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

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

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TEST REPORT

Application No.:	SZEM1703001913CR
Applicant:	KO-STAR DEVELOPMENT CO., LTD
Address of Applicant:	No.3, Yicun Industrial Area, Xikeng, Henggang Town, Longgang District, Shenzhen, China.
Manufacturer:	SHENZHEN BASSWORLD TECHNOLOGY CO., LTD.
Address of Manufacturer:	No.3, Yicun Industrial Area, Xikeng, Henggang Town, Longgang, Shenzhen, China.
Factory:	SHENZHEN BASSWORLD TECHNOLOGY CO., LTD.
Address of Factory:	No.3, Yicun Industrial Area, Xikeng, Henggang Town, Longgang, Shenzhen, China.
Equipment Under Test (EUT):	
EUT Name:	Bluetooth Headset
Model No.:	MZX667-BLK-WM, MZX667, MZX667-BLK, MZX667-GR, MZX667-GR-ASG, MZX667-BLK-ASG, BT-1050, BT-222, BT-1060, BT-1070, BT-1080, BT-685, BT-1069 ♣
♣	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
FCC ID:	2ALHZBT-1050
Standards:	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2017-03-15
Date of Test:	2017-03-31 to 2017-04-06
Date of Issue:	2017-04-07
Test Result :	**Pass***

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

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.

Revision Record				
Version	***Chapter***	***Date***	***Modifier***	***Remark***
01		*2017-04-07*		*Original*

Authorized for issue by:				
Tested By		Edison Li		2017-04-06
		Edison Li /Project Engineer		**Date**
Checked By		Eric Fu		2017-04-07
		Eric Fu /Reviewer		**Date**

2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass
Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)	Pass

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Disturbance at AC Power Line(150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.7	47 CFR Part 15, Subpart C 15.247(a)(1)	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(1)	Pass
Carrier Frequencies Separation	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.2	47 CFR Part 15, Subpart C 15.247a(1)	Pass
Hopping Channel Number	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.3	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Dwell Time	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.4	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.8	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.6	47 CFR Part 15, Subpart C 15.247(d)	Pass

Remark:

Model No.: MZX667-BLK-WM, MZX667, MZX667-BLK, MZX667-GR, MZX667-GR-ASG, MZX667-BLK-ASG, BT-1050, BT-222, BT-1060, BT-1070, BT-1080, BT-685, BT-1069

Only the model MZX667 was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for all the above models, with only difference on colour and model No..

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	DC 3.7V, 250mAh rechargeable battery which charged by USB port
Test voltage	AC 120V, 60Hz
Cable:	AUX IN cable: 54cm unshielded
Frequency range:	2402MHz-2480MHz
Bluetooth version:	Bluetotoh V4.1
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of channels:	79
Antenna type:	Integral
Antenna gain:	5.6dBi
Sample type:	Portable production
USB Cable:	50cm unshielded
AUX Cable:	45cm unshielded

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Adapter	Apple	A1357 W010A051	REF. No.SEA0500

4.3 Test Environment

Operating Environment:	
Temperature:	25.0 °C
Humidity:	55 % RH
Atmospheric Pressure:	1010 mbar

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.25 x 10-8
2	Timeout	2s
3	Duty cycle	0.37%
4	Occupied Bandwidth	3%
5	RF conducted power	0.75dB
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%

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:

• **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.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

5 Equipment List

Conducted Emission					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2016-05-13	2017-05-13
LISN	Rohde & Schwarz	ENV216	SEM007-01	2016-10-09	2017-10-09
LISN	ETS-LINDGREN	3816/2	SEM007-02	2016-04-25	2017-04-25
8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	EMC0120	2016-09-28	2017-09-28
4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	EMC0121	2016-09-28	2017-09-28
2 Line ISN	Fischer Custom	FCC-TLISN-T2-02	EMC0122	2016-09-28	2017-09-28

RF connected test					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2016-04-25	2017-04-25
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

RE in Chamber					
Test Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. date (yyyy-mm-dd)**	**Cal.Due date (yyyy-mm-dd)**
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2016-08-01	2017-08-01
EMI Test Receiver (9k-3GHz)	Rohde & Schwarz	ESCI	SEM004-01	2016-04-25	2017-04-25
Trilog-Broadband Antenna(30M-1GHz)	Schwarzbeck	VULB9168	SEM003-17	2017-01-26	2018-01-26
Pre-amplifier	Sonoma Instrument Co	310N	SEM005-03	2016-04-25	2017-04-25
Loop Antenna	ETS-Lindgren	6502	SEM003-08	2016-08-14	2017-08-14

RE in Chamber					
Test Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. date (yyyy-mm-dd)**	**Cal.Due date (yyyy-mm-dd)**
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2016-05-13	2017-05-13
EMI Test Receiver	Rohde & Schwarz	ESIB26	SEM004-04	2016-04-25	2017-04-25
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2014-11-15	2017-11-15
Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2015-10-09	2016-10-09
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2016-06-14	2017-06-14
Low Noise Amplifier	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2015-10-09	2016-10-09
Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A
Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	2014-11-24	2017-11-24

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	2016-05-18	2017-05-18

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247

6.1.2 Conclusion

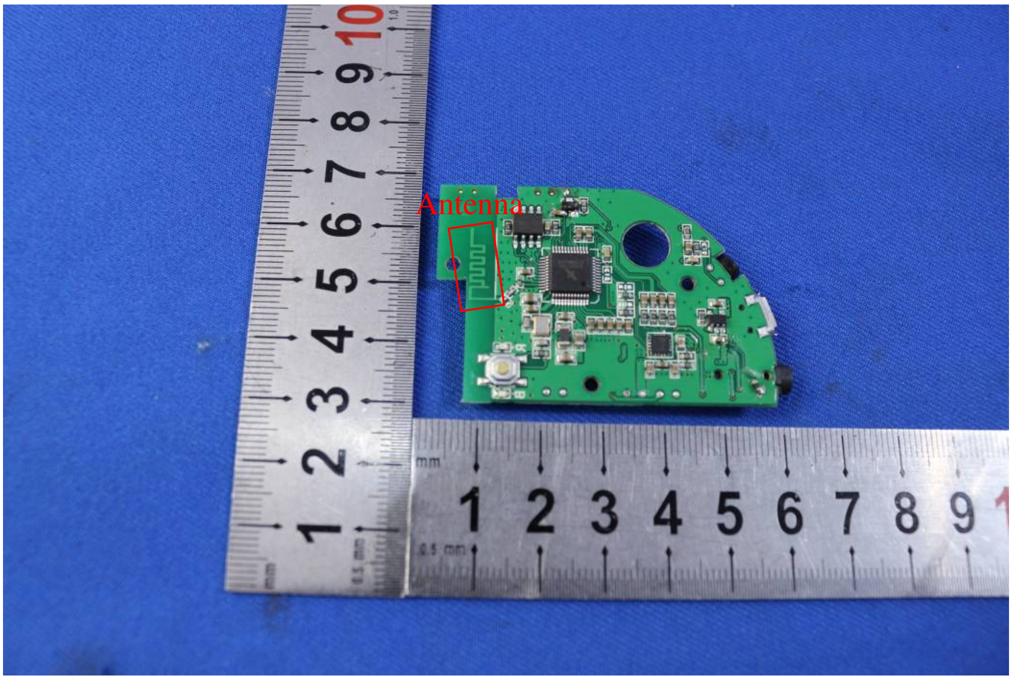
Standard Requirment:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:



The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 5.6dBi.

6.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence

6.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247

6.2.2 Conclusion

Standard Requirment:

The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Compliance for section 15.247(a)(1):

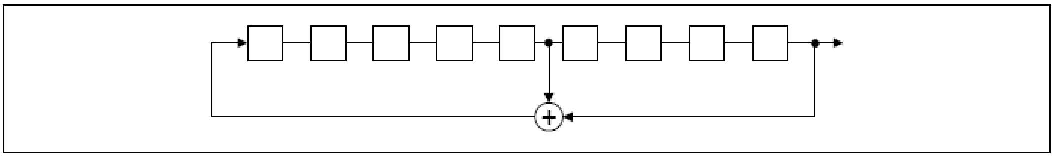
According to Technical Specification, the pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

> Number of shift register stages: 9

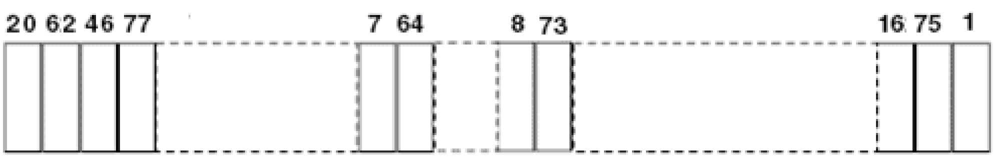
> Length of pseudo-random sequence: 29 -1 = 511 bits

> Longest sequence of zeros: 8 (non-inverted signal)

Linear Feedback Shift Register for Generation of the PRBS sequence



An example of Pseudorandom Frequency Hopping Sequence as follow:



Each frequency used equally on the average by each transmitter.

According to Technical Specification, the receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any transmitters and shift frequencies in synchronization with the transmitted signals.

Compliance for section 15.247(g):

According to Technical Specification, the system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the Bluetooth system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system.

Compliance for section 15.247(h):

According to Bluetooth Core specification, the Bluetooth system incorporates with an adaptive system to detect other user within the spectrum band so that it individually and independently to avoid hopping on the occupied channels.

According to the Bluetooth Core specification, the Bluetooth system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.

7 Radio Spectrum Matter Test Results

7.1 Conducted Disturbance at AC Power Line(150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207
Test Method: ANSI C63.10 (2013) Section 6.2
Limit:

Frequency of emission(MHz)	Conducted limit(dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		

7.1.1 E.U.T. Operation

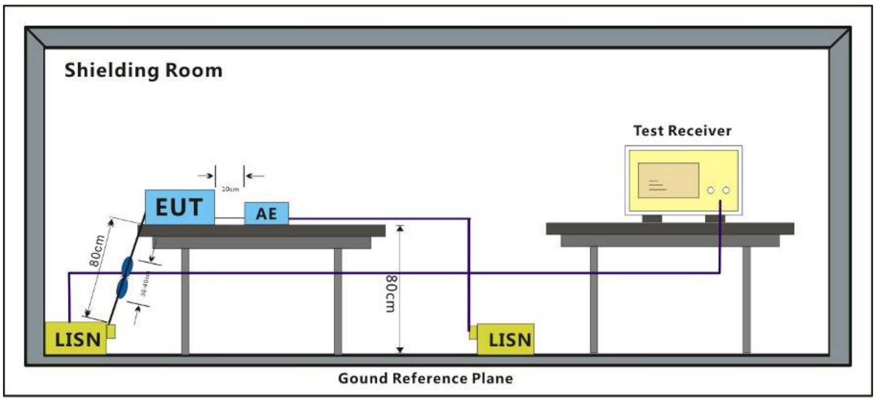
Operating Environment:

Temperature: 25.0 °C Humidity: 56 % RH Atmospheric Pressure: 1020 mbar

Test mode: Non-hopping transmitting mode with all kind of modulation and all kind of data type at the lowest, middle, high channel.
b: TX mode+ charging, Keep the EUT in transmitting mode and being charging.

The worst case for final test: Through Pre-scan, find the DH1 of data type and GFSK modulation at the lowest channel is the worst case.
b: TX mode+ charging, Keep the EUT in transmitting mode and being charging.

7.1.2 Test Setup Diagram



7.1.3 Measurement Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

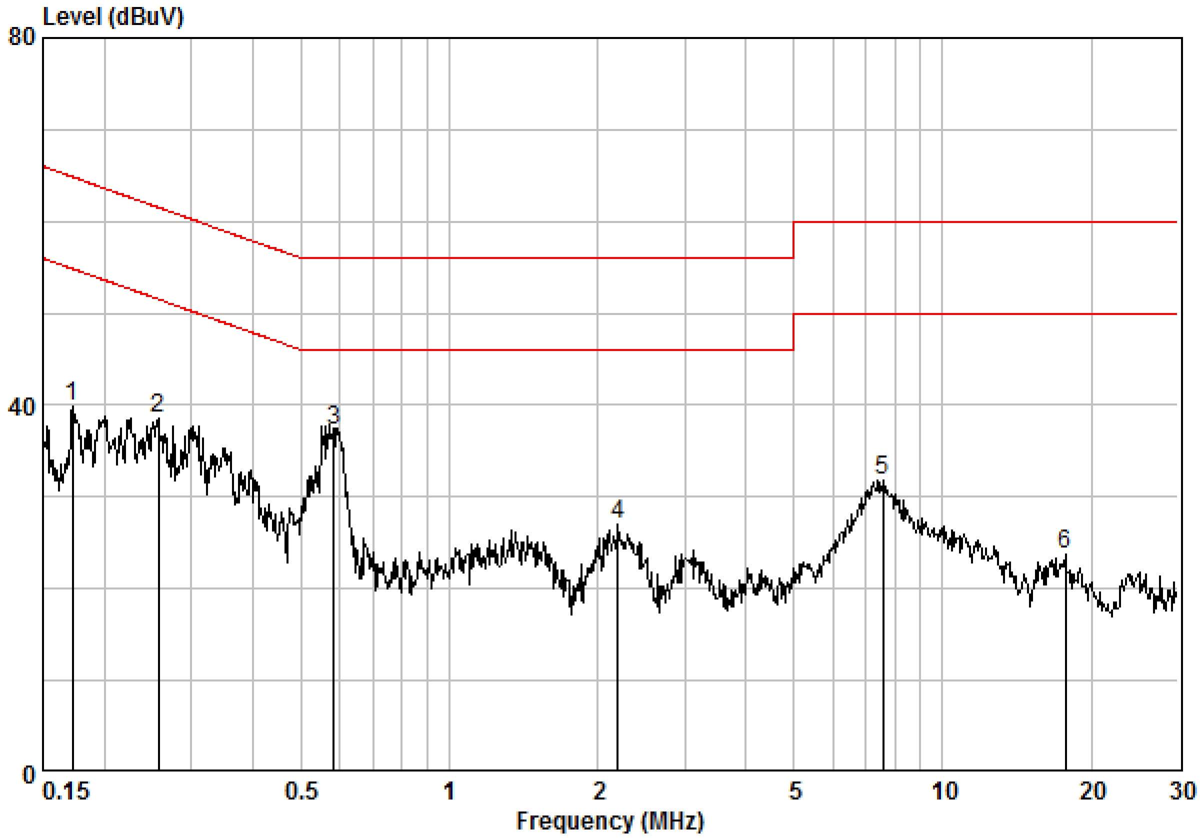
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

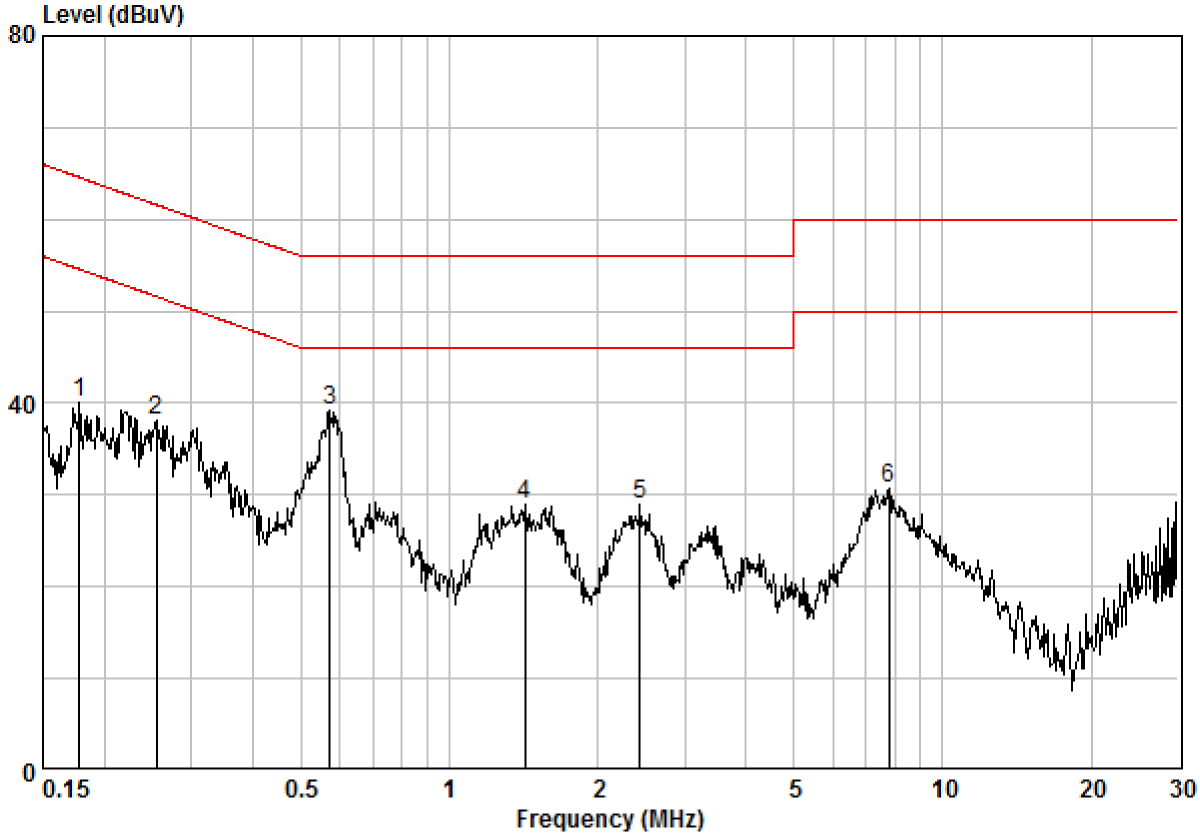
Mode:b; Line:Live Line



Site : Shielding Room
Condition : CE LINE
Job No. : 01913CR
Test Mode : b

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.17215	0.02	9.64	30.20	39.86	54.86	-15.00	Peak
2	0.25751	0.02	9.64	28.95	38.61	51.51	-12.90	Peak
3 @	0.58231	0.02	9.65	27.69	37.36	46.00	-8.64	Peak
4	2.201	0.03	9.67	17.39	27.09	46.00	-18.91	Peak
5	7.566	0.09	9.80	22.00	31.89	50.00	-18.11	Peak
6	17.755	0.16	10.08	13.50	23.74	50.00	-26.26	Peak

Mode:b; Line:Neutral Line



Site : Shielding Room
Condition : CE NEUTRAL
Job No. : 01913CR
Test Mode : b

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.17772	0.02	9.63	30.40	40.05	54.59	-14.54	Peak
2	0.25480	0.02	9.63	28.57	38.22	51.60	-13.38	Peak
3 @	0.57313	0.02	9.63	29.53	39.19	46.00	-6.81	Peak
4	1.426	0.03	9.65	19.27	28.95	46.00	-17.05	Peak
5	2.435	0.03	9.66	19.29	28.98	46.00	-17.02	Peak
6	7.810	0.10	9.79	20.88	30.77	50.00	-19.23	Peak

7.2 20dB Bandwidth

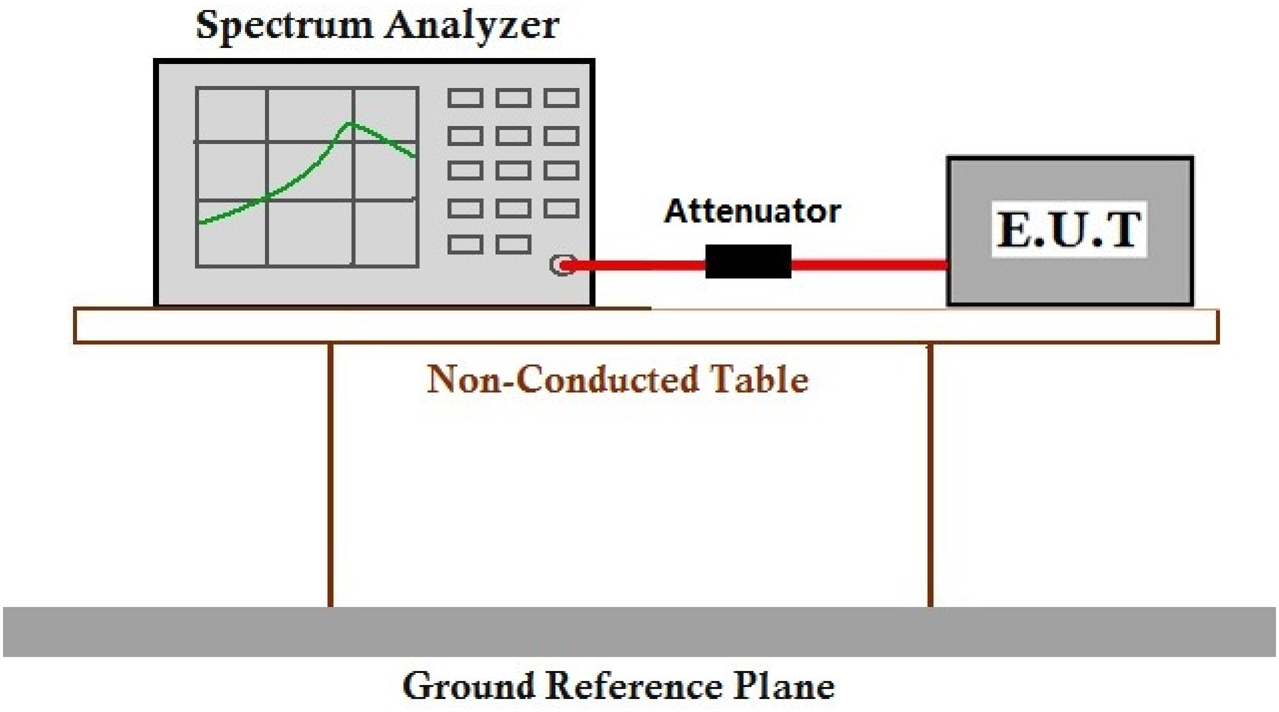
Test Requirement	47 CFR Part 15, Subpart C 15.247(a)(1)
Test Method:	ANSI C63.10 (2013) Section 7.8.7

7.2.1 E.U.T. Operation

Operating Environment:

Temperature:	23.0 °C	Humidity:	56 % RH	Atmospheric Pressure:	1015 mbar
Test mode:	Non-hopping transmitting with all kind of modulation and all kind of data type. Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type, 2-DH1 of data type is the worst case of π/4DQPSK modulation type, 3-DH1 of data type is the worst case of 8DPSK modulation type. a:TX_Keep the EUT in transmitting mode b:TX+Charge_Keep the EUT in transmitting mode and being charged				
The worst case for final test:	b:TX+Charge_Keep the EUT in transmitting mode and being charged				

7.2.2 Test Setup Diagram



7.2.3 Measurement Data

The detailed test data see: Appendix 15.247

7.3 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(1)
Test Method: ANSI C63.10 (2013) Section 7.8.5
Limit:

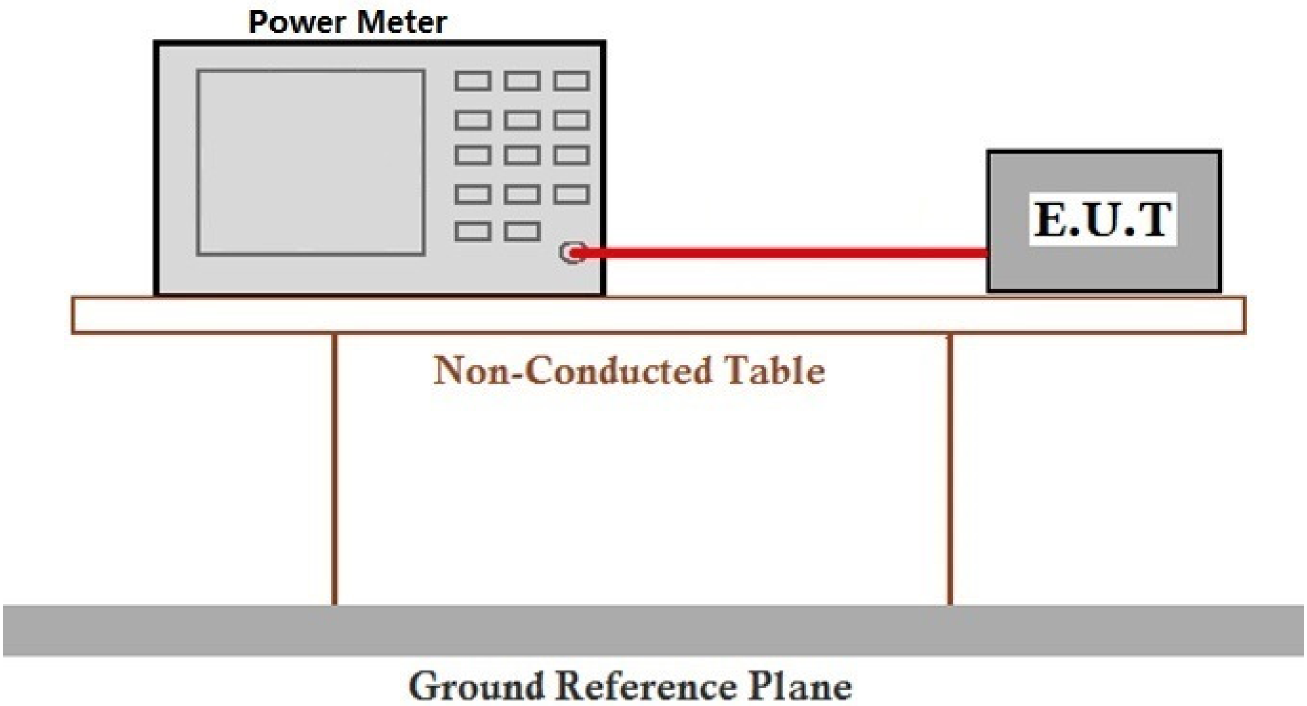
Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1w for ≥50 hopping channels
	0.25w for <50 hopping channels
	1 for digital modulation
2400-2483.5	1w for ≥75 non-overlapping hopping channels
	0.125w for all other frequency hopping systems
	1w for digital modulation
5725-5850	1w for frequency hopping systems and digital modulation

7.3.1 E.U.T. Operation

Operating Environment:

Temperature:	23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar
Test mode:	Non-hopping transmitting with all kind of modulation and all kind of data type. Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type, 2-DH1 of data type is the worst case of π/4DQPSK modulation type, 3-DH1 of data type is the worst case of 8DPSK modulation type. a:TX_Keep the EUT in transmitting mode b:TX+Charge_Keep the EUT in transmitting mode and being charged
The worst case for final test:	b:TX+Charge_Keep the EUT in transmitting mode and being charged

7.3.2 Test Setup Diagram



7.3.3 Measurement Data

The detailed test data see: Appendix 15.247

7.4 Carrier Frequencies Separation

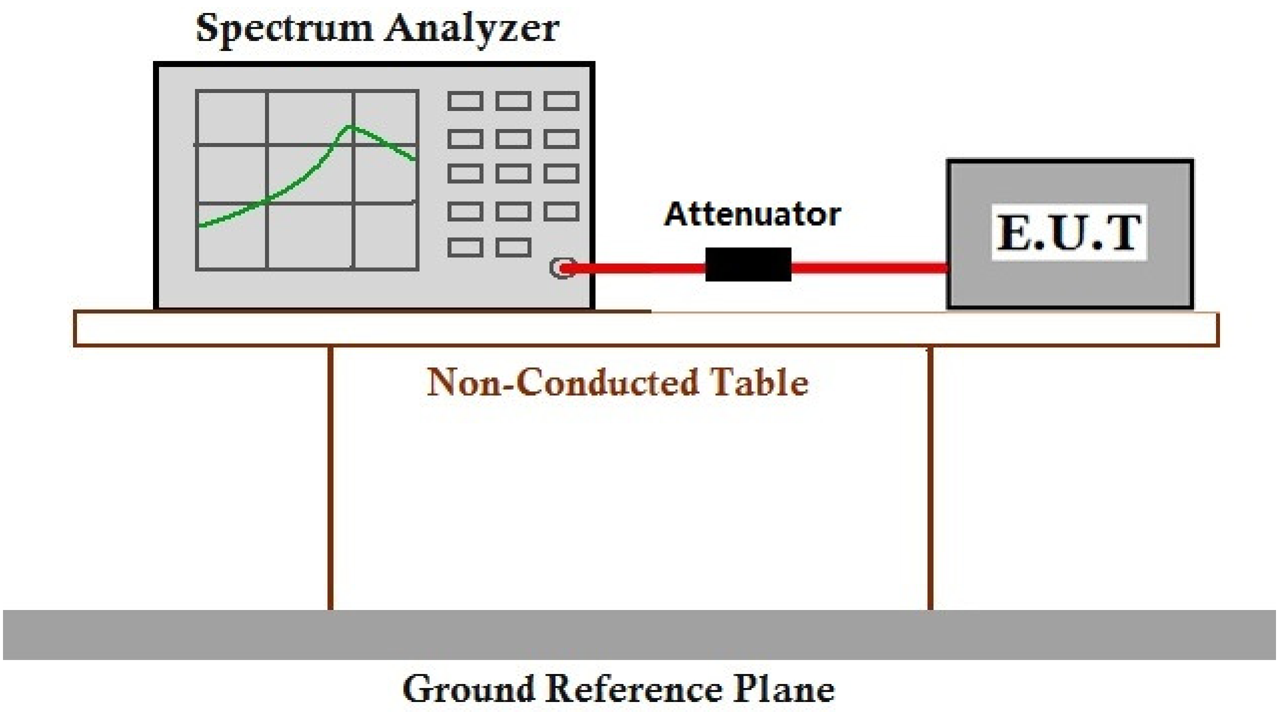
Test Requirement	47 CFR Part 15, Subpart C 15.247a(1)
Test Method:	ANSI C63.10 (2013) Section 7.8.2
Limit:	2/3 of the 20dB bandwidth base on the transmission power is less than 0.125W

7.4.1 E.U.T. Operation

Operating Environment:

Temperature:	23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar
Test mode:	Hopping transmitting with all kind of modulation and all kind of data type. Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type, 2-DH1 of data type is the worst case of π/4DQPSK modulation type, 3-DH1 of data type is the worst case of 8DPSK modulation type. a:TX_Keep the EUT in transmitting mode b:TX+Charge_Keep the EUT in transmitting mode and being charged
The worst case for final test:	b:TX+Charge_Keep the EUT in transmitting mode and being charged

7.4.2 Test Setup Diagram



7.4.3 Measurement Data

The detailed test data see: Appendix 15.247

7.5 Hopping Channel Number

Test Requirement 47 CFR Part 15, Subpart C 15.247(a)(1)

Test Method: ANSI C63.10 (2013) Section 7.8.3

Limit:

Frequency range(MHz)	Number of hopping channels (minimum)
902-928	50 for 20dB bandwidth <250kHz
	25 for 20dB bandwidth ≥250kHz
2400-2483.5	15
5725-5850	75

7.5.1 E.U.T. Operation

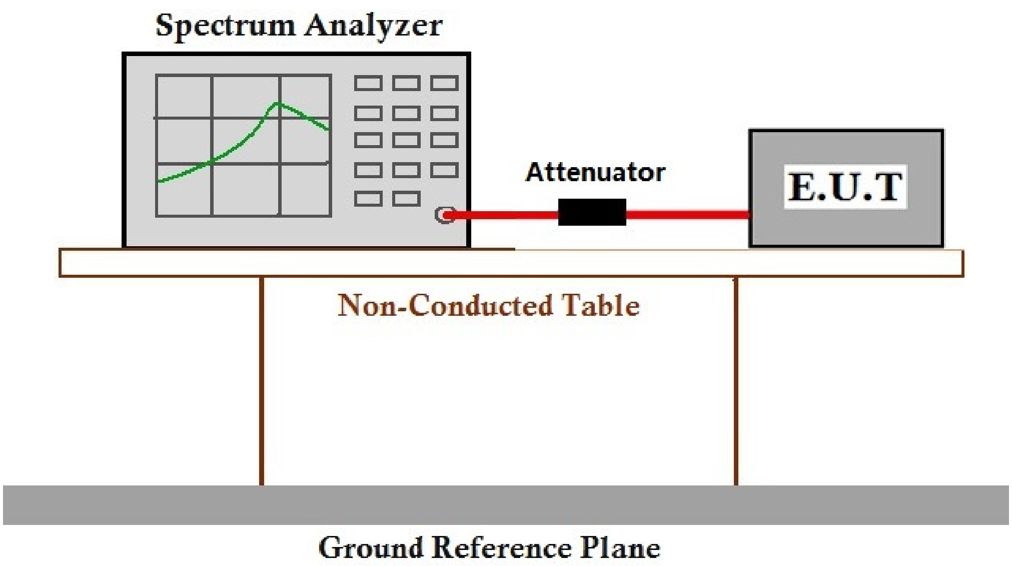
Operating Environment:

Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar

Test mode: Hopping transmitting with all kind of modulation
a:TX_Keep the EUT in transmitting mode
b:TX+Charge_Keep the EUT in transmitting mode and being charged

The worst case for final test: b:TX+Charge_Keep the EUT in transmitting mode and being charged

7.5.2 Test Setup Diagram



7.5.3 Measurement Data

The detailed test data see: Appendix 15.247

7.6 Dwell Time

Test Requirement 47 CFR Part 15, Subpart C 15.247(a)(1)

Test Method: ANSI C63.10 (2013) Section 7.8.4

Limit:

Frequency(MHz)	Limit(S)
902-928	0.4S within a 20S period(20dB bandwidth<250kHz)
	0.4S within a 10S period(20dB bandwidth≥250kHz)
2400-2483.5	0.4S within a period of 0.4S
5725-5850	0.4S within a 30S period

7.6.1 E.U.T. Operation

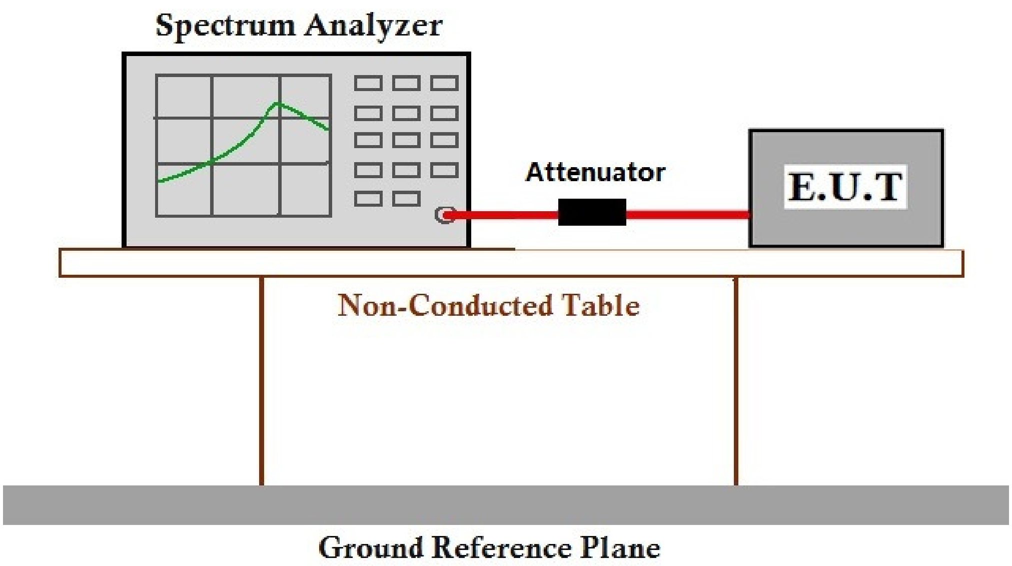
Operating Environment:

Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar

Test mode: Hopping transmitting with all kind of modulation and all kind of data type.
a:TX_Keep the EUT in transmitting mode
b:TX+Charge_Keep the EUT in transmitting mode and being charged

The worst case for final test: b:TX+Charge_Keep the EUT in transmitting mode and being charged

7.6.2 Test Setup Diagram



7.6.3 Measurement Data

The detailed test data see: Appendix 15.247

7.7 Conducted Spurious Emissions

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 7.8.8
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

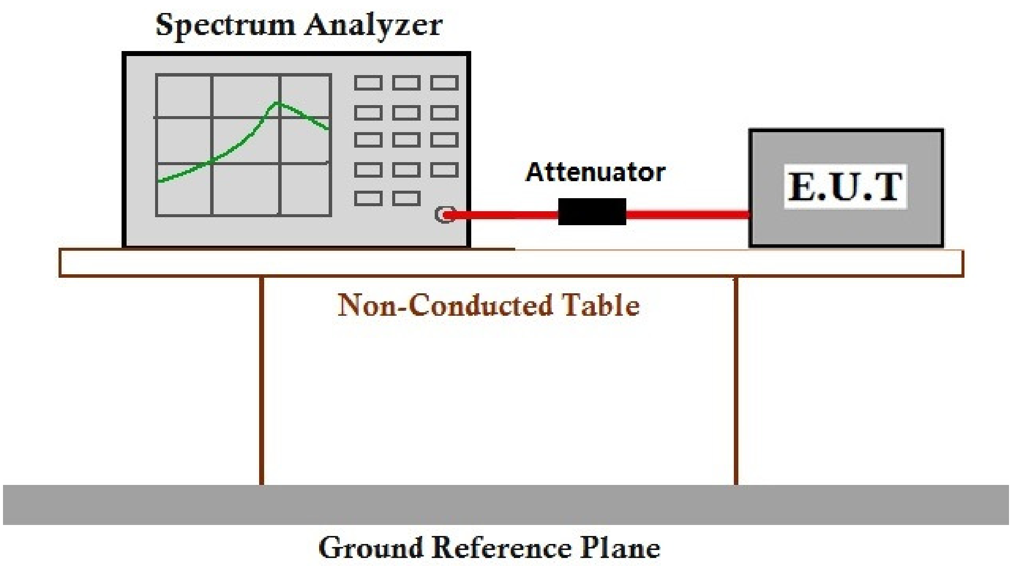
7.7.1 E.U.T. Operation

Operating Environment:

Temperature:	23.0 °C	Humidity:	56 % RH	Atmospheric Pressure:	1015 mbar		

Test mode:	Non-hopping transmitting with all kind of modulation and all kind of data type Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type, 2-DH1 of data type is the worst case of π/4DQPSK modulation type, 3-DH1 of data type is the worst case of 8DPSK modulation type. a:TX_Keep the EUT in transmitting mode b:TX+Charge_Keep the EUT in transmitting mode and being charged
The worst case for final test:	b:TX+Charge_Keep the EUT in transmitting mode and being charged

7.7.2 Test Setup Diagram



7.7.3 Measurement Data

The detailed test data see: Appendix 15.247

7.8 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

Measurement Distance: 10m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	40.0	3
88-216	43.5	3
216-960	46.0	3
Above 960	54.0	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

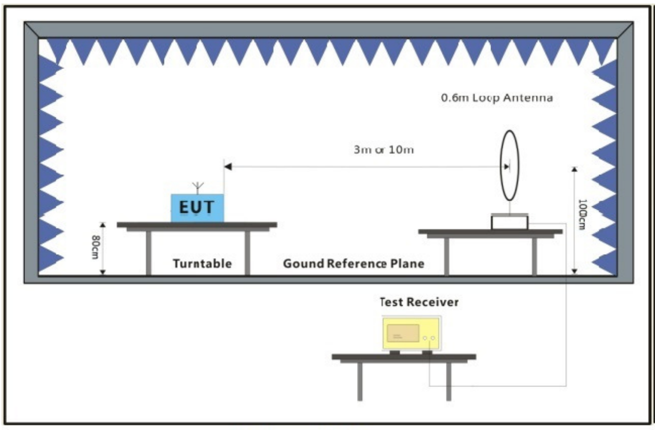
7.8.1 E.U.T. Operation

Operating Environment:

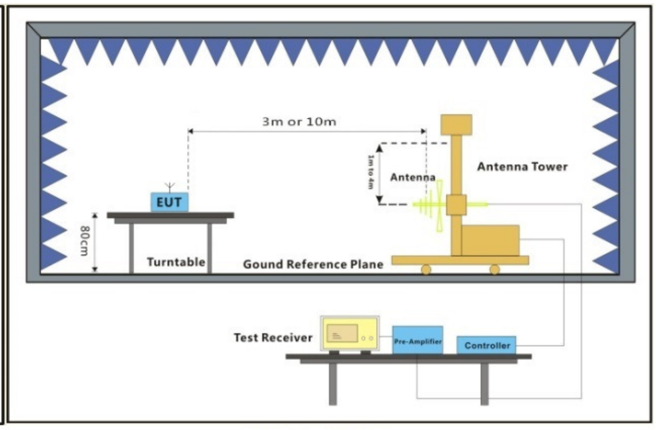
Temperature:	24.0 °C	Humidity:	56 % RH	Atmospheric Pressure:	1020 mbar

Pretest these mode to find the worst case:	Non-hopping transmitting mode with all kind of modulation and all kind of data type a:TX_Keep the EUT in transmitting mode b:TX+Charge_Keep the EUT in transmitting mode and being charged
The worst case for final test:	Through Pre-scan, find the DH1 of data type and GFSK modulation is the worst case. b:TX+Charge_Keep the EUT in transmitting mode and being charged

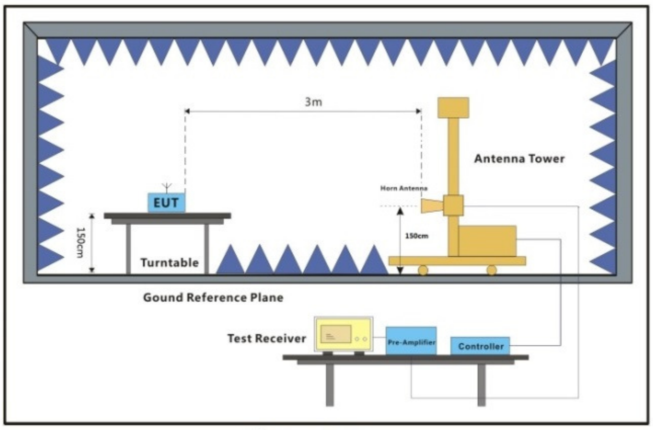
7.8.2 Test Setup Diagram



Below 30MHz



30MHz-1GHz



Above 1GHz

7.8.3 Measurement Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

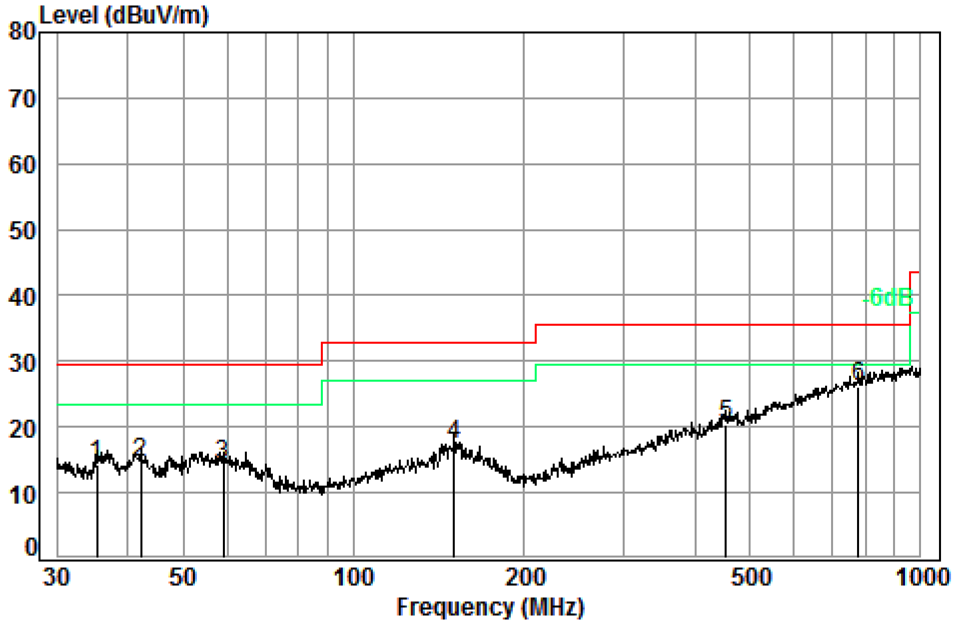
h. Test the EUT in the lowest channel,the middle channel,the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Below 1GHz

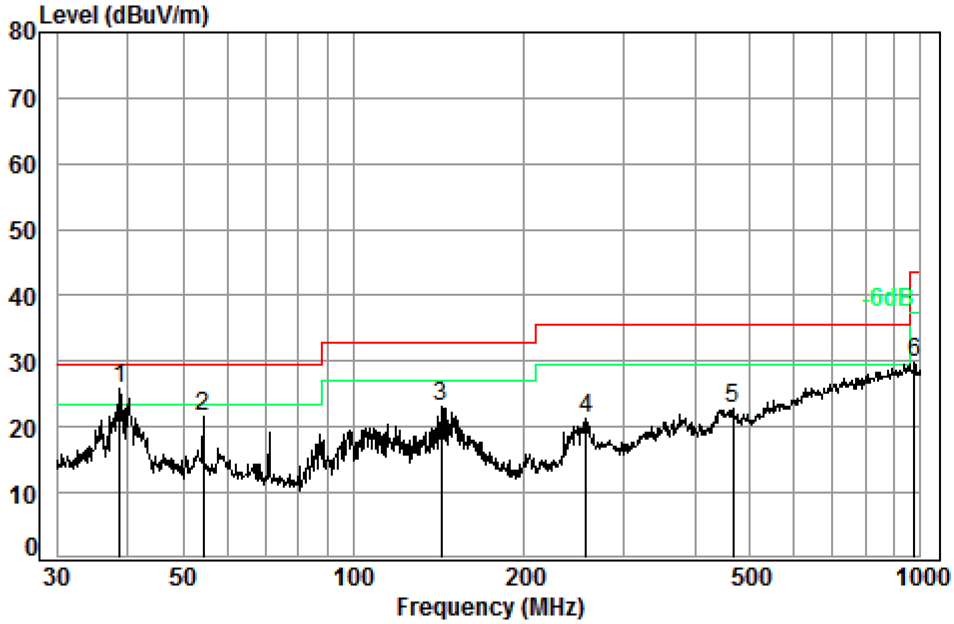
Mode:b



Condition: 10m HORIZONTAL
Job No. : 01913CR
Test Mode: b

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	35.38	6.99	12.69	32.98	27.62	14.32	29.50	-15.18
2	42.30	6.84	13.12	32.99	27.65	14.62	29.50	-14.88
3	58.82	6.32	12.09	32.95	28.76	14.22	29.50	-15.28
4	150.54	7.46	13.41	32.74	29.10	17.23	33.00	-15.77
5	454.31	8.63	16.23	32.60	28.17	20.43	35.60	-15.17
6 pp	776.88	9.72	21.07	32.60	27.99	26.18	35.60	-9.42

Mode:b;



Condition: 10m VERTICAL
Job No. : 01913CR
Test Mode: b

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	38.75	7.06	13.16	32.98	38.71	25.95	29.50	-3.55
2	54.26	6.28	12.43	32.98	35.75	21.48	29.50	-8.02
3	142.82	7.46	12.95	32.75	35.48	23.14	33.00	-9.86
4	257.42	7.79	11.42	32.64	34.62	21.19	35.60	-14.41
5	467.24	8.69	16.37	32.60	30.29	22.75	35.60	-12.85
6	975.75	10.22	22.81	32.50	29.22	29.75	43.50	-13.75

Below 1GHz

The test was performed at a 10m test site. According to below formulate and the test data at 10m test distance,

L3 / L10 = D10 / D3

Note:

L3: Level @ 3m distance. Unit: uV/m;

L10: Level @ 10m distance. Unit: uV/m;

D3: 3m distance. Unit: m

D10: 10m distance. Unit: m

The level at 3m test distance is below:

Frequency (MHz)	Level @ 10m (dBuV/m)	Level @ 10m (uV/m)	Level @ 3m (uV/m)	Level @ 3m (dBuV/m)	Limit @ 3m (dBuV/m)	Margin (dB)	Ant. Polarization
38.75	25.95	19.84	66.13	36.41	40.00	-3.59	V
54.26	21.48	11.86	39.53	31.94	40.00	-8.06	V
142.82	23.14	14.35	47.85	33.60	43.50	-9.90	V
257.42	21.19	11.47	38.23	31.65	46.00	-14.35	V
467.24	22.75	13.72	45.75	33.21	46.00	-12.79	V
975.75	29.75	30.73	102.42	40.21	54.00	-13.79	V
35.38	14.32	5.20	17.33	24.78	40.00	-15.22	H
42.30	14.62	5.38	17.94	25.08	40.00	-14.92	H
58.82	14.22	5.14	17.13	24.68	40.00	-15.32	H
150.54	17.23	7.27	24.23	27.69	43.50	-15.81	H
454.31	20.43	10.51	35.03	30.89	46.00	-15.11	H
776.88	26.18	20.37	67.90	36.64	46.00	-9.36	H

Above 1GHz:

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

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Over limit (dB)
3836.607	33.16	6.58	37.98	45.84	48.09	74	-25.91
4804.000	34.16	7.73	38.40	49.36	53.24	74	-20.76
6140.076	34.82	8.84	38.16	45.07	50.86	74	-23.14
7206.000	36.42	9.65	37.11	44.54	53.76	74	-20.24
9608.000	37.52	11.06	35.10	39.97	53.90	74	-20.10
12422.220	38.85	13.03	36.61	36.92	52.82	74	-21.18

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

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Over limit (dB)
3847.726	33.19	6.58	37.98	44.40	46.68	74	-27.32
4804.000	34.16	7.73	38.40	49.30	53.18	74	-20.82
6238.584	34.89	8.90	38.06	44.87	50.90	74	-23.10
7206.000	36.42	9.65	37.11	44.00	53.22	74	-20.78
9608.000	37.52	11.06	35.10	39.62	53.55	74	-20.45
12226.070	38.74	12.74	36.14	36.88	52.91	74	-21.09

Mode:a; Polarization:Horizontal; Modulation Type:GFSK; Channel:middle

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Over limit (dB)
3858.877	33.22	6.59	37.99	45.26	47.56	74	-26.44
4882.000	34.30	7.84	38.44	49.09	53.20	74	-20.80
6104.642	34.79	8.82	38.20	44.88	50.58	74	-23.42
7323.000	36.37	9.73	37.01	44.13	53.45	74	-20.55
9764.000	37.55	11.21	35.02	39.09	53.29	74	-20.71
12368.410	38.82	12.95	36.48	36.77	52.71	74	-21.29

Mode:a; Polarization:Vertical; Modulation Type:GFSK; Channel:middle

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Over limit (dB)
3960.700	33.50	6.67	38.00	44.77	47.39	74	-26.61
4882.000	34.30	7.84	38.44	49.11	53.22	74	-20.78
6113.481	34.79	8.82	38.19	44.61	50.32	74	-23.68
7323.000	36.37	9.73	37.01	44.50	53.82	74	-20.18
9764.000	37.55	11.21	35.02	39.24	53.44	74	-20.56
12279.260	38.77	12.82	36.27	37.15	53.15	74	-20.85

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

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Over limit (dB)
3847.726	33.19	6.58	37.98	44.24	46.52	74	-27.48
4960.000	34.43	7.95	38.48	49.35	53.68	74	-20.32
6034.386	34.73	8.77	38.27	44.78	50.32	74	-23.68
7440.000	36.32	9.81	36.90	43.46	52.91	74	-21.09
9920.000	37.58	11.36	34.94	38.77	53.23	74	-20.77
12386.320	38.83	12.97	36.53	37.52	53.43	74	-20.57

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

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Over limit (dB)
3875.664	33.27	6.61	37.99	44.62	46.99	74	-27.01
4960.000	34.43	7.95	38.48	48.94	53.27	74	-20.73
6008.249	34.71	8.76	38.29	44.84	50.34	74	-23.66
7440.000	36.32	9.81	36.90	43.89	53.34	74	-20.66
9920.000	37.58	11.36	34.94	39.44	53.90	74	-20.10
12731.570	38.85	13.24	37.36	38.31	53.58	74	-20.42

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

   Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

2) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

7.9 Radiated Emissions which fall in the restricted bands

Test Requirement	47 CFR Part 15C Section 15.209 and 15.205
Test Method:	ANSI C63.10 (2013) Section 6.10.5
Measurement Distance:	3m

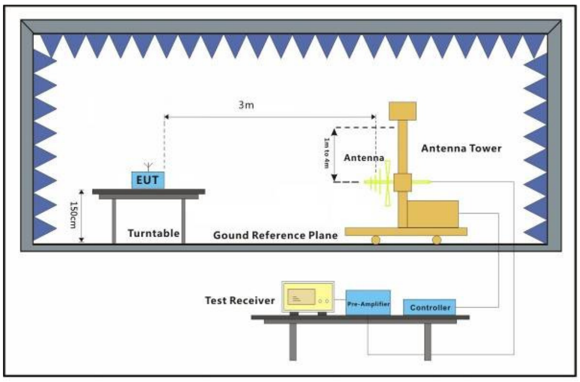
7.9.1 E.U.T. Operation

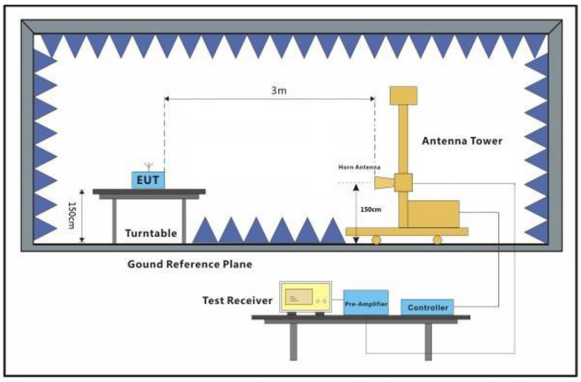
Operating Environment:

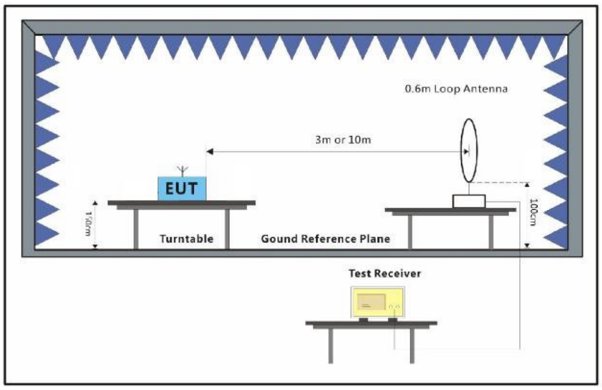
Temperature:	24.0 °C	Humidity:	56 % RH	Atmospheric Pressure:	1020 mbar

Pretest these mode to find the worst case:	Non-hopping transmitting mode with all kind of modulation and all kind of data type a:TX_Keep the EUT in transmitting mode b:TX+Charge_Keep the EUT in transmitting mode and being charged
The worst case for final test:	Through Pre-scan, find the DH5 of data type and GFSK modulation is the worst case. b:TX+Charge_Keep the EUT in transmitting mode and being charged

7.9.2 Test Setup Diagram







7.9.3 Measurement Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

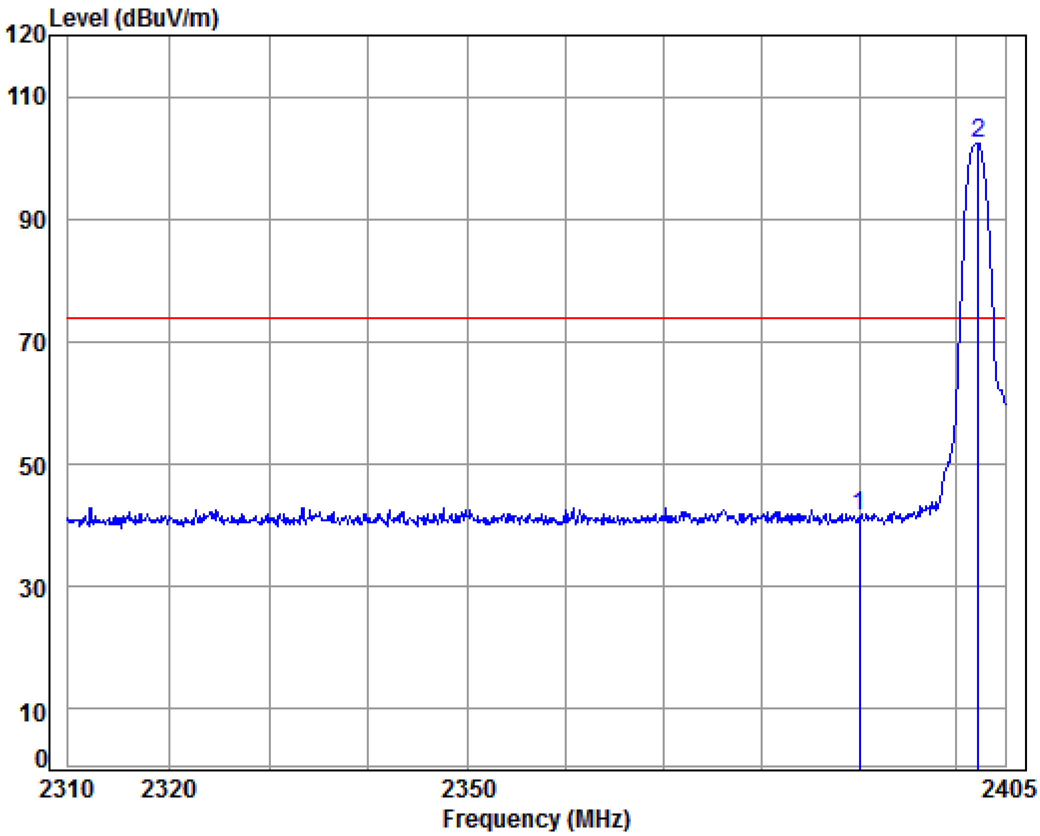
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel,the middle channel,the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

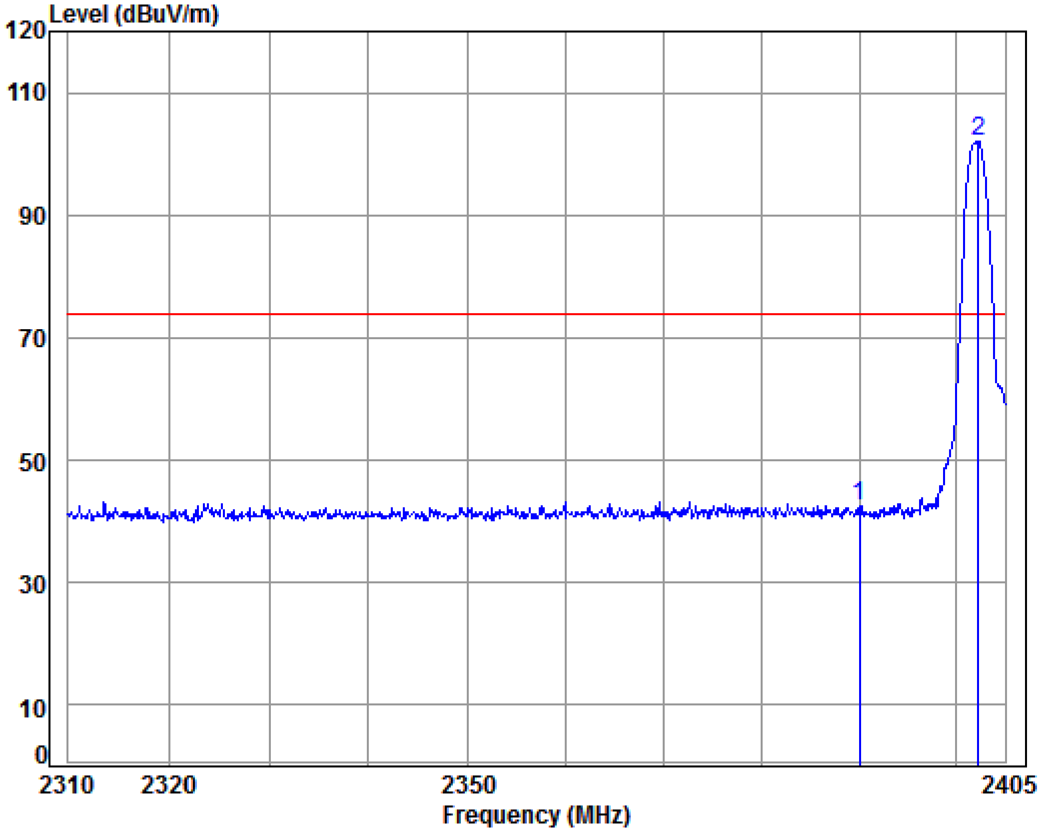
Mode:b; Polarization:Horizontal; Modulation Type:GFSK; Channel:Low



Condition: 3m Horizontal
Job No: : 01913CR
Mode: : 2402 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2390.000	5.34	29.08	37.96	45.18	41.64	74.00	-32.36	Peak
2 pp	2402.191	5.35	29.11	37.96	105.84	102.34	74.00	28.34	Peak

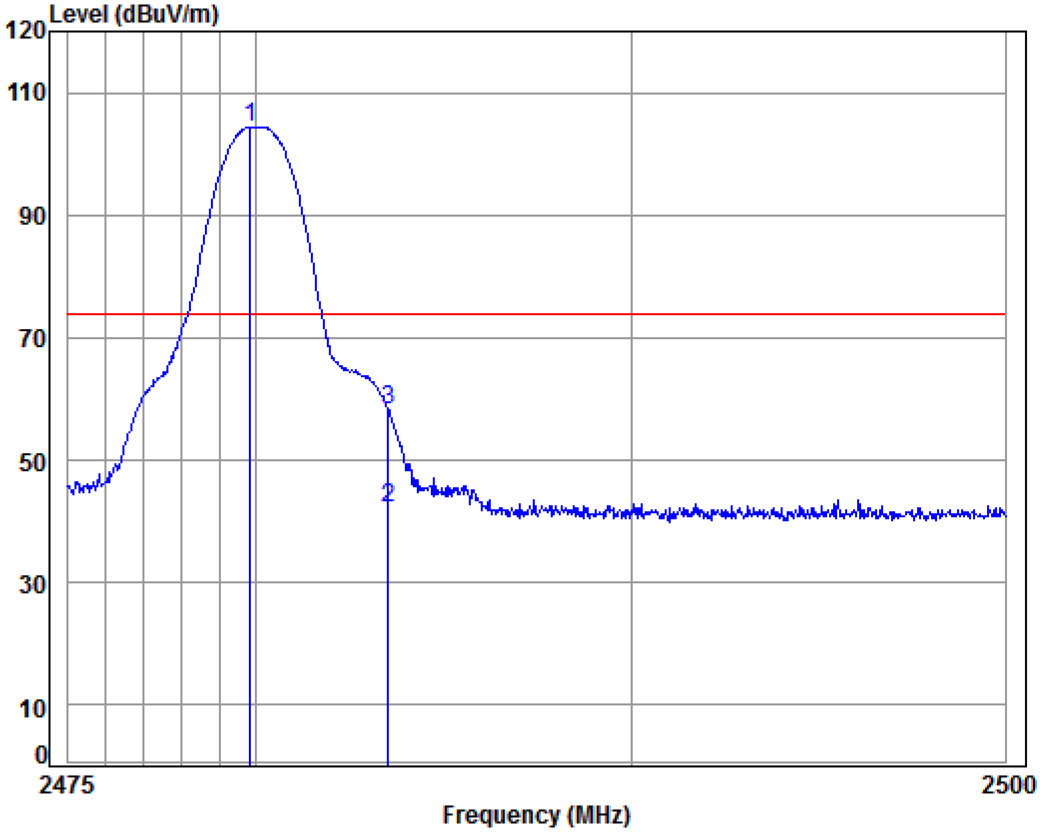
Mode:b; Polarization:Vertical; Modulation Type:GFSK; Channel:Low



Condition: 3m Vertical
Job No: : 01913CR
Mode: : 2402 Band edge

		Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1		2390.000	5.34	29.08	37.96	46.13	42.59	74.00	-31.41	Peak
2	pp	2402.191	5.35	29.11	37.96	105.45	101.95	74.00	27.95	Peak

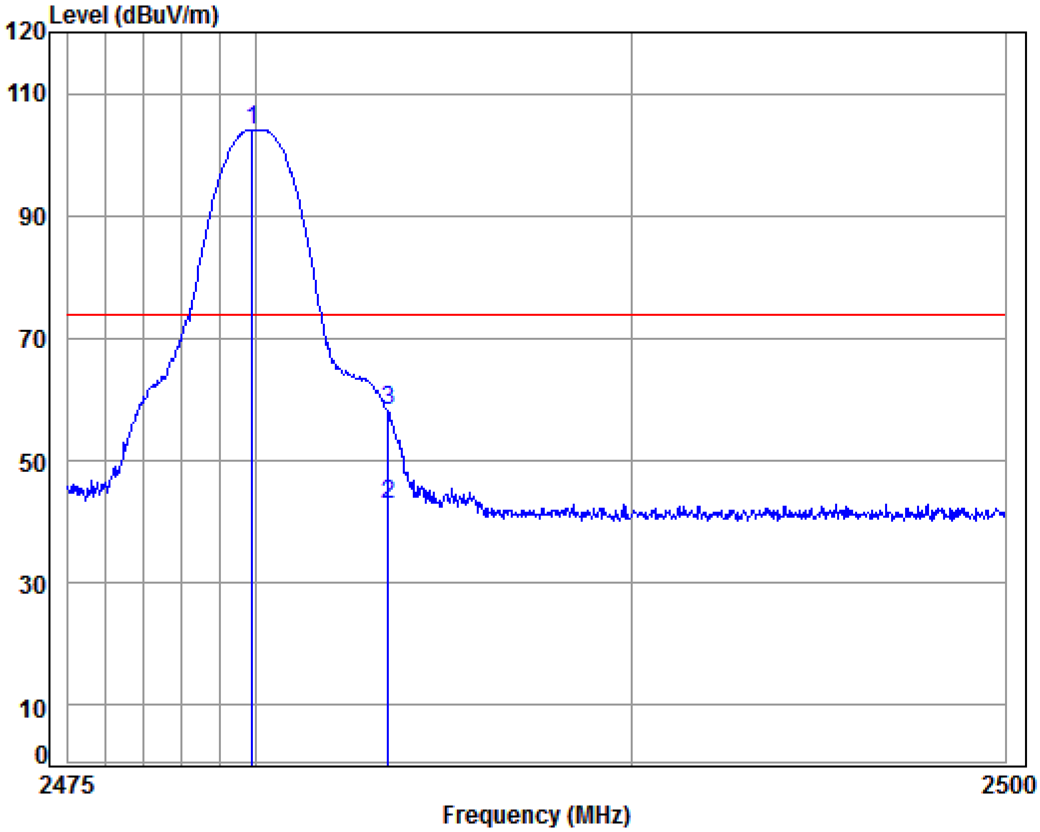
Mode:b; Polarization:Horizontal; Modulation Type:GFSK; Channel:High



Condition: 3m Horizontal
Job No: : 01913CR
Mode: : 2480 Band edge

		Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	pp	2479.830	5.41	29.34	37.95	107.57	104.37	74.00	30.37	Peak
2	av	2483.500	5.41	29.35	37.95	45.47	42.28	54.00	-11.72	Average
3		2483.500	5.41	29.35	37.95	61.49	58.30	74.00	-15.70	Peak

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



Condition: 3m Vertical
Job No: : 01913CR
Mode: : 2480 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2479.880	5.41	29.34	37.95	107.24	104.04	74.00	30.04	Peak
2 av	2483.500	5.41	29.35	37.95	46.15	42.96	54.00	-11.04	Average
3	2483.500	5.41	29.35	37.95	61.46	58.27	74.00	-15.73	Peak

7.10 Conducted Band Edges Measurement

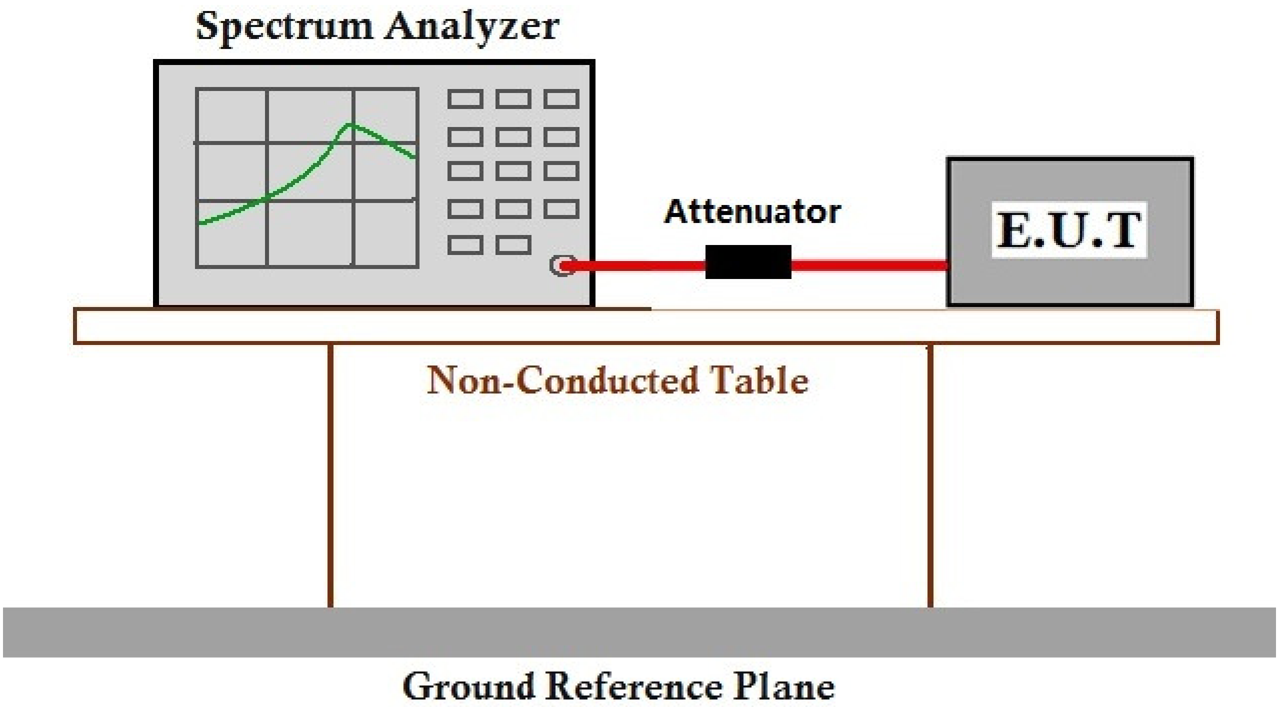
Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 7.8.6

7.10.1 E.U.T. Operation

Operating Environment:

Temperature:	23.0 °C	Humidity:	56 % RH	Atmospheric Pressure:	1015 mbar
Test mode:	Hopping and Non-hopping transmitting with all kind of modulation and all kind of data type Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type, 2-DH1 of data type is the worst case of π/4DQPSK modulation type, 3-DH1 of data type is the worst case of 8DPSK modulation type. a:TX_Keep the EUT in transmitting mode b:TX+Charge_Keep the EUT in transmitting mode and being charged				
The worst case for final test:	b:TX+Charge_Keep the EUT in transmitting mode and being charged				

7.10.2 Test Setup Diagram



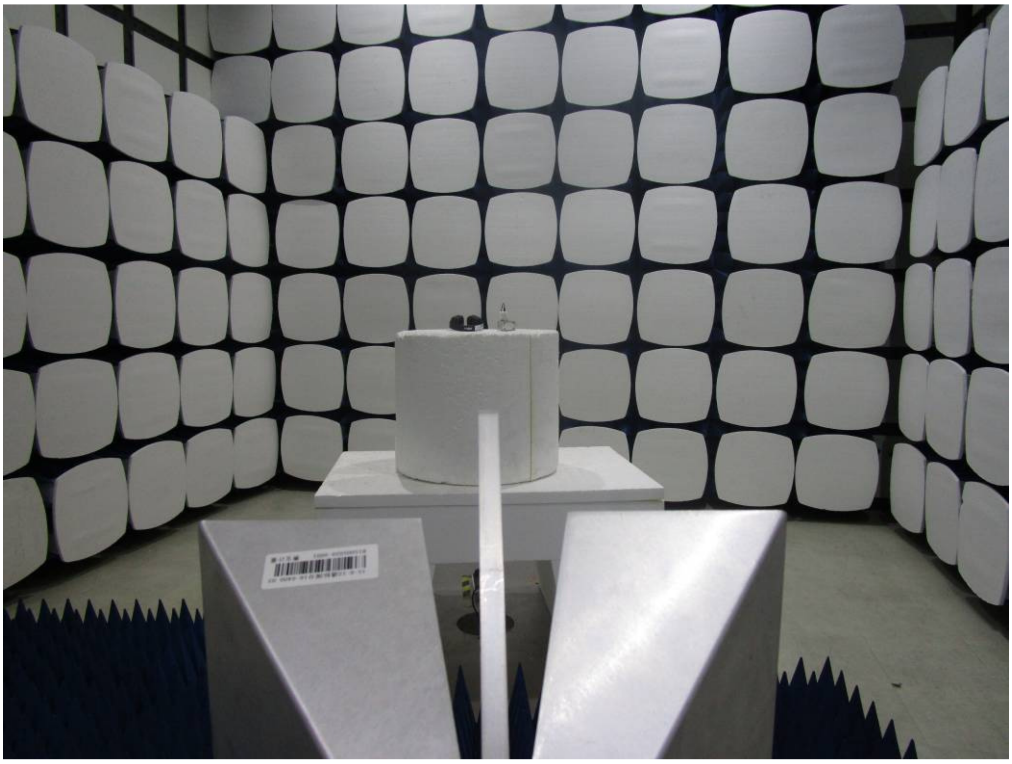
7.10.3 Measurement Data

The detailed test data see: Appendix 15.247

8 Photographs

8.1 Conducted Disturbance at AC Power Line(150kHz-30MHz) Test Setup

8.2 Radiated Spurious Emissions Test Setup



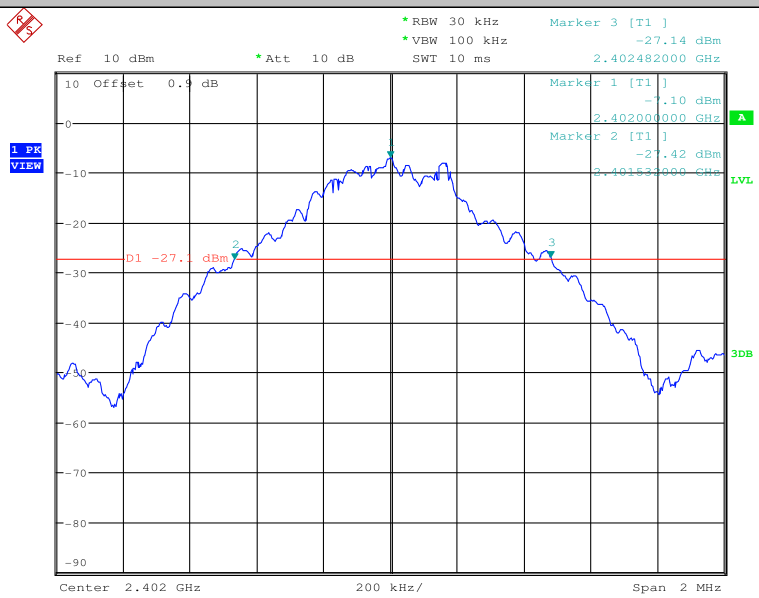
9 Appendix

9.1 Appendix 15.247

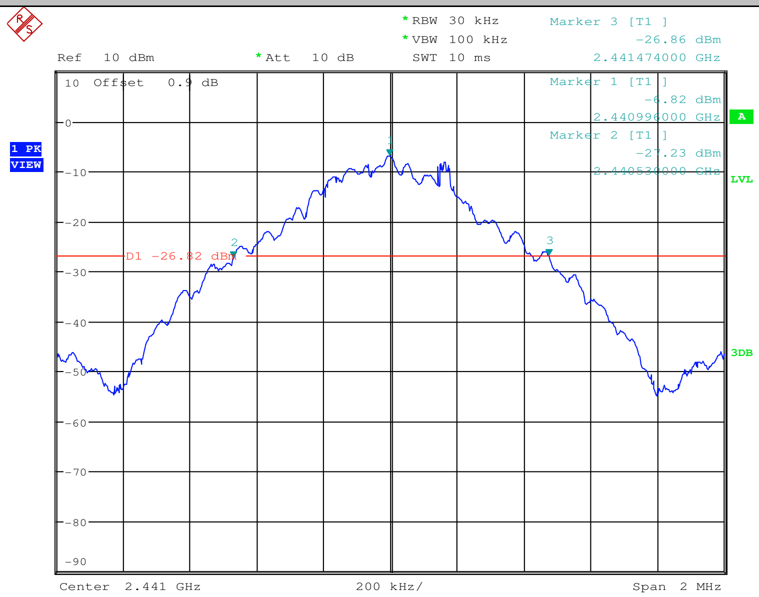
1.20 dB Bandwidth

Test Mode	Test Channel	EBW[MHz]	Limit[MHz]	Verdict
DH5	2402	0.950	---	PASS
DH5	2441	0.944	---	PASS
DH5	2480	0.944	---	PASS
2DH5	2402	1.254	---	PASS
2DH5	2441	1.248	---	PASS
2DH5	2480	1.248	---	PASS
3DH5	2402	1.280	---	PASS
3DH5	2441	1.268	---	PASS
3DH5	2480	1.270	---	PASS

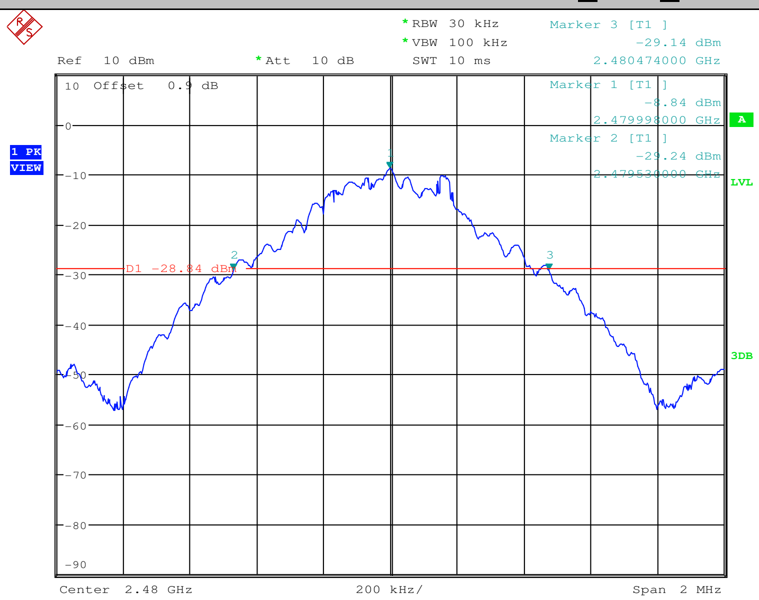
TEST PLOT
20 dB Bandwidth_DH5_2402



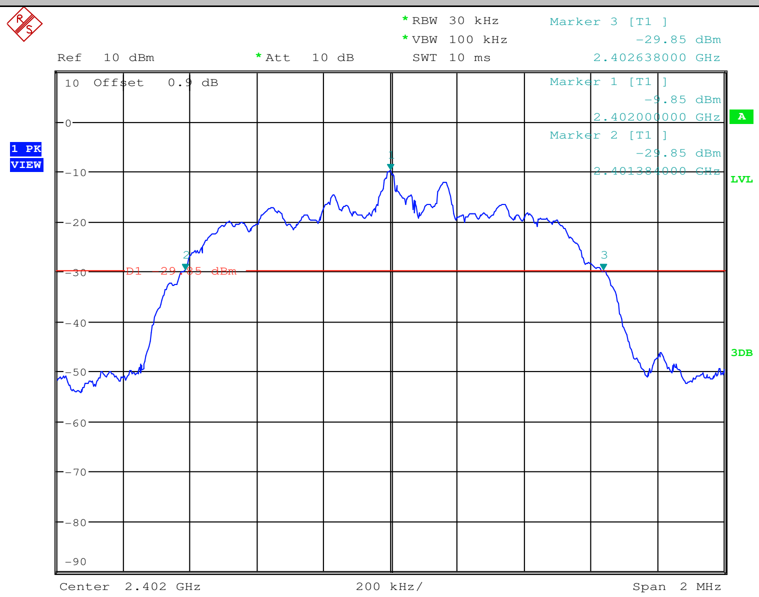
20 dB Bandwidth_DH5_2441



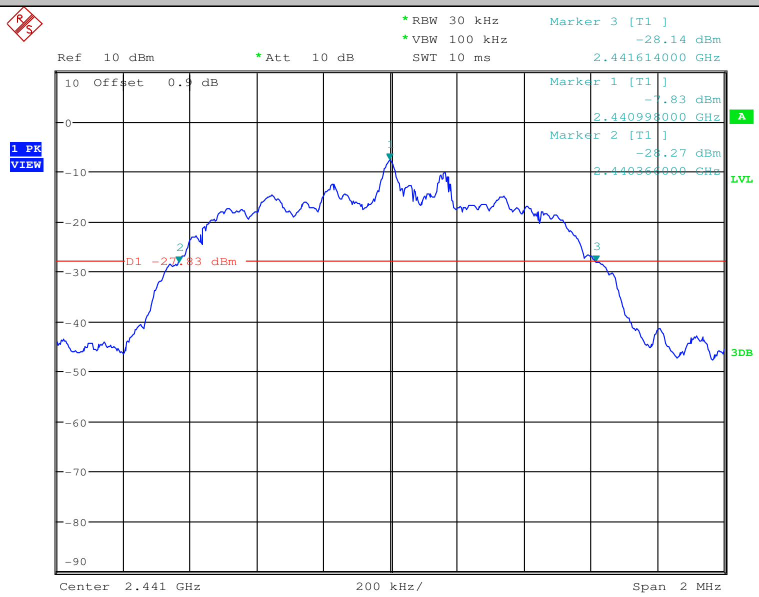
20 dB Bandwidth_DH5_2480



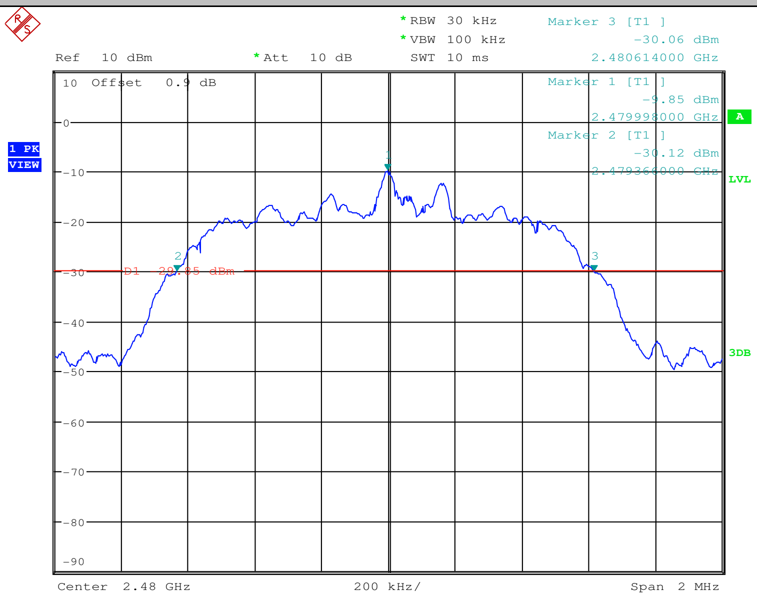
20 dB Bandwidth_2DH5_2402



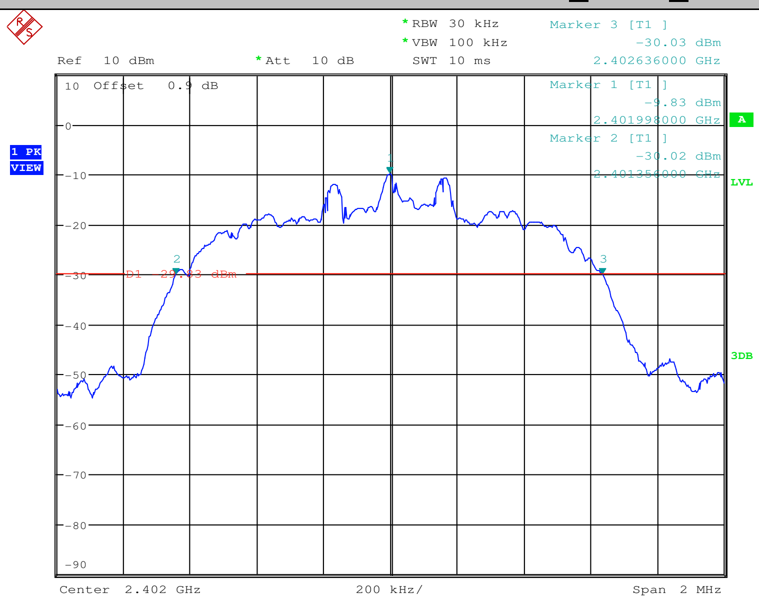
20 dB Bandwidth_2DH5_2441



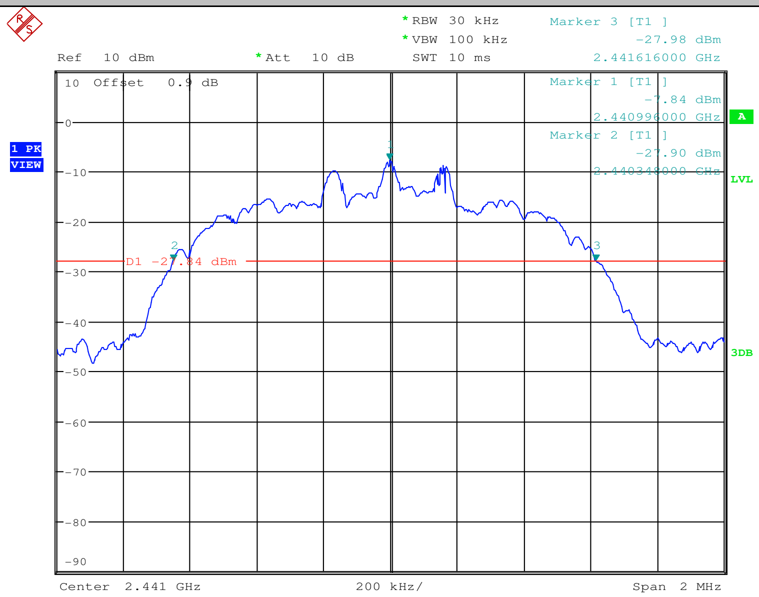
20 dB Bandwidth_2DH5_2480



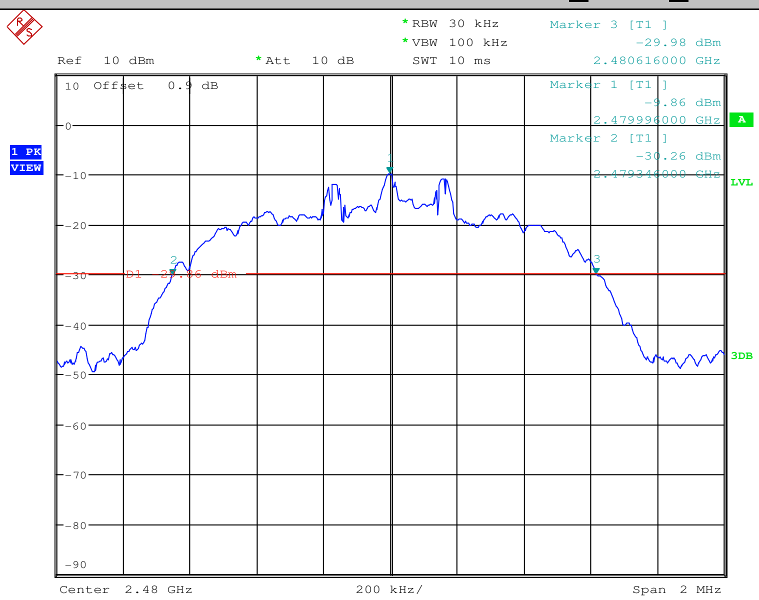
20 dB Bandwidth_3DH5_2402



20 dB Bandwidth_3DH5_2441



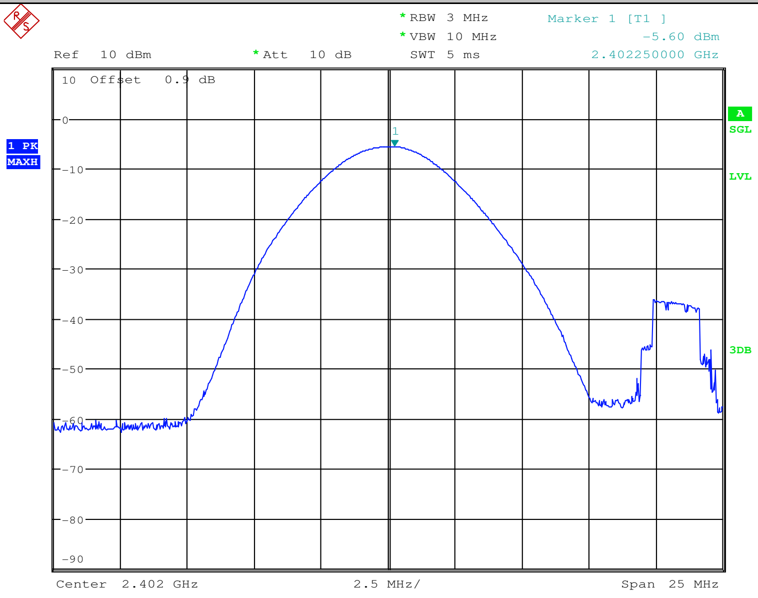
20 dB Bandwidth_3DH5_2480



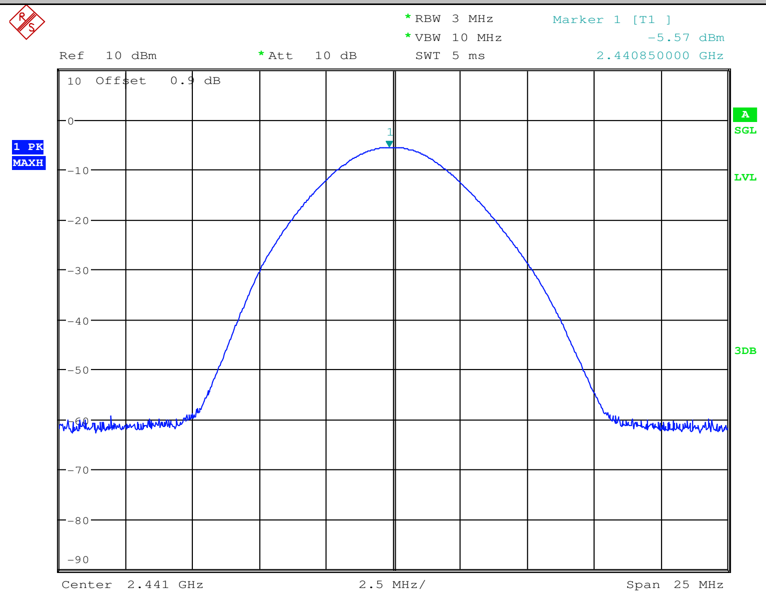
2.Conducted Peak Output Power

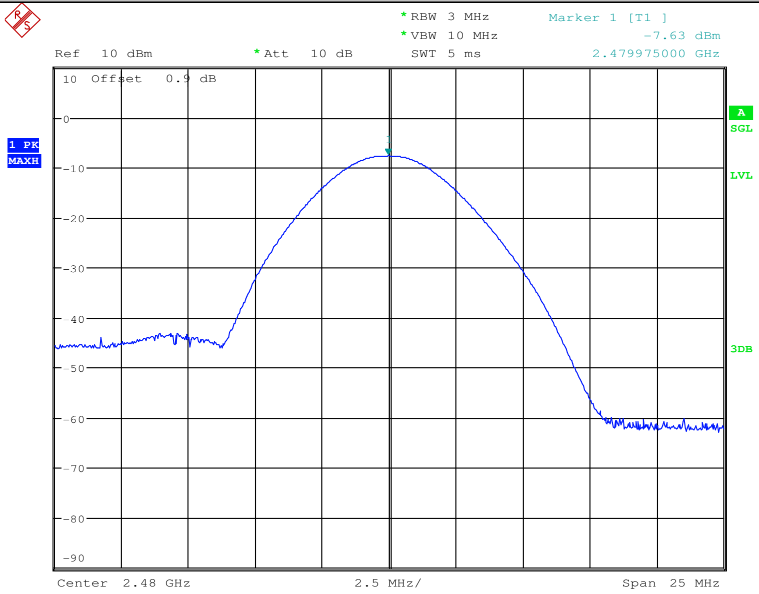
Test Mode	Test Channel	Power[dBm]	Limit[dBm]	Verdict
DH5	2402	-5.6	<30	PASS
DH5	2441	-5.57	<30	PASS
DH5	2480	-7.63	<30	PASS
2DH5	2402	-7.5	<20.97	PASS
2DH5	2441	-6.27	<20.97	PASS
2DH5	2480	-8.33	<20.97	PASS
3DH5	2402	-7.21	<20.97	PASS
3DH5	2441	-6.15	<20.97	PASS
3DH5	2480	-8.14	<20.97	PASS

TEST PLOT
Conducted Peak Output Power_DH5_2402

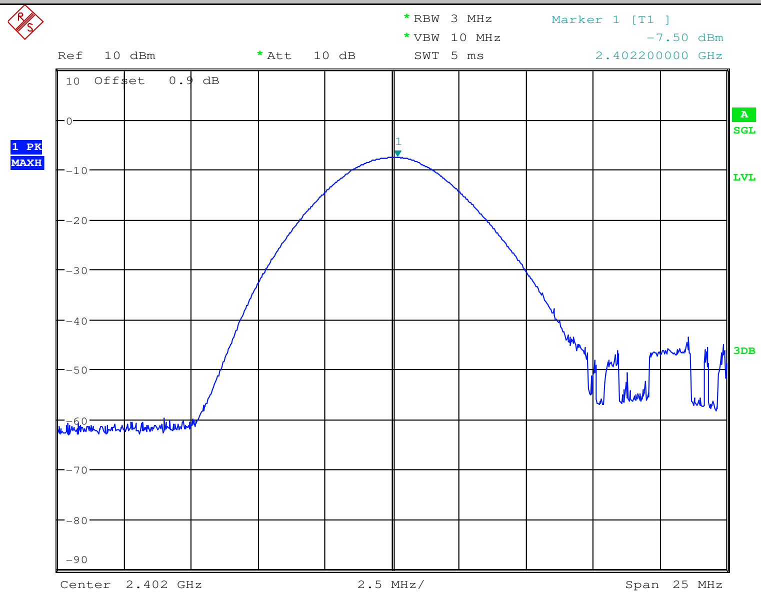


Conducted Peak Output Power_DH5_2441

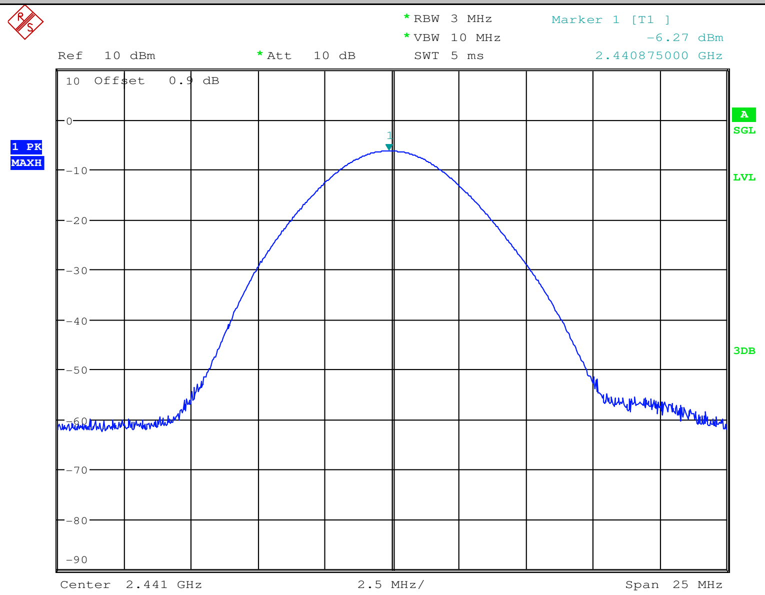


Conducted Peak Output Power_DH5_2480


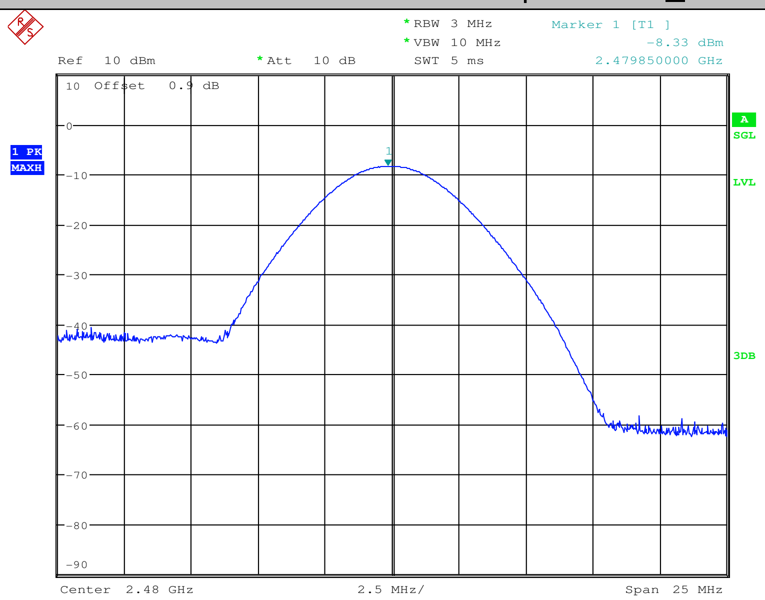
Conducted Peak Output Power_2DH5_2402



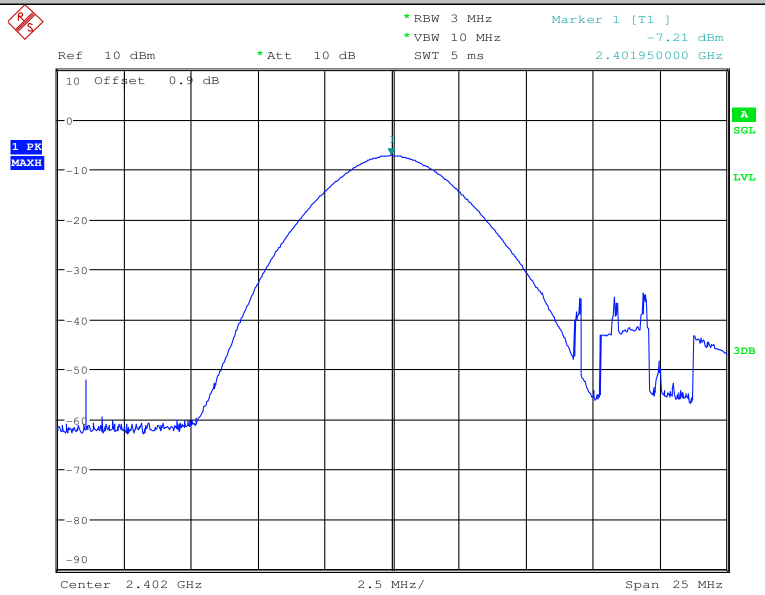
Conducted Peak Output Power_2DH5_2441



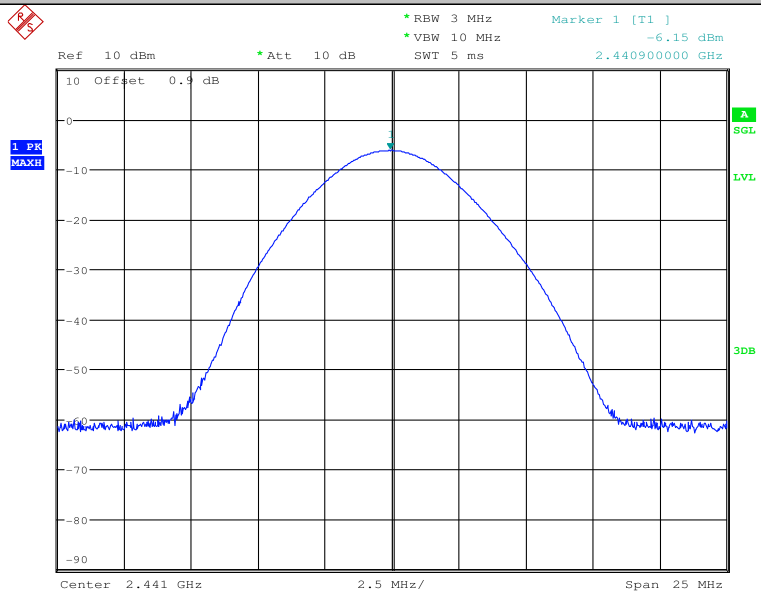
Conducted Peak Output Power_2DH5_2480



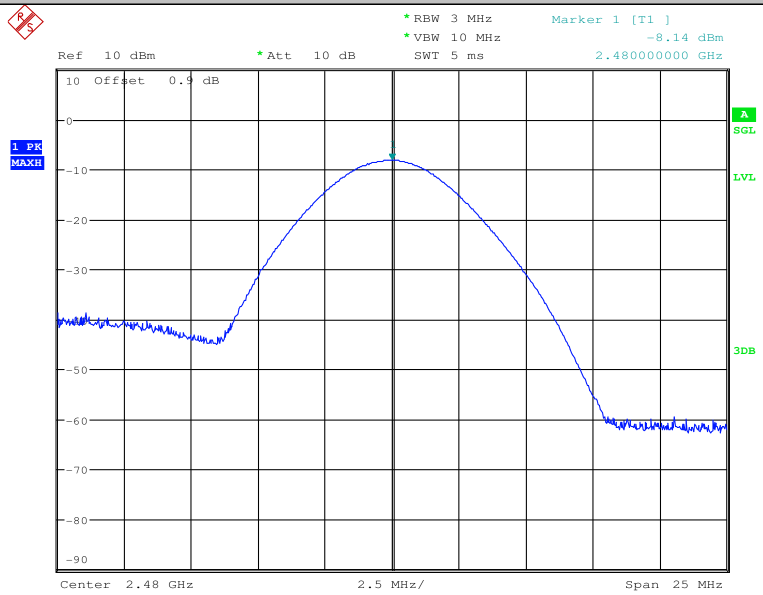
Conducted Peak Output Power_3DH5_2402



Conducted Peak Output Power_3DH5_2441



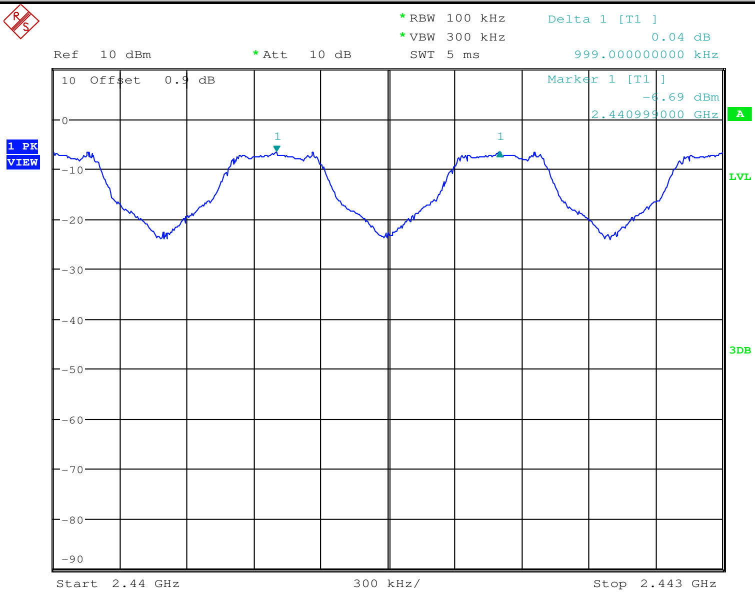
Conducted Peak Output Power_3DH5_2480



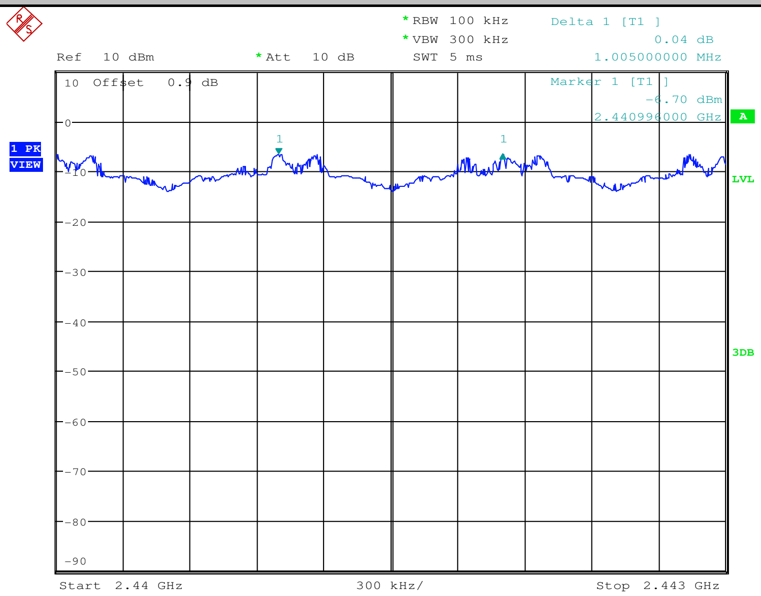
3.Carrier Frequency Separation

Test Mode	Test Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	2441	0.999	>=0.950(20dB Bandwidth)	PASS
2DH5	2441	1.005	>=0.836(2/3*20dB Bandwidth)	PASS
3DH5	2441	1.002	>=0.853(2/3*20dB Bandwidth)	PASS

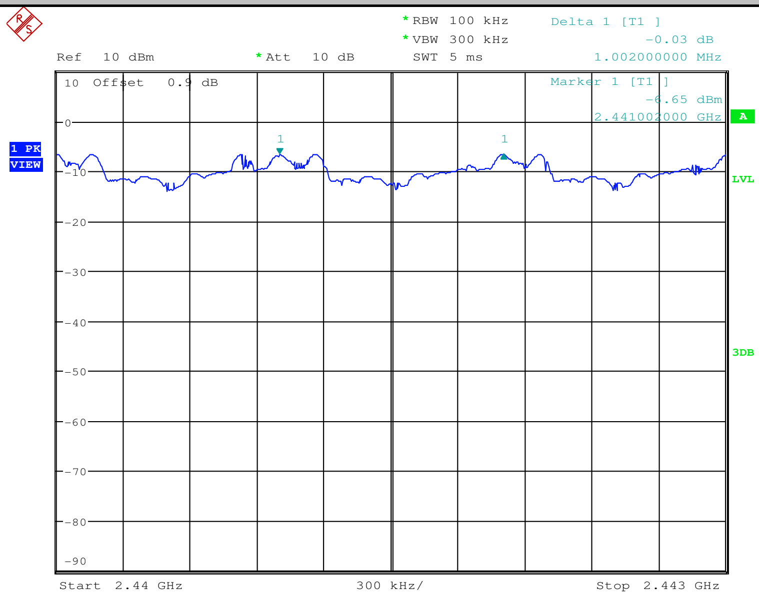
TEST PLOT
Carrier Frequency Separation_DH5_2441



Carrier Frequency Separation_2DH5_2441



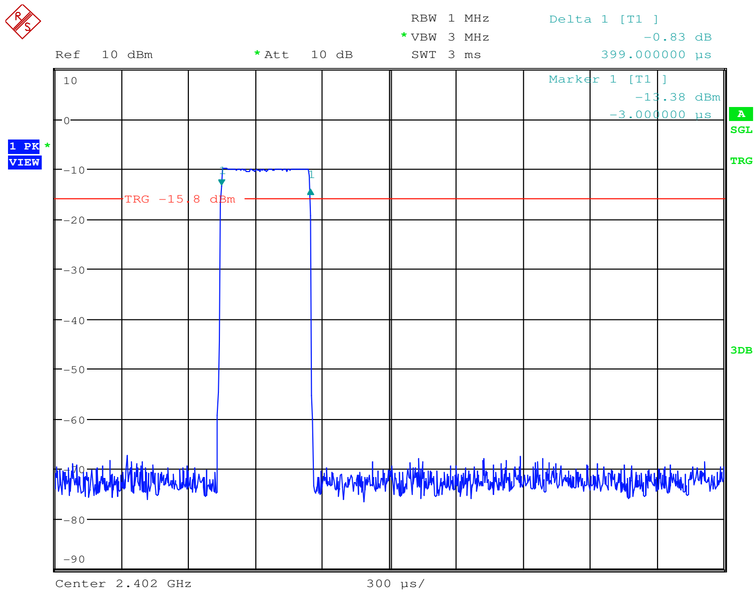
Carrier Frequency Separation_3DH5_2441

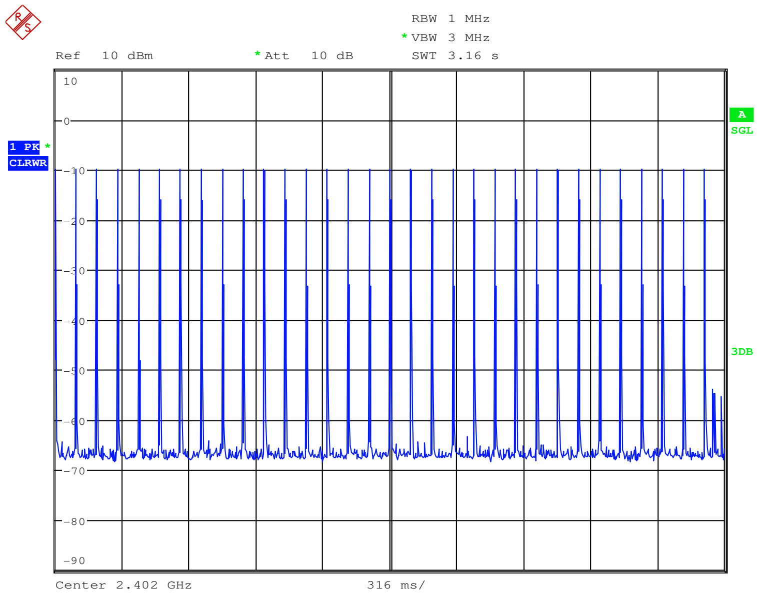


4.Dwell Time

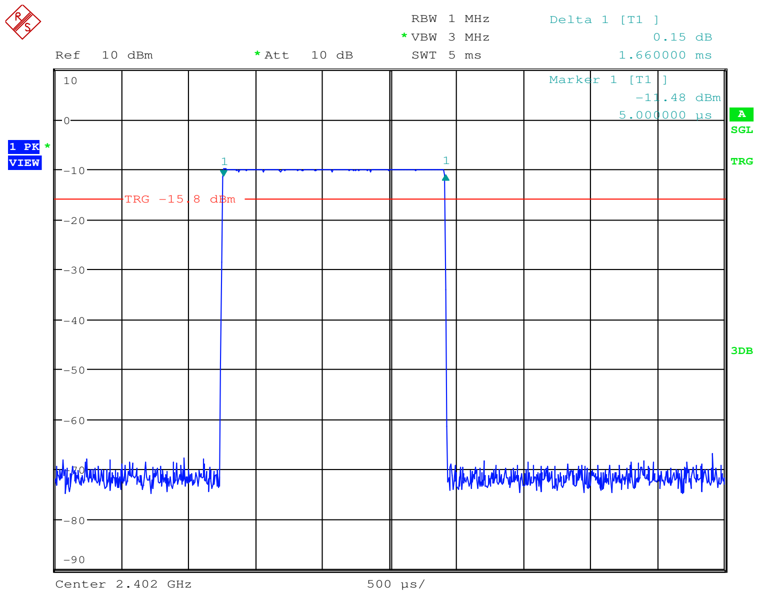
Test Mode	Test Channel	Burst Width[ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit[s]	Verdict
DH1	2402	0.4	310	0.124	<0.4	PASS
DH3	2402	1.66	160	0.266	<0.4	PASS
DH5	2402	2.9	110	0.319	<0.4	PASS
2DH1	2402	0.41	320	0.131	<0.4	PASS
2DH3	2402	1.67	160	0.267	<0.4	PASS
2DH5	2402	2.91	100	0.291	<0.4	PASS
3DH1	2402	0.41	320	0.131	<0.4	PASS
3DH3	2402	1.67	160	0.267	<0.4	PASS
3DH5	2402	2.91	110	0.32	<0.4	PASS

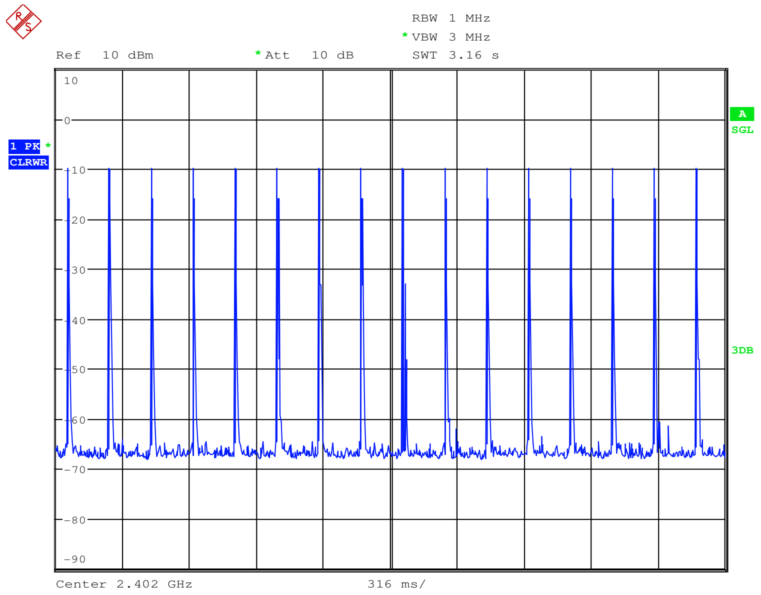
TEST PLOT
Dwell Time_DH1_2402



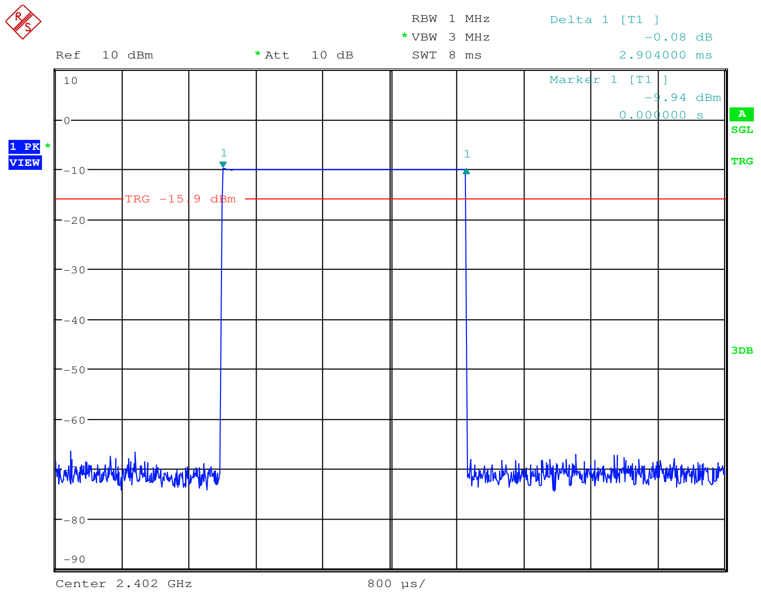


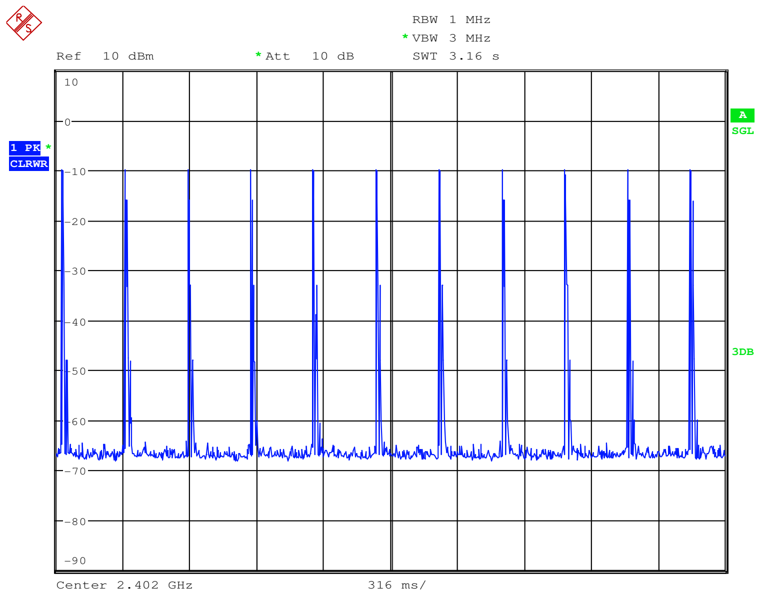
Dwell Time_DH3_2402



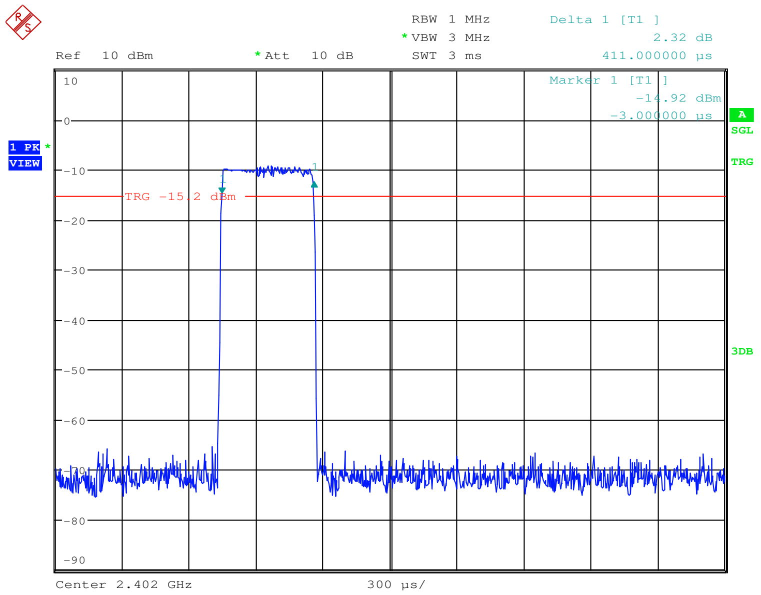


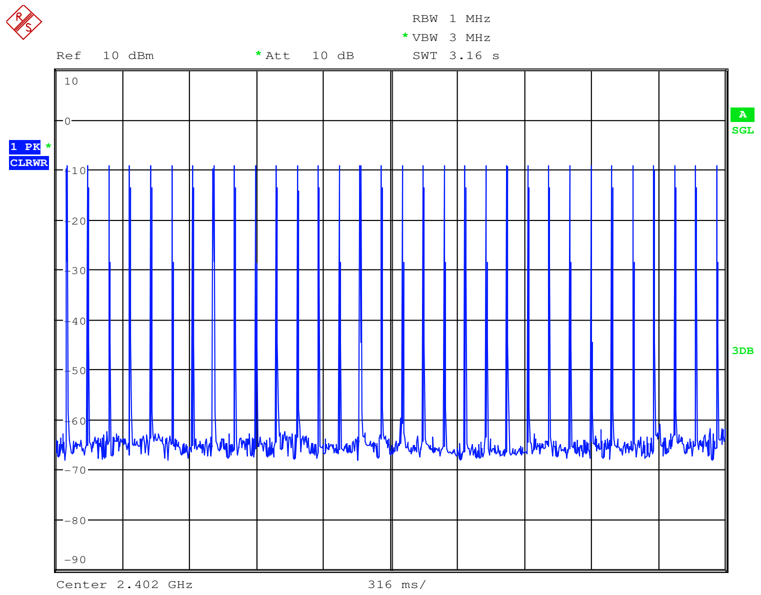
Dwell Time_DH5_2402



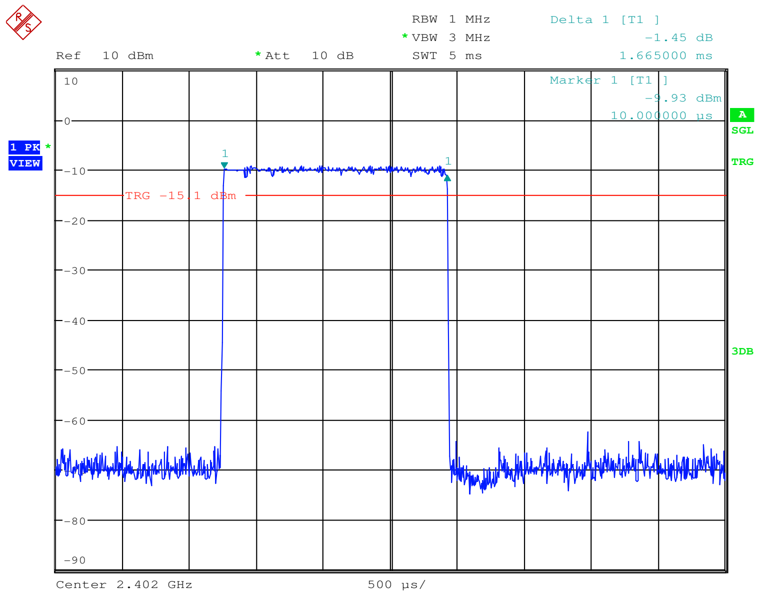


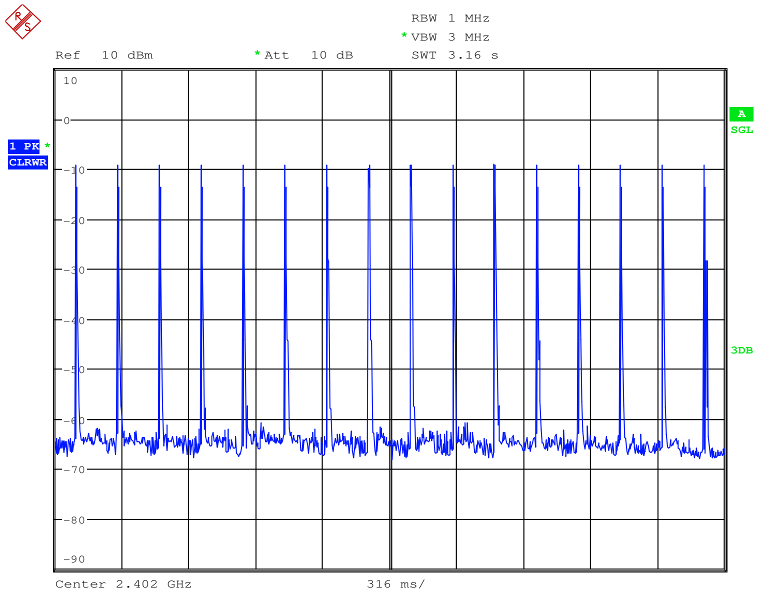
Dwell Time_2DH1_2402



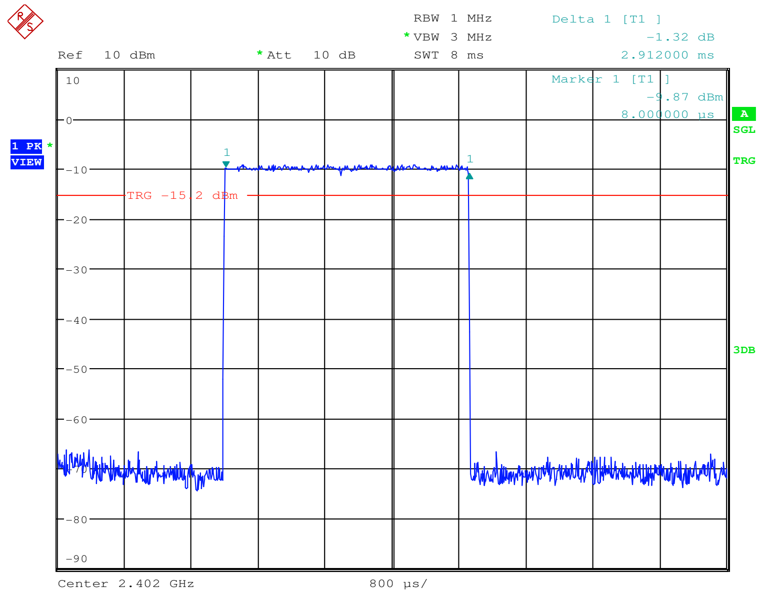


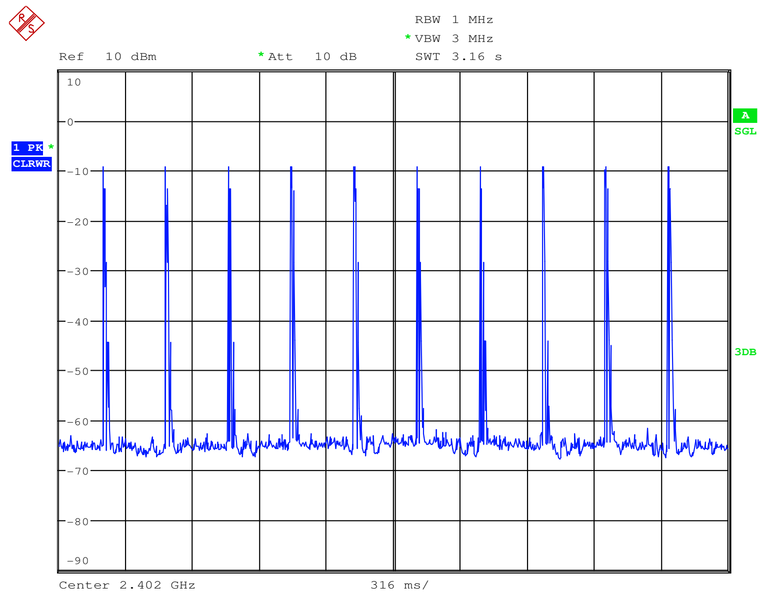
Dwell Time_2DH3_2402



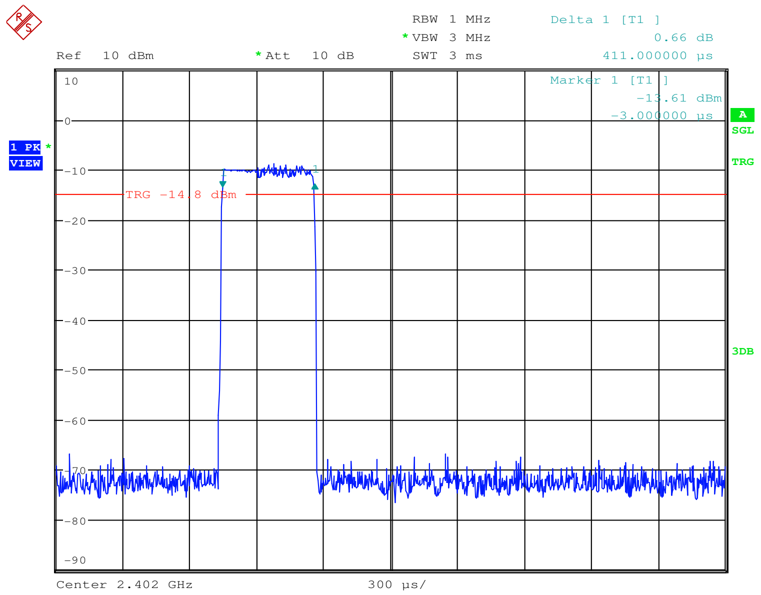


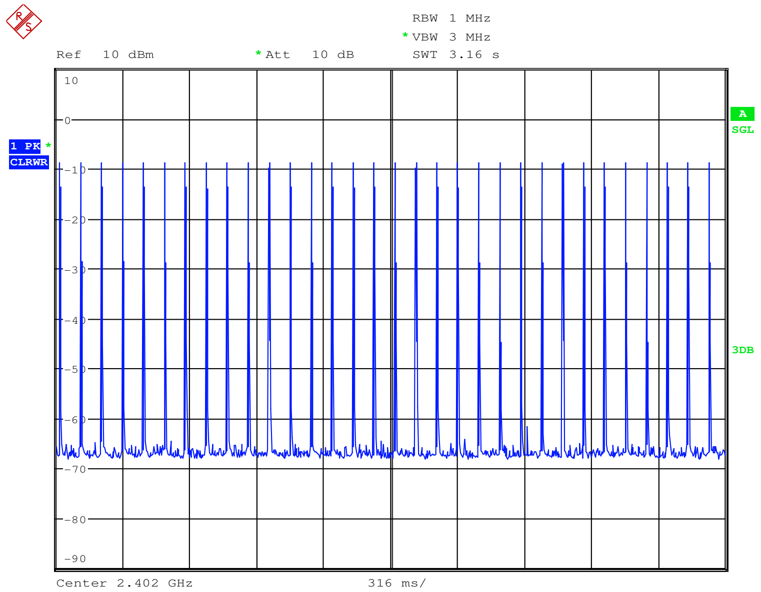
Dwell Time_2DH5_2402



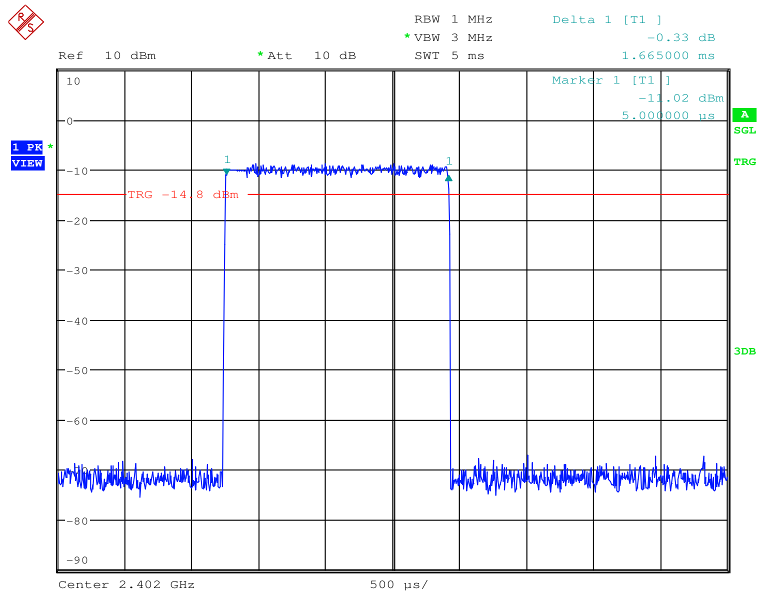


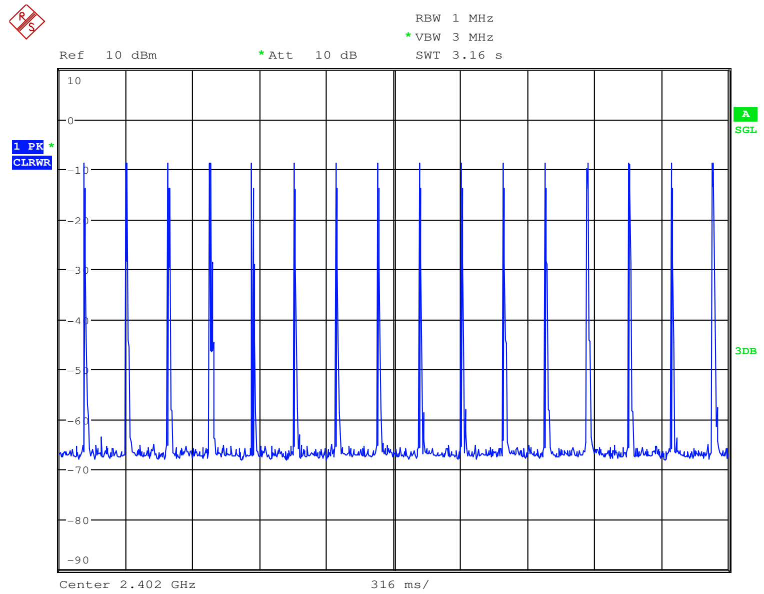
Dwell Time_3DH1_2402



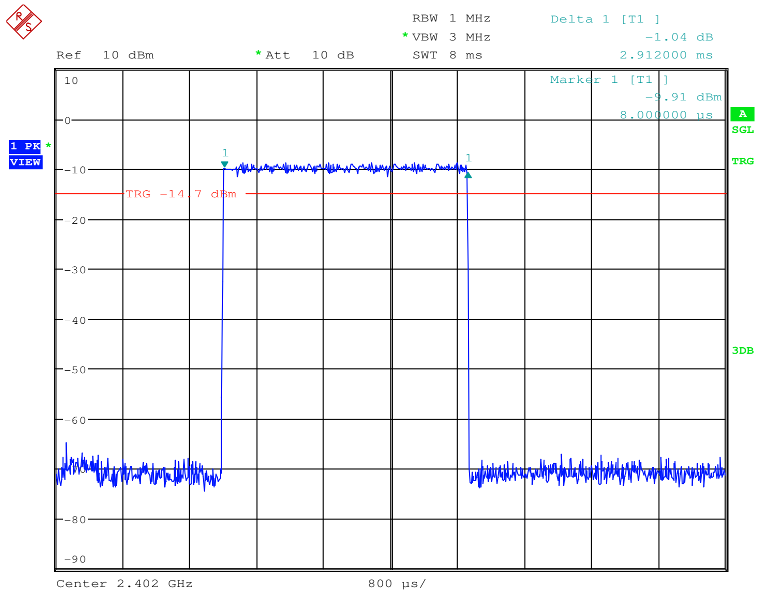


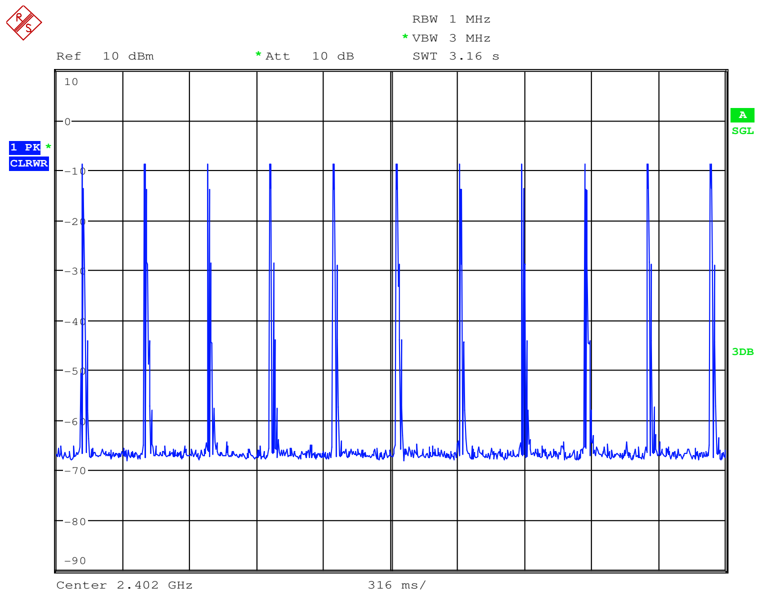
Dwell Time_3DH3_2402





Dwell Time_3DH5_2402

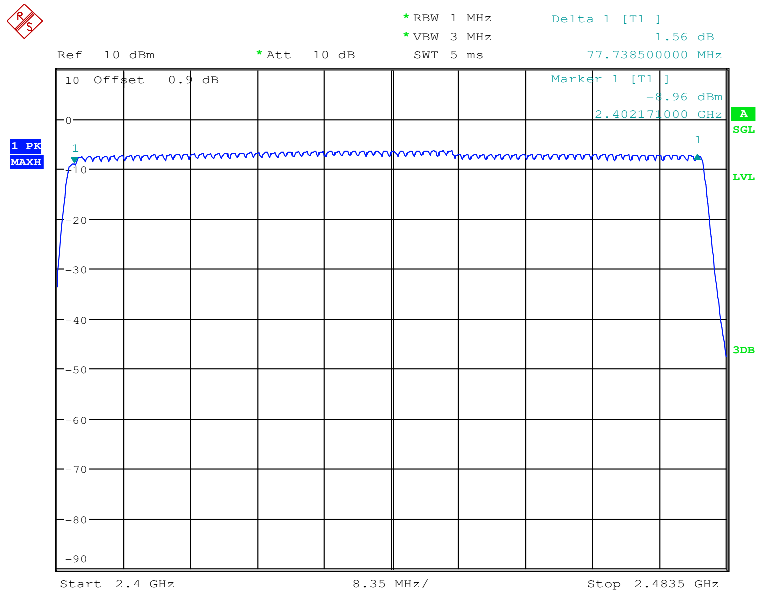




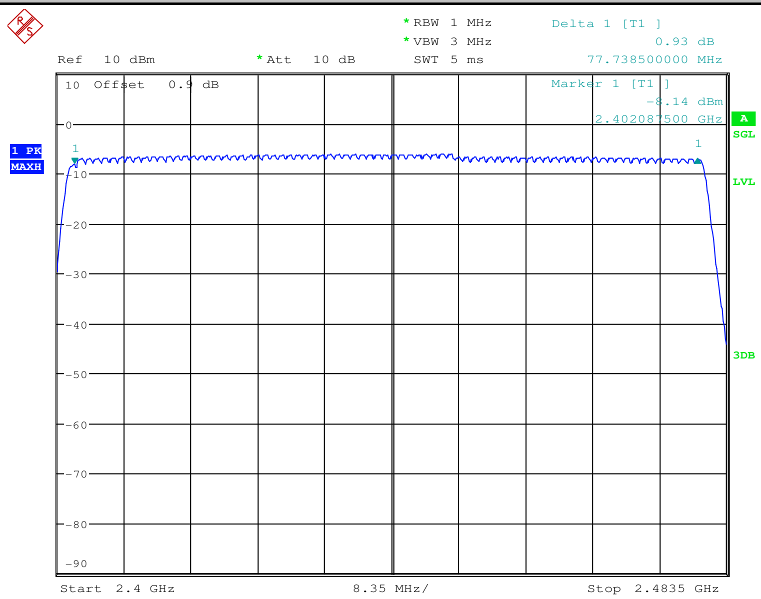
5.Hopping Channel Number

Test Mode	Test Channel	Number of Hopping Channel[N]	Limit[N]	Verdict
DH5	2402	79	>=15	PASS
2DH5	2402	79	>=15	PASS
3DH5	2402	79	>=15	PASS

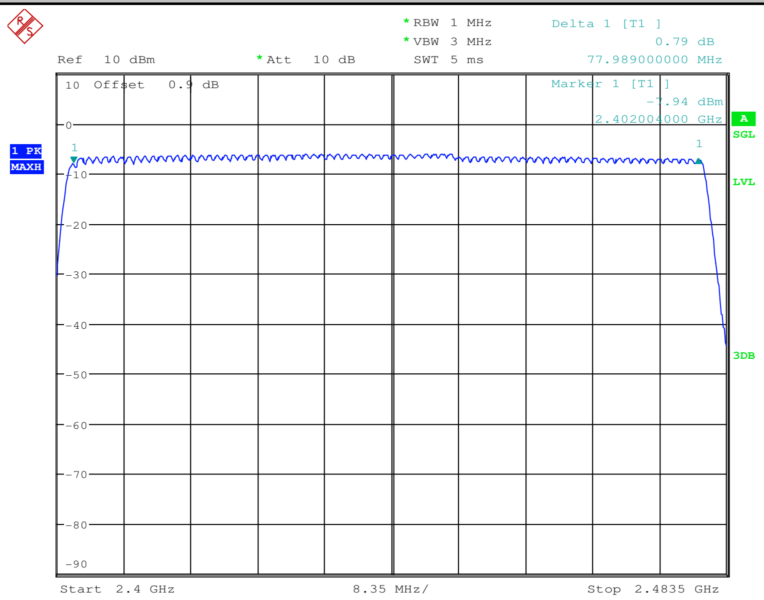
TEST PLOT
Hopping Channel Number_DH5_2402



Hopping Channel Number_2DH5_2402



Hopping Channel Number_3DH5_2402

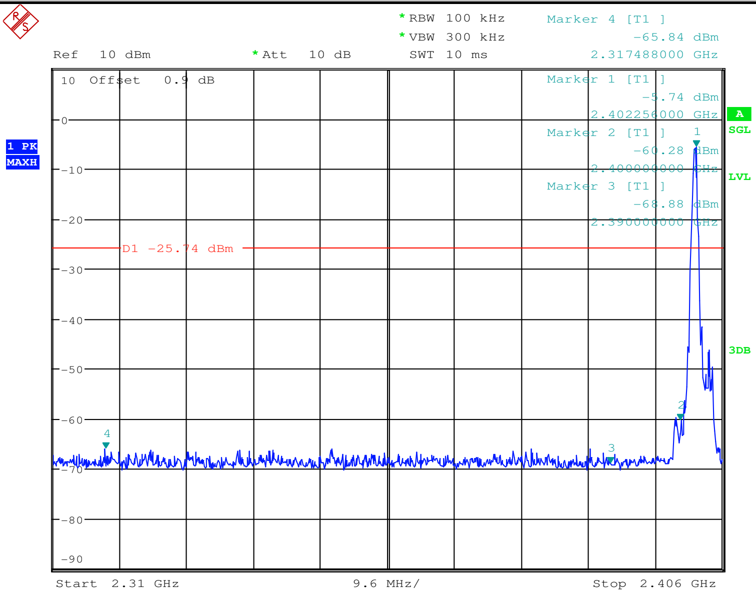


6.Band-edge for RF Conducted Emissions

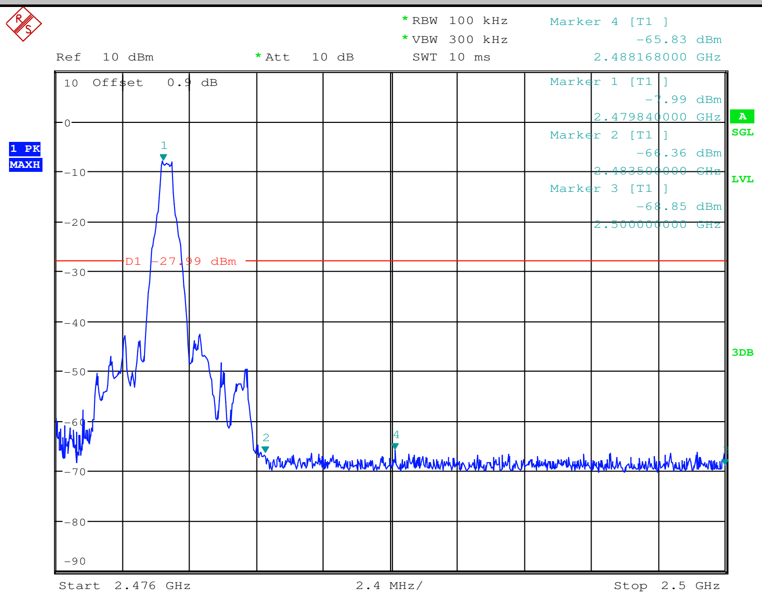
Test Mode	Test Channel	Hopping	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit[dBm]	Verdict
DH5	2402	Off	-5.740	-65.840	<-25.74	PASS
DH5	2480	Off	-7.990	-65.829	<-27.99	PASS
2DH5	2402	Off	-11.660	-65.852	<-31.66	PASS
2DH5	2480	Off	-9.380	-65.716	<-29.38	PASS
3DH5	2402	Off	-10.340	-62.617	<-30.34	PASS
3DH5	2480	Off	-9.060	-63.661	<-29.06	PASS
DH5	2402	On	-7.950	-59.082	<-27.95	PASS
DH5	2480	On	-7.610	-61.163	<-27.61	PASS
2DH5	2402	On	-9.510	-61.103	<-29.51	PASS
2DH5	2480	On	-7.610	-49.096	<-27.61	PASS
3DH5	2402	On	-10.310	-59.752	<-30.31	PASS
3DH5	2480	On	-8.100	-55.735	<-28.1	PASS

TEST PLOT

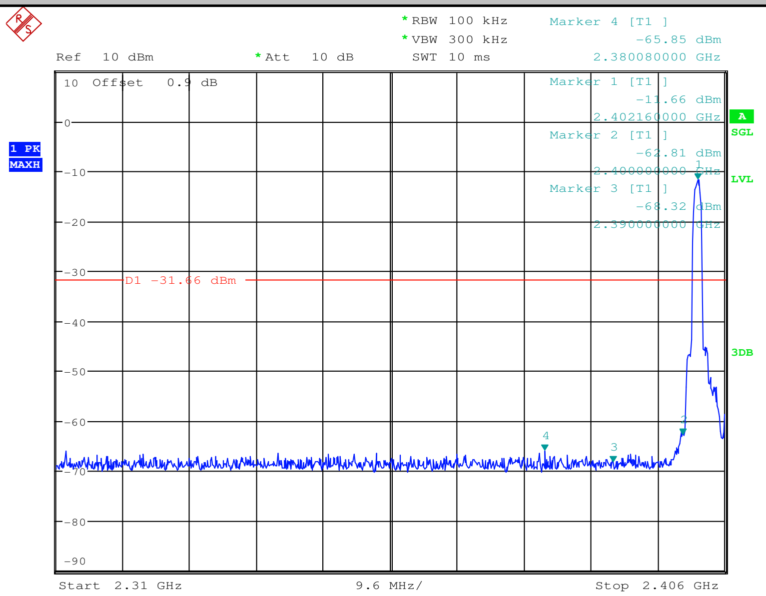
Band-edge for RF Conducted Emissions_DH5_2402_Hopping Off



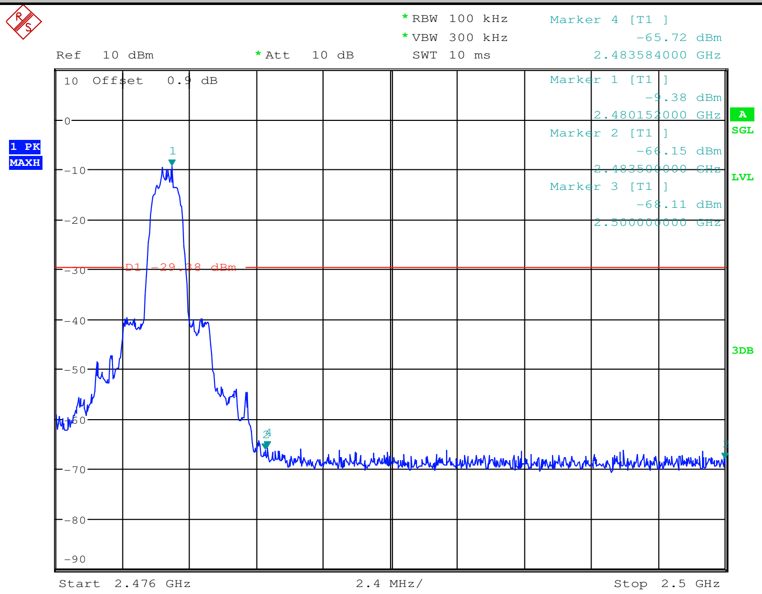
Band-edge for RF Conducted Emissions_DH5_2480_Hopping Off



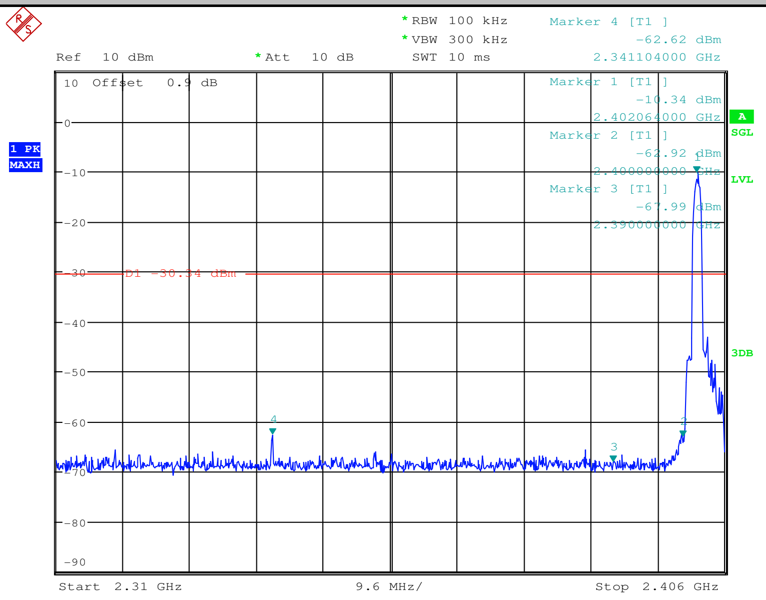
Band-edge for RF Conducted Emissions_2DH5_2402_Hopping Off



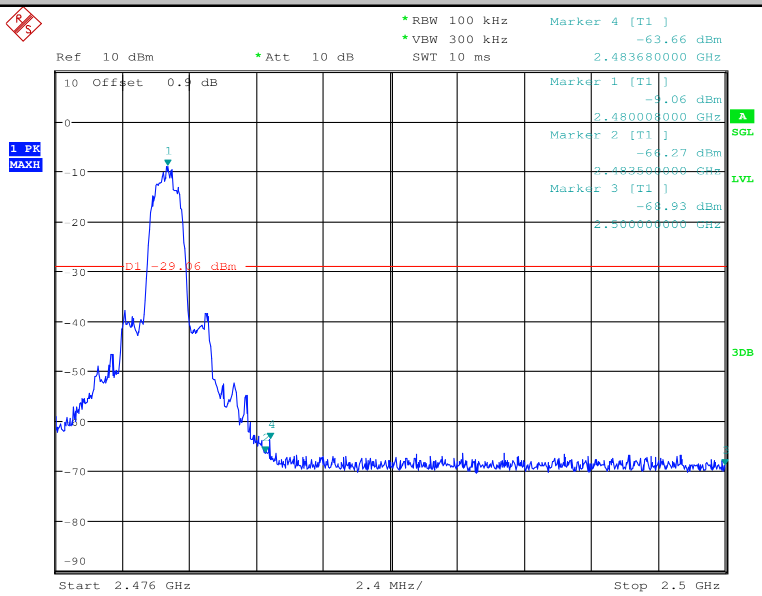
Band-edge for RF Conducted Emissions_2DH5_2480_Hopping Off



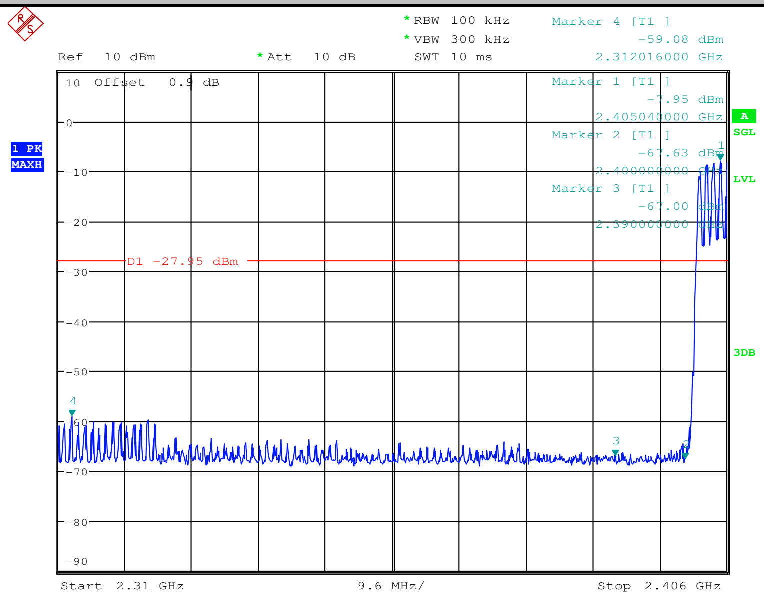
Band-edge for RF Conducted Emissions_3DH5_2402_Hopping Off



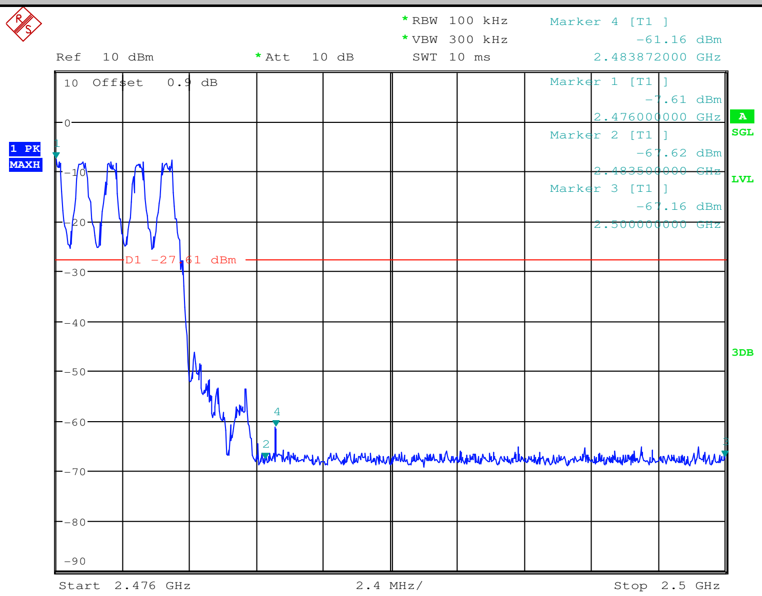
Band-edge for RF Conducted Emissions_3DH5_2480_Hopping Off



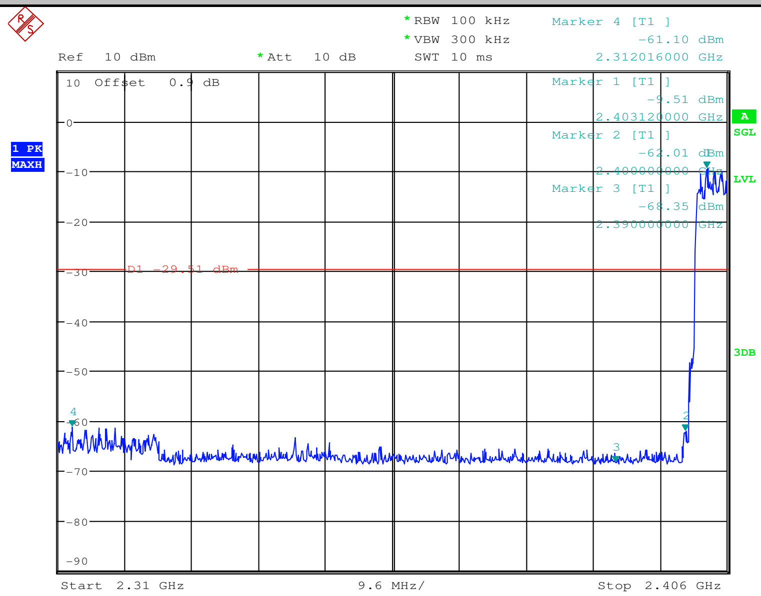
Band-edge for RF Conducted Emissions_DH5_2402_Hopping On



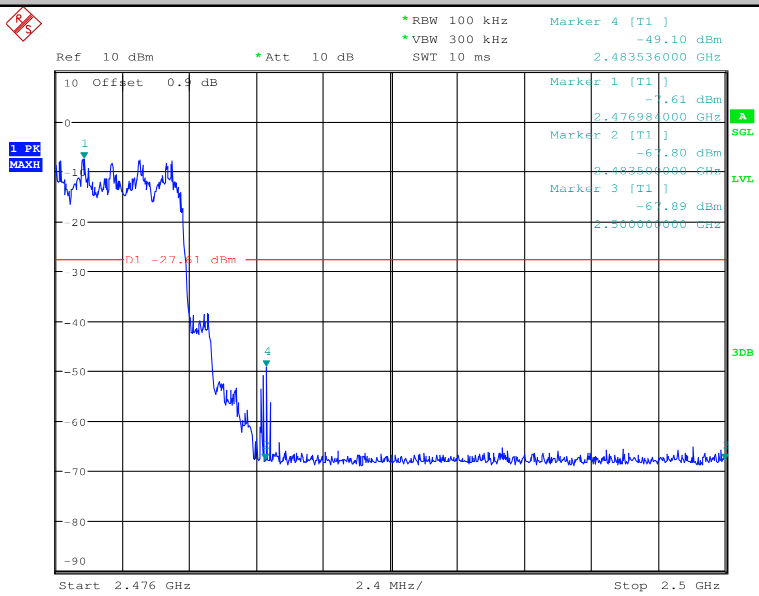
Band-edge for RF Conducted Emissions_DH5_2480_Hopping On



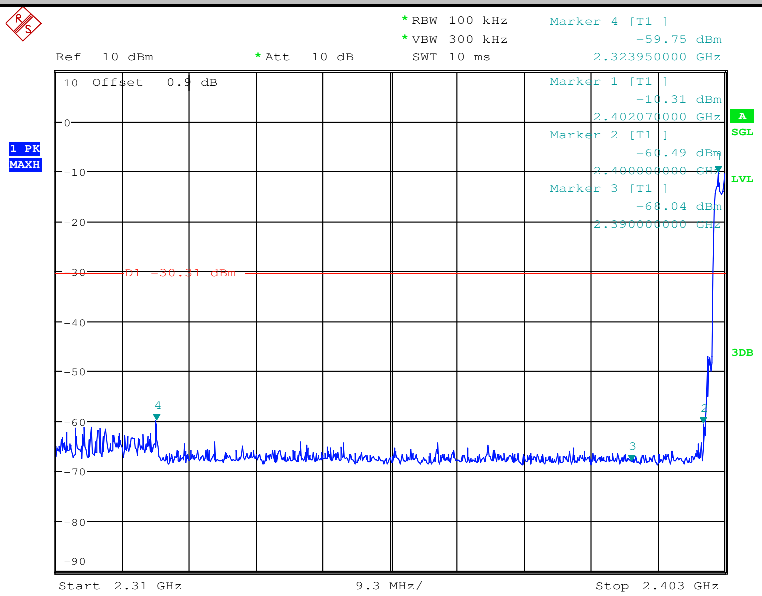
Band-edge for RF Conducted Emissions_2DH5_2402_Hopping On



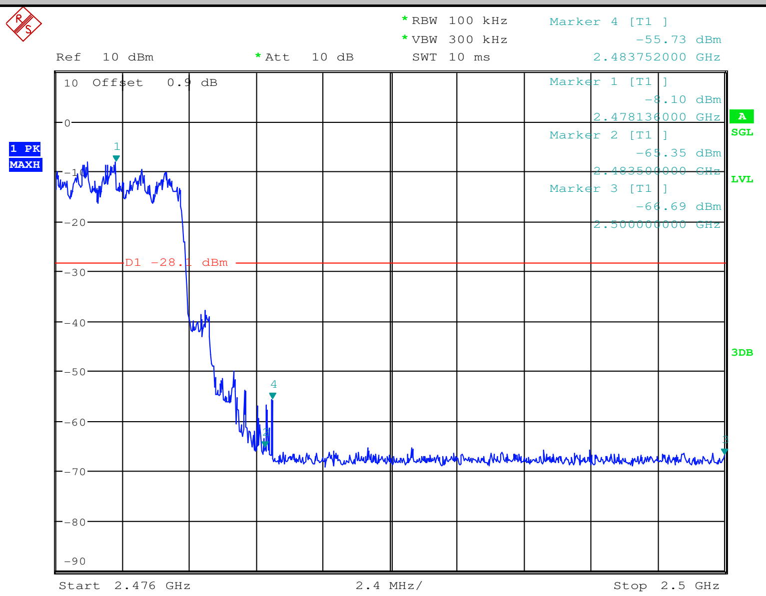
Band-edge for RF Conducted Emissions_2DH5_2480_Hopping On



Band-edge for RF Conducted Emissions_3DH5_2402_Hopping On

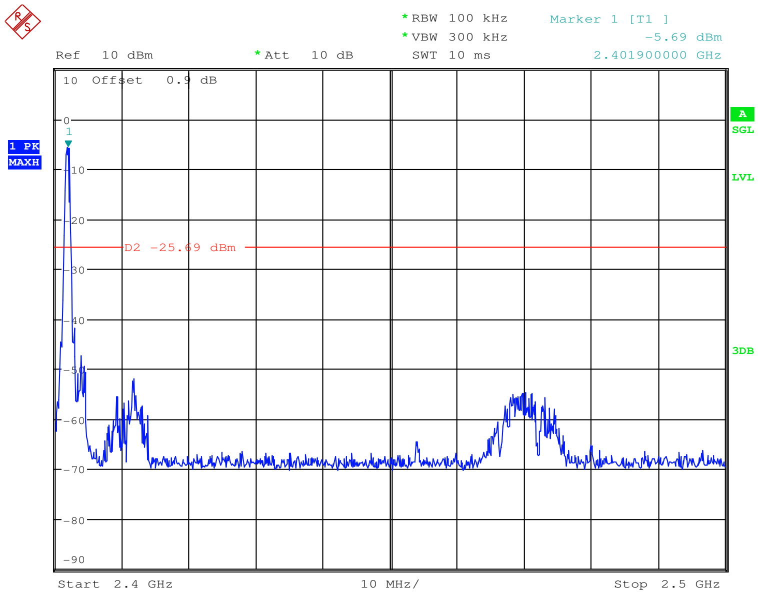


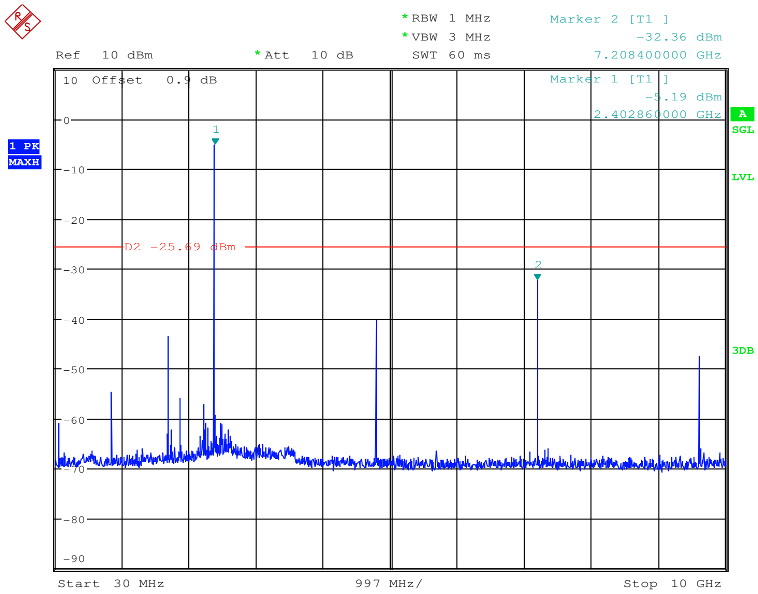
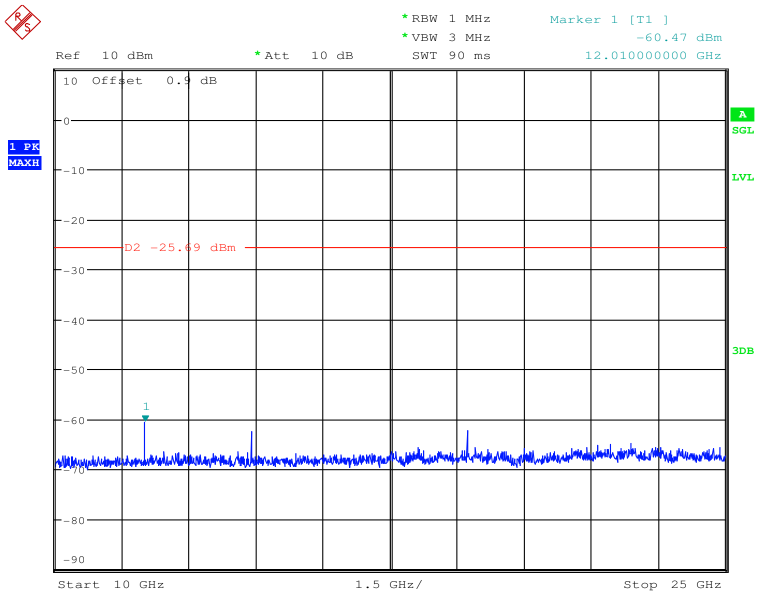
Band-edge for RF Conducted Emissions_3DH5_2480_Hopping On

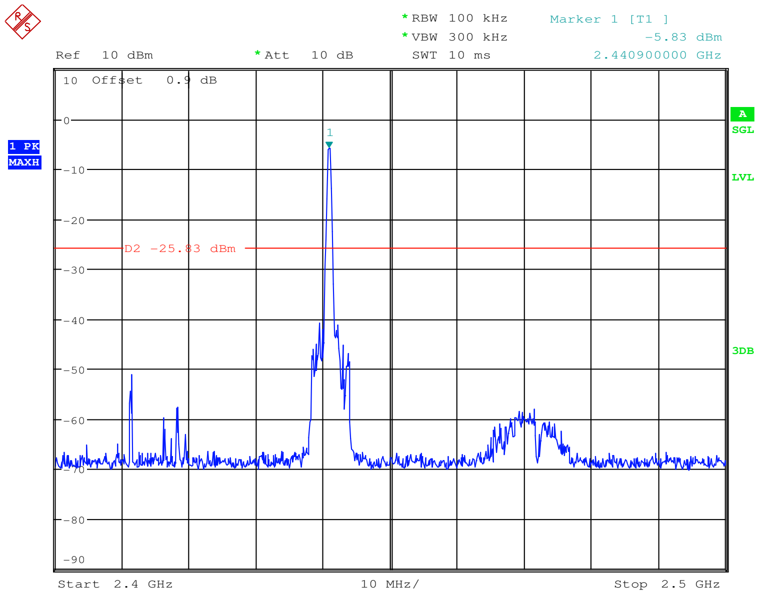


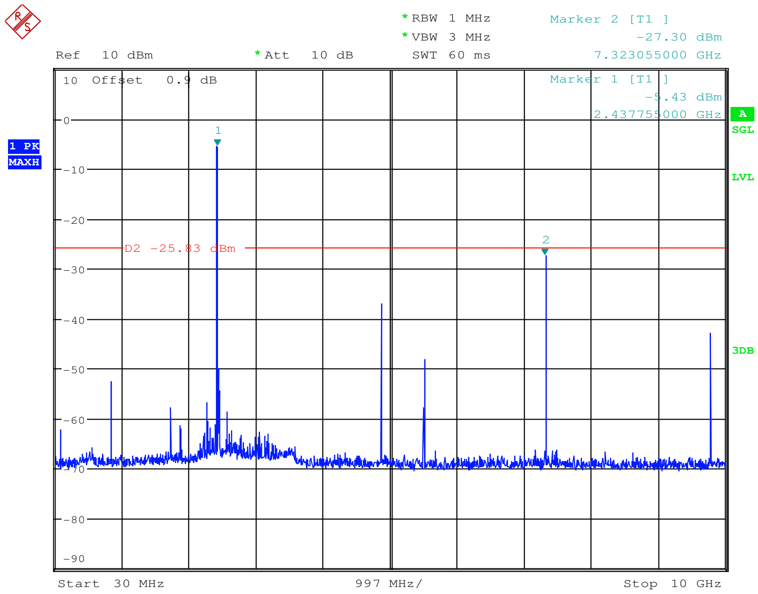
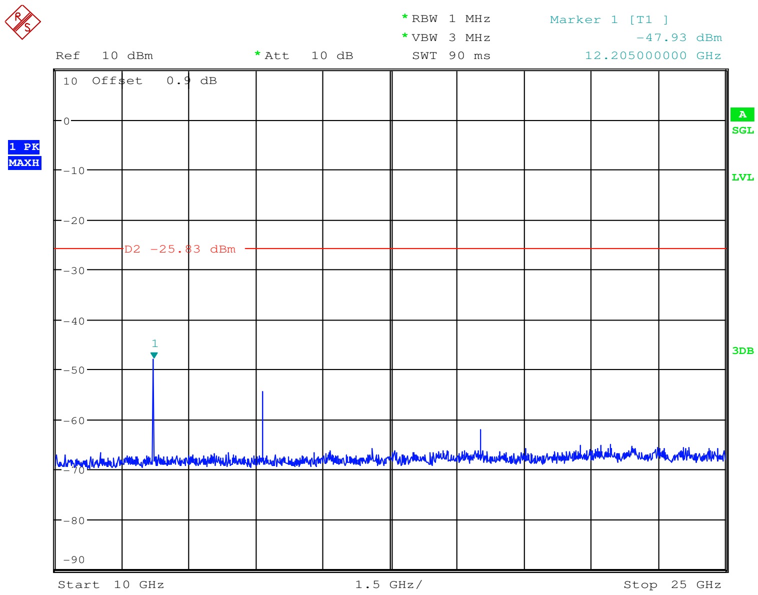
7.RF Conducted Spurious Emissions

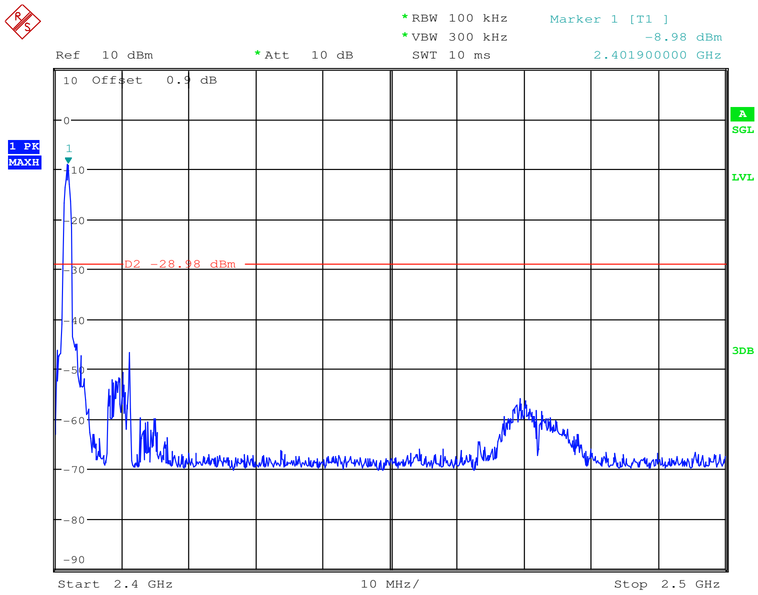
Test Mode	Test Channel	StartFre [MHz]	StopFre [MHz]	RBW [kHz]	VBW [kHz]	Pref[dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
DH5	2402	30	10000	1000	3000	-5.69	-32.360	<-25.69	PASS
DH5	2402	10000	25000	1000	3000	-5.69	-60.470	<-25.69	PASS
DH5	2441	30	10000	1000	3000	-5.83	-27.300	<-25.83	PASS
DH5	2441	10000	25000	1000	3000	-5.83	-47.930	<-25.83	PASS
2DH5	2402	30	10000	1000	3000	-8.98	-32.870	<-28.98	PASS
2DH5	2402	10000	25000	1000	3000	-8.98	-60.650	<-28.98	PASS
2DH5	2441	30	10000	1000	3000	-7.04	-30.900	<-27.04	PASS
2DH5	2441	10000	25000	1000	3000	-7.04	-56.890	<-27.04	PASS
2DH5	2480	30	10000	1000	3000	-9.61	-31.690	<-29.61	PASS
DH5	2480	10000	25000	1000	3000	-9.39	-61.290	<-29.39	PASS
3DH5	2480	30	10000	1000	3000	-8.94	-32.210	<-28.94	PASS
2DH5	2480	10000	25000	1000	3000	-9.61	-59.970	<-29.61	PASS
3DH5	2441	30	10000	1000	3000	-6.98	-31.650	<-26.98	PASS
3DH5	2441	10000	25000	1000	3000	-6.98	-57.510	<-26.98	PASS
DH5	2480	30	10000	1000	3000	-9.39	-32.960	<-29.39	PASS
3DH5	2480	10000	25000	1000	3000	-8.94	-60.710	<-28.94	PASS
3DH5	2402	30	10000	1000	3000	-9.46	-37.850	<-29.46	PASS
3DH5	2402	10000	25000	1000	3000	-9.46	-62.270	<-29.46	PASS

TEST PLOT	
RF Conducted Spurious Emissions_DH5_2402	
Pref	

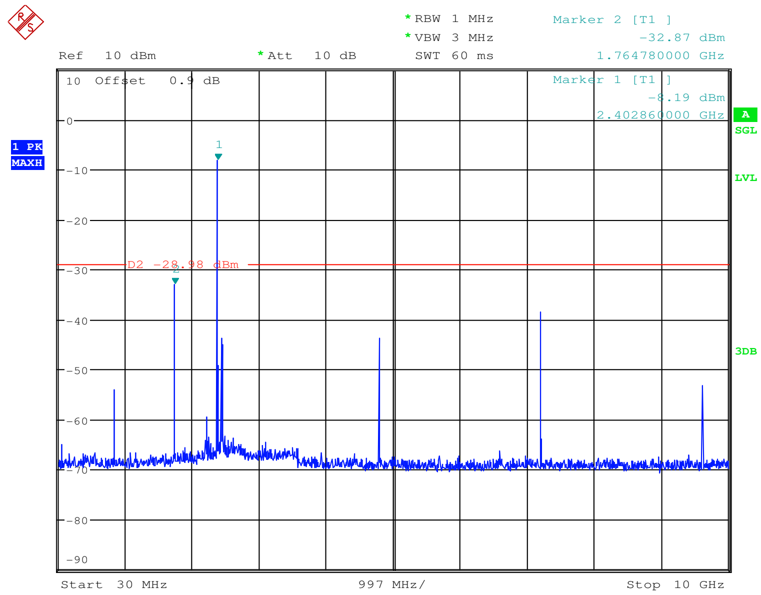
CSE_1	*RBW 1 MHz *VBW 3 MHz Marker 2 [T1] -32.36 dBm 7.208400000 GHz Ref 10 dBm *Att 10 dB SWT 60 ms Offset 0.9 dB Marker 1 [T1] -5.19 dBm 2.402860000 GHz 1 PK MAXH A SGL LVL 3DB D2 -25.69 dBm Start 30 MHz 997 MHz/ Stop 10 GHz
CSE_2	*RBW 1 MHz *VBW 3 MHz Marker 1 [T1] -60.47 dBm 12.010000000 GHz Ref 10 dBm *Att 10 dB SWT 90 ms Offset 0.9 dB 1 PK MAXH A SGL LVL 3DB D2 -25.69 dBm Start 10 GHz 1.5 GHz/ Stop 25 GHz

RF Conducted Spurious Emissions_DH5_2441	
Pref	

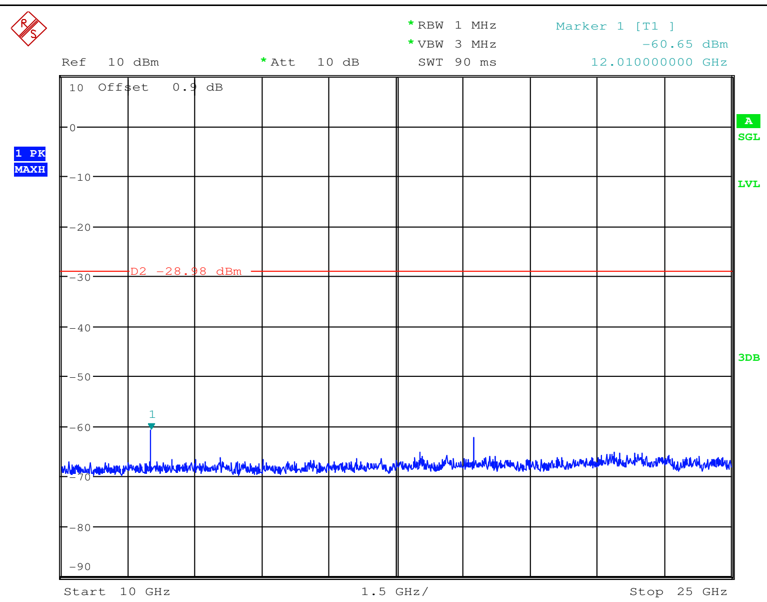
CSE_1	*RBW 1 MHz *VBW 3 MHz Marker 2 [T1] -27.30 dBm 7.323055000 GHz Ref 10 dBm *Att 10 dB SWT 60 ms Offset 0.9 dB Marker 1 [T1] -5.43 dBm 2.437755000 GHz 1 PK MAXH A SGL LVL 3DB D2 -25.83 dBm Start 30 MHz 997 MHz/ Stop 10 GHz
CSE_2	*RBW 1 MHz *VBW 3 MHz Marker 1 [T1] -47.93 dBm 12.205000000 GHz Ref 10 dBm *Att 10 dB SWT 90 ms Offset 0.9 dB 1 PK MAXH A SGL LVL 3DB D2 -25.83 dBm Start 10 GHz 1.5 GHz/ Stop 25 GHz

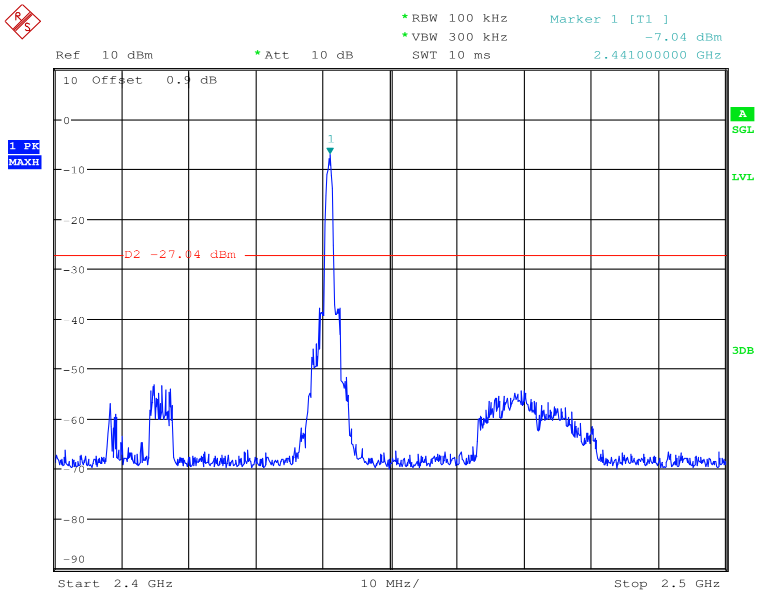
RF Conducted Spurious Emissions_2DH5_2402	
Pref	

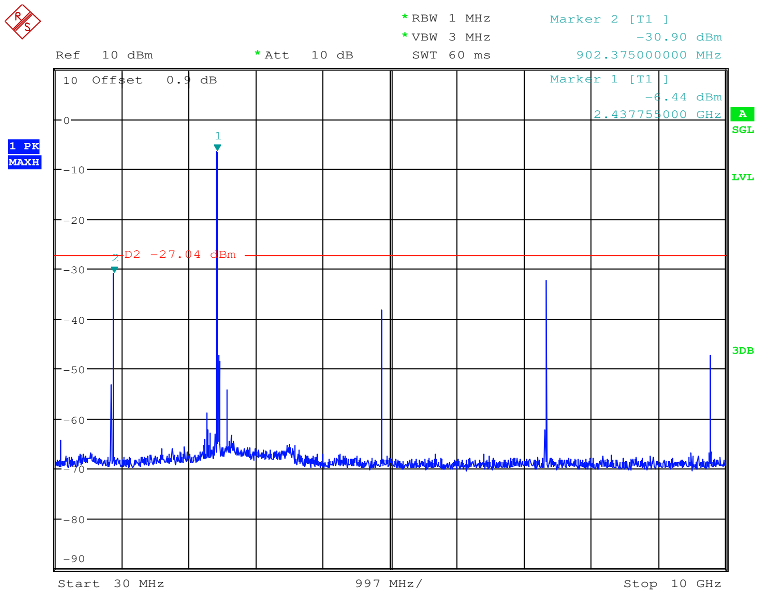
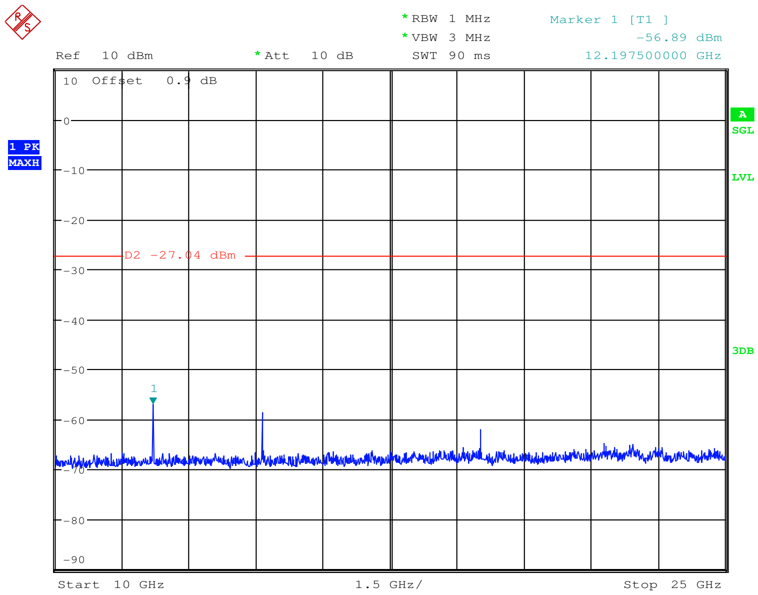
CSE_1

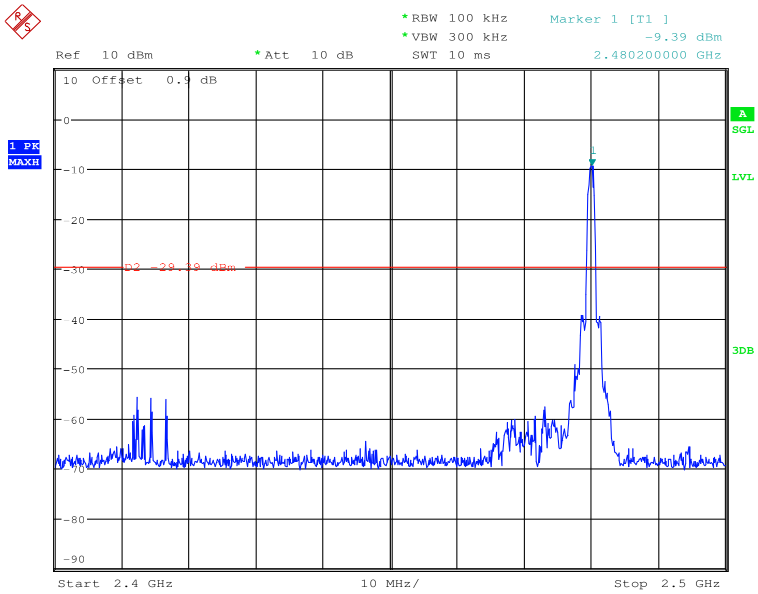

*RBW 1 MHz
*VBW 3 MHz
Marker 2 [T1]
-32.87 dBm
1.764780000 GHz
Ref 10 dBm
*Att 10 dB
SWT 60 ms
Offset 0.9 dB
Marker 1 [T1]
-8.19 dBm
2.402860000 GHz
1 PK
MAXH
D2 -28.98 dBm
A
SGL
LVL
3DB
Start 30 MHz
997 MHz/
Stop 10 GHz

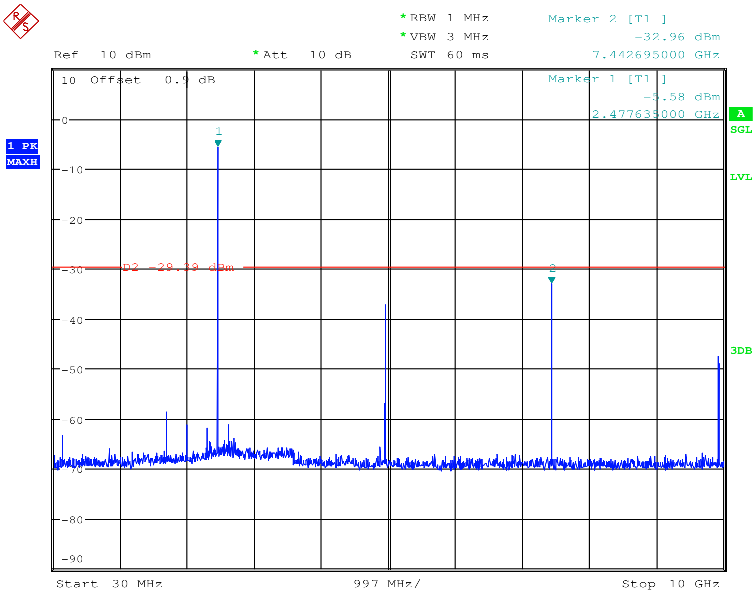
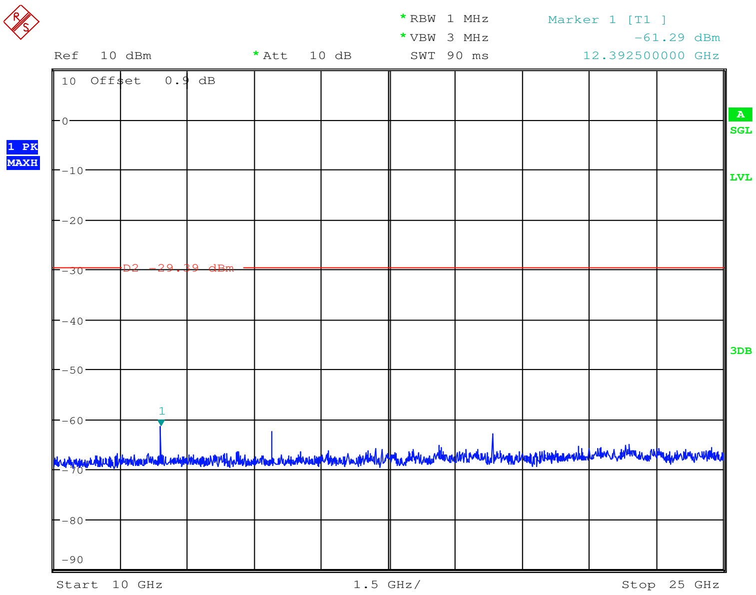
CSE_2

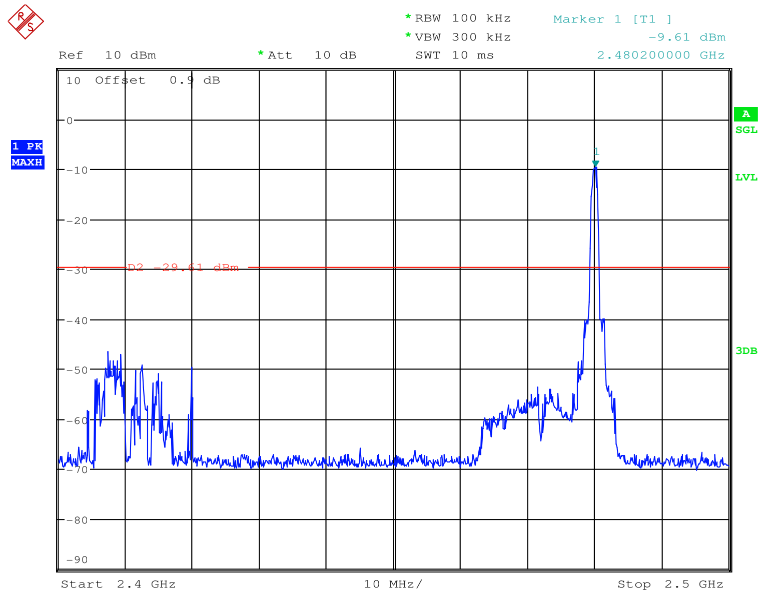

*RBW 1 MHz
*VBW 3 MHz
Marker 1 [T1]
-60.65 dBm
12.010000000 GHz
Ref 10 dBm
*Att 10 dB
SWT 90 ms
Offset 0.9 dB
1 PK
MAXH
D2 -28.98 dBm
A
SGL
LVL
3DB
Start 10 GHz
1.5 GHz/
Stop 25 GHz

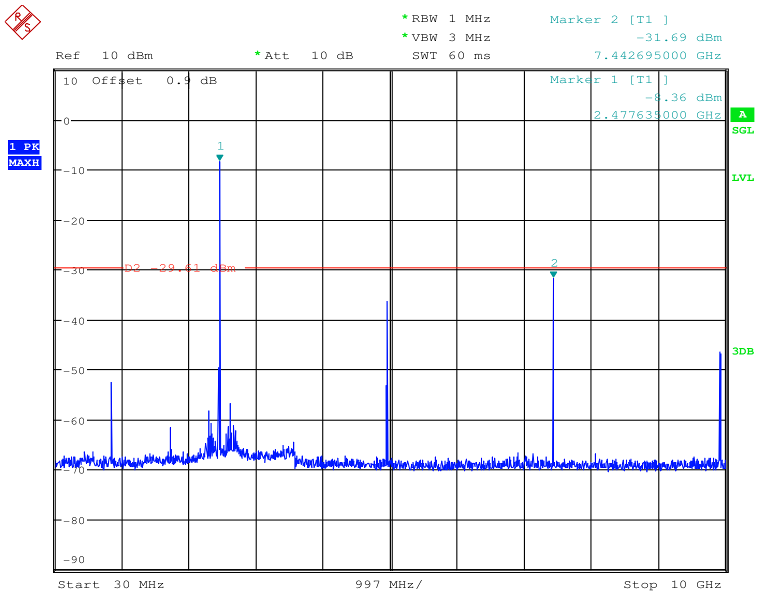
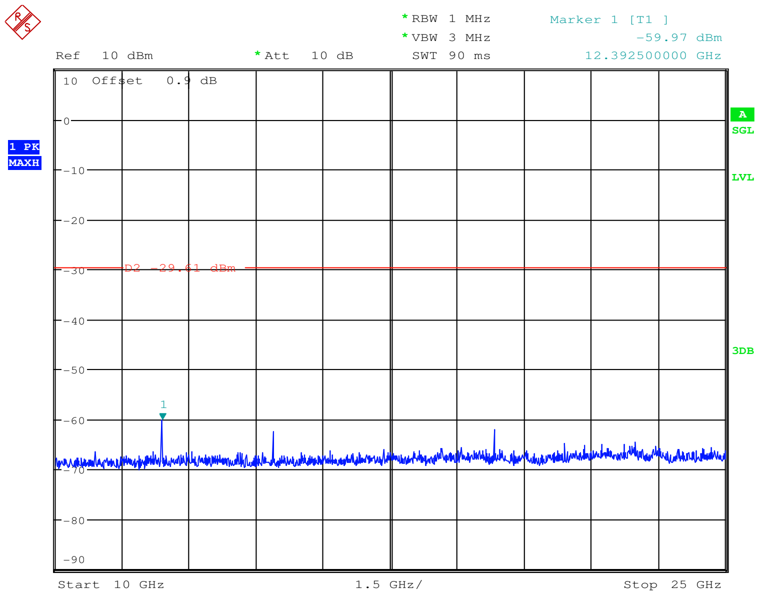
RF Conducted Spurious Emissions_2DH5_2441	
Pref	

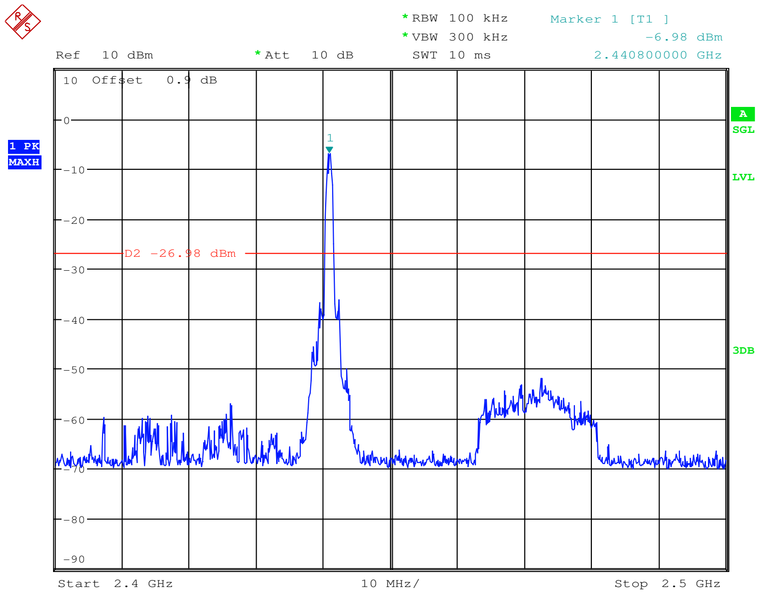
CSE_1	RBW 1 MHz VBW 3 MHz Marker 2 [T1] -30.90 dBm 902.375000000 MHz Ref 10 dBm Att 10 dB SWT 60 ms Offset 0.9 dB Marker 1 [T1] -6.44 dBm 2.437750000 GHz 1 PK MAXH D2 -27.04 dBm Start 30 MHz 997 MHz/ Stop 10 GHz
CSE_2	RBW 1 MHz VBW 3 MHz Marker 1 [T1] -56.89 dBm 12.197500000 GHz Ref 10 dBm Att 10 dB SWT 90 ms Offset 0.9 dB 1 PK MAXH D2 -27.04 dBm Start 10 GHz 1.5 GHz/ Stop 25 GHz

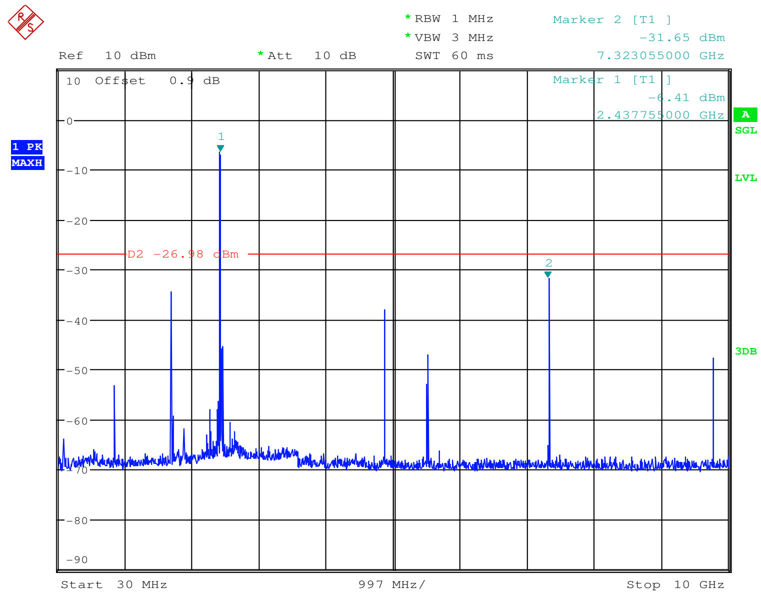
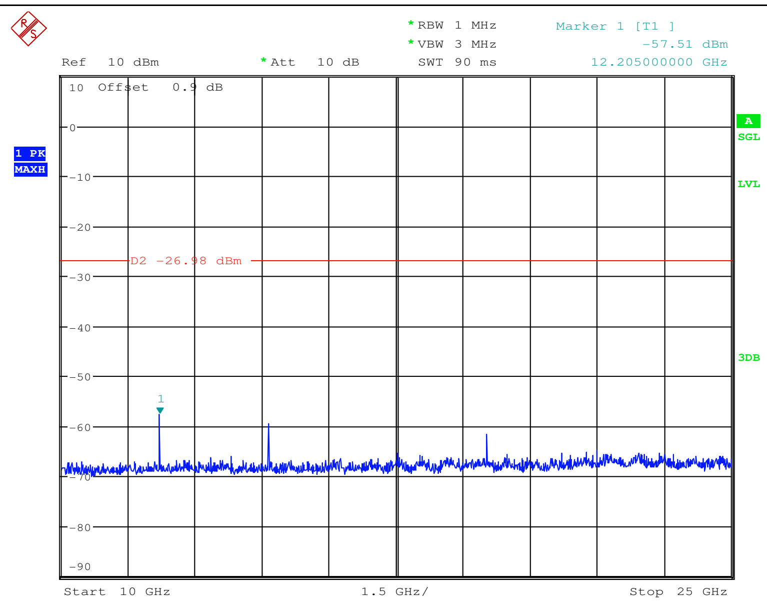
RF Conducted Spurious Emissions_DH5_2480	
Pref	

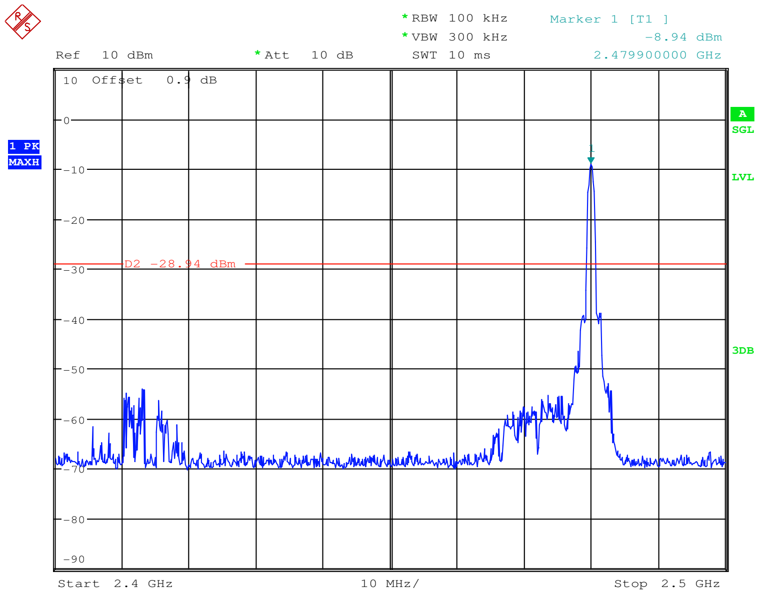
CSE_1	RBW 1 MHz VBW 3 MHz Marker 2 [T1] -32.96 dBm 7.442695000 GHz Ref 10 dBm Att 10 dB SWT 60 ms Offset 0.9 dB Marker 1 [T1] 2.477635000 GHz 1 PK MAXH A SGL LVL 3DB D2 -29.19 dBm Start 30 MHz 997 MHz/ Stop 10 GHz
CSE_2	RBW 1 MHz VBW 3 MHz Marker 1 [T1] -61.29 dBm 12.392500000 GHz Ref 10 dBm Att 10 dB SWT 90 ms Offset 0.9 dB 1 PK MAXH A SGL LVL 3DB D2 -29.19 dBm Start 10 GHz 1.5 GHz/ Stop 25 GHz

RF Conducted Spurious Emissions_2DH5_2480	
Pref	

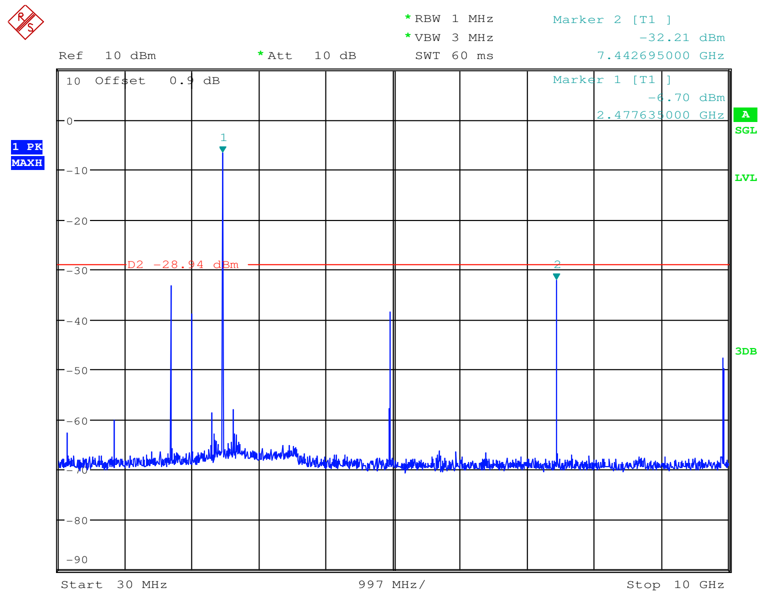
CSE_1	*RBW 1 MHz *VBW 3 MHz SWT 60 ms Marker 2 [T1] -31.69 dBm 7.442695000 GHz Ref 10 dBm *Att 10 dB Offset 0.9 dB Marker 1 [T1] -8.36 dBm 2.477635000 GHz 1 PK MAXH A SGL LVL 3DB D2 -29.61 dBm Start 30 MHz 997 MHz/ Stop 10 GHz
CSE_2	*RBW 1 MHz *VBW 3 MHz SWT 90 ms Marker 1 [T1] -59.97 dBm 12.392500000 GHz Ref 10 dBm *Att 10 dB Offset 0.9 dB 1 PK MAXH A SGL LVL 3DB D2 -29.61 dBm Start 10 GHz 1.5 GHz/ Stop 25 GHz

RF Conducted Spurious Emissions_3DH5_2441	
Pref	

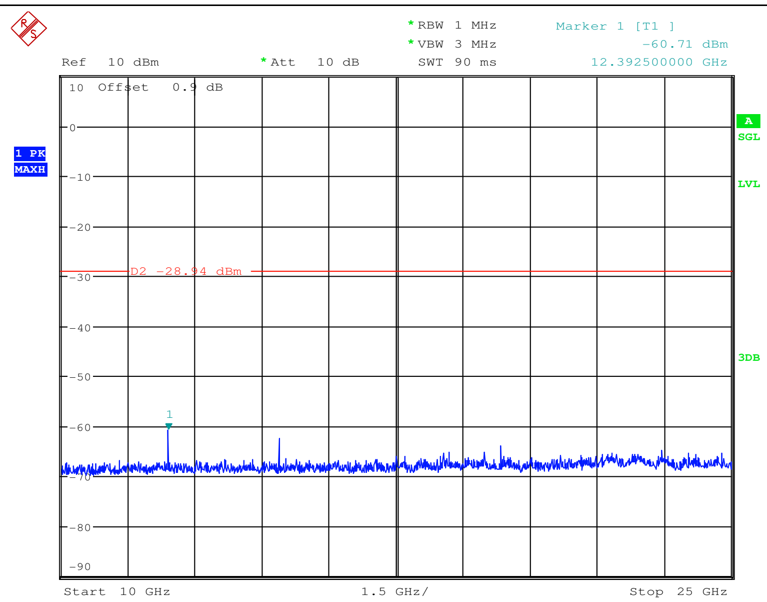
CSE_1	 *RBW 1 MHz Marker 2 [T1] *VBW 3 MHz -31.65 dBm Ref 10 dBm *Att 10 dB SWT 60 ms 7.323055000 GHz 10 Offset 0.9 dB Marker 1 [T1] -6.41 dBm 2.437755000 GHz A SGL 1 PK MAXH LVL D2 -26.98 dBm 3DB Start 30 MHz 997 MHz/ Stop 10 GHz
CSE_2	 *RBW 1 MHz Marker 1 [T1] *VBW 3 MHz -57.51 dBm Ref 10 dBm *Att 10 dB SWT 90 ms 12.205000000 GHz 10 Offset 0.9 dB A SGL 1 PK MAXH LVL D2 -26.98 dBm 3DB Start 10 GHz 1.5 GHz/ Stop 25 GHz

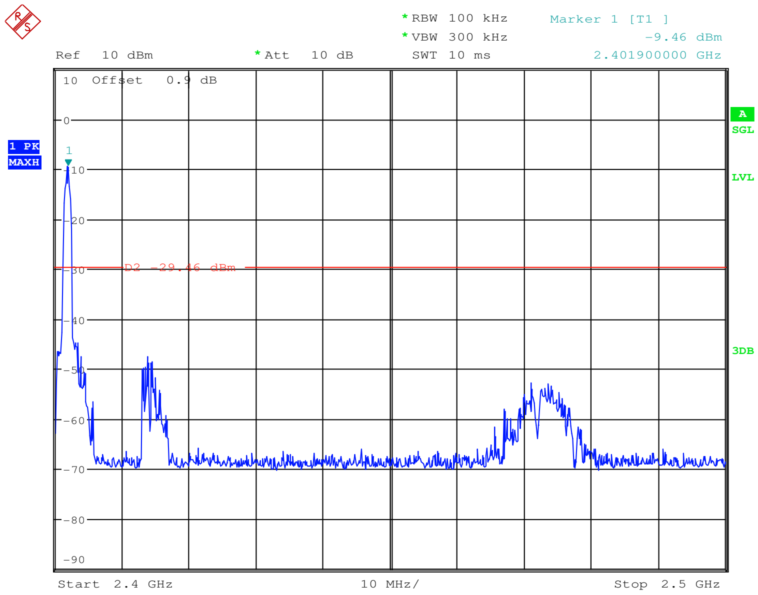
RF Conducted Spurious Emissions_3DH5_2480	
Pref	

CSE_1

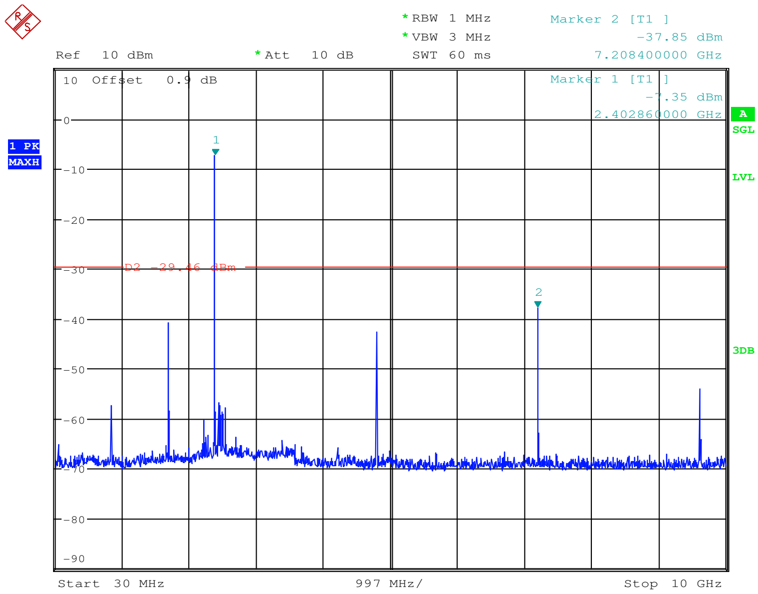

*RBW 1 MHz
*VBW 3 MHz
Marker 2 [T1]
-32.21 dBm
7.442695000 GHz
Ref 10 dBm
*Att 10 dB
SWT 60 ms
Offset 0.9 dB
Marker 1 [T1]
-6.70 dBm
2.477635000 GHz
1 PK
MAXH
A
SGL
LVL
3DB
D2 -28.94 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz

CSE_2

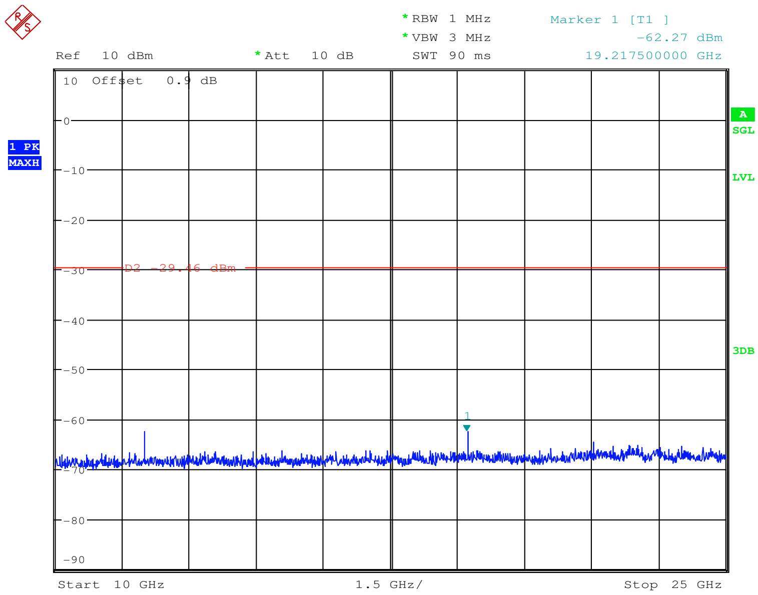

*RBW 1 MHz
*VBW 3 MHz
Marker 1 [T1]
-60.71 dBm
12.392500000 GHz
Ref 10 dBm
*Att 10 dB
SWT 90 ms
Offset 0.9 dB
1 PK
MAXH
A
SGL
LVL
3DB
D2 -28.94 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

RF Conducted Spurious Emissions_3DH5_2402	
Pref	

CSE_1


*RBW 1 MHz
*VBW 3 MHz
SWT 60 ms
Marker 2 [T1]
-37.85 dBm
7.208400000 GHz
Ref 10 dBm
*Att 10 dB
Offset 0.9 dB
Marker 1 [T1]
-7.35 dBm
2.402860000 GHz
1 PK
MAXH
A
SGL
LVL
3DB
D2 -29.46 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz

CSE_2


*RBW 1 MHz
*VBW 3 MHz
SWT 90 ms
Marker 1 [T1]
-62.27 dBm
19.217500000 GHz
Ref 10 dBm
*Att 10 dB
Offset 0.9 dB
1 PK
MAXH
A
SGL
LVL
3DB
D2 -29.46 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz