



FCC RF Test Report

APPLICANT : Viavi Solutions Inc.
EQUIPMENT : 5G Sub-6 GHz M.2 Module with WCDMA and LTE
BRAND NAME : VIAVI
MODEL NAME : RM520N-GL
FCC ID : WUW-RM520NGL
STANDARD : 47 CFR Part 96
CLASSIFICATION : Citizens Band End User Devices (CBE)
EQUIPMENT TYPE : End User Equipment
TEST DATE(S) : Jul. 30, 2024 ~ Nov. 04, 2024

The product was installed into a host (Brand Name: VIAVI, Model Name: NXE-DEVICE-4M) during the test, only Conducted Power, EIRP and RSE test items are tested in this report.

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

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



Approved by: Jason Jia

Sportun International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China



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History of this test report



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
-	§96.41	Peak-to-Average Ratio	Not Applicable	Not applicable for End User Devices
3.3	§96.41	Maximum E.I.R.P	Pass	-
		Maximum Power Spectral Density	Not Applicable	Not applicable for End User Devices
-	§2.1049 §96.41	Occupied Bandwidth	Reporting only	1
-	§2.1051 §96.41	Conducted Band Edge Measurement Adjacent Channel Leakage Ratio	Pass	1
-	§2.1051 §96.41	Conducted Spurious Emission	Pass	1
-	§2.1055	Frequency Stability for Temperature & Voltage	Pass	1
4.4	§2.1051 §96.41	Radiated Spurious Emission	Pass	Under limit 19.42 dB at 14425.00 MHz

Remark 1: Test results are leveraged from module RF report No "FYCR220600021102".

Conformity Assessment Condition:

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

Disclaimer:

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



1 General Description

1.1 Applicant

Viavi Solutions Inc.

1445 South Spectrum Boulevard, Suite 102, Chandler, Arizona 85286

1.2 Manufacturer

Viavi Solutions Inc.

1445 South Spectrum Boulevard, Suite 102, Chandler, Arizona 85286

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	5G Sub-6 GHz M.2 Module with WCDMA and LTE
Brand Name	VIAVI
Model Name	RM520N-GL
FCC ID	WUW-RM520NGL
Tx/Rx Frequency	5G NR n48 : 3550 MHz ~ 3700 MHz
SCS	30kHz
Bandwidth	n48: 10 / 20 / 40MHz
Antenna Gain	< Module A/B/C/D> <Ant. 2> 5G NR n48: 5.5 dBi
Type of Modulation	DFT-s-OFDM (PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM) CP-OFDM (QPSK / 16QAM / 64QAM / 256QAM)
EUT Stage	Identical Prototype

Host Product Feature	
Equipment	XEDGE 2.0
Brand Name	VIAVI
Model Name	NXE-DEVICE-4M
IMEI Code	Conducted : IMEI A: 868371051639645 IMEI B: 868371051635213 IMEI C: 868371051635338 IMEI D: 868371051639819 Radiation : IMEI A: 868371051120539 IMEI B: 868371051121032 IMEI C: 868371051143184 IMEI D: 868371051635312
Applicant	Viavi Solutions Inc. 1445 South Spectrum Boulevard, Suite 102, Chandler, Arizona 85286
Manufacturer	Viavi Solutions Inc. 1445 South Spectrum Boulevard, Suite 102, Chandler, Arizona 85286

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or



user's manual for more detailed description.

2. The maximum EIRP is calculated from max output power and antenna gain, only the maximum EIRP of Modem C Ant. 2 is shown in the report.
3. All the supported EN-DC combinations are verified conducted power, only the EN-DC combination with highest power are shown in the report.
4. The EN-DC mode combination could be referred to the product spec.
5. The four Modules are the same include Power setting, but we still verified the real power, which is within the uncertainty range, so we chose the module of the higher power for testing, each Module has four antennas, for 5G NR n48, only Ant.2 supports TX/RX function, the others are RX only.
6. For RSE testing, we choice the module of the higher conducted Power to test, because between four modules do not support MIMO mode.

1.4 Maximum EIRP Power

5G NR n48		PI/2 BPSK / QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
10	3555.00~3694.98	0.1312	-	0.1012	-
20	3560.01~3690.00	0.1321	-	0.1014	-
40	3570.00~3679.98	0.1343	-	0.1076	-

1.5 Testing Site

Sportun International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sportun International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	Sportun Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH04-KS TH01-KS	CN1257	314309



1.6 Test Software

Item	Site	Manufacture	Name	Version
1.	TH01-KS	Tonscend	JS1120-3 test system China_210602	3.3.10
2.	03CH04-KS	AUDIX	E3	210616

1.7 Applied Standards

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

- ♦ ANSI C63.26-2015
- ♦ 47 CFR Part 96
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 940660 D01 Part 96 CBRS v03
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

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



2 Test Configuration of Equipment Under Test

2.1 Test Mode

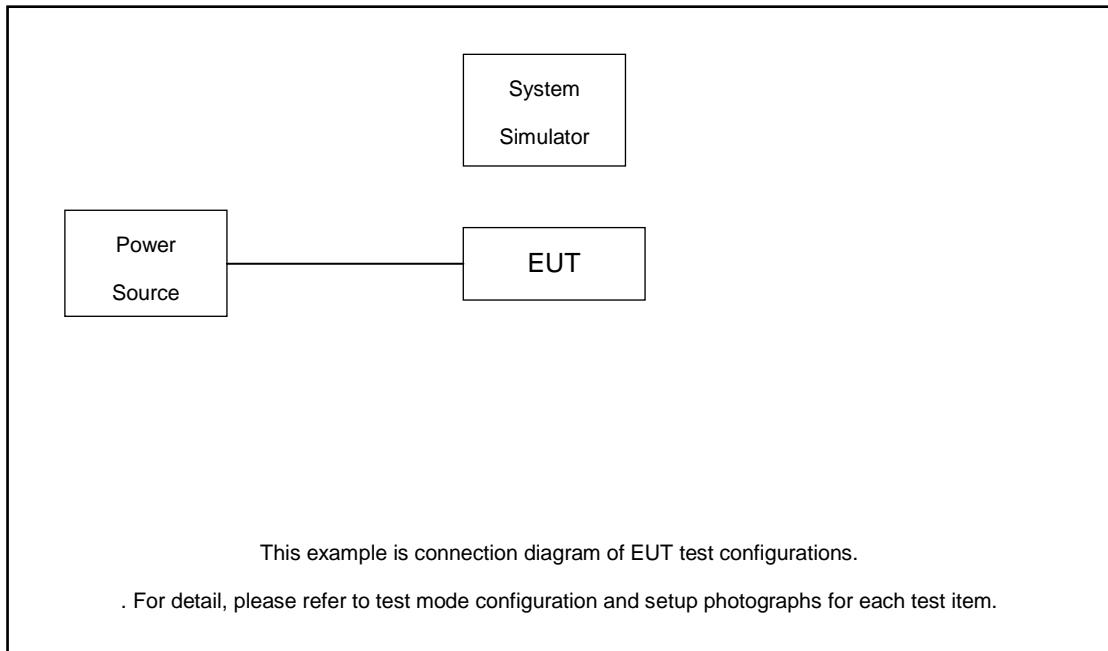
Antenna port conducted and radiated test items listed below are performed according to KDB 971168

D01 Power Meas. License Digital Systems v03r01 with maximum output power.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

Test Items	Band	Bandwidth (MHz)						Modulation					RB #		Test Channel		
		5	10	15	20	-	40	PI/2 BPSK	QPSK	16QAM	64QAM	256 QAM	1	Full	L	M	H
Max. Output Power	n48	-	v	-	v	-	v	v	v	v	v	v	v	v	v	v	v
E.I.R.P	n48	-	v	-	v	-	v	v	v	v	v	v	v	v	v	v	v
Radiated Spurious Emission	n48	Worst Case												v	v	v	
Remark	1. The mark "v" means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. All test items are based on engineering evaluation. 5. Frequency Stability : Normal Voltage = 24V ; Low Voltage =11V. ; High Voltage =28V																

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m
2.	NR Base Station	Anritsu	MT8000A	N/A	N/A	Unshielded, 1.8 m



2.4 Frequency List of Low/Middle/High Channels

5G NR n48 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
40	Channel	638000	641666	645332
	Frequency	3570	3624.99	3679.98
20	Channel	637334	641666	646000
	Frequency	3560.01	3624.99	3690
10	Channel	637000	641666	646332
	Frequency	3555	3624.99	3694.98

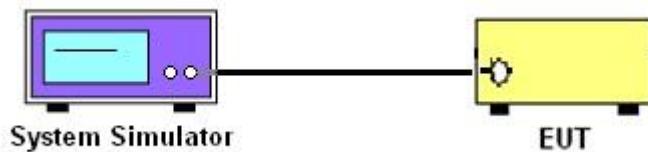
3 Conducted Test Items

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.1.1 Test Setup

3.1.2 Conducted Output Power



3.1.3 Test Result of Conducted Test

Please refer to Appendix A.



3.2 Conducted Output Power

3.2.1 Description of the Conducted Output Power Measurement

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

3.2.2 Test Procedures

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



3.3 EIRP

3.3.1 Description of the EIRP Measurement

EIRP limits for CBRS equipment as below table:

Device		Maximum EIRP (dBm/10 MHz)	Maximum PSD (dBm/MHz)
Applied	End User Device	23	n/a
<input type="checkbox"/>	Category A CBSD	30	20
<input type="checkbox"/>	Category B CBSD	47	37

Remark:

1. The worst case EIRP shown in this section is found with LTE operating only using 1RB. As such, the EIRP/10MHz and full channel EIRP values will be identical since 1RB is fully contained within all available channel bandwidths for LTE Band 48 (i.e. 5, 10, 15, 20MHz)

3.3.2 Test Procedures for EIRP

1. Establishing a communications link with the call box (Base station) to measure the Maximum conducted power, the parameters were set to force the EUT transmitting at maximum output power level. Use the average power measurement function to measure total channel power of each channel bandwidth (per ANSI C63.26-2015 Section 5.2.1)
2. Determining ERP and/or EIRP from conducted RF output power measurements (Per ANSI C63.26-2015 Section 5.2.5.5)

$$\text{EIRP} = P_T + G_T - L_C, \text{ERP} = \text{EIRP} - 2.15, \text{where}$$

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

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

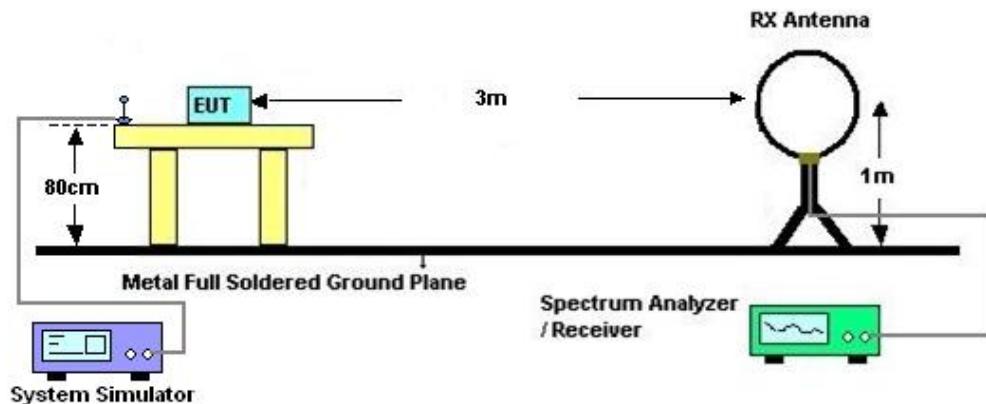
4 Radiated Test Items

4.1 Measuring Instruments

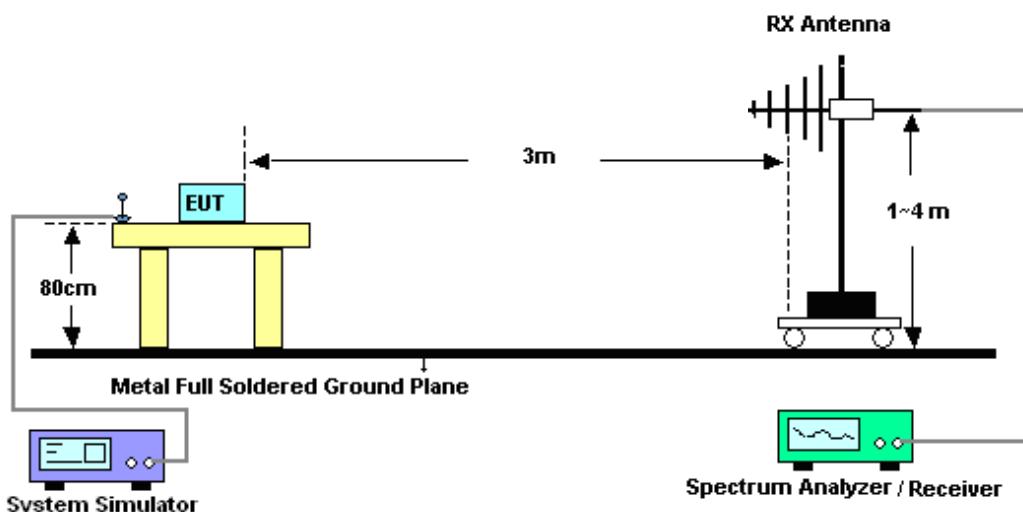
See list of measuring instruments of this test report.

4.2 Test Setup

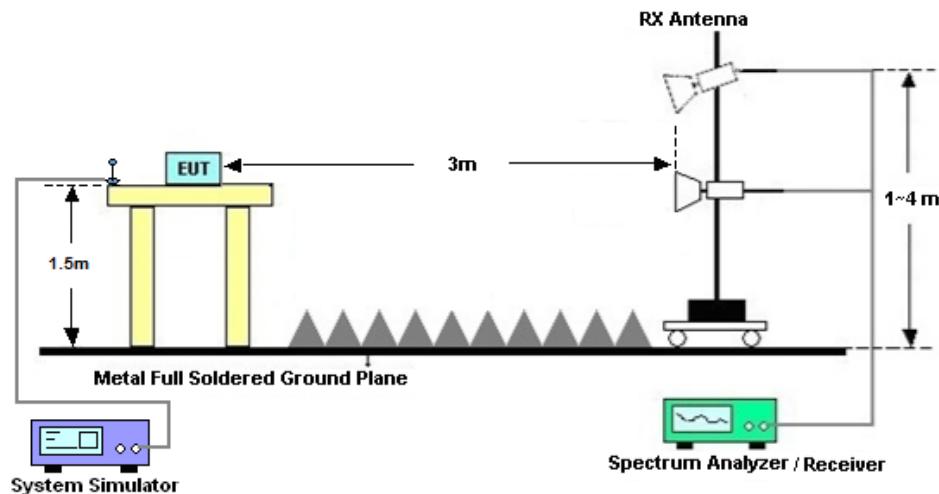
4.2.1 For radiated test below 30MHz



4.2.2 For radiated test from 30MHz to 1GHz



4.2.3 For radiated test above 1GHz



4.3 Test Result of Radiated Test

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

Please refer to Appendix B.



4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least -40dBm / MHz.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

1. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
5. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
ERP (dBm) = EIRP - 2.15
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
The limit line is -40dBm/MHz



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 10, 2024	Oct. 16, 2024~Nov. 04, 2024	Oct. 09, 2025	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	NCR	Oct. 16, 2024~Nov. 04, 2024	NCR	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY574710 79	10Hz-44G,MAX 30dB	Oct. 11, 2023	Jul. 30, 2024	Oct. 10, 2024	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2E	101125	9kHz~30MHz	Sep. 09, 2023	Jul. 30, 2024	Sep. 08, 2024	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz-1GHz	Dec. 06, 2023	Jul. 30, 2024	Dec. 05, 2024	Radiation (03CH04-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 23, 2023	Jul. 30, 2024	Oct. 22, 2024	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 27, 2024	Jul. 30, 2024	Jan. 26, 2025	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	413740	9KHz-1GHz	Jan. 03, 2024	Jul. 30, 2024	Jan. 02, 2025	Radiation (03CH04-KS)
Amplifier	EM	EM18G40GA	060728	18~40GHz	Jan. 02, 2024	Jul. 30, 2024	Jan. 01, 2025	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18GA	060840	1Ghz-18Ghz	Oct. 11, 2023	Jul. 30, 2024	Oct. 10, 2024	Radiation (03CH04-KS)
Amplifier	EM	EM01G18GA	060892	1Ghz-18Ghz	Oct. 11, 2023	Jul. 30, 2024	Oct. 10, 2024	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F1040900 04	N/A	NCR	Jul. 30, 2024	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jul. 30, 2024	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jul. 30, 2024	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required



6 Measurement Uncertainty

Uncertainty of Conducted Measurement

Conducted Power	±0.50 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_{c(y)}$)	2.83 dB
----------------------------------------------------------------------------	---------

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_{c(y)}$)	2.83 dB
----------------------------------------------------------------------------	---------

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_{c(y)}$)	2.82 dB
----------------------------------------------------------------------------	---------

----- THE END -----



Appendix A. Test Results of Conducted Test

Test Engineer :	Smile Wang	Temperature :	22~23°C
		Relative Humidity :	40~42%

Conducted Output Power(Average power) and EIRP

5G NR n48_Module C Ant2:

BW [MHz]	Modulation	RB Size	RB Offset	Power	Power	Power	EIRP (W)		
				Low Ch. / Freq.	Middle Ch. / Freq.	High Ch. / Freq.	L	M	H
	Channel			638000	641666	645332			
	Frequency (MHz)			3570	3624.99	3679.98			
40	PI/2 BPSK	1	1	15.63	15.73	15.55	0.1297	0.1327	0.1274
40	PI/2 BPSK	1	53	15.56	15.55	15.55	0.1276	0.1274	0.1274
40	PI/2 BPSK	1	104	15.53	15.67	15.51	0.1268	0.1309	0.1262
40	PI/2 BPSK	50	0	15.44	15.36	15.12	0.1242	0.1219	0.1153
40	PI/2 BPSK	50	28	15.62	15.70	15.54	0.1294	0.1318	0.1271
40	PI/2 BPSK	50	56	15.23	15.44	15.08	0.1183	0.1242	0.1143
40	PI/2 BPSK	100	0	15.37	15.46	15.12	0.1222	0.1247	0.1153
40	QPSK	1	1	15.74	15.78	15.75	0.1330	0.1343	0.1334
40	QPSK	1	53	15.67	15.67	15.57	0.1309	0.1309	0.1279
40	QPSK	1	104	15.63	15.71	15.55	0.1297	0.1321	0.1274
40	QPSK	50	0	14.73	14.84	14.76	0.1054	0.1081	0.1062
40	QPSK	50	28	15.66	15.69	15.65	0.1306	0.1315	0.1303
40	QPSK	50	56	14.87	14.65	14.67	0.1089	0.1035	0.1040
40	QPSK	100	0	14.93	14.95	14.81	0.1104	0.1109	0.1074
40	16QAM	1	1	14.73	14.82	14.81	0.1054	0.1076	0.1074
40	64QAM	1	1	13.32	13.28	13.14	0.0762	0.0755	0.0731
40	256QAM	1	1	11.27	11.27	11.25	0.0475	0.0475	0.0473
	Channel			637334	641666	646000			
	Frequency (MHz)			3560.01	3624.99	3690	L	M	H
20	QPSK	1	1	15.71	15.71	15.71			
20	16QAM	1	1	14.52	14.53	14.56	0.1005	0.1007	0.1014
	Channel			637000	641666	646332			
	Frequency (MHz)			3555	3624.99	3694.98	L	M	H
10	QPSK	1	1	15.68	15.68	15.66			
10	16QAM	1	1	14.55	14.53	14.52	0.1012	0.1007	0.1005



Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

Test Engineer :	Bruce	Temperature :	23~25°C
		Relative Humidity :	41~42%

SA n48 / 40MHz / QPSK / ANT2								
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	7099	-63.58	-40	-23.58	-75.04	2.84	14.30	H
	10652	-61.61	-40	-21.61	-71.55	3.49	13.43	H
	14205	-61.33	-40	-21.33	-71.57	3.85	14.09	H
	7099	-63.40	-40	-23.40	-74.86	2.84	14.30	V
	10652	-61.67	-40	-21.67	-71.61	3.49	13.43	V
	14205	-61.33	-40	-21.33	-71.57	3.85	14.09	V
Middle	7209	-63.76	-40	-23.76	-75.22	2.84	14.30	H
	10817	-61.73	-40	-21.73	-71.67	3.49	13.43	H
	14425	-61.10	-40	-21.10	-71.34	3.85	14.09	H
	7209	-63.36	-40	-23.36	-74.82	2.84	14.30	V
	10817	-61.79	-40	-21.79	-71.73	3.49	13.43	V
	14425	-60.67	-40	-20.67	-70.91	3.85	14.09	V
Highest	7319	-62.87	-40	-22.87	-74.33	2.84	14.30	H
	10982	-60.71	-40	-20.71	-70.65	3.49	13.43	H
	14645	-61.46	-40	-21.46	-71.70	3.85	14.09	H
	7319	-62.45	-40	-22.45	-73.91	2.84	14.30	V
	10982	-60.61	-40	-20.61	-70.55	3.49	13.43	V
	14645	-60.87	-40	-20.87	-71.11	3.85	14.09	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



DC_66A_n48A / 40MHz / QPSK / ANT2								
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	7165	-63.00	-40	-23.00	-74.46	2.84	14.30	H
	10751	-60.42	-40	-20.42	-70.36	3.49	13.43	H
	14326	-59.73	-40	-19.73	-69.97	3.85	14.09	H
	7165	-63.15	-40	-23.15	-74.61	2.84	14.30	V
	10751	-60.73	-40	-20.73	-70.67	3.49	13.43	V
	14326	-60.06	-40	-20.06	-70.30	3.85	14.09	V
Middle	7209	-62.47	-40	-22.47	-73.93	2.84	14.30	H
	10817	-60.00	-40	-20.00	-69.94	3.49	13.43	H
	14425	-59.42	-40	-19.42	-69.66	3.85	14.09	H
	7209	-62.54	-40	-22.54	-74.00	2.84	14.30	V
	10817	-60.12	-40	-20.12	-70.06	3.49	13.43	V
	14425	-59.96	-40	-19.96	-70.20	3.85	14.09	V
Highest	7264	-62.27	-40	-22.27	-73.73	2.84	14.30	H
	10894	-59.82	-40	-19.82	-69.76	3.49	13.43	H
	14524	-59.77	-40	-19.77	-70.01	3.85	14.09	H
	7264	-62.25	-40	-22.25	-73.71	2.84	14.30	V
	10894	-60.12	-40	-20.12	-70.06	3.49	13.43	V
	14524	-59.78	-40	-19.78	-70.02	3.85	14.09	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.