



FCC RADIO TEST REPORT

FCC ID : XIA-NWL224

Equipment : Vodafone MachineLink 4G Lite

Brand Name : Vodafone,
 **NetComm Wireless**

Model Name : NWL-224

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), 24(E), 27

The product was received on Sep. 20, 2018, and testing was started from Oct. 03, 2018 and completed on Oct. 22, 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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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TEL : 886-3-656-9065
FAX : 886-3-656-9085
Report Template No.: CB Ver1.0



Summary of Test Result

Report Clause	Band	Ref Std. Clause (FCC Rule)	Test Items	Result (PASS/FAIL)	Remark
3.1	☒5	2.1046	Conducted Output Power	PASS	-
	☒2	2.1046			
	☒4	2.1046			
	☒5	22.913(a)(2)	Effective Radiated Power	PASS	-
	☒2	24.232(a)	Equivalent Isotropic Radiated Power	PASS	-
	☒4	2.1046 27.50(d)(2)			
3.2	☒5	22.913(d)	Peak-to-Average Ratio	PASS	-
	☒2	24.232(d)			
	☒4	27.50(d)(5)			
3.3	☒5	2.1049	Occupied Bandwidth	PASS	-
	☒2	2.1049			
	☒4	2.1049			
3.4	☒5	2.1051 22.917(a)	Conducted Band Edge	PASS	-
	☒2	2.1051 24.238(a)			
	☒4	2.1051 27.53(h)			
3.5	☒5	2.1051 22.917(a)	Conducted Emission	PASS	-
	☒2	2.1051 24.238(a)			
	☒4	2.1051 27.53(h)			
3.6	☒5	2.1053 22.917(a)	Field Strength of Spurious Radiation	PASS	-
	☒2	2.1053 24.238(a)			
	☒4	2.1053 27.53(h)			
3.7	☒5	2.1055 22.355	Frequency Stability for Temperature & Voltage	PASS	-
	☒2	2.1055 24.235			
	☒4	2.1055 27.54			

Reviewed by: Sam Chen**Report Producer: Cindy Peng**



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	<input type="checkbox"/> Base Station <input checked="" type="checkbox"/> Mobile Station <input type="checkbox"/> Fixed Subscriber Station			
Operating Frequency	Band	Bandwidth (MHz)	TX Frequency (MHz)	RX Frequency (MHz)
	WCDMA Band 5	5	826.4 ~ 846.6	871.4 ~ 891.6
	WCDMA Band 2	5	1852.4 ~ 1907.6	1932.4 ~ 1987.6
	WCDMA Band 4	5	1712.4 ~ 1752.6	2112.4 ~ 2152.6
Maximum Output Power to Antenna (dBm)	WCDMA Band 5: 23.31 WCDMA Band 2: 22.01 WCDMA Band 4: 22.18			
99% Occupied Bandwidth (MHz)	WCDMA Band 5: 4.142 WCDMA Band 2: 4.145 WCDMA Band 4: 4.146			
Type of Modulation	WCDMA: BPSK / QPSK HSDPA: 16QAM HSUPA: QPSK			

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	WCDMA Gain (dBi)		
					Band 5	Band 2	Band 4
1	NetCommWireless	NANT-00001	Dipole Ant.	SMA	3.13	3.42	3.28

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 Table for Multiple List

The brand names in the following table are all refer to the identical product.

Brand Name	Description
Vodafone	All the models are identical, the difference model for difference brand served as marketing strategy.
 NetCommWireless	

1.1.4 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

WCDMA					
Band	Bandwidth (MHz)	Type of Modulation	Maximum ERP (W)	Frequency Tolerance (ppm)	Emission Designator
WCDMA Band 5	5	QPSK	0.269	0.006	4M14F9W
Band	Bandwidth (MHz)	Type of Modulation	Maximum EIRP (W)	Frequency Tolerance (ppm)	Emission Designator
WCDMA Band 2	5	QPSK	0.349	0.006	4M15F9W
WCDMA Band 4	5	QPSK	0.352	0.005	4M15F9W



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), 24(E), 27
- ANSI/TIA-603-E (2016)
- ANSI C63.26-2015
- FCC KDB 971168 D01 v03r01
- FCC KDB 412172 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		
<input type="checkbox"/>	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
<input checked="" type="checkbox"/>	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	Nick Peng	25°C / 60%	Oct. 03, 2018 ~ Oct. 22, 2018
Radiated	03CH01-CB	Jay Luo	25°C / 60%	Oct. 05, 2018 ~ Oct. 22, 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%
Radiated Emission (18GHz ~ 40GHz)	3.5 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 and EIRP Peak-to-Average Ratio 99% OBW and 26dB Bandwidth Band Edge Conducted Spurious Emission Frequency Stability	
Test Condition	Conducted measurement at transmit chains	
Test Mode	1	WCDMA Band 5
	2	WCDMA Band 2
	3	WCDMA Band 4

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		
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.		
Test Mode	1	EUT in Z axis WCDMA Band 5
	2	EUT in Z axis WCDMA Band 2
	3	EUT in Z axis WCDMA Band 4



2.2 Accessories

Accessories	
No.	Description
1	Wall-mounted rack*1
2	RJ-45 cable*1: Non-shielded 1.5m

2.3 Support Equipment

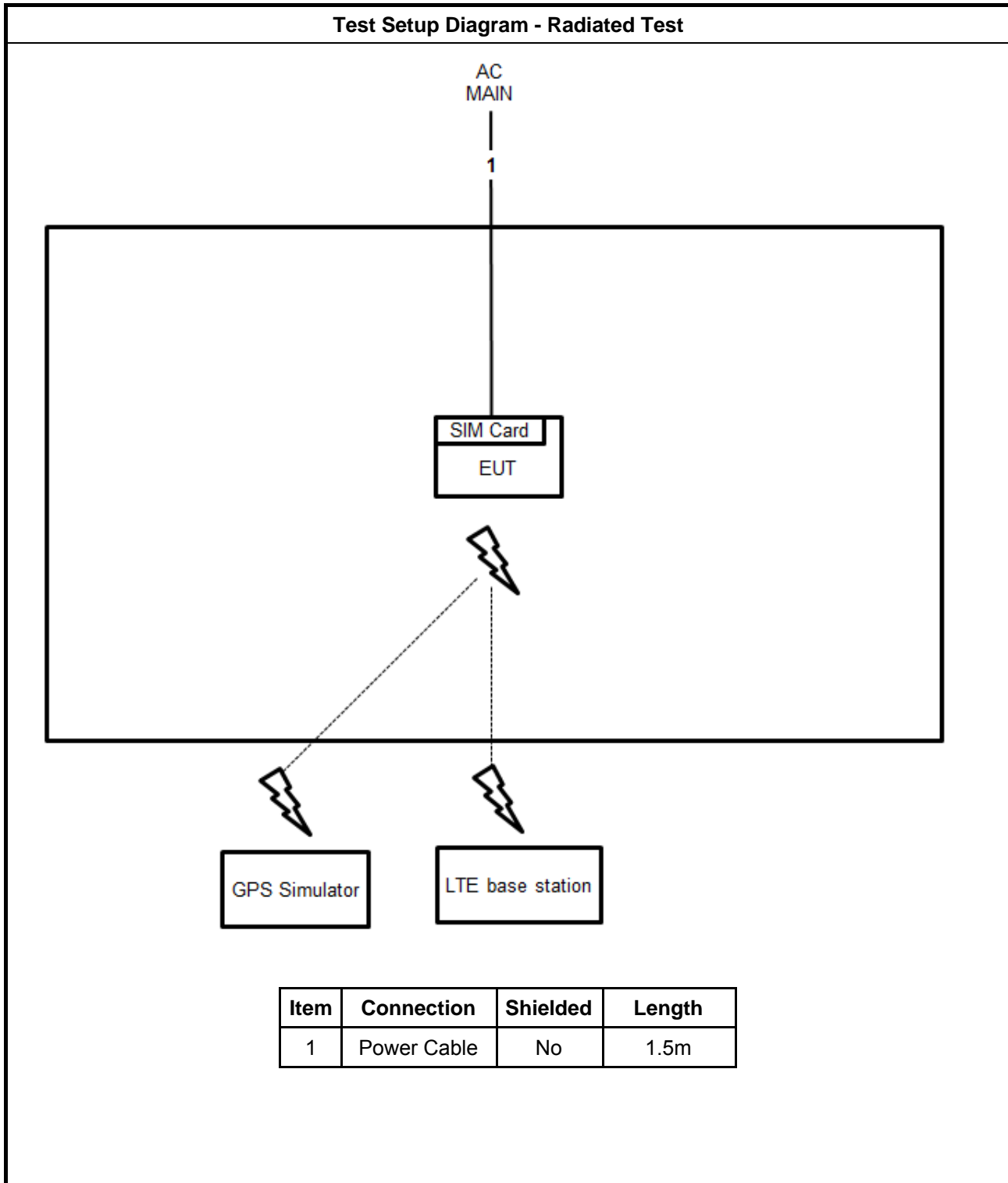
For test site: 03CH01-CB

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





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:

$$\begin{aligned}\text{Offset (dB)} &= \text{RF cable loss (dB)} + \text{attenuator factor (dB)} \\ &= 1 + 20 = 21 \text{ (dB)}\end{aligned}$$



3 Test Result

3.1 Conducted Output Power and ERP/EIRP Measurement

3.1.1 Description of the Conducted Output Power and ERP/EIRP Measurement

FCC	
Conducted Output Power Limit	
<input checked="" type="checkbox"/> Band 5	N/A
<input checked="" type="checkbox"/> Band 2	N/A
<input checked="" type="checkbox"/> Band 4	N/A
Effective Radiated Power (ERP) Limit	
<input checked="" type="checkbox"/> Band 5	Base Station: 500 Watts or 400Watts (PSD) Mobile Station: 7 Watts
Equivalent Isotropic Radiated Power (EIRP) Limit	
<input checked="" type="checkbox"/> Band 2	Base Station: 1640 Watts Mobile Station: 2 Watts
<input checked="" type="checkbox"/> Band 4	Base Station: 1640 Watts Mobile Station: 1 Watts
Note 1: A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.	
Note 2: According to FCC KDB 412172 D01 v01r01 Power Approach, $EIRP = P_T + G_T - L_c$, $ERP = EIRP - 2.15$, where P_T = transmitter output power in dBm G_T = gain of the transmitting antenna in dBi L_c = signal attenuation in the connecting cable between the transmitter and antenna in dB	

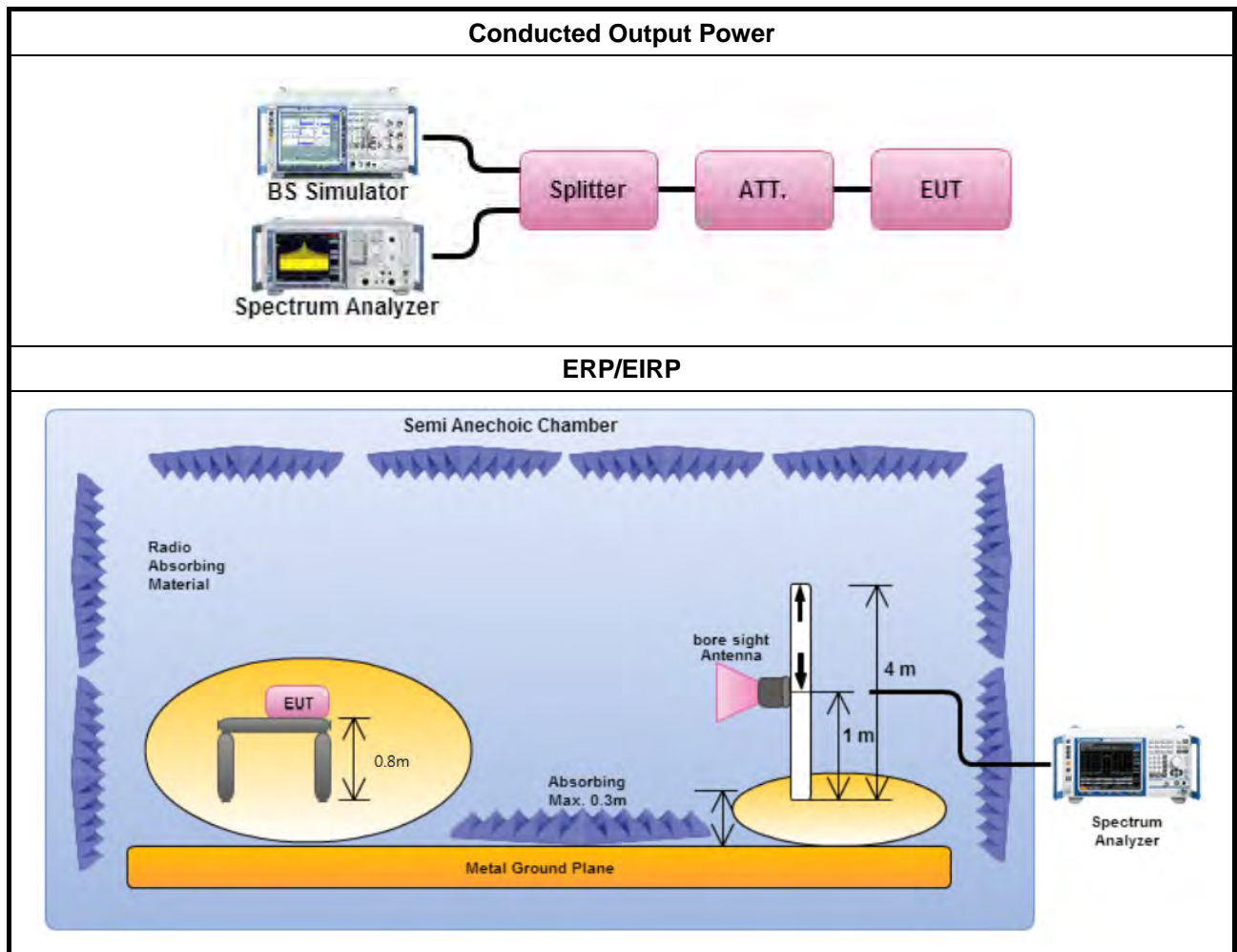
3.1.2 Measuring Instruments

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



3.1.5 Test Result of Conducted Output Power

Refer as Appendix A

3.1.6 Test Result of ERP/EIRP

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.

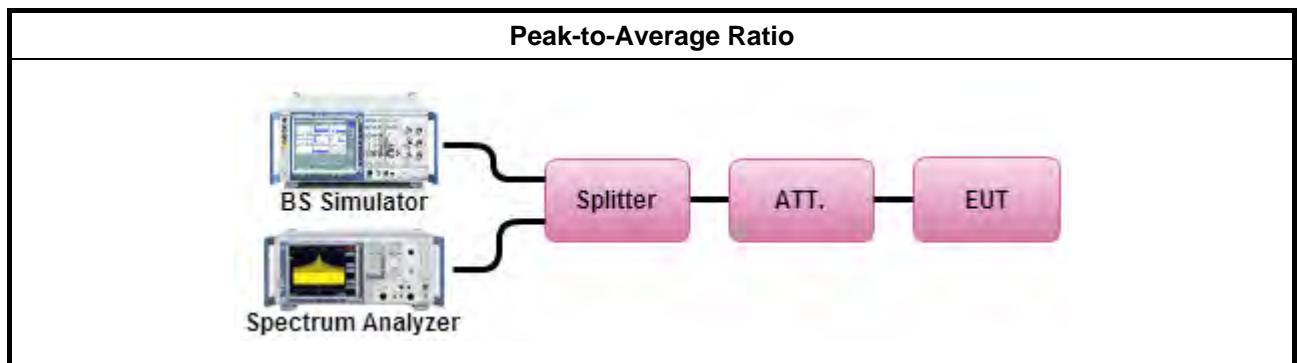
3.2.2 Measuring Instruments

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



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.

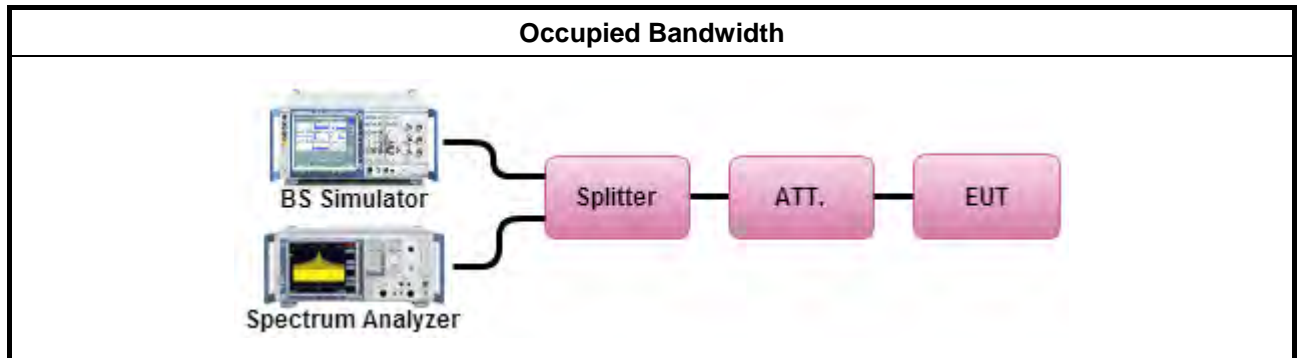
3.3.2 Measuring Instruments

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



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	
<input checked="" type="checkbox"/> Band 5	43 + 10log ₁₀ (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.
<input checked="" type="checkbox"/> Band 2	43 + 10log ₁₀ (P[Watts]) Db below the transmitter power P(Watts) in a 1MHz bandwidth. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.
<input checked="" type="checkbox"/> Band 4	43 + 10log ₁₀ (P[Watts]) dB below the transmitter power P(Watts) in a 1 MHz 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.

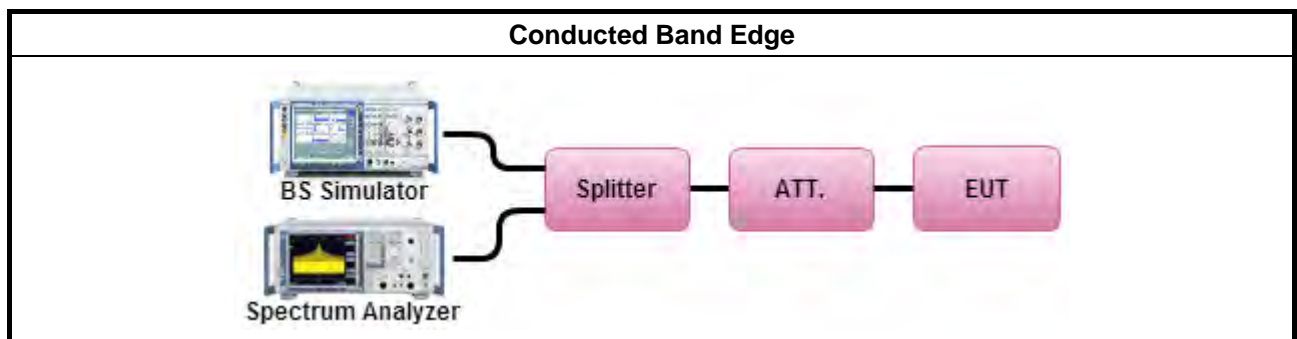
3.4.2 Measuring Instruments

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



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	
<input checked="" type="checkbox"/> 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.
<input checked="" type="checkbox"/> Band 2	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.
<input checked="" type="checkbox"/> Band 4	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.

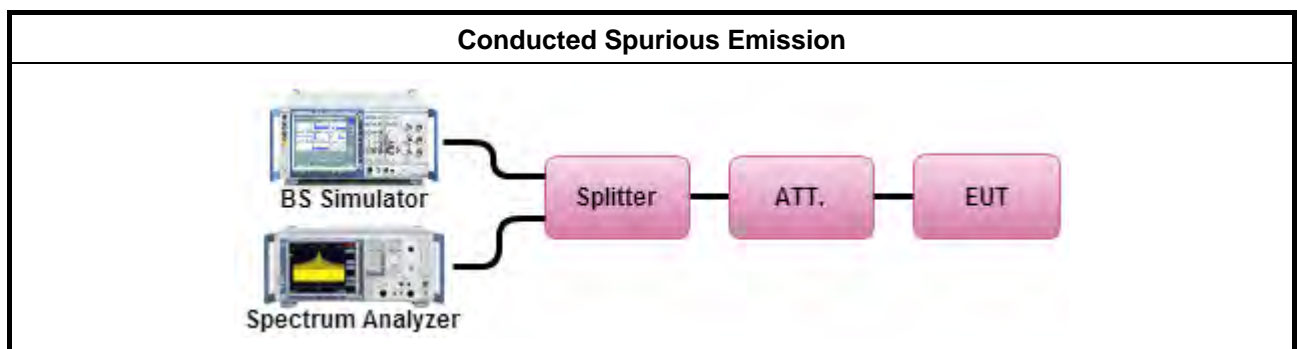
3.5.2 Measuring Instruments

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



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.	
<input checked="" type="checkbox"/> Band 4	Emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotopically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.6.2 Measuring Instruments

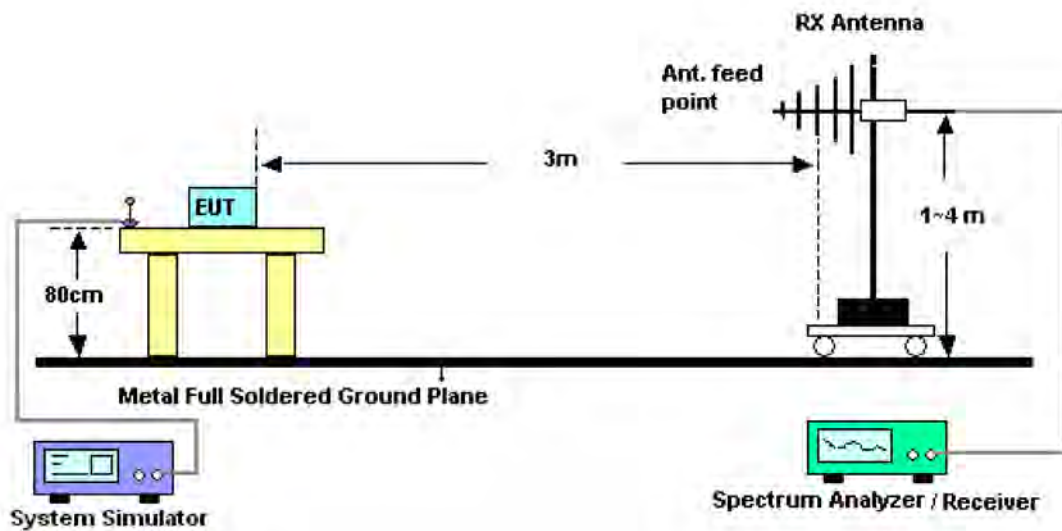
The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

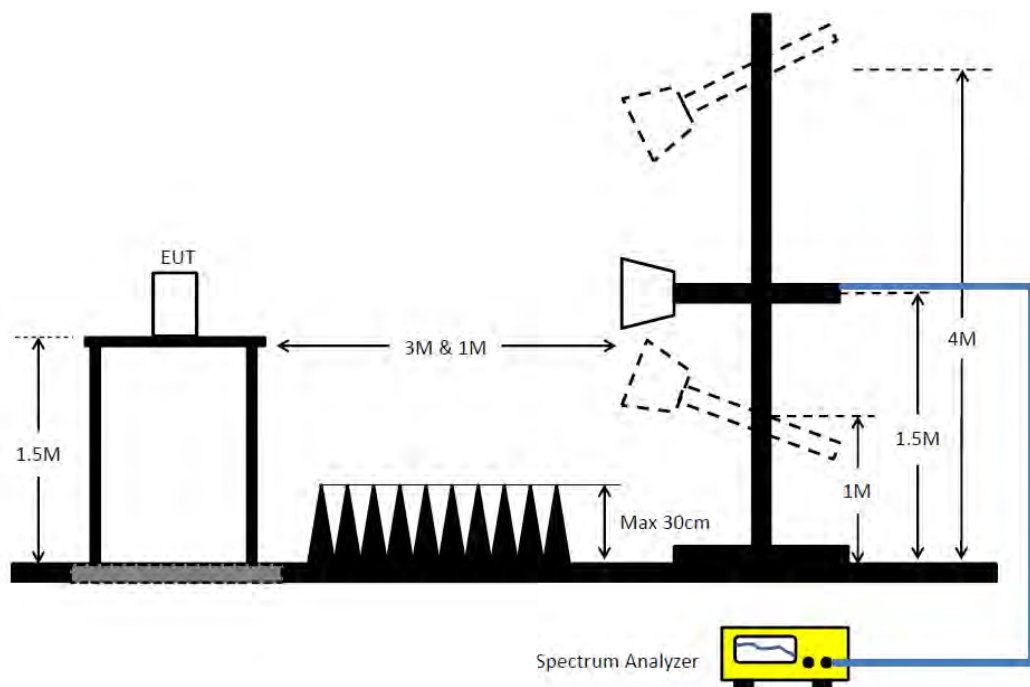
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position 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 Test Result of Field Strength of Spurious Radiated (Below 1GHz)

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

3.6.6 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	
<input checked="" type="checkbox"/> Band 5	Base Station: $\pm 1.5\text{ppm}$ Mobile Station: $\pm 2.5\text{ppm}$
<input checked="" type="checkbox"/> Band 2	Within Authorized Band
<input checked="" type="checkbox"/> Band 4	Within Authorized Band
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.

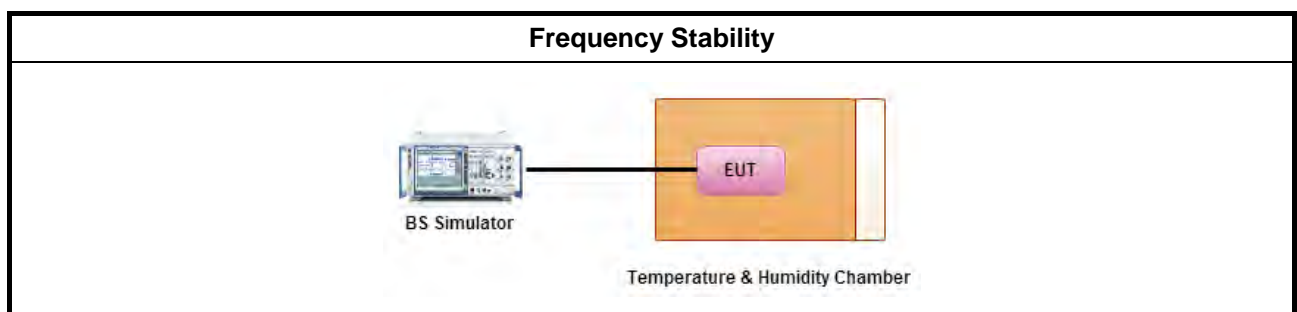
3.7.3 Test Procedures for Temperature Variation

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 $25 \pm 5^{\circ}\text{C}$ 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



3.7.6 Test Result of Temperature and Voltage Variation

Refer as Appendix F



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-C P-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)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 27, 2018	Aug. 26, 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)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 23, 2017	Nov. 22, 2018	Radiation (03CH01-CB)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Test	R&S	ESCS	100354	9kHz ~ 2.75GHz	Dec. 08, 2017	Dec. 07, 2018	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	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)

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	23.31	0.214	24.29	0.269

Result

Mode	Result	P1 (dBm)	Power (dBm)	Power (W)	DG (dBi)	ERP (dBm)	ERP (W)	ERP Lim. (W)
WCDMA_5MHz_Nss1_1TX	-	-	-	-	-	-	-	-
826.4MHz	Pass	23.31	23.31	0.214	3.13	24.29	0.269	7
836.6MHz	Pass	23.25	23.25	0.211	3.13	24.23	0.265	7
846.6MHz	Pass	23.23	23.23	0.210	3.13	24.21	0.264	7
HSDPA Subtest-1								
826.4MHz	Pass	23.25	23.25	0.211	3.13	24.23	0.265	7
836.6MHz	Pass	23.22	23.22	0.210	3.13	24.20	0.263	7
846.6MHz	Pass	23.24	23.24	0.211	3.13	24.22	0.264	7
HSDPA Subtest-2								
826.4MHz	Pass	23.17	23.17	0.207	3.13	24.15	0.260	7
836.6MHz	Pass	23.22	23.22	0.210	3.13	24.20	0.263	7
846.6MHz	Pass	23.28	23.28	0.213	3.13	24.26	0.267	7
HSDPA Subtest-3								
826.4MHz	Pass	23.23	23.23	0.210	3.13	24.21	0.264	7
836.6MHz	Pass	23.15	23.15	0.207	3.13	24.13	0.259	7
846.6MHz	Pass	23.17	23.17	0.207	3.13	24.15	0.260	7
HSDPA Subtest-4								
826.4MHz	Pass	23.23	23.23	0.210	3.13	24.21	0.264	7
836.6MHz	Pass	23.23	23.23	0.210	3.13	24.21	0.264	7
846.6MHz	Pass	23.22	23.22	0.210	3.13	24.20	0.263	7
HSUPA Subtest-1								
826.4MHz	Pass	23.19	23.19	0.208	3.13	24.17	0.261	7
836.6MHz	Pass	23.29	23.29	0.213	3.13	24.27	0.267	7
846.6MHz	Pass	23.15	23.15	0.207	3.13	24.13	0.259	7
HSUPA Subtest-2								
826.4MHz	Pass	23.25	23.25	0.211	3.13	24.23	0.265	7
836.6MHz	Pass	23.22	23.22	0.210	3.13	24.20	0.263	7
846.6MHz	Pass	23.24	23.24	0.211	3.13	24.22	0.264	7
HSUPA Subtest-3								
826.4MHz	Pass	23.23	23.23	0.210	3.13	24.21	0.264	7
836.6MHz	Pass	23.17	23.17	0.207	3.13	24.15	0.260	7
846.6MHz	Pass	23.25	23.25	0.211	3.13	24.23	0.265	7
HSUPA Subtest-4								
826.4MHz	Pass	23.15	23.15	0.207	3.13	24.13	0.259	7
836.6MHz	Pass	23.30	23.30	0.214	3.13	24.28	0.268	7
846.6MHz	Pass	23.21	23.21	0.209	3.13	24.19	0.262	7
HSUPA Subtest-5								
826.4MHz	Pass	23.23	23.23	0.210	3.13	24.21	0.264	7
836.6MHz	Pass	23.25	23.25	0.211	3.13	24.23	0.265	7
846.6MHz	Pass	23.27	23.27	0.212	3.13	24.25	0.266	7

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



Summary

Mode	Power (dBm)	Power (W)	EIRP (dBm)	EIRP (W)
Band 2	-	-	-	-
Band 2_WCDMA_5MHz_Nss1_1TX	22.01	0.159	25.43	0.349

Result

Mode	Result	P1 (dBm)	Power (dBm)	Power (W)	DG (dBi)	EIRP (dBm)	EIRP (W)	EIRP Lim. (W)
WCDMA_5MHz_Nss1_1TX	-	-	-	-	-	-	-	-
1852.4MHz	Pass	21.97	21.97	0.157	3.42	25.39	0.346	2
1880MHz	Pass	22.01	22.01	0.159	3.42	25.43	0.349	2
1907.6MHz	Pass	21.72	21.72	0.149	3.42	25.14	0.327	2
HSDPA Subtest-1								
1852.4MHz	Pass	21.96	21.96	0.157	3.42	25.38	0.345	2
1880MHz	Pass	21.67	21.67	0.147	3.42	25.09	0.323	2
1907.6MHz	Pass	21.79	21.79	0.151	3.42	25.21	0.332	2
HSDPA Subtest-2								
1852.4MHz	Pass	21.87	21.87	0.154	3.42	25.29	0.338	2
1880MHz	Pass	21.68	21.68	0.147	3.42	25.10	0.324	2
1907.6MHz	Pass	21.85	21.85	0.153	3.42	25.27	0.337	2
HSDPA Subtest-3								
1852.4MHz	Pass	21.66	21.66	0.147	3.42	25.08	0.322	2
1880MHz	Pass	21.67	21.67	0.147	3.42	25.09	0.323	2
1907.6MHz	Pass	21.74	21.74	0.149	3.42	25.16	0.328	2
HSDPA Subtest-4								
1852.4MHz	Pass	21.64	21.64	0.146	3.42	25.06	0.321	2
1880MHz	Pass	21.61	21.61	0.145	3.42	25.03	0.318	2
1907.6MHz	Pass	21.86	21.86	0.153	3.42	25.28	0.337	2
HSUPA Subtest-1								
1852.4MHz	Pass	21.97	21.97	0.157	3.42	25.39	0.346	2
1880MHz	Pass	21.89	21.89	0.155	3.42	25.31	0.340	2
1907.6MHz	Pass	21.97	21.97	0.157	3.42	25.39	0.346	2
HSUPA Subtest-2								
1852.4MHz	Pass	21.83	21.83	0.152	3.42	25.25	0.335	2
1880MHz	Pass	21.69	21.69	0.148	3.42	25.11	0.324	2
1907.6MHz	Pass	21.88	21.88	0.154	3.42	25.30	0.339	2
HSUPA Subtest-3								
1852.4MHz	Pass	21.65	21.65	0.146	3.42	25.07	0.321	2
1880MHz	Pass	21.74	21.74	0.149	3.42	25.16	0.328	2
1907.6MHz	Pass	21.87	21.87	0.154	3.42	25.29	0.338	2
HSUPA Subtest-4								
1852.4MHz	Pass	21.61	21.61	0.145	3.42	25.03	0.318	2
1880MHz	Pass	21.95	21.95	0.157	3.42	25.37	0.344	2
1907.6MHz	Pass	21.82	21.82	0.152	3.42	25.24	0.334	2
HSUPA Subtest-5								
1852.4MHz	Pass	21.94	21.94	0.156	3.42	25.36	0.344	2
1880MHz	Pass	21.63	21.63	0.146	3.42	25.05	0.320	2
1907.6MHz	Pass	21.88	21.88	0.154	3.42	25.30	0.339	2

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

Summary

Mode	Power (dBm)	Power (W)	EIRP (dBm)	EIRP (W)
Band 4	-	-	-	-
Band 4_WCDMA_5MHz_Nss1_1TX	22.18	0.165	25.46	0.352

Result

Mode	Result	P1 (dBm)	Power (dBm)	Power (W)	DG (dBi)	EIRP (dBm)	EIRP (W)	EIRP Lim. (W)
WCDMA_5MHz_Nss1_1TX	-	-	-	-	-	-	-	-
1712.4MHz	Pass	22.00	22.00	0.158	3.28	25.28	0.337	1
1732.6MHz	Pass	21.98	21.98	0.158	3.28	25.26	0.336	1
1752.6MHz	Pass	22.18	22.18	0.165	3.28	25.46	0.352	1
HSDPA Subtest-1								
1712.4MHz	Pass	21.99	21.99	0.158	3.28	25.27	0.337	1
1732.6MHz	Pass	22.02	22.02	0.159	3.28	25.30	0.339	1
1752.6MHz	Pass	21.93	21.93	0.156	3.28	25.21	0.332	1
HSDPA Subtest-2								
1712.4MHz	Pass	21.96	21.96	0.157	3.28	25.24	0.334	1
1732.6MHz	Pass	21.89	21.89	0.155	3.28	25.17	0.329	1
1752.6MHz	Pass	21.91	21.91	0.155	3.28	25.19	0.330	1
HSDPA Subtest-3								
1712.4MHz	Pass	21.93	21.93	0.156	3.28	25.21	0.332	1
1732.6MHz	Pass	22.02	22.02	0.159	3.28	25.30	0.339	1
1752.6MHz	Pass	22.13	22.13	0.163	3.28	25.41	0.348	1
HSDPA Subtest-4								
1712.4MHz	Pass	22.09	22.09	0.162	3.28	25.37	0.344	1
1732.6MHz	Pass	21.89	21.89	0.155	3.28	25.17	0.329	1
1752.6MHz	Pass	22.13	22.13	0.163	3.28	25.41	0.348	1
HSUPA Subtest-1								
1712.4MHz	Pass	22.06	22.06	0.161	3.28	25.34	0.342	1
1732.6MHz	Pass	22.04	22.04	0.160	3.28	25.32	0.340	1
1752.6MHz	Pass	21.87	21.87	0.154	3.28	25.15	0.327	1
HSUPA Subtest-2								
1712.4MHz	Pass	21.87	21.87	0.154	3.28	25.15	0.327	1
1732.6MHz	Pass	21.99	21.99	0.158	3.28	25.27	0.337	1
1752.6MHz	Pass	22.04	22.04	0.160	3.28	25.32	0.340	1
HSUPA Subtest-3								
1712.4MHz	Pass	22.08	22.08	0.161	3.28	25.36	0.344	1
1732.6MHz	Pass	22.12	22.12	0.163	3.28	25.40	0.347	1
1752.6MHz	Pass	21.98	21.98	0.158	3.28	25.26	0.336	1
HSUPA Subtest-4								
1712.4MHz	Pass	22.03	22.03	0.160	3.28	25.31	0.340	1
1732.6MHz	Pass	21.89	21.89	0.155	3.28	25.17	0.329	1
1752.6MHz	Pass	21.98	21.98	0.158	3.28	25.26	0.336	1
HSUPA Subtest-5								
1712.4MHz	Pass	22.14	22.14	0.164	3.28	25.42	0.348	1
1732.6MHz	Pass	21.95	21.95	0.157	3.28	25.23	0.333	1
1752.6MHz	Pass	21.96	21.96	0.157	3.28	25.24	0.334	1

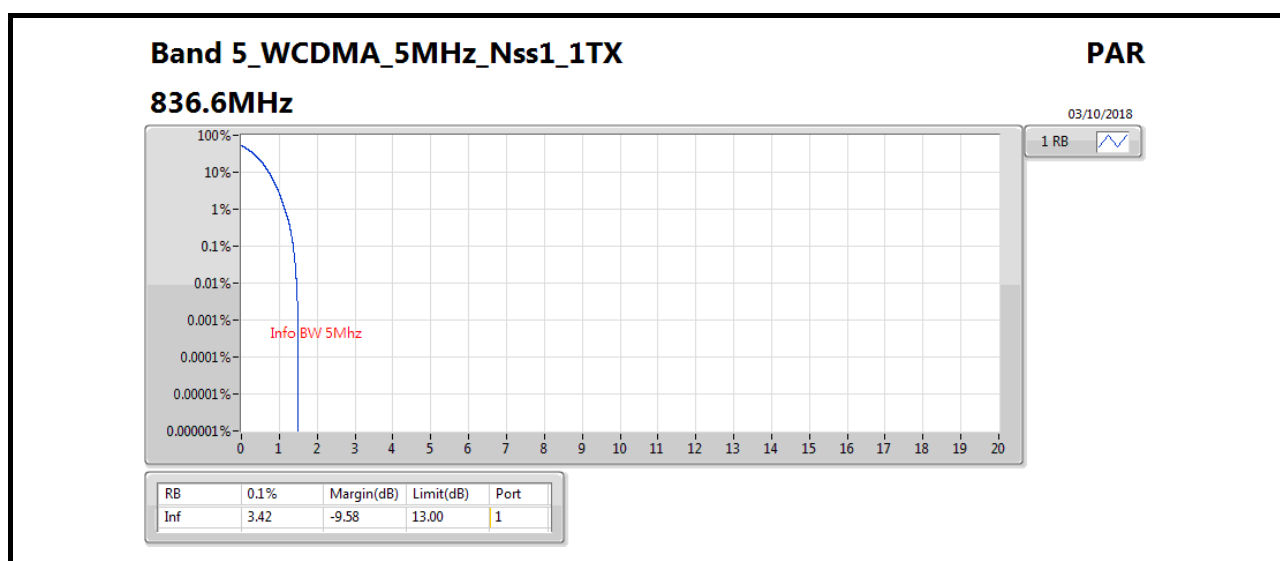
DG = Directional Gain; **Port X** = Port X output power

Summary

Mode	Result	Port	0.1%	Margin (dB)	Limit (dB)
Band 5	-	-	-	-	-
Band 5_WCDMA_5MHz_Nss1_1TX	Pass	1	3.42	-9.58	13.00

Result

Mode	Result	Port	0.1%	Margin (dB)	Limit (dB)
WCDMA_5MHz_Nss1_1TX	-	-	-	-	-
836.6MHz	Pass	1	3.42	-9.58	13.00

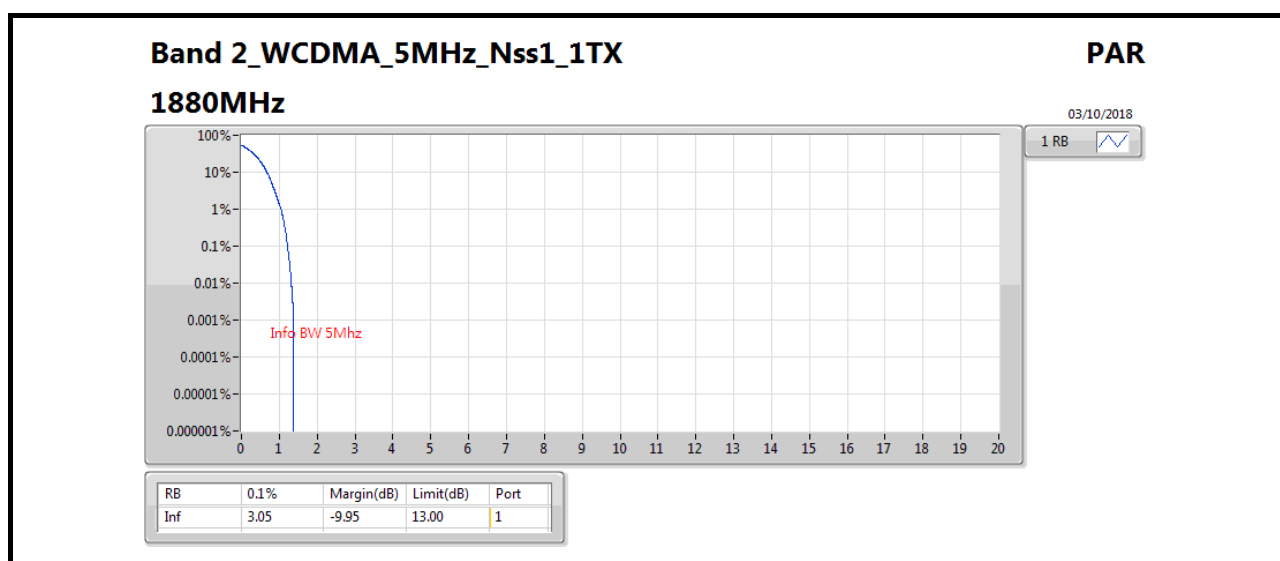


Summary

Mode	Result	Port	0.1%	Margin (dB)	Limit (dB)
Band 2	-	-	-	-	-
Band 2_WCDMA_5MHz_Nss1_1TX	Pass	1	3.05	-9.95	13.00

Result

Mode	Result	Port	0.1%	Margin (dB)	Limit (dB)
WCDMA_5MHz_Nss1_1TX	-	-	-	-	-
1880MHz	Pass	1	3.05	-9.95	13.00

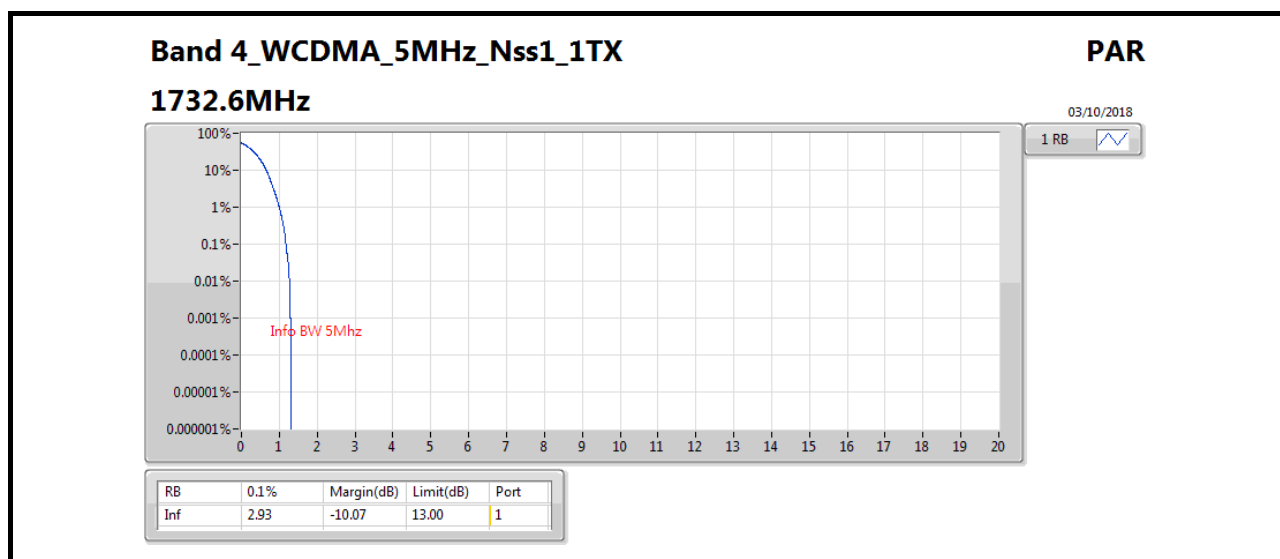


Summary

Mode	Result	Port	0.1%	Margin (dB)	Limit (dB)
Band 4	-	-	-	-	-
Band 4_WCDMA_5MHz_Nss1_1TX	Pass	1	2.93	-10.07	13.00

Result

Mode	Result	Port	0.1%	Margin (dB)	Limit (dB)
WCDMA_5MHz_Nss1_1TX	-	-	-	-	-
1732.6MHz	Pass	1	2.93	-10.07	13.00



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	4.669M	4.142M	4M14F9W	4.631M	4.125M

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

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

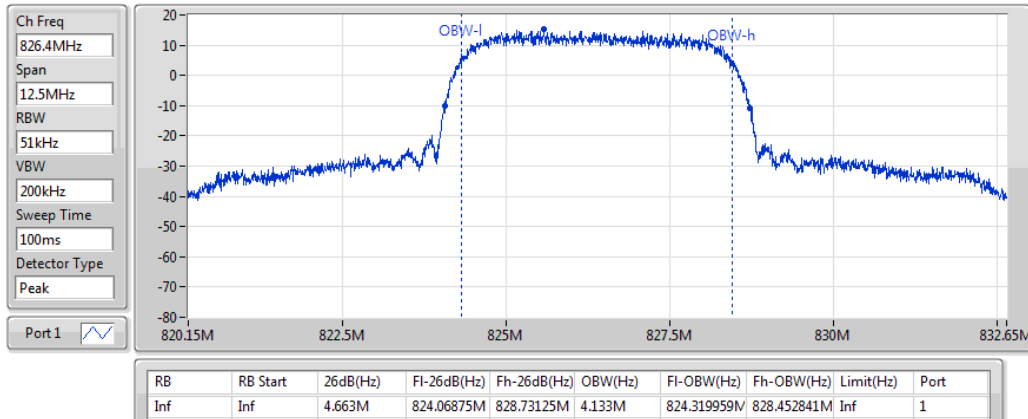
Result

Mode	Result	P1-N dB (Hz)	P1-OBW (Hz)
WCDMA_5MHz_Nss1_1TX	-	-	-
826.4MHz	Pass	4.663M	4.133M
836.6MHz	Pass	4.631M	4.125M
846.6MHz	Pass	4.669M	4.142M

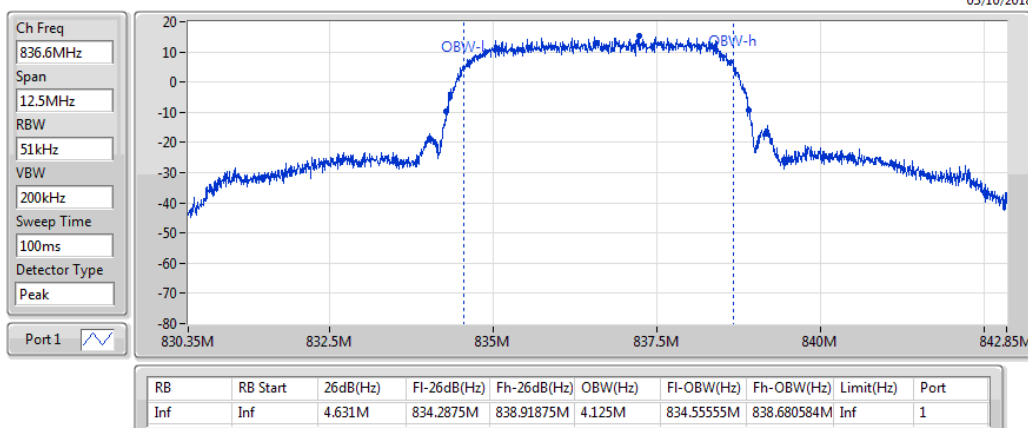
Port X-N dB = Port X26dB downbandwidth; **Port X-OBW** = Port X99% occupied bandwidth;

Band 5_WCDMA_5MHz_Nss1_1TX
EBW
826.4MHz

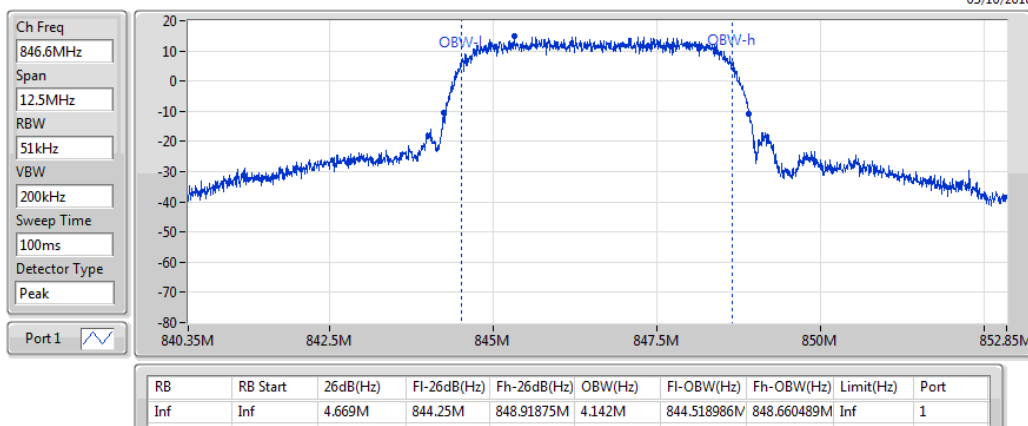
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Band 5_WCDMA_5MHz_Nss1_1TX
EBW
836.6MHz

03/10/2018


Band 5_WCDMA_5MHz_Nss1_1TX
EBW
846.6MHz

03/10/2018



Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
Band 2	-	-	-	-	-
Band 2_WCDMA_5MHz_Nss1_1TX	4.681M	4.145M	4M15F9W	4.663M	4.124M

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

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

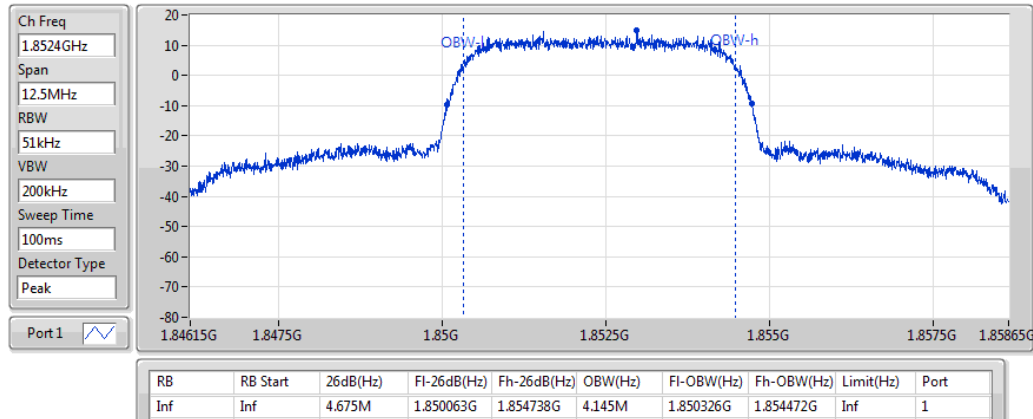
Result

Mode	Result	P1-N dB (Hz)	P1-OBW (Hz)
WCDMA_5MHz_Nss1_1TX	-	-	-
1852.4MHz	Pass	4.675M	4.145M
1880MHz	Pass	4.663M	4.124M
1907.6MHz	Pass	4.681M	4.129M

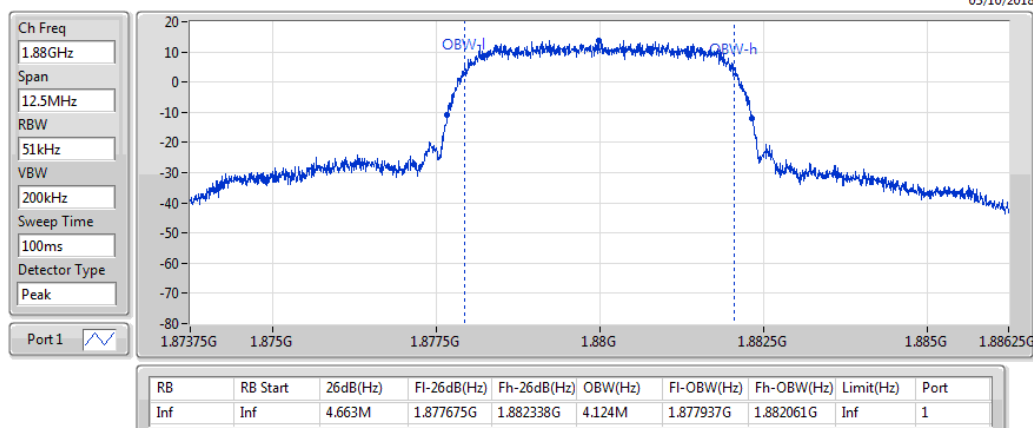
Port X-N dB = Port X26dB downbandwidth; **Port X-OBW** = Port X99% occupied bandwidth;

Band 2_WCDMA_5MHz_Nss1_1TX
EBW
1852.4MHz

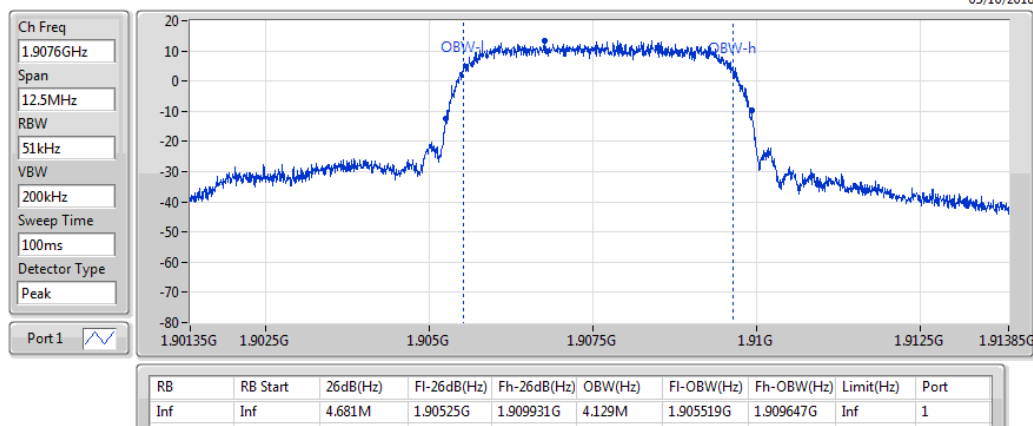
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Band 2_WCDMA_5MHz_Nss1_1TX
EBW
1880MHz

03/10/2018


Band 2_WCDMA_5MHz_Nss1_1TX
EBW
1907.6MHz

03/10/2018



Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
Band 4	-	-	-	-	-
Band 4_WCDMA_5MHz_Nss1_1TX	4.675M	4.146M	4M15F9W	4.663M	4.125M

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

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

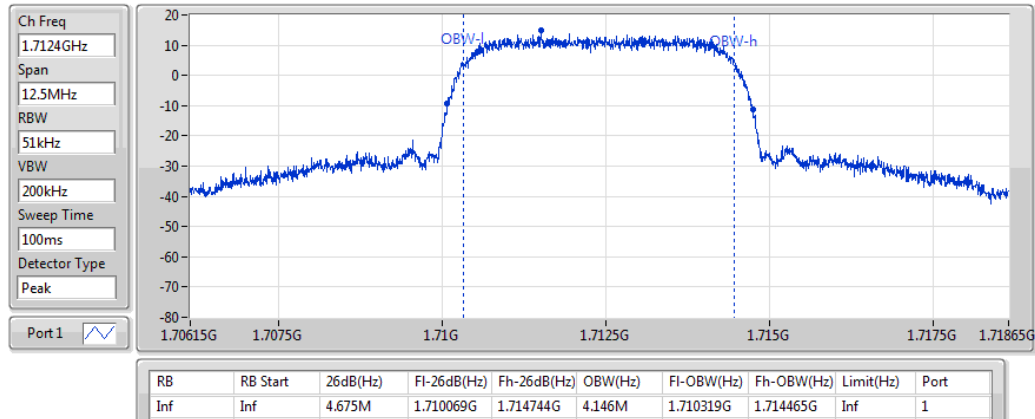
Result

Mode	Result	P1-N dB (Hz)	P1-OBW (Hz)
WCDMA_5MHz_Nss1_1TX	-	-	-
1712.4MHz	Pass	4.675M	4.146M
1732.6MHz	Pass	4.663M	4.125M
1752.6MHz	Pass	4.669M	4.139M

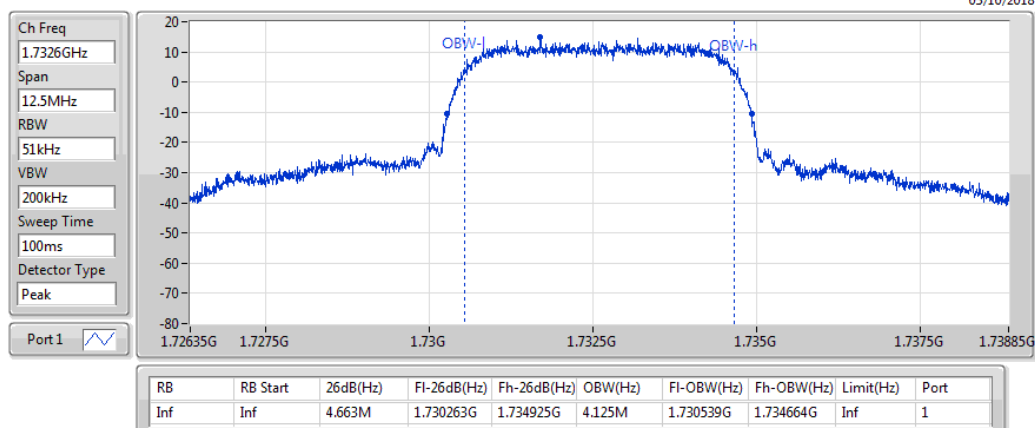
Port X-N dB = Port X26dB downbandwidth; **Port X-OBW** = Port X99% occupied bandwidth;

Band 4_WCDMA_5MHz_Nss1_1TX
EBW
1712.4MHz

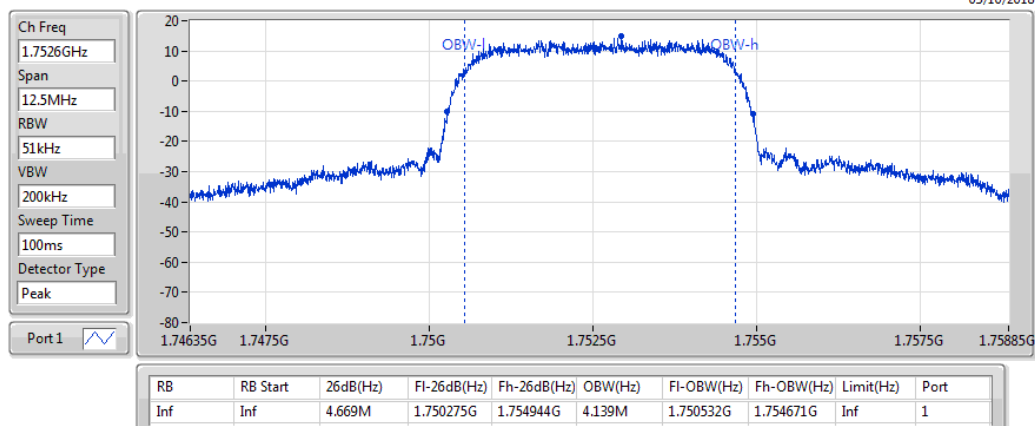
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Band 4_WCDMA_5MHz_Nss1_1TX
EBW
1732.6MHz

03/10/2018


Band 4_WCDMA_5MHz_Nss1_1TX
EBW
1752.6MHz

03/10/2018



Summary

Mode	Result	Port	F-Start (Hz)	F-Stop (Hz)	RBW (Hz)	Detector	Freq (Hz)	Level (dBm)	Limit (dBm)	Margin (dB)	Remark
Band 5	-	-	-	-	-	-	-	-	-	-	-
Band 5_WCDMA_5MHz_Nss1_1TX	Pass	1	849M	850M	50k	RMS	849.144094M	-23.75	-13.00	-10.75	-

Result

Mode	Result	Port	F-Start (Hz)	F-Stop (Hz)	RBW (Hz)	Detector	Freq (Hz)	Level (dBm)	Limit (dBm)	Margin (dB)	Remark
WCDMA_5MHz_Nss1_1TX	-	-	-	-	-	-	-	-	-	-	-
826.4MHz	Pass	1	30M	823M	100k	RMS	822.752188M	-32.01	-13.00	-19.01	-
826.4MHz	Pass	1	823M	824M	50k	RMS	823.999969M	-25.65	-13.00	-12.65	-
826.4MHz	Pass	1	849M	850M	50k	RMS	849.8585M	-51.23	-13.00	-38.23	-
826.4MHz	Pass	1	850M	1G	100k	RMS	871.20625M	-34.16	-13.00	-21.16	-
826.4MHz	Pass	1	1G	10G	1M	RMS	6.2425G	-32.53	-13.00	-19.53	-
836.6MHz	Pass	1	30M	823M	100k	RMS	815.392156M	-47.85	-13.00	-34.85	-
836.6MHz	Pass	1	823M	824M	50k	RMS	823.504219M	-49.74	-13.00	-36.74	-
836.6MHz	Pass	1	849M	850M	50k	RMS	849.081469M	-50.64	-13.00	-37.64	-
836.6MHz	Pass	1	850M	1G	100k	RMS	881.354688M	-33.55	-13.00	-20.55	-
836.6MHz	Pass	1	1G	10G	1M	RMS	9.982281G	-32.70	-13.00	-19.70	-
846.6MHz	Pass	1	30M	823M	100k	RMS	791.527812M	-47.43	-13.00	-34.43	-
846.6MHz	Pass	1	823M	824M	50k	RMS	823.389531M	-51.62	-13.00	-38.62	-
846.6MHz	Pass	1	849M	850M	50k	RMS	849.144094M	-23.75	-13.00	-10.75	-
846.6MHz	Pass	1	850M	1G	100k	RMS	850.445312M	-30.15	-13.00	-17.15	-
846.6MHz	Pass	1	1G	10G	1M	RMS	7.226313G	-32.77	-13.00	-19.77	-

**Summary**

Mode	Result	Port	F-Start (Hz)	F-Stop (Hz)	RBW (Hz)	Detector	Freq (Hz)	Level (dBm)	Limit (dBm)	Margin (dB)	Remark
Band 2	-	-	-	-	-	-	-	-	-	-	-
Band 2_WCDMA_5MHz_Nss1_1TX	Pass	1	1G	1.849G	1M	RMS	1.849G	-14.77	-13.00	-1.77	-

Result

Mode	Result	Port	F-Start (Hz)	F-Stop (Hz)	RBW (Hz)	Detector	Freq (Hz)	Level (dBm)	Limit (dBm)	Margin (dB)	Remark
WCDMA_5MHz_Nss1_1TX	-	-	-	-	-	-	-	-	-	-	-
1852.4MHz	Pass	1	30M	1G	100k	RMS	879.72M	-48.35	-13.00	-35.35	-
1852.4MHz	Pass	1	1G	1.849G	1M	RMS	1.849G	-14.77	-13.00	-1.77	-
1852.4MHz	Pass	1	1.849G	1.85G	50k	RMS	1.85G	-23.93	-13.00	-10.93	-
1852.4MHz	Pass	1	1.91G	1.911G	50k	RMS	1.910004G	-49.60	-13.00	-36.60	-
1852.4MHz	Pass	1	1.911G	20G	1M	RMS	19.936689G	-24.54	-13.00	-11.54	-
1880MHz	Pass	1	30M	1G	100k	RMS	891.23875M	-48.13	-13.00	-35.13	-
1880MHz	Pass	1	1G	1.849G	1M	RMS	1.847302G	-37.11	-13.00	-24.11	-
1880MHz	Pass	1	1.849G	1.85G	50k	RMS	1.849542G	-49.91	-13.00	-36.91	-
1880MHz	Pass	1	1.91G	1.911G	50k	RMS	1.910022G	-49.94	-13.00	-36.94	-
1880MHz	Pass	1	1.911G	20G	1M	RMS	19.923122G	-24.33	-13.00	-11.33	-
1907.6MHz	Pass	1	30M	1G	100k	RMS	855.59125M	-48.68	-13.00	-35.68	-
1907.6MHz	Pass	1	1G	1.849G	1M	RMS	1.663706G	-37.08	-13.00	-24.08	-
1907.6MHz	Pass	1	1.849G	1.85G	50k	RMS	1.849636G	-50.00	-13.00	-37.00	-
1907.6MHz	Pass	1	1.91G	1.911G	50k	RMS	1.910143G	-28.38	-13.00	-15.38	-
1907.6MHz	Pass	1	1.911G	20G	1M	RMS	1.911G	-22.93	-13.00	-9.93	-

**Summary**

Mode	Result	Port	F-Start (Hz)	F-Stop (Hz)	RBW (Hz)	Detector	Freq (Hz)	Level (dBm)	Limit (dBm)	Margin (dB)	Remark
Band 4	-	-	-	-	-	-	-	-	-	-	-
Band 4_WCDMA_5MHz_Nss1_1TX	Pass	1	1.756G	1.766G	1M	RMS	1.756015G	-14.39	-13.00	-1.39	-

Result

Mode	Result	Port	F-Start (Hz)	F-Stop (Hz)	RBW (Hz)	Detector	Freq (Hz)	Level (dBm)	Limit (dBm)	Margin (dB)	Remark
WCDMA_5MHz_Nss1_1TX	-	-	-	-	-	-	-	-	-	-	-
1712.4MHz	Pass	1	30M	1G	100k	RMS	806.788125M	-47.62	-13.00	-34.62	-
1712.4MHz	Pass	1	1G	1.709G	1M	RMS	1.708978G	-22.05	-13.00	-9.05	-
1712.4MHz	Pass	1	1.709G	1.71G	50k	RMS	1.71G	-23.73	-13.00	-10.73	-
1712.4MHz	Pass	1	1.755G	1.756G	50k	RMS	1.755606G	-50.19	-13.00	-37.19	-
1712.4MHz	Pass	1	1.756G	1.766G	1M	RMS	1.763678G	-36.48	-13.00	-23.48	-
1712.4MHz	Pass	1	1.766G	20G	1M	RMS	19.75555G	-23.56	-13.00	-10.56	-
1732.6MHz	Pass	1	30M	1G	100k	RMS	865.139688M	-47.29	-13.00	-34.29	-
1732.6MHz	Pass	1	1G	1.709G	1M	RMS	1.503944G	-37.07	-13.00	-24.07	-
1732.6MHz	Pass	1	1.709G	1.71G	50k	RMS	1.709017G	-50.75	-13.00	-37.75	-
1732.6MHz	Pass	1	1.755G	1.756G	50k	RMS	1.755899G	-50.45	-13.00	-37.45	-
1732.6MHz	Pass	1	1.756G	1.766G	1M	RMS	1.758482G	-36.85	-13.00	-23.85	-
1732.6MHz	Pass	1	1.766G	20G	1M	RMS	19.905981G	-23.54	-13.00	-10.54	-
1752.6MHz	Pass	1	30M	1G	100k	RMS	862.441875M	-47.66	-13.00	-34.66	-
1752.6MHz	Pass	1	1G	1.709G	1M	RMS	1.41297G	-36.77	-13.00	-23.77	-
1752.6MHz	Pass	1	1.709G	1.71G	50k	RMS	1.709268G	-50.48	-13.00	-37.48	-
1752.6MHz	Pass	1	1.755G	1.756G	50k	RMS	1.755005G	-24.65	-13.00	-11.65	-
1752.6MHz	Pass	1	1.756G	1.766G	1M	RMS	1.756015G	-14.39	-13.00	-1.39	-
1752.6MHz	Pass	1	1.766G	20G	1M	RMS	19.96866G	-23.32	-13.00	-10.32	-



RSE above 1GHz_ WCDMA Band 5 Result

Appendix E.1

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

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	1650.30	29.52	82.20	-52.68	34.53	3.78	25.79	34.58	199	282	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	1653.36	34.40	82.20	-47.80	39.40	3.79	25.79	34.58	220	192	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	CableAntenna 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	1671.58	31.06	82.20	-51.14	35.90	3.81	25.94	34.59	196	136	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	1674.86	33.45	82.20	-48.75	38.29	3.81	25.94	34.59	219	234	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	CableAntenna 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	1693.22	29.22	82.20	-52.98	33.96	3.83	26.02	34.59	197	91	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	1693.17	34.19	82.20	-48.01	38.93	3.83	26.02	34.59	226	192	Average	VERTICAL

Band	WCDMA Band 2	Test Mode	QPSK / 5MHz
Test Channel	9262 (185.24 MHz)		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	3705.30	33.79	82.20	-48.41	31.23	5.78	31.78	35.00	160	25	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	3706.76	36.31	82.20	-45.89	33.75	5.78	31.78	35.00	264	205	Average	VERTICAL

Band	WCDMA Band 2	Test Mode	QPSK / 5MHz
Test Channel	9400 (1880 MHz)		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	3755.20	32.39	82.20	-49.81	29.70	5.76	31.92	34.99	172	49	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	3758.38	34.59	82.20	-47.61	31.90	5.76	31.92	34.99	220	207	Average	VERTICAL

Band	WCDMA Band 2	Test Mode	QPSK / 5MHz
Test Channel	9538 (1907.6 MHz)		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	3813.85	34.42	82.20	-47.78	31.53	5.76	32.12	34.99	174	238	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	3813.82	35.29	82.20	-46.91	32.40	5.76	32.12	34.99	226	196	Average	VERTICAL

Band	WCDMA Band 4	Test Mode	QPSK / 5MHz
Test Channel	1132 (1712.4 MHz)		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	3425.70	32.62	82.20	-49.58	31.02	5.57	31.06	35.03	184	110	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	3425.41	35.59	82.20	-46.61	33.99	5.57	31.06	35.03	214	150	Average	VERTICAL

Band	WCDMA Band 4	Test Mode	QPSK / 5MHz
Test Channel	1413 (1732.6 MHz)		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	3463.49	32.66	82.20	-49.54	30.94	5.62	31.13	35.03	202	75	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	3463.49	34.66	82.20	-47.54	32.94	5.62	31.13	35.03	235	148	Average	VERTICAL

Band	WCDMA Band 4	Test Mode	QPSK / 5MHz
Test Channel	1513 (1752.6 MHz)		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	3503.89	33.08	82.20	-49.12	31.23	5.68	31.20	35.03	197	96	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	3505.27	35.02	82.20	-47.18	33.17	5.68	31.20	35.03	233	192	Average	VERTICAL



Summary

Mode	Voltage (V)	Temp (°C)	Ch (Hz)	Center (Hz)	FI (Hz)	Fh (Hz)	FI Limit (Hz)	Fh Limit (Hz)	ppm	Limit (ppm)	Port	Remark
Band 5	-		-	-	-	-	-	-	-	-	-	-
WCDMA_5MHz	110	-10	836.5M	836.500455M	836.401674M	836.599237M	824M	849M	0.006	2.5	1	-

Result

Mode	Voltage (V)	Temp (°C)	Ch (Hz)	Center (Hz)	FI (Hz)	Fh (Hz)	FI Limit (Hz)	Fh Limit (Hz)	ppm	Limit (ppm)	Port	Remark
WCDMA_5MHz		-	-	-	-	-	-	-	-	-	-	-
836.5MHz	110	-40	836.5M	836.499904M	836.401127M	836.598682M	824M	849M	0.003	2.5	1	-
836.5MHz	110	-30	836.5M	836.4999M	836.400944M	836.598857M	824M	849M	0.003	2.5	1	-
836.5MHz	110	-20	836.5M	836.500143M	836.402801M	836.597485M	824M	849M	0.004	2.5	1	-
836.5MHz	110	-10	836.5M	836.500455M	836.401674M	836.599237M	824M	849M	0.006	2.5	1	-
836.5MHz	110	0	836.5M	836.499675M	836.401237M	836.598114M	824M	849M	0.005	2.5	1	-
836.5MHz	110	10	836.5M	836.499604M	836.400847M	836.598362M	824M	849M	0.003	2.5	1	-
836.5MHz	93.5	20	836.5M	836.499682M	836.400675M	836.598688M	824M	849M	0.003	2.5	1	-
836.5MHz	110	20	836.5M	836.499477M	836.40025M	836.598704M	824M	849M	0.005	2.5	1	-
836.5MHz	126.5	20	836.5M	836.499738M	836.400896M	836.59858M	824M	849M	0.004	2.5	1	-
836.5MHz	110	30	836.5M	836.499833M	836.401934M	836.597733M	824M	849M	0.005	2.5	1	-
836.5MHz	110	40	836.5M	836.499783M	836.40098M	836.598586M	824M	849M	0.004	2.5	1	-
836.5MHz	110	50	836.5M	836.500326M	836.401438M	836.599215M	824M	849M	0.005	2.5	1	-
836.5MHz	110	60	836.5M	836.499322M	836.400907M	836.597737M	824M	849M	0.004	2.5	1	-
836.5MHz	110	70	836.5M	836.501029M	836.402499M	836.599558M	824M	849M	0.003	2.5	1	-



Summary

Mode	Voltage (V)	Temp (°C)	Ch (Hz)	Center (Hz)	FI (Hz)	Fh (Hz)	FI Limit (Hz)	Fh Limit (Hz)	ppm	Limit (ppm)	Port	Remark
Band 2		-	-	-	-	-	-	-	-	-	-	-
Band2_WCDMA_5MHz	110	-20	1.88G	1.879999G	1.879901G	1.880098G	1.85G	1.91G	0.006	Inf	1	-

Result

Mode	Voltage (V)	Temp (°C)	Ch (Hz)	Center (Hz)	FI (Hz)	Fh (Hz)	FI Limit (Hz)	Fh Limit (Hz)	ppm	Limit (ppm)	Port	Remark
Band2_WCDMA_5MHz		-	-	-	-	-	-	-	-	-	-	-
1880MHz	110	-40	1.88G	1.88G	1.879901G	1.8801G	1.85G	1.91G	0.004	Inf	1	-
1880MHz	110	-30	1.88G	1.88G	1.8799G	1.880099G	1.85G	1.91G	0.005	Inf	1	-
1880MHz	110	-20	1.88G	1.879999G	1.879901G	1.880098G	1.85G	1.91G	0.006	Inf	1	-
1880MHz	110	-10	1.88G	1.879999G	1.8799G	1.880097G	1.85G	1.91G	0.006	Inf	1	-
1880MHz	110	0	1.88G	1.88G	1.879901G	1.880098G	1.85G	1.91G	0.004	Inf	1	-
1880MHz	110	10	1.88G	1.88G	1.879901G	1.880099G	1.85G	1.91G	0.003	Inf	1	-
1880MHz	93.5	20	1.88G	1.88G	1.879901G	1.880099G	1.85G	1.91G	0.003	Inf	1	-
1880MHz	110	20	1.88G	1.88G	1.879902G	1.880099G	1.85G	1.91G	0.005	Inf	1	-
1880MHz	126.5	20	1.88G	1.88G	1.879903G	1.880098G	1.85G	1.91G	0.003	Inf	1	-
1880MHz	110	30	1.88G	1.88G	1.879901G	1.8801G	1.85G	1.91G	0.005	Inf	1	-
1880MHz	110	40	1.88G	1.88G	1.879901G	1.880099G	1.85G	1.91G	0.005	Inf	1	-
1880MHz	110	50	1.88G	1.88G	1.879901G	1.880099G	1.85G	1.91G	0.005	Inf	1	-
1880MHz	110	60	1.88G	1.88G	1.879901G	1.880099G	1.85G	1.91G	0.004	Inf	1	-
1880MHz	110	70	1.88G	1.88G	1.879901G	1.8801G	1.85G	1.91G	0.003	Inf	1	-



Summary

Mode	Voltage (V)	Temp (°C)	Ch (Hz)	Center (Hz)	FI (Hz)	Fh (Hz)	FI Limit (Hz)	Fh Limit (Hz)	ppm	Limit (ppm)	Port	Remark
Band 4		-	-	-	-	-	-	-	-	-	-	-
Band 4 WCDMA_5MHz	110	-30	1.7325G	1.732499G	1.732401G	1.732598G	1.71G	1.755G	0.005	Inf	1	-

Result

Mode	Voltage (V)	Temp (°C)	Ch (Hz)	Center (Hz)	FI (Hz)	Fh (Hz)	FI Limit (Hz)	Fh Limit (Hz)	ppm	Limit (ppm)	Port	Remark
Band 4 WCDMA_5MHz		-	-	-	-	-	-	-	-	-	-	-
1732.5MHz	110	-40	1.7325G	1.7325G	1.732401G	1.732599G	1.71G	1.755G	0.002	Inf	1	-
1732.5MHz	110	-30	1.7325G	1.732499G	1.732401G	1.732598G	1.71G	1.755G	0.005	Inf	1	-
1732.5MHz	110	-20	1.7325G	1.7325G	1.7324G	1.732599G	1.71G	1.755G	0.003	Inf	1	-
1732.5MHz	110	-10	1.7325G	1.732501G	1.732402G	1.7326G	1.71G	1.755G	0.005	Inf	1	-
1732.5MHz	110	0	1.7325G	1.7325G	1.732401G	1.732599G	1.71G	1.755G	0.003	Inf	1	-
1732.5MHz	110	10	1.7325G	1.7325G	1.732401G	1.7326G	1.71G	1.755G	0.003	Inf	1	-
1732.5MHz	93.5	20	1.7325G	1.7325G	1.732402G	1.732599G	1.71G	1.755G	0.003	Inf	1	-
1732.5MHz	110	20	1.7325G	1.7325G	1.732401G	1.732599G	1.71G	1.755G	0.004	Inf	1	-
1732.5MHz	126.5	20	1.7325G	1.7325G	1.732401G	1.732599G	1.71G	1.755G	0.003	Inf	1	-
1732.5MHz	110	30	1.7325G	1.7325G	1.732401G	1.732598G	1.71G	1.755G	0.003	Inf	1	-
1732.5MHz	110	40	1.7325G	1.7325G	1.7324G	1.732599G	1.71G	1.755G	0.004	Inf	1	-
1732.5MHz	110	50	1.7325G	1.7325G	1.732401G	1.732598G	1.71G	1.755G	0.003	Inf	1	-
1732.5MHz	110	60	1.7325G	1.732501G	1.732402G	1.7326G	1.71G	1.755G	0.003	Inf	1	-
1732.5MHz	110	70	1.7325G	1.7325G	1.732401G	1.732598G	1.71G	1.755G	0.003	Inf	1	-