



FCC TEST REPORT

FCC ID:XUJOADDPD1303A

Report Number..... : ZKT-260805L0254E-1

Date of Test..... Feb. 05, 2026~ Aug. 28, 2026

Date of issue..... Aug. 28, 2026

Total number of pages..... 117

Test Result PASS

Testing Laboratory..... : Shenzhen ZKT Technology Co., Ltd.

Address 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name : Launch Tech Co., Ltd.

Address No.4012, Launch Industrial Park, North Wuhe Rd, Bantian Street, Longgang District, Shenzhen, China

Manufacturer's name : Launch Tech Co., Ltd.

Address No.4012, Launch Industrial Park, North Wuhe Rd, Bantian Street, Longgang District, Shenzhen, China

Test specification:

Standard..... FCC CFR Title 47 Part 15 Subpart C Section 15.247
ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Erratato C63.10a-2024.

Test procedure..... /

Non-standard test method N/A

Test Report Form No..... : TRF-EL-112_V0

Test Report Form(s) Originator..... : ZKT Testing

Master TRF : Dated: 2021-04-22

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Product name..... : Automotive Diagnostic Tool

Trademark LAUNCH

Model/Type reference..... OADD-PD1303A, X-431 PAD9 ULTRA V2, X-431 PAD9 MAX V2,
OADD-PD1303x (x=A-Z, representing different configurations)

Ratings..... Input: 20VDC, 3.25A



Testing procedure and testing location:

Testing Laboratory.....: Shenzhen ZKT Technology Co., Ltd.

Address.....: 1/F, No. 101, Building B, No. 6, Tangwei Community
Industrial Avenue, Fuhai Street, Bao'an District,
Shenzhen, China

Tested by (name + signature).....: Jim Liu

Reviewer (name + signature).....: Jackson Fang

Approved (name + signature).....: Lake Xie





Table of Contents

	Page
1. VERSION	5
2. TEST SUMMARY	6
2.1 TEST FACILITY	7
2.2 MEASUREMENT UNCERTAINTY	7
3. GENERAL INFORMATION	8
3.1 GENERAL DESCRIPTION OF EUT	8
3.2 TEST SETUP CONFIGURATION	10
3.3 SUPPORT EQUIPMENT	11
3.4 TEST MODE	12
3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	13
4. EMC EMISSION TEST	15
4.1 CONDUCTED EMISSIONS	15
4.1.1 POWER LINE CONDUCTED EMISSION Limits	15
4.1.2 TEST PROCEDURE	15
4.1.3 DEVIATION FROM TEST STANDARD	15
4.1.4 TEST SETUP	16
4.1.5 EUT OPERATING CONDITIONS	16
4.1.6 TEST RESULTS	17
4.2 RADIATED EMISSIONS	19
4.2.1 RADIATED EMISSION LIMITS	19
4.2.2 TEST PROCEDURE	19
4.2.3 DEVIATION FROM TEST STANDARD	20
4.2.4 TEST SETUP	20
4.2.5 EUT OPERATING CONDITIONS	21
4.2.6 TEST RESULTS	21
5. EMISSIONS AT RESTRICTED BAND	40
5.1 TEST REQUIREMENT	40
5.2 TEST PROCEDURE	41
5.3 DEVIATION FROM TEST STANDARD	41
5.4 TEST SETUP	42
5.5 EUT OPERATING CONDITIONS	42
5.6 TEST RESULTS	42
6. CONDUCTED BAND EDGE AND SPURIOUS EMISSION	43
6.1 LIMIT	43
6.2 TEST SETUP	43
6.3 TEST PROCEDURE	43
6.4 DEVIATION FROM STANDARD	43
6.5 TEST RESULTS	43
7. 20DB BANDWIDTH	44
7.1 TEST SETUP	44
7.2 LIMIT	44
7.3 TEST PROCEDURE	44
7.4 DEVIATION FROM STANDARD	44



7.5 TEST RESULTS	44
8. MAXIMUM PEAK OUTPUT POWER	45
8.1 BLOCK DIAGRAM OF TEST SETUP	45
8.2 LIMIT	45
8.3 TEST PROCEDURE	45
8.4 DEVIATION FROM STANDARD	45
8.5 TEST RESULTS	45
9. HOPPING CHANNEL SEPARATION	46
9.1 TEST SETUP	46
9.2 TEST PROCEDURE	46
9.3 DEVIATION FROM STANDARD	46
9.4 TEST RESULTS	46
10.NUMBER OF HOPPING FREQUENCY	47
10.1 TEST SETUP	47
10.2 TEST PROCEDURE	47
10.3 DEVIATION FROM STANDARD	47
10.4 TEST RESULTS	47
11. DWELL TIME	48
11.1 TEST SETUP	48
11.2 TEST PROCEDURE	48
11.3 DEVIATION FROM STANDARD	48
11.4 TEST RESULTS	48
12. ANTENNA REQUIREMENT	49
13. APPENDIX 1-TEST DATA	50
14. TEST SETUP PHOTO	117
15. EUT CONSTRUCTIONAL DETAILS	117



1. VERSION

Report No.	Version	Description	Approved
ZKT-260805L0254E-1	Rev.01	Initial issue of report	Aug. 28, 2026



2. TEST SUMMARY

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Result	Remark
15.203/15.247 (c)	Antenna Requirement	PASS	
15.207	AC Power Line Conducted Emission	PASS	
15.247 (b)(1)	Conducted Peak Output Power	PASS	
15.247 (a)(1)	20dB Occupied Bandwidth	PASS	
15.247 (a)(1)	Carrier Frequencies Separation	PASS	
15.247 (a)(1)(iii)	Hopping Channel Number	PASS	
15.247 (a)(1)(iii)	Dwell Time	PASS	
15.205/15.209	Radiated Emission and Restricted Band	PASS	
15.247(d)	Conducted Unwanted emissions and Band Edge	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report



2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.
Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street,
Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 927491
Designation Number: CN1431
IC Registered No.: 27033
CAB identifier: CN0110

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, 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 %.

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(9KHz-30MHz)	U=4.5dB
2	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.8dB
3	3m chamber Radiated spurious emission(1GHz-6GHz)	U=4.9dB
4	3m chamber Radiated spurious emission(6GHz-40GHz)	U=5.0dB
5	Conducted disturbance	U=3.2dB
6	RF Band Edge	U=1.68dB
7	RF power conducted	U=1.86dB
8	RF conducted Spurious Emission	U=2.2dB
9	RF Occupied Bandwidth	U=1.8dB
10	RF Power Spectral Density	U=1.75dB
11	humidity uncertainty	U=5.3%
12	Temperature uncertainty	U=0.59°C



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	Automotive Diagnostic Tool
Trade Mark:	LAUNCH
Model No.:	OADD-PD1303A
Module number:	MT6637X
Serial No.:	X-431 PAD9 ULTRA V2, X-431 PAD9 MAX V2, OADD-PD1303x (x=A-Z, representing different configurations)
Model Different.:	The color of the rubber sleeve or shell is different. OADD-PD1303A: red and black rubber sleeve, black shell; X-431 PAD9 ULTRA V2: all black; X-431 PAD9 MAX V2: black rubber sleeve, red shell
Hardware Version:	V2.0
Software Version:	V2.1.01
Sample Number.:	260805L0254-1
Sample(s) Status:	Engineer sample
Channel numbers:	79
Operation Frequency:	2402MHz~2480MHz
Modulation technology:	GFSK, $\pi/4$ -DQPSK, 8DPSK(3Mbps)
Antenna Type:	FPC Antenna
Antenna gain:	1.64dBi
Power Supply:	Input: 20VDC, 3.25A
Adapter	Model: XDJG651R-PD Brand: XINDEJIA Input: 100-240V~ 50/60Hz 1.8A Output: 5.0VDC 3.0A 15.0W / 9.0VDC 3.0A 27.0W / 12.0VDC 3.0A 36.0W / 15.0DC 3.0A 45.0W / 20.0VDC 3.25A 65.0W
Battery	Model: PAD9 V2 Rated Voltage: 7.6V Charge Limit Voltage: 8.7V Capacity: 9360mAh Manufacturer: Shenzhen Cholipower Technology Co., LTD

Note1: For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

Note2: The EUT's all information provided by client.



Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	21	2422MHz	41	2442MHz	61	2462MHz
2	2403MHz	22	2423MHz	42	2443MHz	62	2463MHz
3	2404MHz	23	2424MHz	43	2444MHz	63	2464MHz
4	2405MHz	24	2425MHz	44	2445MHz	64	2465MHz
5	2406MHz	25	2426MHz	45	2446MHz	65	2466MHz
6	2407MHz	26	2427MHz	46	2447MHz	66	2467MHz
7	2408MHz	27	2428MHz	47	2448MHz	67	2468MHz
8	2409MHz	28	2429MHz	48	2449MHz	68	2469MHz
9	2410MHz	29	2430MHz	49	2450MHz	69	2470MHz
10	2411MHz	30	2431MHz	50	2451MHz	70	2471MHz
11	2412MHz	31	2432MHz	51	2452MHz	71	2472MHz
12	2413MHz	32	2433MHz	52	2453MHz	72	2473MHz
13	2414MHz	33	2434MHz	53	2454MHz	73	2474MHz
14	2415MHz	34	2435MHz	54	2455MHz	74	2475MHz
15	2416MHz	35	2436MHz	55	2456MHz	75	2476MHz
16	2417MHz	36	2437MHz	56	2457MHz	76	2477MHz
17	2418MHz	37	2438MHz	57	2458MHz	77	2478MHz
18	2419MHz	38	2439MHz	58	2459MHz	78	2479MHz
19	2420MHz	39	2440MHz	59	2460MHz	79	2480MHz
20	2421MHz	40	2441MHz	60	2461MHz		

Note:

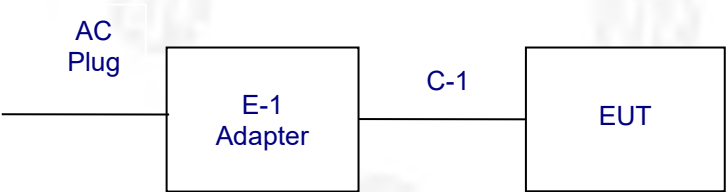
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	Frequency
The lowest channel	2402MHz
The middle channel	2441MHz
The Highest channel	2480MHz

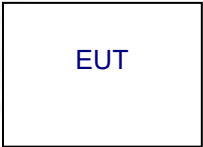


3.2 TEST SETUP CONFIGURATION

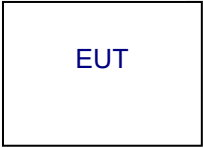
Conducted Emission



Radiated Emission



Conducted Spurious





3.3 SUPPORT EQUIPMENT

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.

Item	Equipment	Mfr/Brand	Model/Type No.	Note
E-1	Adapter	XINDEJIA	XDJG651R-PD	N/A
C-1	USB Cable	LAUNCH	N/A	N/A

Item	Equipment	Mfr/Brand	Length	Note
C-1	Shielded	NO	150cm	N/A

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



3.4 TEST MODE

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

Test Software	Engineering mode
Power level setup	7



3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Conduction Emissions Test

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	N/A	Sep. 23, 2025	Sep. 22, 2026
2	LISN	CYBERTEK	EM5040A	E1850400149	N/A	Sep. 19, 2025	Sep. 18, 2026
3	Test Cable	N/A	C-01	N/A	N/A	May 25, 2025 May 25, 2026	May 24, 2026 May 24, 2027
4	EMI Test Receiver	R&S	ESCI3	101393	4.42 SP3	Oct. 24, 2025	Oct. 23, 2026
5	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	N/A	\	\

Radiation Emissions & Radiation Spurious Emissions Test

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	N9020A	MY55370835	A.17.05	Sep. 20, 2025	Sep. 19, 2026
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Sep. 20, 2025	Sep. 19, 2026
3	EMI Test Receiver (9kHz-7GHz)	R&S	ESCI7	100969	4.32	Oct. 24, 2025	Oct. 23, 2026
4	Bilog Antenna (30MHz-1500MHz)	Schwarzbeck	VULB9168	00877	N/A	Sep. 20, 2025	Sep. 19, 2026
5	Horn Antenna (1GHz-18GHz)	Agilent	AH-118	071145	N/A	Sep. 20, 2025	Sep. 19, 2026
6	Horn Antenna (15GHz-40GHz)	A.H.System	SAS-574	588	N/A	Sep. 30, 2025	Sep. 29, 2026
7	Loop Antenna	TESEQ	HLA6121	58357	N/A	Sep. 20, 2025	Sep. 19, 2026
8	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	60747	N/A	Sep. 19, 2025	Sep. 18, 2026
9	Amplifier (1GHz-26.5GHz)	HuiPu	8449B	3008A00315	N/A	Sep. 19, 2025	Sep. 18, 2026
10	Amplifier (500MHz-40GHz)	QuanJuDa	DLE-161	097	N/A	Oct. 24, 2025	Oct. 23, 2026
11	Test Cable	N/A	R-01	N/A	N/A	May 25, 2025 May 25, 2026	May 24, 2026 May 24, 2027
12	Test Cable	N/A	R-02	N/A	N/A	May 25, 2025 May 25, 2026	May 24, 2026 May 24, 2027
13	Test Cable	N/A	R-03	N/A	N/A	May 25, 2025 May 25, 2026	May 24, 2026 May 24, 2027
14	D.C. Power Supply	LongWei	TPR-6405D	N/A	N/A	\	\
15	EMC Software	Frad	EZ-EMC	Ver.EMC-CO N 3A1.1	N/A	\	\
16	Turntable	MF	MF-7802BS	N/A	N/A	\	\
17	Antenna tower	MF	MF-7802BS	N/A	N/A	\	\



RF Conducted Test

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	N9020A	MY55370835	A.17.05	Sep. 20, 2025	Sep. 19, 2026
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Sep. 20, 2025	Sep. 19, 2026
3	Test Cable	N/A	RF-01	N/A	N/A	May 25, 2025 May 25, 2026	May 24, 2026 May 24, 2027
4	Test Cable	N/A	RF-02	N/A	N/A	May 25, 2025 May 25, 2026	May 24, 2026 May 24, 2027
5	Test Cable	N/A	RF-03	N/A	N/A	May 25, 2025 May 25, 2026	May 24, 2026 May 24, 2027
6	ESG Signal Generator	Agilent	E4421B	GB40051203	B.03.84	Sep. 19, 2025	Sep. 18, 2026
7	Signal Generator	Agilent	N5182A	MY47420215	A.01.87	Sep. 20, 2025	Sep. 19, 2026
8	Magnetic Field Probe Tester	Narda	ELT-400	0-0344	N/A	Sep. 25, 2025	Sep. 24, 2026
9	SHIELD BOX	TESCOM	TC-5970C	5970C015553	N/A	Dec. 18, 2025	Dec. 17, 2026
10	Wideband Radio Communication Test	R&S	CMW500	106504	V 3.7.22	Sep. 28, 2025	Sep. 27, 2026
11	MWRF Power Meter Test system	MW	MW100-R FCB	10371	N/A	Sep. 19, 2025	Sep. 18, 2026
12	MWRF Power Sensor	MW	MW100-P SB	10371	N/A	Sep. 19, 2025	Sep. 18, 2026
13	Power Meter	KEYSIGHT	N1912AP	926431	A.05.00	Sep. 19, 2025	Sep. 18, 2026
14	D.C. Power Supply	LongWei	TPR-6405 D	GQ7516	N/A	Sep. 19, 2025	Sep. 18, 2026
15	Attenuators	XINQY	XQY-SMA JKS-12-2 W	N/A	N/A	Sep. 19, 2025	Sep. 18, 2026
16	RF Software	MW	MTS8310	V2.0.0.0	N/A	\	\



4. EMC EMISSION TEST

4.1 CONDUCTED EMISSIONS

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Erratato C63.10a-2024
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

4.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) *Decreases with the logarithm of the frequency.

4.1.2 TEST PROCEDURE

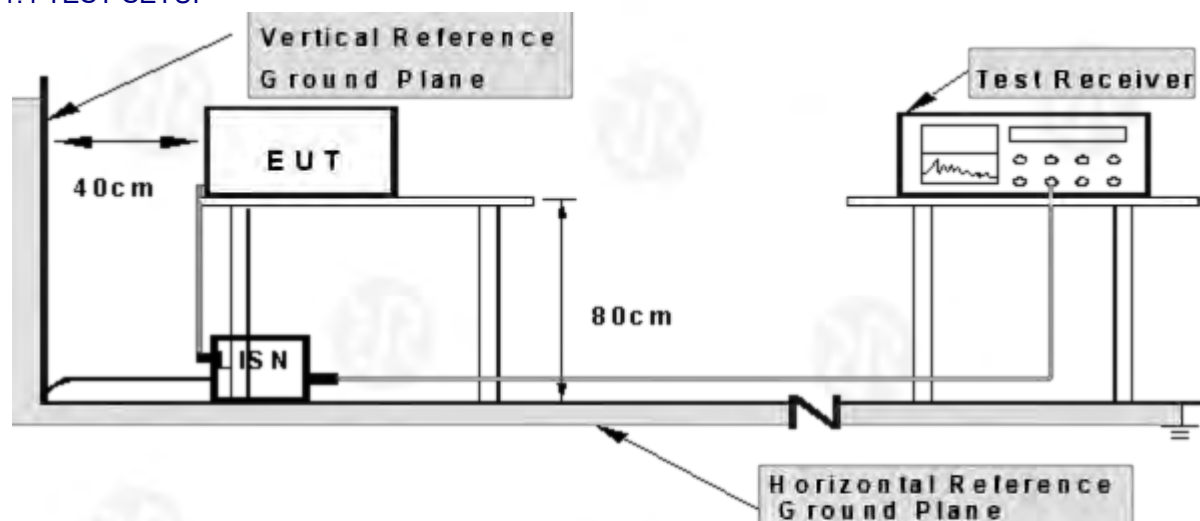
- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation



4.1.4 TEST SETUP



- Note:**
- 1.Support units were connected to second LISN.
 - 2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

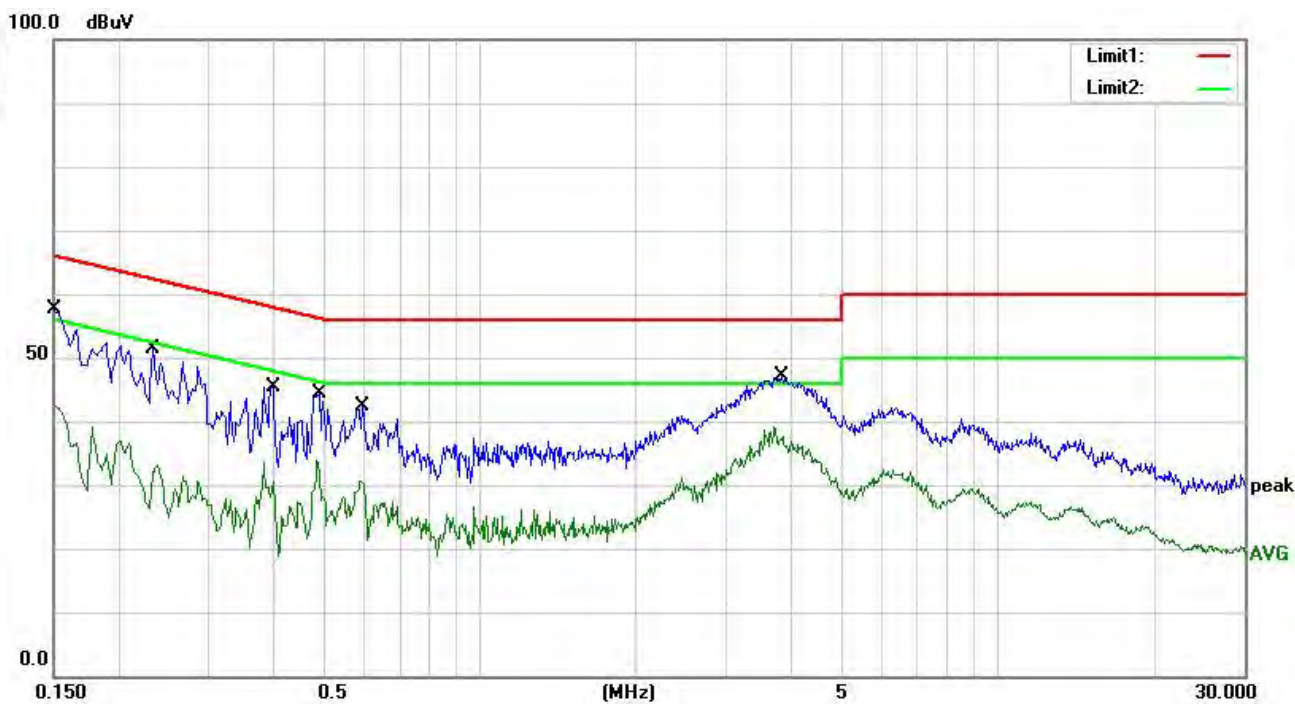
4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



4.1.6 TEST RESULTS

Temperature:	25.1℃	Relative Humidity:	59%
Pressure:	101 kPa	Polarization:	L
Test Voltage:	AC 120V/60Hz	Test Mode:	GFSK 2441MHz



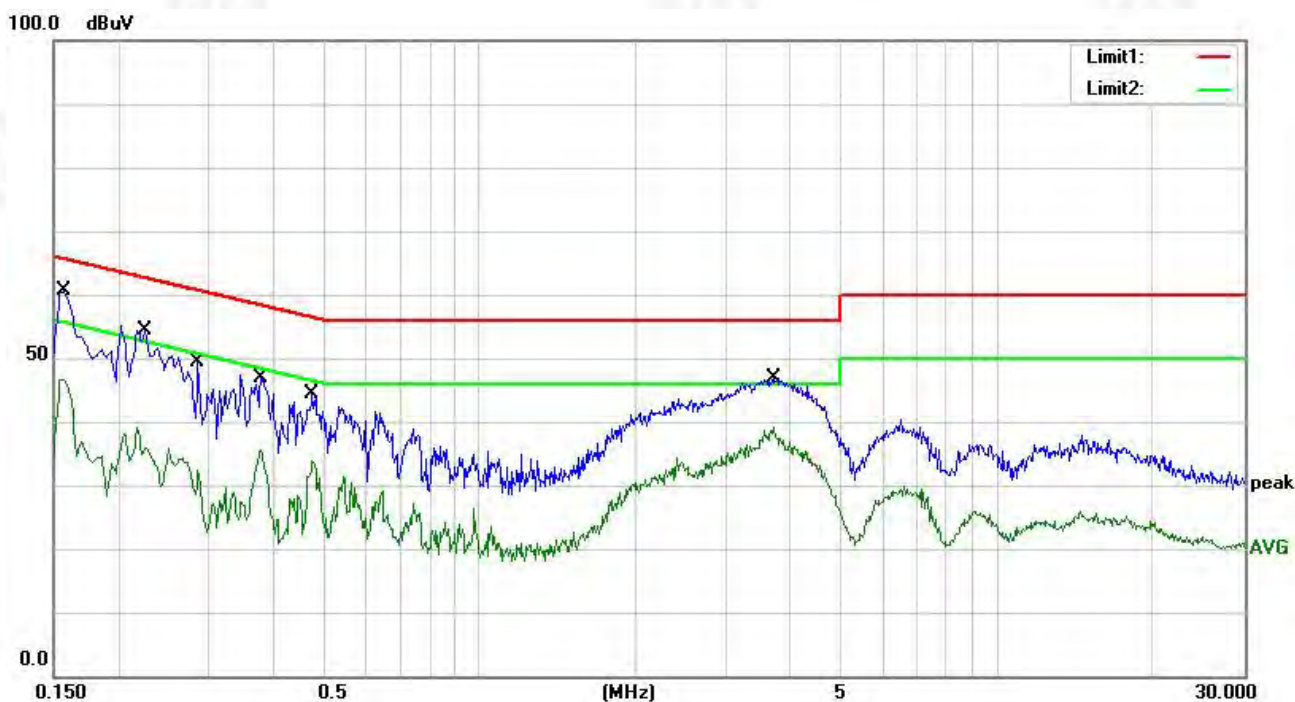
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1500	38.14	19.38	57.52	66.00	-8.48	QP
2	0.1500	23.29	19.38	42.67	56.00	-13.33	AVG
3	0.2340	31.89	19.39	51.28	62.31	-11.03	QP
4	0.2340	19.71	19.39	39.10	52.31	-13.21	AVG
5	0.3980	26.08	19.38	45.46	57.90	-12.44	QP
6	0.3980	14.25	19.38	33.63	47.90	-14.27	AVG
7	0.4900	24.96	19.40	44.36	56.17	-11.81	QP
8	0.4900	14.39	19.40	33.79	46.17	-12.38	AVG
9	0.5940	22.96	19.38	42.34	56.00	-13.66	QP
10	0.5940	11.27	19.38	30.65	46.00	-15.35	AVG
11	3.8220	27.75	19.41	47.16	56.00	-8.84	QP
12	3.8220	19.73	19.41	39.14	46.00	-6.86	AVG

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Reading level + Correct Factor.
4. Correct Factor= Liss factor+ Cable loss factor + limiter factor.
5. Margin= Measurement Level-Limit.
6. The test data shows only the worst case GFSK 2441MHz.



Temperature:	25.1℃	Relative Humidity:	59%
Pressure:	101 kPa	Polarization:	N
Test Voltage:	AC 120V/60Hz	Test Mode:	GFSK 2441MHz



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1580	41.12	19.40	60.52	65.57	-5.05	QP
2	0.1580	27.14	19.40	46.54	55.57	-9.03	AVG
3	0.2260	35.10	19.38	54.48	62.60	-8.12	QP
4	0.2260	19.81	19.38	39.19	52.60	-13.41	AVG
5	0.2860	29.99	19.38	49.37	60.64	-11.27	QP
6	0.2860	16.50	19.38	35.88	50.64	-14.76	AVG
7	0.3780	27.54	19.36	46.90	58.32	-11.42	QP
8	0.3780	16.22	19.36	35.58	48.32	-12.74	AVG
9	0.4740	25.05	19.34	44.39	56.44	-12.05	QP
10	0.4740	14.45	19.34	33.79	46.44	-12.65	AVG
11	3.6820	27.50	19.46	46.96	56.00	-9.04	QP
12	3.6820	19.58	19.46	39.04	46.00	-6.96	AVG

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Reading level + Correct Factor.
4. Correct Factor= Liscn factor+ Cable loss factor + limiter factor.
5. Margin= Measurement Level-Limit.
6. The test data shows only the worst case GFSK 2441MHz.



4.2 RADIATED EMISSIONS

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Erratato C63.10a-2024				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	MX5Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average

4.2.1 RADIATED EMISSION LIMITS

Frequencies (MHz)	Field Strength (micorvolts/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

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

4.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.



- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

- g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).
- h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel

Note:

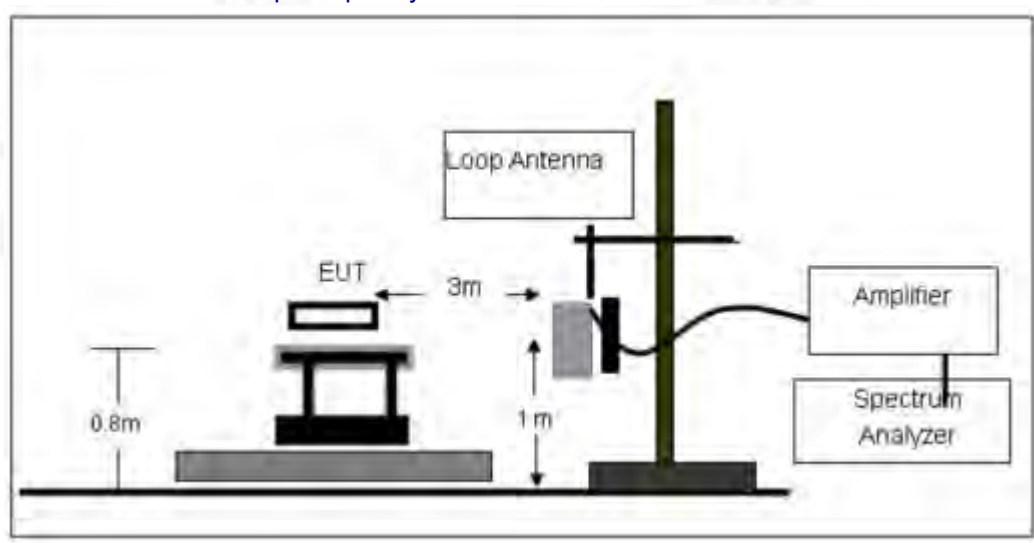
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

4.2.3 DEVIATION FROM TEST STANDARD

No deviation

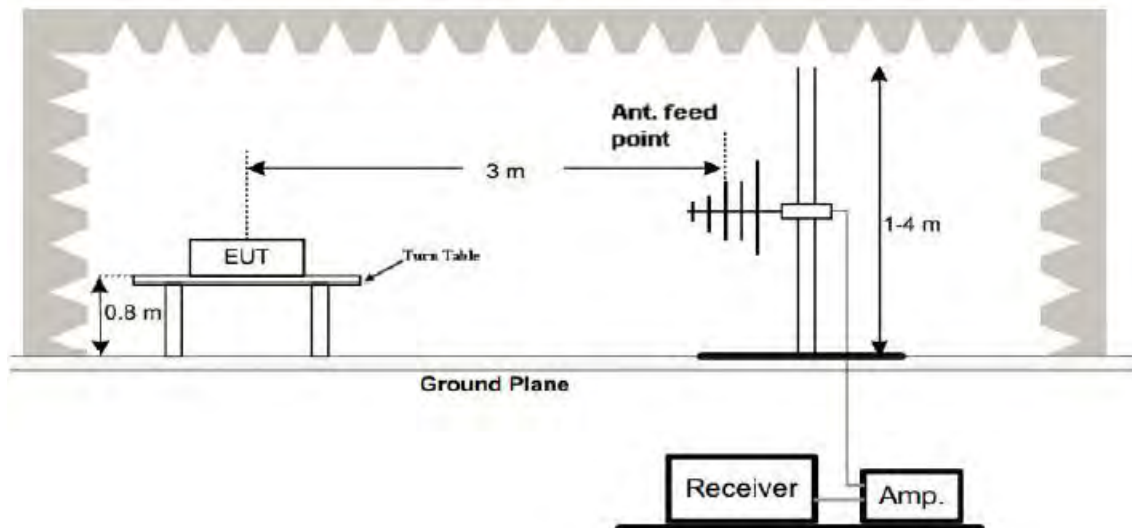
4.2.4 TEST SETUP

(A) Radiated Emission Test-Up Frequency Below 30MHz

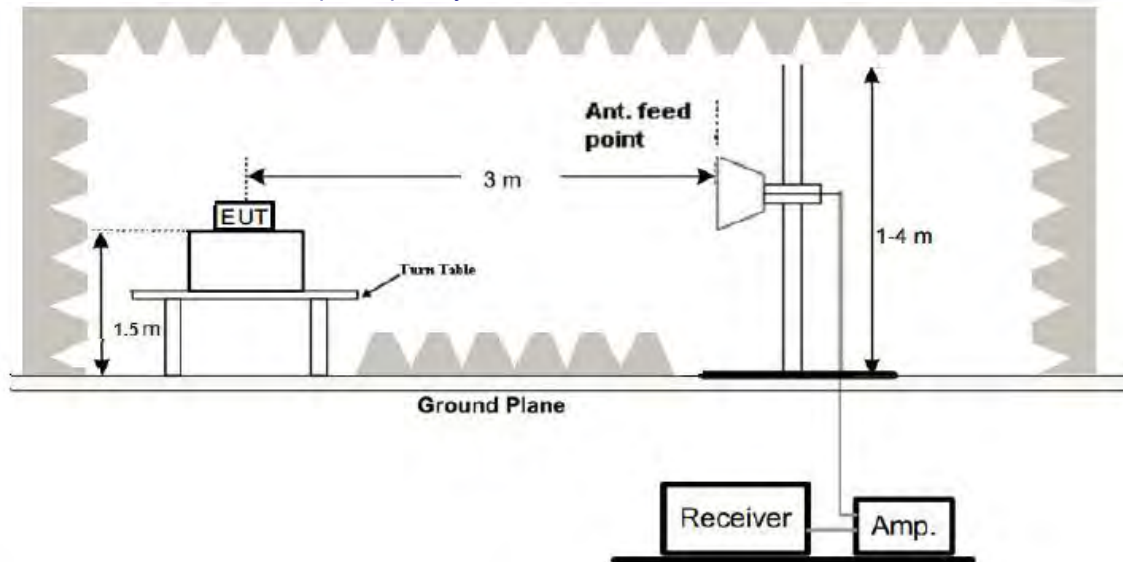




(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



4.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

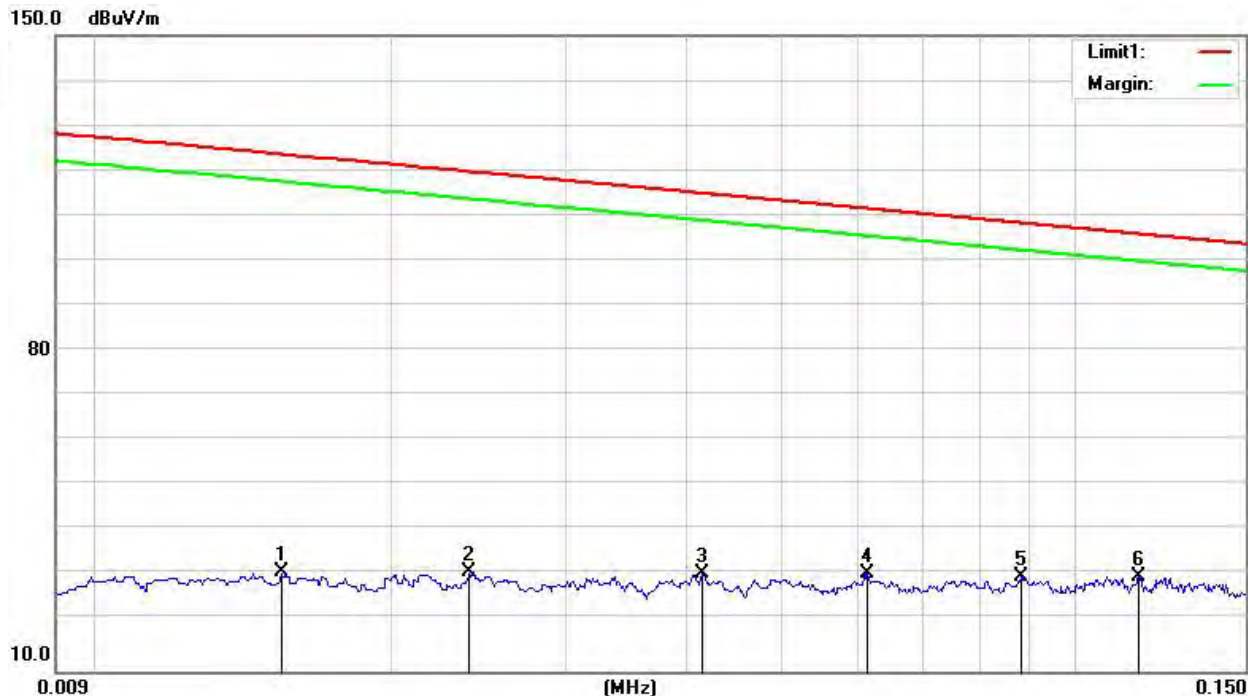
4.2.6 TEST RESULTS



Between 9KHz – 30MHz

9KHz-150KHz

Temperature	23.4°C	Relative Humidity:	60%RH
Test Voltage	DC 7.6V	Polarization:	Coxial
Test Mode	GFSK 2441MHz		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0154	12.10	19.77	31.87	123.85	-91.98	AVG
2	0.0240	11.71	20.02	31.73	120.00	-88.27	AVG
3	0.0415	11.93	19.67	31.60	115.24	-83.64	AVG
4	0.0613	12.43	19.18	31.61	111.86	-80.25	AVG
5	0.0882	12.69	18.17	30.86	108.69	-77.83	AVG
6	0.1165	13.35	17.57	30.92	106.28	-75.36	AVG

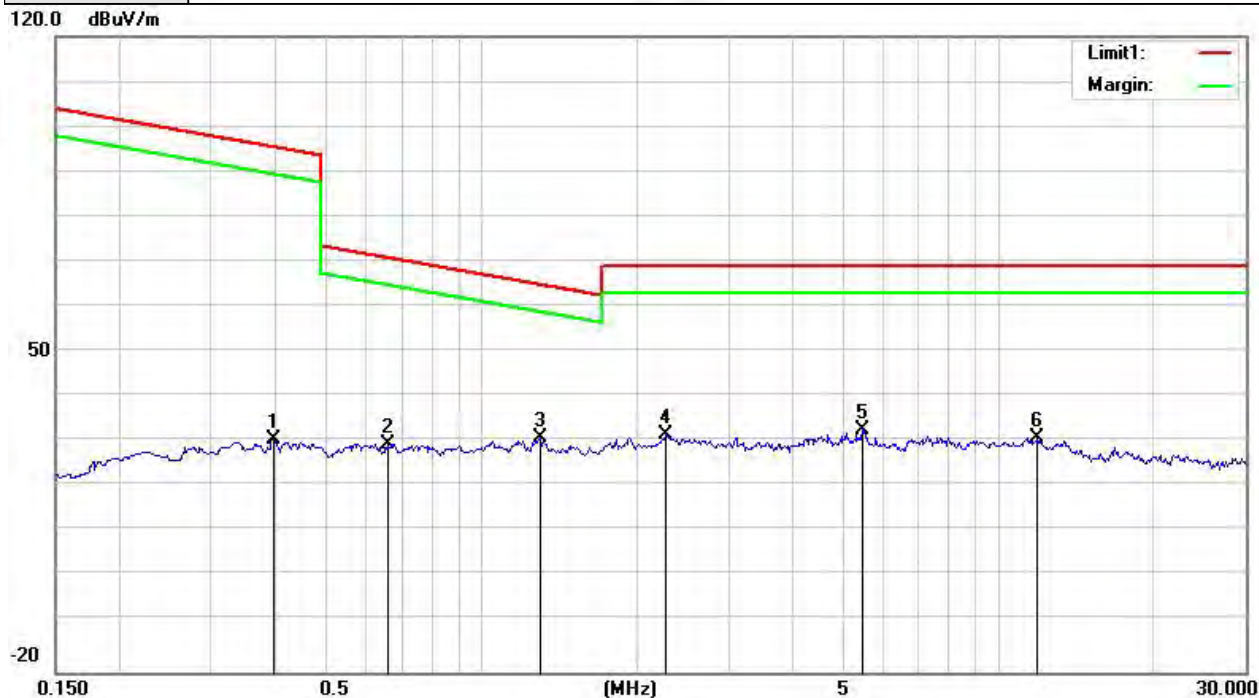
Notes:

1. Distance extrapolation factor = $40 \log (\text{specific distance/test distance})$ (dB) ;
2. Limit line = specific limits (dBuV) + distance extrapolation factor.
3. All modes of GFSK, $\pi/4$ DQPSK and 8DPSK were tested at Low, Middle, and High channel; only the worst result of GFSK 2441MHz was reported.



150KHz-30MHz

Temperature	23.4°C	Relative Humidity:	60%RH
Test Voltage	DC 7.6V	Polarization:	Coxial
Test Mode	GFSK 2441MHz		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.3955	11.10	20.16	31.26	95.66	-64.40	AVG
2	0.6578	9.91	20.26	30.17	71.24	-41.07	QP
3	1.2960	11.43	20.26	31.69	65.35	-33.66	QP
4	2.2726	12.01	20.32	32.33	69.50	-37.17	QP
5	5.4633	12.83	20.47	33.30	69.50	-36.20	QP
6	11.8810	10.90	20.61	31.51	69.50	-37.99	QP

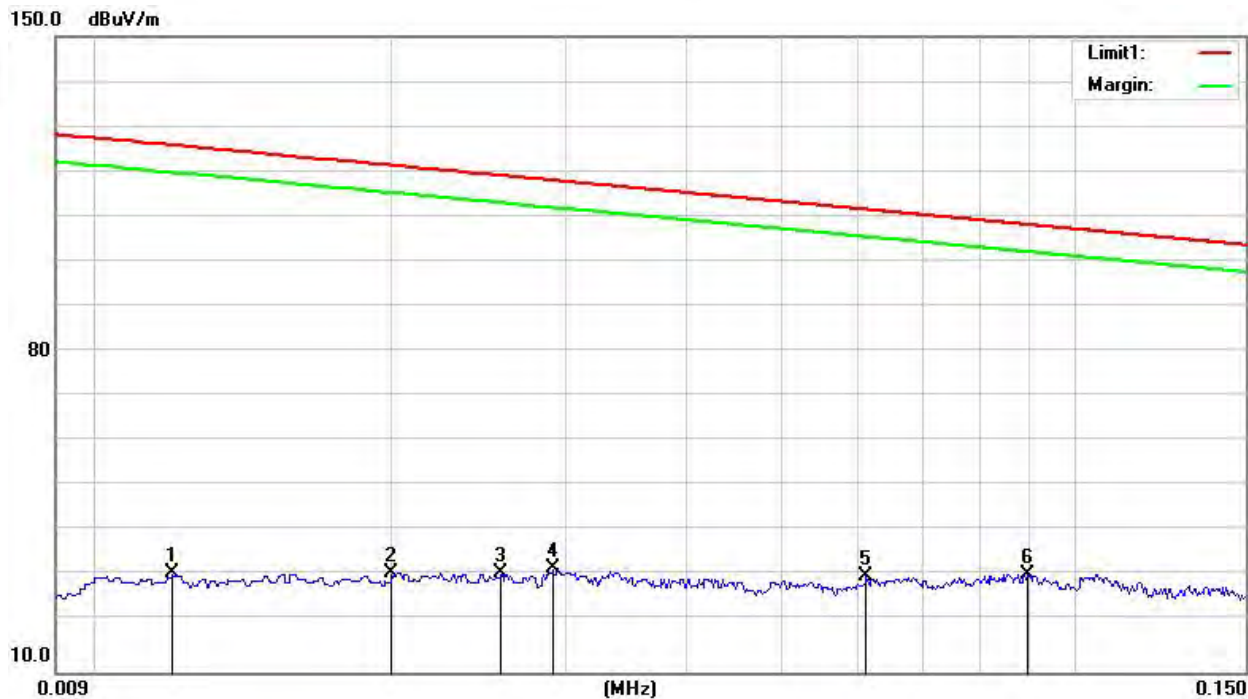
Notes:

1. Distance extrapolation factor = $40 \log (\text{specific distance/test distance})$ (dB) ;
2. Limit line = specific limits (dBuV) + distance extrapolation factor.
3. All modes of GFSK, $\pi/4$ DQPSK and 8DPSK were tested at Low, Middle, and High channel; only the worst result of GFSK 2441MHz was reported.



9KHz-150KHz

Temperature	23.4°C	Relative Humidity:	60%RH
Test Voltage	DC 7.6V	Polarization:	Coplanar
Test Mode	GFSK 2441MHz		



No.	Frequency (KHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0120	12.49	19.52	32.01	126.02	-94.01	AVG
2	0.0200	11.69	20.10	31.79	121.58	-89.79	AVG
3	0.0258	11.89	19.98	31.87	119.37	-87.50	AVG
4	0.0292	12.99	19.92	32.91	118.30	-85.39	AVG
5	0.0611	11.93	19.19	31.12	111.88	-80.76	AVG
6	0.0897	13.55	18.09	31.64	108.55	-76.91	AVG

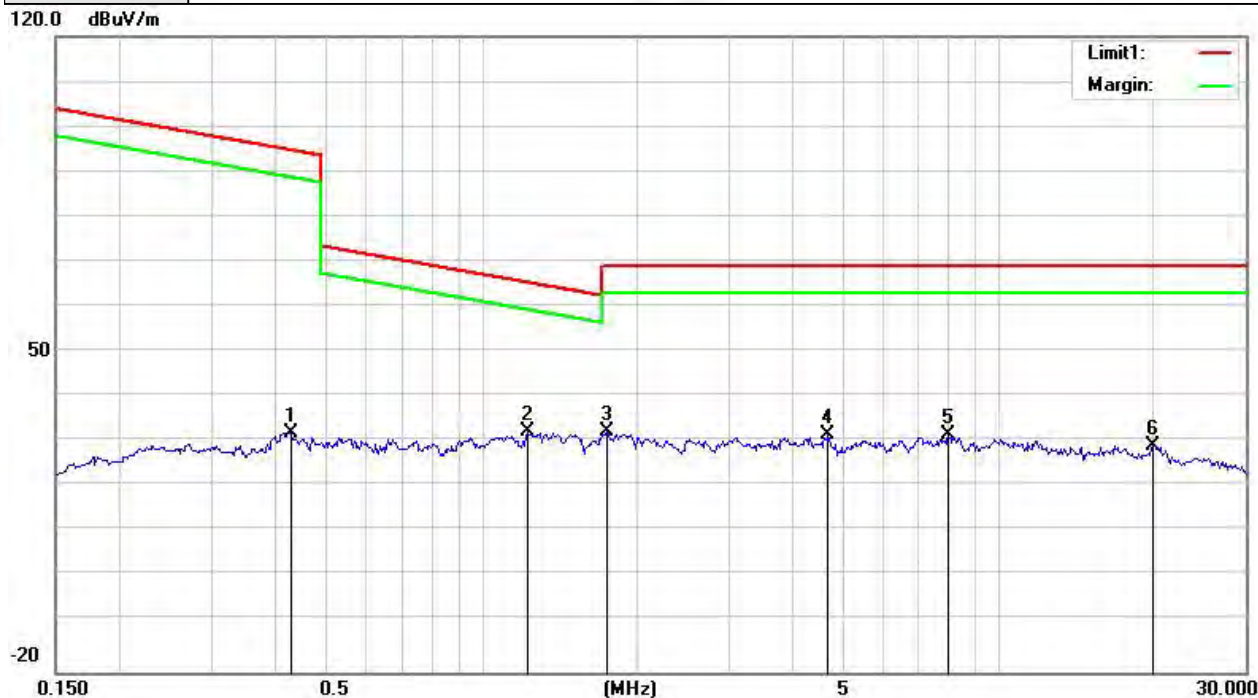
Notes:

1. Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB) ;
2. Limit line = specific limits (dBuV) + distance extrapolation factor.
3. All modes of GFSK, $\pi/4$ DQPSK and 8DPSK were tested at Low, Middle, and High channel; only the worst result of GFSK 2441MHz was reported.



150KHz-30MHz

Temperature	23.4°C	Relative Humidity:	60%RH
Test Voltage	DC 7.6V	Polarization:	Coplanar
Test Mode	GFSK 2441MHz		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.4282	12.47	20.17	32.64	94.97	-62.33	AVG
2	1.2291	12.66	20.25	32.91	65.81	-32.90	QP
3	1.7437	12.52	20.35	32.87	69.50	-36.63	QP
4	4.6870	11.90	20.47	32.37	69.50	-37.13	QP
5	8.0006	11.85	20.32	32.17	69.50	-37.33	QP
6	19.9404	7.42	22.49	29.91	69.50	-39.59	QP

Notes:

1. Distance extrapolation factor = $40 \log (\text{specific distance/test distance})$ (dB) ;
2. Limit line = specific limits (dBuV) + distance extrapolation factor.
3. All modes of GFSK, $\pi/4$ DQPSK and 8DPSK were tested at Low, Middle, and High channel; only the worst result of GFSK 2441MHz was reported.



Between 30MHz – 1GHz

Temperature:	23.4℃	Relative Humidity:	60%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	DC 7.6V	Test Mode :	GFSK 2441MHz



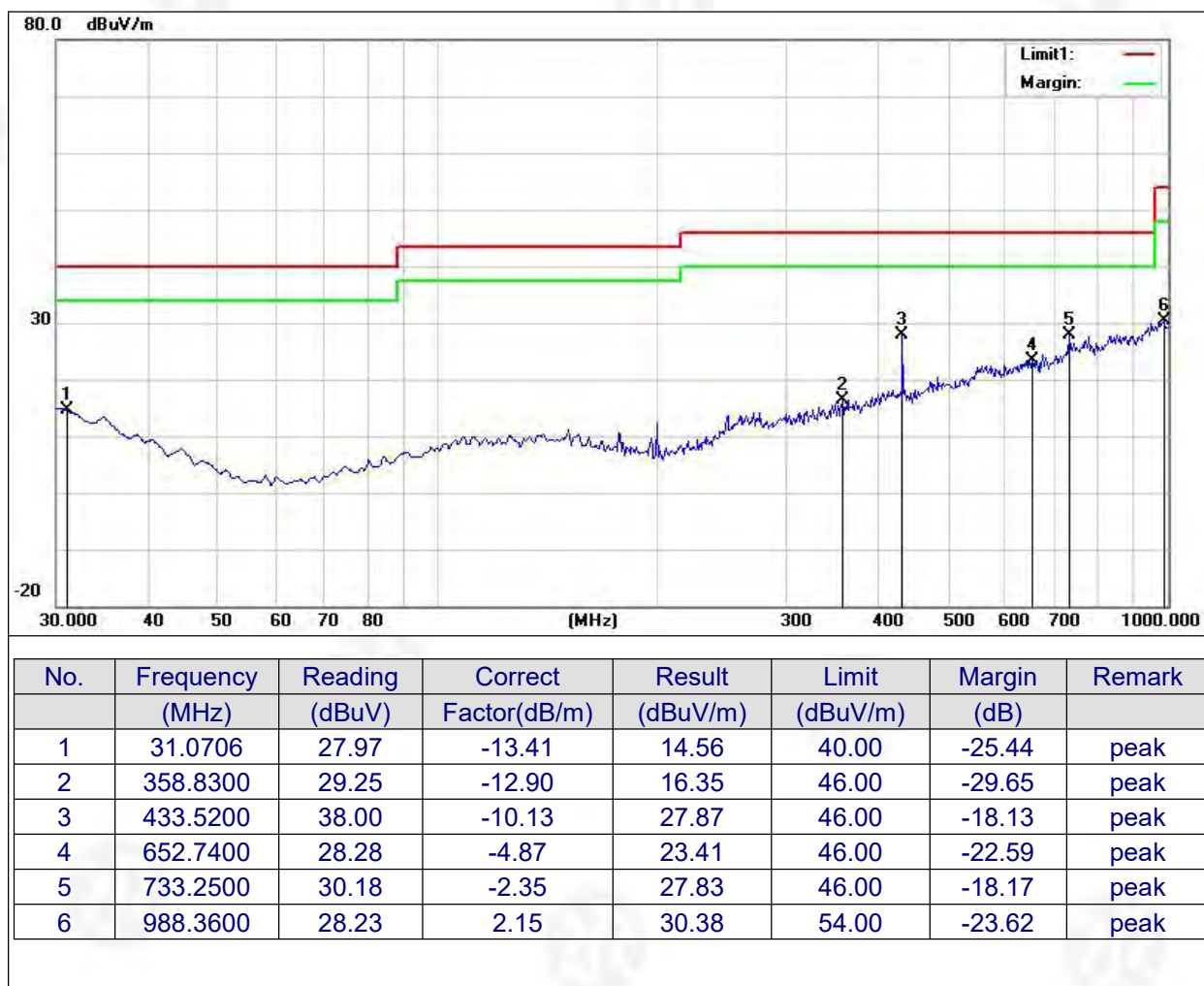
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	31.9400	28.36	-13.86	14.50	40.00	-25.50	peak
2	419.9400	28.95	-10.09	18.86	46.00	-27.14	peak
3	455.8300	28.83	-9.55	19.28	46.00	-26.72	peak
4	641.1000	29.24	-4.84	24.40	46.00	-21.60	peak
5	733.2500	32.21	-2.35	29.86	46.00	-16.14	peak
6	901.0600	37.74	-0.43	37.31	46.00	-8.69	peak

Notes:

1. An initial pre-scan was performed on the peak detector.
2. Quasi-Peak measurement were performed at the frequencies with maximized peak emission.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Final Level = Reading level + Correct Factor.
5. Correct Factor= Antenna factor+ Cable loss factor - Amplifier factor.
6. Margin= Measurement Level-Limit.
7. All modes of GFSK, $\pi/4$ DQPSK and 8DPSK were tested at Low, Middle, and High channel; only the worst result of GFSK 2441MHz was reported.



Temperature:	23.4℃	Relative Humidity:	60%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	DC 7.6V	Test Mode :	GFSK 2441MHz



Notes:

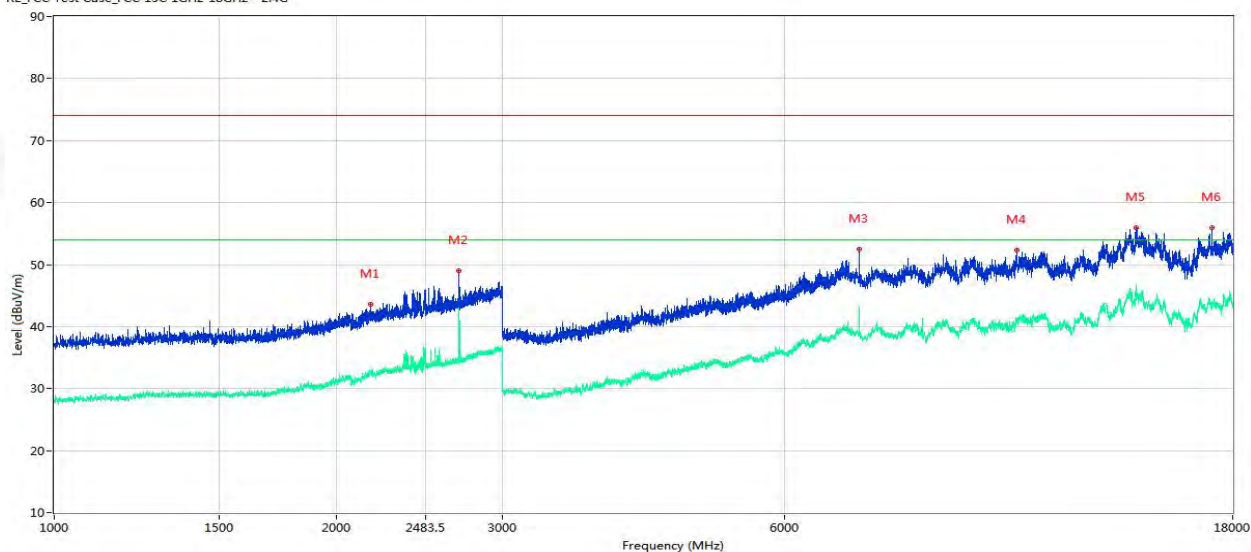
1. An initial pre-scan was performed on the peak detector.
2. Quasi-Peak measurement were performed at the frequencies with maximized peak emission.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Final Level = Reading level + Correct Factor.
5. Correct Factor= Antenna factor+ Cable loss factor - Amplifier factor.
6. Margin= Measurement Level-Limit.
7. All modes of GFSK, $\pi/4$ DQPSK and 8DPSK were tested at Low, Middle, and High channel; only the worst result of GFSK 2441MHz was reported.



Above 1GHz

GFSK_Worst mode
Low Channel
Horizontal

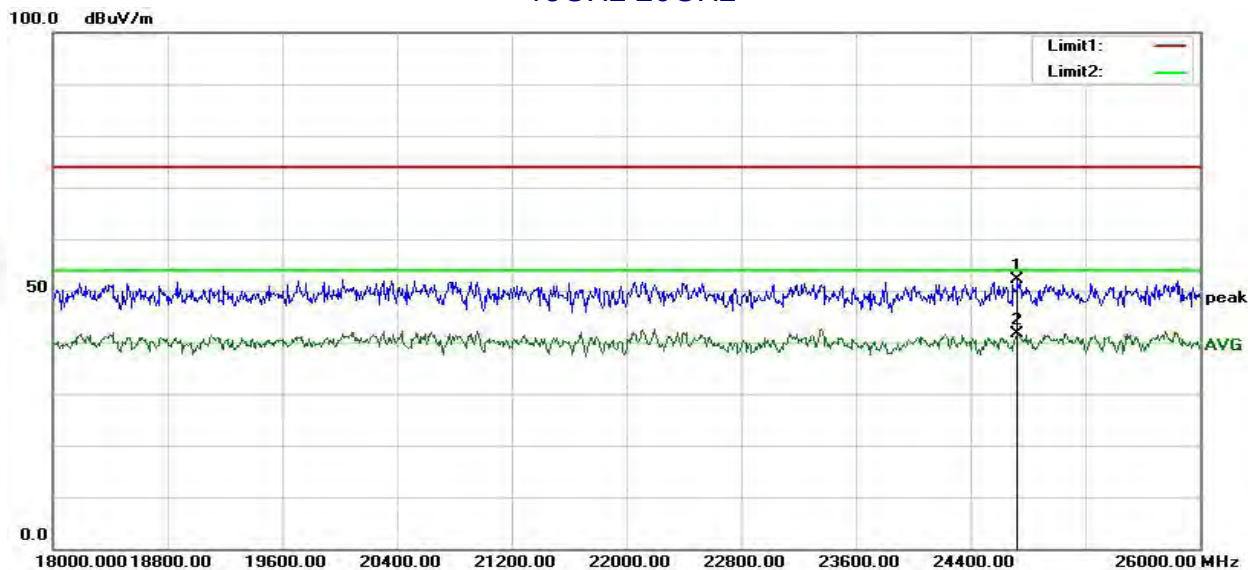
RE_FCC Test Case_FCC 15C 1GHz-18GHz - 2.4G



No	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Antenna	Verdict
1	2171.000	43.56	1.71	74.0	30.44	Peak	58.60	Horizontal	Pass
1**	2171.000	32.60	1.71	54.0	21.40	AV	58.60	Horizontal	Pass
2	2700.000	48.97	3.99	74.0	25.03	Peak	333.90	Horizontal	Pass
2**	2700.000	42.88	3.99	54.0	11.12	AV	333.90	Horizontal	Pass
3	7203.500	52.45	-1.90	74.0	21.55	Peak	360.00	Horizontal	Pass
3**	7203.500	43.36	-1.90	54.0	10.64	AV	360.00	Horizontal	Pass
4	10608.000	52.29	1.77	74.0	21.71	Peak	142.70	Horizontal	Pass
4**	10608.000	40.77	1.77	54.0	13.23	AV	142.70	Horizontal	Pass
5	14191.250	55.90	6.95	74.0	18.10	Peak	62.40	Horizontal	Pass
5**	14191.250	46.74	6.95	54.0	7.26	AV	62.40	Horizontal	Pass
6	17125.500	55.90	4.71	74.0	18.10	Peak	275.20	Horizontal	Pass
6**	17125.500	43.95	4.71	54.0	10.05	AV	275.20	Horizontal	Pass



18GHz-26GHz

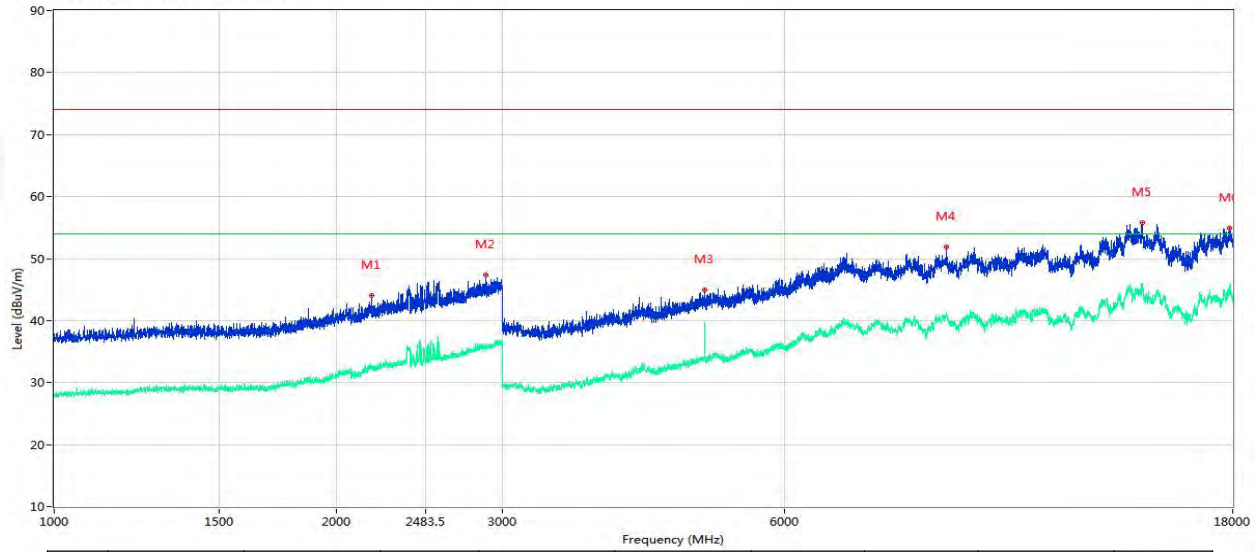


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	24728.000	47.18	4.98	52.16	74.00	-21.84	peak
2	24728.000	36.72	4.98	41.70	54.00	-12.30	AVG



Vertical 1GHz-18GHz

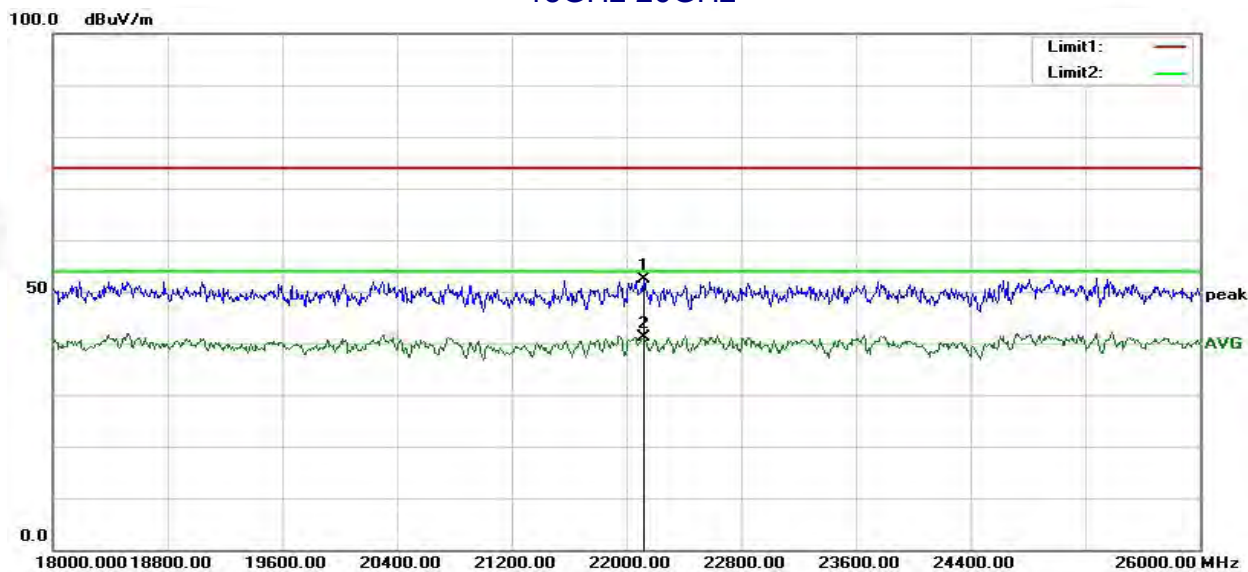
RE_FCC Test Case_FCC 15C 1GHz-18GHz - 2.4G



No	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Antenna	Verdict
1	2179.000	43.99	1.65	74.0	30.01	Peak	255.70	Vertical	Pass
1**	2179.000	32.52	1.65	54.0	21.48	AV	255.70	Vertical	Pass
2	2883.000	47.36	4.93	74.0	26.64	Peak	304.40	Vertical	Pass
2**	2883.000	36.16	4.93	54.0	17.84	AV	304.40	Vertical	Pass
3	4934.000	44.90	-6.03	74.0	29.10	Peak	216.80	Vertical	Pass
3**	4934.000	39.75	-6.03	54.0	14.25	AV	216.80	Vertical	Pass
4	8911.250	51.82	1.45	74.0	22.18	Peak	35.50	Vertical	Pass
4**	8911.250	40.99	1.45	54.0	13.01	AV	35.50	Vertical	Pass
5	14416.750	55.74	6.87	74.0	18.26	Peak	0.90	Vertical	Pass
5**	14416.750	45.61	6.87	54.0	8.39	AV	0.90	Vertical	Pass
6	17881.750	54.83	7.08	74.0	19.17	Peak	28.50	Vertical	Pass
6**	17881.750	44.90	7.08	54.0	9.10	AV	28.50	Vertical	Pass



18GHz-26GHz

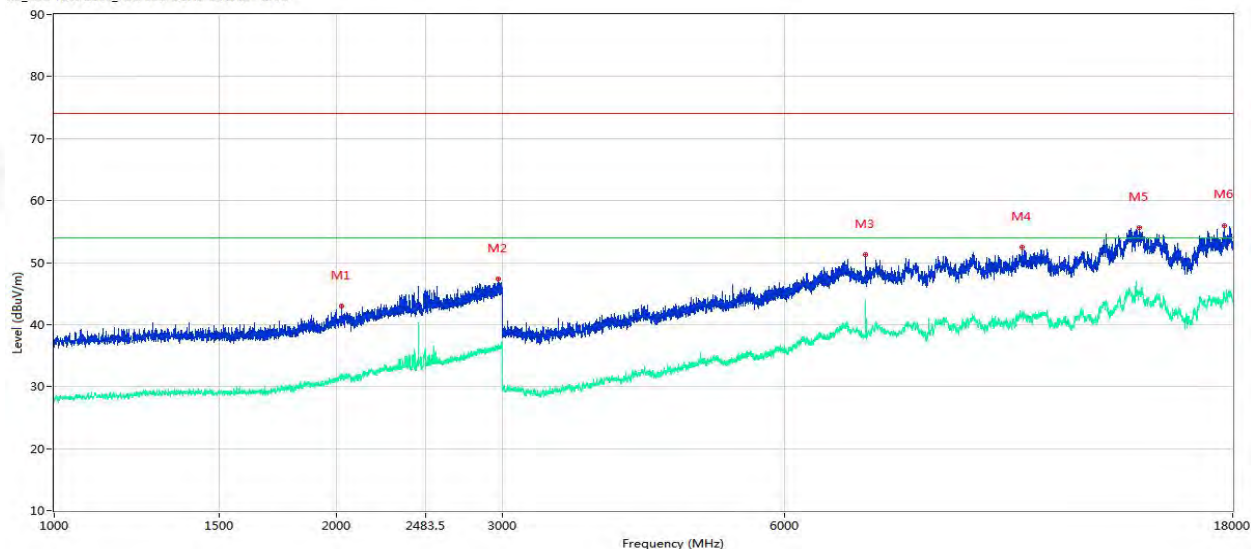


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	22120.000	48.81	3.53	52.34	74.00	-21.66	peak
2	22120.000	37.69	3.53	41.22	54.00	-12.78	AVG



Mid Channel
Horizontal
1GHz-18GHz

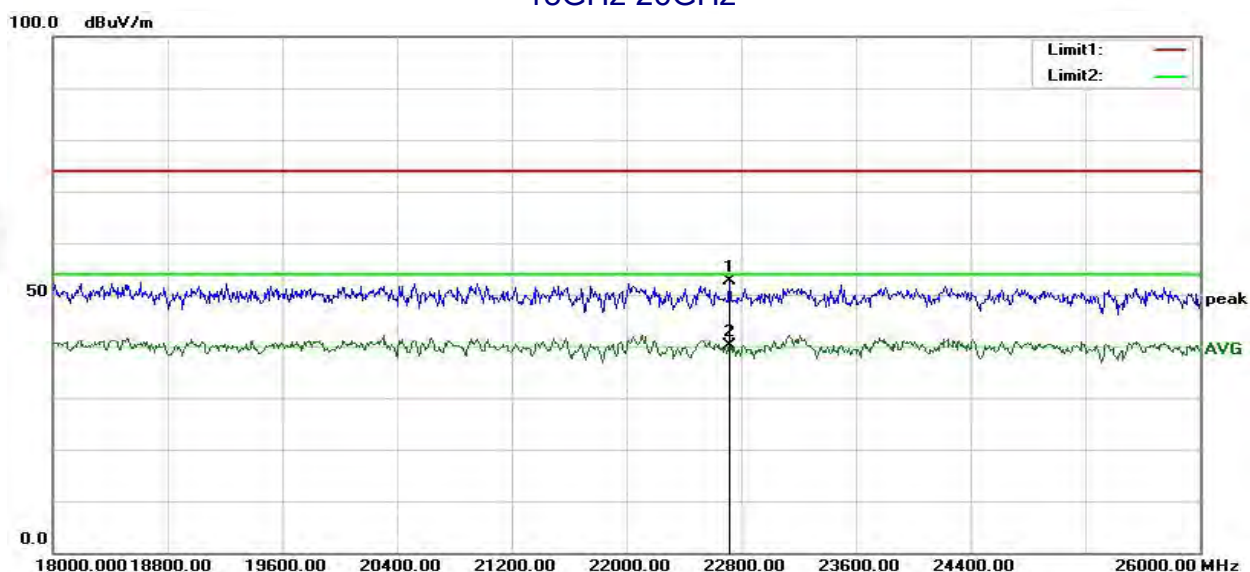
RE_FCC Test Case_FCC 15C 1GHz-18GHz - 2.4G



No	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Antenna	Verdict
1	2025.500	42.94	0.61	74.0	31.06	Peak	70.20	Horizontal	Pass
1**	2025.500	31.72	0.61	54.0	22.28	AV	70.20	Horizontal	Pass
2	2973.500	47.38	5.33	74.0	26.62	Peak	168.10	Horizontal	Pass
2**	2973.500	36.54	5.33	54.0	17.46	AV	168.10	Horizontal	Pass
3	7321.750	51.30	-2.06	74.0	22.70	Peak	1.80	Horizontal	Pass
3**	7321.750	43.83	-2.06	54.0	10.17	AV	1.80	Horizontal	Pass
4	10729.000	52.45	1.41	74.0	21.55	Peak	138.20	Horizontal	Pass
4**	10729.000	41.38	1.41	54.0	12.62	AV	138.20	Horizontal	Pass
5	14301.250	55.58	6.88	74.0	18.42	Peak	339.20	Horizontal	Pass
5**	14301.250	45.27	6.88	54.0	8.73	AV	339.20	Horizontal	Pass
6	17642.500	56.01	6.32	74.0	17.99	Peak	359.00	Horizontal	Pass
6**	17642.500	44.83	6.32	54.0	9.17	AV	359.00	Horizontal	Pass



18GHz-26GHz

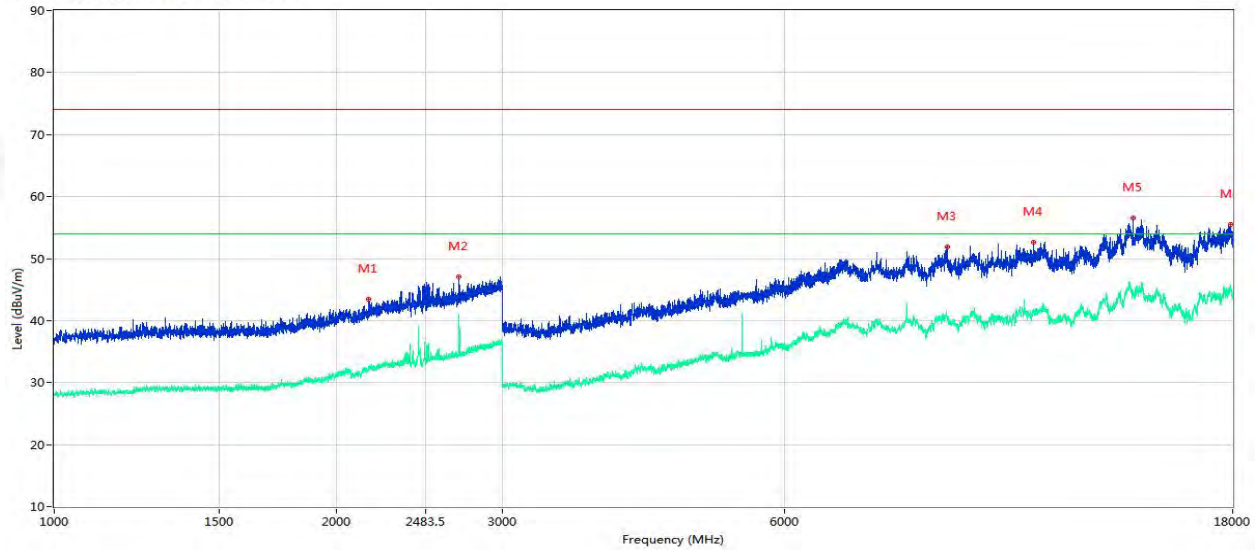


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	22720.000	48.74	3.79	52.53	74.00	-21.47	peak
2	22720.000	36.41	3.79	40.20	54.00	-13.80	AVG



Vertical 1GHz-18GHz

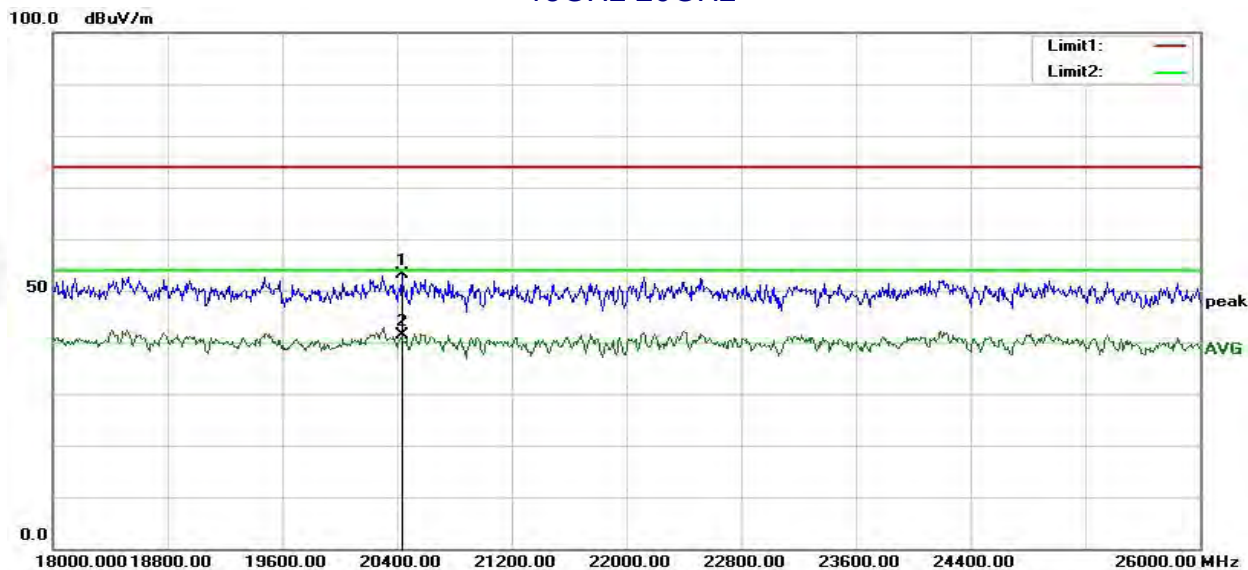
RE_FCC Test Case_FCC 15C 1GHz-18GHz - 2.4G



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Antenna	Verdict
1	2164.000	43.44	1.76	74.0	30.56	Peak	240.70	Vertical	Pass
1**	2164.000	32.61	1.76	54.0	21.39	AV	240.70	Vertical	Pass
2	2700.000	47.11	3.99	74.0	26.89	Peak	360.00	Vertical	Pass
2**	2700.000	41.08	3.99	54.0	12.92	AV	360.00	Vertical	Pass
3	8930.500	51.84	1.10	74.0	22.16	Peak	80.70	Vertical	Pass
3**	8930.500	40.54	1.10	54.0	13.46	AV	80.70	Vertical	Pass
4	11042.500	52.65	1.90	74.0	21.35	Peak	76.60	Vertical	Pass
4**	11042.500	41.51	1.90	54.0	12.49	AV	76.60	Vertical	Pass
5	14084.000	56.55	7.11	74.0	17.45	Peak	39.80	Vertical	Pass
5**	14084.000	44.80	7.11	54.0	9.20	AV	39.80	Vertical	Pass
6	17887.250	55.44	7.13	74.0	18.56	Peak	282.20	Vertical	Pass
6**	17887.250	45.50	7.13	54.0	8.50	AV	282.20	Vertical	Pass



18GHz-26GHz

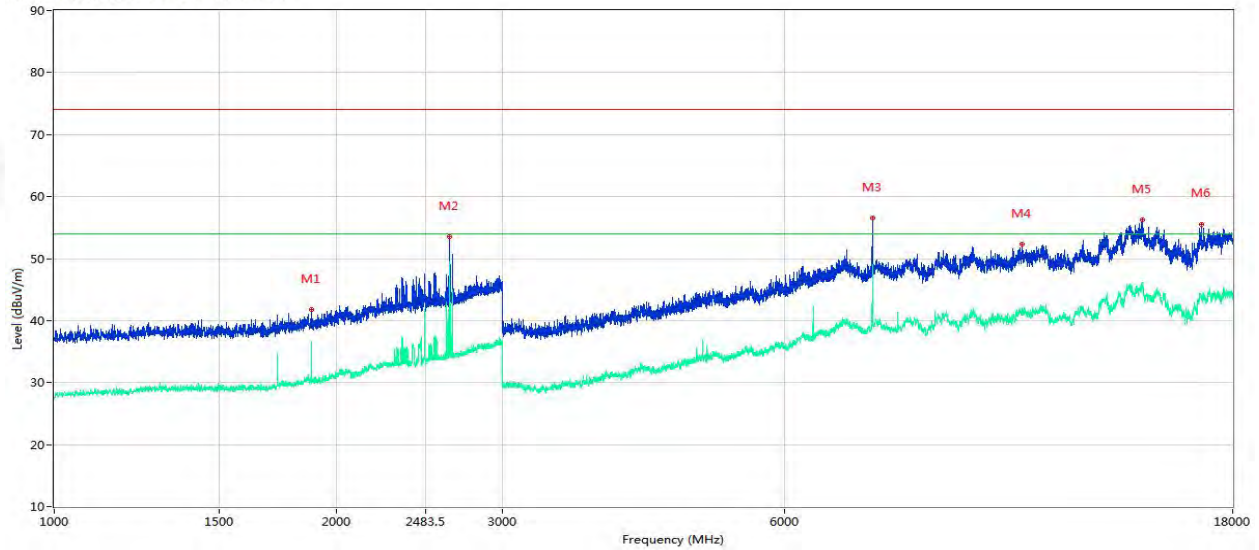


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	20432.000	51.07	2.18	53.25	74.00	-20.75	peak
2	20432.000	39.17	2.18	41.35	54.00	-12.65	AVG



High Channel Horizontal 1GHz-18GHz

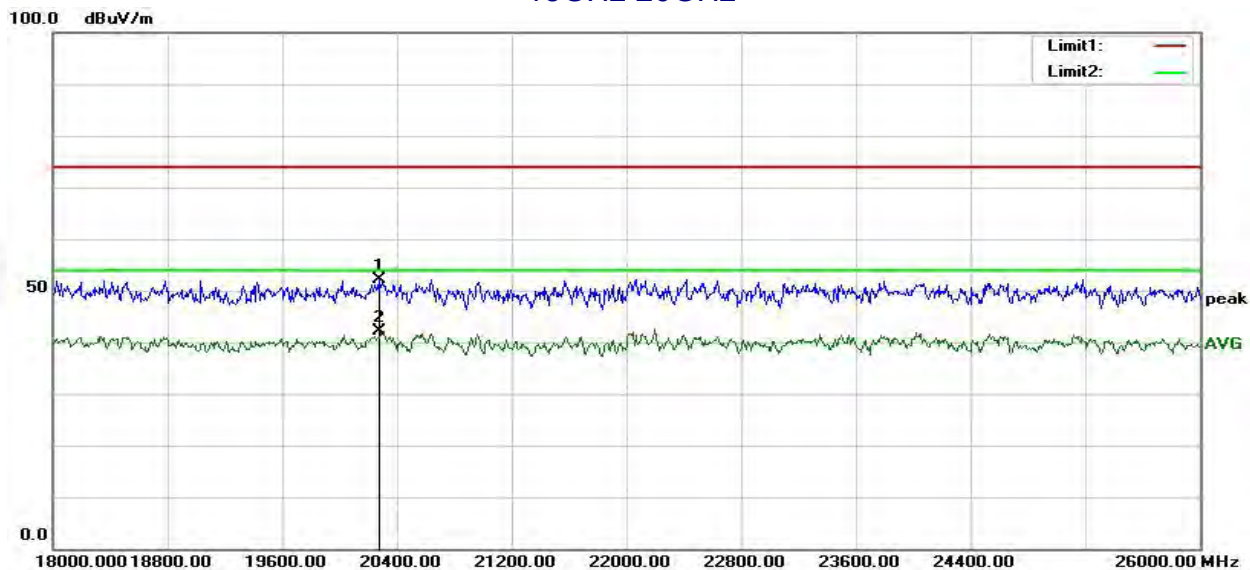
RE_FCC Test Case_FCC 15C 1GHz-18GHz - 2.4G



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Antenna	Verdict
1	1880.500	41.83	-0.12	74.0	32.17	Peak	85.00	Horizontal	Pass
1**	1880.500	34.57	-0.12	54.0	19.43	AV	85.00	Horizontal	Pass
2	2639.000	53.53	3.86	74.0	20.47	Peak	66.10	Horizontal	Pass
2**	2639.000	49.47	3.86	54.0	4.53	AV	66.10	Horizontal	Pass
3	7440.000	56.51	-1.51	74.0	17.49	Peak	1.40	Horizontal	Pass
3**	7440.000	48.22	-1.51	54.0	5.78	AV	1.40	Horizontal	Pass
4	10751.000	52.40	1.60	74.0	21.60	Peak	30.80	Horizontal	Pass
4**	10751.000	40.95	1.60	54.0	13.05	AV	30.80	Horizontal	Pass
5	14414.000	56.19	6.89	74.0	17.81	Peak	126.70	Horizontal	Pass
5**	14414.000	46.12	6.89	54.0	7.88	AV	126.70	Horizontal	Pass
6	16677.250	55.57	4.50	74.0	18.43	Peak	14.50	Horizontal	Pass
6**	16677.250	43.87	4.50	54.0	10.13	AV	14.50	Horizontal	Pass



18GHz-26GHz

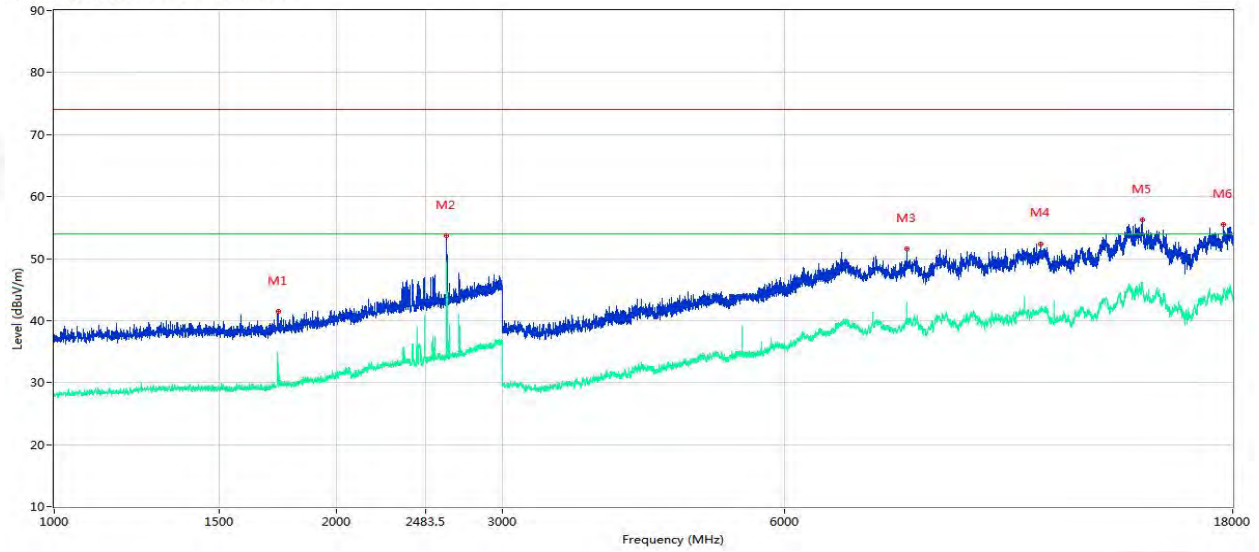


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	20280.000	50.10	2.05	52.15	74.00	-21.85	peak
2	20280.000	40.19	2.05	42.24	54.00	-11.76	AVG



Vertical 1GHz-18GHz

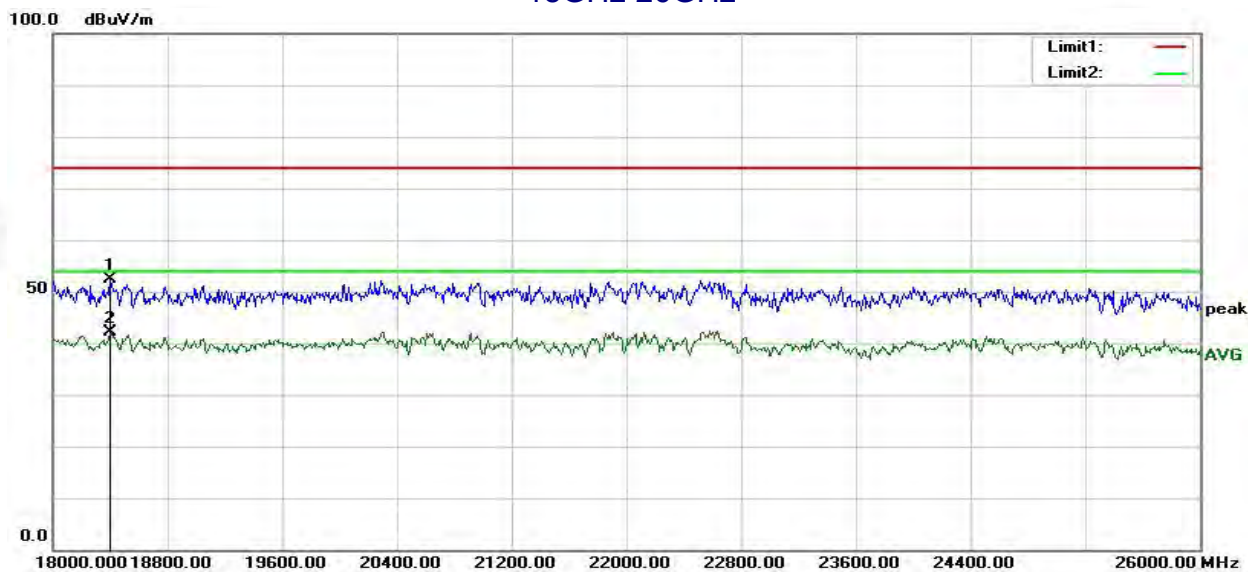
RE_FCC Test Case_FCC 15C 1GHz-18GHz - 2.4G



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Antenna	Verdict
1	1734.000	41.42	-0.67	74.0	32.58	Peak	348.10	Vertical	Pass
1**	1734.000	32.28	-0.67	54.0	21.72	AV	348.10	Vertical	Pass
2	2619.000	53.64	3.64	74.0	20.36	Peak	263.30	Vertical	Pass
2**	2619.000	49.43	3.64	54.0	4.57	AV	263.30	Vertical	Pass
3	8100.000	51.52	0.01	74.0	22.48	Peak	1.40	Vertical	Pass
3**	8100.000	42.99	0.01	54.0	11.01	AV	1.40	Vertical	Pass
4	11235.000	52.41	2.50	74.0	21.59	Peak	91.30	Vertical	Pass
4**	11235.000	41.52	2.50	54.0	12.48	AV	91.30	Vertical	Pass
5	14408.500	56.20	6.93	74.0	17.80	Peak	285.80	Vertical	Pass
5**	14408.500	45.98	6.93	54.0	8.02	AV	285.80	Vertical	Pass
6	17604.000	55.50	6.58	74.0	18.50	Peak	324.50	Vertical	Pass
6**	17604.000	44.62	6.58	54.0	9.38	AV	324.50	Vertical	Pass



18GHz-26GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18400.000	50.00	2.34	52.34	74.00	-21.66	peak
2	18400.000	39.68	2.34	42.02	54.00	-11.98	AVG

Notes:

- Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Emission Level = Reading + Factor.
- The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.
- All modes of GFSK, $\pi/4$ DQPSK and 8DPSK were tested at Low, Middle, and High channel; only the worst result of GFSK was reported.



5. EMISSIONS AT RESTRICTED BAND

5.1 TEST REQUIREMENT

FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (GHz)
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

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

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).



5.2 TEST PROCEDURE

According to ANSI C63.10 Field Strength Approach (linear terms):

$$E = \text{EIRP} - 20 \log d + 104.8$$

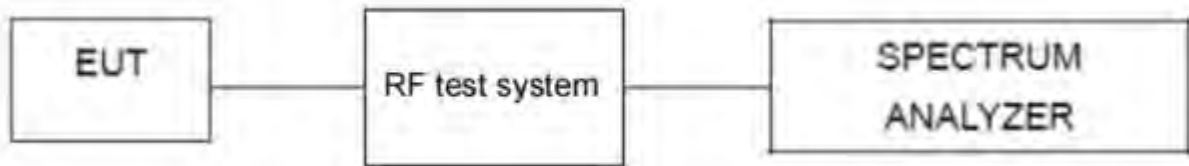
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to an EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz for peak detector and RBW=1MHz, VBW=3 MHz for AVG detector, Max Hold=Average, Trace=100times for AV test.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.
6. Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency for guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
7. Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see 12.2.5 for guidance on determining the applicable antenna gain)
8. Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).
9. For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
10. Compare the resultant electric field strength level to the applicable regulatory limit.
11. Perform radiated spurious emission test duress until all measured frequencies were complete.

5.3 DEVIATION FROM TEST STANDARD

No deviation



5.4 TEST SETUP



5.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

5.6 TEST RESULTS

Notes: The test data please refer to APPENDIX 1.

Remark:

Test results including cable loss;

Measured at difference Packet Type for each mode and recorded worst case for each mode.

“---“means that the fundamental frequency not for RSS GEN limits requirement.

The other emission levels were very low against the limit.

The average measurement was not performed when the peak measured data under the limit of average detection.

Detector AV is setting spectrum/receiver. RBW=1MHz/VBW=3MHz/Sweep time=Auto/Detector=RMS, Max Hold=Average, Trace=100times.

Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.



6. CONDUCTED BAND EDGE AND SPURIOUS EMISSION

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D0115.247 Meas Guidancev05r02

6.1 LIMIT

Regulation 15.247 (d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

6.2 TEST SETUP



6.3 TEST PROCEDURE

Using the following spectrum analyzer setting:

- A) Set the RBW = 100KHz.
- B) Set the VBW = 300KHz.
- C) Sweep time = auto couple.
- D) Detector function = peak.
- E) Trace mode = max hold.
- F) Allow trace to fully stabilize.

6.4 DEVIATION FROM STANDARD

No deviation.

6.5 TEST RESULTS

Notes:

- 1. The test data please refer to APPENDIX 1.
- 2. Input compensation coefficient (dB) = Cable Loss (dB).
- 3. For Conducted spurious emissions plots from 30MHz to 26.5GHz, the worst cable loss and attenuator factors have been set in the 'Input Correction' of the Spectrum Analyzer during the test.



7. 20DB BANDWIDTH

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Erratato C63.10a-2024

7.1 TEST SETUP



7.2 LIMIT

N/A

7.3 TEST PROCEDURE

1. Set RBW = 30 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

7.4 DEVIATION FROM STANDARD

No deviation.

7.5 TEST RESULTS

Notes: The test data please refer to APPENDIX 1.



8. MAXIMUM PEAK OUTPUT POWER

Test Requirement:	FCC Part15 C Section 15.247 (b)(1)
Test Method:	ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Erratato C63.10a-2024
Limit:	GFSK:30 dBm $\pi/4$ -DQPSK & 8-DPSK:20.97 dBm

8.1 BLOCK DIAGRAM OF TEST SETUP



8.2 LIMIT

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

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

8.3 TEST PROCEDURE

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 2MHz. VBW =6MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

8.4 DEVIATION FROM STANDARD

No deviation.

8.5 TEST RESULTS

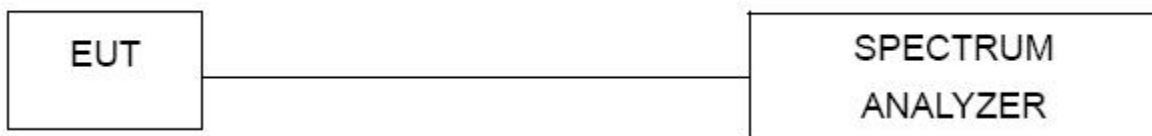
Notes: The test data please refer to APPENDIX 1.



9. HOPPING CHANNEL SEPARATION

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Erratato C63.10a-2024
Receiver setup:	RBW=300KHz, VBW=300KHz, detector=Peak
Limit:	GFSK: 20dB bandwidth $\pi/4$ -DQPSK & 8DSK: 0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)

9.1 TEST SETUP



9.2 TEST PROCEDURE

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 300kHz. VBW = 300kHz , Span = 3.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

9.3 DEVIATION FROM STANDARD

No deviation.

9.4 TEST RESULTS

Notes: The test data please refer to APPENDIX 1.



10.NUMBER OF HOPPING FREQUENCY

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii)
Test Method:	ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Erratato C63.10a-2024
Receiver setup:	RBW=100kHz, VBW=300kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak
Limit:	GFSK 75 channels, $\pi/4$ -DQPSK 15channels

10.1 TEST SETUP



10.2 TEST PROCEDURE

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.
4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz. Sweep=auto;

10.3 DEVIATION FROM STANDARD

No deviation.

10.4 TEST RESULTS

Notes: The test data please refer to APPENDIX 1.



11. DWELL TIME

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii)
Test Method:	ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Erratato C63.10a-2024
Receiver setup:	RBW=1MHz, VBW=3MHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second

11.1 TEST SETUP



11.2 TEST PROCEDURE

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set spectrum analyzer span = 0Hz;
3. Set RBW = 1MHz and VBW = 3MHz.Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3, DH1, 2DH5, 2DH3 and 2DH1 packet transmitting.
4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g.. data rate. modulation format. etc.). repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

11.3 DEVIATION FROM STANDARD

No deviation.

11.4 TEST RESULTS

Notes: The test data please refer to APPENDIX 1.



12. ANTENNA REQUIREMENT

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
EUT Antenna:	
The antenna is FPC Antenna, the best case gain of the antennas is 1.64 dBi, reference to the appendix II for details	



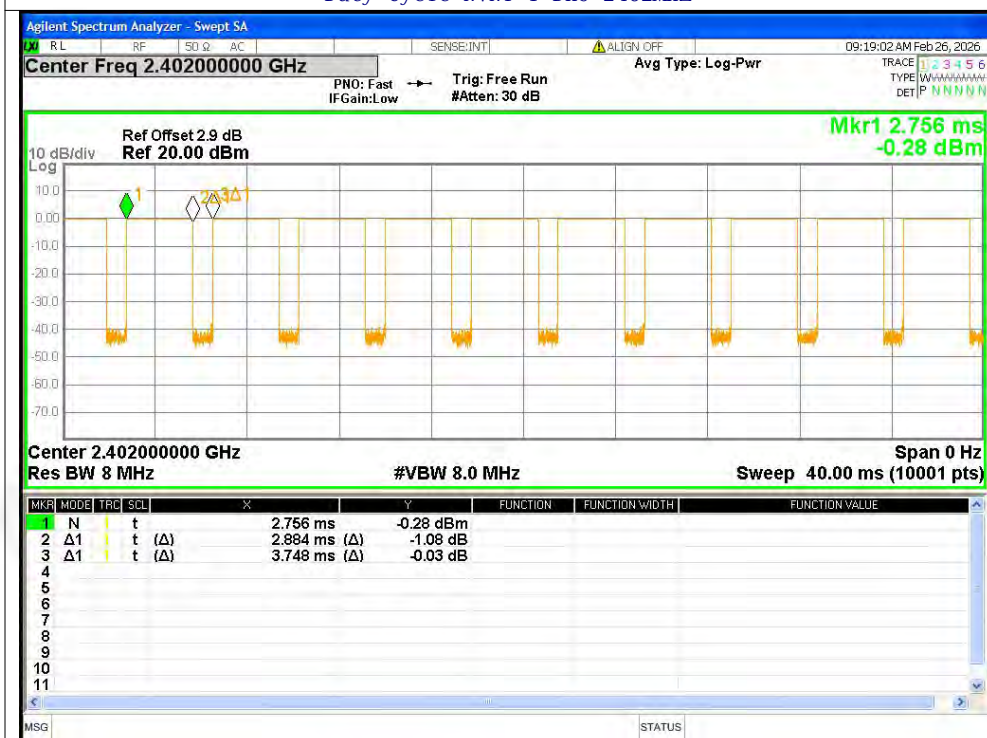
13. APPENDIX 1-TEST DATA

Duty Cycle

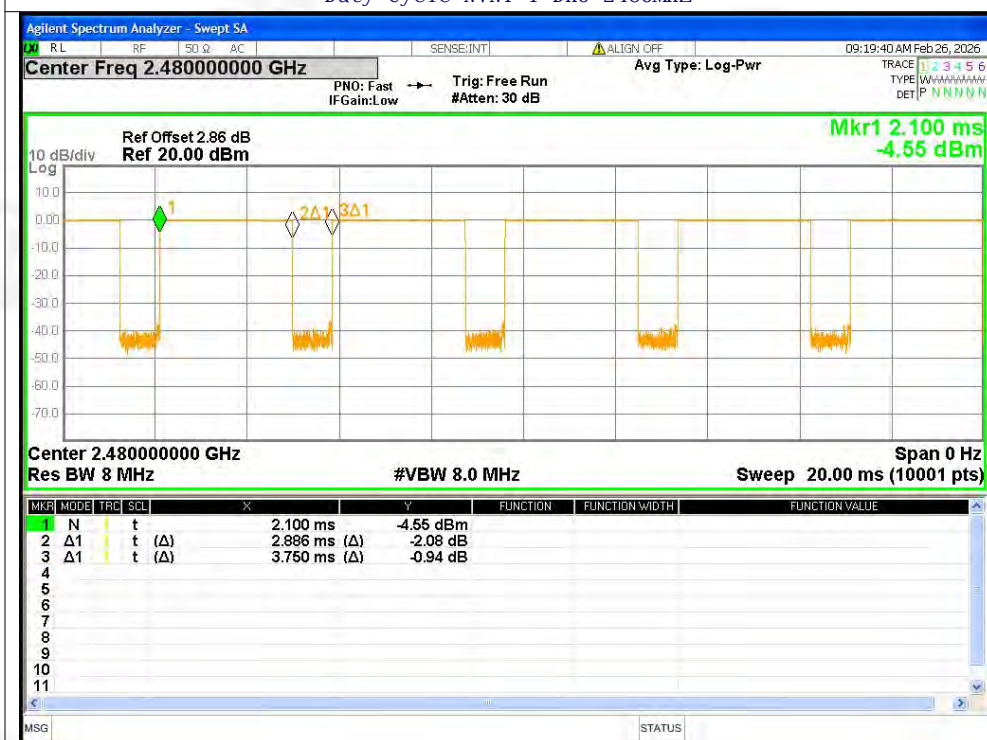
Condition	Mode	Frequency (MHz)	On Time (ms)	Period (ms)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	1-DH5	2402	2.884	3.748	76.95	1.14	0.35
NVNT	1-DH5	2480	2.886	3.75	76.96	1.14	0.35
NVNT	2-DH5	2402	2.89	3.75	77.07	1.13	0.35
NVNT	2-DH5	2480	2.89	3.75	77.07	1.13	0.35
NVNT	3-DH5	2402	2.895	3.75	77.2	1.12	0.35
NVNT	3-DH5	2480	2.89	3.75	77.07	1.13	0.35



Test Graphs
Duty Cycle NVNT 1-DH5 2402MHz

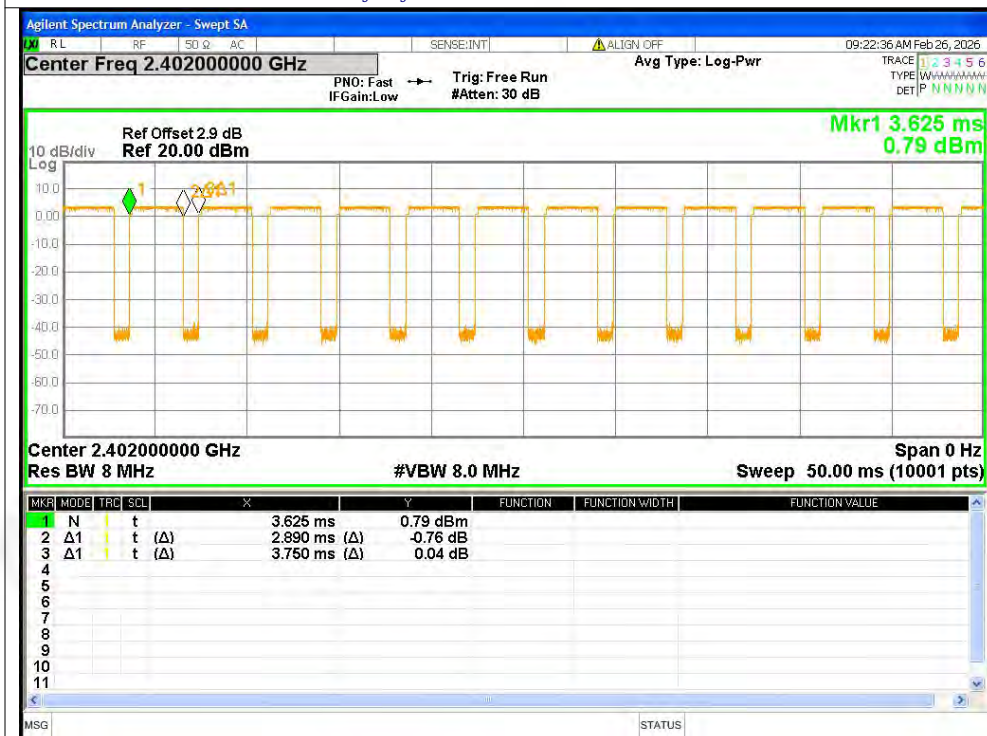


Duty Cycle NVNT 1-DH5 2480MHz

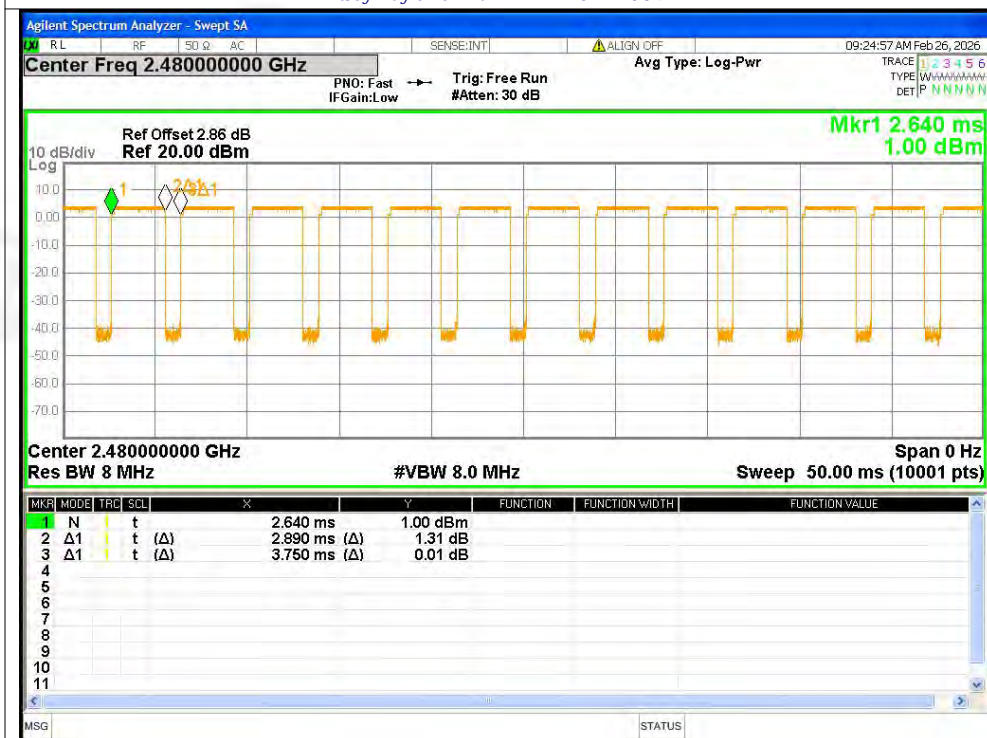




Duty Cycle NVNT 2-DH5 2402MHz

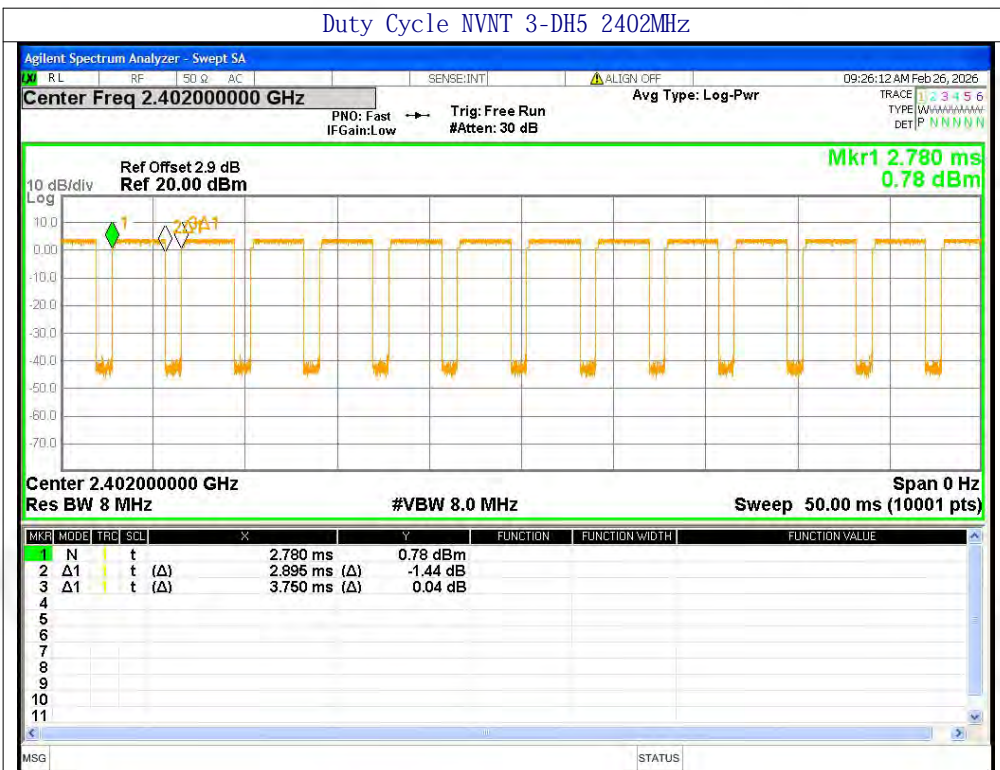


Duty Cycle NVNT 2-DH5 2480MHz

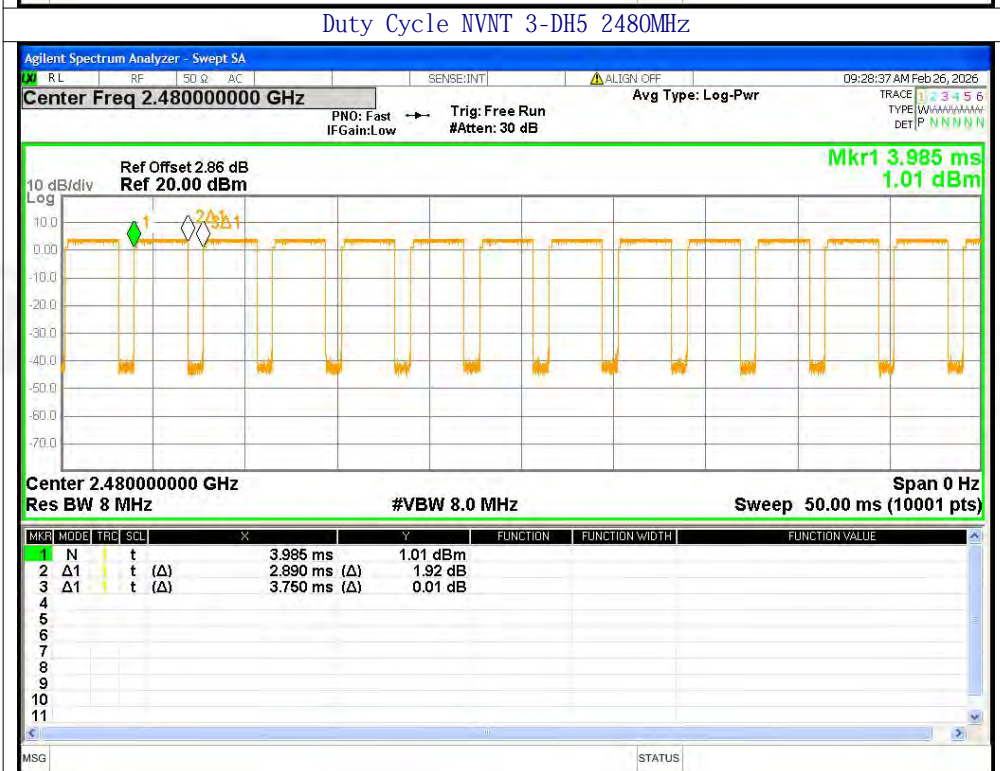




Duty Cycle NVNT 3-DH5 2402MHz



Duty Cycle NVNT 3-DH5 2480MHz





Dwell Time

Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH1	2441	0.375	117.375	313	31600	<=400	Pass
NVNT	1-DH3	2441	1.631	256.067	157	31600	<=400	Pass
NVNT	1-DH5	2441	2.878	305.068	106	31600	<=400	Pass
NVNT	2-DH1	2441	0.383	42.896	112	31600	<=400	Pass
NVNT	2-DH3	2441	1.635	258.33	158	31600	<=400	Pass
NVNT	2-DH5	2441	2.882	302.61	105	31600	<=400	Pass
NVNT	3-DH1	2441	0.383	119.879	313	31600	<=400	Pass
NVNT	3-DH3	2441	1.634	258.172	158	31600	<=400	Pass
NVNT	3-DH5	2441	2.885	334.66	116	31600	<=400	Pass

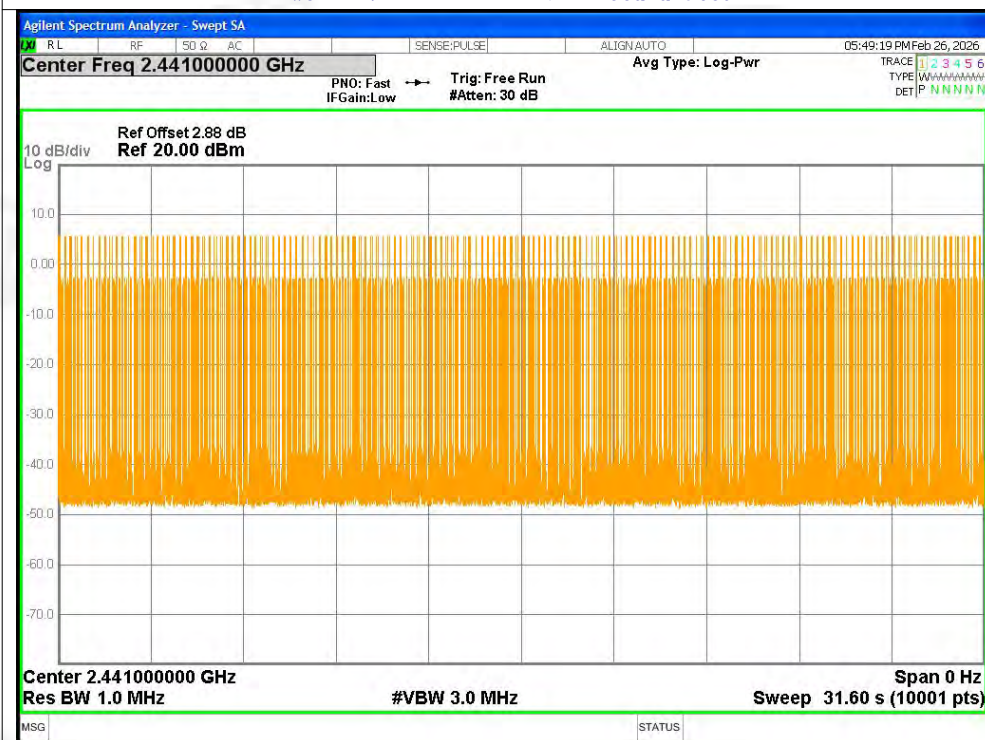


Test Graphs

Dwell NVNT 1-DH1 2441MHz One Burst



Dwell NVNT 1-DH1 2441MHz Accumulated

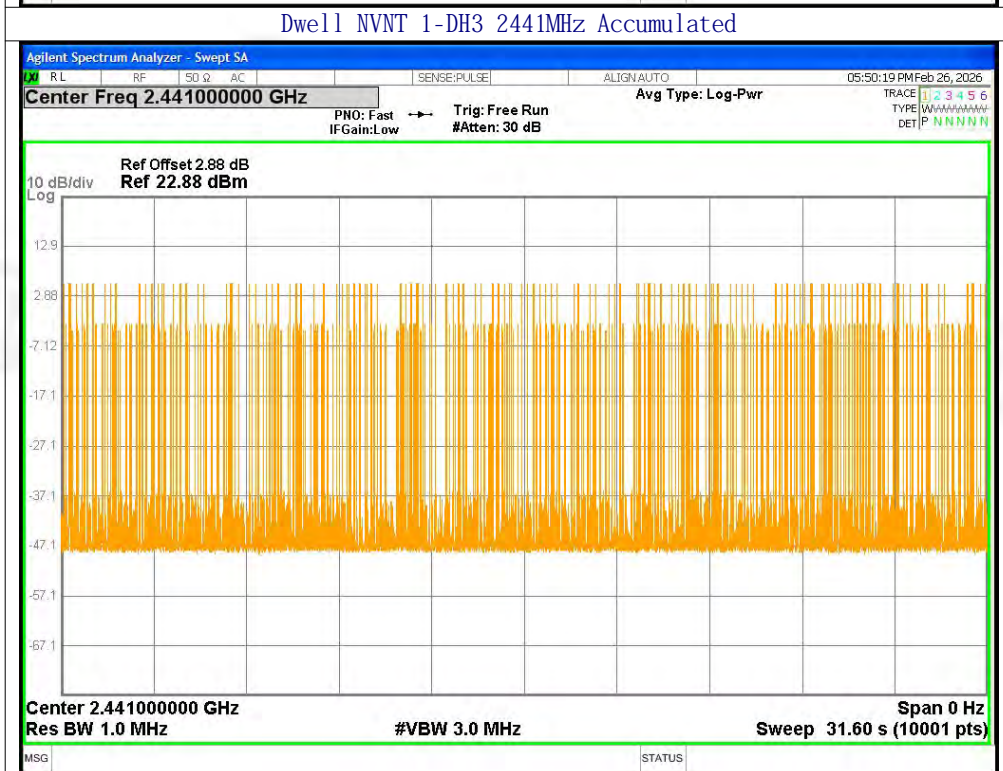




Dwell NVNT 1-DH3 2441MHz One Burst



Dwell NVNT 1-DH3 2441MHz Accumulated

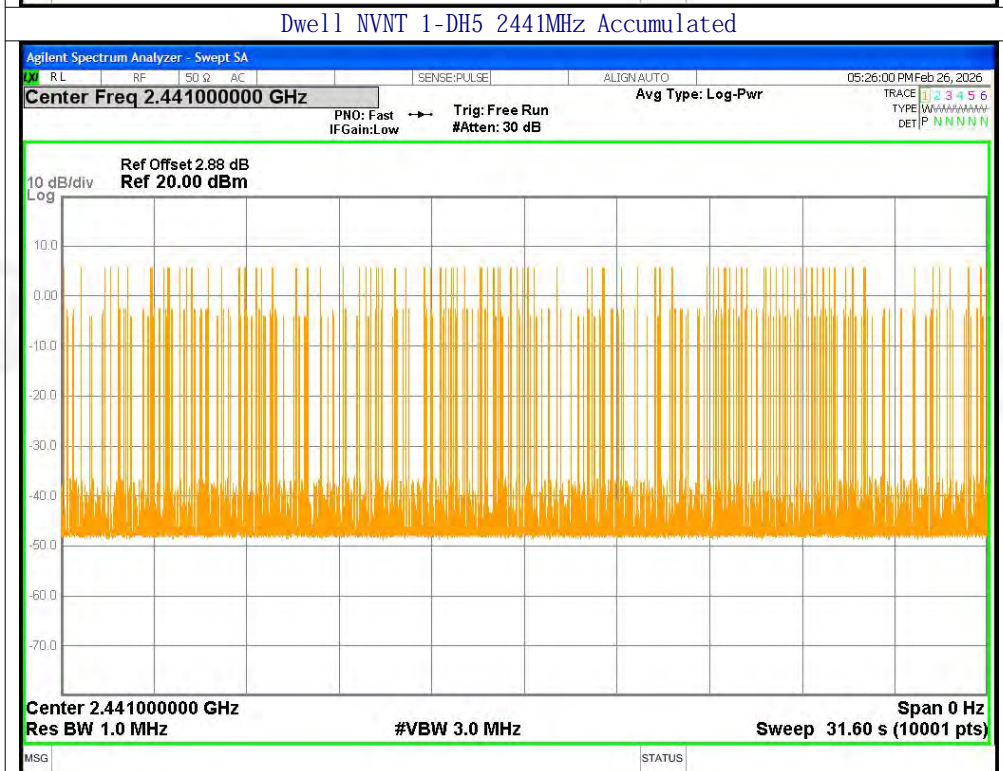




Dwell NVNT 1-DH5 2441MHz One Burst

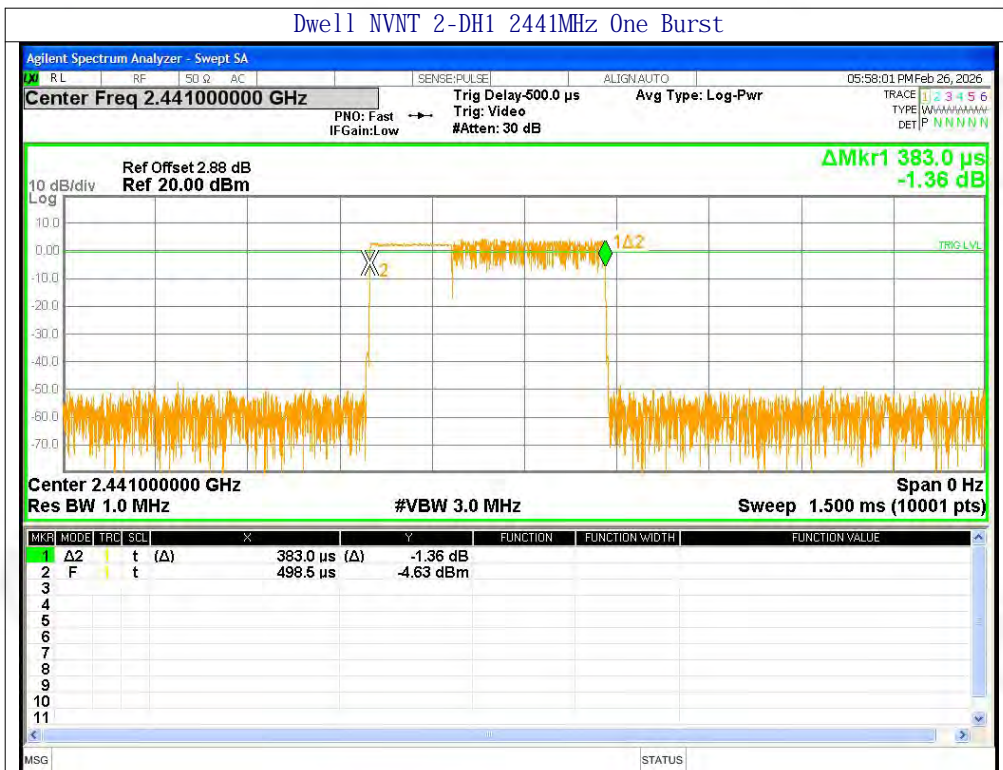


Dwell NVNT 1-DH5 2441MHz Accumulated

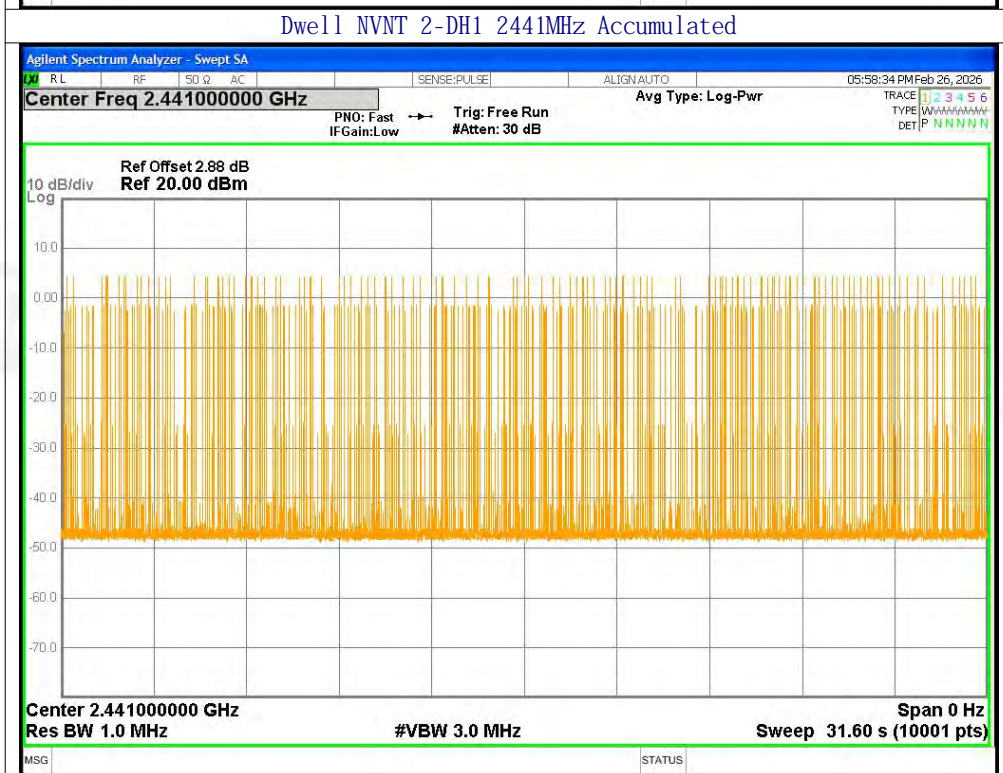




Dwell NVNT 2-DH1 2441MHz One Burst



Dwell NVNT 2-DH1 2441MHz Accumulated





Dwell NVNT 2-DH3 2441MHz One Burst



Dwell NVNT 2-DH3 2441MHz Accumulated

