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Shenzhen Branch

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TEST REPORT

Application No.:	SZEM1706005430CR
Applicant:	ShenZhen FLYSKY Technology Co.,Ltd
Address of Applicant:	ADD 16F, Huafeng Building, No. 6006 Shennan Road, Futian District, Shenzhen, Guangdong, China
Manufacturer:	ShenZhen FLYSKY Technology Co.,Ltd
Address of Manufacturer:	ADD 16F, Huafeng Building, No. 6006 Shennan Road, Futian District, Shenzhen, Guangdong, China
Factory:	Dongguan Flysky RC Model technology Co.,Ltd
Address of Factory:	West building 3, Huangjinyuan Ind Park, Qiaoli North Gate, Changping Town, Dongguan ,China
Equipment Under Test (EUT):	
EUT Name:	Digital propotional radio control system
Model No.:	FS-GT3B
Standards:	EN 300 328 V2.1.1
Date of Receipt:	2017-06-05
Date of Test:	2017-06-06 to 2017-06-16
Date of Issue:	2017-06-24
Test Result :	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EU Declaration of Conformity and compliance with all relevant EU Directives.

Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2017-06-24		Original

Authorized for issue by:

Bill Chen /Project Engineer

Eric Fu /Reviewer

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2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Geo-location capability	EN 300 328 V2.1.1	No need Test	No Limit	Customer Declaration

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
RF Output Power	EN 300 328 V2.1.1	EN 300 328 V2.1.1 clause 5.4.2.2.1.2	EN 300 328 Clause 4.3.1.2	Pass
Duty Cycle, Tx-sequence, Tx-gap	EN 300 328 V2.1.1	EN 300 328 V2.1.1 clause 5.4.2.2.1.3	EN 300 328 Clause 4.3.1.3	Pass
Medium Utilization (MU) factor	EN 300 328 V2.1.1	EN 300 328 V2.1.1 clause 5.4.2.2.1.4	EN 300 328 Clause 4.3.1.6	Pass
Accumulated Transmit Time, Frequency Occupation and Hopping Sequence	EN 300 328 V2.1.1	EN 300 328 V2.1.1 clause 5.4.4.2.1	EN 300 328 Clause 4.3.1.4	Pass
Hopping Frequency Separation	EN 300 328 V2.1.1	EN 300 328 V2.1.1 clause 5.4.5.2.1	EN 300 328 Clause 4.3.1.5	Pass
Occupied Channel Bandwidth	EN 300 328 V2.1.1	EN 300 328 V2.1.1 clause 5.4.7.2.1	EN 300 328 Clause 4.3.1.8	Pass
Transmitter unwanted emissions in the out-of-band domain	EN 300 328 V2.1.1	EN 300 328 V2.1.1 clause 5.4.8.2.1	EN 300 328 Clause 4.3.1.9	Pass
Transmitter unwanted emissions in the spurious domain	EN 300 328 V2.1.1	EN 300 328 V2.1.1 clause 5.4.9.2	EN 300 328 Clause 4.3.1.10	Pass

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4 General Information

4.1 Details of E.U.T.

Frequency Range: 2405.5MHz to 2475MHz
Modulation Type: GFSK
Number of Channels: 140
Sample Type: Portable production
Antenna Type: Intergral
Antenna Gain: 2dBi
Power supply: DC 12V（1.5V x 8 "AA" Size batteries）

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2405.5MHz	35	2423MHz	70	2440.5MHz	105	2458MHz
1	2406MHz	36	2423.5MHz	71	2441MHz	106	2458.5MHz
2	2406.5MHz	37	2424MHz	72	2441.5MHz	107	2459MHz
3	2407MHz	38	2424.5MHz	73	2442MHz	108	2459.5MHz
4	2407.5MHz	39	2425MHz	74	2442.5MHz	109	2460MHz
5	2408MHz	40	2425.5MHz	75	2443MHz	110	2460.5MHz
6	2408.5MHz	41	2426MHz	76	2443.5MHz	111	2461MHz
7	2409MHz	42	2426.5MHz	77	2444MHz	112	2461.5MHz
8	2409.5MHz	43	2427MHz	78	2444.5MHz	113	2462MHz
9	2410MHz	44	2427.5MHz	79	2445MHz	114	2462.5MHz
10	2410.5MHz	45	2428MHz	80	2445.5MHz	115	2463MHz
11	2411MHz	46	2428.5MHz	81	2446MHz	116	2463.5MHz
12	2411.5MHz	47	2429MHz	82	2446.5MHz	117	2464MHz
13	2412MHz	48	2429.5MHz	83	2447MHz	118	2464.5MHz
14	2412.5MHz	49	2430MHz	84	2447.5MHz	119	2465MHz
15	2413MHz	50	2430.5MHz	85	2448MHz	120	2465.5MHz
16	2413.5MHz	51	2431MHz	86	2448.5MHz	121	2466MHz
17	2414MHz	52	2431.5MHz	87	2449MHz	122	2466.5MHz
18	2414.5MHz	53	2432MHz	88	2449.5MHz	123	2467MHz
19	2415MHz	54	2432.5MHz	89	2450MHz	124	2467.5MHz
20	2415.5MHz	55	2433MHz	90	2450.5MHz	125	2468MHz
21	2416MHz	56	2433.5MHz	91	2451MHz	126	2468.5MHz
22	2416.5MHz	57	2434MHz	92	2451.5MHz	127	2469MHz
23	2417MHz	58	2434.5MHz	93	2452MHz	128	2469.5MHz
24	2417.5MHz	59	2435MHz	94	2452.5MHz	129	2470MHz
25	2418MHz	60	2435.5MHz	95	2453MHz	130	2470.5MHz
26	2418.5MHz	61	2436MHz	96	2453.5MHz	131	2471MHz
27	2419MHz	62	2436.5MHz	97	2454MHz	132	2471.5MHz
28	2419.5MHz	63	2437MHz	98	2454.5MHz	133	2472MHz
29	2420MHz	64	2437.5MHz	99	2455MHz	134	2472M.5MHz
30	2420.5MHz	65	2438MHz	100	2455.5MHz	135	2473MHz

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31	2421MHz	66	2438.5MHz	101	2456MHz	136	2473.5MHz
32	2421.5MHz	67	2439MHz	102	2456.5MHz	137	2474MHz
33	2422MHz	68	2439.5MHz	103	2457MHz	138	2474.5MHz
34	2422.5MHz	69	2440MHz	104	2457.5MHz	139	2475MHz

Using test software was control EUT work in continuous transmitter and receiver mode.and select test channel as below:

Channel	Frequency
The lowest channel (CH0)	2405.5MHz
The middle channel (CH69)	2440MHz
The highest channel (CH139)	2475MHz

4.2 Description of Support Units

The EUT has been tested as an independent unit.

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4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.25 x 10-8
2	Duty cycle	0.37%
3	Occupied Bandwidth	3%
4	RF conducted power	0.75dB
5	RF power density	2.84dB
6	Conducted Spurious emissions	0.75dB
7	RF Radiated power	4.5dB (below 1GHz)
		4.8dB (above 1GHz)
8	Radiated Spurious emission test	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-18GHz)
9	Temperature test	1℃
10	Humidity test	3%
11	Supply voltages	1.5%
12	Time	3%

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4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

• FCC – Registration No.: 556682

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

• Industry Canada (IC)

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

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5 Equipment List

RF Output Power					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Spectrum Analyzer	KEYSIGHT	N9010A	SEM004-12	2017-05-04	2018-05-03
Signal Generator (9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-03
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-04
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-04
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-03
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-03
Power Sensor	KEYSIGHT	U2021XA	SEM009-01	2016-10-09	2017-10-09
Power Sensor	KEYSIGHT	U2021XA	SEM009-04	2016-10-09	2017-10-09
Power Sensor	KEYSIGHT	U2021XA	SEM009-13	2017-06-21	2018-06-20
Power Sensor	KEYSIGHT	U2021XA	SEM009-14	2017-06-21	2018-06-20
Bluetooth Tester	Rohde & Schwarz	CBT	W060-01	2016-06-27	2017-06-27

Duty Cycle, Tx-sequence, Tx-gap					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Spectrum Analyzer	KEYSIGHT	N9010A	SEM004-12	2017-05-04	2018-05-03
Signal Generator (9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-03
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-04
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-04
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-03
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-03
Power Sensor	KEYSIGHT	U2021XA	SEM009-01	2016-10-09	2017-10-09
Power Sensor	KEYSIGHT	U2021XA	SEM009-04	2016-10-09	2017-10-09
Power Sensor	KEYSIGHT	U2021XA	SEM009-13	2017-06-21	2018-06-20
Power Sensor	KEYSIGHT	U2021XA	SEM009-14	2017-06-21	2018-06-20
Bluetooth Tester	Rohde & Schwarz	CBT	W060-01	2016-06-27	2017-06-27

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Medium Utilization (MU) factor					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Spectrum Analyzer	KEYSIGHT	N9010A	SEM004-12	2017-05-04	2018-05-03
Signal Generator (9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-03
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-04
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-04
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-03
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-03
Power Sensor	KEYSIGHT	U2021XA	SEM009-01	2016-10-09	2017-10-09
Power Sensor	KEYSIGHT	U2021XA	SEM009-04	2016-10-09	2017-10-09
Power Sensor	KEYSIGHT	U2021XA	SEM009-13	2017-06-21	2018-06-20
Power Sensor	KEYSIGHT	U2021XA	SEM009-14	2017-06-21	2018-06-20
Bluetooth Tester	Rohde & Schwarz	CBT	W060-01	2016-06-27	2017-06-27

Accumulated Transmit Time, Frequency Occupation and Hopping Sequence					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Spectrum Analyzer	KEYSIGHT	N9010A	SEM004-12	2017-05-04	2018-05-03
Signal Generator (9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-03
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-04
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-04
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-03
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-03
Power Sensor	KEYSIGHT	U2021XA	SEM009-01	2016-10-09	2017-10-09
Power Sensor	KEYSIGHT	U2021XA	SEM009-04	2016-10-09	2017-10-09
Power Sensor	KEYSIGHT	U2021XA	SEM009-13	2017-06-21	2018-06-20
Power Sensor	KEYSIGHT	U2021XA	SEM009-14	2017-06-21	2018-06-20
Bluetooth Tester	Rohde & Schwarz	CBT	W060-01	2016-06-27	2017-06-27

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Hopping Frequency Separation					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Spectrum Analyzer	KEYSIGHT	N9010A	SEM004-12	2017-05-04	2018-05-03
Signal Generator (9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-03
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-04
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-04
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-03
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-03
Power Sensor	KEYSIGHT	U2021XA	SEM009-01	2016-10-09	2017-10-09
Power Sensor	KEYSIGHT	U2021XA	SEM009-04	2016-10-09	2017-10-09
Power Sensor	KEYSIGHT	U2021XA	SEM009-13	2017-06-21	2018-06-20
Power Sensor	KEYSIGHT	U2021XA	SEM009-14	2017-06-21	2018-06-20
Bluetooth Tester	Rohde & Schwarz	CBT	W060-01	2016-06-27	2017-06-27

Occupied Channel Bandwidth					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Spectrum Analyzer	KEYSIGHT	N9010A	SEM004-12	2017-05-04	2018-05-03
Signal Generator (9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-03
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-04
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-04
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-03
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-03
Power Sensor	KEYSIGHT	U2021XA	SEM009-01	2016-10-09	2017-10-09
Power Sensor	KEYSIGHT	U2021XA	SEM009-04	2016-10-09	2017-10-09
Power Sensor	KEYSIGHT	U2021XA	SEM009-13	2017-06-21	2018-06-20
Power Sensor	KEYSIGHT	U2021XA	SEM009-14	2017-06-21	2018-06-20
Bluetooth Tester	Rohde & Schwarz	CBT	W060-01	2016-06-27	2017-06-27

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Transmitter unwanted emissions in the out-of-band domain					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Spectrum Analyzer	KEYSIGHT	N9010A	SEM004-12	2017-05-04	2018-05-03
Signal Generator (9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-03
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-04
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-04
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-03
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-03
Power Sensor	KEYSIGHT	U2021XA	SEM009-01	2016-10-09	2017-10-09
Power Sensor	KEYSIGHT	U2021XA	SEM009-04	2016-10-09	2017-10-09
Power Sensor	KEYSIGHT	U2021XA	SEM009-13	2017-06-21	2018-06-20
Power Sensor	KEYSIGHT	U2021XA	SEM009-14	2017-06-21	2018-06-20
Bluetooth Tester	Rohde & Schwarz	CBT	W060-01	2016-06-27	2017-06-27

Transmitter unwanted emissions in the spurious domain					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Fully-Anechoic Chamber 1	SAEMC	MFAC	SEM001-04	2014-07-22	2017-07-22
FSV·Signal Analyzer (10Hz-40GHz)	Rohde & Schwarz	FSV40	SEM008-04	2017-04-14	2018-04-13
BiConiLog Antenna (30MHz-3GHz)	Schwarzbeck	VULB9163	SEM003-05	2015-10-17	2018-10-17
Horn Antenna (800MHz-18GHz)	Rohde & Schwarz	HF907	SEM003-06	2015-06-14	2018-06-14
Pre-amplifier (100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-06	2016-10-09	2017-10-09
Loop Antenna	ETS-Lindgren	6502	SEM003-08	2015-08-14	2018-08-14

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General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2016-10-12	2017-10-12
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2017-04-18	2018-04-18

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6 Radio Spectrum Technical Requirement

6.1 Geo-location capability

6.1.1 Test Requirement:

EN 300 328 Clause 4.3.1.13

6.1.2 Conclusion

Standard Requirment:

The geographical location determined by the equipment as defined in clause below shall not be accessible to the user.

Geo-location capability is a feature of the equipment to determine its geographical location with the purpose to configure itself according to the regulatory requirements applicable at the geographical location where it operates.

The geo-location capability may be present in the equipment or in an external device (temporary) associated with the equipment operating at the same geographical location during the initial power up of the equipment. The geographical location may also be available in equipment already installed and operating at the same geographical location.

The applicant declares:

The product does not have the geo-location function.

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7 Radio Spectrum Matter Test Results

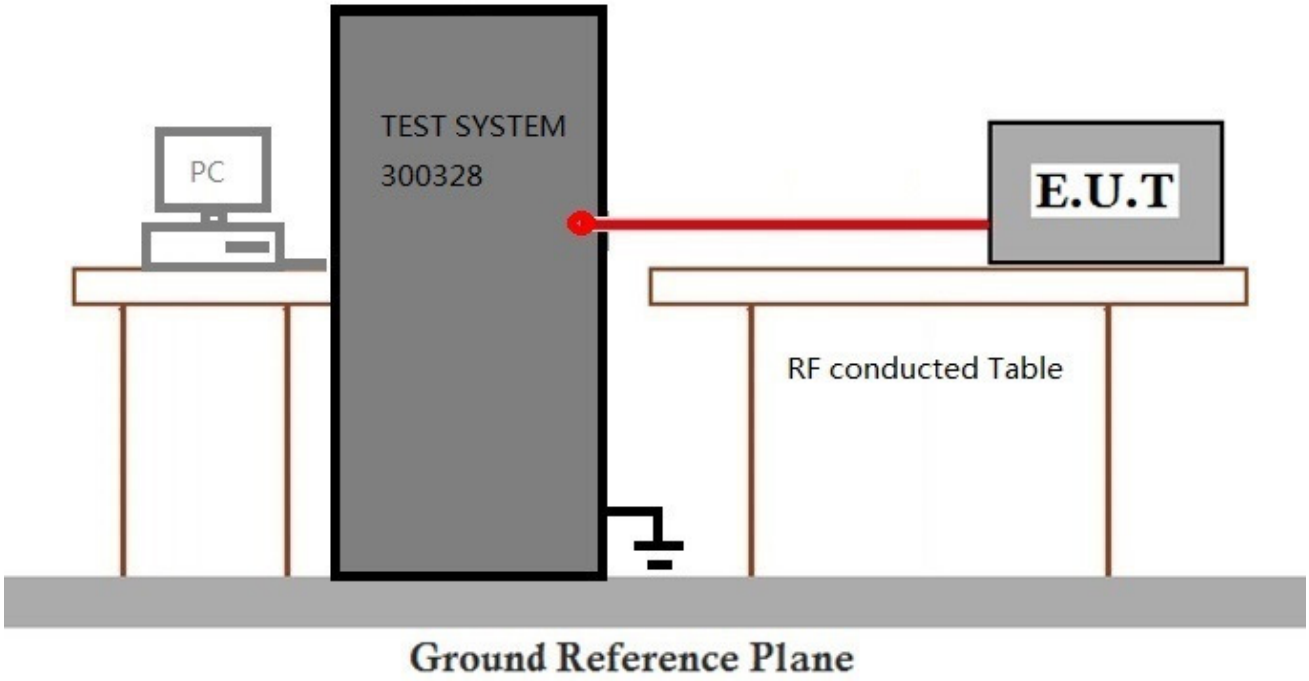
7.1 RF Output Power

Test Requirement EN 300 328 Clause 4.3.1.2
Test Method: EN 300 328 V2.1.1 clause 5.4.2.2.1.2
Limit: 20dBm/(100mw) (e.i.r.p)

7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar
Test mode a:TX_Hop mode_Keep the EUT in frequency hopping with modulation mode.

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

The detailed test data see: Appendix 300328

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7.2 Duty Cycle, Tx-sequence, Tx-gap

Test Requirement: EN 300 328 Clause 4.3.1.3

Test Method: EN 300 328 V2.1.1 clause 5.4.2.2.1.3

Limit: For non-adaptive FHSS equipment, the Duty Cycle shall be equal to or less than the maximum value declared by the supplier. In addition, the maximum Tx-sequence time shall be 5 ms while the minimum Tx-gap time shall be 5 ms.

The Duty Cycle shall be equal to or less than the maximum value declared by the manufacturer. The Tx-sequence time shall be equal to or less than 10 ms. The minimum Tx-gap time following a Tx-sequence shall be equal to the duration of that proceeding Tx-sequence with a minimum of 3,5 ms.

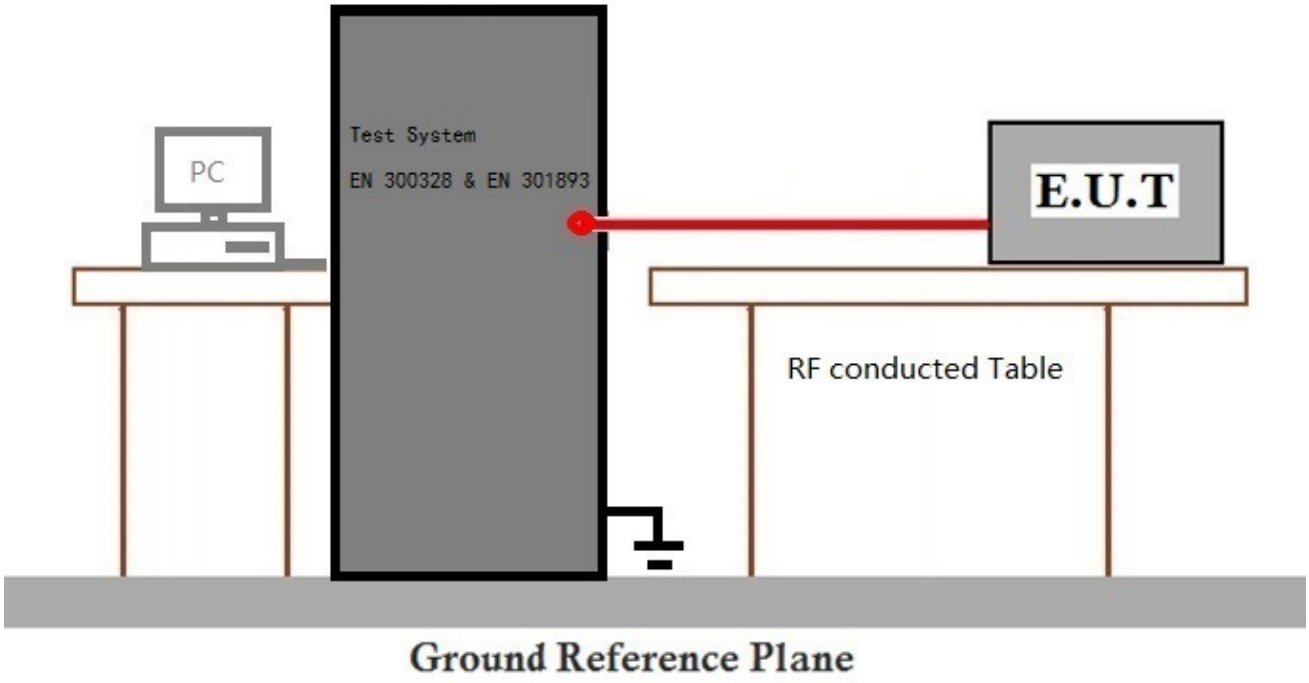
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

Test mode a:TX_Hop mode_Keep the EUT in frequency hopping with modulation mode.

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix 300328

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7.3 Medium Utilization (MU) factor

Test Requirement EN 300 328 Clause 4.3.1.6

Test Method: EN 300 328 V2.1.1 clause 5.4.2.2.1.4

Limit: The maximum Medium Utilization factor for non-adaptive Frequency Hopping equipment shall be 10 %.

For non-adaptive equipment using wide band modulations other than FHSS, the maximum Medium Utilization factor shall be 10 %.

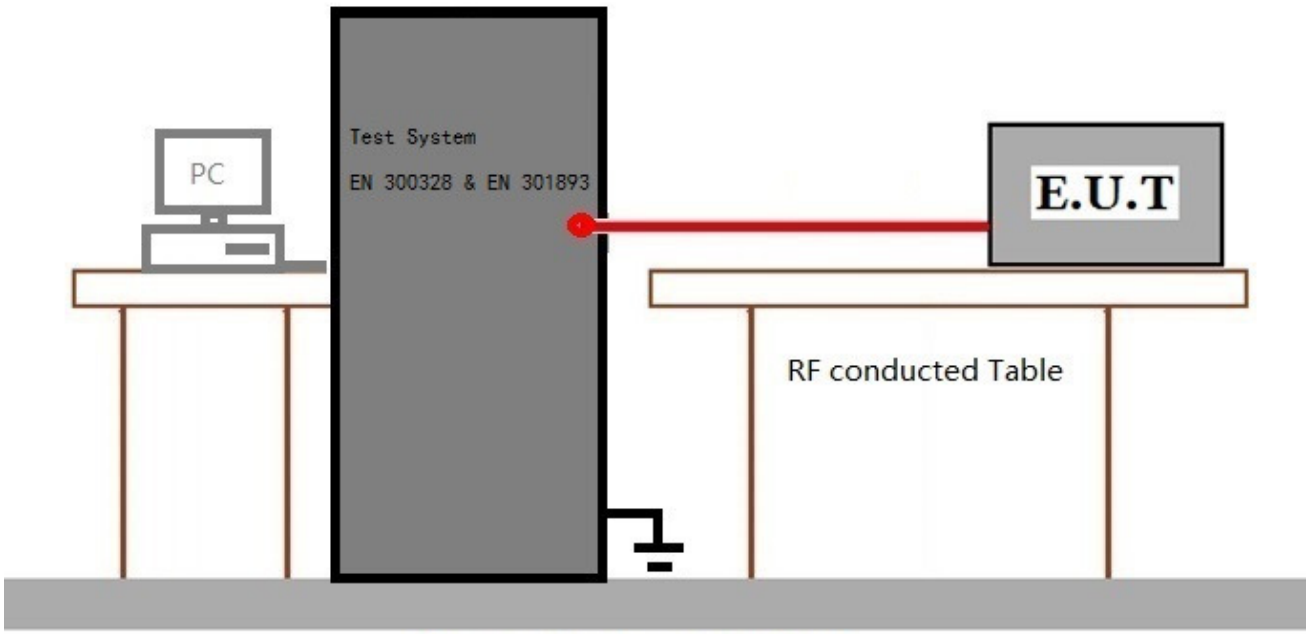
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

Test mode a:TX_Hop mode_Keep the EUT in frequency hopping with modulation mode.

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix 300328

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7.4 Accumulated Transmit Time, Frequency Occupation and Hopping Sequence

Test Requirement EN 300 328 Clause 4.3.1.4

Test Method: EN 300 328 V2.1.1 clause 5.4.4.2.1

Limit:

Non-adaptive frequency hopping equipment:
The Accumulated Transmit Time on any hopping frequency shall not be greater than 15 ms within any observation period of 15 ms multiplied by the minimum number of hopping frequencies (N) that have to be used.
The hopping sequence(s) shall contain at least N hopping frequencies where N is either 5 or the result of 15 MHz
divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater. According to clause 4.3.1.5.3.1 the minimum Hopping Frequency Separation for non-adaptive equipment is equal to the Occupied Channel Bandwidth with a minimum of 100 kHz.

Adaptive frequency hopping equipment
Adaptive Frequency Hopping equipment shall be capable of operating over a minimum of 70 % of the band specified in table 1.
The Accumulated Transmit Time on any hopping frequency shall not be greater than 400 ms within any observation period of 400 ms multiplied by the minimum number of hopping frequencies (N) that have to be used.
The hopping sequence(s) shall contain at least N hopping frequencies at all times, where N is either 15 or the result of 15 MHz divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater.

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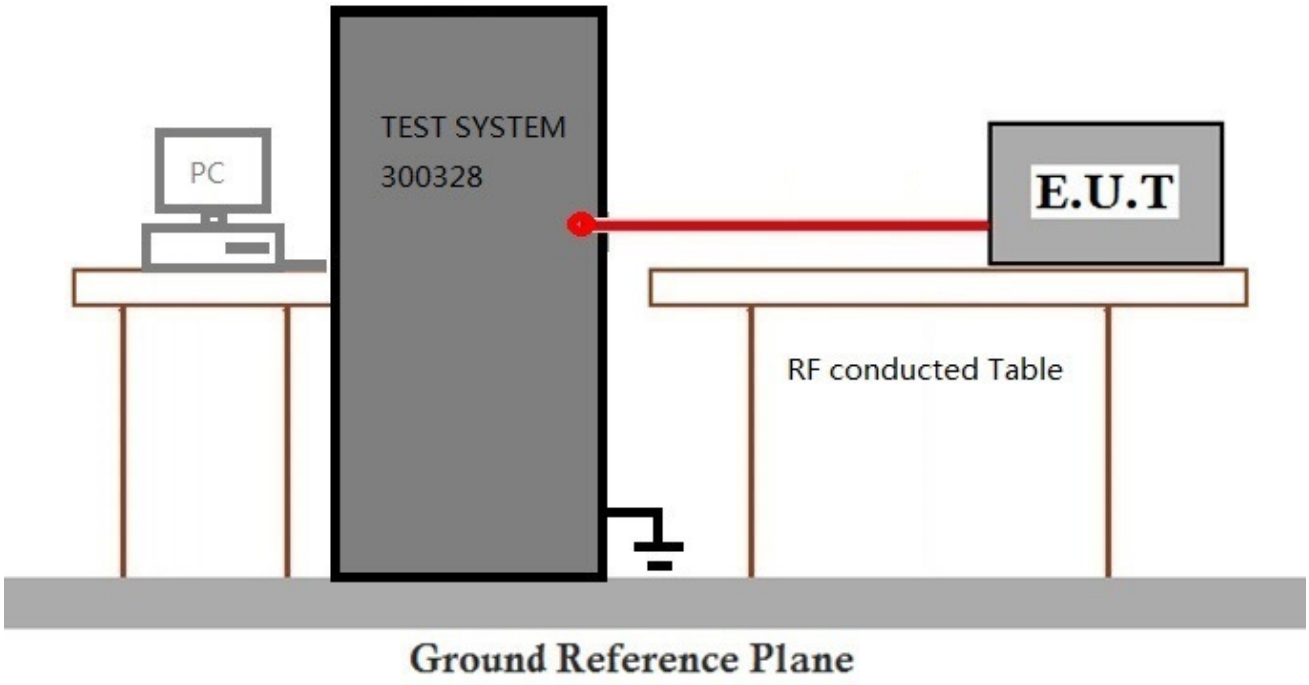
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

Test mode a:TX_Hop mode_Keep the EUT in frequency hopping with modulation mode.

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix 300328

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7.5 Hopping Frequency Separation

Test Requirement EN 300 328 Clause 4.3.1.5

Test Method: EN 300 328 V2.1.1 clause 5.4.5.2.1

Limit:

Non-adaptive frequency hopping equipment:
For non-adaptive Frequency Hopping equipment, the Hopping Frequency Separation shall be equal to or greater than the Occupied Channel Bandwidth (see clause 4.3.1.8), with a minimum separation of 100 kHz.
For equipment with a maximum declared RF Output power level of less than 10 dBm e.i.r.p. or for non-adaptive
Frequency Hopping equipment operating in a mode where the RF Output power is less than 10 dBm e.i.r.p. only the minimum Hopping Frequency Separation of 100 kHz applies.

Adaptive frequency hopping equipment:
For adaptive Frequency Hopping equipment, the minimum Hopping Frequency Separation shall be 100 kHz.
Adaptive Frequency Hopping equipment that switched to a non-adaptive mode for one or more hopping frequencies because interference was detected on these hopping frequencies with a level above the threshold level defined in clause 4.3.1.7.2.2, point 5 or clause 4.3.1.7.3.2, point 5, is allowed to continue to operate with a minimum Hopping Frequency Separation of 100 kHz as long as the interference remains present on these hopping frequencies. The equipment shall continue to operate in an adaptive mode on other hopping frequencies.
Adaptive Frequency Hopping equipment which decided to operate in a non-adaptive mode on one or more hopping frequencies without the presence of interference, shall comply with the limit for Hopping Frequency Separation for non-adaptive equipment defined in clause 4.3.1.5.3.1 (first paragraph) for these hopping frequencies as well as with all other requirements applicable to non-adaptive frequency hopping equipment.

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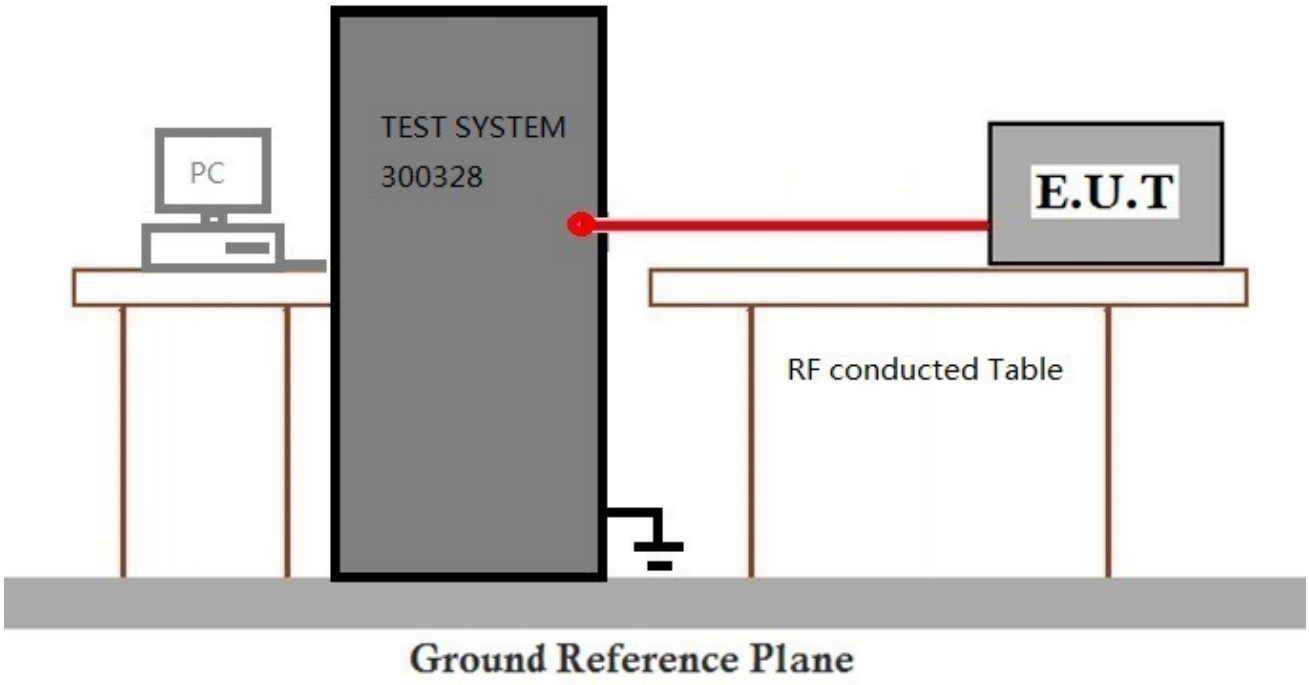
7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

Test mode a:TX_Hop mode_Keep the EUT in frequency hopping with modulation mode.

7.5.2 Test Setup Diagram



7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix 300328

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7.6 Occupied Channel Bandwidth

Test Requirement: EN 300 328 Clause 4.3.1.8

Test Method: EN 300 328 V2.1.1 clause 5.4.7.2.1

Limit: The Occupied Channel Bandwidth shall fall completely within the band given in clause 1. For non-adaptive Frequency Hopping equipment with e.i.r.p. greater than 10 dBm, the Occupied Channel Bandwidth for every occupied hopping frequency shall be equal to or less than the Nominal Channel Bandwidth declared by the manufacturer. See clause 5.4.1 j). This declared value shall not be greater than 5 MHz.

The Occupied Channel Bandwidth shall fall completely within the band given in table 1. In addition, for non-adaptive equipment using wide band modulations other than FHSS and with e.i.r.p. greater than 10 dBm, the occupied channel bandwidth shall be less than 20 MHz.

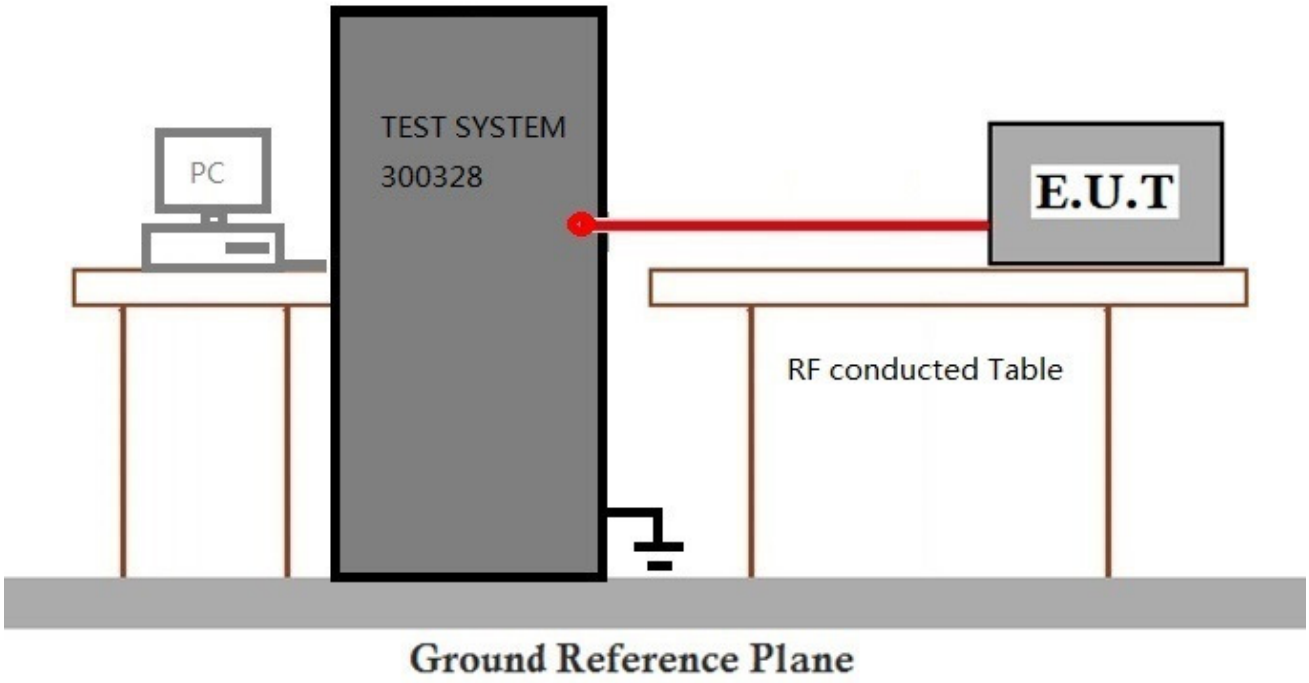
7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

Test mode: b:TX_non-Hop mode_Keep the EUT in continuously transmitting with modulation mode.

7.6.2 Test Setup Diagram



7.6.3 Measurement Procedure and Data

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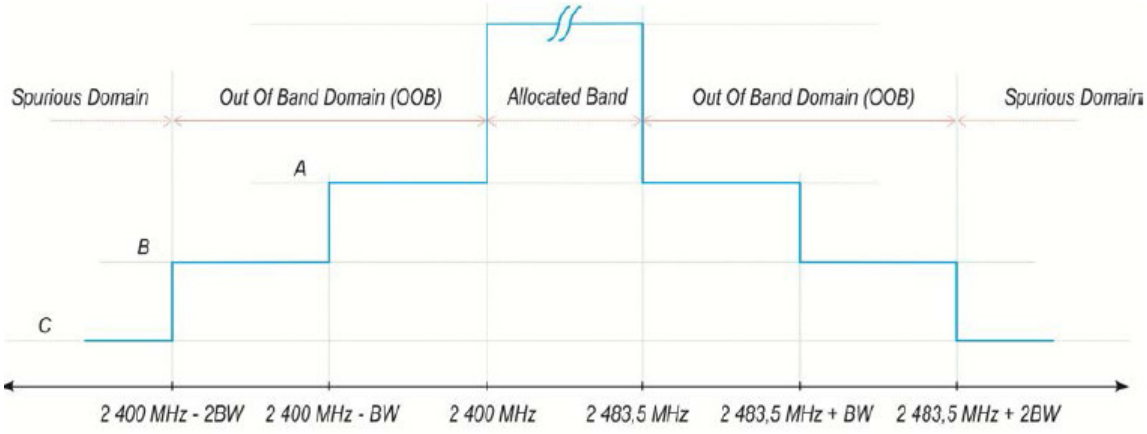
7.7 Transmitter unwanted emissions in the out-of-band domain

Test Requirement EN 300 328 Clause 4.3.1.9

Test Method: EN 300 328 V2.1.1 clause 5.4.8.2.1

Limit:



A: -10 dBm/MHz e.i.r.p.
B: -20 dBm/MHz e.i.r.p.
C: Spurious Domain limits

BW = Occupied Channel Bandwidth in MHz or 1 MHz whichever is greater

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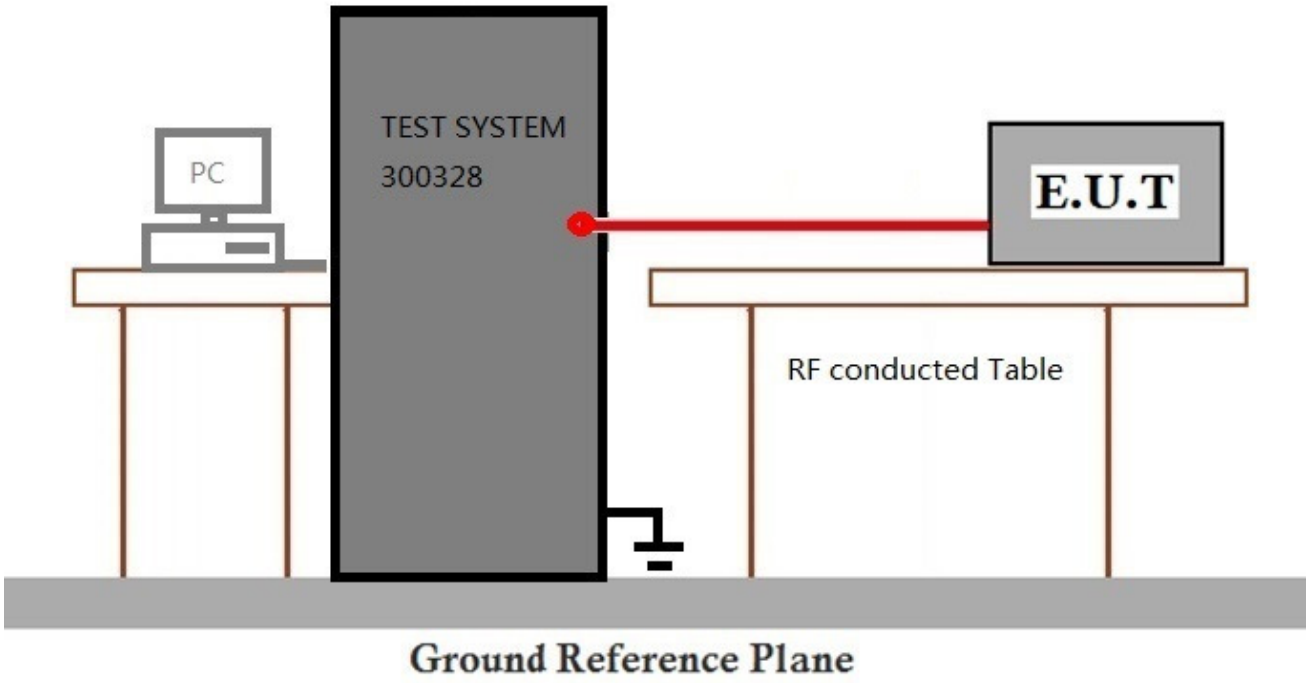
7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

Test mode b:TX_non-Hop mode_Keep the EUT in continuously transmitting with modulation mode.

7.7.2 Test Setup Diagram



7.7.3 Measurement Procedure and Data

The detailed test data see: Appendix 300328

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7.8 Transmitter unwanted emissions in the spurious domain

Test Requirement EN 300 328 Clause 4.3.1.10
Test Method: EN 300 328 V2.1.1 clause 5.4.9.2
Measurement Distance: 3m
Limit:

Table 1: Transmitter limits for spurious emissions

Frequency range	Maximum power, e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)	Bandwidth
30 MHz to 47 MHz	-36dBm	100 kHz
47 MHz to 74 MHz	-54dBm	100 kHz
74 MHz to 87,5 MHz	-36dBm	100 kHz
87,5 MHz to 118 MHz	-54dBm	100 kHz
118 MHz to 174 MHz	-36dBm	100 kHz
174 MHz to 230 MHz	-54dBm	100 kHz
230 MHz to 470 MHz	-36dBm	100 kHz
470 MHz to 862 MHz	-54dBm	100 kHz
862 MHz to 1 GHz	-36dBm	100 kHz
1 GHz to 12,75 GHz	-30dBm	1MHz

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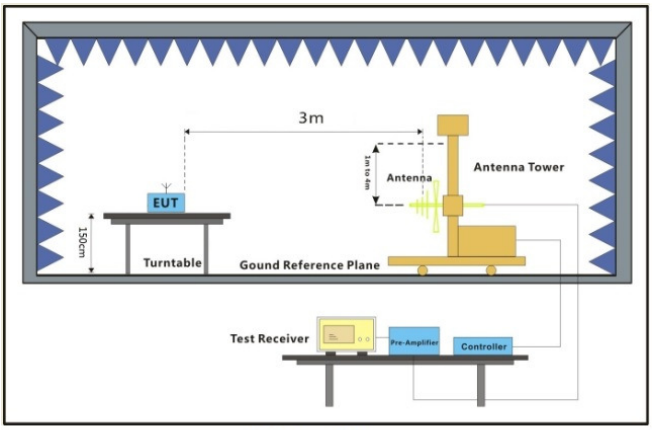
7.8.1 E.U.T. Operation

Operating Environment:

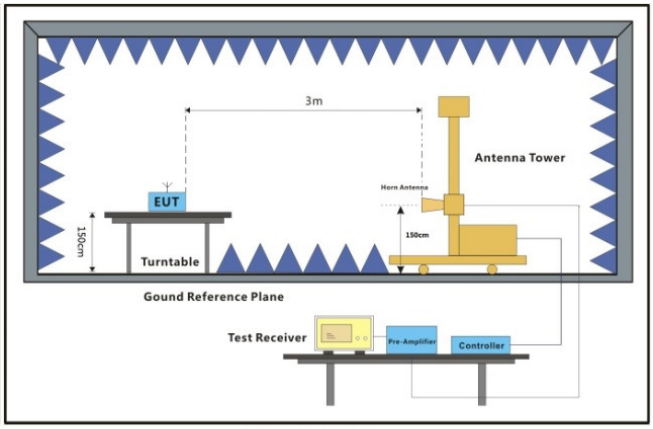
Temperature: 23 °C Humidity: 56 % RH Atmospheric Pressure: 1005 mbar

Test mode b:TX_non-Hop mode_Keep the EUT in continuously transmitting with modulation mode.

7.8.2 Test Setup Diagram



30MHz-1GHz



Above 1GHz

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7.8.3 Measurement Procedure and Data

1. Scan from 30MHz to 12.75GHz, find the maximum radiation frequency to measure.

2. The technique used to find the Spurious Emissions of the transmitter was the antenna substitution method. Substitution method was performed to determine the actual ERP/EIRP emission levels of the EUT.

Below 1GHz test procedure as below:

1) The EUT was powered on and placed on a table in the chamber. The antenna of the transmitter was extended to its maximum length. modulation mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.

2) Rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.

3) Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.

4) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.

5) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2) is obtained for this set of conditions.

6) The output power into the substitution antenna was then measured.

7) Steps 5) and 6)were repeated with both antennas vertically polarized.

8) Calculate power in dBm by the following formula:

ERP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi)

where:

Pg is the generator output power into the substitution antenna.

Above 1GHz test procedure as below:

1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber.

2) Calculate power in dBm by the following formula:

EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi)

EIRP=ERP+2.15dB

where:

Pg is the generator output power into the substitution antenna.

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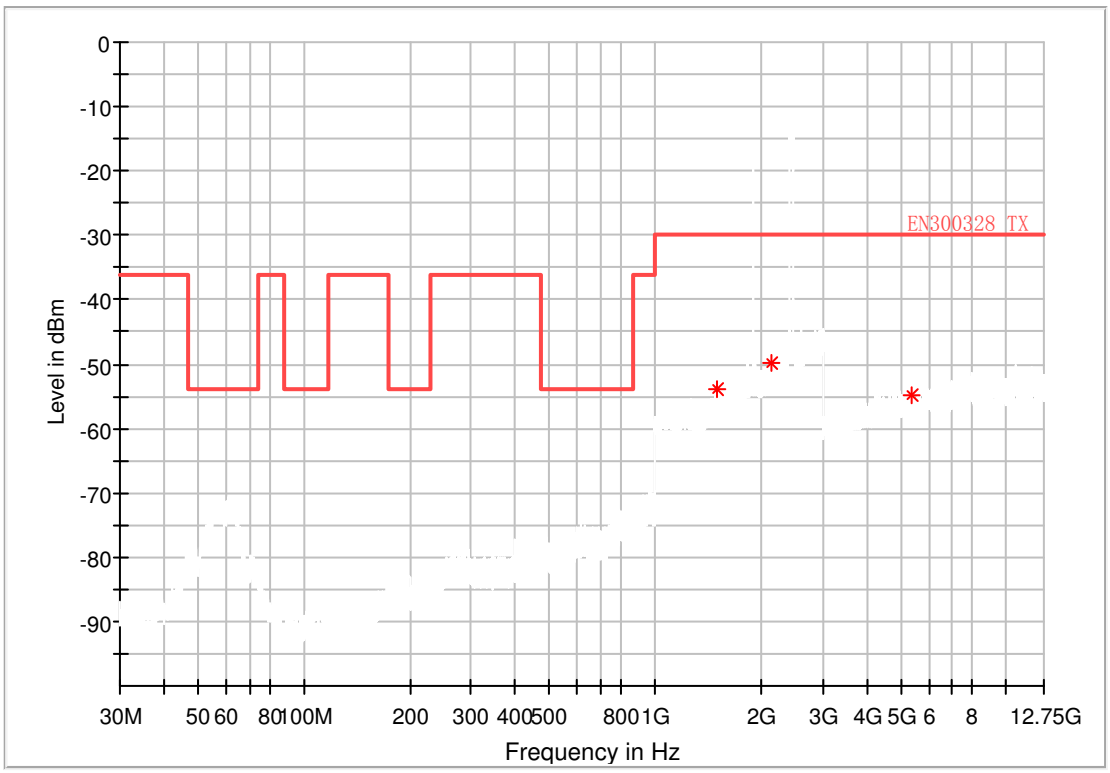
Mode:b; Polarization:Horizontal; Modulation Type:GFSK; Channel:Low

Test

Full Spectrum



Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Corr. (dB)
1507.750000	-54.01	-30.00	24.01	-98.8
2146.000000	-49.95	-30.00	19.95	-93.9
5372.093750	-54.93	-30.00	24.93	-101.6

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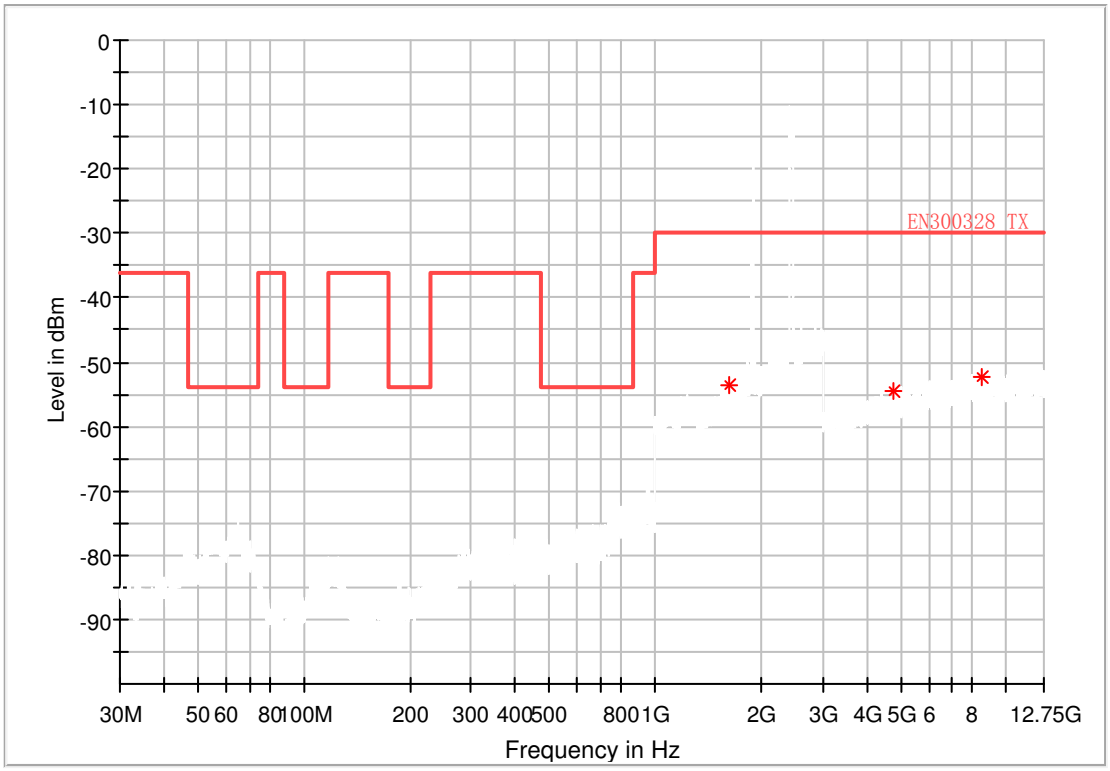
Mode:b; Polarization:Vertical; Modulation Type:GFSK; Channel:Low

Test

Full Spectrum



Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Corr. (dB)
1619.333333	-53.54	-30.00	23.54	-98.2
4739.156250	-54.50	-30.00	24.50	-102.4
8435.218750	-52.46	-30.00	22.46	-98.1

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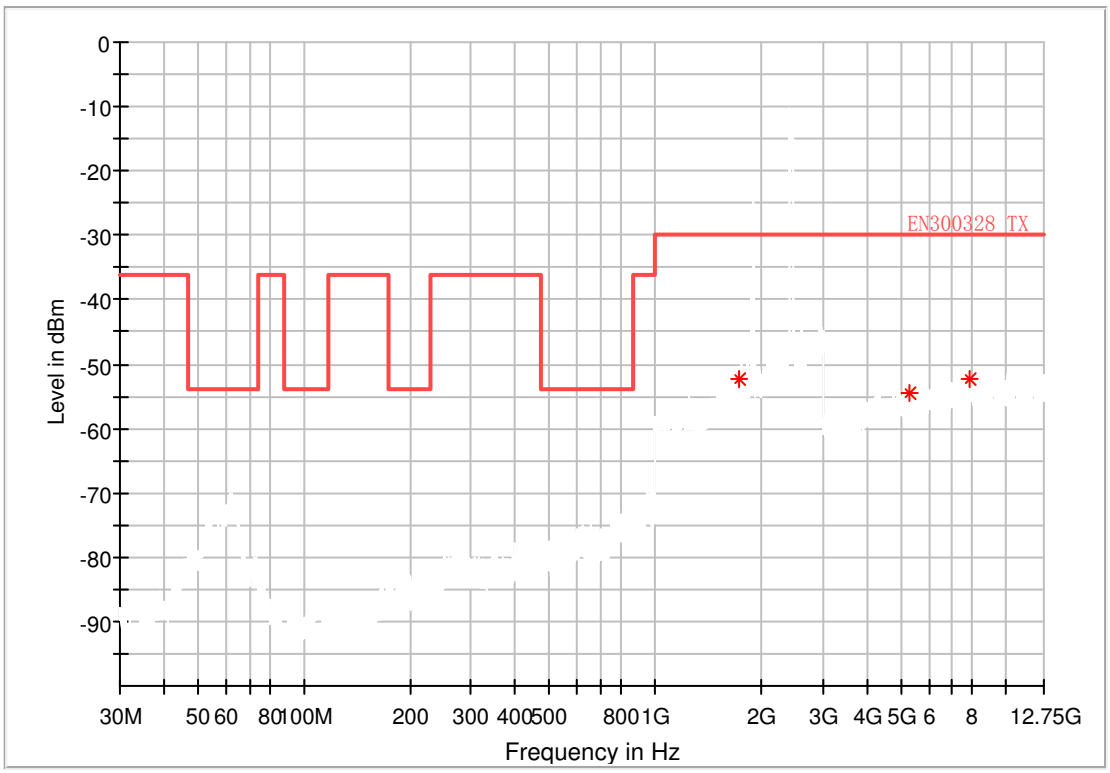
Mode:b; Polarization:Horizontal; Modulation Type:GFSK; Channel:High

Test

Full Spectrum



Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Corr. (dB)
1733.666667	-52.20	-30.00	22.20	-96.8
5318.062500	-54.60	-30.00	24.60	-101.7
7817.312500	-52.27	-30.00	22.27	-97.8

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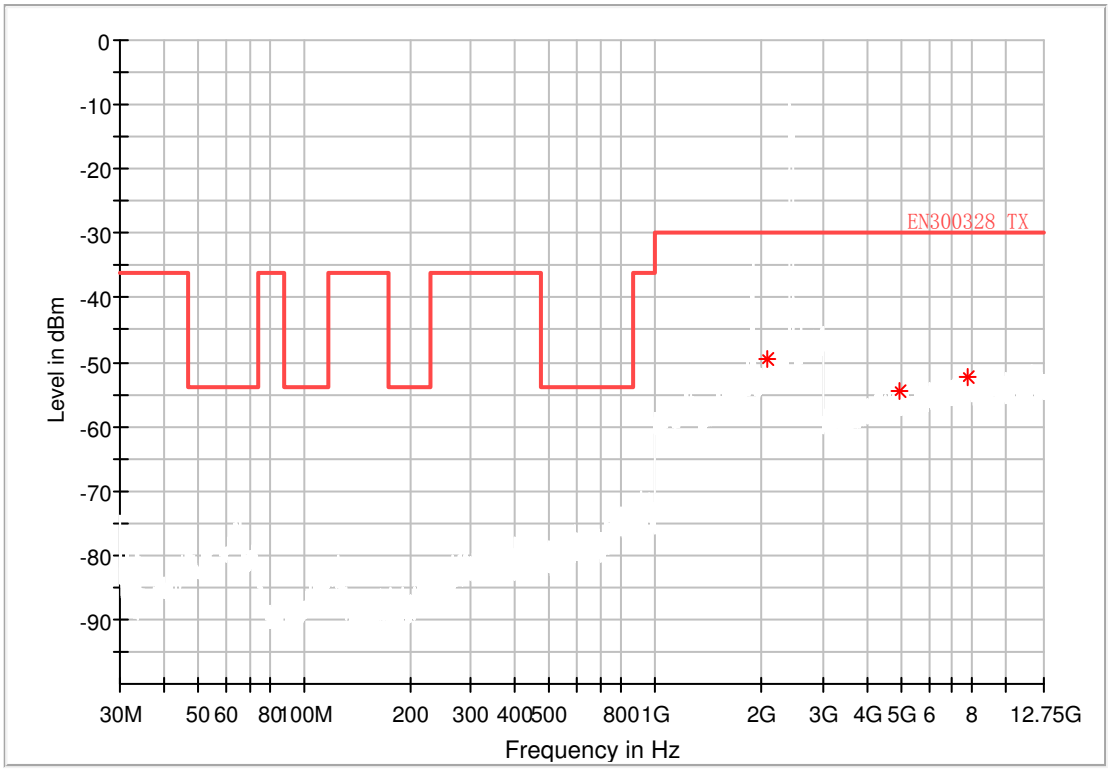
Mode:b; Polarization:Vertical; Modulation Type:GFSK; Channel:High

Test

Full Spectrum



Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Corr. (dB)
2084.083333	-49.55	-30.00	19.55	-94.4
4933.750000	-54.58	-30.00	24.58	-101.7
7759.625000	-52.26	-30.00	22.26	-97.7

Remark:

The disturbance below 1GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

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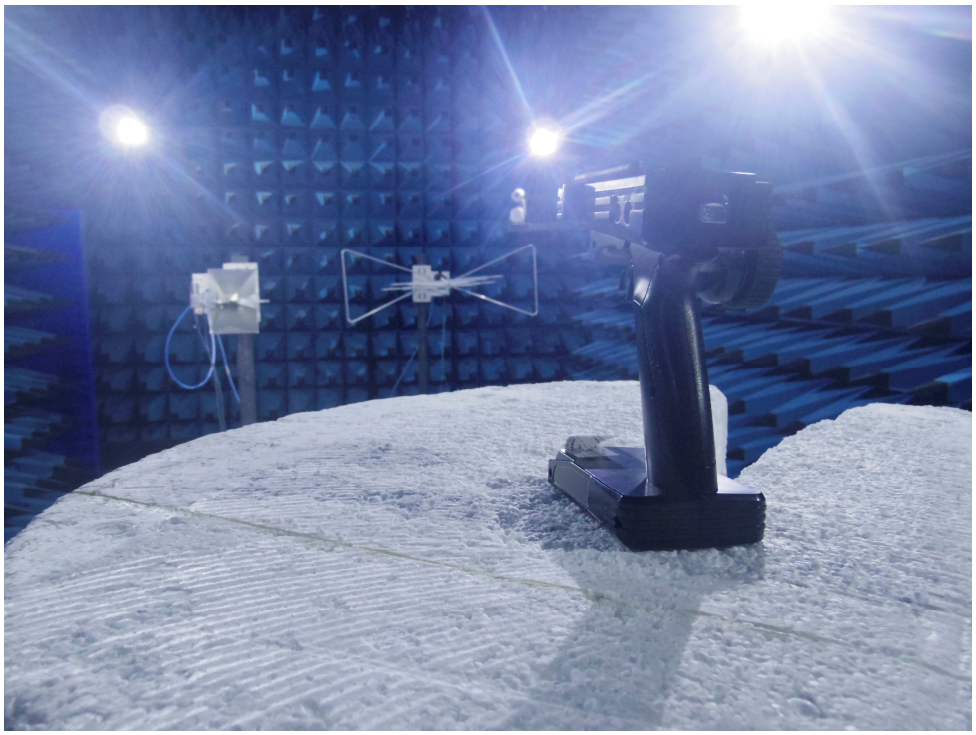
8 Photographs

8.1 Transmitter unwanted emissions in the spurious domain Test Setup



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8.2 EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1706005430CR.

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9 Appendix

9.1 Appendix 300328

1.RF Output Power

Test Condition	Test Mode	Ant	Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
TNVN	FHSS	Ant1	11.9	13.9	<=20	PASS
TLVN	FHSS	Ant1	12.64	14.64	<=20	PASS
THVN	FHSS	Ant1	11.86	13.86	<=20	PASS

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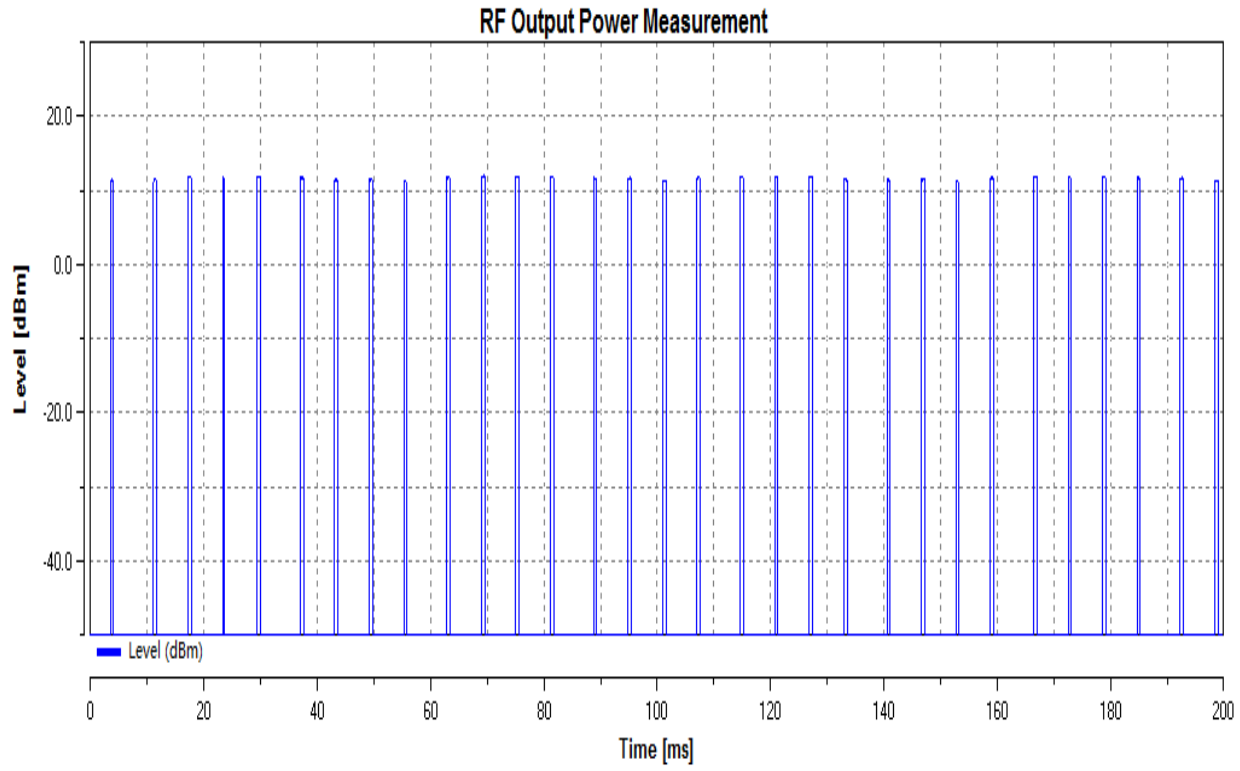
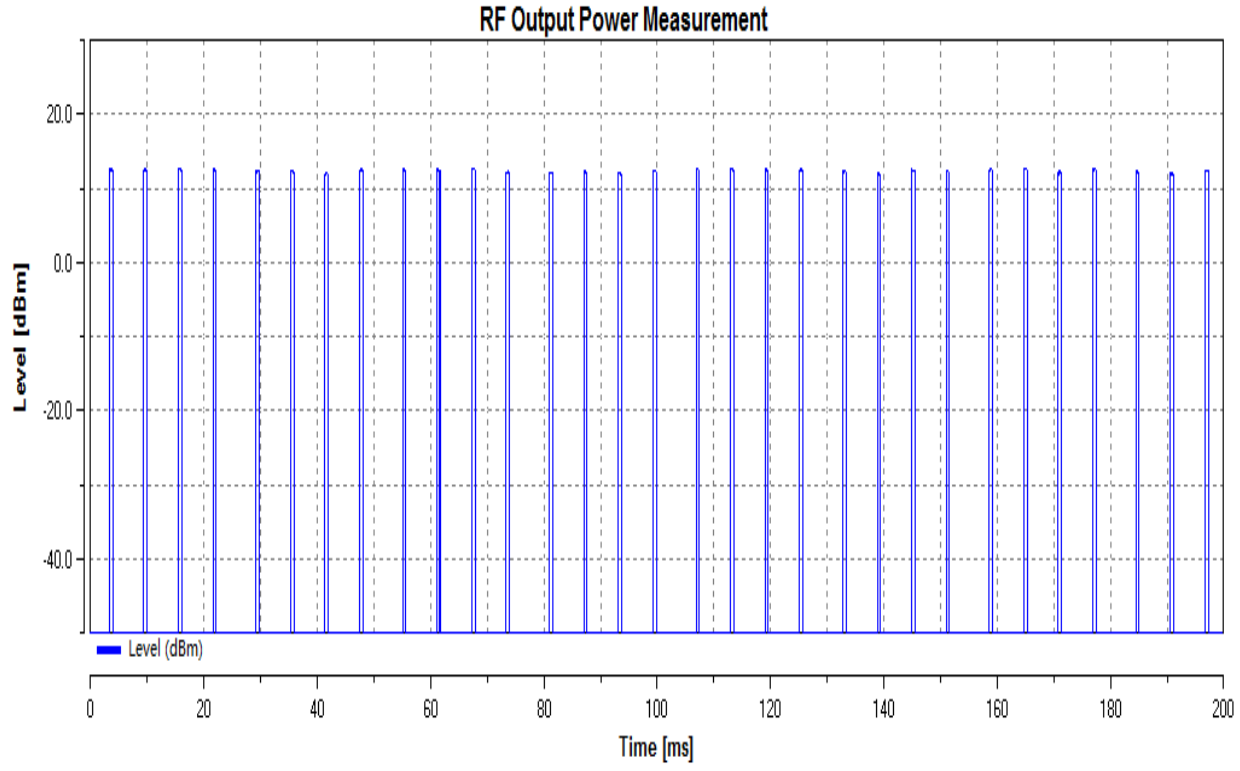
RF Output Power_TNVN_FHSS_Ant1



RF Output Power_TLVN_FHSS_Ant1



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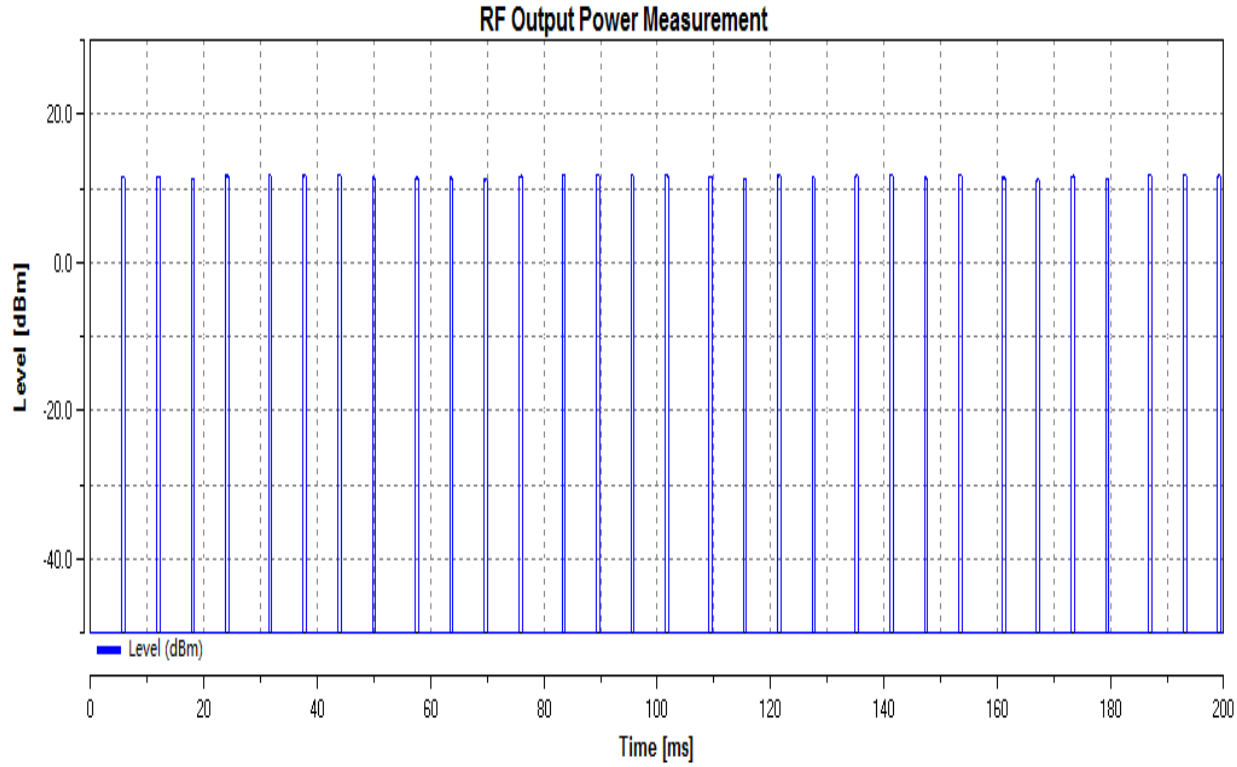
RF Output Power_THVN_FHSS_Ant1



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2.Duty Cycle,Tx-sequence,Tx-gap,Medium Utilization (MU) factor

Test Condition	Test Mode	Ant	DC [%]	TX-Seq. [ms]	TX-gap [ms]	MU [%]	Verdict
TNVN	FHSS	Ant1	8.67	0.57	7.04	3.81	PASS

3.Accumulated Dwell time, Minimum Frequency Occupation and Hopping Sequence

Test Condition	Test Mode	Test Channel	Ant	Accumulated Dwell time [ms]	Limit [ms]	Verdict
TNVN	FHSS	2408	Ant1	1.666	<=400	PASS
TNVN	FHSS	2473	Ant1	1.103	<=400	PASS

Test Condition	Test Mode	Test Channel	Ant	Frequency occupation times [N]	Limit [N]	Verdict
TNVN	FHSS	2408	Ant1	1	>=1	PASS
TNVN	FHSS	2473	Ant1	1	>=1	PASS

Test Condition	Test Mode	Ant	Hopping Number [N]	Limit [N]	-20 dB Bandwidth [%]	Limit [%]	Verdict
TNVN	FHSS	Ant1	16	>=15	80.00	>70	PASS

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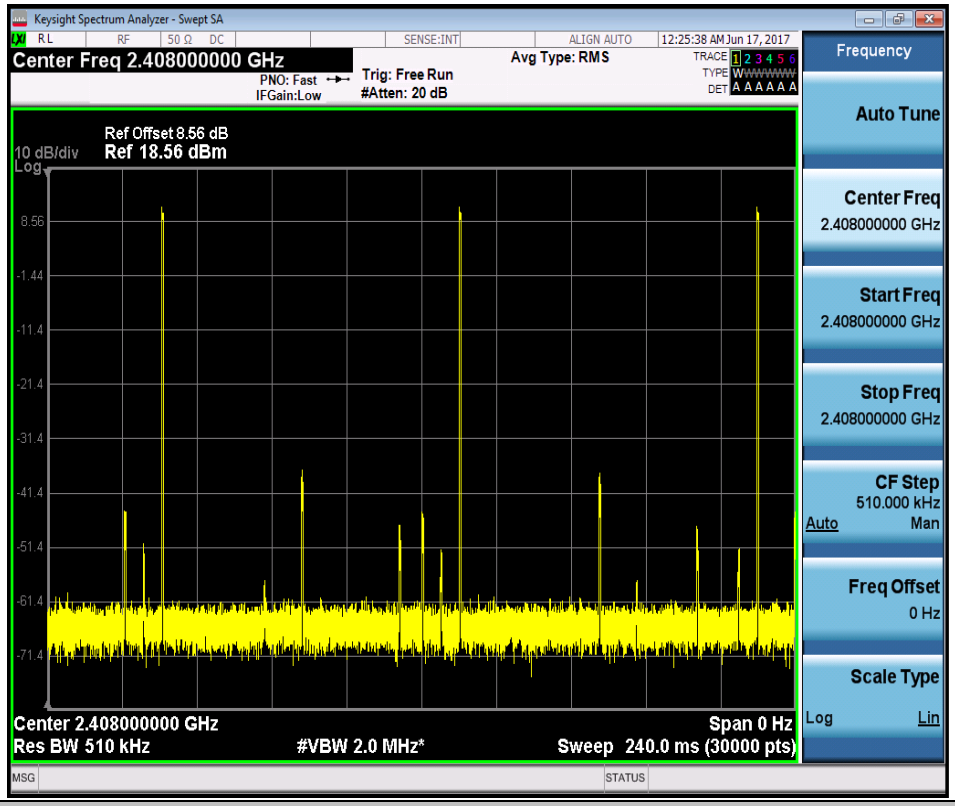
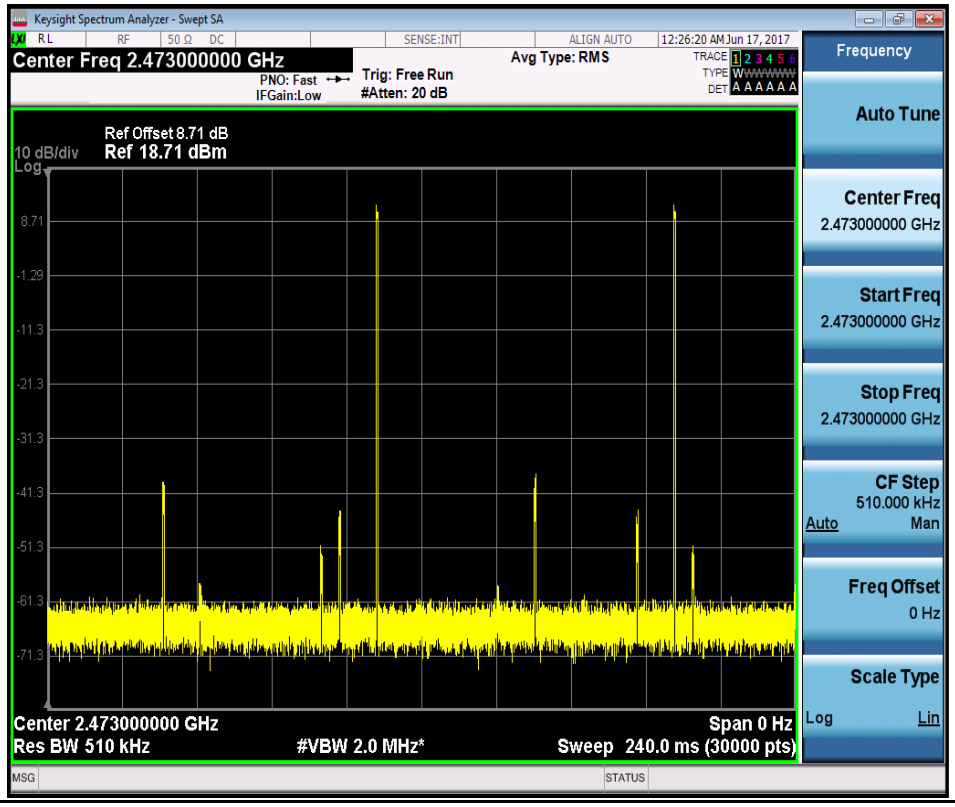
Accumulated Dwell time_TNVN_FHSS_2408_Ant1



Accumulated Dwell time_TNVN_FHSS_2473_Ant1



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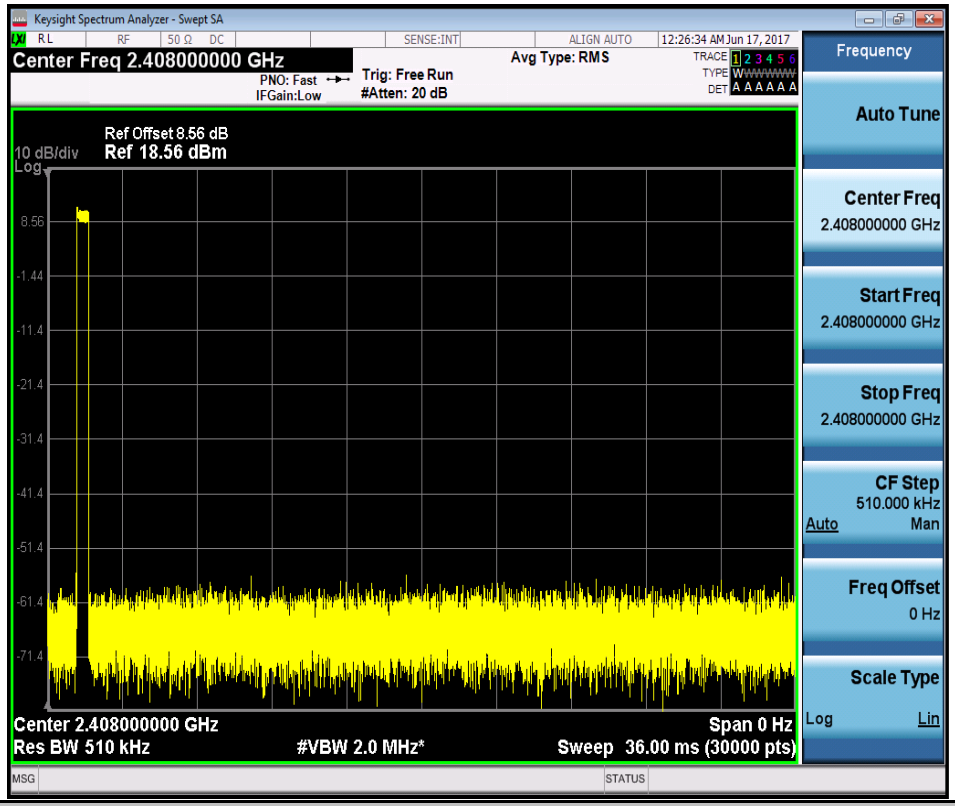
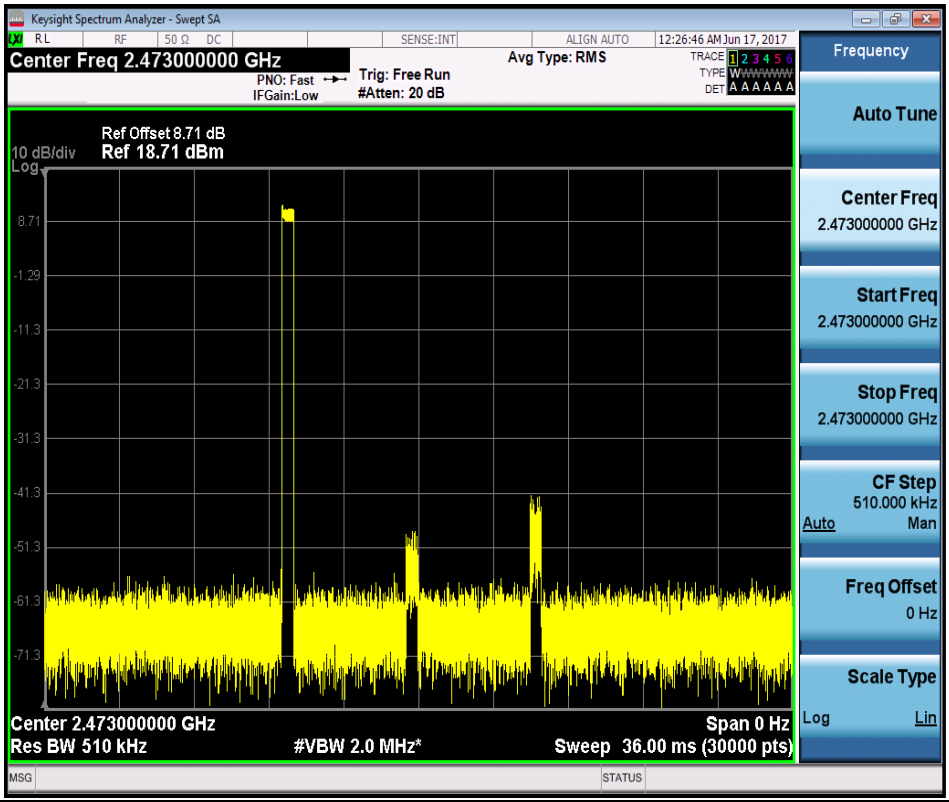
Minimum Frequency Occupation_TNVN_FHSS_2408_Ant1



Minimum Frequency Occupation_TNVN_FHSS_2473_Ant1



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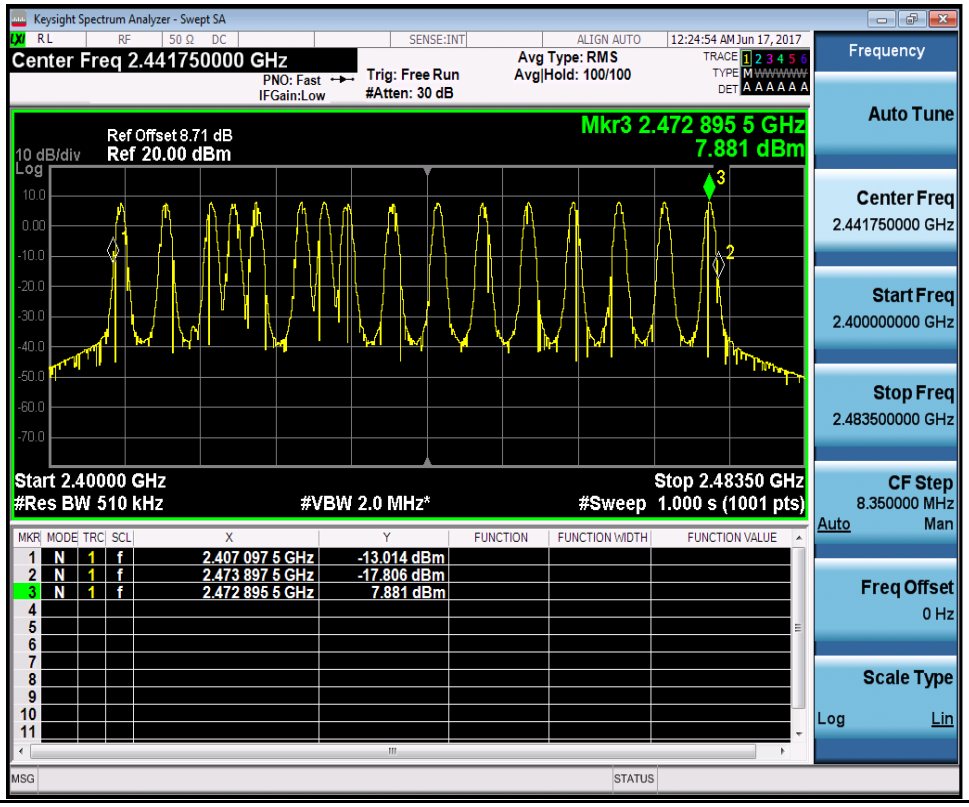
Hopping Sequence_TNVN_FHSS_Ant1



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4. Hopping Frequency Separation

Test Condition	Test Mode	Test Channel	Ant	Channel Separation [MHz]	Limit [MHz]	Verdict
TNVN	FHSS	2433	Ant1	2.500	>=0.1	PASS

Hopping Frequency Separation_TNVN_FHSS_2433_Ant1

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5.Occupied Channel Bandwidth

Test Condition	Test Mode	Test Channel	Ant	OBW [MHz]	FL OBW [MHz]	FH OBW [MHz]	Verdict
TNVN	FHSS	2405.5	Ant1	0.96177	2404.989235	---	PASS
TNVN	FHSS	2475	Ant1	0.96465	---	2475.449515	PASS

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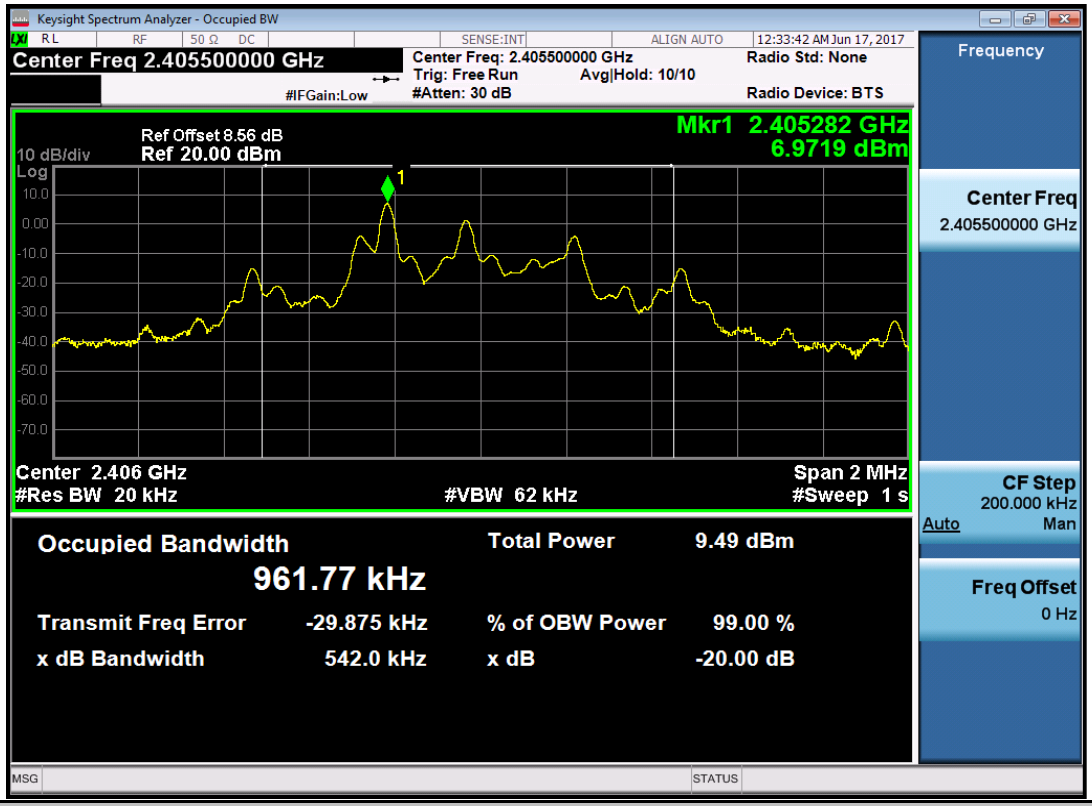
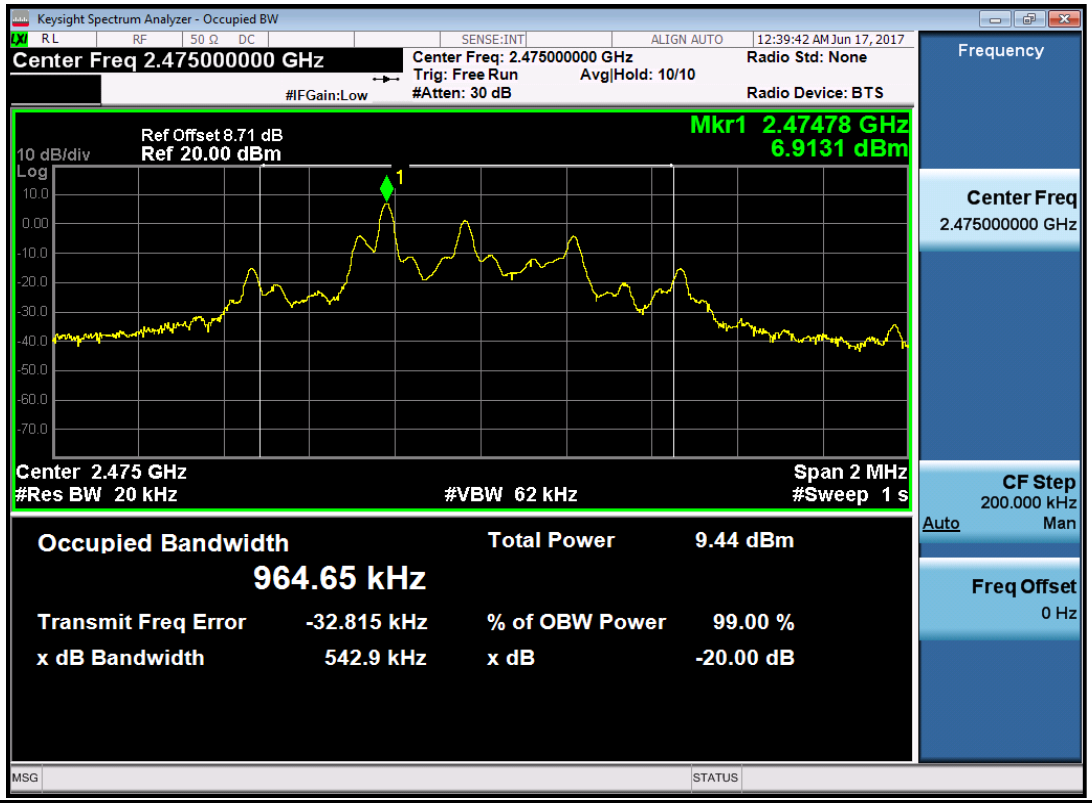
Occupied Channel Bandwidth_TNVN_FHSS_2405.5_Ant1



Occupied Channel Bandwidth_TNVN_FHSS_2475_Ant1



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6.Transmitter unwanted emissions in the out-of-band domain

Test Condition	Test Mode	Test Channel	Ant	Freq [MHz]	Result [dBm]	Limit [dBm]	Verdict
TNVN	FHSS	2405.5	Ant1	2398.500	-38.17	<=-20	PASS
TNVN	FHSS	2405.5	Ant1	2399.500	-36.59	<=-10	PASS
TNVN	FHSS	2405.5	Ant1	2484.000	-67.79	<=-10	PASS
TNVN	FHSS	2405.5	Ant1	2485.000	-67.21	<=-20	PASS
TNVN	FHSS	2475	Ant1	2398.500	-66.83	<=-20	PASS
TNVN	FHSS	2475	Ant1	2399.500	-67.98	<=-10	PASS
TNVN	FHSS	2475	Ant1	2484.000	-42.46	<=-10	PASS
TNVN	FHSS	2475	Ant1	2485.000	-43.74	<=-20	PASS

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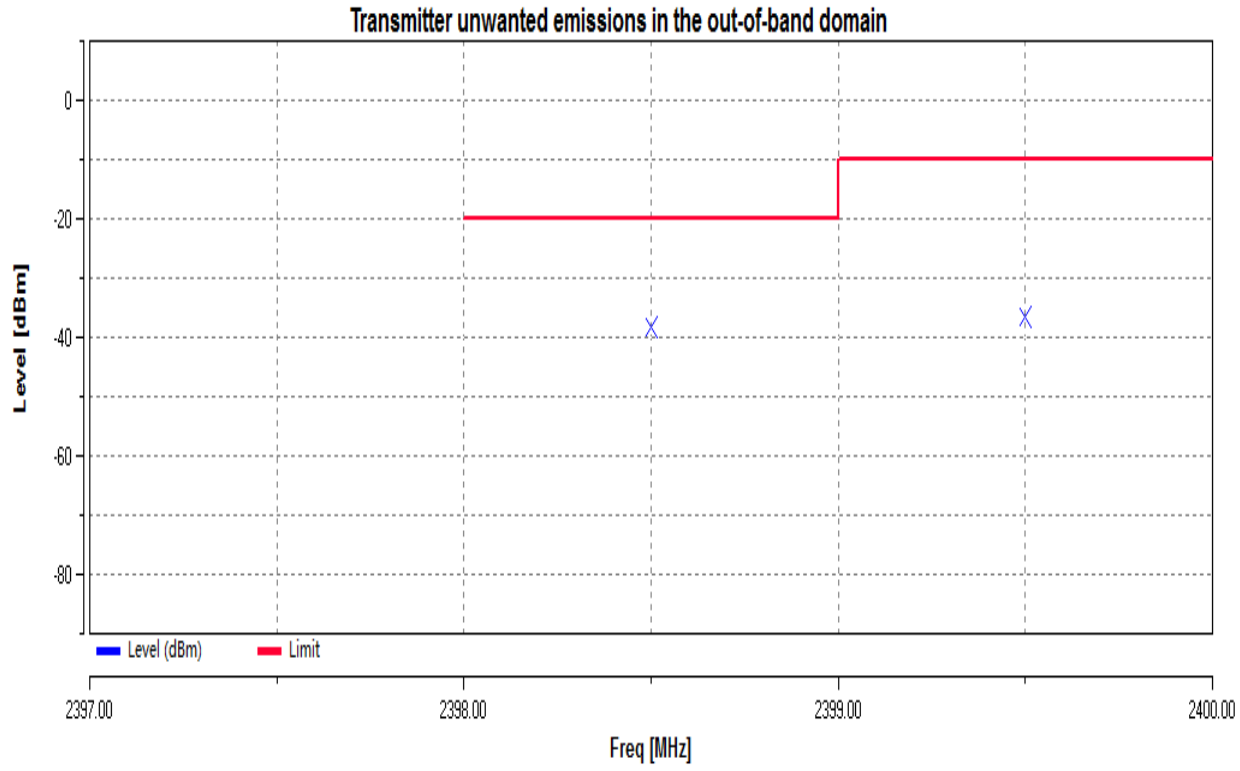
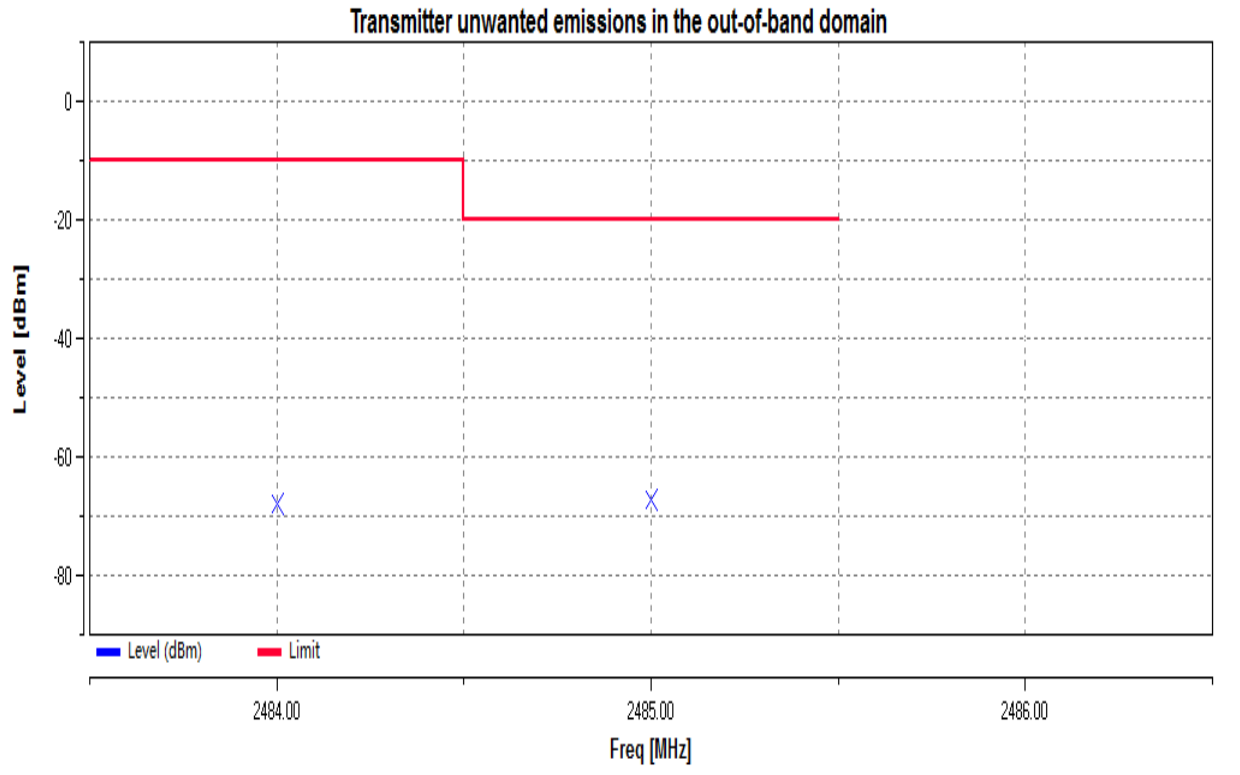
TX_OOB_TNVN_FHSS_2405.5_Ant1_2400MHz-2BW to 2400MHz



TX_OOB_TNVN_FHSS_2405.5_Ant1_2483.5MHz to 2483.5MHz+2BW



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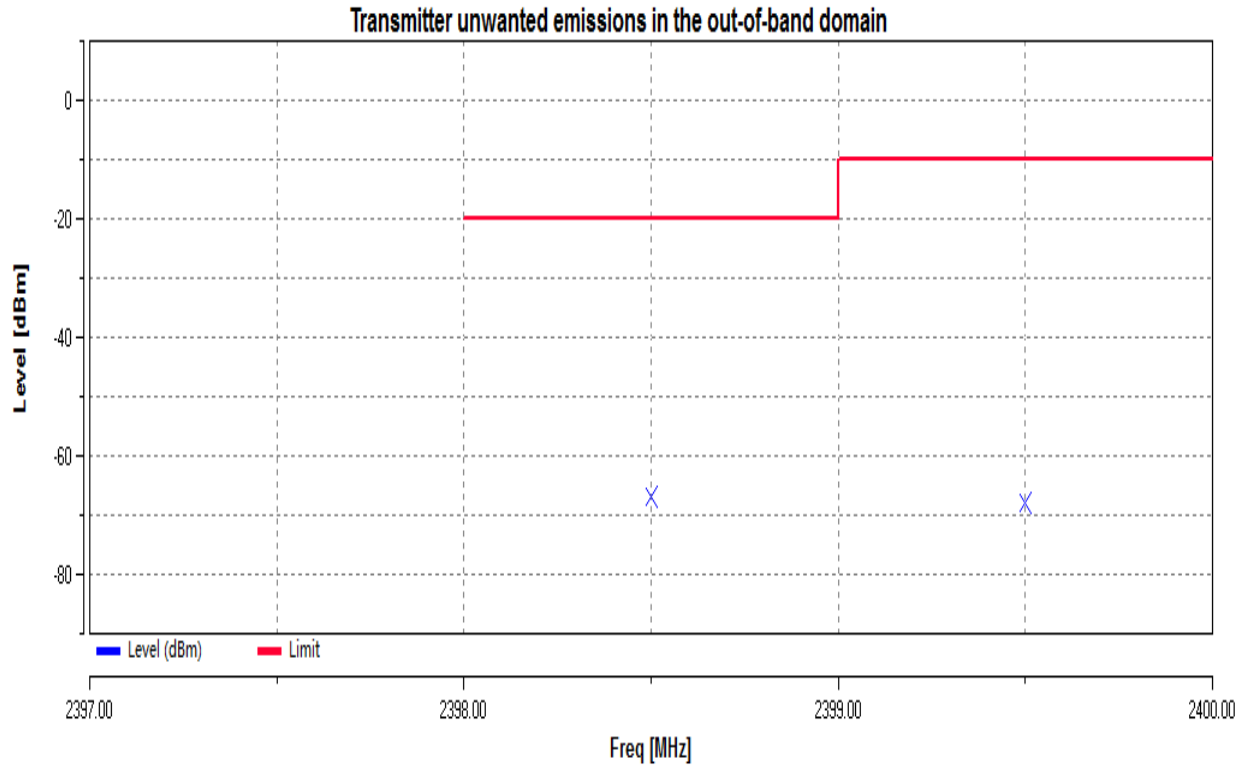
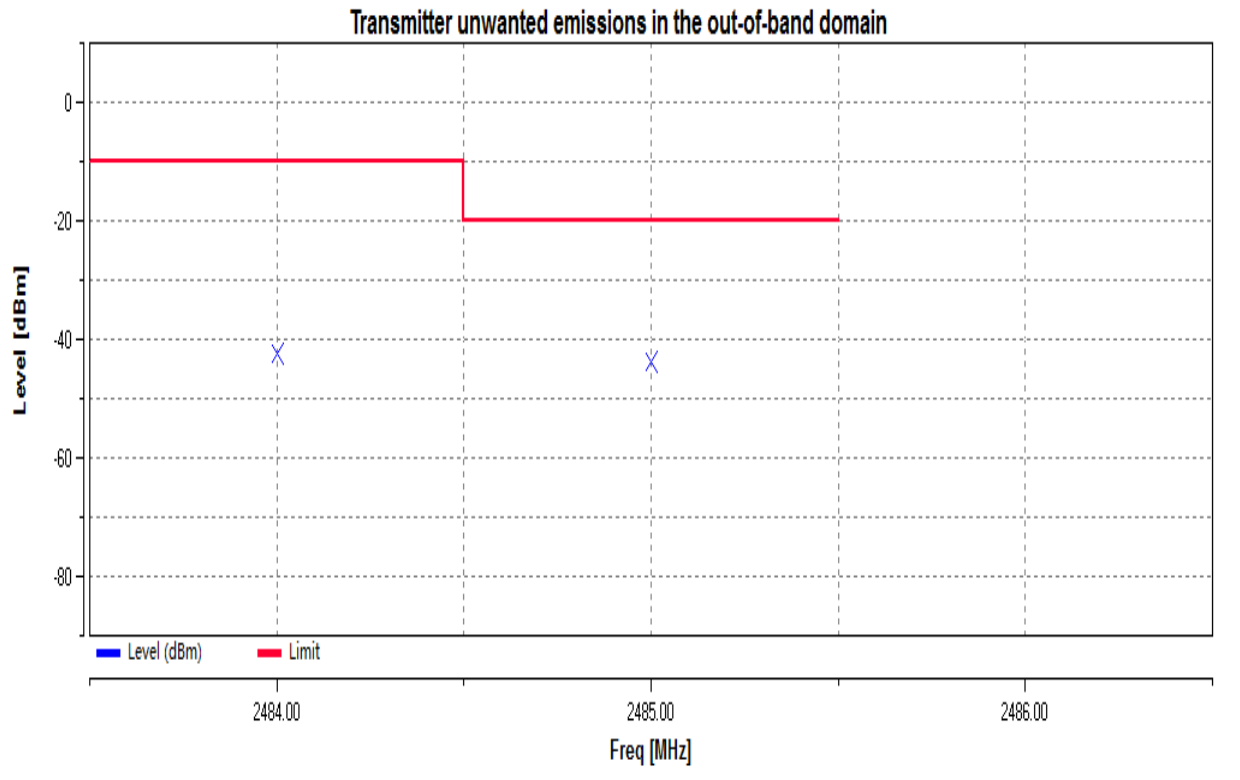
TX_OOB_TNVN_FHSS_2475_Ant1_2400MHz-2BW to 2400MHz



TX_OOB_TNVN_FHSS_2475_Ant1_2483.5MHz to 2483.5MHz+2BW



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