ACCREDITED
CERT #3816.01

TEST REPORT

Application No.:	SZEM2012013549CR
Applicant:	Shenzhen DO Intelligent Technology Co., Ltd
Address of Applicant:	Floor 11, Building 3, Changyi Industrial Factory, No.1 Lirong Road, Xinshi Community, Dalang Sub-district, Longhua District, Shenzhen City, China
Manufacturer:	Shenzhen DO Intelligent Technology Co., Ltd
Address of Manufacturer:	Floor 11, Building 3, Changyi Industrial Factory, No.1 Lirong Road, Xinshi Community, Dalang Sub-district, Longhua District, Shenzhen City, China
Factory:	Shenzhen DO Intelligent Technology Co., Ltd
Address of Factory:	Floor 11, Building 3, Changyi Industrial Factory, No.1 Lirong Road, Xinshi Community, Dalang Sub-district, Longhua District, Shenzhen City, China
Equipment Under Test (EUT):	
EUT Name:	Smart Watch
Model No.:	ID206 ♣
♣	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark:	IDO
Standard(s) :	EN 300 328 V2.2.2
Date of Receipt:	2020-12-30
Date of Test:	2021-01-07 to 2021-01-11
Date of Issue:	2021-01-11
Test Result:	**Pass***

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

Keny Xu
EMC Laboratory Manager

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Revision Record				
Version	*Chapter*	*Date*	*Modifier*	*Remark*
01		*2021-01-11*		*Original*

Authorized for issue by:				
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2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Geo-location capability	EN 300 328 V2.2.2	EN 300 328	EN 300 328	Customer Declaration

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
RF Output Power	EN 300 328 V2.2.2	EN 300 328 Clause 5.4.2.2.1.2	EN 300 328 Clause 4.3.2.2.3	Pass
Power Spectral Density	EN 300 328 V2.2.2	EN 300 328 Clause 5.4.3.2.1	EN 300 328 Clause 4.3.2.3.3	Pass
Occupied Channel Bandwidth	EN 300 328 V2.2.2	EN 300 328 Clause 5.4.7.2.1	EN 300 328 Clause 4.3.2.7.3	Pass
Transmitter unwanted emissions in the OOB domain	EN 300 328 V2.2.2	EN 300 328 Clause 5.4.8.2.1	EN 300 328 Clause 4.3.2.8.3	Pass
Transmitter unwanted emissions in the spurious domain	EN 300 328 V2.2.2	EN 300 328 Clause 5.4.9.2	EN 300 328 Clause 4.3.2.9.3	Pass
Receiver spurious emissions	EN 300 328 V2.2.2	EN 300 328 Clause 5.4.10.2	EN 300 328 Clause 4.3.2.10.3	Pass
Receiver Blocking	EN 300 328 V2.2.2	EN 300 328 Clause 5.4.11.2.1	EN 300 328 Clause 4.3.2.11.4	Pass

Remark:

Model No.: ID206

There are two kinds of samples for the above model.

Only the sample 1 was tested, since according to the declaration of the applicant, the electrical circuit design, PCB layout, components used and internal wiring were identical for the above model, with only difference on display screen.

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4 General Information

4.1 Details of E.U.T.

Power supply:	Rechargeable battery: DC 3.8V 300mAh（Charged by USB）
Cable(s):	USB cable:60cm unshielded
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0 LE
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	PIFA Antenna
Antenna Gain:	0.09dBi

4.2 Environment Parameter

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Value	Temperature(°C)	Voltage(V)
Normal Temperature & Normal Voltage	25	DC3.7V
Low Extreme Test Temperature & Low Extreme Test Voltage	-20	DC3.7V
High Extreme Test Temperature & Low Extreme Test Voltage	+45	DC3.7V
Low Extreme Test Temperature & High Extreme Test Voltage	-20	DC3.7V
High Extreme Test Temperature & High Extreme Test Voltage	+45	DC3.7V

Operation Frequency each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
2	2406MHz	12	2426MHz	22	2446MHz	32	2466MHz
3	2408MHz	13	2428MHz	23	2448MHz	33	2468MHz
4	2410MHz	14	2430MHz	24	2450MHz	34	2470MHz
5	2412MHz	15	2432MHz	25	2452MHz	35	2472MHz
6	2414MHz	16	2434MHz	26	2454MHz	36	2474MHz
7	2416MHz	17	2436MHz	27	2456MHz	37	2476MHz
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz

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)	2402MHz
The middle channel (CH19)	2440MHz
The highest channel (CH39)	2480MHz

4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
--	--	--	--
The EUT has been tested as an independent unit.			

4.4 Measurement Uncertainty

Test Item	Measurement Uncertainty
RF Output Power	± 0.75dB
Power Spectral Density	± 2.84dB
Occupied Channel Bandwidth	± 3%
Transmitter unwanted emissions in the OOB domain	± 0.75dB
Transmitter unwanted emissions in the spurious domain	± 4.5dB (Below 1GHz), ± 4.8dB (Above 1GHz)
Receiver spurious emissions	± 4.5dB (Below 1GHz), ± 4.8dB (Above 1GHz)
Receiver Blocking	± 3%

Remark:
The U_{lab} (lab Uncertainty) is less than U_{cispr} (CISPR Uncertainty), so the test results
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

4.5 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.

4.6 Test Facility

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

• 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 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

5 Equipment List

RF Output Power					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Shielding Room	SAEMC	MSR433	SEM001-11	2019-06-13	2022-06-12
EXA Signal Analyzer	KEYSIGHT	N9010A	SEM004-09	2020-04-09	2021-04-08
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2020-03-23	2021-03-22
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2020-04-09	2021-04-08
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2020-04-09	2021-04-08
Power Sensor	KEYSIGHT	U2021XA	SEM009-13	2020-03-23	2021-03-22
Power Sensor	KEYSIGHT	U2021XA	SEM009-14	2020-03-23	2021-03-22
Power Sensor	KEYSIGHT	U2021XA	SEM009-15	2020-03-23	2021-03-22
Power Sensor	KEYSIGHT	U2021XA	SEM009-16	2020-03-23	2021-03-22
Programmable Temperature&Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2020-03-25	2021-03-24
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.6	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM028-01	2020-07-10	2021-07-09

Power Spectral Density					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Shielding Room	SAEMC	MSR433	SEM001-11	2019-06-13	2022-06-12
EXA Signal Analyzer	KEYSIGHT	N9010A	SEM004-09	2020-04-09	2021-04-08
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2020-03-23	2021-03-22
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.6	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM028-01	2020-07-10	2021-07-09

Occupied Channel Bandwidth					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Shielding Room	SAEMC	MSR433	SEM001-11	2019-06-13	2022-06-12
EXA Signal Analyzer	KEYSIGHT	N9010A	SEM004-09	2020-04-09	2021-04-08
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2020-03-23	2021-03-22
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.6	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM028-01	2020-07-10	2021-07-09

Transmitter unwanted emissions in the OOB domain					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Shielding Room	SAEMC	MSR433	SEM001-11	2019-06-13	2022-06-12
EXA Signal Analyzer	KEYSIGHT	N9010A	SEM004-09	2020-04-09	2021-04-08

DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2020-03-23	2021-03-22
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.6	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM028-01	2020-07-10	2021-07-09

Transmitter unwanted emissions in the spurious domain

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
EXA Signal Analyzer	Agilent Technologies Inc	N9010A	SEM004-12	2020-04-09	2021-04-08
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2020-09-23	2021-09-22
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2020-07-10	2021-07-09

Receiver spurious emissions

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
EXA Signal Analyzer	Agilent Technologies Inc	N9010A	SEM004-12	2020-04-09	2021-04-08
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2020-09-23	2021-09-22
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2020-07-10	2021-07-09

Receiver Blocking

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	SAEMC	MSR433	SEM001-11	2019-06-13	2022-06-12
EXA Signal Analyzer	KEYSIGHT	N9010A	SEM004-09	2020-04-09	2021-04-08
Signal Generator	KEYSIGHT	N5171B	SEM006-13	2020-03-23	2021-03-22
DC Power Supply	KEYSIGHT	E3642A	SEM011-07	2020-03-23	2021-03-22
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2020-04-09	2021-04-08
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2020-04-09	2021-04-08
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.6	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM028-01	2020-07-10	2021-07-09

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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	SEM002-04	2020-09-15	2021-09-14
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2020-09-15	2021-09-14
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2020-04-07	2021-04-06

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6 Radio Spectrum Technical Requirement

6.1 Geo-location capability

6.1.1 Test Requirement:

Limit:
The geographical location determined by the non-FHSS equipment as defined in clause 4.3.2.12.2

Standard Requirement:
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.

7 Radio Spectrum Matter Test Results

7.1 RF Output Power

Test Requirement EN 300 328 Clause 4.3.2.2.3
Test Method: EN 300 328 Clause 5.4.2.2.1.2

Limit:

Frequency band(MHz)	Limit
2400-2483.5	20dBm/(100mw) (e.i.r.p)

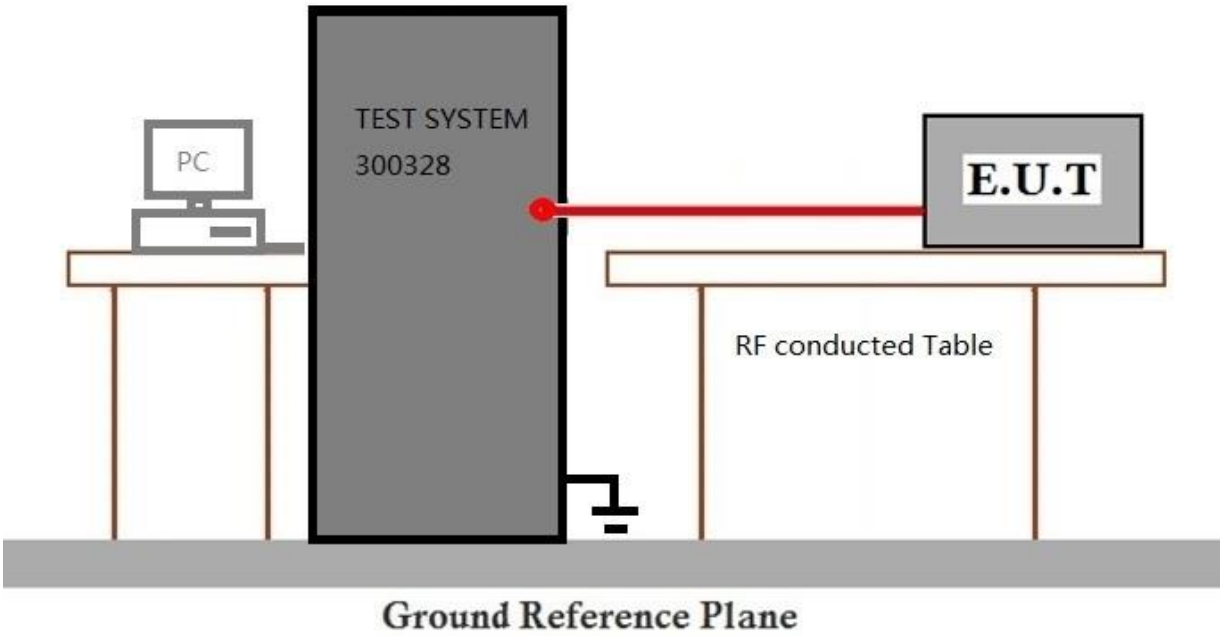
7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 17.2 °C Humidity: 26.1 % RH Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

Please Refer To Appendix For Details

7.2 Power Spectral Density

Test Requirement EN 300 328 Clause 4.3.2.3.3
Test Method: EN 300 328 Clause 5.4.3.2.1

Limit:

Frequency band(MHz)	Limit
2400-2483.5	≤10dBm per MHz

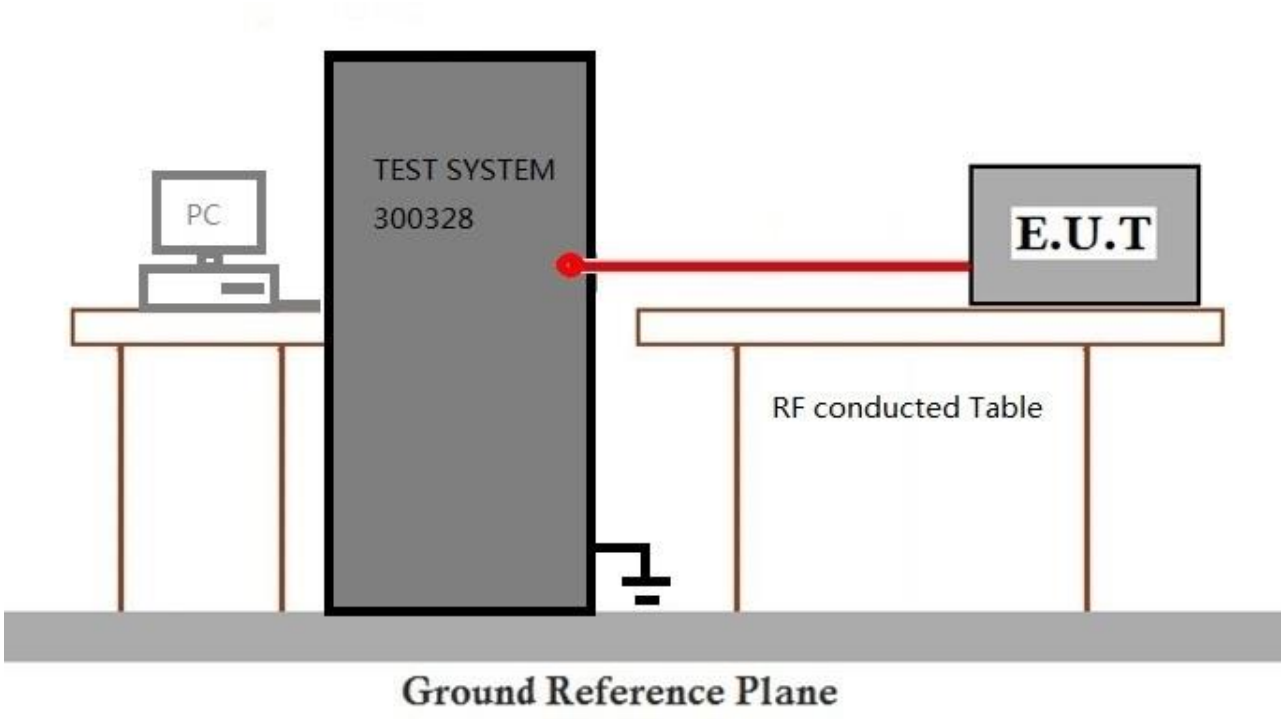
7.2.1 E.U.T. Operation

Operating Environment:
Temperature: 17.2 °C Humidity: 26.1 % RH Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

Please Refer To Appendix For Details

7.3 Occupied Channel Bandwidth

Test Requirement EN 300 328 Clause 4.3.2.7.3

Test Method: EN 300 328 Clause 5.4.7.2.1

Limit:

The Occupied Channel Bandwidth shall be within the band given in table 1.

In addition, for non-adaptive non-FHSS equipment with e.i.r.p. greater than 10 dBm, the Occupied Channel Bandwidth shall be equal to or less than 20 MHz.

7.3.1 E.U.T. Operation

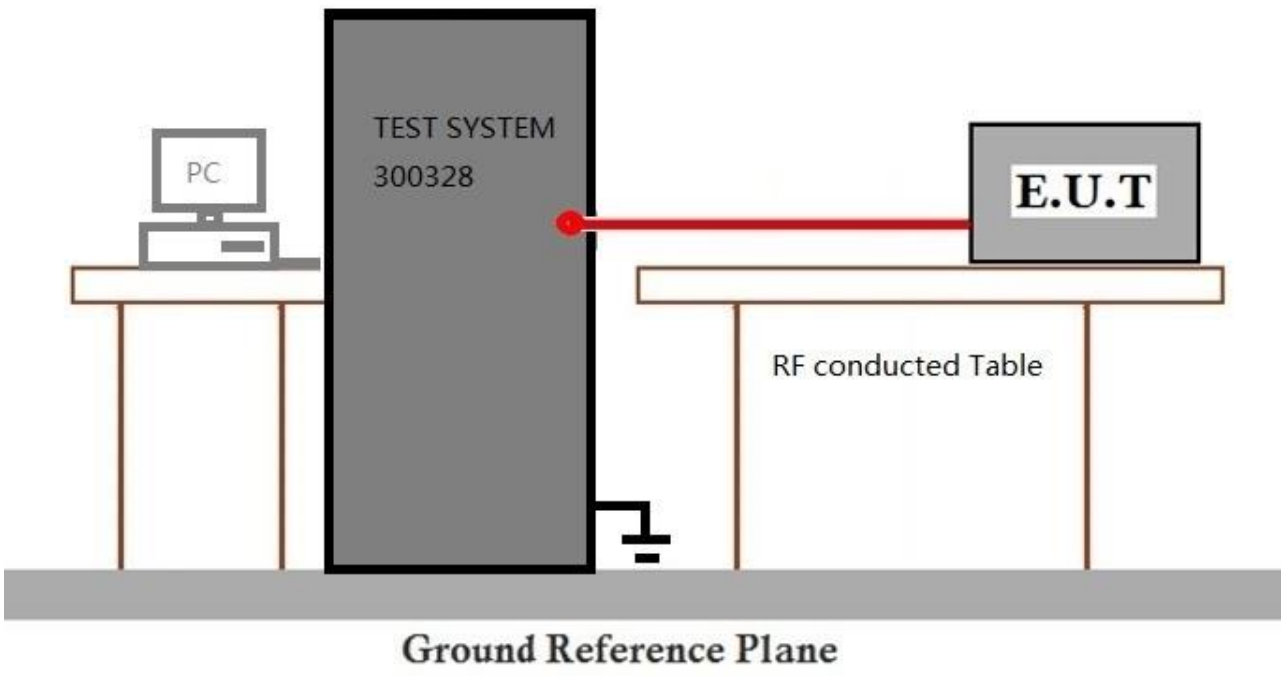
Operating Environment:

Temperature: 17.2 °C Humidity: 26.1 % RH Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.3.3 Test Setup Diagram



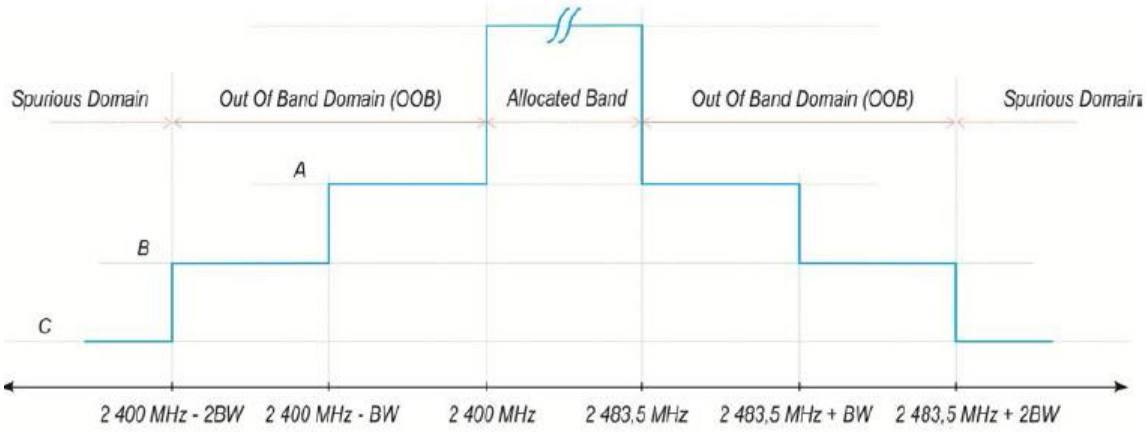
7.3.4 Measurement Procedure and Data

Please Refer To Appendix For Details

7.4 Transmitter unwanted emissions in the OOB domain

Test Requirement EN 300 328 Clause 4.3.2.8.3
Test Method: EN 300 328 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

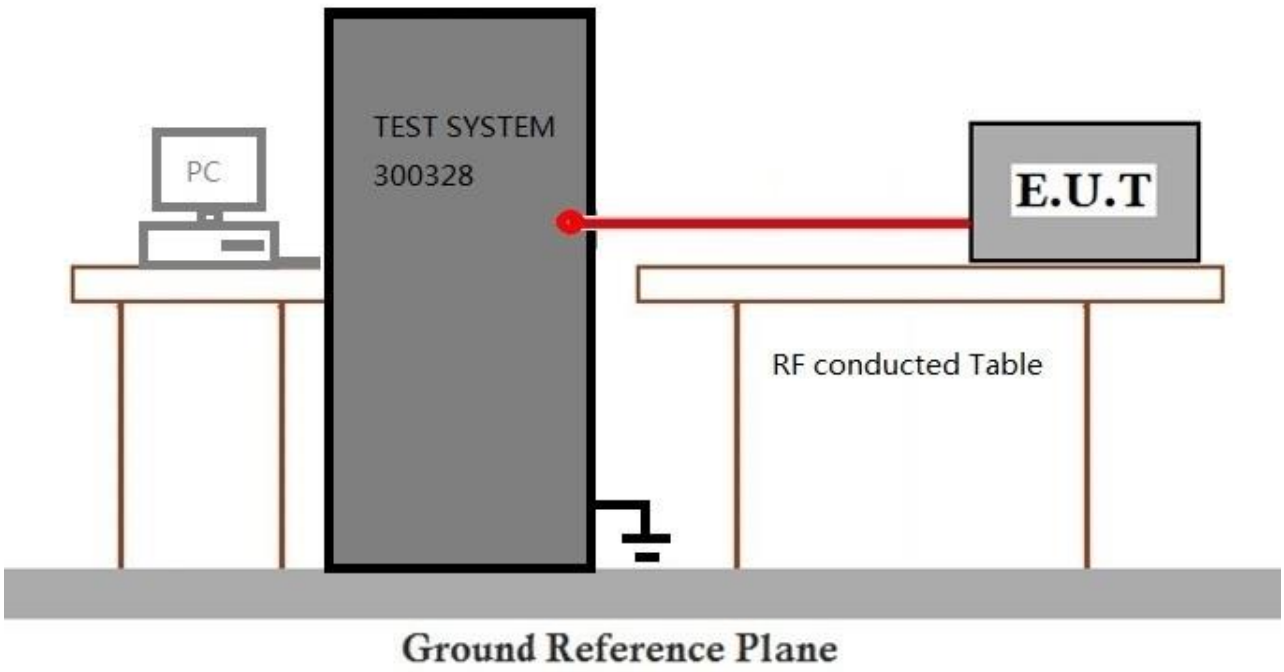
7.4.1 E.U.T. Operation

Operating Environment:
Temperature: 17.2 °C Humidity: 26.1 % RH Atmospheric Pressure: 1010 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

Please Refer To Appendix For Details

7.5 Transmitter unwanted emissions in the spurious domain

Test Requirement EN 300 328 Clause 4.3.2.9.3
Test Method: EN 300 328 Clause 5.4.9.2
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 694 MHz	-54dBm	100 kHz
694 MHz to 1 GHz	-36dBm	100 kHz
1 GHz to 12,75 GHz	-30dBm	1MHz

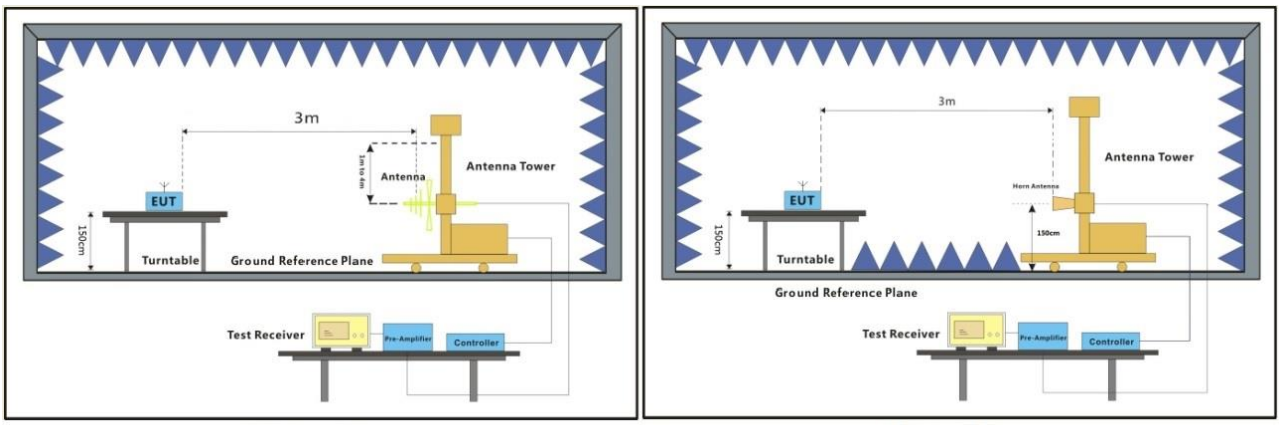
7.5.1 E.U.T. Operation

Operating Environment:
Temperature: 22.4 °C Humidity: 29.9 % RH Atmospheric Pressure: 1010 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.5.3 Test Setup Diagram



30MHz-1GHz Above 1GHz

7.5.4 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.

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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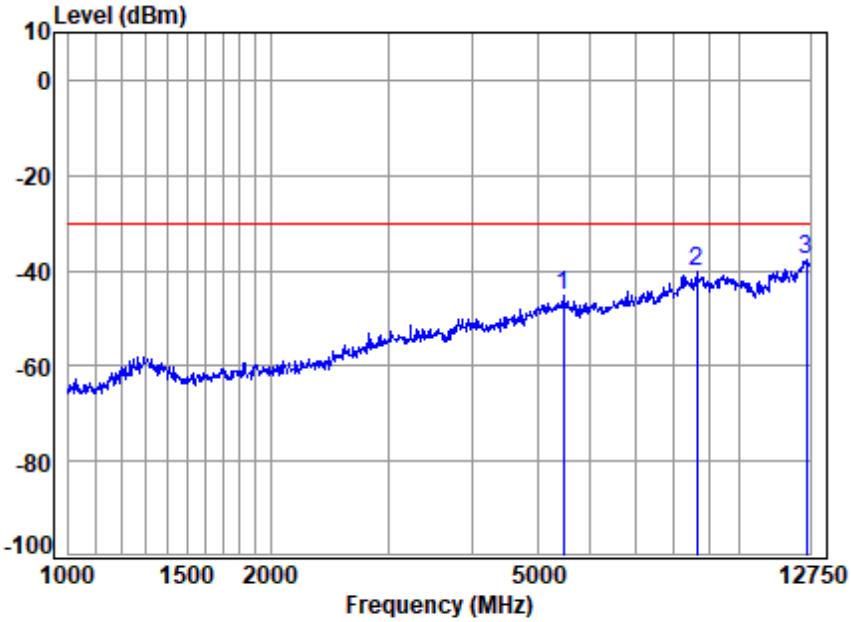
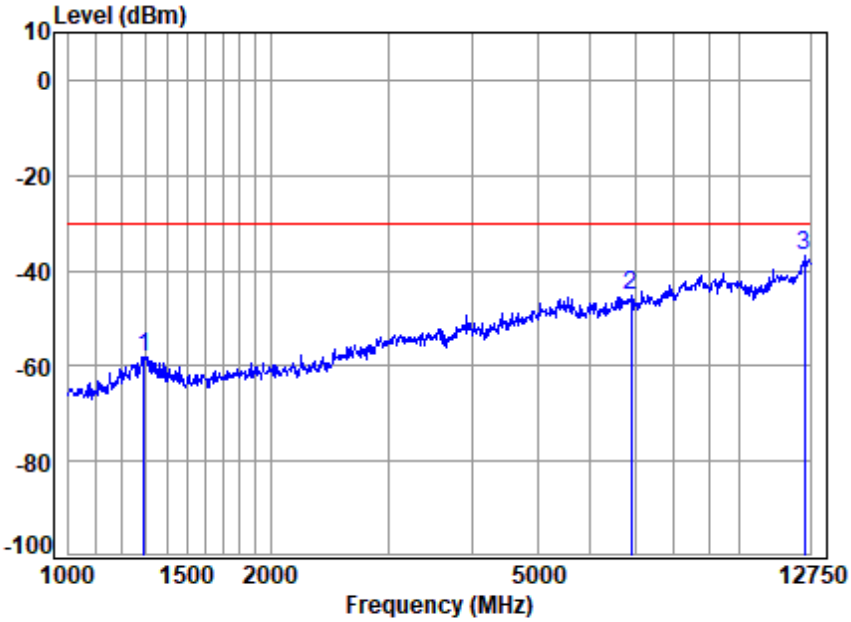
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low



Condition: 3m HORIZONTAL
Job No.: 13549CR
Test mode: 2402 TX SE
: BLE

Marker	Freq. MHz	Level dBm	Limit dBm	Over Limit dB
1	5462.30	-45.42	-30.00	-15.42
2	8637.08	-40.18	-30.00	-10.18
3	12588.75	-37.68	-30.00	-7.68

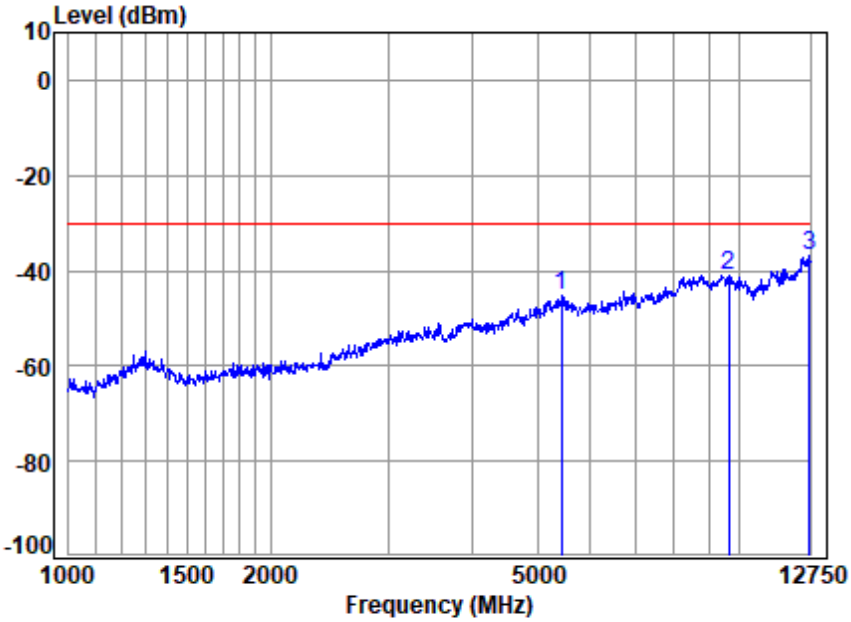
Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:Low



Condition: 3m VERTICAL
Job No.: 13549CR
Test mode: 2402 TX SE
: BLE

Marker	Freq. MHz	Level dBm	Limit dBm	Over Limit dB
1	1293.17	-58.13	-30.00	-28.13
2	6903.71	-45.21	-30.00	-15.21
3	12492.98	-37.04	-30.00	-7.04

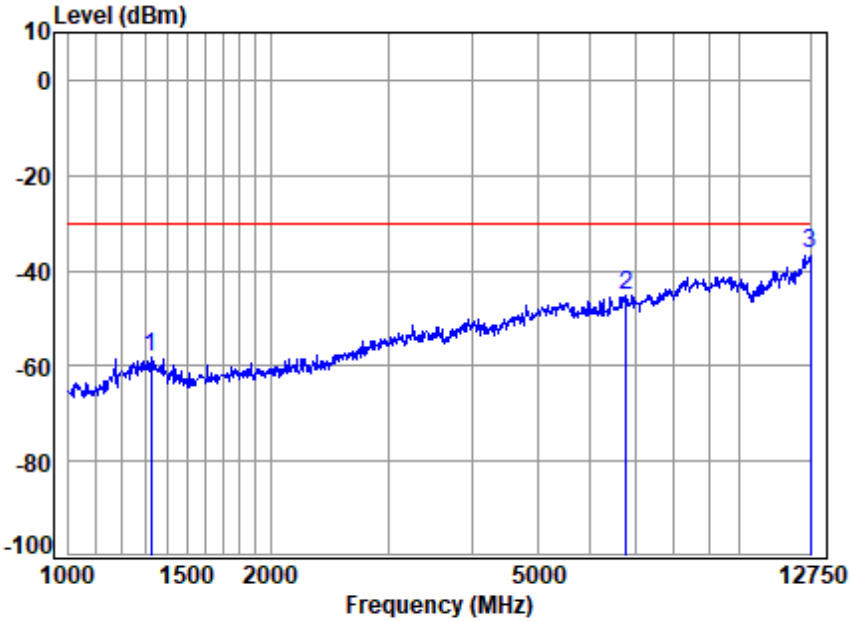
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:High



Condition: 3m HORIZONTAL
Job No.: 13549CR
Test mode: 2480 TX SE
: BLE

Marker	Freq. MHz	Level dBm	Limit dBm	Over Limit dB
1	5420.74	-45.13	-30.00	-15.13
2	9660.72	-40.87	-30.00	-10.87
3	12717.59	-36.71	-30.00	-6.71

Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:High



Condition: 3m VERTICAL
Job No.: 13549CR
Test mode: 2480 TX SE
: BLE

Marker	Freq. MHz	Level dBm	Limit dBm	Over Limit dB
1	1326.51	-58.36	-30.00	-28.36
2	6781.78	-45.13	-30.00	-15.13
3	12750.00	-36.62	-30.00	-6.62

7.6 Receiver spurious emissions

Test Requirement EN 300 328 Clause 4.3.2.10.3
Test Method: EN 300 328 Clause 5.4.10.2

Limit:

The spurious emissions of the receiver shall not exceed the values in tables in the indicated bands:

Frequency Range	Limit
30 MHz to 1 GHz	2nW(-57dBm)
Above 1GHz	20nW(-47dBm)

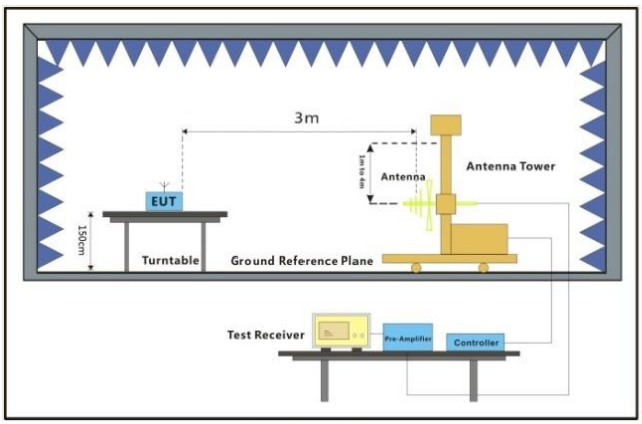
7.6.1 E.U.T. Operation

Operating Environment:
Temperature: 22.4 °C Humidity: 29.9 % RH Atmospheric Pressure: 1010 mbar

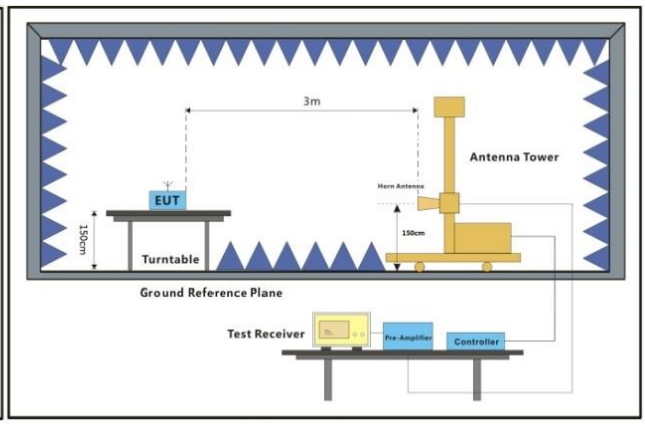
7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	RX_Keep the EUT in receiving mode with GFSK modulation.

7.6.3 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.6.4 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

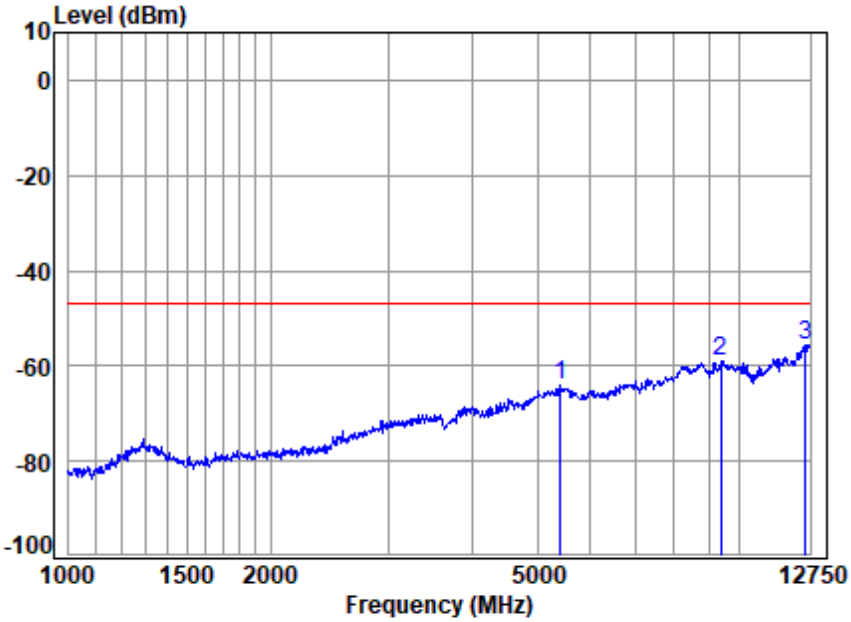
where:

Pg is the generator output power into the substitution antenna.

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.

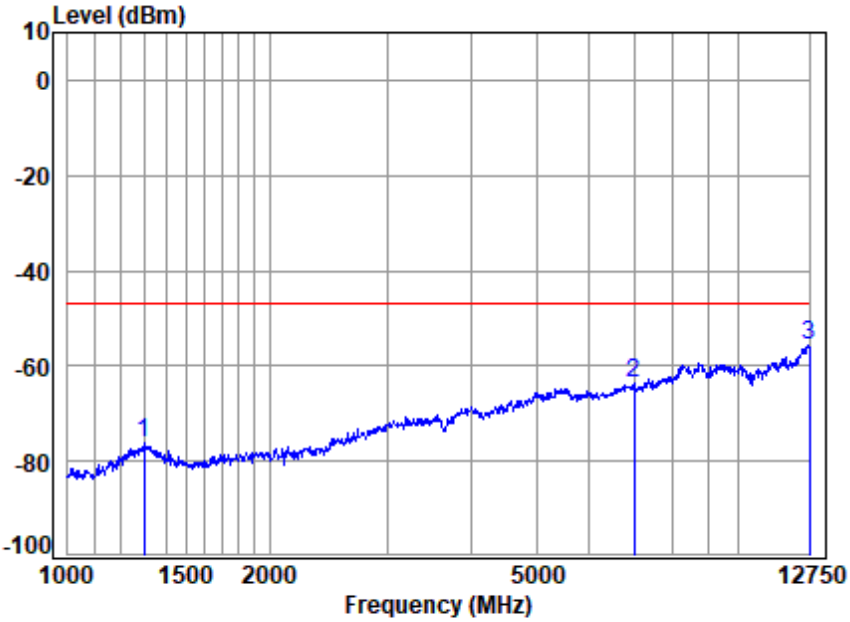
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:Low



Condition: 3m HORIZONTAL
Job No.: 13549CR
Test mode: 2402 RX SE
: BLE

Marker	Freq. MHz	Level dBm	Limit dBm	Over Limit dB
1	5406.96	-64.18	-47.00	-17.18
2	9370.08	-59.00	-47.00	-12.00
3	12556.75	-55.55	-47.00	-8.55

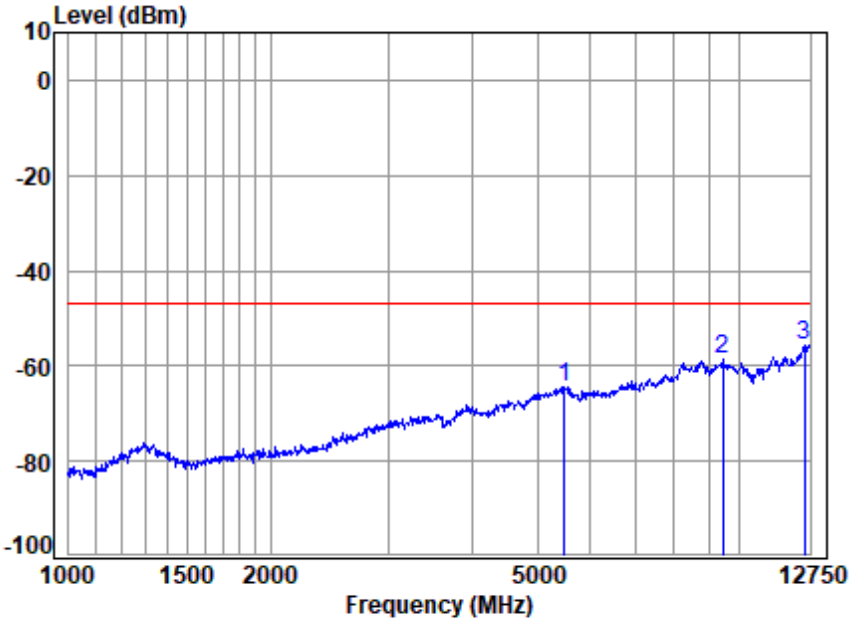
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low



Condition: 3m VERTICAL
Job No.: 13549CR
Test mode: 2402 RX SE
: BLE

Marker	Freq. MHz	Level dBm	Limit dBm	Over Limit dB
1	1299.77	-76.23	-47.00	-29.23
2	6992.14	-63.41	-47.00	-16.41
3	12750.00	-55.50	-47.00	-8.50

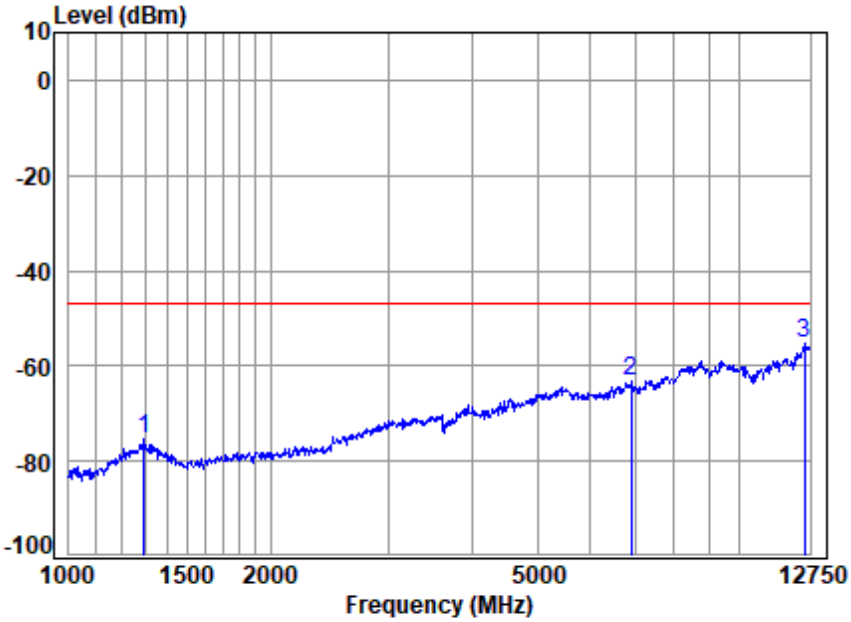
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:High



Condition: 3m HORIZONTAL
Job No.: 13549CR
Test mode: 2480 RX SE
: BLE

Marker	Freq. MHz	Level dBm	Limit dBm	Over Limit dB
1	5476.22	-64.37	-47.00	-17.37
2	9441.91	-58.70	-47.00	-11.70
3	12492.98	-55.79	-47.00	-8.79

Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High



Condition: 3m VERTICAL
Job No.: 13549CR
Test mode: 2480 RX SE
: BLE

Marker	Freq. MHz	Level dBm	Limit dBm	Over Limit dB
1	1293.17	-75.43	-47.00	-28.43
2	6903.71	-63.40	-47.00	-16.40
3	12492.98	-55.38	-47.00	-8.38

7.7 Receiver Blocking

Test Requirement EN 300 328 Clause 4.3.2.11.4
Test Method: EN 300 328 Clause 5.4.11.2.1

Limit:

For equipment that supports a PER or FER test to be performed, the minimum performance criterion shall be a PER or FER less than or equal to 10 %.

For equipment that does not support a PER or a FER test to be performed, the minimum performance criterion shall be no loss of the wireless transmission function needed for the intended use of the equipment.

The blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided below table.

Receiver Blocking parameters for Receiver Category 1 equipment			
Wanted signal mean power from companion device (dBm) (see notes 1 and 4)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 4)	Type of blocking signal
(-133 dBm + 10 × log10(OCBW)) or -68 dBm whichever is less (see note 2)	2380 2504	-34	CW
(-139 dBm + 10 × log10(OCBW)) or -74 dBm whichever is less (see note 3)	2 300 2 330 2 360 2 524 2 584 2 674		

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 26 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 20 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

Receiver Blocking parameters for Receiver Category 2 equipment			
Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + 10 × log10(OCBW) + 10 dB) or (-74 dBm + 10 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 26 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

Receiver Blocking parameters for Receiver Category 3 equipment			
Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + 10 × log10(OCBW) + 20 dB) or (-74 dBm + 20 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 30 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

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7.7.1 E.U.T. Operation

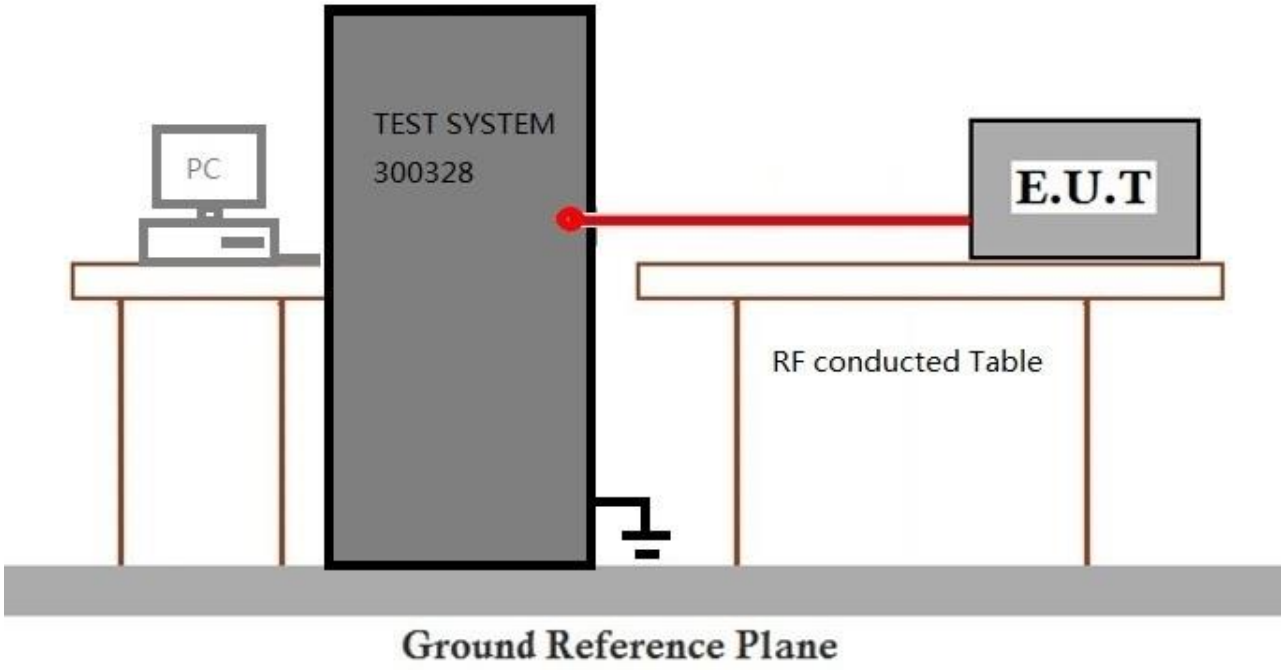
Operating Environment:

Temperature: 17.2 °C Humidity: 26.1 % RH Atmospheric Pressure: 1010 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	Normal operating_Keep the EUT communication with the companion device.

7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

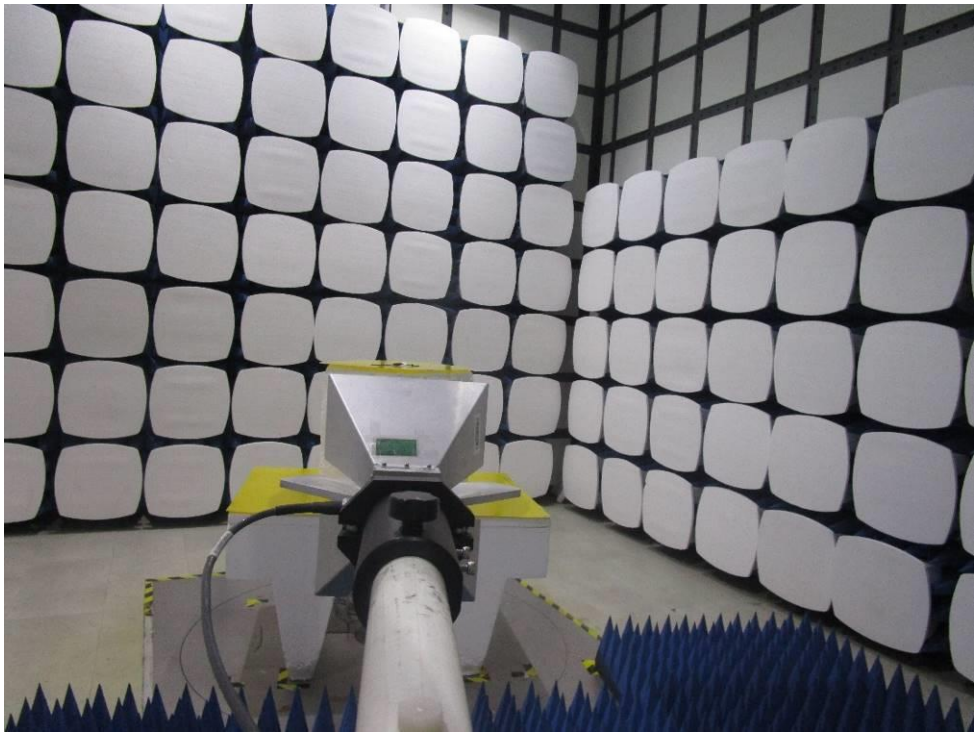
Data Record:

BLE

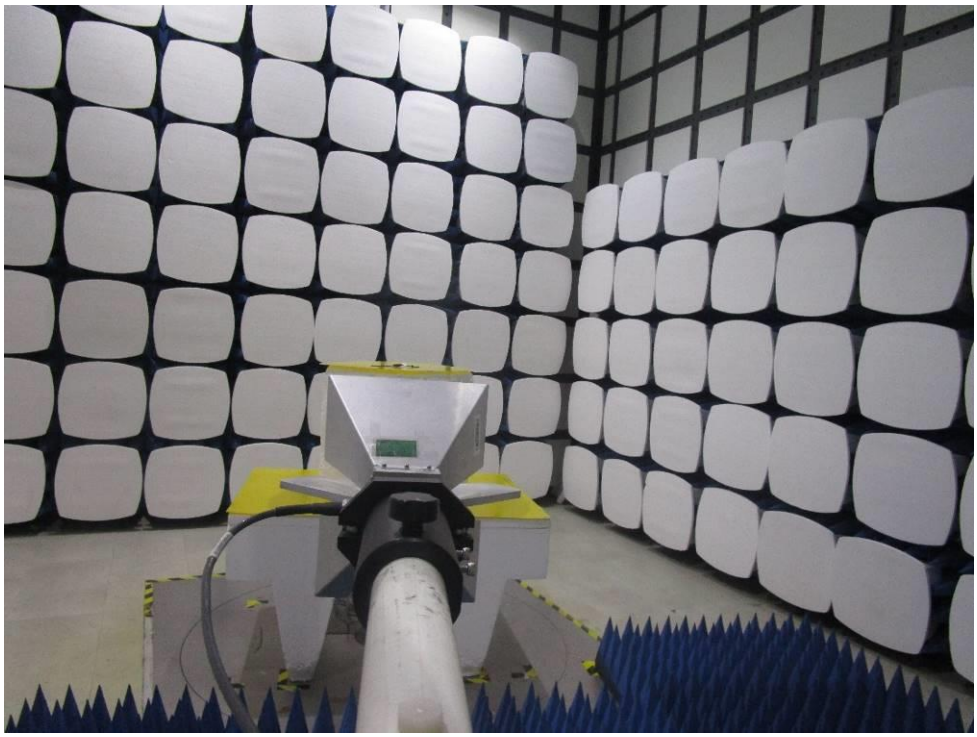
Receiver Category	Test Channel	Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	PER (%)	Limit (%)	Result
2	Lowest	-58.5	2300	-34	3.5	10	Pass
			2380		5.2	10	Pass
	Highest	-58.5	2504		6.4	10	Pass
			2584		4.4	10	Pass

8 Test Setup Photo

Transmitter unwanted emissions in the spurious domain



Receiver spurious emissions



9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for SZEM2012013549CR

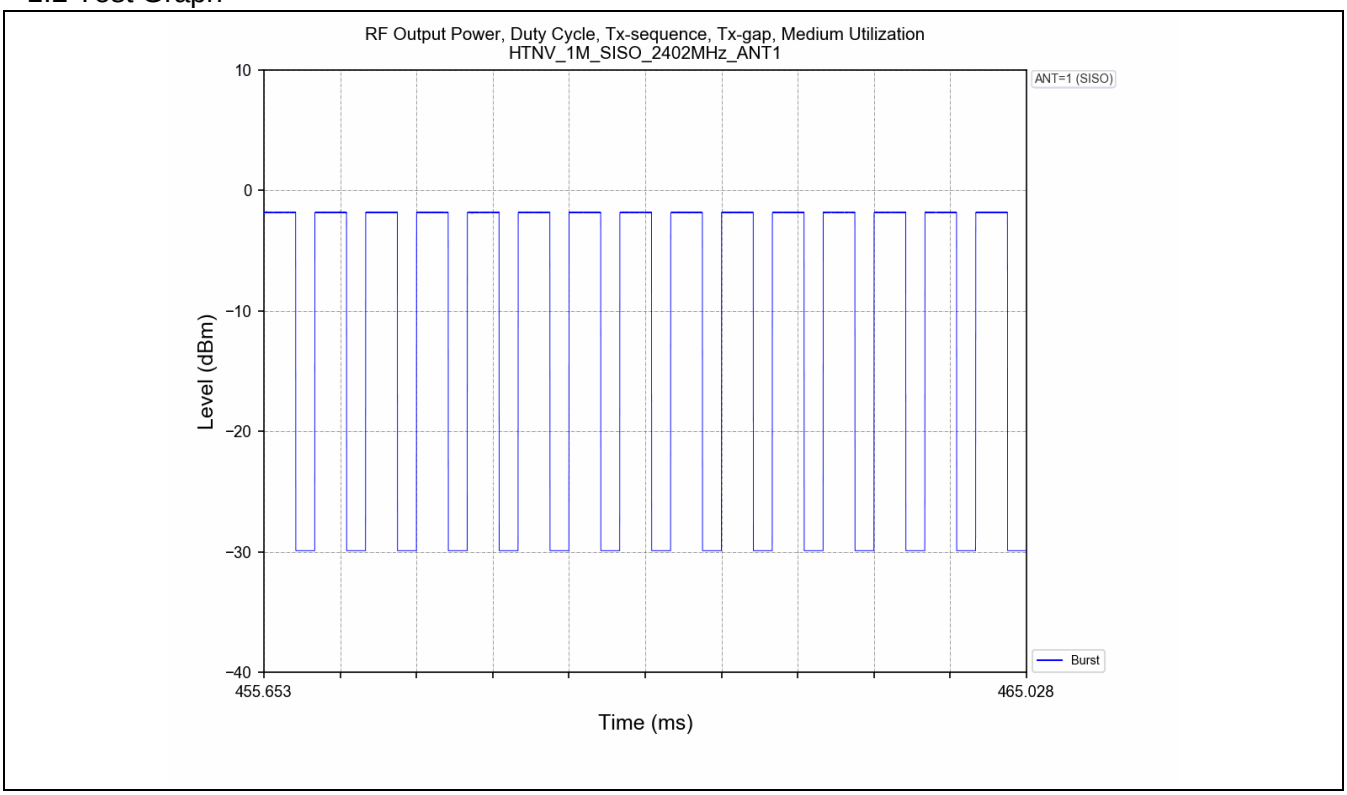
10 Appendix

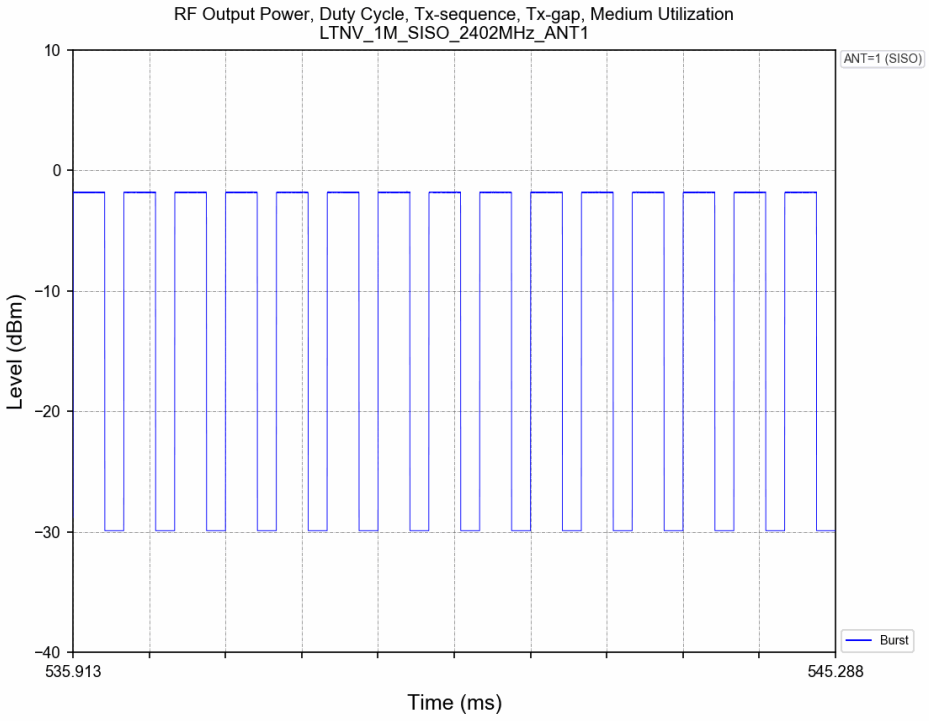
1. RF Output Power, Duty Cycle, Tx-sequence, Tx-gap, Medium Utilization

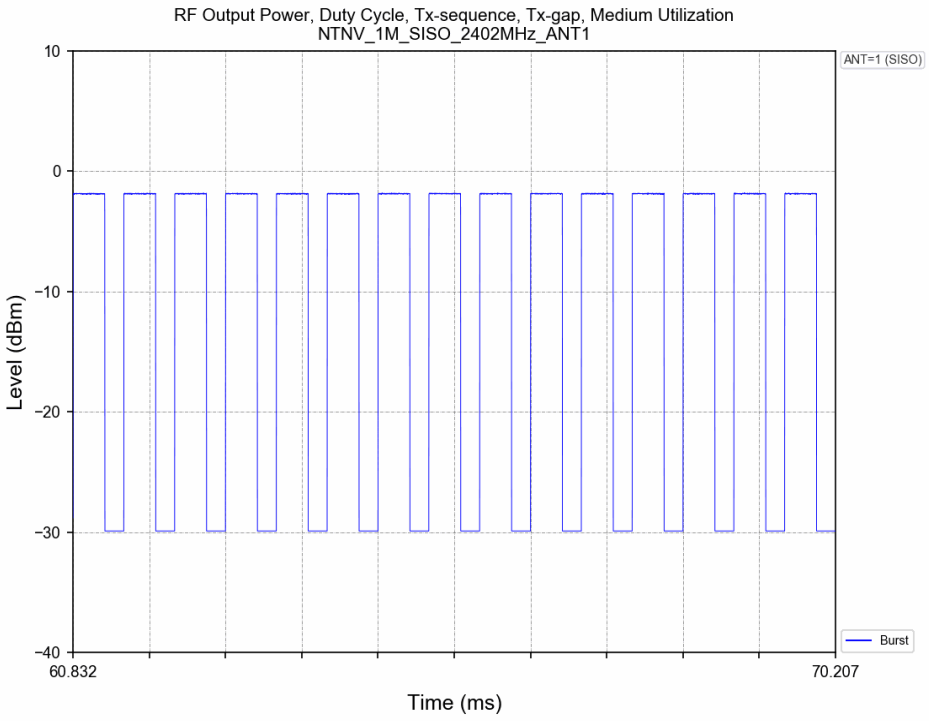
1.1 Test Result

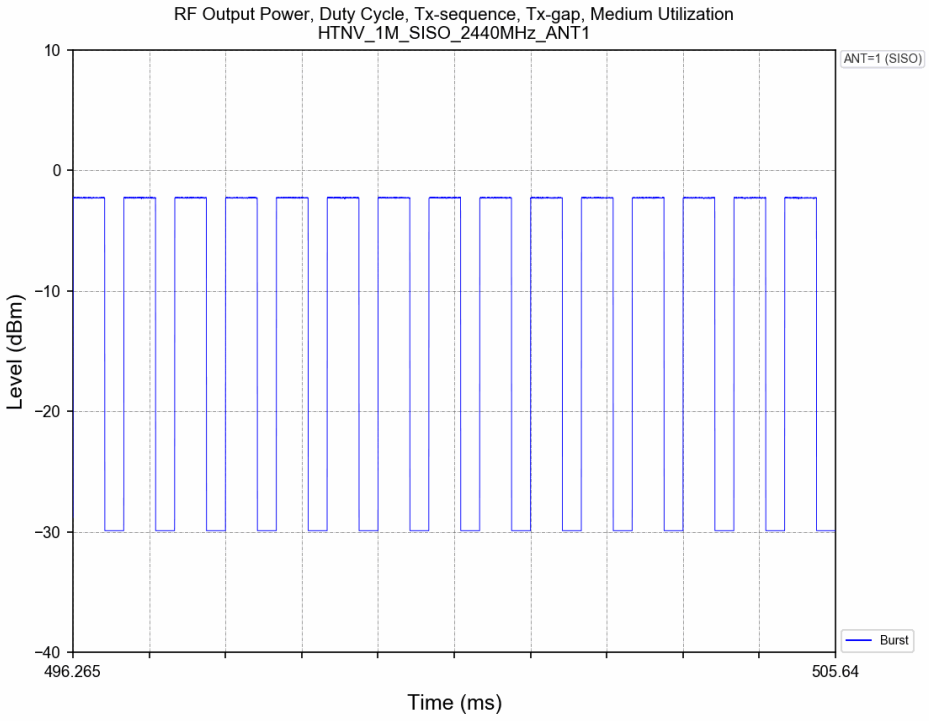
Test Mode	Test Condition	Test Frequency (MHz)	Ant No.	Power (dBm)	EIRP (dBm)	Limit (dBm)	Verdict
1M	NTNV	2402	1	-1.95	-1.86	20.00	PASS
		2440	1	-2.29	-2.20	20.00	PASS
		2480	1	-2.75	-2.66	20.00	PASS
	HTNV	2402	1	-1.91	-1.82	20.00	PASS
		2440	1	-2.36	-2.27	20.00	PASS
		2480	1	-2.72	-2.63	20.00	PASS
	LTNV	2402	1	-1.90	-1.81	20.00	PASS
		2440	1	-2.32	-2.23	20.00	PASS
		2480	1	-2.77	-2.68	20.00	PASS

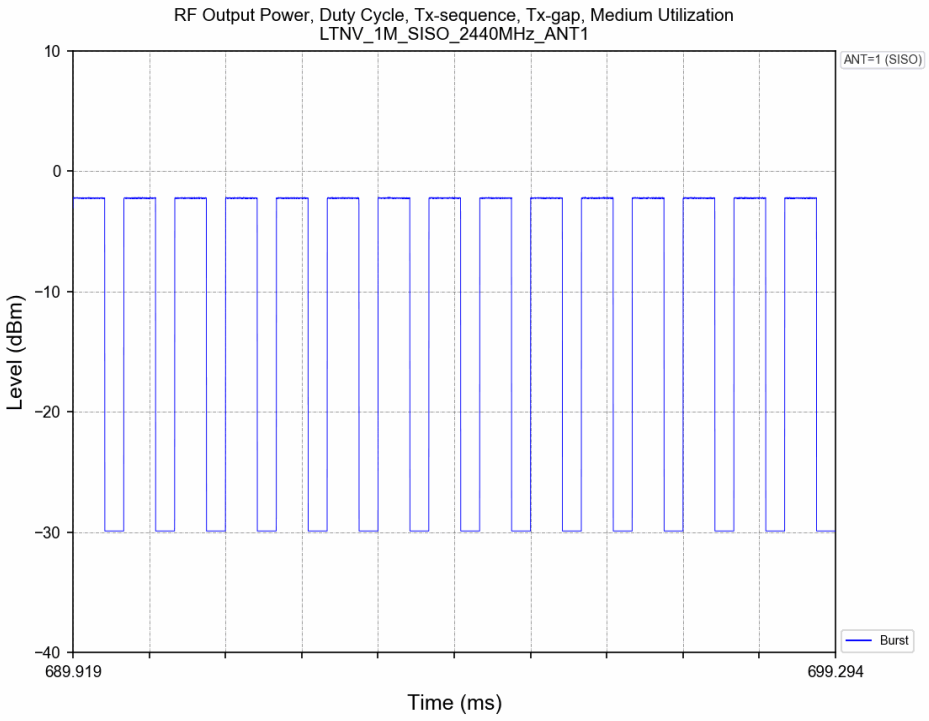
1.2 Test Graph

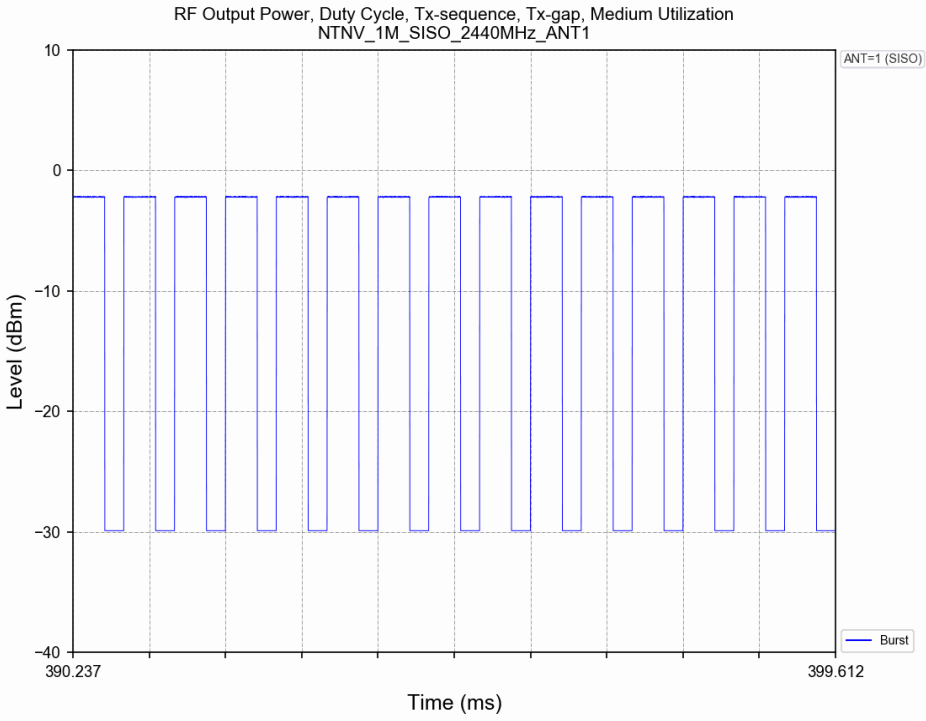


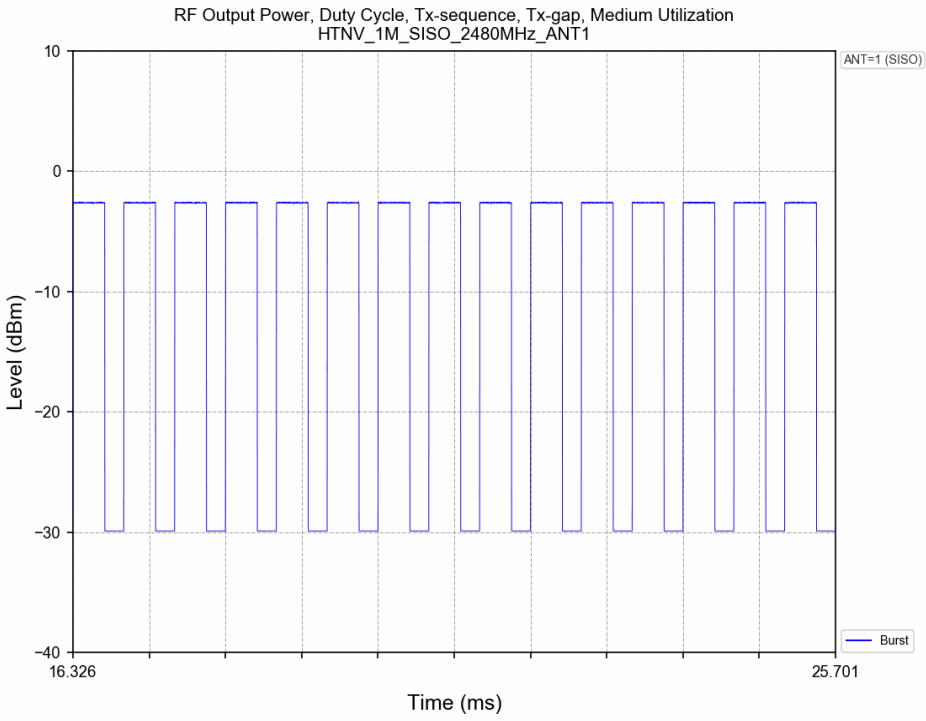












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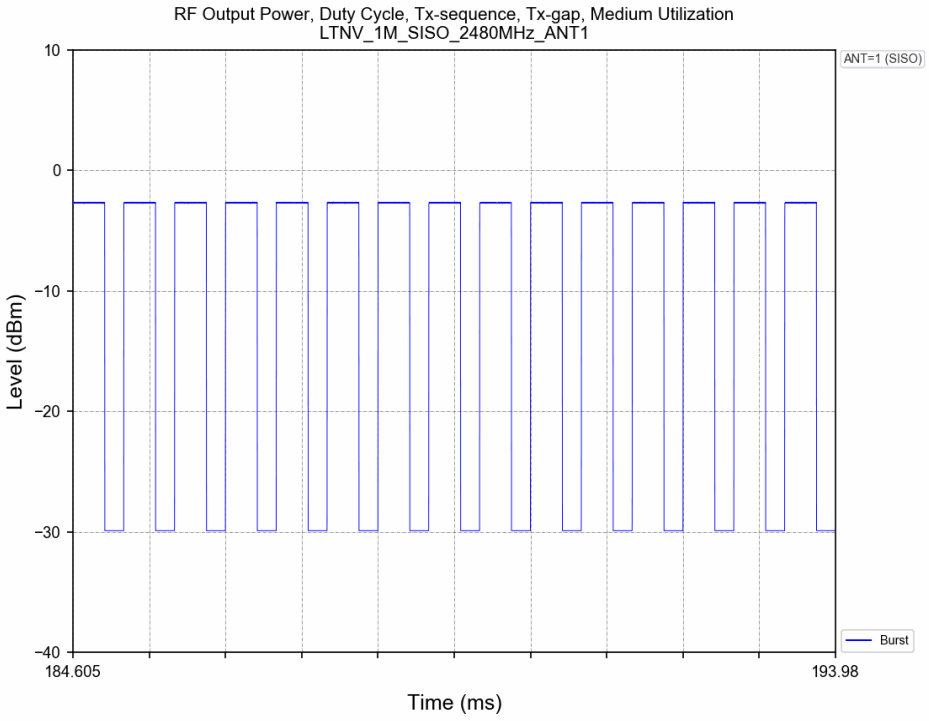
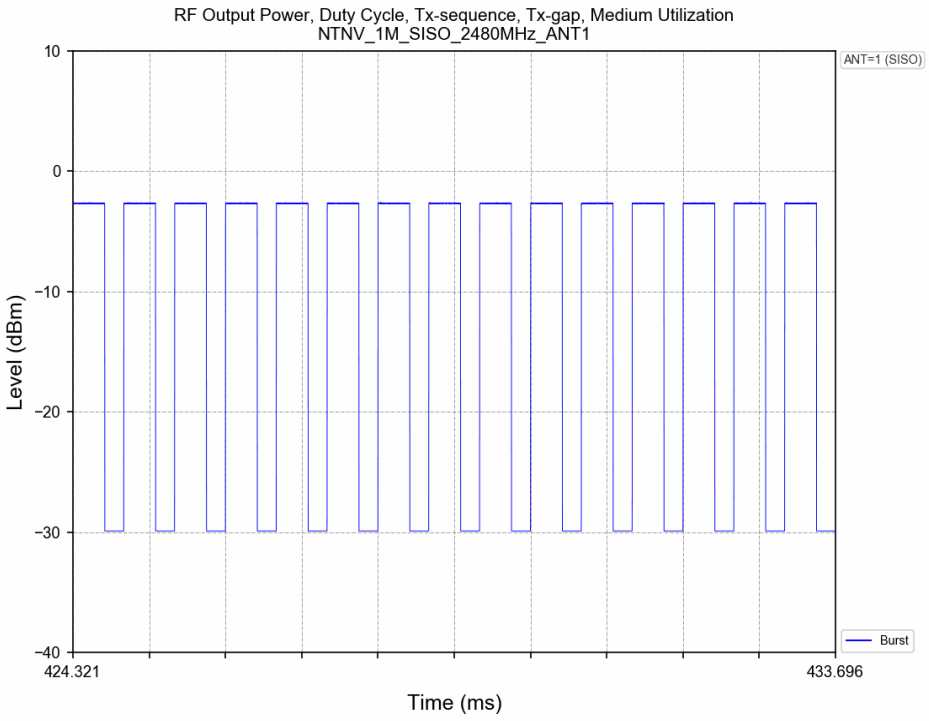


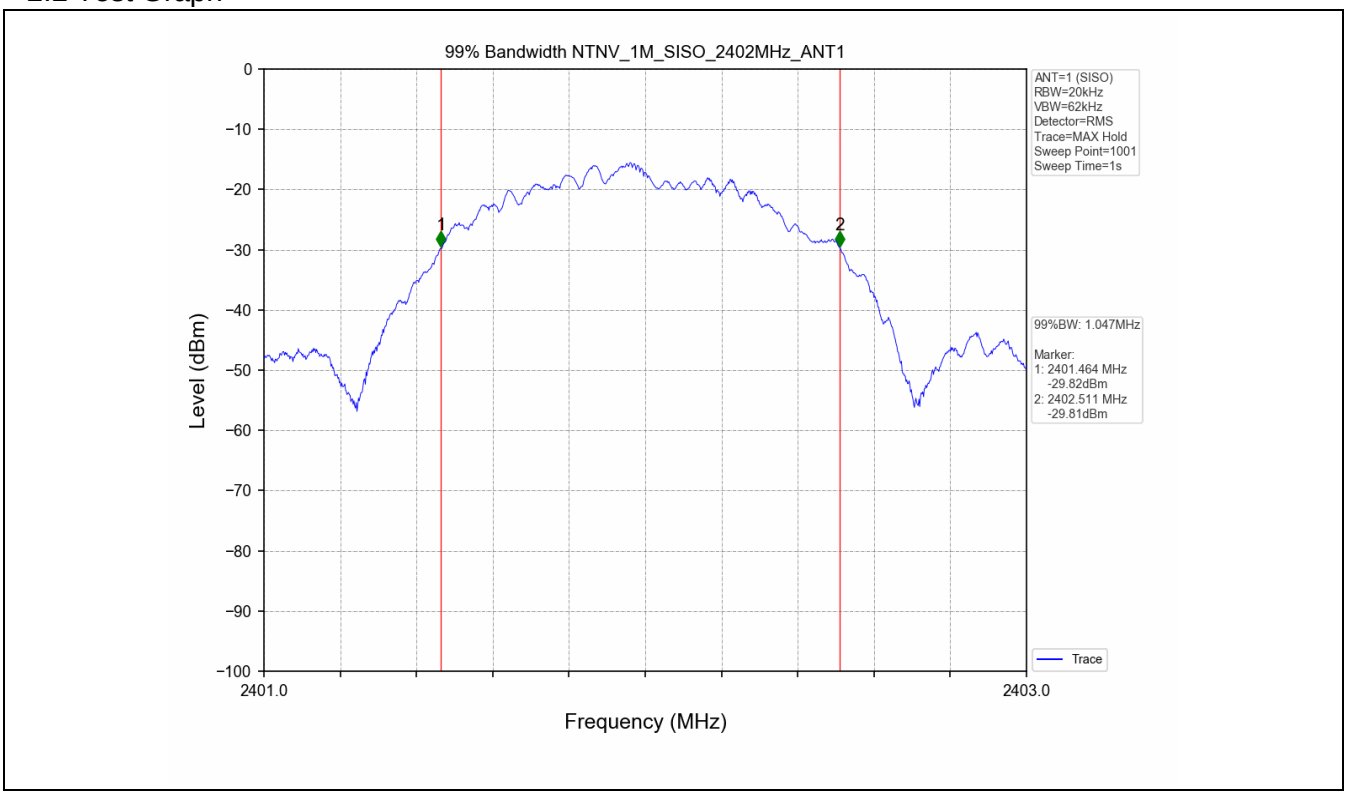


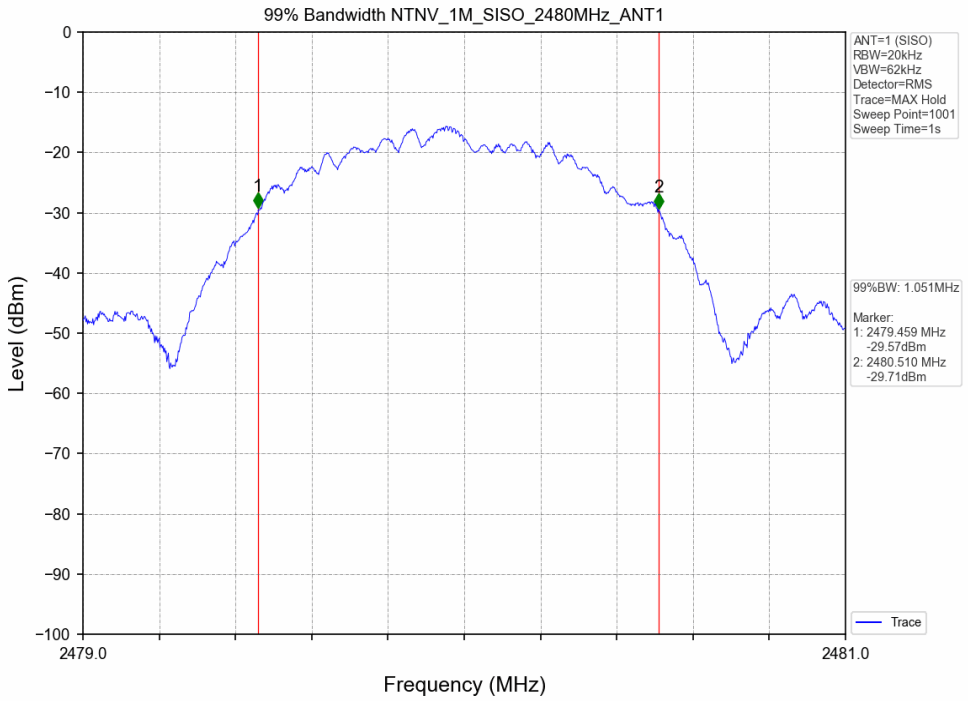
2. Occupied Channel Bandwidth

2.1 Test Result

Test Mode	Test Condition	Test Frequency (MHz)	Ant No.	OBW (MHz)	FL OBW (MHz)	FH OBW (MHz)	Limit (MHz)	Verdict
1M	NTNV	2402	1	1.05	2401.46	/	2400<FL, FH<2483.5	PASS
		2480	1	1.05	/	2480.51	2400<FL, FH<2483.5	PASS

2.2 Test Graph



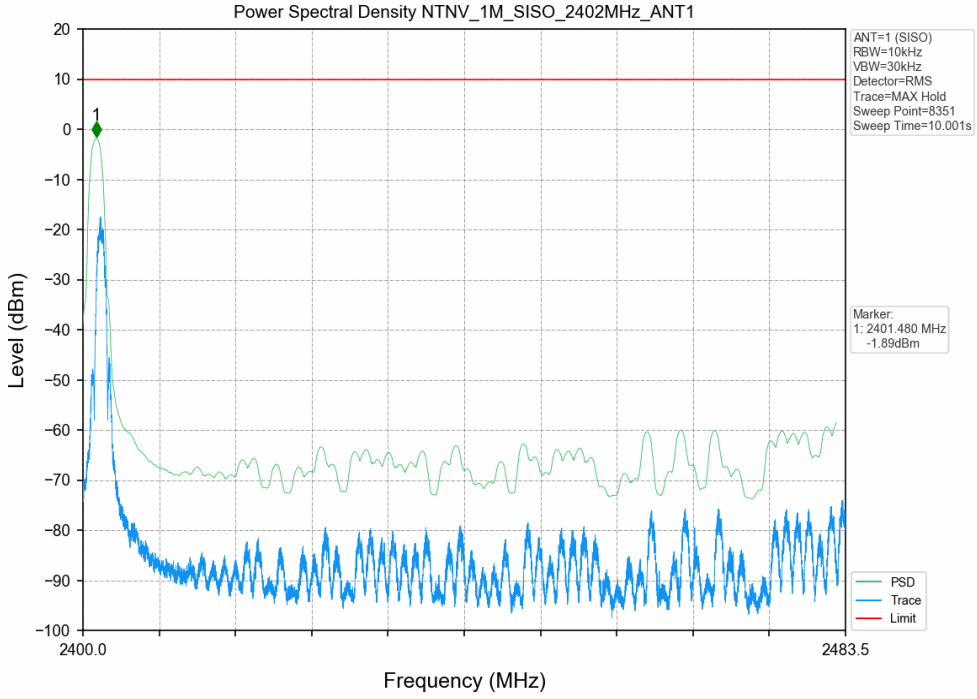


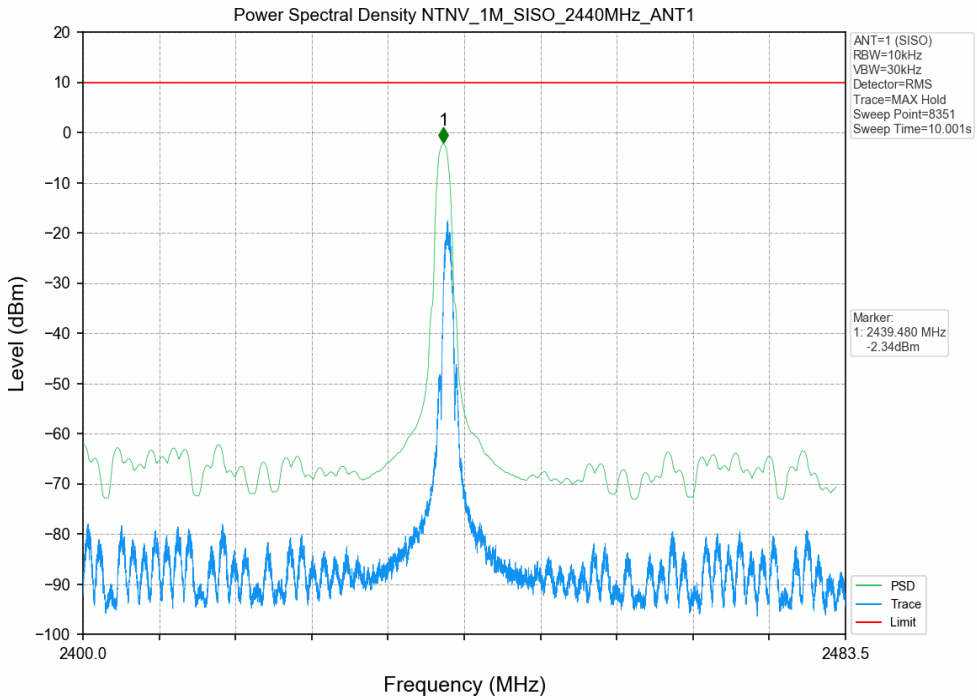
3. Power Spectral Density

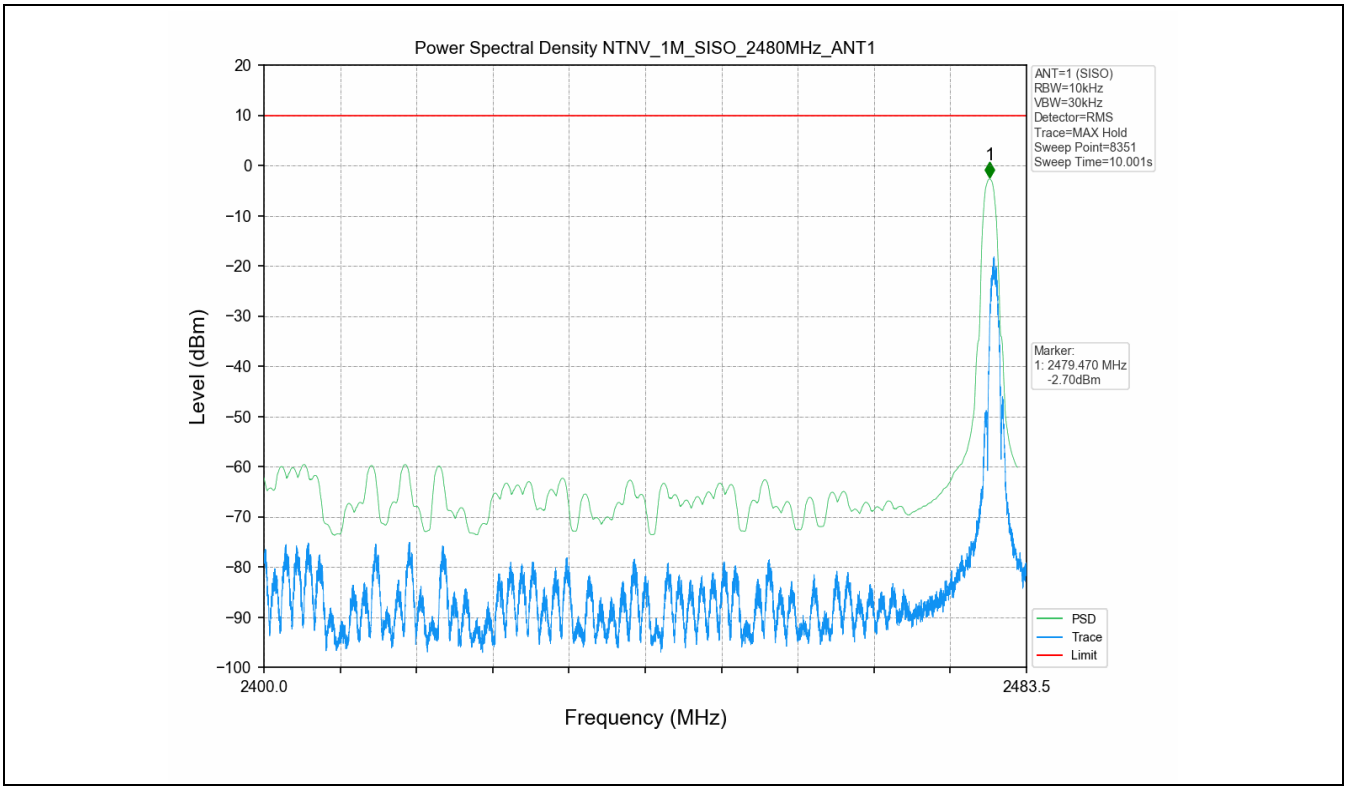
3.1 Test Result

Test Mode	Test Condition	Test Frequency (MHz)	Ant No.	PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
1M	NTNV	2402	1	-1.89	<=10.00	PASS
		2440	1	-2.34	<=10.00	PASS
		2480	1	-2.70	<=10.00	PASS

3.2 Test Graph







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

4.1 Test Result

Test Mode	Test Condition	Test Frequency (MHz)	Ant No.	Freq (MHz)	Result (dBm)	Limit (dBm)	Verdict
1M	NTNV	2402	1	2399.500	-49.79	<=-10.0	PASS
				2399.453	-50.21	<=-10.0	PASS
				2398.453	-54.63	<=-20.0	PASS
				2398.406	-54.84	<=-20.0	PASS
		2480	1	2484.000	-57.31	<=-10.0	PASS
				2484.051	-57.38	<=-10.0	PASS
				2485.051	-60.07	<=-20.0	PASS
				2485.102	-60.14	<=-20.0	PASS

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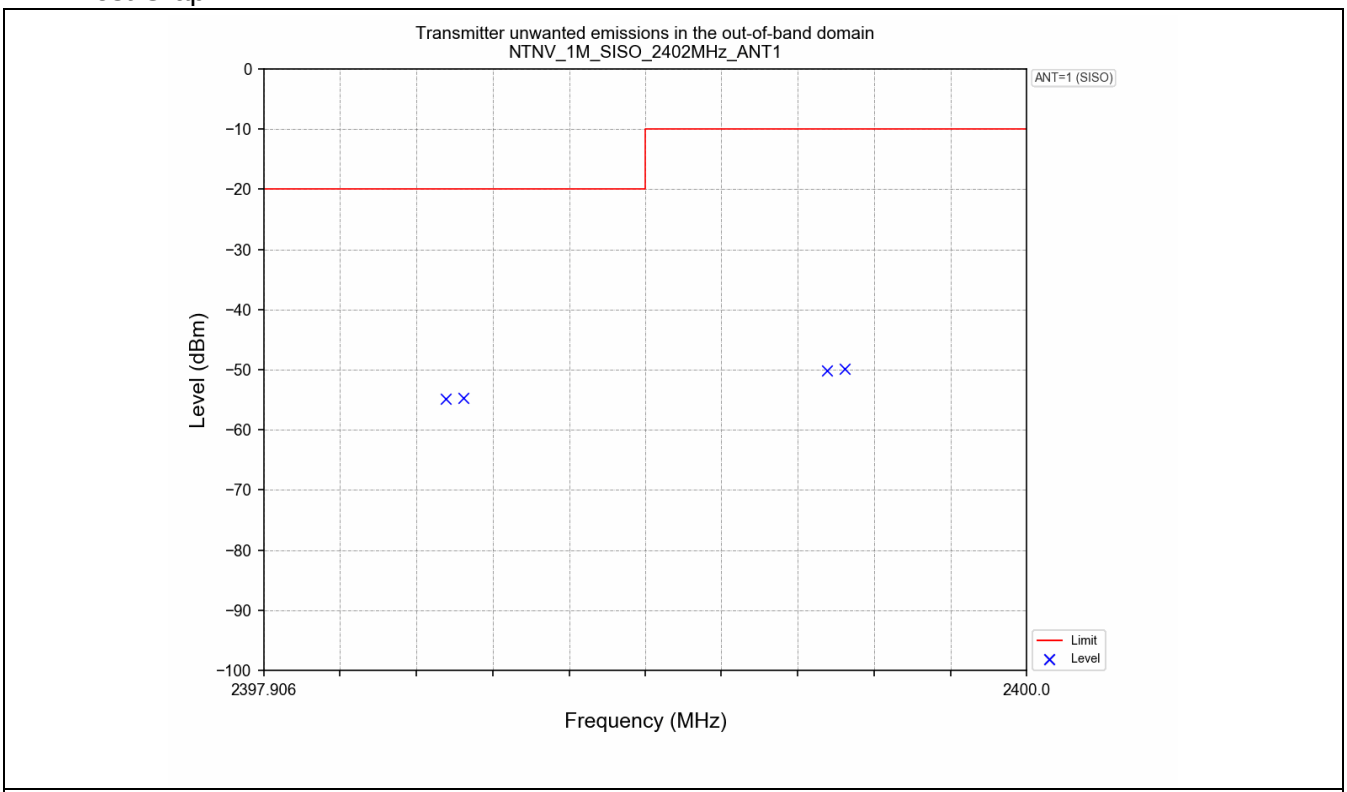
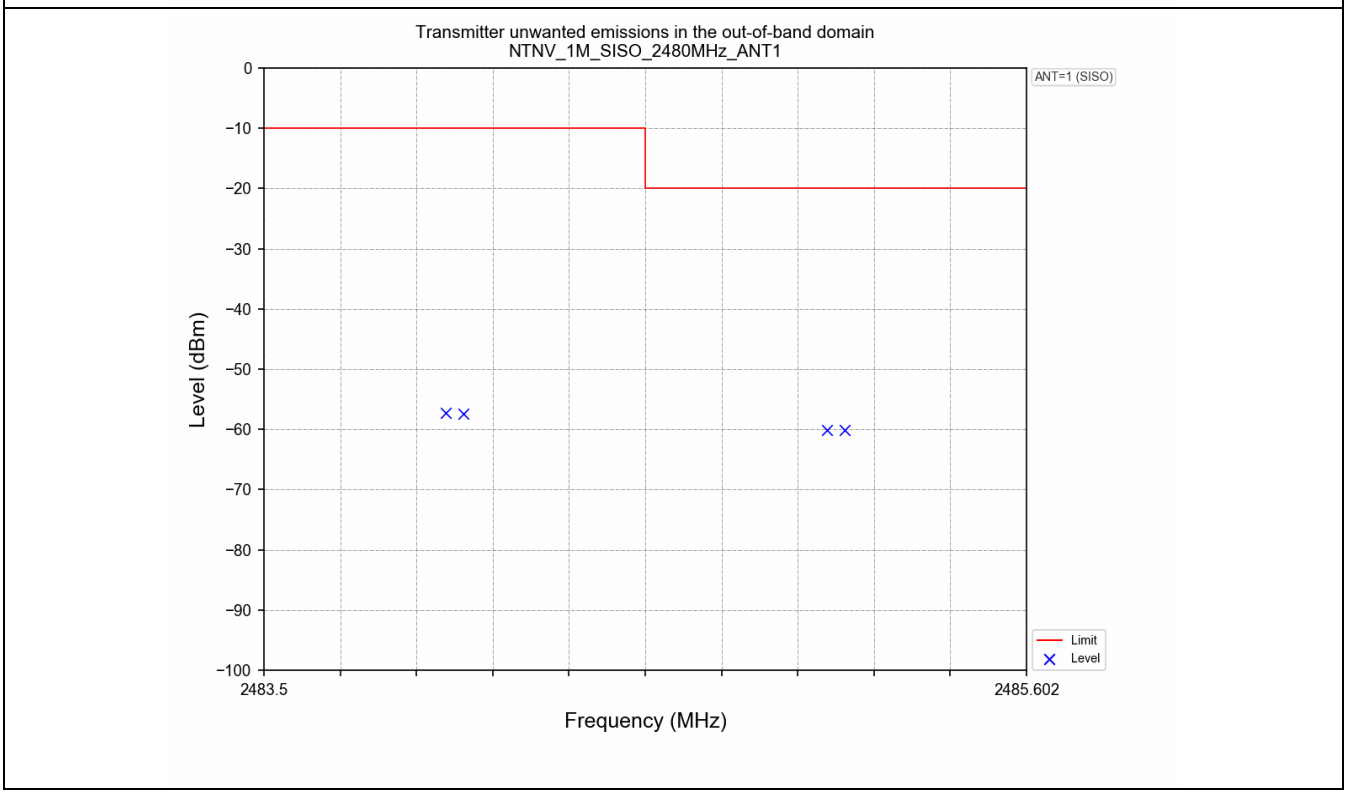
4.2 Test Graph





- End of the Report -