

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 27
47 CFR FCC Part 2

Report No.: RFBCMA-WTW-P25030861-11

FCC ID: RAXTMOG5AR

Product: 5G Gateway

Brand: T-Mobile

Model No.: TMO-G5AR

Received Date: 2025/3/24

Test Date: 2025/5/28 ~ 2025/5/29

Issued Date: 2025/5/29

Applicant: Arcadyan Technology Corporation

Address: No. 8, Sec. 2, Guangfu Rd., Hsinchu City 30071, Taiwan, R.O.C.

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: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan

FCC Registration / 788550 / TW0003

Designation Number:

Approved by: _____

Jeremy Lin

Jeremy Lin / Project Engineer

, Date: _____

2025/5/29

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Prepared by : Celine Chou / Senior Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBCMA-WTW-P25030861-11	Original release.	2025/5/29

1 Certificate

Product: 5G Gateway

Brand: T-Mobile

Test Model: TMO-G5AR

Sample Status: Engineering sample

Applicant: Arcadyan Technology Corporation

Test Date: 2025/5/28 ~ 2025/5/29

Standard: 47 CFR FCC Part 27
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 971168 D02 Misc Rev Approv License Devices v02r02

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

Standard / Clause	Test Item	Result	Remark
Part 2.1046 Part 27.50(h)	Effective Radiated Power and Equivalent Isotropically Radiated Power	Pass	Meet the requirement of limit.
Part 2.1047	Modulation Characteristics	N/A	Refer to Note 2
Part 27.50(d)	Peak to Average Ratio	Pass	Meet the requirement of limit.
Part 2.1049	Bandwidth	Pass	Meet the requirement of limit.
Part 2.1051 Part 27.53(m)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
Part 2.1053 Part 27.53(m)	Radiated Spurious Emissions below 1GHz	Pass	Minimum passing margin is -19.27 dB at 134.76 MHz
Part 2.1053 Part 27.53(m)	Radiated Spurious Emissions above 1GHz	Pass	Minimum passing margin is -15.18 dB at 5106.00 MHz
Part 2.1055 Part 27.54	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.
- NR CA mode is similar to digital modulation in NR single frequency band, so please refer to BV CPS report no.: RFBCMA-WTW-P25030861-8 for the modulation characteristics data of CA mode.

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:

Parameter	Specification	Uncertainty (±)
Effective Radiated Power and Equivalent Isotropically Radiated Power	-	1.371 dB
Peak to Average Ratio	-	0.920 dB
Bandwidth	-	960 Hz
Conducted Spurious Emissions	-	2.12 dB
Radiated Spurious Emissions below 1GHz	9 kHz ~ 30 MHz	3.59 dB
	30 MHz ~ 1 GHz	3.64 dB
Radiated Spurious Emissions above 1GHz	1 GHz ~ 18 GHz	2.29 dB
	18 GHz ~ 40 GHz	2.29 dB
Frequency Stability	-	0.176 ppm

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	5G Gateway
Brand	T-Mobile
Test Model	TMO-G5AR
Status of EUT	Engineering sample
Power Supply Rating	100-240 Vac
EUT Category	Mobile station
Modulation Type	DFT-s-OFDM, CP-OFDM
5G NR bands support CA mode	n41C

Note:

1. EUT Overview

Mode	Bandwidth	Modulation	Max. EIRP (W)	Max. EIRP (dBm)	Emission Designator
NR n41C	100 MHz + 80 MHz	BPSK	0.067	18.24	176MG7D
		QPSK	0.066	18.18	176MG7D
		16QAM	0.065	18.13	176MD7W
		64QAM	0.064	18.06	176MD7W
		256QAM	0.063	18.00	176MD7W

2. E-UTRA CA configuration / Bandwidth combination set.

E-UTRA CA configuration / Bandwidth combination set					
E-UTRA CA configuration	Uplink CA configurations	Component carriers in order of increasing carrier frequency		Maximum aggregated bandwidth (MHz)	Bandwidth combination set
		Channel bandwidths for carrier (MHz)	Channel bandwidths for carrier (MHz)		
CA_n41C	CA_n41C	40	80, 100	180	0
		50, 60, 80	60, 80, 100		

* n41c is continuous CA and maximum combination is 100M+80M.

* n41c is only support SISO mode.

3. For detailed information about each WWAN bands frequency range, bandwidth mode of the product, please refer to section 3.3 of the report.

4. 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 No.	Brand	Model	RF Chain No.	Antenna Net Gain (dBi)	Frequency Range	Antenna Type	Connector Type
ANT0	ARC	120800158700J	TX0	0.95	FDD B2	Monopole	MHF1
				1.02	FDD B4		
				2.06	FDD B5		
				2.46	FDD B12		
				0.95	FDD n25		
			RX	3.93	TDD n41		
				3.79	TDD n48		
				1.02	FDD B66/n66		
			TX0/ TX0	1.90	FDD B71/n71		
				3.79	TDD n77		
ANT1	ARC	120800158800J	RX	1.08	FDD B2	Monopole	MHF1
				0.95	FDD B4		
				1.68	FDD B5		
				1.55	FDD B12		
				1.08	FDD n25		
			TX1	1.04	TDD n41		
				1.00	TDD n48		
				0.95	FDD B66/n66		
			RX/ TX1	3.54	FDD B71/n71		
				0.79	TDD n77		
ANT2	ARC	120800158900J	RX	5.13	FDD B2	Monopole	MHF1
				4.51	FDD B4		
				2.14	FDD B5		
				2.36	FDD B12		
				5.13	FDD n25		
			TX0	1.05	TDD n41		
				0.72	TDD n48		
				4.51	FDD B66/n66		
			RX/ RX	2.16	FDD B71/n71		
				0.96	TDD n77		
ANT3	ARC	120800159000J	RX	1.63	FDD B2	Monopole	MHF1
				4.70	FDD B4		
				1.79	FDD B5		
				2.08	FDD B12		
				1.63	FDD n25		
				2.04	TDD n41		
				4.16	TDD n48		
				4.70	FDD B66/n66		
				2.87	FDD B71/n71		
				4.16	TDD n77		

Antenna No.	Antenna Type	Antenna Connector	RF Chain No.	Antenna Net Gain (dBi)	Frequency Range	Antenna Type	Connector Type
ANT4	ARC	120800159100J	RX	4.66	FDD B2	Dipole	MHF1
				3.77	FDD B4		
				4.66	FDD n25		
				3.45	TDD n41		
				4.32	TDD n48		
				3.77	FDD B66/n66		
				4.32	TDD n77		
ANT5	ARC	120800159200J	RX	3.95	FDD B2	Dipole	MHF1
				5.35	FDD B4		
				3.95	FDD n25		
				4.89	TDD n41		
				3.50	TDD n48		
				5.35	FDD B66/n66		
				3.50	TDD n77		
ANT6	ARC	120800159400J	RX	5.87	FDD B2	Dipole	MHF1
				4.40	FDD B4		
				5.87	FDD B25/n25		
				4.76	TDD n41		
				3.44	TDD n48		
				4.40	FDD B66/n66		
				3.44	TDD n77		
ANT7	ARC	120800159500J	RX	4.79	FDD B2	Dipole	MHF1
				4.62	FDD B4		
				4.79	FDD n25		
				5.64	TDD n41		
				3.88	TDD n48		
				4.62	FDD B66/n66		
				3.88	TDD n77		

* 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:	1. The AC Adapter has the following models: MOSO P30-V3000R200-060Q0-US / MASS POWER PD065E-D1C0AVU. Pre-scan these models of AC Adapters and find the worst case as a representative test condition. 2. Pre-Scan has been conducted to determine the worst-case mode from all bandwidths, RB configurations and modulations.
Worst Case:	1. AC Adapter Worst Condition: MASS POWER PD065E-D1C0AVU 2. The EUT is designed to be positioned on the Z-axis only.

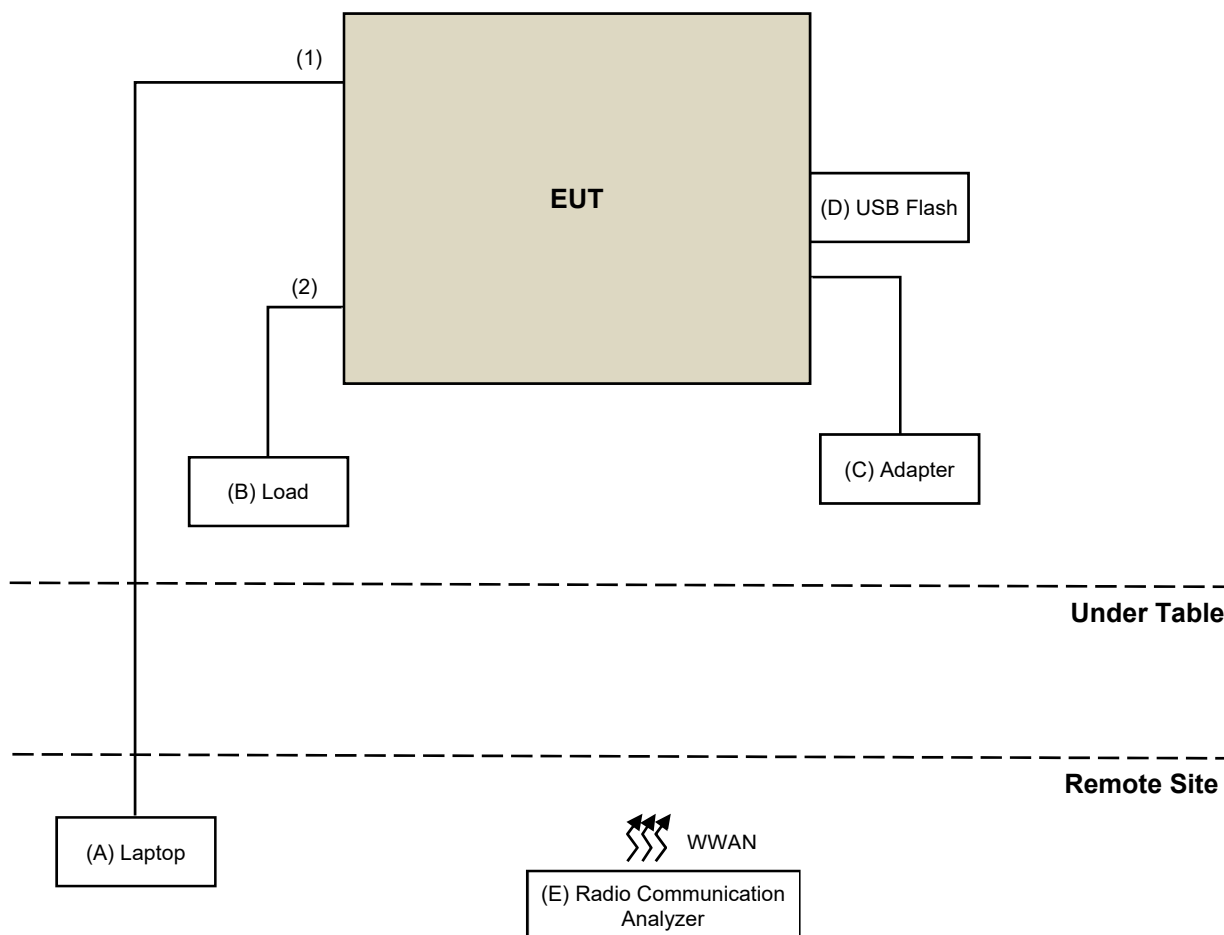
3.3.1 NR n41C

Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
Equivalent Isotropically Radiated Power	509202(2546.01 MHz) + 527178(2635.89 MHz) 510600(2553.00 MHz) + 528576(2642.88 MHz) 512022(2560.11 MHz) + 529998(2649.99 MHz)	100 MHz + 80 MHz	BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB 1 RB / 272 RB
Peak to Average Ratio	509202(2546.01 MHz) + 527178(2635.89 MHz) 510600(2553.00 MHz) + 528576(2642.88 MHz) 512022(2560.11 MHz) + 529998(2649.99 MHz)	100 MHz + 80 MHz	BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB 1 RB / 272 RB
Bandwidth	509202(2546.01 MHz) + 527178(2635.89 MHz) 510600(2553.00 MHz) + 528576(2642.88 MHz) 512022(2560.11 MHz) + 529998(2649.99 MHz)	100 MHz + 80 MHz	BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB 1 RB / 272 RB
Conducted Spurious Emissions	509202(2546.01 MHz) + 527178(2635.89 MHz) 510600(2553.00 MHz) + 528576(2642.88 MHz) 512022(2560.11 MHz) + 529998(2649.99 MHz)	100 MHz + 80 MHz	BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB Full RB
Radiated Spurious Emissions below 1GHz	509202(2546.01 MHz) + 527178(2635.89 MHz)	100 MHz + 80 MHz	BPSK	1 RB / 272 RB 1 RB / 0 RB
Radiated Spurious Emissions above 1GHz	509202(2546.01 MHz) + 527178(2635.89 MHz) 510600(2553.00 MHz) + 528576(2642.88 MHz) 512022(2560.11 MHz) + 529998(2649.99 MHz)	100 MHz + 80 MHz	BPSK	1 RB / 272 RB 1 RB / 0 RB
Frequency Stability	509202(2546.01 MHz) + 527178(2635.89 MHz) 512022(2560.11 MHz) + 529998(2649.99 MHz)	100 MHz + 80 MHz	BPSK	Full RB

3.4 Test Program Used and Operation Descriptions

EUT link Simulator has been activated to set the EUT under transmission condition continuously at specific channel frequency.

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	Laptop	DELL	E5430	2RL3YW1	N/A	Provided by Lab
B	Load	N/A	N/A	N/A	N/A	Provided by Lab
C	Adapter	MASS POWER	PD065E-D1C0AVU	N/A	N/A	Supplied by applicant
D	USB Flash	SanDisk	SDDDC3-032G	N/A	N/A	Provided by Lab
E	Radio Communication Analyzer	Keysight	E7515B	MY59321376	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	RJ-45 Cable	1	10	N	0	Provided by Lab
2	RJ-45 Cable	1	1.5	N	0	Provided by Lab

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 Effective Radiated Power and Equivalent Isotropically Radiated Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
PXA Signal Analyzer Keysight	N9030B	MY57140938	2025/3/24	2026/3/23
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A
UXM 5G Wireless Test Platform Keysight	E7515B	MY59321376	2025/3/20	2026/3/19

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2025/5/29

4.2 Peak to Average Ratio

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
PXA Signal Analyzer Keysight	N9030B	MY57140938	2025/3/24	2026/3/23
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A
UXM 5G Wireless Test Platform Keysight	E7515B	MY59321376	2025/3/20	2026/3/19

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2025/5/29

4.3 Bandwidth

Refer to section 4.2 to get the tested date and information of the instruments.

4.4 Conducted Spurious Emissions

Refer to section 4.1 to get the tested date and information of the instruments.

4.5 Radiated Spurious Emissions below 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower inn-co GmbH	MA 4000	010303	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-155	2024/10/14	2025/10/13
EMI Test Receiver R&S	ESR3	102782	2024/12/10	2025/12/9
Loop Antenna TESEQ	HLA 6121	45745	2024/8/21	2025/8/20
Preamplifier Agilent	8447D	2944A10631	2025/4/27	2026/4/26
RF Coaxial Cable Woken	8D-FB	Cable-CH4-01	2024/7/6	2025/7/5
Signal & Spectrum Analyzer R&S	FSV3044	101105	2025/2/25	2026/2/24
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table BV ADT	TT100	TT93021705	N/A	N/A
Turn Table Controller BV ADT	SC100	SC93021705	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 3.
2. Tested Date: 2025/5/28

4.6 Radiated Spurious Emissions above 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower inn-co GmbH	MA 4000	010303	N/A	N/A
Boresight antenna tower fixture BV	BAF-02	5	N/A	N/A
EMI Test Receiver R&S	ESR3	102782	2024/12/10	2025/12/9
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-408	2024/11/10	2025/11/9
	BBHA 9170	9170-480	2024/11/10	2025/11/9
		BBHA9170241	2024/10/18	2025/10/17
		BBHA9170243	2024/11/10	2025/11/9
Preamplifier EMCI	EMC 184045	980116	2024/9/24	2025/9/23
Preamplifier Keysight	83017A	MY53270295	2025/4/27	2026/4/26
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	2024/7/6	2025/7/5
	EMC102-KM-KM-3000	150929	2024/7/6	2025/7/5
RF Coaxial Cable HUBER+SUHNER	EMC104-SM-SM-10000	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-4)	2025/4/27	2026/4/26
	SUCOFLEX 104	Cable-CH4-03(250724)	2025/4/27	2026/4/26
Signal & Spectrum Analyzer R&S	FSV3044	101105	2025/2/25	2026/2/24
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table BV ADT	TT100	TT93021705	N/A	N/A
Turn Table Controller BV ADT	SC100	SC93021705	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 3.
2. Tested Date: 2025/5/28

4.7 Frequency Stability

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
AC Power Supply Extech Electronics Co.	6905S	1720444	N/A	N/A
Digital Multimeter Fluke	8050A	4660081	2024/6/14	2025/6/13
PXA Signal Analyzer Keysight	N9030B	MY57140938	2025/3/24	2026/3/23
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A
Temperature & Humidity Chamber Terchy	MHU-225AU	920842	2024/6/21	2025/6/20
UXM 5G Wireless Test Platform Keysight	E7515B	MY59321376	2025/3/20	2026/3/19

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2025/5/29

5 Limits of Test Items

5.1 Effective Radiated Power and Equivalent Isotropically Radiated Power

Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

5.2 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.

5.3 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.

5.4 Conducted Spurious Emissions

According to FCC 47 CFR part 27.53(m)(4) regulations, any transmit power outside of the channel edge must be attenuated below the transmitting power (P) by a factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed.

5.5 Radiated Spurious Emissions below 1GHz

According to FCC 47 CFR part 27.53(m)(4), on any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least $55 + 10 \log (P)$ dB. The emission limit equal to – 25 dBm.

5.6 Radiated Spurious Emissions above 1GHz

According to FCC 47 CFR part 27.53(m)(4), on any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least $55 + 10 \log (P)$ dB. The emission limit equal to – 25 dBm.

5.7 Frequency Stability

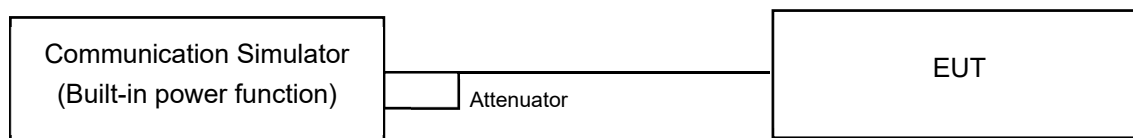
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation (authorized frequency block).

6 Test Arrangements

6.1 Effective Radiated Power and Equivalent Isotropically Radiated Power

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 average (rms) 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.

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:

$$\text{EIRP} = P_{\text{Meas}} + G_T$$

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

where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively

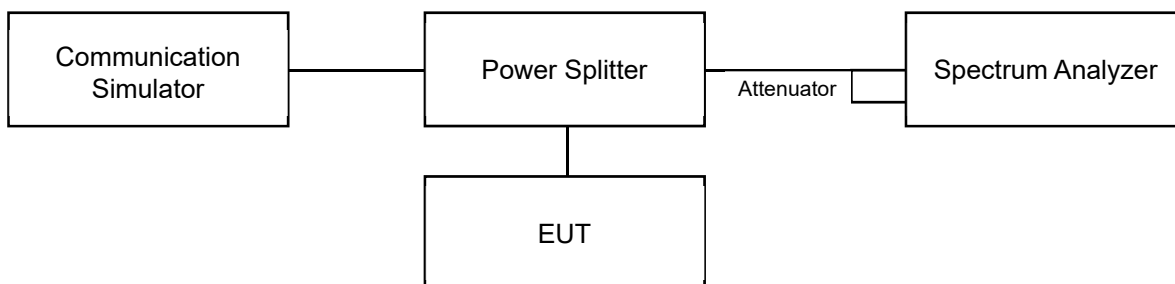
(expressed in the same units as P_{Meas} , e.g., dBm or dBW)

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 Peak to Average Ratio

6.2.1 Test Setup

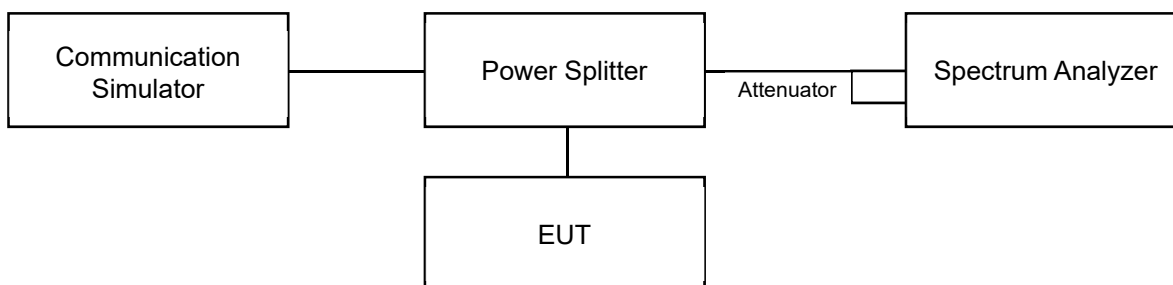


6.2.2 Test Procedure

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

6.3 Bandwidth

6.3.1 Test Setup



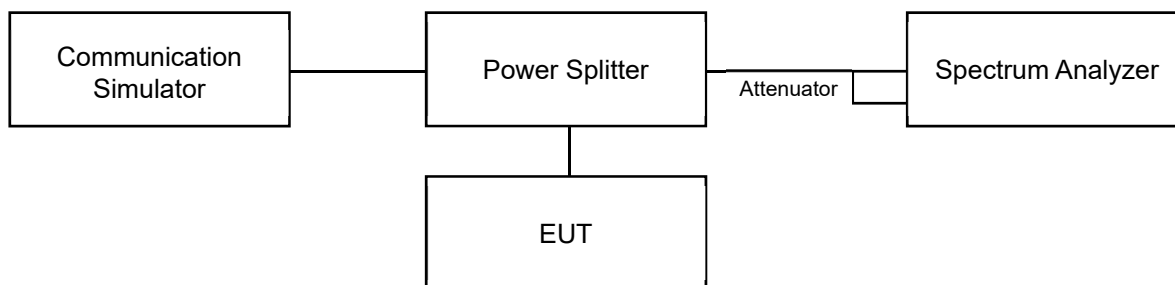
6.3.2 Test Procedure

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

- 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.
- The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times$ RBW.
- 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.
- 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.
- Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
- 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).
- 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.
- 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 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).

6.4 Conducted Spurious Emissions

6.4.1 Test Setup



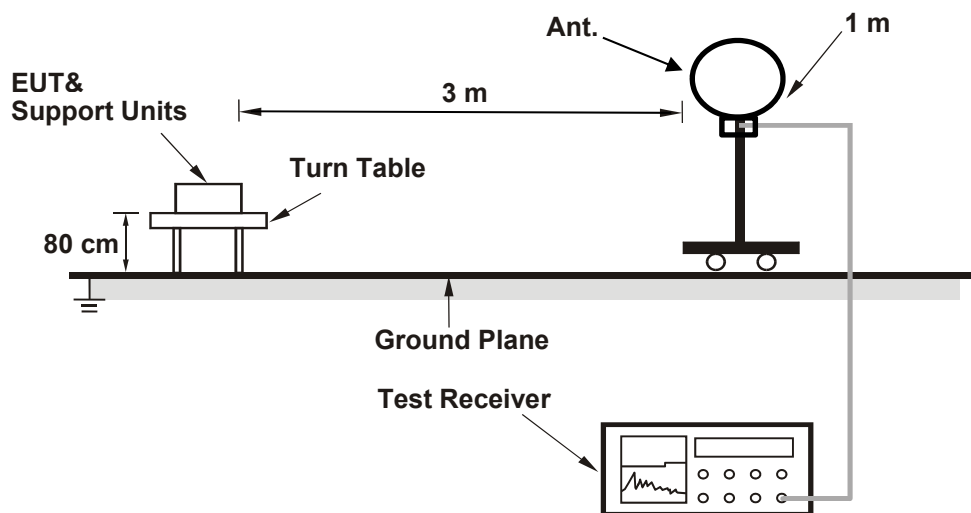
6.4.2 Test Procedure

- Measurement refer to ANSI C63.26 section 5.7.
- All measurements were done at 3 channels: low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. 20 dB attenuation pad is connected with spectrum.
- The fundamental frequency above 1 GHz, the spectrum set RBW = 1 MHz, VBW = 3 MHz, Detector = Average.
- The fundamental frequency below 1 GHz, the spectrum set RBW $\geq$ 100 kHz, VBW $\geq$ 3 x RBW, Detector = Average.
- Measuring frequency band edge, narrow RBW (no less than 1% of the OBW) is used for conducted emission measurement.
- For the emissions measurement method, certain channel BW modes demonstrate compliance by integrating with the smaller RBW allowed by the rule.
For example: Where Reference RBW = 1 MHz and a smaller RBW = 100 kHz is used, worst-case integrated BW power = [Max Measured Value (dBm) with RBW = 100 kHz] + $10 \cdot \log(1000/100)$. To compensate for this integration before comparison to the value, the adjusted reference level offset was increase by 10 dB accordingly.
- Record the maximum power value test plot.

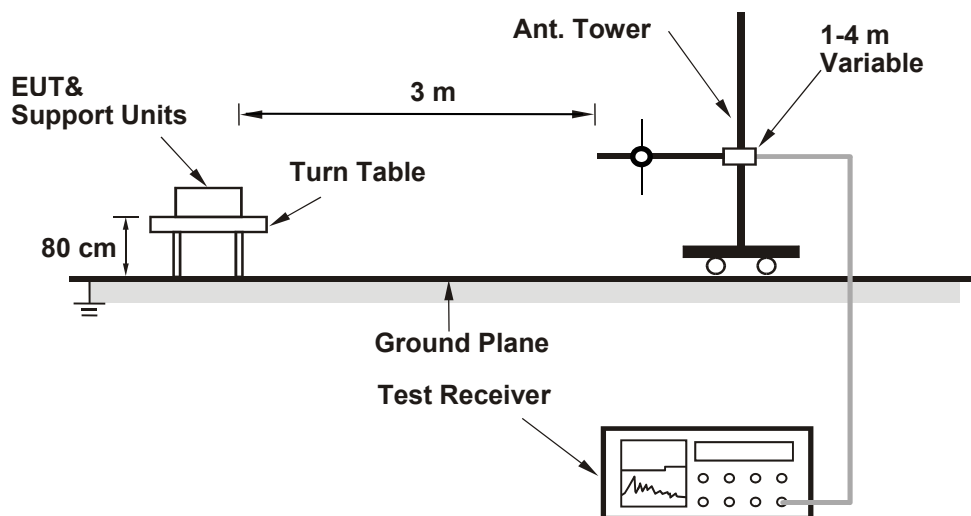
6.5 Radiated Spurious Emissions below 1GHz

6.5.1 Test Setup

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



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

6.5.2 Test Procedure

The EUT is configured 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 ANSI C63.26 section 5.5 and 5.2.7
- e. $EIRP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.
- f. $ERP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8 - 2.15$; where D is the measurement distance (in the far field region) in m.

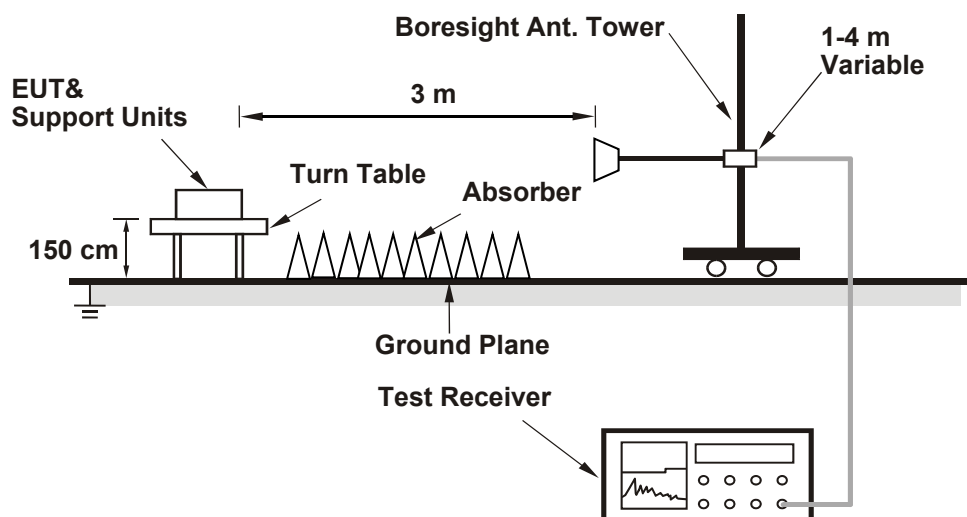
Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz. Set detector = average.
2. The amplitude of spurious emissions in the range 9 kHz to 30 MHz which are attenuated more than 20 dB below the permissible value need not be reported.

6.6 Radiated Spurious Emissions above 1GHz

6.6.1 Test Setup

For radiated emission above 1 GHz



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

6.6.2 Test Procedure

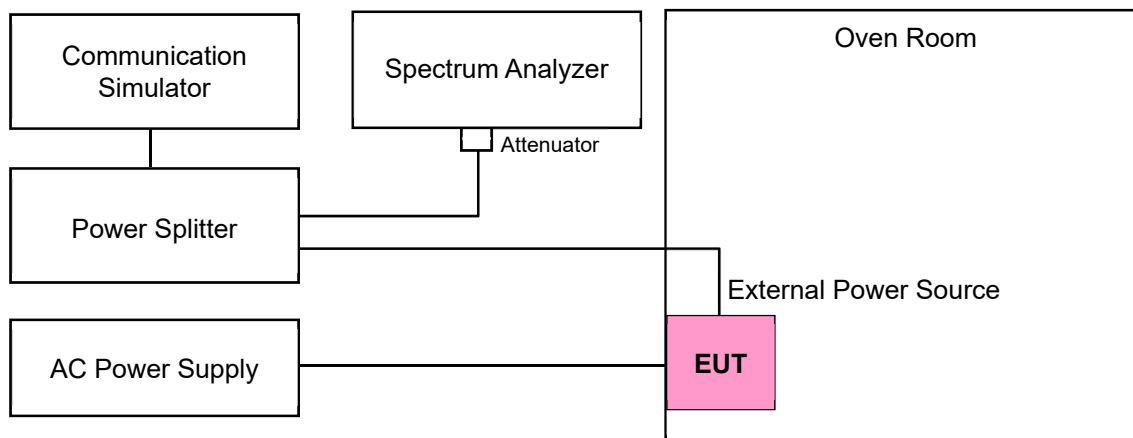
The EUT is configured to set data modulation and maximum power using WWAN technology.

- 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.
- 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.
- 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.
- Following ANSI C63.26 section 5.5 and 5.2.7
- $EIRP \text{ (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.
- $ERP \text{ (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8 - 2.15$; where D is the measurement distance (in the far field region) in m.

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz. Set detector = average.

6.7 Frequency Stability

6.7.1 Test Setup



6.7.2 Test Procedure

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

- 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.
- 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.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^{\circ}\text{C}$ 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 Effective Radiated Power and Equivalent Isotropically Radiated Power

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	23°C, 71% RH	Tested By:	Willy Cheng
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7.1.1 NR n41C

Configure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Channel	UL Frequency (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Channel	UL Frequency (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_n41C	41	100	BPSK	1	0	509202	2546.01	41	80	BPSK	1	216	527178	2635.89	14.97
					1	272						1	0			17.10
		41	100	BPSK	1	0	510600	2553	41	80	BPSK	1	216	528576	2642.88	14.84
					1	272						1	0			17.19
		41	100	BPSK	1	0	512022	2560.11	41	80	BPSK	1	216	529998	2649.99	14.71
					1	272						1	0			17.02
Intra Band Contiguous	CA_n41C	41	100	QPSK	1	0	509202	2546.01	41	80	QPSK	1	216	527178	2635.89	14.90
					1	272						1	0			17.05
		41	100	QPSK	1	0	510600	2553	41	80	QPSK	1	216	528576	2642.88	14.76
					1	272						1	0			17.13
		41	100	QPSK	1	0	512022	2560.11	41	80	QPSK	1	216	529998	2649.99	14.65
					1	272						1	0			16.95
Intra Band Contiguous	CA_n41C	41	100	16QAM	1	0	509202	2546.01	41	80	16QAM	1	216	527178	2635.89	14.82
					1	272						1	0			16.99
		41	100	16QAM	1	0	510600	2553	41	80	16QAM	1	216	528576	2642.88	14.70
					1	272						1	0			17.08
		41	100	16QAM	1	0	512022	2560.11	41	80	16QAM	1	216	529998	2649.99	14.59
					1	272						1	0			16.89
Intra Band Contiguous	CA_n41C	41	100	64QAM	1	0	509202	2546.01	41	80	64QAM	1	216	527178	2635.89	14.76
					1	272						1	0			16.91
		41	100	64QAM	1	0	510600	2553	41	80	64QAM	1	216	528576	2642.88	14.63
					1	272						1	0			17.01
		41	100	64QAM	1	0	512022	2560.11	41	80	64QAM	1	216	529998	2649.99	14.54
					1	272						1	0			16.81
Intra Band Contiguous	CA_n41C	41	100	256QAM	1	0	509202	2546.01	41	80	256QAM	1	216	527178	2635.89	14.70
					1	272						1	0			16.83
		41	100	256QAM	1	0	510600	2553	41	80	256QAM	1	216	528576	2642.88	14.55
					1	272						1	0			16.95
		41	100	256QAM	1	0	512022	2560.11	41	80	256QAM	1	216	529998	2649.99	14.46
					1	272						1	0			16.74

Output Power

Modulation	Minimum Cond. Power (dBm)	Maximum Cond. Power (dBm)	Minimum EIRP (dBm)	Maximum EIRP (dBm)	EIRP Limit (dBm)
BPSK	14.71	17.19	15.76	18.24	33.01
QPSK	14.65	17.13	15.70	18.18	33.01
16QAM	14.59	17.08	15.64	18.13	33.01
64QAM	14.54	17.01	15.59	18.06	33.01
256QAM	14.46	16.95	15.51	18.00	33.01

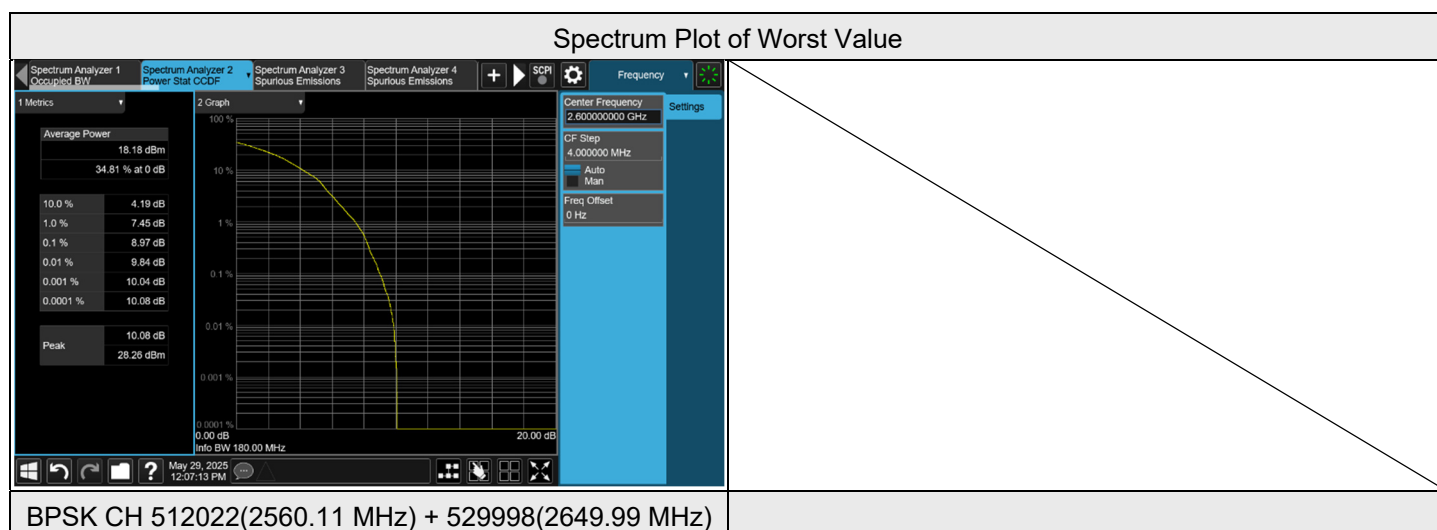
Note: EIRP (dBm) = Cond. Power (dBm) + Antenna Gain (dBi) + Array Gain (if applicable)

7.2 Peak to Average Ratio

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	21°C, 70% RH	Tested By:	Willy Cheng
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7.2.1 NR n41C

Channel	Frequency (MHz)		Peak to Average Ratio (dB)					Limit
			BPSK	QPSK	16QAM	64QAM	256QAM	
509202 + 527178	2546.01	2635.89	7.54	8.57	8.53	8.19	7.46	13.00
510600 + 528576	2553	2642.88	7.87	7.66	8.33	7.35	8.02	
512022 + 529998	2560.11	2649.99	8.97	8.33	7.89	7.64	8.69	



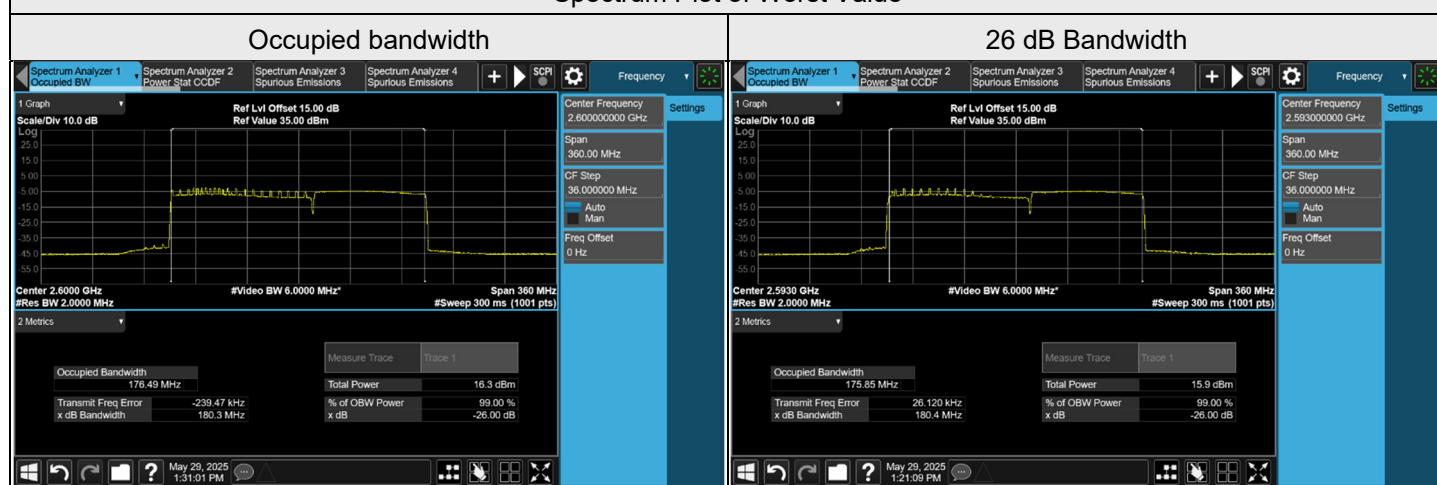
7.3 Bandwidth

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	21°C, 70% RH	Tested By:	Willy Cheng
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7.3.1 NR n41C

Channel	Frequency (MHz)		Occupied Bandwidth (MHz)					26 dB Bandwidth (MHz)				
			BPSK	QPSK	16QAM	64QAM	256 QAM	BPSK	QPSK	16QAM	64QAM	256 QAM
509202 + 527178	2546.01	2635.89	175.58	176.16	175.97	175.75	175.78	179.90	180.30	180.30	180.30	180.30
510600 + 528576	2553	2642.88	175.22	175.85	176.07	175.93	175.88	179.90	180.40	180.30	180.30	180.40
512022 + 529998	2560.11	2649.99	175.84	176.18	176.49	175.95	175.95	180.10	180.40	180.30	180.40	180.30

Spectrum Plot of Worst Value

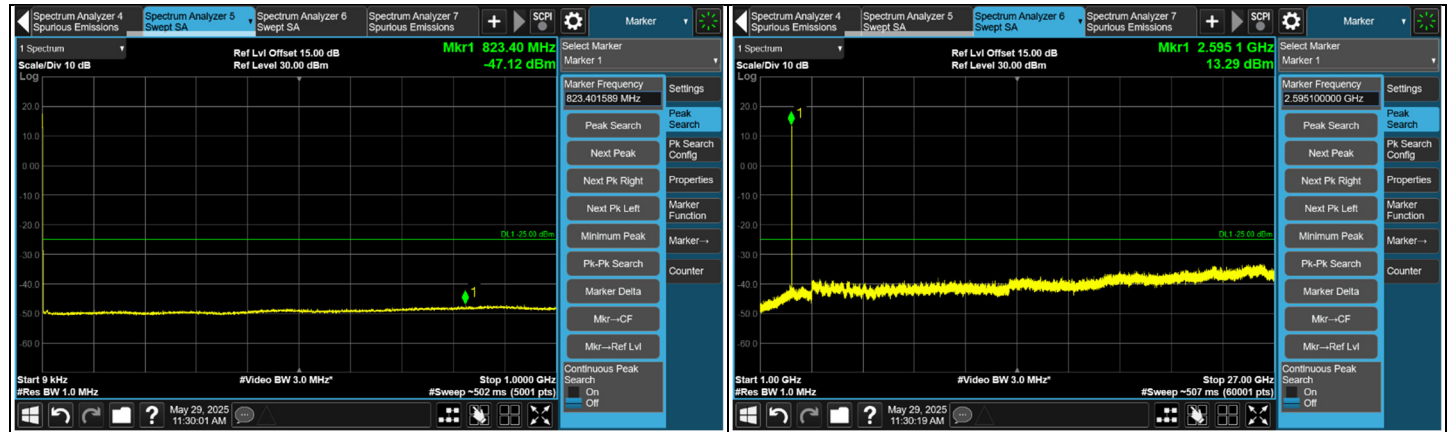


16QAM CH 512022(2560.11 MHz) + 529998(2649.99 MHz)	QPSK CH 510600(2553.00 MHz) + 528576(2642.88 MHz)
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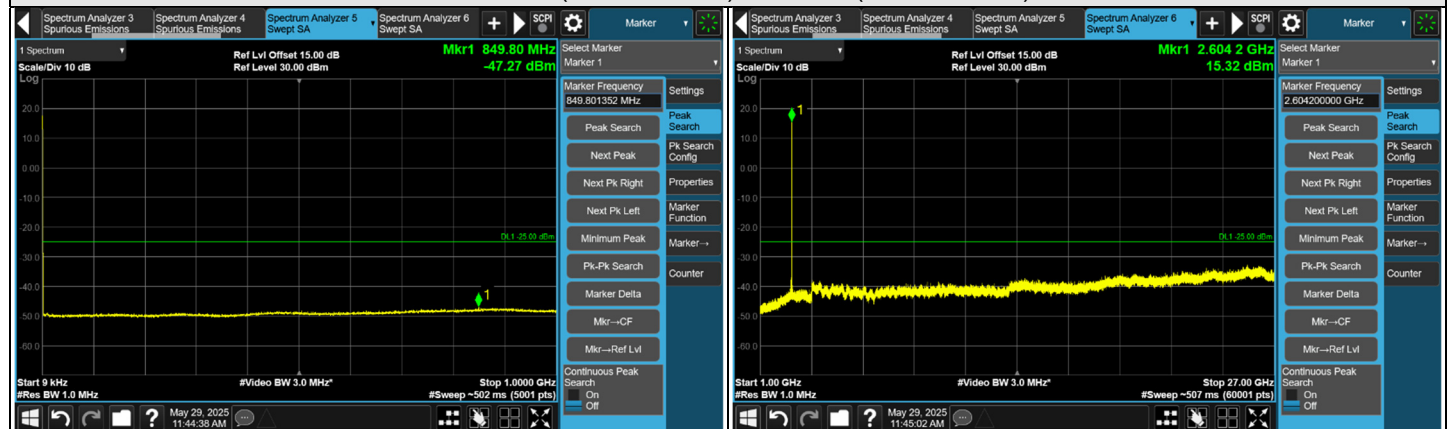
7.4 Conducted Spurious Emissions

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	21°C, 71% RH	Tested By:	Willy Cheng
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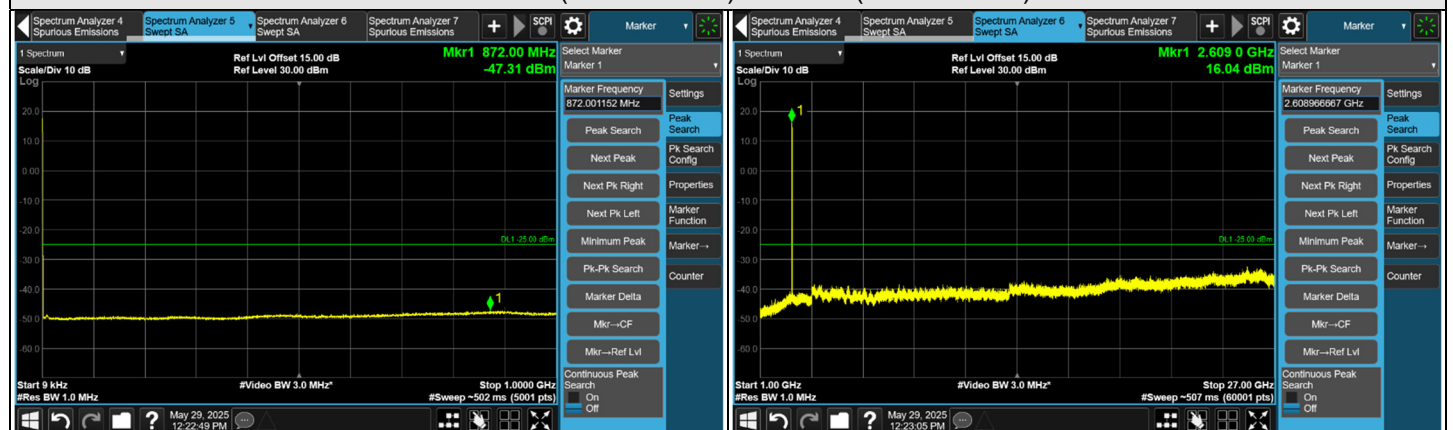
7.4.1 NR n41C



CH 509202(2546.01 MHz) + 527178(2635.89 MHz)

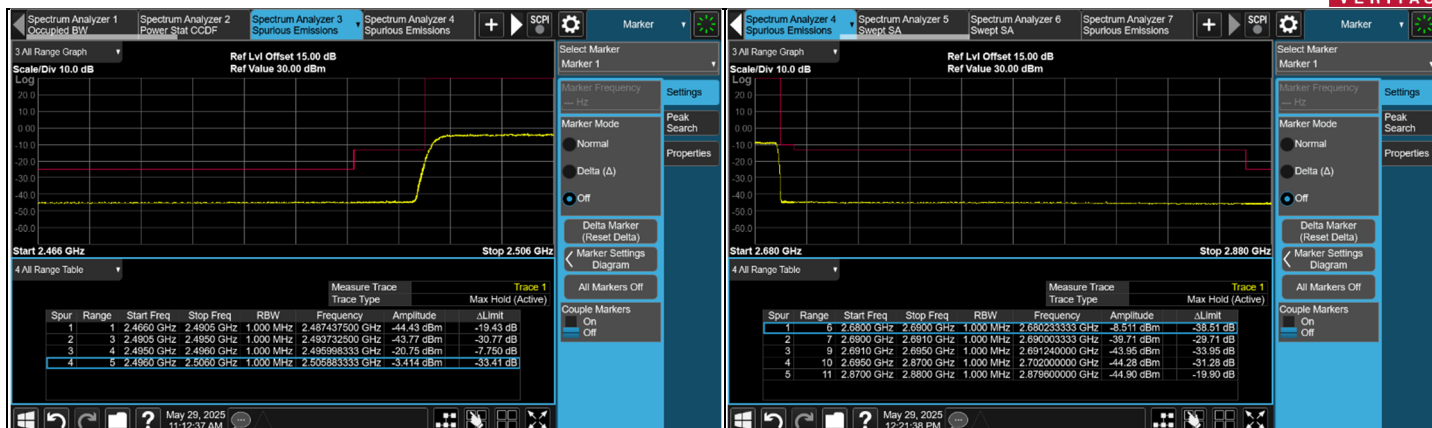


CH 510600(2553.00 MHz) + 528576(2642.88 MHz)



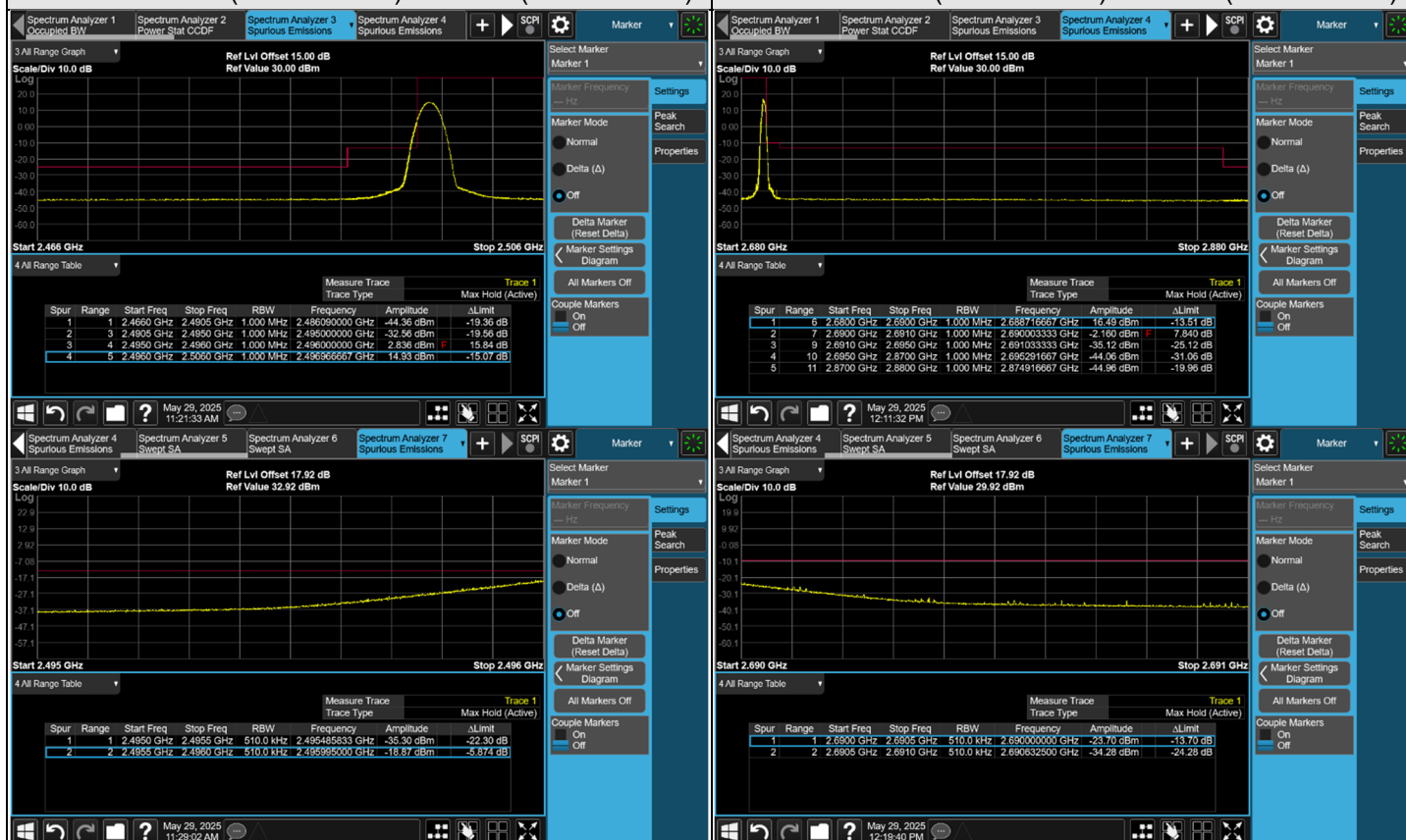
CH 512022(2560.11 MHz) + 529998(2649.99 MHz)

Note: The signal at 9 kHz is IF signal from spectrum analyzer.



FULL CH 509202(2546.01 MHz) + 527178(2635.89 MHz)

FULL CH 512022(2560.11 MHz) + 529998(2649.99 MHz)



1RB CH 509202(2546.01 MHz) + 527178(2635.89 MHz)

1RB CH 512022(2560.11 MHz) + 529998(2649.99 MHz)

7.5 Radiated Spurious Emissions below 1GHz

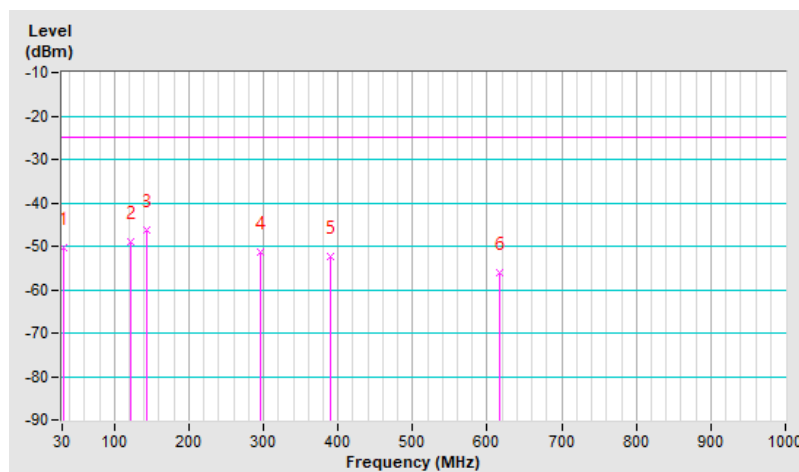
7.5.1 NR n41C

RF Mode	NR n41 Channel Bandwidth: 100 MHz + 80 MHz	Channel	CH 509202(2546.01 MHz) + 527178(2635.89 MHz)
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Adair Peng		

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	31.94	-50.33	-25.00	-25.33	1.51 H	359	55.32	-105.65
2	121.18	-49.14	-25.00	-24.14	1.01 H	14	56.76	-105.90
3	142.52	-46.22	-25.00	-21.22	2.00 H	200	57.71	-103.93
4	296.75	-51.51	-25.00	-26.51	1.01 H	337	50.46	-101.97
5	389.87	-52.40	-25.00	-27.40	2.00 H	286	47.62	-100.02
6	615.88	-55.97	-25.00	-30.97	2.00 H	243	39.54	-95.51

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
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 frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

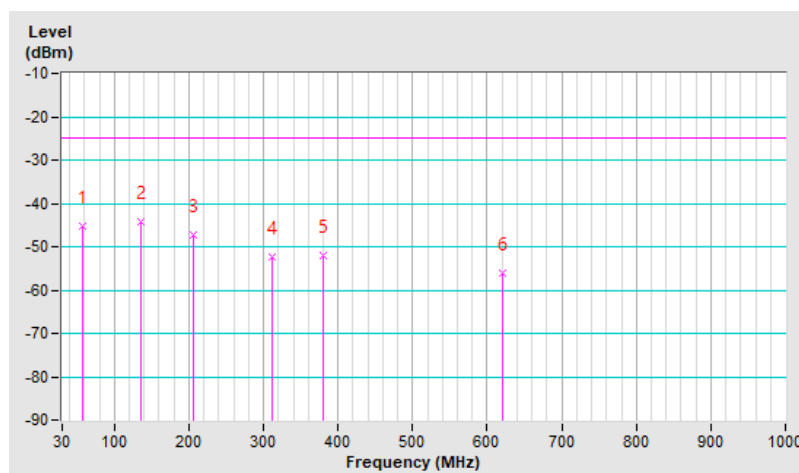


RF Mode	NR n41 Channel Bandwidth: 100 MHz + 80 MHz	Channel	CH 509202(2546.01 MHz) + 527178(2635.89 MHz)
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Adair Peng		

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	57.16	-45.20	-25.00	-20.20	1.49 V	329	59.47	-104.67
2	134.76	-44.27	-25.00	-19.27	2.00 V	128	60.26	-104.53
3	206.54	-47.21	-25.00	-22.21	2.00 V	120	59.09	-106.30
4	312.27	-52.43	-25.00	-27.43	1.49 V	72	49.01	-101.44
5	379.20	-52.06	-25.00	-27.06	1.49 V	190	48.14	-100.20
6	620.73	-55.94	-25.00	-30.94	2.00 V	82	39.48	-95.42

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
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 frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



7.6 Radiated Spurious Emissions above 1GHz

7.6.1 NR n41C

RF Mode	NR n41 Channel Bandwidth: 100 MHz + 80 MHz	Channel	CH 509202(2546.01 MHz) + 527178(2635.89 MHz)
Frequency Range	1 GHz ~ 27 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Adair Peng		

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	5092.02	-42.34	-25.00	-17.34	1.85 H	123	47.15	-89.49
2	5271.78	-42.76	-25.00	-17.76	1.91 H	118	47.19	-89.95
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	5092.02	-40.21	-25.00	-15.21	2.08 V	211	49.28	-89.49
2	5271.78	-40.70	-25.00	-15.70	2.11 V	202	49.25	-89.95

Remarks:

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

RF Mode	NR n41 Channel Bandwidth: 100 MHz + 80 MHz	Channel	CH 510600(2553.00 MHz) + 528576(2642.88 MHz)
Frequency Range	1 GHz ~ 27 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Adair Peng		

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	5106.00	-42.23	-25.00	-17.23	1.84 H	125	47.21	-89.44
2	5285.76	-42.76	-25.00	-17.76	1.82 H	120	47.23	-89.99
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	5106.00	-40.18	-25.00	-15.18	2.15 V	216	49.26	-89.44
2	5285.76	-40.71	-25.00	-15.71	2.11 V	209	49.28	-89.99

Remarks:

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

RF Mode	NR n41 Channel Bandwidth: 100 MHz + 80 MHz	Channel	CH 512022(2560.11 MHz) + 529998(2649.99 MHz)
Frequency Range	1 GHz ~ 27 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Adair Peng		

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	5120.22	-42.31	-25.00	-17.31	1.87 H	117	47.09	-89.40
2	5299.98	-42.73	-25.00	-17.73	1.88 H	124	47.29	-90.02
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	5120.22	-40.19	-25.00	-15.19	2.19 V	208	49.21	-89.40
2	5299.98	-40.71	-25.00	-15.71	2.05 V	213	49.31	-90.02

Remarks:

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

7.7 Frequency Stability

Environmental Conditions:	25°C, 60% RH	Tested By:	Willy Cheng
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7.7.1 NR n41C

Frequency Stability Versus Voltage				
Voltage (Vac)	CH 509202(2546.01 MHz) + 527178(2635.89 MHz)		CH 512022(2560.11 MHz) + 529998(2649.99 MHz)	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
102	2546.010004	0.0016	2649.990001	0.0004
120	2546.009997	-0.0012	2649.990001	0.0004
138	2546.009998	-0.0008	2649.989998	-0.0008

Note: The applicant defined the normal working voltage is from 102 to 138 Vac.

Frequency Stability Versus Temperature				
Temperature (°C)	CH 509202(2546.01 MHz) + 527178(2635.89 MHz)		CH 512022(2560.11 MHz) + 529998(2649.99 MHz)	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2546.009998	-0.0008	2649.990002	0.0008
-20	2546.009995	-0.0020	2649.989997	-0.0011
-10	2546.009995	-0.0020	2649.989998	-0.0008
0	2546.010001	0.0004	2649.989995	-0.0019
10	2546.009996	-0.0016	2649.990002	0.0008
20	2546.010001	0.0004	2649.990003	0.0011
30	2546.010005	0.0020	2649.989998	-0.0008
40	2546.010004	0.0016	2649.990002	0.0008
50	2546.009997	-0.0012	2649.989996	-0.0015

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:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@bureauveritas.com

Web Site: <http://ee.bureauveritas.com.tw>

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

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