

TEST REPORT

Product Name: Asset GPS tracker
FCC ID: 2AWWA-LOCATEXP
Trademark: N/A
Model Number: KYCS LOCATE XP
Prepared For: KYCS Global Inc.
Address: 12 Proctor Rd, 2nd floor Schomberg Ontario Canada, Postal code L0G1T0
Manufacturer: Shenzhen Kingwo IoT Co., Ltd.
Address: Room302, Comprehensive Building Tsinghua Information High-Tech Park, Nanshan Shenzhen, Guangdong, China
Prepared By: Shenzhen CTB Testing Technology Co., Ltd.
Address: 1&2/F., Building A, No.26, Xinghe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date: Sep. 23, 2023
Sample tested Date: Sep. 23, 2023 to Oct. 09, 2023
Issue Date: Oct. 09, 2023
Report No.: CTB231009005RF
Test Standards: FCC Part 2, 22, 24E, 27
Test Results: PASS
Remark: This is LTE radio test report.

Compiled by:

Zhou kui

Zhou Kui

Reviewed by:

Arron Liu

Arron Liu

Approved by:



Bin Mei / Director

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.

TABLE OF CONTENT

Test Report Declaration	Page
1. VERSION	3
2. TEST SUMMARY	4
3. MEASUREMENT UNCERTAINTY	5
4. PRODUCT INFORMATION AND TEST SETUP	6
4.1 Product Information	6
4.2 Test Setup Configuration	7
4.3 Support Equipment	7
4.4 Test Mode	7
4.5 Test Environment	7
5. TEST FACILITY AND TEST INSTRUMENT USED	8
5.1 Test Facility	8
5.2 Test Instrument Used	8
6. RF EXPOSURE	10
6.1 Standard Applicable	10
6.2 Test Result	10
7. RF OUTPUT POWER	11
7.1 Standard Applicable	11
7.2 Test Procedure	11
7.3 Summary of Test Results/Plots	12
8. PEAK-TO-AVERAGE RATIO (PAR) OF TRANSMITTER	21
8.1 Standard Applicable	21
8.2 Test Procedure	21
8.3 Summary of Test Results	21
9. EMISSION BANDWIDTH	22
9.1 Standard Applicable	22
9.2 Test Procedure	22
9.3 Summary of Test Results/Plots	22
10. OUT OF BAND EMISSIONS AT ANTENNA TERMINAL	23
10.1 Standard Applicable	23
10.2 Test Procedure	23
10.3 Summary of Test Results/Plots	24
11. SPURIOUS RADIATED EMISSIONS	25
11.1 Standard Applicable	25
11.2 Test Procedure	26
11.3 Summary of Test Results/Plots	26
12. FREQUENCY STABILITY	39
12.1 Standard Applicable	39
12.2 Test Procedure	39
12.3 Summary of Test Results/Plots	39

(Note: N/A means not applicable)



1. VERSION

Report No.	Issue Date	Description	Approved
CTB231009005RF	Oct. 09, 2023	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 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):	KYCS LOCATE XP
Model Description:	N/A
Hardware Version:	P10
Software Version:	V 3.57
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 2:18.59dBm FDD-LTE BAND 4: 19.57dBm FDD-LTE BAND 12: 19.64dBm FDD-LTE BAND 13: 20.03dBm
Type of Modulation:	QPSK, 16QAM
Antenna installation:	FPC antenna
Antenna Gain:	LTE BAND 2:3.83dBi LTE BAND 4: 3.83dBi LTE BAND 12: -1.63dBi LTE BAND 13: -1.63dBi
Ratings:	DC 5V charging from adapter DC 3.6V 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

No.	Device Type	Brand	Model	Series No.	Note
1.	Adapter	JIYIN	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 12	Low, Middle, High Channels
TM4	FDD-LTE BAND 13	Low, Middle, High Channels

4.5 Test Environment

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Normal Voltage(DC):	3.6V
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, Xinghe 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	2023.10.30
26	Amplifier	AEROFLEX	Aeroflex	097	2023.10.30

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.

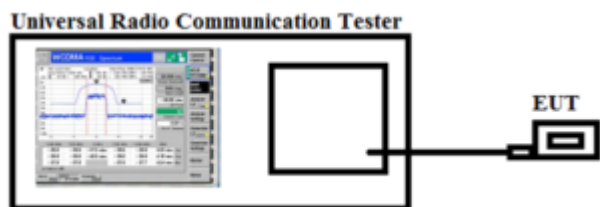
According to §24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

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	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	16.23	<33.00	PASS
		H	16.06		
	MCH	V	16.73		PASS
		H	15.83		
	HCH	V	15.67		PASS
		H	16.58		
16QAM	LCH	V	16.16	<33.00	PASS
		H	16.05		
	MCH	V	16.61		PASS
		H	16.41		
	HCH	V	16.00		PASS
		H	17.41		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	15.91	<33.00	PASS
		H	15.93		
	MCH	V	17.50		PASS
		H	16.52		
	HCH	V	16.76		PASS
		H	15.64		
16QAM	LCH	V	16.71	<33.00	PASS
		H	16.18		
	MCH	V	17.26		PASS
		H	17.24		
	HCH	V	17.23		PASS
		H	15.86		

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	16.90	<33.00	PASS
		H	18.23		
	MCH	V	17.20		PASS
		H	18.03		
	HCH	V	17.92		PASS
		H	16.79		
16QAM	LCH	V	17.93	<33.00	PASS
		H	18.29		
	MCH	V	16.65		PASS
		H	16.69		
	HCH	V	18.11		PASS
		H	17.01		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	18.06	<33.00	PASS
		H	17.94		
	MCH	V	18.22		PASS
		H	18.31		
	HCH	V	17.69		PASS
		H	18.03		
16QAM	LCH	V	17.28	<33.00	PASS
		H	17.38		
	MCH	V	18.21		PASS
		H	17.27		
	HCH	V	17.19		PASS
		H	17.84		

Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	17.26	<33.00	PASS
		H	17.13		
	MCH	V	17.04		PASS
		H	18.30		
	HCH	V	17.69		PASS
		H	17.01		
16QAM	LCH	V	17.64	<33.00	PASS
		H	17.96		
	MCH	V	17.07		PASS
		H	18.13		
	HCH	V	18.25		PASS
		H	18.17		
Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	18.59	<33.00	PASS
		H	16.98		
	MCH	V	17.77		PASS
		H	17.90		
	HCH	V	17.96		PASS
		H	18.17		
16QAM	LCH	V	18.55	<33.00	PASS
		H	18.11		
	MCH	V	18.38		PASS
		H	17.30		
	HCH	V	16.92		PASS
		H	17.48		

FDD-LTE Band 4

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	18.38	<30.00	PASS
		H	17.95		
	MCH	V	18.48		PASS
		H	18.08		
	HCH	V	17.40		PASS
		H	18.87		
16QAM	LCH	V	18.49	<30.00	PASS
		H	17.40		
	MCH	V	18.11		PASS
		H	17.54		
	HCH	V	18.65		PASS
		H	17.51		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	18.80	<30.00	PASS
		H	17.86		
	MCH	V	17.67		PASS
		H	17.33		
	HCH	V	18.19		PASS
		H	18.13		
16QAM	LCH	V	16.74	<30.00	PASS
		H	17.87		
	MCH	V	18.63		PASS
		H	16.35		
	HCH	V	18.04		PASS
		H	17.88		

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	18.02	<30.00	PASS
		H	17.39		
	MCH	V	18.54		PASS
		H	18.65		
	HCH	V	17.31		PASS
		H	18.32		
16QAM	LCH	V	17.81	<30.00	PASS
		H	17.98		
	MCH	V	17.02		PASS
		H	18.63		
	HCH	V	18.39		PASS
		H	17.31		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	17.95	<30.00	PASS
		H	18.32		
	MCH	V	18.27		PASS
		H	19.21		
	HCH	V	18.68		PASS
		H	17.81		
16QAM	LCH	V	19.28	<30.00	PASS
		H	17.85		
	MCH	V	18.55		PASS
		H	18.63		
	HCH	V	18.36		PASS
		H	18.88		

Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	18.51	<30.00	PASS
		H	19.02		
	MCH	V	18.24		PASS
		H	17.41		
	HCH	V	17.61		PASS
		H	19.25		
16QAM	LCH	V	18.57	<30.00	PASS
		H	18.12		
	MCH	V	18.34		PASS
		H	17.44		
	HCH	V	18.11		PASS
		H	18.50		
Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.57	<30.00	PASS
		H	19.24		
	MCH	V	18.11		PASS
		H	18.13		
	HCH	V	18.40		PASS
		H	18.64		
16QAM	LCH	V	19.49	<30.00	PASS
		H	18.93		
	MCH	V	18.44		PASS
		H	17.52		
	HCH	V	19.24		PASS
		H	18.39		

FDD-LTE Band 12

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	17.89	<34.77	PASS
		H	18.44		
	MCH	V	16.55		PASS
		H	17.29		
	HCH	V	18.00		PASS
		H	17.92		
16QAM	LCH	V	16.91	<34.77	PASS
		H	17.98		
	MCH	V	17.98		PASS
		H	17.50		
	HCH	V	17.33		PASS
		H	18.19		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	17.42	<34.77	PASS
		H	16.73		
	MCH	V	18.23		PASS
		H	17.33		
	HCH	V	17.13		PASS
		H	16.86		
16QAM	LCH	V	17.00	<34.77	PASS
		H	17.56		
	MCH	V	17.11		PASS
		H	17.01		
	HCH	V	16.71		PASS
		H	17.69		

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	18.64	<34.77	PASS
		H	18.23		
	MCH	V	17.44		PASS
		H	17.36		
	HCH	V	17.43		PASS
		H	17.60		
16QAM	LCH	V	18.64	<34.77	PASS
		H	18.82		
	MCH	V	17.14		PASS
		H	18.29		
	HCH	V	17.22		PASS
		H	18.75		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.64	<34.77	PASS
		H	19.35		
	MCH	V	18.55		PASS
		H	17.76		
	HCH	V	18.29		PASS
		H	17.96		
16QAM	LCH	V	19.55	<34.77	PASS
		H	19.16		
	MCH	V	19.37		PASS
		H	17.70		
	HCH	V	18.49		PASS
		H	19.50		

FDD-LTE Band 13

Channel Bandwidth: 5.0 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	18.61	<34.77	PASS
		H	19.50		
	MCH	V	19.91		PASS
		H	19.24		
	HCH	V	19.56		PASS
		H	18.72		
16QAM	LCH	V	19.43	<34.77	PASS
		H	19.15		
	MCH	V	18.42		PASS
		H	18.55		
	HCH	V	19.11		PASS
		H	19.71		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.03	<34.77	PASS
		H	19.13		
	MCH	V	19.80		PASS
		H	19.42		
	HCH	V	18.56		PASS
		H	18.20		
16QAM	LCH	V	19.97	<34.77	PASS
		H	18.92		
	MCH	V	19.49		PASS
		H	18.89		
	HCH	V	19.36		PASS
		H	18.14		

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

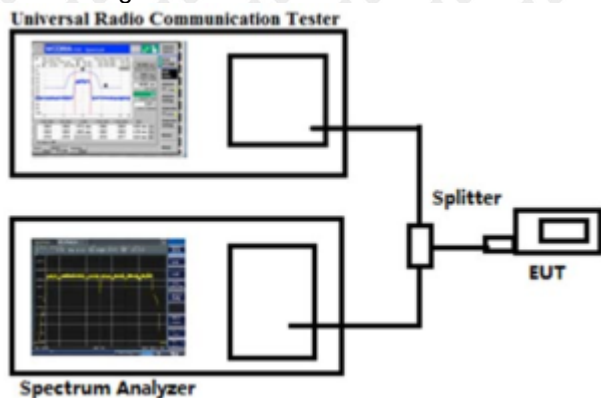
corresponding to the highest PAPR expected during periods of continuous transmission.

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 3: 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.

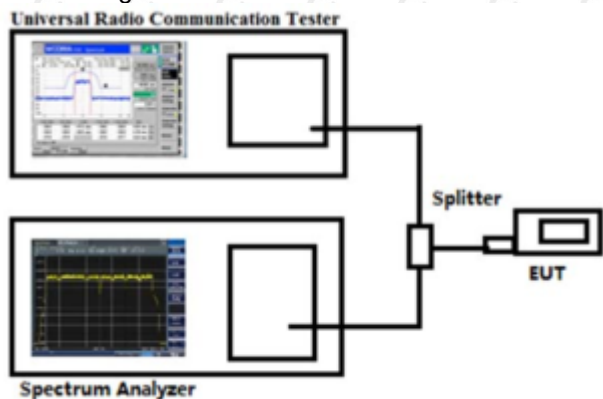
According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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 4: 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.

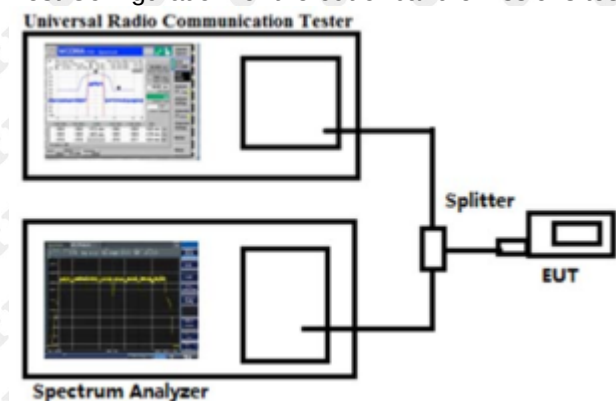
According to §27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ 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 5 & 6: 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 = $43 + 10 \log_{10}(\text{power out in Watts})$

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.
1352.03	149	234	-58.93	-13	-45.93	Pass	H
1729.91	152	131	-49.40	-13	-36.40	Pass	H
3914.25	145	167	-47.83	-13	-34.83	Pass	H
5823.10	151	96	-46.58	-13	-33.58	Pass	H
6461.75	146	62	-45.01	-13	-32.01	Pass	H
8121.98	146	82	-45.34	-13	-32.34	Pass	H
1155.73	153	115	-58.35	-13	-45.35	Pass	V
1541.06	155	351	-57.77	-13	-44.77	Pass	V
3444.66	154	321	-52.86	-13	-39.86	Pass	V
3745.05	154	65	-50.16	-13	-37.16	Pass	V
5777.53	149	350	-46.54	-13	-33.54	Pass	V
6620.10	148	305	-48.69	-13	-35.69	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.
1257.93	150	241	-56.70	-13	-43.70	Pass	H
1606.22	155	291	-48.59	-13	-35.59	Pass	H
3884.02	152	33	-49.00	-13	-36.00	Pass	H
5884.76	152	142	-45.71	-13	-32.71	Pass	H
6410.57	149	101	-45.14	-13	-32.14	Pass	H
8043.62	147	269	-44.15	-13	-31.15	Pass	H
1279.82	151	285	-59.12	-13	-46.12	Pass	V
1509.50	150	262	-61.66	-13	-48.66	Pass	V
3617.36	145	40	-53.78	-13	-40.78	Pass	V
3900.14	152	11	-49.46	-13	-36.46	Pass	V
5713.85	147	230	-45.73	-13	-32.73	Pass	V
6541.04	146	311	-49.05	-13	-36.05	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.
1350.36	152	267	-55.57	-13	-42.57	Pass	H
1793.34	152	28	-49.49	-13	-36.49	Pass	H
3886.30	146	64	-47.44	-13	-34.44	Pass	H
5951.24	148	124	-44.88	-13	-31.88	Pass	H
6573.89	145	150	-46.30	-13	-33.30	Pass	H
8117.92	154	247	-43.48	-13	-30.48	Pass	H
1270.08	145	222	-57.29	-13	-44.29	Pass	V
1520.32	154	273	-61.12	-13	-48.12	Pass	V
3552.64	146	350	-50.77	-13	-37.77	Pass	V
3844.40	152	254	-50.75	-13	-37.75	Pass	V
5896.19	147	93	-45.79	-13	-32.79	Pass	V
6521.78	147	141	-49.26	-13	-36.26	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.
1248.87	147	326	-55.43	-13	-42.43	Pass	H
1667.82	148	289	-47.10	-13	-34.10	Pass	H
3967.09	149	315	-48.58	-13	-35.58	Pass	H
5801.65	146	170	-42.84	-13	-29.84	Pass	H
6436.01	152	312	-44.22	-13	-31.22	Pass	H
8062.90	153	216	-45.98	-13	-32.98	Pass	H
1252.75	153	223	-56.82	-13	-43.82	Pass	V
1428.09	145	310	-60.19	-13	-47.19	Pass	V
3561.52	150	83	-50.40	-13	-37.40	Pass	V
3823.61	154	167	-49.27	-13	-36.27	Pass	V
5745.74	154	178	-48.36	-13	-35.36	Pass	V
6533.26	151	14	-47.59	-13	-34.59	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.
1405.00	151	294	-59.12	-13	-46.12	Pass	H
1791.92	146	58	-47.54	-13	-34.54	Pass	H
3954.18	147	243	-50.10	-13	-37.10	Pass	H
5819.20	151	145	-45.76	-13	-32.76	Pass	H
6598.01	150	135	-47.42	-13	-34.42	Pass	H
8003.36	154	27	-46.19	-13	-33.19	Pass	H
1134.17	151	292	-57.83	-13	-44.83	Pass	V
1443.79	149	181	-59.29	-13	-46.29	Pass	V
3452.52	151	232	-51.15	-13	-38.15	Pass	V
3894.23	150	124	-50.73	-13	-37.73	Pass	V
5801.93	151	89	-49.10	-13	-36.10	Pass	V
6518.27	147	324	-46.89	-13	-33.89	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.
1383.14	148	49	-57.31	-13	-44.31	Pass	H
1603.10	146	162	-49.75	-13	-36.75	Pass	H
3819.14	155	257	-49.33	-13	-36.33	Pass	H
5960.59	145	150	-44.57	-13	-31.57	Pass	H
6446.84	153	196	-45.90	-13	-32.90	Pass	H
8030.62	145	262	-44.70	-13	-31.70	Pass	H
1246.39	149	79	-55.90	-13	-42.90	Pass	V
1493.60	153	191	-58.14	-13	-45.14	Pass	V
3561.87	150	346	-53.29	-13	-40.29	Pass	V
3851.95	154	89	-50.92	-13	-37.92	Pass	V
5843.85	153	265	-45.45	-13	-32.45	Pass	V
6520.78	145	315	-45.93	-13	-32.93	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.
1303.49	150	136	-55.63	-13	-42.63	Pass	H
1614.58	148	263	-49.29	-13	-36.29	Pass	H
3936.64	147	47	-47.83	-13	-34.83	Pass	H
5946.59	154	35	-44.80	-13	-31.80	Pass	H
6579.42	152	121	-43.31	-13	-30.31	Pass	H
8146.80	145	96	-46.74	-13	-33.74	Pass	H
1263.68	148	88	-57.66	-13	-44.66	Pass	V
1452.87	153	120	-59.81	-13	-46.81	Pass	V
3480.00	148	101	-53.04	-13	-40.04	Pass	V
3809.29	150	285	-49.52	-13	-36.52	Pass	V
5738.30	146	233	-48.48	-13	-35.48	Pass	V
6601.29	154	292	-47.43	-13	-34.43	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.
1427.29	145	224	-56.01	-13	-43.01	Pass	H
1727.02	147	351	-50.53	-13	-37.53	Pass	H
3950.44	147	210	-46.41	-13	-33.41	Pass	H
5891.10	151	293	-43.77	-13	-30.77	Pass	H
6590.77	146	210	-44.85	-13	-31.85	Pass	H
8126.88	148	4	-46.34	-13	-33.34	Pass	H
1267.77	149	286	-56.98	-13	-43.98	Pass	V
1375.10	155	32	-60.92	-13	-47.92	Pass	V
3574.48	148	307	-53.72	-13	-40.72	Pass	V
3874.31	150	321	-49.99	-13	-36.99	Pass	V
5722.68	152	280	-47.51	-13	-34.51	Pass	V
6546.37	155	190	-50.10	-13	-37.10	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.
1363.51	153	67	-53.12	-13	-40.12	Pass	H
1649.06	150	273	-50.01	-13	-37.01	Pass	H
3862.59	149	79	-46.60	-13	-33.60	Pass	H
5859.78	153	250	-44.63	-13	-31.63	Pass	H
6517.91	146	223	-45.20	-13	-32.20	Pass	H
8173.98	151	284	-47.25	-13	-34.25	Pass	H
1247.95	150	345	-58.26	-13	-45.26	Pass	V
1535.32	148	318	-58.71	-13	-45.71	Pass	V
3508.99	150	312	-51.67	-13	-38.67	Pass	V
3907.06	148	77	-51.17	-13	-38.17	Pass	V
5723.89	153	102	-48.08	-13	-35.08	Pass	V
6634.67	150	125	-48.91	-13	-35.91	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.
1298.01	148	202	-53.45	-13	-40.45	Pass	H
1664.79	150	50	-51.17	-13	-38.17	Pass	H
3951.67	151	358	-44.88	-13	-31.88	Pass	H
5812.11	148	317	-43.88	-13	-30.88	Pass	H
6409.90	154	245	-45.55	-13	-32.55	Pass	H
8000.05	150	89	-45.38	-13	-32.38	Pass	H
1206.02	153	170	-55.45	-13	-42.45	Pass	V
1488.62	154	339	-59.61	-13	-46.61	Pass	V
3591.08	147	270	-53.13	-13	-40.13	Pass	V
3731.19	153	178	-50.56	-13	-37.56	Pass	V
5805.89	152	17	-48.92	-13	-35.92	Pass	V
6514.69	149	231	-49.35	-13	-36.35	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.
1242.65	149	301	-53.06	-13	-40.06	Pass	H
1656.49	148	160	-48.71	-13	-35.71	Pass	H
3981.90	146	179	-47.34	-13	-34.34	Pass	H
5929.36	149	2	-43.33	-13	-30.33	Pass	H
6476.89	155	323	-46.76	-13	-33.76	Pass	H
8040.55	155	309	-43.68	-13	-30.68	Pass	H
1124.58	150	67	-55.97	-13	-42.97	Pass	V
1544.17	146	160	-57.73	-13	-44.73	Pass	V
3476.14	146	318	-53.59	-13	-40.59	Pass	V
3920.06	153	108	-52.95	-13	-39.95	Pass	V
5708.94	146	273	-47.93	-13	-34.93	Pass	V
6612.12	152	171	-48.37	-13	-35.37	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.
1380.80	146	296	-55.26	-13	-42.26	Pass	H
1616.70	149	81	-51.54	-13	-38.54	Pass	H
3937.49	151	226	-47.65	-13	-34.65	Pass	H
5828.11	146	210	-46.13	-13	-33.13	Pass	H
6432.29	153	205	-46.70	-13	-33.70	Pass	H
8025.07	150	240	-46.87	-13	-33.87	Pass	H
1148.12	149	18	-56.73	-13	-43.73	Pass	V
1440.43	155	134	-57.69	-13	-44.69	Pass	V
3575.70	151	188	-51.71	-13	-38.71	Pass	V
3747.78	154	256	-51.09	-13	-38.09	Pass	V
5881.36	150	166	-47.79	-13	-34.79	Pass	V
6493.66	154	207	-46.85	-13	-33.85	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.
1300.08	146	211	-54.21	-13	-41.21	Pass	H
1626.38	153	283	-49.59	-13	-36.59	Pass	H
3844.75	148	79	-47.64	-13	-34.64	Pass	H
5841.40	153	172	-41.22	-13	-28.22	Pass	H
6436.39	150	54	-45.58	-13	-32.58	Pass	H
8130.18	147	205	-46.60	-13	-33.60	Pass	H
1138.52	146	205	-58.04	-13	-45.04	Pass	V
1484.60	154	197	-60.39	-13	-47.39	Pass	V
3556.85	146	159	-49.55	-13	-36.55	Pass	V
3915.51	147	103	-49.00	-13	-36.00	Pass	V
5870.91	146	23	-48.28	-13	-35.28	Pass	V
6625.26	150	220	-50.71	-13	-37.71	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.
1321.56	151	243	-54.69	-13	-41.69	Pass	H
1755.14	146	252	-51.03	-13	-38.03	Pass	H
3922.88	148	261	-46.15	-13	-33.15	Pass	H
5957.46	153	313	-43.24	-13	-30.24	Pass	H
6412.18	151	78	-46.45	-13	-33.45	Pass	H
8091.97	148	193	-45.57	-13	-32.57	Pass	H
1224.26	149	213	-56.68	-13	-43.68	Pass	V
1557.92	153	139	-60.80	-13	-47.80	Pass	V
3569.48	152	94	-49.22	-13	-36.22	Pass	V
3874.48	153	194	-47.32	-13	-34.32	Pass	V
5896.28	148	323	-49.84	-13	-36.84	Pass	V
6645.18	148	350	-50.50	-13	-37.50	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.
1247.06	152	259	-54.43	-13	-41.43	Pass	H
1792.97	154	76	-52.59	-13	-39.59	Pass	H
3807.69	146	97	-48.06	-13	-35.06	Pass	H
5796.67	154	169	-42.26	-13	-29.26	Pass	H
6535.18	151	218	-47.90	-13	-34.90	Pass	H
8066.47	148	233	-47.76	-13	-34.76	Pass	H
1179.85	155	332	-56.33	-13	-43.33	Pass	V
1396.60	151	250	-58.76	-13	-45.76	Pass	V
3478.18	150	283	-51.05	-13	-38.05	Pass	V
3852.76	146	328	-48.36	-13	-35.36	Pass	V
5820.38	149	257	-48.12	-13	-35.12	Pass	V
6536.37	146	267	-47.95	-13	-34.95	Pass	V

16QAM

Band 12 23017 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1260.83	145	249	-54.02	-13	-41.02	Pass	H
1693.07	152	219	-52.98	-13	-39.98	Pass	H
3825.09	155	229	-48.49	-13	-35.49	Pass	H
5824.13	149	48	-42.13	-13	-29.13	Pass	H
6579.47	154	21	-46.87	-13	-33.87	Pass	H
8056.33	147	131	-46.22	-13	-33.22	Pass	H
1118.87	153	123	-57.99	-13	-44.99	Pass	V
1430.35	146	232	-61.10	-13	-48.10	Pass	V
3478.43	151	326	-50.99	-13	-37.99	Pass	V
3808.25	149	7	-47.54	-13	-34.54	Pass	V
5776.40	146	68	-51.00	-13	-38.00	Pass	V
6603.61	151	31	-47.74	-13	-34.74	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.
1334.58	147	127	-55.06	-13	-42.06	Pass	H
1763.82	152	348	-51.05	-13	-38.05	Pass	H
3988.12	148	203	-46.58	-13	-33.58	Pass	H
5868.79	154	25	-41.46	-13	-28.46	Pass	H
6411.52	150	3	-47.90	-13	-34.90	Pass	H
8026.37	150	176	-47.37	-13	-34.37	Pass	H
1135.24	152	58	-58.81	-13	-45.81	Pass	V
1521.76	146	171	-58.20	-13	-45.20	Pass	V
3639.06	152	118	-50.16	-13	-37.16	Pass	V
3896.73	154	38	-50.48	-13	-37.48	Pass	V
5867.57	146	360	-47.44	-13	-34.44	Pass	V
6537.53	147	8	-50.41	-13	-37.41	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.
1357.39	152	316	-53.89	-13	-40.89	Pass	H
1746.78	147	354	-52.88	-13	-39.88	Pass	H
3905.89	147	81	-45.25	-13	-32.25	Pass	H
5881.76	150	236	-41.14	-13	-28.14	Pass	H
6558.45	150	283	-47.12	-13	-34.12	Pass	H
8008.64	149	304	-48.08	-13	-35.08	Pass	H
1124.62	149	156	-59.45	-13	-46.45	Pass	V
1525.64	148	353	-60.67	-13	-47.67	Pass	V
3517.89	150	101	-50.16	-13	-37.16	Pass	V
3816.01	145	287	-47.14	-13	-34.14	Pass	V
5759.41	149	108	-47.39	-13	-34.39	Pass	V
6586.48	153	88	-47.26	-13	-34.26	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.
1345.08	154	1	-57.69	-13	-44.69	Pass	H
1654.65	154	176	-47.50	-13	-34.50	Pass	H
4000.13	147	356	-46.21	-13	-33.21	Pass	H
5876.91	149	318	-43.13	-13	-30.13	Pass	H
6526.98	153	310	-44.00	-13	-31.00	Pass	H
8053.66	146	293	-43.03	-13	-30.03	Pass	H
1228.76	146	258	-55.80	-13	-42.80	Pass	V
1475.88	147	136	-55.76	-13	-42.76	Pass	V
3560.17	149	265	-50.04	-13	-37.04	Pass	V
3916.34	154	278	-49.92	-13	-36.92	Pass	V
5845.27	146	196	-46.87	-13	-33.87	Pass	V
6522.98	155	291	-50.53	-13	-37.53	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.
1279.28	150	80	-59.81	-13	-46.81	Pass	H
1703.71	153	240	-50.36	-13	-37.36	Pass	H
3864.52	155	239	-47.03	-13	-34.03	Pass	H
5837.89	149	34	-43.08	-13	-30.08	Pass	H
6567.73	149	201	-41.90	-13	-28.90	Pass	H
8041.94	148	273	-44.70	-13	-31.70	Pass	H
1178.53	145	225	-54.92	-13	-41.92	Pass	V
1372.86	154	60	-57.45	-13	-44.45	Pass	V
3538.58	148	291	-49.23	-13	-36.23	Pass	V
3747.31	146	142	-48.27	-13	-35.27	Pass	V
5715.67	150	157	-45.89	-13	-32.89	Pass	V
6604.62	146	68	-50.68	-13	-37.68	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.
1325.65	155	29	-58.76	-13	-45.76	Pass	H
1802.73	147	216	-49.16	-13	-36.16	Pass	H
3969.79	150	72	-46.73	-13	-33.73	Pass	H
5877.68	153	261	-42.93	-13	-29.93	Pass	H
6429.27	150	178	-42.77	-13	-29.77	Pass	H
8032.66	155	79	-43.31	-13	-30.31	Pass	H
1236.73	150	255	-53.50	-13	-40.50	Pass	V
1402.73	150	250	-56.12	-13	-43.12	Pass	V
3481.08	146	117	-50.63	-13	-37.63	Pass	V
3867.97	153	274	-49.63	-13	-36.63	Pass	V
5721.70	153	186	-49.01	-13	-36.01	Pass	V
6485.64	149	28	-47.29	-13	-34.29	Pass	V

16QAM

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.
1237.81	145	42	-55.96	-13	-42.96	Pass	H
1674.24	150	278	-48.00	-13	-35.00	Pass	H
3971.77	152	108	-46.17	-13	-33.17	Pass	H
5792.25	152	190	-42.22	-13	-29.22	Pass	H
6517.51	147	242	-41.36	-13	-28.36	Pass	H
8117.40	146	54	-43.05	-13	-30.05	Pass	H
1166.56	146	231	-54.18	-13	-41.18	Pass	V
1528.40	153	54	-56.09	-13	-43.09	Pass	V
3588.37	145	312	-49.57	-13	-36.57	Pass	V
3903.05	152	318	-49.33	-13	-36.33	Pass	V
5899.14	152	174	-48.91	-13	-35.91	Pass	V
6468.79	150	105	-48.68	-13	-35.68	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.
1390.86	153	255	-59.83	-13	-46.83	Pass	H
1644.32	150	122	-51.02	-13	-38.02	Pass	H
3892.98	149	327	-44.62	-13	-31.62	Pass	H
5915.20	153	330	-44.79	-13	-31.79	Pass	H
6477.07	148	18	-40.82	-13	-27.82	Pass	H
8000.65	149	222	-43.22	-13	-30.22	Pass	H
1225.96	152	200	-55.54	-13	-42.54	Pass	V
1434.24	149	49	-57.94	-13	-44.94	Pass	V
3450.44	147	69	-52.93	-13	-39.93	Pass	V
3860.46	154	200	-48.90	-13	-35.90	Pass	V
5802.45	152	284	-45.65	-13	-32.65	Pass	V
6495.91	152	284	-48.71	-13	-35.71	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.
1324.28	149	132	-59.44	-13	-46.44	Pass	H
1714.67	147	199	-48.81	-13	-35.81	Pass	H
3905.31	150	296	-43.92	-13	-30.92	Pass	H
5915.19	146	35	-42.09	-13	-29.09	Pass	H
6440.02	150	333	-41.17	-13	-28.17	Pass	H
8076.73	152	4	-44.41	-13	-31.41	Pass	H
1286.30	154	93	-53.83	-13	-40.83	Pass	V
1399.51	152	132	-57.44	-13	-44.44	Pass	V
3639.06	149	98	-49.49	-13	-36.49	Pass	V
3778.55	151	339	-50.51	-13	-37.51	Pass	V
5777.47	154	200	-48.31	-13	-35.31	Pass	V
6467.70	155	9	-49.09	-13	-36.09	Pass	V

Note:

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

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.

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=DC 3.24V; High Voltage HV=DC 3.96V

Please refer to Appendix 2: Frequency Stability

Test result: Pass

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