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

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TEST REPORT

Application No.:	SZEM1704003895CR
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-GS-GT2D, FS-GT2♣
♣	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Standards:	ETSI EN 300 328 V2.1.1
Date of Receipt:	2017-05-02
Date of Test:	2017-05-12 to 2017-06-15
Date of Issue:	2017-07-14
Test Result :	**Pass***

* In the configuration tested, the EUT complied with the standards specified above. This report supersedes our previous report SZEM170400389502, issued on 2017-06-16, which is hereby deemed null and void.

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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		2017-06-16		Original
02		2017-07-14		Updated

Authorized for issue by:				
		Jacky Li **Jacky Li /Project Engineer**		
		Eric Fu **Eric Fu /Reviewer**		

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2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Geo-location capability	ETSI EN 300 328 V2.1.1	ETSI EN 300 328 V2.1.1 clause 4.3.1.13	ETSI EN 300 328 Clause 4.3.1.13	Customer Declaration

N/A: Not applicable

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
RF Output Power	ETSI EN 300 328 V2.1.1	ETSI EN 300 328 V2.1.1 clause 5.4.2.2.1.2	ETSI EN 300 328 Clause 4.3.1.2	Pass
Duty Cycle, Tx-sequence, Tx-gap	ETSI EN 300 328 V2.1.1	ETSI EN 300 328 V2.1.1 clause 5.4.2.2.1.3	ETSI EN 300 328 Clause 4.3.1.3	Pass
Medium Utilization (MU) factor	ETSI EN 300 328 V2.1.1	ETSI EN 300 328 V2.1.1 clause 5.4.2.2.1.4	ETSI EN 300 328 Clause 4.3.1.6	Pass
Accumulated Transmit Time, Frequency Occupation and Hopping Sequence	ETSI EN 300 328 V2.1.1	ETSI EN 300 328 V2.1.1 clause 5.4.4.2.1	ETSI EN 300 328 Clause 4.3.1.4	Pass
Hopping Frequency Separation	ETSI EN 300 328 V2.1.1	ETSI EN 300 328 V2.1.1 clause 5.4.5.2.1	ETSI EN 300 328 Clause 4.3.1.5	Pass
Occupied Channel Bandwidth	ETSI EN 300 328 V2.1.1	ETSI EN 300 328 V2.1.1 clause 5.4.7.2.1	ETSI EN 300 328 Clause 4.3.1.8	Pass
Transmitter unwanted emissions in the out-of-band domain	ETSI EN 300 328 V2.1.1	ETSI EN 300 328 V2.1.1 clause 5.4.8.2.1	ETSI EN 300 328 Clause 4.3.1.9	Pass
Transmitter unwanted emissions in the spurious domain	ETSI EN 300 328 V2.1.1	ETSI EN 300 328 V2.1.1 clause 5.4.9.2	ETSI EN 300 328 Clause 4.3.1.10	Pass
Receiver spurious emissions	ETSI EN 300 328 V2.1.1	ETSI EN 300 328 V2.1.1 clause 5.4.10.2	N/A	N/A
Receiver Blocking	ETSI EN 300 328 V2.1.1	ETSI EN 300 328 V2.1.1 clause 5.4.11.2	ETSI EN 300 328 Clause 4.3.1.12	N/A

N/A: Not applicable

Remark:

Model No.: FS-GS-GT2D, FS-GT2

Only the model FS-GT2 was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, only different on product name and model No..

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4 General Information

4.1 Details of E.U.T.

EUT Name:	Digital propotional radio control system
Model No.:	FS-GT2
Carrier Frequency:	2405.5~2475MHz
Channel Spacing:	0.5MHz
Channel Number:	140
Modulation Type:	GFSK
Sample Type:	Portable production
Antenna Type:	Integral antenna
Antenna Gain:	2 dBi
Modulation technique	FHSS
LBT	Non-LBT
Adaptivity	Non-Adaptivity
Power supply:	Transmitter: DC 12V by 8*AA battery Receiver: DC 4.5~6.0V

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	2018-05-04
Signal Generator(9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-04
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-05
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-05
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-04
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-04
RF Control Unit	JS Tonscend	JS0806-2	SEM023-02	2016-10-09	2017-10-09
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	2018-05-04
Signal Generator(9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-04
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-05
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-05
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-04
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-04
RF Control Unit	JS Tonscend	JS0806-2	SEM023-02	2016-10-09	2017-10-09
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	2018-05-04
Signal Generator(9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-04
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-05
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-05
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-04
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-04
RF Control Unit	JS Tonscend	JS0806-2	SEM023-02	2016-10-09	2017-10-09
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	2018-05-04
Signal Generator(9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-04
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-05
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-05
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-04
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-04
RF Control Unit	JS Tonscend	JS0806-2	SEM023-02	2016-10-09	2017-10-09
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	2018-05-04
Signal Generator(9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-04
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-05
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-05
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-04
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-04
RF Control Unit	JS Tonscend	JS0806-2	SEM023-02	2016-10-09	2017-10-09
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	2018-05-04
Signal Generator(9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-04
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-05
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-05
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-04
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-04
RF Control Unit	JS Tonscend	JS0806-2	SEM023-02	2016-10-09	2017-10-09
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	2018-05-04
Signal Generator(9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-04
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-05
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-05
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-04
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-04
RF Control Unit	JS Tonscend	JS0806-2	SEM023-02	2016-10-09	2017-10-09
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	2018-04-14
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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Receiver spurious emissions					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Spectrum Analyzer	KEYSIGHT	N9010A	SEM004-12	2017-05-04	2018-05-04
Signal Generator(9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-04
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-05
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-05
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-04
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-04
RF Control Unit	JS Tonscend	JS0806-2	SEM023-02	2016-10-09	2017-10-09
Bluetooth Tester	Rohde & Schwarz	CBT	W060-01	2016-06-27	2017-06-27

Receiver Blocking					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Spectrum Analyzer	KEYSIGHT	N9010A	SEM004-12	2017-05-04	2018-05-04
Signal Generator(9kHz-3GHz)	KEYSIGHT	N5171B	SEM006-13	2017-05-04	2018-05-04
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2017-06-05	2018-06-05
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2017-06-05	2018-06-05
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2017-05-04	2018-05-04
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2017-05-04	2018-05-04
RF Control Unit	JS Tonscend	JS0806-2	SEM023-02	2016-10-09	2017-10-09
Bluetooth Tester	Rohde & Schwarz	CBT	W060-01	2016-06-27	2017-06-27

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:

ETSI 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

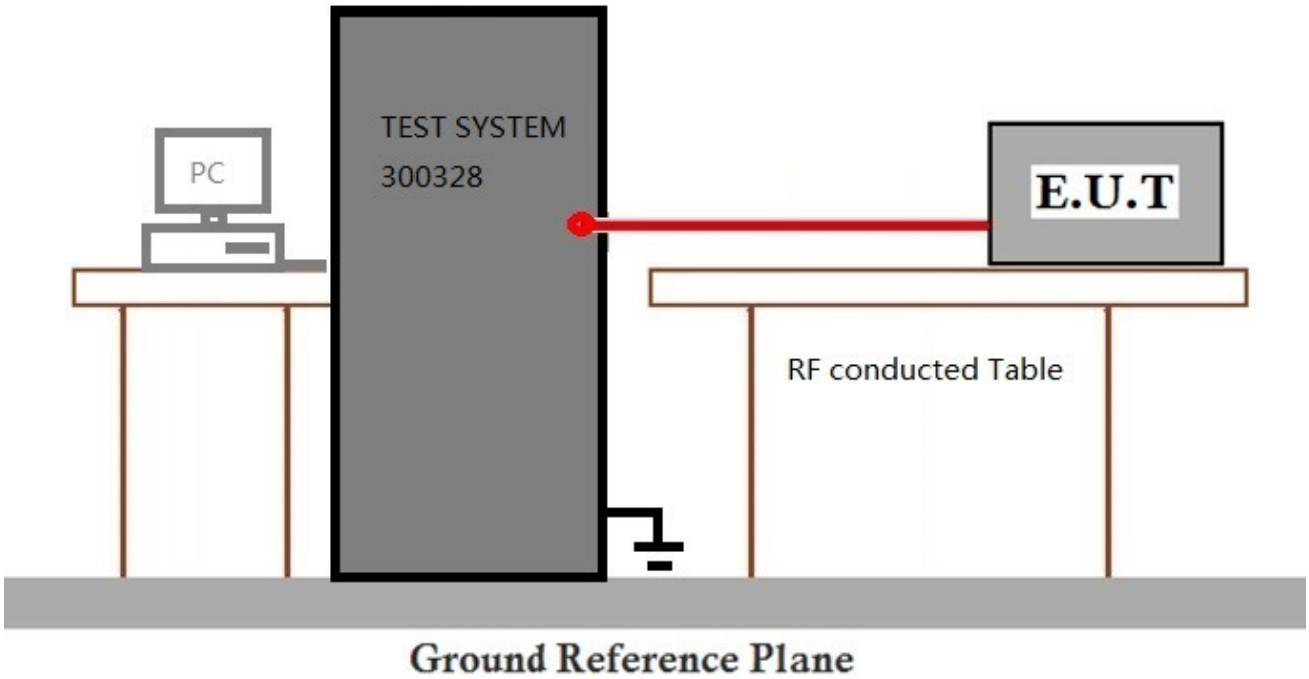
7.1 RF Output Power

Test Requirement ETSI EN 300 328 Clause 4.3.1.2
Test Method: ETSI 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: 1015 mbar
Test mode e: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: ETSI EN 300 328 Clause 4.3.1.3

Test Method: ETSI 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.

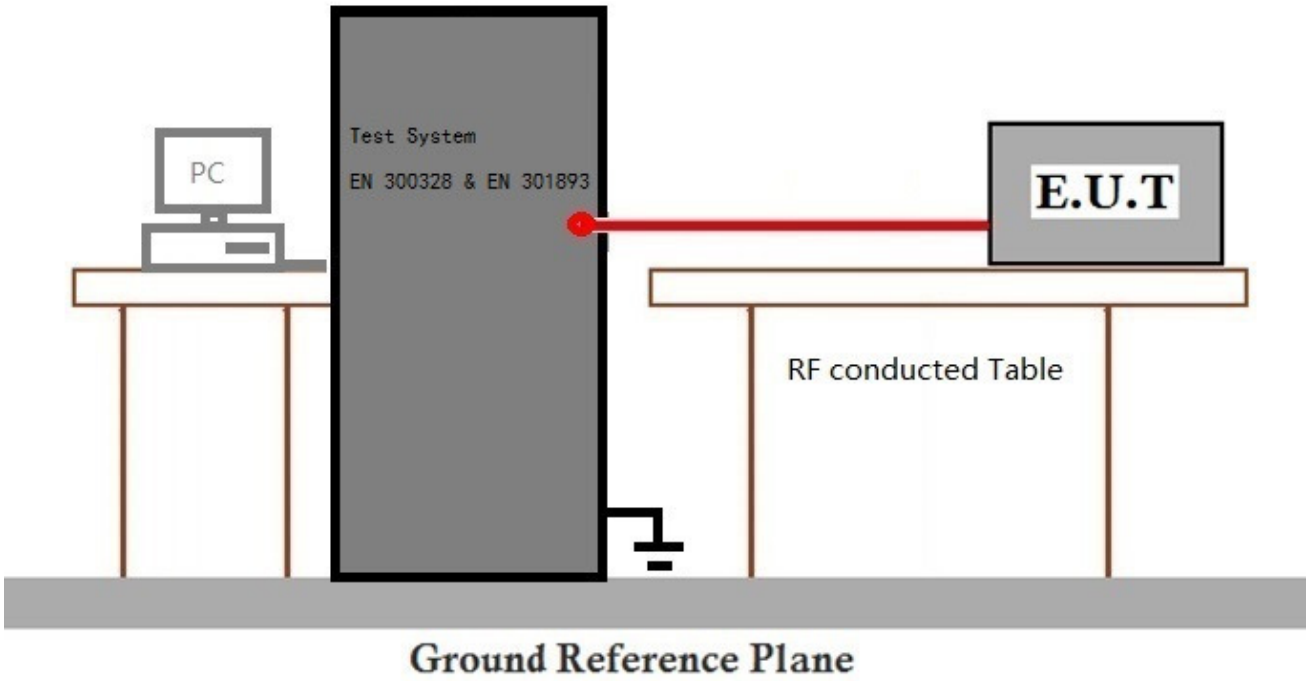
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1015 mbar

Test mode e: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	ETSI EN 300 328 Clause 4.3.1.6
Test Method:	ETSI 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 %.

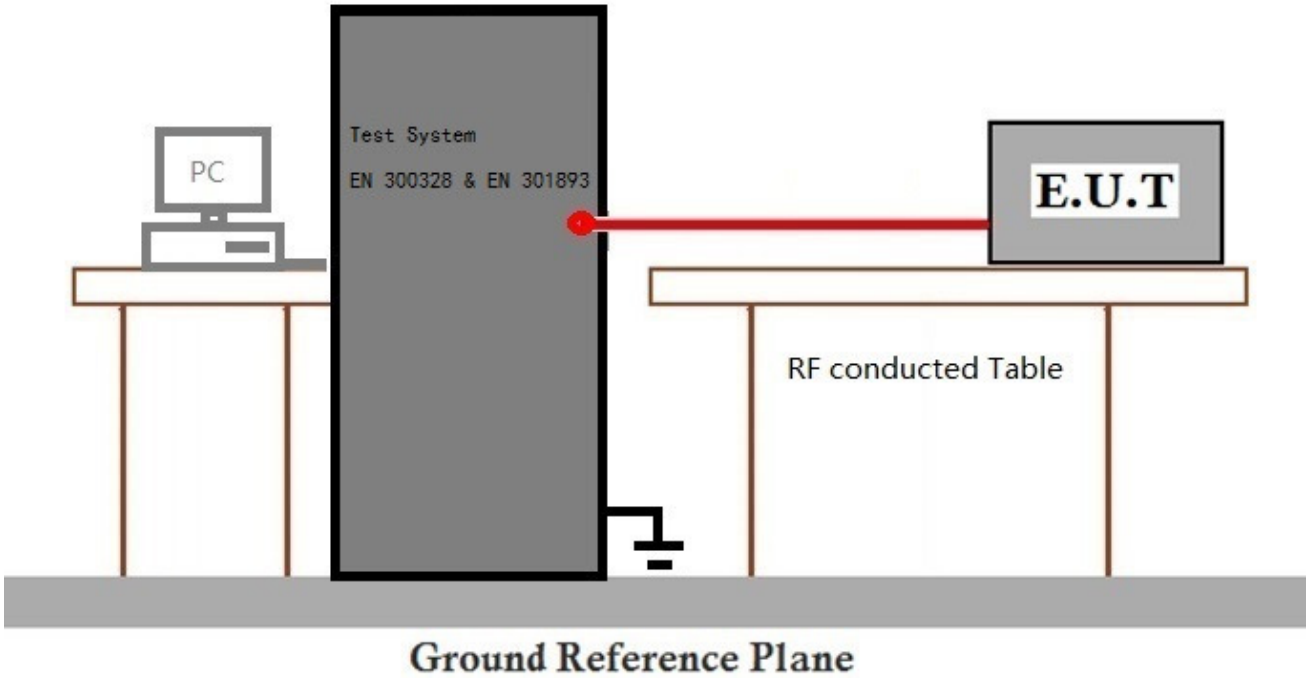
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1015 mbar

Test mode e: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 ETSI EN 300 328 Clause 4.3.1.4
Test Method: ETSI 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.

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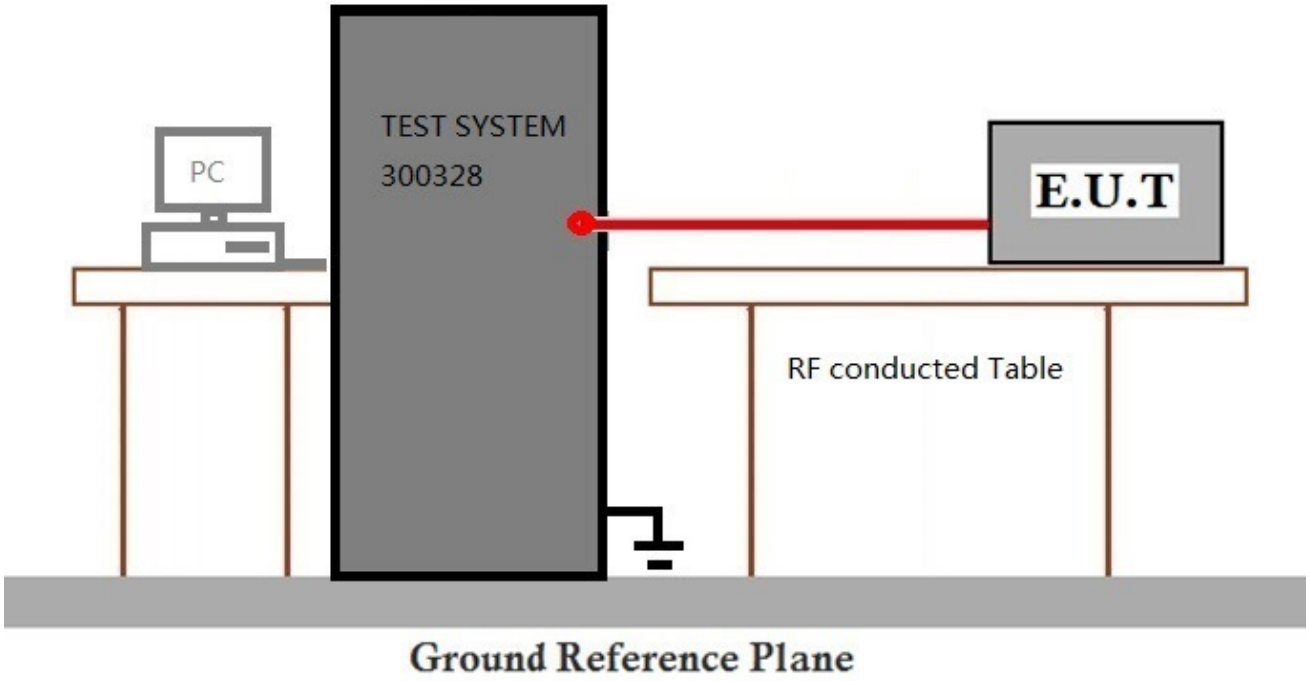
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1015 mbar

Test mode e: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 ETSI EN 300 328 Clause 4.3.1.5
Test Method: ETSI 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.

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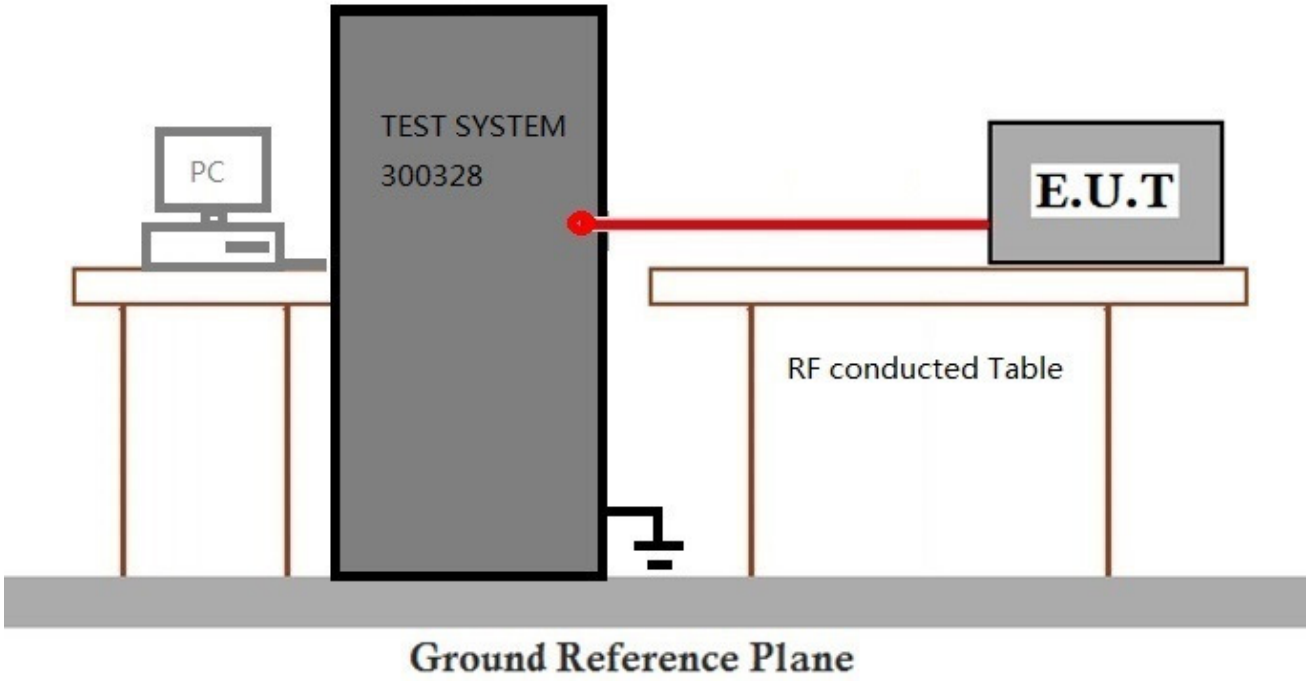
7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1015 mbar

Test mode e: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	ETSI EN 300 328 Clause 4.3.1.8
Test Method:	ETSI 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.

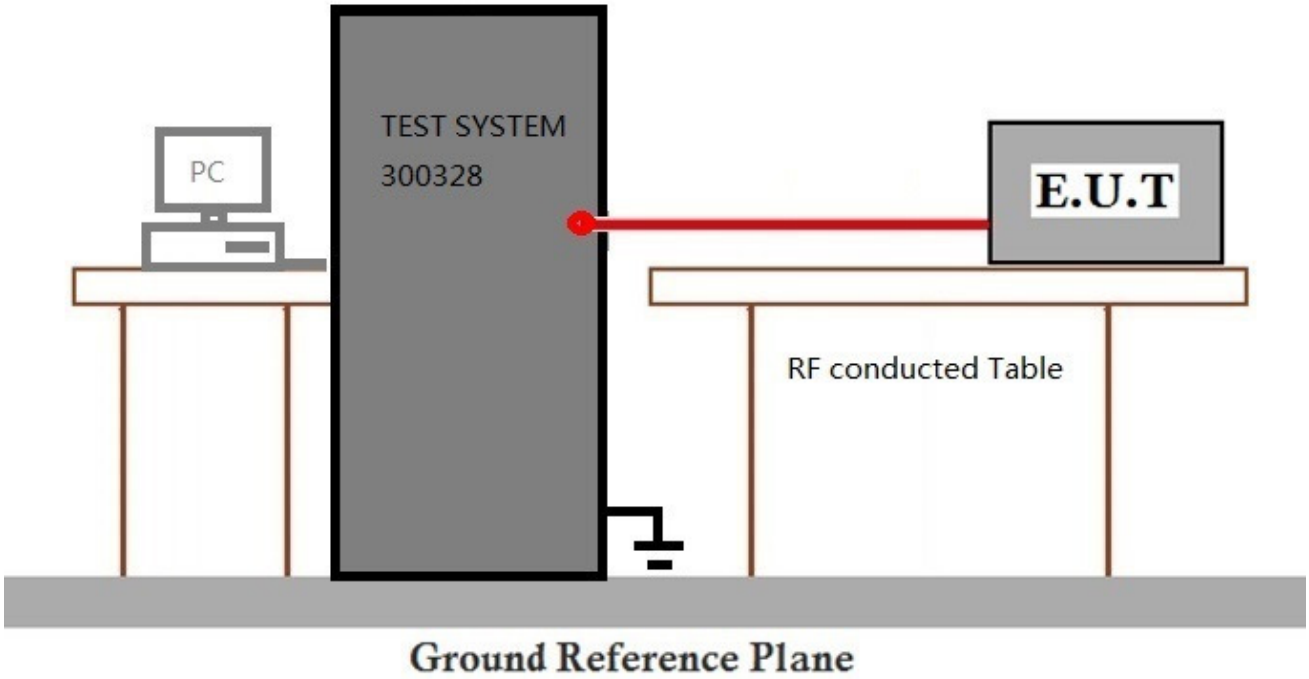
7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1015 mbar

Pretest these mode to find the worst case: f: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

The detailed test data see: Appendix 300328

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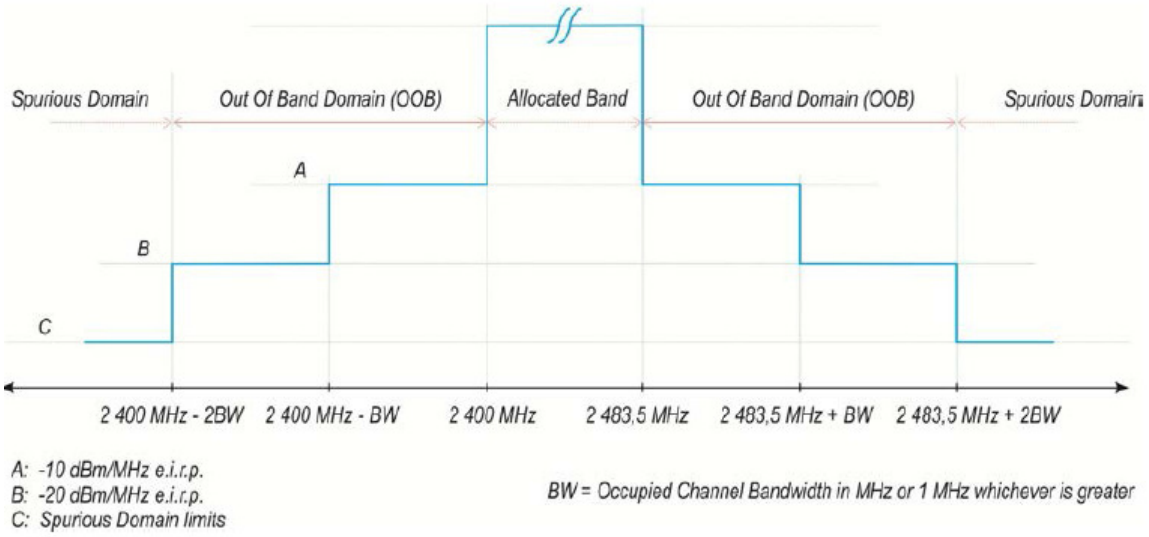
7.7 Transmitter unwanted emissions in the out-of-band domain

Test Requirement ETSI EN 300 328 Clause 4.3.1.9

Test Method: ETSI EN 300 328 V2.1.1 clause 5.4.8.2.1

Limit:



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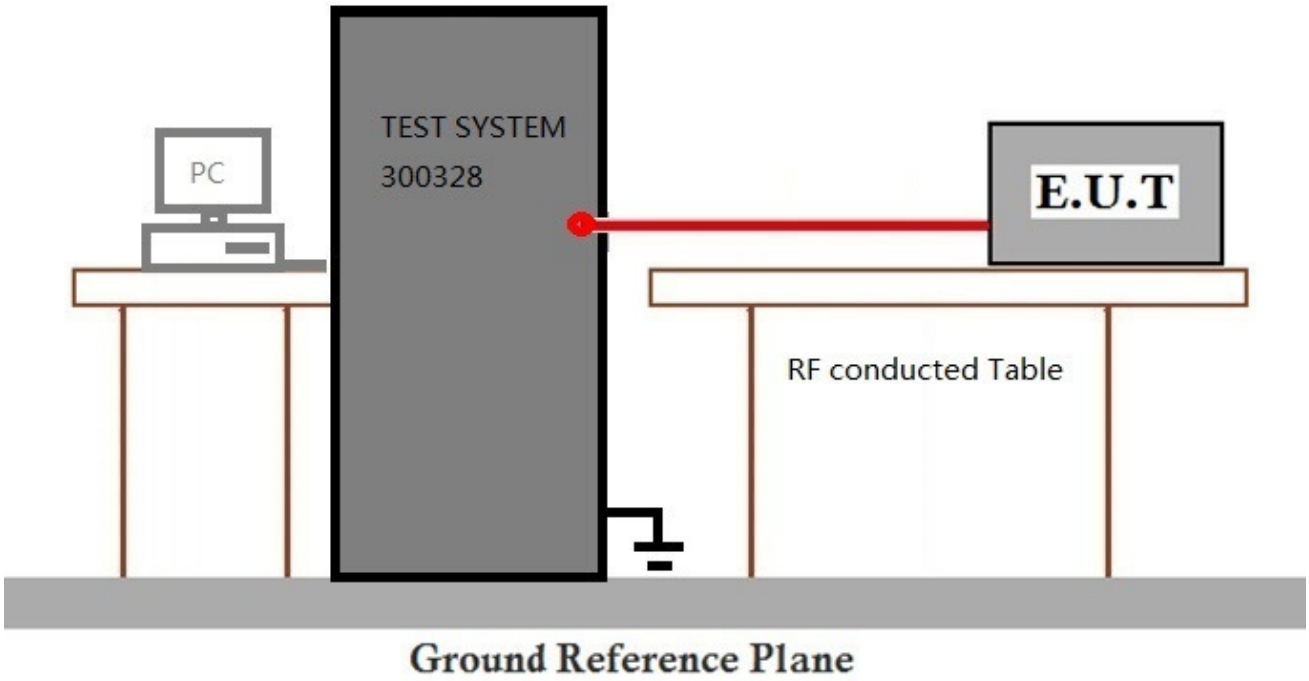
7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1015 mbar

Pretest these mode to find the worst case: f: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 ETSI EN 300 328 Clause 4.3.1.10
Test Method: ETSI 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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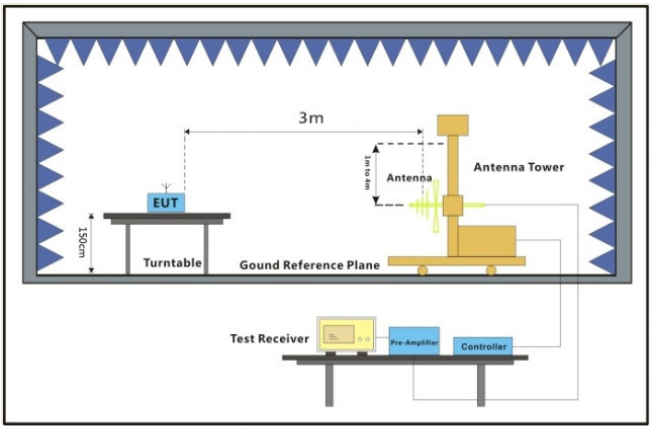
7.8.1 E.U.T. Operation

Operating Environment:

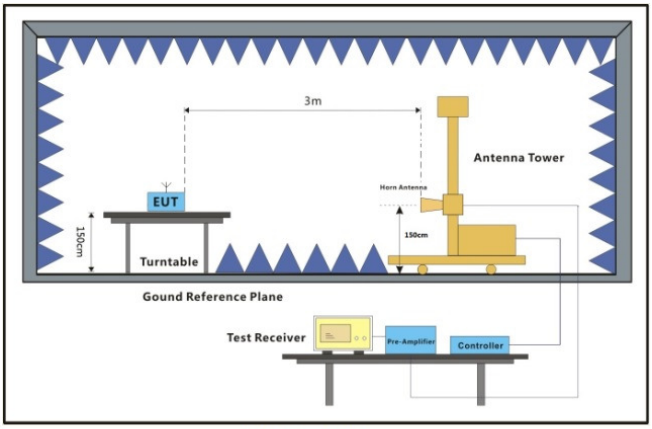
Temperature: 24 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar

Test mode: f: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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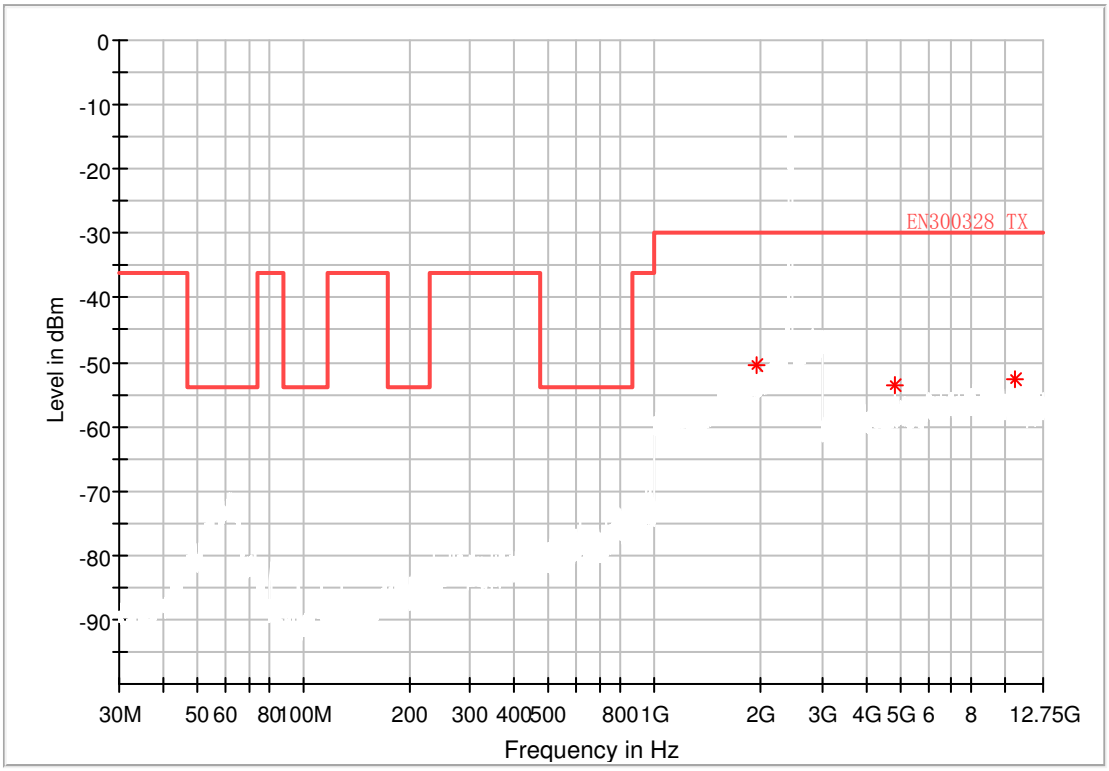
Mode:f; Polarization:Horizontal; Modulation Type:GFSK; ; Channel:Low

Full Spectrum



Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Remark
1960.500000	-50.53	-30.00	20.53	Peak
4807.406250	-53.53	-30.00	23.53	Peak
10665.937500	-52.60	-30.00	22.60	Peak

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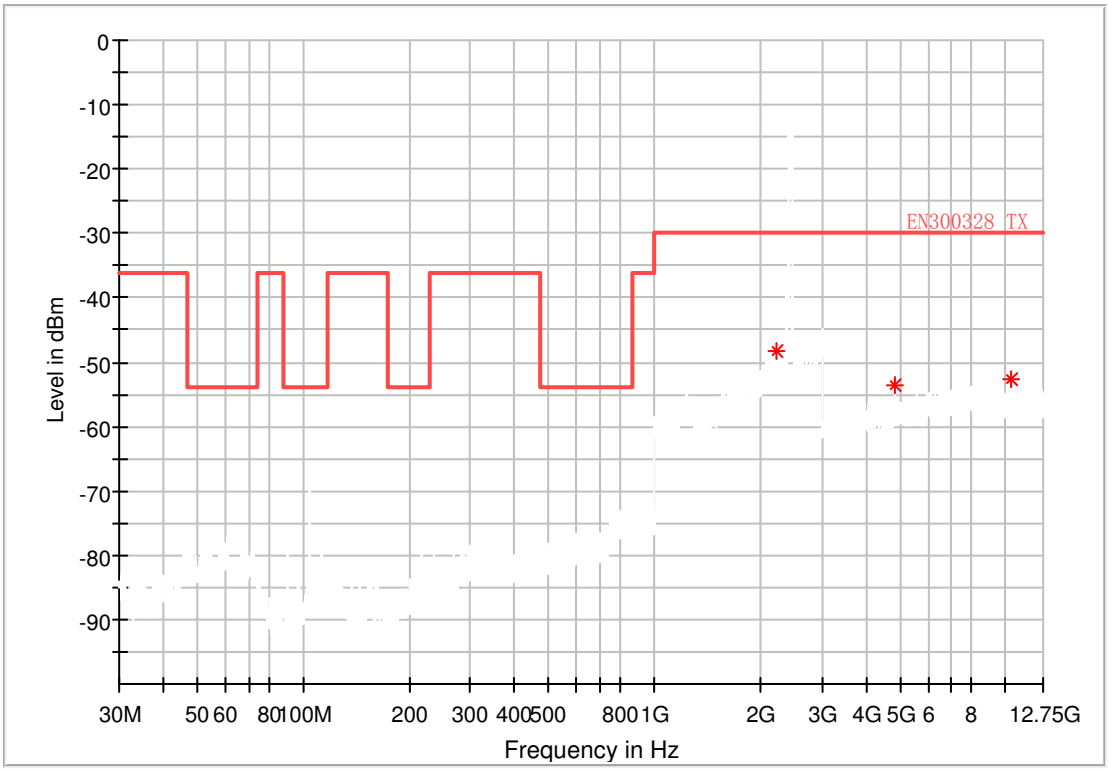
Mode:f; Polarization:Vertical; Modulation Type:GFSK; ; Channel:Low

Full Spectrum



Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Remark
2226.500000	-48.35	-30.00	18.35	Peak
4807.406250	-53.68	-30.00	23.68	Peak
10277.562500	-52.65	-30.00	22.65	Peak

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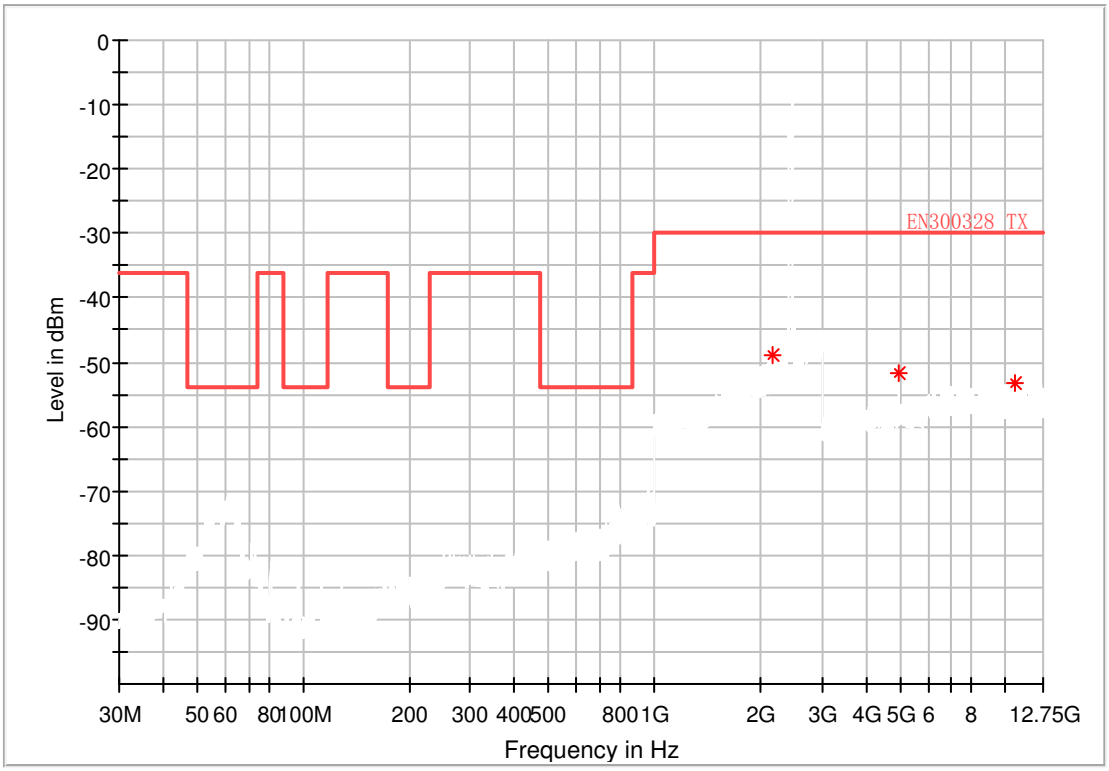
Mode:f; Polarization:Horizontal; Modulation Type:GFSK; ; Channel:High

Full Spectrum



Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Remark
2171.666667	-48.78	-30.00	18.78	Peak
4949.593750	-51.87	-30.00	21.87	Peak
10678.937500	-53.31	-30.00	23.31	Peak

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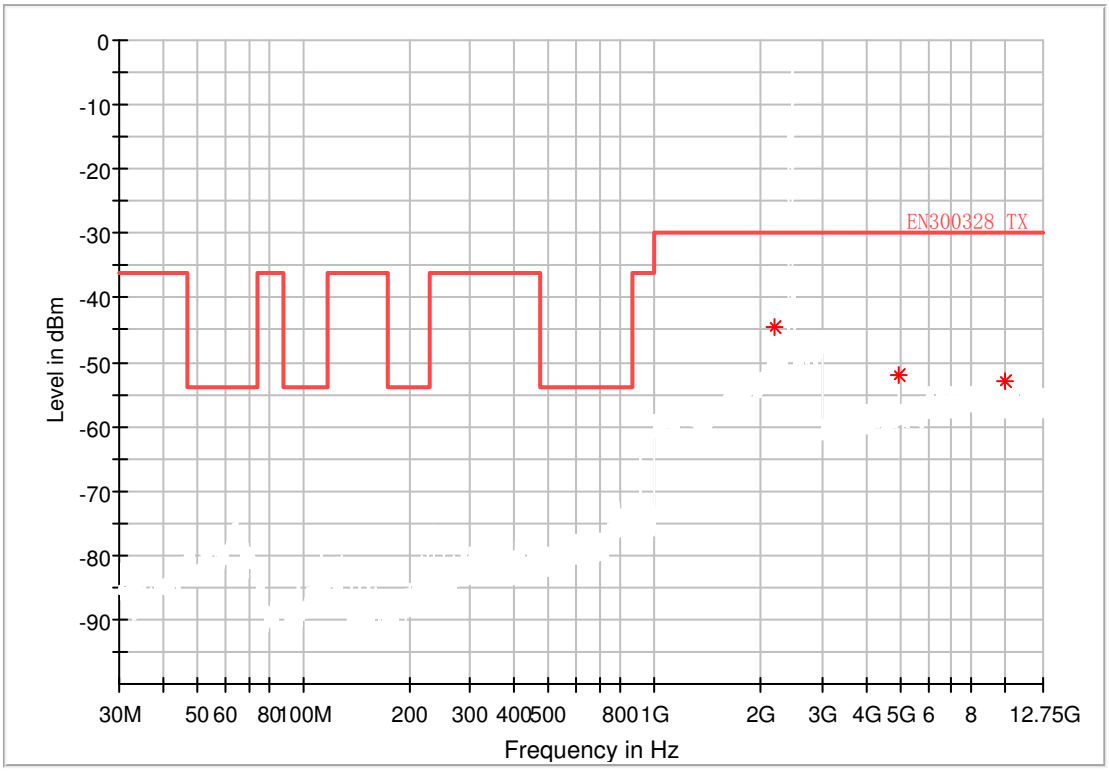
Mode:f; Polarization:Vertical; Modulation Type:GFSK; ; Channel:High

Full Spectrum



Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Remark
2186.583333	-44.68	-30.00	14.68	Peak
4949.593750	-52.13	-30.00	22.13	Peak
9899.343750	-53.02	-30.00	23.02	Peak

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7.9 Receiver spurious emissions

Not applied, the EUT only owns transmit function

7.10 Receiver Blocking

Not applied, the EUT only owns transmit function

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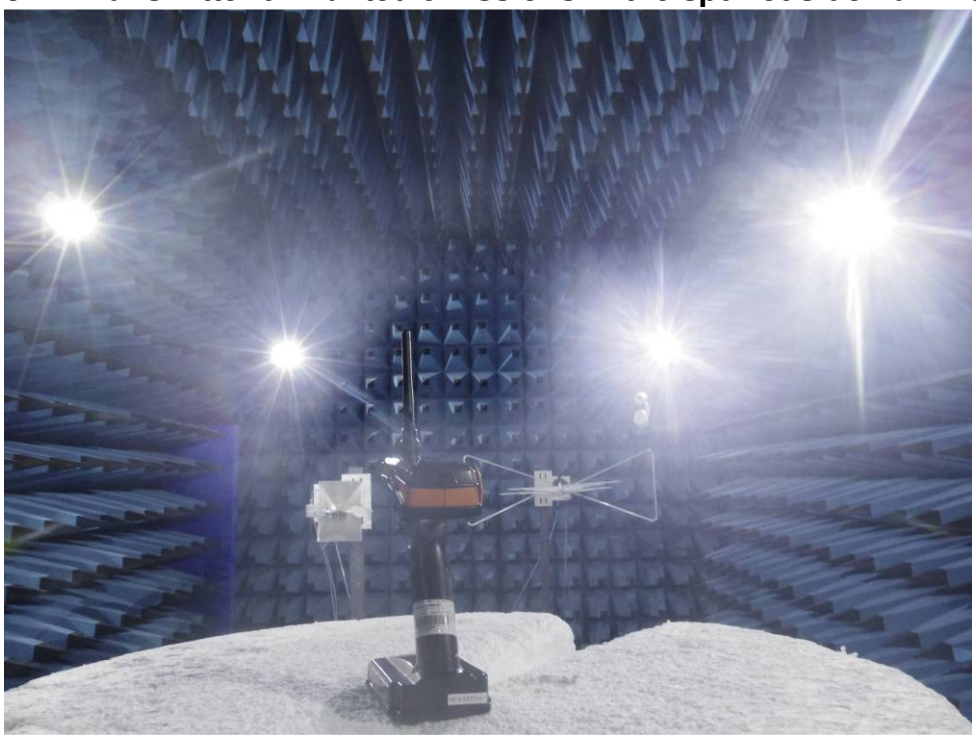
8 Photographs

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 SZEM1704003895CR.

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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	DH5	Ant1	12.67	14.67	<=20	PASS
TLVN	DH5	Ant1	12.74	14.74	<=20	PASS
THVN	DH5	Ant1	12.16	14.16	<=20	PASS

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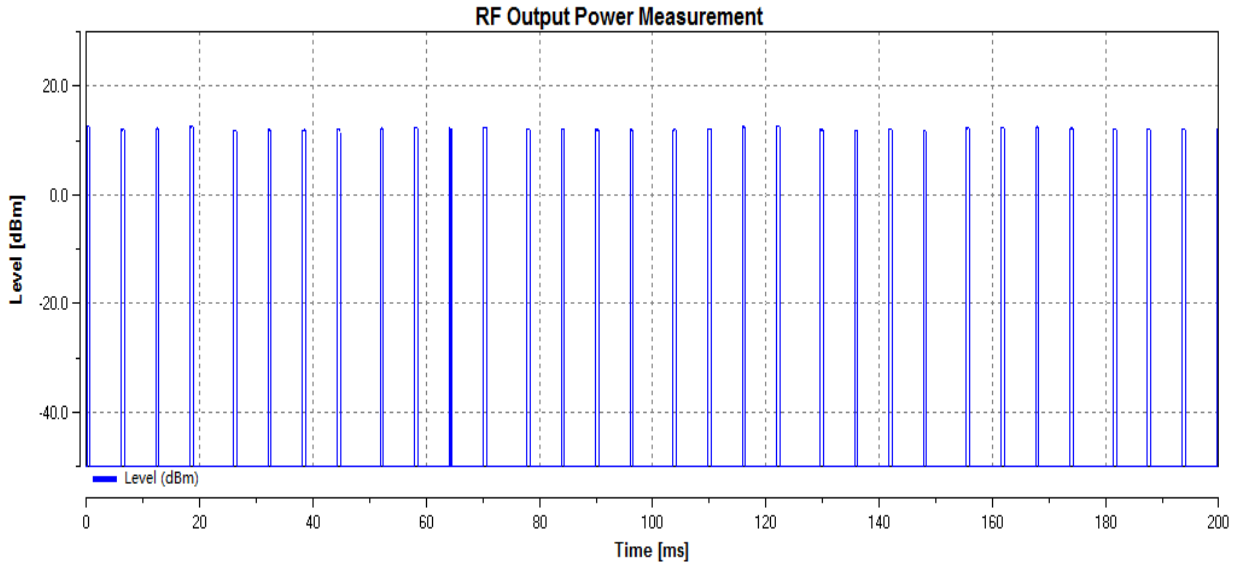
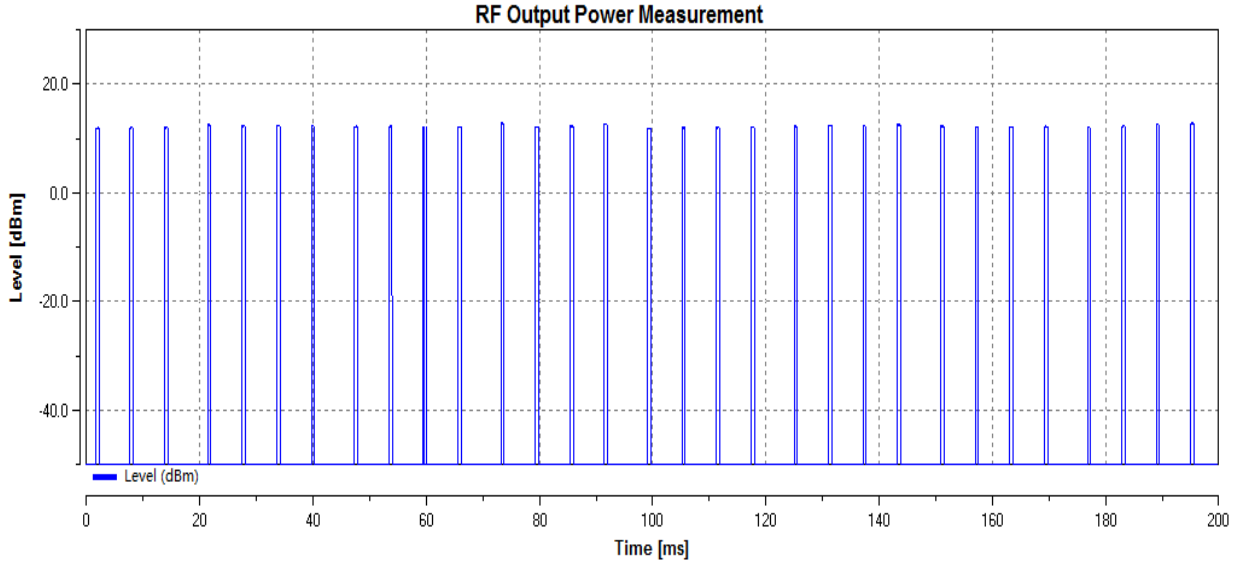
RF Output Power_TNVN_DH5_Ant1



RF Output Power_TLVN_DH5_Ant1



RF Output Power_THVN_DH5_Ant1

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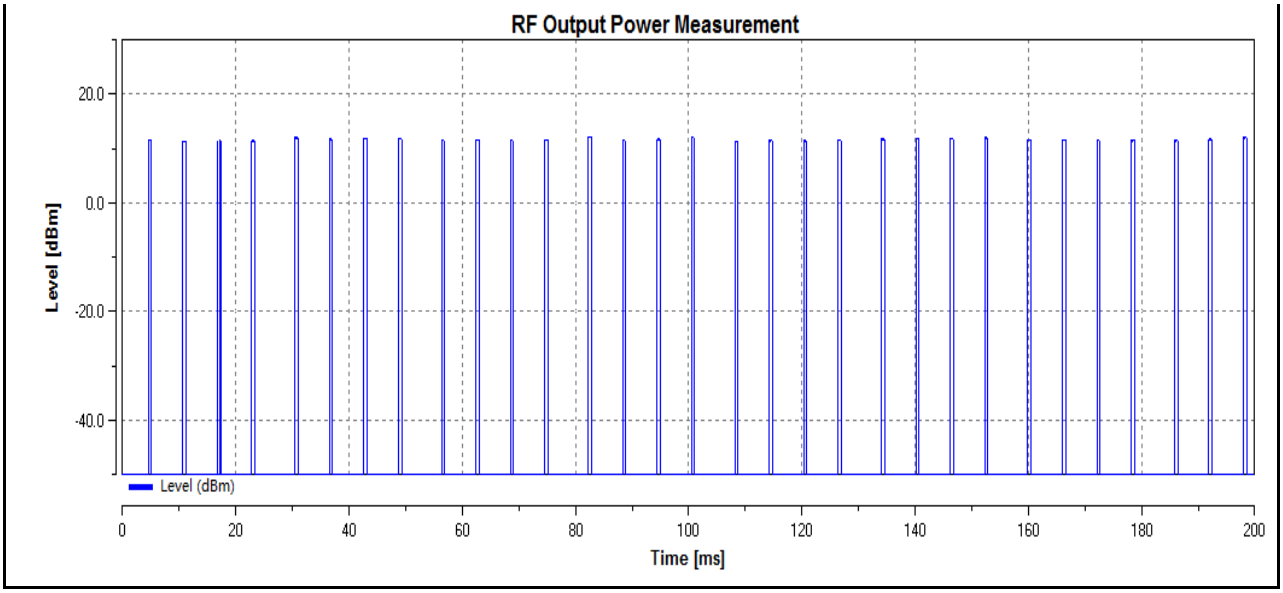

2.Duty Cycle,Tx-sequence,Tx-gap,Medium Utilization (MU) factor

Test Condition	Test Mode	Ant	DC[%]	TX-Seq.[ms]	TX-gap[ms]	MU[%]	Verdict
TNVN	DH5	Ant1	8.73	0.57	7.04	2.60	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	DH5	2407.5	Ant1	1.112	<=15	PASS
TNVN	DH5	2472.5	Ant1	1.104	<=15	PASS

Test Condition	Test Mode	Test Channel	Ant	Frequency occupation times [N]	Limit [N]	Verdict
TNVN	DH5	2407.5	Ant1	1	>=1	PASS
TNVN	DH5	2472.5	Ant1	1	>=1	PASS

Test Condition	Test Mode	Ant	Hopping Number [N]	Limit [N]	-20 dB Bandwidth [%]	Limit [%]	Verdict
TNVN	DH5	Ant1	16	>=15	79.90	>70	PASS

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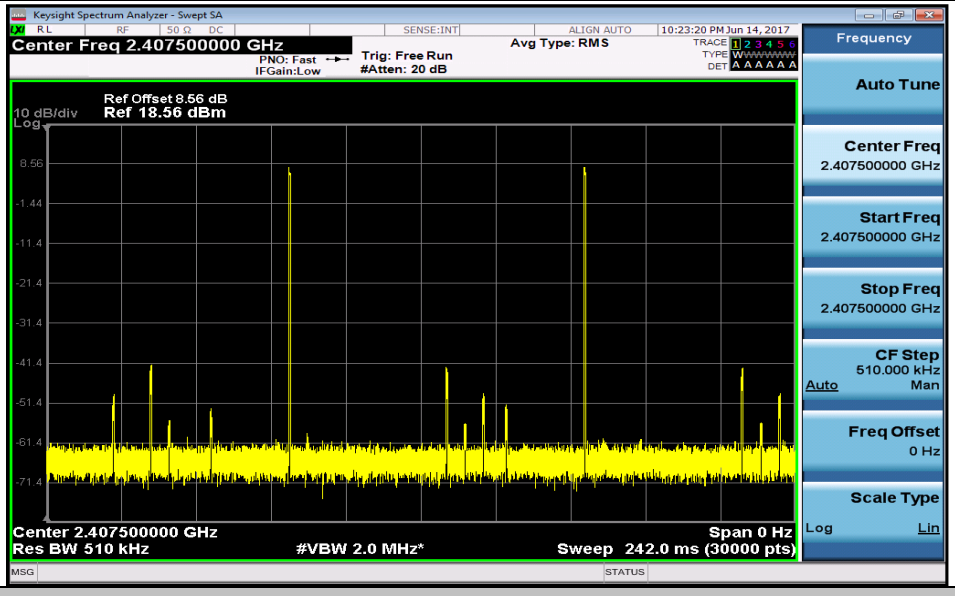
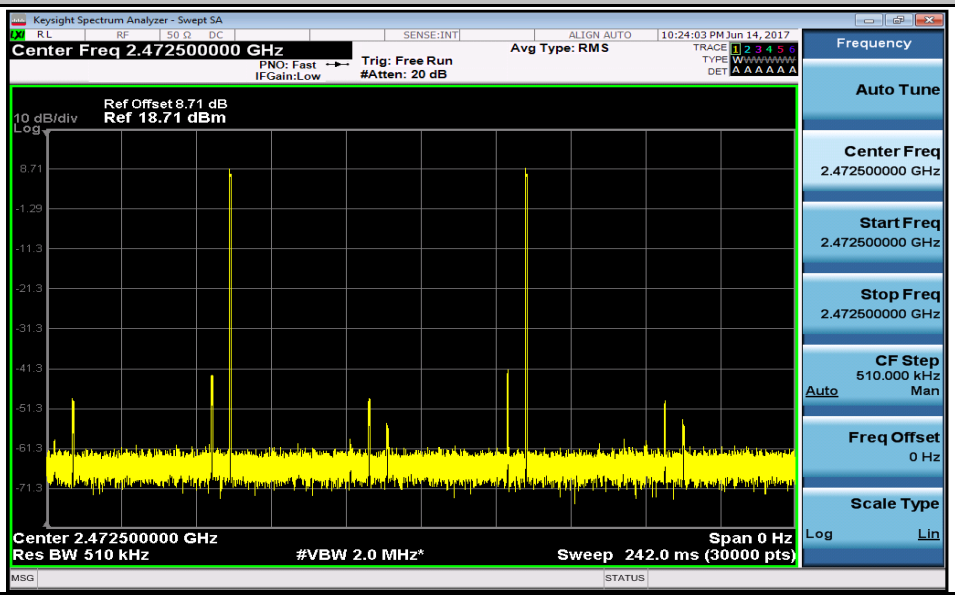
Accumulated Dwell time_TNVN_DH5_2407.5_Ant1



Accumulated Dwell time_TNVN_DH5_2472.5_Ant1



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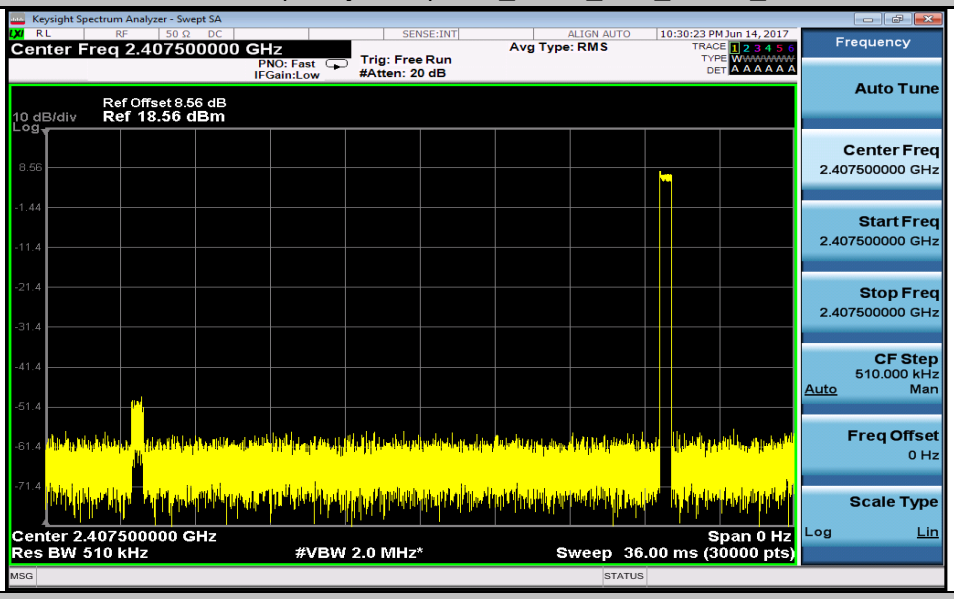
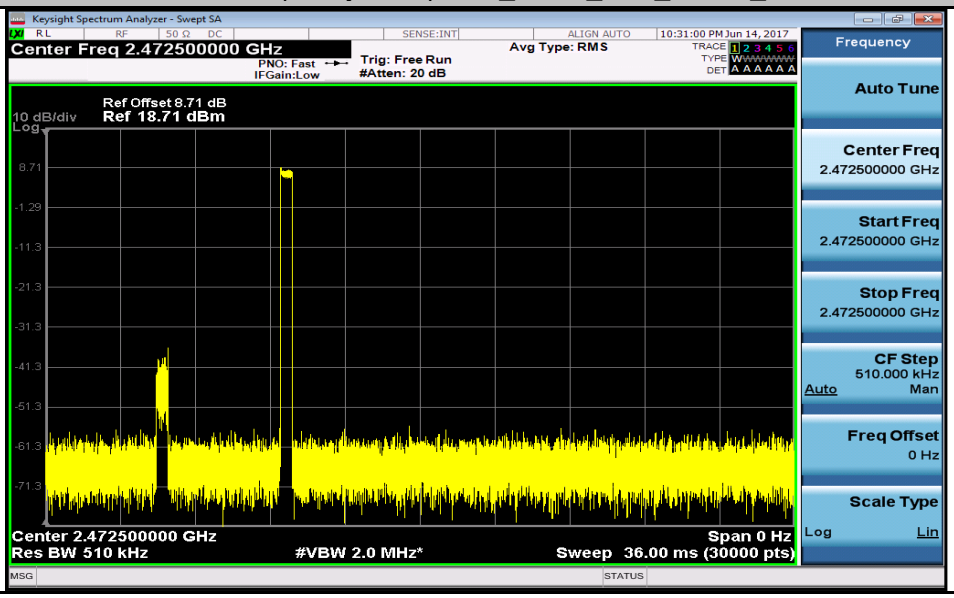
Minimum Frequency Occupation_TNVN_DH5_2407.5_Ant1



Minimum Frequency Occupation_TNVN_DH5_2472.5_Ant1



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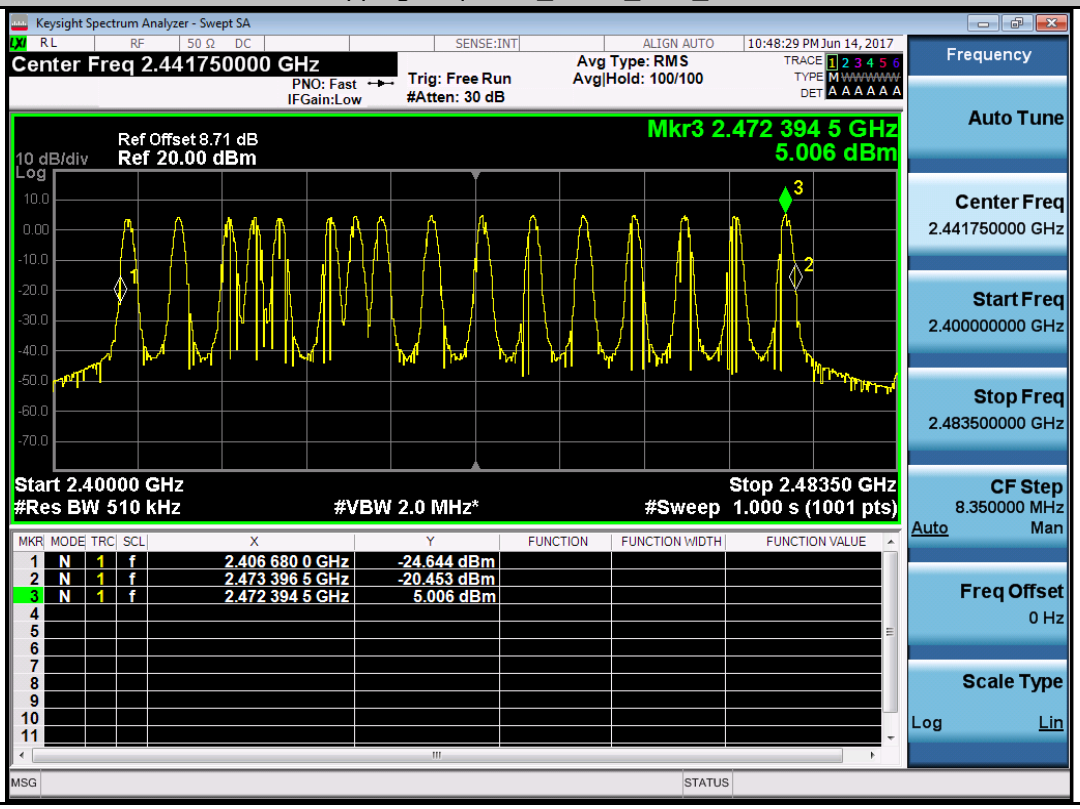
Hopping Sequence_TNVN_DH5_Ant1



4. Hopping Frequency Separation

Test Condition	Test Mode	Test Channel	Ant	Channel Separation [MHz]	Limit [MHz]	Verdict
TNVN	DH5	2432.5	Ant1	2.500	>=0.1	PASS

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Hopping Frequency Separation_TNVN_DH5_2432.5_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	DH5	2405.5	Ant1	1.0062	2404.98306	---	PASS
TNVN	DH5	2475	Ant1	1.0029	---	2475.48704	PASS

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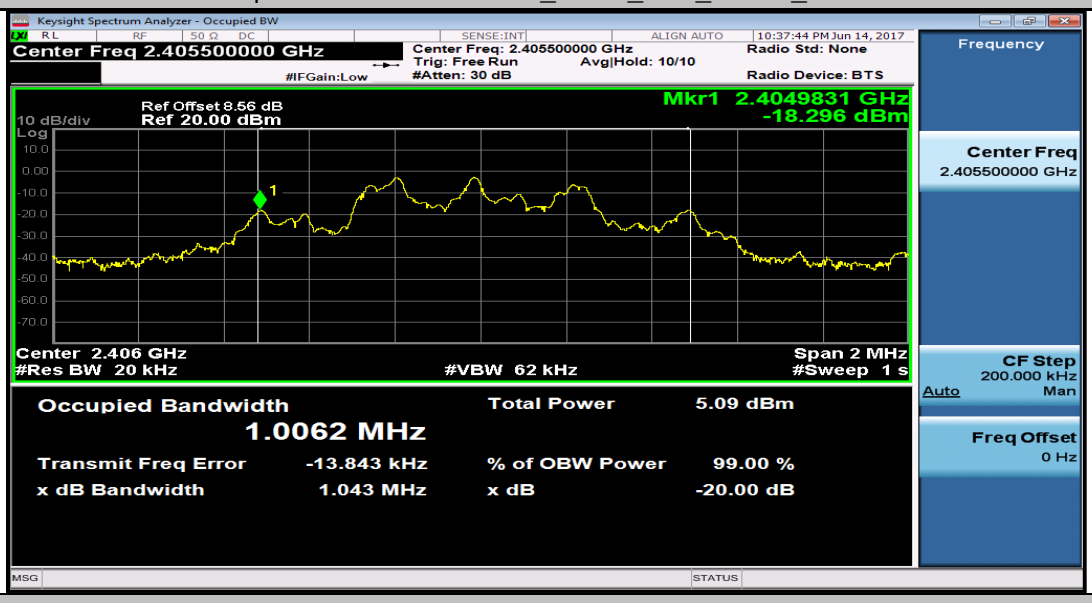
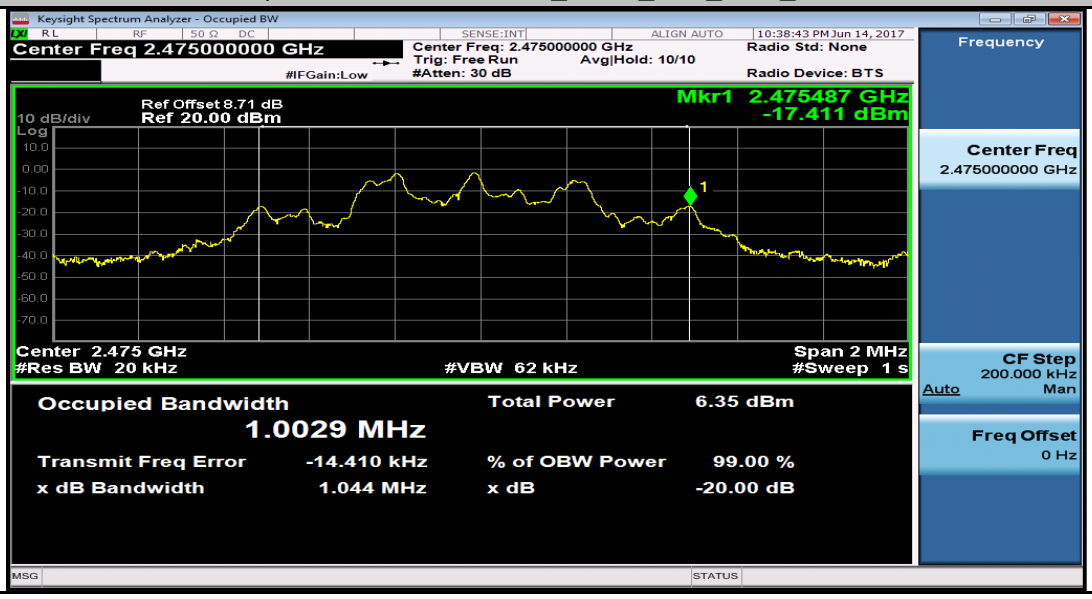
Occupied Channel Bandwidth_TNVN_DH5_2405.5_Ant1



Occupied Channel Bandwidth_TNVN_DH5_2475_Ant1



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	DH5	2405.5	Ant1	2398.488	-43.29	<=-20	PASS
TNVN	DH5	2405.5	Ant1	2398.494	-43.28	<=-20	PASS
TNVN	DH5	2405.5	Ant1	2399.494	-41.98	<=-10	PASS
TNVN	DH5	2405.5	Ant1	2399.500	-42.10	<=-10	PASS

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TNVN	DH5	2405.5	Ant1	2484.000	-68.33	<=-10	PASS
TNVN	DH5	2405.5	Ant1	2484.006	-68.75	<=-10	PASS
TNVN	DH5	2405.5	Ant1	2485.006	-69.36	<=-20	PASS
TNVN	DH5	2405.5	Ant1	2485.012	-69.21	<=-20	PASS
TNVN	DH5	2475	Ant1	2398.494	-68.67	<=-20	PASS
TNVN	DH5	2475	Ant1	2398.497	-68.31	<=-20	PASS
TNVN	DH5	2475	Ant1	2399.497	-69.39	<=-10	PASS
TNVN	DH5	2475	Ant1	2399.500	-68.40	<=-10	PASS
TNVN	DH5	2475	Ant1	2484.000	-46.30	<=-10	PASS
TNVN	DH5	2475	Ant1	2484.003	-46.23	<=-10	PASS
TNVN	DH5	2475	Ant1	2485.003	-47.27	<=-20	PASS
TNVN	DH5	2475	Ant1	2485.006	-47.67	<=-20	PASS

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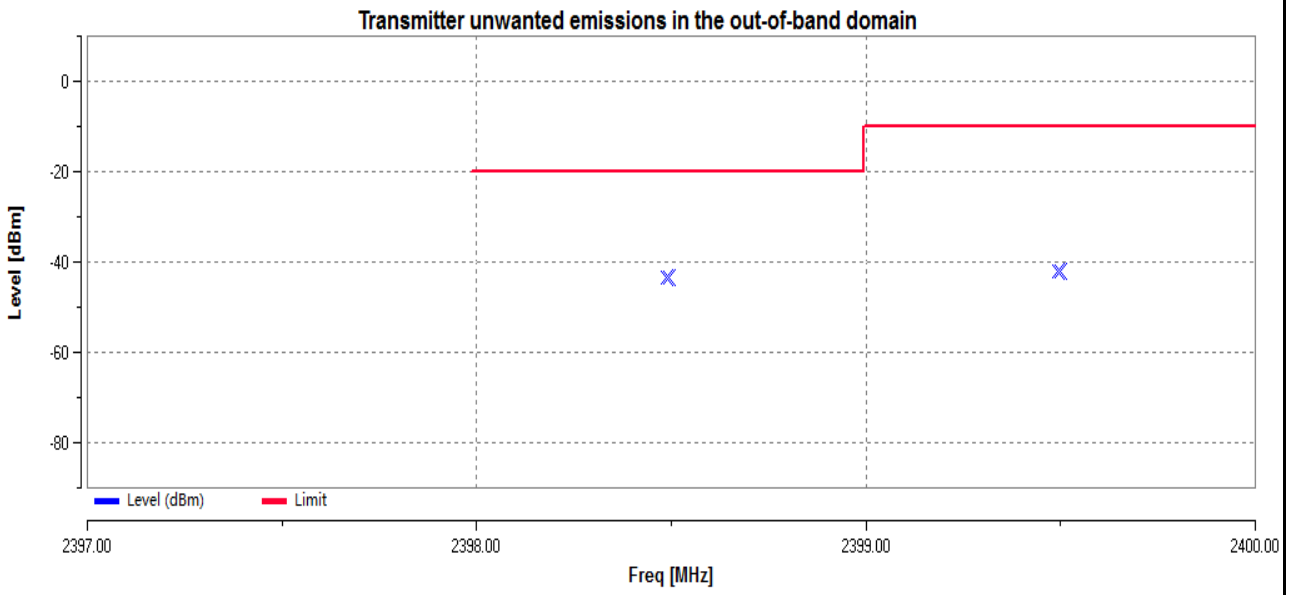
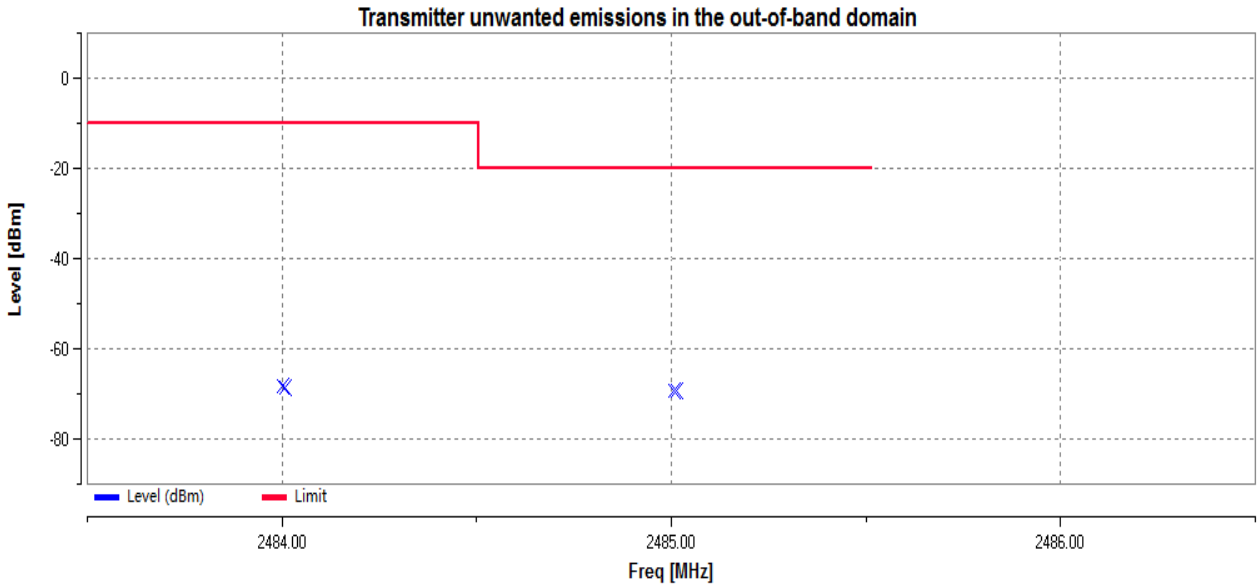
Transmitter unwanted emissions in the out-of-band domain_TNVN_DH5_2405.5_Ant1_2400MHz-2BW to 2400MHz



Transmitter unwanted emissions in the out-of-band domain_TNVN_DH5_2405.5_Ant1_2483.5MHz to 2483.5MHz+2BW



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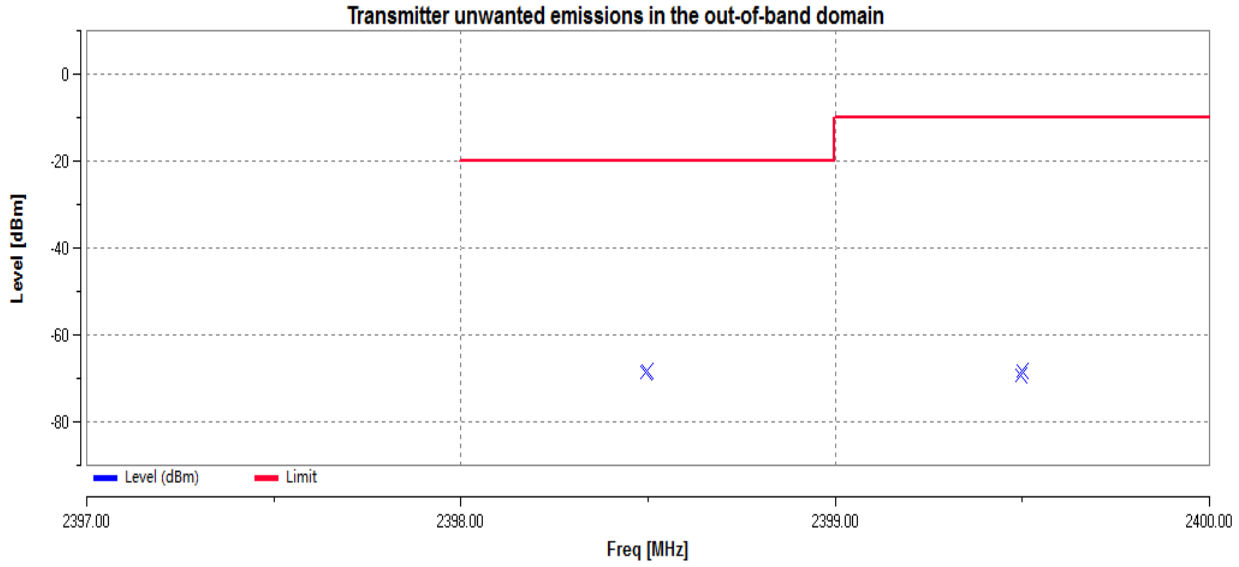
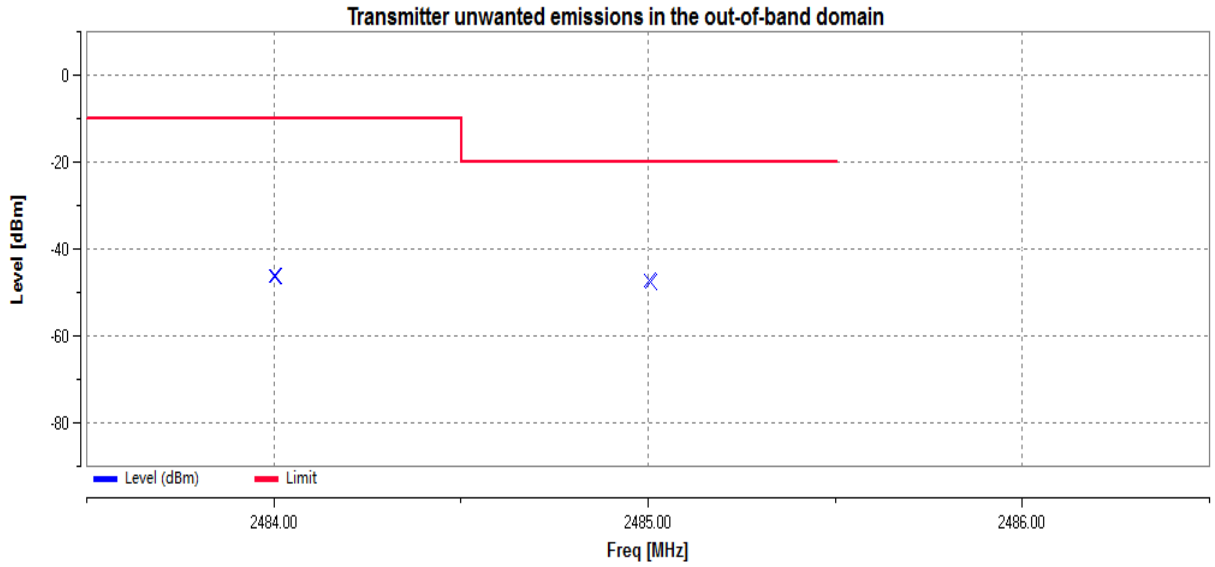
Transmitter unwanted emissions in the out-of-band domain_TNVN_DH5_2475_Ant1_2400MHz-2BW to 2400MHz



Transmitter unwanted emissions in the out-of-band domain_TNVN_DH5_2475_Ant1_2483.5MHz to 2483.5MHz+2BW



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