

TEST REPORT

Report No.:	BCTC2403574494E
Applicant:	Shenzhen Xiangmaite Technology Co. , Ltd.
Product Name:	Dashcam
Test Model:	R3
Tested Date:	2024-03-27 to 2024-04-19
Issued Date:	2024-04-19

Shenzhen BCTC Testing Co., Ltd.



No.: BCTC/RF-EMC-005

Page: 1 of 82

Edition: B.2



FCC ID:2BFZ4-R3

Product Name:	Dashcam		
Trademark:	N/A		
Model/Type reference:	R3		
Prepared For:	Shenzhen Xiangmaite Technology Co. , Ltd.		
Address:	RM406, Nantianhui Innovation and Research Center, 71st Area, Xingdong Community, Xin 'an Street, Baoan District, Shenzhen City, China		
Manufacturer:	Shenzhen Xiangmaite Technology Co. , Ltd.		
Address:	RM406, Nantianhui Innovation and Research Center, 71st Area, Xingdong Community, Xin 'an Street, Baoan District, Shenzhen City, China		
Prepared By:	Shenzhen BCTC Testing Co., Ltd.		
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China		
Sample Received Date:	2024-03-27		
Sample tested Date:	2024-03-27 to 2024-04-19		
Issue Date:	2024-04-19		
Report No.:	BCTC2403574494E		
Test Standards:	FCC Part15.247 ANSI C63.10-2013		
Test Results:	PASS		
Remark:	This is WIFI-2.4GHz band radio test report.		

Tested by: Trang chang

Tang Changyu/ Project Handler

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Approved by:

Zero Zhou/Reviewer

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.



Table Of Content

Test	t Report Declaration	Page
1.	Version	5
2.	Test Summary	6
3.	Measurement Uncertainty	7
4.	Product Information And Test Setup	
4.1	Product Information	
4.2	Test Setup Configuration	8
4.3	Support Equipment	
4.4	Channel List	
4.5	Test Mode	10
4.6	Table Of Parameters Of Text Software Setting	10
5.	Test Facility And Test Instrument Used	
5.1	Test Facility	
5.2	Test Instrument Used	11
6.	Conducted Emissions	
6.1	Block Diagram Of Test Setup	13
6.2	Limit	
6.3	Test Procedure	13
6.4	EUT Operating Conditions	14
6.5	Test Result	
7.	Radiated Emissions	17
7.1	Block Diagram Of Test Setup	
7.2	Limit	
7.3	Test Procedure	20
7.4	EUT Operating Conditions	21
7.5	Test Result	
8.	Radiated Band Emission Measurement And Restricted Bands Of Oper	ration28
8.1	Block Diagram Of Test Setup	
8.2	Limit	
8.3	Test Procedure	29
8.4	EUT operating Conditions	29
8.5	Test Result	30
9.	Power Spectral Density Test	
9.1	Power Spectral Density Test Block Diagram Of Test Setup Limit	32
9.2	Limit	32
9.3	Test Procedure	32
9.4	EUT Operating Conditions	32
9.5	Test Procedure EUT Operating Conditions Test Result	
10.	Bandwidth Test Block Diagram Of Test Setup Limit	40
10.1	Block Diagram Of Test Setup	40
10.2	2 Limit	40
10.3	3 Test Procedure	40
10.4		40

Edition: B.2

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10.5 Test Result	41
11. Peak Output Power Test	48
11.1 Block Diagram Of Test Setup	48
11.2 Limit	48
11.3 Test Procedure	48
11.4 EUT Operating Conditions	48
11.5 Test Result	49
12. 100 KHz Bandwidth Of Frequency Band Edge	50
12.1 Block Diagram Of Test Setup	50
12.2 Limit	50
12.3 Test Procedure	50
12.4 EUT Operating Conditions	50
12.5 Test Result	50
13. Duty Cycle Of Test Signal	71
13.1 Standard Requirement	71
13.2 Formula	71
13.3 Test Procedure	71
13.4 Test Result	71
14. Antenna Requirement	78
14.1 Limit	78
14.2 Test Result	78
15. EUT Photographs	79
16. EUT Test Setup Photographs	80

(Note: N/A means not applicable)

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1. Version

Report No.	Issue Date	Description	Approved
BCTC2403574494E	2024-04-19	Original	Valid





2. Test Summary

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No	Results
1	Conducted Emission	15.207	PASS
2	6dB Bandwidth	15.247 (a)(2)	PASS
3	Peak Output Power	15.247 (b)	PASS
4	Radiated Spurious Emission	15.247 (d)	PASS
5	Power Spectral Density	15.247 (e)	PASS
6	Restricted Band of Operation	15.205	PASS
7	Band Edge (Out of Band Emissions)	15.247 (d)	PASS
8	Antenna Requirement	15.203	PASS



3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(9kHz-30MHz)	U=3.7dB
2	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
3	3m chamber Radiated spurious emission(1GHz-18GHz)	U=4.5dB
4	3m chamber Radiated spurious emission(18GHz-40GHz)	U=3.34dB
5	Conducted Emission(150kHz-30MHz)	U=3.20dB
6	Conducted Adjacent channel power	U=1.38dB
7	Conducted output power uncertainty Above 1G	U=1.576dB
8	Conducted output power uncertainty below 1G	U=1.28dB
9	humidity uncertainty	U=5.3%
10	Temperature uncertainty	U=0.59°C



4. Product Information And Test Setup

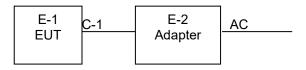
4.1 Product Information

Model/Type reference:	R3
Model differences:	N/A
Operation Frequency:	802.11b/g/n20MHz:2412~2462 MHz 802.11n40MHz:2422~2452 MHz
Bit Rate of Transmitter	802.11b:11/5.5/2/1 Mbps 802.11g:54/48/36/24/18/12/9/6Mbps 802.11n Up to 150Mbps
Type of Modulation:	OFDM/DSSS
Number Of Channel	802.11b/g/n20MHz:11 CH 802.11n40MHz: 7 CH
Antenna installation:	Internal antenna
Antenna Gain:	2.05 dBi Remark: ⊠ The antenna gain of the product comes from the antenna report provided by the customer, and the test data is affected by the customer information.
Ratings:	DC 3.7V From Battery, DC 5V From USB

4.2 Test Setup Configuration

See test photographs attached in *EUT TEST SETUP PHOTOGRAPHS* for the actual connections between Product and support equipment.

Conducted Emission:



Radiated Spurious Emission





4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
E-1	Dashcam	N/A	R3	N/A	EUT
E-2	N/A	N/A	N/A	N/A	Auxiliary

ltem	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	0.5M	DC cable unshielded

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

	Channel List for 802.11b/g/n(20)						
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)		
01	2412	02	2417	03	2422		
04	2427	05	2432	06	2437		
07	2442	08	2447	09	2452		
10	2457	11	2462				

	Channel List for 802.11n(40)						
Channel Frequency Channel Frequency (MHz) Channel (MHz)					Frequency (MHz)		
03	2422	04	2427	05	2432		
06	2437	07	2442	08	2447		
09	2452						

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4.5 Test Mode

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.

Pretest Mode	Description
Mode 1	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11
Mode 3	802.11n20 CH1/ CH6/ CH11
Mode 4	802.11n40 CH3/ CH6/ CH9
Mode 5	Charging

Radiated Emission				
Final Test Mode	Description			
Mode 5	Charging			
Mode 6	WIFI Link+TF			
Mode 7	Video+TF			

Note:

(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.

4.6 Table Of Parameters Of Text Software Setting

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters

Test software Version		SecureCRT
Frequency	2412 MHz	2437 MHz 2462 MHz
Parameters	DEF	DEF
Frequency	2422MHz	2437MHz 2452MHz
Parameters	DEF	DEF

Page: 10 of 82



5. Test Facility And Test Instrument Used

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards. FCC Test Firm Registration Number: 712850 A2LA certificate registration number is: CN1212 ISED Registered No.: 23583 ISED CAB identifier: CN0017

	Conducted Emissions Test										
Equipment	Equipment Manufacturer Model# Serial# Last Cal. Next Cal										
Receiver	R&S	ESR3	102075	May 15, 2023	May 14, 2024						
LISN	R&S	ENV216	101375	May 15, 2023	May 14, 2024						
Software	Software Frad		EMC-CON 3A1	/	١						
Pulse limiter	Schwarzbeck	VTSD9561-F	01323	Sept. 22, 2023	Sept 21, 2024						

5.2 Test Instrument Used

		RF Cond	lucted Test		
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Power meter	Keysight	E4419	١	May 15, 2023	May 14, 2024
Power Sensor (AV)	Keysight	E9300A	1	May 15, 2023	May 14, 2024
Signal Analyzer20kH z-26.5GHz	Keysight	N9020A	MY49100060	May 15, 2023	May 14, 2024
Spectrum Analyzer9kHz- 40GHz	R&S	FSP40	100363	May 15, 2023	May 14, 2024
Radio frequency control box	MAIWEI	MW100-RFC B	/		
Software	MAIWEI	MTS 8310		·····	Ι

Page: 11 of 82



	Radiated Emissions Test (966 Chamber01)								
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.				
966 chamber	ChengYu	966 Room	966	May 15, 2023	May 14, 2026				
Receiver	R&S	ESR3	102075	May 15, 2023	May 14, 2024				
Receiver	R&S	ESRP	101154	May 15, 2023	May 14, 2024				
Amplifier	Schwarzbeck	BBV9744	9744-0037	May 15, 2023	May 14, 2024				
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	942	May 29, 2023	May 28, 2024				
Loop Antenna(9KHz -30MHz)	Schwarzbeck	FMZB1519B	00014	May 31, 2023	May 30, 2024				
Amplifier	Amplifier SKET		SK2021040901	May 15, 2023	May 14, 2024				
Horn Antenna	na Schwarzbeck BBHA9120D 1541 M		May 31, 2023	May 30, 2024					
Amplifier(18G Hz-40GHz)	MITEQ	TTA1840-35- HG	2034381	May 15, 2023	May 14, 2024				
Horn Antenna(18G Schwarzbeck Hz-40GHz)		BBHA9170	00822	May 31, 2023	May 30, 2024				
Spectrum Analyzer9kHz- 40GHz		FSP40	100363	May 15, 2023	May 14, 2024				
Software	Frad	EZ-EMC	FA-03A2 RE	\	/				

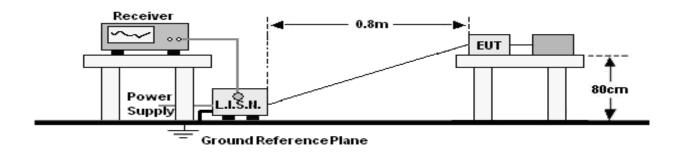
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No.: BCTC/RF-EMC-005 B.2 Page: 12 of 82



6. Conducted Emissions

6.1 Block Diagram Of Test Setup



6.2 Limit

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

Notes:

1. *Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

6.3 Test Procedure

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

a. The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).

b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.

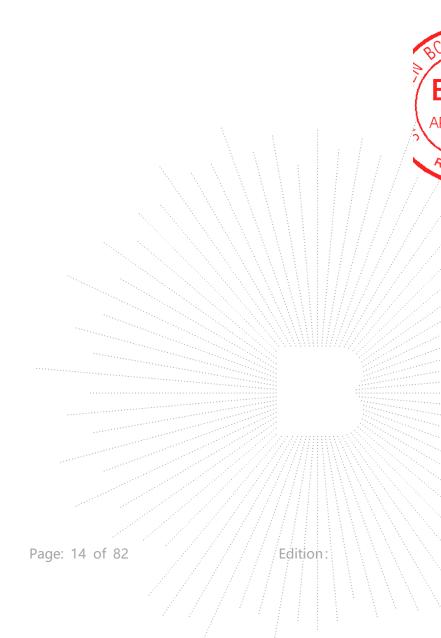
c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

No.: BCTC/RF-EMC-005 B.2 Page: 13 of 82



6.4 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.

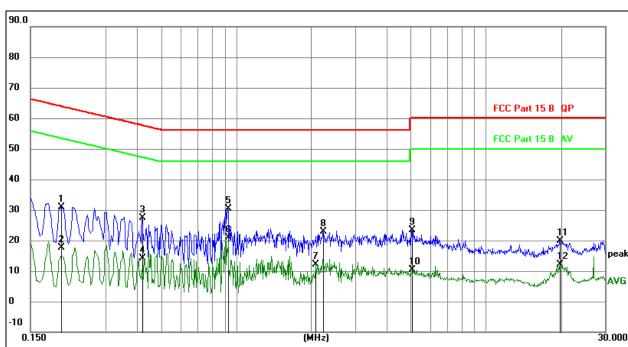


No.: BCTC/RF-EMC-005 B.2



6.5 Test Result

Temperature :	26 ℃	Relative Humidity :	54%
Pressure:	101KPa	Phase :	L
Test Mode:	Mode 5	Test Voltage :	AC120V/60Hz



Remark:

1. All readings are Quasi-Peak and Average values.

2. Factor = Insertion Loss + Cable Loss.

3. Measurement=Reading Level+ Correct Factor

4. Over=Measurement-Limit

No.	Mk.	Freq. MHz	Reading Level	Correct Factor	Measure- ment	Limit	Over	Detector
		IVIHZ		dB	dBuv	dBuV	dB	Detector
1		0.1995	11.17	19.83	31.00	63.63	-32.63	QP
2		0.1995	-2.15	19.83	17.68	53.63	-35.95	AVG
3		0.4200	7.56	19.84	27.40	57.45	-30.05	QP
4		0.4200	-5.72	19.84	14.12	47.45	-33.33	AVG
5		0.9240	10.47	19.92	30.39	56.00	-25.61	QP
6	*	0.9240	0.98	19.92	20.90	46.00	-25.10	AVG
7		2.0805	-7.75	19.98	12.23	46.00	-33.77	AVG
8		2.2290	2.81	20.03	22.84	56.00	-33.16	QP
9		5.0415	2.95	20.42	23.37	60.00	-36.63	QP
10		5.0415	-10.07	20.42	10.35	50.00	-39.65	AVG
11		19.8240	-0.19	19.99	19.80	60.00	-40.20	QP
12		19.8240	-7.78	19.99	12.21	50.00	-37.79	AVG

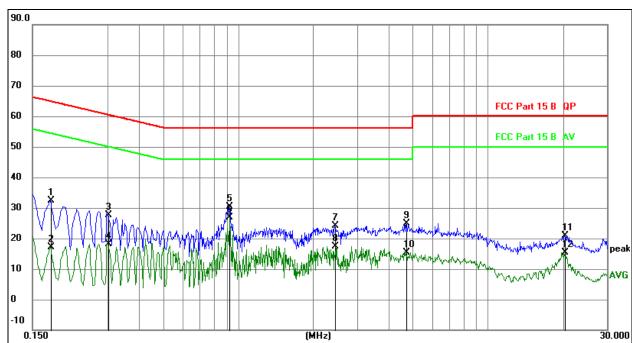
No.: BCTC/RF-EMC-005

B.2

Page: 15 of 82



Temperature :	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Ν
Test Mode:	Mode 5	Test Voltage :	AC120V/60Hz



Remark:

All readings are Quasi-Peak and Average values.
 Factor = Insertion Loss + Cable Loss.
 Measurement=Reading Level+ Correct Factor
 Over=Measurement-Limit

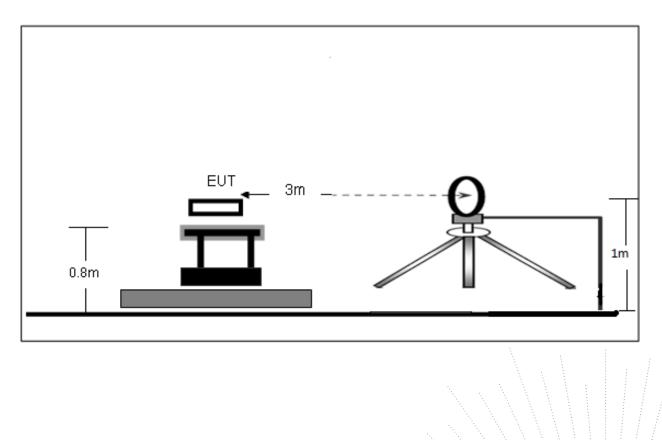
	modeare							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.1770	12.70	19.78	32.48	64.63	-32.15	QP
2		0.1770	-2.60	19.78	17.18	54.63	-37.45	AVG
3		0.3003	7.70	19.83	27.53	60.23	-32.70	QP
4		0.3003	-1.69	19.83	18.14	50.23	-32.09	AVG
5		0.9195	10.45	19.92	30.37	56.00	-25.63	QP
6	*	0.9195	7.03	19.92	26.95	46.00	-19.05	AVG
7		2.4450	3.98	20.11	24.09	56.00	-31.91	QP
8		2.4450	-2.73	20.11	17.38	46.00	-28.62	AVG
9		4.7175	4.44	20.49	24.93	56.00	-31.07	QP
10		4.7175	-4.99	20.49	15.50	46.00	-30.50	AVG
11		20.3685	0.96	19.99	20.95	60.00	-39.05	QP
12		20.3685	-4.52	19.99	15.47	50.00	-34.53	AVG



7. Radiated Emissions

7.1 Block Diagram Of Test Setup

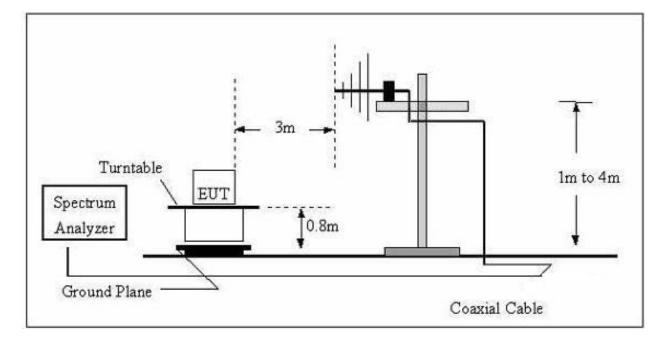
(A) Radiated Emission Test-Up Frequency Below 30MHz



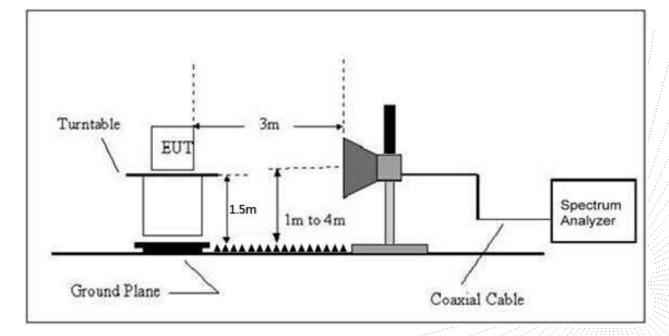
Page: 17 of 82



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



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



7.2 Limit

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.

No.: BCTC/RF-EMC-005

Page: 18 of 82



Frequency	Field Strength	Distance	Field Strength Limit at 3m Distance			
(MHz)	uV/m	(m)	uV/m	dBuV/m		
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	20log ^{(2400/F(kHz))} + 80		
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	20log ^{(24000/F(kHz))} + 40		
1.705 ~ 30	30	30	100 * 30	20log ⁽³⁰⁾ + 40		
30 ~ 88	100	3	100	20log ⁽¹⁰⁰⁾		
88 ~ 216	150	3	150	20log ⁽¹⁵⁰⁾		
216 ~ 960	200	3	200	20log ⁽²⁰⁰⁾		
Above 960	500	3	500	20log ⁽⁵⁰⁰⁾		

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

	Limit (dBuV/m) (at 3M)			
FREQUENCY (MHz)	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).

Page: 19 of 82

Edition:

ENZ



FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

7.3 Test Procedure

Receiver Parameter	Setting
Attenuation	Auto
9kHz~150kHz	RBW 200Hz for QP
150kHz~30MHz	RBW 9kHz for QP
30MHz~1000MHz	RBW 120kHz for QP

Spectrum Parameter	Setting
1-25GHz	RBW 1 MHz /VBW 1 MHz for Peak, RBW 1 MHz / VBW 10Hz for Average

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 chamber. 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:



Page: 20 of 82



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

Above 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter chamber. 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 and the rota 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.

g. Test the EUT in the lowest 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.

7.4 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.

7.5 Test Result

Below 30MHz

Temperature:	26 ℃	Relative Humidity: 54%
Pressure:	101 kPa	Test Voltage : AC120V/60Hz, DC 3.7V
Test Mode:	Mode 7	Polarization :

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
				PASS
				PASS

Note:

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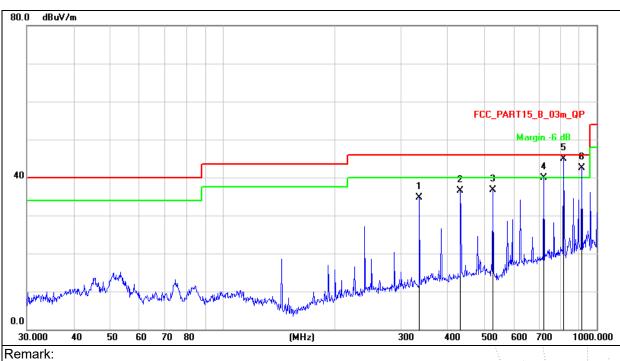
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =40 log (specific distance/test distance)(dB); Limit line = specific limits(dBuv) + distance extrapolation factor. еро



Between 30MHz - 1GHz

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Horizontal
Test Mode:	Mode 6(The Worst data)	Test Voltage :	AC120V/60Hz



1.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

2. Measurement=Reading Level+ Correct Factor

3. Over= Measurement-Limit

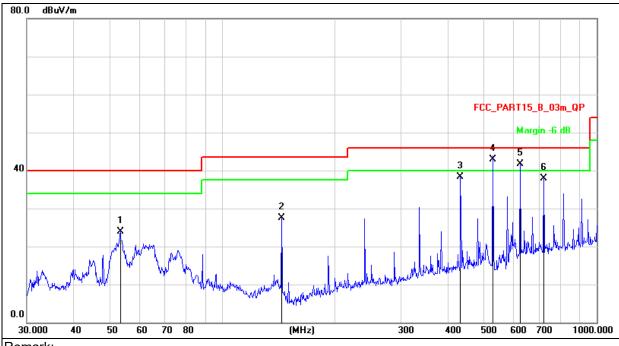
No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		336.0351	46.60	-11.97	34.63	46.00	-11.37	QP
2		432.5457	46.73	-10.20	36.53	46.00	-9.47	QP
3		528.2458	46.34	-9.61	36.73	46.00	-9.27	QP
4		721.7259	45.28	-5.40	39.88	46.00	-6.12	QP
5	*	816.0278	49.13	-4.27	44.86	46.00	-1.14	QP
6	İ	912.8620	45.62	-3.07	42.55	46.00	-3.45	QP

No.: BCTC/RF-EMC-005 B.2

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Temperature:	26°C	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Vertical
Test Mode:	Mode 6(The Worst data)	Test Voltage :	AC120V/60Hz



Remark:

1.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

2. Measurement=Reading Level+ Correct Factor

3. Ov	ver= N	leasurer	ment-Limit
-------	--------	----------	------------

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		53.3179	38.35	-14.35	24.00	40.00	-16.00	QP
2		143.8294	46.56	-19.00	27.56	43.50	-15.94	QP
3		432.5457	48.46	-10.20	38.26	46.00	-7.74	QP
4	*	528.0258	52.54	-9.60	42.94	46.00	-3.06	QP
5	İ	625.0780	48.26	-6.59	41.67	46.00	-4.33	QP
6		721.7259	43.38	-5.40	37.98	46.00	-8.02	QP

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Polar	Fre- quency	Reading Level	Correct Factor	Measure- ment	Limits	Over	Detector						
(H/V)	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре						
	Low channel:2412MHz												
V	4824.00	68.74	-19.95	48.79	74.00	-25.21	PK						
V	4824.00	58.82	-19.95	38.87	54.00	-15.13	AV						
V	7236.00	58.21	-14.14	44.07	74.00	-29.93	PK						
V	7236.00	48.26	-14.14	34.12	54.00	-19.88	AV						
Н	4824.00	64.05	-19.95	44.10	74.00	-29.90	PK						
Н	4824.00	53.78	-19.95	33.83	54.00	-20.17	AV						
Н	7236.00	56.44	-14.14	42.30	74.00	-31.70	PK						
Н	7236.00	49.30	-14.14	35.16	54.00	-18.84	AV						
			Middle chan	nel:2437MHz									
V	4874.00	65.55	-19.85	45.70	74.00	-28.30	PK						
V	4874.00	59.17	-19.85	39.32	54.00	-14.68	AV						
V	7311.00	58.07	-13.93	44.14	74.00	-29.86	PK						
V	7311.00	49.72	-13.93	35.79	54.00	-18.21	AV						
Н	4874.00	63.88	-19.85	44.03	74.00	-29.97	PK						
Н	4874.00	54.83	-19.85	34.98	54.00	-19.02	AV						
Н	7311.00	57.07	-13.93	43.14	74.00	-30.86	PK						
Н	7311.00	49.53	-13.93	35.60	54.00	-18.40	AV						
			High chann	el:2462MHz									
V	4924.00	68.18	-19.75	48.43	74.00	-25.57	PK						
V	4924.00	59.37	-19.75	39.62	54.00	-14.38	AV						
V	7386.00	60.39	-13.72	46.67	74.00	-27.33	PK						
V	7386.00	50.32	-13.72	36.60	54.00	-17.40	AV						
Н	4924.00	66.59	-19.75	46.84	74.00	-27.16	PK						
Н	4924.00	56.36	-19.75	36.61	54.00	-17.39	AV						
Н	7386.00	58.88	-13.72	45.16	74.00	-28.84	PK						
Н	7386.00	50.76	-13.72	37.04	54.00	-16.96	AV						

Between 1GHz – 25GHz **802.11b**

Remark:

1. Measurement = Reading Level + Correct Factor,

Correct Factor = Antenna Factor + Cable Loss - Pre-amplifier,

Over= Measurement - Limit

2.If peak below the average limit, the average emission was no test.

3. In restricted bands of operation, The spurious emissions below the permissible value more than 20dB 4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

5.All the Modulation are test, the worst mode is 802.11b, the data recording in the report.

Page: 24 of 82



802.11g

Polar	Fre- quency	Reading Level	Correct Factor	Measure- ment	Limits	Over	Detector
(H/V)	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре
	•		Low channe	el:2412MHz			
V	4824.00	70.80	-19.95	50.85	74.00	-23.15	PK
V	4824.00	60.89	-19.95	40.94	54.00	-13.06	AV
V	7236.00	61.48	-14.14	47.34	74.00	-26.66	PK
V	7236.00	51.98	-14.14	37.84	54.00	-16.16	AV
Н	4824.00	67.78	-19.95	47.83	74.00	-26.17	PK
Н	4824.00	58.63	-19.95	38.68	54.00	-15.32	AV
Н	7236.00	60.23	-14.14	46.09	74.00	-27.91	PK
Н	7236.00	51.69	-14.14	37.55	54.00	-16.45	AV
			Middle chani	nel:2437MHz			
V	4874.00	68.66	-19.85	48.81	74.00	-25.19	PK
V	4874.00	61.13	-19.85	41.28	54.00	-12.72	AV
V	7311.00	59.29	-13.93	45.36	74.00	-28.64	PK
V	7311.00	50.82	-13.93	36.89	54.00	-17.11	AV
Н	4874.00	65.35	-19.85	45.50	74.00	-28.50	PK
Н	4874.00	54.76	-19.85	34.91	54.00	-19.09	AV
Н	7311.00	57.64	-13.93	43.71	74.00	-30.29	PK
Н	7311.00	49.42	-13.93	35.49	54.00	-18.51	AV
			High chann	el:2462MHz		6 	
V	4924.00	69.84	-19.75	50.09	74.00	-23.91	PK
V	4924.00	58.91	-19.75	39.16	54.00	-14.84	AV
V	7386.00	63.72	-13.72	50.00	74.00	-24.00	PK
V	7386.00	53.92	-13.72	40.20	54.00	-13.80	AV
Н	4924.00	67.44	-19.75	47.69	74.00	-26.31	PK
Н	4924.00	56.70	-19.75	36.95	54.00	-17.05	AV
Н	7386.00	61.62	-13.72	47.90	74.00	-26.10	PK
Н	7386.00	54.18	-13.72	40.46	54.00	-13.54	AV

Remark:

1. Measurement = Reading Level + Correct Factor,

Correct Factor = Antenna Factor + Cable Loss - Pre-amplifier,

Over= Measurement - Limit

2.If peak below the average limit, the average emission was no test.

3. In restricted bands of operation, The spurious emissions below the permissible value more than 20dB 4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

5.All the Modulation are test, the worst mode is 802.11b, the data recording in the report.

Page: 25 of 82



802.11n20

Polar	Fre- quency	Reading Level	Correct Factor	Measure- ment	Limits	Over	Detector
(H/V)	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре
			Low channe	el:2412MHz			-
V	4824.00	69.53	-19.95	49.58	74.00	-24.42	PK
V	4824.00	61.36	-19.95	41.41	54.00	-12.59	AV
V	7236.00	58.81	-14.14	44.67	74.00	-29.33	PK
V	7236.00	49.67	-14.14	35.53	54.00	-18.47	AV
Н	4824.00	65.81	-19.95	45.86	74.00	-28.14	PK
Н	4824.00	55.61	-19.95	35.66	54.00	-18.34	AV
Н	7236.00	57.61	-14.14	43.47	74.00	-30.53	PK
Н	7236.00	48.92	-14.14	34.78	54.00	-19.22	AV
			Middle chan	nel:2437MHz			
V	4874.00	67.26	-19.85	47.41	74.00	-26.59	PK
V	4874.00	58.73	-19.85	38.88	54.00	-15.12	AV
V	7311.00	60.00	-13.93	46.07	74.00	-27.93	PK
V	7311.00	51.27	-13.93	37.34	54.00	-16.66	AV
Н	4874.00	65.96	-19.85	46.11	74.00	-27.89	PK
Н	4874.00	55.91	-19.85	36.06	54.00	-17.94	AV
Н	7311.00	58.45	-13.93	44.52	74.00	-29.48	PK
Н	7311.00	50.77	-13.93	36.84	54.00	-17.16	AV
			High chann	el:2462MHz		*	•
V	4924.00	69.04	-19.75	49.29	74.00	-24.71	PK
V	4924.00	58.28	-19.75	38.53	54.00	-15.47	AV
V	7386.00	61.72	-13.72	48.00	74.00	-26.00	PK
V	7386.00	50.95	-13.72	37.23	54.00	-16.77	AV
Н	4924.00	67.47	-19.75	47.72	74.00	-26.28	PK
Н	4924.00	57.78	-19.75	38.03	54.00	-15.97	AV
Н	7386.00	60.21	-13.72	46.49	74.00	-27.51	PK
Н	7386.00	53.11	-13.72	39.39	54.00	-14.61	AV

Remark:

1. Measurement = Reading Level + Correct Factor,

Correct Factor = Antenna Factor + Cable Loss - Pre-amplifier,

Over= Measurement - Limit

2.If peak below the average limit, the average emission was no test.

3. In restricted bands of operation, The spurious emissions below the permissible value more than 20dB 4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

5.All the Modulation are test, the worst mode is 802.11b, the data recording in the report.

Page: 26 of 82



802.11n40

Polar	Fre- quency	Reading Level	Correct Factor	Measure- ment	Limits	Over	Detector
(H/V)	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре
			Low channe	el:2422MHz			
V	4844.00	70.28	-19.91	50.37	74.00	-23.63	PK
V	4844.00	60.04	-19.91	40.13	54.00	-13.87	AV
V	7266.00	60.80	-14.06	46.74	74.00	-27.26	PK
V	7266.00	50.88	-14.06	36.82	54.00	-17.18	AV
Н	4844.00	67.61	-19.91	47.70	74.00	-26.30	PK
Н	4844.00	57.75	-19.91	37.84	54.00	-16.16	AV
Н	7266.00	58.03	-14.06	43.97	74.00	-30.03	PK
Н	7266.00	49.62	-14.06	35.56	54.00	-18.44	AV
			Middle chan	nel:2437MHz			
V	4874.00	68.40	-19.85	48.55	74.00	-25.45	PK
V	4874.00	60.39	-19.85	40.54	54.00	-13.46	AV
V	7311.00	58.83	-13.93	44.90	74.00	-29.10	PK
V	7311.00	50.40	-13.93	36.47	54.00	-17.53	AV
Н	4874.00	67.22	-19.85	47.37	74.00	-26.63	PK
Н	4874.00	56.92	-19.85	37.07	54.00	-16.93	AV
Н	7311.00	56.14	-13.93	42.21	74.00	-31.79	PK
Н	7311.00	48.17	-13.93	34.24	54.00	-19.76	AV
			High chann	el:2452MHz		6 	*
V	4904.00	71.31	-19.79	51.52	74.00	-22.48	PK
V	4904.00	63.25	-19.79	43.46	54.00	-10.54	AV
V	7356.00	64.93	-13.80	51.13	74.00	-22.87	PK
V	7356.00	55.53	-13.80	41.73	54.00	-12.27	AV
Н	4904.00	68.69	-19.79	48.90	74.00	-25.10	PK
Н	4904.00	58.56	-19.79	38.77	54.00	-15.23	AV
Н	7356.00	63.55	-13.80	49.75	74.00	-24.25	PK
Н	7356.00	54.89	-13.80	41.09	54.00	-12.91	AV

Remark:

1. Measurement = Reading Level + Correct Factor,

Correct Factor = Antenna Factor + Cable Loss - Pre-amplifier,

Over= Measurement - Limit

2.If peak below the average limit, the average emission was no test.

3. In restricted bands of operation, The spurious emissions below the permissible value more than 20dB 4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

5.All the Modulation are test, the worst mode is 802.11b, the data recording in the report.

Page: 27 of 82

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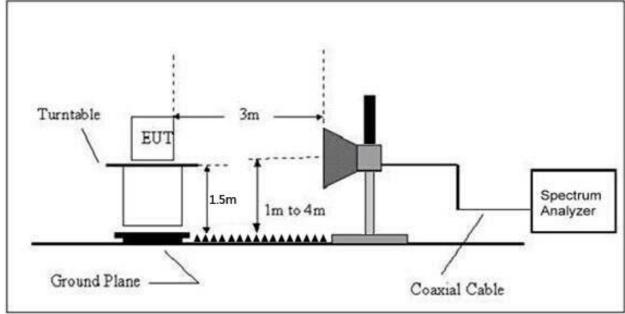
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8. Radiated Band Emission Measurement And Restricted Bands Of Operation

8.1 Block Diagram Of Test Setup

Radiated Emission Test-Up Frequency Above 1GHz



8.2 Limit

FCC Part15 C Section 15.209 and 15.205

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 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	(²)
13.36-13.41			

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LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

	Limit (dBu\	//m) (at 3M)
FREQUENCY (MHz)	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).

8.3 Test Procedure

Receiver Parameter	Setting		
Attenuation	Auto		
Start Frequency	2300MHz		
Stop Frequency	2520		
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average		

Above 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter chamber. 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 and the rota 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.

g. Test the EUT in the lowest 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.

8.4 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.

Page: 29 of 82



8.5 Test Result

	Polar (H/V)	Fre- quency	Reading Level	Correct Factor	Measure- ment (dBuV/m)	Lin (dBu	nits V/m)	Result
	、 ,	(MHz)	(dBuV/m)	(dB)	PK	PK	AV	
			L	ow Channe	l 2412MHz			
	Н	2390.00	72.98	-25.43	47.55	74.00	54.00	PASS
	Н	2400.00	75.22	-25.40	49.82	74.00	54.00	PASS
	V	2390.00	73.78	-25.43	48.35	74.00	54.00	PASS
802.11b	V	2400.00	73.37	-25.40	47.97	74.00	54.00	PASS
002.110			F	ligh Channe	l 2462MHz			
	Н	2483.50	73.15	-25.15	48.00	74.00	54.00	PASS
	Н	2500.00	70.00	-25.10	44.90	74.00	54.00	PASS
	V	2483.50	74.24	-25.15	49.09	74.00	54.00	PASS
	V	2500.00	72.71	-25.10	47.61	74.00	54.00	PASS
			L	ow Channe	l 2412MHz			
	Н	2390.00	72.19	-25.43	46.76	74.00	54.00	PASS
	Н	2400.00	75.68	-25.40	50.28	74.00	54.00	PASS
	V	2390.00	72.30	-25.43	46.87	74.00	54.00	PASS
902 11 m	V	2400.00	75.39	-25.40	49.99	74.00	54.00	PASS
802.11g			F	ligh Channe	l 2462MHz			
	Н	2483.50	71.69	-25.15	46.54	74.00	54.00	PASS
	Н	2500.00	68.47	-25.10	43.37	74.00	54.00	PASS
	V	2483.50	71.37	-25.15	46.22	74.00	54.00	PASS
	V	2500.00	69.75	-25.10	44.65	74.00	54.00	PASS

Remark:

1. Measurement = Reading Level + Correct Factor,

Correct Factor = Antenna Factor + Cable Loss - Pre-amplifier,

Over= Measurement - Limit

2. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

3 In restricted bands of operation, The spurious emissions below the permissible value more than 20dB 4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

No.: BCTC/RF-EMC-005 B.2 Page: 30 of 82



	Polar (H/V)	Fre- quency	Reading Level	Correct Factor	Measure- ment (dBuV/m)		nits V/m)	Result			
	、	(MHz)	(dBuV/m)	(dB)	PK	PK	AV				
		Low Channel 2412MHz									
	Н	2390.00	73.34	-25.43	47.91	74.00	54.00	PASS			
	Н	2400.00	76.98	-25.40	51.58	74.00	54.00	PASS			
	V	2390.00	72.62	-25.43	47.19	74.00	54.00	PASS			
802.11	V	2400.00	76.45	-25.40	51.05	74.00	54.00	PASS			
n20			F	ligh Channe	l 2462MHz						
	Н	2483.50	73.08	-25.15	47.93	74.00	54.00	PASS			
	Н	2500.00	70.40	-25.10	45.30	74.00	54.00	PASS			
	V	2483.50	72.05	-25.15	46.90	74.00	54.00	PASS			
	V	2500.00	70.97	-25.10	45.87	74.00	54.00	PASS			
			L	ow Channe	l 2422MHz						
	Н	2390.00	72.83	-25.43	47.40	74.00	54.00	PASS			
	Н	2400.00	76.97	-25.40	51.57	74.00	54.00	PASS			
	V	2390.00	73.04	-25.43	47.61	74.00	54.00	PASS			
802.11	V	2400.00	76.50	-25.40	51.10	74.00	54.00	PASS			
n40			F	ligh Channe	l 2452MHz						
	Н	2483.50	73.23	-25.15	48.08	74.00	54.00	PASS			
	Н	2500.00	69.49	-25.10	44.39	74.00	54.00	PASS			
	V	2483.50	72.27	-25.15	47.12	74.00	54.00	PASS			
	V	2500.00	70.37	-25.10	45.27	74.00	54.00	PASS			

Remark:

1. Measurement = Reading Level + Correct Factor,

Correct Factor = Antenna Factor + Cable Loss - Pre-amplifier,

Over= Measurement - Limit

2. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

3 In restricted bands of operation, The spurious emissions below the permissible value more than 20dB 4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Page: 31 of 82



9. Power Spectral Density Test

9.1 Block Diagram Of Test Setup



9.2 Limit

FCC Part15 (15.247) , Subpart C						
Section Test Item Limit Frequency Range (MHz)						
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS		

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

9.3 Test Procedure

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. Set the span to 1.5 times the DTS bandwidth.
- 3. Set the RBW to: 3 kHz
- 4. Set the VBW \geq 3 x RBW.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level within the RBW.
- 10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

9.4 EUT Operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing. Note: Power Spectral Density(dBm)=Reading+Cable Loss

No.: BCTC/RF-EMC-005 B.2

Page: 32 of 82



9.5 Test Result

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 3.7V

Condition	Mode	Frequency (MHz)	Power Spectral Density (dBm/10kHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	b	2412	-8.02	-13.25	8	PASS
NVNT	b	2437	-7.75	-12.98	8	PASS
NVNT	b	2462	-7.54	-12.77	8	PASS
NVNT	g	2412	-17.26	-22.49	8	PASS
NVNT	g	2437	-16.65	-21.88	8	PASS
NVNT	g	2462	-16.7	-21.93	8	PASS
NVNT	n20	2412	-16.35	-21.58	8	PASS
NVNT	n20	2437	-16.84	-22.07	8	PASS
NVNT	n20	2462	-15.5	-20.73	8	PASS
NVNT	n40	2422	-19.46	-24.69	8	PASS
NVNT	n40	2437	-18.95	-24.18	8	PASS
NVNT	n40	2452	-18.84	-24.07	8	PASS

Note: Correction Factor = 10log(3KHz/RBW in measurement) =-5.23

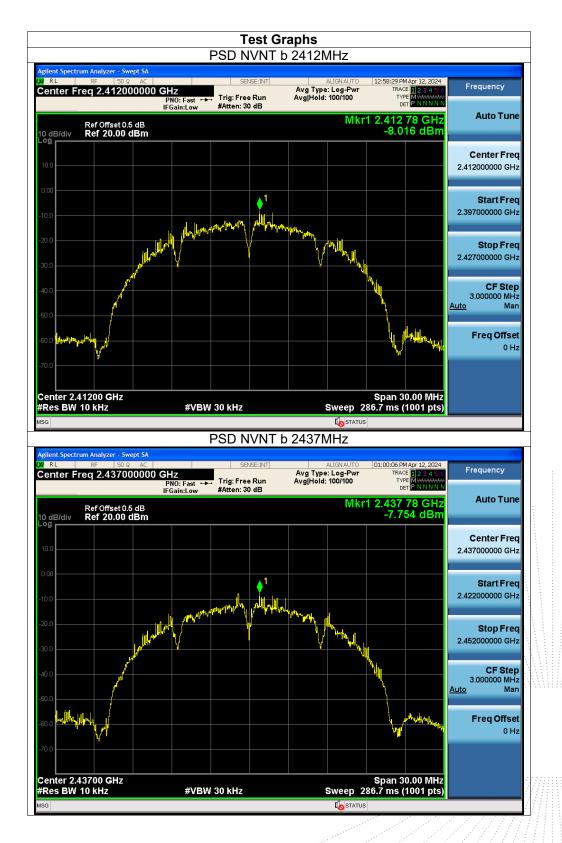
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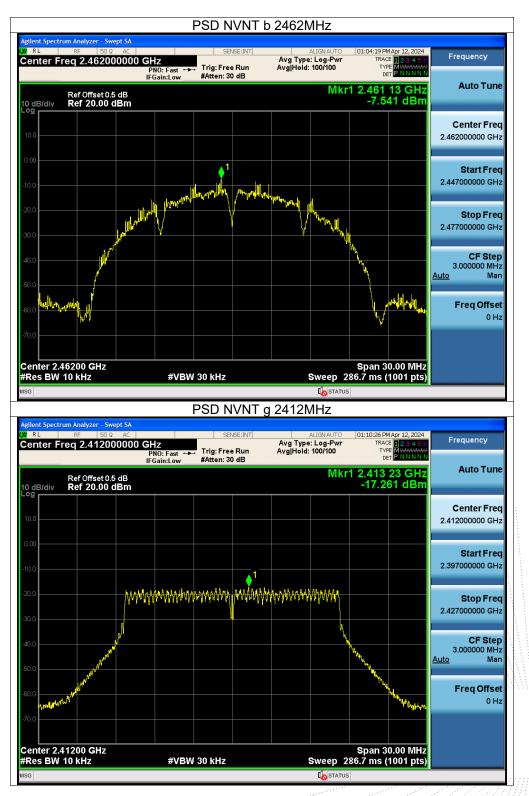
Page: 33 of 82





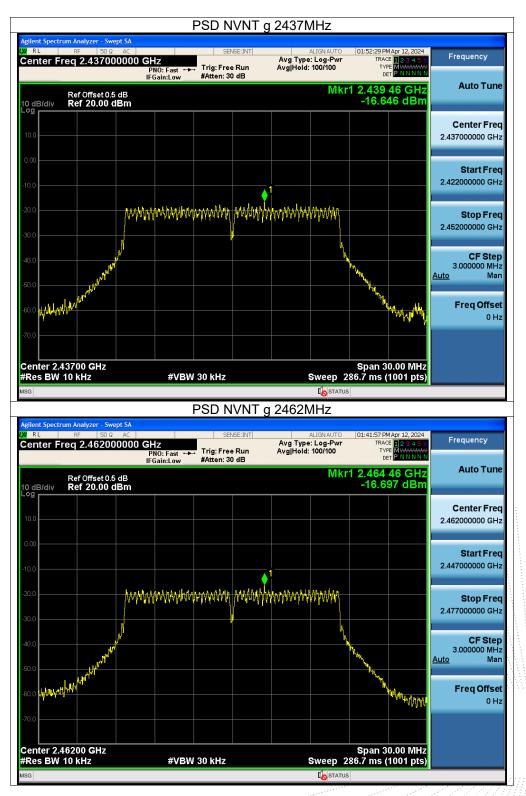
Page: 34 of 82





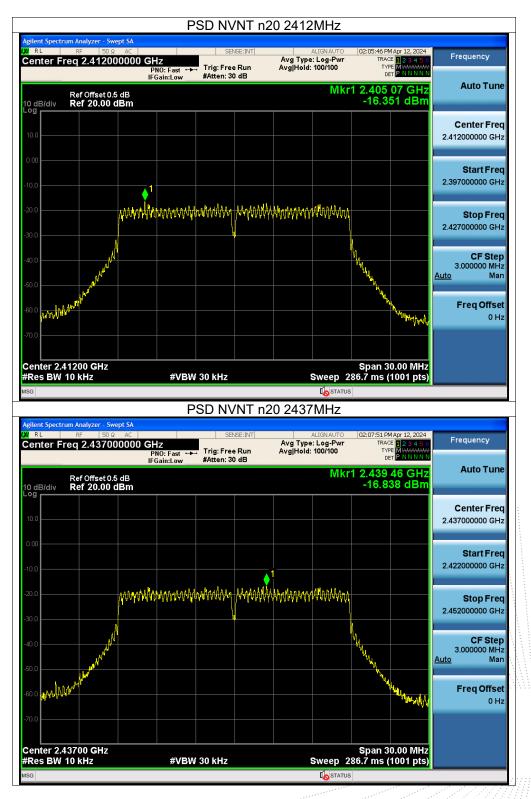
No.: BCTC/RF-EMC-005 B.2 Page: 35 of 82





Page: 36 of 82





Page: 37 of 82





Page: 38 of 82





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10. Bandwidth Test

10.1 Block Diagram Of Test Setup



10.2 Limit

FCC Part15 (15.247) , Subpart C					
Section	Test Item	Limit	Frequency Range (MHz)	Result	
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS	

10.3 Test Procedure

- 1. Set RBW = 100 kHz.
- 2. Set the video bandwidth (VBW) \ge 3 x 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 6 dB relative to the maximum level measured in the fundamental emission.

10.4 EUT Operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing. Note: Power Spectral Density(dBm)=Reading+Cable Loss

Page: 40 of 82

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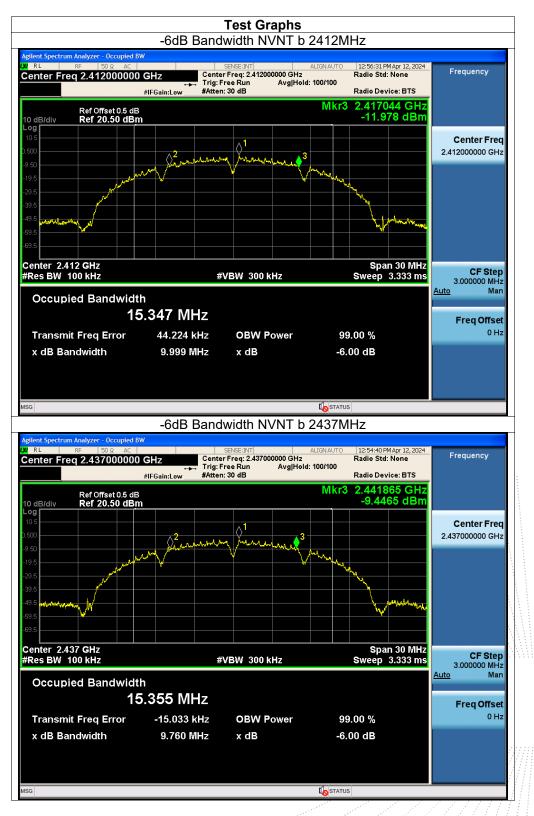
10.5 Test Result

Temperature:	26°C		Relative Humidity:	54%	54%	
Pressure:	101kPa		Test Voltage:	DC 3.7V		
Condition	Mode	Frequency (MHz)	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict	
NVNT	b	2412	9.999	0.5	Pass	
NVNT	b	2437	9.76	0.5	Pass	
NVNT	b	2462	9.558	0.5	Pass	
NVNT	g	2412	16.31	0.5	Pass	
NVNT	g	2437	16.329	0.5	Pass	
NVNT	g	2462	16.341	0.5	Pass	
NVNT	n20	2412	17.574	0.5	Pass	
NVNT	n20	2437	17.562	0.5	Pass	
NVNT	n20	2462	17.537	0.5	Pass	
NVNT	n40	2422	35.332	0.5	Pass	
NVNT	n40	2437	35.117	0.5	Pass	
NVNT	n40	2452	35.296	0.5	Pass	

Page: 41 of 82

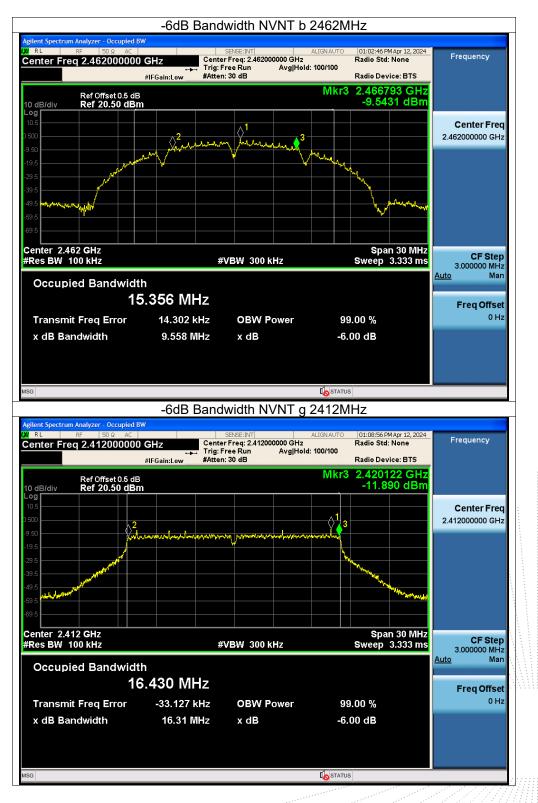


-6dB Bandwidth



Page: 42 of 82





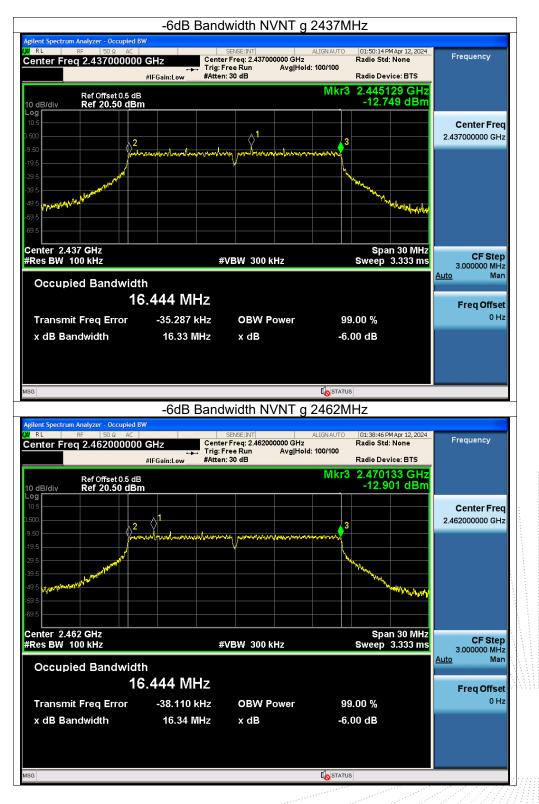
Page: 43 of 82

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Page: 44 of 82

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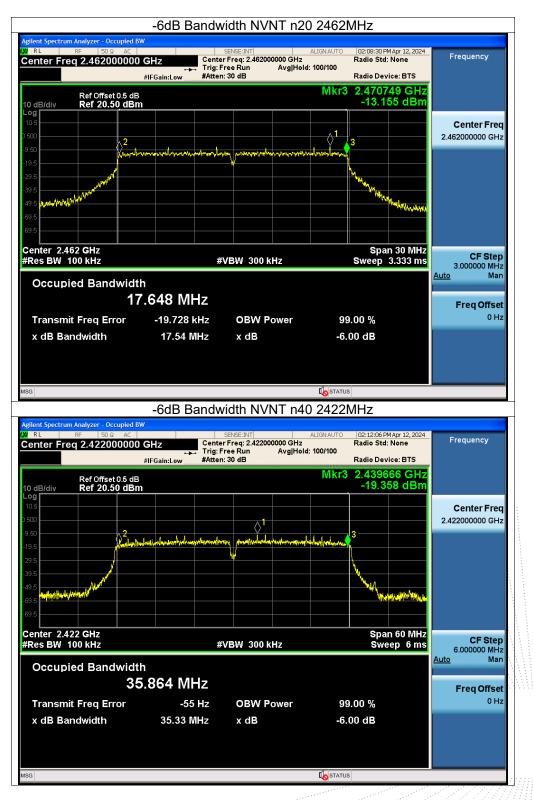


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No.: BCTC/RF-EMC-005 B.2 Page: 45 of 82

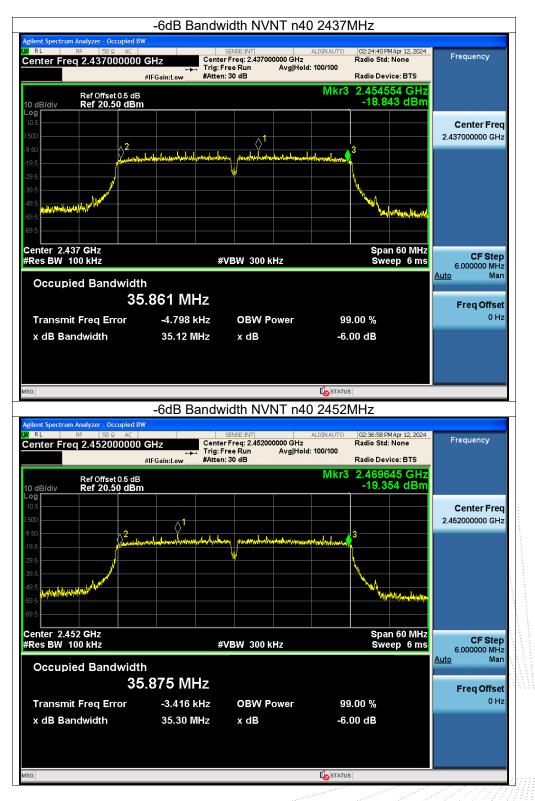






Page: 46 of 82





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No.: BCTC/RF-EMC-005

Page: 47 of 82



11. Peak Output Power Test

11.1 Block Diagram Of Test Setup



11.2 Limit

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

11.3 Test Procedure

a. The EUT was directly connected to the Power meter

11.4 EUT Operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing. Note: Power Spectral Density(dBm)=Reading+Cable Loss

No.: BCTC/RF-EMC-005 B.2 Page: 48 of 82



11.5 Test Result

Temperature:	26 ℃		Relative Humidity	y: 54%	
Pressure:	101kPa		Test Voltage:	DC 3.7V	
Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	9.15	30	Pass
NVNT	b	2437	9.42	30	Pass
NVNT	b	2462	9.8	30	Pass
NVNT	g	2412	7.25	30	Pass
NVNT	g	2437	6.3	30	Pass
NVNT	g	2462	6.37	30	Pass
NVNT	n20	2412	6.15	30	Pass
NVNT	n20	2437	6.44	30	Pass
NVNT	n20	2462	6.69	30	Pass
NVNT	n40	2422	5.61	30	Pass
NVNT	n40	2437	6.05	30	Pass
NVNT	n40	2452	5.8	30	Pass

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No.: BCTC/RF-EMC-005 B.2 Page: 49 of 82



12. 100 KHz Bandwidth Of Frequency Band Edge

12.1 Block Diagram Of Test Setup



12.2 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

12.3 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..

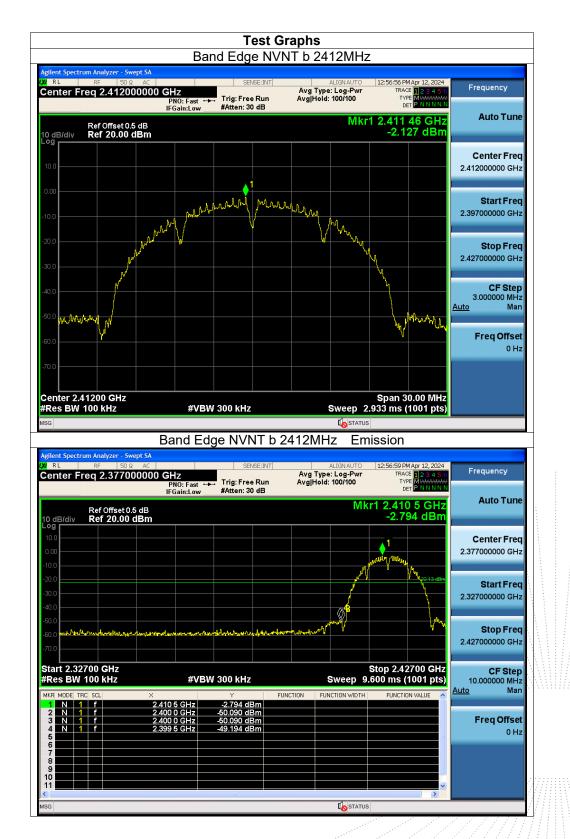
12.4 EUT Operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing. Note: Power Spectral Density(dBm)=Reading+Cable Loss

12.5 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 3.7V





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No.: BCTC/RF-EMC-005



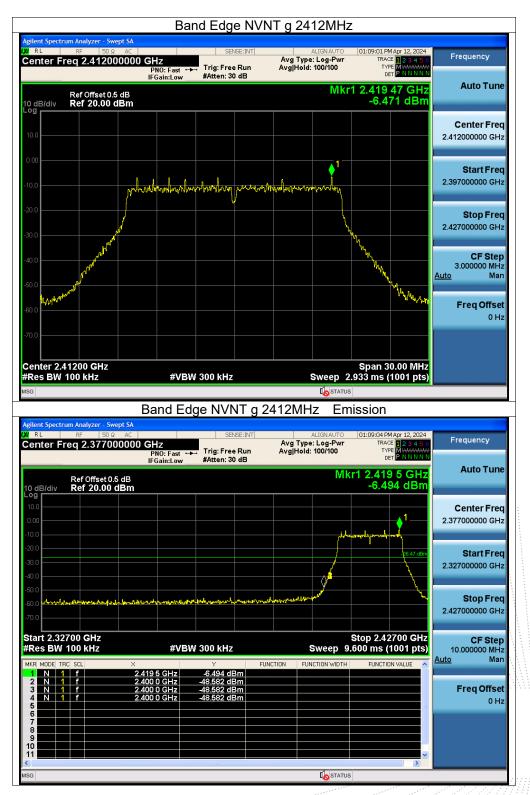


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Page: 52 of 82





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Page: 53 of 82





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Page: 54 of 82





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Page: 55 of 82





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No.: BCTC/RF-EMC-005





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No.: BCTC/RF-EMC-005