RADIO TEST REPORT FCC ID:2AXP2-GK25

Product: GMMK 3

Trade Mark: GLORIOUS

Model No.: GMMK 3 PRO 65% WIRELESS

Family Model: GMMK 3 65% WIRELESS

Report No.: S24041703516002

Issue Date: Jun 11. 2024

Prepared for

Glorious LLC

13809 Research Blvd Suite 500 PMB 93206 Austin, TX 78750, USA

Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.

1/F, Building E, Fenda Science Park, Sanwei Community,
Xixiang Street Bao'an District, Shenzhen 518126 P.R. China
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Website: http://www.ntek.org.cn

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1 TEST RESULT CERTIFICATION

Applicant's name	Glorious LLC
Address	13809 Research Blvd Suite 500 PMB 93206 Austin, TX 78750,USA
Manufacturer's Name:	Glorious LLC
Address:	13809 Research Blvd Suite 500 PMB 93206 Austin, TX 78750,USA
Product description	
Product name:	GMMK 3
Model and/or type reference:	GMMK 3 PRO 65% WIRELESS
Family Model	GMMK 3 65% WIRELESS
Test Sample Number:	S240417035016
Date (s) of performance of tests	May12. 2024 ~ Jun 11. 2024

Measurement Procedure Used:

1 ... 1/21

meacarement recodare coda.				
APPLICABLE STANDARDS				
APPLICABLE STANDARD/ TEST PROCEDURE	TEST RESULT			
FCC 47 CFR Part 2, Subpart J				
FCC 47 CFR Part 15, Subpart C	Complied			
ANSI C63.10-2013				
KDB 558074 D01 15.247 Meas Guidance v05r02				

This device described above has been tested by Shenzhen NTEK Testing Technology Co., Ltd., 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.

This report shall not be reproduced except in full, without the written approval of Shenzhen NTEK Testing Technology Co., Ltd., this document may be altered or revised by Shenzhen NTEK Testing Technology Co., Ltd., personnel only, and shall be noted in the revision of the document.

The test results of this report relate only to the tested sample identified in this report.

Prepared .	Reviewed :	Jason Cheng	Approved .	Alex Li
By · Mary Hu	Ву	Aaron Cheng	By ·	Alex Li
(Project Engineer)		(Supervisor)		(Manager)

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2 SUMMARY OF TEST RESULTS

FCC Part15 (15.247), Subpart C					
Standard Section	Verdict	Remark			
15.207	Conducted Emission	PASS			
15.247 (a)(2)	6dB Bandwidth	PASS			
15.247 (b)	Peak Output Power	PASS			
15.209 (a) 15.205 (a)	Radiated Spurious Emission	PASS			
15.247 (e)	Power Spectral Density	PASS			
15.247 (d)	Band Edge Emission	PASS			
15.247 (d)	Spurious RF Conducted Emission	PASS			
15.203	Antenna Requirement	PASS			

Remark:

- "N/A" denotes test is not applicable in this Test Report.
 All test items were verified and recorded according to the standards and without any deviation during the test.

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3 FACILITIES AND ACCREDITATIONS

3.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen 518126 P.R. China.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

3.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

CNAS-Lab. : The Certificate Registration Number is L5516. IC-Registration
The Certificate Registration Number is 9270A.

CAB identifier:CN0074

FCC- Accredited Test Firm Registration Number: 463705.

Designation Number: CN1184

A2LA-Lab. The Certificate Registration Number is 4298.01

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for

the competence of testing and calibration laboratories.

This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).

Name of Firm : Shenzhen NTEK Testing Technology Co., Ltd.

Site Location : 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang

Street, Bao'an District, Shenzhen 518126 P.R. China.

3.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y±U, where expended 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	Conducted Emission Test	±2.80dB
2	RF power, conducted, PSD	±0.16dB
3	Spurious emissions, conducted	±0.21dB
4	All emissions, radiated(30MHz~1GHz)	±2.64dB
5	All emissions, radiated(1GHz~6GHz)	±2.40dB
6	All emissions, radiated(>6GHz)	±2.52dB
7	Temperature	±0.5°C
8	Humidity	±2%
9	All emissions, radiated(9KHz~30MHz)	±6dB
10	Occupied bandwidth	±4.7%

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4 GENERAL DESCRIPTION OF EUT

Product Feature and Specification				
Equipment	GMMK 3			
Trade Mark	GLORIOUS			
FCC ID	2AXP2-GK25			
Model No.	GMMK 3 PRO 65% WIRELESS			
Family Model	GMMK 3 65% WIRELESS			
Model Difference	All models have the same circuit and RF module, except for the shell color, shaft, and keycap.			
Operating Frequency	2402MHz~2479MHz			
Modulation	GFSK			
Number of Channels	78 Channels			
Antenna Type	PCB Antenna			
Antenna Gain	1.16dBi			
Power supply	DC 3.7Vfrom battery or DC 5V from type-c port			
Adapter N/A				
HW Version	V3.0			
SW Version	V3025			

Note 1: Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.

Note 2: The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.

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Report No.: S24041703516002

Revision History

Report No.	Version	Description	Issued Date
S24041703516002	Rev.01	Initial issue of report	Jun 11. 2024

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5 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Those data rates (2Mbps for GFSK modulation) were used for all test.

The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.

Carrier Frequency and Channel list:

Carrier Frequency and Charmer list.				
Channel	Frequency(MHz)			
1	2402			
2	2403			
	•••			
38	2439			
39	2440			
40	2441			
	•••			
78	2479			

Note: fc=2402MHz+k×1MHz k=1to 78

The following summary table is showing all test modes to demonstrate in compliance with the standard.

The following summary table is snowing all test modes to demonstrate in compliance with the standard.					
	Test Cases				
Test Item	Data Rate/ Modulation				
AC Conducted Emission	Mode 1: normal link mode				
	Mode 1: normal link mode				
Radiated Test	Mode 2: GFSK Tx Ch01_2402MHz_2Mbps				
Cases	Mode 3: GFSK Tx Ch45_2446MHz_2Mbps				
	Mode 4: GFSK Tx Ch79_2479MHz_2Mbps				
Conducted Test	Mode 2: GFSK Tx Ch01_2402MHz_2Mbps				
Conducted rest	Mode 3: GFSK Tx Ch45_2446MHz_2Mbps				
Cases	Mode 4: GFSK Tx Ch79_2479MHz_2Mbps				

Note:

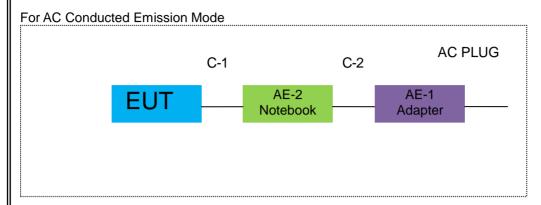
- 1. The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode(duty cycle =100% during the test)
- 2. AC power line Conducted Emission was tested under maximum output power.
- 3. For radiated test cases, the worst mode data rate 2Mbps was reported only, because this data rate has the highest RF output power at preliminary tests, and no other significantly frequencies found in conducted spurious emission.
- 4. EUT built-in battery-powered, the battery is fully-charged.

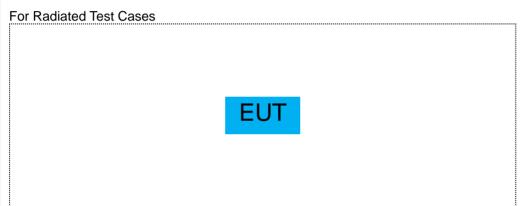
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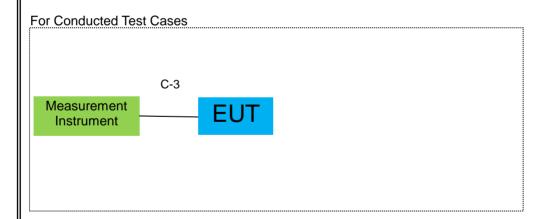


6 SETUP OF EQUIPMENT UNDER TEST

6.1 BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM







Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

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6.2 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.	Series No.	Note
AE-1	Adapter	DELL	HA65NS5-00	N/A	Peripherals
AE-2	Notebook	DELL	Inspiron 5493	N/A	Peripherals

Item	Cable Type	Shielded Type	Ferrite Core	Length
C-1	Type-C cable	NO	YES	2.0m
C-2	Power cable	NO	NO	1.0m
C-3	RF Cable	YES	NO	0.1m

Notes:

- (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 <code>[Length]</code> column.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".

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6.3 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation& Conducted Test equipment

Naulalic	na Conducted i	est equipment					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibratio n period
1	Spectrum Analyzer	Agilent	E4440A	MY41000130	2024.03.12	2025.03.11	1 year
2	Spectrum Analyzer	Agilent	N9020A	MY49100060	2024.04.26	2025.04.25	1 year
3	Spectrum Analyzer	R&S	FSV40	101417	2024.04.26	2025.04.25	1 year
4	Test Receiver	R&S	ESPI7	101318	2024.03.12	2025.03.11	1 year
5	Bilog Antenna	TESEQ	CBL6111D	31216	2024.03.11	2025.03.10	1 year
6	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2023.05.06	2026.05.05	3 year
7	Horn Antenna	EM	EM-AH-1018 0	2011071402	2022.03.31	2025.03.30	3 year
8	Broadband Horn Antenna	SCHWARZBE CK	BBHA 9170	803	2022.11.07	2025.11.06	3 year
9	Amplifier	EMC	EMC051835 SE	980246	2024.01.23	2025.01.22	1 year
10	Active Loop Antenna	SCHWARZBE CK	FMZB 1519 B	055	2023.11.03	2026.11.02	3 year
11	Power Meter	DARE	RPR3006W	15I00041SN O84	2024.04.25	2025.04.24	1 year
12	Test Cable (9KHz-30MHz)	N/A	R-01	N/A	2022.06.17	2025.06.16	3 year
13	Test Cable (30MHz-1GHz)	N/A	R-02	N/A	2022.06.17	2025.06.16	3 year
14	High Test Cable(1G-40G Hz)	N/A	R-03	N/A	2022.06.17	2025.06.16	3 year
15	High Test Cable(1G-40G Hz)	N/A	R-04	N/A	2022.06.17	2025.06.16	3 year
16	Filter	TRILTHIC	2400MHz	29	2023.03.26	2026.03.25	3 year
17	temporary antenna connector (Note)	NTS	R001	N/A	N/A	N/A	N/A

Note

We will use the temporary antenna connector (soldered on the PCB board) When conducted test And this temporary antenna connector is listed within the instrument list

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AC Conduction Test equipment Calibration Kind of Last Calibrated Item Manufacturer Type No. Serial No. Equipment calibration period until Test Receiver R&S **ESCI** 101160 2024.03.12 2025.03.11 1 1 year 2 LISN R&S **ENV216** 101313 2024.03.12 2025.03.11 1 year **SCHWARZBE** 3 LISN **NNLK 8129** 8129245 2024.03.12 2025.03.11 1 year CK 50Ω Coaxial **ANRITSU** 4 MP59B 6200983704 2023.05.06 3 year 2026.05.05 Switch **CORP** Test Cable (9KHz-30MH C01 N/A 5 N/A 2023.05.06 2026.05.05 3 year Test Cable 6 (9KHz-30MH N/A C02 N/A 2023.05.06 2026.05.05 3 year Test Cable 7 (9KHz-30MH N/A C03 N/A 2023.05.06 2026.05.05 3 year z)

Note: Each piece of equipment is scheduled for calibration once a year except the Aux Equipment & Test Cable which is scheduled for calibration every 2 or 3 years.

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7 TEST REQUIREMENTS

7.1 CONDUCTED EMISSIONS TEST

7.1.1 Applicable Standard

According to FCC Part 15.207(a)

7.1.2 Conformance Limit

Fraguency/MHz)	Conducted Emission Limit			
Frequency(MHz)	Quasi-peak	Average		
0.15-0.5	66-56*	56-46*		
0.5-5.0	56	46		
5.0-30.0	60	50		

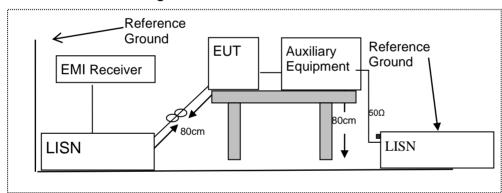
Note: 1. *Decreases with the logarithm of the frequency

- 2. The lower limit shall apply at the transition frequencies
- 3. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

7.1.3 Measuring Instruments

The Measuring equipment is listed in the section 6.3 of this test report.

7.1.4 Test Configuration



7.1.5 Test Procedure

According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode

- 1. The EUT was placed 0.4 meter from the conducting wall of the shielding room.
- 2. The EUT was placed on a table which is 0.8m above ground plane.
- Connect EUT 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.
- 4. 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 40cm long.
- 5. 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.
- 6. LISN at least 80 cm from nearest part of EUT chassis.
- 7. The frequency range from 150KHz to 30MHz was searched.
- 8. Set the test-receiver system to Peak Detect Function and specified bandwidth(IF bandwidth=9KHz) with Maximum Hold Mode
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

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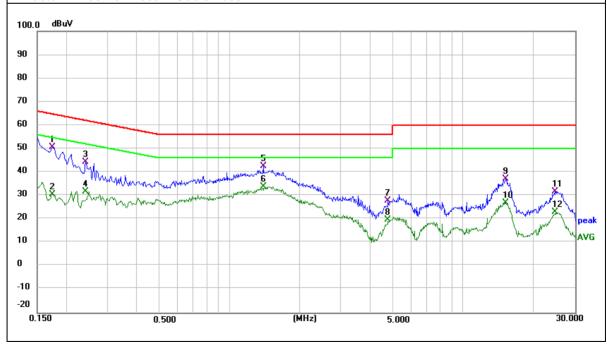
7.1.6 **Test Results**

EUT:	GMMK 3	IIVIOGEI Name .	GMMK 3 PRO 65% WIRELESS
Temperature:	22 ℃	Relative Humidity:	57%
Pressure:	1010hPa	Phase :	L
LIEST VAITAGE .	DC 5V from Notebook Adapter AC 120V/60Hz	Test Mode:	Mode 1

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Domork
(MHz)	(dBµV)	(dB)	(dBµV)	(dBµV)	(dB)	Remark
0.1740	40.58	9.97	50.55	64.77	-14.22	QP
0.1740	20.63	9.97	30.60	54.77	-24.17	AVG
0.2420	34.32	10.12	44.44	62.03	-17.59	QP
0.2420	21.60	10.12	31.72	52.03	-20.31	AVG
1.3940	30.25	12.44	42.69	56.00	-13.31	QP
1.3940	21.36	12.44	33.80	46.00	-12.20	AVG
4.7660	18.17	9.67	27.84	56.00	-28.16	QP
4.7660	10.09	9.67	19.76	46.00	-26.24	AVG
15.1940	27.35	9.71	37.06	60.00	-22.94	QP
15.1940	17.35	9.71	27.06	50.00	-22.94	AVG
24.7660	22.08	9.63	31.71	60.00	-28.29	QP
24.7660	13.37	9.63	23.00	50.00	-27.00	AVG

Remark:

- 1. All readings are Quasi-Peak and Average values.
- 2. Factor = Insertion Loss + Cable Loss.



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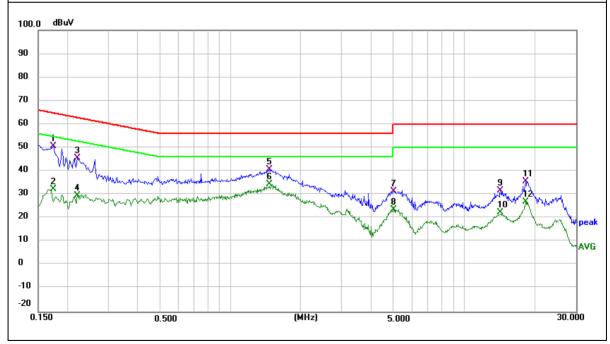


EUT:	GММК 3	IMADI Nama .	GMMK 3 PRO 65% WIRELESS
Temperature:	22 ℃	Relative Humidity:	57%
Pressure:	1010hPa	Phase :	N
Test Voltage:	DC 5V from Notebook Adapter AC 120V/60Hz	Test Mode:	Mode 1

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Domork
(MHz)	(dBµV)	(dB)	(dBµV)	(dBµV)	(dB)	Remark
0.1740	40.68	9.97	50.65	64.77	-14.12	QP
0.1740	22.26	9.97	32.23	54.77	-22.54	AVG
0.2220	35.40	10.08	45.48	62.74	-17.26	QP
0.2220	19.49	10.08	29.57	52.74	-23.17	AVG
1.4700	28.10	12.60	40.70	56.00	-15.30	QP
1.4700	21.95	12.60	34.55	46.00	-11.45	AVG
5.0020	21.73	9.67	31.40	60.00	-28.60	QP
5.0020	14.08	9.67	23.75	50.00	-26.25	AVG
14.2540	22.15	9.70	31.85	60.00	-28.15	QP
14.2540	12.87	9.70	22.57	50.00	-27.43	AVG
18.3100	26.06	9.71	35.77	60.00	-24.23	QP
18.3100	17.29	9.71	27.00	50.00	-23.00	AVG

Remark:

- 1. All readings are Quasi-Peak and Average values.
- 2. Factor = Insertion Loss + Cable Loss.



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7.2 RADIATED SPURIOUS EMISSION

7.2.1 Applicable Standard

According to FCC Part 15.247(d) and 15.209 and ANSI C63.10-2013

7.2.2 Conformance Limit

13.36-13.41

According to FCC Part 15.247(d): 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)).

According to FCC Part15.205, Restricted bands MHz GHz MHz MHz 0.090-0.110 16.42-16.423 399.9-410 4.5-5.15 16.69475-16.69525 5.35-5.46 0.495-0.505 608-614 2.1735-2.1905 16.80425-16.80475 960-1240 7.25-7.75 1300-1427 4.125-4.128 25.5-25.67 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 123-138 2200-2300 14.47-14.5 8.291-8.294 149.9-150.05 2310-2390 15.35-16.2 156.52475-156.52525 8.362-8.366 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 (2)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

conticted band operation of relieved (a), then the relieved (a) mink in the table below has to be relieved.					
Restricted Frequency(MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)	Measurement Distance		
0.009~0.490	2400/F(KHz)	20 log (uV/m)	300		
0.490~1.705	24000/F(KHz)	20 log (uV/m)	30		
1.705~30.0	30	29.5	30		
30-88	100	40	3		
88-216	150	43.5	3		
216-960	200	46	3		
Above 960	500	54	3		

Limits of Radiated Emission Measurement(Above 1000MHz)

Fraguency(MHz)	Class B (dBuV	/m) (at 3M)
Frequency(MHz)	PEAK	AVERAGE
Above 1000	74	54

Remark :1. Emission level in dBuV/m=20 log (uV/m)

- 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
- 3. For Frequency 9kHz~30MHz: Distance extrapolation factor =40log(Specific distance/ test distance)(dB); Limit line=Specific limits(dBuV) + distance extrapolation factor.

For Frequency above 30MHz: Distance extrapolation factor =20log(Specific distance/ test distance)(dB); Limit line=Specific limits(dBuV) + distance extrapolation factor.

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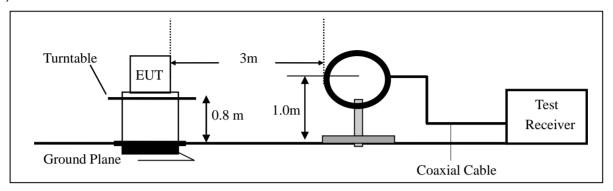


7.2.3 Measuring Instruments

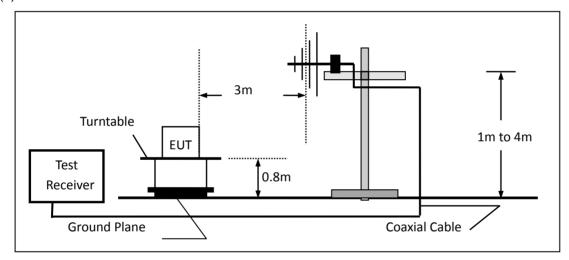
The Measuring equipment is listed in the section 6.3 of this test report.

7.2.4 **Test Configuration**

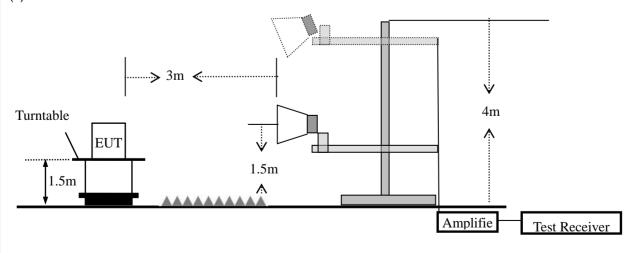
(a) For radiated emissions below 30MHz



(b) For radiated emissions from 30MHz to 1000MHz



(c) For radiated emissions above 1000MHz



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7.2.5 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

es and remaining operations arisary as a settinger					
Spectrum Parameter	Setting				
Attenuation	Auto				
Start Frequency	1000 MHz				
Stop Frequency	10th carrier harmonic				
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 1MHz for Average				

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For the radiated emission test above 1GHz:
 - Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- e. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- f. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- g. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

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

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During the radiated emission test, the Spectrum Analyzer was set with the following config	urations:
--	-----------

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Ab 4000	Peak	1 MHz	1 MHz
Above 1000	Average	1 MHz	1 MHz

Note: for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where RBWCF [dB] =10*lg(100 [kHz]/narrower RBW [kHz]). , the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

7.2.6 Test Results

Spurious Emission below 30MHz (9KHz to 30MHz)

EUT:	GMMK 3	II/IOGEI NO .	GMMK 3 PRO 65% WIRELESS
Temperature:	20 ℃		48%
Test Mode:	Mode1/Mode2/Mode3/ Mode4	Test By:	Mary Hu

Freq.	Ant.Pol.	Emission L	evel(dBuV/m)	Limit 3	m(dBuV/m)	Over(dB)		
(MHz)	H/V	PK AV ´		PK	AV	PK	AV	

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

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■ Spurious Emission below 1GHz (30MHz to 1GHz)
All the modulation modes have been tested, and the worst result was report as below:

7 til tilo illoadiatioi	7 in the mediation medec have been tested, and the worst result was report as below.								
EUT:	GММК 3	IMODE Name	GMMK 3 PRO 65% WIRELESS						
Temperature:	25 ℃	Relative Humidity:	55%						
Pressure:	1010hPa	Test Mode:	GFSK (2M) CH01						
Test Voltage:	DC 3.7V								

Polar	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(H/V)	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	42.1542	10.95	19.05	30.00	40.00	-10.00	QP
V	67.4382	5.31	17.42	22.73	40.00	-17.27	QP
V	137.9028	15.37	14.26	29.63	43.50	-13.87	QP
V	279.0436	9.67	19.81	29.48	46.00	-16.52	QP
V	504.7062	9.24	24.70	33.94	46.00	-12.06	QP
V	706.6999	7.38	27.92	35.30	46.00	-10.70	QP

Remark:

Emission Level= Meter Reading+ Factor, Margin= Emission Level - Limit



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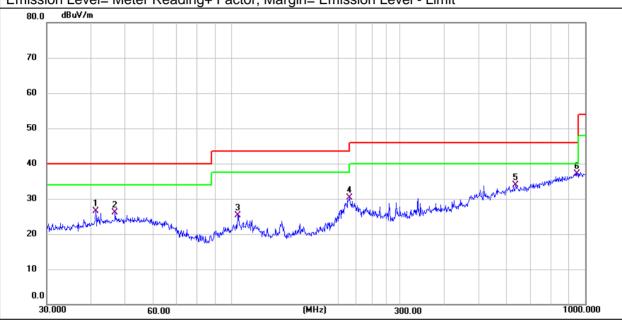




Polar		Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(H/V)	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Н	41.2764	7.79	18.64	26.43	40.00	-13.57	QP
Н	46.8301	6.58	19.49	26.07	40.00	-13.93	QP
Н	104.1701	7.57	17.64	25.21	43.50	-18.29	QP
Н	215.2675	11.55	18.75	30.30	43.50	-13.20	QP
Н	636.1340	6.65	27.21	33.86	46.00	-12.14	QP
Н	948.7610	6.04	31.04	37.08	46.00	-8.92	QP

Remark:

Emission Level= Meter Reading+ Factor, Margin= Emission Level - Limit



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	Spurious	Emission Abo	ove 1GHz (1GHz to 25GHz)
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EUT:	GMMK 3	Model No.:	GMMK 3 PRO 65% WIRELESS
Temperature:	20 ℃	Relative Humidity:	48%
Test Mode:	Mode2/Mode3/Mode4	Test By:	Mary Hu

	D	0.11.	Λ.(D	E				
Frequency	Read Level	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Damark	Commont
(MHz)	(dBµV)	(dB)	dB/m	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Remark	Comment
(1011-12)	(ασμν)	(ub)		, ,	(dbµv/III) MHz)(GFSK	, ,	. ,		
				,	, ,				
4804.78	67.14	5.21	35.59	44.30	63.64	74.00	-10.36	Pk	Vertical
4804.78	44.08	5.21	35.59	44.30	40.58	54.00	-13.42	AV	Vertical
7206.27	66.86	6.48	36.27	44.60	65.01	74.00	-8.99	Pk	Vertical
7206.27	45.29	6.48	36.27	44.60	43.44	54.00	-10.56	AV	Vertical
4804.18	64.08	5.21	35.55	44.30	60.54	74.00	-13.46	Pk	Horizontal
4804.18	45.61	5.21	35.55	44.30	42.07	54.00	-11.93	AV	Horizontal
7206.55	65.27	6.48	36.27	44.52	63.50	74.00	-10.50	Pk	Horizontal
7206.55	45.72	6.48	36.27	44.52	43.95	54.00	-10.05	AV	Horizontal
			Mid Chan	nel (2446 l	MHz)(GFSK)	Above 1G			
4892.17	68.18	5.21	35.66	44.20	64.85	74.00	-9.15	Pk	Vertical
4892.17	46.96	5.21	35.66	44.20	43.63	54.00	-10.37	AV	Vertical
7338.21	65.26	7.10	36.50	44.43	64.43	74.00	-9.57	Pk	Vertical
7338.21	44.06	7.10	36.50	44.43	43.23	54.00	-10.77	AV	Vertical
4892.15	65.92	5.21	35.66	44.20	62.59	74.00	-11.41	Pk	Horizontal
4892.15	44.84	5.21	35.66	44.20	41.51	54.00	-12.49	AV	Horizontal
7338.24	68.38	7.10	36.50	44.43	67.55	74.00	-6.45	Pk	Horizontal
7338.24	46.32	7.10	36.50	44.43	45.49	54.00	-8.51	AV	Horizontal
			High Chan	nel (2479 l	MHz)(GFSK) Above 10	3		
4958.13	66.69	5.21	35.52	44.21	63.21	74.00	-10.79	Pk	Vertical
4958.13	46.63	5.21	35.52	44.21	43.15	54.00	-10.85	AV	Vertical
7338.22	64.97	7.10	36.53	44.60	64.00	74.00	-10.00	Pk	Vertical
7338.22	46.75	7.10	36.53	44.60	45.78	54.00	-8.22	AV	Vertical
4958.15	65.71	5.21	35.52	44.21	62.23	74.00	-11.77	Pk	Horizontal
4958.15	44.74	5.21	35.52	44.21	41.26	54.00	-12.74	AV	Horizontal
7338.26	64.95	7.10	36.53	44.60	63.98	74.00	-10.02	Pk	Horizontal
7338.26	44.02	7.10	36.53	44.60	43.05	54.00	-10.95	AV	Horizontal

Note:

- (1) Emission Level= Antenna Factor + Cable Loss + Read Level Preamp Factor
- (2)All other emissions more than 20dB below the limit.
- (3)Only the worst data is recorded in the report, the data rates (2Mbps for GFSK modulation) test result is the worst

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■ Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

EUT:	GMMK 3	Model No.:	GMMK 3 PRO 65% WIRELESS
Temperature:	20 ℃	Relative Humidity:	48%
Test Mode:	Mode2/ Mode4	Test By:	Mary Hu

Frequency	Meter Reading	Cable Loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBµV)	(dB)	dB/m	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Type	
				2Mbp	s(GFSK)				
2310.00	64.04	2.97	27.80	43.80	51.01	74	-22.99	Pk	Horizontal
2310.00	45.19	2.97	27.80	43.80	32.16	54	-21.84	AV	Horizontal
2310.00	65.30	2.97	27.80	43.80	52.27	74	-21.73	Pk	Vertical
2310.00	46.34	2.97	27.80	43.80	33.31	54	-20.69	AV	Vertical
2390.00	65.20	3.14	27.21	43.80	51.75	74	-22.25	Pk	Vertical
2390.00	46.74	3.14	27.21	43.80	33.29	54	-20.71	AV	Vertical
2390.00	66.65	3.14	27.21	43.80	53.20	74	-20.80	Pk	Horizontal
2390.00	44.23	3.14	27.21	43.80	30.78	54	-23.22	AV	Horizontal
2483.50	68.75	3.58	27.70	44.00	56.03	74	-17.97	Pk	Vertical
2483.50	44.37	3.58	27.70	44.00	31.65	54	-22.35	AV	Vertical
2483.50	65.67	3.58	27.70	44.00	52.95	74	-21.05	Pk	Horizontal
2483.50	46.36	3.58	27.70	44.00	33.64	54	-20.36	AV	Horizontal

Note: (1) All other emissions more than 20dB below the limit.

(2)Only the worst data is recorded in the report, the data rates (2Mbps for GFSK modulation) test result is the worst

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EUT:	GMMK 3	Model No.:	GMMK 3 PRO 65% WIRELESS
Temperature:	20 ℃	Relative Humidity:	48%
Test Mode:	Mode2/ Mode4	Test By:	Mary Hu

Frequency	Reading Level	Cable Loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBµV)	(dB)	dB/m	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Type	
3260	68.46	4.04	29.57	44.70	57.37	74	-16.63	Pk	Vertical
3260	46.28	4.04	29.57	44.70	35.19	54	-18.81	AV	Vertical
3260	68.97	4.04	29.57	44.70	57.88	74	-16.12	Pk	Horizontal
3260	45.73	4.04	29.57	44.70	34.64	54	-19.36	AV	Horizontal
3332	65.11	4.26	29.87	44.40	54.84	74	-19.16	Pk	Vertical
3332	45.58	4.26	29.87	44.40	35.31	54	-18.69	AV	Vertical
3332	65.79	4.26	29.87	44.40	55.52	74	-18.48	Pk	Horizontal
3332	44.65	4.26	29.87	44.40	34.38	54	-19.62	AV	Horizontal
17797	51.04	10.99	43.95	43.50	62.48	74	-11.52	Pk	Vertical
17797	34.34	10.99	43.95	43.50	45.78	54	-8.22	AV	Vertical
17788	50.67	11.81	43.69	44.60	61.57	74	-12.43	Pk	Horizontal
17788	35.37	11.81	43.69	44.60	46.27	54	-7.73	AV	Horizontal

Note: (1) All other emissions more than 20dB below the limit.

(2)Only the worst data is recorded in the report, the data rates (2Mbps for GFSK modulation) test result is the worst

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7.3 6DB BANDWIDTH

7.3.1 Applicable Standard

According to FCC Part 15.247(a)(2) and KDB 558074 D01 15.247 Meas Guidance v05r02 Section 8.2.

7.3.2 Conformance Limit

The minimum permissible 6dB bandwidth is 500 kHz.

7.3.3 **Measuring Instruments**

The Measuring equipment is listed in the section 6.3 of this test report.

7.3.4 Test Setup

Please refer to Section 6.1 of this test report.

7.3.5 Test Procedure

The testing follows Subclause 11.8 of ANSI C63.10

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT was operating in controlled its channel.

Use the following spectrum analyzer settings:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) ≥ 3*RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) 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 6 dB relative to the maximum level measured in the fundamental emission.

7.3.6 Test Results

EUT:	GMMK 3	IMOdel No :	GMMK 3 WIRELESS	PRO	65%
Temperature:	20 ℃	Relative Humidity:	48%		
Test Mode:	Mode2/Mode3/Mode4	Test By:	Mary Hu		

Test data reference attachment.

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7.4 DUTY CYCLE

7.4.1 Applicable Standard

According to KDB 558074 D01 15.247 Meas Guidance v05r02s Section 6.

7.4.2 Conformance Limit

No limit requirement.

7.4.3 Measuring Instruments

The Measuring equipment is listed in the section 6.3 of this test report.

7.4.4 Test Setup

Please refer to Section 6.1 of this test report.

7.4.5 Test Procedure

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW \geq OBW if possible; otherwise, set RBW to the largest available value. Set VBW \geq RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T \leq 16.7 microseconds.)

The transmitter output is connected to the Spectrum Analyzer. We tested accroding to the zero-span measurement method, 6.0)b) in KDB 558074

The largest available value of RBW is 8 MHz and VBW is 50 MHz. The zero-span method of measuring duty cycle shall not be used if $T \le 6.25$ microseconds. (50/6.25 = 8)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are > 50/T.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT was operating in controlled its channel.

Use the following spectrum analyzer settings:

Span = Zero Span

RBW = 8MHz(the largest available value)

 $VBW = 8MHz (\ge RBW)$

Number of points in Sweep >100

Detector function = peak

Trace = Clear write

Measure T_{total} and T_{on}

Calculate Duty Cycle = T_{on} / T_{total}

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7.4.6 **Test Results**

EUT:	GMMK 3	II/IOGEI NO .	GMMK 3 PRO 65% WIRELESS
Temperature:	20 ℃	Relative Humidity:	48%
Test Mode:	N/A	Test By:	N/A

Note: Not Applicable

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7.5 **PEAK OUTPUT POWER**

7.5.1 Applicable Standard

According to FCC Part 15.247(b)(3) and KDB 558074 D01 15.247 Meas Guidance v05r02 Section 8.3.1.

7.5.2 Conformance Limit

The maximum peak conducted output power of the intentional radiator for systems using digital modulation in the 2400 - 2483.5 MHz bands shall not exceed: 1 Watt (30dBm). If transmitting antenna of directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

7.5.3 **Measuring Instruments**

The Measuring equipment is listed in the section 6.3 of this test report.

7.5.4 **Test Setup**

Please refer to Section 6.1 of this test report.

7.5.5 Test Procedure

The testing follows Subclause 11.9.1.1 of ANSI C63.10

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT was operating in controlled its channel.

Use the following spectrum analyzer settings:

Set the RBW ≧ DTS bandwidth.

Set VBW = 3*RBW.

Set the span ≥ 3*RBW

Set Sweep time = auto couple.

Set Detector = peak.

Set Trace mode = max hold.

Allow trace to fully stabilize.

Use peak marker function to determine the peak amplitude level.

7.5.6 Test Results

EUT:	GММК 3	IMOGEL NO .	GMMK 3 PRO 65% WIRELESS
Temperature:	20 ℃	Relative Humidity:	48%
Test Mode:	Mode2/Mode3/Mode4	Test By:	Mary Hu

Test data reference attachment.

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7.6 POWER SPECTRAL DENSITY

7.6.1 Applicable Standard

According to FCC Part 15.247(e) and KDB 558074 D01 15.247 Meas Guidance v05r02 Section 8.4.

7.6.2 Conformance Limit

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

7.6.3 **Measuring Instruments**

The Measuring equipment is listed in the section 6.3 of this test report.

7.6.4 Test Setup

Please refer to Section 6.1 of this test report.

7.6.5 Test Procedure

The testing follows Measurement Procedure Subclause 11.10.2 of ANSI C63.10

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance, and is optional if the maximum conducted (average) output power was used to demonstrate compliance.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT was operating in controlled its channel.

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5*DTS bandwidth.
- c) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d) Set the VBW ≥ 3 RBW.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.
- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

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7.6.6 **Test Results**

EUT:	GMMK 3	II/IOGEI NO .	GMMK 3 PRO 65% WIRELESS
Temperature:	20 ℃	Relative Humidity:	48%
Test Mode:	Mode2/Mode3/Mode4	Test By:	Mary Hu

Test data reference attachment.

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7.7 CONDUCTED BAND EDGE MEASUREMENT

7.7.1 Applicable Standard

According to FCC Part 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02 Section 8.7.

7.7.2 Conformance Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak 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.

7.7.3 Measuring Instruments

The Measuring equipment is listed in the section 6.3 of this test report.

7.7.4 Test Setup

Please refer to Section 6.1 of this test report.

7.7.5 Test Procedure

The testing follows FCC KDB 558074 D01 15.247 Meas Guidance v05r02 Section 8.7.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT was operating in controlled its channel.

Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.

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.

Repeat above procedures until all measured frequencies were complete.

7.7.6 Test Results

EUT:	GММК 3	II/IUUEI I/IU .	GMMK 3 PRO 65% WIRELESS
Temperature:	20 ℃	Relative Humidity:	48%
Test Mode:	Mode2/Mode4	Test By:	Mary Hu

Test data reference attachment.

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7.8 SPURIOUS RF CONDUCTED EMISSIONS

7.8.1 Conformance Limit

- 1. Below -20dB of the highest emission level in operating band.
- 2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

7.8.2 **Measuring Instruments**

The Measuring equipment is listed in the section 6.3 of this test report.

7.8.3 Test Setup

Please refer to Section 6.1 of this test report.

7.8.4 Test Procedure

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBW= 300KHz to measure the peak field strength, and measure frequency range from 30MHz to 26.5GHz.

7.8.5 Test Results

Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.

Test data reference attachment.

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7.9 ANTENNA APPLICATION

7.9.1 Antenna Requirement

15.203 requirement: For intentional device, according to 15.203: 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.

7.9.2 **Result**

The EUT antenna is permanent attached PCB Antenna (Gain:1.16 dBi). It comply with the standard requirement.

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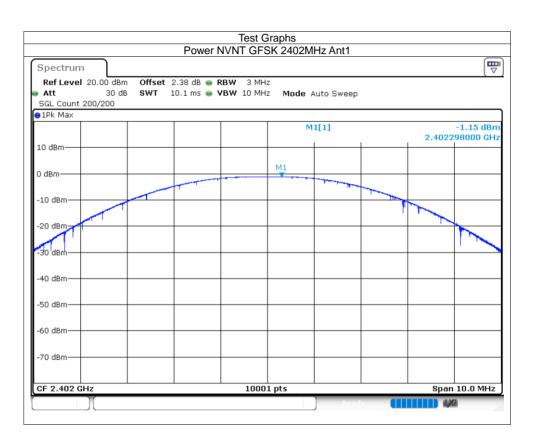




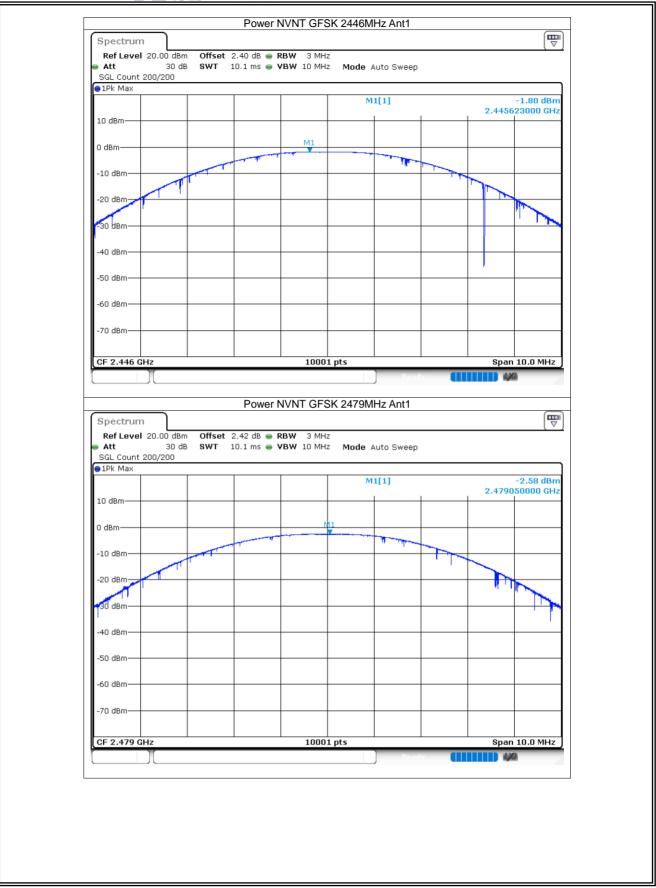
8 TEST RESULTS

8.1 Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	GFSK	2402	Ant1	-1.15	30	Pass
NVNT	GFSK	2446	Ant1	-1.8	30	Pass
NVNT	GFSK	2479	Ant1	-2.58	30	Pass



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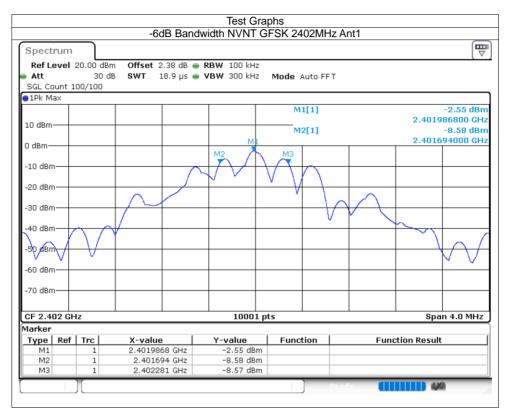
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8.2 -6dB Bandwidth

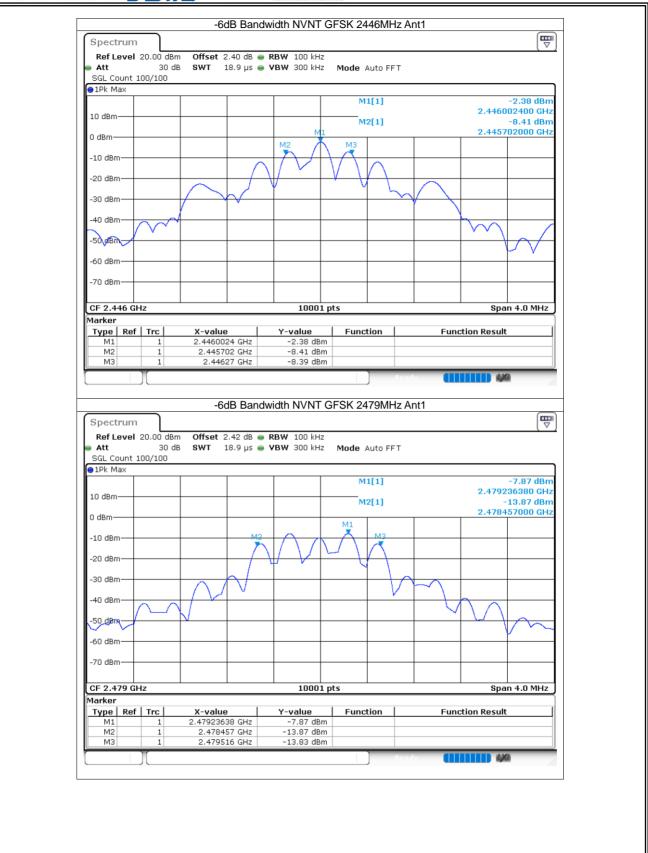
Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	GFSK	2402	Ant1	0.586	0.5	Pass
NVNT	GFSK	2446	Ant1	0.567	0.5	Pass
NVNT	GFSK	2479	Ant1	1.06	0.5	Pass



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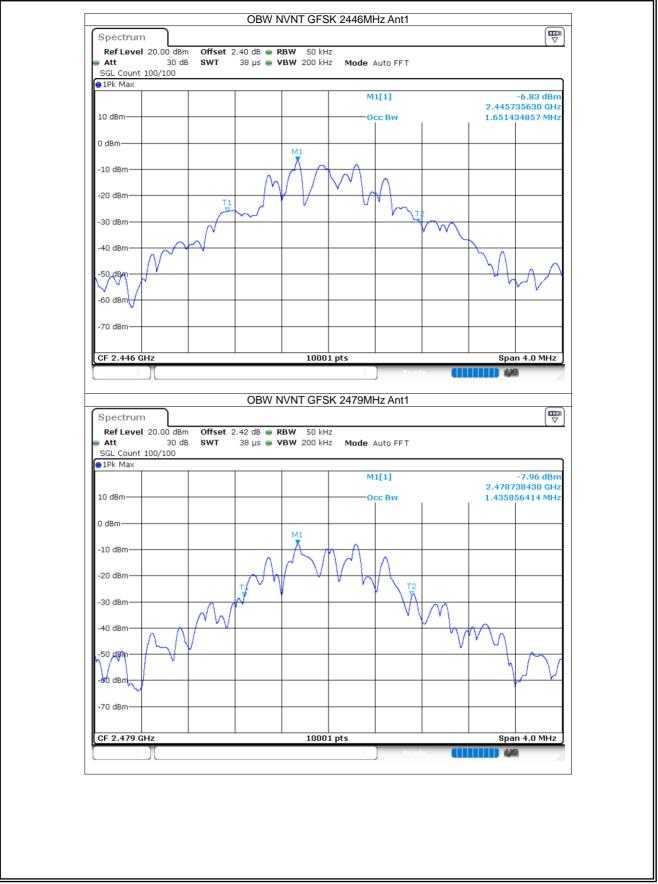


8.3 Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)					
NVNT	GFSK	2402	Ant1	1.639					
NVNT	GFSK	2446	Ant1	1.651					
NVNT	GFSK	2479	Ant1	1.436					



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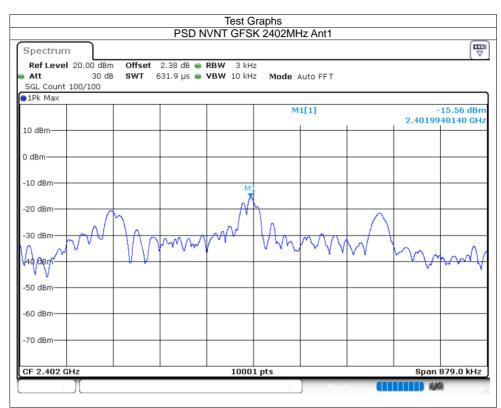
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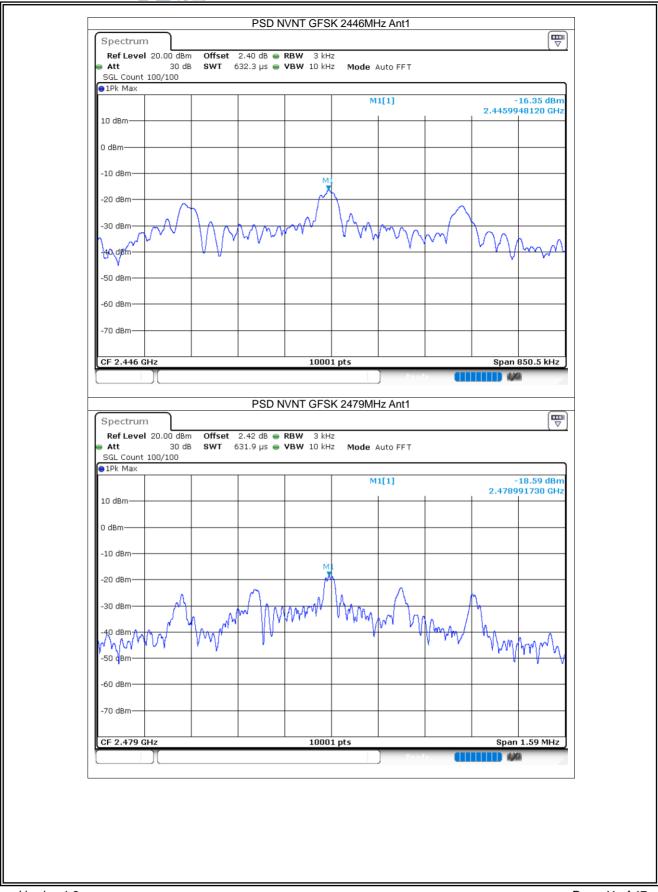
8.4 Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm)	Limit (dBm)	Verdict
NVNT	GFSK	2402	Ant1	-15.56	8	Pass
NVNT	GFSK	2446	Ant1	-16.35	8	Pass
NVNT	GFSK	2479	Ant1	-18.59	8	Pass



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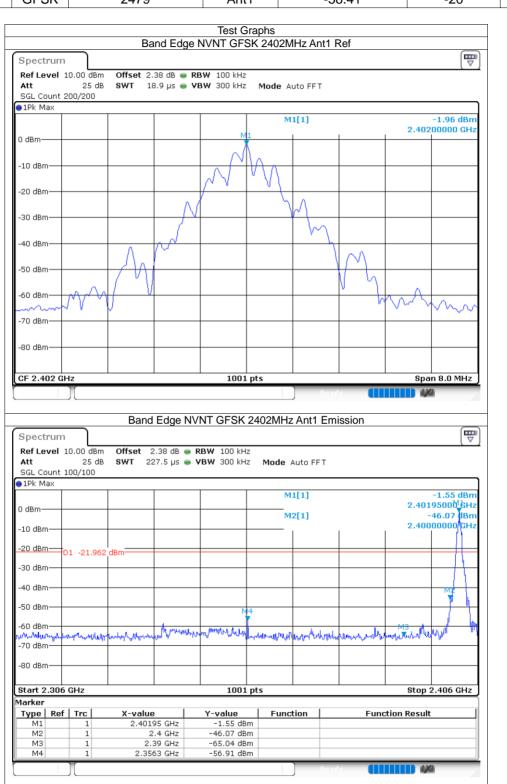
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8.5 Band Edge

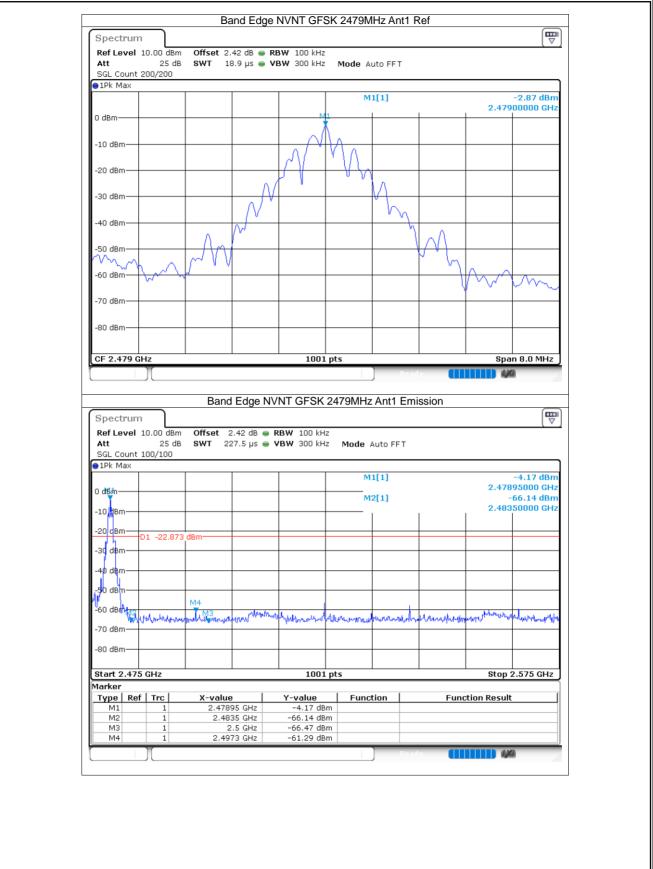
O.O Dank	ı Lage					
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	GFSK	2402	Ant1	-54.95	-20	Pass
NVNT	GFSK	2479	Ant1	-58.41	-20	Pass



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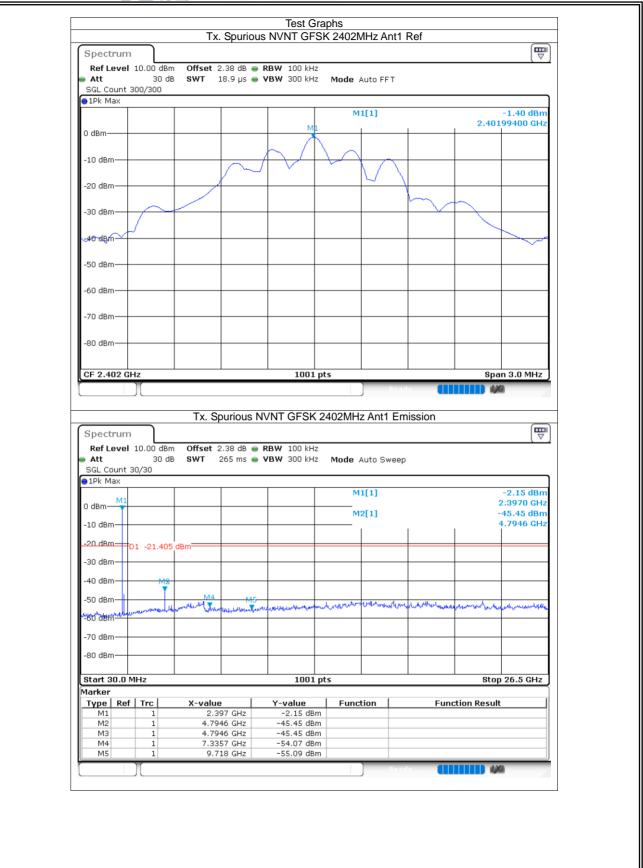
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Report No.: S24041703516002

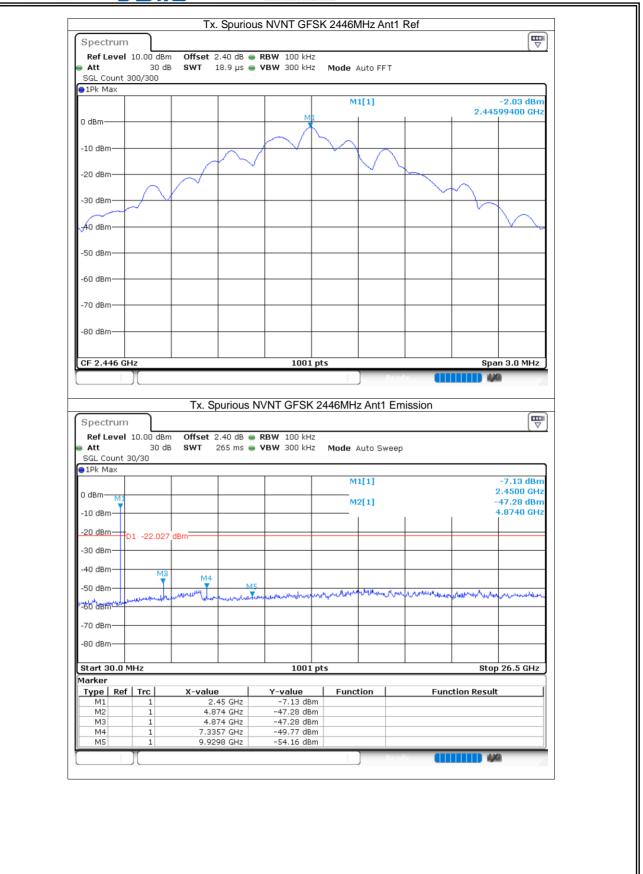
8.6 Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	GFSK	2402	Ant1	-44.05	-20	Pass
NVNT	GFSK	2446	Ant1	-45.24	-20	Pass
NVNT	GFSK	2479	Ant1	-45.17	-20	Pass

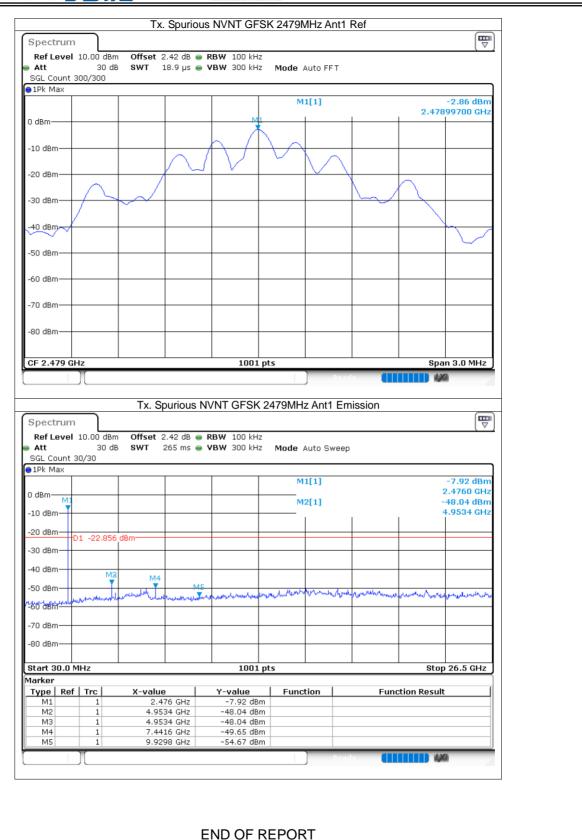
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