FCC Radio Test Report

FCC ID: KA2CS8526LHB1

Report No.	:	BTL-FCCP-4-2404H026
Equipment	:	2K QHD Pan & Tilt Wi-Fi Camera
Model Name	:	DCS-8526LH
Brand Name	:	D-Link
Applicant	:	D-Link Corporation
Address	:	14420 Myford Road Suite 100, Irvine, California 92606, United States
Radio Function	:	Bluetooth (BT)
FCC Rule Part(s)	:	FCC CFR Title 47, Part 15, Subpart C (15.247)
Measurement Procedure(s)	:	ANSI C63.10-2013
Date of Receipt	:	2024/8/06
Date of Test	:	2024/8/07 ~ 2024/8/27
Issued Date	:	2024/10/18

The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** assumes no responsibility for the data provided by the Customer, any statements, inferences or generalizations drawn by the customer or others from the reports issued by **BTL**.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REVISION HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-FCCP-4-2404H026	R00	Original Report.	2024/10/18	Valid

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

Standard(s) Section	Description	Test Result	Judgement	Remark
15.207	AC Power Line Conducted Emissions	APPENDIX A	Pass	------
15.205 15.209 15.247(d)	Radiated Emissions	APPENDIX B APPENDIX C APPENDIX D	Pass	------
15.247(a)	Number of Hopping Frequency	APPENDIX E	Pass	------
15.247(a)	Average Time of Occupancy	APPENDIX F	Pass	------
15.247(a)	Hopping Channel Separation	APPENDIX G	Pass	------
15.247(a)	Bandwidth	APPENDIX H	Pass	------
15.247(a)	Maximum Output Power	APPENDIX I	PASS	------
15.247(d)	Conducted Spurious Emission	APPENDIX J	PASS	------
15.203	Antenna Requirement	------	PASS	Note(2)

Note:

(1) “N/A” denotes test is not applicable in this test report

(2) The device what use a permanently attached antenna were considered sufficient to comply with the provisions of 15.203.

1.1 TEST FACILITY

The test locations stated below are under the TAF Accreditation Number 0659.
The test location(s) used to collect the test data in this report are:
(FCC DN: TW0659)
No. 64, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City
☒ C01 ☒ CB20 ☒ TR01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**, where expanded uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k = 2**, providing a level of confidence of approximately **95 %**.
The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{cispr} requirement.

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U (dB)
C06	CISPR	150 kHz ~ 30MHz	2.4498

B. Radiated emissions test:

Test Site	Measurement Frequency Range	U (dB)
CB21	0.03 GHz ~ 0.2 GHz	4.17
	0.2 GHz ~ 1 GHz	4.72
	1 GHz ~ 6 GHz	5.21
	6 GHz ~ 18 GHz	5.51
	18 GHz ~ 26 GHz	3.69
	26 GHz ~ 40 GHz	4.23

C. Conducted test:

Test Item	U (dB)
Occupied Bandwidth	0.53
Maximum Output Power	0.37
Power Spectral Density	0.66
Conducted Spurious emissions	0.53
Conducted Band edges	0.53

NOTE:
Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Environment Condition	Test Voltage	Tested by
AC Power Line Conducted Emissions	25°C, 45%	AC 120V	Ken Lu
Radiated emissions below 1 GHz	26°C, 65%	AC 120V	Barry Tsui
Radiated emissions above 1 GHz	26°C, 65%	AC 120V	Barry Tsui
Number of Hopping Frequency	25°C, 79%	AC 120V	Cai Hu
Average Time of Occupancy	25°C, 79%	AC 120V	Cai Hu
Hopping Channel Separation	25°C, 79%	AC 120V	Cai Hu
Bandwidth	25°C, 79%	AC 120V	Cai Hu
Maximum Output Power	25°C, 79%	AC 120V	Cai Hu
Antenna Conducted Spurious Emission	25°C, 79%	AC 120V	Cai Hu

1.4 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

Test Software	putty			
Modulation Mode	2402 MHz	2441 MHz	2480 MHz	Data Rate
1 Mbps	DEF	DEF	DEF	1 Mbps
2Mbps	DEF	DEF	DEF	2 Mbps
3Mbps	DEF	DEF	DEF	3 Mbps

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	2K QHD Pan & Tilt Wi-Fi Camera
Brand Name	D-Link
Test Model	DCS-8526LH
Model Difference(s)	N/A
Software Version	N/A
Hardware Version	N/A
Power Source	DC Voltage supplied from AC/DC adapter Brand/Model: KEYU/ KA12C-0502000US
Power Rating	I/P: 100-240V~50/60Hz 0.35A Max O/P: 5V⎓2000mA
Operation Band	2400 MHz ~ 2483.5 MHz
Operation Frequency	2402 MHz ~ 2480 MHz
Modulation Type	GFSK, π/4-DQPSK, 8-DPSK
Bit Rate of Transmitter	1Mbps, 2Mbps, 3Mbps
Max. Output Power	1Mbps: 5.46 dBm (0.0035 W)

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

2. Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

3. Table for Filed Antenna:

Ant.	Brand	P/N	Model Name	Antenna Type	Connector	Gain (dBi)
1		EP07401	N/A	PIFA	N/A	-3.51

4. The above Antenna information are derived from the antenna data sheet provided by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

2.2 TEST MODES

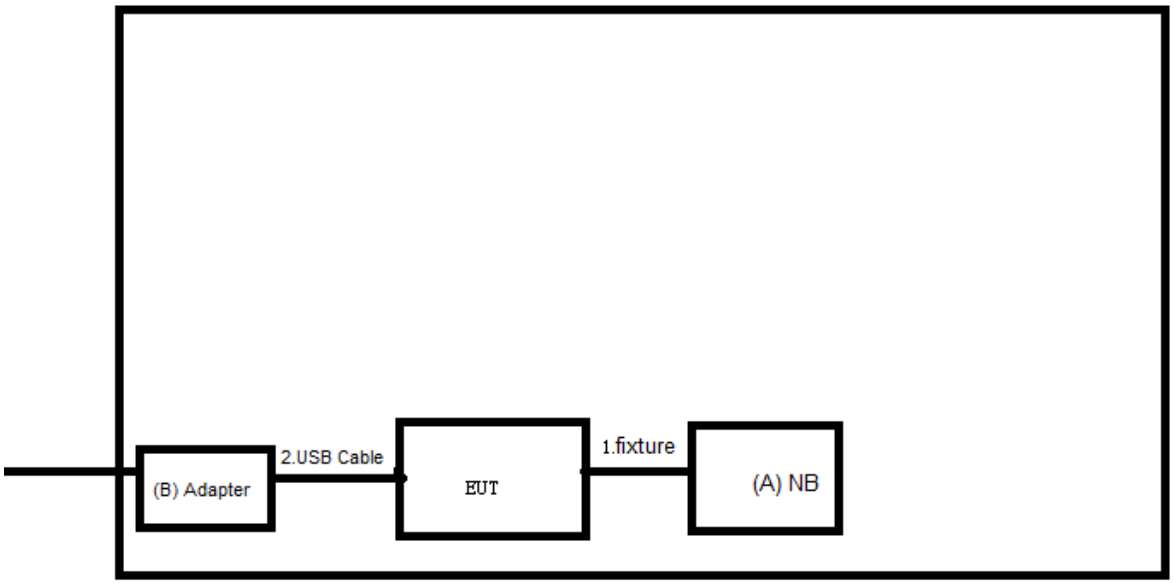
Test Items	Test mode	Channel	Note
AC power line conducted emissions	Normal	-	-
Transmitter Radiated Emissions (below 1GHz)	3 Mbps	78	-
Transmitter Radiated Emissions (above 1GHz)	1/3 Mbps	00/78	Bandedge
	1/3 Mbps	00/39/78	Harmonic
Number of Hopping Frequency	1/3 Mbps	00/39/78	-
Average Time of Occupancy	1/3 Mbps	00/39/78	-
Hopping Channel Separation	1/3 Mbps	00/39/78	-
Bandwidth	1/3 Mbps	00/39/78	
Maximum Output Power	1/2/3 Mbps	00/39/78	
Antenna Conducted Spurious Emission	1/3 Mbps	00/39/78	-

NOTE:
(1) For radiated emission band edge test, both Vertical and Horizontal are evaluated, but only the worst case (Vertical) is recorded.
(2) For radiated emission above 1 GHz test, the spurious points of 1GHz~26.5GHz have been pre-tested and in this report only recorded the worst case. The remaining spurious points are all below the limit value of 20dB.
(3) For radiated emissions below 1 GHz test, the 3 Mbps channel 78 is found to be the worst case and recorded.
(4) For radiated emission above 18 GHz test, only recorded the worst case in this report.
(5) This product has the mode of BT AFH, which was considered during testing.
800/20/X(X = 2 of DH1, X = 4 of DH3 or X = 6 of DH5) with 20, 10 or 6.67 hops per second in a channel, and then multiply 0.4*20 (20 # of hopping). But this mode is not the worst case mode as duration of the packet is same, and this report only shows the worst case mode.

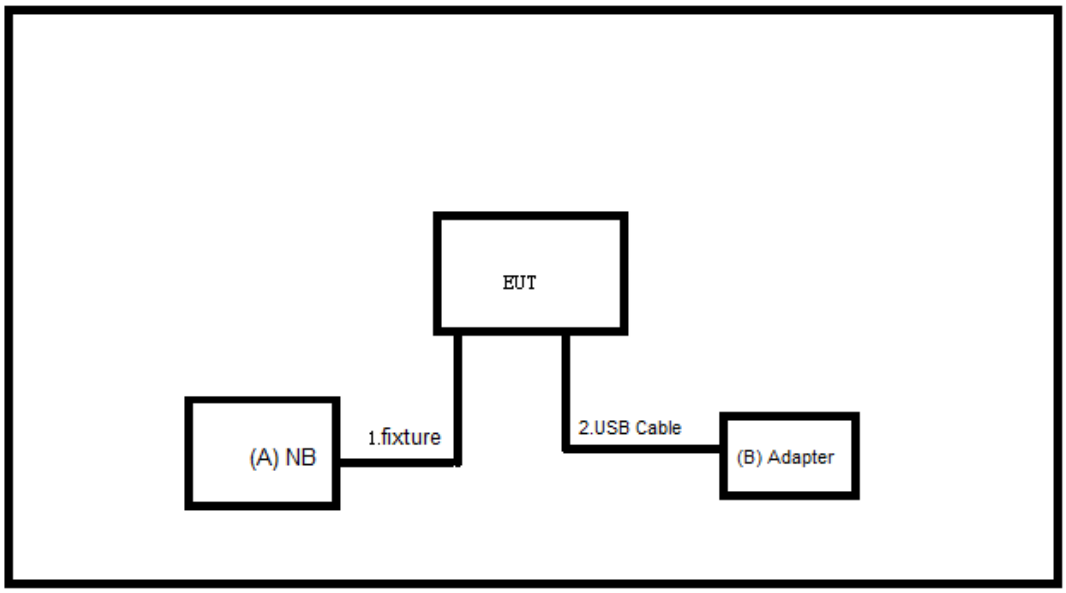
2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Equipment letters and Cable numbers refer to item numbers described in the tables of clause 0.

AC power line conducted emissions



Radiated Emissions



2.4 SUPPORT UNITS

AC power line conducted emissions

Item	Equipment	Brand	Model No.	Series No.	Remarks
A	Notebook	Lenovo	ThinkBook 14 G4 IAP	MP28KHAH	Furnished by test lab.
B	Adapter	N/A	N/A	N/A	Supplied by test requester.

Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
1	fixture	N	N	0.3m	Furnished by test lab.
2	USB Cable	N	N	2 m	Supplied by test requester.

Radiated Emissions

Item	Equipment	Brand	Model No.	Series No.	Remarks
A	Notebook	Lenovo	ThinkBook 14 G4 IAP	MP28KHAH	Furnished by test lab.
B	Adapter	N/A	N/A	N/A	Supplied by test requester.

Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
1	fixture	N	N	0.3m	Furnished by test lab.
2	USB Cable	N	N	2 m	Supplied by test requester.

3. AC POWER LINE CONDUCTED EMISSIONS

3.1 LIMIT

Frequency (MHz)	Limit (dBµV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56 *	56 - 46 *
0.50 - 5.0	56	46
5.0 - 30.0	60	50

NOTE:
(1) The tighter limit applies at the band edges.
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
(3) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor (if use)
Margin Level = Measurement Value – Limit Value
Calculation example:

Reading Level (dBµV)		Correct Factor (dB)		Measurement Value (dBµV)
38.22	+	3.45	=	41.67

Measurement Value (dBµV)		Limit Value (dBµV)		Margin Level (dB)
41.67	-	60	=	-18.33

The following table is the setting of the receiver.

Receiver Parameter	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

3.2 TEST PROCEDURE

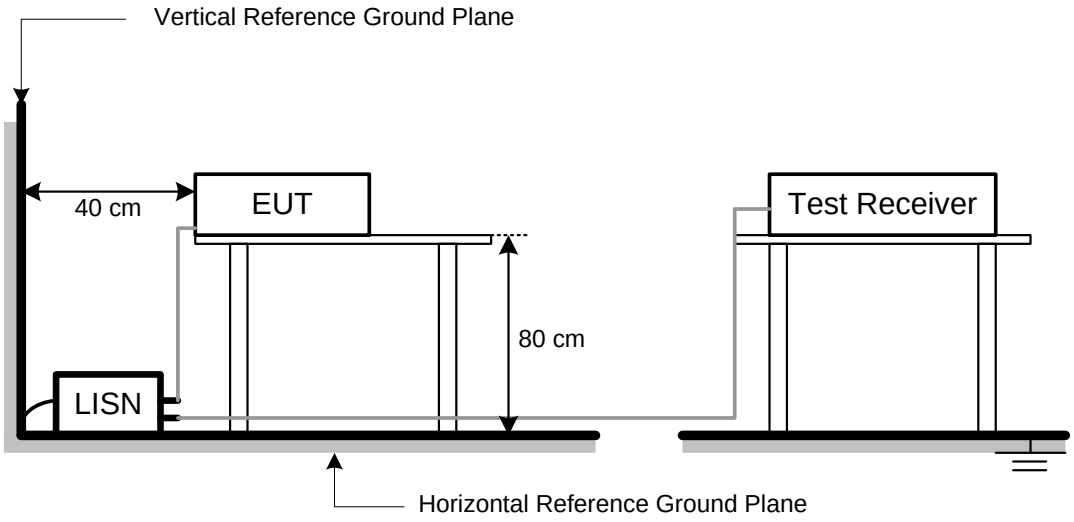
a. The EUT was placed 0.8 m above the horizontal ground plane with the EUT being connected to the power mains through a line impedance stabilization network (LISN).
All other support equipment were powered from an additional LISN(s).
The LISN provides 50 Ohm/50uH of impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle to keep the cable above 40 cm.
c. Excess I/O cables that are not connected to a peripheral shall be bundled in the center.
The end of the cable will be terminated, using the correct terminating impedance.
The overall length shall not exceed 1 m.
d. The LISN is spaced at least 80 cm from the nearest part of the EUT chassis.
e. For the actual test configuration, please refer to the related Item – EUT TEST PHOTO.

NOTE:
(1) In the results, each reading is marked as Peak, QP or AVG per the detector used.
BW=9 kHz (6 dB Bandwidth)
(2) All readings are Peak unless otherwise stated QP or AVG in column of Note. Both the QP and the AVG readings must be less than the limit for compliance.

3.3 DEVIATION FROM TEST STANDARD

No deviation.

3.4 TEST SETUP



3.5 TEST RESULT

Please refer to the **错误!未找到引用源。**.

4. RADIATED EMISSIONS

4.1 LIMIT

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (9 kHz-1000 MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000 MHz)

Frequency (MHz)	(dBuV/m at 3 m)	
	Peak	Average
Above 1000	74	54

NOTE:
(1) The limit for radiated test was performed according to FCC CFR Title 47, Part 15, Subpart C.
(2) The tighter limit applies at the band edges.
(3) Emission level (dBuV/m)=20log Emission level (uV/m).
(4) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
Margin Level = Measurement Value - Limit Value
Calculation example:

Reading Level (dBµV)		Correct Factor (dB/m)		Measurement Value (dBµV/m)
19.11	+	2.11	=	21.22

Measurement Value (dBµV/m)		Limit Value (dBµV/m)		Margin Level (dB)
21.22	-	40	=	-18.78

Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~150 kHz for RBW 200 Hz
Start ~ Stop Frequency	0.15 MHz~30 MHz for RBW 9 kHz
Start ~ Stop Frequency	30 MHz~1000 MHz for RBW 100 kHz

Spectrum Parameters	Setting
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1 MHz / 3 MHz for PK value 1 MHz / 1/T Hz for AVG value

Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30 MHz~1000 MHz for QP detector
Start ~ Stop Frequency	1 GHz~26.5 GHz for PK/AVG detector

4.2 TEST PROCEDURE

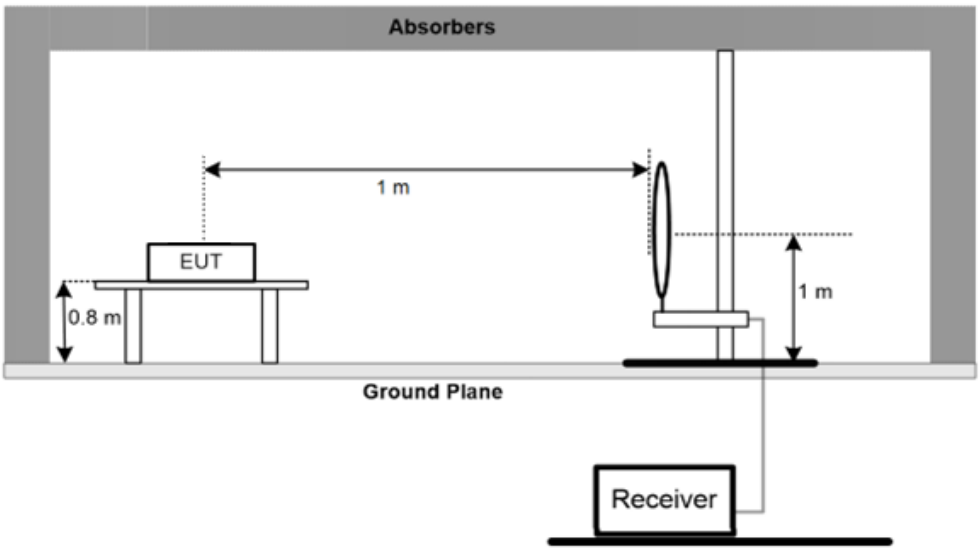
a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1 GHz)
c. The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. 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 find the maximum reading (used Bore sight function).
e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform. (below 1 GHz)
h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn‘t perform. (above 1 GHz)
i. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.3 DEVIATION FROM TEST STANDARD

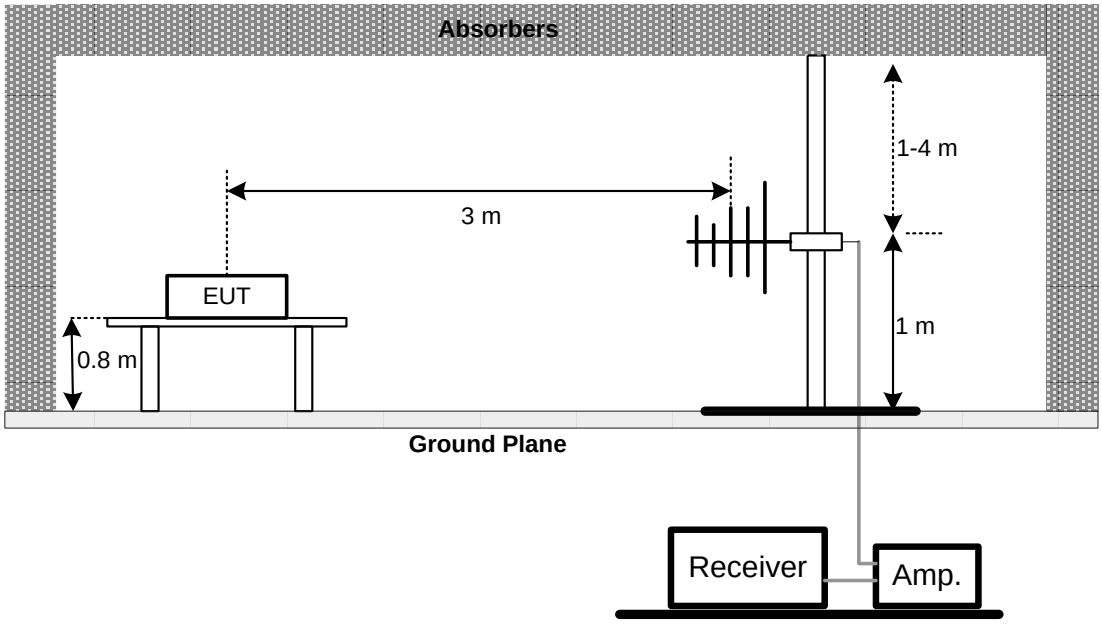
No deviation.

4.4 TEST SETUP

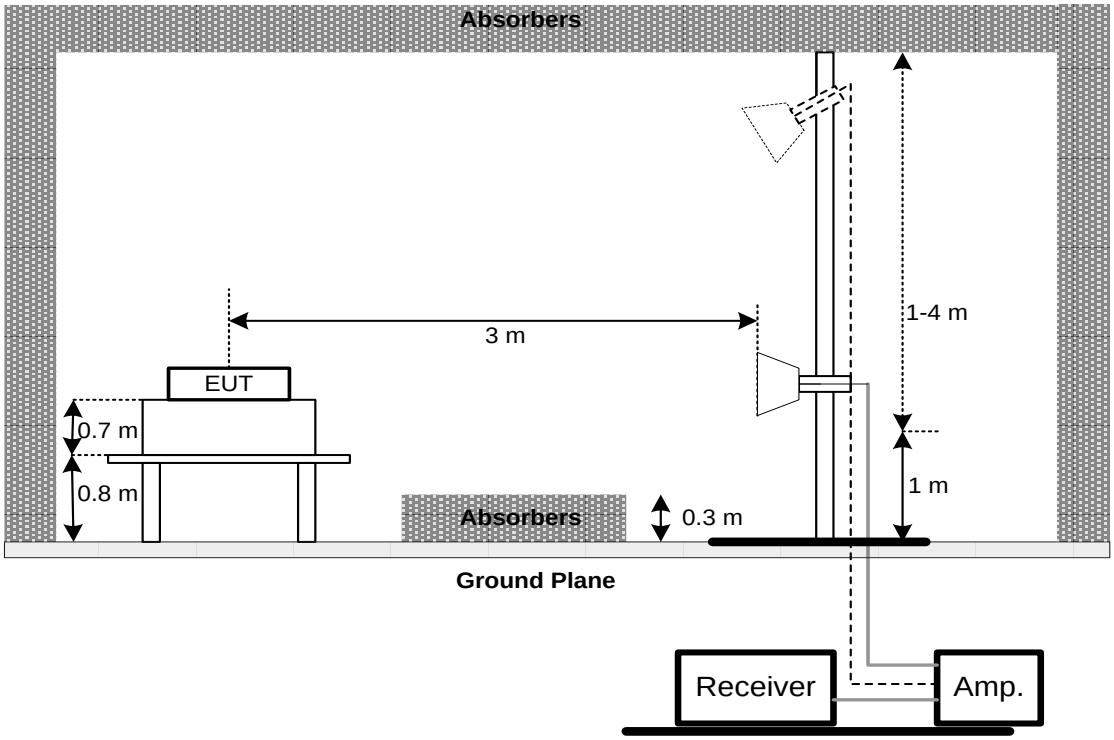
9 kHz to 30 MHz



30 MHz to 1 GHz



Above 1 GHz



4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULT – BELOW 30 MHZ

Please refer to the 错误!未找到引用源。.

4.7 TEST RESULT – 30 MHZ TO 1 GHZ

Please refer to the 错误!未找到引用源。.

4.8 TEST RESULT – ABOVE 1 GHZ

Please refer to the 错误!未找到引用源。.

NOTE:

(1) No limit: This is fundamental signal, the judgment is not applicable.
For fundamental signal judgment was referred to Peak output test.

5. NUMBER OF HOPPING FREQUENCY

5.1 LIMIT

Section	Test Item	Limit
FCC 15.247(a)(1)(iii)	Number of Hopping Frequency	15

5.2 TEST PROCEDURE

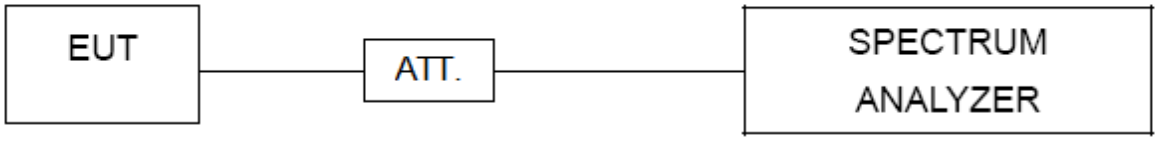
a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	> Operating Frequency Range
RBW	100 kHz
VBW	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULTS

Please refer to the APPENDIX E.

6. AVERAGE TIME OF OCCUPANCY

6.1 LIMIT

Section	Test Item	Limit
FCC 15.247(a)(1)(iii)	Average Time of Occupancy	0.4sec

6.2 TEST PROCEDURE

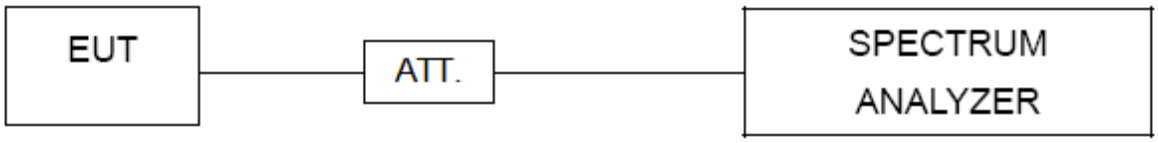
a. Set the EUT for DH1, DH3 and DH5 packet transmitting.
b. Measure the maximum time duration of one single pulse.
c. DH1 Packet permit maximum 1600 / 79 /2 = 10.12 hops per second in each channel (1 time slot TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times 10.12 x 31.6 = 320 within 31.6 seconds.
d. DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times 5.06 x 31.6 = 160 within 31.6 seconds.
e. DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times 3.37 x 31.6 = 106.6 within 31.6 seconds.
f. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
g. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	0 MHz
RBW	1 MHz
VBW	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	As necessary to capture the entire dwell time per hopping channel

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.6 TEST RESULTS

Please refer to the APPENDIX F.

7. HOPPING CHANNEL SEPARATION

7.1 LIMIT

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.

7.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

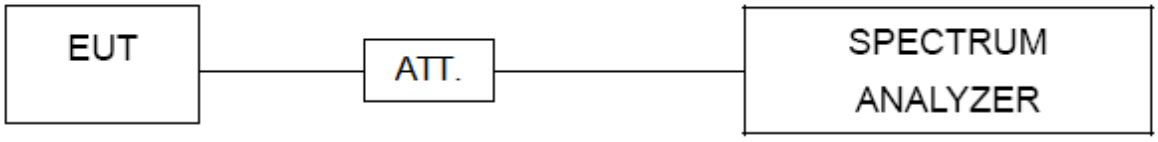
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	Wide enough to capture the peaks of two adjacent channels
RBW	30 kHz
VBW	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.6 TEST RESULTS

Please refer to the APPENDIX G.

8. BANDWIDTH

8.1 LIMIT

Section	Test Item
FCC 15.247(a)(1)	Bandwidth

8.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	> Measurement Bandwidth
RBW	30 kHz
VBW	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP

8.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

8.6 TEST RESULTS

Please refer to the APPENDIX H.

9. MAXIMUM OUTPUT POWER

9.1 LIMIT

Section	Test Item	Limit
FCC 15.247(a)(1)	Maximum Output Power	0.1250 Watt or 20.97 dBm

Note: 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.

9.2 TEST PROCEDURE

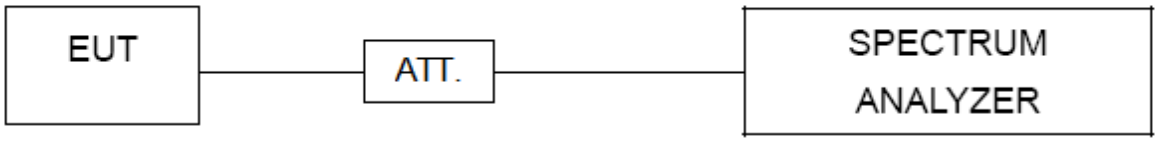
a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	Approximately five times the 20 dB bandwidth, centered on a hopping channel.
RBW	3 MHz
VBW	3 MHz
Detector	RMS
Trace	Max Hold
Sweep Time	Auto

9.3 DEVIATION FROM STANDARD

No deviation.

9.4 TEST SETUP



9.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

9.6 TEST RESULTS

Please refer to the APPENDIX I.

10. CONDUCTED SPURIOUS EMISSION

10.1 LIMIT

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 Output Power limits. If the transmitter complies with the Output 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 Section 15.209(a) is not required.

10.2 TEST PROCEDURE

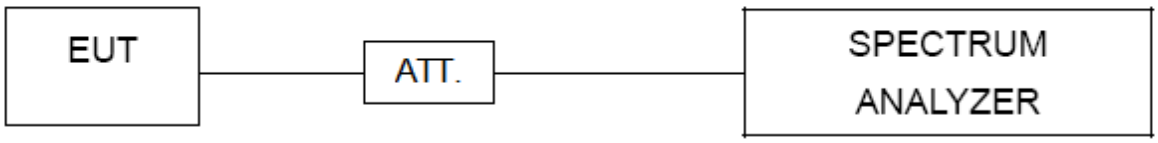
a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Start Frequency	30 MHz
Stop Frequency	26.5 GHz
RBW	100 kHz
VBW	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

10.3 DEVIATION FROM STANDARD

No deviation.

10.4 TEST SETUP



10.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

10.6 TEST RESULTS

Please refer to the APPENDIX J.

11. MEASUREMENT INSTRUMENTS LIST

AC Power Line Conducted Emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Two-Line V-Network	R&S	ENV216	101051	2024/6/26	2025/6/25
2	Test Cable	EMCI	EMCRG58-BM-BM-9000	210501	2023/12/11	2024/12/10
3	EMC Receiver	Keysight	N9038A	MY54130009	2024/6/27	2025/6/26
4	Measurement Software	Farad	EZ_EMC (Ver. NB-03A1-01)	N/A	N/A	N/A

Radiated Emissions_Below 1GHz						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Loop Ant.	Electro-Metrics	EMCI-LPA600	274	2024/7/5	2025/7/4
2	EMC Receiver	Keysight	N9038A	MY54130009	2024/6/27	2025/6/26
3	Pre-Amplifier	EMCI	EMC001340	980555	2023/12/1	2024/11/30
4	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	01207	2023/12/18	2024/12/17
5	EMC Receiver	Keysight	N9038A	MY54130009	2024/6/27	2025/6/26
6	Pre-Amplifier	EMCI	EMC001330-2020 1222	980807	2023/12/11	2024/12/10
7	Test Cable	EMCI	EMC-8D-NM-NM-5000	150106	2023/12/11	2024/12/10
8	Test Cable	EMCI	EMC-CFD-400-NM-NM-8000	200348	2023/12/11	2024/12/10
9	Measurement Software	Farad	EZ_EMC (Ver. NB-03A1-01)	N/A	N/A	N/A

Radiated Emissions_Above 1 GHz						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Broad-Band Horn Antenna	RFSPIN	DRH18-E	210109A18E	2024/1/10	2025/1/9
2	Pre-Amplifier	EMCI	EMC051845SE	980779	2023/12/11	2024/12/10
3	Test Cable	EMCI	EMC105-SM-SM-1000	210119	2023/12/11	2024/12/10
4	Test Cable	EMCI	EMC105-SM-SM-3000	210118	2023/12/11	2024/12/10
5	Test Cable	EMCI	EMC105-SM-SM-7000	210117	2023/12/11	2024/12/10
6	EXA Spectrum Analyzer	keysight	N9010A	MY56480554	2023/9/12	2024/9/11
7	Pre-Amplifier	EMCI	EMC184045SE	980512	2023/12/11	2024/12/10
8	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	340	2024/6/27	2025/6/26
9	Test Cable	EMCI	EMC102-KM-KM-1000	220328	2023/12/11	2024/12/10
10	Test Cable	EMCI	EMC101G-KM-KM-3000	220330	2023/12/11	2024/12/10
11	Measurement Software	Farad	EZ_EMC (Ver. NB-03A1-01)	N/A	N/A	N/A

Number of Hopping Frequency					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 30	100854	2024/6/27
2	10dbAttenuator	INMET	AHC-10dB	1	N/A
3	BTL-ConducredTest	N/A	1247788684	N/A	N/A

Average Time of Occupancy					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 30	100854	2024/6/27
2	10dbAttenuator	INMET	AHC-10dB	1	N/A
3	BTL-ConducredTest	N/A	1247788684	N/A	N/A

Hopping Channel Separation Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 30	100854	2024/6/27
2	10dbAttenuator	INMET	AHC-10dB	1	N/A
3	BTL-ConducredTest	N/A	1247788684	N/A	N/A

Bandwidth					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 30	100854	2024/6/27
2	10dbAttenuator	INMET	AHC-10dB	1	N/A
3	BTL-ConducredTest	N/A	1247788684	N/A	N/A

Maximum Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 30	100854	2024/6/27
2	10dbAttenuator	INMET	AHC-10dB	1	N/A
3	BTL-ConducredTest	N/A	1247788684	N/A	N/A

Antenna Conducted Spurious Emission					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 30	100854	2024/6/27
2	10dbAttenuator	INMET	AHC-10dB	1	N/A
3	BTL-ConducredTest	N/A	1247788684	N/A	N/A

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

12.EUT TEST PHOTO

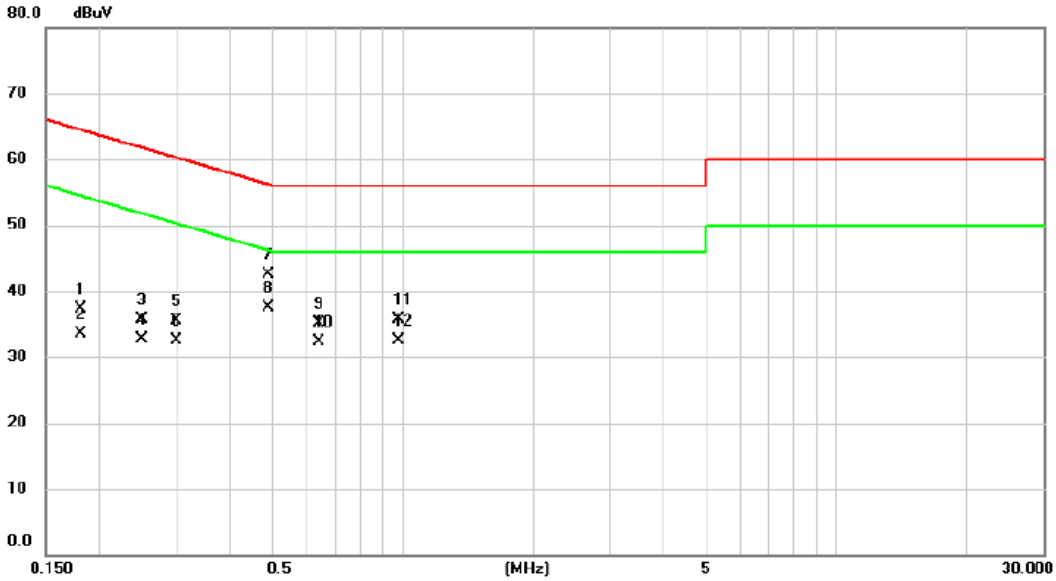
Please refer to document Appendix No.: TP-2404H026-FCCP-1 (APPENDIX-TEST PHOTOS).

13.EUT PHOTOS

Please refer to document Appendix No.: EP-2404H026-1 (APPENDIX-EUT PHOTOS).

APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS

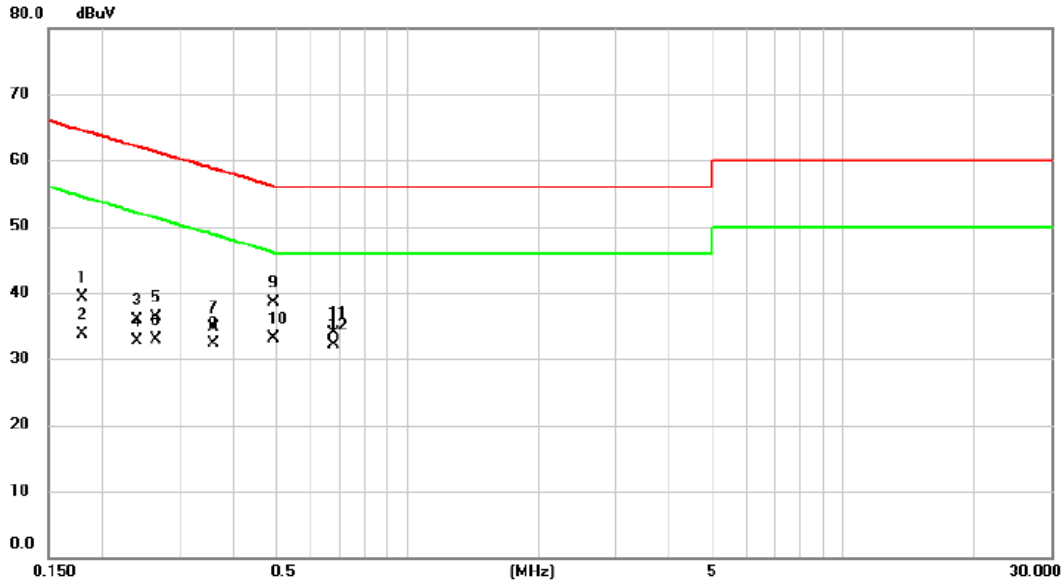
Test Mode	Normal	Tested Date	2024/9/2
Test Frequency	-	Phase	Line
Note	KA12C-0502000US		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1808	27.71	9.64	37.35	64.45	-27.10	QP	
2		0.1808	23.94	9.64	33.58	54.45	-20.87	AVG	
3		0.2511	26.01	9.64	35.65	61.72	-26.07	QP	
4		0.2511	23.08	9.64	32.72	51.72	-19.00	AVG	
5		0.3005	25.94	9.65	35.59	60.23	-24.64	QP	
6		0.3005	22.95	9.65	32.60	50.23	-17.63	AVG	
7		0.4910	32.75	9.66	42.41	56.15	-13.74	QP	
8	*	0.4910	27.80	9.66	37.46	46.15	-8.69	AVG	
9		0.6394	25.42	9.67	35.09	56.00	-20.91	QP	
10		0.6394	22.65	9.67	32.32	46.00	-13.68	AVG	
11		0.9815	26.01	9.70	35.71	56.00	-20.29	QP	
12		0.9815	22.86	9.70	32.56	46.00	-13.44	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	Normal	Tested Date	2024/9/2
Test Frequency	-	Phase	Neutral
Note	KA12C-0502000US		

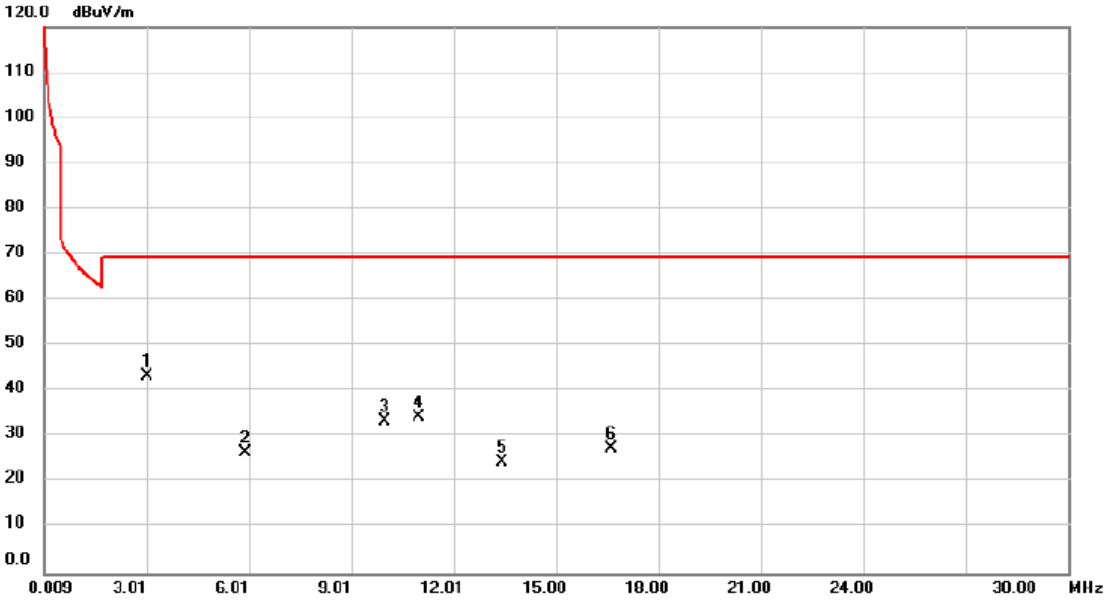


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1794	29.59	9.63	39.22	64.51	-25.29	QP	
2		0.1794	24.06	9.63	33.69	54.51	-20.82	AVG	
3		0.2403	26.20	9.63	35.83	62.09	-26.26	QP	
4		0.2403	23.09	9.63	32.72	52.09	-19.37	AVG	
5		0.2651	26.74	9.63	36.37	61.27	-24.90	QP	
6		0.2651	23.25	9.63	32.88	51.27	-18.39	AVG	
7		0.3583	25.02	9.63	34.65	58.77	-24.12	QP	
8		0.3583	22.68	9.63	32.31	48.77	-16.46	AVG	
9		0.4934	28.82	9.64	38.46	56.11	-17.65	QP	
10	*	0.4934	23.55	9.64	33.19	46.11	-12.92	AVG	
11		0.6800	24.19	9.65	33.84	56.00	-22.16	QP	
12		0.6800	22.36	9.65	32.01	46.00	-13.99	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ

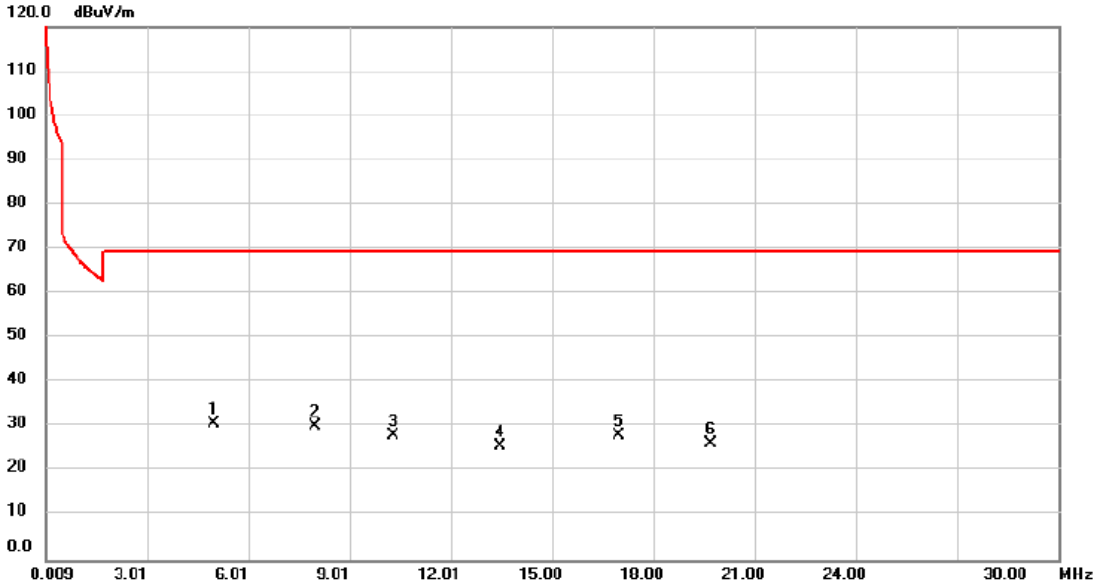
Test Mode	BT (3 Mbps)	Test Date	2024/8/23
Test Frequency	CH78: 2480 MHz	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	3.0081	48.50	-5.03	43.47	69.54	-26.07	peak			
2		5.9172	30.94	-4.26	26.68	69.54	-42.86	peak			
3		9.9960	37.55	-4.13	33.42	69.54	-36.12	peak			
4		10.9857	38.46	-4.21	34.25	69.54	-35.29	peak			
5		13.4150	28.93	-4.41	24.52	69.54	-45.02	peak			
6		16.6240	32.14	-4.68	27.46	69.54	-42.08	peak			

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	BT (3 Mbps)	Test Date	2024/8/23
Test Frequency	CH78: 2480 MHz	Polarization	Horizontal

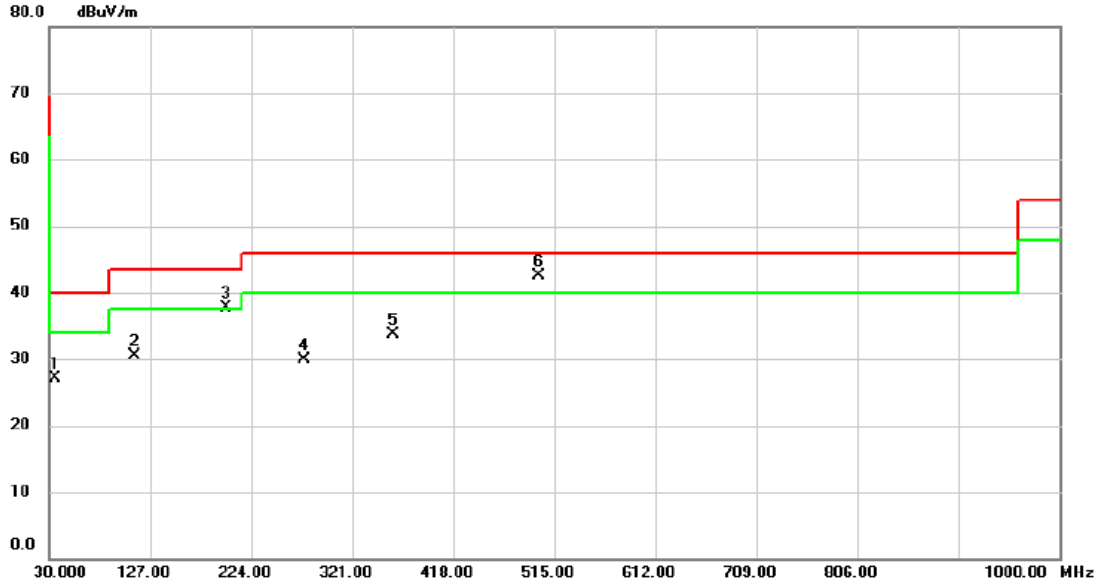


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4.9875	36.41	-5.63	30.78	69.54	-38.76	peak			
2		7.9866	33.95	-3.79	30.16	69.54	-39.38	peak			
3		10.2960	32.09	-4.16	27.93	69.54	-41.61	peak			
4		13.4450	30.21	-4.41	25.80	69.54	-43.74	peak			
5		16.9840	32.64	-4.64	28.00	69.54	-41.54	peak			
6		19.6831	30.81	-4.48	26.33	69.54	-43.21	peak			

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ

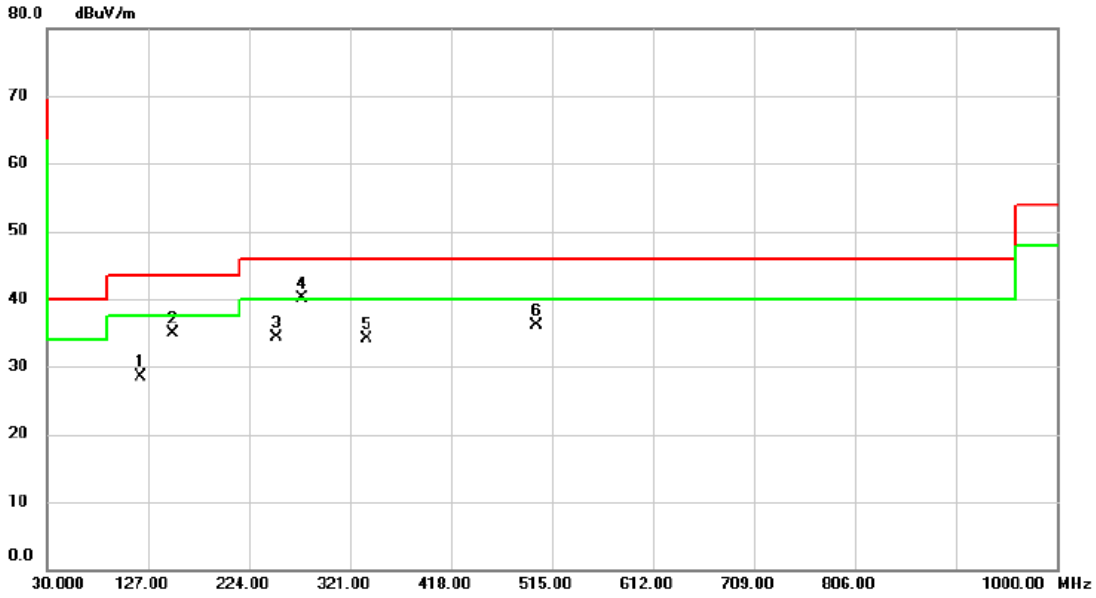
Test Mode	BT (3 Mbps)	Test Date	2024/9/2
Test Frequency	CH78: 2480 MHz	Polarization	Vertical
Note	KA12C-0502000US		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		35.8200	40.32	-13.17	27.15	40.00	-12.85	peak	
2		112.4500	45.04	-14.61	30.43	43.50	-13.07	peak	
3		199.7500	51.98	-14.22	37.76	43.50	-5.74	peak	
4		275.4100	40.84	-11.00	29.84	46.00	-16.16	peak	
5		359.8000	42.30	-8.64	33.66	46.00	-12.34	peak	
6	*	500.4500	47.75	-5.23	42.52	46.00	-3.48	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	BT (3 Mbps)	Test Date	2024/9/2
Test Frequency	CH78: 2480 MHz	Polarization	Horizontal
Note	KA12C-0502000US		

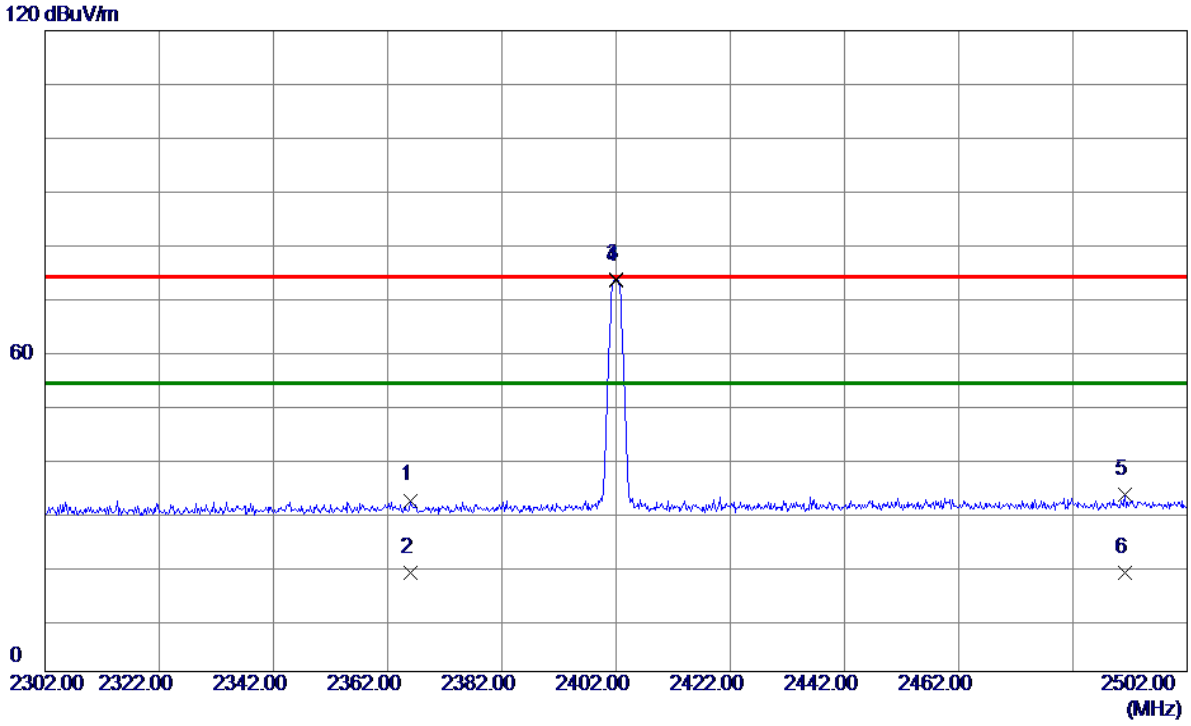


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		120.2100	42.51	-13.92	28.59	43.50	-14.91	peak	
2		150.2800	46.09	-11.12	34.97	43.50	-8.53	peak	
3		250.1900	46.27	-11.99	34.28	46.00	-11.72	peak	
4	*	275.4100	51.05	-11.00	40.05	46.00	-5.95	peak	
5		336.5200	43.40	-9.27	34.13	46.00	-11.87	peak	
6		500.4500	41.40	-5.23	36.17	46.00	-9.83	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ

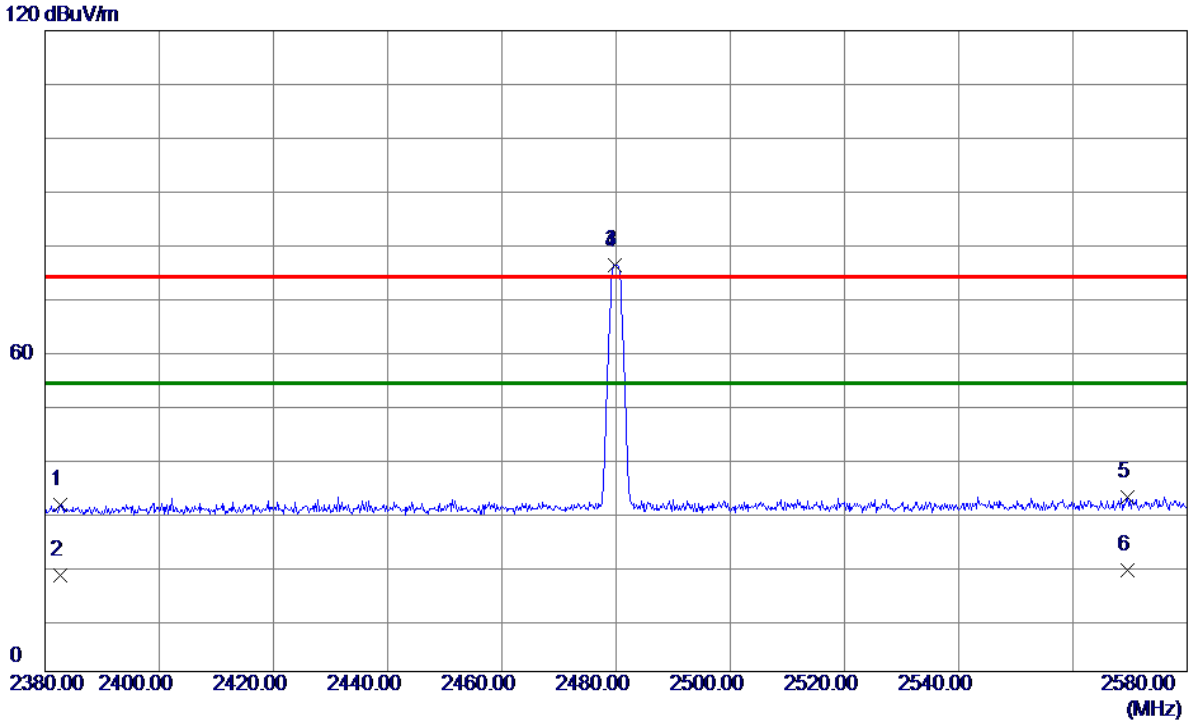
Test Mode	BT (1 Mbps)	Test Date	2024/8/22
Test Frequency	CH00: 2402 MHz	Polarization	Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2366.0000	38.21	-6.17	32.04	74.00	-41.96	Peak	
2	2366.0000	24.69	-6.17	18.52	54.00	-35.48	AVG	
3	2402.0000	79.58	-6.09	73.49	74.00	-0.51	Peak	No Limit
4 *	2402.0000	79.34	-6.09	73.25	54.00	19.25	AVG	No Limit
5	2491.2000	39.01	-5.90	33.11	74.00	-40.89	Peak	
6	2491.2000	24.44	-5.90	18.54	54.00	-35.46	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

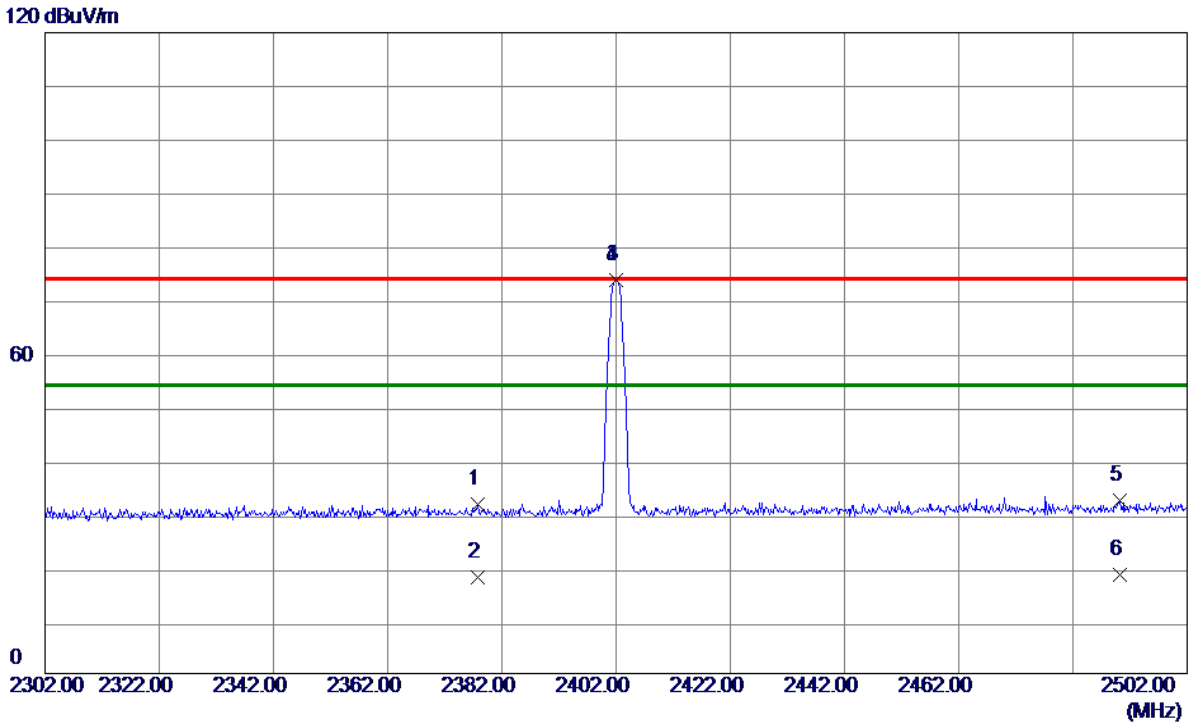
Test Mode	BT (1 Mbps)	Test Date	2024/8/22
Test Frequency	CH78: 2480 MHz	Polarization	Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2382.6000	37.35	-6.14	31.21	74.00	-42.79	Peak	
2	2382.6000	24.24	-6.14	18.10	54.00	-35.90	AVG	
3	2479.8000	82.11	-5.92	76.19	74.00	2.19	Peak	No Limit
4 *	2479.8000	81.88	-5.92	75.96	54.00	21.96	AVG	No Limit
5	2569.6000	38.18	-5.60	32.58	74.00	-41.42	Peak	
6	2569.6000	24.57	-5.60	18.97	54.00	-35.03	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

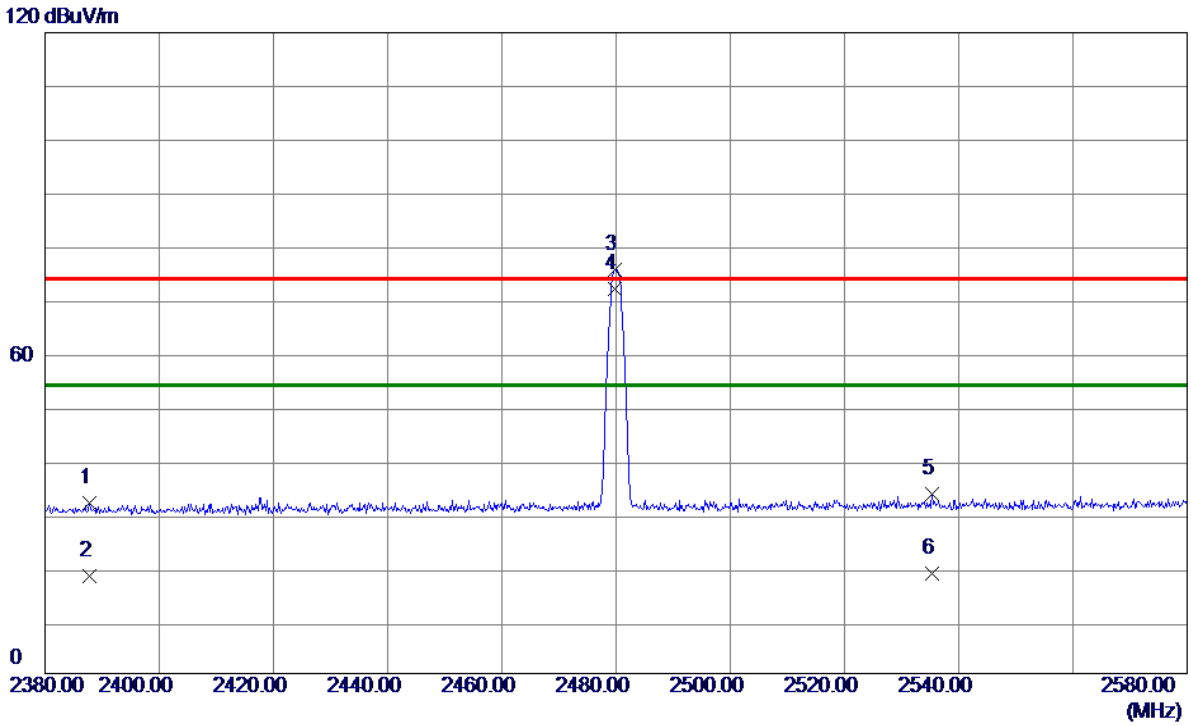
Test Mode	BT (3 Mbps)	Test Date	2024/8/22
Test Frequency	CH00: 2402 MHz	Polarization	Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2377.8000	37.87	-6.15	31.72	74.00	-42.28	Peak	
2	2377.8000	24.25	-6.15	18.10	54.00	-35.90	AVG	
3	2402.0000	79.76	-6.09	73.67	74.00	-0.33	Peak	No Limit
4 *	2402.0000	79.76	-6.09	73.67	54.00	19.67	AVG	No Limit
5	2490.2000	38.33	-5.90	32.43	74.00	-41.57	Peak	
6	2490.2000	24.38	-5.90	18.48	54.00	-35.52	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

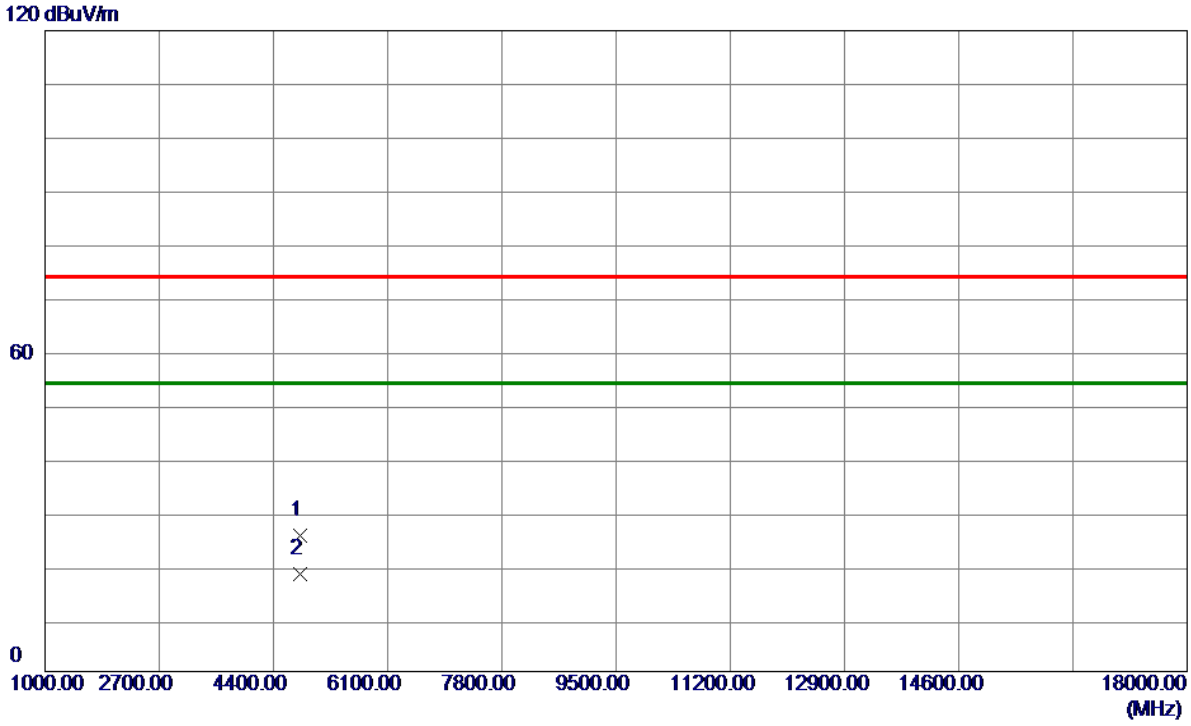
Test Mode	BT (3 Mbps)	Test Date	2024/8/22
Test Frequency	CH00: 2480 MHz	Polarization	Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2387.8000	38.00	-6.12	31.88	74.00	-42.12	Peak	
2	2387.8000	24.28	-6.12	18.16	54.00	-35.84	AVG	
3	2479.8000	81.56	-5.92	75.64	74.00	1.64	Peak	No Limit
4 *	2479.8000	78.02	-5.92	72.10	54.00	18.10	AVG	No Limit
5	2535.4000	39.23	-5.74	33.49	74.00	-40.51	Peak	
6	2535.4000	24.47	-5.74	18.73	54.00	-35.27	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

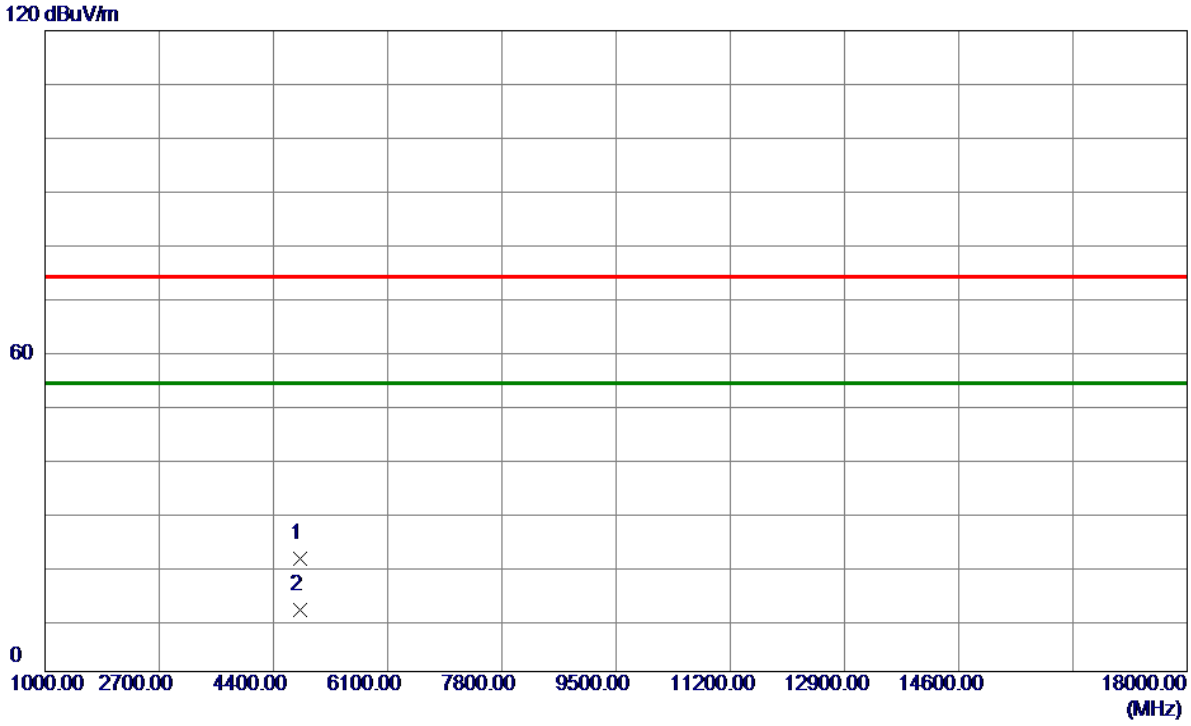
Test Mode	BT (1 Mbps)	Test Date	2024/8/22
Test Frequency	CH00: 2402 MHz	Polarization	Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4804.0000	34.11	-8.62	25.49	74.00	-48.51	Peak	
2 *	4804.0000	26.94	-8.62	18.32	54.00	-35.68	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

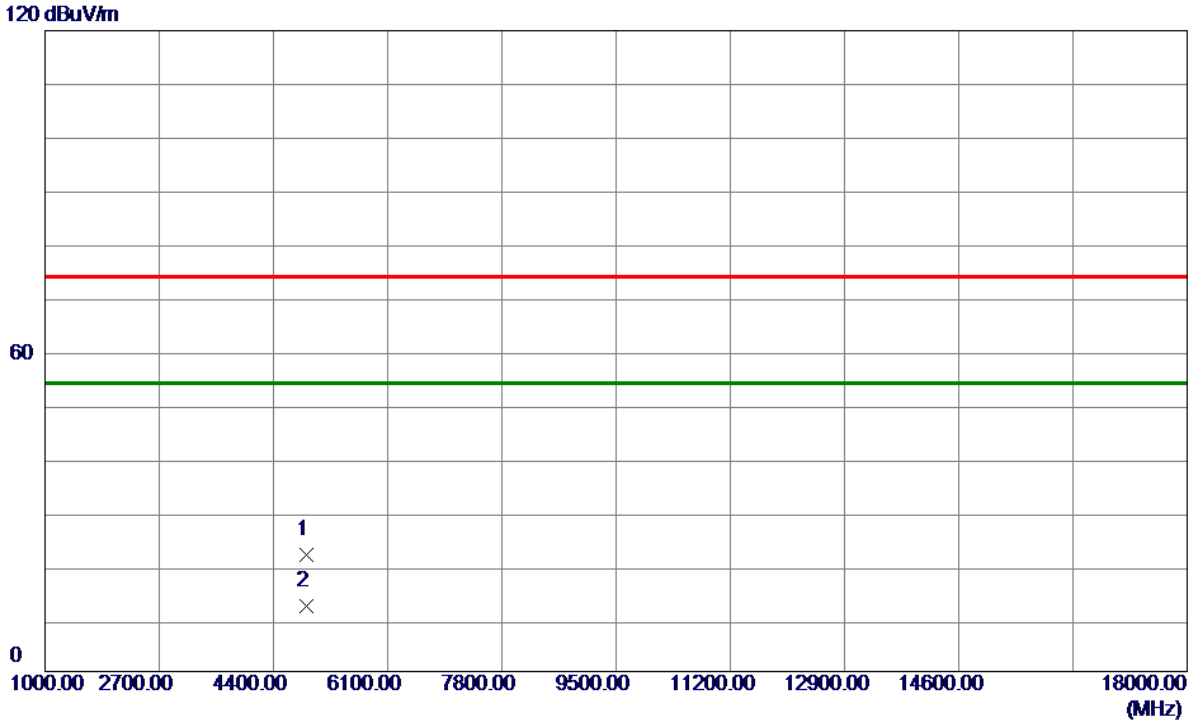
Test Mode	BT (1 Mbps)	Test Date	2024/8/22
Test Frequency	CH00: 2402 MHz	Polarization	Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4804.0000	29.85	-8.62	21.23	74.00	-52.77	Peak	
2 *	4804.0000	20.25	-8.62	11.63	54.00	-42.37	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

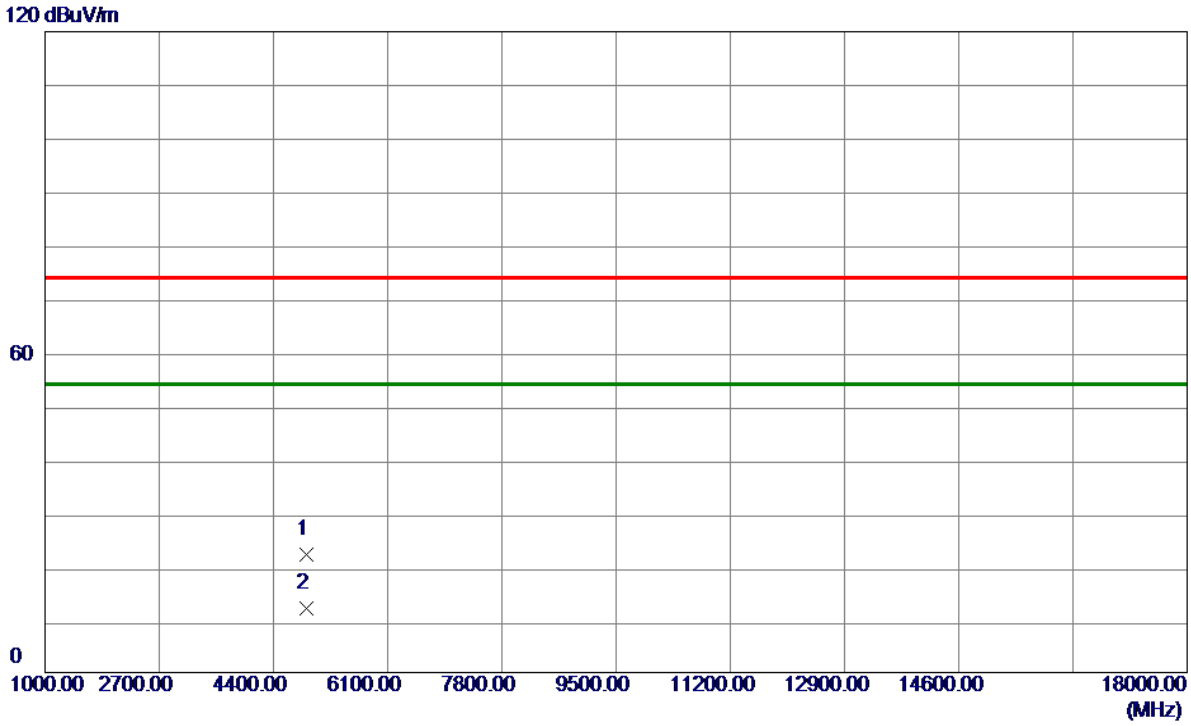
Test Mode	BT (1 Mbps)	Test Date	2024/8/22
Test Frequency	CH39: 2441 MHz	Polarization	Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4882.0000	30.33	-8.42	21.91	74.00	-52.09	Peak	
2 *	4882.0000	20.70	-8.42	12.28	54.00	-41.72	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

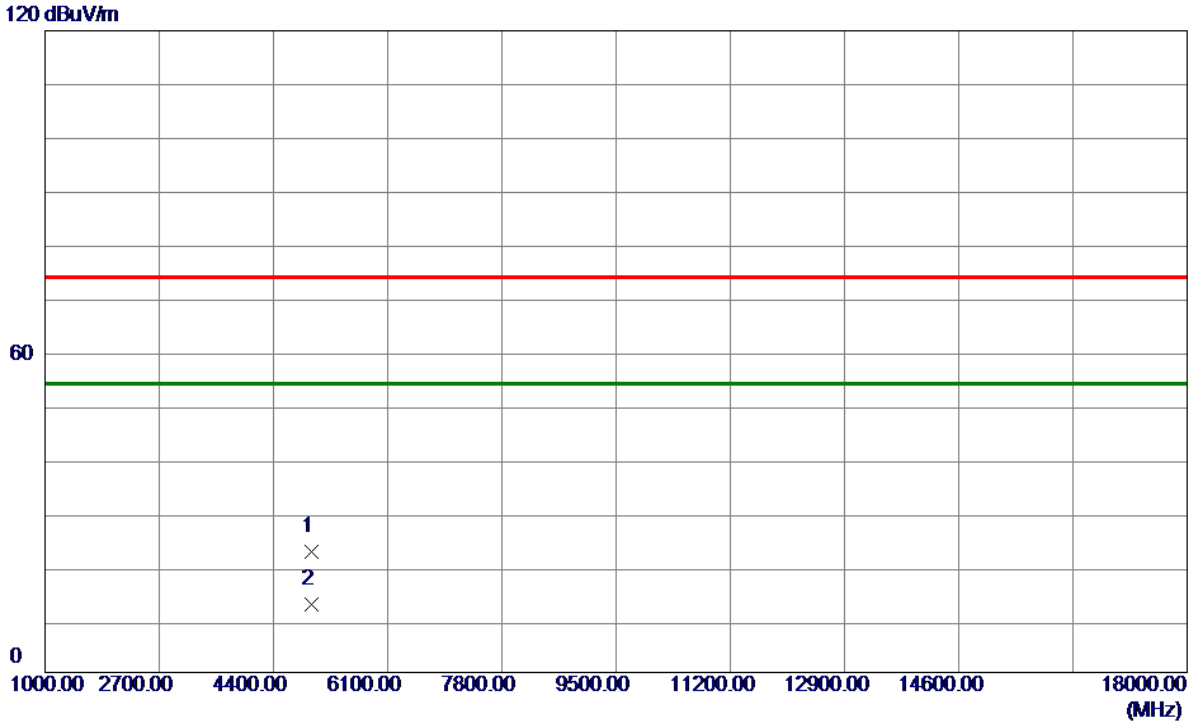
Test Mode	BT (1 Mbps)	Test Date	2024/8/22
Test Frequency	CH39: 2441 MHz	Polarization	Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4882.0000	30.49	-8.42	22.07	74.00	-51.93	Peak	
2 *	4882.0000	20.49	-8.42	12.07	54.00	-41.93	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

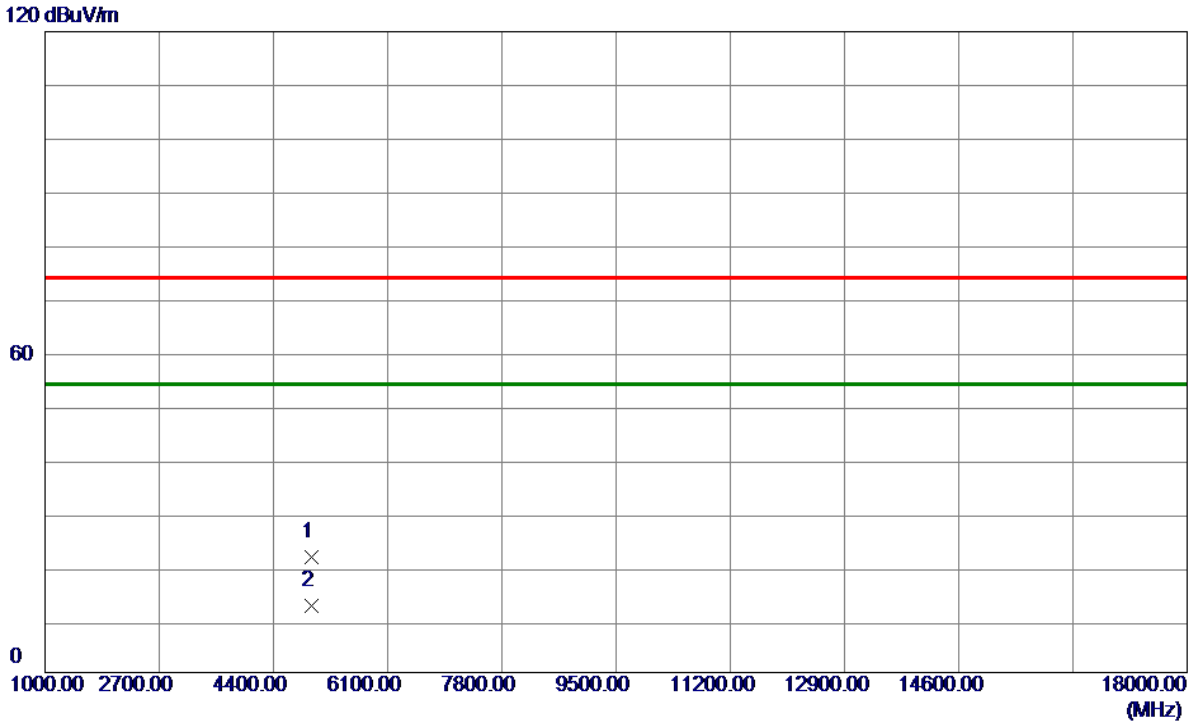
Test Mode	BT (1 Mbps)	Test Date	2024/8/27
Test Frequency	CH78: 2480 MHz	Polarization	Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4960.0000	30.69	-8.23	22.46	74.00	-51.54	Peak	
2 *	4960.0000	20.87	-8.23	12.64	54.00	-41.36	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

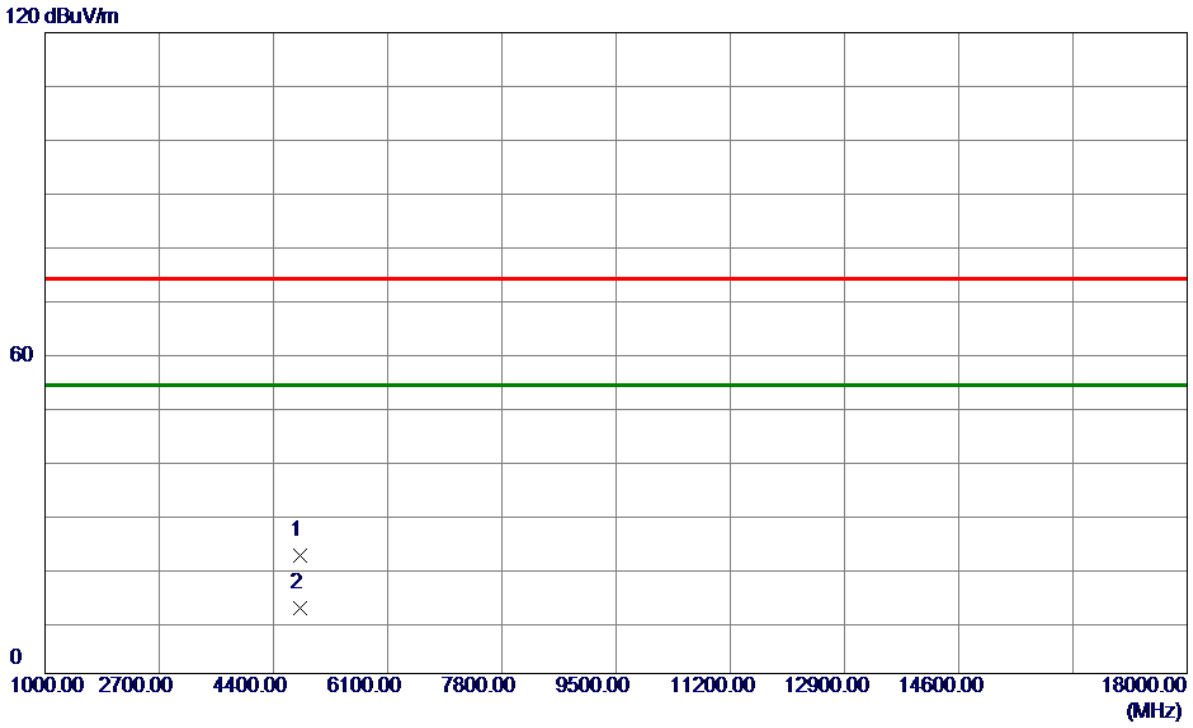
Test Mode	BT (1 Mbps)	Test Date	2024/8/27
Test Frequency	CH78: 2480 MHz	Polarization	Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4960.0000	29.90	-8.23	21.67	74.00	-52.33	Peak	
2 *	4960.0000	20.65	-8.23	12.42	54.00	-41.58	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

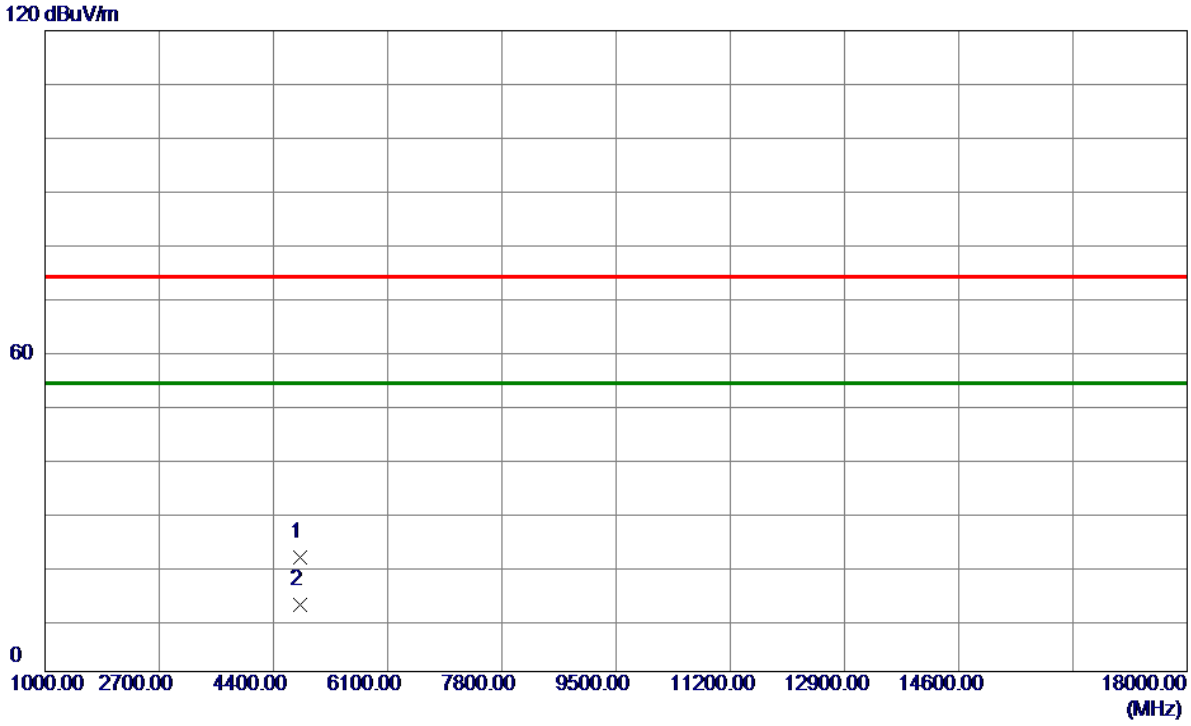
Test Mode	BT (3 Mbps)	Test Date	2024/8/27
Test Frequency	CH00: 2402 MHz	Polarization	Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4804.0000	30.71	-8.62	22.09	74.00	-51.91	Peak	
2 *	4804.0000	20.75	-8.62	12.13	54.00	-41.87	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

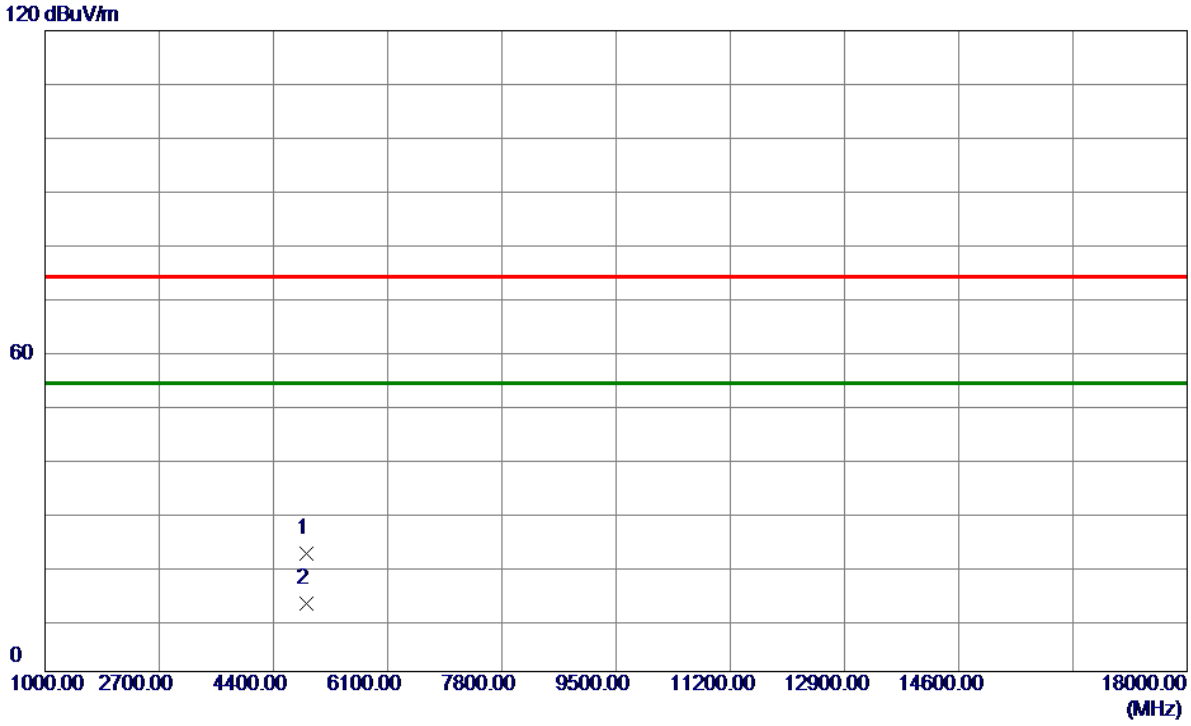
Test Mode	BT (3 Mbps)	Test Date	2024/8/27
Test Frequency	CH00: 2402 MHz	Polarization	Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4804.0000	29.94	-8.62	21.32	74.00	-52.68	Peak	
2 *	4804.0000	20.99	-8.62	12.37	54.00	-41.63	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

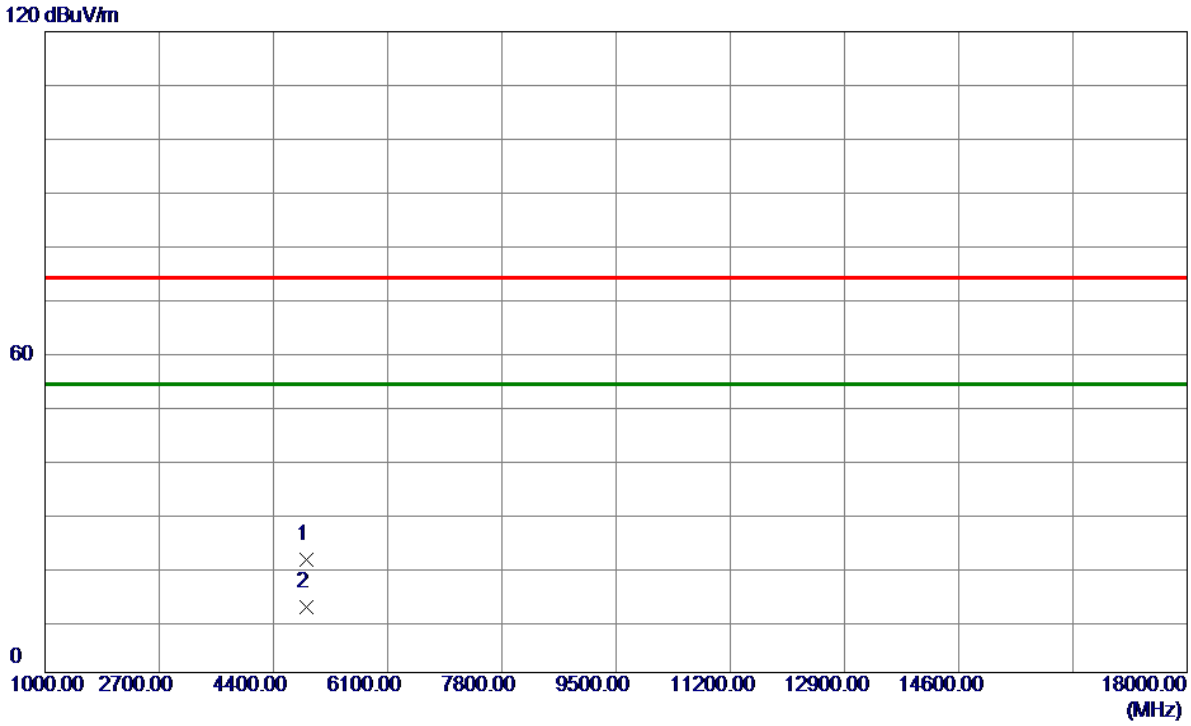
Test Mode	BT (3 Mbps)	Test Date	2024/8/27
Test Frequency	CH39: 2441 MHz	Polarization	Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4882.0000	30.51	-8.42	22.09	74.00	-51.91	Peak	
2 *	4882.0000	21.05	-8.42	12.63	54.00	-41.37	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

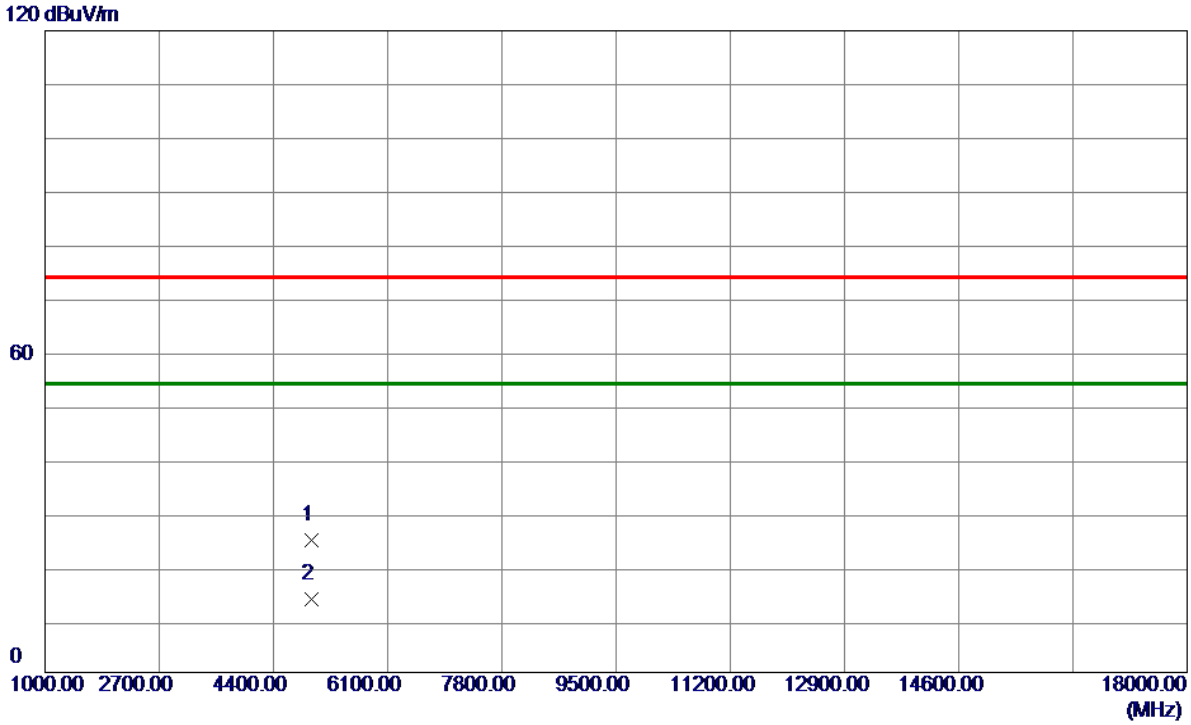
Test Mode	BT (3 Mbps)	Test Date	2024/8/27
Test Frequency	CH39: 2441 MHz	Polarization	Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4882.0000	29.61	-8.42	21.19	74.00	-52.81	Peak	
2 *	4882.0000	20.69	-8.42	12.27	54.00	-41.73	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

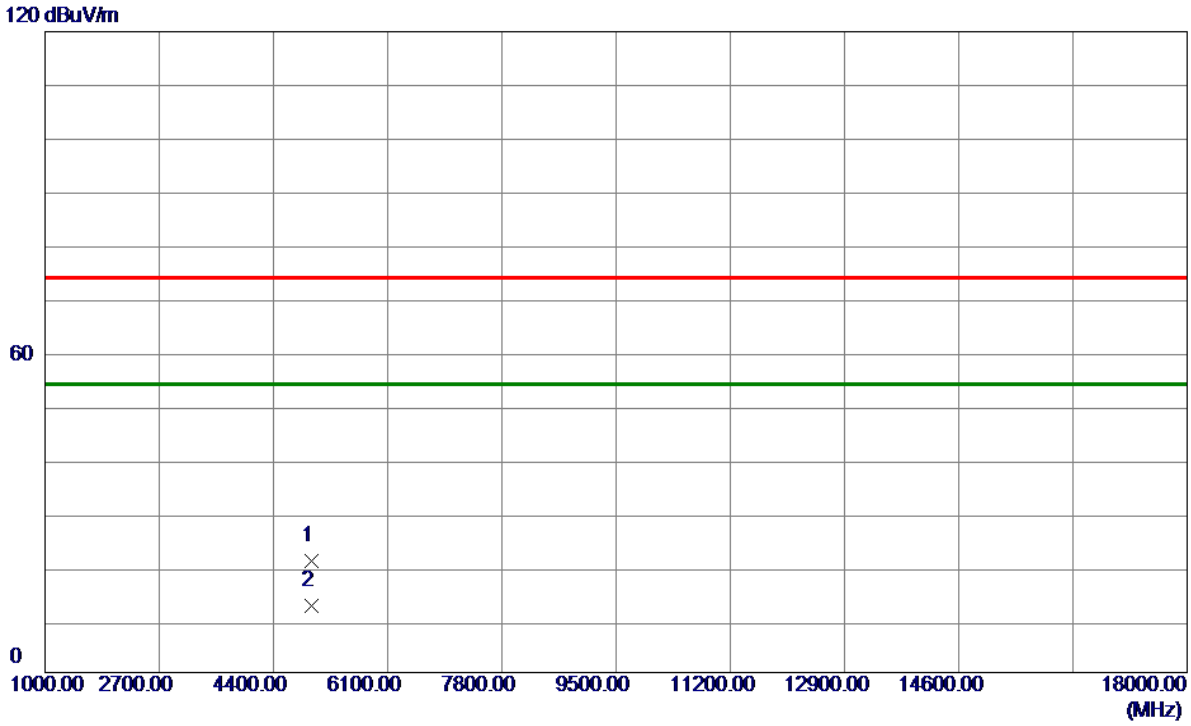
Test Mode	BT (3 Mbps)	Test Date	2024/8/27
Test Frequency	CH78: 2480 MHz	Polarization	Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4960.0000	32.84	-8.23	24.61	74.00	-49.39	Peak	
2 *	4960.0000	21.96	-8.23	13.73	54.00	-40.27	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

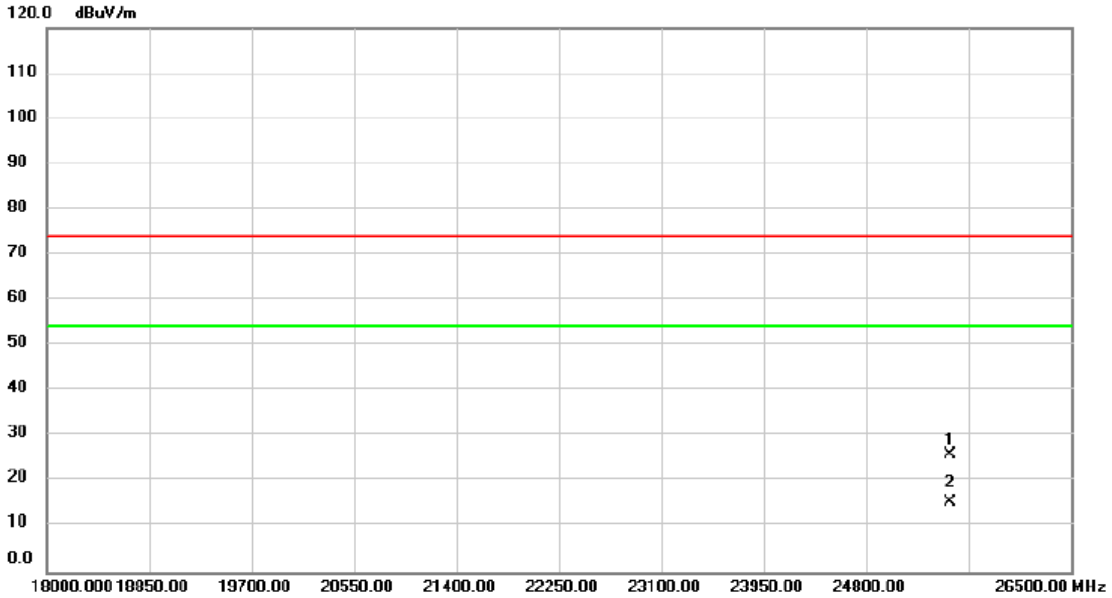
Test Mode	BT (3 Mbps)	Test Date	2024/8/27
Test Frequency	CH78: 2480 MHz	Polarization	Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4960.0000	29.13	-8.23	20.90	74.00	-53.10	Peak	
2 *	4960.0000	20.75	-8.23	12.52	54.00	-41.48	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

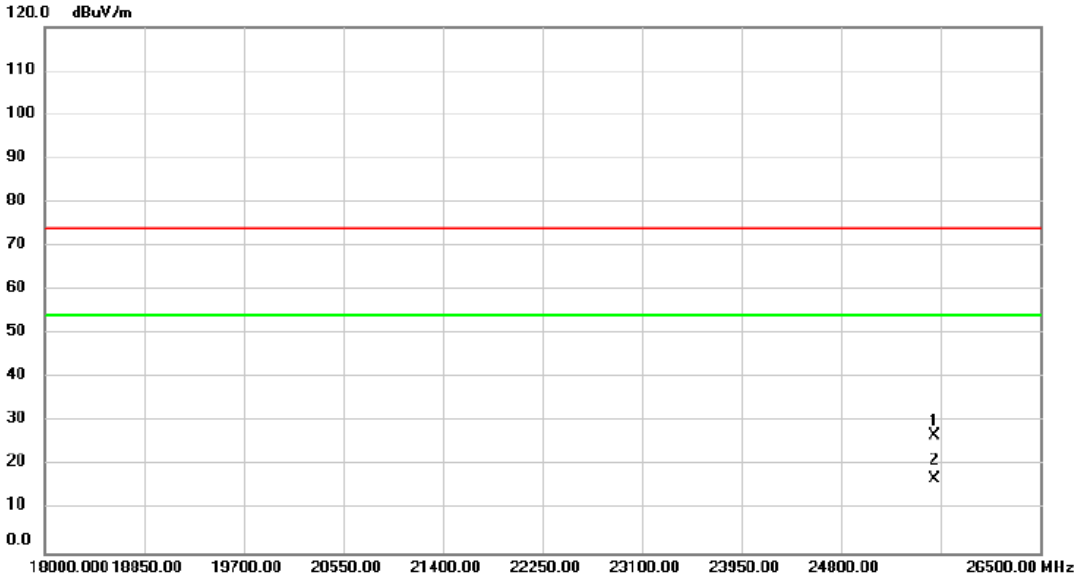
Test Mode	BT (3 Mbps)	Test Date	2024/8/22
Test Frequency	CH78: 2480 MHz	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		25497.00	33.57	-7.57	26.00	74.00	-48.00	peak			
2	*	25497.00	23.09	-7.57	15.52	54.00	-38.48	AVG			

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	BT (3 Mbps)	Test Date	2024/8/22
Test Frequency	CH78: 2480 MHz	Polarization	Horizontal



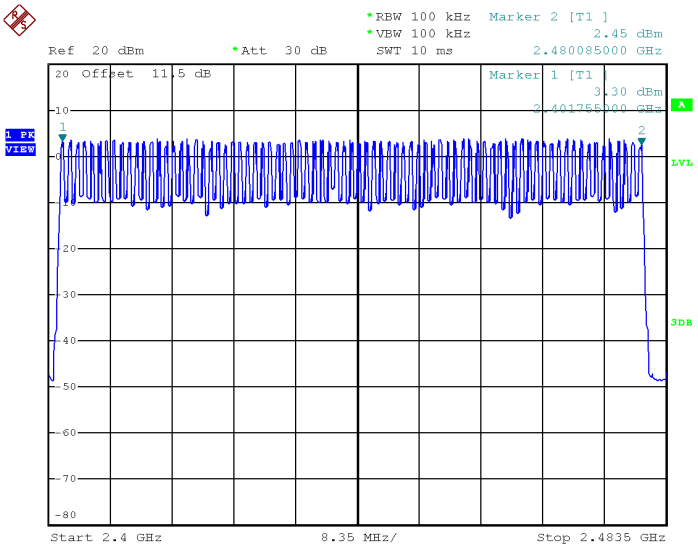
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		25599.00	34.34	-7.57	26.77	74.00	-47.23	peak			
2	*	25599.00	24.39	-7.57	16.82	54.00	-37.18	AVG			

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX E - NUMBER OF HOPPING FREQUENCY

Test Mode:	1Mbps

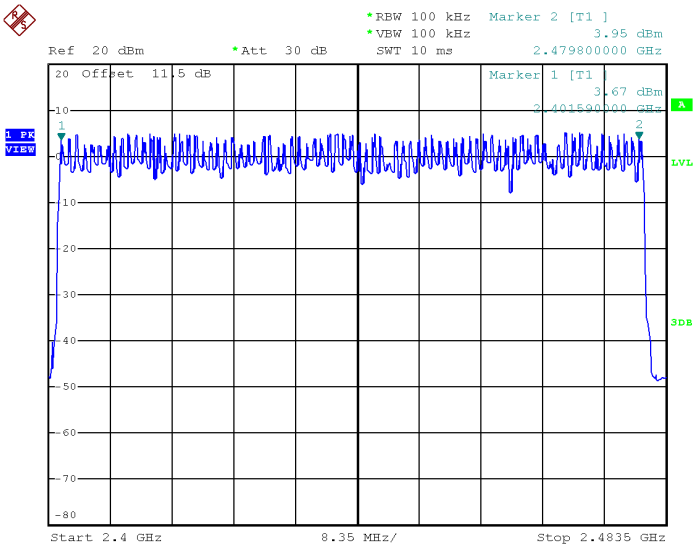
Test Mode	Hopping Mode_1Mbps	Limit	Test Result
Number of Hopping Frequency	79	15	Pass



Date: 8.AUG.2024 23:10:55

Test Mode:	3Mbps

Test Mode	Hopping Mode_3Mbps	Limit	Test Result
Number of Hopping Frequency	79	15	Pass



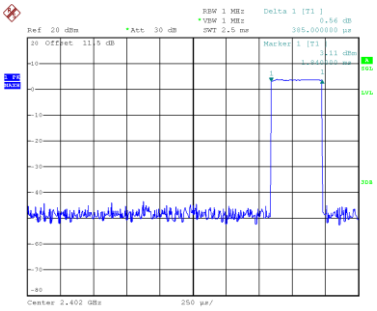
Date: 8.AUG.2024 23:33:16

APPENDIX F - AVERAGE TIME OF OCCUPANCY

Test Mode	Hopping Mode_1Mbps

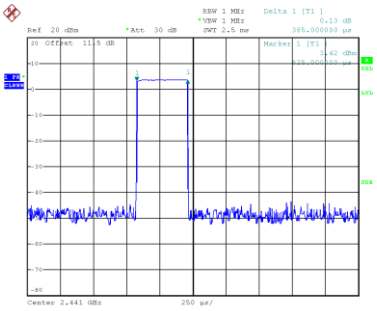
Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
DH1	2402	0.3850	0.1232	0.4000	Pass
DH3	2402	1.6400	0.2624	0.4000	Pass
DH5	2402	2.8800	0.3072	0.4000	Pass
DH1	2441	0.3850	0.1232	0.4000	Pass
DH3	2441	1.6400	0.2624	0.4000	Pass
DH5	2441	2.8800	0.3072	0.4000	Pass
DH1	2480	0.3850	0.1232	0.4000	Pass
DH3	2480	1.6400	0.2624	0.4000	Pass
DH5	2480	2.8800	0.3072	0.4000	Pass

CH00-DH1



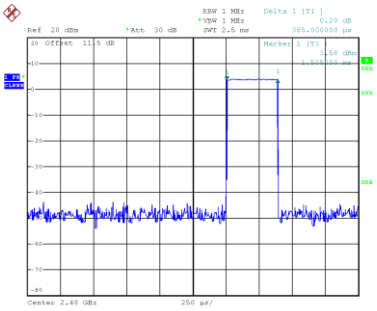
Date: 8.AUG.2024 22:59:12

CH39-DH1



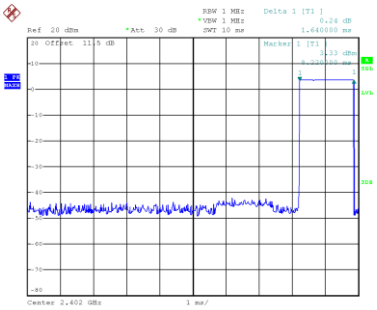
Date: 8.AUG.2024 22:59:18

CH78-DH1



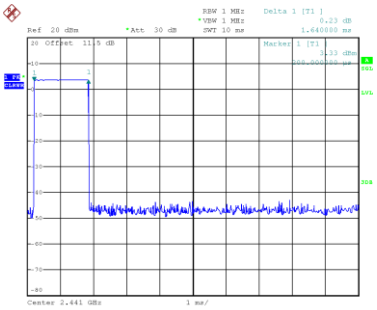
Date: 8.AUG.2024 22:59:30

CH00-DH3



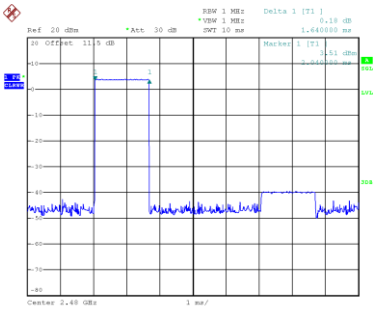
Date: 8.AUG.2024 23:13:26

CH39-DH3



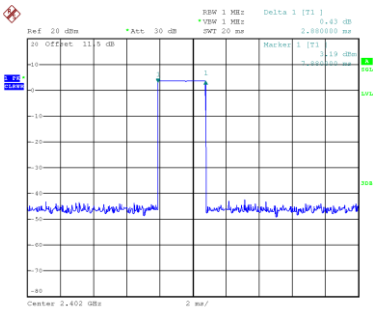
Date: 8.AUG.2024 23:13:32

CH78-DH3



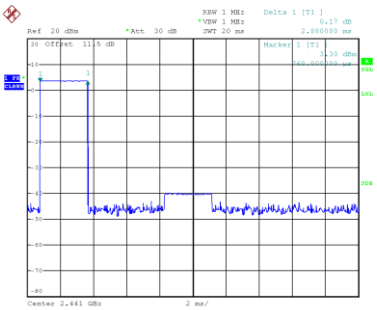
Date: 8.AUG.2024 23:13:40

CH00-DH5



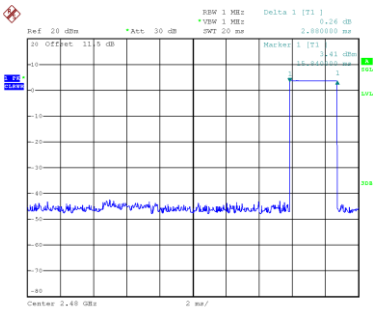
Date: 8.AUG.2024 23:18:42

CH39-DH5



Date: 8.AUG.2024 23:18:48

CH78-DH5

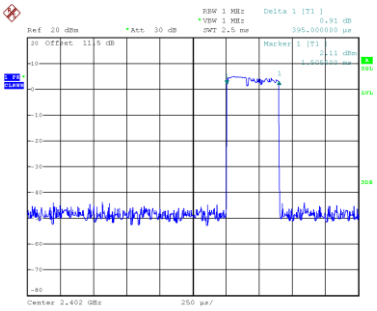


Date: 8.AUG.2024 23:18:54

Test Mode	Hopping Mode_3Mbps

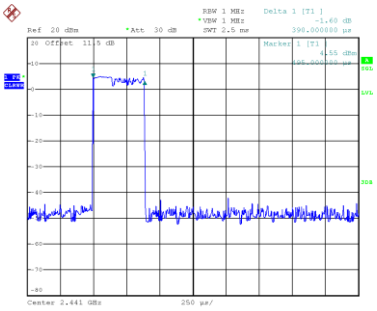
Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
3DH1	2402	0.3950	0.1264	0.4000	Pass
3DH3	2402	1.6400	0.2624	0.4000	Pass
3DH5	2402	2.9200	0.3115	0.4000	Pass
3DH1	2441	0.3900	0.1248	0.4000	Pass
3DH3	2441	1.6600	0.2656	0.4000	Pass
3DH5	2441	2.9200	0.3115	0.4000	Pass
3DH1	2480	0.3950	0.1264	0.4000	Pass
3DH3	2480	1.6600	0.2656	0.4000	Pass
3DH5	2480	2.9200	0.3115	0.4000	Pass

CH00-3DH1



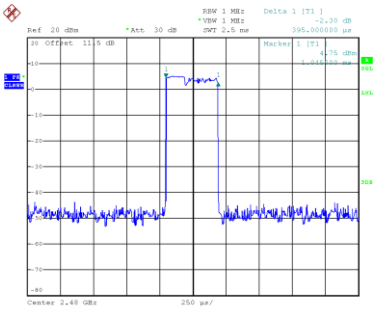
Date: 8.AUG.2024 23:20:25

CH39-3DH1



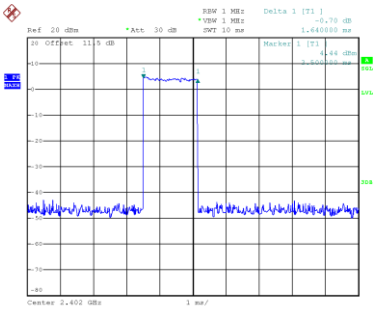
Date: 8.AUG.2024 23:20:33

CH78-3DH1



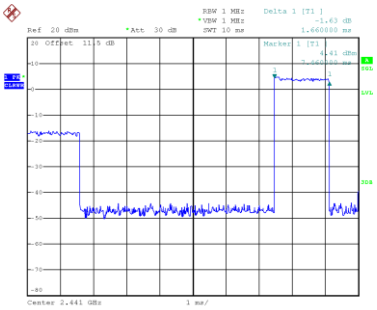
Date: 8.AUG.2024 23:20:38

CH00-3DH3



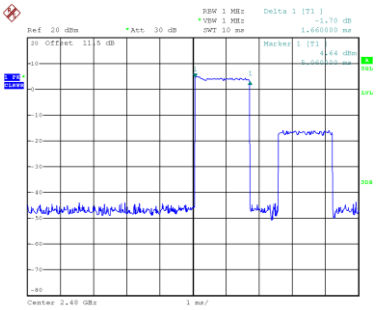
Date: 8.AUG.2024 23:38:41

CH39-3DH3



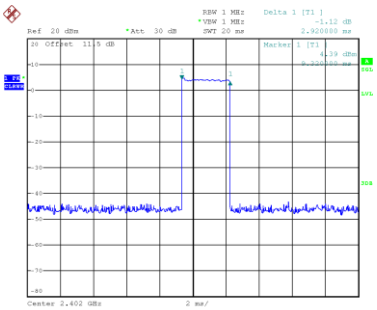
Date: 8.AUG.2024 23:39:07

CH78-3DH3



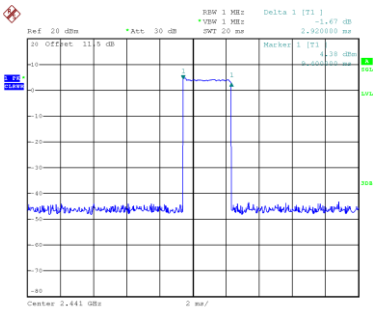
Date: 8.AUG.2024 23:39:16

CH00-3DH5



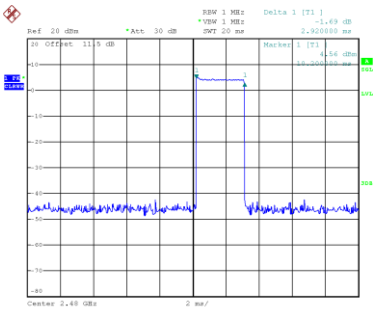
Date: 8.AUG.2024 23:40:02

CH39-3DH5



Date: 8.AUG.2024 23:40:10

CH78-3DH5



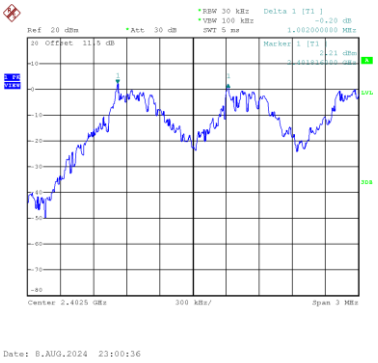
Date: 8.AUG.2024 23:40:16

APPENDIX G - HOPPING CHANNEL SEPARATION

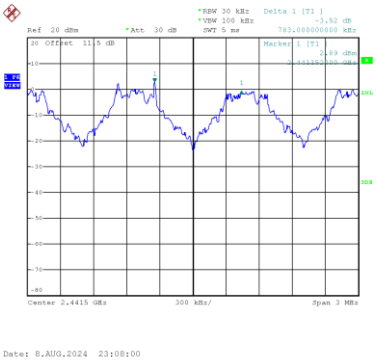
Test Mode	Hopping Mode_1Mbps

Channel	Frequency (MHz)	Channel Separation (MHz)	2/3 of 20 dB Bandwidth (MHz)	Test Result
00	2402	1.002	0.625	Pass
39	2441	0.783	0.695	Pass
78	2480	1.314	0.650	Pass

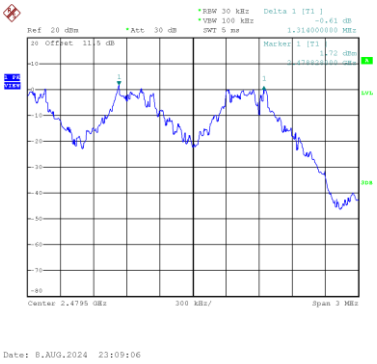
CH00



CH39



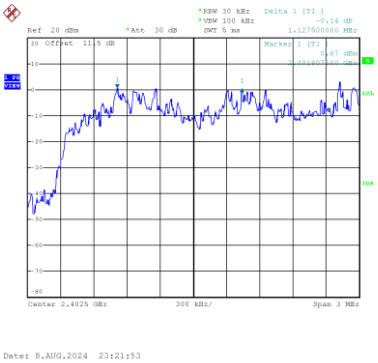
CH78



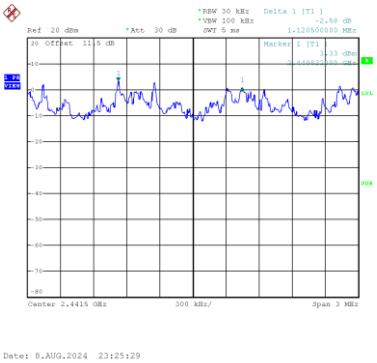
Test Mode	Hopping Mode_3Mbps

Channel	Frequency (MHz)	Channel Separation (MHz)	2/3 of 20 dB Bandwidth (MHz)	Test Result
00	2402	1.128	0.838	Pass
39	2441	1.121	0.839	Pass
78	2480	1.010	0.833	Pass

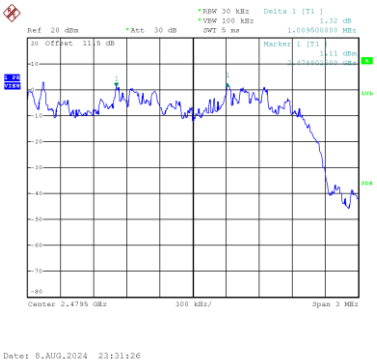
CH00



CH39



CH78

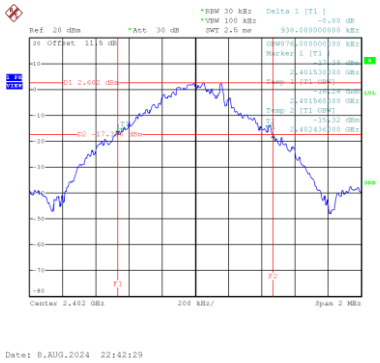


APPENDIX H - BANDWIDTH

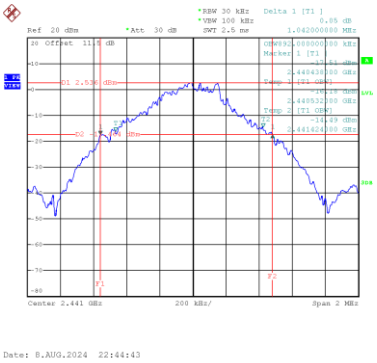
Test Mode	1Mbps

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)
00	2402	0.938	0.876
39	2441	1.042	0.892
78	2480	0.975	0.888

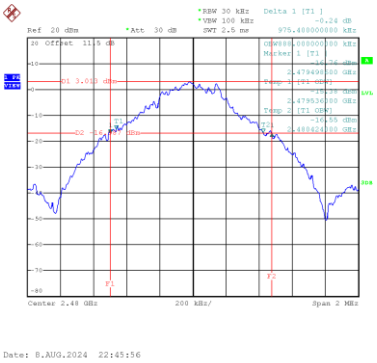
CH00



CH39



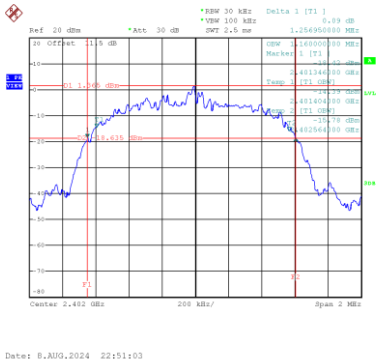
CH78



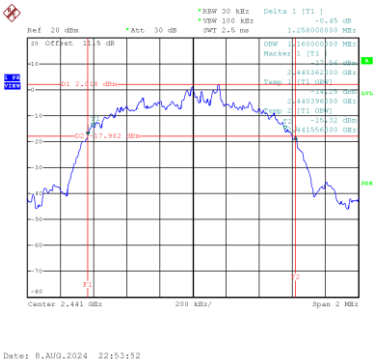
Test Mode	3Mbps

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)
00	2402	1.257	1.160
39	2441	1.258	1.160
78	2480	1.250	1.172

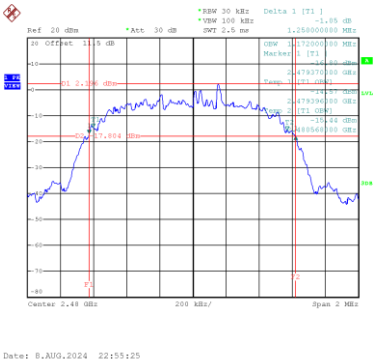
CH00



CH39



CH78

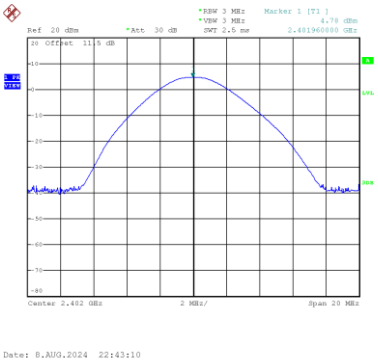


APPENDIX I - MAXIMUM OUTPUT POWER

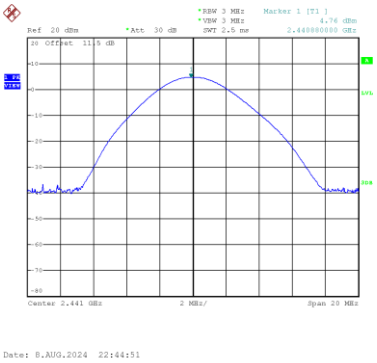
Test Mode	1Mbps

Channel	Frequency (MHz)	Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Test Result
00	2402	4.78	20.97	0.1250	Pass
39	2441	4.76	20.97	0.1250	Pass
78	2480	4.89	20.97	0.1250	Pass

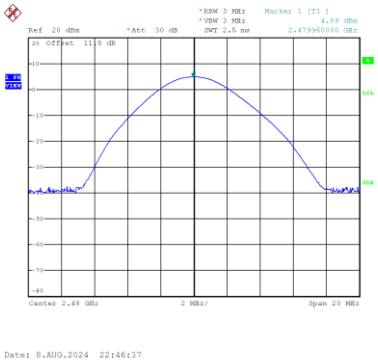
CH00



CH39



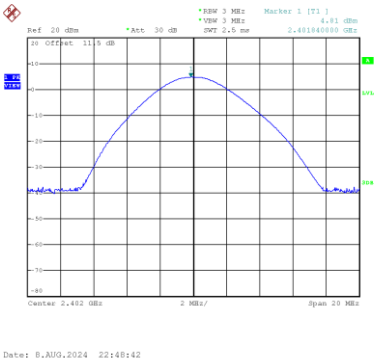
CH78



Test Mode	2Mbps

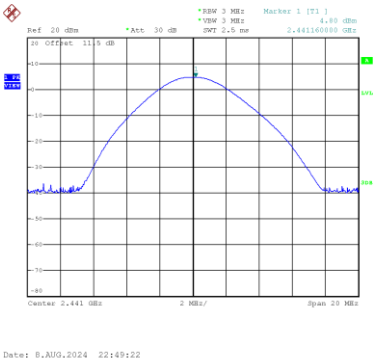
Channel	Frequency (MHz)	Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Test Result
00	2402	4.81	20.97	0.1250	Pass
39	2441	4.80	20.97	0.1250	Pass
78	2480	5.02	20.97	0.1250	Pass

CH00



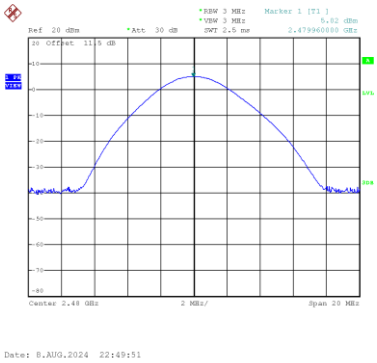
Date: 8.AUG.2024 22:48:42

CH39



Date: 8.AUG.2024 22:49:22

CH78

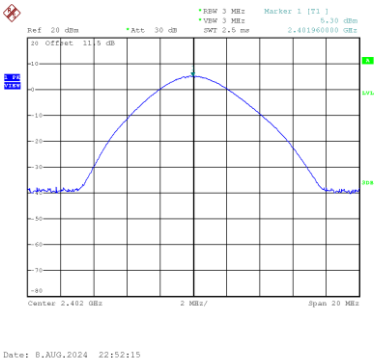


Date: 8.AUG.2024 22:49:51

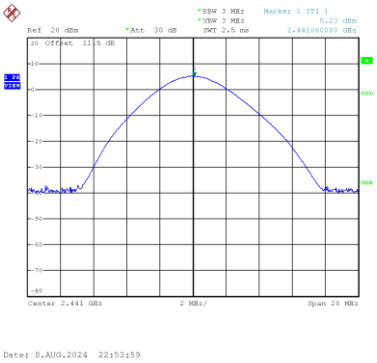
Test Mode	3Mbps

Channel	Frequency (MHz)	Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Test Result
00	2402	5.30	20.97	0.1250	Pass
39	2441	5.23	20.97	0.1250	Pass
78	2480	5.46	20.97	0.1250	Pass

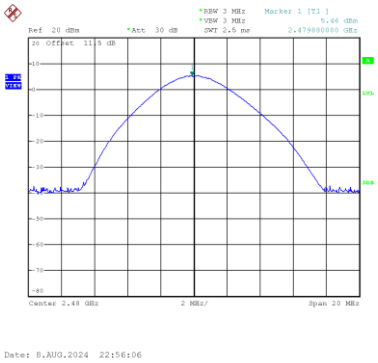
CH00



CH39



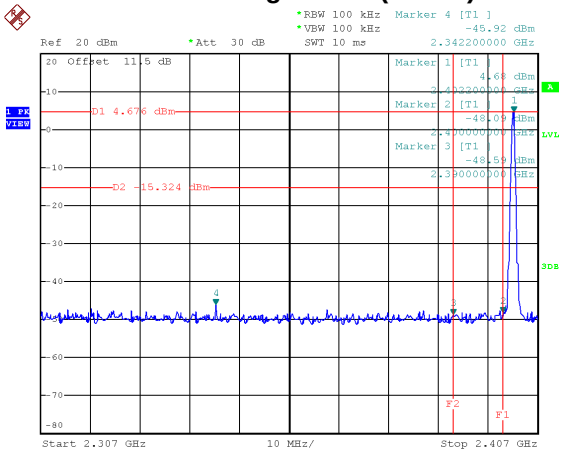
CH78



APPENDIX J - CONDUCTED SPURIOUS EMISSION

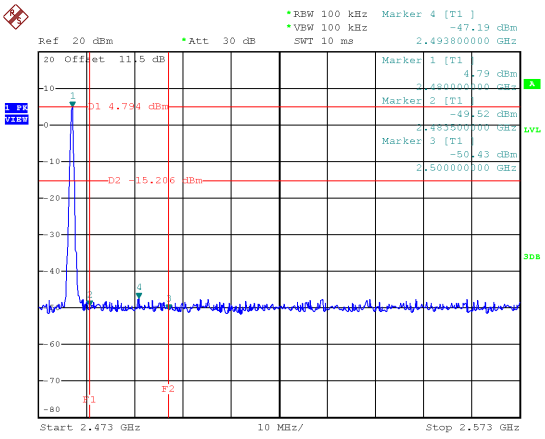
Test Mode	1Mbps

Bandedge CH00 (Lower)



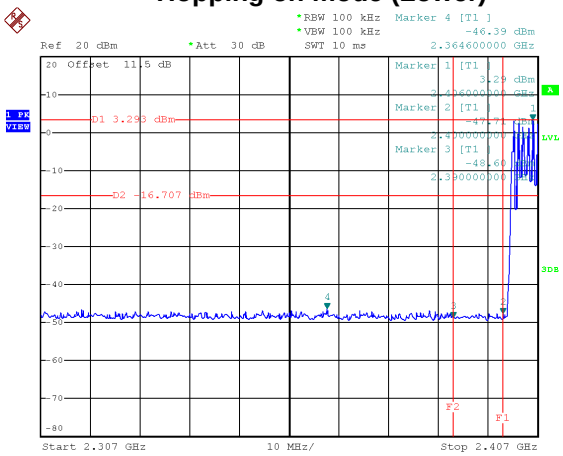
Date: 8.AUG.2024 22:42:01

Bandedge CH78 (Upper)



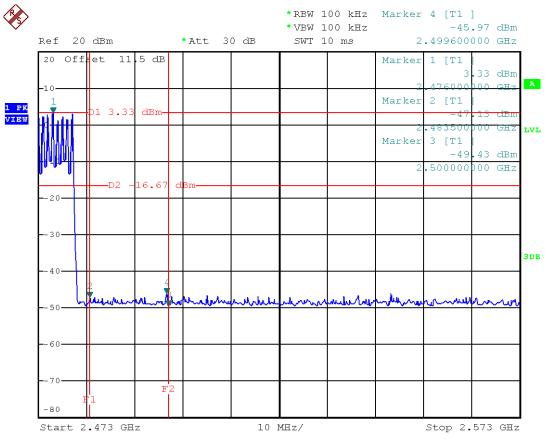
Date: 8.AUG.2024 22:45:28

Hopping on mode (Lower)



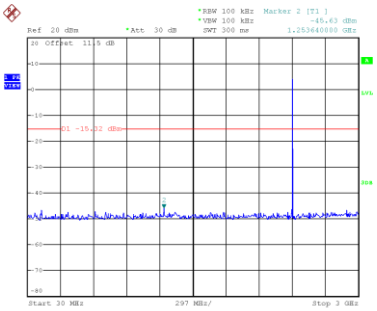
Date: 8.AUG.2024 23:11:31

Hopping on mode (Upper)

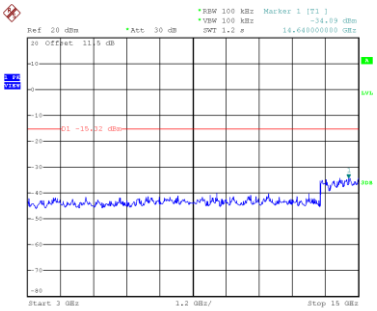


Date: 8.AUG.2024 23:12:08

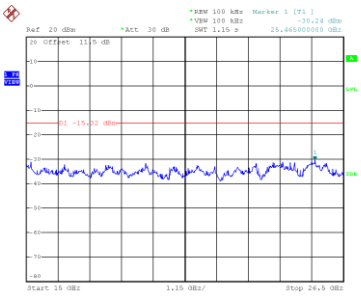
CH00 – 10th Harmonic of the fundamental frequency



Date: 8.AUG.2024 22:42:44

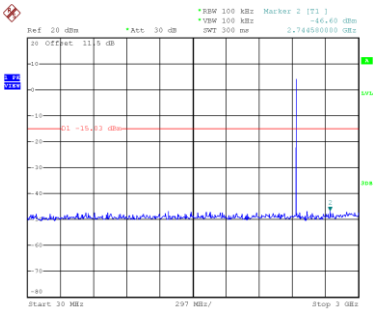


Date: 8.AUG.2024 22:42:53

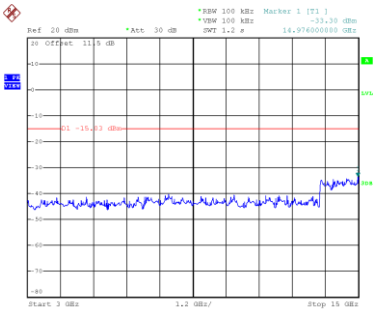


Date: 8.AUG.2024 22:43:03

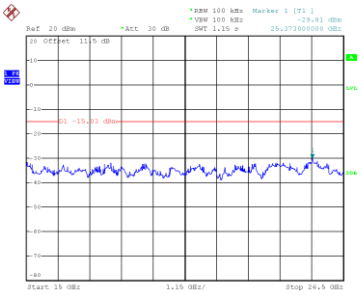
CH39 – 10th Harmonic of the fundamental frequency



Date: 8.AUG.2024 22:43:58

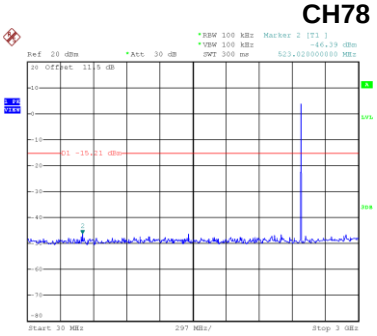


Date: 8.AUG.2024 22:44:07

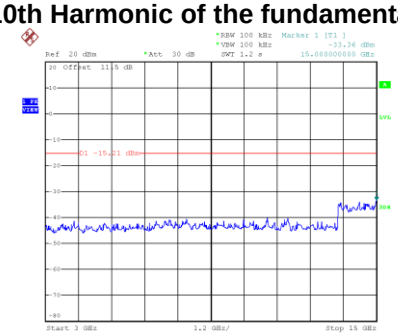


Date: 8.AUG.2024 22:44:16

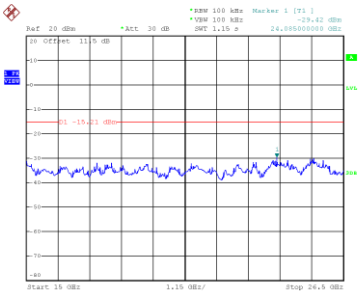
CH78 – 10th Harmonic of the fundamental frequency



Date: 8.AUG.2024 22:46:11



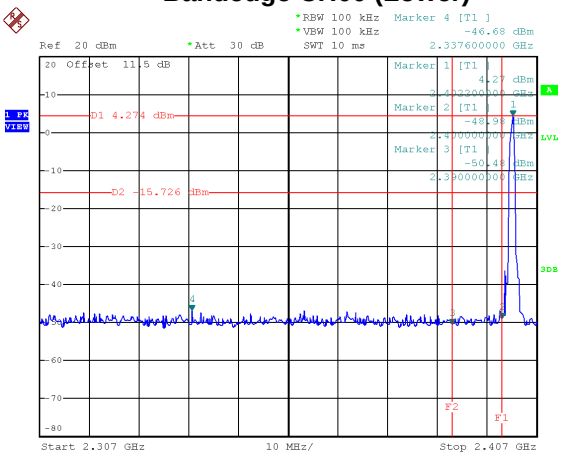
Date: 8.AUG.2024 22:46:20



Date: 8.AUG.2024 22:46:29

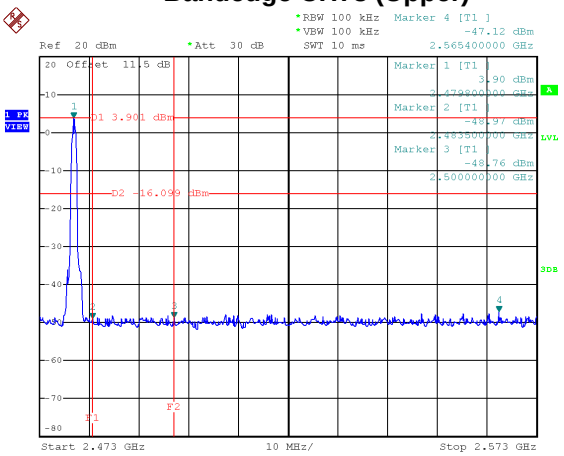
Test Mode	3Mbps

Bandedge CH00 (Lower)



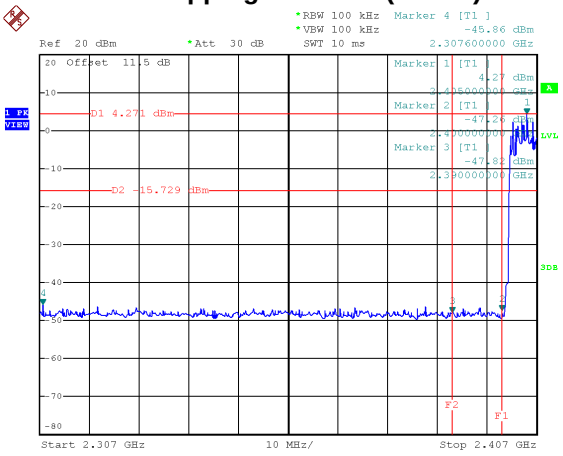
Date: 8.AUG.2024 22:50:41

Bandedge CH78 (Upper)



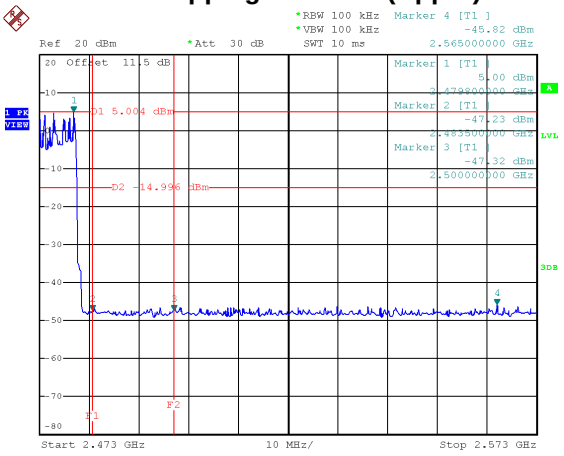
Date: 8.AUG.2024 22:54:58

Hopping on mode (Lower)



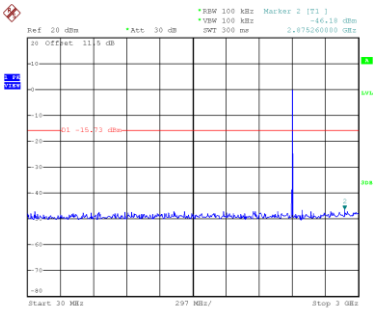
Date: 8.AUG.2024 23:33:52

Hopping on mode (Upper)

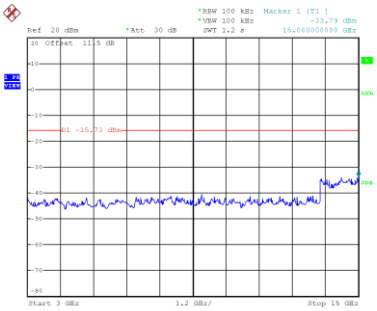


Date: 8.AUG.2024 23:37:33

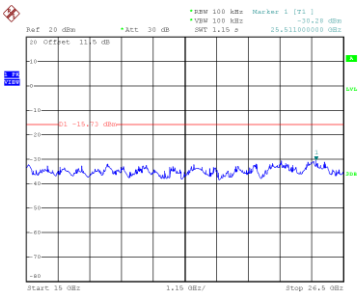
CH00 – 10th Harmonic of the fundamental frequency



Date: 8.AUG.2024 22:51:19

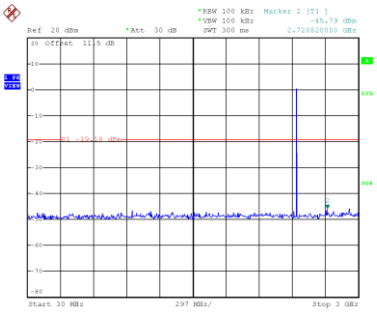


Date: 8.AUG.2024 22:51:28

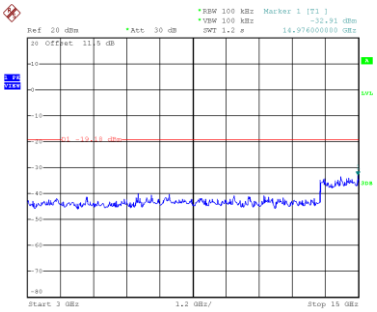


Date: 8.AUG.2024 22:51:37

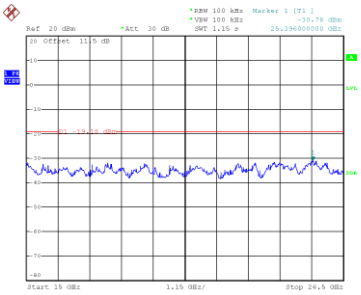
CH39 – 10th Harmonic of the fundamental frequency



Date: 8.AUG.2024 22:53:08

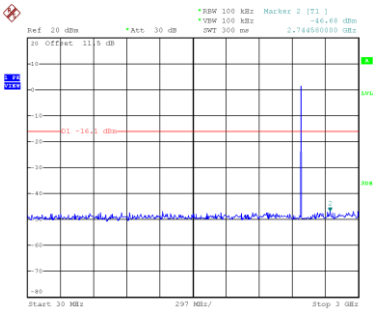


Date: 8.AUG.2024 22:53:17

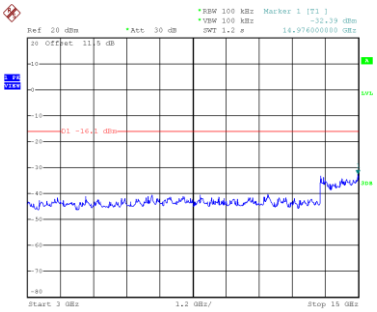


Date: 8.AUG.2024 22:53:26

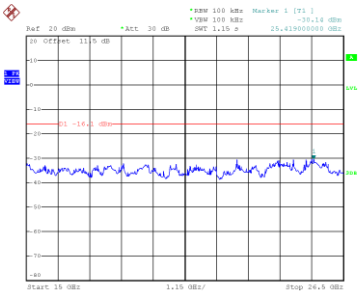
CH78 – 10th Harmonic of the fundamental frequency



Date: 8.AUG.2024 22:55:41



Date: 8.AUG.2024 22:55:50



Date: 8.AUG.2024 22:55:59

APPENDIX K - DECLARATION FOR BLUETOOTH DEVICE

1. Output power and channel separation of a Bluetooth device in the different operating modes:

The different operating modes (data-mode, acquisition-mode) of a Bluetooth device has no influence on the output power and the channel spacing. There is only one transmitter which is driven by identical input parameters concerning these two parameters.
Only a different hopping sequence will be used. For this reason the check of these RF parameters in one op-mode is sufficient.

2. Frequency range of a Bluetooth device:

Hereby we declare that the maximum frequency of this device is: 2402 - 2480MHz. This is according to the Bluetooth Core Specification (+ critical errata) for devices which will be operated in the USA.
This was checked during the Bluetooth Qualification tests (Test Case: TRM/CA/04-E). Other frequency ranges (e.g. for Spain, France, Japan) which are allowed according the Core Specification are not supported by this device.

3. Co-ordination of the hopping sequence in data mode to avoid simultaneous occupancy by multiple transmitters:

Bluetooth units which want to communicate with other units must be organised in a structure called piconet. This piconet consist of max. 8 Bluetooth units. One unit is the master the other seven are the slaves. The master co-ordinates frequency occupation in this piconet for all units. As the master hop sequence is derived from its BD address which is unique for each Bluetooth device, additional masters intending to establish new piconets will always use different hop sequences.

4. Example of a hopping sequence in data mode:

Example of a 79 hopping sequence in data mode:
40, 21, 44, 23, 42, 53, 46, 55, 48, 33, 52, 35, 50, 65, 54, 67, 56, 37, 60, 39, 58, 69, 62, 71, 64, 25, 68, 27, 66, 57, 70, 59, 72, 29, 76, 31, 74, 61, 78, 63, 01, 41, 05, 43, 03, 73, 07, 75, 09, 45, 13, 47, 11, 77, 15, 00, 64, 49, 66, 53, 68, 02, 70, 06, 01, 51, 03, 55, 05, 04

5. Equally average use of frequencies in data mode and behaviour for short transmissions:

The generation of the hopping sequence in connection mode depends essentially on two input values:
a) LAP/UAP of the master of the connection.
b) Internal master clock.

The LAP (lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24 MSB's of the 48 BD_ADDRESS.

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For synchronisation with other units only offset are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5 µs. The clock has a cycle of about one day (23h30). In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire.
LAP (24 bits), 4 LSB's (4 bits) (Input 1) and the 27 MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR- operations) are performed to generate the sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following behaviour:
The first connection between the two devices is established, a hopping sequence was generated. For transmitting the wanted data the complete hopping sequence was not used. The connection ended.
The second connection will be established. A new hopping sequence is generated. Due to the fact that the Bluetooth clock has a different value, because the period between the two transmission is longer (and it cannot be shorter) than the minimum resolution of the clock (312.5 µs). The hopping sequence will always differ from the first one.

6. Receiver input bandwidth and behaviour for repeated single or multiple packets:

The input bandwidth of the receiver is 1 MHz. In every connection one Bluetooth device is the master and the other one is the slave. The master determines the hopping sequence (see chapter 5). The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master.
Additionally the type of connection (e.g. single or multislot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings.
Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

End of Test Report