TEST REPORT

Product Name:	4G Industrial Router
FCC ID:	2A7GC-AR350
Trademark:	织云物联
Model Number:	AR350, AR300, AR500, AR520, AR550, AR580, S200, S300, S500, AR590, AR600, AR650, AR680, sy20, sy30, sy50, D10, D20, D30, D40
Prepared For:	Shenzhen Zhiyun Technology Co., Ltd.
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Manufacturer:	Shenzhen Zhiyun Technology Co., Ltd.
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Prepared By:	Shenzhen CTB Testing Technology Co., Ltd.
Address:	Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Community, Xinqiao Street, Baoan District, Shenzhen, Guangdong China
Sample Received Date:	May. 05, 2022
Sample tested Date:	May. 05, 2022 to May. 28, 2022
Issue Date:	May. 28, 2022
Report No.:	CTB220527023RF
Test Standards	FCC Part 2, 22, 24E, 27
Test Results	PASS
Remark:	This is LTE radio test report.

Compiled by:	Reviewed by:	Approved by:
Chen Zheng	Arron Liu	Bin Mei / Director

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

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(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB220527023RF	May. 28, 2022	Original	Valid

2. TEST SUMMARY

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test method	Result
Conducted output power	Part 2.1046(a)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
Effective Radiated Power of Transmitter(EIRP)	Part 22.913(a)(5)/Part27.50(h)(2)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
peak-to-average ratio	Part 27.50(d)	KDB 971168 D01v02r02	PASS
99% & 26dB Occupied Bandwidth	Part 2.1049(h)	KDB 971168 D01v02r02	PASS
Band Edge at antenna terminals	Part 2.1051/ Part 22.917(a)/Part 27.53(m) (4)	KDB 971168 D01v02r02	PASS
Spurious emissions at antenna terminals	Part 2.1051/ Part 22.917(a)/Part 27.53(m) (4)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
Field strength of spurious radiation	Part 2.1053/ Part 22.917(a)/Part 27.53(m) (4)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
Frequency stability	Part 2.1055/Part 27.54	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS

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3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty
Occupancy bandwidth	54.3kHz
Conducted output power Above 1G	0.9dB
Conducted output power below 1G	0.9dB
Power Spectral Density , Conduction	0.9dB
Conduction spurious emissions	2.0dB
Out of band emission	2.0dB
3m camber Radiated spurious emission(30MHz-1GHz)	4.6dB
3m chamber Radiated spurious emission(1GHz-18GHz)	5.1dB
3m chamber Radiated spurious emission(18GHz-40GHz)	3.4dB
Receiver Reference Sensitivity level	1.9dB
humidity uncertainty	5.5%
Temperature uncertainty	0.63℃
frequency	1×10-7

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s):	AR350, AR300, AR500, AR520, AR550, AR580, S200, S300, S500, AR590, AR600, AR650, AR680, sy20, sy30, sy50, D10, D20, D30, D40
Model Description:	All the model are the same circuit and RF module, only for model n ame. Test sample model: AR350
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	FDD-LTE BAND 2: 1850-1910MHz FDD-LTE BAND 4:1710-1755MHz FDD-LTE BAND 5:824-849MHz FDD-LTE BAND 12: 699-716MHz FDD-LTE BAND 13: 777-787MHz FDD-LTE BAND 17: 704-716MHz FDD-LTE BAND 66: 1710-1780MHz
Max. RF output power:	FDD-LTE BAND 2: 22.80 dBm FDD-LTE BAND 4: 23.02dBm FDD-LTE BAND 5: 23.72 dBm FDD-LTE BAND 13: 23.43 dBm FDD-LTE BAND 12: 24.07 dBm FDD-LTE BAND 17:23.89dBm FDD-LTE BAND 66: 22.44 dBm
Type of Modulation:	QPSK, 16QAM
Antenna installation:	Internal antenna
Antenna Gain:	FDD-LTE BAND 2:2.0dBi FDD-LTE BAND 4: 2.0dBi FDD-LTE BAND 5: 0.5dBi FDD-LTE BAND 12: 2.0 dBi FDD-LTE BAND 13: 0.5dBi FDD-LTE BAND 17: 0.5 dBi TDD-LTE BAND 66: 2.0 dBi
Ratings:	DC 5V charging from adapter

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Test Mode

Test Mode List		
Test Mode	Description	Remark
TM1	FDD-LTE BAND 2	Low, Middle, High Channels
TM2	FDD-LTE BAND 4	Low, Middle, High Channels
TM3	FDD-LTE BAND 5	Low, Middle, High Channels
TM4	FDD-LTE BAND 12	Low, Middle, High Channels
TM5	FDD-LTE BAND 13	Low, Middle, High Channels
TM6	FDD-LTE BAND 17	Low, Middle, High Channels
TM7	TDD-LTE BAND 66	Low, Middle, High Channels

4.5 Test Environment

Humidity(%):	55
Atmospheric Pressure(kPa):	101.1
Normal Voltage(AC):	120V
Normal Temperature(℃)	25
Low Temperature(℃)	0
High Temperature(℃)	40

5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Street, Baoan District, Shenzhen China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test Instrument Used

No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated date	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	2021.09.27	2022.08.05
2	Power Sensor	Agilent	U2021XA	MY56120032	2021.09.27	2022.08.05
3	Power Sensor	Agilent	U2021XA	MY56120034	2021.09.27	2022.08.05
4	Communication test set	R&S	CMW500	108058	2021.09.27	2022.08.05
5	Spectrum Analyzer	R&S	FSP40	100550	2021.09.27	2022.08.05
6	Signal Generator	Agilent	N5181A	MY49060920	2021.09.27	2022.08.16
7	Signal Generator	Agilent	N5182A	MY47420195	2021.09.27	2022.08.05
8	Communication test set	Agilent	E5515C	MY50102567	2021.09.27	2022.08.16
9	band rejection filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	2021.09.27	2022.08.05
10	band rejection filter	Shenxiang	MSF5150-5850MS-1155	20181015001	2021.09.27	2022.08.05
11	band rejection filter	Xingbo	XBLBQ-DZA120	190821-1-1	2021.09.27	2022.08.05
12	BT&WI-FI Automatic test software	Micowave	MTS8310	Ver. 2.0.0.0	2021.09.27	2022.08.05
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	2021.09.27	2022.08.05
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	2021.09.27	2022.08.05
15	234G Automatic test software	Micowave	MTS8200	Ver. 2.0.0.0	2021.09.27	2022.08.05

16	966 chamber	C.R.T.	966 Room	966	2021.09.27	2024.08.11
17	Receiver	R&S	ESPI	100362	2021.09.27	2022.08.05
18	Amplifier	HP	8447E	2945A02747	2021.09.27	2022.08.05
19	Amplifier	Agilent	8449B	3008A01838	2021.09.27	2022.08.05
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	869	2021.09.27	2022.08.07
21	Horn Antenna	Schwarzbeck	BBHA9120D	1911	2021.09.27	2022.08.08
22	Software	Fala	EZ-EMC	FA-03A2 RE	2021.09.27	2022.08.05
23	3-Loop Antenna	Daze	ZN30401	17014	2021.09.27	2022.08.05
24	loop antenna	ZHINAN	ZN30900A	/	2021.09.27	2022.08.05
25	Horn antenna	A/H/System	SAS-574	588	2021.09.27	2022.08.05
26	Amplifier	AEROFLEX	/	S/N/ 097	2021.09.27	2022.08.05

6. RF EXPOSURE

6.1 Standard Applicable

According to §1.1307 and§2.1091,§2.1093, the portable transmitter must comply the RF exposure requirements.

6.2 Test Result

This product complied with the requirement of the RF exposure, please see the RF Exposure report.

7. RF OUTPUT POWER

7.1 Standard Applicable

According to §22.913(a)(2), the ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

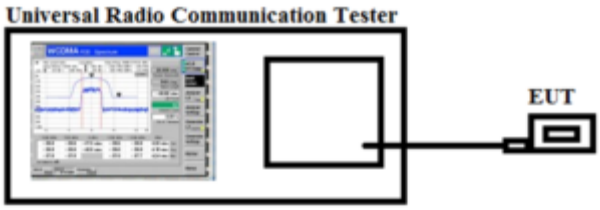
According to §24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to §27.50(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.

According to §27.50(c)(10), portable stations (hand-held devices) in the 698-746 MHz band are limited to 3 watts ERP.

7.2 Test Procedure

Conducted output power test method:



Radiated power test method:
1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
2. 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.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. 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.

7.3 Summary of Test Results/Plots

Max. Radiated Power:

FDD-LTE Band 12

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.25	<34.77	PASS
		H	21.69		
	MCH	V	21.59		PASS
		H	21.03		
	HCH	V	22.81		PASS
		H	21.92		
16QAM	LCH	V	21.37	<34.77	PASS
		H	21.50		
	MCH	V	21.45		PASS
		H	21.51		
	HCH	V	21.32		PASS
		H	22.58		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.21	<34.77	PASS
		H	21.51		
	MCH	V	22.97		PASS
		H	22.07		
	HCH	V	21.58		PASS
		H	21.29		
16QAM	LCH	V	21.89	<34.77	PASS
		H	22.44		
	MCH	V	22.21		PASS
		H	22.23		
	HCH	V	21.72		PASS
		H	22.70		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.83	<34.77	PASS
		H	21.60		

	MCH	V	22.90		PASS
		H	22.66		
	HCH	V	22.44		PASS
		H	21.13		
16QAM	LCH	V	22.32	<34.77	PASS
		H	22.50		
	MCH	V	21.73		PASS
		H	21.38		
	HCH	V	21.47		PASS
		H	21.94		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.60	<34.77	PASS
		H	21.77		
	MCH	V	22.98		PASS
		H	21.89		
	HCH	V	21.70		PASS
		H	22.21		
16QAM	LCH	V	22.21	<34.77	PASS
		H	21.63		
	MCH	V	22.61		PASS
		H	22.38		
	HCH	V	22.92		PASS
		H	21.11		

FDD-LTE Band 17

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.98	<34.77	PASS
		H	22.32		
	MCH	V	21.86		PASS
		H	21.20		
	HCH	V	22.51		PASS
		H	21.35		
16QAM	LCH	V	22.93	<34.77	PASS
		H	22.00		
	MCH	V	22.10		PASS

		H	21.41		
	HCH	V	21.86		PASS
		H	21.57		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.58	<34.77	PASS
		H	22.33		
	MCH	V	22.67		PASS
		H	22.73		
	HCH	V	21.70		PASS
		H	21.30		
16QAM	LCH	V	21.18	<34.77	PASS
		H	22.50		
	MCH	V	21.00		PASS
		H	21.45		
	HCH	V	22.98		PASS
		H	21.20		

FDD-LTE Band 2

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.00	<33.00	PASS
		H	21.47		
	MCH	V	21.94		PASS
		H	21.24		
	HCH	V	21.80		PASS
		H	22.34		
16QAM	LCH	V	20.69	<33.00	PASS
		H	21.31		
	MCH	V	21.85		PASS
		H	21.75		
	HCH	V	21.67		PASS
		H	21.51		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.59	<33.00	PASS
		H	20.73		
	MCH	V	21.21		PASS
		H	21.79		
	HCH	V	21.47		PASS
		H	22.13		
16QAM	LCH	V	21.11	<33.00	PASS
		H	21.67		
	MCH	V	21.79		PASS
		H	21.22		
	HCH	V	20.60		PASS
		H	20.94		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.07	<33.00	PASS
		H	21.31		
	MCH	V	21.08		PASS
		H	21.37		
	HCH	V	20.75		PASS
		H	20.74		

16QAM	LCH	V	22.16	<33.00	PASS
		H	21.93		
	MCH	V	22.32		PASS
		H	20.97		
	HCH	V	21.16		PASS
		H	22.00		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.12	<33.00	PASS
		H	21.92		
	MCH	V	22.49		PASS
		H	20.93		
	HCH	V	22.12		PASS
		H	20.79		
16QAM	LCH	V	22.49	<33.00	PASS
		H	22.30		
	MCH	V	21.44		PASS
		H	20.98		
	HCH	V	22.45		PASS
		H	20.71		
Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.00	<33.00	PASS
		H	20.74		
	MCH	V	22.24		PASS
		H	21.17		
	HCH	V	22.48		PASS
		H	21.66		
16QAM	LCH	V	21.17	<33.00	PASS
		H	21.28		
	MCH	V	20.56		PASS
		H	20.84		
	HCH	V	20.77		PASS
		H	20.69		
Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.23	<33.00	PASS

		H	21.03		
	MCH	V	21.42		PASS
		H	21.85		
	HCH	V	21.14		PASS
		H	22.51		
16QAM	LCH	V	21.02	<33.00	PASS
		H	21.33		
	MCH	V	21.21		PASS
		H	20.60		
	HCH	V	22.47		PASS

FDD-LTE Band 4

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.21	<30.00	PASS
		H	21.80		
	MCH	V	21.77		PASS
		H	22.47		
	HCH	V	22.39		PASS
		H	22.58		
16QAM	LCH	V	22.36	<30.00	PASS
		H	21.24		
	MCH	V	21.06		PASS
		H	21.86		
	HCH	V	20.80		PASS
		H	22.72		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.20	<30.00	PASS
		H	22.72		
	MCH	V	22.01		PASS
		H	22.78		
	HCH	V	21.55		PASS
		H	20.93		
16QAM	LCH	V	22.67	<30.00	PASS
		H	22.06		
	MCH	V	21.66		PASS
		H	22.31		

	HCH	V	21.74		PASS
		H	21.17		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.24	<30.00	PASS
		H	22.70		
	MCH	V	22.71		PASS
		H	22.76		
	HCH	V	20.84		PASS
		H	22.11		
16QAM	LCH	V	21.78	<30.00	PASS
		H	21.88		
	MCH	V	20.82		PASS
		H	22.42		
	HCH	V	22.14		PASS
		H	21.60		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.89	<30.00	PASS
		H	22.36		
	MCH	V	21.70		PASS
		H	21.63		
	HCH	V	21.11		PASS
		H	21.03		
16QAM	LCH	V	21.08	<30.00	PASS
		H	22.20		
	MCH	V	21.59		PASS
		H	21.87		
	HCH	V	21.50		PASS
		H	22.78		
Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.76	<30.00	PASS
		H	21.74		
	MCH	V	22.17		PASS
		H	22.55		
	HCH	V	20.83		PASS

		H	20.99		
16QAM	LCH	V	22.23	<30.00	PASS
		H	22.23		
	MCH	V	22.16		PASS
		H	21.04		
	HCH	V	21.35		PASS
		H	22.69		
Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.80	<30.00	PASS
		H	22.01		
	MCH	V	22.81		PASS
		H	22.33		
	HCH	V	21.53		PASS
		H	21.34		
16QAM	LCH	V	22.39	<30.00	PASS
		H	20.97		
	MCH	V	21.49		PASS
		H	21.98		
	HCH	V	22.79		PASS
		H	21.17		

FDD-LTE Band 5

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.39	<38.45	PASS
		H	21.32		
	MCH	V	21.51		PASS
		H	22.00		
	HCH	V	21.46		PASS
		H	21.33		
16QAM	LCH	V	21.91	<38.45	PASS
		H	22.16		
	MCH	V	21.40		PASS
		H	22.93		
	HCH	V	21.67		PASS
		H	22.44		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.70	<38.45	PASS
		H	22.26		
	MCH	V	22.76		PASS
		H	21.61		
	HCH	V	22.81		PASS
		H	22.32		
16QAM	LCH	V	21.52	<38.45	PASS
		H	21.47		
	MCH	V	21.60		PASS
		H	21.81		
	HCH	V	22.69		PASS
		H	22.01		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.64	<38.45	PASS
		H	22.30		
	MCH	V	21.20		PASS
		H	21.95		
	HCH	V	22.20		PASS
		H	21.63		

16QAM	LCH	V	23.02	<38.45	PASS
		H	21.18		
	MCH	V	21.38		PASS
		H	22.43		
	HCH	V	21.70		PASS
		H	21.95		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.60	<38.45	PASS
		H	21.37		
	MCH	V	21.77		PASS
		H	23.05		
	HCH	V	21.30		PASS
		H	22.36		
16QAM	LCH	V	21.84	<38.45	PASS
		H	21.90		
	MCH	V	22.37		PASS
		H	22.91		
	HCH	V	23.10		PASS
		H	22.76		

FDD-LTE Band 13

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.95	<34.77	PASS
		H	21.26		
	MCH	V	22.57		PASS
		H	22.18		
	HCH	V	22.48		PASS
		H	22.22		
16QAM	LCH	V	21.24	<34.77	PASS
		H	21.85		
	MCH	V	22.25		PASS
		H	22.66		
	HCH	V	22.53		PASS
		H	22.73		
Channel Bandwidth: 10 MHz					

Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.82	<34.77	PASS
		H	22.39		
	MCH	V	22.86		PASS
		H	22.07		
	HCH	V	22.97		PASS
		H	21.77		
16QAM	LCH	V	22.84	<34.77	PASS
		H	22.23		
	MCH	V	22.28		PASS
		H	22.16		
	HCH	V	21.80		PASS
		H	21.75		

FDD-LTE Band 66

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.77	<33.00	PASS
		H	21.99		
	MCH	V	21.88		PASS
		H	21.53		
	HCH	V	21.24		PASS
		H	20.87		
16QAM	LCH	V	21.75	<33.00	PASS
		H	21.67		
	MCH	V	20.76		PASS
		H	21.73		
	HCH	V	21.06		PASS
		H	21.17		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.34	<33.00	PASS
		H	22.54		
	MCH	V	22.51		PASS
		H	21.98		
	HCH	V	21.77		PASS
		H	22.25		

16QAM	LCH	V	20.67	<33.00	PASS
		H	21.92		
	MCH	V	22.16		PASS
		H	22.59		
	HCH	V	20.84		PASS
		H	21.67		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.94	<33.00	PASS
		H	22.20		
	MCH	V	21.73		PASS
		H	21.22		
	HCH	V	21.60		PASS
		H	21.55		
16QAM	LCH	V	20.68	<33.00	PASS
		H	22.05		
	MCH	V	22.22		PASS
		H	22.22		
	HCH	V	21.35		PASS
		H	21.77		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.11	<33.00	PASS
		H	22.45		
	MCH	V	20.63		PASS
		H	22.36		
	HCH	V	20.75		PASS
		H	22.09		
16QAM	LCH	V	21.67	<33.00	PASS
		H	21.26		
	MCH	V	22.33		PASS
		H	21.27		
	HCH	V	21.84		PASS
		H	21.37		
Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict

QPSK	LCH	V	21.60	<33.00	PASS
		H	20.83		
	MCH	V	21.12		PASS
		H	22.28		
	HCH	V	21.96		PASS
		H	20.94		
16QAM	LCH	V	21.01	<33.00	PASS
		H	21.67		
	MCH	V	20.75		PASS
		H	21.57		
	HCH	V	21.08		PASS
		H	21.89		
Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.55	<33.00	PASS
		H	22.17		
	MCH	V	22.21		PASS
		H	21.72		
	HCH	V	22.58		PASS
		H	22.02		
16QAM	LCH	V	21.71	<33.00	PASS
		H	22.45		
	MCH	V	22.68		PASS
		H	20.66		
	HCH	V	22.33		PASS

Max. Conducted Output Power
Please refer to Appendix A: Average Power Output Data
Test result: Pass

8. PEAK-TO-AVERAGE RATIO (PAR) OF TRANSMITTER

8.1 Standard Applicable

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.

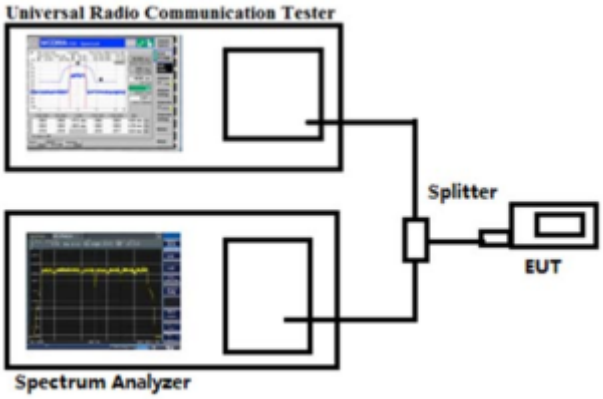
According to §27.50(B), the peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

8.2 Test Procedure

According with KDB 971168

1. The signal analyzer’ s CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal “ RF Burst” trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the “ on time” of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

Test Configuration for the emission bandwidth testing:



8.3 Summary of Test Results

Please refer to Appendix B: Peak-to-Average Ratio

Test result: Pass

9. EMISSION BANDWIDTH

9.1 Standard Applicable

According to §22.917(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

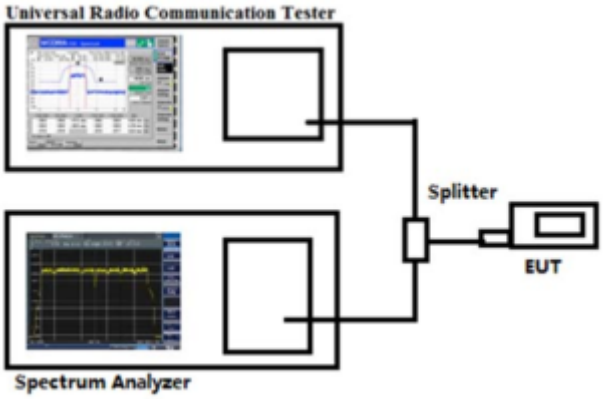
According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

According to §27.53, the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

9.2 Test Procedure

According to § 22.917(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Test Configuration for the emission bandwidth testing:



9.3 Summary of Test Results/Plots

Please refer to Appendix C: 26dB Bandwidth and Occupied Bandwidth
Test result: Pass

10. OUT OF BAND EMISSIONS AT ANTENNA TERMINAL

10.1 Standard Applicable

According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

According to §27.53 (f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

According to §27.53(h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.
According to §27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation,

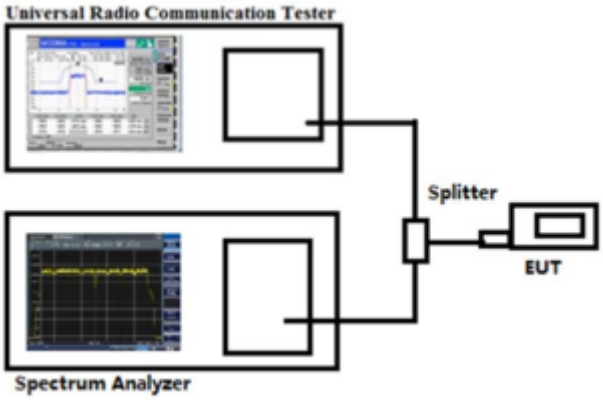
measured in watts, by at least 43 + 10 log (P) dB.

According to §27.53(m)(4), for mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz.

10.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10 th harmonic.

Test Configuration for the out of band emissions testing:



10.3 Summary of Test Results/Plots

Please refer to Appendix D & E: Band Edge & Conducted Spurious Emission
Test result: Pass

11.SPURIOUS RADIATED EMISSIONS

11.1 Standard Applicable

According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to § 24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to § 27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

According to § 27.53 (f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

According to § 27.53(h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

According to § 27.53(g) the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of

operation, measured in watts, by at least 43 + 10 log (P) dB.

11.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA-603-E and ANSI C63.4-2014 measurement procedure.
2. 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.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. 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 attenuation limit in dB =43+10 Log 10 (power out in Watts)

11.3 Summary of Test Results/Plots

Note: 1. this EUT was tested in 3 orthogonal positions and the worst case position data was

reported.
2. All test modes (different bandwidth and different modulation) are performed, but only the worst case is recorded in this report.

Test Data:
QPSK

Band 12 23017 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1337.040	150	78	-57.16	-13	-44.16	Pass	H
1727.538	149	291	-49.70	-13	-36.70	Pass	H
3900.305	151	213	-48.98	-13	-35.98	Pass	H
5857.072	150	89	-45.41	-13	-32.41	Pass	H
6497.747	151	329	-47.21	-13	-34.21	Pass	H
7997.338	148	138	-43.13	-13	-30.13	Pass	H
1219.711	149	99	-60.69	-13	-47.69	Pass	V
1438.119	148	217	-59.91	-13	-46.91	Pass	V
3569.787	150	12	-51.92	-13	-38.92	Pass	V
3837.171	150	137	-51.57	-13	-38.57	Pass	V
5802.315	146	356	-45.02	-13	-32.02	Pass	V
6552.432	146	95	-50.29	-13	-37.29	Pass	V

Band 12 23095 channel/BW1.4 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1294.659	150	142	-54.66	-13	-41.66	Pass	H
1715.090	146	280	-52.31	-13	-39.31	Pass	H
3876.854	150	330	-45.92	-13	-32.92	Pass	H
5867.981	146	194	-45.84	-13	-32.84	Pass	H
6458.152	149	260	-49.36	-13	-36.36	Pass	H
8020.209	151	31	-47.26	-13	-34.26	Pass	H
1235.900	149	4	-55.88	-13	-42.88	Pass	V
1394.665	148	257	-62.27	-13	-49.27	Pass	V
3590.527	147	55	-52.39	-13	-39.39	Pass	V
3913.084	148	273	-56.20	-13	-43.20	Pass	V
5826.871	150	136	-49.51	-13	-36.51	Pass	V
6516.072	150	16	-49.25	-13	-36.25	Pass	V

Band 12 23173 channel/BW1.4 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1340.544	149	156	-59.11	-13	-46.11	Pass	H
1671.555	149	170	-50.33	-13	-37.33	Pass	H
3845.919	149	127	-47.92	-13	-34.92	Pass	H
5909.916	146	42	-42.13	-13	-29.13	Pass	H
6531.782	147	69	-43.62	-13	-30.62	Pass	H
8000.379	151	110	-43.56	-13	-30.56	Pass	H
1256.680	148	61	-56.83	-13	-43.83	Pass	V
1403.281	147	266	-55.62	-13	-42.62	Pass	V
3524.978	148	303	-49.77	-13	-36.77	Pass	V
3906.629	149	195	-47.12	-13	-34.12	Pass	V
5791.124	147	323	-44.42	-13	-31.42	Pass	V
6577.602	146	325	-46.68	-13	-33.68	Pass	V

16QAM

Band 12 23017 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1336.141	150	78	-60.50	-13	-47.50	Pass	H
1727.200	149	291	-49.57	-13	-36.57	Pass	H
3901.508	151	213	-47.03	-13	-34.03	Pass	H
5857.461	150	89	-46.49	-13	-33.49	Pass	H
6497.829	151	329	-45.26	-13	-32.26	Pass	H
7997.100	148	138	-44.78	-13	-31.78	Pass	H
1218.878	149	99	-59.66	-13	-46.66	Pass	V
1438.876	148	217	-56.95	-13	-43.95	Pass	V
3569.350	150	12	-51.52	-13	-38.52	Pass	V
3837.500	150	137	-51.51	-13	-38.51	Pass	V
5802.313	146	356	-47.46	-13	-34.46	Pass	V
6552.048	146	95	-48.29	-13	-35.29	Pass	V

Band 12 23095 channel/BW1.4 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1294.000	150	142	-57.19	-13	-44.19	Pass	H
1715.082	146	280	-51.81	-13	-38.81	Pass	H
3876.124	150	330	-50.87	-13	-37.87	Pass	H
5865.879	146	194	-46.84	-13	-33.84	Pass	H
6458.166	149	260	-46.67	-13	-33.67	Pass	H
8020.228	151	31	-46.02	-13	-33.02	Pass	H
1234.777	149	4	-56.43	-13	-43.43	Pass	V
1395.475	148	257	-59.18	-13	-46.18	Pass	V
3588.987	147	55	-55.95	-13	-42.95	Pass	V
3913.818	148	273	-54.67	-13	-41.67	Pass	V
5827.558	150	136	-48.15	-13	-35.15	Pass	V
6515.913	150	16	-47.21	-13	-34.21	Pass	V

Band 12 23173 channel/BW1.4 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1341.544	149	156	-60.33	-13	-47.33	Pass	H
1670.882	149	170	-48.74	-13	-35.74	Pass	H
3841.413	149	127	-45.95	-13	-32.95	Pass	H
5909.831	146	42	-42.97	-13	-29.97	Pass	H
6530.121	147	69	-45.16	-13	-32.16	Pass	H
8001.774	151	110	-44.55	-13	-31.55	Pass	H
1256.932	148	61	-55.48	-13	-42.48	Pass	V
1403.981	147	266	-56.27	-13	-43.27	Pass	V
3524.468	148	303	-50.34	-13	-37.34	Pass	V
3909.042	149	195	-48.09	-13	-35.09	Pass	V
5792.414	147	323	-44.23	-13	-31.23	Pass	V
6578.572	146	325	-49.16	-13	-36.16	Pass	V

Note:

1) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 1GHz are attenuated more than 20 dB below the applicable limit and not required to be reported, the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

2) Tested with all kind of bandwidth,RB Size and RB Offset, Found the 1.4MHz with full RB were the worst case; and then Only the worst case is recorded in the report.

QPSK

Band 17 23755 channel/BW5(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1338.129	147	256	-60.10	-13	-47.10	Pass	H
1686.780	147	243	-46.64	-13	-33.64	Pass	H
3871.311	148	259	-49.65	-13	-36.65	Pass	H
5924.043	149	28	-45.27	-13	-32.27	Pass	H
6560.103	148	108	-45.33	-13	-32.33	Pass	H
7997.985	147	328	-43.73	-13	-30.73	Pass	H
1177.996	150	16	-54.21	-13	-41.21	Pass	V
1428.472	148	117	-55.21	-13	-42.21	Pass	V
3598.962	147	325	-52.62	-13	-39.62	Pass	V
3900.760	149	302	-50.12	-13	-37.12	Pass	V
5854.322	147	15	-43.72	-13	-30.72	Pass	V
6581.074	147	280	-46.53	-13	-33.53	Pass	V

Band 17 23790 channel/BW5 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.272	151	14	-55.91	-13	-42.91	Pass	H
1724.761	147	71	-51.25	-13	-38.25	Pass	H
3853.581	150	318	-45.99	-13	-32.99	Pass	H
5927.591	147	56	-45.40	-13	-32.40	Pass	H
6505.069	147	216	-43.70	-13	-30.70	Pass	H
8057.938	151	79	-45.09	-13	-32.09	Pass	H
1191.304	151	65	-55.23	-13	-42.23	Pass	V
1382.351	146	225	-58.36	-13	-45.36	Pass	V
3536.011	149	47	-46.97	-13	-33.97	Pass	V
3854.461	150	73	-47.17	-13	-34.17	Pass	V
5820.102	147	168	-43.97	-13	-30.97	Pass	V
6520.166	150	28	-46.85	-13	-33.85	Pass	V

Band 17 23825 channel/BW5 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1334.346	149	165	-54.183	-13	-41.18	Pass	H
1702.501	146	208	-46.988	-13	-33.99	Pass	H
3903.124	146	4	-47.188	-13	-34.19	Pass	H
5888.423	150	198	-41.320	-13	-28.32	Pass	H
6510.737	146	341	-44.957	-13	-31.96	Pass	H
8081.051	150	235	-45.967	-13	-32.97	Pass	H
1207.125	146	292	-54.394	-13	-41.39	Pass	V
1459.456	150	158	-59.015	-13	-46.01	Pass	V
3542.662	149	55	-50.846	-13	-37.85	Pass	V
3829.530	150	319	-49.784	-13	-36.78	Pass	V
5802.198	146	118	-48.027	-13	-35.03	Pass	V
6557.065	150	155	-46.369	-13	-33.37	Pass	V

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Band 17 23755 channel/BW5(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1337.332	150	78	-58.87	-13	-45.87	Pass	H
1725.983	149	291	-52.10	-13	-39.10	Pass	H
3901.024	151	213	-50.22	-13	-37.22	Pass	H
5856.631	150	89	-46.53	-13	-33.53	Pass	H
6497.708	151	329	-47.30	-13	-34.30	Pass	H
7996.196	148	138	-47.45	-13	-34.45	Pass	H
1220.425	149	99	-60.69	-13	-47.69	Pass	V
1439.512	148	217	-59.12	-13	-46.12	Pass	V
3571.796	150	12	-48.65	-13	-35.65	Pass	V
3837.641	150	137	-49.15	-13	-36.15	Pass	V
5803.192	146	356	-45.52	-13	-32.52	Pass	V
6553.428	146	95	-48.93	-13	-35.93	Pass	V

Band 17 23790 channel/BW5 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1295.763	150	142	-55.67	-13	-42.67	Pass	H
1715.750	146	280	-52.05	-13	-39.05	Pass	H
3875.900	150	330	-46.56	-13	-33.56	Pass	H
5865.638	146	194	-43.11	-13	-30.11	Pass	H
6459.083	149	260	-47.65	-13	-34.65	Pass	H
8019.929	151	31	-44.91	-13	-31.91	Pass	H
1235.806	149	4	-58.63	-13	-45.63	Pass	V
1395.540	148	257	-61.53	-13	-48.53	Pass	V
3589.748	147	55	-54.47	-13	-41.47	Pass	V
3914.792	148	273	-50.66	-13	-37.66	Pass	V
5827.084	150	136	-48.54	-13	-35.54	Pass	V
6517.495	150	16	-51.31	-13	-38.31	Pass	V

Band 17 23825 channel/BW5 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1339.424	149	156	-59.16	-13	-46.16	Pass	H
1671.662	149	170	-50.04	-13	-37.04	Pass	H
3844.369	149	127	-47.95	-13	-34.95	Pass	H
5908.355	146	42	-43.03	-13	-30.03	Pass	H
6529.712	147	69	-45.60	-13	-32.60	Pass	H
8001.306	151	110	-43.90	-13	-30.90	Pass	H
1256.427	148	61	-54.93	-13	-41.93	Pass	V
1404.904	147	266	-55.85	-13	-42.85	Pass	V
3525.072	148	303	-50.00	-13	-37.00	Pass	V
3907.086	149	195	-48.73	-13	-35.73	Pass	V
5789.170	147	323	-42.09	-13	-29.09	Pass	V
6578.251	146	325	-46.66	-13	-33.66	Pass	V

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Band 5 20407 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1335.923	150	78	-55.07	-13	-42.07	Pass	H
1726.041	149	291	-50.38	-13	-37.38	Pass	H
3902.205	151	213	-49.01	-13	-36.01	Pass	H
5856.340	150	89	-44.81	-13	-31.81	Pass	H
6497.289	151	329	-44.34	-13	-31.34	Pass	H
7996.504	148	138	-47.49	-13	-34.49	Pass	H
1218.853	149	99	-55.37	-13	-42.37	Pass	V
1440.383	148	217	-58.29	-13	-45.29	Pass	V
3570.413	150	12	-52.19	-13	-39.19	Pass	V
3836.225	150	137	-48.14	-13	-35.14	Pass	V
5802.271	146	356	-45.27	-13	-32.27	Pass	V
6552.230	146	95	-48.48	-13	-35.48	Pass	V

Band 5 20525 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1296.050	150	142	-56.31	-13	-43.31	Pass	H
1715.369	146	280	-51.81	-13	-38.81	Pass	H
3876.610	150	330	-50.52	-13	-37.52	Pass	H
5867.686	146	194	-45.34	-13	-32.34	Pass	H
6458.449	149	260	-49.16	-13	-36.16	Pass	H
8020.853	151	31	-48.51	-13	-35.51	Pass	H
1235.106	149	4	-53.82	-13	-40.82	Pass	V
1394.738	148	257	-59.09	-13	-46.09	Pass	V
3590.206	147	55	-53.87	-13	-40.87	Pass	V
3915.015	148	273	-50.98	-13	-37.98	Pass	V
5829.043	150	136	-48.55	-13	-35.55	Pass	V
6518.620	150	16	-48.26	-13	-35.26	Pass	V

Band 5 20643 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1340.713	149	156	-56.73	-13	-43.73	Pass	H
1669.900	149	170	-52.00	-13	-39.00	Pass	H
3845.500	149	127	-45.66	-13	-32.66	Pass	H
5906.908	146	42	-40.96	-13	-27.96	Pass	H
6531.650	147	69	-42.47	-13	-29.47	Pass	H
8000.071	151	110	-44.74	-13	-31.74	Pass	H
1257.628	148	61	-56.49	-13	-43.49	Pass	V
1403.175	147	266	-56.84	-13	-43.84	Pass	V
3525.243	148	303	-52.79	-13	-39.79	Pass	V
3912.129	149	195	-48.59	-13	-35.59	Pass	V
5788.308	147	323	-43.05	-13	-30.05	Pass	V
6576.285	146	325	-47.76	-13	-34.76	Pass	V

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Band 5 20407 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.388	147	256	-58.58	-13	-45.58	Pass	H
1686.285	147	243	-47.50	-13	-34.50	Pass	H
3871.595	148	259	-48.88	-13	-35.88	Pass	H
5922.236	149	28	-44.97	-13	-31.97	Pass	H
6559.259	148	108	-44.23	-13	-31.23	Pass	H
7999.466	147	328	-42.32	-13	-29.32	Pass	H
1179.127	150	16	-52.48	-13	-39.48	Pass	V
1427.446	148	117	-55.56	-13	-42.56	Pass	V
3593.941	147	325	-51.51	-13	-38.51	Pass	V
3904.708	149	302	-51.53	-13	-38.53	Pass	V
5855.285	147	15	-45.36	-13	-32.36	Pass	V
6579.994	147	280	-49.33	-13	-36.33	Pass	V

Band 5 20525 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.387	151	14	-54.45	-13	-41.45	Pass	H
1724.842	147	71	-50.85	-13	-37.85	Pass	H
3853.828	150	318	-48.20	-13	-35.20	Pass	H
5927.747	147	56	-43.39	-13	-30.39	Pass	H
6504.467	147	216	-45.24	-13	-32.24	Pass	H
8058.305	151	79	-43.22	-13	-30.22	Pass	H
1191.468	151	65	-57.90	-13	-44.90	Pass	V
1383.042	146	225	-56.63	-13	-43.63	Pass	V
3536.693	149	47	-48.94	-13	-35.94	Pass	V
3855.255	150	73	-49.01	-13	-36.01	Pass	V
5820.512	147	168	-46.75	-13	-33.75	Pass	V
6519.526	150	28	-45.41	-13	-32.41	Pass	V

Band 5 20643 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.212	149	165	-56.287	-13	-43.29	Pass	H
1703.699	146	208	-49.706	-13	-36.71	Pass	H
3901.055	146	4	-44.234	-13	-31.23	Pass	H
5890.032	150	198	-42.648	-13	-29.65	Pass	H
6509.796	146	341	-41.373	-13	-28.37	Pass	H
8078.278	150	235	-45.896	-13	-32.90	Pass	H
1205.270	146	292	-55.728	-13	-42.73	Pass	V
1461.157	150	158	-59.167	-13	-46.17	Pass	V
3542.135	149	55	-50.175	-13	-37.17	Pass	V
3830.941	150	319	-50.928	-13	-37.93	Pass	V
5802.269	146	118	-48.924	-13	-35.92	Pass	V
6556.507	150	155	-45.845	-13	-32.84	Pass	V

Note:

3) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 1GHz are attenuated more than 20 dB below the applicable limit and not required to be reported, the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

4) Tested with all kind of bandwidth,RB Size and RB Offset, Found the 1.4MHz with full RB were the worst case; and then Only the worst case is recorded in the report.

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Band 4 19957 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1334.738	150	78	-57.94	-13	-44.94	Pass	H
1726.296	149	291	-48.20	-13	-35.20	Pass	H
3900.612	151	213	-46.22	-13	-33.22	Pass	H
5859.097	150	89	-49.00	-13	-36.00	Pass	H
6497.232	151	329	-49.17	-13	-36.17	Pass	H
7998.063	148	138	-46.42	-13	-33.42	Pass	H
1218.269	149	99	-57.40	-13	-44.40	Pass	V
1438.453	148	217	-59.32	-13	-46.32	Pass	V
3570.657	150	12	-50.29	-13	-37.29	Pass	V
3835.432	150	137	-48.67	-13	-35.67	Pass	V
5804.319	146	356	-47.23	-13	-34.23	Pass	V
6554.727	146	95	-51.46	-13	-38.46	Pass	V

Band 4 20175 channel/BW1.4 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1295.501	150	142	-56.97	-13	-43.97	Pass	H
1715.798	146	280	-54.06	-13	-41.06	Pass	H
3874.610	150	330	-50.26	-13	-37.26	Pass	H
5867.680	146	194	-45.50	-13	-32.50	Pass	H
6458.031	149	260	-46.20	-13	-33.20	Pass	H
8020.783	151	31	-43.66	-13	-30.66	Pass	H
1235.679	149	4	-59.50	-13	-46.50	Pass	V
1395.290	148	257	-62.77	-13	-49.77	Pass	V
3588.119	147	55	-52.80	-13	-39.80	Pass	V
3913.642	148	273	-55.71	-13	-42.71	Pass	V
5828.697	150	136	-50.37	-13	-37.37	Pass	V
6517.420	150	16	-48.95	-13	-35.95	Pass	V

Band 4 20393 channel/BW1.4 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1339.357	149	156	-60.03	-13	-47.03	Pass	H
1666.677	149	170	-50.91	-13	-37.91	Pass	H
3840.796	149	127	-47.85	-13	-34.85	Pass	H
5907.723	146	42	-42.79	-13	-29.79	Pass	H
6528.303	147	69	-44.53	-13	-31.53	Pass	H
7999.023	151	110	-44.89	-13	-31.89	Pass	H
1256.117	148	61	-56.87	-13	-43.87	Pass	V
1403.156	147	266	-55.95	-13	-42.95	Pass	V
3526.908	148	303	-52.90	-13	-39.90	Pass	V
3911.578	149	195	-50.27	-13	-37.27	Pass	V
5791.517	147	323	-42.25	-13	-29.25	Pass	V
6577.532	146	325	-46.54	-13	-33.54	Pass	V

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Band 4 19957 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1338.225	147	256	-58.50	-13	-45.50	Pass	H
1682.857	147	243	-47.33	-13	-34.33	Pass	H
3870.058	148	259	-49.53	-13	-36.53	Pass	H
5921.744	149	28	-47.33	-13	-34.33	Pass	H
6560.766	148	108	-42.96	-13	-29.96	Pass	H
8003.190	147	328	-43.49	-13	-30.49	Pass	H
1176.937	150	16	-52.59	-13	-39.59	Pass	V
1427.474	148	117	-57.43	-13	-44.43	Pass	V
3598.588	147	325	-52.08	-13	-39.08	Pass	V
3901.295	149	302	-50.66	-13	-37.66	Pass	V
5850.167	147	15	-44.78	-13	-31.78	Pass	V
6581.737	147	280	-48.12	-13	-35.12	Pass	V

Band 4 20175 channel/BW1.4 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.648	151	14	-55.31	-13	-42.31	Pass	H
1724.895	147	71	-51.10	-13	-38.10	Pass	H
3853.291	150	318	-45.08	-13	-32.08	Pass	H
5927.773	147	56	-44.31	-13	-31.31	Pass	H
6504.864	147	216	-45.74	-13	-32.74	Pass	H
8058.492	151	79	-41.90	-13	-28.90	Pass	H
1192.049	151	65	-53.62	-13	-40.62	Pass	V
1382.299	146	225	-59.25	-13	-46.25	Pass	V
3536.037	149	47	-51.34	-13	-38.34	Pass	V
3854.790	150	73	-46.39	-13	-33.39	Pass	V
5820.000	147	168	-45.51	-13	-32.51	Pass	V
6519.441	150	28	-47.51	-13	-34.51	Pass	V

Band 4 20393 channel/BW1.4 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1334.753	149	165	-55.039	-13	-42.04	Pass	H
1704.364	146	208	-49.540	-13	-36.54	Pass	H
3902.360	146	4	-45.983	-13	-32.98	Pass	H
5889.170	150	198	-42.411	-13	-29.41	Pass	H
6509.058	146	341	-42.957	-13	-29.96	Pass	H
8080.650	150	235	-44.638	-13	-31.64	Pass	H
1205.775	146	292	-55.085	-13	-42.09	Pass	V
1462.044	150	158	-56.206	-13	-43.21	Pass	V
3541.867	149	55	-49.680	-13	-36.68	Pass	V
3830.387	150	319	-48.953	-13	-35.95	Pass	V
5801.319	146	118	-46.514	-13	-33.51	Pass	V
6556.413	150	155	-46.926	-13	-33.93	Pass	V

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Band 2 18607 channel/BW 1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1336.645	150	78	-54.63	-13	-41.63	Pass	H
1726.235	149	291	-48.52	-13	-35.52	Pass	H
3901.918	151	213	-49.66	-13	-36.66	Pass	H
5857.237	150	89	-47.61	-13	-34.61	Pass	H
6498.052	151	329	-48.57	-13	-35.57	Pass	H
7997.461	148	138	-44.12	-13	-31.12	Pass	H
1218.029	149	99	-57.94	-13	-44.94	Pass	V
1438.008	148	217	-58.01	-13	-45.01	Pass	V
3571.465	150	12	-49.33	-13	-36.33	Pass	V
3837.048	150	137	-49.28	-13	-36.28	Pass	V
5804.472	146	356	-47.83	-13	-34.83	Pass	V
6553.247	146	95	-48.83	-13	-35.83	Pass	V

Band 2 18900 channel/BW 1.4 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1294.045	150	142	-59.86	-13	-46.86	Pass	H
1714.096	146	280	-48.20	-13	-35.20	Pass	H
3876.192	150	330	-49.98	-13	-36.98	Pass	H
5867.580	146	194	-45.95	-13	-32.95	Pass	H
6458.406	149	260	-48.39	-13	-35.39	Pass	H
8019.397	151	31	-46.66	-13	-33.66	Pass	H
1234.406	149	4	-59.47	-13	-46.47	Pass	V
1394.470	148	257	-61.40	-13	-48.40	Pass	V
3588.766	147	55	-55.07	-13	-42.07	Pass	V
3914.633	148	273	-50.77	-13	-37.77	Pass	V
5827.231	150	136	-48.11	-13	-35.11	Pass	V
6515.914	150	16	-46.29	-13	-33.29	Pass	V

Band 2 19193 channel/BW 1.4 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1338.320	149	156	-57.88	-13	-44.88	Pass	H
1668.993	149	170	-50.64	-13	-37.64	Pass	H
3846.378	149	127	-45.45	-13	-32.45	Pass	H
5906.717	146	42	-43.37	-13	-30.37	Pass	H
6529.402	147	69	-45.41	-13	-32.41	Pass	H
8001.698	151	110	-46.60	-13	-33.60	Pass	H
1260.724	148	61	-54.58	-13	-41.58	Pass	V
1406.087	147	266	-54.71	-13	-41.71	Pass	V
3524.754	148	303	-52.97	-13	-39.97	Pass	V
3911.073	149	195	-50.07	-13	-37.07	Pass	V
5792.345	147	323	-45.30	-13	-32.30	Pass	V
6574.974	146	325	-48.41	-13	-35.41	Pass	V

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Band 2 18607 channel/BW 1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1338.824	147	256	-57.74	-13	-44.74	Pass	H
1683.308	147	243	-48.62	-13	-35.62	Pass	H
3867.352	148	259	-50.40	-13	-37.40	Pass	H
5921.926	149	28	-47.11	-13	-34.11	Pass	H
6558.453	148	108	-44.55	-13	-31.55	Pass	H
7999.157	147	328	-44.40	-13	-31.40	Pass	H
1179.718	150	16	-54.03	-13	-41.03	Pass	V
1424.156	148	117	-56.91	-13	-43.91	Pass	V
3597.873	147	325	-51.77	-13	-38.77	Pass	V
3903.550	149	302	-49.89	-13	-36.89	Pass	V
5852.225	147	15	-43.42	-13	-30.42	Pass	V
6582.341	147	280	-49.21	-13	-36.21	Pass	V

Band 2 18900 channel/BW 1.4 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.451	151	14	-56.01	-13	-43.01	Pass	H
1724.871	147	71	-48.35	-13	-35.35	Pass	H
3853.222	150	318	-49.75	-13	-36.75	Pass	H
5927.217	147	56	-41.77	-13	-28.77	Pass	H
6504.626	147	216	-46.20	-13	-33.20	Pass	H
8058.229	151	79	-44.59	-13	-31.59	Pass	H
1191.401	151	65	-56.46	-13	-43.46	Pass	V
1383.127	146	225	-59.65	-13	-46.65	Pass	V
3536.114	149	47	-48.92	-13	-35.92	Pass	V
3854.468	150	73	-46.65	-13	-33.65	Pass	V
5819.864	147	168	-47.35	-13	-34.35	Pass	V
6519.641	150	28	-47.26	-13	-34.26	Pass	V

Band 2 19193 channel/BW 1.4 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1334.877	149	165	-53.643	-13	-40.64	Pass	H
1703.918	146	208	-47.515	-13	-34.51	Pass	H
3900.734	146	4	-45.731	-13	-32.73	Pass	H
5887.806	150	198	-41.763	-13	-28.76	Pass	H
6509.544	146	341	-43.793	-13	-30.79	Pass	H
8079.382	150	235	-42.659	-13	-29.66	Pass	H
1205.771	146	292	-54.217	-13	-41.22	Pass	V
1459.692	150	158	-58.132	-13	-45.13	Pass	V
3542.242	149	55	-52.655	-13	-39.66	Pass	V
3830.523	150	319	-51.757	-13	-38.76	Pass	V
5801.548	146	118	-46.197	-13	-33.20	Pass	V
6557.475	150	155	-45.471	-13	-32.47	Pass	V

Note:

1)Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 1GHz are attenuated more than 20 dB below the applicable limit and not required to be reported, the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

2)Tested with all kind of bandwidth,RB Size and RB Offset, Found the 1.4MHz with full RB were the worst case; and then Only the worst case is recorded in the report.

12. FREQUENCY STABILITY

12.1 Standard Applicable

According to §22.355, §24.235, §27.54 the limit is 2.5ppm.

12.2 Test Procedure

According to §2.1055, the following test procedure was performed.

The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.

The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a

Frequency Domain Analyzer in histogram mode

12.3 Summary of Test Results/Plots

Note: 1.Normal Voltage NV=DC120V; Low Voltage LV=DC108V; High Voltage HV=DC132V

Please refer to Appendix F: Frequency Stability

Test result: Pass

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