

FCC Test Report

Report No: FCS202202015W01

Issued for

Applicant:	A-Sure Technology CO., LIMITED		
Address:	FLAT/RM 1502, EASEY COMMERCIAL BUILDING, 253-261 HENNESSY ROAD, WANCHAI, HK		
Product Name:	Car Infotainment Navigation System		
Brand Name:	A-Sure		
Model Name:	K42_9		
Series Model:	K42 Series, K83 Series, K84 Series, KVL Series, KV5 Series		
FCC ID:	2A43A-K42-9		
Issued By: Flux Compliance Service Laboratory Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan Tel: 769-27280901 Fax:769-27280901 http://www.fcs-lab.com			

TEST RESULT CERTIFICATION

Page 2 of 37

Applicant's Name:	A-Sure Technology CO., LIMITED
Address	FLAT/RM 1502, EASEY COMMERCIAL BUILDING, 253-261 HENNESSY ROAD, WANCHAI, HK
Manufacture's Name:	A-Sure Technology CO., LIMITED
Address	FLAT/RM 1502, EASEY COMMERCIAL BUILDING, 253-261 HENNESSY ROAD, WANCHAI, HK
Product Description	
Product Name:	Car Infotainment Navigation System
Brand Name	A-Sure
Model Name:	K42_9
Series Model	Refer to page 1
Test Standards	FCC Rules and Regulations Part 15 Subpart C, Section 249
Test Procedure:	ANSI C63.10:2013

This device described above has been tested FCS, 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 FCS, this document may be altered or revised by FCS, personal only, and shall be noted in the revision of the document..

Date of Test.....

Date (s) of performance of tests.: 10 Feb, 2022 ~ 18 Feb, 2022

Date of Issue..... 19 Feb, 2022

Test Result..... Pass

Tested by	:	Scott shen	
		(Scott Shen)	STON CERIFICATIO
Reviewed by	:	Duke Quer	FCS
		(Duke Qian)	
Approved by	:	Jukion	SAUTURSHE

(Jack Wang)



Table of Contents

Page

1. SUMMARY OF TEST RESULTS	5
1.1 TEST FACTORY	6
1.2 MEASUREMENT UNCERTAINTY	6
2. GENERAL INFORMATION	7
2.1 GENERAL DESCRIPTION OF THE EUT	7
2.2 DESCRIPTION OF THE TEST MODES	9
2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS	10
2.4 EQUIPMENTS LIST	11
3 .CONDUCTED EMISSION MEASUREMENT	12
3.1 LIMIT	12
3.2 TEST PROCEDURE	12
3.3 TEST SETUP	13
3.4 TEST RESULTS	13
4. RADIATED EMISSION MEASUREMENT	14
4.1 LIMIT	14
4.2 TEST PROCEDURE	15
4.3 TEST SETUP	16
4.4 TEST RESULTS	17
5. BAND EDGE TEST	25
5.1 LIMIT	25
5.2 TEST PROCEDURE	25
5.3 TEST SETUP	
5.4 TEST RESULTS	27
6. 20 DB BANDWIDTH TEST	28
6.1 LIMIT	28
6.2 TEST PROCEDURE	28
6.3 TEST SETUP	
6.4 TEST RESULTS	29
7. ANTENNA REQUIREMENT	35
6.1 STANDARD REQUIREMENT	35
6.2 EUT ANTENNA	35



Page 4 of 37

Revision History

Rev.	Issue Date	Effect Page	Contents
00	19 Feb, 2022	N/A	Initial Issue

 Flux Compliance Service Laboratory

 Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan

 Tel: 769-27280901
 Fax: 769-27280901

 http://www.fcs-lab.com



1. SUMMARY OF TEST RESULTS

FCC Part 15.249,Subpart C					
Standard Section	Lest Item				
15.207	Conducted Emission	N/A			
15.205(a), 15.209(a), 15.249(a), 15.249(c)	Radiated Spurious Emission	PASS			
15.209	Field strength of fundamental	PASS			
15.249(d)	Band Edge Emission	PASS			
15.215(c)	20dB Bandwidth	PASS			
15.203	Antenna Requirement	PASS			

NOTE:

- (1)" N/A" denotes test is not applicable in this Test Report
- (2) All tests are according to ANSI C63.10-2013



1.1 TEST FACTORY

Company Name:	Flux Compliance Service Laboratory		
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan		
Telephone:	+86-769-27280901		
Fax:	+86-769-27280901		
FCC Test Firm Registration Number: 514908 Designation number: CN0127 A2LA accreditation number: 5545.01 CNAS: L15566			

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, 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	RF output power, conducted	±0.71dB
2	Unwanted Emissions, conducted	±2.98 dB
3	Conducted Emission (9KHz-150KHz)	±4.13 dB
4	Conducted Emission (150KHz-30MHz)	±4.74 dB
5	All emissions,radiated(<1G) 30MHz-1000MHz	±3.2 dB
6	All emissions, radiated (1GHz -18GHz)	±3.66 dB
7	All emissions, radiated (18GHz -40GHz)	±4.31 dB



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Car Infotainment Navigation System
Trade Name	A-Sure
Model Name	K42_9
Series Model	Refer to page 1
Model Difference	The above product with same circuit, PCB layout, electrical parts, materials and wiring structures, the materials of decorative accessories is same, only different appearance shape and different color.
Channel List	Please refer to the Note 2.
вт	Frequency:2402-2480MHz Modulation: ☑GFSK,☑ π/4-DQPSK,☑8DPSK Data rate: ☑1Mbps, ☑2Mbps Channel number: ☑79CH Bluetooth technology: ☑BR/EDR
Power Supply	Input: DC 9 -15V 3 -10 A
Battery	N/A
Hardware version number	V1.0
Software version number	V1.0
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

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



2. Channel List

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	21	2422MHz	41	2442MHz	61	2462MHz
2	2403MHz	22	2423MHz	42	2443MHz	62	2463MHz
19	2420MHz	39	2440MHz	59	2460MHz	79	2480MHz
20	2421MHz	40	2441MHz	60	2461MHz		

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	NA	N/A	External antenna	N/A	1.0	Antenna



2.2 DESCRIPTION OF THE 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.

Test software: Pandora_R22.20.1701

The test softeware was used to control EUT work in continuous TX mode, and select test channel, Wireless mode as below table

No.	Test model descrption
1	Low channel GFSK
2	Middle channel GFSK
3	High channel GFSK
4	Low channel π/4-DQPSK
5	Middle channel π/4-DQPSK
6	High channel π/4-DQPSK
7	Low channel 8DPSK
8	Middle channel 8DPSK
9	High channel 8DPSK
Note:	

- 1. All the test modes can be supply by battery, only the result of the worst case recorded in the report. GFSK mode is worst mode.
- 2. For radiated emission, 3 axis were chosen for testing for each applicable mode.
- 3. The EUT used fully charge battery when tested.
- 4. During the test, the dutycycle>98%, the test voltage was tuned from 85% to 115% of the Nominal rate supply votage, and found that the worst case was the nominal rated supply condition, So the report just shows that condition's data

Configuration and peripherals

EUT	



2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

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

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
1	DC power supply	ZHAOXIN	RXN-605D-II	N/A	this is for testing only in repor

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
N/A					

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in ^[]Length_. column.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".

2.4 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2022. 02.10	2023. 02.09
Signal Analyzer	R&S	FSV40-N	FCS-E012	2022. 02.10	2023. 02.09
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2022. 02.10	2023. 02.09
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2022. 02.10	2023. 02.09
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2022. 02.10	2023. 02.09
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2022. 02.10	2023. 02.09
Pre-Amplifier(0.1M-3G Hz)	EMCI	EM330N	FCS-E004	2022. 02.10	2023. 02.09
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2022. 02.10	2023. 02.09
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2022. 02.10	2023. 02.09
Temperature & Humidity	HTC-1	victor	FCS-E005	2022. 02.10	2023. 02.09

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2022. 02.10	2023. 02.09
LISN	R&S	ENV216	FCS-E007	2022. 02.10	2023. 02.09
LISN	ETS	3810/2NM	FCS-E009	2022. 02.10	2023. 02.09
Temperature & Humidity	HTC-1	victor	FCS-E008	2022. 02.10	2023. 02.09

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
Spectrum Analyzer	Keysight	N9020A	FCS-E015	2022. 02.10	2023. 02.09
Spectrum Analyzer	Agilent	E4447A	MY50180039	2022. 02.10	2023. 02.09
Spectrum Analyzer	R&S	FSV-40	101499	2022. 02.10	2023. 02.09



3 .CONDUCTED EMISSION MEASUREMENT

3.1 LIMIT

Operating frequency band. In case the emission fall within the restricted band specified on Part 207(a) limit in the table below has to be followed.

	Conducted Emissionlimit (dBuV)		
FREQUENCY (MHz)	Quasi-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	

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

3.2 TEST PROCEDURE

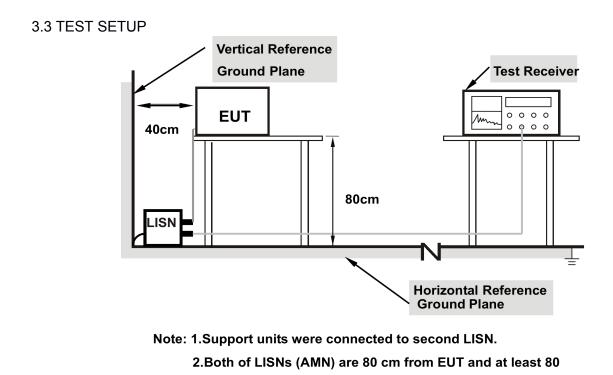
The following table is the setting of the receiver

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

- a. The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. 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.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.







from other units and other metal planes

3.4 TEST RESULTS

Temperature:	25℃	Relative Humidity:	50%
Test Mode:	N/A	Test Voltage:	N/A
Phase:	L	Result:	Pass

4. RADIATED EMISSION MEASUREMENT

4.1 LIMIT

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009mhz - 1000mhz)

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

LIMITS OF RADIATED EMISSION MEASUREMENT (1GHz-25 GHz)

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

LIMITS OF FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL

FREQUENCY (MHz)	(dBuV/m) (at 3M)		
	PEAK	AVERAGE	
2400-2483.5	114	94	

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).



4.2 TEST PROCEDURE

Spectrum Parameter	Setting		
Attenuation	Auto		
Detector	Peak/AV		
Start Frequency	1000 MHz(Peak/AV)		
Stop Frequency	10th carrier hamonic(Peak/AV)		
RB / VB (emission in restricted	PK=1MHz / 1MHz, AV=1 MHz /10 Hz		
band)	(Peak detector is for Both)		

a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz,and above 1GHz.

- b. The EUT was placed on the top of a rotating table 0.8 meters (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. 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 QuasiPeak detector mode re-measured.
- e. 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.
- f. For the actual test configuration, please refer to the related Item -EUT Test Photos.

Note:

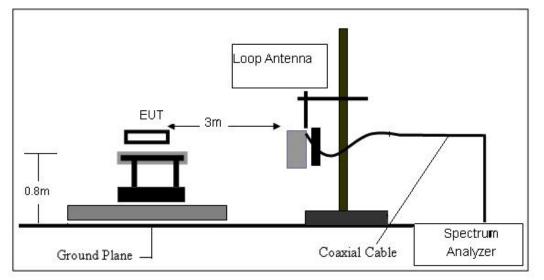
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

For fundamental frequency ,RBW>20dB BW ,VBW>RBW,PK detector for PK value, RMS detector for AV value.

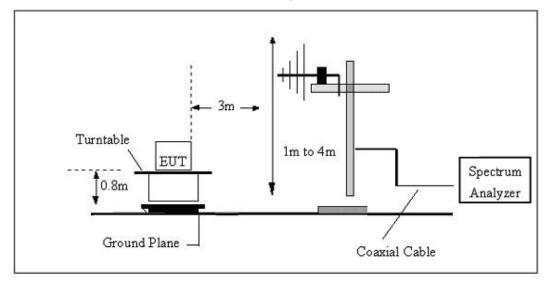


4.3 TEST SETUP

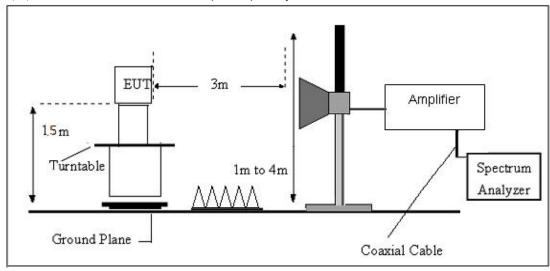
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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





4.4 TEST RESULTS

Temperature:	25.3℃	Relative Humidity:	59%
Test Mode:	GFSK Mode	Test Voltage:	DC 12V

For field strength of the fundamental signal

Peak value

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2402.00	91.57	27.58	5.39	30.18	94.36	114.00	-19.64	Vertical
2402.00	90.61	27,58	5.39	30,18	93.40	114.00	-20.60	Horizontal
2441.00	92.02	27.55	5.43	30.06	94.94	114.00	-19.06	Vertical
2441.00	87.32	27.55	5.43	30.06	90.24	114.00	-23.76	Horizontal
2480.00	89.75	27.52	5.47	29.93	92.81	114.00	-21.19	Vertical
2480.00	88.39	27.52	5.47	29.93	91.45	114.00	-22.55	Horizontal

Average value

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Leve l (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2402.00	80.49	27.58	5.39	30.18	83.28	94.00	-10.72	Vertical
2402.00	79.58	27.58	5.39	30.18	82.37	94.00	-11.63	Horizontal
2441.00	78.92	27.55	5.43	30.06	81.84	94.00	-12.16	Vertical
2441.00	76.25	27.55	5.43	30.06	79.17	94.00	-14.83	Horizontal
2480.00	83.75	27.52	5.47	29.93	86.81	94.00	-7.19	Vertical
2480.00	81.14	27.52	5.47	29.93	84.20	94.00	-9.80	Horizontal



-7.34

-8.80

Vertica

Horizontal

94.00

94.00

Temperature:	25.3℃	Relative Humidity:	59%
Test Mode:	$\pi/4$ DQPSK	Test Voltage:	DC 12V

Peak value

2480.00

2480.00

83.60

82,14

27.52

27.52

5.47

5.47

Freque (MH		Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2402	.00	93.15	27.58	5.39	30.18	95.94	114.00	-18.06	Vertical
2402	.00	92.50	27.58	5.39	30.18	95.29	114.00	-18.71	Horizontal
2441	.00	93.70	27.55	5.43	30.06	96.62	114.00	-17.38	Vertical
2441	.00	88.89	27.55	5.43	30.06	91.81	114.00	-22.19	Horizontal
2480	.00	91.04	27.52	5.47	29.93	94.10	114.00	-19.90	Vertical
2480	.00	89.86	27.52	5.47	29.93	92.92	114.00	-21.08	Horizontal
Average	value								
Freque (MHz	· · · · · ·	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Leve l (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2402.	00	81.57	27.58	5.39	30.18	84.36	94.00	-9.64	Vertical
2402.	00	80.25	27.58	5.39	30.18	83.04	94.00	-10.96	Horizontal
2441.	00	79.17	27.55	5.43	30.06	82.09	94.00	-11.91	Vertical
2441.	00	77.41	27.55	5.43	30.06	80.33	94.00	-13.67	Horizontal

29.93

29.93

86.66

85.20



Temperature:	25.3℃	Relative Humidity:	59%
Test Mode:	8DPSK	Test Voltage:	DC 12V

Peak value

Frequency (MHz)	Read Leve l (dBuV)	Antenna Factor (dB/m)	Cab l e Loss (dB)	Preamp Factor (dB)	Leve l (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	po l arization
2402.00	86.60	27.58	5.39	30.18	89.39	114.00	-24.61	Vertical
2402.00	84.95	27.58	5.39	30.18	87.74	114.00	-26.26	Horizontal
2441.00	85.41	27.55	5.43	30.06	88.33	114.00	-25.67	Vertical
2441.00	84.08	27.55	5.43	30.06	87.00	114.00	-27.00	Horizontal
2480.00	87.37	27.52	5.47	29.93	90.43	114.00	- 23.57	Vertical
2480.00	84.95	27.52	5.47	29.93	88.01	114.00	-25.99	Horizontal

Average value

Frequency (MHz)	Read Leve l (dBuV)	Antenna Factor (dB/m)	Cab l e Loss (dB)	Preamp Factor (dB)	Leve l (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	po l arization
2402.00	80.27	27.58	5.39	30.18	83.06	94.00	-10.94	Vertical
2402.00	77.89	27.58	5.39	30.18	80.68	94.00	-13.32	Horizontal
2441.00	78.59	27.55	5.43	30.06	81.51	94.00	-12.49	Vertical
2441.00	75.65	27.55	5.43	30.06	78.57	94.00	-15.43	Horizonta
2480.00	81.02	27.52	5.47	29.93	84.08	94.00	-9.92	Vertical
2480.00	78.34	27.52	5.47	29.93	81.40	94.00	-12.60	Horizontal

For spurious emission

(9KHz-30MHz)

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

Note:

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);

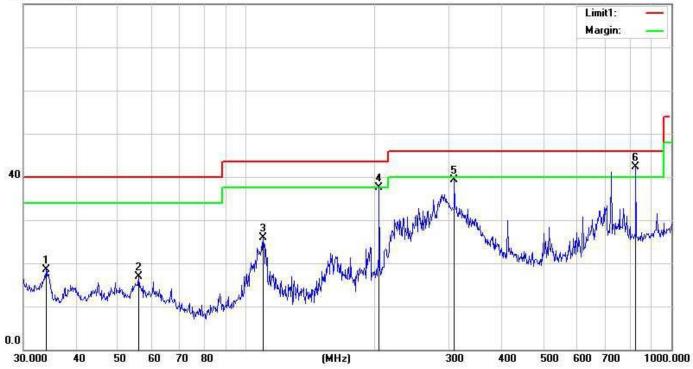
Limit line = specific limits (dBuv) + distance extrapolation factor.



(30MHZ-1000MHZ)

Temperature:	25.7°C	Relative Humidity:	60%
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	GFSK		

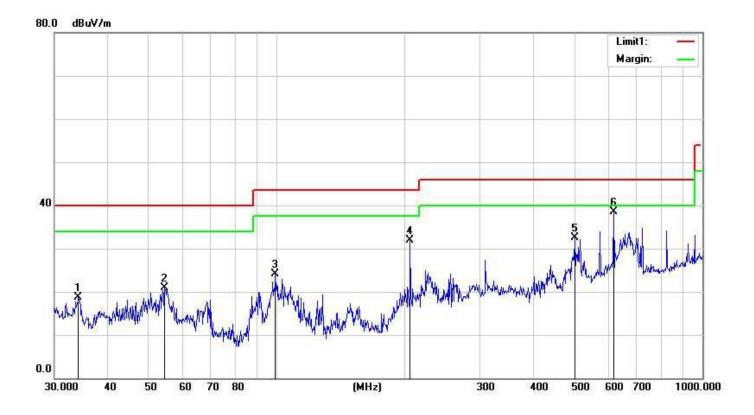
80.0 dBu¥/m



No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	33.9174	34.03	-15.55	18.48	40.00	-21.52	QP
2	56.0007	33.77	-16.89	16.88	40.00	-23.12	QP
3	109.7960	42.79	-16.94	25.85	43.50	-17.65	QP
4	205.6750	53.06	-15.46	37.60	43.50	-5.90	QP
5	308.9126	52.89	-13.52	39.37	46.00	-6.63	QP
6	824.5968	46.61	-4.38	42.23	46.00	-3.77	QP



Temperature:	22.7°C	Relative Humidity:	61%
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	GFSK		



No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	34.1561	34.37	-15.71	18.66	40.00	-21.34	QP
2	54.4516	37.81	-16.81	21.00	40.00	-19.00	QP
3	99.1797	42.12	-18.10	24.02	43.50	-19.48	QP
4	205.6751	47.40	-15.46	31.94	43.50	-11.56	QP
5	501.1790	42.44	-9.92	32.52	46.00	-13.48	QP
6	618.5370	46.22	-7.64	38.58	46.00	-7.42	QP

Remarks:

1. Margin = Result (Result = Reading + Factor) – Limit



(1GHZ~25GHZ)

LOW CH(GFSK)

Peak value

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804.00	41.66	31.78	8.60	32.09	49.95	74.00	-24.05	Vertical
7206.00	33.94	36.15	11.65	32.00	49.74	74.00	-24.26	Vertical
9608.00	31.52	37.95	14.14	31.62	51.99	74.00	-22.01	Vertical
12010.00	*					74.00		Vertical
14412.00	*					74.00		Vertical
4804.00	45.42	31.78	8.60	32.09	53.71	74.00	-20.29	Horizontal
7206.00	37.54	36.15	11.65	32.00	53.34	74.00	-20.66	Horizontal
9608.00	34.08	37.95	14.14	31.62	54.55	74.00	-19.45	Horizontal
12010.00	*					74.00		Horizontal
14412.00	*					74.00		Horizontal

AV value

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804.00	28.57	31.78	8.60	32.09	36.86	54.00	-17.14	Vertical
7206.00	22,93	36,15	11.65	32.00	38,73	54.00	-15.27	Vertical
9608.00	23.63	37.95	14.14	31.62	44.10	54.00	-9.90	Vertical
12010.00	*	0	С			54.00		Vertical
14412.00	*					54.00		Vertical
4804.00	32.34	31.78	8.60	32.09	40.63	54.00	-13.37	Horizontal
7206.00	23.49	36.15	11.65	32.00	39.29	54.00	-14.71	Horizontal
9608.00	23.20	37.95	14.14	31.62	43.67	54.00	-10.33	Horizontal
12010.00	*					54.00		Horizontal
14412.00	*					54.00		Horizontal

MIDDLE CH(GFSK)

Peak value

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804.00	42.00	31,78	8.60	32,09	50,29	74.00	-23.71	Vertical
7206.00	34.28	36.15	11.65	32.00	50.08	74.00	-23.92	Vertical
9608.00	31.86	37.95	14.14	31.62	52.33	74.00	-21.67	Vertical
12010.00	*					74.00		Vertical
14412.00	*					74.00		Vertical
4804.00	45.76	31.78	8.60	32.09	54.05	74.00	-19.95	Horizontal
7206.00	37.88	36.15	11.65	32.00	53.68	74.00	-20.32	Horizontal
9608.00	34.42	37.95	14.14	31.62	54.89	74.00	-19.11	Horizontal
12010.00	*					74.00		Horizontal
14412.00	*					74.00		Horizontal

AV value

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804.00	28.44	31.78	8.60	32.09	36.73	54.00	-17.27	Vertical
7206.00	22,96	36,15	11,65	32,00	38,76	54.00	-15.24	Vertical
9608.00	23.70	37,95	14,14	31,62	44.17	54.00	-9.83	Vertical
12010.00	*					54.00		Vertical
14412.00	*					54.00		Vertical
4804.00	32.32	31.78	8.60	32.09	40.61	54.00	-13.39	Horizontal
7206.00	23.56	36.15	11.65	32.00	39.36	54.00	-14.64	Horizontal
9608.00	23.14	37.95	14.14	31.62	43.61	54.00	-10.39	Horizontal
12010.00	*					54.00		Horizontal
14412.00	*					54.00		Horizontal



HIGH CH(GFSK)

Peak value

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4882.00	37.65	31.85	8.67	32.12	46.05	74.00	-27.95	Vertical
7323.00	32.38	36.37	11.72	31.89	48.58	74.00	-25.42	Vertical
9764.00	29.73	38.35	14.25	31.62	50.71	74.00	-23.29	Vertical
12205.00	*					74.00		Vertical
14646.00	*					74.00		Vertical
4882.00	38.89	31.85	8.67	32.12	47.29	74.00	-26.71	Horizontal
7323.00	31.46	36.37	11.72	31.89	47.66	74.00	-26.34	Horizontal
9764.00	28.05	38,35	14,25	31.62	49.03	74.00	-24.97	Horizontal
12205.00	*					74.00		Horizontal
14646.00	*					74.00		Horizontal

Page 24 of 37

AV value

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4882.00	26.30	31,85	8.67	32,12	34.70	54.00	-19.30	Vertical
7323.00	22.16	36,37	11.72	31.89	38.36	54.00	-15.64	Vertical
9764.00	20.85	38,35	14.25	31.62	41.83	54.00	-12.17	Vertical
12205.00	*					54.00		Vertical
14646.00	*					54.00		Vertical
4882.00	32.51	31.85	8.67	32.12	40.91	54.00	-13.09	Horizontal
7323.00	24.38	36.37	11.72	31.89	40.58	54.00	-13.42	Horizontal
9764.00	20.80	38.35	14.25	31.62	41.78	54.00	-12.22	Horizontal
12205.00	*					54.00		Horizontal
14646.00	*					54.00		Horizontal





5. BAND EDGE TEST

5.1 LIMIT

According to §15.249(d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

5.2 TEST PROCEDURE

- a. The EUT is placed on a turntable, which is 1.5m above ground plane.
- EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out b. the highest emissions.

Use the following spectrum analyzer settings:

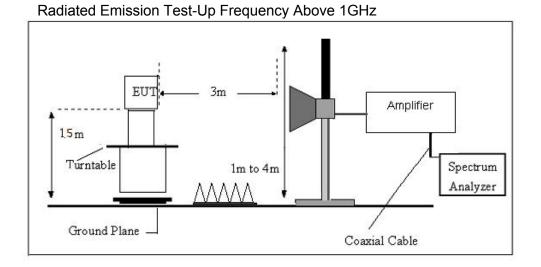
- c. Span = wide enough to fully capture the emission being measured, RBW = 1 MHz, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold Follow the guidelines in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc.
- d. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the duty cycle per channel of the hopping signal is less than 100 ms, then the reading obtained with e.
- ^{c.} the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from 20log(duty cycle/100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Note:

For fundamental frequency ,RBW>20dB BW ,VBW>RBW,PK detector for PK value, RMS detector for AV value.



5.3 TEST SETUP



 Flux Compliance Service Laboratory

 Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan

 Tel: 769-27280901
 Fax: Fax: 769-27280901

 http://www.fcs-lab.com





5.4 TEST RESULTS

Low CH (GFSK)

Horizontal

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	40.57	27.59	5.38	30.18	43.36	74.00	-30.64	Horizontal
2400.00	54.23	27.58	5.39	30.18	57.02	74.00	-16.98	Horizontal
2390.00	40.30	27.59	5.38	30.18	43.09	74.00	-30.91	Vertical
2400.00	53.41	27.58	5.39	30.18	56.20	74.00	-17.80	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	32.30	27.59	5.38	30.18	35.09	54.00	-18.91	Horizontal
2400.00	39.47	27.58	5.39	30.18	42.26	54.00	-11.74	Horizontal
2390.00	32.13	27.59	5.38	30.18	34.92	54.00	-19.08	Vertical
2400.00	41.41	27.58	5.39	30.18	44.20	54.00	-9.80	Vertical

High CH(GFSK) (GFSK)

Vertical

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	43.75	27.53	5.47	29.93	46.82	74.00	-27.18	Horizontal
2500.00	44.93	27.55	5.49	29.93	48.04	74.00	-25.96	Horizontal
2483.50	43.52	27.53	5.47	29.93	46.59	74.00	-27.41	Vertical
2500.00	42.16	27.55	5.49	29.93	45.27	74.00	-28.73	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	33.59	27.53	5.47	29.93	36.66	54.00	-17.34	Horizontal
2500.00	32.81	27.55	5.49	29.93	35.92	54.00	-18.08	Horizontal
2483.50	34.03	27.53	5.47	29.93	37.10	54.00	-16.90	Vertical
2500.00	34.97	27.55	5.49	29.93	38.08	54.00	-15.92	Vertical



6. 20 DB BANDWIDTH TEST

6.1 LIMIT

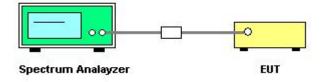
According to 15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation

6.2 TEST PROCEDURE

Check the calibration of the measuring instrument using either an internal calibrator or a

- a. known signal from an external generator
- b. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- C. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

6.3 TEST SETUP





6.4 TEST RESULTS

Temperature:	25 ℃	Relative Humidity:	50%
Test Mode:	GFSK	Test Voltage:	DC 12V

Frequency	20dB Bandwidth (KHz)	Result
2402 MHz	875.9	PASS
2441 MHz	869.0	PASS
2480 MHz	876.2	PASS

Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC		SENSE:PULSE	ALIGN AUTO	03:27:13 PM Oct 27, 2021	
dB -20.00 dB		enter Freq: 2.40200000 rig: Free Run Av		Radio Std: None	Save
	#IFGain:Low #	Atten: 10 dB		Radio Device: BTS	State
dB/div Ref -5.00 dBm					State
3 1.0 5.0		man	~		
.0	~~~		many		
. may man man			and the second s	man and a second and a second and and a second and a second and a second and and and a second and and and a second and and and a second and and a second and and a second and and a second and and and a second and and a second and and and a second and and and a second and and and and and and a second and and and and and and and and and a	
.0				and the for the second	
.0					
					Data
					(Export
40		а			Trace 1
enter 2.402 GHz				Span 3 MHz	-
tes BW 30 kHz		#VBW 100 kHz		Sweep 4.133 ms	Screer
Occupied Bandwidt	h	Total Pow	er -4.18	dBm	Image
	14.80 kHz	2			
Transmit Freq Error	-20.518 kHz	% of OBW	Power 99	.00 %	
x dB Bandwidth	875.9 kHz	x dB	-20.	00 dB	





Keysight Spectrum Analyzer - Occupied BW	/		ALTON ALTO	02-20-10-2	MO:+ 37 2021	
enter Freg 2.441000000		SENSE:PULSE Center Freq: 2.4410000		Radio Std	M Oct 27, 2021 : None	Frequency
		Trig: Free Run #Atten: 10 dB	Avg Hold:>10/10	Radio Dev	rice: BTS	
	#II Gall.Low			induce por		1
5 dB/div Ref -5.00 dBm						
og		mon				
0.0	mon	1 minut	~			Center Fr
35.0	monor		man			2.441000000 G
SO.O			- And	m		
			Ť	WA.	www.	
10.0 15.0						
110						
125						
140						
140						
enter 2.441 GHz					an 3 MHz	CF St
Res BW 30 kHz		#VBW 100 kH	z	Sweep	4.133 ms	300.000 k
Occupied Bandwidt	h	Total Po	wer -3.2	9 dBm		<u>Auto</u> N
	" 20.86 kH:					
8,	20.00 KH					Freq Offs
Transmit Freq Error	-19.711 kH	z % of OB	W Power 9	9.00 %		0
x dB Bandwidth	869.0 kH	z x dB	-20	0.00 dB		
20			STAT	US		
			STAT	US		
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC		SENSE:PULSE	ALIGN AUTO	03:30:13 P	M Oct 27, 2021	
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC	GHz	Center Freq: 2.4800000	ALIGN AUTO			Frequency
	GHz	Center Freq: 2.4800000	ALIGN AUTO	03:30:13 P	: None	
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC	GHz 🖵	Center Freq: 2.4800000 Trig: Free Run	ALIGN AUTO	03:30:13 P Radio Std	: None	
keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 5 dB/div Ref -10.00 dBr	GHz #IFGain:Low	Center Freq: 2.4800000 Trig: Free Run	ALIGN AUTO	03:30:13 P Radio Std	: None	
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 5 dB/div Ref -10.00 dBr	GHz #IFGain:Low	Center Freq: 2.4800000 Trig: Free Run	ALIGN AUTO	03:30:13 P Radio Std	: None	Frequency
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 40000000 40000000 5 dB/div Ref -10.00 dBr 600000000 5 dB/div Ref -10.00 dBr 6000000000000000000000000000000000000	GHz #IFGain:Low	Center Freq: 2.4800000 Trig: Free Run	ALIGN AUTO	03:30:13 P Radio Std	: None	
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 S B/div S dB/div Ref -10.00 dBr S 0 0 S S	GHz #IFGain:Low	Center Freq: 2.4800000 Trig: Free Run	ALIGN AUTO	03:30:13 P Radio Std	: None	Frequency Center Fr
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 S B/div 6 B/div Ref -10.00 dBr 5 0 0 0 5.0 0 0 0	GHz #IFGain:Low	Center Freq: 2.4800000 Trig: Free Run	ALIGN AUTO	03:30:13 P Radio Std	: None	Frequency Center Fr
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 Solution Solution 5 dB/div Ref -10.00 dBr Solution 5 dB/div Ref -10.00 dBr Solution 5 dB/div Ref -10.00 dBr Solution	GHz #IFGain:Low	Center Freq: 2.4800000 Trig: Free Run	ALIGN AUTO	03:30:13 P Radio Std	: None rice: BTS	Frequency Center Fr
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 S0 AC 5 dB/div Ref -10.00 dBr S0 50 G G G	GHz #IFGain:Low	Center Freq: 2.4800000 Trig: Free Run	ALIGN AUTO	03:30:13 P Radio Std	: None rice: BTS	Frequency Center Fr
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000	GHz #IFGain:Low	Center Freq: 2.4800000 Trig: Free Run	ALIGN AUTO	03:30:13 P Radio Std	: None rice: BTS	Frequency Center Fr
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 S0 AC 5 dB/div Ref -10.00 dBr S0 90 S0 AC AC 90 S0 AC AC 90 S0 AC AC 91 AC AC AC	GHz #IFGain:Low	Center Freq: 2.4800000 Trig: Free Run	ALIGN AUTO	03:30:13 P Radio Std	: None rice: BTS	Frequency Center Fr
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 50 50 5 dB/div Ref -10.00 dBr 60 50 0 0 0 50 0 0 0 50 0 0 0 50 0 0 0 50 0 0 0 50 0 0 0 50 0 0 0 50 0 0 0 50 0 0 0 50 0 0 0 50 0 0 0 50 0 0 0 50 0 0 0 50 0 0 0 50 0 0 0 50 0 0 0 50 0 0 0 115 0	GHz #IFGain:Low	Center Freq: 2.4800000 Trig: Free Run	ALIGN AUTO	03:30:13 P Radio Std	: None rice: BTS	Frequency Center Fr
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 AC B 5 dB/div Ref -10.00 dBr B 50 AC AC B 60 AC AC B 60 AC AC B 60 AC AC B 60 AC AC AC 610 AC AC AC 62 AC AC AC 700 AC AC AC 700 AC AC AC 700 AC AC AC	GHz #IFGain:Low	Center Freq: 2.4800000 Trig: Free Run	ALIGN AUTO	adio Dev	: None	Frequency Center Fr
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 AC BC 5 dB/div Ref -10.00 dBr BC 50 AC AC 90 AC AC 50 AC AC 90 AC AC 91 AC AC 92 AC AC 93 AC AC 94 AC AC 95 AC AC 94 AC AC 95 AC AC 90 AC AC 91 AC AC 92 AC AC 93 AC AC 94 AC AC 94 AC AC 95 AC AC 94 AC AC 95 AC AC 95 AC AC 94	GHz #IFGain:Low	Center Freq; 2.480000 Trig: Free Run #Atten: 10 dB	ALIGN AUTO	03:30:13 P Radio Std Radio Dev	: None rice: BTS	Frequency Center Fr 2.480000000 G
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 AC BC 5 dB/div Ref -10.00 dBr BC 50 AC AC 90 AC AC 50 AC AC 90 AC AC 91 AC AC 92 AC AC 93 AC AC 94 AC AC 95 AC AC 94 AC AC 95 AC AC 90 AC AC 91 AC AC 92 AC AC 93 AC AC 94 AC AC 94 AC AC 95 AC AC 94 AC AC 95 AC AC 95 AC AC 94	GHz #IFGain:Low	Center Freq: 2.480000 Trig: Free Run #Atten: 10 dB	ALIGN AUTC 100 GHz Avg Hold:>10/10	Radio Dev Radio Dev Sp Sweep	: None	Frequency Center Fr 2.480000000 G CF St 300.000 k
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 Solution Solution 5 dB/div Ref -10.00 dBr Solution 50 Solution Solution Solution 50 Solution Solution Solution Solution 50 Solution Solution Solution Solution Solution 50 Solution Solut	GHz #FGain:Low	Center Freq; 2.480000 Trig: Free Run #Atten: 10 dB	ALIGN AUTC 100 GHz Avg Hold:>10/10	03:30:13 P Radio Std Radio Dev	: None rice: BTS	Frequency Center Fr 2.480000000 G
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 AC BC 5 dB/div Ref -10.00 dBr BC 5 dB/div Ref -10.00 dBr BC 50 AC AC AC 510 AC AC AC 5110 AC AC	GHz #FGain:Low	Center Freq: 2.4800000 Trig: Free Run #Atten: 10 dB	ALIGN AUTC 100 GHz Avg Hold:>10/10	Radio Dev Radio Dev Sp Sweep	: None rice: BTS	Frequency Center Fr 2.480000000 G CF St 300.000 k Auto
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 AC AC 5 6B/div Ref -10.00 dBr AC 55 0 0 AC AC 50 0 0 AC AC 510 0 0 AC AC 511	GHz #FGain:Low n h 13.45 kHz	Center Freq: 2.480000 Trig: Free Run #Atten: 10 dB #VBW 100 kH Total Por Z	ALIGN AUTC 200 GHz Avg Hold:>10/10	Sp Sweep 59 dBm	: None rice: BTS	Frequency Center Fr 2.480000000 G 300.000 k Auto Freq Offs
Keysight Spectrum Analyzer - Occupied BW RF S0 Ω AC enter Freq 2.4800000000 S0 Δ AC S1 Δ S1 Δ G	GHz #FGain:Low m h 13.45 kH -20.240 kH	Center Freq: 2.480000 Trig: Free Run #Atten: 10 dB #VBW 100 kH #VBW 100 kH Total Por Z Iz % of OB	ALIGN AUTC 200 GHz Avg Hold:>10/10	Radio Dev Radio Dev Sp Sweep	: None rice: BTS	Frequency Center Fr 2.480000000 G CF St 300.000 k Auto
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.480000000 AC AC 5 6B/div Ref -10.00 dBr AC 55 0 0 AC AC 50 0 0 AC AC 510 0 0 AC AC 511	GHz #FGain:Low n h 13.45 kHz	Center Freq: 2.480000 Trig: Free Run #Atten: 10 dB #VBW 100 kH #VBW 100 kH Total Por Z Iz % of OB	ALIGN AUTO	Sp Sweep 59 dBm	: None rice: BTS	Frequency Center Fr 2.480000000 G 300.000 k Auto Freq Offs
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC enter Freq 2.4800000000 5 dB/div Ref -10.00 dBr 9 50 10 10 10 115 10 115 10 115 10 115 10 115 10 115 10 115 10 115 10 115 10 115 10 115 10 115 10 115 10 115 10 115 10 10 115 10 10 10 10 10 10 10 10 10 10	GHz #FGain:Low m h 13.45 kH -20.240 kH	Center Freq: 2.480000 Trig: Free Run #Atten: 10 dB #VBW 100 kH #VBW 100 kH Total Por Z Iz % of OB	ALIGN AUTO	Sp Sweep	: None rice: BTS	Frequency Center Fr 2.480000000 G 300.000 k Auto Freq Offs
Keysight Spectrum Analyzer - Occupied BW RF S0 Ω AC enter Freq 2.4800000000 S0 Δ AC S1 Δ S1 Δ G	GHz #FGain:Low m h 13.45 kH -20.240 kH	Center Freq: 2.480000 Trig: Free Run #Atten: 10 dB #VBW 100 kH #VBW 100 kH Total Por Z Iz % of OB	ALIGN AUTO	Sp Sweep	: None rice: BTS	Frequency Center Fr 2.480000000 G 300.000 k Auto Freq Offs
Keysight Spectrum Analyzer - Occupied BW RF S0 Ω AC enter Freq 2.4800000000 S0 Δ AC S1 Δ S1 Δ G	GHz #FGain:Low m h 13.45 kH -20.240 kH	Center Freq: 2.480000 Trig: Free Run #Atten: 10 dB #VBW 100 kH #VBW 100 kH Total Por Z Iz % of OB	ALIGN AUTO	Sp Sweep	: None rice: BTS	Frequency Center Fr 2.480000000 G 300.000 k Auto Freq Offs





Temperature:	25 ℃	Relative Humidity:	50%
Test Mode:	π/4 DQPSK	Test Voltage:	DC 12V

Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	1.237	PASS
2441 MHz	1.247	PASS
2480 MHz	1.238	PASS

Keysight Spectrum Analyzer - Occupied BW				
d RF 50 Ω AC	Center Freq: 2.40200000 GF Trig: Free Run Avg	ALIGN AUTO Hz Hold:>10/10	03:28:07 PM Oct 27, 2021 Radio Std: None	Save
#IFGai			Radio Device: BTS	State
5 dB/div Ref -5.00 dBm				
og	man and a second	~		
5.0		~		
5.0 minut		m	man man .	
).0				
10				
25				Data (Export
40		3		Trace 1
enter 2.402 GHz Res BW 30 kHz	#VBW 100 kHz		Span 3 MHz	Screer
			Sweep 4.133 ms	Image
Occupied Bandwidth	Total Power	-4.29	dBm	
1.161	8 MHz			
Transmit Freq Error -2	1.790 kHz % of OBW Po	ower 99	.00 %	
x dB Bandwidth 1	.237 MHz x dB	-20.	00 dB	
G		STATUS	3	



Center Freq 2.441000000 0		ENSE:PULSE r Freq: 2.441000000 GHz	ALIGN AUTO	03:29:36 PM Oct 27, 2 Radio Std: None	Frequency
	Trig: I		old:>10/10	Radio Device: BTS	
	argain:Low #Atter	1. 10 00		Radio Device. D13	
15 dB/div Ref -5.00 dBm					
Log		<u>^</u>			
-20.0	- man m	man	7.		Center Freq
-35.0					2.441000000 GHz
			Jun	men Manan	
-65.0 many markand a				apart way	~~
-95.0					
-110					
-125					
-140					
Center 2.441 GHz	#			Span 3 M	Cr Step
#Res BW 30 kHz	#	VBW 100 kHz		Sweep 4.133	Auto 300.000 kHz
Occupied Bandwidth		Total Power	-3.79	dBm	Auto
	694 MHz				Erog Offect
				00.0/	Freq Offset 0 Hz
Transmit Freq Error	-23.863 kHz	% of OBW Pov	wer 99	.00 %	UTIL .
x dB Bandwidth	1.247 MHz	x dB	-20.0	00 dB	
MSG			STATUS		
Keysight Spectrum Analyzer - Occupied BW RF 50 Ω AC					
			ALTCN AUTO	02-20-20 PM Oct 27 2	
Center Freq 2.480000000	Cente	ENSE:PULSE		03:30:29 PM Oct 27, 2 Radio Std: None	
	Hz Cente	r Freq: 2.48000000 GHz			Frequency
	Hz Cente	r Freq: 2.480000000 GHz Free Run Avg Ho		Radio Std: None	Frequency
	Hz Cente	r Freq: 2.480000000 GHz Free Run Avg Ho		Radio Std: None	Frequency
15 dB/div Ref -10.00 dBm	Hz Cente	r Freq: 2.480000000 GHz Free Run Avg Ho		Radio Std: None	Frequency
15 dB/div Ref -10.00 dBm	Hz Cente	r Freq: 2.480000000 GHz Free Run Avg Ho		Radio Std: None	Center Freq
15 dB/div Ref -10.00 dBm	Hz Cente	r Freq: 2.480000000 GHz Free Run Avg Ho		Radio Std: None	Frequency
15 dB/div Ref -10.00 dBm Log -25 0 -40.0 -55 0	Hz Cente	r Freq: 2.480000000 GHz Free Run Avg Ho		Radio Std: None	Center Freq
15 dB/div Ref -10.00 dBm Log -25 0 -40.0 -55 0 -70.0	Hz Cente	r Freq: 2.480000000 GHz Free Run Avg Ho		Radio Std: None Radio Device: BTS	Center Freq
15 dB/div Ref -10.00 dBm Log -25 0 -40.0 -55 0	Hz Cente	r Freq: 2.480000000 GHz Free Run Avg Ho		Radio Std: None Radio Device: BTS	Center Freq
15 dB/div Ref -10.00 dBm Log -25 0 -40.0 -55 0 -70.0 -85.0	Hz Cente	r Freq: 2.480000000 GHz Free Run Avg Ho		Radio Std: None Radio Device: BTS	Center Freq
15 dB/div Ref -10.00 dBm Log -25 0 -40.0 -55 0 -70.0 -85 0 -100	Hz Cente	r Freq: 2.480000000 GHz Free Run Avg Ho		Radio Std: None Radio Device: BTS	Center Freq
15 dB/div Ref -10.00 dBm Log -25 0 -40.0 -55 0 -70.0 -100 -115	Hz Cente	r Freq: 2.480000000 GHz Free Run Avg Ho		Radio Std: None Radio Device: BTS	Center Freq
15 dB/div Ref -10.00 dBm Log	Hz Cente	r Freq: 2.480000000 GHz Free Run Avg Ho		Radio Device: BTS	Center Freq 2.48000000 GHz
15 dB/div Ref -10.00 dBm Log -25.0 -40.0 -55.0 -70.0 -86.0 -100 -115 -130 -145 Center 2.48 GHz	Cente Trig: F #FGain:Low #Atter	r Freq: 2.48000000 GHz Free Run Avg Hc :: 10 dB		Radio Std: None Radio Device: BTS	Hz CF Step
15 dB/div Ref -10.00 dBm Log	Cente Trig: F #FGain:Low #Atter	r Freq: 2.48000000 GHz Free Run Avg Hc 1: 10 dB	id:>10/10	Radio Std: None Radio Device: BTS	Hz CF Step
15 dB/div Ref -10.00 dBm Log	Cente Trig: F #FGain:Low #Atter	r Freq: 2.48000000 GHz Free Run Avg Hc :: 10 dB	id:>10/10	Radio Std: None Radio Device: BTS	Hz CF Step 300.000 KHz
15 dB/div Ref -10.00 dBm Log	Cente Trig: F #FGain:Low #Atter	r Freq: 2.48000000 GHz Free Run Avg Hc 1: 10 dB	id:>10/10	Radio Std: None Radio Device: BTS	Hz ns Hz Auto Man
15 dB/div Ref -10.00 dBm Log -25.0 -40.0 -55.0 -70.0 -85.0 -100 -115 -130 -145 Center 2.48 GHz #Res BW 30 kHz Occupied Bandwidth 1.1	GIST MHz	r Freq: 2.48000000 GHz Free Run Avg Hc :: 10 dB	-3.91	Radio Device: BTS	Hz Ms Hz Auto Man
15 dB/div Ref -10.00 dBm Log	G15 MHz -24.845 kHz	VBW 100 kHz Total Power % of OBW Poy	-3.91 wer 99	Radio Std: None Radio Device: BTS	Hz ns Frequency Center Freq 2.480000000 GHz Auto CF Step 300.000 kHz Man Freq Offset
15 dB/div Ref -10.00 dBm Log -25.0 -40.0 -55.0 -70.0 -85.0 -100 -115 -130 -145 Center 2.48 GHz #Res BW 30 kHz Occupied Bandwidth 1.1	GIST MHz	r Freq: 2.48000000 GHz Free Run Avg Hc :: 10 dB	-3.91 wer 99	Radio Device: BTS	Hz ns Frequency Center Freq 2.480000000 GHz Auto CF Step 300.000 kHz Man Freq Offset
15 dB/div Ref -10.00 dBm Log	G15 MHz -24.845 kHz	VBW 100 kHz Total Power % of OBW Poy	-3.91 wer 99	Radio Std: None Radio Device: BTS	Hz ns Frequency Center Freq 2.480000000 GHz Auto CF Step 300.000 kHz Man Freq Offset
15 dB/div Ref -10.00 dBm Log	G15 MHz -24.845 kHz	VBW 100 kHz Total Power % of OBW Poy	-3.91 wer 99	Radio Std: None Radio Device: BTS	Hz ns Frequency Center Freq 2.480000000 GHz Auto CF Step 300.000 kHz Man Freq Offset





Temperature:	25 ℃	Relative Humidity:	50%
Test Mode:	8DPSK	Test Voltage:	DC 12V

Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	1.218	PASS
2441 MHz	1.216	PASS
2480 MHz	1.211	PASS





Keysight Spectrum Analyzer - Occupied BW						
Center Freq 2.441000000 0	Cente	r Freq: 2.441000000 GH:		Radio Std:	None	Frequency
	Trig: I	Free Run Avg Ho n: 10 dB	old:>10/10	Radio Dev	ice: BTS	
15 dB/div Ref -5.00 dBm						
-20.0		m				Contor From
-35.0	and the second s		mar and a second se			Center Freq 2.441000000 GHz
-50.0						2.1111000000 0112
-65.0 hogana marting			h	and man	mannon	
-80.0						
-95.0						
-110						
-125						
-140						
Center 2.441 GHz				Sp	an 3 MHz	CF Step
#Res BW 30 kHz	#	VBW 100 kHz		Sweep	4.133 ms	300.000 kHz
Occupied Bandwidth		Total Power	-3 42	dBm		<u>Auto</u> Man
	552 MU-		0.12	dBill		
1.1	552 MHz					Freq Offset
Transmit Freq Error	-11.402 kHz	% of OBW Po	wer 99	.00 %		0 Hz
x dB Bandwidth	1.216 MHz	x dB	-20.	00 dB		
MSG			OTATIK			
			STATUS			
Keysight Spectrum Analyzer - Occupied BW			_			- 2 -
Keysight Spectrum Analyzer - Occupied BW	Cente	ENSE:PULSE	ALIGN AUTO	Radio Std:	: None	Frequency
Center Freq 2.480000000 C	Hz Cente	Freq: 2.48000000 GH	ALIGN AUTO			1.000
Center Freq 2.480000000 C	Cente	Freq: 2.480000000 GH: Free Run Avg H	ALIGN AUTO	Radio Std		1.000
RF 50 Ω AC Center Freq 2.480000000 C A	Cente	Freq: 2.480000000 GH: Free Run Avg H	ALIGN AUTO	Radio Std		1.000
RF 50 Ω AC Center Freq 2.480000000 C AC AC Log AC AC AC	Cente	Freq: 2.480000000 GH: Free Run Avg H	ALIGN AUTO	Radio Std		Frequency
RF 50 Ω AC Center Freq 2.480000000 C AC AC 15 dB/div Ref -15.00 dBm 30.0 AC AC	Cente	Freq: 2.480000000 GH: Free Run Avg H	ALIGN AUTO	Radio Std		Frequency Center Freq
RF 50 Ω AC Center Freq 2.480000000 C AC AC 15 dB/div Ref -15.00 dBm AC -30.0 -45.0 -45.0	Cente	Freq: 2.480000000 GH: Free Run Avg H	ALIGN AUTO	Radio Std: Radio Dev		Frequency
RF 50 Ω AC Center Freq 2.480000000 C AC AC 15 dB/div Ref -15.00 dBm AC -30.0 -45.0 -45.0	Cente	Freq: 2.480000000 GH: Free Run Avg H	ALIGN AUTO	Radio Std		Frequency Center Freq
RF 50 Ω AC Center Freq 2.480000000 C AC AC 15 dB/div Ref -15.00 dBm AC -30.0 -45.0 -45.0	Cente	Freq: 2.480000000 GH: Free Run Avg H	ALIGN AUTO	Radio Std: Radio Dev		Frequency Center Freq
RF 50 Ω AC Center Freq 2.480000000 C Ac Ac 15 dB/div Ref -15.00 dBm Ac -30 0 -45.0 -45.0 -45.0 -45.0 -45.0 -75.0 -45.0 -45.0	Cente	Freq: 2.480000000 GH: Free Run Avg H	ALIGN AUTO	Radio Std: Radio Dev		Frequency Center Freq
RF 50 Ω AC Center Freq 2.480000000 C Ac Ac 15 dB/div Ref -15.00 dBm Ac -30.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -90.0 -90.0 -45.0 -45.0	Cente	Freq: 2.480000000 GH: Free Run Avg H	ALIGN AUTO	Radio Std: Radio Dev		Frequency Center Freq
RF 50 Ω AC Center Freq 2.480000000 C Ac Ac 15 dB/div Ref -15.00 dBm Ac -30.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -80.0 -45.0 -45.0 -45.0 -105 -105 -41.0 -41.0 -1120 -1135 -41.0 -41.0	Cente	Freq: 2.480000000 GH: Free Run Avg H	ALIGN AUTO	Radio Std: Radio Dev		Frequency Center Freq
RF 50 Ω AC Center Freq 2.480000000 C Ac Ac 15 dB/div Ref -15.00 dBm Ac -90 0 -45 0 -45 0 -45 0 -80 0 -75 0 -90 0 -105 -105 -120 -120 -120 -120 -120 -120	Cente	Freq: 2.480000000 GH: Free Run Avg H	ALIGN AUTO	Radio Std: Radio Dev		Frequency Center Freq
RF 50 Ω AC Center Freq 2.480000000 C Ac Ac 15 dB/div Ref -15.00 dBm Ac -30.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -100 -45.0 -45.0 -45.0 -100 -45.0 -45.0 -45.0 -100 -45.0 -45.0 -45.0 -100 -45.0 -45.0 -45.0 -120 -45.0 -45.0 -45.0 -120 -45.0 -45.0 -45.0 -120 -45.0 -45.0 -45.0 -120 -45.0 -45.0 -45.0 -120 -45.0 -45.0 -45.0 -120 -45.0 -45.0 -45.0 -120 -45.0 -45.0 -45.0 -120 -45.0 -45.0 -45.0 -120 -45.0 -45.0 -45.0	Cente	Freq: 2.480000000 GH: Free Run Avg H	ALIGN AUTO	Radio Std: Radio Dev	ice: BTS	Frequency Center Freq 2.48000000 GHz
Image: Ref of the second se	Cente Trig: I #FGain:Low #Atter	Freq: 2.480000000 GH: Free Run Avg H	ALIGN AUTO	Radio Std: Radio Dev	ice: BTS	Frequency Center Freq 2.480000000 GHz CF Step 300.000 kHz
RF 50 Ω AC Center Freq 2.480000000 C Ac Ac 15 dB/div Ref -15.00 dBm Ac -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -45 0 -105 -105 -1105 -1105 -1100 -1100 -150 -150 -150 Center 2.48 GHz -48 GHz #Res BW 30 KHz -48 GHz	GHz Cente Trig: f #FGain:Low #Atter	F Freq: 2.48000000 GH Free Run Avg H :: 10 dB	ALIGN AUTO	Radio Std: Radio Dev	ice: BTS	Frequency Center Freq 2.48000000 GHz
RF 50 Ω AC Center Freq 2.480000000 C Ac Ac 15 dB/div Ref -15.00 dBm Ac 15 dB/div Ref -15.00 dBm Ac -30.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -80.0 -45.0 -45.0 -45.0 -80.0 -45.0 -45.0 -45.0 -80.0 -45.0 -45.0 -45.0 -80.0 -45.0 -45.0 -45.0 -90.0 -45.0 -45.0 -45.0 -105 -45.0 -45.0 -45.0 -105 -45.0 -45.0 -45.0 -105 -45.0 -45.0 -45.0 -1150 -45.0 -45.0 -45.0 Center 2.48 GHz -48.0 -45.0 -45.0 Occupied Bandwidth -45.0 -45.0 -45.0	GHz Cente Trig: F #FGain:Low #Atter	Freq: 2.48000000 GH Free Run Avg H : 10 dB	ALIGN AUTO	Radio Std: Radio Dev	ice: BTS	Frequency Center Freq 2.480000000 GHz 300.000 kHz Auto Man
Image: Solution of the second secon	SHz Cente Trig: I #Atter	Freq: 2.48000000 GH; Free Run Avg H : 10 dB	ALIGN AUTO Zold:>10/10	Radio Std: Radio Dev	ice: BTS	Frequency Center Freq 2.480000000 GHz 300.000 kHz Auto Freq Offset
RF 50 Ω AC Center Freq 2.480000000 C Ac Ac 15 dB/div Ref -15.00 dBm Ac 15 dB/div Ref -15.00 dBm Ac -30.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -80.0 -45.0 -45.0 -45.0 -80.0 -45.0 -45.0 -45.0 -80.0 -45.0 -45.0 -45.0 -80.0 -45.0 -45.0 -45.0 -90.0 -45.0 -45.0 -45.0 -105 -45.0 -45.0 -45.0 -105 -45.0 -45.0 -45.0 -105 -45.0 -45.0 -45.0 -1150 -45.0 -45.0 -45.0 Center 2.48 GHz -48.0 -45.0 -45.0 Occupied Bandwidth -45.0 -45.0 -45.0	GHz Cente Trig: F #FGain:Low #Atter	Freq: 2.48000000 GH Free Run Avg H : 10 dB	aLIGN AUTO zold:>10/10	Radio Std: Radio Dev	ice: BTS	Frequency Center Freq 2.480000000 GHz 300.000 kHz Auto Man
Image: Solution of the second secon	SHz Cente Trig: I #Atter	Freq: 2.48000000 GH; Free Run Avg H : 10 dB	ALIGN AUTO 2 old:>10/10 -4.02 wer 99	Radio Std: Radio Dev	ice: BTS	Frequency Center Freq 2.480000000 GHz 300.000 kHz Auto Freq Offset
RF 50 Ω AC Center Freq 2.480000000 C AC AC 15 dB/div Ref -15.00 dBm AC -30.0 -45.0 -45.0 AC -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -105 -45.0 -45.0 -45.0 -1150 -45.0 -45.0 -45.0 Center 2.48 GHz -45.0 -45.0	SHz Cente Trig: F #Atter 506 MHz -11.597 kHz	Freq: 2.48000000 GH Free Run Avg H :: 10 dB	ALIGN AUTO 2 old:>10/10 -4.02 wer 99	Radio Std: Radio Dev Sp Sweep 2 dBm	ice: BTS	Frequency Center Freq 2.480000000 GHz 300.000 kHz Auto Freq Offset
RF 50 Ω AC Center Freq 2.480000000 C AC AC 15 dB/div Ref -15.00 dBm AC -30.0 -45.0 -45.0 AC -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -45.0 -105 -45.0 -45.0 -45.0 -1150 -45.0 -45.0 -45.0 Center 2.48 GHz -45.0 -45.0	SHz Cente Trig: F #Atter 506 MHz -11.597 kHz	Freq: 2.48000000 GH Free Run Avg H :: 10 dB	ALIGN AUTO 2 old:>10/10 -4.02 wer 99	Radio Std: Radio Dev Sp Sweep 2 dBm	ice: BTS	Frequency Center Freq 2.480000000 GHz 300.000 kHz Auto Freq Offset
RF 50 Ω AC Center Freq 2.480000000 C AC AC 15 dB/div Ref -15.00 dBm AC -45 0	SHz Cente Trig: F #Atter 506 MHz -11.597 kHz	Freq: 2.48000000 GH Free Run Avg H :: 10 dB	ALIGN AUTO 2 old:>10/10 -4.02 wer 99	Radio Std: Radio Dev Sp Sweep 2 dBm 0.00 % 00 dB	ice: BTS	Frequency Center Freq 2.480000000 GHz 300.000 kHz Auto Freq Offset



7. ANTENNA REQUIREMENT

6.1 STANDARD 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.

6.2 EUT ANTENNA

The antennas used for this product are External antenna and other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 1.0dBi.

******END OF THE REPORT*****