

TEST REPORT

Product Name: Asset GPS Tracker
FCC ID: 2AUVX-NT07E
Trademark: Kingwo IoT
Model Number: NT07E, NT06E, NT08E, LT01, LT03, LT12, LT32, MT12, MT100
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Sample Received Date: Jun. 23, 2021
Sample tested Date: Jun. 23, 2021 to Jul. 16, 2021
Issue Date: Jul. 20, 2021
Report No.: CTB210625020RFX
Test Standards: FCC Part 2, 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
CTB210625020RFX	Jul. 20, 2021	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 24.232/Part27.50(d)(10) Part27.50(c)(10)/Part27.50(b)(10)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
peak-to-average ratio	Part 27.50(d)/ Part 24.232	KDB 971168 D01v02r02	PASS
99% & 26dB Occupied Bandwidth	Part 2.1049	KDB 971168 D01v02r02	PASS
Band Edge at antenna terminals	Part 24.238/ Part 27.53(g) (1)/ Part 27.53(f)/ Part 27.53(c)	KDB 971168 D01v02r02	PASS
Spurious emissions at antenna terminals	Part 24.238/ Part 27.53(g) (1)/ Part 27.53(f)/ Part 27.53(c)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
Field strength of spurious radiation	Part 24.238/ Part 27.53(g) (1)/ Part 27.53(f)/ Part 27.53(c)	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 chamber Radiated spurious emission(30MHz-1GHz)	4.6dB
3m chamber Radiated spurious emission(1GHz-18GHz)	5.1dB
3m chamber Radiated spurious emission(18GHz-40GHz)	3.4dB
Receiver Reference Sensitivity level	1.9dB
humidity uncertainty	5.5%
Temperature uncertainty	0.63°C
frequency	1×10^{-7}

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s):	NT07E, NT06E, NT08E, LT01, LT03, LT12, LT32, MT12, MT100
Model Description:	All the model are the same circuit and RF module, only for model name. Test sample model: NT07E
Hardware Version:	NT06E_P30
Software Version:	NT06-4.13
Operation Frequency:	TDD-LTE BAND 2: 1850-1910MHz TDD-LTE BAND 4: 1710-1755MHz TDD-LTE BAND 12: 699-716MHz TDD-LTE BAND 13: 779.5-782MHz
Max. RF output power:	TDD-LTE BAND 2: 21.40dBm TDD-LTE BAND 4: 20.98dBm TDD-LTE BAND 12: 21.28dBm TDD-LTE BAND 13: 21.32dBm
Type of Modulation:	QPSK, 16QAM
LTE Category	CAT M1
Antenna installation:	Monopole Antenna
Antenna Gain:	FDD-LTE BAND 2: 1dBi TDD-LTE BAND 4: 1dBi TDD-LTE BAND 12: 1dBi TDD-LTE BAND 13: 1dBi
Ratings:	DC 3.6 for 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

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		5	23025	779.5
		10	23230	782
	Mid Range	5/10	23230	782
		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

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	Sep. 28, 2020	Sep. 28, 2021
2	Power Sensor	Agilent	U2021XA	MY56120032	Sep. 28, 2020	Sep. 28, 2021
3	Power Sensor	Agilent	U2021XA	MY56120034	Sep. 28, 2020	Sep. 28, 2021
4	Communication test set	R&S	CMW500	108058	Sep. 28, 2020	Sep. 28, 2021
5	Spectrum Analyzer	R&S	FSP40	100550	Sep. 28, 2020	Sep. 28, 2021
6	Signal Generator	Agilent	N5181A	MY49060920	Sep. 28, 2020	Sep. 28, 2021
7	Signal Generator	Agilent	N5182A	MY47420195	Sep. 28, 2020	Sep. 28, 2021
8	Communication test set	Agilent	E5515C	MY50102567	Oct. 10, 2020	Oct. 10, 2021
9	band rejection filter	Shenxiang	MSF2400-24 83.5MS-1154	20181015001	Sep. 28, 2020	Sep. 28, 2021
10	band rejection filter	Shenxiang	MSF5150-58 50MS-1155	20181015001	Sep. 28, 2020	Sep. 28, 2021
11	band rejection filter	Xingbo	XBLBQ-DZA 120	190821-1-1	Sep. 28, 2020	Sep. 28, 2021
12	BT&WI-FI Automatic test software	Microwave	MTS8310	Ver. 2.0.0.0	\	\
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	Sep. 28, 2020	Sep. 28, 2021
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	Sep. 28, 2020	Sep. 28, 2021
15	234G Automatic test software	Microwave	MTS8200	Ver. 2.0.0.0	\	\
16	966 chamber	C.R.T.	966 Room	966	Nov. 9, 2019	Nov. 08, 2022
17	Receiver	R&S	ESPI	100362	Sep. 28, 2020	Sep. 28, 2021

18	Amplifier	HP	8447E	2945A02747	Sep. 28, 2020	Sep. 28, 2021
19	Amplifier	Agilent	8449B	3008A01838	Sep. 28, 2020	Sep. 28, 2021
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	Nov. 02, 2020	Nov. 01, 2021
21	Horn Antenna	Schwarzbeck	BBHA9120D	1911	Nov. 02, 2020	Nov. 01, 2021
22	Software	Fala	EZ-EMC	FA-03A2 RE	\	\
23	3-Loop Antenna	Daze	ZN30401	17014	Sep. 28, 2020	Sep. 28, 2021
24	loop antenna	ZHINAN	ZN30900A	/	Sep. 28, 2020	Sep. 28, 2021
25	Horn antenna	A/H/System	SAS-574	588	Sep. 28, 2020	Sep. 28, 2021
26	Amplifier	AEROFLEX	/	S/N/ 097	Sep. 28, 2020	Sep. 28, 2021

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.

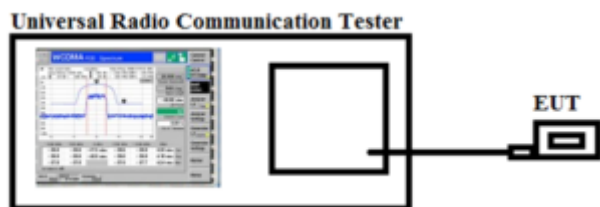
According to §27.50(d)(4), fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

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

According to §27.50(b)(10), Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

7.2 Test Procedure

Conducted output power test method:



Radiated power test method:

1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

7.3 Summary of Test Results/Plots

Max. Radiated Power:

FDD-LTE Band 12

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.96	<34.77	PASS
		H	20.30		
	MCH	V	20.29		PASS
		H	20.34		
	HCH	V	20.59		PASS
		H	18.29		
16QAM	LCH	V	20.13	<34.77	PASS
		H	20.10		
	MCH	V	19.31		PASS
		H	18.80		
	HCH	V	18.40		PASS
		H	18.30		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.46	<34.77	PASS
		H	20.30		
	MCH	V	20.01		PASS
		H	20.10		
	HCH	V	20.81		PASS
		H	18.89		
16QAM	LCH	V	20.20	<34.77	PASS
		H	20.18		
	MCH	V	20.11		PASS
		H	19.28		
	HCH	V	18.42		PASS
		H	18.80		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict

QPSK	LCH	V	21.30	<34.77	PASS
		H	21.22		
	MCH	V	21.01		PASS
		H	21.18		
	HCH	V	21.17		PASS
		H	20.03		
16QAM	LCH	V	21.14	<34.77	PASS
		H	20.22		
	MCH	V	20.21		PASS
		H	20.26		
	HCH	V	20.24		PASS
		H	20.23		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.26	<34.77	PASS
		H	21.22		
	MCH	V	21.20		PASS
		H	21.10		
	HCH	V	21.23		PASS
		H	21.28		
16QAM	LCH	V	21.28	<34.77	PASS
		H	20.30		
	MCH	V	20.22		PASS
		H	20.21		
	HCH	V	20.36		PASS
		H	20.35		

FDD-LTE Band 13

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.32	<34.77	PASS
		H	21.30		
	MCH	V	20.28		PASS
		H	20.34		
	HCH	V	20.59		PASS
		H	20.35		
16QAM	LCH	V	21.28	<34.77	PASS
		H	21.01		
	MCH	V	20.84		PASS
		H	21.25		
	HCH	V	21.03		PASS
		H	20.30		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.40	<34.77	PASS
		H	21.21		
	MCH	V	21.01		PASS
		H	20.79		
	HCH	V	21.03		PASS
		H	21.30		
16QAM	LCH	V	21.24	<34.77	PASS
		H	20.58		
	MCH	V	20.40		PASS
		H	20.22		
	HCH	V	20.43		PASS
		H	20.50		
		H	20.38		

FDD-LTE Band 2

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.92	<33.01	PASS
		H	20.22		
	MCH	V	20.31		PASS
		H	20.55		
	HCH	V	20.30		PASS
		H	19.75		
16QAM	LCH	V	20.05	<33.01	PASS
		H	19.55		
	MCH	V	19.33		PASS
		H	19.56		
	HCH	V	19.36		PASS
		H	19.22		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.18	<33.01	PASS
		H	21.22		
	MCH	V	21.14		PASS
		H	21.06		
	HCH	V	21.10		PASS
		H	21.09		
16QAM	LCH	V	19.03	<33.01	PASS
		H	18.21		
	MCH	V	18.19		PASS
		H	18.27		
	HCH	V	18.75		PASS
		H	19.01		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.20	<33.01	PASS
		H	20.60		
	MCH	V	19.89		PASS
		H	20.98		
	HCH	V	19.84		PASS

		H	19.78		
16QAM	LCH	V	21.16	<33.01	PASS
		H	19.80		
	MCH	V	20.79		PASS
		H	20.89		
	HCH	V	20.83		PASS
		H	20.86		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.27	<33.01	PASS
		H	20.73		
	MCH	V	20.70		PASS
		H	21.09		
	HCH	V	21.05		PASS
		H	21.04		
16QAM	LCH	V	21.22	<33.01	PASS
		H	20.19		
	MCH	V	20.11		PASS
		H	20.18		
	HCH	V	21.02		PASS
		H	20.90		
Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.29	<33.01	PASS
		H	20.73		
	MCH	V	20.78		PASS
		H	21.09		
	HCH	V	21.05		PASS
		H	21.04		
16QAM	LCH	V	21.09	<33.01	PASS
		H	20.19		
	MCH	V	20.03		PASS
		H	20.14		
	HCH	V	21.03		PASS
		H	20.84		
		H	20.84		

Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.40	<33.01	PASS
		H	20.63		
	MCH	V	20.71		PASS
		H	21.10		
	HCH	V	21.03		PASS
		H	21.04		
16QAM	LCH	V	21.26	<33.01	PASS
		H	20.19		
	MCH	V	20.11		PASS
		H	21.14		
	HCH	V	21.02		PASS
		H	20.84		

FDD-LTE Band 4

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.82	<30	PASS
		H	20.05		
	MCH	V	20.48		PASS
		H	20.65		
	HCH	V	20.12		PASS
		H	20.80		
16QAM	LCH	V	19.80	<30	PASS
		H	18.80		
	MCH	V	18.20		PASS
		H	18.41		
	HCH	V	18.23		PASS
		H	18.83		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.90	<30	PASS
		H	20.10		
	MCH	V	20.11		PASS
		H	20.88		

	HCH	V	20.49		PASS
		H	20.39		
	LCH	V	19.71		PASS
		H	18.80		
16QAM	MCH	V	18.08	<30	PASS
		H	18.21		
	HCH	V	18.63		PASS
		H	18.65		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
	LCH	V	20.93		PASS
		H	20.89		
QPSK	MCH	V	20.14	<30	PASS
		H	20.13		
	HCH	V	19.82		PASS
		H	19.83		
	LCH	V	20.84		PASS
		H	20.13		
16QAM	MCH	V	20.78	<30	PASS
		H	20.69		
	HCH	V	19.94		PASS
		H	19.92		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
	LCH	V	20.86		PASS
		H	20.70		
QPSK	MCH	V	20.50	<30	PASS
		H	19.89		
	HCH	V	20.81		PASS
		H	19.98		
	LCH	V	20.84		PASS
		H	20.04		
16QAM	MCH	V	19.70	<30	PASS
		H	19.88		
	HCH	V	19.51		PASS
		H	20.00		

Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.89	<30	PASS
		H	20.80		
	MCH	V	20.08		PASS
		H	19.89		
	HCH	V	19.90		PASS
		H	19.91		
16QAM	LCH	V	20.88	<30	PASS
		H	19.80		
	MCH	V	19.68		PASS
		H	19.78		
	HCH	V	20.75		PASS
		H	20.45		
Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.98	<30	PASS
		H	20.80		
	MCH	V	20.08		PASS
		H	19.89		
	HCH	V	20.85		PASS
		H	19.98		
16QAM	LCH	V	20.86	<30	PASS
		H	20.80		
	MCH	V	19.89		PASS
		H	20.21		
	HCH	V	20.75		PASS
		H	20.45		

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.

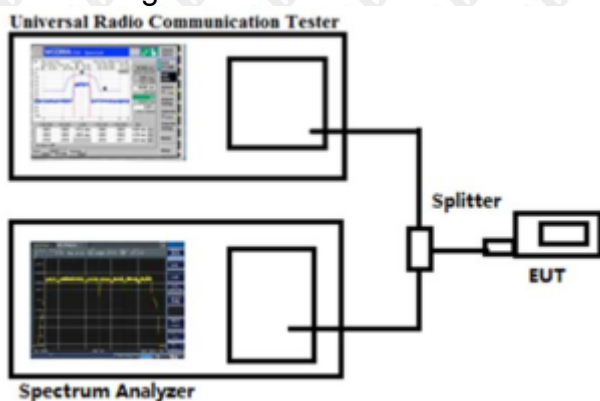
According to §27.50(B), the peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for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

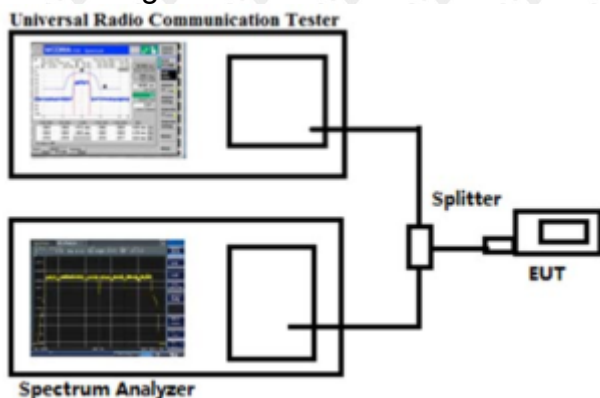
According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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

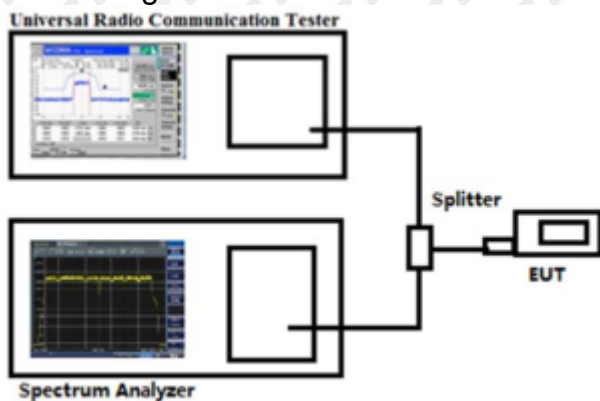
attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.

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 = $43 + 10 \log_{10} (\text{power out in Watts})$

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 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.
1334.852	150	78	-60.04	-13	-47.04	Pass	H
1726.967	149	291	-48.82	-13	-35.82	Pass	H
3901.800	151	213	-48.90	-13	-35.90	Pass	H
5858.532	150	89	-44.23	-13	-31.23	Pass	H
6498.924	151	329	-44.88	-13	-31.88	Pass	H
7995.713	148	138	-44.94	-13	-31.94	Pass	H
1219.789	149	99	-56.12	-13	-43.12	Pass	V
1439.174	148	217	-57.49	-13	-44.49	Pass	V
3571.289	150	12	-47.94	-13	-34.94	Pass	V
3837.363	150	137	-50.87	-13	-37.87	Pass	V
5804.257	146	356	-43.14	-13	-30.14	Pass	V
6553.691	146	95	-49.38	-13	-36.38	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.
1295.222	150	142	-54.94	-13	-41.94	Pass	H
1715.835	146	280	-52.91	-13	-39.91	Pass	H
3876.588	150	330	-51.21	-13	-38.21	Pass	H
5867.217	146	194	-43.58	-13	-30.58	Pass	H
6458.142	149	260	-46.63	-13	-33.63	Pass	H
8018.374	151	31	-44.36	-13	-31.36	Pass	H
1234.738	149	4	-58.17	-13	-45.17	Pass	V
1395.162	148	257	-59.67	-13	-46.67	Pass	V
3588.443	147	55	-51.68	-13	-38.68	Pass	V
3913.009	148	273	-53.17	-13	-40.17	Pass	V
5826.797	150	136	-52.08	-13	-39.08	Pass	V
6517.747	150	16	-49.78	-13	-36.78	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.
1338.171	149	156	-59.46	-13	-46.46	Pass	H
1668.531	149	170	-49.01	-13	-36.01	Pass	H
3841.559	149	127	-47.44	-13	-34.44	Pass	H
5909.655	146	42	-42.53	-13	-29.53	Pass	H
6531.678	147	69	-45.09	-13	-32.09	Pass	H
7999.033	151	110	-44.08	-13	-31.08	Pass	H
1257.992	148	61	-54.21	-13	-41.21	Pass	V
1400.728	147	266	-55.76	-13	-42.76	Pass	V
3527.658	148	303	-49.40	-13	-36.40	Pass	V
3911.278	149	195	-50.09	-13	-37.09	Pass	V
5791.679	147	323	-45.46	-13	-32.46	Pass	V
6576.317	146	325	-46.05	-13	-33.05	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.
1333.023	147	256	-58.37	-13	-45.37	Pass	H
1683.495	147	243	-48.28	-13	-35.28	Pass	H
3868.721	148	259	-51.01	-13	-38.01	Pass	H
5922.680	149	28	-46.31	-13	-33.31	Pass	H
6561.446	148	108	-43.81	-13	-30.81	Pass	H
8002.737	147	328	-41.76	-13	-28.76	Pass	H
1178.545	150	16	-52.33	-13	-39.33	Pass	V
1424.733	148	117	-57.84	-13	-44.84	Pass	V
3598.430	147	325	-52.35	-13	-39.35	Pass	V
3899.482	149	302	-49.50	-13	-36.50	Pass	V
5855.240	147	15	-44.95	-13	-31.95	Pass	V
6583.331	147	280	-47.37	-13	-34.37	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.
1334.022	151	14	-54.51	-13	-41.51	Pass	H
1724.621	147	71	-48.58	-13	-35.58	Pass	H
3853.270	150	318	-47.96	-13	-34.96	Pass	H
5927.474	147	56	-43.02	-13	-30.02	Pass	H
6505.108	147	216	-42.33	-13	-29.33	Pass	H
8057.835	151	79	-42.56	-13	-29.56	Pass	H
1191.373	151	65	-56.96	-13	-43.96	Pass	V
1382.712	146	225	-59.57	-13	-46.57	Pass	V
3536.487	149	47	-50.03	-13	-37.03	Pass	V
3854.493	150	73	-49.55	-13	-36.55	Pass	V
5820.447	147	168	-44.46	-13	-31.46	Pass	V
6519.749	150	28	-45.19	-13	-32.19	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.
1333.844	149	165	-54.842	-13	-41.84	Pass	H
1702.531	146	208	-46.948	-13	-33.95	Pass	H
3901.192	146	4	-47.172	-13	-34.17	Pass	H
5889.681	150	198	-43.122	-13	-30.12	Pass	H
6509.206	146	341	-41.475	-13	-28.47	Pass	H
8078.812	150	235	-44.025	-13	-31.02	Pass	H
1204.585	146	292	-55.032	-13	-42.03	Pass	V
1462.043	150	158	-57.376	-13	-44.38	Pass	V
3542.294	149	55	-51.827	-13	-38.83	Pass	V
3828.492	150	319	-49.763	-13	-36.76	Pass	V
5801.808	146	118	-46.336	-13	-33.34	Pass	V
6557.211	150	155	-45.336	-13	-32.34	Pass	V

Note:

- 1) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 1GHz are attenuated more than 20 dB below the applicable limit and not required to be reported, the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.
- 2) Tested with all kind of bandwidth, RB Size and RB Offset, Found the 1.4MHz with full RB were the worst case; and then Only the worst case is recorded in the report.

QPSK

Band 13 23205 channel/BW5(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1335.083	150	78	-55.68	-13	-42.68	Pass	H
1726.407	149	291	-49.83	-13	-36.83	Pass	H
3901.344	151	213	-47.96	-13	-34.96	Pass	H
5856.784	150	89	-48.82	-13	-35.82	Pass	H
6499.340	151	329	-45.96	-13	-32.96	Pass	H
7996.790	148	138	-44.21	-13	-31.21	Pass	H
1219.439	149	99	-59.32	-13	-46.32	Pass	V
1437.938	148	217	-55.22	-13	-42.22	Pass	V
3570.253	150	12	-48.80	-13	-35.80	Pass	V
3835.495	150	137	-49.53	-13	-36.53	Pass	V
5804.914	146	356	-43.88	-13	-30.88	Pass	V
6554.199	146	95	-46.52	-13	-33.52	Pass	V

Band 13 23230 channel/BW5 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1295.514	150	142	-54.14	-13	-41.14	Pass	H
1715.581	146	280	-48.43	-13	-35.43	Pass	H
3875.067	150	330	-51.15	-13	-38.15	Pass	H
5866.453	146	194	-44.87	-13	-31.87	Pass	H
6459.151	149	260	-47.87	-13	-34.87	Pass	H
8018.208	151	31	-44.22	-13	-31.22	Pass	H
1234.963	149	4	-56.53	-13	-43.53	Pass	V
1394.976	148	257	-62.22	-13	-49.22	Pass	V
3587.656	147	55	-50.78	-13	-37.78	Pass	V
3915.886	148	273	-53.36	-13	-40.36	Pass	V
5827.290	150	136	-49.20	-13	-36.20	Pass	V
6518.634	150	16	-46.42	-13	-33.42	Pass	V

Band 13 23255 channel/BW5 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1339.969	149	156	-58.89	-13	-45.89	Pass	H
1666.379	149	170	-49.43	-13	-36.43	Pass	H
3841.897	149	127	-48.54	-13	-35.54	Pass	H
5907.610	146	42	-43.30	-13	-30.30	Pass	H
6529.267	147	69	-43.11	-13	-30.11	Pass	H
7997.967	151	110	-44.33	-13	-31.33	Pass	H
1255.871	148	61	-54.07	-13	-41.07	Pass	V
1406.454	147	266	-56.91	-13	-43.91	Pass	V
3527.645	148	303	-52.10	-13	-39.10	Pass	V
3910.486	149	195	-50.28	-13	-37.28	Pass	V
5789.441	147	323	-42.92	-13	-29.92	Pass	V
6580.101	146	325	-47.80	-13	-34.80	Pass	V

16QAM

Band 13 23205 channel/BW5 (lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1337.869	147	256	-59.68	-13	-46.68	Pass	H
1682.270	147	243	-48.54	-13	-35.54	Pass	H
3868.681	148	259	-48.97	-13	-35.97	Pass	H
5923.257	149	28	-45.79	-13	-32.79	Pass	H
6561.244	148	108	-43.23	-13	-30.23	Pass	H
8000.078	147	328	-42.33	-13	-29.33	Pass	H
1181.920	150	16	-54.08	-13	-41.08	Pass	V
1427.057	148	117	-55.15	-13	-42.15	Pass	V
3598.310	147	325	-52.10	-13	-39.10	Pass	V
3899.263	149	302	-51.56	-13	-38.56	Pass	V
5850.205	147	15	-45.52	-13	-32.52	Pass	V
6581.040	147	280	-48.21	-13	-35.21	Pass	V

Band 13 23230 channel/BW5 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.428	151	14	-53.07	-13	-40.07	Pass	H
1724.825	147	71	-47.47	-13	-34.47	Pass	H
3853.465	150	318	-49.49	-13	-36.49	Pass	H
5926.951	147	56	-41.76	-13	-28.76	Pass	H
6504.507	147	216	-45.76	-13	-32.76	Pass	H
8057.900	151	79	-45.31	-13	-32.31	Pass	H
1192.197	151	65	-55.62	-13	-42.62	Pass	V
1382.760	146	225	-57.92	-13	-44.92	Pass	V
3536.149	149	47	-46.58	-13	-33.58	Pass	V
3855.136	150	73	-50.45	-13	-37.45	Pass	V
5820.529	147	168	-45.23	-13	-32.23	Pass	V
6519.537	150	28	-46.48	-13	-33.48	Pass	V

Band 13 23255 channel/BW5 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.705	149	165	-55.320	-13	-42.32	Pass	H
1703.709	146	208	-47.328	-13	-34.33	Pass	H
3901.593	146	4	-46.757	-13	-33.76	Pass	H
5888.162	150	198	-43.404	-13	-30.40	Pass	H
6509.428	146	341	-44.543	-13	-31.54	Pass	H
8081.114	150	235	-44.879	-13	-31.88	Pass	H
1206.062	146	292	-55.215	-13	-42.22	Pass	V
1461.199	150	158	-56.140	-13	-43.14	Pass	V
3543.045	149	55	-52.695	-13	-39.70	Pass	V
3829.268	150	319	-51.393	-13	-38.39	Pass	V
5800.516	146	118	-45.477	-13	-32.48	Pass	V
6558.609	150	155	-47.620	-13	-34.62	Pass	V

Note:

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

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

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.
1334.446	150	78	-59.96	-13	-46.96	Pass	H
1725.478	149	291	-49.34	-13	-36.34	Pass	H
3901.380	151	213	-45.90	-13	-32.90	Pass	H
5856.735	150	89	-44.66	-13	-31.66	Pass	H
6498.048	151	329	-46.81	-13	-33.81	Pass	H
7997.513	148	138	-45.23	-13	-32.23	Pass	H
1220.059	149	99	-54.94	-13	-41.94	Pass	V
1439.366	148	217	-60.34	-13	-47.34	Pass	V
3570.911	150	12	-52.18	-13	-39.18	Pass	V
3837.902	150	137	-52.08	-13	-39.08	Pass	V
5802.688	146	356	-44.94	-13	-31.94	Pass	V
6554.120	146	95	-49.15	-13	-36.15	Pass	V

Band 4 20175 channel/BW1.4 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1295.618	150	142	-59.69	-13	-46.69	Pass	H
1714.585	146	280	-54.00	-13	-41.00	Pass	H
3876.529	150	330	-49.72	-13	-36.72	Pass	H
5866.478	146	194	-41.93	-13	-28.93	Pass	H
6459.743	149	260	-50.51	-13	-37.51	Pass	H
8018.592	151	31	-47.34	-13	-34.34	Pass	H
1235.733	149	4	-59.03	-13	-46.03	Pass	V
1393.993	148	257	-64.33	-13	-51.33	Pass	V
3590.065	147	55	-54.76	-13	-41.76	Pass	V
3915.623	148	273	-50.75	-13	-37.75	Pass	V
5827.031	150	136	-47.42	-13	-34.42	Pass	V
6517.851	150	16	-46.58	-13	-33.58	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.
1338.045	149	156	-57.50	-13	-44.50	Pass	H
1668.694	149	170	-52.09	-13	-39.09	Pass	H
3841.774	149	127	-45.56	-13	-32.56	Pass	H
5911.097	146	42	-40.65	-13	-27.65	Pass	H
6532.171	147	69	-43.06	-13	-30.06	Pass	H
8002.144	151	110	-44.19	-13	-31.19	Pass	H
1259.797	148	61	-54.96	-13	-41.96	Pass	V
1405.697	147	266	-56.00	-13	-43.00	Pass	V
3527.140	148	303	-51.75	-13	-38.75	Pass	V
3911.915	149	195	-48.58	-13	-35.58	Pass	V
5792.885	147	323	-45.11	-13	-32.11	Pass	V
6576.408	146	325	-46.40	-13	-33.40	Pass	V

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Band 4 19957 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.598	147	256	-58.10	-13	-45.10	Pass	H
1683.876	147	243	-48.09	-13	-35.09	Pass	H
3869.837	148	259	-49.63	-13	-36.63	Pass	H
5921.842	149	28	-47.77	-13	-34.77	Pass	H
6559.137	148	108	-43.91	-13	-30.91	Pass	H
7997.330	147	328	-44.04	-13	-31.04	Pass	H
1179.252	150	16	-52.82	-13	-39.82	Pass	V
1429.193	148	117	-56.72	-13	-43.72	Pass	V
3594.144	147	325	-51.54	-13	-38.54	Pass	V
3904.115	149	302	-51.38	-13	-38.38	Pass	V
5852.476	147	15	-43.26	-13	-30.26	Pass	V
6583.821	147	280	-48.29	-13	-35.29	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.
1333.751	151	14	-54.11	-13	-41.11	Pass	H
1725.222	147	71	-49.07	-13	-36.07	Pass	H
3853.658	150	318	-47.52	-13	-34.52	Pass	H
5927.529	147	56	-46.55	-13	-33.55	Pass	H
6505.064	147	216	-43.12	-13	-30.12	Pass	H
8058.479	151	79	-44.72	-13	-31.72	Pass	H
1191.245	151	65	-58.09	-13	-45.09	Pass	V
1382.293	146	225	-58.93	-13	-45.93	Pass	V
3536.719	149	47	-51.25	-13	-38.25	Pass	V
3854.765	150	73	-47.46	-13	-34.46	Pass	V
5820.256	147	168	-46.72	-13	-33.72	Pass	V
6520.263	150	28	-47.13	-13	-34.13	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.
1332.842	149	165	-57.204	-13	-44.20	Pass	H
1702.097	146	208	-47.132	-13	-34.13	Pass	H
3902.436	146	4	-47.738	-13	-34.74	Pass	H
5889.386	150	198	-44.689	-13	-31.69	Pass	H
6509.304	146	341	-44.272	-13	-31.27	Pass	H
8078.563	150	235	-42.982	-13	-29.98	Pass	H
1205.307	146	292	-54.690	-13	-41.69	Pass	V
1459.515	150	158	-59.465	-13	-46.47	Pass	V
3543.666	149	55	-50.773	-13	-37.77	Pass	V
3829.081	150	319	-51.511	-13	-38.51	Pass	V
5801.884	146	118	-45.501	-13	-32.50	Pass	V
6558.344	150	155	-48.434	-13	-35.43	Pass	V

QPSK

Band 2 18607 channel/BW 1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1334.711	150	78	-55.39	-13	-42.39	Pass	H
1726.843	149	291	-48.13	-13	-35.13	Pass	H
3902.771	151	213	-47.68	-13	-34.68	Pass	H
5857.979	150	89	-43.37	-13	-30.37	Pass	H
6497.738	151	329	-47.51	-13	-34.51	Pass	H
7996.094	148	138	-45.64	-13	-32.64	Pass	H
1219.477	149	99	-55.14	-13	-42.14	Pass	V
1437.749	148	217	-55.80	-13	-42.80	Pass	V
3569.251	150	12	-51.41	-13	-38.41	Pass	V
3836.703	150	137	-49.83	-13	-36.83	Pass	V
5802.043	146	356	-46.38	-13	-33.38	Pass	V
6552.075	146	95	-48.07	-13	-35.07	Pass	V

Band 2 18900 channel/BW 1.4 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1294.291	150	142	-58.26	-13	-45.26	Pass	H
1713.735	146	280	-52.40	-13	-39.40	Pass	H
3874.596	150	330	-46.28	-13	-33.28	Pass	H
5866.066	146	194	-45.42	-13	-32.42	Pass	H
6458.654	149	260	-46.84	-13	-33.84	Pass	H
8020.387	151	31	-49.21	-13	-36.21	Pass	H
1234.306	149	4	-56.14	-13	-43.14	Pass	V
1393.930	148	257	-61.41	-13	-48.41	Pass	V
3590.021	147	55	-53.42	-13	-40.42	Pass	V
3914.821	148	273	-53.57	-13	-40.57	Pass	V
5828.585	150	136	-51.58	-13	-38.58	Pass	V
6517.316	150	16	-51.92	-13	-38.92	Pass	V

Band 2 19193 channel/BW 1.4 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1342.496	149	156	-57.14	-13	-44.14	Pass	H
1667.132	149	170	-51.38	-13	-38.38	Pass	H
3844.898	149	127	-48.48	-13	-35.48	Pass	H
5908.963	146	42	-40.59	-13	-27.59	Pass	H
6529.955	147	69	-44.65	-13	-31.65	Pass	H
8002.427	151	110	-46.43	-13	-33.43	Pass	H
1260.847	148	61	-54.75	-13	-41.75	Pass	V
1406.103	147	266	-55.12	-13	-42.12	Pass	V
3526.436	148	303	-50.70	-13	-37.70	Pass	V
3906.561	149	195	-49.24	-13	-36.24	Pass	V
5789.510	147	323	-44.79	-13	-31.79	Pass	V
6578.057	146	325	-49.18	-13	-36.18	Pass	V

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Band 2 18607 channel/BW 1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1338.392	147	256	-59.04	-13	-46.04	Pass	H
1687.795	147	243	-49.29	-13	-36.29	Pass	H
3868.049	148	259	-49.05	-13	-36.05	Pass	H
5924.520	149	28	-47.14	-13	-34.14	Pass	H
6561.377	148	108	-45.07	-13	-32.07	Pass	H
7998.993	147	328	-44.24	-13	-31.24	Pass	H
1178.469	150	16	-53.80	-13	-40.80	Pass	V
1428.406	148	117	-56.65	-13	-43.65	Pass	V
3595.427	147	325	-52.59	-13	-39.59	Pass	V
3902.197	149	302	-48.99	-13	-35.99	Pass	V
5852.612	147	15	-43.85	-13	-30.85	Pass	V
6578.962	147	280	-48.20	-13	-35.20	Pass	V

Band 2 18900 channel/BW 1.4 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.589	151	14	-56.53	-13	-43.53	Pass	H
1725.246	147	71	-49.86	-13	-36.86	Pass	H
3853.702	150	318	-46.53	-13	-33.53	Pass	H
5927.474	147	56	-42.15	-13	-29.15	Pass	H
6504.955	147	216	-46.29	-13	-33.29	Pass	H
8058.004	151	79	-40.85	-13	-27.85	Pass	H
1191.329	151	65	-53.82	-13	-40.82	Pass	V
1383.159	146	225	-57.87	-13	-44.87	Pass	V
3536.088	149	47	-48.29	-13	-35.29	Pass	V
3855.274	150	73	-50.71	-13	-37.71	Pass	V
5820.575	147	168	-45.60	-13	-32.60	Pass	V
6520.072	150	28	-45.68	-13	-32.68	Pass	V

Band 2 19193 channel/BW 1.4 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1334.421	149	165	-54.090	-13	-41.09	Pass	H
1702.989	146	208	-47.091	-13	-34.09	Pass	H
3903.373	146	4	-46.301	-13	-33.30	Pass	H
5888.930	150	198	-41.888	-13	-28.89	Pass	H
6510.317	146	341	-43.746	-13	-30.75	Pass	H
8079.117	150	235	-46.162	-13	-33.16	Pass	H
1205.662	146	292	-56.896	-13	-43.90	Pass	V
1459.472	150	158	-57.687	-13	-44.69	Pass	V
3541.757	149	55	-49.955	-13	-36.95	Pass	V
3829.442	150	319	-48.826	-13	-35.83	Pass	V
5802.452	146	118	-46.836	-13	-33.84	Pass	V
6557.210	150	155	-45.557	-13	-32.56	Pass	V

Note:

- 1) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 1GHz are attenuated more than 20 dB below the applicable limit and not required to be reported, the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.
- 2) Tested with all kind of bandwidth, RB Size and RB Offset, Found the 1.4MHz with full RB were the worst case; and then Only the worst case is recorded in the report.

12. FREQUENCY STABILITY

12.1 Standard Applicable

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

12.2 Test Procedure

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

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

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

Frequency Domain Analyzer in histogram mode

12.3 Summary of Test Results/Plots

Note: 1.Normal Voltage NV=DC3.6V; Low Voltage LV=DC3.65V; High Voltage HV=DC3.67V

Please refer to Appendix F: Frequency Stability

Test result: Pass

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