

FCC RF Test Report

APPLICANT : Rolling Wireless S.a r.l.
EQUIPMENT : 5G Module
BRAND NAME : Rolling Wireless
MODEL NAME : RW350R-GL
FCC ID : 2AX2URW350RGL
STANDARD : 47 CFR Part 2, 90(R)
CLASSIFICATION : PCS Licensed Transmitter (PCB)
TEST DATE(S) : Apr. 02, 2024 ~ Apr. 11, 2024

We, Sporton International Inc. (Shenzhen), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Shenzhen), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia



Sporton International Inc. (ShenZhen)

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People's Republic of China



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG430728N	Rev. 01	Initial issue of report	Jun. 13, 2024

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.2	§2.1046	Conducted Output Power	—	Reporting only	-
	§90.542 (a)(7)	Effective Radiated Power	ERP < 3Watt	PASS	-
3.3	-	Peak-to-Average Ratio	—	Reporting only	-
3.4	§2.1049	Occupied Bandwidth	—	Reporting only	-
3.5	§2.1053 §90.543 (e)(2)(3)	Conducted Band Edge Measurement	Refer standard	PASS	-
3.6	§2.1051 §90.210(n)	Emission Mask	Mask B	PASS	-
3.7	§2.1053 §90.543 (e)(3)	Conducted Spurious Emission	< 43+10log ₁₀ (P[Watts])	PASS	-
3.8	§2.1055 §90.539 (e)	Frequency Stability Temperature & Voltage	< ±1.25 ppm	PASS	-
4.4	§2.1053 §90.543 (e)(3) §90.543 (f)	Radiated Spurious Emission	< 43+10log ₁₀ (P[Watts])	PASS	Under limit 22.73 dB at 1572.100 MHz

Conformity Assessment Condition:

- The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
- The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty"

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Applicant

Rolling Wireless S.a r.l.
8-10, rue Mathias Hardt 1717, Luxembourg

1.2 Manufacturer

Rolling Wireless S.a r.l.
8-10, rue Mathias Hardt 1717, Luxembourg

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	5G Module
Brand Name	Rolling Wireless
Model Name	RW350R-GL
FCC ID	2AX2URW350RGL
Tx Frequency	5G NR n14: 788 MHz ~ 798 MHz
Rx Frequency	5G NR n14: 758 MHz ~ 768 MHz
Bandwidth	5MHz / 10MHz
SCS / Bandwidth	15kHz : 5MHz / 10MHz 30kHz: 10MHz
Antenn Type	External Monopole Antenna or External PIFA Antenna
Antenna Gain	3.0 dBi
Type of Modulation	DFT-s-OFDM (PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM) CP-OFDM (QPSK / 16QAM / 64QAM / 256QAM)
IMEI Code	Conducted: 356413950001763 Radiation: 356413950000682
HW Version	V1.1
SW Version	81601.0000.00.29.24.13
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. The device has two optional antennas, they are same antenna gain, RSE pretest the two antennas, choose worst antenna to perform final test and recorded in the report.
3. There are two samples under test, sample 1 is 1st source and sample 2 is 2nd source, the detailed differences could be referred to the RW350R-GL_Operational Description of Product Equality Declaration which is exhibit separately. According to the differences, sample 1 perform full test, sample 2 verify conducted power and found less than sample 1, and sample 2 additional verify the worst case of RSE.
4. 5G NR n14 supports SA mode only.
5. 5G NR n14 supports SCS 15kHz and SCS 30kHz. According to the maximum power, SCS 15kHz covers SCS 30kHz.

1.4 Maximum Conducted Power and Emission Designator

5G NR n14 – SCS 15K		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Maximum Conducted power (W)	Emission Designator (99%OBW)
5	790.5~795.5	0.2158	4M47G7D	0.1633	4M48W7D
10	793	0.2173	9M29G7D	0.1648	9M30W7D

Note: All modulations have been tested, only the worst test results of PSK & QAM are shown in the report.

1.5 Testing Site

Sporton International Inc. (ShenZhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	TH01-SZ	CN1256	421272

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City, Guangdong Province 518103 People's Republic of China TEL: +86-755-86066985		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH03-SZ	CN1256	421272

1.6 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH03-SZ	AUDIX	E3	6.2009-8-24

1.7 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 2, Part 90(R)
- ♦ ANSI C63.26
- ♦ KDB 971168 D01 Power Meas License Digital Systems v03r01
- ♦ KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

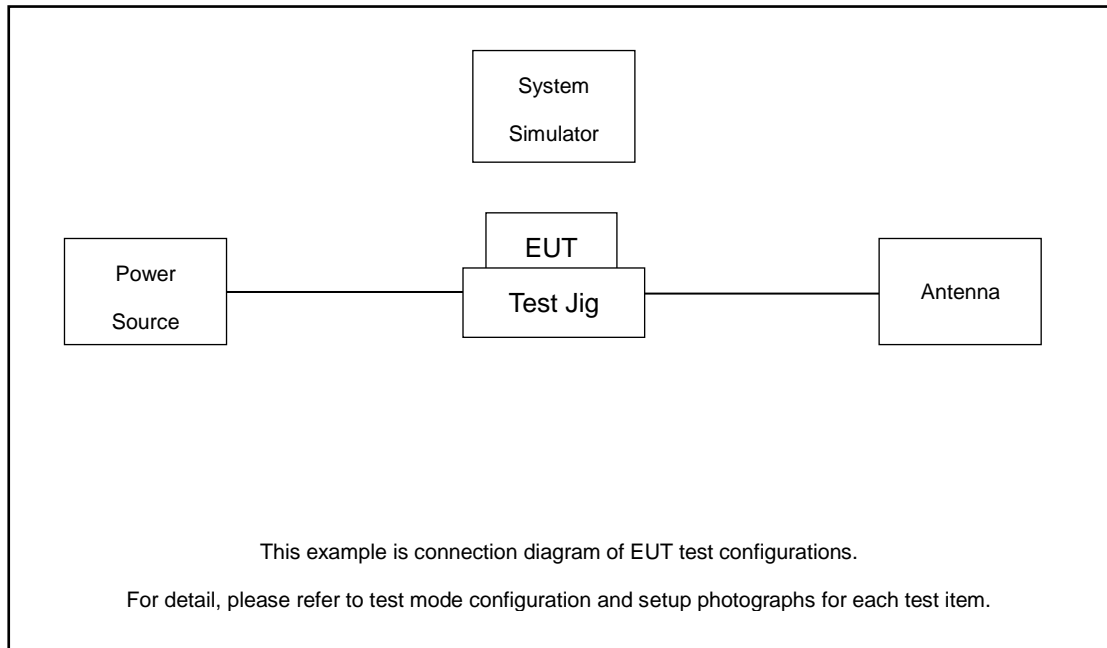
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission. (X Plane)

Conducted Test Cases	Band	Bandwidth (MHz)						Modulation					RB #			Test Channel		
		1.4	3	5	10	15	20	PI/2 BPSK	QPSK	16 QAM	64 QAM	256 QAM	1	Half	Full	L	M	H
Max. Output Power	14	-	-	V	-	-	-		V	V			V		V	V	V	V
	14	-	-		V	-	-	V	V	V	V	V	V		V		V	
Peak-to-Average Ratio	14	-	-	V	V	-	-	V	V						V		V	
26dB and 99% Bandwidth	14	-	-	V	V	-	-		V	V	V	V			V		V	
Conducted Band Edge	14	-	-	V		-	-	V	V				V		V	V		V
	14	-	-		V	-	-	V	V				V		V		V	
Emission Mask	14	-	-	V		-	-	V	V				V		V	V	V	V
	14	-	-		V	-	-	V	V				V		V		V	
Conducted Spurious Emission	14	-	-	V		-	-	V	V				V			V	V	V
	14	-	-		V	-	-	V	V				V				V	
Frequency Stability	14	-	-	V	V	-	-		V						V		V	
E.R.P	14	-	-	V	-	-	-		V	V	V	V	V	V	V	V	V	V
	14	-	-		V	-	-		V	V	V	V	V	V	V		V	
Radiated Spurious Emission	14	-	-		V	-	-		V				V			V	V	V
Note	<ol style="list-style-type: none"> The mark "V" means that this configuration is chosen for testing The mark "-" means that this bandwidth is not supported. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. Frequency Stability : Normal Voltage = 3.3V ; Low Voltage =3.14V ; High Voltage =4.4V . 																	

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8000A	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GW	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
3.	Antenna	N/A	N/A	N/A	N/A	N/A
4.	Adapter	N/A	N/A	N/A	N/A	N/A
5.	Test Jig	N/A	N/A	N/A	N/A	N/A

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 7.5 dB

Example :

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)}. \\ &= 7.5 \text{ (dB)} \end{aligned}$$

2.5 Frequency List of Low/Middle/High Channels

LTE Band 14 Channel and Frequency List for SCS 15K & 30K				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	-	23330	-
	Frequency	-	793	-
5	Channel	23305	23330	23355
	Frequency	790.5	793	795.5

Note: SCS 30K does not support 5MHz bandwidth.

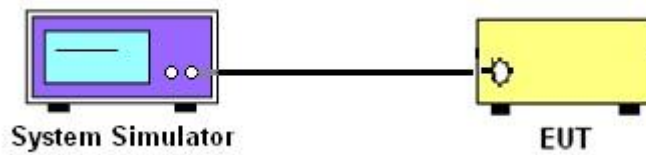
3 Conducted Test Items

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.1.1 Test Setup

3.1.2 Conducted Output Power



3.1.3 Peak-to-Average Ratio, Occupied Bandwidth, Conducted Band-Edge, Emission Mask, and Conducted Spurious Emission



3.1.4 Frequency Stability



3.1.5 Test Result of Conducted Test

Please refer to Appendix A.

3.2 Conducted Output Power and ERP

3.2.1 Description of the Conducted Output Power Measurement and ERP

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 14.

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$, $ERP = EIRP - 2.15$, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.2.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

3.3 Peak-to-Average Ratio

3.3.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.3.2 Test Procedures

1. The EUT was connected to spectrum and system simulator via a power divider.
2. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.

3.4 Occupied Bandwidth

3.4.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.4
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace.
(this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.5 Conducted Band Edge Measurement

3.5.1 Description of Conducted Band Edge Measurement

For operations in the 758-768 MHz and the 788-798 MHz bands

- (1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations.
- (2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations.
- (3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least $43 + 10 \log (P)$ dB.

3.5.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured.
4. Set spectrum analyzer with RMS detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. Checked that all the results comply with the emission limit line.

Example:

The limit line is derived from $43 + 10 \log(P)$ dB below the transmitter power P(Watts)
= $P(W) - [43 + 10 \log(P)]$ (dB)
= $[30 + 10 \log(P)]$ (dBm) - $[43 + 10 \log(P)]$ (dB) = -13dBm.

3.6 Emission Mask

3.6.1 Description of Emission Mask

<Emission Mask B>.

For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

- (1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.
- (2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.
- (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log (P)$ dB.

3.6.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
5. Set spectrum analyzer with RMS detector.
6. Taking the record of maximum spurious emission.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
= $P(W) - [43 + 10\log(P)]$ (dB)
= $[30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)
= -13dBm.

3.7 Conducted Spurious Emission Measurement

3.7.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30MHz up to a frequency including its 10th harmonic.

3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and base station via power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's, for under 1GHz RBW = 100kHz, VBW = 300kHz and for above 1GHz RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. Set spectrum analyzer with RMS detector.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
9. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
= $P(W) - [43 + 10\log(P)]$ (dB)
= $[30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)
= -13dBm.

3.8 Frequency Stability Measurement

3.8.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ± 1.25 ppm of the center frequency.

3.8.2 Test Procedures for Temperature Variation

1. The testing follows ANSI C63.26 section 5.6.4
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C step up to 50°C . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.8.3 Test Procedures for Voltage Variation

1. The testing follows ANSI C63.26 section 5.6.5.
2. The EUT was placed in a temperature chamber at $20\pm 5^{\circ}\text{C}$ and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

4 Radiated Test Items

4.1 Measuring Instruments

See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated test below 30MHz



4.2.2 For radiated test from 30MHz to 1GHz



4.2.3 For radiated test above 1GHz



4.3 Test Result of Radiated Test

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

Please refer to Appendix B.

4.4 Radiated Spurious Emission Measurement

4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559–1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

4.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
11. $ERP \text{ (dBm)} = EIRP - 2.15$
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 09, 2024	Apr. 02, 2024~ Apr. 03, 2024	Apr. 08, 2025	Conducted (TH01-SZ)
Power Divider	TOJOIN	PS-2SM-04 265	60.06.020.007 7	0.4GHz~26.5GHz	Dec. 25, 2023	Apr. 02, 2024~ Apr. 03, 2024	Dec. 24, 2024	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Jul. 05, 2023	Apr. 02, 2024~ Apr. 03, 2024	Jul. 04, 2024	Conducted (TH01-SZ)
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY54450083	20Hz~8.4GHz	Apr. 09, 2024	Apr. 11, 2024	Apr. 08, 2025	Radiation (03CH03-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150246	10Hz~44GHz;	Apr. 09, 2024	Apr. 11, 2024	Apr. 08, 2025	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jun. 28, 2022	Apr. 11, 2024	Jun. 27, 2024	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz~2GHz	Aug. 20, 2023	Apr. 11, 2024	Aug. 19, 2025	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1355	1GHz~18GHz	Apr. 09, 2024	Apr. 11, 2024	Apr. 08, 2025	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18GHz~40GHz	Apr. 09, 2024	Apr. 11, 2024	Apr. 08, 2025	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 18, 2023	Apr. 11, 2024	Oct. 17, 2024	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35 -HG	1871923	18GHz~40GHz	Jul. 07, 2023	Apr. 11, 2024	Jul. 06, 2024	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Dec. 27, 2023	Apr. 11, 2024	Dec. 26, 2024	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010002729	N/A	Oct. 18, 2023	Apr. 11, 2024	Oct. 17, 2024	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Apr. 11, 2024	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Apr. 11, 2024	NCR	Radiation (03CH03-SZ)

NCR: No Calibration Required

6 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Spurious Emission & Bandedge	±1.34 dB
Occupied Channel Bandwidth	±0.012 MHz
Conducted Power	±1.34 dB
Peak to Average Ratio	±1.34 dB
Frequency Stability	±1.3 Hz

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.0 dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.6 dB
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.8 dB
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----- THE END -----



Appendix A. Test Results of Conducted Test

Test Engineer :	Khan	Temperature :	24~26°C
		Relative Humidity :	50~53%

FR1 N14 –SCS15K

Transmitter Conducted Output Power And ERP, ($G_T - L_C$)=3dBi

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Conducted Power(dBm)	ERP (dBm)	ERP (W)
14	15	5	158100	790.5	DFT-s-OFDM QPSK	1@1	23.34	24.19	0.2624
14	15	5	158100	790.5	DFT-s-OFDM 16 QAM	1@1	22.13	22.98	0.1986
14	15	5	158600	793	DFT-s-OFDM QPSK	1@1	23.27	24.12	0.2582
14	15	5	158600	793	DFT-s-OFDM 16 QAM	1@1	22.01	22.86	0.1932
14	15	5	159100	795.5	DFT-s-OFDM QPSK	1@1	23.18	24.03	0.2529
14	15	5	159100	795.5	DFT-s-OFDM 16 QAM	1@1	21.99	22.84	0.1923
14	15	10	158600	793	DFT-s-OFDM PI/2 BPSK	25@12	23.24	24.09	0.2564
14	15	10	158600	793	DFT-s-OFDM PI/2 BPSK	1@1	23.37	24.22	0.2642
14	15	10	158600	793	DFT-s-OFDM PI/2 BPSK	1@50	23.24	24.09	0.2564
14	15	10	158600	793	DFT-s-OFDM QPSK	25@12	23.23	24.08	0.2559
14	15	10	158600	793	DFT-s-OFDM QPSK	1@1	23.18	24.03	0.2529
14	15	10	158600	793	DFT-s-OFDM QPSK	1@50	22.98	23.83	0.2415
14	15	10	158600	793	DFT-s-OFDM 16 QAM	25@12	22.17	23.02	0.2004
14	15	10	158600	793	DFT-s-OFDM 16 QAM	1@1	21.94	22.79	0.1901
14	15	10	158600	793	DFT-s-OFDM 16 QAM	1@50	21.72	22.57	0.1807
14	15	10	158600	793	DFT-s-OFDM 64 QAM	25@12	20.81	21.66	0.1466
14	15	10	158600	793	DFT-s-OFDM 64 QAM	1@1	20.87	21.72	0.1486
14	15	10	158600	793	DFT-s-OFDM 64 QAM	1@50	20.71	21.56	0.1432
14	15	10	158600	793	DFT-s-OFDM 256 QAM	25@12	18.78	19.63	0.0918
14	15	10	158600	793	DFT-s-OFDM 256 QAM	1@1	18.63	19.48	0.0887
14	15	10	158600	793	DFT-s-OFDM 256 QAM	1@50	18.62	19.47	0.0885
14	15	10	158600	793	CP-OFDM QPSK	26@13	21.68	22.53	0.1791
14	15	10	158600	793	CP-OFDM QPSK	1@1	21.66	22.51	0.1782
14	15	10	158600	793	CP-OFDM QPSK	1@50	21.58	22.43	0.1750

FR1 N14 –SCS30K

Transmitter Conducted Output Power And ERP, (G_T - L_C)=3dBi

NR Band	SCS	BandWidth	Arfcn	Freq(MHz)	Modulation	RB	Conducted Power(dBm)	EIRP (dBm)	EIRP(W)
14	30	10	158600	793	DFT-s-OFDM PI/2 BPSK	12@6	23.31	24.16	0.2606
14	30	10	158600	793	DFT-s-OFDM PI/2 BPSK	1@1	23.3	24.27	0.2673
14	30	10	158600	793	DFT-s-OFDM PI/2 BPSK	1@22	23.19	24.14	0.2594
14	30	10	158600	793	DFT-s-OFDM QPSK	12@6	23.32	24.27	0.2673
14	30	10	158600	793	DFT-s-OFDM QPSK	1@1	23.27	24.22	0.2642
14	30	10	158600	793	DFT-s-OFDM QPSK	1@22	23.14	24.09	0.2564
14	30	10	158600	793	DFT-s-OFDM 16 QAM	12@6	22.26	23.21	0.2094
14	30	10	158600	793	DFT-s-OFDM 16 QAM	1@1	22.41	23.36	0.2168
14	30	10	158600	793	DFT-s-OFDM 16 QAM	1@22	22.27	23.22	0.2099
14	30	10	158600	793	DFT-s-OFDM 64 QAM	12@6	20.89	21.84	0.1528
14	30	10	158600	793	DFT-s-OFDM 64 QAM	1@1	20.86	21.81	0.1517
14	30	10	158600	793	DFT-s-OFDM 64 QAM	1@22	20.79	21.74	0.1493
14	30	10	158600	793	DFT-s-OFDM 256 QAM	12@6	18.84	19.79	0.0953
14	30	10	158600	793	DFT-s-OFDM 256 QAM	1@1	18.67	19.62	0.0916
14	30	10	158600	793	DFT-s-OFDM 256 QAM	1@22	18.52	19.47	0.0885
14	30	10	158600	793	CP-OFDM QPSK	12@6	21.7	22.65	0.1841
14	30	10	158600	793	CP-OFDM QPSK	1@1	21.74	22.69	0.1858
14	30	10	158600	793	CP-OFDM QPSK	1@22	21.56	22.51	0.1782

FR1 N14 –SCS15K

Frequency Stability

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Deviation (ppm)	Verdict	Environment
14	15	5	158600	793.0	DFT-s-OFDM QPSK	25@0	0.0000	PASS	NV
14	15	5	158600	793.0	DFT-s-OFDM QPSK	25@0	0.0037	PASS	LV
14	15	5	158600	793.0	DFT-s-OFDM QPSK	25@0	0.0026	PASS	HV
14	15	5	158600	793.0	DFT-s-OFDM QPSK	25@0	0.0130	PASS	-30°C
14	15	5	158600	793.0	DFT-s-OFDM QPSK	25@0	0.0067	PASS	-20°C
14	15	5	158600	793.0	DFT-s-OFDM QPSK	25@0	0.0010	PASS	-10°C
14	15	5	158600	793.0	DFT-s-OFDM QPSK	25@0	0.0120	PASS	0°C
14	15	5	158600	793.0	DFT-s-OFDM QPSK	25@0	0.0083	PASS	10°C
14	15	5	158600	793.0	DFT-s-OFDM QPSK	25@0	0.0000	PASS	20°C
14	15	5	158600	793.0	DFT-s-OFDM QPSK	25@0	0.0023	PASS	30°C
14	15	5	158600	793.0	DFT-s-OFDM QPSK	25@0	0.0047	PASS	40°C
14	15	5	158600	793.0	DFT-s-OFDM QPSK	25@0	0.0028	PASS	50°C

Frequency Stability

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Deviation (ppm)	Verdict	Environment
14	15	10	158600	793.0	DFT-s-OFDM QPSK	50@0	0.0000	PASS	NV
14	15	10	158600	793.0	DFT-s-OFDM QPSK	50@0	0.0018	PASS	LV
14	15	10	158600	793.0	DFT-s-OFDM QPSK	50@0	0.0010	PASS	HV
14	15	10	158600	793.0	DFT-s-OFDM QPSK	50@0	0.0095	PASS	-30°C
14	15	10	158600	793.0	DFT-s-OFDM QPSK	50@0	0.0028	PASS	-20°C
14	15	10	158600	793.0	DFT-s-OFDM QPSK	50@0	0.0043	PASS	-10°C
14	15	10	158600	793.0	DFT-s-OFDM QPSK	50@0	0.0030	PASS	0°C
14	15	10	158600	793.0	DFT-s-OFDM QPSK	50@0	0.0090	PASS	10°C
14	15	10	158600	793.0	DFT-s-OFDM QPSK	50@0	0.0000	PASS	20°C
14	15	10	158600	793.0	DFT-s-OFDM QPSK	50@0	0.0040	PASS	30°C
14	15	10	158600	793.0	DFT-s-OFDM QPSK	50@0	0.0044	PASS	40°C
14	15	10	158600	793.0	DFT-s-OFDM QPSK	50@0	0.0009	PASS	50°C

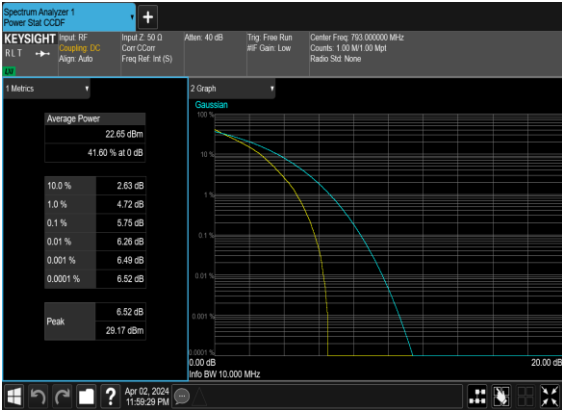
Peak to Average Ratio

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result (dB)	Limit (dB)	Verdict
14	15	10	158600	793.0	DFT-s-OFDM PI/2 BPSK	50@0	4.8	13	PASS
14	15	10	158600	793.0	DFT-s-OFDM QPSK	50@0	5.75	13	PASS

N14(10M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH



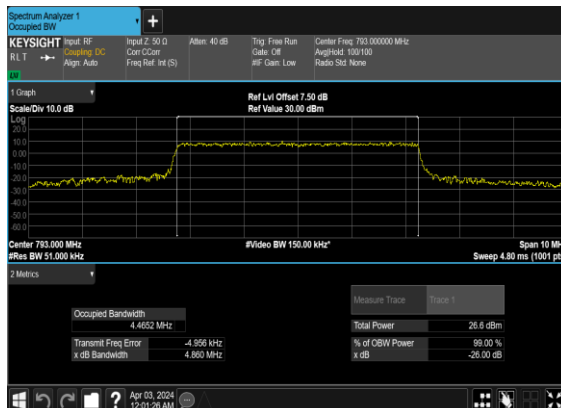
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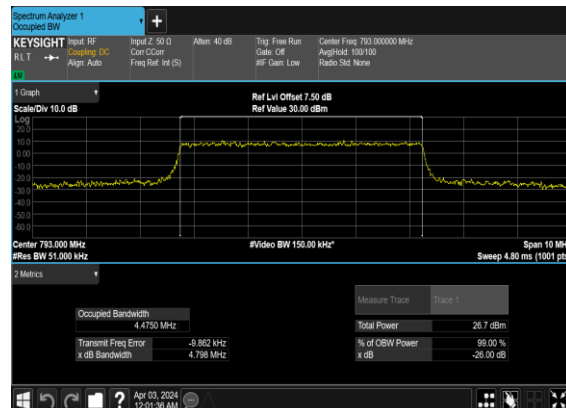
Occupied Bandwidth

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	OBW (MHz)	26dB BW (MHz)
14	15	5	158600	793.0	CP-OFDM QPSK	25@0	4.4652	4.86
14	15	5	158600	793.0	CP-OFDM 16 QAM	25@0	4.475	4.798
14	15	5	158600	793.0	CP-OFDM 64 QAM	25@0	4.4668	4.831
14	15	5	158600	793.0	CP-OFDM 256 QAM	25@0	4.4646	4.8
14	15	10	158600	793.0	CP-OFDM QPSK	52@0	9.2894	9.917
14	15	10	158600	793.0	CP-OFDM 16 QAM	52@0	9.2769	9.736
14	15	10	158600	793.0	CP-OFDM 64 QAM	52@0	9.2953	9.768
14	15	10	158600	793.0	CP-OFDM 256 QAM	52@0	9.2737	9.74

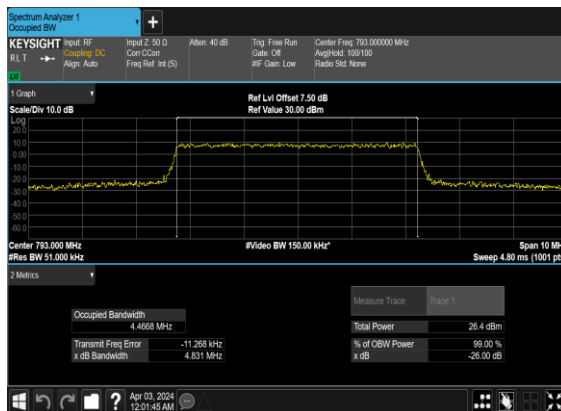
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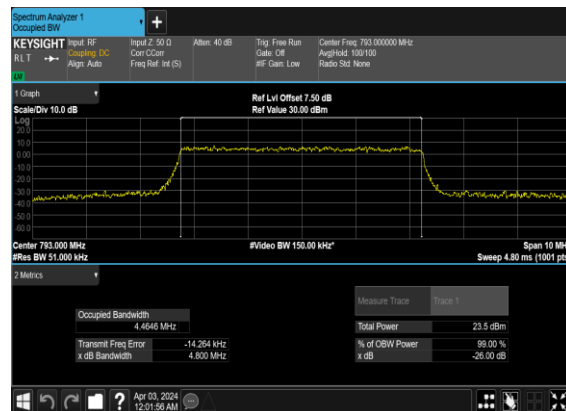
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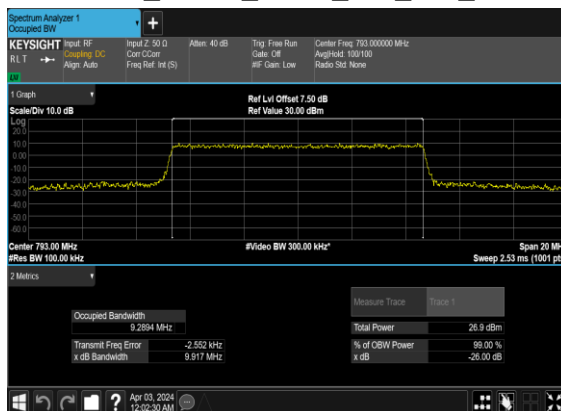
N14(5M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



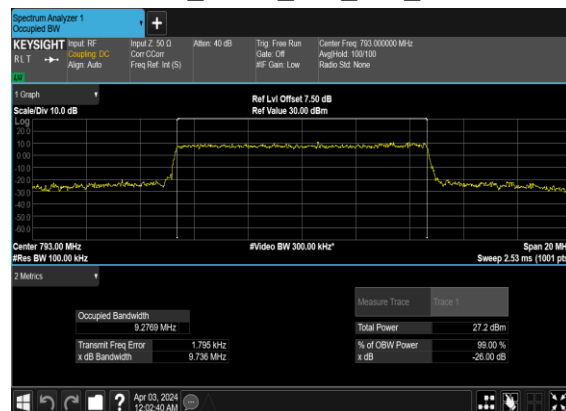
N14(5M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



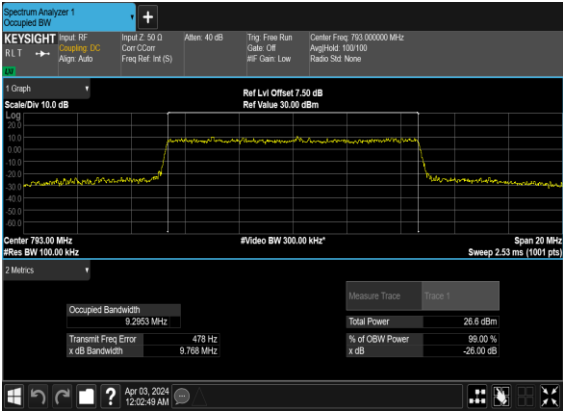
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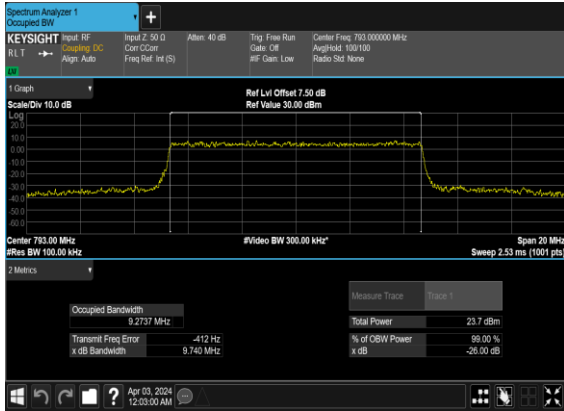
N14(10M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



N14(10M)_CP-OFDM_64
QAM_Outer_Full_Mid_CH



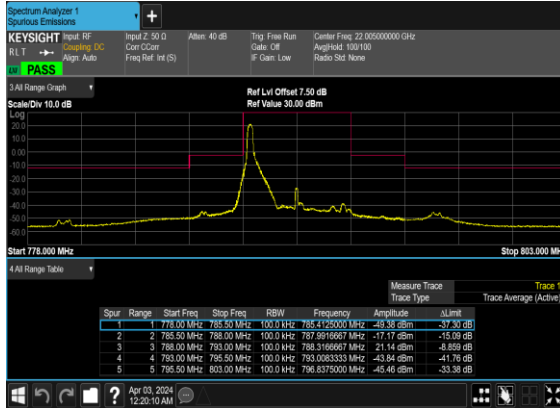
N14(10M)_CP-OFDM_256
QAM_Outer_Full_Mid_CH



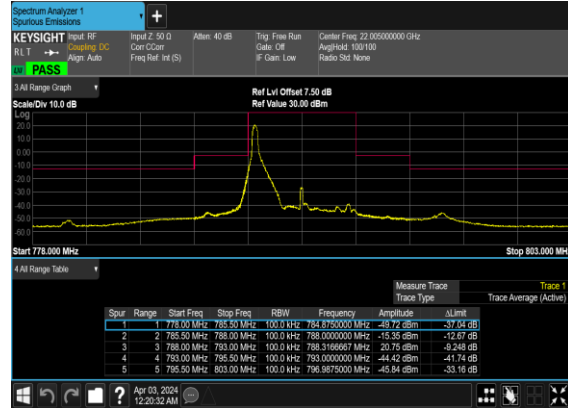
Emission Mask

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Limit (dBm/MHz)	Verdict
14	15	5	158100	790.5	DFT-s-OFDM BPSK	1@0	see graph	PASS
14	15	5	158100	790.5	DFT-s-OFDM QPSK	1@0	see graph	PASS
14	15	5	158100	790.5	DFT-s-OFDM BPSK	1@24	see graph	PASS
14	15	5	158100	790.5	DFT-s-OFDM QPSK	1@24	see graph	PASS
14	15	5	158100	790.5	DFT-s-OFDM BPSK	25@0	see graph	PASS
14	15	5	158100	790.5	DFT-s-OFDM QPSK	25@0	see graph	PASS
14	15	5	158600	793.0	DFT-s-OFDM BPSK	1@0	see graph	PASS
14	15	5	158600	793.0	DFT-s-OFDM QPSK	1@0	see graph	PASS
14	15	5	158600	793.0	DFT-s-OFDM BPSK	1@24	see graph	PASS
14	15	5	158600	793.0	DFT-s-OFDM QPSK	1@24	see graph	PASS
14	15	5	158600	793.0	DFT-s-OFDM BPSK	25@0	see graph	PASS
14	15	5	158600	793.0	DFT-s-OFDM QPSK	25@0	see graph	PASS
14	15	5	159100	795.5	DFT-s-OFDM BPSK	1@0	see graph	PASS
14	15	5	159100	795.5	DFT-s-OFDM QPSK	1@0	see graph	PASS
14	15	5	159100	795.5	DFT-s-OFDM BPSK	1@24	see graph	PASS
14	15	5	159100	795.5	DFT-s-OFDM QPSK	1@24	see graph	PASS
14	15	5	159100	795.5	DFT-s-OFDM BPSK	25@0	see graph	PASS
14	15	5	159100	795.5	DFT-s-OFDM QPSK	25@0	see graph	PASS
14	15	10	158600	793.0	DFT-s-OFDM BPSK	1@0	see graph	PASS
14	15	10	158600	793.0	DFT-s-OFDM QPSK	1@0	see graph	PASS
14	15	10	158600	793.0	DFT-s-OFDM BPSK	1@51	see graph	PASS
14	15	10	158600	793.0	DFT-s-OFDM QPSK	1@51	see graph	PASS
14	15	10	158600	793.0	DFT-s-OFDM BPSK	50@0	see graph	PASS
14	15	10	158600	793.0	DFT-s-OFDM QPSK	50@0	see graph	PASS

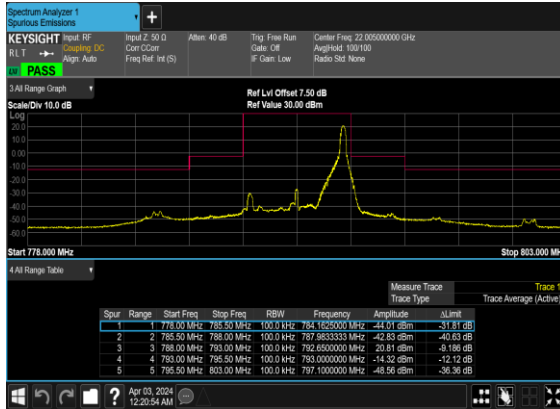
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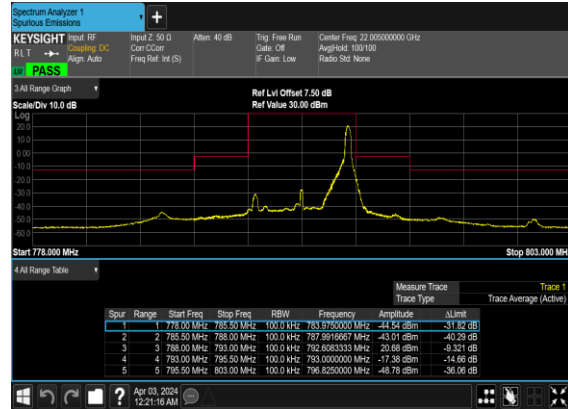
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OFDM_QPSK_Edge_1RB_Left_Low_CH



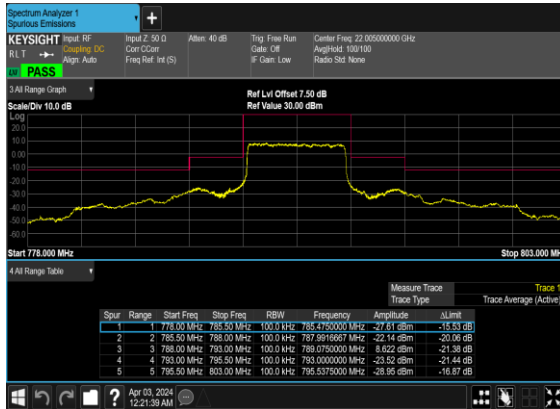
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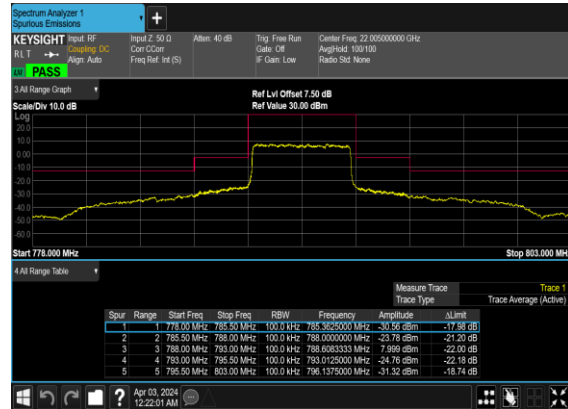
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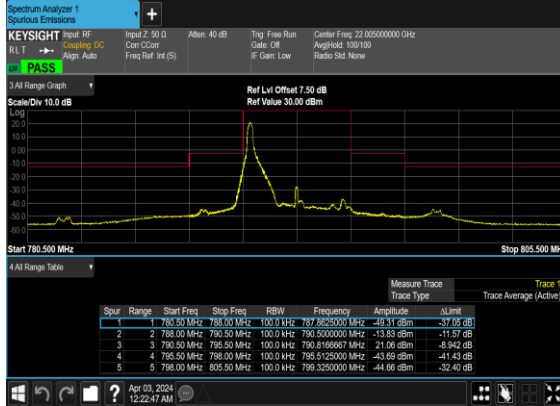
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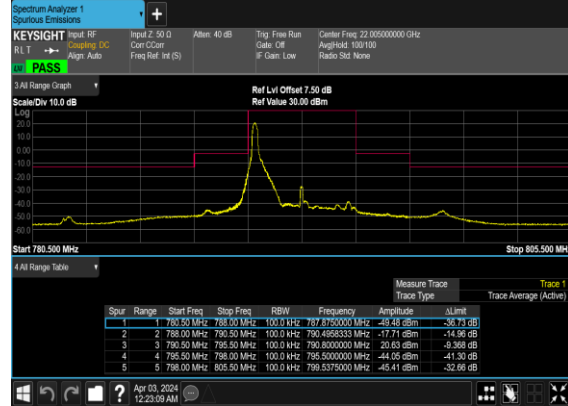
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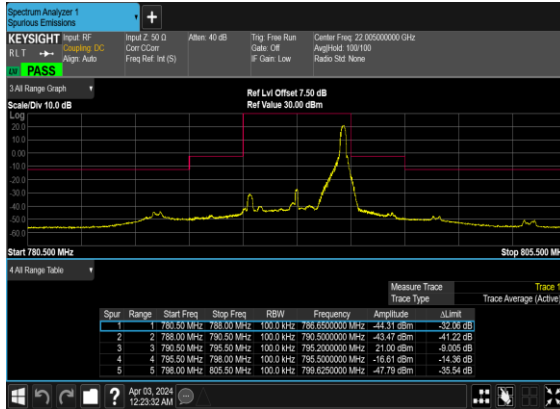
N14(5M)_DFT-s-
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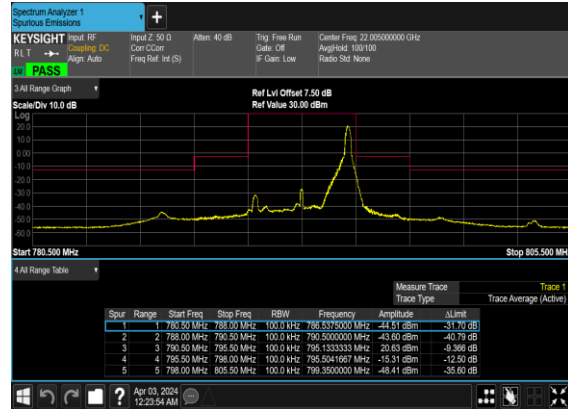
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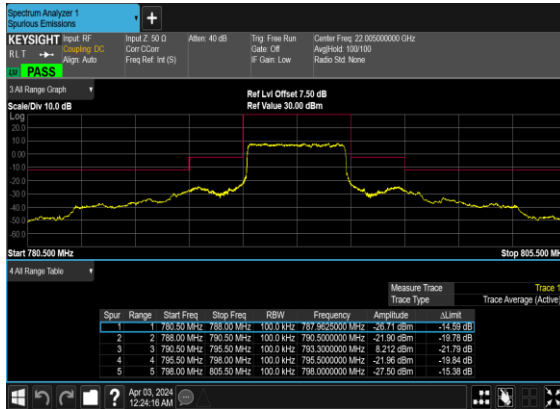
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OFDM_BPSK_Edge_1RB_Right_Mid_CH



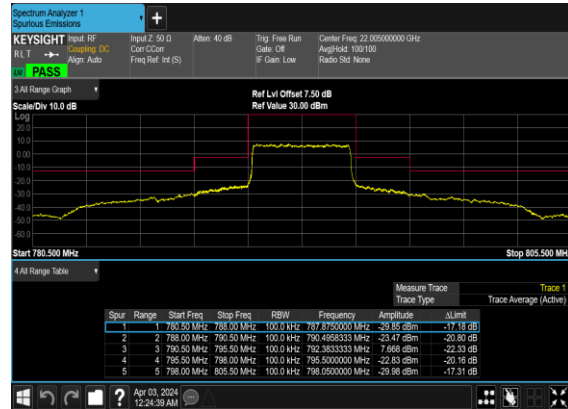
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OFDM_QPSK_Edge_1RB_Right_Mid_CH



N14(5M)_DFT-s-
OFDM_BPSK_Outer_Full_Mid_CH



N14(5M)_DFT-s-
OFDM_QPSK_Outer_Full_Mid_CH



Keysight Spectrum Analyzer 1
Spurious Emissions

KEYSIGHT Input Ref: Creating DC
R/LT → Align: Auto

Input 2: 50.0 GHz
Corr: Center
Freq Ref: Ref (S)

Att: 40 dB

Trig: Free Run
Gate: Off
IF Gain: Low

Center Freq: 22.00000000 GHz
Amp/Hz: 100.100
Radio Std: None

3.48 Range Graph
Scale/Div: 10.0 dB
Log

Ref Lvl: Diff'd 7.50 dBm
Ref Value: 30.00 dBm

Start: 783.000 MHz
Stop: 808.000 MHz

4 All Range Table

Spur	Range	Start Freq	Stop Freq	PBW	Frequency	Amplitude	dBm
1	783.00 MHz	790.50 MHz	100.0 MHz	793.22000000 MHz	-43.00 dBm	-37.44 dB	
2	790.50 MHz	793.00 MHz	100.0 MHz	793.00000000 MHz	-19.18 dBm	-17.00 dB	
3	793.00 MHz	796.00 MHz	100.0 MHz	793.39666667 MHz	21.10 dBm	-8.600 dB	
4	796.00 MHz	800.50 MHz	100.0 MHz	796.01800000 MHz	-43.07 dBm	-41.38 dB	
5	800.50 MHz	808.00 MHz	100.0 MHz	801.80000000 MHz	-44.91 dBm	-32.73 dB	

Spectrum Analyzer 1
Spurious Emissions

KEYSIGHT Input Ref: **Coating DC** Input 2: 50.0 dBm Center Freq: 22.000000000 GHz
 R L T → **Coating DC** Corr CCat: **Auto** Trig: Free Run Gate: Off Avid: Low Center Freq: 22.000000000 GHz
Low PASS Freq Ref: 1st (S) Freq Ref: 100.100 MHz Radio Std: None

3.68 Range Graph
 Scale/Div: 10.0 dB
 Log
 20.0
 10.0
 0.0
 -10.0
 -20.0
 -30.0
 -40.0
 -50.0
 -60.0

Ref Lvl Offset: 7.50 dB
 Ref Value: 30.00 dBm

Start: 783.000 MHz Stop: 808.000 MHz

4 All Range Table

				Measure Trace		Trace Type		Trace Average (Active)	
Spur	Range	Start Freq	Stop Freq	PBW	Frequency	Amplitude	AUnit		
1	2	783.000 MHz	783.500 MHz	100.0 MHz	783.222000000 MHz	-48.00 dBm	dBm	-36.96 dB	
2	2	790.500 MHz	793.000 MHz	100.0 MHz	792.075000000 MHz	-14.84 dBm	dBm	-12.01 dB	
3	3	793.000 MHz	798.000 MHz	100.0 MHz	797.300000000 MHz	20.00 dBm	dBm	-9.348 dB	
4	4	798.000 MHz	800.500 MHz	100.0 MHz	798.000000000 MHz	-43.04 dBm	dBm	-41.11 dB	
5	5	800.500 MHz	808.000 MHz	100.0 MHz	801.950000000 MHz	-45.55 dBm	dBm	-32.72 dB	

Apr 03, 2024
 12:25:47 AM

Spectrum Analyzer 1
Spurious Emissions

KEYSIGHT Input Ref: RLT
Coupling: DC
Align: Auto

Input 2: 50 Ω
Port C: Corr
Freq Ref: Int (s)

Att: 40 dB

Trig: Free Run
Gate: Off
IF Gain: Low

Center Freq: 22.000500000 GHz
ResBW: 103100
Span: Std Noise

PASS

1 All Range Graph

Scale/Div: 10.0 dB

Log

Ref Lvl Offset 7.50 dB
Ref Value 30.00 dBm

Start 783.000 MHz Stop 808.000 MHz

4 All Range Table

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	ΔAm
1	1	783.00 MHz	790.50 MHz	100.00 MHz	783.1650000 MHz	-24.05 dBm	-32.45 dB
2	2	790.50 MHz	793.00 MHz	100.00 MHz	792.9968333 MHz	-44.06 dBm	-41.86 dB
3	3	793.00 MHz	796.00 MHz	100.00 MHz	797.6503333 MHz	-20.76 dBm	-9.222 dB
4	4	796.00 MHz	800.50 MHz	100.00 MHz	798.0000000 MHz	-15.81 dBm	-13.61 dB
5	5	800.50 MHz	808.00 MHz	100.00 MHz	801.8375000 MHz	-48.24 dBm	-36.04 dB

Measure Trace Trace Type Trace Average (Active)

The screenshot displays the Keysight Spectrum Analyzer software interface. The main window shows a spectral plot with a prominent peak at 783.000 MHz. The plot is set to a 40 dBm scale and a 10.0 dB resolution bandwidth. The peak is labeled with a value of 30.00 dBm. The interface includes several control panels and a data table.

Control Panels:

- Top Left:** Spectrum Analyzer 1, Spurious Emissions, KEYSIGHT Input, R.L.T. →, Analog DC, Auto, Input 2: 50 D, Core C: C, Center Freq: 783.000 MHz, Span: 100.0 MHz, Res Freq: 10.0 MHz, Res BW: 10.0 MHz, Res Freq: 10.0 MHz, Res BW: 10.0 MHz, Res Freq: 10.0 MHz, Res BW: 10.0 MHz.
- Top Right:** Center Freq: 22.00000000 GHz, Amplitude: 100.0 dBm, Span: 10.0 MHz.
- Left Panel:** 3.61 Range Graph, Scale/Div: 10.0 dB, Log, 20 dB, 40 dB, 60 dB, 80 dB, 100 dB, 120 dB, 140 dB, 160 dB, 180 dB, 200 dB, 220 dB, 240 dB, 260 dB, 280 dB, 300 dB, 320 dB, 340 dB, 360 dB, 380 dB, 400 dB, 420 dB, 440 dB, 460 dB, 480 dB, 500 dB, 520 dB, 540 dB, 560 dB, 580 dB, 600 dB, 620 dB, 640 dB, 660 dB, 680 dB, 700 dB, 720 dB, 740 dB, 760 dB, 780 dB, 800 dB, 820 dB, 840 dB, 860 dB, 880 dB, 900 dB, 920 dB, 940 dB, 960 dB, 980 dB, 1000 dB.
- Right Panel:** Ref Level Offset: 7.50 dB, Ref Value: 30.00 dBm.

Data Table:

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	dBm
1	783.000 MHz	783.000 MHz	783.000 MHz	100.0 MHz	783.00000000 MHz	25.32 dBm	-34.52 dB
2	783.000 MHz	783.000 MHz	783.000 MHz	100.0 MHz	783.00000000 MHz	44.03 dBm	-41.23 dB
3	783.000 MHz	783.000 MHz	783.000 MHz	100.0 MHz	783.00000000 MHz	20.73 dBm	-39.27 dB
4	783.000 MHz	783.000 MHz	783.000 MHz	100.0 MHz	783.00000000 MHz	-14.56 dBm	-12.16 dB
5	800.000 MHz	808.000 MHz	808.000 MHz	100.0 MHz	801.83750000 MHz	-49.23 dBm	-36.43 dB

Keysight Spectrum Analyzer 1
 Spurious Emissions

KEYSIGHT Input RF
 RLT → Creating DC
 Align Auto

Input Z: 50 Ω
 Corr Coef
 Freq Ref: 100 Hz (S)

Att: 40 dB

Trig: Free Run
 Gate: Off
 IF Gain: Low

Center Freq: 22.00000000 GHz
 Arg/Hd: 100/100
 Radio Std: None

3.48 Range Graph
 Scale/Div: 10.0 dB
 Log

Ref Lvl Offset: 7.50 dB
 Ref Value: 33.00 dBm

Start: 783.000 MHz
 Stop: 808.000 MHz

4.01 Range Table

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Unit
1	783.00 MHz	790.50 MHz	100.0 MHz	792.4375000 MHz	-26.56 dBm	-14.46 dB	
2	2 790.50 MHz	793.00 MHz	100.0 MHz	792.9333333 MHz	-22.02 dBm	-19.92 dB	
3	3 793.00 MHz	796.00 MHz	100.0 MHz	797.3750000 MHz	-8.14 dBm	-21.86 dB	
4	4 796.00 MHz	800.50 MHz	100.0 MHz	798.6541667 MHz	-11.13 dBm	-19.03 dB	
5	5 800.50 MHz	808.00 MHz	100.0 MHz	800.5750000 MHz	-26.81 dBm	-14.71 dB	

Measure Trace
 Trace Type
 Trace Average (Active)

Apr 03, 2024
 12:26:55 AM

Spectrum Analyzer 1
Spurious Emissions

KEYSIGHT Input RF: Coupling DC, Imped 2.50 D, Corr CCat, Att: 40 dB, Trig: Free Run, Gate: Off, Center Freq: 22.000000000 GHz, Avg: Auto, Res: Std, Noise, Amplitude: 100.00 dB, Span: 100.00 MHz

Log PASS

3.68 Range Graph

Scale/Div: 10.0 dB

Log

Ref Lvl Offset: 7.50 dB
Ref Value: 38.00 dBm

Start 783.00 MHz

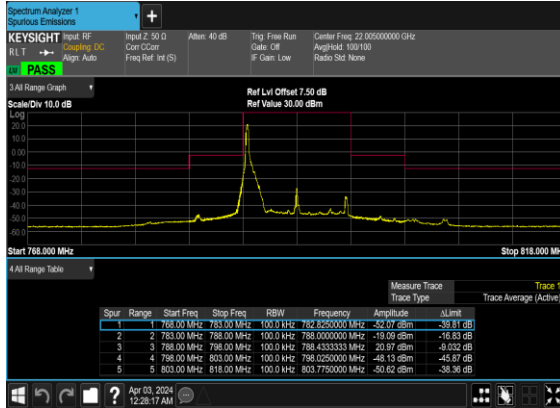
Stop 808.00 MHz

4 All Range Table

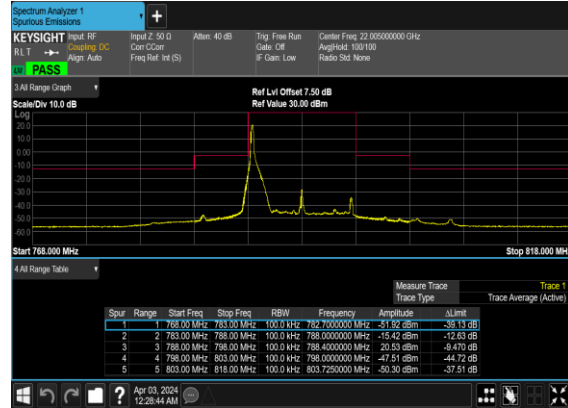
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	AUnit
1	783.00 MHz	783.00 MHz	100.00 MHz	100.00 MHz	792.28000000 MHz	-29.70 dBm	-17.00 dB
2	790.50 MHz	793.00 MHz	100.00 MHz	100.00 MHz	792.28000000 MHz	-22.83 dBm	-20.13 dB
3	793.00 MHz	798.00 MHz	100.00 MHz	100.00 MHz	794.9416667 MHz	5.064 dBm	-21.91 dB
4	798.00 MHz	800.50 MHz	100.00 MHz	100.00 MHz	798.0041667 MHz	-21.57 dBm	-19.27 dB
5	800.50 MHz	808.00 MHz	100.00 MHz	100.00 MHz	800.81250000 MHz	-29.13 dBm	-16.43 dB

Measure Trace 1
Trace Type: Trace Average (Active)

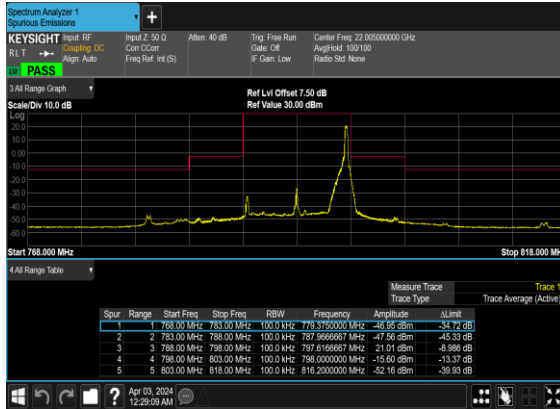
N14(10M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Mid_CH



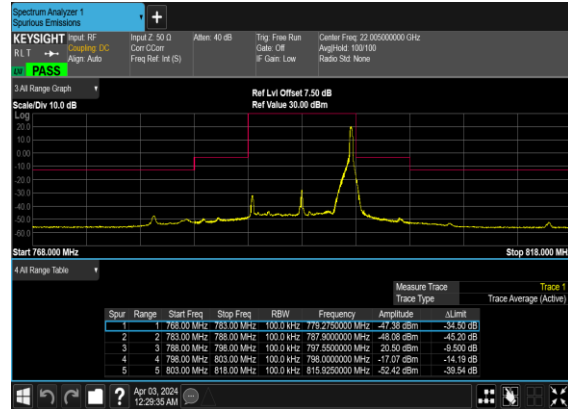
N14(10M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Mid_CH



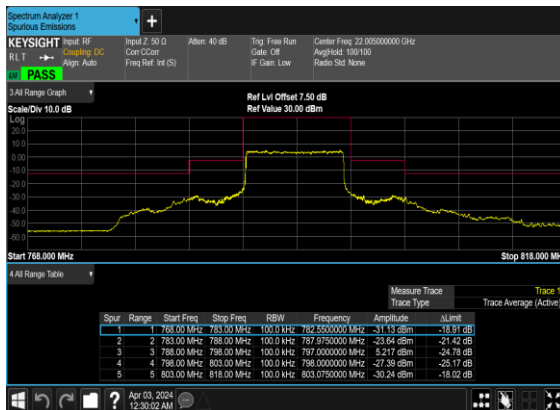
N14(10M)_DFT-s-
OFDM_BPSK_Edge_1RB_Right_Mid_CH



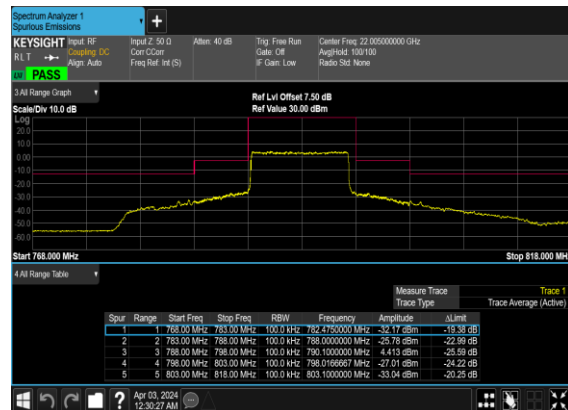
N14(10M)_DFT-s-
OFDM_QPSK_Edge_1RB_Right_Mid_CH



N14(10M)_DFT-s-
OFDM_BPSK_Outer_Full_Mid_CH



N14(10M)_DFT-s-
OFDM_QPSK_Outer_Full_Mid_CH



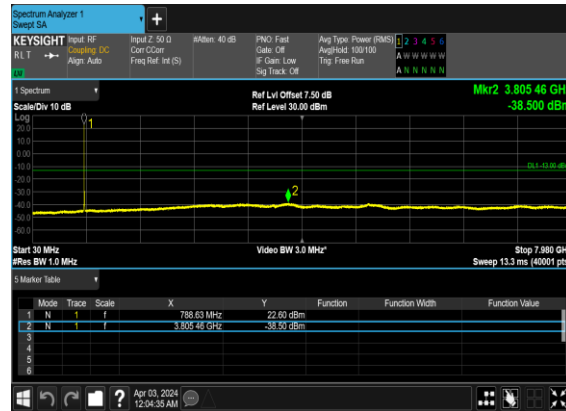
Conducted Spurious Emissions

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
14	15	5	158100	790.5	DFT-s-OFDM BPSK	1@0	see graph	---
14	15	5	158100	790.5	DFT-s-OFDM BPSK	1@0	see graph	PASS
14	15	5	158100	790.5	DFT-s-OFDM QPSK	1@0	see graph	---
14	15	5	158100	790.5	DFT-s-OFDM QPSK	1@0	see graph	PASS
14	15	5	158600	793.0	DFT-s-OFDM BPSK	1@0	see graph	---
14	15	5	158600	793.0	DFT-s-OFDM BPSK	1@0	see graph	PASS
14	15	5	158600	793.0	DFT-s-OFDM QPSK	1@0	see graph	---
14	15	5	158600	793.0	DFT-s-OFDM QPSK	1@0	see graph	PASS
14	15	5	159100	795.5	DFT-s-OFDM BPSK	1@0	see graph	---
14	15	5	159100	795.5	DFT-s-OFDM BPSK	1@0	see graph	PASS
14	15	5	159100	795.5	DFT-s-OFDM QPSK	1@0	see graph	---
14	15	5	159100	795.5	DFT-s-OFDM QPSK	1@0	see graph	PASS
14	15	10	158600	793.0	DFT-s-OFDM BPSK	1@0	see graph	---
14	15	10	158600	793.0	DFT-s-OFDM BPSK	1@0	see graph	PASS
14	15	10	158600	793.0	DFT-s-OFDM QPSK	1@0	see graph	---
14	15	10	158600	793.0	DFT-s-OFDM QPSK	1@0	see graph	PASS

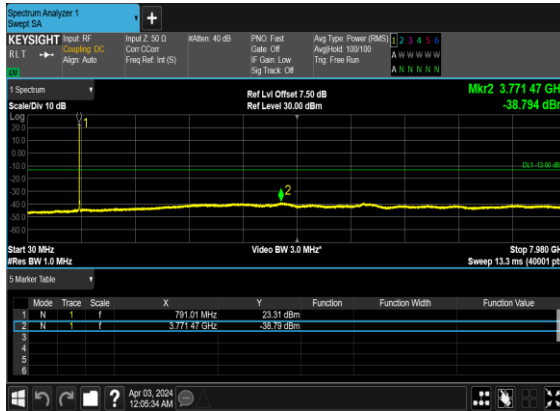
N14(5M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Low_CH



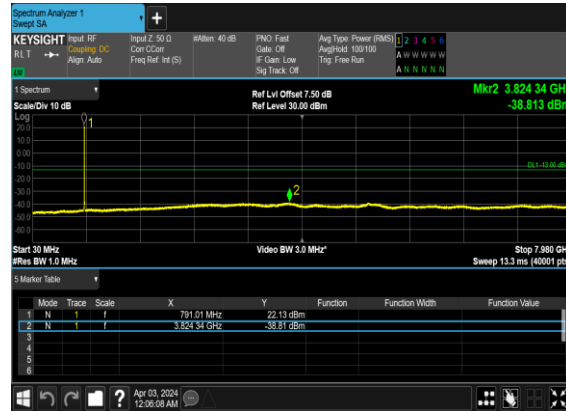
N14(5M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Low_CH



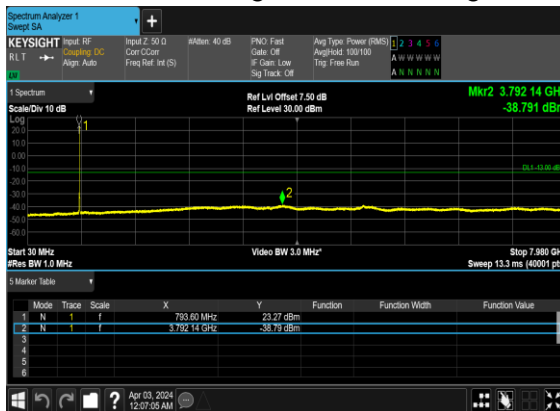
N14(5M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Mid_CH



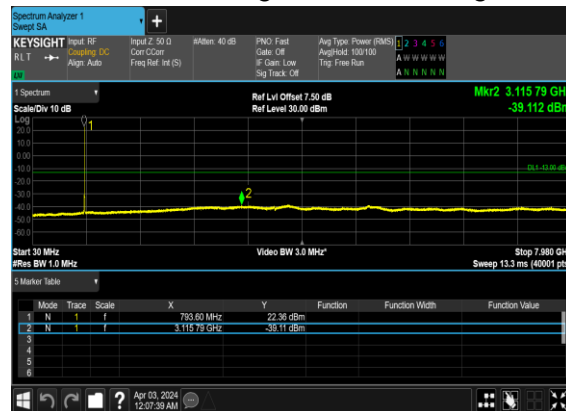
N14(5M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Mid_CH



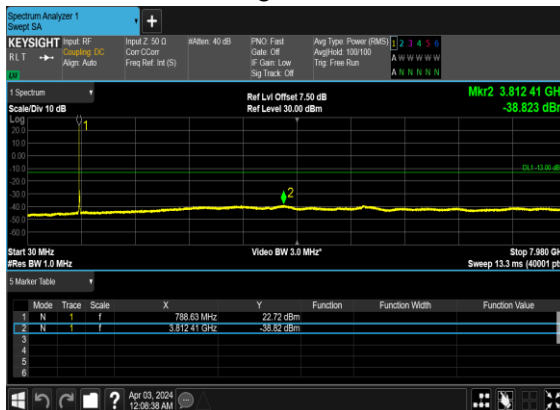
N14(5M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_High_CH



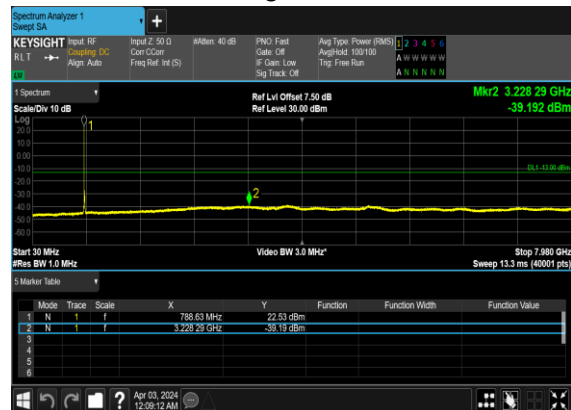
N14(5M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_High_CH



N14(10M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Mid_CH



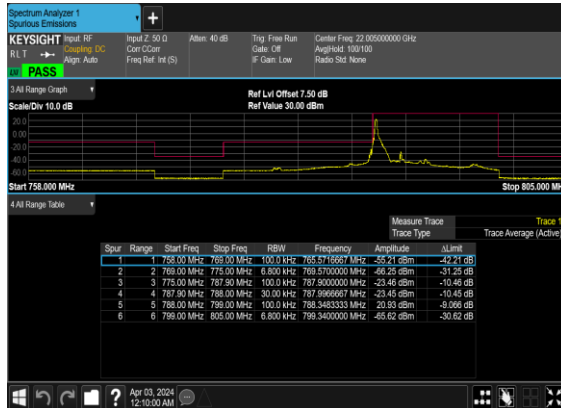
N14(10M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Mid_CH



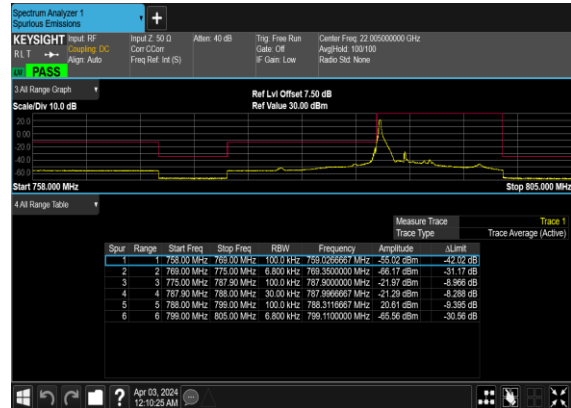
Conducted Band Edge

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
14	15	5	158100	790.5	DFT-s-OFDM BPSK	1@0	see graph	PASS
14	15	5	158100	790.5	DFT-s-OFDM QPSK	1@0	see graph	PASS
14	15	5	158100	790.5	DFT-s-OFDM BPSK	25@0	see graph	PASS
14	15	5	158100	790.5	DFT-s-OFDM QPSK	25@0	see graph	PASS
14	15	5	159100	795.5	DFT-s-OFDM BPSK	1@24	see graph	PASS
14	15	5	159100	795.5	DFT-s-OFDM QPSK	1@24	see graph	PASS
14	15	5	159100	795.5	DFT-s-OFDM BPSK	25@0	see graph	PASS
14	15	5	159100	795.5	DFT-s-OFDM QPSK	25@0	see graph	PASS
14	15	10	158600	793.0	DFT-s-OFDM BPSK	1@0	see graph	PASS
14	15	10	158600	793.0	DFT-s-OFDM QPSK	1@0	see graph	PASS
14	15	10	158600	793.0	DFT-s-OFDM BPSK	1@51	see graph	PASS
14	15	10	158600	793.0	DFT-s-OFDM QPSK	1@51	see graph	PASS
14	15	10	158600	793.0	DFT-s-OFDM BPSK	50@0	see graph	PASS
14	15	10	158600	793.0	DFT-s-OFDM QPSK	50@0	see graph	PASS

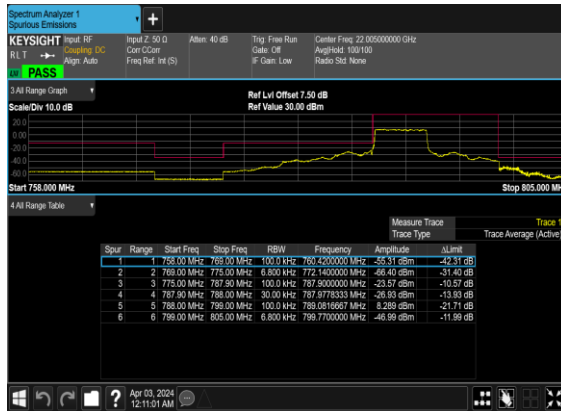
N14(5M)_DFT-s- OFDM_BPSK_Edge_1RB_Left_Low_CH



N14(5M)_DFT-s- OFDM_QPSK_Edge_1RB_Left_Low_CH



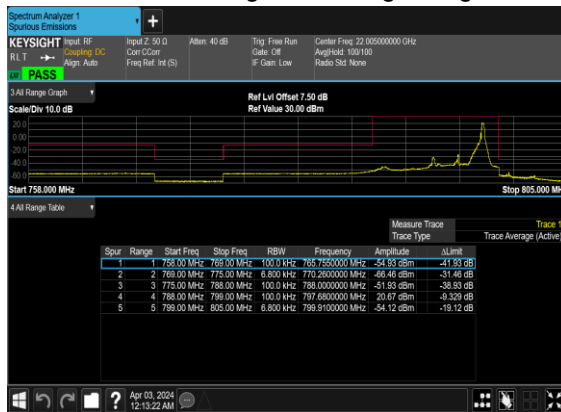
N14(5M)_DFT-s- OFDM_BPSK_Outer_Full_Low_CH



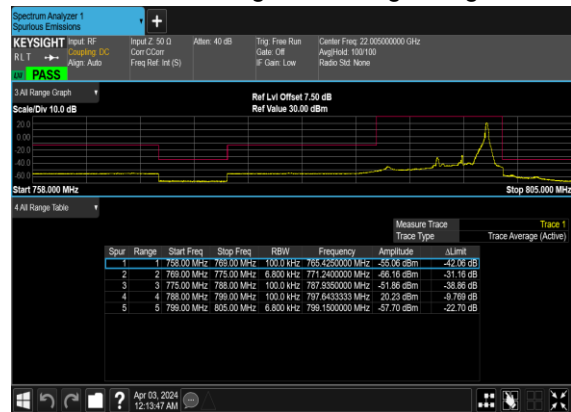
N14(5M)_DFT-s- OFDM_QPSK_Outer_Full_Low_CH



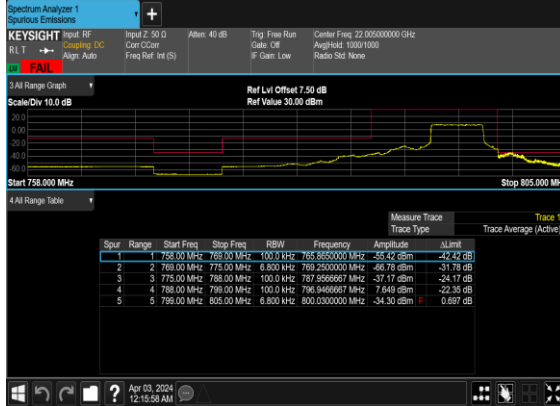
N14(5M)_DFT-s- OFDM_BPSK_Edge_1RB_Right_High_CH



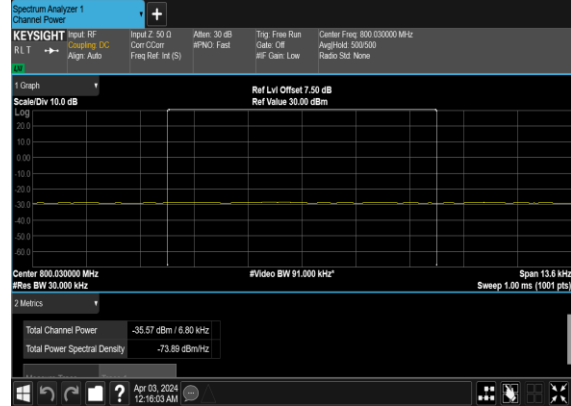
N14(5M)_DFT-s- OFDM_QPSK_Edge_1RB_Right_High_CH



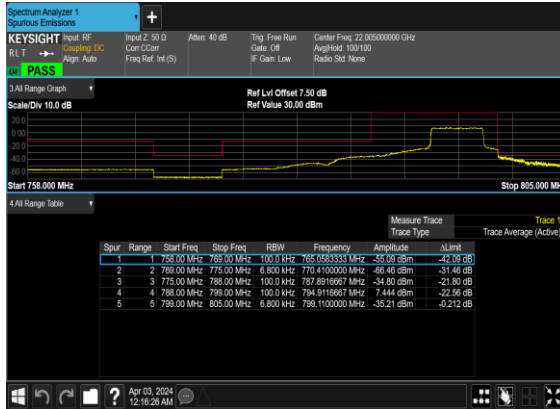
N14(5M)_DFT-s-OFDM_BPSK_Outer_Full_High_CH



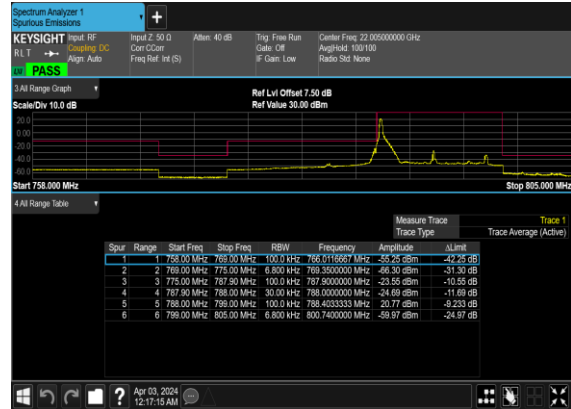
N14(5M)_DFT-s-OFDM_BPSK_Outer_Full_High_CH_CHP_PASS



N14(5M)_DFT-s-OFDM_QPSK_Outer_Full_High_CH



N14(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



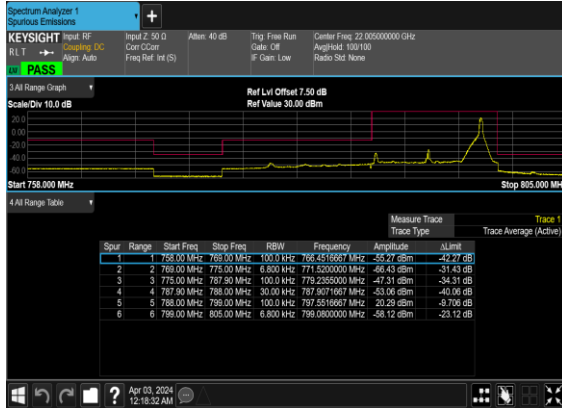
N14(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



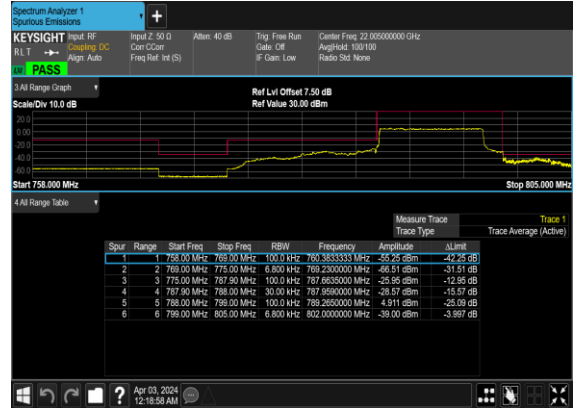
N14(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Right_Mid_CH



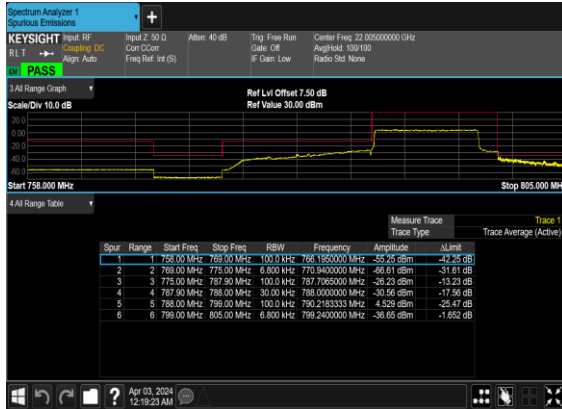
N14(10M)_DFT-s- OFDM_QPSK_Edge_1RB_Right_Mid_CH



N14(10M)_DFT-s- OFDM_BPSK_Outer_Full_Mid_CH



N14(10M)_DFT-s- OFDM_QPSK_Outer_Full_Mid_CH



Appendix B. Test Results of Radiated Test

Field Strength of Spurious Radiated

Test Engineer :	Zhaohui Liang	Temperature :	22~25°C
		Relative Humidity :	48~52%

SA n14 / NR 10MHz / QPSK / Sample 1 & Monopole Antenna									
Bandwidth	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1572.1	-65.82	-42.15	-23.67	-77.61	-69.05	3.98	9.36	H
	2358.15	-60.26	-13	-47.26	-78.86	-63.81	4.85	10.55	H
	3144.2	-59.07	-13	-46.07	-79.43	-64.00	5.50	12.58	H
	1572.1	-64.88	-42.15	-22.73	-77.24	-68.11	3.98	9.36	V
	2358.15	-59.89	-13	-46.89	-78.95	-63.44	4.85	10.55	V
	3144.2	-57.48	-13	-44.48	-79.70	-62.41	5.50	12.58	V
Middle	1581.4	-65.87	-42.15	-23.72	-77.70	-69.12	4.00	9.40	H
	2372.1	-60.13	-13	-47.13	-78.73	-63.70	4.88	10.60	H
	3162.8	-59.52	-13	-46.52	-79.91	-64.45	5.52	12.60	H
	1581.4	-65.07	-42.15	-22.92	-77.47	-68.32	4.00	9.40	V
	2372.1	-59.62	-13	-46.62	-78.76	-63.19	4.88	10.60	V
	3162.8	-56.90	-13	-43.90	-79.22	-61.83	5.52	12.60	V
Highest	1582.1	-65.93	-42.15	-23.78	-77.76	-69.10	4.10	9.42	H
	2373.15	-59.84	-13	-46.84	-78.44	-63.42	4.90	10.63	H
	3164.2	-59.11	-13	-46.11	-79.50	-64.03	5.55	12.62	H
	1582.1	-65.48	-42.15	-23.33	-77.88	-68.65	4.10	9.42	V
	2373.15	-59.34	-13	-46.34	-78.48	-62.92	4.90	10.63	V
	3164.2	-57.58	-13	-44.58	-79.90	-62.50	5.55	12.62	V
Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.									
Test Result					PASS				

SA n14 / NR 10MHz / QPSK/ Sample 1 & Monopole Antenna									
Bandwidth	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1577	-65.90	-42.15	-23.75	-77.73	-69.15	4.00	9.40	H
	2365.5	-60.13	-13	-47.13	-78.73	-63.70	4.88	10.60	H
	3154	-59.12	-13	-46.12	-79.52	-64.05	5.52	12.60	H
	1577	-65.06	-42.15	-22.91	-77.46	-68.31	4.00	9.40	V
	2365.5	-59.62	-13	-46.62	-78.68	-63.19	4.88	10.60	V
	3154	-56.90	-13	-43.90	-79.23	-61.83	5.52	12.60	V
Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.									
Test Result					PASS				