

TEST REPORT

Product Name: Asset GPS tracker
FCC ID: 2AWWA-KYCS-LOC
Trademark: N/A
Model Number: XRGSWIFIBT KYCS-LOC
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Sample Received Date: May. 25, 2022
Sample tested Date: May. 25, 2022 to Jun. 09, 2022
Issue Date: Jun. 09, 2022
Report No.: CTB220609023RF
Test Standards: FCC Part 2, 22, 24E, 27
Test Results: PASS
Remark: This is LTE radio test report.

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(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB220609023RF	Jun. 09, 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

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°C
frequency	1×10 ⁻⁷

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s):	XRGSWIFIBT KYCS-LOC
Model Description:	N/A
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 12: 699-716MHz FDD-LTE BAND 13: 777-787MHz
Max. RF output power:	FDD-LTE BAND 2:20.00 dBm FDD-LTE BAND 4: 20.06 dBm FDD-LTE BAND 12: 19.57 dBm FDD-LTE BAND 13: 20.11 dBm
Type of Modulation:	QPSK, 16QAM
Antenna installation:	Internal antenna
Antenna Gain:	LTE BAND 2 2.5dBi LTE BAND 4 2.3dBi LTE BAND 12 0.8dBi LTE BAND 13 0.9dBi
Ratings:	Battery AA3.6V

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 12	Low, Middle, High Channels
TM4	FDD-LTE BAND 13	Low, Middle, High Channels

Test Mode	Test Frequency ID	Bandwidth (MHz)	Number [UL]	Frequency of Uplink(MHz)
LTE band 2	Low Range	1.4	18607	1850.7
		3	18615	1851.5
		5	18625	1852.5
		10	18650	1855
		15	18675	1857.5
		20	18700	1860
	Mid Range	1.4/3/5/10/15/20	18900	1880
	High Range	1.4	19193	1909.3
		3	19185	1908.5
		5	19175	1907.5
		10	19150	1905
		15	19125	1902.5
		20	19100	1900

Test Mode	Test Frequency ID	Bandwidth (MHz)	Number [UL]	Frequency of Uplink(MHz)
LTE band 4	Low Range	1.4	19957	1710.7
		3	19965	1711.5
		5	19975	1712.5
		10	20000	1715
		15	20025	1717.5
		20	20050	1720
	Mid Range	1.4/3/5/10/15/20	20175	1732.5
	High Range	1.4	20393	1754.3
		3	20385	1753.5
		5	20375	1752.5
		10	20350	1750
		15	20325	1747.5
		20	20300	1745

Test Mode	Test Frequency ID	Bandwidth (MHz)	Number [UL]	Frequency of Uplink(MHz)
LTE band 12	Low Range	1.4	23017	699.7
		3	23025	700.5
		5	23035	701.5
		10	23060	704
	Mid Range	1.4/3/5/10	23095	707.5
	High Range	1.4	23173	715.3
		3	23165	714.5
		5	23155	713.5
		10	23130	711

Test Mode	Test Frequency ID	Bandwidth (MHz)	Number [UL]	Frequency of Uplink(MHz)
LTE band 13	Low Range	5	23205	779.5
		10	23230	782
	Mid Range	5/10	23230	782
	High Range	5	23255	784.5
		10	23230	782

4.5 Test Environment

Humidity(%):	55
Atmospheric Pressure(kPa):	101.1
Normal Voltage(DC):	3.6V
Normal Temperature(°C)	25
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 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	Microwave	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	Microwave	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.

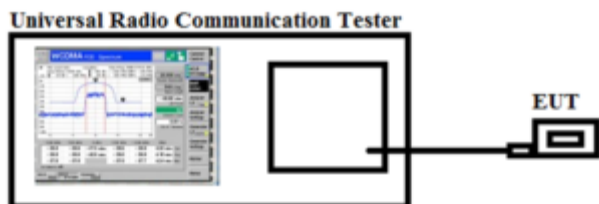
According to §24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

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 2

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.32	<33.00	PASS
		H	19.06		
	MCH	V	19.26		PASS
		H	18.68		
	HCH	V	19.04		PASS
		H	18.63		
16QAM	LCH	V	18.73	<33.00	PASS
		H	18.03		
	MCH	V	19.04		PASS
		H	19.22		
	HCH	V	19.48		PASS
		H	18.10		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.45	<33.00	PASS
		H	18.54		
	MCH	V	18.08		PASS
		H	19.97		
	HCH	V	19.13		PASS
		H	18.23		
16QAM	LCH	V	19.18	<33.00	PASS
		H	19.71		
	MCH	V	18.68		PASS
		H	19.00		
	HCH	V	19.16		PASS
		H	18.86		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.89	<33.00	PASS
		H	18.67		

	MCH	V	19.56		PASS
		H	18.14		
	HCH	V	19.73		PASS
		H	19.60		
16QAM	LCH	V	18.99	<33.00	PASS
		H	19.63		
	MCH	V	18.42		PASS
		H	18.25		
	HCH	V	18.28		PASS
		H	19.07		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.50	<33.00	PASS
		H	19.92		
	MCH	V	19.94		PASS
		H	19.12		
	HCH	V	18.36		PASS
		H	19.83		
16QAM	LCH	V	19.11	<33.00	PASS
		H	18.68		
	MCH	V	19.82		PASS
		H	18.93		
	HCH	V	19.68		PASS
		H	19.87		
Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.46	<33.00	PASS
		H	19.21		
	MCH	V	19.36		PASS
		H	19.81		
	HCH	V	18.26		PASS
		H	18.79		
16QAM	LCH	V	19.10	<33.00	PASS
		H	18.37		
	MCH	V	19.89		PASS
		H	19.09		
	HCH	V	18.24		PASS

		H	18.60		
Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	18.93	<33.00	PASS
		H	18.66		
	MCH	V	18.38		PASS
		H	20.22		
	HCH	V	18.68		PASS
		H	18.41		
16QAM	LCH	V	19.44	<33.00	PASS
		H	18.67		
	MCH	V	18.45		PASS
		H	18.91		
	HCH	V	18.79		PASS
		H	20.26		

FDD-LTE Band 4

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.30	<30.00	PASS
		H	18.36		
	MCH	V	18.76		PASS
		H	19.14		
	HCH	V	19.69		PASS
		H	18.56		
16QAM	LCH	V	18.94	<30.00	PASS
		H	18.83		
	MCH	V	18.92		PASS
		H	18.98		
	HCH	V	19.11		PASS
		H	19.63		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.51	<30.00	PASS
		H	19.62		
	MCH	V	19.97		PASS

	HCH	H	18.91		PASS
		V	19.23		
		H	19.65		
16QAM	LCH	V	18.58	<30.00	PASS
		H	18.62		
	MCH	V	18.53		PASS
		H	18.20		
	HCH	V	19.21		PASS
		H	18.60		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	18.18	<30.00	PASS
		H	19.97		
	MCH	V	18.16		PASS
		H	18.28		
	HCH	V	18.88		PASS
		H	20.09		
16QAM	LCH	V	19.13	<30.00	PASS
		H	19.86		
	MCH	V	20.00		PASS
		H	18.50		
	HCH	V	19.38		PASS
		H	18.69		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	18.94	<30.00	PASS
		H	19.88		
	MCH	V	19.96		PASS
		H	18.67		
	HCH	V	19.78		PASS
		H	18.86		
16QAM	LCH	V	18.34	<30.00	PASS
		H	18.12		
	MCH	V	20.08		PASS
		H	19.35		
	HCH	V	19.79		PASS
		H	18.59		

Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	18.40	<30.00	PASS
		H	19.70		
	MCH	V	18.54		PASS
		H	19.31		
	HCH	V	18.30		PASS
		H	18.23		
16QAM	LCH	V	19.92	<30.00	PASS
		H	19.74		
	MCH	V	18.87		PASS
		H	18.36		
	HCH	V	18.38		PASS
		H	19.47		
Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.47	<30.00	PASS
		H	20.04		
	MCH	V	19.16		PASS
		H	18.60		
	HCH	V	18.85		PASS
		H	19.34		
16QAM	LCH	V	19.91	<30.00	PASS
		H	18.81		
	MCH	V	20.17		PASS
		H	18.70		
	HCH	V	19.70		PASS
		H	18.98		

FDD-LTE Band 12

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	18.37	<34.77	PASS
		H	18.51		
	MCH	V	18.39		PASS
		H	18.26		

	HCH	V	19.90		PASS
		H	19.13		
16QAM	LCH	V	19.03	<34.77	PASS
		H	18.87		
	MCH	V	18.80		PASS
		H	19.22		
	HCH	V	18.32		PASS
		H	19.05		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.24	<34.77	PASS
		H	19.04		
	MCH	V	17.95		PASS
		H	18.88		
	HCH	V	19.88		PASS
		H	19.02		
16QAM	LCH	V	19.66	<34.77	PASS
		H	18.89		
	MCH	V	18.61		PASS
		H	18.30		
	HCH	V	18.38		PASS
		H	18.47		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.33	<34.77	PASS
		H	18.68		
	MCH	V	18.77		PASS
		H	19.32		
	HCH	V	19.38		PASS
		H	19.22		
16QAM	LCH	V	19.22	<34.77	PASS
		H	17.95		
	MCH	V	18.54		PASS
		H	18.74		
	HCH	V	18.63		PASS
		H	18.32		
Channel Bandwidth: 10 MHz					

Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	18.37	<34.77	PASS
		H	19.99		
	MCH	V	18.41		PASS
		H	18.30		
	HCH	V	19.22		PASS
		H	18.27		
16QAM	LCH	V	18.70	<34.77	PASS
		H	19.28		
	MCH	V	19.42		PASS
		H	18.87		
	HCH	V	19.72		PASS
		H	20.14		

FDD-LTE Band 13

Channel Bandwidth: 5.0 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	18.31	<34.77	PASS
		H	19.52		
	MCH	V	19.88		PASS
		H	18.68		
	HCH	V	18.85		PASS
		H	18.99		
16QAM	LCH	V	19.03	<34.77	PASS
		H	19.57		
	MCH	V	20.12		PASS
		H	20.06		
	HCH	V	19.94		PASS
		H	19.31		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.97	<34.77	PASS
		H	19.23		
	MCH	V	19.25		PASS
		H	19.02		
	HCH	V	18.57		PASS

		H	19.27		
16QAM	LCH	V	20.02	<34.77	PASS
		H	19.91		
	MCH	V	19.92		PASS
		H	20.20		
		V	19.95		
	HCH	H	20.25		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.

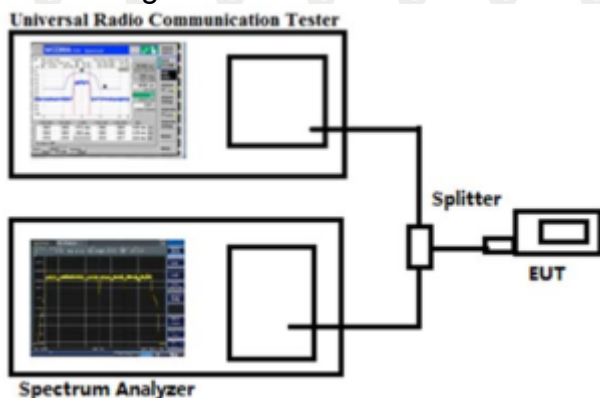
According to §27.50(B), the peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for 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.

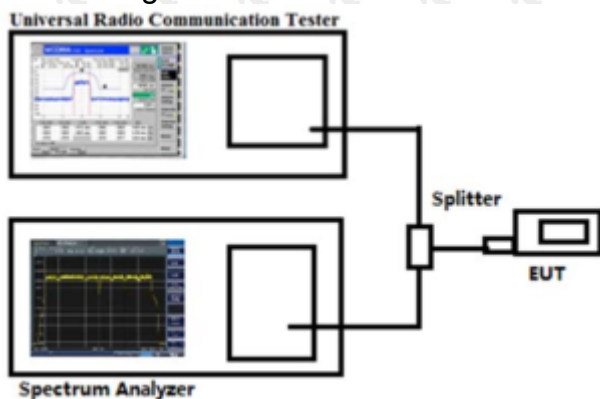
According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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 $43 + 10 \log_{10}(P)$ 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,

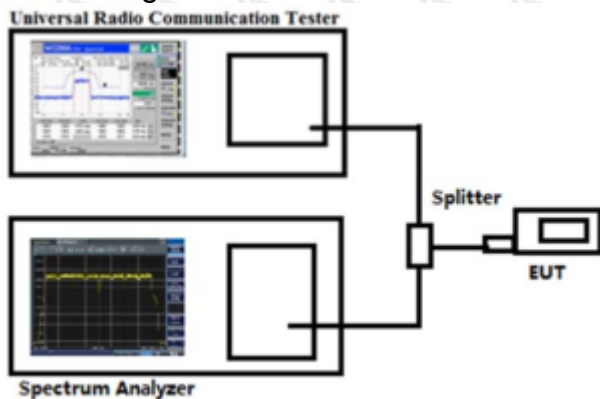
measured in watts, by at least $43 + 10 \log (P)$ dB.

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 $43 + 10 \log_{10}(P)$ 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 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.
1335.150	149	165	-56.240	-13	-43.24	Pass	H
1702.977	146	208	-47.409	-13	-34.41	Pass	H
3902.401	146	4	-47.437	-13	-34.44	Pass	H
5890.611	150	198	-43.620	-13	-30.62	Pass	H
6509.626	146	341	-44.593	-13	-31.59	Pass	H
8080.440	150	235	-43.454	-13	-30.45	Pass	H
1206.150	146	292	-56.894	-13	-43.89	Pass	V
1460.409	150	158	-58.754	-13	-45.75	Pass	V
3541.667	149	55	-51.010	-13	-38.01	Pass	V
3829.899	150	319	-48.517	-13	-35.52	Pass	V
5803.089	146	118	-46.429	-13	-33.43	Pass	V
6558.254	150	155	-46.279	-13	-33.28	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.
1335.036	149	165	-54.444	-13	-41.44	Pass	H
1703.362	146	208	-48.967	-13	-35.97	Pass	H
3901.377	146	4	-45.002	-13	-32.00	Pass	H
5887.799	150	198	-44.795	-13	-31.80	Pass	H
6509.658	146	341	-44.402	-13	-31.40	Pass	H
8080.738	150	235	-42.285	-13	-29.28	Pass	H
1206.524	146	292	-55.829	-13	-42.83	Pass	V
1459.921	150	158	-57.283	-13	-44.28	Pass	V
3543.575	149	55	-52.286	-13	-39.29	Pass	V
3830.657	150	319	-49.510	-13	-36.51	Pass	V
5801.708	146	118	-47.541	-13	-34.54	Pass	V
6556.909	150	155	-47.038	-13	-34.04	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.
1335.207	149	165	-55.359	-13	-42.36	Pass	H
1702.947	146	208	-49.162	-13	-36.16	Pass	H
3901.062	146	4	-47.677	-13	-34.68	Pass	H
5889.008	150	198	-42.410	-13	-29.41	Pass	H
6509.058	146	341	-44.120	-13	-31.12	Pass	H
8080.806	150	235	-43.010	-13	-30.01	Pass	H
1206.897	146	292	-54.843	-13	-41.84	Pass	V
1459.619	150	158	-57.456	-13	-44.46	Pass	V
3542.782	149	55	-49.833	-13	-36.83	Pass	V
3830.145	150	319	-47.820	-13	-34.82	Pass	V
5801.408	146	118	-45.446	-13	-32.45	Pass	V
6556.681	150	155	-46.201	-13	-33.20	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.
1333.893	149	165	-56.742	-13	-43.74	Pass	H
1702.716	146	208	-48.184	-13	-35.18	Pass	H
3903.353	146	4	-44.005	-13	-31.01	Pass	H
5890.111	150	198	-44.504	-13	-31.50	Pass	H
6511.063	146	341	-42.764	-13	-29.76	Pass	H
8078.173	150	235	-42.993	-13	-29.99	Pass	H
1205.365	146	292	-56.161	-13	-43.16	Pass	V
1460.344	150	158	-59.590	-13	-46.59	Pass	V
3543.298	149	55	-53.215	-13	-40.21	Pass	V
3829.095	150	319	-50.163	-13	-37.16	Pass	V
5801.280	146	118	-46.154	-13	-33.15	Pass	V
6557.845	150	155	-47.359	-13	-34.36	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.
1334.608	149	165	-55.932	-13	-42.93	Pass	H
1701.773	146	208	-50.139	-13	-37.14	Pass	H
3902.435	146	4	-46.618	-13	-33.62	Pass	H
5887.828	150	198	-41.839	-13	-28.84	Pass	H
6510.876	146	341	-44.063	-13	-31.06	Pass	H
8079.742	150	235	-44.670	-13	-31.67	Pass	H
1204.775	146	292	-53.138	-13	-40.14	Pass	V
1460.289	150	158	-56.174	-13	-43.17	Pass	V
3543.542	149	55	-51.543	-13	-38.54	Pass	V
3829.804	150	319	-49.981	-13	-36.98	Pass	V
5801.156	146	118	-46.100	-13	-33.10	Pass	V
6557.247	150	155	-46.078	-13	-33.08	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.
1335.461	149	165	-54.710	-13	-41.71	Pass	H
1702.831	146	208	-46.970	-13	-33.97	Pass	H
3900.425	146	4	-47.171	-13	-34.17	Pass	H
5888.162	150	198	-42.994	-13	-29.99	Pass	H
6510.267	146	341	-43.787	-13	-30.79	Pass	H
8079.707	150	235	-42.830	-13	-29.83	Pass	H
1206.172	146	292	-53.835	-13	-40.83	Pass	V
1461.106	150	158	-58.482	-13	-45.48	Pass	V
3543.341	149	55	-50.442	-13	-37.44	Pass	V
3829.739	150	319	-49.356	-13	-36.36	Pass	V
5801.708	146	118	-48.841	-13	-35.84	Pass	V
6558.991	150	155	-45.617	-13	-32.62	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.
1334.531	149	165	-53.727	-13	-40.73	Pass	H
1703.065	146	208	-48.551	-13	-35.55	Pass	H
3902.814	146	4	-45.134	-13	-32.13	Pass	H
5888.271	150	198	-44.041	-13	-31.04	Pass	H
6509.578	146	341	-44.291	-13	-31.29	Pass	H
8079.289	150	235	-44.442	-13	-31.44	Pass	H
1204.418	146	292	-55.712	-13	-42.71	Pass	V
1460.937	150	158	-58.305	-13	-45.31	Pass	V
3544.274	149	55	-52.056	-13	-39.06	Pass	V
3828.678	150	319	-50.003	-13	-37.00	Pass	V
5802.174	146	118	-47.496	-13	-34.50	Pass	V
6556.128	150	155	-47.474	-13	-34.47	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.
1333.940	149	165	-57.245	-13	-44.25	Pass	H
1702.194	146	208	-49.081	-13	-36.08	Pass	H
3901.252	146	4	-46.191	-13	-33.19	Pass	H
5890.534	150	198	-42.330	-13	-29.33	Pass	H
6508.832	146	341	-41.256	-13	-28.26	Pass	H
8079.059	150	235	-45.541	-13	-32.54	Pass	H
1204.946	146	292	-55.820	-13	-42.82	Pass	V
1461.516	150	158	-58.441	-13	-45.44	Pass	V
3541.632	149	55	-52.888	-13	-39.89	Pass	V
3830.662	150	319	-48.305	-13	-35.30	Pass	V
5800.783	146	118	-46.078	-13	-33.08	Pass	V
6558.923	150	155	-45.249	-13	-32.25	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.
1333.750	149	165	-53.416	-13	-40.42	Pass	H
1702.059	146	208	-46.836	-13	-33.84	Pass	H
3900.502	146	4	-45.736	-13	-32.74	Pass	H
5889.441	150	198	-43.195	-13	-30.19	Pass	H
6509.030	146	341	-42.893	-13	-29.89	Pass	H
8080.846	150	235	-44.497	-13	-31.50	Pass	H
1206.702	146	292	-56.837	-13	-43.84	Pass	V
1459.321	150	158	-58.090	-13	-45.09	Pass	V
3544.030	149	55	-53.082	-13	-40.08	Pass	V
3831.147	150	319	-51.450	-13	-38.45	Pass	V
5801.026	146	118	-46.781	-13	-33.78	Pass	V
6557.032	150	155	-47.273	-13	-34.27	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.
1332.965	149	165	-56.037	-13	-43.04	Pass	H
1701.666	146	208	-47.141	-13	-34.14	Pass	H
3901.861	146	4	-45.603	-13	-32.60	Pass	H
5890.718	150	198	-44.341	-13	-31.34	Pass	H
6508.992	146	341	-42.862	-13	-29.86	Pass	H
8080.119	150	235	-44.932	-13	-31.93	Pass	H
1205.452	146	292	-56.127	-13	-43.13	Pass	V
1462.136	150	158	-59.340	-13	-46.34	Pass	V
3544.277	149	55	-53.048	-13	-40.05	Pass	V
3829.379	150	319	-48.872	-13	-35.87	Pass	V
5801.875	146	118	-48.343	-13	-35.34	Pass	V
6557.299	150	155	-46.752	-13	-33.75	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.
1335.699	149	165	-55.909	-13	-42.91	Pass	H
1704.145	146	208	-49.306	-13	-36.31	Pass	H
3900.734	146	4	-45.747	-13	-32.75	Pass	H
5888.433	150	198	-43.363	-13	-30.36	Pass	H
6511.285	146	341	-41.417	-13	-28.42	Pass	H
8080.393	150	235	-44.928	-13	-31.93	Pass	H
1204.831	146	292	-56.299	-13	-43.30	Pass	V
1460.927	150	158	-57.937	-13	-44.94	Pass	V
3541.849	149	55	-52.749	-13	-39.75	Pass	V
3829.281	150	319	-49.143	-13	-36.14	Pass	V
5800.917	146	118	-48.706	-13	-35.71	Pass	V
6556.564	150	155	-48.171	-13	-35.17	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.
1333.418	149	165	-54.873	-13	-41.87	Pass	H
1703.571	146	208	-47.445	-13	-34.44	Pass	H
3902.634	146	4	-47.307	-13	-34.31	Pass	H
5889.542	150	198	-42.605	-13	-29.61	Pass	H
6509.101	146	341	-45.063	-13	-32.06	Pass	H
8079.054	150	235	-45.467	-13	-32.47	Pass	H
1204.591	146	292	-53.258	-13	-40.26	Pass	V
1460.714	150	158	-57.167	-13	-44.17	Pass	V
3542.080	149	55	-50.022	-13	-37.02	Pass	V
3829.786	150	319	-51.575	-13	-38.57	Pass	V
5800.189	146	118	-45.471	-13	-32.47	Pass	V
6557.128	150	155	-48.023	-13	-35.02	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 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.
1335.303	149	165	-54.355	-13	-41.36	Pass	H
1702.214	146	208	-50.300	-13	-37.30	Pass	H
3903.367	146	4	-46.207	-13	-33.21	Pass	H
5890.043	150	198	-41.414	-13	-28.41	Pass	H
6508.687	146	341	-44.922	-13	-31.92	Pass	H
8079.113	150	235	-45.543	-13	-32.54	Pass	H
1205.964	146	292	-56.933	-13	-43.93	Pass	V
1459.203	150	158	-59.043	-13	-46.04	Pass	V
3542.271	149	55	-49.761	-13	-36.76	Pass	V
3830.148	150	319	-47.918	-13	-34.92	Pass	V
5803.095	146	118	-48.196	-13	-35.20	Pass	V
6558.093	150	155	-47.723	-13	-34.72	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.
1332.938	149	165	-54.804	-13	-41.80	Pass	H
1703.706	146	208	-48.951	-13	-35.95	Pass	H
3901.084	146	4	-46.465	-13	-33.47	Pass	H
5890.720	150	198	-41.109	-13	-28.11	Pass	H
6508.545	146	341	-41.257	-13	-28.26	Pass	H
8079.158	150	235	-45.876	-13	-32.88	Pass	H
1207.011	146	292	-56.828	-13	-43.83	Pass	V
1461.441	150	158	-58.310	-13	-45.31	Pass	V
3542.062	149	55	-49.648	-13	-36.65	Pass	V
3828.867	150	319	-49.367	-13	-36.37	Pass	V
5801.530	146	118	-46.413	-13	-33.41	Pass	V
6558.733	150	155	-44.879	-13	-31.88	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.
1334.421	149	165	-56.612	-13	-43.61	Pass	H
1702.694	146	208	-49.609	-13	-36.61	Pass	H
3902.234	146	4	-43.957	-13	-30.96	Pass	H
5889.710	150	198	-42.358	-13	-29.36	Pass	H
6509.962	146	341	-42.694	-13	-29.69	Pass	H
8080.758	150	235	-43.072	-13	-30.07	Pass	H
1205.485	146	292	-53.116	-13	-40.12	Pass	V
1460.568	150	158	-57.107	-13	-44.11	Pass	V
3543.993	149	55	-51.522	-13	-38.52	Pass	V
3830.015	150	319	-48.167	-13	-35.17	Pass	V
5802.667	146	118	-48.988	-13	-35.99	Pass	V
6556.976	150	155	-47.012	-13	-34.01	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.
1332.776	149	165	-53.535	-13	-40.54	Pass	H
1703.126	146	208	-46.894	-13	-33.89	Pass	H
3901.342	146	4	-44.873	-13	-31.87	Pass	H
5888.438	150	198	-42.990	-13	-29.99	Pass	H
6509.010	146	341	-41.379	-13	-28.38	Pass	H
8080.276	150	235	-45.758	-13	-32.76	Pass	H
1206.232	146	292	-54.847	-13	-41.85	Pass	V
1460.904	150	158	-58.740	-13	-45.74	Pass	V
3544.348	149	55	-52.344	-13	-39.34	Pass	V
3830.397	150	319	-48.164	-13	-35.16	Pass	V
5800.998	146	118	-46.137	-13	-33.14	Pass	V
6556.632	150	155	-48.717	-13	-35.72	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.
1333.453	149	165	-54.619	-13	-41.62	Pass	H
1701.676	146	208	-47.836	-13	-34.84	Pass	H
3902.776	146	4	-46.004	-13	-33.00	Pass	H
5888.338	150	198	-44.752	-13	-31.75	Pass	H
6508.868	146	341	-42.210	-13	-29.21	Pass	H
8079.375	150	235	-45.027	-13	-32.03	Pass	H
1206.180	146	292	-55.243	-13	-42.24	Pass	V
1459.261	150	158	-58.462	-13	-45.46	Pass	V
3543.745	149	55	-51.084	-13	-38.08	Pass	V
3829.226	150	319	-47.946	-13	-34.95	Pass	V
5801.541	146	118	-46.677	-13	-33.68	Pass	V
6556.220	150	155	-46.643	-13	-33.64	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.
1332.903	149	165	-56.835	-13	-43.83	Pass	H
1703.622	146	208	-48.432	-13	-35.43	Pass	H
3901.250	146	4	-46.710	-13	-33.71	Pass	H
5888.303	150	198	-43.984	-13	-30.98	Pass	H
6508.684	146	341	-43.132	-13	-30.13	Pass	H
8079.723	150	235	-42.387	-13	-29.39	Pass	H
1205.076	146	292	-54.148	-13	-41.15	Pass	V
1461.315	150	158	-57.433	-13	-44.43	Pass	V
3542.783	149	55	-49.896	-13	-36.90	Pass	V
3828.374	150	319	-50.848	-13	-37.85	Pass	V
5800.902	146	118	-47.906	-13	-34.91	Pass	V
6556.199	150	155	-46.521	-13	-33.52	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.

QPSK

Band 13 23205 channel/BW 5(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1334.595	149	165	-56.929	-13	-43.93	Pass	H
1702.967	146	208	-48.225	-13	-35.22	Pass	H
3902.786	146	4	-44.572	-13	-31.57	Pass	H
5890.729	150	198	-42.824	-13	-29.82	Pass	H
6509.454	146	341	-41.343	-13	-28.34	Pass	H
8080.704	150	235	-43.304	-13	-30.30	Pass	H
1206.659	146	292	-53.125	-13	-40.13	Pass	V
1460.304	150	158	-56.172	-13	-43.17	Pass	V
3542.753	149	55	-49.947	-13	-36.95	Pass	V
3831.290	150	319	-49.208	-13	-36.21	Pass	V
5800.548	146	118	-46.411	-13	-33.41	Pass	V
6558.417	150	155	-47.944	-13	-34.94	Pass	V

Band 13 23230 channel/BW 5(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.678	149	165	-54.711	-13	-41.71	Pass	H
1703.190	146	208	-47.722	-13	-34.72	Pass	H
3901.217	146	4	-47.336	-13	-34.34	Pass	H
5889.086	150	198	-44.057	-13	-31.06	Pass	H
6509.371	146	341	-42.701	-13	-29.70	Pass	H
8078.590	150	235	-45.655	-13	-32.65	Pass	H
1206.022	146	292	-57.075	-13	-44.08	Pass	V
1461.764	150	158	-56.080	-13	-43.08	Pass	V
3541.775	149	55	-52.406	-13	-39.41	Pass	V
3829.011	150	319	-49.317	-13	-36.32	Pass	V
5802.764	146	118	-45.911	-13	-32.91	Pass	V
6556.989	150	155	-46.447	-13	-33.45	Pass	V

Band 13 23255 channel/BW 5(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1334.470	149	165	-54.354	-13	-41.35	Pass	H
1703.505	146	208	-47.066	-13	-34.07	Pass	H
3902.798	146	4	-45.169	-13	-32.17	Pass	H
5887.972	150	198	-43.783	-13	-30.78	Pass	H
6509.343	146	341	-44.916	-13	-31.92	Pass	H
8080.923	150	235	-45.556	-13	-32.56	Pass	H
1205.414	146	292	-56.636	-13	-43.64	Pass	V
1461.697	150	158	-56.668	-13	-43.67	Pass	V
3543.320	149	55	-52.307	-13	-39.31	Pass	V
3831.309	150	319	-48.606	-13	-35.61	Pass	V
5801.117	146	118	-45.797	-13	-32.80	Pass	V
6556.651	150	155	-45.716	-13	-32.72	Pass	V

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Band 13 23205 channel/BW 5(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.895	149	165	-57.366	-13	-44.37	Pass	H
1702.662	146	208	-49.497	-13	-36.50	Pass	H
3901.014	146	4	-47.527	-13	-34.53	Pass	H
5888.707	150	198	-45.003	-13	-32.00	Pass	H
6508.568	146	341	-43.187	-13	-30.19	Pass	H
8080.607	150	235	-43.025	-13	-30.02	Pass	H
1206.101	146	292	-57.059	-13	-44.06	Pass	V
1460.584	150	158	-58.603	-13	-45.60	Pass	V
3543.788	149	55	-52.095	-13	-39.10	Pass	V
3830.258	150	319	-50.957	-13	-37.96	Pass	V
5801.406	146	118	-46.594	-13	-33.59	Pass	V
6558.916	150	155	-44.831	-13	-31.83	Pass	V

Band 13 23230 channel/BW 5(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.585	149	165	-56.918	-13	-43.92	Pass	H
1702.860	146	208	-46.544	-13	-33.54	Pass	H
3900.924	146	4	-46.133	-13	-33.13	Pass	H
5889.723	150	198	-44.887	-13	-31.89	Pass	H
6508.545	146	341	-43.598	-13	-30.60	Pass	H
8079.926	150	235	-45.738	-13	-32.74	Pass	H
1204.724	146	292	-53.941	-13	-40.94	Pass	V
1461.932	150	158	-57.814	-13	-44.81	Pass	V
3544.194	149	55	-50.846	-13	-37.85	Pass	V
3829.158	150	319	-50.494	-13	-37.49	Pass	V
5802.143	146	118	-45.534	-13	-32.53	Pass	V
6558.852	150	155	-47.461	-13	-34.46	Pass	V

Band 13 23225 channel/BW 5(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1335.261	149	165	-53.561	-13	-40.56	Pass	H
1702.847	146	208	-49.520	-13	-36.52	Pass	H
3902.089	146	4	-46.122	-13	-33.12	Pass	H
5889.172	150	198	-41.586	-13	-28.59	Pass	H
6510.651	146	341	-42.089	-13	-29.09	Pass	H
8078.314	150	235	-44.696	-13	-31.70	Pass	H
1205.098	146	292	-54.819	-13	-41.82	Pass	V
1460.270	150	158	-59.382	-13	-46.38	Pass	V
3541.687	149	55	-50.739	-13	-37.74	Pass	V
3830.914	150	319	-50.916	-13	-37.92	Pass	V
5800.660	146	118	-46.463	-13	-33.46	Pass	V
6556.246	150	155	-47.420	-13	-34.42	Pass	V

Note:

7) 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.

8) 2)Tested with all kind of bandwidth, RB Size and RB Offset, Found the 5.0MHz 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=DC3.6V; Low Voltage LV=DC3.24V; High Voltage HV=DC3.96V

Please refer to Appendix F: Frequency Stability

Test result: Pass

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