

Partial FCC Test Report

(PART 27)

Report No.: RFBBGM-WTW-P22090842-6

FCC ID: WIYSLM758A

Test Model: SLM758

Received Date: Sep. 26, 2022

Test Date: Oct. 18, 2022

Issued Date: Nov. 18, 2022

Applicant: CASTLES TECHNOLOGY CO., LTD.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

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33383, Taiwan

**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RFBBGM-WTW-P22090842-6	Original Release	Nov. 18, 2022

1 Certificate of Conformity

Product: Smart module

Brand:  CASTLES
TECHNOLOGY

Test Model: SLM758

Sample Status: Identical Prototype

Applicant: CASTLES TECHNOLOGY CO., LTD.

Test Date: Oct. 18, 2022

Standards: FCC Part 27, Subpart C, H, F, L

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Vera Huang, **Date:** Nov. 18, 2022
Vera Huang / Specialist

Approved by : Jeremy Lin, **Date:** Nov. 18, 2022
Jeremy Lin / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2							
FCC Clause					Test Item	Result	Remarks
WCDMA B4 / LTE B4	LTE B12	LTE B13	LTE B17	LTE B7			
2.1046 27.50 (d)(4)	2.1046 27.50 (c)	2.1046 27.50 (b)	2.1046 27.50 (c)	2.1046 27.50 (h)(2)	Equivalent Isotropically Radiated Power / Equivalent Radiated Power	Pass	Meet the requirement of limit.
2.1047	2.1047	2.1047	2.1047	2.1047	Modulation characteristics	N/A	Refer to Note
27.50 (d)(5)	----	----	----	----	Peak To Average Ratio	N/A	Refer to Note
2.1055 27.54	2.1055 27.54	2.1055 27.54	2.1055 27.54	2.1055 27.54	Frequency Stability	N/A	Refer to Note
2.1049	2.1049	2.1049	2.1049	2.1049	Emission Bandwidth	N/A	Refer to Note
2.1051 27.53 (h)	2.1051 27.53 (g)	2.1051 27.53 (c)	2.1051 27.53 (g)	2.1051 27.53 (m)(4)(6)	Out of Band Emission Measurements	N/A	Refer to Note
2.1051 27.53 (h)	2.1051 27.53 (g)	2.1051 27.53 (c)(f)	2.1051 27.53 (g)	2.1051 27.53 (m)(4)(6)	Conducted Spurious Emissions	N/A	Refer to Note
2.1053 27.53 (h)	2.1053 27.53 (g)	2.1053 27.53 (c)(f)	2.1053 27.53 (g)	2.1053 27.53 (m)(4)(6)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -20.60 dB at 5020.00 MHz.

Note:

1. This report is a partial report. Therefore, only test item of Equivalent Isotropically Radiated Power / Equivalent Radiated Power and Radiated Spurious Emissions tests were performed for this report. Other testing data please refer to Sporton lab report no.: FG970101A (for WCDMA) and FG970101B (for LTE).
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.86 dB
	200MHz ~1000MHz	3.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESR3	102579	2022/07/01	2023/06/30
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	2022/04/11	2023/04/10
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	2021/10/29	2022/10/28
HORN Antenna SCHWARZBECK	9120D	209	2021/11/14	2022/11/13
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	2021/11/14	2022/11/13
Loop Antenna TESEQ	HLA 6121	45745	2022/07/27	2023/07/26
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	2022/07/09	2023/07/08
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	2022/03/19	2023/03/18
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH3-01	2022/05/14	2023/05/13
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	2022/07/09	2023/07/08
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104- SM-SM-8000	Cable-CH3-03 (309224+170907)	2022/07/09	2023/07/08
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Radio Communication Analyzer Anritsu	MT8821C	6261806803	Feb. 16, 2022	Feb. 15, 2023

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 3.

3 General Information

3.1 General Description of EUT

Product	Smart module	
Brand		
Test Model	SLM758	
Status of EUT	Identical Prototype	
Power Supply Rating	5.0 Vdc (host equipment)	
Modulation Type	WCDMA	BPSK (Uplink)
	HSDPA/DC-HSDPA	QPSK (Uplink)
	HSUPA	QPSK (Uplink)
	HSPA+	16QAM (16QAM Uplink is not supported)
	DC-HSDPA	64QAM
	LTE	QPSK, 16QAM
Frequency Range	WCDMA Band 4	1712.4 ~ 1752.6 MHz
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	1710.7 ~ 1754.3 MHz
	LTE Band 4 (Channel Bandwidth: 3 MHz)	1711.5 ~ 1753.5 MHz
	LTE Band 4 (Channel Bandwidth: 5 MHz)	1712.5 ~ 1752.5 MHz
	LTE Band 4 (Channel Bandwidth: 10 MHz)	1715.0 ~ 1750.0 MHz
	LTE Band 4 (Channel Bandwidth: 15 MHz)	1717.5 ~ 1747.5 MHz
	LTE Band 4 (Channel Bandwidth: 20 MHz)	1720.0 ~ 1745.0 MHz
	LTE Band 7 (Channel Bandwidth: 5 MHz)	2502.5 ~ 2567.5 MHz
	LTE Band 7 (Channel Bandwidth: 10 MHz)	2505 ~ 2565 MHz
	LTE Band 7 (Channel Bandwidth: 15 MHz)	2507.5 ~ 2562.5 MHz
	LTE Band 7 (Channel Bandwidth: 20 MHz)	2510 ~ 2560 MHz
	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	699.7 ~ 715.3 MHz
	LTE Band 12 (Channel Bandwidth: 3 MHz)	700.5 ~ 714.5 MHz
	LTE Band 12 (Channel Bandwidth: 5 MHz)	701.5 ~ 713.5 MHz
	LTE Band 12 (Channel Bandwidth: 10 MHz)	704.0 ~ 711.0 MHz
	LTE Band 13 (Channel Bandwidth: 5 MHz)	779.5 ~ 784.5 MHz
	LTE Band 13 (Channel Bandwidth: 10 MHz)	782.0 MHz
	LTE Band 17 (Channel Bandwidth: 5 MHz)	706.5 ~ 713.5 MHz
	LTE Band 17 (Channel Bandwidth: 10 MHz)	709.0 ~ 711.0 MHz

Max. ERP Power		QPSK	16QAM
	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	73.722 mW (18.676dBm)	54.275 mW (17.346dBm)
	LTE Band 12 (Channel Bandwidth: 3 MHz)	76.138 mW (18.816dBm)	54.903 mW (17.396dBm)
	LTE Band 12 (Channel Bandwidth: 5 MHz)	76.666 mW (18.846dBm)	56.053 mW (17.486dBm)
	LTE Band 12 (Channel Bandwidth: 10 MHz)	78.271 mW (18.936dBm)	57.095 mW (17.566dBm)
	LTE Band 13 (Channel Bandwidth: 5 MHz)	94.167 mW (19.739dBm)	69.647 mW (18.429dBm)
	LTE Band 13 (Channel Bandwidth: 10 MHz)	96.361 mW (19.839dBm)	72.260 mW (18.589dBm)
	LTE Band 17 (Channel Bandwidth: 5 MHz)	69.599 mW (18.426dBm)	55.667 mW (17.456dBm)
	LTE Band 17 (Channel Bandwidth: 10 MHz)	77.019 mW (18.866dBm)	53.530 mW (17.286dBm)
Max. EIRP Power	WCDMA Band 4	28.933 mW (14.614dBm)	
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	35.270 mW (15.474dBm)	27.127 mW (14.334dBm)
	LTE Band 4 (Channel Bandwidth: 3 MHz)	35.596 mW (15.514dBm)	27.252 mW (14.354dBm)
	LTE Band 4 (Channel Bandwidth: 5 MHz)	35.351 mW (15.484dBm)	27.568 mW (14.404dBm)
	LTE Band 4 (Channel Bandwidth: 10 MHz)	35.760 mW (15.534dBm)	27.378 mW (14.374dBm)
	LTE Band 4 (Channel Bandwidth: 15 MHz)	36.174 mW (15.584dBm)	27.127 mW (14.334dBm)
	LTE Band 4 (Channel Bandwidth: 20 MHz)	36.341 mW (15.604dBm)	27.631 mW (14.414dBm)
	LTE Band 7 (Channel Bandwidth: 5 MHz)	304.229 mW (24.832dBm)	218.877 mW (23.402dBm)
	LTE Band 7 (Channel Bandwidth: 10 MHz)	304.930 mW (24.842dBm)	219.381 mW (23.412dBm)
	LTE Band 7 (Channel Bandwidth: 15 MHz)	306.337 mW (24.862dBm)	217.370 mW (23.372dBm)
	LTE Band 7 (Channel Bandwidth: 20 MHz)	313.473 mW (24.962dBm)	226.048 mW (23.542dBm)
Antenna Type	Refer to Note as below		
Accessory Device	Refer to Note as below		
Data Cable Supplied	Refer to Note as below		

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report of Sporton lab report no.: FG970101A (for WCDMA) and FG970101B (for LTE). The differences from the original report are adding an End-product (POS Terminal (Brand:  CASTLES TECHNOLOGY, Model: S1E2)), changing antenna type & gain, and disable BLE, UNII-2A, UNII-2C function via software. Therefore, only Equivalent Isotropically Radiated Power / Effective Radiated Power and Radiated Spurious Emissions tests were verified and recorded in this report. Other testing data please refer to the original Sporton lab report no.: FG970101A (for WCDMA) and FG970101B (for LTE).
2. The EUT was installed in POS Terminal (Brand:  CASTLES TECHNOLOGY, Model: S1E2).
3. The POS Terminal contains following accessory devices.

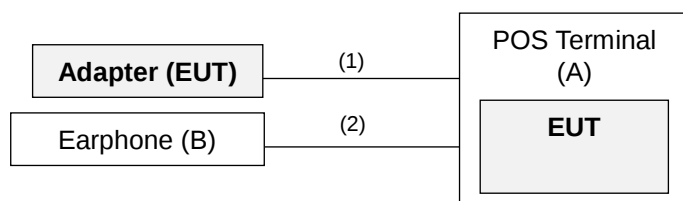
Product	Brand	Model	Description
Adapter	 CASTLES TECHNOLOGY	1A52-UB52A	I/P: 100-240 Vac, 50-60 Hz, 0.3 A O/P: 5 Vdc, 2 A
Battery	 CASTLES TECHNOLOGY	S1E	3.75 Vdc
USB Cable	N/A	N/A	2m shielded cable w/o core

4. The antenna information of POS Terminal is listed as below.

Ant. Type	PIFA antenna									
Band	WCDMA			LTE						
	II	IV	V	2	4	5	7	12	13	17
Gain (dBi)	0.077	-6.906	-0.985	0.077	-6.906	-0.985	2.622	-1.054	-0.031	-1.054

5. Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.
6. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or User's Manual.
7. BT & WWAN & NFC (FCC ID: WIYS1E2001) technology can transmit at same time.
8. WLAN 2.4G & WWAN & NFC (FCC ID: WIYS1E2001) technology can transmit at same time.
9. WLAN 5G & WWAN & NFC (FCC ID: WIYS1E2001) technology can transmit at same time.

3.2 Configuration of System under Test



Remote site



Radio Communication
Analyzer (C)

3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
A	POS Terminal	 CASTLES TECHNOLOGY	S1E2	N/A	N/A
B	Earphone	APPLE	MB77PFEB	N/A	N/A
C	Radio Communication Analyzer	Anritsu	MT8821C	6261806803	N/A

Note: Items C acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable	1	2	Y	0	Provided by client
2.	Audio Cable	1	1.2	N	0	Provided by Lab

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, and antenna ports. The worst case was found when positioned on X-plane. Following channel(s) was (were) selected for the final test as listed below.

WCDMA Band 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	EIRP	1312 to 1513	1312, 1413, 1513	WCDMA, HSDPA, HSUPA
-	Radiated Emission	1312 to 1513	1413	WCDMA

LTE Band 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	RB #
-	EIRP	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM	1 Half Full
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	1 Half Full
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	1 Half Full
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM	1 Half Full
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM	1 Half Full
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM	1 Half Full
-	Radiated Emission	20050 to 20300	20050	20 MHz	QPSK	1

LTE Band 7

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	RB #
-	EIRP	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK, 16QAM	1 Half Full
		20800 to 21400	20800, 21100, 21400	10 MHz	QPSK, 16QAM	1 Half Full
		20825 to 21375	20825, 21100, 21375	15 MHz	QPSK, 16QAM	1 Half Full
		20850 to 21350	20850, 21100, 21350	20 MHz	QPSK, 16QAM	1 Half Full
-	Radiated Emission	20850 to 21350	20850	20 MHz	QPSK	1

LTE Band 12

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	RB #
-	ERP	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	1 Half Full
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM	1 Half Full
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM	1 Half Full
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM	1 Half Full

LTE Band 13

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	RB #
-	ERP	23205 to 23255	23205, 23230, 23255	5 MHz	QPSK, 16QAM	1 Half Full
		23230	23230	10 MHz	QPSK, 16QAM	1 Half Full

LTE Band 17

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	RB #
-	ERP	23755 to 23825	23755, 23790, 23825	5 MHz	QPSK, 16QAM	1 Half Full
		23780 to 23800	23780, 23790, 23800	10 MHz	QPSK, 16QAM	1 Half Full

Note: For radiated emissions, select the worst radiated emission channel for final testing.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP / EIRP	25 deg. C, 65 % RH	120 Vac, 60 Hz	Wayne Lin
Radiated Emission	23 deg. C, 67 % RH	120 Vac, 60 Hz	Adair Peng

3.4 EUT Operating Conditions

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

3.5 General Description of Applied Standards and references

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:

FCC 47 CFR Part 2

FCC 47 CFR Part 27

ANSI 63.26-2015

Note: All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

ANSI/TIA/EIA-603-E 2016

Note: All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

For LTE Band 12, LTE Band 13, LTE Band 17:

Control and mobile stations in the 698-746 MHz, 746-757 MHz, 787-788 MHz and 805-806 MHz band are limited to 30 watts ERP.

Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink, 746-757 MHz, 787-788 MHz and 805-806 MHz band are limited to 3 watts ERP.

For WCDMA Band 4, LTE Band 4:

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

For LTE Band 7:

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

4.1.2 Test Procedures

Conducted Power Measurement:

- The EUT was set up for the maximum power with WCDMA and LTE link data modulation and link up with simulator.
- Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

Maximum EIRP / ERP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

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

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

where

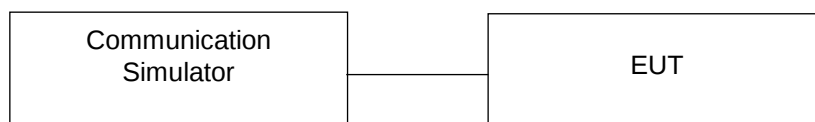
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively
(expressed in the same units as P_{Meas} , e.g., dBm or dBW)

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

G_T gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

4.1.3 Test Setup

Conducted Power Measurement:



4.1.4 Test Results

Conducted Output Power (dBm)

Band	WCDMA IV		
Channel	1312	1413	1513
Frequency (MHz)	1712.4	1732.6	1752.6
RMC 12.2K	21.36	21.44	21.52
HSDPA Subtest-1	20.67	20.71	20.78
HSDPA Subtest-2	20.62	20.69	20.75
HSDPA Subtest-3	20.22	20.34	20.46
HSDPA Subtest-4	20.2	20.32	20.41
DC-HSDPA Subtest-1	20.59	20.64	20.69
DC-HSDPA Subtest-2	20.54	20.61	20.64
DC-HSDPA Subtest-3	20.16	20.21	20.36
DC-HSDPA Subtest-4	20.07	20.09	20.31
HSUPA Subtest-1	20.65	20.66	20.81
HSUPA Subtest-2	18.9	18.97	18.98
HSUPA Subtest-3	19.82	19.7	19.85
HSUPA Subtest-4	18.94	18.98	18.86
HSUPA Subtest-5	20.61	20.65	20.71

LTE Band 4						
BW	MCS Index	Channel		19957	20175	20393
		Frequency (MHz)		1710.7	1732.5	1754.3
1.4M	QPSK	1	0	21.95	22.32	22.27
		1	2	22.13	22.19	22.38
		1	5	22.01	22.02	22.17
		3	0	22.17	21.98	22.18
		3	1	21.93	21.93	22.11
		3	3	22	21.93	22.11
		6	0	20.9	21.01	21.09
	16QAM	1	0	21.01	21.1	21.24
		1	2	20.92	21.06	21
		1	5	20.77	20.82	20.95
		3	0	21	21	21.12
		3	1	20.97	20.96	21.03
		3	3	20.78	20.81	20.97
		6	0	19.96	19.99	20.17
BW	MCS Index	Channel		19965	20175	20385
		Frequency (MHz)		1711.5	1732.5	1753.5
3M	QPSK	1	0	22.12	22.32	22.41
		1	7	22.09	22.28	22.42
		1	14	22.08	22.13	22.31
		8	0	21.16	21.13	21.26
		8	3	21.06	21.02	21.1
		8	7	21.03	20.98	21.11
		15	0	20.98	21.07	21.13
	16QAM	1	0	21.06	21.21	21.26
		1	7	20.96	21	21.09
		1	14	20.87	20.85	21.04
		8	0	20.07	20.07	20.18
		8	3	20.03	20.05	20.14
		8	7	19.8	19.93	20.01
		15	0	19.98	20.03	20.16

LTE Band 4						
BW	MCS Index	Channel		19975	20175	20375
		Frequency (MHz)		1712.5	1732.5	1752.5
5M	QPSK	1	0	22.15	22.34	22.42
		1	12	22.13	22.25	22.39
		1	24	22.07	22.12	22.32
		12	0	21.09	21.11	21.21
		12	6	21.09	21.04	21.15
		12	13	20.99	20.99	21.08
		25	0	20.95	21.06	21.21
	16QAM	1	0	21.15	21.21	21.31
		1	12	20.96	21	21.08
		1	24	20.87	20.85	21.05
		12	0	20.09	20.15	20.16
		12	6	20.03	20.05	20.09
		12	13	19.84	19.9	20.04
		25	0	20	20.03	20.17
BW	MCS Index	Channel		20000	20175	20350
		Frequency (MHz)		1715	1732.5	1750
10M	QPSK	1	0	22.13	22.26	22.44
		1	24	22.12	22.21	22.37
		1	49	22.03	22.16	22.34
		25	0	21.09	21.1	21.26
		25	12	21.05	21.05	21.11
		25	25	21.06	21.05	21.07
		50	0	20.98	20.99	21.19
	16QAM	1	0	21.1	21.15	21.28
		1	24	21.05	20.97	21.1
		1	49	20.9	20.91	21
		25	0	20.05	20.1	20.26
		25	12	20.07	20	20.12
		25	25	19.83	19.88	20.01
		50	0	20.02	20	20.14

LTE Band 4						
BW	MCS Index	Channel		20025	20175	20325
		Frequency (MHz)		1717.5	1732.5	1747.5
15M	QPSK	1	0	22.11	22.28	22.49
		1	37	22.15	22.31	22.43
		1	74	22.11	22.13	22.3
		36	0	21.07	21.07	21.24
		36	19	21.09	21.11	21.13
		36	39	21.05	21.05	21.12
		75	0	20.95	21.06	21.19
	16QAM	1	0	21.14	21.23	21.24
		1	37	21.01	20.99	21.15
		1	74	20.82	20.85	21.02
		36	0	20.05	20.08	20.18
		36	19	20.01	20.06	20.16
		36	39	19.81	19.9	20.06
		75	0	19.97	20.03	20.09
BW	MCS Index	Channel		20050	20175	20300
		Frequency (MHz)		1720	1732.5	1745
20M	QPSK	1	0	22.17	22.35	22.51
		1	50	22.15	22.31	22.45
		1	99	22.12	22.21	22.36
		50	0	21.17	21.17	21.29
		50	25	21.09	21.11	21.19
		50	50	21.06	21.07	21.15
		100	0	21.05	21.07	21.22
	16QAM	1	0	21.15	21.23	21.32
		1	50	21.05	21.07	21.16
		1	99	20.92	20.93	21.05
		50	0	20.09	20.16	20.26
		50	25	20.07	20.08	20.16
		50	50	19.87	19.96	20.11
		100	0	20.04	20.1	20.18

LTE Band 7						
BW	MCS Index	Channel		20775	21100	21425
		Frequency (MHz)		2502.5	2535	2567.5
5M	QPSK	1	0	22.01	22.19	21.92
		1	12	21.93	22.21	21.85
		1	24	21.82	21.95	21.67
		12	0	20.89	21.08	20.77
		12	6	20.8	20.99	20.63
		12	13	20.88	20.93	20.77
		25	0	21.02	21.12	20.83
	16QAM	1	0	20.61	20.78	20.51
		1	12	20.51	20.67	20.34
		1	24	20.41	20.65	20.23
		12	0	19.91	20.04	19.7
		12	6	19.85	19.99	19.7
		12	13	19.87	20.03	19.68
		25	0	19.95	20.13	19.82
BW	MCS Index	Channel		20800	21100	21400
		Frequency (MHz)		2505	2535	2565
10M	QPSK	1	0	21.97	22.22	21.88
		1	24	21.9	22.19	21.85
		1	49	21.8	22.05	21.73
		25	0	20.97	21.01	20.73
		25	12	20.78	20.97	20.68
		25	25	20.82	20.98	20.79
		50	0	20.99	21.16	20.83
	16QAM	1	0	20.64	20.79	20.45
		1	24	20.49	20.75	20.36
		1	49	20.47	20.66	20.23
		25	0	19.88	20.11	19.72
		25	12	19.82	20.06	19.69
		25	25	19.8	19.94	19.76
		50	0	19.98	20.11	19.85

LTE Band 7						
BW	MCS Index	Channel		20825	21100	21375
		Frequency (MHz)		2507.5	2535	2562.5
15M	QPSK	1	0	21.96	22.24	21.86
		1	37	21.93	22.14	21.85
		1	74	21.79	22.03	21.71
		36	0	20.92	21.04	20.74
		36	19	20.82	20.98	20.65
		36	39	20.86	20.97	20.74
		75	0	21	21.1	20.84
	16QAM	1	0	20.63	20.72	20.43
		1	37	20.56	20.75	20.39
		1	74	20.38	20.66	20.27
		36	0	19.84	20.04	19.65
		36	19	19.89	20	19.67
		36	39	19.84	20.01	19.76
		75	0	19.96	20.11	19.8
BW	MCS Index	Channel		20850	21100	21350
		Frequency (MHz)		2510	2535	2560
20M	QPSK	1	0	22.12	22.34	22.05
		1	50	22.08	22.31	21.97
		1	99	21.97	22.15	21.84
		50	0	21.07	21.19	20.89
		50	25	20.95	21.14	20.8
		50	50	21	21.11	20.9
		100	0	21.15	21.28	21.03
	16QAM	1	0	20.76	20.92	20.62
		1	50	20.67	20.85	20.49
		1	99	20.58	20.76	20.39
		50	0	20.02	20.22	19.82
		50	25	19.99	20.16	19.83
		50	50	19.99	20.14	19.87
		100	0	20.1	20.26	19.97

LTE Band 12						
BW	MCS Index	Channel		23017	23095	23173
		Frequency (MHz)		699.7	707.5	715.3
1.4M	QPSK	1	0	21.88	21.59	21.57
		1	2	21.82	21.7	21.58
		1	5	21.72	21.52	21.51
		3	0	21.26	21.18	21.15
		3	1	21.3	21.01	21.06
		3	3	21.24	21.18	21.04
		6	0	20.65	20.45	20.3
	16QAM	1	0	20.51	20.55	20.29
		1	2	20.41	20.3	20.21
		1	5	20.27	20.17	20.08
		3	0	20.36	20.24	20.09
		3	1	20.13	20.11	20.01
		3	3	20.24	20.05	20.08
		6	0	19.77	19.64	19.45
BW	MCS Index	Channel		23025	23095	23165
		Frequency (MHz)		700.5	707.5	714.5
3M	QPSK	1	0	21.98	21.79	21.74
		1	7	22.02	21.86	21.74
		1	14	21.8	21.71	21.58
		8	0	20.79	20.7	20.61
		8	3	20.73	20.59	20.51
		8	7	20.68	20.63	20.52
		15	0	20.79	20.59	20.43
	16QAM	1	0	20.6	20.52	20.33
		1	7	20.52	20.34	20.35
		1	14	20.33	20.21	20.08
		8	0	19.85	19.62	19.52
		8	3	19.76	19.64	19.4
		8	7	19.69	19.54	19.5
		15	0	19.91	19.75	19.55

LTE Band 12						
BW	MCS Index	Channel		23035	23095	23155
		Frequency (MHz)		701.5	707.5	713.5
5M	QPSK	1	0	22.05	21.78	21.74
		1	12	21.95	21.77	21.72
		1	24	21.81	21.67	21.62
		12	0	20.77	20.67	20.55
		12	6	20.72	20.61	20.46
		12	13	20.77	20.66	20.54
		25	0	20.78	20.63	20.5
	16QAM	1	0	20.69	20.51	20.42
		1	12	20.51	20.37	20.34
		1	24	20.32	20.26	20.09
		12	0	19.79	19.66	19.54
		12	6	19.75	19.61	19.42
		12	13	19.72	19.57	19.51
		25	0	19.89	19.78	19.54
BW	MCS Index	Channel		23060	23095	23130
		Frequency (MHz)		704	707.5	711
10M	QPSK	1	0	22.14	21.95	21.93
		1	24	22.11	21.94	21.84
		1	49	21.93	21.79	21.71
		25	0	20.92	20.82	20.7
		25	12	20.88	20.74	20.61
		25	25	20.85	20.76	20.62
		50	0	20.89	20.73	20.6
	16QAM	1	0	20.77	20.68	20.5
		1	24	20.68	20.51	20.43
		1	49	20.49	20.35	20.19
		25	0	19.93	19.75	19.66
		25	12	19.86	19.73	19.58
		25	25	19.81	19.72	19.62
		50	0	20.01	19.86	19.72

LTE Band 13						
BW	MCS Index	Channel		23205	23230	23255
		Frequency (MHz)		779.5	782	784.5
5M	QPSK	1	0	21.68	21.92	21.8
		1	12	21.64	21.83	21.76
		1	24	21.47	21.8	21.67
		12	0	20.49	20.82	20.63
		12	6	20.6	20.71	20.66
		12	13	20.51	20.76	20.63
		25	0	20.34	20.67	20.52
	16QAM	1	0	20.3	20.61	20.5
		1	12	20.31	20.51	20.43
		1	24	20.12	20.5	20.28
		12	0	19.68	19.9	19.74
		12	6	19.62	19.77	19.71
		12	13	19.45	19.7	19.63
		25	0	19.41	19.79	19.63
BW	MCS Index	Channel		23230		
		Frequency (MHz)		782		
10M	QPSK	1	0	22.02		
		1	24	21.99		
		1	49	21.95		
		25	0	20.91		
		25	12	20.89		
		25	25	20.85		
		50	0	20.81		
	16QAM	1	0	20.77		
		1	24	20.68		
		1	49	20.58		
		25	0	20.03		
		25	12	19.95		
		25	25	19.88		
		50	0	19.87		

LTE Band 17						
BW	MCS Index	Channel		23755	23790	23825
		Frequency (MHz)		706.5	710	713.5
5M	QPSK	1	0	21.63	21.35	21.26
		1	12	21.5	21.42	21.31
		1	24	21.31	21.25	21.1
		12	0	20.39	20.31	20.13
		12	6	20.39	20.16	20.04
		12	13	20.27	20.1	20.01
		25	0	20.27	20.14	20.51
	16QAM	1	0	20.16	20.05	20.49
		1	12	20.66	20.45	20.33
		1	24	20.34	20.22	20.04
		12	0	19.4	19.2	19.16
		12	6	19.38	19.23	19.14
		12	13	19.25	19.21	19.04
		25	0	19.42	19.33	19.27
BW	MCS Index	Channel		23780	23790	23800
		Frequency (MHz)		709	710	711
10M	QPSK	1	0	22.07	21.8	21.7
		1	24	21.65	21.56	21.7
		1	49	21.48	21.38	21.24
		25	0	20.53	20.39	20.27
		25	12	20.48	20.34	20.2
		25	25	20.42	20.27	20.15
		50	0	20.37	20.24	20.14
	16QAM	1	0	20.26	20.11	20.49
		1	24	20.47	20.3	20.13
		1	49	20.43	20.34	20.17
		25	0	19.52	19.36	19.25
		25	12	19.48	19.38	19.25
		25	25	19.42	19.33	19.16
		50	0	19.59	19.48	19.4

EIRP Power(dBm)

Band	WCDMA IV		
Channel	1312	1413	1513
Frequency (MHz)	1712.4	1732.6	1752.6
RMC 12.2K	14.454	14.534	14.614
HSDPA Subtest-1	13.764	13.804	13.874
HSDPA Subtest-2	13.714	13.784	13.844
HSDPA Subtest-3	13.314	13.434	13.554
HSDPA Subtest-4	13.294	13.414	13.504
DC-HSDPA Subtest-1	13.684	13.734	13.784
DC-HSDPA Subtest-2	13.634	13.704	13.734
DC-HSDPA Subtest-3	13.254	13.304	13.454
DC-HSDPA Subtest-4	13.164	13.184	13.404
HSUPA Subtest-1	13.744	13.754	13.904
HSUPA Subtest-2	11.994	12.064	12.074
HSUPA Subtest-3	12.914	12.794	12.944
HSUPA Subtest-4	12.034	12.074	11.954
HSUPA Subtest-5	13.704	13.744	13.804

*EIRP = Conducted + antenna gain (-6.906dBi)

LTE Band 4						
BW	MCS Index	Channel		19957	20175	20393
		Frequency (MHz)		1710.7	1732.5	1754.3
1.4M	QPSK	1	0	15.044	15.414	15.364
		1	2	15.224	15.284	15.474
		1	5	15.104	15.114	15.264
		3	0	15.264	15.074	15.274
		3	1	15.024	15.024	15.204
		3	3	15.094	15.024	15.204
		6	0	13.994	14.104	14.184
	16QAM	1	0	14.104	14.194	14.334
		1	2	14.014	14.154	14.094
		1	5	13.864	13.914	14.044
		3	0	14.094	14.094	14.214
		3	1	14.064	14.054	14.124
		3	3	13.874	13.904	14.064
		6	0	13.054	13.084	13.264
BW	MCS Index	Channel		19965	20175	20385
		Frequency (MHz)		1711.5	1732.5	1753.5
3M	QPSK	1	0	15.214	15.414	15.504
		1	7	15.184	15.374	15.514
		1	14	15.174	15.224	15.404
		8	0	14.254	14.224	14.354
		8	3	14.154	14.114	14.194
		8	7	14.124	14.074	14.204
		15	0	14.074	14.164	14.224
	16QAM	1	0	14.154	14.304	14.354
		1	7	14.054	14.094	14.184
		1	14	13.964	13.944	14.134
		8	0	13.164	13.164	13.274
		8	3	13.124	13.144	13.234
		8	7	12.894	13.024	13.104
		15	0	13.074	13.124	13.254

*EIRP = Conducted + antenna gain (-6.906dBi)

LTE Band 4						
BW	MCS Index	Channel		19975	20175	20375
		Frequency (MHz)		1712.5	1732.5	1752.5
5M	QPSK	1	0	15.244	15.434	15.514
		1	12	15.224	15.344	15.484
		1	24	15.164	15.214	15.414
		12	0	14.184	14.204	14.304
		12	6	14.184	14.134	14.244
		12	13	14.084	14.084	14.174
		25	0	14.044	14.154	14.304
	16QAM	1	0	14.244	14.304	14.404
		1	12	14.054	14.094	14.174
		1	24	13.964	13.944	14.144
		12	0	13.184	13.244	13.254
		12	6	13.124	13.144	13.184
		12	13	12.934	12.994	13.134
		25	0	13.094	13.124	13.264
BW	MCS Index	Channel		20000	20175	20350
		Frequency (MHz)		1715	1732.5	1750
10M	QPSK	1	0	15.224	15.354	15.534
		1	24	15.214	15.304	15.464
		1	49	15.124	15.254	15.434
		25	0	14.184	14.194	14.354
		25	12	14.144	14.144	14.204
		25	25	14.154	14.144	14.164
		50	0	14.074	14.084	14.284
	16QAM	1	0	14.194	14.244	14.374
		1	24	14.144	14.064	14.194
		1	49	13.994	14.004	14.094
		25	0	13.144	13.194	13.354
		25	12	13.164	13.094	13.214
		25	25	12.924	12.974	13.104
		50	0	13.114	13.094	13.234

*EIRP = Conducted + antenna gain (-6.906dBi)

LTE Band 4						
BW	MCS Index	Channel		20025	20175	20325
		Frequency (MHz)		1717.5	1732.5	1747.5
15M	QPSK	1	0	15.204	15.374	15.584
		1	37	15.244	15.404	15.524
		1	74	15.204	15.224	15.394
		36	0	14.164	14.164	14.334
		36	19	14.184	14.204	14.224
		36	39	14.144	14.144	14.214
		75	0	14.044	14.154	14.284
	16QAM	1	0	14.234	14.324	14.334
		1	37	14.104	14.084	14.244
		1	74	13.914	13.944	14.114
		36	0	13.144	13.174	13.274
		36	19	13.104	13.154	13.254
		36	39	12.904	12.994	13.154
		75	0	13.064	13.124	13.184
BW	MCS Index	Channel		20050	20175	20300
		Frequency (MHz)		1720	1732.5	1745
20M	QPSK	1	0	15.264	15.444	15.604
		1	50	15.244	15.404	15.544
		1	99	15.214	15.304	15.454
		50	0	14.264	14.264	14.384
		50	25	14.184	14.204	14.284
		50	50	14.154	14.164	14.244
		100	0	14.144	14.164	14.314
	16QAM	1	0	14.244	14.324	14.414
		1	50	14.144	14.164	14.254
		1	99	14.014	14.024	14.144
		50	0	13.184	13.254	13.354
		50	25	13.164	13.174	13.254
		50	50	12.964	13.054	13.204
		100	0	13.134	13.194	13.274

*EIRP = Conducted + antenna gain (-6.906dBi)

LTE Band 7						
BW	MCS Index	Channel		20775	21100	21425
		Frequency (MHz)		2502.5	2535	2567.5
5M	QPSK	1	0	24.632	24.812	24.542
		1	12	24.552	24.832	24.472
		1	24	24.442	24.572	24.292
		12	0	23.512	23.702	23.392
		12	6	23.422	23.612	23.252
		12	13	23.502	23.552	23.392
		25	0	23.642	23.742	23.452
	16QAM	1	0	23.232	23.402	23.132
		1	12	23.132	23.292	22.962
		1	24	23.032	23.272	22.852
		12	0	22.532	22.662	22.322
		12	6	22.472	22.612	22.322
		12	13	22.492	22.652	22.302
		25	0	22.572	22.752	22.442
BW	MCS Index	Channel		20800	21100	21400
		Frequency (MHz)		2505	2535	2565
10M	QPSK	1	0	24.592	24.842	24.502
		1	24	24.522	24.812	24.472
		1	49	24.422	24.672	24.352
		25	0	23.592	23.632	23.352
		25	12	23.402	23.592	23.302
		25	25	23.442	23.602	23.412
		50	0	23.612	23.782	23.452
	16QAM	1	0	23.262	23.412	23.072
		1	24	23.112	23.372	22.982
		1	49	23.092	23.282	22.852
		25	0	22.502	22.732	22.342
		25	12	22.442	22.682	22.312
		25	25	22.422	22.562	22.382
		50	0	22.602	22.732	22.472

*EIRP = Conducted + antenna gain (2.622dBi)

LTE Band 7						
BW	MCS Index	Channel		20825	21100	21375
		Frequency (MHz)		2507.5	2535	2562.5
15M	QPSK	1	0	24.582	24.862	24.482
		1	37	24.552	24.762	24.472
		1	74	24.412	24.652	24.332
		36	0	23.542	23.662	23.362
		36	19	23.442	23.602	23.272
		36	39	23.482	23.592	23.362
		75	0	23.622	23.722	23.462
	16QAM	1	0	23.252	23.342	23.052
		1	37	23.182	23.372	23.012
		1	74	23.002	23.282	22.892
		36	0	22.462	22.662	22.272
		36	19	22.512	22.622	22.292
		36	39	22.462	22.632	22.382
		75	0	22.582	22.732	22.422
BW	MCS Index	Channel		20850	21100	21350
		Frequency (MHz)		2510	2535	2560
20M	QPSK	1	0	24.742	24.962	24.672
		1	50	24.702	24.932	24.592
		1	99	24.592	24.772	24.462
		50	0	23.692	23.812	23.512
		50	25	23.572	23.762	23.422
		50	50	23.622	23.732	23.522
		100	0	23.772	23.902	23.652
	16QAM	1	0	23.382	23.542	23.242
		1	50	23.292	23.472	23.112
		1	99	23.202	23.382	23.012
		50	0	22.642	22.842	22.442
		50	25	22.612	22.782	22.452
		50	50	22.612	22.762	22.492
		100	0	22.722	22.882	22.592

*EIRP = Conducted + antenna gain (2.622dBi)

ERP Power (dBm)

LTE Band 12						
BW	MCS Index	Channel		23017	23095	23173
		Frequency (MHz)		699.7	707.5	715.3
1.4M	QPSK	1	0	18.676	18.386	18.366
		1	2	18.616	18.496	18.376
		1	5	18.516	18.316	18.306
		3	0	18.056	17.976	17.946
		3	1	18.096	17.806	17.856
		3	3	18.036	17.976	17.836
		6	0	17.446	17.246	17.096
	16QAM	1	0	17.306	17.346	17.086
		1	2	17.206	17.096	17.006
		1	5	17.066	16.966	16.876
		3	0	17.156	17.036	16.886
		3	1	16.926	16.906	16.806
		3	3	17.036	16.846	16.876
		6	0	16.566	16.436	16.246
BW	MCS Index	Channel		23025	23095	23165
		Frequency (MHz)		700.5	707.5	714.5
3M	QPSK	1	0	18.776	18.586	18.536
		1	7	18.816	18.656	18.536
		1	14	18.596	18.506	18.376
		8	0	17.586	17.496	17.406
		8	3	17.526	17.386	17.306
		8	7	17.476	17.426	17.316
		15	0	17.586	17.386	17.226
	16QAM	1	0	17.396	17.316	17.126
		1	7	17.316	17.136	17.146
		1	14	17.126	17.006	16.876
		8	0	16.646	16.416	16.316
		8	3	16.556	16.436	16.196
		8	7	16.486	16.336	16.296
		15	0	16.706	16.546	16.346

*ERP = Conducted + antenna gain (-1.054dBi)-2.15

LTE Band 12						
BW	MCS Index	Channel		23035	23095	23155
		Frequency (MHz)		701.5	707.5	713.5
5M	QPSK	1	0	18.846	18.576	18.536
		1	12	18.746	18.566	18.516
		1	24	18.606	18.466	18.416
		12	0	17.566	17.466	17.346
		12	6	17.516	17.406	17.256
		12	13	17.566	17.456	17.336
		25	0	17.576	17.426	17.296
	16QAM	1	0	17.486	17.306	17.216
		1	12	17.306	17.166	17.136
		1	24	17.116	17.056	16.886
		12	0	16.586	16.456	16.336
		12	6	16.546	16.406	16.216
		12	13	16.516	16.366	16.306
		25	0	16.686	16.576	16.336
BW	MCS Index	Channel		23060	23095	23130
		Frequency (MHz)		704	707.5	711
10M	QPSK	1	0	18.936	18.746	18.726
		1	24	18.906	18.736	18.636
		1	49	18.726	18.586	18.506
		25	0	17.716	17.616	17.496
		25	12	17.676	17.536	17.406
		25	25	17.646	17.556	17.416
		50	0	17.686	17.526	17.396
	16QAM	1	0	17.566	17.476	17.296
		1	24	17.476	17.306	17.226
		1	49	17.286	17.146	16.986
		25	0	16.726	16.546	16.456
		25	12	16.656	16.526	16.376
		25	25	16.606	16.516	16.416
		50	0	16.806	16.656	16.516

*ERP = Conducted + antenna gain (-1.054dBi)-2.15

LTE Band 13						
BW	MCS Index	Channel		23205	23230	23255
		Frequency (MHz)		779.5	782	784.5
5M	QPSK	1	0	19.499	19.739	19.619
		1	12	19.459	19.649	19.579
		1	24	19.289	19.619	19.489
		12	0	18.309	18.639	18.449
		12	6	18.419	18.529	18.479
		12	13	18.329	18.579	18.449
		25	0	18.159	18.489	18.339
	16QAM	1	0	18.119	18.429	18.319
		1	12	18.129	18.329	18.249
		1	24	17.939	18.319	18.099
		12	0	17.499	17.719	17.559
		12	6	17.439	17.589	17.529
		12	13	17.269	17.519	17.449
		25	0	17.229	17.609	17.449
BW	MCS Index	Channel		23230		
		Frequency (MHz)		782		
10M	QPSK	1	0	19.839		
		1	24	19.809		
		1	49	19.769		
		25	0	18.729		
		25	12	18.709		
		25	25	18.669		
		50	0	18.629		
	16QAM	1	0	18.589		
		1	24	18.499		
		1	49	18.399		
		25	0	17.849		
		25	12	17.769		
		25	25	17.699		
		50	0	17.689		

*ERP = Conducted + antenna gain (-0.031dBi)-2.15

LTE Band 17						
BW	MCS Index	Channel		23755	23790	23825
		Frequency (MHz)		706.5	710	713.5
5M	QPSK	1	0	18.426	18.146	18.056
		1	12	18.296	18.216	18.106
		1	24	18.106	18.046	17.896
		12	0	17.186	17.106	16.926
		12	6	17.186	16.956	16.836
		12	13	17.066	16.896	16.806
		25	0	17.066	16.936	17.306
	16QAM	1	0	16.956	16.846	17.286
		1	12	17.456	17.246	17.126
		1	24	17.136	17.016	16.836
		12	0	16.196	15.996	15.956
		12	6	16.176	16.026	15.936
		12	13	16.046	16.006	15.836
		25	0	16.216	16.126	16.066
BW	MCS Index	Channel		23780	23790	23800
		Frequency (MHz)		709	710	711
10M	QPSK	1	0	18.866	18.596	18.496
		1	24	18.446	18.356	18.496
		1	49	18.276	18.176	18.036
		25	0	17.326	17.186	17.066
		25	12	17.276	17.136	16.996
		25	25	17.216	17.066	16.946
		50	0	17.166	17.036	16.936
	16QAM	1	0	17.056	16.906	17.286
		1	24	17.266	17.096	16.926
		1	49	17.226	17.136	16.966
		25	0	16.316	16.156	16.046
		25	12	16.276	16.176	16.046
		25	25	16.216	16.126	15.956
		50	0	16.386	16.276	16.196

*ERP = Conducted + antenna gain (-1.054dBi)-2.15

4.2 Radiated Emission Measurement

4.2.1 Limits of Radiated Emission Measurement

For WCDMA band 4, LTE Band 4:

According to FCC 27.53(h), for operations in the 1695-1710MHz, 1710-1755MHz, 1755-1780 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log (P)$ dB.

For LTE Band 7:

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

4.2.2 Test Procedure

- In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
- Following C63.26 section 5.5 and 5.2.7
 $\text{EIRP (dBm)} = E (\text{dB}\mu\text{V/m}) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.
 $\text{ERP (dBm)} = E (\text{dB}\mu\text{V/m}) + 20\log(D) - 104.8 - 2.15$; where D is the measurement distance (in the far field region) in m.

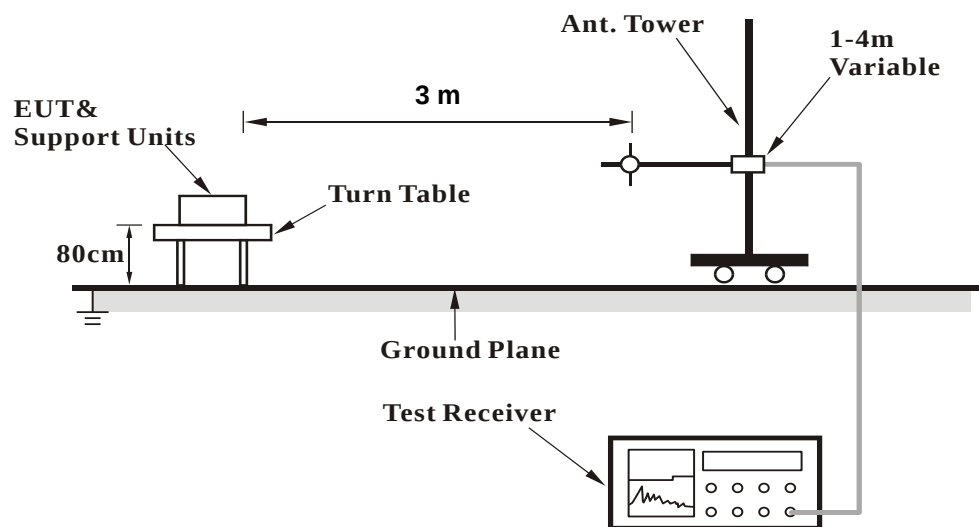
Note: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.2.3 Deviation from Test Standard

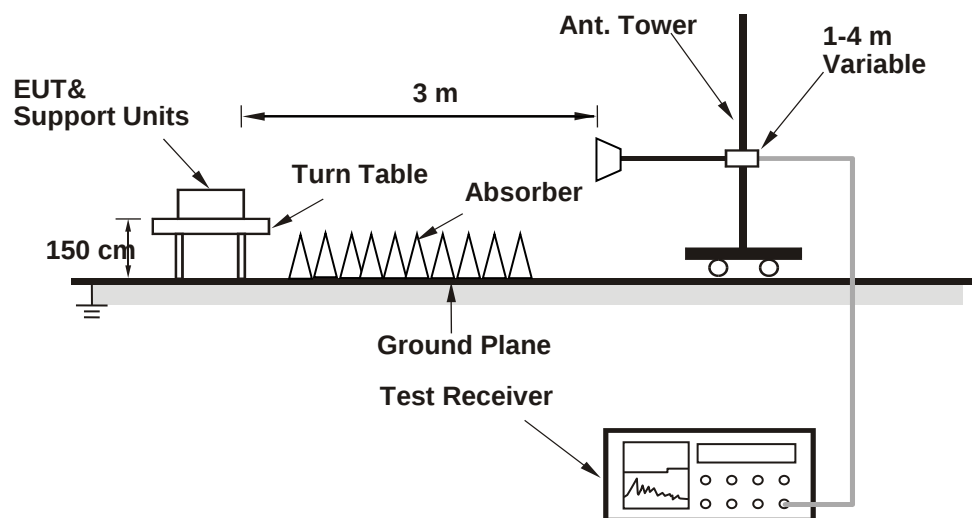
No deviation.

4.2.4 Test Setup

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



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

4.2.5 Test Results

Below 1GHz

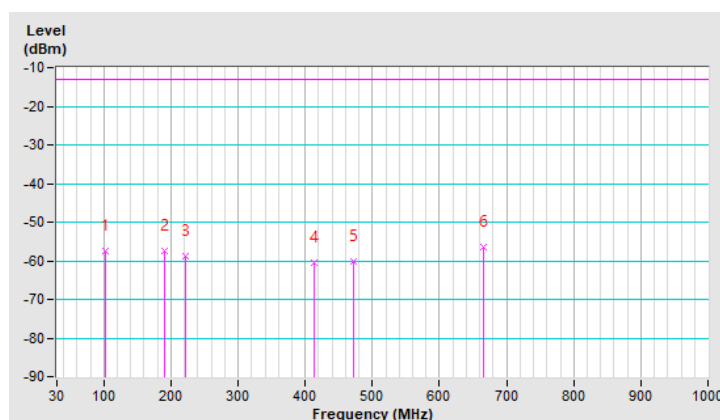
WCDMA Band 4

RF Mode	TX WCDMA Band IV	Channel	CH 1413 : 1732.6 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	102.75	-57.45	-13.00	-44.45	1.50 H	335	51.05	-108.50
2	191.02	-57.36	-13.00	-44.36	1.00 H	146	49.25	-106.61
3	222.06	-58.77	-13.00	-45.77	1.50 H	151	47.67	-106.44
4	413.15	-60.54	-13.00	-47.54	2.00 H	162	39.42	-99.96
5	471.35	-60.21	-13.00	-47.21	1.00 H	18	38.12	-98.33
6	666.32	-56.47	-13.00	-43.47	1.00 H	123	38.34	-94.81

Remarks:

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

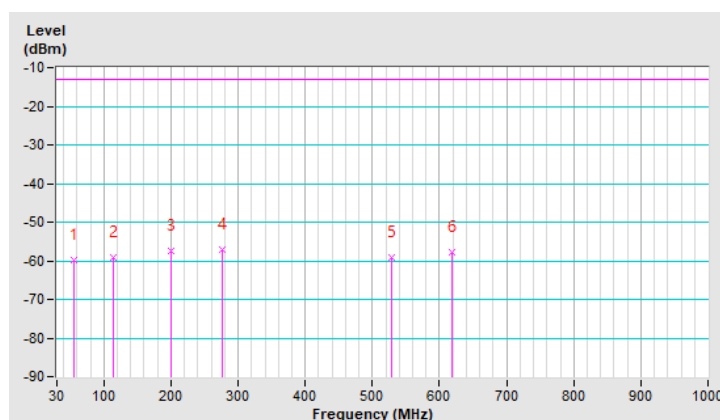


RF Mode	TX WCDMA Band IV	Channel	CH 1413 : 1732.6 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	56.19	-59.69	-13.00	-46.69	2.00 V	188	44.85	-104.54
2	113.42	-59.04	-13.00	-46.04	1.00 V	15	48.09	-107.13
3	199.75	-57.41	-13.00	-44.41	1.50 V	99	49.43	-106.84
4	277.35	-57.09	-13.00	-44.09	2.00 V	198	45.74	-102.83
5	529.55	-59.18	-13.00	-46.18	1.00 V	162	37.99	-97.17
6	617.82	-57.75	-13.00	-44.75	1.00 V	285	37.62	-95.37

Remarks:

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



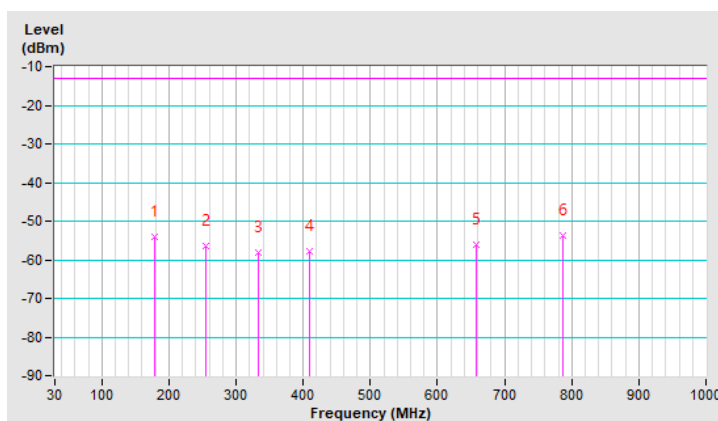
LTE Band 4, Channel Bandwidth: 20MHz

RF Mode	TX LTE Band IV-20MHz	Channel	CH 20050 : 1720 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	179.38	-54.07	-13.00	-41.07	1.50 H	140	51.25	-105.32
2	254.07	-56.41	-13.00	-43.41	1.00 H	80	47.73	-104.14
3	333.61	-58.14	-13.00	-45.14	2.00 H	140	43.16	-101.30
4	410.24	-57.77	-13.00	-44.77	1.00 H	140	42.28	-100.05
5	657.59	-55.99	-13.00	-42.99	1.50 H	203	38.94	-94.93
6	786.60	-53.69	-13.00	-40.69	1.00 H	5	38.66	-92.35

Remarks:

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

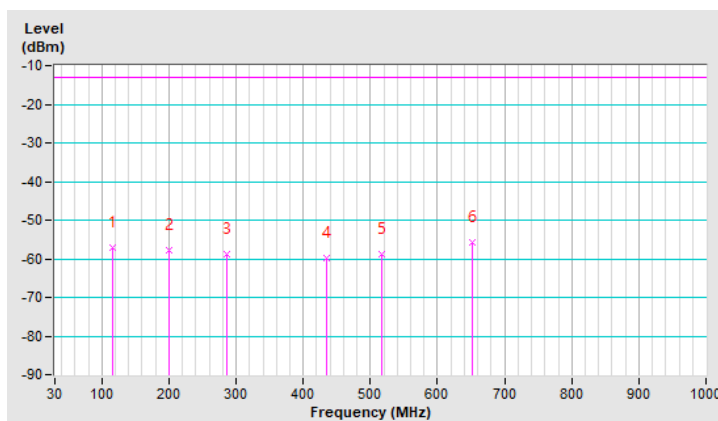


RF Mode	TX LTE Band IV-20MHz	Channel	CH 20050 : 1720 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	116.33	-57.20	-13.00	-44.20	2.00 V	250	49.67	-106.87
2	200.72	-57.72	-13.00	-44.72	1.00 V	103	49.11	-106.83
3	286.08	-58.86	-13.00	-45.86	1.50 V	106	43.67	-102.53
4	434.49	-59.84	-13.00	-46.84	1.50 V	137	39.21	-99.05
5	516.94	-58.82	-13.00	-45.82	1.00 V	36	38.60	-97.42
6	652.74	-55.78	-13.00	-42.78	1.00 V	237	39.19	-94.97

Remarks:

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



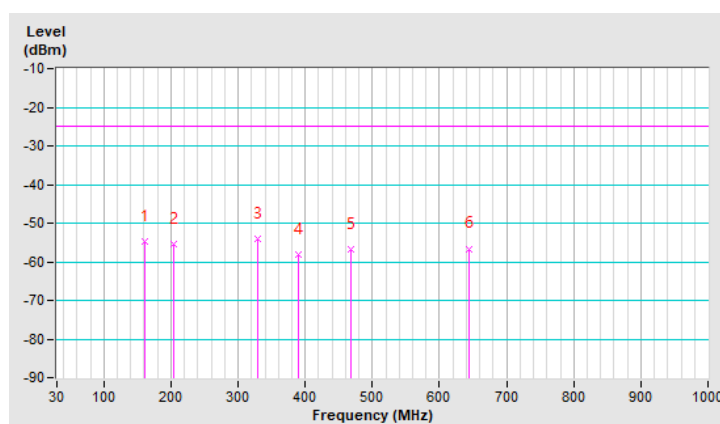
LTE Band 7, Channel Bandwidth: 20MHz

RF Mode	TX LTE Band VII-20MHz	Channel	CH 20850 : 2510 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	160.95	-54.60	-25.00	-29.60	1.50 H	123	49.39	-103.99
2	204.60	-55.34	-25.00	-30.34	1.50 H	154	51.46	-106.80
3	329.73	-54.16	-25.00	-29.16	1.00 H	123	47.15	-101.31
4	388.90	-58.08	-25.00	-33.08	2.00 H	126	42.35	-100.43
5	468.44	-56.74	-25.00	-31.74	1.00 H	123	41.64	-98.38
6	644.98	-56.61	-25.00	-31.61	1.00 H	26	38.33	-94.94

Remarks:

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

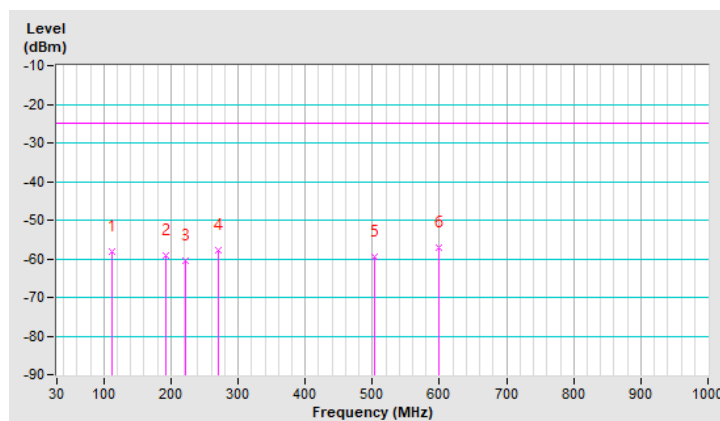


RF Mode	TX LTE Band VII-20MHz	Channel	CH 20850 : 2510 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	112.45	-58.12	-25.00	-33.12	1.00 V	9	49.07	-107.19
2	192.96	-59.27	-25.00	-34.27	1.50 V	114	47.53	-106.80
3	221.09	-60.57	-25.00	-35.57	1.00 V	48	45.83	-106.40
4	270.56	-57.76	-25.00	-32.76	1.50 V	181	45.39	-103.15
5	502.39	-59.40	-25.00	-34.40	1.00 V	40	38.37	-97.77
6	599.39	-57.26	-25.00	-32.26	1.00 V	119	38.37	-95.63

Remarks:

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



Above 1GHz

WCDMA Band 4

RF Mode	TX WCDMA Band IV	Channel	CH 1413 : 1732.6 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3465.20	-39.98	-13.00	-26.98	3.15 H	245	54.63	-94.61
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3465.20	-38.18	-13.00	-25.18	1.69 V	109	56.43	-94.61

Remarks:

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

LTE Band 4, Channel Bandwidth: 20MHz

RF Mode	TX LTE Band IV-20MHz	Channel	CH 20050 : 1720 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3440.00	-40.68	-13.00	-27.68	3.08 H	242	54.13	-94.81
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3440.00	-38.59	-13.00	-25.59	1.73 V	94	56.22	-94.81

Remarks:

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

LTE Band 7, Channel Bandwidth: 20MHz

RF Mode	TX LTE Band VII-20MHz	Channel	CH 20850 : 2510 MHz
Frequency Range	1GMHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5020.00	-45.85	-25.00	-20.85	3.15 H	253	43.87	-89.72
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5020.00	-45.60	-25.00	-20.60	1.82 V	123	44.12	-89.72

Remarks:

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

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.bureauveritas-adt.com

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

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