30	PASS
6	2437	25.1	25.1	647.2	28.1	30	PASS
11	2462	23.3	22.9	408.8	26.1	30	PASS

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2422	20.2	20.2	209.4	23.2	30	PASS
4	2437	23.3	23.6	442.9	26.5	30	PASS
7	2452	22.1	22.2	328.1	25.2	30	PASS

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
R&S SPECTRUM ANALYZER	FSP40	100039	Jan. 11, 2011	Jan. 10, 2012

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

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 10kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

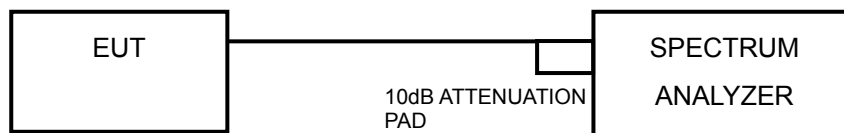
The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

Follow method 2 of KDB 662911 D01 Multiple Transmitter Output v01 to calculate total power density of 2 TX port.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

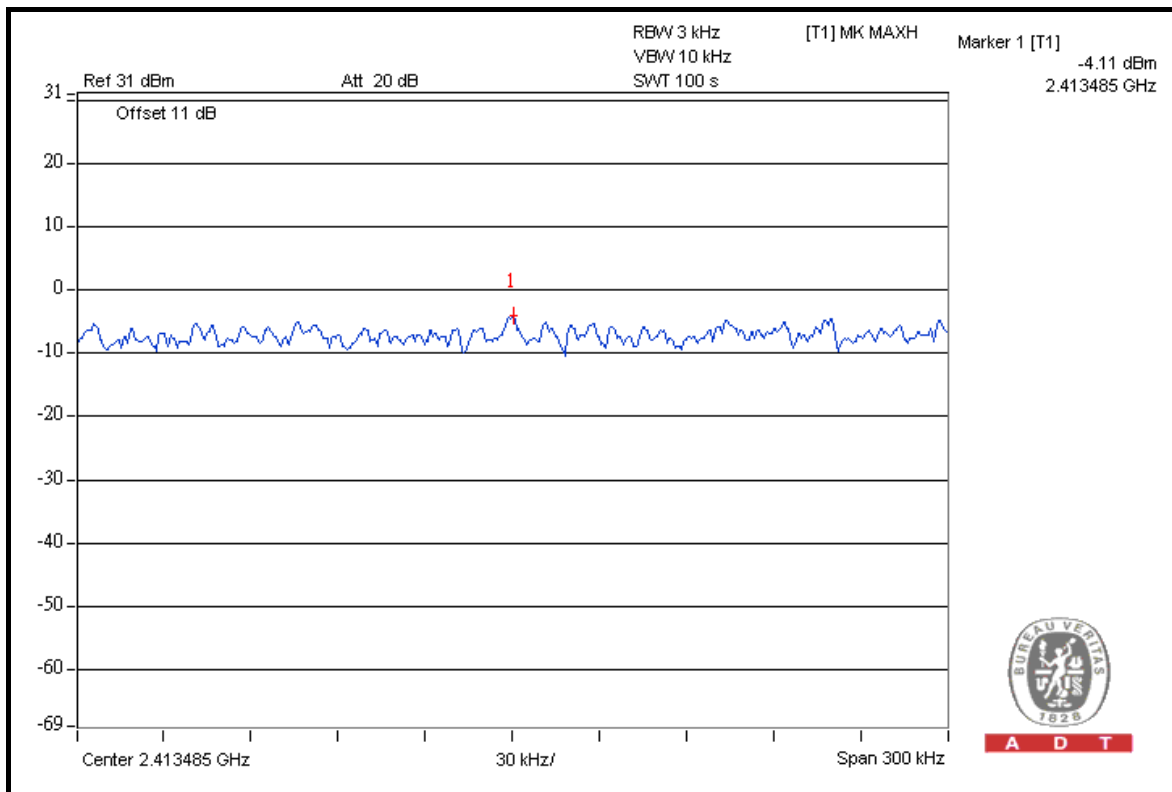
Same as Item 4.3.6

4.5.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-4.1	8	PASS
6	2437	-4.5	8	PASS
11	2462	-4.6	8	PASS

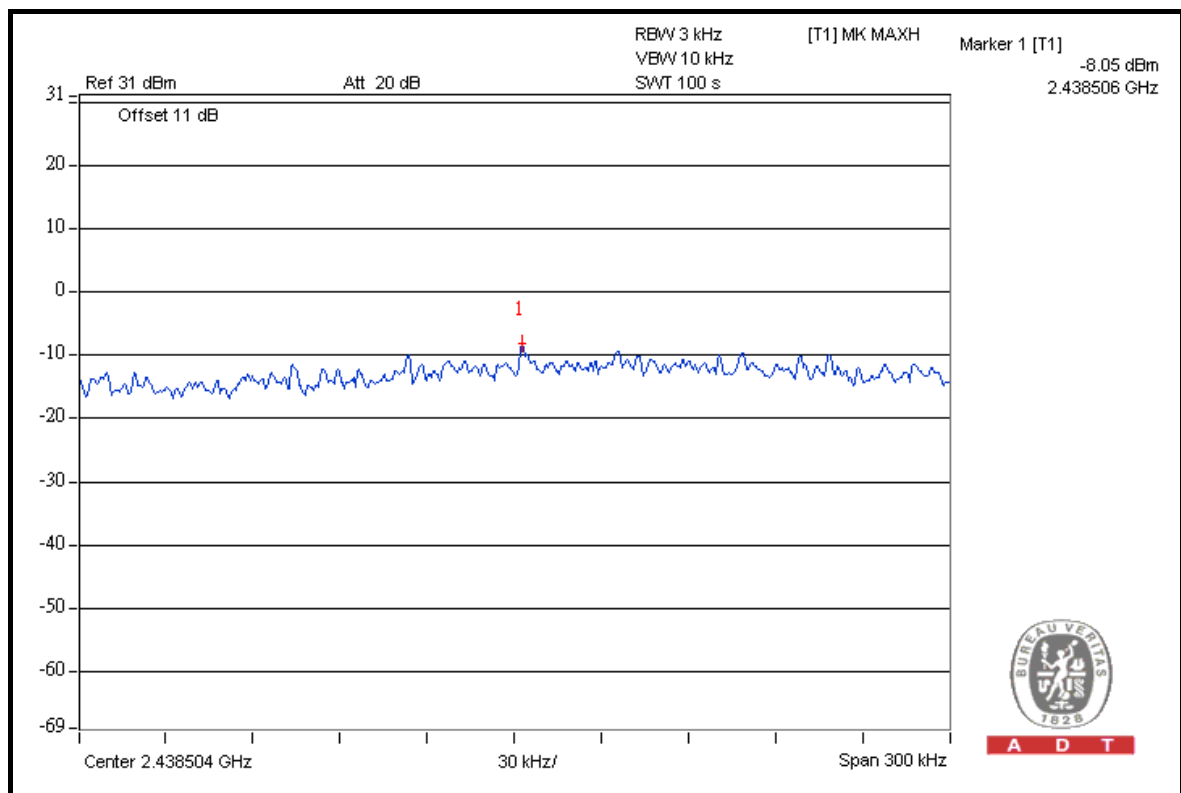
CH 1



802.11g

CHAIN	CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
			MEASURED	10 log (N=2) dB			
0	1	2412	-9.7	3.01	-6.7	8	PASS
	6	2437	-8.1	3.01	-5.1	8	PASS
	11	2462	-9.8	3.01	-6.8	8	PASS
1	1	2412	-10.1	3.01	-7.1	8	PASS
	6	2437	-9.3	3.01	-6.3	8	PASS
	11	2462	-10.2	3.01	-7.2	8	PASS

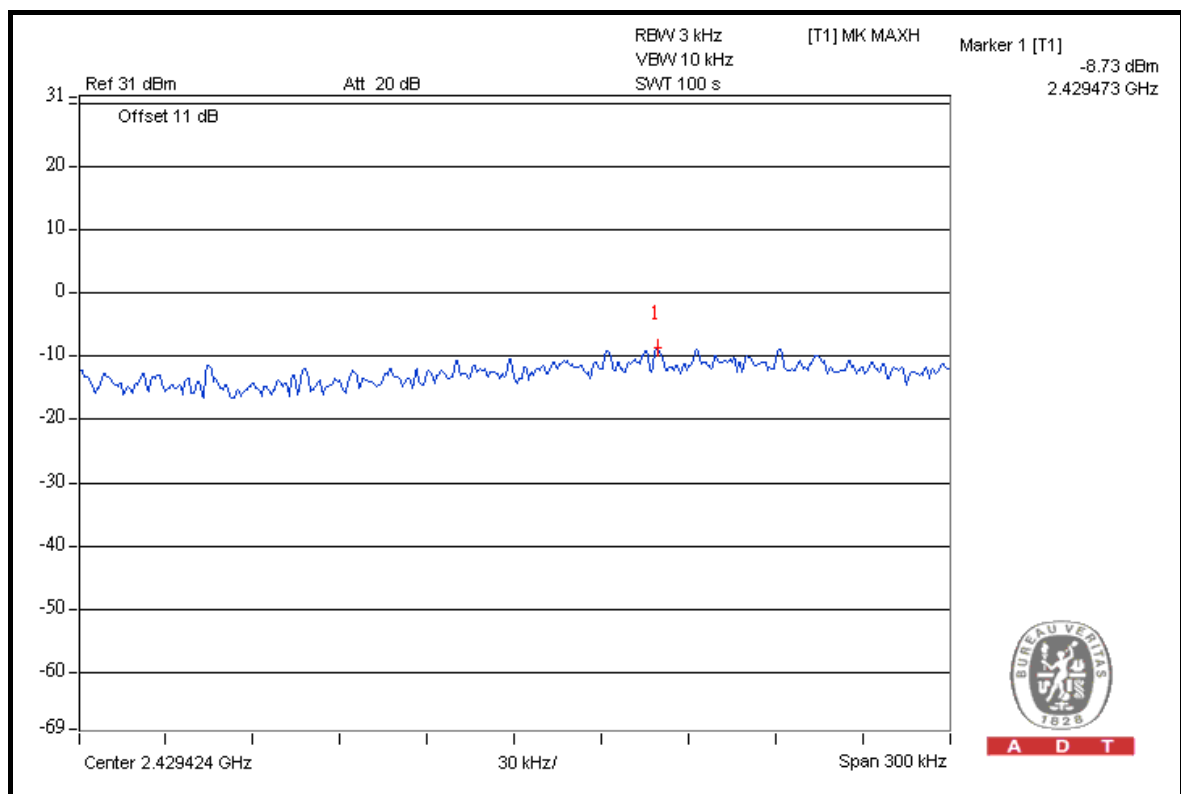
FOR CHAIN 0: CH 6



802.11n (20MHz)

CHAIN	CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
			MEASURED	10 log (N=2) dB			
0	1	2412	-12.4	3.01	-9.4	8	PASS
	6	2437	-8.7	3.01	-5.7	8	PASS
	11	2462	-10.9	3.01	-7.9	8	PASS
1	1	2412	-12.6	3.01	-9.6	8	PASS
	6	2437	-10.7	3.01	-7.7	8	PASS
	11	2462	-13.1	3.01	-10.1	8	PASS

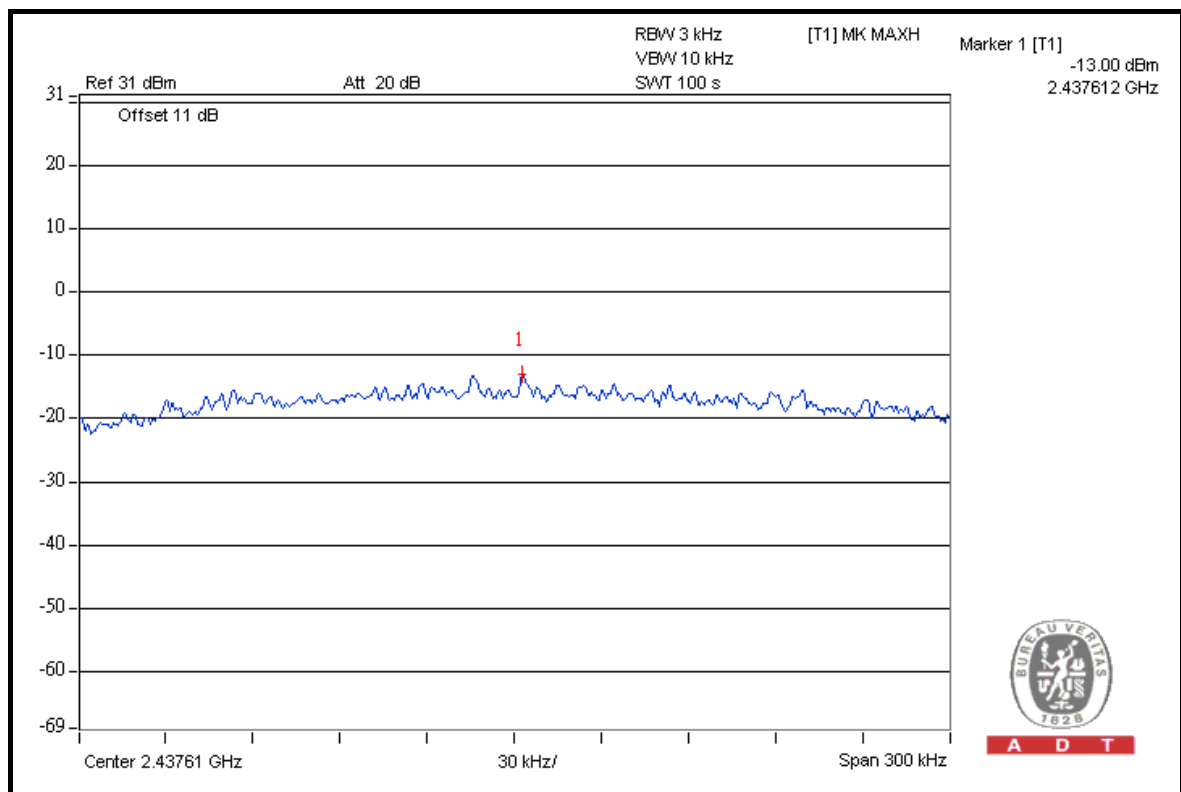
FOR CHAIN 0: CH 6



802.11n (40MHz)

CHAIN	CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
			MEASURED	10 log (N=2) dB			
0	1	2422	-16.4	3.01	-13.4	8	PASS
	4	2437	-13.0	3.01	-10.0	8	PASS
	7	2452	-14.7	3.01	-11.7	8	PASS
1	1	2422	-17.3	3.01	-14.3	8	PASS
	4	2437	-13.7	3.01	-10.7	8	PASS
	7	2452	-15.4	3.01	-12.4	8	PASS

FOR CHAIN 0: CH 4



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
FOR CONDUCTED MEASUREMENT				
R&S SPECTRUM ANALYZER	FSP40	100039	Jan. 11, 2011	Jan. 10, 2012
FOR RADIATED MEASUREMENT				
Test Receiver ROHDE & SCHWARZ	ESCI	100744	Apr. 19, 2011	Apr. 18, 2012
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jan. 06, 2011	Jan. 05, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Apr. 12, 2011	Apr. 11, 2012
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Sep. 06, 2011	Sep. 05, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8449B	3008A01911	Nov. 03, 2010	Nov. 02, 2011
Preamplifier Agilent	8447D	2944A10638	Nov. 03, 2010	Nov. 02, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295013/4 283403/4	Aug. 19, 2011	Aug. 18, 2012
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 13, 2011	Aug. 12, 2012
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

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

FOR CONDUCTED MEASUREMENT

The transmitter output was connected to the spectrum analyzer via a low loss cable. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 300kHz 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.

FOR RADIATED MEASUREMENT

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. 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.
- f. The spectrum plots (Peak RBW = 100kHz, VBW = 300kHz) are attached on the following pages.

NOTE: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation.

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, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

802.11b

RESTRICT BAND (2310 ~ 2390 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2412.00 (PK)	112.7	47.62	65.08	74.00
2412.00 (AV)	108.7	55.83	52.87	54.00

RESTRICT BAND (2483.5 ~ 2500 MHz)

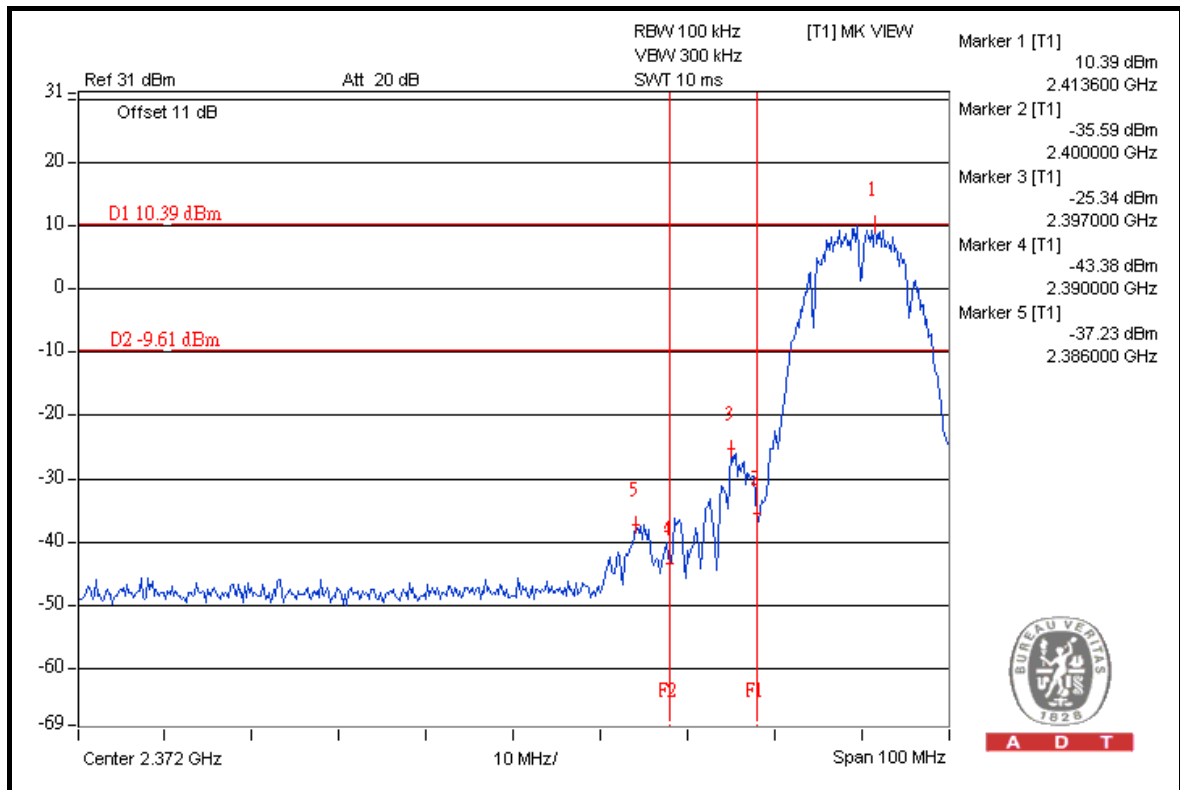
FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2462.00 (PK)	112.2	48.24	63.96	74.00
2462.00 (AV)	107.8	56.07	51.73	54.00

NOTE:

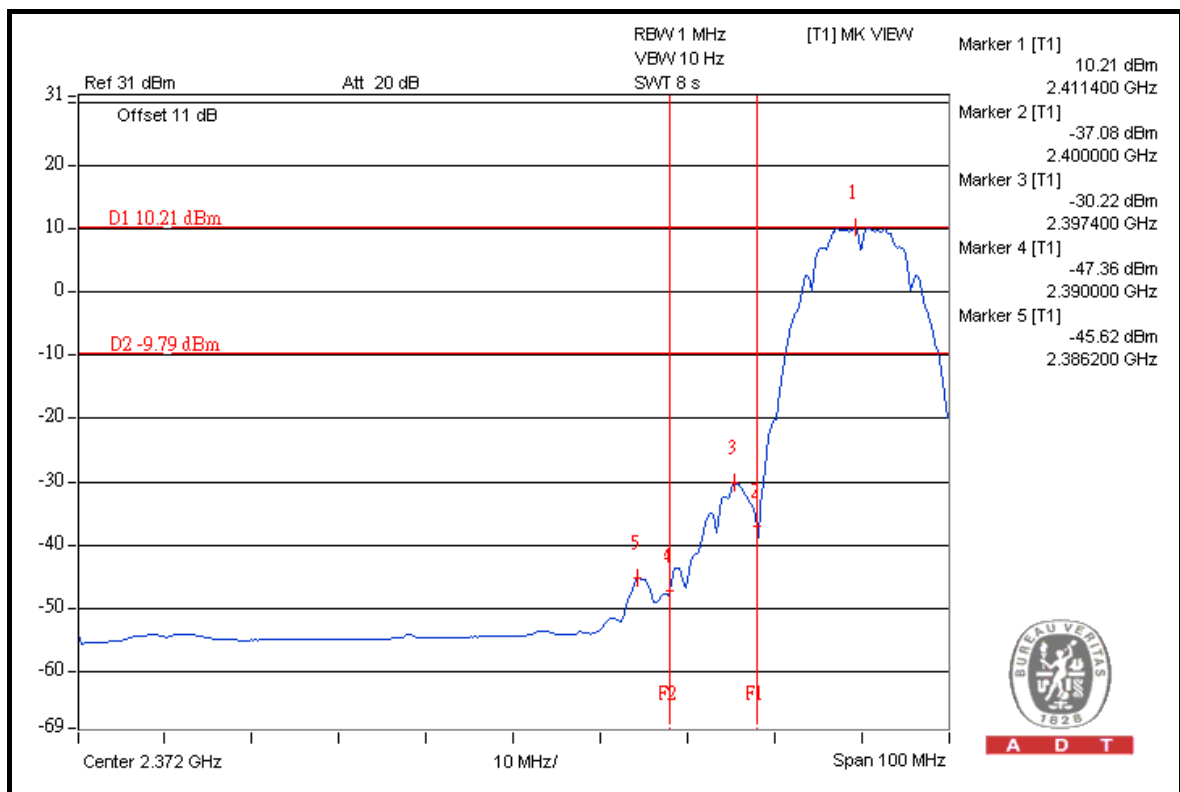
- Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission. Please check following 3 pages.
- Maximum field strength in restrict band = Fundamental emission – Delta.



A D T



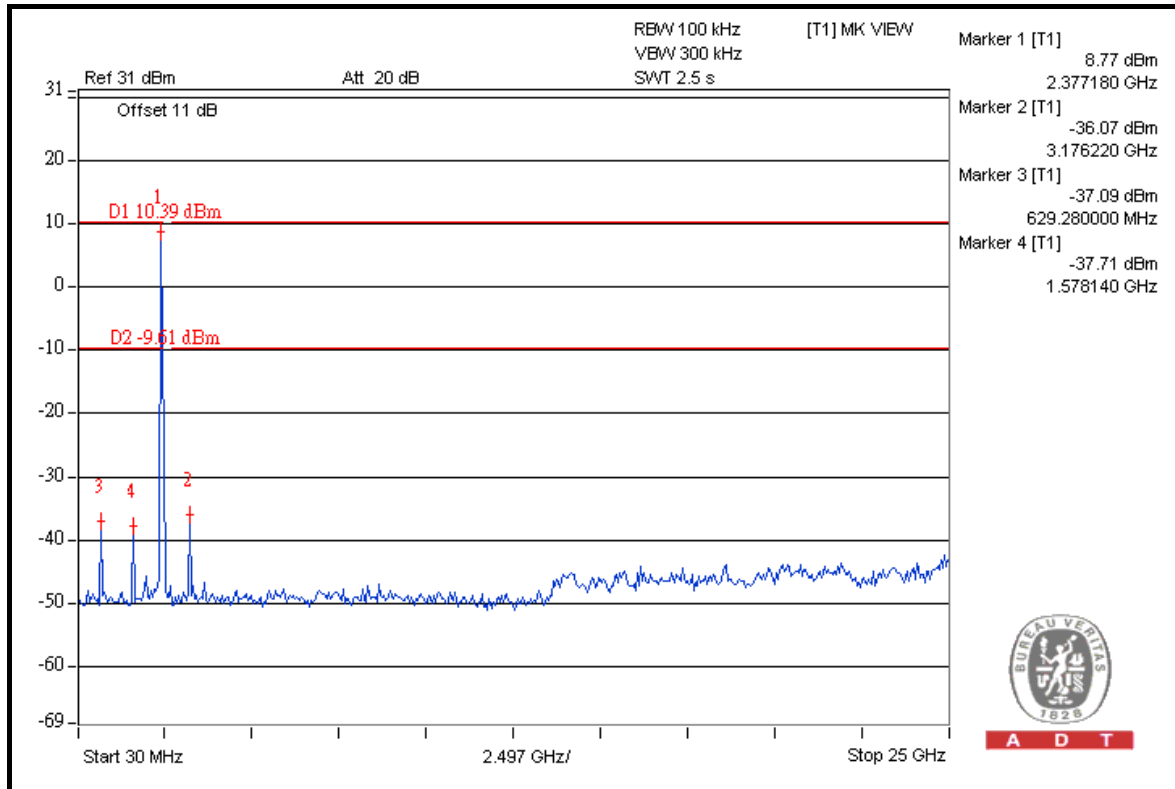
A D T



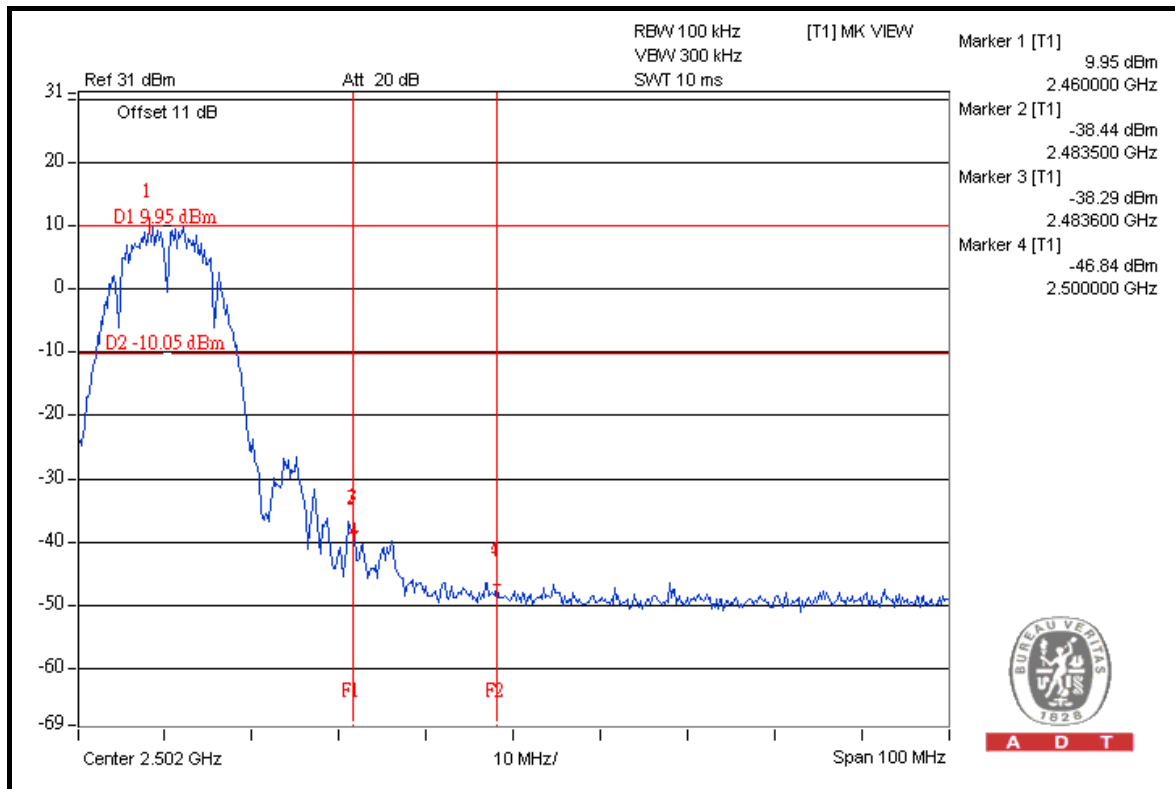
A D T



A D T



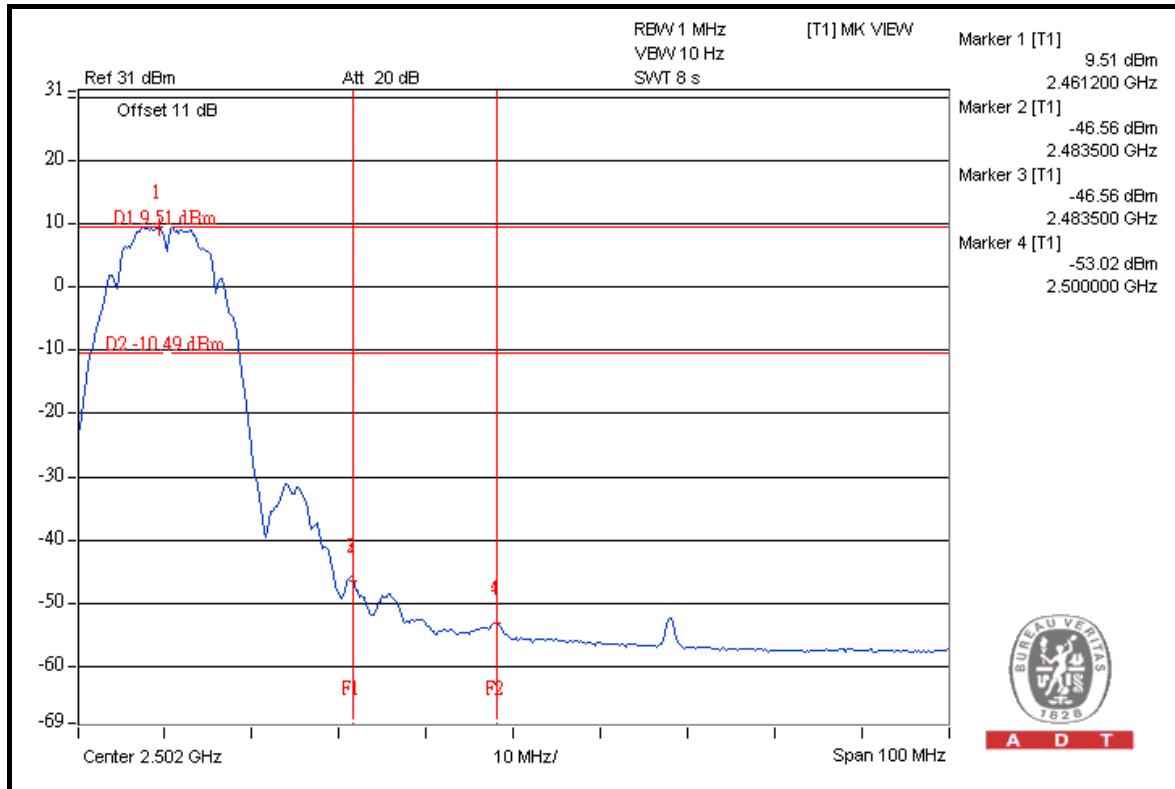
A D T



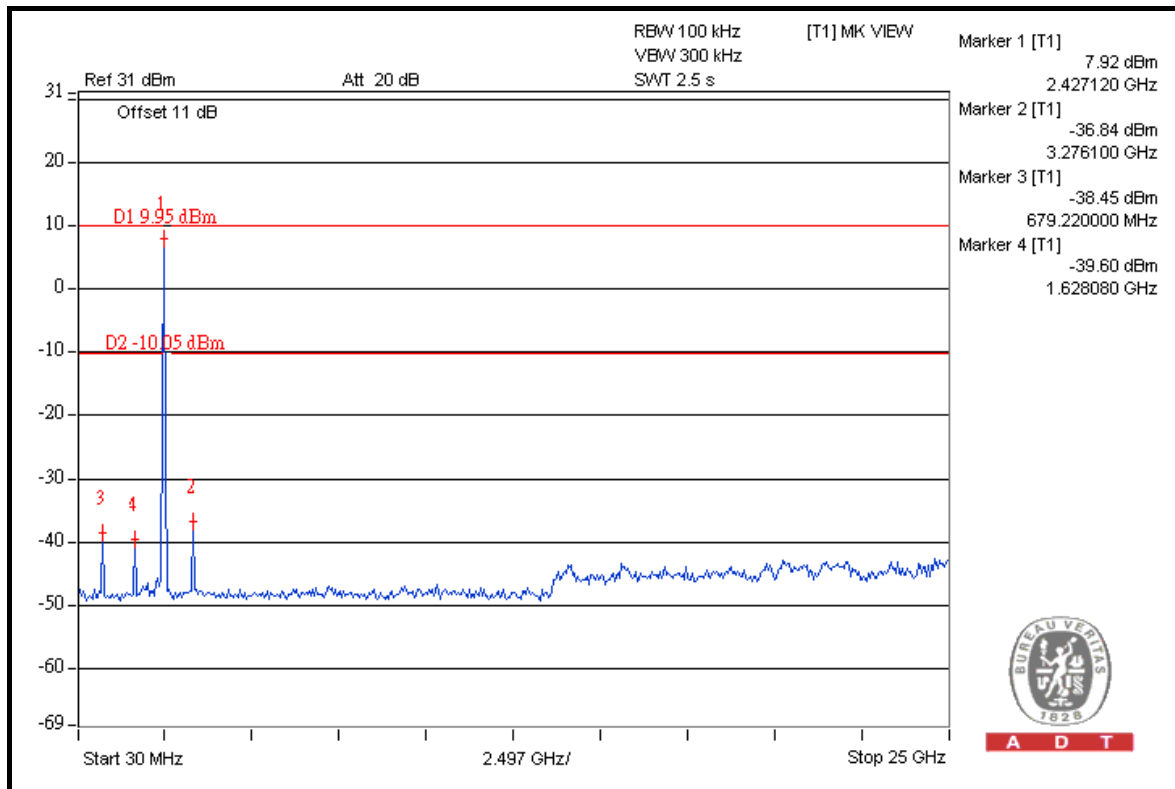
A D T



A D T



A D T



A D T

802.11g

RESTRICT BAND (2310 ~ 2390 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2412.00 (PK)	110.6	45.86	64.74	74.00
2412.00 (AV)	99.5	49.76	49.74	54.00

RESTRICT BAND (2483.5 ~ 2500 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2462.00 (PK)	110.9	43.25	67.65	74.00
2462.00 (AV)	100.1	49.26	50.84	54.00

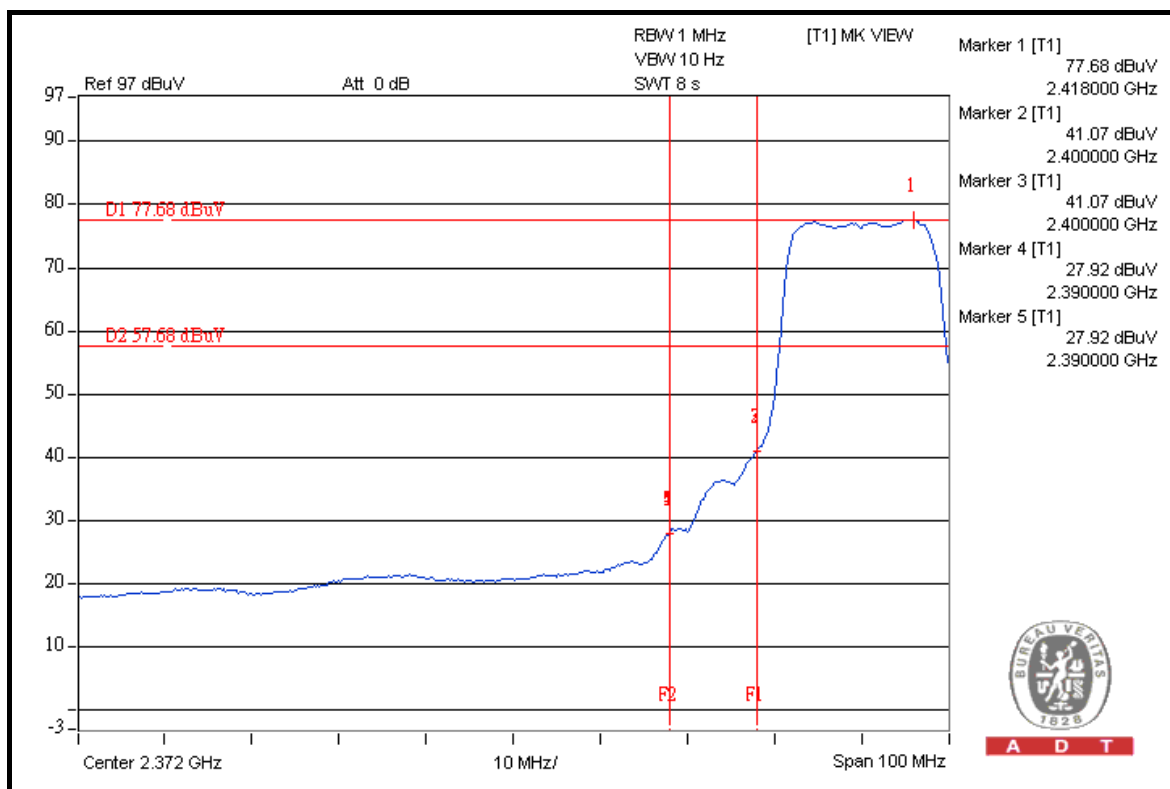
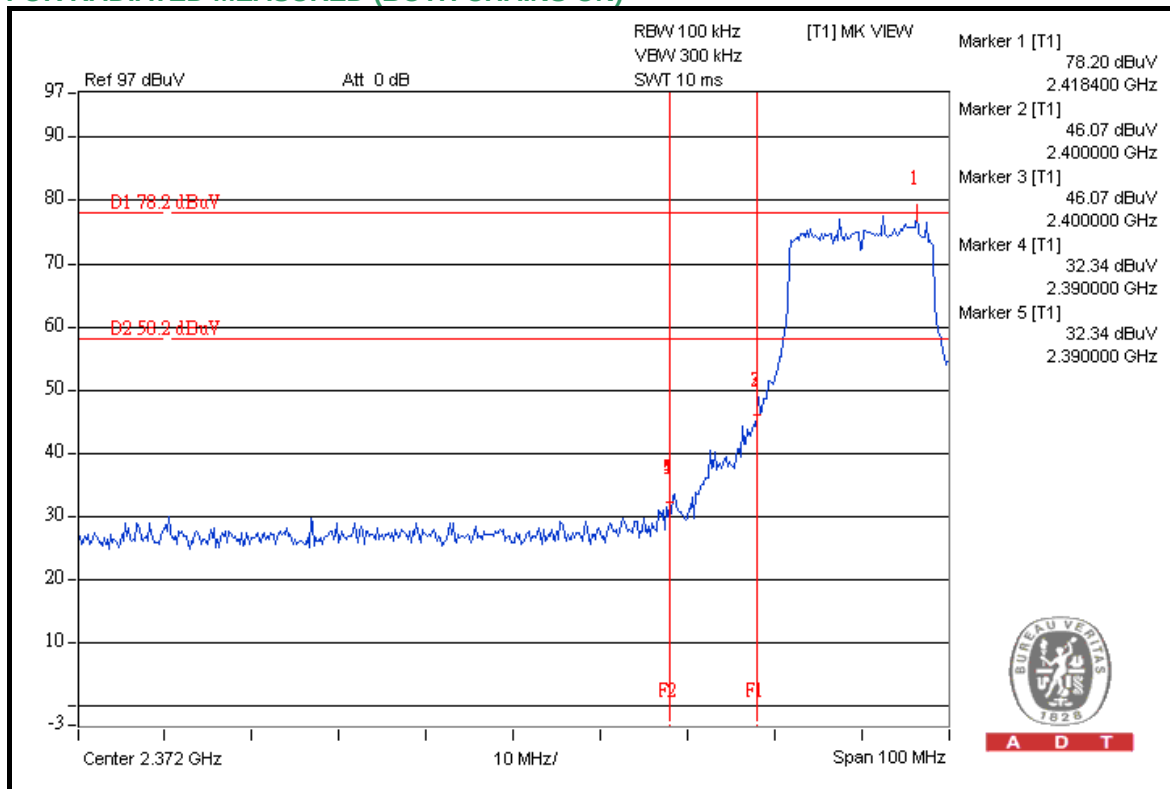
NOTE:

1. Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission. Please check following 3 pages.
2. Maximum field strength in restrict band = Fundamental emission – Delta.



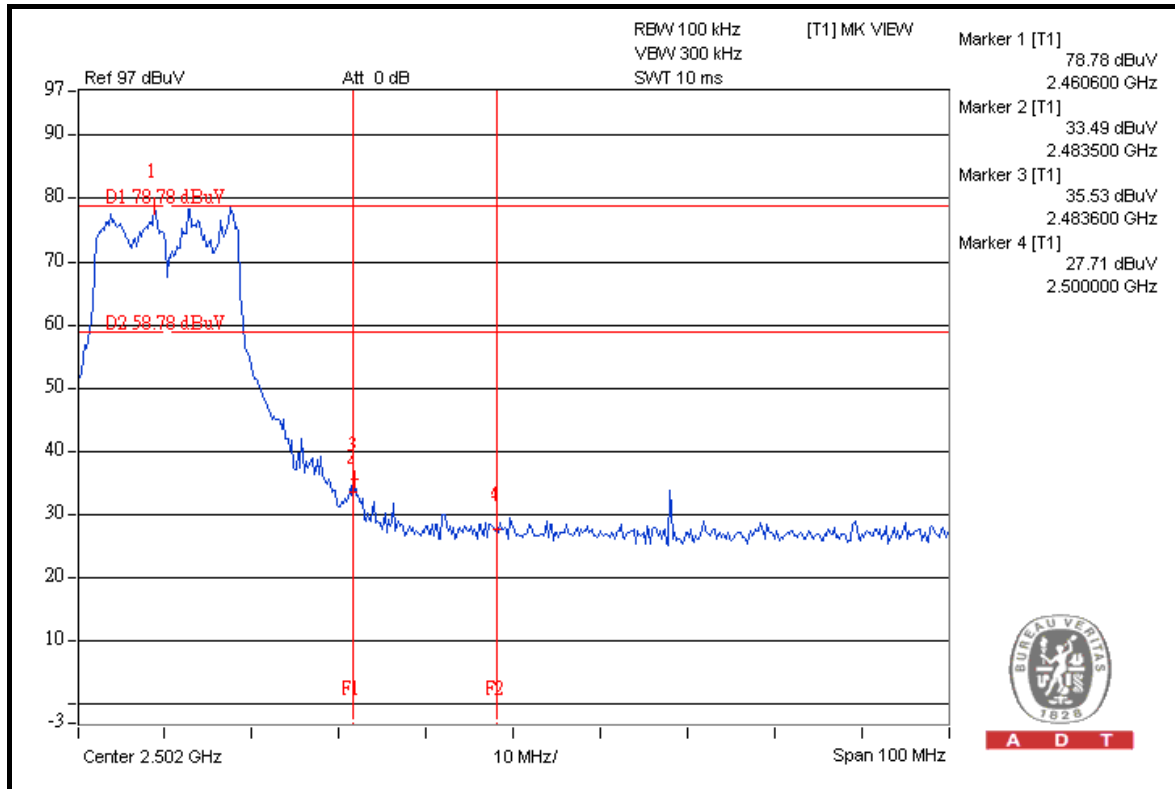
A D T

FOR RADIATED MEASURED (BOTH CHAINS ON)

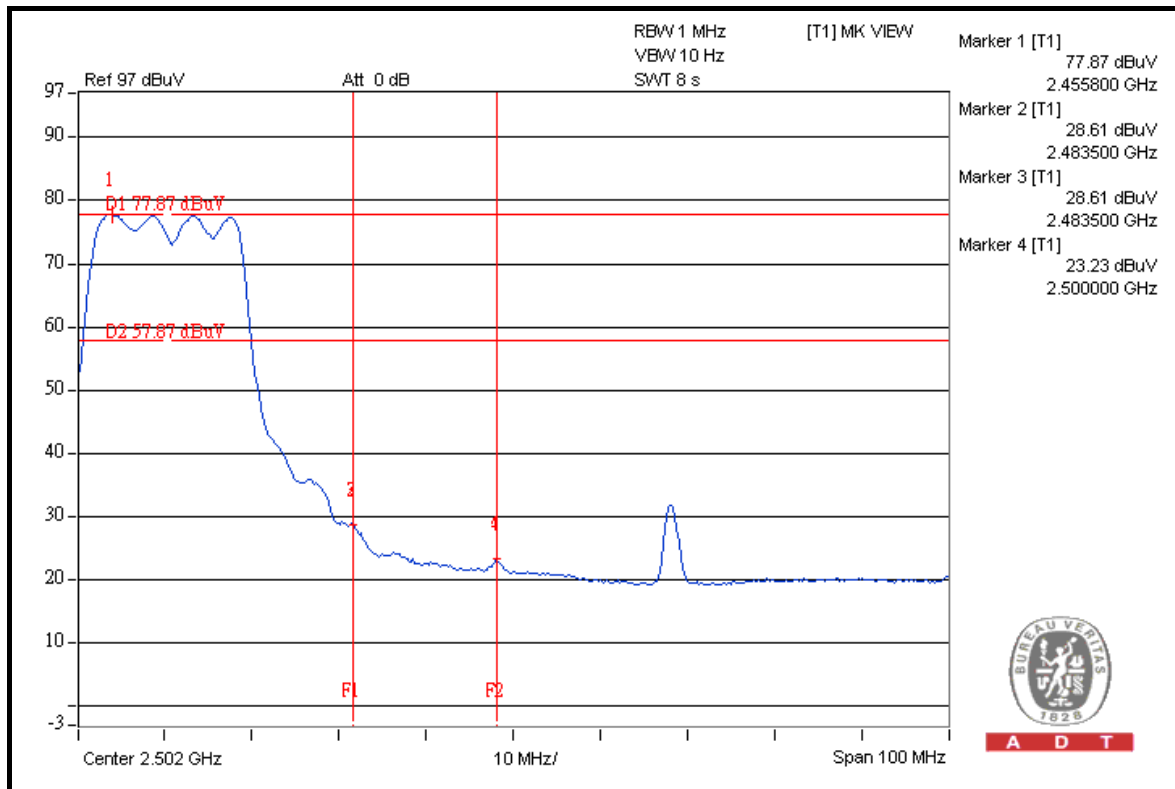




A D T



A D T

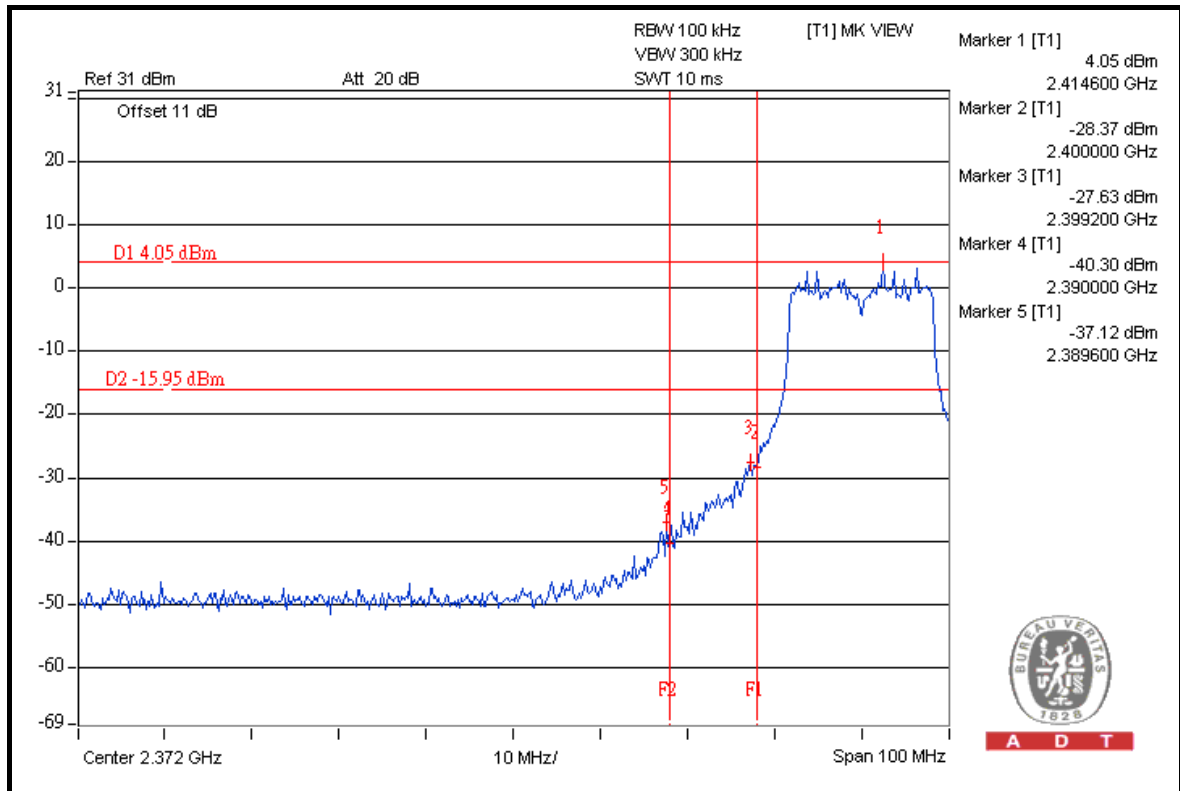


A D T

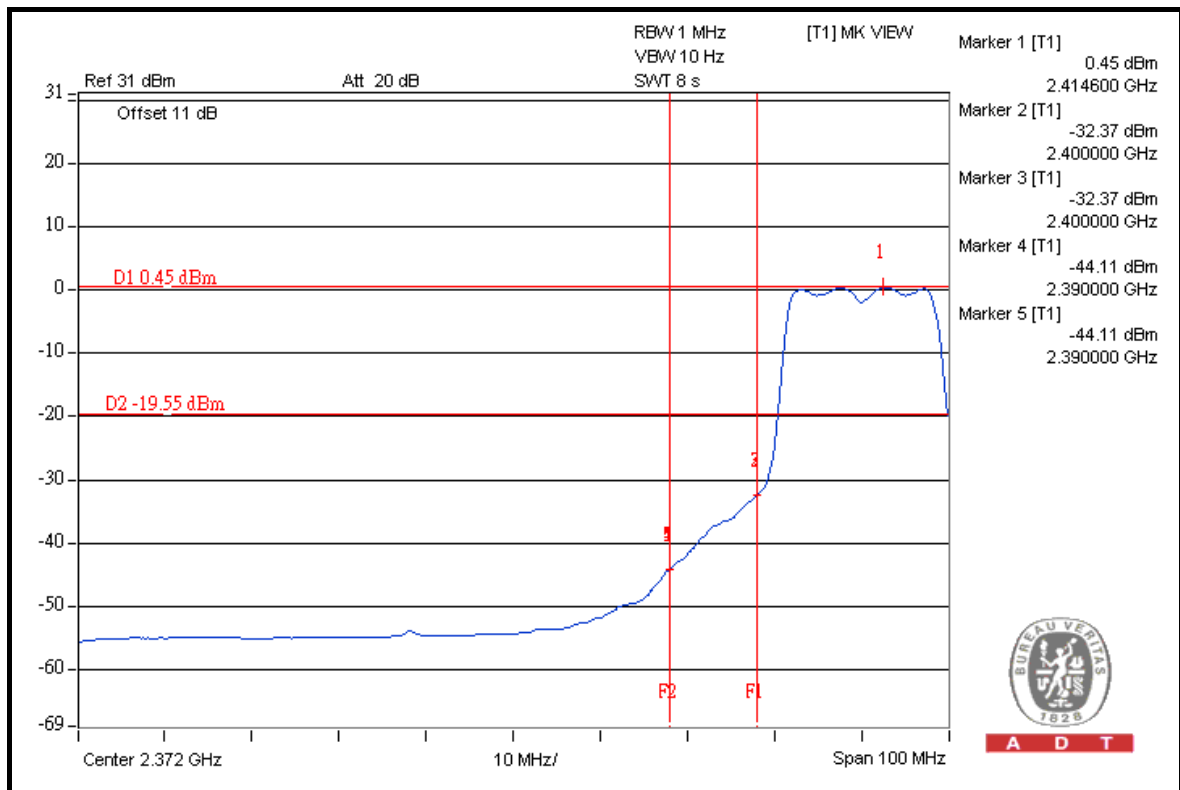


A D T

FOR CONDUCTED MEASURED CHAIN 0



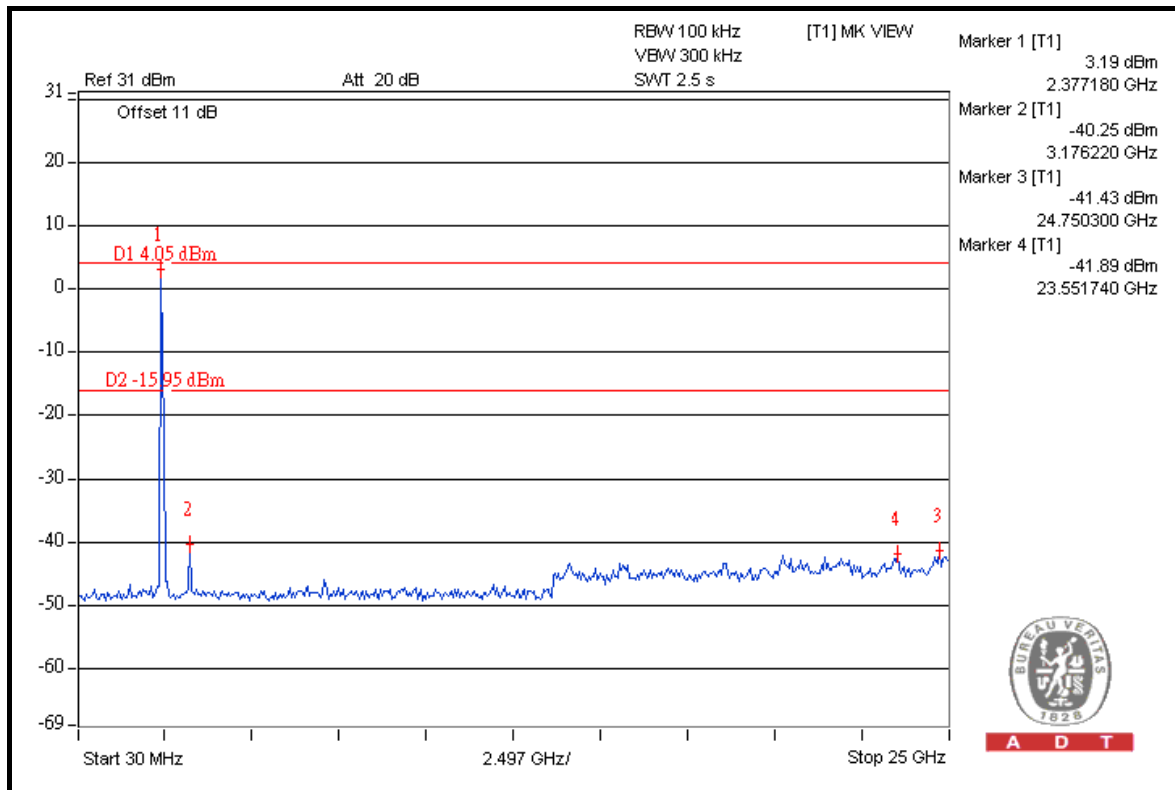
A D T



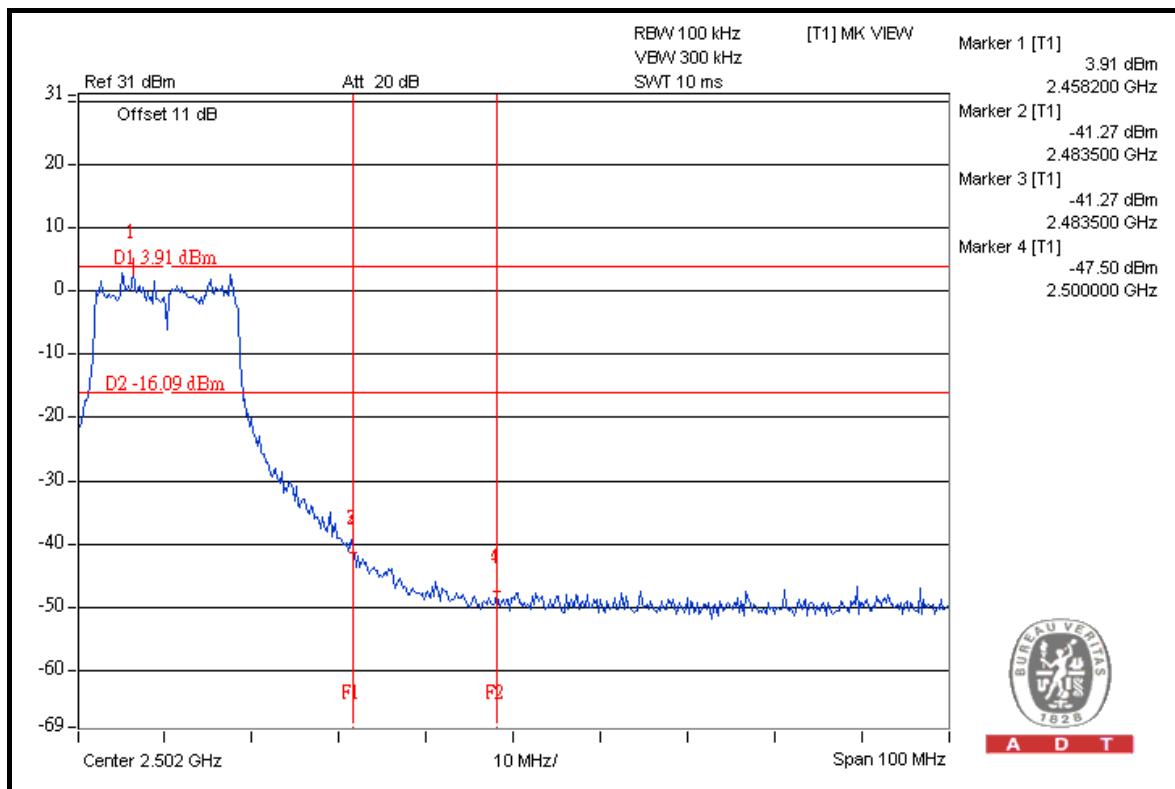
A D T



A D T



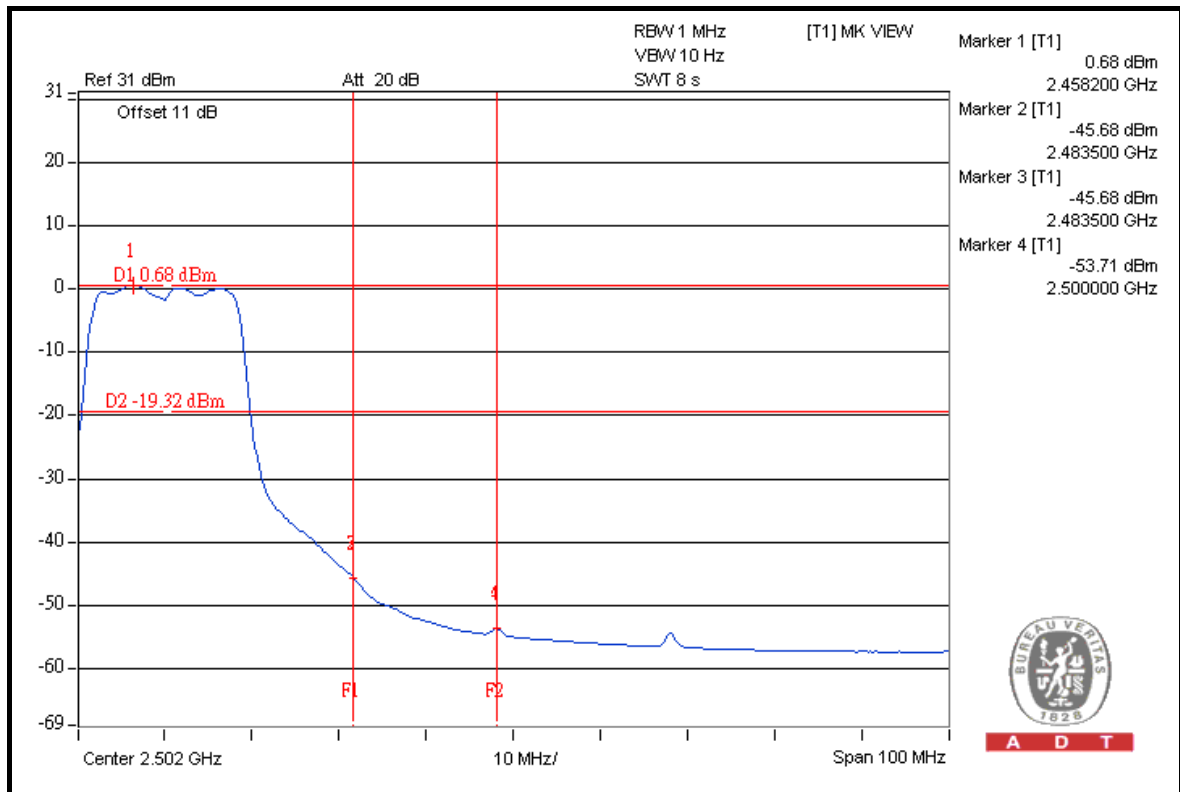
A D T



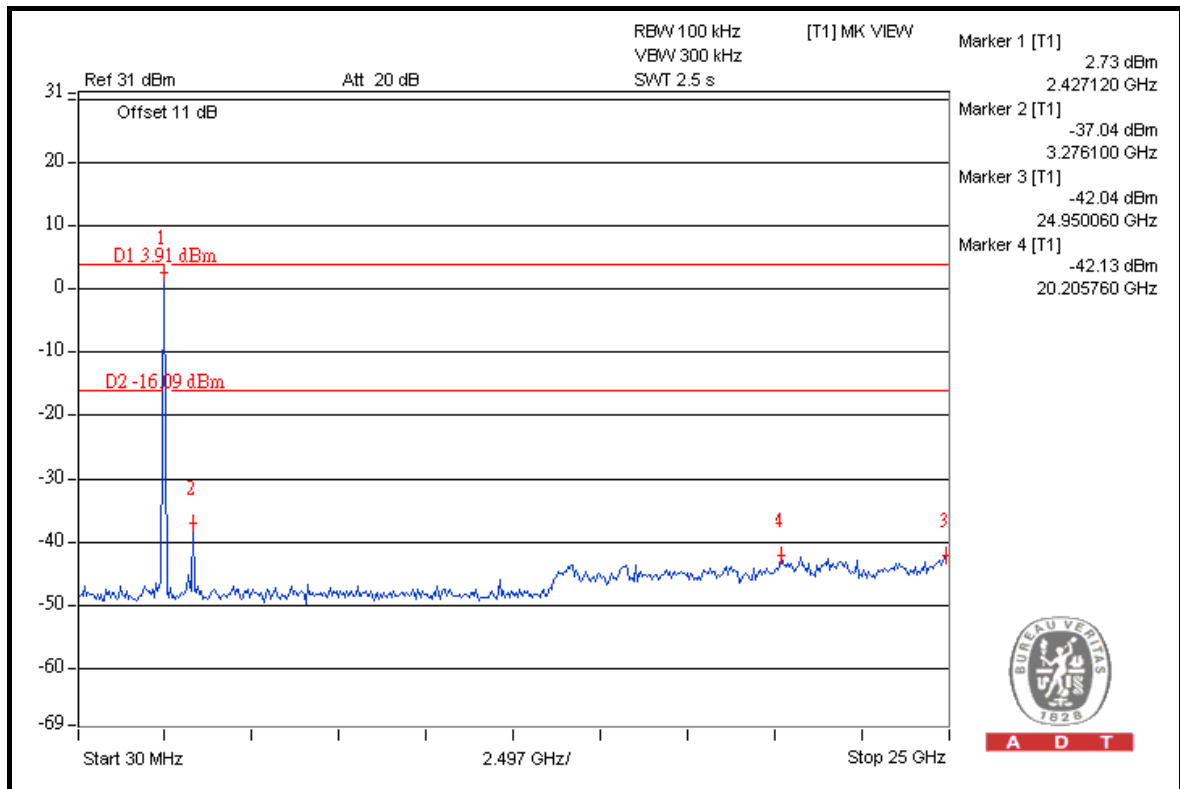
A D T



A D T

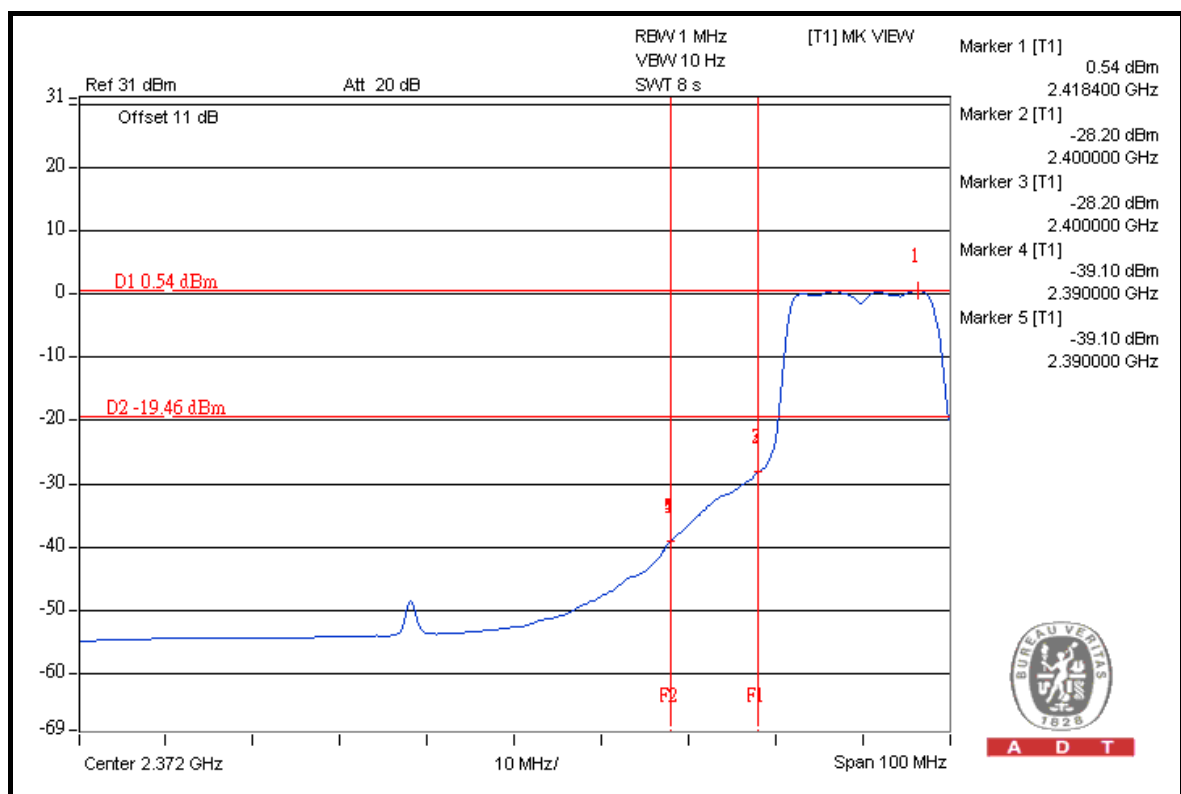
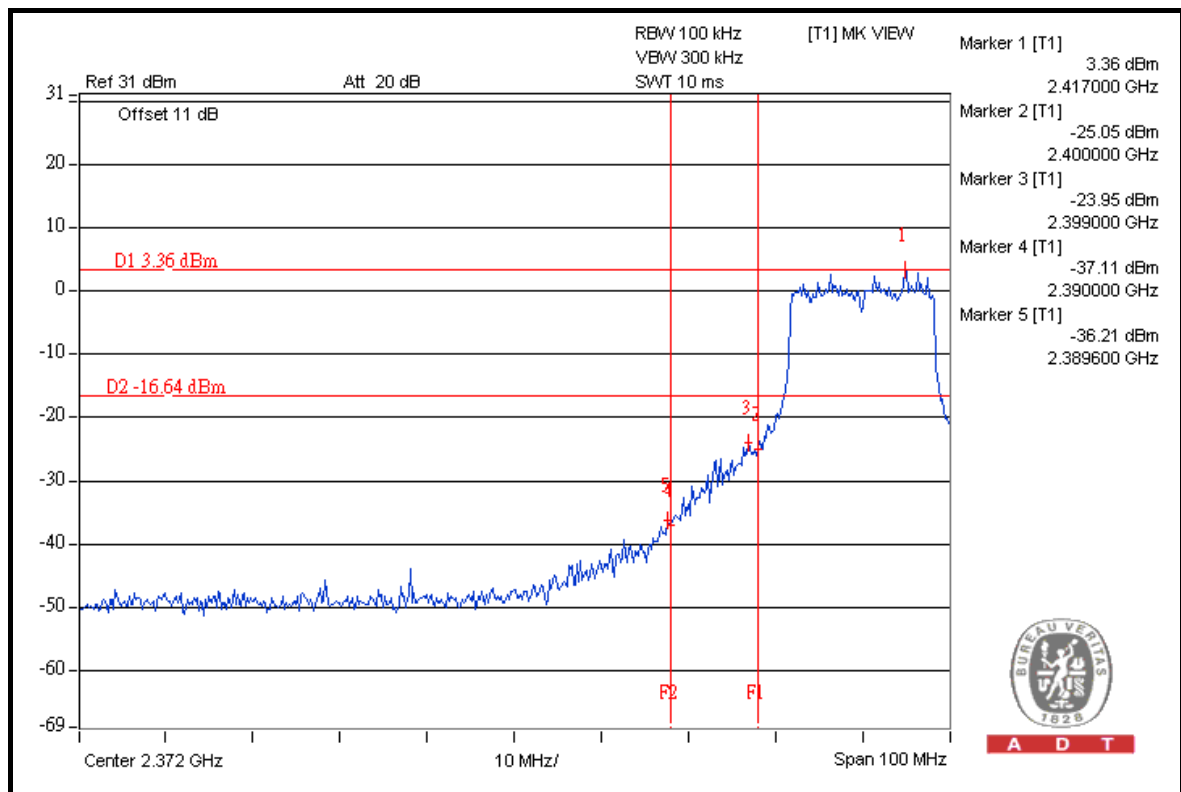


A D T



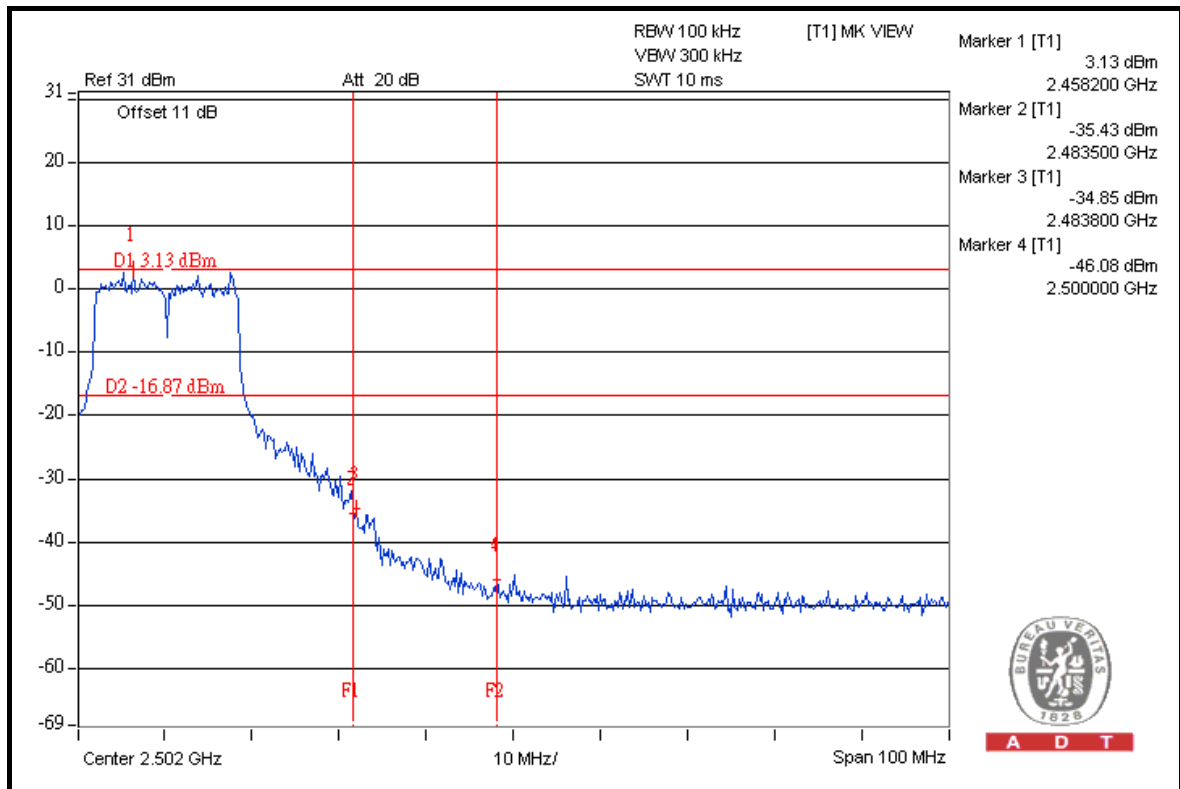
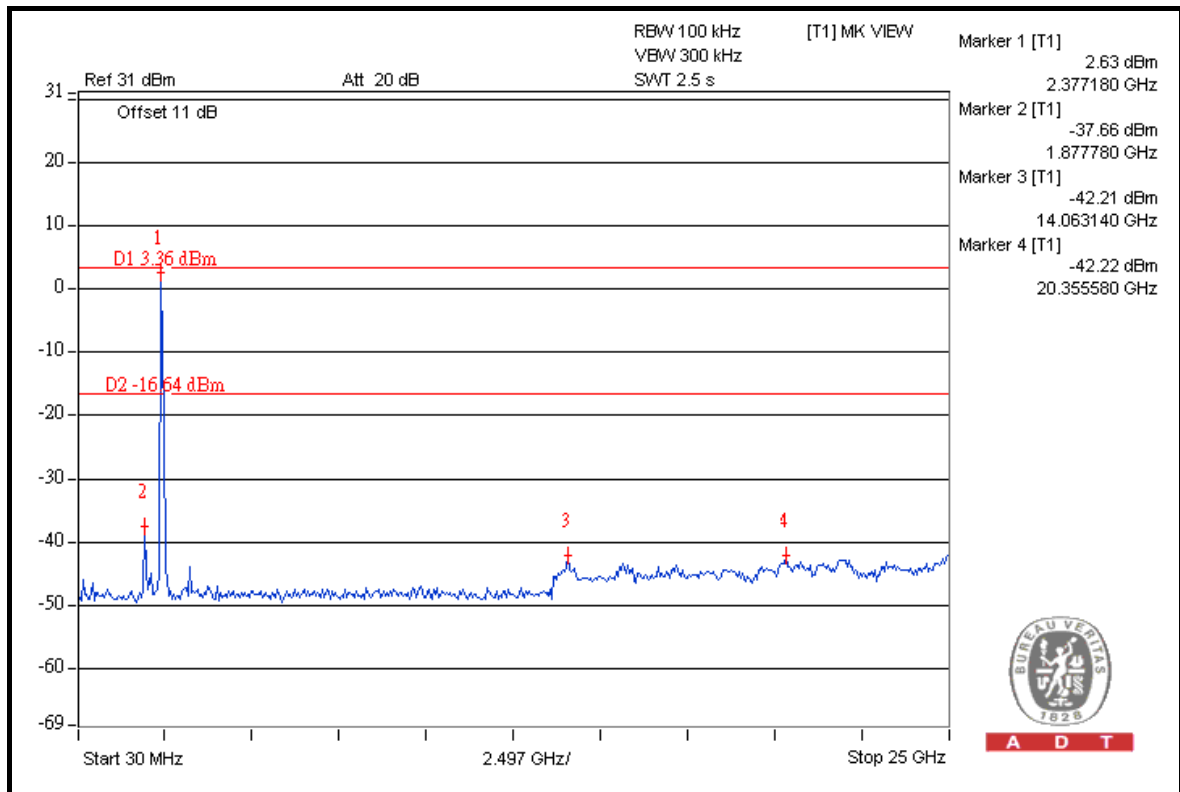
A D T

CHAIN 1



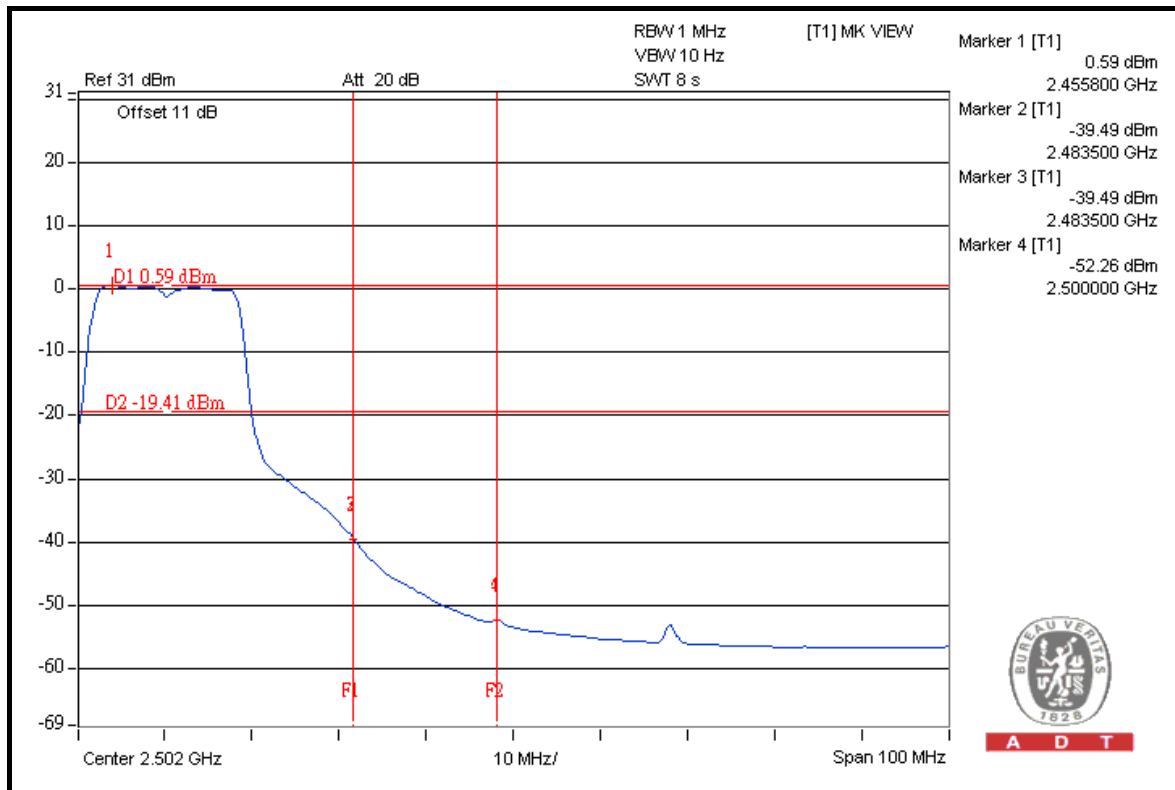


A D T

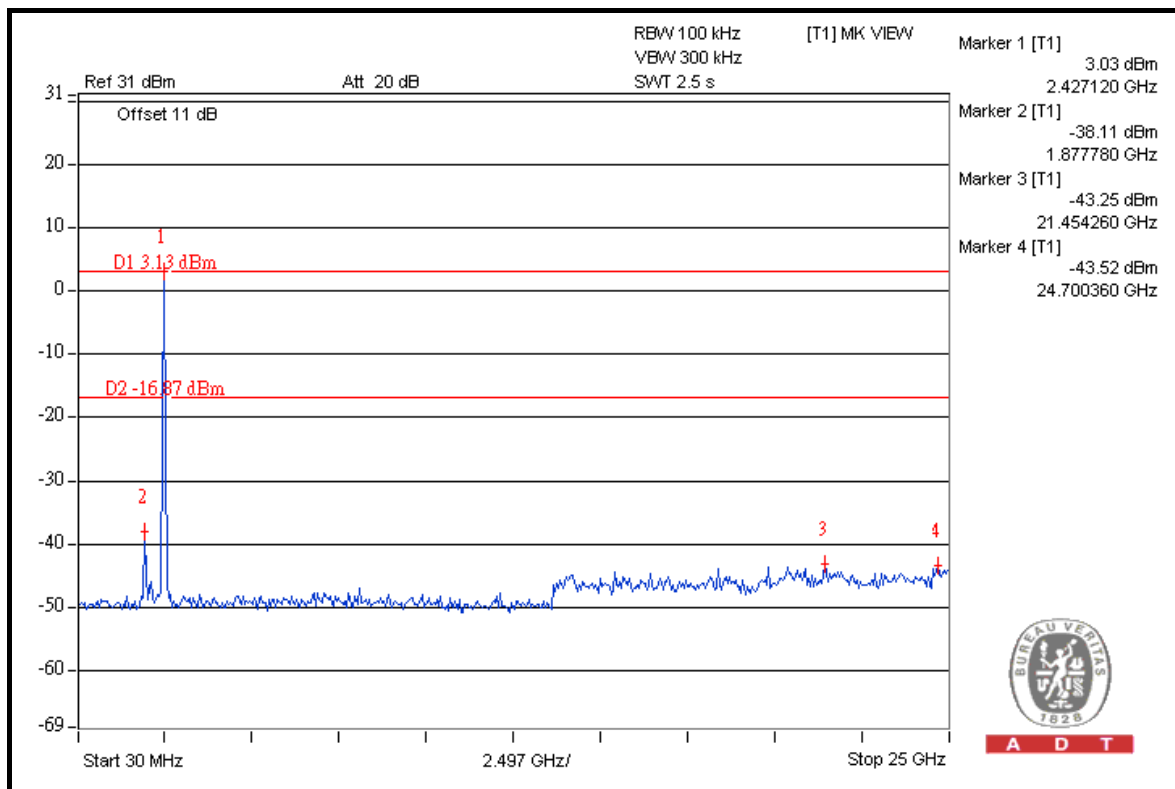




A D T



A D T



A D T

802.11n (20MHz)

RESTRICT BAND (2310 ~ 2390 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2412.00 (PK)	109.4	43.24	66.16	74.00
2412.00 (AV)	98.3	47.43	50.87	54.00

RESTRICT BAND (2483.5 ~ 2500 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2462.00 (PK)	111.3	44.17	67.13	74.00
2462.00 (AV)	100.8	49.12	51.68	54.00

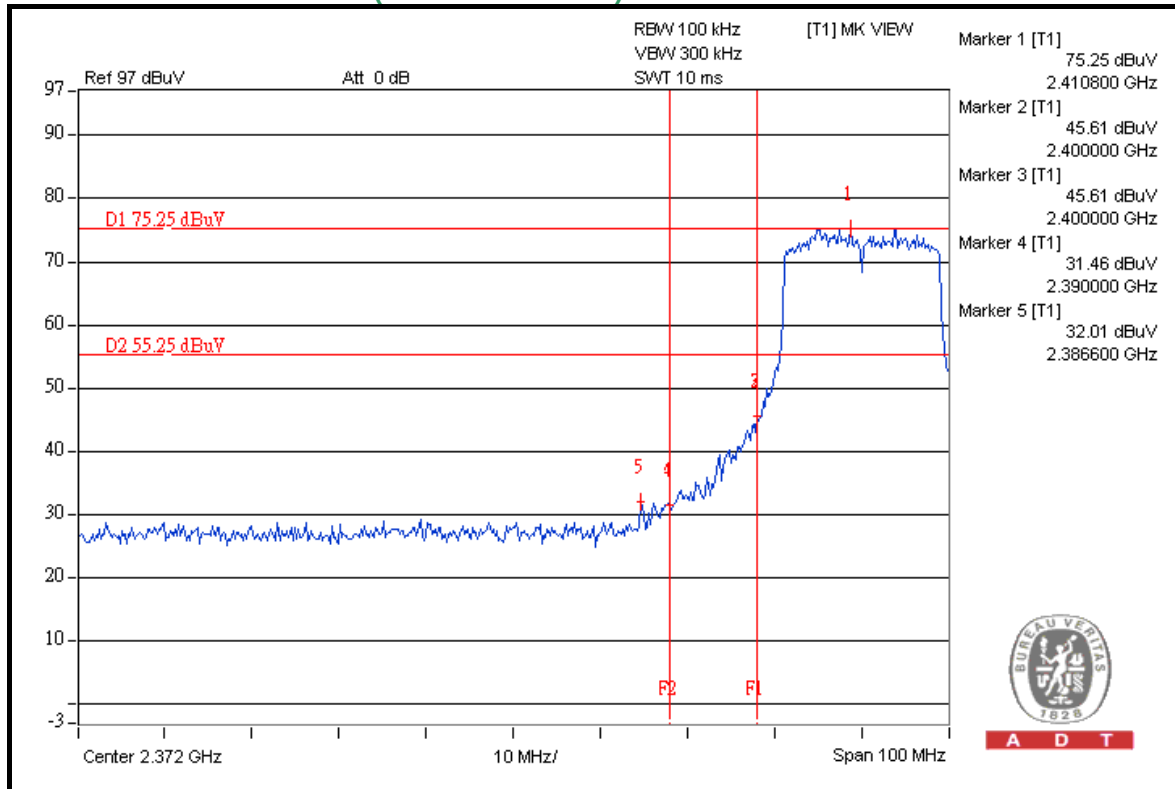
NOTE:

1. Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission.
Please check following 3 pages.
2. Maximum field strength in restrict band = Fundamental emission – Delta.

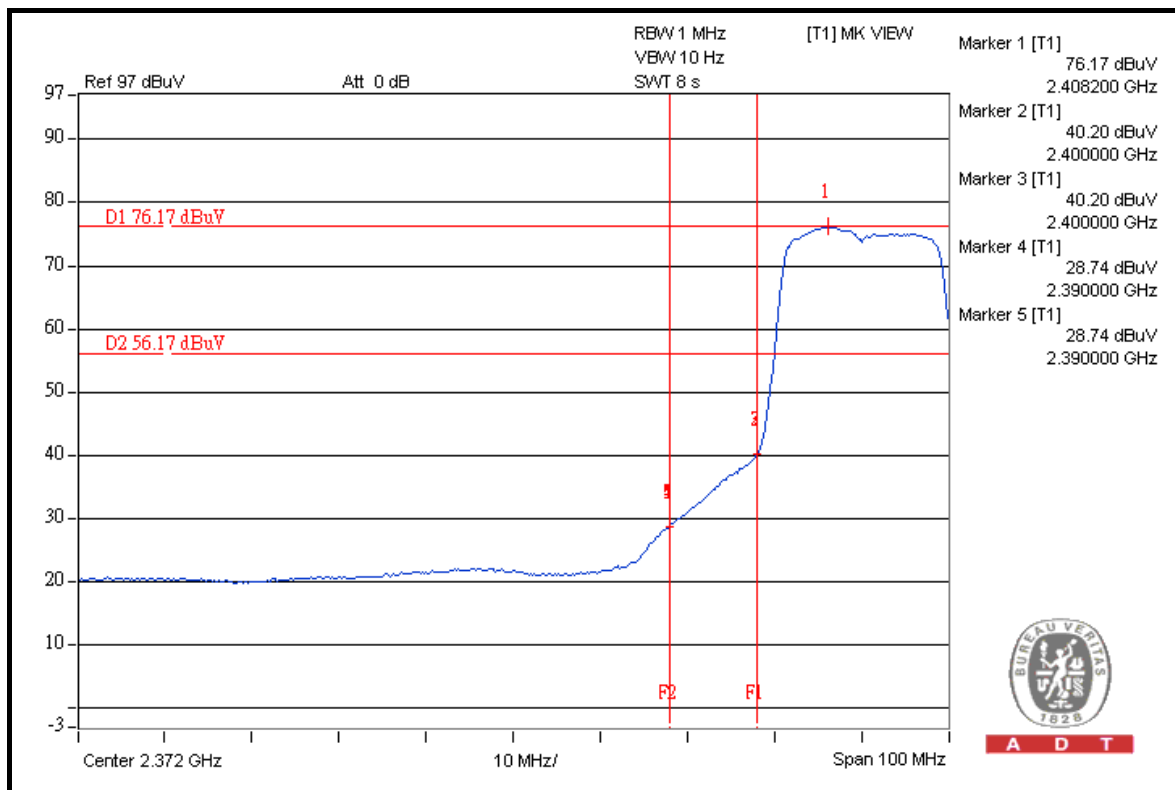


A D T

FOR RADIATED MEASURED (BOTH CHAINS ON)



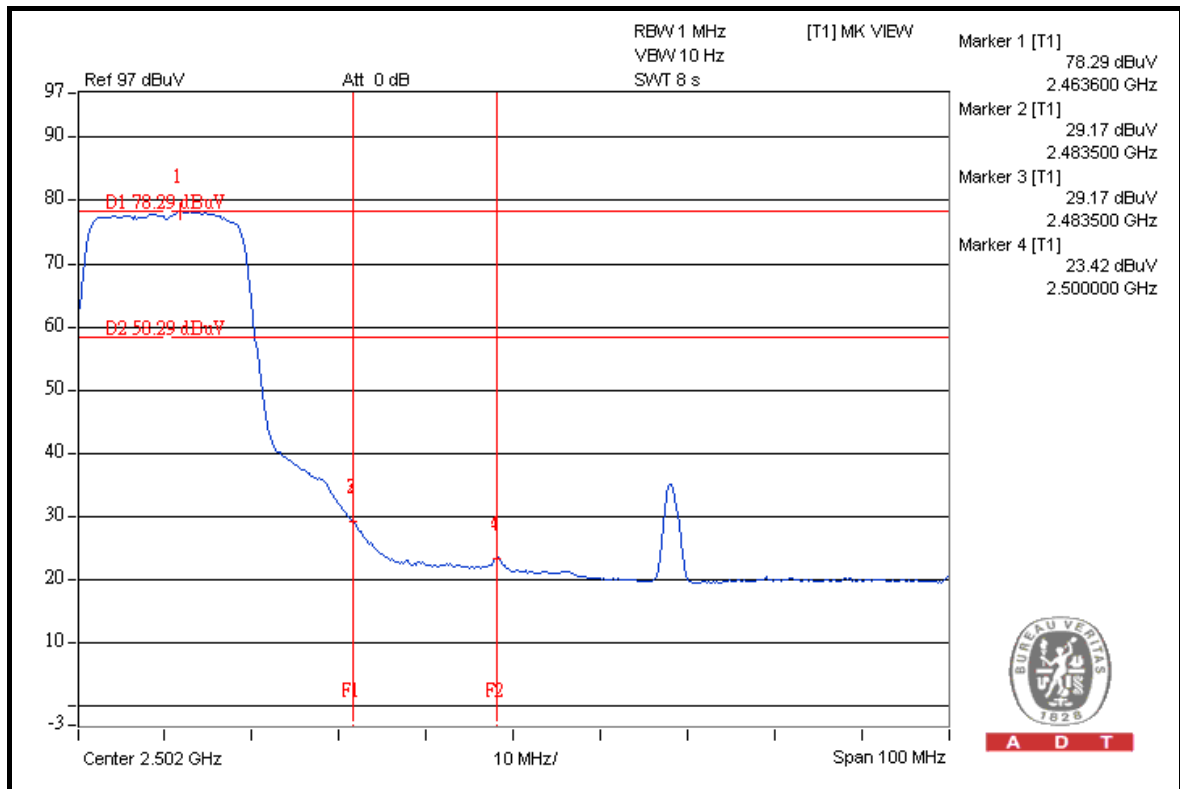
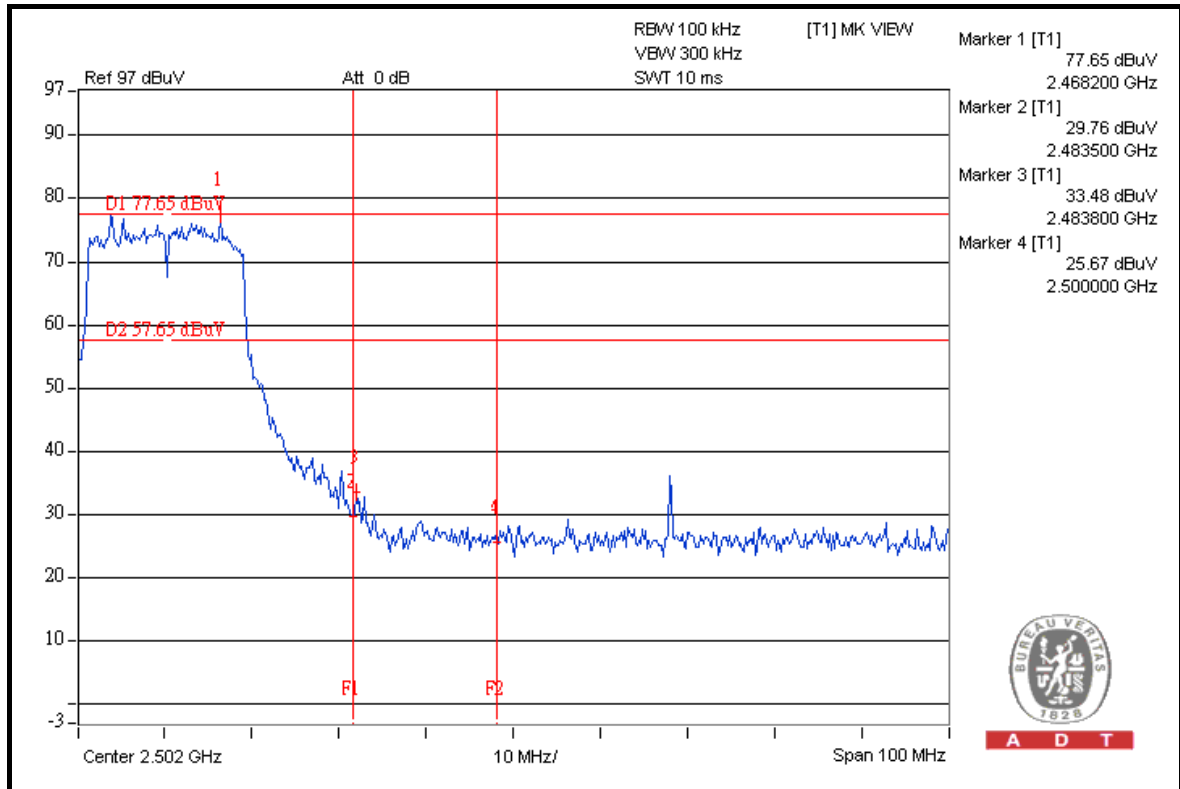
A D T



A D T



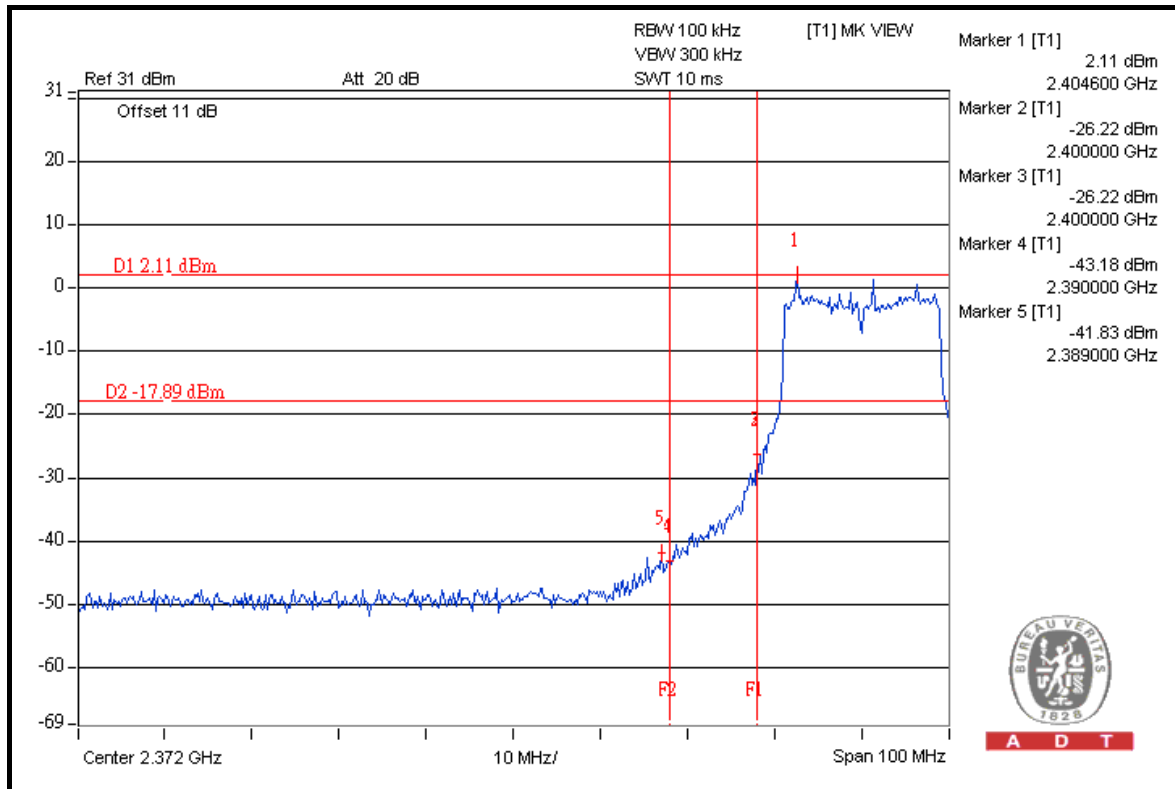
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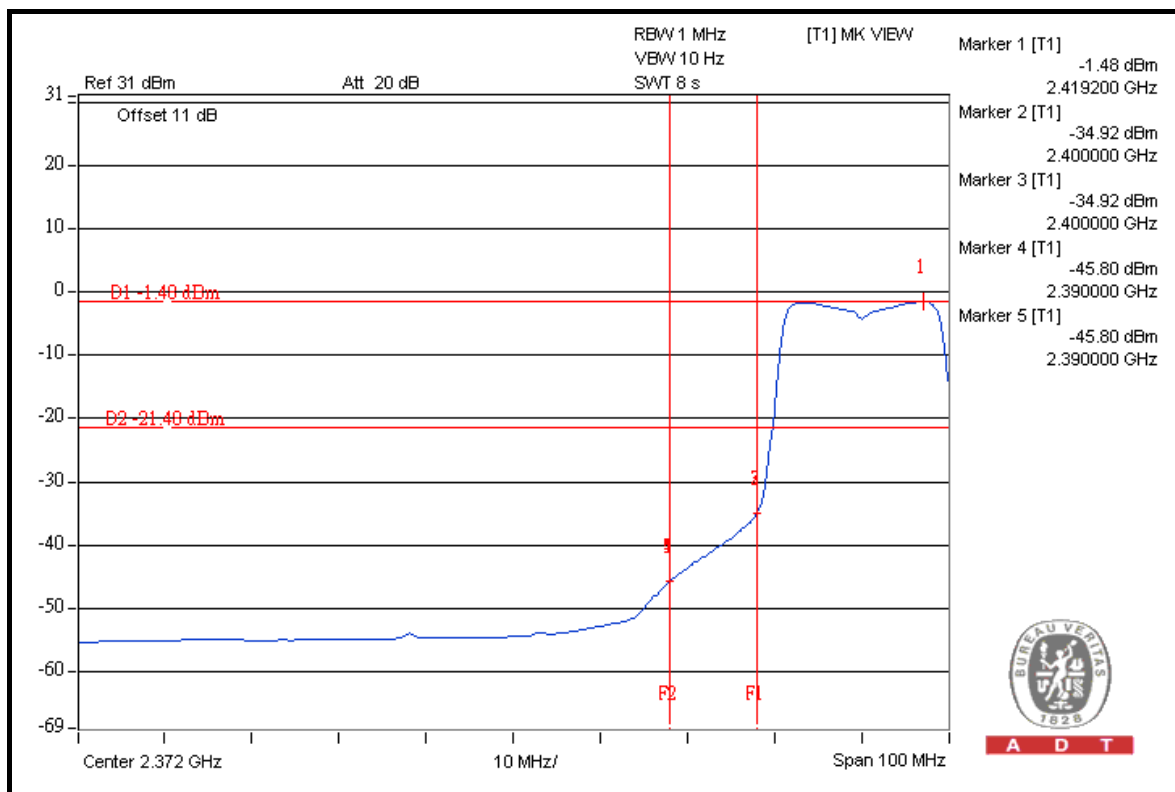


A D T

FOR CONDUCTED MEASURED CHAIN 0



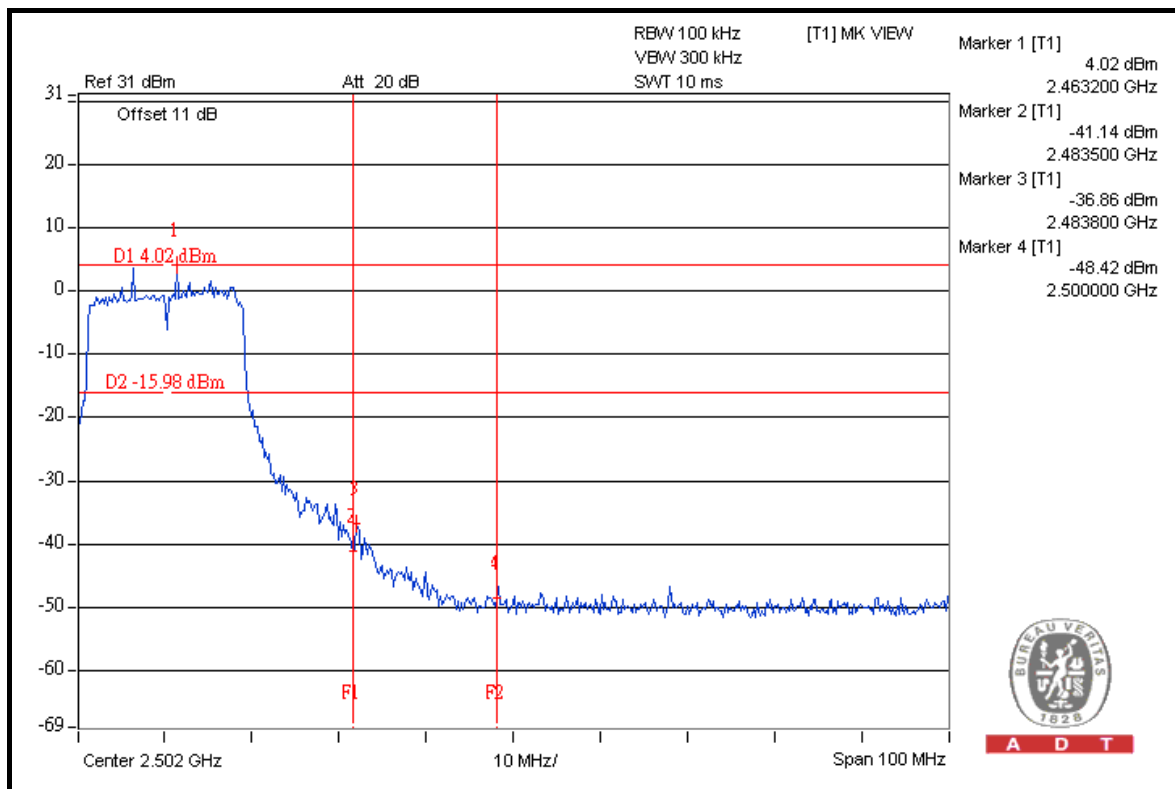
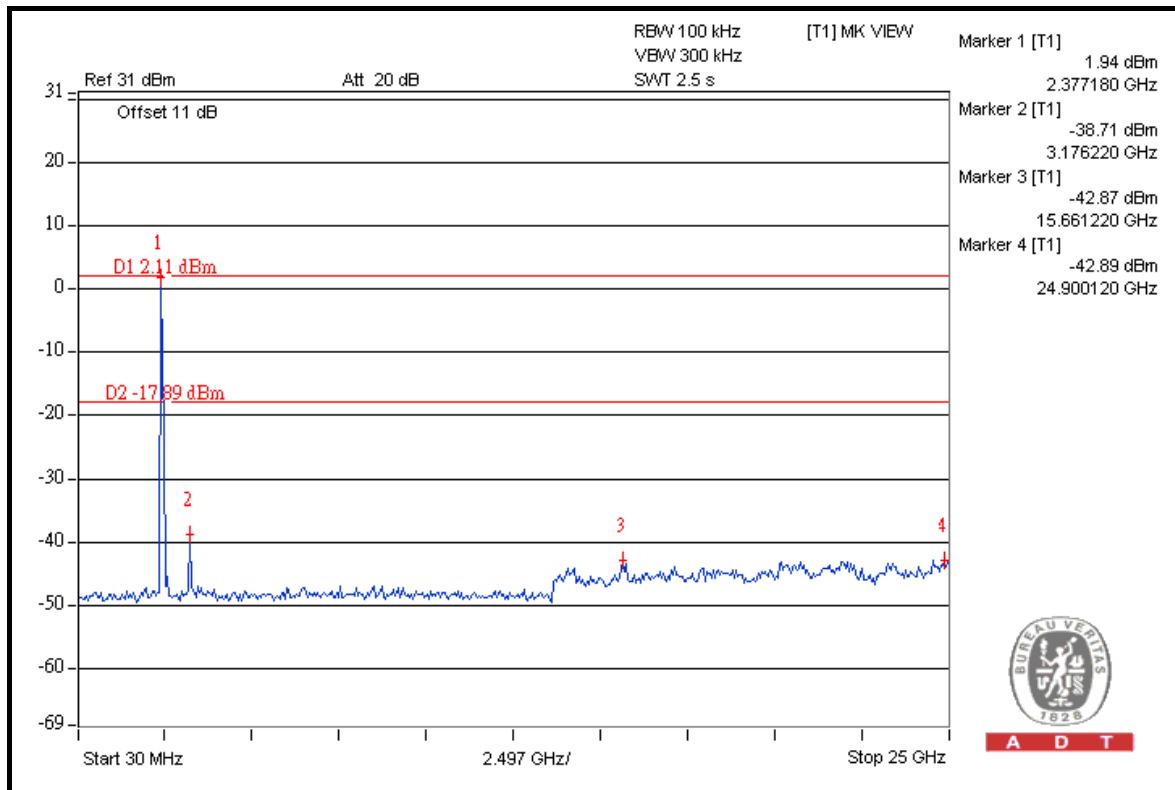
A D T



A D T

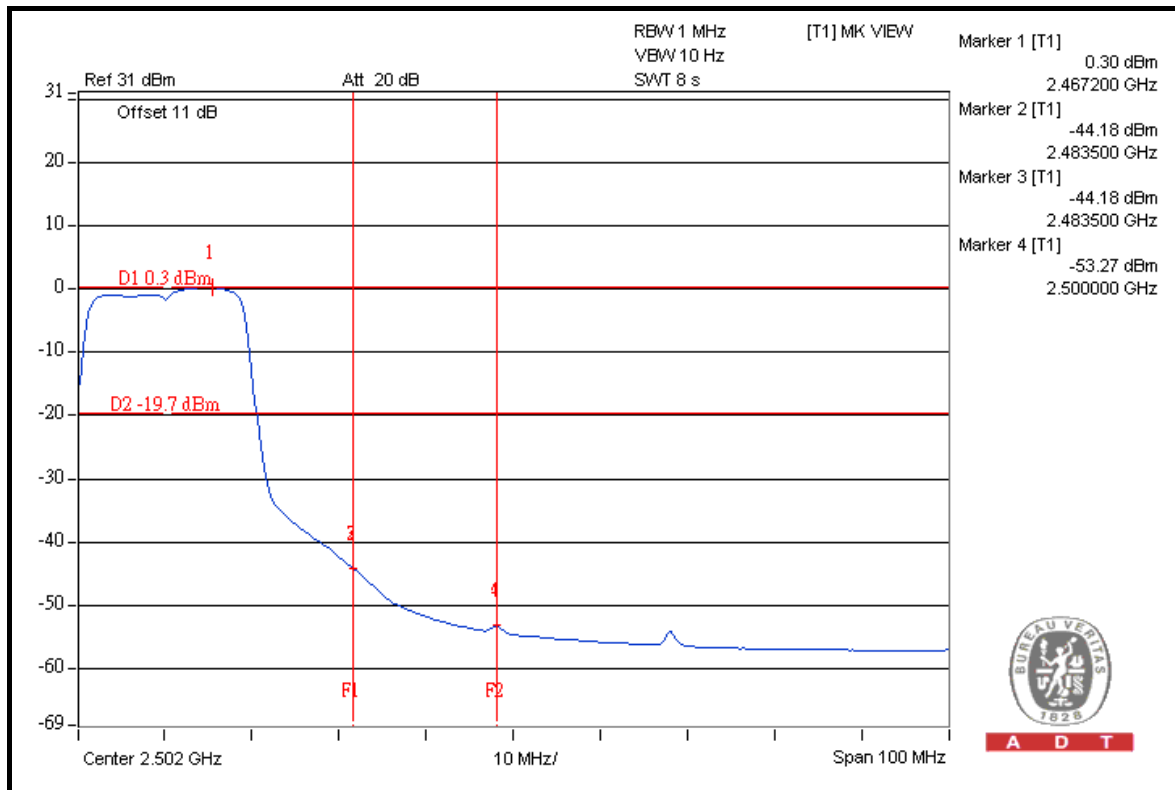


A D T

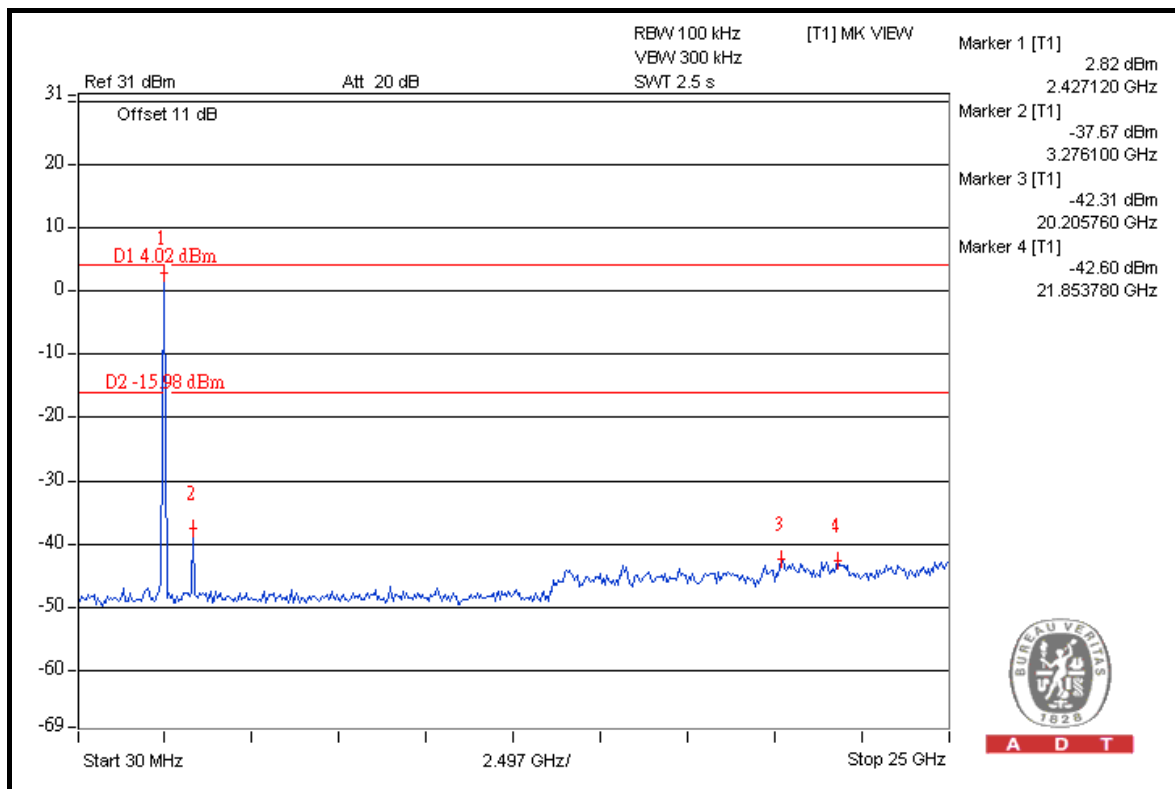




A D T

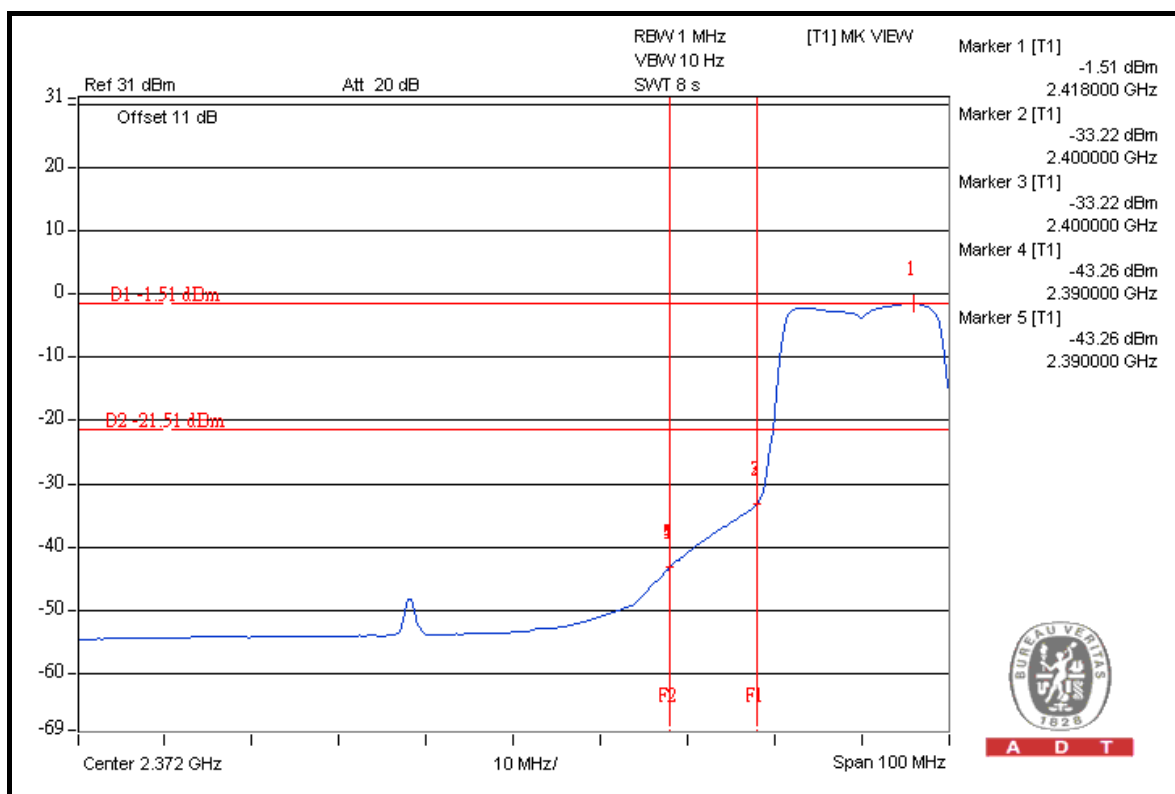
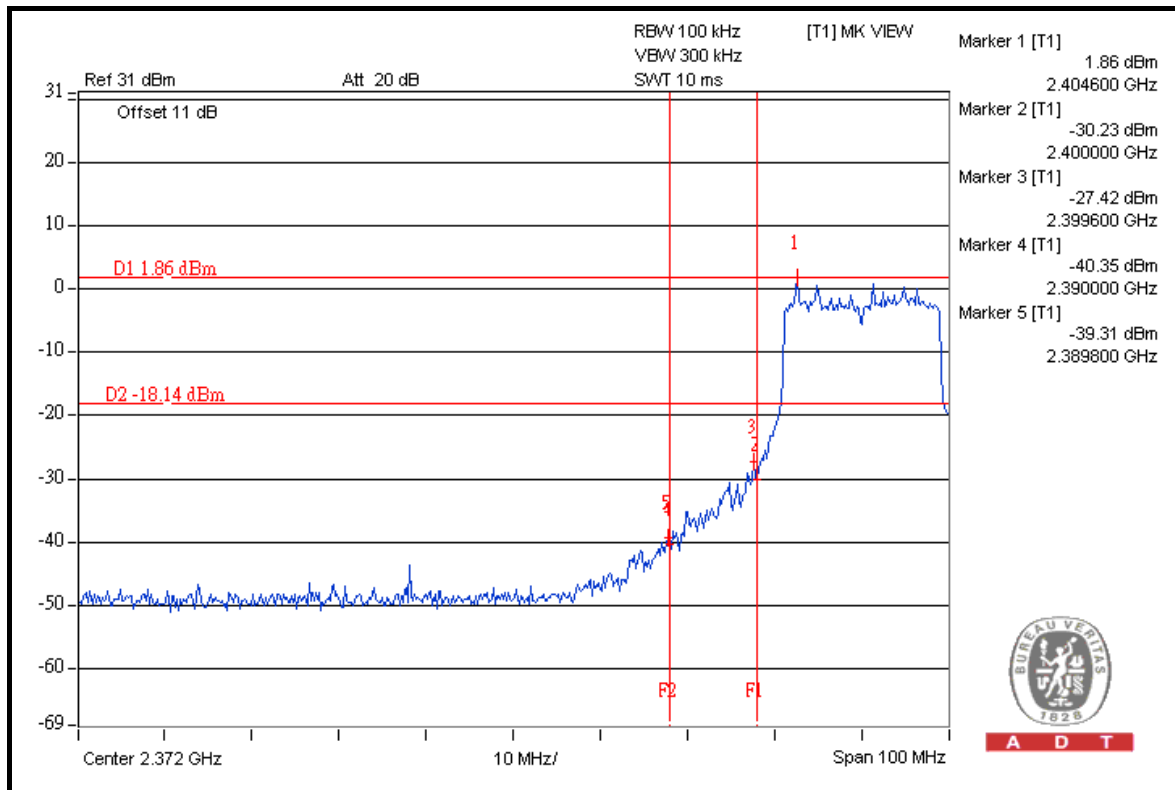


A D T



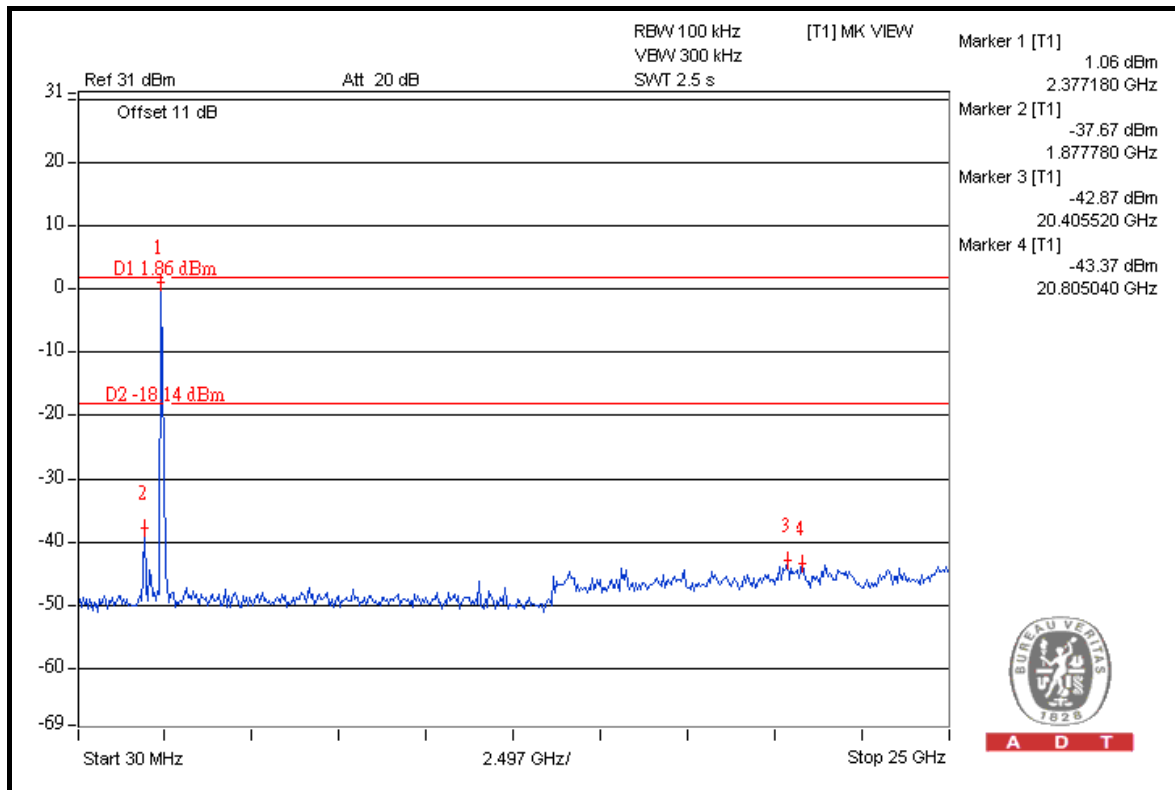
A D T

CHAIN 1

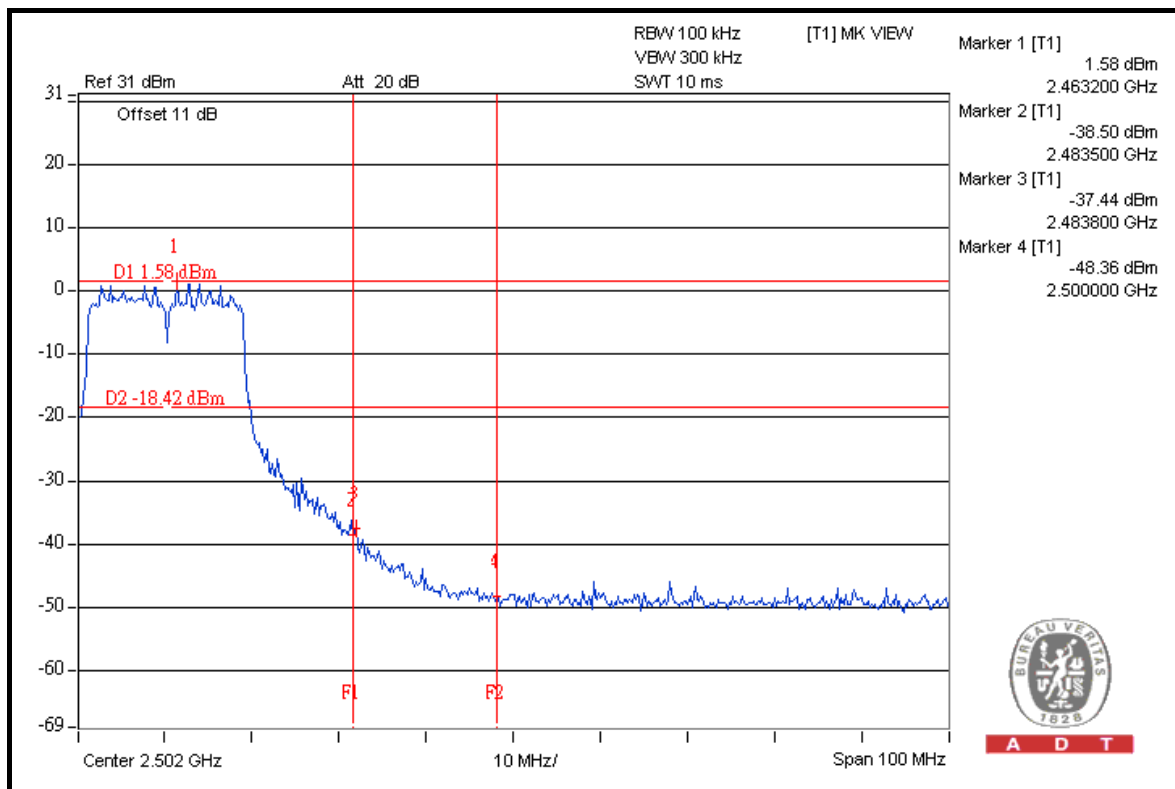




A D T



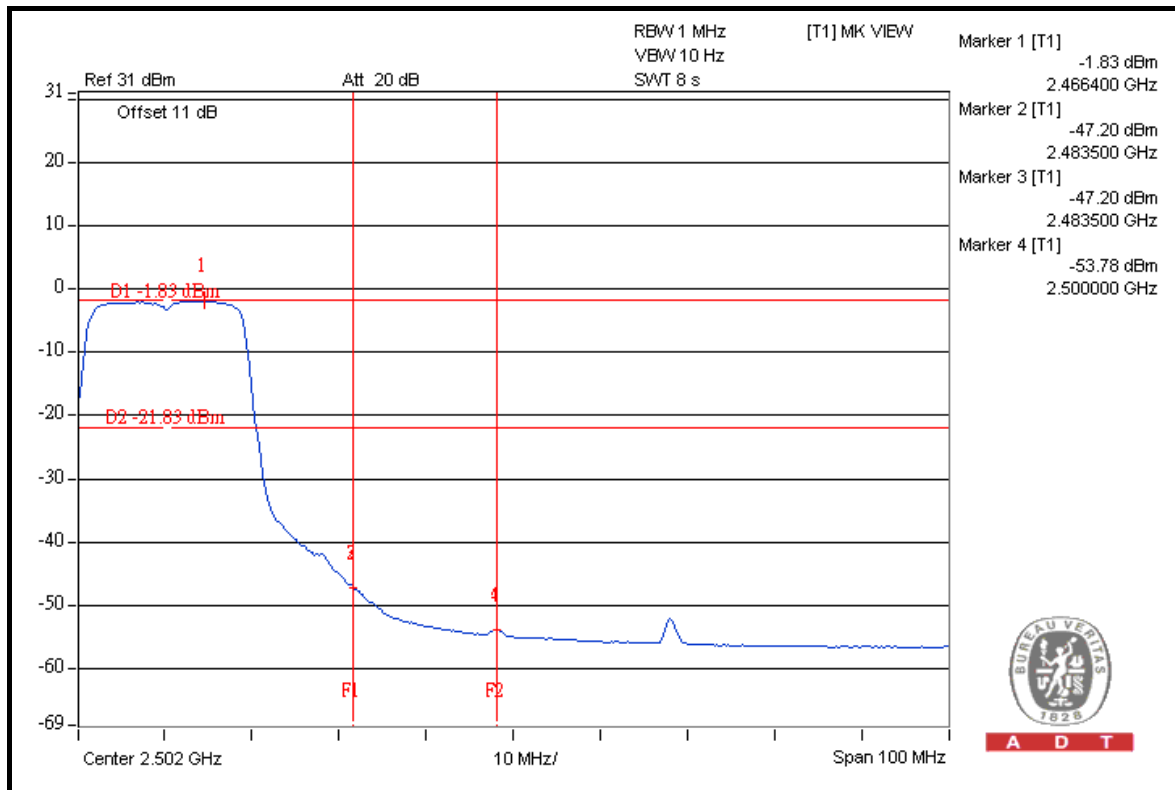
A D T



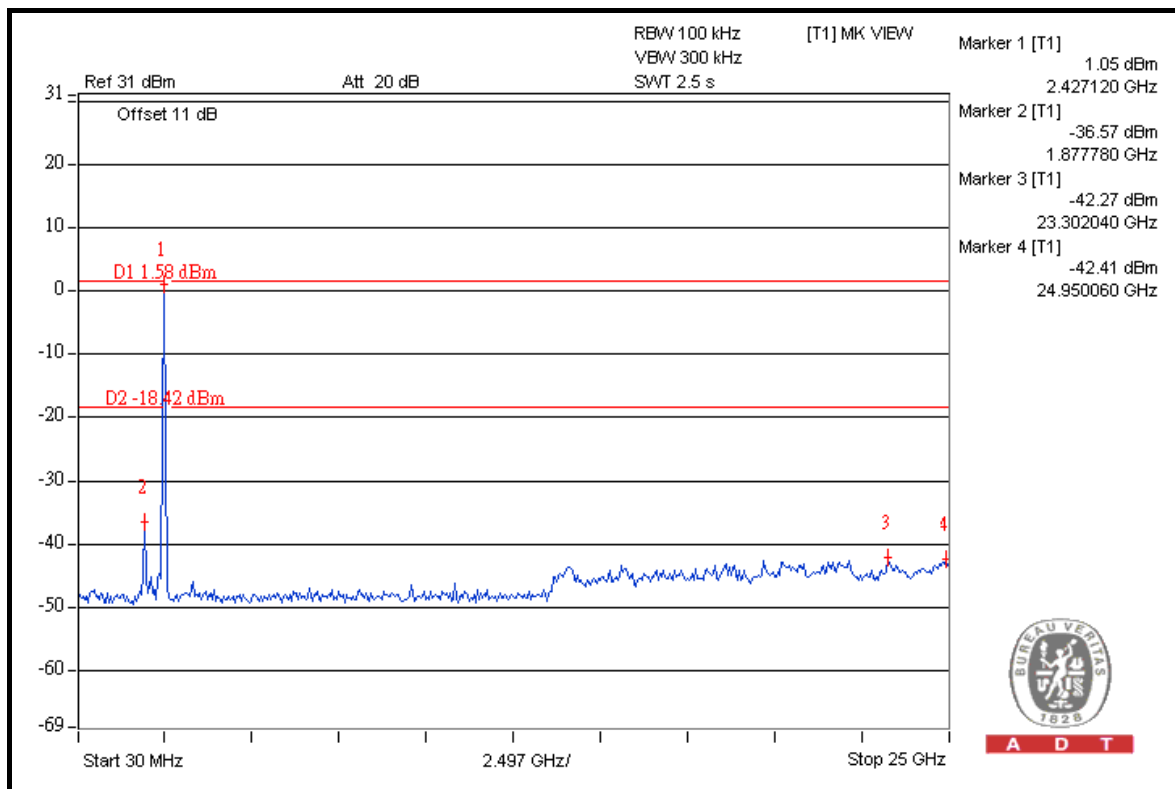
A D T



A D T



A D T



A D T

802.11n (40MHz)

RESTRICT BAND (2310 ~ 2390 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2422.00 (PK)	104.7	37.24	67.46	74.00
2422.00 (AV)	93.2	41.66	51.54	54.00

RESTRICT BAND (2483.5 ~ 2500 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2452.00 (PK)	107.2	42.93	64.27	74.00
2452.00 (AV)	95.8	46.85	48.95	54.00

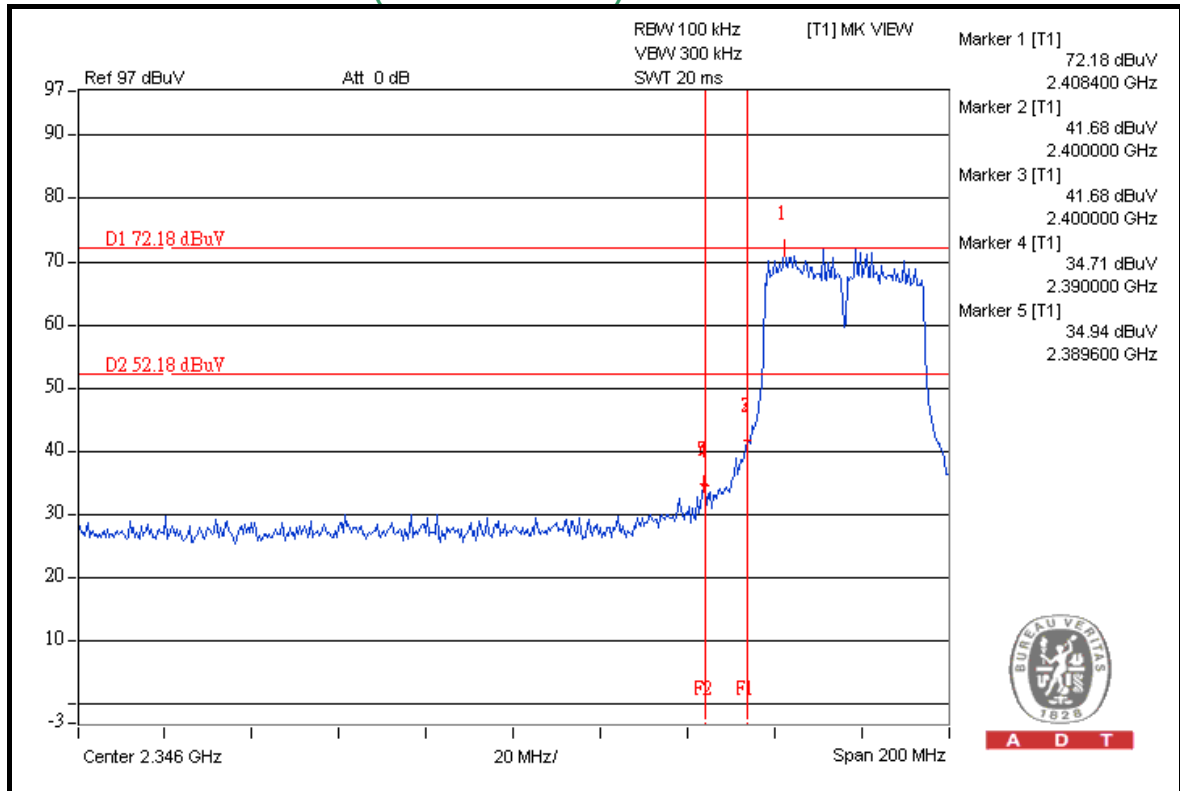
NOTE:

1. Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission. Please check following 3 pages.
2. Maximum field strength in restrict band = Fundamental emission – Delta.

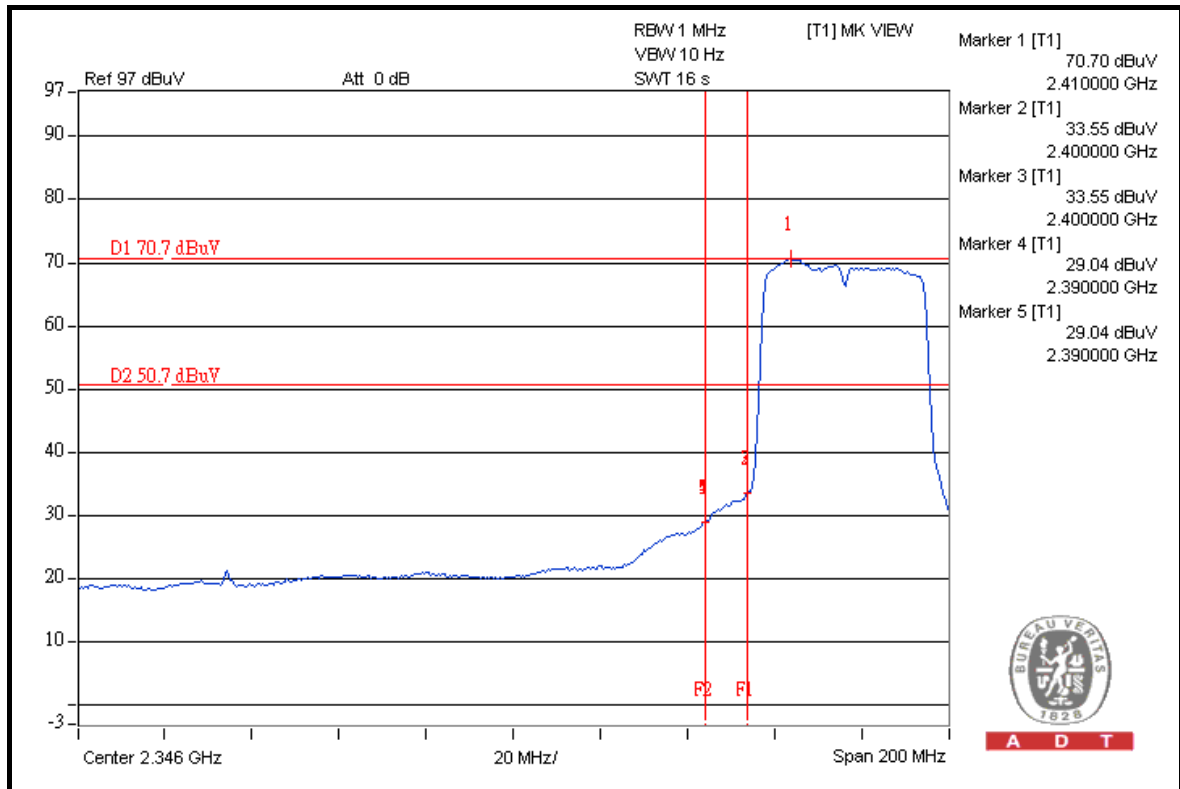


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FOR RADIATED MEASURED (BOTH CHAINS ON)



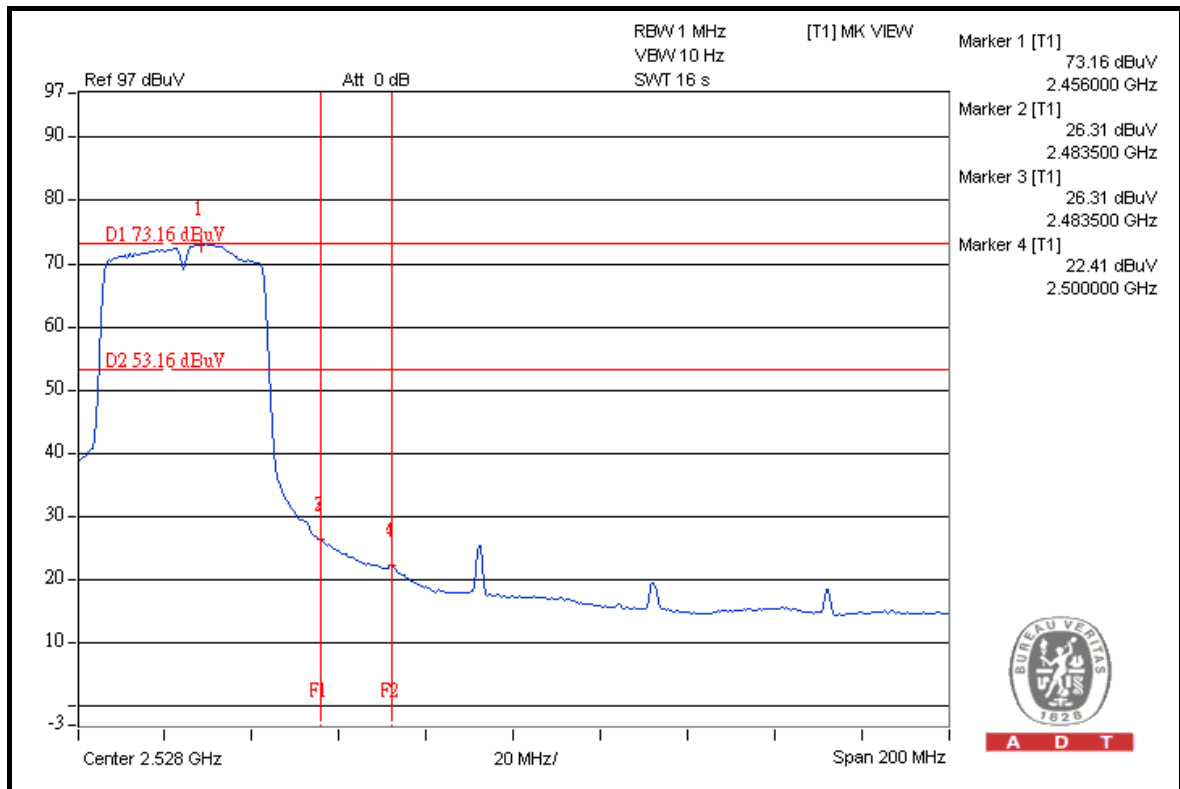
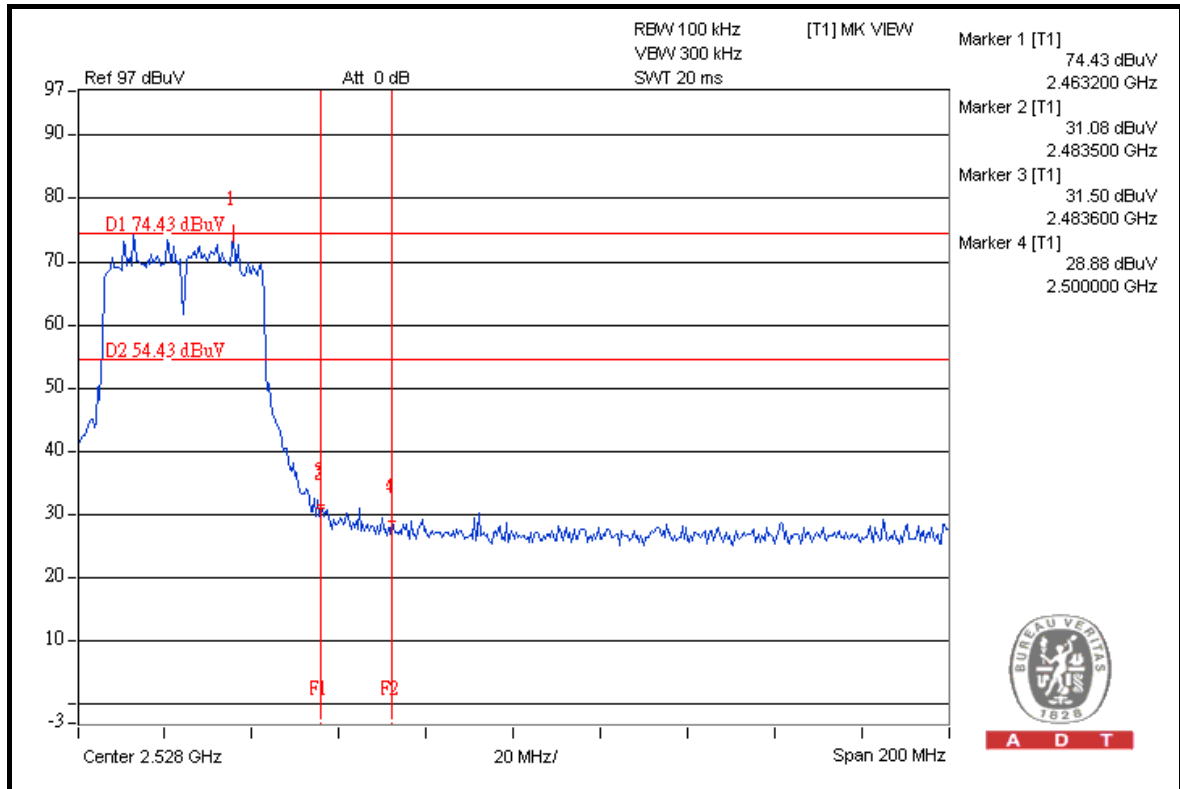
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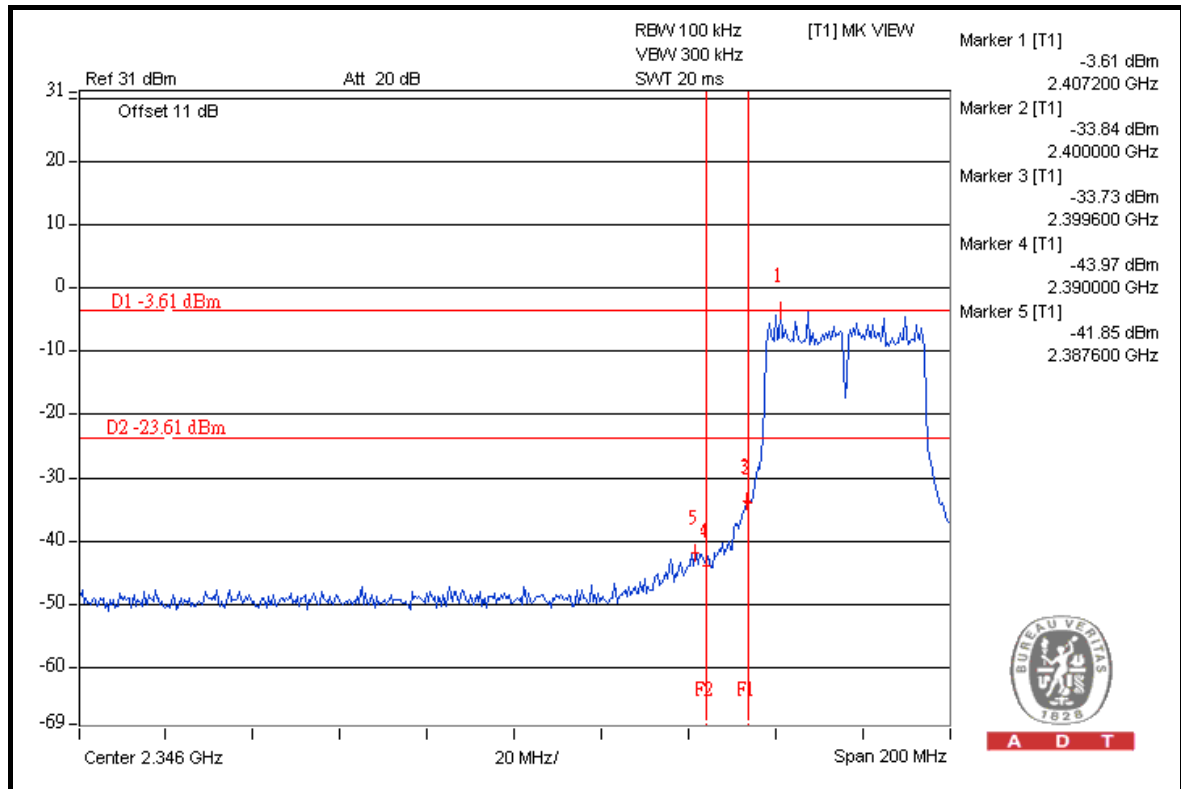




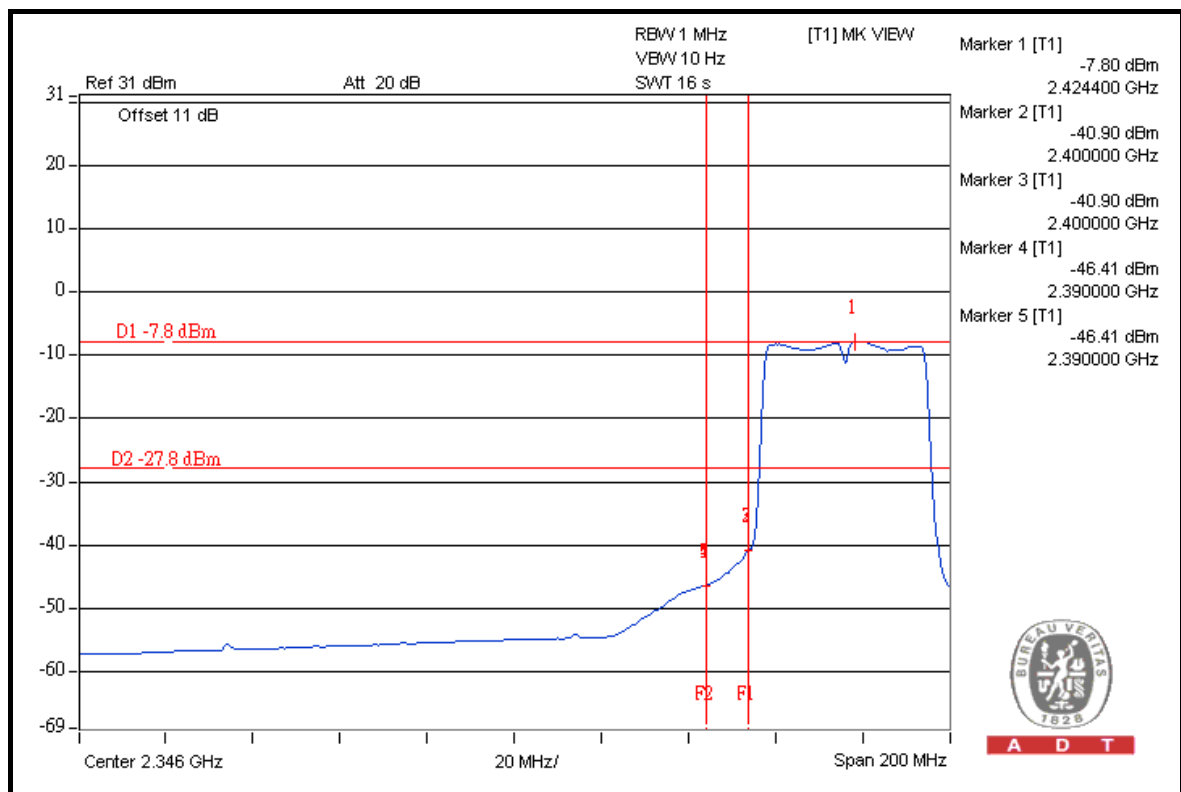
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FOR CONDUCTED MEASURED

CHAIN 0



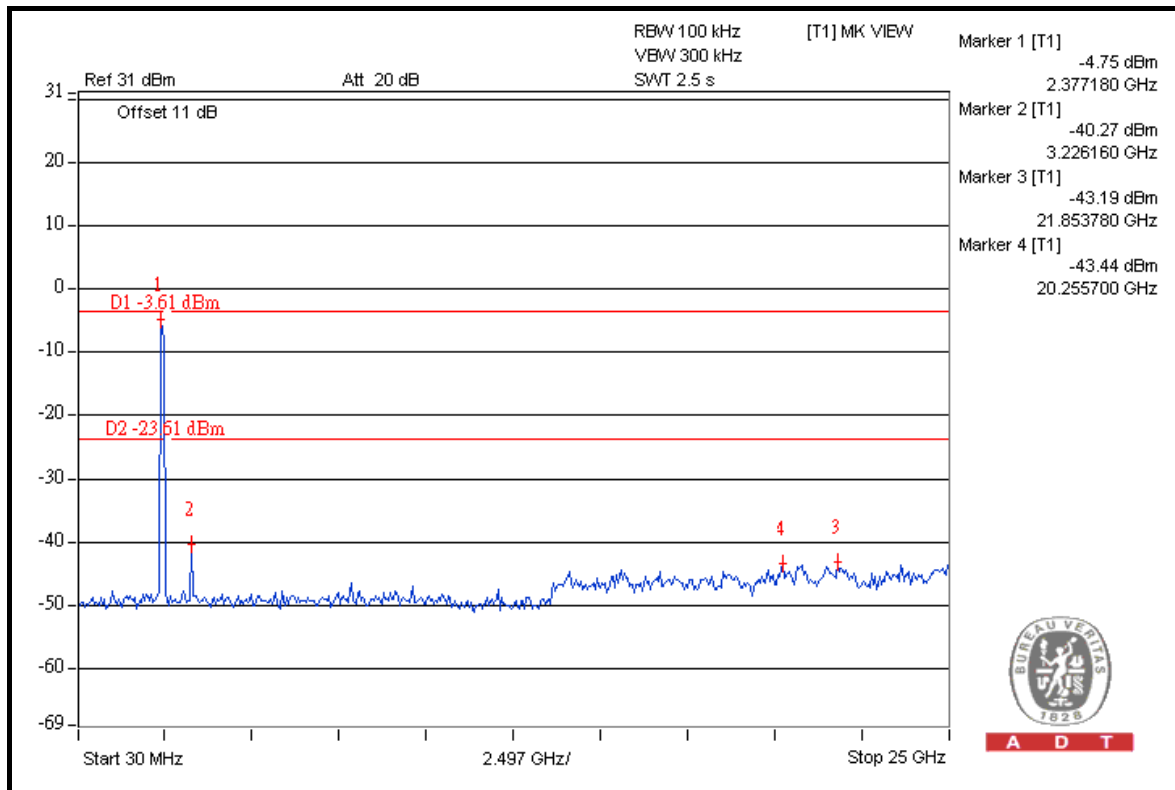
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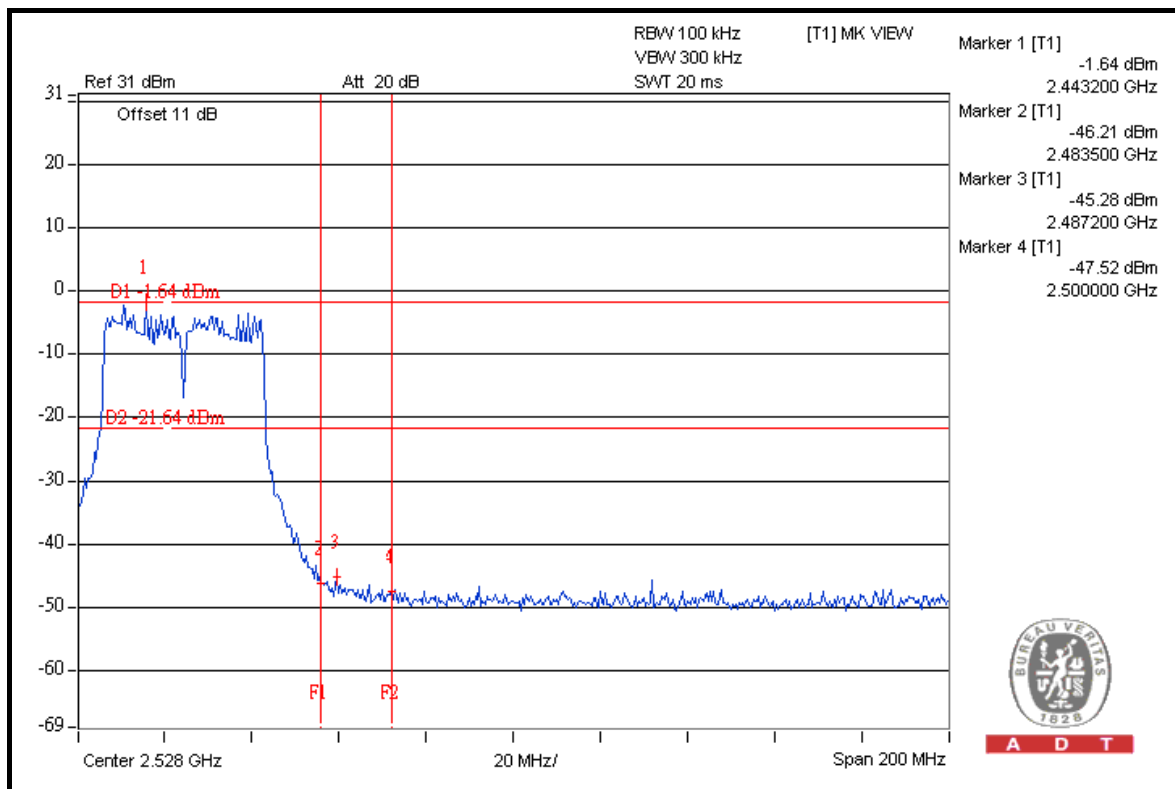
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A D T



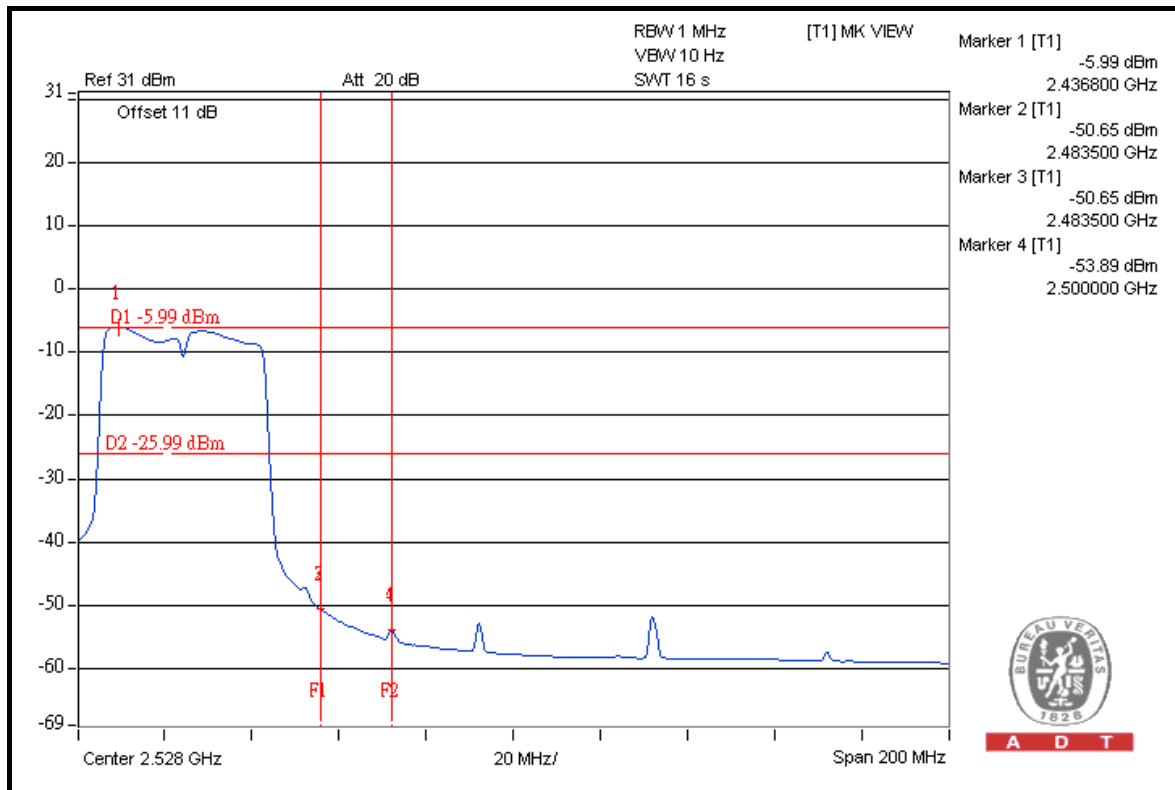
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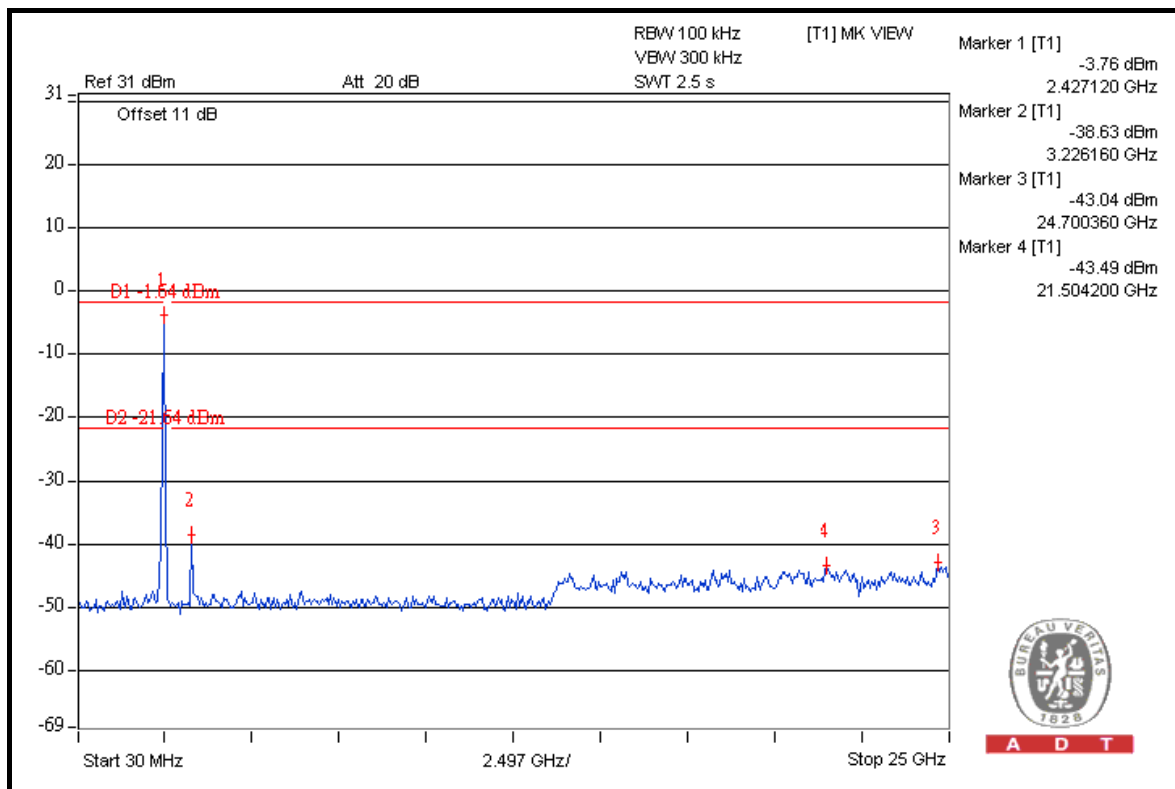
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A D T



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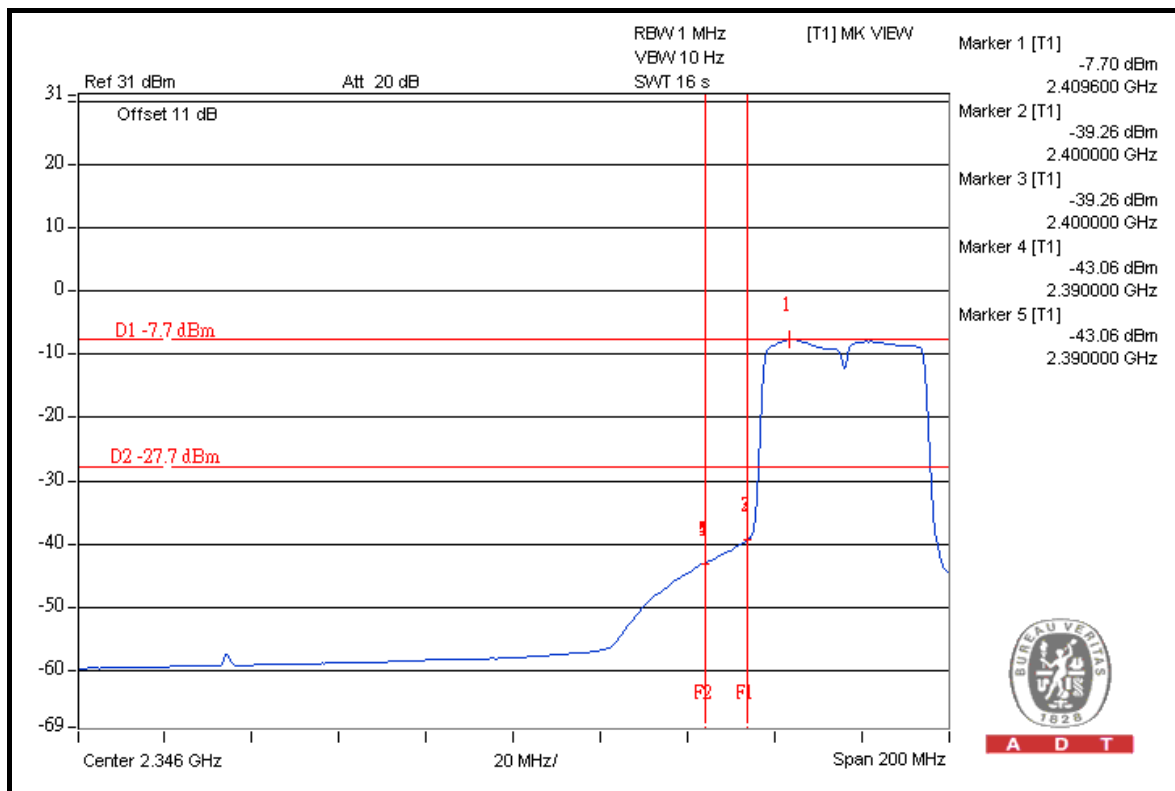
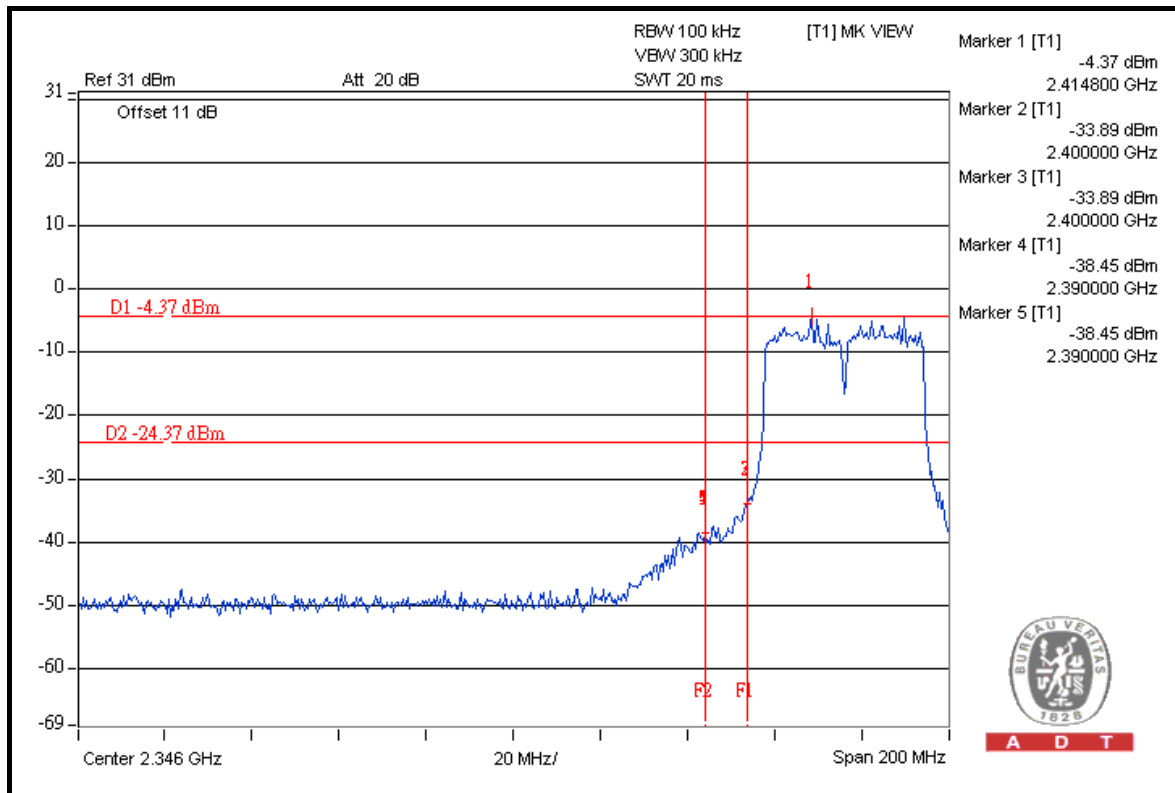


A D T



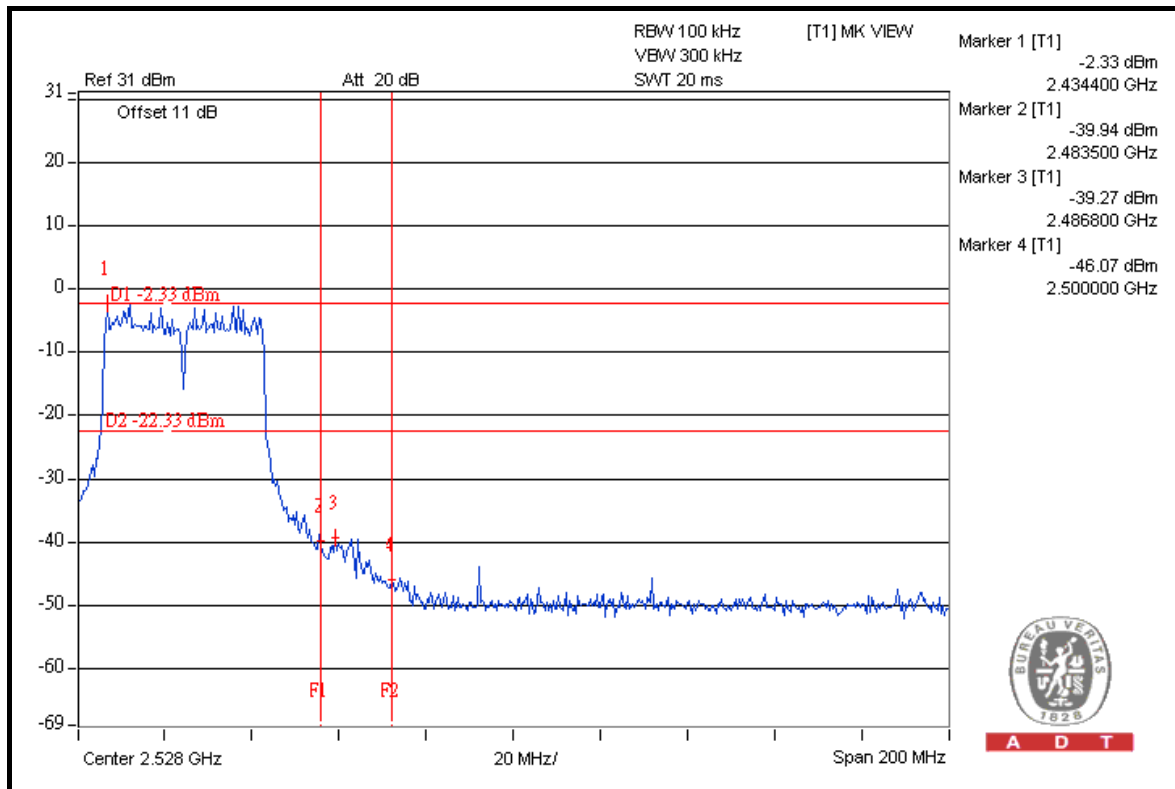
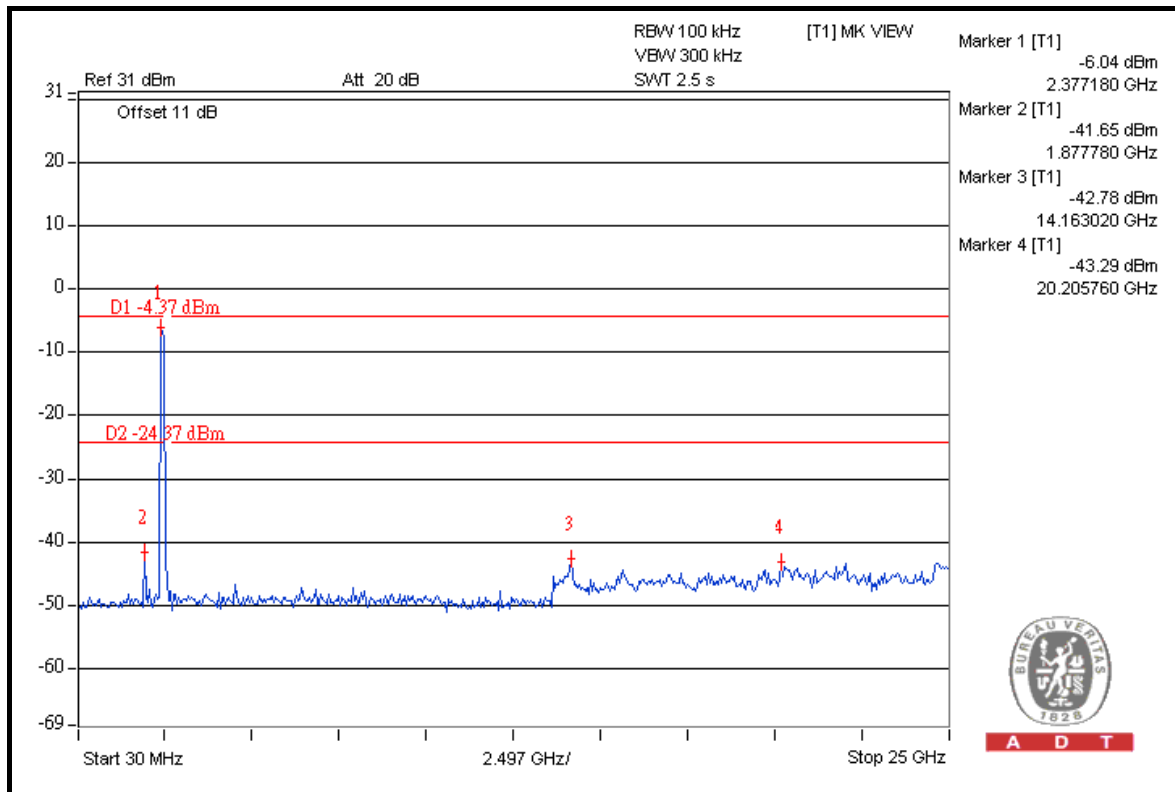
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CHAIN 1



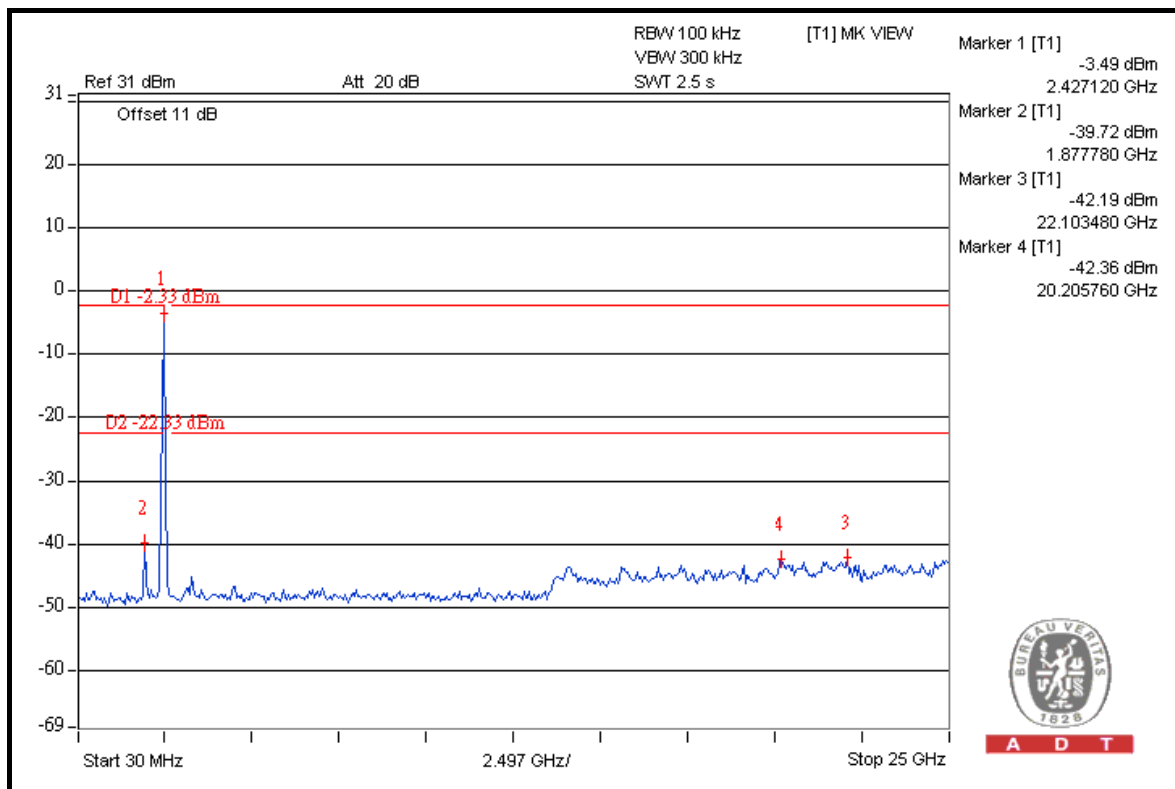
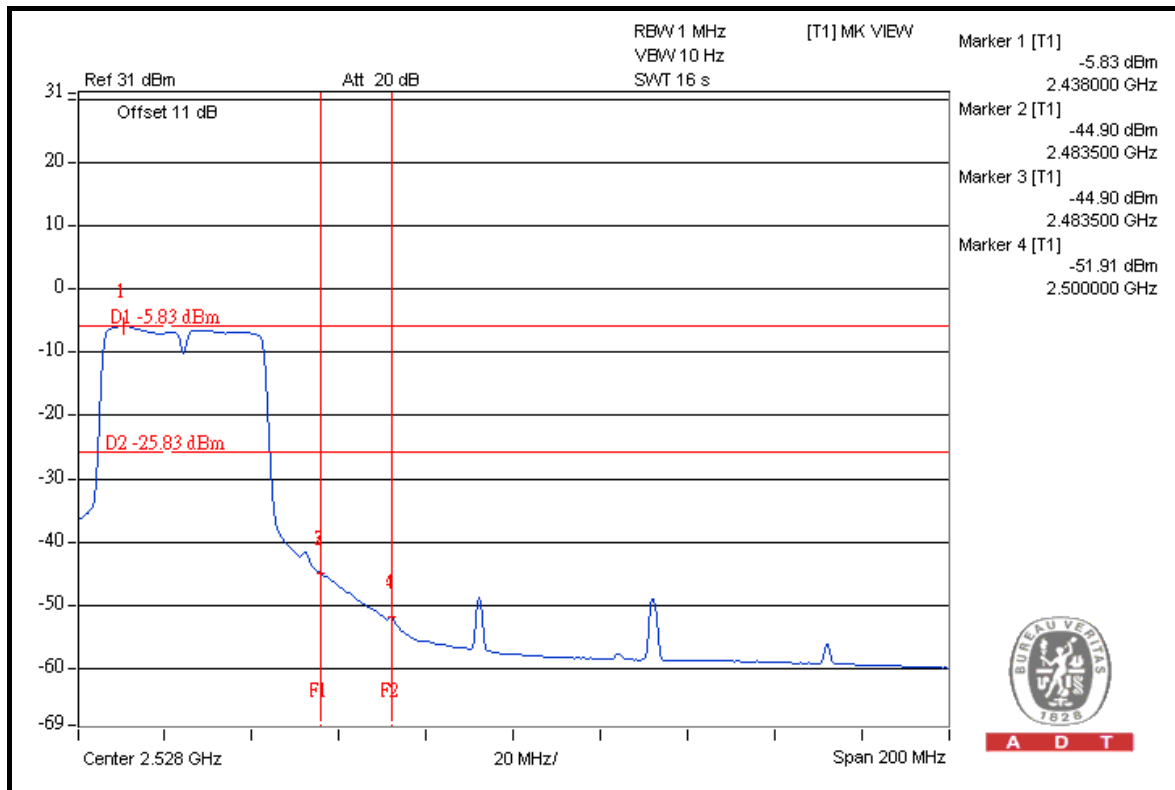


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5. TEST TYPES AND RESULTS (FOR 5.0GHz BAND)

5.1 RADIATED EMISSION MEASUREMENT

5.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a). Other emissions shall be at least 20dB below the highest level of the desired power.

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.

5.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100744	Apr. 19, 2011	Apr. 18, 2012
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jan. 06, 2011	Jan. 05, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Apr. 12, 2011	Apr. 11, 2012
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Sep. 06, 2011	Sep. 05, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8449B	3008A01911	Nov. 03, 2010	Nov. 02, 2011
Preamplifier Agilent	8447D	2944A10638	Nov. 03, 2010	Nov. 02, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295013/4 283403/4	Aug. 19, 2011	Aug. 18, 2012
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 13, 2011	Aug. 12, 2012
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	815221	Nov. 03, 2010	Nov. 02, 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.

5.1.3 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.

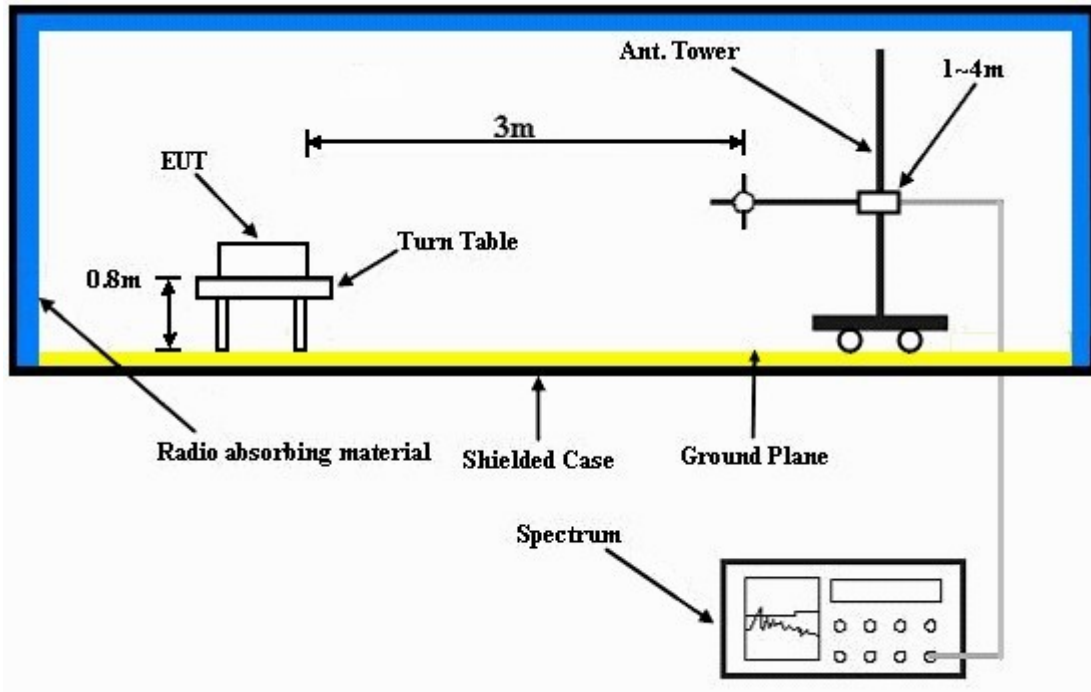
NOTE:

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 100kHz and video bandwidth is 300kHz 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.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation.

5.1.5 TEST SETUP



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

5.1.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

5.1.7 TEST RESULTS

802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

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	5000.00	54.6 PK	74.0	-19.4	1.00 H	159	17.00	37.60
2	5000.00	43.5 AV	54.0	-10.5	1.00 H	159	5.90	37.60
3	#5725.00	80.0 PK	82.5	-2.5	1.25 H	113	41.30	38.70
4	#5725.00	60.9 AV	71.7	-10.8	1.25 H	113	22.20	38.70
5	*5745.00	102.5 PK			1.00 H	62	63.70	38.80
6	*5745.00	91.7 AV			1.00 H	62	52.90	38.80
7	11490.00	55.8 PK	74.0	-18.2	1.28 H	157	6.10	49.70
8	11490.00	46.8 AV	54.0	-7.2	1.28 H	157	-2.90	49.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	61.8 PK	74.0	-12.2	1.18 V	208	24.20	37.60
2	5000.00	50.9 AV	54.0	-3.1	1.18 V	208	13.30	37.60
3	#5725.00	88.2 PK	95.2	-7.0	1.43 V	17	49.50	38.70
4	#5725.00	72.1 AV	84.0	-11.9	1.43 V	17	33.40	38.70
5	*5745.00	115.2 PK			1.15 V	53	76.40	38.80
6	*5745.00	104.0 AV			1.15 V	53	65.20	38.80
7	11490.00	64.7 PK	74.0	-9.3	1.42 V	310	15.00	49.70
8	11490.00	49.9 AV	54.0	-4.1	1.42 V	310	0.20	49.70

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. The 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 (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

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	5000.00	54.8 PK	74.0	-19.2	1.07 H	195	17.20	37.60
2	5000.00	43.7 AV	54.0	-10.3	1.07 H	195	6.10	37.60
3	5080.00	54.8 PK	74.0	-19.2	1.02 H	165	17.10	37.70
4	5080.00	43.2 AV	54.0	-10.8	1.02 H	165	5.50	37.70
5	*5785.00	102.1 PK			1.02 H	108	63.20	38.90
6	*5785.00	91.2 AV			1.02 H	108	52.30	38.90
7	11570.00	55.2 PK	74.0	-18.8	1.22 H	198	5.70	49.50
8	11570.00	46.8 AV	54.0	-7.2	1.22 H	198	-2.70	49.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	57.8 PK	74.0	-16.2	1.27 V	103	20.20	37.60
2	5000.00	51.6 AV	54.0	-2.4	1.27 V	103	14.00	37.60
3	5080.00	62.2 PK	74.0	-11.8	1.41 V	246	24.50	37.70
4	5080.00	52.4 AV	54.0	-1.6	1.41 V	246	14.70	37.70
5	*5785.00	114.9 PK			1.86 V	205	76.00	38.90
6	*5785.00	103.6 AV			1.86 V	205	64.70	38.90
7	11570.00	64.3 PK	74.0	-9.7	1.48 V	304	14.80	49.50
8	11570.00	50.5 AV	54.0	-3.5	1.48 V	304	1.00	49.50

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

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	5000.00	54.5 PK	74.0	-19.5	1.07 H	201	16.90	37.60
2	5000.00	43.8 AV	54.0	-10.2	1.07 H	201	6.20	37.60
3	5120.00	54.2 PK	74.0	-19.8	1.29 H	227	16.40	37.80
4	5120.00	42.8 AV	54.0	-11.2	1.29 H	227	5.00	37.80
5	*5825.00	101.7 PK			1.02 H	205	62.70	39.00
6	*5825.00	90.8 AV			1.02 H	205	51.80	39.00
7	#5850.00	76.5 PK	81.7	-5.2	1.15 H	81	37.50	39.00
8	#5850.00	56.9 AV	70.8	-13.9	1.15 H	81	17.90	39.00
9	11650.00	54.7 PK	74.0	-19.3	1.28 H	195	5.30	49.40
10	11650.00	46.2 AV	54.0	-7.8	1.28 H	195	-3.20	49.40
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	5000.00	62.8 PK	74.0	-11.2	1.25 V	182	25.20	37.60
2	5000.00	52.4 AV	54.0	-1.6	1.25 V	182	14.80	37.60
3	5120.00	62.8 PK	74.0	-11.2	1.26 V	237	25.00	37.80
4	5120.00	52.3 AV	54.0	-1.7	1.26 V	237	14.50	37.80
5	*5825.00	112.1 PK			1.00 V	192	73.10	39.00
6	*5825.00	101.1 AV			1.00 V	192	62.10	39.00
7	#5850.00	80.5 PK	92.1	-11.6	1.18 V	254	41.50	39.00
8	#5850.00	61.1 AV	81.1	-20.0	1.18 V	254	22.10	39.00
9	11650.00	67.6 PK	74.0	-6.4	1.52 V	299	18.20	49.40
10	11650.00	49.3 AV	54.0	-4.7	1.52 V	299	-0.10	49.40

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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802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

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	5000.00	54.8 PK	74.0	-19.2	1.02 H	168	17.20	37.60
2	5000.00	43.7 AV	54.0	-10.3	1.02 H	168	6.10	37.60
3	5080.00	55.2 PK	74.0	-18.8	1.08 H	177	17.50	37.70
4	5080.00	43.8 AV	54.0	-10.2	1.08 H	177	6.10	37.70
5	#5725.00	80.2 PK	82.1	-1.9	1.22 H	108	41.50	38.70
6	#5725.00	61.2 AV	71.2	-10.0	1.22 H	108	22.50	38.70
7	*5745.00	102.1 PK			1.02 H	77	63.30	38.80
8	*5745.00	91.2 AV			1.02 H	77	52.40	38.80
9	11490.00	55.2 PK	74.0	-18.8	1.25 H	157	5.50	49.70
10	11490.00	46.2 AV	54.0	-7.8	1.25 H	157	-3.50	49.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	62.6 PK	74.0	-11.4	1.12 V	252	25.00	37.60
2	5000.00	52.3 AV	54.0	-1.7	1.12 V	252	14.70	37.60
3	5080.00	59.8 PK	74.0	-14.2	1.24 V	9	22.10	37.70
4	5080.00	50.9 AV	54.0	-3.1	1.24 V	9	13.20	37.70
5	#5725.00	89.9 PK	95.5	-5.6	1.18 V	5	51.20	38.70
6	#5725.00	71.7 AV	83.2	-11.5	1.18 V	5	33.00	38.70
7	*5745.00	115.5 PK			1.29 V	3	76.70	38.80
8	*5745.00	103.2 AV			1.29 V	3	64.40	38.80
9	11490.00	62.6 PK	74.0	-11.4	1.60 V	120	12.90	49.70
10	11490.00	48.9 AV	54.0	-5.1	1.60 V	120	-0.80	49.70

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ”: Fundamental frequency.
 6. The 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 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

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	5000.00	55.2 PK	74.0	-18.8	1.02 H	158	17.60	37.60
2	5000.00	43.9 AV	54.0	-10.1	1.02 H	158	6.30	37.60
3	#5160.00	54.7 PK	81.7	-27.0	1.12 H	147	16.90	37.80
4	#5160.00	43.2 AV	70.7	-27.5	1.12 H	147	5.40	37.80
5	*5785.00	101.7 PK			1.27 H	52	62.80	38.90
6	*5785.00	90.7 AV			1.27 H	52	51.80	38.90
7	11570.00	55.8 PK	74.0	-18.2	1.22 H	202	6.30	49.50
8	11570.00	46.7 AV	54.0	-7.3	1.22 H	202	-2.80	49.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	61.6 PK	74.0	-12.4	1.02 V	216	24.00	37.60
2	5000.00	52.4 AV	54.0	-1.6	1.02 V	216	14.80	37.60
3	#5160.00	61.9 PK	94.8	-32.9	1.13 V	190	24.10	37.80
4	#5160.00	50.4 AV	82.9	-32.5	1.13 V	190	12.60	37.80
5	*5785.00	114.8 PK			1.15 V	219	75.90	38.90
6	*5785.00	102.9 AV			1.15 V	219	64.00	38.90
7	11570.00	65.2 PK	74.0	-8.8	1.69 V	291	15.70	49.50
8	11570.00	50.9 AV	54.0	-3.1	1.69 V	291	1.40	49.50

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “: Fundamental frequency.
6. The 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 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

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	5000.00	55.7 PK	74.0	-18.3	1.07 H	162	18.10	37.60
2	5000.00	44.5 AV	54.0	-9.5	1.07 H	162	6.90	37.60
3	5120.00	54.5 PK	74.0	-19.5	1.02 H	247	16.70	37.80
4	5120.00	43.5 AV	54.0	-10.5	1.02 H	247	5.70	37.80
5	*5825.00	100.2 PK			1.22 H	78	61.20	39.00
6	*5825.00	89.1 AV			1.22 H	78	50.10	39.00
7	#5850.00	78.5 PK	80.2	-1.7	1.24 H	98	39.50	39.00
8	#5850.00	59.7 AV	69.1	-9.4	1.24 H	98	20.70	39.00
9	11650.00	55.7 PK	74.0	-18.3	1.28 H	228	6.30	49.40
10	11650.00	46.8 AV	54.0	-7.2	1.28 H	228	-2.60	49.40
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	5000.00	62.2 PK	74.0	-11.8	1.01 V	216	24.60	37.60
2	5000.00	53.0 AV	54.0	-1.0	1.01 V	216	15.40	37.60
3	5120.00	61.5 PK	74.0	-12.5	1.09 V	237	23.70	37.80
4	5120.00	51.3 AV	54.0	-2.7	1.09 V	237	13.50	37.80
5	*5825.00	112.5 PK			1.28 V	3	73.50	39.00
6	*5825.00	100.6 AV			1.28 V	3	61.60	39.00
7	#5850.00	81.0 PK	92.5	-11.5	1.22 V	339	42.00	39.00
8	#5850.00	62.5 AV	80.6	-18.1	1.22 V	339	23.50	39.00
9	11650.00	69.2 PK	74.0	-4.8	1.59 V	291	19.80	49.40
10	11650.00	50.2 AV	54.0	-3.8	1.59 V	291	0.80	49.40

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

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

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	5000.00	54.7 PK	74.0	-19.3	1.02 H	199	17.10	37.60
2	5000.00	43.8 AV	54.0	-10.2	1.02 H	199	6.20	37.60
3	5080.00	54.2 PK	74.0	-19.8	1.09 H	147	16.50	37.70
4	5080.00	43.9 AV	54.0	-10.1	1.09 H	147	6.20	37.70
5	#5725.00	77.8 PK	79.2	-1.4	1.22 H	358	39.10	38.70
6	#5725.00	62.8 AV	68.5	-5.7	1.22 H	358	24.10	38.70
7	*5755.00	99.2 PK			1.27 H	322	60.40	38.80
8	*5755.00	88.5 AV			1.27 H	322	49.70	38.80
9	11510.00	55.2 PK	74.0	-18.8	1.22 H	169	5.60	49.60
10	11510.00	46.2 AV	54.0	-7.8	1.22 H	169	-3.40	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	5000.00	60.8 PK	74.0	-13.2	1.25 V	246	23.20	37.60
2	5000.00	51.1 AV	54.0	-2.9	1.25 V	246	13.50	37.60
3	5080.00	60.9 PK	74.0	-13.1	1.05 V	187	23.20	37.70
4	5080.00	51.8 AV	54.0	-2.2	1.05 V	187	14.10	37.70
5	#5725.00	90.1 PK	91.5	-1.4	1.12 V	188	51.40	38.70
6	#5725.00	75.0 AV	80.0	-5.0	1.12 V	188	36.30	38.70
7	*5755.00	111.5 PK			1.12 V	224	72.70	38.80
8	*5755.00	100.0 AV			1.12 V	224	61.20	38.80
9	11510.00	58.6 PK	74.0	-15.4	1.48 V	293	9.00	49.60
10	11510.00	46.4 AV	54.0	-7.6	1.48 V	293	-3.20	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 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 (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Sun Lin

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	5000.00	54.2 PK	74.0	-19.8	1.08 H	202	16.60	37.60
2	5000.00	43.2 AV	54.0	-10.8	1.08 H	202	5.60	37.60
3	5080.00	54.8 PK	74.0	-19.2	1.07 H	262	17.10	37.70
4	5080.00	43.5 AV	54.0	-10.5	1.07 H	262	5.80	37.70
5	*5795.00	98.5 PK			1.07 H	245	59.60	38.90
6	*5795.00	88.0 AV			1.07 H	245	49.10	38.90
7	#5850.00	67.9 PK	78.5	-10.6	1.08 H	258	28.90	39.00
8	#5850.00	52.2 AV	68.0	-15.8	1.08 H	258	13.20	39.00
9	11590.00	60.7 PK	74.0	-13.3	1.47 H	205	11.20	49.50
10	11590.00	48.2 AV	54.0	-5.8	1.47 H	205	-1.30	49.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	60.8 PK	74.0	-13.2	1.12 V	254	23.20	37.60
2	5000.00	51.0 AV	54.0	-3.0	1.12 V	254	13.40	37.60
3	5080.00	61.8 PK	74.0	-12.2	1.01 V	227	24.10	37.70
4	5080.00	53.0 AV	54.0	-1.0	1.01 V	227	15.30	37.70
5	*5795.00	112.0 PK			1.18 V	224	73.10	38.90
6	*5795.00	100.4 AV			1.18 V	224	61.50	38.90
7	#5850.00	76.4 PK	92.0	-15.6	1.17 V	222	37.40	39.00
8	#5850.00	61.9 AV	80.4	-18.5	1.17 V	222	22.90	39.00
9	11590.00	60.6 PK	74.0	-13.4	2.00 V	95	11.10	49.50
10	11590.00	48.0 AV	54.0	-6.0	2.00 V	95	-1.50	49.50

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * ”: Fundamental frequency.
6. The 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 : 802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH	TESTED BY	Sun Lin

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	107.67	33.4 QP	43.5	-10.1	1.50 H	238	23.80	9.60
2	125.17	40.0 QP	43.5	-3.5	1.50 H	148	28.00	12.00
3	191.28	32.0 QP	43.5	-11.5	1.50 H	139	21.30	10.70
4	239.88	33.6 QP	46.0	-12.4	1.25 H	121	21.50	12.10
5	626.80	38.5 QP	46.0	-7.5	1.00 H	157	16.10	22.40
6	722.07	36.8 QP	46.0	-9.2	1.25 H	25	13.40	23.40
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	47.40	35.9 QP	40.0	-4.1	1.00 V	10	22.70	13.20
2	76.56	36.6 QP	40.0	-3.4	1.00 V	208	26.60	10.00
3	125.17	38.9 QP	43.5	-4.6	1.25 V	205	26.90	12.00
4	500.42	38.1 QP	46.0	-7.9	1.00 V	187	18.40	19.70
5	626.80	39.9 QP	46.0	-6.1	1.50 V	10	17.50	22.40
6	780.40	40.2 QP	46.0	-5.8	1.50 V	142	16.00	24.20

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.

5.2 CONDUCTED EMISSION MEASUREMENT

5.2.1 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.

5.2.2 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	100312	Jul. 07, 2011	Jul. 06, 2012
V-LISN SCHWARZBECK	NNBL 8226-2	8226-142	Jun. 30, 2011	Jun. 29, 2012
LISN ROHDE & SCHWARZ	ENV216	100072	Jun. 10, 2011	Jun. 09, 2012
Software ADT	ADT_Conc_ V7.3.7	NA	NA	NA

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

5.2.3 TEST PROCEDURES

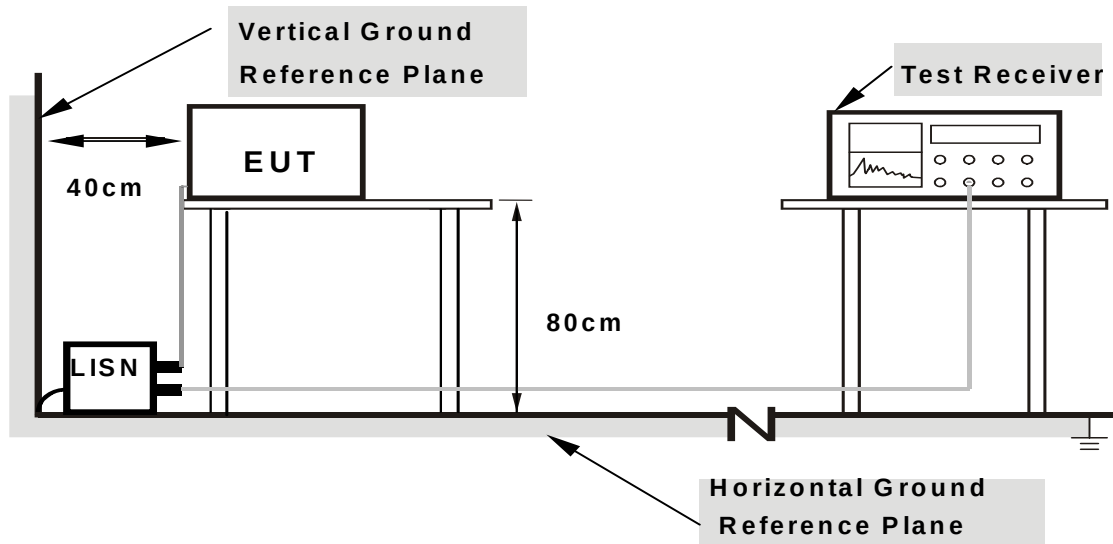
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

5.2.4 DEVIATION FROM TEST STANDARD

No deviation.

5.2.5 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).

5.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

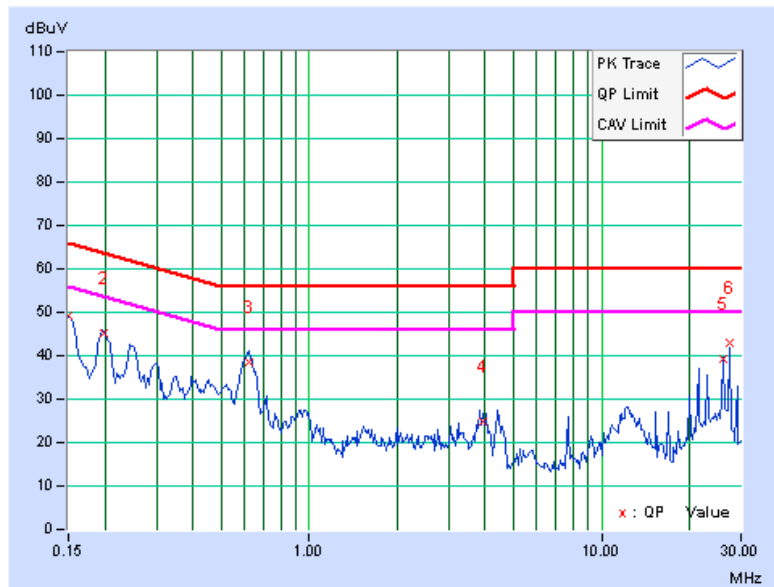
5.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA : 802.11n (20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.15	49.15	41.85	49.30	42.00	66.00	56.00	-16.70	-14.00
2	0.199	0.15	44.99	39.65	45.14	39.80	63.63	53.63	-18.49	-13.83
3	0.621	0.18	38.44	33.89	38.62	34.07	56.00	46.00	-17.38	-11.93
4	3.930	0.32	24.38	14.82	24.70	15.14	56.00	46.00	-31.30	-30.86
5	26.061	1.24	38.13	38.12	39.37	39.36	60.00	50.00	-20.63	-10.64
6	27.595	1.26	41.79	41.73	43.05	42.99	60.00	50.00	-16.95	-7.01

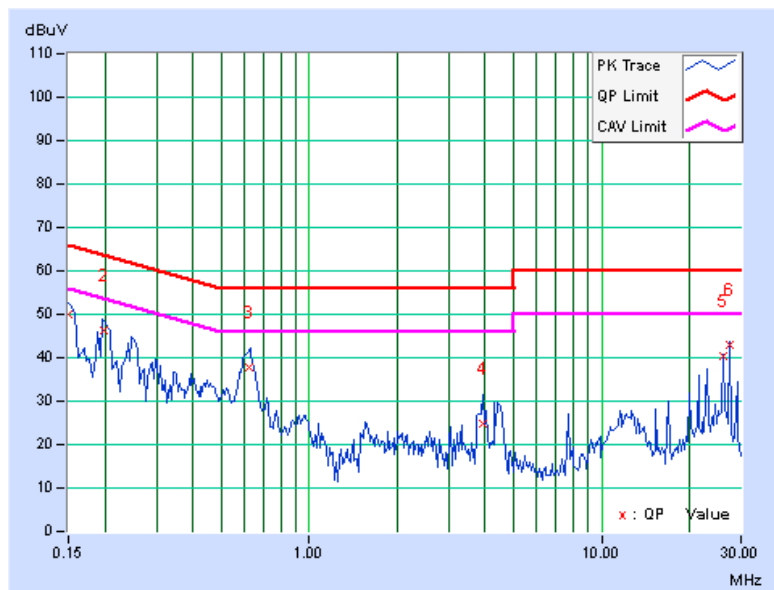
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.16	49.69	41.75	49.85	41.91	66.00	56.00	-16.15	-14.09
2	0.199	0.17	46.03	39.84	46.20	40.01	63.63	53.63	-17.43	-13.62
3	0.624	0.20	37.76	33.14	37.96	33.34	56.00	46.00	-18.04	-12.66
4	3.938	0.32	24.40	14.43	24.72	14.75	56.00	46.00	-31.28	-31.25
5	26.066	1.06	39.49	38.91	40.55	39.97	60.00	50.00	-19.45	-10.03
6	27.600	1.08	41.73	41.59	42.81	42.67	60.00	50.00	-17.19	-7.33

- 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.



5.3 6dB BANDWIDTH MEASUREMENT

5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

5.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
R&S SPECTRUM ANALYZER	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012

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

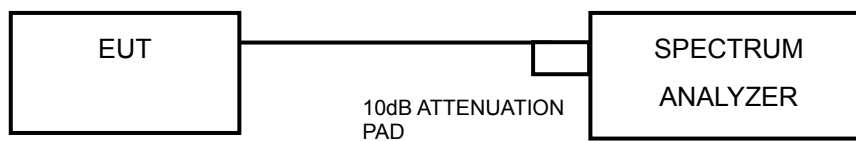
5.3.3 TEST PROCEDURE

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.

5.3.4 DEVIATION FROM TEST STANDARD

No deviation.

5.3.5 TEST SETUP



5.3.6 EUT OPERATING CONDITIONS

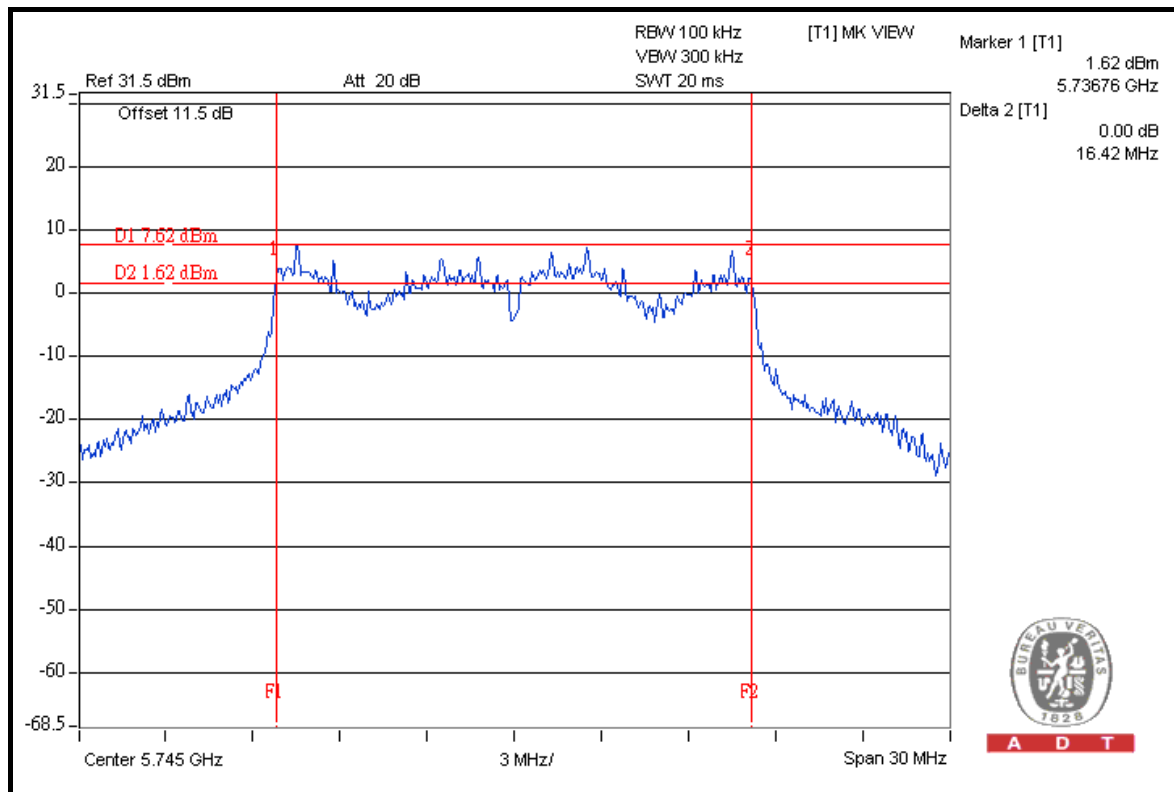
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

5.3.7 TEST RESULTS

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	15.78	15.84	16.42	0.5	PASS
157	5785	13.32	14.52	15.95	0.5	PASS
165	5825	15.80	13.54	15.73	0.5	PASS

FOR CHAIN 2: CH 149



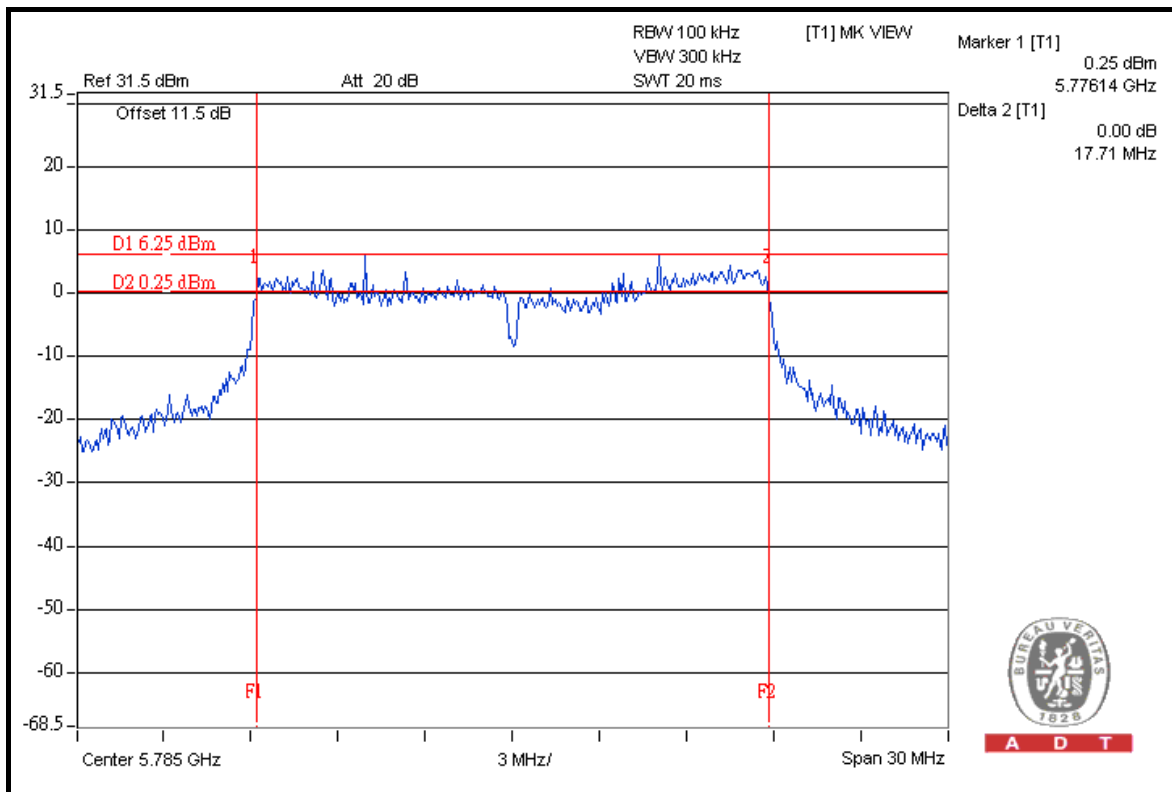


A D T

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	17.34	16.72	17.03	0.5	PASS
157	5785	17.35	16.99	17.71	0.5	PASS
165	5825	15.15	16.38	17.62	0.5	PASS

FOR CHAIN 2: CH 157

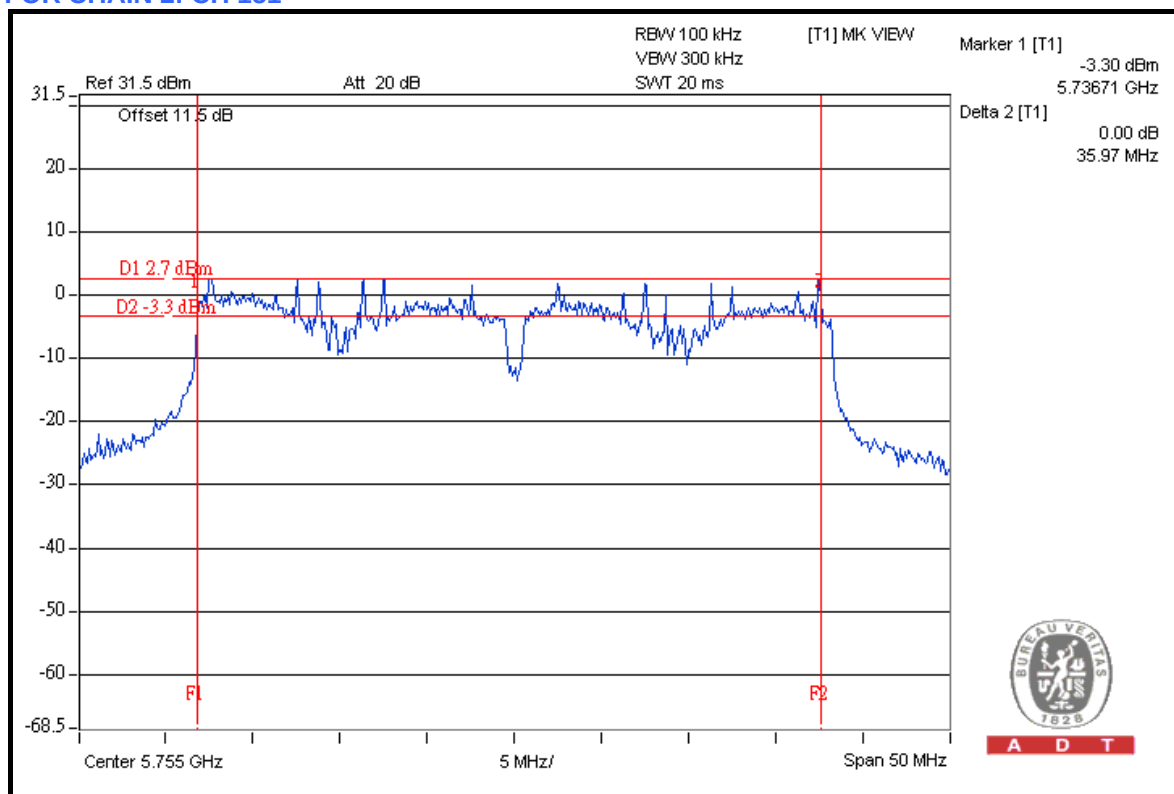


A D T

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	35.76	34.01	35.97	0.5	PASS
159	5795	35.49	33.00	32.06	0.5	PASS

FOR CHAIN 2: CH 151



5.4 MAXIMUM OUTPUT POWER

5.4.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

The Maximum Output Power Measurement is 30dBm.

5.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
High Speed Peak Power Meter	ML2495A	0824011	Aug. 04, 2011	Aug. 03, 2012
Power Sensor	MA2411B	0738171	Aug. 04, 2011	Aug. 03, 2012

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.

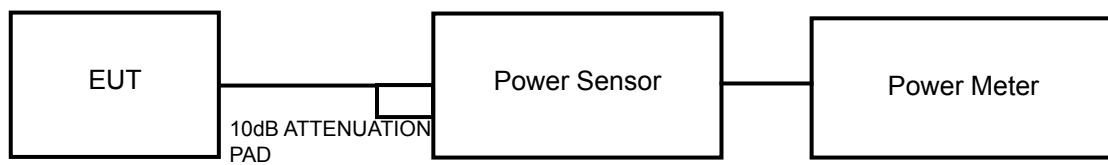
5.4.3 TEST PROCEDURES

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.

5.4.4 DEVIATION FROM TEST STANDARD

No deviation.

5.4.5 TEST SETUP



5.4.6 EUT OPERATING CONDITIONS

Same as Item 5.3.6

5.4.7 TEST RESULTS

802.11a

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	24.5	24.8	23.4	802.6	29.0	29.2	PASS
157	5785	23.7	24.6	23.4	741.6	28.7	29.2	PASS
165	5825	21.3	23.2	22.2	509.8	27.1	29.2	PASS

NOTE: Directional gain = $2\text{dBi} + 10\log(3) = 6.77\text{dBi} > 6\text{dBi}$, so the conducted power limit shall be reduced to $30 - (6.77 - 6) = 29.2\text{dBm}$.

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	24.5	24.4	24.0	808.4	29.1	30	PASS
157	5785	23.6	24.5	23.4	729.7	28.6	30	PASS
165	5825	21.8	22.5	22.4	503.0	27.0	30	PASS

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
151	5755	24.5	24.8	23.6	812.9	29.1	30	PASS
159	5795	23.2	24.1	22.8	656.5	28.2	30	PASS

5.5 POWER SPECTRAL DENSITY MEASUREMENT

5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

5.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
R&S SPECTRUM ANALYZER	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012

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

5.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 10kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

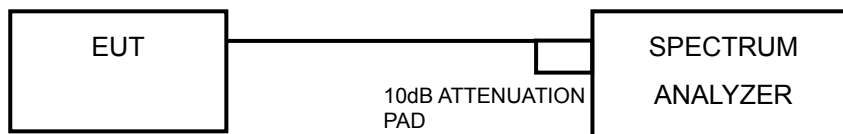
The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

Follow method 2 of KDB 662911 D01 Multiple Transmitter Output v01 to calculate total power density of 2 TX port.

5.5.4 DEVIATION FROM TEST STANDARD

No deviation.

5.5.5 TEST SETUP



5.5.6 EUT OPERATING CONDITION

Same as Item 5.3.6.

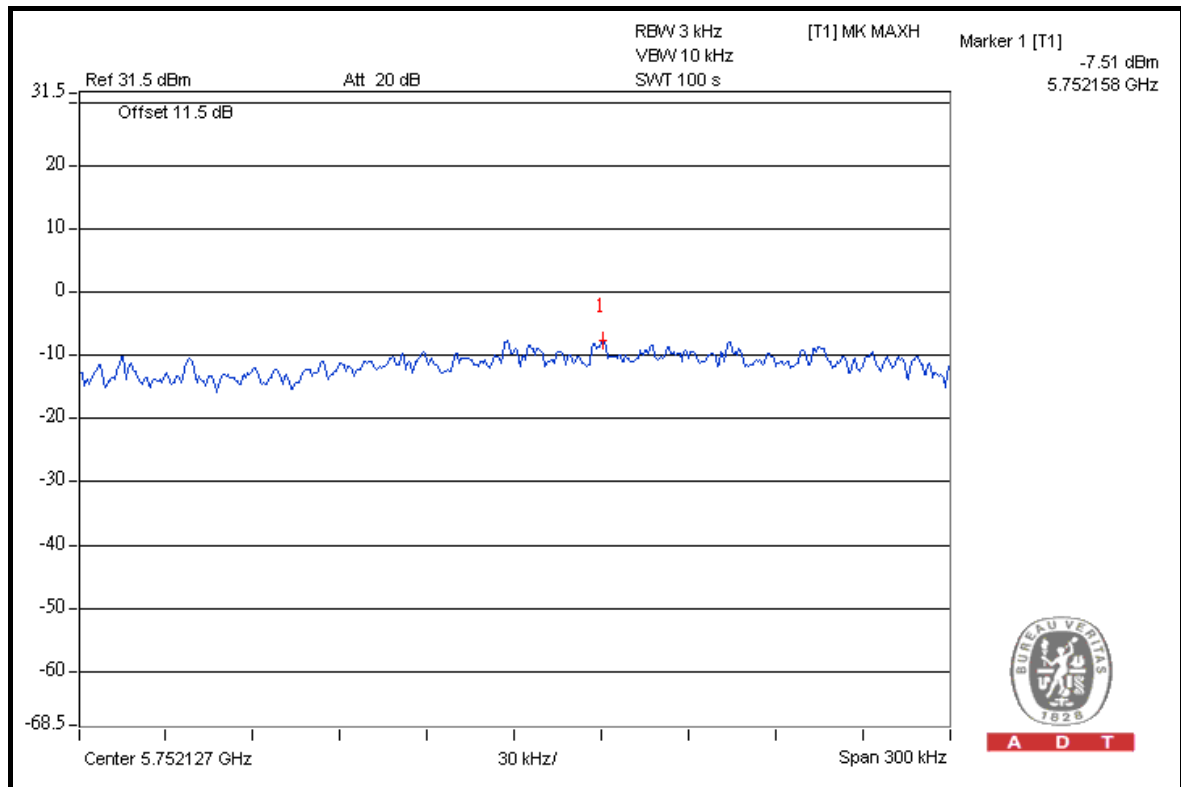
5.5.7 TEST RESULTS

802.11a

CHAIN	CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
			MEASURED	10 log (N=3) dB			
0	149	5745	-9.8	4.77	-5.0	7.2	PASS
	157	5785	-10.6	4.77	-5.8	7.2	PASS
	165	5825	-13.2	4.77	-8.4	7.2	PASS
1	149	5745	-7.5	4.77	-2.7	7.2	PASS
	157	5785	-7.5	4.77	-2.7	7.2	PASS
	165	5825	-9.0	4.77	-4.2	7.2	PASS
2	149	5745	-8.4	4.77	-3.6	7.2	PASS
	157	5785	-8.2	4.77	-3.4	7.2	PASS
	165	5825	-9.4	4.77	-4.6	7.2	PASS

NOTE: Directional gain = 2dBi + 10log(3) = 6.77dBi > 6dBi , so the power density limit shall be reduced to 8-(6.77-6) = 7.2dBm.

FOR CHAIN 1: CH 149



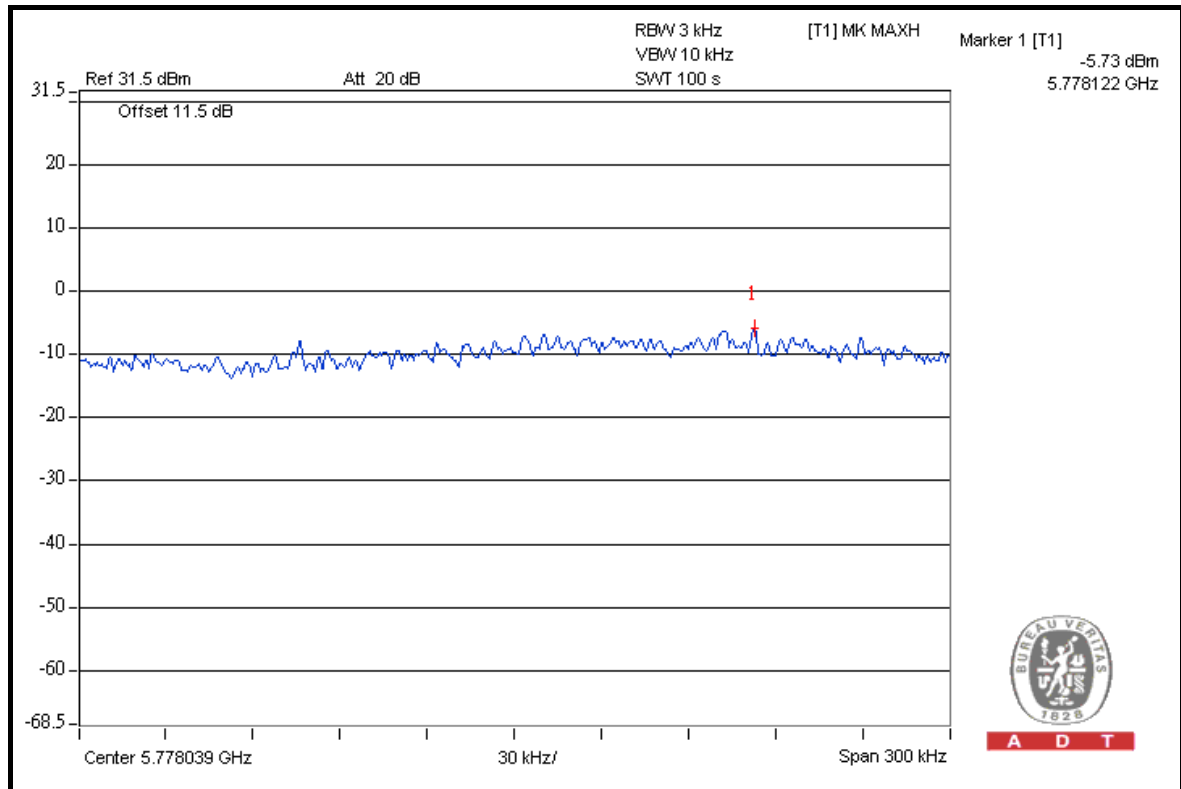


A D T

802.11n (20MHz)

CHAIN	CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
			MEASURED	10 log (N=3) dB			
0	149	5745	-6.6	4.77	-1.8	8	PASS
	157	5785	-7.6	4.77	-2.8	8	PASS
	165	5825	-9.3	4.77	-4.5	8	PASS
1	149	5745	-5.9	4.77	-1.1	8	PASS
	157	5785	-5.7	4.77	-0.9	8	PASS
	165	5825	-7.6	4.77	-2.8	8	PASS
2	149	5745	-5.8	4.77	-1.0	8	PASS
	157	5785	-6.2	4.77	-1.4	8	PASS
	165	5825	-7.4	4.77	-2.6	8	PASS

FOR CHAIN 1: CH 157

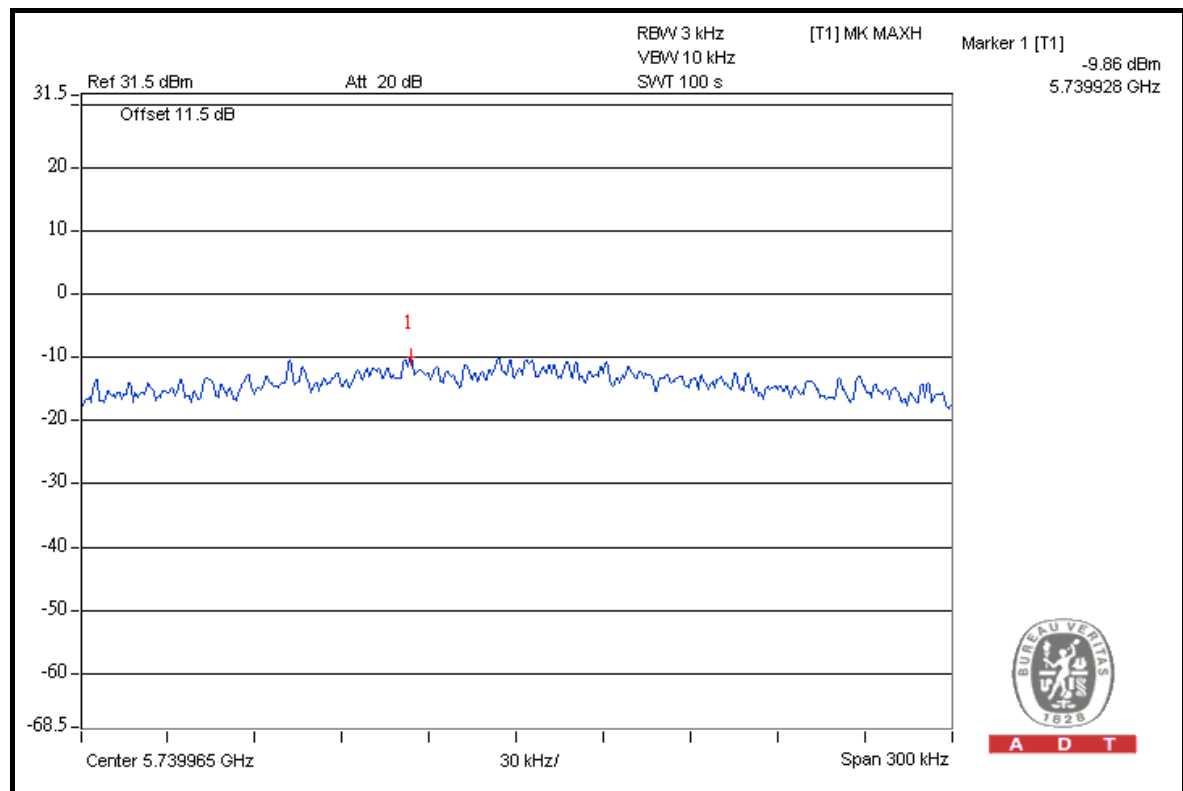


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802.11n (40MHz)

CHAIN	CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
			MEASURED	10 log (N=3) dB			
0	151	5755	-9.9	4.77	-5.1	8	PASS
	159	5795	-11.0	4.77	-6.2	8	PASS
1	151	5755	-10.4	4.77	-5.6	8	PASS
	159	5795	-11.2	4.77	-6.4	8	PASS
2	151	5755	-11.8	4.77	-7.0	8	PASS
	159	5795	-12.5	4.77	-7.7	8	PASS

FOR CHAIN 0: CH 151



5.6 BAND EDGES MEASUREMENT

5.6.1 LIMITS OF BAND EDGES MEASUREMENT

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

5.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100744	Apr. 19, 2011	Apr. 18, 2012
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jan. 06, 2011	Jan. 05, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Apr. 12, 2011	Apr. 11, 2012
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Sep. 06, 2011	Sep. 05, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8449B	3008A01911	Nov. 03, 2010	Nov. 02, 2011
Preamplifier Agilent	8447D	2944A10638	Nov. 03, 2010	Nov. 02, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295013/4 283403/4	Aug. 19, 2011	Aug. 18, 2012
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 13, 2011	Aug. 12, 2012
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

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

5.6.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. 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.
- f. The spectrum plots (Peak RBW = 100kHz, VBW = 300kHz) are attached on the following pages.

NOTE: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.



A D T

5.6.4 DEVIATION FROM TEST STANDARD

No deviation.

5.6.5 EUT OPERATING CONDITION

Same as Item 5.3.6.

5.6.6 TEST RESULTS

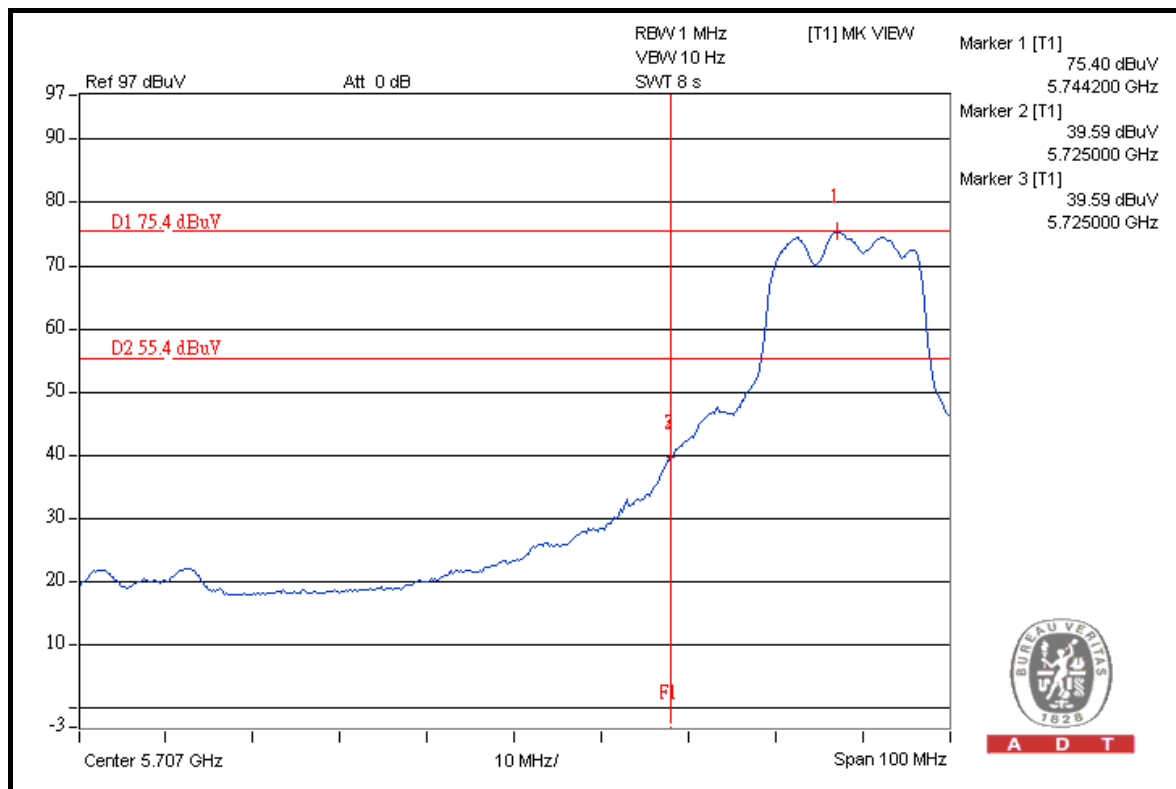
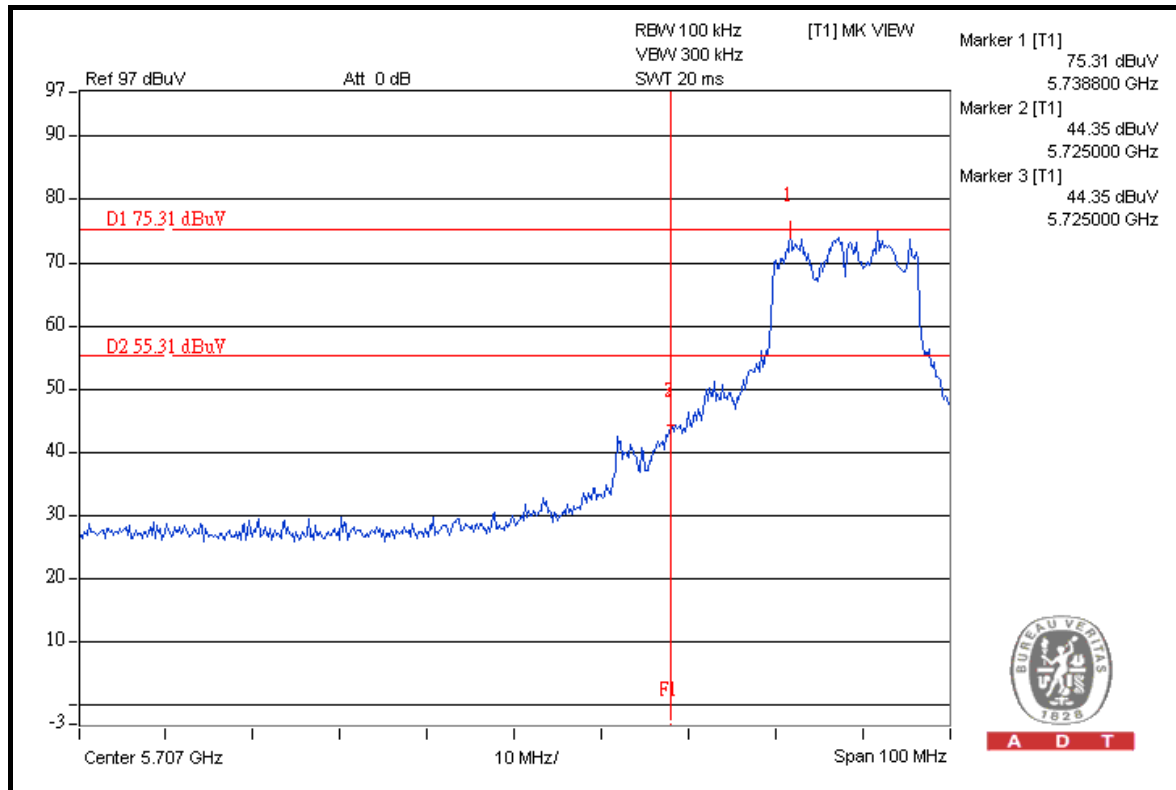
The spectrum plots are attached on the following pages. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).



A D T

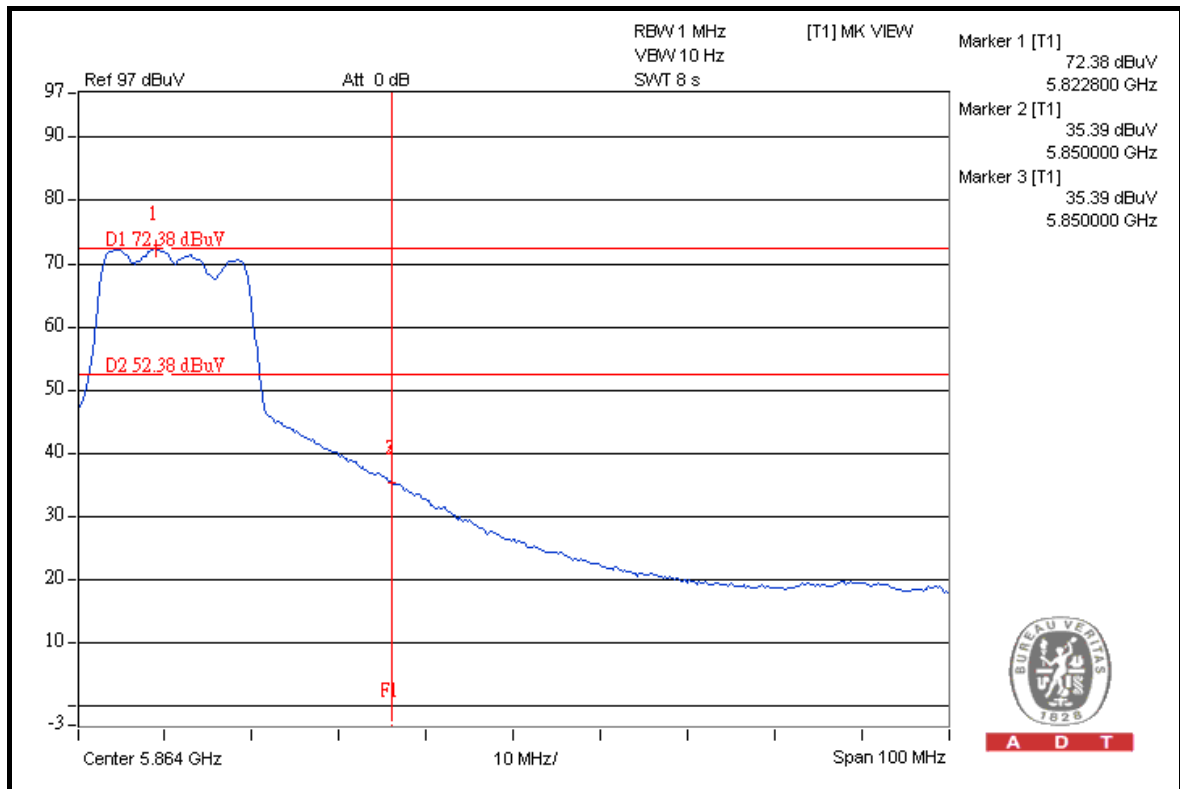
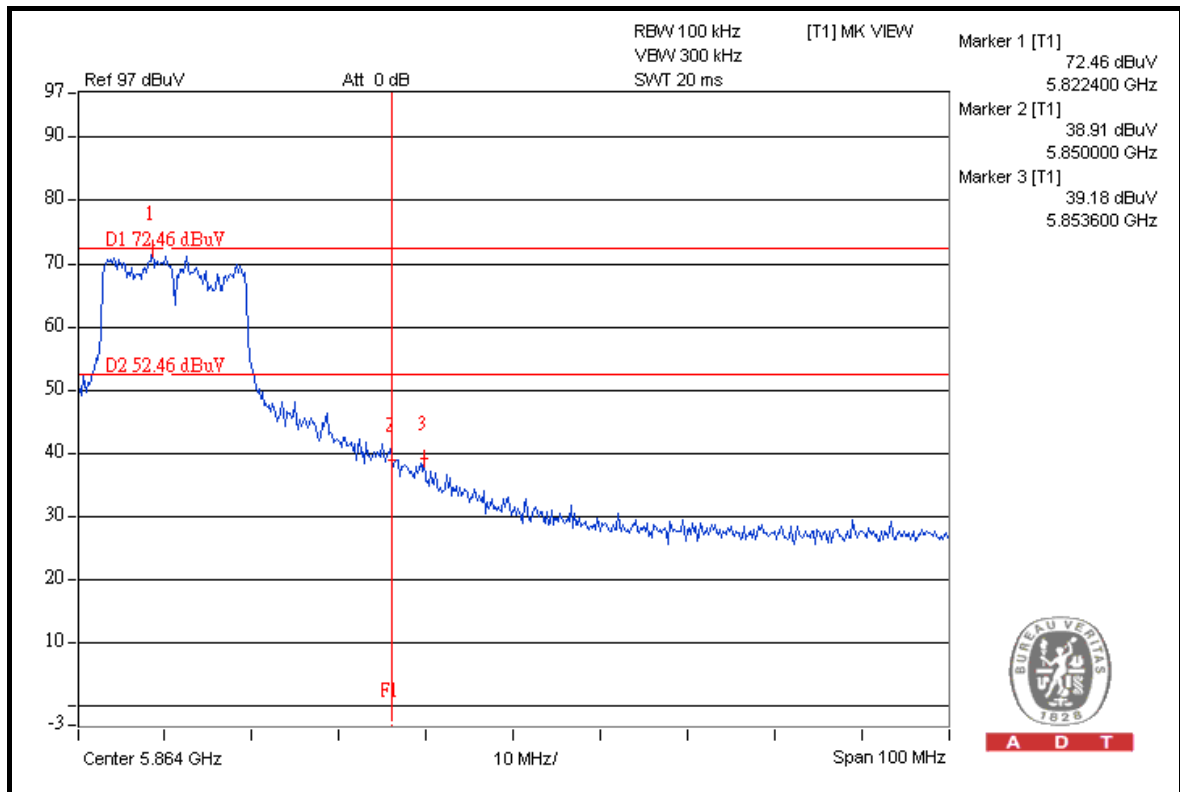
802.11a

FOR RADIATED MEASURED (THREE CHAINS ON)





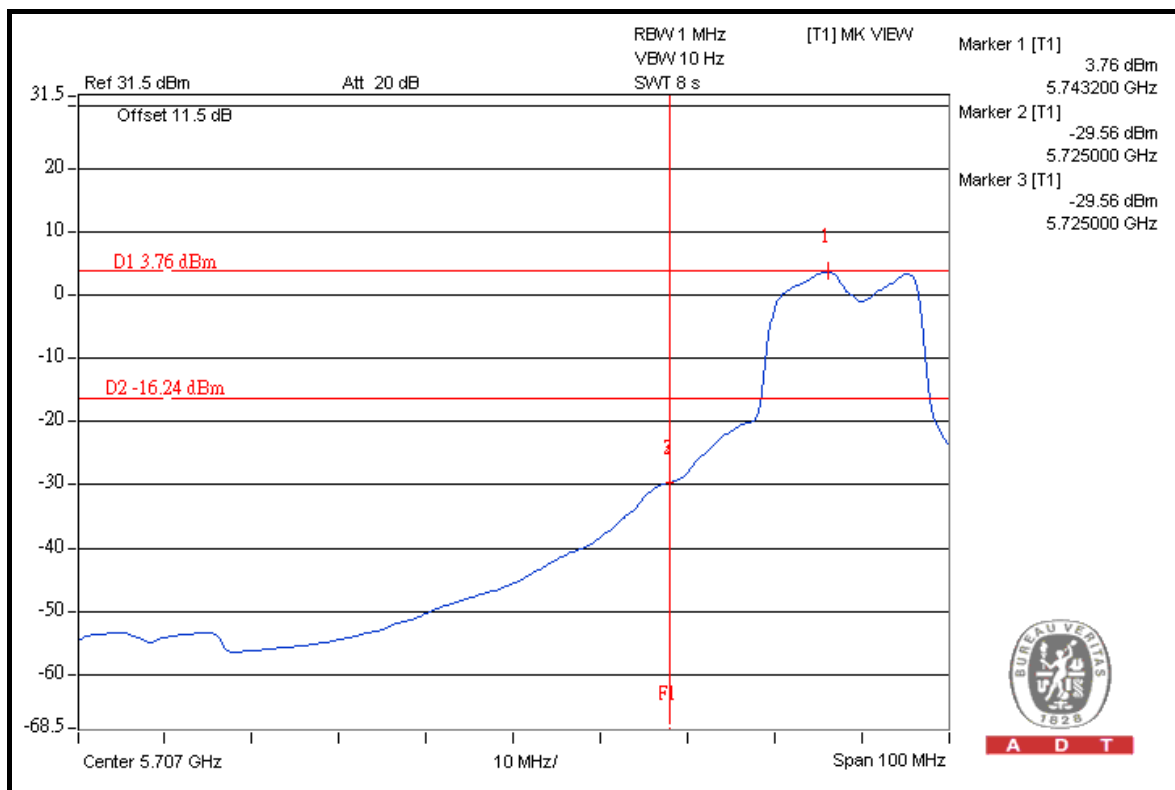
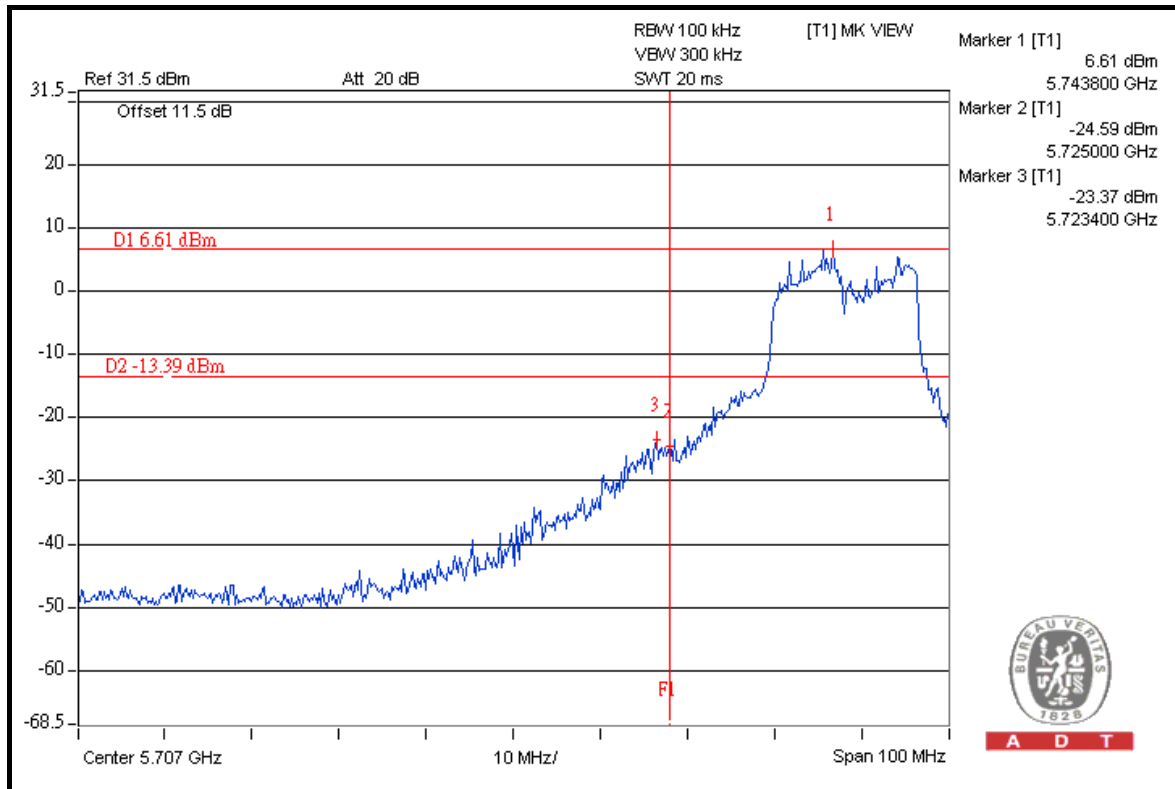
A D T





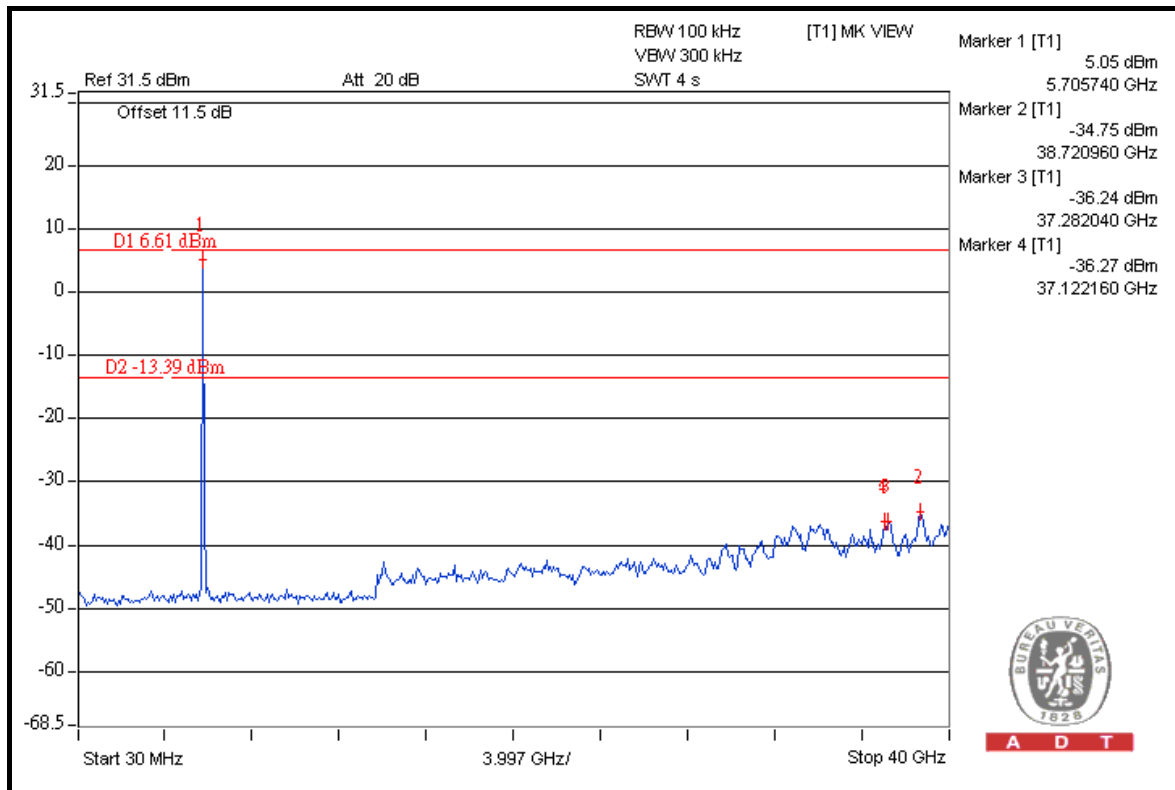
A D T

FOR CONDUCTED MEASURED CHAIN 0

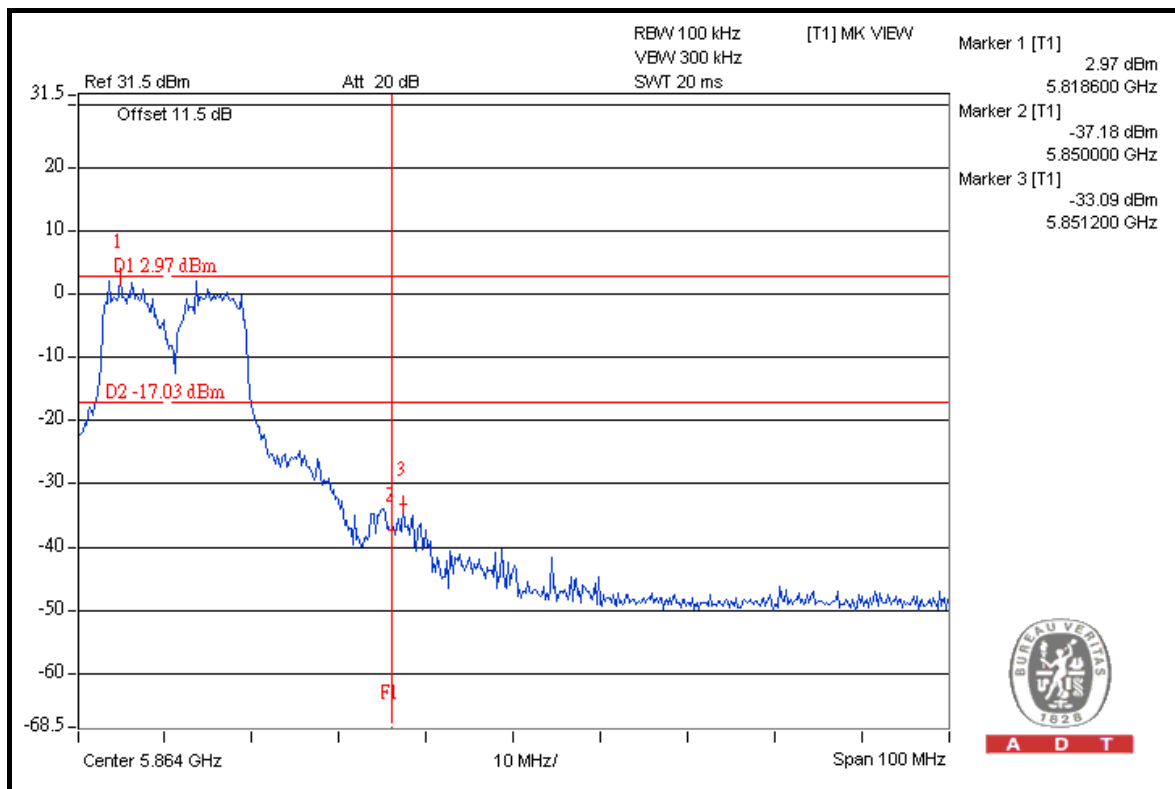




A D T



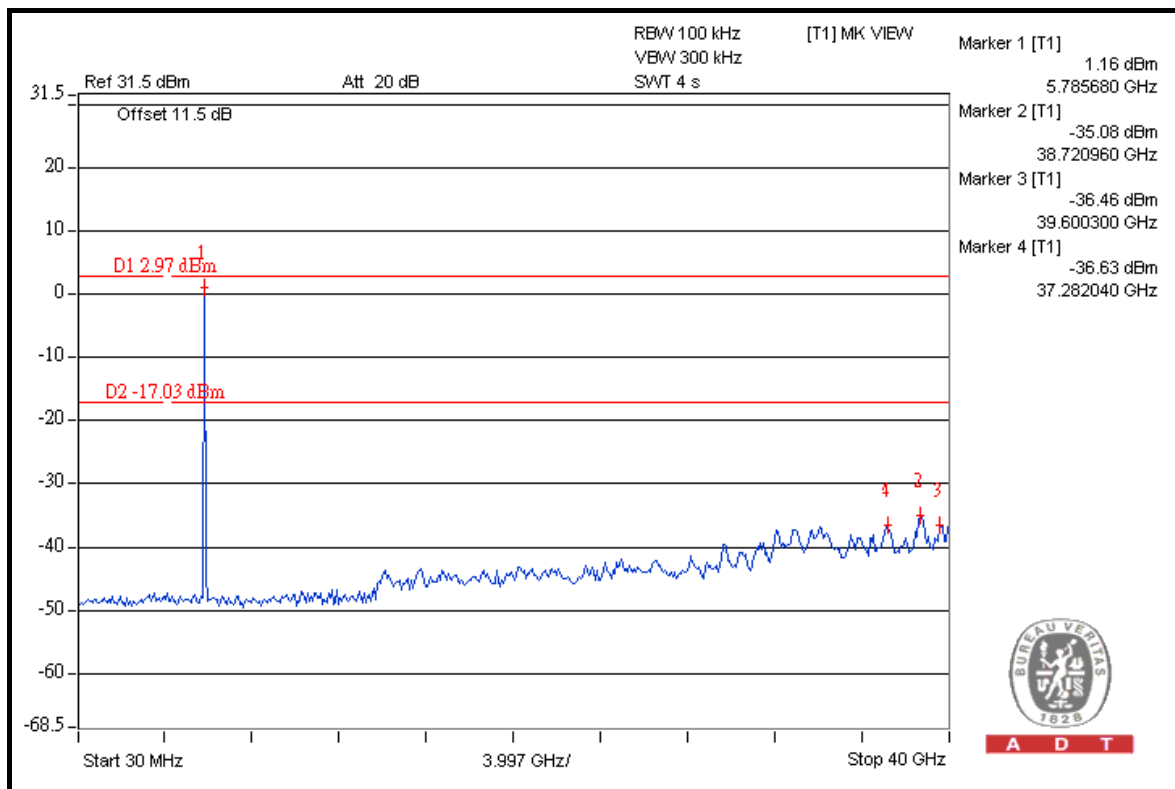
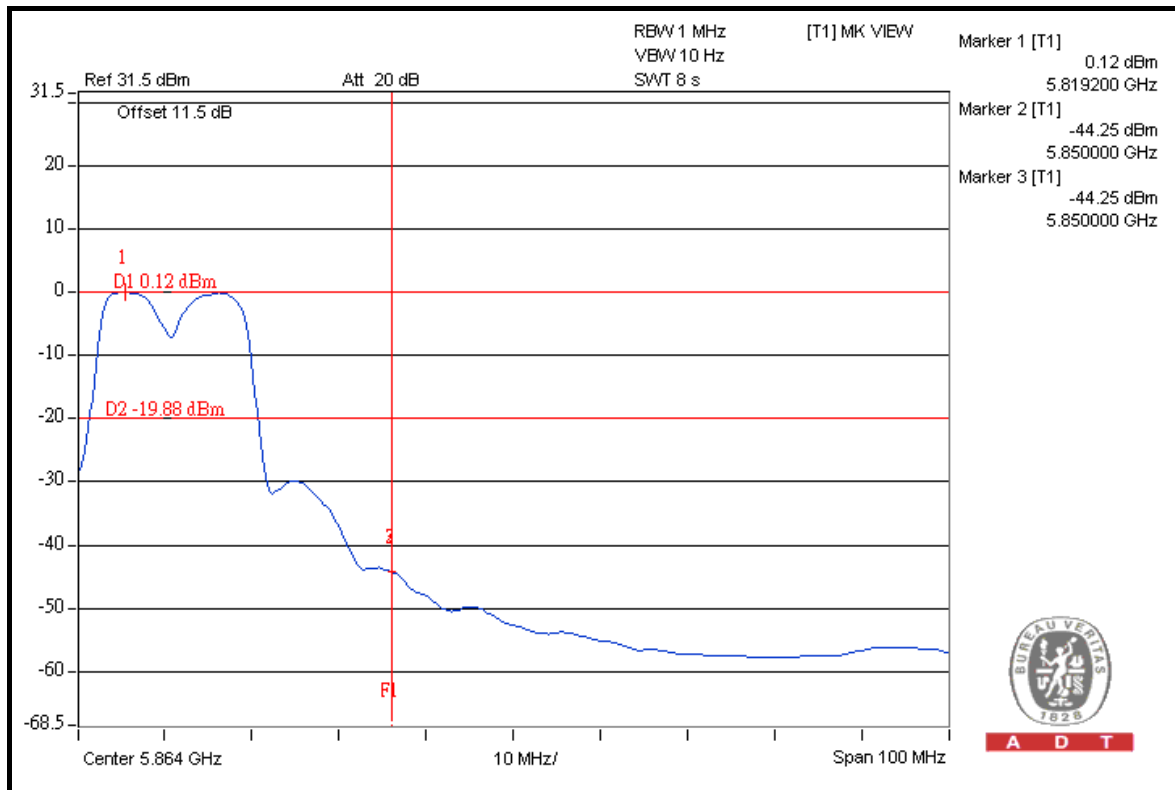
A D T



A D T



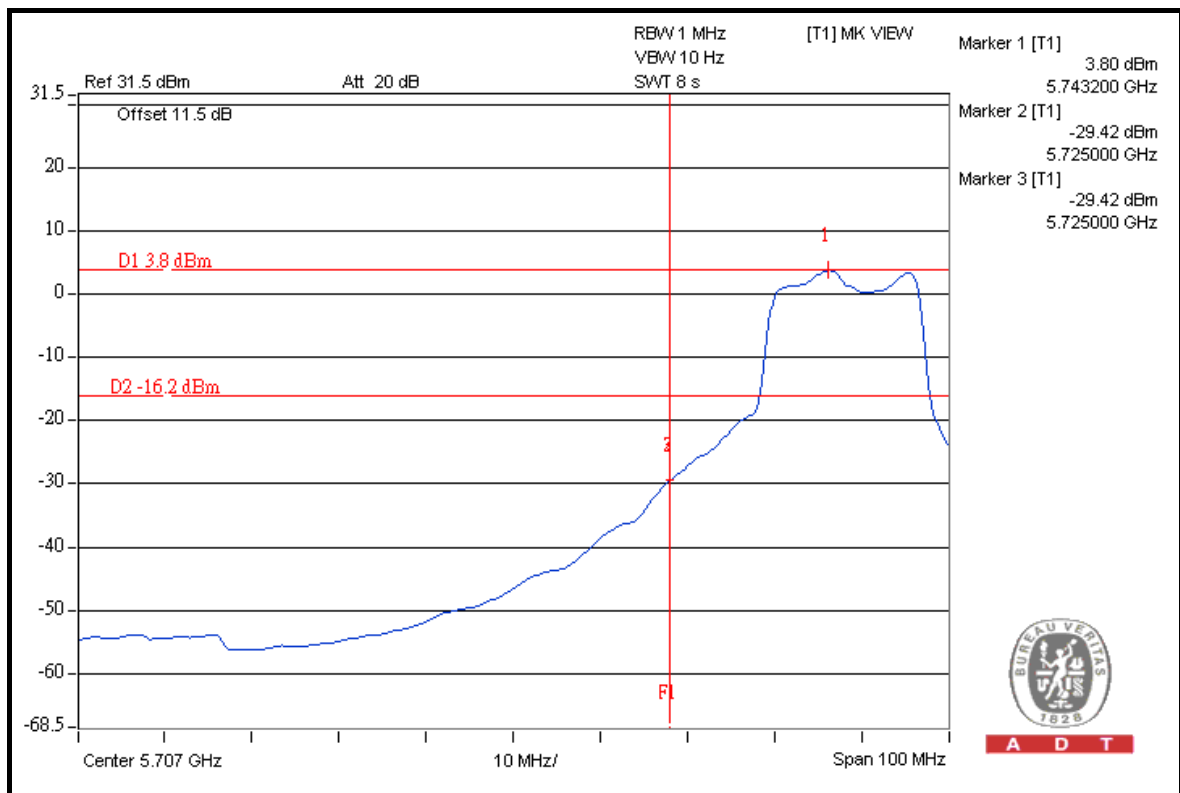
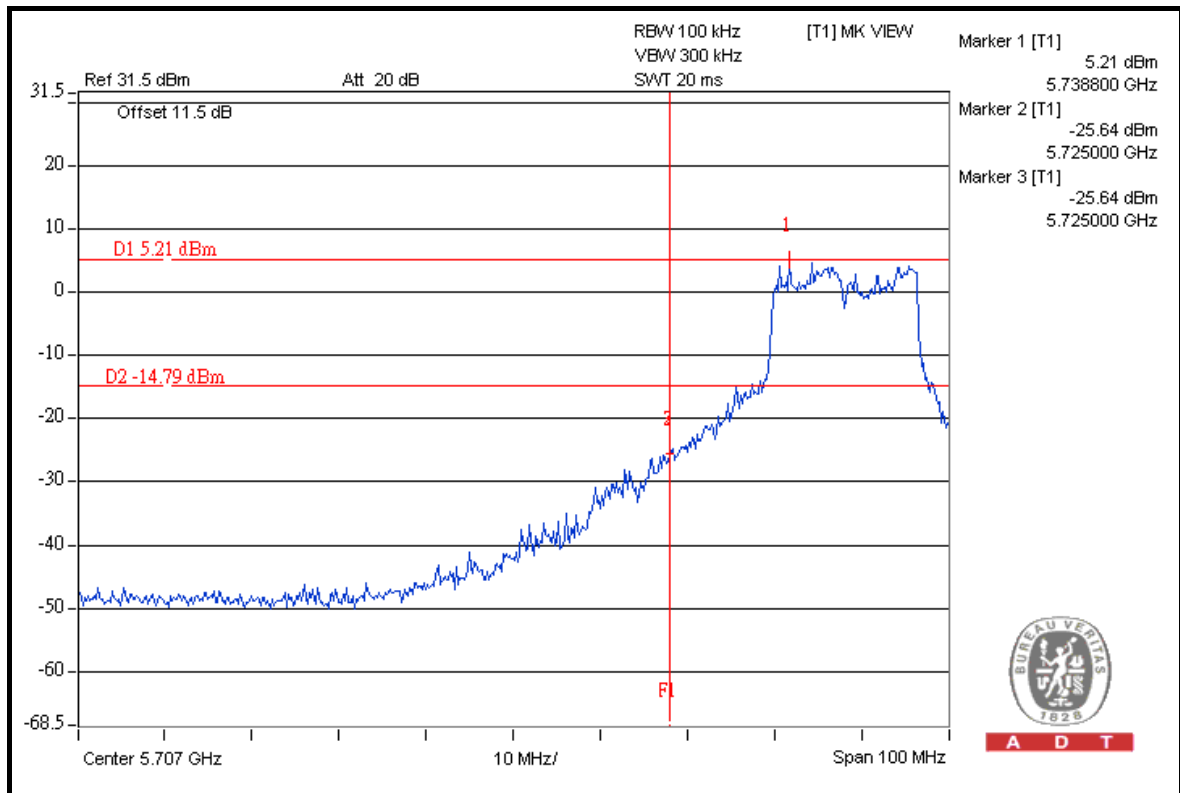
A D T





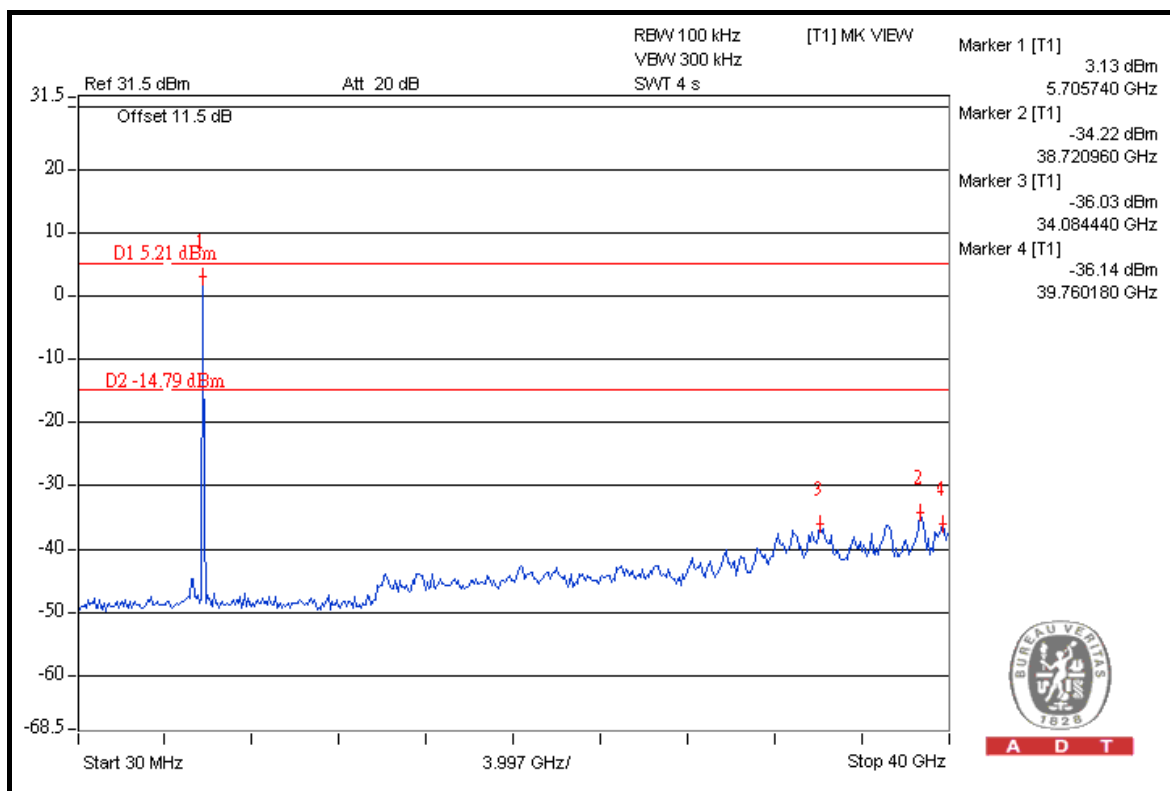
A D T

CHAIN 1

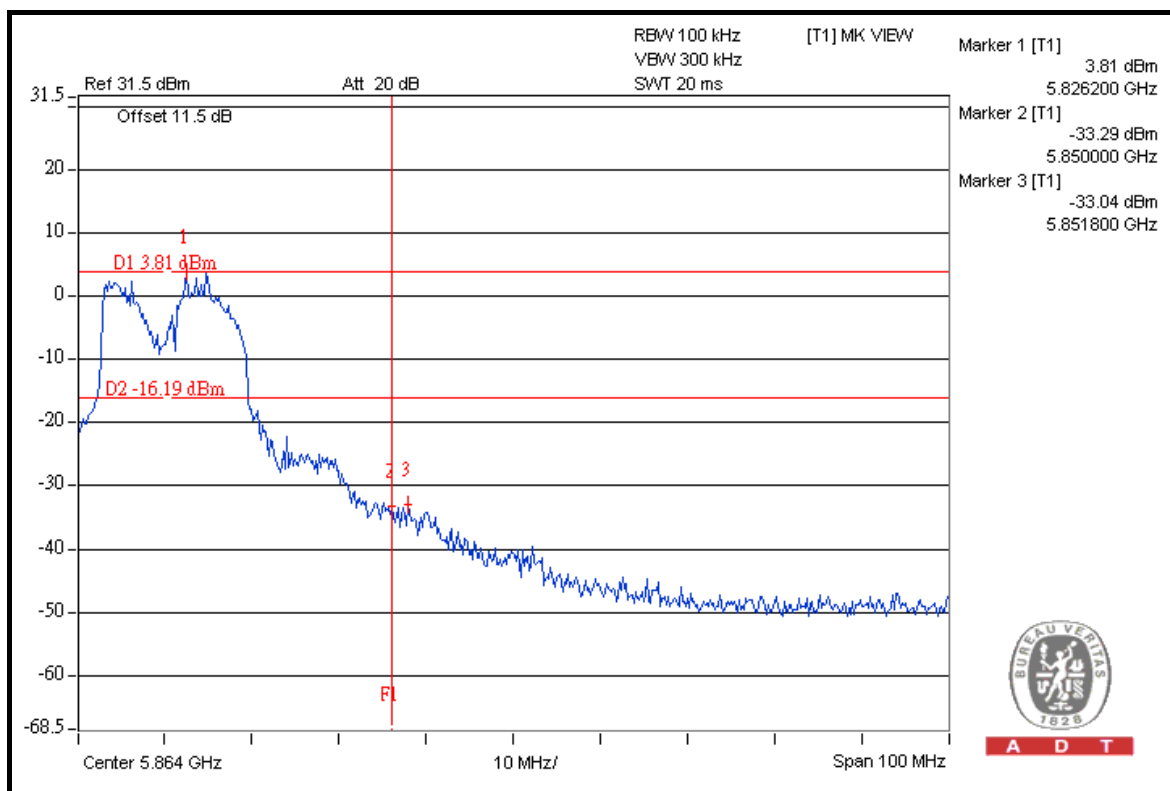




A D T



A D T



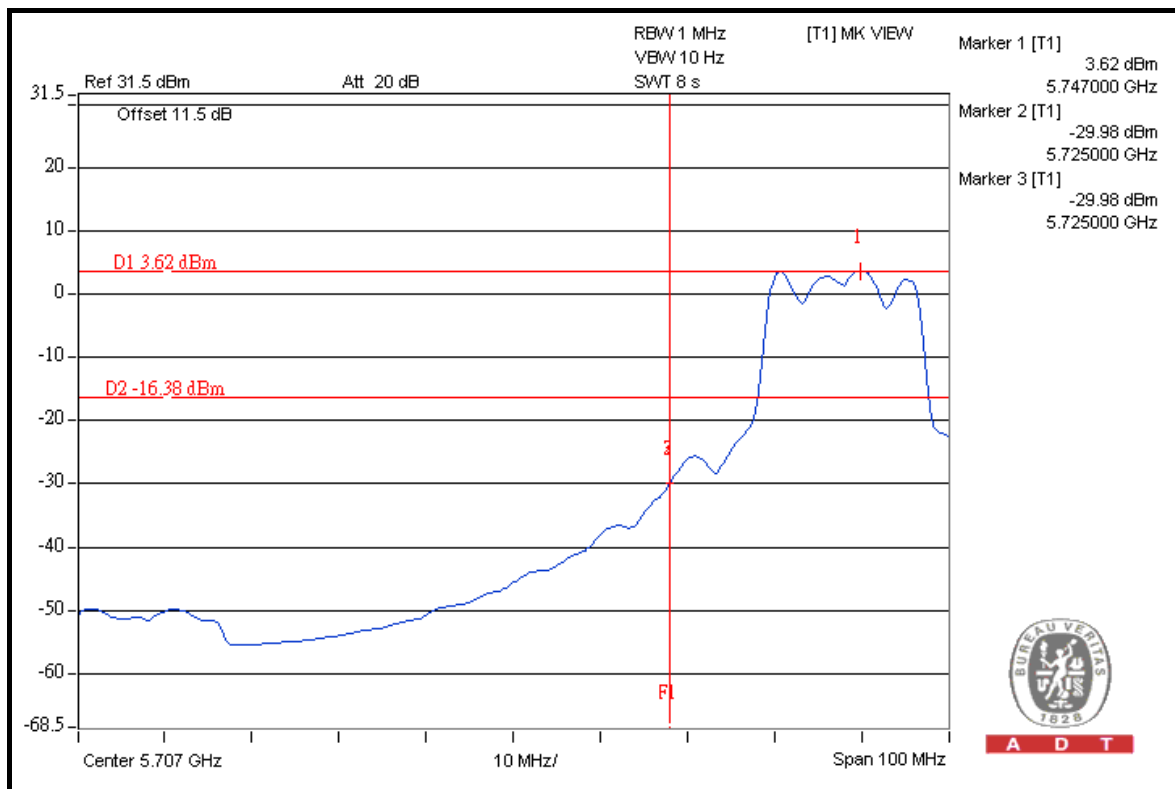
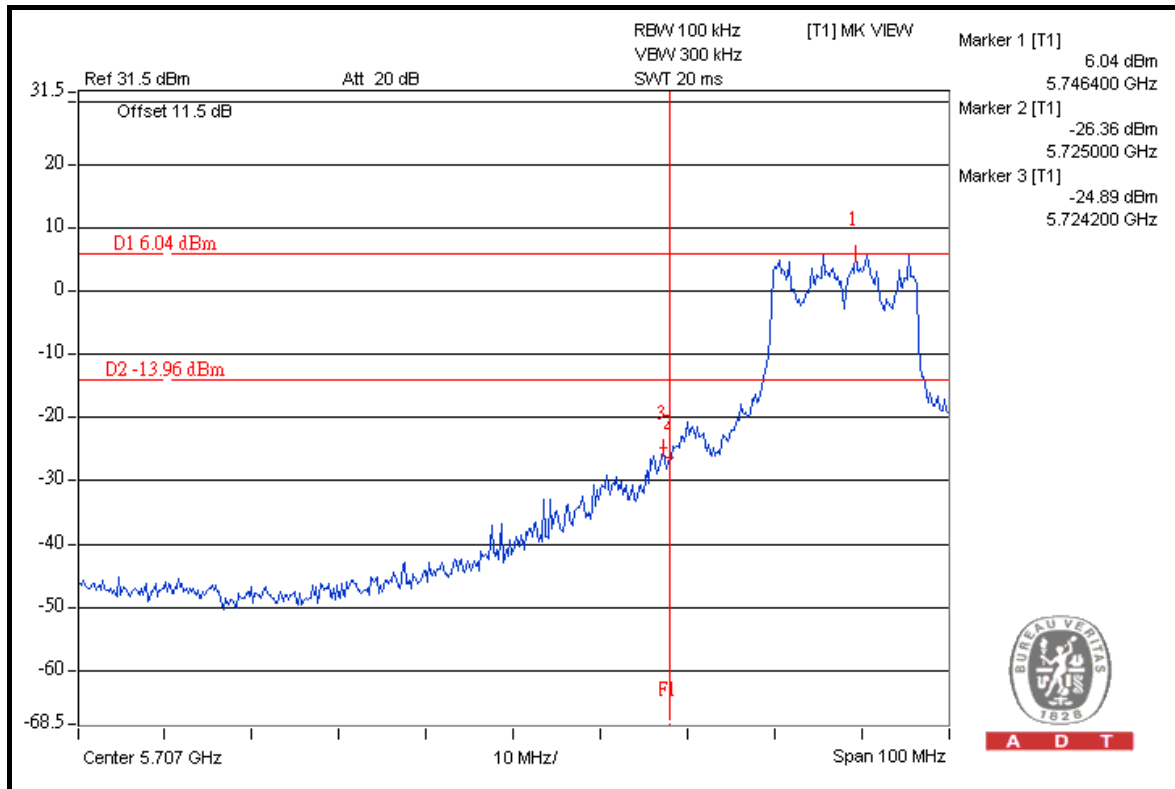
A D T





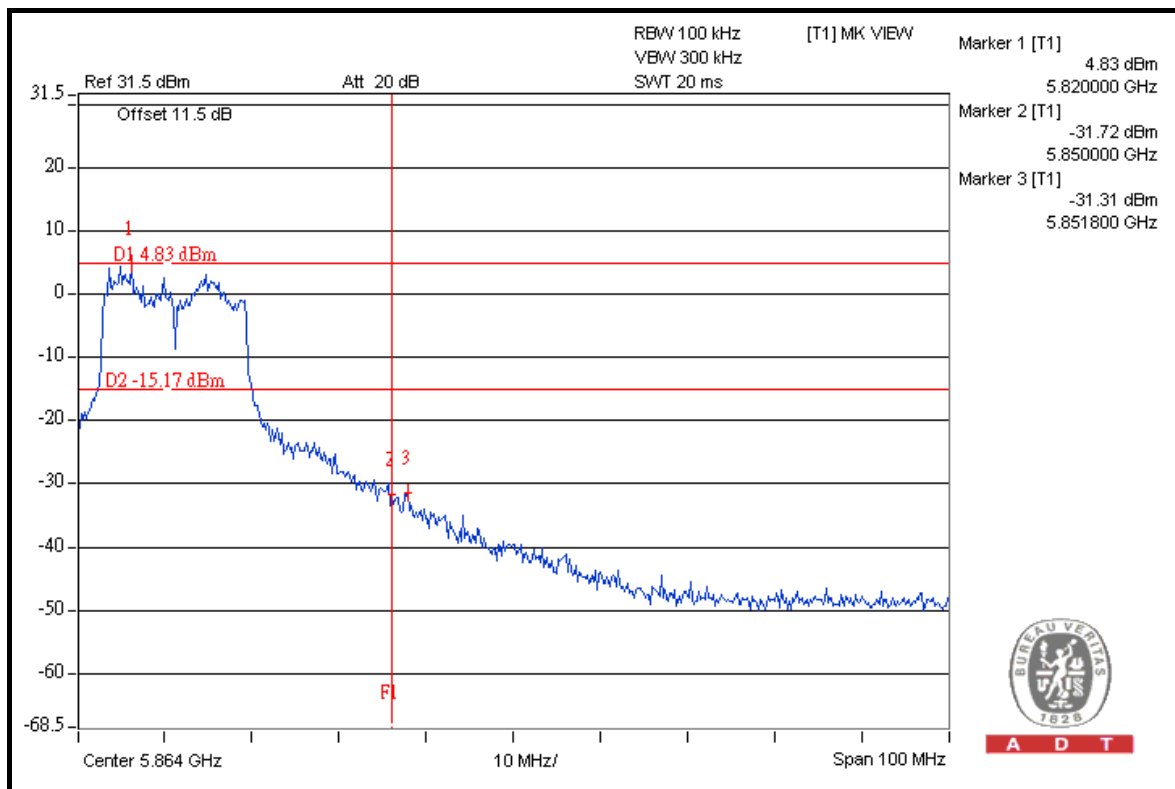
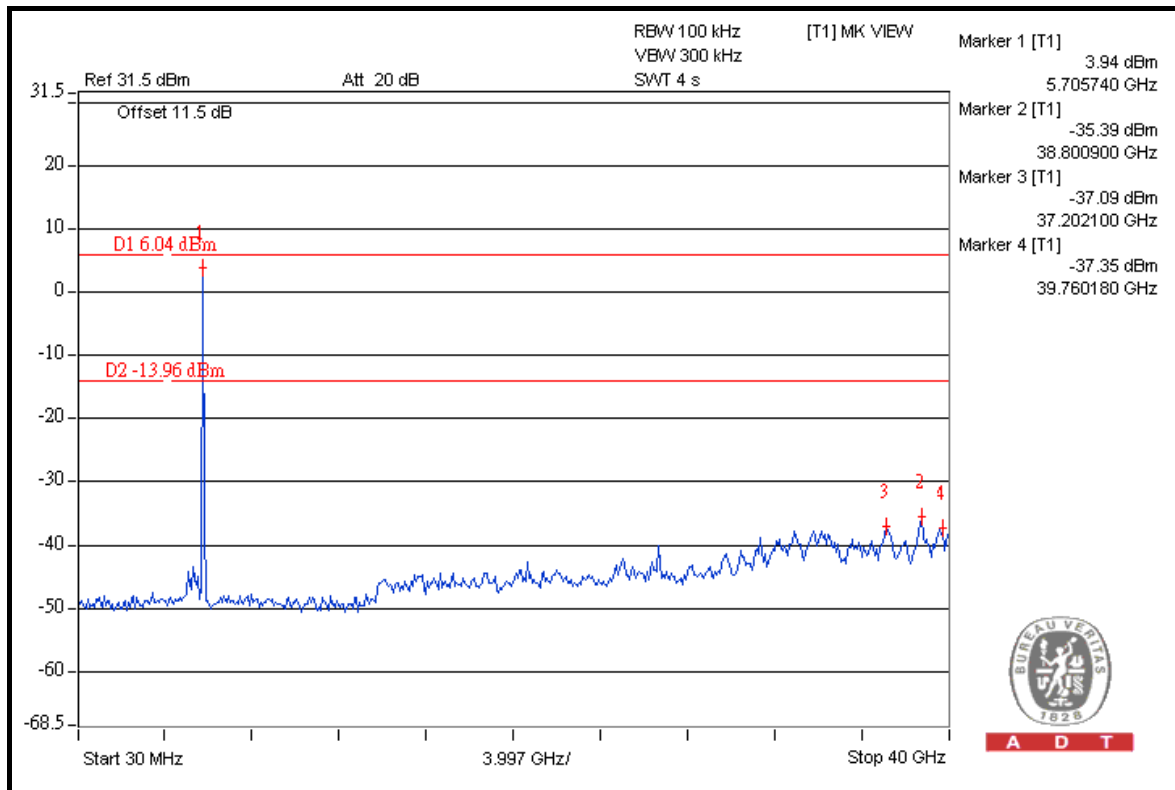
A D T

CHAIN 2



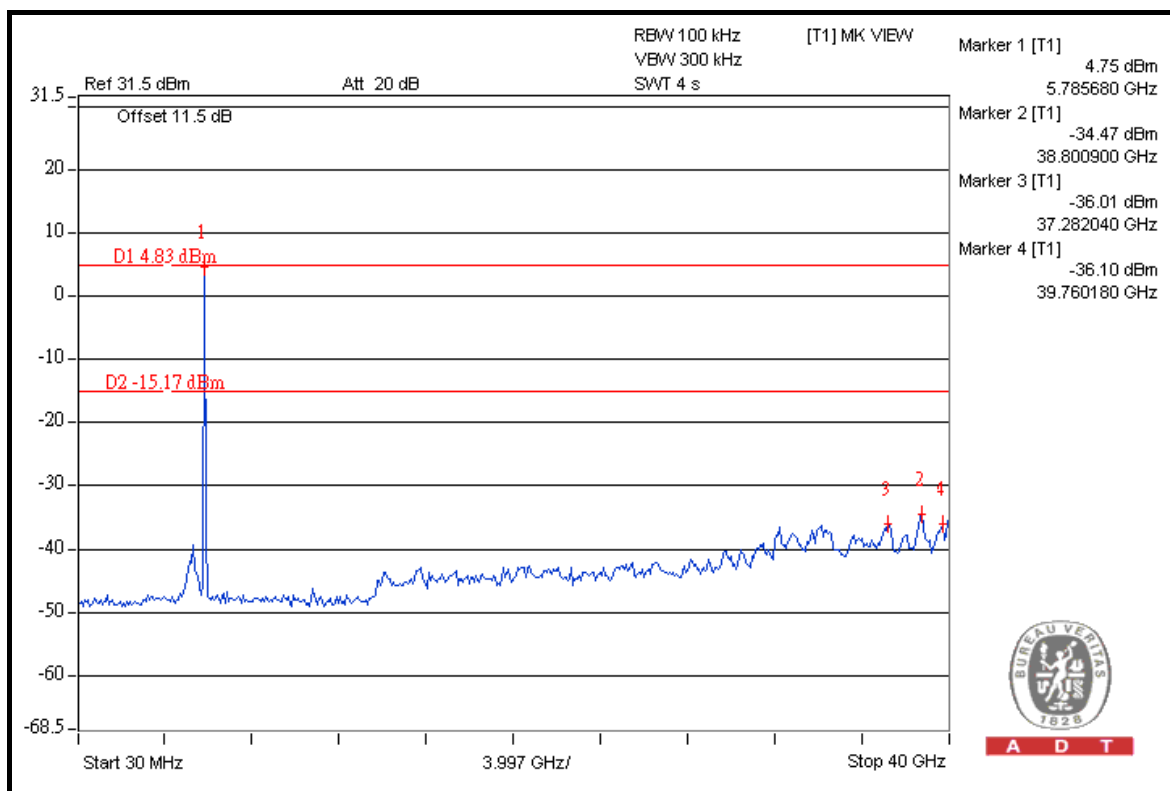
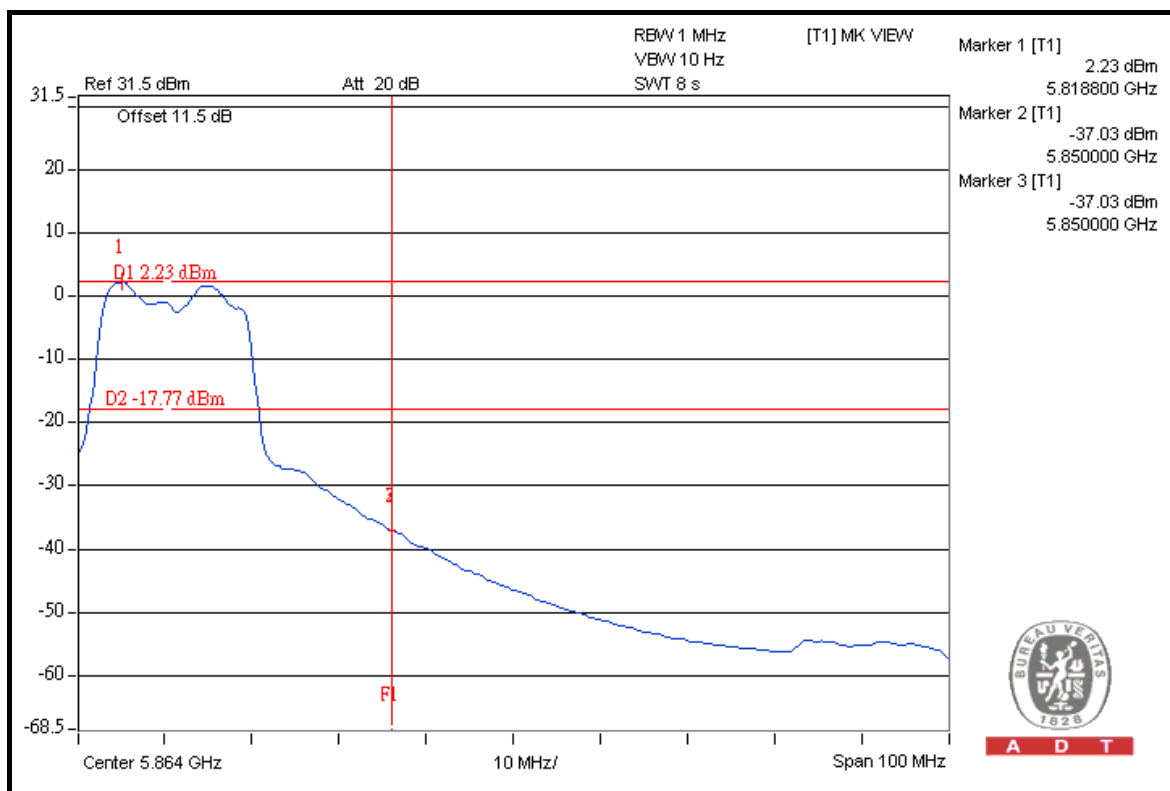


A D T





A D T

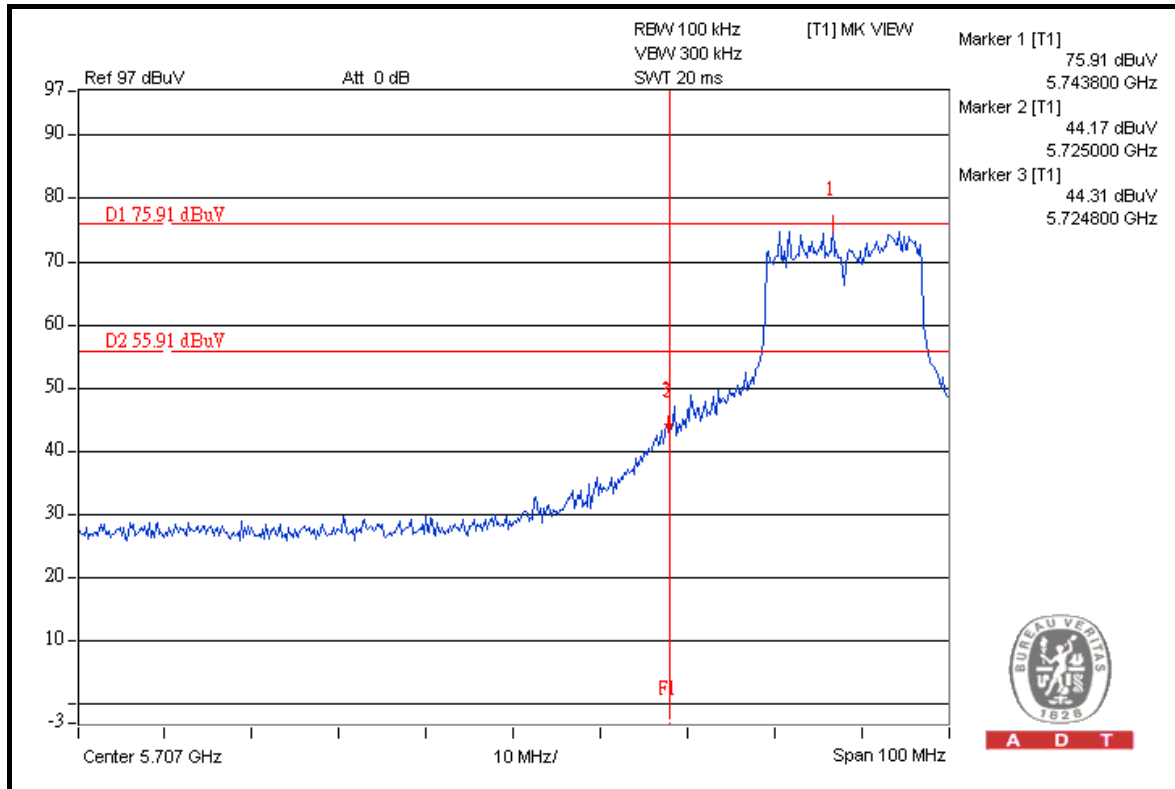




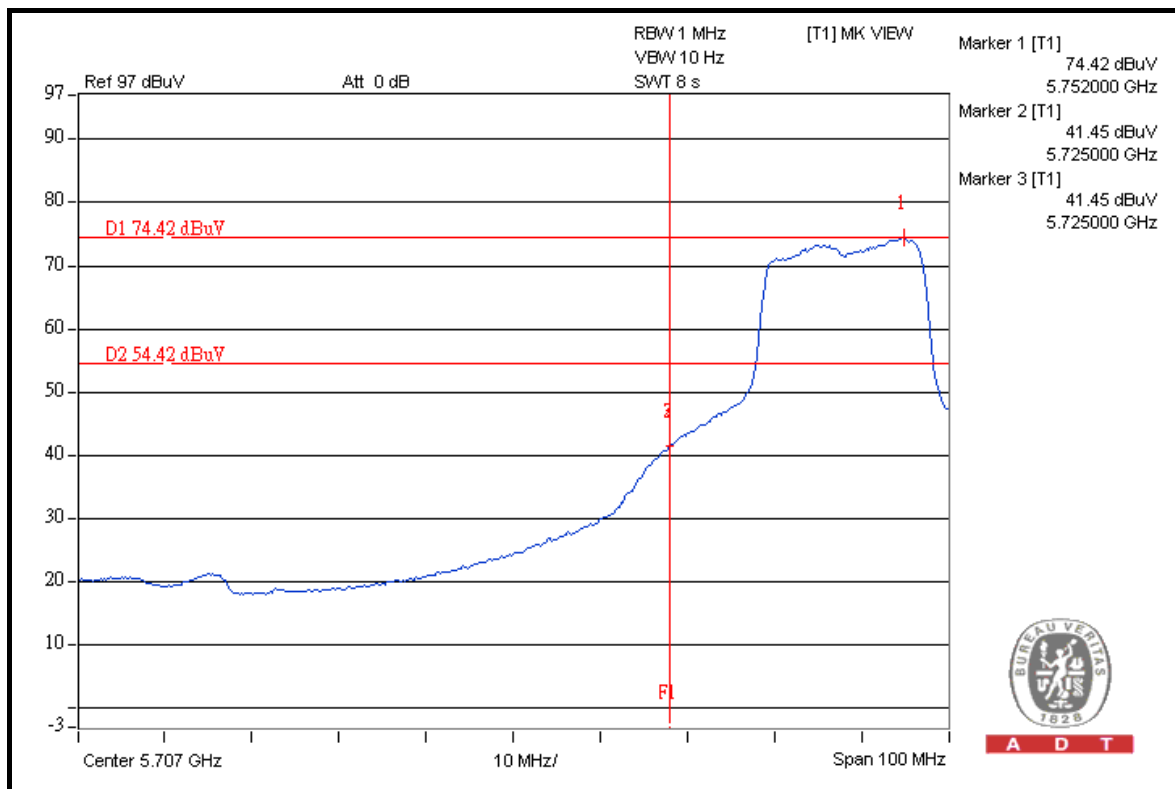
A D T

802.11n (20MHz)

FOR RADIATED MEASURED (THREE CHAINS ON)



A D T



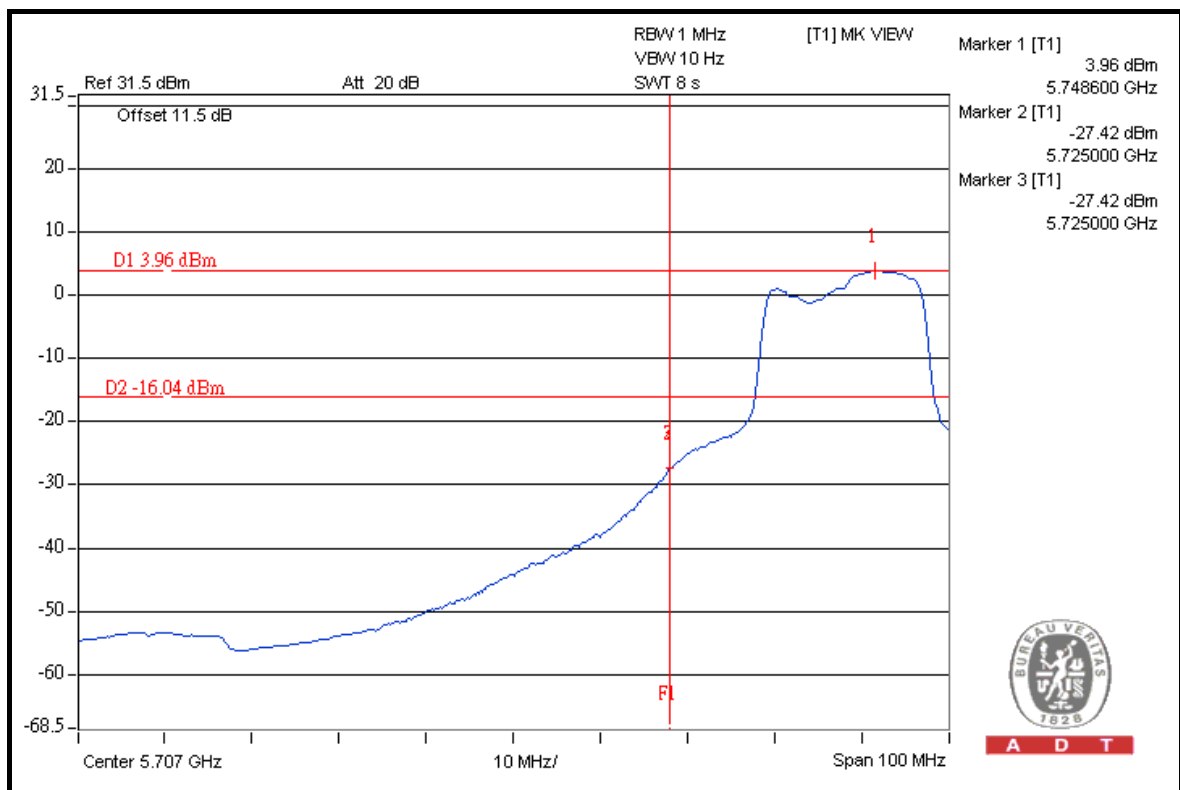
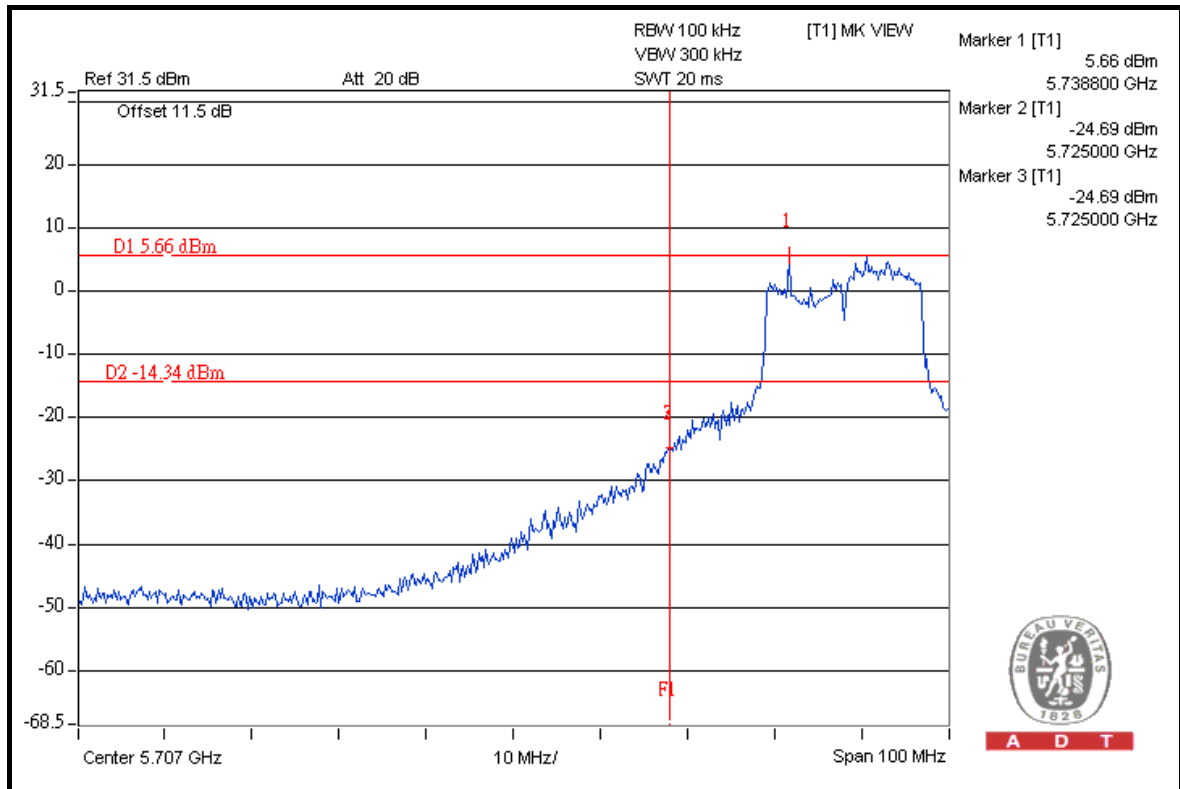
A D T





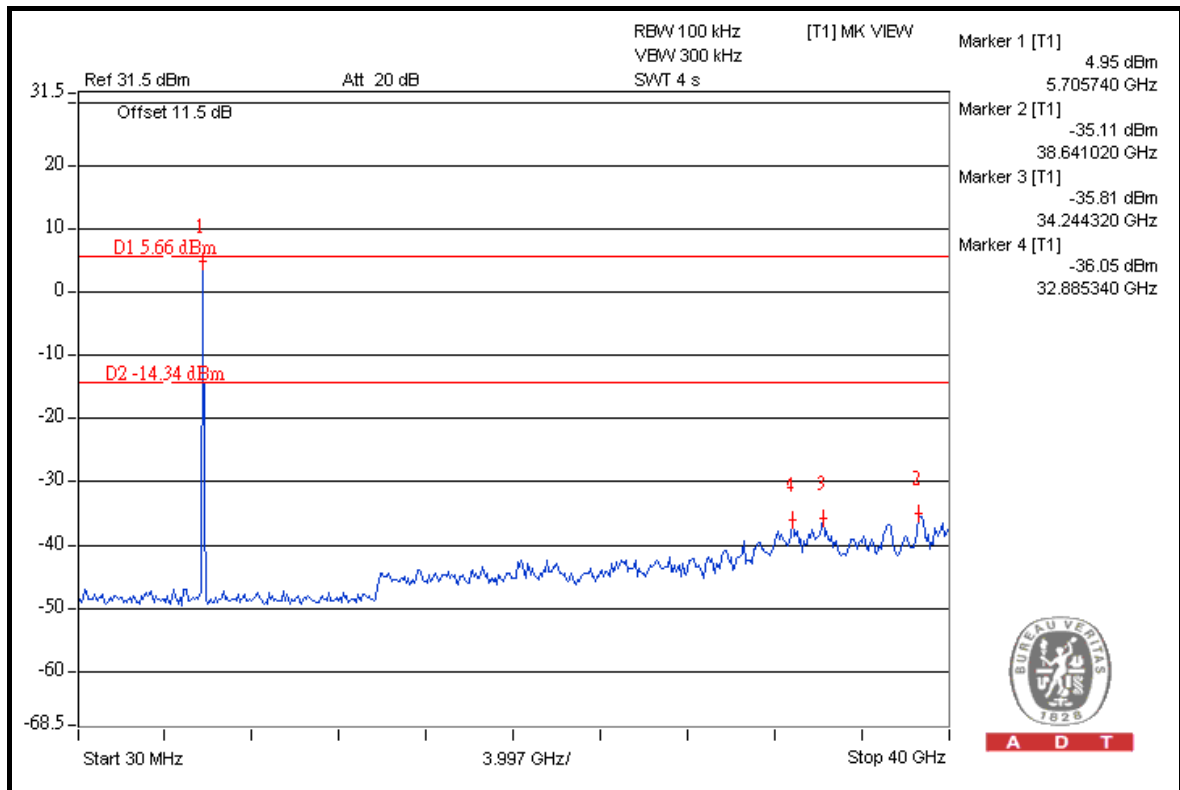
A D T

FOR CONDUCTED MEASURED CHAIN 0

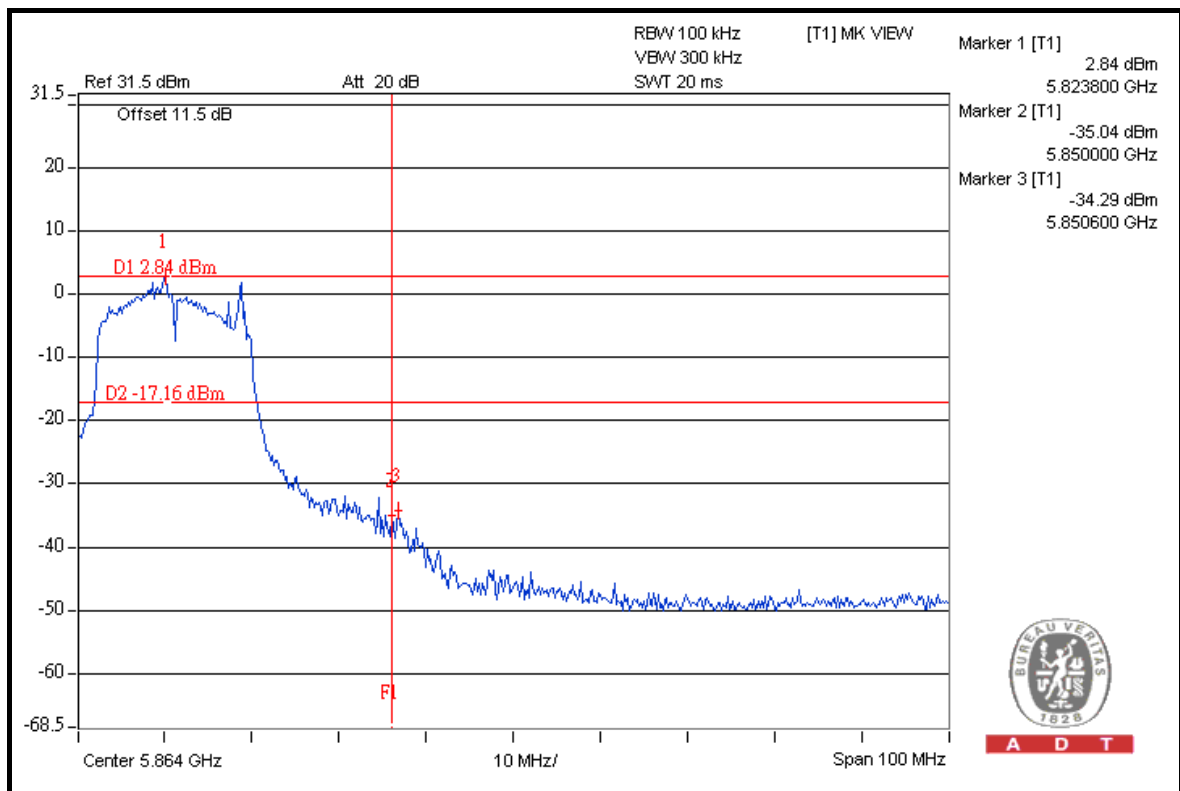




A D T



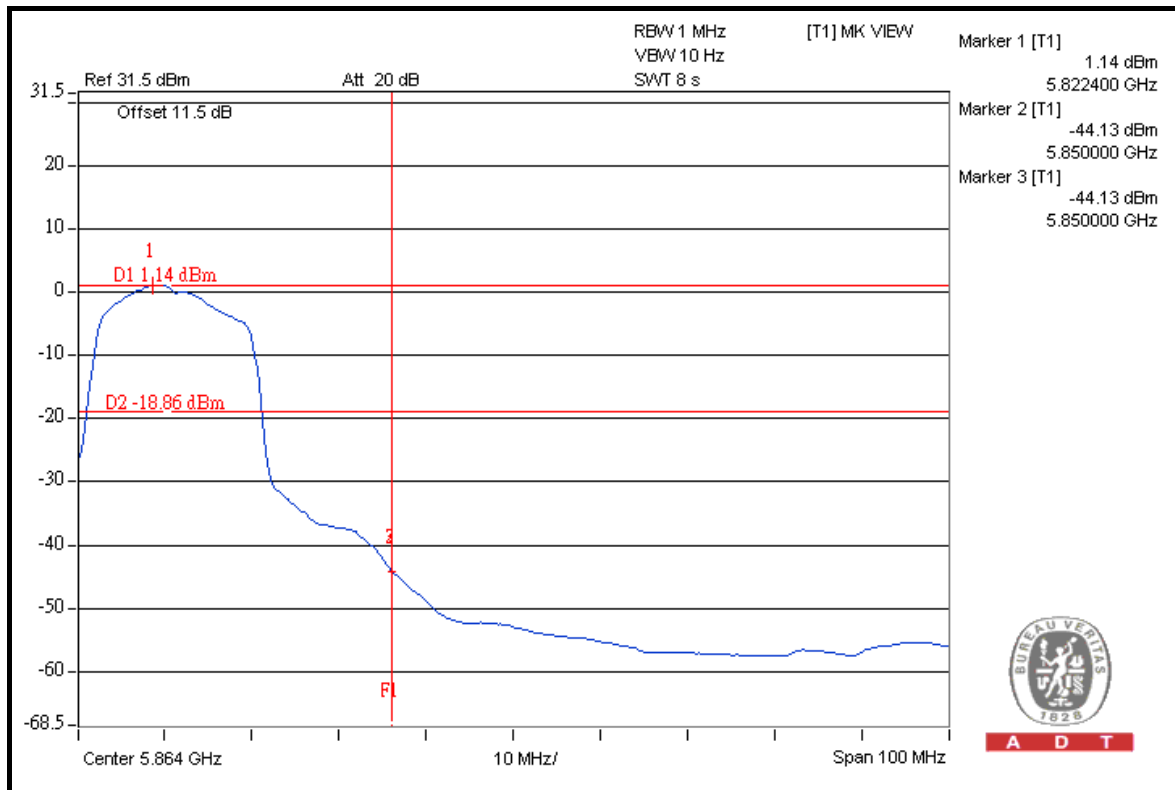
A D T



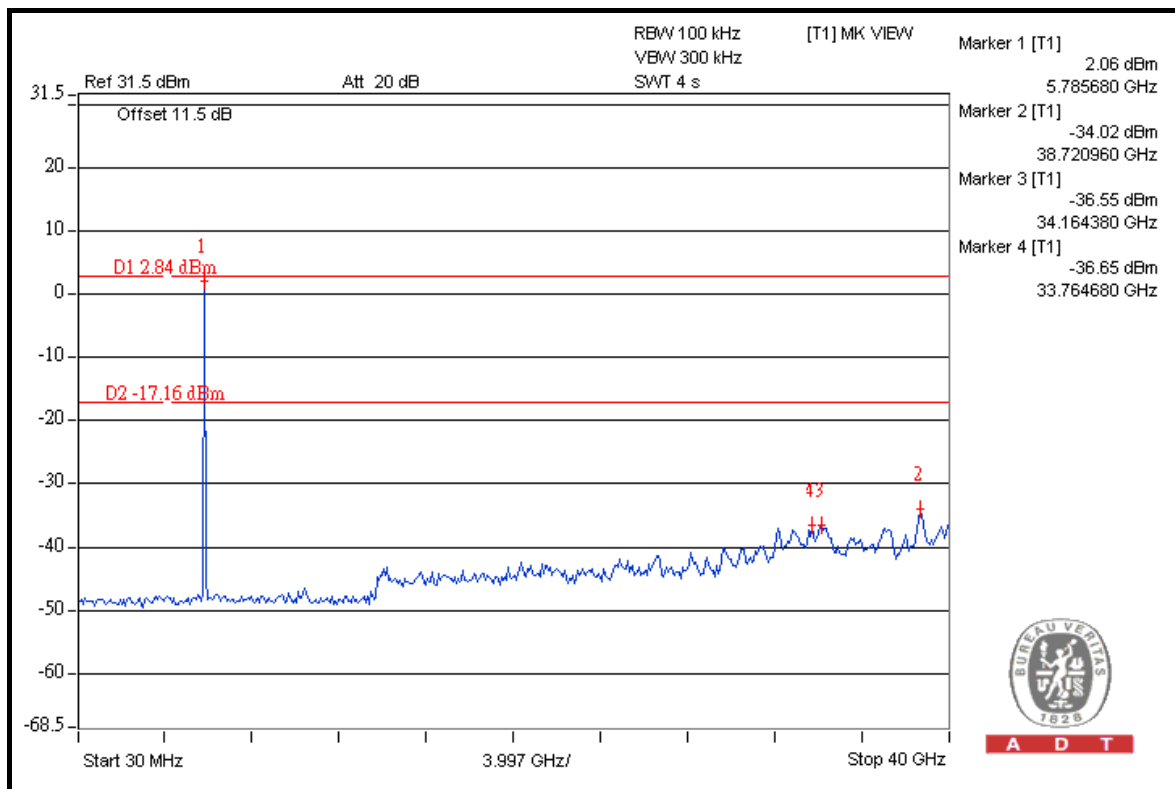
A D T



A D T



A D T

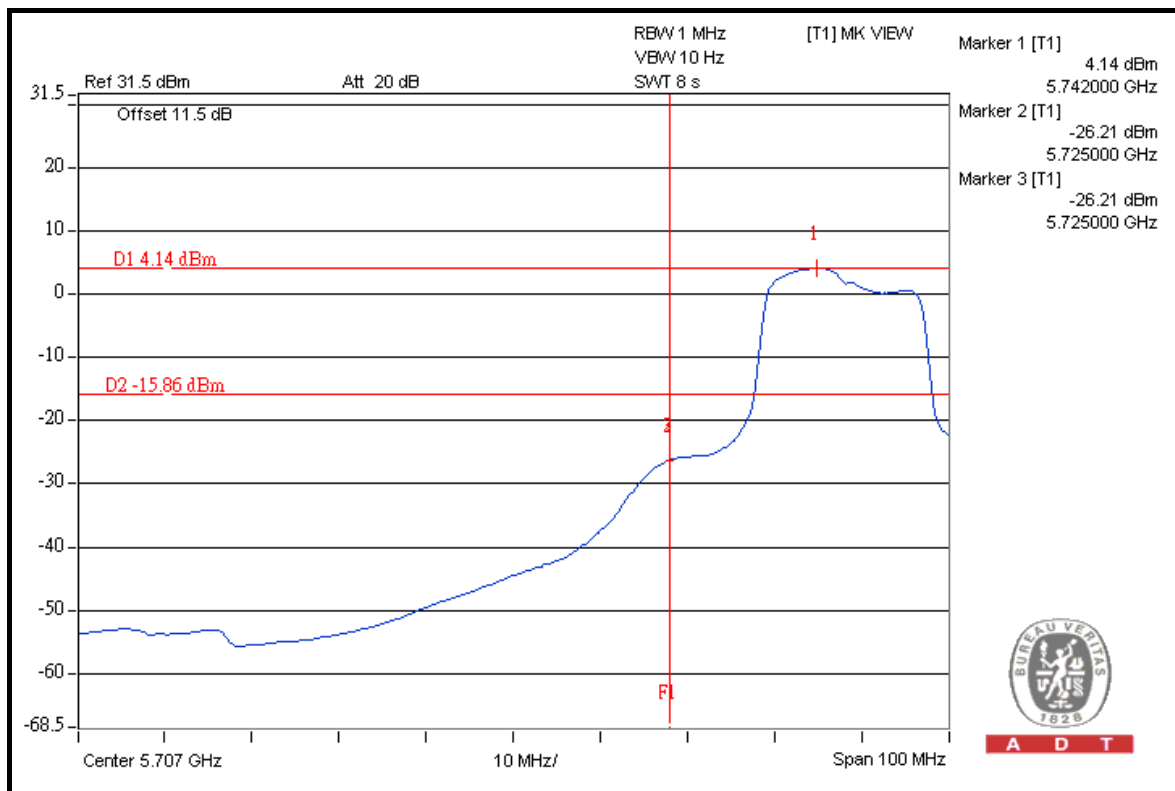
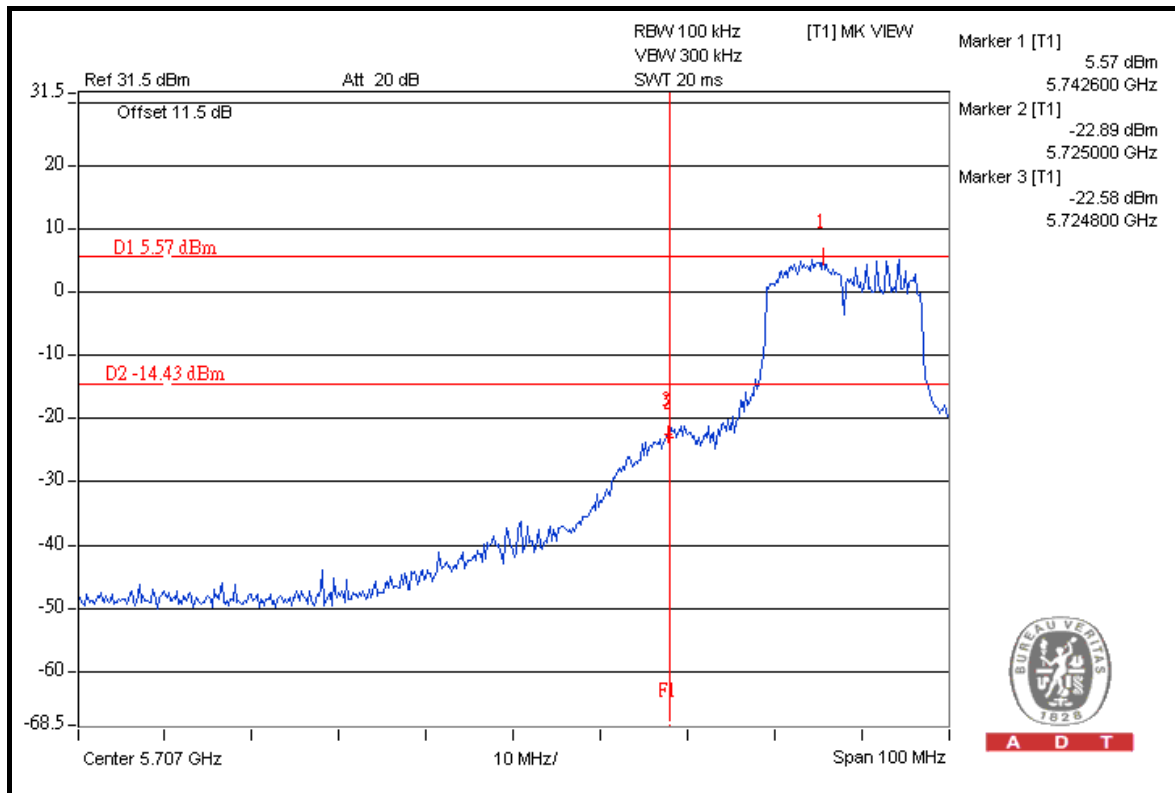


A D T



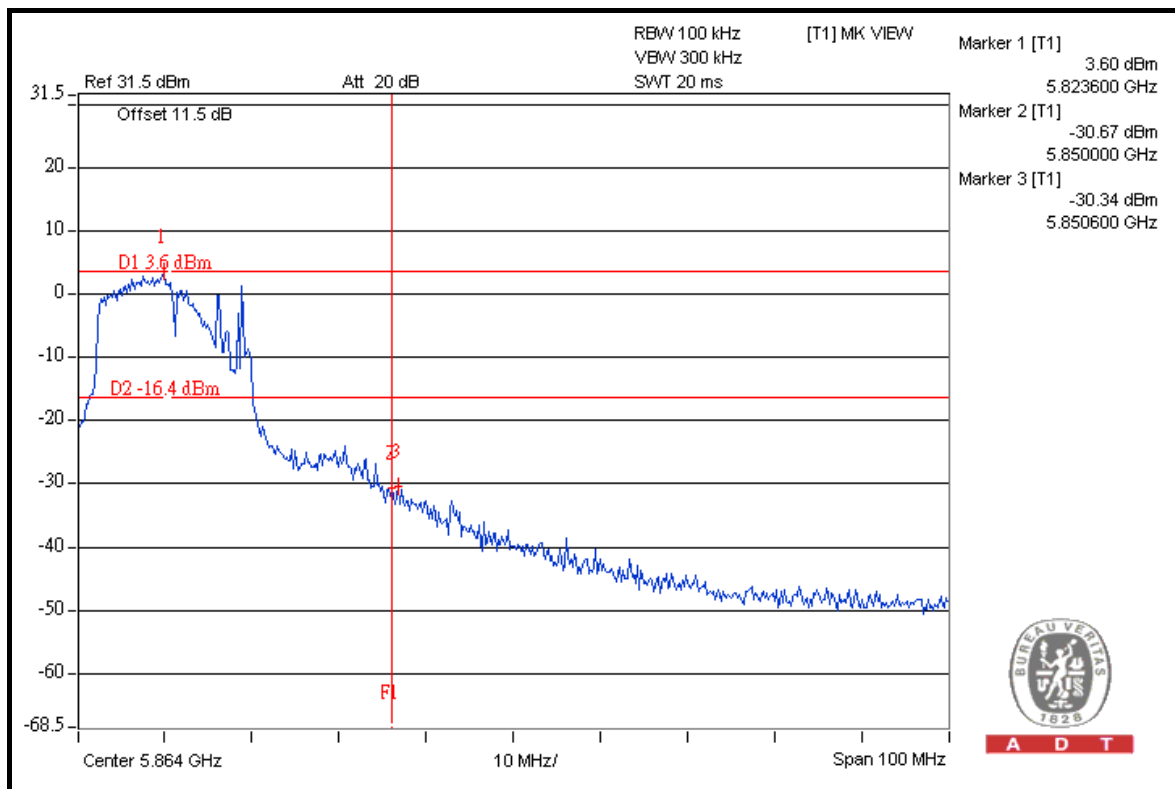
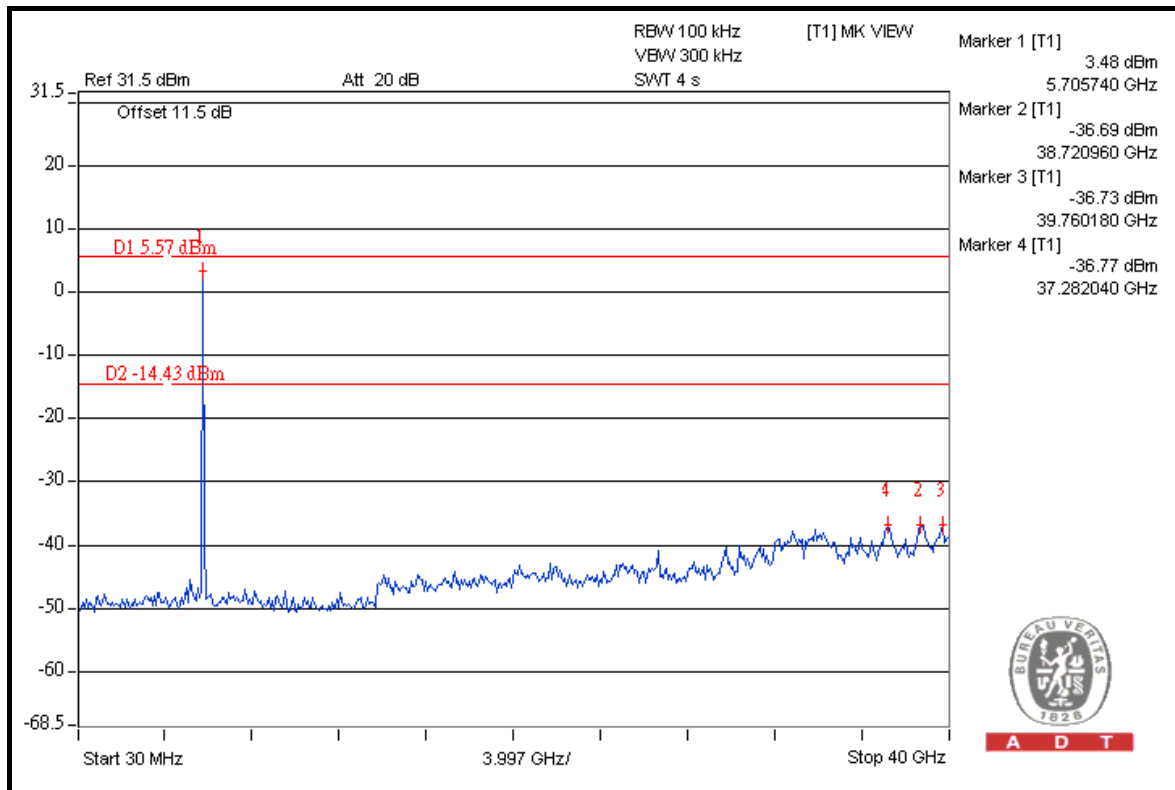
A D T

CHAIN 1



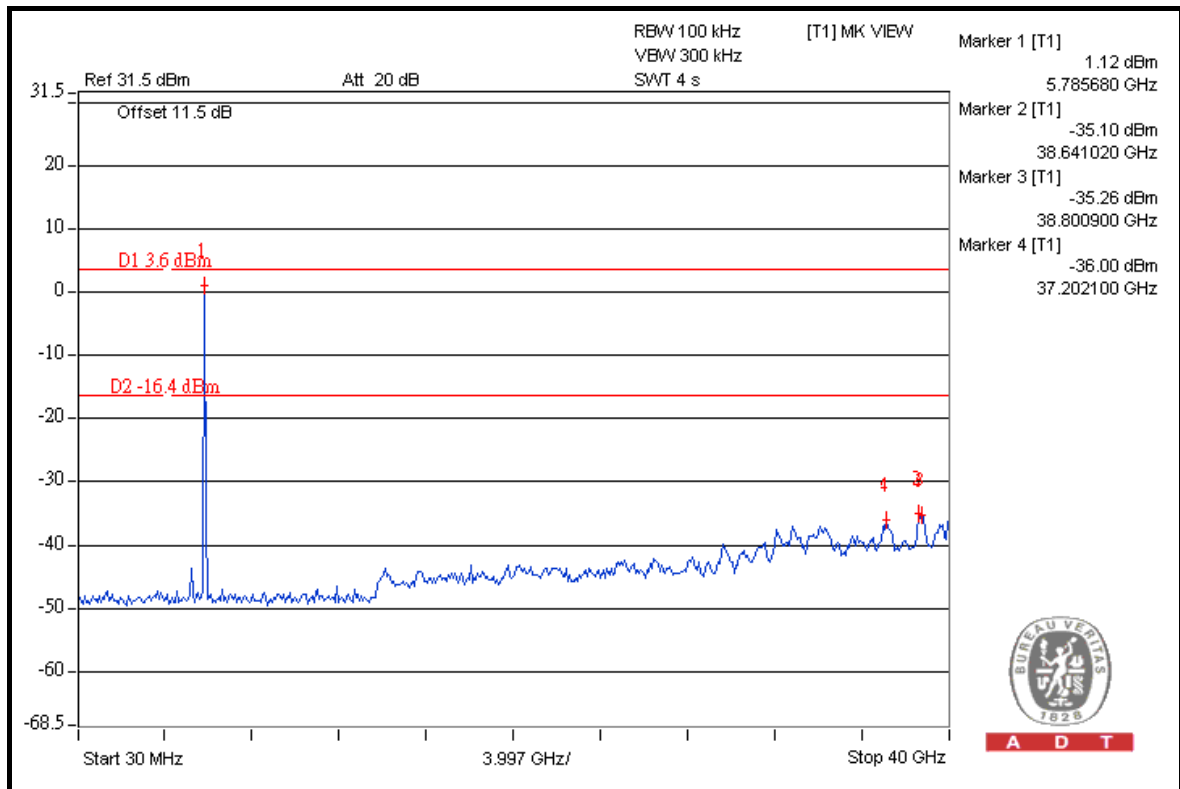
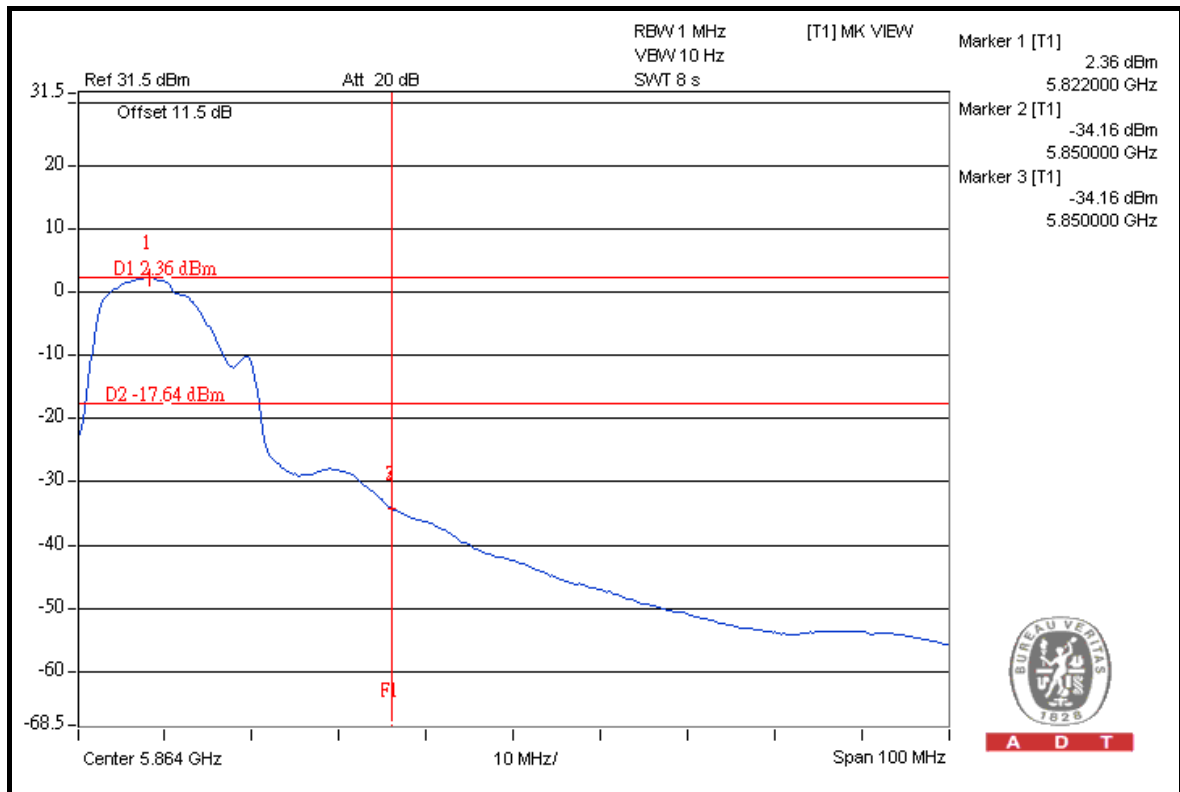


A D T





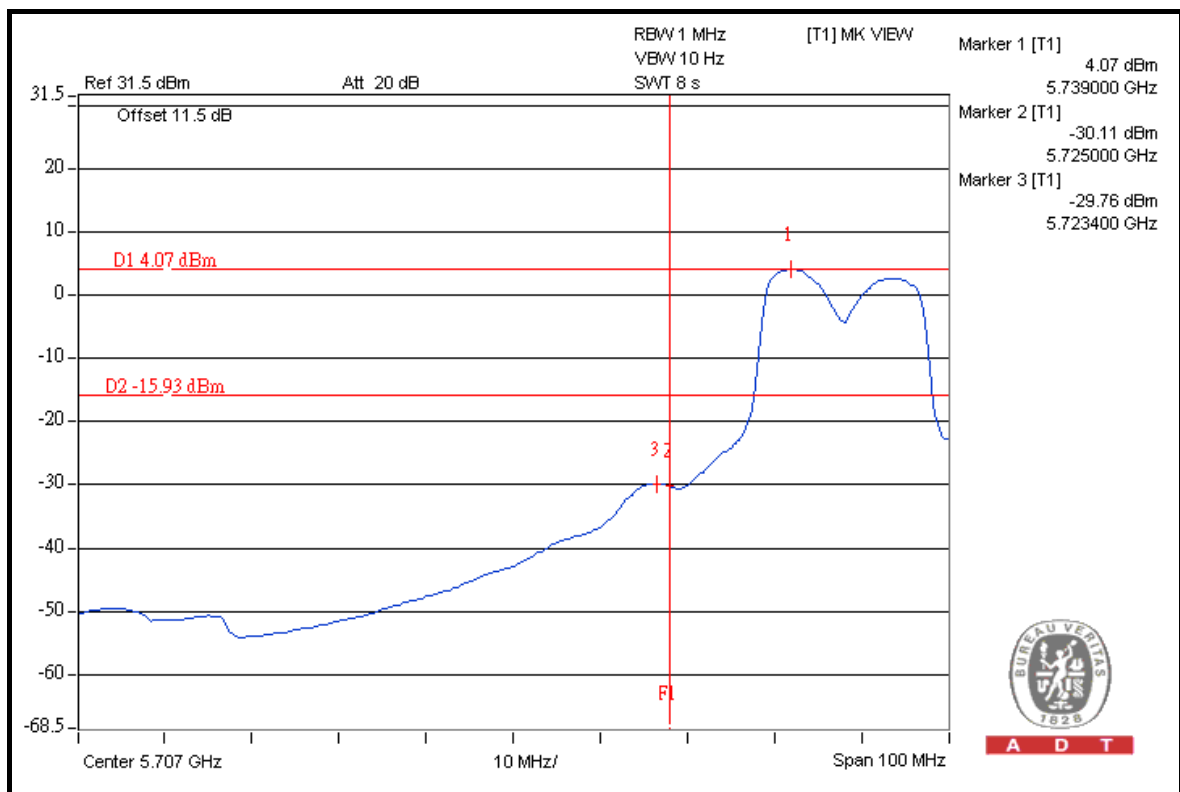
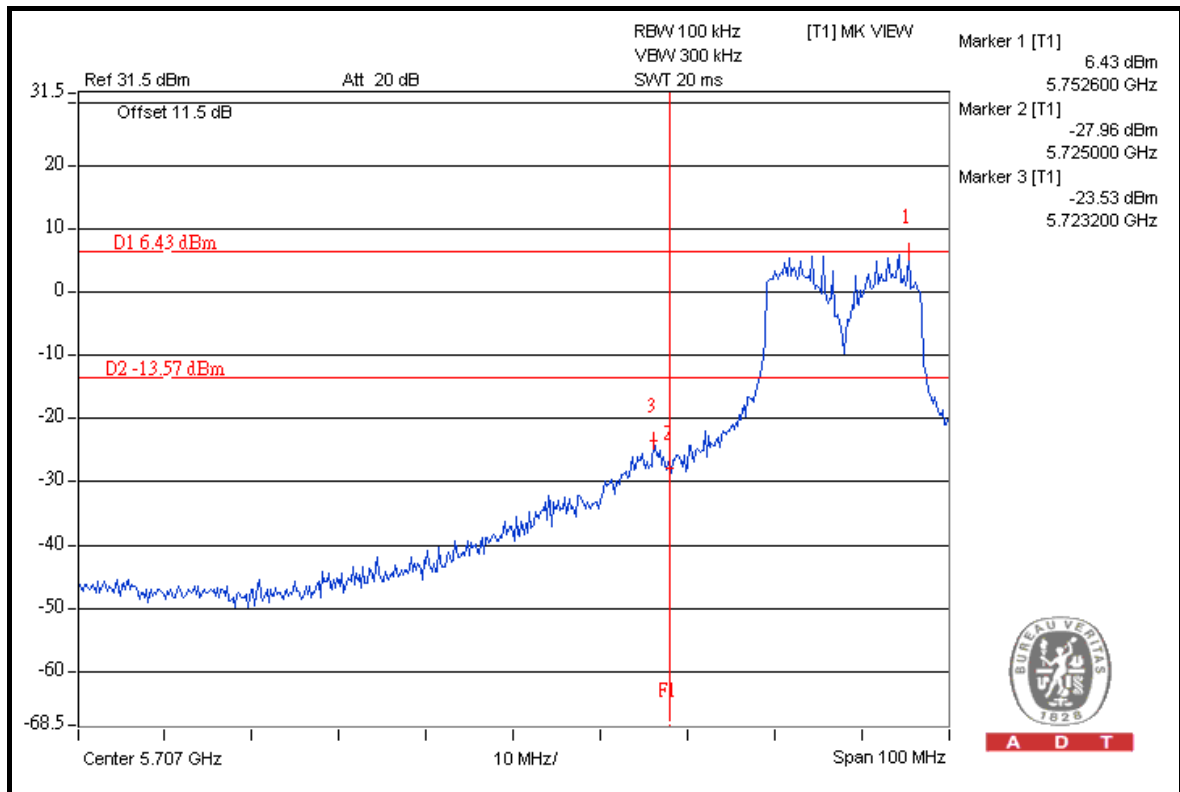
A D T





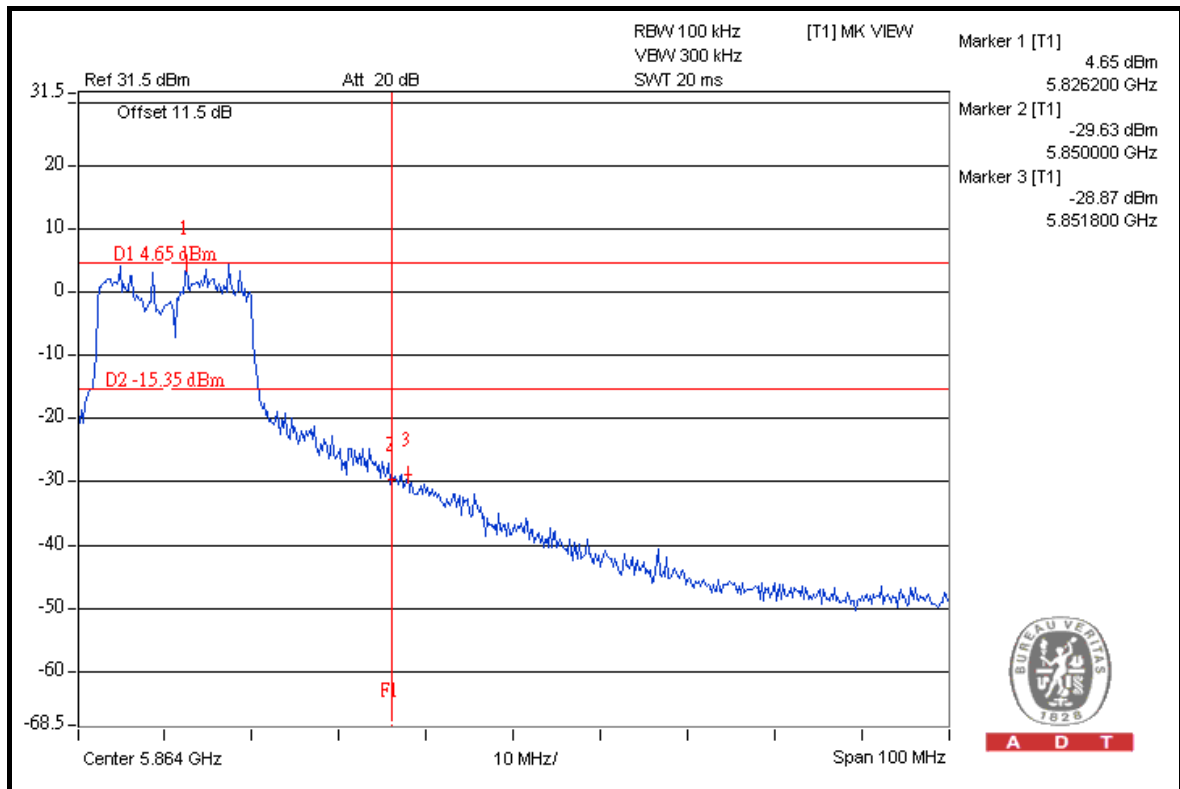
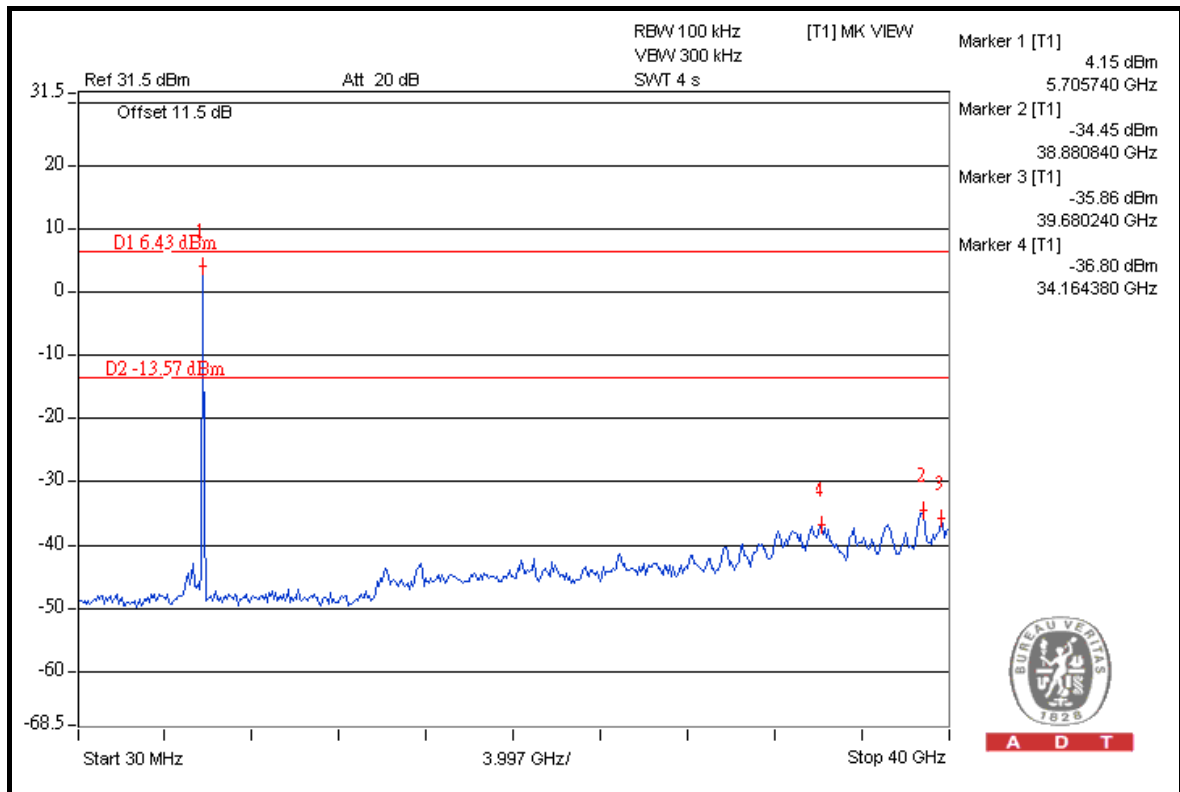
A D T

CHAIN 2



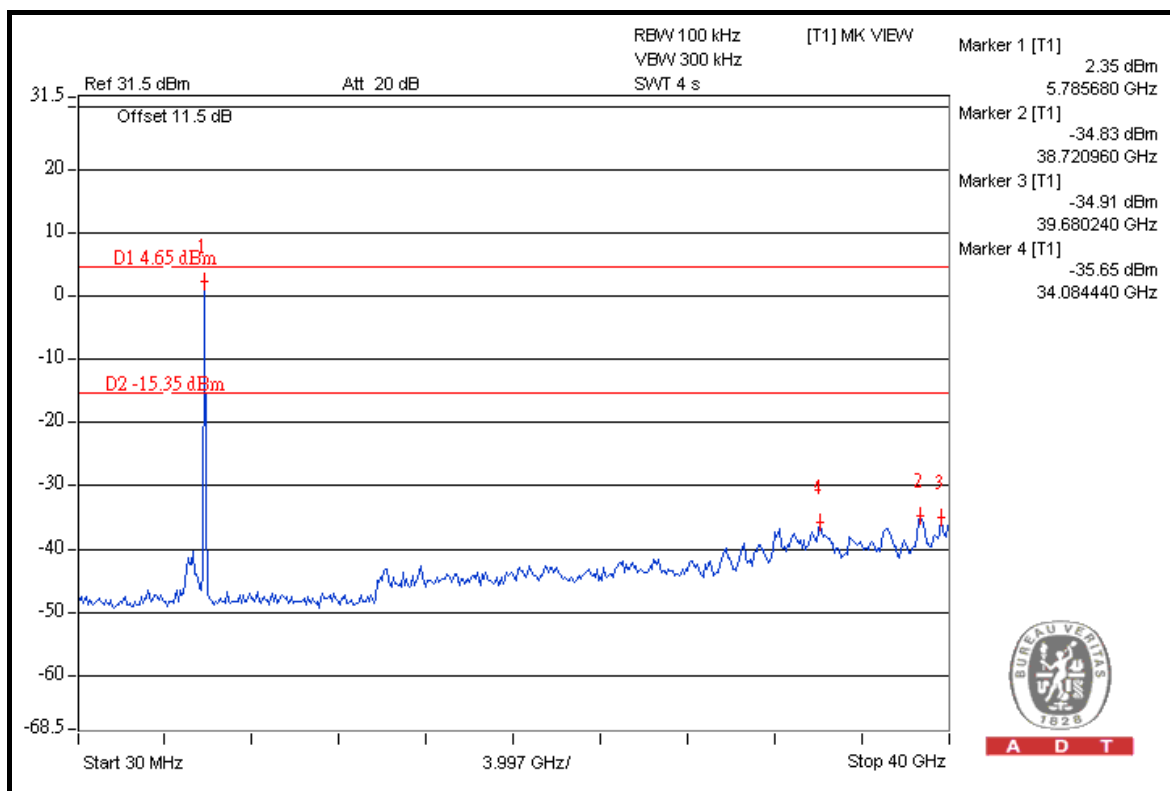
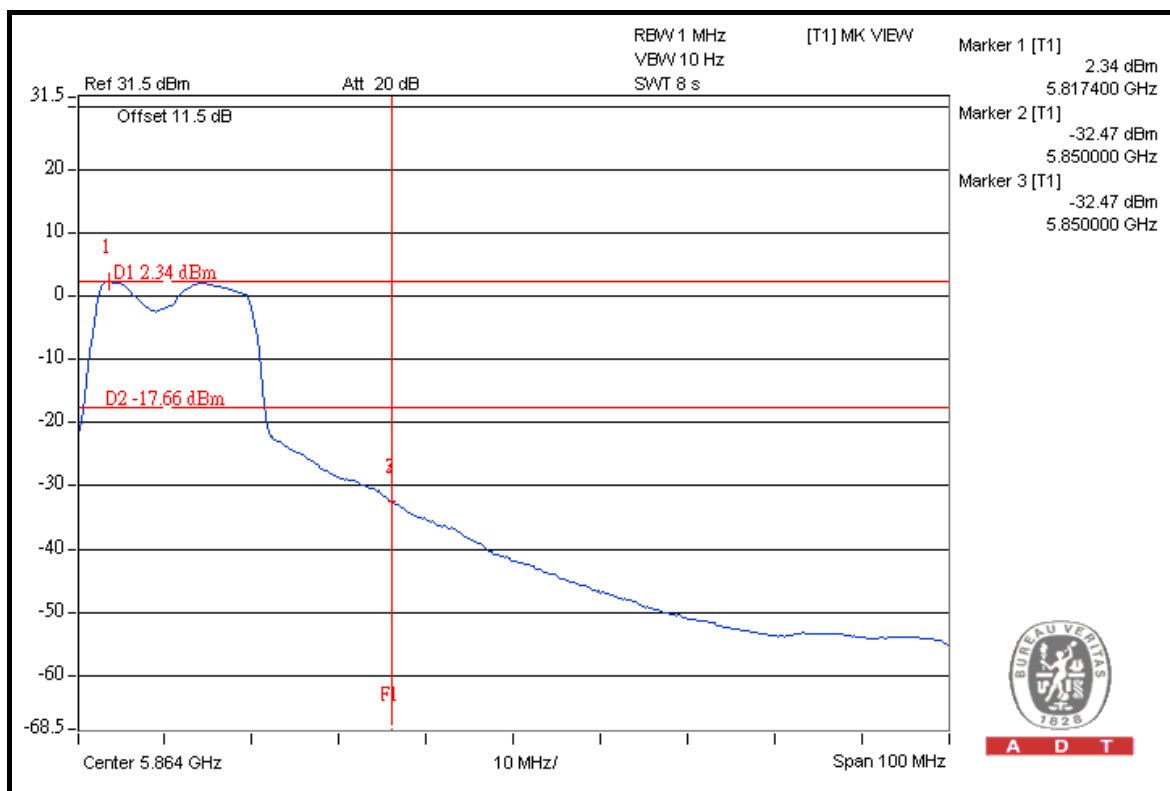


A D T





A D T

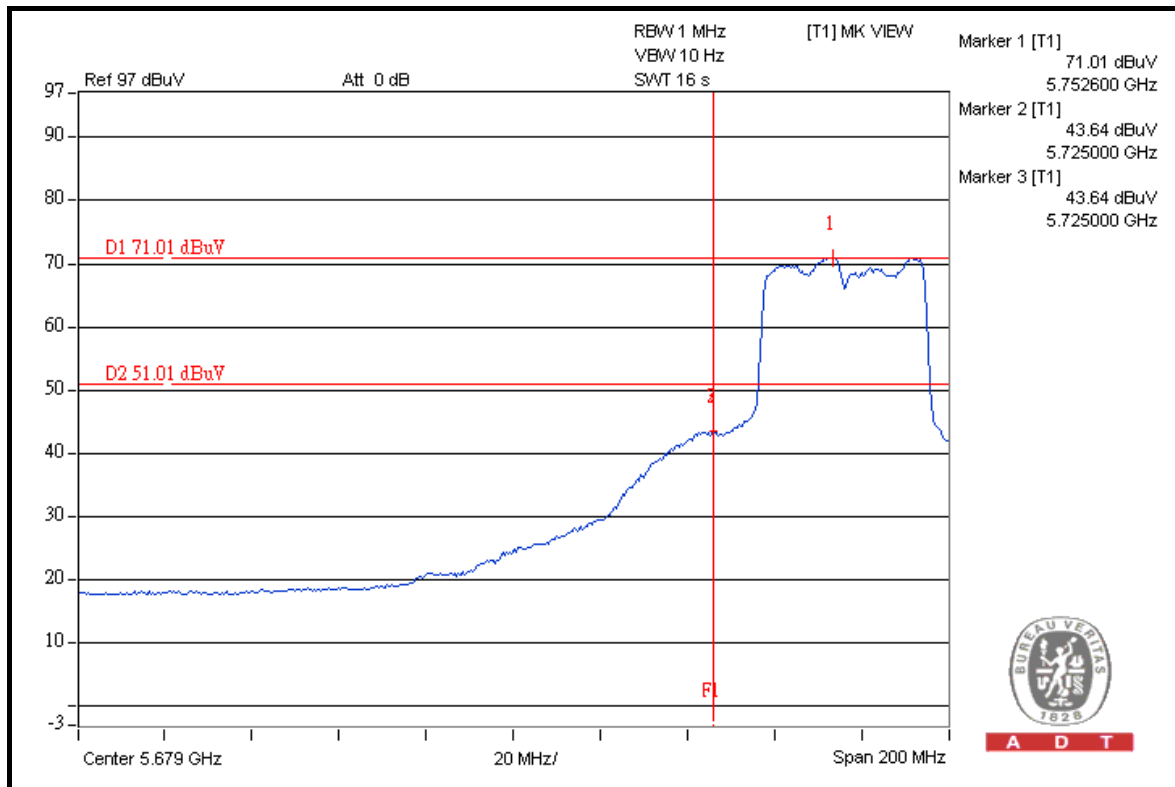
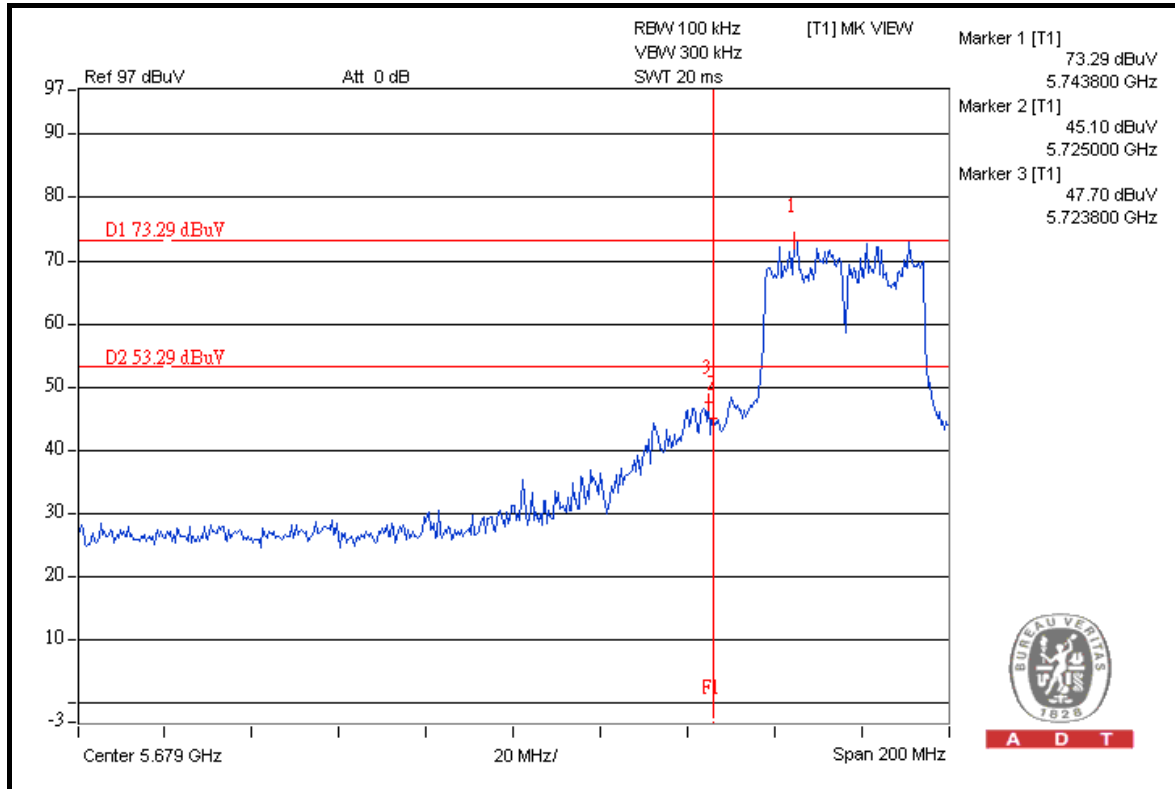




A D T

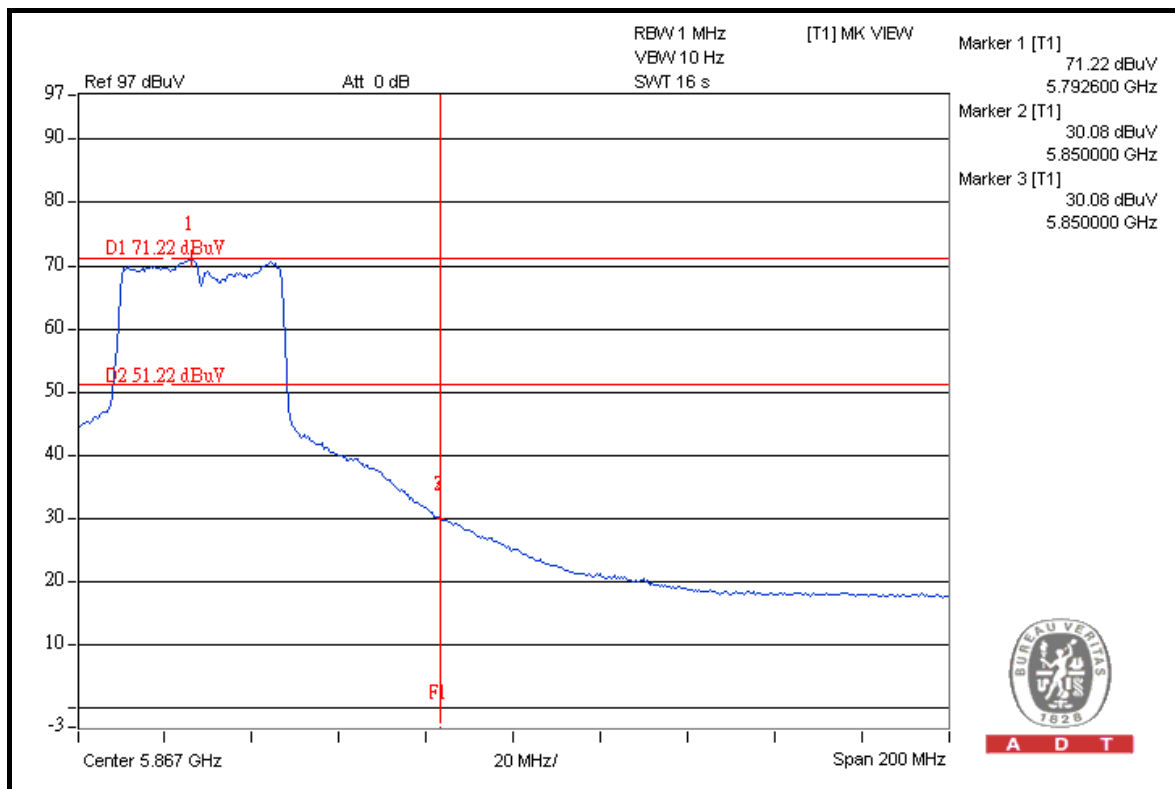
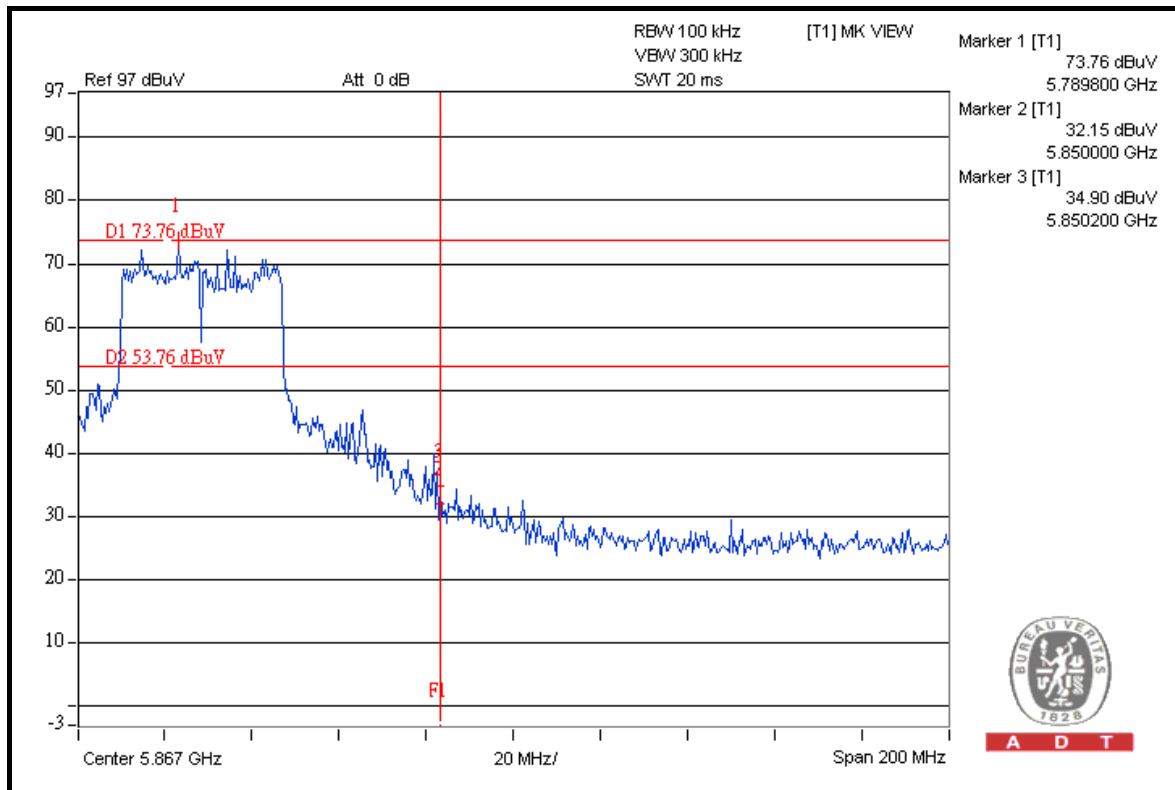
802.11n (40MHz)

FOR RADIATED MEASURED (THREE CHAINS ON)





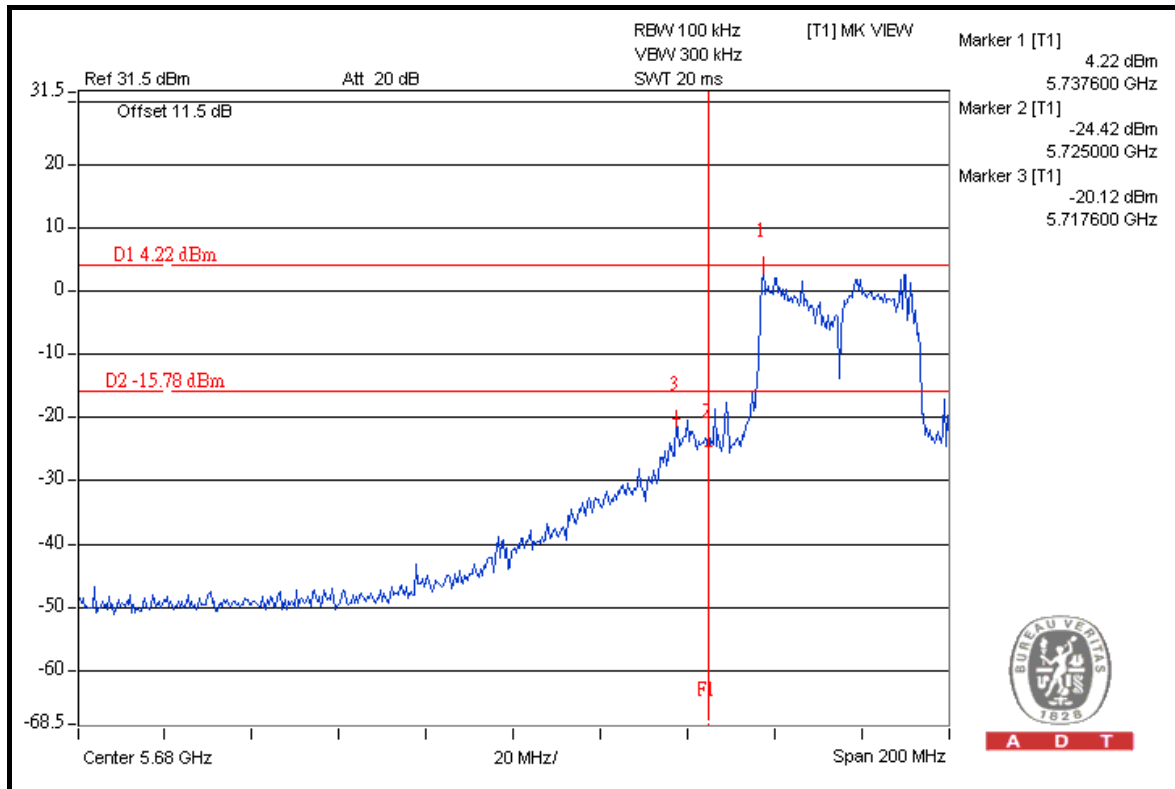
A D T



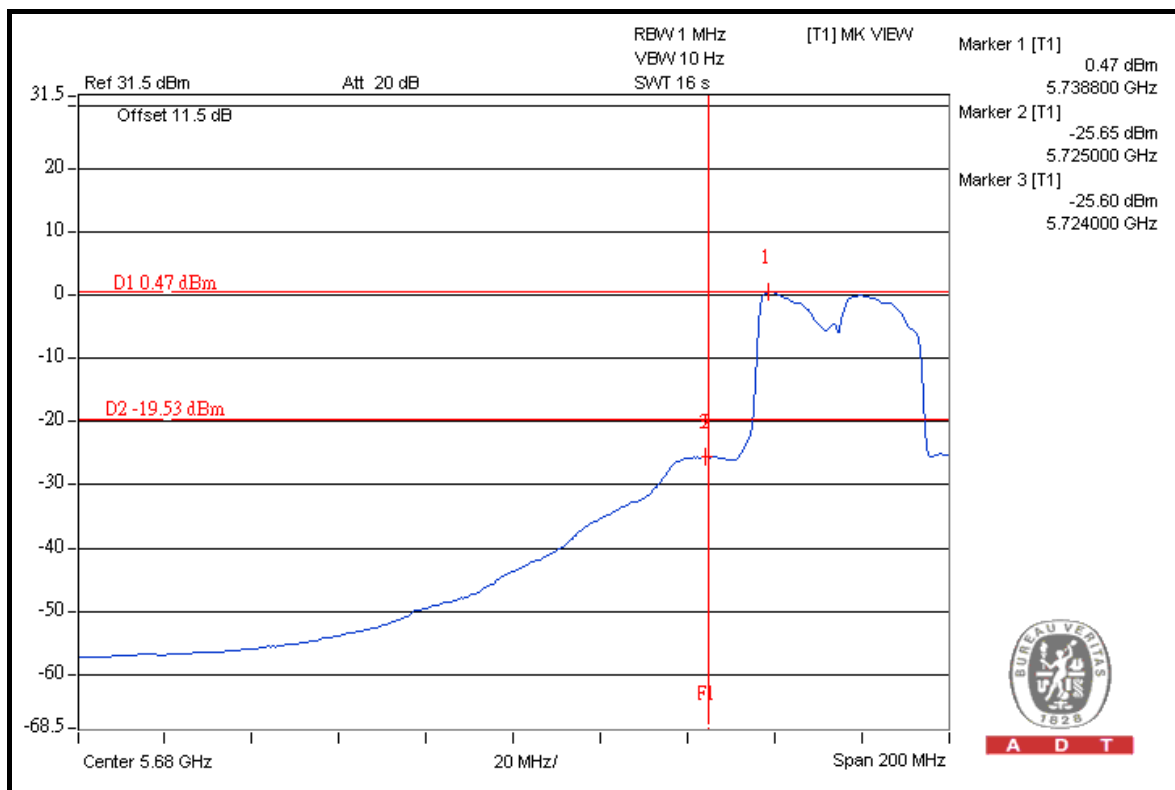


A D T

FOR CONDUCTED MEASURED CHAIN 0



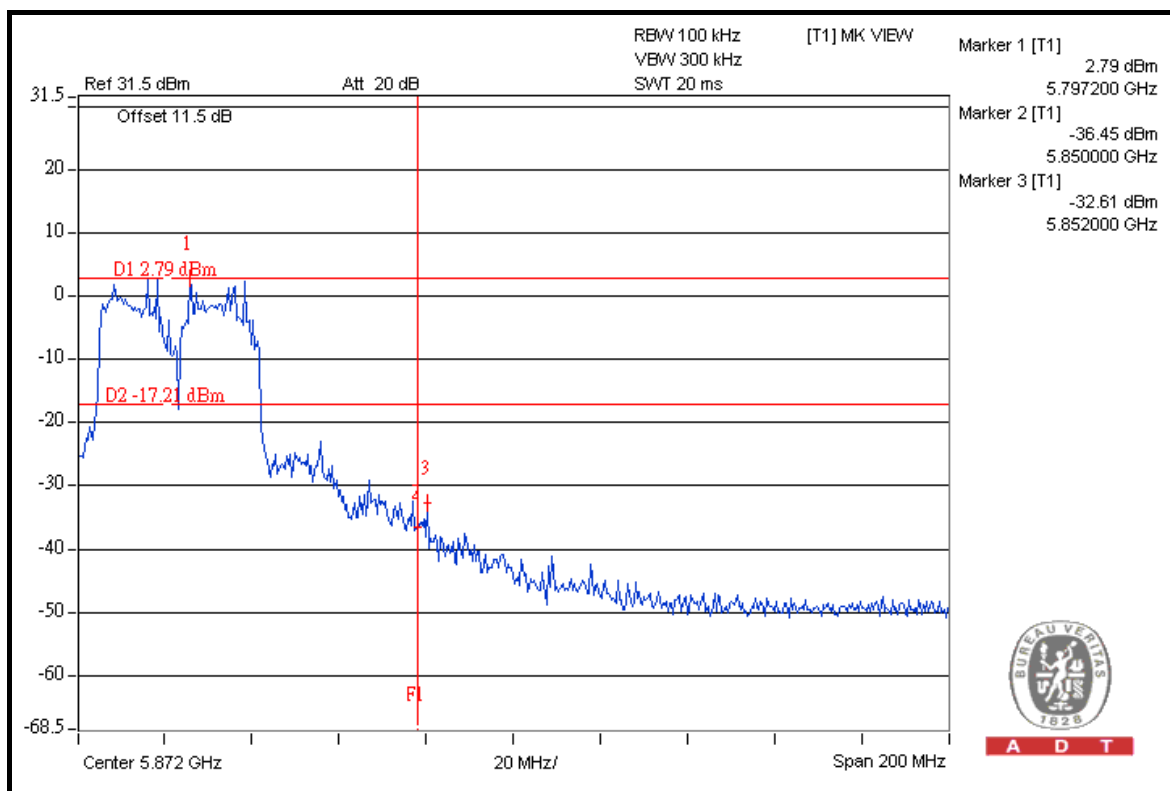
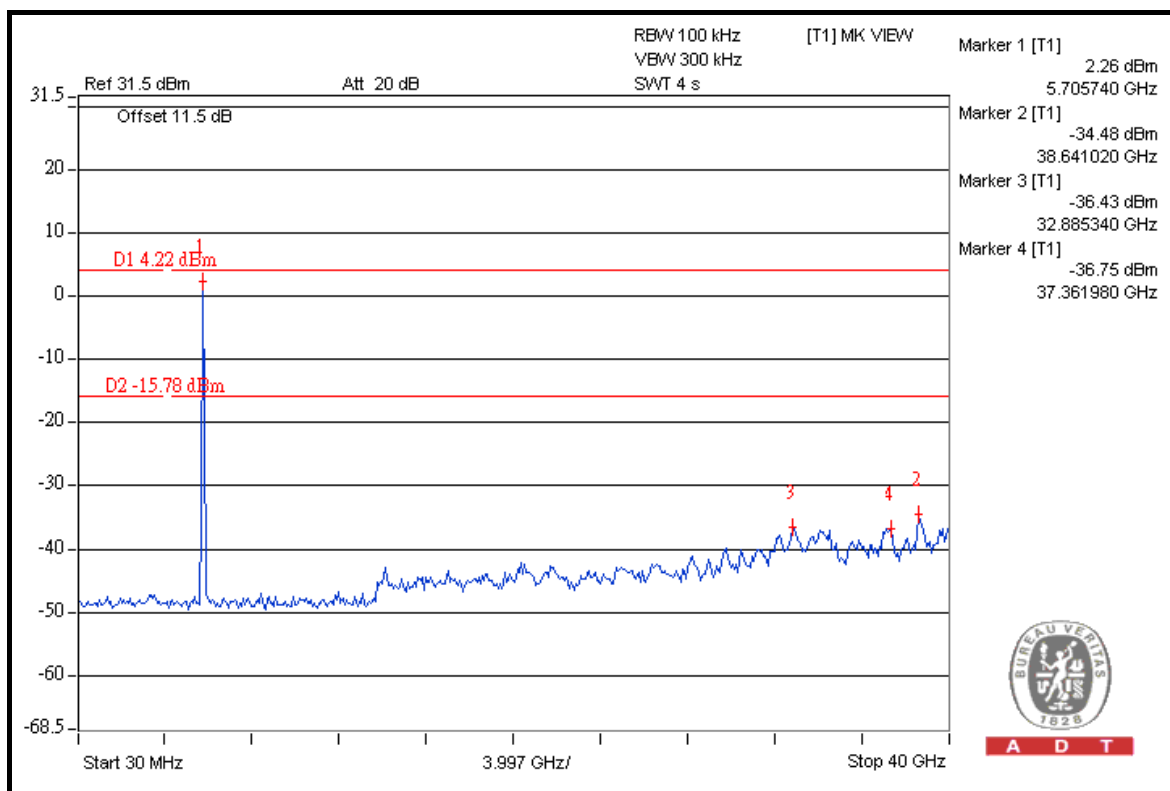
A D T



A D T

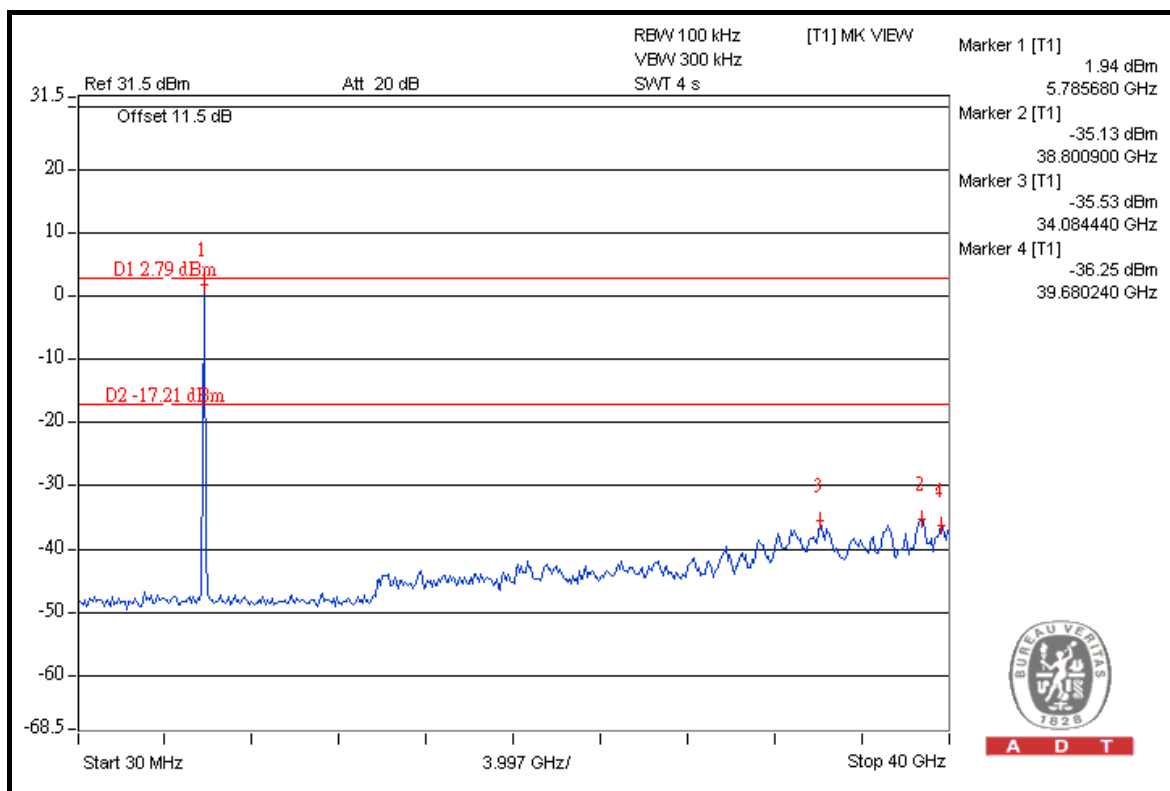
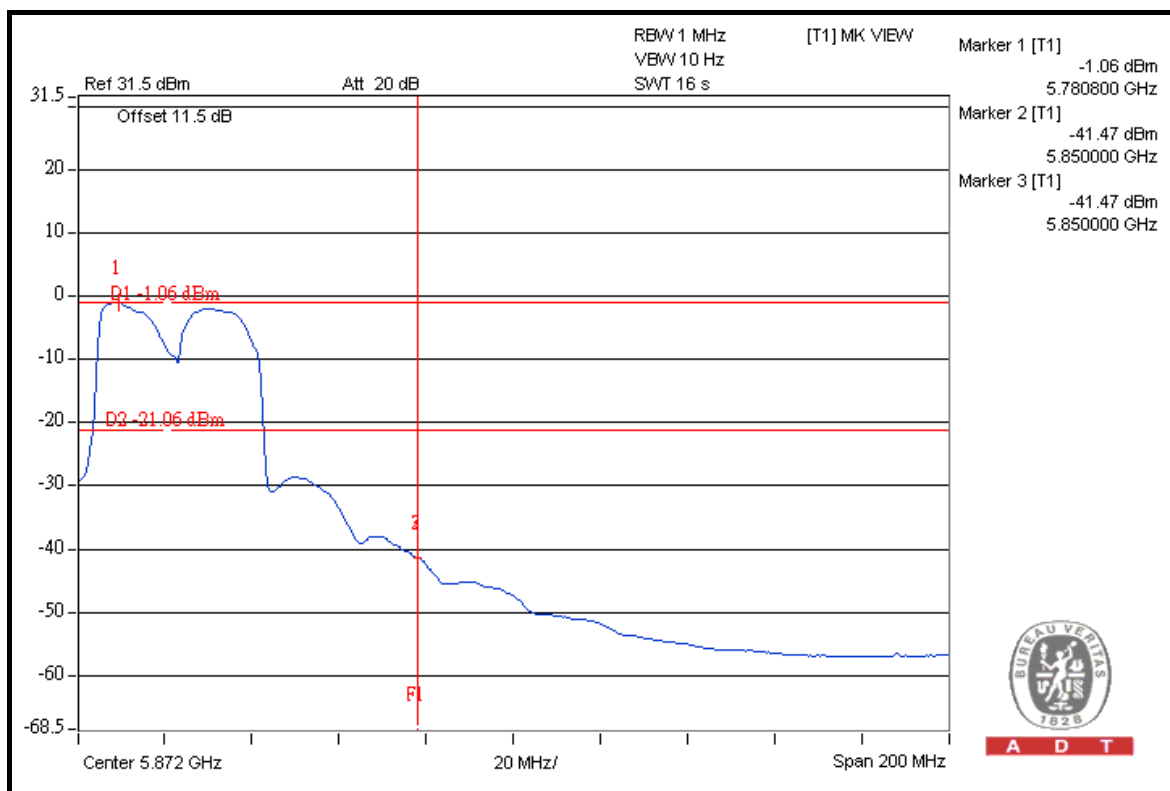


A D T





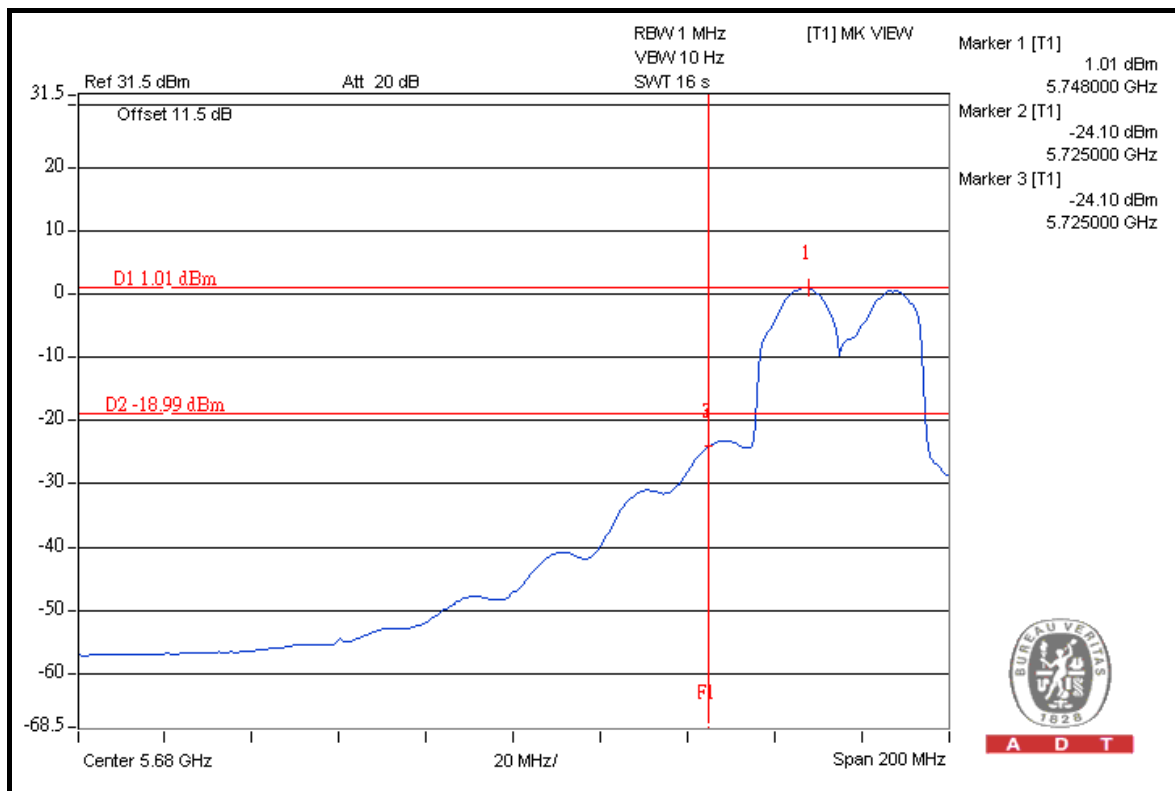
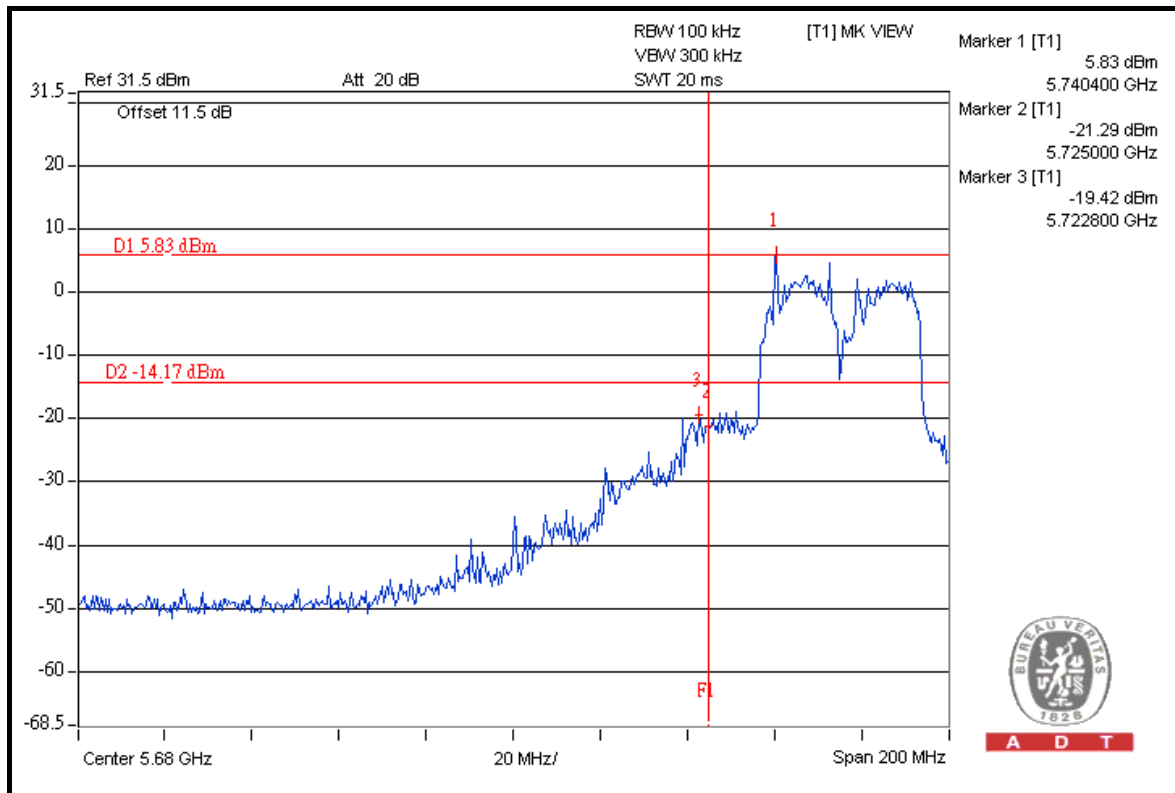
A D T





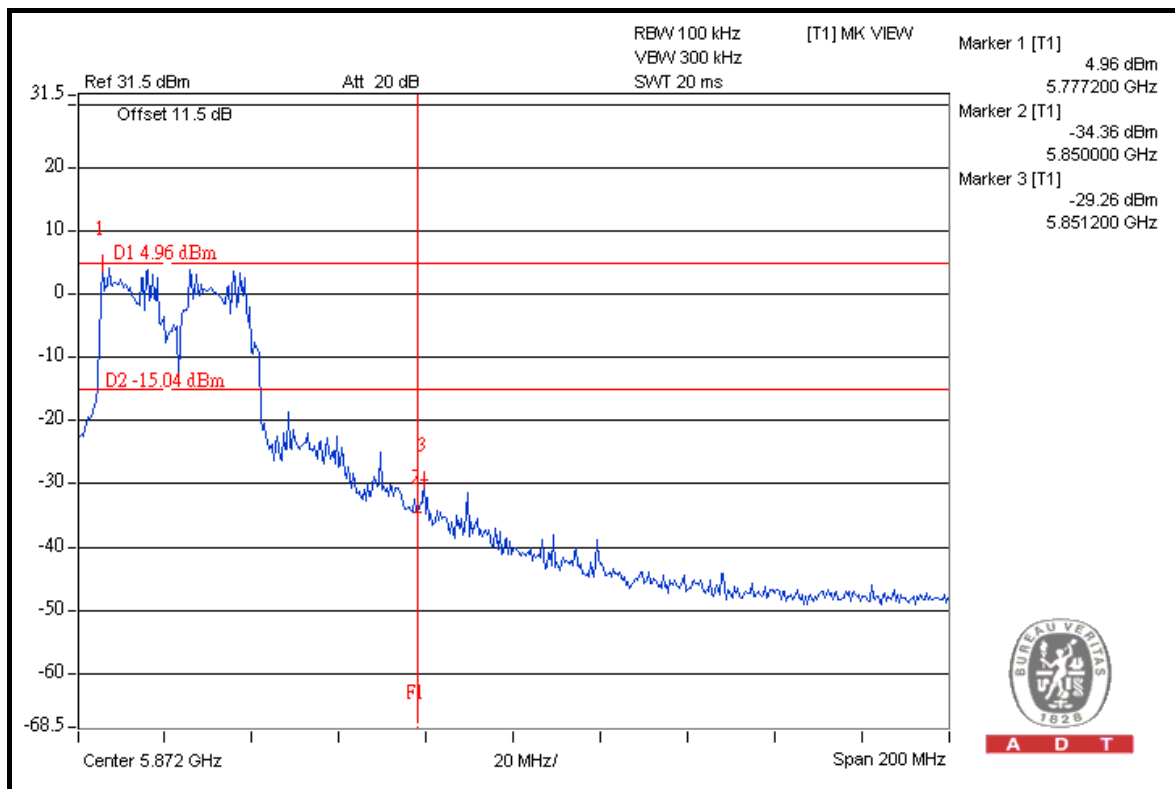
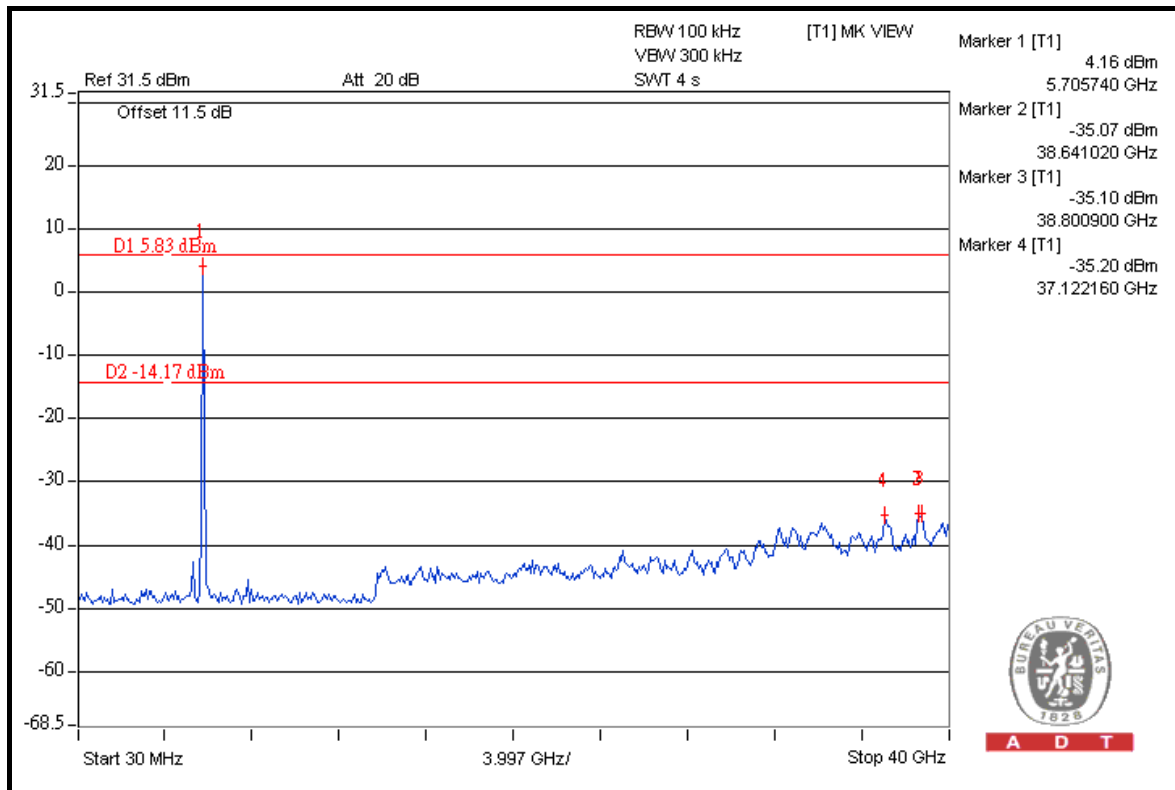
A D T

CHAIN 1





A D T

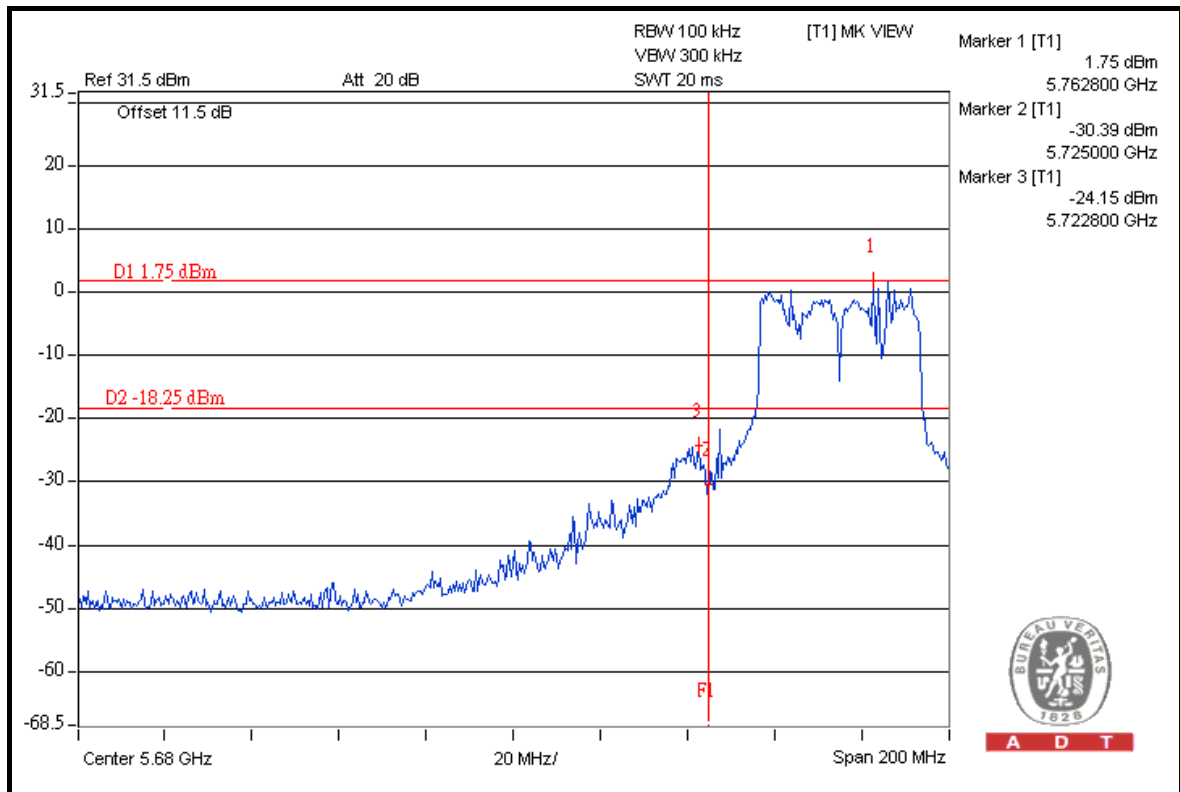




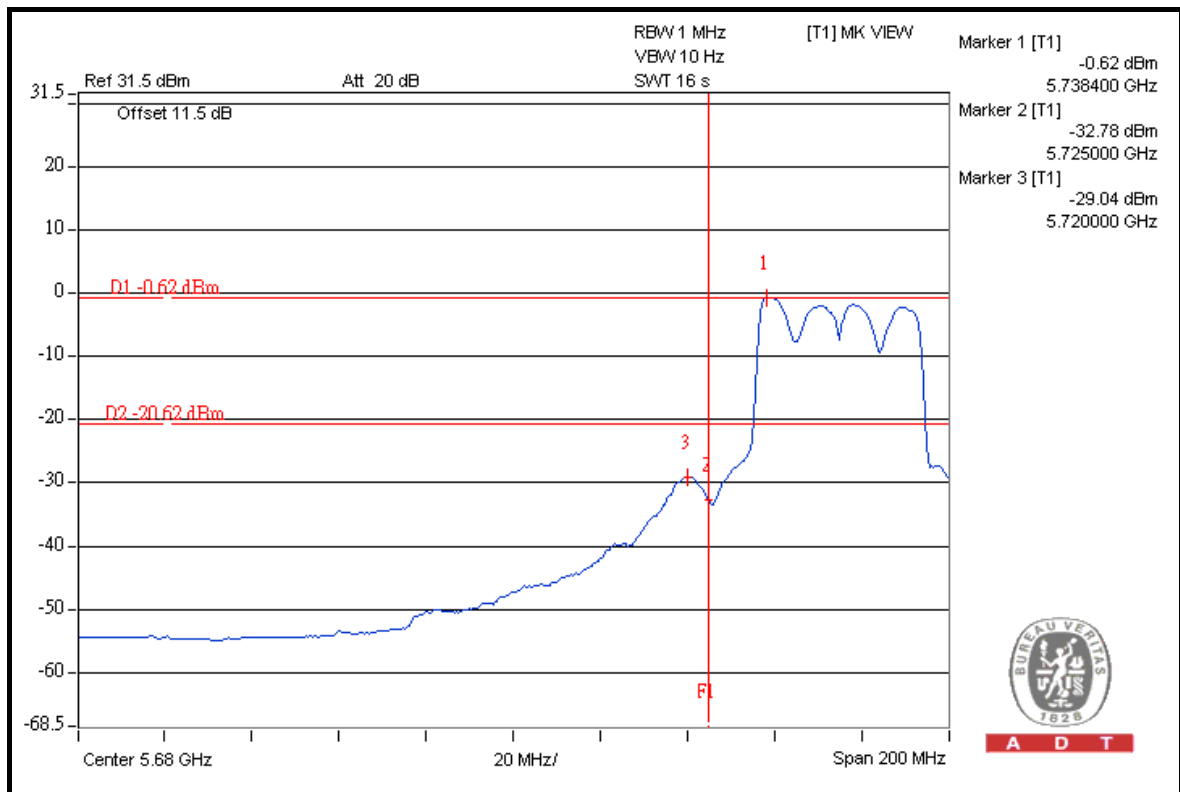


A D T

CHAIN 2



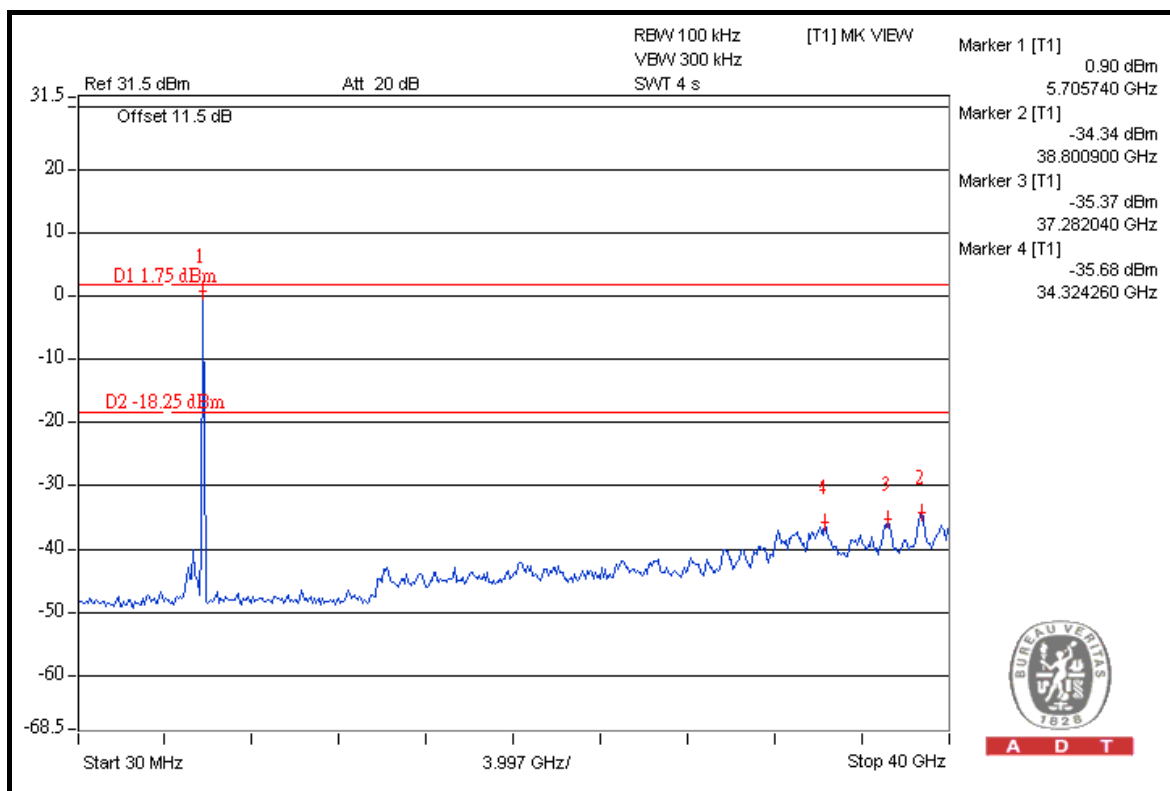
A D T



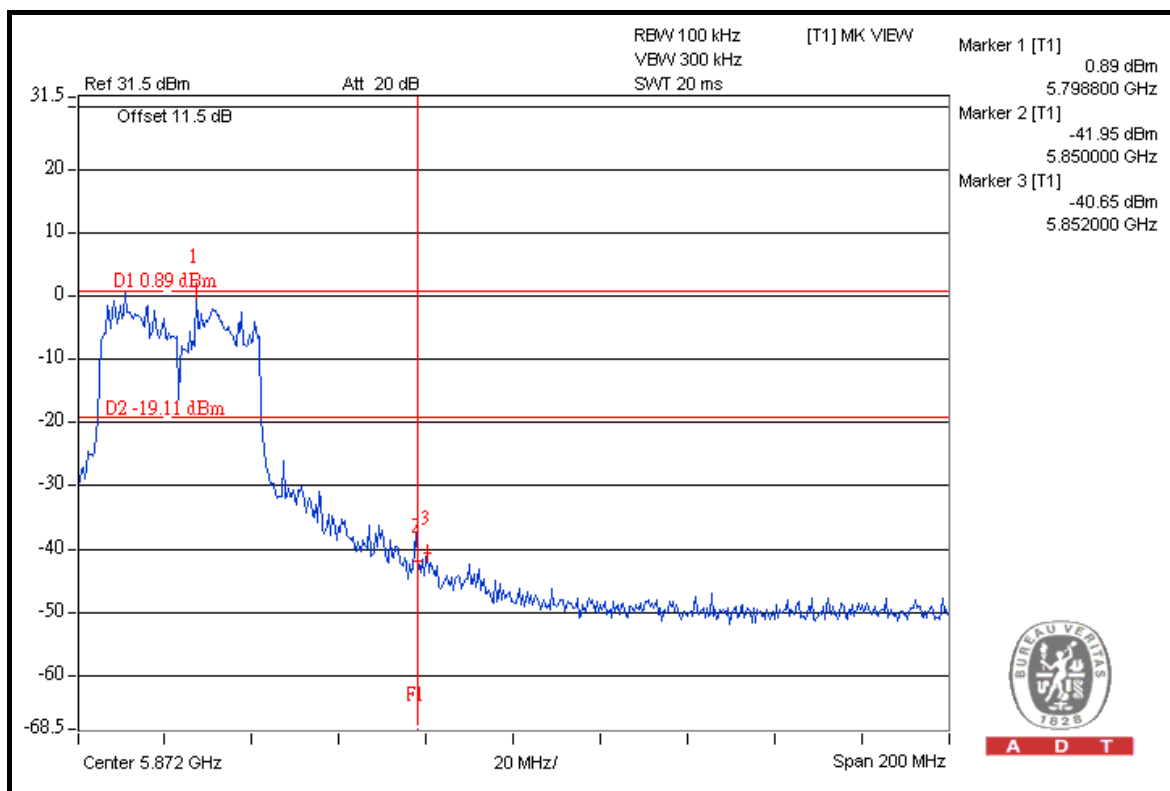
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6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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7. INFORMATION ON THE TESTING LABORATORIES

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

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

www.adt.com.tw/index.5.phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3185050

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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8. 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---