TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 96** **47 CFR FCC Part 2**
Report No.:	RFBFJZ-WTW-P22110126-10
FCC ID:	V65E7200
Product:	Smartphone
Brand:	Kyocera
Model No.:	E7200
Received Date:	2022/12/7
Test Date:	2022/12/23 ~ 2023/3/15
Issued Date:	2023/4/11
Applicant:	Kyocera Corporation ℅ Kyocera International, Inc.
Address:	8611 Balboa Avenue, San Diego, CA 92123
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location (1):	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN
FCC Registration / Designation Number:	788550 / TW0003
Test Location (2):	No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
FCC Registration / Designation Number:	281270 / TW0032

Approved by: Jeremy Lin , **Date:** 2023/4/11

Jeremy Lin / Project Engineer

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Prepared by : Celine Chou / Senior Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBFJZ-WTW-P22110126-10	Original release.	2023/4/11

1 Certificate

Product:	Smartphone
Brand:	Kyocera
Test Model:	E7200
Sample Status:	Identical prototype
Applicant:	Kyocera Corporation ℅ Kyocera International, Inc.
Test Date:	2022/12/23 ~ 2023/3/15
Standard:	47 CFR FCC Part 96 47 CFR FCC Part 2
Measurement procedure:	ANSI/TIA/EIA-603-E 2016 ANSI C63.26-2015 KDB 971168 D01 Power Meas License Digital Systems v03r01 KDB 940660 D01 Part 96 CBRS Eqpt v03

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

47 CFR FCC Part 96 & Part 2			
Standard / Clause	Test Item	Result	Remark
FCC 47 CFR Part 2.1046 FCC 47 CFR Part 96.41(b)	Maximum EIRP	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1047	Modulation Characteristics	Pass	Meet the requirement of limit.
FCC 47 CFR Part 96.41(g)	Peak to Average Ratio	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1049	Bandwidth	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1051 FCC 47 CFR Part 96.41(e)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1053 FCC 47 CFR Part 96.41(e)	Radiated Spurious Emissions below 1GHz	Pass	Minimum passing margin is -5.05 dB at 161.92 MHz
FCC 47 CFR Part 2.1053 FCC 47 CFR Part 96.41(e)	Radiated Spurious Emissions above 1GHz	Pass	Minimum passing margin is -1.12 dB at 7140.00 MHz
FCC 47 CFR Part 2.1055	Frequency Stability	Pass	Meet the requirement of limit.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Specification	Expanded Uncertainty (k=2) (±)
Radiated Spurious Emissions below 1GHz	9 kHz ~ 30 MHz	3.00 dB
	30 MHz ~ 1 GHz	2.93 dB
Radiated Spurious Emissions above 1GHz	1 GHz ~ 18 GHz	1.76 dB
	18 GHz ~ 40 GHz	1.77 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Smartphone
Brand	Kyocera
Test Model	E7200
Status of EUT	Identical prototype
Power Supply Rating	20Vdc or 15Vdc or 9Vdc or 5Vdc (From adapter) 3.87Vdc (From battery)

Note:

1. The EUT supports the following ENDC configuration.

	FCC 5G FR1			ENDC
	Band	SCS	Bandwidth (MHz)	
5GNR	n2	15kHz	5/10/15/20	Band 5/12/13/14/30/66
	n5	15kHz	5/10/15/20	Band 2/66/48
	n25	15kHz	5/10/15/20	Band 12/48/66
	n30	15kHz	10	Band 2/66
	n41	30kHz	20/30/40/50/60/70/80/90/100	Band 2/66
	n48	30kHz	20/40	Band 2
	n66	15kHz	5/10/15/20/30	Band 2/5/13/14/30/48
	n71	15kHz	5/10/15/20	Band 2/66
	n77	30kHz	20/30/40/60/80/100	Band 2/5/12/13/14/66

* This EUT support SA mode and NSA mode, after verification, SA mode was the worst case and chosen for final test.

2. EUT Overview

Band / Bandwidth	TX Frequency Range (MHz)	Max. EIRP Power				
		BPSK	QPSK	16QAM	64QAM	256QAM
n48 (Channel Bandwidth 20MHz)	3560.01-3690.00	130.918mW (21.17dBm/10MHz)	136.458mW (21.35dBm/10MHz)	107.152mW (20.30dBm/10MHz)	73.282mW (18.65dBm/10MHz)	46.452mW (16.67dBm/10MHz)
		133.045mW (21.24dBm/20MHz)	138.676mW (21.42dBm/20MHz)	110.408mW (20.43dBm/20MHz)	74.989mW (18.75dBm/20MHz)	47.098mW (16.73dBm/20MHz)
n48 (Channel Bandwidth 40MHz)	3570.00-3679.98	133.660mW (21.26dBm/10MHz)	136.144mW (21.34dBm/10MHz)	107.895mW (20.33dBm/10MHz)	74.302mW (18.71dBm/10MHz)	46.345mW (16.66dBm/10MHz)
		135.207mW (21.31dBm/40MHz)	139.316mW (21.44dBm/40MHz)	109.648mW (20.40dBm/40MHz)	75.509mW (18.78dBm/40MHz)	46.989mW (16.72dBm/40MHz)

Band / Bandwidth	TX Frequency Range (MHz)	Emission Designator				
		BPSK	QPSK	16QAM	64QAM	256QAM
n48 (Channel Bandwidth 20MHz)	3560.01-3690.00	18M1G7D	18M2G7D	18M2D7W	18M2D7W	18M2D7W
n48 (Channel Bandwidth 40MHz)	3570.00-3679.98	37M5G7D	37M8G7D	37M8D7W	37M8D7W	37M8D7W

3. The EUT uses following accessories.

Battery		
Brand	Model	Specification
Kyocera	SCP-76LBPS	Power Rating : 3.87Vdc, typ 4270mAh, typ. 16.6Wh
USB Type A to USB type C cable		
Brand	Model	Specification
Kyocera	SCP-24 SDC	Signal Line : 1m shielded Type A to Type C USB

4. The EUT uses following support unit only.

Adapter (Support unit)		
Brand	Model	Specification
Kyocera	SCP-53ADT	AC Input: 100-240 Vac, 50/60 Hz, 0.6A DC Output: 5Vdc, 3A; 9Vdc, 3A; 15Vdc 1.8A; 20Vdc, 1.35A

5. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna Type		Monopole	
Antenna Connector		NA	
Item	Antenna No.	Band	Gain (dBi)
5G NR FR1	ANT0	n2	-0.7
		n5	-2.8
		n25	-0.7
		n30	-1.4
		n66	-0.1
		n71	-6.2
	ANT1	n2	0.1
		n25	0.2
		n41	-1.5
		n48	-2.0
		n66	0.0
		n77	-2.0

* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3.3 Test Mode Applicability and Tested Channel Detail

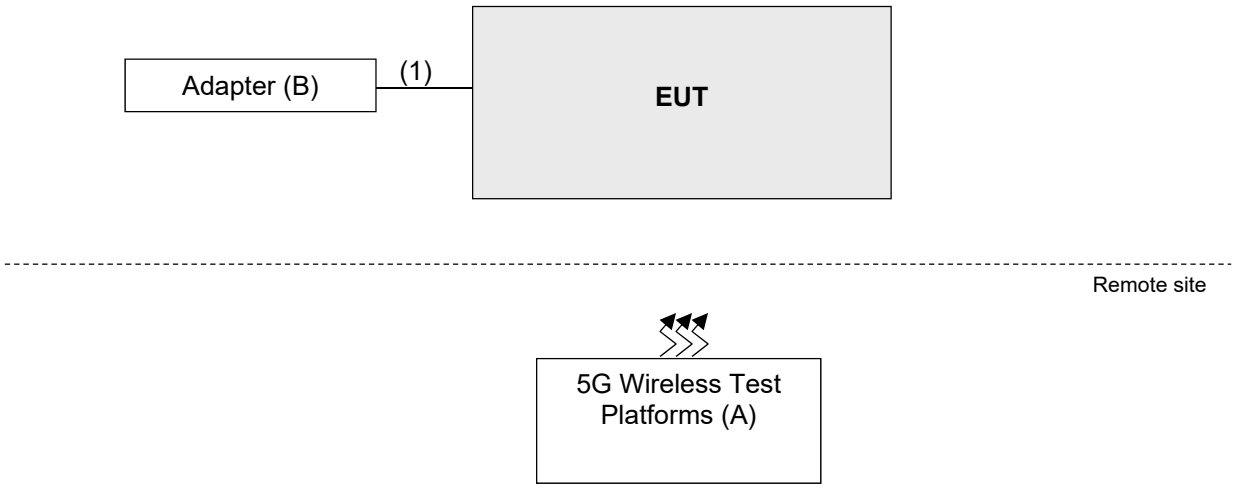
Pre-Scan:	EUT can be used in the following ways: X-axis/ Y-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition.
Worst Case:	X-axis/ Y-axis/ Z-axis Worst Condition: Z-axis

Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
EIRP	637334 (3560.01 MHz) 641666 (3624.99 MHz) 646000 (3690.00 MHz)	20 MHz	BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB Half RB Full RB
	638000 (3570.00 MHz) 641666 (3624.99 MHz) 645332 (3679.98 MHz)	40 MHz	BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB Half RB Full RB
Modulation Characteristics	641666 (3624.99 MHz)	40 MHz	BPSK / QPSK / 16QAM / 64QAM / 256QAM	Full RB
Frequency Stability	637334 (3560.01 MHz) 646000 (3690.00 MHz)	20 MHz	QPSK	Full RB
	638000 (3570.00 MHz) 645332 (3679.98 MHz)	40 MHz	QPSK	Full RB
Occupied Bandwidth	637334 (3560.01 MHz) 641666 (3624.99 MHz) 646000 (3690.00 MHz)	20 MHz	BPSK / QPSK / 16QAM / 64QAM / 256QAM	Full RB
	638000 (3570.00 MHz) 641666 (3624.99 MHz) 645332 (3679.98 MHz)	40 MHz	BPSK / QPSK / 16QAM / 64QAM / 256QAM	Full RB
Peak to Average Ratio	637334 (3560.01 MHz) 641666 (3624.99 MHz) 646000 (3690.00 MHz)	20 MHz	BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB
	638000 (3570.00 MHz) 641666 (3624.99 MHz) 645332 (3679.98 MHz)	40 MHz	BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB
Conducted Emission	637334 (3560.01 MHz) 641666 (3624.99 MHz) 646000 (3690.00 MHz)	20 MHz	QPSK	1 RB Full RB
	638000 (3570.00 MHz) 641666 (3624.99 MHz) 645332 (3679.98 MHz)	40 MHz	QPSK	1 RB Full RB
RE Below 1GHz	638000 (3570.00 MHz)	40 MHz	QPSK	1 RB
RE Above 1GHz	637334 (3560.01 MHz) 641666 (3624.99 MHz) 646000 (3690.00 MHz)	20 MHz	QPSK	1 RB
	638000 (3570.00 MHz) 641666 (3624.99 MHz) 645332 (3679.98 MHz)	40 MHz	QPSK	1 RB

3.4 Test Program Used and Operation Descriptions

There is no need to controlling software during the test, and the EUT can be paired with the 5G Wireless Test Platforms to test the connection when it is powered on.

3.5 Connection Diagram of EUT and Peripheral Devices



3.6 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	5G Wireless Test Platforms	Keysight	E7515B	MY60102114	N/A	Provided by Lab
B	Adapter	Kyocera	SCP-53ADT	N/A	N/A	Provided by Client

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	USB Cable	1	1	Y	0	Accessory of EUT

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 Maximum EIRP

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
N9030B - PXA Signal Analyzer KEYSIGHT	N9030B	MY57140938	2022/3/15	2023/3/14
5G Wireless Test Platforms Keysight	E7515B	MY60102114	2022/5/20	2023/5/19
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2022/12/23 ~ 2023/3/7

4.2 Modulation Characteristics

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
N9030B - PXA Signal Analyzer KEYSIGHT	N9030B	MY57140938	2022/3/15	2023/3/14
5G Wireless Test Platforms Keysight	E7515B	MY60102114	2022/5/20	2023/5/19
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2022/12/23 ~ 2023/3/7

4.3 Peak to Average Ratio

Refer to section 4.2 to get information of the instruments.

4.4 Bandwidth

Refer to section 4.2 to get information of the instruments.

4.5 Conducted Spurious Emissions

Refer to section 4.2 to get information of the instruments.

4.6 Radiated Spurious Emissions below 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	MFT-151SS-0.5T	N/A	N/A	N/A
Bi-log Broadband Antenna Schwarzbeck	VULB9168	9168-1213	2022/10/20	2023/10/19
Loop Antenna EMCI	EM-6879	269	2022/9/19	2023/9/18
Loop Antenna TESEQ	HLA 6121	45745	2022/7/27	2023/7/26
Pre-amplifier EMCI	EMC001340	980201	2022/9/23	2023/9/22
Pre_Amplifier EMCI	EMC330N	980782	2022/1/17	2023/1/16
RF Coaxial Cable EMCI	5D-NM-BM	140903+140902	2022/1/15	2023/1/14
	EMCCFD400-NM-NM-500	201233	2022/1/17	2023/1/16
	EMCCFD400-NM-NM-3000	201235	2022/1/17	2023/1/16
	EMCCFD400-NM-NM-9000	201236	2022/1/17	2023/1/16
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Spectrum Analyzer R&S	FSW43	101866	2022/1/14	2023/1/13
Test Receiver R&S	ESR3+	102782	2022/12/12	2023/12/11
Turn Table Max-Full	MF-7802BS	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208674	N/A	N/A
5G Wireless Test Platforms Keysight	E7515B	MY60102114	2022/5/20	2023/5/19

Notes:

1. The test was performed in WM - 966 chamber 8.
2. Tested Date: 2023/1/6

4.7 Radiated Spurious Emissions above 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	MFT-151SS-0.5T	N/A	N/A	N/A
Horn Antenna RFSPIN	DRH18-E	210103A18E	2022/11/13	2023/11/12
Horn Antenna Schwarzbeck	BBHA 9170	9170-1049	2022/11/13	2023/11/12
Pre_Amplifier EMCI	EMC118A45SE	980808	2022/12/29	2023/12/28
	EMC184045SE	980788	2022/1/17	2023/1/16
RF Coaxial Cable EMCI	EMC101G-KM-KM-2000	201254	2022/1/17	2023/1/16
	EMC101G-KM-KM-3000	201257	2022/1/17	2023/1/16
	EMC101G-KM-KM-5000	201260	2022/1/17	2023/1/16
	EMC104-SM-SM-1000	210102	2022/1/17	2023/1/16
	EMC104-SM-SM-3000	201231	2022/1/17	2023/1/16
	EMC104-SM-SM-9000	201243	2022/1/17	2023/1/16
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Spectrum Analyzer R&S	FSW43	101866	2022/1/14	2023/1/13
Test Receiver R&S	ESR3+	102782	2022/12/12	2023/12/11
Turn Table Max-Full	MF-7802BS	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208674	N/A	N/A
5G Wireless Test Platforms Keysight	E7515B	MY60102114	2022/5/20	2023/5/19

Notes:

1. The test was performed in WM - 966 chamber 8.
2. Tested Date: 2023/1/5

4.8 Frequency Stability

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
3-channel DC power supply JIN YIH Technology	ODP3033	ODP30332128138	N/A	N/A
Digital Multimeter Fluke	87-III	70360742	2022/6/23	2023/6/22
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer R&S	FSV40	100980	2022/4/20	2023/4/19
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	2022/12/27	2023/12/26
5G Wireless Test Platforms Keysight	E7515B	MY60102114	2022/5/20	2023/5/19

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2023/3/15

5 Limits of Test Items

5.1 Maximum EIRP

Device		Maximum EIRP (dBm/10 MHz)
☒	End User Device	23
☐	Category A CBSD	30
☐	Category B CBSD	47

5.2 Modulation Characteristics

A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

5.3 Peak to Average Ratio

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.

5.4 Bandwidth

According to FCC 47 CFR part 2.1049, the occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5% of the total mean power radiated by a given emission.

5.5 Conducted Spurious Emissions

Power of any emissions outside the Fundamental	Limit
Within 0-10MHz above the Assigned Channel	-13 dBm/MHz
Within 0-10MHz below the Assigned Channel	
Greater than 10MHz above the Assigned Channel	-25 dBm/MHz
Greater than 10MHz below the Assigned Channel	
Power of any emission below 3530MHz	-40 dBm/MHz
Power of any emission above 3720MHz	

5.6 Radiated Spurious Emissions below 1GHz

Power of any emissions outside the Fundamental	Limit
Within 0-10MHz above the Assigned Channel	-13 dBm/MHz
Within 0-10MHz below the Assigned Channel	
Greater than 10MHz above the Assigned Channel	-25 dBm/MHz
Greater than 10MHz below the Assigned Channel	
Power of any emission below 3530MHz	-40 dBm/MHz
Power of any emission above 3720MHz	

5.7 Radiated Spurious Emissions above 1GHz

Power of any emissions outside the Fundamental	Limit
Within 0-10MHz above the Assigned Channel	-13 dBm/MHz
Within 0-10MHz below the Assigned Channel	
Greater than 10MHz above the Assigned Channel	-25 dBm/MHz
Greater than 10MHz below the Assigned Channel	
Power of any emission below 3530MHz	-40 dBm/MHz
Power of any emission above 3720MHz	

5.8 Frequency Stability

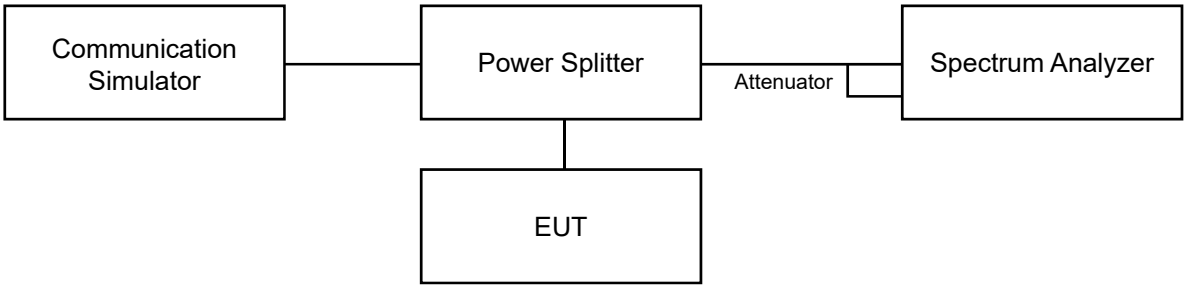
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation (authorized frequency block).

6 Test Arrangements

6.1 Maximum EIRP

6.1.1 Test Setup

Conducted Power Measurement:



6.1.2 Test Procedure

Conducted Power Measurement:

The EUT is configured by emulator to set data modulation and maximum power using WWAN technology. The power measurement was performed on emulator and power value was measured from power function on emulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

Measurement method refers to ANSI C63.26 section 5.2.4.4.

a. Set span to 2 × to 3 × the OBW.
b. Set RBW = 1% to 5% of the OBW.
c. Set VBW ≥ 3 × RBW.
d. Set number of measurement points in sweep ≥ 2 × span / RBW.
e. Set Sweep time = auto-couple.
f. Detector = power averaging (rms).
g. Set sweep trigger to “free run.”
h. Trace average at least 100 traces in power averaging (rms) mode.
i. Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band or channel power measurement function with band/channel limits set equal to the OBW band edges.
j. If Duty cycle < 98%, Add 10 log (1/duty cycle) to the measured power level to compute the average power during continuous transmission.
k. For per 10MHz method, channel power integrating bandwidth 10MHz is used for bandwidth 20M and 40M. For full power method, channel power integrating bandwidth 20MHz is used for bandwidth 20M, integrating bandwidth 40MHz is used for bandwidth 40M.

Maximum EIRP / ERP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

$EIRP = P_{Meas} + G_T$

$ERP = P_{Meas} + G_T - 2.15$

where

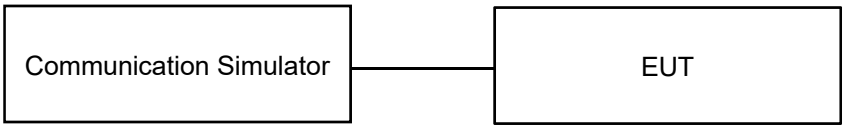
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively
(expressed in the same units as P_{Meas}, e.g., dBm or dBW)

P_{Meas} measured transmitter output power or PSD, in dBm or dBW

G_T gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

6.2 Modulation Characteristics

6.2.1 Test Setup

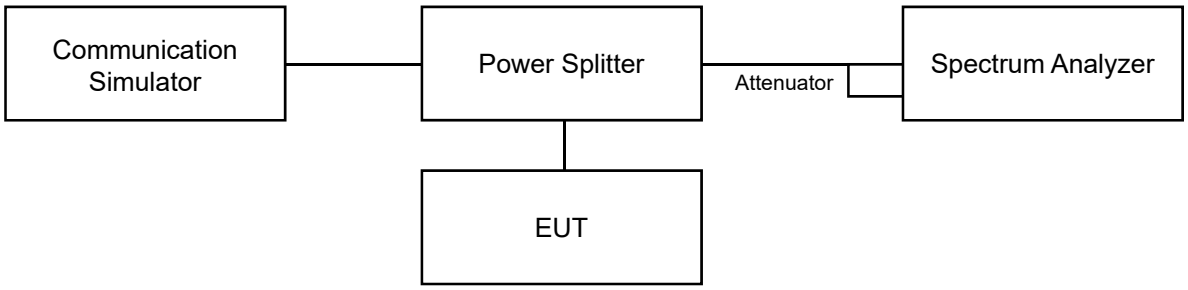


6.2.2 Test Procedure

Connect the EUT to Communication Simulator via the antenna connector, the frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

6.3 Peak to Average Ratio

6.3.1 Test Setup

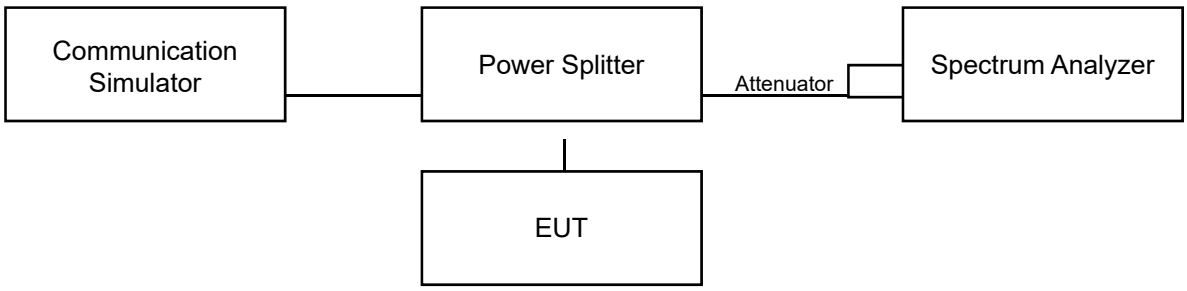


6.3.2 Test Procedure

a. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
b. Set the number of counts to a value that stabilizes the measured CCDF curve;
c. Record the maximum PAPR level associated with a probability of 0.1%.

6.4 Bandwidth

6.4.1 Test Setup



6.4.2 Test Procedure

For the 26 dBc bandwidth measurement method, please refer to section 5.4.3 of ANSI C63.26.

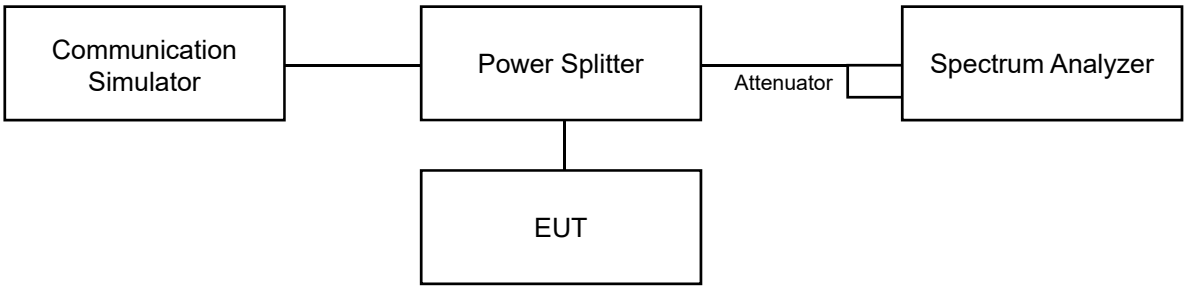
a. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c. Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
d. The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target "−X dB" requirement, i.e., if the requirement calls for measuring the −26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
e. Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
f. Determine the following reference values: 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).
g. Determine the "−X dB amplitude" as equal to (Reference Value − X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
h. 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 amplitude" determined in step f). If a marker is below this "−X dB amplitude" value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers.
i. The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

For the occupied bandwidth measurement method, please refer to section 5.4.4 of ANSI C63.26.

a. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c. Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
d. The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target "−X dB" requirement, i.e., if the requirement calls for measuring the −26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
e. Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
f. Determine the reference value by either of the following:
g. 1) 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).
h. 2) Set the EUT to transmit an unmodulated carrier. Set the spectrum analyzer marker to the level of the carrier.
i. Determine the "−X dB amplitude" as equal to (Reference Value − X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
j. If the reference value was determined using an unmodulated carrier, turn the EUT modulation on, then either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise the trace from step f) shall be used for step i).
k. 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 amplitude" determined in step f). If a marker is below this "−X dB amplitude" value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers. The spectral envelope can cross the "−X dB amplitude" at multiple points. The lowest or highest frequency shall be selected as the frequencies that are the farthest away from the center frequency at which the spectral envelope crosses the "−X dB amplitude."
l. The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

6.5 Conducted Spurious Emissions

6.5.1 Test Setup



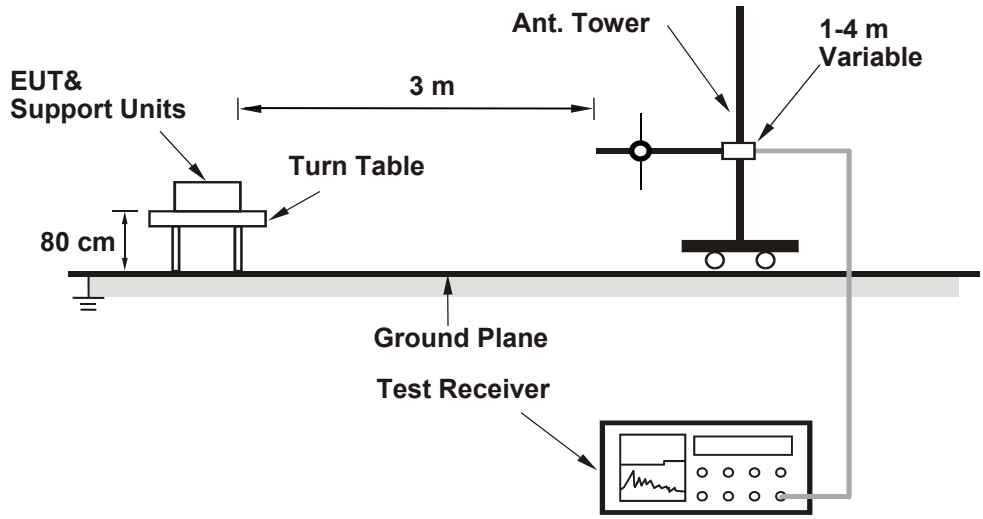
6.5.2 Test Procedure

a. Measurement refer to ANSI C63.26 section 5.7.
b. All measurements were done at 3 channels: low, middle and high operational frequency range.
c. Measuring frequency range is from 9 kHz up to the tenth harmonic of the hightest fundamental frequency or to 40 GHz, whichever is lower. 20 dB attenuation pad is connected with spectrum.
d. The fundamental frequency above 1 GHz, the spectrum set RBW = 1 MHz, VBW = 3 MHz, Detector = Average.
e. The fundamental frequency below 1 GHz, the spectrum set RBW ≥ 100 kHz, VBW ≥ 3 x RBW, Detector = Average.
f. Measuring frequency band edge, narrow RBW (no less than 1% of the OBW) is used for conducted emission measurement.

6.6 Radiated Spurious Emissions below 1GHz

6.6.1 Test Setup

For radiated emission 30 MHz to 1 GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.6.2 Test Procedure

The EUT is configured by emulator to set data modulation and maximum power using WWAN technology.

a. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) height of turn table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.

d. Following C63.26 section 5.5 and 5.2.7

e. EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.

f. ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

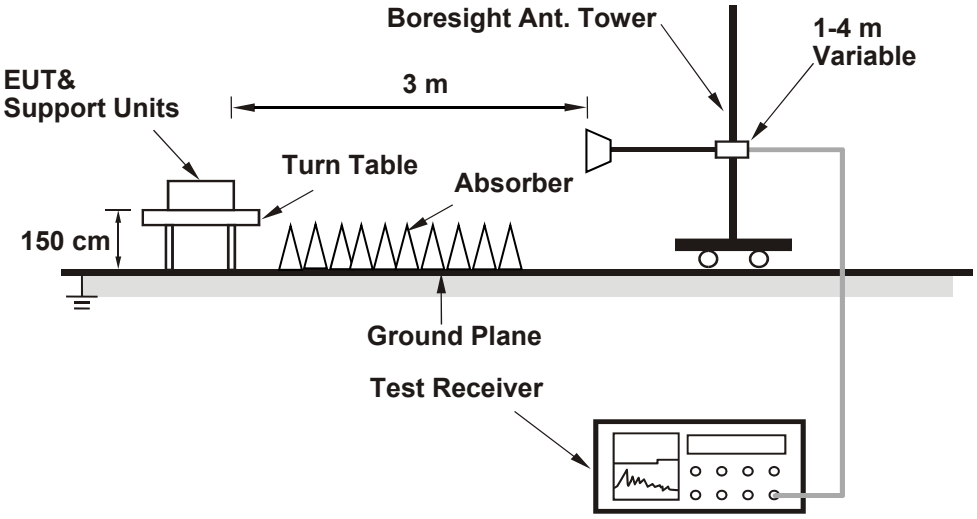
Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
   The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

6.7 Radiated Spurious Emissions above 1GHz

6.7.1 Test Setup

For radiated emission above 1 GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.7.2 Test Procedure

The EUT is configured by emulator to set data modulation and maximum power using WWAN technology.

a. In the semi-anechoic chamber, EUT placed on the 1.5 m height of turn table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.

d. Following C63.26 section 5.5 and 5.2.7

e. EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.

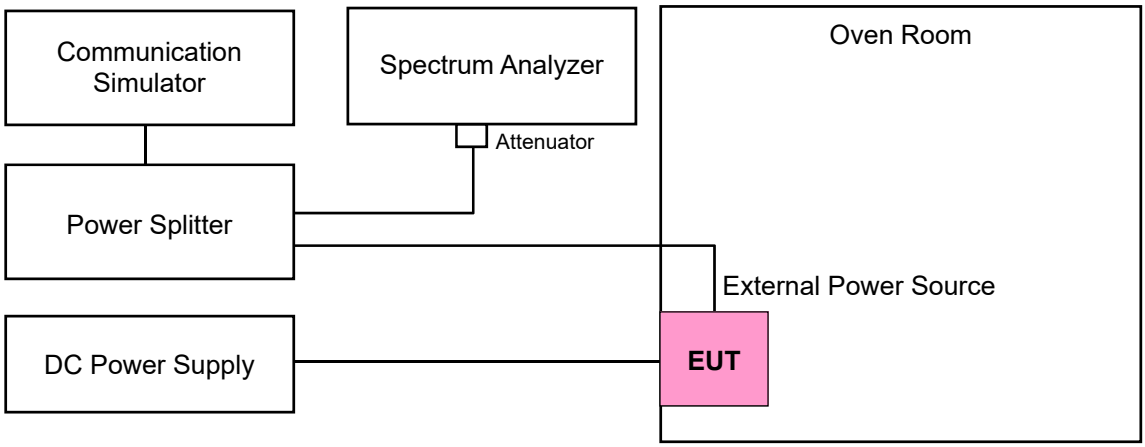
f. ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

6.8 Frequency Stability

6.8.1 Test Setup



6.8.2 Test Procedure

The EUT is configured by emulator to set data modulation and maximum power using WWAN technology.

a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

Note: The frequency error was recorded frequency error from the communication simulator.

7 Test Results of Test Item

7.1 Maximum EIRP

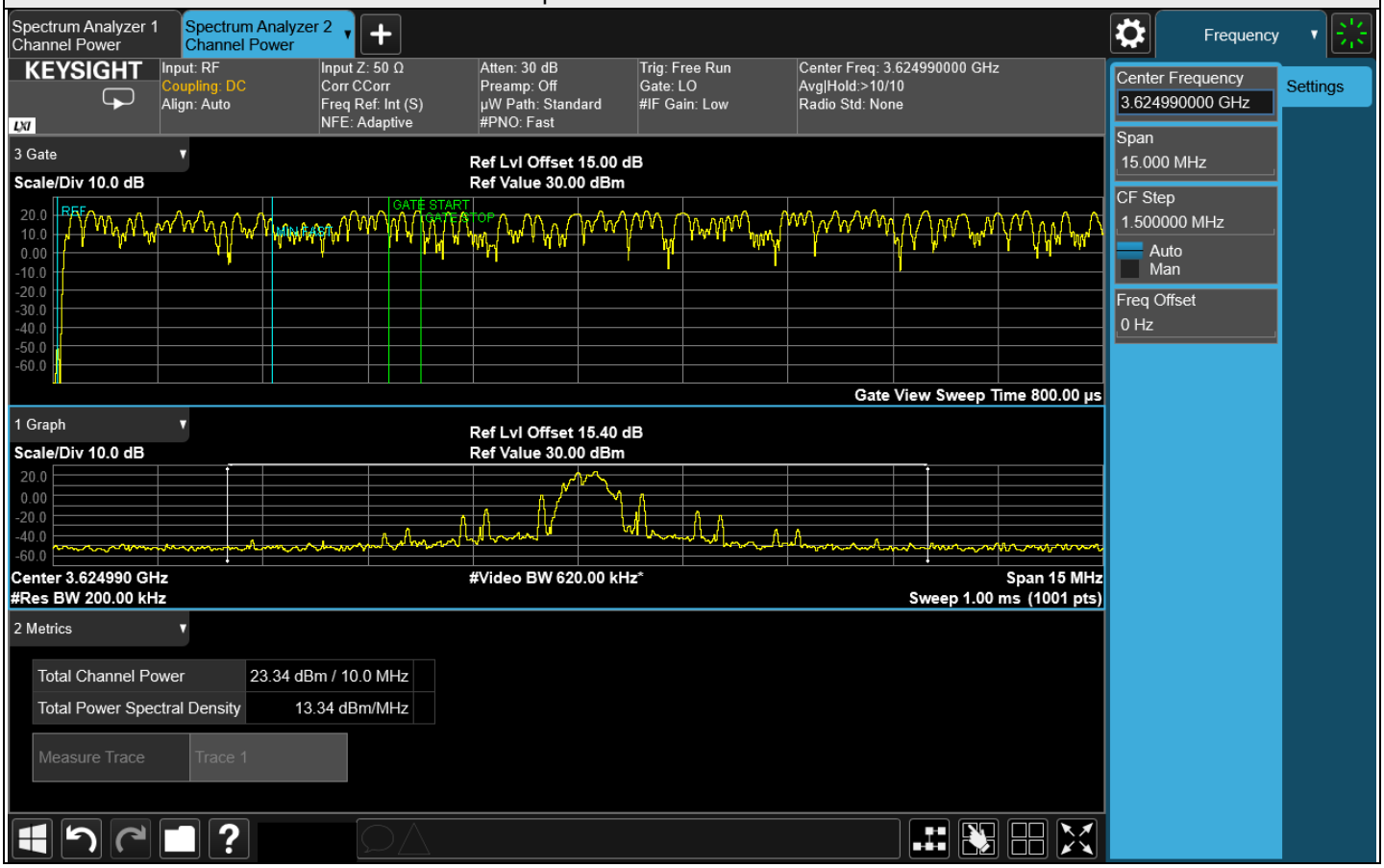
Input Power:	3.87 Vdc	Environmental Conditions:	22°C, 70% RH	Tested By:	James Yang

7.1.1 NR n48 SCS 30 kHz

Conducted Output Power (dBm/10MHz)

NR Band 48						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		638000	641666	645332
		Frequency (MHz)		3570	3624.99	3679.98
40M	DFT-S PI/2 BPSK	1	1	23.26	23.12	22.94
40M	DFT-S QPSK	1	1	23.16	23.19	23.02
		1	53	23.26	23.34	22.96
		1	104	23.14	23.08	23.06
		50	0	22.31	22.28	22.24
		50	28	23.24	23.08	23.00
		50	56	19.12	19.08	19.05
		100	0	15.81	15.76	15.72
40M	DFT-S 16QAM	1	1	22.17	22.33	21.99
40M	DFT-S 64QAM	1	1	20.53	20.71	20.56
40M	DFT-S 256QAM	1	1	18.56	18.66	18.55
40M	CP QPSK	1	1	21.52	21.87	21.61
BW	MCS Index	Channel		637334	641666	646000
		Frequency (MHz)		3560.01	3624.99	3690
20M	DFT-S PI/2 BPSK	1	1	23.17	23.03	22.87
20M	DFT-S QPSK	1	1	23.34	23.07	22.90
		1	26	23.23	23.07	22.94
		1	49	23.15	23.04	23.02
		25	0	22.28	22.22	22.19
		25	13	23.14	23.01	22.96
		25	26	22.18	22.06	21.95
		50	0	19.13	19.11	19.09
20M	DFT-S 16QAM	1	1	22.30	22.08	21.96
20M	DFT-S 64QAM	1	1	20.65	20.55	20.45
20M	DFT-S 256QAM	1	1	18.67	18.47	18.44
20M	CP QPSK	1	1	21.72	21.85	21.64

Spectrum Plot of Worst Value



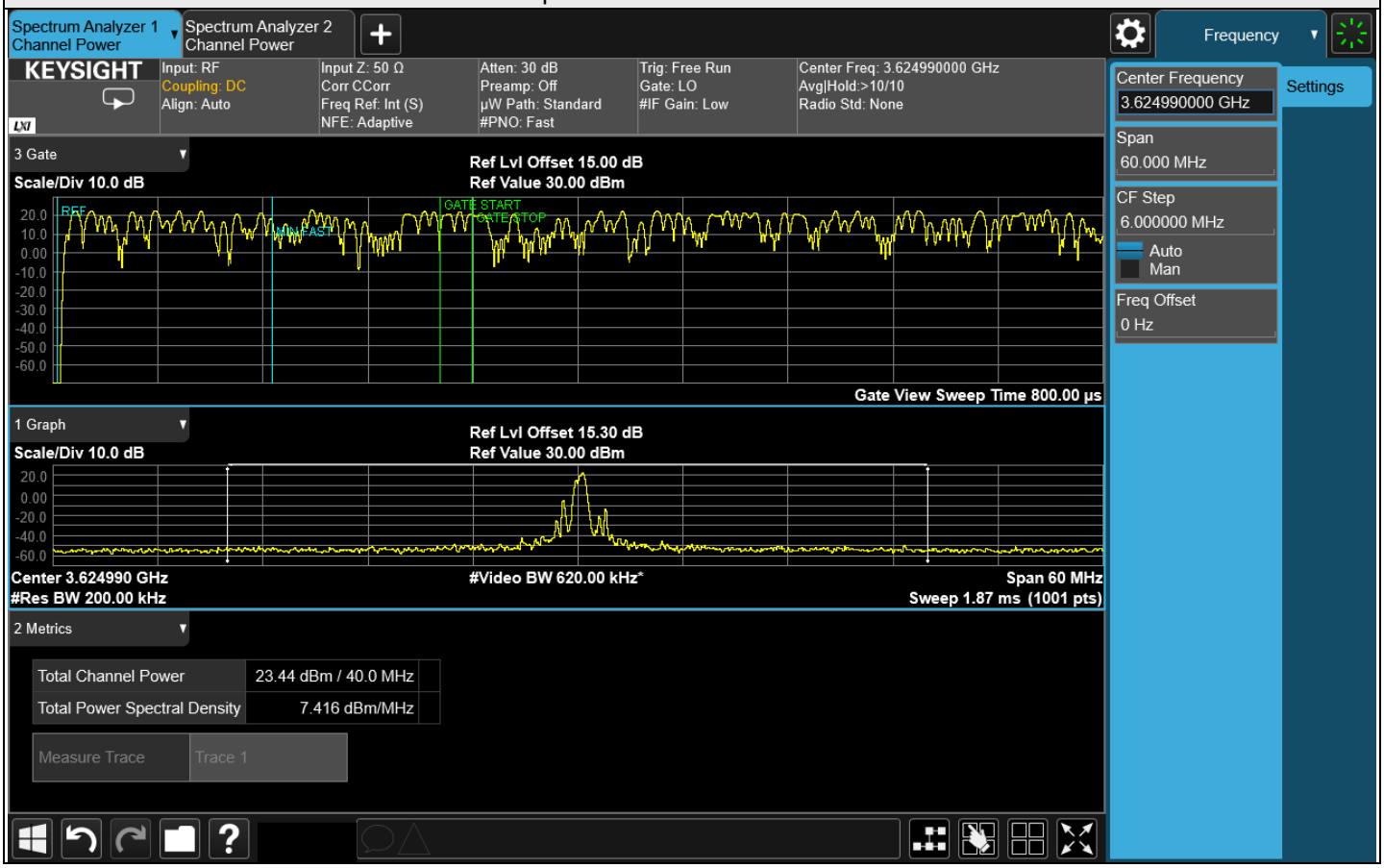
Full Conducted Output Power (dBm/40MHz)

NR Band 48						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		638000	641666	645332
		Frequency (MHz)		3570	3624.99	3679.98
40M	DFT-S PI/2 BPSK	1	1	23.31	23.18	23.03
40M	DFT-S QPSK	1	1	23.21	23.24	23.10
		1	53	23.35	23.44	23.09
		1	104	23.27	23.18	23.12
		50	0	22.44	22.42	22.29
		50	28	23.31	23.15	23.10
		50	56	22.31	22.23	22.09
		100	0	22.34	22.30	21.96
40M	DFT-S 16QAM	1	1	22.27	22.40	22.06
40M	DFT-S 64QAM	1	1	20.62	20.78	20.61
40M	DFT-S 256QAM	1	1	18.65	18.72	18.62
40M	CP QPSK	1	1	21.61	21.93	21.75

Full Conducted Output Power (dBm/20MHz)

NR Band 48						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		637334	641666	646000
		Frequency (MHz)		3560.01	3624.99	3690
20M	DFT-S PI/2 BPSK	1	1	23.24	23.14	22.94
20M	DFT-S QPSK	1	1	23.42	23.20	23.03
		1	26	23.29	23.19	22.99
		1	49	23.26	23.11	23.11
		25	0	22.39	22.33	22.27
		25	13	23.24	23.11	23.03
		25	26	22.30	22.16	22.09
		50	0	22.23	22.11	21.94
20M	DFT-S 16QAM	1	1	22.43	22.17	22.02
20M	DFT-S 64QAM	1	1	20.75	20.66	20.59
20M	DFT-S 256QAM	1	1	18.73	18.61	18.56
20M	CP QPSK	1	1	21.85	21.90	21.76

Spectrum Plot of Worst Value



Maximum EIRP (dBm/10MHz)

NR Band 48						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		638000	641666	645332
		Frequency (MHz)		3570	3624.99	3679.98
40M	DFT-S PI/2 BPSK	1	1	21.26	21.12	20.94
40M	DFT-S QPSK	1	1	21.16	21.19	21.02
		1	53	21.26	21.34	20.96
		1	104	21.14	21.08	21.06
		50	0	20.31	20.28	20.24
		50	28	21.24	21.08	21.00
		50	56	17.12	17.08	17.05
		100	0	13.81	13.76	13.72
40M	DFT-S 16QAM	1	1	20.17	20.33	19.99
40M	DFT-S 64QAM	1	1	18.53	18.71	18.56
40M	DFT-S 256QAM	1	1	16.56	16.66	16.55
40M	CP QPSK	1	1	19.52	19.87	19.61
BW	MCS Index	Channel		637334	641666	646000
		Frequency (MHz)		3560.01	3624.99	3690
20M	DFT-S PI/2 BPSK	1	1	21.17	21.03	20.87
20M	DFT-S QPSK	1	1	21.35	21.07	20.90
		1	26	21.23	21.07	20.94
		1	49	21.15	21.04	21.02
		25	0	20.28	20.22	20.19
		25	13	21.14	21.01	20.96
		25	26	20.18	20.06	19.95
		50	0	17.13	17.11	17.09
20M	DFT-S 16QAM	1	1	20.30	20.08	19.96
20M	DFT-S 64QAM	1	1	18.65	18.55	18.45
20M	DFT-S 256QAM	1	1	16.67	16.47	16.44
20M	CP QPSK	1	1	19.72	19.85	19.64

*EIRP (dBm/10MHz) = Conducted Output Power (dBm/10MHz) + Antenna Gain (dBi).

Full Maximum EIRP (dBm/40MHz)

NR Band 48						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		638000	641666	645332
		Frequency (MHz)		3570	3624.99	3679.98
40M	DFT-S PI/2 BPSK	1	1	21.31	21.18	21.03
40M	DFT-S QPSK	1	1	21.21	21.24	21.10
		1	53	21.35	21.44	21.09
		1	104	21.27	21.18	21.12
		50	0	20.44	20.42	20.29
		50	28	21.31	21.15	21.10
		50	56	20.31	20.23	20.09
		100	0	20.34	20.30	19.96
40M	DFT-S 16QAM	1	1	20.27	20.40	20.06
40M	DFT-S 64QAM	1	1	18.62	18.78	18.61
40M	DFT-S 256QAM	1	1	16.65	16.72	16.62
40M	CP QPSK	1	1	19.61	19.93	19.75

*EIRP (dBm/40MHz) = Conducted Output Power (dBm/40MHz) + Antenna Gain (dBi).

Full Maximum EIRP (dBm/20MHz)

NR Band 48						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		637334	641666	646000
		Frequency (MHz)		3560.01	3624.99	3690
20M	DFT-S PI/2 BPSK	1	1	21.24	21.14	20.94
20M	DFT-S QPSK	1	1	21.42	21.20	21.03
		1	26	21.29	21.19	20.99
		1	49	21.26	21.11	21.11
		25	0	20.39	20.33	20.27
		25	13	21.24	21.11	21.03
		25	26	20.30	20.16	20.09
		50	0	20.23	20.11	19.94
20M	DFT-S 16QAM	1	1	20.43	20.17	20.02
20M	DFT-S 64QAM	1	1	18.75	18.66	18.59
20M	DFT-S 256QAM	1	1	16.73	16.61	16.56
20M	CP QPSK	1	1	19.85	19.90	19.76

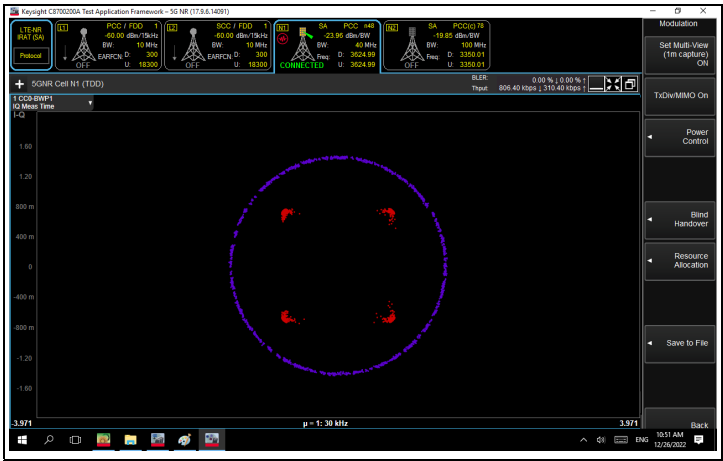
*EIRP (dBm/20MHz) = Conducted Output Power (dBm/20MHz) + Antenna Gain (dBi).

7.2 Modulation Characteristics

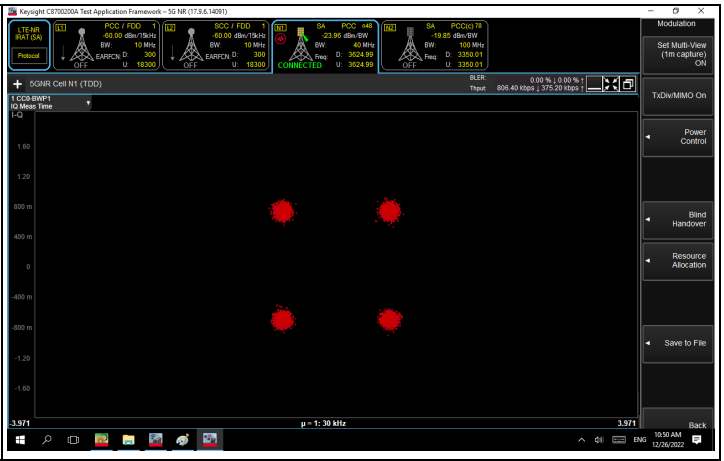
Input Power:	3.87 Vdc	Environmental Conditions:	22°C, 70% RH	Tested By:	James Yang

7.2.1 NR n48 SCS 30 kHz

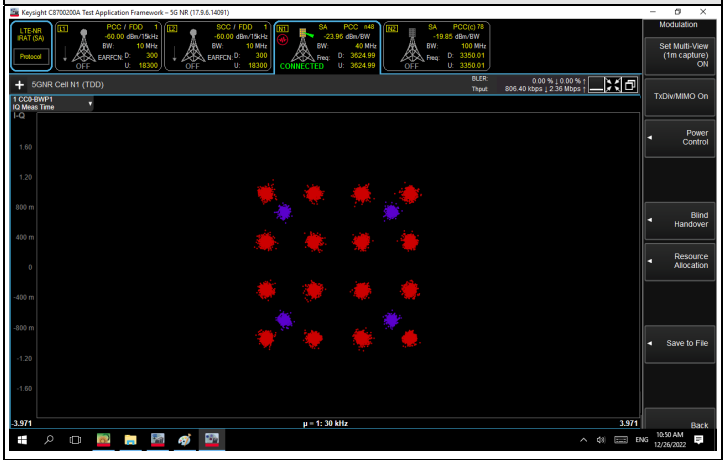
NR n48 SCS 15 kHz, Channel Bandwidth: 40 MHz



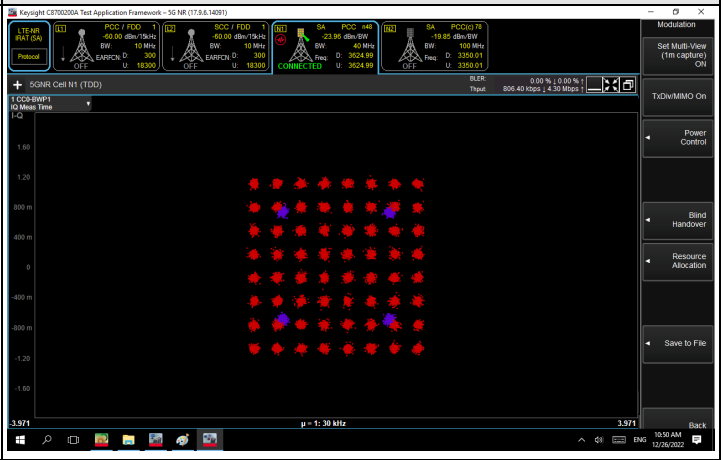
BPSK CH 641666 (3624.99 MHz)



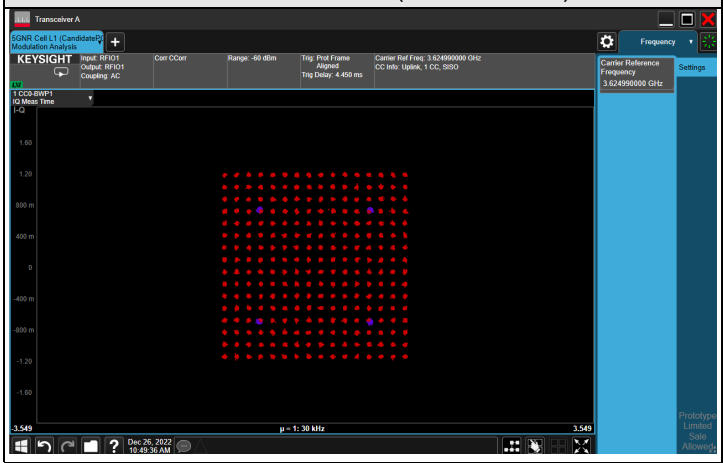
QPSK CH 641666 (3624.99 MHz)



16QAM CH 641666 (3624.99 MHz)



64QAM CH 641666 (3624.99 MHz)



256QAM CH 641666 (3624.99 MHz)

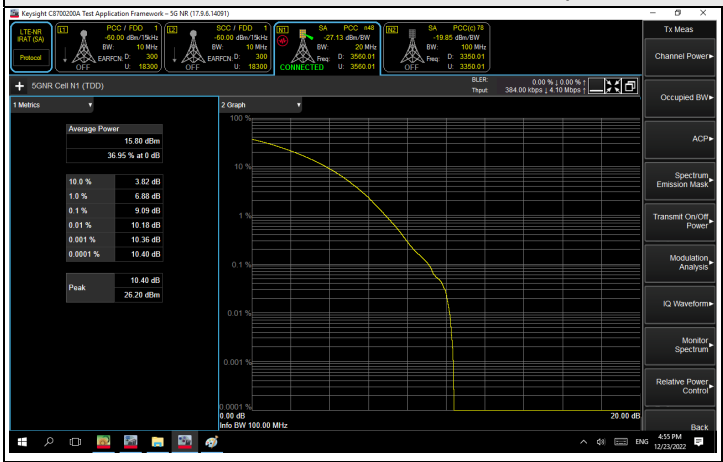
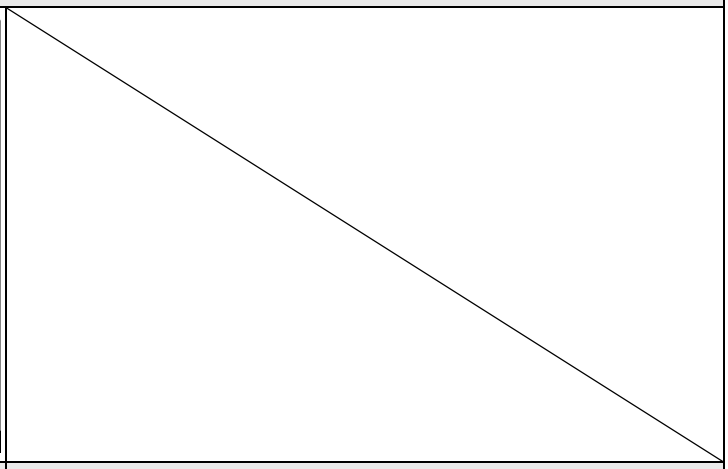
7.3 Peak to Average Ratio

Input Power:	3.87 Vdc	Environmental Conditions:	22°C, 70% RH	Tested By:	James Yang

7.3.1 NR n48 SCS 30 kHz

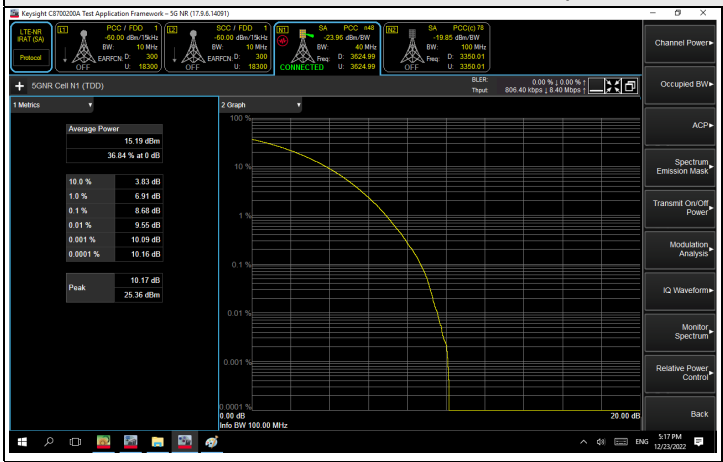
NR n48 SCS 30 kHz, Channel Bandwidth: 20 MHz

Channel	Frequency (MHz)	Peak to Average Ratio (dB)					Limit
		BPSK	QPSK	16QAM	64QAM	256QAM	
637334	3560.01	4.15	6.81	6.81	7.24	9.09	13.00
641666	3624.99	4.28	6.81	6.82	7.24	8.95	
646000	3690	4.16	6.78	6.82	7.22	8.98	

Spectrum Plot of Worst Value	
	
256QAM CH 637334 (3560.01 MHz)	

NR n48 SCS 30 kHz, Channel Bandwidth: 40 MHz

Channel	Frequency (MHz)	Peak to Average Ratio (dB)					Limit
		BPSK	QPSK	16QAM	64QAM	256QAM	
638000	3570	4.25	6.83	6.96	7.39	8.67	13.00
641666	3624.99	4.17	6.83	6.96	7.44	8.68	
645332	3679.98	4.16	6.83	6.94	7.37	8.66	

Spectrum Plot of Worst Value	
	
256QAM CH 641666 (3624.99 MHz)	

7.4 Bandwidth

Input Power:	3.87 Vdc	Environmental Conditions:	22°C, 70% RH	Tested By:	James Yang

7.4.1 NR n48 SCS 30 kHz

NR n48 SCS 30 kHz, Channel Bandwidth: 20 MHz

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)					26 dB Bandwidth (MHz)				
		BPSK	QPSK	16QAM	64QAM	256QAM	BPSK	QPSK	16QAM	64QAM	256QAM
637334	3560.01	18.09	18.20	18.19	18.24	18.20	18.71	19.07	19.10	19.17	19.17
641666	3624.99	18.08	18.24	18.19	18.24	18.20	18.67	19.06	18.19	19.10	19.01
646000	3690	18.09	18.20	18.19	18.24	18.20	18.55	19.06	19.05	19.04	19.01

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
64QAM CH 641666 (3624.99 MHz)	64QAM CH 637334 (3560.01 MHz)

NR n48 SCS 30 kHz, Channel Bandwidth: 40 MHz

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)					26 dB Bandwidth (MHz)				
		BPSK	QPSK	16QAM	64QAM	256QAM	BPSK	QPSK	16QAM	64QAM	256QAM
638000	3570	37.51	37.82	37.83	37.83	37.82	37.09	39.25	39.24	39.23	39.22
641666	3624.99	37.51	37.82	37.82	37.82	37.82	37.08	39.25	39.24	39.25	39.21
645332	3679.98	37.49	37.82	37.82	37.80	37.81	37.04	39.23	39.21	39.24	39.21

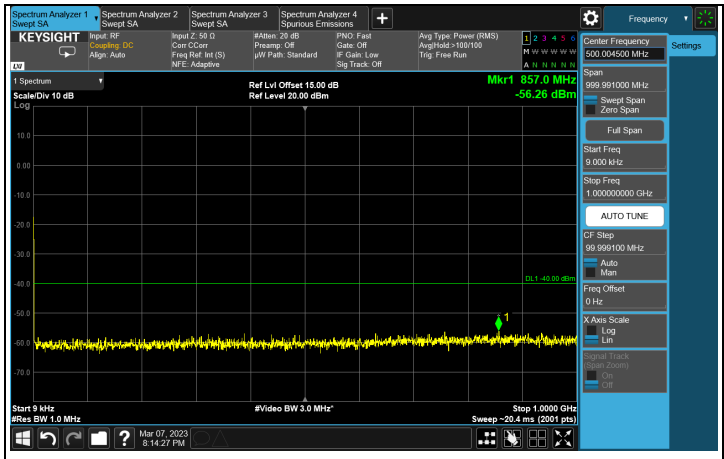
Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
64QAM CH 638000 (3570 MHz)	64QAM CH 641666 (3624.99 MHz)

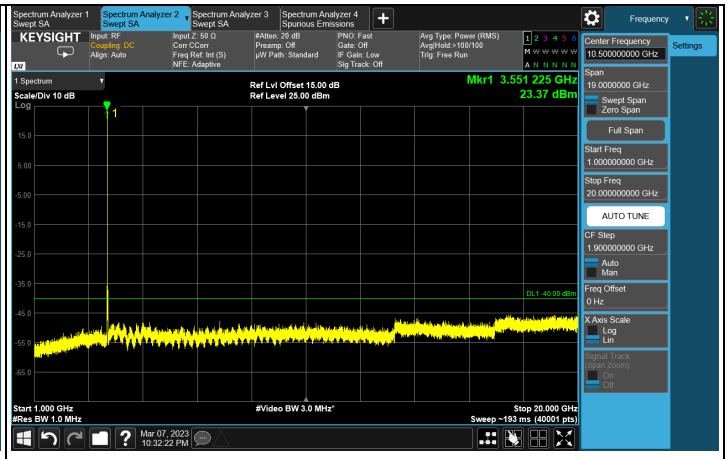
7.5 Conducted Spurious Emissions

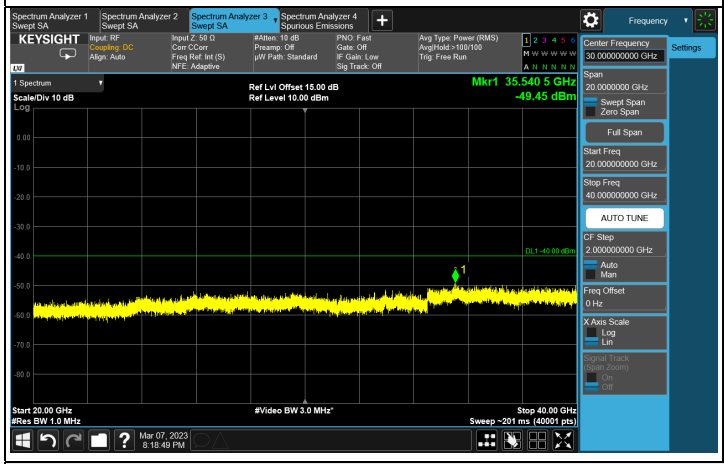
Input Power:	3.87 Vdc	Environmental Conditions:	22°C, 70% RH	Tested By:	James Yang

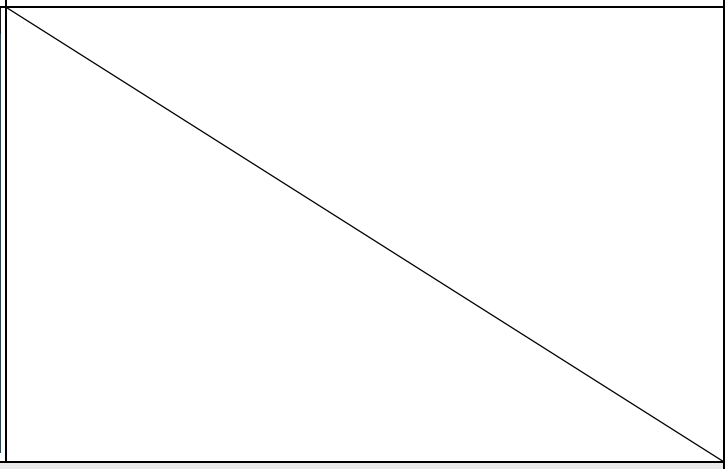
7.5.1 NR n48 SCS 30 kHz

NR n48 SCS 30 kHz, Channel Bandwidth: 20 MHz

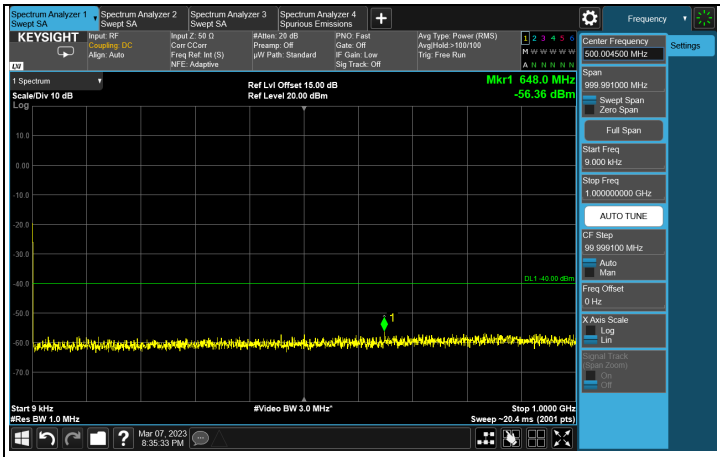


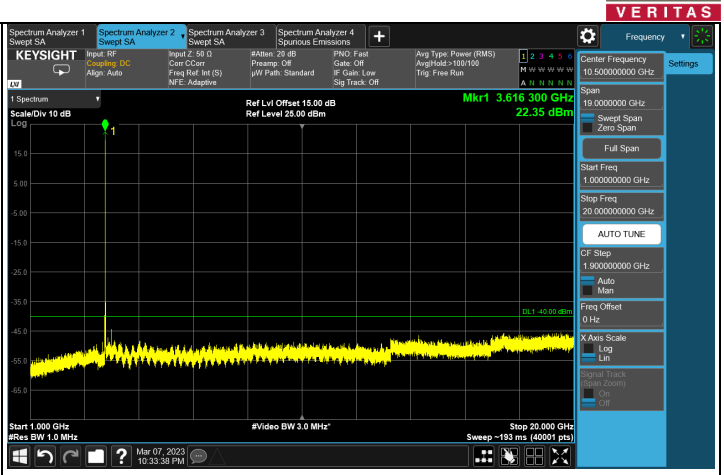


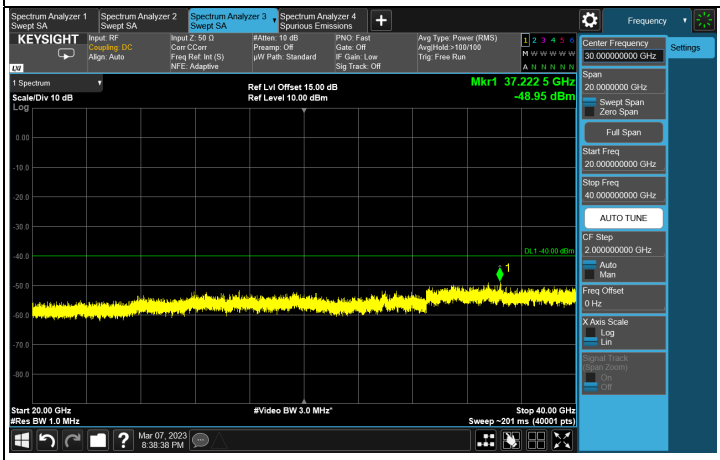




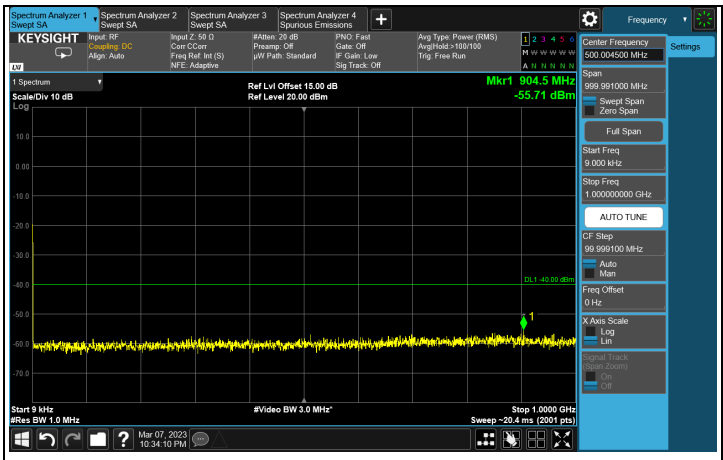
CH 637334 (3560.01 MHz)

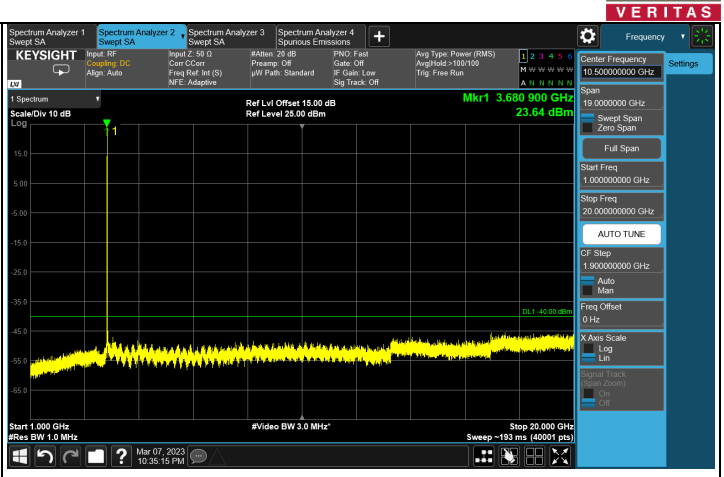


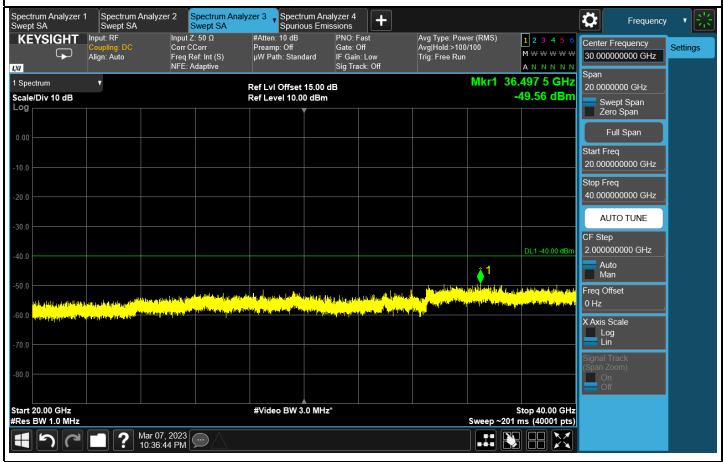




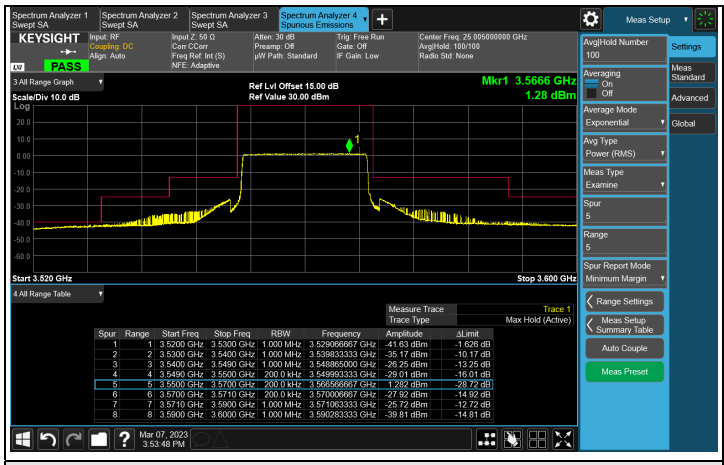
CH 641666 (3624.99 MHz)



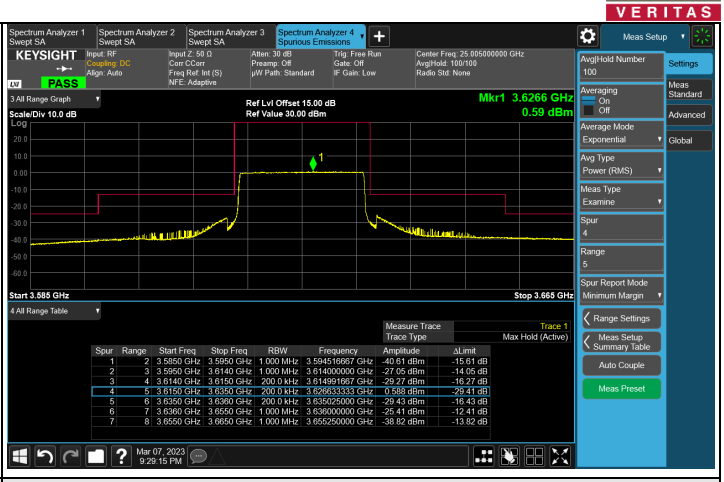




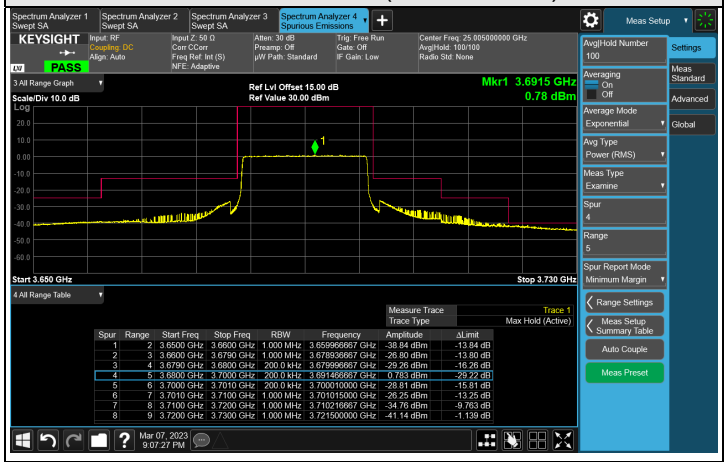
CH 646000 (3690 MHz)



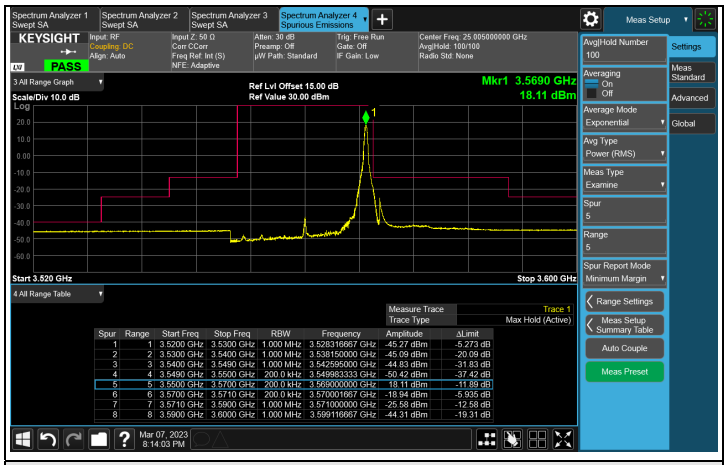
FULL CH 637334 (3560.01 MHz)



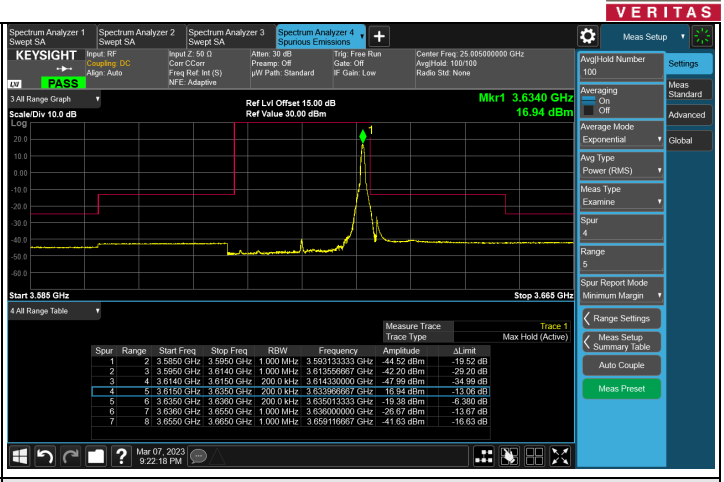
FULL CH 641666 (3624.99 MHz)



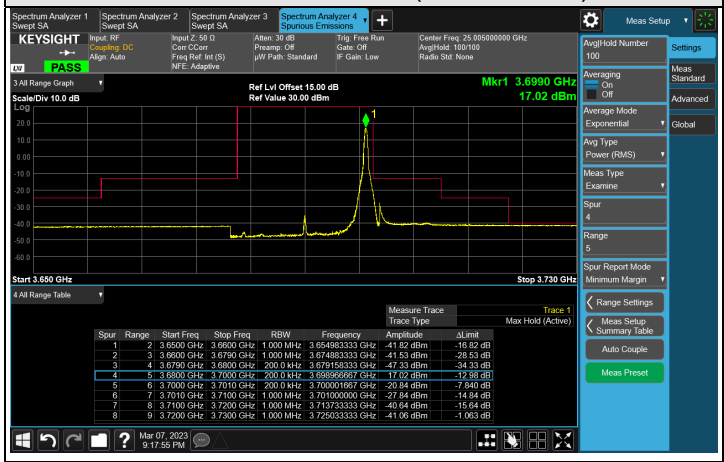
FULL CH 646000 (3690 MHz)



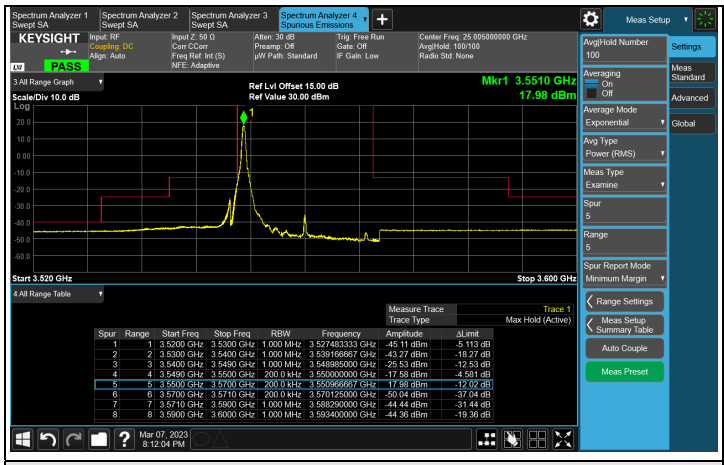
1RB#MAX CH 637334 (3560.01 MHz)



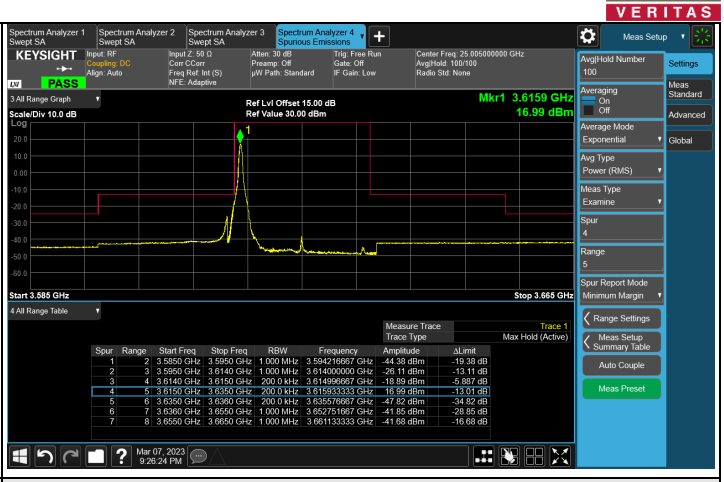
1RB#MAX CH 641666 (3624.99 MHz)



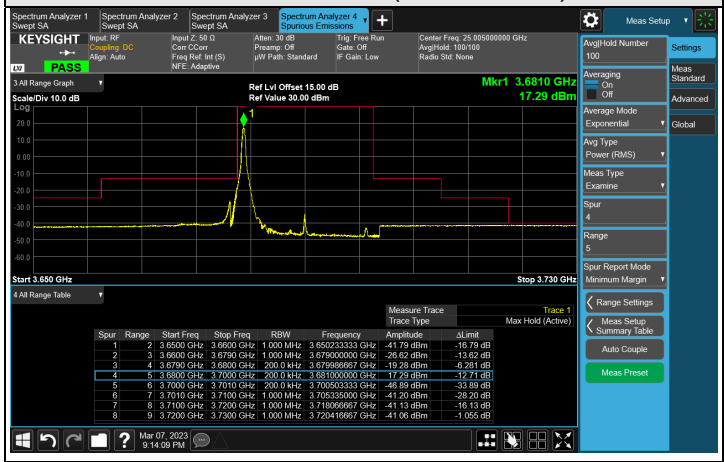
1RB#MAX CH 646000 (3690 MHz)



1RB#0 CH 637334 (3560.01 MHz)

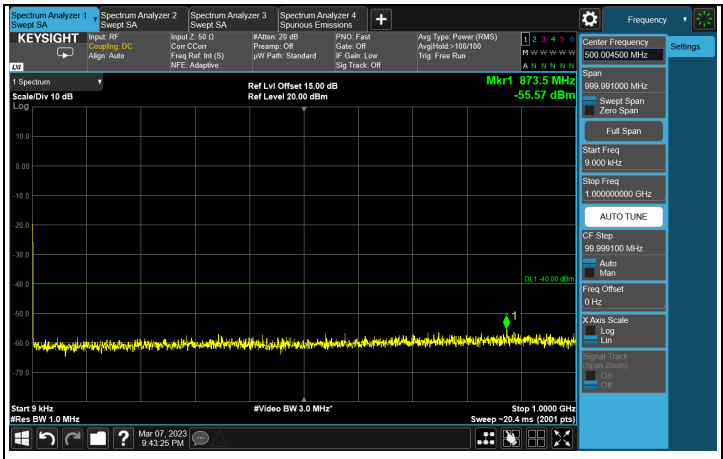


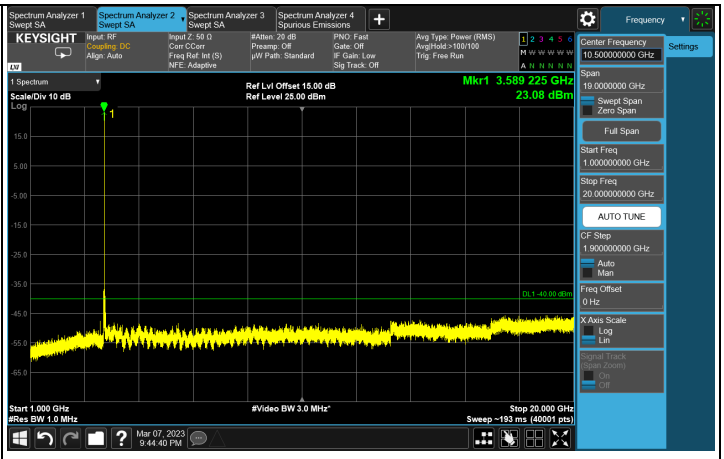
1RB#0 CH 641666 (3624.99 MHz)

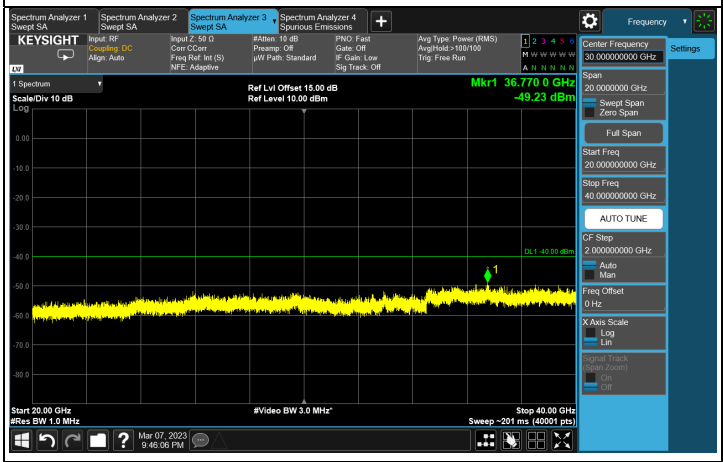


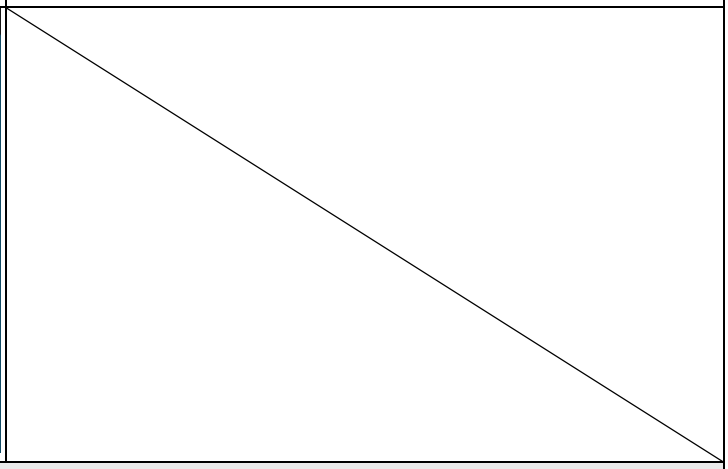
1RB#0 CH 646000 (3690 MHz)

NR n48 SCS 30 kHz, Channel Bandwidth: 40 MHz

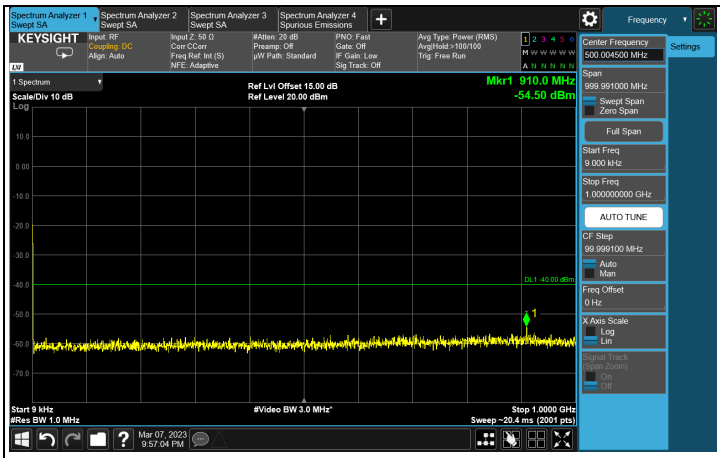


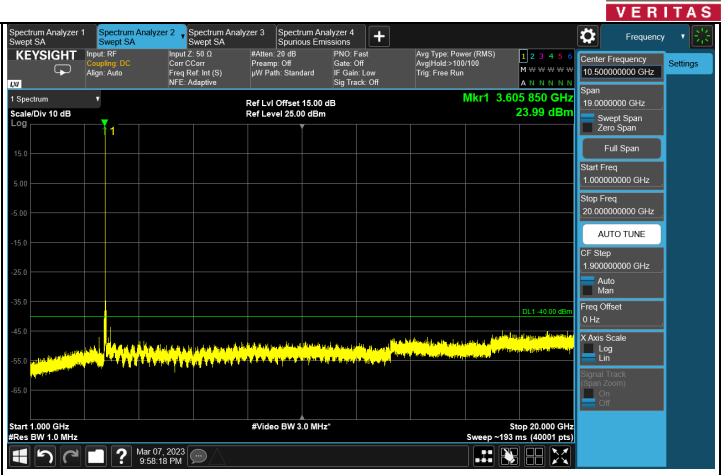


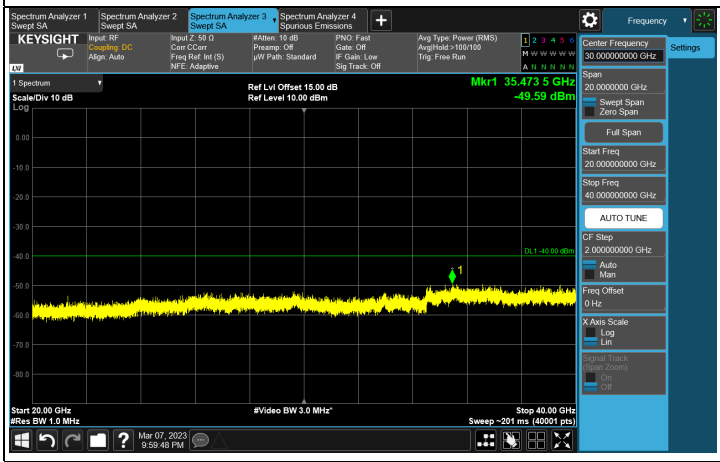




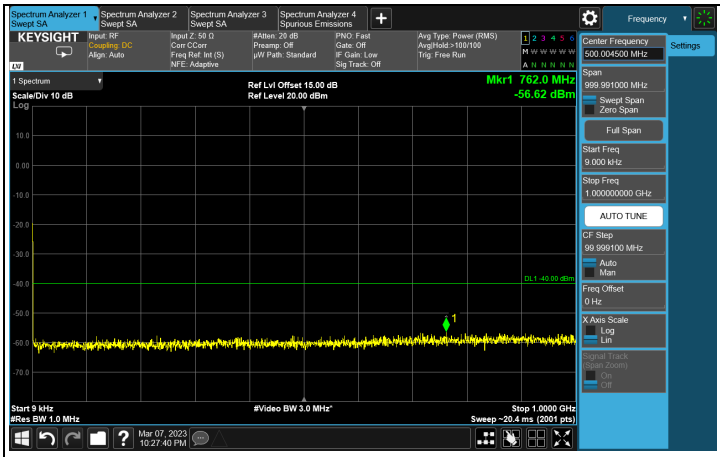
CH 638000 (3570 MHz)

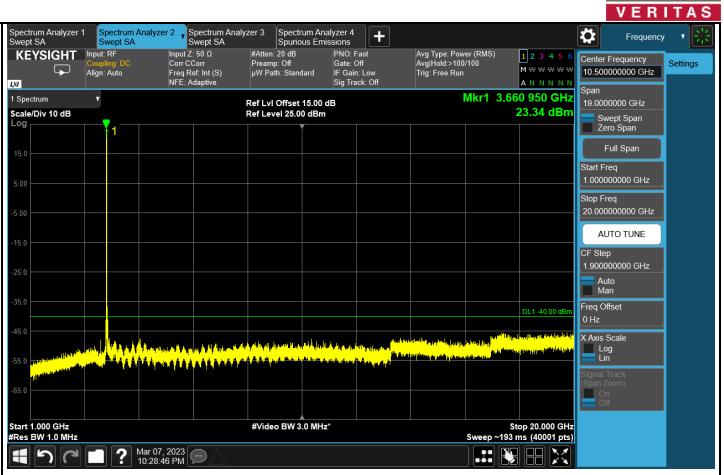


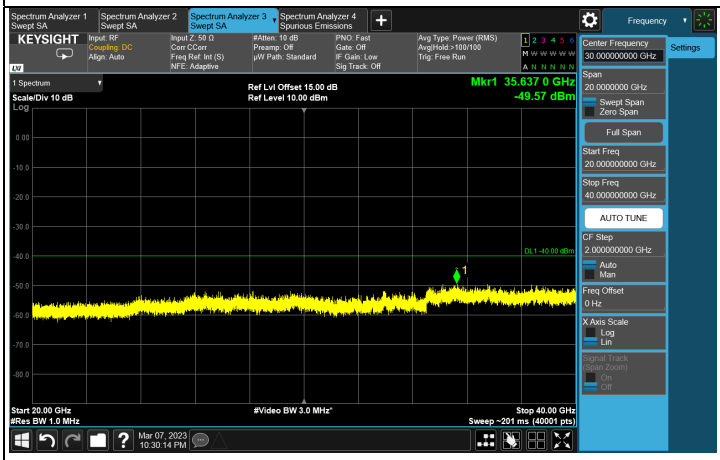




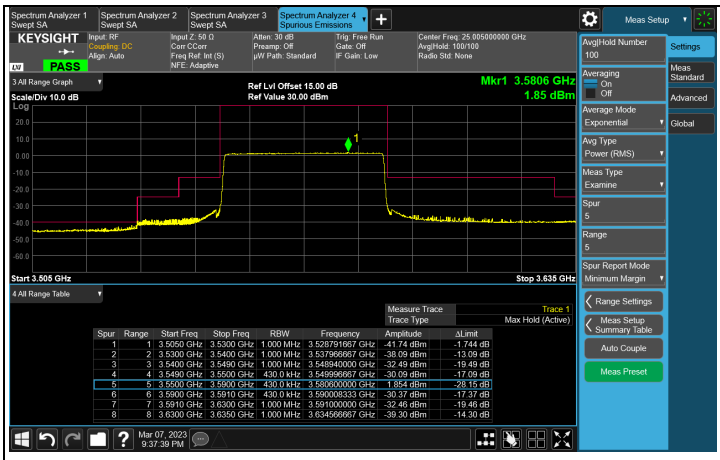
CH 641666 (3624.99 MHz)



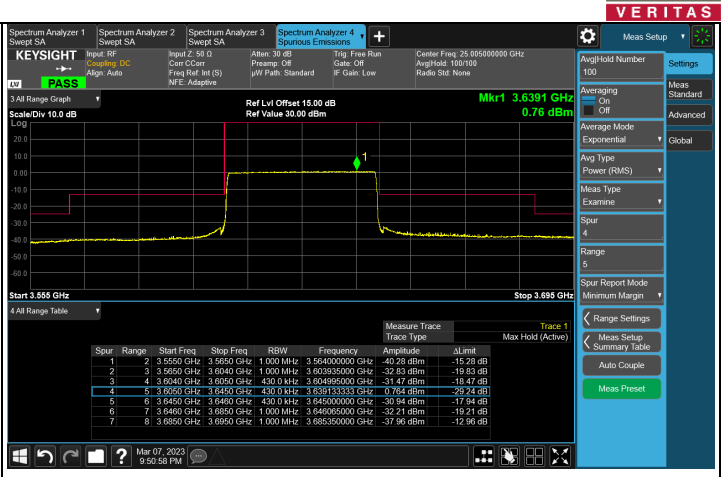




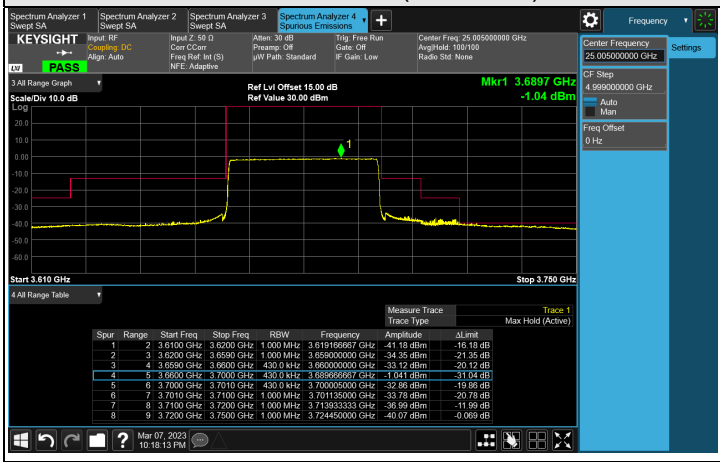
CH 645332 (3679.98 MHz)



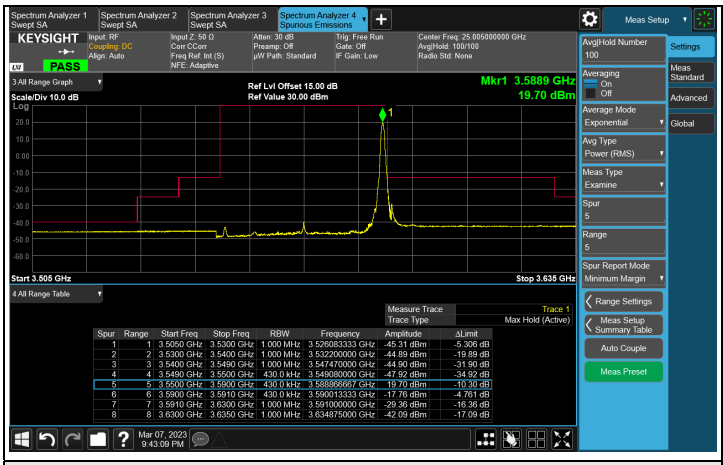
FULL CH 638000 (3570 MHz)



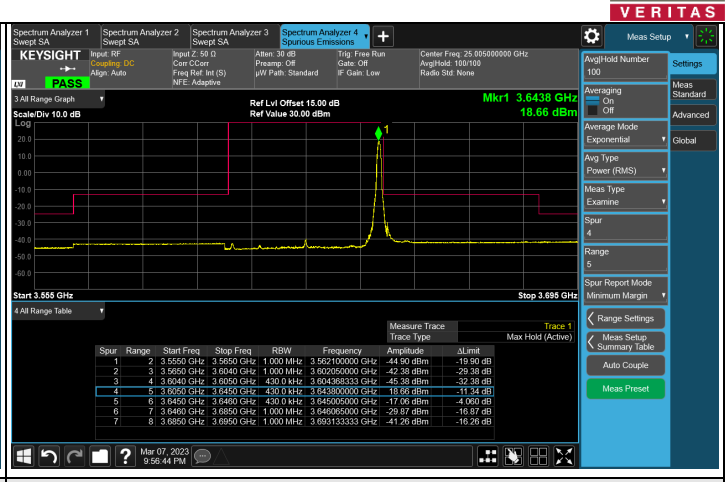
FULL CH 641666 (3624.99 MHz)



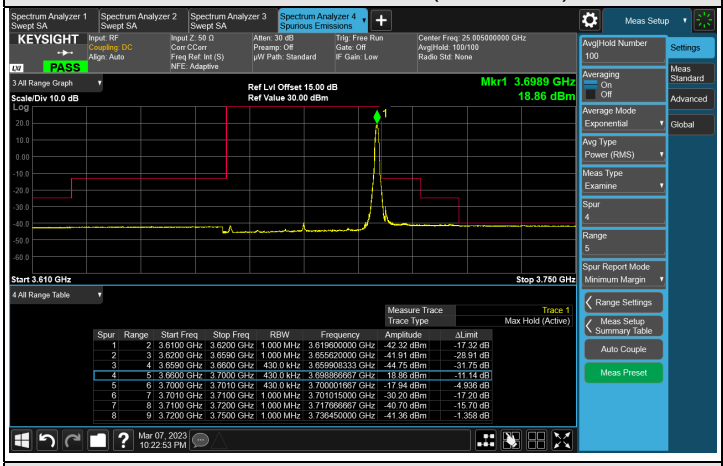
FULL CH 645332 (3679.98 MHz)



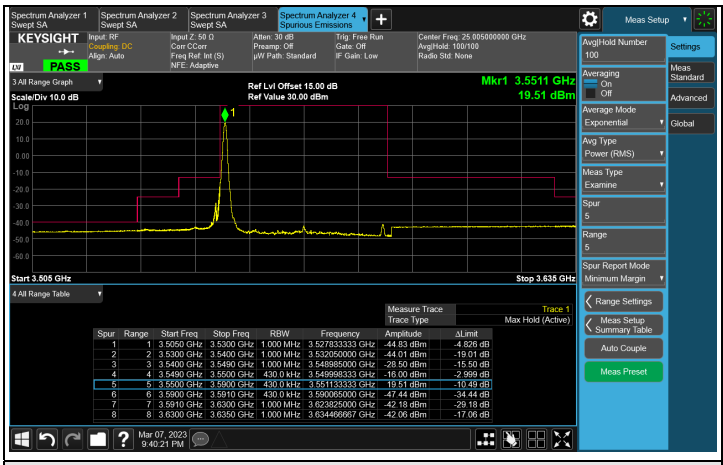
1RB#MAX CH 638000 (3570 MHz)



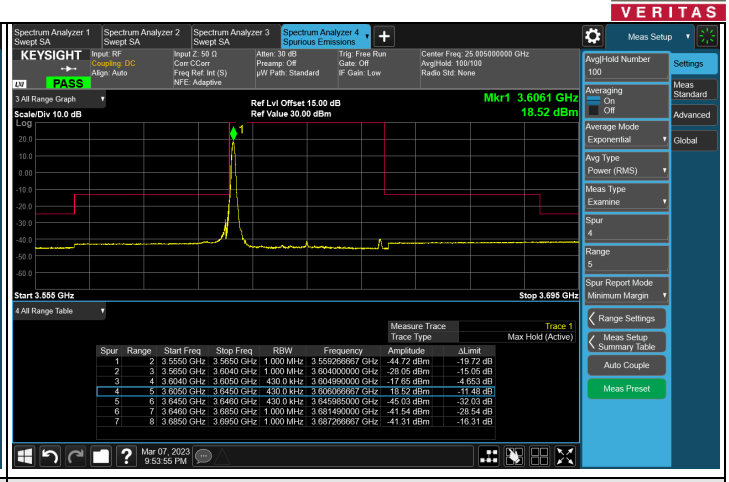
1RB#MAX CH 641666 (3624.99 MHz)



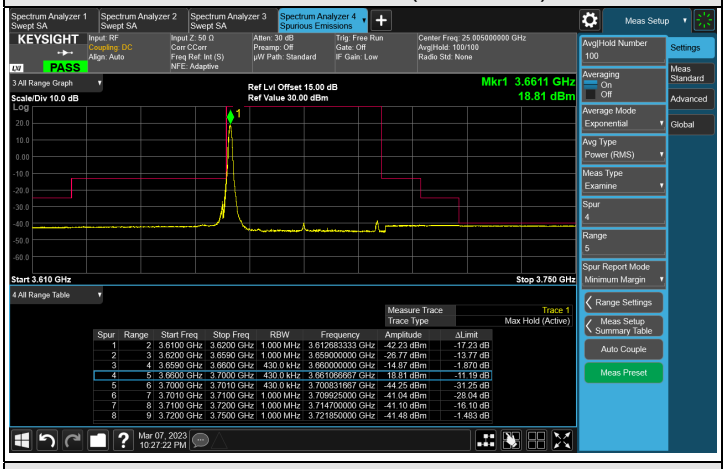
1RB#MAX CH 645332 (3679.98 MHz)



1RB#0 CH 638000 (3570 MHz)



1RB#0 CH 641666 (3624.99 MHz)



1RB#0 CH 645332 (3679.98 MHz)

7.6 Radiated Spurious Emissions below 1GHz

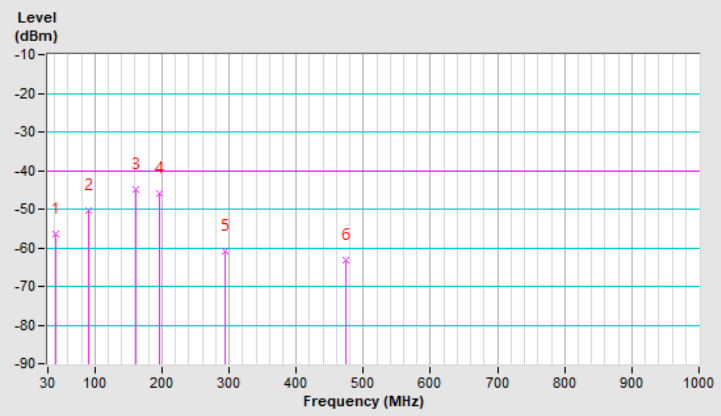
7.6.1 NR n48 SCS 30 kHz

RF Mode	NR n48 Channel Bandwidth: 40MHz	**Channel**	CH 638000：3570 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	22°C, 68% RH
Tested By	Edison Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	41.64	-56.51	-40.00	-16.51	2.00 H	164	52.14	-108.65
2	91.11	-50.25	-40.00	-10.25	1.50 H	188	63.94	-114.19
3	**161.92**	**-45.05**	**-40.00**	**-5.05**	**1.50 H**	**242**	**63.24**	**-108.29**
4	195.87	-45.99	-40.00	-5.99	1.50 H	255	65.74	-111.73
5	294.81	-61.00	-40.00	-21.00	1.50 H	303	46.98	-107.98
6	473.29	-63.07	-40.00	-23.07	1.00 H	110	40.44	-103.51

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The EIRP levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

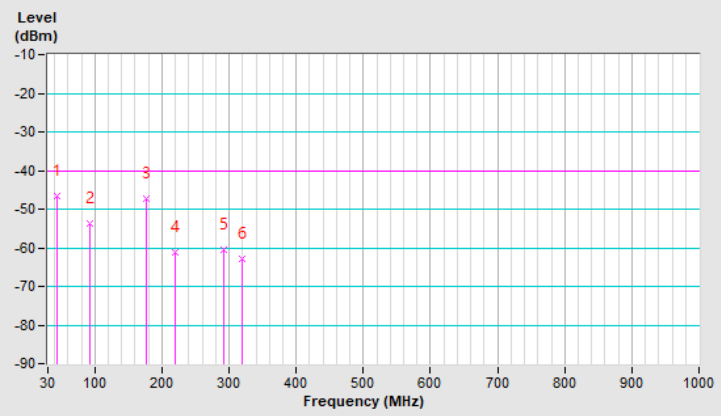


RF Mode	NR n48 Channel Bandwidth: 40MHz	**Channel**	CH 638000：3570 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	22°C, 68% RH
Tested By	Edison Lee		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	44.55	-46.56	-40.00	-6.56	1.50 V	102	61.98	-108.54
2	92.08	-53.66	-40.00	-13.66	1.00 V	140	60.34	-114.00
3	176.47	-47.45	-40.00	-7.45	1.00 V	273	61.93	-109.38
4	220.12	-61.28	-40.00	-21.28	1.99 V	258	50.68	-111.96
5	292.87	-60.62	-40.00	-20.62	1.00 V	341	47.39	-108.01
6	319.06	-63.05	-40.00	-23.05	1.99 V	18	44.24	-107.29

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The EIRP levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



7.7 Radiated Spurious Emissions above 1GHz

7.7.1 NR n48 SCS 30 kHz

RF Mode	NR n48 Channel Bandwidth: 20MHz	**Channel**	CH 637334：3560.01 MHz
Frequency Range	1 GHz ~ 40 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	22°C, 68% RH
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7120.02	-43.39	-40.00	-3.39	1.41 H	212	43.81	-87.20
Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7120.02	-41.51	-40.00	-1.51	1.82 V	307	45.69	-87.20

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

RF Mode	NR n48 Channel Bandwidth: 20MHz	**Channel**	CH 640000：3624.99 MHz
Frequency Range	1 GHz ~ 40 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	22°C, 68% RH
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7249.98	-43.26	-40.00	-3.26	1.40 H	218	43.88	-87.14
Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7249.98	-41.50	-40.00	-1.50	1.78 V	305	45.64	-87.14

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

RF Mode	NR n48 Channel Bandwidth: 20MHz	**Channel**	CH 642666：3690 MHz
Frequency Range	1 GHz ~ 40 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	22°C, 68% RH
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7380.00	-43.41	-40.00	-3.41	1.39 H	212	43.76	-87.17
Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7380.00	-41.58	-40.00	-1.58	1.86 V	305	45.59	-87.17

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

RF Mode	NR n48 Channel Bandwidth: 40MHz	**Channel**	CH 638000：3570 MHz
Frequency Range	1 GHz ~ 40 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	22°C, 68% RH
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7140.00	-43.28	-40.00	-3.28	1.39 H	214	43.93	-87.21
Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	**7140.00**	**-41.12**	**-40.00**	**-1.12**	**1.82 V**	**303**	**46.09**	**-87.21**

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

RF Mode	NR n48 Channel Bandwidth: 40MHz	**Channel**	CH 640000：3624.99 MHz
Frequency Range	1 GHz ~ 40 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	22°C, 68% RH
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7249.98	-43.01	-40.00	-3.01	1.45 H	218	44.13	-87.14
Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7249.98	-41.49	-40.00	-1.49	1.78 V	307	45.65	-87.14

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

RF Mode	NR n48 Channel Bandwidth: 40MHz	**Channel**	CH 642000：3679.98 MHz
Frequency Range	1 GHz ~ 40 GHz	**Detector Function & Bandwidth**	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	22°C, 68% RH
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7359.96	-43.40	-40.00	-3.40	1.43 H	215	43.75	-87.15
Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	7359.96	-41.38	-40.00	-1.38	1.78 V	301	45.77	-87.15

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

7.8 Frequency Stability

Environmental Conditions:	25°C, 60% RH	Tested By:	Ted Chang

7.8.1 NR n48 SCS 30 kHz

NR n48 SCS 30 kHz, Channel Bandwidth: 20 MHz

Frequency Stability Versus Voltage				
Voltage (Vdc)	CH 637334 (3560.01 MHz)		CH 646000 (3690 MHz)	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.28	3560.009990	-0.003	3690.000020	0.005
3.87	3560.010018	0.005	3689.999988	-0.003
4.46	3560.009983	-0.005	3690.000013	0.004

Note: The applicant defined the normal working voltage is from 3.28 to 4.46 Vdc.

Frequency Stability Versus Temperature				
Temperature (℃)	CH 637334 (3560.01 MHz)		CH 646000 (3690 MHz)	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	3560.010012	0.003	3690.000011	0.003
-20	3560.009986	-0.004	3690.000019	0.005
-10	3560.009988	-0.003	3689.999982	-0.005
0	3560.009990	-0.003	3690.000013	0.004
10	3560.010012	0.003	3689.999984	-0.004
20	3560.009984	-0.004	3690.000013	0.004
30	3560.010017	0.005	3689.999985	-0.004
40	3560.009990	-0.003	3690.000020	0.005
50	3560.009989	-0.003	3690.000012	0.003
60	3560.010013	0.004	3690.000017	0.005

NR n48 SCS 30 kHz, Channel Bandwidth: 40 MHz

Frequency Stability Versus Voltage				
Voltage (Vdc)	CH 638000 (3570 MHz)		CH 645332 (3679.98 MHz)	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.28	3570.000011	0.003	3679.979984	-0.004
3.87	3570.000016	0.004	3679.979989	-0.003
4.46	3570.000015	0.004	3679.979989	-0.003

Note: The applicant defined the normal working voltage is from 3.28 to 4.46 Vdc.

Frequency Stability Versus Temperature				
Temperature (℃)	CH 638000 (3570 MHz)		CH 645332 (3679.98 MHz)	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	3570.000017	0.005	3679.980015	0.004
-20	3570.000017	0.005	3679.979984	-0.004
-10	3569.999988	-0.003	3679.980014	0.004
0	3570.000014	0.004	3679.980018	0.005
10	3570.000019	0.005	3679.980012	0.003
20	3569.999985	-0.004	3679.980018	0.005
30	3570.000013	0.004	3679.980016	0.004
40	3569.999988	-0.003	3679.979982	-0.005
50	3570.000018	0.005	3679.980012	0.003
60	3569.999990	-0.003	3679.980020	0.005

8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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