BACL
Bay Area Compliance Labs Corp.

FCC PART 22H, PART 24E,PART 27

MEASUREMENT AND TEST REPORT

For

Quanzhou Tesunho Electronics Co., Ltd

2#, 5F E-19# Phase 2 Xunmei, Quanzhou, Fujian, China

FCC ID: 2AKS9TH282

Report Type:	Product Type:
Original Report	PoC Radio

Report Number:	RXM190410056-00B
Report Date:	2019-06-07
Reviewed By:	Dean Lau RF Supervisor
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	PoC Radio
EUT Model:	TH-282
Operation modes:	WCDMA(R99 (Data), HSDPA/HSUPA/HSPA+/DC-HSDPA Data) FDD-LTE
Operation Frequency:	WCDMA Band 2: 1850-1910 MHz(TX); 1930-1990 MHz(RX) WCDMA Band 5: 824-849 MHz(TX); 869-894 MHz(RX) LTE Band 2: 1850-1910 MHz(TX); 1930-1990 MHz(RX) LTE Band 4: 1710-1755 MHz(TX) ; 2110-2155 MHz(RX) LTE Band 5: 824-849 MHz(TX); 869-894 MHz(RX) LTE Band 12: 699-716 MHz(TX); 729-746 MHz(RX) LTE Band 17: 704-716 MHz(TX); 734-746 MHz(RX)
Maximum Output Power: (Conducted)	WCDMA Band 2: 22.35 dBm; WCDMA Band 5: 22.49 dBm LTE Band 2:23.29 dBm; LTE Band 4: 22.48 dBm LTE Band 5: 24.23 dBm; LTE Band 12: 24.47 dBm; LTE Band 17: 23.67 dBm
Modulation Type:	QPSK, 16QAM
Adapter Information **Model:**	ZM-01A1210
Input:	AC 100-240V, 50/60Hz, 0.5A Max
Output:	DC12V, 1000mA
Rated Input Voltage:	DC3.7V from Battery; DC5V from adapter; DC 12 V from base
External Dimension:	148mm(L)*57 mm(W)*57 mm(H)
Serial Number:	190410056
EUT Received Date:	2019-4-12

Objective

This report is prepared on behalf of *Quanzhou Tesunho Electronics Co., Ltd* in accordance with: Part 2-Subpart J, Part 22-Subpart H, and Part 24-Subpart E Part 27 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Rules for output power, modulation characteristic, occupied bandwidth, spurious emissions at antenna terminal, spurious radiated emission, frequency stability and band edge.

Related Submittal(s)/Grant(s)

No related submittal.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 22 Subpart H - Public Mobile Services
Part 24 Subpart E - Personal Communication Services
Part 27 – Miscellaneous wireless communications services

Applicable Standards: TIA/EIA 603-D-2010.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp.(Dongguan).

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Unwanted Emissions, radiated	30MHz ~ 1GHz:5.85 dB 1G~26.5GHz: 5.23 dB
Unwanted Emissions, conducted	±1.5 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier : CN0022.

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA-603-D 2010.

The test items were performed with the EUT operating at testing mode. The device operates on WCDMA Band 2/5, and LTE band 2/4/5/12/17, test was performed with channels as below table:

Frequency Bands	Bandwidth (MHz)	Test Frequency(MHz)		
		Low	Middle	High
WCDMA Band 2	4.2	1852.4	1880	1907.6
WCDMA Band 5	4.2	826.4	836.6	846.6
LTE Band 2	1.4	1850.7	1880	1909.3
	3	1851.5	1880	1908.5
	5	1852.5	1880	1907.5
	10	1855	1880	1905
	15	1857.5	1880	1902.5
	20	1860	1880	1900
LTE Band 4	1.4	1710.7	1732.5	1754.3
	3	1711.5	1732.5	1753.5
	5	1712.5	1732.5	1752.5
	10	1715	1732.5	1750
	15	1717.5	1732.5	1747.5
	20	1720	1732.5	1745
LTE Band 5	1.4	824.7	836.5	848.3
	3	825.5	836.5	847.5
	5	826.5	836.5	846.5
	10	829	836.5	844
LTE Band 12	1.4	699.7	707.5	715.3
	3	700.5	707.5	714.5
	5	701.5	707.5	713.5
	10	704	707.5	711
LTE Band 17	5	706.5	710	713.5
	10	709	710	711

For LTE band 2 and 4, 10/15/20MHz bandwidth only supports QPSK modulation, 16QAM was not enabled, For LTE band 5/12/17, 10MHz bandwidth only supports QPSK modulation, 16QAM was not enabled.
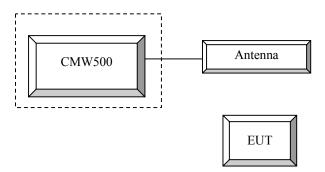
Equipment Modifications

No modification was made to the EUT.
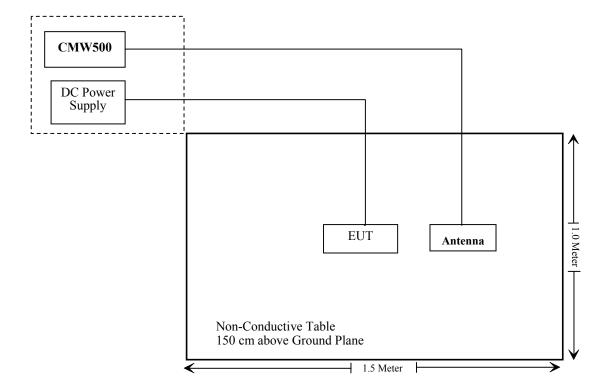
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R&S	Wideband Radio Communication Tester	CMW500	147473
Un-known	ANTENNA	/	/

Configuration of Test Setup

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┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
│   ┌──────────────┐    │          ┌──────────────┐
│   │   CMW500     │────┼──────────│   Antenna    │
│   └──────────────┘    │          └──────────────┘
└ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘

                                   ┌──────────────┐
                                   │     EUT      │
                                   └──────────────┘
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Block Diagram of Test Setup

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┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
│  ┌────────────┐     │
│  │  CMW500    │─────┼──────────────────────────┐
│  └────────────┘     │                          │
│                     │                          │
│  ┌────────────┐     │                          │
│  │ DC Power   │─────┼──────────────┐           │
│  │ Supply     │     │              │           │
│  └────────────┘     │              │           │
└ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘              │           │
         ┌───────────────────────────┼───────────┼──────────┐  ▲
         │                           │           │          │  │
         │                           │           │          │  │
         │                      ┌─────────┐  ┌─────────┐     │  1.0 Meter
         │                      │  EUT    │  │ Antenna │     │  │
         │                      └─────────┘  └─────────┘     │  │
         │                                                   │  │
         │  Non-Conductive Table                             │  ▼
         │  150 cm above Ground Plane                        │
         └───────────────────────────────────────────────────┘
         |◄────────────── 1.5 Meter ──────────────►|
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SUMMARY OF TEST RESULTS

Rules	Description of Test	Result
§1.1310, §2.1093	RF Exposure	Compliance
FCC§2.1046;§ 22.913 (a); § 24.232 (c);§27.50	RF Output Power	Compliance
FCC§ 2.1047	Modulation Characteristics	Not Applicable
FCC§ 2.1049; § 22.905 § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliance
FCC§ 2.1051, § 22.917 (a); § 24.238 (a); §27.53;	Spurious Emissions at Antenna Terminal	Compliance
FCC§ 2.1053 § 22.917 (a); § 24.238 (a); §27.53	Field Strength of Spurious Radiation	Compliance
FCC§ 22.917 (a); § 24.238 (a); §27.53;	Out of band emission, Band Edge	Compliance
FCC§ 2.1055 § 22.355; § 24.235; §27.54	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

FCC §1.1310 & §2.1093- RF EXPOSURE

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliance, please refer to the SAR report: RXM190410056-20.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E, Part 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

FCC § 2.1046, § 22.913 (a) & § 24.232 (c) & § 27.50- RF OUTPUT POWER

Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (C), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to §24.232 (d) Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

According to §27.50

(b)(10) Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

(c) (10) 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 band are limited to 3 watts ERP.

(d), (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. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

(h),(2) Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

Test Procedure

WCDMA-Release 99

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification. The EUT has a nominal maximum output power of 24dBm (+1.7/-3.7).

	Loopback Mode	Test Mode 1
WCDMA General Settings	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc / βd	8/15

WCDMA HSDPA

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification.

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subset	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βd (SF)	64			
	βc/ βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR(dB)	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs=βhs/ βc	30/15			

WCDMA HSUPA

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification.

	Mode	**HSUPA**	**HSUPA**	**HSUPA**	**HSUPA**	**HSUPA**
	Subset	**1**	**2**	**3**	**4**	**5**
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/ βd	11/15	6/15	15/9	2/15	-
	βhs	22/15	12/15	30/15	4/15	5/15
	CM(dB)	1.0	3.0	2.0	3.0	1.0
	MPR(dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback	4ms				
	CQI Repetition Factor	2				
	Ahs=βhs/ βc	30/15				
HSUPA Specific Settings	DE-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_FCls		E-TFCI 11 E E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27	E-TFCI 11 E-TFCI PO4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27	

HSPA+

The following tests were conducted according to the test requirements in Table C.11.1.4 of 3GPP TS 34.121-1

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed}1: 30/15 β_{ed}2: 30/15	β_{ed}3: 24/15 β_{ed}4: 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c .

Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).

Note 3: DPDCH is not configured, therefore the β_c is set to 1 and β_d = 0 by default.

Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

DC-HSDPA

The following tests were conducted according to the test requirements in Table C.8.1.12 of 3GPP TS 34.121-1

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Proces ses	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.		
Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

LTE (FDD):

The following tests were conducted according to the test requirements in 3GPP TS36.101

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS_01".

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 / 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23[1]	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	.	.	.	.	.

Note 1:   Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

Radiated method:

ANSI/TIA-603-D section 2.2.17

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2018-12-10	2019-12-10
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
EMCO	Adjustable Dipole Antenna	3121C	9109-753	Not Required	/
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2018-05-06	2019-05-06
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2018-09-05	2019-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-01-04	2020-01-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2018-09-05	2019-09-05
Agilent	Signal Generator	E8247C	MY43321350	2018-12-10	2019-12-10
R&S	Wideband Radio Communication Tester	CMW500	149216	2018-12-10	2019-12-10
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41005012	Each time	N/A

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25.7~27.2°C
Relative Humidity:	59~60 %
ATM Pressure:	100.5~100.7kPa

* The testing was performed by Blake Yang from 2019-04-25 to 2019-04-28.

Conducted Output Power

WCDMA Band II

Mode	3GPP Sub Test	Low Channel		Middle Channel		High Channel	
		Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)
Rel 99	1	22.35	2.52	21.82	3.00	20.87	2.80
HSDPA	1	21.13	3.40	20.51	3.60	19.83	3.16
	2	21.10	3.41	20.46	3.60	19.85	3.12
	3	21.14	3.39	20.54	3.59	19.87	3.19
	4	21.18	3.36	20.52	3.58	19.87	3.17
HSUPA	1	20.79	3.32	20.11	3.12	19.14	3.88
	2	20.76	3.36	20.14	3.10	19.09	3.90
	3	20.75	3.32	20.11	3.17	19.10	3.89
	4	20.81	3.34	20.11	3.16	19.10	3.91
	5	20.78	3.36	20.14	3.09	19.10	3.94
DC-HSDPA	1	20.71	3.31	20.11	3.18	19.08	3.91
	2	20.75	3.30	20.07	3.16	19.11	3.85
	3	20.75	3.34	20.18	3.11	19.11	3.92
	4	20.70	3.35	20.08	3.16	19.13	3.91
HSPA+ (16QAM)	1	20.84	3.29	20.10	3.14	19.14	3.85

WCDMA Band V

Mode	3GPP Sub Test	Low Channel		Middle Channel		High Channel	
		Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)
Rel 99	1	22.32	2.52	22.45	2.56	22.49	2.28
HSDPA	1	21.25	3.64	21.37	3.24	21.29	3.84
	2	21.21	3.65	21.40	3.29	21.26	3.87
	3	21.23	3.59	21.36	3.21	21.30	3.82
	4	21.29	3.64	21.35	3.24	21.29	3.88
HSUPA	1	20.67	3.88	20.72	3.48	20.68	3.40
	2	20.71	3.90	20.68	3.45	20.68	3.36
	3	20.64	3.86	20.75	3.53	20.69	3.42
	4	20.69	3.89	20.67	3.44	20.70	3.39
	5	20.64	3.87	20.69	3.52	20.65	3.42
DC-HSDPA	1	20.68	3.83	20.73	3.45	20.66	3.39
	2	20.68	3.94	20.73	3.45	20.67	3.37
	3	20.66	3.87	20.72	3.50	20.71	3.43
	4	20.74	3.94	20.63	3.46	20.70	3.41
HSPA+ (16QAM)	1	20.69	3.91	20.69	3.49	20.64	3.44

LTE Band 2

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	22.51	22.29	21.23
		RB1#3	22.91	22.42	21.40
		RB1#5	22.70	22.35	21.46
		RB3#0	22.57	22.13	21.46
		RB3#3	22.70	22.02	21.43
		RB6#0	21.75	21.08	20.27
	16QAM	RB1#0	21.45	21.24	20.45
		RB1#3	21.68	21.42	20.63
		RB1#5	21.68	21.27	20.35
		RB3#0	21.77	20.76	20.48
		RB3#3	21.76	20.78	20.40
		RB6#0	20.90	20.10	19.19
3MHz	QPSK	RB1#0	22.65	22.12	21.59
		RB1#8	22.66	22.10	21.33
		RB1#14	22.62	22.01	21.55
		RB6#0	21.76	21.18	20.32
		RB6#9	21.91	21.06	20.37
		RB15#0	21.83	21.12	20.33
	16QAM	RB1#0	22.15	21.28	20.98
		RB1#8	22.00	21.17	20.96
		RB1#14	21.99	21.32	20.99
		RB6#0	20.83	19.95	19.26
		RB6#9	21.00	20.00	19.25
		RB15#0	20.81	20.13	19.14
5MHz	QPSK	RB1#0	22.67	22.13	21.49
		RB1#13	22.51	22.22	21.21
		RB1#24	22.29	22.13	21.43
		RB15#0	21.93	21.14	20.50
		RB15#10	21.64	21.10	20.41
		RB25#0	21.90	21.17	20.47
	16QAM	RB1#0	21.16	21.71	20.18
		RB1#13	21.10	21.41	20.11
		RB1#24	20.87	21.36	20.31
		RB15#0	20.92	19.91	19.48
		RB15#10	20.94	20.03	19.35
		RB25#0	20.71	20.17	19.59

		RB1#0	22.98	21.70	21.02
10MHz	QPSK	RB1#25	22.77	21.67	20.74
		RB1#49	22.15	21.71	20.60
		RB25#0	21.75	20.71	19.92
		RB25#25	21.34	20.50	19.69
		RB50#0	21.55	20.67	19.89
15MHz	QPSK	RB1#0	22.28	22.79	22.67
		RB1#38	21.82	22.77	22.66
		RB1#74	21.97	22.66	22.39
		RB36#0	21.30	21.73	21.63
		RB36#39	21.03	21.69	21.46
		RB75#0	21.18	21.44	21.66
20MHz	QPSK	RB1#0	22.79	22.65	23.10
		RB1#50	22.79	22.73	**23.29**
		RB1#99	22.92	22.46	23.14
		RB50#0	21.75	21.76	22.07
		RB50#50	21.71	21.66	21.91
		RB100#0	21.71	21.55	22.09

LTE Band 4

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	22.07	21.58	21.33
		RB1#3	21.92	21.71	21.37
		RB1#5	21.85	21.65	21.25
		RB3#0	22.10	21.69	21.49
		RB3#3	22.14	21.72	21.48
		RB6#0	21.21	20.80	20.41
	16QAM	RB1#0	21.35	20.77	20.54
		RB1#3	21.39	20.99	20.73
		RB1#5	21.32	20.86	20.89
		RB3#0	21.59	20.74	20.36
		RB3#3	21.48	20.78	20.42
		RB6#0	20.44	19.62	19.47
3MHz	QPSK	RB1#0	22.31	21.66	20.98
		RB1#8	21.84	21.41	21.11
		RB1#14	21.99	21.58	21.48
		RB6#0	21.08	20.66	20.29
		RB6#9	20.87	20.65	20.48
		RB15#0	21.03	20.67	20.41
	16QAM	RB1#0	21.21	21.23	20.12
		RB1#8	21.23	21.21	19.86
		RB1#14	21.10	21.24	20.08
		RB6#0	20.19	20.00	18.98
		RB6#9	19.91	20.12	19.39
		RB15#0	20.08	19.96	19.29
5MHz	QPSK	RB1#0	22.12	21.88	21.34
		RB1#13	21.86	21.59	21.35
		RB1#24	21.79	21.63	21.67
		RB15#0	21.08	20.75	20.29
		RB15#10	20.90	20.65	20.57
		RB25#0	21.05	20.76	20.39
	16QAM	RB1#0	20.69	21.05	19.83
		RB1#13	20.11	20.52	19.67
		RB1#24	20.31	20.58	20.16
		RB15#0	19.82	19.53	19.34
		RB15#10	19.67	19.56	19.41
		RB25#0	20.17	19.71	19.56

		RB1#0	22.21	21.59	21.26
10MHz	QPSK	RB1#25	21.88	21.72	21.68
		RB1#49	21.92	21.41	21.40
		RB25#0	21.11	20.71	20.38
		RB25#25	21.02	20.68	20.42
		RB50#0	21.07	20.74	20.43
15MHz	QPSK	RB1#0	22.15	22.06	21.94
		RB1#38	21.97	22.00	21.74
		RB1#74	22.02	21.90	22.29
		RB36#0	21.19	21.24	21.01
		RB36#39	21.19	21.10	21.03
		RB75#0	21.43	21.09	21.09
20MHz	QPSK	RB1#0	22.01	21.99	22.30
		RB1#50	22.14	**22.48**	22.05
		RB1#99	22.35	21.71	22.19
		RB50#0	21.31	21.21	21.07
		RB50#50	21.36	21.14	21.11
		RB100#0	21.32	21.21	21.12

LTE Band 5

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	23.43	23.81	23.77
		RB1#3	23.27	24.07	24.01
		RB1#5	23.10	23.93	23.99
		RB3#0	23.39	23.94	23.87
		RB3#3	23.32	23.96	23.50
		RB6#0	22.29	23.02	22.63
	16QAM	RB1#0	22.39	22.58	22.53
		RB1#3	22.80	22.85	22.67
		RB1#5	22.52	22.42	22.81
		RB3#0	22.66	23.06	22.80
		RB3#3	22.46	23.01	22.83
		RB6#0	21.63	21.95	21.53
3MHz	QPSK	RB1#0	23.32	24.17	23.36
		RB1#8	23.37	**24.23**	23.55
		RB1#14	23.20	23.85	23.54
		RB6#0	22.28	23.19	22.53
		RB6#9	22.18	23.06	22.66
		RB15#0	22.30	23.10	22.55
	16QAM	RB1#0	22.57	23.88	23.08
		RB1#8	22.47	23.45	23.35
		RB1#14	22.41	22.93	23.45
		RB6#0	21.36	21.86	21.91
		RB6#9	21.17	21.91	21.98
		RB15#0	21.18	21.91	21.81
5MHz	QPSK	RB1#0	23.26	23.94	23.14
		RB1#13	23.28	23.87	23.34
		RB1#24	23.32	23.43	23.68
		RB15#0	22.30	23.07	22.23
		RB15#10	22.28	22.94	22.60
		RB25#0	22.23	22.90	22.35
	16QAM	RB1#0	21.77	23.43	21.79
		RB1#13	21.70	23.57	21.59
		RB1#24	21.66	23.04	22.19
		RB15#0	21.47	21.82	21.46
		RB15#10	21.06	21.88	21.50
		RB25#0	21.26	21.83	21.27
10MHz	QPSK	RB1#0	23.28	23.89	23.34
		RB1#25	23.61	24.14	23.11
		RB1#49	24.12	23.16	23.67
		RB25#0	22.38	23.22	22.03
		RB25#25	22.90	22.72	22.33
		RB50#0	22.66	22.81	22.18

LTE Band 12

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	24.20	24.07	23.96
		RB1#3	24.20	24.28	24.42
		RB1#5	24.32	24.18	24.22
		RB3#0	24.09	24.17	23.97
		RB3#3	23.98	24.25	24.12
		RB6#0	23.09	23.23	22.95
	16QAM	RB1#0	23.10	23.53	23.19
		RB1#3	23.20	23.80	23.40
		RB1#5	23.10	23.75	23.21
		RB3#0	23.15	23.15	22.80
		RB3#3	23.18	23.09	23.28
		RB6#0	22.18	22.20	21.82
3MHz	QPSK	RB1#0	23.89	24.34	23.97
		RB1#8	23.81	**24.47**	23.95
		RB1#14	23.91	24.29	24.16
		RB6#0	23.18	23.17	23.15
		RB6#9	23.00	23.39	23.14
		RB15#0	23.24	23.23	22.99
	16QAM	RB1#0	23.30	23.86	23.35
		RB1#8	23.21	23.66	23.62
		RB1#14	23.33	23.52	23.68
		RB6#0	22.23	22.11	22.03
		RB6#9	22.06	22.23	22.24
		RB15#0	22.29	22.32	22.03
5MHz	QPSK	RB1#0	23.95	23.93	23.97
		RB1#13	24.04	24.18	23.92
		RB1#24	24.02	24.06	23.98
		RB15#0	23.25	23.15	23.10
		RB15#10	23.17	23.29	23.10
		RB25#0	23.04	23.17	23.08
	16QAM	RB1#0	22.82	22.50	23.39
		RB1#13	22.64	23.31	23.17
		RB1#24	22.75	23.18	23.48
		RB15#0	22.17	22.02	22.06
		RB15#10	22.15	22.10	21.78
		RB25#0	22.09	22.21	22.00
10MHz	QPSK	RB1#0	23.81	23.57	23.65
		RB1#25	24.20	24.05	24.35
		RB1#49	24.11	23.75	23.76
		RB25#0	23.03	22.99	23.10
		RB25#25	23.21	23.05	23.10
		RB50#0	22.97	23.06	23.15

LTE Band 17

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5MHz	QPSK	RB1#0	23.51	23.25	23.57
		RB1#13	23.28	23.35	23.58
		RB1#24	23.57	23.38	23.56
		RB15#0	22.52	22.47	22.73
		RB15#10	22.55	22.48	22.54
		RB25#0	22.53	22.52	22.62
	16QAM	RB1#0	22.53	22.91	22.21
		RB1#13	22.13	22.50	21.68
		RB1#24	22.46	22.74	22.19
		RB15#0	21.47	21.73	21.69
		RB15#10	21.81	21.48	21.45
		RB25#0	21.46	21.70	21.66
10MHz	QPSK	RB1#0	23.58	23.44	23.63
		RB1#25	**23.67**	23.86	23.61
		RB1#49	23.33	23.40	23.44
		RB25#0	22.62	22.63	22.60
		RB25#25	22.63	22.72	22.63
		RB50#0	22.68	22.70	22.67

PAR, Band 2

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	2.60	2.72	2.52	13
	100 RB		6.48	6.44	6.40	13
16QAM	1 RB	5 MHz	1.88	2.88	4.20	13
	25 RB		5.16	4.92	4.60	13

PAR, Band 4

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	3.88	3.44	4.76	13
	100 RB		6.48	6.48	6.48	13
16QAM	1 RB	5 MHz	3.80	4.12	4.28	13
	25 RB		4.72	4.60	4.84	13

PAR, Band 5

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	4.20	4.84	4.40	13
	50 RB		5.32	5.56	5.36	13
16QAM	1 RB	5 MHz	6.32	5.94	5.82	13
	25 RB		5.78	6.15	6.03	13

Note: peak-to-average ratio (PAR) <13 dB.

ERP & EIRP

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
WCDMA Band V Middle Channel								
836.60	H	96.87	21.95	0.00	0.97	20.98	38.45	17.47
836.60	V	100.15	28.36	0.00	0.97	27.39	38.45	11.06
WCDMA Band II Middle Channel								
1880.00	H	81.63	9.02	11.66	2.66	18.02	33.00	14.98
1880.00	V	85.40	12.93	11.66	2.66	21.93	33.00	11.07

Note:
1) The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.
2) Absolute Level = Substituted Level - Cable loss + Antenna Gain
3) Margin = Limit-Absolute Level

LTE Band 2

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1880.00	1.40	QPSK	H	82.89	10.28	11.66	2.66	19.28	33.00	13.72
1880.00			V	86.49	14.02	11.66	2.66	23.02	33.00	9.98
1880.00	3.00		H	82.91	10.30	11.66	2.66	19.30	33.00	13.70
1880.00			V	86.40	13.93	11.66	2.66	22.93	33.00	10.07
1880.00	5.00		H	82.78	10.17	11.66	2.66	19.17	33.00	13.83
1880.00			V	86.42	13.95	11.66	2.66	22.95	33.00	10.05
1880.00	10.00		H	81.96	9.35	11.66	2.66	18.35	33.00	14.65
1880.00			V	85.34	12.87	11.66	2.66	21.87	33.00	11.13
1880.00	15.00		H	81.90	9.29	11.66	2.66	18.29	33.00	14.71
1880.00			V	85.15	12.68	11.66	2.66	21.68	33.00	11.32
1880.00	20.00		H	81.74	9.13	11.66	2.66	18.13	33.00	14.87
1880.00			V	85.12	12.65	11.66	2.66	21.65	33.00	11.35
1880.00	1.40	16QAM	H	82.21	9.60	11.66	2.66	18.60	33.00	14.40
1880.00			V	85.56	13.09	11.66	2.66	22.09	33.00	10.91
1880.00	3.00		H	82.16	9.55	11.66	2.66	18.55	33.00	14.45
1880.00			V	85.63	13.16	11.66	2.66	22.16	33.00	10.84
1880.00	5.00		H	82.06	9.45	11.66	2.66	18.45	33.00	14.55
1880.00			V	85.47	13.00	11.66	2.66	22.00	33.00	11.00

LTE Band 4

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1732.50	1.40	QPSK	H	83.28	9.23	10.90	2.51	17.62	30.00	12.38
1732.50			V	86.03	11.66	10.90	2.51	20.05	30.00	9.95
1732.50	3.00		H	83.20	9.15	10.90	2.51	17.54	30.00	12.46
1732.50			V	86.11	11.74	10.90	2.51	20.13	30.00	9.87
1732.50	5.00		H	83.24	9.19	10.90	2.51	17.58	30.00	12.42
1732.50			V	85.88	11.51	10.90	2.51	19.90	30.00	10.10
1732.50	10.00		H	82.56	8.51	10.90	2.51	16.90	30.00	13.10
1732.50			V	84.90	10.53	10.90	2.51	18.92	30.00	11.08
1732.50	15.00		H	82.24	8.19	10.90	2.51	16.58	30.00	13.42
1732.50			V	85.00	10.63	10.90	2.51	19.02	30.00	10.98
1732.50	20.00		H	82.30	8.25	10.90	2.51	16.64	30.00	13.36
1732.50			V	84.92	10.55	10.90	2.51	18.94	30.00	11.06
1732.50	1.40	16QAM	H	82.13	8.08	10.90	2.51	16.47	30.00	13.53
1732.50			V	84.89	10.52	10.90	2.51	18.91	30.00	11.09
1732.50	3.00		H	82.24	8.19	10.90	2.51	16.58	30.00	13.42
1732.50			V	84.90	10.53	10.90	2.51	18.92	30.00	11.08
1732.50	5.00		H	82.17	8.12	10.90	2.51	16.51	30.00	13.49
1732.50			V	84.76	10.39	10.90	2.51	18.78	30.00	11.22

LTE Band 5

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
836.50	1.40	QPSK	H	90.44	15.51	0.00	0.97	14.54	38.45	23.91
836.50	1.40		V	100.71	28.92	0.00	0.97	27.95	38.45	10.50
836.50	3.00		H	87.69	12.76	0.00	0.97	11.79	38.45	26.66
836.50	3.00		V	98.51	26.72	0.00	0.97	25.75	38.45	12.70
836.50	5.00		H	89.01	14.08	0.00	0.97	13.11	38.45	25.34
836.50	5.00		V	98.62	26.83	0.00	0.97	25.86	38.45	12.59
836.50	10.00		H	87.09	12.16	0.00	0.97	11.19	38.45	27.26
836.50	10.00		V	97.19	25.40	0.00	0.97	24.43	38.45	14.02
836.50	1.40	16QAM	H	90.87	15.94	0.00	0.97	14.97	38.45	23.48
836.50	1.40		V	100.97	29.18	0.00	0.97	28.21	38.45	10.24
836.50	3.00		H	87.97	13.04	0.00	0.97	12.07	38.45	26.38
836.50	3.00		V	99.20	27.41	0.00	0.97	26.44	38.45	12.01
836.50	5.00		H	89.54	14.61	0.00	0.97	13.64	38.45	24.81
836.50	5.00		V	98.87	27.08	0.00	0.97	26.11	38.45	12.34

LTE Band 12

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
707.50	1.40	QPSK	H	82.13	5.27	0.00	0.94	4.33	34.77	30.44
707.50	1.40		V	93.50	19.08	0.00	0.94	18.14	34.77	16.63
707.50	3.00		H	80.58	3.72	0.00	0.94	2.78	34.77	31.99
707.50	3.00		V	91.84	17.42	0.00	0.94	16.48	34.77	18.29
707.50	5.00		H	81.45	4.59	0.00	0.94	3.65	34.77	31.12
707.50	5.00		V	91.36	16.94	0.00	0.94	16.00	34.77	18.77
707.50	10.00		H	81.17	4.31	0.00	0.94	3.37	34.77	31.40
707.50	10.00		V	90.38	15.96	0.00	0.94	15.02	34.77	19.75
707.50	1.40	16QAM	H	83.11	6.25	0.00	0.94	5.31	34.77	29.46
707.50	1.40		V	94.88	20.46	0.00	0.94	19.52	34.77	15.25
707.50	3.00		H	81.52	4.66	0.00	0.94	3.72	34.77	31.05
707.50	3.00		V	92.57	18.15	0.00	0.94	17.21	34.77	17.56
707.50	5.00		H	81.41	4.55	0.00	0.94	3.61	34.77	31.16
707.50	5.00		V	92.54	18.12	0.00	0.94	17.18	34.77	17.59

LTE Band 17

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
710.00	5	QPSK	H	81.50	4.69	0.00	0.94	3.75	34.77	31.02
710.00			V	92.69	18.33	0.00	0.94	17.39	34.77	17.38
710.00	10		H	80.47	3.66	0.00	0.94	2.72	34.77	32.05
710.00			V	91.50	17.14	0.00	0.94	16.20	34.77	18.57
710.00	5	16QAM	H	81.84	5.03	0.00	0.94	4.09	34.77	30.68
710.00			V	92.79	18.43	0.00	0.94	17.49	34.77	17.28

Note:
1) The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.
2) Absolute Level = Substituted Level - Cable loss + Antenna Gain
3) Margin = Limit-Absolute Level

FCC §2.1049, §22.917, §22.905 & §24.238 & §27.53- OCCUPIED BANDWIDTH
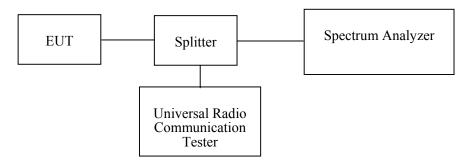
Applicable Standard

FCC §2.1049, §22.917, §22.905, §24.238 and §27.53.

Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The 26 dB & 99% bandwidth was recorded.

```
┌─────────┐      ┌─────────┐      ┌─────────────────────┐
│   EUT   │──────│ Splitter│──────│  Spectrum Analyzer  │
└─────────┘      └─────────┘      └─────────────────────┘
                      │
                 ┌─────────────────┐
                 │ Universal Radio │
                 │  Communication  │
                 │     Tester      │
                 └─────────────────┘
```

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41005012	Each time	N/A
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
E-Microwave	Two-way Spliter	ODP-1-6-2S	OE0120142	Each time	N/A

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25.7~27.2°C
Relative Humidity:	59~60 %
ATM Pressure:	100.5~100.7kPa

* The testing was performed by Black Yang from 2019-04-25to 2019-04-28.

Test Mode: Transmitting
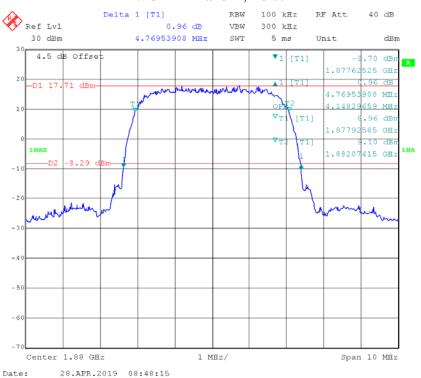
Test Result: Compliance. Please refer to the following table and plots.
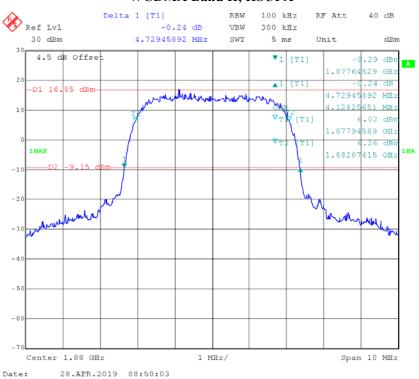
Band	Test Channel	Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
WCDMA Band II	M	Rel 99	4.148	4.770
		HSDPA	4.148	4.770
		HSUPA	4.128	4.729
WCDMA Band V		Rel 99	4.128	4.729
		HSDPA	4.148	4.749
		HSUPA	4.148	4.729

Band	Bandwidth	Modulation	99% occupied bandwidth (MHz)	26 dB bandwidth (MHz)
LTE Band 2	1.4 MHz	QPSK	1.100	1.335
		16QAM	1.100	1.299
	3 MHz	QPSK	2.705	2.946
		16QAM	2.705	2.982
	5 MHz	QPSK	4.529	5.030
		16QAM	4.529	5.050
	10 MHz	QPSK	8.978	9.860
	15 MHz	QPSK	13.527	15.040
	20 MHz	QPSK	17.956	19.459
LTE Band 4	1.4 MHz	QPSK	1.106	1.347
		16QAM	1.118	1.317
	3 MHz	QPSK	2.693	2.958
		16QAM	2.693	2.970
	5 MHz	QPSK	4.549	5.050
		16QAM	4.529	5.090
	10 MHz	QPSK	8.978	10.040
	15 MHz	QPSK	13.527	14.880
	20 MHz	QPSK	17.876	19.479
LTE Band 5	1.4 MHz	QPSK	1.106	1.311
		16QAM	1.106	1.305
	3 MHz	QPSK	2.705	2.970
		16QAM	2.705	2.970
	5 MHz	QPSK	4.549	5.070
		16QAM	4.529	5.010
	10 MHz	QPSK	9.018	9.860
LTE Band 12	1.4 MHz	QPSK	1.106	1.299
		16QAM	1.106	1.299
	3 MHz	QPSK	2.693	2.910
		16QAM	2.693	2.970
	5 MHz	QPSK	4.529	5.010
		16QAM	4.529	5.030
	10 MHz	QPSK	8.938	9.860
LTE Band 17	5 MHz	QPSK	4.509	4.990
		16QAM	4.549	5.050
	10 MHz	QPSK	8.978	9.684

WCDMA Band II, Rel 99

Date:　　28.APR.2019　08:48:15

WCDMA Band II, HSUPA

Date:　　28.APR.2019　08:50:03

WCDMA Band II, HSDPA

Date:　　28.APR.2019　08:52:29

WCDMA Band V, Rel 99

Date:　　28.APR.2019　09:23:01

WCDMA Band V, HSDPA

Date: 28.APR.2019   09:26:07

WCDMA Band V, HSUPA

Date: 28.APR.2019   09:24:09

LTE Band 2

QPSK_1.4 MHz

Date: 25.APR.2019 15:06:23

QPSK_3 MHz

Date: 25.APR.2019 15:08:16

QPSK_5 MHz

Date:　　　25.APR.2019　15:09:33

QPSK_10 MHz

Date:　　　26.APR.2019　10:56:47

QPSK_15 MHz

Date: 26.APR.2019 10:58:56

QPSK_20 MHz

Date: 26.APR.2019 11:01:01

16QAM_1.4 MHz

	Delta 1 [T1]		RBW	30 kHz	RF Att	40 dB
Ref Lvl		1.84 dB	VBW	100 kHz		
30 dBm		1.29859719 MHz	SWT	8.5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -13.48 dBm
                 1.87935972 GHz
▲1 [T1]   1.84 dB
                 1.29859719 MHz
OPB   1.10020040 MHz
▽T1 [T1]   5.81 dBm
                 1.87945591 GHz
▽T2 [T1]   6.13 dBm
                 1.88055611 GHz

D1 12.74 dBm

1MAX

D2 -13.26 dBm

1MA

A

Center 1.88 GHz   300 kHz/   Span 3 MHz

Date: 25.APR.2019 15:07:02

16QAM_3 MHz

	Delta 1 [T1]		RBW	30 kHz	RF Att	40 dB
Ref Lvl		0.11 dB	VBW	100 kHz		
30 dBm		2.98196393 MHz	SWT	17 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -17.16 dBm
                 1.87852705 GHz
▲1 [T1]   0.11 dB
                 2.98196393 MHz
OPB   2.70541082 MHz
▽T1 [T1]   4.40 dBm
                 1.87865932 GHz
▽T2 [T1]   4.27 dBm
                 1.88136473 GHz

D1 9.29 dBm

1MAX

D2 -16.71 dBm

1MA

A

Center 1.88 GHz   600 kHz/   Span 6 MHz

Date: 25.APR.2019 15:08:52

16QAM_5 MHz

	Delta 1 [T1]		RBW	100 kHz	RF Att	40 dB
Ref Lvl		2.48 dB	VBW	300 kHz		
30 dBm		5.05010020 MHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-16.00 dBm
1.87748497 GHz

▲1 [T1]　　2.48 dB
5.05010020 MHz

D1 12.18 dBm

4.52905812 MHz

▽T1 ▽T1 [T1]　5.77 dBm
1.87774549 GHz

▽T2 [T1]　6.84 dBm
1.88227455 GHz

1MAX

1MA

D2 -13.82 dBm

Center 1.88 GHz　　　　1 MHz/　　　　Span 10 MHz

Date:　　25.APR.2019　15:10:15

LTE Band 4

QPSK_1.4 MHz

	Delta 1 [T1]		RBW	30 kHz	RF Att	40 dB
Ref Lvl		0.71 dB	VBW	100 kHz		
30 dBm		1.34669339 MHz	SWT	8.5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-12.36 dBm
1.73183567 GHz

▲1 [T1]　　0.71 dB
1.34669339 MHz

D1 13.63 dBm

1.10621242 MHz

▽T1 [T1]　5.35 dBm
1.73194990 GHz

▽T2 [T1]　5.94 dBm
1.73305611 GHz

1MAX

1MA

D2 -12.37 dBm

Center 1.7325 GHz　　　　300 kHz/　　　　Span 3 MHz

Date:　　25.APR.2019　14:31:51

QPSK_3 MHz


```
           Delta 1 [T1]            RBW    30 kHz    RF Att    40 dB
  Ref Lvl                0.37 dB   VBW   100 kHz
  30 dBm         2.95791583 MHz    SWT    17 ms    Unit        dBm
```

```
      4.5 dB Offset                            ▼1 [T1]        -14.11 dBm
                                                        1.73102705 GHz
                                               ▲1 [T1]          0.37 dB
                                                        2.95791583 MHz
   D1 11.88 dBm                                OPB          2.69338677 MHz
                                                 T1 ▽T1 [T1]     5.55 dBm
                                                        1.73115932 GHz
   1MAX                                          ▽T2 [T1]        6.51 dBm
                                                        1.73385271 GHz   1MA
   D2 -14.12 dBm
```

```
  Center 1.7325 GHz          600 kHz/              Span 6 MHz
  Date:      25.APR.2019  14:33:06
```

QPSK_5 MHz


```
           Delta 1 [T1]            RBW   100 kHz    RF Att    40 dB
  Ref Lvl               -0.80 dB   VBW   300 kHz
  30 dBm         5.05010020 MHz    SWT     5 ms    Unit        dBm
```

```
      4.5 dB Offset                            ▼1 [T1]        -12.95 dBm
                                                        1.72998497 GHz
                                               ▲1 [T1]         -0.80 dB
                                                        5.05010020 MHz
   D1 13.36 dBm                                          4.54909820 MHz
                                                 T1 ▽T1 [T1]     6.53 dBm
                                                        1.73024549 GHz
   1MAX                                          ▽T2 [T1]        6.65 dBm
                                                        1.73479459 GHz   1MA
   D2 -12.64 dBm
```

```
  Center 1.7325 GHz            1 MHz/               Span 10 MHz
  Date:      25.APR.2019  14:34:18
```

QPSK_10 MHz

	Delta 1 [T1]		RBW	100 kHz	RF Att	30 dB
Ref Lvl		-1.43 dB	VBW	300 kHz		
24.5 dBm		10.04008016 MHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1] -15.55 dBm
1.72755010 GHz
▲1 [T1] -1.43 dB
D1 10.52 dBm
2 10.04008016 MHz
OPB 8.97795591 MHz
▽T1 [T1] 5.09 dBm
1.72803106 GHz
▽T2 [T1] 6.56 dBm
1MAX
1.73700902 GHz
D2 -15.48 dBm

Center 1.7325 GHz   2 MHz/   Span 20 MHz

Date: 26.APR.2019   11:06:29

QPSK_15 MHz

	Delta 1 [T1]		RBW	300 kHz	RF Att	30 dB
Ref Lvl		1.95 dB	VBW	1 MHz		
24.5 dBm		14.87975952 MHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1] -13.87 dBm
1.72507515 GHz
▲1 [T1] 1.95 dB
D1 13.96 dBm
2 14.87975952 MHz
OPB 13.52705411 MHz
▽T1 [T1] 8.31 dBm
1.72579659 GHz
▽T2 [T1] 6.61 dBm
1MAX
1.73932365 GHz
D2 -12.04 dBm

Center 1.7325 GHz   3 MHz/   Span 30 MHz

Date: 26.APR.2019   11:04:12

QPSK_20 MHz

Delta 1 [T1]		RBW	300 kHz	RF Att	30 dB
Ref Lvl	1.12 dB	VBW	1 MHz		
24.5 dBm	19.47895792 MHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-13.97 dBm
1.72276052 GHz
▲1 [T1]　　1.12 dB
19.47895792 MHz
OPB　17.87575150 MHz
▽T1 [T1]　　8.57 dBm
1.72364228 GHz
▽T2 [T1]　　7.71 dBm
1.74151804 GHz

D1 13.34 dBm
D2 -12.66 dBm
1MAX

Center 1.7325 GHz　　　4 MHz/　　　Span 40 MHz

Date:　26.APR.2019　11:02:55

16QAM_1.4 MHz

Delta 1 [T1]		RBW	30 kHz	RF Att	40 dB
Ref Lvl	0.69 dB	VBW	100 kHz		
30 dBm	1.31663327 MHz	SWT	8.5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-13.06 dBm
1.73184168 GHz
▲1 [T1]　　0.69 dB
1.31663327 MHz
OPB　1.11823647 MHz
▽T1 [T1]　　3.77 dBm
1.73194389 GHz
▽T2 [T1]　　4.38 dBm
1.73306212 GHz

D1 13.59 dBm
D2 -12.41 dBm
1MAX

Center 1.7325 GHz　　　300 kHz/　　　Span 3 MHz

Date:　25.APR.2019　14:32:27

16QAM_3 MHz

Delta 1 [T1]		RBW	30 kHz	RF Att	40 dB
Ref Lvl	0.51 dB	VBW	100 kHz		
30 dBm	2.96993988 MHz	SWT	17 ms	Unit	dBm

4.5 dB Offset

▼1 [T1] -16.18 dBm 1.73103908 GHz
▲1 [T1] 0.51 dB 2.96993988 MHz 2.69338677 MHz
▽T1 [T1] 3.65 dBm 1.73115932 GHz
▽T2 [T1] 5.38 dBm 1.73385271 GHz

D1 9.99 dBm

1MAX

D2 -16.01 dBm

Center 1.7325 GHz   600 kHz/   Span 6 MHz

Date: 25.APR.2019 14:33:45

16QAM_5 MHz

Delta 1 [T1]		RBW	100 kHz	RF Att	40 dB
Ref Lvl	1.61 dB	VBW	300 kHz		
30 dBm	5.09018036 MHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1] -14.58 dBm 1.72996493 GHz
▲1 [T1] 1.61 dB 5.09018036 MHz 4.52905812 MHz
▽T1 [T1] 6.06 dBm 1.73024549 GHz
▽T2 [T1] 7.01 dBm 1.73477455 GHz

D1 12.61 dBm

1MAX

D2 -13.39 dBm

Center 1.7325 GHz   1 MHz/   Span 10 MHz

Date: 25.APR.2019 14:34:47

LTE Band 5:

QPSK_1.4 MHz

	Delta 1 [T1]		RBW	30 kHz	RF Att	40 dB
Ref Lvl		-0.34 dB	VBW	100 kHz	
30 dBm		1.31062124 MHz	SWT	8.5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1] -8.95 dBm 835.84769539 MHz

▲1 [T1] -0.34 dB 1.31062124 MHz
OPB 2 1.10621242 MHz

▽T1 [T1] 7.90 dBm 835.94989980 MHz

▽T2 [T1] 9.56 dBm 837.05611222 MHz

D1 16.59 dBm

1MAX

D2 -9.41 dBm

Center 836.5 MHz   300 kHz/   Span 3 MHz

Date: 25.APR.2019 15:11:18

QPSK_3 MHz

	Delta 1 [T1]		RBW	30 kHz	RF Att	40 dB
Ref Lvl		1.25 dB	VBW	100 kHz	
30 dBm		2.96993988 MHz	SWT	17 ms	Unit	dBm

4.5 dB Offset

▼1 [T1] -11.21 dBm 835.02705411 MHz

▲1 [T1] 1.25 dB 2.96993988 MHz
OPB 2 2.70541082 MHz

▽T1 [T1] 9.58 dBm 835.15931864 MHz

▽T2 [T1] 8.37 dBm 837.86472946 MHz

D1 15.11 dBm

1MAX

D2 -10.89 dBm

Center 836.5 MHz   600 kHz/   Span 6 MHz

Date: 25.APR.2019 15:12:50

QPSK_5 MHz

Date: 25.APR.2019 15:14:10

QPSK_10 MHz

Date: 26.APR.2019 11:09:02

16QAM_1.4 MHz

	Delta 1 [T1]	RBW	30 kHz	RF Att	40 dB
Ref Lvl	0.21 dB	VBW	100 kHz		
30 dBm	1.30460922 MHz	SWT	8.5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1] −9.46 dBm
835.85370741 MHz
▲1 [T1] 0.21 dB
1.30460922 MHz
OFS 1.10621242 MHz
▽T1 [T1] 7.48 dBm
835.95591182 MHz
▽T2 [T1] 8.63 dBm
837.06212425 MHz

D1 16.52 dBm

1MAX

D2 −9.48 dBm

1MA

Center 836.5 MHz   300 kHz/   Span 3 MHz

Date: 25.APR.2019 15:11:47

16QAM_3 MHz

	Delta 1 [T1]	RBW	30 kHz	RF Att	40 dB
Ref Lvl	−0.23 dB	VBW	100 kHz		
30 dBm	2.96993988 MHz	SWT	17 ms	Unit	dBm

4.5 dB Offset

▼1 [T1] −11.97 dBm
835.02705411 MHz
▲1 [T1] −0.23 dB
2.96993988 MHz
T2 2.70541082 MHz
▽T1 [T1] 7.80 dBm
835.15931864 MHz
▽T2 [T1] 8.19 dBm
837.86472946 MHz

D1 12.97 dBm

1MAX

D2 −13.03 dBm

1MA

Center 836.5 MHz   600 kHz/   Span 6 MHz

Date: 25.APR.2019 15:13:19

16QAM_5 MHz

```
                                                    RBW    100 kHz    RF Att    40 dB
Ref Lvl              Delta 1 [T1]                    VBW    300 kHz
30 dBm                        0.13 dB               SWT    5 ms       Unit      dBm
                     5.01002004 MHz
```



```
Center 836.5 MHz                   1 MHz/                           Span 10 MHz
Date:        25.APR.2019  15:14:40
```

LTE Band 12:

QPSK_1.4 MHz

```
                                                    RBW    30 kHz     RF Att    40 dB
Ref Lvl              Delta 1 [T1]                    VBW    100 kHz
30 dBm                        0.27 dB               SWT    8.5 ms     Unit      dBm
                     1.29859719 MHz
```



```
Center 707.5 MHz                   300 kHz/                         Span 3 MHz
Date:        25.APR.2019  15:15:26
```

QPSK_3 MHz

Date: 25.APR.2019 15:16:30

QPSK_5 MHz

Date: 25.APR.2019 15:18:28

QPSK_10 MHz

	Delta 1 [T1]		RBW	100 kHz	RF Att	30 dB
Ref Lvl		0.10 dB	VBW	300 kHz		
24.5 dBm	9.85971944 MHz		SWT	5 ms	Unit	dBm

```
 24.5
   20    4.5 dB Offset                      ▼1 [T1]        -11.53 dBm    [A]
                                                        702.59018036 MHz
 D1 14.73 dBm                                    ▲1 [T1]         0.10 dB
   10                                               9.85971944 MHz
                                                 OPB  8.93787575 MHz
    0                                            ▽T1 [T1]         8.94 dBm
                                                    703.07114228 MHz
  -10                                            ▽T2 [T1]        11.27 dBm
 1MAX                                               712.00901804 MHz  1MA
 D2 -11.27 dBm
  -20

  -30

  -40

  -50

  -60

  -70
-75.5
   Center 707.5 MHz              2 MHz/              Span 20 MHz
```

Date: 26.APR.2019 11:10:57

16QAM_1.4 MHz

	Delta 1 [T1]		RBW	30 kHz	RF Att	40 dB
Ref Lvl		-0.08 dB	VBW	100 kHz		
30 dBm	1.29859719 MHz		SWT	8.5 ms	Unit	dBm

```
   30
         4.5 dB Offset                       ▼1 [T1]        -9.55 dBm    [A]
   20                                                    706.85370741 MHz
 D1 16.46 dBm                                    ▲1 [T1]        -0.08 dB
   10                                               1.29859719 MHz
                                                 OPB  1.10621242 MHz
    0                                            ▽T1 [T1]         7.32 dBm
                                                    706.94989980 MHz
  -10                                            ▽T2 [T1]         9.37 dBm
 1MAX                                               708.05611222 MHz  1MA
 D2 -9.54 dBm
  -20

  -30

  -40

  -50

  -60

  -70
   Center 707.5 MHz              300 kHz/            Span 3 MHz
```

Date: 25.APR.2019 15:16:04

16QAM_3 MHz

Date: 25.APR.2019 15:17:46

16QAM_5 MHz

Date: 25.APR.2019 15:19:00

LTE Band 17:

QPSK_5 MHz

Date: 25.APR.2019 15:19:36

QPSK_10 MHz

Date: 26.APR.2019 11:15:30

16QAM_5 MHz


```
                                              Delta 1 [T1]              RBW   100 kHz    RF Att   40 dB
                           Ref Lvl                       1.56 dB        VBW   300 kHz
                            30 dBm                  5.05010020 MHz       SWT    5 ms     Unit       dBm
```

```
 30
       4.5 dB Offset                                          ▼1 [T1]          -11.54 dBm    A
                                                                          707.48496994 MHz
 20                                                           ▲1 [T1]            1.56 dB
     D1 15.1 dBm                                                           5.05010020 MHz
                                                             OPR T2         4.54909820 MHz
 10                                                          ▽T1 [T1]            8.00 dBm
                                                                          707.74549098 MHz
  0                                                          ▽T2 [T1]            7.96 dBm
     1MAX                                                                  712.29458918 MHz    1MA
-10  D2 -10.9 dBm ▽
-20
-30
-40
-50
-60
-70
     Center 710 MHz                     1 MHz/                        Span 10 MHz
```

Date: 25.APR.2019 15:20:08

FCC §2.1051, §22.917(a) & §24.238(a) & §27.53- SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

FCC §2.1051, §22.917(a) , §24.238(a) and §27.53.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

```
┌─────────┐     ┌──────────┐     ┌────────────────────┐
│   EUT   │─────│ Splitter │─────│ Spectrum Analyzer  │
└─────────┘     └──────────┘     └────────────────────┘
                     │
                ┌──────────┐
                │  CMW500  │
                └──────────┘
```

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
R&S	Spectrum Analyzer	FSP 38	100478	2019/5/9	2020/5/9
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41005012	Each time	N/A
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
E-Microwave	Two-way Spliter	ODP-1-6-2S	OE0120142	Each time	N/A

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25.7~27.2°C
Relative Humidity:	59~60 %
ATM Pressure:	100.5~100.7kPa
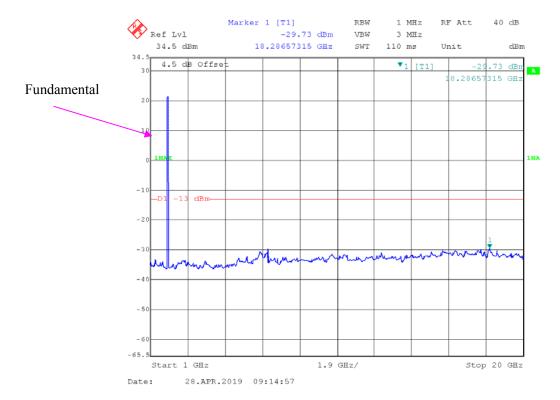
* The testing was performed by Blake Yang from 2019-04-25 to 2019-06-07.

Test mode: Transmitting (Middle Channel)

Test Result: Compliance, Please refer to the following plots.

WCDMA Band II,Rel99

	Marker 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	-51.13 dBm	VBW	300 kHz		
20 dBm	994.17434870 MHz	SWT	245 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-51.13 dBm
994.17434870 MHz

D1 -13 dBm

Start 31 MHz　　　　96.9 MHz/　　　　Stop 1 GHz

Date:　　28.APR.2019　09:13:57

	Marker 1 [T1]	RBW	1 MHz	RF Att	40 dB
Ref Lvl	-29.73 dBm	VBW	3 MHz		
34.5 dBm	18.28657315 GHz	SWT	110 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-29.73 dBm
18.28657315 GHz

Fundamental

D1 -13 dBm

Start 1 GHz　　　　1.9 GHz/　　　　Stop 20 GHz

Date:　　28.APR.2019　09:14:57

WCDMA Band V,Rel99

Fundamental

Date: 28.APR.2019 09:21:12

Date: 28.APR.2019 09:19:49

LTE Band 2 (Middle Channel)

QPSK_1.4 MHz

	Marker 1 [T1]		RBW	100 kHz	RF Att	30 dB
Ref Lvl		-51.90 dBm	VBW	300 kHz		
20 dBm		986.39278557 MHz	SWT	245 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -51.90 dBm
986.39278557 MHz

D1 -13 dBm

Start 30 MHz   97 MHz/   Stop 1 GHz

Date: 25.APR.2019 13:44:02

	Marker 1 [T1]		RBW	1 MHz	RF Att	40 dB
Ref Lvl		-30.44 dBm	VBW	3 MHz		
30 dBm		6.97795591 GHz	SWT	110 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -30.44 dBm
6.97795591 GHz

Fundamental

1MAX

D1 -13 dBm

Start 1 GHz   1.9 GHz/   Stop 20 GHz

Date: 25.APR.2019 13:44:12

QPSK_3 MHz

		RBW	100 kHz	RF Att	30 dB
	Marker 1 [T1]				
Ref Lvl	-51.81 dBm	VBW	300 kHz		
20 dBm	994.16833667 MHz	SWT	245 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-51.81 dBm
994.16833667 MHz

A

D1 -13 dBm

1MA

Start 30 MHz　　　　　97 MHz/　　　　　Stop 1 GHz

Date:　　25.APR.2019　13:44:29

		RBW	1 MHz	RF Att	40 dB
	Marker 1 [T1]				
Ref Lvl	-30.41 dBm	VBW	3 MHz		
30 dBm	6.97795591 GHz	SWT	110 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-30.41 dBm
6.97795591 GHz

A

Fundamental

1MAX

D1 -13 dBm

1MA

Start 1 GHz　　　　　1.9 GHz/　　　　　Stop 20 GHz

Date:　　25.APR.2019　13:44:39

QPSK_5 MHz

Marker 1 [T1]		RBW	100 kHz	RF Att	30 dB
Ref Lvl	-51.81 dBm	VBW	300 kHz		
20 dBm	898.91783567 MHz	SWT	245 ms	Unit	dBm

4.5 dB Offset ▼1 [T1] -51.81 dBm
898.91783567 MHz

A

D1 -13 dBm 1MA

Start 30 MHz　　　　　　97 MHz/　　　　　　Stop 1 GHz

Date:　　　25.APR.2019　13:44:55

Marker 1 [T1]		RBW	1 MHz	RF Att	40 dB
Ref Lvl	-30.46 dBm	VBW	3 MHz		
30 dBm	18.28657315 GHz	SWT	110 ms	Unit	dBm

4.5 dB Offset ▼1 [T1] -30.46 dBm
18.28657315 GHz

A

Fundamental

1MAX

D1 -13 dBm 1MA

Start 1 GHz　　　　　　1.9 GHz/　　　　　　Stop 20 GHz

Date:　　　25.APR.2019　13:45:06

QPSK_10 MHz

```
                        Marker 1 [T1]              RBW    100 kHz    RF Att    30 dB
         Ref Lvl                  -52.23 dBm       VBW    300 kHz
          20 dBm           978.61723447 MHz        SWT    245 ms     Unit       dBm
```

4.5 dB Offset   ▼1 [T1]   -52.23 dBm   A
                                                            978.61723447 MHz

D1 -13 dBm   1MA

```
    Start 30 MHz                      97 MHz/                   Stop 1 GHz
```

Date: 25.APR.2019 13:45:27

```
                        Marker 1 [T1]              RBW    1 MHz      RF Att    40 dB
         Ref Lvl                  -30.52 dBm       VBW    3 MHz
          30 dBm            17.10621242 GHz        SWT    110 ms     Unit       dBm
```

4.5 dB Offset   ▼1 [T1]   -30.52 dBm   A
                                                            17.10621242 GHz

Fundamental

1MAX   1MA

D1 -13 dBm

```
    Start 1 GHz                       1.9 GHz/                  Stop 20 GHz
```

Date: 25.APR.2019 13:45:37

QPSK_15 MHz

Marker 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	-52.07 dBm	VBW	300 kHz	
20 dBm	875.59118236 MHz	SWT	245 ms	Unit	dBm

4.5 dB Offset   ▼1 [T1]   -52.07 dBm
                            875.59118236 MHz   **A**

D1 -13 dBm   1MA

Start 30 MHz   97 MHz/   Stop 1 GHz

Date: 25.APR.2019 13:45:57

Marker 1 [T1]	RBW	1 MHz	RF Att	40 dB
Ref Lvl	-30.10 dBm	VBW	3 MHz	
30 dBm	18.32464930 GHz	SWT	110 ms	Unit	dBm

4.5 dB Offset   ▼1 [T1]   -30.10 dBm
                            18.32464930 GHz   **A**

Fundamental

1MAX

D1 -13 dBm   1MA

Start 1 GHz   1.9 GHz/   Stop 20 GHz

Date: 25.APR.2019 13:46:11

QPSK_20 MHz

```
            R&S        Marker 1 [T1]              RBW   100 kHz   RF Att   30 dB
            Ref Lvl                 -52.02 dBm    VBW   300 kHz
             20 dBm          996.11222445 MHz     SWT   245 ms    Unit        dBm
```

```
 20
       4.5 dB Offset                              ▼1 [T1]        -52.02 dBm    A
 10                                                       996.11222445 MHz
  0
-10
      D1 -13 dBm                                                              1MA
-20
-30
-40
-50                                                                           1
-60
-70
-80
    Start 30 MHz              97 MHz/              Stop 1 GHz
```

```
Date:       25.APR.2019  13:46:31
```

```
            R&S                          *RBW 1 MHz    Marker 1 [T1 ]
                                         *VBW 3 MHz           -17.51 dBm
            Ref  24.5 dBm     *Att  30 dB  SWT 380 ms     17.416000000 GHz
```

Fundamental

```
      Offset  4.5 dB
-20
 1 PK                                                                         A
 MAXH
-10
  0                                                                          LVL
-10
      D1 -13 dBm
-20                                                                  1
-30                                                                          3DB
-40
-50
-60
-70
    Start 1 GHz               1.9 GHz/             Stop 20 GHz
```

```
Date: 7.JUN.2019  14:10:39
```

LTE Band 4 (Middle Channel)

QPSK_1.4 MHz

			RBW	100 kHz	RF Att	30 dB
	Marker 1 [T1]					
Ref Lvl		-52.23 dBm	VBW	300 kHz		
20 dBm		998.05611222 MHz	SWT	245 ms	Unit	dBm

```
20
      4.5 dB Offset                                    ▼1 [T1]        -52.23 dBm   A
 10                                                       998.05611222 MHz
  0
-10
    D1 -13 dBm                                                            1MA
-20
-30
-40
-50
-60
-70
-80
   Start 30 MHz                   97 MHz/                    Stop 1 GHz
```

Date: 25.APR.2019   13:47:40

			RBW	1 MHz	RF Att	40 dB
	Marker 1 [T1]					
Ref Lvl		-30.10 dBm	VBW	3 MHz		
30 dBm		18.59118236 GHz	SWT	110 ms	Unit	dBm

Fundamental

```
30
      4.5 dB Offset                                    ▼1 [T1]        -30.10 dBm   A
 20                                                       18.59118236 GHz
 10
  0
    1MAX
-10
    D1 -13 dBm                                                            1MA
-20
-30                                                                  1
                                                                     ▼
-40
-50
-60
-70
   Start 1 GHz                    1.9 GHz/                   Stop 20 GHz
```

Date: 25.APR.2019   13:47:51

QPSK_3 MHz

	Marker 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	-51.92 dBm	VBW	300 kHz		
20 dBm	994.16833667 MHz	SWT	245 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -51.92 dBm
994.16833667 MHz

A

D1 -13 dBm   1MA

Start 30 MHz   97 MHz/   Stop 1 GHz

Date: 25.APR.2019 13:48:07

	Marker 1 [T1]	RBW	1 MHz	RF Att	40 dB
Ref Lvl	-30.56 dBm	VBW	3 MHz		
30 dBm	17.29659319 GHz	SWT	110 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -30.56 dBm
17.29659319 GHz

A

Fundamental

1MAX

D1 -13 dBm   1MA

Start 1 GHz   1.9 GHz/   Stop 20 GHz

Date: 25.APR.2019 13:48:17

QPSK_5 MHz

	Marker 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	-52.35 dBm	VBW	300 kHz		
20 dBm	970.84168337 MHz	SWT	245 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -52.35 dBm
970.84168337 MHz

A

D1 -13 dBm

1MA

1

Start 30 MHz   97 MHz/   Stop 1 GHz

Date: 25.APR.2019 13:48:34

	Marker 1 [T1]	RBW	1 MHz	RF Att	40 dB
Ref Lvl	-30.12 dBm	VBW	3 MHz		
30 dBm	16.49699399 GHz	SWT	110 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -30.12 dBm
16.49699399 GHz

A

Fundamental

1MAX

D1 -13 dBm

1MA

1

Start 1 GHz   1.9 GHz/   Stop 20 GHz

Date: 25.APR.2019 13:48:44

QPSK_10 MHz

```
         R                 Marker 1 [T1]              RBW    100 kHz    RF Att    30 dB
         &S    Ref Lvl                  -52.45 dBm    VBW    300 kHz
               20 dBm        972.78557114 MHz         SWT    245 ms     Unit        dBm
      20
          4.5 dB Offset                              ▼1 [T1]          -52.45 dBm    A
      10                                                      972.78557114 MHz
       0
     -10
         D1 -13 dBm                                                               1MA
     -20
     -30
     -40
     -50                                                                           1
                                                                                  ▼
     -60
     -70
     -80
      Start 30 MHz                    97 MHz/                      Stop 1 GHz
      Date:        25.APR.2019  13:49:03
```
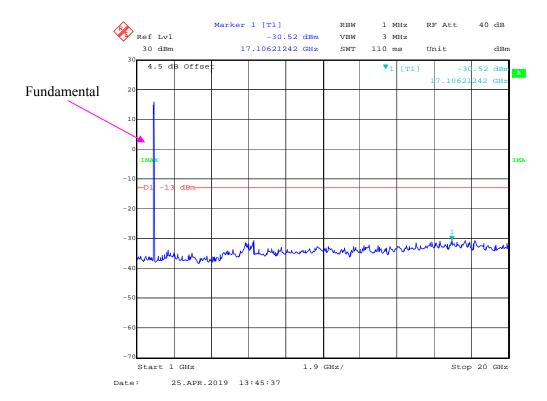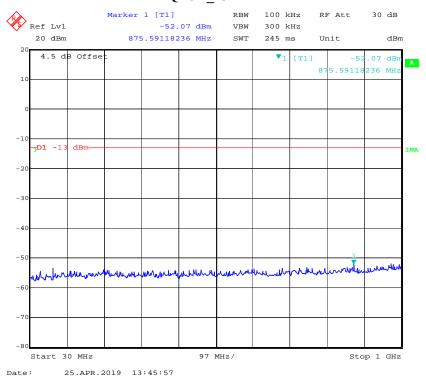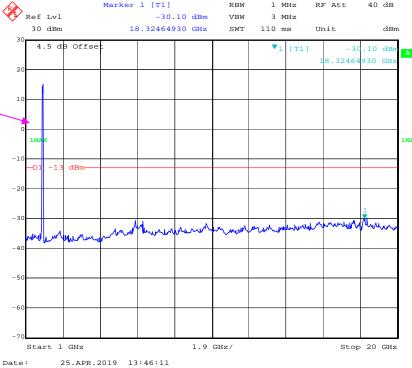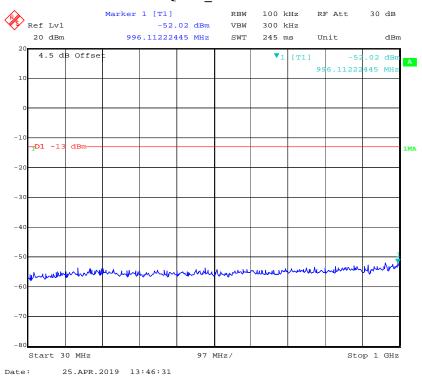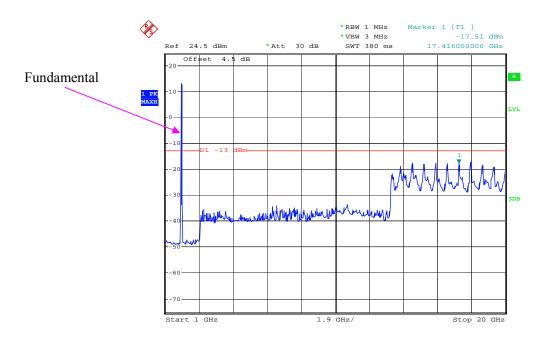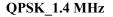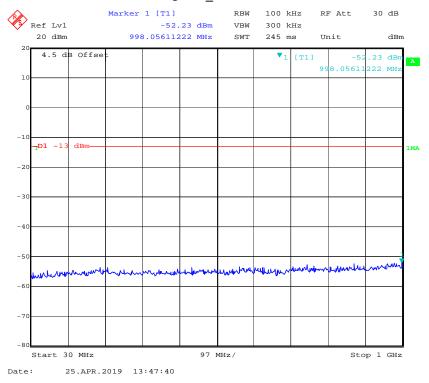
```
         R                 Marker 1 [T1]              RBW     1 MHz     RF Att    40 dB
         &S    Ref Lvl                  -29.94 dBm    VBW     3 MHz
               30 dBm        18.32464930 GHz          SWT    110 ms     Unit        dBm
      30
          4.5 dB Offset                              ▼1 [T1]          -29.94 dBm    A
      20                                                      18.32464930 GHz
      10
       0   MAX
     -10
         D1 -13 dBm                                                               1MA
     -20
     -30                                                                       1
                                                                              ▼
     -40
     -50
     -60
     -70
      Start 1 GHz                     1.9 GHz/                      Stop 20 GHz
      Date:        25.APR.2019  13:49:13
```
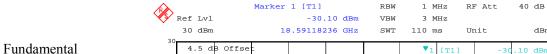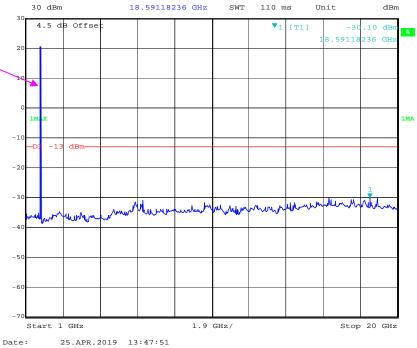
Fundamental

QPSK_15 MHz

```
         R&S                    Marker 1 [T1]              RBW    100 kHz    RF Att    30 dB
              Ref Lvl                   -52.77 dBm        VBW    300 kHz
              20 dBm              961.12224449 MHz        SWT    245 ms     Unit        dBm
```

```
  20  ┬ 4.5 dB Offset                                 ▼1 [T1]       -52.77 dBm   ┌─A─┐
      │                                                       961.12224449 MHz
  10  ┤
      │
   0  ┤
      │
 -10  ┤D1 -13 dBm                                                               1MA
      │
 -20  ┤
      │
 -30  ┤
      │
 -40  ┤
      │
 -50  ┤                                                                      1▼
      │  (noise trace)                                                    
 -60  ┤
      │
 -70  ┤
      │
 -80  ┴
     Start 30 MHz                    97 MHz/                    Stop 1 GHz
```

Date: 25.APR.2019 13:49:34

Fundamental

```
         R&S                    Marker 1 [T1]              RBW      1 MHz    RF Att    40 dB
              Ref Lvl                   -30.25 dBm        VBW      3 MHz
              30 dBm              17.06813627 GHz         SWT    110 ms     Unit        dBm
```

```
  30  ┬ 4.5 dB Offset                                 ▼1 [T1]       -30.25 dBm   ┌─A─┐
      │                                                       17.06813627 GHz
  20  ┤
      │
  10  ┤
      │
   0  ┤
      │
 -10  ┤1MAX                                                                       1MA
      │D1 -13 dBm
 -20  ┤
      │
 -30  ┤                                                                  1▼
      │
 -40  ┤
      │
 -50  ┤
      │
 -60  ┤
      │
 -70  ┴
     Start 1 GHz                     1.9 GHz/                   Stop 20 GHz
```

Date: 25.APR.2019 13:49:44

QPSK_20 MHz

	Marker 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	-52.00 dBm	VBW	300 kHz		
20 dBm	992.22444890 MHz	SWT	245 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-52.00 dBm
992.22444890 MHz

A

D1 -13 dBm

1MA

1

Start 30 MHz　　　　97 MHz/　　　　Stop 1 GHz

Date:　　25.APR.2019　13:50:04

Fundamental

	Marker 1 [T1]	RBW	1 MHz	RF Att	40 dB
Ref Lvl	-30.20 dBm	VBW	3 MHz		
30 dBm	18.28657315 GHz	SWT	110 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-30.20 dBm
18.28657315 GHz

A

1MAX

D1 -13 dBm

1MA

1

Start 1 GHz　　　　1.9 GHz/　　　　Stop 20 GHz

Date:　　25.APR.2019　13:50:15

LTE Band 5 (Middle Channel)

QPSK_1.4 MHz

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-41.54 dBm	VBW	300 kHz		
30 dBm	1.00000000 GHz	SWT	245 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -41.54 dBm
1.00000000 GHz   Fundamental

A

1MAX

D1 -13 dBm

1MA

Start 30 MHz   97 MHz/   Stop 1 GHz

Date: 25.APR.2019   13:50:40

	Marker 1 [T1]	RBW	1 MHz	RF Att	30 dB
Ref Lvl	-31.16 dBm	VBW	3 MHz		
20 dBm	1.66733467 GHz	SWT	52 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -31.16 dBm
1.66733467 GHz

A

D1 -13 dBm

1MA

1

Start 1 GHz   900 MHz/   Stop 10 GHz

Date: 25.APR.2019   13:50:50

QPSK_3 MHz

```
            Marker 1 [T1]              RBW    100 kHz    RF Att    40 dB
Ref Lvl                  -41.26 dBm    VBW    300 kHz
 30 dBm          988.33667335 MHz      SWT    245 ms     Unit        dBm
```

30 4.5 dB Offset   ▼1 [T1]   -41.26 dBm   A
                                                              988.33667335 MHz

Fundamental

20

10

0

1MAX   1MA

-10   D1 -13 dBm

-20

-30

-40   1

-50

-60

-70
Start 30 MHz   97 MHz/   Stop 1 GHz

Date: 25.APR.2019 13:51:07

```
            Marker 1 [T1]              RBW    1 MHz      RF Att    30 dB
Ref Lvl                  -34.88 dBm    VBW    3 MHz
 20 dBm            1.66733467 GHz      SWT    52 ms      Unit        dBm
```

20 4.5 dB Offset   ▼1 [T1]   -34.88 dBm   A
                                                                1.66733467 GHz

10

0

-10   D1 -13 dBm   1MA

-20

-30
      1
-40

-50

-60

-70

-80
Start 1 GHz   900 MHz/   Stop 10 GHz

Date: 25.APR.2019 13:51:16

QPSK_5 MHz

```
           Marker 1 [T1]          RBW    100 kHz   RF Att    40 dB
 Ref Lvl                -41.99 dBm  VBW    300 kHz
   30 dBm        970.84168337 MHz  SWT    245 ms    Unit       dBm
```

Fundamental

```
 30
    4.5 dB Offset                        ▼1 [T1]      -41.99 dBm  A
                                            970.84168337 MHz
 20

 10

  0
 1MAX                                                         1MA
-10
  D1 -13 dBm
-20

-30

-40                                                      1
                                                         ▼
-50

-60

-70
Start 30 MHz              97 MHz/              Stop 1 GHz
```

Date: 25.APR.2019   13:52:06

```
           Marker 1 [T1]          RBW    1 MHz     RF Att    30 dB
 Ref Lvl                -37.11 dBm  VBW    3 MHz
   20 dBm        1.66733467 GHz    SWT    52 ms     Unit       dBm
 20
    4.5 dB Offset                        ▼1 [T1]      -37.11 dBm  A
                                            1.66733467 GHz
 10

  0

-10
  D1 -13 dBm                                                  1MA
-20

-30
      1
      ▼
-40

-50

-60

-70

-80
Start 1 GHz              900 MHz/              Stop 10 GHz
```

Date: 25.APR.2019   13:52:19

QPSK_10 MHz

| Marker 1 [T1] | RBW | 100 kHz | RF Att | 40 dB |
Ref Lvl -41.92 dBm VBW 300 kHz
30 dBm 996.11222445 MHz SWT 245 ms Unit dBm

4.5 dB Offset
▼1 [T1] -41.92 dBm
996.11222445 MHz
A

1MAX
1MA

D1 -13 dBm

Start 30 MHz   97 MHz/   Stop 1 GHz

Date: 25.APR.2019 13:52:37

| Marker 1 [T1] | RBW | 1 MHz | RF Att | 30 dB |
Ref Lvl -38.84 dBm VBW 3 MHz
20 dBm 1.64929860 GHz SWT 52 ms Unit dBm

4.5 dB Offset
▼1 [T1] -38.84 dBm
1.64929860 GHz
A

D1 -13 dBm
1MA

Start 1 GHz   900 MHz/   Stop 10 GHz

Date: 25.APR.2019 13:52:46

Fundamental

LTE Band 12 (Middle Channel)

QPSK_1.4 MHz

		Marker 1 [T1]		RBW	100 kHz	RF Att	40 dB
	Ref Lvl		-34.20 dBm	VBW	300 kHz		
	30 dBm		459.59919840 MHz	SWT	245 ms	Unit	dBm

4.5 dB Offset

▼1 [T1] -34.20 dBm
459.59919840 MHz

A

Fundamental

1MAX

1MA

D1 -13 dBm

Start 30 MHz   97 MHz/   Stop 1 GHz

Date: 25.APR.2019 13:53:03

		Marker 1 [T1]		RBW	1 MHz	RF Att	30 dB
	Ref Lvl		-30.91 dBm	VBW	3 MHz		
	20 dBm		1.41482966 GHz	SWT	52 ms	Unit	dBm

4.5 dB Offset

▼1 [T1] -30.91 dBm
1.41482966 GHz

A

D1 -13 dBm

1MA

Start 1 GHz   900 MHz/   Stop 10 GHz

Date: 25.APR.2019 13:53:13

QPSK_3 MHz


```
         Marker 1 [T1]            RBW   100 kHz   RF Att   40 dB
Ref Lvl                -39.27 dBm  VBW   300 kHz
 30 dBm        459.59919840 MHz    SWT   245 ms    Unit      dBm
```

4.5 dB Offset ... ▼1 [T1]   -39.27 dBm
459.59919840 MHz

1MAX

D1 -13 dBm

1MA

1

```
Start 30 MHz            97 MHz/            Stop 1 GHz
Date:      25.APR.2019  13:53:30
```



```
         Marker 1 [T1]            RBW     1 MHz   RF Att   30 dB
Ref Lvl                -34.19 dBm  VBW     3 MHz
 20 dBm        1.39679359 GHz      SWT    52 ms    Unit      dBm
```

4.5 dB Offset ... ▼1 [T1]   -34.19 dBm
1.39679359 GHz

D1 -13 dBm

1MA

1

```
Start 1 GHz            900 MHz/            Stop 10 GHz
Date:      25.APR.2019  13:53:39
```

Fundamental

QPSK_5 MHz

```
                    Marker 1 [T1]          RBW    100 kHz   RF Att    40 dB
      Ref Lvl                  -42.10 dBm  VBW    300 kHz
       30 dBm            959.17835671 MHz  SWT    245 ms    Unit        dBm
```

Fundamental

```
 30
      4.5 dB Offset                              ▼1 [T1]      -42.10 dBm   A
 20                                                      959.17835671 MHz
 10
  0
     1MAX                                                             1MA
-10
    —D1 -13 dBm—
-20
-30
-40                                                                 1
-50
-60
-70
     Start 30 MHz              97 MHz/                      Stop 1 GHz
```

Date: 25.APR.2019 13:53:56

```
                    Marker 1 [T1]          RBW      1 MHz   RF Att    30 dB
      Ref Lvl                  -37.25 dBm  VBW      3 MHz
       20 dBm           1.37875752 GHz     SWT     52 ms    Unit        dBm
```

```
 20
      4.5 dB Offset                              ▼1 [T1]      -37.25 dBm   A
 10                                                       1.37875752 GHz
  0
-10
    —D1 -13 dBm—                                                    1MA
-20
-30
      1
-40
-50
-60
-70
-80
     Start 1 GHz              900 MHz/                     Stop 10 GHz
```

Date: 25.APR.2019 13:54:06

QPSK_10 MHz

```
        R&S  Ref Lvl          Marker 1 [T1]        RBW   100 kHz   RF Att   40 dB
                              -41.66 dBm           VBW   300 kHz
             30 dBm           1.00000000 GHz       SWT   245 ms    Unit       dBm
```

Fundamental

```
Date:      25.APR.2019  13:54:24
```

```
        R&S  Ref Lvl          Marker 1 [T1]        RBW    1 MHz   RF Att    30 dB
                              -38.50 dBm           VBW    3 MHz
             20 dBm           1.43286573 GHz       SWT    52 ms   Unit        dBm
```

```
Date:      25.APR.2019  13:54:34
```

LTE Band 17 (Middle Channel)

QPSK_5 MHz

		RBW	100 kHz	RF Att	40 dB
	Marker 1 [T1]				
Ref Lvl	-42.07 dBm	VBW	300 kHz		
30 dBm	957.23446894 MHz	SWT	245 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-42.07 dBm
957.23446894 MHz

Fundamental

1MAX

D1 -13 dBm

1MA

Start 30 MHz　　　　97 MHz/　　　　Stop 1 GHz

Date:　　25.APR.2019　13:54:51

		RBW	1 MHz	RF Att	30 dB
	Marker 1 [T1]				
Ref Lvl	-38.92 dBm	VBW	3 MHz		
20 dBm	1.37875752 GHz	SWT	52 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-38.92 dBm
1.37875752 GHz

D1 -13 dBm

1MA

Start 1 GHz　　　　900 MHz/　　　　Stop 10 GHz

Date:　　25.APR.2019　13:55:00

QPSK_10 MHz

Fundamental

```
Marker 1 [T1]          RBW    100 kHz    RF Att    40 dB
Ref Lvl                -42.22 dBm        VBW    300 kHz
  30 dBm               984.44889780 MHz  SWT    245 ms    Unit      dBm

4.5 dB Offset                                ▼1 [T1]      -42.22 dBm
                                                     984.44889780 MHz
1MAX                                                              1MA
D1 -13 dBm

Start 30 MHz              97 MHz/                    Stop 1 GHz
```

Date: 25.APR.2019 13:55:18


```
Marker 1 [T1]          RBW    1 MHz      RF Att    30 dB
Ref Lvl                -39.72 dBm        VBW    3 MHz
  20 dBm               1.43286573 GHz    SWT    52 ms     Unit      dBm

4.5 dB Offset                                ▼1 [T1]      -39.72 dBm
                                                     1.43286573 GHz
D1 -13 dBm                                                        1MA

Start 1 GHz              900 MHz/                    Stop 10 GHz
```

Date: 25.APR.2019 13:55:29

FCC §2.1053, §22.917 & §24.238 & §27.53- SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC § 2.1053, §22.917, § 24.238 and § 27.53;

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = $43 + 10 \log_{10}$ (power out in Watts)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2018-12-10	2019-12-10
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2018-05-06	2019-05-06
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2018-09-05	2019-09-05
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-01-04	2020-01-04
TDK RF	Horn Antenna	HRN-0118	130 084	2018-10-12	2021-10-12
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2018-06-27	2019-06-27
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2018-09-05	2019-09-05
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-02 1304	2016-11-18	2019-11-18
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2018-06-27	2019-06-27
Agilent	Signal Generator	E8247C	MY43321350	2018-12-10	2019-12-10
Micro-tronics	High Pass Filter	HPM50111	S/N-G217	2018-06-16	2019-06-16
Sinoscite	Band-stop filter	BSF1710-1785MN-0383-003	0383003	2018-06-16	2019-06-16
Sinoscite	Band-stop filter	BSF824-862MS-1438-001	1438001	2018-06-16	2019-06-16
Sinoscite	Band-stop filter	BSF1850-1910MS-0935V2	0935V2	2018-06-16	2019-06-16

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Relative Humidity:	43~52 %
Temperature:	23.8~25.1°C
ATM Pressure:	100.4~101.2 kPa

* The testing was performed by Tyler Pan, Vern Shen, Neil Liao on 2019-04-21.

Operation Mode: Transmitting

Test Result: Compliance, please refer to the below tables.

30 MHz-10 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
WCDMA Band V R99,Frequency:836.600 MHz								
1673.200	H	51.26	-62.95	10.6	0.73	-53.1	-13.0	40.1
1673.200	V	54.93	-59.88	10.6	0.73	-50.0	-13.0	37.0
2509.800	H	46.98	-66.04	13.1	1.25	-54.2	-13.0	41.2
2509.800	V	48.77	-64.28	13.1	1.25	-52.4	-13.0	39.4
3346.400	H	46.37	-64.29	13.8	1.61	-52.1	-13.0	39.1
3346.400	V	46.28	-64.43	13.8	1.61	-52.2	-13.0	39.2
354.000	H	49.37	-57.21	0.0	0.57	-57.8	-13.0	44.8
41.640	V	46.75	-42.32	-24.2	0.21	-66.8	-13.0	53.8

30 MHz-20 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
WCDMA Band II R99,Frequency: 1880.000 MHz								
3760.000	H	48.25	-60.55	13.8	1.63	-48.4	-13.0	35.4
3760.000	V	48.57	-60.1	13.8	1.63	-48.0	-13.0	35.0
5640.000	H	45.96	-60.07	14.0	1.31	-47.4	-13.0	34.4
5640.000	V	46.23	-59.68	14.0	1.31	-47.0	-13.0	34.0
113.420	H	48.87	-55.53	0.0	0.29	-55.8	-13.0	42.8
113.420	V	51.12	-60.2	0.0	0.29	-60.5	-13.0	47.5

LTE Band 2 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:1880.000 MHz								
3760.00	H	50.98	-57.82	13.76	1.63	-45.69	-13.00	32.69
3760.00	V	51.81	-56.86	13.76	1.63	-44.73	-13.00	31.73
5640.00	H	46.24	-59.79	14.02	1.31	-47.08	-13.00	34.08
5640.00	V	45.79	-60.12	14.02	1.31	-47.41	-13.00	34.41
144.40	H	38.70	-67.45	0.00	0.36	-67.81	-13.00	54.81
104.58	V	46.37	-66.05	0.00	0.27	-66.32	-13.00	53.32

LTE Band 4 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:1732.500 MHz								
3465.00	H	50.29	-59.95	13.91	1.62	-47.66	-13.00	34.66
3465.00	V	50.97	-59.31	13.91	1.62	-47.02	-13.00	34.02
5197.50	H	46.77	-59.65	14.00	1.52	-47.17	-13.00	34.17
5197.50	V	46.42	-60.07	14.00	1.52	-47.59	-13.00	34.59
99.87	H	39.40	-67.01	0.00	0.26	-67.27	-13.00	54.27
40.54	V	47.70	-40.02	-25.69	0.21	-65.92	-13.00	52.92

LTE Band 5 (30MHz-10GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:836.500 MHz								
1673.00	H	54.13	-60.09	10.61	0.73	-50.21	-13.00	37.21
1673.00	V	58.21	-56.61	10.61	0.73	-46.73	-13.00	33.73
2509.50	H	52.08	-60.94	13.11	1.25	-49.08	-13.00	36.08
2509.50	V	53.94	-59.11	13.11	1.25	-47.25	-13.00	34.25
3346.00	H	46.67	-63.99	13.83	1.61	-51.77	-13.00	38.77
3346.00	V	46.83	-63.88	13.83	1.61	-51.66	-13.00	38.66
159.98	H	36.00	-71.10	0.00	0.40	-71.50	-13.00	58.50
39.70	V	47.57	-39.10	-26.26	0.21	-65.57	-13.00	52.57

LTE Band 12 (30MHz-10GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:707.500 MHz								
1415.00	H	58.42	-55.08	9.08	1.22	-47.22	-13.00	34.22
1415.00	V	61.37	-52.66	9.08	1.22	-44.80	-13.00	31.80
2122.50	H	53.95	-58.84	11.27	1.11	-48.68	-13.00	35.68
2122.50	V	55.53	-57.24	11.27	1.11	-47.08	-13.00	34.08
2830.00	H	53.82	-58.26	13.34	1.36	-46.28	-13.00	33.28
2830.00	V	53.94	-58.37	13.34	1.36	-46.39	-13.00	33.39
3537.50	H	46.73	-63.41	13.91	1.57	-51.07	-13.00	38.07
3537.50	V	47.13	-63.01	13.91	1.57	-50.67	-13.00	37.67
439.34	H	38.77	-65.81	0.00	0.65	-66.46	-13.00	53.46
45.87	V	48.70	-45.91	-18.95	0.21	-65.07	-13.00	52.07

LTE Band 17 (30MHz-10GHz)

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:710.000 MHz								
1420.00	H	53.94	-59.66	9.10	1.23	-51.79	-13.00	38.79
1420.00	V	56.37	-57.73	9.10	1.23	-49.86	-13.00	36.86
2130.00	H	50.62	-62.13	11.22	1.11	-52.02	-13.00	39.02
2130.00	V	49.73	-62.99	11.22	1.11	-52.88	-13.00	39.88
2840.00	H	46.94	-65.10	13.42	1.36	-53.04	-13.00	40.04
2840.00	V	47.69	-64.59	13.42	1.36	-52.53	-13.00	39.53
387.36	H	35.70	-69.59	0.00	0.60	-70.19	-13.00	57.19
42.50	V	47.50	-42.62	-23.10	0.21	-65.93	-13.00	52.93

Note:
1) The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.
2) Absolute Level = Substituted Level - Cable loss + Antenna Gain
3) Margin = Limit-Absolute Level

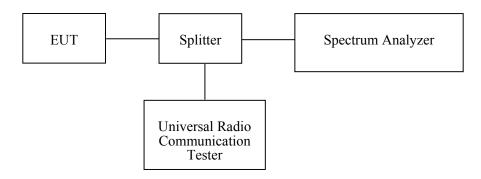## FCC §22.917(a) & §24.238(a) & §27.53- BAND EDGES

Applicable Standard

FCC § 2.1053, §22.917, § 24.238 and § 27.53;

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41005012	Each time	N/A
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
E-Microwave	Two-way Spliter	ODP-1-6-2S	OE0120142	Each time	N/A

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions
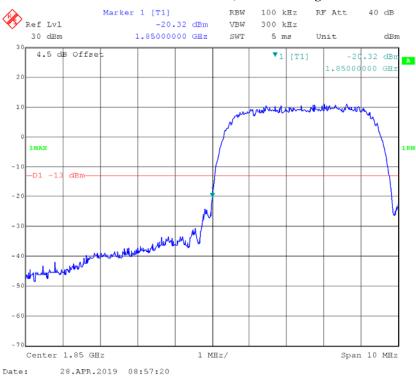
Temperature:	23.8~25.1°C
Relative Humidity:	43~52 %
ATM Pressure:	100.4~101.2 kPa

The testing was performed by Elena Lei & Blake Yang on 2019-04-25~2019-04-28.

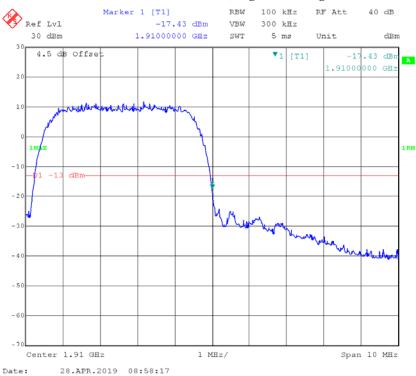*Test Mode: Transmitting*
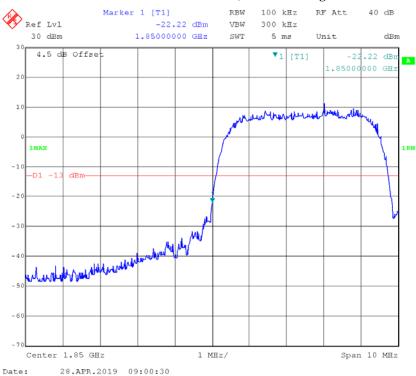*Test Result: Compliant. Please refer to the following plots.*

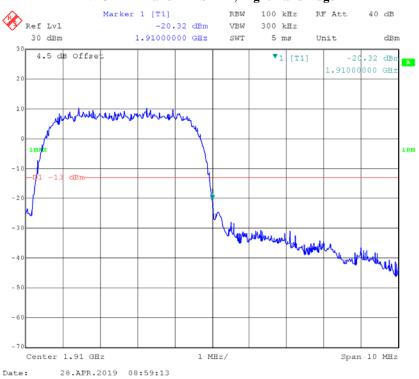**WCDMA Band II Rel 99, Left Band Edge**

Date: 28.APR.2019   08:57:20

WCDMA Band II Rel 99, Right Band Edge

Date: 28.APR.2019   08:58:17
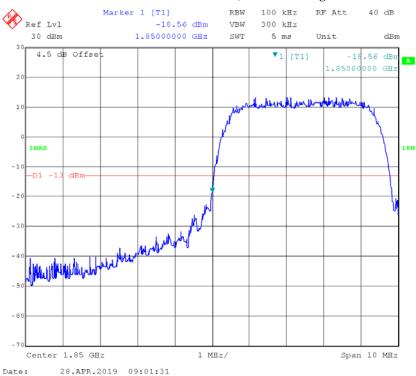
WCDMA Band II HSDPA, Left Band Edge

Date: 28.APR.2019   09:00:30
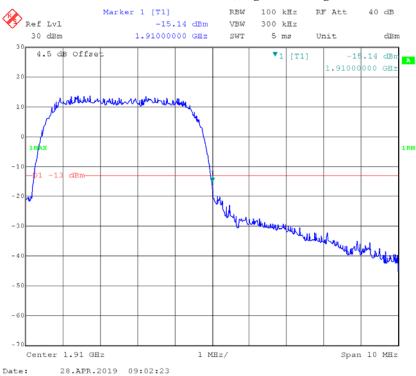
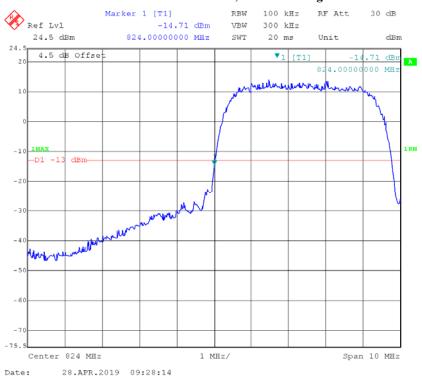**WCDMA Band II HSDPA, Right Band Edge**

Date: 28.APR.2019   08:59:13

WCDMA Band II HSUPA, Left Band Edge
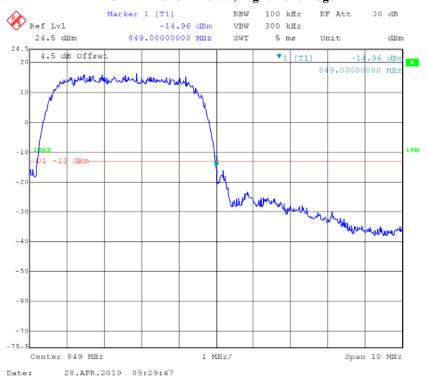
WCDMA Band II HSUPA, Right Band Edge
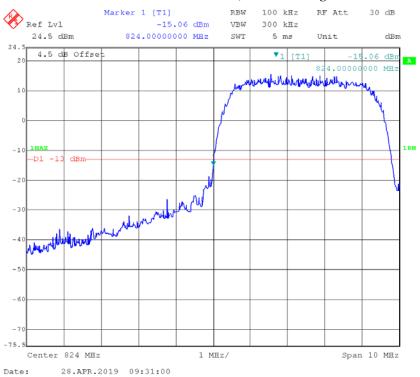
WCDMA Band V Rel 99, Left Band Edge

Date: 28.APR.2019   09:28:14
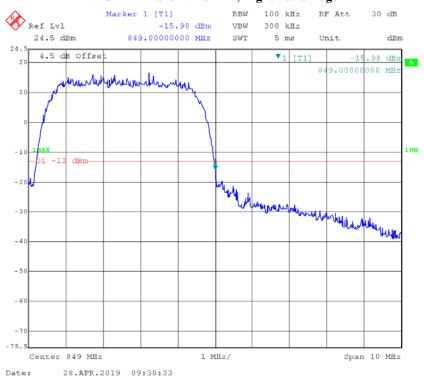
WCDMA Band V Rel 99, Right Band Edge

Date: 28.APR.2019   09:29:47
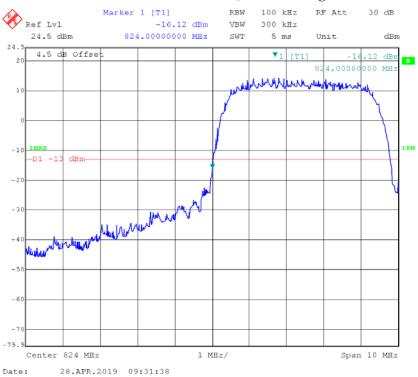
WCDMA Band V HSDPA, Left Band Edge

	Marker 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	-15.06 dBm	VBW	300 kHz	
24.5 dBm	824.00000000 MHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -15.06 dBm
824.00000000 MHz

1MAX
D1 -13 dBm

1RM

Center 824 MHz   1 MHz/   Span 10 MHz

Date: 28.APR.2019 09:31:00
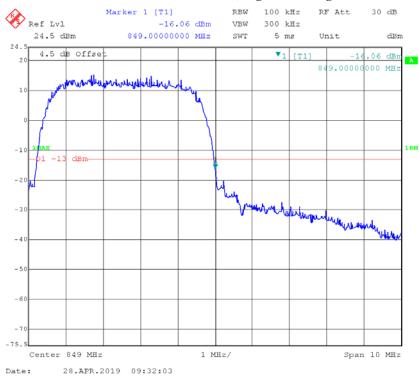
WCDMA Band V HSDPA, Right Band Edge

	Marker 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	-15.98 dBm	VBW	300 kHz	
24.5 dBm	849.00000000 MHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -15.98 dBm
849.00000000 MHz

1MAX
D1 -13 dBm

1RM

Center 849 MHz   1 MHz/   Span 10 MHz

Date: 28.APR.2019 09:30:33

WCDMA Band V HSUPA, Left Band Edge

Date:　　　28.APR.2019　09:31:38
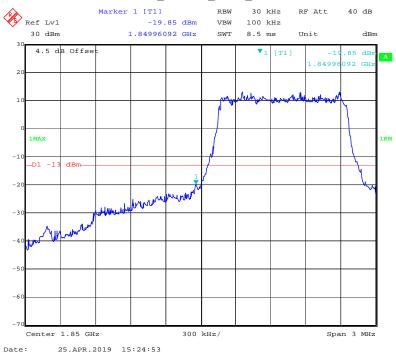
WCDMA Band V HSUPA, Right Band Edge

Date:　　　28.APR.2019　09:32:03

LTE Band 2

QPSK_1.4MHz_ 6 RB_ Left

	Marker 1 [T1]	RBW　30 kHz	RF Att　40 dB
Ref Lvl	-19.85 dBm	VBW　100 kHz	
30 dBm	1.84996092 GHz	SWT　8.5 ms	Unit　dBm

Center 1.85 GHz　　　　　　　300 kHz/　　　　　　　Span 3 MHz

Date:　　　25.APR.2019　15:24:53

QPSK_1.4MHz_ 6 RB_ Right

	Marker 1 [T1]	RBW　30 kHz	RF Att　40 dB
Ref Lvl	-14.04 dBm	VBW　100 kHz	
30 dBm	1.91002705 GHz	SWT　8.5 ms	Unit　dBm

Center 1.91 GHz　　　　　　　300 kHz/　　　　　　　Span 3 MHz

Date:　　　25.APR.2019　15:25:53

QPSK_3MHz_ 15 RB_ Left

	Marker 1 [T1]	RBW	30 kHz	RF Att	40 dB
Ref Lvl	-22.77 dBm	VBW	100 kHz		
30 dBm	1.85000000 GHz	SWT	17 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -22.77 dBm
1.85000000 GHz

1MAX

D1 -13 dBm

1RM

Center 1.85 GHz   600 kHz/   Span 6 MHz

Date: 25.APR.2019 15:29:36

QPSK_3MHz_ 15 RB_ Right

	Marker 1 [T1]	RBW	30 kHz	RF Att	40 dB
Ref Lvl	-19.20 dBm	VBW	100 kHz		
30 dBm	1.91007816 GHz	SWT	17 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -19.20 dBm
1.91007816 GHz

1MAX

D1 -13 dBm

1RM

Center 1.91 GHz   600 kHz/   Span 6 MHz

Date: 25.APR.2019 15:30:36

QPSK_5MHz_ 25 RB_ Left

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-16.84 dBm	VBW	300 kHz		
30 dBm	1.84998998 GHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -16.84 dBm
1.84998998 GHz

A

1MAX

1RM

D1 -13 dBm

Center 1.85 GHz   1 MHz/   Span 10 MHz

Date: 25.APR.2019 15:32:28

QPSK_5MHz_ 25 RB_ Right

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-16.53 dBm	VBW	300 kHz		
30 dBm	1.91003006 GHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -16.53 dBm
1.91003006 GHz

A

1MAX

1RM

D1 -13 dBm

Center 1.91 GHz   1 MHz/   Span 10 MHz

Date: 25.APR.2019 15:33:28

QPSK_10MHz_ 50 RB_ Left

	Marker 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	-25.40 dBm	VBW	300 kHz		
24.5 dBm	1.85000000 GHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-25.40 dBm
1.85000000 GHz

A

1MAX

D1 -13 dBm

1RM

Center 1.85 GHz　　　　2 MHz/　　　　Span 20 MHz

Date:　　26.APR.2019　10:28:04

QPSK_10MHz_ 50 RB_ Right

	Marker 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	-20.49 dBm	VBW	300 kHz		
24.5 dBm	1.91000000 GHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-20.49 dBm
1.91000000 GHz

A

1MAX

D1 -13 dBm

1RM

Center 1.91 GHz　　　　2 MHz/　　　　Span 20 MHz

Date:　　26.APR.2019　10:30:13

QPSK_15MHz_ 75 RB_ Left

	Marker 1 [T1]	RBW	300 kHz	RF Att	30 dB
Ref Lvl	-24.46 dBm	VBW	1 MHz		
24.5 dBm	1.85000000 GHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -24.46 dBm
1.85000000 GHz

A

1MAX
D1 -13 dBm

1RM

Center 1.85 GHz   3 MHz/   Span 30 MHz

Date: 26.APR.2019 10:31:55

QPSK_15MHz_ 75 RB_ Right

	Marker 1 [T1]	RBW	300 kHz	RF Att	30 dB
Ref Lvl	-21.04 dBm	VBW	1 MHz		
24.5 dBm	1.91000000 GHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -21.04 dBm
1.91000000 GHz

A

1MAX
D1 -13 dBm

1RM

Center 1.91 GHz   3 MHz/   Span 30 MHz

Date: 26.APR.2019 10:31:24

QPSK_20MHz_ FULL RB_ Left

Marker 1 [T1]		RBW	300 kHz	RF Att	30 dB
Ref Lvl	-26.51 dBm	VBW	1 MHz		
24.5 dBm	1.85000000 GHz	SWT	5 ms	Unit	dBm

Date: 26.APR.2019   10:35:00

QPSK_20MHz_ FULL RB_ Right

Marker 1 [T1]		RBW	300 kHz	RF Att	30 dB
Ref Lvl	-26.20 dBm	VBW	1 MHz		
24.5 dBm	1.91000000 GHz	SWT	5 ms	Unit	dBm

Date: 26.APR.2019   10:35:32

16QAM_1.4MHz_ 6 RB_ Left

Date:　　　25.APR.2019　15:25:25

16QAM_1.4MHz_ 6 RB_ Right

Date:　　　25.APR.2019　15:27:11

16QAM_3MHz_ 15 RB_ Left

	Marker 1 [T1]	RBW	30 kHz	RF Att	40 dB
Ref Lvl	-23.77 dBm	VBW	100 kHz		
30 dBm	1.85000000 GHz	SWT	17 ms	Unit	dBm

```
4.5 dB Offset                          ▼1 [T1]        -23.77 dBm
                                                      1.85000000 GHz
1MAX
D1 -13 dBm
```

Center 1.85 GHz   600 kHz/   Span 6 MHz

Date: 25.APR.2019 15:30:02

16QAM_3MHz_ 15 RB_ Right

	Marker 1 [T1]	RBW	30 kHz	RF Att	40 dB
Ref Lvl	-22.22 dBm	VBW	100 kHz		
30 dBm	1.91001804 GHz	SWT	17 ms	Unit	dBm

```
4.5 dB Offset                          ▼1 [T1]        -22.22 dBm
                                                      1.91001804 GHz
1MAX
D1 -13 dBm
```

Center 1.91 GHz   600 kHz/   Span 6 MHz

Date: 25.APR.2019 15:31:50

16QAM_5MHz_ 25 RB_ Left

Date: 25.APR.2019 15:32:58

16QAM_5MHz_ 25 RB_ Right

Date: 25.APR.2019 15:34:01

LTE Band 4

QPSK_1.4MHz_ 6 RB_ Left

Date: 25.APR.2019   14:53:56

QPSK_1.4MHz_ 6 RB_ Right

Date: 25.APR.2019   14:55:06

QPSK_3MHz_ 15 RB_ Left

Marker 1 [T1]		RBW	100 kHz	RF Att	40 dB
Ref Lvl	-15.57 dBm	VBW	300 kHz		
30 dBm	1.71000000 GHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-15.57 dBm
1.71000000 GHz

1MAX
1RM
D1 -13 dBm

Center 1.71 GHz　　　　1 MHz/　　　　Span 10 MHz

Date:　　25.APR.2019　14:56:12

QPSK_3MHz_ 15 RB_ Right

Marker 1 [T1]		RBW	100 kHz	RF Att	40 dB
Ref Lvl	-15.74 dBm	VBW	300 kHz		
30 dBm	1.75501002 GHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-15.74 dBm
1.75501002 GHz

1MAX
1RM
D1 -13 dBm

Center 1.755 GHz　　　　1 MHz/　　　　Span 10 MHz

Date:　　25.APR.2019　14:57:22

QPSK_5MHz_ 25 RB_ Left

	Marker 1 [T1]	RBW	100 kHz RF Att 40 dB
Ref Lvl	-15.57 dBm	VBW	300 kHz
30 dBm	1.71000000 GHz	SWT	5 ms Unit dBm

4.5 dB Offset

▼1 [T1]   -15.57 dBm
1.71000000 GHz

A

1MAX

1RM

D1 -13 dBm

Center 1.71 GHz   1 MHz/   Span 10 MHz

Date: 25.APR.2019 14:56:12

QPSK_5MHz_ 25 RB_ Right

	Marker 1 [T1]	RBW	100 kHz RF Att 40 dB
Ref Lvl	-15.74 dBm	VBW	300 kHz
30 dBm	1.75501002 GHz	SWT	5 ms Unit dBm

4.5 dB Offset

▼1 [T1]   -15.74 dBm
1.75501002 GHz

A

1MAX

1RM

D1 -13 dBm

Center 1.755 GHz   1 MHz/   Span 10 MHz

Date: 25.APR.2019 14:57:22

QPSK_10MHz_ 50 RB_ Left

	Marker 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	-24.26 dBm	VBW	300 kHz		
24.5 dBm	1.71000000 GHz	SWT	5 ms	Unit	dBm

Date:　　26.APR.2019　10:37:00

QPSK_10MHz_ 50 RB_ Right

	Marker 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	-24.96 dBm	VBW	300 kHz		
24.5 dBm	1.75500000 GHz	SWT	5 ms	Unit	dBm

Date:　　26.APR.2019　10:37:35

QPSK_15MHz_ 75 RB_ Left

	Marker 1 [T1]		RBW	300 kHz	RF Att	30 dB
Ref Lvl		-22.87 dBm	VBW	1 MHz		
24.5 dBm		1.71000000 GHz	SWT	5 ms	Unit	dBm

```
 24.5
    4.5 dB Offset                              ▼1 [T1]        -22.87 dBm    A
  20                                                     1.71000000 GHz
  10
   0
 -10  1MAX                                                                 1RM
     D1 -13 dBm
 -20
 -30
 -40
 -50
 -60
 -70
-75.5
    Center 1.71 GHz            3 MHz/              Span 30 MHz
```

Date: 26.APR.2019 10:40:38

QPSK_15MHz_ 75 RB_ Right

	Marker 1 [T1]		RBW	300 kHz	RF Att	30 dB
Ref Lvl		-20.77 dBm	VBW	1 MHz		
24.5 dBm		1.75500000 GHz	SWT	5 ms	Unit	dBm

```
 24.5
    4.5 dB Offset                              ▼1 [T1]        -20.77 dBm    A
  20                                                     1.75500000 GHz
  10
   0
 -10  1MAX                                                                 1RM
     D1 -13 dBm
 -20
 -30
 -40
 -50
 -60
 -70
-75.5
    Center 1.755 GHz           3 MHz/              Span 30 MHz
```

Date: 26.APR.2019 10:38:32

QPSK_20MHz_ FULL RB_ Left

	Marker 1 [T1]	RBW 300 kHz	RF Att 30 dB
Ref Lvl	-27.66 dBm	VBW 1 MHz	
24.5 dBm	1.71000000 GHz	SWT 5 ms	Unit dBm

4.5 dB Offset　　　　　▼1 [T1]　　-27.66 dBm　A
　　　　　　　　　　　　　　　　1.71000000 GHz

1MAX　　　　　　　　　　　　　　　　　　　1RM
D1 -13 dBm

Center 1.71 GHz　　　　4 MHz/　　　　Span 40 MHz

Date:　　26.APR.2019　10:41:19

QPSK_20MHz_ FULL RB_ Right

	Marker 1 [T1]	RBW 300 kHz	RF Att 30 dB
Ref Lvl	-26.11 dBm	VBW 1 MHz	
24.5 dBm	1.75500000 GHz	SWT 5 ms	Unit dBm

4.5 dB Offset　　　　　▼1 [T1]　　-26.11 dBm　A
　　　　　　　　　　　　　　　　1.75500000 GHz

MAX　　　　　　　　　　　　　　　　　　　1RM
D1 -13 dBm

Center 1.755 GHz　　　　4 MHz/　　　　Span 40 MHz

Date:　　26.APR.2019　10:41:55

16QAM_1.4MHz_ 6 RB_ Left

Marker 1 [T1]		RBW	30 kHz	RF Att	40 dB
Ref Lvl	-17.20 dBm	VBW	100 kHz		
30 dBm	1.71000000 GHz	SWT	8.5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-17.20 dBm
1.71000000 GHz

A

1MAX

D1 -13 dBm

1RM

Center 1.71 GHz　　　　300 kHz/　　　　Span 3 MHz

Date:　　25.APR.2019　14:49:39

16QAM_1.4MHz_ 6 RB_ Right

Marker 1 [T1]		RBW	30 kHz	RF Att	40 dB
Ref Lvl	-18.92 dBm	VBW	100 kHz		
30 dBm	1.75503908 GHz	SWT	8.5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　-18.92 dBm
1.75503908 GHz

A

1MAX

D1 -13 dBm

1RM

Center 1.755 GHz　　　　300 kHz/　　　　Span 3 MHz

Date:　　25.APR.2019　14:51:05

16QAM_3MHz_ 15 RB_ Left

Date: 25.APR.2019   14:54:29

16QAM_3MHz_ 15 RB_ Right

Date: 25.APR.2019   14:55:44

16QAM_5MHz_ 25 RB_ Left

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl		-16.32 dBm	VBW	300 kHz	
30 dBm		1.70998998 GHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -16.32 dBm
1.70998998 GHz

A

1MAX

1RM

D1 -13 dBm

Center 1.71 GHz   1 MHz/   Span 10 MHz

Date: 25.APR.2019 14:56:45

16QAM_5MHz_ 25 RB_ Right

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl		-16.91 dBm	VBW	300 kHz	
30 dBm		1.75501002 GHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -16.91 dBm
1.75501002 GHz

A

1MAX

1RM

D1 -13 dBm

Center 1.755 GHz   1 MHz/   Span 10 MHz

Date: 25.APR.2019 14:57:35

LTE Band 5

QPSK_1.4MHz_ 6 RB_ Left

	Marker 1 [T1]		RBW	30 kHz	RF Att	40 dB
Ref Lvl		-15.60 dBm	VBW	100 kHz		
30 dBm		824.00000000 MHz	SWT	8.5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -15.60 dBm
824.00000000 MHz

A

1MAX

1RM

D1 -13 dBm

Center 824 MHz   300 kHz/   Span 3 MHz

Date: 25.APR.2019 15:36:36

QPSK_1.4MHz_ 6 RB_ Right

	Marker 1 [T1]		RBW	30 kHz	RF Att	40 dB
Ref Lvl		-14.49 dBm	VBW	100 kHz		
30 dBm		849.15931864 MHz	SWT	20 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -14.49 dBm
849.15931864 MHz

A

1MAX

1RM

D1 -13 dBm

Center 849 MHz   300 kHz/   Span 3 MHz

Date: 25.APR.2019 16:35:45

QPSK_3MHz_ 15 RB_ Left

Date:　　　25.APR.2019 15:39:25

QPSK_3MHz_ 15 RB_ Right

Date:　　　25.APR.2019 15:41:13

QPSK_5MHz_ 25 RB_ Left

	Marker 1 [T1]		RBW	100 kHz	RF Att	40 dB
Ref Lvl		-14.13 dBm	VBW	300 kHz		
30 dBm		824.00000000 MHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -14.13 dBm
824.00000000 MHz

A

1MAX

D1 -13 dBm

1RM

Center 824 MHz   1 MHz/   Span 10 MHz

Date: 25.APR.2019 15:46:50

QPSK_5MHz_ 25 RB_ Right

	Marker 1 [T1]		RBW	100 kHz	RF Att	40 dB
Ref Lvl		-14.08 dBm	VBW	300 kHz		
30 dBm		849.00000000 MHz	SWT	10 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -14.08 dBm
849.00000000 MHz

A

1MAX

D1 -13 dBm

1RM

Center 849 MHz   1 MHz/   Span 10 MHz

Date: 25.APR.2019 16:40:50

QPSK_10MHz_ 50 RB_ Left

Marker 1 [T1]		RBW	100 kHz	RF Att	30 dB
Ref Lvl	-18.44 dBm	VBW	300 kHz		
24.5 dBm	824.00000000 MHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -18.44 dBm
824.00000000 MHz

1MAX
D1 -13 dBm

1RM

Center 824 MHz   2 MHz/   Span 20 MHz

Date: 26.APR.2019 10:46:02

QPSK_10MHz_ 50 RB_ Right

Marker 1 [T1]		RBW	100 kHz	RF Att	30 dB
Ref Lvl	-23.72 dBm	VBW	300 kHz		
24.5 dBm	849.00000000 MHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -23.72 dBm
849.00000000 MHz

MAX
D1 -13 dBm

1RM

Center 849 MHz   2 MHz/   Span 20 MHz

Date: 26.APR.2019 10:46:43

16QAM_1.4MHz_ 6 RB_ Left

Date:　　　25.APR.2019　15:37:21

16QAM_1.4MHz_ 6 RB_ Right

Date:　　　25.APR.2019　16:34:38

16QAM_3MHz_ 15 RB_ Left

Date: 25.APR.2019 15:40:01

16QAM_3MHz_ 15 RB_ Right

Date: 25.APR.2019 15:41:46

16QAM_5MHz_ 25 RB_ Left

	Marker 1 [T1]		RBW	100 kHz	RF Att	40 dB
Ref Lvl		-15.33 dBm	VBW	300 kHz		
30 dBm		824.00000000 MHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -15.33 dBm
824.00000000 MHz

A

1MAX

1RM

D1 -13 dBm

Center 824 MHz   1 MHz/   Span 10 MHz

Date: 25.APR.2019 15:47:30

16QAM_5MHz_ 25 RB_ Right

	Marker 1 [T1]		RBW	100 kHz	RF Att	40 dB
Ref Lvl		-16.44 dBm	VBW	300 kHz		
30 dBm		849.00000000 MHz	SWT	15 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -16.44 dBm
849.00000000 MHz

A

MAX

1RM

D1 -13 dBm

Center 849 MHz   1 MHz/   Span 10 MHz

Date: 25.APR.2019 16:42:37

LTE Band 12

QPSK_1.4MHz_ 6 RB_ Left

Date: 26.APR.2019 09:54:09

QPSK_1.4MHz_ 6 RB_ Right

Date: 25.APR.2019 16:50:50

QPSK_3MHz_ 15 RB_ Left

Date: 26.APR.2019 09:58:36

QPSK_3MHz_ 15 RB_ Right

Date: 25.APR.2019 15:58:51

QPSK_5MHz_ 25 RB_ Left

Marker 1 [T1]		RBW	50 kHz	RF Att	30 dB
Ref Lvl	−14.40 dBm	VBW	200 kHz		
24.5 dBm	699.00000000 MHz	SWT	100 ms	Unit	dBm

4.5 dB Offset ... ▼1 [T1] −14.40 dBm 699.00000000 MHz

1MAX
D1 −13 dBm
1RM

Center 699 MHz   1 MHz/   Span 10 MHz

Date: 26.APR.2019 10:17:40

QPSK_5MHz_ 25 RB_ Right

Marker 1 [T1]		RBW	100 kHz	RF Att	40 dB
Ref Lvl	−14.39 dBm	VBW	300 kHz		
30 dBm	716.00000000 MHz	SWT	35 ms	Unit	dBm

4.5 dB Offset ... ▼1 [T1] −14.39 dBm 716.00000000 MHz

1MAX
D1 −13 dBm
1RM

Center 716 MHz   1 MHz/   Span 10 MHz

Date: 25.APR.2019 16:47:37

QPSK_10MHz_ 50 RB_ Left

	Marker 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	-15.62 dBm	VBW	300 kHz		
24.5 dBm	699.00000000 MHz	SWT	10 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -15.62 dBm   A
699.00000000 MHz

1MAX
D1 -13 dBm
1RM

Center 699 MHz   2 MHz/   Span 20 MHz

Date: 26.APR.2019 10:48:16

QPSK_10MHz_ 50 RB_ Right

	Marker 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	-16.65 dBm	VBW	300 kHz		
24.5 dBm	716.00000000 MHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -16.65 dBm   A
716.00000000 MHz

1MAX
D1 -13 dBm
1RM

Center 716 MHz   2 MHz/   Span 20 MHz

Date: 26.APR.2019 10:49:37

16QAM_1.4MHz_ 6 RB_ Left

Date:　　26.APR.2019　09:55:27

16QAM_1.4MHz_ 6 RB_ Right

Date:　　25.APR.2019　16:51:42

16QAM_3MHz_ 15 RB_ Left

```
                    Marker 1 [T1]              RBW    30 kHz    RF Att    30 dB
       Ref Lvl                   -16.86 dBm    VBW   100 kHz
        24.5 dBm         699.00000000 MHz      SWT   100 ms     Unit       dBm
```

Date: 26.APR.2019   09:59:35

16QAM_3MHz_ 15 RB_ Right

```
                    Marker 1 [T1]              RBW    30 kHz    RF Att    40 dB
       Ref Lvl                   -14.54 dBm    VBW   100 kHz
         30 dBm         716.00601202 MHz       SWT    17 ms     Unit       dBm
```

Date: 25.APR.2019   16:00:23

16QAM_5MHz_ 25 RB_ Left

	Marker 1 [T1]		RBW	50 kHz	RF Att 30 dB
Ref Lvl		-14.42 dBm	VBW	200 kHz	
24.5 dBm		698.95991984 MHz	SWT	10 ms	Unit dBm

4.5 dB Offset

▼1 [T1]   -14.42 dBm
698.95991984 MHz

1MAX
D1 -13 dBm

1RM

Center 699 MHz   1 MHz/   Span 10 MHz

Date: 26.APR.2019 10:20:20

16QAM_5MHz_ 25 RB_ Right

	Marker 1 [T1]		RBW	100 kHz	RF Att 40 dB
Ref Lvl		-15.12 dBm	VBW	300 kHz	
30 dBm		716.00000000 MHz	SWT	20 ms	Unit dBm

4.5 dB Offset

▼1 [T1]   -15.12 dBm
716.00000000 MHz

1MAX
D1 -13 dBm

1RM

Center 716 MHz   1 MHz/   Span 10 MHz

Date: 25.APR.2019 16:45:12

LTE Band 17

QPSK_5MHz_ 25 RB_ Left

	Marker 1 [T1]		RBW	100 kHz	RF Att	30 dB
Ref Lvl		-15.74 dBm	VBW	300 kHz		
24.5 dBm		704.00000000 MHz	SWT	10 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -15.74 dBm
704.00000000 MHz

A

1MAX

D1 -13 dBm

1RM

Center 704 MHz   1 MHz/   Span 10 MHz

Date: 26.APR.2019 10:24:43

QPSK_5MHz_ 25 RB_ Right

	Marker 1 [T1]		RBW	100 kHz	RF Att	40 dB
Ref Lvl		-14.91 dBm	VBW	300 kHz		
30 dBm		716.00000000 MHz	SWT	25 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -14.91 dBm
716.00000000 MHz

A

1MAX

D1 -13 dBm

1RM

Center 716 MHz   1 MHz/   Span 10 MHz

Date: 25.APR.2019 16:19:20

QPSK_10MHz_ 50 RB_ Left

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-18.41 dBm	VBW	300 kHz		
30 dBm	703.71943888 MHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -18.41 dBm
703.71943888 MHz

A

1MAX

1RM

D1 -13 dBm

1

Center 704 MHz   2 MHz/   Span 20 MHz

Date: 25.APR.2019 16:23:51

QPSK_10MHz_ 50 RB_ Right

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-22.34 dBm	VBW	300 kHz		
30 dBm	716.08016032 MHz	SWT	5 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]   -22.34 dBm
716.08016032 MHz

A

1MAX

1RM

D1 -13 dBm

Center 716 MHz   2 MHz/   Span 20 MHz

Date: 25.APR.2019 16:28:57

16QAM_5MHz_ 25 RB_ Left

	Marker 1 [T1]		RBW	100 kHz	RF Att	40 dB
Ref Lvl		-14.86 dBm	VBW	300 kHz	
30 dBm		704.00000000 MHz	SWT	10 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　　-14.86 dBm
704.00000000 MHz

Center 704 MHz　　　　1 MHz/　　　　Span 10 MHz

Date:　　25.APR.2019　16:21:09

16QAM_5MHz_ 25 RB_ Right

	Marker 1 [T1]		RBW	100 kHz	RF Att	40 dB
Ref Lvl		-15.41 dBm	VBW	300 kHz	
30 dBm		716.00000000 MHz	SWT	20 ms	Unit	dBm

4.5 dB Offset

▼1 [T1]　　　-15.41 dBm
716.00000000 MHz

Center 716 MHz　　　　1 MHz/　　　　Span 10 MHz

Date:　　25.APR.2019　16:17:12

FCC §2.1055, §22.355 & §24.235 & §27.54- FREQUENCY STABILITY

Applicable Standard

FCC § 2.1055 (a), § 2.1055 (d), §22.355, §24.235, §27.54

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile > 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A
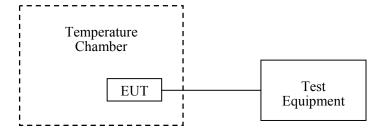
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable power supply was connected to the battery terminals of the equipment under test. The voltage was set from 85% to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41005012	2018-09-05	2019-09-05
R&S	Wideband Radio Communication Tester	CMW500	147473	2018-08-03	2019-08-03
ESPEC	Constant temperature and humidity Tester	ESX-4CA	018 463	2019-03-26	2020-03-26
UNI-T	Multimeter	UT39A	M130199938	2018-07-24	2019-07-24
R&S	Spectrum Analyzer	FSU 26	200256	2019-01-04	2020-01-04
Pro instrument	DC Power Supply	pps3300	3300012	N/A	N/A

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25.7~27.2°C
Relative Humidity:	59~60 %
ATM Pressure:	100.5~100.7kPa

* The testing was performed by Blake Yang from 2019-04-25to 2019-04-28.

WCDMA Band II: R99

Middle Channel, f_c = 1880.0 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	V_{DC}	**Hz**	**ppm**	
-30		-4	-0.00213	
-20		-1	-0.00053	
-10		-4	-0.00213	
0		-3	-0.00160	
10	3.7	-2	-0.00106	
20		-7	-0.00372	Pass
30		-3	-0.00160	
40		-5	-0.00266	
50		-4	-0.00213	
20	3.5	-6	-0.00319	
20	4.25	-2	-0.00106	

WCDMA Band Ⅴ: R99

Middle Channel, f_c = 836.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limits**
℃	V_{DC}	**Hz**	**ppm**	**ppm**
-30		-1	-0.00120	
-20		-2	-0.00239	
-10		-4	-0.00478	
0		-3	-0.00359	
10	3.7	-2	-0.00239	
20		-5	-0.00598	2.5
30		-6	-0.00717	
40		-3	-0.00359	
50		-1	-0.00120	
20	3.5	-2	-0.00239	
20	4.25	-3	-0.00359	

LTE Band 2:

QPSK, Channel Bandwidth:1.4MHz Middle Channel, f_c = 1880 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	V_{DC}	Hz	ppm	
-30		5	0.0027	
-20		6	0.0032	
-10		3	0.0016	
0		7	0.0037	
10	3.7	6	0.0032	
20		2	0.0011	Pass
30		1	0.0005	
40		8	0.0043	
50		4	0.0021	
20	3.5	5	0.0027	
20	4.25	6	0.0032	

16QAM, Channel Bandwidth:1.4MHz Middle Channel, f_c = 1880 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	V_{DC}	Hz	ppm	
-30		6	0.0032	
-20		7	0.0037	
-10		2	0.0011	
0		5	0.0027	
10	3.7	5	0.0027	
20		4	0.0021	Pass
30		5	0.0027	
40		3	0.0016	
50		2	0.0011	
20	3.5	6	0.0032	
20	4.25	5	0.0027	

LTE Band4:

QPSK, Channel Bandwidth:1.4MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30		1710.52	1754.42	1710	1755
-20		1710.52	1754.41	1710	1755
-10		1710.53	1754.45	1710	1755
0		1710.49	1754.43	1710	1755
10	3.7	1710.54	1754.39	1710	1755
20		1710.56	1754.45	1710	1755
30		1710.53	1754.51	1710	1755
40		1710.44	1754.45	1710	1755
50		1710.55	1754.43	1710	1755
20	3.5	1710.54	1754.52	1710	1755
20	4.25	1710.56	1754.51	1710	1755

16QAM, Channel Bandwidth:1.4MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30		1710.52	1754.44	1710	1755
-20		1710.52	1754.51	1710	1755
-10		1710.55	1754.45	1710	1755
0		1710.53	1754.45	1710	1755
10	3.7	1710.52	1754.51	1710	1755
20		1710.54	1754.45	1710	1755
30		1710.52	1754.55	1710	1755
40		1710.48	1754.41	1710	1755
50		1710.51	1754.38	1710	1755
20	3.5	1710.48	1754.42	1710	1755
20	4.25	1710.53	1754.49	1710	1755

LTE Band 5:

QPSK, Middle Channel, f_c = 836.5 MHz, Channel Bandwidth:1.4MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
℃	V_{DC}	Hz	ppm	ppm
-30		-12	-0.0143	
-20		-10	-0.012	
-10		-8	-0.0096	
0		-14	-0.0167	
10	3.7	-7	-0.0084	
20		-6	-0.0072	2.5
30		-13	-0.0155	
40		-11	-0.0132	
50		-8	-0.0096	
20	3.5	-9	-0.0108	
20	4.25	-7	-0.0084	

16QAM, Middle Channel, f_c = 836.5 MHz, Channel Bandwidth:1.4MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
℃	V_{DC}	Hz	ppm	ppm
-30		-13	-0.0155	
-20		-12	-0.0143	
-10		-10	-0.012	
0		-15	-0.0179	
10	3.7	-9	-0.0108	
20		-7	-0.0084	2.5
30		-16	-0.0191	
40		-12	-0.0143	
50		-9	-0.0108	
20	3.5	-11	-0.0132	
20	4.25	-8	-0.0096	

LTE Band 12:

QPSK, Channel Bandwidth:1.4MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30		699.55	715.52	699	716
-20		699.49	715.51	699	716
-10		699.56	715.55	699	716
0		699.56	715.53	699	716
10	3.7	699.51	715.49	699	716
20		699.53	715.51	699	716
30		699.49	715.48	699	716
40		699.49	715.56	699	716
50		699.54	715.50	699	716
20	3.5	699.52	715.52	699	716
20	4.25	699.56	715.49	699	716

16QAM, Channel Bandwidth:1.4MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30		699.53	715.49	699	716
-20		699.54	715.45	699	716
-10		699.54	715.46	699	716
0		699.55	715.45	699	716
10	3.7	699.48	715.41	699	716
20		699.53	715.45	699	716
30		699.51	715.44	699	716
40		699.42	715.42	699	716
50		699.55	715.41	699	716
20	3.5	699.51	715.45	699	716
20	4.25	699.55	715.50	699	716

LTE Band 17(704-716 MHz):

QPSK, Channel Bandwidth:5MHz					
Temperature	**Voltage**	**Test Result (MHz)**		**Limit (MHz)**	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30		704.61	715.53	704	716
-20		704.64	715.55	704	716
-10		704.58	715.53	704	716
0		704.66	715.48	704	716
10	3.7	704.59	715.51	704	716
20		704.61	715.51	704	716
30		704.63	715.54	704	716
40		704.57	715.54	704	716
50		704.61	715.50	704	716
20	3.5	704.56	715.55	704	716
20	4.25	704.64	715.53	704	716

16QAM, Channel Bandwidth:5MHz					
Temperature	**Voltage**	**Test Result (MHz)**		**Limit (MHz)**	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30		704.49	715.51	704	716
-20		704.52	715.46	704	716
-10		704.58	715.55	704	716
0		704.53	715.53	704	716
10	3.7	704.55	715.45	704	716
20		704.53	715.55	704	716
30		704.46	715.43	704	716
40		704.48	715.53	704	716
50		704.52	715.49	704	716
20	3.5	704.55	715.45	704	716
20	4.25	704.55	715.51	704	716

Note: The fundamental emissions stay within the authorized bands of operation based
on the frequency deviation measured is small, the extreme voltage was declared by applicant.

***** END OF REPORT *****