

4.7.3 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 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

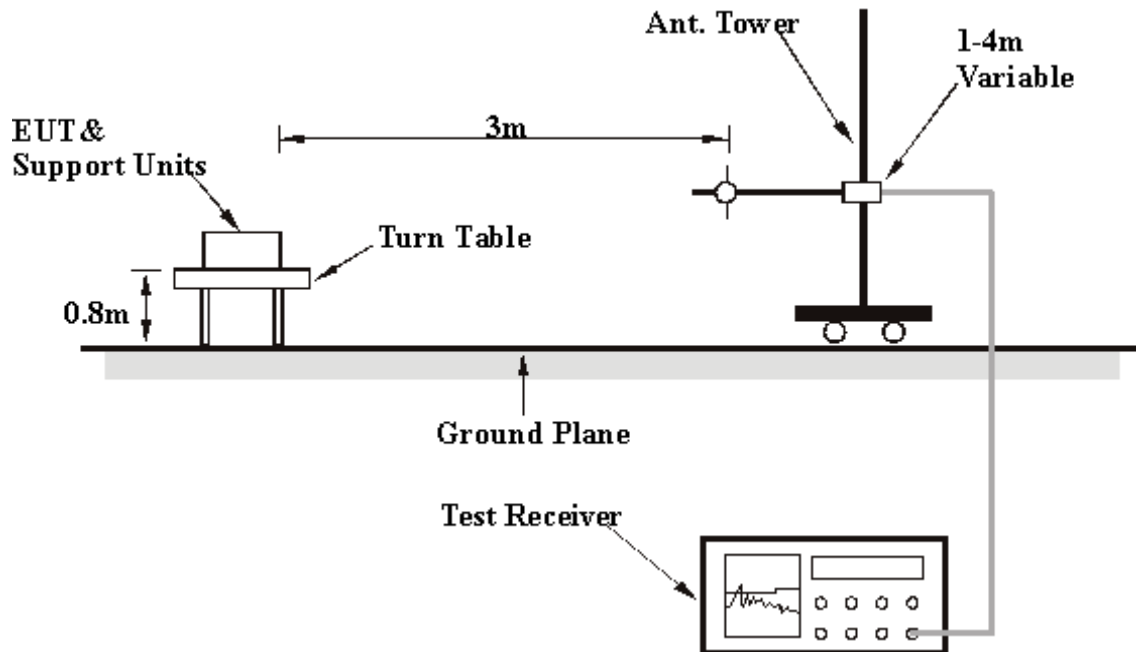
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.7.6 TEST RESULTS

EUT	Bluetooth USB Adapter	MODEL	BT-0330
CHANNEL	78	FREQUENCY RANGE	Below 1 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 65% RH, 991 hPa	TESTED BY	Long Chen

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	455.71	33.89 QP	46.00	-12.11	2.00 H	226	15.71	18.18
2	601.50	31.95 QP	46.00	-14.05	1.00 H	154	10.68	21.27
3	735.63	38.43 QP	46.00	-7.57	1.00 H	106	15.09	23.34
4	801.72	35.20 QP	46.00	-10.80	1.00 H	67	11.42	23.79
5	867.82	39.14 QP	46.00	-6.86	1.00 H	70	14.54	24.60
6	912.53	36.05 QP	46.00	-9.95	1.50 H	313	10.67	25.39

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	455.71	34.91 QP	46.00	-11.09	2.00 V	190	16.74	18.18
2	601.50	34.35 QP	46.00	-11.65	1.00 V	79	13.08	21.27
3	669.54	32.30 QP	46.00	-13.70	1.00 V	7	10.14	22.16
4	735.63	34.85 QP	46.00	-11.15	1.00 V	106	11.51	23.34
5	801.72	31.52 QP	46.00	-14.48	1.50 V	97	7.73	23.79
6	867.82	33.45 QP	46.00	-12.55	1.50 V	88	8.85	24.60

- 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.



EUT	Bluetooth USB Adapter	MODEL	BT-0330
CHANNEL	0	FREQUENCY RANGE	1 ~25 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70% RH, 991 hPa	TESTED BY	Long Chen

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	1602.00	42.23 PK	74.00	-31.77	1.35 H	215	13.66	28.57
2	*2402.00	100.37 PK			1.46 H	261	69.21	31.16
2	*2402.00	65.83 AV			1.46 H	261	34.67	31.16
3	4804.00	51.34 PK	74.00	-22.66	1.08 H	224	13.51	37.83
3	4804.00	16.80 AV	54.00	-37.20	1.08 H	224	-21.03	37.83
4	7206.00	54.38 PK	74.00	-19.62	1.64 H	225	11.00	43.38
4	7206.00	19.84 AV	54.00	-34.16	1.64 H	225	-23.54	43.38
5	9608.00	59.36 PK	74.00	-14.64	1.67 H	57	12.93	46.43
5	9608.00	24.82 AV	54.00	-29.18	1.67 H	57	-21.61	46.43

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	1602.00	41.29 PK	74.00	-32.71	1.65 V	107	12.72	28.57
2	*2402.00	95.70 PK			1.70 V	122	64.54	31.16
2	*2402.00	61.16 AV			1.70 V	122	30.00	31.16
3	4804.00	53.25 PK	74.00	-20.75	1.00 V	296	15.42	37.83
3	4804.00	18.71 AV	54.00	-35.29	1.00 V	296	-19.02	37.83
4	7206.00	53.12 PK	74.00	-20.88	1.36 V	75	9.74	43.38
4	7206.00	18.58 AV	54.00	-35.42	1.36 V	75	-24.80	43.38

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 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 DH3 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*3 per 197.5 ms per channel. Therefore, the duty cycle be equal to: $20\log(1.875/100) = -34.54\text{dB}$
 7. Average value = peak reading $-20\log(\text{duty cycle})$



EUT	Bluetooth USB Adapter	MODEL	BT-0330
CHANNEL	39	FREQUENCY RANGE	1 ~25 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70% RH, 991 hPa	TESTED BY	Long Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M								
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	1628.00	41.30 PK	74.00	-32.70	1.35 H	215	12.71	28.59
2	*2441.00	101.06 PK			1.39 H	79	69.71	31.36
2	*2441.00	66.52 AV			1.39 H	79	35.16	31.36
3	4882.00	50.80 PK	74.00	-23.20	1.07 H	20	12.79	38.01
3	4882.00	16.26 AV	54.00	-37.71	1.07 H	20	-21.75	38.01
4	9764.00	59.08 PK	74.00	-14.92	1.49 H	52	12.70	46.38
4	9764.00	24.54 AV	54.00	-29.46	1.49 H	52	-21.84	46.38

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M								
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	1628.00	41.82 PK	74.00	-32.18	1.32 V	120	13.23	28.59
2	*2441.00	96.40 PK			1.69 V	195	65.04	31.36
2	*2441.00	61.86 AV			1.69 V	195	30.50	31.36
3	4882.00	53.66 PK	74.00	-20.34	1.02 V	337	15.65	38.01
3	4882.00	19.12 AV	54.00	-34.88	1.02 V	337	-18.89	38.01
4	9764.00	65.56 PK	74.00	-8.44	1.37 V	255	19.18	46.38
4	9764.00	31.02 AV	54.00	-22.98	1.37 V	255	-15.36	46.38

- REMARKS:**
1. Emission level(dBUV/m)=Raw Value(dBUV) + Correction Factor(dB)
 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 DH3 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*3 per 197.5 ms per channel. Therefore, the duty cycle be equal to: $20\log(1.875/100) = -34.54\text{dB}$
 7. Average value = peak reading $-20\log(\text{duty cycle})$



EUT	Bluetooth USB Adapter	MODEL	BT-0330
CHANNEL	78	FREQUENCY RANGE	1 ~25 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70% RH, 991 hPa	TESTED BY	Long Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M								
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	1653.00	43.83 PK	74.00	-30.17	1.00 H	158	15.23	28.60
2	*2480.00	99.88 PK			1.42 H	258	68.33	31.55
2	*2480.00	65.34 AV			1.42 H	258	33.79	31.55
3	4960.00	50.93 PK	74.00	-23.07	1.58 H	89	12.73	38.20
3	4960.00	16.39 AV	54.00	-37.61	1.58 H	89	-21.80	38.20
4	9920.00	57.97 PK	74.00	-16.03	1.32 H	72	11.37	46.60
4	9920.00	23.43 AV	54.00	-30.57	1.32 H	72	-23.17	46.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M								
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	1654.00	42.02 PK	74.00	-31.98	1.83 V	252	13.41	28.60
2	*2480.00	95.43 PK			1.69 V	127	63.88	31.55
2	*2480.00	60.89 AV			1.69 V	127	29.34	31.55
3	4960.00	53.88 PK	74.00	-20.12	1.00 V	337	15.68	38.20
3	4960.00	19.34 AV	54.00	-34.66	1.00 V	337	-18.86	38.20
4	9920.00	56.42 PK	74.00	-17.58	1.00 V	343	9.82	46.60
4	9920.00	21.88 AV	54.00	-32.12	1.00 V	343	-24.72	46.60

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 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 DH3 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*3 per 197.5 ms per channel. Therefore, the duty cycle be equal to: $20\log(1.875/100) = -34.54\text{dB}$
 7. Average value = peak reading $-20\log(\text{duty cycle})$

4.8 BAND EDGES MEASUREMENT

4.8.1 LIMITS OF BAND EDGES MEASUREMENT

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

4.8.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004

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

4.8.3 TEST PROCEDURE

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

4.8.4 DEVIATION FROM TEST STANDARD

No deviation

4.8.5 EUT OPERATING CONDITION

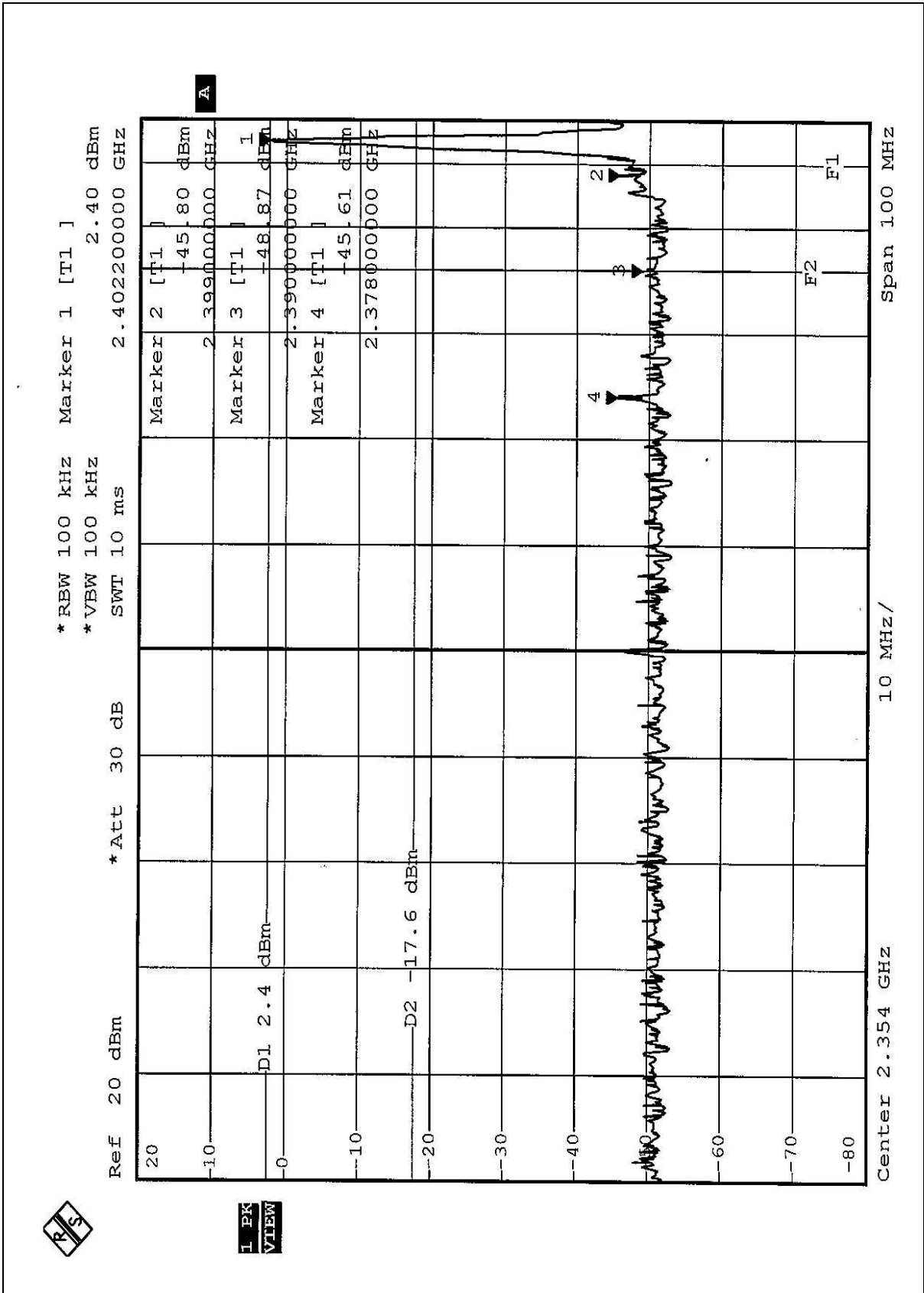
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

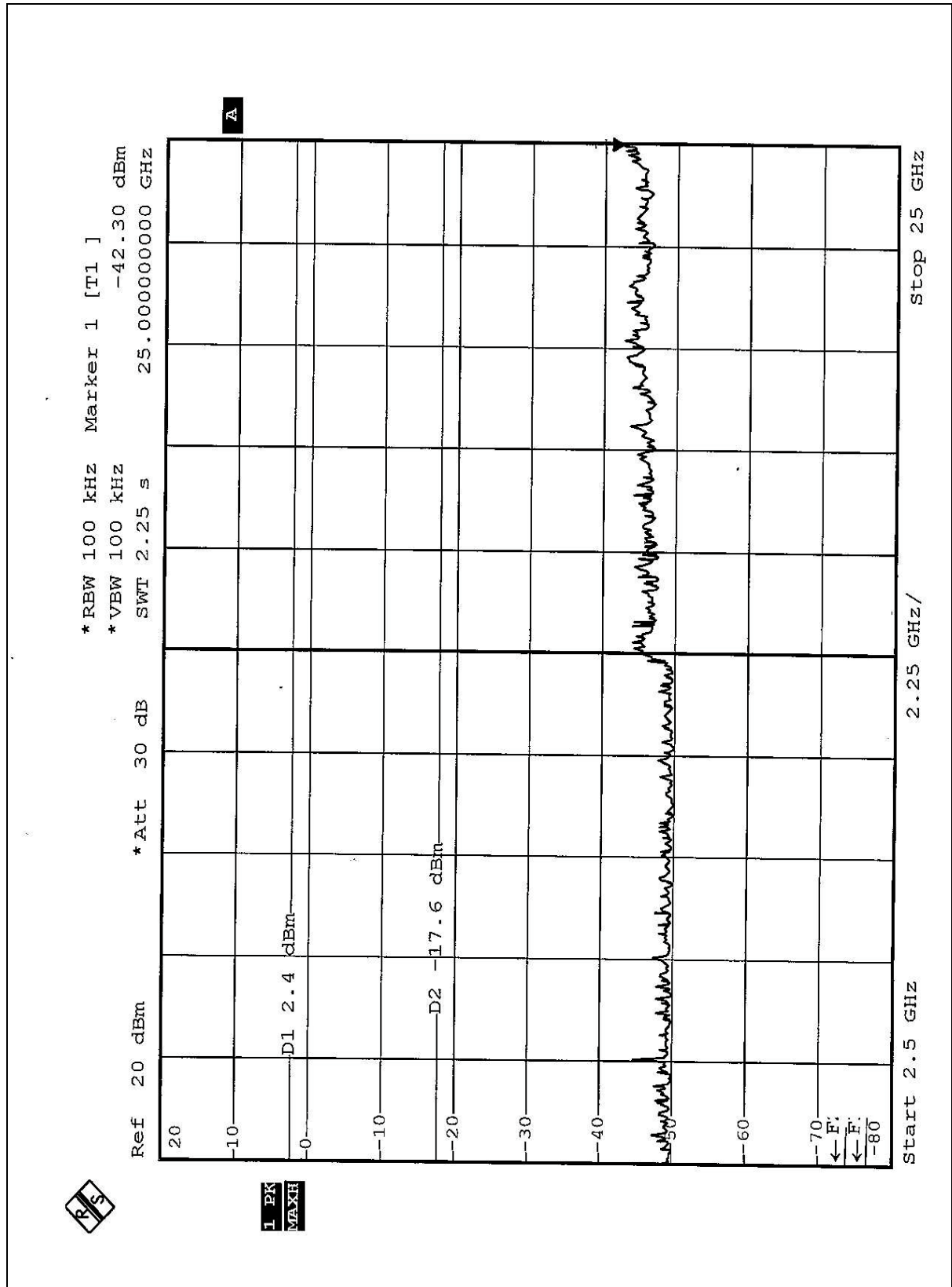
4.8.6 TEST RESULTS

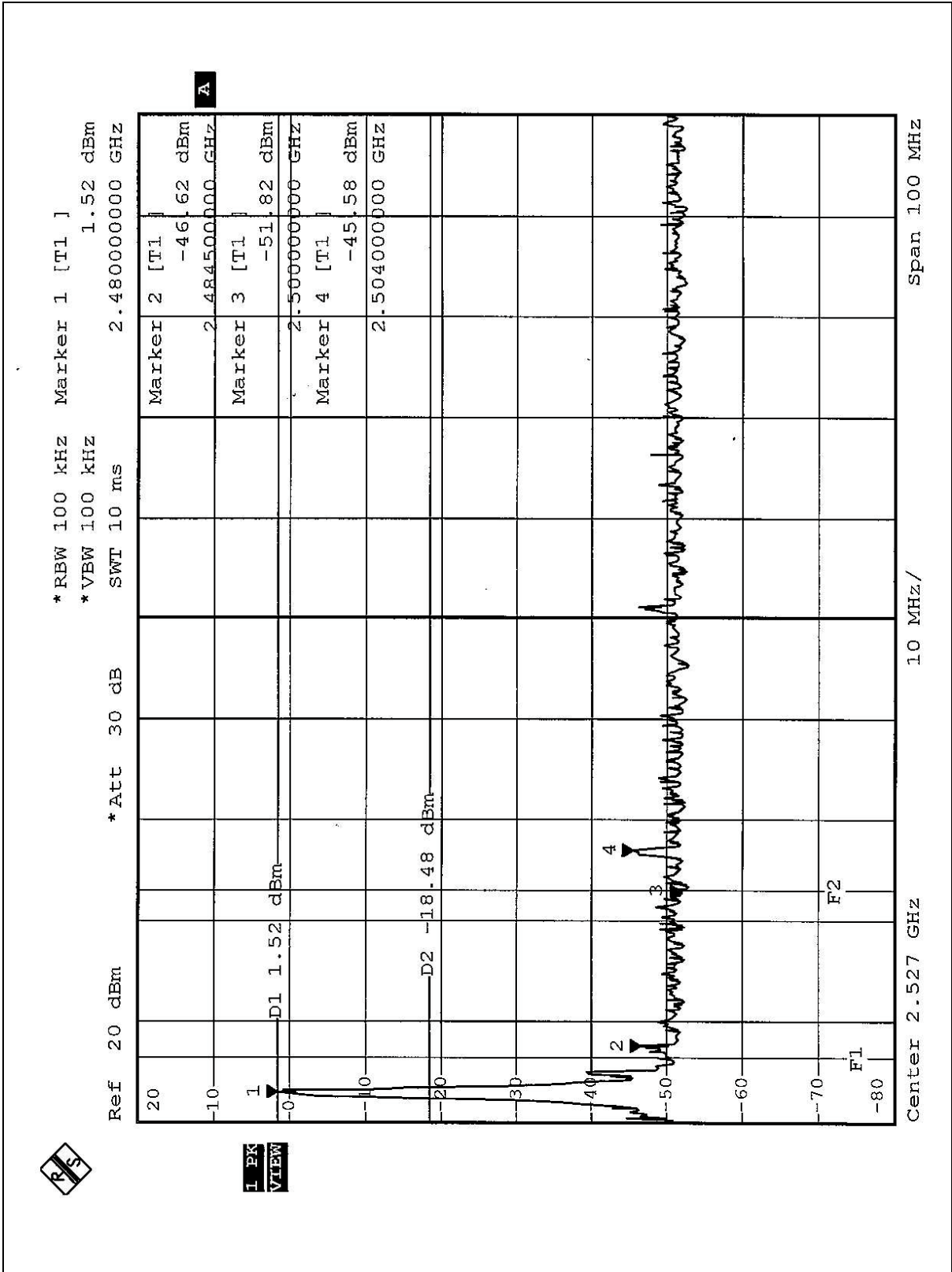
The spectrum plots are attached on the following 4 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

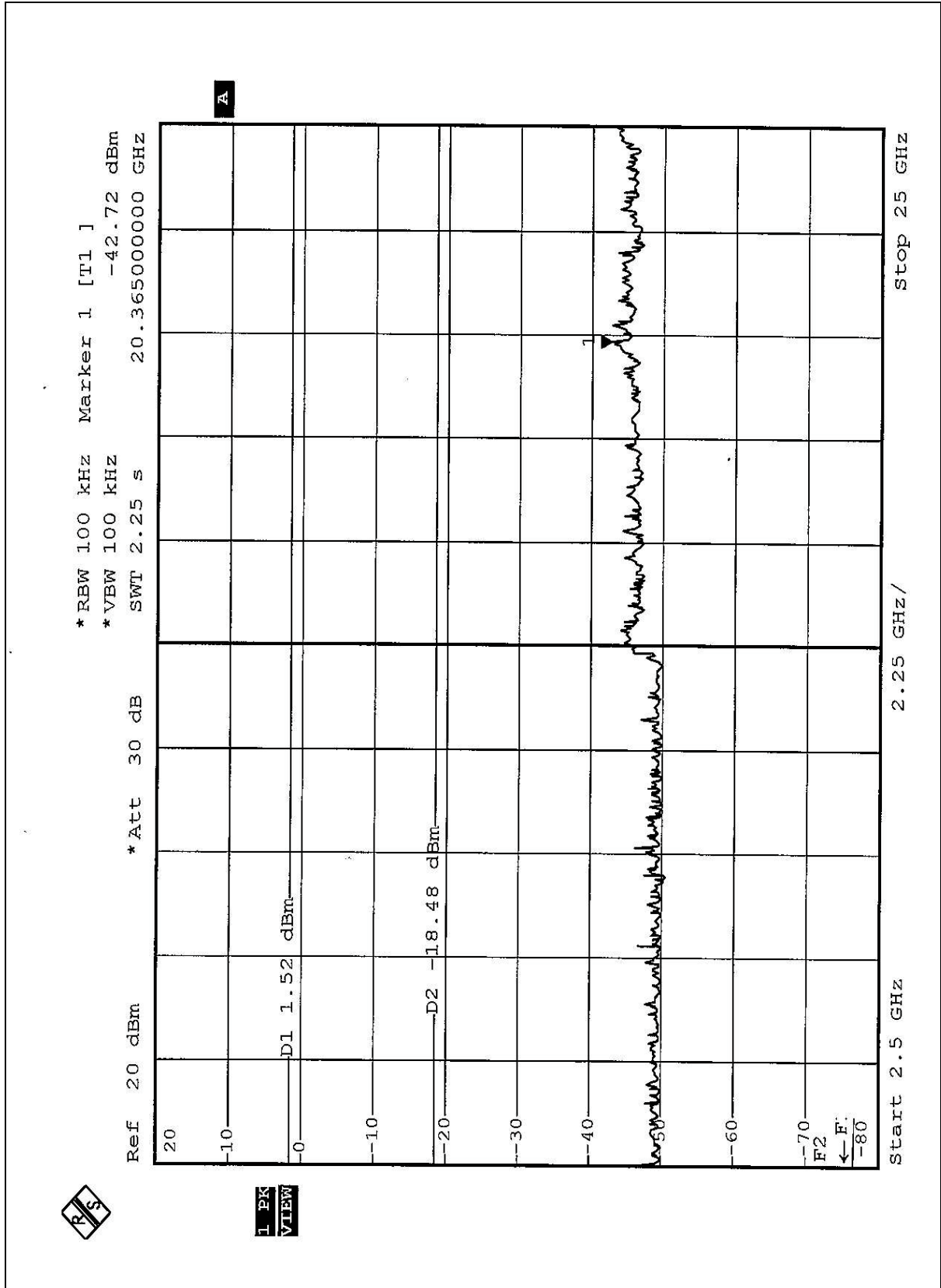
NOTE1: The band edge emission plot on the following 1 ~ 2 pages show 48.01dB delta between carrier maximum power and local maximum emission in restrict band (2.3780GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.7.6 is 65.83dBuV/m, so the maximum field strength in restrict band is $65.83 - 48.01 = 17.82$ dBuV/m which is under 54 dBuV/m limit.

NOTE2: The band edge emission plot on the following 3 ~ 4 pages show 48.14dB delta between carrier maximum power and local maximum emission in restrict band (2.4845GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.7.6 is 65.34dBuV/m, so the maximum field strength in restrict band is $65.34 - 48.14 = 17.20$ dBuV/m which is under 54 dBuV/m limit.











4.9 ANTENNA REQUIREMENT

4.9.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.9.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is chip antenna without antenna connector. The maximum gain of this antenna is 0dBi.

5 PHOTOGRAPHS OF THE TEST CONFIGURATION CONDUCTED EMISSION TEST



RADIATED EMISSION TEST





6 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

USA	FCC, NVLAP, UL
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	CNLA, BSMI, DGT
Netherlands	Telefication
Singapore	PSB , GOST-ASIA(MOU)
Russia	CERTIS(MOU)

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.

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The address and road map of all our labs can be found in our web site also.

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