ACCREDITED
CERTIFICATE #5473.01

Test Report No.:
FCC2022-0030-RF1

RF Test Report

EUT	:	**SPARK LXi2 Datalogger**
MODEL	:	**PS-3600B**
BRAND NAME	:	**N/A**
APPLICANT	:	**Chengdu Vantron Technology Co., Ltd.**
Classification Of Test	:	**N/A**

CVC Testing Technology Co., Ltd.

Client	**Name : Chengdu Vantron Technology Co., Ltd.** **Address : No.5 GaoPeng Road, Hi-Tech Zone, Chengdu, SiChuan, P.R. China**		
Manufacturer	**Name : Chengdu Vantron Technology Co., Ltd.** **Address : No.5 GaoPeng Road, Hi-Tech Zone, Chengdu, SiChuan, P.R. China**		
Equipment Under Test	**Name : SPARK LXi2 Datalogger** **Model/Type: PS-3600B** **Trade mark : N/A** **SerialNO.:N/A** **Sampe NO.:3-1**		
Date of Receipt.	**2022.05.17**	Date of Testing	**2022.05.17～2022.06.23**
Test Specification		**Test Result**	
FCC Part 15, Subpart C, Section 15.247 **Canada RSS-247 Issue 2 (2017-02)** **Canada RSS-Gen Issue 5 (2019-03)**		PASS	
Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied. **Issue Date: 2022.06.24**		
Tested by: Xu ZhenFei Name Signature	Reviewed by: Liu YongHai Name Signature	Approved by: Chen HuaWen Name Signature	
Other Aspects: NONE.			
Abbreviations:OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested			

TABLE OF CONTENTS

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCC2022-0030-RF1	Original release	2022.06.24

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C; RSS-247; RSS-Gen			
FCC STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
15.207 RSS-Gen 8.8	AC Power Conducted Emission	PASS	Meet the requirement of limit
RSS-Gen 6.7	Occupied Bandwidth Measurement	PASS	Report only
15.247(a)(1) RSS-247 5.1(d)	Number of Hopping Frequency Used	PASS	Meet the requirement of limit.
15.247(a)(1) RSS-247 5.1(b)	Hopping Channel Separation	PASS	Meet the requirement of limit.
15.247(a)(1) RSS-247 5.1(d)	Dell Time of Each Channel	PASS	Meet the requirement of limit.
15.247(a)(1)	20dB EMISSION BANDWIDTH	PASS	Meet the requirement of limit.
15.247(b) RSS-247 5.4(b)	MAXIMUM OUTPUT POWER	PASS	Meet the requirement of limit.
15.247(d), 15.209,15.205 RSS-Gen 8.10 Table 7 RSS-Gen 8.9 Table 5	Radiated Emissions	PASS	Meet the requirement of limit.
15.247(d) RSS-247 5.5	Out of band Emission Measurement	PASS	Meet the requirement of limit.
15.203 14.247(b)	Antenna Requirement	PASS	No antenna connector is used.

1.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Test Equipment	Type/Mode	SERIAL NO.	Equipment No.	Manufacturer	Cal. Due
WIFI & Bluetooth Test System 1					/
Communication Shielded Room 1	4m*3m*3m	CRTDSWKSR44301	VGDS-0699	CRT	2024/04/24
Spectrum Analyzer	FSV30	104337	DZ-000235	R&S	2022/11/03
Comprehensive Test Instrument	CMW500	137779	DZ-000220	R&S	2022/06/30
Comprehensive Test Instrument	CMW500	169888	DZ-000342	R&S	2022/12/01
Analog Signal Generator	SMA100B	103663	DZ-000239-2	R&S	2022/06/30
Vector Signal Generator	SMBV100B	101757	DZ-000239-1	R&S	2022/06/30
Programmable DC Power Supply	E3642A	MY59108106	DZ-000242-2	KEYSIGHT	2022/08/05
Radiation SpuriousTest System					/
3m Semi-Anechoic Chamber	FACT-4	ST08035	WKNA-0024	ETS	2024/12/12
Spectrum Analyzer	N9010B	MY57470323	DZ-000174	KEYSIGHT	2023/03/02
EMI Test Receiver	N9038A-508	MY532290079	EM-000397	Agilent	2023/03/02
Broadband Antenna	VULB 9163	9163-530	EM-000342	SCHWARZBECK	2022/06/26
Waveguide Horn Antenna	HF906	360306/008	WKNA-0024-8	R&S	2023/03/04
Waveguide Horn Antenna	BBHA9170	00949	DZ-000209-2	SCHWARZBECK	2022/08/27
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	2022/06/30
5G Bandstop Filters	WRCJV12-4900-5100-5900-6100-50EE	1	DZ-000186	WI	2022/12/20
Comprehensive tester	CMW500	159000	DZ-000240-2	R&S	2022/12/20
Conducted emission					/
EMI Test Receiver	ESCI	100857	WKNB-0081	R&S	2022-12-08
EMI Test Receiver	ESR3	102394	VGDY-0705	R&S	2023-03-04
LISN	NSLK 8127	8127644	VGDY-0150	SCHWARZBECK	2022-09-01
LISN	NSLK 8129	8129-268	EM-000388	SCHWARZBECK	2023-03-03
Plus Limiter（#1）	VTSD 9561 F-N	00515	VGDY-0808	SCHWARZBECK	2023-03-04
Impedance Stabilization Network	ISN T800	27095	WKNE-0195	TESEQ	2022-09-01
Voltage Probe	TK9420	9420-499	VGDY-0128	SCHWARZBECK	2023-03-04
Power Divider	4901.17.B	22643830	DB-0016	HUBER+SUHNER	2023-09-01
AudioSignalGenerator	GAG-810	EK871591	EM-000309	GW	2022-12-08
Shielding Room(#1)	GP1A	001	WKNF-0001	LEINING	2024-08-08

1.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

No.	ITEM	FREQUENCY	UNCERTAINTY
1	Conducted Emissions	9kHz~30MHz	±2.66dB
2	Radiated Spurious Emissions	9KHz ~ 30MHz	±0.769dB
		30MHz ~ 1GMHz	±0.877dB
		1GHz ~ 18GHz	±0.777dB
		18GHz ~ 40GHz	±1.315dB

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

1.3 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology Co., Ltd.

Address: No.3,TiantaiyiRoad,KaitaiAvenue,ScienceCity,Guangzhou,China
Post Code：510663 Tel：020-32293888
FAX：020-32293889 E-mail：office@cvc.org.cn

2 GENERAL INFORMATION

2.1 GENERAL PRODUCT INFORMATION

PRODUCT	SPARK LXi2 Datalogger
BRAND	N/A
MODEL	PS-3600B
ADDITIONAL MODEL	N/A
FCC ID	2AAGEPASCO
IC ID	11152A-PASCO
POWER SUPPLY	DC 5V from Adapter or DC 3.8V from battery
MODULATION TYPE	GFSK, π/4 DQPSK, 8DPSK
OPERATING FREQUENCY	2402MHz~2480MHz
NUMBER OF CHANNEL	79
PEAK OUTPUT POWER	9.12dBm (Max.Conducted) 10.16dBm (Max.EIRP)
ANTENNA TYPE（Remark 4）	PIFA Antenna, with 1.14dBi gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	USB line, 1 Meter, Shielded without ferrite

Remark:

1. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. EUT photo refer to the report (Report NO.: FCC2022-0030-E).
4. Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, CVC is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.
5. The EUT have SISO function, provides 1 completed transmitter and 1 receiver.

2.2 Description of Accessories

Adapter	
BRAND	N/A
Model No.:	SW1260502000UN
Input:	100-240 V~50/60 Hz 0.4 A Max
Output:	5.0 V ⎓ 2 A
AC Cable:	N/A
DC Cable:	N/A

2.3 OTHER INFORMATION

Operation frequency each of channel.

Operation Frequency Each of Channel							
For BT (GFSK, π/4 DQPSK, 8 DPSK)							
CHANNEL	**FREQ. (MHz)**	**CHANNEL**	**FREQ. (MHz)**	**CHANNEL**	**FREQ. (MHz)**	**CHANNEL**	**FREQ. (MHz)**
0	**2402**	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	**78**	**2480**
19	2421	**39**	**2441**	59	2461		

1. The channels which were indicated in bold type of the above channel list were selected as representative test channel. Therefore only the data of the test channels were recorded in this report.

2.4 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, xyz axis and antenna ports

The worst case was found when positioned on xaxis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	APPLICABLE TEST ITEMS				DESCRIPTION
	RSE<1G	RSE≥1G	PLC	APCM	
A	√	√	√	√	BT LINK

Where **RSE<1G:** Radiated Emission below 1GHz. **RSE≥1G:** Radiated Emission above 1GHz.
PLC: Power Line Conducted Emission. **APCM:** Antenna Port Conducted Measurement.

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
A	0	FHSS	GFSK	DH5

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
A	0, 39, 78	FHSS	GFSK	DH5
A	0, 39, 78	FHSS	π/4 DQPSK	2DH5
A	0, 39, 78	FHSS	8DPSK	3DH5

POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	TESTED CONDITION
-	BT Link

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
A	0, 39, 78	FHSS	GFSK	DH5
A	0, 39, 78	FHSS	π/4 DQPSK	2DH5
A	0, 39, 78	FHSS	8DPSK	3DH5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE (SYSTEM)	TESTED BY
RSE<1G	24deg. C, 55%RH	DC 5V from Adapter	Liu ShiWei
RSE≥1G	24deg. C, 55%RH	DC 5V from Adapter	Liu ShiWei
PLC	24deg. C, 55%RH	DC 5V from Adapter	Liu ShiWei
APCM	25deg. C, 58%RH	DC 5V from Adapter	Liu ShiWei

2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC PART 15, Subpart C. Section 15.247
KDB 558074 D01 15.247 Meas Guidance v05r02
ANSI C63.10-2020
Canada RSS-247 Issue 2 (2017-02)
Canada RSS-Gen Issue 5 (2019-03)

All test items have been performed and recorded as per the above standards

2.6 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Support Equipment					
NO	**Description**	**Brand**	**Model No.**	**Serial Number**	**Supplied by**
1	Latop	Lenovo	V14	PFNXB1628023	Lab

Support Cable							
NO	**Description**	**Quantity (Number)**	**Length (m)**	**Detachable (Yes/ No)**	**Shielded (Yes/ No)**	**Cores (Number)**	**Supplied by**
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 Limit

Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50
NOTE: 1. The lower limit shall apply at the transition frequencies. NOTE: 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.		

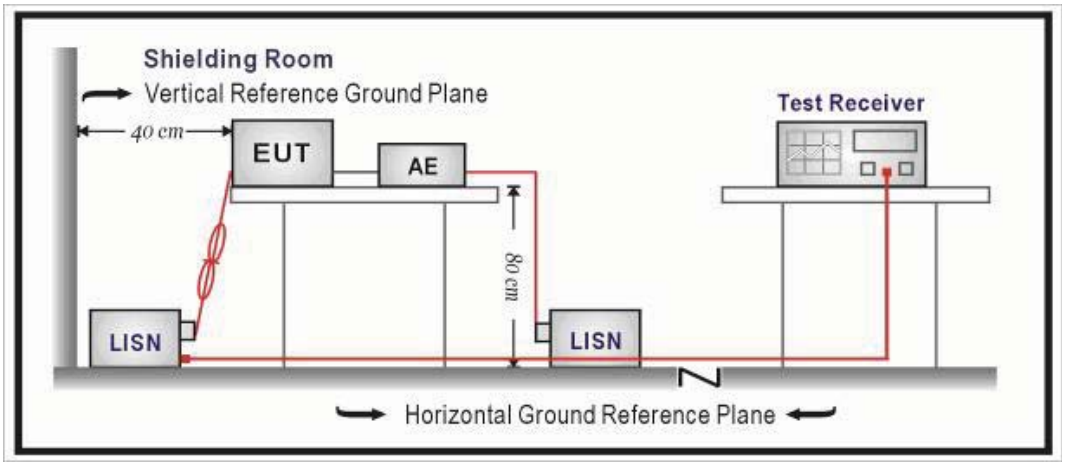
3.1.2 Measurement procedure

a. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the Test photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.The equipment under test shall be placed on a support of non-metallic material, the height of which shall be1.5m above the ground,

b. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

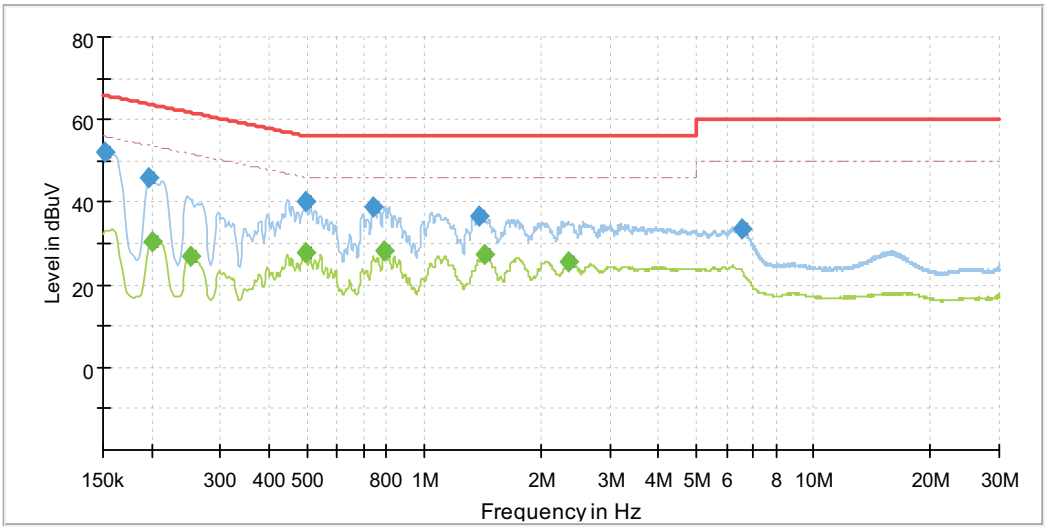
c. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

3.1.3 Test setup



3.1.4 Test results

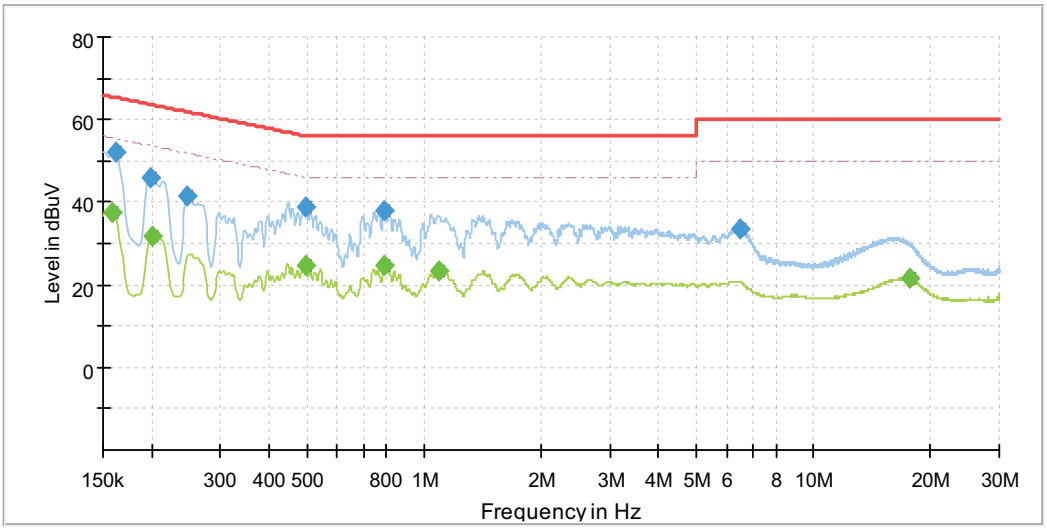
Test Mode	BT Link	Frequency Range	150KHz ~ 30MHz
PHASE	Line (L)		



NO	Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr.Factor (dB)
1	0.159	---	38.5	55.5	17.0	L1	19.5
2	0.159	55.3	---	65.5	10.2	L1	19.5
3	0.202	---	35.9	53.5	17.7	L1	19.5
4	0.202	49.8	---	63.5	13.7	L1	19.5
5	0.256	43.1	---	61.6	18.4	L1	19.5
6	0.337	---	25.3	49.3	23.9	L1	19.5
7	0.501	---	31.6	46.0	14.4	L1	19.5
8	0.503	37.0	---	56.0	19.0	L1	19.5
9	0.677	---	21.7	46.0	24.3	L1	19.6
10	1.030	---	23.0	46.0	23.0	L1	19.5
11	**1.469**	**30.0**	**---**	**56.0**	**26.0**	**L1**	**19.6**
12	4.281	35.8	---	56.0	20.2	L1	19.6

Remark: The emission levels of other frequencies were very low against the limit.

Test Mode	BT Link	Frequency Range	150KHz ~ 30MHz
PHASE	Line (N)		



NO	Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr.Factor (dB)
1	0.159	---	37.5	55.5	18.0	L1	19.5
2	0.161	52.1	---	65.4	13.3	L1	19.5
3	0.200	46.0	---	63.6	17.7	L1	19.5
4	0.202	---	31.9	53.5	21.6	L1	19.5
5	0.247	41.4	---	61.9	20.4	L1	19.5
6	0.494	---	24.9	46.1	21.2	L1	19.5
7	0.497	39.0	---	56.1	17.1	L1	19.5
8	0.791	---	24.7	46.0	21.3	L1	19.6
9	0.794	37.9	---	56.0	18.1	L1	19.6
10	1.091	---	23.6	46.0	22.4	L1	19.5
11	6.500	33.8	---	60.0	26.2	L1	19.7
12	17.592	---	21.4	50.0	28.6	L1	19.9

Remark: The emission levels of other frequencies were very low against the limit.

3.2 RADIATED EMISSIONS

3.2.1 Limits (FCC)

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a). Other emissions shall be at least 20dB below the highest level of the desired power.

FREQUENCIES (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	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE: 1. The lower limit shall apply at the transition frequencies.
NOTE: 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
NOTE: 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

3.2.2 Limit (IC)

Radiated emissions which fall in the restricted bands, as defined in RSS-Gen Section 8.10, must also comply with the radiated emission limits specified in RSS-Gen Section 8.9. as following:

Table 5 – General field strength limits at frequencies above 30 MHz		
FREQUENCIES (MHz)	**FIELD STRENGTH (microvolts/meter)**	**MEASUREMENT DISTANCE (meters)**
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Table 6 – General field strength limits at frequencies below 30 MHz		
FREQUENCIES (MHz)	**Magnetic field strength (H-Field) (μA/m)**	**MEASUREMENT DISTANCE (meters)**
9 - 490 kHz	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

NOTE:

1. The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.
2. The lower limit shall apply at the transition frequencies.
3. Emission level (dBuV/m) = 20 log Emission level (uV/m).
4. dBuV/m=dBuA/m+51.5

3.2.3 Measurement procedure

a. The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. For below 1GHz was used bilog antenna, and above 1GHz was used horn antenna, and its 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.
d. 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 and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
g. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

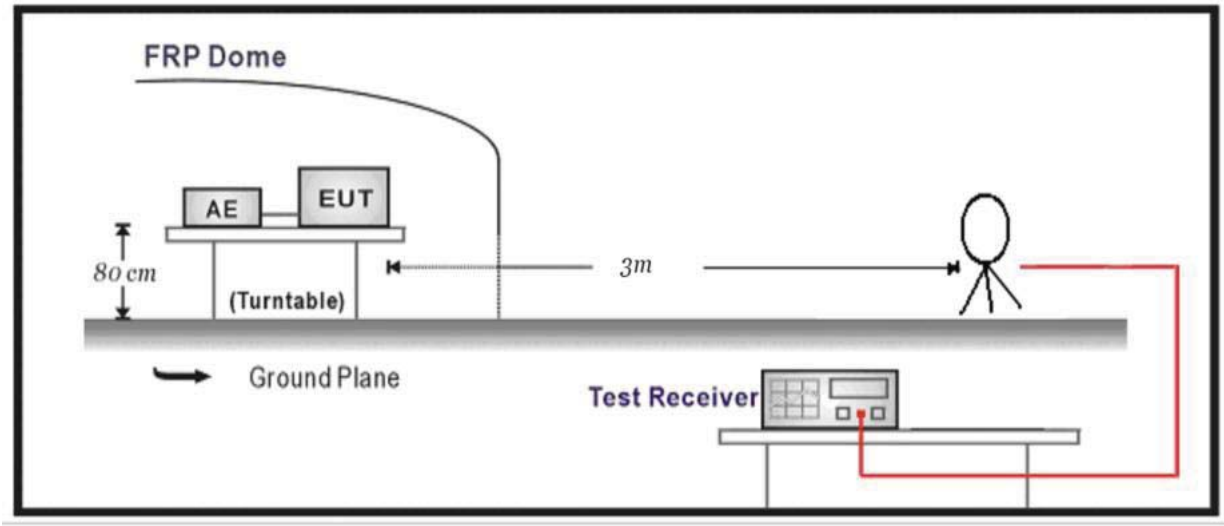
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ⩾ 1/T (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

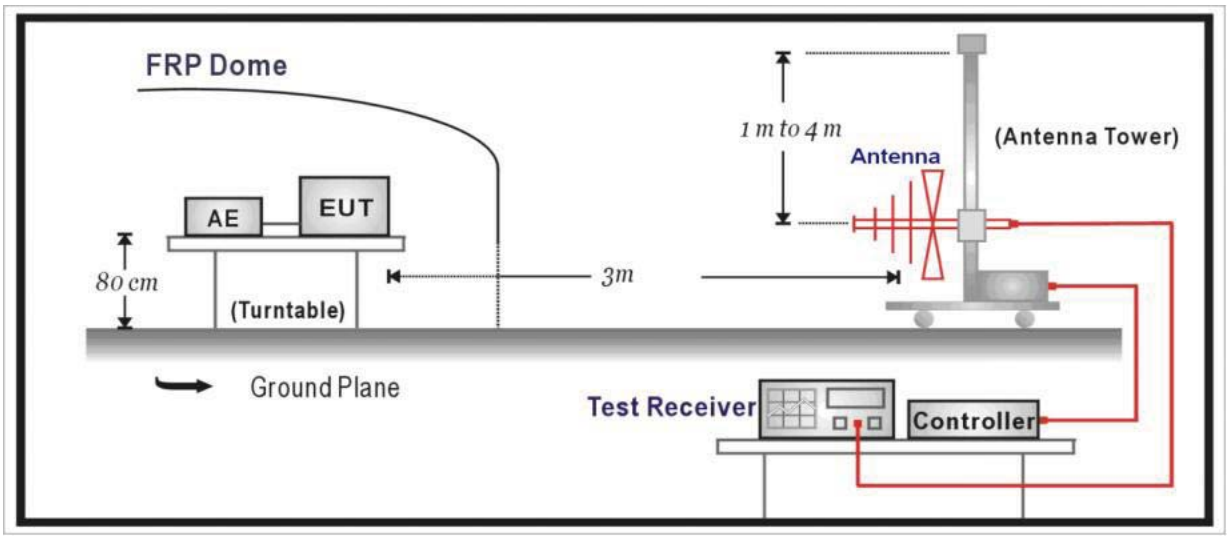
The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

3.2.4 Test setup

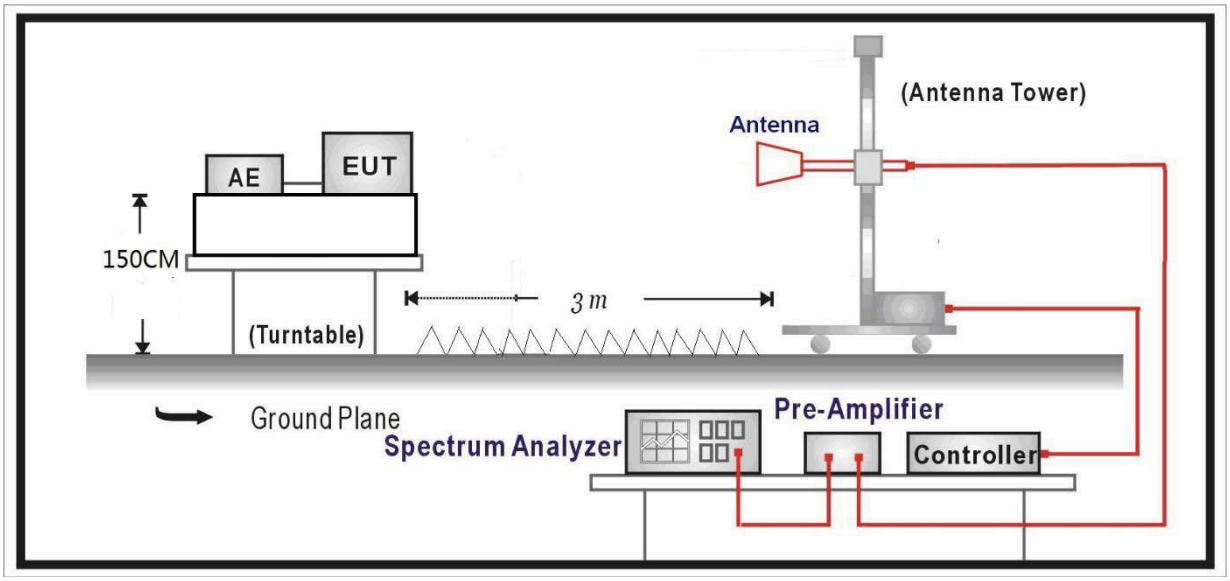
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:

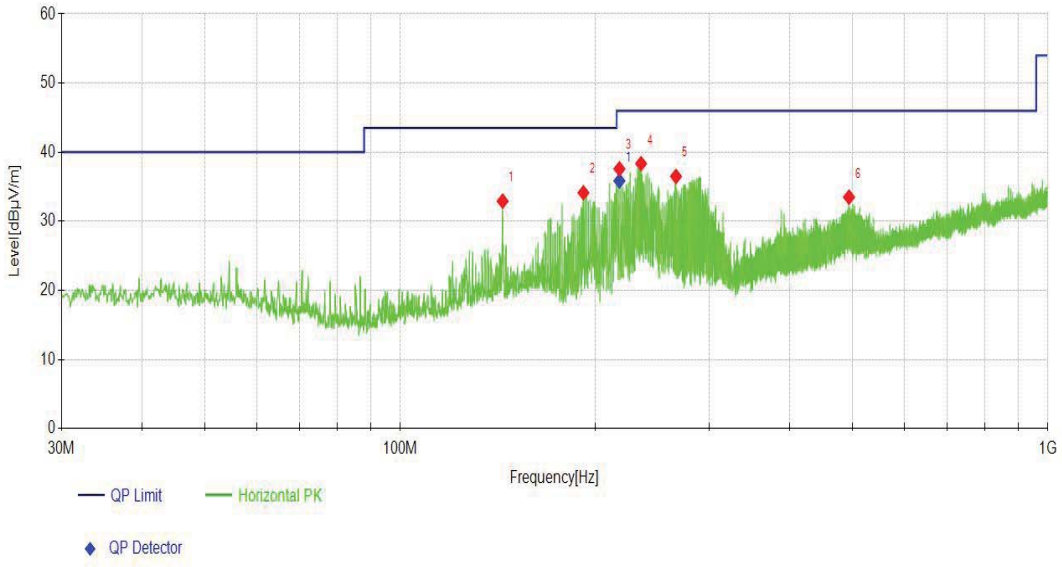

(Antenna Tower)
Antenna
AE
EUT
150CM
3 m
(Turntable)
Ground Plane
Spectrum Analyzer
Pre-Amplifier
Controller

3.2.5 Test results

BELOW 1GHz WORST-CASE DATA:

Worst Test Mode	DH5	**Channel**	CH 0
Frequency Range	9KHz ~ 1GHz	**Detector Function**	Quasi-Peak (QP)

Horizontal

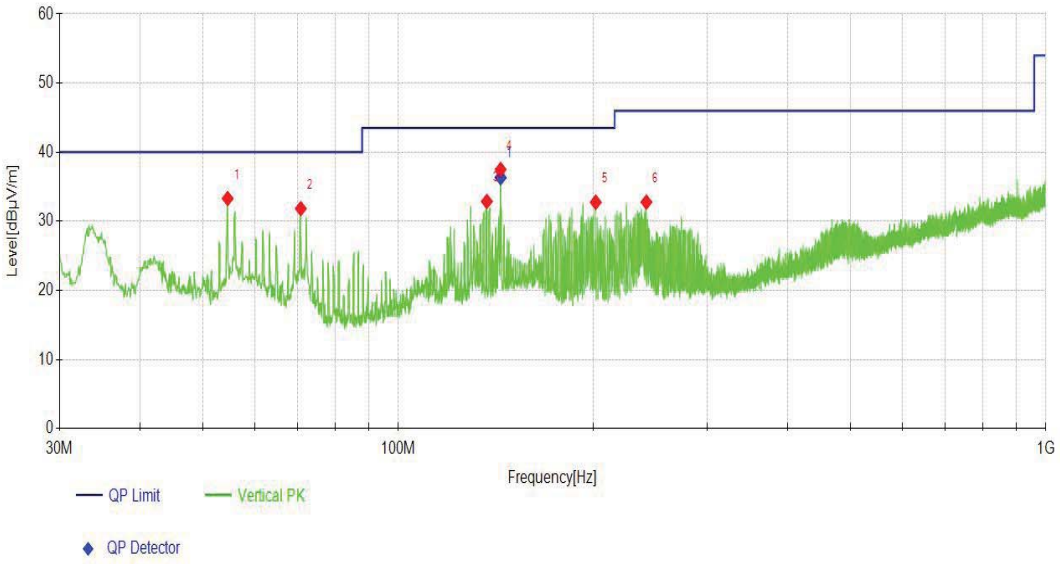


NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]
1	143.9864	12.88	20.03	32.91	43.50	10.59	200	243
2	191.9092	16.98	17.15	34.13	43.50	9.37	200	282
3	218.1018	18.5	17.35	35.85	46.00	10.15	100	343
4	235.5636	20.13	18.21	38.34	46.00	7.66	100	320
5	266.7037	17.68	18.81	36.49	46.00	9.51	100	348
6	143.9864	12.88	20.03	32.91	43.50	10.59	200	243

Remark: 1. 9KHz~30MHz have been test and test data more than 20dB margin.
2. The emission levels of other frequencies were greater than 20dB margin.
3. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
4. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
5. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]

Worst Test Mode	DH5	**Channel**	CH 0
Frequency Range	9KHz ~ 1GHz	**Detector Function**	Quasi-Peak (QP)

Vertical



NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]
1	54.5435	14.03	19.26	33.29	40.00	19.65	100	316
2	70.7441	15.10	16.73	31.83	40.00	17.26	100	201
3	137.0987	13.41	19.46	32.87	43.50	19.91	100	265
4	143.9864	16.30	20.03	36.33	43.50	7.17	100	237
5	201.9012	15.71	17.04	32.75	43.50	18.55	100	358
6	241.7722	14.38	18.40	32.78	46.00	14.70	100	184

Remark: 1. 9KHz~30MHz have been test and test data more than 20dB margin.
2. The emission levels of other frequencies were greater than 20dB margin.
3. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
4. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
5. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]

ABOVE 1GHz DATA

DH5-CH 0

Channel	CH 0	Frequency	2402MHz
Frequency Range	Above 1G	Detector Function	PK/AV

Horizontal

NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2390.0000	36.51	-0.15	36.36	54.00	17.64	165	136	AV
2	2390.0000	44.42	-0.15	44.27	74.00	29.73	165	41	PK
3	2401.9122	103.19	-0.03	103.16			184	190	AV
4	2402.0832	103.57	-0.03	103.54			184	190	PK
5	4804.0000	43.49	9.29	52.78	74.00	21.22	130	154	PK
6	4804.0000	35.64	9.29	44.93	54.00	9.07	130	256	AV
7	7206.0000	18.53	12.81	31.34	54.00	22.66	166	144	AV
8	7206.0000	26.54	12.81	39.35	74.00	34.65	166	272	PK
9	9608.0000	28.12	13.32	41.44	74.00	32.56	193	144	PK
10	9608.0000	19.22	13.32	32.54	54.00	21.46	193	99	AV

Vertical

NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2390.0000	36.57	-0.15	36.42	54.00	17.58	247	60	AV
2	2390.0000	44.31	-0.15	44.16	74.00	29.84	247	224	PK
3	2401.7602	101.30	-0.04	101.26			181	327	PK
4	2401.8172	101.03	-0.03	101.00			181	327	AV
5	4804.0000	43.10	9.29	52.39	74.00	21.61	213	139	PK
6	4804.0000	34.51	9.29	43.80	54.00	10.20	213	302	AV
7	7206.0000	18.68	12.81	31.49	54.00	22.51	106	353	AV
8	7206.0000	26.97	12.81	39.78	74.00	34.22	106	48	PK
9	9608.0000	27.16	13.32	40.48	74.00	33.52	144	88	PK
10	9608.0000	19.27	13.32	32.59	54.00	21.41	144	32	AV

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]

DH5-CH 39

Channel	CH 39	Frequency	2441MHz
Frequency Range	Above 1G	Detector Function	PK/AV

Horizontal

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4882.0000	42.84	9.84	52.68	74.00	21.32	105	328	PK
2	4882.0000	35.08	9.84	44.92	54.00	9.08	105	257	AV
3	7323.0000	19.36	10.96	30.32	54.00	23.68	249	277	AV
4	7323.0000	27.15	10.96	38.11	74.00	35.89	249	272	PK
5	9764.0000	27.31	13.23	40.54	74.00	33.46	294	328	PK
6	9764.0000	19.34	13.23	32.57	54.00	21.43	294	353	AV

Vertical

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4882.0000	43.46	9.84	53.30	74.00	20.70	210	77	PK
2	4882.0000	34.67	9.84	44.51	54.00	9.49	210	354	AV
3	7323.0000	19.77	10.96	30.73	54.00	23.27	251	185	AV
4	7323.0000	27.45	10.96	38.41	74.00	35.59	251	185	PK
5	9764.0000	27.31	13.23	40.54	74.00	33.46	128	93	PK
6	9764.0000	19.20	13.23	32.43	54.00	21.57	128	252	AV

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]

DH5-CH 78

Channel	CH 78	Frequency	2480MHz
Frequency Range	Above 1G	Detector Function	PK/AV

Horizontal

NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2479.7440	104.27	0.33	104.60			288	205	PK
2	2479.7440	103.84	0.33	104.17			288	212	AV
3	2483.5000	39.83	0.46	40.29	54.00	13.71	139	198	AV
4	2483.5000	47.33	0.46	47.79	74.00	26.21	139	198	PK
5	4960.0000	43.86	10.69	54.55	74.00	19.45	217	168	PK
6	4960.0000	35.04	10.69	45.73	54.00	8.27	217	17	AV
7	7440.0000	19.66	9.75	29.41	54.00	24.59	229	356	AV
8	7440.0000	27.86	9.75	37.61	74.00	36.39	229	356	PK
9	9920.0000	27.88	13.83	41.71	74.00	32.29	226	102	PK
10	9920.0000	19.48	13.83	33.31	54.00	20.69	226	243	AV

Vertical

NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2479.7630	100.10	0.33	100.43			295	204	PK
2	2479.7630	99.72	0.33	100.05			295	204	AV
3	2483.5000	37.95	0.46	38.41	54.00	15.59	220	204	AV
4	2483.5000	46.21	0.46	46.67	74.00	27.33	220	184	PK
5	4960.0000	43.28	10.69	53.97	74.00	20.03	231	237	PK
6	4960.0000	34.84	10.69	45.53	54.00	8.47	231	227	AV
7	7440.0000	19.44	9.75	29.19	54.00	24.81	157	8	AV
8	7440.0000	27.76	9.75	37.51	74.00	36.49	157	330	PK
9	9920.0000	27.57	13.83	41.40	74.00	32.60	292	265	PK
10	9920.0000	19.94	13.83	33.77	54.00	20.23	292	58	AV

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]

2DH5-CH 0

Channel	CH 0	Frequency	2402MHz
Frequency Range	Above 1G	Detector Function	PK/AV

Horizontal

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2390.0000	37.12	-0.15	36.97	54.00	17.03	124	84	AV
2	2390.0000	44.86	-0.15	44.71	74.00	29.29	124	69	PK
3	2401.8742	89.50	-0.03	89.47			142	188	AV
4	2402.0072	92.01	-0.03	91.98			142	188	PK
5	4804.0000	42.31	9.29	51.60	74.00	22.40	115	184	PK
6	4804.0000	35.03	9.29	44.32	54.00	9.68	115	73	AV
7	7206.0000	19.07	12.81	31.88	54.00	22.12	115	328	AV
8	7206.0000	27.51	12.81	40.32	74.00	33.68	115	298	PK
9	9608.0000	27.09	13.32	40.41	74.00	33.59	191	222	PK
10	9608.0000	19.00	13.32	32.32	54.00	21.68	191	323	AV

Vertical

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2390.0000	37.07	-0.15	36.92	54.00	17.08	264	253	AV
2	2390.0000	44.29	-0.15	44.14	74.00	29.86	264	115	PK
3	2401.6652	86.57	-0.04	86.53			284	323	AV
4	2401.7222	89.80	-0.04	89.76			284	323	PK
5	4804.0000	42.43	9.29	51.72	74.00	22.28	161	359	PK
6	4804.0000	35.02	9.29	44.31	54.00	9.69	161	272	AV
7	7206.0000	19.73	12.81	32.54	54.00	21.46	188	180	AV
8	7206.0000	26.68	12.81	39.49	74.00	34.51	188	124	PK
9	9608.0000	27.68	13.32	41.00	74.00	33.00	204	88	PK
10	9608.0000	19.74	13.32	33.06	54.00	20.94	204	267	AV

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]

2DH5-CH 39

Channel	CH 39	**Frequency**	2441MHz
Frequency Range	Above 1G	**Detector Function**	PK/AV

Horizontal

NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4882.0000	42.26	9.84	52.10	74.00	21.90	244	1	PK
2	4882.0000	34.70	9.84	44.54	54.00	9.46	244	335	AV
3	7323.0000	19.68	10.96	30.64	54.00	23.36	139	15	AV
4	7323.0000	28.56	10.96	39.52	74.00	34.48	139	0	PK
5	9764.0000	27.37	13.23	40.60	74.00	33.40	281	1	PK
6	9764.0000	19.31	13.23	32.54	54.00	21.46	281	273	AV

Vertical

NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4882.0000	43.03	9.84	52.87	74.00	21.13	221	181	PK
2	4882.0000	35.41	9.84	45.25	54.00	8.75	221	323	AV
3	7323.0000	19.81	10.96	30.77	54.00	23.23	275	219	AV
4	7323.0000	27.70	10.96	38.66	74.00	35.34	275	360	PK
5	9764.0000	26.49	13.23	39.72	74.00	34.28	289	199	PK
6	9764.0000	19.02	13.23	32.25	54.00	21.75	289	229	AV

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]

2DH5-CH 78

Channel	CH 78	Frequency	2480MHz
Frequency Range	Above 1G	Detector Function	PK/AV

Horizontal

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2479.8010	94.15	0.32	94.47			134	211	PK
2	2480.0480	91.72	0.32	92.04			134	191	AV
3	2483.5000	36.79	0.46	37.25	54.00	16.75	262	36	AV
4	2483.5000	45.94	0.46	46.40	74.00	27.60	262	232	PK
5	4960.0000	42.57	10.69	53.26	74.00	20.74	297	225	PK
6	4960.0000	35.10	10.69	45.79	54.00	8.21	297	240	AV
7	7440.0000	19.76	9.75	29.51	54.00	24.49	143	190	AV
8	7440.0000	28.40	9.75	38.15	74.00	35.85	143	175	PK
9	9920.0000	28.19	13.83	42.02	74.00	31.98	155	257	PK
10	9920.0000	20.50	13.83	34.33	54.00	19.67	155	88	AV

Vertical

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2479.9340	85.49	0.32	85.81			202	127	AV
2	2480.0670	88.04	0.32	88.36			202	127	PK
3	2483.5000	37.14	0.46	37.60	54.00	16.40	283	46	AV
4	2483.5000	46.23	0.46	46.69	74.00	27.31	283	46	PK
5	4960.0000	43.54	10.69	54.23	74.00	19.77	142	100	PK
6	4960.0000	34.59	10.69	45.28	54.00	8.72	142	20	AV
7	7440.0000	20.68	9.75	30.43	54.00	23.57	121	194	AV
8	7440.0000	28.19	9.75	37.94	74.00	36.06	121	275	PK
9	9920.0000	27.52	13.83	41.35	74.00	32.65	143	320	PK
10	9920.0000	20.11	13.83	33.94	54.00	20.06	143	129	AV

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]

3DH5-CH 0

Channel	CH 0	Frequency	2402MHz
Frequency Range	Above 1G	Detector Function	PK/AV

Horizontal

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2390.0000	36.47	-0.15	36.32	54.00	17.68	113	77	AV
2	2390.0000	44.38	-0.15	44.23	74.00	29.77	113	226	PK
3	2401.9312	92.18	-0.03	92.15			200	185	PK
4	2401.9502	89.27	-0.03	89.24			200	192	AV
5	4804.0000	44.16	9.29	53.45	74.00	20.55	236	306	PK
6	4804.0000	35.50	9.29	44.79	54.00	9.21	236	291	AV
7	7206.0000	19.53	12.81	32.34	54.00	21.66	161	23	AV
8	7206.0000	28.28	12.81	41.09	74.00	32.91	161	312	PK
9	9608.0000	27.79	13.32	41.11	74.00	32.89	184	287	PK
10	9608.0000	20.14	13.32	33.46	54.00	20.54	184	282	AV

Vertical

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2390.0000	36.76	-0.15	36.61	54.00	17.39	268	188	AV
2	2390.0000	45.56	-0.15	45.41	74.00	28.59	268	256	PK
3	2401.9882	89.97	-0.03	89.94			126	331	PK
4	2402.0832	87.02	-0.03	86.99			126	324	AV
5	4804.0000	43.94	9.29	53.23	74.00	20.77	226	236	PK
6	4804.0000	35.00	9.29	44.29	54.00	9.71	226	114	AV
7	7206.0000	19.22	12.81	32.03	54.00	21.97	178	22	AV
8	7206.0000	27.07	12.81	39.88	74.00	34.12	178	205	PK
9	9608.0000	28.85	13.32	42.17	74.00	31.83	288	215	PK
10	9608.0000	20.04	13.32	33.36	54.00	20.64	288	276	AV

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]

3DH5-CH 39

Channel	CH 39	Frequency	2441MHz
Frequency Range	Above 1G	Detector Function	PK/AV

Horizontal

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4882.0000	44.74	9.84	54.58	74.00	19.42	300	322	PK
2	4882.0000	36.16	9.84	46.00	54.00	8.00	300	327	AV
3	7323.0000	20.15	10.96	31.11	54.00	22.89	217	119	AV
4	7323.0000	28.58	10.96	39.54	74.00	34.46	217	1	PK
5	9764.0000	28.10	13.23	41.33	74.00	32.67	226	104	PK
6	9764.0000	19.42	13.23	32.65	54.00	21.35	226	104	AV

Vertical

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4882.0000	43.60	9.84	53.44	74.00	20.56	201	90	PK
2	4882.0000	35.63	9.84	45.47	54.00	8.53	201	323	AV
3	7323.0000	20.51	10.96	31.47	54.00	22.53	285	83	AV
4	7323.0000	29.40	10.96	40.36	74.00	33.64	285	204	PK
5	9764.0000	27.15	13.23	40.38	74.00	33.62	194	148	PK
6	9764.0000	19.62	13.23	32.85	54.00	21.15	194	118	AV

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]

3DH5-CH 78

Channel	CH 78	Frequency	2480MHz
Frequency Range	Above 1G	Detector Function	PK/AV

Horizontal

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2479.9340	104.37	0.32	104.69			253	207	AV
2	2479.9910	107.06	0.31	107.37			253	207	PK
3	2483.5000	44.22	0.46	44.68	54.00	9.32	289	200	AV
4	2483.5000	52.46	0.46	52.92	74.00	21.08	289	180	PK
5	4960.0000	35.17	10.69	45.86	54.00	8.14	152	291	AV
6	4960.0000	43.33	10.69	54.02	74.00	19.98	152	17	PK
7	7440.0000	28.31	9.75	38.06	74.00	35.94	255	175	PK
8	7440.0000	20.40	9.75	30.15	54.00	23.85	255	119	AV
9	9920.0000	27.64	13.83	41.47	74.00	32.53	137	180	PK
10	9920.0000	19.57	13.83	33.40	54.00	20.60	137	159	AV

Vertical

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2479.9150	99.15	0.32	99.47			297	127	AV
2	2480.0290	100.94	0.32	101.26			297	127	PK
3	2483.5000	41.00	0.46	41.46	54.00	12.54	221	113	AV
4	2483.5000	47.73	0.46	48.19	74.00	25.81	221	100	PK
5	4960.0000	43.29	10.69	53.98	74.00	20.02	253	282	PK
6	4960.0000	35.25	10.69	45.94	54.00	8.06	253	261	AV
7	7440.0000	19.82	9.75	29.57	54.00	24.43	223	263	AV
8	7440.0000	29.30	9.75	39.05	74.00	34.95	223	155	PK
9	9920.0000	28.50	13.83	42.33	74.00	31.67	238	12	PK
10	9920.0000	19.91	13.83	33.74	54.00	20.26	238	232	AV

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]

3.3 NUMBER OF HOPPING FREQUENCY USED

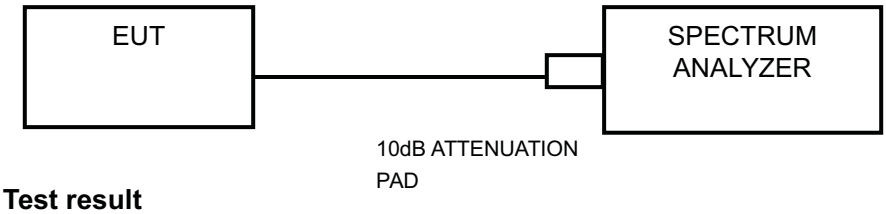
3.3.1 Limits

At least 15 channels frequencies, and should be equally spaced.

3.3.2 Measurement procedure

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
d. Set the SA on View mode and then plot the result on SA screen.
e. Repeat above procedures until all frequencies measured were completed.

3.3.3 Test setup



3.3.4 Test result

Refer to Appendix A.

3.4 DWELL TIME ON EACH CHANNEL

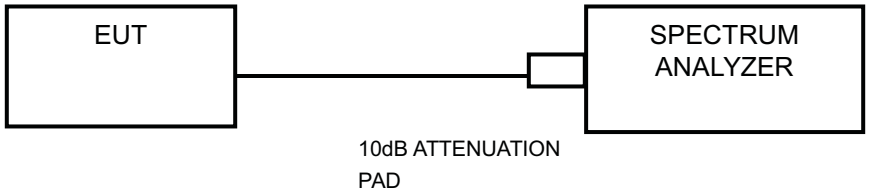
3.4.1 Limits

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

3.4.2 Measurement procedure

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
e. Repeat above procedures until all different time-slot modes have been completed.

3.4.3 Test setup



3.4.4 Test result

Refer to Appendix A.

3.5 20dB EMISSION BANDWIDTH

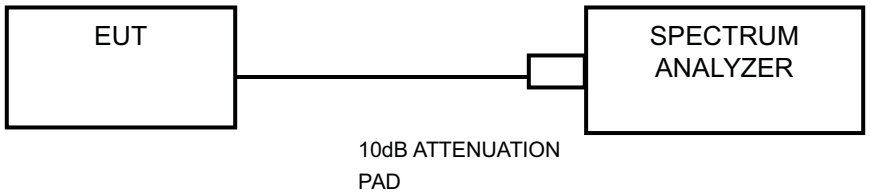
3.5.1 Limits

For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dBbandwidth of hopping channel shell be a minimum limit for the hopping channel separation

3.5.2 Measurement procedure

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
d. Repeat above procedures until all frequencies measured were complete.

3.5.3 Test setup



3.5.4 Test result

Refer to Appendix A.

3.6 HOPPING CHANNEL SEPARATION

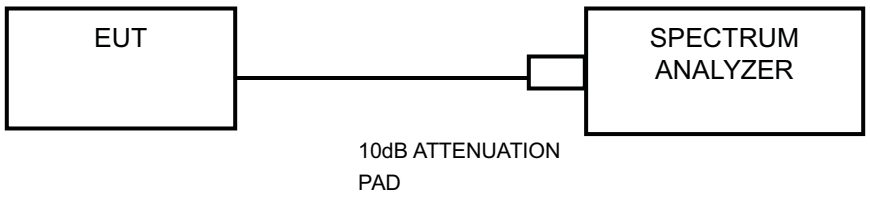
3.6.1 Limits

At least 25kHz or two-third of 20dB hopping channel bandwidth (whichever is greater).

3.6.2 Measurement procedure

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

3.6.3 Test setup



3.6.4 Test result

Refer to Appendix A.

3.7 MAXIMUM OUTPUT POWER

3.7.1 Limits(FCC)

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

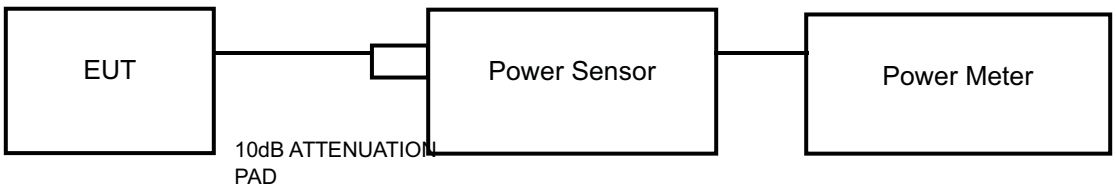
3.7.2 Limits(IC)

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channels. The e.i.r.p. shall not exceed 4 W

3.7.3 Measurement procedure

a. A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor and set the detector to PEAK. Record the power level.
b. An average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power senso and set the detector to AVERAGE. Record the power level.

3.7.4 Test setup



3.7.5 Test result

Refer to Appendix A.

3.8 OUT OF BAND EMISSION MEASUREMENT

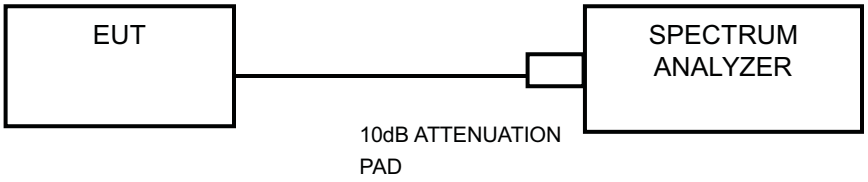
3.8.1 Limits

Below –20dB of the highest emission level of operating band (in 100KHz RBW).

3.8.2 Measurement procedure

The transmitter output was connected to the spectrum analyzer via a low loss cable. of Spectrum Analyzer was set RBW to 100 kHz and VBW to 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. Detector = PEAK and Trace mode = Max Hold. The band edges was measured and recorded.

3.8.3 Test setup



3.8.4 Test result

Refer to Appendix A.

3.9 OCCUPIED BANDWIDTH MEASUREMENT

3.9.1 Measurement procedure

The transmitter antenna output was connected to the spectrum analyzer through an attenuator. The resolution bandwidth shall be set to the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth.
below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

3.9.2 TEST SETUP

3.9.3 Test result

Please refer Annex A.

4 PHOTOGRAPHS OF TEST SETUP

Please refer to the attached file (Test Photos).

5 PHOTOGRAPHS OF THE EUT

Please refer to the attached file (External Photos report and Internal Photos).

6 Appendix A

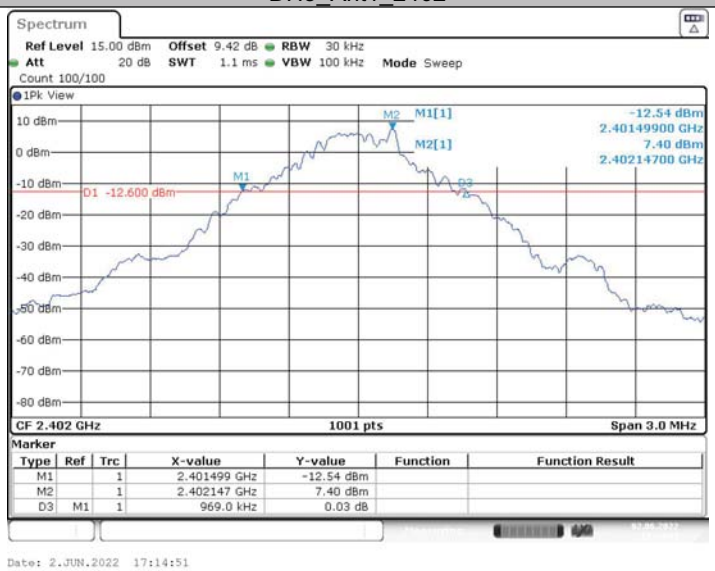
6.1 20dB Emission Bandwidth

6.1.1 Test Result

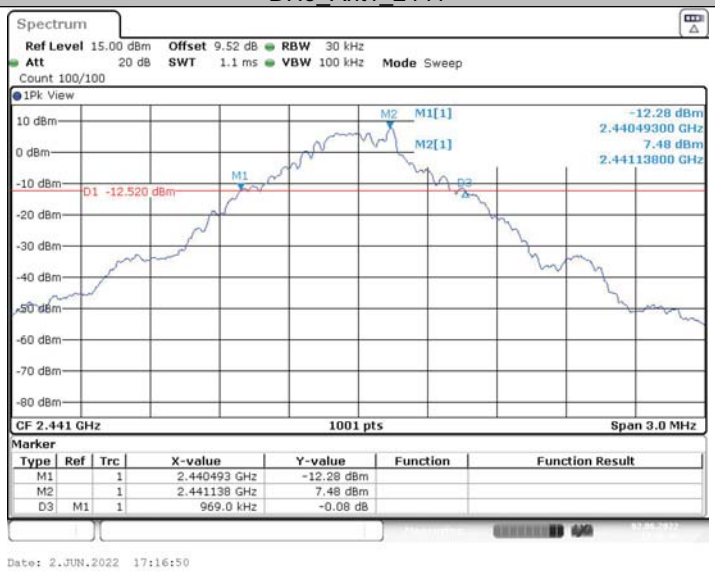
TestMode	Antenna	Frequency[MHz]	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.97	2401.50	2402.47	---	---
		2441	0.97	2440.49	2441.46	---	---
		2480	0.97	2479.48	2480.45	---	---
2DH5	Ant1	2402	1.34	2401.32	2402.66	---	---
		2441	1.34	2440.31	2441.65	---	---
		2480	1.34	2479.31	2480.65	---	---
3DH5	Ant1	2402	1.30	2401.35	2402.65	---	---
		2441	1.30	2440.34	2441.64	---	---
		2480	1.30	2479.33	2480.63	---	---

6.1.2 Test Graphs

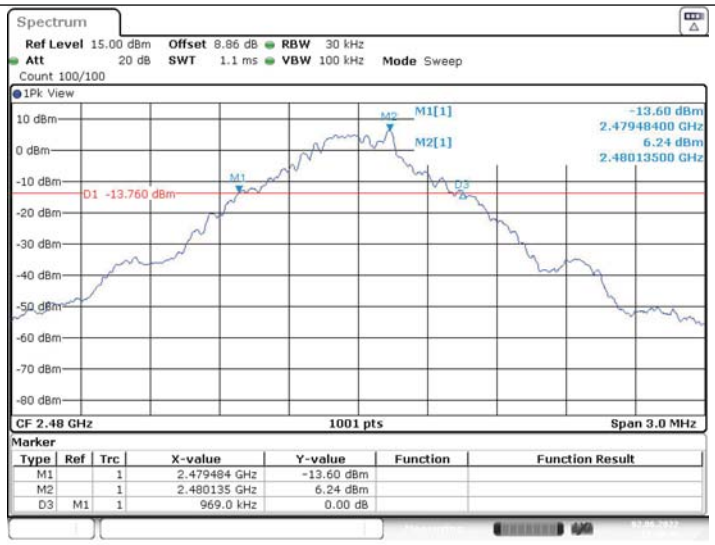
DH5_Ant1_2402



DH5_Ant1_2441

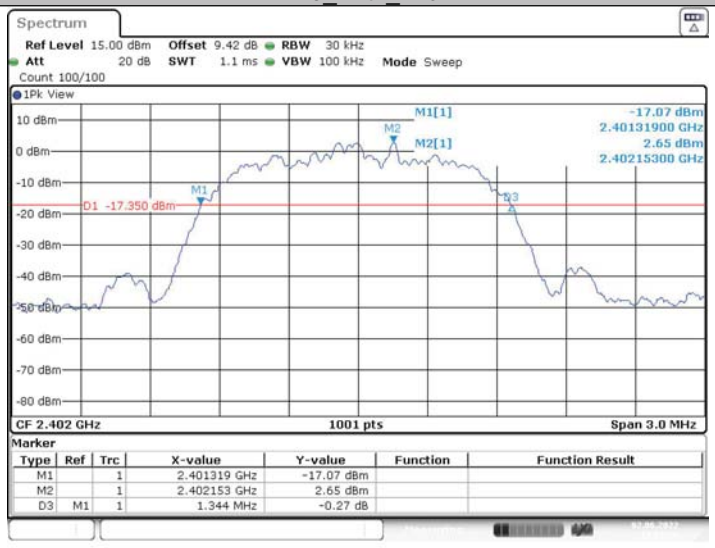


DH5_Ant1_2480



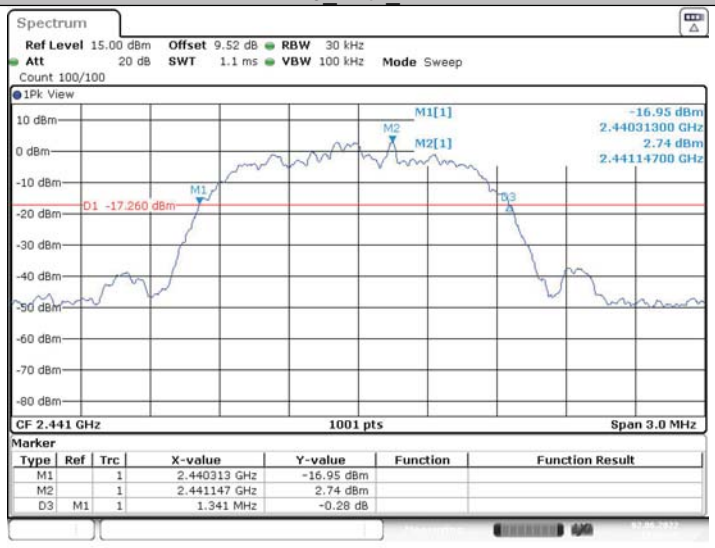
Date: 2.JUN.2022 17:18:48

2DH5_Ant1_2402



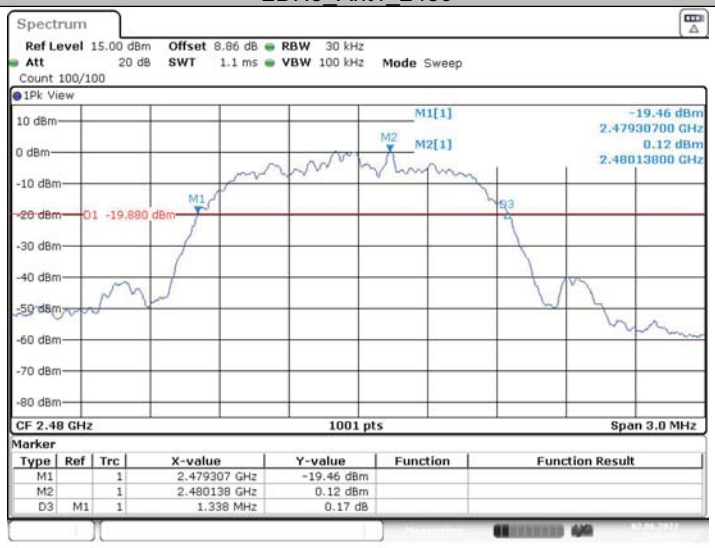
Date: 2.JUN.2022 17:21:21

2DH5_Ant1_2441

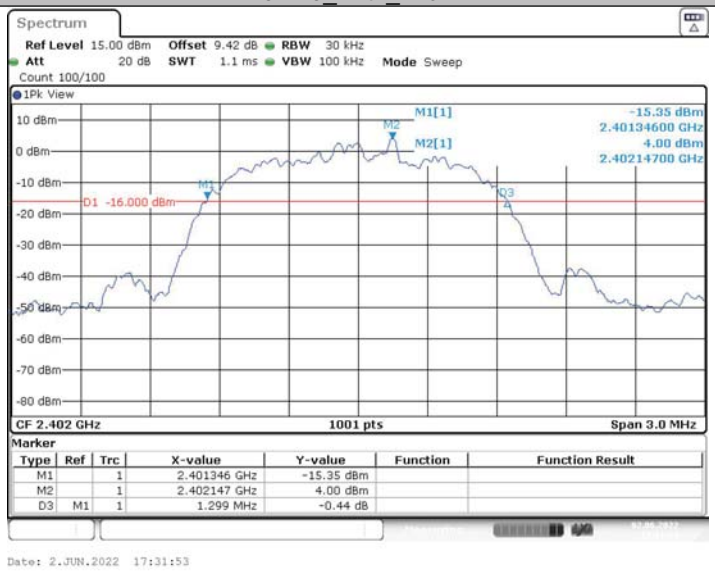


Date: 2.JUN.2022 17:23:25

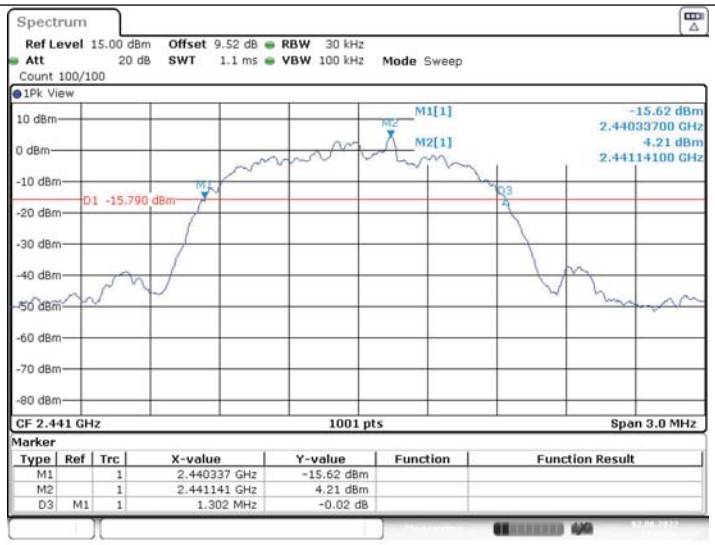
2DH5_Ant1_2480



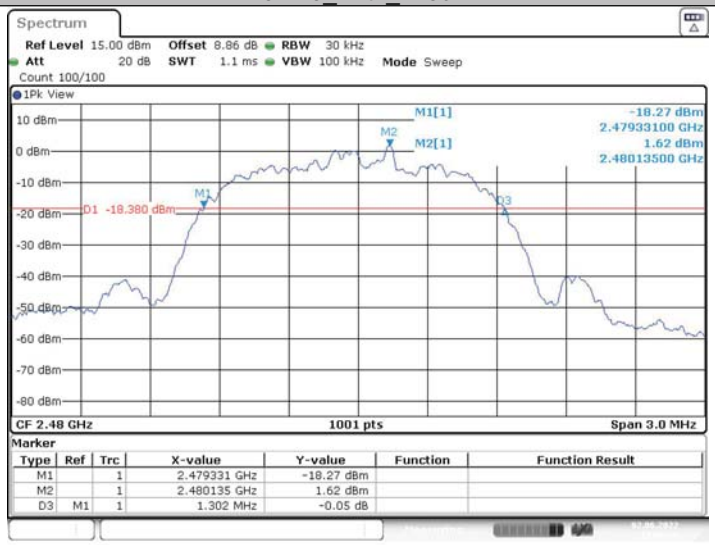
3DH5_Ant1_2402



3DH5_Ant1_2441



3DH5_Ant1_2480



6.2 MAXIMUM OUTPUT POWER

6.2.1 Test Result

PK

Test Mode	Antenna	Frequency[MHz]	Peak Powert[dBm]	Limit [dBm]	Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
DH5	Ant1	2402	3.21	≤20.97	1.14	4.35	≤36.00	PASS
		2441	5.14	≤20.97	1.14	6.28	≤36.00	PASS
		2480	3.86	≤20.97	1.14	5.00	≤36.00	PASS
2DH5	Ant1	2402	6.13	≤20.97	1.14	7.27	≤36.00	PASS
		2441	4.26	≤20.97	1.14	5.40	≤36.00	PASS
		2480	5.55	≤20.97	1.14	6.69	≤36.00	PASS
3DH5	Ant1	2402	6.66	≤20.97	1.14	7.80	≤36.00	PASS
		2441	4.71	≤20.97	1.14	5.85	≤36.00	PASS
		2480	5.95	≤20.97	1.14	7.09	≤36.00	PASS

AV

Test Mode	Antenna	Frequency[MHz]	AV Powert[dBm]	Limit [dBm]	Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
DH5	Ant1	2402	1.52	≤20.97	1.14	2.66	≤36.00	PASS
		2441	3.43	≤20.97	1.14	4.57	≤36.00	PASS
		2480	1.88	≤20.97	1.14	3.02	≤36.00	PASS
2DH5	Ant1	2402	2.34	≤20.97	1.14	3.50	≤36.00	PASS
		2441	0.38	≤20.97	1.14	1.18	≤36.00	PASS
		2480	1.51	≤20.97	1.14	2.65	≤36.00	PASS
3DH5	Ant1	2402	2.33	≤20.97	1.14	3.47	≤36.00	PASS
		2441	0.39	≤20.97	1.14	1.19	≤36.00	PASS
		2480	1.54	≤20.97	1.14	2.68	≤36.00	PASS

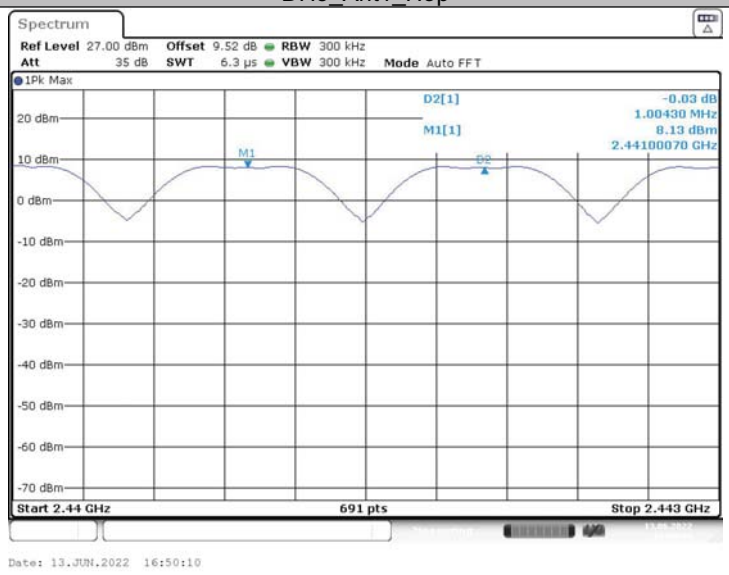
6.3 Hopping Channel Separation

6.3.1 Test Result

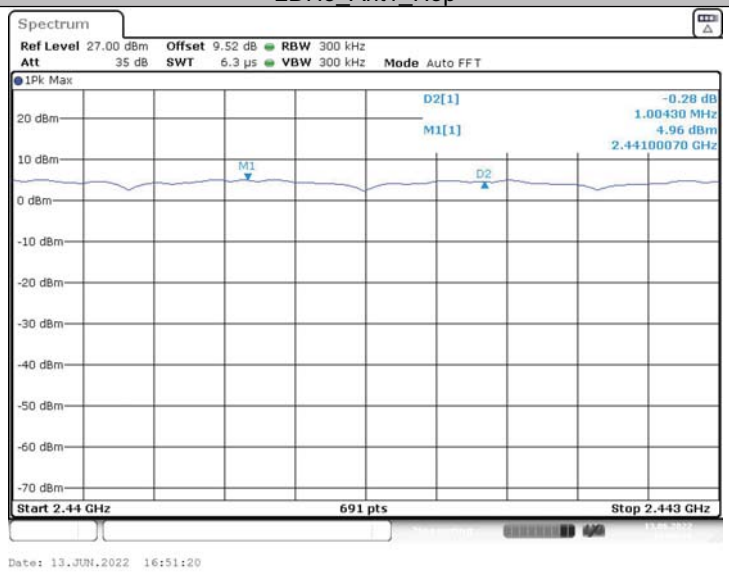
TestMode	Antenna	Frequency[MHz]	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.004	≥0.970	PASS
2DH5	Ant1	Hop	1.004	≥0.893	PASS
3DH5	Ant1	Hop	1.004	≥0.867	PASS

6.3.2 Test Graphs

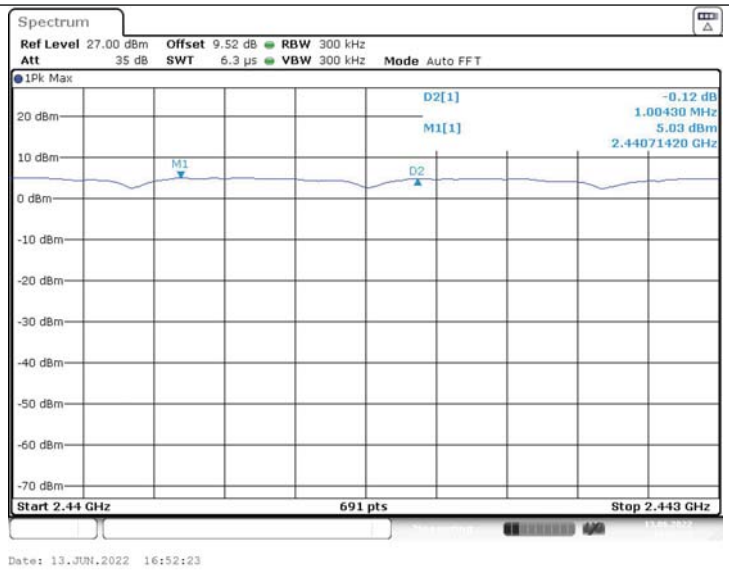
DH5_Ant1_Hop



2DH5_Ant1_Hop



3DH5_Ant1_Hop


Spectrum
Ref Level 27.00 dBm Offset 9.52 dB RBW 300 kHz
Att 35 dB SWT 6.3 µs VBW 300 kHz Mode Auto FFT
1Pk Max
D2[1] -0.12 dB
1.00430 MHz
M1[1] 5.03 dBm
2.44071420 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
D2
Start 2.44 GHz
691 pts
Stop 2.443 GHz
Date: 13.JUN.2022 16:52:23

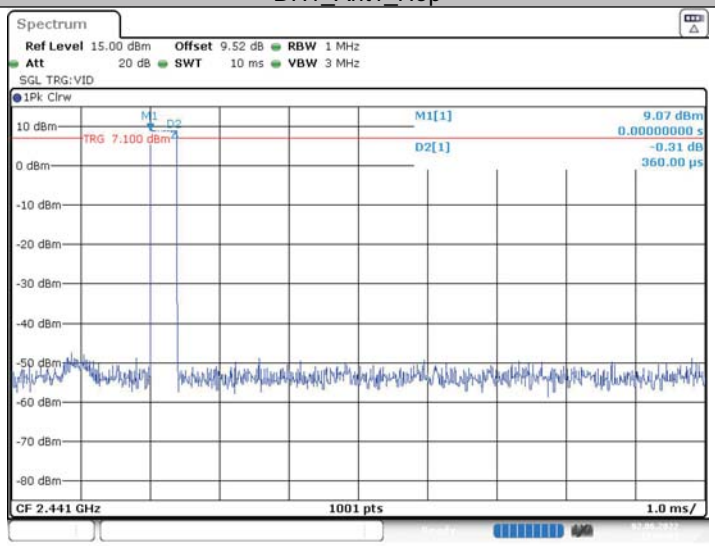
6.4 Dell Time of Each Channel

6.4.1 Test Result

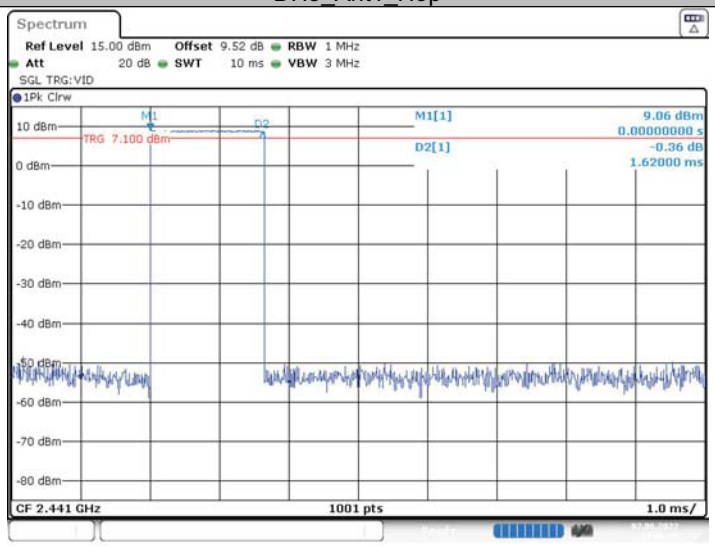
TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.36	320	0.115	≤0.4	PASS
DH3	Ant1	Hop	1.62	160	0.259	≤0.4	PASS
DH5	Ant1	Hop	2.87	106.67	0.306	≤0.4	PASS
2DH1	Ant1	Hop	0.37	320	0.118	≤0.4	PASS
2DH3	Ant1	Hop	1.62	160	0.259	≤0.4	PASS
2DH5	Ant1	Hop	2.87	106.67	0.306	≤0.4	PASS
3DH1	Ant1	Hop	0.37	320	0.118	≤0.4	PASS
3DH3	Ant1	Hop	1.63	160	0.261	≤0.4	PASS
3DH5	Ant1	Hop	2.87	106.67	0.306	≤0.4	PASS

6.4.1 Test Graphs

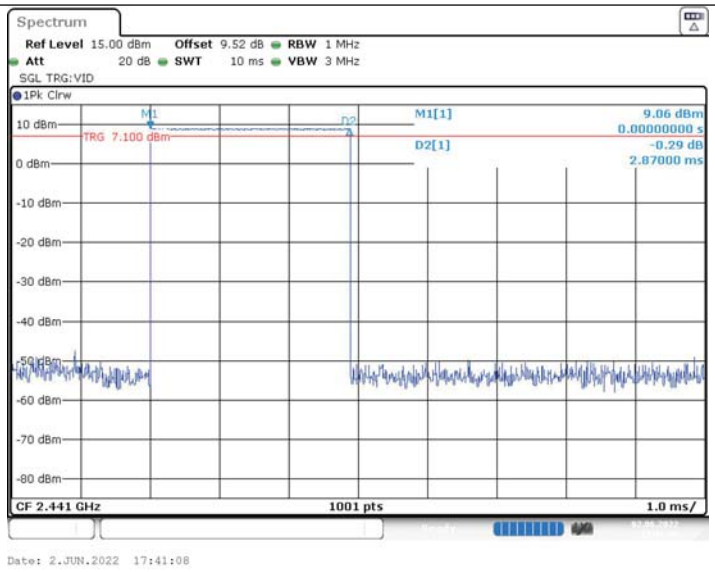
DH1_Ant1_Hop



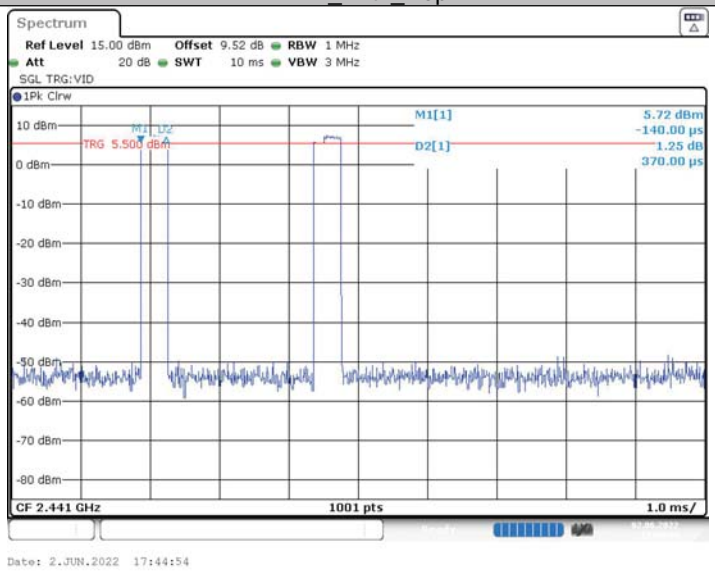
DH3_Ant1_Hop



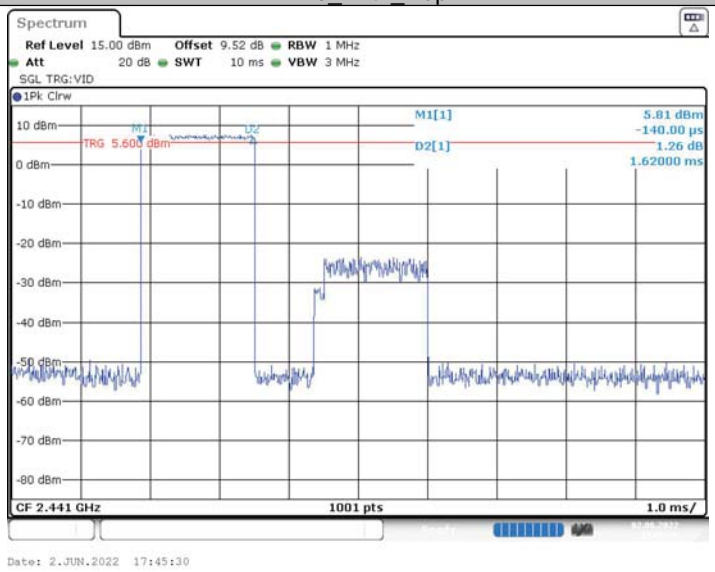
DH5_Ant1_Hop



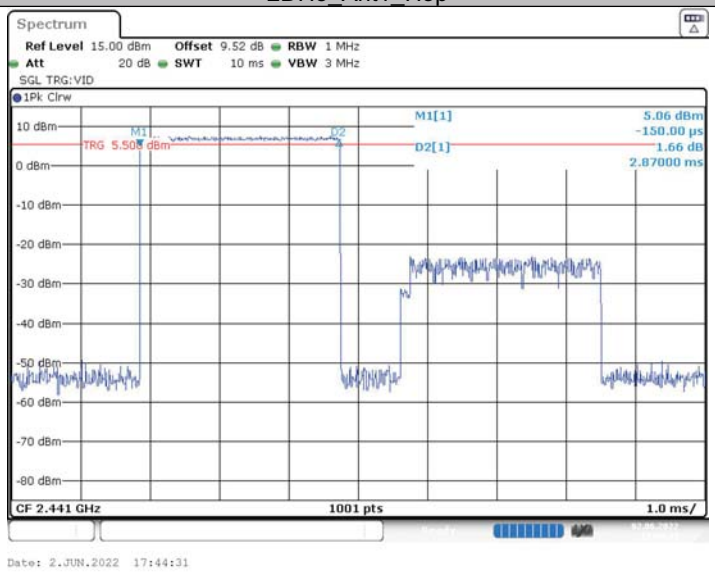
2DH1_Ant1_Hop



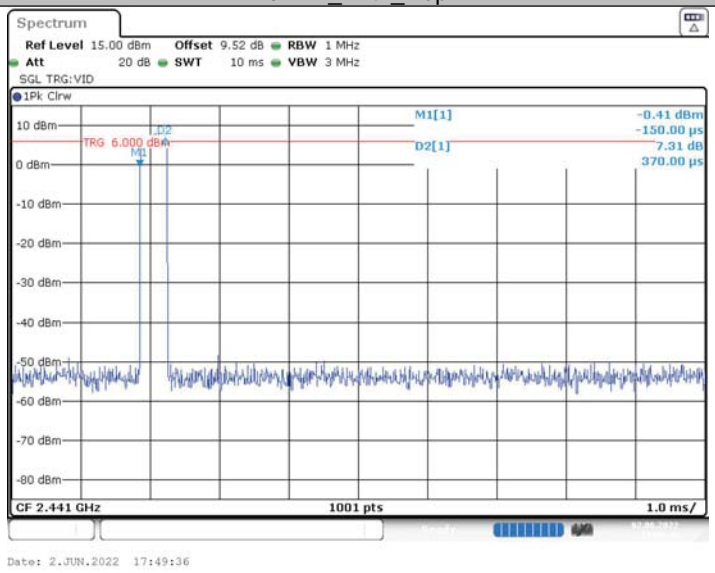
2DH3_Ant1_Hop



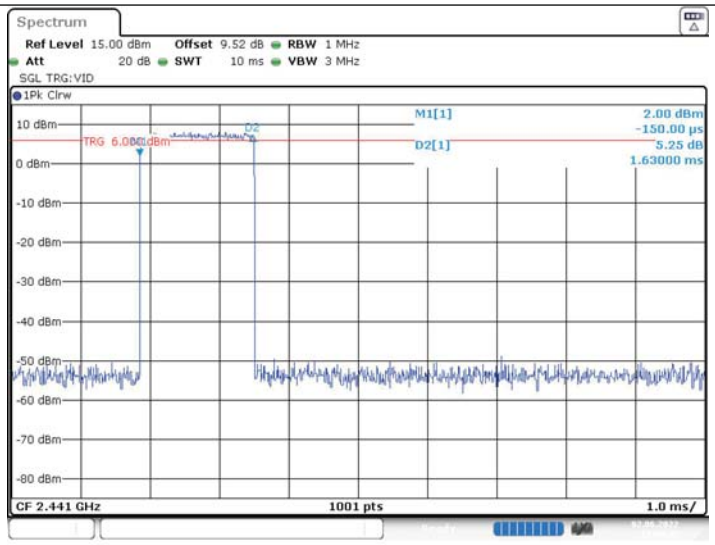
2DH5_Ant1_Hop



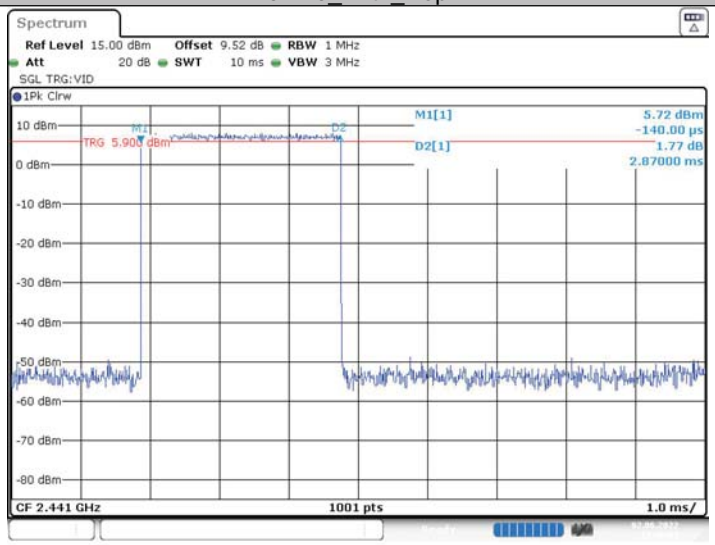
3DH1_Ant1_Hop



3DH3_Ant1_Hop



3DH5_Ant1_Hop



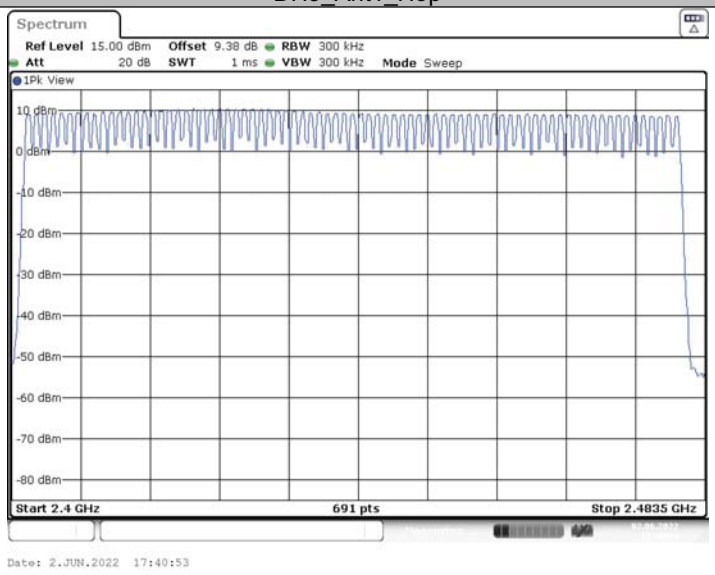
6.5 Number of hopping channels

6.5.1 Test Result

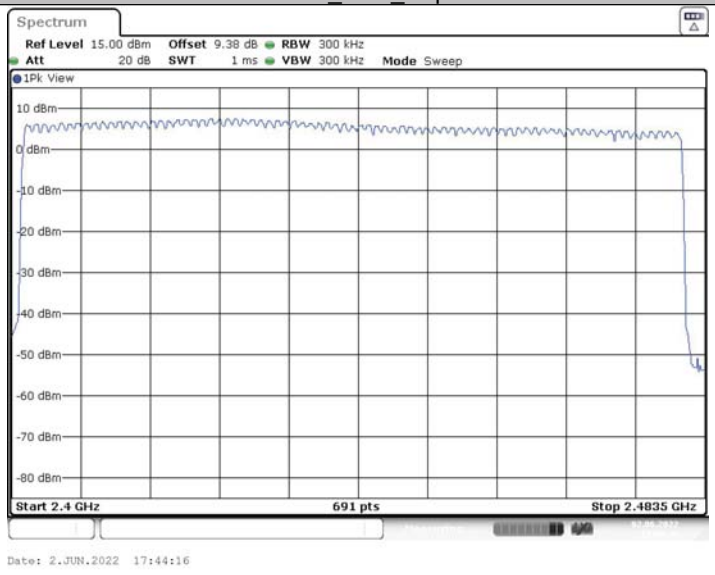
TestMode	Antenna	Frequency[MHz]	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS

6.5.2 Test Graphs

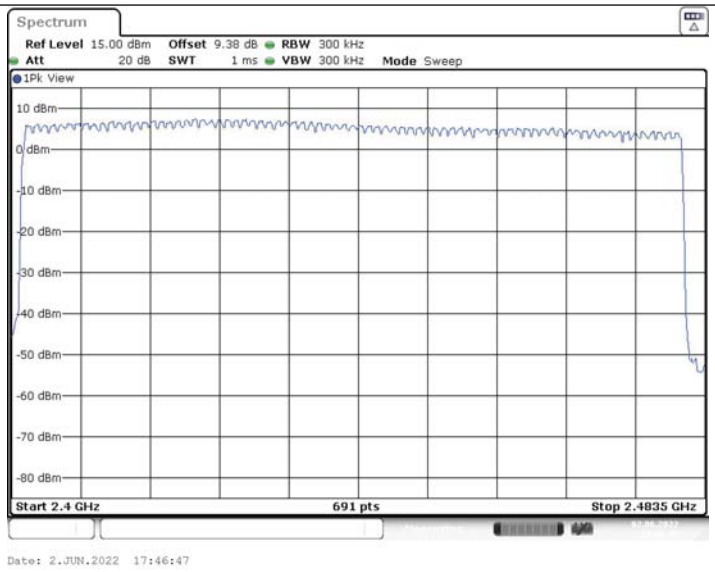
DH5_Ant1_Hop



2DH5_Ant1_Hop



3DH5_Ant1_Hop


Spectrum
Ref Level 15.00 dBm Offset 9.38 dB RBW 300 kHz
Att 20 dB SWT 1 ms VBW 300 kHz Mode Sweep
1Pk View
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
Start 2.4 GHz
691 pts
Stop 2.4835 GHz
Date: 2.JUN.2022 17:46:47

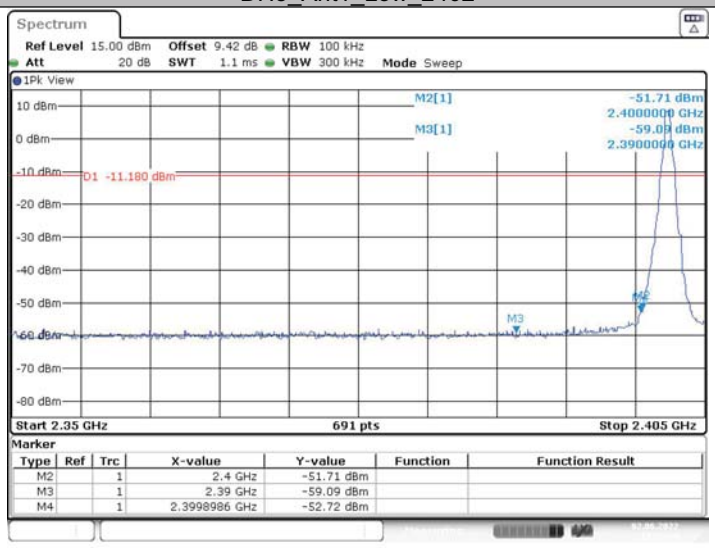
6.6 Band edge measurements

6.6.1 Test Result

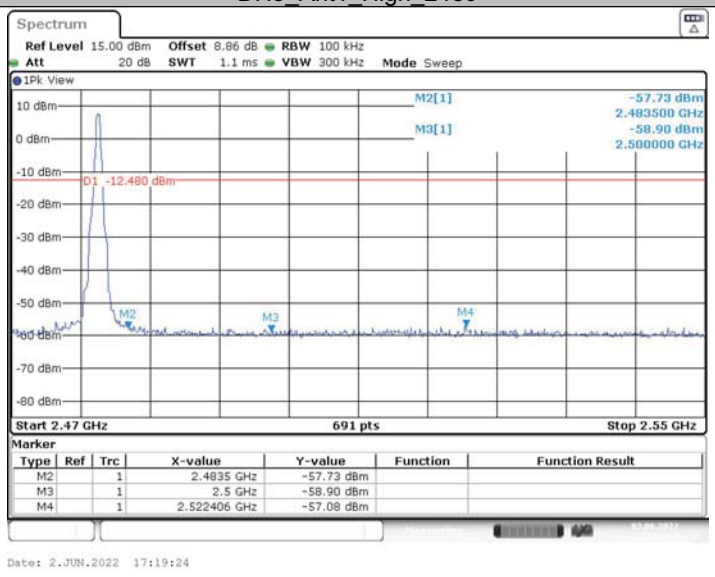
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	8.82	-52.72	≤-11.18	PASS
		High	2480	7.52	-57.08	≤-12.48	PASS
		Low	Hop_2402	7.87	-58.43	≤-12.13	PASS
		High	Hop_2480	7.87	-57.31	≤-12.13	PASS
2DH5	Ant1	Low	2402	5.54	-45.37	≤-14.46	PASS
		High	2480	2.87	-57.31	≤-17.13	PASS
		Low	Hop_2402	5.28	-58.23	≤-14.72	PASS
		High	Hop_2480	2.68	-56.13	≤-17.32	PASS
3DH5	Ant1	Low	2402	5.42	-45.08	≤-14.58	PASS
		High	2480	2.89	-57.02	≤-17.11	PASS
		Low	Hop_2402	4.62	-58.07	≤-15.38	PASS
		High	Hop_2480	3.26	-57.34	≤-16.74	PASS

6.6.2 Test Graphs

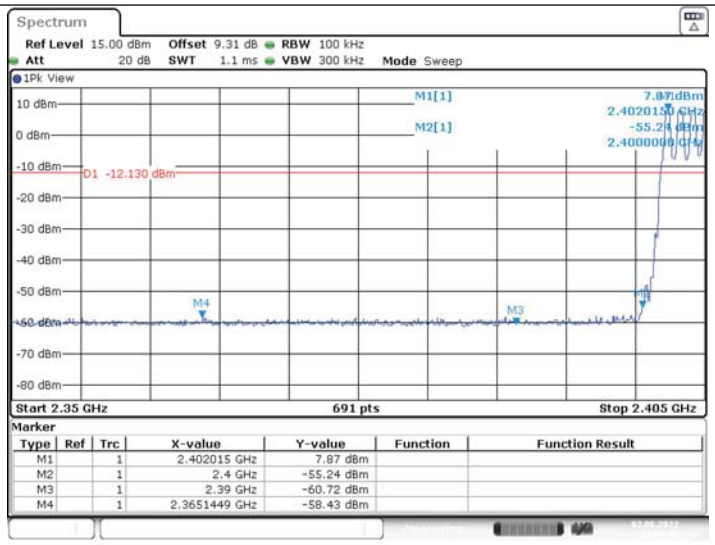
DH5_Ant1_Low_2402



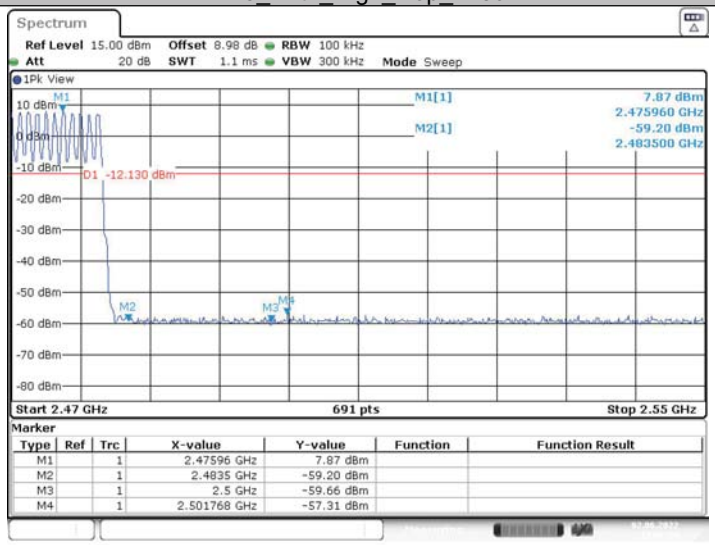
DH5_Ant1_High_2480



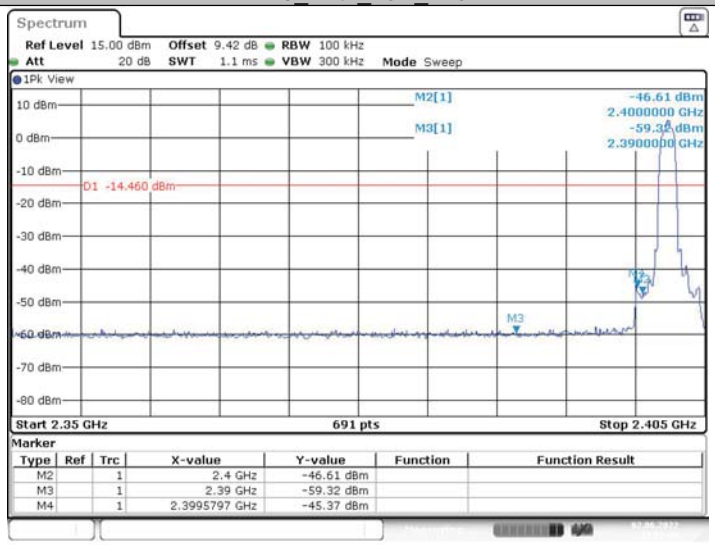
DH5_Ant1_Low_Hop_2402



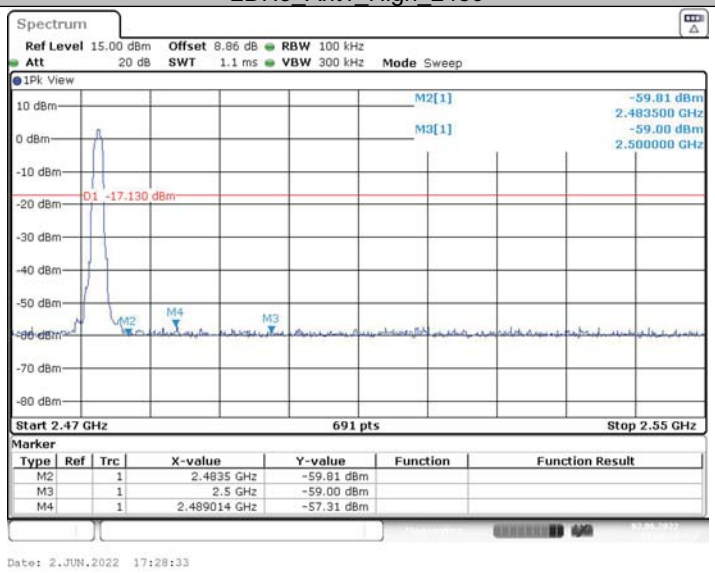
DH5_Ant1_High_Hop_2480



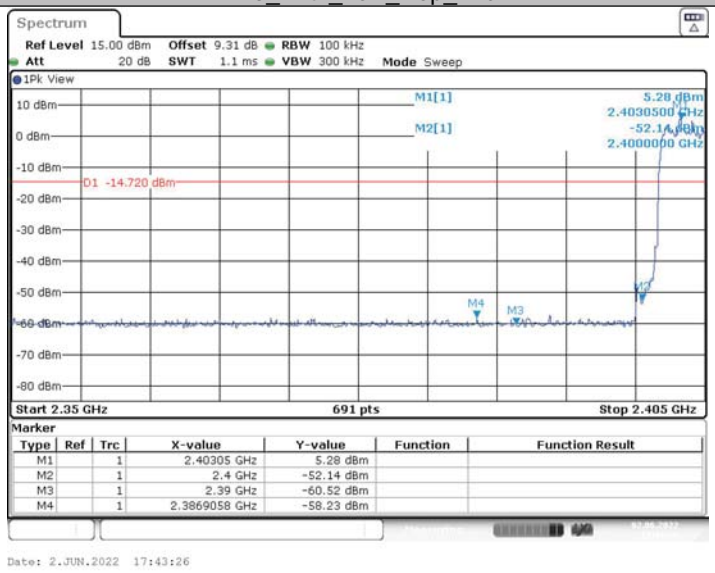
2DH5_Ant1_Low_2402



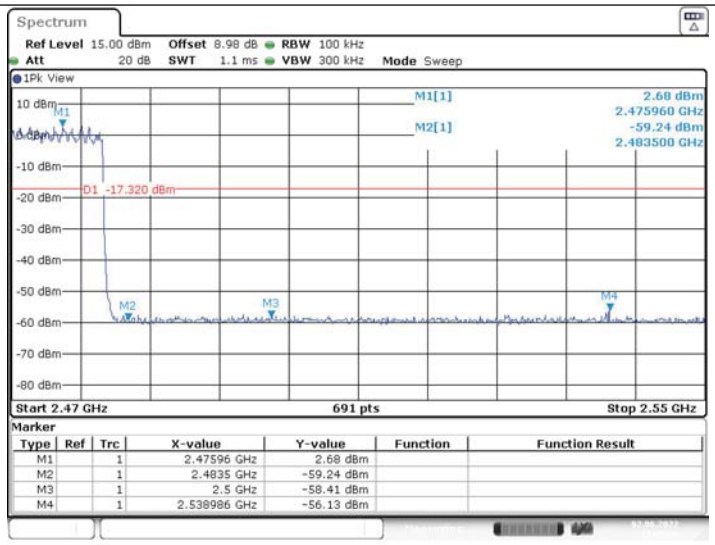
2DH5_Ant1_High_2480



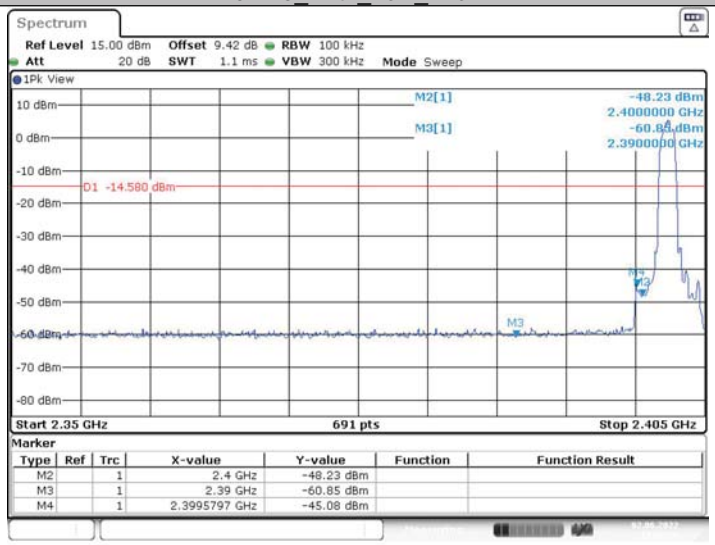
2DH5_Ant1_Low_Hop_2402



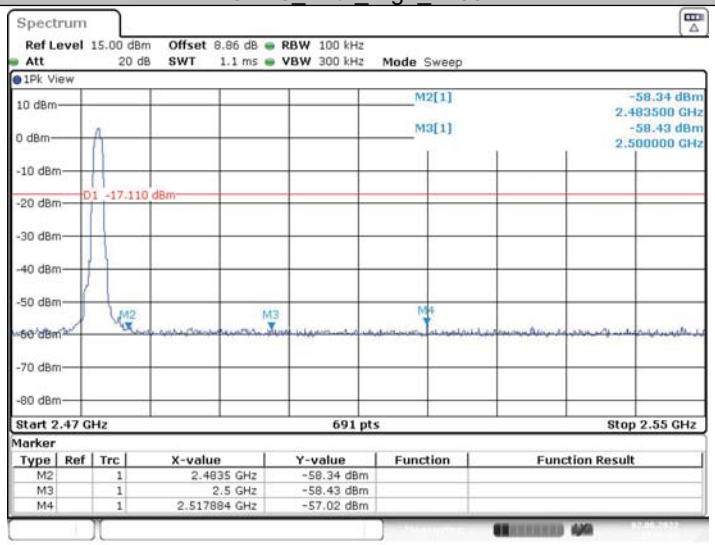
2DH5_Ant1_High_Hop_2480



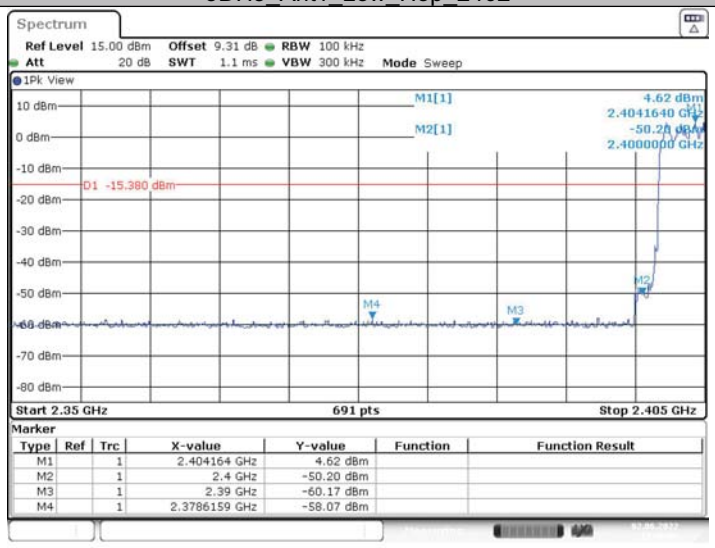
3DH5_Ant1_Low_2402



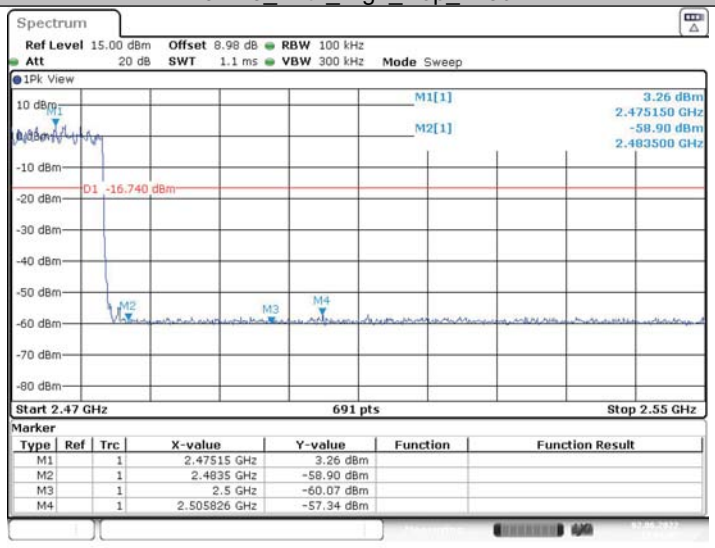
3DH5_Ant1_High_2480



3DH5_Ant1_Low_Hop_2402



3DH5_Ant1_High_Hop_2480



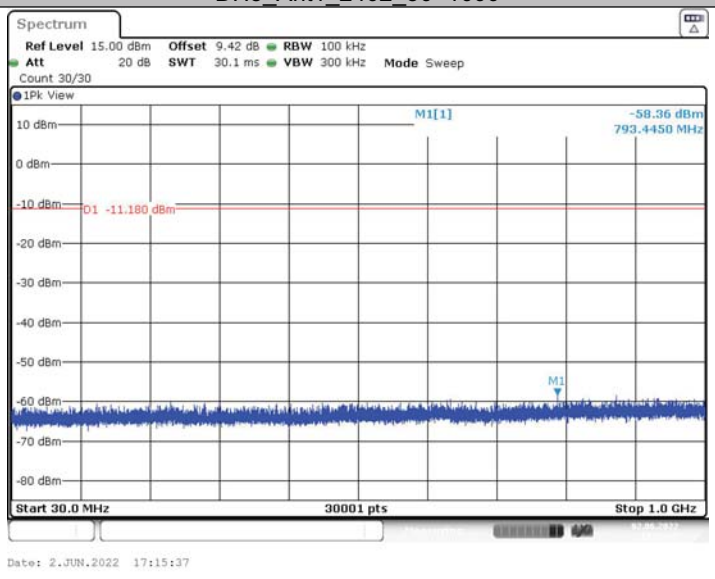
6.7 Out of band Emission Measurement

6.7.1 Test Result

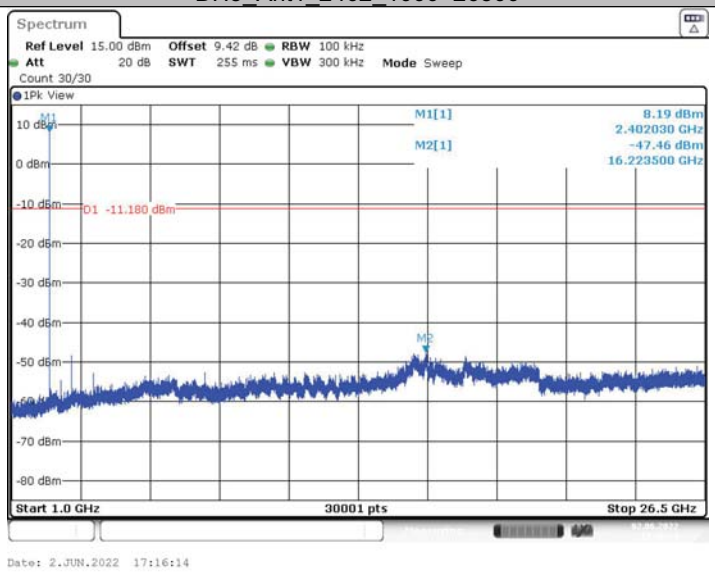
TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	30~1000	8.82	-58.36	≤-11.18	PASS
			1000~26500	8.82	-47.46	≤-11.18	PASS
		2441	30~1000	8.81	-58.41	≤-11.19	PASS
			1000~26500	8.81	-46.46	≤-11.19	PASS
		2480	30~1000	7.52	-58.75	≤-12.48	PASS
			1000~26500	7.52	-48.22	≤-12.48	PASS
2DH5	Ant1	2402	30~1000	5.54	-58.73	≤-14.46	PASS
			1000~26500	5.54	-47.3	≤-14.46	PASS
		2441	30~1000	5.52	-58.65	≤-14.48	PASS
			1000~26500	5.52	-47.41	≤-14.48	PASS
		2480	30~1000	2.87	-59.33	≤-17.13	PASS
			1000~26500	2.87	-48.19	≤-17.13	PASS
3DH5	Ant1	2402	30~1000	5.42	-58.29	≤-14.58	PASS
			1000~26500	5.42	-47.35	≤-14.58	PASS
		2441	30~1000	5.52	-58.53	≤-14.48	PASS
			1000~26500	5.52	-47.13	≤-14.48	PASS
		2480	30~1000	2.89	-59.48	≤-17.11	PASS
			1000~26500	2.89	-47.86	≤-17.11	PASS

6.7.1 Test Graphs

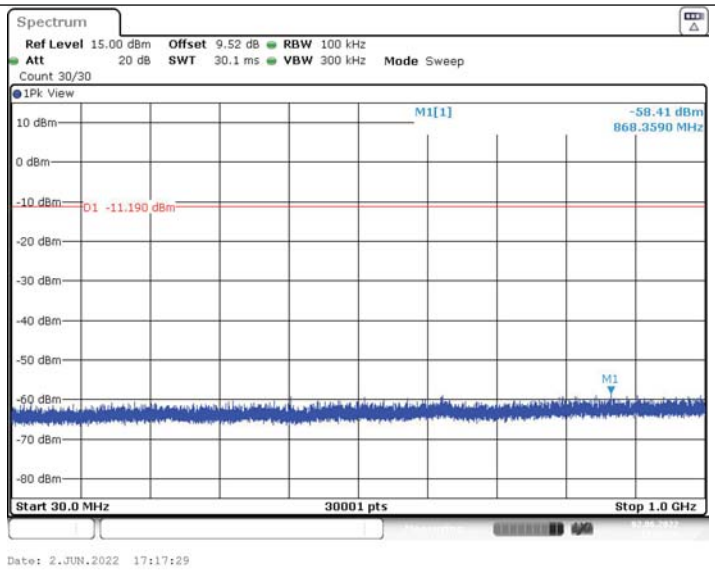
DH5_Ant1_2402_30~1000



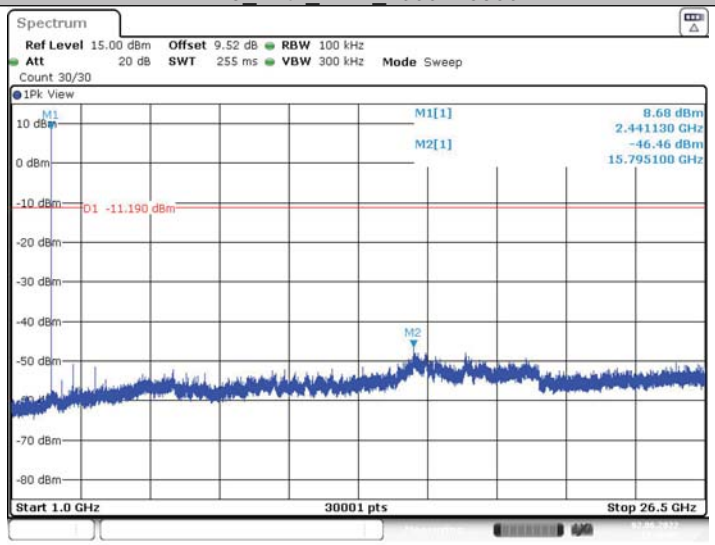
DH5_Ant1_2402_1000~26500



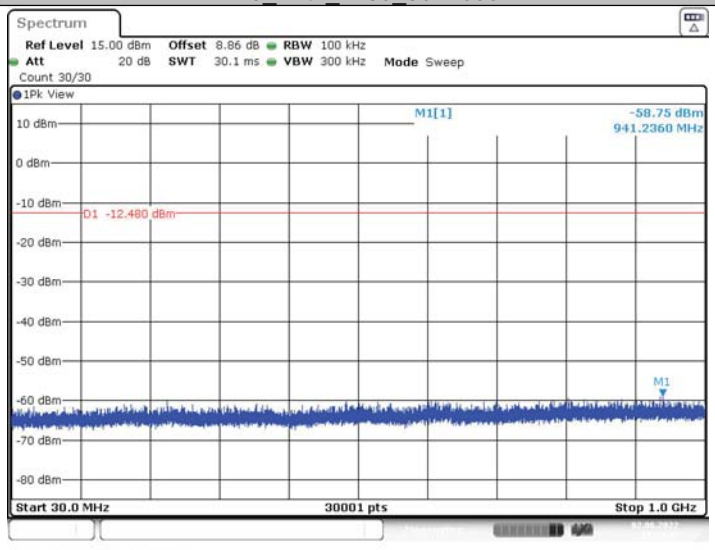
DH5_Ant1_2441_30~1000



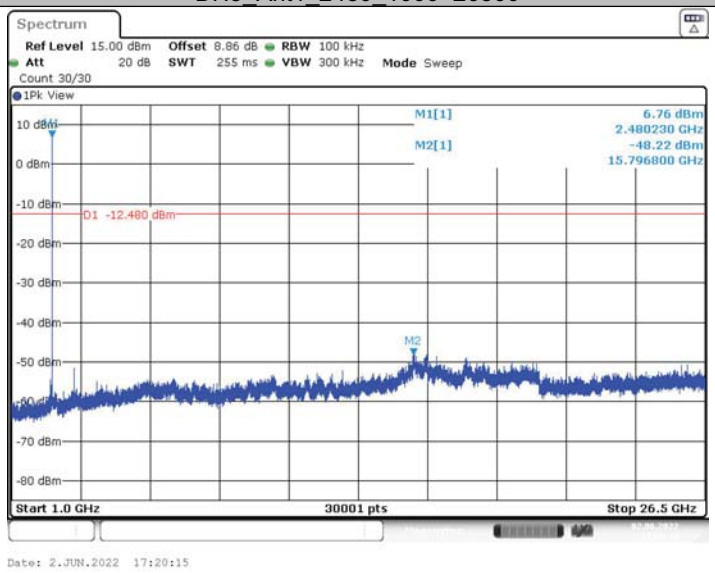
DH5_Ant1_2441_1000~26500



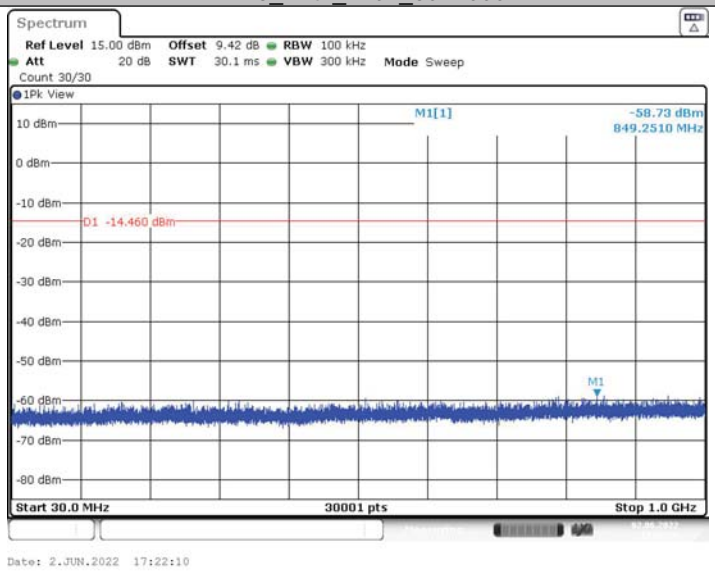
DH5_Ant1_2480_30~1000



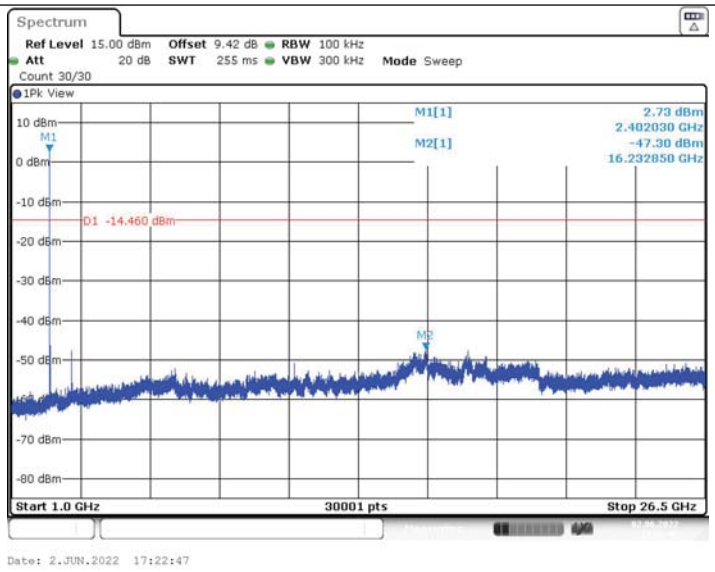
DH5_Ant1_2480_1000~26500



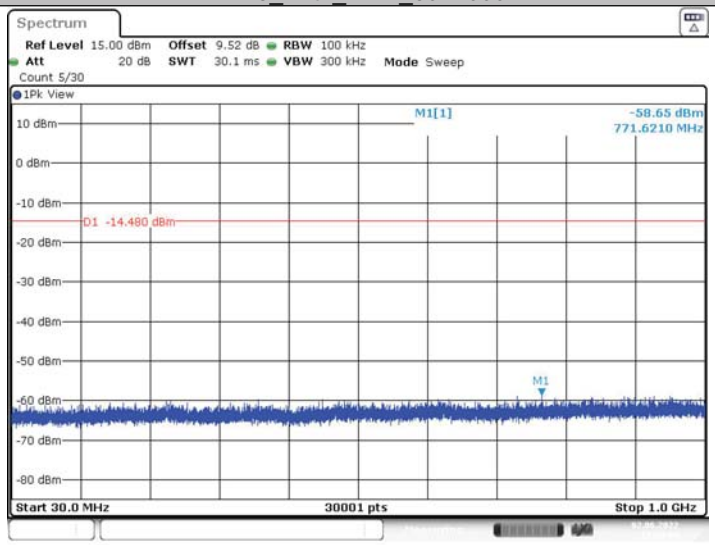
2DH5_Ant1_2402_30~1000



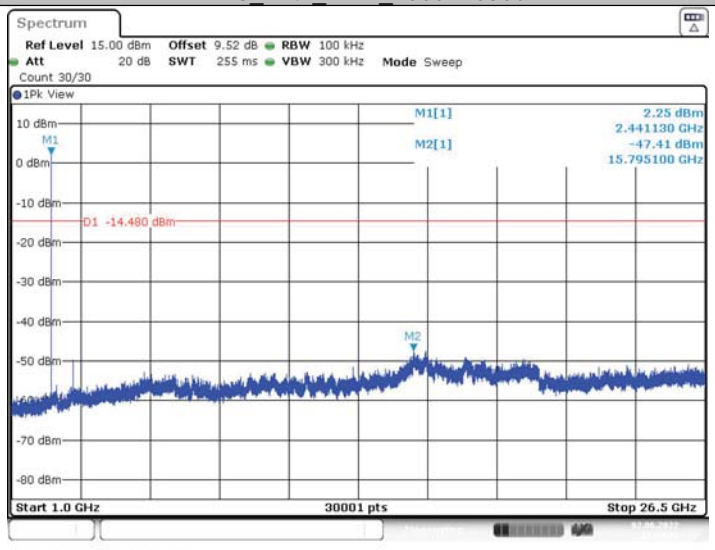
2DH5_Ant1_2402_1000~26500



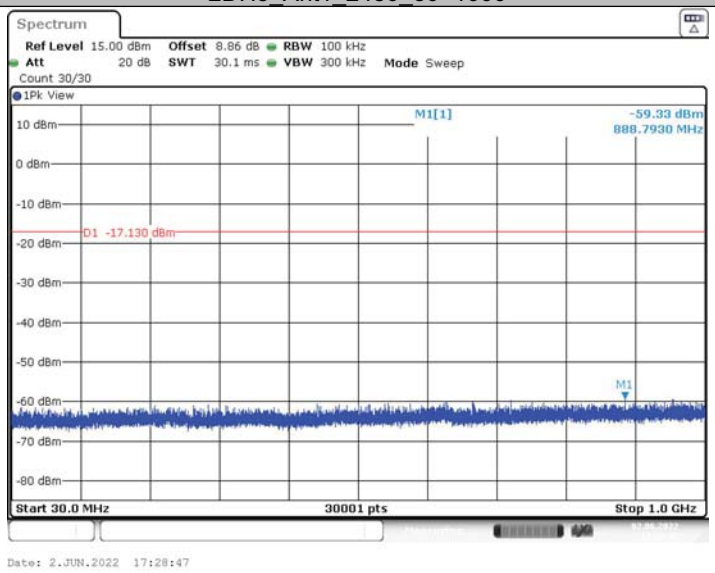
2DH5_Ant1_2441_30~1000



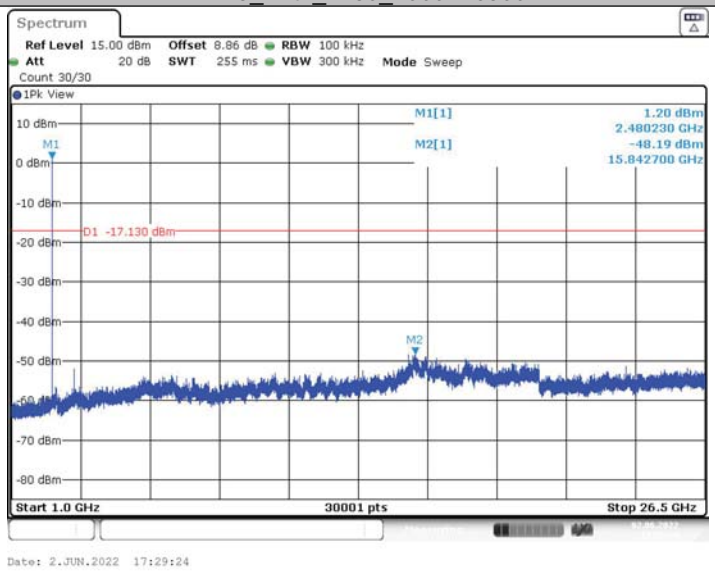
2DH5_Ant1_2441_1000~26500



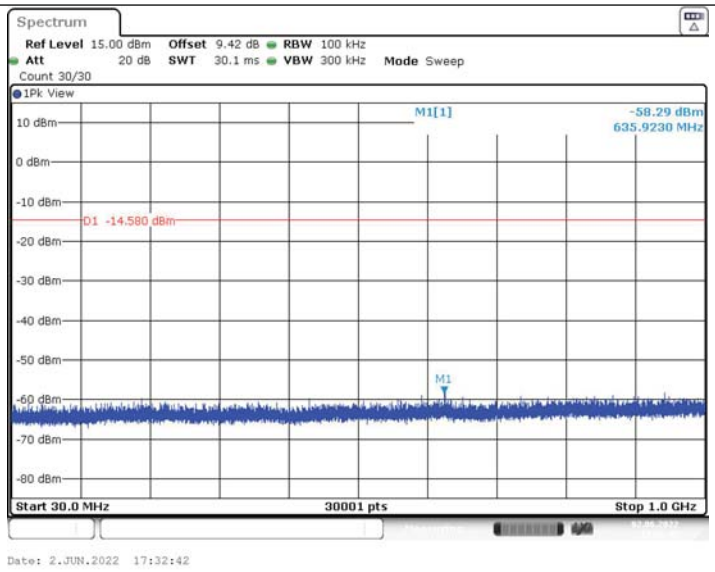
2DH5_Ant1_2480_30~1000



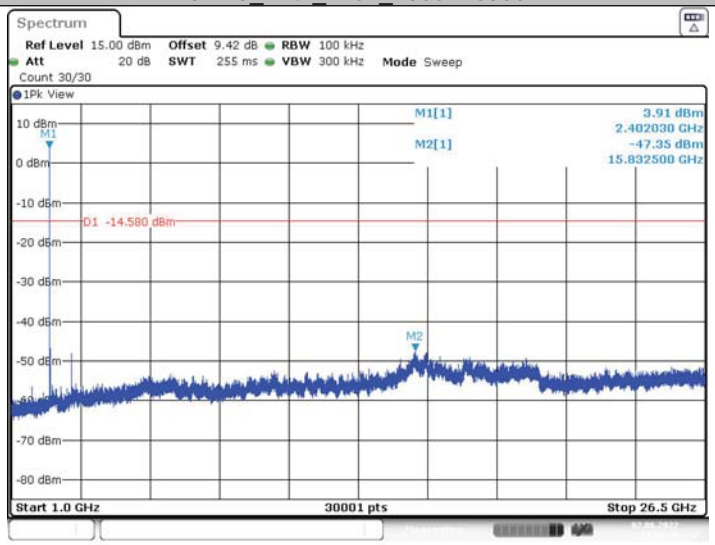
2DH5_Ant1_2480_1000~26500



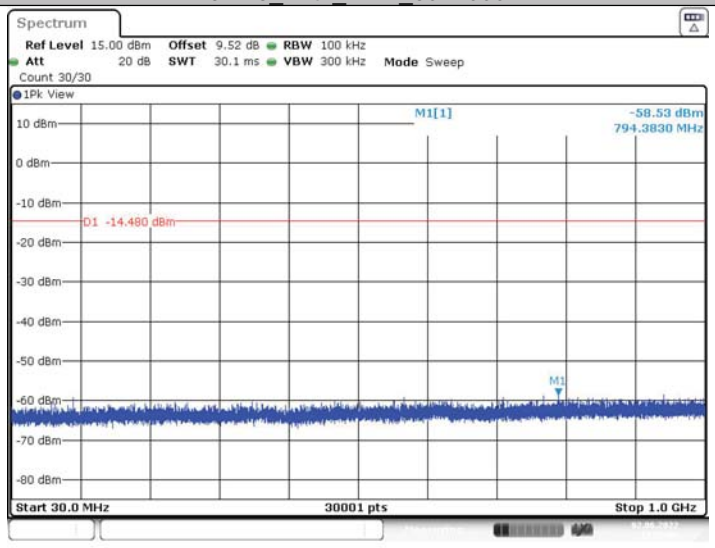
3DH5_Ant1_2402_30~1000



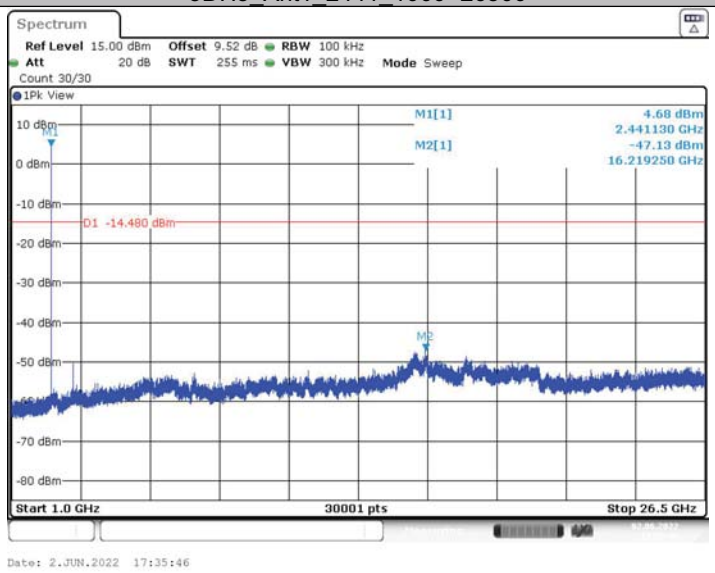
3DH5_Ant1_2402_1000~26500



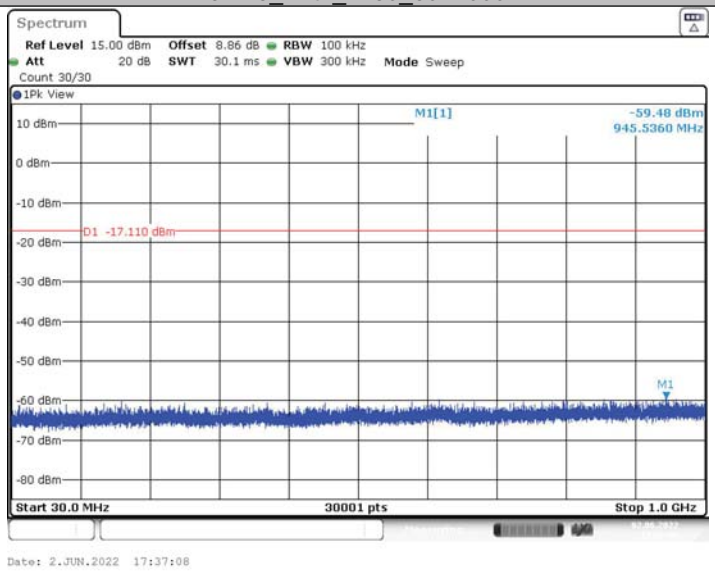
3DH5_Ant1_2441_30~1000



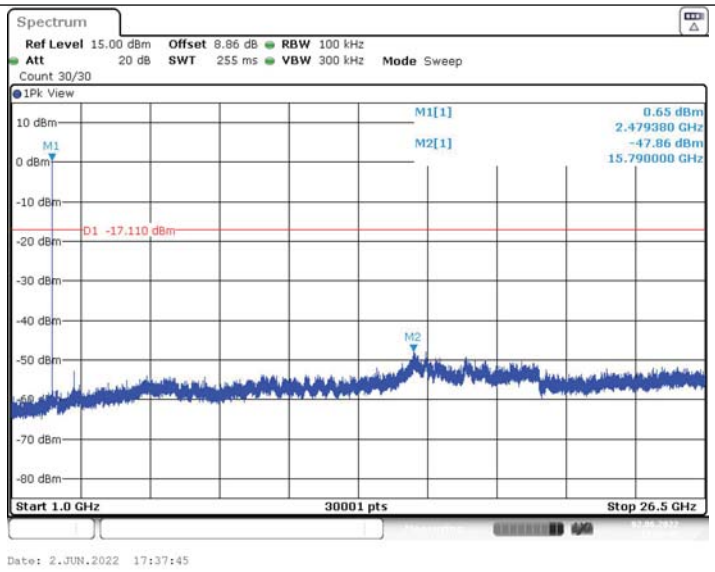
3DH5_Ant1_2441_1000~26500



3DH5_Ant1_2480_30~1000



3DH5_Ant1_2480_1000~26500


Spectrum
Ref Level 15.00 dBm Offset 8.86 dB RBW 100 kHz
Att 20 dB SWT 255 ms VBW 300 kHz Mode Sweep
Count 30/30
1Pk View
M1[1] 0.65 dBm
2.479380 GHz
M2[1] -47.86 dBm
15.790000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
-80 dBm
M1
D1 -17.110 dBm
M2
Start 1.0 GHz
30001 pts
Stop 26.5 GHz
Date: 2.JUN.2022 17:37:45

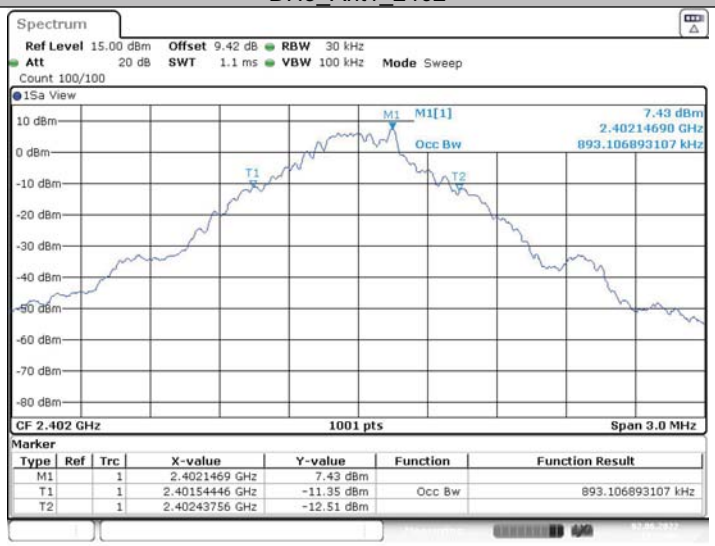
6.8 Occupied Channel Bandwidth

6.8.1 Test Result

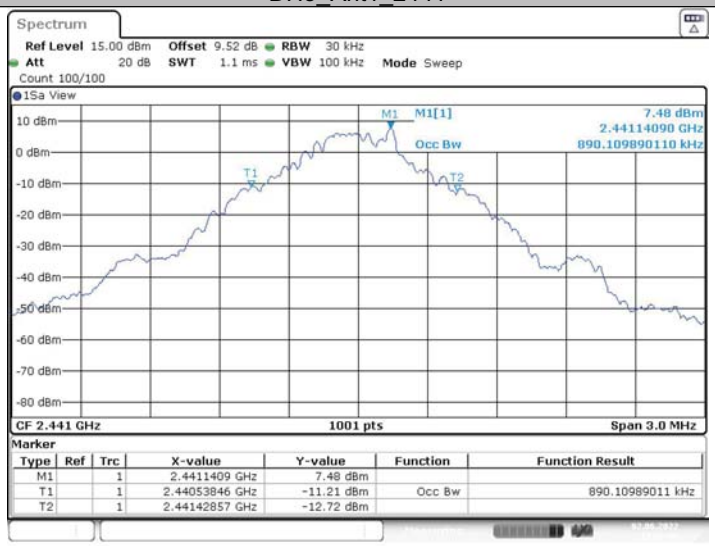
TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.893	2401.544	2402.438	---	---
		2441	0.89	2440.538	2441.429	---	---
		2480	0.893	2479.529	2480.423	---	---
2DH5	Ant1	2402	1.19	2401.398	2402.587	---	---
		2441	1.193	2440.389	2441.581	---	---
		2480	1.19	2479.383	2480.572	---	---
3DH5	Ant1	2402	1.184	2401.401	2402.584	---	---
		2441	1.187	2440.392	2441.578	---	---
		2480	1.184	2479.386	2480.569	---	---

6.8.2 Test Graphs

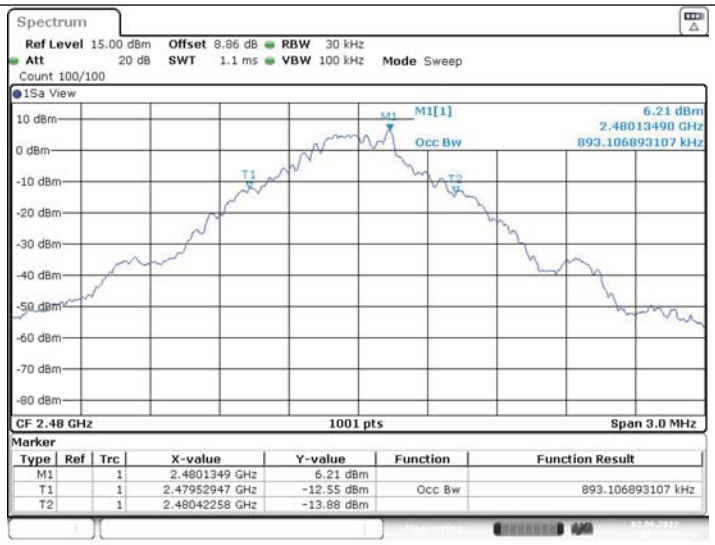
DH5_Ant1_2402



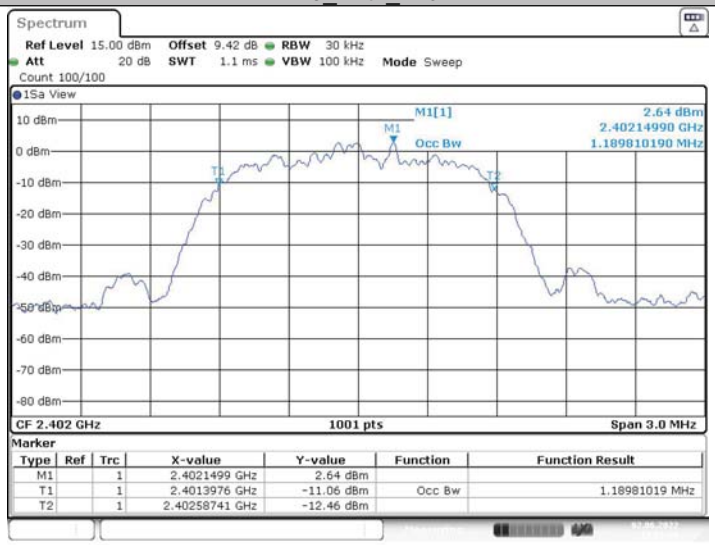
DH5_Ant1_2441



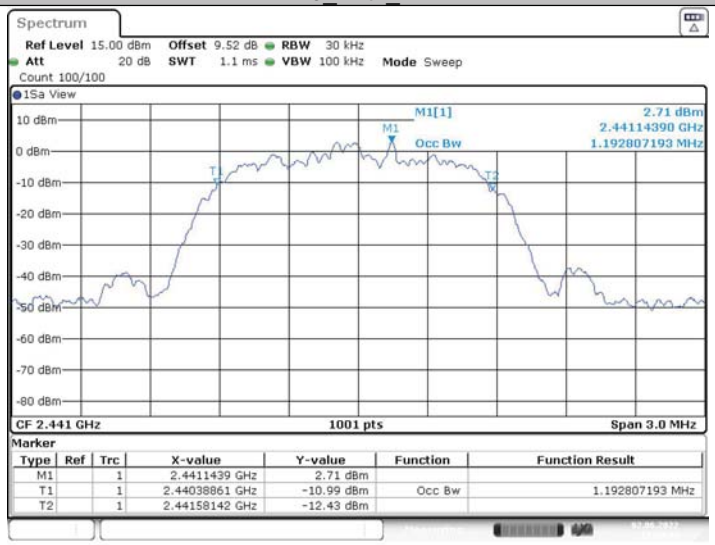
DH5_Ant1_2480



2DH5_Ant1_2402



2DH5_Ant1_2441

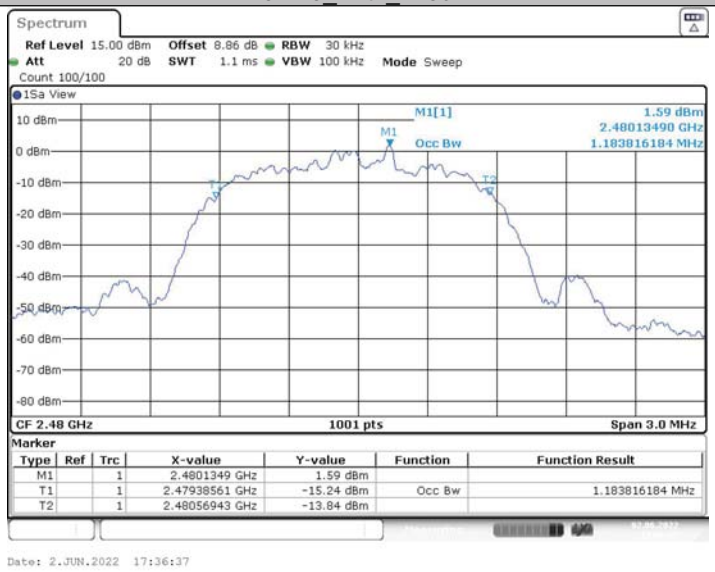


2DH5_Ant1_2480

3DH5_Ant1_2402

3DH5_Ant1_2441

3DH5_Ant1_2480



Important

(1) The test report is valid with the official seal of the laboratory and the signatures of Test engineer, Author and Reviewer simultaneously.

(2) The test report is invalid if altered.

(3) Any photocopies or part photocopies in the test report are forbidden without the written permission from the laboratory.

(4) Objections to the test report must be submitted to the laboratory within 15 days.

(5) Generally, commission test is responsible for the tested samples only.

(6)Any photocopies or part photocopies of the test report are forbidden without the written permission from CVC;

Address of the laboratory:

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Post Code：510663 Tel：020-32293888
FAX：020-32293889 E-mail：office@cvc.org.cn