FCC PART 27
FCC PART 22H, PART 24E
TEST REPORT

For

Mediafly (HongKong) Co.,Limited

09 and 27/F,Ho King Commercial Centre,2-16 Fa Yuen Street,Mong Kok

FCC ID:2AZY4-T2000

Report Type:	**Product Type:**
Original Report	Tablet PC

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Reviewed By: Candy Li, RF Engineer

Prepared By: Shenzhen Accurate Technology Co., Ltd.
1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China
Tel: (0755) 26503290
Fax: (0755) 26503396
Http://www.atc-lab.com

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Tablet PC
Trade	HAOVM
Tested Model	T2000
Frequency Range	GSM 850: 824-849MHz(TX); 869-894MHz(RX) PCS 1900: 1850-1910MHz(TX); 1930-1990MHz(RX) WCDMA Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX) WCDMA Band 5: 824-849MHz(TX); 869-894MHz(RX) LTE Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX) LTE Band 4: 1710-1755MHz(TX); 2110-2155MHz(RX) LTE Band 5: 824-849MHz(TX); 869-894MHz(RX) LTE Band 7: 2500-2570MHz(TX); 2620-2690MHz(RX)
Maximum Target Output Power (Conducted power)	GSM 850: 27.26dBm(GMSK), 21.08 dBm(8PSK) PCS 1900: 30.20dBm(GMSK), 24.99dBm (8PSK) WCDMA Band 2: 24.55dBm WCDMA Band 5:19.50dBm LTE Band 2:24.41dBm LTE Band 4:24.58dBm LTE Band 5:20.01dBm LTE Band 7:23.95dBm
Modulation Technique	2G: GMSK/8PSK 3G: BPSK, QPSK, 16QAM 4G: QPSK, 16QAM
Antenna Specification*	FPC Main Antenna: GSM 850: -2.2 dBi* PCS 1900: 1.1 dBi* WCDMA Band 2: 1.1dBi* WCDMA Band 5: -2.2dBi* LTE Band 2: 1.1dBi * LTE Band 4: 0.9dBi * LTE Band 5: -2.2dBi * LTE Band 7: 0.7dBi * (provided by the applicant)
Voltage Range	DC3.7V by battery or DC 5V from adapter.
Date of Test	2021-04-22 to 2021-05-10
Sample serial number	SZ4210419-12287E-RF-S1(Assigned by ATC)
Received date	2021-04-19
Sample/EUT Status	Good condition

Objective

This test report is in accordance with Part 2-Subpart J, Part 22-Subpart H, Part 24-Subpart E, and Subpart 27 of the Federal Communication Commission's rules.

The objective is to determine the compliance of the EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability and band edge.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2-Subpart J as well as the following parts:

Part 22 Subpart H - Public Mobile Services
Part 24 Subpart E - Personal Communication Services
Part 27 - Miscellaneous Wireless Communications Services

ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.
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Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF output power, conducted		±0.73dB
Unwanted Emission, conducted		±1.6dB
RF Frequency		$\pm 0.082*10^{-7}$
Emissions, Radiated	30MHz - 1GHz	±4.28dB
	1GHz - 18GHz	±4.98dB
	18GHz - 26.5GHz	±5.06dB
Temperature		±1℃
Humidity		±6%
Supply voltages		±0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISEDC), the Registration Number is 5077A.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The final qualification test was performed with the EUT operating at normal mode.

The test items were performed with the EUT operating at testing mode. Test was performed with channels as below table:

Band	Channel Bandwidth	Frequency
GSM 850	0.3 MHz	824.2MHz, 836.6MHz, 848.8MHz
PCS 1900	0.3 MHz	1850.2MHz, 1880.0MHz, 1909.8MHz;
WCDMA Band 2	4.2 MHz	1852.4MHz, 1880.0MHz, 1907.6MHz;
WCDMA Band 5	4.2 MHz	826.4MHz, 836.6MHz, 846.6MHz
LTE Band 2	1.4 MHz	1850.7MHz, 1880.0 MHz, 1909.3 MHz;
	3.0 MHz	1851.5MHz, 1880.0 MHz, 1908.5 MHz;
	5.0 MHz	1852.5MHz, 1880.0 MHz, 1907.5 MHz;
	10.0 MHz	1855MHz, 1880.0 MHz, 1905 MHz;
	15.0 MHz	1857.5MHz, 1880.0 MHz, 1902.5 MHz;
	20.0 MHz	1860MHz, 1880.0 MHz, 1900MHz;
LTE Band 4	1.4 MHz	1710.7MHz, 1732.5MHz, 1754.3MHz;
	3.0 MHz	1711.5MHz, 1732.5MHz, 1753.5MHz
	5.0 MHz	1712.5MHz, 1732.5MHz, 1752.5MHz
	10.0 MHz	1715MHz, 1732.5MHz, 1750MHz
	15.0 MHz	1717.5MHz, 1732.5MHz, 1747.5MHz
	20.0 MHz	1720MHz, 1732.5MHz, 1745MHz
LTE Band 5	1.4 MHz	824.7MHz, 836.5MHz, 848.3MHz
	3.0 MHz	825.5MHz, 836.5MHz, 847.5MHz
	5.0 MHz	826.5MHz, 836.5MHz, 846.5MHz
	10.0 MHz	829MHz, 836.5MHz, 844MHz
LTE Band 7	5.0 MHz	2502.5MHz, 2535.0MHz, 2567.5MHz
	10.0 MHz	2505MHz, 2535.0MHz, 2565MHz
	15.0 MHz	2507.5MHz, 2535.0MHz, 2562.5MHz
	20.0 MHz	2510MHz, 2535.0MHz, 2560MHz

Equipment Modifications

No modification was made to the EUT.

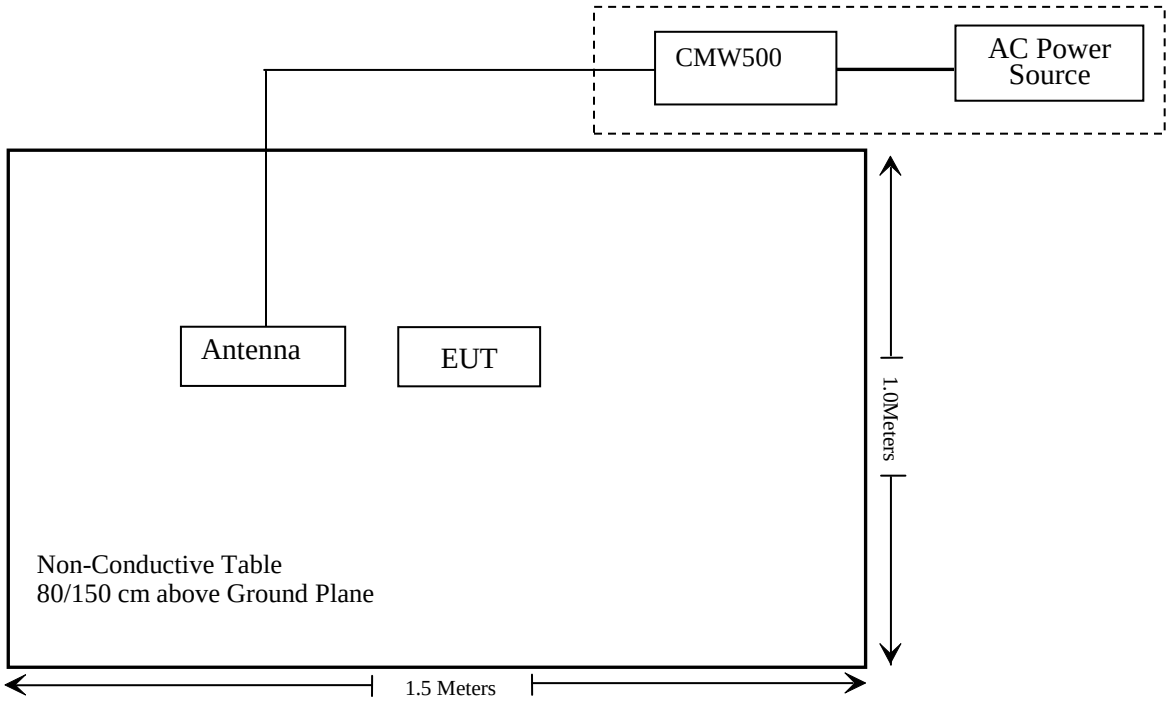
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	154606

Support Cable Description

Cable Description	Length (m)	From / Port	To
/	/	/	/

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 1.1307 , §2.1093	RF Exposure (SAR)	Compliance*
§2.1046; § 22.913 (a); § 24.232 (c); §27.50 (b) (c) (d) (h);	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliance
§ 2.1051; § 22.917 (a); § 24.238 (a); §27.53;	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53	Field Strength of Spurious Radiation	Compliance
§ 22.917 (a); § 24.238 (a); §27.53 (c) (h) (m)	Band Edge	Compliance
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency stability	Compliance

Note: * Please refer to SAR report number: SZ4210419-12287E-20.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101495	2020/12/24	2021/12/23
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	154606	2020/12/25	2021/12/24
Vector Signal Generator	AGILENT	N5182A	MY50143401	2020/12/25	2021/12/24
V.R. of Signal Generators	Anritsu	68369B	004114	2020/07/31	2020/0730
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
SCHWARZBECK	HORN ANTENNA	BBHA9120D	9120D-655	2020/01/05	2023/01/04
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2020/01/05	2023/01/04
Ducommun Technolagies	Horn antenna	ARH-4223-02	1007726-01 1304	2020/12/06	2023/12/05
A.H. Systems, inc.	Preamplifier	PAM-0118P	531	2020/07/08	2021/07/07
Quinstar	Amplifier	QLW-184055 36-J0	15964001002	2020/11/28	2021/11/27
Rohde& Schwarz	Test Receiver	ESR	101817	2020/12/24	2021/12/23
SONOMA INSTRUMENT	Amplifier	310 N	186131	2020/12/25	2021/12/24
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2020/12/25	2021/12/24
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2020/01/05	2023/01/04
Schwarzbeck	Bilog Antenna	VULB9163	9163-194	2020/01/05	2023/01/04
RF Coaxial Cable	Unknown	N-5m	No.1	2020/12/25	2021/12/24
RF Coaxial Cable	Unknown	N-1m	No.6	2020/12/25	2021/12/24
RF Coaxial Cable	Unknown	N-6m	No.10	2020/12/25	2021/12/24
RF Coaxial Cable	Unknown	N-2m	No.11	2020/12/25	2021/12/24
RF Coaxial Cable	Unknown	N-8m	No.15	2020/12/25	2021/12/24

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Unknown	Band Reject Filter	MSF1850-1910MS-1148	201706003	2020/12/25	2021/12/24
Unknown	Band Reject Filter	MSF1710-1785MS-1150	201706003	2020/12/25	2021/12/24
Unknown	Band Reject Filter	MSF824-862 MS-1147	201706003	2020/12/25	2021/12/24
Unknown	Band Reject Filter	MSF700-800 MS-1153	201706003	2020/12/25	2021/12/24
Unknown	High Pass Filter	HPM-1.2/18G-60	110	2020/12/25	2021/12/24
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101495	2020/12/24	2021/12/23
Rohde& Schwarz	Test Receiver	ESR	101817	2020/12/24	2021/12/23
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	154606	2020/12/25	2021/12/24
Fluke	Desktop Multi Meter	45	7664009	2020/12/25	2021/12/24
Mini-Circuits	Power Splitter	DC-18000MHz	SF10944151S	2020/12/25	2021/12/24
UNI-T	DC Power Supply	UTP8305B	10584	NCR	NCR
Gongwen	Temp. & Humid. Chamber	HSD-500	109	2020/12/25	2021/12/24
Fluke	Desktop Multi Meter	45	7664009	2020/12/25	2021/12/24
WEINSCHEL	10dB Attenuator	5324	AU 3842	Each time	

* Statement of Traceability: Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §1.1307(b) & §2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliance, please refer to the SAR report: SZ4210419-12287E-SA.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC §2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

FCC §2.1046, §22.913 (a) & §24.232 (c); §27.50 (b) (c) (d) (h) - RF OUTPUT POWER

Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §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.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

According to §27.50(b), Control stations and mobile stations transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands and fixed stations transmitting in the 787-788 MHz and 805-806 MHz bands are limited to 30 watts ERP.

According to §27.50(c), Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP. And Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

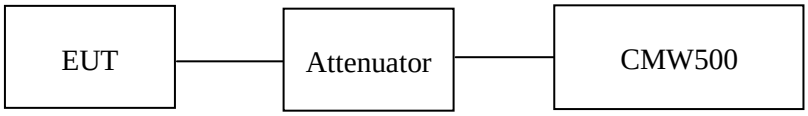
According to §27.50(d), Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2500-2570MHz.

Test Procedure

Conducted method:

The RF output of the transmitter was connected to the CMW500 through sufficient attenuation.



Radiated method:

ANSI C63.26-2015 Section 5.5.

Test Data

Environmental Conditions

Temperature:	28~29.3 ℃
Relative Humidity:	50~58 %
ATM Pressure:	101.0~101.1 kPa

The testing was performed by Charley Lin on 2021-4-22 to 2021-5-10.

Conducted Power

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	ERP(dBm)	Limit (dBm)
GSM	128	824.2	31.75	26.90	38.45
	190	836.6	31.95	27.10	38.45
	251	848.8	32.11	**27.26**	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				ERP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	30.13	29.61	28.23	26.45	25.28	24.76	23.38	21.60	38.45
	190	836.6	30.21	29.48	28.21	26.24	25.36	24.63	23.36	21.39	38.45
	251	848.8	30.24	29.75	28.16	26.28	25.39	24.90	23.31	21.43	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				ERP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	25.76	23.57	21.48	19.04	20.91	18.72	16.63	14.19	38.45
	190	836.6	25.84	23.45	21.46	19.12	20.99	18.60	16.61	14.27	38.45
	251	848.8	25.93	23.76	21.68	19.49	**21.08**	18.91	16.83	14.64	38.45

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 5)	RMC12.2k		23.62	23.69	23.60	18.77	18.84	18.75
	HSDPA	1	23.11	24.14	23.40	18.26	19.29	18.55
		2	23.13	24.05	23.29	18.28	19.20	18.44
		3	23.09	24.15	23.31	18.24	19.30	18.46
		4	23.12	24.11	23.42	18.27	19.26	18.57
	HSUPA	1	23.93	24.29	24.20	19.08	19.44	19.35
		2	23.90	24.25	24.18	19.05	19.40	19.33
		3	23.82	24.18	24.19	18.97	19.33	19.34
		4	23.96	24.35	24.22	19.11	**19.50**	19.37
		5	23.75	24.21	24.15	18.90	19.36	19.30
	HSPA+	1	22.76	22.81	22.85	17.91	17.96	18.00

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable loss(dB)
For GSM850 / WCDMA Band5: Antenna Gain = -2.2dBi = -4.35dBd (0dBd=2.15dBi)
For 600-1000MHz, Cable Loss=0.5dB* (provided by the applicant)
Limit: ERP≤38.45dBm

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	EIRP(dBm)	Limit (dBm)
GSM	512	1850.2	29.59	29.89	33
	661	1880.0	29.75	30.05	33
	810	1909.8	29.90	**30.20**	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				EIRP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	29.57	28.74	26.84	25.45	29.87	29.04	27.14	25.75	33
	661	1880.0	29.44	28.57	26.86	25.66	29.74	28.87	27.16	25.96	33
	810	1909.8	29.54	28.49	26.84	25.33	29.84	28.79	27.14	25.63	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				EIRP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	24.55	22.46	20.40	18.21	24.85	22.76	20.70	18.51	33
	661	1880.0	24.69	22.48	20.25	18.13	24.99	22.78	20.55	18.43	33
	810	1909.8	24.64	22.33	20.17	18.76	24.94	22.63	20.47	19.06	33

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 2)	RMC12.2k		22.23	22.26	22.36	22.53	22.56	22.66
	HSDPA	1	23.11	24.14	23.40	23.41	24.44	23.70
		2	23.05	24.25	23.15	23.35	**24.55**	23.45
		3	23.13	23.98	23.33	23.43	24.28	23.63
		4	23.01	24.11	23.51	23.31	24.41	23.81
	HSUPA	1	22.96	23.71	22.94	23.26	24.01	23.24
		2	23.12	23.56	22.63	23.42	23.86	22.93
		3	23.05	23.69	22.48	23.35	23.99	22.78
		4	22.87	23.81	23.15	23.17	24.11	23.45
		5	22.76	23.57	22.87	23.06	23.87	23.17
	HSPA+	1	22.51	22.35	22.49	22.81	22.65	22.79

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable loss(dB)
For PCS1900 / WCDMA Band2: Antenna Gain =1.1dBi
For 1000-3000MHz, Cable Loss=0.8dB*(provided by the applicant)
Limit: EIRP≤33dBm

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
RMC	Low	2.73	13
	Middle	3.45	13
	High	2.93	13
HSDPA	Low	4.05	13
	Middle	2.64	13
	High	3.81	13
HSUPA	Low	2.65	13
	Middle	3.99	13
	High	2.94	13
HSPA+	Low	2.87	13
	Middle	3.52	13
	High	2.63	13

PCS Band (Part 24E)

Mode	Channel	PAR (dB)	Limit (dB)
RMC	Low	3.74	13
	Middle	2.54	13
	High	2.69	13
HSDPA	Low	2.75	13
	Middle	3.52	13
	High	3.86	13
HSUPA	Low	2.32	13
	Middle	2.42	13
	High	2.86	13
HSPA+	Low	3.36	13
	Middle	2.25	13
	High	2.72	13

LTE Band 2:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	23.19	23.68	22.83	23.49	23.98	23.13
		RB1#3	23.21	23.69	22.89	23.51	23.99	23.19
		RB1#5	23.29	23.62	22.89	23.59	23.92	23.19
		RB3#0	23.33	23.79	22.86	23.63	**24.09**	23.16
		RB3#3	23.36	23.75	22.94	23.66	24.05	23.24
		RB6#0	22.85	23.25	22.26	23.15	23.55	22.56
	16QAM	RB1#0	22.91	22.50	22.38	23.21	22.80	22.68
		RB1#3	22.92	22.51	22.41	23.22	22.81	22.71
		RB1#5	23.01	22.41	22.46	23.31	22.71	22.76
		RB3#0	23.27	23.79	22.96	23.57	24.09	23.26
		RB3#3	23.29	23.80	22.90	23.59	**24.10**	23.20
		RB6#0	21.39	21.92	21.13	21.69	22.22	21.43
3.0	QPSK	RB1#0	23.19	23.74	22.66	23.49	**24.04**	22.96
		RB1#8	23.33	23.65	22.69	23.63	23.95	22.99
		RB1#14	23.23	23.69	22.77	23.53	23.99	23.07
		RB6#0	22.76	23.31	22.27	23.06	23.61	22.57
		RB6#9	22.61	23.22	22.36	22.91	23.52	22.66
		RB15#0	22.85	23.31	22.36	23.15	23.61	22.66
	16QAM	RB1#0	22.44	23.22	21.42	22.74	**23.52**	21.72
		RB1#8	22.46	23.18	21.48	22.76	23.48	21.78
		RB1#14	22.39	23.11	21.56	22.69	23.41	21.86
		RB6#0	21.47	21.96	21.09	21.77	22.26	21.39
		RB6#9	21.43	21.90	21.21	21.73	22.20	21.51
		RB15#0	21.44	21.69	20.91	21.74	21.99	21.21

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	23.06	23.95	22.64	23.36	**24.25**	22.94
		RB1#13	23.11	23.80	22.70	23.41	24.10	23.00
		RB1#24	23.34	23.76	22.81	23.64	24.06	23.11
		RB15#0	22.82	23.25	22.16	23.12	23.55	22.46
		RB15#10	22.79	23.15	22.38	23.09	23.45	22.68
		RB25#0	22.70	23.29	22.22	23.00	23.59	22.52
	16QAM	RB1#0	21.48	22.87	21.35	21.78	23.17	21.65
		RB1#38	21.47	22.84	21.36	21.77	23.14	21.66
		RB1#74	21.54	22.78	21.60	21.84	23.08	21.90
		RB36#0	22.83	23.31	22.15	23.13	**23.61**	22.45
		RB36#39	22.77	23.27	22.39	23.07	23.57	22.69
		RB75#0	21.41	21.85	20.80	21.71	22.15	21.10
10.0	QPSK	RB1#0	23.18	23.97	22.69	23.48	**24.27**	22.99
		RB1#25	23.38	23.80	22.65	23.68	24.10	22.95
		RB1#49	23.72	23.60	22.86	24.02	23.90	23.16
		RB25#0	22.76	23.39	22.10	23.06	23.69	22.40
		RB25#25	23.17	23.26	22.15	23.47	23.56	22.45
		RB50#0	23.01	23.28	22.29	23.31	23.58	22.59
	16QAM	RB1#0	22.64	23.10	21.39	22.94	23.40	21.69
		RB1#25	22.78	22.95	21.39	23.08	23.25	21.69
		RB1#49	23.22	22.64	21.58	23.52	22.94	21.88
		RB25#0	22.77	23.30	22.09	23.07	**23.60**	22.39
		RB25#25	23.13	23.05	22.22	23.43	23.35	22.52
		RB50#0	21.52	22.00	20.86	21.82	22.30	21.16

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
15.0	QPSK	RB1#0	23.22	23.92	22.66	23.52	24.22	22.96
		RB1#38	23.50	23.75	22.56	23.80	24.05	22.86
		RB1#74	23.97	23.31	22.79	**24.27**	23.61	23.09
		RB36#0	22.77	23.35	22.15	23.07	23.65	22.45
		RB36#39	23.42	22.98	22.09	23.72	23.28	22.39
		RB75#0	23.17	23.17	22.13	23.47	23.47	22.43
	16QAM	RB1#0	22.61	23.17	21.83	22.91	23.47	22.13
		RB1#38	22.96	22.87	21.75	23.26	23.17	22.05
		RB1#74	23.29	22.56	22.03	23.59	22.86	22.33
		RB36#0	22.89	23.36	22.15	23.19	**23.66**	22.45
		RB36#39	23.31	22.97	22.08	23.61	23.27	22.38
		RB75#0	21.59	21.87	21.03	21.89	22.17	21.33
20.0	QPSK	RB1#0	23.33	24.11	23.10	23.63	**24.41**	23.40
		RB1#50	23.88	23.80	22.66	24.18	24.10	22.96
		RB1#99	24.11	23.33	22.92	24.41	23.63	23.22
		RB50#0	22.89	23.45	22.27	23.19	23.75	22.57
		RB50#50	23.57	22.97	22.28	23.87	23.27	22.58
		RB100#0	23.26	23.14	22.30	23.56	23.44	22.60
	16QAM	RB1#0	22.27	22.98	22.69	22.57	23.28	22.99
		RB1#50	22.82	22.69	22.34	23.12	22.99	22.64
		RB1#99	23.07	22.17	22.54	23.37	22.47	22.84
		RB50#0	22.97	23.46	22.27	23.27	23.76	22.57
		RB50#50	23.56	22.98	22.28	**23.86**	23.28	22.58
		RB100#0	22.15	21.85	21.23	22.45	22.15	21.53

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable loss(dB)
For Band2: Antenna Gain = 1.1dBi
For 1000-3000MHz, Cable Loss=0.8dB*(provided by the applicant)
Limit: EIRP≤33dBm

Peak-to-average ratio (PAR)

20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.52	5.62	5.22	13	Pass
QPSK (100RB Size)	5.04	5.19	5.16	13	Pass
16QAM (1RB Size)	5.57	5.83	6.29	13	Pass
16QAM (100RB Size)	6.09	6.12	6.20	13	Pass

LTE Band 4

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	22.88	23.86	24.22	22.98	23.96	**24.32**
		RB1#3	22.85	23.80	24.16	22.95	23.90	24.26
		RB1#5	22.82	23.81	24.20	22.92	23.91	24.30
		RB3#0	22.90	23.84	24.13	23.00	23.94	24.23
		RB3#3	22.94	23.83	24.08	23.04	23.93	24.18
		RB6#0	22.43	23.29	23.57	22.53	23.39	23.67
	16QAM	RB1#0	22.50	23.39	23.10	22.60	23.49	23.20
		RB1#3	22.51	23.46	23.10	22.61	23.56	23.20
		RB1#5	22.51	23.48	23.04	22.61	23.58	23.14
		RB3#0	22.96	23.72	24.09	23.06	23.82	24.19
		RB3#3	22.90	23.83	24.09	23.00	23.93	**24.19**
		RB6#0	21.49	21.91	22.35	21.59	22.01	22.45
3.0	QPSK	RB1#0	22.83	23.74	24.39	22.93	23.84	**24.49**
		RB1#8	22.78	23.80	24.26	22.88	23.90	24.36
		RB1#14	22.81	23.92	24.27	22.91	24.02	24.37
		RB6#0	22.35	23.34	23.76	22.45	23.44	23.86
		RB6#9	22.33	23.41	23.63	22.43	23.51	23.73
		RB15#0	22.45	23.29	23.65	22.55	23.39	23.75
	16QAM	RB1#0	22.30	22.83	23.22	22.40	22.93	**23.32**
		RB1#8	22.28	23.00	23.20	22.38	23.10	23.30
		RB1#14	22.26	23.07	23.04	22.36	23.17	23.14
		RB6#0	21.31	22.04	22.47	21.41	22.14	22.57
		RB6#9	20.94	22.05	22.37	21.04	22.15	22.47
		RB15#0	21.40	21.87	22.20	21.50	21.97	22.30

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	22.84	23.69	24.23	22.94	23.79	**24.33**
		RB1#13	22.88	23.82	24.05	22.98	23.92	24.15
		RB1#24	22.84	23.96	23.99	22.94	24.06	24.09
		RB15#0	22.45	23.33	23.83	22.55	23.43	23.93
		RB15#10	22.51	23.41	23.75	22.61	23.51	23.85
		RB25#0	22.43	23.33	23.73	22.53	23.43	23.83
	16QAM	RB1#0	21.15	22.84	22.89	21.25	22.94	22.99
		RB1#13	21.05	22.97	22.79	21.15	23.07	22.89
		RB1#24	21.03	23.05	22.60	21.13	23.15	22.70
		RB15#0	22.47	23.32	23.75	22.57	23.42	**23.85**
		RB15#10	22.40	23.41	23.64	22.50	23.51	23.74
		RB25#0	21.12	21.87	22.15	21.22	21.97	22.25
10.0	QPSK	RB1#0	22.82	23.63	24.46	22.92	23.73	24.56
		RB1#25	22.77	23.90	24.48	22.87	24.00	**24.58**
		RB1#49	22.95	24.17	24.26	23.05	24.27	24.36
		RB25#0	22.48	23.10	23.84	22.58	23.20	23.94
		RB25#25	22.46	23.33	23.72	22.56	23.43	23.82
		RB50#0	22.42	23.34	23.94	22.52	23.44	24.04
	16QAM	RB1#0	22.12	22.70	22.90	22.22	22.80	23.00
		RB1#25	22.33	23.06	23.04	22.43	23.16	23.14
		RB1#49	22.40	23.27	22.70	22.50	23.37	22.80
		RB25#0	22.36	23.11	23.86	22.46	23.21	**23.96**
		RB25#25	22.45	23.34	23.67	22.55	23.44	23.77
		RB50#0	21.07	21.87	22.47	21.17	21.97	22.57

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
15.0	QPSK	RB1#0	22.74	23.36	24.39	22.84	23.46	24.49
		RB1#38	22.90	23.86	24.45	23.00	23.96	**24.55**
		RB1#74	23.26	24.28	24.31	23.36	24.38	24.41
		RB36#0	22.49	23.08	23.78	22.59	23.18	23.88
		RB36#39	22.66	23.55	23.93	22.76	23.65	24.03
		RB75#0	22.55	23.36	23.92	22.65	23.46	24.02
	16QAM	RB1#0	22.09	23.08	23.57	22.19	23.18	23.67
		RB1#38	22.07	23.51	23.76	22.17	23.61	23.86
		RB1#74	22.46	24.02	23.55	22.56	**24.12**	23.65
		RB36#0	22.37	23.07	23.80	22.47	23.17	23.90
		RB36#39	22.64	23.65	23.82	22.74	23.75	23.92
		RB75#0	21.25	21.88	22.36	21.35	21.98	22.46
20.0	QPSK	RB1#0	22.83	23.19	24.03	22.93	23.29	24.13
		RB1#50	23.12	23.81	24.43	23.22	23.91	24.53
		RB1#99	23.55	24.31	24.25	23.65	24.41	**24.35**
		RB50#0	22.28	23.02	23.60	22.38	23.12	23.70
		RB50#50	22.84	23.58	23.91	22.94	23.68	24.01
		RB100#0	22.53	23.30	23.81	22.63	23.40	23.91
	16QAM	RB1#0	22.05	22.61	23.65	22.15	22.71	23.75
		RB1#50	22.11	22.83	24.04	22.21	22.93	**24.14**
		RB1#99	22.78	23.40	23.88	22.88	23.50	23.98
		RB50#0	22.37	23.06	23.66	22.47	23.16	23.76
		RB50#50	22.79	23.61	23.96	22.89	23.71	24.06
		RB100#0	21.04	21.81	22.71	21.14	21.91	22.81

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable loss(dB)
For Band4: Antenna Gain = 0.9dBi
For 1000-3000MHz, Cable Loss=0.8dB*(provided by the applicant)
Limit: EIRP≤30dBm

Peak-to-average ratio (PAR)

20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.75	5.16	4.78	13	Pass
QPSK (100RB Size)	4.93	5.19	4.81	13	Pass
16QAM (1RB Size)	5.74	5.94	5.86	13	Pass
16QAM (100RB Size)	6.09	6.32	6.00	13	Pass

LTE Band 5:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	24.44	24.37	24.50	19.59	19.52	19.65
		RB1#2	24.39	24.47	24.51	19.54	19.62	19.66
		RB1#5	24.44	24.51	24.52	19.59	19.66	19.67
		RB3#0	24.38	24.59	24.59	19.53	19.74	19.74
		RB3#1	24.36	24.59	24.67	19.51	19.74	**19.82**
		RB3#2	23.83	24.07	24.08	18.98	19.22	19.23
		RB6#0	23.97	24.51	23.32	19.12	19.66	18.47
	16QAM	RB1#0	23.76	24.13	23.24	18.91	19.28	18.39
		RB1#2	23.93	24.18	23.29	19.08	19.33	18.44
		RB1#5	24.37	24.58	24.57	19.52	19.73	19.72
		RB3#0	24.34	24.58	24.69	19.49	19.73	**19.84**
		RB3#1	22.85	22.54	22.77	18.00	17.69	17.92
		RB3#2	24.44	24.37	24.50	19.59	19.52	19.65
		RB6#0	24.39	24.47	24.51	19.54	19.62	19.66
3.0	QPSK	RB1#0	24.27	24.38	24.57	19.42	19.53	19.72
		RB1#7	24.26	24.59	24.67	19.41	19.74	**19.82**
		RB1#14	24.41	24.51	24.67	19.56	19.66	19.82
		RB8#0	23.94	24.02	24.08	19.09	19.17	19.23
		RB8#4	24.03	24.05	24.16	19.18	19.20	19.31
		RB8#7	23.86	23.99	24.10	19.01	19.14	19.25
		RB15#0	23.66	24.59	23.20	18.81	19.74	18.35
	16QAM	RB1#0	23.45	24.27	23.23	18.60	19.42	18.38
		RB1#7	23.59	24.21	23.17	18.74	19.36	18.32
		RB1#14	22.91	22.97	23.24	18.06	18.12	18.39
		RB8#0	22.96	22.57	22.74	18.11	17.72	17.89
		RB8#4	22.90	22.60	22.97	18.05	17.75	18.12
		RB8#7	24.27	24.38	24.57	19.42	19.53	19.72
		RB15#0	24.26	24.59	24.67	19.41	19.74	**19.82**

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	24.26	24.32	24.46	19.41	19.47	19.61
		RB1#12	24.34	24.52	24.40	19.49	19.67	19.55
		RB1#24	24.28	24.55	24.50	19.43	**19.70**	19.65
		RB12#0	23.82	23.94	24.13	18.97	19.09	19.28
		RB12#6	24.03	24.02	24.05	19.18	19.17	19.20
		RB12#11	24.02	24.03	24.09	19.17	19.18	19.24
		RB25#0	22.49	24.01	23.12	17.64	19.16	18.27
	16QAM	RB1#0	22.63	23.56	23.14	17.78	18.71	18.29
		RB1#12	22.77	23.62	23.12	17.92	18.77	18.27
		RB1#24	23.89	23.94	24.08	19.04	19.09	19.23
		RB12#0	23.90	24.01	24.13	19.05	19.16	19.28
		RB12#6	22.88	22.52	22.93	18.03	17.67	18.08
		RB12#11	24.26	24.32	24.46	19.41	19.47	19.61
		RB25#0	24.34	24.52	24.40	19.49	**19.67**	19.55
10.0	QPSK	RB1#0	24.35	24.58	24.55	19.50	19.73	19.70
		RB1#24	24.39	24.65	24.55	19.54	19.80	19.70
		RB1#49	24.51	24.86	24.57	19.66	**20.01**	19.72
		RB25#0	24.06	24.00	24.12	19.21	19.15	19.27
		RB25#12	23.95	24.12	24.15	19.10	19.27	19.30
		RB25#24	24.01	24.08	24.07	19.16	19.23	19.22
		RB50#0	23.75	23.67	22.94	18.90	18.82	18.09
	16QAM	RB1#0	23.78	23.69	23.03	18.93	18.84	18.18
		RB1#24	23.89	23.91	23.01	19.04	19.06	18.16
		RB1#49	23.98	23.89	24.14	19.13	19.04	19.29
		RB25#0	23.98	24.09	24.15	19.13	19.24	19.30
		RB25#12	22.44	22.67	22.56	17.59	17.82	17.71
		RB25#24	24.35	24.58	24.55	19.50	19.73	19.70
		RB50#0	24.39	24.65	24.55	19.54	**19.80**	19.70

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable loss(dB)
For Band5: Antenna Gain =-2.22dBi = -4.35dBd (0dBd=2.15dBi)
For 600-1000MHz, Cable Loss=0.5dB*(provided by the applicant)
Limit: ERP≤38.45dBm

Peak-to-average ratio (PAR)

10MHz bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.88	5.22	5.86	13	Pass
QPSK (50RB Size)	5.30	5.30	5.51	13	Pass
16QAM (1RB Size)	6.61	5.97	7.19	13	Pass
16QAM (50RB Size)	6.35	6.29	6.35	13	Pass

LTE Band 7:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	23.80	23.54	23.92	23.70	23.44	**23.82**
		RB1#25	23.76	23.60	23.78	23.66	23.50	23.68
		RB1#49	23.76	23.65	23.78	23.66	23.55	23.68
		RB25#0	23.27	23.10	23.40	23.17	23.00	23.30
		RB25#25	23.31	23.05	23.44	23.21	22.95	23.34
		RB50#0	23.23	23.11	23.38	23.13	23.01	23.28
	16QAM	RB1#0	22.15	22.51	22.72	22.05	22.41	22.62
		RB1#25	22.08	22.39	22.51	21.98	22.29	22.41
		RB1#49	22.08	22.46	22.54	21.98	22.36	22.44
		RB25#0	23.29	23.10	23.39	23.19	23.00	23.29
		RB25#25	23.29	23.03	23.43	23.19	22.93	**23.33**
		RB50#0	22.01	21.66	21.90	21.91	21.56	21.80
10.0	QPSK	RB1#0	23.63	23.50	23.95	23.53	23.40	23.85
		RB1#38	23.57	23.55	24.05	23.47	23.45	**23.95**
		RB1#74	23.54	23.56	23.94	23.44	23.46	23.84
		RB36#0	23.30	23.02	23.43	23.20	22.92	23.33
		RB36#39	23.20	23.07	23.48	23.10	22.97	23.38
		RB75#0	23.25	23.09	23.56	23.15	22.99	23.46
	16QAM	RB1#0	22.90	22.71	22.62	22.80	22.61	22.52
		RB1#38	22.90	22.77	22.81	22.80	22.67	22.71
		RB1#74	22.85	22.89	22.72	22.75	22.79	22.62
		RB36#0	23.18	23.02	23.41	23.08	22.92	23.31
		RB36#39	23.20	23.05	23.49	23.10	22.95	**23.39**
		RB75#0	21.72	21.81	22.23	21.62	21.71	22.13

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
15.0	QPSK	RB1#0	23.60	23.50	23.95	23.50	23.40	23.85
		RB1#50	23.55	23.59	23.98	23.45	23.49	23.88
		RB1#99	23.54	23.71	24.00	23.44	23.61	**23.90**
		RB50#0	23.28	23.00	23.37	23.18	22.90	23.27
		RB50#50	23.12	23.15	23.41	23.02	23.05	23.31
		RB100#0	23.23	22.99	23.37	23.13	22.89	23.27
	16QAM	RB1#0	23.05	23.28	23.38	22.95	23.18	23.28
		RB1#50	22.86	23.28	23.34	22.76	23.18	23.24
		RB1#99	22.86	23.68	23.32	22.76	**23.58**	23.22
		RB50#0	23.18	22.98	23.37	23.08	22.88	23.27
		RB50#50	23.15	23.14	23.41	23.05	23.04	23.31
		RB100#0	21.84	21.71	22.10	21.74	21.61	22.00
20.0	QPSK	RB1#0	23.74	23.54	24.01	23.64	23.44	**23.91**
		RB1#50	23.64	23.63	23.90	23.54	23.53	23.80
		RB1#99	23.57	24.00	23.95	23.47	23.90	23.85
		RB50#0	23.14	22.98	23.44	23.04	22.88	23.34
		RB50#50	23.00	23.12	23.47	22.90	23.02	23.37
		RB100#0	23.06	23.16	23.36	22.96	23.06	23.26
	16QAM	RB1#0	22.67	23.03	23.55	22.57	22.93	23.45
		RB1#50	22.59	23.05	23.59	22.49	22.95	**23.49**
		RB1#99	22.52	23.35	23.57	22.42	23.25	23.47
		RB50#0	23.17	22.99	23.47	23.07	22.89	23.37
		RB50#50	23.02	23.13	23.49	22.92	23.03	23.39
		RB100#0	21.71	21.72	22.08	21.61	21.62	21.98

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable loss(dB)
For Band7: Antenna Gain = 0.7dBi
For 2500-2570MHz, Cable Loss=0.8dB*(provided by the applicant)
Limit: EIRP≤33dBm

Peak-to-average ratio (PAR)

20MHz bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.49	5.25	4.84	13	Pass
QPSK (50RB Size)	4.70	4.99	4.72	13	Pass
16QAM (1RB Size)	5.80	5.28	5.80	13	Pass
16QAM (50RB Size)	5.83	6.09	5.91	13	Pass

FCC §2.1049, §22.917, §22.905 & §24.238 & §27.53 - OCCUPIED BANDWIDTH

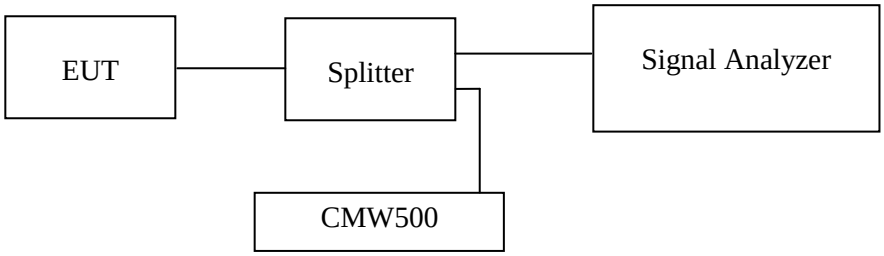
Applicable Standard

FCC 47 §2.1049, §22.917, §22.905, §24.238, and §27.53.

Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded.



Test Data

Environmental Conditions

Temperature:	23 - 25 ℃
Relative Humidity:	51- 55 %
ATM Pressure:	100.8 - 101.3 kPa

The testing was performed by Charley Lin on 2021-04-22 to 2021-05-10.

EUT operation mode: Transmitting

Test Result: Pass

Test plots refer to the Appendix A.

FCC §2.1051, §22.917(a) & §24.238(a) & §27.53 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

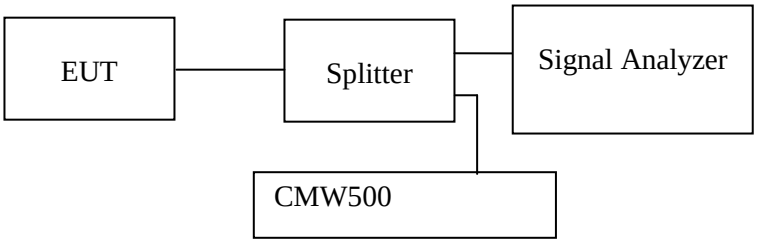
Applicable Standard

FCC §2.1051, §22.917(a) & §24.238(a) & §27.53.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in §2.1051.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Data

Environmental Conditions

Temperature:	23-25 ℃
Relative Humidity:	51-55 %
ATM Pressure:	100.8 - 101.0 kPa

The testing was performed by Charley Lin on 2021-04-22 to 2021-05-10.

EUT operation mode: Transmitting

Test result: Pass

Test plots refer to the Appendix B.

FCC §2.1053; §22.917 (a); §24.238 (a); §27.53 - SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC §2.1053, §22.917(a) & §24.238(a) & §27.53.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the receiving 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.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Test Data

Environmental Conditions

Temperature:	28~29.3 ℃
Relative Humidity:	50~58 %
ATM Pressure:	101.0~101.1 kPa

The testing was performed by Charley Lin on 2021-04-21.

EUT operation mode: Transmitting(Worst case record in the reports)

The worst case is as below:

30MHz- 10GHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
	Reading (dBm)	PK/QP/ Ave.		Height (m)	Polar (H/V)				
GSM850,Low Channel									
129.47	-37.62	PK	138	1.1	H	-4.35	-41.97	-13	28.97
129.48	-41.25	PK	101	1.1	V	-3.48	-44.73	-13	31.73
1648.40	-19.28	PK	251	1.3	H	-2.32	-21.60	-13	8.60
1648.40	-23.15	PK	6	1.9	V	-2.29	-25.44	-13	12.44
GSM850, Middle Channel									
129.47	-35.15	PK	158	1.8	H	-4.35	-39.50	-13	26.50
129.45	-40.92	PK	358	1.2	V	-3.48	-44.40	-13	31.40
1673.20	-20.11	PK	64	1.5	H	-2.34	-22.45	-13	9.45
1673.20	-23.15	PK	258	1.9	V	-2.31	-25.46	-13	12.46
GSM850, High Channel									
129.47	-35.95	PK	82	1.3	H	-4.35	-40.30	-13	27.30
129.47	-40.25	PK	341	2.1	V	-3.48	-43.73	-13	30.73
1697.60	-19.56	PK	258	1.6	H	-2.38	-21.94	-13	8.94
1697.60	-21.25	PK	164	1.5	V	-2.34	-23.59	-13	10.59
WCDMA BAND5, Low Channel									
129.51	-35.92	PK	164	1.4	H	-4.35	-40.27	-13	27.27
129.47	-40.93	PK	58	1.6	V	-3.48	-44.41	-13	31.41
1652.80	-28.16	PK	281	1.40	H	-2.32	-30.48	-13	17.48
1652.80	-34.51	PK	201	1.20	V	-2.29	-36.80	-13	23.80
WCDMA BAND5, Middle Channel									
129.47	-35.82	PK	36	1.3	H	-4.35	-40.17	-13	27.17
129.47	-40.13	PK	194	2.1	V	-3.48	-43.61	-13	30.61
1673.20	-27.64	PK	91	1.6	H	-2.34	-29.98	-13	16.98
1673.20	-34.62	PK	351	1.5	V	-2.31	-36.93	-13	23.93
WCDMA BAND5, High Channel									
129.45	-35.82	PK	164	1.6	H	-4.35	-40.17	-13	27.17
129.49	-41.29	PK	184	1.9	V	-3.48	-44.77	-13	31.77
1693.20	-27.41	PK	146	1.4	H	-2.38	-29.79	-13	16.79
1693.20	-34.59	PK	329	2.0	V	-2.34	-36.93	-13	23.93
LTE BAND5, 5M QPSK Low Channel									
129.47	-36.16	PK	144	1.5	H	-4.35	-40.51	-13	27.51
129.47	-41.81	PK	165	2.0	V	-3.48	-45.29	-13	32.29
1649.40	-30.72	PK	35	1.3	H	1.46	-29.26	-13	16.26
1649.40	-34.56	PK	30	1.0	V	1.40	-33.16	-13	20.16

LTE BAND5, 5M QPSK Middle Channel									
129.52	-35.92	PK	25	1.2	H	-4.35	-40.27	-13	27.27
129.39	-41.58	PK	64	1.3	V	-3.48	-45.06	-13	32.06
1673.00	-29.62	PK	184	1.5	H	1.53	-28.09	-13	15.09
1673.00	-35.18	PK	269	1.6	V	1.48	-33.70	-13	20.70
LTE BAND5, 5M QPSK High Channel									
129.47	-35.62	PK	284	2.0	H	-4.35	-39.97	-13	26.97
129.49	-40.15	PK	261	1.4	V	-3.48	-43.63	-13	30.63
1696.60	-50.68	PK	30	1.4	H	1.60	-49.08	-13	36.08
1696.60	-34.92	PK	251	1.3	V	1.55	-33.37	-13	20.37

30MHz - 20GHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
	Reading (dBm)	PK/QP/ Ave.		Height (m)	Polar (H/V)				
PCS1900, Low Channel									
129.47	-34.92	PK	318	1.6	H	-4.35	-39.27	-13	26.27
129.56	-39.51	PK	215	1.4	V	-3.48	-42.99	-13	29.99
3700.40	-31.25	PK	36	1.6	H	4.72	-26.53	-13	13.53
3700.40	-35.81	PK	25	1.5	V	4.61	-31.20	-13	18.20
PCS1900, Middle Channel									
129.47	-36.78	PK	154	1.1	H	-4.35	-41.13	-13	28.13
129.47	-39.68	PK	195	1.3	V	-3.48	-43.16	-13	30.16
3760.00	-32.11	PK	184	2.0	H	4.94	-27.17	-13	14.17
3760.00	-37.25	PK	215	1.7	V	4.85	-32.40	-13	19.40
PCS1900, High Channel									
129.47	-35.62	PK	164	1.4	H	-4.35	-39.97	-13	26.97
129.61	-40.19	PK	184	1.5	V	-3.48	-43.67	-13	30.67
3819.60	-31.58	PK	152	1.6	H	5.25	-26.33	-13	13.33
3819.60	-38.15	PK	317	1.6	V	5.08	-33.07	-13	20.07
WCDMA BAND2, Low Channel									
129.47	-35.92	PK	20	1.1	H	-4.35	-40.27	-13	27.27
129.53	-39.18	PK	168	1.3	V	-3.48	-42.66	-13	29.66
3704.80	-34.51	PK	139	1.5	H	4.75	-29.76	-13	16.76
3704.80	-43.25	PK	158	1.6	V	4.62	-38.63	-13	25.63
WCDMA BAND2, Middle Channel									
129.48	-36.15	PK	66	1.7	H	-4.35	-40.50	-13	27.50
129.44	-40.65	PK	16	1.2	V	-3.48	-44.13	-13	31.13
3760.00	-34.28	PK	184	1.4	H	4.94	-29.34	-13	16.34
3760.00	-43.25	PK	305	1.3	V	4.85	-38.40	-13	25.40
WCDMA BAND2, High Channel									
129.54	-37.69	PK	325	1.6	H	-4.35	-42.04	-13	29.04
129.46	-40.15	PK	195	1.0	V	-3.48	-43.63	-13	30.63
3815.20	-35.13	PK	145	2.0	H	5.22	-29.91	-13	16.91
3815.20	-39.68	PK	151	1.6	V	5.05	-34.63	-13	21.63
LTE BAND2, 1.4M QPSK Low Channel									
129.47	-36.92	PK	36	1.7	H	-4.35	-41.27	-13	28.27
129.44	-40.82	PK	14	1.5	V	-3.48	-44.30	-13	31.30
3701.40	-35.11	PK	281	1.6	H	4.72	-30.39	-13	17.39
3701.40	-43.01	PK	265	1.7	V	4.61	-38.40	-13	25.40
LTE BAND2, 1.4M QPSK Middle Channel									
129.47	-36.99	PK	326	1.6	H	-4.35	-41.34	-13	28.34
129.44	-40.87	PK	135	1.4	V	-3.48	-44.35	-13	31.35

3760.00	-35.01	PK	168	1.4	H	4.94	-30.07	-13	17.07
3760.00	-40.82	PK	251	1.6	V	4.85	-35.97	-13	22.97
LTE BAND2, 1.4M QPSK High Channel									
129.47	-35.92	PK	264	2.1	H	-4.35	-40.27	-13	27.27
129.47	-41.09	PK	246	1.9	V	-3.48	-44.57	-13	31.57
3818.60	-35.68	PK	325	1.5	H	5.25	-30.43	-13	17.43
3818.60	-43.11	PK	195	1.6	V	5.08	-38.03	-13	25.03
LTE BAND4, 1.4M QPSK Low Channel									
129.47	-37.25	PK	144	1.8	H	-4.35	-41.60	-13	28.60
129.42	-41.09	PK	168	1.6	V	-3.48	-44.57	-13	31.57
3421.40	-32.84	PK	192	1.7	H	2.72	-30.12	-13	17.12
3421.40	-36.45	PK	224	1.6	V	2.59	-33.86	-13	20.86
LTE BAND4, 1.4M QPSK Middle Channel									
129.47	-37.16	PK	164	1.2	H	-4.35	-41.51	-13	28.51
129.45	-41.62	PK	30	2.0	V	-3.48	-45.10	-13	32.10
3465.00	-33.25	PK	215	1.7	H	3.09	-30.16	-13	17.16
3465.00	-38.87	PK	68	1.6	V	2.97	-35.90	-13	22.90
LTE BAND4, 1.4M QPSK High Channel									
129.47	-35.82	PK	64	1.7	H	-4.35	-40.17	-13	27.17
129.47	-40.31	PK	2	1.5	V	-3.48	-43.79	-13	30.79
3508.60	-34.10	PK	64	1.2	H	3.44	-30.66	-13	17.66
3508.60	-40.25	PK	109	1.5	V	3.31	-36.94	-13	23.94

1-26.5 GHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
	Reading (dBm)	PK/QP/ Ave.		Height (m)	Polar (H/V)				
LTE BAND7, 5M QPSK Low Channel									
129.47	-35.92	PK	355	1.3	H	-4.35	-40.27	-25	15.27
129.47	-41.36	PK	351	1.2	V	-3.48	-44.84	-25	19.84
5005.00	-39.18	PK	154	1.5	H	8.82	-30.36	-25	5.36
5005.00	-44.03	PK	68	1.6	V	8.53	-35.50	-25	10.50
LTE BAND7, 5M QPSK Middle Channel									
129.47	-36.15	PK	64	2.1	H	-4.35	-40.50	-25	15.50
129.47	-40.95	PK	153	1.9	V	-3.48	-44.43	-25	19.43
5070.00	-39.35	PK	201	1.5	H	9.18	-30.17	-25	5.17
5070.00	-44.61	PK	246	1.4	V	8.56	-36.05	-25	11.05
LTE BAND7, 5M QPSK High Channel									
129.41	-36.35	PK	106	1.3	H	-4.35	-40.70	-25	15.70
129.43	-40.68	PK	52	1.5	V	-3.48	-44.16	-25	19.16
5135.00	-38.65	PK	43	1.4	H	9.47	-29.18	-25	4.18
5135.00	-42.36	PK	186	1.7	V	8.65	-33.71	-25	8.71

Note:
Absolute Level = Reading Level + Substituted Factor
Substituted Factor contains: SG Level - Cable loss+ Antenna Gain
Margin = Limit - Absolute Level

FCC §22.917 (a); §24.238 (a); §27.53 (c)(h)(m) - BAND EDGES

Applicable Standard

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 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.

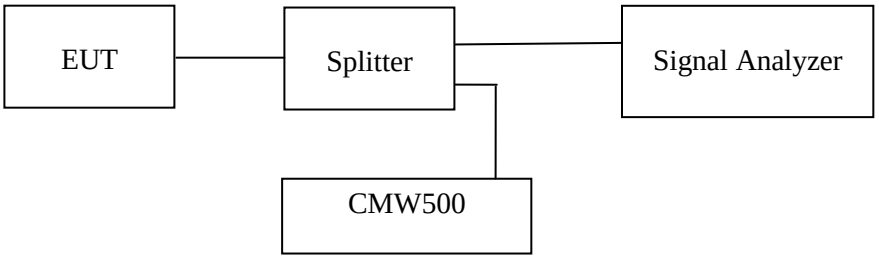
According to FCC §27.53 (c), For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance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

According to FCC §27.53 (h)(m), 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.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency



Test Data

Environmental Conditions

Temperature:	23-25 ℃
Relative Humidity:	50-55 %
ATM Pressure:	100.8- 101.3 kPa

The testing was performed by Charley Lin on 2021-04-22 to 2021-05-10.

EUT operation mode: Transmitting (Worst case)

Test Result: Pass

Test plots refer to the Appendix C.

FCC §2.1055; §22.355; §24.235; §27.54 - FREQUENCY STABILITY

Applicable Standard

FCC §2.1055, §22.355, §24.235 & §27.54.

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile > 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

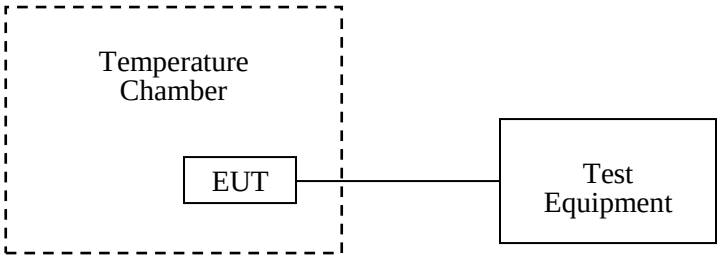
According to §24.235 & §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external AC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The AC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



Test Data

Environmental Conditions

Temperature:	20 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Charley Lin on 2021-04-22 to 2021-05-10.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

Cellular Band (Part 22H)

GSM Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.7	3.52	0.0042	2.5
-20		4.03	0.0048	2.5
-10		5.16	0.0062	2.5
0		4.85	0.0058	2.5
10		-2.54	-0.0030	2.5
20		3.06	0.0037	2.5
30		7.74	0.0093	2.5
40		3.04	0.0036	2.5
50		4.27	0.0051	2.5
20	V min.= 3.5	5.52	0.0066	2.5
	V max.= 4.2	6.12	0.0073	2.5

EDGE Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.7	3.63	0.0043	2.5
-20		4.26	0.0051	2.5
-10		5.06	0.0060	2.5
0		3.95	0.0047	2.5
10		-1.63	-0.0019	2.5
20		3.15	0.0038	2.5
30		7.72	0.0092	2.5
40		3.16	0.0038	2.5
50		4.25	0.0051	2.5
20	V min.= 3.5	4.63	0.0055	2.5
	V max.= 4.2	5.96	0.0071	2.5

WCDMA Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{AC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.7	-1.63	-0.0019	2.5
-20		2.08	0.0025	2.5
-10		-4.75	-0.0057	2.5
0		5.66	0.0068	2.5
10		4.35	0.0052	2.5
20		5.64	0.0067	2.5
30		3.29	0.0039	2.5
40		6.15	0.0074	2.5
50		4.42	0.0053	2.5
20	V min.= 3.5	4.09	0.0049	2.5
	V max.= 4.2	3.42	0.0041	2.5

PCS Band (Part 24E)

GSM Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{AC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.7	3.09	0.0016	pass
-20		3.15	0.0017	pass
-10		5.33	0.0028	pass
0		1.14	0.0006	pass
10		-6.81	-0.0036	pass
20		2.24	0.0012	pass
30		-4.14	-0.0022	pass
40		-6.52	-0.0035	pass
50		-3.26	-0.0017	pass
20	V min.= 3.5	-2.14	-0.0011	pass
	V max.= 4.2	-1.15	-0.0006	pass

EDGE Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.7	3.43	0.0018	pass
-20		4.12	0.0022	pass
-10		5.06	0.0027	pass
0		4.15	0.0022	pass
10		-2.73	-0.0015	pass
20		3.19	0.0017	pass
30		7.45	0.0040	pass
40		3.06	0.0016	pass
50		4.85	0.0026	pass
20	V min.= 3.5	5.73	0.0030	pass
	V max.= 4.2	6.66	0.0035	pass

WCDMA Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{AC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.7	2.63	0.0014	pass
-20		1.32	0.0007	pass
-10		-1.69	-0.0009	pass
0		2.06	0.0011	pass
10		2.11	0.0011	pass
20		1.69	0.0009	pass
30		2.03	0.0011	pass
40		1.65	0.0009	pass
50		-2.15	-0.0011	pass
20	V min.= 3.5	2.15	0.0011	pass
	V max.= 4.2	-1.98	-0.0011	pass

LTE:
QPSK:
Band 2:

10.0 MHz Middle Channel				
Temperature (℃)	**Voltage Supplied (V_{AC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.7	-5.14	-0.0027	pass
-20		-6.97	-0.0037	pass
-10		-5.50	-0.0029	pass
0		6.06	0.0032	pass
10		9.80	0.0052	pass
20		5.03	0.0027	pass
30		-6.62	-0.0035	pass
40		-8.73	-0.0046	pass
50		-7.05	-0.0038	pass
20	V min.= 3.5	3.99	0.0021	pass
	V max.= 4.2	-3.17	-0.0017	pass

Band 4:

10 MHz Bandwidth Middle Channel					
Temperature (℃)	**Voltage Supplied (V_{AC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.7	1710.0426	1754.9732	1710	1755
-20		1710.0432	1754.9728	1710	1755
-10		1710.0441	1754.9735	1710	1755
0		1710.0429	1754.9724	1710	1755
10		1710.0422	1754.9722	1710	1755
20		1710.0425	1754.9733	1710	1755
30		1710.0442	1754.9729	1710	1755
40		1710.0439	1754.9733	1710	1755
50		1710.0441	1754.9736	1710	1755
20	V min.= 3.5	1710.0445	1754.9725	1710	1755
	V max.= 4.2	1710.0426	1754.9732	1710	1755

Band 5:

10.0 MHz Middle Channel, f_o =836.5MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.7	-6.32	-0.0076	2.5
-20		3.02	0.0036	2.5
-10		2.16	0.0026	2.5
0		1.98	0.0024	2.5
10		2.57	0.0031	2.5
20		2.63	0.0031	2.5
30		-1.14	-0.0014	2.5
40		-2.06	-0.0025	2.5
50		3.15	0.0038	2.5
20	V min.= 3.5	2.14	0.0026	2.5
	V max.= 4.2	2.63	0.0031	2.5

Band 7:

10 MHz Bandwidth Middle Channel					
Temperature (℃)	**Voltage Supplied (V_{AC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.7	2500.0525	2569.9621	2500	2570
-20		2500.0497	2569.9642	2500	2570
-10		2500.0494	2569.9655	2500	2570
0		2500.0499	2569.9644	2500	2570
10		2500.0512	2569.9652	2500	2570
20		2500.0495	2569.9643	2500	2570
30		2500.0502	2569.9649	2500	2570
40		2500.0509	2569.9651	2500	2570
50		2500.0491	2569.9666	2500	2570
20	V min.= 3.5	2500.0507	2569.9635	2500	2570
	V max.= 4.2	2500.0525	2569.9621	2500	2570

16QAM:

Band 2:

10.0 MHz Middle Channel, f_o =1880MHz				
Temperature (℃)	**Voltage Supplied (V_{AC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.7	-5.06	-0.0027	pass
-20		-6.42	-0.0034	pass
-10		-5.16	-0.0027	pass
0		6.71	0.0036	pass
10		9.14	0.0049	pass
20		5.62	0.0030	pass
30		-6.41	-0.0034	pass
40		-8.16	-0.0043	pass
50		-7.12	-0.0038	pass
20	V min.= 3.5	3.25	0.0017	pass
	V max.= 4.2	-3.09	-0.0016	pass

Band 4:

10 MHz Bandwidth Middle Channel					
Temperature (℃)	**Voltage Supplied (V_{AC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.7	1710.0422	1754.9730	1710	1755
-20		1710.0452	1754.9725	1710	1755
-10		1710.0430	1754.9711	1710	1755
0		1710.0425	1754.9728	1710	1755
10		1710.0436	1754.9766	1710	1755
20		1710.0442	1754.9732	1710	1755
30		1710.0417	1754.9721	1710	1755
40		1710.0426	1754.9741	1710	1755
50		1710.0419	1754.9726	1710	1755
20	V min.= 3.5	1710.0432	1754.9743	1710	1755
	V max.= 4.2	1710.0419	1754.9714	1710	1755

Band 5:

10.0 MHz Middle Channel, f_o =836.5MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.7	-6.16	-0.0074	2.5
-20		3.11	0.0037	2.5
-10		2.21	0.0026	2.5
0		1.63	0.0019	2.5
10		2.52	0.0030	2.5
20		2.14	0.0026	2.5
30		-1.47	-0.0018	2.5
40		-2.19	-0.0026	2.5
50		3.20	0.0038	2.5
20	V min.= 3.5	2.13	0.0025	2.5
	V max.= 4.2	2.70	0.0032	2.5

Band 7:

10 MHz Bandwidth Middle Channel					
Temperature (℃)	**Voltage Supplied (V_{AC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.7	2500.0514	2569.9655	2500	2570
-20		2500.0436	2569.9663	2500	2570
-10		2500.0415	2569.9642	2500	2570
0		2500.0439	2569.9669	2500	2570
10		2500.0519	2569.9682	2500	2570
20		2500.0436	2569.9673	2500	2570
30		2500.0514	2569.9664	2500	2570
40		2500.0536	2569.9649	2500	2570
50		2500.0415	2569.9633	2500	2570
20	V min.= 3.5	2500.0516	2569.9668	2500	2570
	V max.= 4.2	2500.0536	2569.9685	2500	2570

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