



FCC TEST REPORT (BLUETOOTH)

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MODEL NO.: TX201L
FCC ID: MSQ-TX201L
RECEIVED: Jul. 26, 2013
TESTED: Aug. 02, 2013 ~ Aug. 27, 2013
ISSUED: Sep. 04, 2013

APPLICANT: ASUSTek COMPUTER INC.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130729C17	Original release	Sep. 04, 2013



1. CERTIFICATION

PRODUCT: Notebook PC
MODEL NO.: TX201L
BRAND: ASUS
APPLICANT: ASUSTek COMPUTER INC.
TESTED: Aug. 02, 2013 ~ Aug. 27, 2013
TEST SAMPLE: Production Unit
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

The above equipment (model: TX201L) 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 : Vera Huang , **DATE** : Sep. 04, 2013
Vera Huang / Specialist

APPROVED BY : Sam chen , **DATE** : Sep. 04, 2013
Sam Chen / Assistant Manager

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C (Bluetooth EDR)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -10.46dB at 0.20078MHz.
15.247(a)(1) (iii)	Number of Hopping Frequency Used	PASS	Meet the requirement of limit.
15.247(a)(1) (iii)	Dwell Time on Each Channel	PASS	Meet the requirement of limit.
15.247(a)(1)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power	PASS	Meet the requirement of limit.
15.247(d)	Transmitter Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -4.33dB at 39.45MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

NOTE: If The Frequency Hopping System operating in 2400-2483.5MHz band and the output power less than 125mW. The hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of hopping channel whichever is greater.

2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	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

<Pad>

EUT	Notebook PC
MODEL NO.	TX201L
POWER SUPPLY	5Vdc (adapter or host equipment) 3.75Vdc (battery)
MODULATION TYPE	GFSK, $\pi/4$ -DQPSK, 8DPSK
TRANSFER RATE	1/2/3Mbps
OPERATING FREQUENCY	2402 ~ 2480MHz
NUMBER OF CHANNEL	79
CHANNEL SPACING	1MHz
OUTPUT POWER	7.551mW
ANTENNA TYPE	PIFA antenna with -2.71dBi gain
ANTENNA CONNECTOR	NA
DATA CABLE	Refer to Note as below
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Refer to Note as below

<Base>

POWER SUPPLY	19Vdc (adapter) 7.54Vdc (battery)	
MODULATION TYPE	Bluetooth EDR	GFSK, $\pi/4$ -DQPSK, 8DPSK
	Bluetooth LE 4.0	GFSK
TRANSFER RATE	Bluetooth EDR	1/2/3Mbps
	Bluetooth LE 4.0	1Mbps
OPERATING FREQUENCY	2402 ~ 2480MHz	
NUMBER OF CHANNEL	Bluetooth EDR	79
	Bluetooth LE 4.0	40
CHANNEL SPACING	Bluetooth EDR	1MHz
	Bluetooth LE 4.0	2MHz
ANTENNA TYPE	PIFA antenna with -1.93dBi gain	
ANTENNA CONNECTOR	NA	
DATA CABLE	Refer to Note as below	
I/O PORTS	Refer to user's manual	
ACCESSORY DEVICES	Refer to Note as below	

NOTE:

1. The EUT has following accessories.

<For Pad>

ITEM	BRAND	MODEL	DESCRIPTION
AC Adapter 1	ASUS	AD83531	I/P: 100-240Vac, 50-60Hz, 0.3A O/P: 5Vdc, 2A
AC Adapter 2	ASUS	AD835M1	I/P: 100-240Vac, 50-60Hz, 0.3A O/P: 5Vdc, 2A
Li-ion Battery	Dynapack International Technology Corp/ Trademark for ASUS	C11N1312	Rating: 3.75Vdc, 19Wh
USB cable	ASUS	N/A	0.9m shielded cable w/o ferrite core
Photo Camera	LITEON	13P2BA515	--
Video Camera	CHICONY	CNFDH3021003870LH	--
WLAN/BT Module	Broadcom	BCM43340	--
CPU	Intel	Z2560	760 Pin
Main Borad	ASUS	TX201LA PAD MAIN BOARD	--
LCD Panel 1	INNOLUX	N116HSE	--
LCD Panel 2	BOE	HN116WX1	--
Flash Memory 1	HYNIX	H9TKNNNBPDARAR- NGM	Co-POP LPDDR2 Memory 2G Support Dual 32-bit channels. 6.4GB/s @ 800MHz, 8.2GB/s @ 1066MHz.
Flash Memory 2	ELPIDA	EDB8164B3PD-1D-F	Co-POP LPDDR2 Memory 1G Support Dual 32-bit channels. 6.4GB/s @ 800MHz, 8.2GB/s @ 1066MHz.
eMMC 1	HYNIX	H26M64003DQR	eMMC 32G
eMMC 2	SANDISK	SDIN8DE4-32G	eMMC 16G

* Adapter 1 and adapter 2 have same design, material, and specification. The difference between them is adapter 2 could change plug type.

<For Base>

ITEM	BRAND	MODEL	DESCRIPTION
AC Adapter	ASUS	AD883J20	I/P: 100-240Vac, 50-60Hz, 1A O/P: 19Vdc, 2.37A 2.2m shielded cable w/o ferrite core
Li-ion Battery	Dynapack International Technology Corp/ Trademark for ASUS	C21N1313	Rating: 7.54Vdc, 33Wh
WLAN/BT Module	AZWAVE	AW-CB161H	--
USB to RJ45 Cable	ASUS	USB Ethernet cable	0.18m shielded cable w/o ferrite core Support 10Mbps and 100Mbps
MDP to VGA Cable	ASUS	N/A	0.12m shielded cable w/o ferrite core
CPU 1	Intel	i5-4200U	1168 Pin, 1.8GHz
CPU 2	Intel	i74500u	1168 Pin, 1.6GHz
Main Borad	ASUS	TX201LA BASE BOARD	--
Flash Memory 1	HYNIX	H5TC4G63AFR-PBA	Onboard 4G (256 x 16 x8), 8G (512 x 16 x 8) 1600MHz DDR3L SDRAM
Flash Memory 2	ELPIDA	EDJ4216EFBG-GNL-F	Onboard 4G (256 x 16 x8), 8G (512 x 16 x 8) 1600MHz DDR3L SDRAM
HDD 1	HGST	HTS545050A7E680	7mm HDD 320G/500G/750G 5400RPM
HDD 2	Seagate	ST500LT012	7mm HDD 320G/500G/750G 5400RPM

2. The configurations of the device are as below.

SKU 1 Pad: LCD Panel 1 + Flash Memory 1 + eMMC 1

SKU 2 Pad: LCD Panel 2 + Flash Memory 2 + eMMC 2

SKU 1 Base: CPU 1 + Flash Memory 1 + HDD 1

SKU 2 Base: CPU 2 + Flash Memory 2 + HDD 2

3. The above EUT information is declared by the 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 Bluetooth EDR:

79 channels are provided to this EUT:

CHANNEL	FREQ. (MHz)						
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

For Bluetooth LE 4.0:

40 channels are provided to this EUT:

CHANNEL	FREQ. (MHz)						
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

TEST MODE		TX MODULE		TX ANTENNA	
		PAD	BASE	PAD	BASE
1	Pad	V	-	V	-
2	Pad + Base	V	-	V	-
3	Pad + Base	-	V	-	V

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis for mode 1.
2. The above modes had been pre-tested, mode 1 and mode 3 were the worst cases and only these modes were presented in this report.

For Bluetooth EDR:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE \geq 1G	RE $<$ 1G	PLC	APCM	
A	√	√	√	√	SKU 1 Pad
B	√	√	√	-	SKU 2 Pad
C	√	√	√	-	SKU 1 Pad + SKU 1 Base
D	√	√	√	-	SKU 2 Pad + SKU 2 Base

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

- NOTE:** 1. For Radiated emission test, pre-tested GFSK, $\pi/4$ -DQPSK, 8DPSK modulation type and found GFSK was the worse, therefore chosen for the final test and presented in the test report.
2. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane** for MODE A and MODE B.

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	PACKET TYPE
A	0 to 78	0, 39, 78	GFSK	DH5
B, C, D	0 to 78	78	GFSK	DH5

RADIATED EMISSION TEST (BELOW 1 GHz):

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	PACKET TYPE
A	0 to 78	39	GFSK	DH5
B, C, D	0 to 78	78	GFSK	DH5

POWER LINE CONDUCTED EMISSION TEST:

The EUT was tested with the following mode.

EUT CONFIGURE MODE	TEST CONDITION
A, B	BT Link + WLAN (2.4G) Link + Earphone + Adapter
C, D	BT Link + WLAN (2.4G) Link + Earphone + Adapter + Mouse

ANTENNA PORT CONDUCTED MEASUREMENT:

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	PACKET TYPE
A	0 to 78	0, 39, 78	GFSK	DH5
	0 to 78	0, 39, 78	$\pi/4$ -DQPSK	DH5
	0 to 78	0, 39, 78	8DPSK	DH5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE \geq 1G	25deg. C, 65%RH	120Vac, 60Hz	Anson Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	David Huang
PLC	25deg. C, 65%RH	120Vac, 60Hz	Johnson Liao
APCM	25deg. C, 65%RH	120Vac, 60Hz	Howard Kao

FOR Bluetooth LE 4.0 (for Base only):

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE \geq 1G	RE<1G	PLC	
C	√	√	√	SKU 1 Pad + SKU 1 Base
D	√	√	√	SKU 2 Pad + SKU 2 Base

Where **RE \geq 1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane** for MODE C and D.

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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
C, D	0 to 39	19	GFSK	1.0

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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
C, D	0 to 39	19	GFSK	1.0

POWER LINE CONDUCTED EMISSION TEST:

The EUT was tested with the following mode.

EUT CONFIGURE MODE	TEST CONDITION
C	BT LE 4.0 Tx + WLAN (5G) Link + Earphone + Adapter + Mouse
D	BT LE 4.0 Tx + WLAN (2.4G) Link + Earphone + Adapter + Mouse

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE \geq 1G	25deg. C, 65%RH	120Vac, 60Hz	Anson Lin
RE $<$ 1G	25deg. C, 65%RH	120Vac, 60Hz	David Huang
PLC	25deg. C, 65%RH	120Vac, 60Hz	Johnson Liao
APCM	25deg. C, 65%RH	120Vac, 60Hz	Howard Kao

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 C63.10-2009

FCC Public Notice DA 00-705

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. 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.

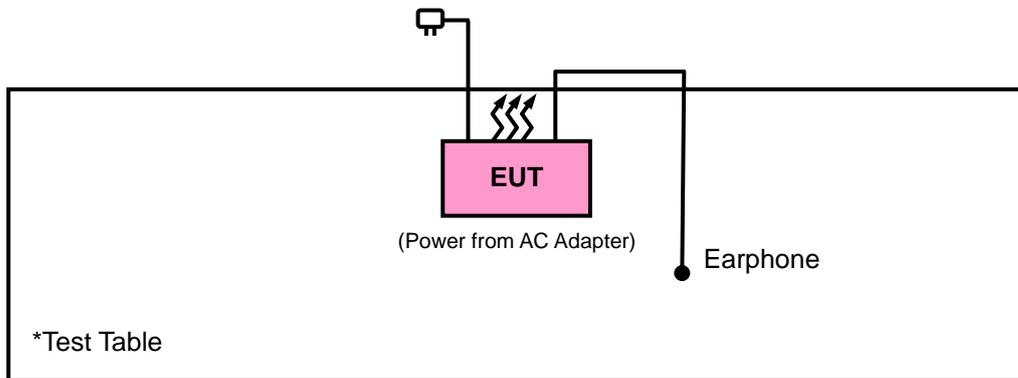
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	BLUETOOTH TESTER	R&S	CBT	100870	N/A
2	EARPHONE	Acon	CW-010M.V	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A
2	N/A

NOTE:

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

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS (FOR Bluetooth EDR)

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. 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. 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	100612	Sep. 20, 2012	Sep. 19, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2012	Dec. 16, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Mar. 25, 2013	Mar. 24, 2014
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 07, 2013	Jan. 06, 2014
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 25, 2012	Dec. 24, 2013
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier EMCI	EMC 012645	980115	Dec. 28, 2012	Dec. 27, 2013
Preamplifier EMCI	EMC 184045	980116	Dec. 28, 2012	Dec. 27, 2013
Preamplifier EMCI	EMC 330H	980112	Dec. 28, 2012	Dec. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4	Oct. 19, 2012	Oct. 18, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 19, 2012	Oct. 18, 2013
RF signal cable Worken	RG-213	NA	Dec. 29, 2012	Dec. 28, 2013
Software	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	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 calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. The test was performed in HwaYa Chamber 10.
 4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 5. The FCC Site Registration No. is 690701.
 6. The IC Site Registration No. is IC 7450F-10.

4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

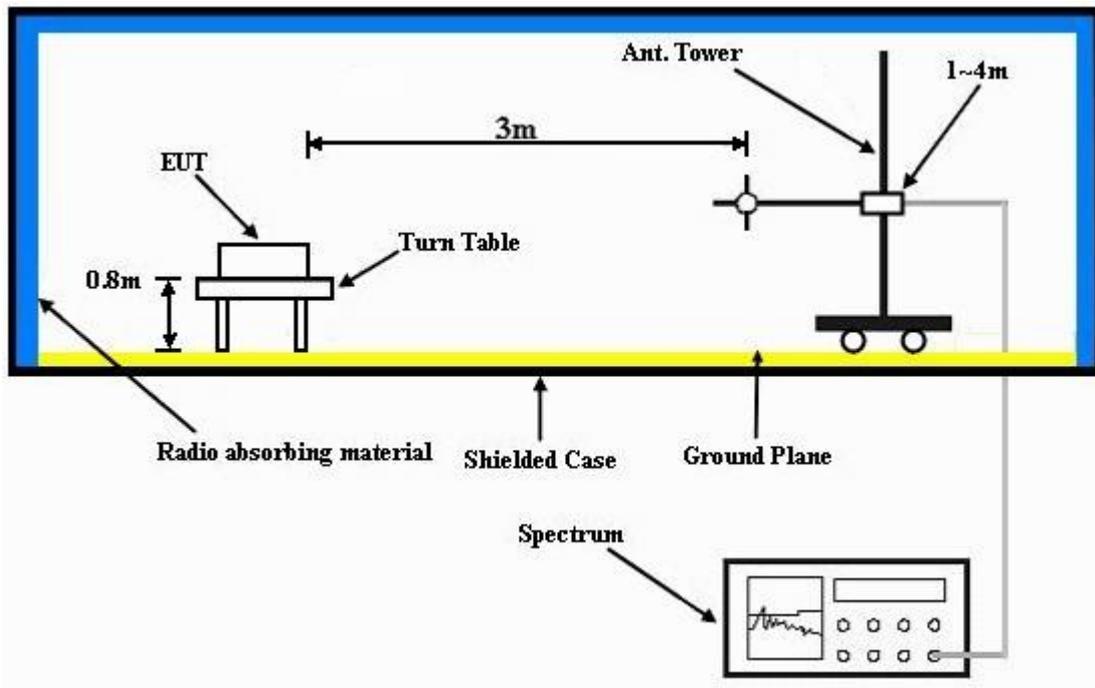
NOTE:

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



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

4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on a testing table.
- b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.7 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA : GFSK

MODE A

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	33.44	40.51	54	-20.56	26.91	3.54	37.52	105	38	Average
2390	46.29	53.36	74	-27.71	26.91	3.54	37.52	105	38	Peak
2402	78.38	85.45			26.91	3.54	37.52	105	38	Average
2402	100.06	107.13			26.91	3.54	37.52	105	38	Peak
2498	33.73	40.16	54	-20.27	27.2	3.62	37.25	105	38	Average
2498	46.88	53.31	74	-27.12	27.2	3.62	37.25	105	38	Peak
4804	40.3	56.68	54	-13.7	30.97	5.75	53.1	108	15	Average
4804	48.06	64.44	74	-25.94	30.97	5.75	53.1	108	15	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2388	34.92	41.97	54	-19.08	26.91	3.54	37.5	100	5	Average
2388	46.52	53.57	74	-27.48	26.91	3.54	37.5	100	5	Peak
2402	82.82	89.89			26.91	3.54	37.52	100	5	Average
2402	105.45	112.52			26.91	3.54	37.52	100	5	Peak
2500	34.25	40.68	54	-19.75	27.2	3.62	37.25	100	5	Average
2500	47.04	53.47	74	-26.96	27.2	3.62	37.25	100	5	Peak
4804	45.89	62.27	54	-8.11	30.97	5.75	53.1	100	339	Average
4804	52.87	69.25	74	-21.13	30.97	5.75	53.1	100	339	Peak

REMARKS:

- 2402MHz: Fundamental frequency.
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2441	77.42	84.17			27.06	3.58	37.39	124	74	Average
2441	98.84	105.59			27.06	3.58	37.39	124	74	Peak
4882	43.19	59.38	54	-10.81	31.06	5.8	53.05	145	28	Average
4882	49.27	65.46	74	-24.73	31.06	5.8	53.05	145	28	Peak
7323	38.56	47.75	54	-15.44	35.89	6.69	51.77	100	163	Average
7323	46.39	55.58	74	-27.61	35.89	6.69	51.77	100	163	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2441	83	89.75			27.06	3.58	37.39	117	3	Average
2441	105.73	112.48			27.06	3.58	37.39	117	3	Peak
4882	47.72	63.91	54	-6.28	31.06	5.8	53.05	100	2	Average
4882	54.01	70.2	74	-19.99	31.06	5.8	53.05	100	2	Peak
7323	38.5	47.69	54	-15.5	35.89	6.69	51.77	100	263	Average
7323	47.55	56.74	74	-26.45	35.89	6.69	51.77	100	263	Peak

REMARKS:

- 2441MHz: Fundamental frequency.
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2372	33.01	40.13	54	-20.99	26.86	3.52	37.5	103	47	Average
2372	46.15	53.27	74	-27.85	26.86	3.52	37.5	103	47	Peak
2480	77.22	83.79			27.15	3.6	37.32	103	47	Average
2480	98.86	105.43			27.15	3.6	37.32	103	47	Peak
2484	34.02	40.59	54	-19.98	27.15	3.6	37.32	103	47	Average
2484	47.8	54.37	74	-26.2	27.15	3.6	37.32	103	47	Peak
4960	44.49	60.53	54	-9.51	31.16	5.84	53.04	100	132	Average
4960	50.87	66.91	74	-23.13	31.16	5.84	53.04	100	132	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2386	34.38	41.45	54	-19.62	26.91	3.52	37.5	118	4	Average
2386	46.09	53.16	74	-27.91	26.91	3.52	37.5	118	4	Peak
2480	81.48	88.05			27.15	3.6	37.32	118	4	Average
2480	104.2	110.77			27.15	3.6	37.32	118	4	Peak
2484	35.42	41.99	54	-18.58	27.15	3.6	37.32	118	4	Average
2484	52.71	59.28	74	-21.29	27.15	3.6	37.32	118	4	Peak
4960	49.21	65.25	54	-4.79	31.16	5.84	53.04	123	64	Average
4960	55.83	71.87	74	-18.17	31.16	5.84	53.04	123	64	Peak

REMARKS:

1. 2480MHz: Fundamental frequency.
2. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value



MODE B

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2356	32.86	40.04	54	-21.14	26.81	3.5	37.49	105	26	Average
2356	46.47	53.65	74	-27.53	26.81	3.5	37.49	105	26	Peak
2480	78.46	85.03			27.15	3.6	37.32	105	26	Average
2480	101.32	107.89			27.15	3.6	37.32	105	26	Peak
2484	34.47	41.04	54	-19.53	27.15	3.6	37.32	105	26	Average
2484	50.74	57.31	74	-23.26	27.15	3.6	37.32	105	26	Peak
4960	42.59	58.63	54	-11.41	31.16	5.84	53.04	100	126	Average
4960	51.11	67.15	74	-22.89	31.16	5.84	53.04	100	126	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2374	32.82	39.94	54	-21.18	26.86	3.52	37.5	118	348	Average
2374	46.19	53.31	74	-27.81	26.86	3.52	37.5	118	348	Peak
2480	77.36	83.93			27.15	3.6	37.32	118	348	Average
2480	100.22	106.79			27.15	3.6	37.32	118	348	Peak
2484	34.24	40.81	54	-19.76	27.15	3.6	37.32	118	348	Average
2484	52.85	59.42	74	-21.15	27.15	3.6	37.32	118	348	Peak
4960	46.54	62.58	54	-7.46	31.16	5.84	53.04	100	168	Average
4960	54.57	70.61	74	-19.43	31.16	5.84	53.04	100	168	Peak

REMARKS:

1. 2480MHz: Fundamental frequency.
2. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value



MODE C

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2322	32.68	39.95	54	-21.32	26.72	3.48	37.47	100	204	Average
2322	45.83	53.1	74	-28.17	26.72	3.48	37.47	100	204	Peak
2480	76.95	83.52			27.15	3.6	37.32	100	204	Average
2480	90.38	96.95			27.15	3.6	37.32	100	204	Peak
2484	33.48	40.05	54	-20.52	27.15	3.6	37.32	100	204	Average
2484	62.58	69.15	74	-11.42	27.15	3.6	37.32	100	204	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2380	32.93	40.05	54	-21.07	26.86	3.52	37.5	142	134	Average
2380	46.5	53.62	74	-27.5	26.86	3.52	37.5	142	134	Peak
2480	81.76	88.33			27.15	3.6	37.32	142	134	Average
2480	95.92	102.49			27.15	3.6	37.32	142	134	Peak
2486	33.88	40.45	54	-20.12	27.15	3.6	37.32	142	134	Average
2486	62.26	68.83	74	-11.74	27.15	3.6	37.32	142	134	Peak

REMARKS:

- 2480MHz: Fundamental frequency.
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value



MODE D

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	33.71	40.78	54	-20.29	26.91	3.54	37.52	107	198	Average
2390	45.1	52.17	74	-28.9	26.91	3.54	37.52	107	198	Peak
2480	78.08	84.65			27.15	3.6	37.32	107	198	Average
2480	93.48	100.05			27.15	3.6	37.32	107	198	Peak
2484	33.79	40.36	54	-20.21	27.15	3.6	37.32	107	198	Average
2484	66.19	72.76	74	-7.81	27.15	3.6	37.32	107	198	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	35.08	42.15	54	-18.92	26.91	3.54	37.52	138	130	Average
2390	46.39	53.46	74	-27.61	26.91	3.54	37.52	138	130	Peak
2480	80.02	86.59			27.15	3.6	37.32	138	130	Average
2480	95.9	102.47			27.15	3.6	37.32	138	130	Peak
2484	34.08	40.65	54	-19.92	27.15	3.6	37.32	138	130	Average
2484	68.41	74.98	74	-5.59	27.15	3.6	37.32	138	130	Peak

REMARKS:

1. 2480MHz: Fundamental frequency.
2. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value



**BELOW 1GHz WORST-CASE DATA : GFSK
MODE A**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-Peak (QP)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	David Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
56.19	31	49.19	40	-9	12.35	0.8	31.34	100	326	Peak
86.7	28.96	51.51	40	-11.04	8.23	1	31.78	100	241	Peak
171.48	26.73	45.46	43.5	-16.77	11.57	1.45	31.75	110	185	Peak
626.9	25.37	34.42	46	-20.63	19.93	3.17	32.15	100	129	Peak
675.9	28.76	36.72	46	-17.24	20.53	3.34	31.83	100	210	Peak
770.4	26.77	32.64	46	-19.23	21.81	3.62	31.3	100	117	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
30.54	34.83	53.24	40	-5.17	12.14	0.57	31.12	100	317	QP
39.45	35.67	52.47	40	-4.33	13.54	0.65	30.99	100	123	Peak
56.46	32.51	50.7	40	-7.49	12.35	0.8	31.34	100	147	Peak
561.8	25.74	36.1	46	-20.26	18.72	2.98	32.06	100	126	Peak
633.9	29.64	38.55	46	-16.36	20.02	3.19	32.12	100	182	Peak
675.9	28.29	36.25	46	-17.71	20.53	3.34	31.83	100	115	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value

MODE B

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-Peak (QP)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	David Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
55.38	31.79	49.87	40	-8.21	12.45	0.8	31.33	100	130	Peak
173.64	27.51	46.44	43.5	-15.99	11.38	1.46	31.77	100	117	Peak
217.11	24.89	44.79	46	-21.11	10.09	1.68	31.67	100	269	Peak
449.1	19.79	32.85	46	-26.21	16.31	2.61	31.98	100	125	Peak
566.7	22.51	32.75	46	-23.49	18.84	2.99	32.07	100	139	Peak
651.4	27.44	35.97	46	-18.56	20.23	3.25	32.01	100	155	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
31.05	31.47	49.88	40	-8.53	12.14	0.57	31.12	100	163	QP
39.72	34.32	51.12	40	-5.68	13.54	0.65	30.99	100	163	Peak
55.65	31.97	50.05	40	-8.03	12.45	0.8	31.33	100	189	Peak
579.3	27.65	37.62	46	-18.35	19.12	3.03	32.12	100	158	Peak
651.4	31.59	40.12	46	-14.41	20.23	3.25	32.01	100	134	Peak
750.8	27.64	33.84	46	-18.36	21.53	3.58	31.31	100	153	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value

MODE C

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-Peak (QP)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	David Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
72.12	26.56	47.12	40	-13.44	10.29	0.91	31.76	100	168	Peak
174.18	20.35	39.38	43.5	-23.15	11.28	1.47	31.78	100	225	Peak
274.08	27.72	45.52	46	-18.28	12.2	1.93	31.93	100	195	Peak
360.2	34.09	49.41	46	-11.91	14.38	2.27	31.97	100	143	Peak
763.4	26.95	33.04	46	-19.05	21.71	3.61	31.41	100	195	Peak
970.6	28.97	32.81	54	-25.03	23.91	4.11	31.86	100	162	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
55.11	24.46	42.54	40	-15.54	12.45	0.8	31.33	100	131	Peak
159.33	20.57	38.31	43.5	-22.93	12.73	1.38	31.85	100	64	Peak
274.89	18.23	36.03	46	-27.77	12.2	1.93	31.93	100	245	Peak
432.3	33.41	46.89	46	-12.59	15.98	2.55	32.01	100	225	Peak
650.7	31.49	40.04	46	-14.51	20.22	3.24	32.01	100	256	Peak
900.6	30.35	34.87	46	-15.65	23.52	3.97	32.01	100	173	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value

MODE D

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-Peak (QP)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	David Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
54.3	24.43	42.41	40	-15.57	12.56	0.79	31.33	100	241	Peak
159.6	20.67	38.43	43.5	-22.83	12.73	1.39	31.88	100	185	Peak
286.23	27.64	44.84	46	-18.36	12.54	1.99	31.73	100	192	Peak
384	32.19	46.86	46	-13.81	14.96	2.36	31.99	100	262	Peak
671.7	26.25	34.26	46	-19.75	20.48	3.33	31.82	100	82	Peak
970.6	28.97	32.81	54	-25.03	23.91	4.11	31.86	100	0	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
57.54	19.21	37.5	40	-20.79	12.25	0.81	31.35	100	132	Peak
167.97	16.87	35.24	43.5	-26.63	11.96	1.43	31.76	100	160	Peak
260.31	17.22	35.44	46	-28.78	11.77	1.86	31.85	100	241	Peak
407.8	29.99	44.09	46	-16.01	15.48	2.45	32.03	100	154	Peak
672.4	25.17	33.18	46	-20.83	20.48	3.33	31.82	100	115	Peak
975.5	29.06	32.8	54	-24.94	23.93	4.12	31.79	100	227	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Nov. 09, 2012	Nov. 08, 2013
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 28, 2012	Dec. 27, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 21, 2012	Dec. 20, 2013
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 02, 2013	Jul. 01, 2014
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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

4.2.3 TEST PROCEDURES

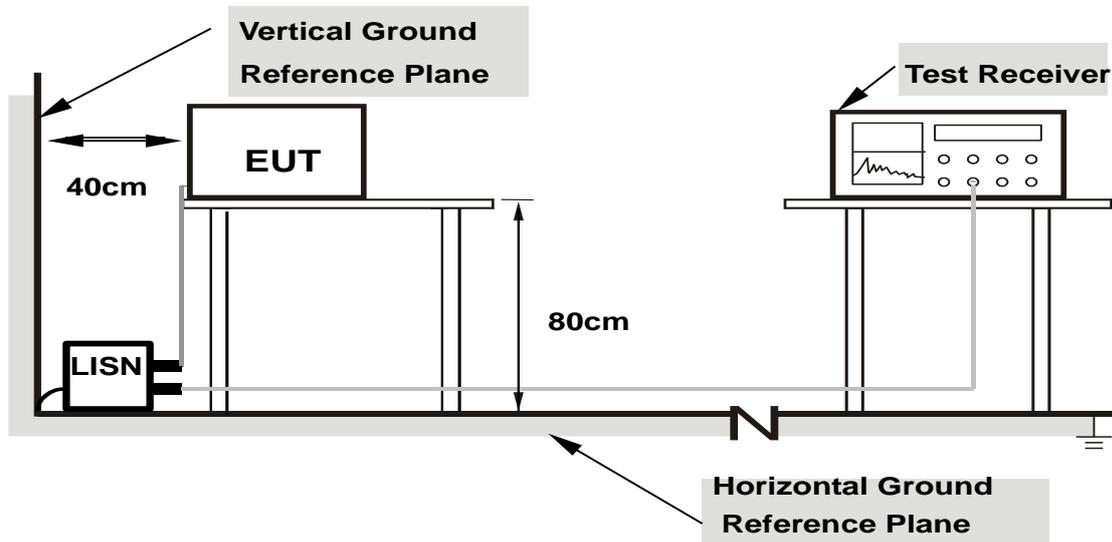
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

CONDUCTED WORST CASE DATA: GFSK

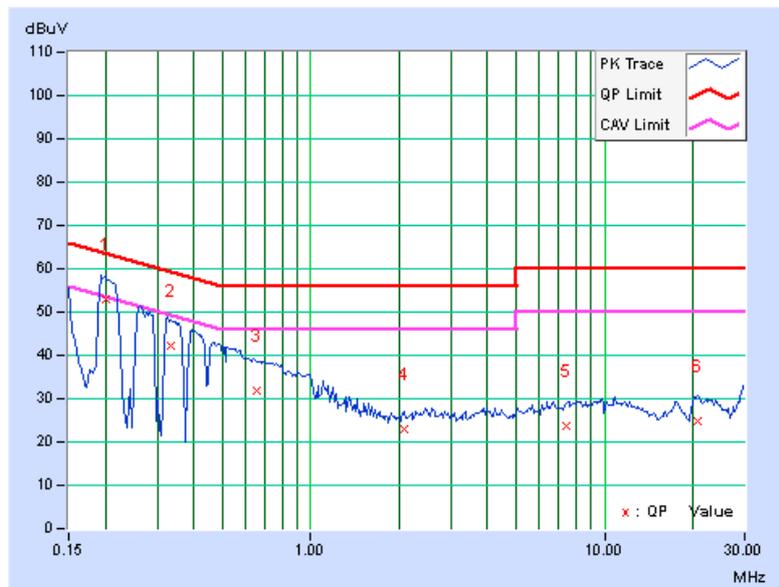
MODE A

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.20078	0.17	52.95	38.69	53.12	38.86	63.58
2	0.33359	0.20	42.07	25.37	42.27	25.57	59.36	49.36	-17.09	-23.79
3	0.65391	0.24	31.68	14.28	31.92	14.52	56.00	46.00	-24.08	-31.48
4	2.07813	0.28	22.57	11.51	22.85	11.79	56.00	46.00	-33.15	-34.21
5	7.42969	0.40	23.37	18.26	23.77	18.66	60.00	50.00	-36.23	-31.34
6	20.83203	0.63	24.08	17.72	24.71	18.35	60.00	50.00	-35.29	-31.65

REMARKS:

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

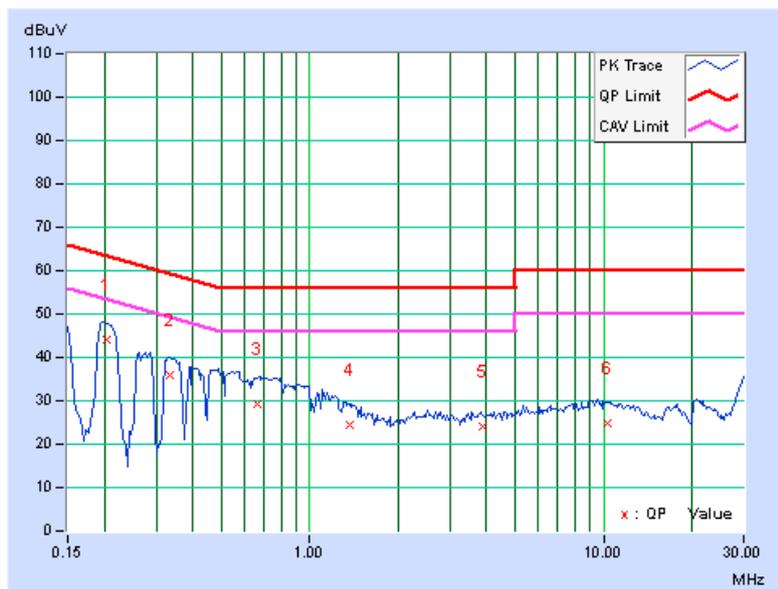


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.20469	0.18	44.00	29.23	44.18	29.41	63.42
2	0.33359	0.23	35.84	19.66	36.07	19.89	59.36	49.36	-23.29	-29.47
3	0.66563	0.24	29.04	11.84	29.28	12.08	56.00	46.00	-26.72	-33.92
4	1.36328	0.25	24.28	12.52	24.53	12.77	56.00	46.00	-31.47	-33.23
5	3.88281	0.38	23.56	14.07	23.94	14.45	56.00	46.00	-32.06	-31.55
6	10.38281	0.49	24.31	19.63	24.80	20.12	60.00	50.00	-35.20	-29.88

REMARKS:

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



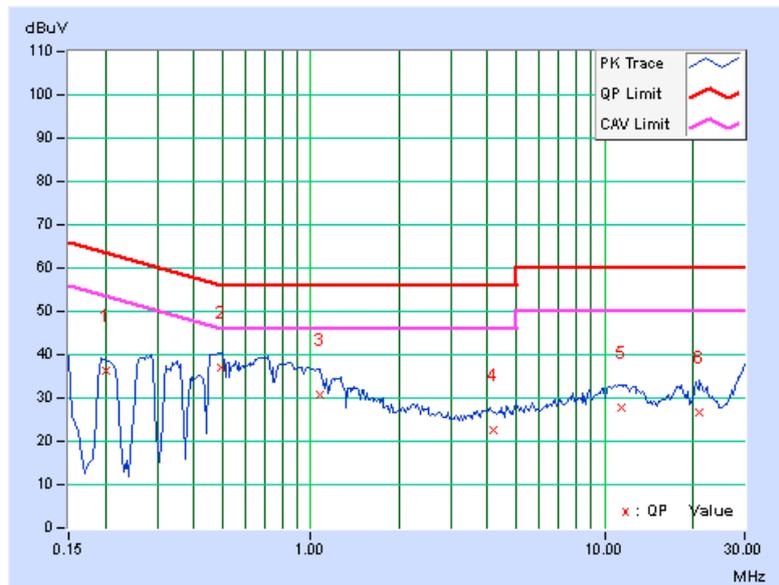
MODE B

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.20078	0.17	36.03	22.54	36.20	22.71	63.58	53.58	-27.38	-30.87
2	0.49375	0.22	36.88	17.92	37.10	18.14	56.10	46.10	-19.01	-27.97
3	1.07422	0.27	30.43	13.26	30.70	13.53	56.00	46.00	-25.30	-32.47
4	4.19531	0.37	22.13	13.26	22.50	13.63	56.00	46.00	-33.50	-32.37
5	11.35156	0.46	27.46	22.56	27.92	23.02	60.00	50.00	-32.08	-26.98
6	21.09375	0.63	26.09	18.82	26.72	19.45	60.00	50.00	-33.28	-30.55

REMARKS:

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

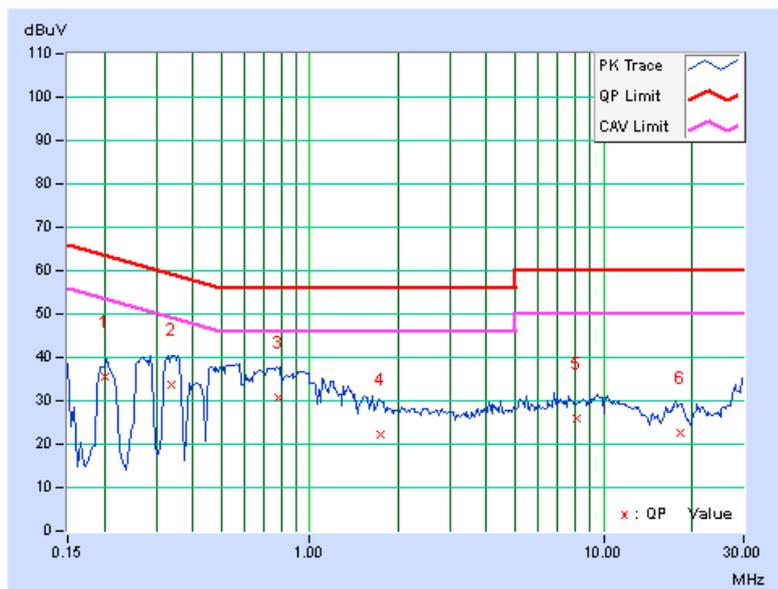


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.20078	0.18	35.22	21.01	35.40	21.19	63.58
2	0.33750	0.23	33.61	16.27	33.84	16.50	59.26	49.26	-25.43	-32.77
3	0.77891	0.24	30.51	15.30	30.75	15.54	56.00	46.00	-25.25	-30.46
4	1.73438	0.27	22.10	8.22	22.37	8.49	56.00	46.00	-33.63	-37.51
5	8.05859	0.45	25.38	18.74	25.83	19.19	60.00	50.00	-34.17	-30.81
6	18.31641	0.69	21.88	15.65	22.57	16.34	60.00	50.00	-37.43	-33.66

REMARKS:

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



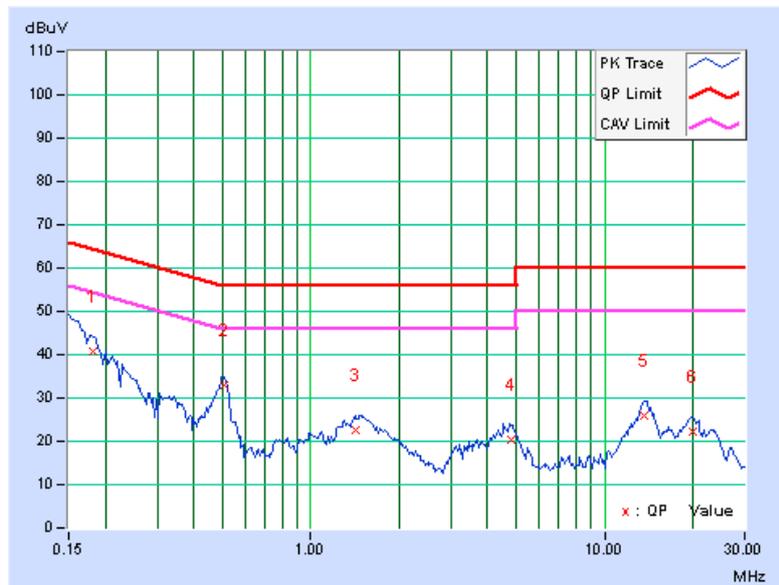
MODE C

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18125	0.17	40.56	25.51	40.73	25.68	64.43	54.43	-23.70	-28.75
2	0.50938	0.22	32.77	27.09	32.99	27.31	56.00	46.00	-23.01	-18.69
3	1.42188	0.27	22.16	16.69	22.43	16.96	56.00	46.00	-33.57	-29.04
4	4.80078	0.38	19.82	11.00	20.20	11.38	56.00	46.00	-35.80	-34.62
5	13.72656	0.51	25.32	17.28	25.83	17.79	60.00	50.00	-34.17	-32.21
6	19.86719	0.64	21.40	17.52	22.04	18.16	60.00	50.00	-37.96	-31.84

REMARKS:

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

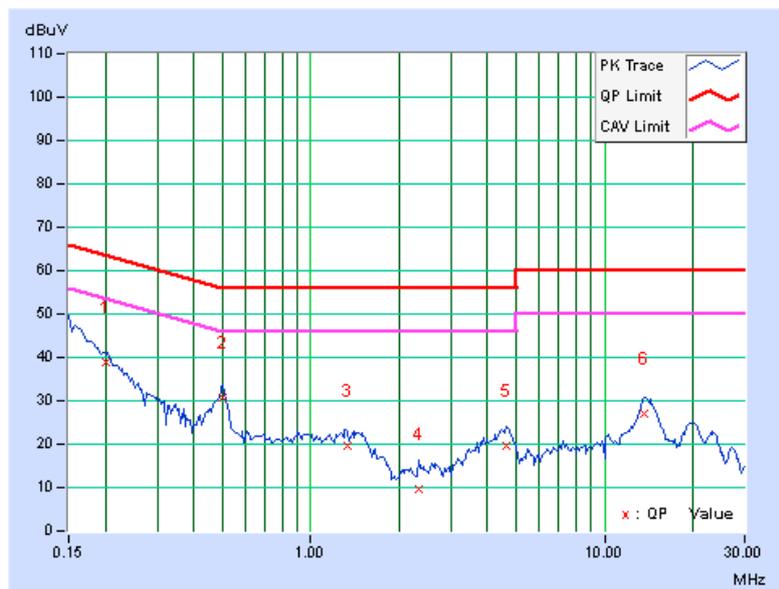


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.20078	0.18	38.56	23.69	38.74	23.87	63.58
2	0.50156	0.25	30.52	23.49	30.77	23.74	56.00	46.00	-25.23	-22.26
3	1.33203	0.25	19.42	13.04	19.67	13.29	56.00	46.00	-36.33	-32.71
4	2.33203	0.30	9.47	2.33	9.77	2.63	56.00	46.00	-46.23	-43.37
5	4.66016	0.40	19.25	11.49	19.65	11.89	56.00	46.00	-36.35	-34.11
6	13.71875	0.57	26.52	19.14	27.09	19.71	60.00	50.00	-32.91	-30.29

REMARKS:

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



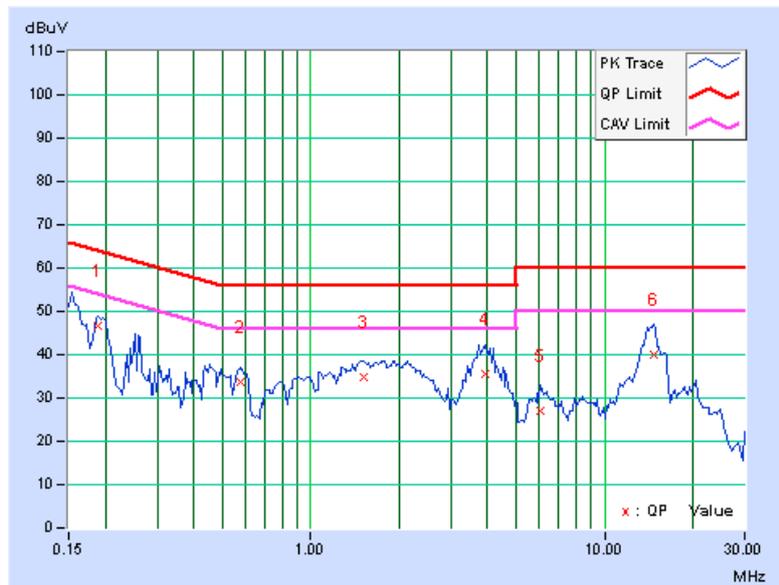
MODE D

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18906	0.17	46.47	34.87	46.64	35.04	64.08	54.08	-17.44	-19.04
2	0.57578	0.23	33.36	21.95	33.59	22.18	56.00	46.00	-22.41	-23.82
3	1.50781	0.28	34.65	24.92	34.93	25.20	56.00	46.00	-21.07	-20.80
4	3.90625	0.37	35.31	26.77	35.68	27.14	56.00	46.00	-20.32	-18.86
5	6.07031	0.39	26.75	21.65	27.14	22.04	60.00	50.00	-32.86	-27.96
6	14.67969	0.53	39.65	29.32	40.18	29.85	60.00	50.00	-19.82	-20.15

REMARKS:

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

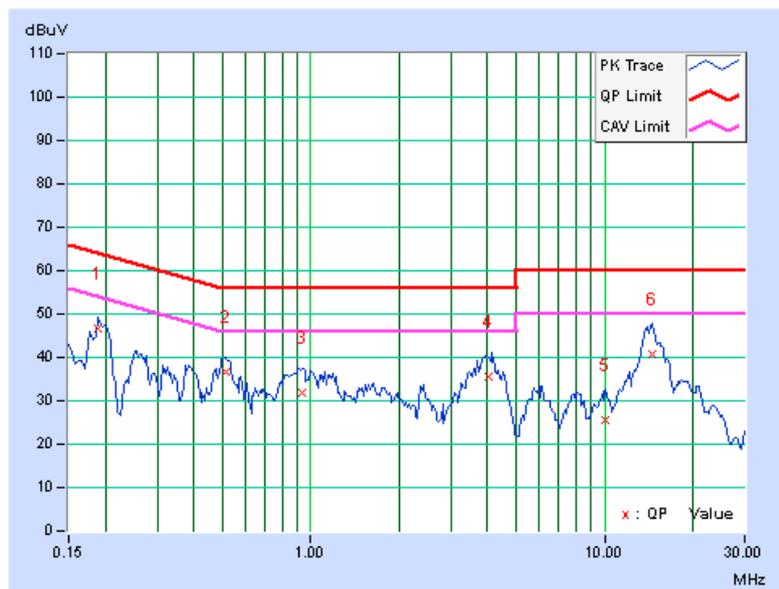


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.18906	0.18	46.34	35.56	46.52	35.74	64.08
2	0.51328	0.25	36.45	25.87	36.70	26.12	56.00	46.00	-19.30	-19.88
3	0.93906	0.23	31.50	22.86	31.73	23.09	56.00	46.00	-24.27	-22.91
4	4.03906	0.39	35.34	26.34	35.73	26.73	56.00	46.00	-20.27	-19.27
5	10.06250	0.48	25.02	19.57	25.50	20.05	60.00	50.00	-34.50	-29.95
6	14.58594	0.59	40.16	31.85	40.75	32.44	60.00	50.00	-19.25	-17.56

REMARKS:

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

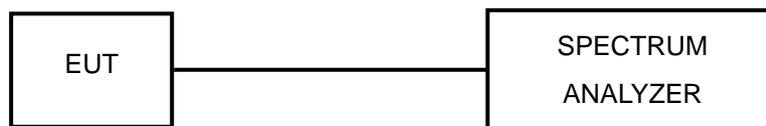


4.3 NUMBER OF HOPPING FREQUENCY USED

4.3.1 LIMIT OF HOPPING FREQUENCY USED

At least 15 channels frequencies, and should be equally spaced.

4.3.2 TEST SETUP



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.3.4 TEST PROCEDURES

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

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

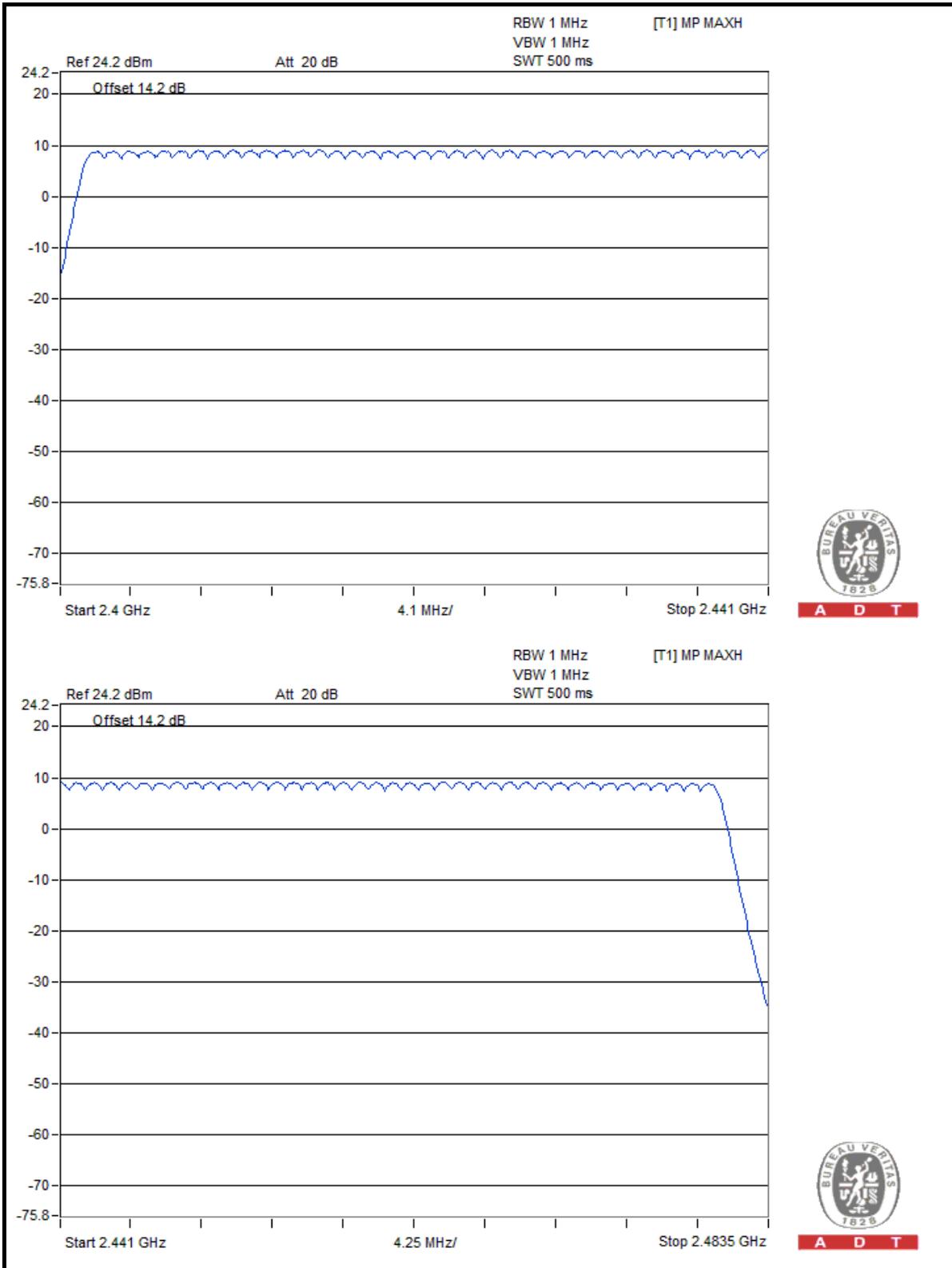
4.3.6 TEST RESULTS

There are 79 hopping frequencies in the hopping mode. Please refer to next page for the test result. On the plot, it shows that the hopping frequencies are equally spaced.



A D T

GFSK



A D T



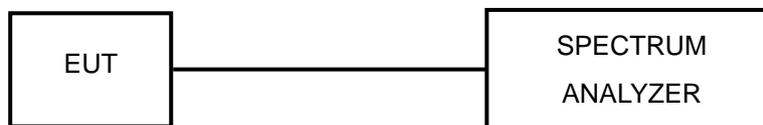
A D T

4.4 DWELL TIME ON EACH CHANNEL

4.4.1 LIMIT OF DWELL TIME USED

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.4.4 TEST PROCEDURES

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

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

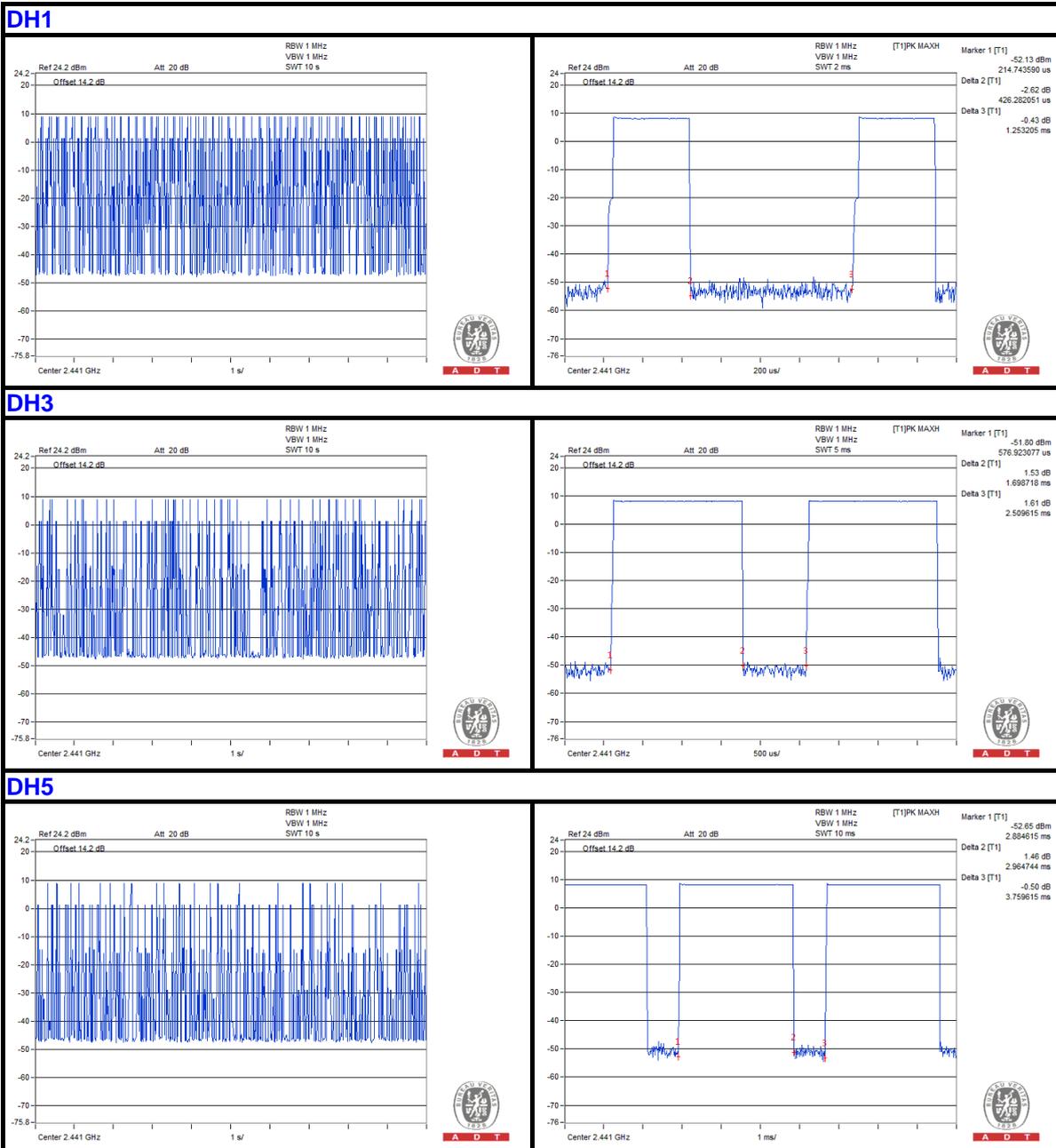
4.4.6 TEST RESULTS

GFSK

Mode	Average Hopping Channel	Package Transfer Time (usec)	Result (sec)	Limit (sec)
DH1	9.30	426.28	0.13	0.4
DH3	4.50	1698.72	0.24	0.4
DH5	2.70	2964.74	0.25	0.4

NOTE:

1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79 channels come from the Hopping Channel number
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)
5. Test plots of the transmitting time slot are shown as below.





A D T

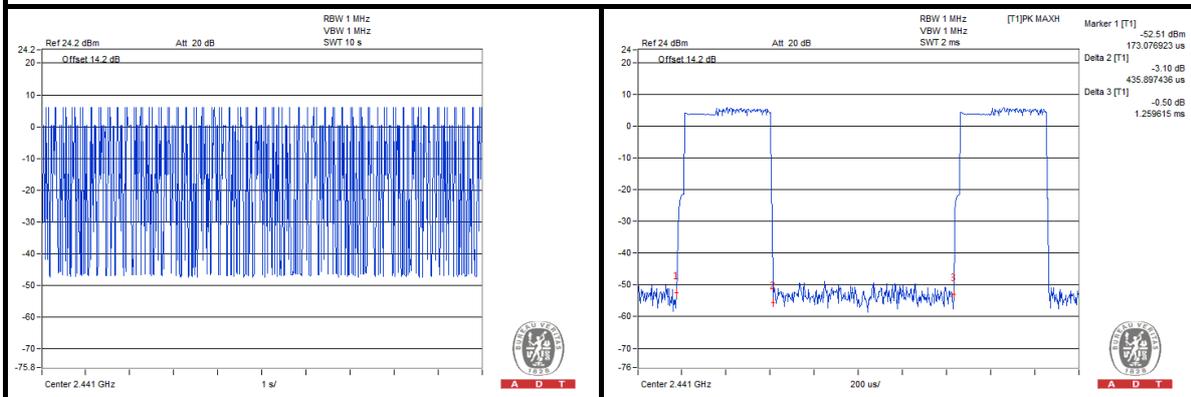
π/4-DQPSK

Mode	Average Hopping Channel	Package Transfer Time (usec)	Result (sec)	Limit (sec)
DH1	9.00	435.90	0.12	0.4
DH3	4.90	1698.72	0.26	0.4
DH5	2.90	2964.74	0.27	0.4

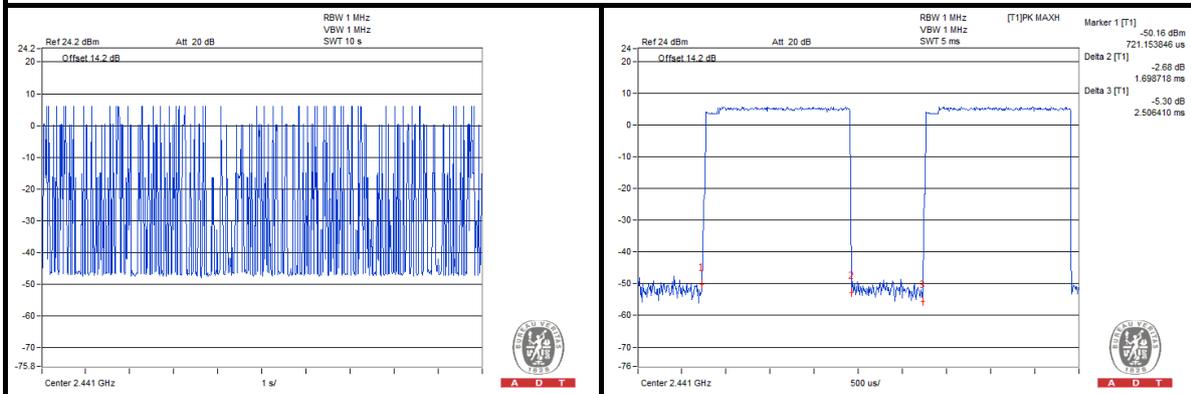
NOTE:

1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79 channels come from the Hopping Channel number
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)
5. Test plots of the transmitting time slot are shown as below.

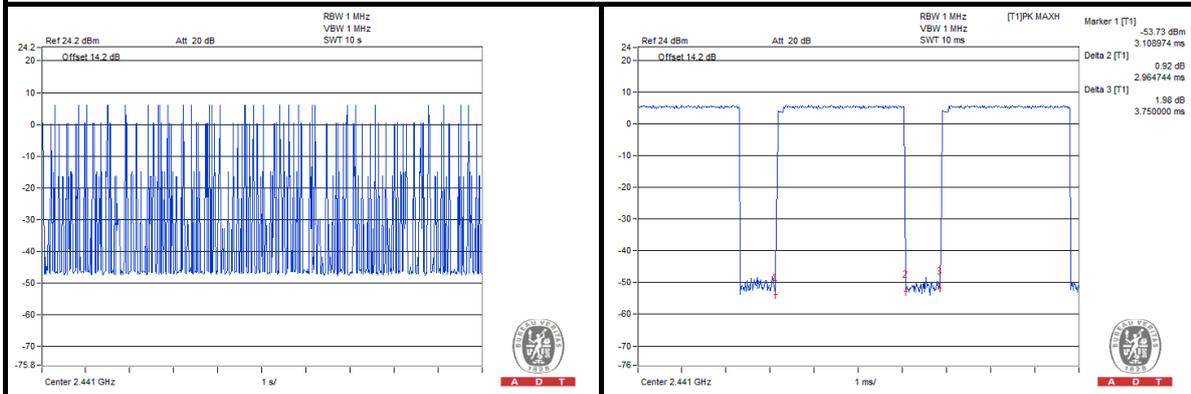
DH1



DH3



DH5



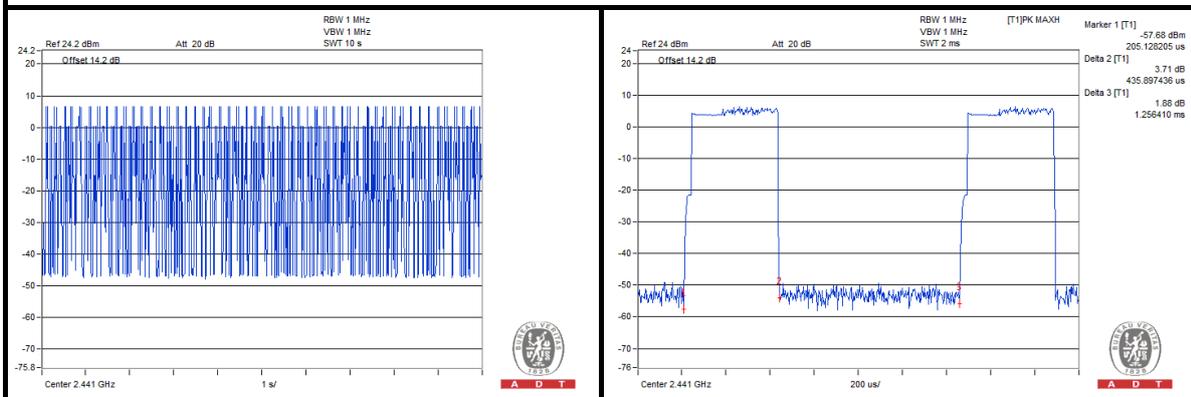
8DPSK

Mode	Average Hopping Channel	Package Transfer Time (usec)	Result (sec)	Limit (sec)
DH1	8.70	435.90	0.12	0.4
DH3	5.00	1701.92	0.27	0.4
DH5	3.00	2967.95	0.28	0.4

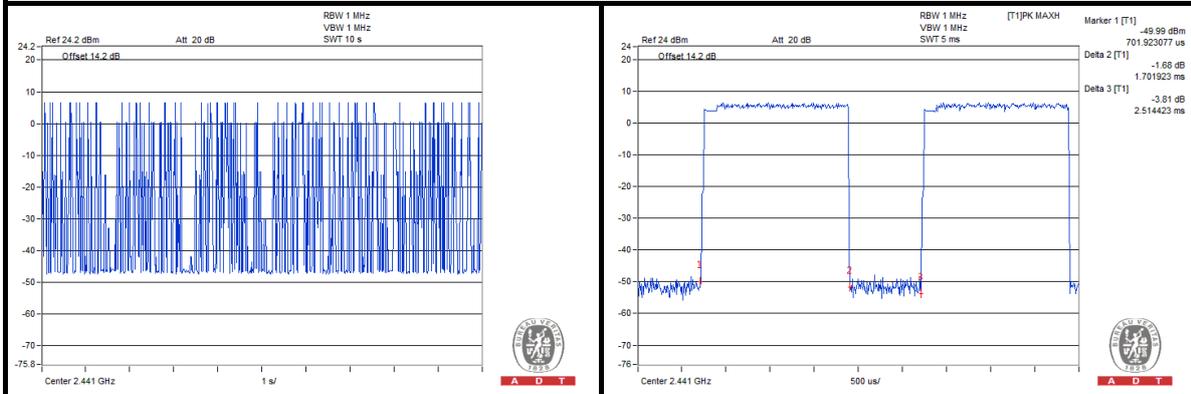
NOTE:

1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79 channels come from the Hopping Channel number
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)
5. Test plots of the transmitting time slot are shown as below.

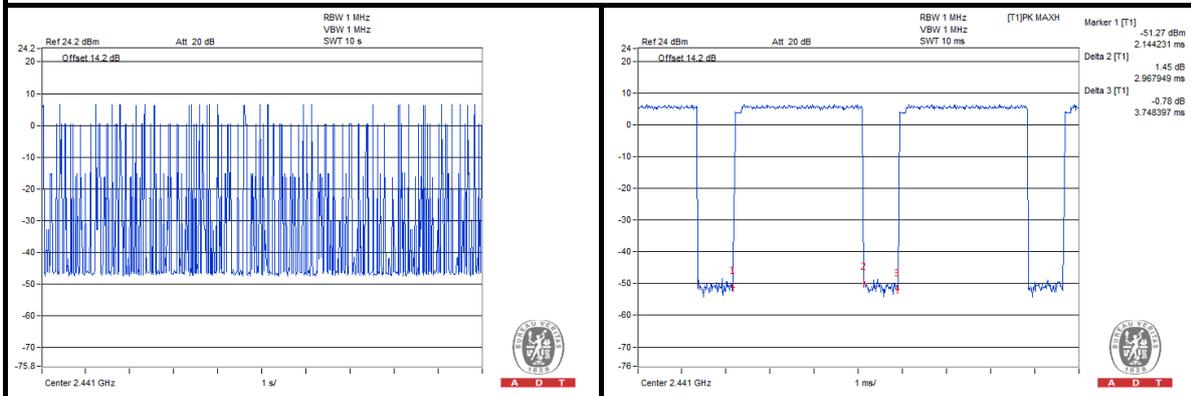
DH1



DH3



DH5

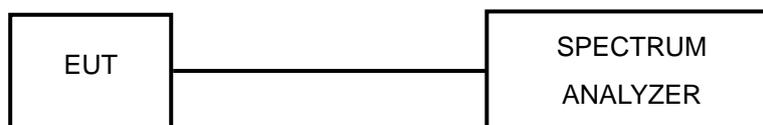


4.5 CHANNEL BANDWIDTH

4.5.1 LIMITS OF CHANNEL BANDWIDTH

For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.5.4 TEST PROCEDURE

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- d. Repeat above procedures until all frequencies measured were complete.

4.5.5 DEVIATION FROM TEST STANDARD

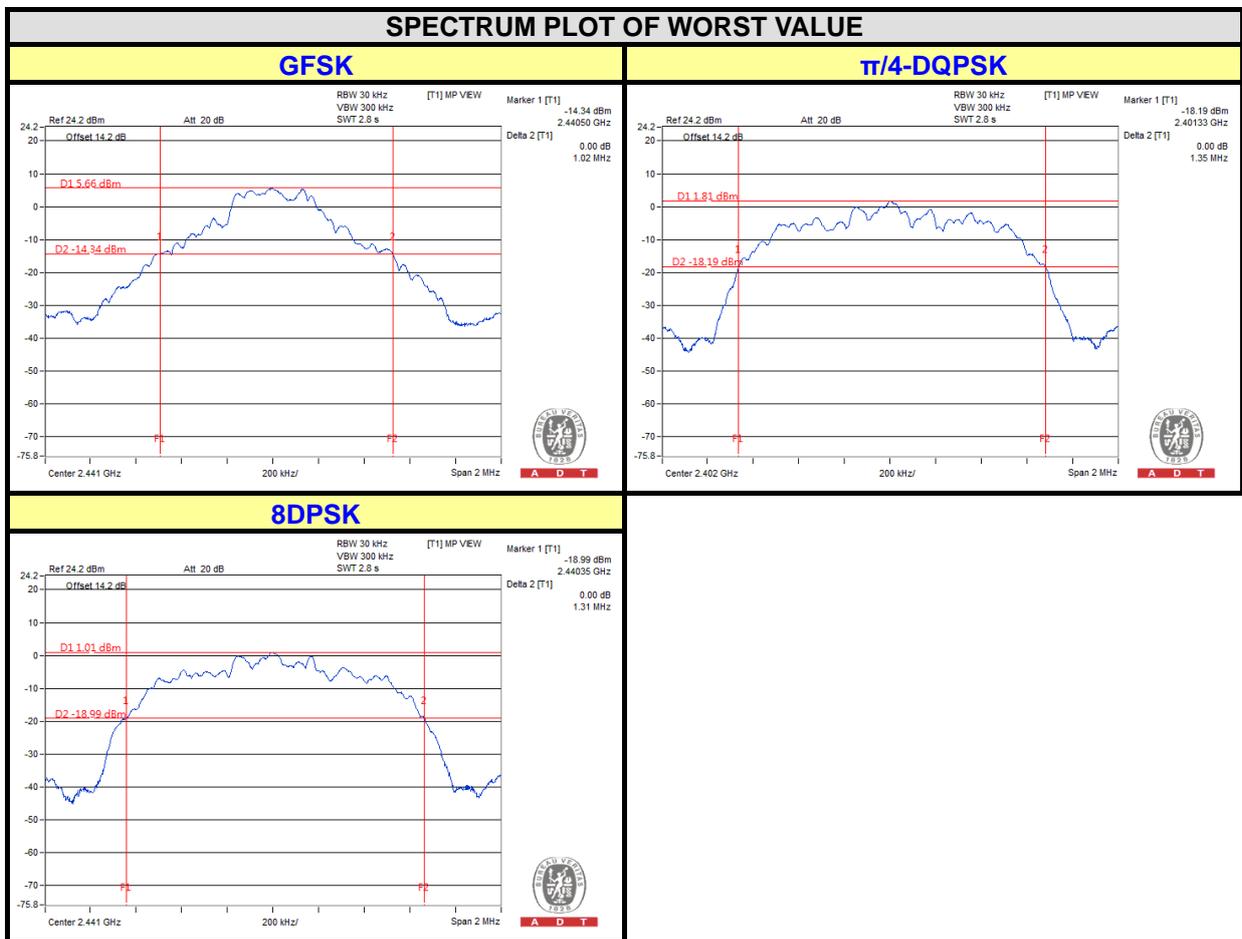
No deviation.

4.5.6 EUT OPERATING CONDITION

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

4.5.7 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	20dB BANDWIDTH (MHz)		
		GFSK	$\pi/4$ -DQPSK	8DPSK
0	2402	1.01	1.35	1.30
39	2441	1.02	1.35	1.31
78	2480	1.01	1.35	1.31

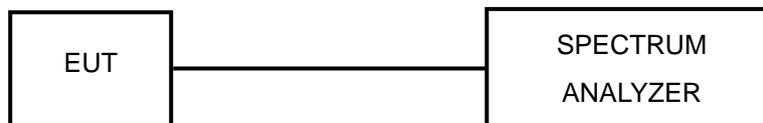


4.6 HOPPING CHANNEL SEPARATION

4.6.1 LIMIT OF HOPPING CHANNEL SEPARATION

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

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.6.4 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. By using the MaxHold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

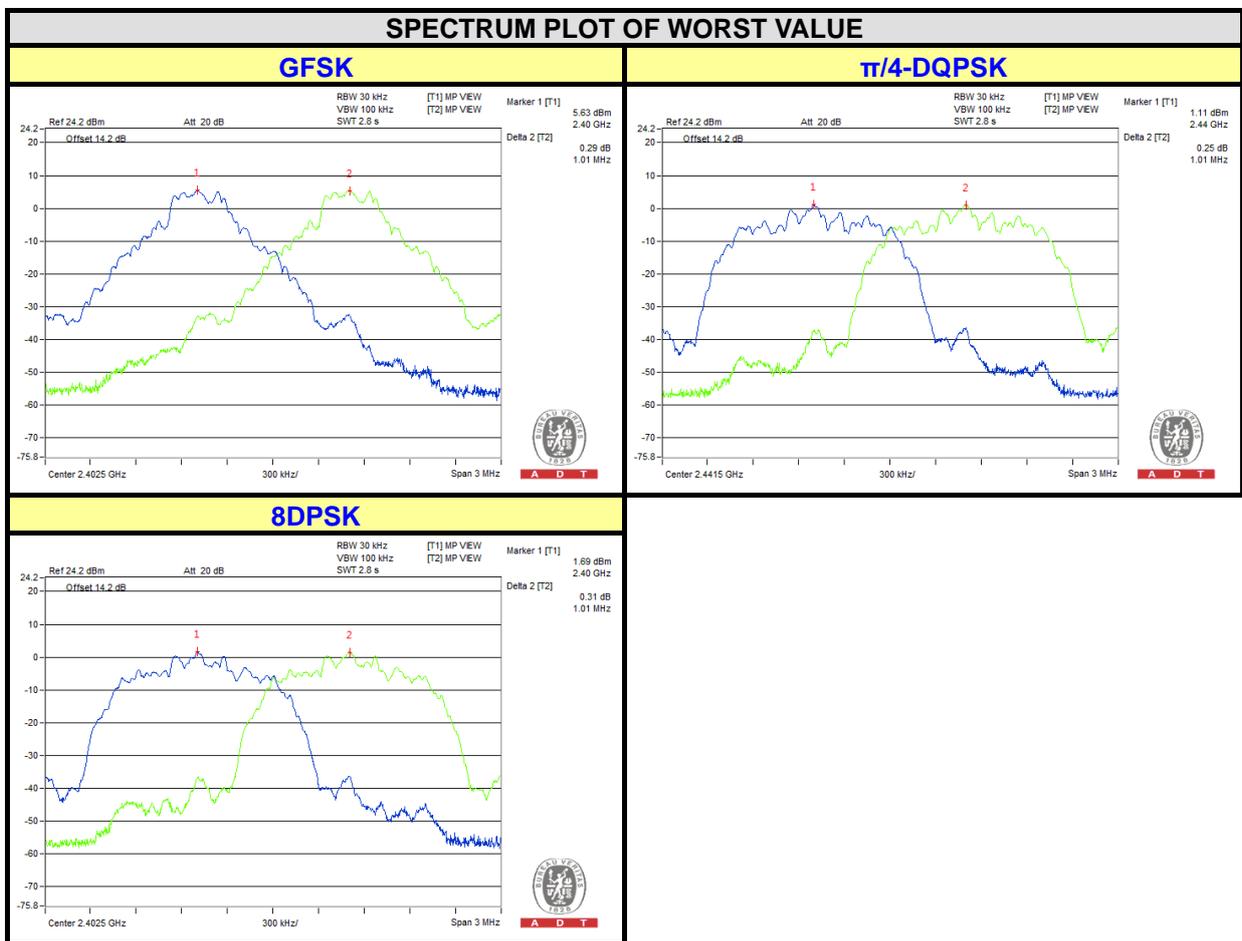
4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 TEST RESULTS

CHAN.	FREQ. (MHz)	ADJACENT CHANNEL SEPARATION (MHz)			20dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)			PASS / FAIL
		GFSK	$\pi/4$ -DQPSK	8DPSK	GFSK	$\pi/4$ -DQPSK	8DPSK	GFSK	$\pi/4$ -DQPSK	8DPSK	
0	2402	1.01	1.00	1.01	1.01	1.35	1.30	0.673	0.900	0.867	PASS
39	2441	1.00	1.01	1.00	1.02	1.35	1.31	0.680	0.900	0.873	PASS
78	2480	1.00	1.00	1.00	1.01	1.35	1.31	0.673	0.900	0.873	PASS

NOTE: The minimum limit is two-third 20dB bandwidth.

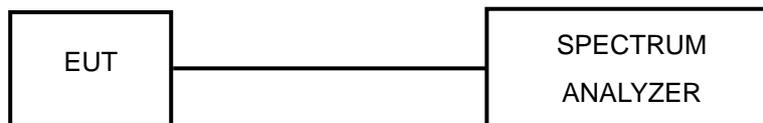


4.7 MAXIMUM OUTPUT POWER

4.7.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

The Maximum Output Power Measurement is 125mW.

4.7.2 TEST SETUP



4.7.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.7.4 TEST PROCEDURES

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3MHz RBW and 10 MHz VBW.
- d. Measure the captured power within the band and recording the plot.
- e. Repeat above procedures until all frequencies required were complete.

4.7.5 DEVIATION FROM TEST STANDARD

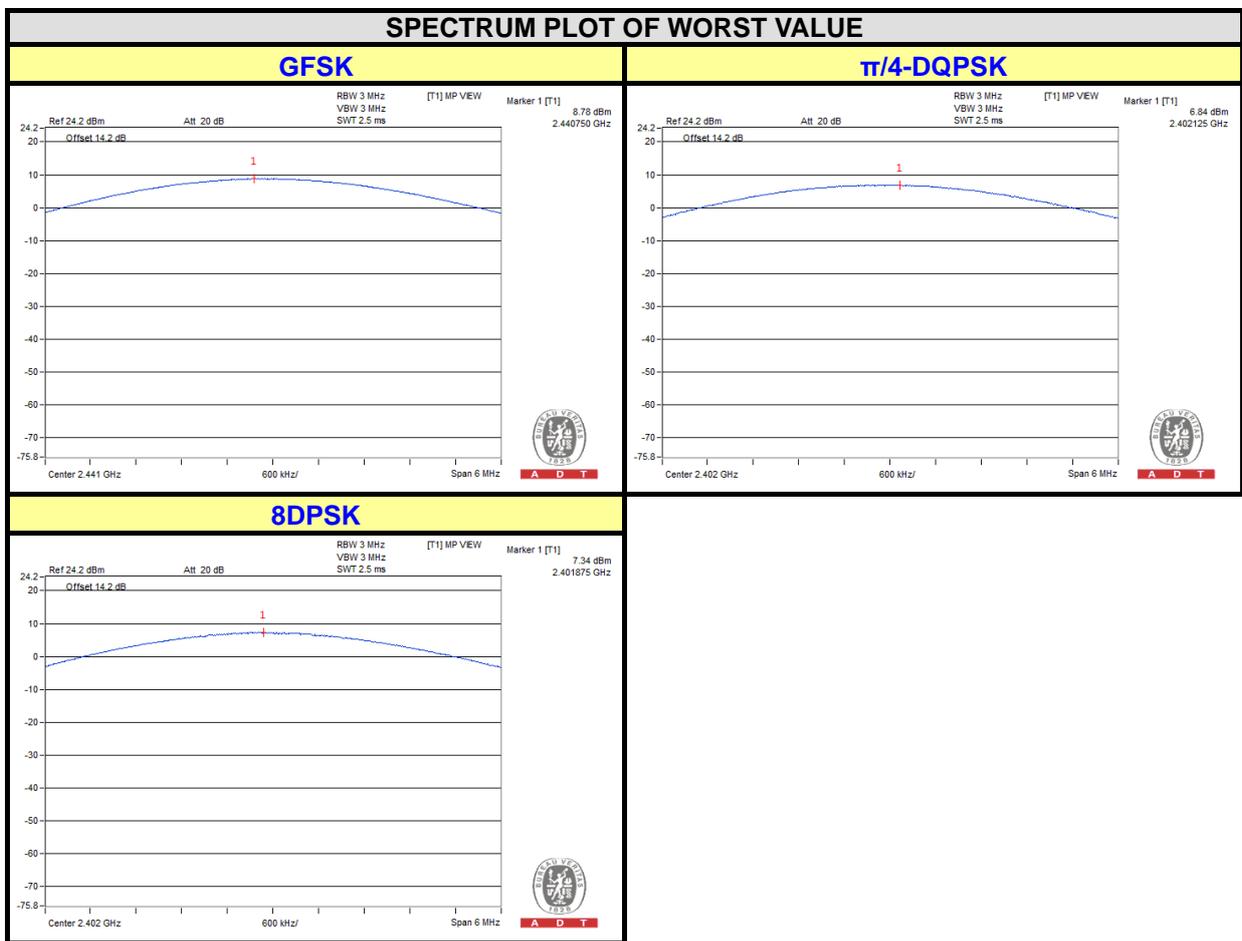
No deviation.

4.7.6 EUT OPERATING CONDITION

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

4.7.7 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	OUTPUT POWER (mW)			OUTPUT POWER (dBm)			POWER LIMIT (mW)	PASS / FAIL
		GFSK	$\pi/4$ -DQPSK	8DPSK	GFSK	$\pi/4$ -DQPSK	8DPSK		
0	2402	7.328	4.831	5.420	8.65	6.84	7.34	125	PASS
39	2441	7.551	4.436	5.105	8.78	6.47	7.08	125	PASS
78	2480	7.244	4.295	4.819	8.60	6.33	6.83	125	PASS



4.8 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.8.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

4.8.2 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.8.3 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set VBW =300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

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 continuously.

4.8.6 TEST RESULTS

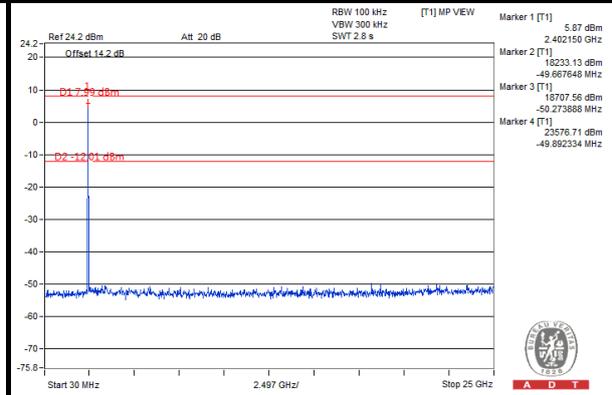
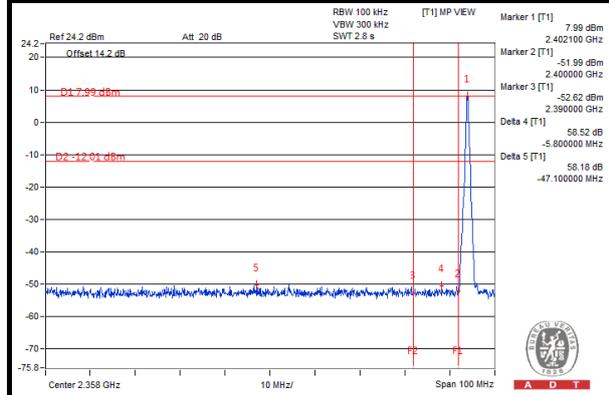
The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



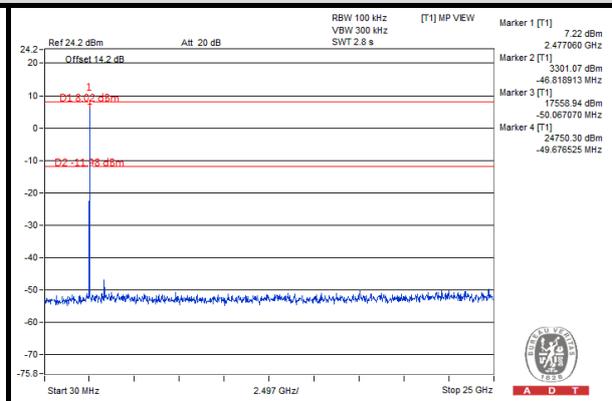
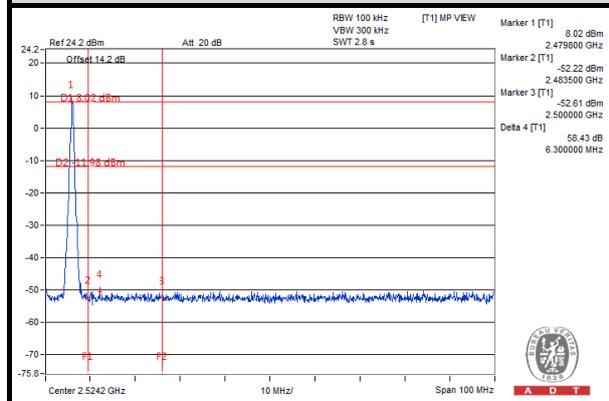
A D T

GFSK

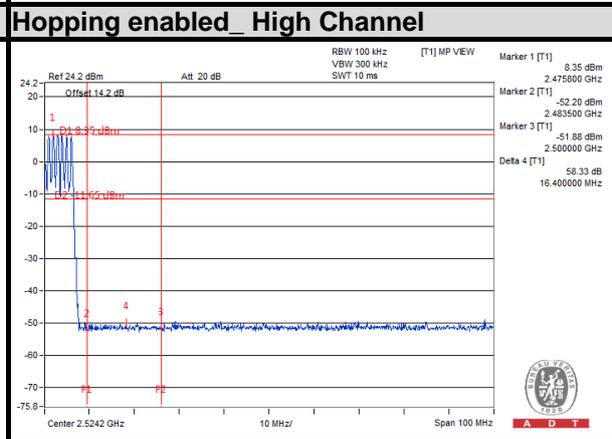
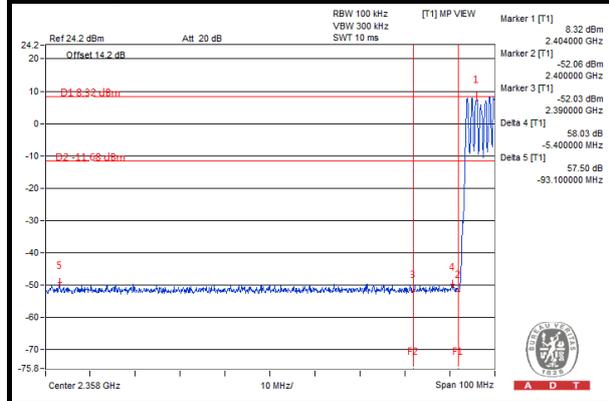
Hopping disabled_ Low Channel



Hopping disabled_ High Channel



Hopping enabled_ Low Channel

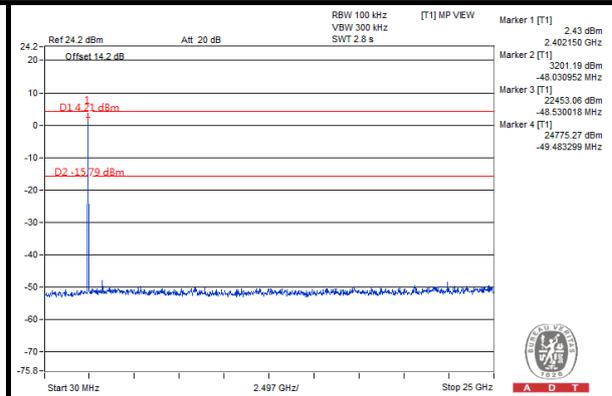
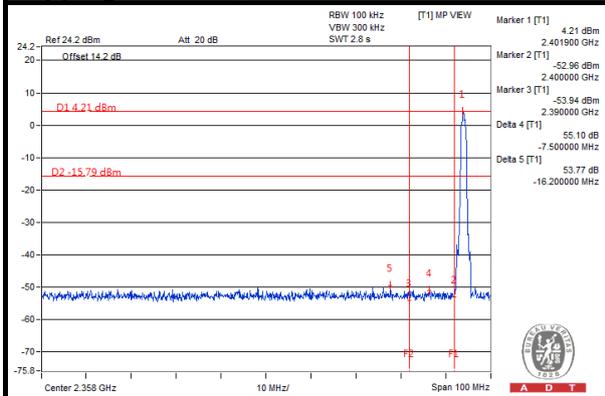




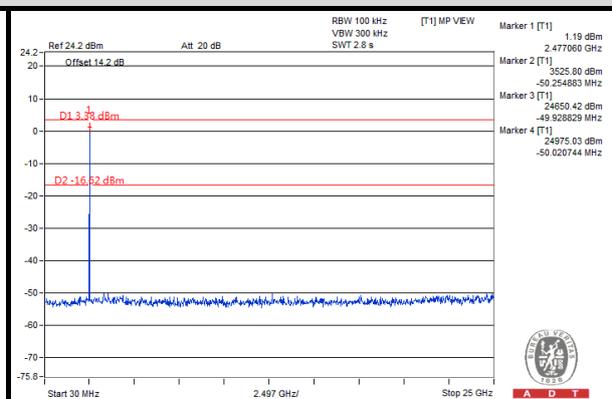
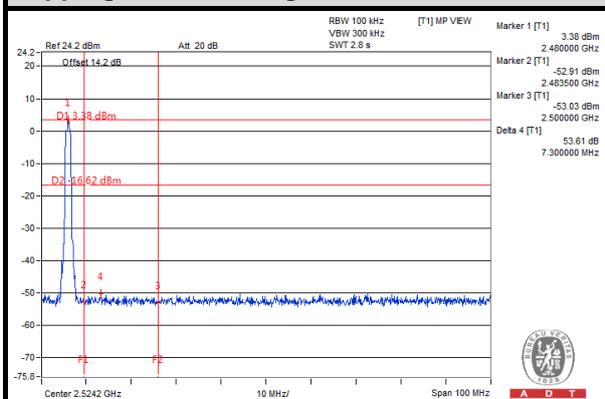
A D T

$\pi/4$ -DQPSK

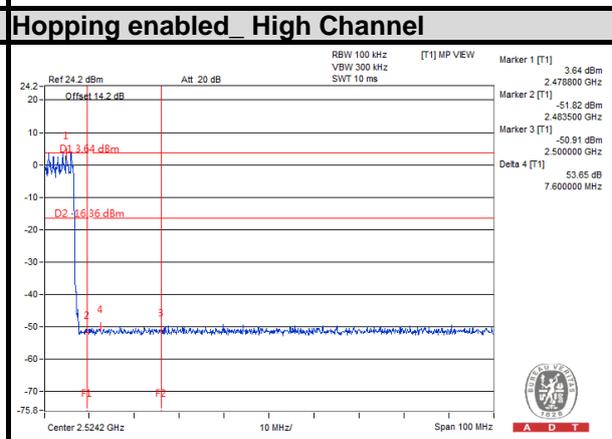
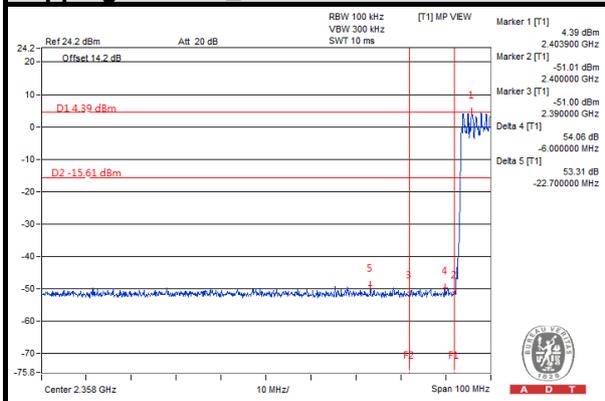
Hopping disabled_ Low Channel



Hopping disabled_ High Channel



Hopping enabled_ Low Channel

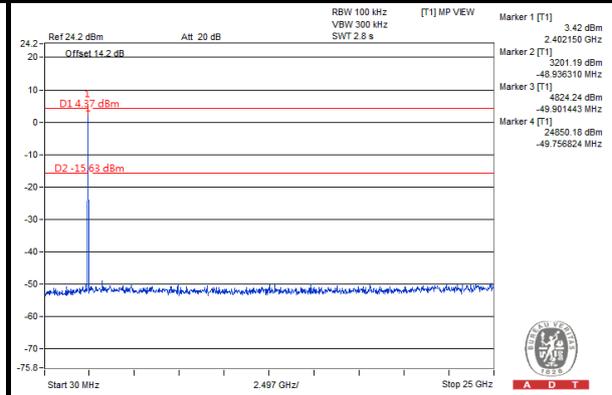
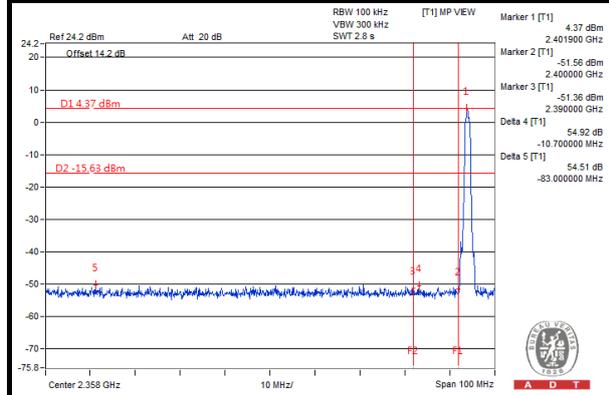




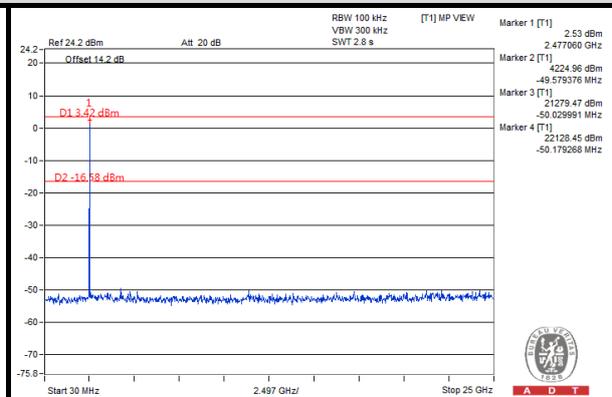
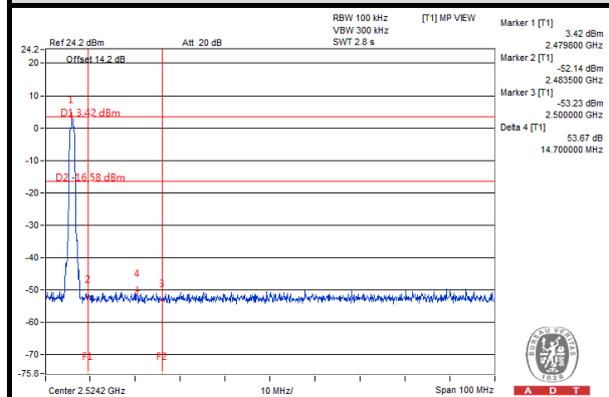
A D T

8DPSK

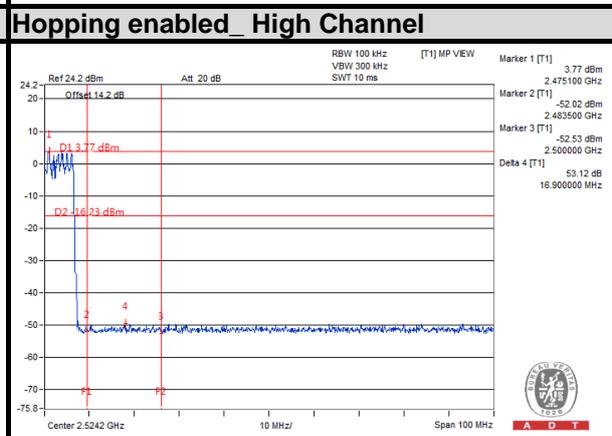
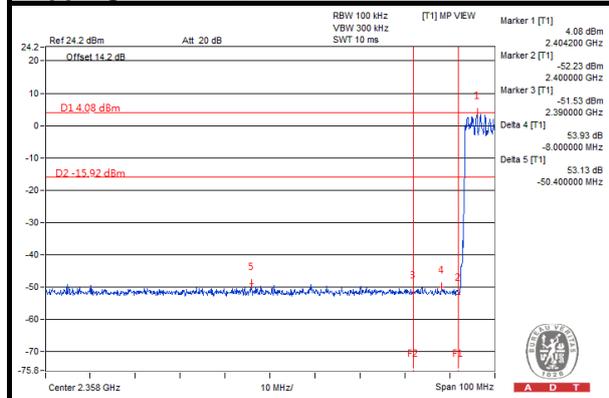
Hopping disabled _ Low Channel



Hopping disabled _ High Channel



Hopping enabled _ Low Channel



5. TEST TYPES AND RESULTS (FOR Bluetooth LE 4.0)

5.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

5.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

Same as 4.1.2.

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. Height of receiving antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

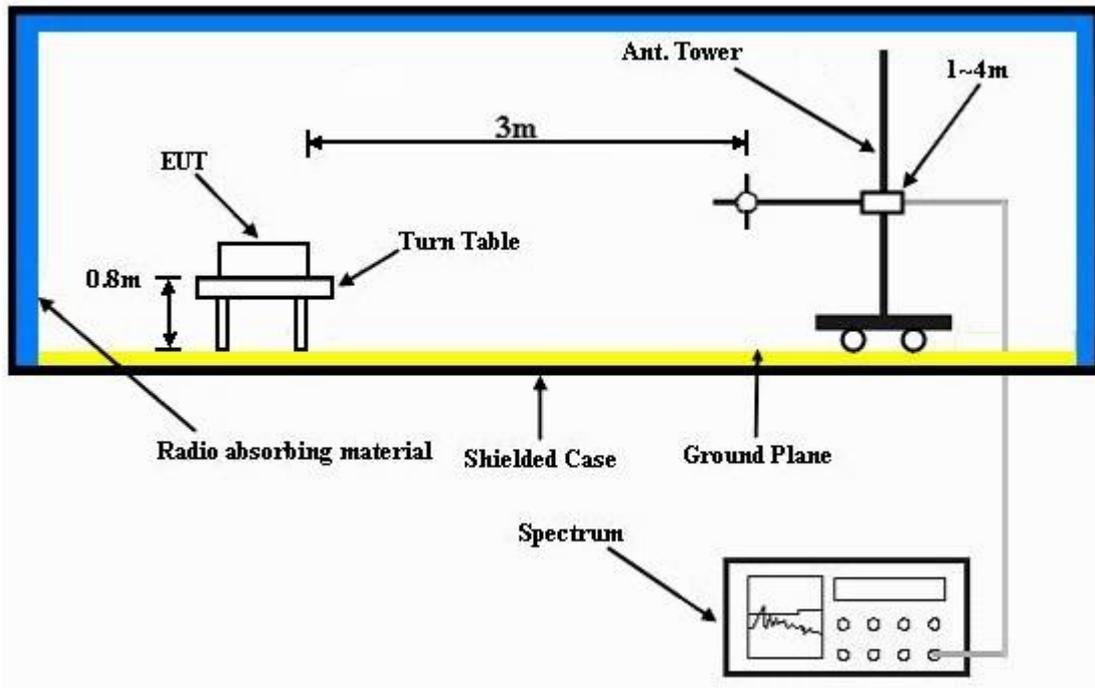
NOTE:

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

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

- a. Placed the EUT on a testing table.
- b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

5.1.7 TEST RESULTS

ABOVE 1GHz DATA

MODE C

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 19	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	110Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2384	34.6	41.72	54	-19.4	26.86	3.52	37.5	121	356	Average
2384	46.7	53.82	74	-27.3	26.86	3.52	37.5	121	356	Peak
2440	97.92	104.74			27.06	3.58	37.46	121	356	Average
2440	99.2	106.02			27.06	3.58	37.46	121	356	Peak
2500	35.12	41.55	54	-18.88	27.2	3.62	37.25	121	356	Average
2500	46.71	53.14	74	-27.29	27.2	3.62	37.25	121	356	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2356	35.39	42.57	54	-18.61	26.81	3.5	37.49	156	138	Average
2356	47.13	54.31	74	-26.87	26.81	3.5	37.49	156	138	Peak
2440	102.15	108.97			27.06	3.58	37.46	156	138	Average
2440	103.42	110.24			27.06	3.58	37.46	156	138	Peak
2486	35.47	42.04	54	-18.53	27.15	3.6	37.32	156	138	Average
2486	47.18	53.75	74	-26.82	27.15	3.6	37.32	156	138	Peak

REMARKS:

- 2440MHz: Fundamental frequency.
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value

MODE D

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 19	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	110Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	34.7	41.77	54	-19.3	26.91	3.54	37.52	110	254	Average
2390	44.67	51.74	74	-29.33	26.91	3.54	37.52	110	254	Peak
2440	96.48	103.3			27.06	3.58	37.46	110	254	Average
2440	97.58	104.4			27.06	3.58	37.46	110	254	Peak
2484	34.71	41.28	54	-19.29	27.15	3.6	37.32	110	254	Average
2484	45.5	52.07	74	-28.5	27.15	3.6	37.32	110	254	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	35.14	42.21	54	-18.86	26.91	3.54	37.52	135	158	Average
2390	45.53	52.6	74	-28.47	26.91	3.54	37.52	135	158	Peak
2440	99.3	106.12			27.06	3.58	37.46	135	158	Average
2440	100.2	107.02			27.06	3.58	37.46	135	158	Peak
2484	-2.36	4.21	54	-56.36	27.15	3.6	37.32	135	158	Average
2484	46.22	52.79	74	-27.78	27.15	3.6	37.32	156	138	Peak
2484	34.96	41.53	74	-39.04	27.15	3.6	37.32	156	138	Peak

REMARKS:

- 2440MHz: Fundamental frequency.
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value



BELOW 1GHz WORST-CASE DATA
MODE C

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 19	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	110Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	David Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
54.3	24.43	42.41	40	-15.57	12.56	0.79	31.33	100	179	Peak
174.18	20.35	39.38	43.5	-23.15	11.28	1.47	31.78	100	262	Peak
288.12	31.06	48.16	46	-14.94	12.6	2	31.7	100	314	Peak
384	32.19	46.86	46	-13.81	14.96	2.36	31.99	100	165	Peak
696.2	26.85	34.47	46	-19.15	20.77	3.42	31.81	100	230	Peak
970.6	28.97	32.81	54	-25.03	23.91	4.11	31.86	100	45	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
75.63	29.48	50.86	40	-10.52	9.33	0.94	31.65	100	235	Peak
159.33	20.57	38.31	43.5	-22.93	12.73	1.38	31.85	100	284	Peak
267.06	17.65	35.76	46	-28.35	11.97	1.9	31.98	100	177	Peak
407.8	29.99	44.09	46	-16.01	15.48	2.45	32.03	100	164	Peak
650.7	31.49	40.04	46	-14.51	20.22	3.24	32.01	100	201	Peak
975.5	29.06	32.8	54	-24.94	23.93	4.12	31.79	100	162	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
 Margin Value = Emission Level - Limit Value

MODE D

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 19	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	110Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	David Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
75.9	20.74	42.12	40	-19.26	9.33	0.94	31.65	100	194	Peak
172.02	20.04	38.77	43.5	-23.46	11.57	1.45	31.75	100	264	Peak
286.5	27.76	44.96	46	-18.24	12.54	1.99	31.73	100	141	Peak
384	32.19	46.86	46	-13.81	14.96	2.36	31.99	100	209	Peak
671.7	26.25	34.26	46	-19.75	20.48	3.33	31.82	100	173	Peak
970.6	28.97	32.81	54	-25.03	23.91	4.11	31.86	100	182	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
55.11	24.46	42.54	40	-15.54	12.45	0.8	31.33	100	135	Peak
159.33	20.57	38.31	43.5	-22.93	12.73	1.38	31.85	100	194	Peak
288.93	22.71	39.76	46	-23.29	12.63	2	31.68	100	126	Peak
335.7	26.09	41.93	46	-19.91	13.8	2.18	31.82	100	152	Peak
575.8	31.88	41.9	46	-14.12	19.06	3.02	32.1	100	223	Peak
900.6	30.35	34.87	46	-15.65	23.52	3.97	32.01	100	102	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value

5.2 CONDUCTED EMISSION MEASUREMENT

5.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

Same as 4.2.1.

5.2.2 TEST INSTRUMENTS

Same as 4.2.2.

5.2.3 TEST PROCEDURES

Same as 4.2.3.

5.2.4 DEVIATION FROM TEST STANDARD

No deviation.

5.2.5 TEST SETUP

Same as 4.2.5.

5.2.6 EUT OPERATING CONDITIONS

Same as 4.2.6.

5.2.7 TEST RESULTS

CONDUCTED WORST CASE DATA:

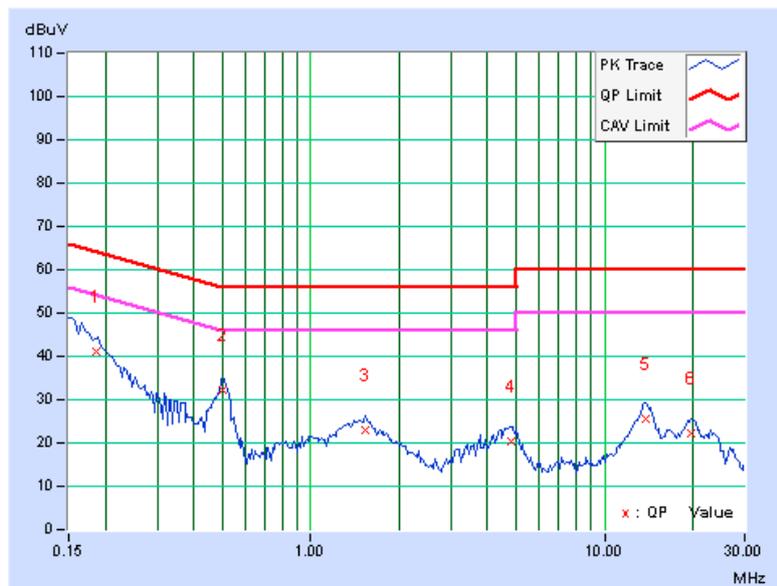
MODE C

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.18516	0.17	40.88	25.65	41.05	25.82	64.25
2	0.50156	0.22	32.09	25.50	32.31	25.72	56.00	46.00	-23.69	-20.28
3	1.53125	0.28	22.81	17.47	23.09	17.75	56.00	46.00	-32.91	-28.25
4	4.81250	0.38	19.92	11.14	20.30	11.52	56.00	46.00	-35.70	-34.48
5	13.89453	0.51	25.23	17.01	25.74	17.52	60.00	50.00	-34.26	-32.48
6	19.80078	0.64	21.44	17.72	22.08	18.36	60.00	50.00	-37.92	-31.64

REMARKS:

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

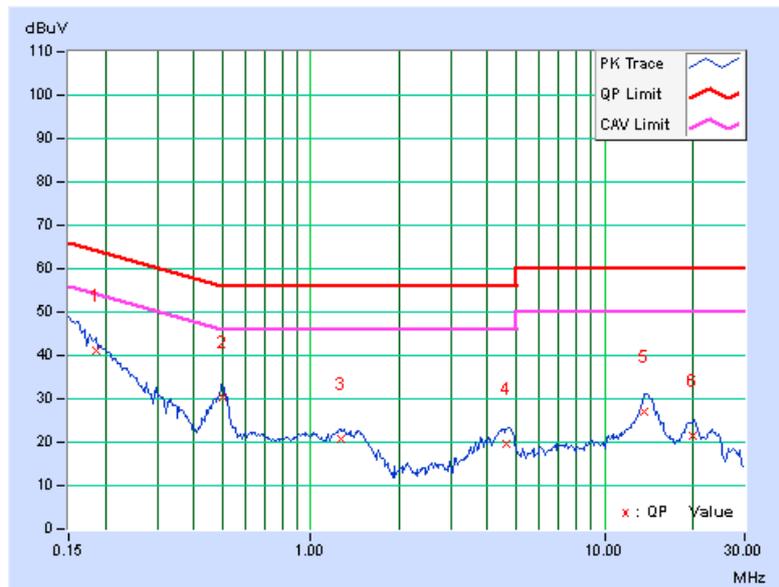


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18516	0.18	40.82	26.67	41.00	26.85	64.25	54.25	-23.25	-27.40
2	0.50156	0.25	30.20	23.21	30.45	23.46	56.00	46.00	-25.55	-22.54
3	1.26172	0.24	20.33	14.75	20.57	14.99	56.00	46.00	-35.43	-31.01
4	4.64844	0.40	19.39	11.47	19.79	11.87	56.00	46.00	-36.21	-34.13
5	13.72266	0.57	26.60	19.00	27.17	19.57	60.00	50.00	-32.83	-30.43
6	19.95703	0.73	20.57	16.83	21.30	17.56	60.00	50.00	-38.70	-32.44

REMARKS:

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



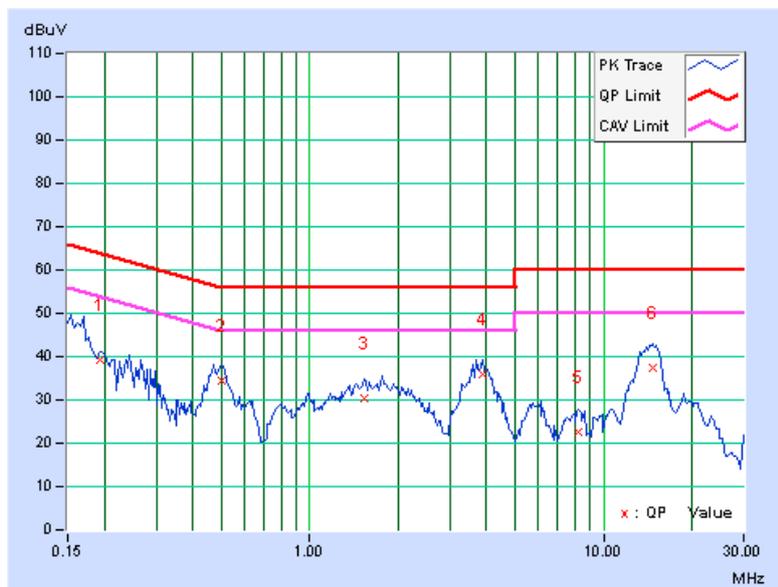
MODE D

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.19297	0.17	39.21	27.71	39.38	27.88	63.91
2	0.50156	0.22	34.11	30.03	34.33	30.25	56.00	46.00	-21.67	-15.75
3	1.53516	0.28	30.27	25.13	30.55	25.41	56.00	46.00	-25.45	-20.59
4	3.85547	0.36	35.67	27.52	36.03	27.88	56.00	46.00	-19.97	-18.12
5	8.22656	0.41	22.04	15.19	22.45	15.60	60.00	50.00	-37.55	-34.40
6	14.66016	0.53	36.72	27.06	37.25	27.59	60.00	50.00	-22.75	-22.41

REMARKS:

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

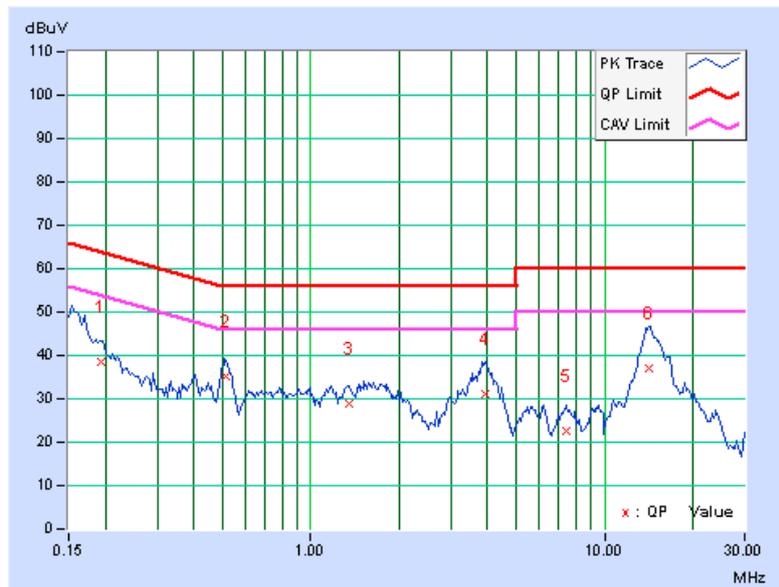


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19297	0.18	38.34	29.19	38.52	29.37	63.91	53.91	-25.39	-24.54
2	0.51719	0.25	34.92	28.03	35.17	28.28	56.00	46.00	-20.83	-17.72
3	1.34766	0.25	28.70	23.84	28.95	24.09	56.00	46.00	-27.05	-21.91
4	3.93750	0.39	30.87	22.64	31.26	23.03	56.00	46.00	-24.74	-22.97
5	7.45313	0.44	22.33	17.72	22.77	18.16	60.00	50.00	-37.23	-31.84
6	14.21094	0.59	36.61	27.25	37.20	27.84	60.00	50.00	-22.80	-22.16

REMARKS:

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





6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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





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.

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

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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



A D T

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

No modifications were made to the EUT by the lab during the test.

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