



RADIO TEST REPORT

Report No.: STS2203037W01

Issued for

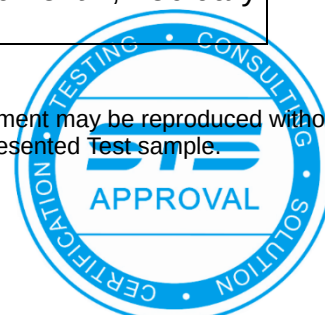
Star Systems International Limited

Unit 7B, 8/F, Vanta Industrial Centre, 21-33 Tai Lin Pai Road,
Kwai Chung, NT, Hong Kong

Product Name:	RFID Reader
Brand Name:	TitanPro
Model Name:	HRD28000
Series Model:	N/A
FCC ID:	2AA7KTITANPRO28000
IC:	20068-TNPRO28000
Test Standard:	FCC Part 15.247 RSS-247 Issue 2, February 2017 RSS-Gen Issue 5, Amendment 2, February 2021

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**TEST RESULT CERTIFICATION**

Applicant's Name: Star Systems International Limited
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Manufacturer's Name: Star Systems International Limited
Address: Unit 7B, 8/F, Vanta Industrial Centre, 21-33 Tai Lin Pai Road,
Kwai Chung, NT, Hong Kong

Product Description

Product Name: RFID Reader
Brand Name: TitanPro
Model Name: HRD28000
Series Model: N/A
Test Standards: FCC Part15.247
RSS-247 Issue 2, February 2017
RSS-Gen Issue 5, Amendment 2, February 2021
Test Procedure: ANSI C63.10-2013

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

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Date of Test.....:

Date of receipt of test item.....: 03 Mar. 2022
Date (s) of performance of tests.: 03 Mar. 2022 ~ 14 June 2022
Date of Issue: 14 June 2022
Test Result: Pass

Testing Engineer :

(Chris Chen)

Technical Manager :

(Sean she)

Authorized Signatory :

(Bovey Yang)





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**Revision History**

Rev.	Issue Date	Report No.	Effect Page	Contents
00	14 June 2022	STS2203037W01	ALL	Initial Issue





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:
KDB 558074 D01 15.247 Meas Guidance v05r02.

FCC Part 15.247, Subpart C RSS-247 Issue 2, February 2017			
Standard Section	Test Item	Judgement	Remark
15.207 RSS-Gen 8.8	Conducted Emission	PASS	--
15.247(a)(1) RSS-247 5.1(b)	Hopping Channel Separation	PASS	--
15.247(b)(2) RSS-247 5.4(a)	Output Power	PASS	--
15.209 RSS-247 5.5	Radiated Spurious Emission	PASS	--
15.247(d) RSS-247 5.5	Conducted Spurious & Band Edge Emission	PASS	--
15.247(a)(1)(i) RSS-247 5.1(c)	Number of Hopping Frequency	PASS	--
15.247(a)(1)(i) RSS-247 5.1(c)	Dwell Time	PASS	--
15.247(a)(1)(i) RSS-247 5.1(c)	Bandwidth	PASS	--
15.205 RSS-Gen 8.10	Restricted bands of operation	PASS	--
Part 15.247(d)/part 15.209(a) RSS-Gen 8.10	Band Edge Emission	PASS	--
15.203 RSS-Gen 8.3	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

SHENZHEN STS TEST SERVICES CO., LTD

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FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

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	$\pm 0.87\text{dB}$
2	Unwanted Emissions, conducted	$\pm 2.895\text{dB}$
3	All emissions, radiated 9K-30MHz	$\pm 3.80\text{dB}$
4	All emissions, radiated 30M-1GHz	$\pm 4.09\text{dB}$
5	All emissions, radiated 1G-6GHz	$\pm 4.92\text{dB}$
6	All emissions, radiated >6G	$\pm 5.49\text{dB}$
7	Conducted Emission (9KHz-30MHz)	$\pm 2.73\text{dB}$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	RFID Reader
Trade Name	TitanPro
Model Name	HRD28000
Series Model	N/A
Model Difference	N/A
Channel List	Please refer to the Note 2.
RF Information	Frequency: 902~928MHz Modulation: FHSS
Antenna Type	Please refer to the Note 3.
Adapter	Input: AC 90-264V, 50/60Hz Output: DC 56V
Battery	Rated Voltage: 3 V Capacity: 48 mAh
Operation mode	Dense reader mode
	Single reader mode
Hardware version number	R1
Software version number	0.1.1.27687
Connecting I/O Port(s)	Please refer to the Note 1.

Note:

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



2.

Operation Frequency of channel					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	902.75	18	911.25	35	919.75
2	903.25	19	911.75	36	920.25
3	903.75	20	912.25	37	920.75
4	904.25	21	912.75	38	921.25
5	904.75	22	913.25	39	921.75
6	905.25	23	913.75	40	922.25
7	905.75	24	914.25	41	922.75
8	906.25	25	914.75	42	923.25
9	906.75	26	915.25	43	923.75
10	907.25	27	915.75	44	924.25
11	907.75	28	916.25	45	924.75
12	908.25	29	916.75	46	925.25
13	908.75	30	917.25	47	925.75
14	909.25	31	917.75	48	926.25
15	909.75	32	918.25	49	926.75
16	910.25	33	918.75	50	927.25
17	910.75	34	919.25		

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Antenna Cable loss (dB)	Antenna combination (dBi)
1	TitanPro	HRD28000	Avior	N/A	15	12	3
2	TitanPro	HRD28000	Cheetah II	N/A	12	12	0
3	TitanPro	HRD28000	Hydra	N/A	12	12	0
4	TitanPro	HRD28000	Kuma	N/A	10	12	-2
5	TitanPro	HRD28000	Bobcat	N/A	8	12	-4

Note: All antennas have been tested for conducted emission and radiated spurious emission, but the report only shows the worst data of the Avior 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.

Worst Mode	Description	Operation mode
Mode 1	CH01	Dense reader mode
Mode 2	CH26	Dense reader mode
Mode 3	CH50	Dense reader mode
Mode 4	CH01	Single reader mode
Mode 5	CH26	Single reader mode
Mode 6	CH50	Single reader mode

Note:

- (1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.
- (2) We tested for all available U.S. voltage and frequencies (For 120V,50/60Hz and 240V, 50/60Hz) for which the device is capable of operation, and the worst case of 120V/ 60Hz is shown in the report.
- (3) The battery is fully-charged during the radiated and RF conducted test.

For AC Conducted Emission

Test Case	
AC Conducted Emission	Mode 7 : Keeping TX

2.3 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

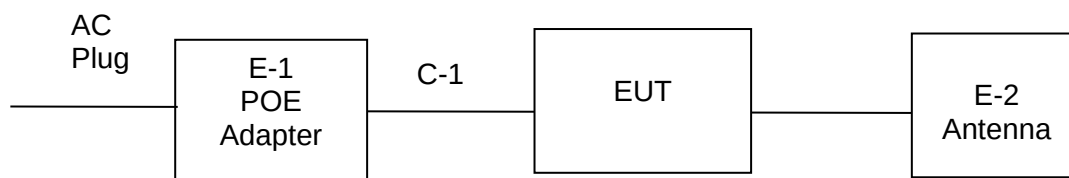
During testing, the channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final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

Type	Mode Or Modulation type	Power Class	Software For Testing
902-928MHz	FHSS	Default	Ctest

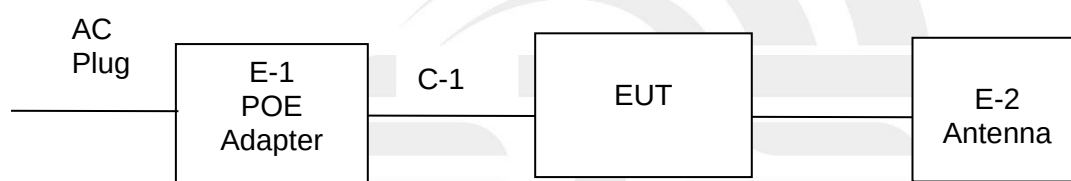


2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Emission Test





2.5 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.	Length	Note
E-1	POE Adapter	MsTronic	MIT-09G-56D	N/A	N/A
C-1	DC Cable	N/A	N/A	>300cm	NO
E-2	Antenna	N/A	N/A	N/A	N/A

Support units

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

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



2.7 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2021.09.30	2022.09.29
Signal Analyzer	R&S	FSV 40-N	101823	2021.09.30	2022.09.29
Active loop Antenna	ZHINAN	ZN30900C	16035	2021.04.11	2023.04.10
Bilog Antenna	TESEQ	CBL6111D	34678	2020.10.12	2022.10.11
Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	2021.10.11	2023.10.10
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	J211020657	2020.10.12	2022.10.11
Pre-Amplifier (0.1M-3GHz)	EM	EM330	060665	2021.10.08	2022.10.07
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2021.09.30	2022.09.29
Pre-Amplifier (18G-40GHz)	SKET	LNPA-1840-50	SK2018101801	2021.09.28	2022.09.27
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
Turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2021.09.30	2022.09.29
LISN	R&S	ENV216	101242	2021.09.30	2022.09.29
LISN	EMCO	3810/2NM	23625	2021.09.30	2022.09.29
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			



RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Power Sensor	Keysight	U2021XA	MY55520005	2021.09.30	2022.09.29
			MY55520006	2021.09.30	2022.09.29
			MY56120038	2021.09.30	2022.09.29
			MY56280002	2021.09.30	2022.09.29
Signal Analyzer	Agilent	N9020A	MY51110105	2022.03.01	2023.02.28
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			





3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table.

FREQUENCY (MHz)	Conducted Emission limit (dBuV)	
	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.

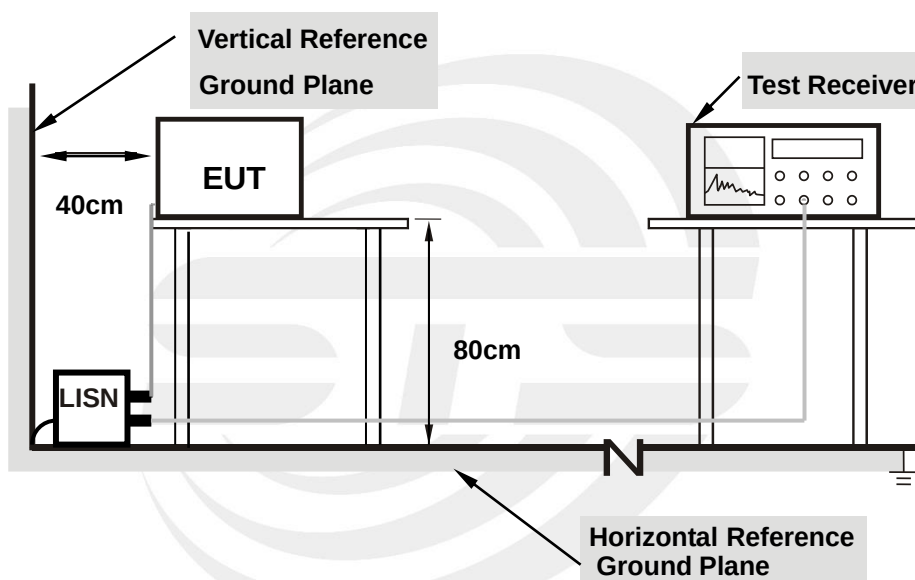
The following table is the setting of the receiver

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

3.1.2 TEST PROCEDURE

- The EUT is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN is at least 80 cm from the nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes support.

3.1.4 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.



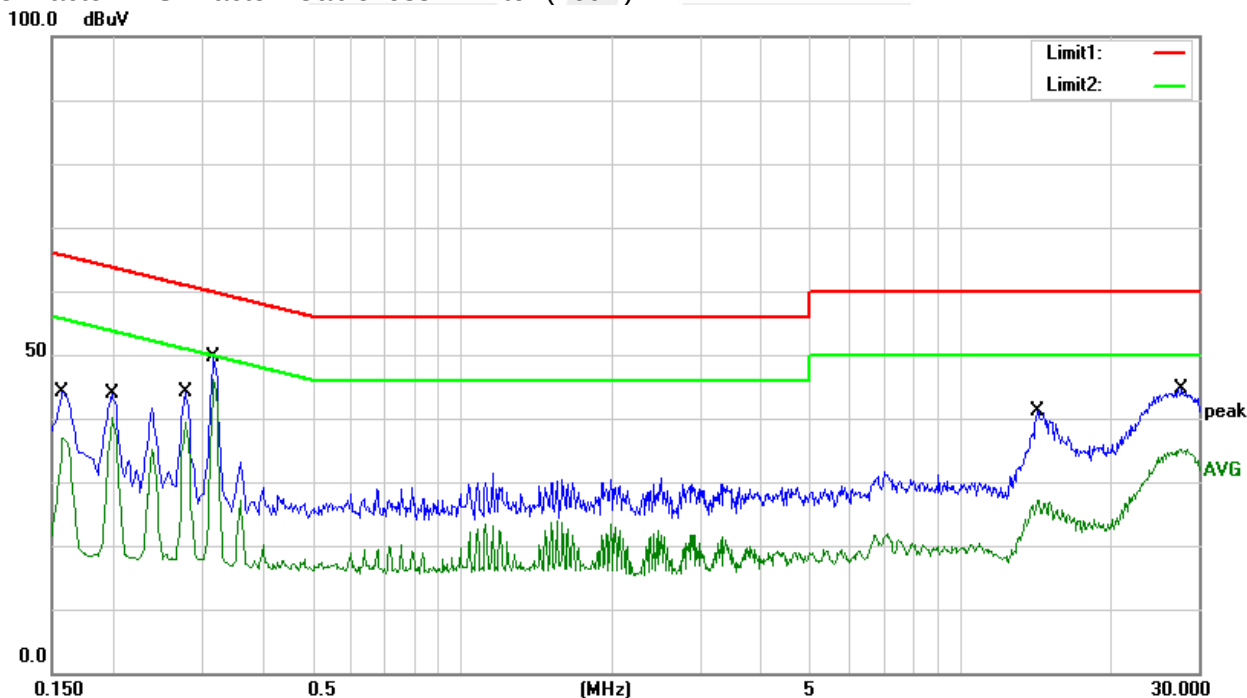
3.1.5 TEST RESULT

Temperature:	23.2℃	Relative Humidity:	44%RH
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 7		

No.	Frequency (MHz)	Reading (dBUV)	Correct Factor(dB)	Result (dBUV)	Limit (dBUV)	Margin (dB)	Remark
1	0.1580	23.92	20.31	44.23	65.57	-21.34	QP
2	0.1580	16.52	20.31	36.83	55.57	-18.74	AVG
3	0.1980	23.38	20.40	43.78	63.69	-19.91	QP
4	0.1980	19.65	20.40	40.05	53.69	-13.64	AVG
5	0.2780	23.35	20.70	44.05	60.88	-16.83	QP
6	0.2780	18.76	20.70	39.46	50.88	-11.42	AVG
7	0.3180	28.87	20.75	49.62	59.76	-10.14	QP
8	0.3180	25.30	20.75	46.05	49.76	-3.71	AVG
9	14.2420	19.76	21.47	41.23	60.00	-18.77	QP
10	14.2420	5.68	21.47	27.15	50.00	-22.85	AVG
11	27.8020	21.65	22.98	44.63	60.00	-15.37	QP
12	27.8020	11.71	22.98	34.69	50.00	-15.31	AVG

Remark:

1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result = Reading + Factor) – Limit
3. Factor=LISN factor+Cable loss+Limiter (10dB)



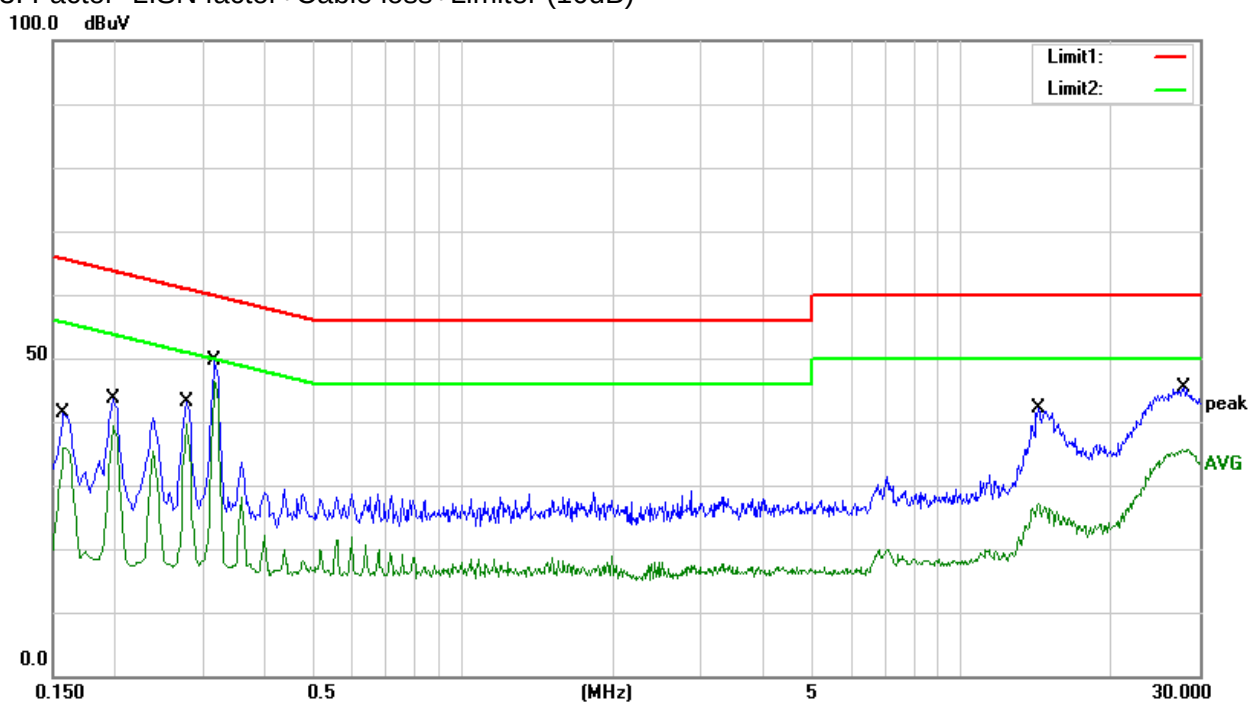


Temperature:	23.2℃	Relative Humidity:	44%RH
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 7		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1580	21.01	20.31	41.32	65.57	-24.25	QP
2	0.1580	15.56	20.31	35.87	55.57	-19.70	AVG
3	0.1980	23.29	20.40	43.69	63.69	-20.00	QP
4	0.1980	18.96	20.40	39.36	53.69	-14.33	AVG
5	0.2780	22.47	20.70	43.17	60.88	-17.71	QP
6	0.2780	18.95	20.70	39.65	50.88	-11.23	AVG
7	0.3180	28.87	20.75	49.62	59.76	-10.14	QP
8	0.3180	25.74	20.75	46.49	49.76	-3.27	AVG
9	14.2820	20.55	21.47	42.02	60.00	-17.98	QP
10	14.2820	5.57	21.47	27.04	50.00	-22.96	AVG
11	27.8700	22.43	22.98	45.41	60.00	-14.59	QP
12	27.8700	12.74	22.98	35.72	50.00	-14.28	AVG

Remark:

1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result = Reading + Factor) – Limit
3. Factor = LISN factor + Cable loss + Limiter (10dB)





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

In case the emission fall within the Restricted band specified on Part15.205 (a)&209(a), RSS-Gen&RSS-247 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 (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

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

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

Notes:

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

LIMITS OF RESTRICTED FREQUENCY BANDS

FCC:

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



IC:

FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (GHz)
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 - 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 - 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 - 8500	
108 - 138		



For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP/AV
Start Frequency	9 KHz/150KHz(Peak/QP/AV)
Stop Frequency	150KHz/30MHz(Peak/QP/AV)
RB / VB (emission in restricted band)	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz); 200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP
Start Frequency	30 MHz(Peak/QP)
Stop Frequency	1000 MHz (Peak/QP)
RB / VB (emission in restricted band)	120 KHz / 300 KHz

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 band)	1 MHz / 3 MHz(Peak) 1 MHz/1/T MHz(AVG)

For Band Edge

Spectrum Parameter	Setting
Detector	Peak/AV
Start/Stop Frequency	Lower Band Edge: 890 to 905 MHz Upper Band Edge: 925 to 940 MHz
RB / VB	1 MHz / 3 MHz(Peak) 1 MHz/1/T MHz(AVG)



Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

- The measuring distance at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- The EUT was placed on the top of a rotating table 0.8 m (above 1GHz is 1.5 m) above the ground at a 3 m anechoic chamber test site. The table was rotated 360 degree to determine the position of the highest radiation.
- 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 polarization of the antenna are set to make the measurement.
- 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 QuasiPeak detector mode will be re-measured.
- If the Peak Mode measured value is compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and no additional QP Mode measurement was performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

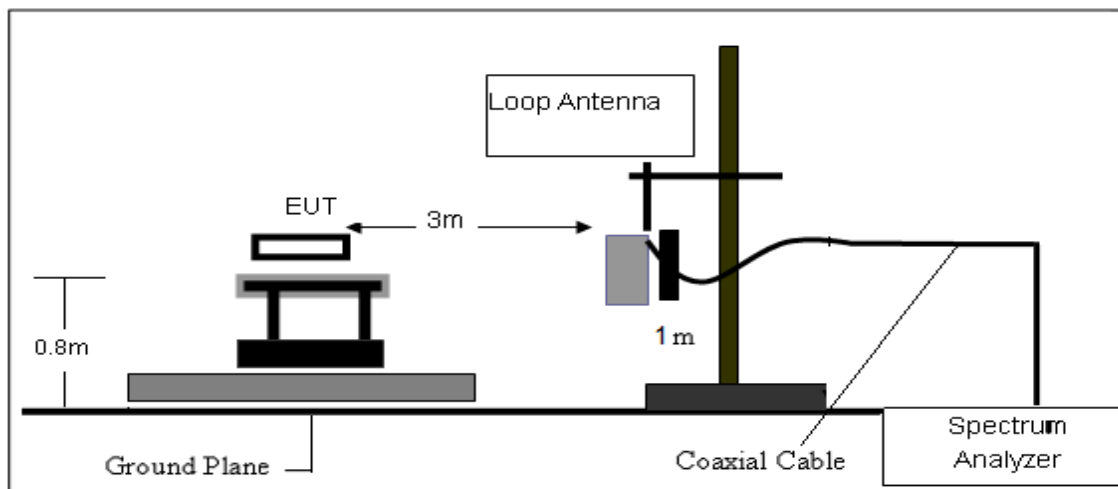
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

3.2.3 DEVIATION FROM TEST STANDARD

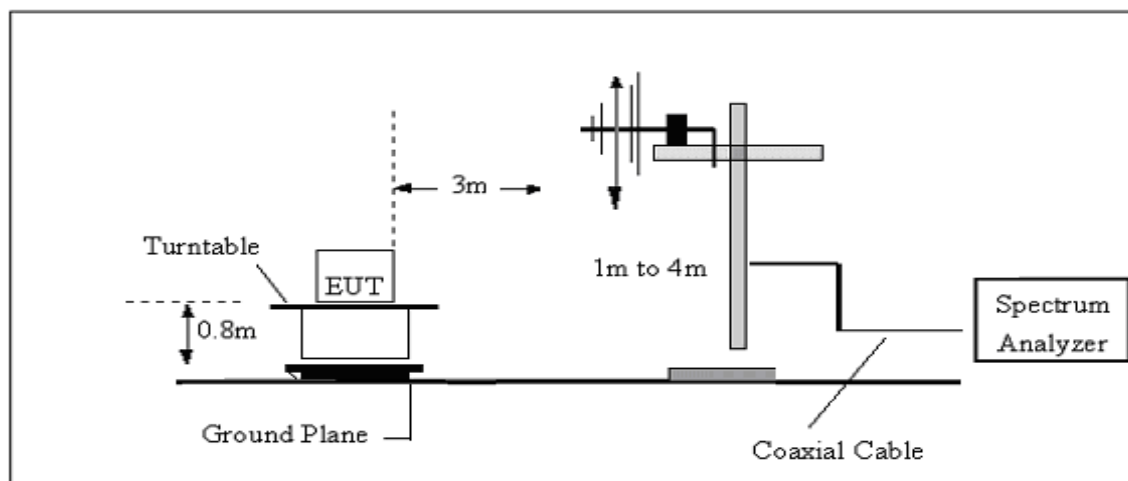
No deviation.

3.2.4 TESTSETUP

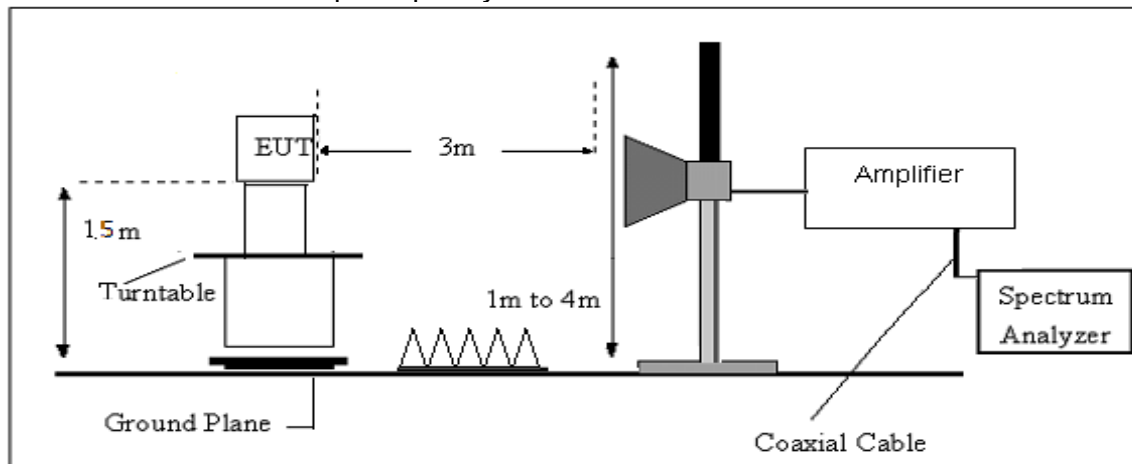
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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



3.2.5 EUT OPERATING CONDITIONS

Please refer to section 2.4 of this report.



3.2.6 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

For example

Frequency	FS	RA	AF	CL	AG	Factor
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dB)	(dB)	(dB)
300	40	58.1	12.2	1.6	31.9	-18.1

$$\text{Factor} = \text{AF} + \text{CL} - \text{AG}$$





3.2.7 TEST RESULTS

(9KHz-30MHz)

Temperature:	23.1℃	Relative Humidity:	60%RH
Test Voltage:	DC 3V	Test Mode:	TX Mode

Freq.	Reading	Limit	Margin	State	Test Result
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F	
--	--	--	--	--	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 = $40 \log (\text{specific distance/test distance})$ (dB);

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



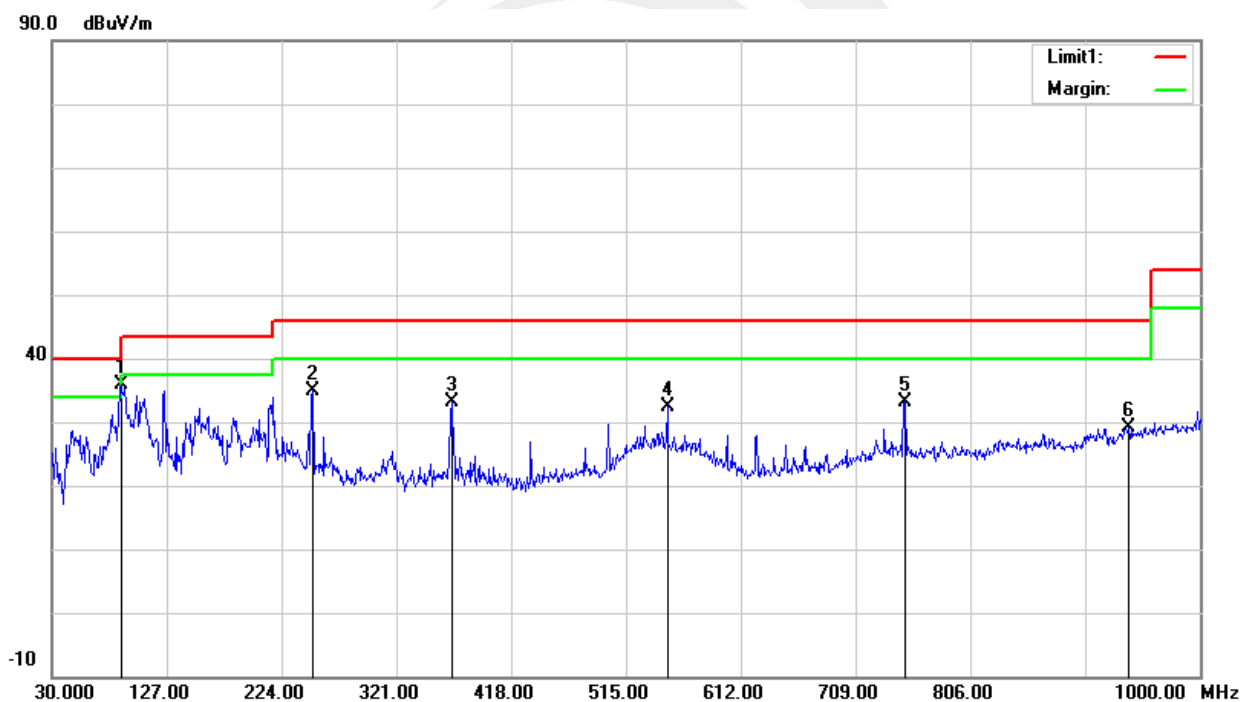
(30MHz-1000MHz)

Temperature:	23.1℃	Relative Humidity:	60%RH
Test Voltage:	DC 3V	Phase:	Horizontal
Test Mode:	Mode 1/2/3 (Mode 1 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	88.2000	57.56	-21.72	35.84	43.50	-7.66	QP
2	250.1900	50.87	-16.10	34.77	46.00	-11.23	QP
3	367.5600	45.76	-12.58	33.18	46.00	-12.82	QP
4	549.9200	38.22	-5.78	32.44	46.00	-13.56	QP
5	750.7100	35.36	-2.16	33.20	46.00	-12.80	QP
6	939.8600	27.68	1.37	29.05	46.00	-16.95	QP

Remark:

- Margin = Result (Result = Reading + Factor)-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



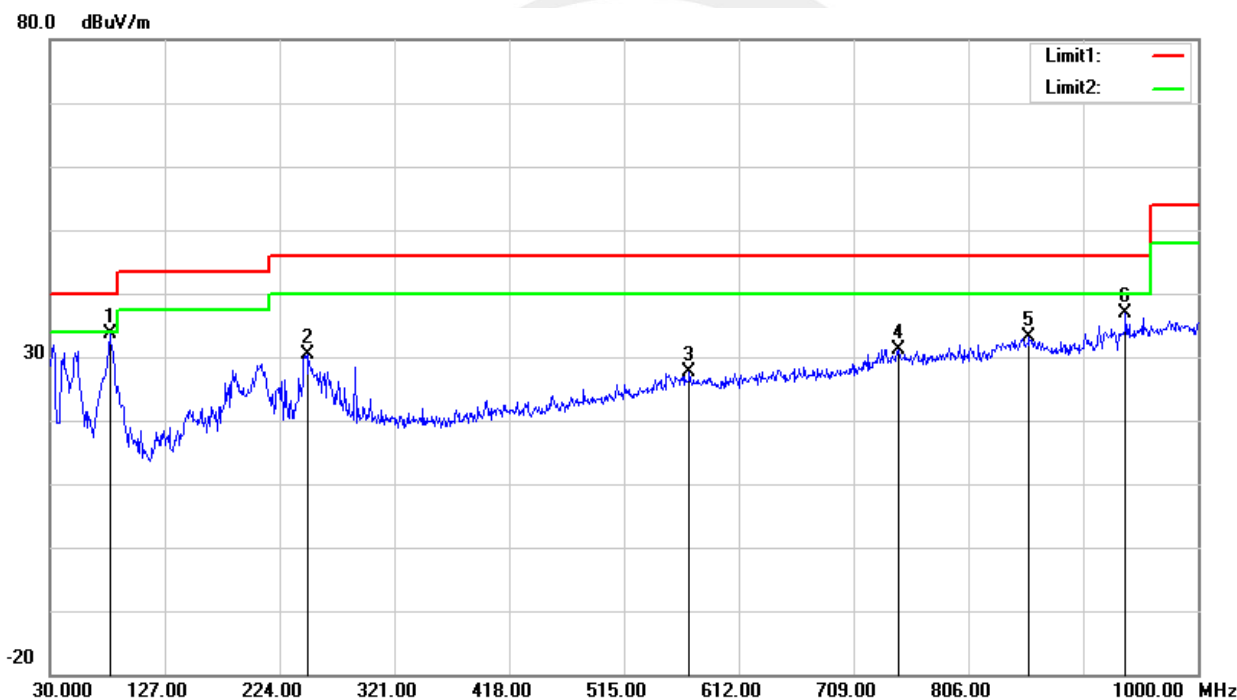


Temperature:	24℃	Relative Humidity:	54%RH
Test Voltage:	DC 3V	Phase:	Vertical
Test Mode:	Mode 1/2/3 (Mode 1 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	80.4400	56.68	-22.93	33.75	40.00	-6.25	QP
2	247.2800	46.98	-16.59	30.39	46.00	-15.61	QP
3	570.2900	33.36	-5.61	27.75	46.00	-18.25	QP
4	746.8300	33.30	-2.15	31.15	46.00	-14.85	QP
5	857.4100	33.62	-0.50	33.12	46.00	-12.88	QP
6	938.8900	35.67	1.29	36.96	46.00	-9.04	QP

Remark:

1. Margin = Result (Result = Reading + Factor) – Limit
2. Factor = Antenna factor + Cable attenuation factor (cable loss) – Amplifier gain



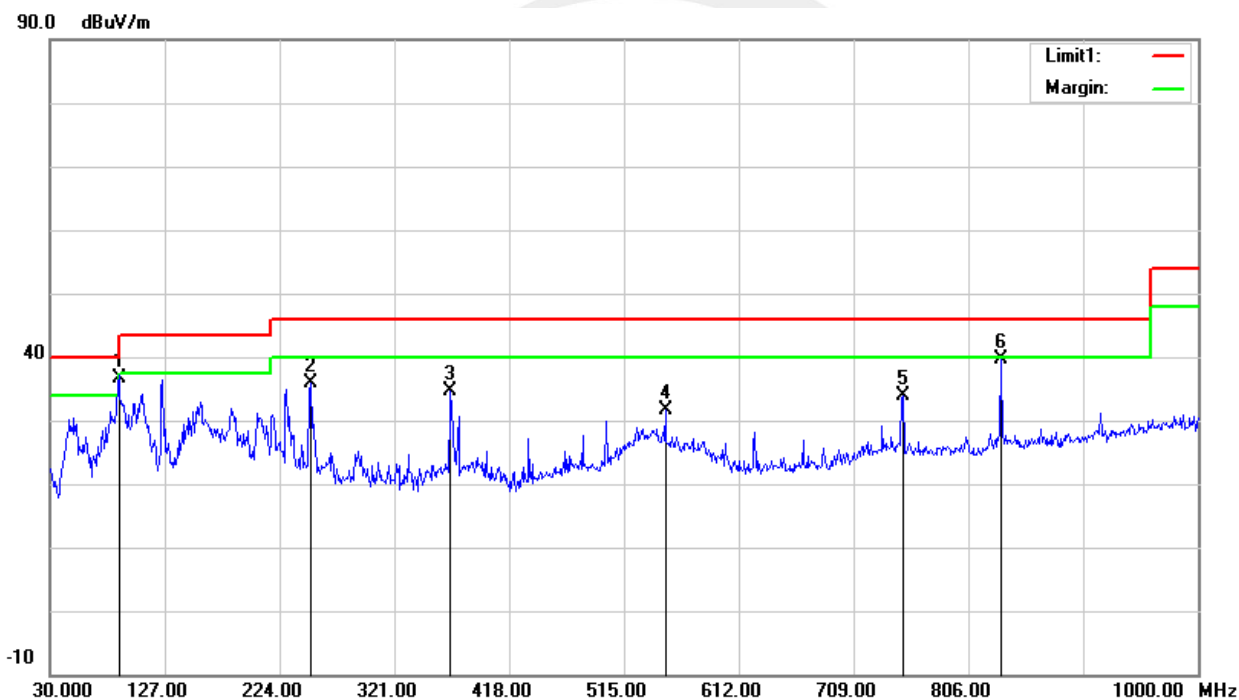


Temperature:	24℃	Relative Humidity:	54%RH
Test Voltage:	DC 3V	Phase:	Horizontal
Test Mode:	Mode 4/5/6 (Mode 4 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	88.2000	58.39	-21.72	36.67	43.50	-6.83	QP
2	250.1900	52.08	-16.10	35.98	46.00	-10.02	QP
3	368.5300	47.20	-12.55	34.65	46.00	-11.35	QP
4	549.9200	37.51	-5.78	31.73	46.00	-14.27	QP
5	750.7100	36.00	-2.16	33.84	46.00	-12.16	QP
6	833.1600	40.29	-0.62	39.67	46.00	-6.33	QP

Remark:

1. Margin = Result (Result = Reading + Factor) – Limit
2. Factor = Antenna factor + Cable attenuation factor (cable loss) – Amplifier gain



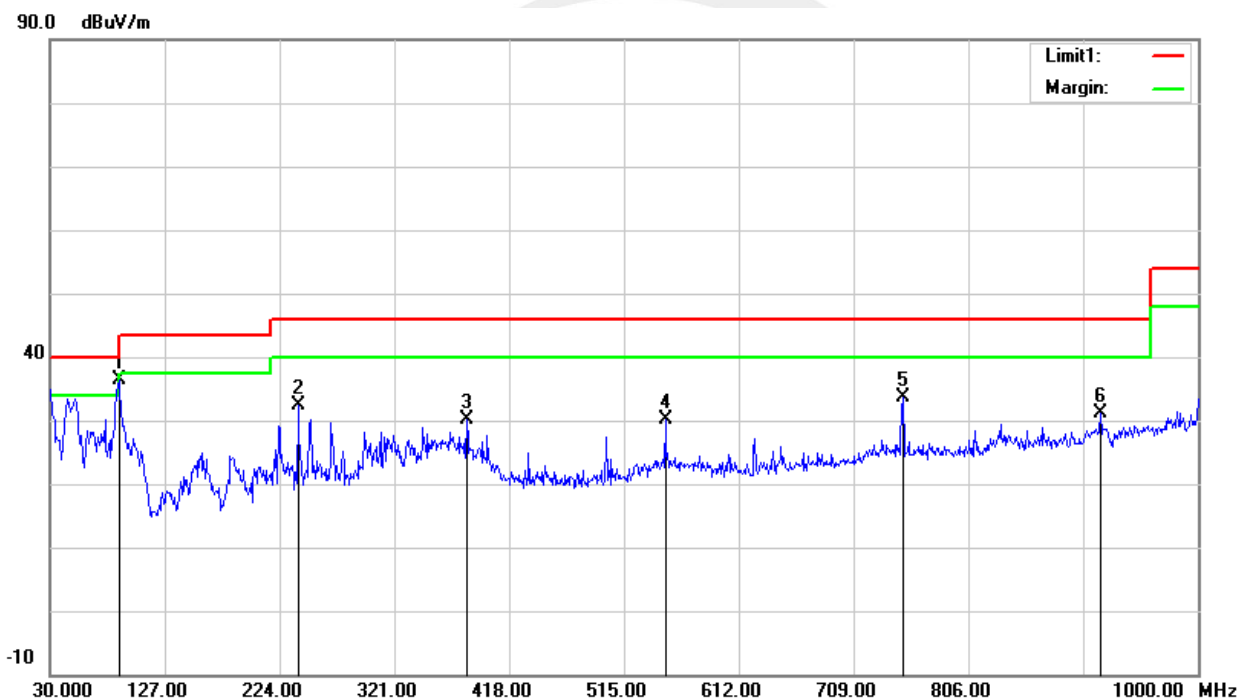


Temperature:	24℃	Relative Humidity:	54%RH
Test Voltage:	DC 3V	Phase:	Vertical
Test Mode:	Mode 4/5/6 (Mode 4 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	88.2000	58.13	-21.72	36.41	43.50	-7.09	QP
2	239.5200	50.55	-18.10	32.45	46.00	-13.55	QP
3	382.1100	42.17	-12.13	30.04	46.00	-15.96	QP
4	549.9200	35.82	-5.78	30.04	46.00	-15.96	QP
5	750.7100	35.75	-2.16	33.59	46.00	-12.41	QP
6	917.5500	31.19	-0.06	31.13	46.00	-14.87	QP

Remark:

1. Margin = Result (Result = Reading + Factor) – Limit
2. Factor = Antenna factor + Cable attenuation factor (cable loss) – Amplifier gain





(1GHz~25GHz) Spurious emission Requirements

Dense reader mode

Frequency	Meter Reading	Amplifier	Loss	Antenna Factor	Orrected Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBμV)	(dB)	(dB)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	Type	
Low Channel 902.75MHz										
1091.57	67.78	46.30	3.70	24.30	-18.30	49.48	74.00	-24.52	Pk	Vertical
1091.57	55.03	46.30	3.70	24.30	-18.30	36.73	54.00	-17.27	AV	Vertical
1090.76	57.90	46.30	3.70	24.30	-18.30	39.60	74.00	-34.40	Pk	Horizontal
1090.76	49.27	46.30	3.70	24.30	-18.30	30.97	54.00	-23.03	AV	Horizontal
1506.98	60.70	44.90	4.19	25.00	-15.71	44.99	74.00	-29.01	Pk	Vertical
1506.98	50.24	44.90	4.19	25.00	-15.71	34.53	54.00	-19.47	AV	Vertical
1506.86	61.44	44.90	4.19	25.00	-15.71	45.73	74.00	-28.27	Pk	Horizontal
1506.86	57.00	44.90	4.19	25.00	-15.71	41.29	54.00	-12.71	AV	Horizontal
1803.23	61.82	44.10	5.30	25.00	-13.80	48.02	74.00	-25.98	Pk	Vertical
1803.23	45.57	44.10	5.30	25.00	-13.80	31.77	54.00	-22.23	AV	Vertical
1798.67	62.14	44.10	5.30	25.00	-13.80	48.34	74.00	-25.66	Pk	Horizontal
1798.67	50.60	44.10	5.30	25.00	-13.80	36.80	54.00	-17.20	AV	Horizontal
2137.42	53.11	43.80	5.40	25.90	-12.50	40.61	74.00	-33.39	Pk	Vertical
2137.42	50.82	43.80	5.40	25.90	-12.50	38.32	54.00	-15.68	AV	Vertical
2139.93	60.31	43.80	5.40	25.90	-12.50	47.81	74.00	-26.19	Pk	Horizontal
2139.93	47.05	43.80	5.40	25.90	-12.50	34.55	54.00	-19.45	AV	Horizontal
2698.91	66.47	44.40	6.20	27.60	-10.60	55.87	74.00	-18.13	Pk	Vertical
2698.91	41.68	44.40	6.20	27.60	-10.60	31.08	54.00	-22.92	AV	Vertical
2702.74	59.39	44.40	6.20	27.60	-10.60	48.79	74.00	-25.21	Pk	Horizontal
2702.74	42.27	44.40	6.20	27.60	-10.60	31.67	54.00	-22.33	AV	Horizontal
3258.19	60.48	44.70	6.70	28.20	-9.80	50.68	74.00	-23.32	Pk	Vertical
3258.19	46.68	44.70	6.70	28.20	-9.80	36.88	54.00	-17.12	AV	Vertical
3261.99	55.28	44.70	6.70	28.20	-9.80	45.48	74.00	-28.52	Pk	Horizontal
3261.99	45.22	44.70	6.70	28.20	-9.80	35.42	54.00	-18.58	AV	Horizontal
3989.77	65.31	44.20	7.90	29.70	-6.60	58.71	74.00	-15.29	Pk	Vertical
3989.77	40.45	44.20	7.90	29.70	-6.60	33.85	54.00	-20.15	AV	Vertical
3988.35	66.24	44.20	7.90	29.70	-6.60	59.64	74.00	-14.36	Pk	Horizontal
3988.35	42.34	44.20	7.90	29.70	-6.60	35.74	54.00	-18.26	AV	Horizontal
7215.54	55.08	43.50	11.40	35.50	3.40	58.48	74.00	-15.52	Pk	Vertical
7215.54	30.08	43.50	11.40	35.50	3.40	33.48	54.00	-20.52	AV	Vertical
7212.42	50.97	43.50	11.40	35.50	3.40	54.37	74.00	-19.63	Pk	Horizontal
7212.42	31.43	43.50	11.40	35.50	3.40	34.83	54.00	-19.17	AV	Horizontal



8116.72	49.16	44.20	12.00	37.00	4.80	53.96	74.00	-20.04	Pk	Vertical
8116.72	29.34	44.20	12.00	37.00	4.80	34.14	54.00	-19.86	AV	Vertical
8115.86	49.76	44.20	12.00	37.00	4.80	54.56	74.00	-19.44	Pk	Horizontal
8115.86	32.87	44.20	12.00	37.00	4.80	37.67	54.00	-16.33	AV	Horizontal
9093.76	44.17	45.00	12.57	37.40	4.97	49.14	74.00	-24.86	Pk	Vertical
9093.76	36.27	45.00	12.57	37.40	4.97	41.24	54.00	-12.76	AV	Vertical
9097.16	45.55	45.00	12.57	37.40	4.97	50.52	74.00	-23.48	Pk	Horizontal
9097.16	38.48	45.00	12.57	37.40	4.97	43.45	54.00	-10.55	AV	Horizontal
9922.02	46.51	43.60	14.33	39.50	10.20	56.71	74.00	-17.29	Pk	Vertical
9922.02	29.45	43.60	14.33	39.50	10.20	39.65	54.00	-14.35	AV	Vertical
9919.95	47.69	43.60	14.33	39.50	10.20	57.89	74.00	-16.11	Pk	Horizontal
9919.95	29.90	43.60	14.33	39.50	10.20	40.10	54.00	-13.90	AV	Horizontal
Mid Channel 915.25MHz										
1089.28	66.04	46.30	3.70	24.30	-18.30	47.74	74.00	-26.26	Pk	Vertical
1089.28	48.25	46.30	3.70	24.30	-18.30	29.95	54.00	-24.05	AV	Vertical
1086.01	59.27	46.30	3.70	24.30	-18.30	40.97	74.00	-33.03	Pk	Horizontal
1086.01	55.61	46.30	3.70	24.30	-18.30	37.31	54.00	-16.69	AV	Horizontal
1501.62	59.69	44.90	4.19	25.00	-15.71	43.98	74.00	-30.02	Pk	Vertical
1501.62	47.50	44.90	4.19	25.00	-15.71	31.79	54.00	-22.21	AV	Vertical
1505.62	65.34	44.90	4.19	25.00	-15.71	49.63	74.00	-24.37	Pk	Horizontal
1505.62	48.85	44.90	4.19	25.00	-15.71	33.14	54.00	-20.86	AV	Horizontal
1811.96	55.95	44.10	5.30	25.00	-13.80	42.15	74.00	-31.85	Pk	Vertical
1811.96	45.38	44.10	5.30	25.00	-13.80	31.58	54.00	-22.42	AV	Vertical
1814.58	63.00	44.10	5.30	25.00	-13.80	49.20	74.00	-24.80	Pk	Horizontal
1814.58	51.94	44.10	5.30	25.00	-13.80	38.14	54.00	-15.86	AV	Horizontal
2123.27	56.06	43.80	5.40	25.90	-12.50	43.56	74.00	-30.44	Pk	Vertical
2123.27	42.42	43.80	5.40	25.90	-12.50	29.92	54.00	-24.08	AV	Vertical
2127.26	57.75	43.80	5.40	25.90	-12.50	45.25	74.00	-28.75	Pk	Horizontal
2127.26	46.84	43.80	5.40	25.90	-12.50	34.34	54.00	-19.66	AV	Horizontal
2716.76	65.49	44.40	6.20	27.60	-10.60	54.89	74.00	-19.11	Pk	Vertical
2716.76	46.12	44.40	6.20	27.60	-10.60	35.52	54.00	-18.48	AV	Vertical
2723.18	63.41	44.40	6.20	27.60	-10.60	52.81	74.00	-21.19	Pk	Horizontal
2723.18	48.91	44.40	6.20	27.60	-10.60	38.31	54.00	-15.69	AV	Horizontal
3240.62	57.56	44.70	6.70	28.20	-9.80	47.76	74.00	-26.24	Pk	Vertical
3240.62	41.78	44.70	6.70	28.20	-9.80	31.98	54.00	-22.02	AV	Vertical
3241.08	57.65	44.70	6.70	28.20	-9.80	47.85	74.00	-26.15	Pk	Horizontal
3241.08	47.32	44.70	6.70	28.20	-9.80	37.52	54.00	-16.48	AV	Horizontal
3964.67	58.77	44.20	7.90	29.70	-6.60	52.17	74.00	-21.83	Pk	Vertical



3964.67	42.68	44.20	7.90	29.70	-6.60	36.08	54.00	-17.92	AV	Vertical
3970.49	58.45	44.20	7.90	29.70	-6.60	51.85	74.00	-22.15	Pk	Horizontal
3970.49	39.87	44.20	7.90	29.70	-6.60	33.27	54.00	-20.73	AV	Horizontal
7265.51	45.80	43.50	11.40	35.50	3.40	49.20	74.00	-24.80	Pk	Vertical
7265.51	33.07	43.50	11.40	35.50	3.40	36.47	54.00	-17.53	AV	Vertical
7264.54	51.60	43.50	11.40	35.50	3.40	55.00	74.00	-19.00	Pk	Horizontal
7264.54	30.00	43.50	11.40	35.50	3.40	33.40	54.00	-20.60	AV	Horizontal
8061.39	47.99	44.20	12.00	37.00	4.80	52.79	74.00	-21.21	Pk	Vertical
8061.39	33.62	44.20	12.00	37.00	4.80	38.42	54.00	-15.58	AV	Vertical
8062.51	52.86	44.20	12.00	37.00	4.80	57.66	74.00	-16.34	Pk	Horizontal
8062.51	28.30	44.20	12.00	37.00	4.80	33.10	54.00	-20.90	AV	Horizontal
9077.43	47.65	45.00	12.57	37.40	4.97	52.62	74.00	-21.38	Pk	Vertical
9077.43	39.32	45.00	12.57	37.40	4.97	44.29	54.00	-9.71	AV	Vertical
9075.45	45.11	45.00	12.57	37.40	4.97	50.08	74.00	-23.92	Pk	Horizontal
9075.45	36.40	45.00	12.57	37.40	4.97	41.37	54.00	-12.63	AV	Horizontal
9858.56	45.04	43.60	14.33	39.50	10.20	55.24	74.00	-18.76	Pk	Vertical
9858.56	28.19	43.60	14.33	39.50	10.20	38.39	54.00	-15.61	AV	Vertical
9856.39	42.87	43.60	14.33	39.50	10.20	53.07	74.00	-20.93	Pk	Horizontal
9856.39	29.90	43.60	14.33	39.50	10.20	40.10	54.00	-13.90	AV	Horizontal
High Channel 927.25MHz										
1074.99	65.79	46.30	3.70	24.30	-18.30	47.49	74.00	-26.51	Pk	Vertical
1074.99	49.95	46.30	3.70	24.30	-18.30	31.65	54.00	-22.35	AV	Vertical
1082.88	58.98	46.30	3.70	24.30	-18.30	40.68	74.00	-33.32	Pk	Horizontal
1082.88	56.48	46.30	3.70	24.30	-18.30	38.18	54.00	-15.82	AV	Horizontal
1494.28	60.20	44.90	4.19	25.00	-15.71	44.49	74.00	-29.51	Pk	Vertical
1494.28	54.05	44.90	4.19	25.00	-15.71	38.34	54.00	-15.66	AV	Vertical
1486.68	57.97	44.90	4.19	25.00	-15.71	42.26	74.00	-31.74	Pk	Horizontal
1486.68	47.31	44.90	4.19	25.00	-15.71	31.60	54.00	-22.40	AV	Horizontal
1824.65	59.61	44.10	5.30	25.00	-13.80	45.81	74.00	-28.19	Pk	Vertical
1824.65	53.45	44.10	5.30	25.00	-13.80	39.65	54.00	-14.35	AV	Vertical
1826.65	56.83	44.10	5.30	25.00	-13.80	43.03	74.00	-30.97	Pk	Horizontal
1826.65	52.90	44.10	5.30	25.00	-13.80	39.10	54.00	-14.90	AV	Horizontal
2112.80	61.55	43.80	5.40	25.90	-12.50	49.05	74.00	-24.95	Pk	Vertical
2112.80	48.56	43.80	5.40	25.90	-12.50	36.06	54.00	-17.94	AV	Vertical
2112.85	61.20	43.80	5.40	25.90	-12.50	48.70	74.00	-25.30	Pk	Horizontal
2112.85	47.72	43.80	5.40	25.90	-12.50	35.22	54.00	-18.78	AV	Horizontal
2736.11	61.55	44.40	6.20	27.60	-10.60	50.95	74.00	-23.05	Pk	Vertical
2736.11	50.07	44.40	6.20	27.60	-10.60	39.47	54.00	-14.53	AV	Vertical



2735.66	57.25	44.40	6.20	27.60	-10.60	46.65	74.00	-27.35	Pk	Horizontal
2735.66	42.43	44.40	6.20	27.60	-10.60	31.83	54.00	-22.17	AV	Horizontal
3211.47	56.70	44.70	6.70	28.20	-9.80	46.90	74.00	-27.10	Pk	Vertical
3211.47	47.41	44.70	6.70	28.20	-9.80	37.61	54.00	-16.39	AV	Vertical
3215.58	61.13	44.70	6.70	28.20	-9.80	51.33	74.00	-22.67	Pk	Horizontal
3215.58	44.74	44.70	6.70	28.20	-9.80	34.94	54.00	-19.06	AV	Horizontal
3940.41	61.60	44.20	7.90	29.70	-6.60	55.00	74.00	-19.00	Pk	Vertical
3940.41	42.79	44.20	7.90	29.70	-6.60	36.19	54.00	-17.81	AV	Vertical
3939.08	66.29	44.20	7.90	29.70	-6.60	59.69	74.00	-14.31	Pk	Horizontal
3939.08	39.50	44.20	7.90	29.70	-6.60	32.90	54.00	-21.10	AV	Horizontal
7317.46	53.75	43.50	11.40	35.50	3.40	57.15	74.00	-16.85	Pk	Vertical
7317.46	38.10	43.50	11.40	35.50	3.40	41.50	54.00	-12.50	AV	Vertical
7317.88	49.15	43.50	11.40	35.50	3.40	52.55	74.00	-21.45	Pk	Horizontal
7317.88	33.44	43.50	11.40	35.50	3.40	36.84	54.00	-17.16	AV	Horizontal
8005.69	45.54	44.20	12.00	37.00	4.80	50.34	74.00	-23.66	Pk	Vertical
8005.69	29.06	44.20	12.00	37.00	4.80	33.86	54.00	-20.14	AV	Vertical
8009.61	53.06	44.20	12.00	37.00	4.80	57.86	74.00	-16.14	Pk	Horizontal
8009.61	31.17	44.20	12.00	37.00	4.80	35.97	54.00	-18.03	AV	Horizontal
9147.55	47.86	45.00	12.57	37.40	4.97	52.83	74.00	-21.17	Pk	Vertical
9147.55	30.43	45.00	12.57	37.40	4.97	35.40	54.00	-18.60	AV	Vertical
9145.56	46.11	45.00	12.57	37.40	4.97	51.08	74.00	-22.92	Pk	Horizontal
9145.56	38.30	45.00	12.57	37.40	4.97	43.27	54.00	-10.73	AV	Horizontal
9788.25	46.03	43.60	14.33	39.50	10.20	56.23	74.00	-17.77	Pk	Vertical
9788.25	30.80	43.60	14.33	39.50	10.20	41.00	54.00	-13.00	AV	Vertical
9792.46	48.40	43.60	14.33	39.50	10.20	58.60	74.00	-15.40	Pk	Horizontal
9792.46	28.78	43.60	14.33	39.50	10.20	38.98	54.00	-15.02	AV	Horizontal



Single reader mode

Frequency	Meter Reading	Amplifier	Loss	Antenna Factor	Orrected Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBμV)	(dB)	(dB)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	Type	
Low Channel 902.3MHz										
1102.54	68.37	46.30	3.70	24.30	-18.30	50.07	74.00	-23.93	Pk	Vertical
1099.65	57.80	46.30	3.70	24.30	-18.30	39.50	54.00	-14.50	AV	Vertical
1102.56	69.15	46.30	3.70	24.30	-18.30	50.85	74.00	-23.15	Pk	Horizontal
1102.22	56.45	46.30	3.70	24.30	-18.30	38.15	54.00	-15.85	AV	Horizontal
1518.16	66.72	44.90	4.19	25.00	-15.71	51.01	74.00	-22.99	Pk	Vertical
1521.05	57.54	44.90	4.19	25.00	-15.71	41.83	54.00	-12.17	AV	Vertical
1523.16	66.67	44.90	4.19	25.00	-15.71	50.96	74.00	-23.04	Pk	Horizontal
1524.82	58.13	44.90	4.19	25.00	-15.71	42.42	54.00	-11.58	AV	Horizontal
1814.00	66.15	44.10	5.30	25.00	-13.80	52.35	74.00	-21.65	Pk	Vertical
1810.13	56.19	44.10	5.30	25.00	-13.80	42.39	54.00	-11.61	AV	Vertical
1809.99	66.66	44.10	5.30	25.00	-13.80	52.86	74.00	-21.14	Pk	Horizontal
1808.77	54.12	44.10	5.30	25.00	-13.80	40.32	54.00	-13.68	AV	Horizontal
2150.85	63.60	43.80	5.40	25.90	-12.50	51.10	74.00	-22.90	Pk	Vertical
2150.80	53.88	43.80	5.40	25.90	-12.50	41.38	54.00	-12.62	AV	Vertical
2144.30	63.86	43.80	5.40	25.90	-12.50	51.36	74.00	-22.64	Pk	Horizontal
2150.32	50.76	43.80	5.40	25.90	-12.50	38.26	54.00	-15.74	AV	Horizontal
2712.18	68.48	44.40	6.20	27.60	-10.60	57.88	74.00	-16.12	Pk	Vertical
2709.66	51.60	44.40	6.20	27.60	-10.60	41.00	54.00	-13.00	AV	Vertical
2711.25	65.42	44.40	6.20	27.60	-10.60	54.82	74.00	-19.18	Pk	Horizontal
2716.27	52.28	44.40	6.20	27.60	-10.60	41.68	54.00	-12.32	AV	Horizontal
3265.63	65.38	44.70	6.70	28.20	-9.80	55.58	74.00	-18.42	Pk	Vertical
3267.74	51.38	44.70	6.70	28.20	-9.80	41.58	54.00	-12.42	AV	Vertical
3264.86	63.46	44.70	6.70	28.20	-9.80	53.66	74.00	-20.34	Pk	Horizontal
3266.44	51.92	44.70	6.70	28.20	-9.80	42.12	54.00	-11.88	AV	Horizontal
3998.06	67.12	44.20	7.90	29.70	-6.60	60.52	74.00	-13.48	Pk	Vertical
4006.74	48.36	44.20	7.90	29.70	-6.60	41.76	54.00	-12.24	AV	Vertical
4003.65	69.32	44.20	7.90	29.70	-6.60	62.72	74.00	-11.28	Pk	Horizontal
4001.04	50.98	44.20	7.90	29.70	-6.60	44.38	54.00	-9.62	AV	Horizontal
7219.74	55.85	43.50	11.40	35.50	3.40	59.25	74.00	-14.75	Pk	Vertical
7227.15	40.06	43.50	11.40	35.50	3.40	43.46	54.00	-10.54	AV	Vertical
7219.75	55.51	43.50	11.40	35.50	3.40	58.91	74.00	-15.09	Pk	Horizontal
7222.91	39.06	43.50	11.40	35.50	3.40	42.46	54.00	-11.54	AV	Horizontal
8126.27	55.11	44.20	12.00	37.00	4.80	59.91	74.00	-14.09	Pk	Vertical



8128.09	39.29	44.20	12.00	37.00	4.80	44.09	54.00	-9.91	AV	Vertical
8122.66	54.78	44.20	12.00	37.00	4.80	59.58	74.00	-14.42	Pk	Horizontal
8129.18	37.77	44.20	12.00	37.00	4.80	42.57	54.00	-11.43	AV	Horizontal
9101.65	54.08	45.00	12.57	37.40	4.97	59.05	74.00	-14.95	Pk	Vertical
9104.12	42.47	45.00	12.57	37.40	4.97	47.44	54.00	-6.56	AV	Vertical
9101.77	53.68	45.00	12.57	37.40	4.97	58.65	74.00	-15.35	Pk	Horizontal
9103.73	39.54	45.00	12.57	37.40	4.97	44.51	54.00	-9.49	AV	Horizontal
9927.77	49.44	43.60	14.33	39.50	10.20	59.64	74.00	-14.36	Pk	Vertical
9926.83	34.85	43.60	14.33	39.50	10.20	45.05	54.00	-8.95	AV	Vertical
9926.31	52.70	43.60	14.33	39.50	10.20	62.90	74.00	-11.10	Pk	Horizontal
9928.89	37.64	43.60	14.33	39.50	10.20	47.84	54.00	-6.16	AV	Horizontal
Mid Channel 908.5MHz										
1093.61	68.90	46.30	3.70	24.30	-18.30	50.60	74.00	-23.40	Pk	Vertical
1100.90	58.10	46.30	3.70	24.30	-18.30	39.80	54.00	-14.20	AV	Vertical
1098.26	68.53	46.30	3.70	24.30	-18.30	50.23	74.00	-23.77	Pk	Horizontal
1099.75	57.53	46.30	3.70	24.30	-18.30	39.23	54.00	-14.77	AV	Horizontal
1511.24	66.93	44.90	4.19	25.00	-15.71	51.22	74.00	-22.78	Pk	Vertical
1512.56	57.29	44.90	4.19	25.00	-15.71	41.58	54.00	-12.42	AV	Vertical
1509.22	66.86	44.90	4.19	25.00	-15.71	51.15	74.00	-22.85	Pk	Horizontal
1515.29	59.63	44.90	4.19	25.00	-15.71	43.92	54.00	-10.08	AV	Horizontal
1817.06	66.02	44.10	5.30	25.00	-13.80	52.22	74.00	-21.78	Pk	Vertical
1822.51	56.20	44.10	5.30	25.00	-13.80	42.40	54.00	-11.60	AV	Vertical
1817.09	65.72	44.10	5.30	25.00	-13.80	51.92	74.00	-22.08	Pk	Horizontal
1822.07	54.10	44.10	5.30	25.00	-13.80	40.30	54.00	-13.70	AV	Horizontal
2131.24	63.73	43.80	5.40	25.90	-12.50	51.23	74.00	-22.77	Pk	Vertical
2131.27	54.11	43.80	5.40	25.90	-12.50	41.61	54.00	-12.39	AV	Vertical
2134.38	64.66	43.80	5.40	25.90	-12.50	52.16	74.00	-21.84	Pk	Horizontal
2132.51	51.05	43.80	5.40	25.90	-12.50	38.55	54.00	-15.45	AV	Horizontal
2727.43	67.85	44.40	6.20	27.60	-10.60	57.25	74.00	-16.75	Pk	Vertical
2731.64	51.03	44.40	6.20	27.60	-10.60	40.43	54.00	-13.57	AV	Vertical
2734.81	65.78	44.40	6.20	27.60	-10.60	55.18	74.00	-18.82	Pk	Horizontal
2725.60	50.30	44.40	6.20	27.60	-10.60	39.70	54.00	-14.30	AV	Horizontal
3248.59	64.24	44.70	6.70	28.20	-9.80	54.44	74.00	-19.56	Pk	Vertical
3246.39	52.16	44.70	6.70	28.20	-9.80	42.36	54.00	-11.64	AV	Vertical
3246.11	63.48	44.70	6.70	28.20	-9.80	53.68	74.00	-20.32	Pk	Horizontal
3244.34	51.44	44.70	6.70	28.20	-9.80	41.64	54.00	-12.36	AV	Horizontal
3979.85	66.39	44.20	7.90	29.70	-6.60	59.79	74.00	-14.21	Pk	Vertical
3976.53	49.55	44.20	7.90	29.70	-6.60	42.95	54.00	-11.05	AV	Vertical



3977.04	69.07	44.20	7.90	29.70	-6.60	62.47	74.00	-11.53	Pk	Horizontal
3981.99	50.37	44.20	7.90	29.70	-6.60	43.77	54.00	-10.23	AV	Horizontal
7277.15	56.23	43.50	11.40	35.50	3.40	59.63	74.00	-14.37	Pk	Vertical
7270.16	39.38	43.50	11.40	35.50	3.40	42.78	54.00	-11.22	AV	Vertical
7269.28	56.44	43.50	11.40	35.50	3.40	59.84	74.00	-14.16	Pk	Horizontal
7270.22	39.41	43.50	11.40	35.50	3.40	42.81	54.00	-11.19	AV	Horizontal
8074.97	54.39	44.20	12.00	37.00	4.80	59.19	74.00	-14.81	Pk	Vertical
8074.21	39.85	44.20	12.00	37.00	4.80	44.65	54.00	-9.35	AV	Vertical
8069.91	55.39	44.20	12.00	37.00	4.80	60.19	74.00	-13.81	Pk	Horizontal
8071.02	38.68	44.20	12.00	37.00	4.80	43.48	54.00	-10.52	AV	Horizontal
9090.88	53.50	45.00	12.57	37.40	4.97	58.47	74.00	-15.53	Pk	Vertical
9092.61	41.91	45.00	12.57	37.40	4.97	46.88	54.00	-7.12	AV	Vertical
9086.83	54.76	45.00	12.57	37.40	4.97	59.73	74.00	-14.27	Pk	Horizontal
9085.66	40.23	45.00	12.57	37.40	4.97	45.20	54.00	-8.80	AV	Horizontal
9871.65	50.03	43.60	14.33	39.50	10.20	60.23	74.00	-13.77	Pk	Vertical
9863.12	36.27	43.60	14.33	39.50	10.20	46.47	54.00	-7.53	AV	Vertical
9867.38	52.72	43.60	14.33	39.50	10.20	62.92	74.00	-11.08	Pk	Horizontal
9870.34	35.90	43.60	14.33	39.50	10.20	46.10	54.00	-7.90	AV	Horizontal
High Channel 915.1MHz										
1093.70	69.35	46.30	3.70	24.30	-18.30	51.05	74.00	-22.95	Pk	Vertical
1093.15	57.61	46.30	3.70	24.30	-18.30	39.31	54.00	-14.69	AV	Vertical
1093.64	68.43	46.30	3.70	24.30	-18.30	50.13	74.00	-23.87	Pk	Horizontal
1091.30	57.42	46.30	3.70	24.30	-18.30	39.12	54.00	-14.88	AV	Horizontal
1505.41	68.09	44.90	4.19	25.00	-15.71	52.38	74.00	-21.62	Pk	Vertical
1504.64	56.61	44.90	4.19	25.00	-15.71	40.90	54.00	-13.10	AV	Vertical
1503.41	65.31	44.90	4.19	25.00	-15.71	49.60	74.00	-24.40	Pk	Horizontal
1500.84	58.70	44.90	4.19	25.00	-15.71	42.99	54.00	-11.01	AV	Horizontal
1830.07	66.86	44.10	5.30	25.00	-13.80	53.06	74.00	-20.94	Pk	Vertical
1839.04	54.97	44.10	5.30	25.00	-13.80	41.17	54.00	-12.83	AV	Vertical
1835.80	65.82	44.10	5.30	25.00	-13.80	52.02	74.00	-21.98	Pk	Horizontal
1830.49	53.91	44.10	5.30	25.00	-13.80	40.11	54.00	-13.89	AV	Horizontal
2124.54	64.67	43.80	5.40	25.90	-12.50	52.17	74.00	-21.83	Pk	Vertical
2123.14	55.42	43.80	5.40	25.90	-12.50	42.92	54.00	-11.08	AV	Vertical
2117.49	64.53	43.80	5.40	25.90	-12.50	52.03	74.00	-21.97	Pk	Horizontal
2124.66	50.69	43.80	5.40	25.90	-12.50	38.19	54.00	-15.81	AV	Horizontal
2749.52	68.58	44.40	6.20	27.60	-10.60	57.98	74.00	-16.02	Pk	Vertical
2754.80	51.09	44.40	6.20	27.60	-10.60	40.49	54.00	-13.51	AV	Vertical
2751.33	65.98	44.40	6.20	27.60	-10.60	55.38	74.00	-18.62	Pk	Horizontal



2747.97	51.13	44.40	6.20	27.60	-10.60	40.53	54.00	-13.47	AV	Horizontal
3229.83	64.19	44.70	6.70	28.20	-9.80	54.39	74.00	-19.61	Pk	Vertical
3224.32	52.70	44.70	6.70	28.20	-9.80	42.90	54.00	-11.10	AV	Vertical
3226.35	65.44	44.70	6.70	28.20	-9.80	55.64	74.00	-18.36	Pk	Horizontal
3227.19	52.05	44.70	6.70	28.20	-9.80	42.25	54.00	-11.75	AV	Horizontal
3946.16	66.72	44.20	7.90	29.70	-6.60	60.12	74.00	-13.88	Pk	Vertical
3946.62	48.82	44.20	7.90	29.70	-6.60	42.22	54.00	-11.78	AV	Vertical
3953.84	68.75	44.20	7.90	29.70	-6.60	62.15	74.00	-11.85	Pk	Horizontal
3949.19	49.56	44.20	7.90	29.70	-6.60	42.96	54.00	-11.04	AV	Horizontal
7323.86	56.48	43.50	11.40	35.50	3.40	59.88	74.00	-14.12	Pk	Vertical
7320.92	39.32	43.50	11.40	35.50	3.40	42.72	54.00	-11.28	AV	Vertical
7328.30	56.14	43.50	11.40	35.50	3.40	59.54	74.00	-14.46	Pk	Horizontal
7330.42	40.48	43.50	11.40	35.50	3.40	43.88	54.00	-10.12	AV	Horizontal
8019.04	55.82	44.20	12.00	37.00	4.80	60.62	74.00	-13.38	Pk	Vertical
8020.32	39.69	44.20	12.00	37.00	4.80	44.49	54.00	-9.51	AV	Vertical
8016.80	53.88	44.20	12.00	37.00	4.80	58.68	74.00	-15.32	Pk	Horizontal
8015.14	39.16	44.20	12.00	37.00	4.80	43.96	54.00	-10.04	AV	Horizontal
9150.81	54.80	45.00	12.57	37.40	4.97	59.77	74.00	-14.23	Pk	Vertical
9159.10	40.27	45.00	12.57	37.40	4.97	45.24	54.00	-8.76	AV	Vertical
9157.59	54.32	45.00	12.57	37.40	4.97	59.29	74.00	-14.71	Pk	Horizontal
9158.44	38.66	45.00	12.57	37.40	4.97	43.63	54.00	-10.37	AV	Horizontal
9802.80	50.92	43.60	14.33	39.50	10.20	61.12	74.00	-12.88	Pk	Vertical
9804.30	33.90	43.60	14.33	39.50	10.20	44.10	54.00	-9.90	AV	Vertical
9797.90	52.13	43.60	14.33	39.50	10.20	62.33	74.00	-11.67	Pk	Horizontal
9799.80	37.57	43.60	14.33	39.50	10.20	47.77	54.00	-6.23	AV	Horizontal

Note:

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

Emission Level = Reading + Factor

2) The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

(Radiation Band edge)

Note: The main frequency is too far away from the restricted band and does not require testing.



4. CONDUCTED SPURIOUS & BAND EDGE EMISSION

4.1 LIMIT

According to FCC section 15.247(d)&RSS-247 5.5, in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

4.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

For Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 800 - 904 MHz Upper Band Edge: 924 - 1000 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

For Hopping Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 800 - 904 MHz Upper Band Edge: 924 - 1000 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

4.3 TEST SETUP



The EUT is connected to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. Tune the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, the span is set to be greater than RBW.

4.4 EUT OPERATION CONDITIONS

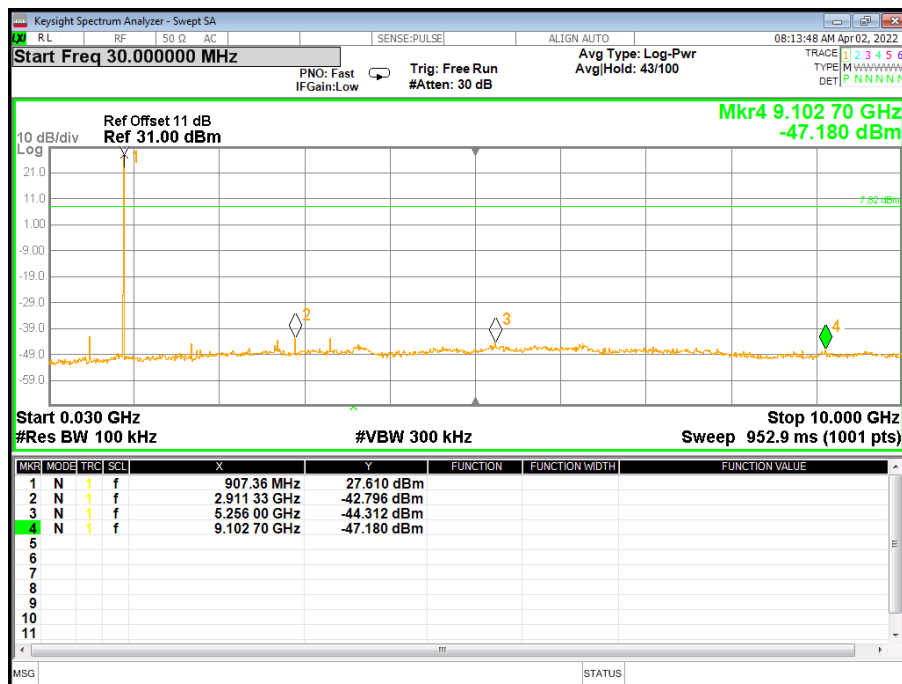
Please refer to section 2.4 of this report.



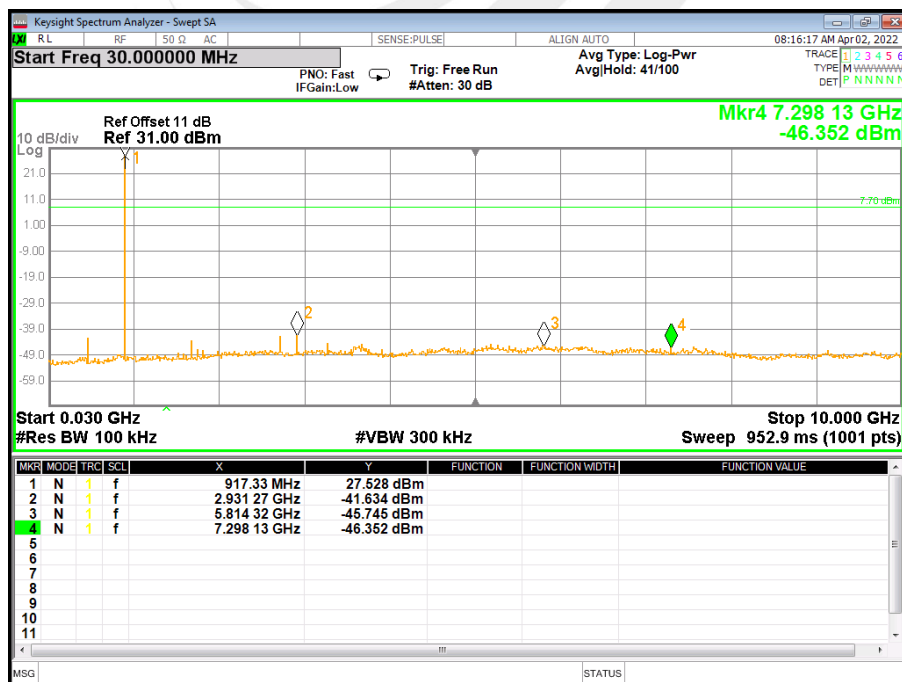
4.5 TEST RESULTS

Temperature:	25°C	Relative Humidity:	50%
Test Mode:	Dense reader mode / CH01, CH26, CH50	Test Voltage:	DC 3V

CH 01

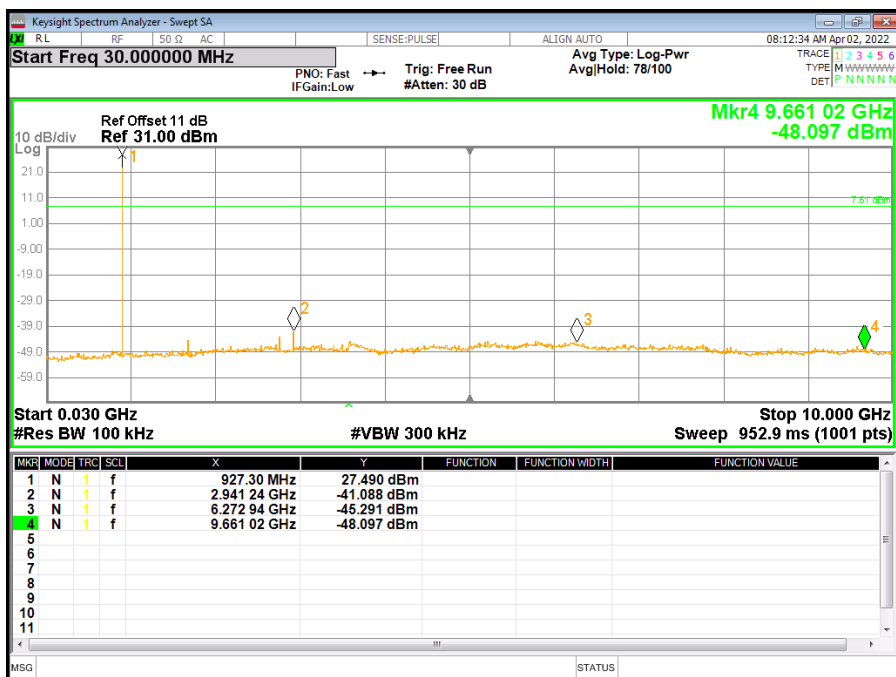


CH 26





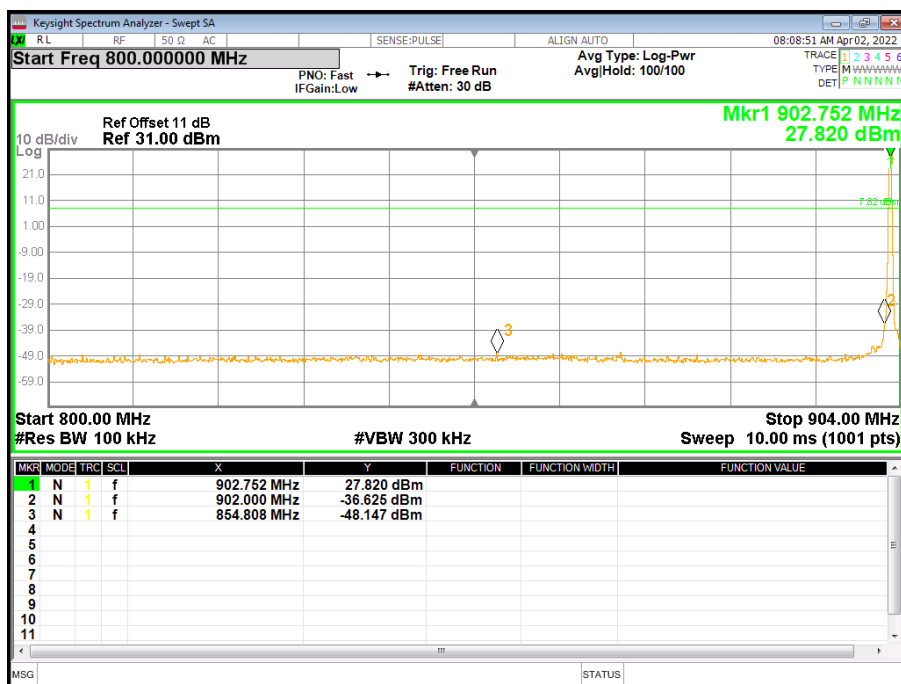
CH 50



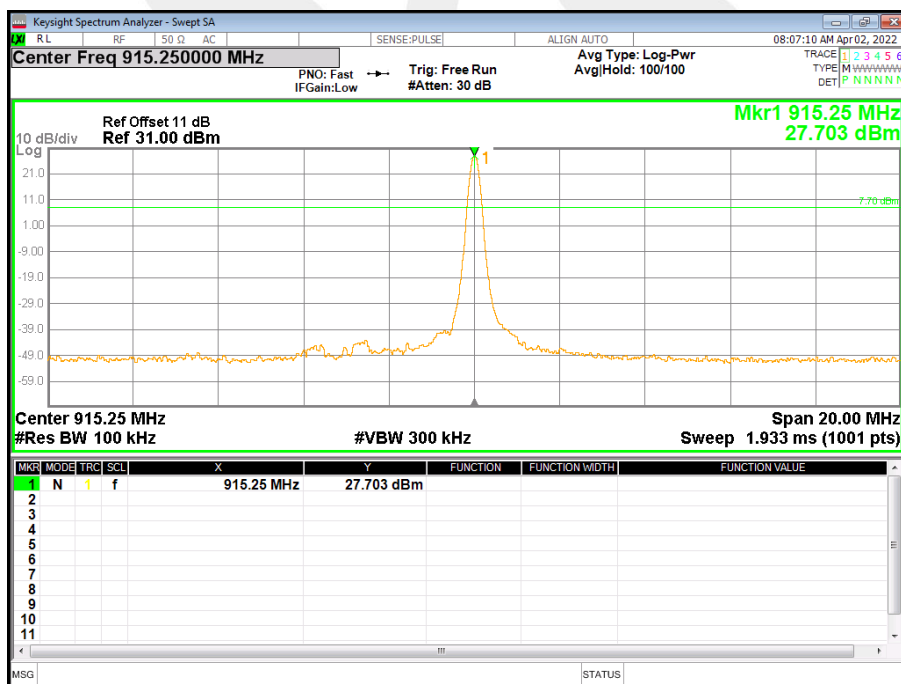


For Band edge(it's also the reference level for conducted spurious emission)

CH 01

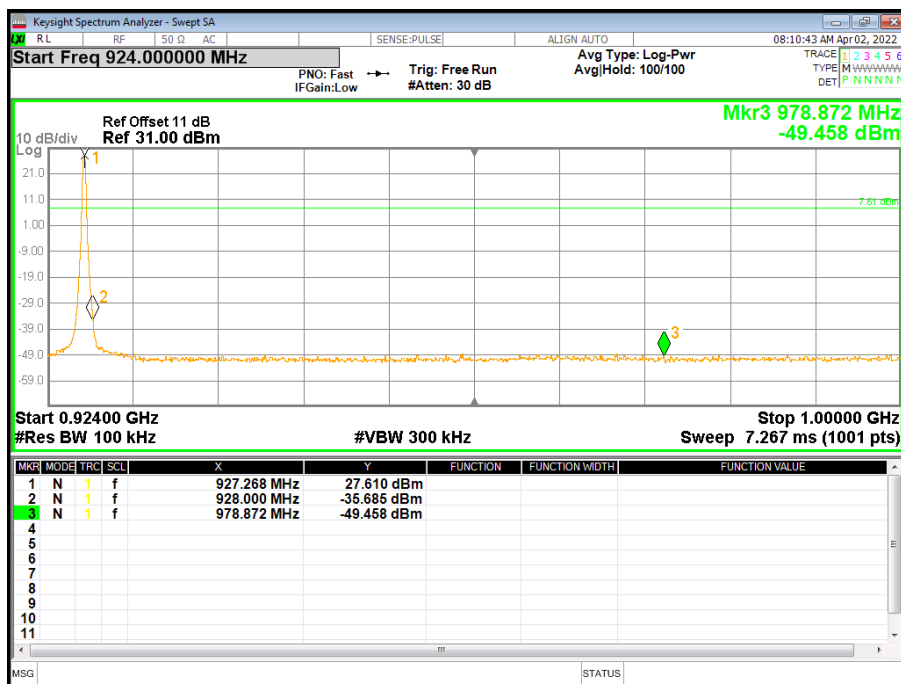


CH 26





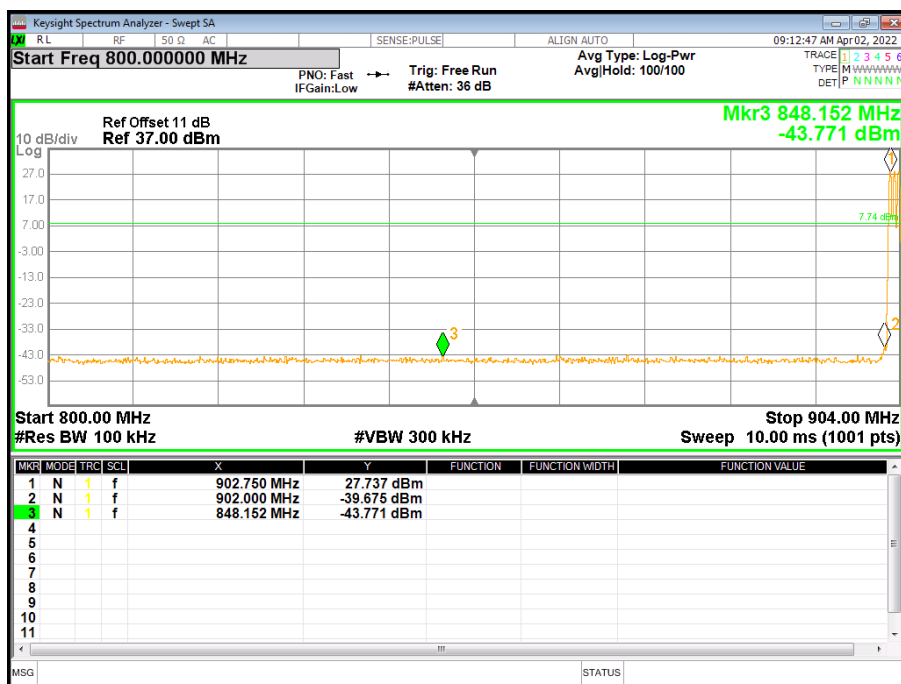
CH 50



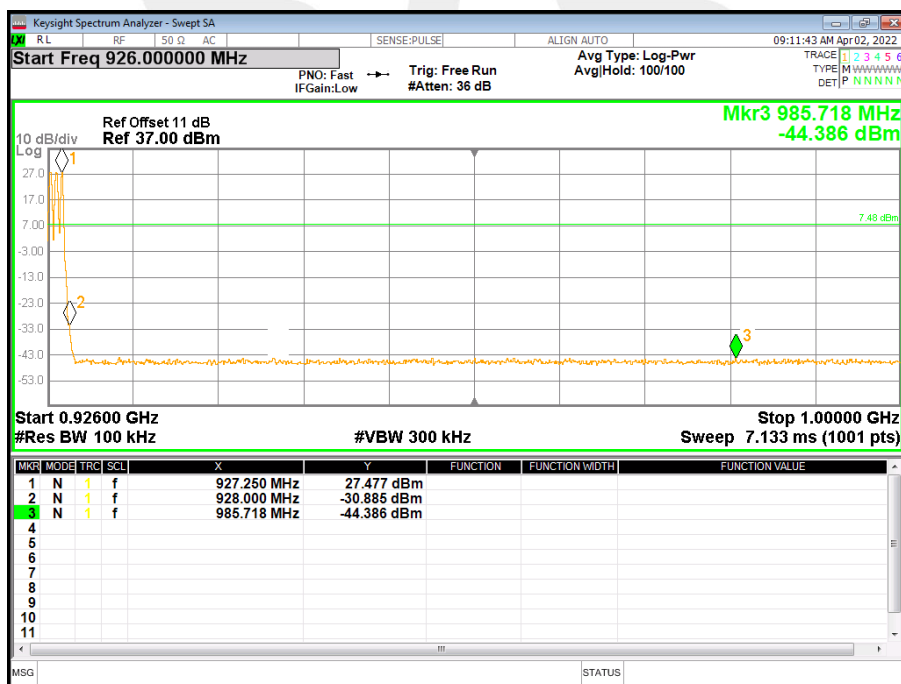


For Hopping Band edge

CH 01



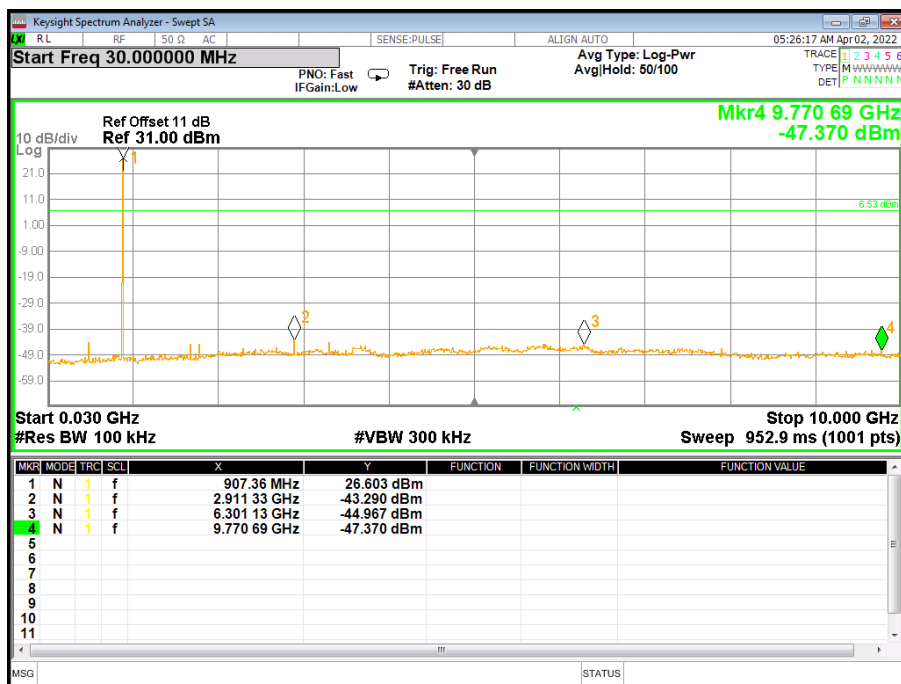
CH 50



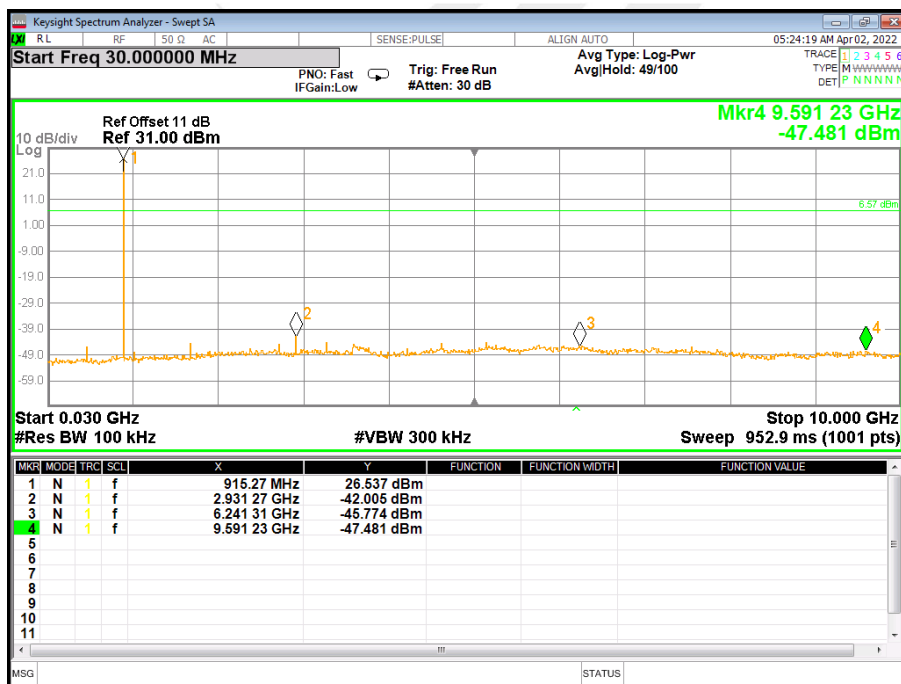


Temperature:	25°C	Relative Humidity:	50%
Test Mode:	Single reader mode / CH01, CH26, CH50	Test Voltage:	DC 3V

CH 01

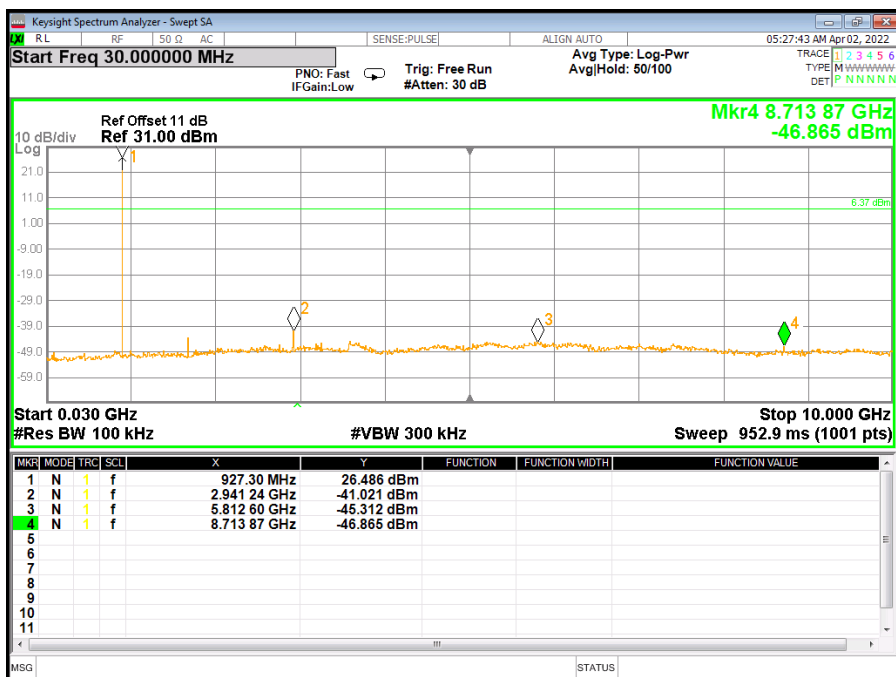


CH 26





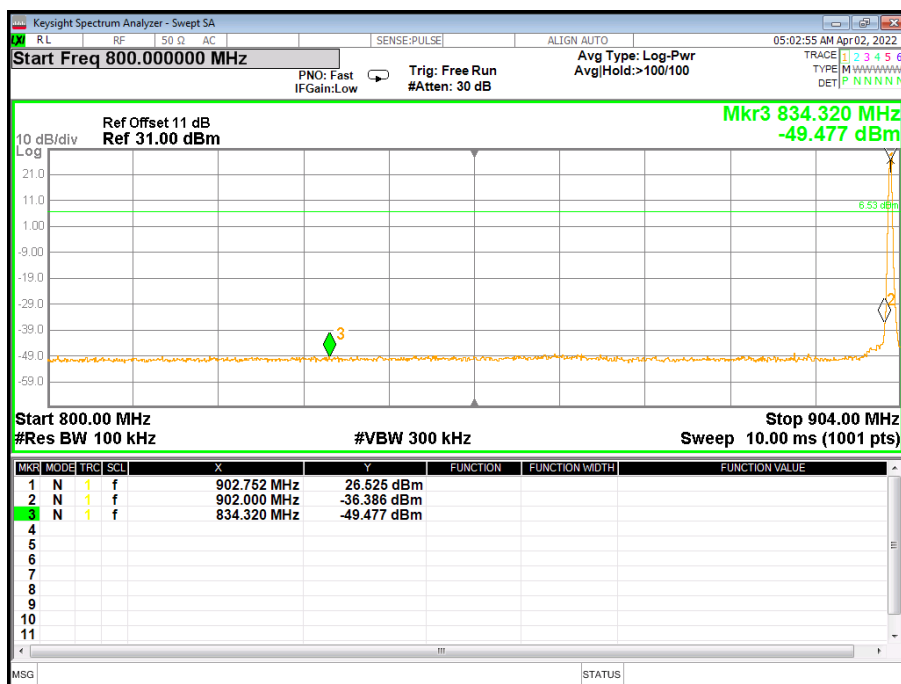
CH 50



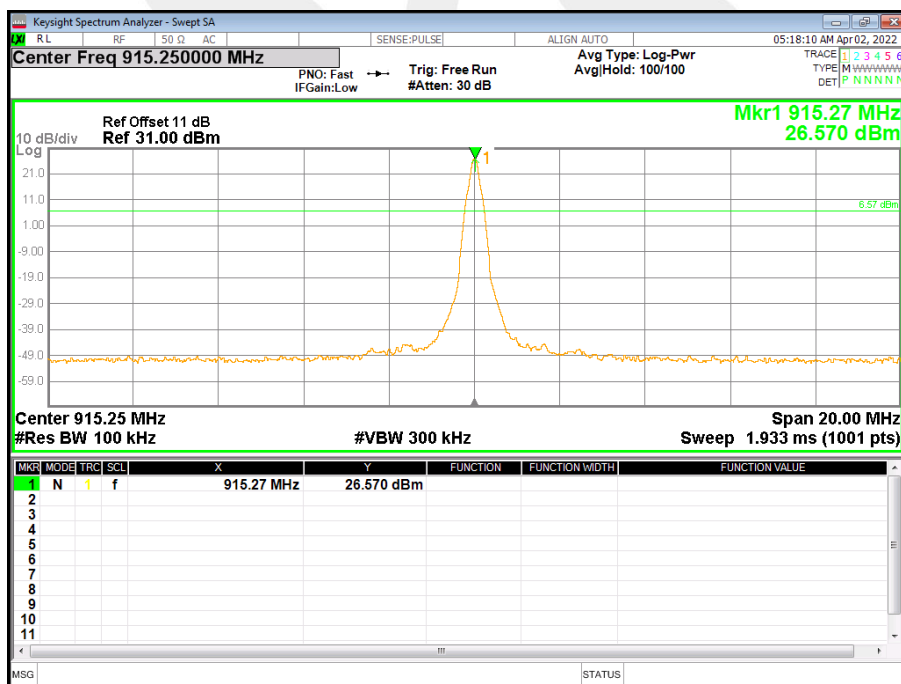


For Band edge(it's also the reference level for conducted spurious emission)

CH 01

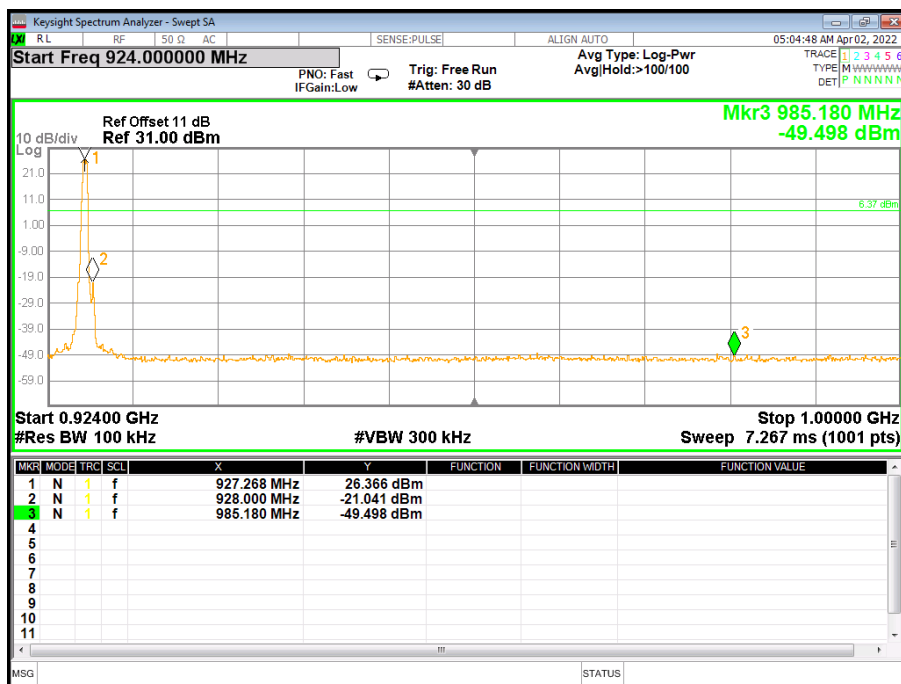


CH 26





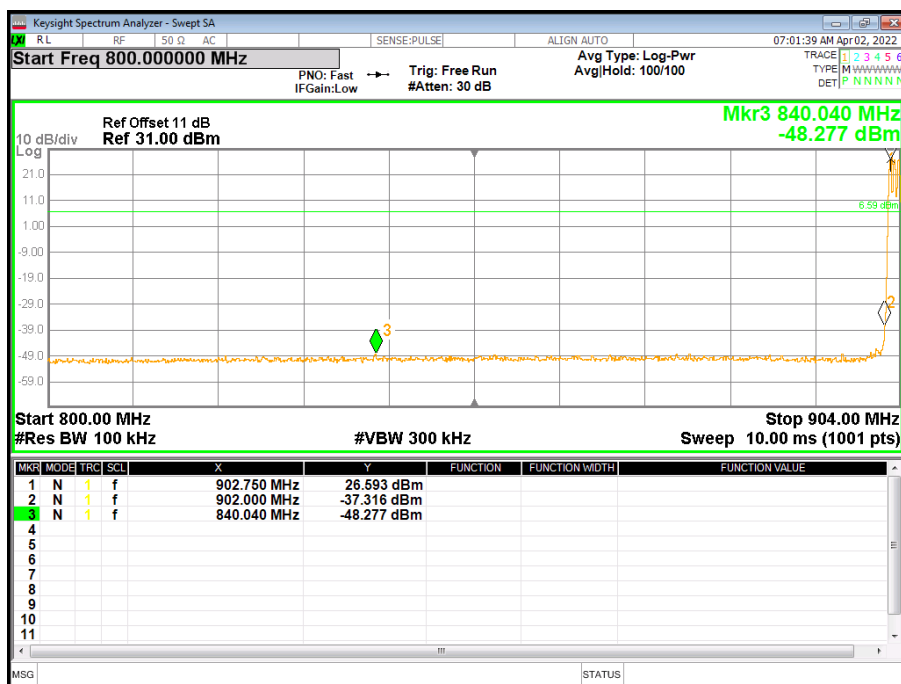
CH 50



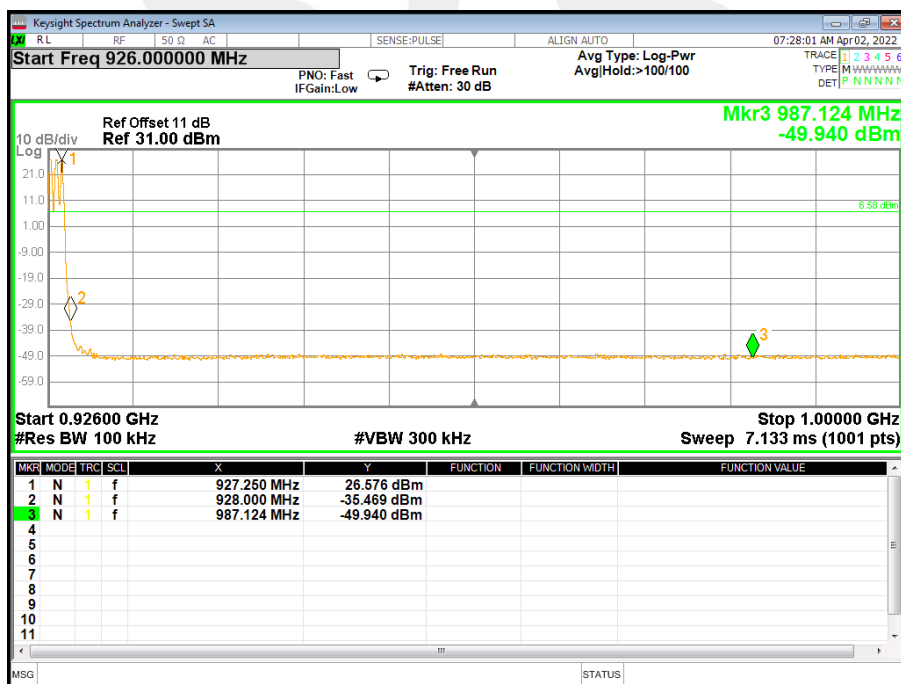


For Hopping Band edge

CH 01



CH 50





5. NUMBER OF HOPPING CHANNEL

5.1 LIMIT

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

EUT 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100KHz
VB	300KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as shown in the block diagram below.
- Spectrum Setting: RBW= 100KHz, VBW=300KHz, Sweep time = Auto.

5.3 TEST SETUP



5.4 EUT OPERATION CONDITIONS

Please refer to section 2.4 of this report.



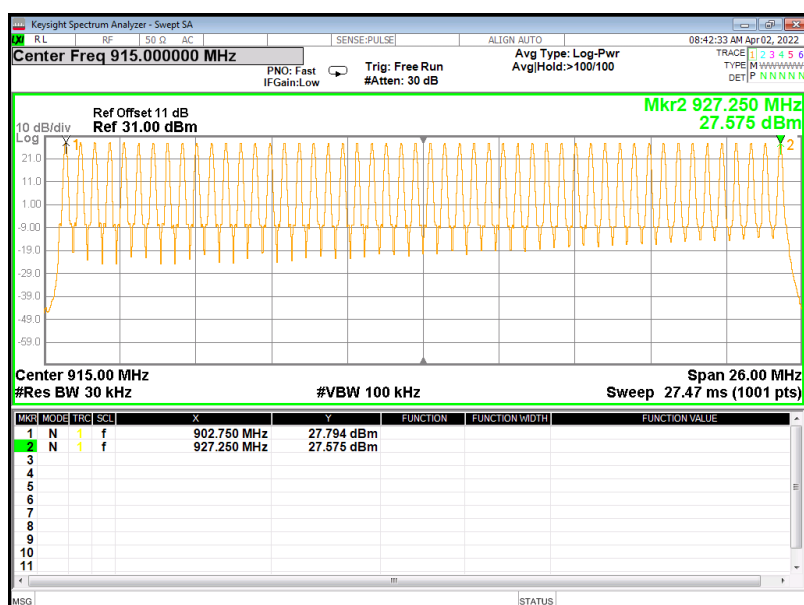
5.5 TEST RESULTS

Temperature:	25°C	Relative Humidity:	60%
Test Mode:	Hopping Mode (Dense reader mode)	Test Voltage:	DC 3V

Number of Hopping Channel

50

Hopping channel



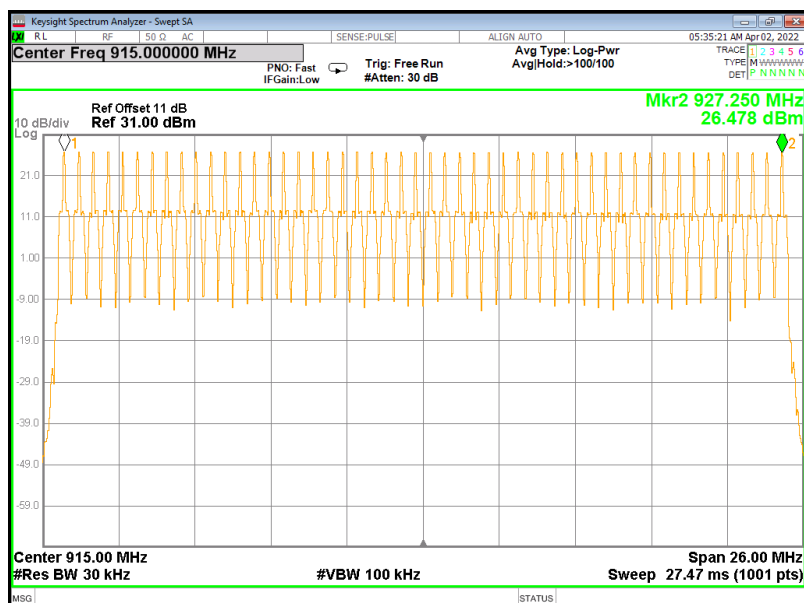


Temperature:	25°C	Relative Humidity:	60%
Test Mode:	Hopping Mode (Single reader mode)	Test Voltage:	DC 3V

Number of Hopping Channel

50

Hopping channel





6. AVERAGE TIME OF OCCUPANCY

6.1 LIMIT

FCC Part 15.247, Subpart C RSS-247				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(i) RSS-247 5.1(c)	Average Time of Occupancy	0.4sec	902-928	PASS

6.2 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyzer.
- Set RBW = 100KHz/VBW = 300KHz.
- Use a video trigger with the trigger level set to enable triggering only on full pulses.
- Sweep Time is 20 second.
- Set the center frequency on any frequency would be measured and set the frequency span to zero span.
- Measure the maximum time duration of one single pulse.

6.3 TEST SETUP



6.4 EUT OPERATION CONDITIONS

Please refer to section 2.4 of this report.



6.5 TEST RESULTS

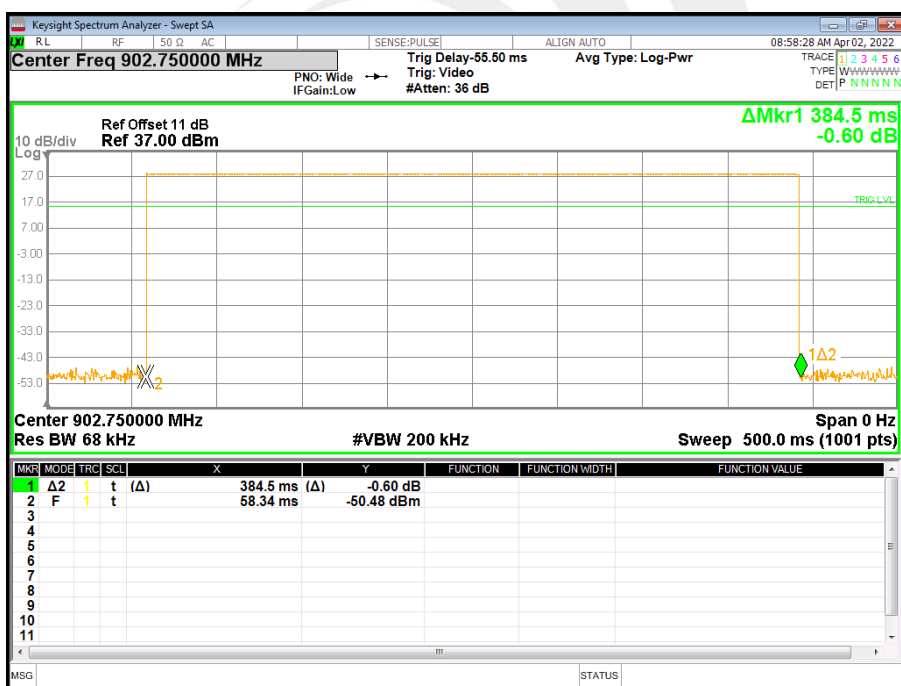
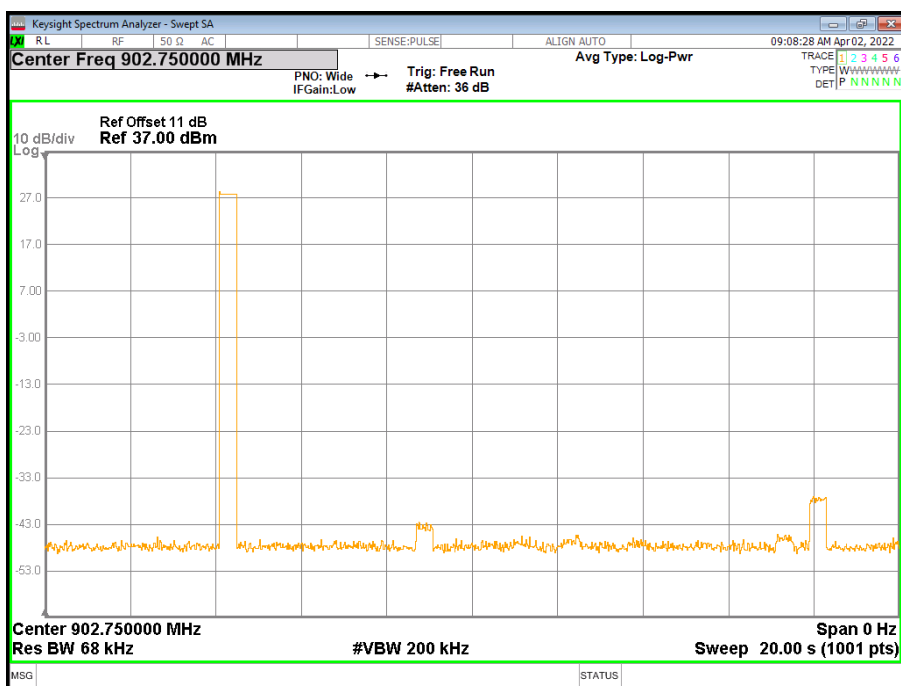
Temperature:	25°C	Relative Humidity:	50%
Test Mode:	Dense reader mode / CH01, CH26, CH50	Test Voltage:	DC 3V

Frequency (MHz)	Single Pulse Time (ms)	Number Of Pulses	Dwell Time (s)	Limit (s)	Result
902.75	384.500	1	0.38450	0.4	Pass
915.25	384.000	1	0.38400	0.4	Pass
927.25	383.000	1	0.38300	0.4	Pass



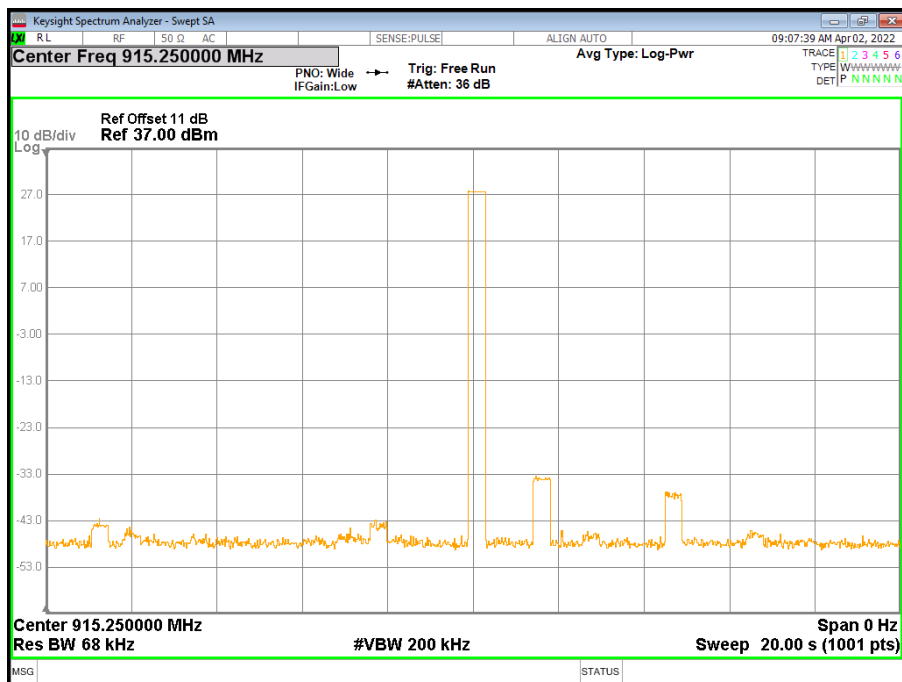


CH 01



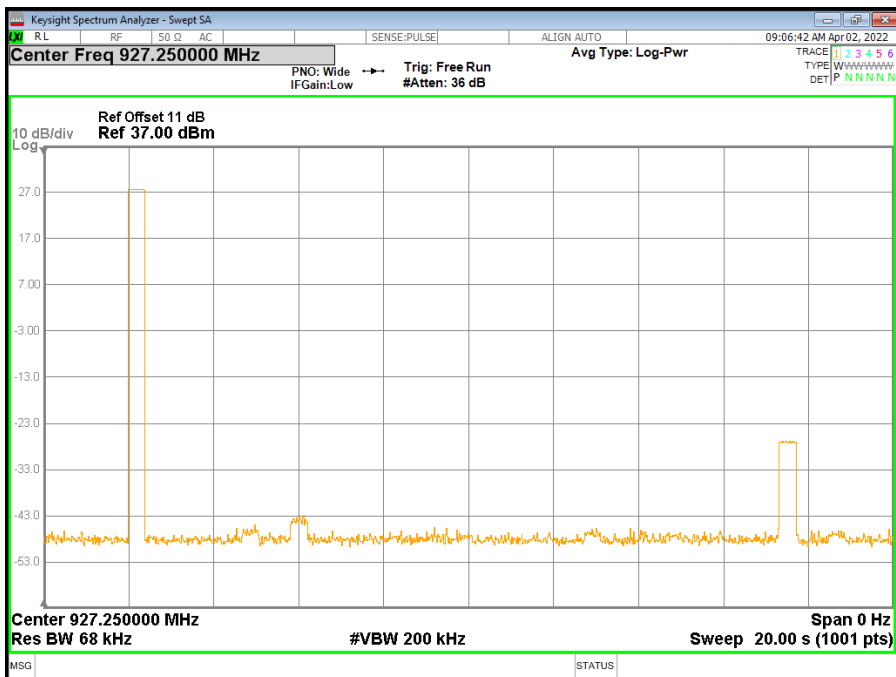


CH 26





CH 50





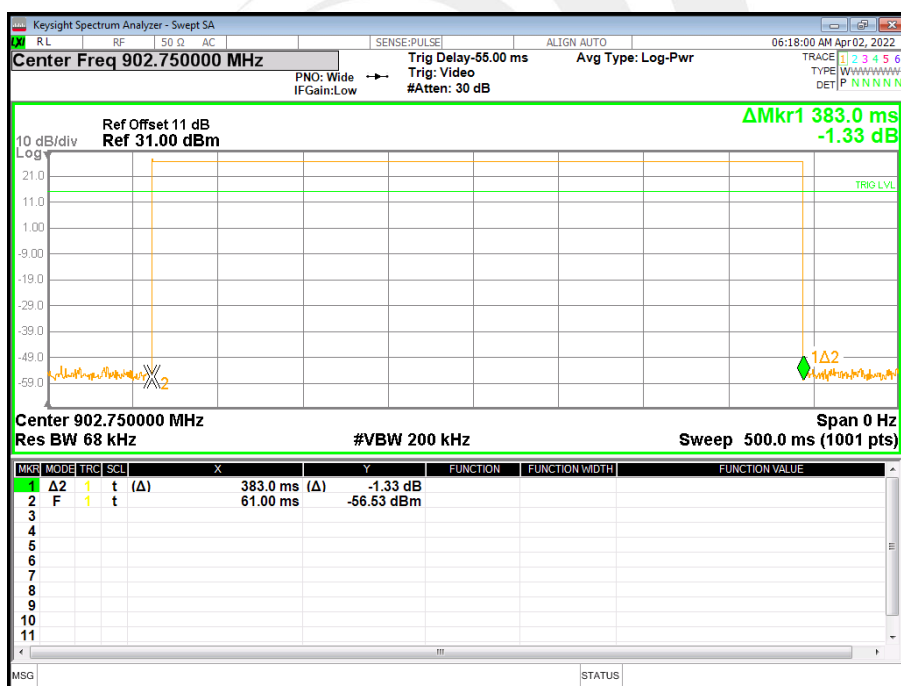
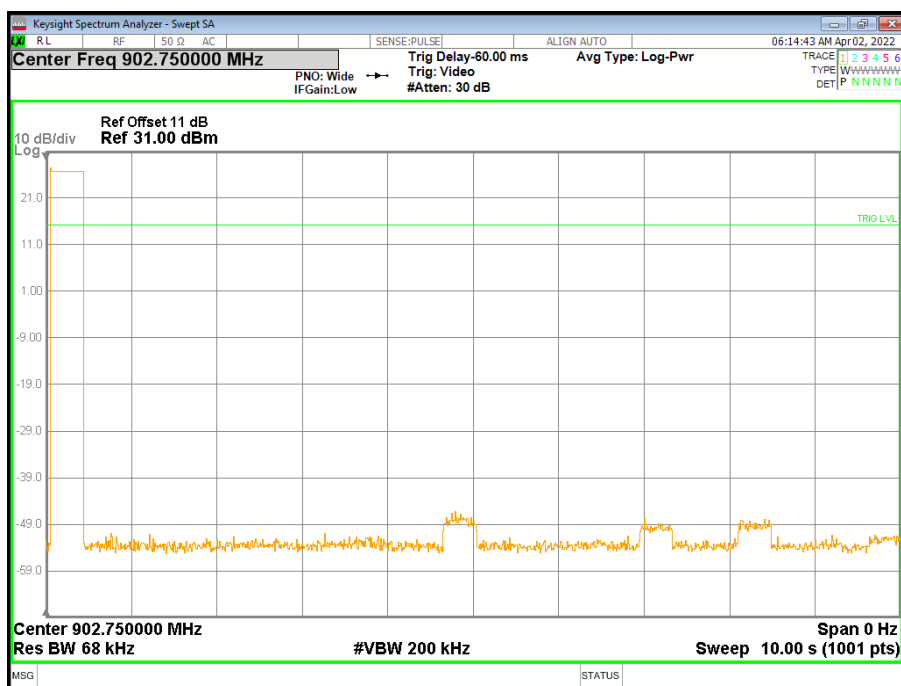
Temperature:	25°C	Relative Humidity:	50%
Test Mode:	Single reader mode / CH01, CH26, CH50	Test Voltage:	DC 3V

Frequency (MHz)	Single Pulse Time (ms)	Number Of Pulses	Dwell Time (s)	Limit (s)	Result
902.75	383.000	1	0.38300	0.4	Pass
915.25	383.500	1	0.38350	0.4	Pass
927.25	383.500	1	0.38350	0.4	Pass



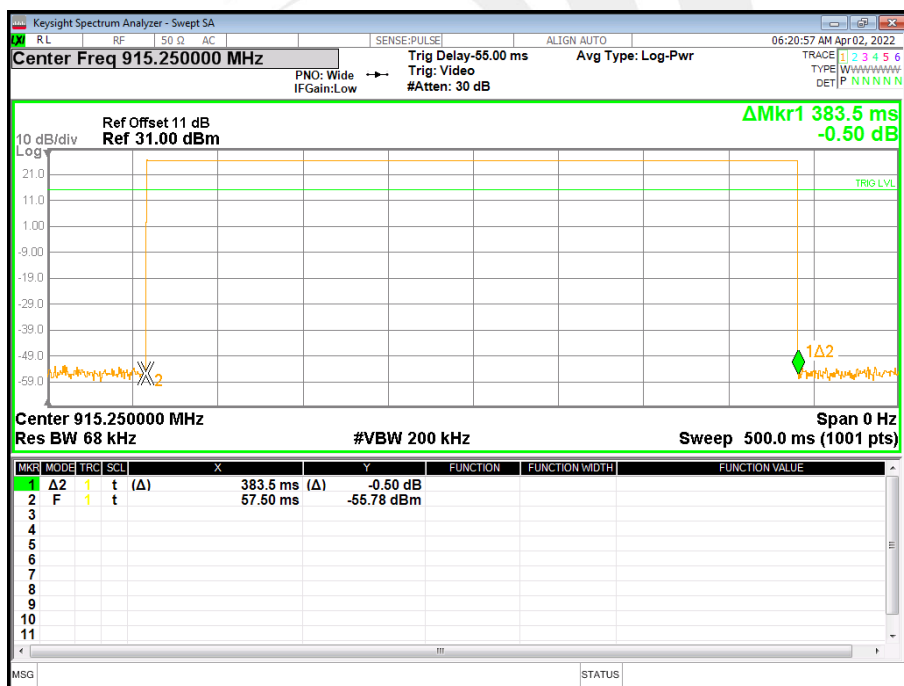
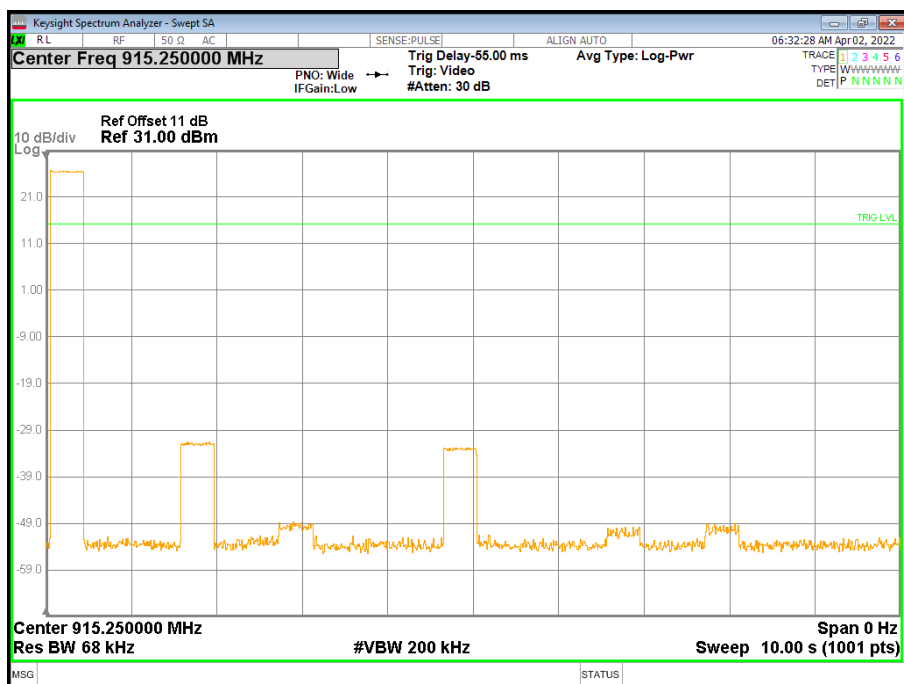


CH 01



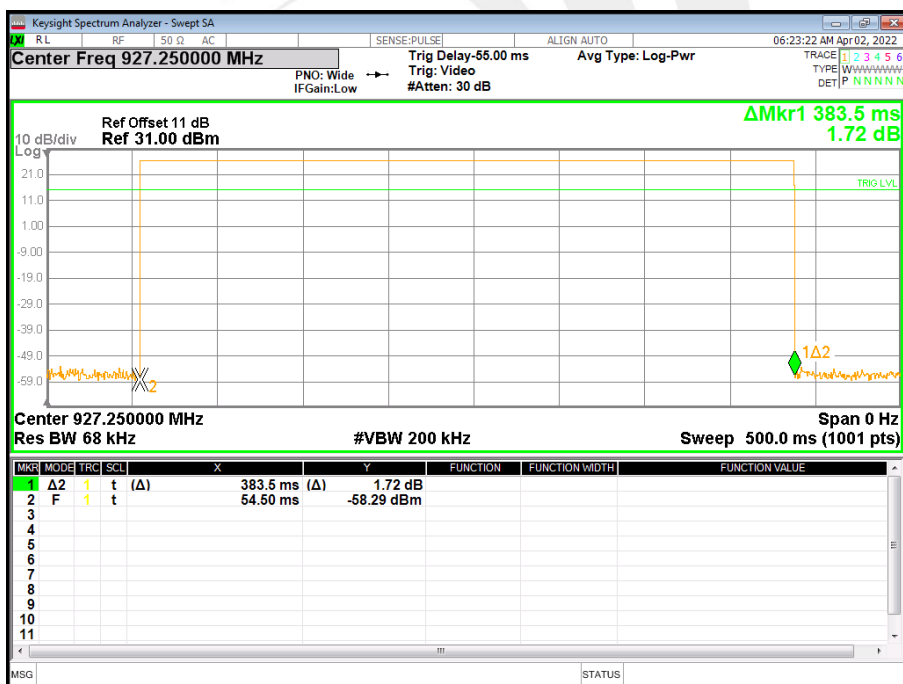
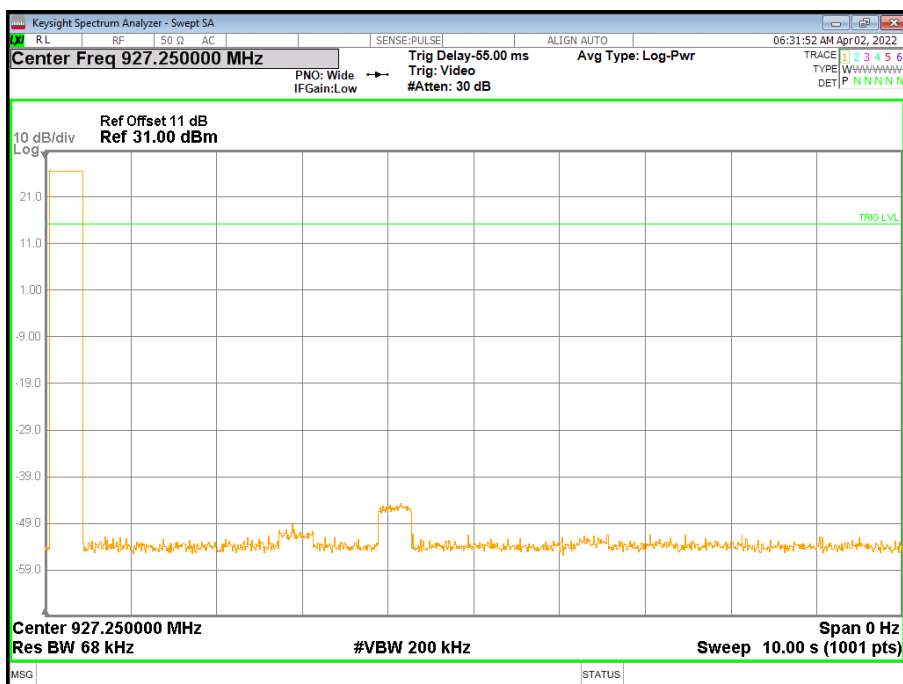


CH 26





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7. HOPPING CHANNEL SEPARATION MEASUREMENT

7.1 LIMIT

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operating with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Spectrum Parameter	Setting
Attenuation	Auto
Span	1MHz
RB	30KHz
VB	100KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.2 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- Spectrum Setting: RBW= 30KHz, VBW= 100KHz, Sweep time = Auto.

7.3 TEST SETUP



7.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuous transmitting mode.



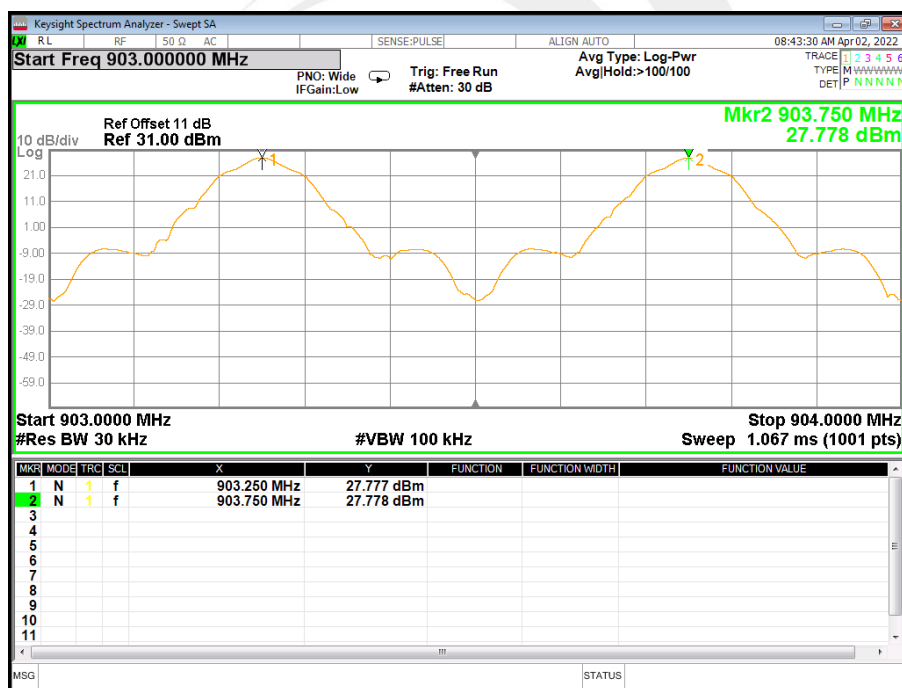
7.5 TEST RESULTS

Temperature:	25°C	Relative Humidity:	50%
Test Mode:	Dense reader mode / CH01, CH26, CH50	Test Voltage:	DC 3V

Frequency	Mark1 Frequency (MHz)	Mark2 Frequency (MHz)	Ch. Separation (MHz)	Limit (KHz)	Result
902.75 MHz	903.250	903.750	500.000	90.39	Pass
915.25 MHz	915.250	915.750	500.000	91.31	Pass
927.25 MHz	926.750	927.251	501.000	90.69	Pass

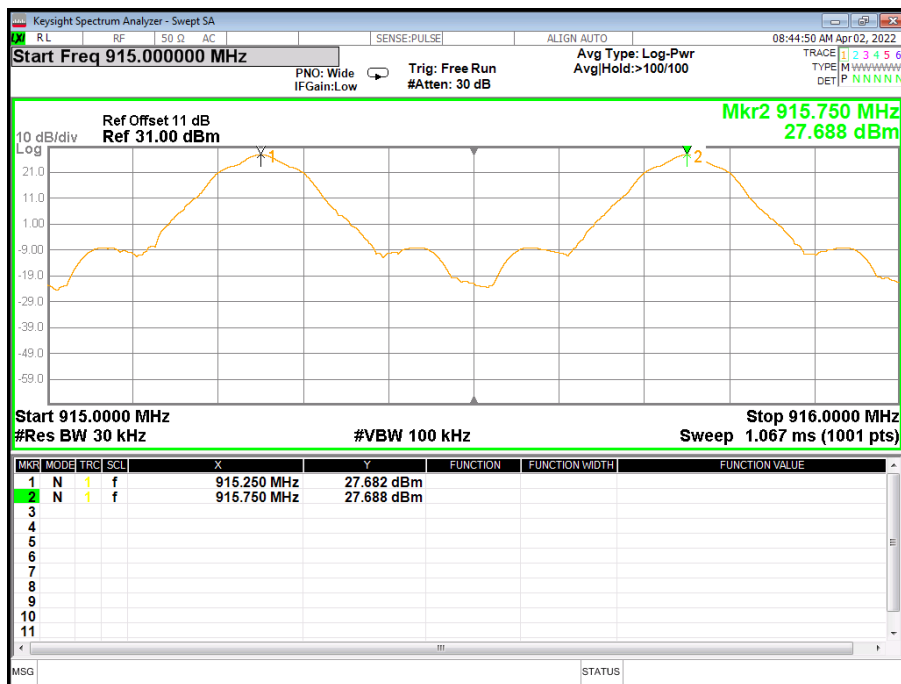
Ch. Separation Limits: > 20dB bandwidth

CH 01

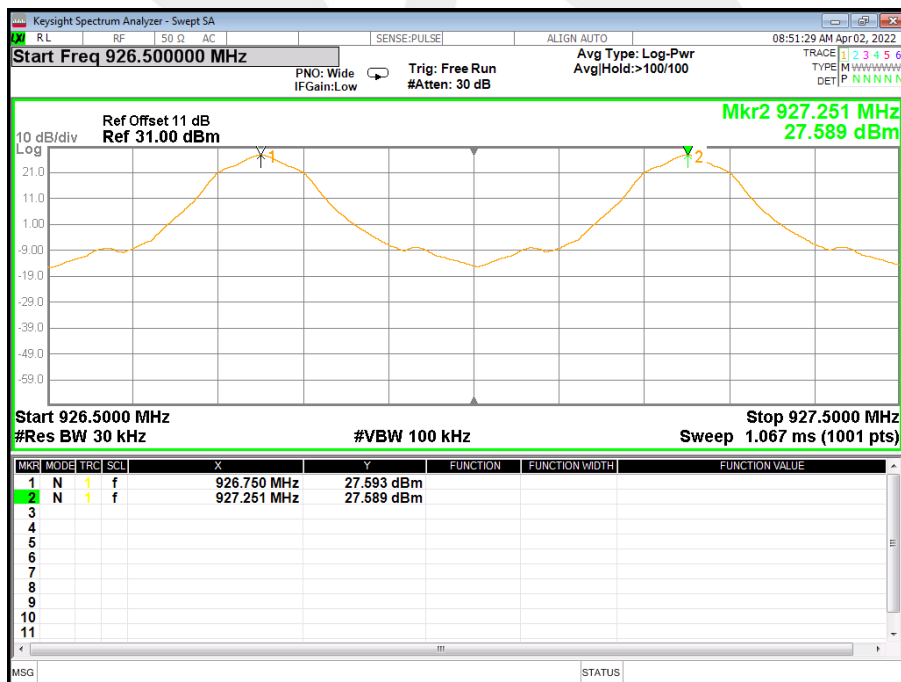




CH 26



CH 50



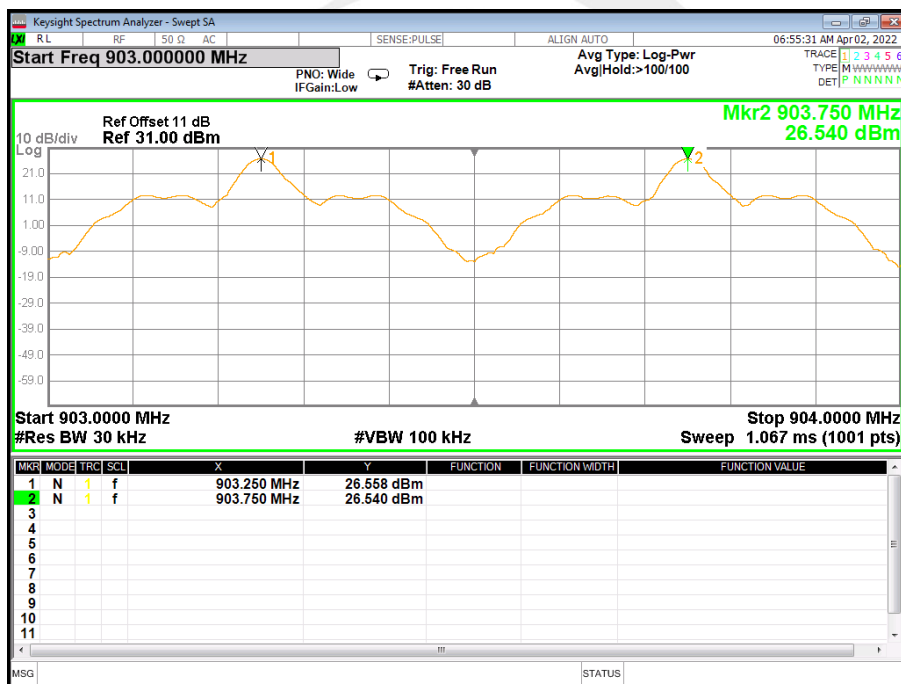


Temperature:	25°C	Relative Humidity:	50%
Test Mode:	Single reader mode / CH01, CH26, CH50	Test Voltage:	DC 3V

Frequency	Mark1 Frequency (MHz)	Mark2 Frequency (MHz)	Ch. Separation (MHz)	Limit (KHz)	Result
902.75 MHz	903.250	903.750	500.000	329.20	Pass
915.25 MHz	915.250	915.750	500.000	328.40	Pass
927.25 MHz	926.750	927.250	500.000	322.70	Pass

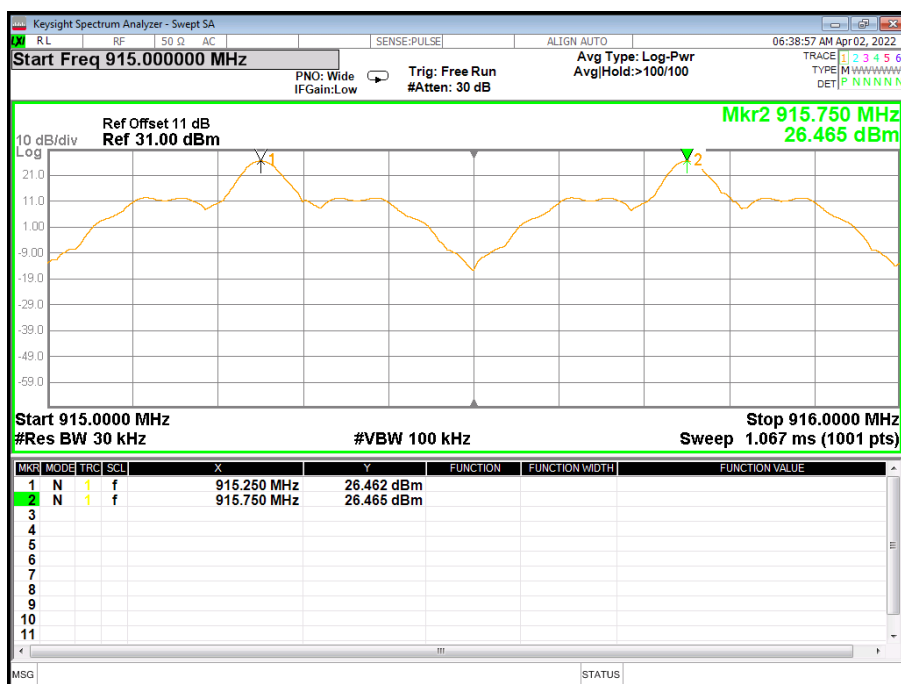
Ch. Separation Limits: > 20dB bandwidth

CH 01

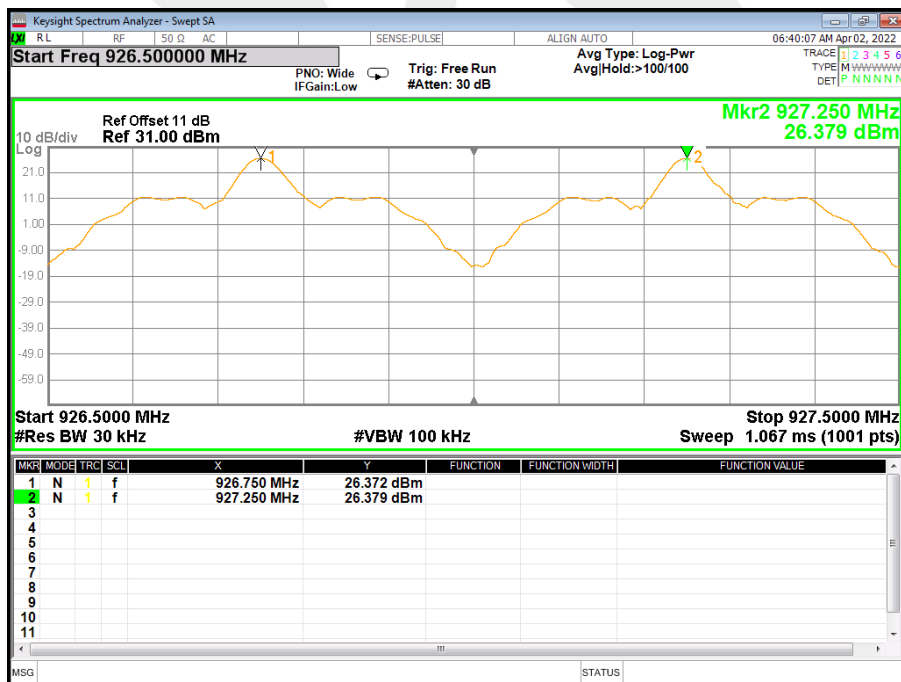




CH 26



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8. BANDWIDTH TEST

8.1 LIMIT

FCC Part15 15.247,Subpart C RSS-247				
Section	Test Item	Limit	FrequencyRange (MHz)	Result
15.247 (a)(1)(i) RSS-247 5.1(c)	20dB Bandwidth	500KHz	902-928	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span	500 KHz
RB	3 KHz
VB	10 KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as shown in the block diagram below.
- Spectrum Setting: RBW= 3KHz, VBW=10KHz, Sweep time = Auto.

8.3 TEST SETUP



8.4 EUT OPERATION CONDITIONS

Please refer to section 2.4 of this report.

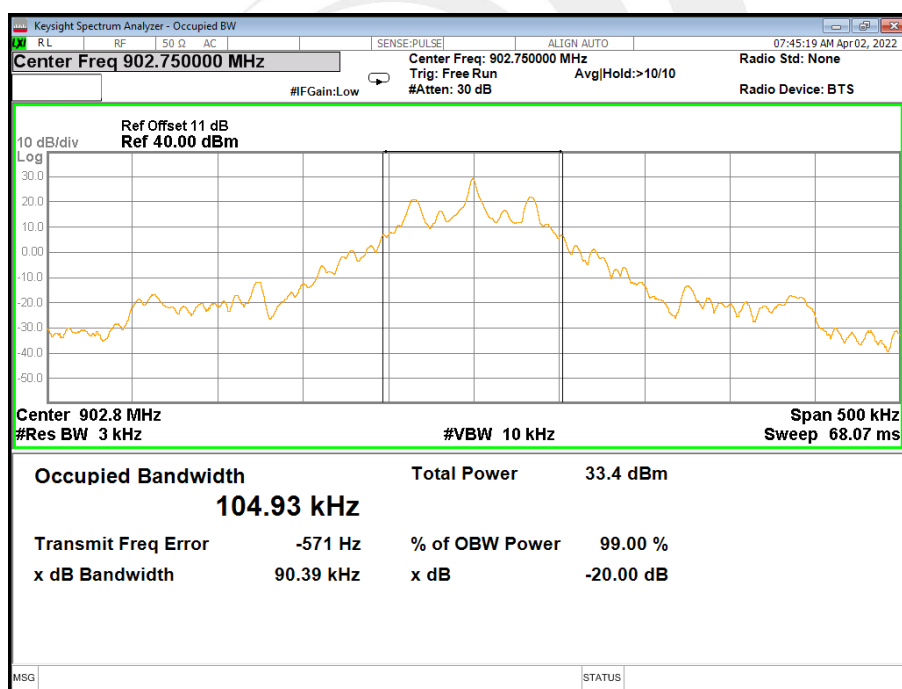


8.5 TEST RESULTS

Temperature:	25°C	Relative Humidity:	50%
Test Mode:	Dense reader mode / CH01, CH26, CH50	Test Voltage:	DC 3V

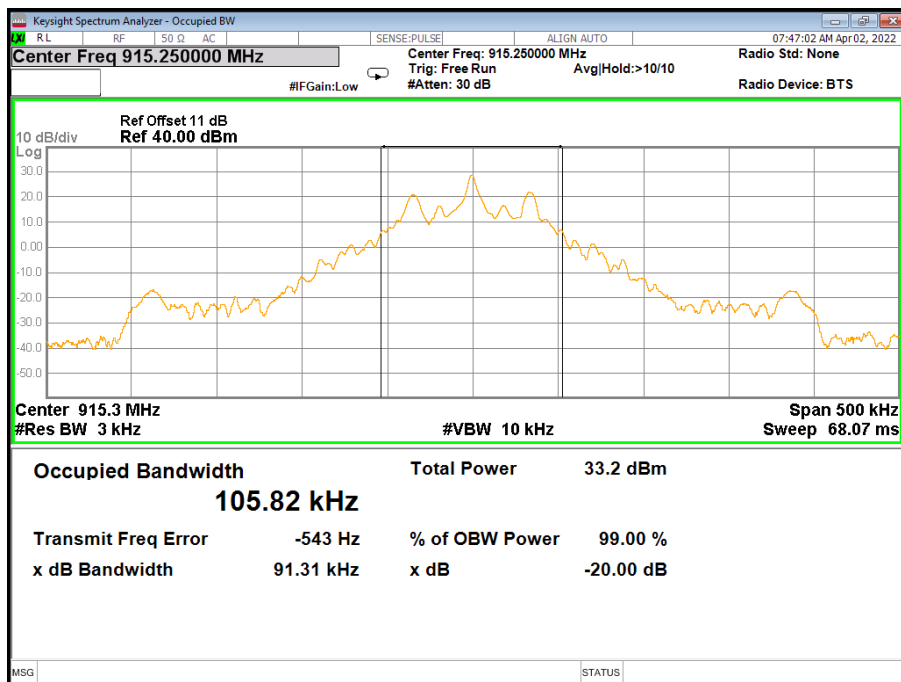
Frequency	20dB Bandwidth(kHz)	99% Bandwidth(kHz)	Limit (KHz)	Result
902.75 MHz	90.39	104.93	500	PASS
915.25 MHz	91.31	105.82	500	PASS
927.25 MHz	90.69	108.88	500	PASS

CH 01

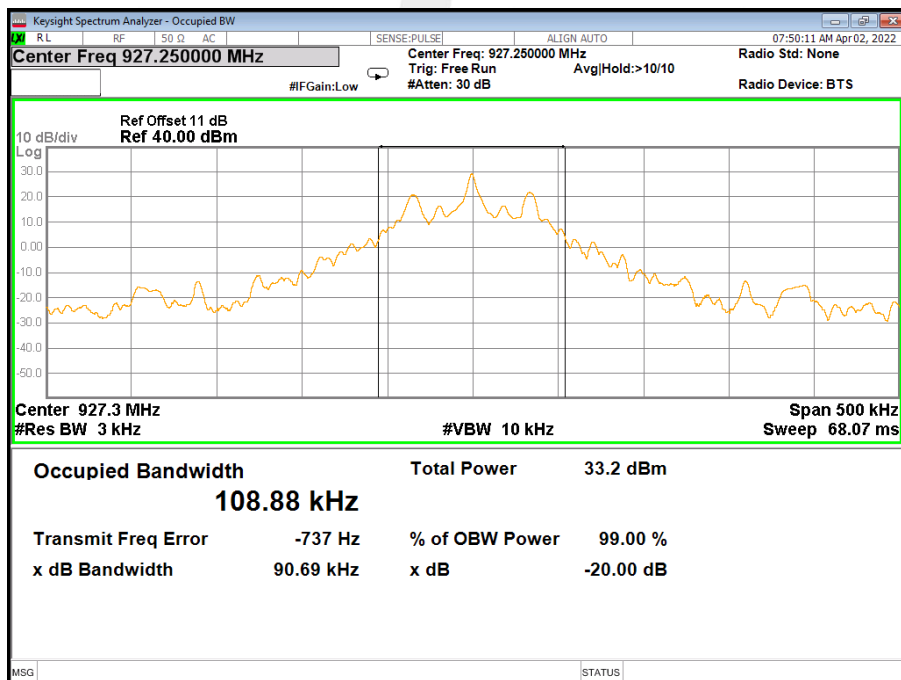




CH 26



CH 50

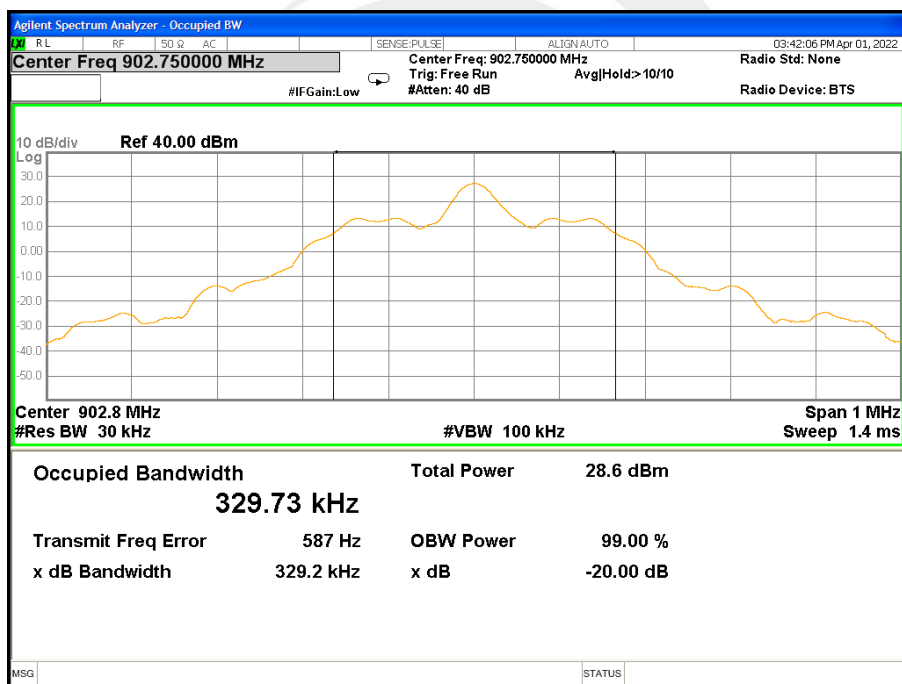




Temperature:	25°C	Relative Humidity:	50%
Test Mode:	Single reader mode / CH01, CH26, CH50	Test Voltage:	DC 3V

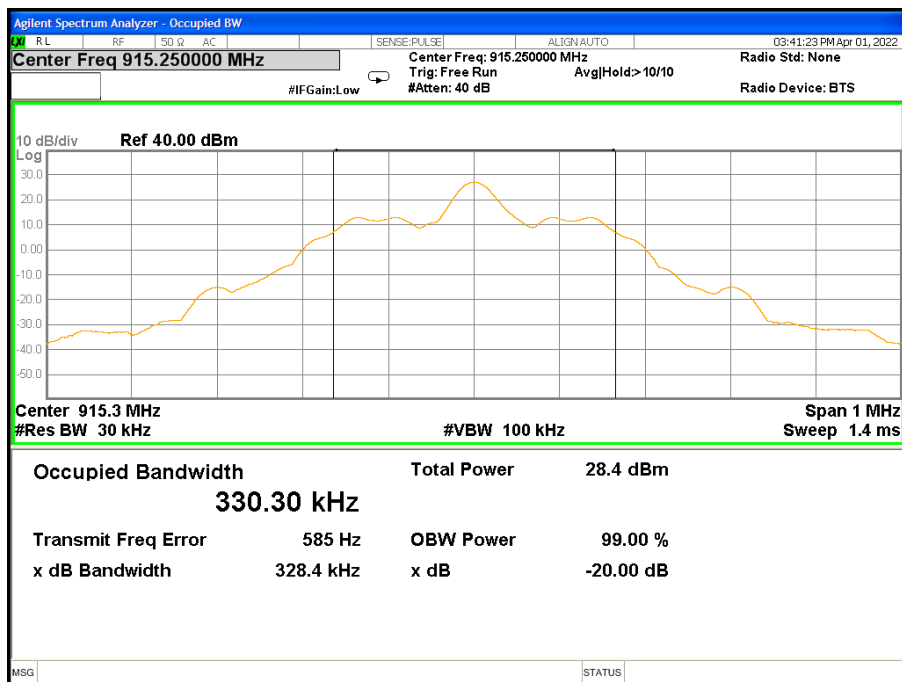
Frequency	20dB Bandwidth(kHz)	99% Bandwidth(kHz)	Limit (KHz)	Result
902.75 MHz	329.2	329.73	500	PASS
915.25 MHz	328.4	330.30	500	PASS
927.25 MHz	322.7	325.60	500	PASS

CH 01

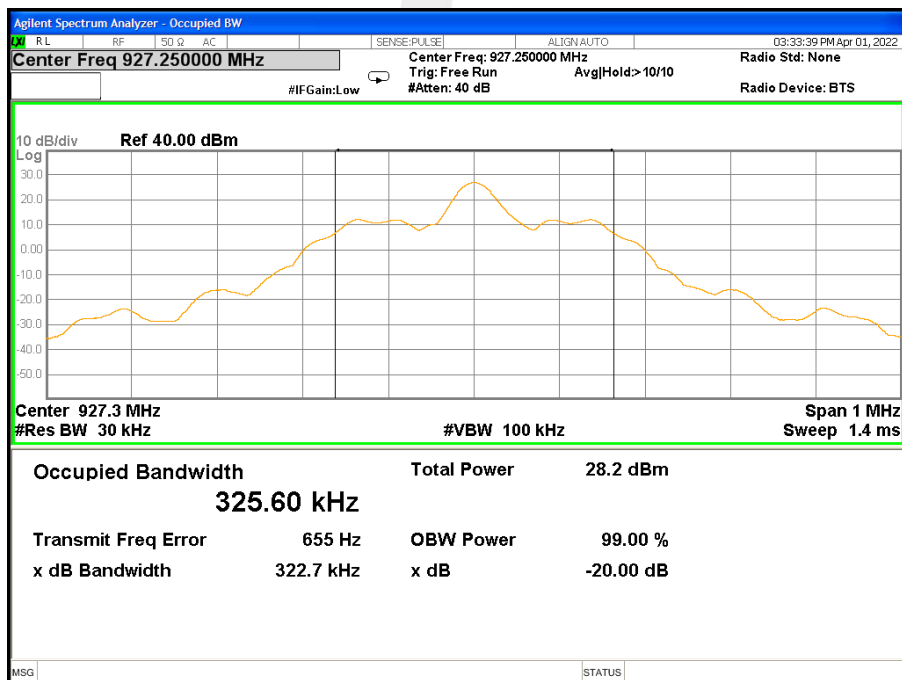




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9. OUTPUT POWER TEST

9.1 LIMIT

FCC Part 15.247, Subpart C RSS-247				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (b)(2) RSS-247 5.4(a)	Output Power	1 W	902-928	PASS
RSS-247 5.4(a)	EIRP	4W		

9.2 TEST PROCEDURE

This is a RF-conducted test to evaluate the maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. The hopping shall be disabled for this test:

a) Use the following spectrum analyzer settings:

1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.

2) RBW > 20 dB bandwidth of the emission being measured.

3) VBW $\geq$ RBW.

4) Sweep: Auto.

5) Detector function: Peak.

6) Trace: Max hold.

b) Allow trace to stabilize.

c) Use the marker-to-peak function to set the marker to the peak of the emission.

d) The indicated level is the peak output power, after any corrections for external attenuators and cables.

e) A plot of the test results and setup description shall be included in the test report.

NOTE—A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.

PKPM1 Peak power meter method:

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DSS bandwidth and shall use a fast-responding diode detector.

9.3 TEST SETUP



9.4 EUT OPERATION CONDITIONS

Please refer to section 2.4 of this report.



9.5 TEST RESULTS

Temperature:	25°C	Relative Humidity:	60%
Test Voltage:	DC 3V		

Dense reader mode			
Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)	Limit (dBm)
902.75	27.776	27.684	30.00
915.25	27.710	27.683	30.00
927.25	27.624	27.602	30.00

Single reader mode			
Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)	Limit (dBm)
902.75	27.445	27.425	30.00
915.25	27.305	27.281	30.00
927.25	27.178	27.161	30.00

EIRP Power						
Mode	Frequency (MHz)	Peak Power	Cable Loss	Antenna Gain	EIRP Power	Limit
		(dBm)	(dB)	(dBi)	(dBm)	(dBm)
Dense reader mode	902.75	27.776	12.00	15.00	30.78	36.02
	915.25	27.710	12.00	15.00	30.71	36.02
	927.25	27.624	12.00	15.00	30.62	36.02

Mode	Frequency (MHz)	Peak Power	Cable Loss	Antenna Gain	EIRP Power	Limit
		(dBm)	(dB)	(dBi)	(dBm)	(dBm)
Single reader mode	902.75	27.445	12.00	15.00	30.45	36.02
	915.25	27.305	12.00	15.00	30.31	36.02
	927.25	27.178	12.00	15.00	30.18	36.02



10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

FCC Part 15.203&RSS-Gen requirement: For intentional device, according to FCC Part 15.203&RSS-Gen: 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.

Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

10.2 EUT ANTENNA

The EUT antenna should be installed by professional installer only so that the limits in this part do not exceed.





11. FREQUENCY STABILITY

11.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.02\%$ of the operating frequency over a temperature variation of $-30\text{ }^{\circ}\text{C}$ to $50\text{ }^{\circ}\text{C}$ at normal supply voltage, and for a variation in primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of $20\text{ }^{\circ}\text{C}$.

11.2 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
2. Turn the EUT on and couple its output to spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at $+20\text{ }^{\circ}\text{C}$ for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and record the frequency.

11.3 TEST RESULT

Dense reader mode

Channel 25 (915.25MHz)

Voltage vs. Frequency Stability

Voltage(V)	Measurement Frequency(MHz)
138	915.2502
120	915.2496
102	915.2496
Max.Deviation(MHz)	0.0002
Max.Deviation(ppm)	0.22

Rated working voltage: AC 120V/60Hz

Temperature vs. Frequency Stability

Temperature($^{\circ}\text{C}$)	Measurement Frequency(MHz)
-30	915.2502
-20	915.2495
-10	915.2497
0	915.2493
10	915.2491
20	915.2499
30	915.2495
40	915.2496
50	915.2499
Max.Deviation(MHz)	0.0002
Max.Deviation(ppm)	0.22



Single reader mode

Channel 25 (915.25MHz)

Voltage vs. Frequency Stability

Voltage(V)	Measurement Frequency(MHz)
138	915.2504
120	915.2497
102	915.2502
Max.Deviation(MHz)	0.0004
Max.Deviation(ppm)	0.44

Rated working voltage: AC 120V/60Hz

Temperature vs. Frequency Stability

Temperature(°C)	Measurement Frequency(MHz)
-30	915.2504
-20	915.2495
-10	915.2497
0	915.2503
10	915.2499
20	915.2498
30	915.2494
40	915.2500
50	915.2499
Max.Deviation(MHz)	0.0004
Max.Deviation(ppm)	0.44



APPENDIX-PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

※※※※※END OF THE REPORT※※※※※

