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 FCC ID: V65E6920 Test Model: E6920 Received Date: Aug. 22, 2018 Test Date: Sep. 25, 2018 - Oct. 01, 2018 Issued Date: Oct. 19, 2018 Applicant: Kyocera Corporation c/o Kyocera International, Inc. Address: 8611 Balboa Avenue, San Diego, CA 92123 Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch (R.O.C) Test Location (1): No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C) Test Location (2): No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan, R.O.C. FCC Registration / 427177 / TW0011 		FCC Test Report
Test Model:E6920Received Date:Aug. 22, 2018Test Date:Sep. 25, 2018 - Oct. 01, 2018Issued Date:Oct. 19, 2018Applicant:Kyocera Corporation c/o Kyocera International, Inc.Address:8611 Balboa Avenue, San Diego, CA 92123Issued By:Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan BranchLab Address:No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)Test Location (1):No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 3338, Taiwan, R.O.C.FCC Registration / Designation Number:427177 / TW0011	Report No.:	RF180822C04
Received Date:Aug. 22, 2018Test Date:Sep. 25, 2018 ~ Oct. 01, 2018Issued Date:Oct. 19, 2018Applicant:Kyocera Corporation c/o Kyocera International, Inc.Address:8611 Balboa Avenue, San Diego, CA 92123Issued By:Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan BranchLab Address:No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)Test Location (1):No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan, R.O.C.Test Location (2):No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan, R.O.CFCC Registration / Designation Number:427177 / TW0011	FCC ID:	V65E6920
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R.O.C FCC Registration / Designation Number: 427177 / TW0011	Test Location (1):	
427177/TW0011 Designation Number:	Test Location (2):	
Designation Number:	FCC Registration /	427177 / TW0011
	Designation Number:	
		TAF
		Iac-MRA
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port are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical pr	ntion, the uncertainty of measuremen	the of the completeness of this report, the tests conducted and the correctness of the report contents. Unless speci t has been explicitly taken into account to declare the compliance or non-compliance to the specification. The rep roduct certification, approval, or endorsement by TAF or any government agencies.



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Release Control Record Issue No. Description Date Issued Original Release Oct. 19, 2018 RF180822C04



Certificate of Conformity 1

Product:	Smart Phone
Brand:	Kyocera
Test Model:	E6920
Sample Status:	Identical Prototype
Applicant:	Kyocera Corporation c/o Kyocera International, Inc.
Test Date:	Sep. 25, 2018 ~ Oct. 01, 2018
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247)
	ANSI C63.10:2013

The above equipment 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 RF characteristics under the conditions specified in this report.

Prepared by :

Gina Liu / Specialist

Date:

Grina Lin, Date: Oct. 19, 2018

Oct. <u>19, 2018</u>

ho C 100

Approved by :

Dylan Chiou / Project Engineer



2 Summary of Test Results

	47 CFR FCC Part 15, Subpart C (Section 15.247)							
FCC Clause	Test Item	Result	Remarks					
15.207	15.207 AC Power Conducted Emission		Meet the requirement of limit. Minimum passing margin is -15.29 dB at 18.01088 MHz.					
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)	 Hopping Channel Separation 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.					
	Occupied Bandwidth Measurement	Pass	Reference only					
15.205 & 209	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -12.99 dB at 2489.76 MHz.					
15.247(d)	15.247(d) Band Edge Measurement		Meet the requirement of limit.					
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.					
15.203	Antenna Requirement	Pass	No antenna connector is used.					

Note: If The Frequency Hopping System operating in 2400-2483.5 MHz band and the output power less than 125 mW. The hopping channel carrier frequencies separated by a minimum of 25 kHz or two-thirds of the 20 dB 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	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.0153 dB
Radiated Emissions up to 1 GHz	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Modification Record

There were no modifications required for compliance.



3 General Information

3.1 General Description of EUT

Product	Smart Phone
Brand	Kyocera
Test Model	E6920
Status of EUT	Identical Prototype
	3.8 Vdc (Battery)
Power Supply Rating	5 Vdc or 9 Vdc or 12 Vdc (Adapter)
	5 Vdc (Host equipment)
Modulation Type	GFSK, π/4-DQPSK, 8DPSK
Transfer Rate	1/2/3 Mbps
Operating Frequency	2402 ~ 2480 MHz
Number of Channel	79
Output Power	9.099 mW
Antenna Type	Fixed Internal antenna with -1.0 dBi gain
Antenna Connector N/A	
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

1. The EUT's accessories list refers to Ext. Pho.

2. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or User's Manual.



3.2 Description of Test Modes

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		



3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure		Applic	able To		Description
Mode	RE≥1G	RE<1G	PLC	APCM	Description
-	\checkmark	\checkmark	\checkmark	\checkmark	-
					adiated Emission below 1 GHz tenna Port Conducted Measurement

Note:

1. For Radiated emission test, pre-tested GFSK, π /4-DQPSK, 8DPSK modulation type and found 8DPSK was the worse, therefore chosen for the below 1 GHz 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 Z-plane.

3. "-" means no effect.

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.

EUT Configure Mode	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	3DH5

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.

EUT Configure Mode	e Available Channel Tested Channel		Modulation Technology	Modulation Type	Packet Type
-	0 to 78	39	FHSS	8DPSK	3DH5

Power Line Conducted Emission Test:

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

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
-	0 to 78	39	FHSS	8DPSK	3DH5



Antenna Port Conducted Measurement:

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

EUT Configure Mode	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	3DH5

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by		
RE≥1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Harry Hsueh		
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Harry Hsueh		
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Jisyong Wang		
APCM	25 deg. C, 65 % RH	3.8 Vdc	Wayne Lin		



3.3 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.

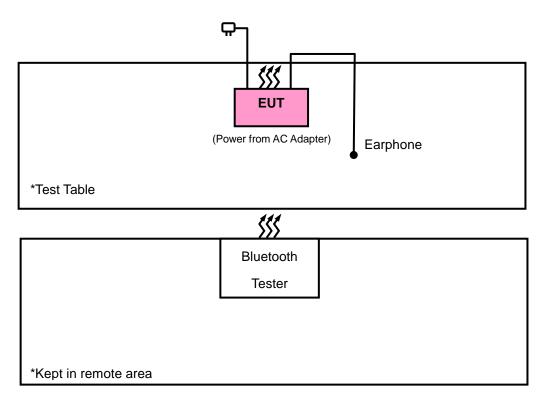
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Earphone	Funkey	FK130102	N/A	N/A

No.	Signal Cable Description Of The Above Support Units
1.	N/A

Note:

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

3.3.1 Configuration of System under Test





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) KDB 558074 D01 15.247 Meas Guidance v05 ANSI C63.10-2013

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



4 Test Types and Results

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 20 dB 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:

- a. The lower limit shall apply at the transition frequencies.
- b. Emission level (dBuV/m) = 20 log Emission level (uV/m).
- c. For frequencies above 1000 MHz, 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 20 dB 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 Agilent Technologies	N9038A	MY52260177	Aug. 20, 2018	Aug. 19, 2019	
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Jan. 11, 2018	Jan. 10, 2019	
HORN Antenna ETS-Lindgren	3117	00143293	Dec. 13, 2017	Dec. 12, 2018	
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Dec. 14, 2017	Dec. 13, 2018	
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 01, 2017	Nov. 30, 2018	
Fixed Attenuator Woken	00801A1GGAM02Y	NA	May 17, 2018	May 16, 2019	
Bluetooth Tester	СВТ	100980	Jun. 28, 2017	Jun. 27, 2019	
Loop Antenna	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019	
Preamplifier Agilent	310N	187226	Jun. 19, 2018	Jun. 18, 2019	
Preamplifier Agilent	83017A	MY39501357	Jun. 19, 2018	Jun. 18, 2019	
Power Meter Anritsu	ML2495A	1012010	Sep. 05, 2018	Sep. 04, 2019	
Power Sensor Anritsu	MA2411B	1315050	Sep. 04, 2018	Sep. 03, 2019	
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC -SMS-100-SMS-12 0+RFC-SMS-100-S MS-400)	Jun. 19, 2018	Jun. 18, 2019	
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC -SMS-100-SMS-24)	Jun. 19, 2018	Jun. 18, 2019	
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA	
Software BV ADT	E3 8.130425b	NA	NA	NA	
Antenna Tower MF	NA	NA	NA	NA	
Turn Table MF	NA	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 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.

- 2. The test was performed in HsinTien Chamber 1.
- 3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.
- 4. The IC Site Registration No. is IC7450I-1.



4.1.3 Test Procedures

For Radiated Emission below 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter 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. Both Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case 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.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. 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 and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz. (RBW = 1 MHz, VBW = 3 kHz)
- 4. All modes of operation were investigated and the worst-case emissions are reported.

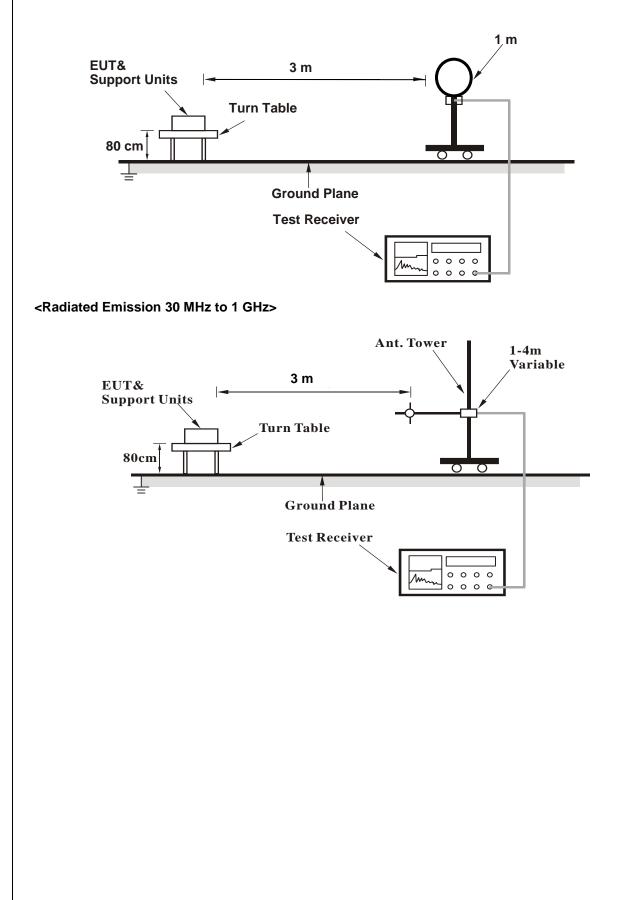
4.1.4 Deviation from Test Standard

No deviation.

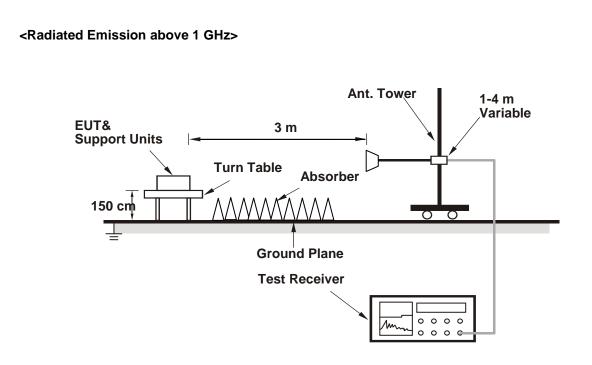


4.1.5 Test Set Up

<Radiated Emission below 30 MHz>







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

4.1.6 EUT Operating Conditions

Set the EUT under transmission condition continuously at specific channel frequency.



4.1.7 Test Results

Above 1 GHz Data:

GFSK

EUT Test Condition		Measurement Detail			
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz		
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)		
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Harry Hsueh		

	Antenna Polarity & Test Distance: Horizontal at 3 m									
Frequency (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
2388.66	40.42	38.71	54	-13.58	31.8	5.4	35.49	178	254	Average
2388.66	51.41	49.7	74	-22.59	31.8	5.4	35.49	178	254	Peak
2402	99.72	97.99			31.8	5.4	35.47	178	254	Average
2402	101.22	99.49			31.8	5.4	35.47	178	254	Peak
4804	36.61	28.52	54	-17.39	33.96	8.25	34.12	122	156	Average
4804	46.12	38.03	74	-27.88	33.96	8.25	34.12	122	156	Peak
		A	Antenna P	olarity &	Test Dista	ance: Vert	ical at 3 r	n		
Frequency (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
2389.29	40.31	38.6	54	-13.69	31.8	5.4	35.49	121	242	Average
2389.29	51.7	49.99	74	-22.3	31.8	5.4	35.49	121	242	Peak
2402	96.19	94.46			31.8	5.4	35.47	121	242	Average
2402	98.56	96.83			31.8	5.4	35.47	121	242	Peak
4804	36.33	28.24	54	-17.67	33.96	8.25	34.12	169	178	Average
4804	46.14	38.05	74	-27.86	33.96	8.25	34.12	169	178	Peak

Remarks:

 Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor Margin value = Emission level – Limit value

2. 2402 MHz: Fundamental frequency.



EUT Test Condition		Measurement Detail		
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz	
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)	
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Harry Hsueh	

	Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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	
2372.01	40.34	38.68	54	-13.66	31.78	5.37	35.49	121	242	Average	
2372.01	51.65	49.99	74	-22.35	31.78	5.37	35.49	121	242	Peak	
2441	96.88	95.01			31.85	5.46	35.44	121	242	Average	
2441	98.75	96.88			31.85	5.46	35.44	121	242	Peak	
2497.92	40.91	38.89	54	-13.09	31.9	5.53	35.41	121	242	Average	
2497.92	52.53	50.51	74	-21.47	31.9	5.53	35.41	121	242	Peak	
4882	38.14	29.95	54	-15.86	33.98	8.27	34.06	133	169	Average	
4882	47.01	38.82	74	-26.99	33.98	8.27	34.06	133	169	Peak	
		Δ	ntenna P	olarity &	Test Dista	ance: Vert	ical at 3 r	n			

Frequency (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
2382.81	40.41	38.72	54	-13.59	31.78	5.4	35.49	178	254	Average
2382.81	51.39	49.7	74	-22.61	31.78	5.4	35.49	178	254	Peak
2441	101.55	99.68			31.85	5.46	35.44	178	254	Average
2441	102.46	100.59			31.85	5.46	35.44	178	254	Peak
2488.92	40.95	38.94	54	-13.05	31.9	5.53	35.42	178	254	Average
2488.92	52.12	50.11	74	-21.88	31.9	5.53	35.42	178	254	Peak
4882	38.09	29.9	54	-15.91	33.98	8.27	34.06	104	174	Average
4882	47.26	39.07	74	-26.74	33.98	8.27	34.06	104	174	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor Margin value = Emission level – Limit value

2. 2441 MHz: Fundamental frequency.



EUT Test Condition		Measurement Detail			
Channel	Channel 78	Frequency Range	1 GHz ~ 25 GHz		
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)		
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Harry Hsueh		

		An	tenna Po	larity & T	est Distar	nce: Horiz	ontal at 3	m		
Frequency (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
2480	99.91	97.95			31.88	5.5	35.42	178	254	Average
2480	102.37	100.41			31.88	5.5	35.42	178	254	Peak
2483.68	40.95	38.99	54	-13.05	31.88	5.5	35.42	178	254	Average
2483.68	52.02	50.06	74	-21.98	31.88	5.5	35.42	178	254	Peak
4960	37.27	29	54	-16.73	33.99	8.29	34.01	122	168	Average
4960	46.62	38.35	74	-27.38	33.99	8.29	34.01	122	168	Peak
		A	Intenna P	olarity &	Test Dista	ance: Vert	tical at 3 r	n		
Frequency (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
2480	95.85	93.89			31.88	5.5	35.42	121	242	Average
2480	97.23	95.27			31.88	5.5	35.42	121	242	Peak
2483.96	40.88	38.92	54	-13.12	31.88	5.5	35.42	121	242	Average
2483.96	52.23	50.27	74	-21.77	31.88	5.5	35.42	121	242	Peak
4960	38.14	29.87	54	-15.86	33.99	8.29	34.01	104	185	Average
4960	46.79	38.52	74	-27.21	33.99	8.29	34.01	104	185	Peak

Remarks:

 Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor Margin value = Emission level – Limit value

2. 2480 MHz: Fundamental frequency.



8DPSK

EUT Test Condition		Measurement Detail							
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz						
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)						
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Harry Hsueh						

		An	tenna Po	larity & T	est Distar	nce: Horiz	ontal at 3	m		
Frequency (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
2402	97.72	95.99			31.8	5.4	35.47	178	254	Average
2402	101.91	100.18			31.8	5.4	35.47	178	254	Peak
2496.84	40.89	38.87	54	-13.11	31.9	5.53	35.41	178	254	Average
2496.84	52	49.98	74	-22	31.9	5.53	35.41	178	254	Peak
4804	36.88	28.79	54	-17.12	33.96	8.25	34.12	155	147	Average
4804	46.58	38.49	74	-27.42	33.96	8.25	34.12	155	147	Peak
		A	Antenna P	olarity &	Test Dista	ance: Vert	tical at 3 i	n		
Frequency (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
2402	93.55	91.82			31.8	5.4	35.47	121	242	Average
2402	97.15	95.42			31.8	5.4	35.47	121	242	Peak
2487.2	40.89	38.9	54	-13.11	31.88	5.53	35.42	121	242	Average
2487.2	52.14	50.15	74	-21.86	31.88	5.53	35.42	121	242	Peak
4804	37.88	29.79	54	-16.12	33.96	8.25	34.12	143	162	Average
4804	46.8	38.71	74	-27.2	33.96	8.25	34.12	143	162	Peak

Remarks:

 Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor Margin value = Emission level – Limit value

2. 2402 MHz: Fundamental frequency.



EUT Test Condition		Measurement Detail			
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz		
Input Power	120 Vac, 60 Hz		Peak (PK) Average (AV)		
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Harry Hsueh		

		An	tenna Po	larity & T	est Distar	nce: Horiz	ontal at 3	m		
Frequency (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
2380.56	40.43	38.74	54	-13.57	31.78	5.4	35.49	121	242	Average
2380.56	51.62	49.93	74	-22.38	31.78	5.4	35.49	121	242	Peak
2441	94.94	93.07			31.85	5.46	35.44	121	242	Average
2441	98.39	96.52			31.85	5.46	35.44	121	242	Peak
2489.76	41.01	39	54	-12.99	31.9	5.53	35.42	121	242	Average
2489.76	51.78	49.77	74	-22.22	31.9	5.53	35.42	121	242	Peak
4882	38.08	29.89	54	-15.92	33.98	8.27	34.06	103	214	Average
4882	47.87	39.68	74	-26.13	33.98	8.27	34.06	103	214	Peak
		A	ntenna P	olarity &	Test Dista	ance: Vert	ical at 3 r	n		

Frequency (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
2389.74	40.43	38.72	54	-13.57	31.8	5.4	35.49	178	254	Average
2389.74	51.98	50.27	74	-22.02	31.8	5.4	35.49	178	254	Peak
2441	98.54	96.67			31.85	5.46	35.44	178	254	Average
2441	102.74	100.87			31.85	5.46	35.44	178	254	Peak
2496.16	40.86	38.84	54	-13.14	31.9	5.53	35.41	178	254	Average
2496.16	53.16	51.14	74	-20.84	31.9	5.53	35.41	178	254	Peak
4882	38.08	29.89	54	-15.92	33.98	8.27	34.06	146	195	Average
4882	47.92	39.73	74	-26.08	33.98	8.27	34.06	146	195	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor Margin value = Emission level – Limit value

2. 2441 MHz: Fundamental frequency.



EUT Test Condition		Measurement Detail			
Channel	Channel 78	Frequency Range	1 GHz ~ 25 GHz		
Input Power	120 Vac, 60 Hz		Peak (PK) Average (AV)		
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Harry Hsueh		

		An	tenna Po	larity & T	est Distar	nce: Horiz	ontal at 3	m		Antenna Polarity & Test Distance: Horizontal at 3 m									
Frequency (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									
2384.7	40.33	38.64	54	-13.67	31.78	5.4	35.49	178	254	Average									
2384.7	51.92	50.23	74	-22.08	31.78	5.4	35.49	178	254	Peak									
2480	98.26	96.3			31.88	5.5	35.42	178	254	Average									
2480	102.68	100.72			31.88	5.5	35.42	178	254	Peak									
4960	38.15	29.88	54	-15.85	33.99	8.29	34.01	169	184	Average									
4960	47.59	39.32	74	-26.41	33.99	8.29	34.01	169	184	Peak									
		A	Intenna P	olarity &	Test Dista	ance: Vert	ical at 3 r	n											
Frequency (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									
2374.98	40.26	38.6	54	-13.74	31.78	5.37	35.49	121	242	Average									
2374.98	51.85	50.19	74	-22.15	31.78	5.37	35.49	121	242	Peak									
2480	94.48	92.52			31.88	5.5	35.42	121	242	Average									
2480	97.82	95.86			31.88	5.5	35.42	121	242	Peak									
4960	38.07	29.8	54	-15.93	33.99	8.29	34.01	148	172	Average									
4960	47.75	39.48	74	-26.25	33.99	8.29	34.01	148	172	Peak									

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss Preamp Factor Margin value = Emission level – Limit value
- 2. 2480 MHz: Fundamental frequency.
- 3. The emission levels of other frequencies were very low against the limit.



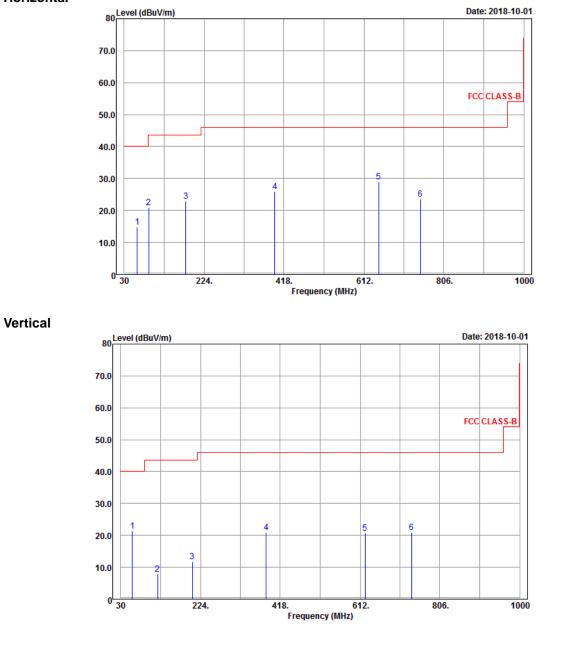
9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

EUT Test Condition		Measurement Detail			
Channel	Channel 39	Frequency Range	30 MHz ~ 1 GHz		
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)		
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Harry Hsueh		

Horizontal





Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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
61.32	14.73	32.95	40	-25.27	13.11	0.9	32.23	141	152	Peak
89.67	21.02	41.16	43.5	-22.48	10.46	1.11	31.71	136	251	Peak
179.58	22.8	43.75	43.5	-20.7	9.68	1.61	32.24	107	158	Peak
395.9	25.9	40.86	46	-20.1	14.91	2.34	32.21	115	184	Peak
647.9	29.06	39.81	46	-16.94	18.41	2.99	32.15	107	142	Peak
749.4	23.61	32.73	46	-22.39	19.81	3.22	32.15	169	185	Peak
		A	Intenna Po	olarity &	Test Dista	ance: Vert	ical at 3 r	n		
Frequency (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
58.35	21.27	38.92	40	-18.73	13.68	0.9	32.23	112	136	Peak
119.91	7.94	28.75	43.5	-35.56	10.16	1.28	32.25	157	184	Peak
204.42	11.87	31.38	43.5	-31.63	11.12	1.65	32.28	105	126	Peak
384	20.85	36.02	46	-25.15	14.67	2.34	32.18	125	162	Peak
624.1	20.63	31.71	46	-25.37	18.16	2.93	32.17	112	132	Peak
737.5	20.92	30.21	46	-25.08	19.68	3.16	32.13	148	195	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

	Conducted Limit (dBuV)				
Frequency (MHz)	Quasi-Peak	Average			
0.15 - 0.5	66 - 56	56 - 46			
0.50 - 5.0	56	46			
5.0 - 30.0	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.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 23, 2017	Nov. 22, 2018
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
LISN/AMN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 26, 2018	Feb. 25, 2019
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 19, 2018	Aug. 18, 2019
Software ADT	BV ADT_Cond_ V7.3.7.4	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 1.
- 3. The VCCI Site Registration No. is C-2040.



4.2.3 Test Procedures

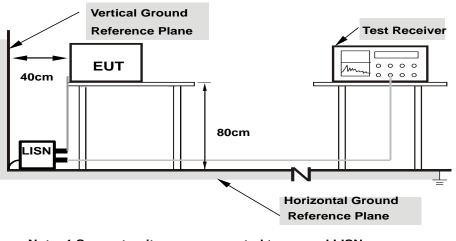
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50 uH of coupling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

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz - 30 MHz.

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 Condition

Set the EUT under transmission condition continuously at specific channel frequency.



4.2.7 Test Results

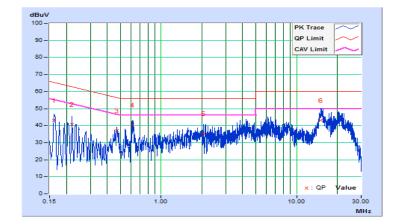
CONDUCTED WORST-CASE DATA : 8DPSK

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Jisyong Wang	Test Date	2018/9/28

	Phase Of Power : Line (L)									
	Frequency	Correction	Reading Value		Emission Level		Limit		Margin	
No		Factor	(dBuV)		(dBuV)		(dBuV)		(dB)	
	(MHz)	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16181	9.67	33.34	18.81	43.01	28.48	65.37	55.37	-22.36	-26.89
2	0.22038	9.67	30.95	17.53	40.62	27.20	62.80	52.80	-22.18	-25.60
3	0.47062	9.66	27.38	11.97	37.04	21.63	56.50	46.50	-19.46	-24.87
4	0.61138	9.66	30.63	15.86	40.29	25.52	56.00	46.00	-15.71	-20.48
5	2.06590	9.68	25.65	13.02	35.33	22.70	56.00	46.00	-20.67	-23.30
6	15.08620	9.89	33.06	18.33	42.95	28.22	60.00	50.00	-17.05	-21.78

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



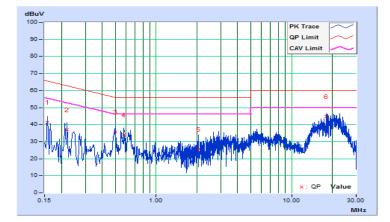


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Jisyong Wang	Test Date	2018/9/28

	Phase Of Power : Neutral (N)									
	Frequency	Correction	Reading Value		Emission Level		Limit		Margin	
No		Factor	(dBuV)		(dBuV)		(dBuV)		(dB)	
	(MHz)	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	9.68	31.58	14.19	41.26	23.87	65.58	55.58	-24.32	-31.71
2	0.22038	9.67	27.25	11.15	36.92	20.82	62.80	52.80	-25.88	-31.98
3	0.50190	9.67	26.02	12.02	35.69	21.69	56.00	46.00	-20.31	-24.31
4	0.58010	9.66	24.24	8.74	33.90	18.40	56.00	46.00	-22.10	-27.60
5	2.06199	9.68	16.01	1.72	25.69	11.40	56.00	46.00	-30.31	-34.60
6	18.01088	9.98	34.73	21.90	44.71	31.88	60.00	50.00	-15.29	-18.12

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

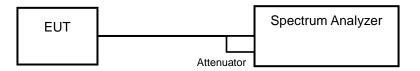


4.3 Number of Hopping Frequency Used

4.3.1 Limits of Hopping Frequency Used Measurement

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 Procedure

- 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

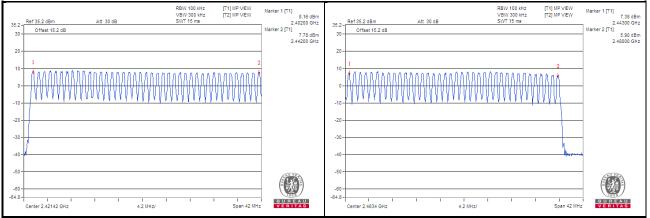
No deviation.



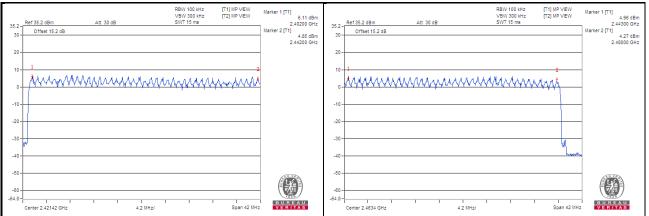
4.3.6 Test Results

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

<GFSK>



<8DPSK>



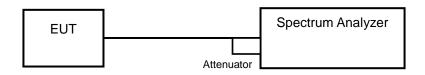


4.4 Dwell Time on Each Channel

4.4.1 Limits of Dwell Time on Each Channel Measurement

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.

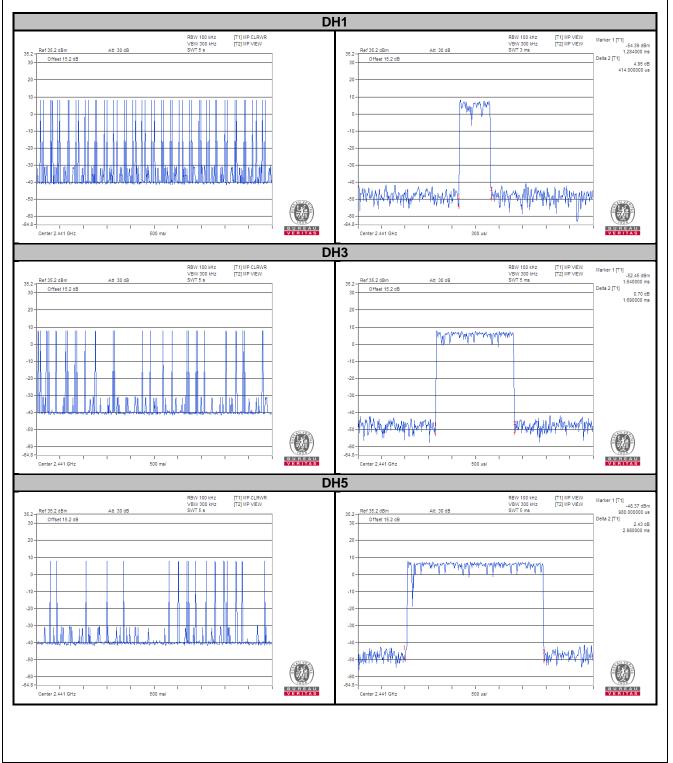


4.4.6 Test Results

GFSK

Number of Transmission in a 31.6 (79 Hopping*0.4)	Length of Transmission Time (msec)	Result (msec)	Limit (sec)
50 (times / 5 sec) * 6.32 = 316 times	0.414	130.82	0.4
27 (times / 5 sec) * 6.32 = 170.64 times	1.690	288.38	0.4
17 (times / 5 sec) * 6.32 = 107.44 times	2.980	320.17	0.4
	31.6 (79 Hopping*0.4) 50 (times / 5 sec) * 6.32 = 316 times 27 (times / 5 sec) * 6.32 = 170.64 times	Number of Transmission In a 31.6 (79 Hopping*0.4) Transmission Time (msec) 50 (times / 5 sec) * 6.32 = 316 times 0.414 27 (times / 5 sec) * 6.32 = 170.64 times 1.690	Number of Transmission in a 31.6 (79 Hopping*0.4) Transmission Time (msec) Result (msec) 50 (times / 5 sec) * 6.32 = 316 times 0.414 130.82 27 (times / 5 sec) * 6.32 = 170.64 times 1.690 288.38

Note: Test plots of the transmitting time slot are shown as below.





8DPSK

Mode	Number of Transmission in a 31.6 (79 Hopping*0.4)	Length of Transmission Time (msec)	Result (msec)	Limit (sec)
3DH1	50 (times / 5 sec) * 6.32 = 316 times	0.468	147.89	0.4
3DH3	26 (times / 5 sec) * 6.32 = 164.32 times	1.730	284.27	0.4
3DH5	16 (times / 5 sec) * 6.32 = 101.12 times	2.948	298.10	0.4

Note: Test plots of the transmitting time slot are shown as below.



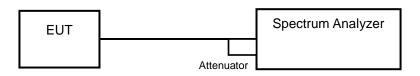


4.5 Channel Bandwidth

4.5.1 Limits of Channel Bandwidth Measurement

For frequency hopping system operating in the 2400-2483.5 MHz, if the 20 dB bandwidth of hopping channel is greater than 25 kHz, two-thirds 20 dB bandwidth of hopping channel shell 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 20 dB 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.

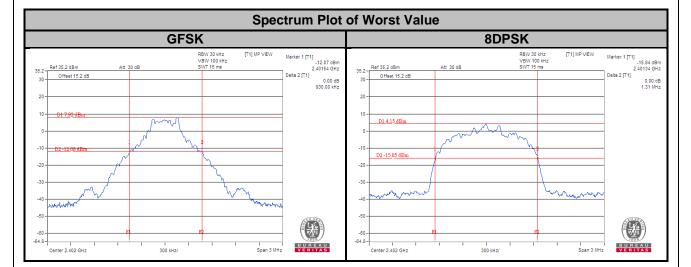
4.5.6 EUT Operating Condition

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

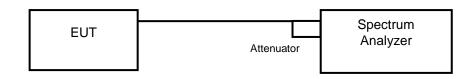
Channel	Frequency	20 dB Bandwidth (MHz)			
Channel	(MHz)	GFSK	8DPSK		
0	2402	0.93	1.31		
39	2441	0.95	1.31		
78	2480	0.95	1.31		





4.6 Occupied Bandwidth Measurement

4.6.1 Test Setup



4.6.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument

4.6.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to PEAK. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.6.4 Deviation from Test Standard

No deviation.

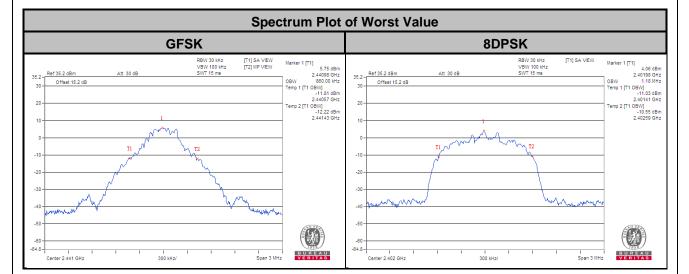
4.6.5 EUT Operating Conditions

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



4.6.6 Test Results

Channel	Frequency	Occupied Bandwidth (MHz)					
Channel	(MHz)	GFSK	8DPSK				
0	2402	0.83	1.18				
39	2441	0.86	1.18				
78	2480	0.85	1.18				



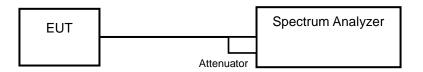


4.7 Hopping Channel Separation

4.7.1 Limits of Hopping Channel Separation Measurement

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

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 Procedure

Measurement Procedure REF

- 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.
- c. By using the MaxHold function record the separation of two adjacent channels.
- d. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
- e. Repeat above procedures until all frequencies measured were complete.

4.7.5 Deviation from Test Standard

No deviation.

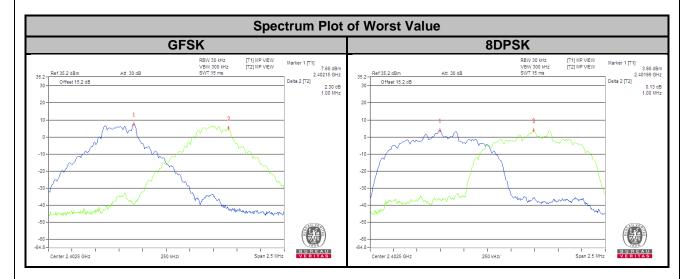


4.7.6 Test Results

Channel	Freq. (MHz)	Adjacent Sepai (Mi	ration	20 dB Bandwidth (MHz)		Minimum I	Pass / Fail	
		GFSK	8DPSK	GFSK	8DPSK	GFSK	8DPSK	
0	2402	1.00	1.00	0.93	1.31	0.62	0.88	Pass
39	2441	1.00	1.00	0.95	1.31	0.64	0.88	Pass
78	2480	1.00	1.00	0.95	1.31	0.64	0.88	Pass

Note:

1. The minimum limit is two-third 20 dB bandwidth.



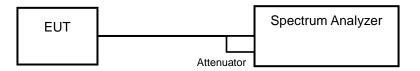


4.8 Maximum Output Power

4.8.1 Limits of Maximum Output Power Measurement

The Maximum Output Power Measurement is 125 mW.

4.8.2 Test Setup



4.8.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.8.4 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. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3 MHz 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.

4.8.5 Deviation from Test Standard

No deviation.

4.8.6 EUT Operating Condition

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



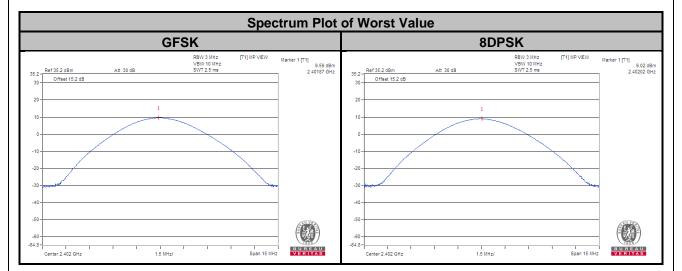
4.8.7 Test Results

<GFSK>

Channel	Freq. (MHz)	Output Power (mW)	Output Power (dBm)	Power Limit (mW)	Pass / Fail
0	2402	9.099	9.59	125	Pass
39	2441	8.166	9.12	125	Pass
78	2480	7.228	8.59	125	Pass

<8DPSK>

Channel	Freq. (MHz)	Output Power (mW)	Output Power (dBm)	Power Limit (mW)	Pass / Fail
0	2402	7.980	9.02	125	Pass
39	2441	7.096	8.51	125	Pass
78	2480	5.689	7.55	125	Pass





4.9 Conducted Out of Band Emission Measurement

4.9.1 Limits Of Conducted Out of Band Emission Measurement

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

4.9.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.9.3 Test Procedure

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

4.9.4 Deviation from Test Standard

No deviation.

4.9.5 EUT Operating Condition

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

4.9.6 Test Results

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



GFSK Hopping Disabled_Low Channel RBW 100 kHz VBW 300 kHz SWT 20 ms RBW 100 kHz VBW 300 kHz SWT 2.5 s Marker 1 [T1] 8.19 dBm 2.40200 GHz Marker 2 [T1] -41.92 dBm 2.40000 GHz Marker 3 [T1] [T1] MP VIEW [T1] MP VIEW Marker 1 [T1] Marker 1 [T1] 2.40215 GHz Marker 2 [T1] -37.02 dBm 17.54645 GHz Marker 3 [T1] -36.86 dBm 22.41560 GHz Marker 4 [T1] -37.44 dBm 22.62785 GHz 35.2 - Ref 35.2 dBm 30 - Offset 1= 35.2 - Ref 35.2 dBm 30 - Offset 15.2 dB Att 30 dB Att 30 dB Offset 15.2 dB 30 2.40000 -Marker 3 [T1] -38.29 dBm 2.39552 GHz Marker 4 [T1] -44.74 dBm 2.39000 GHz 20 20-1 10 10-D1 0.19 dE 0--38.21 dBm 2.31577 GHz -10--10 -20 -20--30 -30--40 -40 -50 -50--60 -60 -64.8--64.8-Stop 25 GHz 10 MHz/ BUREAU VERITAS BUREAU 1 2.497 GHz/ I Span 100 MHz Center 2.358 GHz Start 30 MHz Hopping Disabled_Middle Channel Marker 1 [T1] 7.60 dBm 2.44097 GHz Marker 2 [T1] -42.50 dBm 2.48350 GHz Marker 3 [T1] -38.91 dBm 2.48927 GHz RBW 100 kHz VBW 300 kHz SWT 20 ms RBW 100 kHz VBW 300 kHz SWT 2.5 s [T1] MP VIEW [T2] MP VIEW [T1] MP VIEW [T2] MP VIEW Marker 1 [T1] 7.09 dBm 2.43860 GHz Marker 2 [T1] -37.26 dBm 1-37.26 dBm 19.94357 GHz Marker 4 [T1] -37.06 dBm 24.76278 GHz Marker 1 [T1] Ref 35.2 dBm Att 30 dB Ref 35.2 dBm Att 30 dB 35.2 35.2 Offset 15.2 dB Offset 15.2 dB 30 30-20-2 10 10--11 -10 -20 -20 -30 -30 -4 -5 -60 -60 -64.8--64.8-Start 30 MHz Stop 25 GHz I Span 100 MHz BUREAU BUREAU Center 2.441 GHz I 10 MHz/ 1 2.497 GHz/ Hopping Disabled_High Channel Marker 1 [71] 6.63 dBm 2.48012 GHz Marker 2 [71] -4.121 dBm 2.4350 GHz Marker 3 [71] -38.07 dBm 2.49022 GHz Marker 4 [71] .41.09 dBm 2.50000 GHz Marker 1 [T1] 6.48 dBm 2.47706 GHz Marker 2 [T1] -36.55 dBm 23.70156 GHz Marker 4 [T1] -36.56 dBm 24.71284 GHz RBW 100 kHz VBW 300 kHz SWT 2.5 s RBW 100 kHz VBW 300 kHz SWT 20 ms [T1] MP VIEW [T2] MP VIEW [T1] MP VIEW [T2] MP VIEW 35.2 - Ref 35.2 dBm Att 30 di 35.2 - Ref 35.2 dBn Att 30 dE Offset 15.2 dB Offset 15.2 dB 30 30-20 20-10 1 D1 6.63 dB 10-D1 6.63 8 0. -10--10 D2 -13 37 dE -20 -20 -30 -30-14 -4 -50 -50 -60 --64.8 --64.8-Start 30 MHz I Span 100 MHz BUREAU VERITAS Stop 25 GHz BUREAU VERITAS 1 2.497 GHz/ Center 2.5242 GHz 10 MHz/



15.2 dBm	Att 30 dB	RBW 100 kHz VBW 300 kHz SWT 20 ms	[T1] MP VIEW [T2] MP VIEW	Marker 1 [T1] 8.74 dBm	ed_Low Chan	Att 30 dB	RBW 100 kHz VBW 300 kHz SWT 2.5 s	(T1) MP VIEW (T2) MP VIEW	Marker 1 [T1]
Offset 15.2 dB	All 30 0B	3441 20 115		2.40413 GHz Marker 2 [T1] -41.57 dBm	35.2 - Offset 15.2 dB	All 30 GB	3991 2.3 8		2.44 Marker 2 [T1] -3
				2.40000 GHz	50-				3 23.16 Marker 3 [T1]
			1	Marker 3 [T1] -38.33 dBm 2.39716 GHz	20-				-3 23.6
D1 8.74 dBm				Marker 4 [T1]	10 - D1 8.74 dBm				Marker 4 [T1] -3
			MUMUMUM	2.39000 GHz Marker 5 [T1]	0-				24.24
D2 -11 26 dBm			10 North	-37.53 dBm 2.34351 GHz	10 D2 1106 JBm				
02-11.20 UDH			Hun himilia	-	-10 - <u>D2 -11 26 dBm</u>				
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	5			-	-30			234	
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Center 2.358 GHz	14 MHz/		Span 140 MH	Z VERITAS	Start 30 MHz	2.497 G	SHz/	Stop 25 GHz	VERIT
			Норр	ing Enable	d_High Char	nnel			
		RBW 100 kHz VBW 300 kHz	[T1] MP VIEW [T2] MP VIEW	Marker 1 [T1]			RBW 100 kHz VBW 300 kHz	[T1] MP VIEW [T2] MP VIEW	Marker 1 [T1]
	Att 30 dB	SWT 20 ms	[12] are view	8.57 dBm 2.46211 GHz	35.2 - Ref 35.2 dBm	Att 30 dB		[12] ME VIEW	
	All 30 0B				35.2-	A. 00 05	SWT 2.5 s		
Ref 35.2 dBm Offset 15.2 dB	All 30 0B			Marker 2 [T1] -41.03 dBm	35.2 - Offset 15.2 dB	A. 00 0D	SWI 2.5 8		Marker 2 [T1]
	AIL 30 0B			Marker 2 [T1] -41.03 dBm 2.48350 GHz Marker 3 [T1] -38.15 dBm	044-0445-0440	A1 00 00	50012.58		Marker 2 [T1] -3 18.68 Marker 3 [T1] -3
	ALL SU US			Marker 2 [T1] -41.03 dBm 2.48350 GHz Marker 3 [T1] -38.15 dBm 2.48531 GHz Marker 4 [T1]	30 - Offset 15.2 dB	AK 000	5001 2.5 8		Marker 2 [T1] -3 18.66 Marker 3 [T1] -3 22.24 Marker 4 [T1]
				Marker 2 [T1] -41.03 dBm 2.48350 GHz Marker 3 [T1] -38.15 dBm 2.48531 GHz	30 - Offset 15.2 dB 20	Au 000	SWI 2.5 \$		Marker 2 [T1] -3 18.64 Marker 3 [T1] -3 22.24 Marker 4 [T1] -3
Offset 15.2 dB				Marker 2 [T1] -41.03 dBm 2.48350 GHz Marker 3 [T1] -38.15 dBm 2.48531 GHz Marker 4 [T1] -40.49 dBm	20- 1		SWI 25 S		Marker 2 [T1] -3 18.64 Marker 3 [T1] -3 22.24 Marker 4 [T1] -3
Offset 15.2 dB	AL 30 UD			Marker 2 [T1] -41.03 dBm 2.48350 GHz Marker 3 [T1] -38.15 dBm 2.48531 GHz Marker 4 [T1] -40.49 dBm	30 - Offset 15.2 dB 20		SWI 2.58		Marker 2 [T1] -3 18.66 Marker 3 [T1] -3 22.24 Marker 4 [T1] -3
Offset 15.2 dB				Marker 2 [T1] -41.03 dBm 2.48350 GHz Marker 3 [T1] -38.15 dBm 2.48531 GHz Marker 4 [T1] -40.49 dBm	0 Offset 15.2 dB		SW1253		-3 18.68 Marker 3 [T1] -3 22.24
Offset 15.2 dB	AL 30 UD			Marker 2 [T1] -41.03 dBm 2.48350 GHz Marker 3 [T1] -38.15 dBm 2.48531 GHz Marker 4 [T1] -40.49 dBm	0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 -		SW1258		Marker 2 [T1] -3: 18.68 Marker 3 [T1] -3: 22.24 Marker 4 [T1] -3:
Offset 15.2 dB				Marker 2 [T1] -41.03 dBm 2.48350 GHz Marker 3 [T1] -38.15 dBm 2.48531 GHz Marker 4 [T1] -40.49 dBm	30 Offset 15.2 dB 20 - 10 - 0 - - - - - - - - - - - - - - - - - - - - -		2	3 4	Marker 2 [T1] -3 18.66 Marker 3 [T1] -3 22.24 Marker 4 [T1] -3
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Offset 15.2 dB		the set of section of	ngylere yksztyketkete	Marker 2 [T1] -41.03 dBm 2.48350 GHz Marker 3 [T1] -38.15 dBm 2.48531 GHz Marker 4 [T1] -40.49 dBm	30 Offset 15.2 dB 20 - 10 - 0 - - - - - - - - - - - - - - - - - - - - -		2 2 2	3 4	Marker 2 [T1] -3: 18.68 Marker 3 [T1] -3: 22.24 Marker 4 [T1] -3:
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				Marker 2 [71] 2.4350 GHz Marker 3 [71] -33.15 GHm 12.4351 GHz Marker 4 [71] 0.49 GHm 2.50000 GHz	30 Offset 15.2 dB 20 10 10 10 02 11 10 12 10 <td></td> <td>2</td> <td></td> <td>Nariser 2 ("1] 18.88 Mariser 3 ("1] 22.22 Mariser 4 ("1] 23.22 23.22</td>		2		Nariser 2 ("1] 18.88 Mariser 3 ("1] 22.22 Mariser 4 ("1] 23.22 23.22
Offset 15.2 dB			Andread	Marker 2 [71] 2.4350 GHz Marker 3 [71] -33.15 GHm 12.4351 GHz Marker 4 [71] 0.49 GHm 2.50000 GHz	30 Offset 15.2 dB 20 D1.9.17 4Bm 0 D1.9.17 4Bm 0 D1.9.17 4Bm 0 D1.9.17 4Bm -0 D2.11 42 4Bm -00 D2.11 42 4Bm -00 D2.11 42 4Bm		2	3 4	Nariser 2 ("1] 18.88 Mariser 3 ("1] 22.22 Mariser 4 ("1] 23.22 23.22



8DPSK Hopping Disabled_Low Channel Marker 1 [71] 5.47 dBm 2.40200 GHz Marker 2 (71] 4.0.82 dBm 2.30257 GHz Marker 3 (71] -39.39 dBm 2.30257 GHz Marker 4 (71] -42.83 dBm marker 4 (71] -38.24 dBm RBW 100 kHz VBW 300 kHz SWT 20 ms RBW 100 kHz VBW 300 kHz SWT 2.5 s [T1] MP VIEW [T1] MP VIEW Marker 1 [T1] Marker 1 [71] 2.40215 GHz Marker 2 [71] -36 91 dBm 15.68619 GHz Marker 3 [71] -37.06 dBm 19.30059 GHz Marker 4 [71] -36.82 dBm 24.71284 GHz 35.2 - Ref 35.2 dBm 30 - Offset 15 35.2 - Ref 35.2 dBm 30 - Offset 15.2 dB Att 30 dB Att 30 dB Offset 15.2 dB 30 20 20-10 10-D1 5.47 dBm D1 5.47 dBm Å 0--38.24 dBm 2.33955 GHz -10--10 D2 -14.53 dBm D2 -14 -20 -20--30 -30-Л -41 40 -50 -50 (\mathbf{P}) -60 .6 -64.8--64.8-10 MHz/ BUREAU VERITAS Stop 25 GHz B U R E A U VERITAS 2.497 GHz/ Span 100 MHz Center 2.358 GHz Start 30 MH: Hopping Disabled_Middle Channel Marker 1 [T1] 3.24 dBm 2.44097 GHz Marker 2 [T1] -44.98 dBm 2.48350 GHz Marker 3 [T1] -39.60 dBm 2.48750 GHz RBW 100 kHz VBW 300 kHz SWT 20 ms RBW 100 kHz VBW 300 kHz SWT 2.5 s [T1] MP VIEW [T2] MP VIEW [T1] MP VIEW [T2] MP VIEW Marker 1 [71] 2.04 dBm 2.43960 GHz Marker 2 [71] -37.38 dBm 20.01224 GHz Marker 3 [71] -38.29 dBm 22.91500 GHz Marker 4 [71] -37.99 dBm 24.18847 GHz Marker 1 [T1] 35.2 - Ref 35.2 dBm Ref 35.2 dBm Att 30 dB Att 30 dB 35.2 30 Offset 15.2 dB Offset 15.2 dB 30-20 20 10 11 D1 3.24 dBm 0 -10 D2 -16.76 dBm D2 -16.76 dBn -20 -20 -30 -30 -40 -40 **UNA** -50 -50 -60 -60 -64.8--64.8-Start 30 MHz Center 2.441 GHz 10 MHz/ Span 100 MHz Stop 25 GHz BUREAU VERITAS BUREAU VERITAS 2.497 GHz/ Hopping Disabled_High Channel Marker 1 [71] 3.96 dBm 2.48012 GHz Marker 2 [71] .40.15 dBm 2.48580 GHz Marker 3 [71] .38.24 dBm 2.48687 GHz Marker 4 [71] .41.16 dBm 2.50000 GHz Marker 1 [71] 2.81 dBm 2.47706 GHz Marker 2 [71] 3.65 dSBm 19.2569 GHz Marker 3 [71] -36.55 dBm 21.76638 GHz Marker 4 [71] -36.36 dBm 23.62665 GHz RBW 100 kHz VBW 300 kHz SWT 20 ms RBW 100 kHz VBW 300 kHz SWT 2.5 s [T1] MP VIEW [T2] MP VIEW [T1] MP VIEW [T2] MP VIEW 35.2 - Ref 35.2 dBm Att 30 dB Att 30 dB Ref 35.2 dBr 35.2 30 - Offset 15.2 dB Offset 15.2 dB 30 20 20-10-10 D1 3.96 dBm D1 3.96 dBm -10 -11 D2-1604 dBm D2 -16.04 dBn -2 -20 -30 -30 -4 -50 -50 -60 -64.8--64.8-BUREAU Start 30 MHz BUREAU 10 MHz/ Span 100 MHz Stop 25 GHz 2.497 GHz/ Center 2.5242 GHz



	44.00.40	RBW 100 kHz VBW 300 kHz	[T1] MP VIEW [T2] MP VIEW	Marker 1 [T1] 4.73 dBm	Γ			RBW 100 VBW 300	kHz [T2] MP VIEW	Marker ([1]
of 35.2 dBm Offset 15.2 dB	Att 30 dB	SWT 20 ms		2.40703 GHz Marker 2 [T1]	35.2 - Ref 35.2	et 15.2 dB	Att 30 dB	SWT 2.5	s	2 Marker 2 [T1]
				-40.70 dBm 2.40000 GHz	30-0115					16
				Marker 3 [T1] -38.76 dBm	20 -					Marker 3 [T1]
				2.39531 GHz Marker 4 [T1]	10					24 Marker 4 [T1]
D1 4.73 dBm				-40.58 dBm 2.39000 GHz	10 - D1 4	.73 dBm				24
				Marker 5 [T1] -37.74 dBm	0 -					_
			of a side of the second	2.36458 GHz	-10 -					_
D2 -15.27 dBm				_	D2 -1.	5.27 dBm				_
				-	-20 -					-
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nter 2.358 GHz	14 MHz/		Span 140 MH:	VERITAS	Start 30	MHz	2	2.497 GHz/	Stop 25	GHZ VERI
			Hoppi	ing Enable	ed_High	h Chan	nel			
		RBW 100 kHz VBW 300 kHz	[T1] MP VIEW [T2] MP VIEW	Marker 1 [T1]				RBW 100 VBW 300		Marker 1 [T1]
ef 35.2 dBm	Att 30 dB	SWT 20 ms	[12]	5.32 dBm 2.45616 GHz	35.2 - Ref 35.2	dBm set 15.2 dB	Att 30 dB	SWT 2.5		
				Marker 2 [T1]						
Offset 15.2 dB				-41.25 dBm	30-0118	Set 15.2 00				Marker 2 [11]
Offset 15.2 dB				-41.25 dBm 2.48350 GHz Marker 3 [T1]	30-	Set 13.2 00				Marker 3 [T1]
Offset 15.2 dB				-41.25 dBm 2.48350 GHz Marker 3 [T1] -38.65 dBm 2.48423 GHz	20-	SEL 15.2 00				Marker 3 [T1]
D1 5.32 dBm				-41.25 dBm 2.48350 GHz Marker 3 [T1] -38.65 dBm 2.48423 GHz Marker 4 [T1] -41.50 dBm	20-	1 .32 dBm				Marker 3 [T1] 19 Marker 4 [T1]
				41.25 dBm 2.48350 GHz Marker 3 [T1] -38.65 dBm 2.48423 GHz Marker 4 [T1]	20-	4				Marker 3 [T1] 19 Marker 4 [T1]
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D1 5.32 dBm				-41.25 dBm 2.48350 GHz Marker 3 [T1] -38.65 dBm 2.48423 GHz Marker 4 [T1] -41.50 dBm	20 - 10 - 0 -	1 32 dBm				Marker 3 [T1] 19 Marker 4 [T1]
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DI 5 32 4Bm			L U. 1 1994 144 194 	.4.1.5.08 Marker 3 (TI) 2.4823 GHz Marker 4 (TI) 4.1.50 GBm 2.50000 GHz	30 - 01 5 0 - 01 5 0 02 - 1 - 20	1 2 dBm 4 F8 dBm		2 	3 	Marker 3 [71] 19 Marker 4 [71] 24 4



5 Pictures of Test Arrangements

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



Appendix – 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 FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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

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

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