FCC RADIO TEST REPORT

FCC ID	:	XIA-221
Equipment	:	Vodafone MachineLink 4G Lite
Brand Name	:	NetCommWireless, Vodafone
Model Name	:	NWL-221
Applicant	:	NetComm Wireless Limited 18-20 Orion Road Lane Cove NSW 2066 Australia
Manufacturer	:	NetComm Wireless Limited 18-20 Orion Road Lane Cove NSW 2066 Australia
Standard	:	47 CFR Part2, 22(H)

The product was received on Sep. 19, 2018, and testing was started from Oct. 02, 2018 and completed on Oct. 18, 2018. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI/TIA-603-E (2016), 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. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Cliff Chang

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FG891369-06AA	01	Initial issue of report	Sep. 28, 2020

Summary of Test Result

Report Clause	Ref Std. Clause (FCC Rule)	Test Items	Result (PASS/FAIL)	Remark
3.1	2.1046	Conducted Output Power	PASS	-
	22.913(a)(2)	Effective Radiated Power	PASS	-
3.2	22.913(d)	Peak-to-Average Ratio	PASS	-
3.3	2.1049	Occupied Bandwidth	PASS	-
3.4	2.1051 22.917(a)	Conducted Band Edge	PASS	-
3.5	2.1051 22.917(a)	Conducted Emission	PASS	-
3.6	2.1053 22.917(a)	Field Strength of Spurious Radiation	PASS	-
3.7	2.1055 22.355	Frequency Stability for Temperature & Voltage	PASS	-
Note: Reference to Sporton Project No.: 891369-02.				

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Wendy Pan

1 General Description

1.1 Information

1.1.1 RF General Information

Items	Description
EUT Power Type	From power adapter Note:The EUT was tested with a 12V power adapter and the device supports 8-40V.
EUT Type	☐ Base Station ☒ Mobile Station ☐ Fixed Subscriber Station
TX Frequency (MHz)	WCDMA Band 5: 826.4 ~ 846.6
RX Frequency (MHz)	WCDMA Band 5: 871.4 ~ 891.6
Bandwidth (MHz)	5
Maximum Output Power to Antenna (dBm)	WCDMA Band 5: 23.47
99% Occupied Bandwidth (MHz)	WCDMA Band 5: 4.148
Type of Modulation	WCDMA: BPSK / QPSK HSDPA: 16QAM HSUPA: QPSK

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	NetCommWireless	NANT-00006	Dipole Ant.	SMA	0.40

Note: **The EUT support 1TX, 2RX functions:**

Only Main port can be used as transmitting functions.

Main port and Aux port could receive simultaneously.

1.1.3 Maximum ERP Power, Frequency Tolerance, and Emission Designator

WCDMA					
FCC Rule	**System**	**Type of Modulation**	**Maximum ERP (W)**	**Frequency Tolerance (ppm)**	**Emission Designator**
Part 22	WCDMA Band 5	QPSK	0.149	0.007	4M15F9W

1.1.4 Table for Multiple Listing

The difference for brand name is shown as below:

Brand Name	Equipment Name	Model Name	Description
NetCommWireless; Vodafone	Vodafone MachineLink 4G Lite	NWL-221	All the brand name are identical; different brand names serve as marketing strategy.

1.2 Applicable Standards

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

- 47 CFR Part2, 22(H)
- ANSI/TIA-603-E (2016)
- ANSI C63.26-2015
- FCC KDB 971168 D01 v03r01

The following reference test guidance is not within the scope of accreditation of TAF.

- FCC KDB 412172 D01 v01r01
- FCC KDB 414788 D01 v01r01

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

1.3 Testing Location

Testing Location			
☐	HWA YA	ADD :	No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)
		TEL :	886-3-327-3456 FAX : 886-3-327-0973
☒	JHUBEI	ADD :	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
		TEL :	886-3-656-9065 FAX : 886-3-656-9085

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH01-CB	Lucke Hsieh	25°C / 60%	Oct. 02, 2018 ~ Oct. 17, 2018
Radiated	03CH01-CB	Jay Luo	25°C / 60%	Oct. 03, 2018 ~ Oct. 18, 2018

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

1.4 Measurement Uncertainty

Test Items	Uncertainty	Remark
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%

2 Test Configuration of Equipment Under Test

2.1 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests		
Tests Item	Conducted Output Power ERP Peak-to-Average Ratio 99% OBW and 26dB Bandwidth Conducted Band Edge Conducted Spurious Emission Frequency Stability	
Test Condition	Conducted measurement at transmit chains	
Test Mode	1	EUT WCDMA Band 5

The Worst Case Mode for Following Conformance Tests	
Tests Item	Field Strength of Spurious Radiation
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.
Operating Mode > 1GHz	Normal Link
The EUT was performed at Y axis and Z axis position and the worst case was found at Z axis. So the measurement will follow this same test configuration.	
1	EUT in Z axis – WCDMA Band 5

2.2 Accessories

RJ-45*1: Non-shielded 1.5m

DIN rail mounting bracket*1

2.3 Support Equipment

For test site: 03CH01-CB

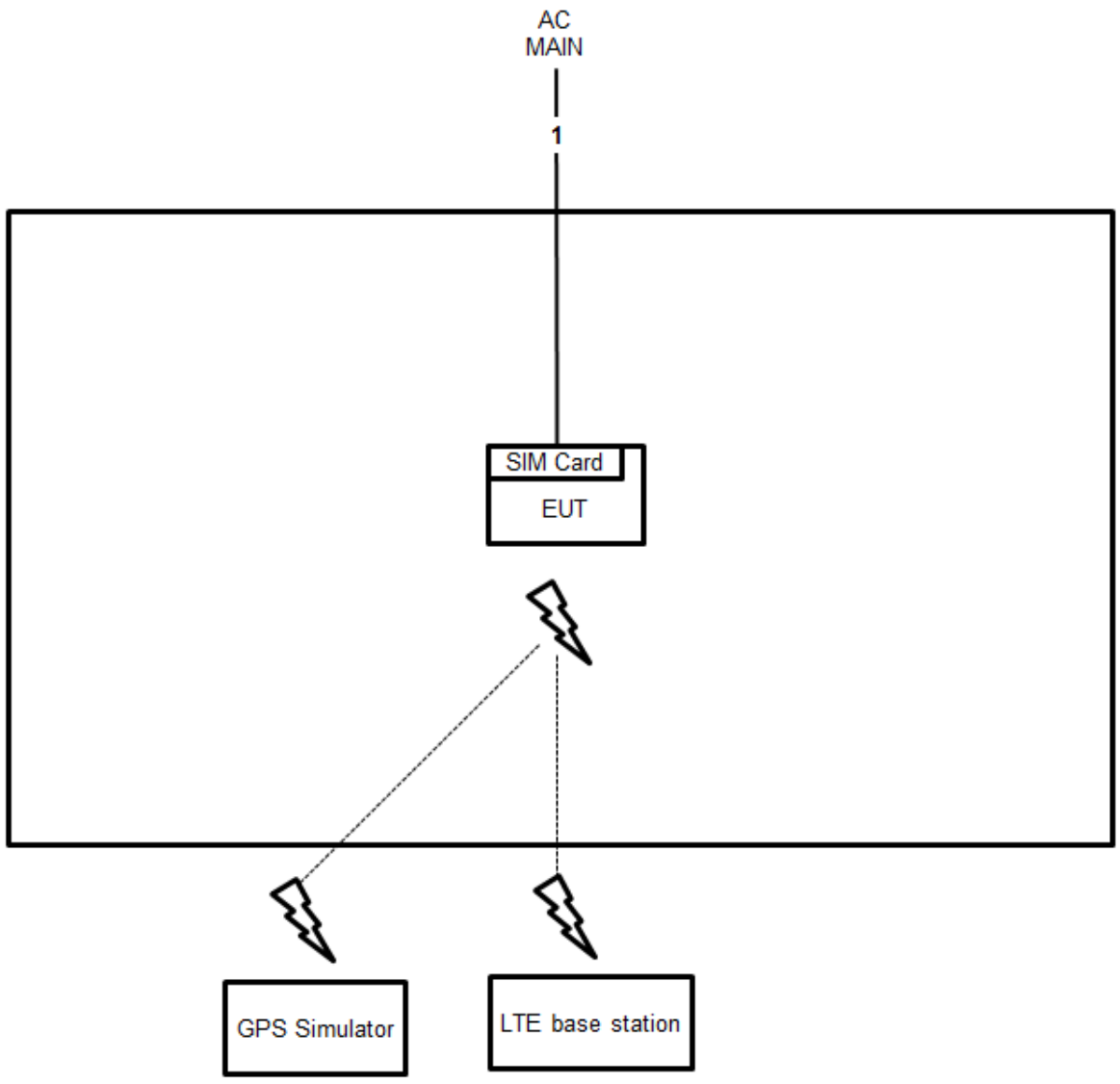
Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	LTE base station	Anritsu	MT8820C	N/A
2	SIM Card	Anritsu	N/A	N/A
3	GPS Simulator	WELNAVIGATE	GS-100	N/A
4	Adapter	Tenpao	S018BAM1200150	N/A

For test site: TH01-CB

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	NB	DELL	E4300	N/A
2	LTE base station	Anritsu	MT8820C	N/A
3	SIM Card	Anritsu	N/A	N/A
4	Adapter	Tenpao	S018BAM1200150	N/A

2.4 Test Setup Diagram

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length
1	Power Cable	No	1.5m

2.5 Measurement Results Explanation Example

For all conducted test items:

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

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

The following shows an offset computation example with RF cable loss 1 dB and a 20dB attenuator.

Example:

Offset (dB) = RF cable loss (dB) + attenuator factor (dB).

= 1 + 20 = 21 (dB)

3 Test Result

3.1 Conducted Output Power and ERP Measurement

3.1.1 Description of the Conducted Output Power and ERP Measurement

FCC	
Conducted Output Power Limit	
☒Band 5	N/A
Effective Radiated Power (ERP) Limit	
☒Band 5	Base Station: 500 Watts or 400Watts (PSD) Mobile Station: 7 Watts

3.1.2 Measuring Instruments

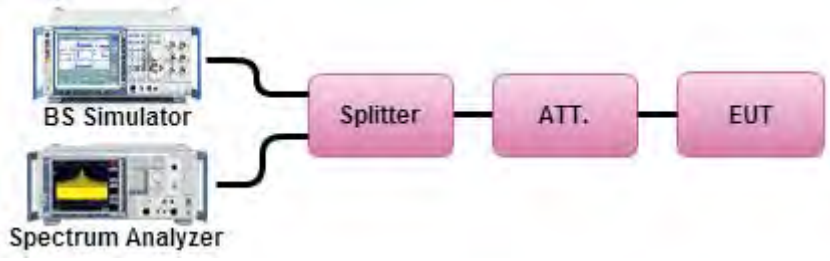
The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

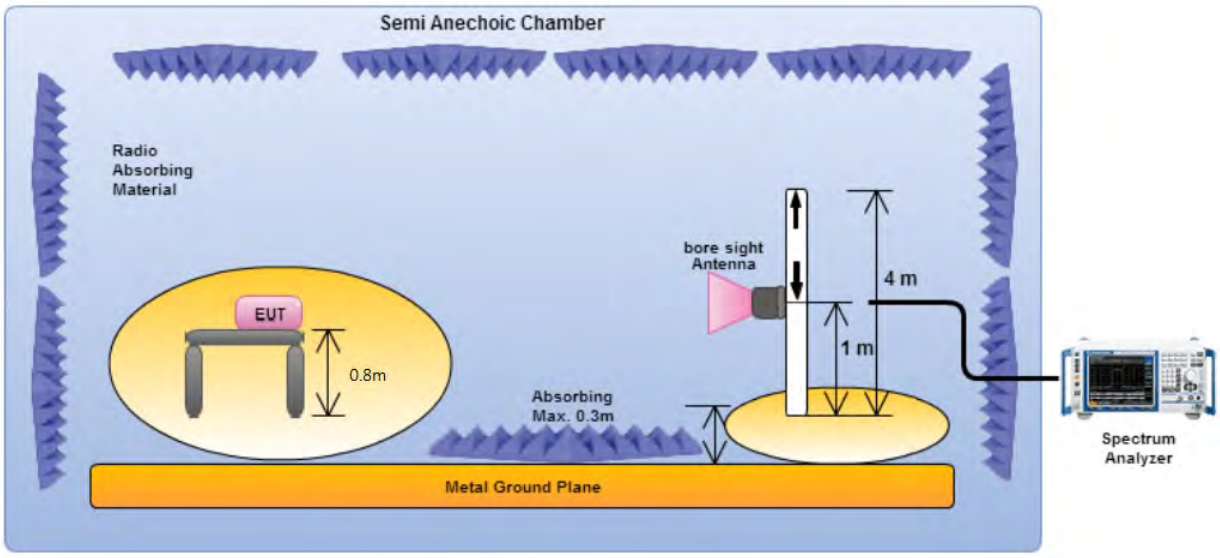
1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

3.1.4 Test Setup

Conducted Output Power



ERP



3.1.5 Test Result of Conducted Output Power

Refer as Appendix A

3.1.6 Test Result of ERP

Refer as Appendix A

3.2 Peak-to-Average Ratio Measurement

3.2.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.2.2 Measuring Instruments

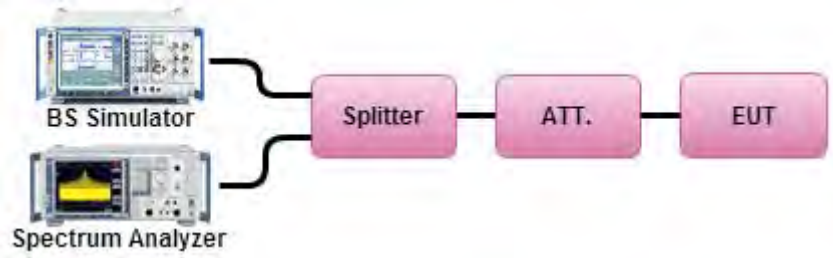
The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

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

3.2.4 Test Setup

Peak-to-Average Ratio



3.2.5 Test Result of Peak-to-Average Ratio

Refer as Appendix B

3.3 Occupied Bandwidth Measurement

3.3.1 Description of Occupied Bandwidth Measurement

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

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

3.3.2 Measuring Instruments

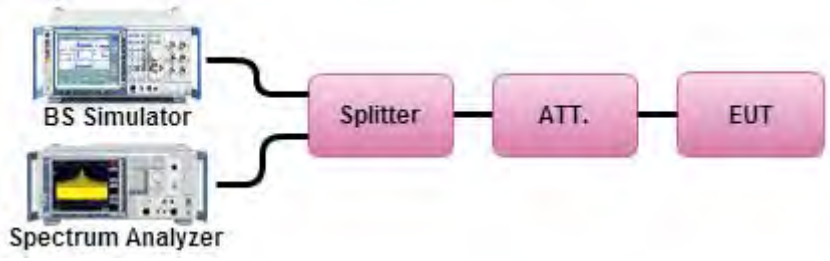
The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

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

3.3.4 Test Setup

Occupied Bandwidth



3.3.5 Test Result of Occupied Bandwidth

Refer as Appendix C

3.4 Conducted Band Edge Measurement

3.4.1 Description of Conducted Band Edge Measurement

Conducted Band Edge	
☒ Band 5	43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 100kHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

3.4.2 Measuring Instruments

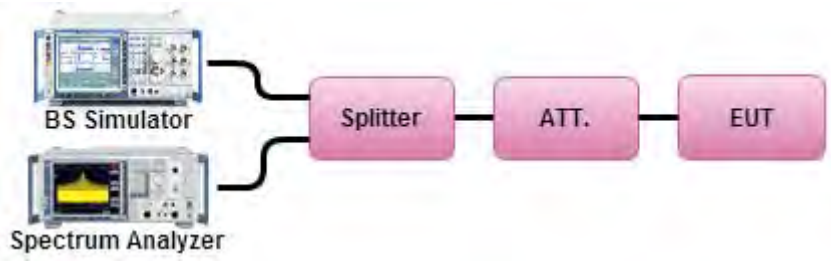
The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured.
3. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
5. Set spectrum analyzer with RMS detector.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. Checked that all the results comply with the emission limit line.

3.4.4 Test Setup

Conducted Band Edge



3.4.5 Test Result of Conducted Band Edge

Refer as Appendix D

3.5 Conducted Spurious Emission Measurement

3.5.1 Description of Conducted Spurious Emission Measurement

Conducted Band Edge	
☒ Band 5	The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

3.5.2 Measuring Instruments

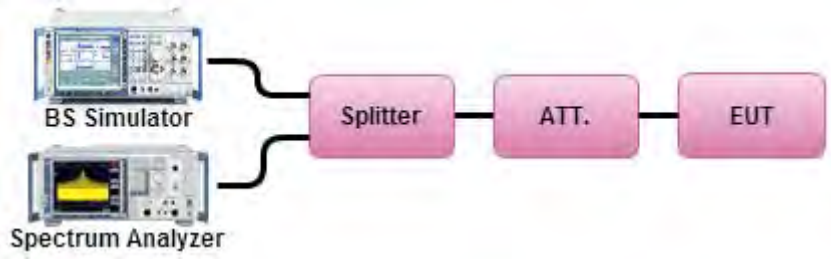
The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.
   The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
6. Set spectrum analyzer with RMS detector.
7. Taking the record of maximum spurious emission.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.5.4 Test Setup

Conducted Spurious Emission



3.5.5 Test Result of Conducted Spurious Emission

Refer as Appendix D

3.6 Field Strength of Spurious Radiation Measurement

3.6.1 Description of Field Strength of Spurious Radiated Measurement

Field Strength of Spurious Radiated
The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

3.6.2 Measuring Instruments

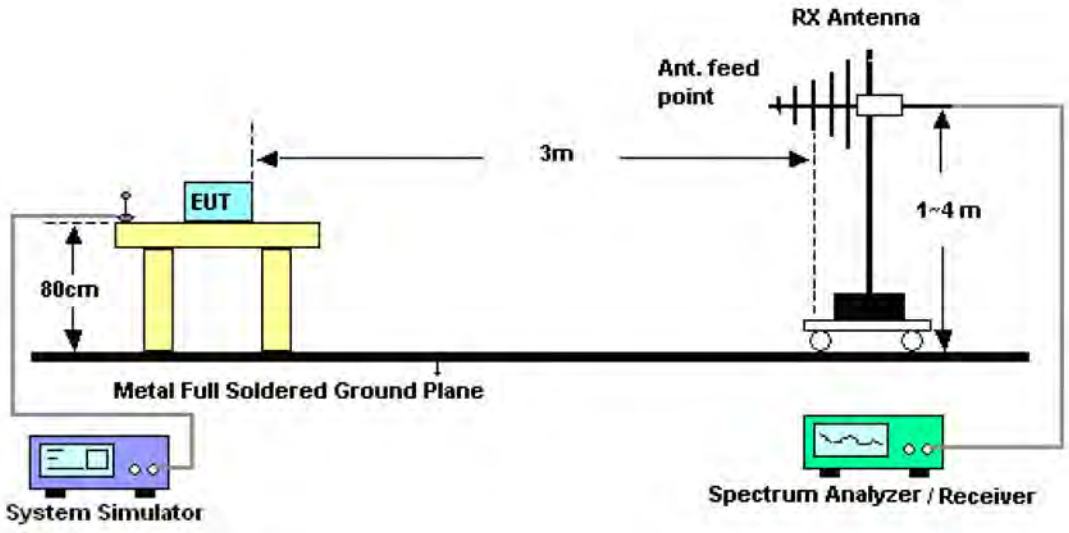
The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

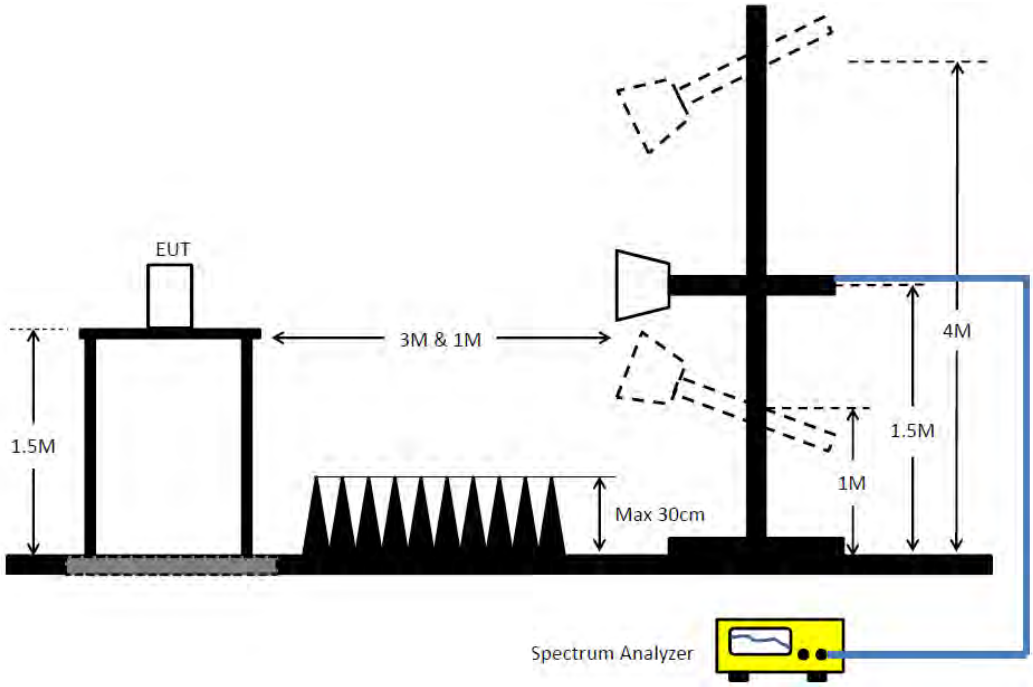
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.6.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.6.5 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Antenna factor (AF) + Cable loss (CL) + Read level (Raw) - Preamp factor (PA)(if applicable) = Level.

3.6.6 Test Result of Field Strength of Spurious Radiated (Below 1GHz)

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

3.6.7 Test Result of Field Strength of Spurious Radiated (Above 1GHz)

Refer as Appendix E

3.7 Frequency Stability Measurement

3.7.1 Description of Frequency Stability Measurement

Frequency Stability	
☒Band 5	Base Station: ±1.5ppm Mobile Station: ±2.5ppm
Note: The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block.	

3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Procedures for Temperature Variation

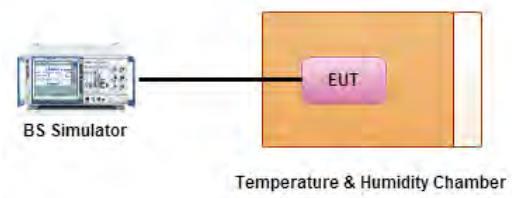
1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to -40°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in -40°C steps up to 70°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.7.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.
2. The power supply voltage to the EUT was varied from 85 to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

3.7.5 Test Setup

Frequency Stability



3.7.6 Test Result of Temperature and Voltage Variation

Refer as Appendix G

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Spectrum analyzer	Keysight	N9020A	MY55400138	10 Hz up to 26.5 GHz	Jan. 02, 2018	Jan. 01, 2019	Conducted (TH01-CB)
MW Analog Signal Generator	Keysight	N5183A	MY50142965	100kHz~20GHz	Nov. 24, 2017	Nov. 23, 2018	Conducted (TH01-CB)
Vector Signal Generator	Keysight	N5182B	MY53052408	9kHz~6GHz	Jan. 02, 2018	Jan. 01, 2019	Conducted (TH01-CB)
Temp. and Humidity Chamber	Gaint Force	GTH-408-40-CP-AR	MAA1410-011	-40~100 degree	Sep. 14, 2018	Sep. 13, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 20, 2017	Nov. 19, 2018	Conducted (TH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH01-CB)
BILOG ANTENNA with 6 dB attenuator	SCHAFFNER / Woken	CBL 6112B / N-6-06-06	2888 / AT-N0609	30MHz~1GHz	Jan. 03, 2018	Jan. 02, 2019	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 20, 2017	Nov. 19, 2018	Radiation (03CH01-CB)
Pre-Amplifier	EMCI	EMC330N	980332	20MHz ~ 3GHz	May 02, 2018	May 01, 2019	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 09, 2018	Jan. 08, 2019	Radiation (03CH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 23, 2017	Nov. 22, 2018	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100354	9kHz ~ 2.75GHz	Dec. 08, 2017	Dec. 07, 2018	Radiation (03CH01-CB)
Low Cable	Woken	RG402	Low Cable-16+17	30MHz~1GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
Low Cable	Woken	RG402	Low Cable-16+17	30MHz~1GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH01-CB)
High Cable	Woken	RG402	High Cable-16	1GHz~18GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH01-CB)
High Cable	Woken	RG402	High Cable-16	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH01-CB)
High Cable	Woken	RG402	High Cable-16+17	1GHz~18GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
High Cable	Woken	RG402	High Cable-16+17	1GHz~18GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH01-CB)

Note: Calibration Interval of instruments listed above is one year.

Summary

Mode	Power (dBm)	Power (W)	ERP (dBm)	ERP (W)
Band 5	-	-	-	-
Band 5_WCDMA_5MHz_Nss1_1TX	23.47	0.222	21.72	0.149

Result

Mode	Result	Power (dBm)	Power (W)	Power Lim. (W)	DG (dBi)	ERP (dBm)	ERP (W)	ERP Lim. (W)	P1 (dBm)
WCDMA_5MHz_Nss1_1TX	-	-	-	-	-	-	-	-	-
826.4MHz	Pass	23.28	0.213	Inf	0.4	21.53	0.142	7	23.28
836.6MHz	Pass	23.41	0.219	Inf	0.4	21.66	0.147	7	23.41
846.6MHz	Pass	23.47	0.222	Inf	0.4	21.72	0.149	7	23.47
HSDPA Subtest-1									
826.4MHz	Pass	23.22	0.210	Inf	0.4	21.47	0.140	7	23.22
836.6MHz	Pass	23.38	0.218	Inf	0.4	21.63	0.146	7	23.38
846.6MHz	Pass	23.36	0.217	Inf	0.4	21.61	0.145	7	23.36
HSDPA Subtest-2									
826.4MHz	Pass	23.25	0.211	Inf	0.4	21.5	0.141	7	23.25
836.6MHz	Pass	23.33	0.215	Inf	0.4	21.58	0.144	7	23.33
846.6MHz	Pass	23.32	0.215	Inf	0.4	21.57	0.144	7	23.32
HSDPA Subtest-3									
826.4MHz	Pass	23.26	0.212	Inf	0.4	21.51	0.142	7	23.26
836.6MHz	Pass	23.35	0.216	Inf	0.4	21.6	0.145	7	23.35
846.6MHz	Pass	23.37	0.217	Inf	0.4	21.62	0.145	7	23.37
HSDPA Subtest-4									
826.4MHz	Pass	23.27	0.212	Inf	0.4	21.52	0.142	7	23.27
836.6MHz	Pass	23.39	0.218	Inf	0.4	21.64	0.146	7	23.39
846.6MHz	Pass	23.36	0.217	Inf	0.4	21.61	0.145	7	23.36
HSUPA Subtest-1									
826.4MHz	Pass	22.66	0.185	Inf	0.4	20.91	0.123	7	22.66
836.6MHz	Pass	22.73	0.187	Inf	0.4	20.98	0.125	7	22.73
846.6MHz	Pass	22.76	0.189	Inf	0.4	21.01	0.126	7	22.76
HSUPA Subtest-2									
826.4MHz	Pass	22.61	0.182	Inf	0.4	20.86	0.122	7	22.61
836.6MHz	Pass	22.78	0.190	Inf	0.4	21.03	0.127	7	22.78
846.6MHz	Pass	22.75	0.188	Inf	0.4	21.00	0.126	7	22.75
HSUPA Subtest-3									
826.4MHz	Pass	22.68	0.185	Inf	0.4	20.93	0.124	7	22.68
836.6MHz	Pass	22.74	0.188	Inf	0.4	20.99	0.126	7	22.74
846.6MHz	Pass	22.73	0.187	Inf	0.4	20.98	0.125	7	22.73
HSUPA Subtest-4									
826.4MHz	Pass	22.67	0.185	Inf	0.4	20.92	0.124	7	22.67
836.6MHz	Pass	22.77	0.189	Inf	0.4	21.02	0.126	7	22.77
846.6MHz	Pass	22.72	0.187	Inf	0.4	20.97	0.125	7	22.72
HSUPA Subtest-5									
826.4MHz	Pass	23.25	0.211	Inf	0.4	21.5	0.141	7	23.25
836.6MHz	Pass	23.35	0.216	Inf	0.4	21.6	0.145	7	23.35
846.6MHz	Pass	23.31	0.214	Inf	0.4	21.56	0.143	7	23.31

DG = Directional Gain;**Port X** = Port X output power

Summary

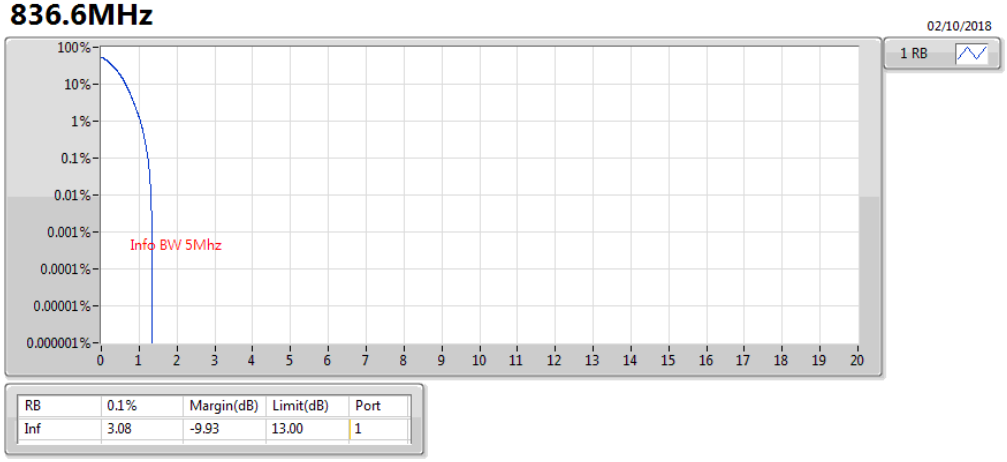
Mode	Result	RB	0.1%	Margin (dB)	Limit (dB)	Port
Band 5	-	-	-	-	-	-
Band 5_WCDMA_5MHz_Nss1_1TX	Pass	Inf	3.08	-9.93	13.00	1

Result

Mode	Result	RB	0.1%	Margin (dB)	Limit (dB)	Port
WCDMA_5MHz_Nss1_1TX	-	-	-	-	-	-
836.6MHz	Pass	Inf	3.08	-9.93	13.00	1

Band 5_WCDMA_5MHz_Nss1_1TX **PAR**

836.6MHz



Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
Band 5	-	-	-	-	-
Band 5_WCDMA_5MHz_Nss1_1TX	4.694M	4.148M	4M15F9W	4.638M	4.124M

Max-N dB = Maximum26dB downbandwidth;**Max-OBW** = Maximum99% occupied bandwidth;
Min-N dB = Minimum26dB downbandwidth;**Min-OBW** = Minimum99% occupied bandwidth;

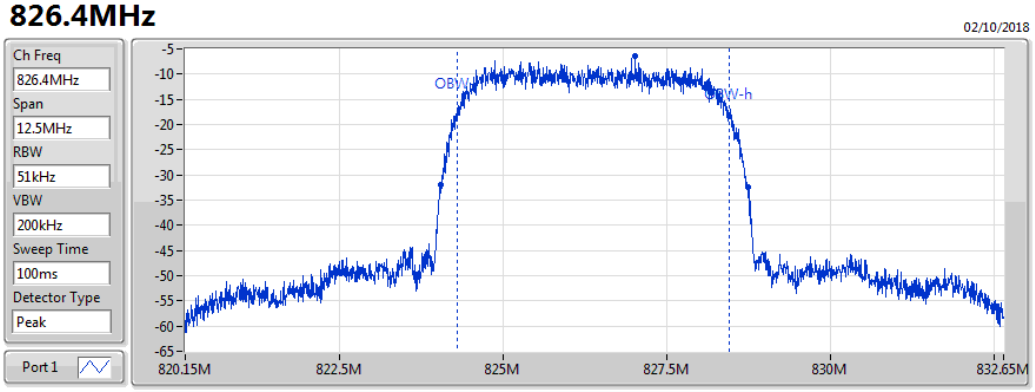
Result

Mode	Result	RB	RB Start	Limit	P1-N dB (Hz)	P1-OBW (Hz)
WCDMA_5MHz_Nss1_1TX	-	-	-	-	-	-
826.4MHz	Pass	Inf	Inf	Inf	4.694M	4.148M
836.6MHz	Pass	Inf	Inf	Inf	4.65M	4.128M
846.6MHz	Pass	Inf	Inf	Inf	4.638M	4.124M

Port X-N dB = Port **X**26dB downbandwidth; **Port X-OBW** = Port **X**99% occupied bandwidth;

Band 5_WCDMA_5MHz_Nss1_1TX **EBW**

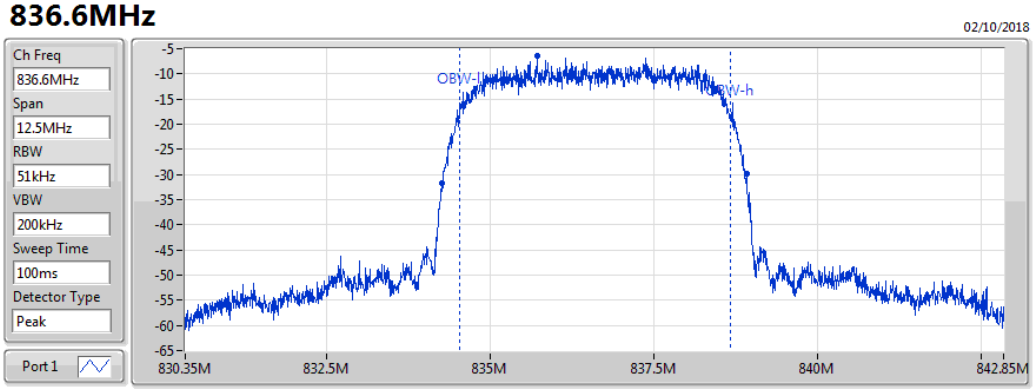
826.4MHz



RB	RB Start	26dB(Hz)	Fl-26dB(Hz)	Fh-26dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
Inf	Inf	4.694M	824.05M	828.74375M	4.148M	824.307934M	828.455943M	Inf	1

Band 5_WCDMA_5MHz_Nss1_1TX **EBW**

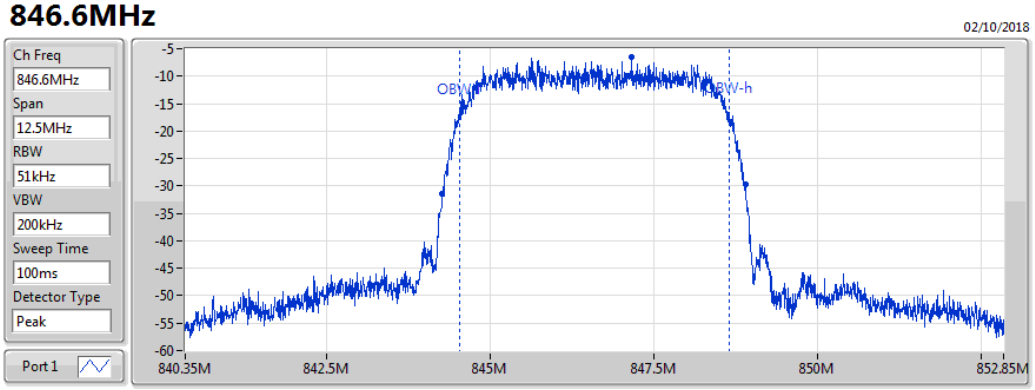
836.6MHz



RB	RB Start	26dB(Hz)	Fl-26dB(Hz)	Fh-26dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
Inf	Inf	4.65M	834.275M	838.925M	4.128M	834.545783M	838.67391M	Inf	1

Band 5_WCDMA_5MHz_Nss1_1TX **EBW**

846.6MHz



RB	RB Start	26dB(Hz)	Fl-26dB(Hz)	Fh-26dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
Inf	Inf	4.638M	844.275M	848.9125M	4.124M	844.535361M	848.659368M	Inf	1

Summary

Mode	Result	RB	RB Start	F-Start (Hz)	F-Stop (Hz)	RBW (Hz)	Detector	Freq (Hz)	Level (dBm)	Limit (dBm)	Margin (dB)	Port	Remark
Band 5	-	-	-	-	-	-	-	-	-	-	-	-	-
Band 5_WCDMA_5MHz_Nss1_1TX	Pass	Inf	Inf	850M	1G	100k	RMS	872.93125M	-19.65	-13.00	-6.65	1	-

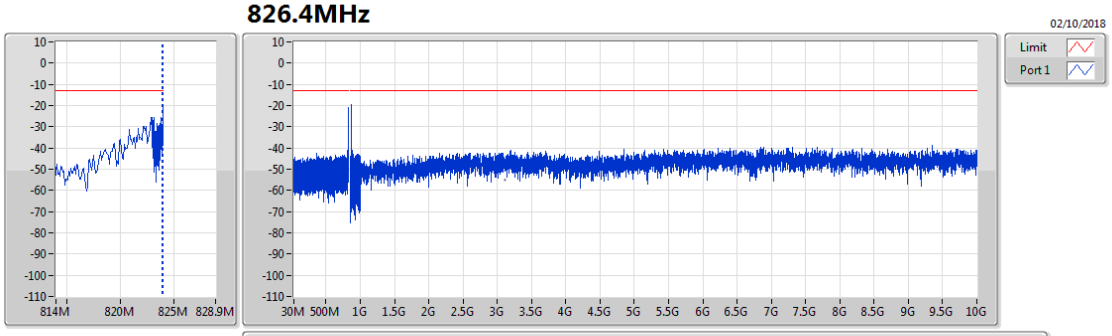
DG = Directional Gain;

Result

Mode	Result	RB	RB Start	F-Start (Hz)	F-Stop (Hz)	RBW (Hz)	Detector	Freq (Hz)	Level (dBm)	Limit (dBm)	Margin (dB)	Port	Remark
WCDMA_5MHz_Nss1_1TX	-	-	-	-	-	-	-	-	-	-	-	-	-
826.4MHz	Pass	Inf	Inf	30M	823M	100k	RMS	822.900875M	-25.66	-13.00	-12.66	1	-
826.4MHz	Pass	Inf	Inf	823M	824M	50k	RMS	823.95M	-24.53	-13.00	-11.53	1	-
826.4MHz	Pass	Inf	Inf	849M	850M	50k	RMS	849.25M	-50.76	-13.00	-37.76	1	-
826.4MHz	Pass	Inf	Inf	850M	1G	100k	RMS	872.93125M	-19.65	-13.00	-6.65	1	-
826.4MHz	Pass	Inf	Inf	1G	10G	1M	RMS	9.348625G	-38.87	-13.00	-25.87	1	-
836.6MHz	Pass	Inf	Inf	30M	823M	100k	RMS	796.4345M	-40.99	-13.00	-27.99	1	-
836.6MHz	Pass	Inf	Inf	823M	824M	50k	RMS	823.55M	-47.16	-13.00	-34.16	1	-
836.6MHz	Pass	Inf	Inf	849M	850M	50k	RMS	849.45M	-47.47	-13.00	-34.47	1	-
836.6MHz	Pass	Inf	Inf	850M	1G	100k	RMS	881.14375M	-21.55	-13.00	-8.55	1	-
836.6MHz	Pass	Inf	Inf	1G	10G	1M	RMS	7.9255G	-38.69	-13.00	-25.69	1	-
846.6MHz	Pass	Inf	Inf	30M	823M	100k	RMS	796.335375M	-42.58	-13.00	-29.58	1	-
846.6MHz	Pass	Inf	Inf	823M	824M	50k	RMS	823.65M	-48.13	-13.00	-35.13	1	-
846.6MHz	Pass	Inf	Inf	849M	850M	50k	RMS	849.15M	-23.05	-13.00	-10.05	1	-
846.6MHz	Pass	Inf	Inf	850M	1G	100k	RMS	891.34375M	-23.40	-13.00	-10.40	1	-
846.6MHz	Pass	Inf	Inf	1G	10G	1M	RMS	9.971875G	-38.57	-13.00	-25.57	1	-

Band 5_WCDMA_5MHz_Nss1_1TX **CSE-TX**

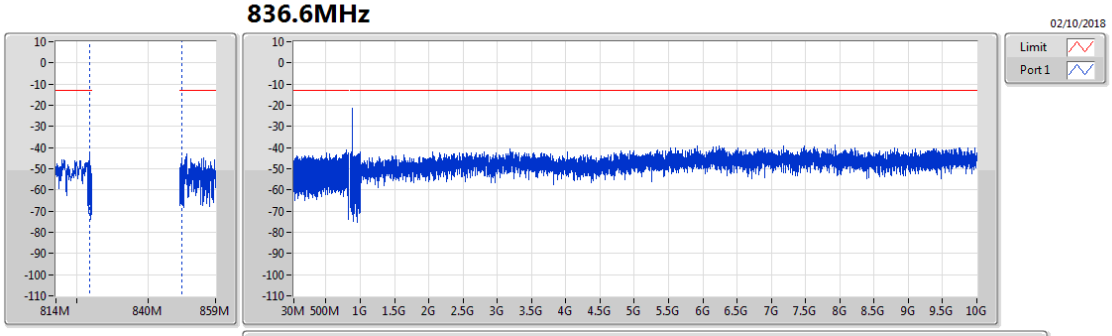
826.4MHz



RB	RB Start	F-Start(Hz)	F-Stop(Hz)	RBW(Hz)	VBW(Hz)	Detector	Freq(Hz)	Level(dBm)	Limit(dBm)	Margin(dB)	Port	Remark
Inf	Inf	30M	823M	100k	300k	RMS	822.900875(	-25.66	-13.00	-12.66	1	-
Inf	Inf	823M	824M	50k	150k	RMS	823.95M	-24.53	-13.00	-11.53	1	-
Inf	Inf	849M	850M	50k	150k	RMS	849.25M	-50.76	-13.00	-37.76	1	-
Inf	Inf	850M	1G	100k	300k	RMS	872.93125M	-19.65	-13.00	-6.65	1	-
Inf	Inf	1G	10G	1M	3M	RMS	9.348625G	-38.87	-13.00	-25.87	1	-

Band 5_WCDMA_5MHz_Nss1_1TX **CSE-TX**

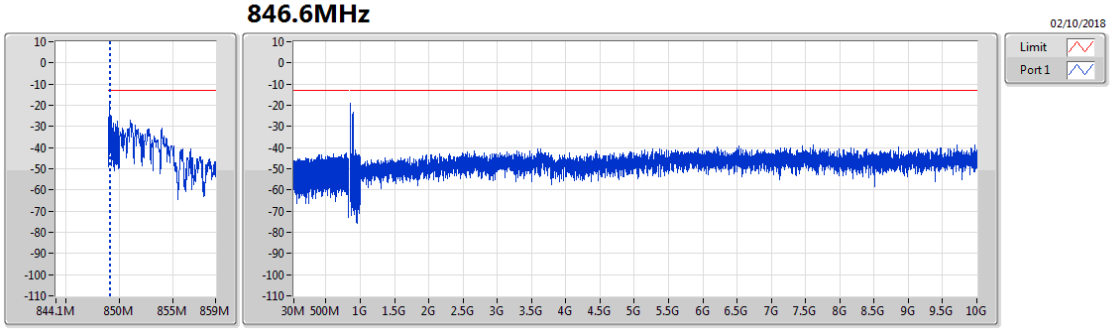
836.6MHz



RB	RB Start	F-Start(Hz)	F-Stop(Hz)	RBW(Hz)	VBW(Hz)	Detector	Freq(Hz)	Level(dBm)	Limit(dBm)	Margin(dB)	Port	Remark
Inf	Inf	30M	823M	100k	300k	RMS	796.4345M	-40.99	-13.00	-27.99	1	-
Inf	Inf	823M	824M	50k	150k	RMS	823.55M	-47.16	-13.00	-34.16	1	-
Inf	Inf	849M	850M	50k	150k	RMS	849.45M	-47.47	-13.00	-34.47	1	-
Inf	Inf	850M	1G	100k	300k	RMS	881.14375M	-21.55	-13.00	-8.55	1	-
Inf	Inf	1G	10G	1M	3M	RMS	7.9255G	-38.69	-13.00	-25.69	1	-

Band 5_WCDMA_5MHz_Nss1_1TX **CSE-TX**

846.6MHz



RB	RB Start	F-Start(Hz)	F-Stop(Hz)	RBW(Hz)	VBW(Hz)	Detector	Freq(Hz)	Level(dBm)	Limit(dBm)	Margin(dB)	Port	Remark
Inf	Inf	30M	823M	100k	300k	RMS	796.335375(	-42.58	-13.00	-29.58	1	-
Inf	Inf	823M	824M	50k	150k	RMS	823.65M	-48.13	-13.00	-35.13	1	-
Inf	Inf	849M	850M	50k	150k	RMS	849.15M	-23.05	-13.00	-10.05	1	-
Inf	Inf	850M	1G	100k	300k	RMS	891.34375M	-23.40	-13.00	-10.40	1	-
Inf	Inf	1G	10G	1M	3M	RMS	9.971875G	-38.57	-13.00	-25.57	1	-

Band	WCDMA Band 5	Test Mode	QPSK / 5MHz
Test Channel	4132 (826.4 MHz)		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1649.98	33.48	82.20	-48.72	38.49	3.78	25.79	34.58	150	26	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1654.74	41.64	82.20	-40.56	46.56	3.79	25.87	34.58	128	88	Average	VERTICAL

Band	WCDMA Band 5	Test Mode	QPSK / 5MHz
Test Channel	4183 (836.6 MHz)		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1675.46	32.53	82.20	-49.67	37.36	3.82	25.94	34.59	154	79	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1675.14	39.91	82.20	-42.29	44.75	3.81	25.94	34.59	198	101	Average	VERTICAL

Band	WCDMA Band 5	Test Mode	QPSK / 5MHz
Test Channel	4233 (846.6 MHz)		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1695.74	32.01	82.20	-50.19	36.74	3.84	26.02	34.59	147	67	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1690.54	38.44	82.20	-43.76	43.18	3.83	26.02	34.59	221	91	Average	VERTICAL

Summary

Mode	Voltage (V)	Temp (°C)	Ch (Hz)	Center (Hz)	Fl (Hz)	Fh (Hz)	Fl Limit (Hz)	Fh Limit (Hz)	ppm	Limit (ppm)	Port	Remark
Band 5	-		-	-	-	-	-	-	-	-	-	-
WCDMA_5MHz	110	0	836.5M	836.500434M	836.402406M	836.598462M	824M	849M	0.007	2.5	1	-

Result

Mode	Voltage (V)	Temp (°C)	Ch (Hz)	Center (Hz)	Fl (Hz)	Fh (Hz)	Fl Limit (Hz)	Fh Limit (Hz)	ppm	Limit (ppm)	Port	Result
WCDMA_5MHz			-	-	-	-	-	-	-	-	-	-
836.5MHz	110	-40	836.5M	836.499957M	836.400486M	836.599428M	824M	849M	0.003	2.5	1	Pass
836.5MHz	110	-30	836.5M	836.499764M	836.400946M	836.598581M	824M	849M	0.003	2.5	1	Pass
836.5MHz	110	-20	836.5M	836.500303M	836.401655M	836.598952M	824M	849M	0.005	2.5	1	Pass
836.5MHz	110	-10	836.5M	836.500672M	836.401609M	836.599734M	824M	849M	0.004	2.5	1	Pass
836.5MHz	110	0	836.5M	836.500434M	836.402406M	836.598462M	824M	849M	0.007	2.5	1	Pass
836.5MHz	110	10	836.5M	836.500361M	836.401313M	836.59941M	824M	849M	0.005	2.5	1	Pass
836.5MHz	93.5	20	836.5M	836.50012M	836.4014M	836.598841M	824M	849M	0.004	2.5	1	Pass
836.5MHz	110	20	836.5M	836.500043M	836.401384M	836.598702M	824M	849M	0.003	2.5	1	Pass
836.5MHz	126.5	20	836.5M	836.499733M	836.400996M	836.598469M	824M	849M	0.007	2.5	1	Pass
836.5MHz	110	30	836.5M	836.499992M	836.40127M	836.598713M	824M	849M	0.005	2.5	1	Pass
836.5MHz	110	40	836.5M	836.499966M	836.40129M	836.598641M	824M	849M	0.003	2.5	1	Pass
836.5MHz	110	50	836.5M	836.499998M	836.400474M	836.599521M	824M	849M	0.004	2.5	1	Pass
836.5MHz	110	60	836.5M	836.499494M	836.400859M	836.598129M	824M	849M	0.004	2.5	1	Pass
836.5MHz	110	70	836.5M	836.500408M	836.401946M	836.59887M	824M	849M	0.003	2.5	1	Pass