FCC TEST REPORT (BLUETOOTH)

REPORT NO.:	RF111214E06-3
MODEL NO.:	MC919ZWR
FCC ID:	UZ7MC919ZWR
RECEIVED:	Dec. 14, 2011
TESTED:	Dec. 20, 2011 to Jan. 03, 2012
ISSUED:	Jan. 11, 2012
APPLICANT:	Motorola Solution Inc.
ADDRESS:	One Motorola Plaza Holts ville NY 11742-1300 USA
ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
LAB ADDRESS:	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan
TEST LOCATION (1):	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan
TEST LOCATION (2):	No.49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF111214E06-3	Original release	Jan. 11, 2012

1 CERTIFICATION

PRODUCT :	Hand Held RFID Reader
BRAND NAME :	MOTOROLA
MODEL NO. :	MC919ZWR
TEST SAMPLE :	PROTOTYPE
APPLICANT :	Motorola Solution Inc.
TESTED DATE :	Dec. 20, 2011 to Jan. 03, 2012
STANDARDS :	FCC Part 15, Subpart C (Section 15.247) ANSI C63.4-2003 ANSI C63.10-2009

The above equipment (Model: MC919ZWR) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : _____ , **DATE:** *Jan. 11, 2012*
(Midoli Peng, Specialist)

APPROVED BY : _____ , **DATE:** *Jan. 11, 2012*
(May Chen, Deputy Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -10.98dB at 0.219MHz.
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 -8.1dB at 48.00MHz.
15.247(d)	Conducted Out-Band Emission Measurement	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

NOTE: 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 ME ASUREMENT UNCERTAINTY

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

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Conducted emissions	2.45 dB
Radiated emissions (30MHz-1GHz)	3.81 dB
Radiated emissions (1GHz -18GHz)	2.19 dB
Radiated emissions (18GHz -40GHz)	2.56 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Hand Held RFID Reader
MODEL NO.	MC919ZWR
FCC ID	UZ7MC919ZWR
POWER SUPPLY	DC 7.4V from battery, DC 12V from cradle or car charger
MODULATION TYPE	GFSK, π/4-DQPSK, 8DPSK
MODULATION TECHNOLOGY	FHSS
DATE RATE	up to 3Mbps
FREQUENCY RANGE	2402MHz ~ 2480MHz
NUMBER OF CHANNEL	79
MAX. OUTPUT POWER	1.698mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer User's manual
ASSOCIATED DEVICES	Battery x 1 (Part No.: 21-65587-03)

NOTE:

1. There are Bluetooth, WLAN and RFID technology used for the EUT.

Remark	Report No.
15.247	RF111214E06
15.407	RF111214E06-1
DFS	RF111214E06-2
Bluetooth	RF111214E06-3
RFID	RF111214E06-4

2. Spurious Emission of the simultaneous operation (Bluetooth, WLAN and RFID) have been evaluated and no non-compliance found.

3. The EUT configuration list:

Keypad	53keys
Scan	SE1524
WLAN (a/b/g)	V
BT	V
RFID	V

4. The antennas provided to the EUT, please refer to the following table:

WLAN Antenna Spec.

No.	Brand	Model No.	Antenna Type	Gain (dBi) < included cable loss>	Connecter Type	Frequency range (MHz)	Cable Loss (dB)	Cable Length (mm)
1	Auden	750353-00 (Main, Tx & Rx)	Loop	4.5 (2.4G) 5.5 (5G)	Hirose	2400~2500 5150~5850	0.082 (2.4G) 0.138 (5G)	33
2	Auden	750330-00 (Aux ,Tx & Rx)	PIFA	4.5 (2.4G) 5.5 (5G)	Hirose	2400~2500 5150~5850	0.235 (2.4G) 0.394 (5G)	94

Bluetooth

No.	Brand	Model	Antenna Type	Gain (dBi) < included cable loss>	Connecter Type	Frequency range (MHz)
1	TY	AH104F2650S1-T	Chip	-3.73	SMT	2400~2500

RFID Antenna Spec.

No.	Brand	Model No.	Antenna Type	Gain (dBi) < included cable loss>	Connecter Type	Frequency range (MHz)	Cable Loss (dB)	Cable Length (mm)
1_USS	Auden	41-68888-05	YAGI	5	Hirose	902~928	0.304	185
2_USL	Auden	41-68888-07	YAGI	5	Hirose	902~928	0.304	185

5. The EUT could be supplied with a Cradle, Car Charger and battery as below table:

Cradle (not for sale together)	
Brand:	SYMBOL
Model No.:	CRD9000-1000
Part No.:	CRD9000-1001SR
Input power :	+12V ------ 9A
I/O Ports:	USB Port x 1 RS232 Port x 1
Associated Devices:	USB cable (unshielded, 1.8m with one core) USB cable (Part No.: 25-64396-01R) RJ-45 to RS232 cable (shielded, 1.85m with one core) RJ-45 to RS232 cable(Part No.: 25-63852-01R) Adapter (Part No.: 50-14000-148R)
Direct charging (Car Charger) (not for sale together)	
Brand:	SYMBOL
Part No.:	ADP9000-110R and ADP9000-100R
I/O Ports:	RS232 Port x 1
Associated Devices:	USB cable (shielded, 1.85m with one core) USB cable (Part No.: 25-62166-01R)
Adapter (for Cradle & Car Charger only, and not for sale together) Brand: Model No.: Part No.: Input power : Output power :	 HIPRO HP-O2040D43 50-14000-148R 100-240V, 50-60Hz, 1.5A +12V ------ 3.33A DC output cable (unshielded, 1.8m with one core)
Battery	
Brand:	SYMBOL
Part No.:	21-65587-03
Rating:	7.4V, 2200mAh, 16.3Wh

6. The EUT was pre-tested in chamber under following test modes :

Pre-test Mode	Description
Mode A	Direct charging(Part No.: ADP9000-110R) mode : EUT (X-Y plane)
Mode B	Direct charging(Part No.: ADP9000-100R) mode : EUT (X-Y plane)
Mode C	**Direct charging(Part No.: ADP9000-100R) mode : EUT (X-Z plane)**
Mode D	Direct charging(Part No.: ADP9000-100R) mode : EUT (Y-Z plane)
Mode E	Battery mode : EUT (X-Y plane)
Mode F	Cradle mode : EUT

From the above modes, the radiated emissions test, worse case was found in **Mode C**. Therefore only the test data of the mode was recorded in this report.

7. The above EUT information was 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

Seventy-nine channels are provided for Bluetooth.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	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		

3.3 TEST MODE APPLICABLITY AND TESTED CHANNEL DETAIL:

EUT CONFIGURE MODE	APPLICABLE TO					DESCRIPTION
	PLC	RE < 1G	RE ³ 1G	APCM	OB	
1	√	-	-	-	-	Cradle mode
2	√	√	√	√	√	Direct charging (Part No.: ADP9000-100R) mode

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

RE ³ 1G: Radiated Emission above 1GHz **APCM:** Antenna Port Conducted Measurement

OB: Conducted Out-Band Emission Measurement

Power Line Conducted Emission Test:

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

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

Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
0 to 78	0	FHSS	8DPSK	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, data rates and antenna ports (if EUT with antenna diversity architecture).

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

Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
0 to 78	0	FHSS	8DPSK	DH5

Radiated Emission Test (Above 1 GHz):

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

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

Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
0 to 78	0, 39, 78	FHSS	GFSK	DH5
0 to 78	0, 39, 78	FHSS	8DPSK	DH5

Antenna Port Conducted Measurement:

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

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

Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
0 to 78	0, 39, 78	FHSS	GFSK	DH5
0 to 78	0, 39, 78	FHSS	8DPSK	DH5

Conducted Out-Band Emission Measurement:

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

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

Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
0 to 78	0, 78	FHSS	GFSK	DH5
0 to 78	0, 78	FHSS	8DPSK	DH5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER(SYSTEM)	TESTED BY
PLC	25deg. C, 58%RH,	120Vac, 60Hz	Kyle Huang
RE<1G	26deg. C, 71%RH	120Vac, 60Hz	Nick Chang
RE≥1G	17deg. C, 63%RH	120Vac, 60Hz	Nick Chang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Rex Huang
OB	25deg. C, 60%RH	120Vac, 60Hz	Rex Huang

3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C. (15.247)
ANSI C63.4-2003
ANSI C63.10-2009

All test items have been performed and recorded as per the above standards.

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.5 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.

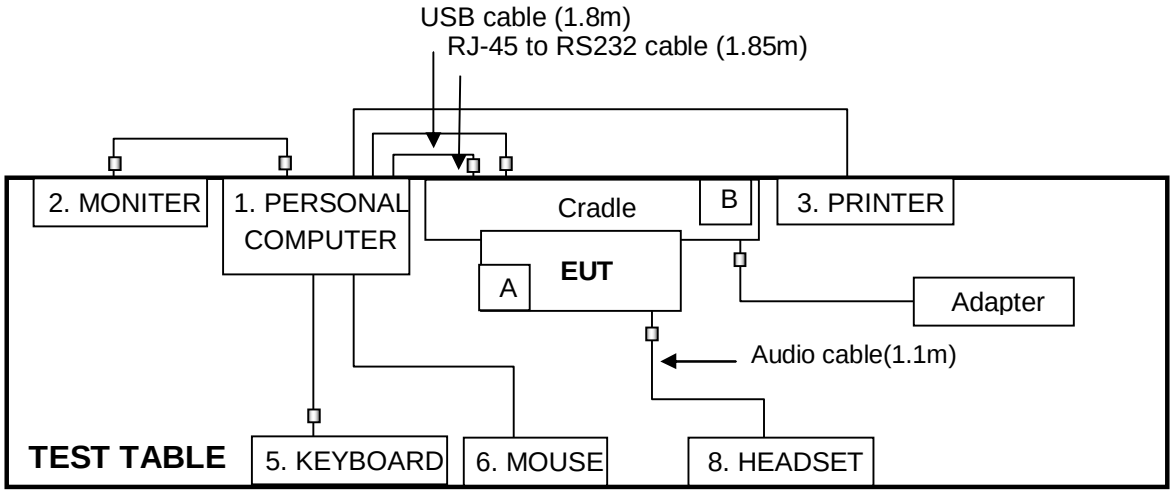
For conducted emission test					
No.	Product	Brand	Model No.	Serial No.	FCC ID
1	PERSONAL COMPUTER	DELL	DCSCMF	9KKB32S	FCC DoC
2	MONITOR	DELL	E2210Hc	CN-OG337R-64180-97S-OQMS	FCC DoC
3	PRINTER	EPSON	LQ-300+II	G88Y074085	FCC DoC
4	MODEM	ACEEX	1414	0206026778	IFAXDM1414
5	KEYBOARD	DELL	SK-8115	MY-0DJ325-71619-99B-0475	FCC DoC
6	MOUSE	DELL	MOC5UO	l1401LVG	FCC DoC
7	HEADSET	VX1	NA	NA	NA
For other test items					
No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
2	iPod shuffle	Apple	MC749TA/A	CC4DMFJUDFDM	NA
3	HEADSET	VX1	NA	NA	NA

For conducted emission test	
No.	Signal cable description
1	RJ-45 to RS232 cable (shielded, 1.85m with one core) USB cable (shielded, 1.8m with one core) USB cable (shielded, 1.85m with one core)
2	VGA cable. (1.8m with two cores)
3	USB cable.(1m)
4	RS232 cable.(1m)
5	USB cable.(2m with one core)
6	USB cable.(2m)
7	Audio cable (shielded, 1.1m with one core)
For other test items	
No.	Signal cable description
1	USB cable (shielded, 1.85m with one core)
2	USB cable (shielded, 0.1m)
3	Audio cable (shielded, 1.1m with one core)

NOTE: All power cords of the above support units are non shielded (1.8m).

3.6 CONFIGURATION OF SYSTEM UNDER TEST

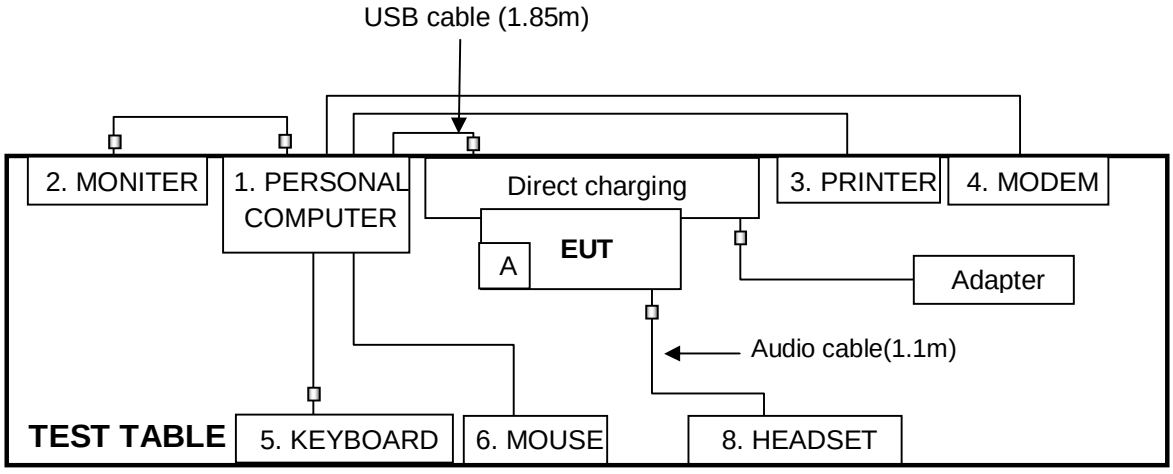
For conducted emission test mode 1:



NOTE: 1. Item A is the SD Card.

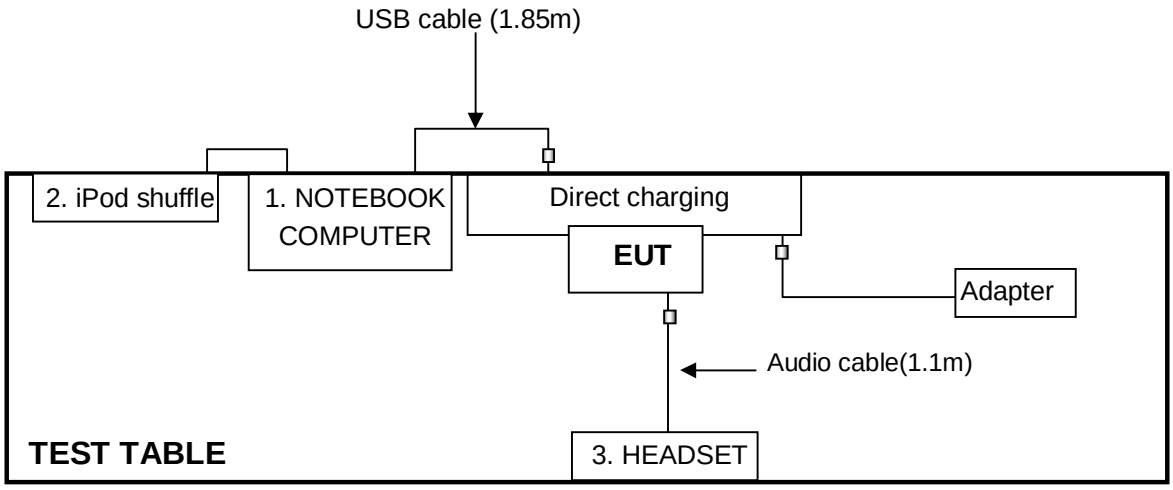
2. Item B is the Battery.

For conducted emission test mode 2:



NOTE: 1. Item A is the SD Card.

For other test items



4 TEST PROCEDURES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. All emanations from a class B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

Test date: Jan. 03, 2012

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	100287	Mar. 02, 2011	Mar. 01, 2012
Line-Impedance Stabilization Network (for EUT)	NSLK 8127	8127-523	Sep. 20, 2011	Sep. 19, 2012
Line-Impedance Stabilization Network (for Peripheral)	ENV-216	100072	June 10, 2011	June 09, 2012
RF Cable (JYEBAO)	5DFB	CONCAB-003	Aug. 05, 2011	Aug. 04, 2012
50 ohms Terminator	50	3	Nov. 02, 2011	Nov. 01, 2012
Software	BV ADT_Cond_V7.3.7	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. A.
3 The VCCI Con A Registration No. is C-817.

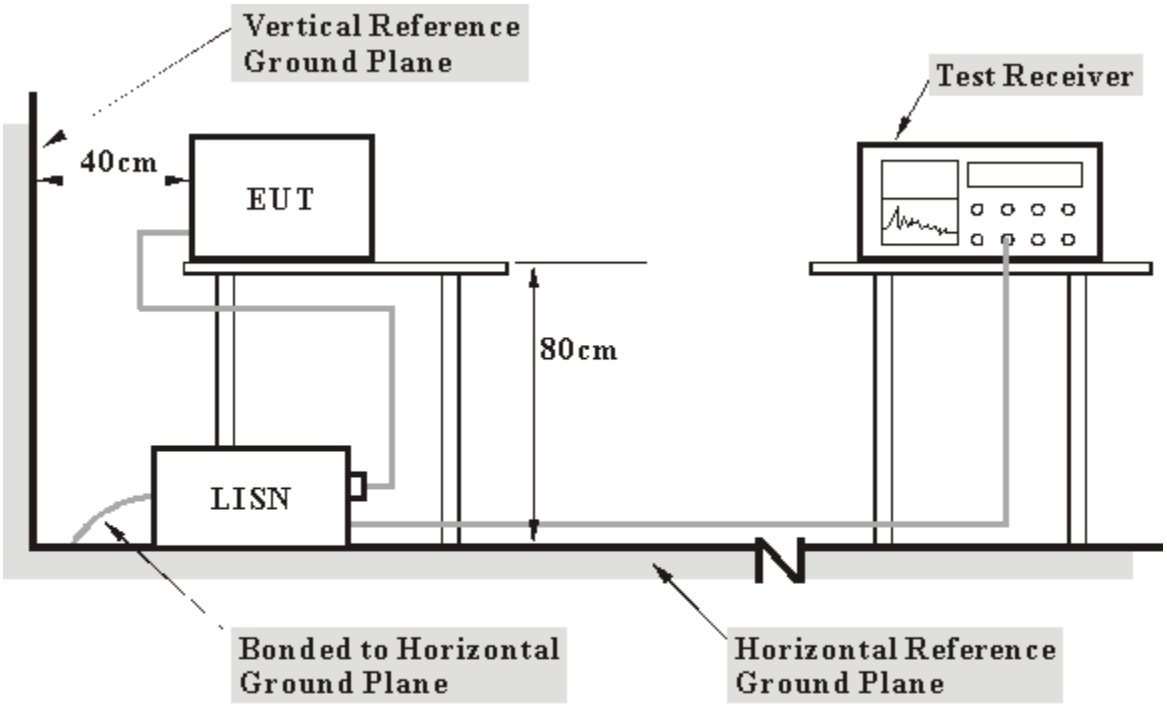
4.1.3 TEST PROCEDURES

a. The EUT/HOST was placed 0.4 meters from the conducting wall of the shielded room with EUT/HOST 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/HOST were checked for maximum conducted interference.

c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

4.1.4 TEST SETUP



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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

4.1.5 EUT OPERATING CONDITIONS

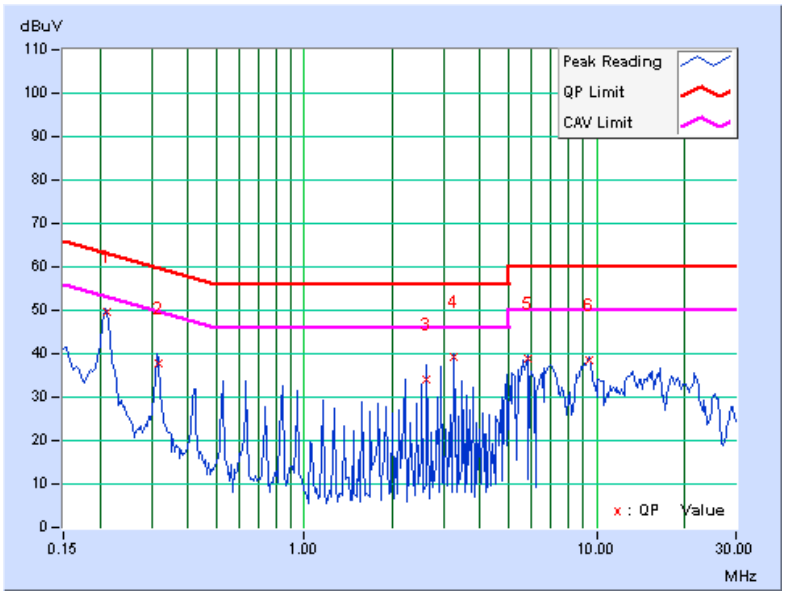
1. Connect the EUT with the support unit 1 (Personal Computer) which is placed on a testing table.
2. The communication partner run test program “BTRegTest Ver3.14” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.6 TEST RESULTS (MODE 1)

PHASE	Line (L)	6dB BANDWIDTH	9 kHz

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.212**	**0.06**	**49.52**	**42.09**	**49.58**	**42.15**	**63.13**	**53.13**	**-13.55**	**-10.98**
2	0.317	0.07	37.68	29.27	37.75	29.34	59.77	49.77	-22.03	-20.44
3	2.632	0.19	33.97	25.95	34.16	26.14	56.00	46.00	-21.84	-19.86
4	3.262	0.21	38.99	30.34	39.20	30.55	56.00	46.00	-16.80	-15.45
5	5.789	0.28	38.62	36.73	38.90	37.01	60.00	50.00	-21.10	-12.99
6	9.473	0.38	38.10	35.66	38.48	36.04	60.00	50.00	-21.52	-13.96

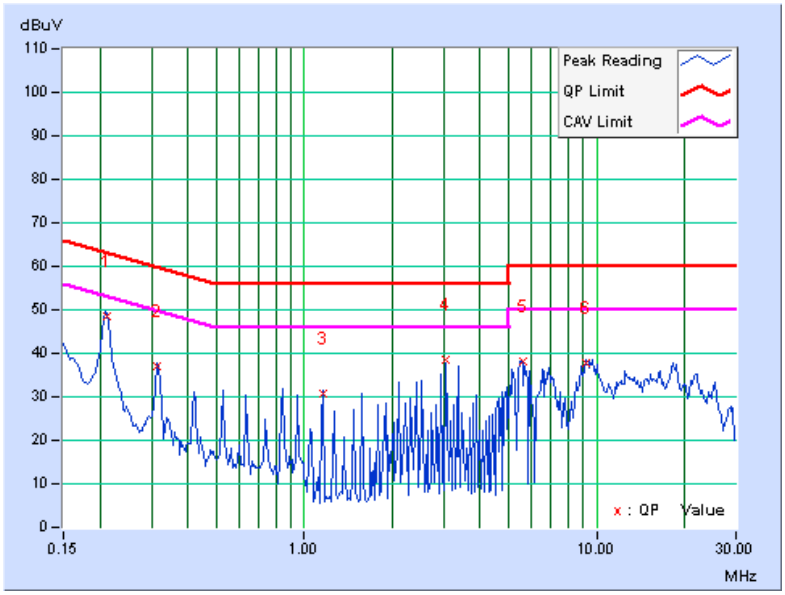
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading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



PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.212	0.07	48.39	41.50	48.46	41.57	63.13	53.13	-14.67	-11.56
2	0.315	0.08	36.89	29.67	36.97	29.75	59.84	49.84	-22.87	-20.09
3	1.156	0.10	30.79	28.19	30.89	28.29	56.00	46.00	-25.11	-17.71
4	3.052	0.19	38.42	28.77	38.61	28.96	56.00	46.00	-17.39	-17.04
5	5.578	0.26	37.93	36.34	38.19	36.60	60.00	50.00	-21.81	-13.40
6	9.156	0.35	37.33	34.18	37.68	34.53	60.00	50.00	-22.32	-15.47

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.

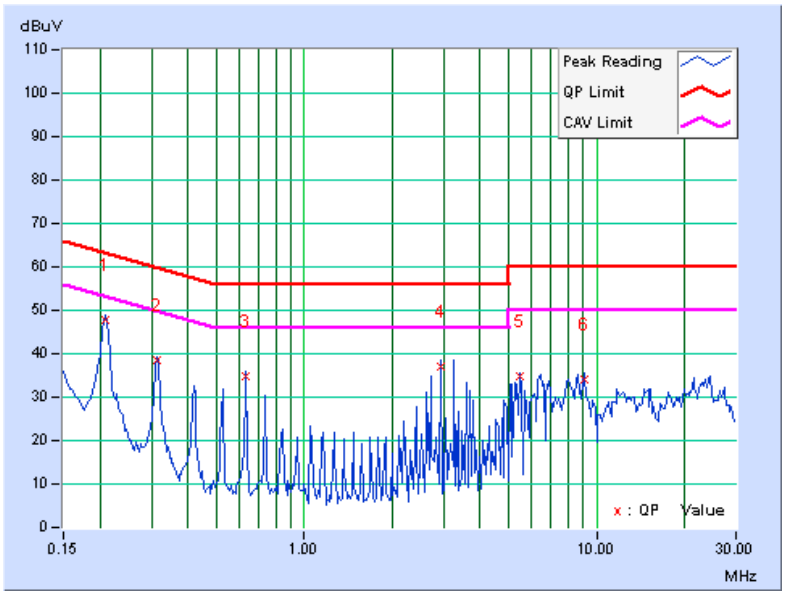


4.1.7 TEST RESULTS (MODE 2)

PHASE	Line (L)	6dB BANDWIDTH	9 kHz

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.209	0.06	47.55	39.05	47.61	39.11	63.26	53.26	-15.65	-14.15
2	0.314	0.07	38.36	33.31	38.43	33.38	59.86	49.86	-21.44	-16.49
3	0.630	0.08	34.82	33.74	34.90	33.82	56.00	46.00	-21.10	-12.18
4	2.941	0.20	36.98	26.92	37.18	27.12	56.00	46.00	-18.82	-18.88
5	5.464	0.28	34.70	33.40	34.98	33.68	60.00	50.00	-25.02	-16.32
6	9.037	0.37	33.84	30.96	34.21	31.33	60.00	50.00	-25.79	-18.67

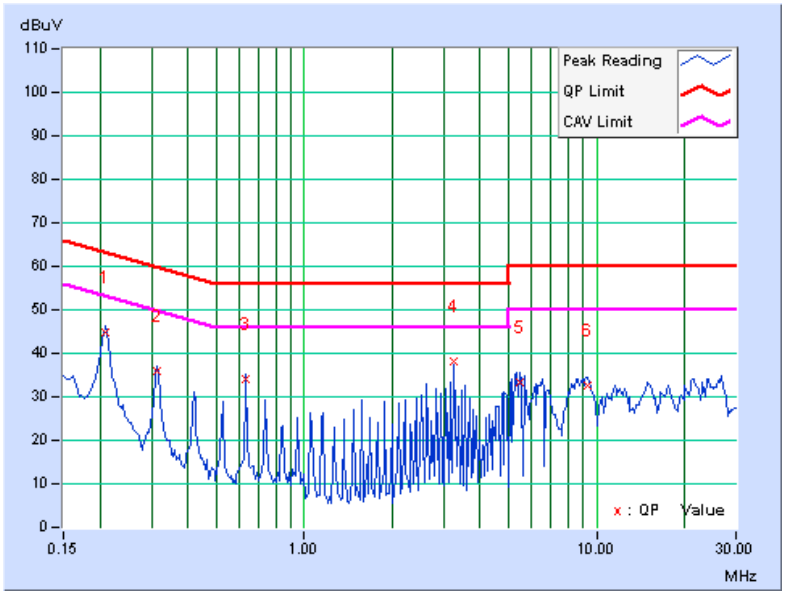
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading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



PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.209	0.07	44.81	38.07	44.88	38.14	63.26	53.26	-18.38	-15.12
2	0.314	0.08	35.94	32.01	36.02	32.09	59.86	49.86	-23.85	-17.78
3	0.630	0.08	33.97	33.30	34.05	33.38	56.00	46.00	-21.95	-12.62
4	3.258	0.20	37.88	28.21	38.08	28.41	56.00	46.00	-17.92	-17.59
5	5.465	0.26	33.06	32.09	33.32	32.35	60.00	50.00	-26.68	-17.65
6	9.352	0.35	32.07	30.54	32.42	30.89	60.00	50.00	-27.58	-19.11

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.



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
4. Section 15.205 restricted bands of operation shall compliance with the limits in Section 15.209.

4.2.2 TEST INSTRUMENTS

Below 1GHz test - Test date: Dec. 20, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY48250254	July 12, 2011	July 11, 2012
Agilent Pre-Selector	N9039A	MY46520311	July 12, 2011	July 11, 2012
Agilent Signal Generator	N5181A	MY49060517	July 12, 2011	July 11, 2012
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-03	Nov. 15, 2011	Nov. 14, 2012
Agilent Pre-Amplifier	8449B	3008A02578	July 04, 2011	July 03, 2012
SPACEK LABS	SLKKa-48-6	9K16	Nov. 15, 2011	Nov. 14, 2012
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-360	Apr. 14, 2011	Apr. 13, 2012
AISI Horn_Antenna	AIH.8018	0000320091110	Nov. 14, 2011	Nov. 13, 2012
SCHWARZBECK Horn_Antenna	BBHA 9170	9170-424	Oct. 07, 2011	Oct. 06, 2012
RF CABLE	NA	RF104-201 RF104-203 RF104-204	Dec. 27, 2010	Dec. 26, 2011
RF Cable	NA	CHGCAB_001	Oct. 07, 2011	Oct. 06, 2012
Software	ADT_Radiated_ V8.7.05	NA	NA	NA
CT Antenna Tower & Turn Table	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.

Above 1GHz test - Test date: Jan. 02, 2012

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY48250253	Aug. 29, 2011	Aug. 28, 2012
Agilent Pre-Selector	N9039A	MY46520310	Aug. 29, 2011	Aug. 28, 2012
Agilent Signal Generator	N5181A	MY49060347	July 25, 2011	July 24, 2012
LIG NEX1 Test Receiver	ER-265	L09068005	Oct. 24, 2011	Oct. 23, 2012
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-04	Nov. 15, 2011	Nov. 14, 2012
Agilent Pre-Amplifier	8449B	3008A02465	Feb. 28, 2011	Feb. 27, 2012
SPACEK LABS	SLKKa-48-6	9K16	Nov. 15, 2011	Nov. 14, 2012
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-361	Apr. 14, 2011	Apr. 13, 2012
AISI Horn_Antenna	AIH.8018	0000220091110	Nov. 23, 2011	Nov. 22, 2012
SCHWARZBECK Horn_Antenna	BBHA 9170	9170-424	Oct. 07, 2011	Oct. 06, 2012
RF CABLE	NA	RF104-205 RF104-207 RF104-202	Dec. 27, 2011	Dec. 26, 2012
RF Cable	NA	CHHCAB_001	Oct. 08, 2011	Oct. 07, 2012
Software	ADT_Radiated_ V8.7.05	NA	NA	NA
CT Antenna Tower & Turn Table	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5. The CANADA Site Registration No. is IC 7450H-3.

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters chamber room. 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 height of 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

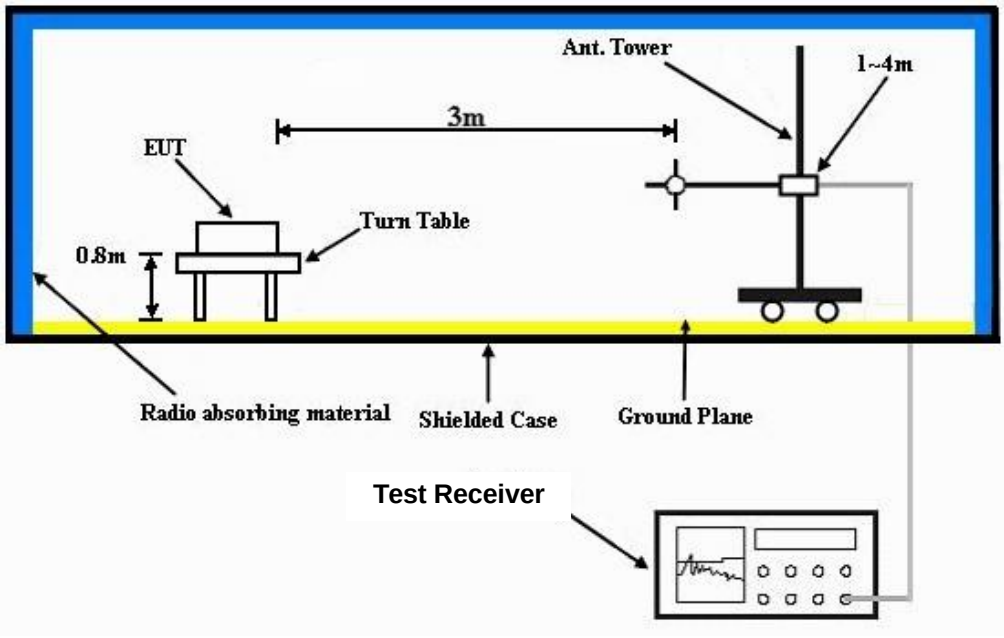
NOTE:

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit 1 (Notebook Computer) which is placed on a testing table.
2. The communication partner run test program “BTRegTest Ver3.14” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA：GFSK MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Nick Chang

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	69.55	24.8 QP	40.0	-15.2	1.50 H	54	12.25	12.57
2	144.04	32.6 QP	43.5	-10.9	1.00 H	321	18.17	14.42
3	291.60	34.0 QP	46.0	-12.1	1.00 H	94	18.97	14.98
4	648.52	29.0 QP	46.0	-17.0	1.00 H	111	6.25	22.78
5	746.93	32.2 QP	46.0	-13.9	1.00 H	116	7.81	24.34
6	947.42	34.7 QP	46.0	-11.3	1.50 H	283	6.99	27.75
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	**48.00**	**31.9 QP**	**40.0**	**-8.1**	**1.00 V**	**143**	**17.62**	**14.30**
2	93.83	34.5 QP	43.5	-9.0	1.50 V	197	25.58	8.93
3	300.71	31.8 QP	46.0	-14.2	1.50 V	111	16.48	15.34
4	598.55	30.6 QP	46.0	-15.4	1.00 V	12	8.07	22.55
5	656.46	29.2 QP	46.0	-16.8	1.00 V	88	6.37	22.82
6	945.29	35.5 QP	46.0	-10.5	1.00 V	63	7.77	27.73

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.

ABOVE 1GHz WORST-CASE DATA

GFSK MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	17deg. C, 63%RH	TESTED BY	Nick Chang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.4 PK	74.0	-17.6	1.35 H	110	25.19	31.21
2	2390.00	26.3 AV	54.0	-27.7	1.35 H	110	-4.91	31.21
3	*2402.00	91.9 PK			1.35 H	110	60.65	31.25
4	*2402.00	61.8 AV			1.35 H	110	30.55	31.25
5	4804.00	48.1 PK	74.0	-25.9	1.23 H	105	8.75	39.35
6	4804.00	18.0 AV	54.0	-36.0	1.23 H	105	-21.35	39.35
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.7 PK	74.0	-18.3	1.56 V	235	24.49	31.21
2	2390.00	25.6 AV	54.0	-28.4	1.56 V	235	-5.61	31.21
3	*2402.00	87.0 PK			1.56 V	235	55.75	31.25
4	*2402.00	56.9 AV			1.56 V	235	25.65	31.25
5	4804.00	47.1 PK	74.0	-26.9	1.03 V	287	7.75	39.35
6	4804.00	17.0 AV	54.0	-37.0	1.03 V	287	-22.35	39.35

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 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 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	17deg. C, 63%RH	TESTED BY	Nick Chang

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	*2441.00	91.9 PK			1.56 H	97	60.55	31.35
2	*2441.00	61.8 AV			1.56 H	97	30.45	31.35
3	4882.00	48.2 PK	74.0	-25.8	1.18 H	111	8.55	39.65
4	4882.00	18.1 AV	54.0	-35.9	1.18 H	111	-21.55	39.65
5	7323.00	51.9 PK	74.0	-22.1	1.13 H	246	7.78	44.12
6	7323.00	21.8 AV	54.0	-32.2	1.13 H	246	-22.32	44.12
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	*2441.00	85.6 PK			1.55 V	174	54.25	31.35
2	*2441.00	55.5 AV			1.55 V	174	24.15	31.35
3	4882.00	47.6 PK	74.0	-26.4	1.02 V	298	7.95	39.65
4	4882.00	17.5 AV	54.0	-36.5	1.02 V	298	-22.15	39.65
5	7323.00	53.3 PK	74.0	-20.7	1.24 V	83	9.18	44.12
6	7323.00	23.2 AV	54.0	-30.8	1.24 V	83	-20.92	44.12

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 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 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

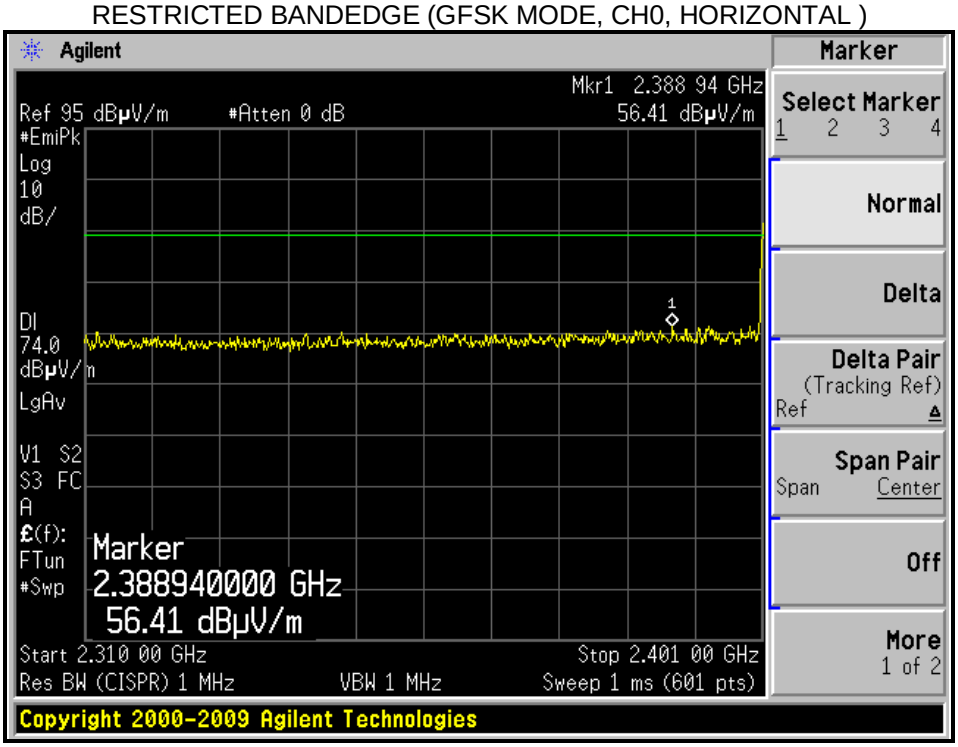
EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	17deg. C, 63%RH	TESTED BY	Nick Chang

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	*2480.00	92.2 PK			1.53 H	112	60.75	31.45
2	*2480.00	62.1 AV			1.53 H	112	30.65	31.45
3	2483.50	56.5 PK	74.0	-17.5	1.53 H	112	25.04	31.46
4	2483.50	26.4 AV	54.0	-27.6	1.53 H	112	-5.06	31.46
5	4960.00	48.0 PK	74.0	-26.0	1.16 H	126	8.03	39.97
6	4960.00	17.9 AV	54.0	-36.1	1.16 H	126	-22.07	39.97
7	7440.00	52.6 PK	74.0	-21.4	1.08 H	250	8.36	44.24
8	7440.00	22.5 AV	54.0	-31.5	1.08 H	250	-21.74	44.24
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	*2480.00	86.2 PK			1.50 V	189	54.75	31.45
2	*2480.00	56.1 AV			1.50 V	189	24.65	31.45
3	2483.50	55.9 PK	74.0	-18.1	1.50 V	189	24.44	31.46
4	2483.50	25.8 AV	54.0	-28.2	1.50 V	189	-5.66	31.46
5	4960.00	47.8 PK	74.0	-26.2	1.05 V	304	7.83	39.97
6	4960.00	17.7 AV	54.0	-36.3	1.05 V	304	-22.27	39.97
7	7440.00	52.9 PK	74.0	-21.1	1.26 V	87	8.66	44.24
8	7440.00	22.8 AV	54.0	-31.2	1.26 V	87	-21.44	44.24

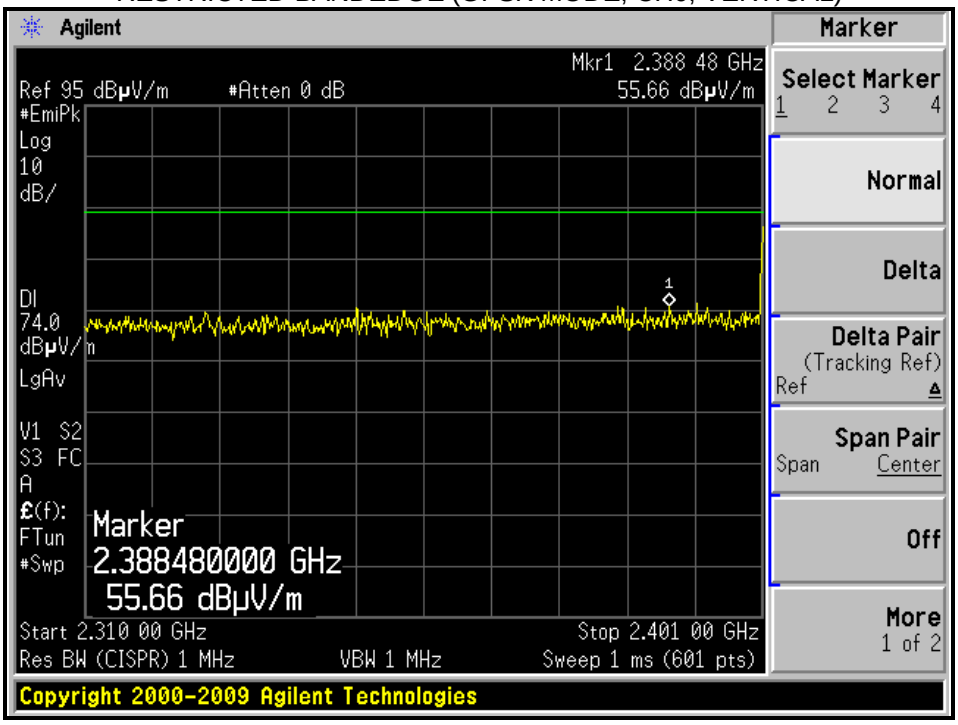
REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 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 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

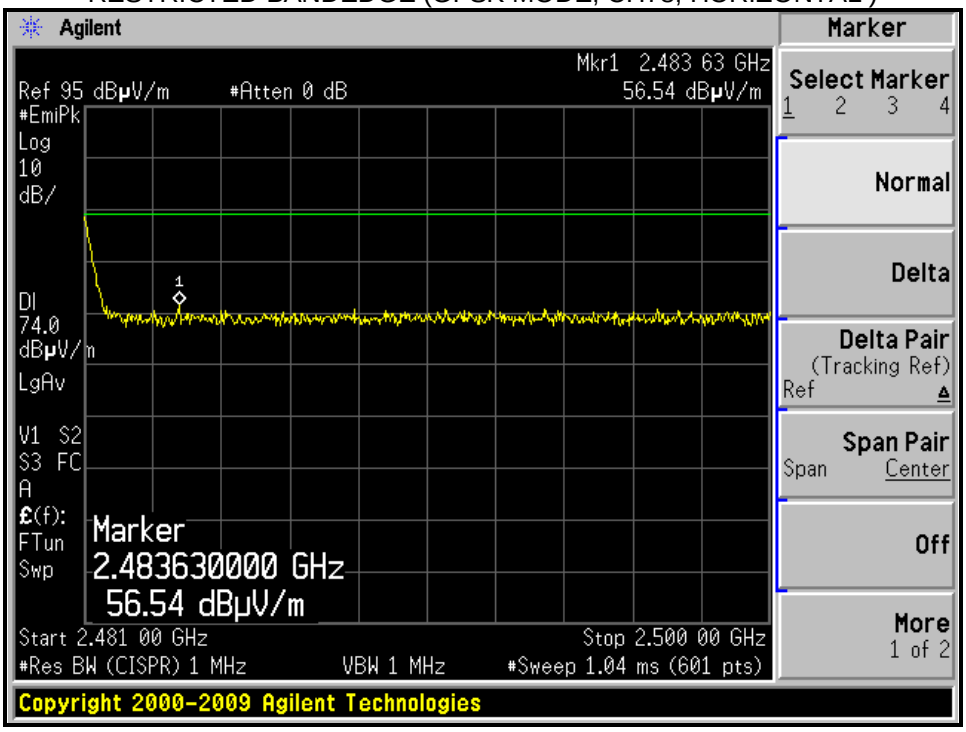
RESTRICTED BANDEDGE (GFSK MODE, CH0, HORIZONTAL)



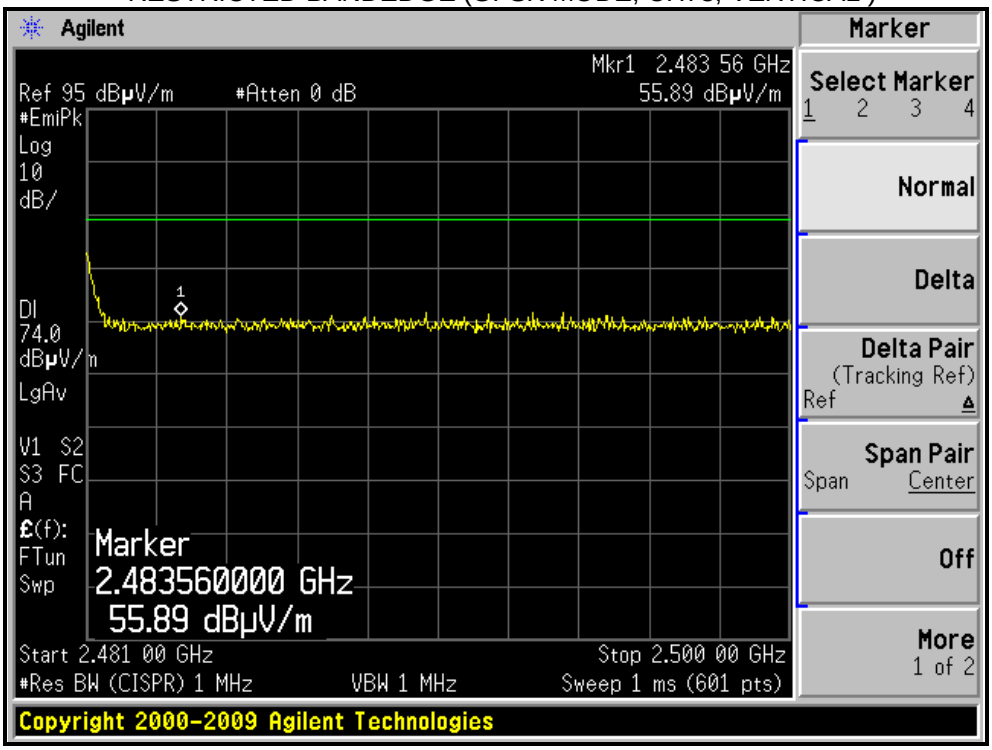
RESTRICTED BANDEDGE (GFSK MODE, CH0, VERTICAL)



RESTRICTED BANDEDGE (GFSK MODE, CH78, HORIZONTAL)



RESTRICTED BANDEDGE (GFSK MODE, CH78, VERTICAL)



The average value is Average value = peak reading + 20log(duty cycle). And it meets the requirement of limit.

8DPSK MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	17deg. C, 63%RH	TESTED BY	Nick Chang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.1 PK	74.0	-16.9	1.45 H	239	25.89	31.21
2	2390.00	27.0 AV	54.0	-27.0	1.45 H	239	-4.21	31.21
3	*2402.00	93.0 PK			1.45 H	239	61.75	31.25
4	*2402.00	62.9 AV			1.45 H	239	31.65	31.25
5	4804.00	47.2 PK	74.0	-26.8	1.06 H	88	7.85	39.35
6	4804.00	17.1 AV	54.0	-36.9	1.06 H	88	-22.25	39.35
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.1 PK	74.0	-17.9	1.33 V	221	24.89	31.21
2	2390.00	26.0 AV	54.0	-28.0	1.33 V	221	-5.21	31.21
3	*2402.00	88.6 PK			1.33 V	221	57.35	31.25
4	*2402.00	58.5 AV			1.33 V	221	27.25	31.25
5	4804.00	48.1 PK	74.0	-25.9	1.16 V	142	8.75	39.35
6	4804.00	18.0 AV	54.0	-36.0	1.16 V	142	-21.35	39.35

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 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 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	17deg. C, 63%RH	TESTED BY	Nick Chang

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	*2441.00	92.7 PK			1.40 H	209	61.35	31.35
2	*2441.00	62.6 AV			1.40 H	209	31.25	31.35
3	4882.00	47.7 PK	74.0	-26.3	1.15 H	117	8.05	39.65
4	4882.00	17.6 AV	54.0	-36.4	1.15 H	117	-22.05	39.65
5	7323.00	53.2 PK	74.0	-20.8	1.10 H	243	9.08	44.12
6	7323.00	23.1 AV	54.0	-30.9	1.10 H	243	-21.02	44.12
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	*2441.00	87.4 PK			1.35 V	233	56.05	31.35
2	*2441.00	57.3 AV			1.35 V	233	25.95	31.35
3	4882.00	48.4 PK	74.0	-25.6	1.11 V	143	8.75	39.65
4	4882.00	18.3 AV	54.0	-35.7	1.11 V	143	-21.35	39.65
5	7323.00	53.0 PK	74.0	-21.0	1.33 V	57	8.88	44.12
6	7323.00	22.9 AV	54.0	-31.1	1.33 V	57	-21.22	44.12

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 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 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

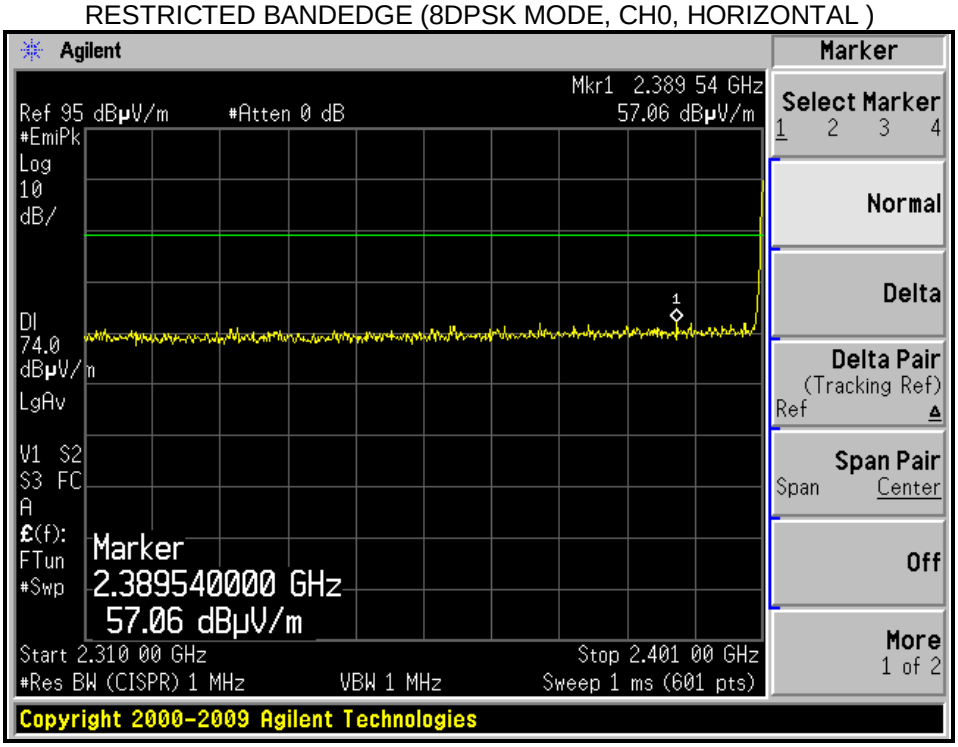
EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	17deg. C, 63%RH	TESTED BY	Nick Chang

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	*2480.00	93.0 PK			1.45 H	239	61.55	31.45
2	*2480.00	62.9 AV			1.45 H	239	31.45	31.45
3	2483.50	56.1 PK	74.0	-17.9	1.45 H	239	24.64	31.46
4	2483.50	26.0 AV	54.0	-28.0	1.45 H	239	-5.46	31.46
5	4960.00	47.2 PK	74.0	-26.8	1.11 H	109	7.23	39.97
6	4960.00	17.1 AV	54.0	-36.9	1.11 H	109	-22.87	39.97
7	7440.00	52.8 PK	74.0	-21.2	1.07 H	249	8.56	44.24
8	7440.00	22.7 AV	54.0	-31.3	1.07 H	249	-21.54	44.24
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	*2480.00	88.1 PK			1.32 V	223	56.65	31.45
2	*2480.00	58.0 AV			1.32 V	223	26.55	31.45
3	2483.50	55.8 PK	74.0	-18.2	1.32 V	223	24.34	31.46
4	2483.50	25.7 AV	54.0	-28.3	1.32 V	223	-5.76	31.46
5	4960.00	48.5 PK	74.0	-25.5	1.06 V	156	8.53	39.97
6	4960.00	18.4 AV	54.0	-35.6	1.06 V	156	-21.57	39.97
7	7440.00	52.8 PK	74.0	-21.2	1.38 V	55	8.56	44.24
8	7440.00	22.7 AV	54.0	-31.3	1.38 V	55	-21.54	44.24

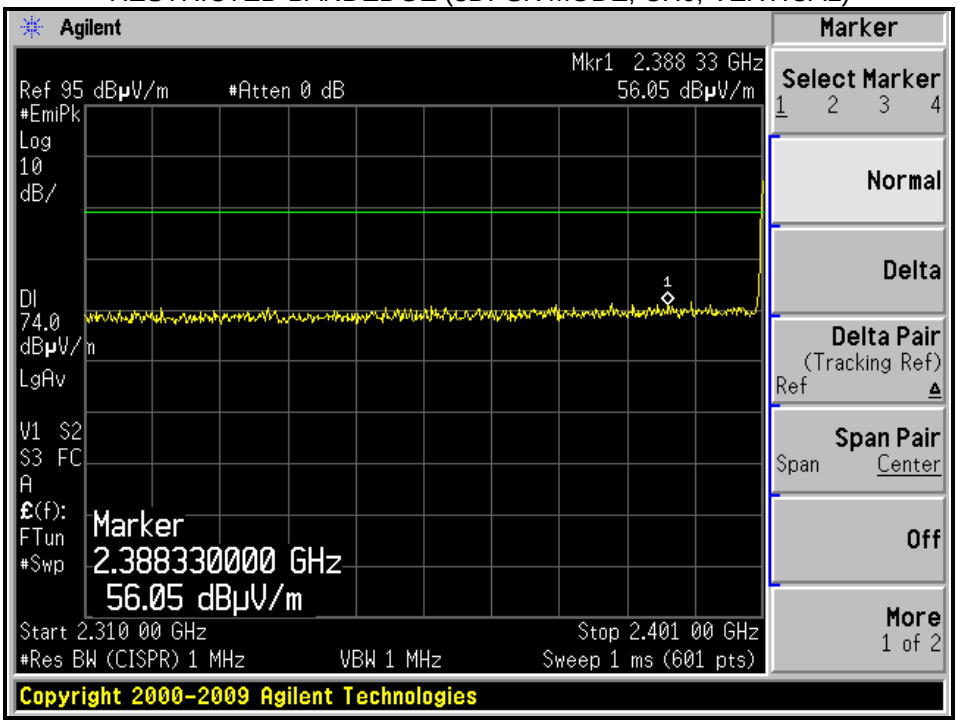
REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 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 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

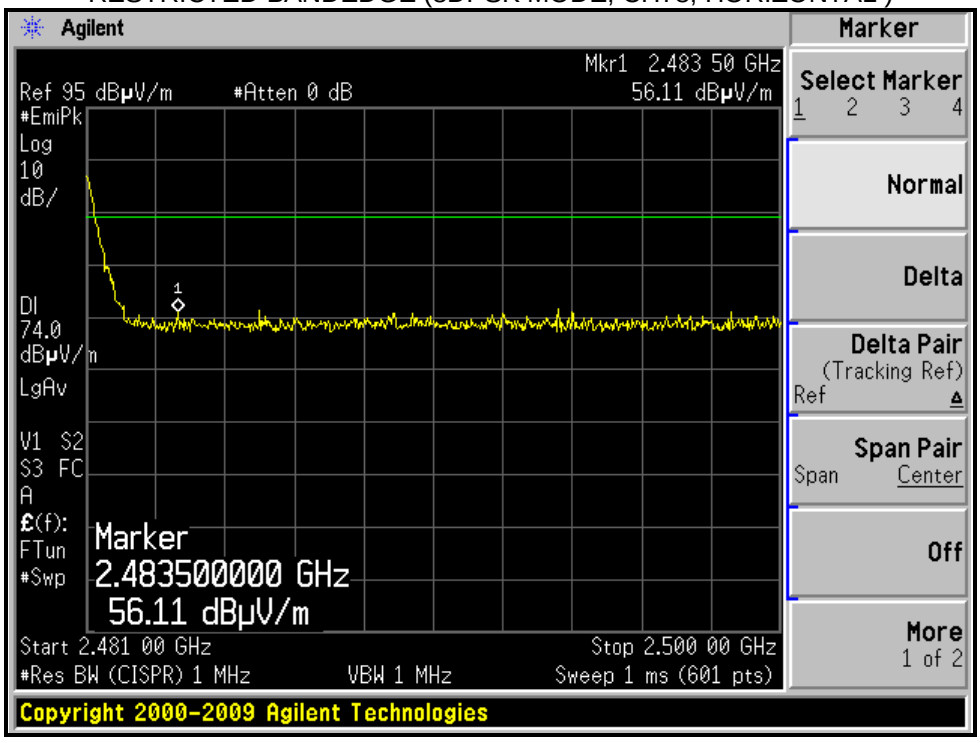
RESTRICTED BANDEDGE (8DPSK MODE, CH0, HORIZONTAL)



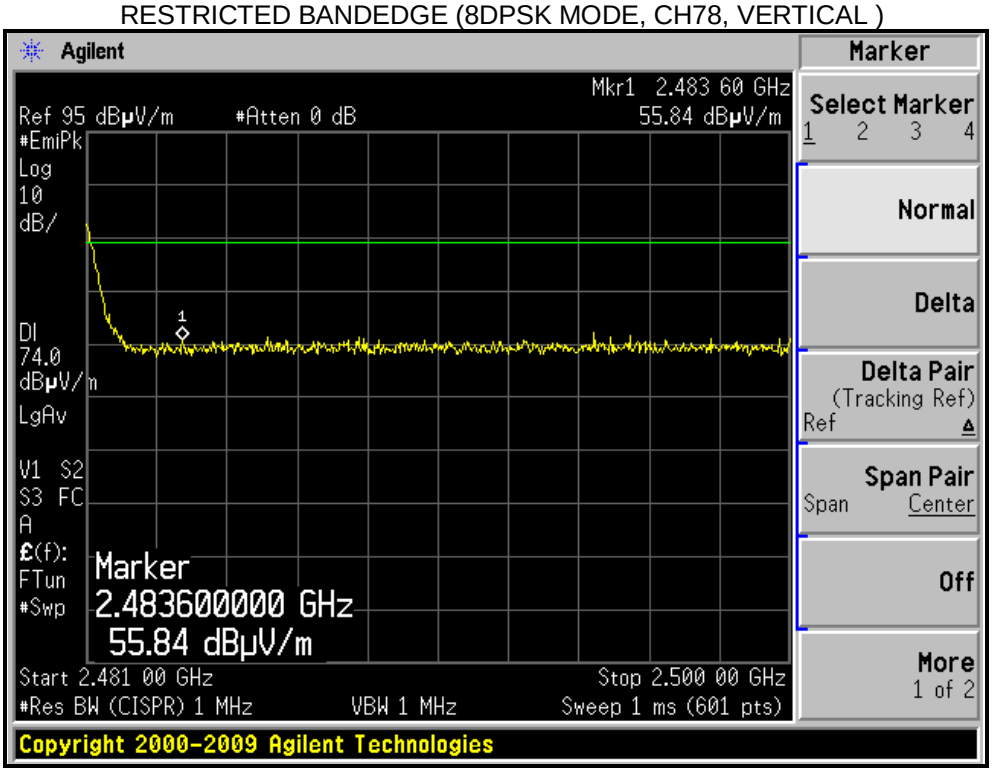
RESTRICTED BANDEDGE (8DPSK MODE, CH0, VERTICAL)



RESTRICTED BANDEDGE (8DPSK MODE, CH78, HORIZONTAL)



RESTRICTED BANDEDGE (8DPSK MODE, CH78, VERTICAL)



* The average value is Average value = peak reading + 20log(duty cycle). And it meets the requirement of limit.

4.3 NUMBER OF HOPPING FREQUENCY USED

4.3.1 LIMIT OF HOPPING FREQUENCY USED

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

4.3.2 TEST INSTRUMENTS

Test date: Dec. 23, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP 40	100060	May 11, 2011	May 10, 2012

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

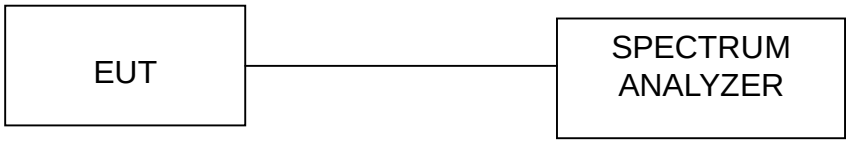
4.3.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. 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.
3. 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.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

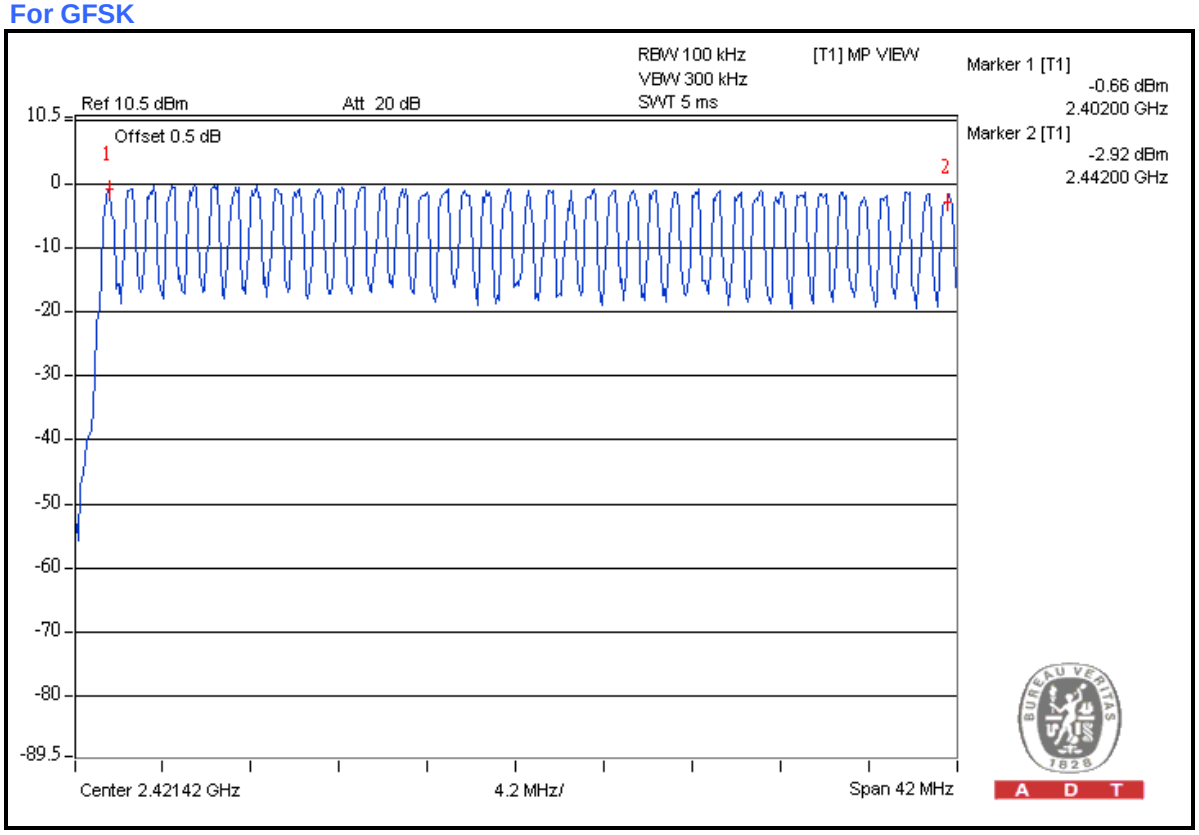
4.3.5 TEST SETUP

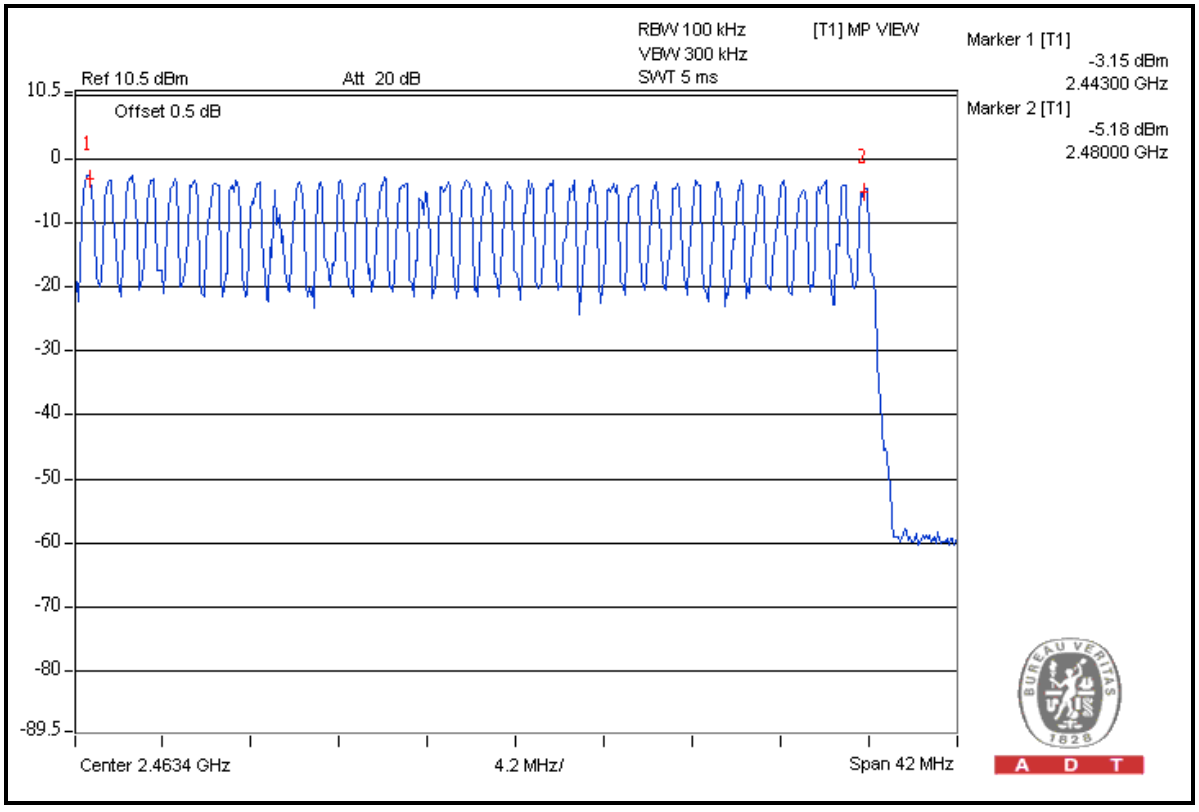


4.3.6 TEST RESULTS

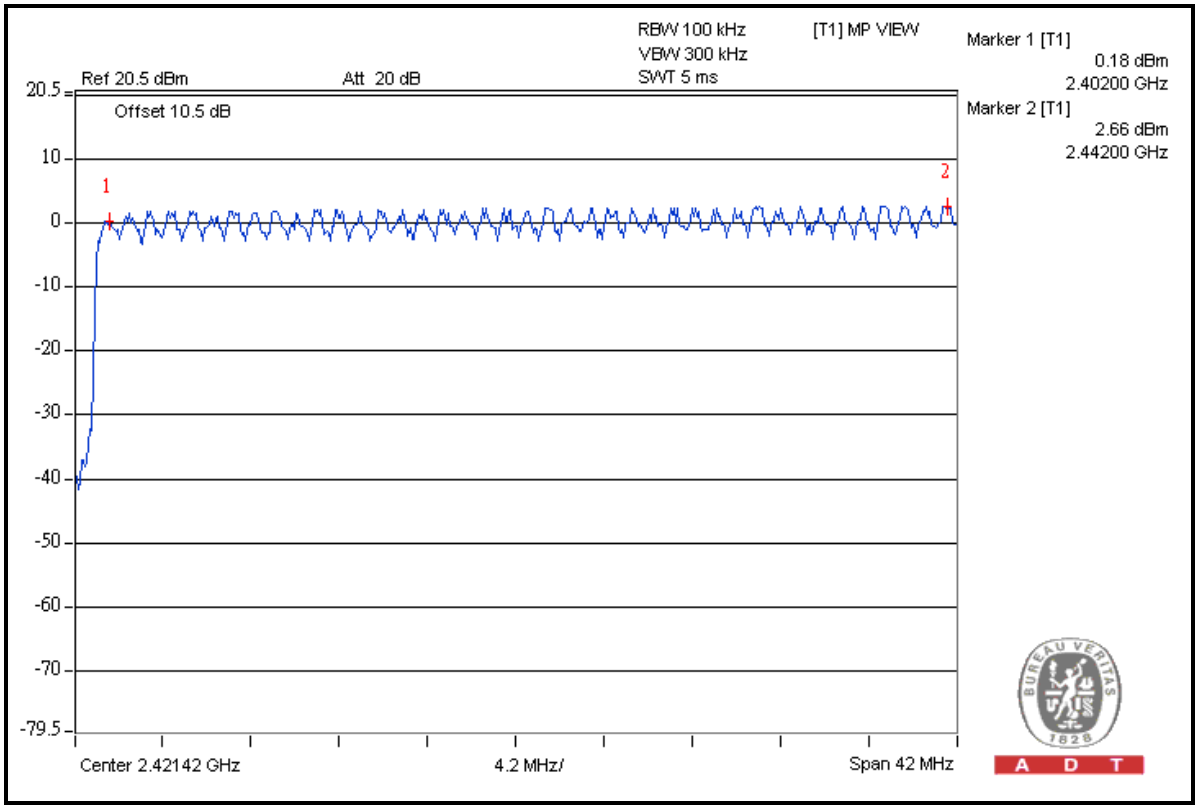
There are 79 hopping frequencies in the hopping mode. Please refer to next pages for the test result. On the plots, it shows that the hopping frequencies are equally spaced.

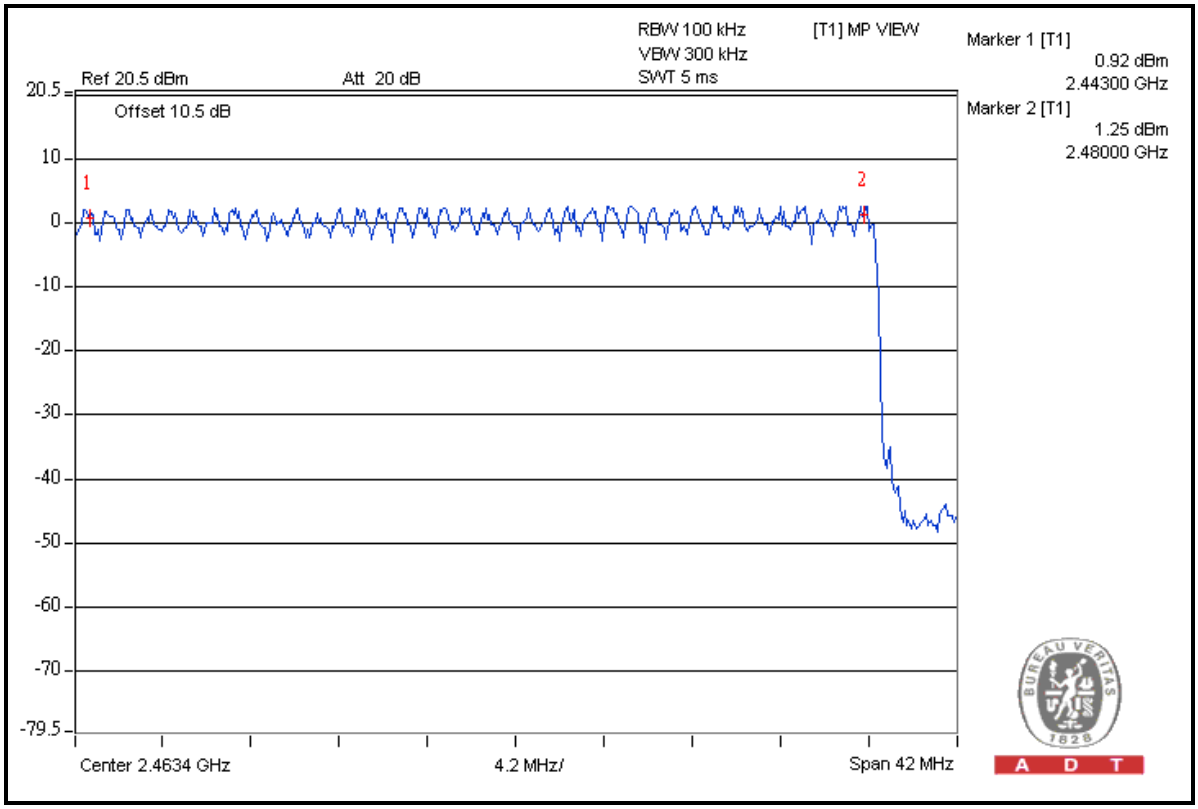
For GFSK


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MP VIEW
Marker 1 [T1]
-0.66 dBm
2.40200 GHz
Marker 2 [T1]
-2.92 dBm
2.44200 GHz
Ref 10.5 dBm
Att 20 dB
Offset 0.5 dB
10.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-89.5
Center 2.42142 GHz
4.2 MHz/
Span 42 MHz


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MP VIEW
Marker 1 [T1]
-3.15 dBm
2.44300 GHz
Marker 2 [T1]
-5.18 dBm
2.48000 GHz
Ref 10.5 dBm
Att 20 dB
Offset 0.5 dB
10.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-89.5
Center 2.4634 GHz
4.2 MHz/
Span 42 MHz

For 8DPSK


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MP VIEW
Marker 1 [T1]
0.18 dBm
2.40200 GHz
Marker 2 [T1]
2.66 dBm
2.44200 GHz
Ref 20.5 dBm
Att 20 dB
Offset 10.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.42142 GHz
4.2 MHz/
Span 42 MHz


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MP VIEW
Marker 1 [T1]
0.92 dBm
2.44300 GHz
Marker 2 [T1]
1.25 dBm
2.48000 GHz
Ref 20.5 dBm
Att 20 dB
Offset 10.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.4634 GHz
4.2 MHz/
Span 42 MHz

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 INSTRUMENTS

Test date: Dec. 23, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP 40	100060	May 11, 2011	May 10, 2012

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

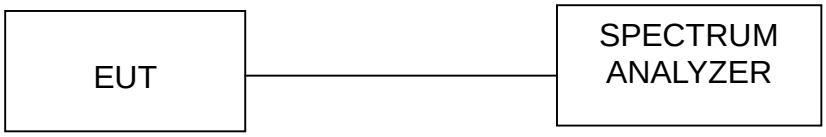
4.4.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. 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.
3. 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.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
5. Repeat above procedures until all frequencies measured were complete.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



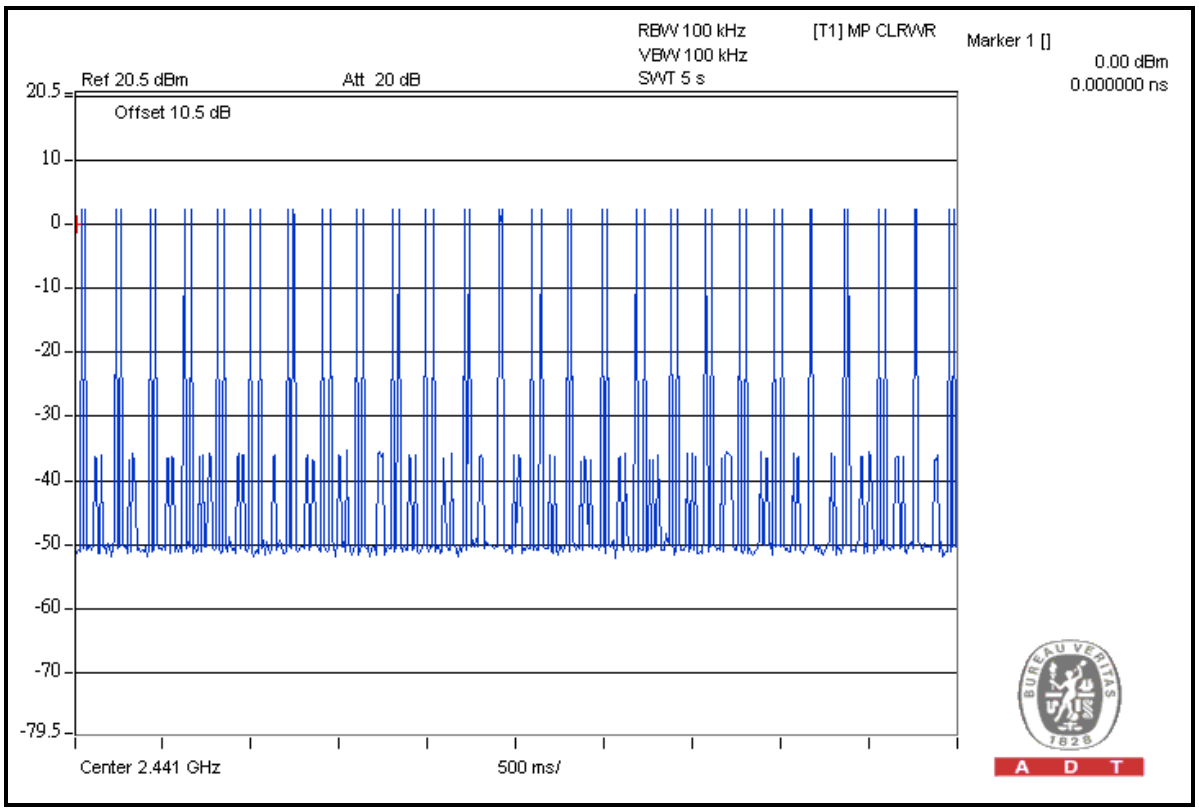
4.4.6 TEST RESULTS

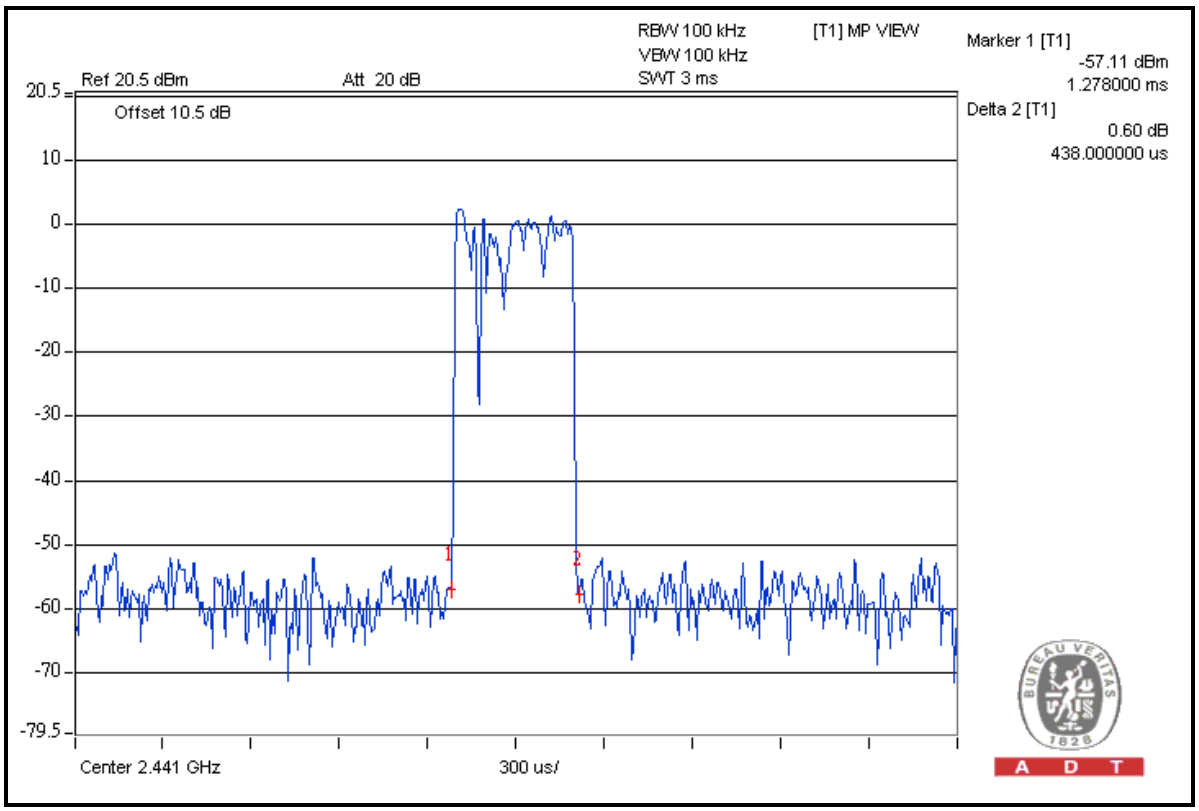
For GFSK:

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	50 (times / 5 sec) *6.32=316 times	0.438	138.41	400
DH3	26 (times / 5 sec) *6.32=164.32 times	1.692	278.03	400
DH5	16 (times / 5 sec) *6.32=101.12 times	2.97	300.33	400

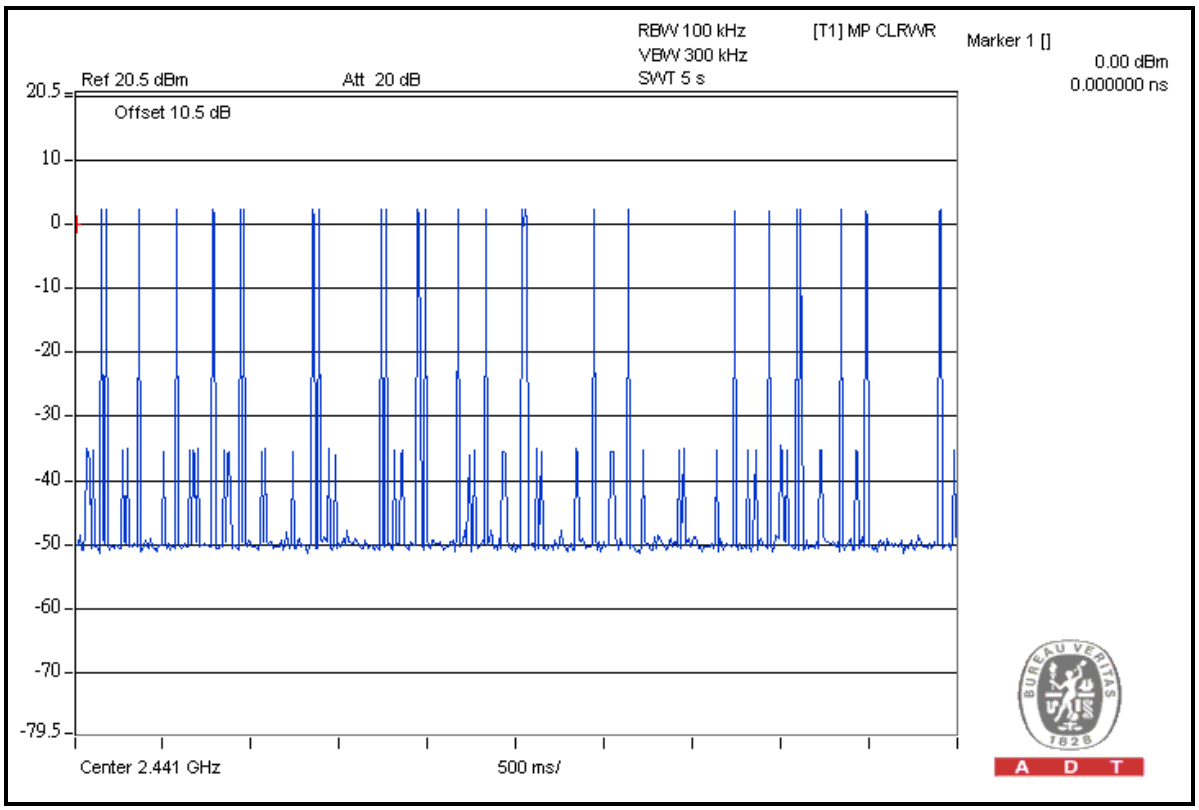
NOTE: Test plots of the transmitting time slot are shown on next 3 pages.

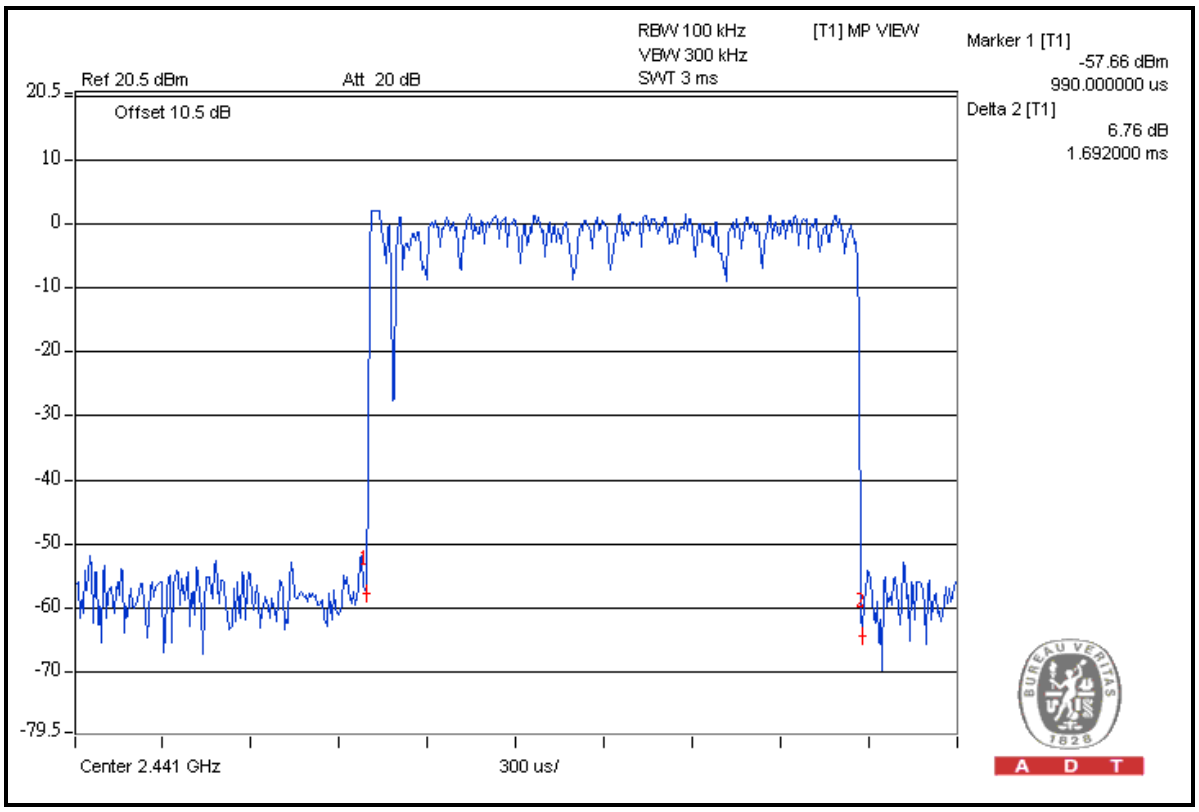
DH1


RBW 100 kHz
VBW 100 kHz
SWT 5 s
[T1] MP CLRWR
Marker 1 []
0.00 dBm
0.000000 ns
Ref 20.5 dBm
Att 20 dB
Offset 10.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
500 ms/

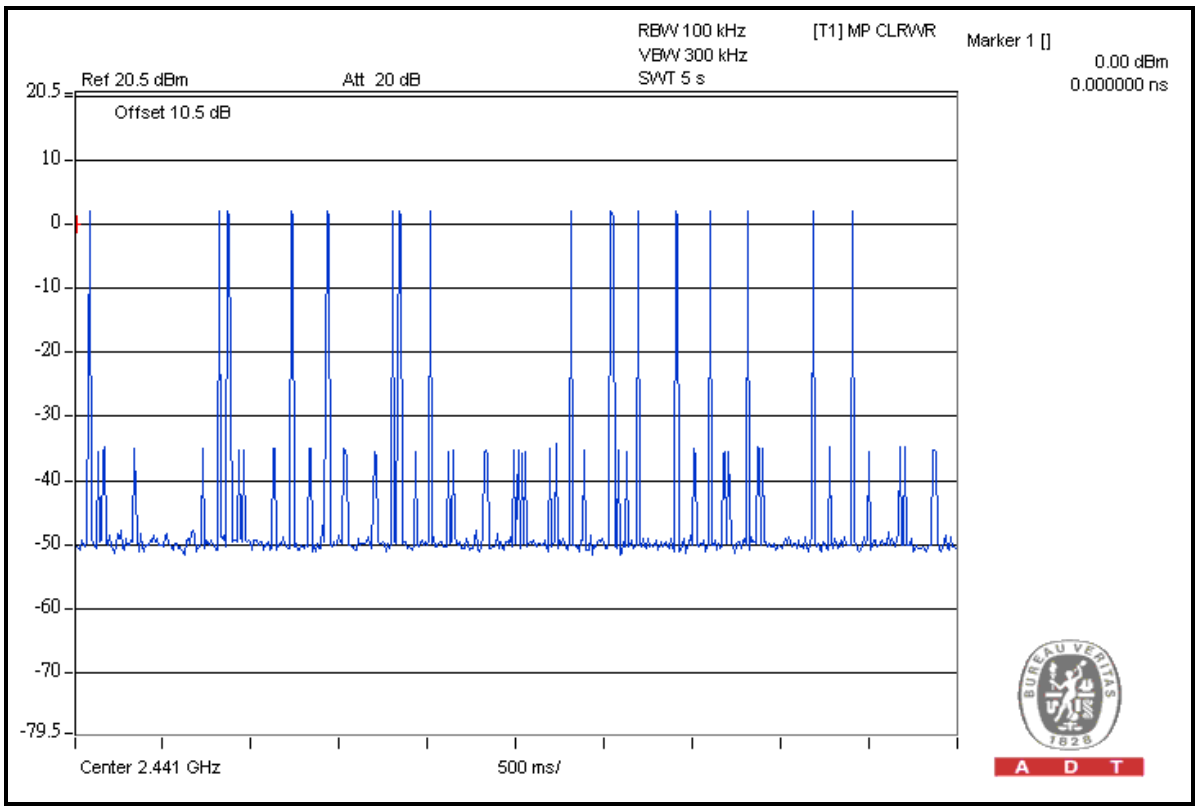

RBW 100 kHz
VBW 100 kHz
SWT 3 ms
[T1] MP VIEW
Marker 1 [T1]
-57.11 dBm
1.278000 ms
Delta 2 [T1]
0.60 dB
438.000000 us
Ref 20.5 dBm
Att 20 dB
Offset 10.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
300 us/

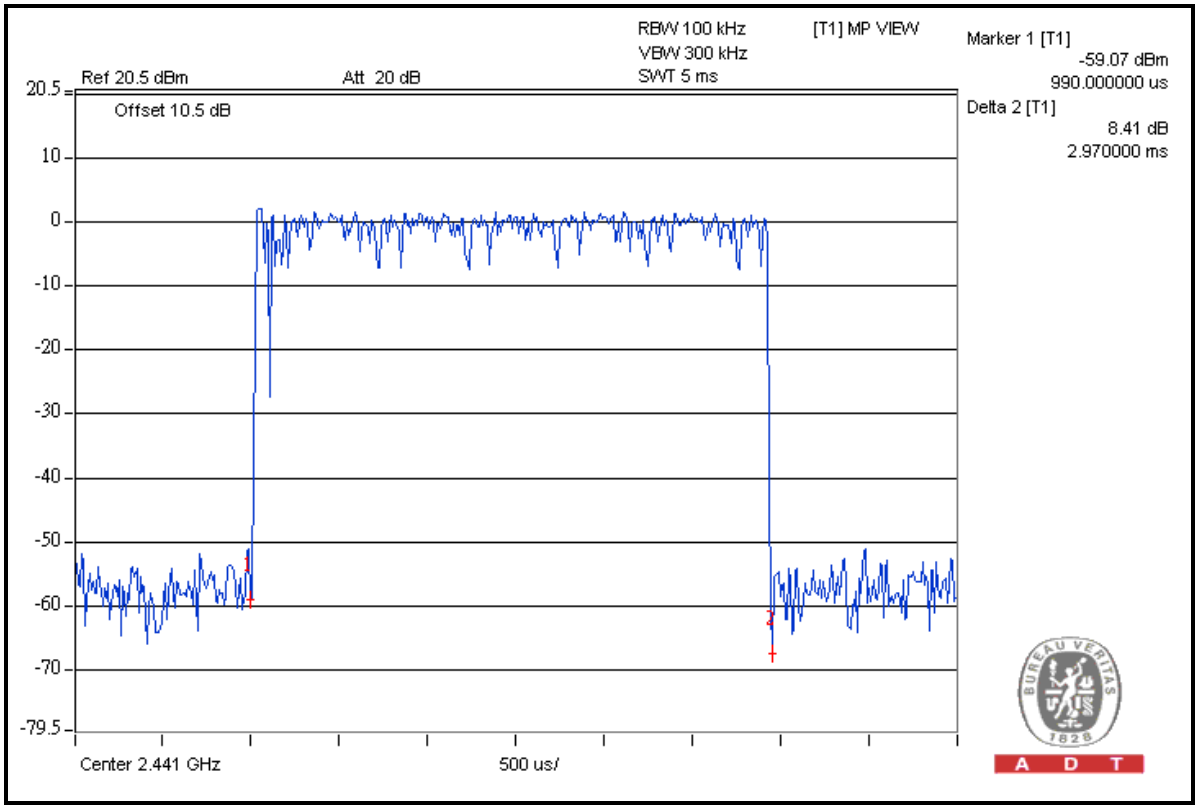
DH3


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
Marker 1 []
0.00 dBm
0.000000 ns
Ref 20.5 dBm
Att 20 dB
Offset 10.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
500 ms/


RBW 100 kHz
VBW 300 kHz
SWT 3 ms
[T1] MP VIEW
Marker 1 [T1]
-57.66 dBm
990.000000 us
Delta 2 [T1]
6.76 dB
1.692000 ms
Ref 20.5 dBm
Att 20 dB
Offset 10.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
300 us/

DH5


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
Marker 1 []
0.00 dBm
0.000000 ns
Ref 20.5 dBm
Att 20 dB
Offset 10.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
500 ms/

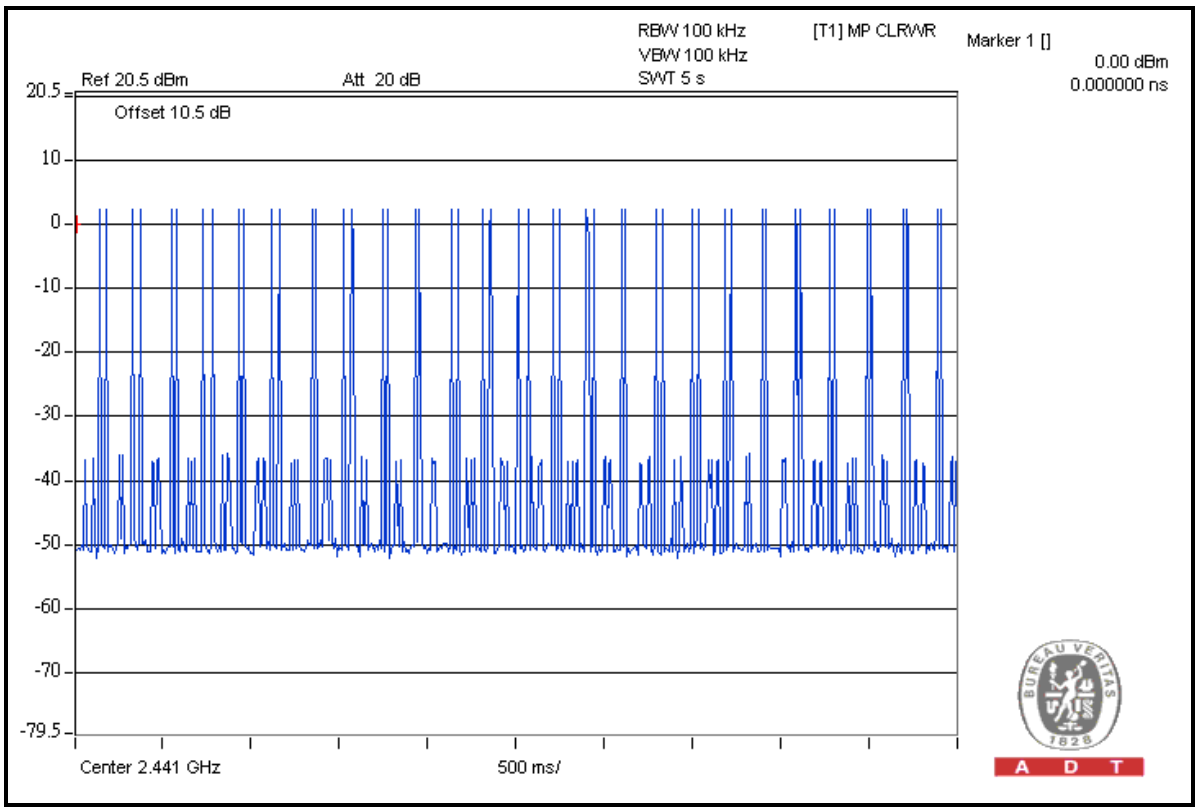

RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MP VIEW
Marker 1 [T1]
-59.07 dBm
990.000000 us
Delta 2 [T1]
8.41 dB
2.970000 ms
Ref 20.5 dBm
Att 20 dB
Offset 10.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
500 us/

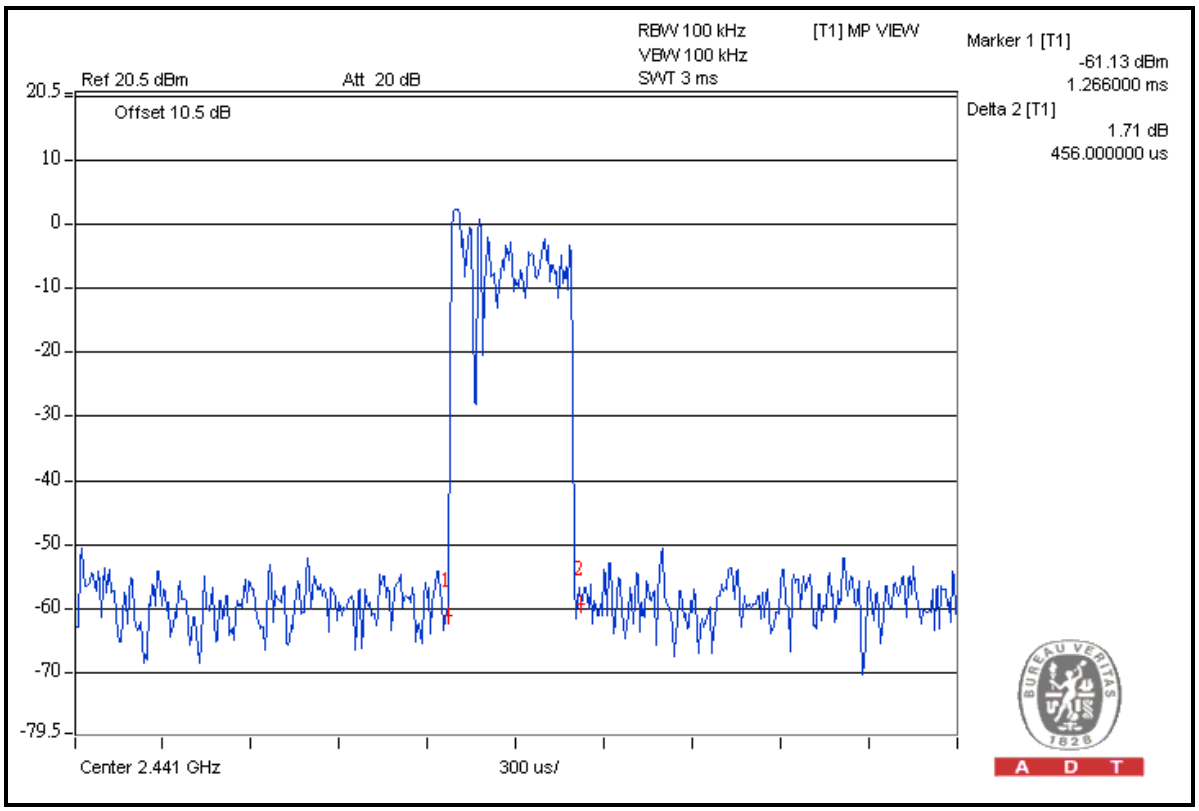
For 8DPSK :

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	50 (times / 5 sec) *6.32=316 times	0.456	144.1	400
DH3	25 (times / 5 sec) *6.32=158 times	1.692	267.34	400
DH5	18 (times / 5 sec) *6.32=113.76 times	3.02	343.56	400

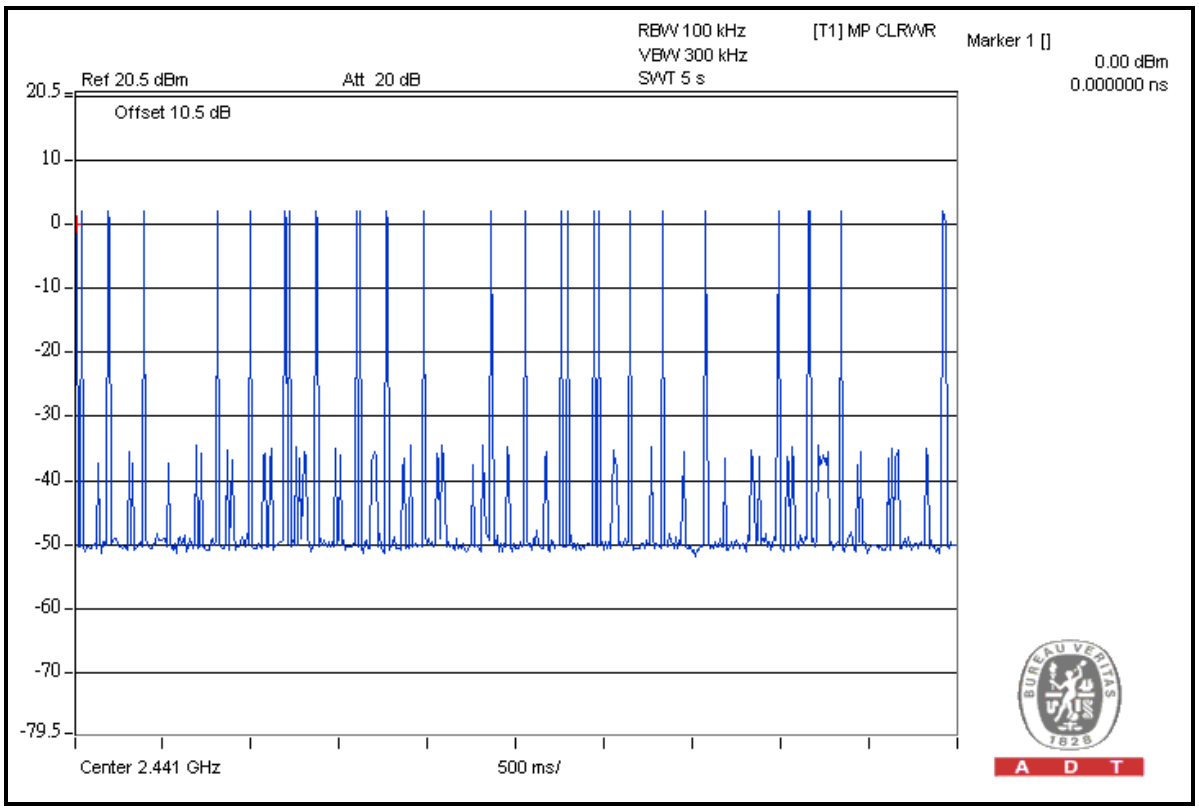
NOTE: Test plots of the transmitting time slot are shown on next 3 pages.

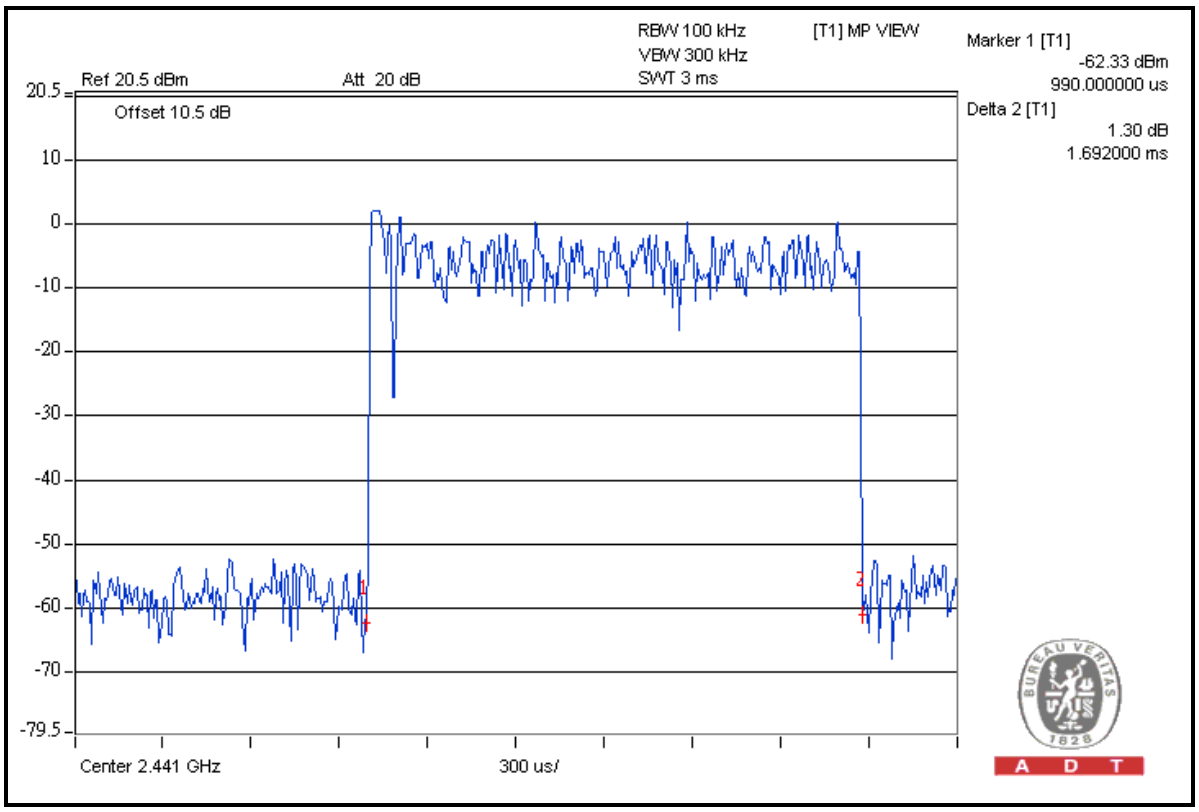
DH1


RBW 100 kHz
VBW 100 kHz
SWT 5 s
[T1] MP CLRWR
Marker 1 []
0.00 dBm
0.000000 ns
Ref 20.5 dBm
Att 20 dB
Offset 10.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
500 ms/

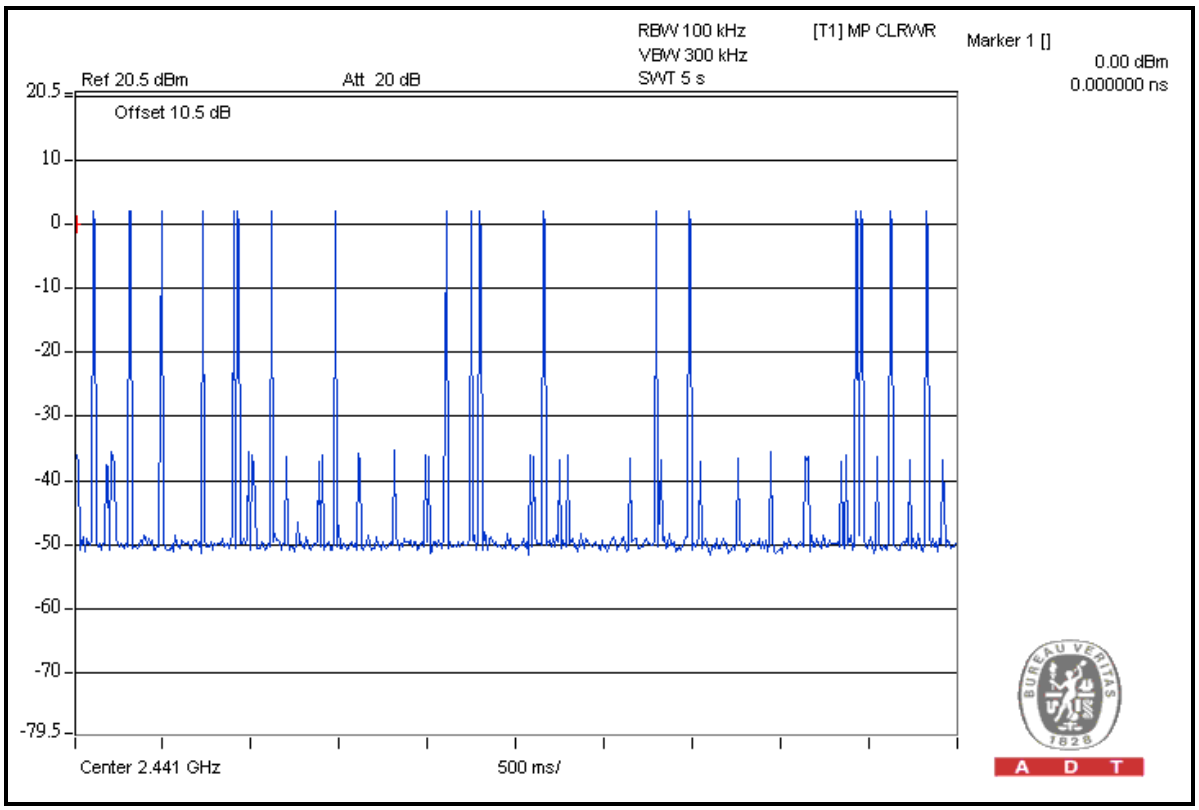

RBW 100 kHz
VBW 100 kHz
SWT 3 ms
[T1] MP VIEW
Marker 1 [T1]
-61.13 dBm
1.266000 ms
Delta 2 [T1]
1.71 dB
456.000000 us
Ref 20.5 dBm
Att 20 dB
Offset 10.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
300 us/

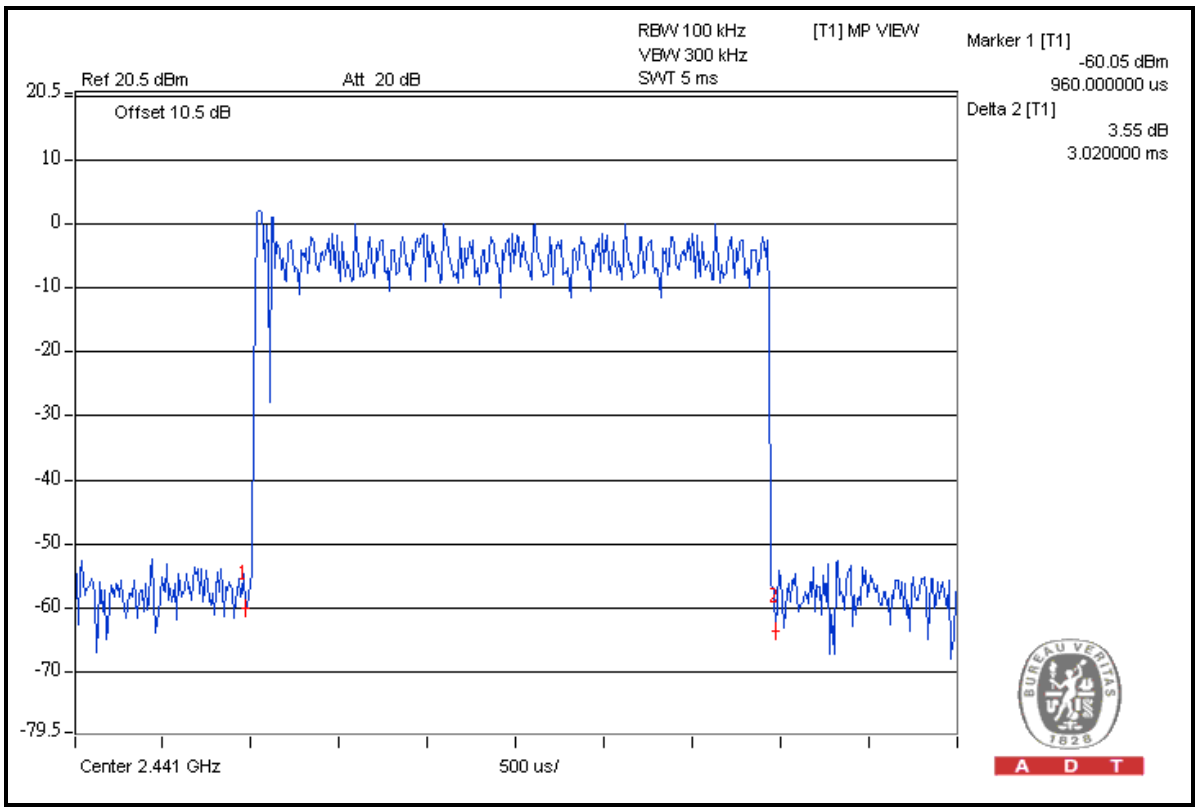
DH3


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
Marker 1 []
0.00 dBm
0.000000 ns
Ref 20.5 dBm
Att 20 dB
Offset 10.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
500 ms/


RBW 100 kHz
VBW 300 kHz
SWT 3 ms
[T1] MP VIEW
Marker 1 [T1]
-62.33 dBm
990.000000 us
Delta 2 [T1]
1.30 dB
1.692000 ms
Ref 20.5 dBm
Att 20 dB
Offset 10.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
300 us/

DH5


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
Marker 1 []
0.00 dBm
0.000000 ns
Ref 20.5 dBm
Att 20 dB
Offset 10.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
500 ms/


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MP VIEW
Marker 1 [T1]
-60.05 dBm
960.000000 us
Delta 2 [T1]
3.55 dB
3.020000 ms
Ref 20.5 dBm
Att 20 dB
Offset 10.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.441 GHz
500 us/

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 20dBbandwidth of hopping channel shell be a minimum limit for the hopping channel separation.

4.5.2 TEST INSTRUMENTS

Test date: Dec. 23, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP 40	100060	May 11, 2011	May 10, 2012

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

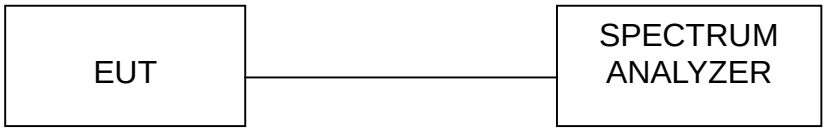
4.5.3 TEST PROCEDURE

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. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

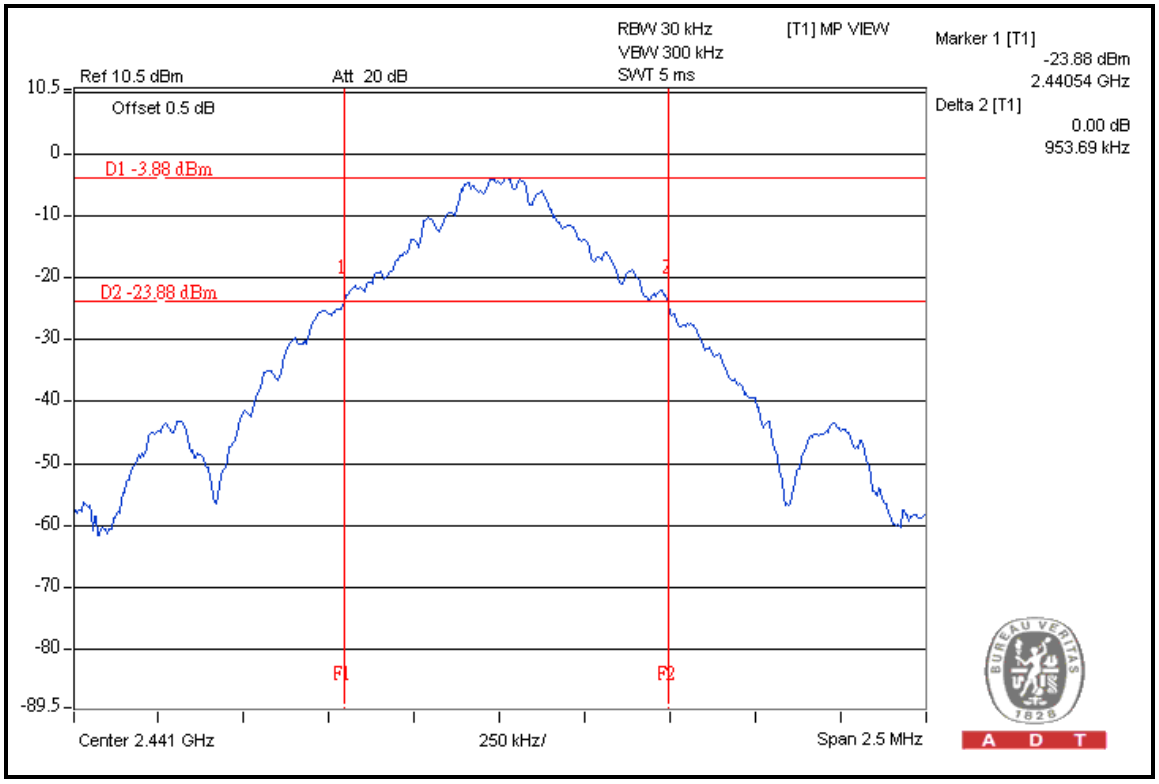
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.5.7 TEST RESULTS

For GFSK:

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
0	2402	0.94
39	2441	0.95
78	2480	0.94

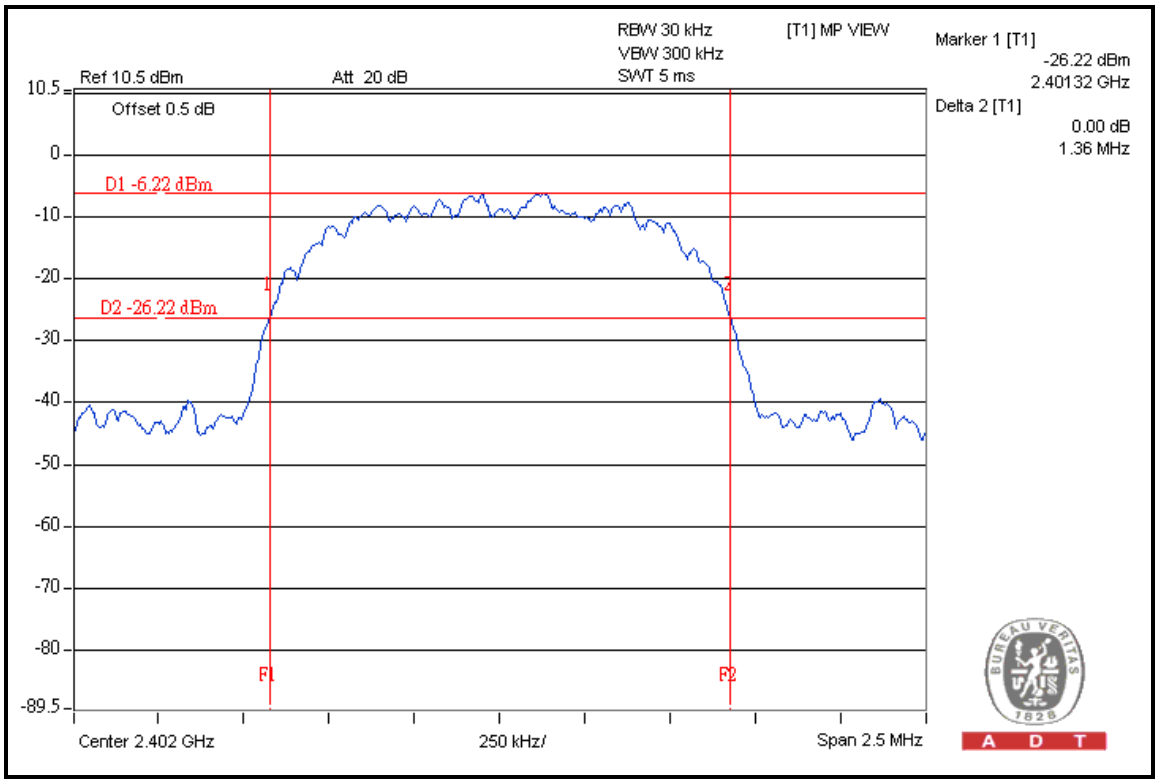
CH 39



For 8DPSK:

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
0	2402	1.36
39	2441	1.35
78	2480	1.35

CH 0



4.6 HOPPING CHANNEL SEPARATION

4.6.1 LIMIT OF HOPPING CHANNEL SEPARATION

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

4.6.2 TEST INSTRUMENTS

Test date: Dec. 23, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP 40	100060	May 11, 2011	May 10, 2012

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

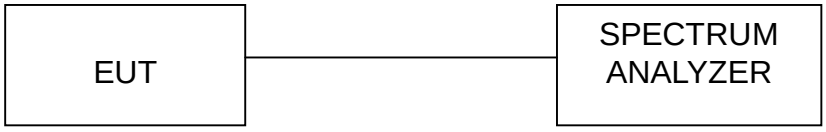
4.6.3 TEST PROCEDURES

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.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



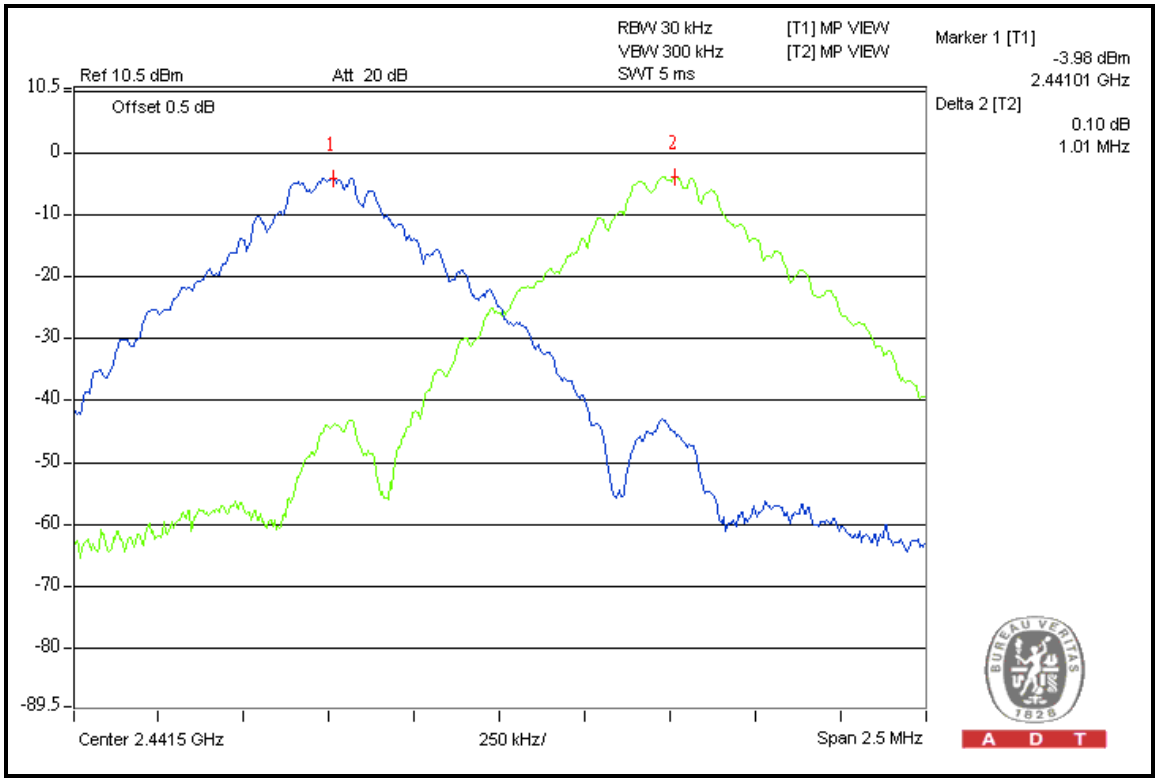
4.6.6 TEST RESULTS

For GFSK

Channel	Frequency (MHz)	Adjacent Channel Separation (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	1.00	0.63	PASS
39	2441	1.01	0.63	PASS
78	2480	1.00	0.63	PASS

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

CH 39

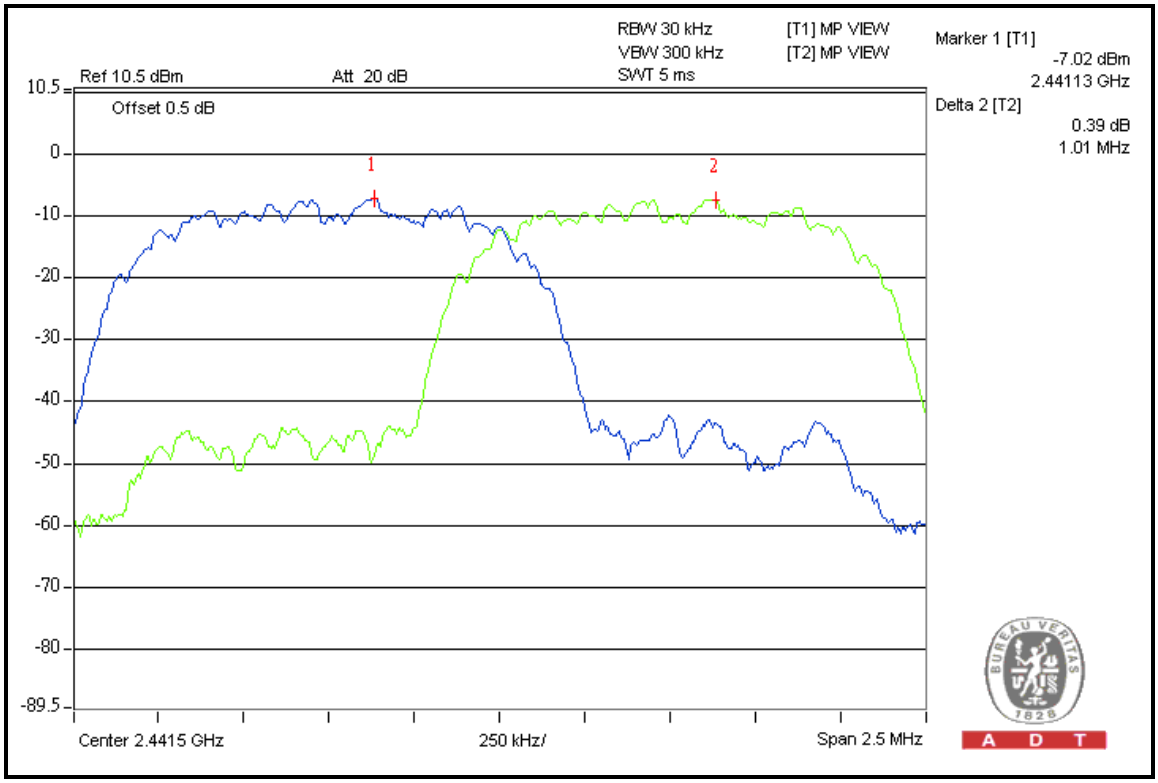


For 8DPSK

Channel	Frequency (MHz)	Adjacent Channel Separation (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	1.00	0.91	PASS
39	2441	1.01	0.9	PASS
78	2480	1.00	0.9	PASS

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

CH 39



4.7 MAXIMUM PEAK OUTPUT POWER

4.7.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Limit is 125mW.

4.7.2 INSTRUMENTS

Test date: Dec. 23, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP 40	100060	May 11, 2011	May 10, 2012

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

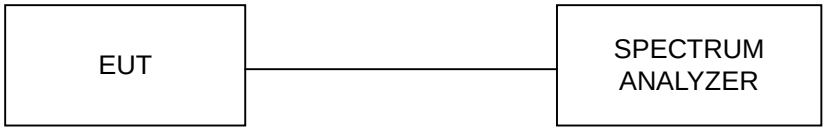
4.7.3 TEST PROCEDURES

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. Set a reference level on the measuring instrument equal to the highest peak value.
3. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3 MHz RBW and 10 MHz VBW.
4. Measure the captured power within the band and recording the plot.
5. Repeat above procedures until all frequencies measured were complete.

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 EUT OPERATING CONDITION

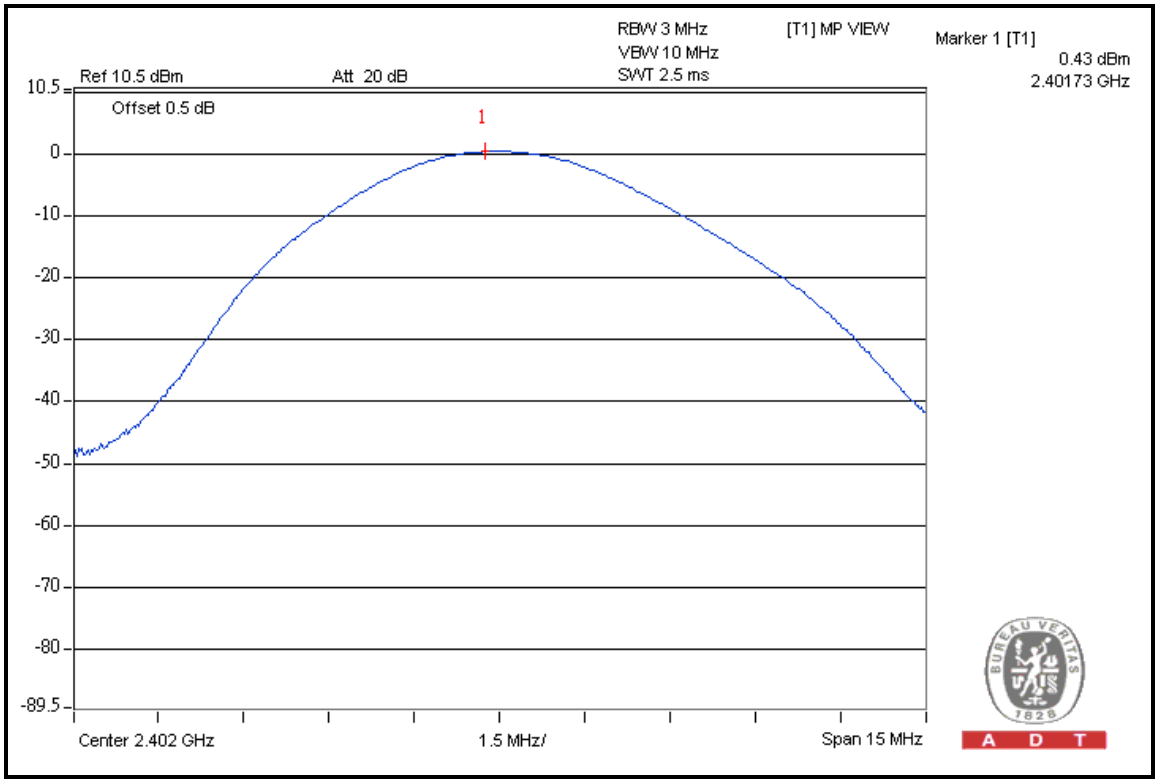
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.7.7 TEST RESULTS

GFSK

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER OUTPUT (dBm)	POWER OUTPUT (mW)	POWER LIMIT (mW)	PASS/FAIL
0	2402	0.4	1.096	125	PASS
39	2441	-0.8	0.832	125	PASS
78	2480	-1.6	0.692	125	PASS

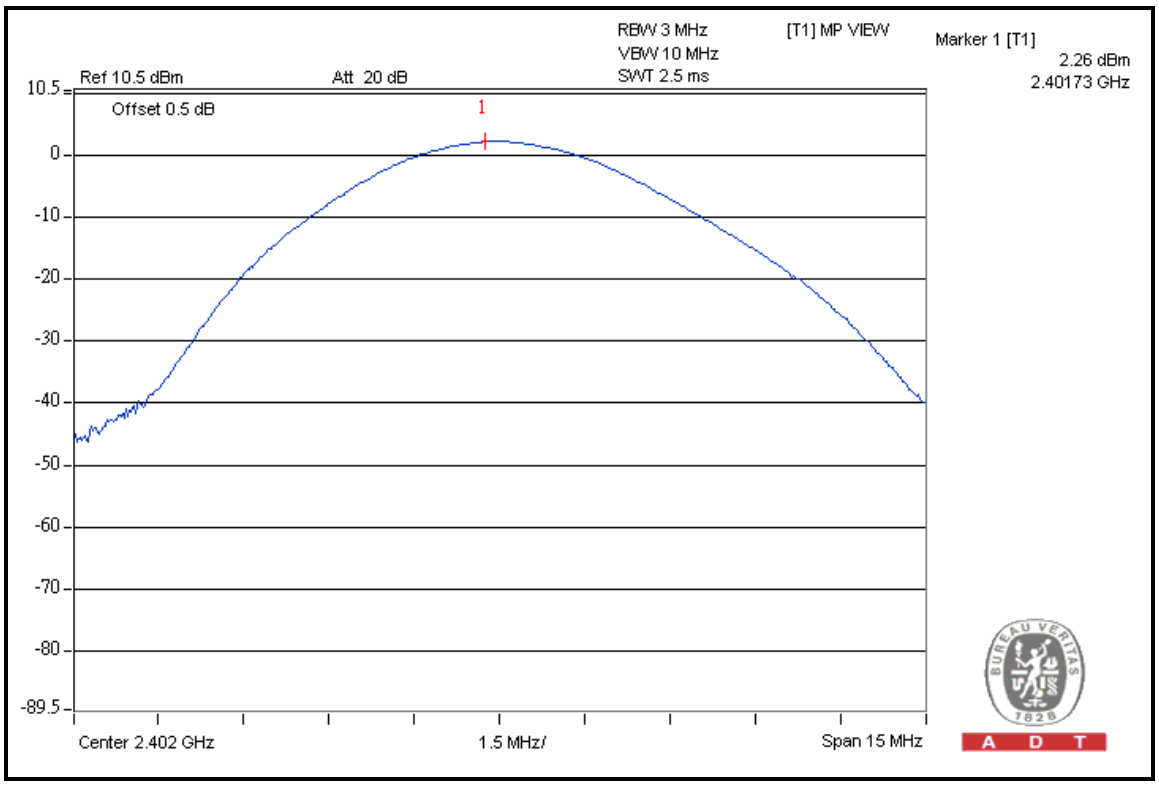
CH 0



For 8DPSK

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER OUTPUT (dBm)	POWER OUTPUT (mW)	POWER LIMIT (mW)	PASS/FAIL
0	2402	2.3	1.698	125	PASS
39	2441	1.6	1.445	125	PASS
78	2480	0.5	1.122	125	PASS

CH 0



4.8 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.8.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

4.8.2 TEST INSTRUMENTS

Test date: Dec. 23, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP 40	100060	May 11, 2011	May 10, 2012

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

4.8.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set RBW a of spectrum analyzer to 100 kHz and VBW of spectrum analyzer to 300 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

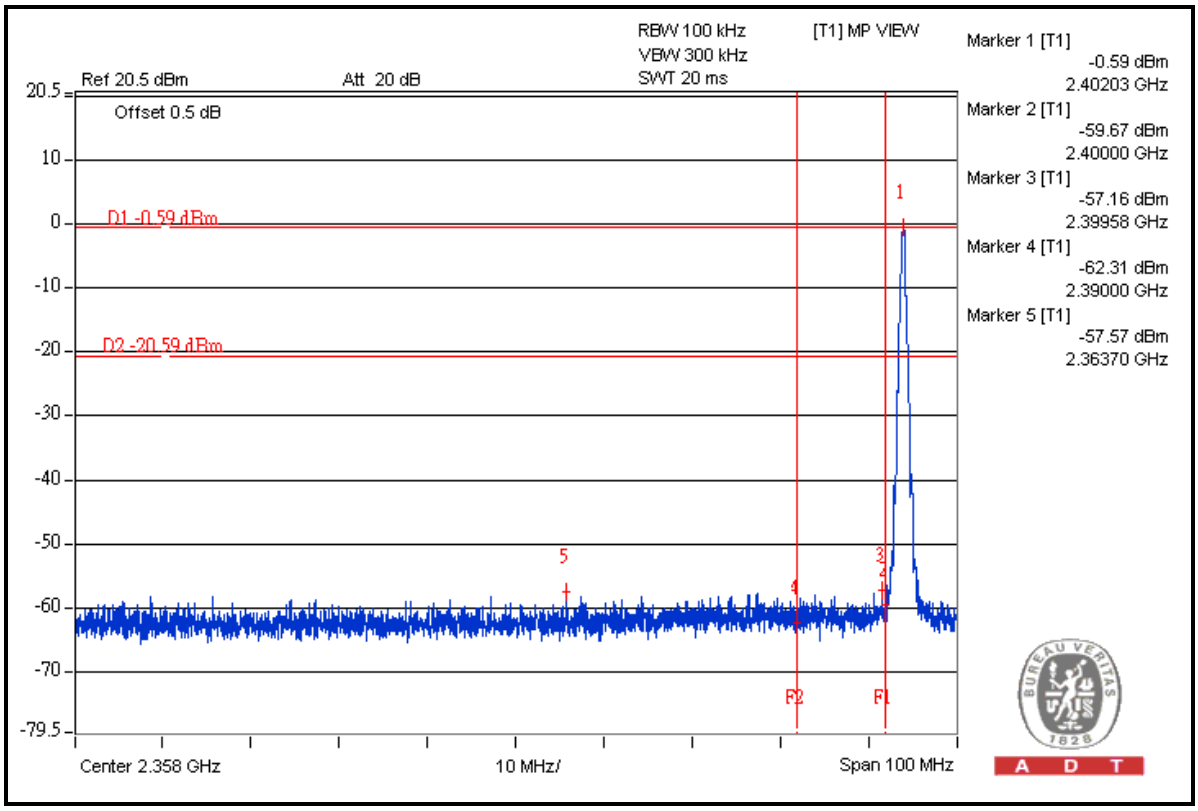
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

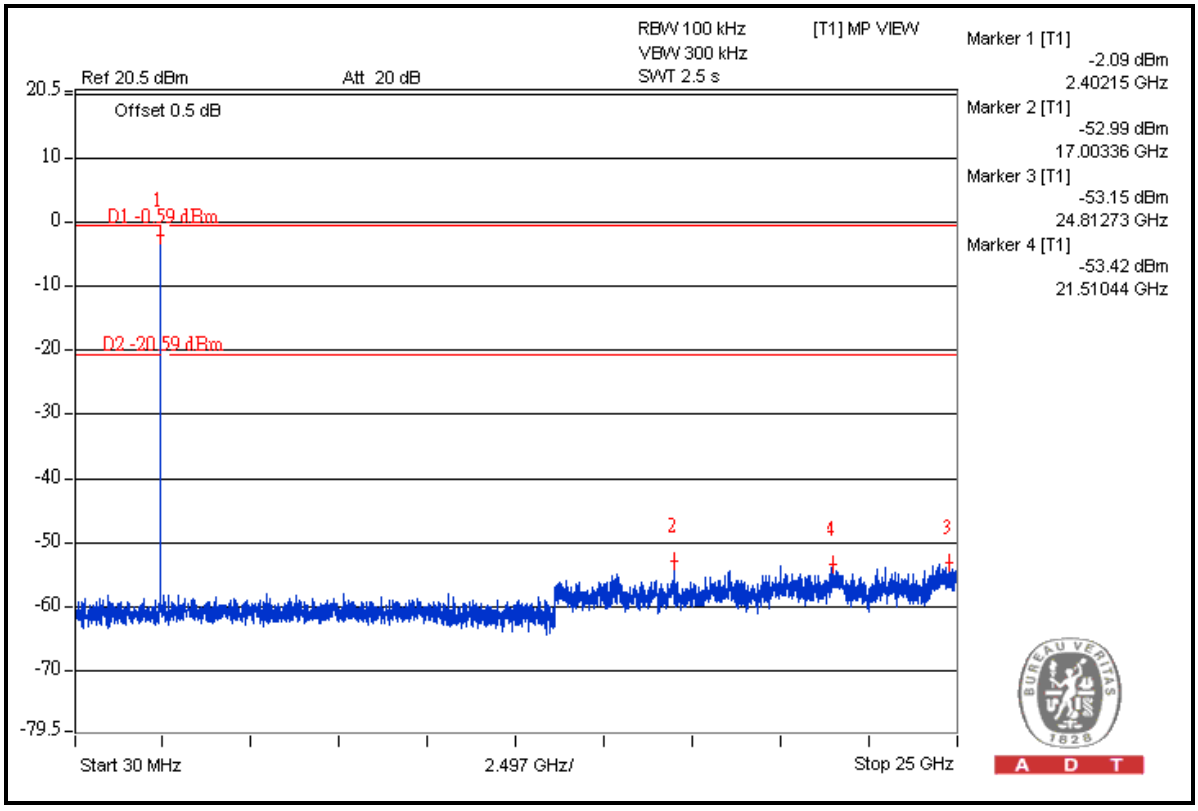
4.8.6 TEST RESULTS

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

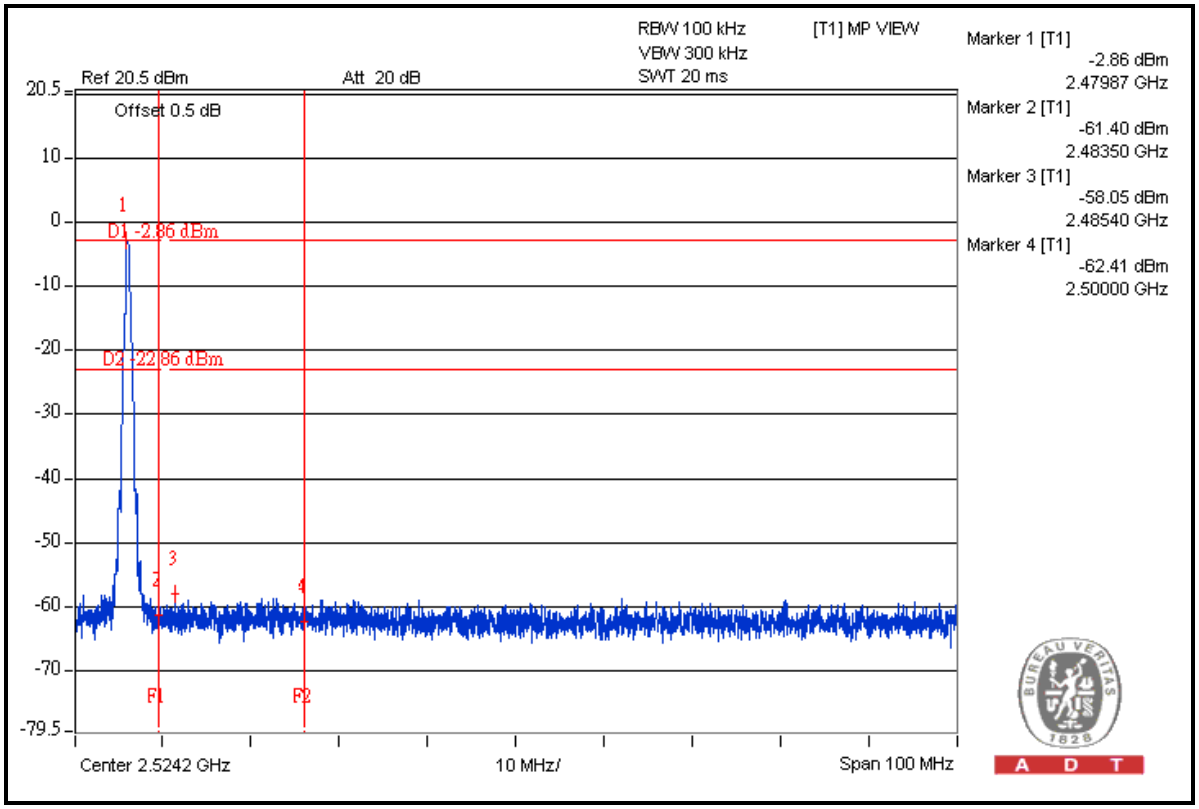
For GFSK Modulation Type:

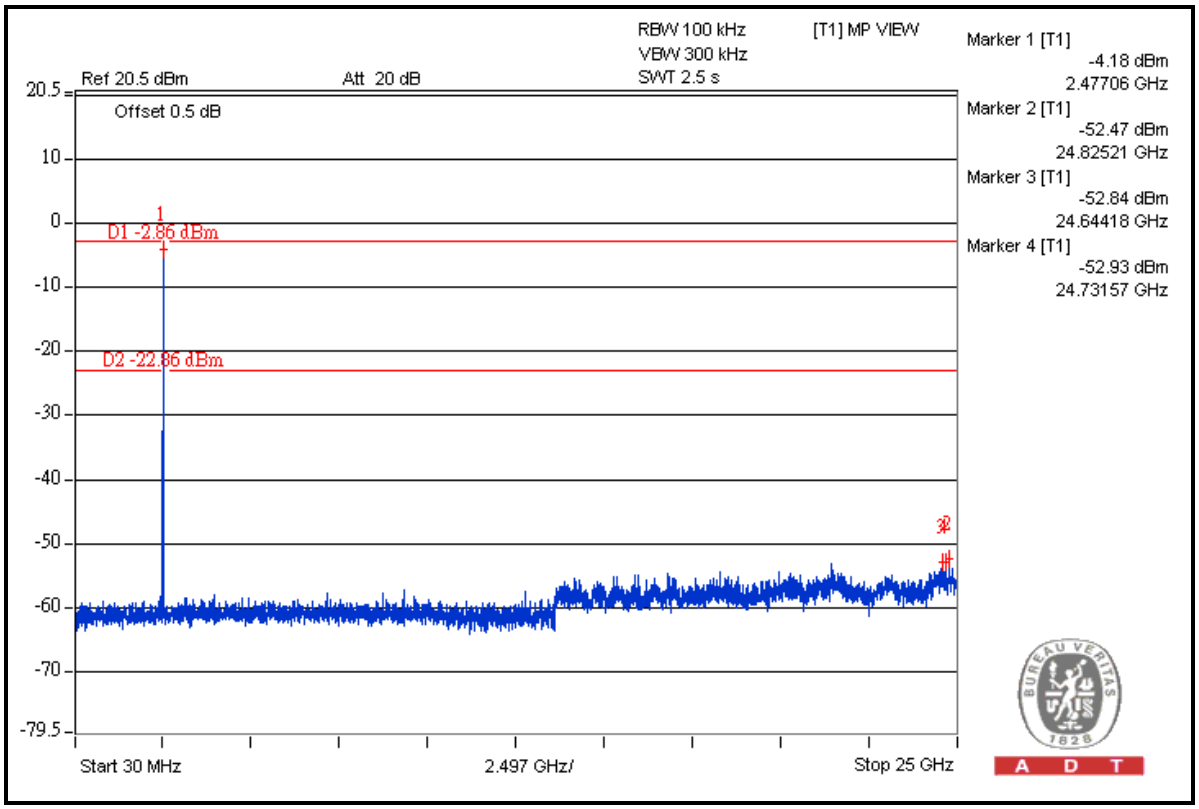
CH 0





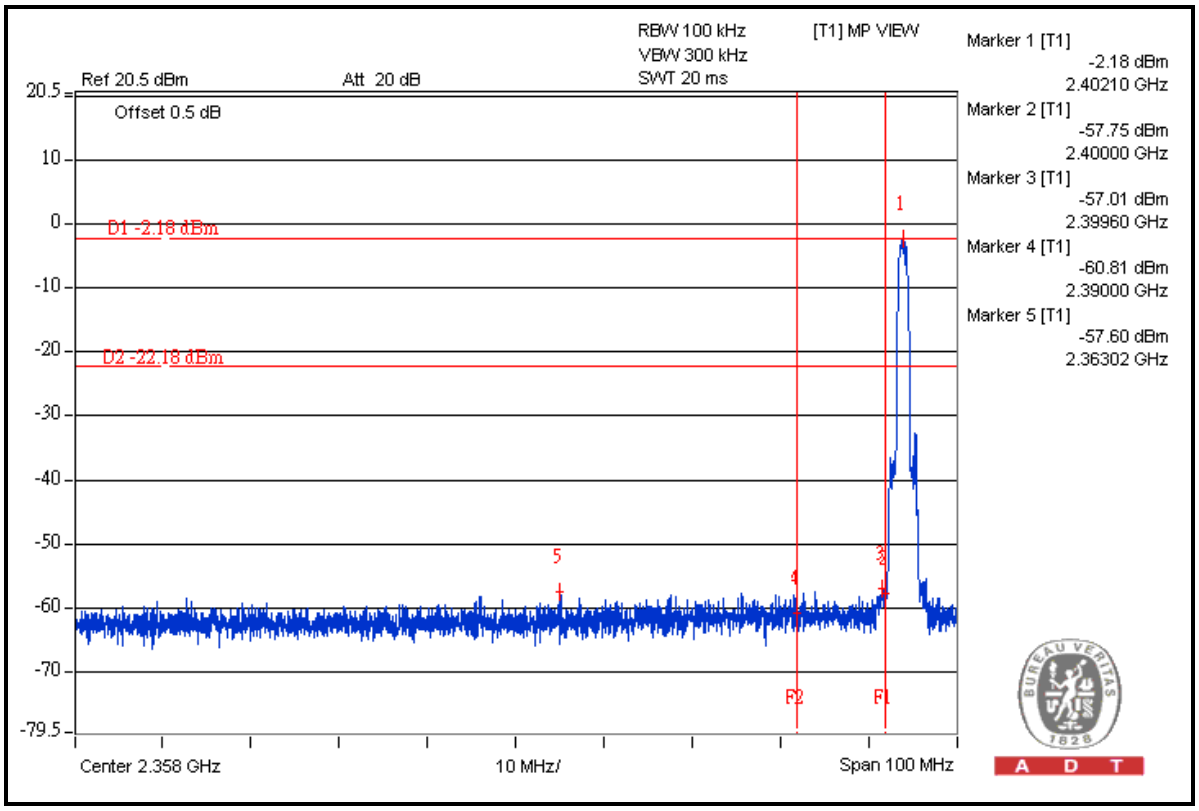
CH 78

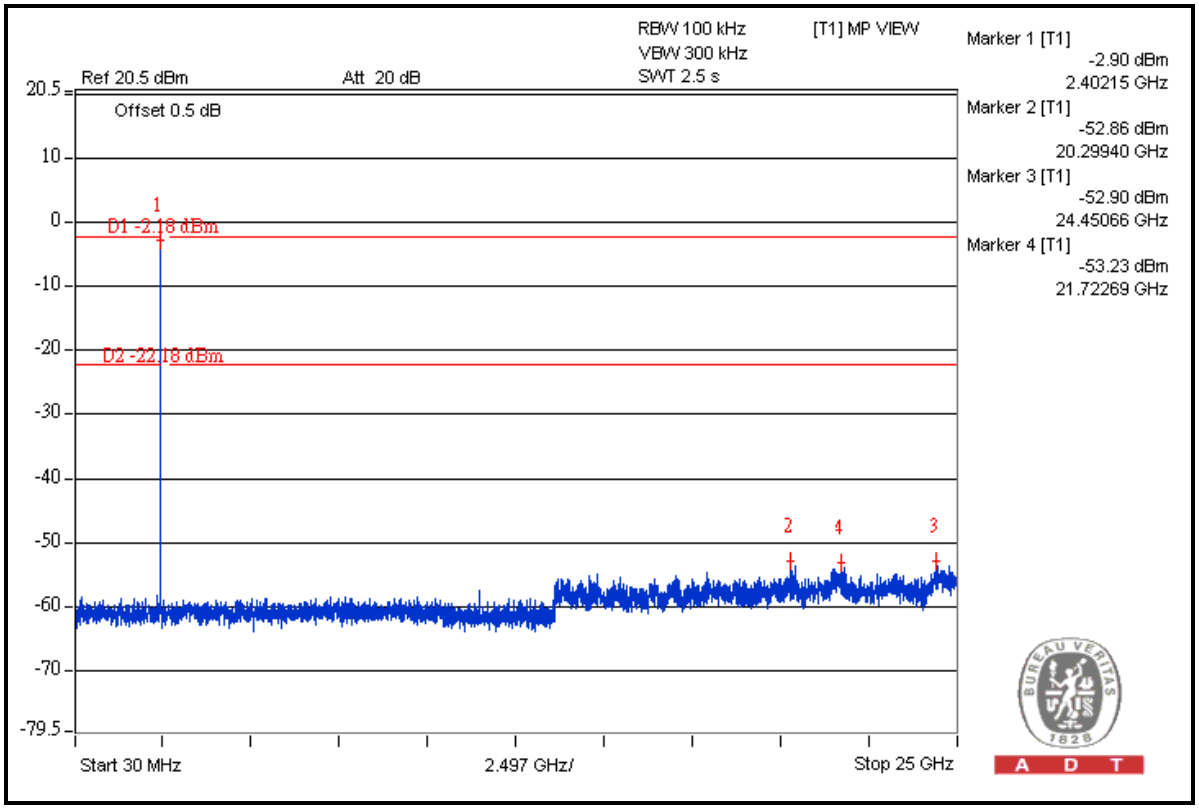

RBW 100 kHz
VBW 300 kHz
SWT 20 ms
[T1] MP VIEW
Ref 20.5 dBm
Att 20 dB
Offset 0.5 dB
D1 -2.86 dBm
D2 -22.86 dBm
Marker 1 [T1]
-2.86 dBm
2.47987 GHz
Marker 2 [T1]
-61.40 dBm
2.48350 GHz
Marker 3 [T1]
-58.05 dBm
2.48540 GHz
Marker 4 [T1]
-62.41 dBm
2.50000 GHz
Center 2.5242 GHz
10 MHz/
Span 100 MHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MP VIEW
Ref 20.5 dBm
Att 20 dB
Offset 0.5 dB
D1 -2.86 dBm
D2 -22.86 dBm
Marker 1 [T1]
-4.18 dBm
2.47706 GHz
Marker 2 [T1]
-52.47 dBm
24.82521 GHz
Marker 3 [T1]
-52.84 dBm
24.64418 GHz
Marker 4 [T1]
-52.93 dBm
24.73157 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

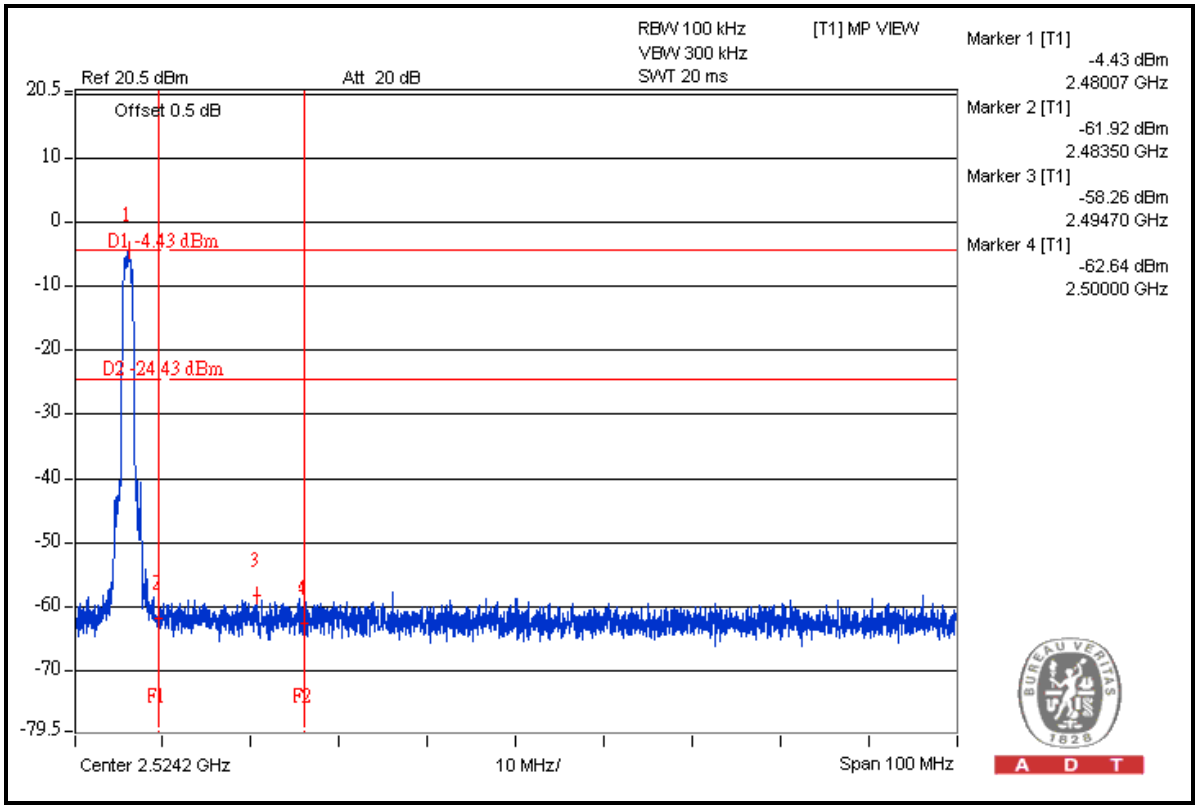
For 8DPSK Modulation Type:

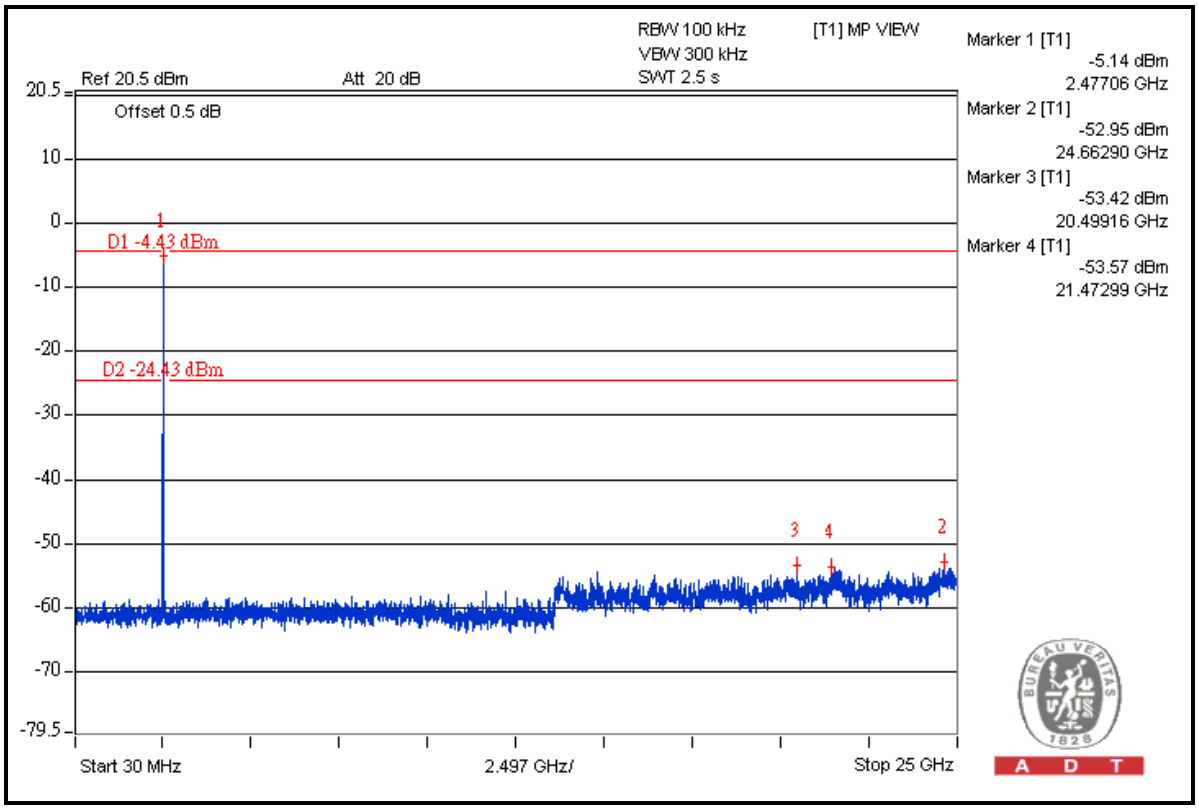
CH 0





CH 78


RBW 100 kHz
VBW 300 kHz
SWT 20 ms
[T1] MP VIEW
Ref 20.5 dBm
Att 20 dB
Offset 0.5 dB
D1 -4.43 dBm
D2 -24.43 dBm
F1
F2
Center 2.5242 GHz
10 MHz/
Span 100 MHz
Marker 1 [T1]
-4.43 dBm
2.48007 GHz
Marker 2 [T1]
-61.92 dBm
2.48350 GHz
Marker 3 [T1]
-58.26 dBm
2.49470 GHz
Marker 4 [T1]
-62.64 dBm
2.50000 GHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MP VIEW
Ref 20.5 dBm
Att 20 dB
Offset 0.5 dB
D1 -4.43 dBm
D2 -24.43 dBm
Start 30 MHz
2.497 GHz/
Stop 25 GHz
Marker 1 [T1]
-5.14 dBm
2.47706 GHz
Marker 2 [T1]
-52.95 dBm
24.66290 GHz
Marker 3 [T1]
-53.42 dBm
20.49916 GHz
Marker 4 [T1]
-53.57 dBm
21.47299 GHz

5 INFORMATION ON THE TESTING LABORATORIES

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

Copies of accreditation and authorization certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5.phtml.
If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:
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Fax: 886-3-5935342

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Email: service.adt@tw.bureauveritas.com
Web Site: www.adt.com.tw

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

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

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

--- END ---