

Test Report No.: 2411050494-RF-US-01

**FCC Part 15, Subpart C
Test Report**

FCC ID: 2BBQK-HEDDON

Applicant: Marshall Group AB

Address: Centralplan 15 111 20 Stockholm Sweden

Manufacturer: Marshall Group AB

Address: Centralplan 15 111 20 Stockholm Sweden

Product(s): MUSIC STREAMING HUB

Brand(s): Marshall

Test Model(s): HEDDON

Series Model(s): N/A

Test Date: Dec. 05, 2024 ~ Apr. 15, 2025

Issued Date: Apr. 16, 2025

Issued By: Hwa-Hsing (Dongguan) Testing Co., Ltd.

Address: No.101, Building N1, Yuyuan 2 Road, Yuyuan Industrial Park, HuangJiang Town, Dongguan City, People's Republic of China

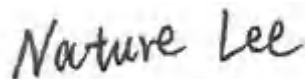
Test Firm Registration No.: 915896

Designation No.: CN1255

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2013

The above equipment has been tested by **Hwa-Hsing (Dongguan) Testing Co., Ltd.**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :



Reviewed by :



Nature Lee

Sye Yang

Approved by :



Scott He

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Release Control Record

Issue No.	Description	Date Issued
2411050494-RF-US-01	Original Release	Apr. 16, 2025

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1 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247) KDB 558074 D01 15.247 Meas Guidance v05r02 ANSI C63.10:2013;			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit.
15.247(a)(1) (iii)	Number of Hopping Frequency Used	Pass	Meet the requirement of limit.
15.247(a)(1) (iii)	Dwell Time on Each Channel	Pass	Meet the requirement of limit.
15.247(a)(1)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	Pass	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	Pass	Reference only
15.205 & 209	Radiated Emissions	Pass	Meet the requirement of limit.
15.247(d)	Band Edge Measurement	Pass	Meet the requirement of limit.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note

- If the Frequency Hopping System operating in 2400-2483.5MHz band and the output power less than 125mW. The hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of hopping channel whichever is greater.
- The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (sDoC). The test report has been issued separately.

1.1 Measurement Uncertainty

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

The listed uncertainties are the worst-case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9KHz ~ 30MHz	2.16 dB
	30MHz ~ 1000MHz	3.56 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.71 dB
	6GHz~18GHz	4.84 dB
	18GHz ~ 40GHz	5.73 dB

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

1.2 Modification Record

There were no modifications required for compliance.

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2 General Information**2.1 General Description of EUT**

Product(s)	MUSIC STREAMING HUB
Test Model(s)	HEDDON
Sample No.	HS2411050494-S002, HS2411050494-S003
Series Model(s)	N/A
Status of EUT	Engineering Prototype
Power Supply Rating	AC 100-240V ~ 50/60Hz, 10W
Modulation Type	GFSK for FHSS (BLE)
Transfer Rate	1Mbps, 2Mbps
Operating Frequency	1M: 2402 ~ 2480MHz 2M: 2404 ~ 2478MHz
Number of Channel	40 for 1Mbps 37 for 2Mbps
Max. Output Power	12.946dBm-Peak
Antenna Type and Antenna Gain	Internal Antenna, 2.96dBi
Antenna Connector	NA
Accessory Device	AC Cable: Detachable, Unshielded, 200cm

Note:

1. Please refer to the EUT photo document (Reference No.: 2411050494-01&02) for detailed product photo.
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.
Hwa-Hsing (Dongguan) Testing Co., Ltd. is not responsible for the accuracy of the information provided by the manufacturer.
3. For the test results, the EUT had been tested with all conditions, and only the worst case was shown in the test report.

2.2 Description of Test Modes

40 channels are provided to 1Mbps:

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

37 channels are provided to 2Mbps:

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

2.3 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable test items	X-Axis	Y-Axis	Z-Axis	Voltage Supply
Conducted	AC Power Conducted Emission	N/A	N/A	N/A	AC120V 60Hz
Radiated	Radiated Emissions	√	√	√	AC120V 60Hz
Antenna Port Conducted Measurement	Number of Hopping Frequency Used	N/A	N/A	N/A	
	Dwell Time on Each Channel	N/A	N/A	N/A	
	Band Edge Measurement	N/A	N/A	N/A	
	Antenna Port Emission	N/A	N/A	N/A	
	Conducted power	N/A	N/A	N/A	
	Hopping Channel Separation	N/A	N/A	N/A	
	Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	N/A	N/A	N/A	
<p>1. *: The EUT had been pre-tested on the positioned of each 3 Axis. The worst case was found when positioned on X-plane.</p> <p>2. "N/A" means no effect.</p>					

Evaluation of difference data rate:

Applicable test items	Modulation Type	The Worst-case modes recording in report
	GFSK	
Radiated Emissions	√	GFSK
Antenna Port Conducted Measurement	√	GFSK

Test Condition:

Applicable test items	Environmental Conditions	Test Date	Tested by
Radiated Emissions	24.0deg. C, 55%RH	Apr. 10, 2025 ~ Apr. 15, 2025	Hua
Antenna Port Conducted Measurement	25.5deg. C, 58%RH	Apr. 10, 2025 ~ Apr. 14, 2025	Sye Yang

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

Radiated Emission Test (Above 1 GHz):

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	0 to 39	0,19, 39	FHSS	GFSK	1
-	1 to 38	1,19, 38	FHSS	GFSK	2

Radiated Emission Test (Below 1 GHz):

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	0 to 39	0,19, 39	FHSS	GFSK	1

Power Line Conducted Emission Test:

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	0 to 39	0,19, 39	FHSS	GFSK	1

Antenna Port Conducted Measurement:

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

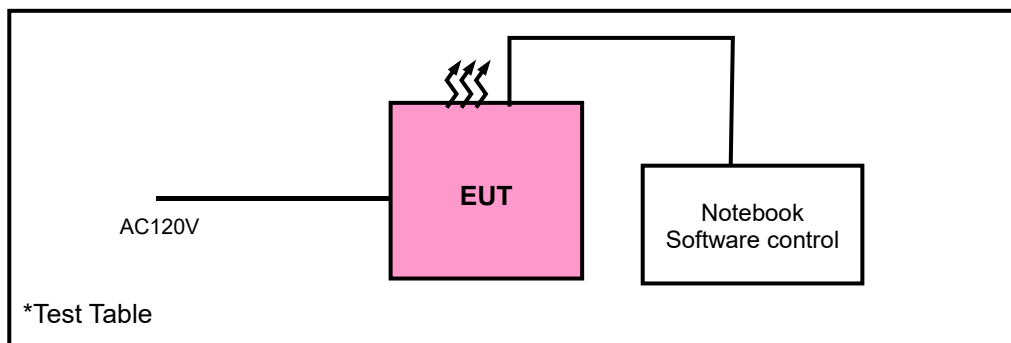
EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	0 to 39	0,19, 39	FHSS	GFSK	1
-	1 to 38	1,19, 38	FHSS	GFSK	2

2.4 Description of Support Units

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

No.	Product	Brand	Model No.	Serial No.	FCC ID
1	Notebook	HUAWEI	NbD-WFH9	EUEPM21725002655	N/A
2	Notebook	DELL	Inspiron 14R Aluminum Edition	6WPG9-63PV4-RBPF2-T6RHW-W9GBP	N/A

No.	Signal Cable Description of The Above Support Units
1	USB extension cord: Unshielded, Detachable 1.2m;

2.5 Configuration of System under Test

3 Test Types and Results**3.1 Radiated Emission and Band-edge Measurement****3.1.1 Limits of Radiated Emission and Band-edge Measurement**

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

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

* DTS emissions in non-restricted frequency bands Subclause 11.11 of ANSI C63.10 is applicable.

* DTS emissions in restricted frequency bands Subclause 11.12 of ANSI C63.10 is applicable.

Note:

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

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3.1.2 Test Instruments

Radiated emission below 30MHz:

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	100962	2025-07-25
3m Semi-anechoic Chamber	MAORUI	9m*6m*6m	NSEMC003	2026-03-12*
Test software	FARAD	FARAD	EZ_EMCV1.1.4.2	N/A
Loop Antenna	EMCI	HLA 6121	56735	2025-05-03
Antenna Tower	MF	MFA-440H	NA	NA
Turn Table	MF	MFT-201SS	NA	NA
Antenna Tower&Turn Table Controller	MF	MF-7802	NA	NA

Frequency Range below 1GHz:

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver (9kHz~3GHz)	Rohde&Schwarz	ESPI 7	101978	2025-07-25
Broadband antenna (25MHz~2500MHz)	Schwarzbeck	VULB 9168	937	2025-07-25
3m Semi-anechoic Chamber	MAORUI	9m*6m*6m	HS-2018037	2026-03-12*
Signal Amplifier (30MHz~1000MHz)	Com-power	PAM-103	18020051	2025-07-25
Attenuator	R&S	TS2GA-6dB	18101101	N/A
Test software	FARAD	EZ_EMCV1.1.4.2	N/A	N/A
Broadcast test system	R&S	SFU	100410	2025-07-25

Frequency Range above 1GHz:

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESPI 7	101978	2025-07-25
3m Semi-anechoic Chamber	MAORUI	9m*6m*6m	NSEMC003	2026-03-12*
Test software	FARAD	EZ_EMCV1.1.4.2	N/A	N/A
Digital Multimeter	FLUKE	15B+	43512617WS	2025-07-25
Horn Antenna	Schwarzbeck	BBHA 9120 D	1959	2025-08-15
Spectrum Analyzer	Rohde&Schwarz	FSV-40N	101783	2025-07-25
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	25	2025-07-25
Pre-Amplifier	EMCI	EMC 184045SE	9870709	2025-07-25
Spectrum	Keysight	N9020A	MY51240612	2025-07-25
Broadcast test system	R&S	SFU	100410	2025-07-25
Antenna Tower	MF	MFA-440H	NA	NA
Turn Table	MF	MFT-201SS	NA	NA
Antenna Tower&Turn Table Controller	MF	MF-7802	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months or 36 months (*).
2. The test was performed in 966.

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3.1.3 Test Procedures

a. Peak emission levels are measured by setting the instrument as follow:

- 1) RBW&VBW setting as a function of frequency:

Frequency	RBW	VBW
9kHz~150kHz	200Hz	600Hz
0.15MHz~30MHz	9kHz	30kHz
30MHz~1000MHz	120kHz	300kHz
>1000MHz	1MHz	3MHz

- 2) Detector = peak.
- 3) Sweep time = auto.
- 4) Trace mode = max hold.
- 5) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be lengthened for low-duty-cycle applications.)

Note: If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement

b. Average emission levels are measured by setting the instrument as follow:**● Trace averaging with continuous EUT transmission at full power**

If the EUT can be configured or modified to transmit continuously ($D \geq 98\%$), then the average emission levels shall be measured using the following method (with EUT transmitting continuously):

- 1) RBW=1 MHz (unless otherwise specified).
- 2) $VBW \geq 3 * RBW$.
- 3) Detector =RMS
- 4) Sweep time = auto.
- 5) Perform a trace average of at least 100 traces.

● Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT ($D \geq 98\%$) cannot be achieved and the duty cycle is constant (duty cycle variations are less than $\pm 2\%$), then the following procedure shall be used

- 1) The EUT shall be configured to operate at the maximum achievable duty cycle.
- 2) Measure the duty cycle D of the transmitter output signal as described in 11.6.
- 3) RBW=1 MHz (unless otherwise specified).
- 4) $VBW \geq 3 * RBW$.
- 5) Detector =RMS
- 6) Sweep time = auto.
- 7) Perform a trace average of at least 100 traces.

A correction factor shall be added to the measurement results prior to comparing with the emission limit to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

*If power averaging (rms) mode was used in step 5), then the applicable correction factor is $[10 \log (1/D)]$, where D is the duty cycle.

**If linear voltage averaging mode was used in step f), then the applicable correction factor is $[20 \log (1/D)]$, where D is the duty cycle.

***If a specific emission is demonstrated to be continuous ($D > 98\%$) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that.

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● Reduced VBW Averaging across ON and OFF times of the EUT transmissions with max hold

If continuous transmission of the EUT ($D > 98\%$) cannot be achieved and the duty cycle is not constant (duty cycle variations exceed $\pm 2\%$), then the following procedure shall be used:

- 1) RBW = 1 MHz
 - 2) $VBW \geq 1/T$.
 - 3) Detector = peak
 - 4) Sweep time = auto.
 - 5) Trace mode = max hold.
 - 6) Allow max hold to run for at least $[50 \times (1/D)]$ traces
- c. The EUT was placed on the top of a rotating table 0.8 meters (below 1GHz) / 1.5 meters (Above 1GHz) above the reference ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The EUT was set 3 meters away from the interference-receiving antenna (Below 1GHz) & (Above 1GHz), which was mounted on the top of a variable-height antenna tower.
- e. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- f. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- g. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- h. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

1. Test procedures for measuring FHSS device: The use of a duty cycle correction factor (DCCF) is permitted for calculating average radiated field strength emission levels for an FHSS device in 15.247. This DCCF can be applied when the unwanted emission limit is subject to an average field strength limit (e.g., within a Government Restricted band) and the conditions specified in Section 15.35(c) can be satisfied. The average radiated field strength is calculated by subtracting the DCCF from the maximum radiated field strength level as determined through measurement. The maximum radiated field strength level represents the worst-case (maximum amplitude) RMS measurement of the emission(s) during continuous transmission (i.e., not including any time intervals during which the transmitter is off or is transmitting at a reduced power level). It is also acceptable to apply the DCCF to a measurement performed with a peak detector instead of the specified RMS power averaging detector. Note that Section 15.35(c) specifies that the DCCF shall represent the worst-case (greatest duty cycle) over any 100 msec transmission period. Subclause 7.5 of ANSI C63.10 provides additional measurement guidance applicable to determination of the DCCF.
2. All modes of operation were investigated and the worst-case emissions are reported.

3.1.4 Deviation from Test Standard

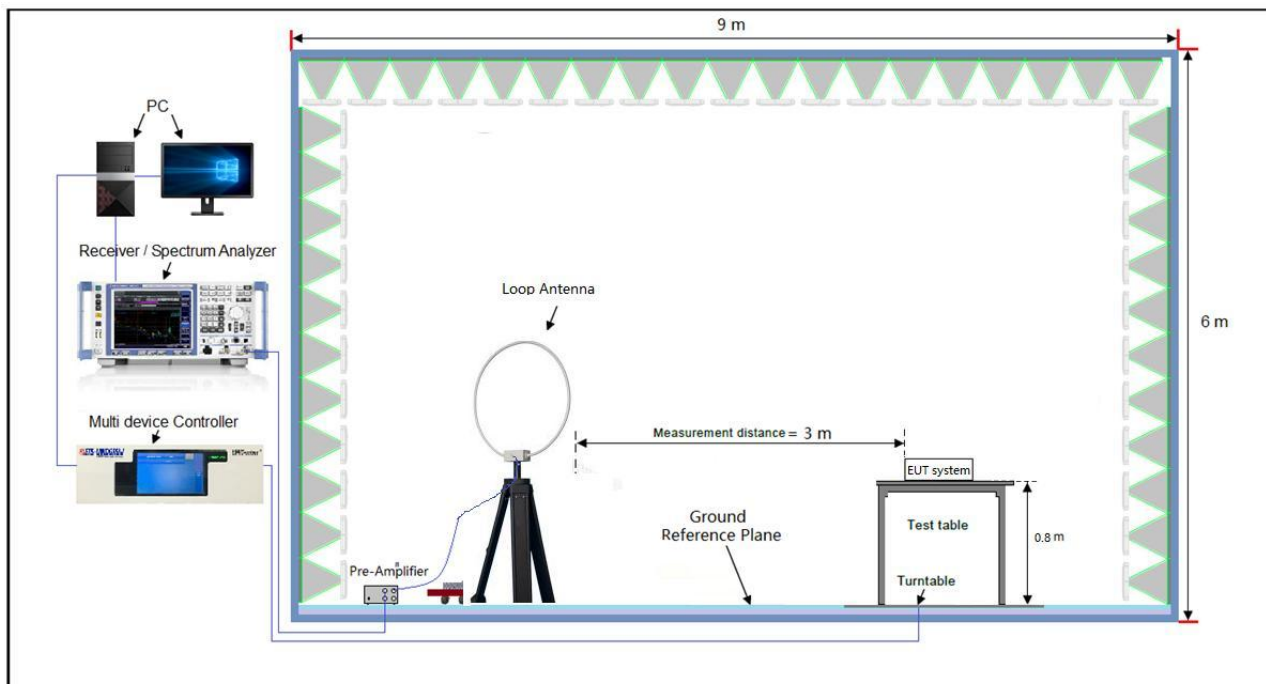
No deviation.

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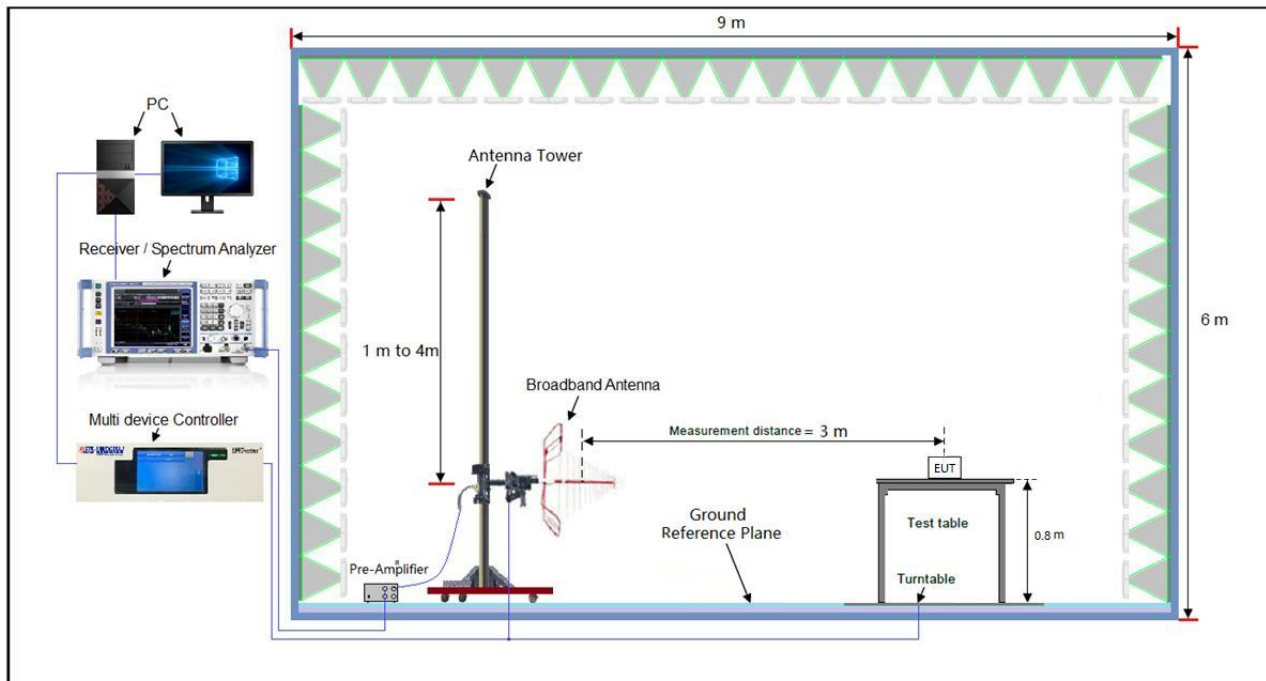
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3.1.5 Test Setup

Radiated emission below
30MHz:



Frequency Range below
1GHz:



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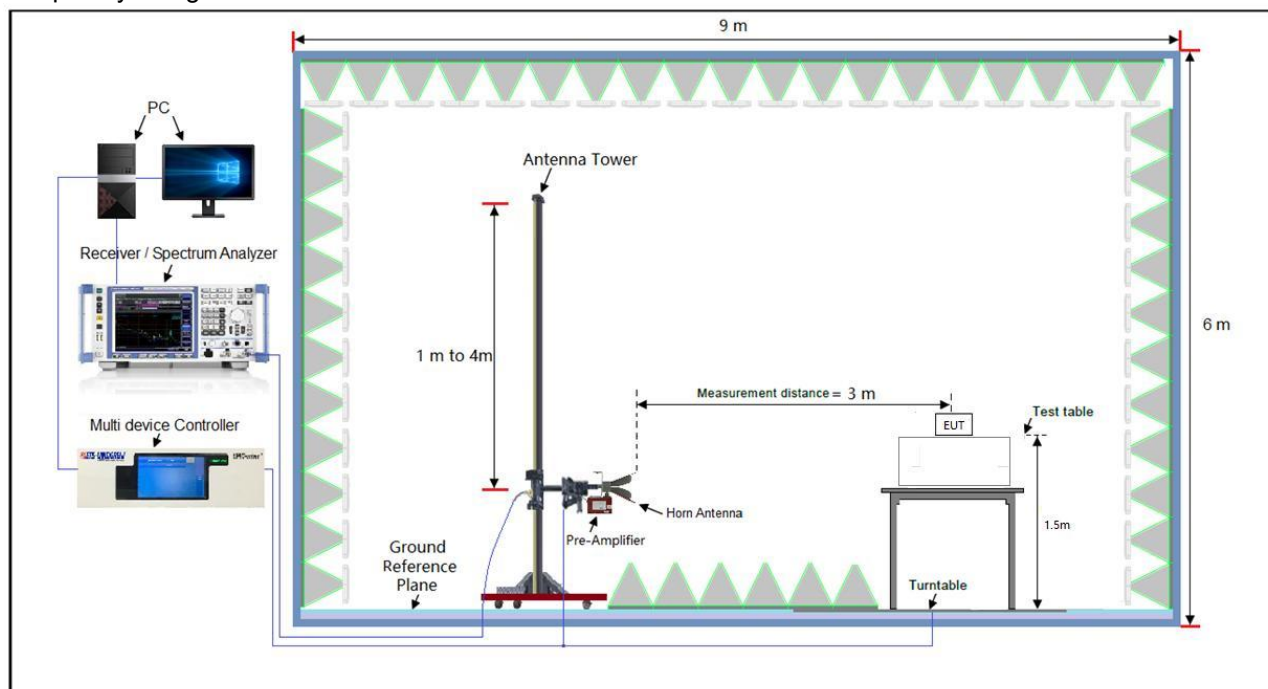
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Frequency Range above 1GHz:



*For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.1.6 EUT Operating Conditions

Set the EUT under transmission condition continuously at specific channel frequency.

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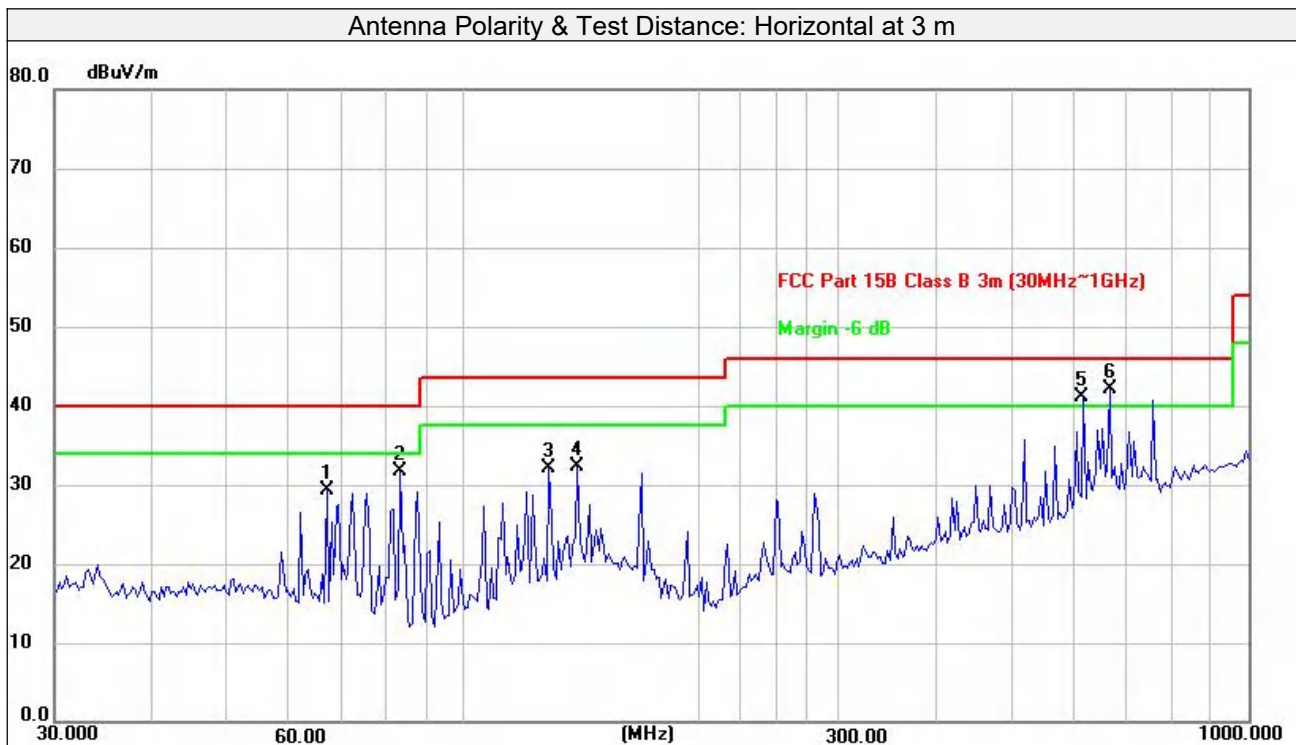
3.1.7 Test Results

9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1GHz Worst-Case Data:

Frequency Range	30MHz ~ 1GHz	Detector Function	Peak (PK) Quasi-peak (QP)
Test Channel	Channel 0		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Antenna Height (cm)	Table Angle (Degree)
1	66.7325	46.64	-17.39	29.25	40.00	-10.75	peak	245	124
2	82.9384	51.00	-19.39	31.61	40.00	-8.39	peak	320	214
3	128.1130	47.08	-15.03	32.05	43.50	-11.45	peak	389	192
4	139.3611	46.19	-13.96	32.23	43.50	-11.27	peak	205	166
5	616.3716	45.63	-4.46	41.17	46.00	-4.83	peak	317	78
6	665.8034	45.23	-3.22	42.01	46.00	-3.99	peak	199	13

Remarks:

1.Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)

2.Margin value = Emission level – Limit value

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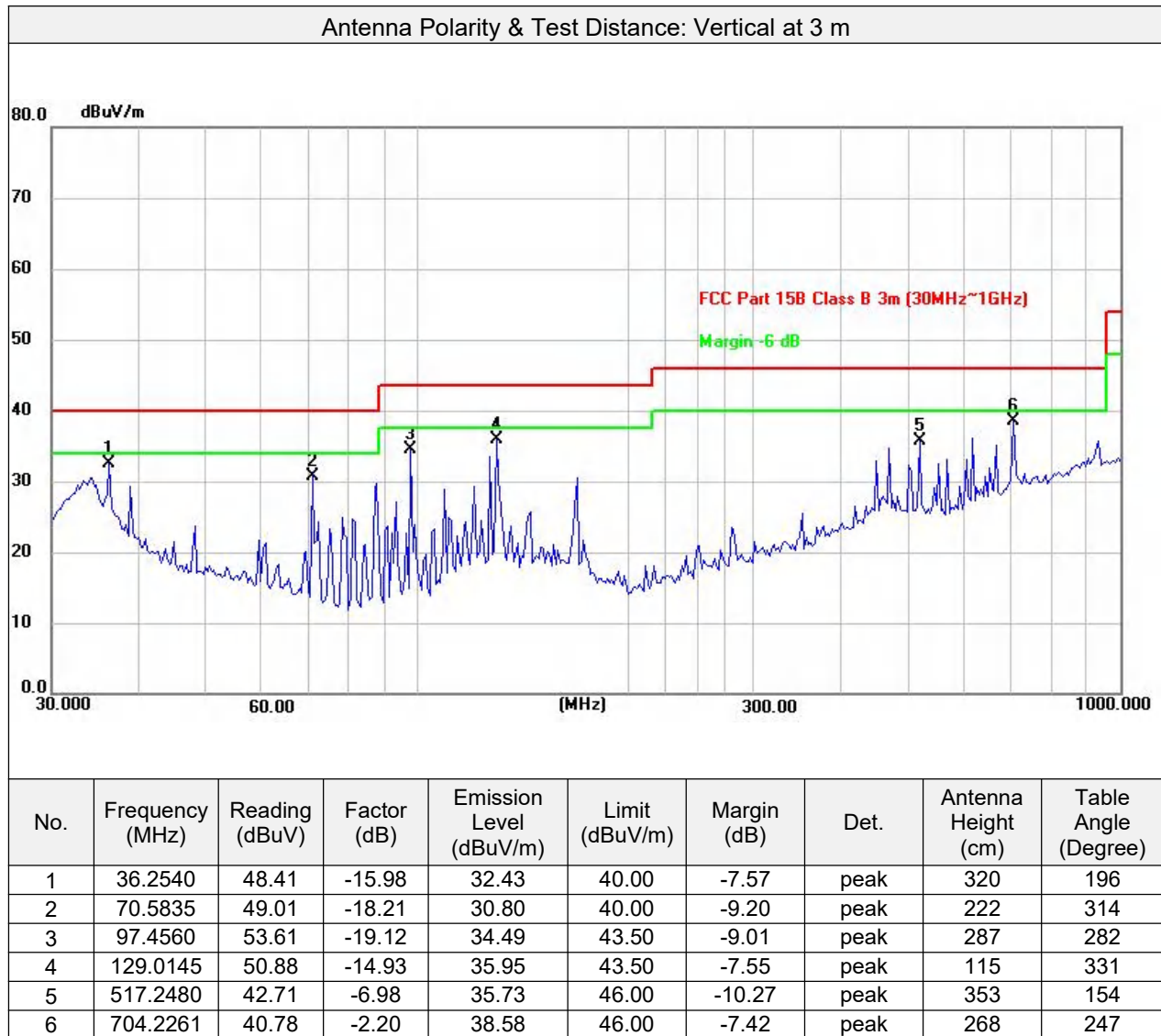
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Frequency Range	30MHz ~ 1GHz	Detector Function	Peak (PK) Quasi-peak (QP)
Test Channel	Channel 0		



Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)

2. Margin value = Emission level – Limit value

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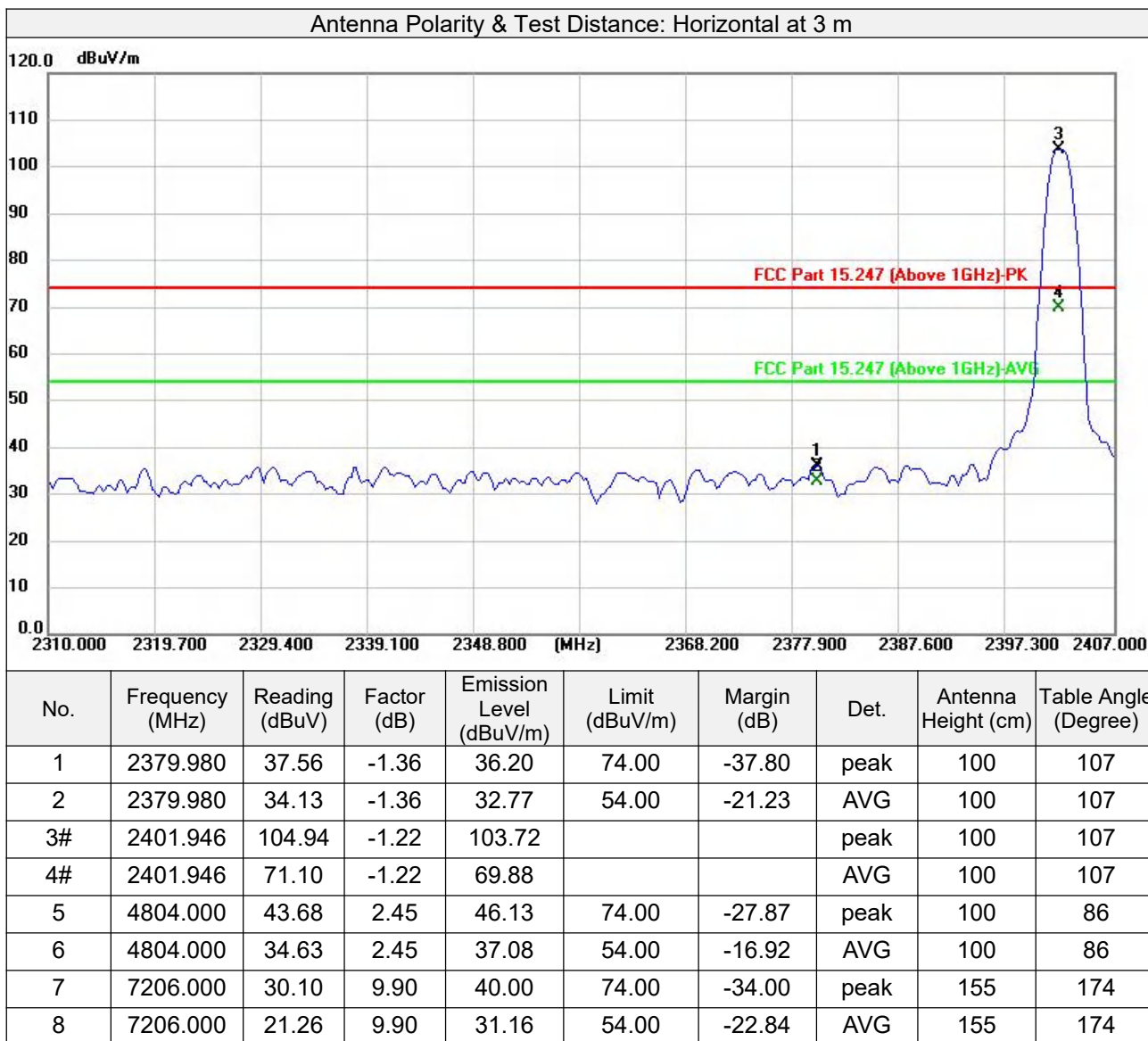
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Above 1GHz Data:

GFSK 1Mbps

Frequency Range	Above 1GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 0		



Remarks:

- Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
Margin value = Emission level – Limit value
- #2402MHz: Fundamental frequency.
- The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

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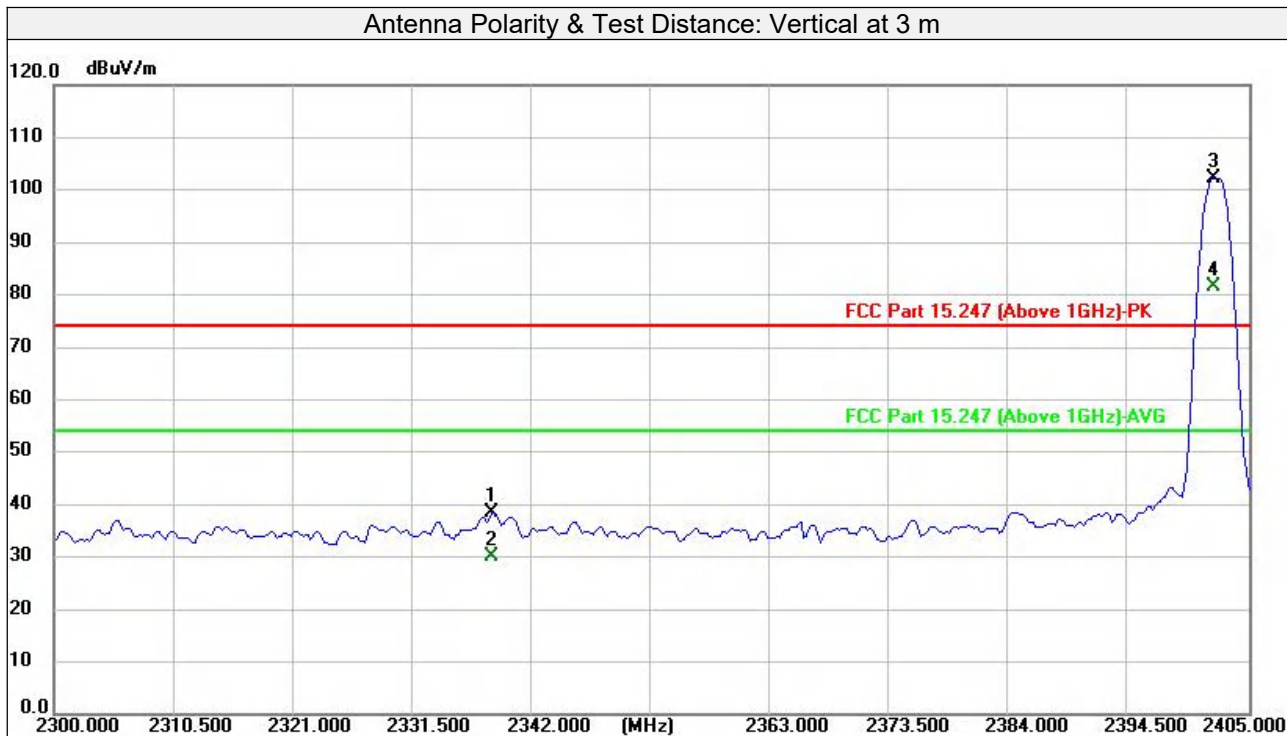
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Frequency Range	Above 1GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 0		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Antenna Height (cm)	Table Angle (Degree)
1	2338.717	40.11	-1.62	38.49	74.00	-35.51	peak	356	69
2	2338.717	31.55	-1.62	29.93	54.00	-24.07	AVG	356	69
3#	2401.844	103.48	-1.22	102.26			peak	356	69
4#	2401.844	82.87	-1.22	81.65			AVG	356	69
5	4804.000	44.28	2.45	46.73	74.00	-27.27	peak	100	330
6	4804.000	36.78	2.45	39.23	54.00	-14.77	AVG	100	330
7	7206.000	21.24	9.90	31.14	54.00	-22.86	AVG	105	236
8	7206.000	30.48	9.90	40.38	54.00	-13.62	AVG	105	236

Remarks:

- 1.Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
Margin value = Emission level – Limit value
- 2.#2402MHz: Fundamental frequency.
- 3.The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

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Frequency Range	Above 1GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 19		

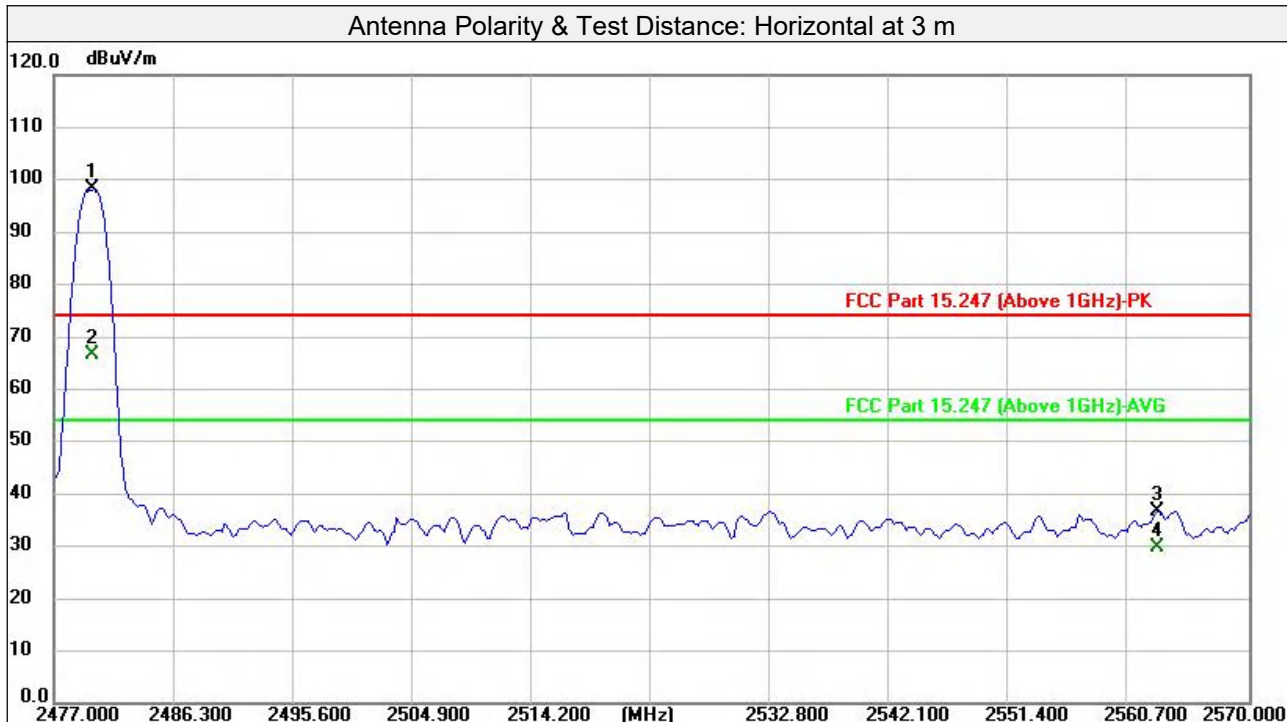
Antenna Polarity & Test Distance: Horizontal at 3 m									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Antenna Height (cm)	Table Angle (Degree)
1 #	2440.000	103.65	-0.98	102.67			peak	350	164
2 #	2440.000	103.19	-0.98	102.21			AVG	350	164
3	4880.000	43.22	2.63	45.85	74.00	-28.15	peak	369	54
4	4880.000	35.89	2.63	38.52	54.00	-15.48	AVG	369	54
5	7320.000	31.50	10.20	41.70	74.00	-32.30	peak	244	299
6	7320.000	21.11	10.20	31.31	54.00	-22.69	AVG	244	299
Antenna Polarity & Test Distance: Vertical at 3 m									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Antenna Height (cm)	Table Angle (Degree)
1 #	2440.000	103.65	-0.98	102.67			peak	186	288
2 #	2440.000	103.70	-0.98	102.72			AVG	186	288
3	4880.000	46.61	2.63	49.24	74.00	-24.76	peak	188	220
4	4880.000	41.47	2.63	44.10	54.00	-9.90	AVG	188	220
5	7320.000	29.28	10.20	39.48	74.00	-34.52	peak	197	36
6	7320.000	20.98	10.20	31.18	54.00	-22.82	AVG	197	36

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
Margin value = Emission level – Limit value
2. #2440MHz: Fundamental frequency.
3. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Test Report No.: 2411050494-RF-US-01

Frequency Range	Above 1GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 39		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Antenna Height (cm)	Table Angle (Degree)
1#	2480.168	98.90	-0.72	98.18			peak	400	360
2#	2480.168	67.26	-0.72	66.54			AVG	400	360
3	2563.104	37.07	-0.42	36.65	74.00	-37.35	peak	400	360
4	2563.104	30.30	-0.42	29.88	54.00	-24.12	AVG	400	360
5	4960.000	43.63	2.82	46.45	74.00	-27.55	peak	332	89
6	4960.000	38.26	2.82	41.08	54.00	-12.92	AVG	332	89
7	7440.000	31.08	10.51	41.59	74.00	-32.41	peak	122	58
8	7440.000	20.75	10.51	31.26	54.00	-22.74	AVG	122	58

Remarks:

- Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
Margin value = Emission level – Limit value
- #2480MHz: Fundamental frequency.
- The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

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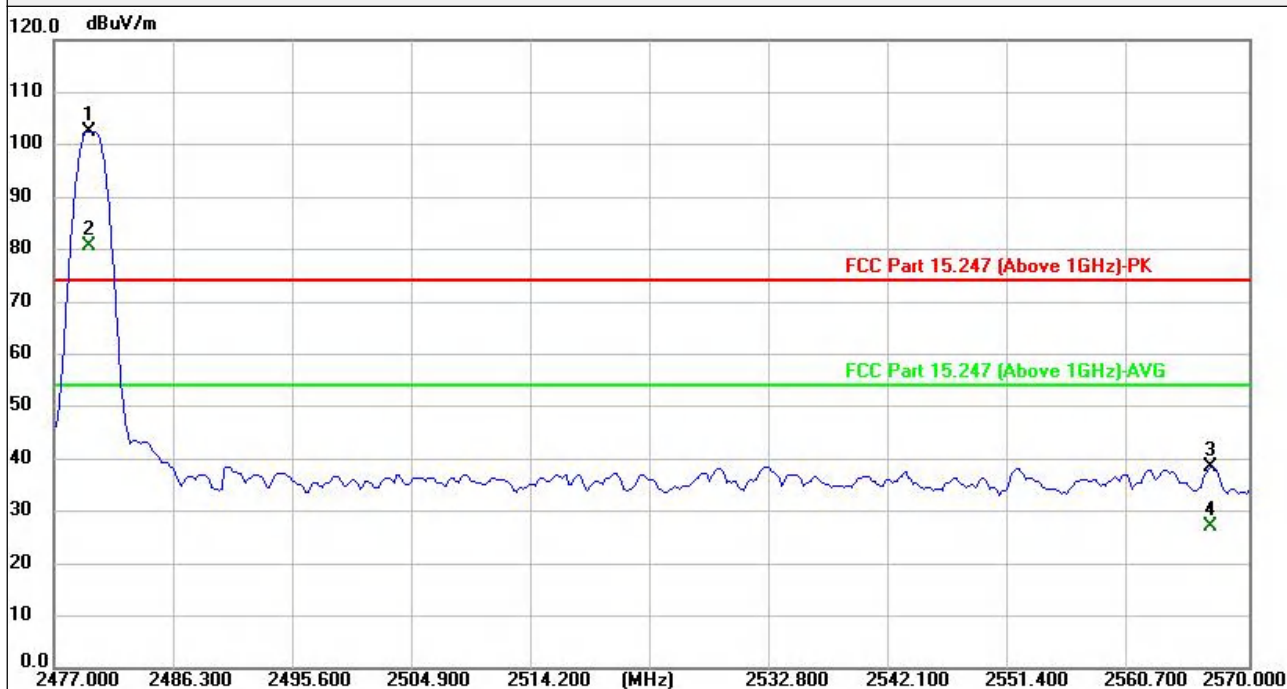
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Test Report No.: 2411050494-RF-US-01

Frequency Range	Above 1GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 39		

Antenna Polarity & Test Distance: Vertical at 3 m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Antenna Height (cm)	Table Angle (Degree)
1#	2479.796	103.35	-0.72	102.63			peak	371	73
2#	2479.796	81.38	-0.72	80.66			AVG	371	73
3	2567.204	39.01	-0.41	38.60	74.00	-35.40	peak	371	73
4	2567.204	27.36	-0.41	26.95	54.00	-27.05	AVG	371	73
5	4960.000	44.86	2.82	47.68	74.00	-26.32	peak	103	90
6	4960.000	38.87	2.82	41.69	54.00	-12.31	AVG	103	90
7	7440.000	30.50	10.51	41.01	74.00	-32.99	peak	355	178
8	7440.000	20.79	10.51	31.30	54.00	-22.70	AVG	355	178

Remarks:

- Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
Margin value = Emission level – Limit value
- #2480MHz: Fundamental frequency.
- The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

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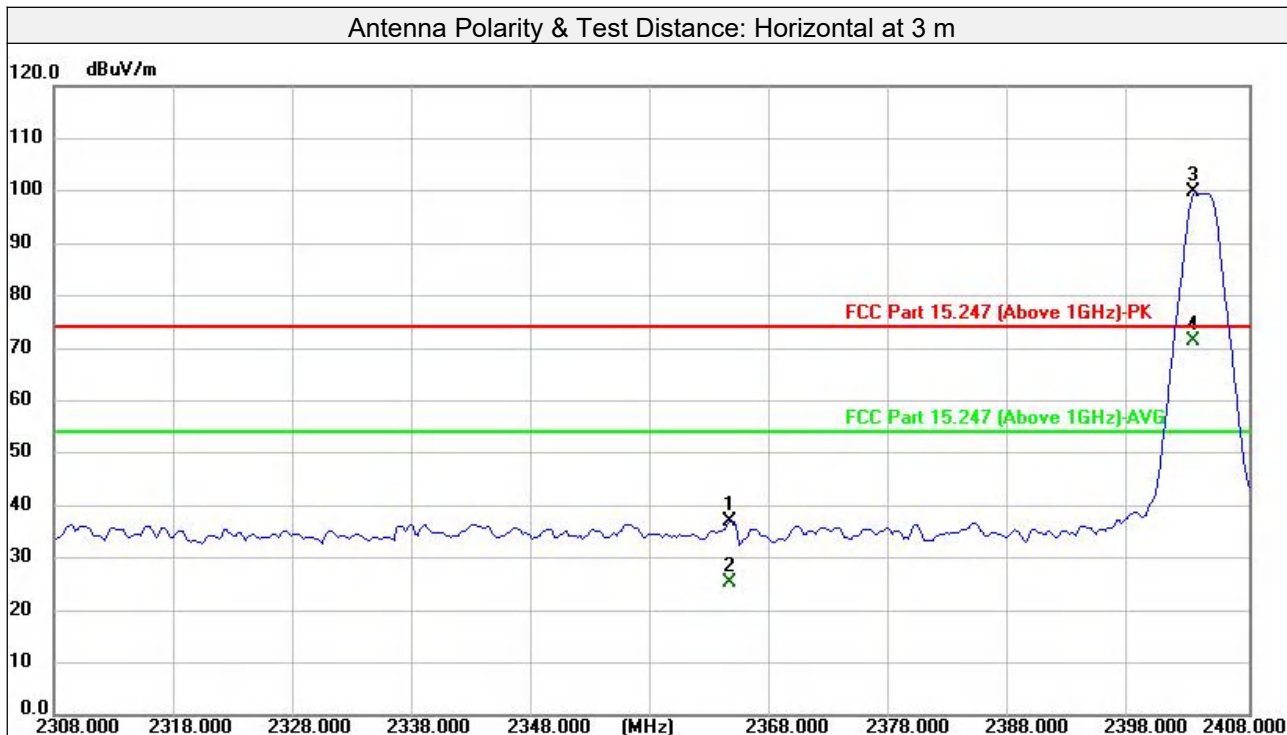
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GFSK-2Mbps

Frequency Range	Above 1GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 1		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Antenna Height (cm)	Table Angle (Degree)
1	2364.713	38.49	-1.45	37.04	74.00	-36.96	peak	340	360
2	2364.713	26.79	-1.45	25.34	54.00	-28.66	AVG	340	360
3#	2403.591	100.94	-1.21	99.73			peak	340	360
4#	2403.591	72.70	-1.21	71.49			AVG	340	360
5	4804.000	42.09	2.45	44.54	74.00	-29.46	peak	105	70
6	4804.000	30.13	2.45	32.58	54.00	-21.42	AVG	105	70
7	7212.000	31.38	9.92	41.30	74.00	-32.70	peak	115	170
8	7212.000	21.52	9.92	31.44	54.00	-22.56	AVG	115	170

Remarks:

- Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamplifier Factor)
Margin value = Emission level – Limit value
- #2404MHz: Fundamental frequency.
- The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

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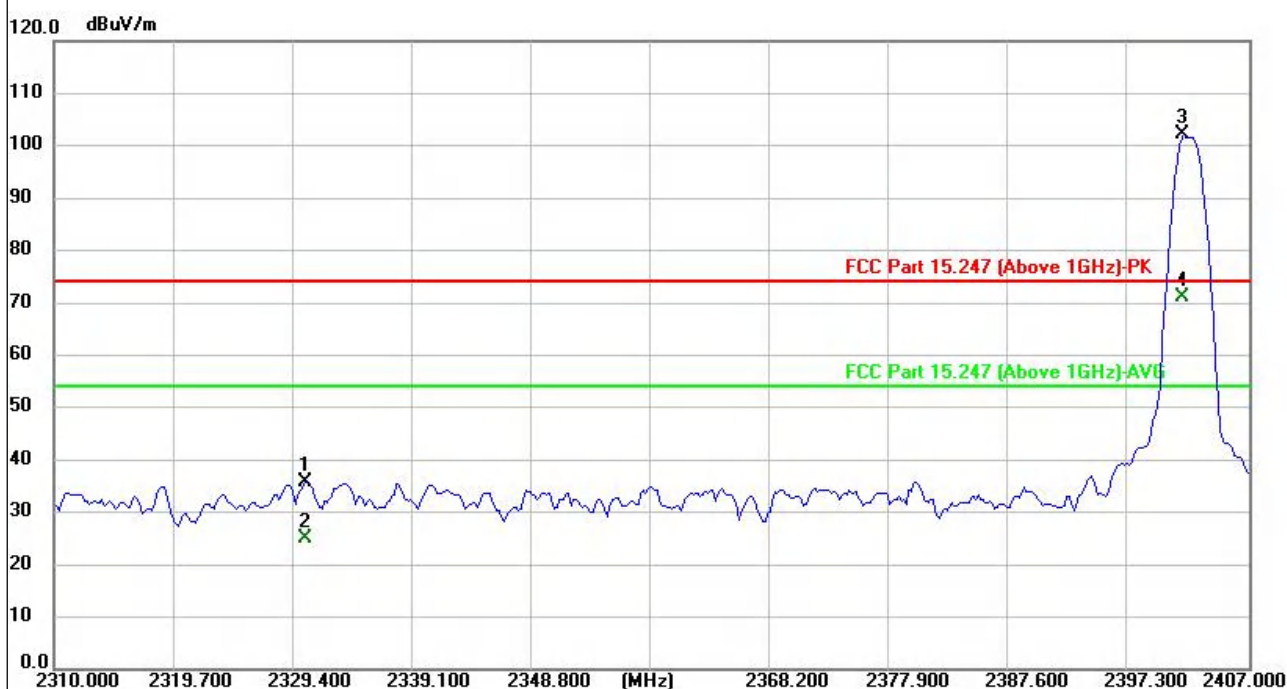
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Frequency Range	Above 1GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 1		

Antenna Polarity & Test Distance: Vertical at 3 m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Antenna Height (cm)	Table Angle (Degree)
1	2330.411	37.38	-1.67	35.71	74.00	-38.29	peak	115	349
2	2330.411	26.67	-1.67	25.00	54.00	-29.00	AVG	115	349
3#	2403.751	103.43	-1.22	102.21			peak	288	159
4#	2403.751	72.22	-1.22	71.00			AVG	288	159
5	4808.000	41.45	2.45	43.90	74.00	-30.10	peak	202	83
6	4808.000	30.38	2.45	32.83	54.00	-21.17	AVG	202	83
7	7212.000	30.02	9.92	39.94	74.00	-34.06	peak	299	74
8	7212.000	21.16	9.92	31.08	54.00	-22.92	AVG	299	74

Remarks:

- Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamplifier Factor)
Margin value = Emission level – Limit value
- #2404MHz: Fundamental frequency.
- The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

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Frequency Range	Above 1GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 19		

Antenna Polarity & Test Distance: Horizontal at 3 m

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Antenna Height (cm)	Table Angle (Degree)
1#	2440.000	103.63	-0.98	102.65			peak	150	266
2#	2440.000	78.85	-0.98	77.87			AVG	150	266
3	4880.000	41.52	2.63	44.15	74.00	-29.85	peak	344	155
4	4880.000	36.81	2.63	39.44	54.00	-14.56	AVG	344	155
5	7320.000	31.92	10.20	42.12	74.00	-31.88	peak	189	87
6	7320.000	21.91	10.20	32.11	54.00	-21.89	AVG	189	87

Antenna Polarity & Test Distance: Vertical at 3 m

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Antenna Height (cm)	Table Angle (Degree)
1#	2440.000	105.37	-0.98	104.39			peak	336	76
2#	2440.000	83.42	-0.98	82.44			AVG	336	76
3	4880.000	46.08	2.63	48.71	74.00	-25.29	peak	122	354
4	4880.000	41.36	2.63	43.99	54.00	-10.01	AVG	122	354
5	7320.000	30.32	10.20	40.52	74.00	-33.48	peak	144	178
6	7320.000	22.54	10.20	32.74	54.00	-21.26	AVG	144	178

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
Margin value = Emission level – Limit value
2. #2440MHz: Fundamental frequency.
3. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

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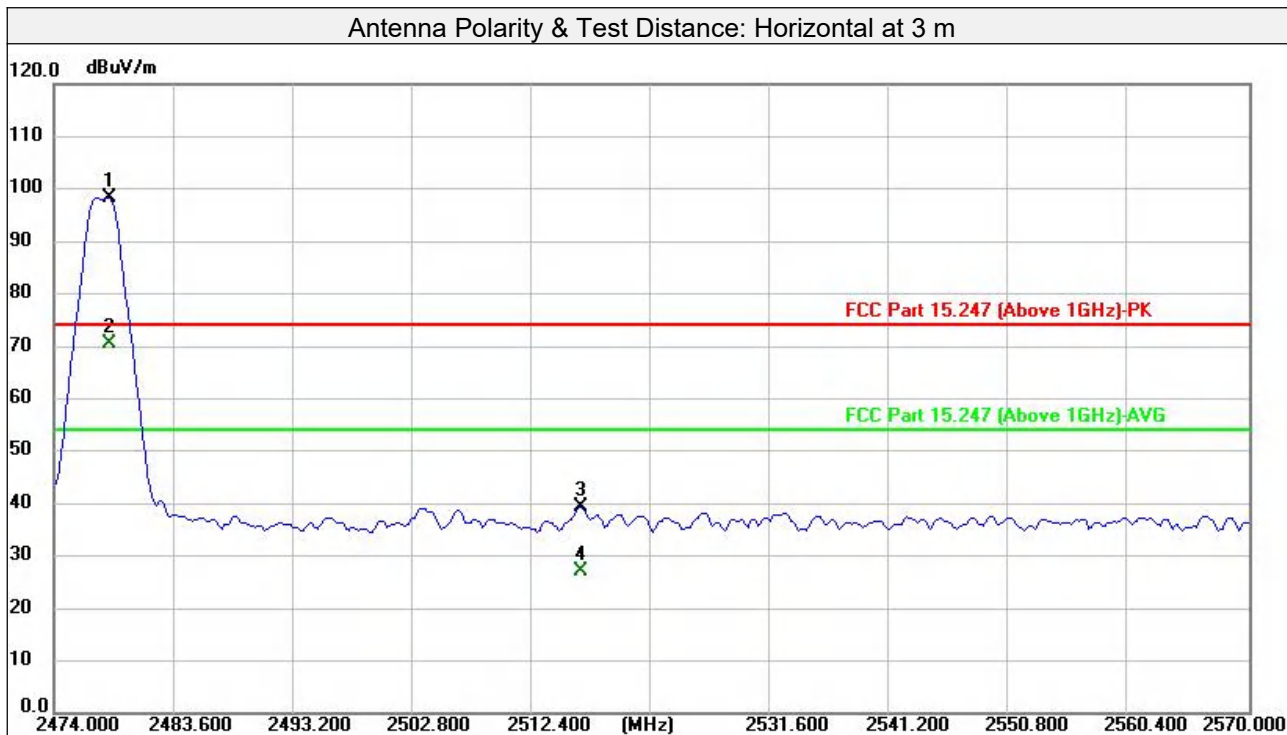
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Frequency Range	Above 1GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 38		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Antenna Height (cm)	Table Angle (Degree)
1#	2478.425	99.15	-0.72	98.43			peak	400	360
2#	2478.425	71.13	-0.72	70.41			AVG	400	360
3	2516.325	39.81	-0.55	39.26	74.00	-34.74	peak	400	360
4	2516.325	27.60	-0.55	27.05	54.00	-26.95	AVG	400	360
5	4956.000	40.89	2.80	43.69	74.00	-30.31	peak	135	69
6	4956.000	29.67	2.80	32.47	54.00	-21.53	AVG	135	69
7	7434.000	29.94	10.50	40.44	74.00	-33.56	peak	104	239
8	7434.000	21.26	10.50	31.76	54.00	-22.24	AVG	104	239

Remarks:

- Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
Margin value = Emission level – Limit value
- #2478MHz: Fundamental frequency.
- The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

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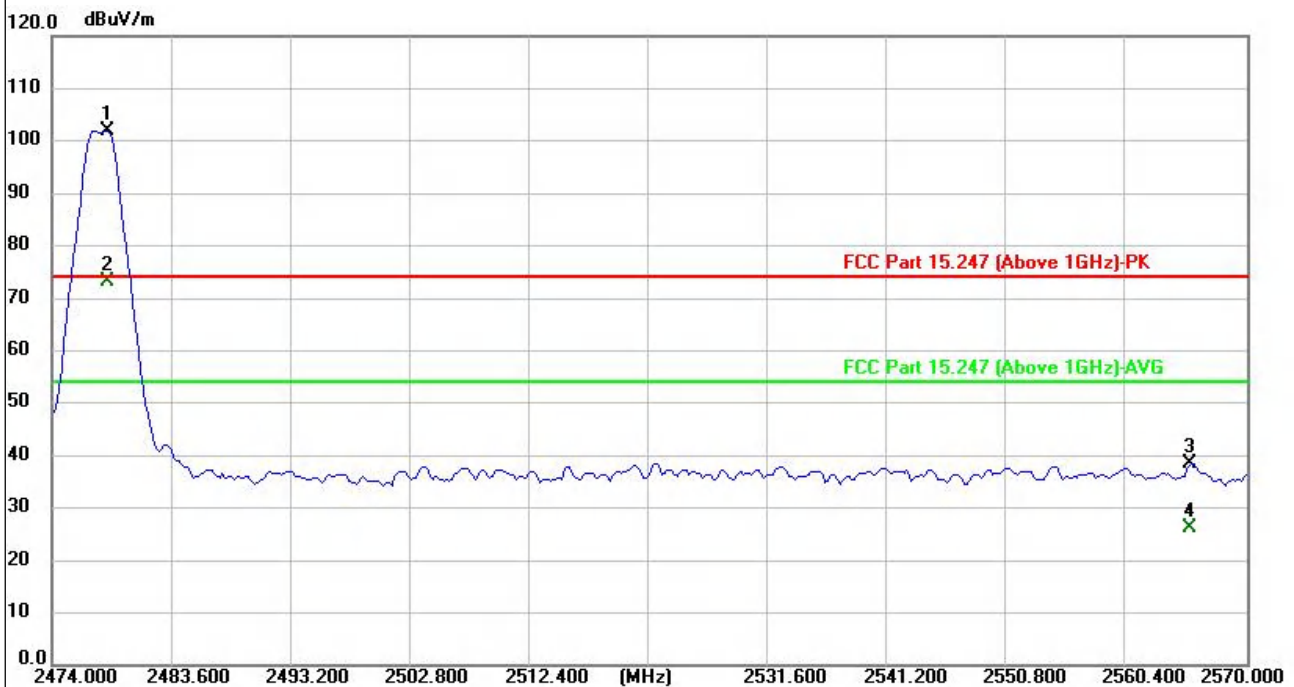
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Test Report No.: 2411050494-RF-US-01

Frequency Range	Above 1GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 38		

Antenna Polarity & Test Distance: Vertical at 3 m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Antenna Height (cm)	Table Angle (Degree)
1#	2478.425	102.75	-0.72	102.03			peak	388	80
2#	2478.425	73.89	-0.72	73.17			AVG	388	80
3	2565.575	38.88	-0.41	38.47	74.00	-35.53	peak	388	80
4	2565.575	26.66	-0.41	26.25	54.00	-27.75	AVG	388	80
5	4956.000	45.78	2.80	48.58	74.00	-25.42	peak	111	325
6	4956.000	36.77	2.80	39.57	54.00	-14.43	AVG	111	325
7	7434.000	20.97	10.50	31.47	74.00	-42.53	peak	138	239
8	7434.000	29.39	10.50	39.89	54.00	-14.11	AVG	138	239

Remarks:

- Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamplifier Factor)
Margin value = Emission level – Limit value
- #2478MHz: Fundamental frequency.
- The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

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3.2 Conducted Emission Measurement**3.2.1 Limits of Conducted Emission Measurement**

Frequency (MHz)	Conducted Limit (dBuV)	
	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 lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3.2.2 Test Instruments

Equipment	Manufacturer	Model No.	Serial No.	Next Cal. Date
EMI Test Receiver (10kHz~7GHz)	Rohde&Schwarz	ESR7	101961	2025-07-25
2 Line V-Network LISN	Rohde&Schwarz	ENV216	3560.6550.15	2025-07-25
Test software	FARAD	EZ_EMV V1.1.4.2	N/A	N/A
Broadcast test system	R&S	SFU	100410	2025-07-25

Note:

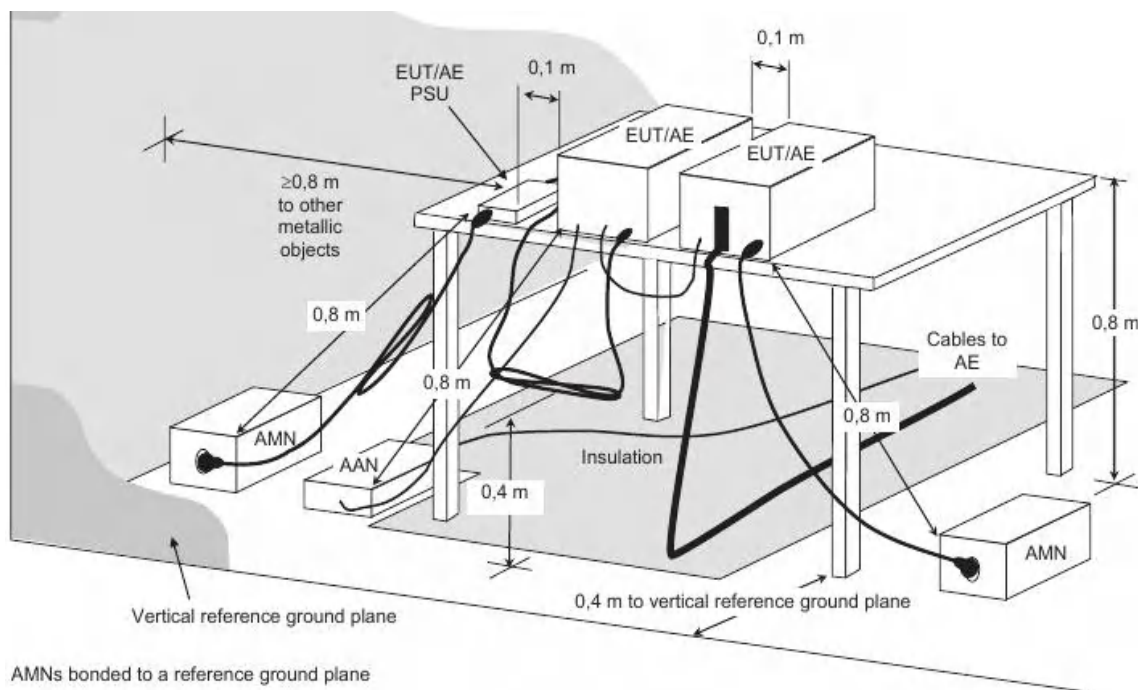
1. The calibration interval of the above test instruments is 12 months and calibrated by LISAI/CHINA.
2. The test was performed in Shielded Room 743.

3.2.3 Test Procedures

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit – 20dB) was not recorded.

Note: All modes of operation were investigated and the worst-case emissions are reported.

3.2.4 Test Setup



For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.2.5 EUT Operating Condition

Set the EUT under transmission condition continuously at specific channel frequency.

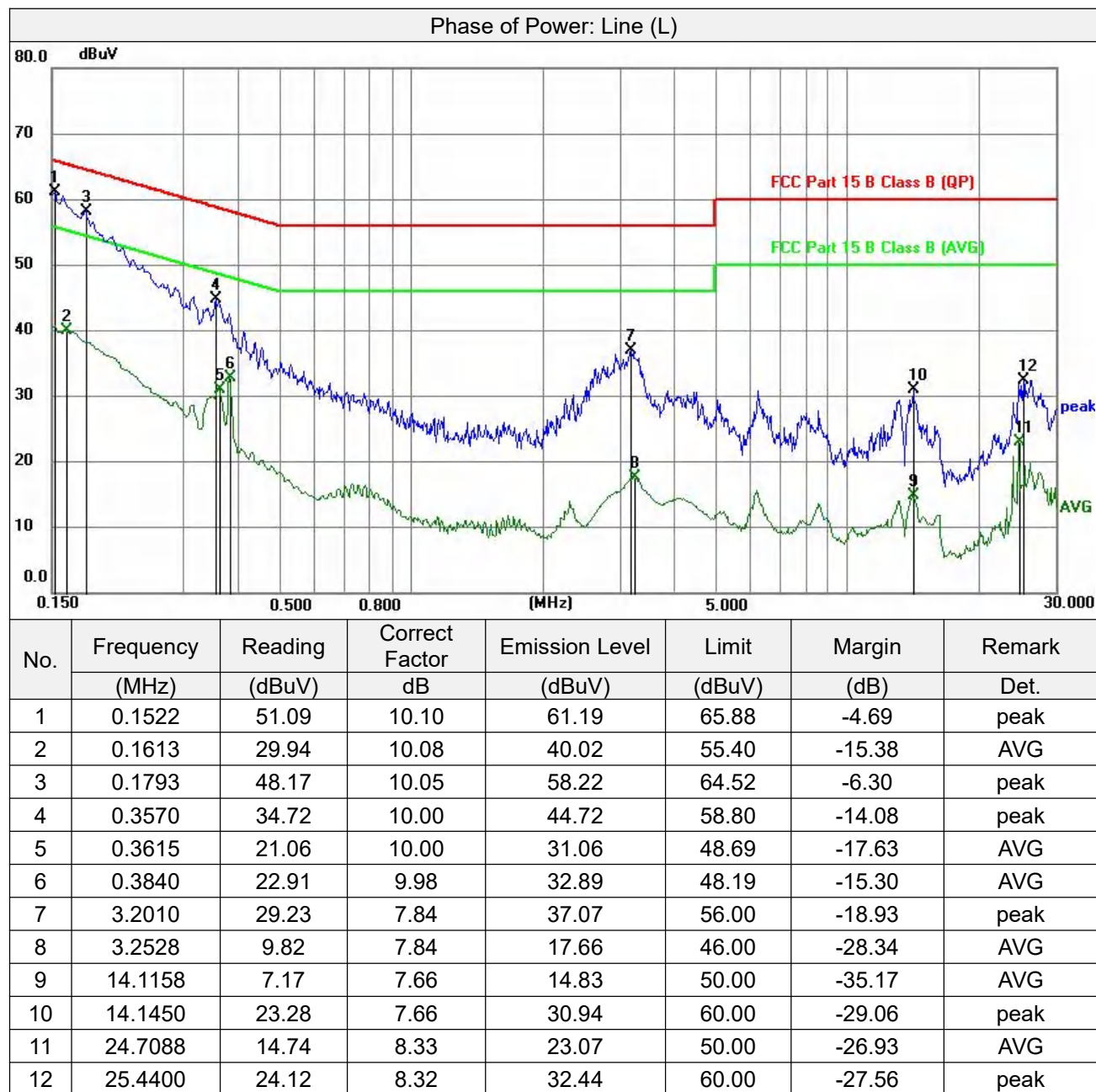
3.2.6 Deviation from Test Standard

No deviation.

Test Report No.: 2411050494-RF-US-01

3.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
-----------------	----------------	--	--------------------------------------



Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

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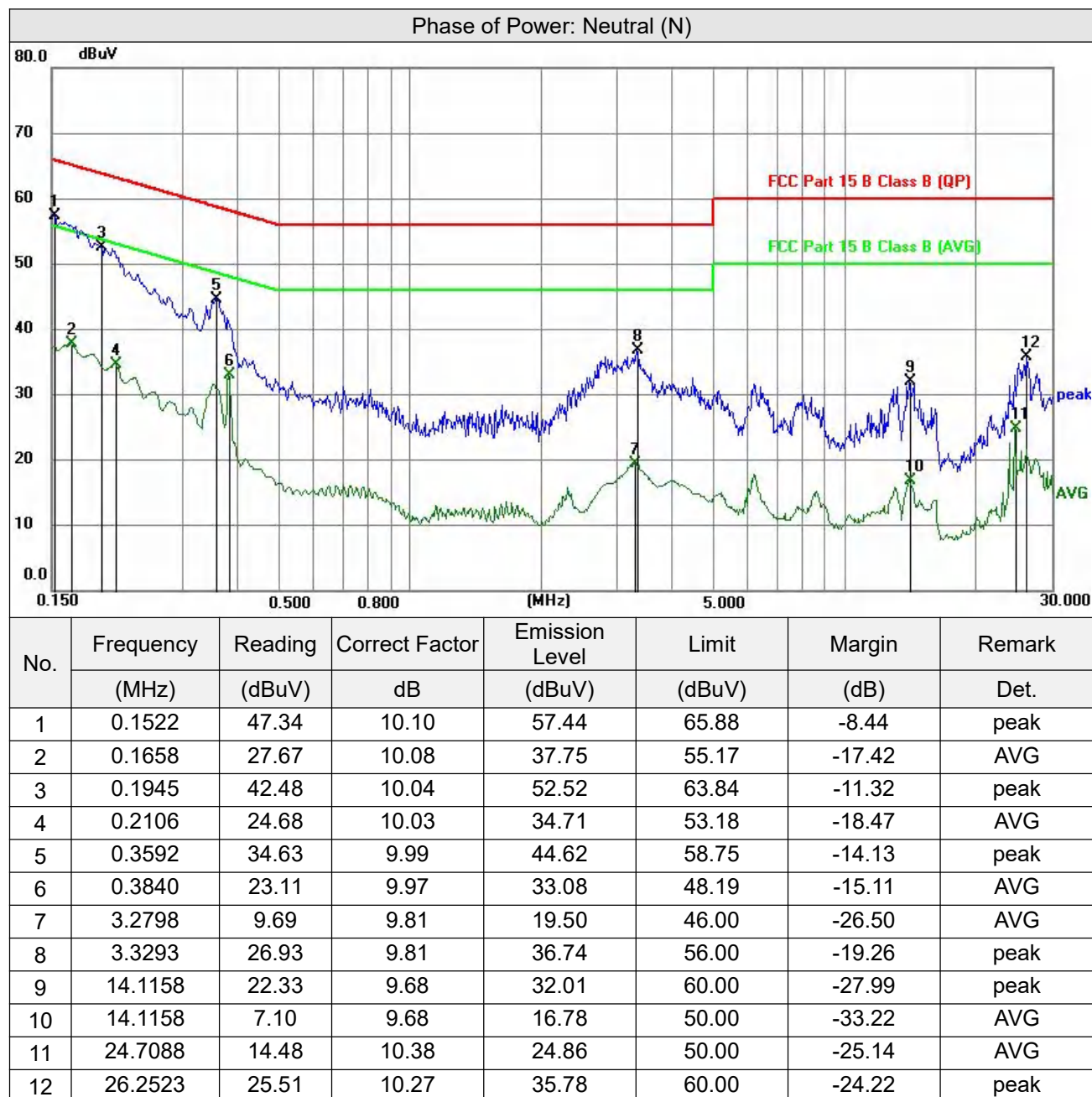
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Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
-----------------	----------------	--	--------------------------------------



Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

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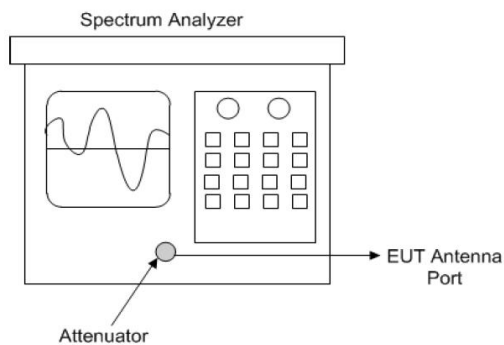
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3.3 Number of Hopping Frequency Used

3.3.1 Limits of Hopping Frequency Used Measurement

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

3.3.2 Test Setup



Spectrum analyzer test configuration

3.3.3 Test Instruments

Refer to section 5 to get information of above instrument.

3.3.4 Test Procedure

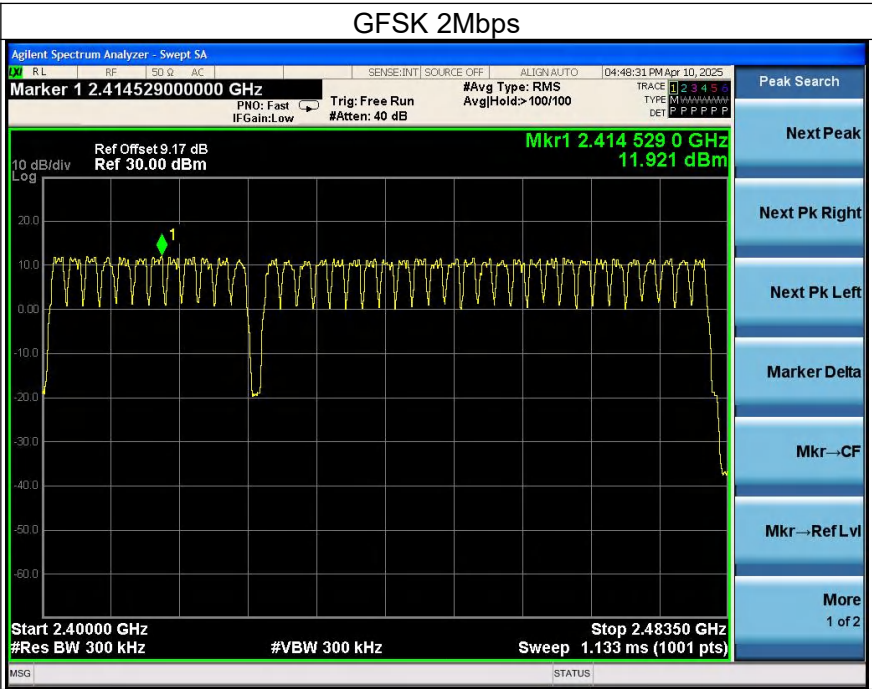
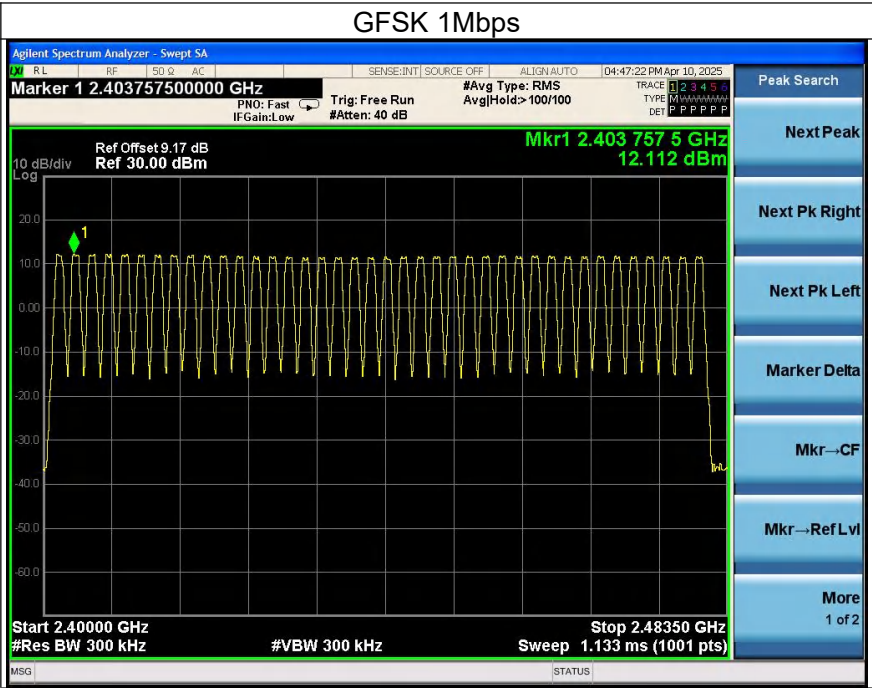
- Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make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

3.3.5 Deviation from Test Standard

No deviation.

3.3.6 Test Results

Test Mode	Channel	Result[Num]	Limit[Num]	Verdict
GFSK 1Mbps	Hop	39	≥15	PASS
GFSK 2Mbps	Hop	36	≥15	PASS

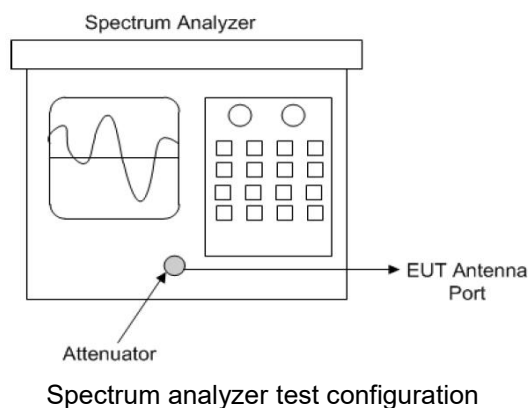


3.4 Dwell Time on Each Channel

3.4.1 Limits of Dwell Time on Each Channel Measurement

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

3.4.2 Test Setup



3.4.3 Test Instruments

Refer to section 5 to get information of above instrument.

3.4.4 Test Procedures

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

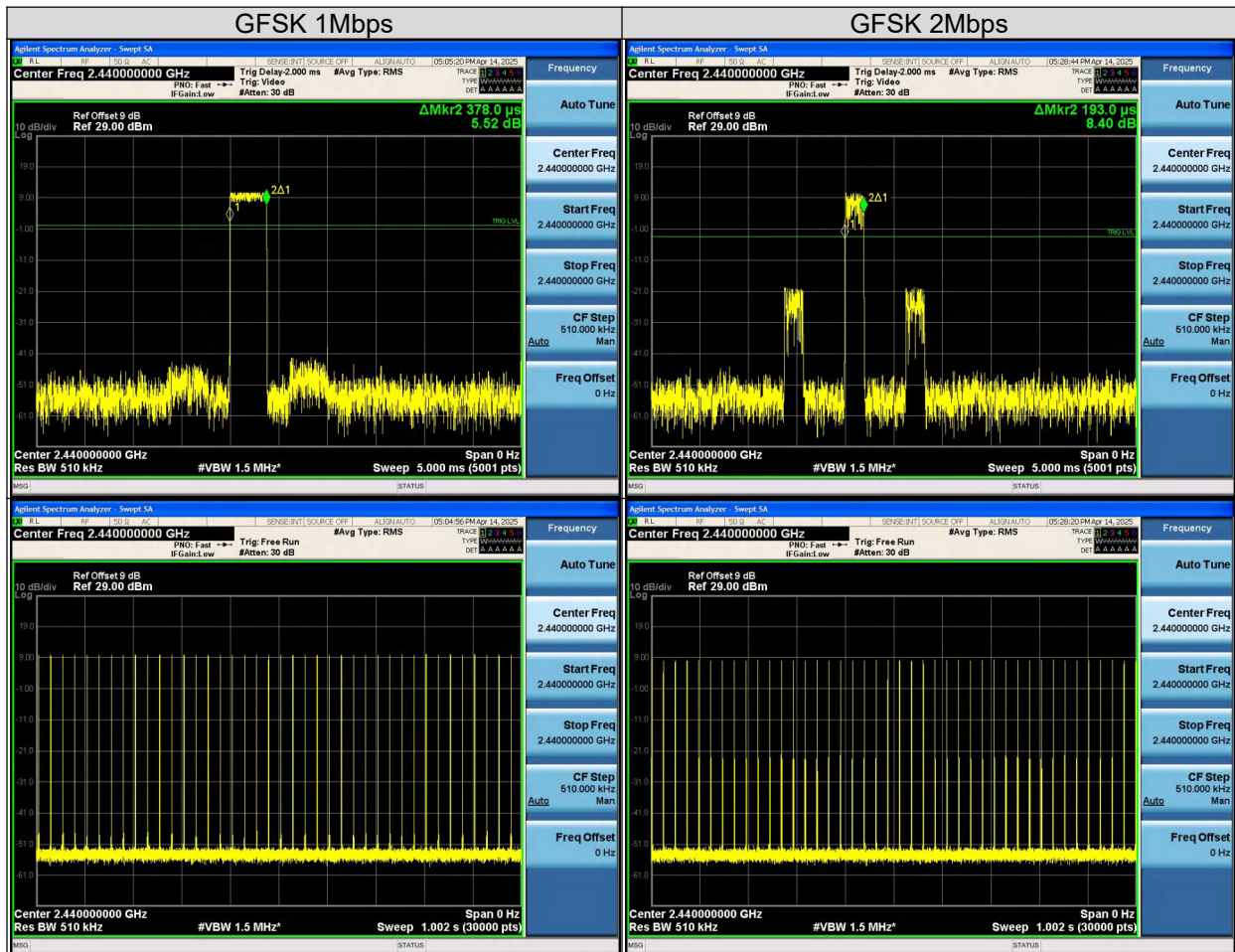
3.4.5 Deviation from Test Standard

No deviation.

3.4.6 Test Results

Test Mode	Channel	Burst Width [ms]	Total Hops [Num]	Result[ms]	Limit[ms]	Verdict
GFSK 1Mbps	Hop	0.378	640	241.92	≤400	PASS
GFSK 2Mbps	Hop	0.193	606.8	177.11	≤400	PASS

Note: Test plots of the transmitting time slot are shown as below.



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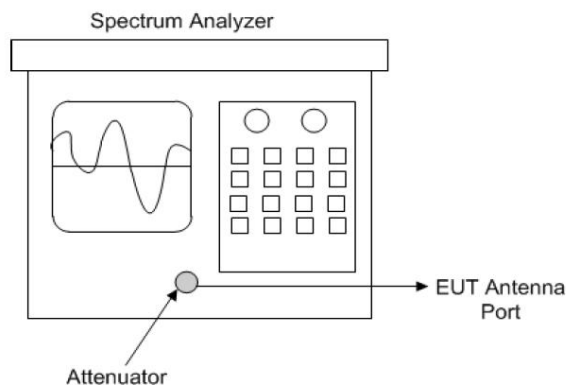
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3.5 Channel Bandwidth

3.5.1 Limits of Channel Bandwidth Measurement

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

3.5.2 Test Setup



Spectrum analyzer test configuration

3.5.3 Test Instruments

Refer to section 5 to get information of above instrument.

3.5.4 Test Procedure

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

3.5.5 Deviation from Test Standard

No deviation.

3.5.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

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3.5.7 Test Results

Test Mode	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]
1Mbps	2402	1.143	2401.415	2402.558
	2440	1.140	2439.415	2440.555
	2480	1.140	2479.415	2480.555
2Mbps	2404	2.346	2402.848	2405.194
	2440	2.346	2438.848	2441.194
	2478	2.358	2476.842	2479.200

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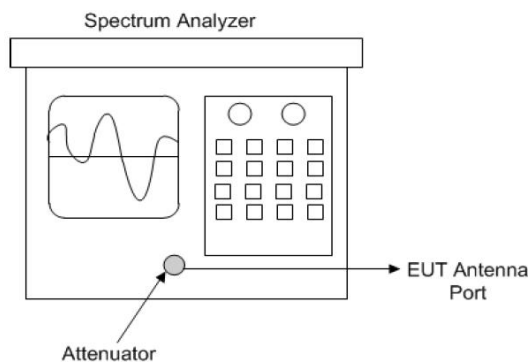
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3.6 Occupied Bandwidth Measurement

3.6.1 Test Setup



Spectrum analyzer test configuration

3.6.2 Test Instruments

Refer to section 5 to get information of above instrument.

3.6.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to PEAK. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean power of a given emission.

3.6.4 Deviation from Test Standard

No deviation.

3.6.5 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

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3.6.6 Test Results

Test Mode	Channel	OCB [MHz]	FL[MHz]	FH[MHz]
1Mbps	2402	1.0412	2401.475	2402.516
	2440	1.0371	2439.479	2440.516
	2480	1.0388	2479.477	2480.516
2Mbps	2404	2.0655	2402.977	2405.042
	2440	2.0646	2438.977	2441.041
	2478	2.0657	2476.975	2479.041

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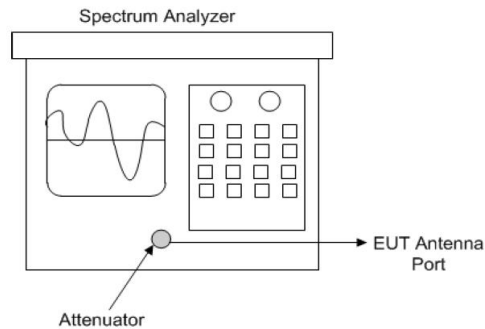
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3.7 Hopping Channel Separation

3.7.1 Limits of Hopping Channel Separation Measurement

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

3.7.2 Test Setup



3.7.3 Test Instruments

Refer to section 5 to get information of above instrument.

3.7.4 Test Procedure

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
- By using the MaxHold function record the separation of two adjacent channels.
- Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
- Repeat above procedures until all frequencies measured were complete.

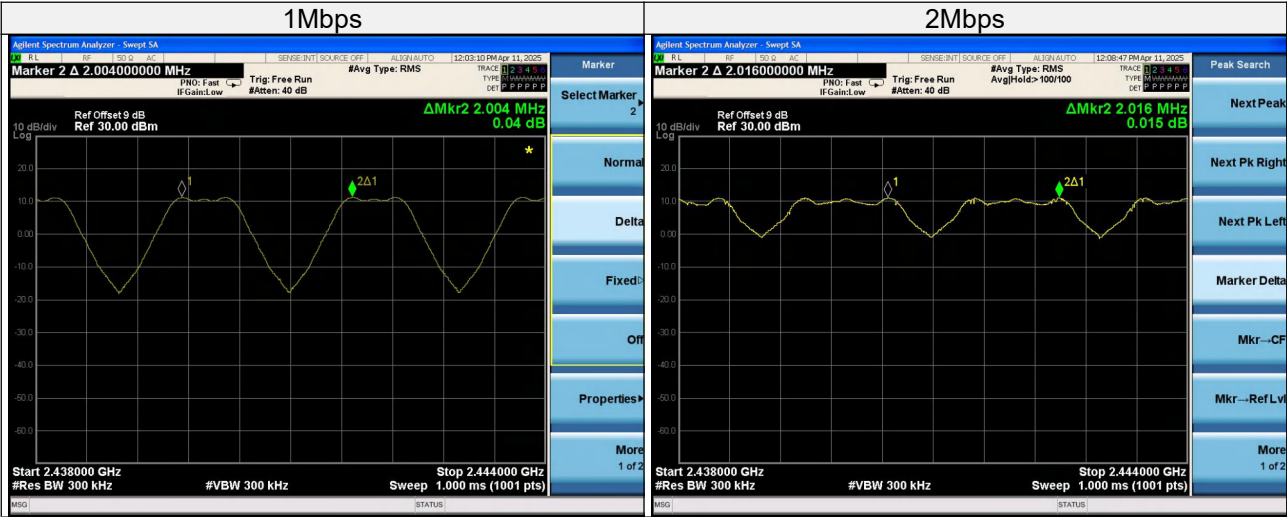
3.7.5 Deviation from Test Standard

No deviation.

3.7.6 Test Results

Test Mode	Channel	Result[MHz]	Limit[MHz]	Verdict
1Mbps	Hop	2.004	≥ 0.762	PASS
2Mbps	Hop	2.016	≥ 1.572	PASS

Note: The minimum limit is two-third 20 dB bandwidth.



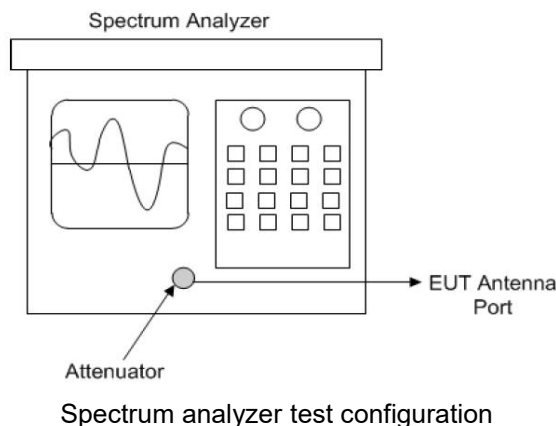
3.8 Maximum Output Power

3.8.1 Limits of Maximum Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

3.8.2 Test Setup

- Measurement using a spectrum analyzer (SA) Subclause 11.9.2.2 of ANSI C63.10 is applicable



3.8.3 Test Instruments

Refer to section 5 to get information of above instrument.

3.8.4 Test Procedure

Measurement using a spectrum analyzer (SA), Selection of test method:

The proper test method is selected based on the following criteria:

- Method AVGSA-1 or method AVGSA-1A (alternative)** shall be applied if either of the following conditions can be satisfied:
 - 1) The EUT transmits continuously (or with a D> 98%).
 - 2) Sweep triggering can be implemented in such a way that the device transmits at the maximum power control level throughout the duration of each of the instrument sweeps to be averaged. This condition can generally be achieved by triggering the instrument's sweep if the duration of the sweep (with the instrument configured as in method AVGSA-1) is equal to or shorter than the duration T of each transmission from the EUT, and if those transmissions exhibit full power throughout their durations.
- Method AVGSA-2 or method AVGSA-2A (alternative)** shall be applied if the conditions of the preceding item a) cannot be achieved and the transmissions exhibit a constant duty cycle during the measurement duration. Duty cycle will be considered to be constant if variations are less than +2%.
- Method AVGSA-3 or method AVGSA-3A (alternative)** shall be applied if the conditions of the preceding item a) and item b) cannot be achieved.

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☒ Measurement using a spectrum analyzer (SA), Selection of test method:

☒ Maximum peak conducted output power

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

- a) Set the RBW > DTS bandwidth.
- b) Set VBW > [3 x RBW]
- c) Set span > [3 x RBW]
- d) Sweep time = auto couple.
- e) Detector = peak
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

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☒ Maximum conducted (average) output power (Method AVGSA-2):

- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c) SA Setting:
 - 1* Set span to at least 1.5 times the OBW
 - 2* Set sweep trigger to "free run."
 - 3* Set RBW= 1% to 5% of the OBW. not to exceed 1MHz.
 - 4* Set VBW $\geq 3 \times$ RBW
 - 5* Number of points in sweep $\geq 2 \times$ span /RBW. (This gives bin-to-bin spacing \leq RBW / 2. so that narrowband signals are not lost between frequency bins).
 - 6* Sweep time \leq (number of points in sweep) \times T. where T is defined in 11.6. If this gives a sweep time less than the auto sweep time of the instrument. then method AVGSA-3 shall not be used (use AVGSA-3A). The purpose of this step is so that the averaging time in each bin is less than or equal to the minimum time of a transmission.
 - 7* Detector =RMS (power averaging).
 - 8* Trace mode =max hold.
 - 9* Allow max hold to run for at least 60 s or longer as needed to allow the trace to stabilize.
 - 10* Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function. then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW
- d. Measure the captured power within the band and recording the plot.
- e. Repeat above procedures until all frequencies required were complete.

3.8.5 Deviation from Test Standard

No deviation.

3.8.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

3.8.7 Test Results

Peak power

Test Mode	Channel	Result		Limit [mW]	Verdict
		[dBm]	[mW]		
1Mbps	2402	12.901	19.503	<125	PASS
	2440	12.235	16.730	<125	PASS
	2480	12.411	17.422	<125	PASS
2Mbps	2404	12.946	19.706	<125	PASS
	2440	12.262	16.834	<125	PASS
	2478	12.451	17.583	<125	PASS

Peak Power Spectrum Plot

1Mbps



2Mbps



CH0



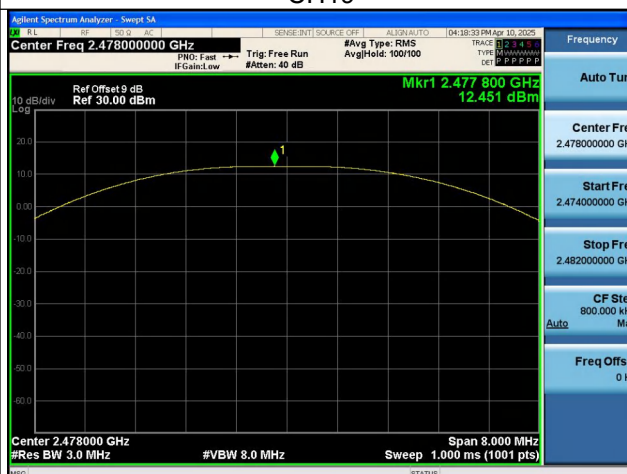
CH1



CH19



CH19



CH39

CH38

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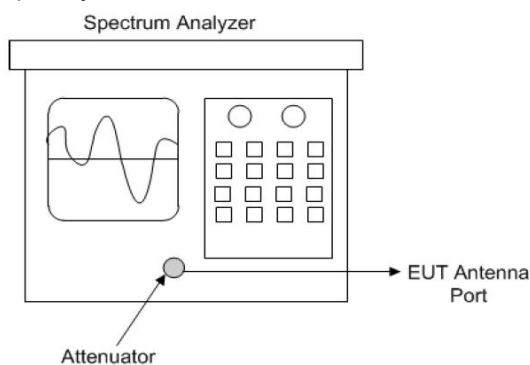
3.9 Conducted Out of Band Emission Measurement

3.9.1 Limits of Conducted Out of Band Emission Measurement

- a. **If the maximum peak conducted output power procedure was used to determine compliance as described in 11.9.1**, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).
- b. **If maximum conducted (average) output power was used to determine compliance as described in 11.9.2**, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc)

3.9.2 Test Setup

- DTS emissions in non-restricted frequency bands Subclause 11.11 of ANSI C63.10 is applicable.
- DTS emissions in restricted frequency bands Subclause 11.12 of ANSI C63.10 is applicable.



Spectrum analyzer test configuration

3.9.3 Test Instruments

Refer to section 5 to get information of above instrument.

3.9.4 Test Procedure

a. Establish a reference level by using the following procedure:

- 1) Set instrument center frequency to DTS channel center frequency.
- 2) Set the span to 21.5 times the DTS bandwidth)
- 3) Set the RBW= 100 kHz)
- 4) Set the VBW $\geq 3 \times$ RBW
- 5) Detector = peak
- 6) Sweep time = auto coupling
- 7) Trace mode =max hold
- 8) Allow trace to fully stabilize
- 9) Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

b. Establish an emission level by using the following procedure:

- 1) Set the center frequency and span to encompass frequency range to be measured.
- 2) Set the RBW = 100 kHz
- 3) Set the VBW ≥ 300 kHz.
- 4) Detector = peak.
- 5) Sweep time = auto couple.
- 6) Trace mode = max hold.
- 7) Allow trace to fully stabilize.
- 8) Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

3.9.5 Deviation from Test Standard

No deviation.

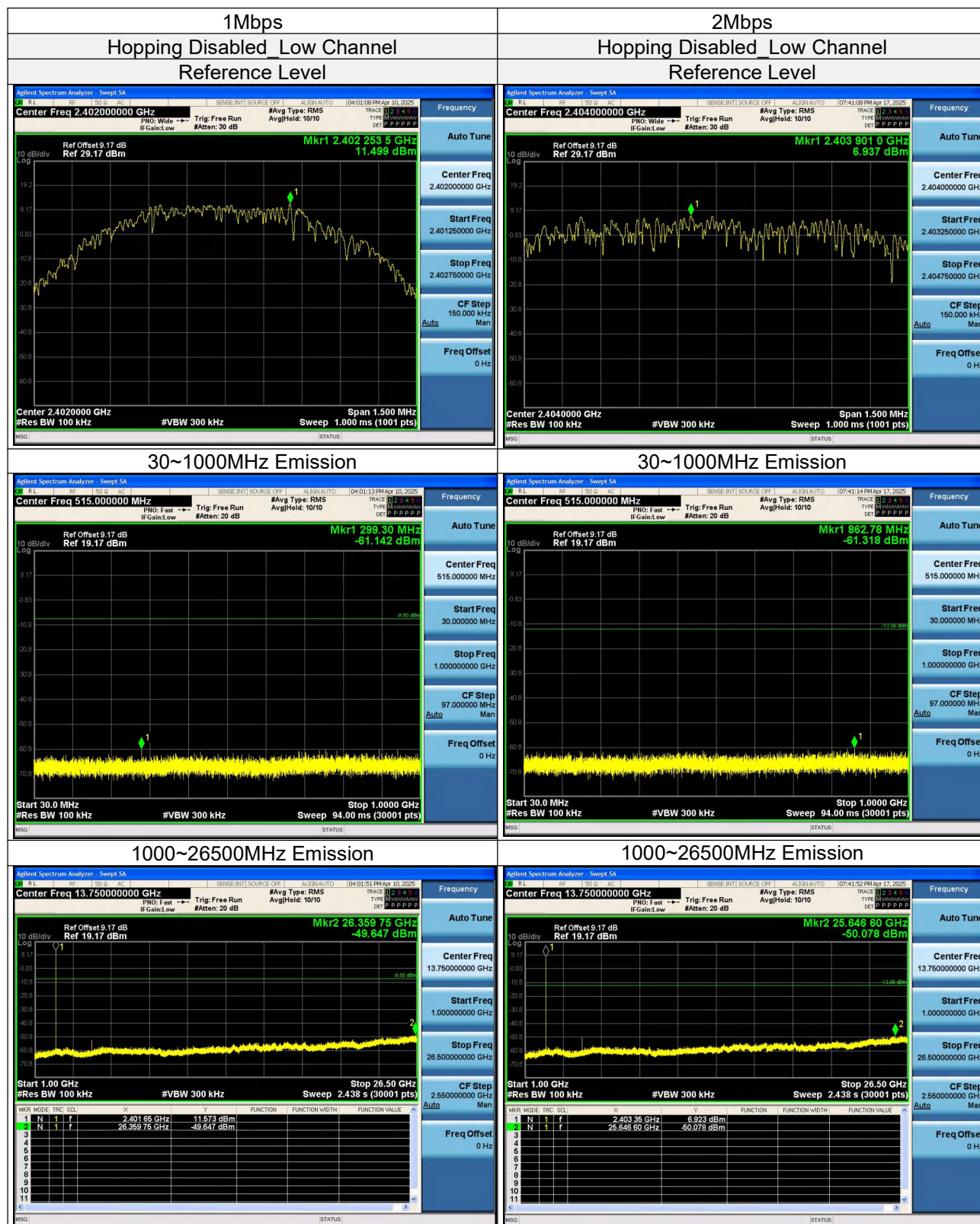
3.9.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

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3.9.7 Test Results

The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



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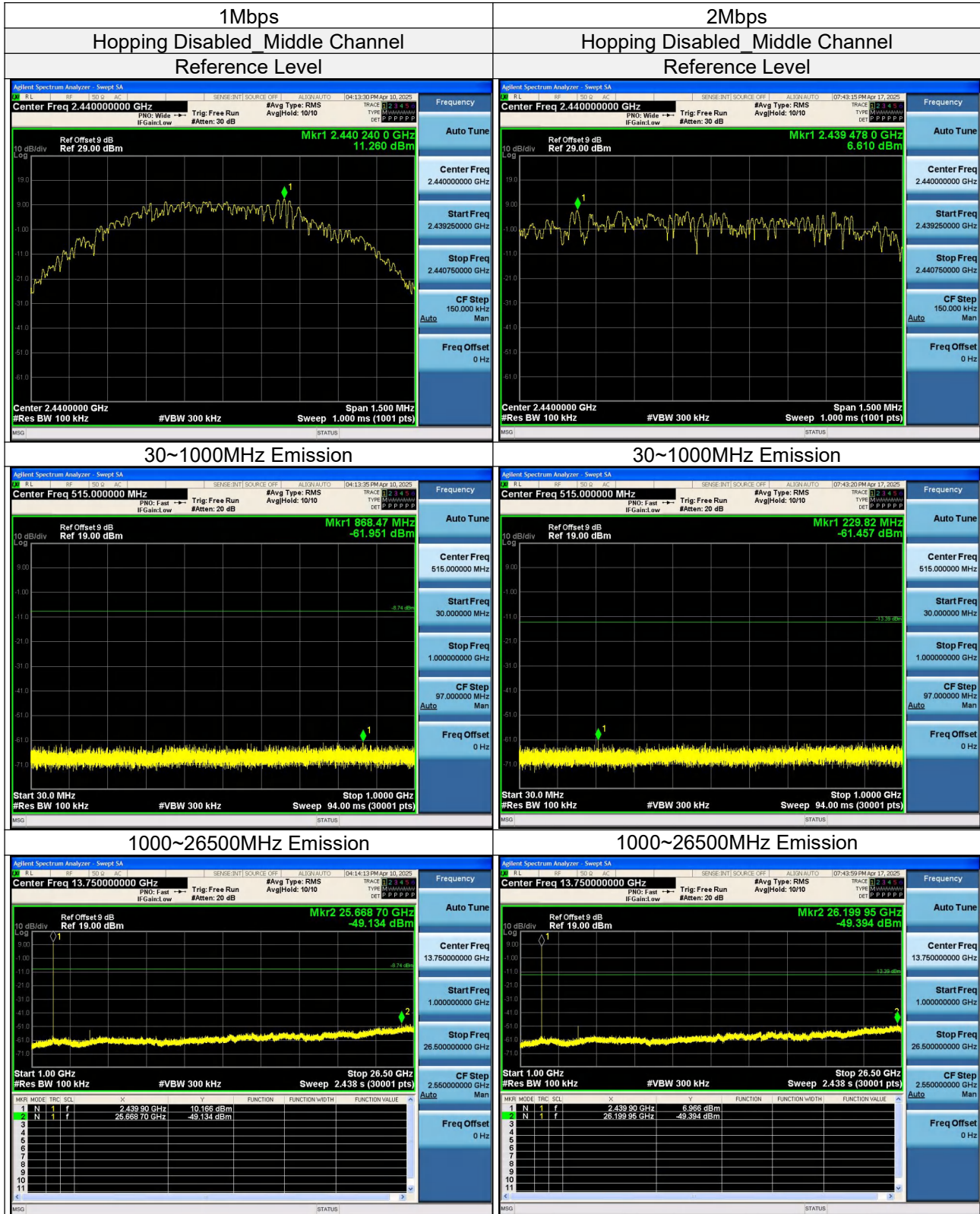
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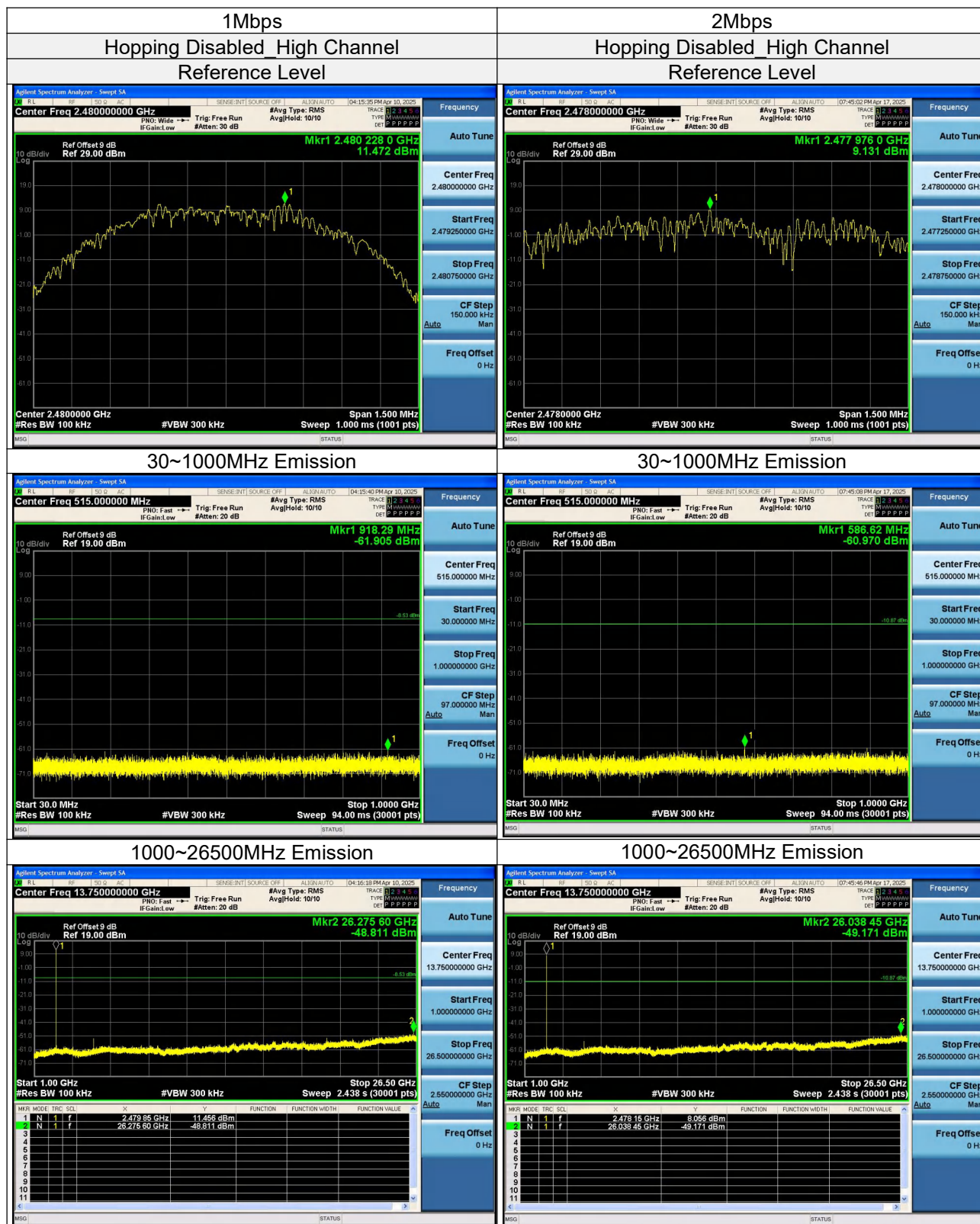
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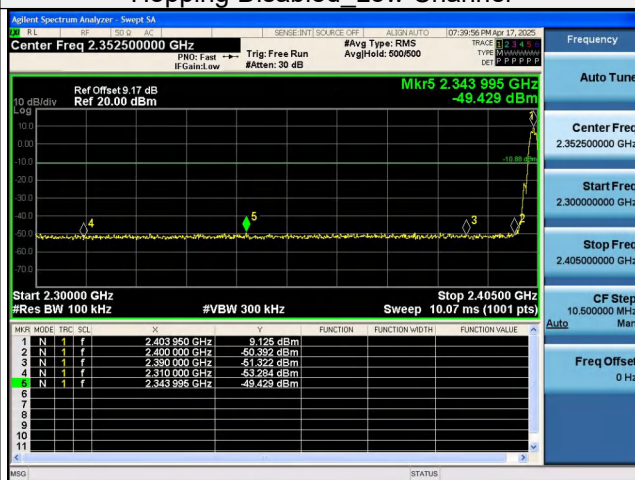
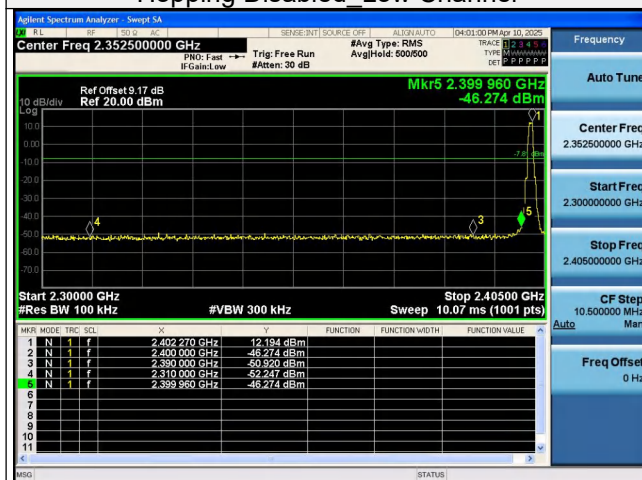
Band edge

1Mbps

2Mbps

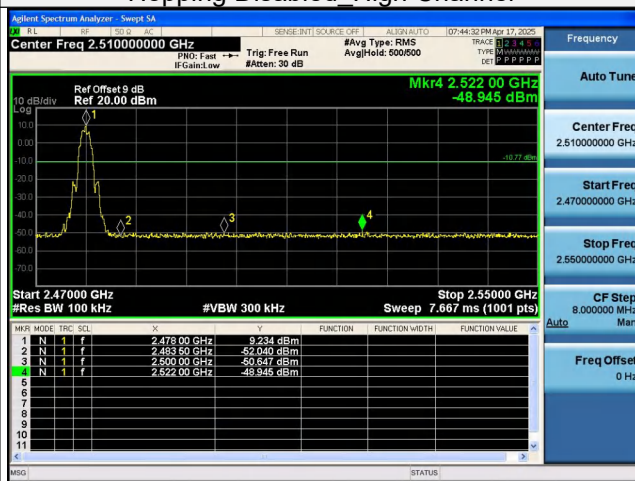
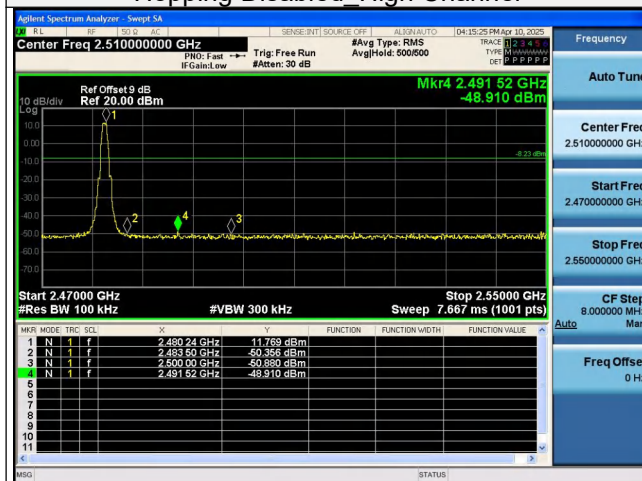
Hopping Disabled_Low Channel

Hopping Disabled_Low Channel



Hopping Disabled_High Channel

Hopping Disabled_High Channel



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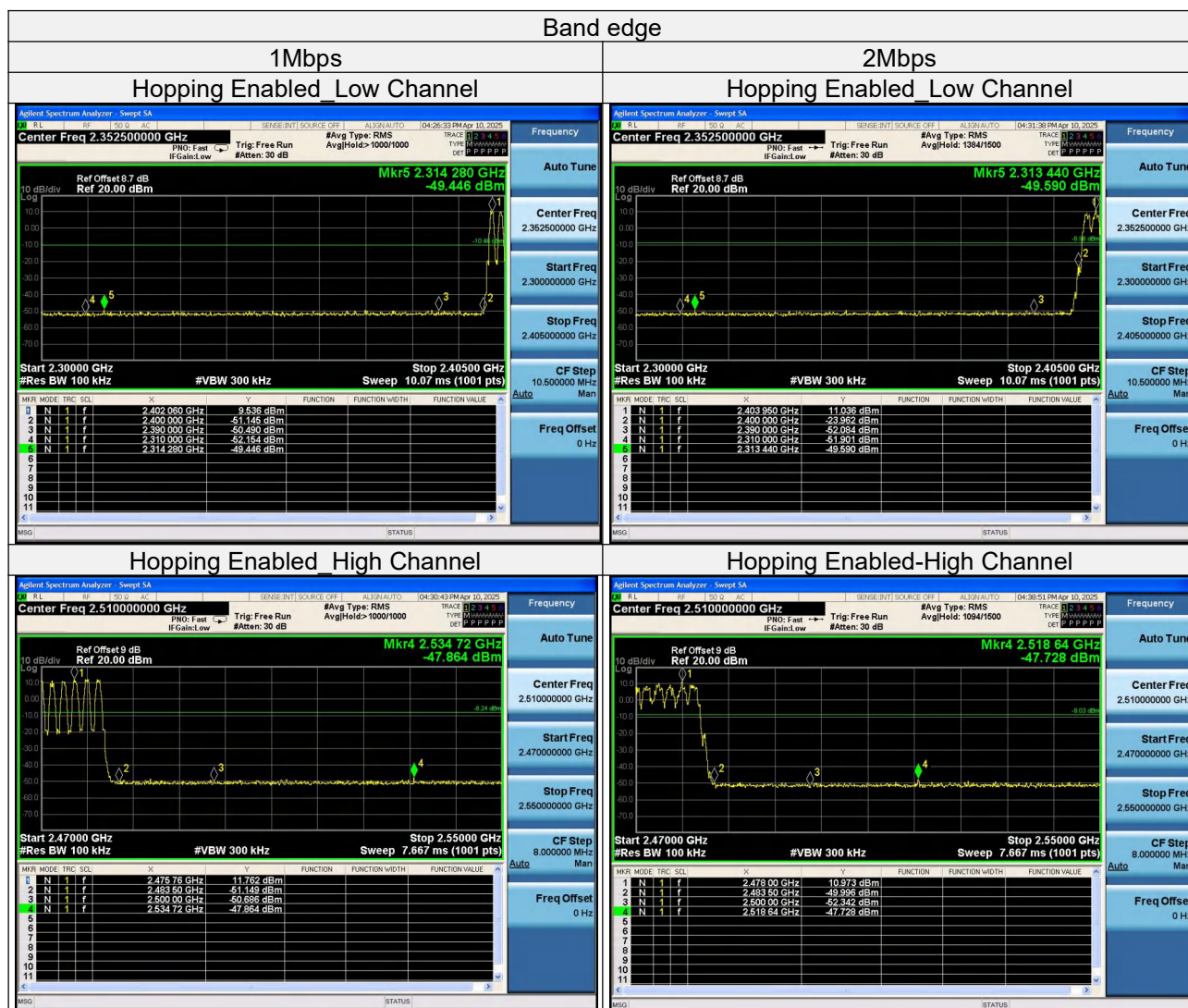
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4 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

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5 Test Instruments

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.Date
Spectrum	Keysight	N9020A	MY51240612	2025-07-25
Spectrum Analyzer	Rohde&Schwarz	FSV-40N	101783	2025-07-25
Power Meter 10Hz~18GHz	Tonscend	JS0806-2	188060126	2025-07-25
Signal generator	Keysight	E4421B	GB40051020	2025-05-16
Universal Switch Control Unit	Rohde&Schwarz	CMW500	12010002k50	2025-07-25
Test Software	Tonscend	JS0806-2	NA	NA
Humidity tester	Jingchuang	GSP-8A	CMA22B000592	2025-07-29

Note: 1. The calibration interval of the above test instruments is 12 months.
2. The test was performed in RF Chamber.

Appendix – Information on the Testing Laboratories

We, [Hwa-Hsing \(Dongguan\) Testing Co., Ltd.](#), A global provider of TESTING and CERTIFICATION services for consumer products, electronic products and wireless information technology products. Adhering to the core values “HONEST and TRUSTWORTHY, OBJECTIVE and IMPARTIALITY, RIGOROUS and AFFICIENT”, commitment to provide professional, perfect and efficient comprehensive ONE-STOP solution of TESTING and CERTIFICATION services for Manufacturers, Buyers, Traders, Brands, Retailers. Assist client to better manage risk, protect their brands, reduce costs and cut time to over 150 markets in global. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lab Address: [No.101, Building N1, Yuyuan 2 Road, Yuyuan Industrial Park, HuangJiang Town, Dongguan City, People's Republic of China](#)

Contact Tel: [0769-85598986](#)

Email: service-hs@lyns-tci.com

Web Site: www.lyns-tci.com

The address and road map of all our labs can be found in our web site also.

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