

FCC/IC Radio Test Report

FCC ID: PAB1LFS003 IC: 10556A-1LFS003

This report concerns (check one): Original Grant Class II Change

Issued Date : Mar. 04, 2013
Project No. : 1206C176E
Equipment : Cavallino GT1
Model Name : 1LFS003
Applicant : Logic3 plc

Address : Rhodes Way, Watford, WD24 4YW, UK Manufacturer : Dongguan Kenwin Digital Technology Limited

Address : No.8, Lin Chang Lu, Pinshan 188 Industry District, Tang

Xia Town, Dongguan City, Guangdong Province, China.

Tested by:

Neutron Engineering Inc. EMC Laboratory

Date of Receipt: Aug. 08, 2012

Date of Test:

Aug. 08, 2012 ~ Mar. 02, 2013

Testing Engineer

(David Mao)

Technical Manager

(Leo Hunat

Authorized Signatory

(Steven Lu)

Neutron Engineering Inc.

No.3, Jinshagang 1st Road, ShiXia, Dalang Town, Dong Guan, China.

TEL: (0769) 8318-3000 FAX: (0769) 8319-6000

Report No.: NEI-FICP-1-1206C176E Page 1 of 103



Declaration

Neutron represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (NML) of CHINA, or National Institute of Standards and Technology (NIST) of U.S.A.

Neutron's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. Neutron shall have no liability for any declarations, inferences or generalizations drawn by the client or others from Neutron issued reports.

Neutron's reports must not be used by the client to claim product endorsement by the authorities or any agency of the Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and Neutron-self, extracts from the test report shall not be reproduced except in full with Neutron's authorized written approval.

Neutron's laboratory quality assurance procedures are in compliance with the ISO Guide 17025 requirements, and accredited by the conformity assessment authorities listed in this test report.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Report No.: NEI-FICP-1-1206C176E Page 2 of 103

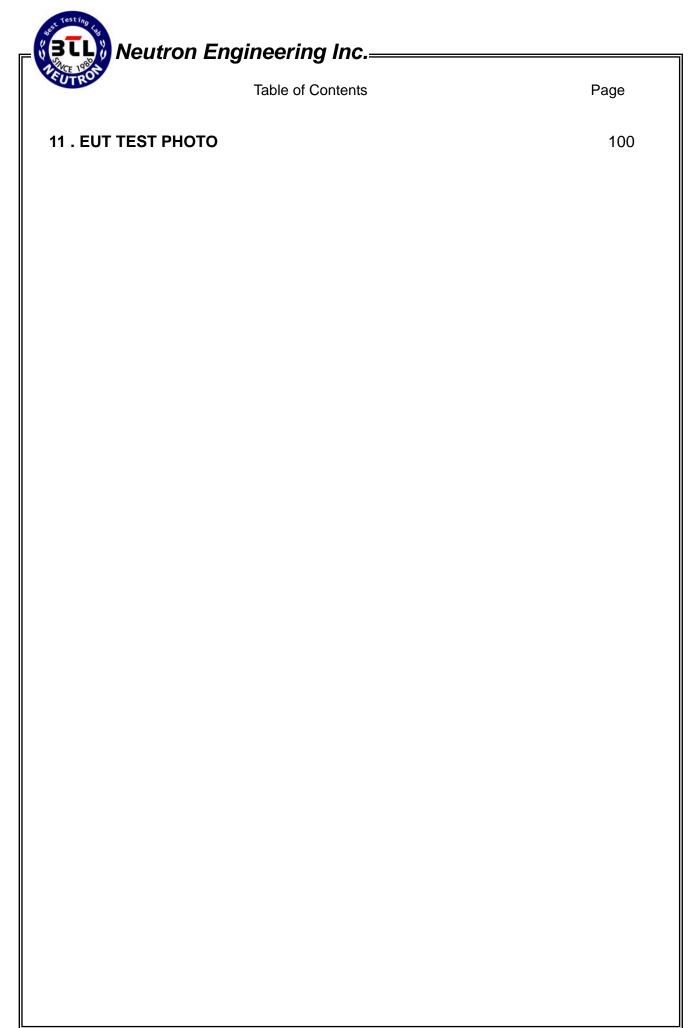
Table of Contents	Page
1. CERTIFICATION	6
2 . SUMMARY OF TEST RESULTS	7
2.1 TEST FACILITY	8
2.2 MEASUREMENT UNCERTAINTY	8
3 . GENERAL INFORMATION	9
3.1 GENERAL DESCRIPTION OF EUT	9
3.2 DESCRIPTION OF TEST MODES	11
3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING	11
3.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTE	D 12
3.5 DESCRIPTION OF SUPPORT UNITS	13
4 . EMC EMISSION TEST	14
4.1 CONDUCTED EMISSION MEASUREMENT	14
4.1.1 POWER LINE CONDUCTED EMISSION LIMITS	14
4.1.2 MEASUREMENT INSTRUMENTS LIST AND SETTING	14
4.1.3 TEST PROCEDURE 4.1.4 DEVIATION FROM TEST STANDARD	15 15
4.1.5 TEST SETUP	15
4.1.6 EUT OPERATING CONDITIONS	15
4.1.7 TEST RESULTS	15
4.2 RADIATED EMISSION MEASUREMENT	18
4.2.1 RADIATED EMISSION LIMITS	18
4.2.2 MEASUREMENT INSTRUMENTS LIST ANS SETTING	19
4.2.3 TEST PROCEDURE 4.2.4 DEVIATION FROM TEST STANDARD	20 20
4.2.5 TEST SETUP	20
4.2.6 EUT OPERATING CONDITIONS	22
4.2.7 TEST RESULTS (BELOW 30MHZ)	23
4.2.8 TEST RESULTS (BETWEEN30 – 1000 MHZ)	24
4.2.9 TEST RESULTS (ABOVE 1000 MHZ)	31
5 . NUMBER OF HOPPING CHANNEL	55
5.1 APPLIED PROCEDURES / LIMIT	55
5.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING 5.1.2 TEST PROCEDURE	55 55
5.1.2 TEST PROCEDURE 5.1.3 DEVIATION FROM STANDARD	55 55
5.1.4 TEST SETUP	55 55
5.1.5 EUT OPERATION CONDITIONS	55
5.1.6 TEST RESULTS	56

Report No.: NEI-FICP-1-1206C176E Page 3 of 103

STL W	Neutron Engineering Inc.
CUTRO	Table of Contents

	Table of Contents	Page
6 . AVERAGE TIME OF O	CCLIDANCY	58
6.1 APPLIED PROCEDU		58
	T INSTRUMENTS LIST	58
6.1.2 TEST PROCEDU		58
6.1.3 DEVIATION FRO	OM STANDARD	58
6.1.4 TEST SETUP		59
6.1.5 EUT OPERATIO		59
6.1.6 TEST RESULTS		60
	SEPARATION MEASUREMENT	72
7.1 APPLIED PROCEDU		72
	TINSTRUMENTS LIST AND SETTING	72
7.1.2 TEST PROCEDU		72
7.1.3 DEVIATION FRO	OM STANDARD	72
7.1.4 TEST SETUP		72
7.1.5 EUT OPERATIO		72
7.1.6 TEST RESULTS		73
8. BANDWIDTH TEST		77
8.1 APPLIED PROCEDU	RES / LIMIT	77
8.1.1 MEASUREMENT	TINSTRUMENTS LIST AND SETTING	77
8.1.2 TEST PROCEDU	JRE	77
8.1.3 DEVIATION FRO	OM STANDARD	77
8.1.4 TEST SETUP		77
8.1.5 EUT OPERATIO		77
8.1.6 TEST RESULTS		78
9 . PEAK OUTPUT POWE	R TEST	82
9.1 APPLIED PROCEDUI	RES / LIMIT	82
	TINSTRUMENTS LIST AND SETTING	82
9.1.2 TEST PROCEDU		82
9.1.3 DEVIATION FRO	OM STANDARD	82
9.1.4 TEST SETUP		82
9.1.5 EUT OPERATIO		82
9.1.6 TEST RESULTS		83
10. ANTENNA CONDUCT	ED SPURIOUS EMISSION	87
10.1 APPLIED PROCEDU	JRES / LIMIT	87
10.1.1 MEASUREMEN	NT INSTRUMENTS LIST AND SETTING	87
10.1.2 TEST PROCED	DURE	87
10.1.3 DEVIATION FR	OM STANDARD	87
10.1.4 TEST SETUP		87
10.1.5 EUT OPERATION	ON CONDITIONS	87
10.1.6 TEST RESULTS	S	88

Report No.: NEI-FICP-1-1206C176E



Report No.: NEI-FICP-1-1206C176E Page 5 of 103

1. CERTIFICATION

Equipment : Cavallino GT1

Brand Name : Logic3 Model Name : 1LFS003 Applicant : Logic3 plc

Factory : Dongguan Kenwin Digital Technology Limited

Address : No.8, Lin Chang Lu, Pinshan 188 Industry District, Tang Xia Town, Dongguan City,

Guangdong Province, China.

Date of Test : Aug. 08, 2012 ~ Mar. 02, 2013 Test Item : ENGINEERING SAMPLE

Standards : FCC Part15, Subpart C(15.247) / ANSI C63.4 : 2009

FCC Public Notice DA 00-705, March 30, 2000.

Canada RSS-210:2010

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FICP-1-1206C176E) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP and TAF according to the ISO-17025 quality assessment standard and technical standard(s).

Report No.: NEI-FICP-1-1206C176E Page 6 of 103



2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

APF	APPLIED STANDARD: 47 CFR Part 15, Subpart C; Canada RSS-210:2010			
Standard Section				
RSS-210	47 CFR Part 15	Test Item	Judgment	Remark
RSS-GEN 7.2.2	15.207	Conducted Emission	PASS	
RSS-210 Annex 8 (A8.1d)	15.247(d)	Antenna conducted Spurious Emission	PASS	
RSS-210 Annex 8 (A8.1d)	15.247 (a)(1)	Hopping Channel Separation	PASS	
RSS-210 Annex 8 (A8.1b)	15.247 (b)(1)	Peak Output Power	PASS	
RSS-210 Annex 8 (A8.1a)	15.247(d) 15.209	Radiated Spurious Emission	PASS	
RSS-210 Annex 8 (A8.4(2))	15.247 (a)(1)(iii)	Number of Hopping Frequency	PASS	
RSS-210 Annex 8 (A8.5)	15.247 (a)(1)(iii)	Dwell Time	PASS	
RSS-Gen 7.2.3	15.205	Restricted Bands	PASS	
RSS-210 Annex 8 (A8.5)	15.203	Antenna Requirement	PASS	

NOTE:

- (1)" N/A" denotes test is not applicable in this test report
- (2) According to FCC Public Notice DA 00-705, March 30, 2000.

Report No.: NEI-FICP-1-1206C176E Page 7 of 103

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is DG-C02/DG-CB03 at the location of No.3, Jinshagang 1st Road, ShiXia, Dalang Town, Dong Guan, China.523792

Neutron's test firm number for FCC 319330

Neutron's test firm number for IC 4428B-1

2.2 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:

The reported uncertainty of measurement y \pm U , where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2 , providing a level of confidence of approximately 95 % ,

A. Conducted Measurement:

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
DG-C02	CISPR	150 KHz ~ 30MHz	1.94	

B. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U , (dB)	NOTE
		30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	Н	3.60	
		200MHz ~ 1,000MHz	V	3.86	
DG-CB03	CISPR	200MHz ~ 1,000MHz	Н	3.94	
DG-CB03	CISER	1GHz~18GHz	V	3.12	
		1GHz~18GHz	Н	3.68	
		18GHz~40GHz	V	4.15	
		18GHz~40GHz	Н	4.14	

Report No.: NEI-FICP-1-1206C176E Page 8 of 103

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Cavallino GT1	
Brand Name	Logic3	
Model Name	1LFS003	
Model Difference	N/A	
Product Description	User's Manual, the EUT	2402~2480 MHz GFSK(1Mbps) π/4-DQPSK(2Mbps) 8-DPSK(3Mbps) 79 CH, Please see note 2.(Page 10) Please see note 3.(Page 10) 2.07 dBm (1Mbps) 1.77 dBm (3Mbps) n, features, or specification exhibited in is considered as an ITE/Computing EUT technical specification, please
Power Source	AC Mains	
Power Rating	I/P: AC 90-240V 50/60H	z
Connecting I/O Port(s)	Please refer to the User	s Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

Report No.: NEI-FICP-1-1206C176E Page 9 of 103



2.

		Chann	el List		
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PIFA Antenna	N/A	2.12

Report No.: NEI-FICP-1-1206C176E Page 10 of 103

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	TX Mode NOTE (1)
Mode 2	Bluetooth

The EUT system operated these modes were found to be the worst case during the pre-scanning test as following:

For Conducted Emission		
Final Test Mode	Description	
Mode 2	Bluetooth	

For Radiated Emission	
Final Test Mode	Description
Mode 1	TX Mode NOTE (1)

Note:

- (1) The measurements are performed at the high, middle, low available channels.
- (2) The measurements for Hopping Channel Separation, Bandwidth and Peak Output Power were tested during 1Mbps, 2Mbps and 3Mbps, the worst case are 1Mbps and 3Mbps, only worst case was documented.

3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Test software Version	CSR			
Frequency	2402 MHz	2441 MHz	2480 MHz	
Parameters-1Mbps	63	63	63	
Parameters-3Mbps	100	100	100	

Report No.: NEI-FICP-1-1206C176E Page 11 of 103

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **DG-C02/DG-CB03** at the location of No.3, Jinshagang 1st Road, ShiXia, Dalang Town, Dong Guan, China.523792 Neutron's test firm number for FCC 319330 Neutron's test firm number for IC 4428B-1

2.2 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:

The reported uncertainty of measurement $\mathbf{y} \pm \mathbf{U}$, where expended uncertainty \mathbf{U} is based on a standard uncertainty multiplied by a coverage factor of $\mathbf{k=2}$, providing a level of confidence of approximately 95 % \circ

A. Conducted Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
DG-C02	CISPR	150 KHz ~ 30MHz	1.94	

B. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)	NOTE
		30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	Н	3.60	
DG-CB03	CISPR	200MHz ~ 1,000MHz	V	3.86	
DG-CB03 CIS		200MHz ~ 1,000MHz	Н	3.94	
		1GHz~18GHz	V	3.12	
		1GHz~18GHz	Н	3.68	

Report No.: NEI-FICP-1-1206C176E Page 8 of 103

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Cavallino GT1			
Brand Name	Logic3			
Model Name	1LFS003			
Model Difference	N/A			
Product Description	User's Manual, the EUT	2402~2480 MHz GFSK(1Mbps) π /4-DQPSK(2Mbps) 8-DPSK(3Mbps) 79 CH, Please see note 2.(Page 10) Please see note 3.(Page 10) 2.07 dBm (1Mbps) 1.77 dBm (3Mbps) n, features, or specification exhibited in is considered as an ITE/Computing EUT technical specification, please		
Power Source	AC Mains			
Power Rating	I/P: AC 90-240V 50/60Hz			
Connecting I/O Port(s)	Please refer to the User'	s Manual		

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

Report No.: NEI-FICP-1-1206C176E Page 9 of 103



2.

	Channel List						
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)		
00	2402	27	2429	54	2456		
01	2403	28	2430	55	2457		
02	2404	29	2431	56	2458		
03	2405	30	2432	57	2459		
04	2406	31	2433	58	2460		
05	2407	32	2434	59	2461		
06	2408	33	2435	60	2462		
07	2409	34	2436	61	2463		
08	2410	35	2437	62	2464		
09	2411	36	2438	63	2465		
10	2412	37	2439	64	2466		
11	2413	38	2440	65	2467		
12	2414	39	2441	66	2468		
13	2415	40	2442	67	2469		
14	2416	41	2443	68	2470		
15	2417	42	2444	69	2471		
16	2418	43	2445	70	2472		
17	2419	44	2446	71	2473		
18	2420	45	2447	72	2474		
19	2421	46	2448	73	2475		
20	2422	47	2449	74	2476		
21	2423	48	2450	75	2477		
22	2424	49	2451	76	2478		
23	2425	50	2452	77	2479		
24	2426	51	2453	78	2480		
25	2427	52	2454				
26	2428	53	2455				

Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PIFA Antenna	N/A	2.12

Report No.: NEI-FICP-1-1206C176E Page 10 of 103

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	TX Mode NOTE (1)
Mode 2	Bluetooth

The EUT system operated these modes were found to be the worst case during the pre-scanning test as following:

For Conducted Emission				
Final Test Mode	Description			
Mode 2	Bluetooth			

For Radiated Emission			
Final Test Mode	Description		
Mode 1	TX Mode NOTE (1)		

Note:

(1) The measurements are performed at the high, middle, low available channels.

3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Test software Version	CSR			
Frequency	2402 MHz	2441 MHz	2480 MHz	
Parameters-1Mbps	63	63	63	
Parameters-3Mbps	100	100	100	

Report No.: NEI-FICP-1-1206C176E Page 11 of 103

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.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID/IC	Series No.	Note
E-1	Cavallino GT1	Logic3	1LFS003	PAB1LFS003/ 10556A-1LFS003	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note
-	-	-	-	

Note:

(1) For detachable type I/O cable should be specified the length in m in <code>"Length_"</code> column.

Report No.: NEI-FICP-1-1206C176E Page 13 of 103

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A	(dBuV)	Class B	Standard	
FREQUENCT (MITZ)	Quasi-peak	Average	Quasi-peak	Average	Stariuaru
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

4.1.2 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	EMCO	3816/2	00052765	May.04.2013
2	LISN	R&S	ENV216	100087	May.04.2013
3	Test Cable	N/A	C_17	N/A	Mar.28.2013
4	EMI TEST RECEIVER	R&S	ESCS30	826547/022	May.04.2013
5	50Ω Terminator	SHX	TF2-3G-A	08122902	May.04.2013

Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of Equipment List is One Year.

The following table is the setting of the receiver

Receiver Parameters	Setting		
Attenuation	10 dB		
Start Frequency	0.15 MHz		
Stop Frequency	30 MHz		
IF Bandwidth	9 kHz		

Report No.: NEI-FICP-1-1206C176E Page 14 of 103

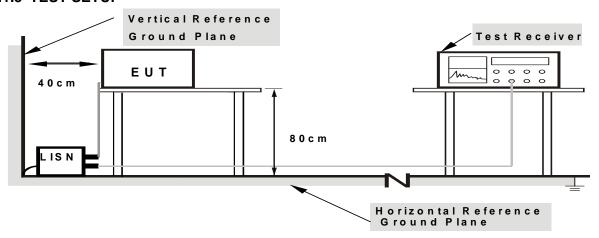
4.1.3 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

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

4.1.6 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

The EUT is continued Transmitter/Receive data or Hopping on mode.

4.1.7 TEST RESULTS

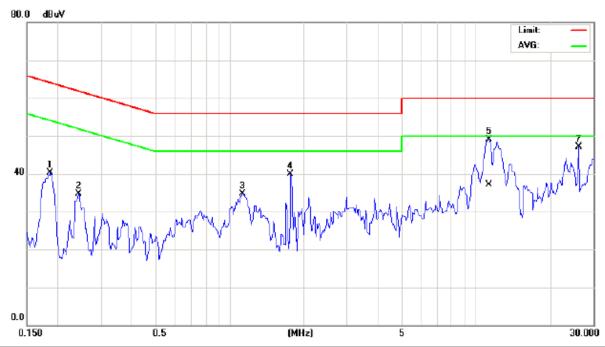
Remark

- (1) All readings are QP Mode value unless otherwise stated AVG in column of Note ... If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform on this case, a " * " marked in AVG Mode column of Interference Voltage Measured on the Note of Interference Voltage Measured on the Note
- (2) Measuring frequency range from 150KHz to 30MHz.

Report No.: NEI-FICP-1-1206C176E Page 15 of 103



E.U.T:	Cavallino GT1	Model Name :	1LFS003
Temperature :	25 ℃	Relative Humidity:	67 %
Pressure:	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	Bluetooth	Phase:	Line

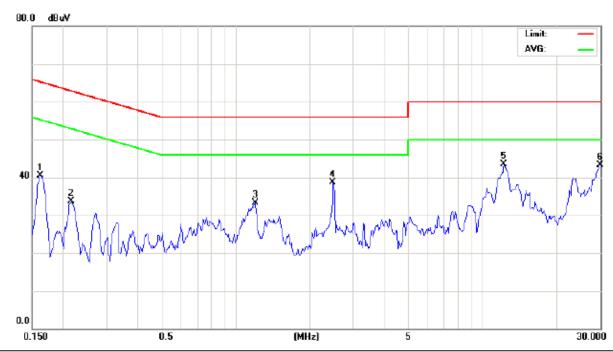


No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBu∀	dB	dBu∀	dBu∀	dB	Detector	Comment
1	0.1864	30.67	9.58	40.25	64.20	-23.95	peak	
2	0.2436	25.18	9.59	34.77	61.97	-27.20	peak	
3	1.1343	25.04	9.72	34.76	56.00	-21.24	peak	
4	1.7710	30.14	9.78	39.92	56.00	-16.08	peak	
5 *	11.2734	38.94	10.25	49.19	60.00	-10.81	peak	
6	11.2734	26.80	10.25	37.05	50.00	-12.95	AVG	
7	26.1755	36.55	10.58	47.13	60.00	-12.87	peak	

Report No.: NEI-FICP-1-1206C176E Page 16 of 103



E.U.T:	Cavallino GT1	Model Name :	1LFS003
Temperature :	25 ℃	Relative Humidity:	67 %
Pressure:	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	Bluetooth	Phase:	Neutral



No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBu∀	dB	dBu∀	dBu∀	dB	Detector	Comment
1	0.1617	30.97	9.53	40.50	65.38	-24.88	peak	
2	0.2164	24.10	9.58	33.68	62.96	-29.28	peak	
3	1.2007	23.62	9.78	33.40	56.00	-22.60	peak	
4	2.4820	28.75	9.91	38.66	56.00	-17.34	peak	
5 *	12.2147	33.13	10.30	43.43	60.00	-16.57	peak	
6	29.8750	32.48	10.74	43.22	60.00	-16.78	peak	

Report No.: NEI-FICP-1-1206C176E Page 17 of 103

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies	Field Strength	Measurement Distance
(MHz)	(micorvolts/meter)	(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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

EDEOLIENCY (MHz)	(dBuV/m) (at 3M)		
FREQUENCY (MHz)	PEAK	AVERAGE	
Above 1000	74	54	

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

Report No.: NEI-FICP-1-1206C176E Page 18 of 103

4.2.2 MEASUREMENT INSTRUMENTS LIST ANS SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	May.25.2013
2	Amplifier	HP	8447D	2944A09673	May.04.2013
3	Test Receiver	R&S	ESCI	100382	May.04.2013
4	Test Cable	N/A	C-01_CB03	N/A	Jul.01.2013
5	Antenna	ETS	3115	00075789	May.25.2013
6	Amplifier	Agilent	8449B	3008A02274	May.04.2013
7	Spectrum	Agilent	E4408B	US39240143	Nov.24.2013
8	Test Cable	HUBER+SUH NER	C-45	N/A	May.02.2013
9	Controller	СТ	SC100	N/A	N/A
10	Active Loop Antenna	R&S	HFH2-Z2	830749/020	May.04.2013
11	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Oct.12.2013
12	Horn Antenna	EMCO	3115	9605-4803	May.25.2013

Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of Equipment List is One Year.

Spectrum Parameter	Setting			
Attenuation	Auto			
Start Frequency	1000 MHz			
Stop Frequency	10th carrier harmonic			

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz for PK/AVG detector
Start ~ Stop Frequency	90kHz~110kHz for QP detector
Start ~ Stop Frequency	110kHz~490kHz for PK/AVG detector
Start ~ Stop Frequency	490kHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

Report No.: NEI-FICP-1-1206C176E Page 19 of 103



4.2.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.4 DEVIATION FROM TEST STANDARD

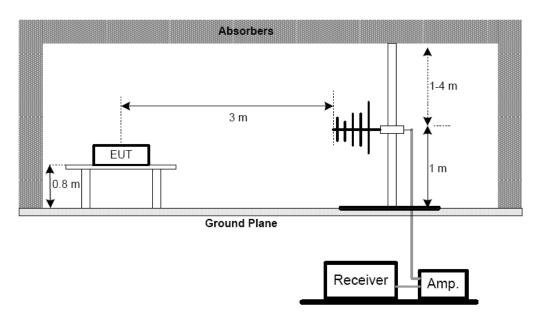
No deviation

Report No.: NEI-FICP-1-1206C176E Page 20 of 103

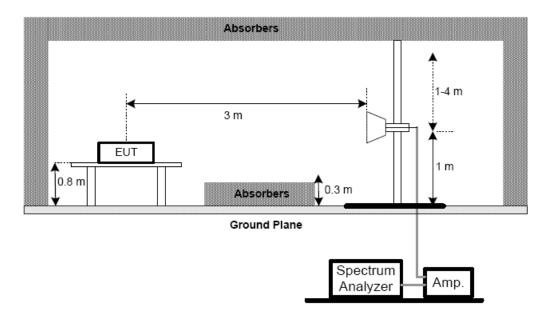


4.2.5 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



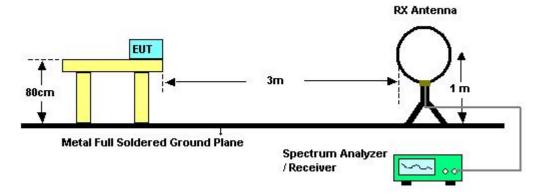
(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



Report No.: NEI-FICP-1-1206C176E Page 21 of 103



(C) For radiated emissions below 30MHz



4.2.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **4.1.6** Unless otherwise a special operating condition is specified in the follows during the testing.

Report No.: NEI-FICP-1-1206C176E Page 22 of 103

4.2.7 TEST RESULTS (BELOW 30MHZ)

EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	26 ℃	Relative Humidity:	53 %
Pressure:	1010 Pa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2402MHz -CH00-1Mbps		

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.0096	0 /90 0°	28.27	24.30	52.57	127.96	-75.39	AVG
0.0096	0°	31.90	24.30	56.20	147.96	-91.76	PK
0.0294	0°	24.78	23.70	48.48	118.24	-69.76	AVG
0.0294	0°	26.55	23.70	50.25	138.24	-87.99	PK
0.0389	0°	20.04	23.10	43.14	115.81	-72.67	AVG
0.0389	0°	22.41	23.10	45.51	135.81	-90.29	PK
0.0607	0°	19.58	22.19	41.77	111.94	-70.17	AVG
0.0607	0°	23.64	22.19	45.83	131.94	-86.11	PK
0.2530	0°	21.82	20.39	42.21	99.54	-57.33	AVG
0.2530	0°	23.87	20.39	44.26	119.54	-75.28	PK
1.7751	0°	26.39	19.52	45.91	69.54	-23.63	QP

Freq.	Ant.	Reading(RA)	Corr.Factor(CF)	Measured(FS)	Limits(QP)	Margin	Note
(MHz)	0°/90°	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Note
0.0098	90°	18.45	24.30	42.75	127.82	-85.07	AVG
0.0098	90°	21.60	24.30	45.90	147.82	-101.92	PK
0.0205	90°	14.96	24.27	39.23	121.37	-82.14	AVG
0.0205	90°	17.83	24.27	42.10	141.37	-99.27	PK
0.0465	90°	20.66	22.62	43.28	114.26	-70.97	AVG
0.0465	90°	23.87	22.62	46.49	134.26	-87.76	PK
0.0741	90°	21.49	21.92	43.41	110.21	-66.80	AVG
0.0741	90°	24.37	21.92	46.29	130.21	-83.92	PK
0.3642	90°	21.50	20.13	41.63	96.38	-54.75	AVG
0.3642	90°	24.86	20.13	44.99	116.38	-71.39	PK
1.6850	90°	23.33	19.53	42.86	63.07	-20.21	QP

Remark:

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported ∘
- (2) Distance extrapolation factor = 40 log (specific distance / test distance) (dB); •
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor. •

Report No.: NEI-FICP-1-1206C176E Page 23 of 103

4.2.8 TEST RESULTS (BETWEEN30 - 1000 MHZ)

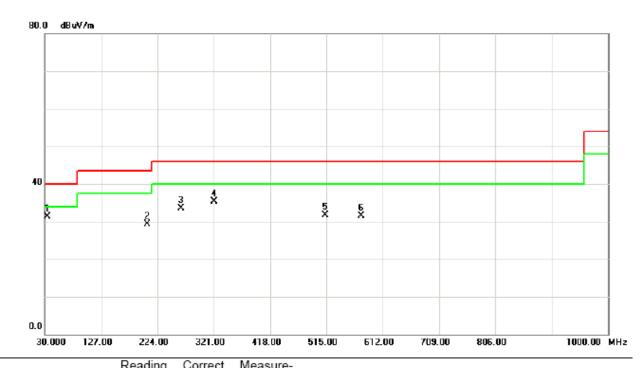
Remark:

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz ; SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz $^{\circ}$
- (2) All readings are Peak unless otherwise stated QP in column of <code>『Note』</code>. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform \circ
- (3) Measuring frequency range from 30MHz to 1000MHz o
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table \circ

Report No.: NEI-FICP-1-1206C176E Page 24 of 103



EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2402MHz -CH00-1Mbps	Polarization:	Vertical



No.	Mk.	. Freq.	Level	Factor	ment	Limit	Over			
		MHz	dBu∀	dB	dBu∀/m	dBu∀/m	dB	Detector	Comment	
1	*	34.8500	48.25	-16.95	31.30	40.00	-8.70	peak		
2		207.0250	46.03	-16.82	29.21	43.50	-14.29	peak		
3		265.2250	47.59	-14.08	33.51	46.00	-12.49	peak		
4		321.0000	47.42	-12.18	35.24	46.00	-10.76	peak		
5		512.5750	39.72	-7.93	31.79	46.00	-14.21	peak		
6		575.6250	37.46	-6.03	31.43	46.00	-14.57	peak		

Report No.: NEI-FICP-1-1206C176E Page 25 of 103



E.U.T:	Cavallino GT1	Model Name :	1LFS003
Temperature :	25 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2402MHz -CH00-1Mbps	Polarization:	Horizontal

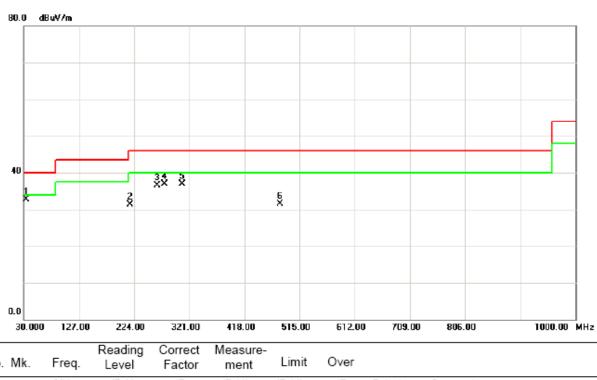


No	. Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBu∀	dB	dBu∀/m	dBu∀/m	dB	Detector	Comment
1		66.3750	43.00	-17.95	25.05	40.00	-14.95	peak	
2)	170.6500	46.78	-17.60	29.18	43.50	-14.32	peak	
3	}	260.3750	51.27	-14.36	36.91	46.00	-9.09	peak	
- 4	*	284.6250	49.88	-12.91	36.97	46.00	-9.03	peak	
5	,	313.7250	48.84	-12.35	36.49	46.00	-9.51	peak	
- 6	j	689.6000	35.80	-4.65	31.15	46.00	-14.85	peak	

Report No.: NEI-FICP-1-1206C176E Page 26 of 103



EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2441MHz -CH39-1Mbps	Polarization:	Vertical

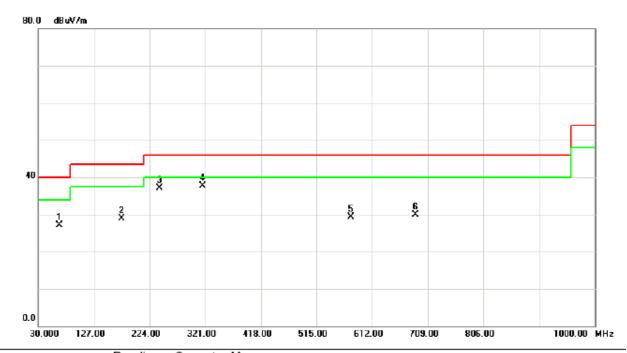


	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
_			MHz	dBu∀	dB	dBu∀/m	dBu∀/m	dB	Detector	Comment	
	1	*	34.8500	49.75	-16.95	32.80	40.00	-7.20	peak		
	2		216.7250	47.85	-16.46	31.39	46.00	-14.61	peak		
	3		265.2250	50.59	-14.08	36.51	46.00	-9.49	peak		
	4		277.3500	50.20	-13.34	36.86	46.00	-9.14	peak		
-	5		308.8750	49.36	-12.45	36.91	46.00	-9.09	peak		
-	6		481.0500	40.09	-8.63	31.46	46.00	-14.54	peak		

Report No.: NEI-FICP-1-1206C176E Page 27 of 103



E.U.T:	Cavallino GT1	Model Name :	1LFS003
Temperature :	25 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2441MHz -CH39-1Mbps	Polarization:	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBu∀	dB	dBu∀/m	dBu∀/m	dB	Detector	Comment
1		66.3750	45.00	-17.95	27.05	40.00	-12.95	peak	
2		175.5000	46.40	-17.41	28.99	43.50	-14.51	peak	
3		240.9750	52.75	-15.63	37.12	46.00	-8.88	peak	
4	*	316.1500	50.06	-12.29	37.77	46.00	-8.23	peak	
5		575.6250	35.32	-6.03	29.29	46.00	-16.71	peak	
6		687.1750	34.54	-4.66	29.88	46.00	-16.12	peak	

Report No.: NEI-FICP-1-1206C176E Page 28 of 103



EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2480MHz -CH78-1Mbps	Polarization:	Vertical

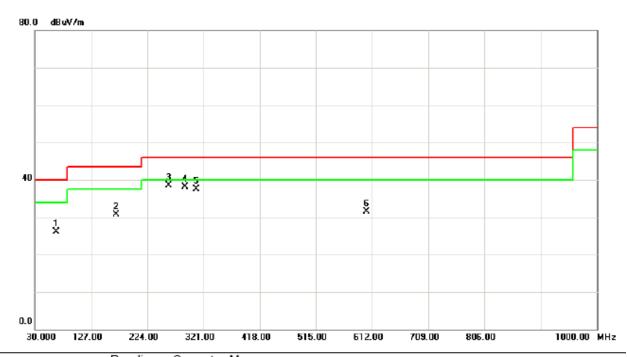


No.	Mk.	Freq.	Level	Factor	ment	Limit	Over		
		MHz	dBu∀	dB	dBu∀/m	dBu∀/m	dB	Detector	Comment
1	*	34.8500	50.25	-16.95	33.30	40.00	-6.70	peak	
2		192.4750	49.46	-17.06	32.40	43.50	-11.10	peak	
3		277.3500	48.70	-13.34	35.36	46.00	-10.64	peak	
4		316.1500	48.20	-12.29	35.91	46.00	-10.09	peak	
5		481.0500	40.59	-8.63	31.96	46.00	-14.04	peak	
6		672.6250	38.33	-4.66	33.67	46.00	-12.33	peak	

Report No.: NEI-FICP-1-1206C176E Page 29 of 103



E.U.T:	Cavallino GT1	Model Name :	1LFS003
Temperature :	25 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2480MHz –CH78-1Mbps	Polarization:	Horizontal



No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBu∀	dB	dBu∀/m	dBu∀/m	dB	Detector	Comment
1		66.3750	44.00	-17.95	26.05	40.00	-13.95	peak	
2		170.6500	48.28	-17.60	30.68	43.50	-12.82	peak	
3	*	260.3750	52.77	-14.36	38.41	46.00	-7.59	peak	
4		289.4750	50.79	-12.63	38.16	46.00	-7.84	peak	
5		308.8750	49.88	-12.45	37.43	46.00	-8.57	peak	
6		602.3000	36.91	-5.46	31.45	46.00	-14.55	peak	

Report No.: NEI-FICP-1-1206C176E Page 30 of 103

4.2.9 TEST RESULTS (ABOVE 1000 MHZ)

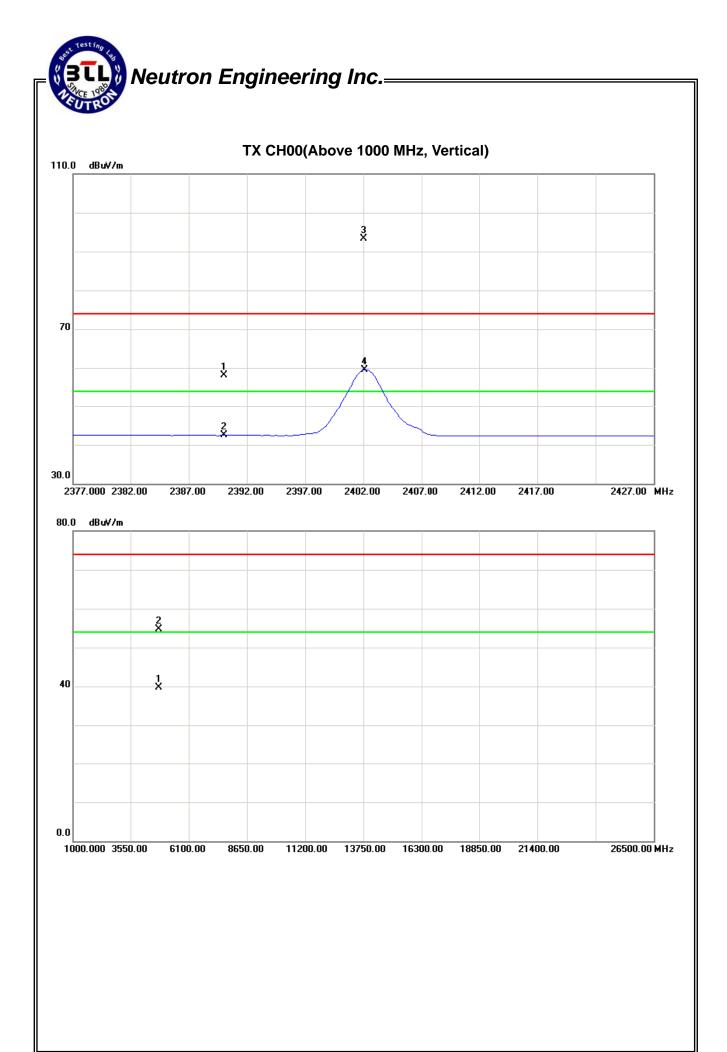
EUT:	Cavallino GT1	Model Name :	1LFS003	
Temperature:	25 ℃	Relative Humidity:	58 %	
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz	
Test Mode :	TX 2402MHz – CH 00-1Mbps			

Freq.	Ant.Pol.	Rea	ding	Ant./CF	Act.		Lim it		Margin		
		Peak	AV		Peak AV		Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2390.00	V	25.78	10.19	32.28	58.06	42.47	74.00	54.00	-15.94	-11.53	X/E
2402.00	V	60.99	27.32	32.27	93.26	59.59					X/F
4804.10	V	48.69	33.58	6.11	54.80	39.69	74.00	54.00	-19.20	-14.31	X/H

Remark:

- (1) All readings are Peak unless otherwise stated QP in column of ${}^{\mathbb{F}}$ Note $_{\mathbb{J}}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform \circ
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission •
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Report No.: NEI-FICP-1-1206C176E Page 31 of 103

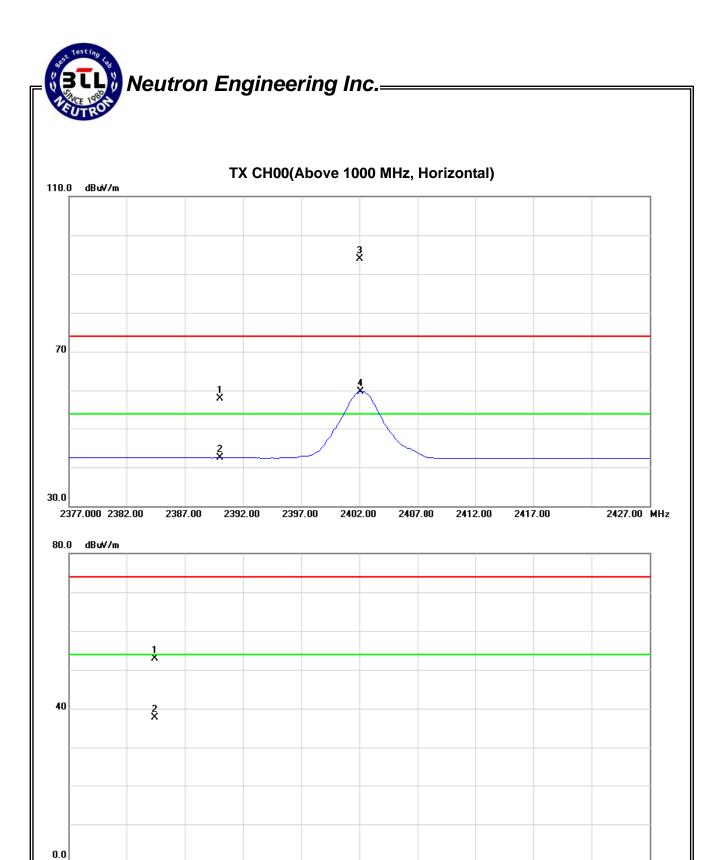


EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1010hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2402MHz – CH 00-1Mbps		

Freq.	Ant.Pol.	Rea	ding	Ant./CF	Act.		Limit		Margin		
		Peak	AV		Peak	AV	Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2390.00	Н	25.70	10.19	32.28	57.98	42.47	74.00	54.00	-16.02	-11.53	X/E
2402.00	Н	61.69	27.47	32.27	93.96	59.74					X/F
4803.89	Н	46.87	31.52	6.11	52.98	37.63	74.00	54.00	-21.02	-16.37	X/H

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform ∘
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission ∘
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Report No.: NEI-FICP-1-1206C176E Page 33 of 103



11200.00 13750.00 16300.00 18850.00

26500.00 MHz

21400.00

1000.000 3550.00

6100.00

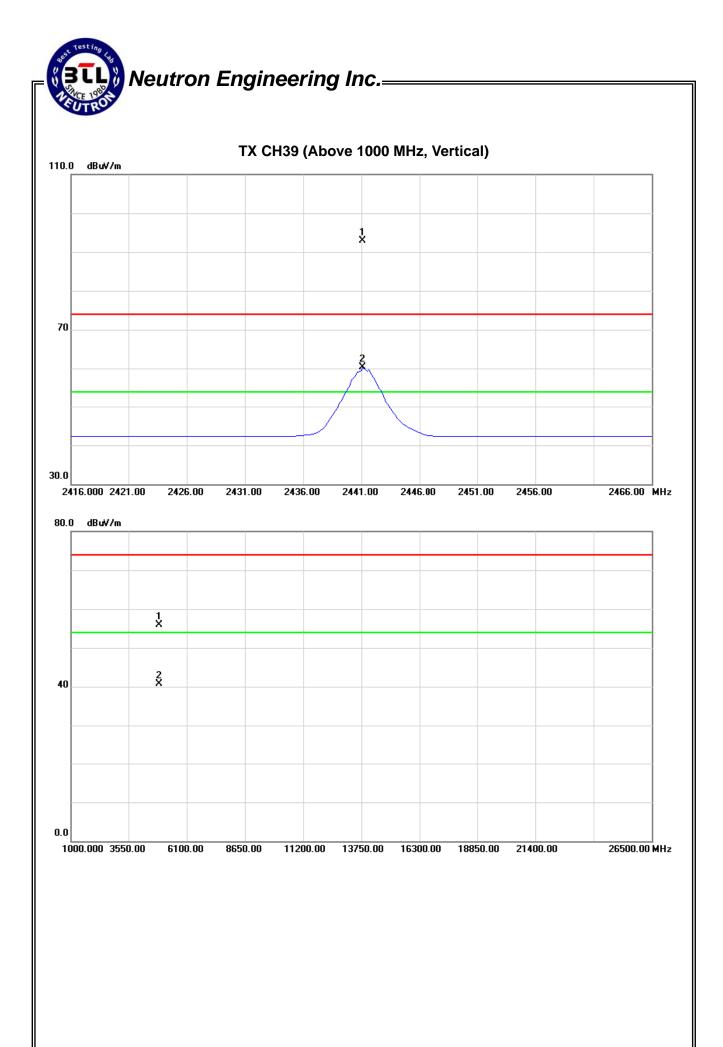
8650.00

EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2441MHz –CH39-1Mbps		

Freg. Ant.Pol		Ant Pol Reading		Ant./CF	Act.		Limit		Margin		
r req.	Ant.i oi.	Peak	AV		Peak	AV	Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	dBuV/m	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2441.13	٧	60.58	28.05	32.23	92.81	60.28					X/F
4882.18	V	49.54	34.23	6.43	55.97	40.66	74.00	54.00	-18.03	-13.34	X/H

- (1) All readings are Peak unless otherwise stated QP in column of \lceil Note $_{
 m J}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform $_{
 m O}$
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission \circ
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Report No.: NEI-FICP-1-1206C176E Page 35 of 103



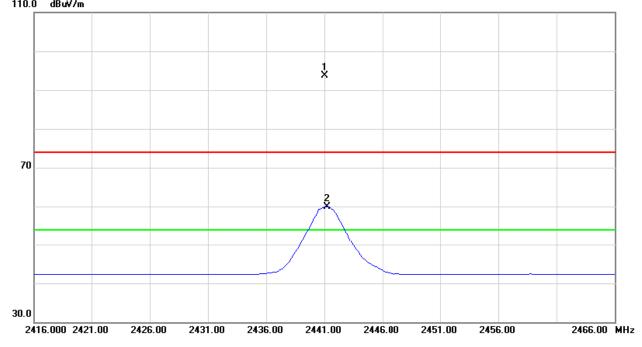
EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2441MHz –CH39-1Mbps		

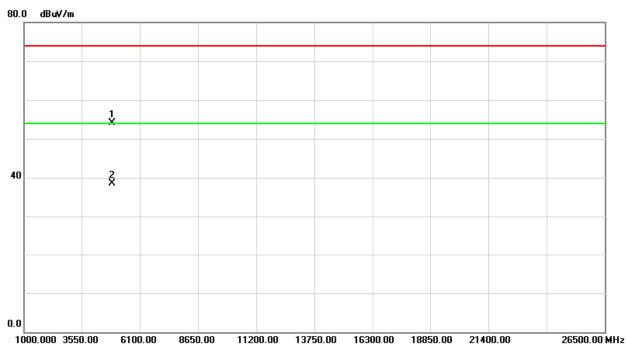
Freg. Ant.Pol.		Reading		Ant./CF	Act.		Limit		Margin		
r req.	AIIL.FUI.	Peak	AV		Peak	AV	Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2441.00	Н	61.57	27.68	32.23	93.80	59.91					X/F
4882.02	Н	47.58	32.01	6.43	54.01	38.44	74.00	54.00	-19.99	-15.56	X/H

- (1) All readings are Peak unless otherwise stated QP in column of \lceil Note $_{
 m J}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform $_{
 m O}$
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission •
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Report No.: NEI-FICP-1-1206C176E Page 37 of 103

TX CH39 (Above 1000 MHz, Horizontal)





EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1010hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2480MHz -CH78-1Mbps		

Freq.	Ant.Pol.	Rea	ding	Ant./CF	Act.		Limit		Margin		
		Peak	AV		Peak	AV	Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2480.00	٧	60.79	27.33	32.18	92.97	59.51					X/F
2483.50	V	35.16	13.56	32.17	67.33	45.73	74.00	54.00	-6.67	-8.27	X/E
4960.25	V	47.14	32.55	6.74	53.88	39.29	74.00	54.00	-20.12	-14.71	X/H

- (1) All readings are Peak unless otherwise stated QP in column of \lceil Note $_{
 m J}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform $_{
 m O}$
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission ∘
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Report No.: NEI-FICP-1-1206C176E Page 39 of 103

TX CH78 (Above 1000 MHz, Vertical) 110.0 dBuV/m 1 10.0 dBuV/m 2 2 3 3 4

30.0



Report No.: NEI-FICP-1-1206C176E Page 40 of 103

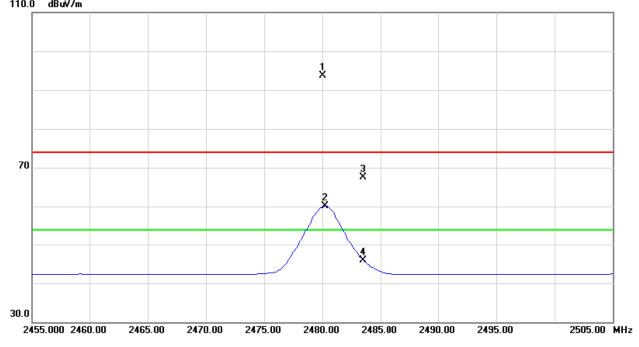
EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2480MHz -CH78-1Mbps		

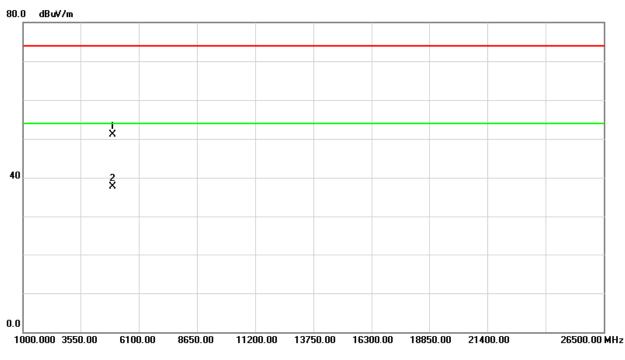
Freq.	Ant.Pol.	Rea	ding	Ant./CF	A	ct.	Lir	nit	Ма	rgin	
		Peak	AV		Peak	AV	Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2480.00	Н	61.51	27.93	32.18	93.69	60.11					X/F
2483.50	Н	35.42	13.77	32.17	67.59	45.94	74.00	54.00	-6.41	-8.06	X/E
4960.10	Н	44.27	30.95	6.74	51.01	37.69	74.00	54.00	-22.99	-16.31	X/H

- (1) All readings are Peak unless otherwise stated QP in column of ${}^{\mathbb{F}}$ Note ${}_{\mathbb{J}}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform ${}^{\circ}$
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency of E" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission ∘
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Report No.: NEI-FICP-1-1206C176E Page 41 of 103

TX CH78 (Above 1000 MHz, Horizontal)





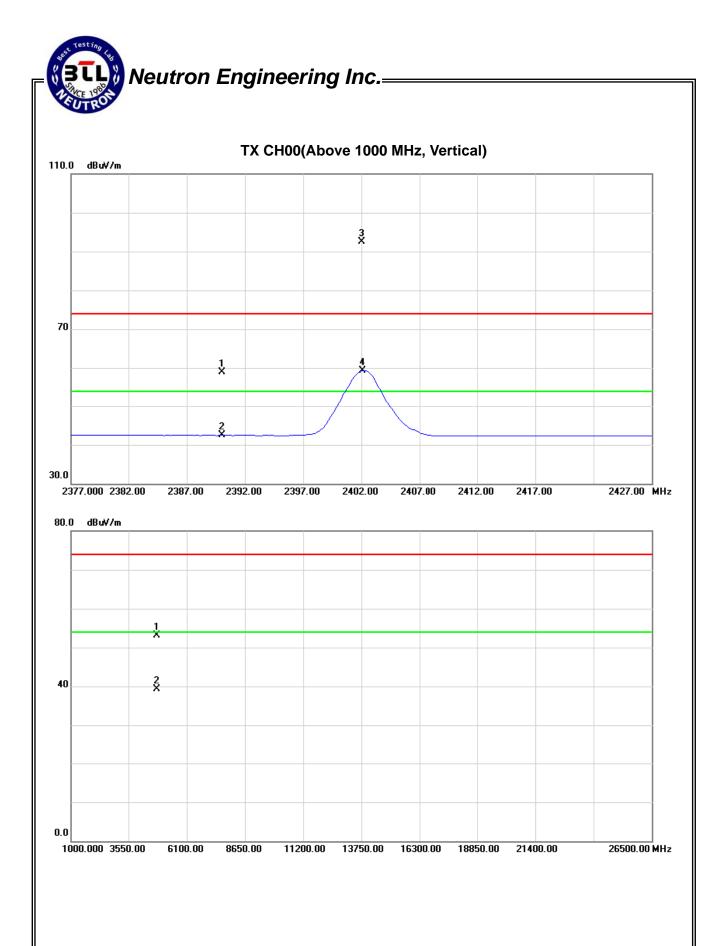
Page 42 of 103

EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2402MHz – CH 00-3Mbps		

Freq.	Ant.Pol.	Rea	ding	Ant./CF	Act.		Limit		Ma	rgin	
		Peak	AV		Peak	AV	Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2390.00	V	26.55	10.14	32.28	58.83	42.42	74.00	54.00	-15.17	-11.58	X/E
2402.00	٧	60.30	27.05	32.27	92.57	59.32					X/F
4803.89	V	47.05	33.24	6.11	53.16	39.35	74.00	54.00	-20.84	-14.65	X/H

- (1) All readings are Peak unless otherwise stated QP in column of \lceil Note $_{
 m J}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform $_{
 m O}$
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission \circ
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Report No.: NEI-FICP-1-1206C176E Page 43 of 103



Page 44 of 103

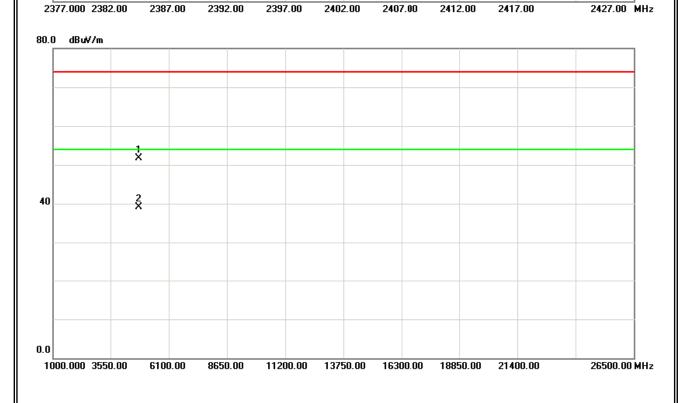
EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1010hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2402MHz – CH 00-3Mbps		

Freq.	Ant.Pol.	Rea	ding	Ant./CF	Act.		Limit		Margin		
		Peak	AV		Peak	AV	Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2390.00	Н	26.45	10.15	32.28	58.73	42.43	74.00	54.00	-15.27	-11.57	X/E
2402.00	Н	60.87	27.22	32.27	93.14	59.49					X/F
4804.23	Н	45.62	32.95	6.11	51.73	39.06	74.00	54.00	-22.27	-14.94	X/H

- (1) All readings are Peak unless otherwise stated QP in column of \lceil Note $_{
 m J}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform $_{
 m O}$
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission \circ
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Report No.: NEI-FICP-1-1206C176E Page 45 of 103

TX CH00(Above 1000 MHz, Horizontal) 110.0 dBuV/m 20



Report No.: NEI-FICP-1-1206C176E

30.0

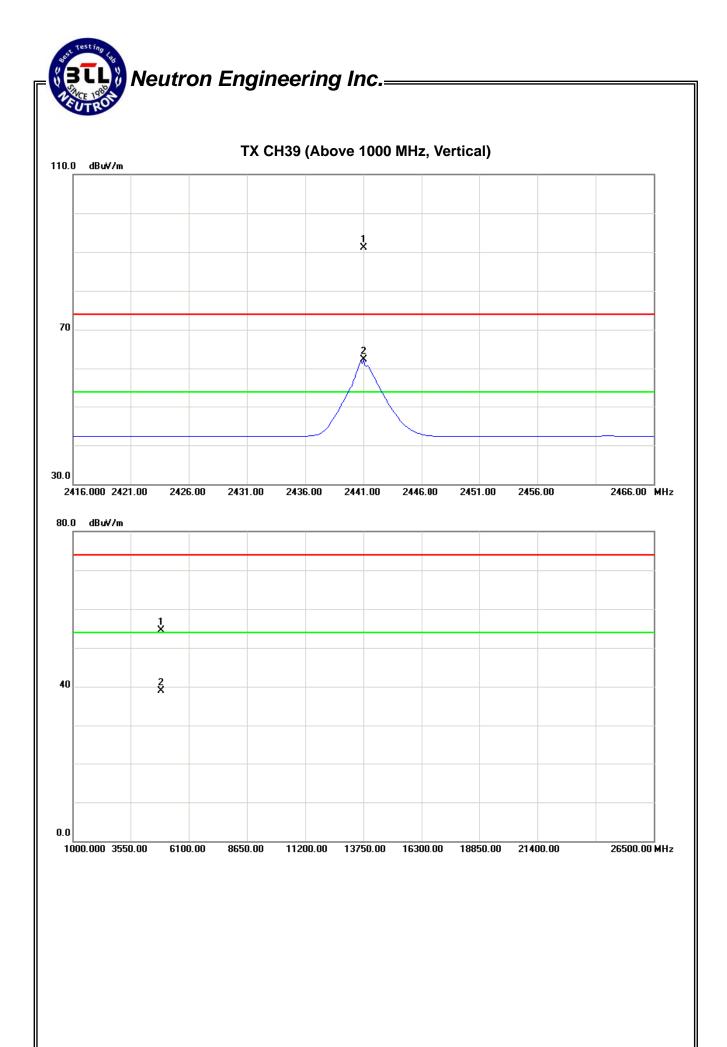
Page 46 of 103

EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2441MHz –CH39-3Mbps		

Freq.	Ant.Pol.	Rea	ding	Ant./CF	A	ct.	Liı	mit	Ма	rgin	
		Peak	AV		Peak	AV	Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2441.00	٧	58.97	30.01	32.23	91.20	62.24					X/F
4882.25	V	48.02	32.46	6.43	54.45	38.89	74.00	54.00	-19.55	-15.11	X/H

- (1) All readings are Peak unless otherwise stated QP in column of \lceil Note $_{
 m J}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform $_{
 m O}$
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission o
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Report No.: NEI-FICP-1-1206C176E Page 47 of 103



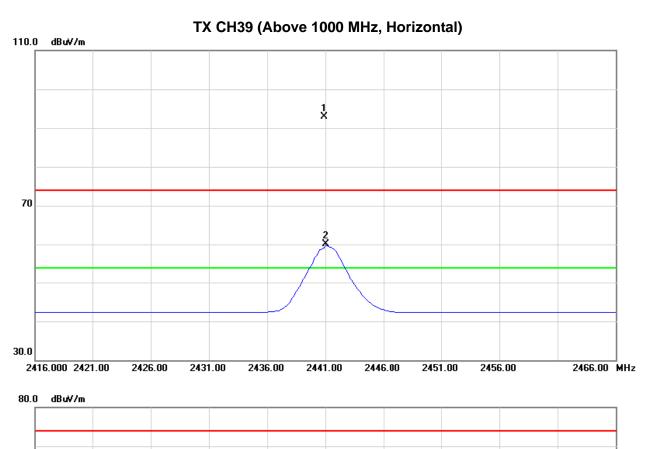
EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2441MHz –CH39-3Mbps		

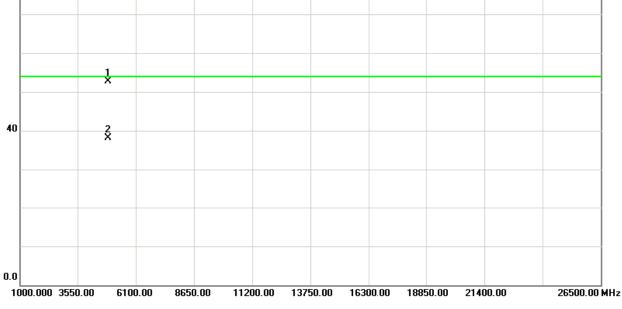
(MHz) 2440.88 4882.14	Ant.Pol.	Read	ding	Ant./CF	Act.		Limit		Margin		
		Peak	AV		Peak	AV	Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2440.88	Н	60.58	27.78	32.23	92.81	60.01					X/F
4882.14	Н	46.22	31.70	6.43	52.65	38.13	74.00	54.00	-21.35	-15.87	X/H

- (1) All readings are Peak unless otherwise stated QP in column of \lceil Note $_{
 m J}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform $_{
 m O}$
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission o
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Report No.: NEI-FICP-1-1206C176E Page 49 of 103

Neutron Engineering Inc.— TX CH39 (Above 1000 MH



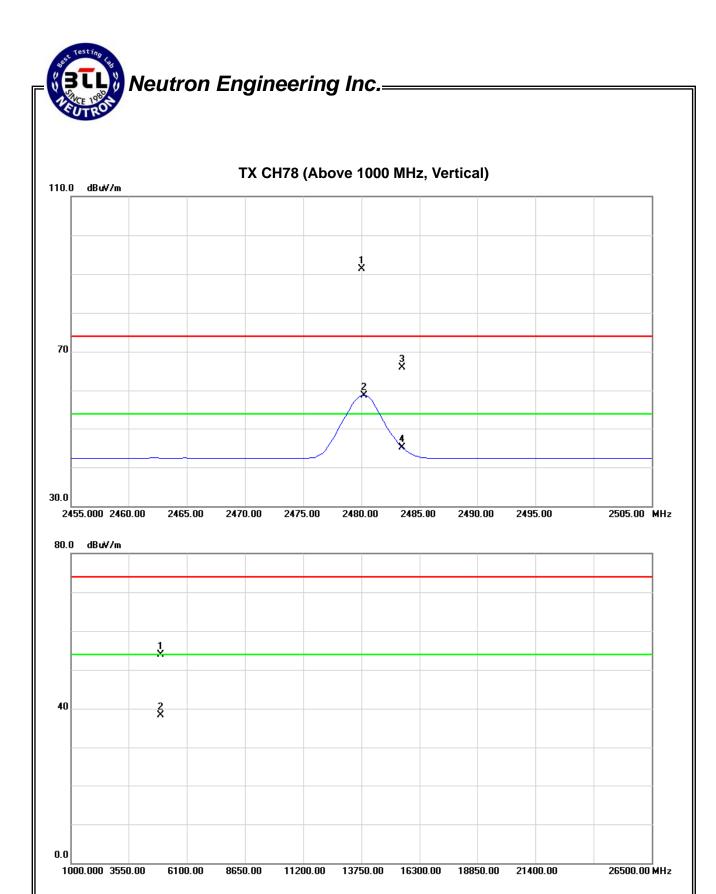


EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1010hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2480MHz –CH78-3Mbps		

Freq.	Ant.Pol.	Rea	ding	Ant./CF	A	ct.	Liı	mit	Mai	rgin	
		Peak	AV		Peak	AV	Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2480.00	٧	59.20	26.54	32.18	91.38	58.72					X/F
2483.50	V	33.72	13.02	32.17	65.89	45.19	74.00	54.00	-8.11	-8.81	X/E
4960.15	V	47.21	31.50	6.74	53.95	38.24	74.00	54.00	-20.05	-15.76	X/H

- (1) All readings are Peak unless otherwise stated QP in column of \lceil Note $_{
 m J}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform $_{
 m O}$
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission \circ
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Report No.: NEI-FICP-1-1206C176E Page 51 of 103



Page 52 of 103



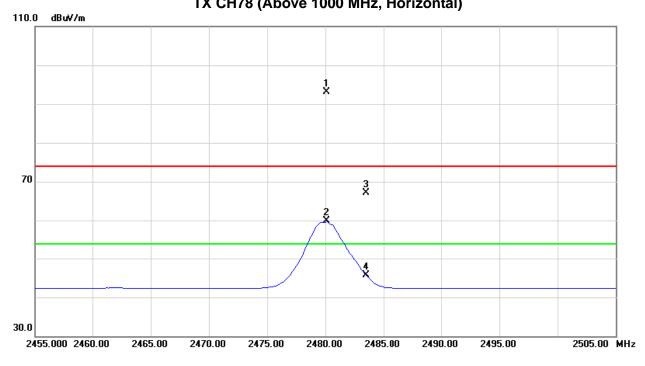
EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2480MHz -CH78-3Mbps		

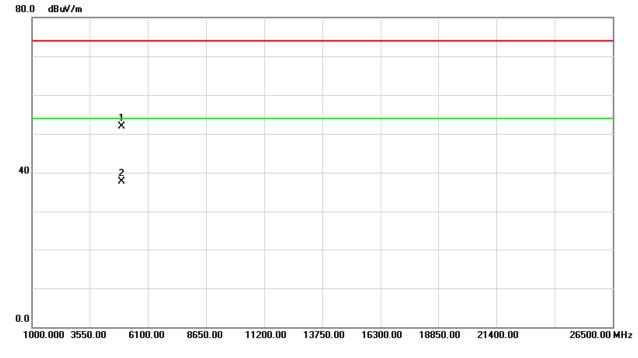
Freq.	Ant.Pol.	Rea	iding	Ant./CF	Act.		Limit		Margin		
		Peak	AV		Peak	AV	Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2480.13	Н	60.98	27.76	32.18	93.16	59.94					X/F
2483.50	Н	35.02	13.55	32.17	67.19	45.72	74.00	54.00	-6.81	-8.28	X/E
4959.95	Н	45.22	30.96	6.74	51.96	37.70	74.00	54.00	-22.04	-16.30	X/H

- (1) All readings are Peak unless otherwise stated QP in column of \lceil Note $_{
 m J}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform $_{
 m O}$
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission \circ
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Report No.: NEI-FICP-1-1206C176E Page 53 of 103

Neutron Engineering Inc. TX CH78 (Above 1000 MHz, Horizontal)





5. NUMBER OF HOPPING CHANNEL

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C								
Section	Test Item	Frequency Range (MHz)	Result					
15.247 (a)(1)(iii)	Number of Hopping Channel	2400-2483.5	PASS					

5.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.24.2013

Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of Equipment List is One Year.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.1.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

5.1.3 DEVIATION FROM STANDARD

No deviation.

5.1.4 TEST SETUP

EUT	SPECTRUM
	ANALYZER

5.1.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

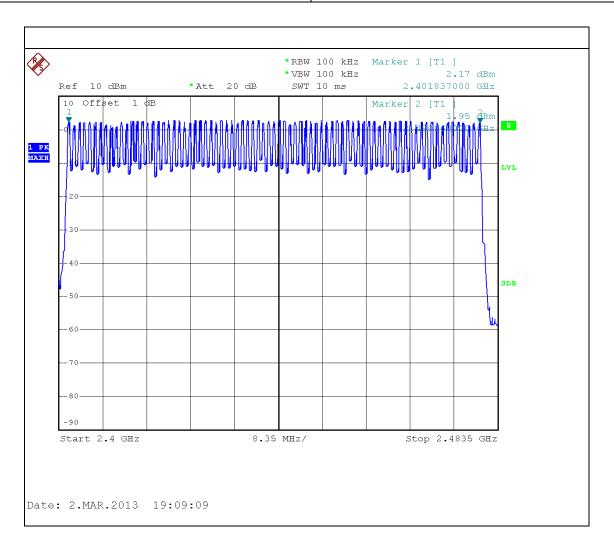
Report No.: NEI-FICP-1-1206C176E Page 55 of 103



5.1.6 TEST RESULTS

EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Hopping Mode -1Mbps		

Number of Hopping Channel	79
---------------------------	----

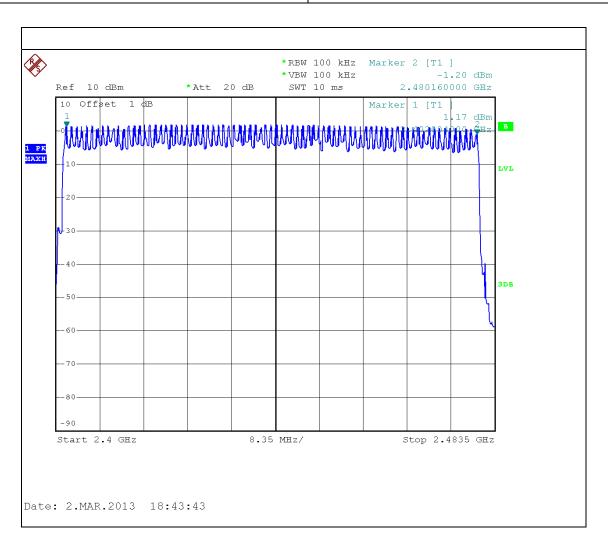


Report No.: NEI-FICP-1-1206C176E



EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Hopping Mode -3Mbps		

Number of Hopping Channel	79



Report No.: NEI-FICP-1-1206C176E Page 57 of 103

6. AVERAGE TIME OF OCCUPANCY

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

6.1.1 MEASUREMENT INSTRUMENTS LIST

I	tem	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
	1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.24.2013

Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of Equipment List is One Year.

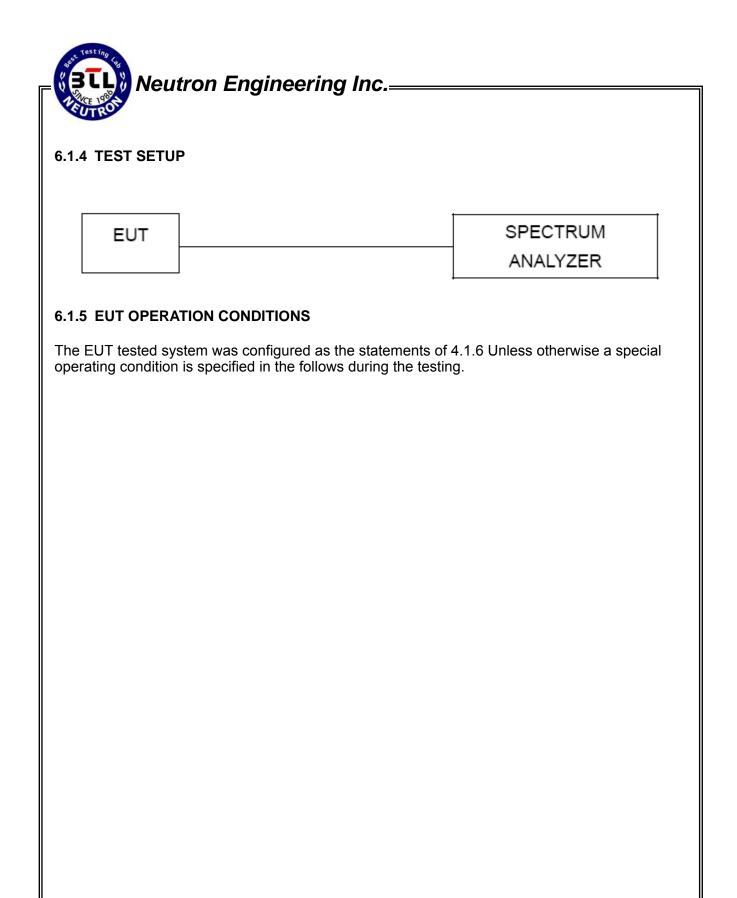
6.1.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyzer
- b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- C. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- f Measure the maximum time duration of one single pulse.
- g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
- h Measure the maximum time duration of one single pulse.
- i. DH5 Packet permit maximum 1600/79/6 = 3.37 hops per second in each channel (5 time slots TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times $3.37 \times 31.6 = 106.6$ within 31.6 seconds.
- j. DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times 5.06 x 31.6 = 160 within 31.6 seconds.
- k. DH1 Packet permit maximum 1600 / 79 /2 = 10.12 hops per second in each channel (1 time slot TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times 10.12 x 31.6 = 320 within 31.6 seconds.

6.1.3 DEVIATION FROM STANDARD

No deviation.

Report No.: NEI-FICP-1-1206C176E Page 58 of 103

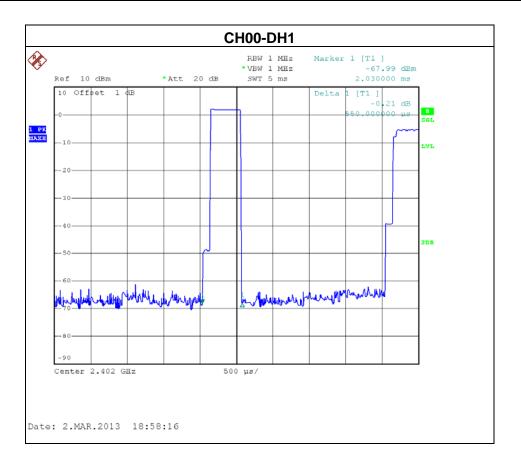


Report No.: NEI-FICP-1-1206C176E Page 59 of 103

6.1.6 TEST RESULTS

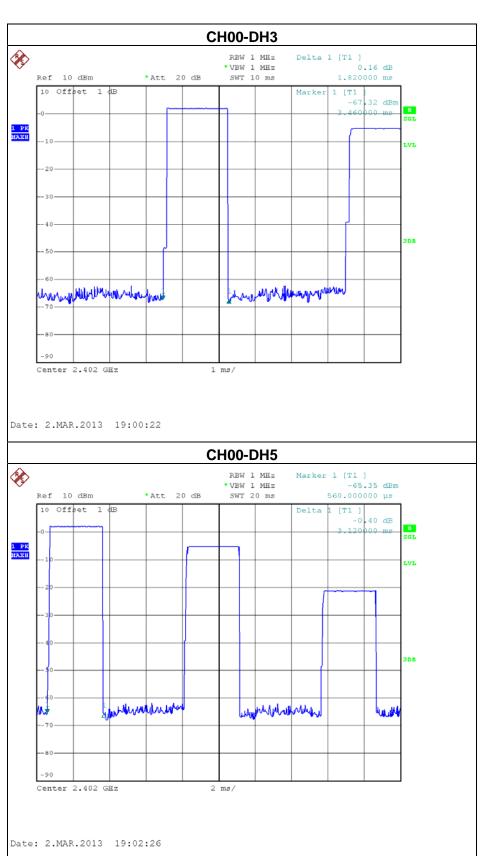
EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH00-DH1/DH3/DH5 -1Mbps		

Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2402 MHz	3.1200	0.3328	0.4000
DH3	2402 MHz	1.8200	0.2912	0.4000
DH1	2402 MHz	0.5500	0.1760	0.4000



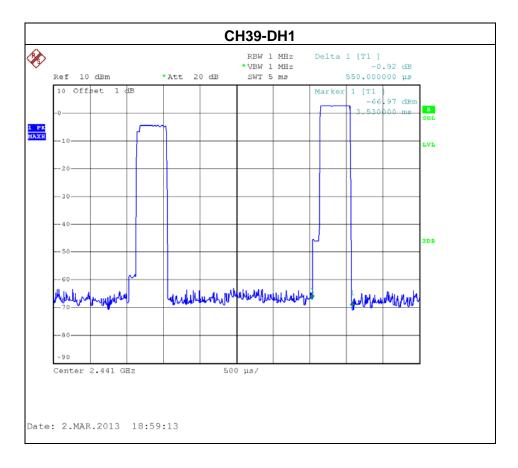
Report No.: NEI-FICP-1-1206C176E Page 60 of 103

Neutron Engineering Inc.



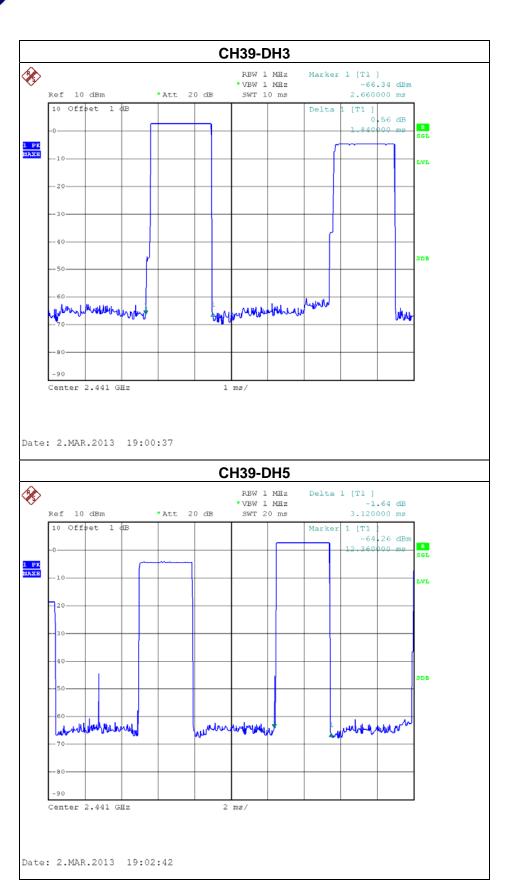
EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH39 -DH1/DH3/DH5 -1Mbps		

Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2441 MHz	3.1200	0.3328	0.4000
DH3	2441 MHz	1.8400	0.2944	0.4000
DH1	2441 MHz	0.5500	0.1760	0.4000



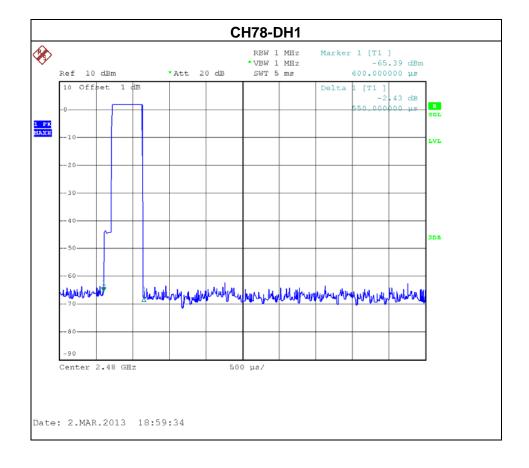
Report No.: NEI-FICP-1-1206C176E Page 62 of 103

Neutron Engineering Inc.



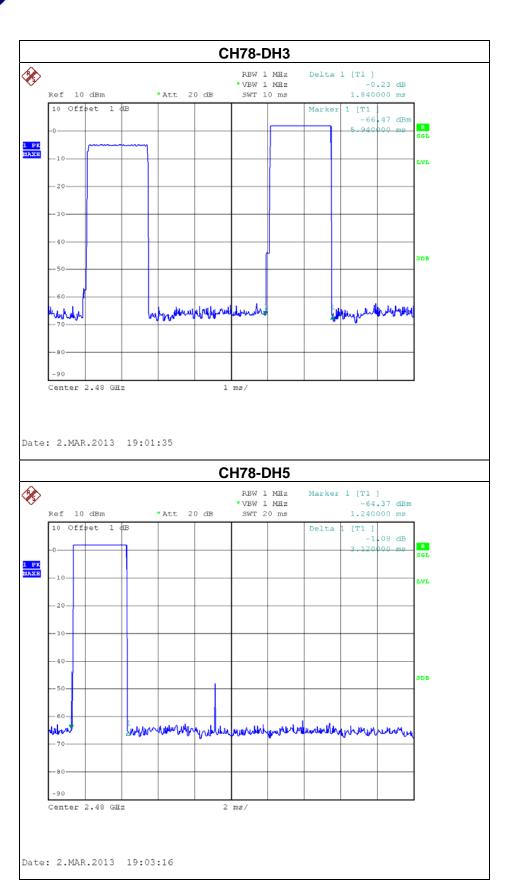
EUT:	Cavallino GT1(Bluetooth)	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH78 -DH1/DH3/DH5-1Mbps		

Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2480 MHz	3.1200	0.3328	0.4000
DH3	2480 MHz	1.8400	0.2912	0.4000
DH1	2480 MHz	0.5500	0.1760	0.4000



Report No.: NEI-FICP-1-1206C176E Page 64 of 103

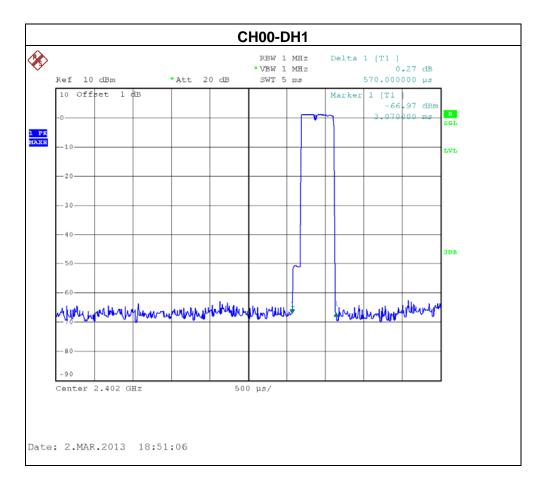
Neutron Engineering Inc.





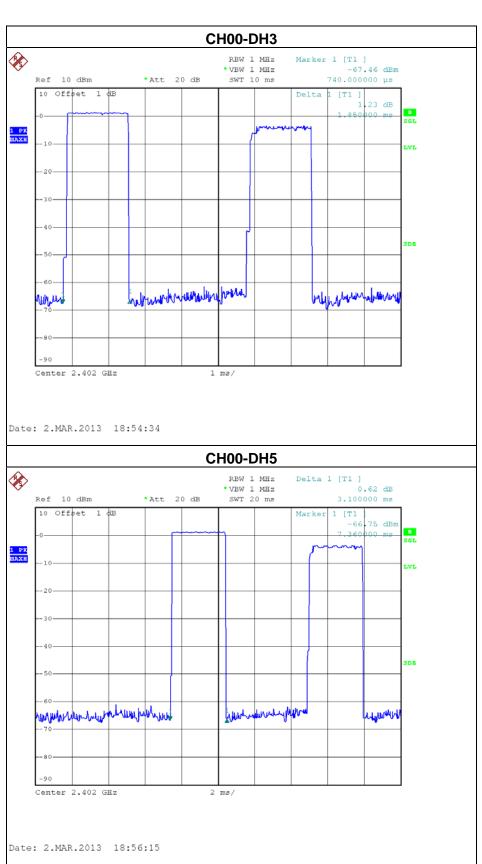
EUT:	Cavallino GT1(Bluetooth)	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH00-DH1/DH3/DH5-3Mbps		

Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2402 MHz	3.1000	0.3371	0.4000
DH3	2402 MHz	1.8500	0.2912	0.4000
DH1	2402 MHz	0.5700	0.1824	0.4000



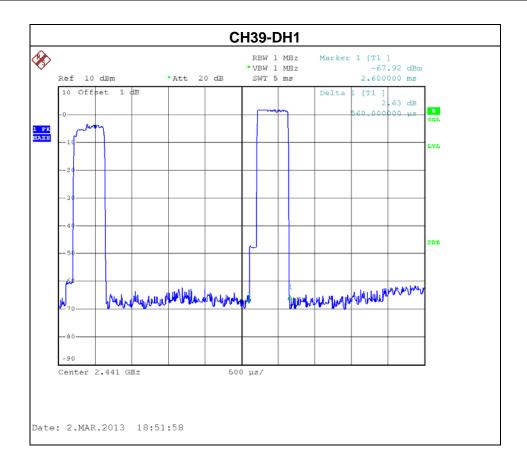
Report No.: NEI-FICP-1-1206C176E Page 66 of 103

Neutron Engineering Inc.

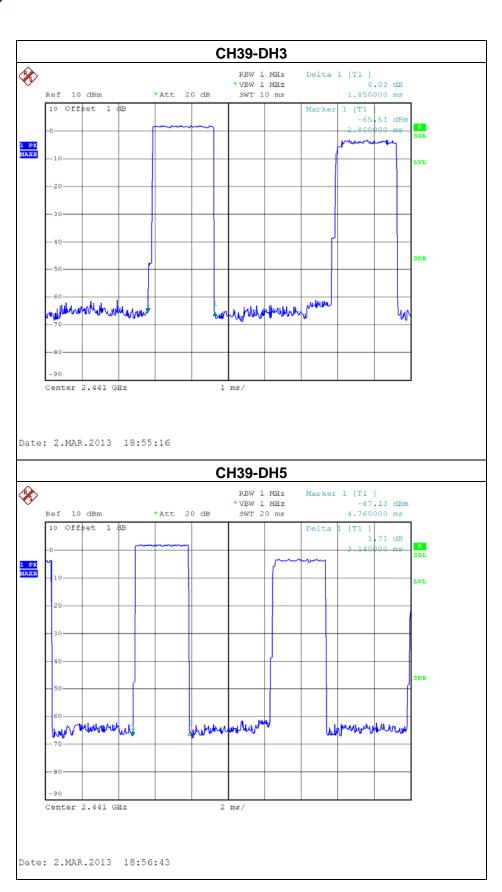


EUT:	Cavallino GT1(Bluetooth)	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH39 -DH1/DH3/DH5-3Mbps		

Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2441 MHz	3.1400	0.3328	0.4000
DH3	2441 MHz	1.8500	0.2944	0.4000
DH1	2441 MHz	0.5600	0.1792	0.4000

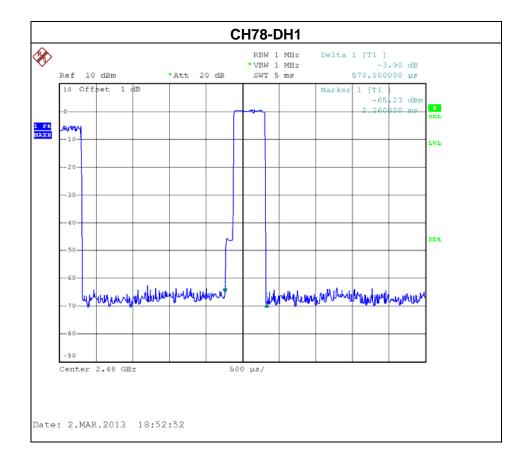


Report No.: NEI-FICP-1-1206C176E Page 68 of 103

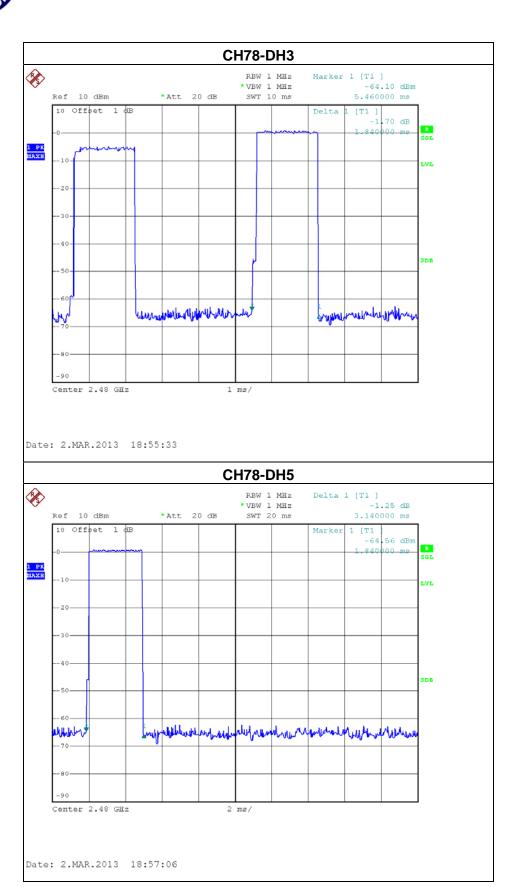


EUT:	Cavallino GT1(Bluetooth)	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH78 -DH1/DH3/DH5-3Mbps		

Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2480 MHz	3.1400	0.3371	0.4000
DH3	2480 MHz	1.8400	0.2944	0.4000
DH1	2480 MHz	0.5700	0.1792	0.4000



Report No.: NEI-FICP-1-1206C176E Page 70 of 103



7. HOPPING CHANNEL SEPARATION MEASUREMENT

7.1 APPLIED PROCEDURES / LIMIT

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

7.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.24.2013

Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of Equipment List is One Year.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

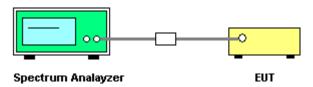
7.1.2 TEST PROCEDURE

- a. The EUT must have its hopping function enabled
- b. Span = wide enough to capture the peaks of two adjacent channels Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span Video (or Average) Bandwidth (VBW) ≥ RBW Sweep = auto Detector function = peak Trace = max hold

7.1.3 DEVIATION FROM STANDARD

No deviation.

7.1.4 TEST SETUP



7.1.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in hopping mode.

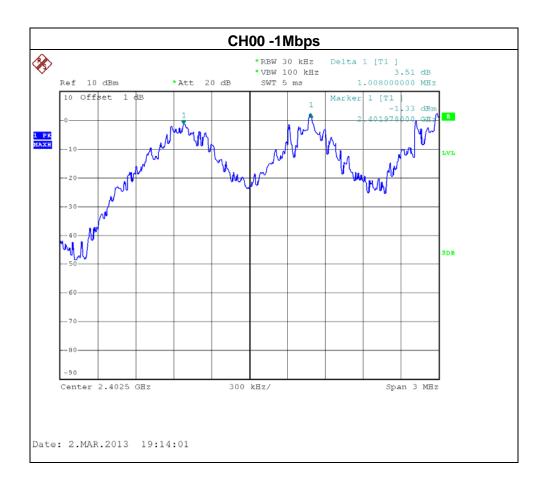
Report No.: NEI-FICP-1-1206C176E Page 72 of 103

7.1.6 TEST RESULTS

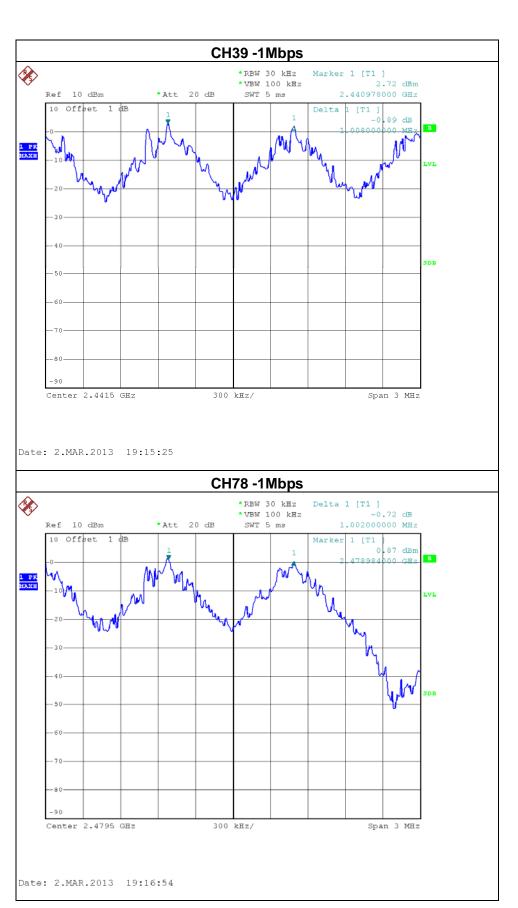
EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH00 / CH39 /CH78-1Mbps		

Frequency	Ch. Separation (MHz)	20dB Bandwidth (MHz)	Result
2402 MHz	1.008	0.830	Complies
2441 MHz	1.008	0.830	Complies
2480 MHz	1.002	0.830	Complies

Ch. Separation Limits: >20dB bandwidth or >2/3 of 20dB bandwidth



Report No.: NEI-FICP-1-1206C176E Page 73 of 103

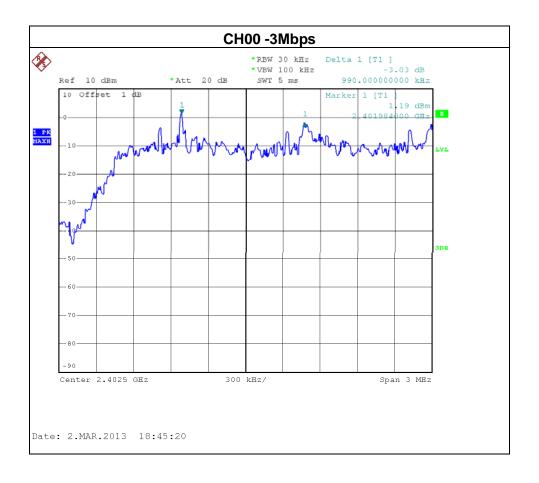




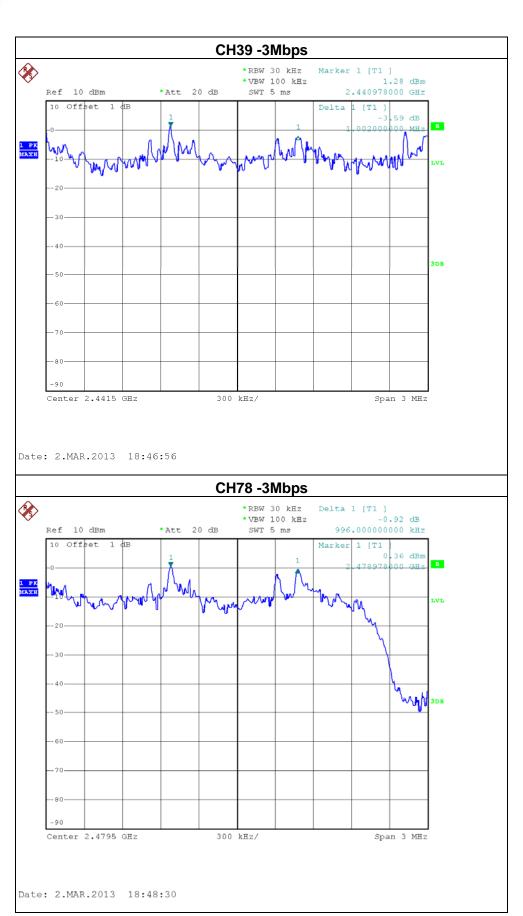
EUT:	Cavallino GT1(Bluetooth)	Model Name :	1LFS003
Temperature:	20 ℃	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Hopping on -CH00 / CH39 /CH78-3Mbps		

Frequency	Ch. Separation (MHz)	20dB Bandwidth (MHz)	Result
2402 MHz	0.990	1.20	Complies
2441 MHz	1.002	1.20	Complies
2480 MHz	0.996	1.20	Complies

Ch. Separation Limits: >20dB bandwidth or >2/3 of 20dB bandwidth



Report No.: NEI-FICP-1-1206C176E Page 75 of 103



8. BANDWIDTH TEST

8.1 APPLIED PROCEDURES / LIMIT

/						
	FCC Part15 (15.247) , Subpart C					
Section	Test Item	Limit	Frequency Range (MHz)	Result		
15.247 (a)(2)	Bandwidth	<= 1 MHz (20dB bandwidth)	2400-2483.5	PASS		

8.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.24.2013

Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of Equipment List is One Year.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.1.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 30KHz, VBW=100KHz, Sweep time = Auto.

8.1.3 DEVIATION FROM STANDARD

No deviation.

8.1.4 TEST SETUP

EUT	SPECTRUM
	ANALYZER

8.1.5 EUT OPERATION CONDITIONS

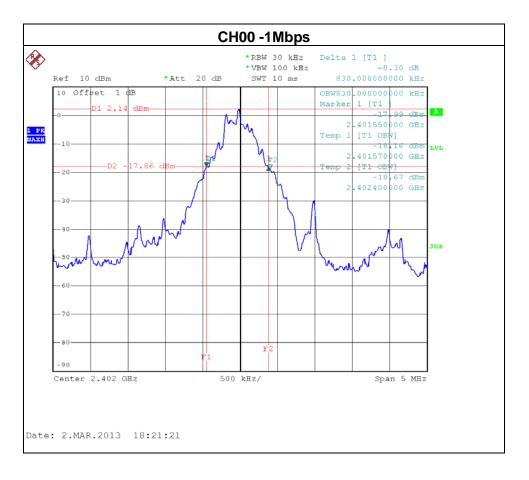
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

Report No.: NEI-FICP-1-1206C176E Page 77 of 103

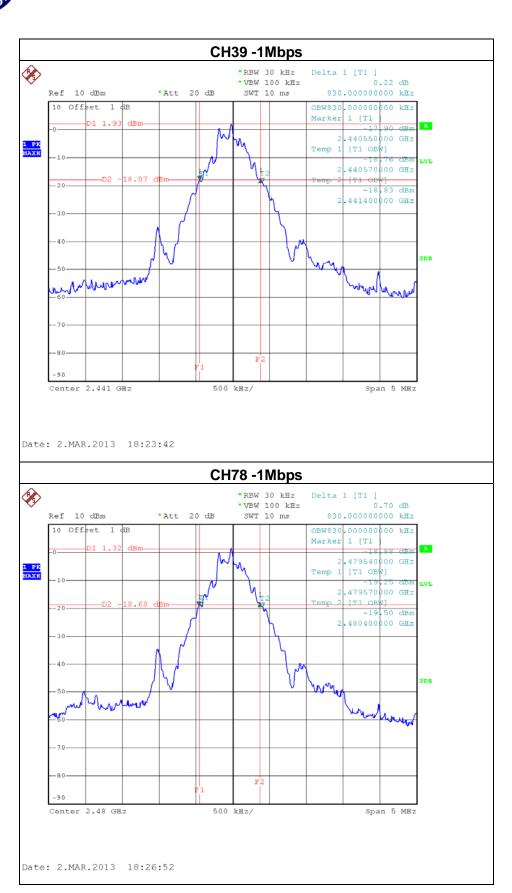
8.1.6 TEST RESULTS

EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH00 / CH39 /CH78-1Mbps		

Frequency	20dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Channel Separation (MHz)	Result
2402 MHz	0.830	0.830	<= 1MHz	PASS
2441 MHz	0.830	0.830	<= 1MHz	PASS
2480 MHz	0.830	0.830	<= 1MHz	PASS



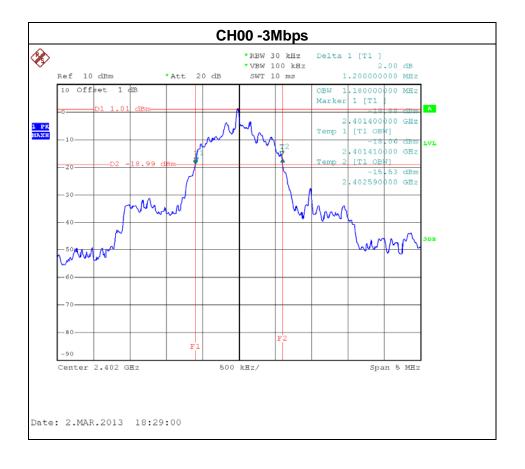
Report No.: NEI-FICP-1-1206C176E Page 78 of 103



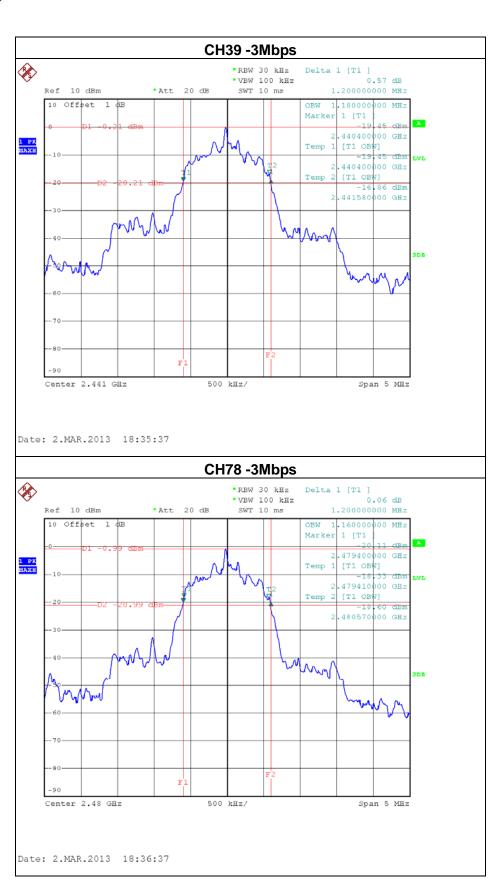


EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure: 1009 hPa		Test Voltage :	AC 120V/60Hz
Test Mode :	CH00 / CH39 /CH78-3Mbps		

Frequency	20dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Channel Separation (MHz)	Result
2402 MHz	1.20	1.18	<= 1MHz	PASS
2441 MHz	1.20	1.18	<= 1MHz	PASS
2480 MHz	1.20	1.16	<= 1MHz	PASS



Report No.: NEI-FICP-1-1206C176E Page 80 of 103



9. PEAK OUTPUT POWER TEST

9.1 APPLIED PROCEDURES / LIMIT

*** *** * ==== * **** * == *****				
FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (b)(1)	Peak Output Power	0.125 watt or 21dBm	2400-2483.5	PASS

9.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

I	Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
	1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.24.2013

Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of Equipment List is One Year.

9.1.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 3MHz, VBW= 3MHz, Sweep time = Auto.

9.1.3 DEVIATION FROM STANDARD

No deviation.

9.1.4 TEST SETUP

EUT	SPECTRUM
	ANALYZER

9.1.5 EUT OPERATION CONDITIONS

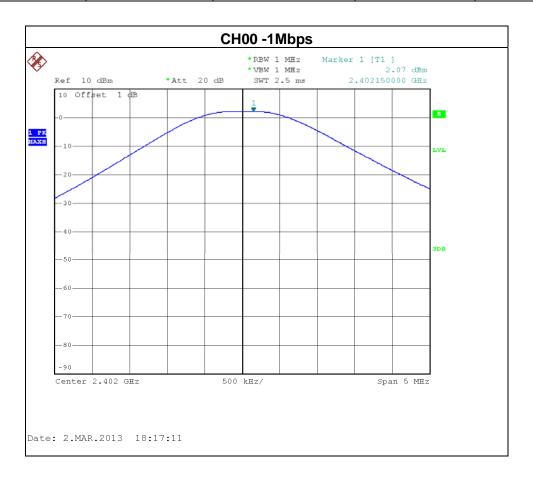
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

Report No.: NEI-FICP-1-1206C176E Page 82 of 103

9.1.6 TEST RESULTS

EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH00/ CH39 /CH78 -1Mbps		

	Test Channel	Frequency	Peak Output Power	LIMIT	LIMIT
L	rest Charmer	(MHz)	(dBm)	(dBm)	(W)
	CH00	2402	2.07	21	0.125
ſ	CH39	2441	1.83	21	0.125
Ī	CH78	2480	1.28	21	0.125



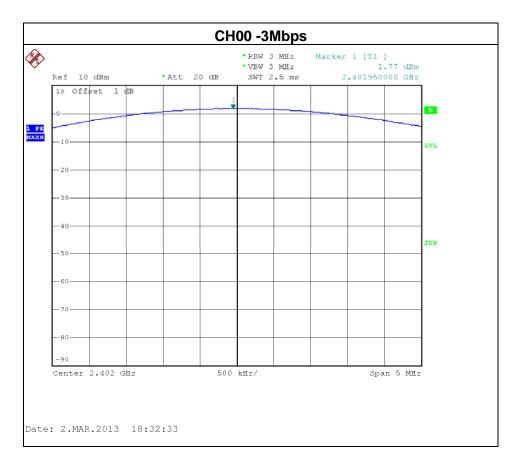
Report No.: NEI-FICP-1-1206C176E Page 83 of 103



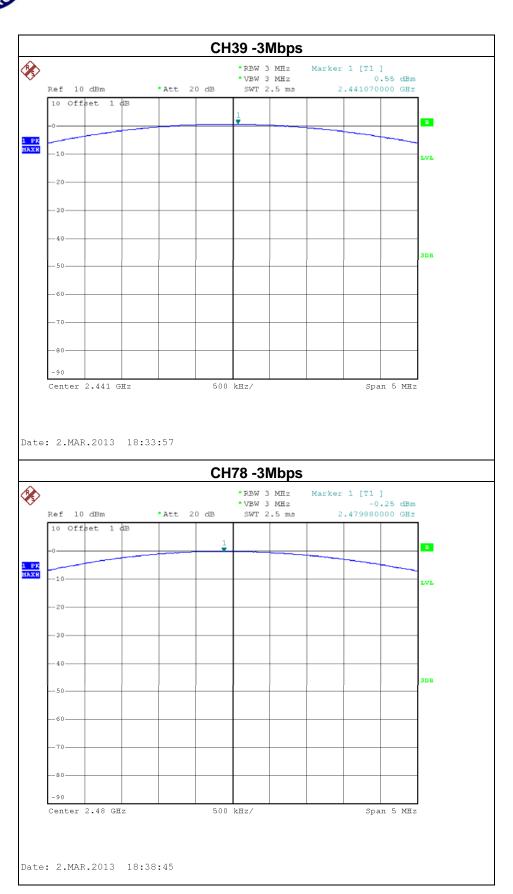


EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH00/ CH39 /CH78 -3Mbps		

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)	LIMIT (W)
CH00	2402	1.77	21	0.125
CH39	2441	0.55	21	0.125
CH78	2480	-0.25	21	0.125



Report No.: NEI-FICP-1-1206C176E Page 85 of 103



10. ANTENNA CONDUCTED SPURIOUS EMISSION

10.1 APPLIED PROCEDURES / LIMIT

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

10.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.24.2013

Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of Equipment List is One Year.

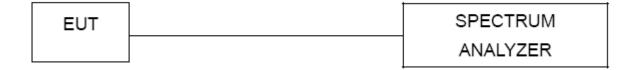
10.1.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

10.1.3 DEVIATION FROM STANDARD

No deviation.

10.1.4 TEST SETUP



10.1.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

Report No.: NEI-FICP-1-1206C176E Page 87 of 103

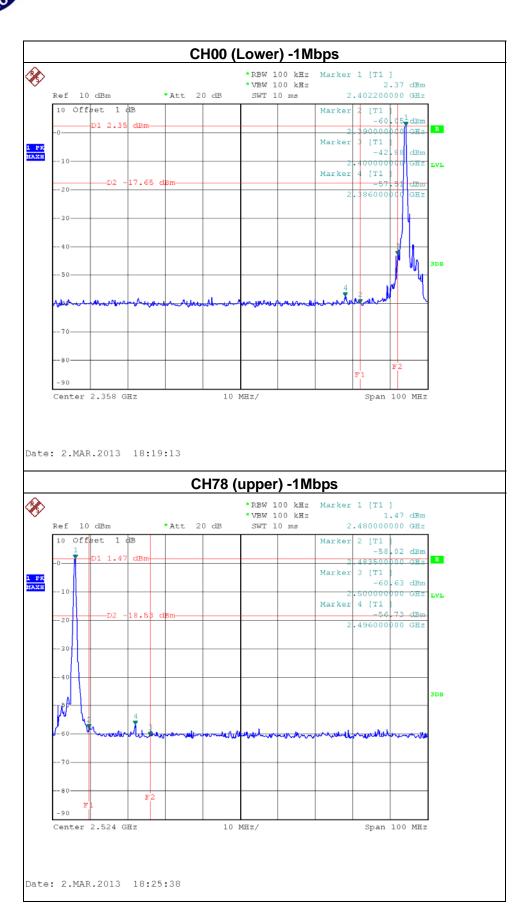
10.1.6 TEST RESULTS

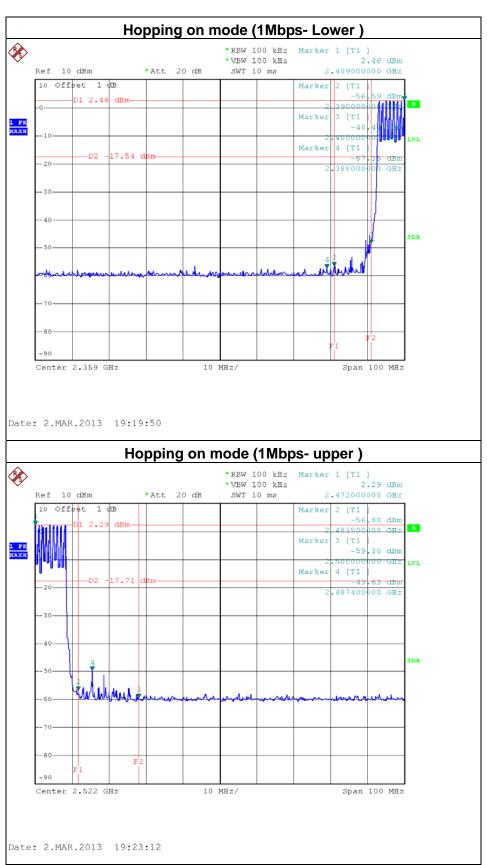
EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH00 / CH39/ CH78-1Mbps & Hopping on mode (1Mbps)		

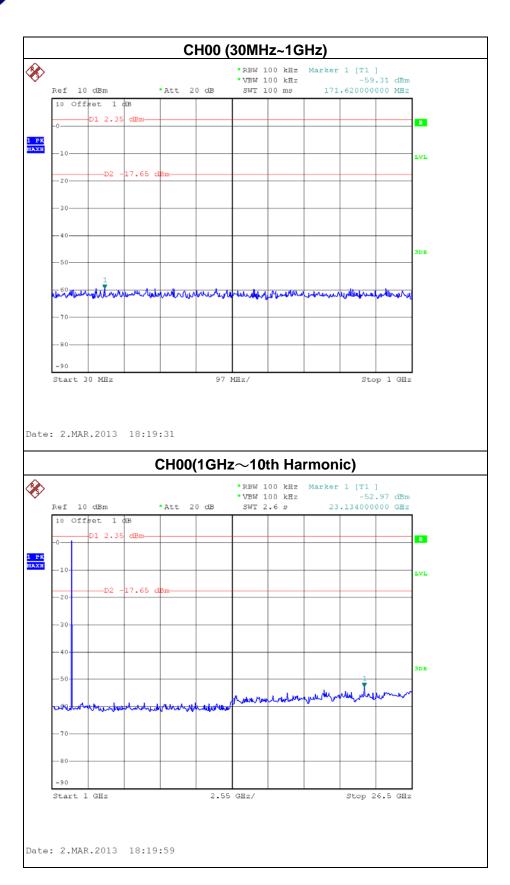
The max. radio frequency power in any 100kHz bandwidth within the frequency band		The max. radio frequency power in any 100 kHz bandwidth within the frequency band.		
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)	
2400.00	-42.88	2496.00	-56.73	
Result				

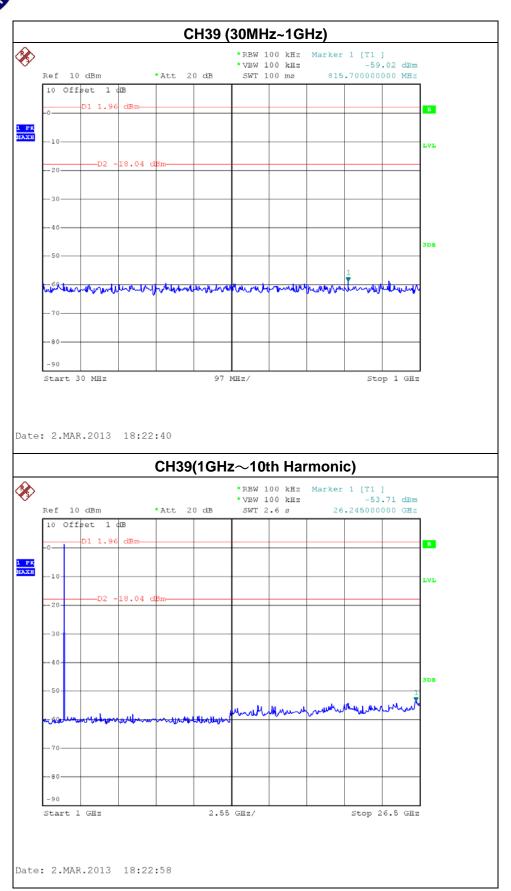
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.

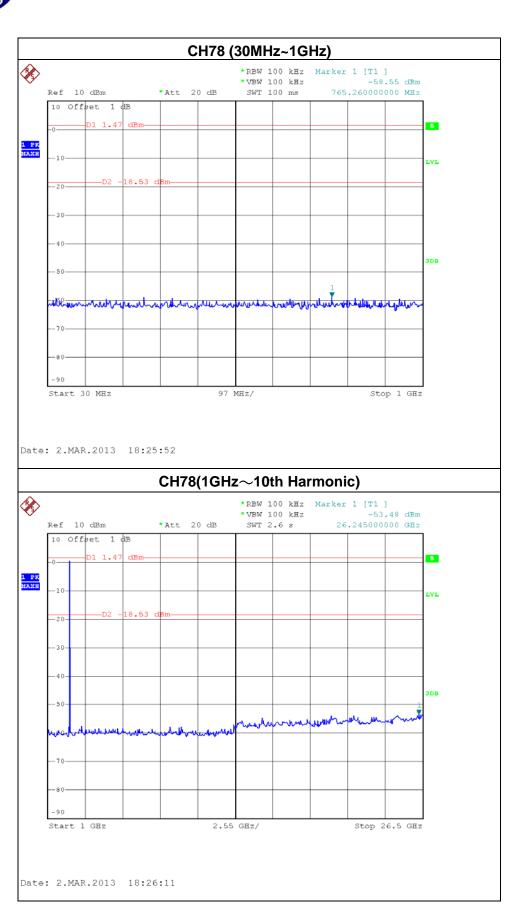
Report No.: NEI-FICP-1-1206C176E Page 88 of 103











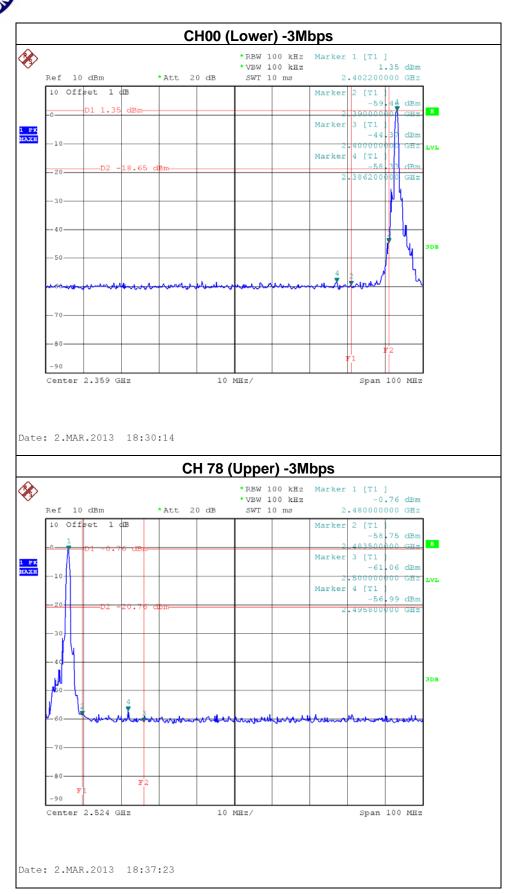


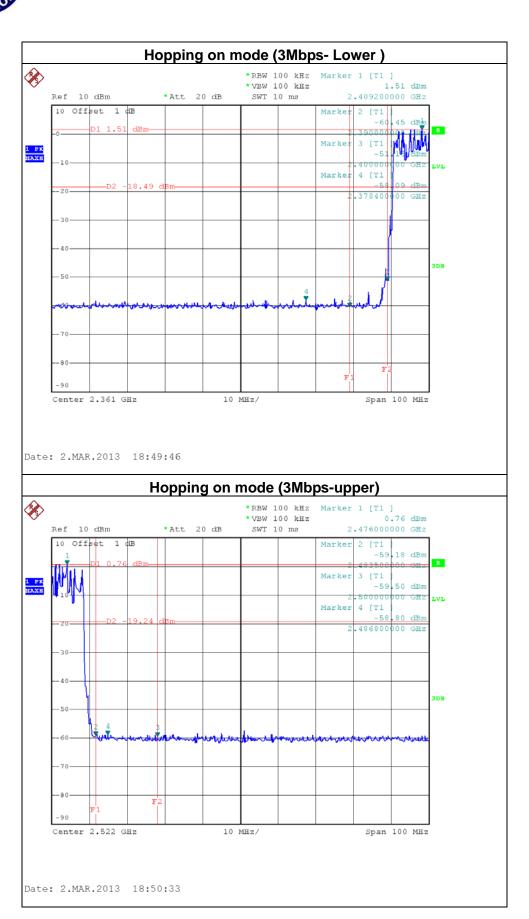
EUT:	Cavallino GT1	Model Name :	1LFS003
Temperature:	25 ℃	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH00 / CH39/ CH78 -3Mbps & Hopping on mode (3Mbps)		

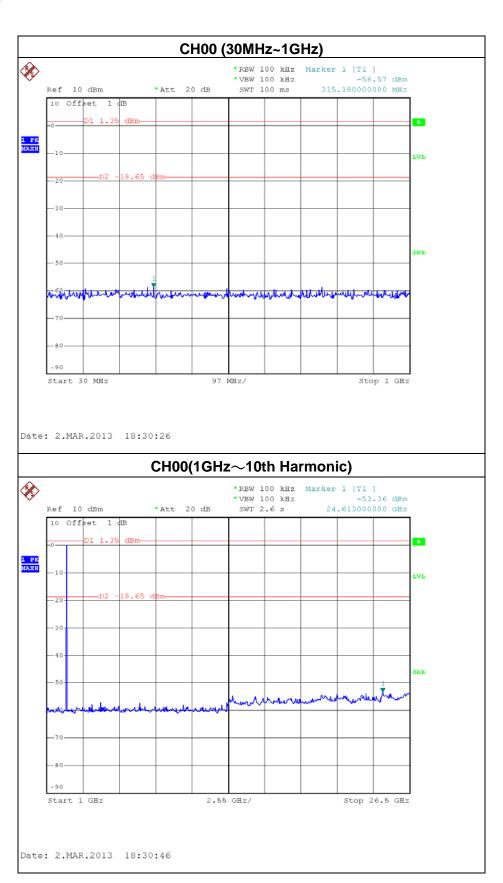
The max. radio frequency power in any 100kHz bandwidth within the frequency band		The max. radio frequency power in any 100 kHz bandwidth within the frequency band.		
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)	
2400.00	-44.37	2495.80	-56.99	
Result				

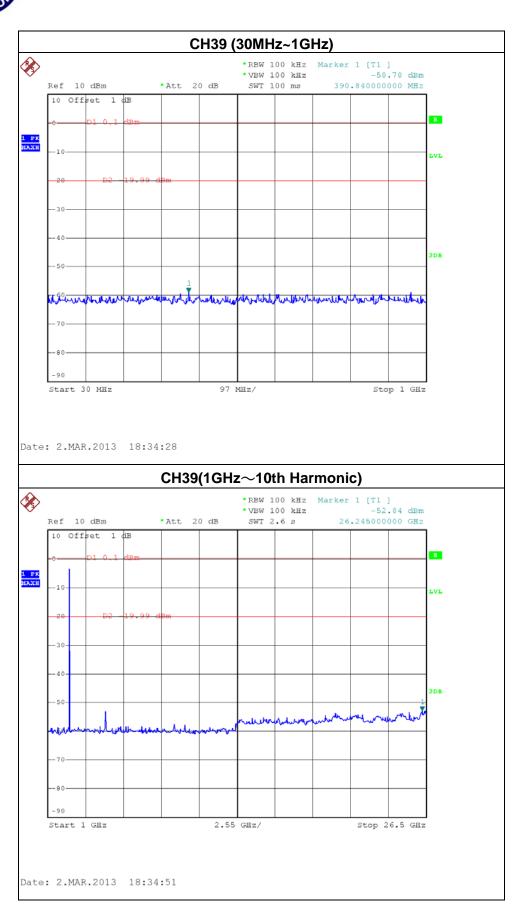
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.

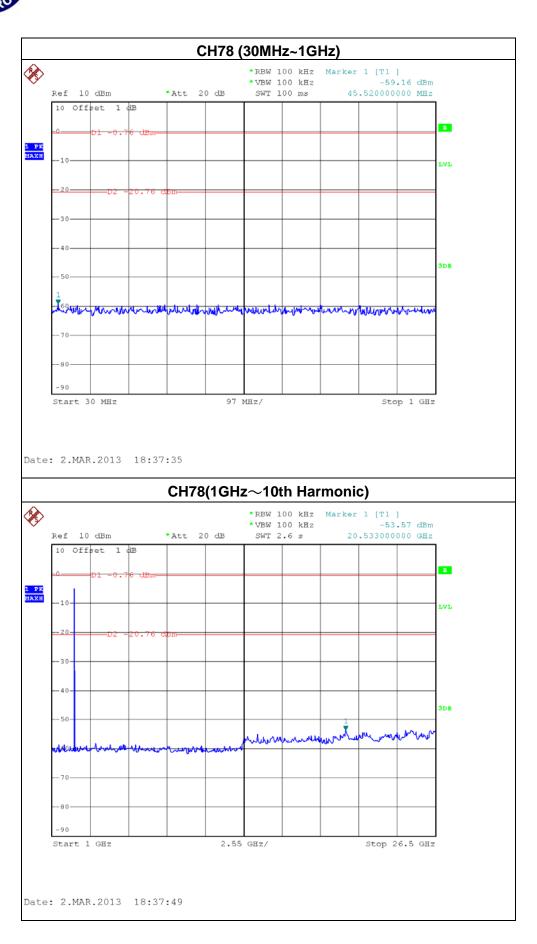
Report No.: NEI-FICP-1-1206C176E Page 94 of 103









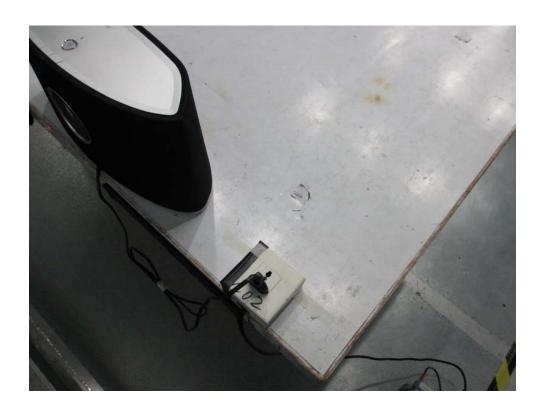




11. EUT TEST PHOTO

Conducted Measurement Photos

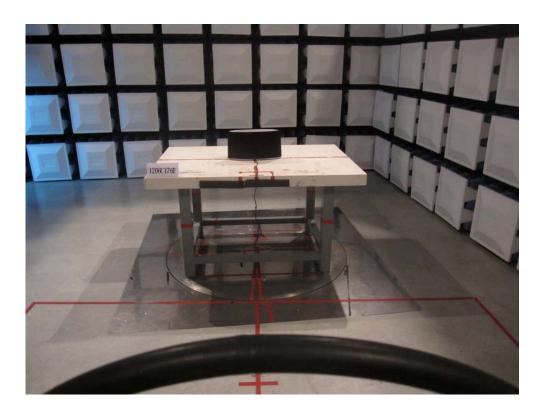


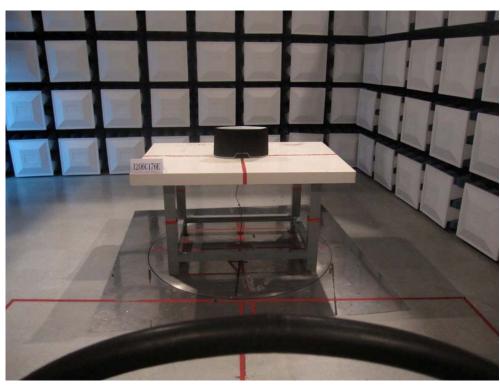


Report No.: NEI-FICP-1-1206C176E Page 100 of 103



Radiated Measurement Photos 9K~30MHz



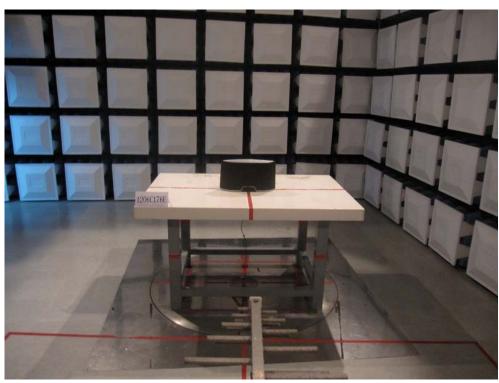


Report No.: NEI-FICP-1-1206C176E Page 101 of 103



Radiated Measurement Photos 30M~1000MHz





Report No.: NEI-FICP-1-1206C176E Page 102 of 103



Radiated Measurement Photos Above 1000MHz





Report No.: NEI-FICP-1-1206C176E Page 103 of 103