



Test Report No:
2360394R-RFUSV23S-A

TEST REPORT FCC Rules&Regulations

Product Name	TracKing V5
Brand Name	Thermo King
Model No.	TKV5LA
FCC ID	Q37TKV5LA
Applicant's Name / Address	Thermo King Corporation 314 West 90th Street, Minneapolis, MN USA 55420
Manufacturer's Name / Address	Thermo King Corporation 314 West 90th Street, Minneapolis, MN USA 55420
Test Method Requested, Standard	FCC CFR Title 47 Part 22 Subpart H FCC CFR Title 47 Part 24 Subpart E ANSI/TIA-603-E-2016 ANSI C63.26-2015
Verdict Summary	IN COMPLIANCE
Documented By	<i>Amelia Wu</i> Amelia Wu
Approved By	<i>Rueyyan Lin</i> Rueyyan Lin
Date of Receipt	Jun. 12, 2023
Date of Issue	Sep. 25, 2023
Report Version	V1.0

INDEX

	page
Competences and Guarantees.....	4
General Conditions.....	4
Revision History.....	5
Summary of Test Result.....	6
Comments and Remarks.....	6
1. General Information.....	7
1.1. EUT Description.....	7
1.2. EUT Information.....	7
1.3. Testing Applied Standards.....	7
1.4. Testing Location Information.....	8
1.5. Measurement Uncertainty.....	8
1.6. List of Test Equipment.....	9
2. Test Configuration of EUT.....	10
2.1. Test Condition.....	10
2.2. The Worst Case Measurement Configuration.....	10
2.3. Tested System Details.....	11
2.4. Configuration of Tested System.....	11
3. RF Output Power.....	12
3.1. Test Setup.....	12
3.2. Test Procedure.....	12
3.3. Test Result of RF Output Power.....	12
4. Occupied Bandwidth.....	13
4.1. Test Setup.....	13
4.2. Test Procedures.....	13
4.3. Test Result of Occupied Bandwidth.....	13
5. Peak to Average Power Ratio.....	14
5.1. Test Setup.....	14
5.2. Test Procedure.....	14
5.3. Test Result of Peak to Average Power Ratio.....	14
6. Spurious Emission.....	15
6.1. Test Setup.....	15
6.2. Test Procedure.....	16
6.3. Test Methodology and Reference Procedures.....	16
6.4. Test Result of Spurious Emission.....	16
7. Conducted Band Edge.....	17
7.1. Test Setup.....	17

7.2.	Test Procedure	17
7.3.	Test Result of Conducted Band Edge	17
8.	Frequency Stability	18
8.1.	Test Setup	18
8.2.	Test Procedures	18
8.3.	Test Result of Frequency Stability	18
Appendix A. Test Result of RF Output Power		
Appendix B. Test Result of Occupied Bandwidth		
Appendix C. Test Result of Peak to Average Power Ratio		
Appendix D. Test Result of Spurious Emission		
Appendix E. Test Result of Conducted Band Edge		
Appendix F. Test Result of Frequency Stability		
Appendix G. Test Setup Photograph		

Competences and Guarantees

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

General Conditions

1. The test results relate only to the samples tested.
2. The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.
3. This report must not be used to claim product endorsement by TAF or any agency of the government.
4. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.
5. Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	Sep. 25, 2023

Summary of Test Result

Report Clause	Test Items	Band	Ref Std. Clause	Limit	Result (PASS/FAIL)	Remark
3	RF Output Power	2	§2.1033 §2.1046 §24.232	< 2 Watts EIRP	PASS	-
		5	§2.1033 §2.1046 §22.913	< 7 Watts ERP	PASS	-
4	Occupied Bandwidth	2, 5	§2.1049	N/A	PASS	-
5	Peak to Average Power Ratio	2	§24.232	\leq 13 dB	PASS	-
		5	§22.913	\leq 13 dB	PASS	-
6	Spurious Emission	2	§2.1053 §24.238	< -13 dBm	PASS	-
		5	§22.917	< -13 dBm	PASS	-
7	Conducted Band Edge	2	§24.238	< -13 dBm	PASS	-
		5	§2.1053 §22.917	< -13 dBm	PASS	-
8	Frequency Stability	2	§2.1055 §24.235	\pm 2.5 ppm	PASS	-
		5	§2.1055 §22.335	\pm 2.5 ppm	PASS	-

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.

Comments and Remarks

The product specification and testing instructions for the EUT declared in the report are provided by the manufacturer who will take all responsibilities for the accuracy.

1. General Information

1.1. EUT Description

Uplink Frequency Range (MHz)	WCDMA Band 2: 1850~1910 WCDMA Band 5: 824~849
Downlink Frequency Range (MHz)	WCDMA Band 2: 1930~1990 WCDMA Band 5: 869~894
Function	WCDMA / HSDPA / DC-HSDPA / HSUPA / HSPA+
Type of Modulation	BPSK / QPSK / 16QAM
Hardware Version	3.0
Software Version	1.00014
IMEI No.	8627540511

Antenna Information					
Ant.	Brand Name	Model No.	Type	Gain (dBi)	
				WCDMA Band 2	WCDMA Band 5
0	N/A	N/A	PCB	2.33	-0.35

1.2. EUT Information

EUT Power Type	From DC power supply
----------------	----------------------

1.3. Testing Applied Standards

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

- FCC CFR Title 47 Part 22 Subpart H
- FCC CFR Title 47 Part 24 Subpart E
- FCC CFR Title 47 Part 2
- 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.

1.4. Testing Location Information

Testing Location Information	
Test Laboratory : DEKRA Testing and Certification Co., Ltd.	
1 (TAF: 3024)	ADD: No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. TEL: +886-3-582-8001 FAX: +886-3-582-8958
2 (TAF: 3024)	ADD: No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. TEL: +886-3-582-8001 FAX: +886-3-582-8958
Test site number for address 1 includes HC-SR02. Test site number for address 2 includes HC-CB02, HC-CB03, HC-CB04, HC-SR10 and HC-SR12.	

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
RF Conducted Emission	HC-SR12	Getaz Yang	23 / 61	2023/06/26
Radiated Emission	HC-CB04	Cyril Chen	25 / 65	2023/06/19

1.5. Measurement Uncertainty

Uncertainties have been calculated according to the DEKRA internal document with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Test Item	Uncertainty
RF Output Power	± 1.16 dB
Occupied Bandwidth	± 217.9 Hz
Peak to Average Power Ratio	± 2.47 dB
Conducted Band Edge	± 2.47 dB
Spurious Emissions	± 3.52 dB below 1 GHz ± 3.56 dB above 1 GHz
Frequency Stability	± 217.9 Hz

1.6. List of Test Equipment

HC-SR12

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Cal. Date	Next Cal. Date
Temperature & Humidity Test Chamber	KSON	THS-B4T-150	A0401	-40°C~+150°C/10%-98%R.H ; 114x93x162cm	2022/12/07	2023/12/06
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	0.3-40 GHz	2022/11/02	2023/11/01
Pulse Power Sensor	Anritsu	MA2411B	1531043	0.3-40 GHz	2022/11/02	2023/11/01
EXA Signal Analyzer	Keysight	N9010A	MY51440132	10 Hz-44 GHz	2022/12/13	2023/12/12
Pulse Power Sensor	Anritsu	MA2411B	1531044	0.3-40 GHz	2022/11/02	2023/11/01
Spectrum Analyzer	Keysight	N9010B	MY57110159	10 Hz-7 GHz	2023/03/03	2024/03/02
Wireless Conn. Tester	R&S	CMW500	157118	Simulator	2022/07/11	2023/07/10
Dual Output Autoranging DC Power Supply	Keysight	E36234A	MY59001234	Output: 200W, 0-60V, 0-10A	2022/10/31	2023/10/30
Spectrum Analyzer	Agilent	N9010A	US47140172	9 kHz-26.5 GHz	2023/05/09	2024/05/08
Signal & Spectrum Analyzer	R&S	FSV40	101869	10Hz-40GHz	2022/07/13	2023/07/12

HC-CB04

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	10 Hz-40 GHz	2022/09/29	2023/09/28
EXA Signal Analyzer	Keysight	N9010A	MY51440132	10 Hz-44 GHz	2022/12/13	2023/12/12
Trilog Broadband Antenna	Schwarzbeck	VULB 9168	1209	30 MHz-2 GHz	2023/06/13	2024/06/12
Horn Antenna	Schwarzbeck	BBHA 9170	203	18G-40GHz	2023/02/13	2024/02/12
Pre-Amplifier	EMCI	EMC01820I	980364	30M-8 GHz,20 dB	2023/06/06	2024/06/05
Pre-Amplifier	EMEC	EM01G18GA	060835	1-18 GHz,50 dB	2022/07/04	2023/07/03
Pre-Amplifier	DEKRA	AP-400C	201801231	18G-40 GHz,48 dB	2022/09/27	2023/09/26
Wireless Conn. Tester	R&S	CMW500	157118	Simulator	2022/07/11	2023/07/10
Dual Output Autoranging DC Power Supply	Keysight	E36234A	MY59001234	Output: 200W, 0-60V, 0-10A	2022/10/31	2023/10/30
Coaxial Cable(10m)	Suhner	SF102_SF104	HC-CB04	30M-18 GHz	2022/08/08	2023/08/07
Coaxial Cable(3m)	Suhner,Rosnol	SF102_UP0264	HC-CB04_1	18G-40 GHz	2022/08/14	2023/08/13
Radiated Software	AUDIX	e3 V9	HC-CB04_1	N/A	N/A	N/A

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2. Test Configuration of EUT

2.1. Test Condition

EUT Operational Condition	
Testing Voltage	DC 14.2V

2.2. The Worst Case Measurement Configuration

Test Mode	Mode 1: WCDMA Band 2 Mode 2: WCDMA Band 5
-----------	--

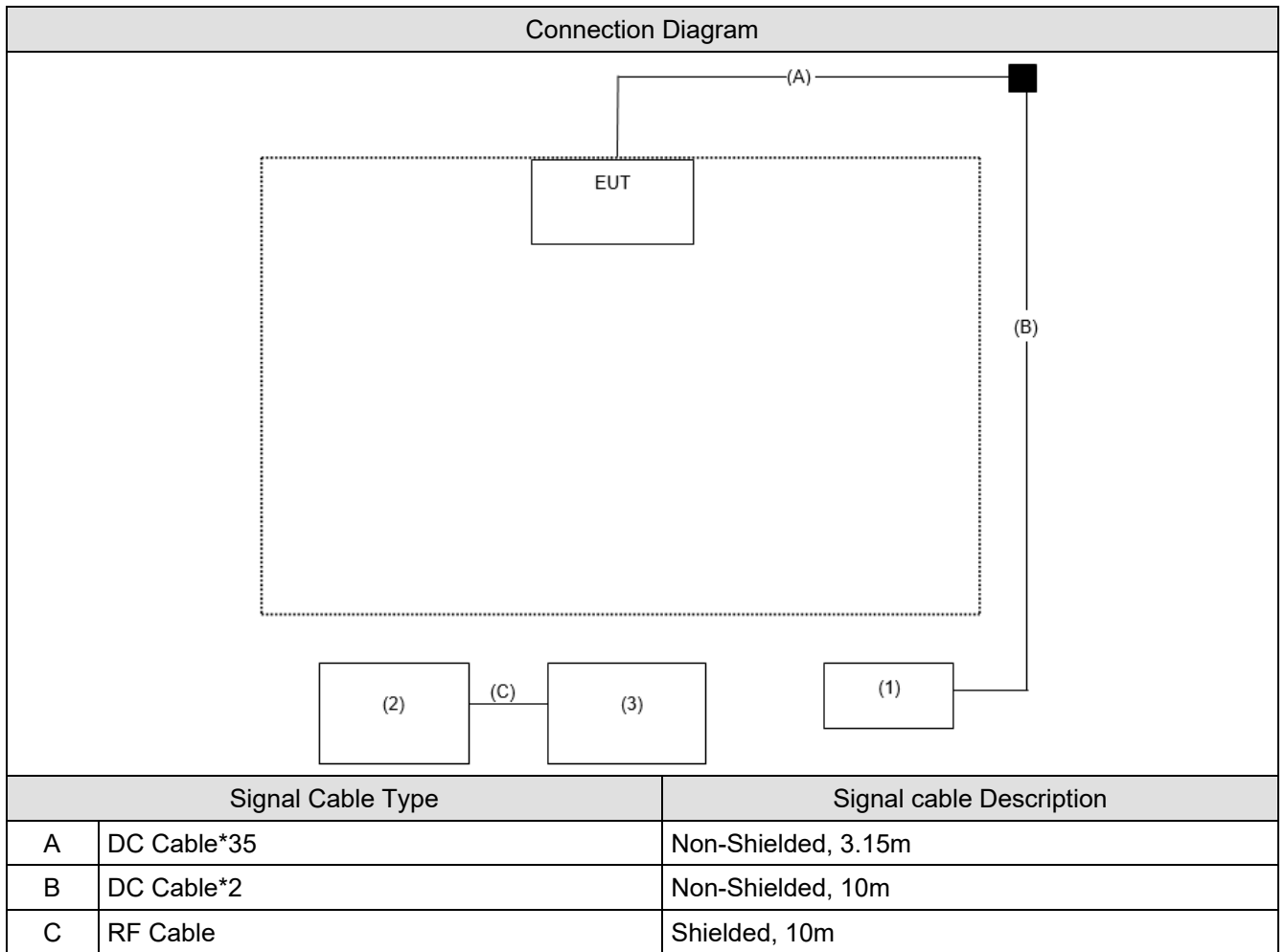
Note:

1. Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. The device was tested under all bandwidths, RB configurations and modulations, and the worst case was found in QPSK modulation and show in "Conducted Band Edge" & "Spurious Emission".
3. The EUT was performed at X axis, Y axis and Z axis position for radiated spurious emission test. The worst case was found at X axis, so the measurement will follow this same test configuration.

2.3. Tested System Details

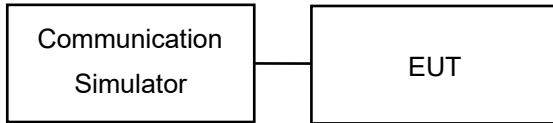
No.	Equipment	Brand Name	Model No.	Serial No.
1	Power Supply	Topward	6303D	8095908
2	Base Station	R&S	CMW500	157118
3	Horn Antenna	Schwarzbeck	BBHA 9120D	1640

2.4. Configuration of Tested System



3. RF Output Power

3.1. Test Setup



3.2. Test Procedure

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum conducted RF output power under transmission mode and specific channel frequency. The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_{\text{T}} - L_{\text{C}}$$

where:

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

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

G_{T} = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

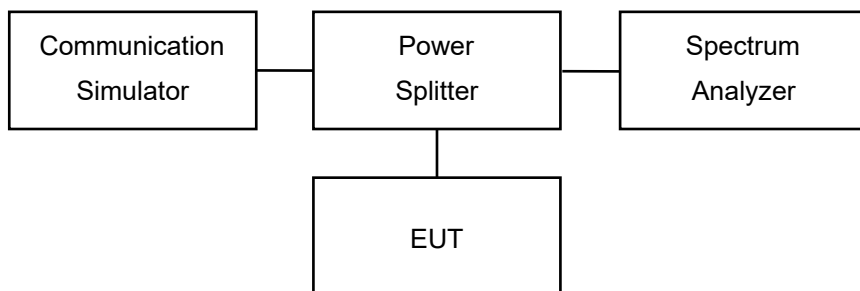
L_{C} = signal attenuation in the connecting cable between the transmitter and antenna, in dB

3.3. Test Result of RF Output Power

Refer as Appendix A

4. Occupied Bandwidth

4.1. Test Setup



4.2. Test Procedures

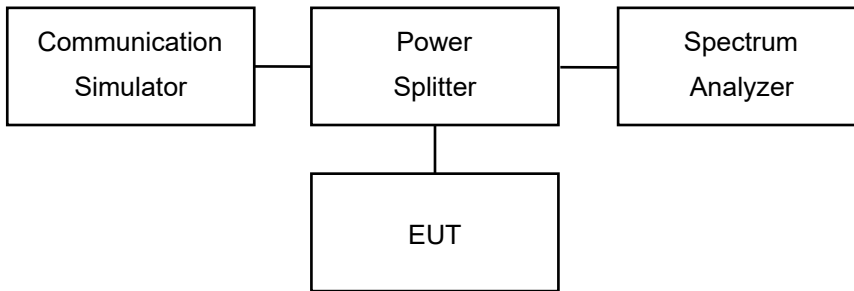
The EUT makes a call to the communication simulator. The 26dB bandwidth and 99% occupied bandwidth measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. The path loss was compensated to the results for each measurement.

4.3. Test Result of Occupied Bandwidth

Refer as Appendix B

5. Peak to Average Power Ratio

5.1. Test Setup



5.2. Test Procedure

1. The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. The path loss was compensated to the results for each measurement.
2. Set resolution/measurement bandwidth \geq signal's occupied bandwidth.
3. Set the number of counts to a value that stabilizes the measured CCDF curve.
4. Record the maximum PAPR level associated with a probability of 0.1 %.

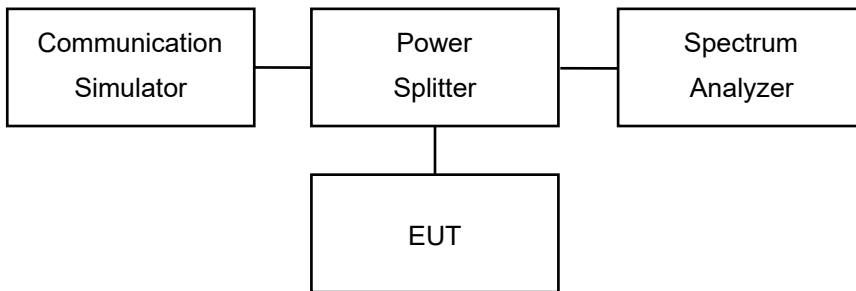
5.3. Test Result of Peak to Average Power Ratio

Refer as Appendix C

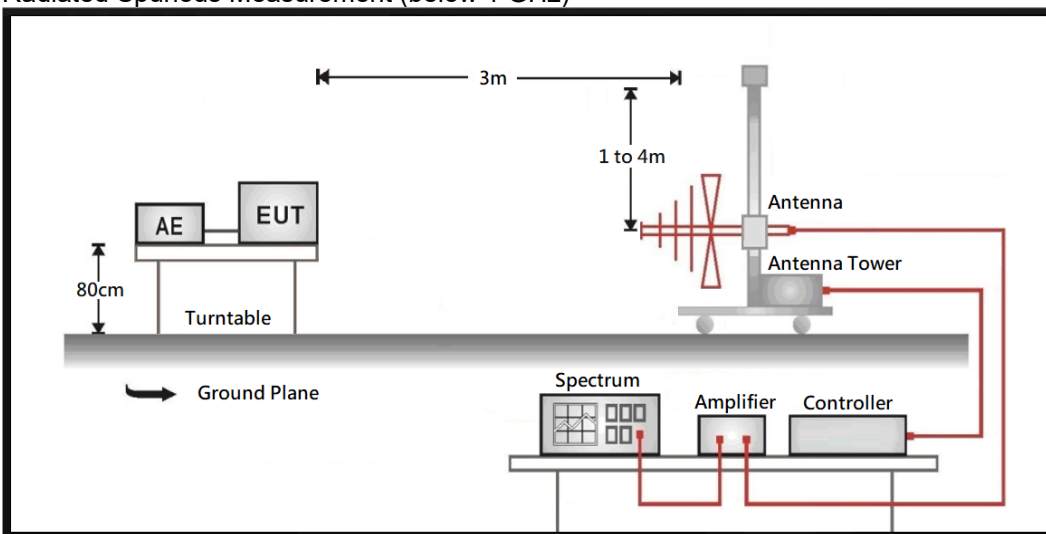
6. Spurious Emission

6.1. Test Setup

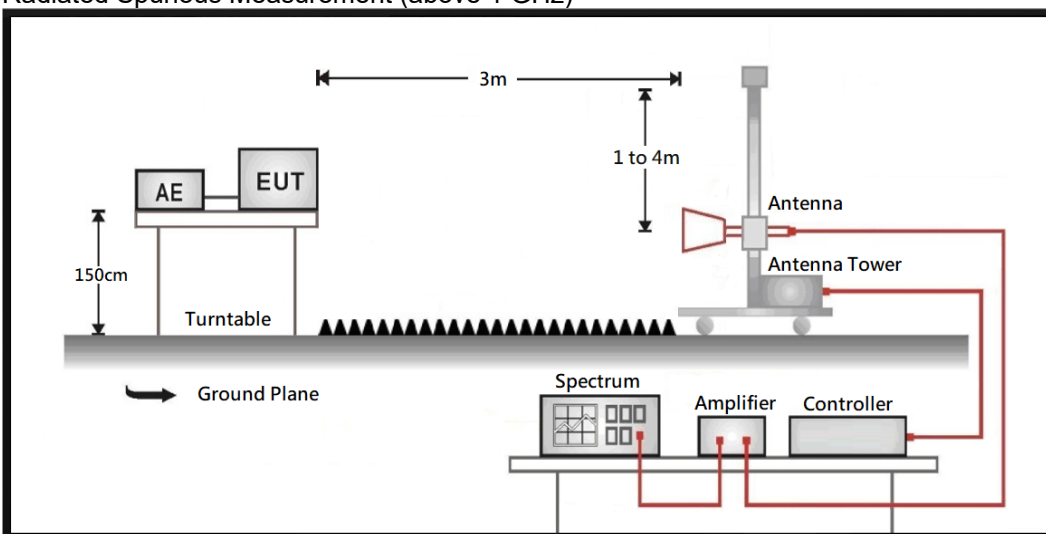
Conducted Spurious Measurement



Radiated Spurious Measurement (below 1 GHz)



Radiated Spurious Measurement (above 1 GHz)



6.2. Test Procedure

Conducted Spurious Measurement:

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. The path loss was compensated to the results for each measurement. The resolution bandwidth of the spectrum analyzer was set at 1 MHz, sufficient scans were taken to show the out of band Emission if any up to 10th harmonic.

Radiated Spurious Measurement:

The EUT and its simulators are placed on a turn table which is 0.8 or 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. 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. The resolution bandwidth of the spectrum analyzer was set at 1 MHz, sufficient scans were taken to show the out of band Emission if any up to 10th harmonic. Taking the record of maximum spurious emission.

6.3. Test Methodology and Reference Procedures

KDB 971168 D01 Power Meas License Digital Systems v03r01

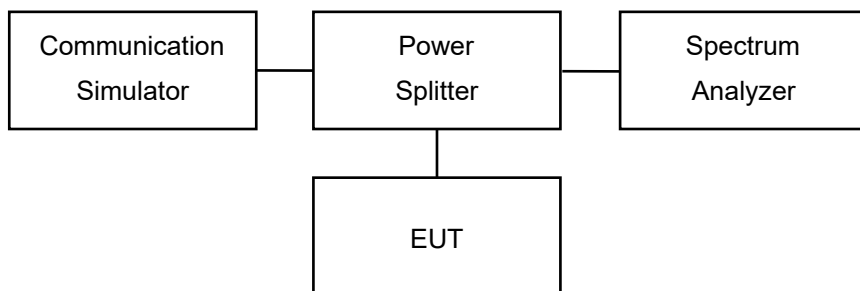
ANSI C63.26-2015

6.4. Test Result of Spurious Emission

Refer as Appendix D

7. Conducted Band Edge

7.1. Test Setup



7.2. Test Procedure

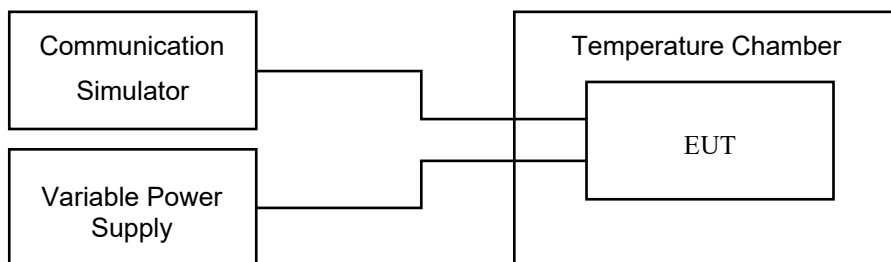
1. The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. The path loss was compensated to the results for each measurement.
2. In the 1MHz bands immediately 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 to measure the out of band Emissions.

7.3. Test Result of Conducted Band Edge

Refer as Appendix E

8. Frequency Stability

8.1. Test Setup



8.2. Test Procedures

Frequency Stability under Temperature Variations:

The EUT under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a communication simulator. The EUT was placed inside the temperature chamber. Set the EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

Frequency Stability under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC or DC power supply to power the EUT and set the voltage to rated voltage. Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

8.3. Test Result of Frequency Stability

Refer as Appendix F

Appendix A. Test Result of RF Output Power

WCDMA Band 2						
Test Mode	Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	EIRP Limit (W)
RMC	1852.4	23.11	2.33	25.440	0.350	2
	1880	23.17	2.33	25.500	0.355	2
	1907.6	23.18	2.33	25.510	0.356	2
HSUPA Subtest 1	1852.4	22.56	2.33	24.890	0.308	2
	1880	22.61	2.33	24.940	0.312	2
	1907.6	22.63	2.33	24.960	0.313	2
HSUPA Subtest 2	1852.4	22.13	2.33	24.460	0.279	2
	1880	22.19	2.33	24.520	0.283	2
	1907.6	22.21	2.33	24.540	0.284	2
HSUPA Subtest 3	1852.4	22.53	2.33	24.860	0.306	2
	1880	22.56	2.33	24.890	0.308	2
	1907.6	22.58	2.33	24.910	0.310	2
HSUPA Subtest 4	1852.4	22.55	2.33	24.880	0.308	2
	1880	22.58	2.33	24.910	0.310	2
	1907.6	22.61	2.33	24.940	0.312	2
HSUPA Subtest 5	1852.4	22.14	2.33	24.470	0.280	2
	1880	22.17	2.33	24.500	0.282	2
	1907.6	22.21	2.33	24.540	0.284	2
HSDPA Subtest 1	1852.4	20.47	2.33	22.800	0.191	2
	1880	20.53	2.33	22.860	0.193	2
	1907.6	20.59	2.33	22.920	0.196	2
HSDPA Subtest 2	1852.4	20.16	2.33	22.490	0.177	2
	1880	20.21	2.33	22.540	0.179	2
	1907.6	20.24	2.33	22.570	0.181	2
HSDPA Subtest 3	1852.4	20.03	2.33	22.360	0.172	2
	1880	20.06	2.33	22.390	0.173	2
	1907.6	20.08	2.33	22.410	0.174	2
HSDPA Subtest 4	1852.4	20.01	2.33	22.340	0.171	2
	1880	20.06	2.33	22.390	0.173	2
	1907.6	20.80	2.33	23.130	0.206	2

Note:

1. EIRP (dBm) = Conducted Output Power (dBm) + Antenna Gain (dBi)
2. EIRP (W) = $(10^{(\text{Power}(\text{dBm})/10)}) * 10^{-3}$

WCDMA Band 5						
Test Mode	Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	ERP (dBm)	ERP (W)	ERP Limit (W)
RMC	826.4	23.42	-0.35	20.920	0.124	7
	836.6	23.48	-0.35	20.980	0.125	7
	846.6	23.74	-0.35	21.240	0.133	7
HSUPA Subtest 1	826.4	23.13	-0.35	20.630	0.116	7
	836.6	23.19	-0.35	20.690	0.117	7
	846.6	23.46	-0.35	20.960	0.125	7
HSUPA Subtest 2	826.4	23.08	-0.35	20.580	0.114	7
	836.6	23.11	-0.35	20.610	0.115	7
	846.6	23.19	-0.35	20.690	0.117	7
HSUPA Subtest 3	826.4	23.03	-0.35	20.530	0.113	7
	836.6	23.07	-0.35	20.570	0.114	7
	846.6	23.14	-0.35	20.640	0.116	7
HSUPA Subtest 4	826.4	23.02	-0.35	20.520	0.113	7
	836.6	23.08	-0.35	20.580	0.114	7
	846.6	23.20	-0.35	20.700	0.117	7
HSUPA Subtest 5	826.4	22.98	-0.35	20.480	0.112	7
	836.6	23.05	-0.35	20.550	0.114	7
	846.6	23.13	-0.35	20.630	0.116	7
HSDPA Subtest 1	826.4	22.68	-0.35	20.180	0.104	7
	836.6	22.75	-0.35	20.250	0.106	7
	846.6	22.86	-0.35	20.360	0.109	7
HSDPA Subtest 2	826.4	22.48	-0.35	19.980	0.100	7
	836.6	22.53	-0.35	20.030	0.101	7
	846.6	22.71	-0.35	20.210	0.105	7
HSDPA Subtest 3	826.4	20.16	-0.35	17.660	0.058	7
	836.6	20.21	-0.35	17.710	0.059	7
	846.6	20.53	-0.35	18.030	0.064	7
HSDPA Subtest 4	826.4	20.05	-0.35	17.550	0.057	7
	836.6	20.13	-0.35	17.630	0.058	7
	846.6	20.42	-0.35	17.920	0.062	7

Note:

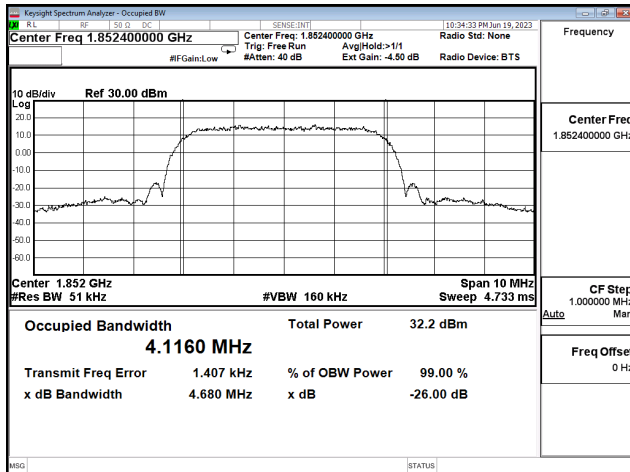
1. EIRP (dBm) = Conducted Output Power (dBm) + Antenna Gain (dBi)
2. EIRP (W) = $(10^{(\text{Power}(\text{dBm})/10)}) * 10^{-3}$

Appendix B. Test Result of Occupied Bandwidth

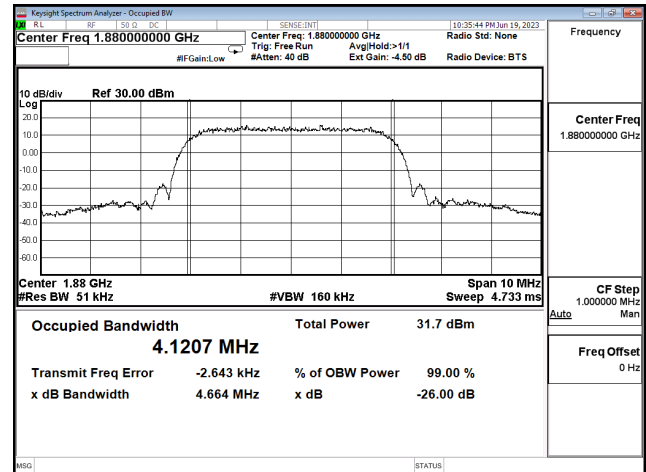
WCDMA Band 2					
Modulation	Channel	Frequency (MHz)	Measure Level (MHz)		Limit (MHz)
			26dB BW	99% OBW	
RMC	9262	1852.4	4.680	4.116	N/A
	9400	1880.0	4.664	4.121	N/A
	9538	1907.6	4.650	4.109	N/A

WCDMA Band 5					
Modulation	Channel	Frequency (MHz)	Measure Level (MHz)		Limit (MHz)
			26dB BW	99% OBW	
RMC	4132	826.4	4.667	4.129	N/A
	4183	836.6	4.680	4.126	N/A
	4233	846.6	4.670	4.121	N/A

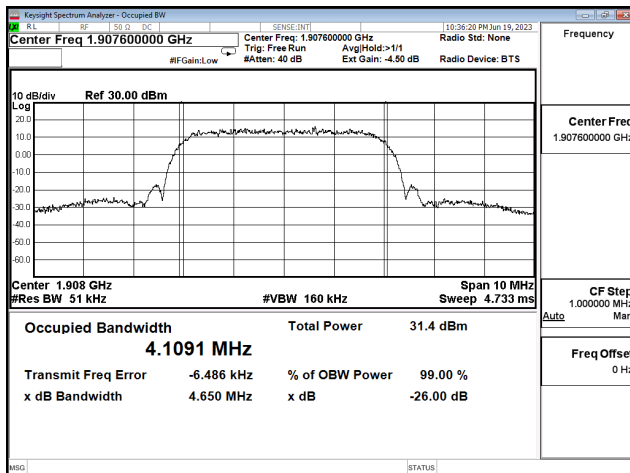
WCDMA Band 2 / RMC / CH9262



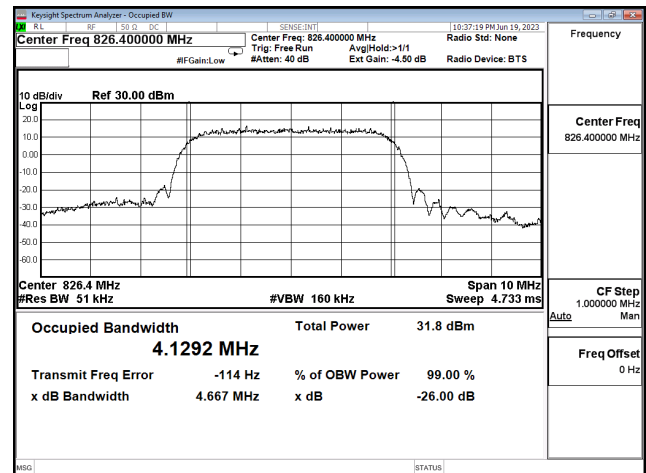
WCDMA Band 2 / RMC / CH9400



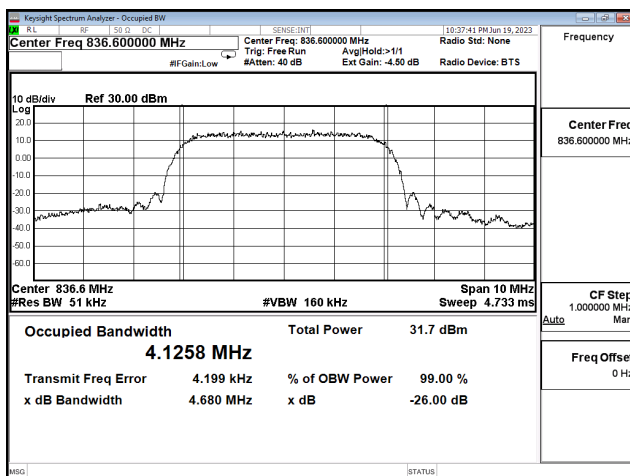
WCDMA Band 2 / RMC / CH9538



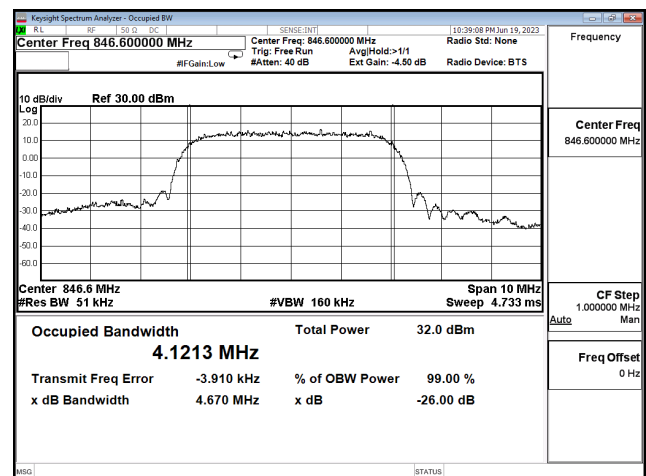
WCDMA Band 5 / RMC / CH4132



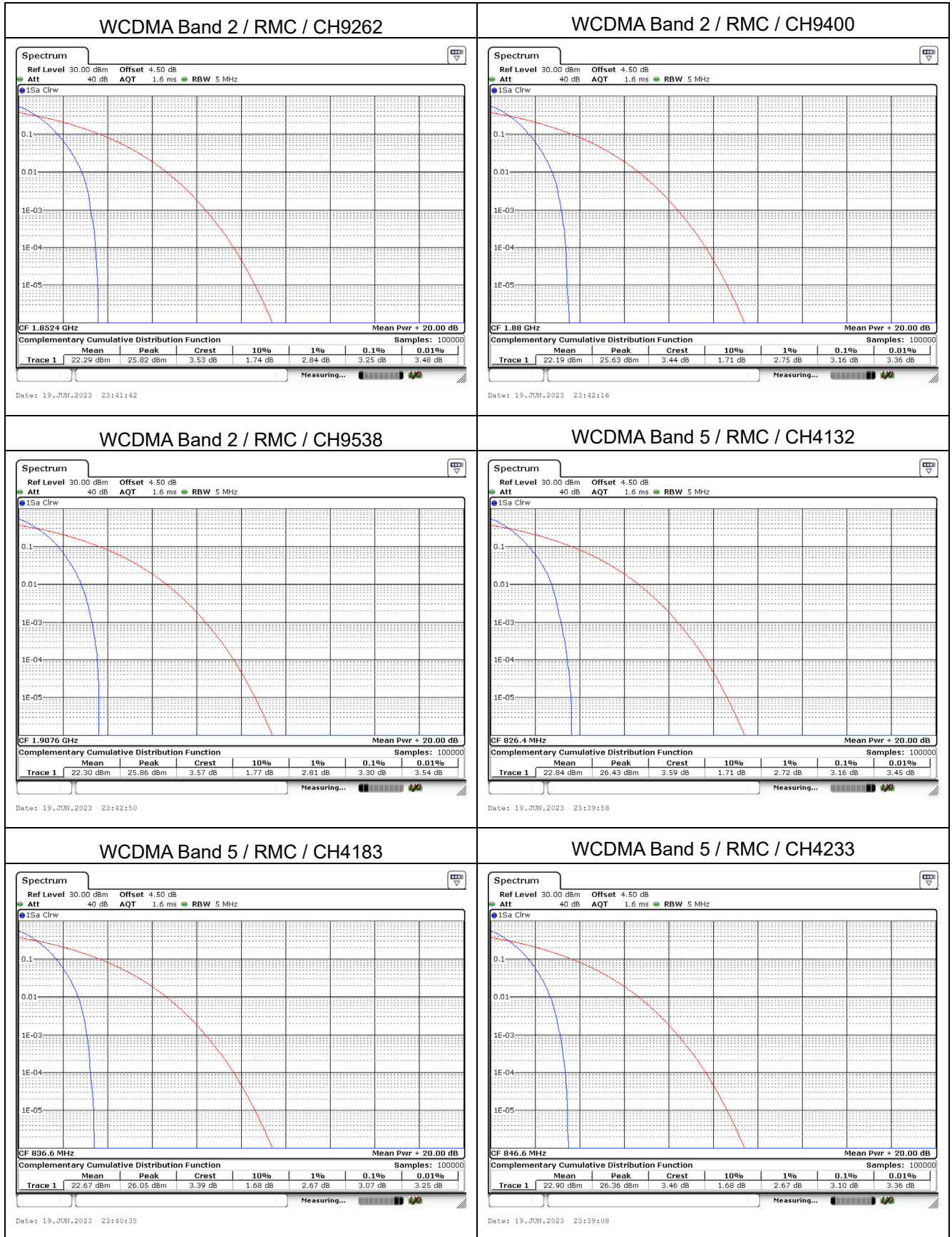
WCDMA Band 5 / RMC / CH4183



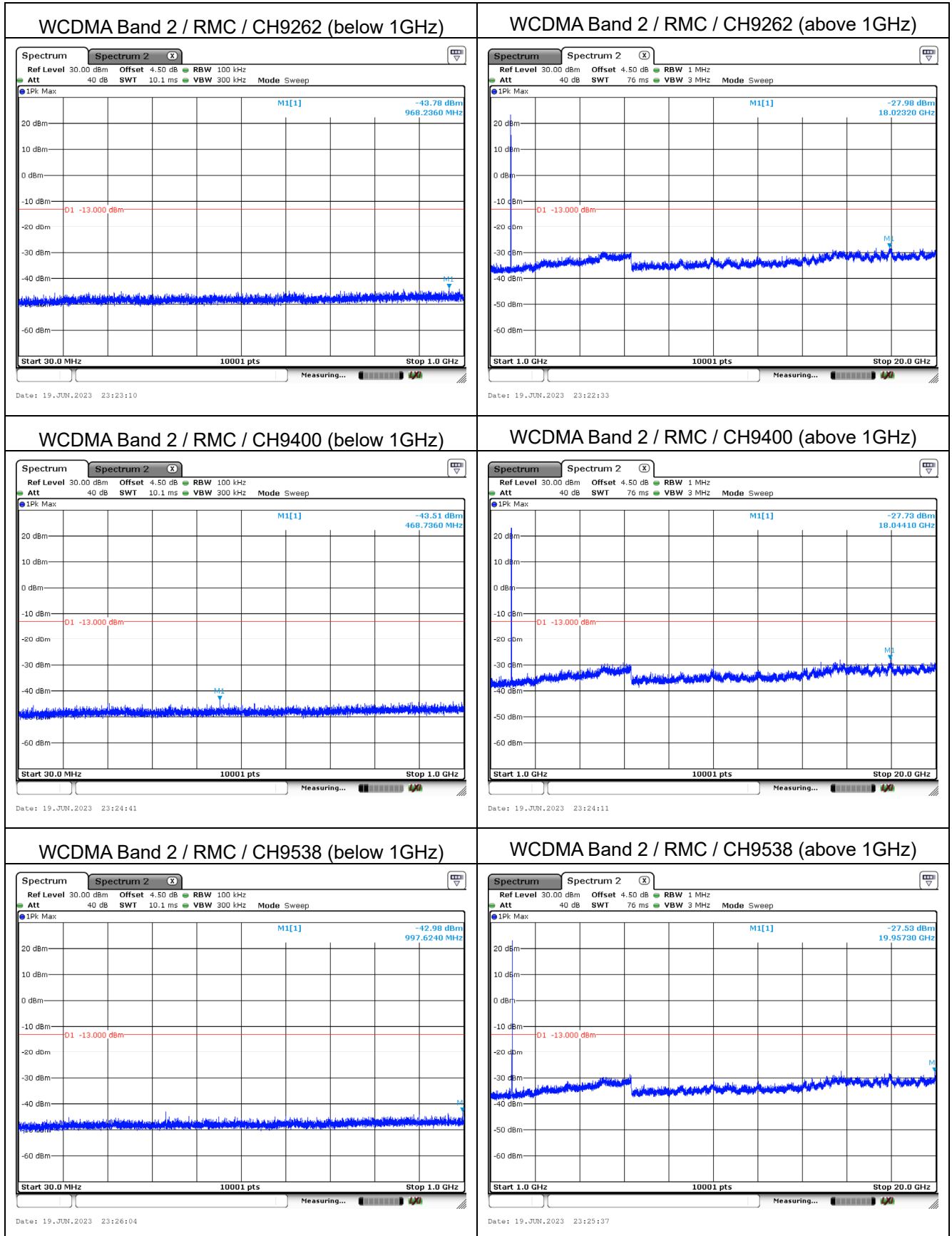
WCDMA Band 5 / RMC / CH4233



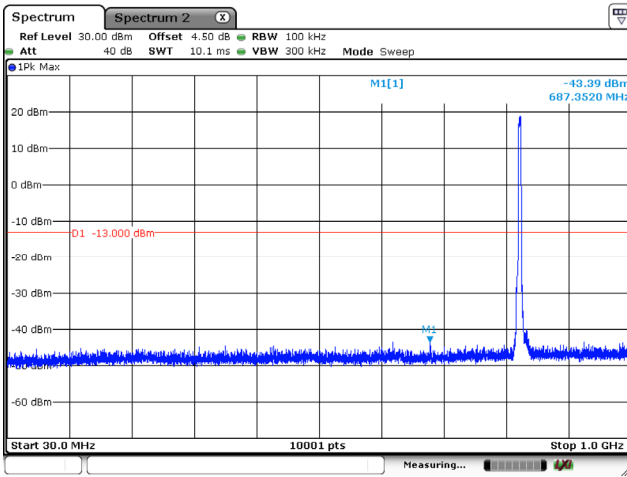
Appendix C. Test Result of Peak to Average Power Ratio



Appendix D.1 Test Result of Conducted Spurious Emission

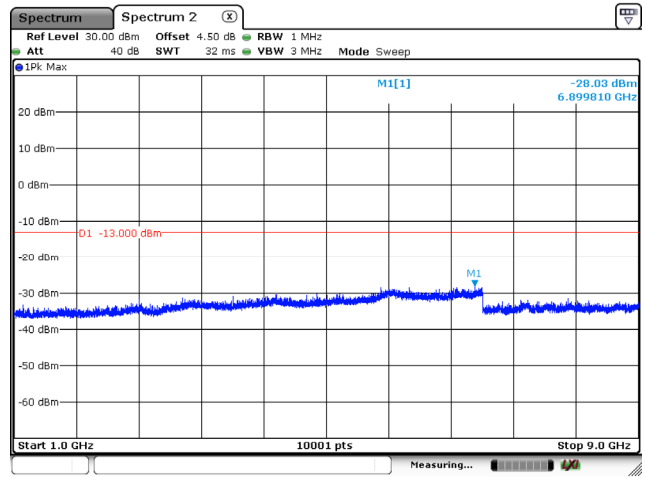


WCDMA Band 5 / RMC / CH4132 (below 1GHz)



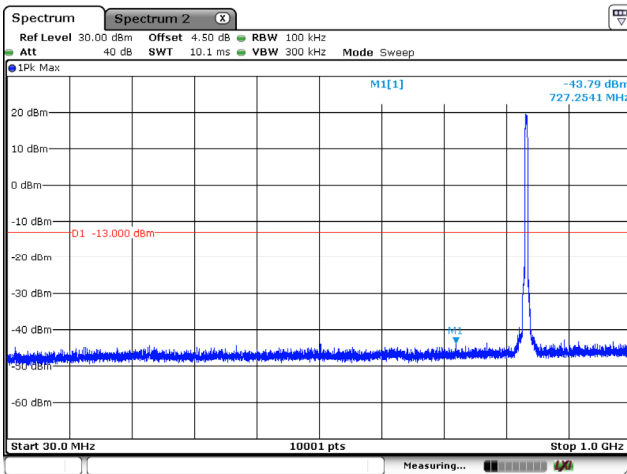
Date: 19.JUN.2023 23:12:01

WCDMA Band 5 / RMC / CH4132 (above 1GHz)



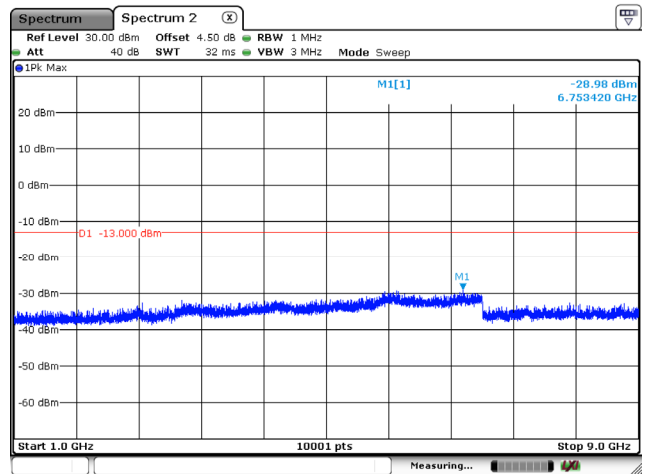
Date: 19.JUN.2023 23:09:53

WCDMA Band 5 / RMC / CH4183 (below 1GHz)



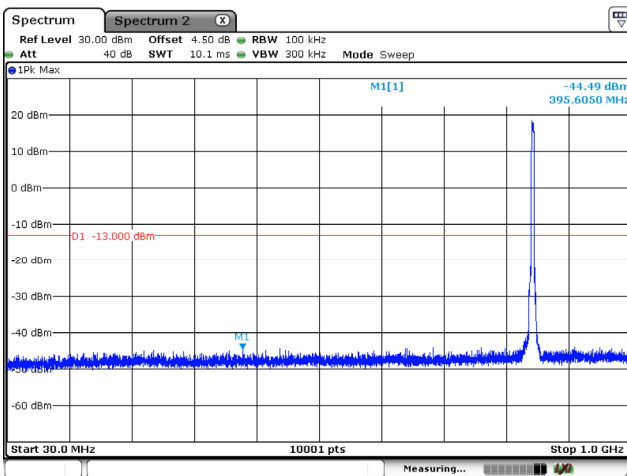
Date: 19.JUN.2023 23:11:05

WCDMA Band 5 / RMC / CH4183 (above 1GHz)



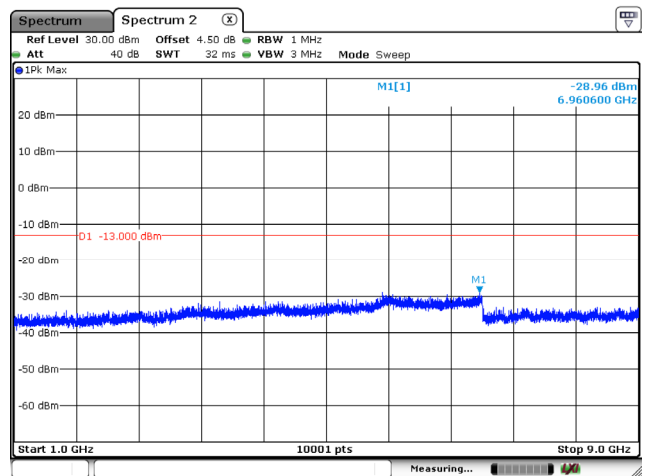
Date: 19.JUN.2023 23:12:18

WCDMA Band 5 / RMC / CH4233 (below 1GHz)



Date: 19.JUN.2023 23:13:05

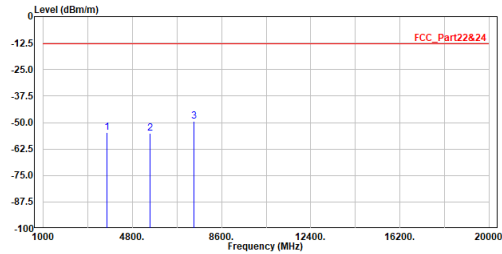
WCDMA Band 5 / RMC / CH4233 (above 1GHz)



Date: 19.JUN.2023 23:13:28

Appendix D.2 Test Result of Radiated Spurious Emission

Site :HC-CB04
 Condition :3m Horizontal
 Mode :WCDMA_B2_CH9262
 Test By :Cyril

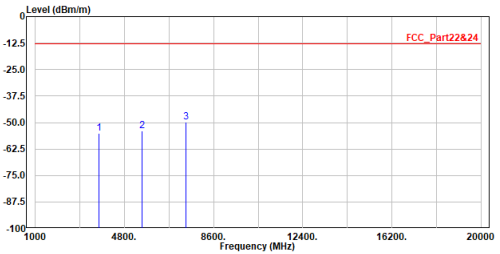


No.	Frequency MHz	Level dBm	Limit Line dBm	Over Limit dB	Read Level dBm	Factor dB	Remark
1	3704.800	-54.68	-13.00	-41.68	-45.71	-8.97	Peak
2	5557.200	-55.04	-13.00	-42.04	-49.63	-5.41	Peak
3	7409.600	-49.43	-13.00	-36.43	-48.71	-0.72	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuV/m) to EIRP (dBm)
 $= 107 + 20\log(3) - 104.8 = 11.8 \text{ dB}$
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.

Site :HC-CB04
 Condition :3m Vertical
 Mode :WCDMA_B2_CH9262
 Test By :Cyril

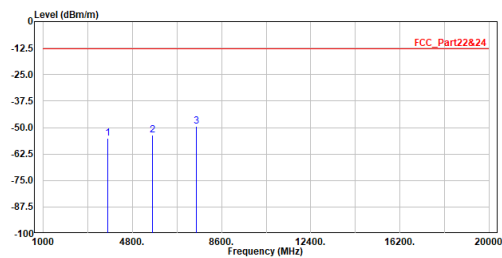


No.	Frequency MHz	Level dBm	Limit Line dBm	Over Limit dB	Read Level dBm	Factor dB	Remark
1	3704.800	-55.04	-13.00	-42.04	-46.07	-8.97	Peak
2	5557.200	-53.85	-13.00	-40.85	-48.44	-5.41	Peak
3	7409.600	-49.90	-13.00	-36.90	-49.18	-0.72	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuV/m) to EIRP (dBm)
 $= 107 + 20\log(3) - 104.8 = 11.8 \text{ dB}$
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.

Site :HC-CB04
 Condition :3m Horizontal
 Mode :WCDMA_B2_CH9400
 Test By :Cyril

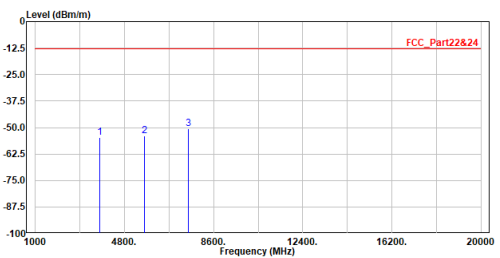


No.	Frequency MHz	Level dBm	Limit Line dBm	Over Limit dB	Read Level dBm	Factor dB	Remark
1	3760.000	-55.13	-13.00	-42.13	-46.41	-8.72	Peak
2	5640.000	-53.63	-13.00	-40.63	-48.43	-5.20	Peak
3	7520.000	-49.57	-13.00	-36.57	-49.00	-0.57	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuV/m) to EIRP (dBm)
 $= 107 + 20\log(3) - 104.8 = 11.8 \text{ dB}$
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.

Site :HC-CB04
 Condition :3m Vertical
 Mode :WCDMA_B2_CH9400
 Test By :Cyril

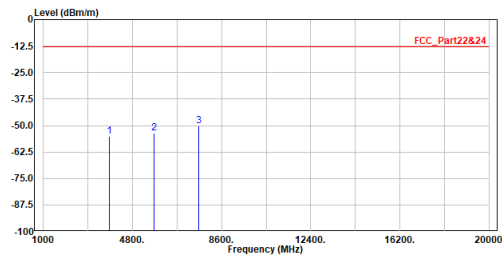


No.	Frequency MHz	Level dBm	Limit Line dBm	Over Limit dB	Read Level dBm	Factor dB	Remark
1	3760.000	-54.58	-13.00	-41.58	-45.86	-8.72	Peak
2	5640.000	-53.95	-13.00	-40.95	-48.75	-5.20	Peak
3	7520.000	-50.44	-13.00	-37.44	-49.87	-0.57	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuV/m) to EIRP (dBm)
 $= 107 + 20\log(3) - 104.8 = 11.8 \text{ dB}$
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.

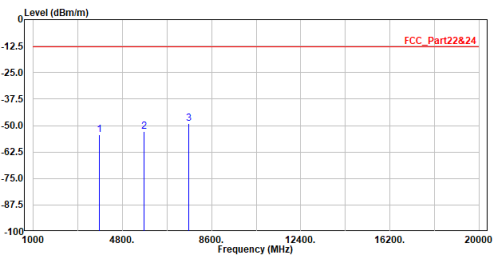
Site :HC-CB04
 Condition :3m Horizontal
 Mode :WCDMA_B2_CH9538
 Test By :Cyril



No.	Frequency MHz	Level dBm	Limit Line dBm	Over Limit dB	Read Level dBm	Factor dB	Remark
1	3815.200	-55.17	-13.00	-42.17	-46.68	-8.49	Peak
2	5722.800	-53.46	-13.00	-40.46	-48.47	-4.99	Peak
3	7630.400	-50.28	-13.00	-37.28	-49.75	-0.53	Peak

Note:
 1. Level = Read Level + Factor
 2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
 3. Over Limit = Level - Limit Line
 4. Aux Factor = Convert E (dBuV/m) to EIRP (dBm)
 = 107 + 20log(3) - 104.8 = 11.8 dB
 5. The other emission levels were very low against the limit.
 6. The emission under 1GHz was not included since the emission levels are very low against the limit.

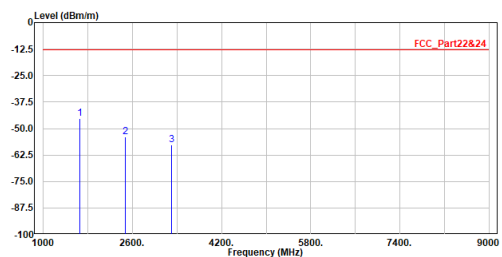
Site :HC-CB04
 Condition :3m Vertical
 Mode :WCDMA_B2_CH9538
 Test By :Cyril



No.	Frequency MHz	Level dBm	Limit Line dBm	Over Limit dB	Read Level dBm	Factor dB	Remark
1	3815.200	-54.31	-13.00	-41.31	-45.82	-8.49	Peak
2	5722.800	-52.97	-13.00	-39.97	-47.98	-4.99	Peak
3	7630.400	-49.18	-13.00	-36.18	-48.65	-0.53	Peak

Note:
 1. Level = Read Level + Factor
 2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
 3. Over Limit = Level - Limit Line
 4. Aux Factor = Convert E (dBuV/m) to EIRP (dBm)
 = 107 + 20log(3) - 104.8 = 11.8 dB
 5. The other emission levels were very low against the limit.
 6. The emission under 1GHz was not included since the emission levels are very low against the limit.

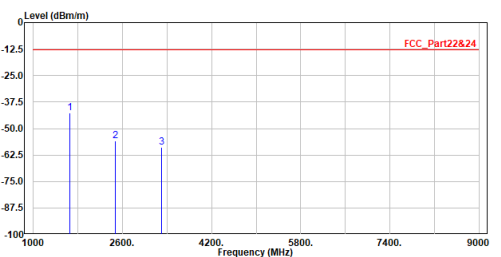
Site :HC-CB04
 Condition :3m Horizontal
 Mode :WCDMA_B5_CH4132
 Test By :Cyril



No.	Frequency MHz	Level dBm	Limit Line dBm	Over Limit dB	Read Level dBm	Factor dB	Remark
1	1652.800	-45.21	-13.00	-32.21	-30.80	-14.41	Peak
2	2479.200	-53.92	-13.00	-40.92	-41.89	-12.03	Peak
3	3305.600	-57.66	-13.00	-44.66	-47.53	-10.13	Peak

Note:
 1. Level = Read Level + Factor
 2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
 3. Over Limit = Level - Limit Line
 4. Aux Factor = Convert E (dBuV/m) to EIRP (dBm)
 = 107 + 20log(3) - 104.8 = 11.8 dB
 5. The other emission levels were very low against the limit.
 6. The emission under 1GHz was not included since the emission levels are very low against the limit.

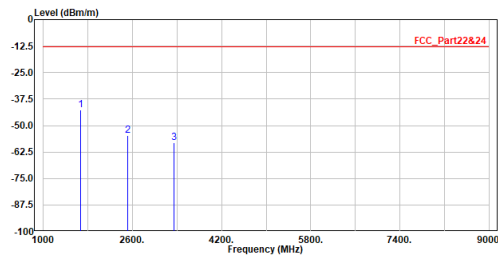
Site :HC-CB04
 Condition :3m Vertical
 Mode :WCDMA_B5_CH4132
 Test By :Cyril



No.	Frequency MHz	Level dBm	Limit Line dBm	Over Limit dB	Read Level dBm	Factor dB	Remark
1	1652.800	-42.63	-13.00	-29.63	-28.22	-14.41	Peak
2	2479.200	-55.98	-13.00	-42.98	-43.95	-12.03	Peak
3	3305.600	-58.84	-13.00	-45.84	-48.71	-10.13	Peak

Note:
 1. Level = Read Level + Factor
 2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
 3. Over Limit = Level - Limit Line
 4. Aux Factor = Convert E (dBuV/m) to EIRP (dBm)
 = 107 + 20log(3) - 104.8 = 11.8 dB
 5. The other emission levels were very low against the limit.
 6. The emission under 1GHz was not included since the emission levels are very low against the limit.

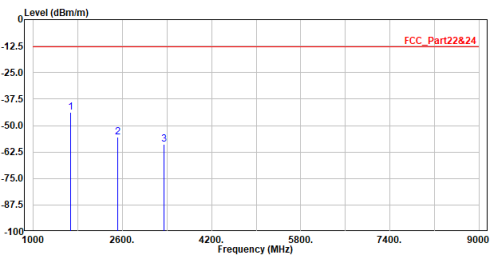
Site :HC-CB04
 Condition :3m Horizontal
 Mode :WCDMA_B5_CH4183
 Test By :Cyril



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	1673.200	-42.65	-13.00	-29.65	-28.31	-14.34	Peak
2	2509.800	-54.78	-13.00	-41.78	-42.83	-11.95	Peak
3	3346.400	-58.27	-13.00	-45.27	-48.20	-10.07	Peak

Note:
 1. Level = Read Level + Factor
 2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
 3. Over Limit = Level - Limit Line
 4. Aux Factor = Convert E (dBuV/m) to EIRP (dBm)
 = 107 + 20log(3) - 104.8 = 11.8 dB
 5. The other emission levels were very low against the limit.
 6. The emission under 1GHz was not included since the emission levels are very low against the limit.

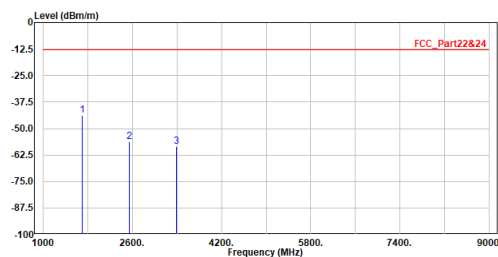
Site :HC-CB04
 Condition :3m Vertical
 Mode :WCDMA_B5_CH4183
 Test By :Cyril



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	1673.200	-43.88	-13.00	-30.88	-29.54	-14.34	Peak
2	2509.800	-55.29	-13.00	-42.29	-43.34	-11.95	Peak
3	3346.400	-58.76	-13.00	-45.76	-48.69	-10.07	Peak

Note:
 1. Level = Read Level + Factor
 2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
 3. Over Limit = Level - Limit Line
 4. Aux Factor = Convert E (dBuV/m) to EIRP (dBm)
 = 107 + 20log(3) - 104.8 = 11.8 dB
 5. The other emission levels were very low against the limit.
 6. The emission under 1GHz was not included since the emission levels are very low against the limit.

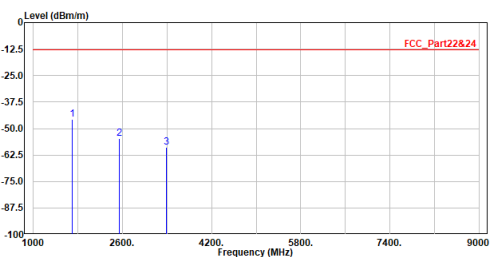
Site :HC-CB04
 Condition :3m Horizontal
 Mode :WCDMA_B5_CH4233
 Test By :Cyril



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	1693.200	-43.65	-13.00	-30.65	-29.39	-14.26	Peak
2	2539.800	-56.16	-13.00	-43.16	-44.30	-11.86	Peak
3	3386.400	-58.44	-13.00	-45.44	-48.41	-10.03	Peak

Note:
 1. Level = Read Level + Factor
 2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
 3. Over Limit = Level - Limit Line
 4. Aux Factor = Convert E (dBuV/m) to EIRP (dBm)
 = 107 + 20log(3) - 104.8 = 11.8 dB
 5. The other emission levels were very low against the limit.
 6. The emission under 1GHz was not included since the emission levels are very low against the limit.

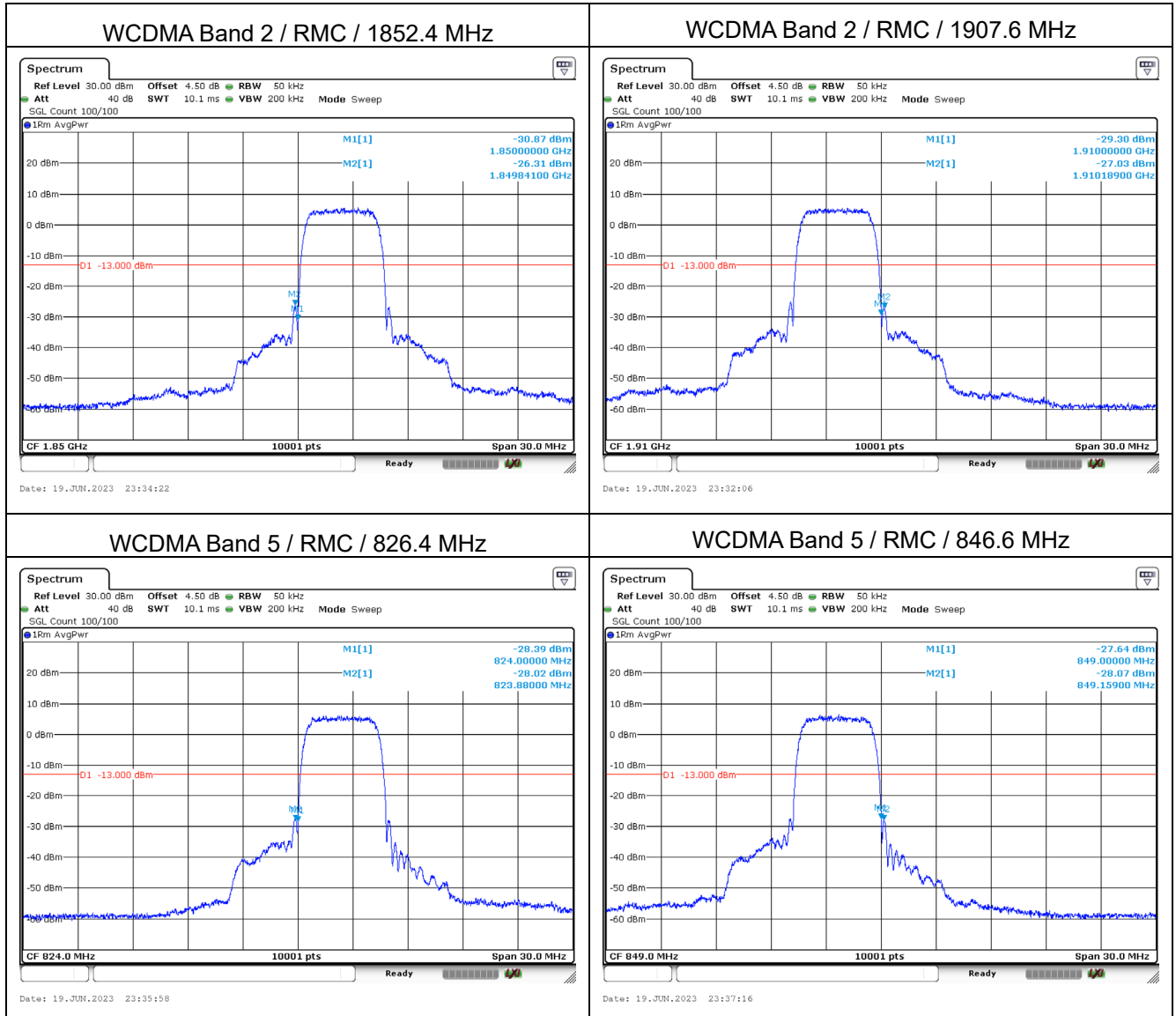
Site :HC-CB04
 Condition :3m Vertical
 Mode :WCDMA_B5_CH4233
 Test By :Cyril



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	1693.200	-45.71	-13.00	-32.71	-31.45	-14.26	Peak
2	2539.800	-54.75	-13.00	-41.75	-42.89	-11.86	Peak
3	3386.400	-58.86	-13.00	-45.86	-48.83	-10.03	Peak

Note:
 1. Level = Read Level + Factor
 2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
 3. Over Limit = Level - Limit Line
 4. Aux Factor = Convert E (dBuV/m) to EIRP (dBm)
 = 107 + 20log(3) - 104.8 = 11.8 dB
 5. The other emission levels were very low against the limit.
 6. The emission under 1GHz was not included since the emission levels are very low against the limit.

Appendix E. Test Result of Conducted Band Edge



Appendix F. Test Result of Frequency Stability

WCDMA Band 2 / 1852.4 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
27.60	1.94	0.0010
14.20	2.41	0.0013
10.20	2.67	0.0014

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-40	1.66	0.0009
-30	1.59	0.0009
-20	2.00	0.0011
-10	2.89	0.0016
0	2.56	0.0014
10	2.39	0.0013
20	2.14	0.0012
30	2.92	0.0016
40	1.66	0.0009
50	2.01	0.0011
60	1.13	0.0006
70	1.75	0.0009
85	2.45	0.0013

WCDMA Band 2 / 1880 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
27.60	1.87	0.0010
14.20	2.22	0.0012
10.20	0.9	0.0005

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-40	1.81	0.0010
-30	1.40	0.0007
-20	1.90	0.0010
-10	0.99	0.0005
0	2.24	0.0012
10	2.75	0.0015
20	1.85	0.0010
30	2.74	0.0015
40	1.87	0.0010
50	1.46	0.0008
60	1.68	0.0009
70	1.75	0.0009
85	2.18	0.0012

WCDMA Band 2 / 1907.6 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
27.60	1.46	0.0008
14.20	1.69	0.0009
10.20	1.09	0.0006

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-40	0.46	0.0002
-30	0.70	0.0004
-20	0.88	0.0005
-10	0.74	0.0004
0	0.93	0.0005
10	1.11	0.0006
20	0.96	0.0005
30	1.18	0.0006
40	1.45	0.0008
50	0.78	0.0004
60	1.16	0.0006
70	0.61	0.0003
85	1.11	0.0006

WCDMA Band 5 / 826.4 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
27.60	3.38	0.00409
14.20	3.04	0.00368
10.20	2.64	0.00319

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-40	2.59	0.0031
-30	2.85	0.0034
-20	2.26	0.0027
-10	3.01	0.0036
0	2.63	0.0032
10	3.07	0.0037
20	2.15	0.0026
30	2.05	0.0025
40	3.53	0.0043
50	1.52	0.0018
60	1.83	0.0022
70	2.30	0.0028
85	1.96	0.0024

WCDMA Band 5 / 835 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
27.60	2.44	0.0029
14.20	2.78	0.0033
10.20	2.70	0.0032

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-40	2.09	0.0025
-30	2.03	0.0024
-20	2.39	0.0029
-10	1.64	0.0020
0	2.98	0.0036
10	1.40	0.0017
20	2.82	0.0034
30	2.32	0.0028
40	1.19	0.0014
50	3.71	0.0044
60	2.72	0.0033
70	2.06	0.0025
85	2.68	0.0032

WCDMA Band 5 / 837.6 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
27.60	3.77	0.0045
14.20	3.24	0.0039
10.20	2.79	0.0033

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-40	3.13	0.0037
-30	2.48	0.0030
-20	2.98	0.0036
-10	2.88	0.0034
0	2.37	0.0028
10	2.37	0.0028
20	2.72	0.0032
30	3.46	0.0041
40	2.24	0.0027
50	3.58	0.0043
60	2.30	0.0027
70	3.40	0.0041
85	3.37	0.0040