

FCC TEST REPORT

Report No.: SEFB908145

According to

CFR47 §15.247

Applicant: Protop International Inc.

10F-8, No.237, Sec.,1, Datong Rd., Xizhi Dist., New Taipei City 22161,

Address

Taiwan, R.O.C.

Manufacturer: Protop International Inc.

10F-8, No.237, Sec.,1, Datong Rd., Xizhi Dist., New Taipei City 22161,

Address

: Taiwan, R.O.C.

Equipment: Bluetooth Receiver Adapter

Model No. : B07TVPV4MJ

Brand : AmazonBasics

FCC ID : 2AAYXB07TVPV4MJ

Test Period : Aug. 07, 2019~ August 24, 2019

- The test result refers exclusively to the test presented test model / sample.
- Without written approval of *Cerpass Technology (Suzhou) Co., Ltd.*, the test report shall not be reproduced except in full.
- The test report must not be used by the clients to claim product certification approval by any agency of the Government.

I HEREBY CERTIFY THAT:

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.10 – 2013& FCC Part15.247** and the energy emitted by this equipment was *passed.*

Approved by:	Laboratory Accreditation: Cerpass Technology Corpor	ation Test Laborato	rv
	TAF LAB Code:	1439	٠,
Miro Chueh	Cerpass Technology (SuZho	ou) Co., Ltd.	
EMC/RF Manager	A2LA LAB Code:	4981.01	

Page No.

: 1 of 79

S-FD-501V1.0



Contents

Report No.: SEFB908145

Issued Date

Page No.

Aug. 24, 2019

2 of 79

1.	Report of Measurements and Examinations	5
2.	General Info	
2.1	Description of EUT	6
2.2	Carrier Frequency of Channels	7
2.3	The Worst Case Configuration	7
2.4	Test Mode & Test Software	8
2.5	Description of Test System	8
3.	General Information of Test Site	9
3.1		
3.2	Measuring Equipment	10
3.3	Measurement Uncertainty	11
4.	AC Conducted Emission Measurement	13
4.1	Test Limit	13
4.2	Test Procedures	13
4.3	Typical Test Setup	13
4.4	Test Result and Data	14
5.	Radiated Emission Measurement	16
5.1	Test Limit	16
5.2	Test Standard	17
	Test Procedures	
5.4	Typical Test Setup	17
	Test Result and Data	
	20dB Bandwidth Measurement	
6.1	Test Limit	39
6.2	Test Standard	39
6.3	•	
6.4	Test Setup Layout	
6.5		
	Channel Carrier Frequencies Separation Measurement	
	Test Limit	
	Test Standard	
	Test Setup	
	Test Setup Layout	
	Test Result and Data	
	Dwell Time Measurement	
	Test Limit	
	Test Standard	
	Test Setup	
	Test Setup Layout	
	Test Result and Data	
	Number of Hopping Channels Measurement	
	Test Limit	
9.2	Test Standard	52



9.3 Test Setup	52
9.4 Test Setup Layout	52
9.5 Test Result and Data	
10.Peak Output Power Measurement	
10.1 Test Limit	
10.2 Test Standard	
10.3 Test Setup	54
10.4 Test Setup Layout	
10.5 Test Result and Data	
11. Conducted Spurious Emissions Measurement	59
11.1 Limit	59
11.2 Test Procedure	60
11.3 Test Setup	60
11.4 Test Result	
12.Radiated Emission Band Edge Measurement	66
12.1 Limit	
12.2 Test Procedure	
12.3 Test Setup	
12.4 Test Result	

S-FD-501V1.0

Issued Date : Aug. 24, 2019
Page No. : 3 of 79

Report No.: SEFB908145



History of this Test Report

Report No.: SEFB908145

Report No.	Version	Issue Date	Description
SEFB1908145	Rev 01	Aug. 24, 2019	Original

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0 Page No. : 4 of 79



1. Report of Measurements and Examinations

FCC Rule	. Description of Test	Result
§ 15.203	. Antenna Requirement	Pass
§ 15.207(a)	. Conducted Emission	Pass
§ 15.209(a)	. Radiated Emission	Pass
§ 15.247(a)(1)	. Channel Carrier Frequencies Separation	Pass
§ 15.247(a)(1)	. 20dB Bandwidth Measurement	Pass
§ 15.247(a)(1) . Dwell Time		Pass
§ 15.247(b)	§ 15.247(b) . Number of Hopping Channels	
§ 15.247(b)	. Peak Output Power Measurement Data	Pass
§ 15.247(d)	. Band Edges Measurement Data	Pass

Report No.: SEFB908145

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0 Page No. : 5 of 79



2. General Info

2.1 Description of EUT

Product name	Bluetooth Receiver Adapter
Model No.	B07TVPV4MJ
Model Discrepancy	N/A
Power supply	Input: 5VDC, 0.12A
	Capacity:180mAh, 0.666Wh
Frequency Range	2402~2480MHz
Number of Channels	79
Modulation	GFSK (1Mbps), Π/4 DQPSK (2Mbps) and 8DPSK (3Mbps)
Data Rates	Bluetooth: 1, 2, 3Mbps,
Antenna Spec.	PCB Antenna with 0dBi

Report No.: SEFB908145

Note: For more details, please refer to the User's manual of the EUT.

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0 Page No. : 6 of 79



2.2 Carrier Frequency of Channels

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

Report No.: SEFB908145

2.3 The Worst Case Configuration

Data rate Configuration:

Test Mode	
DH5	√
2DH5	√
3DH5	√

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0 Page No. : 7 of 79



2.4 Test Mode & Test Software

 During testing, the interface cables and equipment positions were varied according to ANSI C63.10

Report No.: SEFB908145

- b. The complete test system included support units and EUT for RF test.
- c. Run the test software "Blue Test3.exe".
- d. The following test mode was performed for conduction and radiation test:

Test Mode 1: GFSK: CH 00: 2402MHz, CH 39: 2441MHz, CH 78: 2480MHz.

Test Mode 2: $\pi/4$ DQPSK : CH 00: 2402MHz, CH 39: 2441MHz, CH 78: 2480MHz.

Test Mode 3: 8DPSK: CH 00: 2402MHz, CH 39: 2441MHz, CH 78: 2480MHz.

2.5 Description of Test System

No	Device	Manufacturer	Model No.	Description
1	Notebook	SONY	PCG-71811P	R33021

Use Cable:

No.	Cable	Quantity	Description	
1	Micro USB Cable	1	0.15m Non Shielding	
2	DC Cable	1	1.7m Non Shielding	
3	USB Cable	1	1.0m Shielding	

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0 Page No. : 8 of 79



3. General Information of Test Site

3.1 Information of Test Site

Test Site	Cerpass Technology Corporation Test Laboratory Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan C 33848, Taiwan (R.O.C.) Tel:+886-3-3226-888 Fax:+886-3-3226-881 Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C. Tel: +886-2-2663-8582		
TAF	1439		
FCC	TW1079, TW1061		
IC	4934E-1, 4934E-2		
VCCI	T-2205 for Telecommunication Test C-4663 for Conducted emission test R-4399, R-4218 for Radiated emission test G-812, G-813 for radiated disturbance above 1GHz		
Test Site	Cerpass Technology (Suzhou) Co.,Ltd Address: No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China Tel: +86-512-6917-5888 Fax: +86-512-6917-5666		
CNAS	L5515		
FCC	CN1243		
A2LA	4981.01		
IC	7290A-1, 7290A-2		
VCCI	T-11945 for Telecommunication Test C-12919 for Conducted emission test R-12670 for Radiated emission test G-10227 for radiated disturbance above 1GHz		

Report No.: SEFB908145

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0 Page No. : 9 of 79



3.2 Measuring Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMI Receiver	R&S	ESCI3	100563	2019.06.21	2020.06.20
LISN	Schwarzbeck	NSLK 8127	8127-920	2018.09.25	2019.09.24
Pulse Limiter	R&S	ESH3-Z2	100529	2019.03.11	2020.03.10
Software	Farad	Ez-EMC	ver.ct3a1	N/A	N/A

Report No.: SEFB908145

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.	
Bilog Antenna	Sunol	Sunol JB1 A072414-2 -2		2019.07.13	2020.07.13	
EMI Receiver	R&S	ESCI3	101183	2019.06.28	2020.06.27	
EMI Receiver	R&S	ESCI7	100968	2019.07.28	2020.07.27	
Preamplifier	EM Electronics corp.	EM330	60618	2019.03.11	2020.03.10	
Horn Antenna	Schwarzbeck	BBHA9120 D	9120D-619	2019.07.13	2020.07.13	
Horn Antenna	Schwarzbeck	BBHA9170	9170-348	2019.06.23	2020.06.22	
Spectrum Analyzer	R&S	FSP40	100324	2019.07.13	2020.07.12	
Preamplifier	EMCI	EMCI 030-00-3230	SN016723	2019.03.11	2020.03.10	
Preamplifier	EM Electronics corp.	EM01G18G	SN060714	2019.03.23	2020.03.22	
Spectrum Analyzer	KEYSIGHT	N9010A	MY53400169	2018.08.25	2019.08.24	
Software	E3	AUDIX	Version: 8.14.806b	N/A	N/A	

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0 Page No. : 10 of 79



3.3 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2).

Report No.: SEFB908145

RF Conducted Measurement

Test Item		Uncertainty	Limit
Radio Frequency		±8.7X10 ⁻⁷	±1X10 ⁻⁵
RF output power, condu	cted	\pm 0.63dB	\pm 1.5dB
Power density, conducted	ed	±1.21dB	± 3 dB
Unwanted emissions,	30-1000MHz	\pm 0.51dB	± 3 dB
conducted	1-12.75GHz	\pm 0.67dB	± 3 dB
All emissions, radiated	30-1000MHz	\pm 2.28dB	\pm 6dB
1-12.75GHz		\pm 2.59dB	\pm 6dB
Temperature		±0.8℃	±1°C
Humidity		±3%	$\pm 5\%$
DC and low frequency v	oltages	±3%	$\pm 3\%$

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0 Page No. : 11 of 79



AC Conducted Measurement

Measurement	Frequency	Uncertainty
Conducted emissions(LINE)	9KHz-30MHz	+/- 0.7738 dB
Conducted emissions(NEUTRAL)	9KHz-30MHz	+/- 0.7886 dB
Conducted emissions(10Mbps)	150KHz-30MHz	+/- 1.3013dB
Conducted emissions(100Mbps)	150KHz-30MHz	+/- 1.3197 dB
Conducted emissions(1000Mbps)	150KHz-30MHz	+/- 1.2987 dB

Report No.: SEFB908145

Radiated Measurement

Measurement	Polarity	Frequency	Uncertainty
	Horizontal	below 1GHz	+/- 3.8936 dB
Radiated	Vertical	below 1GHz	+/- 3.8928 dB
emissions	Horizontal	above 1GHz	+/- 5.18858dB
	Vertical	above 1GHz	+/- 5.18928 dB

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0 Page No. : 12 of 79



AC Conducted Emission Measurement

4.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.10-2013 Section 6.2. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 6.2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

Report No.: SEFB908145

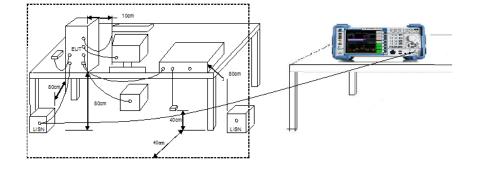
Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

^{*}Decreases with the logarithm of the frequency.

4.2 Test Procedures

- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connecting to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

4.3 Typical Test Setup



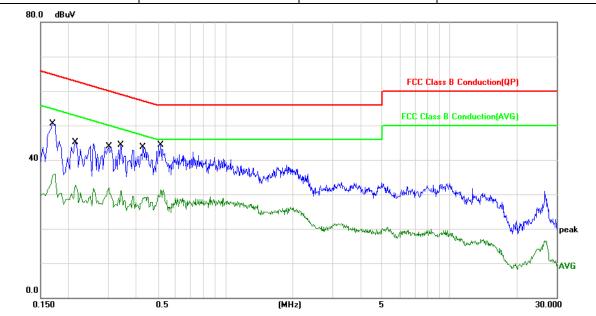
Issued Date Aug. 24, 2019 S-FD-501V1.0 Page No. 13 of 79



4.4 Test Result and Data

Test Mode :	Normal Link				
AC Power :	AC 120V/60Hz	Phase:	LINE		
Temperature :	26°C	Humidity:	60%		
Pressure(mbar) :	1002	Date:	2019-08-14		

Report No.: SEFB908145



No.	Frequency	Factor	Reading	Level	Limit	Margin	Detector
	(MHz)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dB)	
1	0.1700	10.06	35.11	45.17	64.96	-19.79	QP
2	0.1700	10.06	23.12	33.18	54.96	-21.78	AVG
3	0.2140	10.05	30.30	40.35	63.04	-22.69	QP
4	0.2140	10.05	20.56	30.61	53.04	-22.43	AVG
5	0.3020	10.00	30.49	40.49	60.19	-19.70	QP
6	0.3020	10.00	20.64	30.64	50.19	-19.55	AVG
7	0.3420	9.98	27.40	37.38	59.15	-21.77	QP
8	0.3420	9.98	18.41	28.39	49.15	-20.76	AVG
9	0.4300	9.93	27.68	37.61	57.25	-19.64	QP
10	0.4300	9.93	19.07	29.00	47.25	-18.25	AVG
11	0.5180	9.91	30.25	40.16	56.00	-15.84	QP
12	0.5180	9.91	21.27	31.18	46.00	-14.82	AVG

Note: Measurement Level = Reading Level + Correct Factor

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

Page No.

: 14 of 79

S-FD-501V1.0



I CSL IVI	lode :	Normal Link						
AC Po	wer:	AC 120V/	0V/60Hz Phase:		N	NEUTRAL		
Temperature : 26°C			Humidity:		60	60%		
Pressu	ure(mbar) :	1002		Date:	20	2019-08-14		
40			And the state of t	Markey Ma	FCC Class	B Conduction(QF		
				Walter Tolking	chisopher participate and free operations of the second	garphy Mr. Berg. chron V	peak	
0.0 0.1	150	0.5	(MHz		5		peak AVG	
L	Frequency	Factor	Reading	Level	5 Limit	Margin (dB)	AVG	
0.1					5	Margin	30.000	
0.1 No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level	5 Limit (dBuV)	Margin (dB)	30.000 Detector	
0.1 No.	Frequency (MHz) 0.1740	Factor (dB) 10.06	Reading (dBuV) 37.19	Level (dBuV) 47.25	5 Limit (dBuV) 64.76	Margin (dB) -17.51	30.000 Detector QP	
No. 1	Frequency (MHz) 0.1740 0.1740	Factor (dB) 10.06 10.06	Reading (dBuV) 37.19 24.26	Level (dBuV) 47.25 34.32	5 Limit (dBuV) 64.76 54.76	Margin (dB) -17.51 -20.44	30.000 Detector QP AVG	
0.1 No.	Frequency (MHz) 0.1740 0.1740 0.2940	Factor (dB) 10.06 10.06 10.01	Reading (dBuV) 37.19 24.26 28.70	Level (dBuV) 47.25 34.32 38.71	5 Limit (dBuV) 64.76 54.76 60.41	Margin (dB) -17.51 -20.44 -21.70	30.000 Detector QP AVG QP	
0.1 No. 1 2 3 4	Frequency (MHz) 0.1740 0.1740 0.2940 0.2940	Factor (dB) 10.06 10.06 10.01	Reading (dBuV) 37.19 24.26 28.70 20.03	Level (dBuV) 47.25 34.32 38.71 30.04	5 Limit (dBuV) 64.76 54.76 60.41 50.41	Margin (dB) -17.51 -20.44 -21.70 -20.37	30.000 Detector QP AVG QP AVG	
0.1 No. 1 2 3 4 5	Frequency (MHz) 0.1740 0.1740 0.2940 0.2940 0.3899	Factor (dB) 10.06 10.06 10.01 10.01 9.95	Reading (dBuV) 37.19 24.26 28.70 20.03 26.72	Level (dBuV) 47.25 34.32 38.71 30.04 36.67	5 Limit (dBuV) 64.76 54.76 60.41 50.41 58.06	Margin (dB) -17.51 -20.44 -21.70 -20.37 -21.39	30.000 Detector QP AVG QP AVG QP AVG	
No. 1 2 3 4 5	Frequency (MHz) 0.1740 0.1740 0.2940 0.2940 0.3899 0.3899	Factor (dB) 10.06 10.06 10.01 10.01 9.95 9.95	Reading (dBuV) 37.19 24.26 28.70 20.03 26.72 17.59	Level (dBuV) 47.25 34.32 38.71 30.04 36.67 27.54	5 Limit (dBuV) 64.76 54.76 60.41 50.41 58.06 48.06	Margin (dB) -17.51 -20.44 -21.70 -20.37 -21.39 -20.52	30.000 Detector QP AVG QP AVG QP AVG AVG	
0.1 No. 1 2 3 4 5 6 7	Frequency (MHz) 0.1740 0.1740 0.2940 0.2940 0.3899 0.3899 0.5100	Factor (dB) 10.06 10.06 10.01 10.01 9.95 9.95 9.90	Reading (dBuV) 37.19 24.26 28.70 20.03 26.72 17.59 30.19	Level (dBuV) 47.25 34.32 38.71 30.04 36.67 27.54 40.09	5 Limit (dBuV) 64.76 54.76 60.41 50.41 58.06 48.06 56.00	Margin (dB) -17.51 -20.44 -21.70 -20.37 -21.39 -20.52 -15.91	30.000 Detector QP AVG QP AVG QP AVG QP AVG	
0.1 No. 1 2 3 4 5 6 7 8	Frequency (MHz) 0.1740 0.1740 0.2940 0.2940 0.3899 0.3899 0.5100 0.5100	Factor (dB) 10.06 10.06 10.01 10.01 9.95 9.95 9.90	Reading (dBuV) 37.19 24.26 28.70 20.03 26.72 17.59 30.19 21.53	30.04 36.67 27.54 40.09 31.43	5 Limit (dBuV) 64.76 54.76 60.41 50.41 58.06 48.06 56.00 46.00	Margin (dB) -17.51 -20.44 -21.70 -20.37 -21.39 -20.52 -15.91 -14.57	30.000 Detector QP AVG QP AVG QP AVG QP AVG QP AVG	
0.1 No. 1 2 3 4 5 6 7 8 9	Frequency (MHz) 0.1740 0.1740 0.2940 0.2940 0.3899 0.3899 0.5100 0.5100 0.5299	Factor (dB) 10.06 10.06 10.01 10.01 9.95 9.95 9.90 9.90 9.90	Reading (dBuV) 37.19 24.26 28.70 20.03 26.72 17.59 30.19 21.53 28.89	30.04 36.67 27.54 40.09 31.43 38.81	5 Limit (dBuV) 64.76 54.76 60.41 50.41 58.06 48.06 56.00 46.00 56.00	Margin (dB) -17.51 -20.44 -21.70 -20.37 -21.39 -20.52 -15.91 -14.57 -17.19	30.000 Detector QP AVG QP AVG QP AVG QP AVG QP AVG QP AVG	

Report No.: SEFB908145

Issued Date : Aug. 24, 2019

Note: Measurement Level = Reading Level + Correct Factor

S-FD-501V1.0 Page No. : 15 of 79



5. Radiated Emission Measurement

5.1 Test Limit

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

Report No.: SEFB908145

FREQUENCIES (MHz)	FIELD STRENGTH (micro volts/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

For unintentional device, according to CISPR PUB.22, for Class B digital devices, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 10 meters shall not exceed the above table.

Frequency (MHz)	Distance Meters	Radiated (dB μV/ M)
30-230	10	30
230-1000	10	37

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0 Page No. : 16 of 79

5.2 Test Standard

ANSI C63.10-2013-Section 6.10.5

5.3 Test Procedures

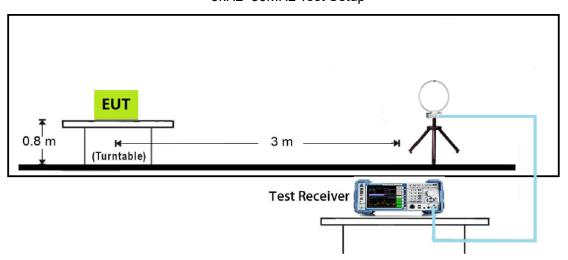
a. The EUT was placed on a rotatable table top 0.8 meter for frequency below 1GHz and 1.5meter for frequency above 1GHz above ground.

Report No.: SEFB908145

- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

5.4 Typical Test Setup

9kHz~30MHz Test Setup



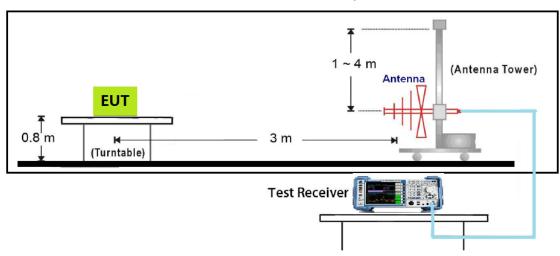
Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0 Page No. : 17 of 79

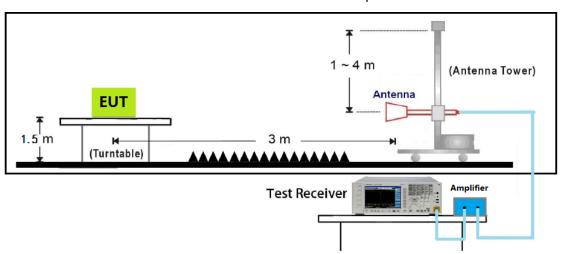


Below 1GHz Test Setup

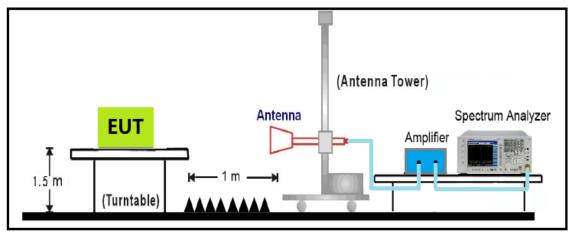
Report No.: SEFB908145



1GHz~18GHz Test Setup



18GHz~40GHz Test Setup



S-FD-501V1.0 Page No. : 18 of 79



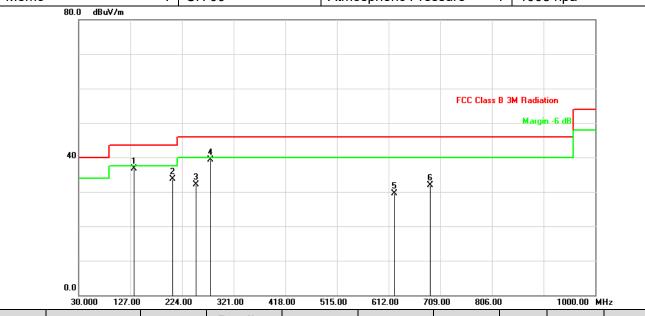
5.5 **Test Result and Data**

The 9kHz-30MHz spurious emission is under limit 20dB more.

Below 1GHz

Power :	120V/60Hz	Pol/Phase :	HORIZONTAL
Test Mode :	Mode 1	Temperature :	18 °C
Test Date :	Aug. 14, 2019	Humidity :	49 %
Memo :	CH 00	Atmospheric Pressure :	1008 hpa

Report No.: SEFB908145



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	134.7599	-11.68	48.31	36.63	43.50	-6.87	peak	100	75
2	206.5399	-9.63	43.29	33.66	43.50	-9.84	peak	200	103
3	251.1599	-6.24	38.35	32.11	46.00	-13.89	peak	200	157
4	277.3500	-6.51	45.85	39.34	46.00	-6.66	QP	224	206
5	622.6699	-2.49	32.05	29.56	46.00	-16.44	peak	100	6
6	689.6000	-2.25	34.08	31.83	46.00	-14.17	peak	200	18

Note: Level = Reading + Factor Margin = Level - Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019 S-FD-501V1.0 Page No. : 19 of 79



Power	-	: 120	0V/60Hz	Po	ol/Phase		: VEF	RTICAL	
Test M	1ode	: Mo	de 1	Te	emperature		: 18°	С	
Test D	ate	: Au	g. 14, 2019	H	umidity		: 49 %	6	
Memo		: CH	00	At	mospheric Pre	essure	: 1008	8 hpa	
	80.0 dBuV/m		3 ×		55	FCC Class	B 3M Radiation Margin -6 dB		
	0.0 30.000 127.00	0 224.00	321.00 418	3.00 515.0	00 612.00 70	09.00 806.0	0	1000.00 M	Hz
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/n	Limit n) (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	134.7600	-11.68	41.24	29.56	43.50	-13.94	peak	100	30
2	206.5399	-8.63	43.24	34.61	43.50	-8.89	peak	100	201
3	277.3500	-10.51	49.13	38.62	46.00	-7.38	peak	100	57
4	484.9300	-2.21	32.14	29.93	46.00	-16.07	peak	100	192
5	591.6300	-2.68	33.17	30.49	46.00	-15.51	peak	100	307

Note: Level = Reading + Factor Margin = Level – Limit

690.5700

Factor = Antenna Factor + Cable Loss - Amplifier Factor

36.81

34.57

46.00

-11.43

peak

100

85

-2.24

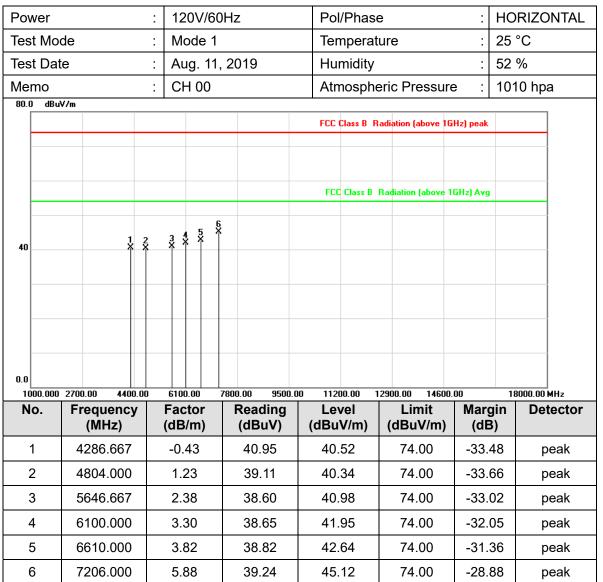
Cerpass Technology (Suzhou) Co., Ltd.

S-FD-501V1.0 Page No. : 20 of 79

Report No.: SEFB908145



Radiated Emission above 1GHz:



Report No.: SEFB908145

21 of 79

Note: Level = Reading + Factor
Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0 Page No.



Power		: 120V/60)Hz	Pol/Phase	<u>е</u>	: \	/ERTICAL
Test Mo	de	: Mode 1		Temperat	: 2	25 °C	
Test Da	te	: Aug. 11	2019	Humidity		: 5	52 %
Memo		: CH 00		Atmosphe	eric Pressure	e : 1	010 hpa
80.0 dBu	V/m			500 dt			
ı				FLL Class B H	ladiation (above 1G	Hzj peak	
				FCC Class D	D - 1 - 1 - 1 - 1 - 1	CU-) A	
				FLU Class B	Radiation (above 1	GHZJ AVG	
		4 5 8					
40	1 2 3 X X	4 5 8	<u> </u>				
0.0 1000 000	2700.00 4400.00	6100.00	7800.00 9500.0	00 11200.00 1	12900.00 14600.	nn .	18000.00 MHz
No.	Frequency	Factor	Reading	Level	Limit	Margii	
	(MHz)	(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	3238.333	-4.98	45.34	40.36	74.00	-33.64	l peak
2	4145.000	-1.15	41.14	39.99	74.00	-34.01	l peak
3	4804.000	1.23	38.90	40.13	74.00	-33.87	7 peak
4	6100.000	3.30	37.81	41.11	74.00	-32.89) peak
5	6723.333	4.18	37.65	41.83	74.00	-32.17	7 peak
6	7206.000	5.88	37.48	43.36	74.00	-30.64	l peak

Report No.: SEFB908145

Note: Level = Reading + Factor Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

S-FD-501V1.0



Power	er : 120V/60Hz)Hz	Pol/Phase :				RIZONTAL
Test Mo	de	:	Mode 1		Temperat	ture	:	25 °C	
Test Dat	te	:	Aug. 11,	2019	Humidity		:	52 '	%
Memo		:	CH 39	Atmospheric Pressure : 1010					0 hpa
80.0 dBu	V/m				FCC Class D. F	Radiation (above 16	11-1 1-		
					FCC Class B F	radiadun (abuve 10	іпгу реак		
					FCC Class R	Radiation (above 1	GHa) Ava		
					T CC Class B	Tradiation (above 1	uliz) Atg		
	. 2	2	–	6 1					
40	1 2 1 X	3 X	4 5 × ×						
0.0 1000.000	2700.00 4400).00	6100.00	7800.00 9500.0	00 11200.00	12900.00 14600.	.00	18	000.00 MHz
No.	Frequency (MHz)	′	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Marq (dE		Detector
1	3521.667		-3.53	43.40	39.87	74.00	-34.	13	peak
2	4286.667		-0.43	41.48	41.05	74.00	-32.9	95	peak
3	4882.000		1.38	39.03	40.41	74.00	-33.	59	peak
4	5618.333		2.31	38.72	41.03	74.00	-32.9	97	peak
5	6553.333		3.63	37.97	41.60	74.00	-32.4	40	peak
6	7323.000		6.34	40.21	46.55	74.00	-27.4	45	peak

Report No.: SEFB908145

: 23 of 79

Note: Level = Reading + Factor Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

S-FD-501V1.0 Page No.



Power				: 12	20V/6	60H	Z		Po	l/Phas	se	:	VE	RTIC	AL
Test Mo	de			: M	ode	1			Tei	npera	ture	:	25	°C	
Test Da	te			: Au	ıg. 1	1, 2	019	Humidity : 52 %			%				
Memo				: Cl	H 39				Atr	nosph	eric Press	ure :	101	10 hp	а
80.0 dBu	N/m								ECC	Class B. I	Radiation (above	1CUa) acak			
									FLL	Class B	nadiation (above	гингу реак			
									FC	Clace R	Radiation (abo	re 1GHz) Avo			
										Cidss D	Tradiation (abo	re runz, Arg			
			3		4 5 X X	6 X									
40		1 2	3 X	,	* *										
0.0 1000.000	2700.00	440	0.00	6100	0.00	780	0.00	9500.0	0 112	00.00	12900.00 14	600.00	18	8000.00	MHz
No.	Frequ (MI		У	Fac (dB	tor /m)		Read (dBu			vel V/m)	Limit (dBuV/n	Marg n) (dE		Det	tector
1	3550	.000		-3.	43		43.3	34	39	.91	74.00	-34.	09	р	eak
2	4201	.667		-0.	86		41.4	19	40	.63	74.00	-33.	37	р	eak
3	4882	.000		1.3	38		39.6	36	41	.04	74.00	-32.	96	р	eak
4	6100	.000		3.3	30		38.3	32	41	.62	74.00	-32.	38	р	eak
5	6780	.000		4.3	37		37.8	30	42	.17	74.00	-31.	83	р	eak
6	7326	.000		6.3	35		38.6	37	45	.02	74.00	-28.	98	р	eak

Report No.: SEFB908145

Note: Level = Reading + Factor Margin = Level – Limit

S-FD-501V1.0

Factor = Antenna Factor + Cable Loss - Amplifier Factor

Page No.

: 24 of 79



Power		: 120V/60	0Hz	Pol/Phase	е	:	HORIZO	NTAL
Test Mo	de	: Mode 1		Temperat	ure	:	25 °C	
Test Da	te	: Aug. 11	, 2019	Humidity		:	52 %	
Memo		: CH 78		Atmosphe	eric Pressure	e :	1010 hp	а
80.0 dBu	V/m							1
				FCC Class B H	adiation (above 1G	Hzj peak		
				500 01 0				
				FCU Class B	Radiation (above 1	GHZJ AVG		
			6 X					
40	1 2 * *	3 4 5						
0.0	0700 00 4400 0	0.000.00	7000 00 0000	1100000	10000 00 11000		40000 00	
1000.000 No.	2700.00 4400.0 Frequency	6100.00 Factor	7800.00 9500.0 Reading	00 11200.00 1 Level	2900.00 14600. Limit	Marg	18000.00 in De	tector
	(MHz)	(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1	3380.000	-4.23	43.72	39.49	74.00	-34.5	51 p	eak
2	4258.333	-0.57	41.16	40.59	74.00	-33.4	·1 p	eak
3	4960.000	1.52	38.43	39.95	74.00	-34.0	5 p	eak
4	6100.000	3.30	37.82	41.12	74.00	-32.8	8 p	eak
5	6525.000	3.54	37.92	41.46	74.00	-32.5	64 p	eak
6	7440.000	6.80	38.52	45.32	74.00	-28.6	8 p	eak

Report No.: SEFB908145

Note: Level = Reading + Factor Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

S-FD-501V1.0



Power		: 120V/60)Hz	Pol/Phase	e	: '	VERTICAL
Test M	ode	: Mode 1		Temperat	ure	: :	25 °C
Test Da	ate	: Aug. 11	, 2019	Humidity		: :	52 %
Memo		: CH 78		Atmosphe	eric Pressure	e :	1010 hpa
80.0 di	BuV/m			FCC CL P. F			
-				FLL Class B H	ladiation (above 1G	нгј реак	
				FCC Class D	D - 1 - 1 1	CH-VA	
-				FLU Class B	Radiation (above 1	ынг у А уд	
		4 5	6 X				
40	1 2 X	3 4 5					
0.0 1000 00	00 2700.00 4400.00	0 6100.00	7800.00 9500.0	00 11200.00 1	12900.00 14600.	nn	18000.00 MHz
No.	Frequency	Factor	Reading	Level	Limit	Margi	in Detector
	(MHz)	(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	3351.667	-4.38	44.87	40.49	74.00	-33.5	1 peak
2	4513.333	0.69	40.71	41.40	74.00	-32.6	0 peak
3	4960.000	1.52	38.98	40.50	74.00	-33.5	0 peak
4	5901.667	3.02	38.24	41.26	74.00	-32.7	4 peak
5	6553.333	3.63	38.40	42.03	74.00	-31.9	7 peak
6	7440.000	6.80	37.53	44.33	74.00	-29.6	7 peak

Report No.: SEFB908145

Note: Level = Reading + Factor Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

S-FD-501V1.0 Page No. : 26 of 79



Power		: 120)V/60Hz		Pol	/Phase	9	:	НО	RIZONTAL
Test Mo	ode	: Mo	de 2		Ten	nperat	ure	:	25	°C
Test Da	ite	: Aug	g. 11, 20	19	Hui	midity		:	52	%
Memo		: CH	00		Atn	nosphe	eric Pressur	e :	101	0 hpa
80.0 dB	uV/m				FCC (Clace R R	adiation (above 1	GHz) nask		
					100	Sidas D TI	adiadon (above 1	urrz) peak		
					FCC	Class B	Radiation (above	1GHz) Avg		
40	1 2	3 4 * * 5	5 8							
40	1 2 X X									
0.0										
1000.000 No.	Frequency	6100.		00 9500.0 Reading	1120 Lev		2900.00 14600 Limit	Marg		Detector
	(MHz)	(dB/ı		dBuV)	(dBu	V/m)	(dBuV/m)			
1	3295.000	-4.6	8	43.31	38.	63	74.00	-35.3	37	peak
2	4116.667	-1.2	.9	40.14	38.	85	74.00	-35.	15	peak
3	4804.000	1.23	3	40.35	41.	58	74.00	-32.4	42	peak
4	5986.667	3.2	3	38.06	41.	29	74.00	-32.	71	peak
5	6326.667	3.39	9	36.53	39.	92	74.00	-34.0	80	peak
6	7206.000	5.8	8	37.14	43.	02	74.00	-30.9	98	peak

Report No.: SEFB908145

Note: Level = Reading + Factor Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

Page No.

: 27 of 79

S-FD-501V1.0



Power		: 120V/6	60Hz	Pol/Phas	e	: \	VERTICAL	
Test Mo	ode	: Mode 2	2	Temperat	ture	: 2	25 °C	
Test Da	nte	: Aug. 1	1, 2019	Humidity		: !	52 %	
Memo		: CH 00		Atmosph	eric Pressure	e :	1010 hpa	
80.0 dB	uV/m			ECC Class B. E	ladiation (above 1G	Uz) posk		
				rec class b r	iaulation (above 10	пгу реак		
				FCC Class B	Radiation (above 1	GHz) Ava		
				700 01400 0		a,g		
		3 4 5 3 X X	6 X					
40	1 2 X X	3 4 5						
0.0								
1000.00	0 2700.00 4400.0		7800.00 9500.0		12900.00 14600.		18000.00 MHz	
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margi (dB)		
1	3295.000	-4.68	43.40	38.72	74.00	-35.2	8 peak	
2	4088.333	-1.44	40.52	39.08	74.00	-34.9	2 peak	
3	4804.000	1.23	39.42	40.65	74.00	-33.3	5 peak	
4	5675.000	2.45	38.84	41.29	74.00	-32.7	1 peak	
5	6581.667	3.72	37.48	41.20	74.00	-32.8	0 peak	
6	7206.000	5.88	37.66	43.54	74.00	-30.4	6 peak	

Report No.: SEFB908145

Note: Level = Reading + Factor Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

Page No.

28 of 79

S-FD-501V1.0



Power		: 120V/60)Hz	Pol/Phase	e	:	HORIZO	NTAL
Test Mo	ode	: Mode	2	Temperat	:	25 °C		
Test Da	te	: Aug. 11,	2019	Humidity		:	52 %	
Memo		: CH 39		Atmosphe	eric Pressure	e :	1010 hpa	3
80.0 dB	uV/m			FCC Class R. P.	ladiation (above 1G	Hz) naak		
				TCC Class B 11	ladiadoli (above 14	IIZ) peak		
				FCC Class B	Radiation (above 1	GHz) Avg		
		3 4 5	\$ *					
40	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \							
0.0								
1000.000 No.	Frequency	Factor	7800.00 9500.0 Reading	00 11200.00 1 Level	2900.00 14600. Limit	00 Marg	18000.00 in Dot	ector
NO.	(MHz)	(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		ector
1	3436.667	-3.93	42.97	39.04	74.00	-34.9)6 р	eak
2	3918.333	-2.17	40.87	38.70	74.00	-35.3	0 р	eak
3	4882.000	1.38	39.42	40.80	74.00	-33.2	.0 p	eak
4	5675.000	2.45	38.47	40.92	74.00	-33.0)8 p	eak
5	6298.333	3.38	36.74	40.12	74.00	-33.8	8 p	eak
6	7323.000	6.34	38.51	44.85	74.00	-29.1	5 p	eak

Report No.: SEFB908145

Note: Level = Reading + Factor Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

S-FD-501V1.0 Page No. : 29 of 79



Power		: 120V/60)Hz	Pol/Phas	e	: V	ERTICAL
Test Mo	ode	: Mode	2	Temperat	: 2	25 °C	
Test Da	ate	: Aug. 11	2019	Humidity		: 5	2 %
Memo		: CH 39		Atmosphe	eric Pressure	e : 1	010 hpa
80.0 dB	uV/m			FCC Class R. F	ladiation (above 1G	Hz) neak	
				T CC Class B T	radiation (above 12	Trzy pouk	
				FCC Class B	Radiation (above 1	GHz) Avg	
40	1 2 X X	3 4 5	Š				
0.0	0 2700.00 4400.0	0 6100.00	7800.00 9500.0	00 11200.00 1	12900.00 14600.	00	18000.00 MHz
No.	Frequency	Factor	Reading	Level	Limit	Margin	
	(MHz)	(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	3521.667	-3.53	42.84	39.31	74.00	-34.69	peak
2	4003.333	-1.87	40.74	38.87	74.00	-35.13	peak
3	4882.000	1.38	39.21	40.59	74.00	-33.41	peak
4	5731.667	2.59	37.11	39.70	74.00	-34.30	peak
5	6241.667	3.36	37.59	40.95	74.00	-33.05	peak
6	7323.000	6.34	36.75	43.09	74.00	-30.91	peak

Report No.: SEFB908145

Note: Level = Reading + Factor Margin = Level – Limit

S-FD-501V1.0

Factor = Antenna Factor + Cable Loss - Amplifier Factor

Page No.

: 30 of 79



Power		: 120V/60)Hz	Pol/Phase	e	: 1	HORIZONTA	
Test Mo	ode	: Mode 2		Temperat	ure	: 2	25 °C	
Test Da	ite	: Aug. 11,	2019	Humidity		: :	52 %	
Memo		: CH 78		Atmosphe	eric Pressure	e :	1010 hpa	
80.0 dB	uV/m			FCC Class R. F	ladiation (above 1G	Hz) neak		
				TCC Class D T	ladiadoli (above 14	nzj peak		
				FCC Class B	Radiation (above 1	GHz) Avg		
40	1 2 2 X	3 4 5 3 X X	6 *					
40								
0.0								
1000.000 No.	Frequency	Factor	7800.00 9500.0 Reading	00 11200.00 1 Level	2900.00 14600. Limit	⁰⁰ Margi	18000.00 MHz	
	(MHz)	(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1	3578.333	-3.33	43.22	39.89	74.00	-34.1	1 peak	
2	4031.667	-1.73	42.48	40.75	74.00	-33.2	5 peak	
3	4960.000	1.52	38.78	40.30	74.00	-33.7	0 peak	
4	5901.667	3.02	37.83	40.85	74.00	-33.1	5 peak	
5	6581.667	3.72	38.05	41.77	74.00	-32.2	3 peak	
6	7440.000	6.80	35.70	42.50	74.00	-31.5	0 peak	

Report No.: SEFB908145

Note: Level = Reading + Factor Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

Page No.

: 31 of 79

S-FD-501V1.0



Power		:	120V/60	Hz	Pol/Phas	е	:	VEI	RTICAL
Test Mo	de	:	Mode 2		Tempera	ture	:	25 '	°C
Test Da	te	:	Aug. 11,	2019	Humidity	midity : 52 %			%
Memo		:	CH 78 Atmospheric Pressure : 1				101	0 hpa	
80.0 dBu	N/m				ECC Class B. F	Radiation (above 16	Ua) acak		
					FUL Class B F	radiation (above 16	нгу реак		
					ECC Class P	Radiation (above 1	GUa) Ava		
					T CC Class B	Tradiation (above 1	uliz) Atg		
	. 2	2	4 ×	e X					
40	1 2	Ž	4 ×	1					
0.0 1000.000	2700.00 4400.0	00	6100.00 7	7800.00 9500.0	00 11200.00	12900.00 14600.	.00	18	000.00 MHz
No.	Frequency (MHz)		actor dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Marg (dB		Detector
1	3351.667		-4.38	44.56	40.18	74.00	-33.8	32	peak
2	4230.000		-0.72	41.84	41.12	74.00	-32.8	38	peak
3	4960.000		1.52	38.97	40.49	74.00	-33.5	51	peak
4	5760.000		2.66	38.32	40.98	74.00	-33.0)2	peak
5	6751.667		4.28	38.56	42.84	74.00	-31.1	16	peak
6	7440.000		6.80	35.41	42.21	74.00	-31.7	79	peak

Note: Level = Reading + Factor Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

Issued Date : Aug. 24, 2019
Page No. : 32 of 79

Report No.: SEFB908145



Power		: 120V/60)Hz	Pol/Phase	e	:	HORIZONTAL		
Test Mo	ode	: Mode 3	Mode 3		ure	:	25 °C		
Test Da	ite	: Aug. 11	Aug. 11, 2019		Humidity :				
Memo		: CH 00	CH 00		Atmospheric Pressure :				
80.0 dBuV/m FCC Class B Radiation (above 1GHz) peak									
				TCC Class D TI	adiadon (above 14	пгу реак			
				FCC Class R	Radiation (above 1	GHz) Ava			
				100 01000 0		a,g			
	1 2 X	4 5 6 * \$ 8							
40	1 2 7								
0.0									
1000.000	D 2700.00 4400.00		7800.00 9500.0	00 11200.00 1	2900.00 14600.	00	18000.00 MHz		
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margi (dB)			
1	3748.333	-2.75	42.52	39.77	74.00	-34.2	3 peak		
2	4315.000	-0.28	39.57	39.29	74.00	-34.7	1 peak		
3	4804.000	1.23	40.38	41.61	74.00	-32.3	9 peak		
4	5675.000	2.45	39.97	42.42	74.00	-31.5	8 peak		
5	6241.667	3.36	38.52	41.88	74.00	-32.1	2 peak		
6	7206.000	5.88	37.24	43.12	74.00	-30.8	8 peak		

Report No.: SEFB908145

Note: Level = Reading + Factor Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



Power		: 120V/6	0Hz	Pol/Phas	e	: \	VERTICAL	
Test Mo	de	: Mode 3	3	Temperature :			25 °C	
Test Da	te	: Aug. 1	Aug. 11, 2019			: 5	52 %	
Memo		: CH 00	CH 00		eric Pressur	e : 1	1010 hpa	
80.0 dBu	N/m			ECC Class P. F	ladiation (above 16	Han noak		
				FCC Class B T	Taulation (above 10	іпгу реак		
				FCC Class R	Radiation (above 1	GHz) Ava		
				T CC Class B	Tradiation (above	unzjrarg		
	1 2	4 =	6 X					
40	1 2 3 X 2 X	\$ \$						
0.0 1000.000	2700.00 4400.00	6100.00	7800.00 9500.0	00 11200.00 1	12900.00 14600	.00	18000.00 MHz	
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margii (dB)		
1	3521.667	-3.53	44.84	41.31	74.00	-32.69	9 peak	
2	4286.667	-0.43	40.80	40.37	74.00	-33.63	3 peak	
3	4804.000	1.23	39.41	40.64	74.00	-33.36	6 peak	
4	5901.667	3.02	37.97	40.99	74.00	-33.01	1 peak	
5	6468.333	3.45	37.08	40.53	74.00	-33.47	7 peak	
6	7206.000	5.88	37.30	43.18	74.00	-30.82	2 peak	

Report No.: SEFB908145

: 34 of 79

Note: Level = Reading + Factor Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

S-FD-501V1.0 Page No.



Power		: 120V/60)Hz	Pol/Phase	e	:	HORIZON	ITAL	
Test Mo	ode	: Mode 3		Temperature :			25 °C		
Test Da	nte	: Aug. 11	Aug. 11, 2019		Humidity :			52 %	
Memo		: CH 39	CH 39		Atmospheric Pressure :			1010 hpa	
80.0 dBuV/m FCC Class B Radiation (above 1GHz) peak									
				T CC Class D T	ladiation (above 14	mzj peak			
				FCC Class B	Radiation (above 1	GHz) Avg			
40	1 2	3 4 5 3 X X	6 Y						
40	1 2	1							
0.0									
1000.000 No.	700.00 4400.00 Frequency	Factor	7800.00 9500.0 Reading	00 11200.00 1 Level	2900.00 14600. Limit	Marg	in Dete		
	(MHz)	(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)			
1	3295.000	-4.68	44.81	40.13	74.00	-33.8	pea	ak	
2	4088.333	-1.44	40.47	39.03	74.00	-34.9	7 pea	ak	
3	4882.000	1.38	39.15	40.53	74.00	-33.4	7 pea	ak	
4	6043.333	3.28	37.85	41.13	74.00	-32.8	7 pea	ak	
5	6355.000	3.40	37.51	40.91	74.00	-33.0	9 pea	ak	
6	7323.000	6.34	37.46	43.80	74.00	-30.2	.0 pea	ak	

Report No.: SEFB908145

Note: Level = Reading + Factor Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



Power		: 120V/60)Hz	Pol/Phas	e	:	VERTICA	\L	
Test Mo	de	: Mode 3	Temperature		:	25 °C			
Test Da	te	: Aug. 11,	Aug. 11, 2019		Humidity :			52 %	
Memo		: CH 39	CH 39		Atmospheric Pressure :			1010 hpa	
80.0 dBu	ıV/m			ECC Class B. E	ladiation (above 1G	Ua) noak			
				LCC Cidss B L	raulaum (auve ru	пгу реак			
				FCC Class R	Radiation (above 1	GHz) Ava			
				T CC Class B	Tradiation (above 1	ulizjaty			
		3 4 - 5	Š						
40	1 2 3	\$ \$ 5 '	•						
0.0 1000.000	2700.00 4400.00	6100.00	7800.00 9500.0	00 11200.00 1	12900.00 14600.	00	18000.00 M	Hz	
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Marg (dB)		ector	
1	3748.333	-2.75	42.88	40.13	74.00	-33.8	37 ре	eak	
2	4343.333	-0.14	39.68	39.54	74.00	-34.4	-6 pe	eak	
3	4882.000	1.38	39.33	40.71	74.00	-33.2	.9 ре	eak	
4	6015.000	3.27	37.66	40.93	74.00	-33.0	7 ре	eak	
5	6581.667	3.72	36.48	40.20	74.00	-33.8	80 ре	eak	
6	7323.000	6.34	36.84	43.18	74.00	-30.8	32 pe	eak	

Report No.: SEFB908145

Note: Level = Reading + Factor Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

S-FD-501V1.0 Page No. : 36 of 79



Power		: 120V/60	OHz	Pol/Phase	e	:	HORIZON	TAL	
Test Mode : Mode 3				Temperat	Temperature :			25 °C	
Test Da	te	: Aug. 11	, 2019	Humidity		:	52 %		
Memo		: CH 78		Atmosphe	eric Pressure	e :	1010 hpa		
80.0 dBu	N/m			ECC Class B. E	ladiation (above 16	U=) nonk			
				FCC Class B T	Taulation (above 10	пгу реак			
				ECC Class P	Radiation (above 1	GUa) Ava			
				T CC Class B	Tradiation (above 1	ulizjaty			
		3 4 5	6 *						
40	1 2 1 7	3 \$ 5							
0.0 1000.000	2700.00 4400.00	0 6100.00	7800.00 9500.0	00 11200.00 1	12900.00 14600.	.00	18000.00 MH;	z	
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margi (dB)		ctor	
1	3266.667	-4.83	44.20	39.37	74.00	-34.6	3 pea	ak	
2	3946.667	-2.07	41.73	39.66	74.00	-34.3	4 pea	ak	
3	4960.000	1.52	38.84	40.36	74.00	-33.6	4 pea	ak	
4	5901.667	3.02	38.83	41.85	74.00	-32.1	5 pea	ak	
5	6326.667	3.39	37.53	40.92	74.00	-33.0	8 pea	ak	
6	7440.000	6.80	36.45	43.25	74.00	-30.7	5 pea	ak	

Report No.: SEFB908145

Note: Level = Reading + Factor Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

S-FD-501V1.0 Page No. : 37 of 79



Power		: 120V/60	OHz	Pol/Phas	e	: V	ERTICAL	
Test Mode : Mode 3				Temperat	ture	: 2	25 °C	
Test Da	te	: Aug. 11	, 2019	Humidity		: 52	2 %	
Memo		: CH 78		Atmosphe	eric Pressure	e : 10	010 hpa	
80.0 dBu	W/m			500 di				
 				FLL Class B H	ladiation (above 16	Hzj peak		
				FCC Class D	D - 1 - 1 - 1 - 1 - 1	CULA		
				FLU Class B	Radiation (above 1	GHZJ AVG		
			6 X					
40	1 2 * *	3 4 5 X X X	*					
1000 000	2700.00 4400.00	0 6100.00	7800.00 9500.0	00 11200.00 1	12900.00 14600.	nn	18000.00 MHz	
No.	Frequency	Factor	Reading	Level	Limit	Margin		
	(MHz)	(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1	3295.000	-4.68	43.90	39.22	74.00	-34.78	peak	
2	4116.667	-1.29	40.18	38.89	74.00	-35.11	peak	
3	4960.000	1.52	39.51	41.03	74.00	-32.97	peak	
4	5901.667	3.02	37.47	40.49	74.00	-33.51	peak	
5	6355.000	3.40	37.77	41.17	74.00	-32.83	peak	
6	7440.000	6.80	36.24	43.04	74.00	-30.96	peak	

Report No.: SEFB908145

Note: Level = Reading + Factor Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

S-FD-501V1.0 Page No. : 38 of 79

Issued Date

: Aug. 24, 2019

20dB Bandwidth Measurement

6.1 Test Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, 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, provided the systems operate with an output power no greater than 125mW.

Report No.: SEFB908145

6.2 Test Standard

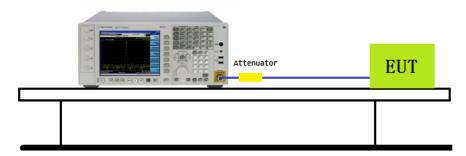
ANSI C63.10-2013- Section 7.8.7

6.3 Test Setup

- 1. Set RBW ≥ 1% of the 20dB bandwidth
- 2. VBW ≥ 3 ×RBW
- 3. Span = approximately 2 to 3 times the 20dB bandwidth, centered on a hopping channel
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple
- 7. Allow the trace to stabilize
- 8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20dB relative to the maximum level measured in the fundamental emission

6.4 Test Setup Layout

Spectrum Analyzer



Cerpass Technology (Suzhou) Co., Ltd. **Issued Date** Aug. 24, 2019 Page No. 39 of 79

S-FD-501V1.0

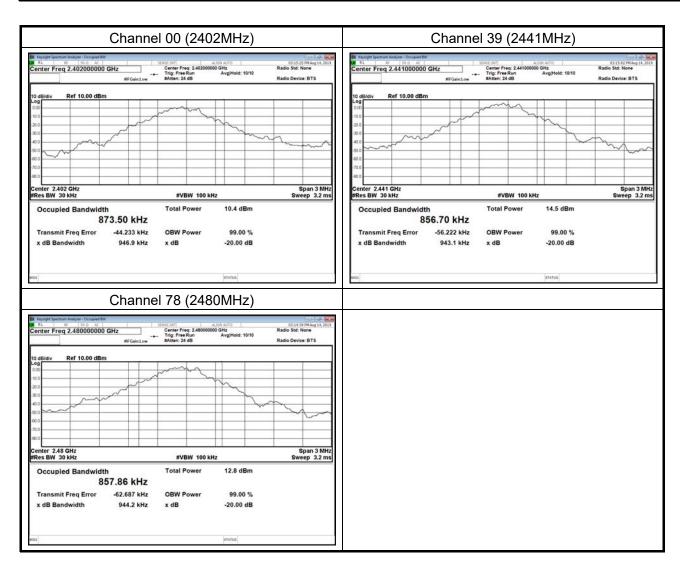


6.5 Test Result and Data

Test Item	Occupied Bandwidth
Test Mode	Mode 1: Transmitter DH5

Report No.: SEFB908145

Channel No.	Frequency(MHz)	20dB Bandwidth(kHz)
00	2402	946.9
39	2441	943.1
78	2480	944.2



S-FD-501V1.0 Page No. : 40 of 79

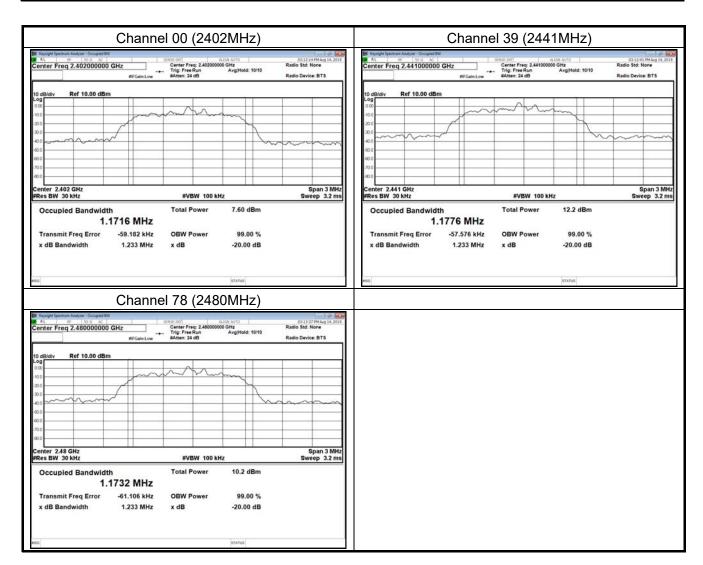


Test Item	Occupied Bandwidth
Test Mode	Mode 2: Transmitter 2DH5

Report No.: SEFB908145

Issued Date : Aug. 24, 2019

Channel No.	Frequency(MHz)	20dB Bandwidth(kHz)	
00	2402	1233.0	
39	2441	1233.0	
78	2480	1233.0	



S-FD-501V1.0 Page No. : 41 of 79

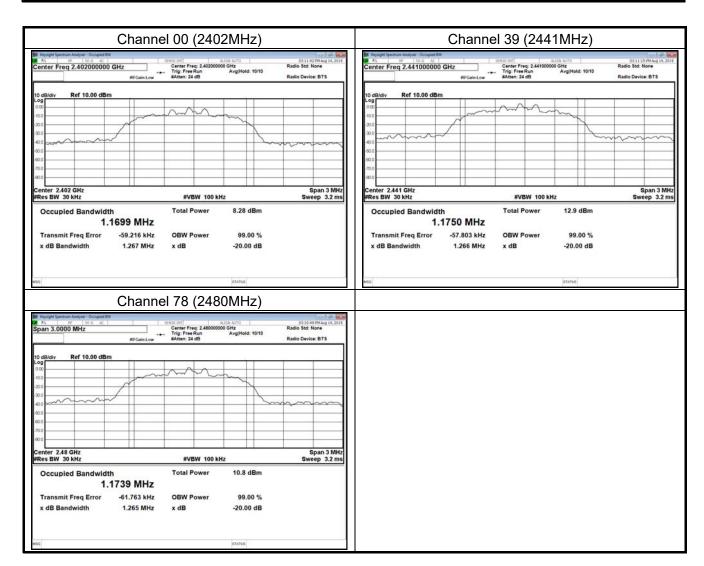


Test Item	Occupied Bandwidth
Test Mode	Mode 3: Transmitter 3DH5

Report No.: SEFB908145

Issued Date : Aug. 24, 2019

Channel No.	Frequency(MHz)	20dB Bandwidth(kHz)
00	2402	1267.0
39	2441	1266.0
78	2480	1265.0



S-FD-501V1.0 Page No. : 42 of 79

7. Channel Carrier Frequencies Separation Measurement

7.1 Test Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

7.2 Test Standard

ANSI C63.10-2013- Section 7.8.2

7.3 Test Setup

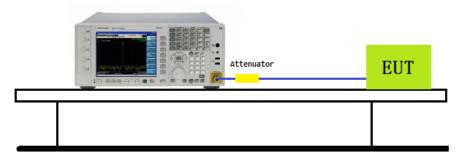
The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

- a) Span: Wide enough to capture the peaks of two adjacent channels.
- b) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
- c) Video (or average) bandwidth (VBW) ≥ RBW
- d) Sweep: Auto
- e) Detector function: Peak
- Trace: Max hold f)
- g) Allow the trace to stabilize

Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A plot of the data shall be included in the test report.

7.4 Test Setup Layout

Spectrum Analyzer



Cerpass Technology (Suzhou) Co., Ltd. **Issued Date**

S-FD-501V1.0

Aug. 24, 2019

43 of 79

Page No.



7.5 Test Result and Data

Test Item : Channel Carrier Frequency Separation		Channel Carrier Frequency Separation
Test Mode		Mode 1: Transmitter DH5

Report No.: SEFB908145

Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
00	2402	1000	>25 kHz or 2/3 of 20 dB BW	Pass
39	2441	1000	>25 kHz or 2/3 of 20 dB BW	Pass
78	2480	1000	>25 kHz or 2/3 of 20 dB BW	Pass

Test Item	• •	Carrier Frequency Separation
Test Mode	:	Mode 2: Transmitter 2DH5

Channel No.	Frequency (MHz)	Carrier Frequency Separation(kHz)	Limit (kHz)	Result
00	2402	1000	>25 kHz or 2/3 of 20 dB BW	Pass
39	2441	1000	>25 kHz or 2/3 of 20 dB BW	Pass
78	2480	1000	>25 kHz or 2/3 of 20 dB BW	Pass

Test Item	• •	Carrier Frequency Separation
Test Mode	•	Mode 3: Transmitter 3DH5

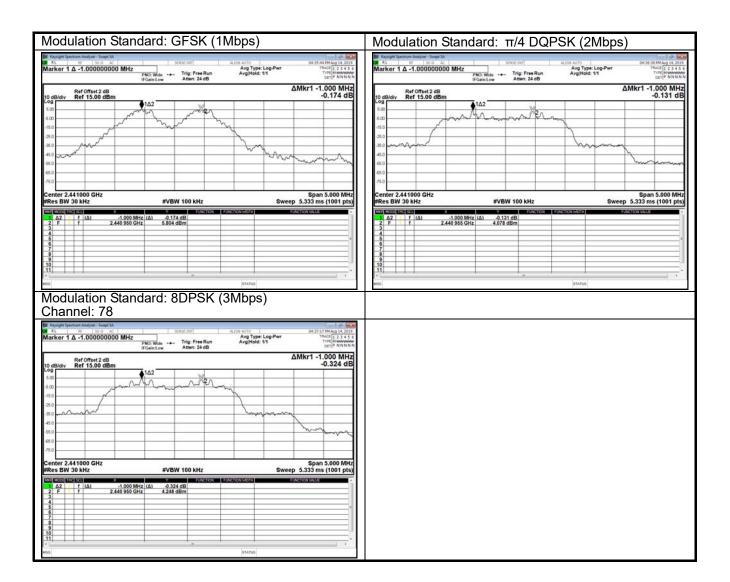
Channel No.	Frequency (MHz)	Carrier Frequency Separation(kHz)	Limit (kHz)	Result
00	2402	1000	>25 kHz or 2/3 of 20 dB BW	Pass
39	2441	1000	>25 kHz or 2/3 of 20 dB BW	Pass
78	2480	1000	>25 kHz or 2/3 of 20 dB BW	Pass

Page No.

: 44 of 79

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019





Report No.: SEFB908145

: 45 of 79

S-FD-501V1.0 Page No.

8. Dwell Time Measurement

8.1 Test Limit

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.

Report No.: SEFB908145

8.2 Test Standard

ANSI C63.10-2013- Section 7.8.3

8.3 Test Setup

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

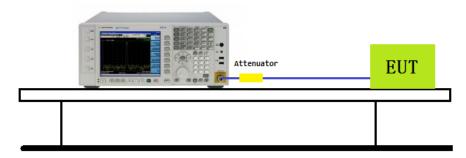
- a) Span: Zero span, centered on a hopping channel.
- b) RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
- c) Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.

d) Detector function: Peak

e) Trace: Max hold

8.4 Test Setup Layout

Spectrum Analyzer



 Cerpass Technology (Suzhou) Co., Ltd.
 Issued Date
 : Aug. 24, 2019

 S-FD-501V1.0
 Page No.
 : 46 of 79



8.5 Test Result and Data

Test Date : Aug. 14, 2019 Temperature : 22C Atmospheric pressure : 1017 hPa Humidity : 60 %

Test Period = 0.4 (second/ channel) x 79 Channel = 31.6 sec

Modulation Standard: GFSK(1Mbps)

DH 1

Pulse Time	Total of Dwell	Period Time	Limit	
(ms)	(ms)	(s)	(ms)	Result
0.432	138.24	31.6	400	PASS

Report No.: SEFB908145

Remark:Total of Dwell =pulse Time*(1600/2)/79*Period Time DH 3

Pulse Time	Total of Dwell	Period Time	Limit	
(ms)	(ms)	(s)	(ms)	Result
1.685	269.60	31.6	400	PASS

Remark:Total of Dwell =pulse Time*(1600/4)/79*Period Time DH 5

Pulse Time	Total of Dwell	Period Time	Limit	
(ms)	(ms)	(s)	(ms)	Result
2.935	313.07	31.6	400	PASS

Remark:Total of Dwell =pulse Time*(1600/6)/79*Period Time

Modulation Standard: π /4 DQPSK(2Mbps)

DH 1

Pulse Time	Total of Dwell	Period Time	Limit	
(ms)	(ms)	(s)	(ms)	Result
0.444	142.08	31.6	400	PASS

Remark:Total of Dwell =pulse Time*(1600/2)/79*Period Time DH 3

Pulse Time	Total of Dwell	Period Time	Limit	
(ms)	(ms)	(s)	(ms)	Result
1.7	272.00	31.6	400	PASS

Remark:Total of Dwell =pulse Time*(1600/4)/79*Period Time DH 5

Pulse Time	Total of Dwell	Period Time	Limit	
(ms)	(ms)	(s)	(ms)	Result
2.945	314.13	31.6	400	PASS

Remark:Total of Dwell =pulse Time*(1600/6)/79*Period Time

 Cerpass Technology (Suzhou) Co., Ltd.
 Issued Date
 : Aug. 24, 2019

 S-FD-501V1.0
 Page No.
 : 47 of 79



Modulation Standard: 8DPSK(3Mbps)

DH 1

Pulse Time	Total of Dwell	Period Time	Limit	
(ms)	(ms)	(s)	(ms)	Result
0.441	141.12	31.6	400	PASS

Report No.: SEFB908145

Remark:Total of Dwell =pulse Time*(1600/2)/79*Period Time DH 3

Pulse Time	Total of Dwell	Period Time	Limit	
(ms)	(ms)	(s)	(ms)	Result
1.69	270.40	31.6	400	PASS

Remark:Total of Dwell =pulse Time*(1600/4)/79*Period Time DH 5

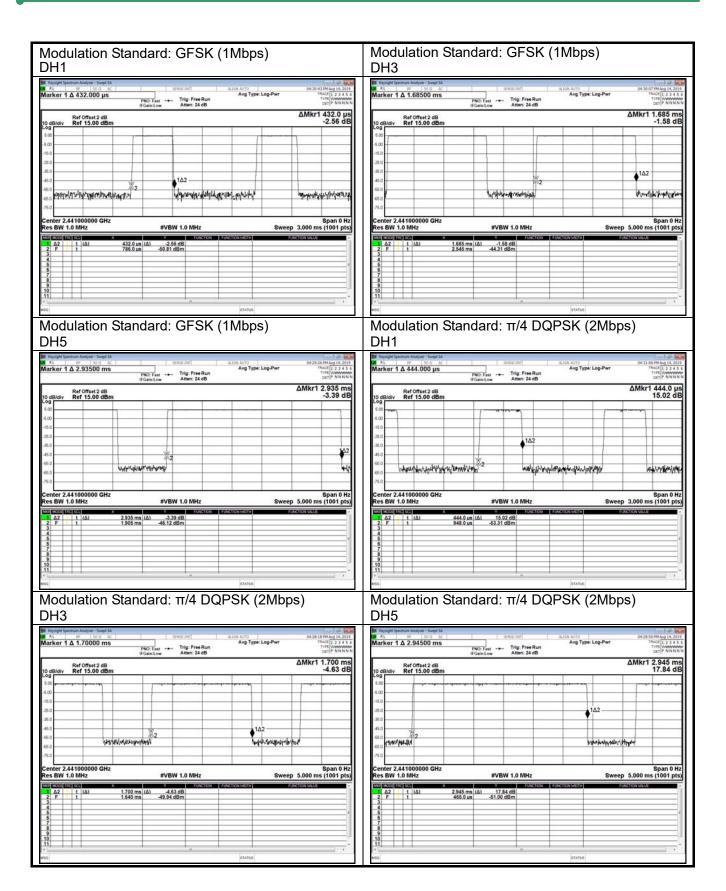
Pulse Time	Total of Dwell	Period Time	Limit	
(ms)	(ms)	(s)	(ms)	Result
2.945	314.13	31.6	400	PASS

Remark:Total of Dwell =pulse Time*(1600/6)/79*Period Time

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0 Page No. : 48 of 79

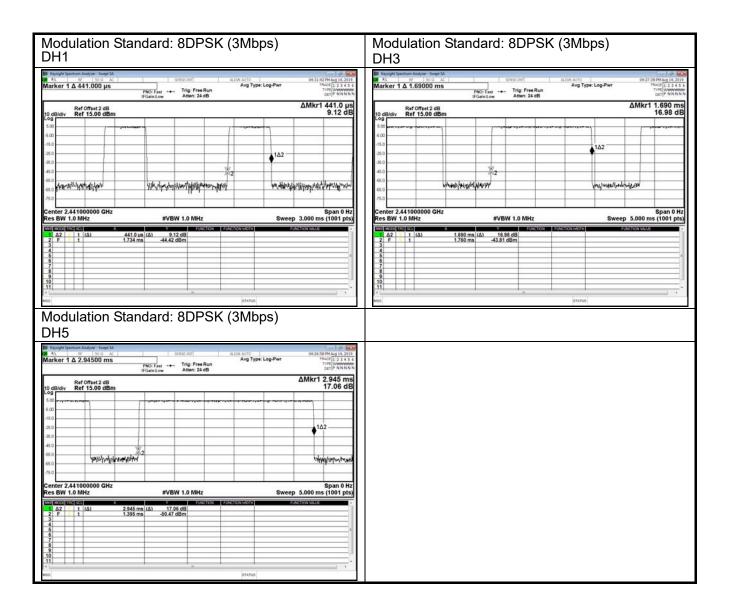




Report No.: SEFB908145

S-FD-501V1.0 Page No. : 49 of 79

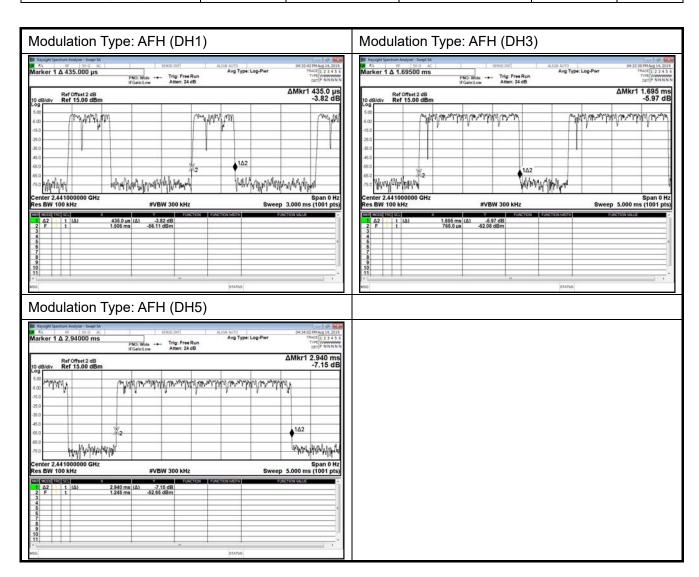






Test Period = 0.4 (second/ channel) x 20 Channel = 8 sec

Modulation Type	Frequency (MHz)	Length of transmission time (ms)	Number of transmission in a 8 (20 Hopping*0.4)	Dwell Time (ms)	Limit (ms)
AFH (DH1)	2402-2421	0.435	160	69.60	400
AFH (DH3)	2402-2421	1.695	80	135.60	400
AFH (DH5)	2402-2421	2.94	53.33	156.79	400



S-FD-501V1.0 Page No. : 51 of 79

9. Number of Hopping Channels Measurement

9.1 Test Limit

Frequency hopping systems in the 2400 ~ 2483.5 MHz band shall use at least 15 channels.

9.2 Test Standard

ANSI C63.10-2013- Section 7.8.3

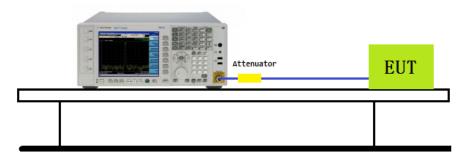
9.3 Test Setup

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

- a) Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
- b) RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
- c) VBW ≥ RBW
- d) Sweep: Auto
- e) Detector function: Peak
- f) Trace: Max hold
- g) Allow the trace to stabilize

9.4 Test Setup Layout

Spectrum Analyzer



Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0

Page No. : 52 of 79

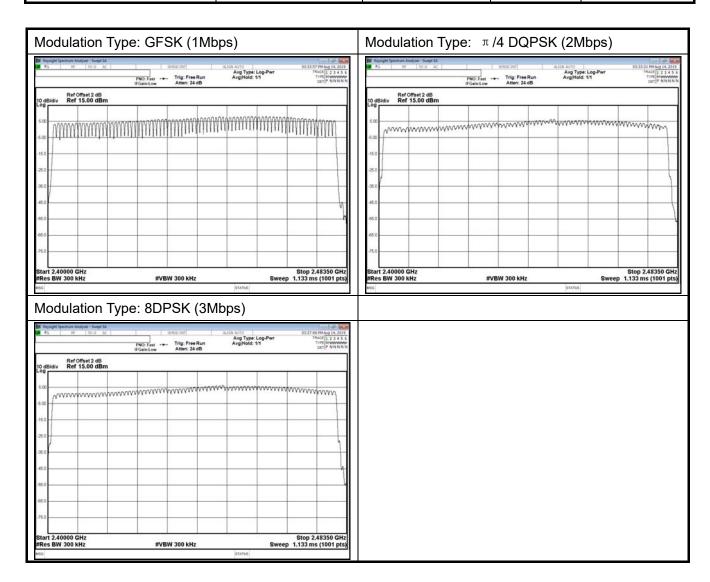


9.5 Test Result and Data

Test Item :	Number of Hopping Frequencies
-------------	-------------------------------

Report No.: SEFB908145

Test Mode	Frequency Band	Number of Hopping	Limit	Result
	(MHz)	Frequencies		
Mode 1: Transmitter DH5	2400 - 2483.5	79	>15	Pass
Mode 2: Transmitter DH5	2400 - 2483.5	79	>15	Pass
Mode 3: Transmitter DH5	2400 - 2483.5	79	>15	Pass



S-FD-501V1.0 Page No. : 53 of 79



10. Peak Output Power Measurement

10.1 Test Limit

The Maximum Peak Output Power Measurement is 125mW (20.97dBm).

10.2 Test Standard

ANSI C63.10-2013- Section 7.8.5

10.3 Test Setup

Spectrum analyzer method

- a) Use the following spectrum analyzer settings:
- 1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
- 2) RBW > 20 dB bandwidth of the emission being measured.
- 3) VBW ≥ RBW.
- 4) Sweep: Auto.
- 5) Detector function: Peak.
- 6) Trace: Max hold.
- b) Allow trace to stabilize.
- c) Use the marker-to-peak function to set the marker to the peak of the emission.
- d) The indicated level is the peak output power, after any corrections for external attenuators and cables.
- e) A plot of the test results and setup description shall be included in the test report

Peak power meter method

The antenna port (RF output) of the EUT was connected to the input (RF input) of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

Cerpass Technology (Suzhou) Co., Ltd. Issued Date Aug. 24, 2019

S-FD-501V1.0

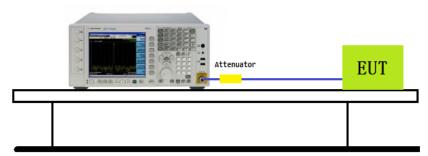
54 of 79

Page No.



10.4 Test Setup Layout

Spectrum Analyzer



Report No.: SEFB908145

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

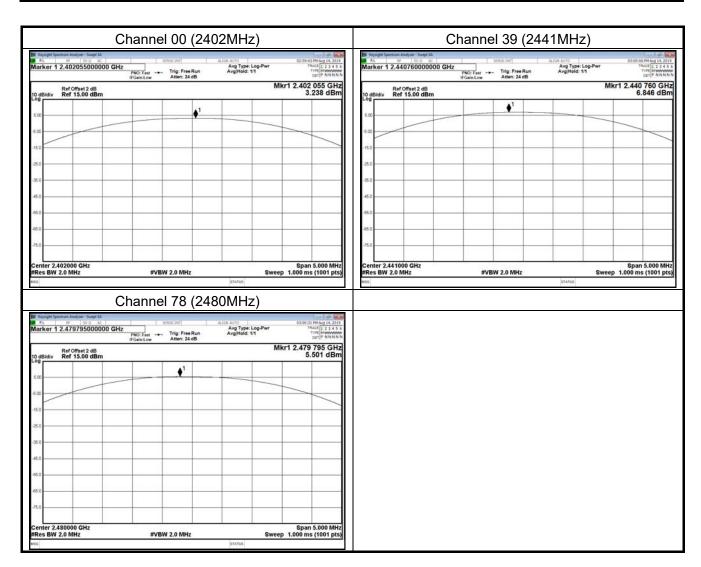
S-FD-501V1.0 Page No. : 55 of 79



10.5 Test Result and Data

Test Item	:	Peak Output Power
Test Mode	:	Mode 1: Transmitter DH5

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	3.24	20.97	Pass
39	2441	6.85	20.97	Pass
78	2480	5.50	20.97	Pass



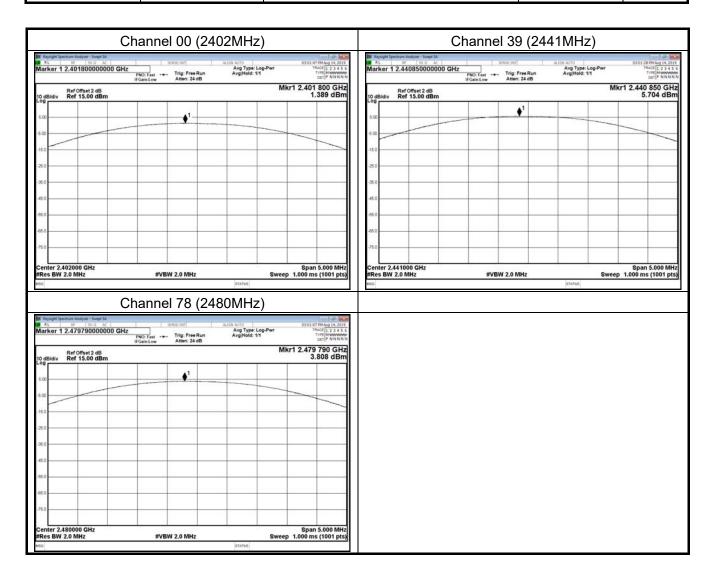
S-FD-501V1.0 Page No. : 56 of 79



Test Item	:	Peak Output Power
Test Mode	:	Mode 2: Transmitter 2DH5

Report No.: SEFB908145

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	1.39	20.97	Pass
39	2441	5.70	20.97	Pass
78	2480	3.81	20.97	Pass



S-FD-501V1.0 Page No. : 57 of 79

Issued Date

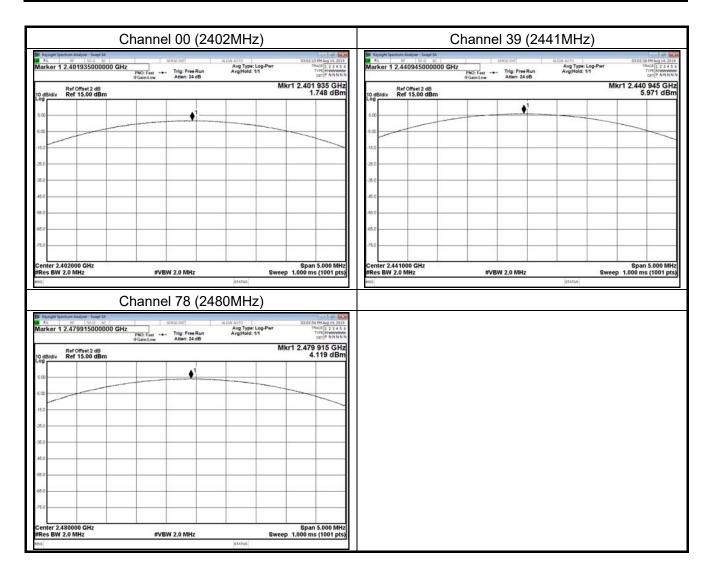
: Aug. 24, 2019



Test Item	:	Peak Output Power
Test Mode	:	Mode 3: Transmitter 3DH5

Report No.: SEFB908145

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	1.75	20.97	Pass
39	2441	5.97	20.97	Pass
78	2480	4.12	20.97	Pass



S-FD-501V1.0 Page No. : 58 of 79

Issued Date

: Aug. 24, 2019



11. Conducted Spurious Emissions Measurement

11.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) of FCC part 15 is not required.

Cerpass Technology (Suzhou) Co., Ltd. S-FD-501V1.0

Page No. 59 of 79

Aug. 24, 2019

Issued Date



11.2 Test Procedure

According to ANSI C63.10: 2013.

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

Report No.: SEFB908145

RBW = 100 kHz

VBW ≧ RBW

Sweep = auto

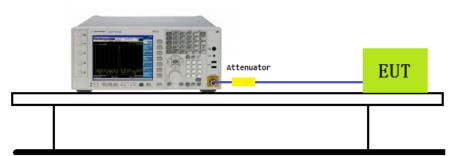
Detector function = peak

Trace = max hold

Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this section.

11.3 Test Setup

Spectrum Analyzer



Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

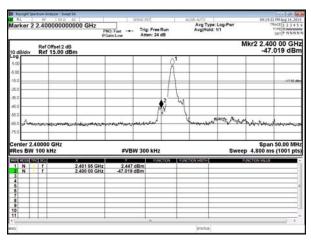
S-FD-501V1.0 Page No. : 60 of 79

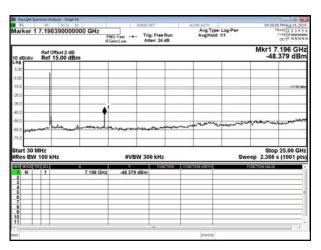
11.4 Test Result

Single test

Modulation Standard: GFSK (1Mbps)

Channel: 00

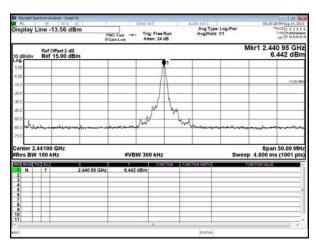


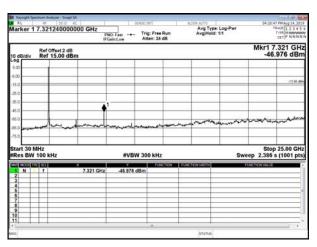


Report No.: SEFB908145

Modulation Standard: GFSK (1Mbps)

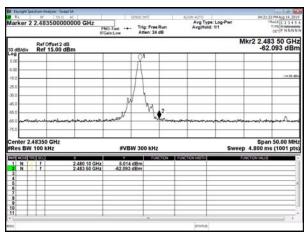
Channel: 39

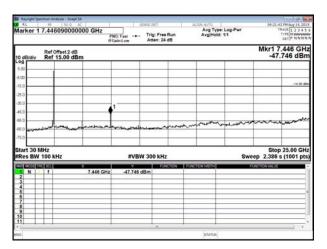




Modulation Standard: GFSK (1Mbps)

Channel: 78





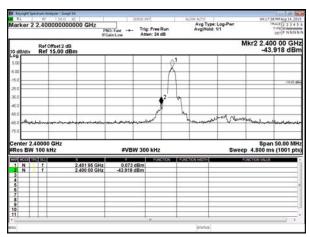
Cerpass Technology (Suzhou) Co., Ltd.

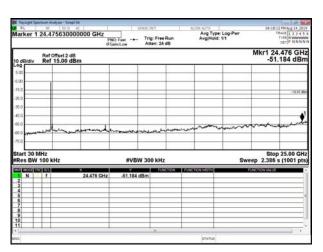
S-FD-501V1.0 Page No. : 61 of 79



Modulation Standard: π/4 DQPSK (2Mbps)

Channel: 00

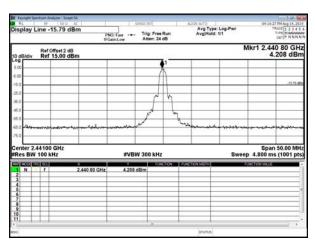


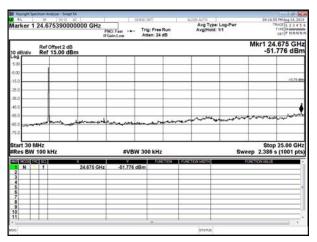


Report No.: SEFB908145

Modulation Standard: π/4 DQPSK (2Mbps)

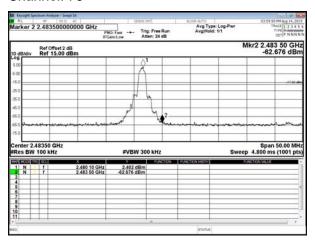
Channel: 39

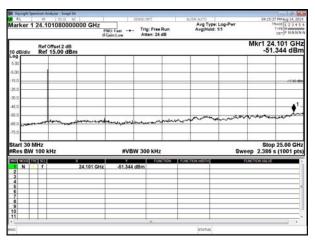




Modulation Standard: $\pi/4$ DQPSK (2Mbps)

Channel: 78



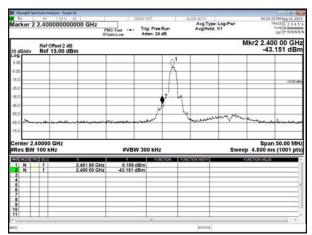


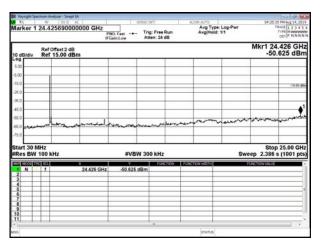
Cerpass Technology (Suzhou) Co., Ltd. S-FD-501V1.0 Page No. : 62 of 79



Modulation Standard: 8DPSK (3Mbps)

Channel: 00

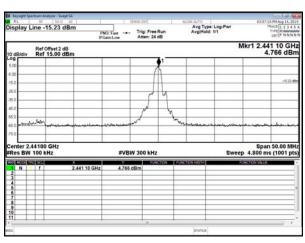


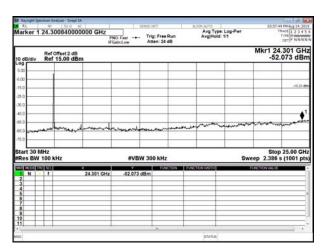


Report No.: SEFB908145

Modulation Standard: 8DPSK (3Mbps)

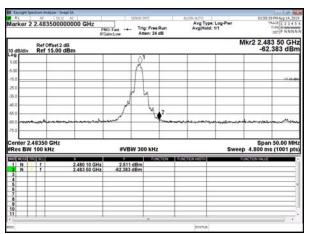
Channel: 39

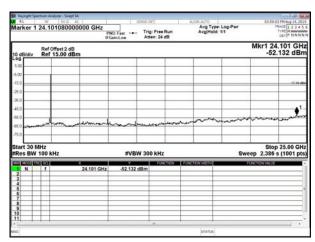




Modulation Standard: 8DPSK (3Mbps)

Channel: 78





: Aug. 24, 2019

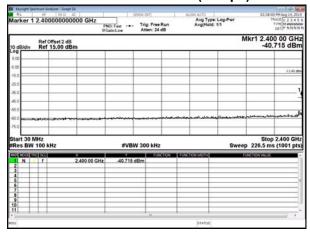
: 63 of 79

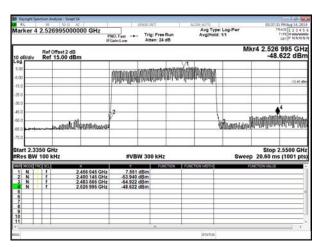
Cerpass Technology (Suzhou) Co., Ltd. Issued Date S-FD-501V1.0 Page No.



Hopping test

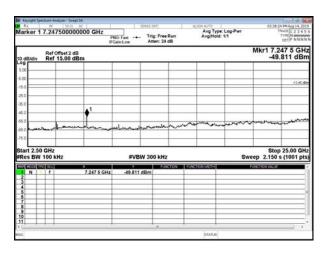
Modulation Standard: GFSK (1Mbps)

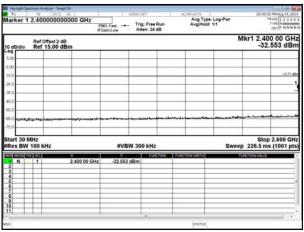


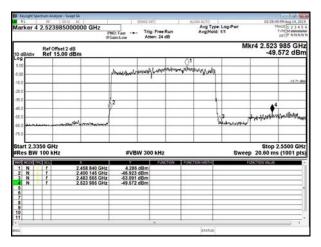


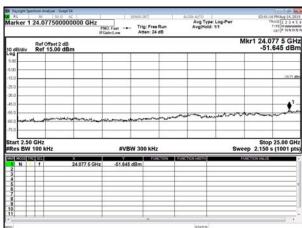
Report No.: SEFB908145

Modulation Standard: π/4 DQPSK (2Mbps)







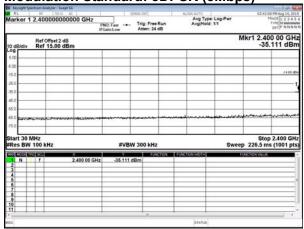


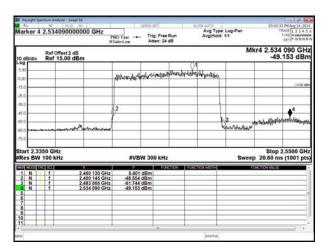
Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0 Page No. : 64 of 79



Modulation Standard: 8DPSK (3Mbps)

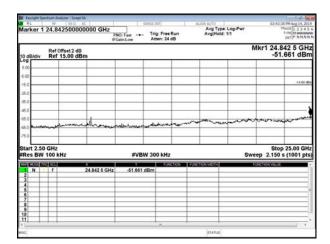




Issued Date

: Aug. 24, 2019

Report No.: SEFB908145



S-FD-501V1.0 Page No. : 65 of 79



12. Radiated Emission Band Edge Measurement

12.1 Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a) of FCC part 15.

Report No.: SEFB908145

12.2 Test Procedure

According to ANSI C63.10: 2013.

This test is required for any spurious emission or modulation product that falls in a Restricted Band, as defined in Section 15.205 of FCC part 15. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \ge 1$ GHz, 100 kHz for f < 1GHz

VBW ≧ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b) of FCC part 15.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209 of FCC Part 15. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from 20log (dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit of FCC part 15.

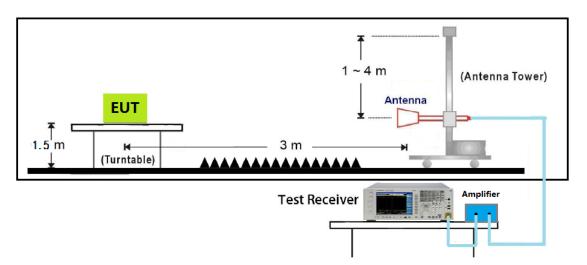
If the emission on which a radiated measurement must be made is located at the edge of the authorized band of operation, then the alternative "marker-delta" method may be employed.

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019

S-FD-501V1.0 Page No. : 66 of 79



12.3 Test Setup



Report No.: SEFB908145

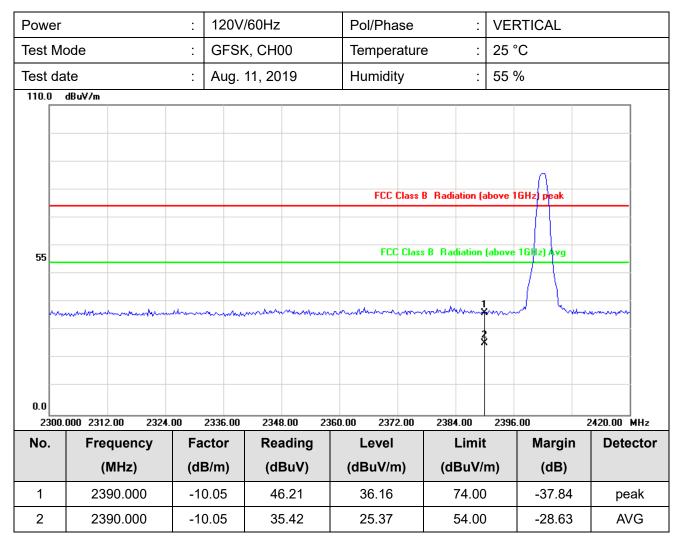
S-FD-501V1.0 Page No. : 67 of 79

Issued Date

Aug. 24, 2019



12.4 Test Result



Note: Level=Reading +Factor. Margin=Level-Limit.

S-FD-501V1.0 Page No. : 68 of 79



Power		: 120V/60Hz				Pol/Pha	ase	:	НО	HORIZONTAL			
Test M	ode	:	GFS	K, CH00	CH00 Temperature : 25 °C								
Test da	ate	:	Aug.	11, 201	9	Humidi	ty	:	55	%			
110.0	dBuV/m							B Radiation					
	and the second the sec	was the same of th	1		mmn			s B Radiation	_	: 1GHz)			
0.0 2300	.000 2312.00 2324	.00	2336.00	2348.	00 23	60.00 237	2.00	2384.00	2396	5.00	;	2420.00	MHz
No.	Frequency (MHz)		ctor 3/m)	Read (dB	•	Level (dBuV/r	n)	Limi (dBuV			argin dB)	Dete	ector
1	2390.000	-10	0.05	46.	.29	36.24		74.0	0	-3	7.76	ре	ak
2	2390.000	-10	0.05	35.	45	25.40		54.0	0	-2	8.60	A۱	/G

Report No.: SEFB908145

: Aug. 24, 2019

: 69 of 79



Power		:	120V	/60Hz		Pol/Ph	ase		:	VE	RTICAL		
Test Mo	ode	:	GFSł	K, CH78	3	Tempe	eratur	е		25	°C		
Test da	te	:	Aug.	11, 201	9	Humid	ity		:	55	%		
110.0	dBuV/m												7
55		*			Montes						1GHz) peak	gundhouden	
No.	000 2465.00 2480. Frequency (MHz)	Fa (dl	2495.00 ctor 3/m)	2510.0 Read (dB	ding uV)	Leve (dBuV/	m)	(dE	Limit BuV/ı	m)	Margir (dB)		ector
1	2483.500	-9	0.65	52.	89	43.24	1	7	74.00		-30.76	pe	eak
2	2483.500	-9	.65	35.	09	25.44	1	5	54.00		-28.56	A'	VG

Report No.: SEFB908145

Note: Level=Reading +Factor. Margin=Level-Limit.

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019 Page No. : 70 of 79

S-FD-501V1.0



Power		120V	/60Hz		Pol/Pha	se	:	НО	HORIZONTAL			
Test Mo	ode	:	GFSk	K, CH78		Tempera	ature	e :	25	°C		
Test da	ate	:	Aug.	11, 2019		Humidit	у	:	55	%		
110.0	dBuV/m											1
55		X		Manager and Application and the	•				ı (above	1GHz) peak = 1GHz) Avg	who who we	
0.0	000 2465.00 2480		2495.00	2510.00	2525.	.00 2540	. 00	2555.00	2570	0.00	2600.00	
No.	Frequency		ctor	2510.00 Reading		Level		Zaba.uu Limi		Margin		ector
1,0.	(MHz)		B/m)	(dBuV)		(dBuV/m	1)	(dBuV		(dB)		
1	2483.500	-6	0.65	55.52		45.87		74.0	0	-28.13	ре	eak
2	2483.500	-6	9.65	36.49		26.84		54.0	0	-27.16	A۱	/G

Report No.: SEFB908145



Power		:	120V	/60Hz		Pol/Pha	se		: VE	/ERTICAL				
Test M	ode	:	π/4 D	QPSK, C	H00	Temper	ature)	: 25	°C				
Test da	ate	:	Aug.	11, 2019		Humidit	у		: 55	%				
55	dBuV/m	and the same of th			manana		Class	B Radiation		e 1GH:	z) Avg			
0.0 2300 No .	.000 2312.00 2324 Frequency	Fa	2336.00 ctor	2348.00 Readin		Level		2384.00 Lin	nit		largin (dB)	2420.00 Dete	MHz ector	
	(MHz)	,	3/m)	(dBuV	_	•	(dBuV/m)		(dBuV/m)					
1	2390.000	1	0.05	45.74		35.69		74.			38.31	<u> </u>	ak	
2	2390.000	-10	0.05	35.46		25.41		54.0	00	-	28.59	A۱	/G	

Report No.: SEFB908145

Note: Level=Reading +Factor. Margin=Level-Limit.

Cerpass Technology (Suzhou) Co., Ltd. Issued Date : Aug. 24, 2019 Page No. : 72 of 79

S-FD-501V1.0



Power :				/60Hz		Pol/Pha	se	:	HORIZONTAL					
Test Mo	ode	:	π/4 D	QPSK, C	H00	Tempera	ature	e :	25 °	,C				
Test da	te		Aug.	11, 2019		Humidit	у	:	55 °	%				
110.0	dBuV/m			i									1	
						FCC (Tace F	3 Radiation (a	ahove 1		l-			
						100	JIGSS L	, madiadon (t	10070	(112) pto				
55						FCC Class B Radiati			(above	1GHz) A	/g			
									.					
~~	-andreader, mand	**-	-There		-war	Annahara an	~~~~	<u> </u>			4	moder		
0.0	000 2312.00 2324.	nn	2336.00	2348.00	2360	0.00 2372	o nn	2384.00	2396	00		2420.00	 	
No.	Frequency		ctor	Readir		Level		Limit		Mar			ctor	
	(MHz)	(di	3/m)	(dBuV	')	(dBuV/m)		(dBuV/m)		(dB)				
1	2390.000	-10	0.05	46.71		36.66		74.00		-37.34		peak		
2	2390.000	-10	0.05	35.48	3	25.43		54.00)	-28.	57	A۱	/G	

Note: Level=Reading +Factor. Margin=Level-Limit.

: Aug. 24, 2019

Page No. : 73 of 79



Power		120V/	/60Hz		Pol/Pha	se	:	VERTICAL					
Test Mo	ode	:	π/4 D	QPSK, CH	78	Temper	ature	:	25 °	25 °C			
Test da	te	:	Aug.	11, 2019		Humidit	у	:	55 9	%			
110.0	dBuV/m											1	
55	born war of the state of the st	*	MM MANA	mana		FCC	Class	Radiation ((above		and the second second		
0.0	000 2465.00 24	80.00	2495.00	2510.00	2525.0	0 2540) OO	2555.00	2570	00	2600.00	MU-	
No.	Frequency		ctor	Reading		Level	5.00	Limi		Margin		ector	
	(MHz)		B/m)	(dBuV)		dBuV/m	1)	(dBuV/		(dB)			
1	2483.500	-:	9.65	9.65 62.85		53.20 74.0			0 -20.80		ре	eak	
2	2483.500	-9	9.65	43.27		33.62		54.00)	-20.38	A۱	/G	

Report No.: SEFB908145

Note: Level=Reading +Factor. Margin=Level-Limit.

S-FD-501V1.0



Power		120V	/60Hz	Pol/Ph	ase		•	HORIZONTAL					
Test Mo	ode	:	π/4 D	QPSK, C	Tempe	eratur	е	:	25 °C				
Test da	ite	:	Aug.	11, 2019		Humic	lity		:	55	%		
110.0	dBuV/m												1
55	manam	×		None of the second of the seco			CC Clas	s BRad	liation	(above	1GHz) peak	photo-st-th-elleropeans	
0.0 2450. No.	000 2465.00 2480. Frequency (MHz)	Fa	2495.00 ctor B/m)	2510.00 Readii (dBu\	ng	25.00 25 Leve (dBuV/			5.00 Limit BuV/i		0.00 Margir (dB)	2600.00 n Deta	MHz ector
1	2483.500	-9	9.65	67.7	5	58.10)	7	74.00)	-15.90	ре	eak
2	2483.500	-6	9.65	49.0	1	39.36	3	ţ	54.00)	-14.64	A'	٧G

Report No.: SEFB908145

 $\textbf{Note:} \ \mathsf{Level} \texttt{=} \mathsf{Reading} \ \texttt{+} \mathsf{Factor}.$

Margin=Level-Limit.

S-FD-501V1.0 Page No. : 75 of 79

Issued Date

: Aug. 24, 2019



Power	120V	/60Hz		Pol/Pha	se	:	VE	VERTICAL							
Test Mo	8DPS	K, CH	00	Temper	Temperature : 25					25 °C					
Test da	ite	:	Aug.	11, 20	19	Humidit	:y	:	55	%					
55	dBuV/m	de commence de la com					Class	3 Radiation B Radiation			Avg	LAND MALLON			
0.0 2300. No.	000 2312.00 2324 Frequency (MHz)	Fa	2336.00 ctor 3/m)		.00 23 iding BuV)	Level	2.00	2384.00 Lim		M	argin	2420.00 Dete	MHz ector		
1	2390.000	,	0.05	,	5.06	36.01	. , ,		(dBuV/m) 74.00		-37.99		ak		
2	2390.000	1	0.05		5.44	25.39		54.0				AVG			

Report No.: SEFB908145



Power :			120V	/60Hz	Pol/Phase	:	HORIZONTAL				
Test Mo	ode	:	8DPS	SK, CH00	Temperatur	e :	25 °C				
Test da	te	:	Aug.	11, 2019	Humidity	:	55 %				
110.0	dBuV/m										
55		differential			FCC Clas		above 1GHz) peak (above 1GHz) Avg				
0.0 2300. No.	000 2312.00 2324. Frequency (MHz)	Fa	2336.00 ctor 3/m)	2348.00 23 Reading (dBuV)	2372.00 Level (dBuV/m)	2384.00 Limit		2420.00 MHz Detector			
1	2390.000	,	0.05	46.50	36.45	74.00		peak			
2	2390.000		0.05	35.57	25.52	54.00		AVG			

Report No.: SEFB908145



Power		:	120V/	/60Hz		Pol/Pł	nase		: VE	VERTICAL				
Test Mo	ode	e :			BDPSK, CH78 Temperature : 25 °C									
Test da	ite	:	Aug.	11, 2019		Humid	lity		: 55	%				
110.0	dBuV/m											1		
55	m	*		~	mmayh		CC Clas	s B Radiatio	n (abov	1GHz) peak	www.			
0.0	000 2465.00 2480		2495.00	2510.00	252	5.00 25	640.00	2555.00	257	0.00	2600.00	<u> </u>		
No.	Frequency		ctor	2510.00 Reading		Leve		2555.00 Lim		Margin		ector		
	(MHz)		B/m)	(dBuV)		(dBuV		(dBu\		(dB)				
1	, , ,		0.65 61.66			52.0	1	74.00		-21.99	pe	eak		
2	2483.500	-6	9.65	42.00		32.3	5	54.0	00	-21.65	A۱	/G		

Report No.: SEFB908145



Power		:	120V	120V/60Hz				se		•	HORIZONTAL				
Test Mo	ode	:	8DPSK, CH78				Temperature :					25 °C			
Test da	Test date :			11, 201	9	Н	umidit	:y			55	%			
110.0	dBuV/m													1	
55		*			yran van A			Class	B Rac	liation	(above	1GHz) peak			
0.0	200 2405 20 2400		2405.00	0510)	054		0555	- 00	0574		2020 20		
No.	000 2465.00 2480. Frequency		2495.00 ctor	2510.0 Read		2525.00	2540 Level	U.UU	2555	Limit	2570	Margin	2600.00 Det	ector	
1101	(MHz)		B/m)	(dBi			BuV/n	n)		BuV/ı		(dB)	500	00101	
1	2483.500	-6	0.65 68.88			59.23			74.00		-14.77	ре	peak		
2	2483.500	-6	9.65	49.	22	;	39.57			54.00		-14.43 A\		VG	

Note: Level=Reading +Factor.

Margin=Level-Limit.

_____ The End

S-FD-501V1.0 Page No. : 79 of 79