FCC Test Report

Report No.:	2405Z56633EB
Applicant:	SHENZHEN MOCLOUD TECHNOLOGY CO., LTD.
Address:	Rm 1401-02, Huatong Bldg., Ganli 2nd Road, Jihua Town, Longgang Dist., Shenzhen, China
Product Name:	SPEAKER
Product Model:	MPD523
Multiple Models:	N/A
Trade Mark:	Maxpower
FCC ID:	2AXUUMPD523
Standards:	FCC CFR Title 47 Part 15C (§15.247)
Test Date:	2024-12-02 to 2024-12-16
Test Result:	Complied
Report Date:	2024-12-17

Reviewed by: Frank Yin — Project Engineer

Approved by: Jacob Kong — Manager

Prepared by:

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

NVLAP TESTING NVLAP LAB CODE 600335-0

ilac-MRA

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3. This sample tested is in compliance with the limits of the above regulation.

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5. The information marked "#" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

Revision History

Version No.	Issued Date	Description
00	*2024-12-17*	*Original*

Contents

1 General Information

1.1 Client Information

Applicant:	SHENZHEN MOCLOUD TECHNOLOGY CO., LTD.
Address:	Rm 1401-02, Huatong Bldg., Ganli 2nd Road, Jihua Town, Longgang Dist., Shenzhen, China
Manufacturer:	SHENZHEN MOCLOUD TECHNOLOGY CO., LTD.
Address:	Rm 1401-02, Huatong Bldg., Ganli 2nd Road, Jihua Town, Longgang Dist., Shenzhen, China

1.2 Product Description of EUT

The EUT is SPEAKER that contains Classic Bluetooth radio, this report covers the full testing of the Classic Bluetooth radio.

Sample Serial Number	2UTB-2 for CE&RE test, 2UTB-3 for RF conducted test (assigned by WATC)
Sample Received Date	2024-11-20
Sample Status	Good Condition
Frequency Range	2402MHz - 2480MHz
Maximum Conducted Peak Output Power	-4.87dBm
Modulation Technology	GFSK, π/4-DQPSK, 8DPSK
Spatial Streams	SISO (1TX, 1RX)
Antenna Gain#	-2.9dBi
Power Supply	DC 9V, 2A from AC adapter or DC 7.4V from battery
Adapter Information	Input: AC110-240V, 50/60Hz Output: DC 9V/2A,
Modification	Sample No Modification by the test lab

1.3 Antenna information

15.203 requirement:

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.

Device Antenna information:	

The BT antenna is an internal antenna which cannot replace by end-user, please see product internal photos for details.

1.4 Related Submittal(s)/Grant(s)

No related submittal(s)/Grant(s)

1.5 Measurement Uncertainty

Parameter		Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
AC Power Lines Conducted Emissions		±3.14dB
Emissions, Radiated	Below 30MHz	±2.78dB
	Below 1GHz	±4.84dB
	Above 1GHz	±5.44dB
Emissions, Conducted		1.75dB
Conducted Power		0.74dB
Frequency Error		150Hz
Bandwidth		0.34%
Power Spectral Density		0.74dB

Note: *The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.*

1.6 Laboratory Location

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Tel: +86-755-29691511, Email: qa@watc.com.cn

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 463912, the FCC Designation No. : CN5040.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0160.

1.7 Test Methodology

FCC CFR 47 Part 2

FCC CFR 47 Part 15

KDB 558074 D01 15.247 Meas Guidance v05r02

ANSI C63.10-2020

2 Description of Measurement

2.1 Test Configuration

Operating channels:					
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	2402	39	2441	76	2478
1	2403	40	2442	77	2479
…	…	…	…	78	2480
38	2440	…	…	/	/
According to ANSI C63.10-2020 chapter 5.6.1 Table 11 requirement, select lowest channel, middle channel, and highest channel in the frequency range in which device operates for testing. The detailed frequency points are as follows:					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	2402	39	2441	78	2480

Test Mode:				
Transmitting mode:	Keep the EUT in continuous transmitting with modulation			
Exercise software#:	FrequencyTool_v0.3.0			
Mode	**Data rate**	**Power Level Setting#**		
		Low Channel	**Middle Channel**	**High Channel**
GFSK	1Mbps	-4	-4	-4
π/4 DQPSK	2Mbps	-4	-4	-4
8DPSK	3Mbps	-4	-4	-4
The exercise software and the maximum power setting that provided by manufacturer.				

Worst-Case Configuration:
For AC power line conducted emission and radiated emission 9kHz-1GHz and above 18GHz were performed with the EUT transmits at the channel with highest output power as worst-case scenario.

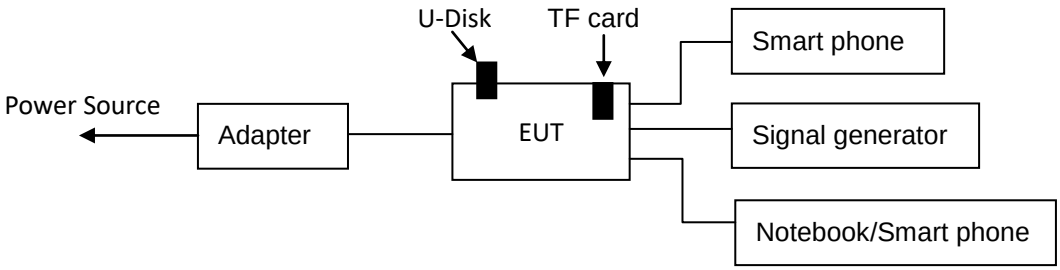
2.2 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
R&S	Signal generator	SMBV100A	256300
Sparx	Smart phone	Neo x	Unknown
Unknown	Smart phone	Unknown	Unknown
DELL	Notebook	E5570	52KW7
Unknown	U-Disk	Unknown	Unknown
Unknown	TF card	Unknown	Unknown

2.3 Interconnecting Cables

Manufacturer	Description	Length(m)	From	To
Unknown	DC cable	1.2	Adapter	EUT
Unknown	3.5mm to 3.5mm cable	0.5	EUT	Smart phone
Unknown	6.5mm to coaxial cable	1.0	EUT	Signal generator
Unknown	3.5mm to 6.5mm cable	1.5	EUT	Notebook/Smart Phone

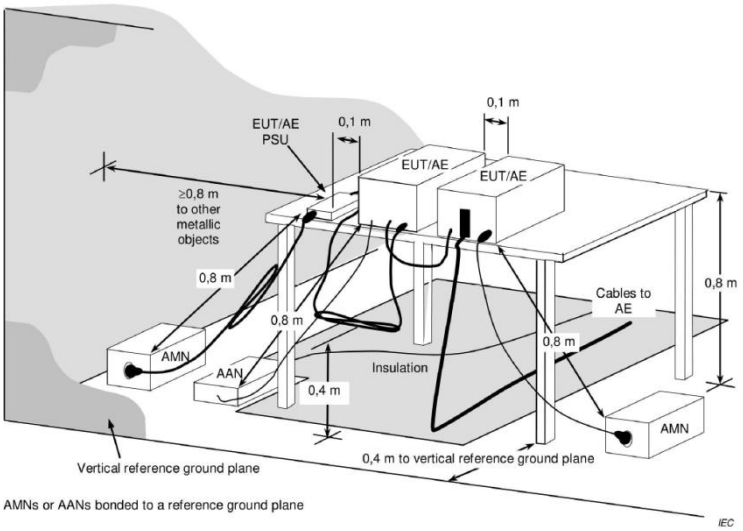
2.4 Block Diagram of Connection between EUT and AE



Note: for reference only, the actual connection setup used for testing please refer to the test photos.

2.5 Test Setup

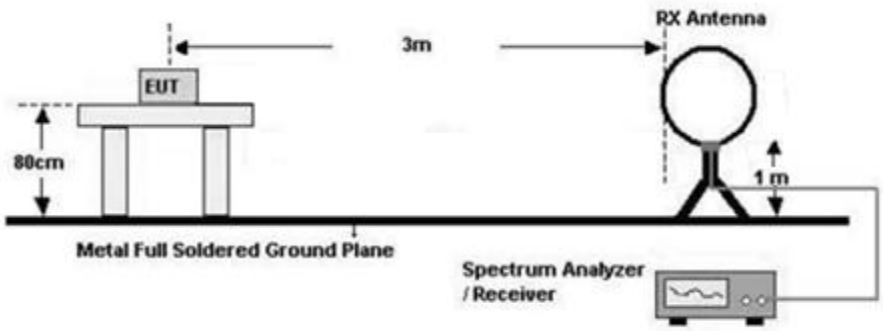
1) Conducted emission measurement:



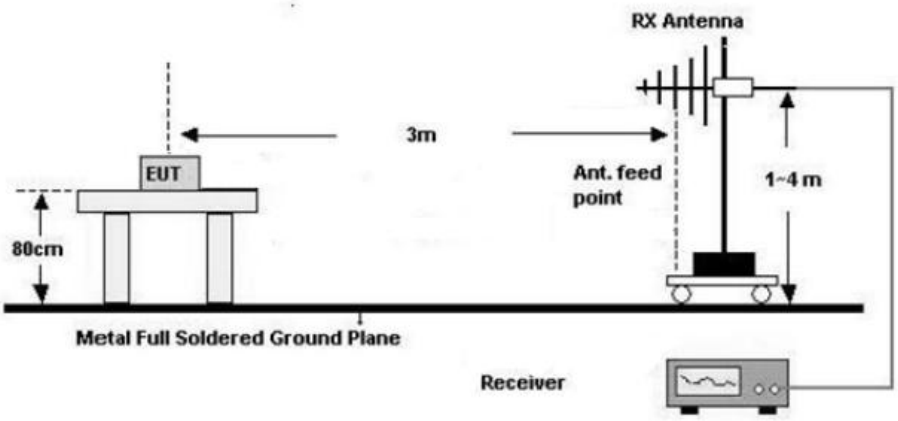
Note: The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

2) Radiated emission measurement:

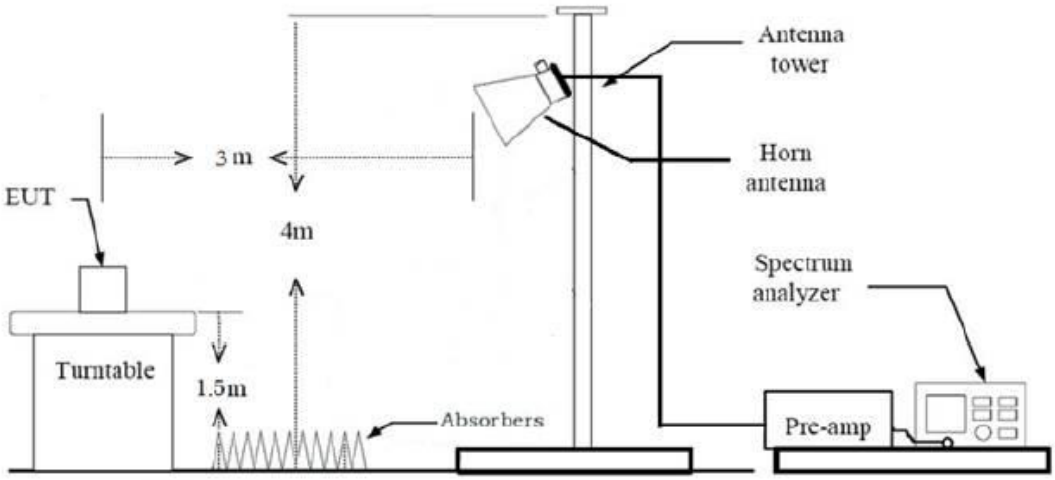
Below 30MHz (3m SAC)



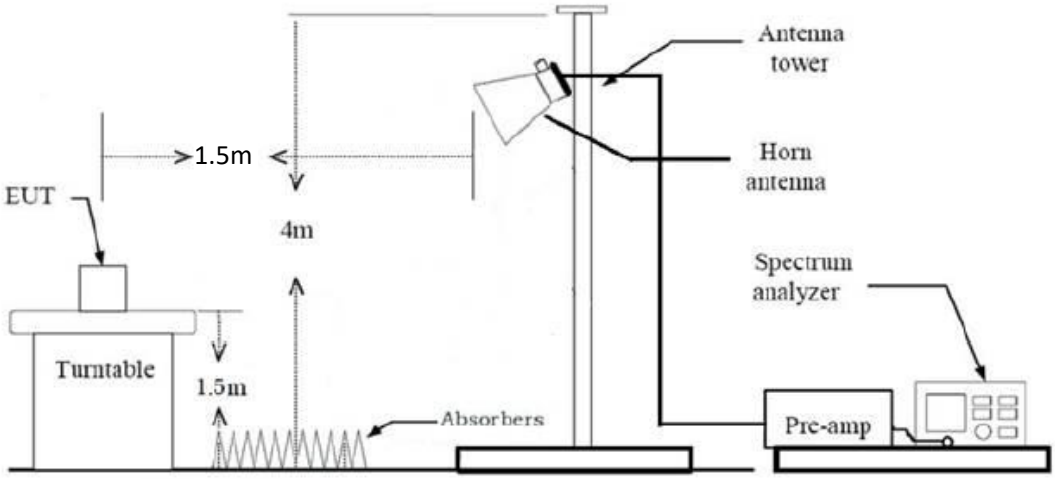
30MHz-1GHz (3m SAC)



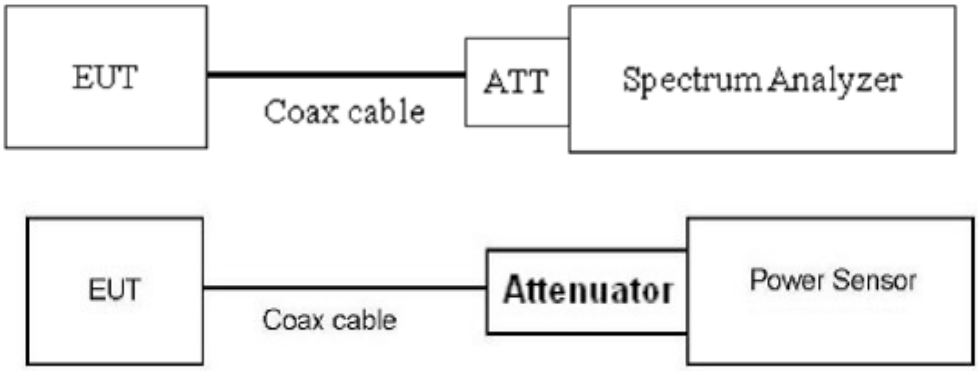
1GHz-18GHz(3m FAC)



Above 18GHz (3m FAC)



3) RF Conducted Test



or

2.6 Test Procedure

Conducted emission:

1. The E.U.T is placed on a non-conducting table 40cm from the vertical ground plane and 80cm above the horizontal ground plane (Please refer to the block diagram of the test setup and photographs).
2. Both sides of A.C. line are checked for maximum conducted interference. 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.
3. Line conducted data is recorded for both Line and Neutral

Radiated Emission Procedure:

a) For below 30MHz

1. All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz- 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were 40*Log (test distance / specification distance).
2. Loop antenna use, investigation was done on the three antenna orientations (parallel, perpendicular, gound-parallel)

b) For 30MHz-1GHz:

1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m.
2. EUT works in each mode of operation that needs to be tested. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.

c) For above 1GHz:

1. The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m (1-18GHz) and 1.5 m (above 18GHz).
2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.
3. The RBW/VBW of spectrum analyzer is set to 1MHz/3MHz for scan Peak emission, for measured average emission, reduce the VBW to 10Hz. (Note: a high VBW (for example 5kHz) may used to scan average emissions to avoid long sweep time.)
4. If the Peak emission complies with the Average limit, then perform average measurement is optional.
5. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.

6. Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

RF Conducted Test:

1. The antenna port of EUT was connected to the RF port of the test equipment (Power Meter or Spectrum analyzer) through Attenuator and RF cable.
2. The cable assembly insertion loss of 7.0dB (including 6.0 dB Attenuator and 1.0 dB cable) was entered as an offset in the power meter. Note: Actual cable loss was unavailable at the time of testing, therefore a loss of 1.0dB was assumed as worst case. This was later verified to be true by laboratory. (if the RF cable provided by client, the cable loss declared by client)
3. The EUT is keeping in continuous transmission mode and tested in all modulation modes.

2.7 Measurement Method

Description of Test	Measurement Method
AC Line Conducted Emissions	ANSI C63.10-2020 Section 6.2
Maximum Conducted Output Power	ANSI C63.10-2020 Section 7.8.5
20 dB Emission Bandwidth	ANSI C63.10-2020 Section 6.9.2
99% Occupied Bandwidth	ANSI C63.10-2020 Section 6.9.3
Channel separation	ANSI C63.10-2020 Section 7.8.2
Number of hopping Frequency	ANSI C63.10-2020 Section 7.8.3
Time of occupancy (dwell time)	ANSI C63.10-2020 Section 7.8.4
100kHz Bandwidth of Frequency Band Edge	ANSI C63.10-2020 Section 7.8.7.2&6.10
Radiated emission	ANSI C63.10-2020 Section 7.8&6.3&6.4&6.5&6.6

2.8 Measurement Equipment

Manufacturer	Description	Model	Management No.	Calibration Date	Calibration Due Date
AC Line Conducted Emission Test					
ROHDE& SCHWARZ	EMI TEST RECEIVER	ESR	101817	2024/6/4	2025/6/3
R&S	LISN	ENV216	101748	2024/6/4	2025/6/3
N/A	Coaxial Cable	NO.12	N/A	2024/6/4	2025/6/3
Farad	Test Software	EZ-EMC	Ver. EMEC-3A1	/	/
Radiated Emission Test					
R&S	EMI test receiver	ESR3	102758	2024/6/4	2025/6/3
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSV40-N	101608	2024/6/4	2025/6/3
SONOMA INSTRUMENT	Low frequency amplifier	310	186014	2024/6/4	2025/6/3
A.H. Systems	PREAMPLIFIER	PAM-0118P	531	2024/6/4	2025/6/3
COM-POWER	Amplifier	PAM-840A	461306	2024/8/7	2025/8/6
BACL	Loop Antenna	1313-1A	4010611	2024/2/7	2027/2/6
SCHWARZBECK	Log - periodic wideband antenna	VULB 9163	9163-872	2023/7/7	2026/7/6
Astro Antenna Ltd	Horn antenna	AHA-118S	3015	2023/7/6	2026/7/5
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-03	2023/7/10	2026/7/9
Oulitong	Band Reject Filter	OBSF-2400-248 3.5-50N	OE02103119	2024/6/4	2025/6/3
N/A	Coaxial Cable	NO.9	N/A	2024/6/4	2025/6/3
N/A	Coaxial Cable	NO.13	N/A	2024/6/4	2025/6/3
N/A	Coaxial Cable	NO.15	N/A	2024/6/4	2025/6/3
N/A	Coaxial Cable	NO.16	N/A	2024/6/4	2025/6/3
N/A	Coaxial Cable	NO.17	N/A	2024/6/4	2025/6/3
Audix	Test Software	E3	191218 V9	/	/
RF Conducted Test					
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSV40	101419	2024/6/4	2025/6/3
MEEA	6dB attenuator	603-06-1	N/A	2024/6/4	2025/6/3

Note: All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or International standards.

3 Test Results

3.1 Test Summary

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.247 (a)(1)	20dB Emission Bandwidth	Compliance
-	99% Occupied Bandwidth	Report only
§15.247 (a)(1)	Channel separation	Compliance
§15.247 (a)(1)(iii)	Number of hopping Frequency	Compliance
§15.247 (a)(1)(iii)	Time of occupancy (dwell time)	Compliance
§15.247(b)(1)	Maximum Conducted Output Power	Compliance
§15.247(d)	100kHz Bandwidth of Frequency Band Edge	Compliance
§15.205, §15.209, §15.247(d)	Radiated emission	Compliance

3.2 Limit

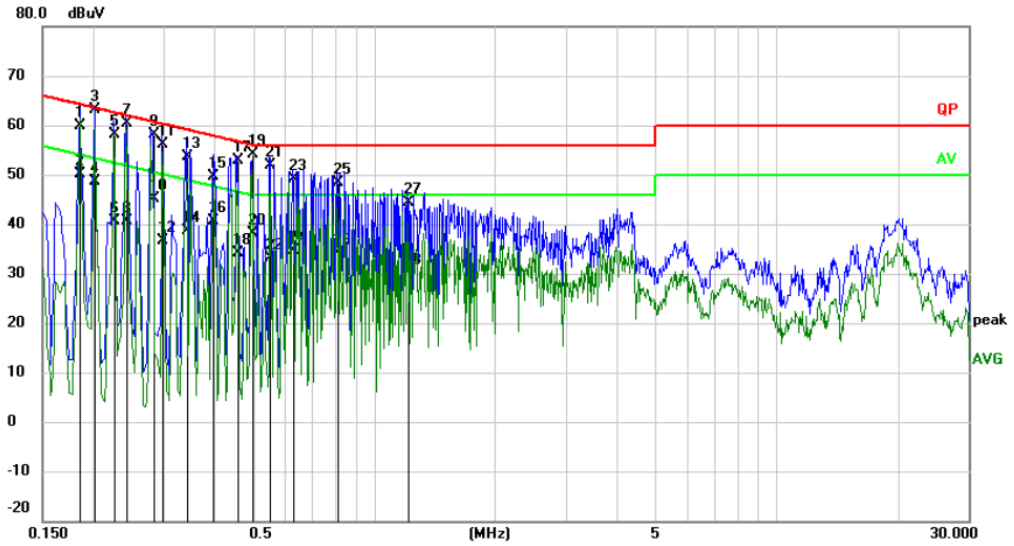
Test items	Limit
AC Line Conducted Emissions	See details §15.207 (a)
Conducted Output Power	For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.
Channel separation	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.
Number of hopping Frequency	Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.
Time of occupancy (dwell time)	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.
Spurious Emissions, 100kHz Bandwidth of Frequency Band Edge	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

3.3 AC Line Conducted Emissions Test Data

Test Date:	2024-12-02	Test By:	Lirou Li
Environment condition:	Temperature: 23.1°C; Relative Humidity:57%; ATM Pressure: 101.0kPa		

Conducted Emission Measurement

File :2405Z56633E Data :#15 Date: 2024/12/2 Time: 13:58:19



Limit: QP
Mode:transmitting
Note: 3DH5 Low channle

Phase: L1
Power: AC 120V/60Hz

Temperature: 23.1 ℃
Humidity: 57 %
Air Pressure: 1010 hpa

Receiver Setting: 9~150kHz: Pre-scan: RBW: 200Hz, DET: PK/AV; Final measure: RBW: 200Hz, DET: QP/AV
0.15~30MHz: Pre-scan: RBW: 9kHz, DET: PK/AV; Final measure: RBW: 9kHz, DET: QP/AV

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1860	49.46	10.34	59.80	64.21	-4.41	QP	
2		0.1860	39.77	10.34	50.11	54.21	-4.10	AVG	
3	*	0.2020	52.73	10.31	63.04	63.53	-0.49	QP	
4		0.2020	38.33	10.31	48.64	53.53	-4.89	AVG	
5		0.2260	47.68	10.34	58.02	62.60	-4.58	QP	
6		0.2260	30.27	10.34	40.61	52.60	-11.99	AVG	
7		0.2420	50.07	10.35	60.42	62.03	-1.61	QP	
8		0.2420	30.26	10.35	40.61	52.03	-11.42	AVG	
9		0.2819	47.73	10.38	58.11	60.76	-2.65	QP	
10		0.2819	34.65	10.38	45.03	50.76	-5.73	AVG	
11		0.2980	45.66	10.41	56.07	60.30	-4.23	QP	
12		0.2980	26.18	10.41	36.59	50.30	-13.71	AVG	
13		0.3420	43.16	10.43	53.59	59.15	-5.56	QP	
14		0.3420	28.22	10.43	38.65	49.15	-10.50	AVG	

*:Maximum data x:Over limit !:over margin

Engineer Signature: Lirou

Limit: QP	Phase:	*L1*	Temperature: 23.1 ℃
Mode:transmitting	Power:	AC 120V/60Hz	Humidity: 57 %
Note: 3DH5 Low channle			Air Pressure: 1010 hpa

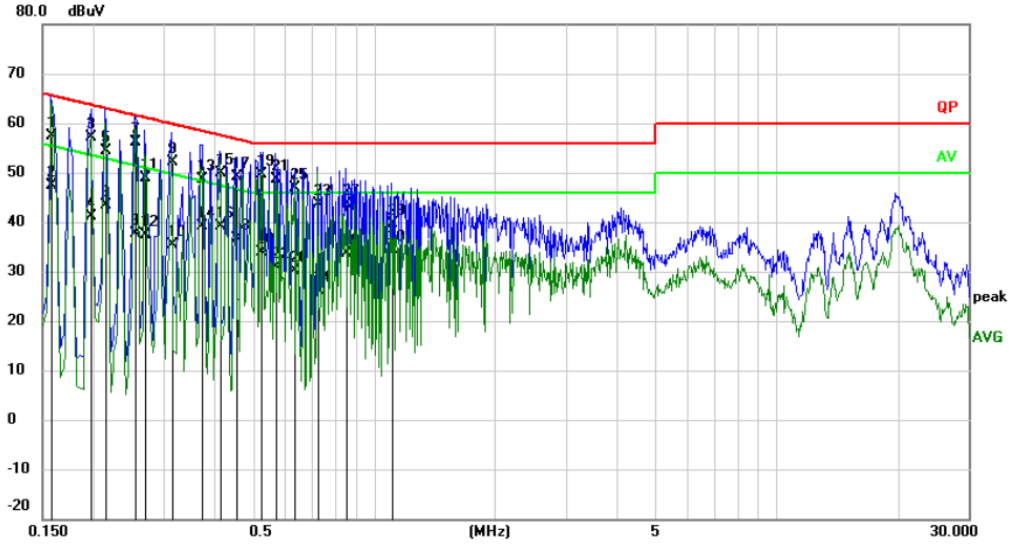
Receiver Setting: 9~150kHz: Pre-scan: RBW: 200Hz, DET: PK/AV; Final measure: RBW: 200Hz, DET: QP/AV
0.15~30MHz: Pre-scan: RBW: 9kHz, DET: PK/AV; Final measure: RBW: 9kHz, DET: QP/AV

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
15		0.3980	39.05	10.48	49.53	57.90	-8.37	QP	
16		0.3980	30.17	10.48	40.65	47.90	-7.25	AVG	
17		0.4580	42.34	10.50	52.84	56.73	-3.89	QP	
18		0.4580	23.71	10.50	34.21	46.73	-12.52	AVG	
19		0.4980	43.61	10.51	54.12	56.03	-1.91	QP	
20		0.4980	27.73	10.51	38.24	46.03	-7.79	AVG	
21		0.5500	41.35	10.53	51.88	56.00	-4.12	QP	
22		0.5500	22.67	10.53	33.20	46.00	-12.80	AVG	
23		0.6300	38.62	10.54	49.16	56.00	-6.84	QP	
24		0.6300	23.98	10.54	34.52	46.00	-11.48	AVG	
25		0.8100	37.78	10.61	48.39	56.00	-7.61	QP	
26		0.8100	23.53	10.61	34.14	46.00	-11.86	AVG	
27		1.2140	33.72	10.69	44.41	56.00	-11.59	QP	
28		1.2140	19.35	10.69	30.04	46.00	-15.96	AVG	

*:Maximum data x:Over limit !:over margin Engineer Signature: Lirou

Conducted Emission Measurement

File :2405Z56633E Data :#16 Date: 2024/12/2 Time: 14:02:47



Limit: QP Phase: N Temperature: 23.1 ℃

Mode:transmitting Power: AC 120V/60Hz Humidity: 57 %

Note: 3DH5 Low channle Air Pressure: 1010 hpa

Receiver Setting: 9~150kHz: Pre-scan: RBW: 200Hz, DET: PK/AV; Final measure: RBW: 200Hz, DET: QP/AV
0.15~30MHz: Pre-scan: RBW: 9kHz, DET: PK/AV; Final measure: RBW: 9kHz, DET: QP/AV

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1580	47.16	10.23	57.39	65.57	-8.18	QP	
2		0.1580	37.24	10.23	47.47	55.57	-8.10	AVG	
3		0.1980	46.75	10.31	57.06	63.69	-6.63	QP	
4		0.1980	30.81	10.31	41.12	53.69	-12.57	AVG	
5		0.2140	44.10	10.32	54.42	63.05	-8.63	QP	
6		0.2140	32.99	10.32	43.31	53.05	-9.74	AVG	
7	*	0.2540	45.69	10.37	56.06	61.63	-5.57	QP	
8		0.2540	27.37	10.37	37.74	51.63	-13.89	AVG	
9		0.3140	41.64	10.42	52.06	59.86	-7.80	QP	
10		0.3140	25.08	10.42	35.50	49.86	-14.36	AVG	
11		0.2700	38.54	10.38	48.92	61.12	-12.20	QP	
12		0.2700	27.04	10.38	37.42	51.12	-13.70	AVG	
13		0.3740	38.08	10.47	48.55	58.41	-9.86	QP	
14		0.3740	28.59	10.47	39.06	48.41	-9.35	AVG	

*:Maximum data x:Over limit !:over margin Engineer Signature: Lirou

Limit: QP	Phase: N	Temperature: 23.1 ℃
Mode:transmitting	Power: AC 120V/60Hz	Humidity: 57 %
Note: 3DH5 Low channle		Air Pressure: 1010 hpa

Receiver Setting: 9~150kHz: Pre-scan: RBW: 200Hz, DET: PK/AV; Final measure: RBW: 200Hz, DET: QP/AV
0.15~30MHz: Pre-scan: RBW: 9kHz, DET: PK/AV; Final measure: RBW: 9kHz, DET: QP/AV

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
15		0.4140	39.42	10.48	49.90	57.57	-7.67	QP	
16		0.4140	28.60	10.48	39.08	47.57	-8.49	AVG	
17		0.4540	38.62	10.50	49.12	56.80	-7.68	QP	
18		0.4540	26.25	10.50	36.75	46.80	-10.05	AVG	
19		0.5220	39.24	10.51	49.75	56.00	-6.25	QP	
20		0.5220	23.31	10.51	33.82	46.00	-12.18	AVG	
21		0.5700	38.03	10.49	48.52	56.00	-7.48	QP	
22		0.5700	20.40	10.49	30.89	46.00	-15.11	AVG	
23		0.7260	33.28	10.47	43.75	56.00	-12.25	QP	
24		0.7260	15.66	10.47	26.13	46.00	-19.87	AVG	
25		0.6340	36.44	10.48	46.92	56.00	-9.08	QP	
26		0.6340	19.71	10.48	30.19	46.00	-15.81	AVG	
27		0.8500	33.03	10.52	43.55	56.00	-12.45	QP	
28		0.8500	23.15	10.52	33.67	46.00	-12.33	AVG	
29		1.1100	28.99	10.57	39.56	56.00	-16.44	QP	
30		1.1100	23.89	10.57	34.46	46.00	-11.54	AVG	

*:Maximum data x:Over limit !:over margin Engineer Signature: Lirou

Remark:

Measurement (dBuV)= Reading Level (dBuV) + Correct Factor(dB)

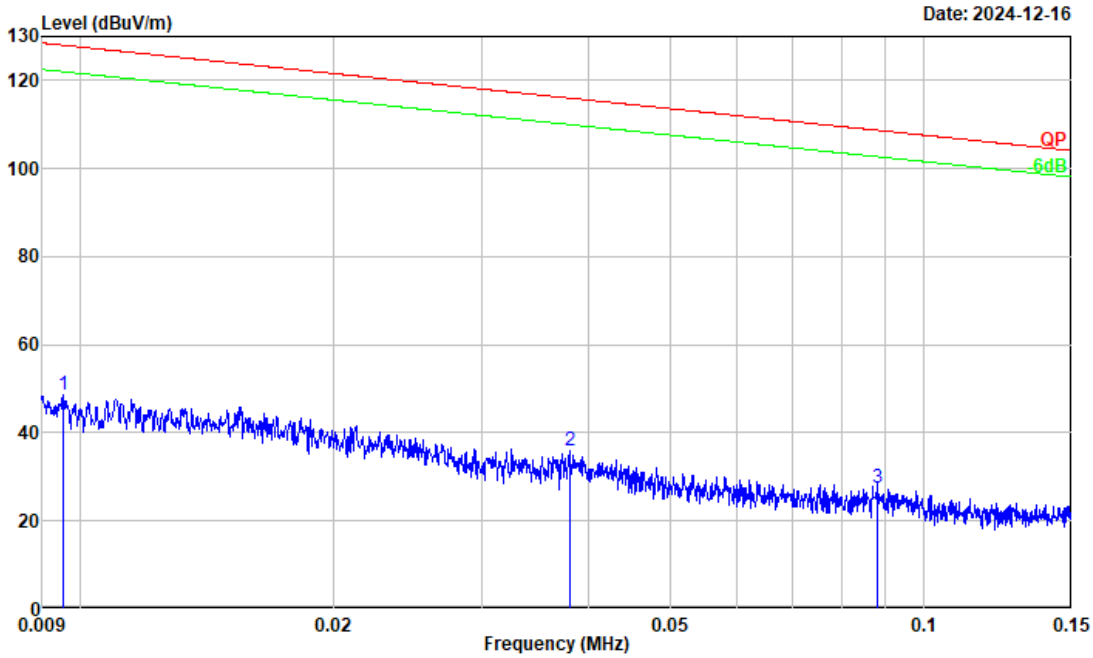
Correct Factor(dB)= LISN Voltage Division Factor (dB)+ Cable loss(dB)

Over Limit = Measurement – Limit

3.4 Radiated emission Test Data

9 kHz-30MHz:

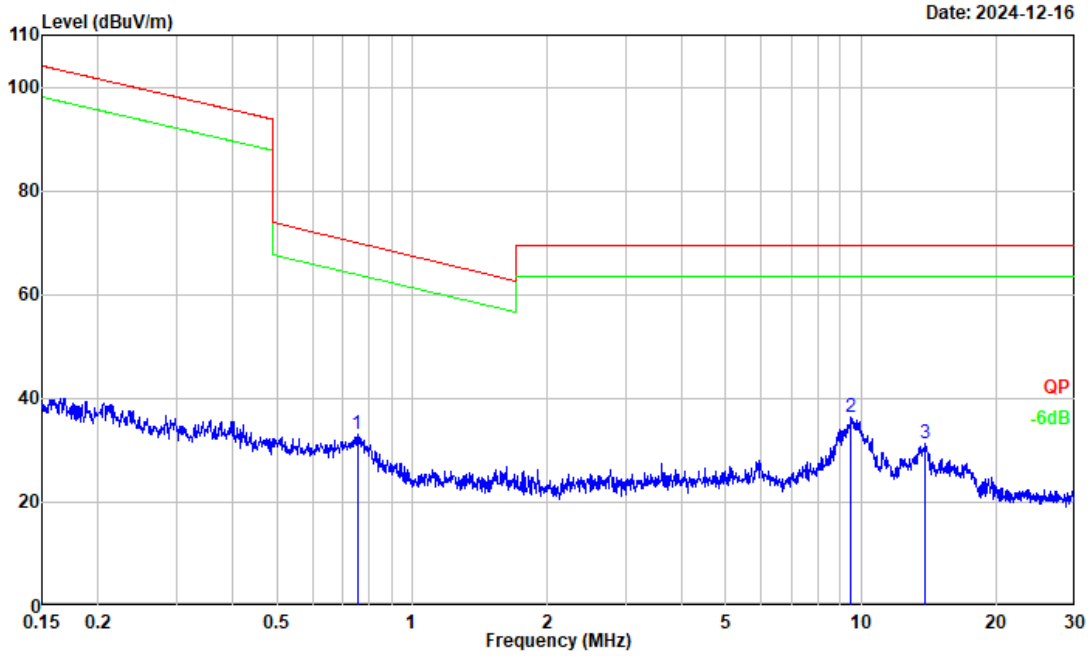
Test Date:	2024-12-16	Test By:	Bard Huang
Environment condition:	Temperature: 23.9°C; Relative Humidity:33%; ATM Pressure: 101.0kPa		



Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/33%R.H./101.0kPa
Tested by : Bard Huang
Polarization : PARALLEL
Remark : 3DH5 2402

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	0.010	11.18	37.57	48.75	128.01	-79.26	Peak
2	0.038	13.04	22.85	35.89	115.99	-80.10	Peak
3	0.088	11.88	15.72	27.60	108.69	-81.09	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: RBW/VWB: 200Hz/1kHz, DET: PK



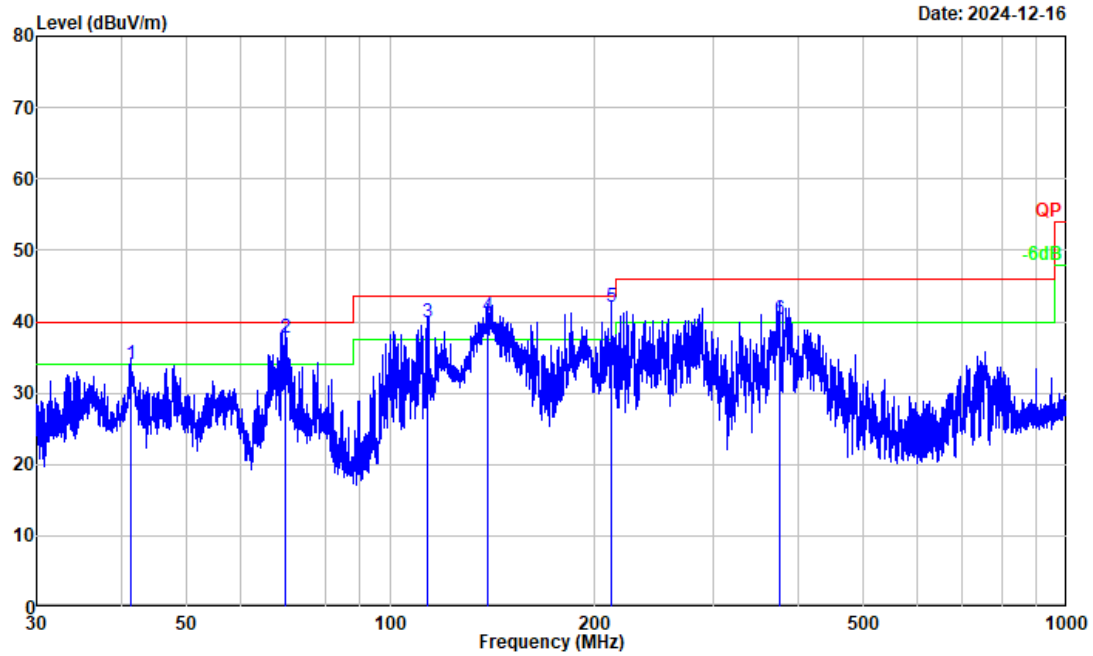
Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/33%R.H./101.0kPa
Tested by : Bard Huang
Polarization : PARALLEL
Remark : 3DH5 2402

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	0.756	30.32	2.83	33.15	69.96	-36.81	Peak
2	9.471	40.05	-3.64	36.41	69.54	-33.13	Peak
3	13.909	34.96	-3.64	31.32	69.54	-38.22	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: RBW/VWB: 9kHz/30kHz, DET: PK

30MHz-1GHz:

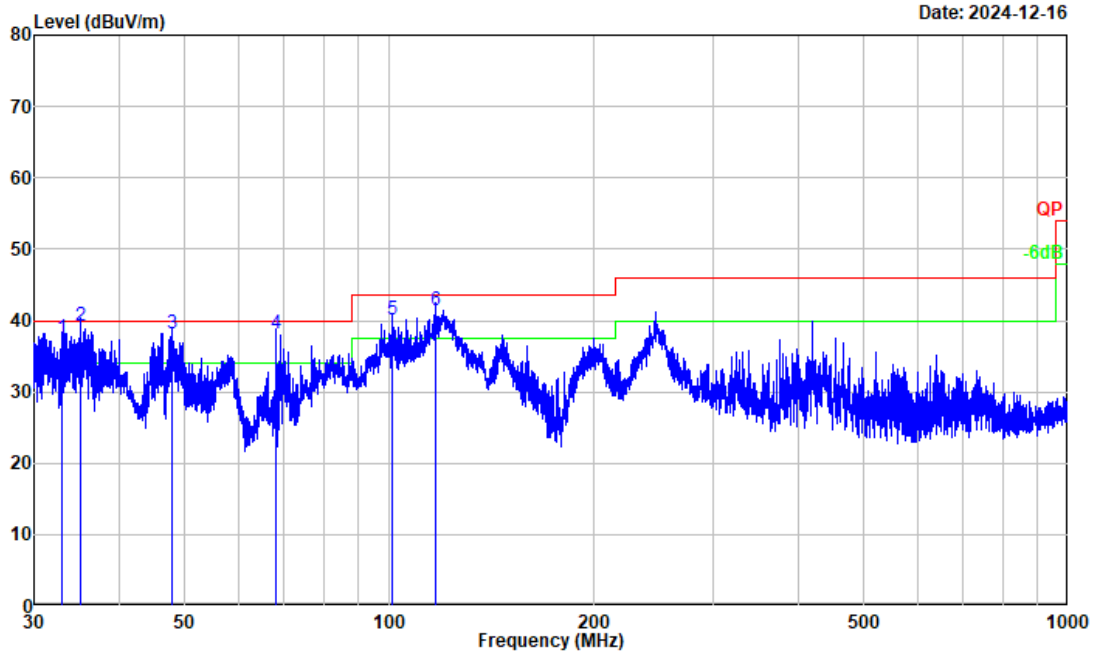
Test Date:	2024-12-16	Test By:	Bard Huang
Environment condition:	Temperature: 23.9°C; Relative Humidity:33%; ATM Pressure: 101.0kPa		



Project No. : 2405Z56633E-RF
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/33%R.H./101.0kPa
Tested by : Bard Huang
Polarization : horizontal
Remark : 3DH5 2402MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	41.367	46.75	-12.67	34.08	40.00	-5.92	QP
2	69.814	53.97	-16.28	37.69	40.00	-2.31	QP
3	113.316	54.64	-14.70	39.94	43.50	-3.56	QP
4	139.484	58.27	-17.60	40.67	43.50	-2.83	QP
5	212.456	55.87	-13.88	41.99	43.50	-1.51	QP
6	376.103	49.76	-9.43	40.33	46.00	-5.67	QP

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Pre-scan: RBW/VWB: 100Hz/300kHz, DET: PK
Final measure: RBW: 120kHz, DET: QP



Project No. : 2405Z56633E-RF
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/33%R.H./101.0kPa
Tested by : Bard Huang
Polarization : vertical
Remark : 3DH5 2402MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	32.950	52.73	-15.13	37.60	40.00	-2.40	QP
2	35.189	53.87	-14.68	39.19	40.00	-0.81	QP
3	48.015	50.31	-12.16	38.15	40.00	-1.85	QP
4	68.211	53.77	-15.56	38.21	40.00	-1.79	QP
5	101.244	54.30	-14.12	40.18	43.50	-3.32	QP
6	116.847	56.80	-15.32	41.48	43.50	-2.02	QP

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Pre-scan: RBW/VWB: 100Hz/300kHz, DET: PK
Final measure: RBW: 120kHz, DET: QP

Above 1GHz:

Test Date:	2024-12-09~2024-12-10	Test By:	Luke Li
Environment condition:	Temperature: 23.4~23.9°C; Relative Humidity:46~49%; ATM Pressure: 101.0~101.1kPa		

Frequency (MHz)	Reading level (dBμV)	Polar	Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
GFSK							
Low Channel							
4804.000	50.82	horizontal	-2.87	47.95	74.00	-26.05	Peak
4804.000	48.55	vertical	-2.87	45.68	74.00	-28.32	Peak
Middle Channel							
4882.000	50.02	horizontal	-2.32	47.70	74.00	-26.30	Peak
4882.000	48.28	vertical	-2.32	45.96	74.00	-28.04	Peak
High Channel							
4960.000	48.19	horizontal	-2.18	46.01	74.00	-27.99	Peak
4960.000	48.62	vertical	-2.18	46.44	74.00	-27.56	Peak
π/4 DQPSK							
Low Channel							
4804.000	49.90	horizontal	-2.87	47.03	74.00	-26.97	Peak
4804.000	47.10	vertical	-2.87	44.23	74.00	-29.77	Peak
Middle Channel							
4882.000	47.42	horizontal	-2.32	45.10	74.00	-28.90	Peak
4882.000	49.64	vertical	-2.32	47.32	74.00	-26.68	Peak
High Channel							
4960.000	48.53	horizontal	-2.18	46.35	74.00	-27.65	Peak
4960.000	47.39	vertical	-2.18	45.21	74.00	-28.79	Peak
8DPSK							
Low Channel							
4804.000	49.22	horizontal	-2.87	46.35	74.00	-27.65	Peak
4804.000	49.86	vertical	-2.87	46.99	74.00	-27.01	Peak
Middle Channel							
4882.000	50.06	horizontal	-2.32	47.74	74.00	-26.26	Peak
4882.000	47.38	vertical	-2.32	45.06	74.00	-28.94	Peak

High Channel							
4960.000	48.73	horizontal	-2.18	46.55	74.00	-27.45	Peak
4960.000	47.53	vertical	-2.18	45.35	74.00	-28.65	Peak

Remark:

Corrected Amplitude= Reading level + corrected Factor

Corrected Factor = Antenna factor + Cable loss – Amplifier gain

Margin = Corrected Amplitude – Limit

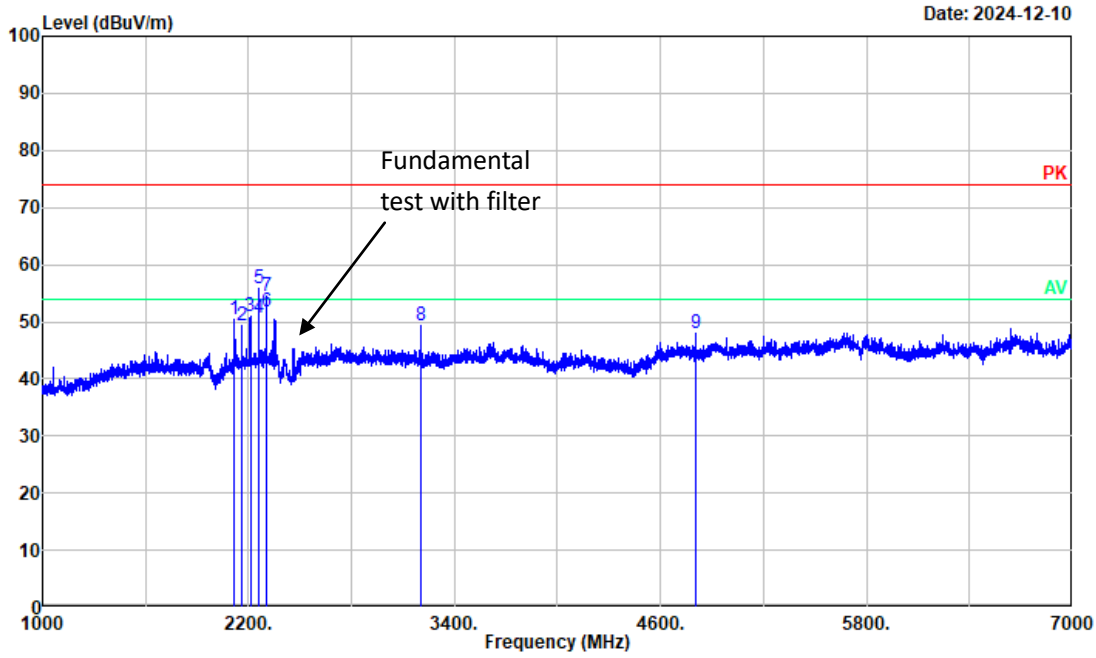
For the test result of Peak below the Peak limit more than 20dB, which can compliance with the average limit, just the Peak level was recorded.

The emission levels of other frequencies that were lower than the limit 20dB, not show in test report.

Test plot for example as below:

1-18GHz:

Mode:	GFSK	**Channel:**	2402MHz

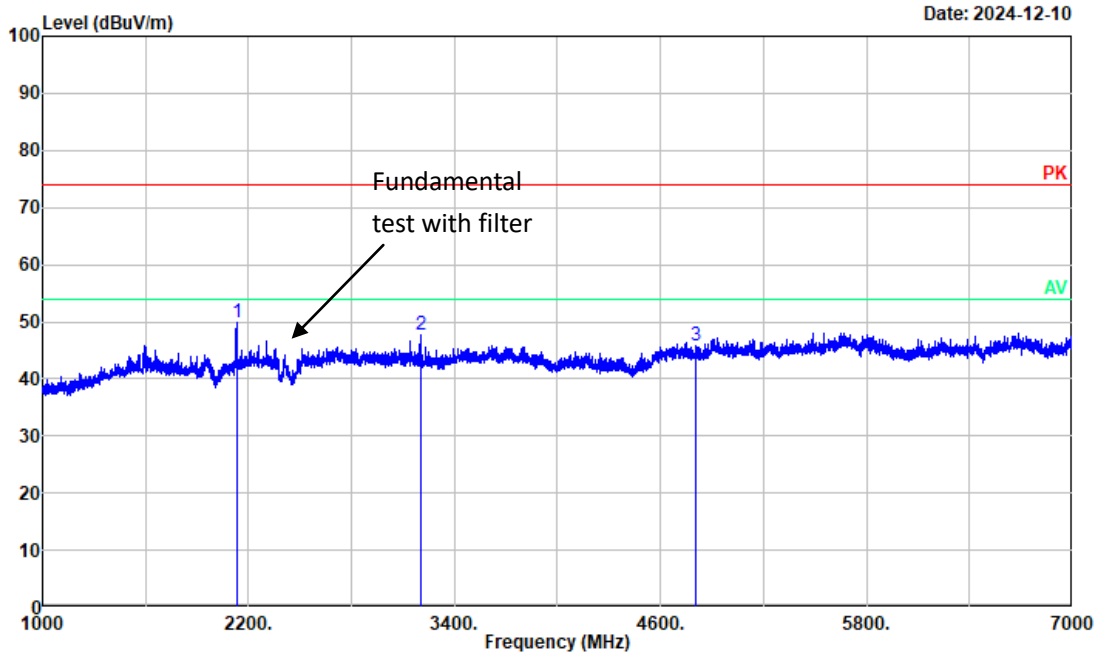


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/49%R.H./101.1kPa
Tested by : Luke Li
Polarization : horizontal
Remark : DH5 2402

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2113.000	54.86	-4.32	50.54	74.00	-23.46	Peak
2	2162.000	53.31	-4.02	49.29	74.00	-24.71	Peak
3	2210.000	54.43	-3.56	50.87	74.00	-23.13	Peak
4	2258.000	54.14	-3.36	50.78	54.00	-3.22	Average
5	2258.000	59.24	-3.36	55.88	74.00	-18.12	Peak
6	2306.000	55.13	-3.37	51.76	54.00	-2.24	Average
7	2306.000	57.85	-3.37	54.48	74.00	-19.52	Peak
8	3202.000	52.35	-3.16	49.19	74.00	-24.81	Peak
9	4804.000	50.82	-2.87	47.95	74.00	-26.05	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/1kHz, DET: PK

Mode:	GFSK	Channel:	2402MHz

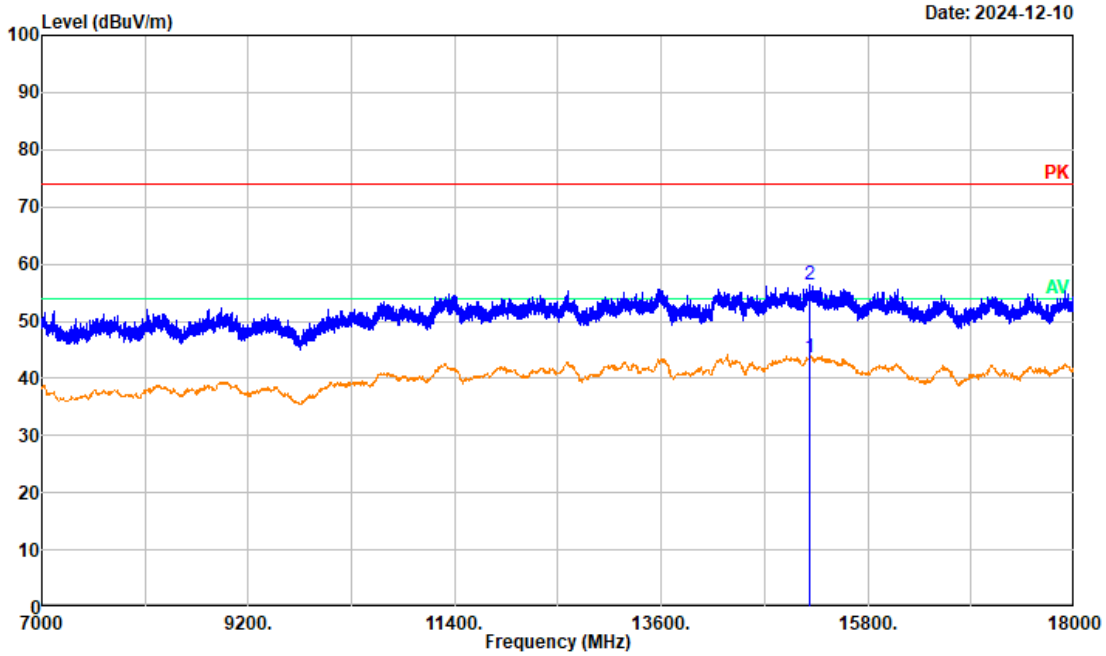


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/49%R.H./101.1kPa
Tested by : Luke Li
Polarization : vertical
Remark : DH5 2402

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	2132.000	54.04	-4.22	49.82	74.00	-24.18	Peak
2	3203.000	50.71	-3.14	47.57	74.00	-26.43	Peak
3	4804.000	48.55	-2.87	45.68	74.00	-28.32	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/1kHz, DET: PK

Mode:	GFSK	Channel:	2402MHz

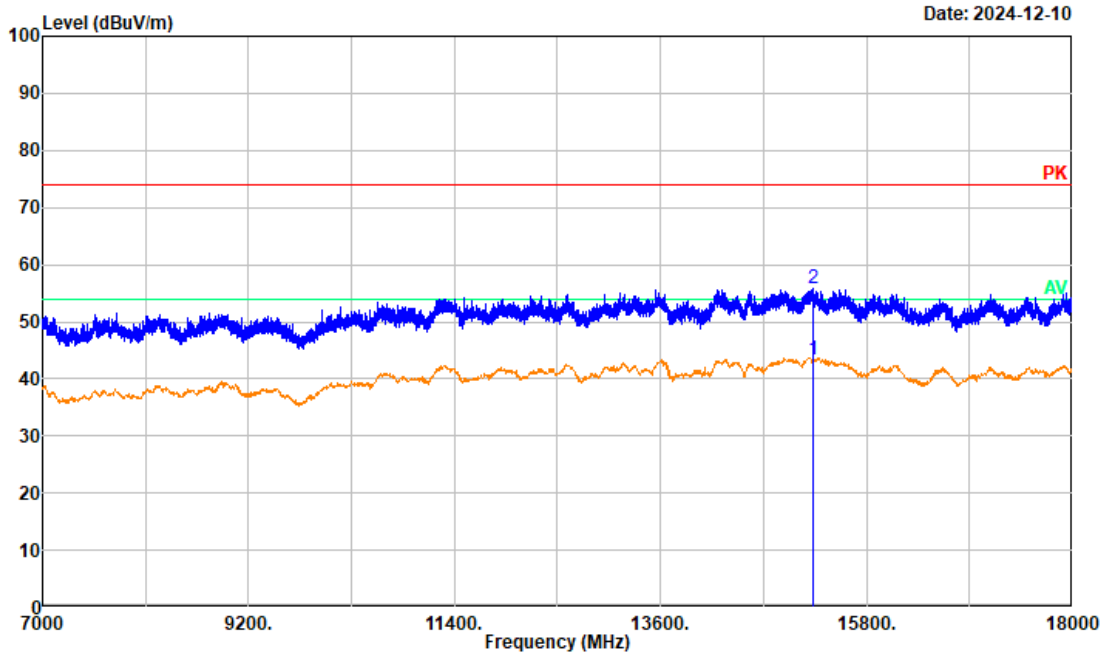


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/49%R.H./101.1kPa
Tested by : Luke Li
Polarization : horizontal
Remark : DH5 2402

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	15181.000	38.43	5.25	43.68	54.00	-10.32	Average
2	15181.000	51.00	5.25	56.25	74.00	-17.75	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/1kHz, DET: PK

Mode:	GFSK	Channel:	2402MHz

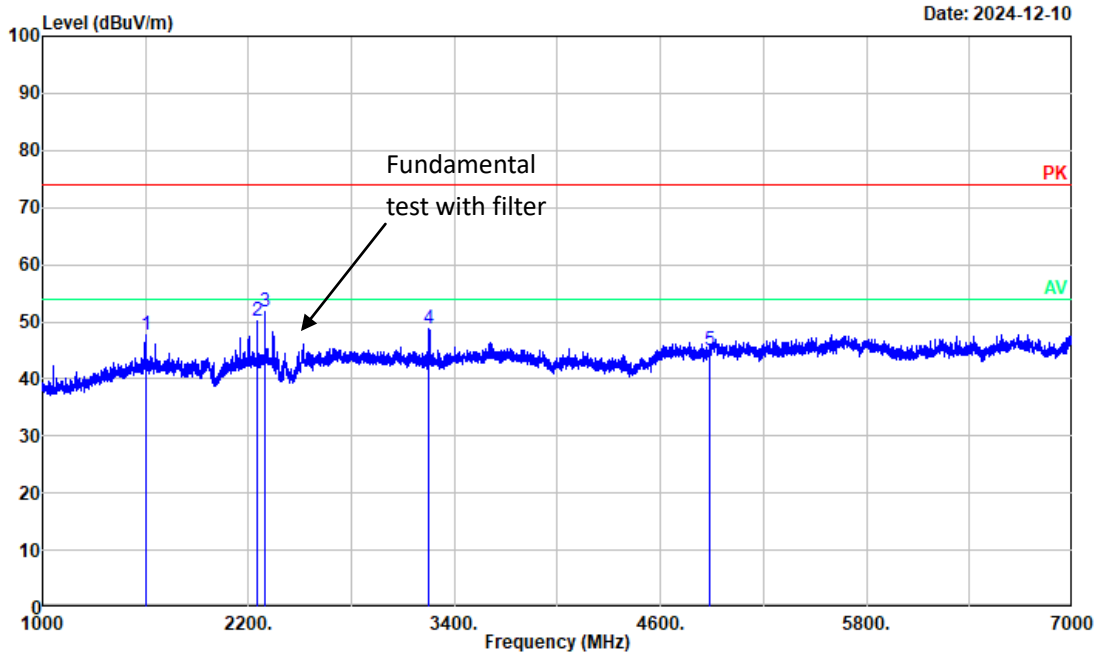


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/49%R.H./101.1kPa
Tested by : Luke Li
Polarization : vertical
Remark : DH5 2402

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	15229.000	38.07	5.24	43.31	54.00	-10.69	Average
2	15229.000	50.69	5.24	55.93	74.00	-18.07	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/1kHz, DET: PK

Mode:	π /4 DQPSK	Channel:	2441MHz

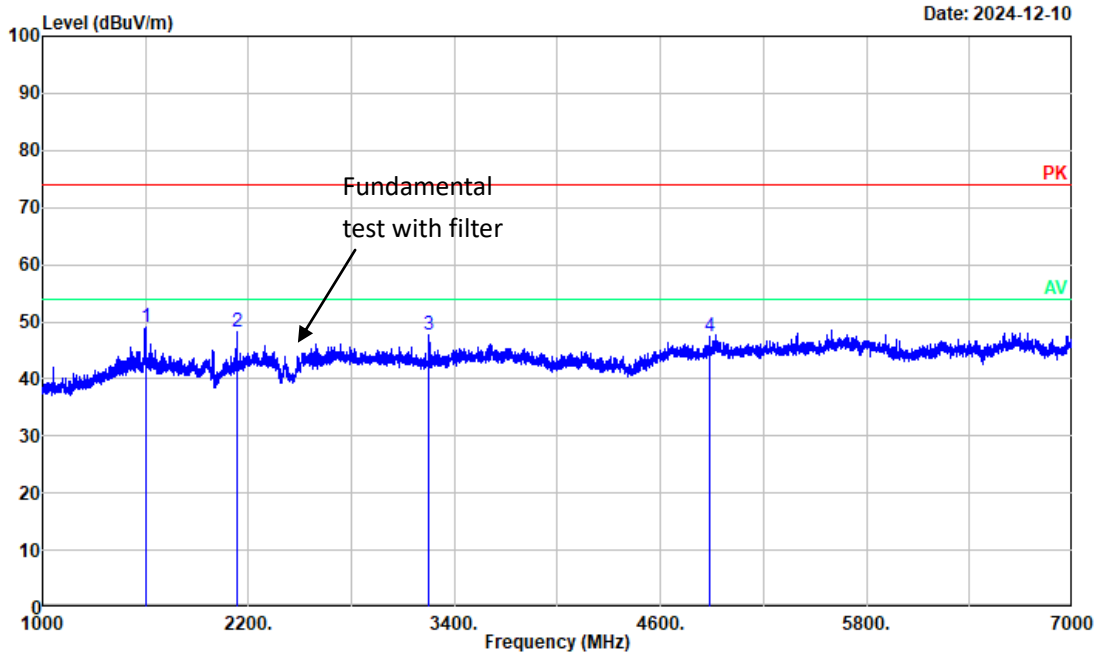


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/49%R.H./101.1kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 2DH5 2441

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	1599.000	52.27	-4.46	47.81	74.00	-26.19	Peak
2	2248.000	53.43	-3.36	50.07	74.00	-23.93	Peak
3	2297.000	55.06	-3.38	51.68	74.00	-22.32	Peak
4	3252.000	51.90	-3.01	48.89	74.00	-25.11	Peak
5	4882.000	47.42	-2.32	45.10	74.00	-28.90	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/1kHz, DET: PK

Mode:	π /4 DQPSK	Channel:	2441MHz

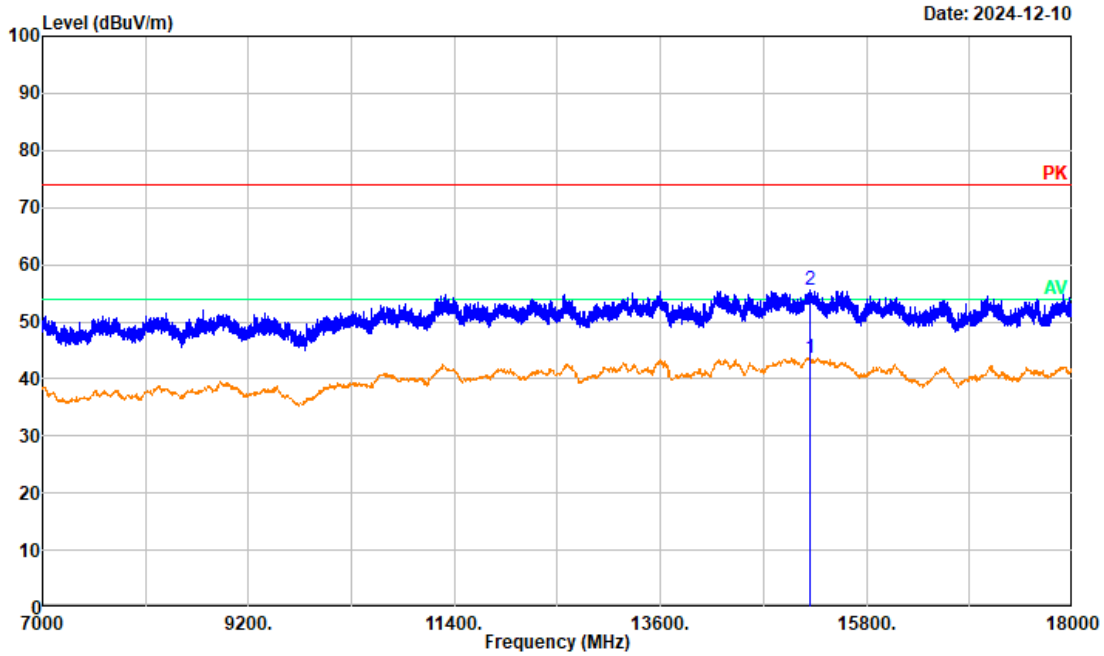


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/49%R.H./101.1kPa
Tested by : Luke Li
Polarization : vertical
Remark : 2DH5 2441

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	1599.000	53.56	-4.46	49.10	74.00	-24.90	Peak
2	2133.000	52.46	-4.22	48.24	74.00	-25.76	Peak
3	3252.000	50.58	-3.01	47.57	74.00	-26.43	Peak
4	4882.000	49.64	-2.32	47.32	74.00	-26.68	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/1kHz, DET: PK

Mode:	π /4 DQPSK	Channel:	2441MHz

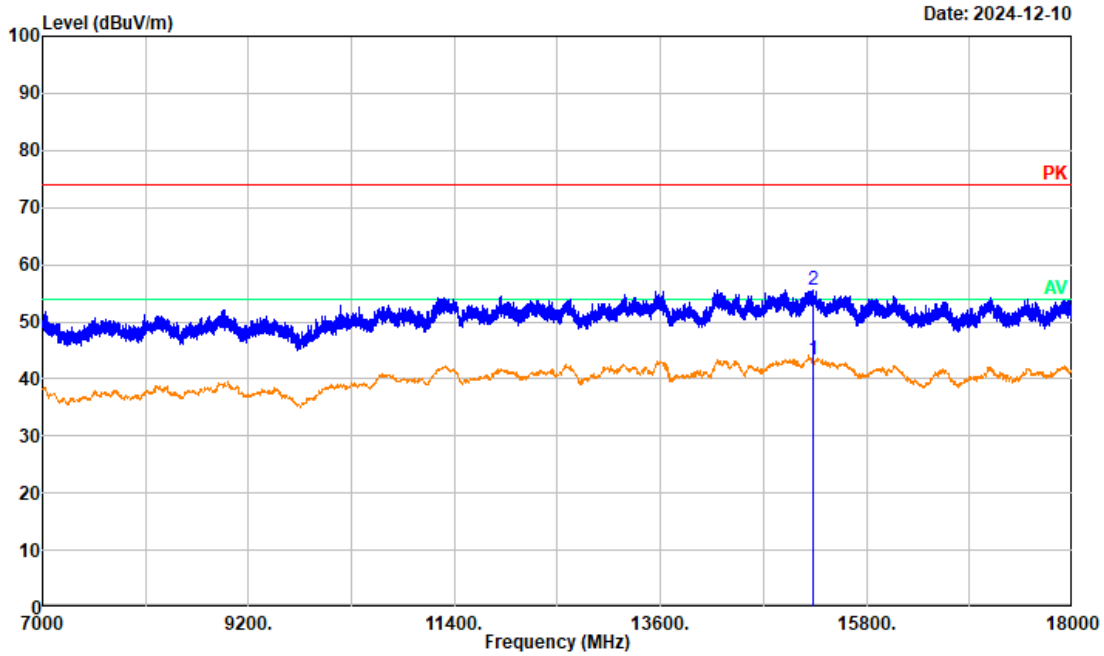


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/49%R.H./101.1kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 2DH5 2441

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	15190.000	38.26	5.26	43.52	54.00	-10.48	Average
2	15190.000	50.42	5.26	55.68	74.00	-18.32	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/1kHz, DET: PK

Mode:	π /4 DQPSK	Channel:	2441MHz

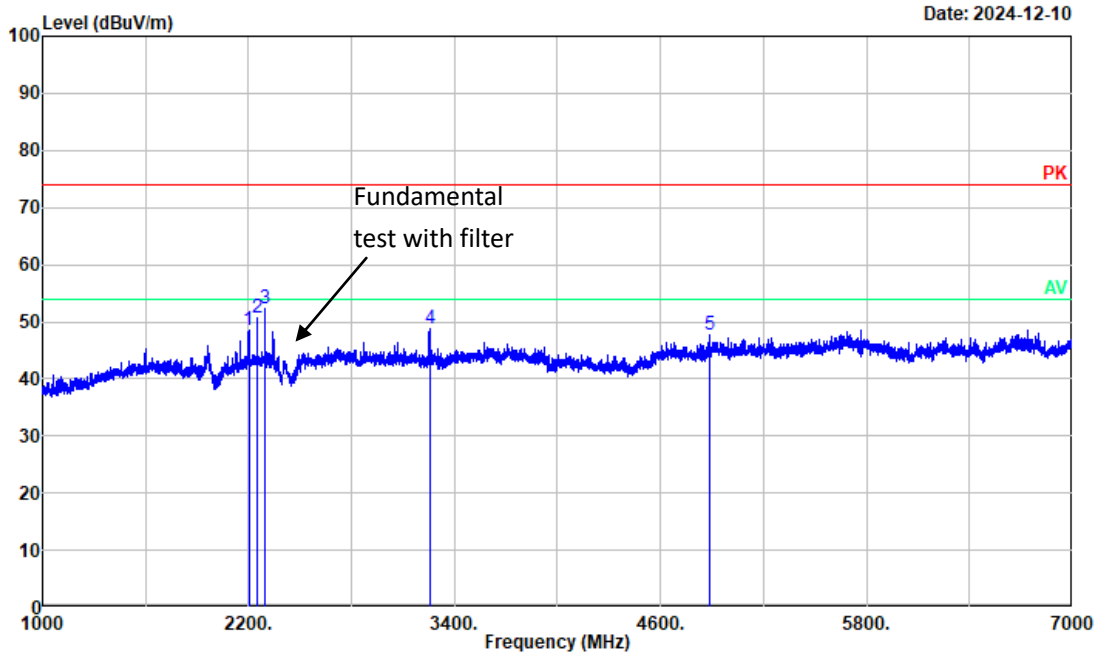


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/49%R.H./101.1kPa
Tested by : Luke Li
Polarization : vertical
Remark : 2DH5 2441

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	15229.000	38.01	5.24	43.25	54.00	-10.75	Average
2	15229.000	50.41	5.24	55.65	74.00	-18.35	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/1kHz, DET: PK

Mode:	8DPSK	Channel:	2441MHz

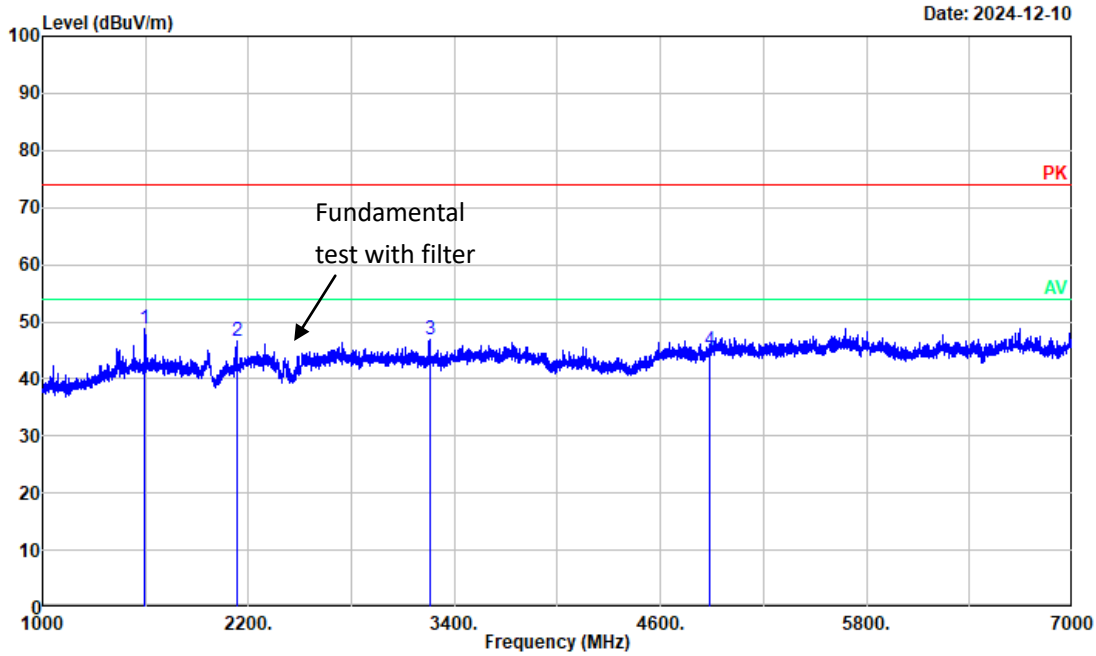


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/49%R.H./101.1kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 3DH5 2441

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	2201.000	52.11	-3.61	48.50	74.00	-25.50	Peak
2	2248.000	54.14	-3.36	50.78	74.00	-23.22	Peak
3	2297.000	55.74	-3.38	52.36	74.00	-21.64	Peak
4	3254.000	51.81	-3.01	48.80	74.00	-25.20	Peak
5	4882.000	50.06	-2.32	47.74	74.00	-26.26	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/1kHz, DET: PK

Mode:	8DPSK	Channel:	2441MHz

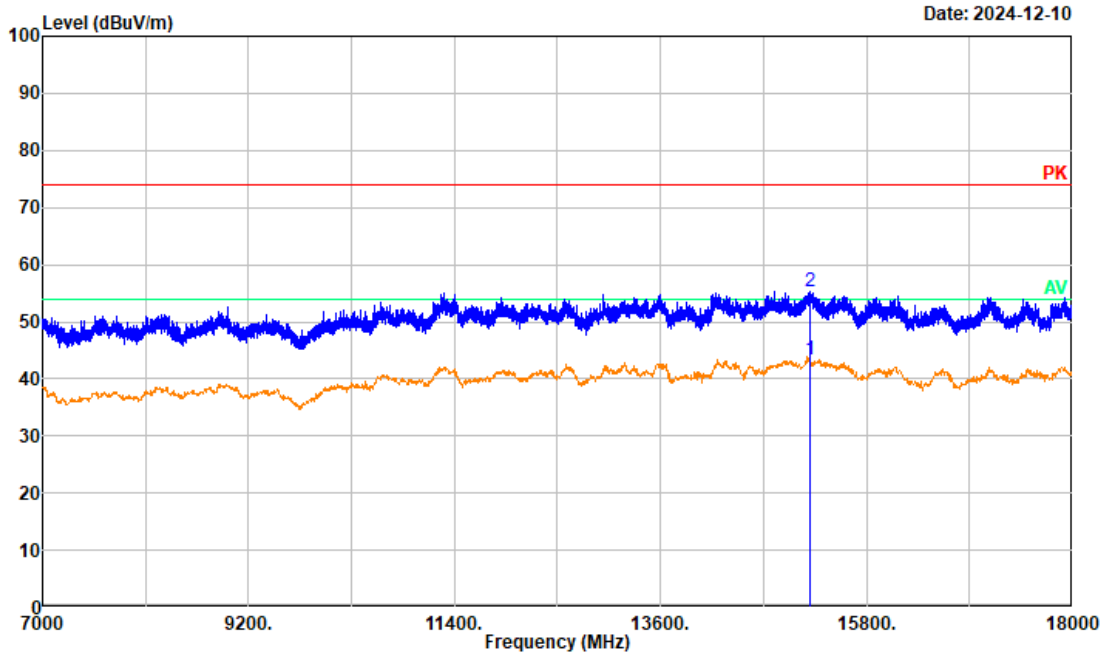


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/49%R.H./101.1kPa
Tested by : Luke Li
Polarization : vertical
Remark : 3DH5 2441

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	1598.000	53.29	-4.47	48.82	74.00	-25.18	Peak
2	2130.000	50.74	-4.23	46.51	74.00	-27.49	Peak
3	3255.000	49.98	-3.01	46.97	74.00	-27.03	Peak
4	4882.000	47.38	-2.32	45.06	74.00	-28.94	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/1kHz, DET: PK

Mode:	8DPSK	Channel:	2441MHz

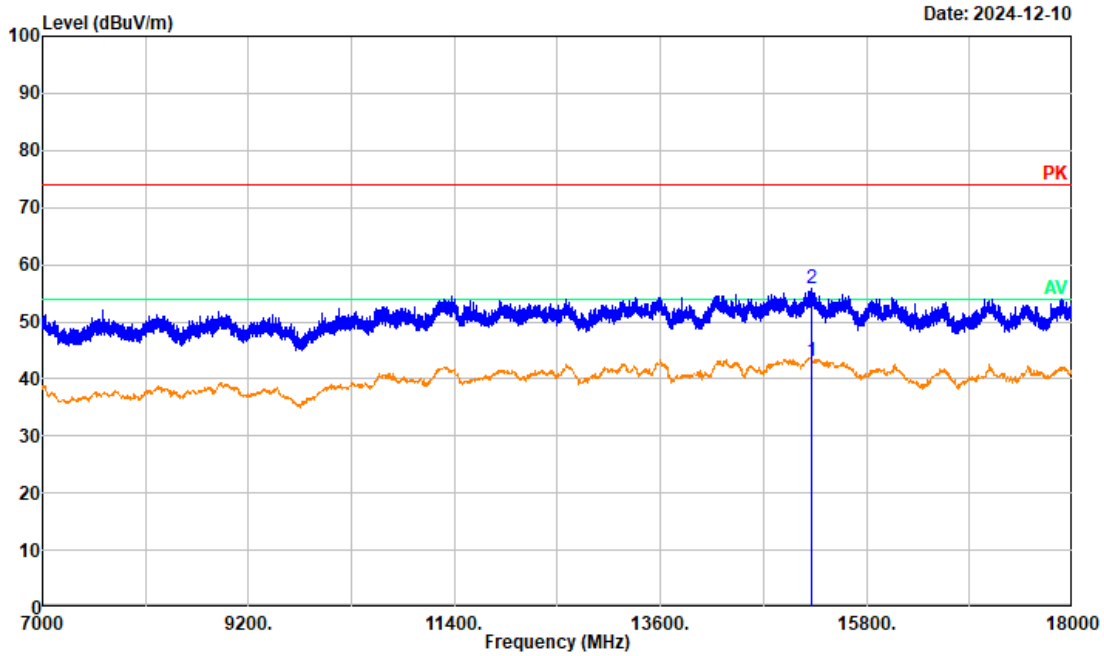


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/49%R.H./101.1kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 3DH5 2441

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	15203.000	38.19	5.28	43.47	54.00	-10.53	Average
2	15203.000	50.11	5.28	55.39	74.00	-18.61	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/1kHz, DET: PK

Mode:	8DPSK	Channel:	2441MHz



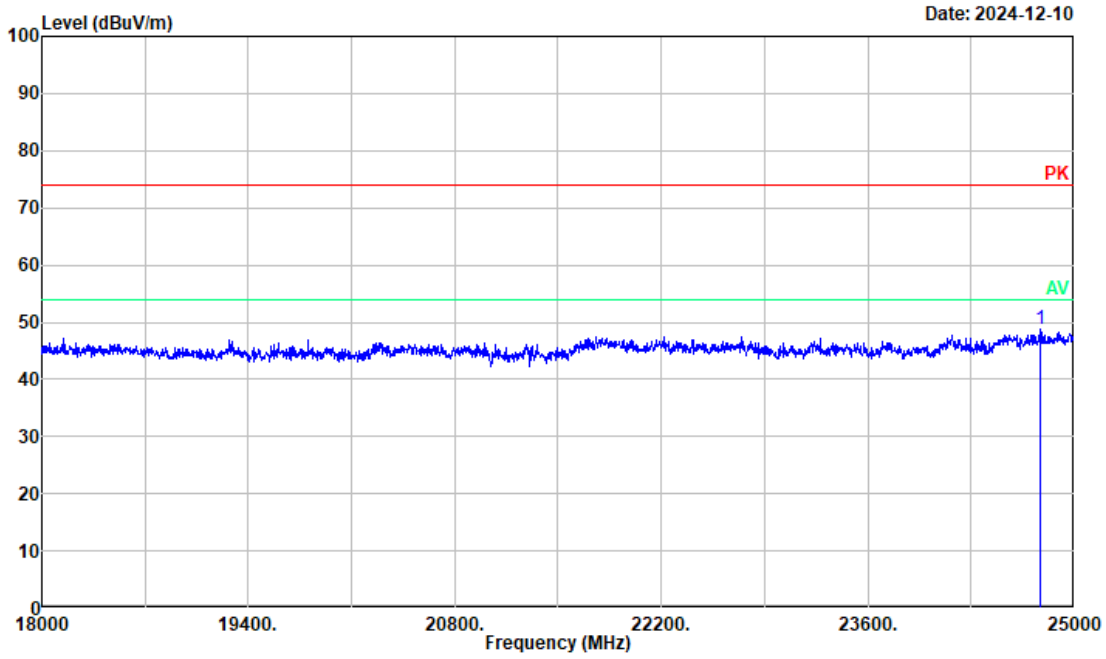
Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/49%R.H./101.1kPa
Tested by : Luke Li
Polarization : vertical
Remark : 3DH5 2441

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	15207.000	37.93	5.27	43.20	54.00	-10.80	Average
2	15207.000	50.50	5.27	55.77	74.00	-18.23	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/1kHz, DET: PK

18-25GHz:

Mode:	8DPSK	Channel:	2402MHz

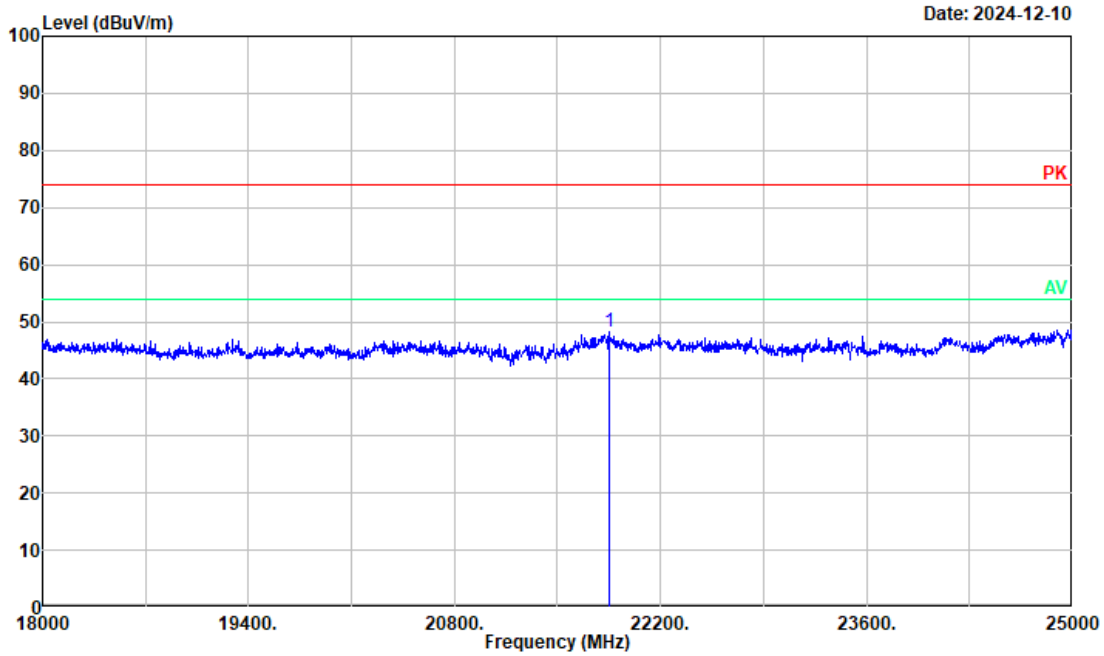


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/49%R.H./101.1kPa
Tested by : Luke Li
Polarization : Horizontal
Remark : 3DH5 2402

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	24765.380	53.07	-4.28	48.79	74.00	-25.21	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain - Distance extrapolate factor
Distance extrapolate factor = 20*log(specified distance/measured distance)
Specified distance = 3 meters, measured distance = 1.5 meters
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/1kHz, DET: PK

Mode:	8DPSK	Channel:	2402MHz



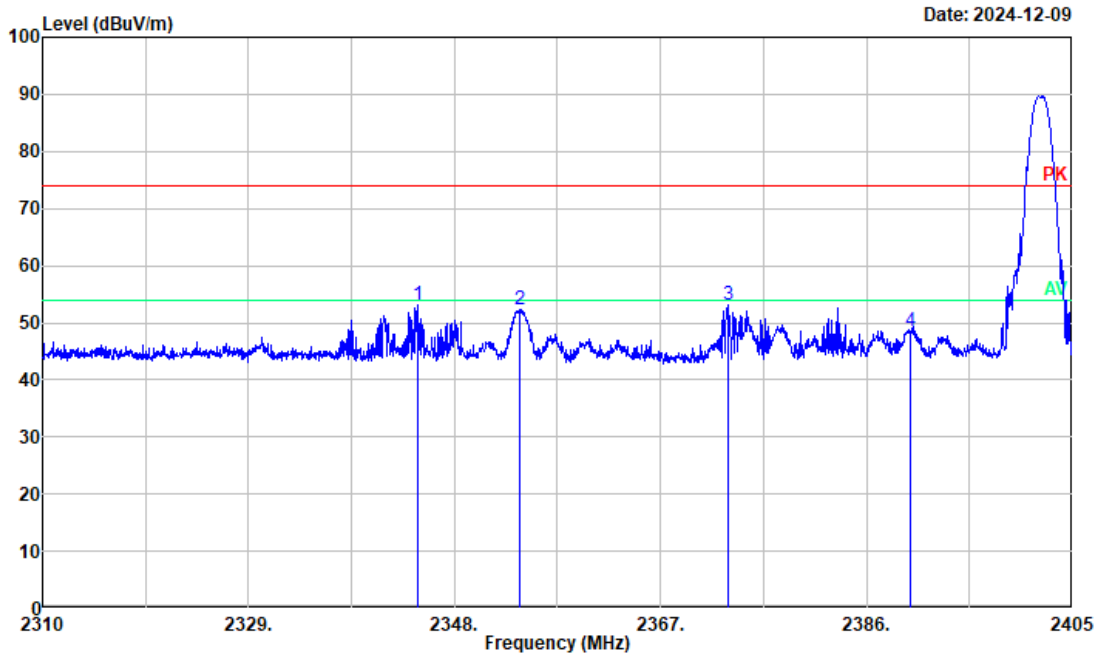
Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.9℃/49%R.H./101.1kPa
Tested by : Luke Li
Polarization : Vertical
Remark : 3DH5 2402

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	21851.930	55.25	-6.90	48.35	74.00	-25.65	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain - Distance extrapolate factor
Distance extrapolate factor = 20*log(specified distance/measured distance)
Specified distance = 3 meters, measured distance = 1.5 meters
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/1kHz, DET: PK

Radiated Band edge:

Mode:	DH5	Channel:	2402MHz

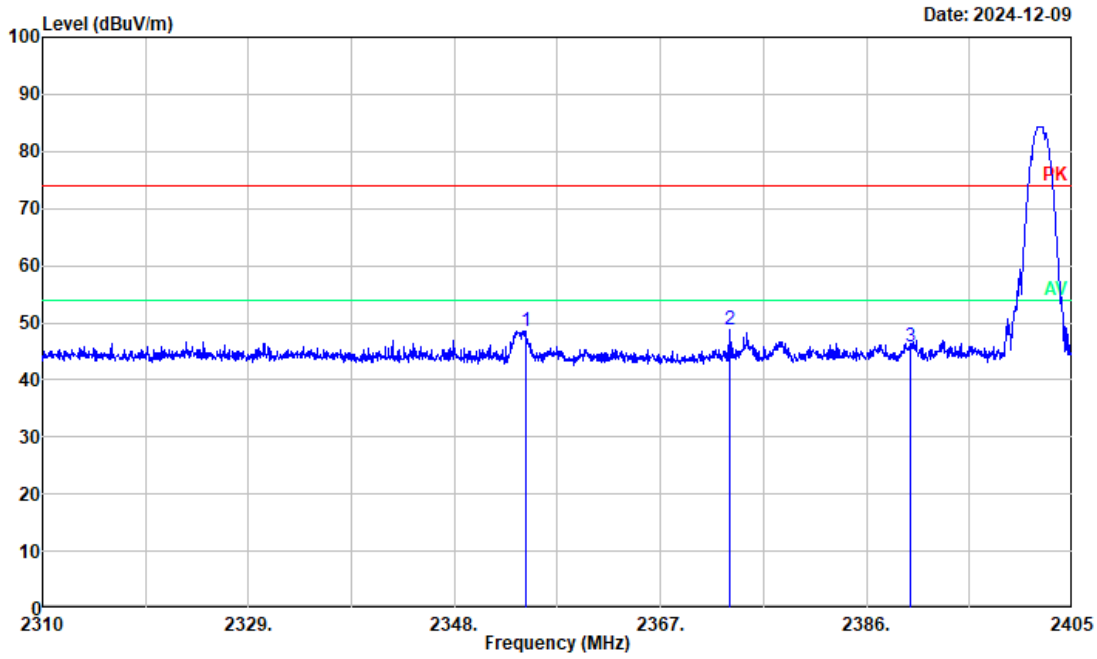


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.4℃/46%R.H./101.0kPa
Tested by : Luke Li
Polarization : horizontal
Remark : DH5 2402

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	2344.597	56.32	-3.23	53.09	74.00	-20.91	Peak
2	2354.007	55.53	-3.22	52.31	74.00	-21.69	Peak
3	2373.302	56.32	-3.20	53.12	74.00	-20.88	Peak
4	2390.000	51.79	-3.18	48.61	74.00	-25.39	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/10Hz , DET: PK

Mode:	DH5	Channel:	2402MHz

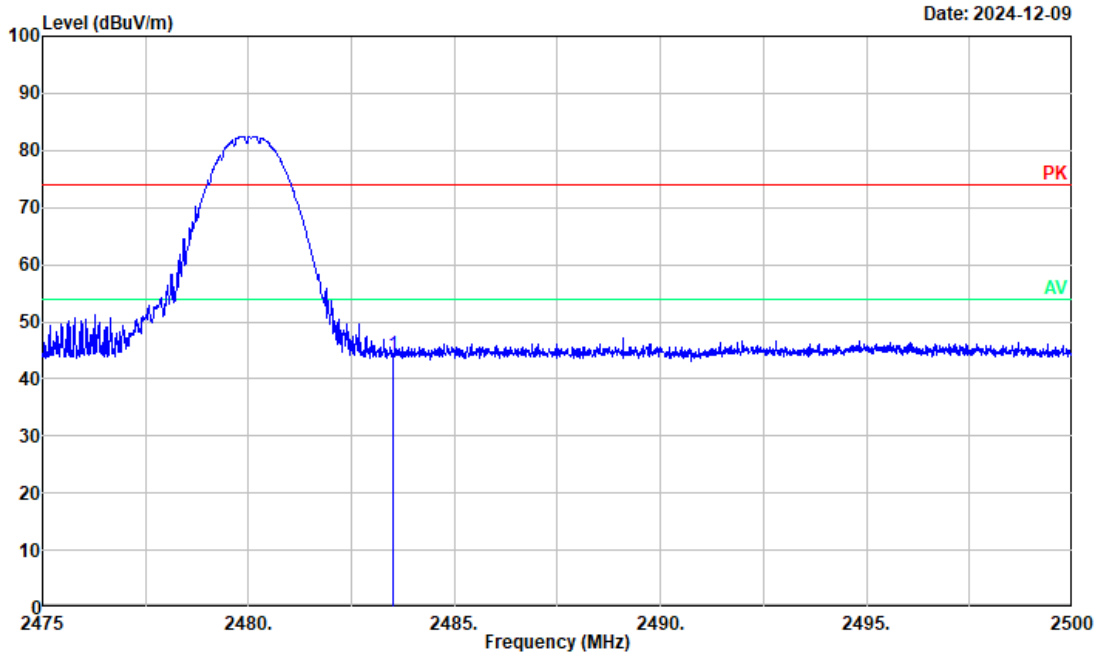


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.4℃/46%R.H./101.0kPa
Tested by : Luke Li
Polarization : vertical
Remark : DH5 2402

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2354.530	51.83	-3.22	48.61	74.00	-25.39	Peak
2	2373.349	51.85	-3.20	48.65	74.00	-25.35	Peak
3	2390.000	48.99	-3.18	45.81	74.00	-28.19	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/10Hz , DET: PK

Mode:	DH5	Channel:	2480MHz

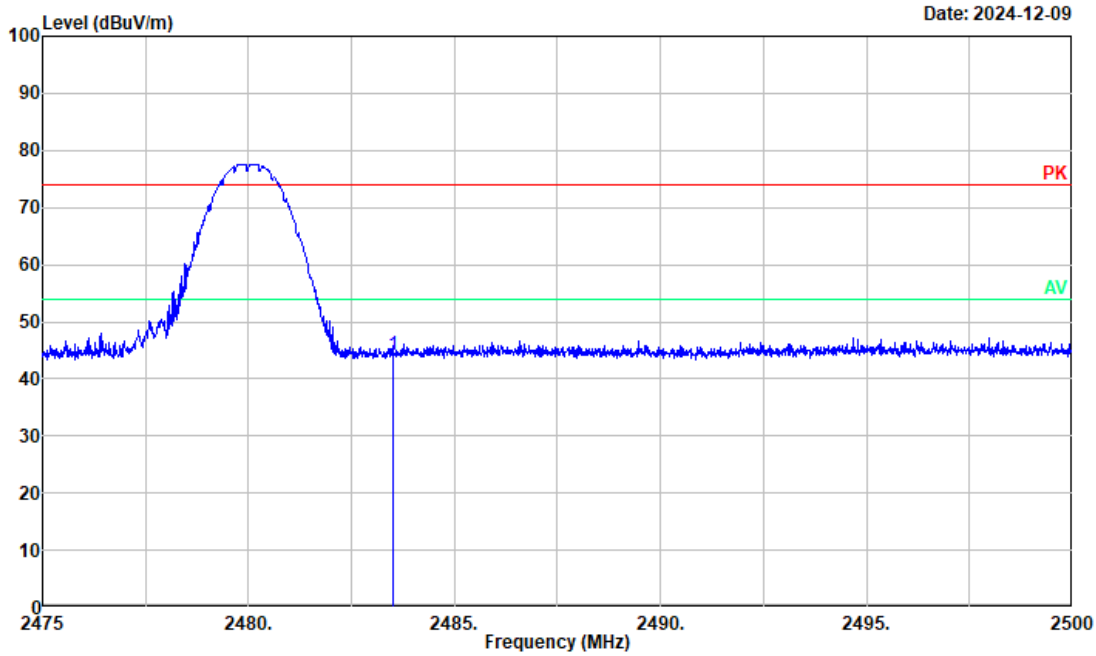


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.4℃/46%R.H./101.0kPa
Tested by : Luke Li
Polarization : horizontal
Remark : DH5 2480

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2483.500	47.06	-2.98	44.08	74.00	-29.92	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/10Hz , DET: PK

Mode:	DH5	Channel:	2480MHz

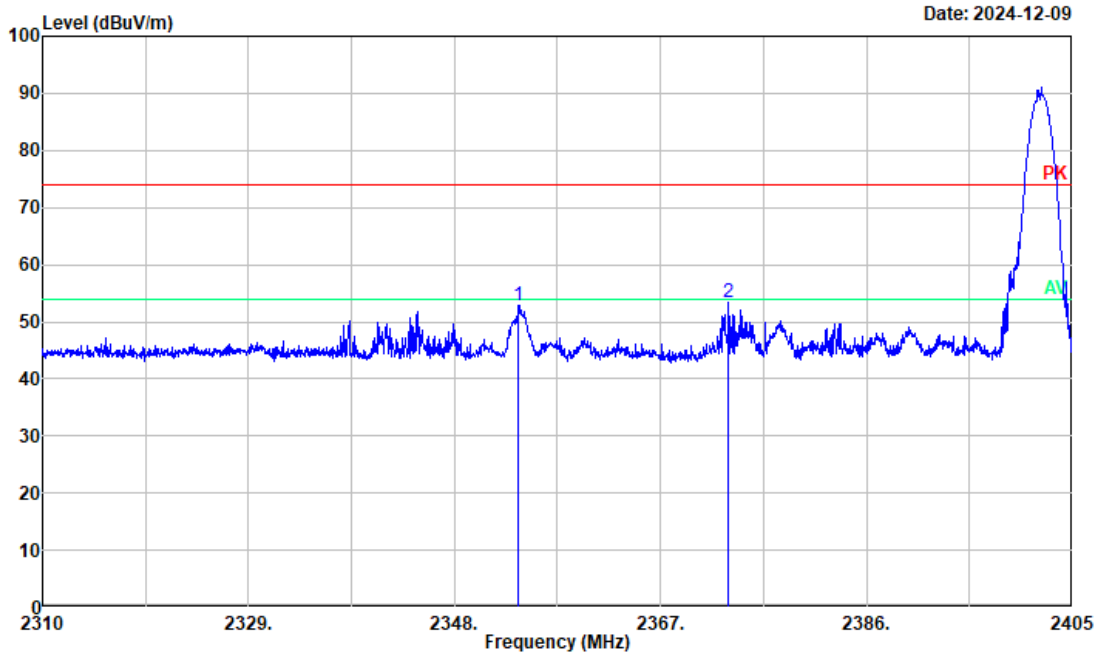


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.4℃/46%R.H./101.0kPa
Tested by : Luke Li
Polarization : vertical
Remark : DH5 2480

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2483.500	47.27	-2.98	44.29	74.00	-29.71	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/10Hz , DET: PK

Mode:	2DH5	Channel:	2402MHz

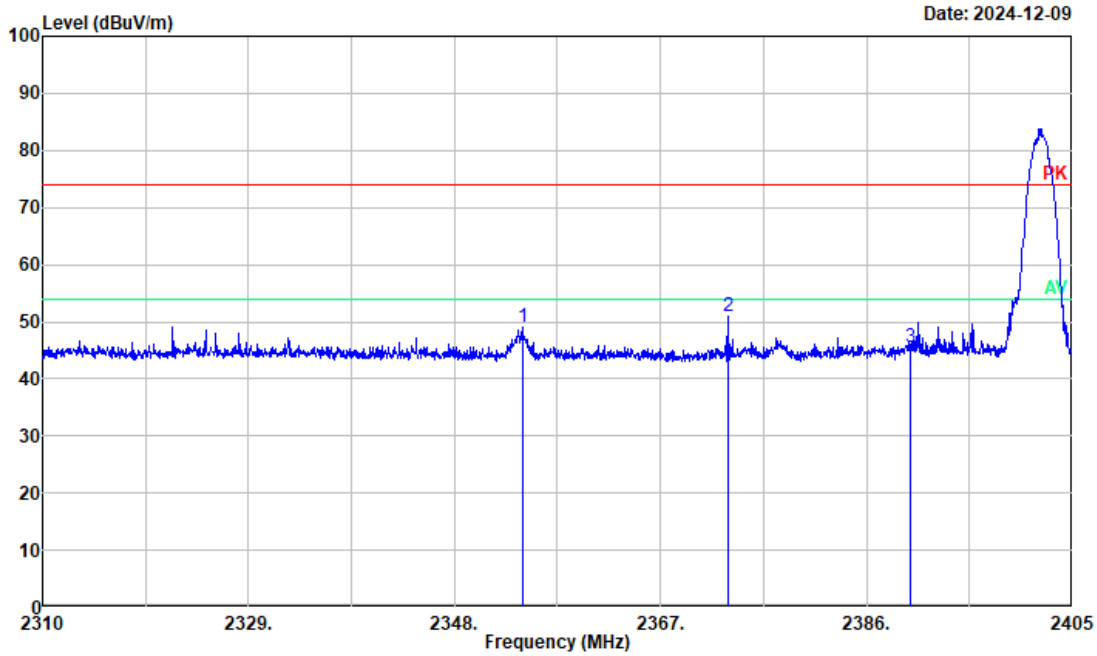


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.4℃/46%R.H./101.0kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 2DH5 2402

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2353.912	56.18	-3.22	52.96	74.00	-21.04	Peak
2	2373.302	56.47	-3.20	53.27	74.00	-20.73	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/10Hz , DET: PK

Mode:	2DH5	Channel:	2402MHz

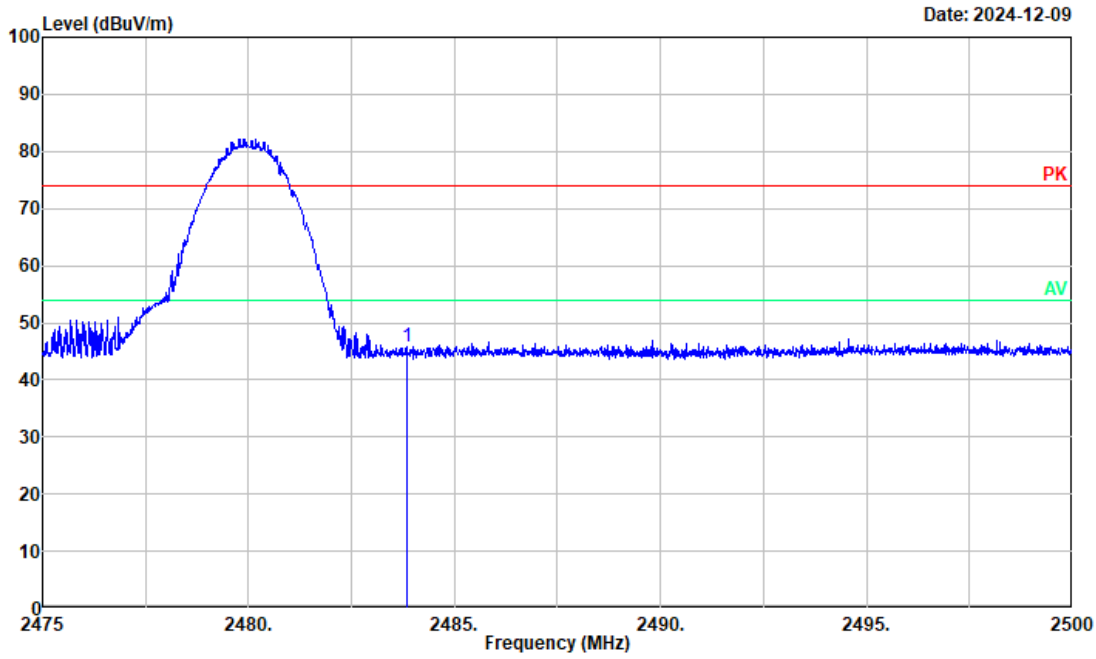


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.4℃/46%R.H./101.0kPa
Tested by : Luke Li
Polarization : vertical
Remark : 2DH5 2402

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2354.245	52.22	-3.22	49.00	74.00	-25.00	Peak
2	2373.207	54.24	-3.20	51.04	74.00	-22.96	Peak
3	2390.000	48.84	-3.18	45.66	74.00	-28.34	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/10Hz , DET: PK

Mode:	2DH5	Channel:	2480MHz

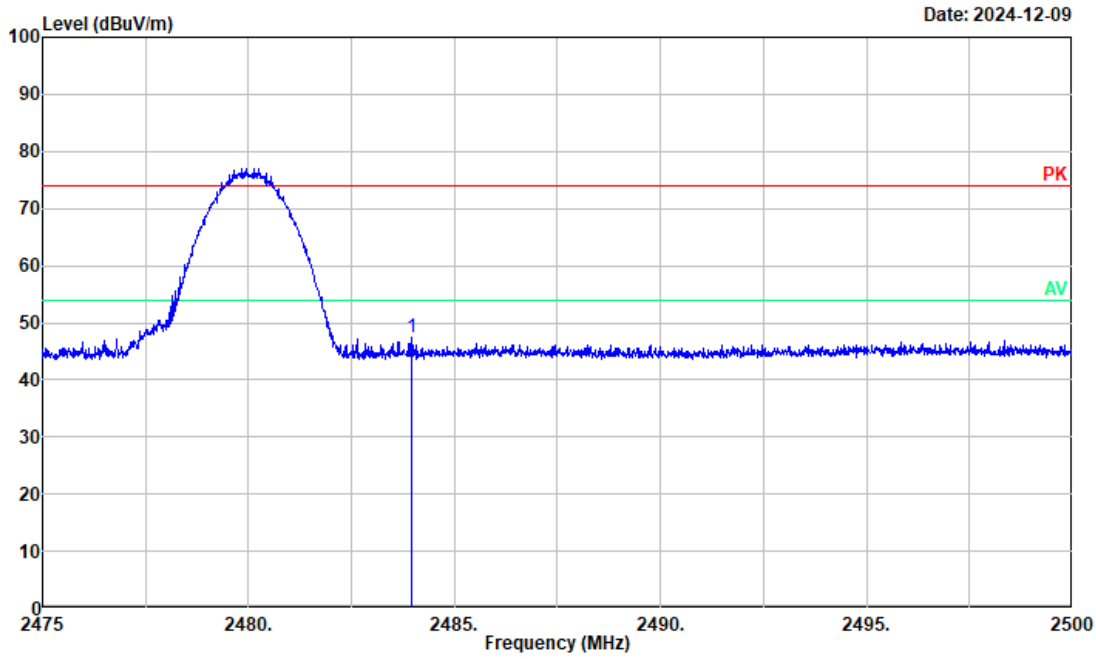


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.4℃/46%R.H./101.0kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 2DH5 2480

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2483.842	48.74	-2.98	45.76	74.00	-28.24	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/10Hz , DET: PK

Mode:	2DH5	Channel:	2480MHz

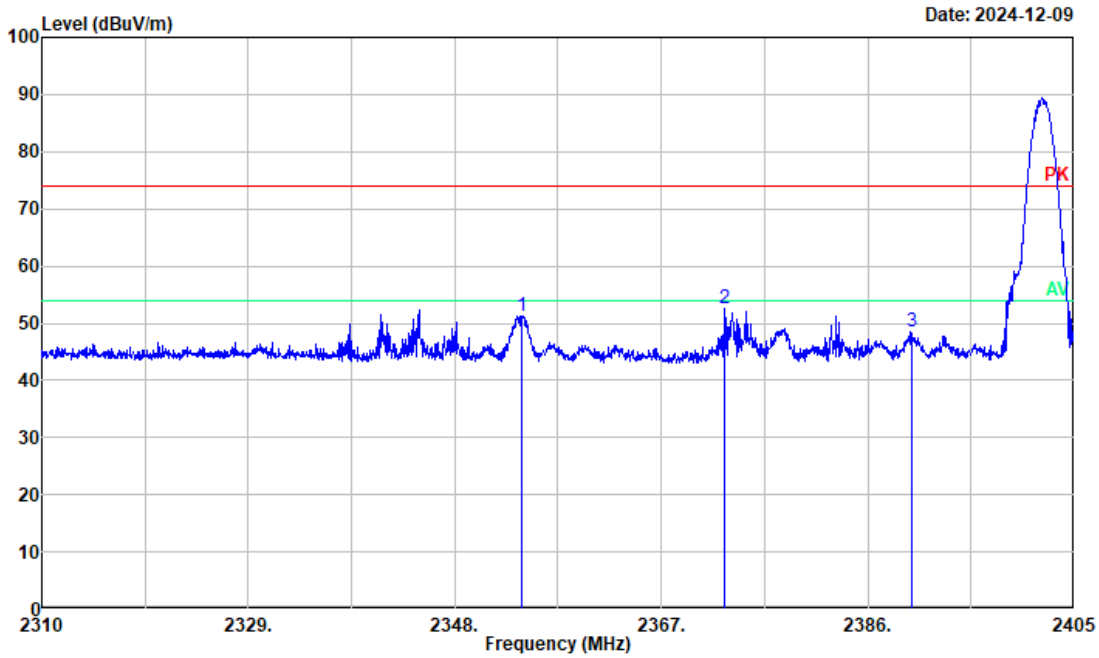


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.4℃/46%R.H./101.0kPa
Tested by : Luke Li
Polarization : vertical
Remark : 2DH5 2480

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2483.942	50.48	-2.98	47.50	74.00	-26.50	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/10Hz , DET: PK

Mode:	3DH5	Channel:	2402MHz

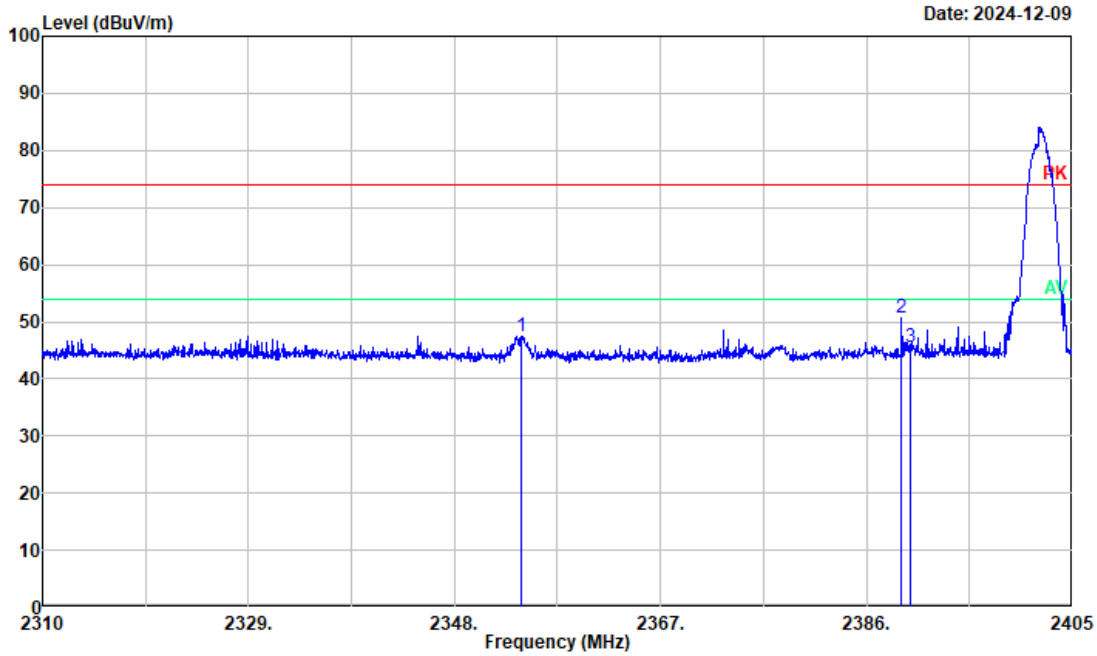


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.4℃/46%R.H./101.0kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 3DH5 2402

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2354.150	54.45	-3.22	51.23	74.00	-22.77	Peak
2	2372.874	55.86	-3.20	52.66	74.00	-21.34	Peak
3	2390.000	51.66	-3.18	48.48	74.00	-25.52	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/10Hz , DET: PK

Mode:	3DH5	Channel:	2402MHz

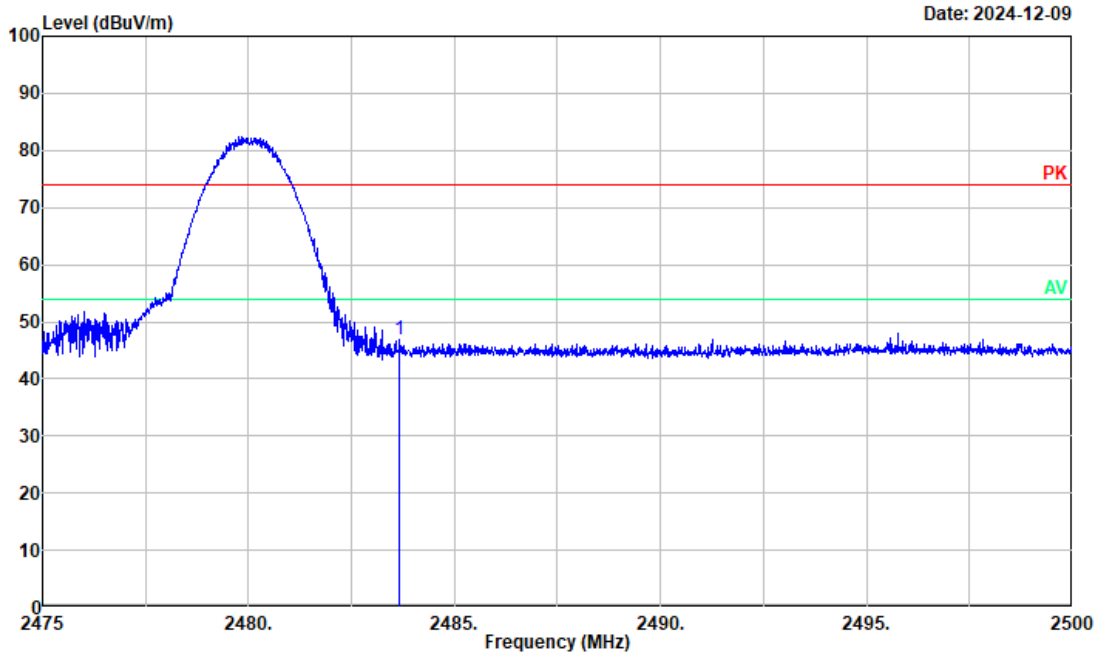


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.4℃/46%R.H./101.0kPa
Tested by : Luke Li
Polarization : vertical
Remark : 3DH5 2402

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2354.102	50.76	-3.22	47.54	74.00	-26.46	Peak
2	2389.222	53.79	-3.18	50.61	74.00	-23.39	Peak
3	2390.000	48.60	-3.18	45.42	74.00	-28.58	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/10Hz , DET: PK

Mode:	3DH5	Channel:	2480MHz

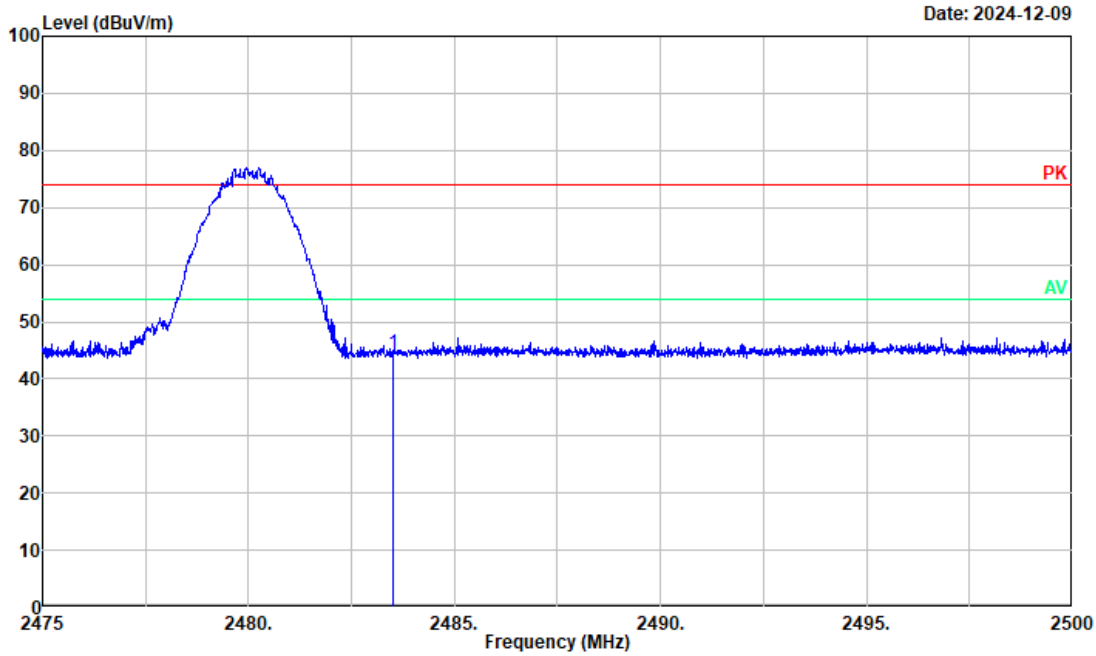


Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.4℃/46%R.H./101.0kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 3DH5 2480

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2483.667	49.76	-2.98	46.78	74.00	-27.22	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/10Hz , DET: PK

Mode:	3DH5	Channel:	2480MHz



Project No. : 2405Z56633E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.4℃/46%R.H./101.0kPa
Tested by : Luke Li
Polarization : vertical
Remark : 3DH5 2480

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2483.504	47.41	-2.98	44.43	74.00	-29.57	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit
SA setting: Peak: RBW/VWB: 1MHz/3MHz, DET: PK
Average: RBW/VWB: 1MHz/10Hz , DET: PK

3.5 RF Conducted Test Data

Test Date:	2024-12-10	Test By:	Ryan Zhang
Environment condition:	Temperature: 25.4°C; Relative Humidity: 47%; ATM Pressure: 101.0kPa		

3.5.1 20 dB Emission Bandwidth

Mode	Channel	Result (MHz)	Verdict
DH1	Low	0.955	Pass
	Middle	0.982	Pass
	High	0.985	Pass
2DH1	Low	1.309	Pass
	Middle	1.318	Pass
	High	1.321	Pass
3DH1	Low	1.300	Pass
	Middle	1.303	Pass
	High	1.303	Pass

3.5.2 99% Occupied Bandwidth

Mode	Channel	99% OBW (MHz)
DH1	Low	0.906
	Middle	0.912
	High	0.906
2DH1	Low	1.188
	Middle	1.188
	High	1.188
3DH1	Low	1.182
	Middle	1.185
	High	1.188

3.5.3 Maximum Conducted Peak Output Power

Mode	Channel	Result (dBm)	Limit (dBm)	Verdict
DH1	Low	-5.27	21.00	Pass
	Middle	-9.66	21.00	Pass
	High	-12.62	21.00	Pass
2DH1	Low	-4.89	21.00	Pass
	Middle	-9.27	21.00	Pass
	High	-13.42	21.00	Pass
3DH1	Low	-4.87	21.00	Pass
	Middle	-9.25	21.00	Pass
	High	-13.34	21.00	Pass

3.5.4 Channel separation

Mode	Channel	Result (MHz)	Limit (MHz)	Verdict
DH1	Low	1.003	0.873	Pass
	Middle	1.003	0.879	Pass
	High	1	0.881	Pass

Note: Limit≤2/3*20dB BW

Only the GFSK mode was test since π/4-DQPSK and 8DPSK has the same channel plan.

3.5.5 Number of hopping Frequency

Mode	Channel	Result	Limit	Verdict
DH1	Hopping	79	15	Pass
2DH1	Hopping	79	15	Pass
3DH1	Hopping	79	15	Pass

3.5.6 Time of occupancy (dwell time)

Mode	Channel	Pulse width (ms)	Dwell time (s)	Limit (s)	Verdict
DH1	Hopping	0.641	0.205	0.400	Pass
DH3	Hopping	1.898	0.304	0.400	Pass
DH5	Hopping	3.153	0.336	0.400	Pass
2DH1	Hopping	0.638	0.204	0.400	Pass
2DH3	Hopping	1.898	0.304	0.400	Pass
2DH5	Hopping	3.153	0.336	0.400	Pass
3DH1	Hopping	0.630	0.202	0.400	Pass
3DH3	Hopping	1.898	0.304	0.400	Pass
3DH5	Hopping	3.158	0.337	0.400	Pass

Note:

DH5:Dwell time=Pulse width (ms) × (1600/2/79) ×31.6 s

DH3:Dwell time=Pulse width (ms) × (1600/4/79) ×31.6 s

DH5:Dwell time=Pulse width (ms) × (1600/6/79) ×31.6 s

2DH5: Dwell time=Pulse width (ms) × (1600/2/79) ×31.6 s

2DH3: Dwell time=Pulse width (ms) × (1600/4/79) ×31.6 s

2DH5: Dwell time=Pulse width (ms) × (1600/6/79) ×31.6 s

3DH5: Dwell time=Pulse width (ms) × (1600/2/79) ×31.6 s

3DH3: Dwell time=Pulse width (ms) × (1600/4/79) ×31.6 s

3DH5: Dwell time=Pulse width (ms) × (1600/6/79) ×31.6 s

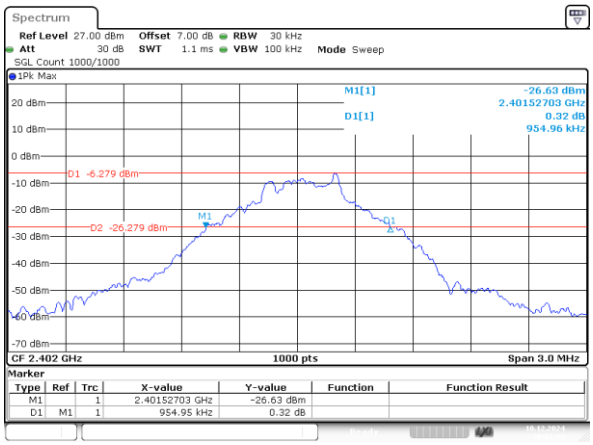
3.5.7 100 kHz Bandwidth of Frequency Band Edge

Mode	Channel	Result (dB)	Limit (dB)	Verdict
DH1	Low	29.87	20.00	Pass
	High	38.40	20.00	Pass
	Hopping_Lower	30.51	20.00	Pass
	Hopping_Upper	38.05	20.00	Pass
2DH1	Low	30.32	20.00	Pass
	High	37.65	20.00	Pass
	Hopping_Lower	29.40	20.00	Pass
	Hopping_Upper	37.80	20.00	Pass
3DH1	Low	30.02	20.00	Pass
	High	37.80	20.00	Pass
	Hopping_Lower	28.89	20.00	Pass
	Hopping_Upper	37.46	20.00	Pass

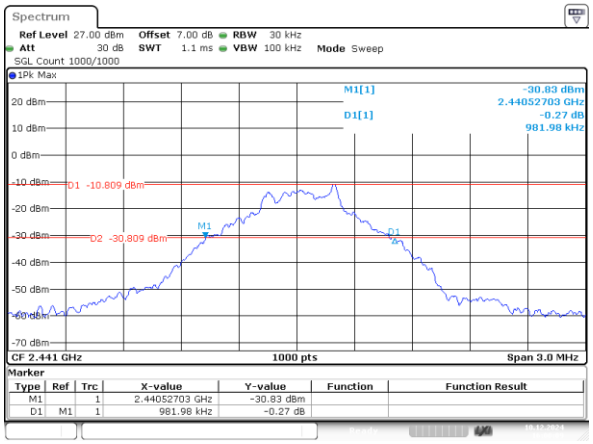
Test Plots:

20 dB Emission Bandwidth:

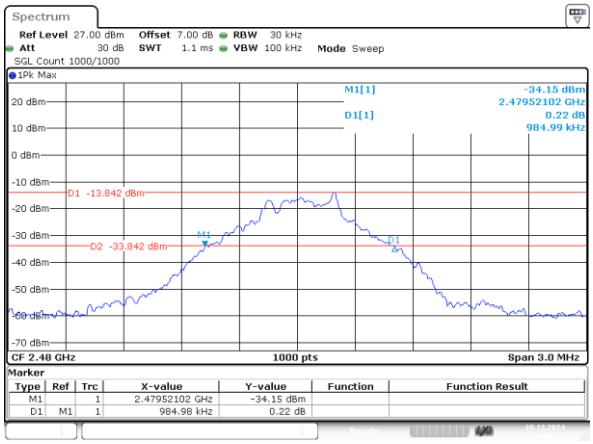
DH1_Low 0.979MHz



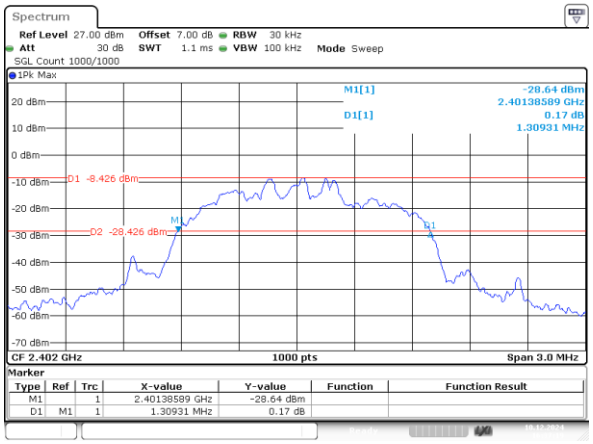
DH1_Middle 0.982MHz



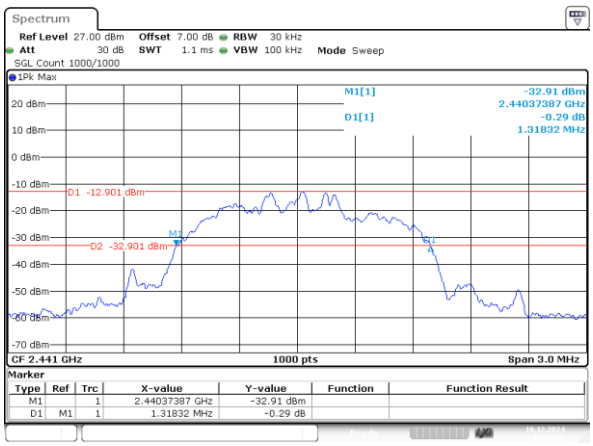
DH1_High 0.985MHz



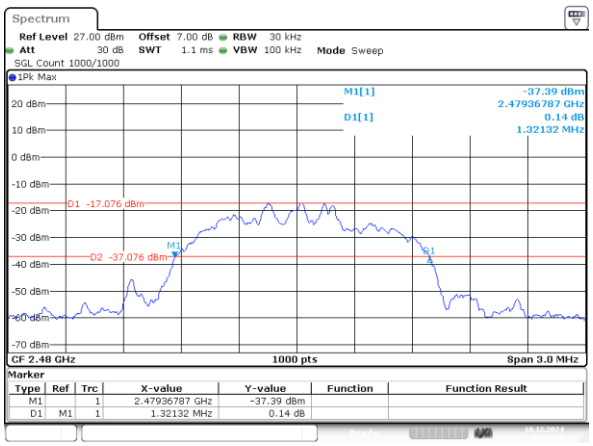
2DH1_Low 1.309MHz



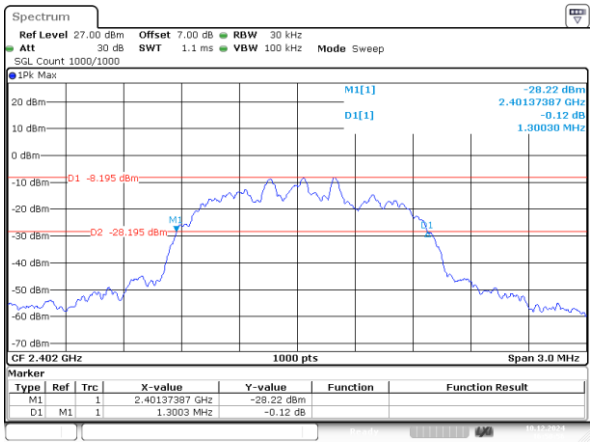
2DH1_Middle 1.318MHz



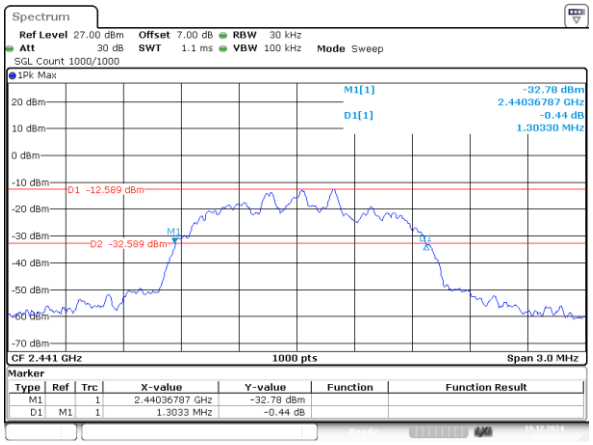
2DH1_High 1.321MHz



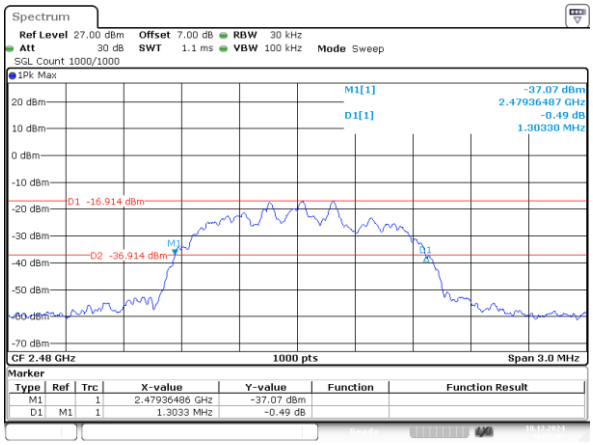
3DH1_Low 1.300MHz



3DH1_Middle 1.303MHz

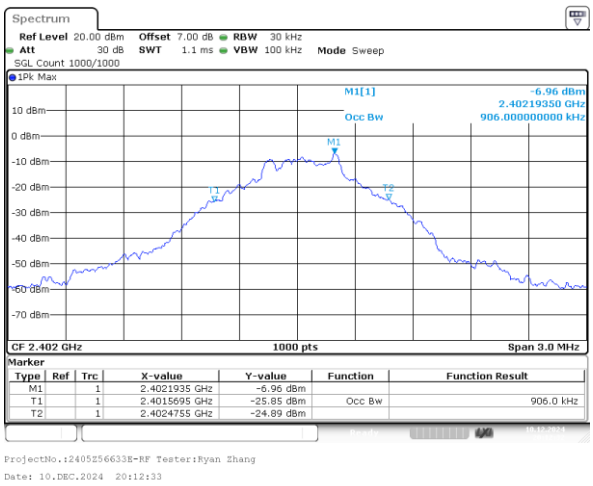


3DH1_High 1.303MHz

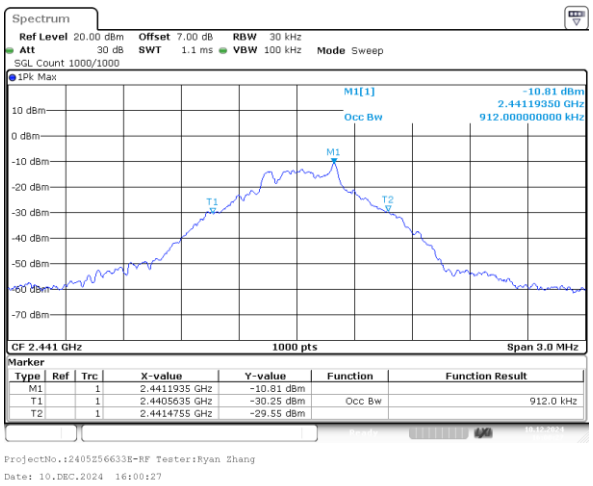


99% Occupied Bandwidth:

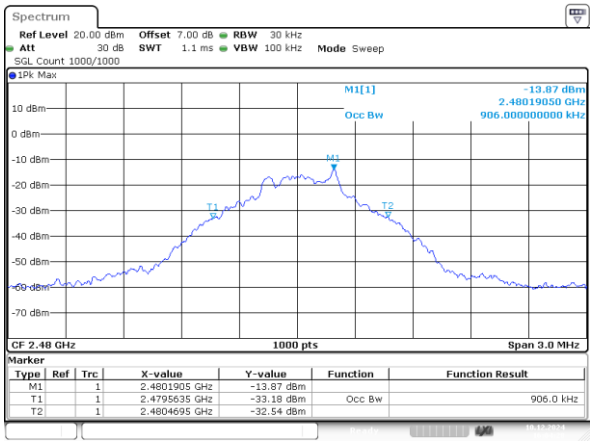
DH1_Low 0.906MHz



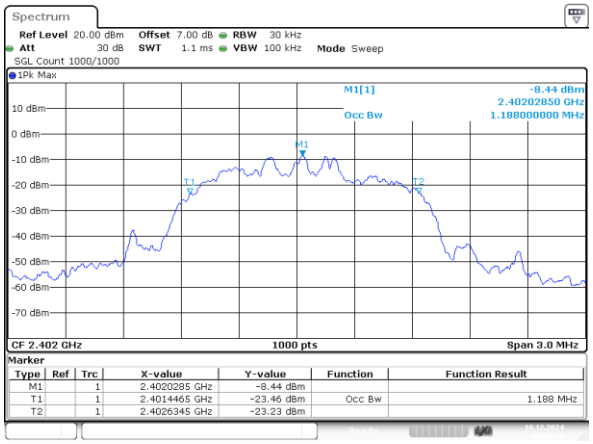
DH1_Middle 0.912MHz



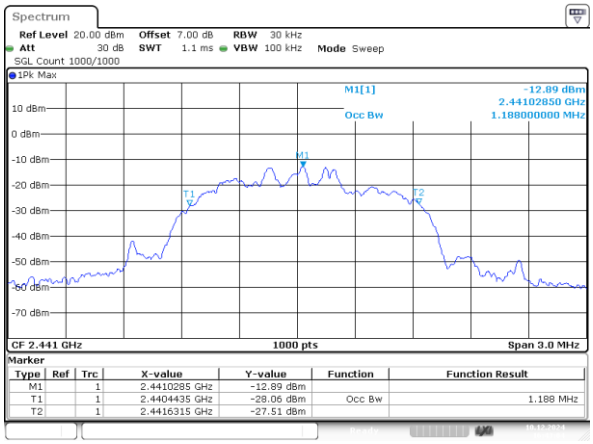
DH1_High 0.906MHz



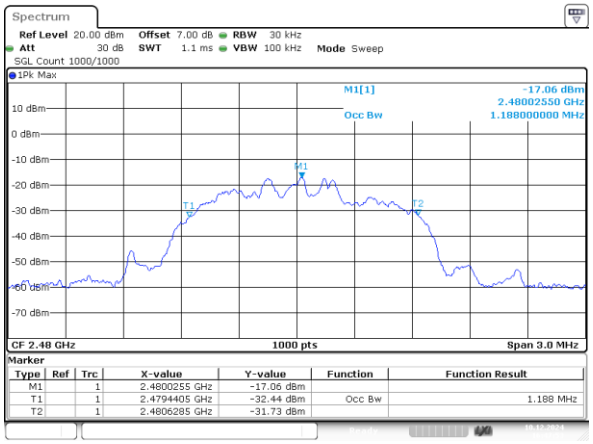
2DH1_Low 1.188MHz



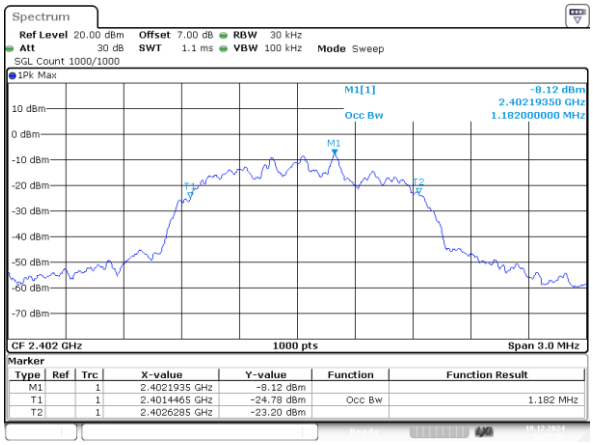
2DH1_Middle 1.188MHz



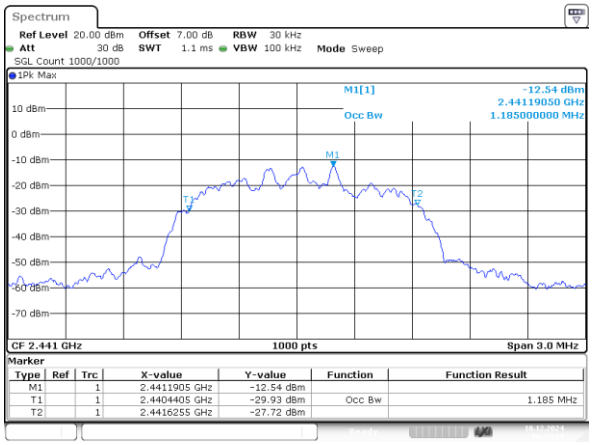
2DH1_High 1.188MHz



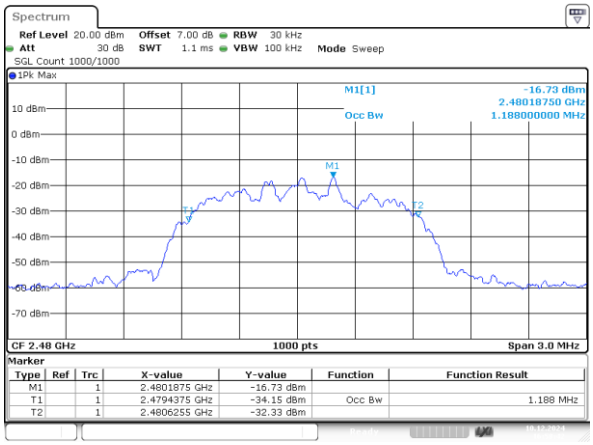
3DH1_Low 1.182MHz



3DH1_Middle 1.185MHz

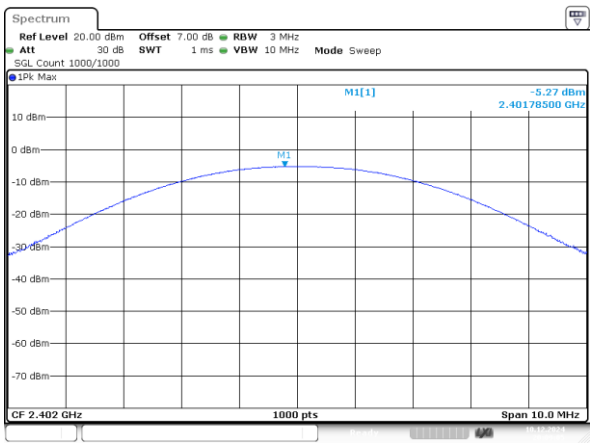


3DH1_High 1.188MHz

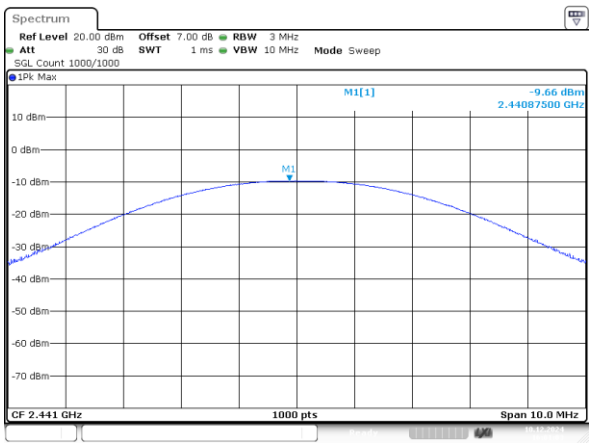


Maximum Conducted Peak Output Power:

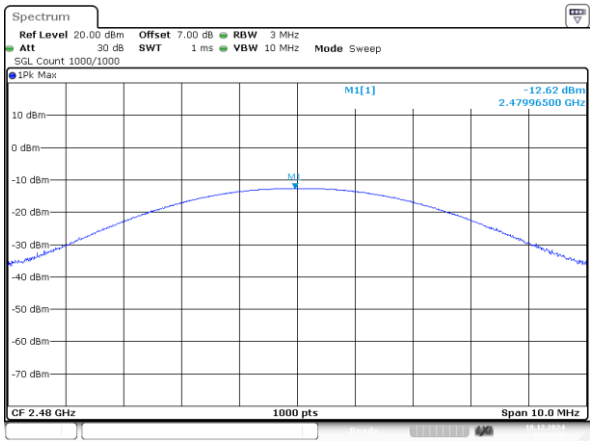
DH1_Low -6.80dBm



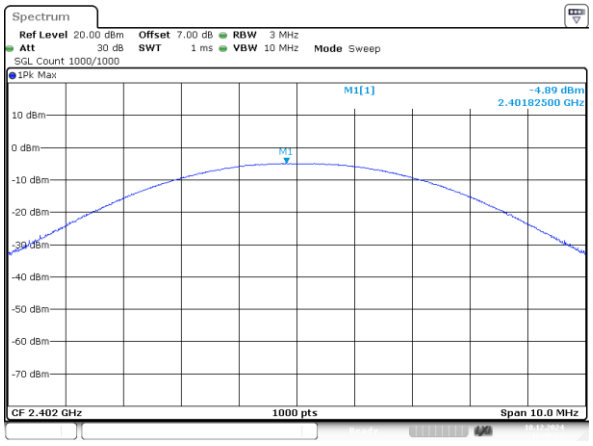
DH1_Middle -9.66dBm



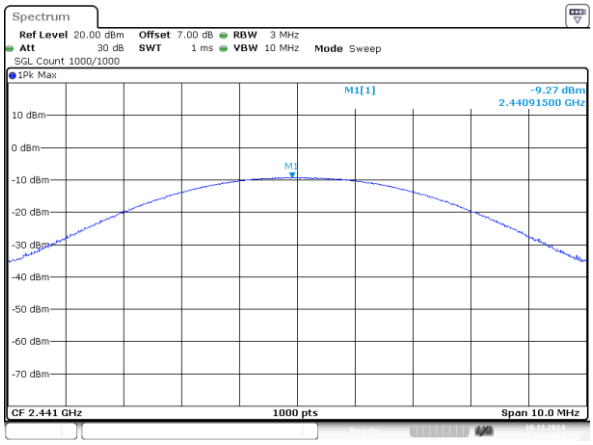
DH1_High -12.62dBm



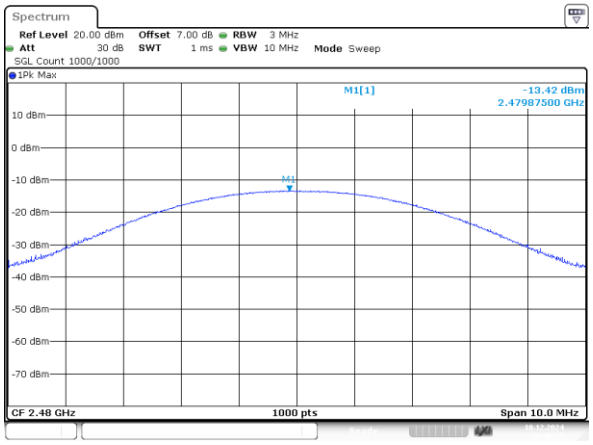
2DH1_Low -4.89dBm



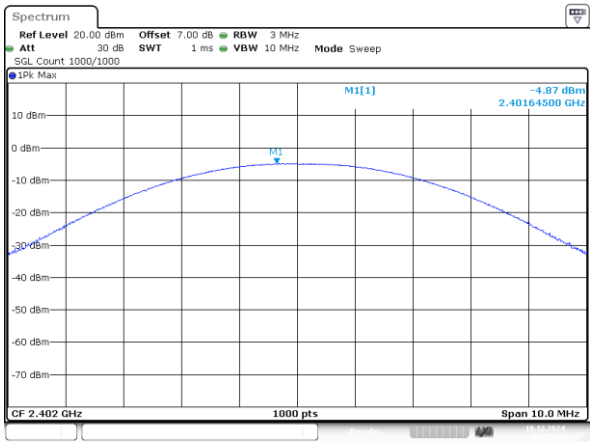
2DH1_Middle -9.27dBm



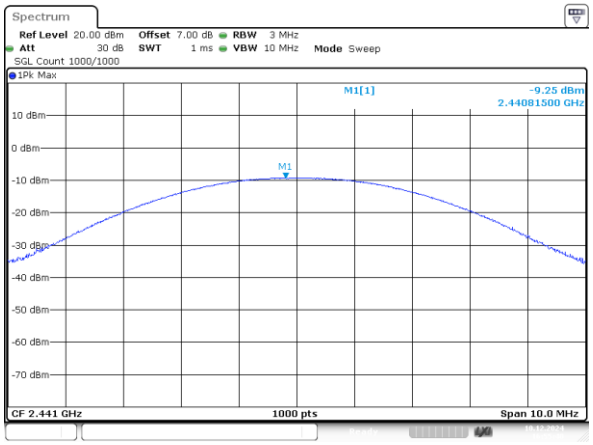
2DH1_High -13.42dBm



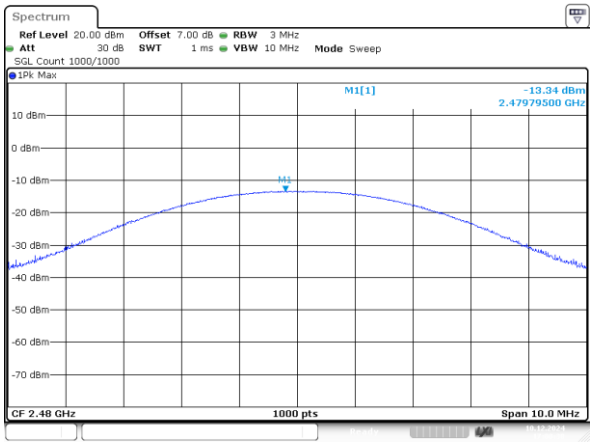
3DH1_Low -4.87dBm



3DH1_Middle -9.25dBm

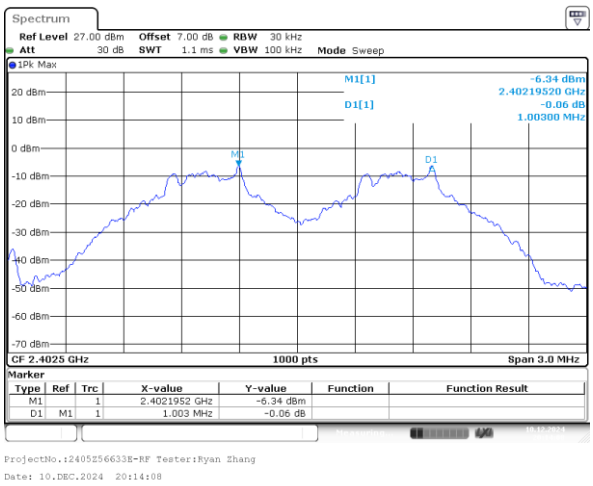


3DH1_High -13.34dBm

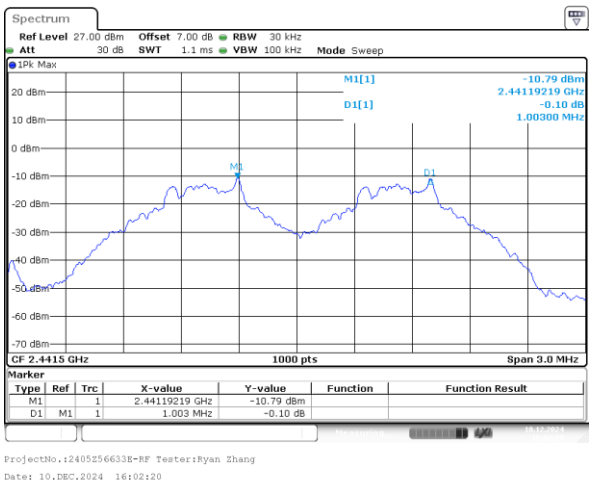


Channel separation:

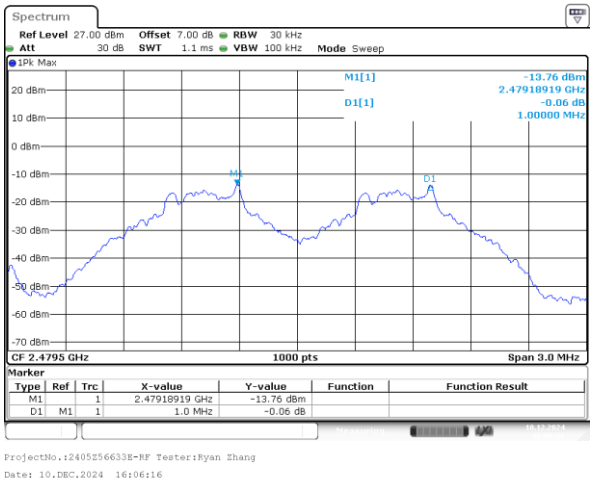
DH1_Low 1MHz



DH1_Middle 1.003MHz

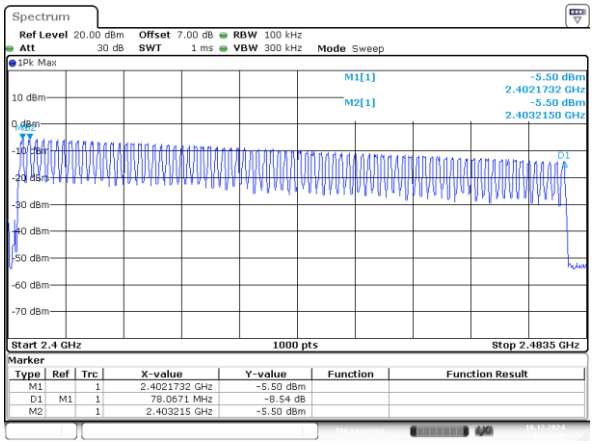


DH1_High 1MHz

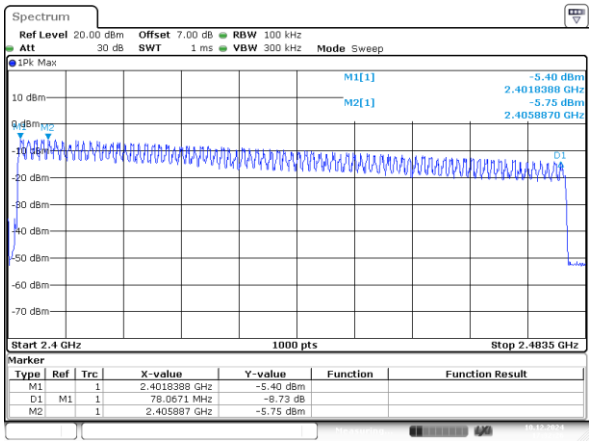


Number of hopping Frequency

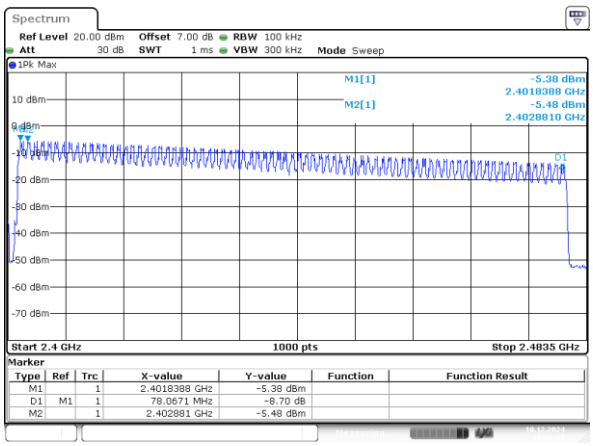
DH1_Hopping 79



2DH1_Hopping 79

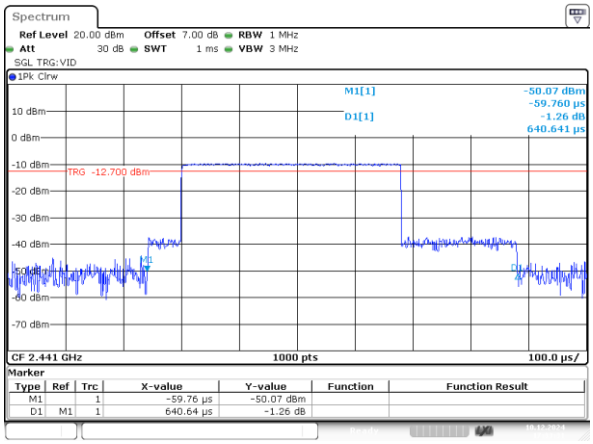


3DH1_Hopping 79



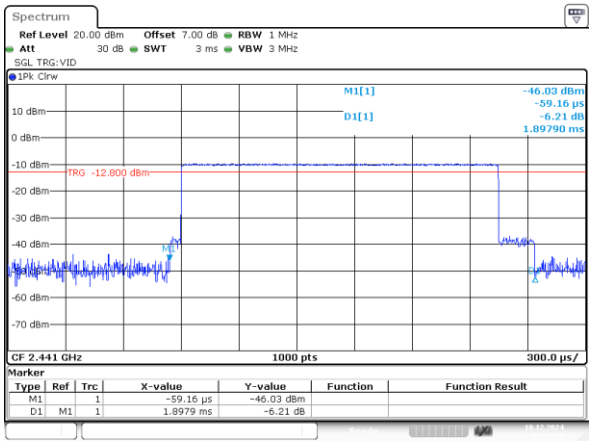
Time of occupancy (dwell time)

DH1_Hopping 0.641ms



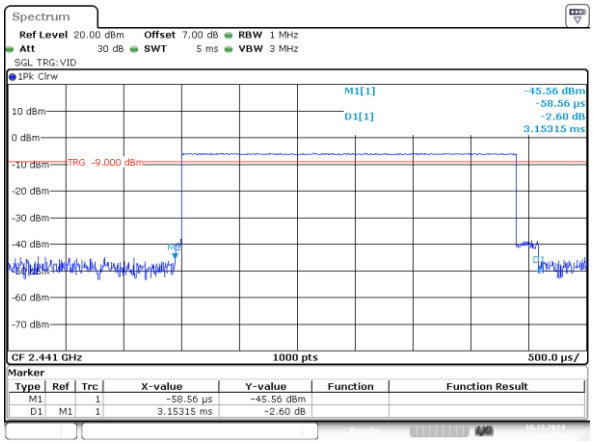
ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 17:33:31

DH3_Hopping 1.898ms



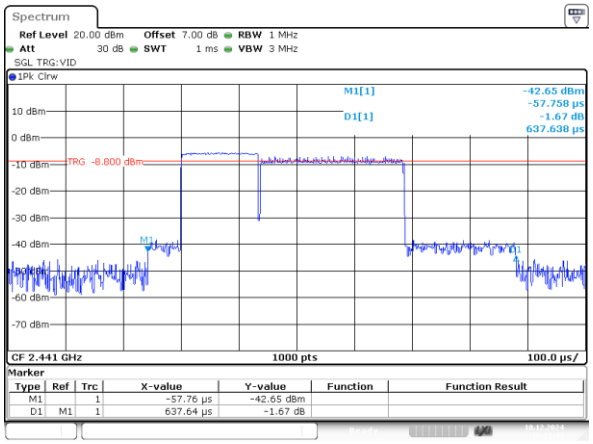
ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 17:34:36

DH5_Hopping 3.153ms



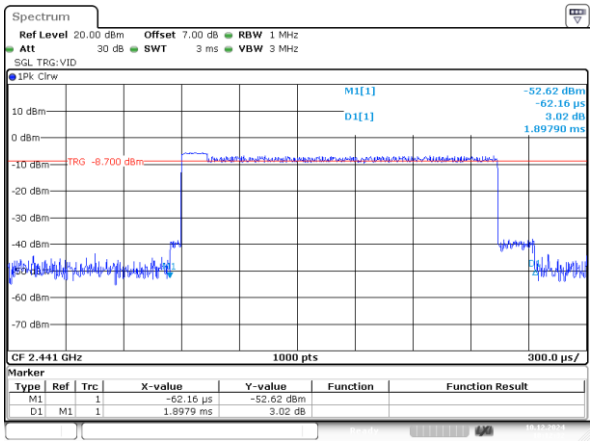
ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 18:10:55

2DH1_Hopping 0.638ms



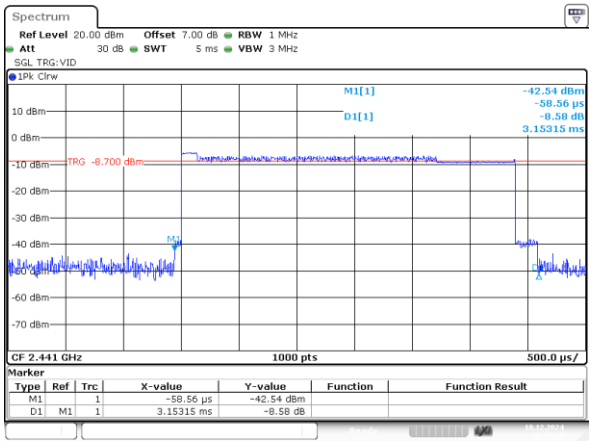
ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 18:11:42

2DH3_Hopping 1.898ms



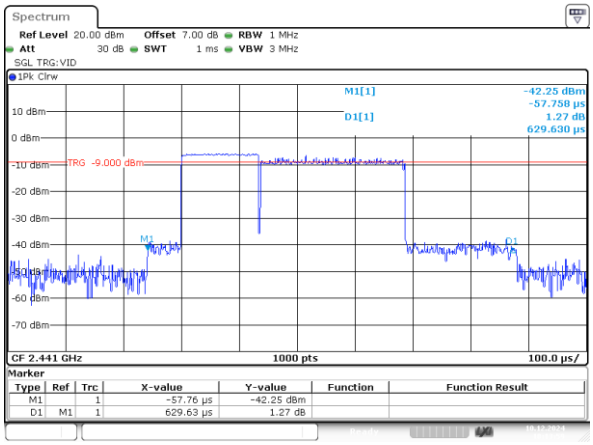
ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 18:12:32

2DH5_Hopping 3.153ms

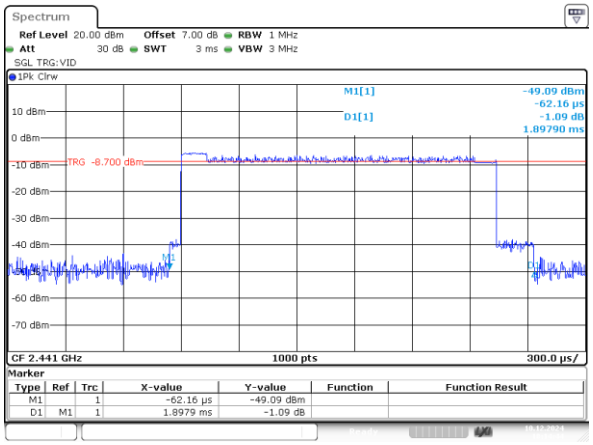


ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 18:13:15

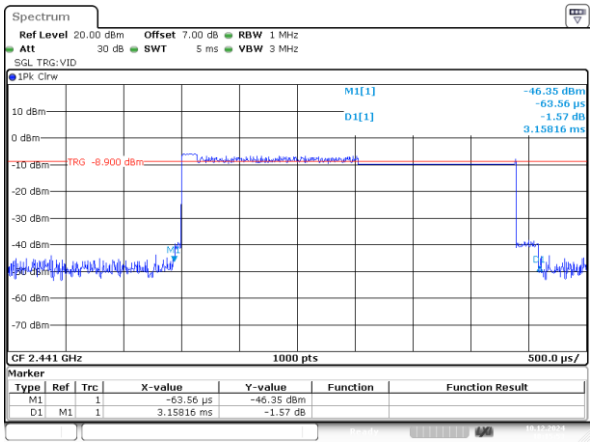
3DH1_Hopping 0.630ms



3DH3_Hopping 1.898ms

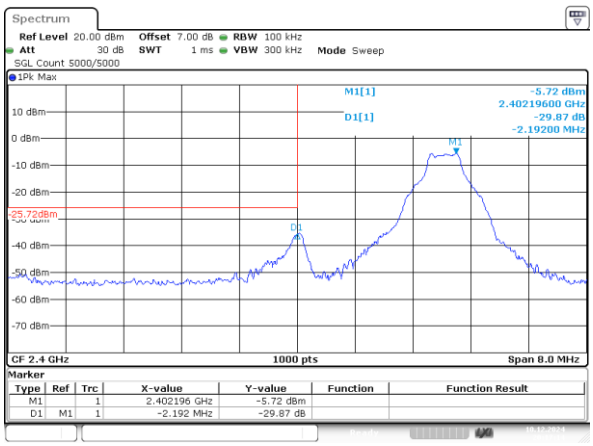


3DH5_Hopping 3.158ms



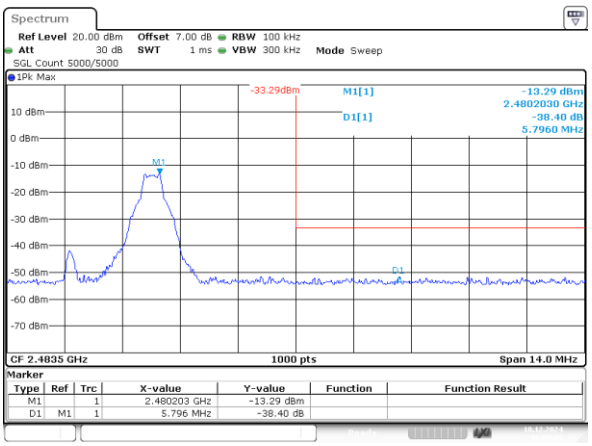
100kHz Bandwidth of Frequency Band Edge:

DH1_Low 30.20dB



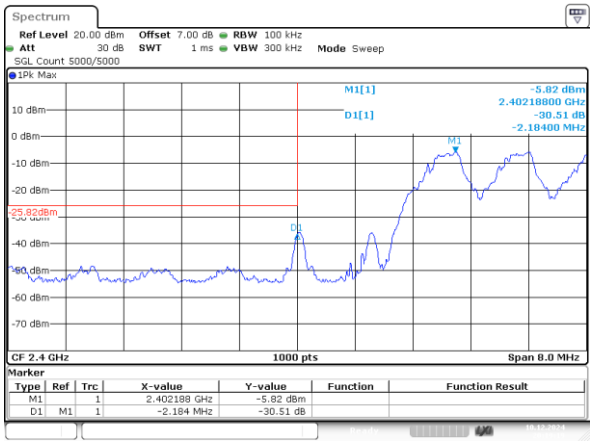
ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 20:17:14

DH1_High 38.40dB



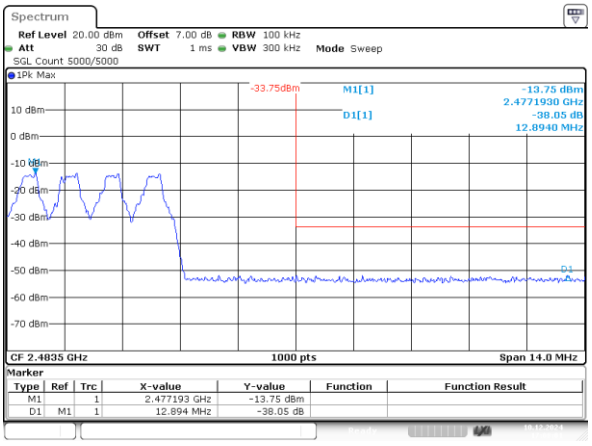
ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 16:04:09

DH1_Hopping_Lower 30.60dB



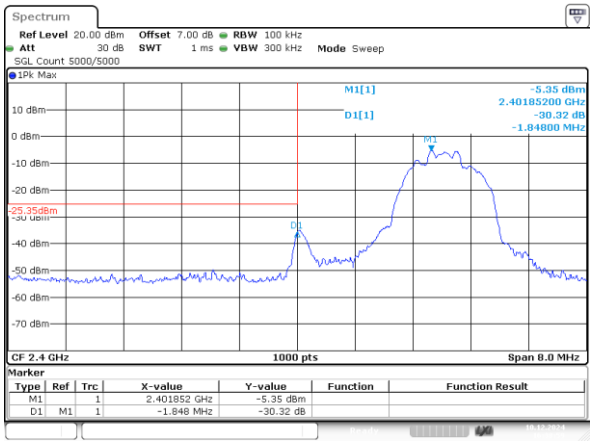
ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 20:19:19

DH1_Hopping_Upper 38.05dB



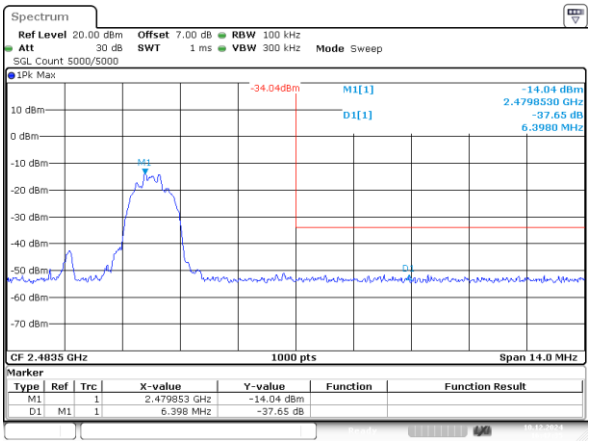
ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 17:08:00

2DH1_Low 30.32dB



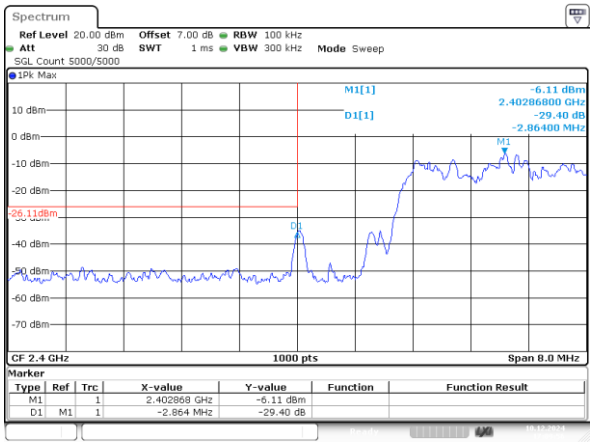
ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 16:38:59

2DH1_High 37.65dB



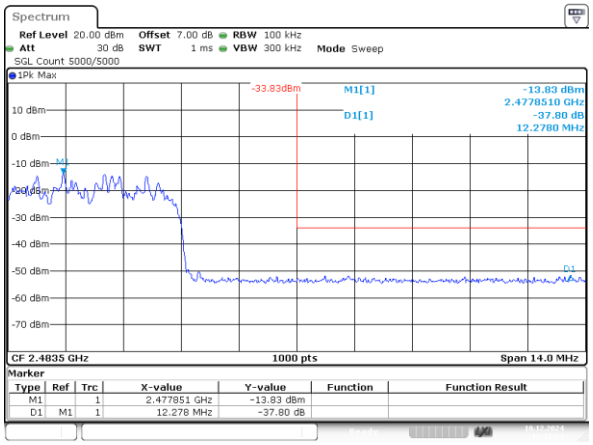
ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 16:47:34

2DH1_Hopping_Lower 29.40dB



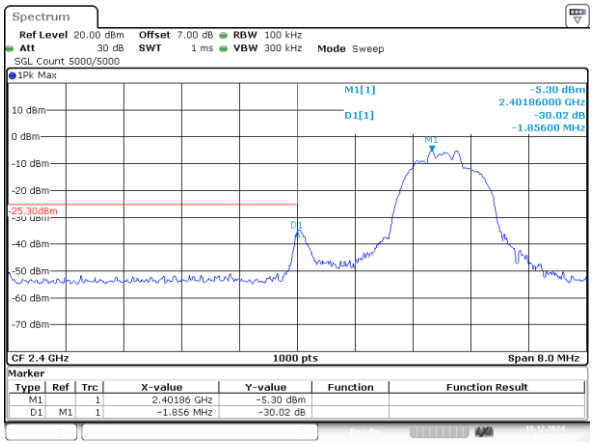
ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 17:09:55

2DH1_Hopping_Upper 37.80dB



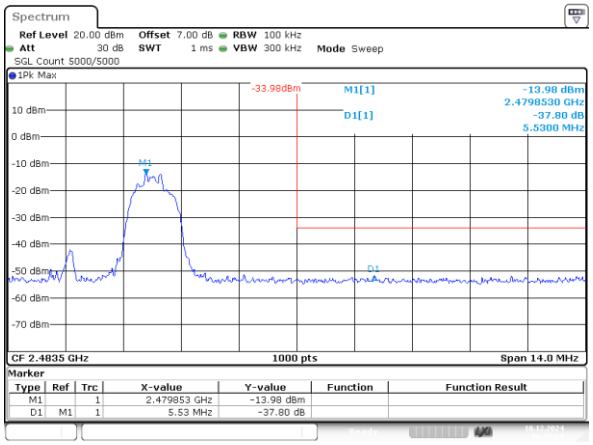
ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 17:12:22

3DH1_Low 30.02dB



ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 16:52:37

3DH1_High 37.80dB



ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
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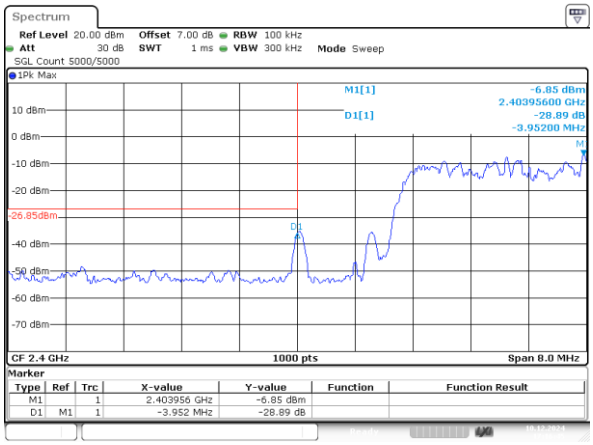
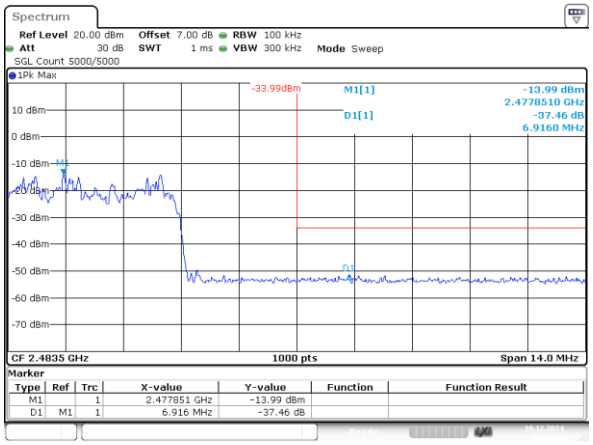
3DH1_Hopping_Lower 28.89dB



ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 17:16:45

3DH1_Hopping_Upper 37.46dB



ProjectNo.:2405Z56633E-RF Tester:Ryan Zhang
Date: 10.DEC.2024 17:18:42

4 Test Setup Photo

Please refer to the attachment 2405Z56633E Test Setup photo.

5 E.U.T Photo

Please refer to the attachment 2405Z56633E External photo and 2405Z56633E Internal photo.

---End of Report---