

TEST REPORT

Product Name: FA x GPS Tracker
FCC ID: 2BCG8-CSIFAX
Trademark: AIBEILE
Model Number: CSI FA x
Prepared For: BE SOLUTIONS S.A.S.
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Sample Received Date: Jul. 03, 2022
Sample tested Date: Jul. 03, 2022 to Jul. 28, 2022
Issue Date: Jul. 28, 2022
Report No.: CTB230728030RFX
Test Standards: FCC Part 2, 22, 24E, 27
Test Results: PASS
Remark: This is LTE radio test report.

Compiled by:

Reviewed by:

Approved by:

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Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. 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. "*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

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(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB230728030RFX	Jul. 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 D01v03r01	PASS
Effective Radiated Power of Transmitter(EIRP)	Part 22.913(a)(5)/Part27.50(h)(2)	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
peak-to-average ratio	Part 27.50(d)	KDB 971168 D01v03r01	PASS
99% & 26dB Occupied Bandwidth	Part 2.1049(h)	KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	Part 2.1051/ Part 22.917(a)/Part 27.53(m) (4)	KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	Part 2.1051/ Part 22.917(a)/Part 27.53(m) (4)	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	Part 2.1053/ Part 22.917(a)/Part 27.53(m) (4)	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Frequency stability	Part 2.1055/Part 27.54	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS

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 chamber 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°C
frequency	1×10 ⁻⁷

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s):	CSI FA x
Model Description:	N/A
Hardware Version:	C401_MB_V1.1
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 7:2500-2570MHz FDD-LTE BAND 12: 699-716MHz
Max. RF output power:	FDD-LTE BAND 2: 22.85dBm FDD-LTE BAND 4: 23.33dBm FDD-LTE BAND 5: 23.52dBm FDD-LTE BAND 7: 22.14dBm FDD-LTE BAND 12: 23.33dBm
Type of Modulation:	QPSK, 16QAM
Antenna installation:	Internal antenna
Antenna Gain:	LTE BAND 2: -6.75dBi LTE BAND 4: -1.51dBi LTE BAND 5: -9.09dBi LTE BAND 7: 0.43dBi LTE BAND 12: -6.69dBi
Ratings:	DC 5V charging from adapter DC 3.8V from battery

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

			Model	Series No.	
	Adapter	JYIN	JY-05100C	/	/

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 7	Low, Middle, High Channels
TM5	FDD-LTE BAND 12	Low, Middle, High Channels

4.5 Test Environment

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Normal Voltage(DC):	3.8V
Normal Temperature(°C)	23
Low Temperature(°C)	0
High Temperature(°C)	40

5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at 1&2F., Building A, No. 26, Xinhua Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, 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

Item	Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	2024.07.05
2	Power Sensor	Agilent	U2021XA	MY56120032	2024.07.05
3	Power Sensor	Agilent	U2021XA	MY56120034	2024.07.05
4	Communication test set	R&S	CMW500	108058	2024.07.05
5	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	2024.07.05
6	Signal Generator	Agilent	N5181A	MY50140365	2024.07.05
7	Vector signal generator	Agilent	N5182A	MY47420195	2024.07.05
8	Communication test set	Agilent	E5515C	MY50102567	2024.07.06
9	2.4 GHz Filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	2024.07.05
10	5 GHz Filter	Shenxiang	MSF5150-5850 MS-1155	20181015001	2024.07.06
11	Filter	Xingbo	XBLBQ-DZA120	190821-1-1	2024.07.06
12	BT&WI-FI Automatic test software	Microwave	MTS8000	Ver. 2.0.0.0	/
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	2023.10.30
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	2024.07.05
15	234G Automatic test software	Microwave	MTS8200	Ver. 2.0.0.0	/
16	966 chamber	C.R.T.	966	/	2024.08.11
17	Receiver	R&S	ESPI	100362	2024.07.05
18	Amplifier	HP	8447E	2945A02747	2024.07.05
19	Amplifier	Agilent	8449B	3008A01838	2024.07.05
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	2024.07.08

21	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA9120D	01911	2024.07.08
22	EMI test software	Fala	EZ-EMC	FA-03A2 RE	/
23	Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-224	2024.07.08
24	loop antenna	ZHINAN	ZN30900A	GTS534	/
25	40G Horn antenna	A/H/System	SAS-574	588	2024.10.30
26	Amplifier	AEROFLEX	Aeroflex	097	2024.10.30

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.

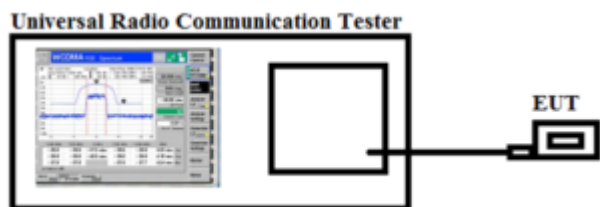
According to §24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

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 2

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.17	<33.00	PASS
		H	21.72		
	MCH	V	20.71		PASS
		H	22.35		
	HCH	V	20.63		PASS
		H	21.18		
16QAM	LCH	V	22.18	<33.00	PASS
		H	21.80		
	MCH	V	21.87		PASS
		H	20.87		
	HCH	V	22.19		PASS
		H	21.00		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.85	<33.00	PASS
		H	21.82		
	MCH	V	21.27		PASS
		H	20.78		
	HCH	V	21.92		PASS
		H	20.91		
16QAM	LCH	V	21.69	<33.00	PASS
		H	20.63		
	MCH	V	22.38		PASS
		H	21.50		
	HCH	V	21.28		PASS
		H	21.46		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.91	<33.00	PASS
		H	21.05		
	MCH	V	19.56		PASS

	HCH	H	20.12		PASS
		V	20.01		
		H	19.64		
16QAM	LCH	V	19.57	<33.00	PASS
		H	21.45		
	MCH	V	20.02		PASS
		H	19.84		
	HCH	V	19.58		PASS
		H	21.02		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.76	<33.00	PASS
		H	20.88		
	MCH	V	20.80		PASS
		H	19.91		
	HCH	V	19.38		PASS
		H	20.89		
16QAM	LCH	V	20.66	<33.00	PASS
		H	20.19		
	MCH	V	20.73		PASS
		H	19.05		
	HCH	V	18.90		PASS
		H	20.09		
Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.89	<33.00	PASS
		H	20.04		
	MCH	V	20.62		PASS
		H	21.15		
	HCH	V	19.57		PASS
		H	20.35		
16QAM	LCH	V	20.64	<33.00	PASS
		H	19.77		
	MCH	V	20.36		PASS
		H	20.47		
	HCH	V	19.94		PASS
		H	21.41		

Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.85	<33.00	PASS
		H	18.52		
	MCH	V	19.49		PASS
		H	19.88		
	HCH	V	19.51		PASS
		H	19.69		
16QAM	LCH	V	22.66	<33.00	PASS
		H	19.46		
	MCH	V	19.51		PASS
		H	18.75		
	HCH	V	20.46		PASS
		H	20.02		

FDD-LTE Band 4

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.22	<30.00	PASS
		H	20.73		
	MCH	V	22.08		PASS
		H	21.40		
	HCH	V	21.62		PASS
		H	22.02		
16QAM	LCH	V	22.43	<30.00	PASS
		H	22.12		
	MCH	V	21.02		PASS
		H	22.51		
	HCH	V	20.67		PASS
		H	20.87		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.08	<30.00	PASS
		H	21.20		
	MCH	V	20.10		PASS
		H	20.04		

	HCH	V	20.14		PASS
		H	21.62		
16QAM	LCH	V	20.95	<30.00	PASS
		H	20.30		
	MCH	V	20.94		PASS
		H	19.71		
	HCH	V	19.74		PASS
		H	20.54		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.36	<30.00	PASS
		H	21.68		
	MCH	V	20.53		PASS
		H	21.51		
	HCH	V	21.66		PASS
		H	21.76		
16QAM	LCH	V	20.53	<30.00	PASS
		H	21.94		
	MCH	V	21.21		PASS
		H	22.19		
	HCH	V	20.99		PASS
		H	20.56		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.17	<30.00	PASS
		H	21.36		
	MCH	V	21.15		PASS
		H	22.33		
	HCH	V	20.62		PASS
		H	20.98		
16QAM	LCH	V	21.93	<30.00	PASS
		H	21.26		
	MCH	V	22.48		PASS
		H	22.46		
	HCH	V	21.03		PASS
		H	21.58		

Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.47	<30.00	PASS
		H	22.09		
	MCH	V	21.29		PASS
		H	22.56		
	HCH	V	22.02		PASS
		H	21.99		
16QAM	LCH	V	20.68	<30.00	PASS
		H	21.72		
	MCH	V	20.76		PASS
		H	21.54		
	HCH	V	21.57		PASS
		H	22.50		
Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	23.33	<30.00	PASS
		H	22.13		
	MCH	V	20.19		PASS
		H	22.65		
	HCH	V	21.41		PASS
		H	21.07		
16QAM	LCH	V	22.95	<30.00	PASS
		H	21.47		
	MCH	V	19.52		PASS
		H	21.39		
	HCH	V	22.40		PASS
		H	22.20		

FDD-LTE Band 5

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.32	<34.77	PASS
		H	21.02		
	MCH	V	22.45		PASS
		H	22.23		
	HCH	V	20.93		PASS

		H	21.34		
16QAM	LCH	V	21.72	<34.77	PASS
		H	22.11		
	MCH	V	22.35		PASS
		H	21.97		
	HCH	V	21.81		PASS
		H	22.27		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.88	<34.77	PASS
		H	21.40		
	MCH	V	21.35		PASS
		H	22.13		
	HCH	V	22.39		PASS
		H	22.24		
16QAM	LCH	V	21.82	<34.77	PASS
		H	22.45		
	MCH	V	22.54		PASS
		H	23.00		
	HCH	V	21.19		PASS
		H	22.12		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.99	<34.77	PASS
		H	21.18		
	MCH	V	22.62		PASS
		H	21.41		
	HCH	V	21.35		PASS
		H	22.88		
16QAM	LCH	V	22.68	<34.77	PASS
		H	22.40		
	MCH	V	21.96		PASS
		H	21.29		
	HCH	V	21.42		PASS
		H	22.06		

Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	23.52	<34.77	PASS
		H	22.31		
	MCH	V	21.70		PASS
		H	21.81		
	HCH	V	22.56		PASS
		H	22.03		
16QAM	LCH	V	23.41	<34.77	PASS
		H	21.30		
	MCH	V	21.84		PASS
		H	21.19		
	HCH	V	22.49		PASS
		H	21.09		

FDD-LTE Band 7

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.44	<33	PASS
		H	21.47		
	MCH	V	19.69		PASS
		H	19.81		
	HCH	V	20.98		PASS
		H	20.18		
16QAM	LCH	V	21.30	<33	PASS
		H	21.01		
	MCH	V	20.19		PASS
		H	21.01		
	HCH	V	21.36		PASS
		H	20.52		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.13	<33	PASS
		H	21.03		
	MCH	V	20.53		PASS
		H	19.95		
	HCH	V	20.02		PASS

		H	19.72		
16QAM	LCH	V	20.87	<33	PASS
		H	20.31		
	MCH	V	21.19		PASS
		H	19.46		
	HCH	V	19.48		PASS
		H	20.62		

Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.39	<33	PASS
		H	20.01		
	MCH	V	20.56		PASS
		H	20.52		
	HCH	V	21.04		PASS
		H	20.18		
16QAM	LCH	V	21.28	<33	PASS
		H	21.23		
	MCH	V	20.32		PASS
		H	21.08		
	HCH	V	21.59		PASS
		H	20.20		
Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.14	<33	PASS
		H	20.45		
	MCH	V	20.85		PASS
		H	20.07		
	HCH	V	21.43		PASS
		H	19.76		
16QAM	LCH	V	22.05	<33	PASS
		H	20.92		
	MCH	V	19.75		PASS
		H	21.18		
	HCH	V	20.73		PASS
		H	20.38		

FDD-LTE Band 12

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.73	<34.77	PASS
		H	21.28		
	MCH	V	22.18		PASS
		H	20.94		
	HCH	V	22.23		PASS
		H	20.71		
16QAM	LCH	V	21.04	<34.77	PASS
		H	21.61		
	MCH	V	21.89		PASS
		H	20.60		
	HCH	V	21.45		PASS
		H	21.17		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.46	<34.77	PASS
		H	21.64		
	MCH	V	20.80		PASS
		H	21.12		
	HCH	V	21.45		PASS
		H	20.01		
16QAM	LCH	V	20.28	<34.77	PASS
		H	20.40		
	MCH	V	21.44		PASS
		H	20.03		
	HCH	V	20.51		PASS
		H	20.36		

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.55	<34.77	PASS
		H	21.22		
	MCH	V	20.76		PASS
		H	21.91		
	HCH	V	21.23		PASS
		H	20.80		
16QAM	LCH	V	21.70	<34.77	PASS
		H	20.71		
	MCH	V	21.48		PASS
		H	21.10		
	HCH	V	20.12		PASS
		H	20.92		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.85	<34.77	PASS
		H	20.12		
	MCH	V	20.61		PASS
		H	20.90		
	HCH	V	21.05		PASS
		H	21.59		
16QAM	LCH	V	22.56	<34.77	PASS
		H	21.72		
	MCH	V	20.96		PASS
		H	21.20		
	HCH	V	21.00		PASS
		H	21.72		

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

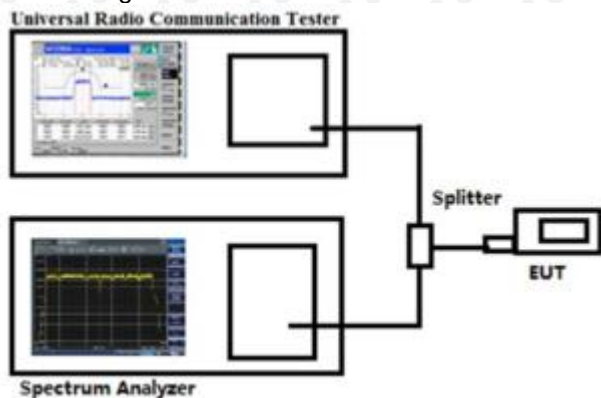
corresponding to the highest PAPR expected during periods of continuous transmission.

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.

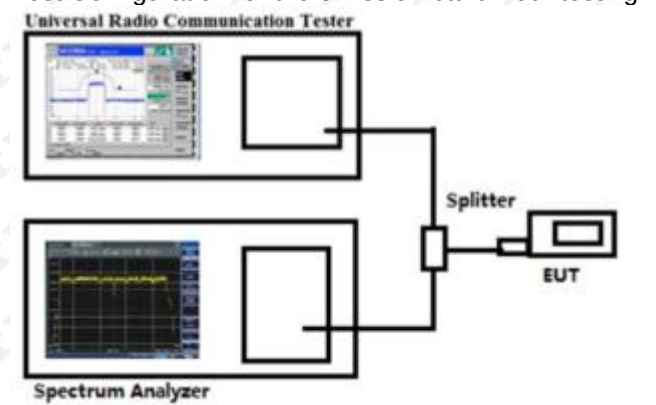
According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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 $43 + 10 \log_{10}(P)$ dB.

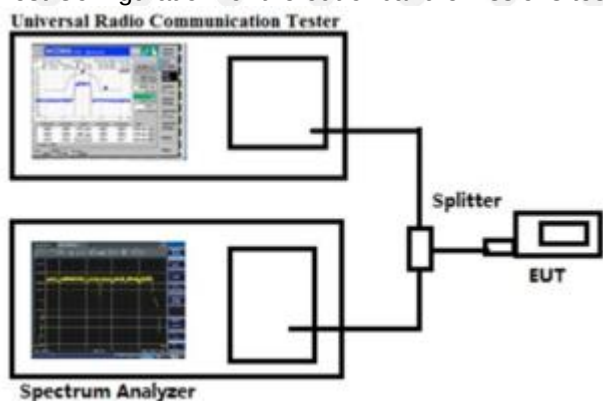
According to §27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ 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 than $43 + 10 \log(P)$ 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 $43 + 10 \log(P)$ 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 = $43 + 10 \log_{10}(\text{power out in Watts})$

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 2 18607 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1372.59	146	122	-58.33	-13	-45.33	Pass	H
1822.94	143	191	-52.67	-13	-39.67	Pass	H
4047.57	156	8	-51.20	-13	-38.20	Pass	H
6000.03	149	88	-44.36	-13	-31.36	Pass	H
6621.79	141	294	-42.91	-13	-29.91	Pass	H
7973.17	146	357	-45.45	-13	-32.45	Pass	H
1261.43	147	329	-61.26	-13	-48.26	Pass	V
1429.85	154	289	-60.33	-13	-47.33	Pass	V
3561.33	142	318	-52.92	-13	-39.92	Pass	V
3839.04	146	68	-45.39	-13	-32.39	Pass	V
5756.25	157	92	-46.63	-13	-33.63	Pass	V
6378.11	142	59	-46.72	-13	-33.72	Pass	V

Band 2 18900 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1140.26	150	296	-55.36	-13	-42.36	Pass	H
1762.41	146	172	-53.59	-13	-40.59	Pass	H
3713.47	150	179	-49.39	-13	-36.39	Pass	H
5687.84	146	251	-42.24	-13	-29.24	Pass	H
6391.25	149	166	-46.03	-13	-33.03	Pass	H
7948.80	151	326	-53.25	-13	-40.25	Pass	H
1296.71	149	197	-50.18	-13	-37.18	Pass	V
1232.37	148	171	-57.88	-13	-44.88	Pass	V
3552.27	147	105	-52.49	-13	-39.49	Pass	V
3815.56	148	212	-49.14	-13	-36.14	Pass	V
5887.51	150	272	-48.44	-13	-35.44	Pass	V
6599.73	150	72	-46.77	-13	-33.77	Pass	V

Band 2 19193 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1344.52	151	323	-57.57	-13	-44.57	Pass	H
1752.94	147	144	-50.47	-13	-37.47	Pass	H
3839.04	142	318	-49.50	-13	-36.50	Pass	H
5806.02	158	55	-41.33	-13	-28.33	Pass	H
6448.98	152	176	-45.22	-13	-32.22	Pass	H
8108.87	153	95	-42.51	-13	-29.51	Pass	H
1274.48	155	39	-54.28	-13	-41.28	Pass	V
1434.68	157	194	-58.72	-13	-45.72	Pass	V
3449.59	143	31	-49.85	-13	-36.85	Pass	V
3819.01	140	146	-48.16	-13	-35.16	Pass	V
5778.03	145	28	-44.51	-13	-31.51	Pass	V
6467.45	143	96	-45.78	-13	-32.78	Pass	V

16QAM

Band 2 18607 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1394.90	147	291	-58.15	-13	-45.15	Pass	H
1653.39	160	175	-50.61	-13	-37.61	Pass	H
3903.74	146	276	-44.96	-13	-31.96	Pass	H
5906.18	143	110	-46.59	-13	-33.59	Pass	H
6411.78	151	222	-43.97	-13	-30.97	Pass	H
8065.80	157	333	-44.30	-13	-31.30	Pass	H
1250.63	145	83	-55.03	-13	-42.03	Pass	V
1457.99	157	64	-58.63	-13	-45.63	Pass	V
3545.51	140	245	-51.77	-13	-38.77	Pass	V
3916.86	142	184	-52.90	-13	-39.90	Pass	V
5869.98	156	163	-47.55	-13	-34.55	Pass	V
6539.95	157	112	-46.37	-13	-33.37	Pass	V

Band 2 18900 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1261.13	143	173	-45.04	-13	-32.04	Pass	H
1646.25	159	30	-36.76	-13	-23.76	Pass	H
3964.30	143	236	-32.23	-13	-19.23	Pass	H
5801.66	158	350	-29.82	-13	-16.82	Pass	H
6501.61	149	49	-32.03	-13	-19.03	Pass	H
8015.93	143	137	-30.11	-13	-17.11	Pass	H
1214.06	150	354	-41.35	-13	-28.35	Pass	V
1364.01	149	203	-45.98	-13	-32.98	Pass	V
3456.15	142	10	-36.98	-13	-23.98	Pass	V
3744.18	143	26	-36.87	-13	-23.87	Pass	V
5866.26	143	111	-31.27	-13	-18.27	Pass	V
6492.80	153	42	-31.38	-13	-18.38	Pass	V

Band 2 19193 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1270.34	142	260	-57.40	-13	-44.40	Pass	H
1774.58	143	192	-46.59	-13	-33.59	Pass	H
3873.82	153	117	-46.53	-13	-33.53	Pass	H
5938.17	148	114	-43.51	-13	-30.51	Pass	H
6496.66	156	312	-45.94	-13	-32.94	Pass	H
8031.76	153	64	-41.57	-13	-28.57	Pass	H
1292.58	158	184	-55.62	-13	-42.62	Pass	V
1473.00	157	323	-59.14	-13	-46.14	Pass	V
3574.67	149	21	-51.72	-13	-38.72	Pass	V
3754.82	146	357	-49.67	-13	-36.67	Pass	V
5801.78	153	116	-51.56	-13	-38.56	Pass	V
6491.96	160	198	-43.81	-13	-30.81	Pass	V

Note:

- 1) Scan from 9kHz to 40GHz, 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 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.
1418.08	148	181	-53.41	-13	-40.41	Pass	H
1604.31	141	126	-50.55	-13	-37.55	Pass	H
3961.58	141	225	-44.75	-13	-31.75	Pass	H
5815.77	145	65	-43.54	-13	-30.54	Pass	H
6602.49	157	81	-45.52	-13	-32.52	Pass	H
8113.95	145	262	-45.41	-13	-32.41	Pass	H
1204.34	140	300	-56.14	-13	-43.14	Pass	V
1481.85	156	179	-59.19	-13	-46.19	Pass	V
3489.25	156	99	-50.77	-13	-37.77	Pass	V
3926.51	144	358	-52.37	-13	-39.37	Pass	V
5721.99	156	326	-46.02	-13	-33.02	Pass	V
6547.20	149	241	-45.68	-13	-32.68	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.
1319.38	158	209	-56.75	-13	-43.75	Pass	H
1764.64	157	334	-51.07	-13	-38.07	Pass	H
3897.68	152	307	-47.81	-13	-34.81	Pass	H
5899.89	160	75	-43.57	-13	-30.57	Pass	H
6489.13	154	189	-43.12	-13	-30.12	Pass	H
8099.18	148	102	-48.42	-13	-35.42	Pass	H
1141.46	143	74	-54.58	-13	-41.58	Pass	V
1444.50	159	216	-59.98	-13	-46.98	Pass	V
3497.49	147	134	-53.46	-13	-40.46	Pass	V
3903.27	141	59	-47.05	-13	-34.05	Pass	V
5726.51	143	177	-46.52	-13	-33.52	Pass	V
6564.27	144	118	-45.54	-13	-32.54	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.
1402.14	150	298	-55.66	-13	-42.66	Pass	H
1756.01	147	202	-47.77	-13	-34.77	Pass	H
3991.45	147	352	-48.31	-13	-35.31	Pass	H
5830.51	157	208	-43.17	-13	-30.17	Pass	H
6473.28	159	95	-41.02	-13	-28.02	Pass	H
8179.82	160	34	-42.94	-13	-29.94	Pass	H
1130.61	141	49	-58.34	-13	-45.34	Pass	V
1550.99	157	17	-57.41	-13	-44.41	Pass	V
3634.91	148	22	-54.06	-13	-41.06	Pass	V
3769.55	146	249	-53.39	-13	-40.39	Pass	V
5862.65	151	319	-47.45	-13	-34.45	Pass	V
6576.83	153	53	-48.24	-13	-35.24	Pass	V

16QAM

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.
1394.02	148	38	-58.82	-13	-45.82	Pass	H
1668.63	149	261	-49.21	-13	-36.21	Pass	H
3802.21	141	291	-47.12	-13	-34.12	Pass	H
5864.23	147	337	-44.68	-13	-31.68	Pass	H
6554.38	140	10	-41.88	-13	-28.88	Pass	H
8101.96	143	350	-43.44	-13	-30.44	Pass	H
1232.88	148	102	-57.05	-13	-44.05	Pass	V
1456.15	154	257	-61.49	-13	-48.49	Pass	V
3621.62	152	356	-53.07	-13	-40.07	Pass	V
3811.00	144	125	-48.20	-13	-35.20	Pass	V
5864.87	152	121	-47.44	-13	-34.44	Pass	V
6525.60	158	162	-48.05	-13	-35.05	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.
1396.65	160	320	-56.95	-13	-43.95	Pass	H
1623.21	152	185	-52.02	-13	-39.02	Pass	H
3821.41	153	207	-47.85	-13	-34.85	Pass	H
5880.56	147	301	-46.17	-13	-33.17	Pass	H
6421.22	143	160	-41.99	-13	-28.99	Pass	H
8035.83	144	353	-43.09	-13	-30.09	Pass	H
1220.87	141	185	-56.91	-13	-43.91	Pass	V
1437.33	157	37	-56.18	-13	-43.18	Pass	V
3473.58	146	113	-52.84	-13	-39.84	Pass	V
3774.25	156	291	-51.96	-13	-38.96	Pass	V
5849.92	159	4	-51.54	-13	-38.54	Pass	V
6602.26	157	137	-49.63	-13	-36.63	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.
1298.80	143	146	-56.71	-13	-43.71	Pass	H
1715.74	146	351	-50.32	-13	-37.32	Pass	H
3977.38	147	344	-45.60	-13	-32.60	Pass	H
5881.62	149	163	-40.81	-13	-27.81	Pass	H
6447.47	156	86	-45.63	-13	-32.63	Pass	H
8034.29	143	331	-48.24	-13	-35.24	Pass	H
1117.03	153	147	-55.83	-13	-42.83	Pass	V
1360.83	145	269	-59.13	-13	-46.13	Pass	V
3591.40	141	339	-51.25	-13	-38.25	Pass	V
3760.42	151	10	-51.95	-13	-38.95	Pass	V
5880.09	152	27	-44.70	-13	-31.70	Pass	V
6545.38	150	191	-46.23	-13	-33.23	Pass	V

Note:

3) Scan from 9kHz to 40GHz, 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.

QPSK

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.
1236.49	157	5	-55.37	-13	-42.37	Pass	H
1649.06	140	205	-48.94	-13	-35.94	Pass	H
3883.44	148	60	-48.10	-13	-35.10	Pass	H
5838.32	141	296	-44.91	-13	-31.91	Pass	H
6589.36	151	221	-45.18	-13	-32.18	Pass	H
8097.72	153	302	-41.22	-13	-28.22	Pass	H
1113.36	157	85	-52.59	-13	-39.59	Pass	V
1542.81	151	19	-59.56	-13	-46.56	Pass	V
3511.02	149	25	-51.33	-13	-38.33	Pass	V
3908.57	147	127	-51.28	-13	-38.28	Pass	V
5730.35	159	334	-49.67	-13	-36.67	Pass	V
6502.01	150	265	-46.21	-13	-33.21	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.
1219.98	150	159	-58.26	-13	-45.26	Pass	H
1806.87	146	179	-54.23	-13	-41.23	Pass	H
3963.45	150	7	-50.52	-13	-37.52	Pass	H
5847.82	146	61	-44.26	-13	-31.26	Pass	H
6432.05	149	138	-49.87	-13	-36.87	Pass	H
8059.22	151	293	-51.18	-13	-38.18	Pass	H
1212.17	149	230	-55.20	-13	-42.20	Pass	V
1450.54	148	263	-59.62	-13	-46.62	Pass	V
3584.54	147	119	-53.49	-13	-40.49	Pass	V
3816.27	148	127	-50.48	-13	-37.48	Pass	V
5770.32	150	74	-48.48	-13	-35.48	Pass	V
6482.37	150	257	-50.86	-13	-37.86	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.
1340.71	152	91	-56.73	-13	-43.73	Pass	H
1669.90	154	311	-52	-13	-39	Pass	H
3845.50	146	199	-45.66	-13	-32.66	Pass	H
5906.91	155	56	-40.96	-13	-27.96	Pass	H
6531.65	147	78	-42.47	-13	-29.47	Pass	H
8000.07	150	250	-44.74	-13	-31.74	Pass	H
1257.63	152	110	-56.49	-13	-43.49	Pass	V
1403.18	151	350	-56.84	-13	-43.84	Pass	V
3525.24	151	130	-52.79	-13	-39.79	Pass	V
3912.13	148	107	-48.59	-13	-35.59	Pass	V
5788.31	153	43	-43.05	-13	-30.05	Pass	V
6576.29	149	280	-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.
1420.95	154	352	-59.47	-13	-46.47	Pass	H
1767.98	150	20	-46.29	-13	-33.29	Pass	H
3870.05	149	102	-47.85	-13	-34.85	Pass	H
5863.31	146	29	-43.51	-13	-30.51	Pass	H
6611.29	149	8	-45.55	-13	-32.55	Pass	H
7999.77	149	305	-43.44	-13	-30.44	Pass	H
1182.46	155	147	-50.81	-13	-37.81	Pass	V
1459.99	152	195	-52.66	-13	-39.66	Pass	V
3496.11	151	31	-52.61	-13	-39.61	Pass	V
3831.32	147	20	-51.63	-13	-38.63	Pass	V
5946.38	152	161	-44.41	-13	-31.41	Pass	V
6548.76	146	140	-51.25	-13	-38.25	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.
1247.62	151	303	-52.24	-13	-41.45	Pass	H
1683.59	145	160	-51.15	-13	-37.85	Pass	H
3953.37	152	225	-50.97	-13	-35.2	Pass	H
5957.45	152	213	-40.89	-13	-30.39	Pass	H
6542.95	154	222	-42.06	-13	-32.24	Pass	H
8126.32	154	309	-39.89	-13	-30.22	Pass	H
1133.12	149	275	-57.00	-13	-44.9	Pass	V
1330.70	155	228	-53.58	-13	-43.63	Pass	V
3629.52	149	235	-45.76	-13	-35.94	Pass	V
3805.69	154	72	-50.90	-13	-36.01	Pass	V
5729.10	147	359	-46.31	-13	-33.75	Pass	V
6477.88	147	138	-47.76	-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.
1248.26	153	26	-56.71	-13	-43.71	Pass	H
1628.49	153	134	-47.66	-13	-34.66	Pass	H
3846.57	150	258	-42.71	-13	-29.71	Pass	H
5835.94	145	58	-45.11	-13	-32.11	Pass	H
6415.86	153	3	-38.50	-13	-25.50	Pass	H
8043.56	145	338	-47.92	-13	-34.92	Pass	H
1194.20	147	98	-55.92	-13	-42.92	Pass	V
1380.20	153	284	-61.92	-13	-48.92	Pass	V
3479.46	146	192	-47.64	-13	-34.64	Pass	V
3841.96	146	230	-48.61	-13	-35.61	Pass	V
5743.28	148	295	-49.11	-13	-36.11	Pass	V
6499.69	150	5	-44.77	-13	-31.77	Pass	V

Note:

5) Scan from 9kHz to 40GHz, 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.

6) 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 7 20775 channel/BW 5(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1380.06	148	261	-58.86	-13	-45.86	Pass	H
1756.42	151	109	-49.29	-13	-36.29	Pass	H
3964.39	154	133	-49.47	-13	-36.47	Pass	H
5853.49	149	311	-42.85	-13	-29.85	Pass	H
6515.04	152	192	-47.10	-13	-34.10	Pass	H
7952.11	146	103	-40.56	-13	-27.56	Pass	H
1108.45	152	241	-53.84	-13	-40.84	Pass	V
1354.34	151	155	-57.97	-13	-44.97	Pass	V
3527.36	154	284	-53.46	-13	-40.46	Pass	V
3918.91	147	190	-51.18	-13	-38.18	Pass	V
5796.20	149	171	-44.17	-13	-31.17	Pass	V
6505.56	149	336	-45.88	-13	-32.88	Pass	V

Band 7 21100 channel/BW 5 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1328.10	149	105	-52.31	-13	-39.31	Pass	H
1653.90	154	183	-47.49	-13	-34.49	Pass	H
3909.12	154	8	-45.39	-13	-32.39	Pass	H
5993.40	154	117	-38.91	-13	-25.91	Pass	H
6505.39	151	146	-40.81	-13	-27.81	Pass	H
8123.19	152	5	-42.24	-13	-29.24	Pass	H
1263.63	150	19	-59.18	-13	-46.18	Pass	V
1304.46	146	162	-59.89	-13	-46.89	Pass	V
3558.33	149	228	-45.60	-13	-32.60	Pass	V
3777.89	151	256	-48.97	-13	-35.97	Pass	V
5755.62	146	59	-40.38	-13	-27.38	Pass	V
6473.16	146	84	-48.55	-13	-35.55	Pass	V

Band 7 21425 channel/BW 5 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1289.52	149	165	-50.80	-13	-37.80	Pass	H
1752.82	146	208	-47.26	-13	-34.26	Pass	H
3958.68	146	4	-41.44	-13	-28.44	Pass	H
5981.04	150	198	-42.01	-13	-29.01	Pass	H
6505.98	146	341	-46.44	-13	-33.44	Pass	H
8026.73	150	235	-39.94	-13	-26.94	Pass	H
1239.08	146	292	-51.58	-13	-38.58	Pass	V
1552.59	150	158	-59.37	-13	-46.37	Pass	V
3577.64	149	55	-49.32	-13	-36.32	Pass	V
3831.35	150	319	-50.57	-13	-37.57	Pass	V
5776.12	146	118	-48.46	-13	-35.46	Pass	V
6541.26	150	155	-45.05	-13	-32.05	Pass	V

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Band 7 20775 channel/BW 5 (lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1431.66	150	78	-55.55	-13	-42.55	Pass	H
1783.64	149	291	-49.66	-13	-36.66	Pass	H
3954.03	151	213	-53.32	-13	-40.32	Pass	H
5812.93	150	89	-47.09	-13	-34.09	Pass	H
6419.55	151	329	-48.96	-13	-35.96	Pass	H
8050.68	148	138	-48.42	-13	-35.42	Pass	H
1141.60	149	99	-59.86	-13	-46.86	Pass	V
1415.48	148	217	-55.50	-13	-42.50	Pass	V
3552.44	150	12	-50.93	-13	-37.93	Pass	V
3875.20	150	137	-44.71	-13	-31.71	Pass	V
5802.64	146	356	-45.97	-13	-32.97	Pass	V
6606.77	146	95	-46.36	-13	-33.36	Pass	V

Band 7 21100 channel/BW 5 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1223.25	150	142	-56.84	-13	-43.84	Pass	H
1645.37	146	280	-50.54	-13	-37.54	Pass	H
3851.30	150	330	-50.25	-13	-37.25	Pass	H
5920.95	146	194	-44.63	-13	-31.63	Pass	H
6416.65	149	260	-50.14	-13	-37.14	Pass	H
7934.13	151	31	-46.10	-13	-33.10	Pass	H
1260.26	149	4	-55.42	-13	-42.42	Pass	V
1403.89	148	257	-59.56	-13	-46.56	Pass	V
3503.95	147	55	-50.04	-13	-37.04	Pass	V
3861.39	148	273	-50.77	-13	-37.77	Pass	V
5786.93	150	136	-54.11	-13	-41.11	Pass	V
6421.98	150	16	-50.67	-13	-37.67	Pass	V

Band 7 21425 channel/BW 5 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1289.10	149	156	-56.97	-13	-43.97	Pass	H
1590.17	149	170	-47.95	-13	-34.95	Pass	H
3776.28	149	127	-46.84	-13	-33.84	Pass	H
5882.89	146	42	-42.24	-13	-29.24	Pass	H
6443.66	147	69	-43.28	-13	-30.28	Pass	H
7943.12	151	110	-48.34	-13	-35.34	Pass	H
1209.81	148	61	-56.42	-13	-43.42	Pass	V
1364.98	147	266	-55.33	-13	-42.33	Pass	V
3426.39	148	303	-48.67	-13	-35.67	Pass	V
3867.65	149	195	-44.16	-13	-31.16	Pass	V
5714.38	147	323	-48.15	-13	-35.15	Pass	V
6508.82	146	325	-44.51	-13	-31.51	Pass	V

Note:

7) Scan from 9kHz to 40GHz, 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.

8) 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 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.
1339.27	155	181	-53.69	-13	-40.69	Pass	H
1617.47	147	343	-53.01	-13	-40.01	Pass	H
3951.29	156	353	-48.61	-13	-35.61	Pass	H
5840.33	160	56	-42.57	-13	-29.57	Pass	H
6549.97	154	56	-44.41	-13	-31.41	Pass	H
8013.04	148	81	-43.97	-13	-30.97	Pass	H
1171.79	154	114	-54.97	-13	-41.97	Pass	V
1530.05	147	233	-59.49	-13	-46.49	Pass	V
3567.55	151	348	-51.14	-13	-38.14	Pass	V
3830.52	158	99	-48.27	-13	-35.27	Pass	V
5806.04	154	232	-49.38	-13	-36.38	Pass	V
6464.66	160	219	-47.15	-13	-34.15	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.
1399.06	154	165	-55.20	-13	-42.20	Pass	H
1723.36	157	160	-52.46	-13	-39.46	Pass	H
3999.64	149	275	-46.83	-13	-33.83	Pass	H
5820.08	160	167	-43.57	-13	-30.57	Pass	H
6487.38	155	19	-44.84	-13	-31.84	Pass	H
8130.11	158	15	-43.92	-13	-30.92	Pass	H
1297.03	141	8	-56.36	-13	-43.36	Pass	V
1505.80	159	207	-57.97	-13	-44.97	Pass	V
3453.32	157	349	-51.71	-13	-38.71	Pass	V
3741.88	157	345	-47.27	-13	-34.27	Pass	V
5817.33	157	298	-50.38	-13	-37.38	Pass	V
6623.90	141	57	-48.12	-13	-35.12	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.
1399.56	148	284	-57.32	-13	-44.32	Pass	H
1776.90	143	170	-48.38	-13	-35.38	Pass	H
3982.42	151	43	-44.96	-13	-31.96	Pass	H
5833.03	151	277	-41.24	-13	-28.24	Pass	H
6587.83	143	335	-42.97	-13	-29.97	Pass	H
8049.51	153	351	-45.27	-13	-32.27	Pass	H
1129.40	158	11	-59.26	-13	-46.26	Pass	V
1367.09	143	36	-58.15	-13	-45.15	Pass	V
3577.06	144	145	-51.54	-13	-38.54	Pass	V
3736.52	147	317	-46.26	-13	-33.26	Pass	V
5829.32	158	123	-48.86	-13	-35.86	Pass	V
6556.63	157	294	-46.35	-13	-33.35	Pass	V

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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.
1341.61	154	76	-54.20	-13	-41.20	Pass	H
1606.44	142	305	-48.41	-13	-35.41	Pass	H
3839.21	151	270	-46.02	-13	-33.02	Pass	H
5879.48	146	303	-41.46	-13	-28.46	Pass	H
6419.01	141	358	-46.08	-13	-33.08	Pass	H
8030.24	151	59	-43.82	-13	-30.82	Pass	H
1157.82	150	249	-58.97	-13	-45.97	Pass	V
1548.83	147	48	-60.57	-13	-47.57	Pass	V
3466.94	151	61	-51.56	-13	-38.56	Pass	V
3833.77	144	85	-48.69	-13	-35.69	Pass	V
5704.20	149	227	-47.40	-13	-34.40	Pass	V
6635.71	154	345	-50.31	-13	-37.31	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.
1372.33	159	125	-56.81	-13	-43.81	Pass	H
1757.23	143	321	-52.74	-13	-39.74	Pass	H
3875.64	160	169	-48.97	-13	-35.97	Pass	H
5879.63	142	66	-43.35	-13	-30.35	Pass	H
6543.63	153	320	-44.21	-13	-31.21	Pass	H
8118.88	149	88	-44.69	-13	-31.69	Pass	H
1207.69	147	46	-57.11	-13	-44.11	Pass	V
1503.63	145	107	-58.03	-13	-45.03	Pass	V
3442.58	141	207	-48.35	-13	-35.35	Pass	V
3829.66	158	170	-49.24	-13	-36.24	Pass	V
5793.53	148	17	-47.41	-13	-34.41	Pass	V
6620.29	155	206	-47.32	-13	-34.32	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.
1363.00	154	159	-52.87	-13	-39.87	Pass	H
1664.50	141	108	-53.13	-13	-40.13	Pass	H
3870.02	158	214	-45.23	-13	-32.23	Pass	H
5822.30	144	11	-40.40	-13	-27.40	Pass	H
6510.69	148	83	-43.44	-13	-30.44	Pass	H
8140.34	148	54	-44.06	-13	-31.06	Pass	H
1173.28	148	37	-55.06	-13	-42.06	Pass	V
1543.66	156	156	-61.87	-13	-48.87	Pass	V
3516.78	150	44	-52.56	-13	-39.56	Pass	V
3764.99	158	188	-49.55	-13	-36.55	Pass	V
5759.23	149	21	-50.83	-13	-37.83	Pass	V
6593.19	145	181	-45.76	-13	-32.76	Pass	V

Note:

9) Scan from 9kHz to 40GHz, 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.

10) 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=DC 3.8V; Low Voltage LV=DC 3.42V; High Voltage HV=DC 4.18V

Please refer to Appendix F: Frequency Stability

Test result: Pass

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