TESTREPORT

Applicant Name :	Shenzhen Youmi Intelligent Technology Co., Ltd.
Address :	406-407 Jinqi Zhigu Building, 4/F, 1 Tangling Road, Nanshan District, Shenzhen, China
ReportNumber:	SZNS211231-68438E-RF-00C
FCC ID:	2ATZ4-BIXSGN

Test Standard (s)

FCC PART 27; FCC PART 22H; FCC PART 24E

Sample Description

Product Type:	RP05
Model No.:	BISON X10S NFC
Multiple Model(s) No.:	BISON X10G NFC(Please refer to DOS for Model difference)
Trade Mark:	UMIDIGI
Date Received:	2021/12/31
Date of Test:	2022/01/13~2022/02/21
Report Date:	2022/02/21

Test Result:	Pass*

* In the configuration tested, the EUT complied with the standards above.

Prepared andChecked By:

Ting Lü
EMC Engineer

Approved By:

Robert Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★ ".
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

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 5: 824-849MHz(TX); 869-894MHz(RX) LTE Band 12: 699-716MHz(TX); 729-746MHz(RX) LTE Band 41: 2555-2655MHz(TX/RX)
Modulation Technique	2G: GMSK 3G: BPSK, QPSK, 16QAM 4G: QPSK, 16QAM
Antenna Specification*	GSM850/WCDMA 850/LTE B5 : -2.3dBi WCDMA 1900/PCS1900/LTE B2 : 1.3dBi LTE B12 : -2.3dBi LTE B41 : 1.2dBi (provided by the applicant)
Voltage Range	DC 3.87V from battery or DC 5Vfrom adapter
Sample serial number	SZNS211231-68438E-RF-S1for Conducted and Radiated Emissions SZNS211231-68438E-RF-S2 for RF Conducted Test (Assigned by ATC)
Sample/EUT Status	Good condition
Adapter information	Model: HJ-0502000W2-US Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5.0V, 2.0A
Normal/Extreme Condition	L.V.: Low Voltage 3.5V_{DC} N.V.: Normal Voltage3.87V_{DC} H.V.: High Voltage 4.45V_{DC}

Objective

This test report is in accordance with Part 2-Subpart J, Part 22-Subpart H,Part24-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.
Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		$0.082*10^{-7}$
RF output power, conducted		0.73dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.66dB
	30MHz - 1GHz	4.28dB
	1GHz - 18GHz	4.98dB
	18GHz -26.5GHz	5.06dB
	26.5GHz -40GHz	4.72dB
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.

Frequency band	Bandwidth (MHz)	Test Frequency(MHz)		
		Low	Middle	High
GSM850	0.25	824.2	836.6	848.8
PCS1900	0.25	1850.2	1880	1909.8
WCDMA B2	4.2	1852.4	1880	1907.6
WCDMA B5	4.2	826.4	836.6	846.6
LTE B2	1.4	1850.7	1880	1909.3
	3	1851.5	1880	1908.5
	5	1852.5	1880	1907.5
	10	1855	1880	1905
	15	1857.5	1880	1902.5
	20	1860	1880	1900
LTE B5	1.4	824.7	836.5	848.3
	3	825.5	836.5	847.5
	5	826.5	836.5	846.5
	10	829	836.5	844
LTE B12	1.4	699.7	707.5	715.3
	3	700.5	707.5	714.5
	5	701.5	707.5	713.5
	10	704.0	707.5	711
LTE B41	5	2557.5	2605	2652.5
	10	2560	2605	2650
	15	2562.5	2605	2647.5
	20	2565	2605	2645

GSM850/WCDMA B5/LTE B5/LTE B12 was transmit on main antenna
PCS1900/WCDMA B2/LTE B2/LTE B41 was transmit on AUX antenna

Equipment Modifications

No modification was made to the EUT.

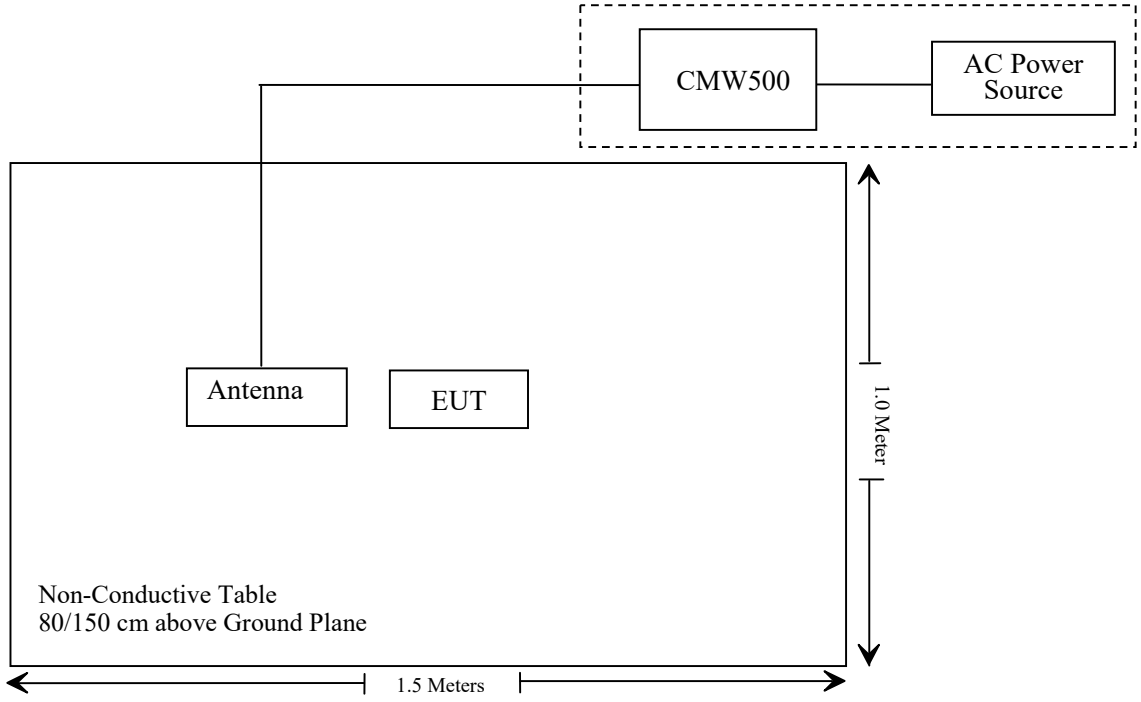
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde&Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-116218-UY

Support Cable Description

Cable Description	Length (m)	From / Port	To
Un-shielded Un-detachable AC cable	1.2	AC Power	CMW500/ CMU200

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

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

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde& Schwarz	Test Receiver	ESR	102725	2021/12/13	2022/12/12
Rohde&Schwarz	Spectrum Analyzer	FSV40	101949	2021/12/13	2022/12/12
SONOMA INSTRUMENT	Amplifier	310 N	186131	2021/11/09	2022/11/08
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2021/11/09	2022/11/08
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
Unknown	RF Coaxial Cable	No.10	N050	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.11	N1000	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.12	N040	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.13	N300	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.15	N600	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.16	N650	2021/12/14	2022/12/13
Unknown	Band Reject Filter	MSF824-862MS-1147	201706003	2021/12/14	2022/12/13
Unknown	Band Reject Filter	MSF1850-1910MS-1148	201706003	2021/12/14	2022/12/13
Unknown	Band Reject Filter	MSF1710-1785MS-1150	201706003	2021/12/14	2022/12/13
Unknown	Band Reject Filter	MSF2495-2570MS-1152	201706003	2021/12/14	2022/12/13
Unknown	Band Reject Filter	MSF700-800MS-1153	201706003	2021/12/14	2022/12/13
Schwarzbeck	Bilog Antenna	VULB9163	9163-194	2020/01/05	2023/01/04
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-655	2020/01/05	2023/01/04
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
PASTERNACK	Horn Antenna	PE9852/2F-20	1120	2020/01/05	2023/01/04
PASTERNACK	Horn Antenna	PE9852/2F-20	1120	2020/01/05	2023/01/04
Agilent	Signal Generator	N5183A	MY51040755	2021/12/13	2022/12/12
Radiated Emission Test Software: e3 19821b (V9)					
RF Conducted Test					
SPECTRUM ANALYZER	Rohde & Schwarz	FSU26	200982	2021/07/06	2022/07/05
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	154606	2021/12/13	2022/12/12
Mini-Circuits	Power Splitter	DC-18000MHz	SF10944151S	2021/12/14	2022/12/13
Gongwen	Temp. & Humid. Chamber	HSD-500	109	2021/10/14	2022/10/13
Fluke	Multi Meter	45	7664009	2021/12/14	2022/12/13
Manson	DC Power Source	KPS-6604	ATCS-205	NCR	NCR
Unknown	RF Cable	Unknown	Unknown	Each time	/
HP	6dB Attenuator	8493B 6dB Attenuator	06151	2021/12/14	2022/12/13

* 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

Compliant, please refer to the SAR report: SZNS211231-68438E-20A.

FCC§2.1047 - MODULATION CHARACTERISTIC

Accordingto FCC § 2.1047(d), Part 22H,24E&27 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(c)(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.

Accordingto 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 successfulcommunications.

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

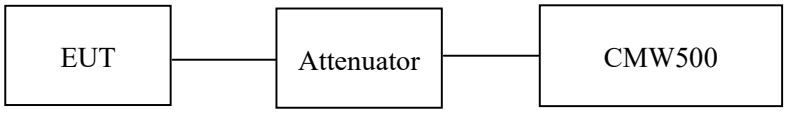
According to §27.50(c), Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP. And Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2496-2690MHz.

Test Procedure

Conducted method:

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



ANSI C63.26-2015 Section 5.5.

Test Data

Environmental Conditions

Temperature:	27 ℃
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by Gala Liu from 2022-01-13 to 2022-01-14.

Conducted Power

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	ERP(dBm)	Limit (dBm)
GSM	128	824.2	33.30	28.35	38.45
	190	836.6	33.30	28.35	38.45
	251	848.8	33.10	28.15	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	33.42	31.73	29.75	27.54	28.47	26.78	24.80	22.59	38.45
	190	836.6	33.38	31.68	29.70	27.50	28.43	26.73	24.75	22.55	38.45
	251	848.8	33.17	31.54	29.61	27.41	28.22	26.59	24.66	22.46	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		23.72	23.73	23.63	18.77	18.78	18.68
	HSDPA	1	22.77	22.68	22.51	17.82	17.73	17.56
		2	22.85	22.67	22.54	17.90	17.72	17.59
		3	22.67	22.65	22.53	17.72	17.69	17.58
		4	22.72	22.64	22.61	17.77	17.69	17.66
	HSUPA	1	23.29	23.16	23.33	18.34	18.21	18.38
		2	23.28	23.46	23.28	18.33	18.51	18.33
		3	23.64	23.42	23.41	18.69	18.47	18.46
		4	23.54	23.35	23.28	18.59	18.40	18.33
		5	23.42	23.34	23.46	18.47	18.39	18.51
	HSPA+	1	23.45	23.41	23.52	18.50	18.46	18.57

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)
For GSM850 / WCDMA Band5: Antenna Gain = -2.3dBi = -4.45dBd (0dBd=2.15dBi)
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	29.50	30.80	33
	661	1880.0	29.50	30.80	33
	810	1909.8	29.60	30.90	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	29.52	27.11	25.06	22.91	30.82	28.41	26.36	24.21	33
	661	1880.0	29.42	26.97	24.92	22.81	30.72	28.27	26.22	24.11	33
	810	1909.8	29.56	26.78	24.77	22.67	30.86	28.08	26.07	23.97	33

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 2)	RMC12.2k		22.32	23.28	23.20	23.62	24.58	24.50
	HSDPA	1	22.02	21.86	22.07	23.32	23.16	23.37
		2	22.10	21.59	22.07	23.40	22.89	23.37
		3	22.13	21.47	22.09	23.43	22.77	23.39
		4	22.14	21.35	22.10	23.44	22.65	23.40
	HSUPA	1	22.41	22.60	22.79	23.71	23.90	24.09
		2	22.35	22.55	22.75	23.65	23.85	24.05
		3	22.34	22.54	22.64	23.64	23.84	23.94
		4	22.28	22.61	22.72	23.58	23.91	24.02
		5	22.36	22.53	22.71	23.66	23.83	24.01
	HSPA+	1	22.37	22.41	22.68	23.67	23.71	23.98

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi)
For PCS1900 / WCDMA Band2: Antenna Gain = 1.3dBi
Limit: EIRP≤33dBm

LTE Band 2

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	21.25	21.99	21.69	22.55	23.29	22.99
		RB1#3	21.23	21.97	21.63	22.53	23.27	22.93
		RB1#5	21.28	21.99	21.62	22.58	23.29	22.92
		RB3#0	21.24	22.01	21.64	22.54	23.31	22.94
		RB3#3	21.20	22.06	21.64	22.50	23.36	22.94
		RB6#0	20.26	21.02	20.63	21.56	22.32	21.93
	16QAM	RB1#0	20.79	20.85	21.30	22.09	22.15	22.60
		RB1#3	20.73	20.89	21.31	22.03	22.19	22.61
		RB1#5	20.74	20.93	21.33	22.04	22.23	22.63
		RB3#0	20.42	21.29	20.77	21.72	22.59	22.07
		RB3#3	20.52	21.26	20.80	21.82	22.56	22.10
		RB6#0	19.56	20.20	19.96	20.86	21.50	21.26
3.0	QPSK	RB1#0	21.08	21.93	21.63	22.38	23.23	22.93
		RB1#8	21.10	21.87	21.59	22.40	23.17	22.89
		RB1#14	21.19	21.85	21.62	22.49	23.15	22.92
		RB6#0	20.20	21.02	20.74	21.50	22.32	22.04
		RB6#9	20.20	21.02	20.62	21.50	22.32	21.92
		RB15#0	20.10	21.02	20.56	21.40	22.32	21.86
	16QAM	RB1#0	20.44	21.58	20.48	21.74	22.88	21.78
		RB1#8	20.38	21.52	20.46	21.68	22.82	21.76
		RB1#14	20.45	21.52	20.47	21.75	22.82	21.77
		RB6#0	19.48	20.23	19.90	20.78	21.53	21.20
		RB6#9	19.54	20.20	19.94	20.84	21.50	21.24
		RB15#0	19.30	20.06	19.73	20.60	21.36	21.03

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	21.11	22.08	21.69	22.41	23.38	22.99
		RB1#13	21.13	21.96	21.54	22.43	23.26	22.84
		RB1#24	21.31	22.03	21.66	22.61	23.33	22.96
		RB15#0	20.17	21.03	20.72	21.47	22.33	22.02
		RB15#10	20.29	20.91	20.68	21.59	22.21	21.98
		RB25#0	20.31	20.95	20.64	21.61	22.25	21.94
	16QAM	RB1#0	19.48	21.15	20.40	20.78	22.45	21.70
		RB1#13	19.50	21.09	20.35	20.80	22.39	21.65
		RB1#24	19.59	21.14	20.44	20.89	22.44	21.74
		RB15#0	19.29	19.95	19.77	20.59	21.25	21.07
		RB15#10	19.41	19.94	19.75	20.71	21.24	21.05
		RB25#0	19.44	19.99	19.66	20.74	21.29	20.96
10.0	QPSK	RB1#0	21.12	22.03	21.77	22.42	23.33	23.07
		RB1#25	21.20	21.98	21.71	22.50	23.28	23.01
		RB1#49	21.51	21.92	21.65	22.81	23.22	22.95
		RB25#0	20.22	21.03	20.73	21.52	22.33	22.03
		RB25#25	20.54	20.96	20.74	21.84	22.26	22.04
		RB50#0	20.28	21.03	20.67	21.58	22.33	21.97
	16QAM	RB1#0	20.38	21.15	20.18	21.68	22.45	21.48
		RB1#25	20.57	21.13	20.22	21.87	22.43	21.52
		RB1#49	20.78	21.13	20.21	22.08	22.43	21.51
		RB25#0	19.34	20.17	19.89	20.64	21.47	21.19
		RB25#25	19.57	20.13	19.85	20.87	21.43	21.15
		RB50#0	19.54	20.15	19.83	20.84	21.45	21.13

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	21.13	21.99	21.65	22.43	23.29	22.95
		RB1#38	21.35	21.85	21.62	22.65	23.15	22.92
		RB1#74	21.77	21.85	21.57	23.07	23.15	22.87
		RB36#0	20.42	20.95	20.77	21.72	22.25	22.07
		RB36#39	20.69	20.96	20.67	21.99	22.26	21.97
		RB75#0	20.51	20.99	20.71	21.81	22.29	22.01
	16QAM	RB1#0	20.53	21.23	21.11	21.83	22.53	22.41
		RB1#38	20.87	21.18	21.10	22.17	22.48	22.40
		RB1#74	21.21	21.13	21.04	22.51	22.43	22.34
		RB36#0	19.43	20.14	19.80	20.73	21.44	21.10
		RB36#39	19.69	20.09	19.77	20.99	21.39	21.07
		RB75#0	19.50	20.15	19.85	20.80	21.45	21.15
20.0	QPSK	RB1#0	21.18	22.06	21.82	22.48	23.36	23.12
		RB1#50	21.52	21.91	21.83	22.82	23.21	23.13
		RB1#99	22.06	22.01	21.73	23.36	23.31	23.03
		RB50#0	20.40	21.03	20.85	21.70	22.33	22.15
		RB50#50	20.84	20.97	20.81	22.14	22.27	22.11
		RB100#0	20.56	21.06	20.76	21.86	22.36	22.06
	16QAM	RB1#0	20.30	21.04	21.53	21.60	22.34	22.83
		RB1#50	20.73	21.07	21.42	22.03	22.37	22.72
		RB1#99	21.20	20.94	21.40	22.50	22.24	22.70
		RB50#0	19.54	20.24	19.78	20.84	21.54	21.08
		RB50#50	19.98	20.00	19.82	21.28	21.30	21.12
		RB100#0	19.57	20.12	19.82	20.87	21.42	21.12

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi)
For Band2: Antenna Gain = 1.3dBi
Limit: EIRP≤33dBm

LTE Band5

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	22.47	22.13	22.10	17.52	17.18	17.15
		RB1#3	22.52	22.11	22.12	17.57	17.16	17.17
		RB1#5	22.49	22.06	22.12	17.54	17.11	17.17
		RB3#0	22.61	22.20	22.18	17.66	17.25	17.23
		RB3#3	22.61	22.19	22.21	17.66	17.24	17.26
		RB6#0	21.52	21.19	21.13	16.57	16.24	16.18
	16QAM	RB1#0	22.07	21.95	21.31	17.12	17.00	16.36
		RB1#3	22.19	21.86	20.89	17.24	16.91	15.94
		RB1#5	22.09	21.83	20.94	17.14	16.88	15.99
		RB3#0	21.62	21.07	21.65	16.67	16.12	16.70
		RB3#3	21.64	21.08	21.15	16.69	16.13	16.20
		RB6#0	20.85	20.74	20.86	15.90	15.79	15.91
3.0	QPSK	RB1#0	22.36	22.13	22.24	17.41	17.18	17.29
		RB1#8	22.31	22.03	22.22	17.36	17.08	17.27
		RB1#14	21.96	22.10	22.14	17.01	17.15	17.19
		RB6#0	21.50	21.22	21.53	16.55	16.27	16.58
		RB6#9	21.10	21.17	21.15	16.15	16.22	16.20
		RB15#0	21.56	21.13	21.47	16.61	16.18	16.52
	16QAM	RB1#0	21.93	21.96	21.22	16.98	17.01	16.27
		RB1#8	21.79	21.89	21.15	16.84	16.94	16.20
		RB1#14	21.47	21.88	20.73	16.52	16.93	15.78
		RB6#0	20.50	20.55	20.81	15.55	15.60	15.86
		RB6#9	20.07	20.77	20.72	15.12	15.82	15.77
		RB15#0	20.60	20.61	20.59	15.65	15.66	15.64

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	22.54	22.13	22.40	17.59	17.18	17.45
		RB1#13	22.05	22.17	22.08	17.10	17.22	17.13
		RB1#24	22.03	22.17	21.96	17.08	17.22	17.01
		RB15#0	21.55	21.18	21.56	16.60	16.23	16.61
		RB15#10	21.18	21.17	21.54	16.23	16.22	16.59
		RB25#0	21.11	21.23	21.58	16.16	16.28	16.63
	16QAM	RB1#0	20.65	21.36	21.11	15.70	16.41	16.16
		RB1#13	20.20	21.34	21.13	15.25	16.39	16.18
		RB1#24	20.29	21.36	20.76	15.34	16.41	15.81
		RB15#0	20.68	20.51	20.55	15.73	15.56	15.60
		RB15#10	20.18	20.57	20.60	15.23	15.62	15.65
		RB25#0	20.20	20.61	20.49	15.25	15.66	15.54
10.0	QPSK	RB1#0	22.41	22.27	22.20	17.46	17.32	17.25
		RB1#25	21.99	22.23	22.16	17.04	17.28	17.21
		RB1#49	22.10	22.33	22.12	17.15	17.38	17.17
		RB25#0	21.11	21.28	21.62	16.16	16.33	16.67
		RB25#25	21.45	21.24	21.55	16.50	16.29	16.60
		RB50#0	21.20	21.26	21.13	16.25	16.31	16.18
	16QAM	RB1#0	21.71	21.66	20.61	16.76	16.71	15.66
		RB1#25	21.26	21.38	20.66	16.31	16.43	15.71
		RB1#49	21.31	21.74	20.62	16.36	16.79	15.67
		RB25#0	20.16	20.72	20.72	15.21	15.77	15.77
		RB25#25	20.63	20.44	20.77	15.68	15.49	15.82
		RB50#0	20.60	20.75	20.25	15.65	15.80	15.30

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)
For Band5: Antenna Gain =-2.3dBi = -4.45dBd (0dBd=2.15dBi)
Cable Loss=0.5dB*(provided by the applicant)
Limit: ERP≤38.45dBm

LTE Band 12

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	21.47	21.48	21.38	16.52	16.53	16.43
		RB1#3	21.47	21.50	21.32	16.52	16.55	16.37
		RB1#5	21.47	21.46	21.35	16.52	16.51	16.40
		RB3#0	21.41	21.53	21.43	16.46	16.58	16.48
		RB3#3	21.56	21.50	21.49	16.61	16.55	16.54
		RB6#0	20.47	20.38	20.40	15.52	15.43	15.45
	16QAM	RB1#0	20.82	21.16	20.11	15.87	16.21	15.16
		RB1#3	20.81	20.98	20.03	15.86	16.03	15.08
		RB1#5	20.82	21.01	20.03	15.87	16.06	15.08
		RB3#0	20.59	20.40	20.54	15.64	15.45	15.59
		RB3#3	20.62	20.41	20.43	15.67	15.46	15.48
		RB6#0	20.17	19.58	20.13	15.22	14.63	15.18
3.0	QPSK	RB1#0	21.48	21.51	21.50	16.53	16.56	16.55
		RB1#8	21.35	21.51	21.37	16.4	16.56	16.42
		RB1#14	21.37	21.51	21.35	16.42	16.56	16.40
		RB6#0	20.45	20.57	20.53	15.50	15.62	15.58
		RB6#9	20.52	20.45	20.41	15.57	15.50	15.46
		RB15#0	20.53	20.42	20.50	15.58	15.47	15.55
	16QAM	RB1#0	20.85	21.22	20.16	15.90	16.27	15.21
		RB1#8	20.82	21.01	20.03	15.87	16.06	15.08
		RB1#14	20.81	21.13	19.99	15.86	16.18	15.04
		RB6#0	19.95	19.49	20.11	15.00	14.54	15.16
		RB6#9	19.95	19.54	20.15	15.00	14.59	15.20
		RB15#0	20.00	19.58	19.87	15.05	14.63	14.92

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	21.41	21.40	21.41	16.46	16.45	16.46
		RB1#13	21.42	21.58	21.45	16.47	16.63	16.50
		RB1#24	21.51	21.54	21.31	16.56	16.59	16.36
		RB15#0	20.50	20.51	20.59	15.55	15.56	15.64
		RB15#10	20.51	20.42	20.45	15.56	15.47	15.50
		RB25#0	20.55	20.32	20.52	15.60	15.37	15.57
	16QAM	RB1#0	19.58	20.47	20.11	14.63	15.52	15.16
		RB1#13	19.53	20.41	20.15	14.58	15.46	15.20
		RB1#24	19.47	20.89	20.10	14.52	15.94	15.15
		RB15#0	20.05	19.38	20.04	15.10	14.43	15.09
		RB15#10	20.07	19.44	19.91	15.12	14.49	14.96
		RB25#0	20.15	19.49	19.79	15.20	14.54	14.84
10.0	QPSK	RB1#0	21.39	21.43	21.58	16.44	16.48	16.63
		RB1#25	21.42	21.56	21.69	16.47	16.61	16.74
		RB1#49	21.51	21.57	21.50	16.56	16.62	16.55
		RB25#0	20.43	20.38	20.35	15.48	15.43	15.40
		RB25#25	20.55	20.98	20.58	15.60	16.03	15.63
		RB50#0	20.48	20.44	20.96	15.53	15.49	16.01
	16QAM	RB1#0	20.50	20.57	20.04	15.55	15.62	15.09
		RB1#25	20.50	20.51	20.55	15.55	15.56	15.60
		RB1#49	20.46	20.66	20.01	15.51	15.71	15.06
		RB25#0	20.06	19.55	19.73	15.11	14.60	14.78
		RB25#25	19.46	19.98	20.01	14.51	15.03	15.06
		RB50#0	20.10	19.54	19.87	15.15	14.59	14.92

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)
For Band12: Antenna Gain = -2.3dBi = -4.45dBd (0dBd=2.15dBi)
Cable Loss=0.5dB*(provided by the applicant)
Limit: ERP≤34.77dBm

LTE Band 41

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	22.21	22.41	22.51	23.41	23.61	23.71
		RB1#13	22.32	22.34	22.45	23.52	23.54	23.65
		RB1#24	22.28	22.32	22.52	23.48	23.52	23.72
		RB15#0	21.22	21.41	21.52	22.42	22.61	22.72
		RB15#10	21.18	21.35	21.46	22.38	22.55	22.66
		RB25#0	21.21	21.36	21.45	22.41	22.56	22.65
	16QAM	RB1#0	21.57	21.36	21.44	22.77	22.56	22.64
		RB1#13	21.52	21.22	21.61	22.72	22.42	22.81
		RB1#24	21.62	21.41	21.47	22.82	22.61	22.67
		RB15#0	20.43	20.74	20.60	21.63	21.94	21.80
		RB15#10	20.40	20.65	20.67	21.60	21.85	21.87
		RB25#0	20.60	20.39	20.74	21.80	21.59	21.94
10.0	QPSK	RB1#0	22.39	22.53	22.35	23.59	23.73	23.55
		RB1#25	22.38	22.53	22.42	23.58	23.73	23.62
		RB1#49	22.45	22.70	22.46	23.65	23.90	23.66
		RB25#0	21.20	21.39	21.59	22.40	22.59	22.79
		RB25#25	21.30	21.46	21.47	22.50	22.66	22.67
		RB50#0	21.20	21.42	21.52	22.40	22.62	22.72
	16QAM	RB1#0	21.33	21.79	21.25	22.53	22.99	22.45
		RB1#25	21.48	21.48	21.44	22.68	22.68	22.64
		RB1#49	21.48	21.66	21.34	22.68	22.86	22.54
		RB25#0	20.32	20.68	20.89	21.52	21.88	22.09
		RB25#25	20.28	20.75	20.88	21.48	21.95	22.08
		RB50#0	20.31	20.70	20.55	21.51	21.90	21.75

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	22.36	22.46	22.42	23.56	23.66	23.62
		RB1#38	22.42	22.49	22.42	23.62	23.69	23.62
		RB1#74	22.41	22.56	22.45	23.61	23.76	23.65
		RB36#0	21.34	21.45	21.51	22.54	22.65	22.71
		RB36#39	21.32	21.43	21.53	22.52	22.63	22.73
		RB75#0	21.33	21.35	21.61	22.53	22.55	22.81
	16QAM	RB1#0	21.47	21.59	21.29	22.67	22.79	22.49
		RB1#38	21.48	21.85	20.89	22.68	23.05	22.09
		RB1#74	21.45	21.69	20.97	22.65	22.89	22.17
		RB36#0	20.43	20.40	20.77	21.63	21.60	21.97
		RB36#39	20.40	20.52	20.90	21.60	21.72	22.10
		RB75#0	20.39	20.55	20.64	21.59	21.75	21.84
20.0	QPSK	RB1#0	22.21	22.44	22.67	23.41	23.64	23.87
		RB1#50	22.27	22.55	22.81	23.47	23.75	24.01
		RB1#99	22.38	22.54	22.78	23.58	23.74	23.98
		RB50#0	21.29	21.34	21.35	22.49	22.54	22.55
		RB50#50	21.27	21.40	21.39	22.47	22.60	22.59
		RB100#0	21.28	21.27	21.47	22.48	22.47	22.67
	16QAM	RB1#0	21.64	21.18	22.21	22.84	22.38	23.41
		RB1#50	21.52	21.24	22.29	22.72	22.44	23.49
		RB1#99	21.71	21.25	22.37	22.91	22.45	23.57
		RB50#0	20.50	20.45	20.58	21.70	21.65	21.78
		RB50#50	20.59	20.56	20.64	21.79	21.76	21.84
		RB100#0	20.49	20.40	20.46	21.69	21.60	21.66

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi)
For Band41: Antenna Gain = 1.2dBi
Limit: EIRP≤33dBm

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit(dB)
GMSK	Low	3.22	13
	Middle	3.51	13
	High	3.28	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.19	13
	Middle	3.34	13
	High	3.25	13
HSDPA (16QAM)	Low	4.25	13
	Middle	3.65	13
	High	3.85	13
HSUPA (BPSK)	Low	3.58	13
	Middle	3.65	13
	High	3.64	13
HSPA+	Low	3.35	13
	Middle	3.12	13
	High	3.56	13

PCS Band

Mode	Channel	PAR (dB)	Limit(dB)
GMSK	Low	3.24	13
	Middle	3.15	13
	High	3.23	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.35	13
	Middle	3.25	13
	High	3.14	13
HSDPA (16QAM)	Low	3.65	13
	Middle	4.42	13
	High	4.45	13
HSUPA (BPSK)	Low	3.45	13
	Middle	3.65	13
	High	3.67	13
HSPA+	Low	3.65	13
	Middle	3.55	13
	High	3.42	13

LTE Band 2 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.26	4.33	4.52	13	Pass
QPSK (100RB Size)	5.58	5.45	5.48	13	Pass
16QAM (1RB Size)	6.12	5.54	5.67	13	Pass
16QAM (100RB Size)	6.38	6.22	6.15	13	Pass

LTE Band 5 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.51	5.19	5.74	13	Pass
QPSK (50RB Size)	5.54	5.77	5.61	13	Pass
16QAM (1RB Size)	6.06	6.60	6.83	13	Pass
16QAM (50RB Size)	6.51	6.41	6.44	13	Pass

LTE Band 12 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.16	5.10	5.64	13	Pass
QPSK (50RB Size)	5.74	5.74	5.67	13	Pass
16QAM (1RB Size)	6.54	6.15	6.92	13	Pass
16QAM (50RB Size)	6.54	6.57	6.38	13	Pass

LTE Band 41 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	7.50	5.83	9.68	13	Pass
QPSK (100RB Size)	8.08	7.44	9.26	13	Pass
16QAM (1RB Size)	10.87	7.56	8.30	13	Pass
16QAM (100RB Size)	8.85	7.92	8.53	13	Pass

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

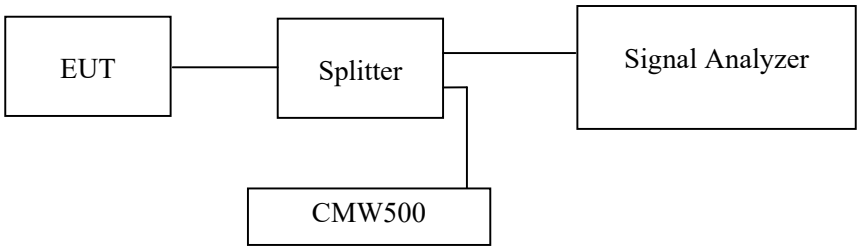
Applicable Standard

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:	27 ℃
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by Gala Liu from 2022-01-13 to 2022-02-21.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables and plots.

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(8PSK)	128	824.2	242.00	305.69
	190	836.6	242.00	308.14
	251	848.8	242.00	306.49

Frequency (MHz)		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	826.4	4.16	4.72
	836.6	4.16	4.70
	846.6	4.16	4.68
HSDPA	826.4	4.16	4.68
	836.6	4.16	4.69
	846.6	4.18	4.71
HSUPA	826.4	4.18	4.71
	836.6	4.18	4.70
	846.6	4.20	4.74

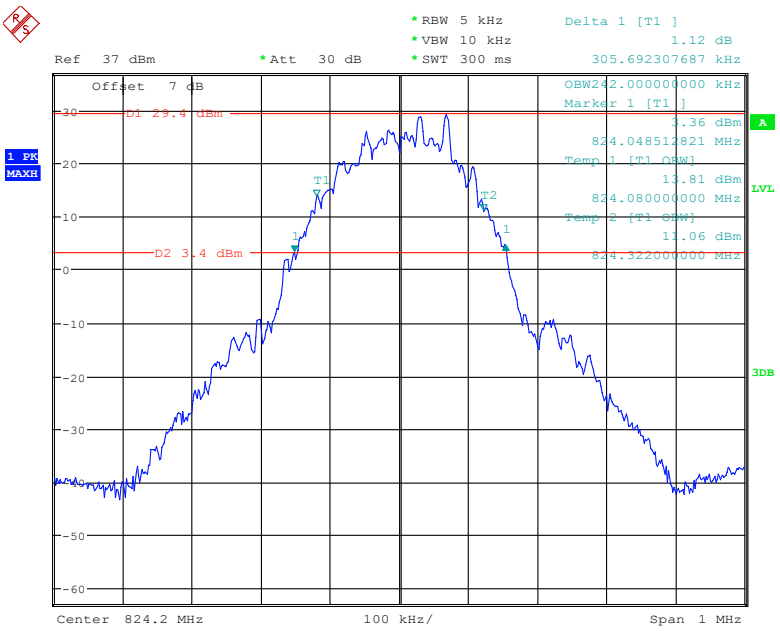
PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(8PSK)	512	1850.2	246.00	309.29
	661	1880.0	244.00	307.64
	810	1909.8	242.00	312.50

Frequency (MHz)		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	1852.4	4.16	4.72
	1880.0	4.16	4.71
	1907.6	4.16	4.70
HSDPA	1852.4	4.18	4.69
	1880.0	4.20	4.70
	1907.6	4.18	4.69
HSUPA	1852.4	4.18	4.70
	1880.0	4.18	4.72
	1907.6	4.18	4.70

Cellular Band (Part 22H)

26 dB Emissions &99% Occupied Bandwidth for GSM(GMSK) Mode, Low channel



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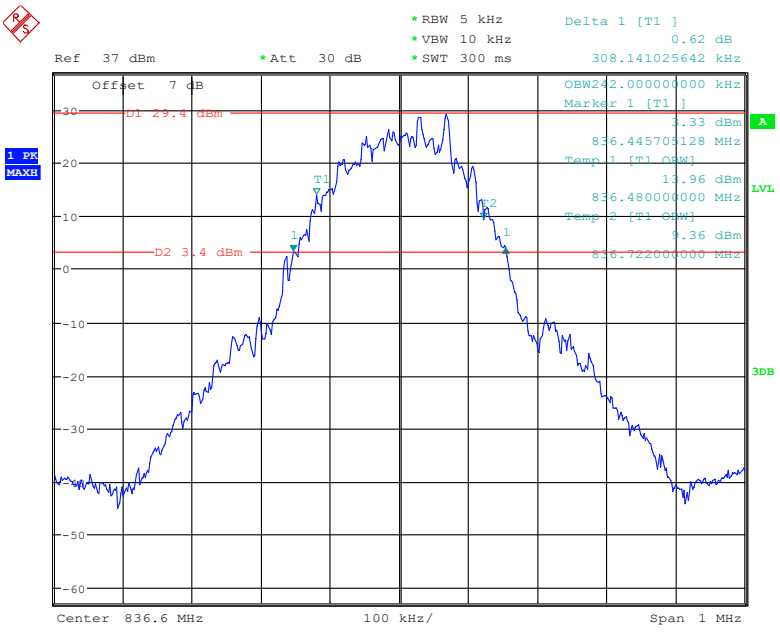
26 dB Emissions &99% Occupied Bandwidth for GSM(GMSK) Mode, Middle channel



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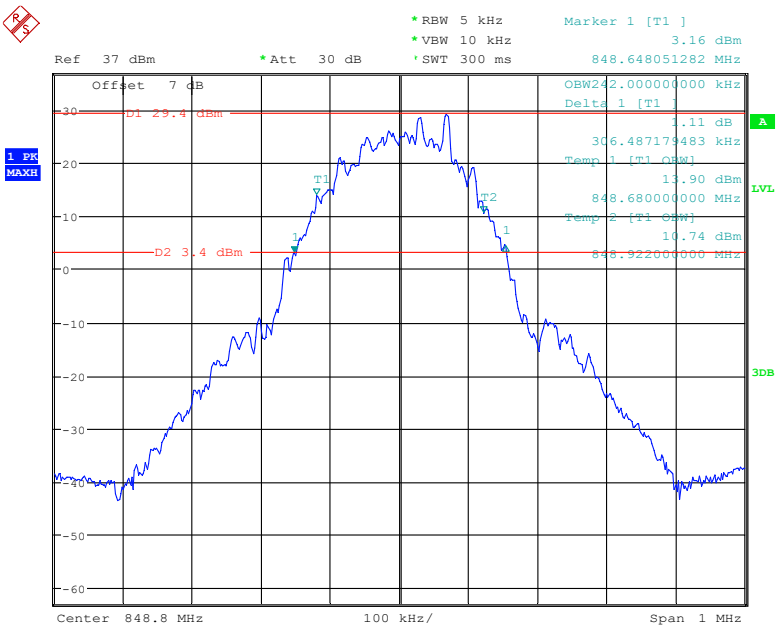
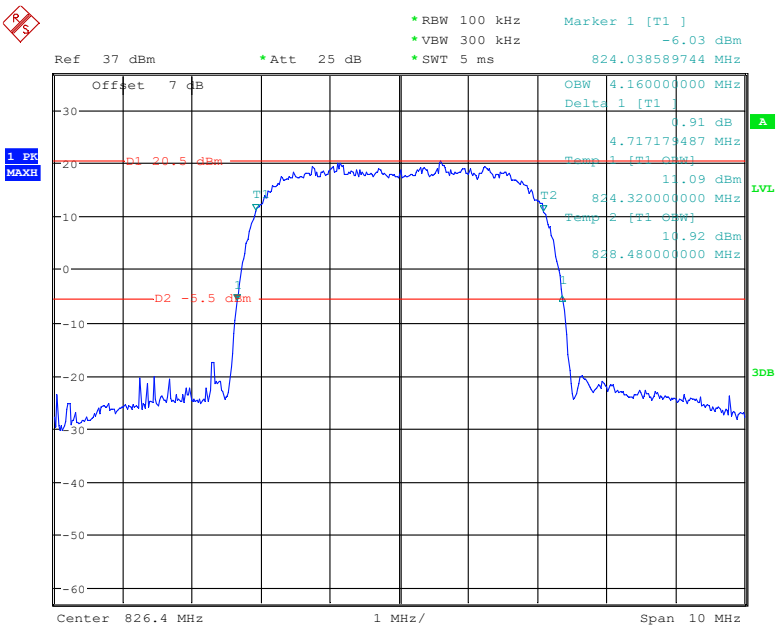
26 dB Emissions &99% Occupied Bandwidth for GSM(GMSK) Mode, High channel



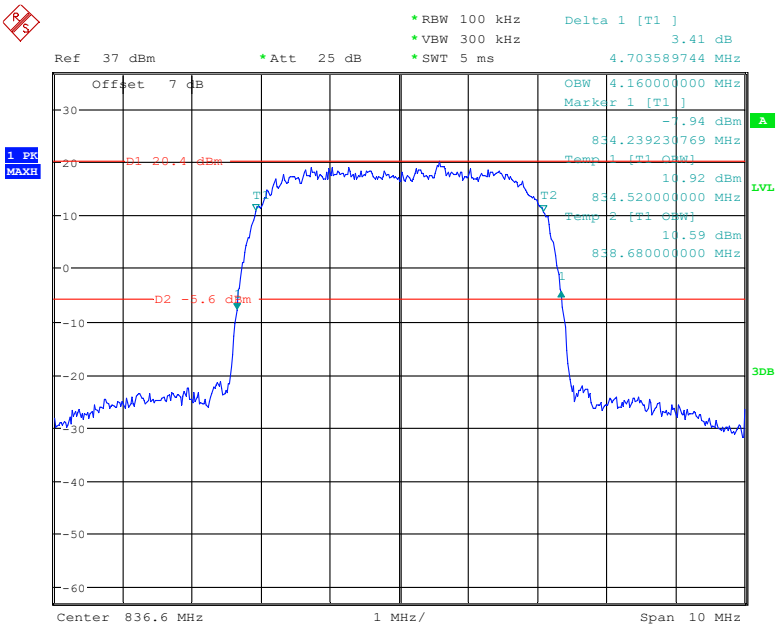
Date: 14.JAN.2022 09:08:42

26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel



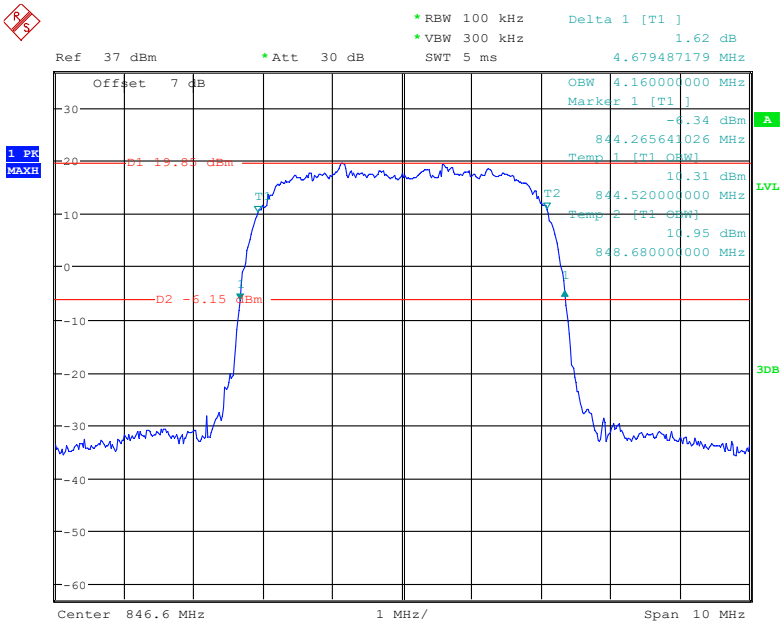
Date: 14.JAN.2022 10:57:28

26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel



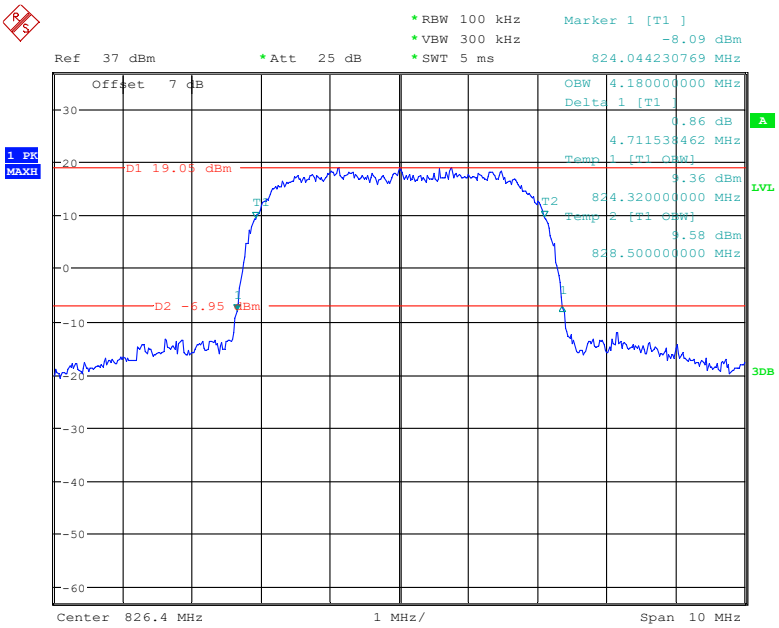
Date: 14.JAN.2022 10:58:20

26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode, High channel



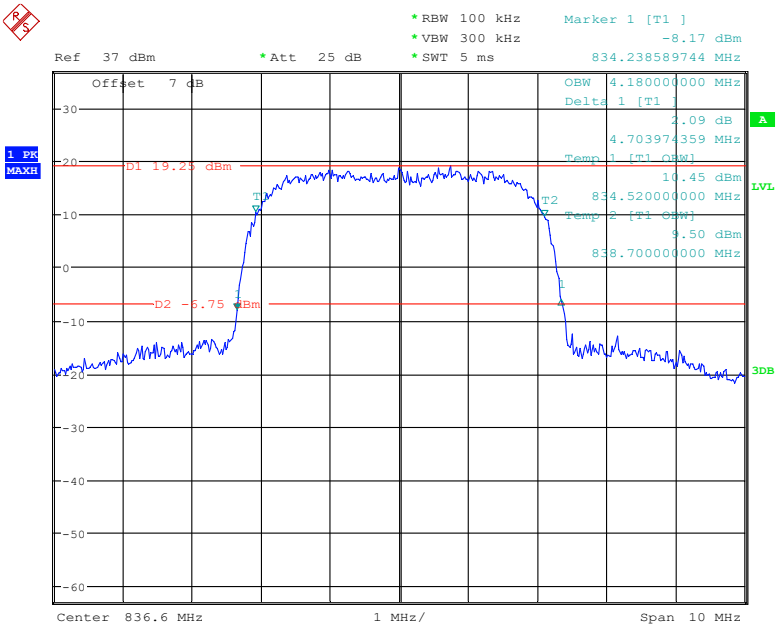
Date: 21.FEB.2022 14:44:04

26 dB Emissions &99% Occupied Bandwidth for HSUPA (BPSK) Mode, Low channel



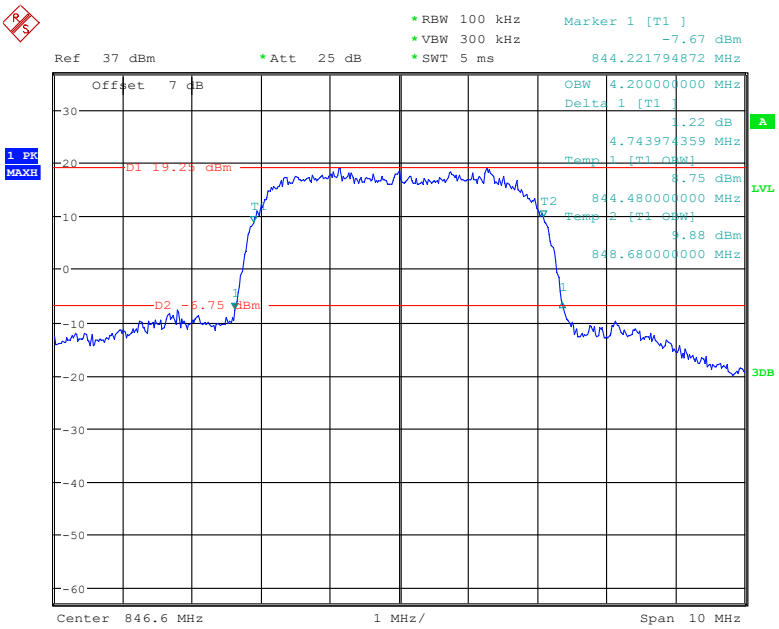
Date: 14.JAN.2022 11:10:12

26 dB Emissions &99% Occupied Bandwidth for HSUPA (BPSK) Mode, Middle channel



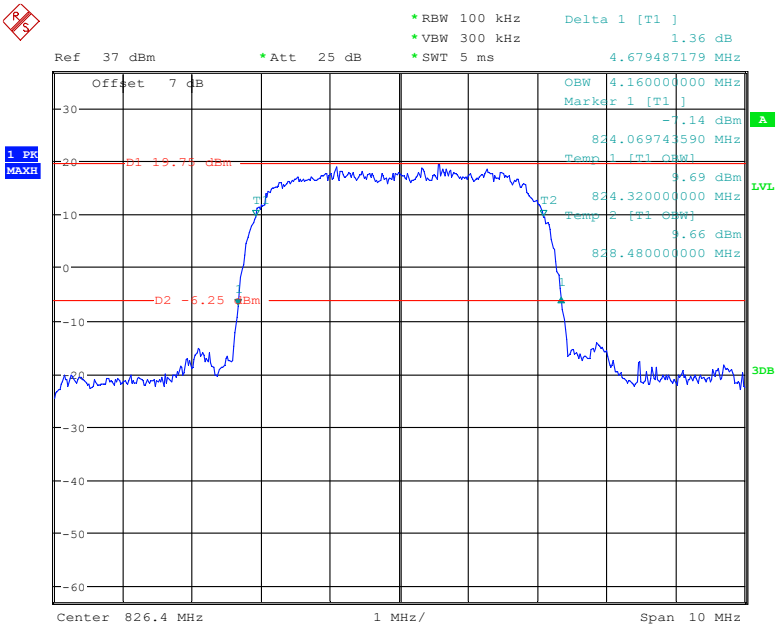
Date: 14.JAN.2022 11:11:19

26 dB Emissions &99% Occupied Bandwidth for HSUPA (BPSK) Mode, High channel



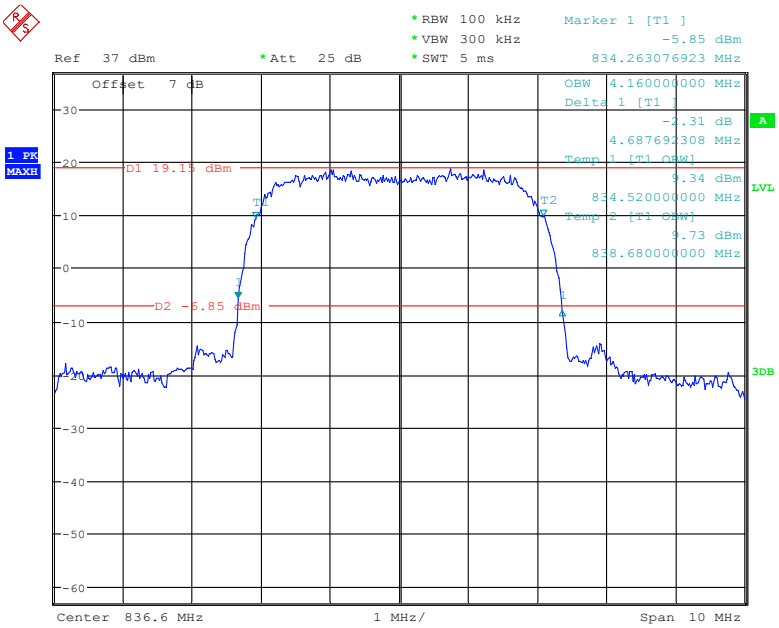
Date: 14.JAN.2022 11:12:17

26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel



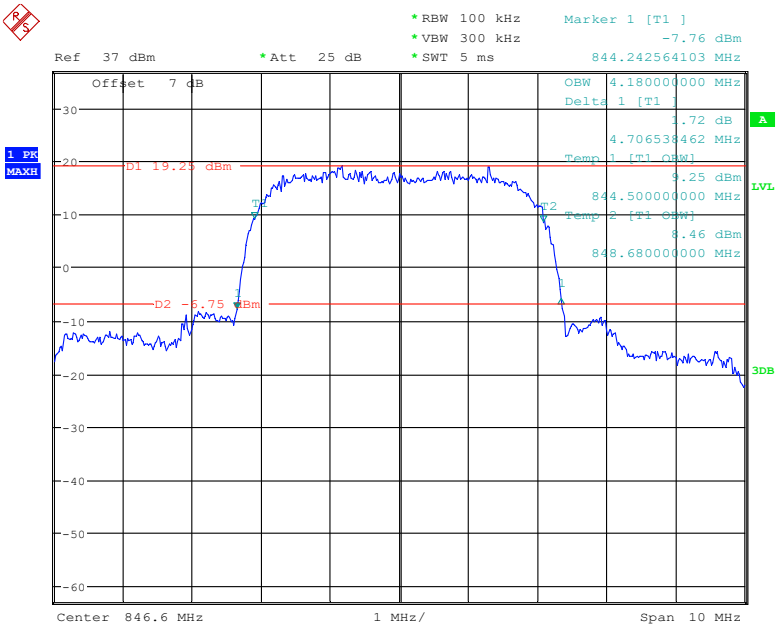
Date: 14.JAN.2022 11:15:30

26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel



Date: 14.JAN.2022 11:16:37

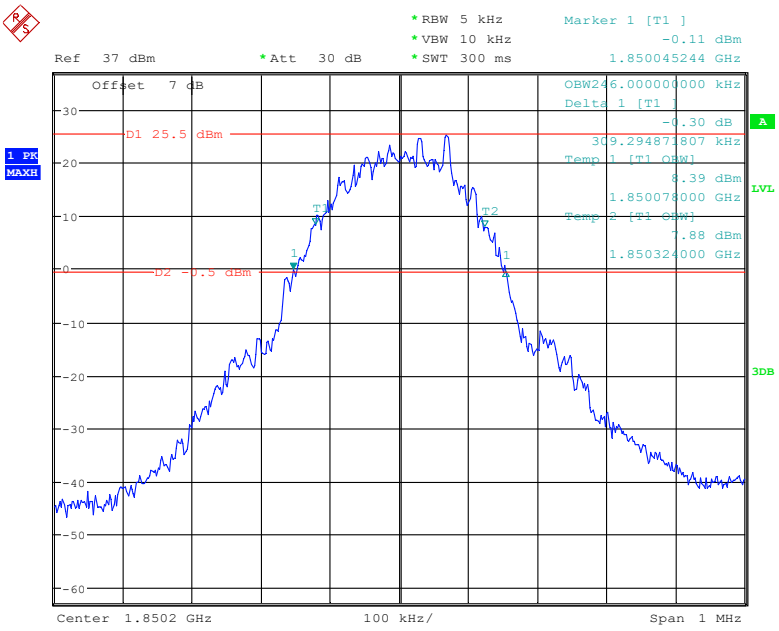
26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel



Date: 14.JAN.2022 11:17:22

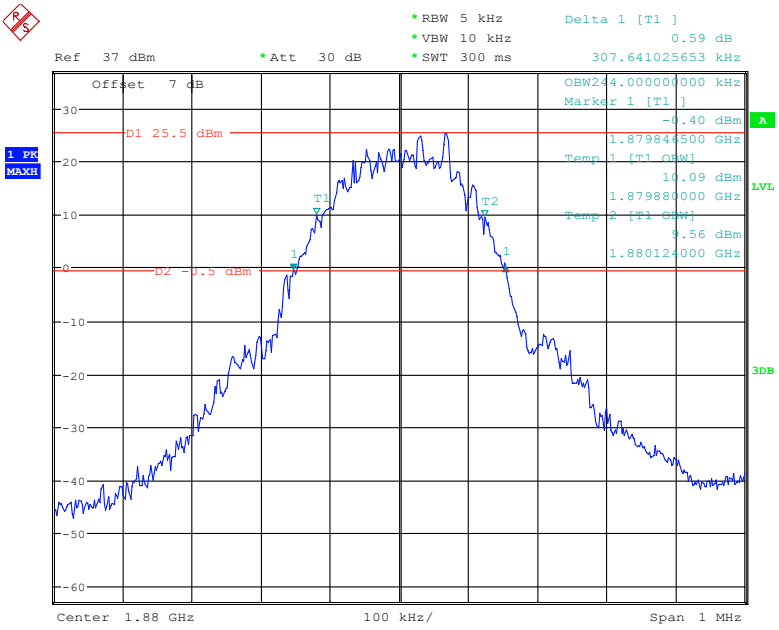
PCS Band (Part 24E)

26 dB Emissions &99% Occupied Bandwidth for GSM (GMSK) Mode, Low channel



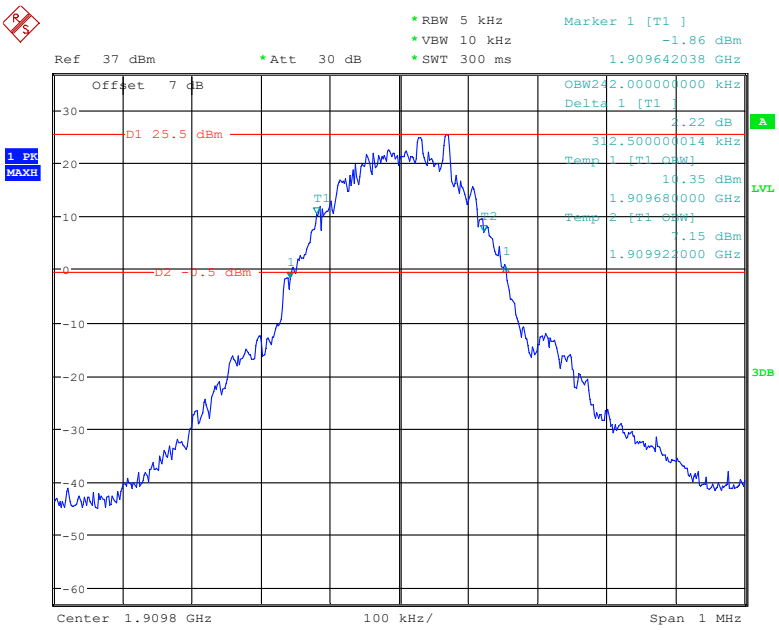
Date: 14.JAN.2022 09:26:23

26 dB Emissions &99% Occupied Bandwidth for GSM (GMSK) Mode, Middle channel



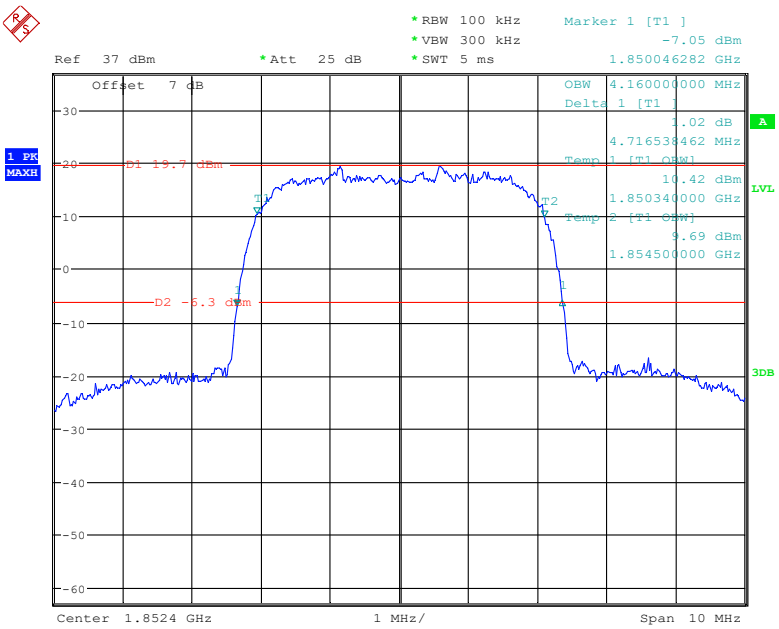
Date: 14.JAN.2022 09:25:15

26 dB Emissions &99% Occupied Bandwidth for GSM (GMSK)) Mode, High channel



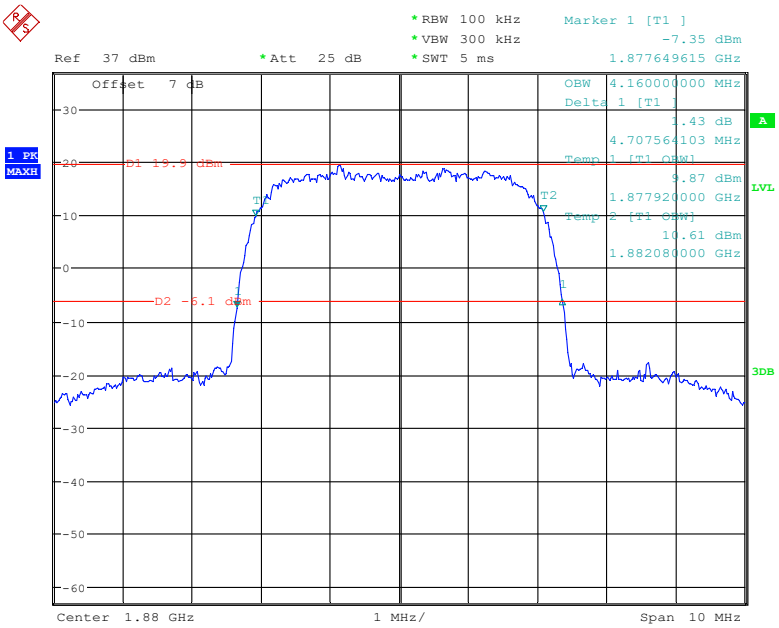
Date: 14.JAN.2022 09:24:46

26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel



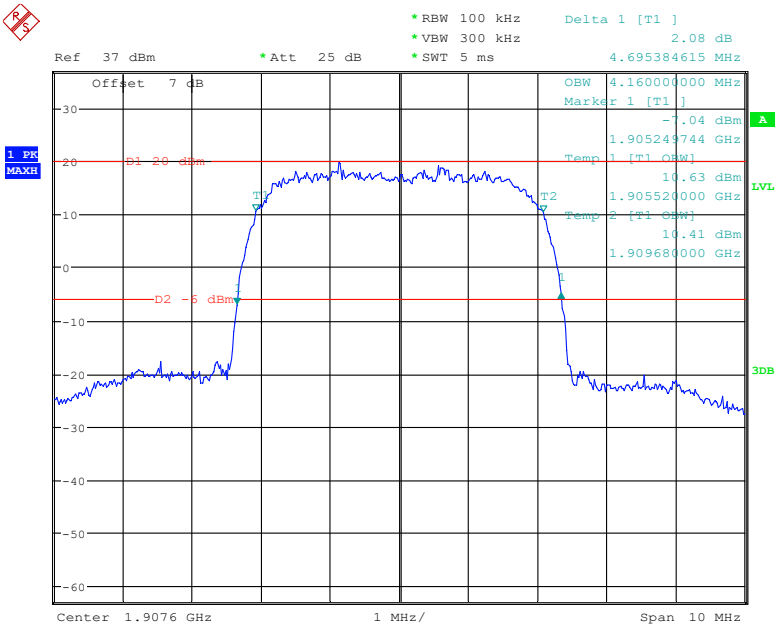
Date: 14.JAN.2022 10:56:12

26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel



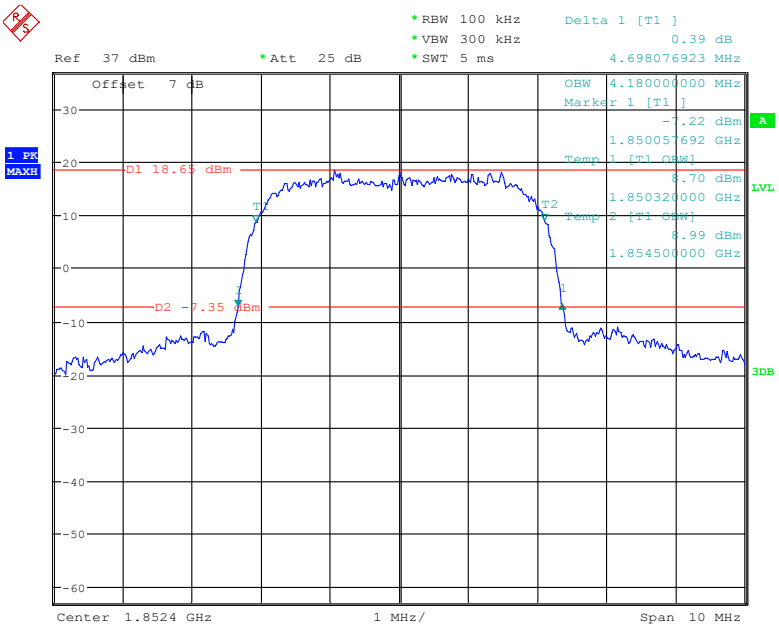
Date: 14.JAN.2022 10:55:07

26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode, High channel



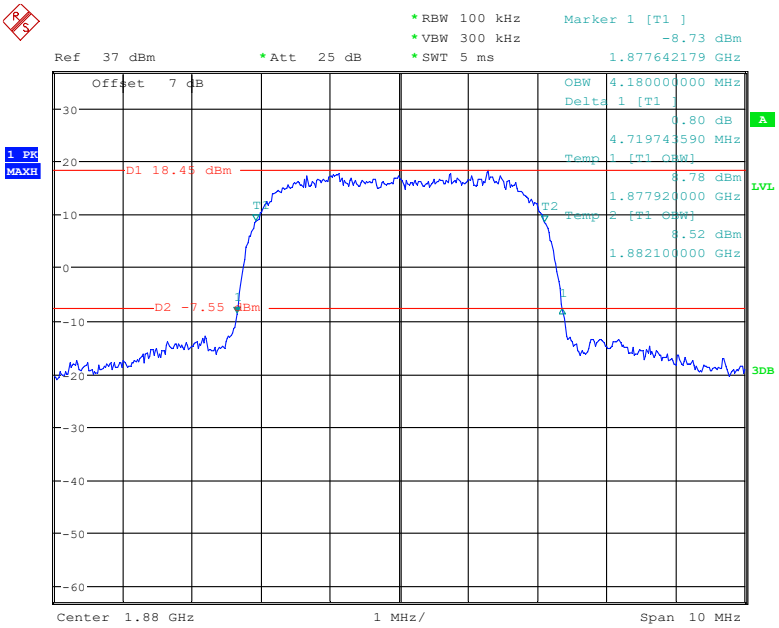
Date: 14.JAN.2022 10:53:46

26 dB Emissions &99% Occupied Bandwidth for HSUPA (BPSK) Mode, Low channel



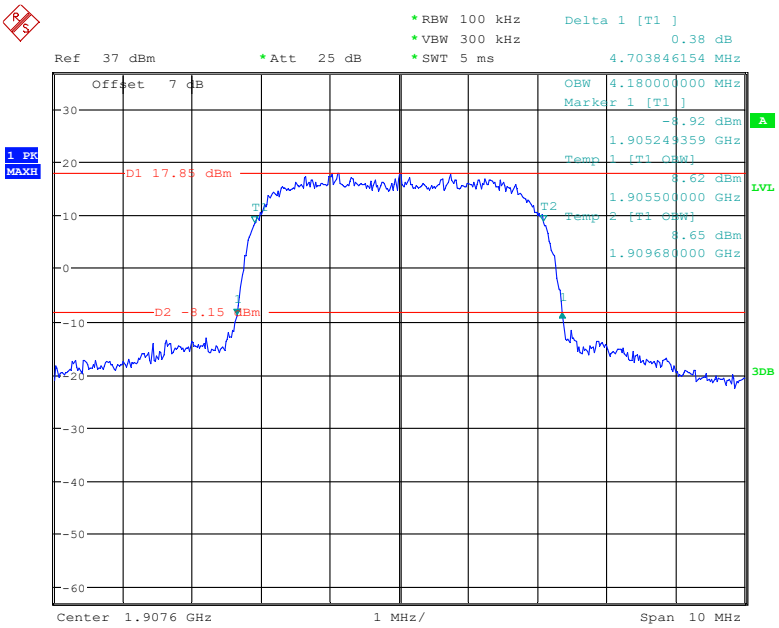
Date: 14.JAN.2022 11:09:10

26 dB Emissions &99% Occupied Bandwidth for HSUPA (BPSK) Mode, Middle channel



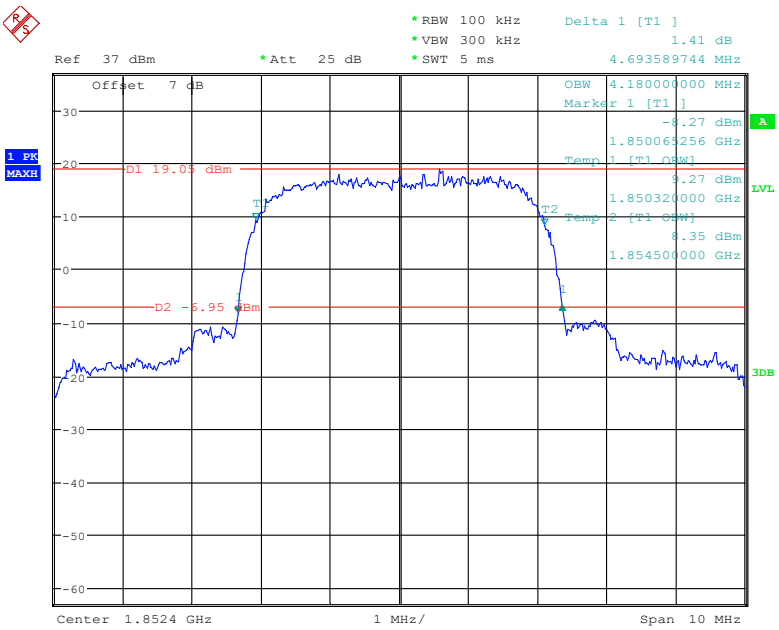
Date: 14.JAN.2022 11:08:13

26 dB Emissions &99% Occupied Bandwidth for HSUPA (BPSK) Mode, High channel



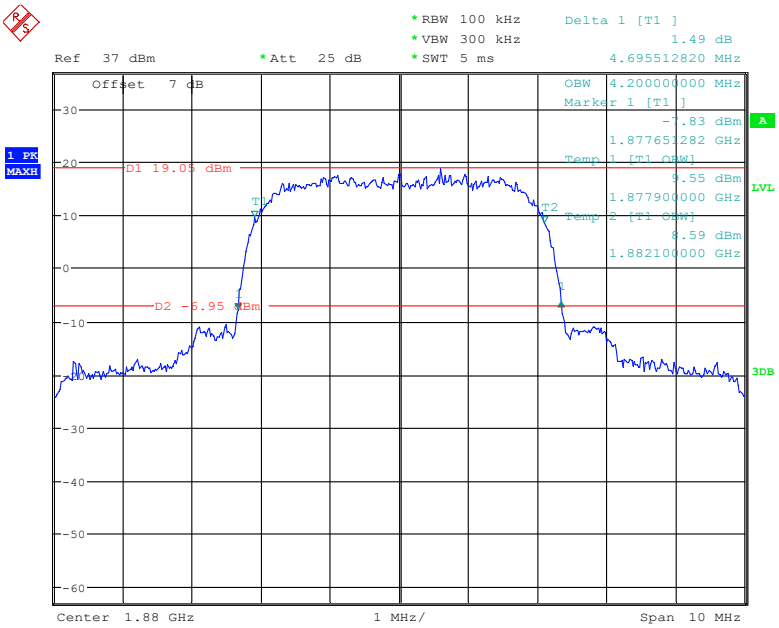
Date: 14.JAN.2022 11:07:16

26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel



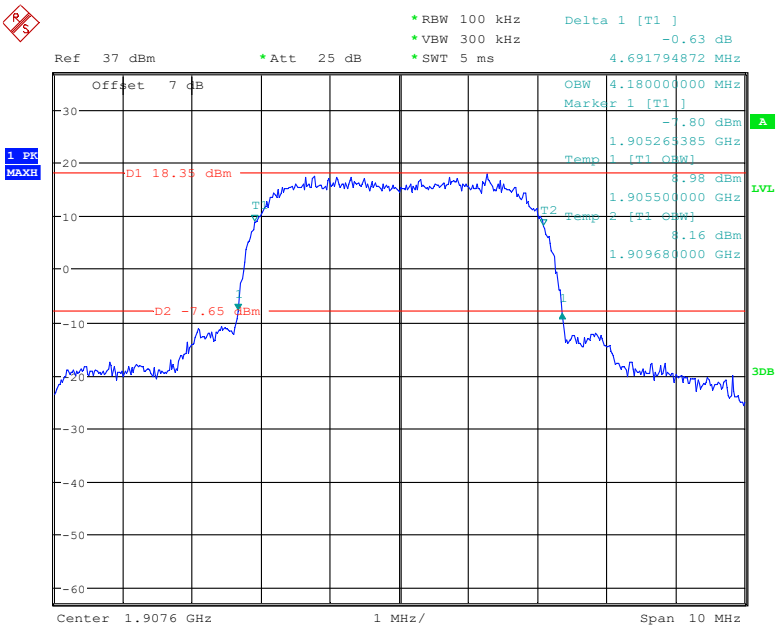
Date: 14.JAN.2022 11:18:15

26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel



Date: 14.JAN.2022 11:19:06

26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel



Date: 14.JAN.2022 11:19:57

LTE Band 2:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.104	1.260	1.104	1.260	1.110	1.260
	16QAM	1.116	1.266	1.098	1.260	1.104	1.260
3 MHz	QPSK	2.712	3.000	2.700	3.000	2.700	3.012
	16QAM	2.700	3.036	2.700	3.012	2.700	3.012
5 MHz	QPSK	4.520	5.020	4.520	5.000	4.520	4.940
	16QAM	4.520	4.980	4.520	5.020	4.520	5.000
10 MHz	QPSK	9.000	9.760	8.960	9.760	8.960	9.760
	16QAM	9.000	9.800	9.000	9.800	8.960	9.720
15 MHz	QPSK	13.620	15.060	13.560	15.060	13.500	15.120
	16QAM	13.560	15.060	13.620	15.120	13.560	15.120
20 MHz	QPSK	18.000	19.600	18.000	19.760	18.000	19.760
	16QAM	18.080	19.760	18.080	19.840	18.000	19.760

LTE Band 5:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.104	1.260	1.110	1.254	1.104	1.260
	16QAM	1.110	1.260	1.098	1.254	1.104	1.260
3 MHz	QPSK	2.712	3.000	2.700	3.000	2.700	3.012
	16QAM	2.700	3.012	2.700	3.000	2.700	3.036
5 MHz	QPSK	4.520	5.000	4.520	5.000	4.520	4.960
	16QAM	4.520	4.980	4.540	5.020	4.540	5.020
10 MHz	QPSK	8.960	9.680	8.960	9.760	8.960	9.760
	16QAM	8.960	9.720	8.960	9.760	8.960	9.760

LTE Band 12:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.104	1.254	1.104	1.254	1.104	1.260
	16QAM	1.110	1.260	1.098	1.248	1.104	1.260
3 MHz	QPSK	2.712	2.988	2.700	3.000	2.688	3.024
	16QAM	2.688	3.000	2.688	3.000	2.700	3.036
5 MHz	QPSK	4.520	4.980	4.520	5.000	4.520	4.980
	16QAM	4.520	4.980	4.540	5.020	4.540	5.000
10 MHz	QPSK	8.960	9.760	9.000	9.760	8.960	9.720
	16QAM	8.960	9.760	9.000	9.840	8.960	9.760

LTE Band 41

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
5 MHz	QPSK	4.520	5.240	4.520	5.020	4.520	4.980
	16QAM	4.500	4.980	4.520	5.060	4.520	5.000
10 MHz	QPSK	8.960	10.041	8.960	9.840	8.960	9.880
	16QAM	8.960	9.600	8.960	9.720	8.960	10.000
15 MHz	QPSK	13.620	16.560	13.500	15.300	13.560	15.480
	16QAM	13.560	15.480	13.620	17.280	13.620	15.720
20 MHz	QPSK	18.000	19.440	18.000	19.520	18.000	19.600
	16QAM	18.000	19.760	18.000	20.000	18.000	20.080

The test plots of LTE band please refer to the Appendix A.

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

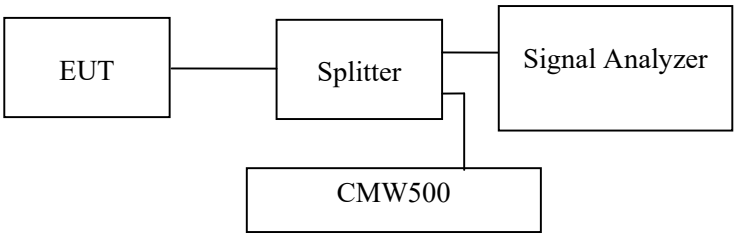
Applicable Standard

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 10^{th} harmonic.



Test Data

Environmental Conditions

Temperature:	27 ℃
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by Gala Liu from 2022-01-13 to 2022-02-21.

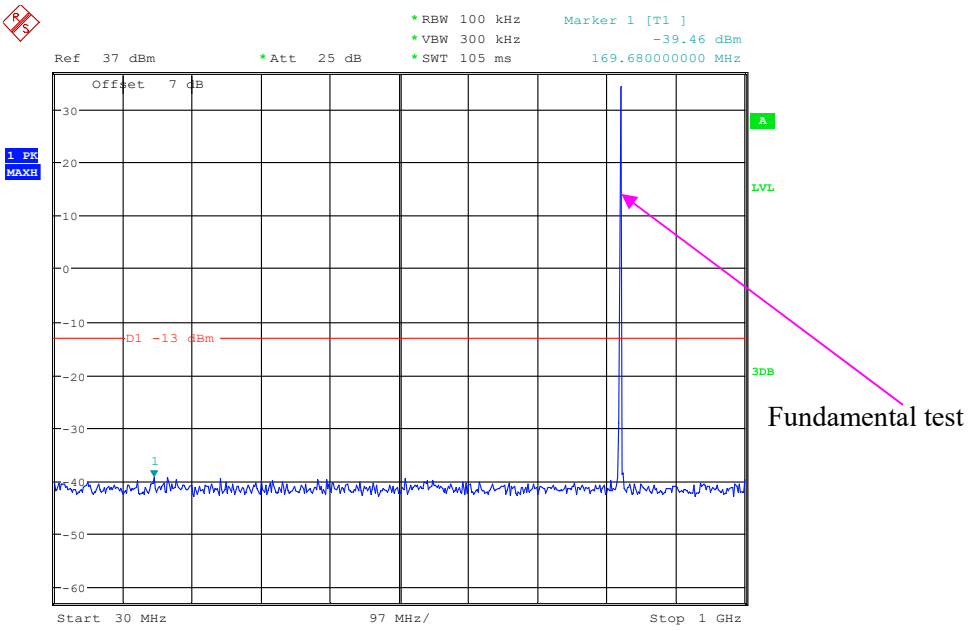
EUT operation mode: Transmitting

Test result: Pass

Please refer to the following plots.

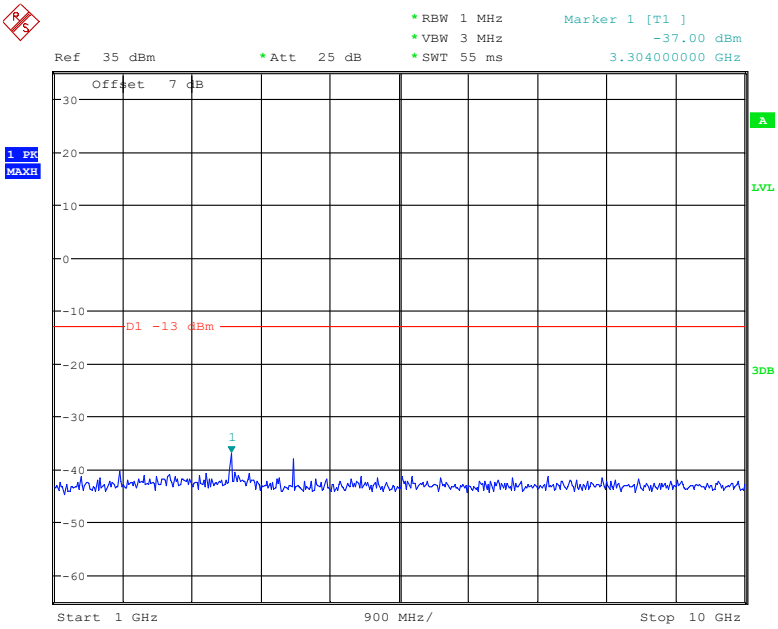
Cellular Band (Part 22H)
Low Channel:

30 MHz – 1 GHz (GSM Mode)



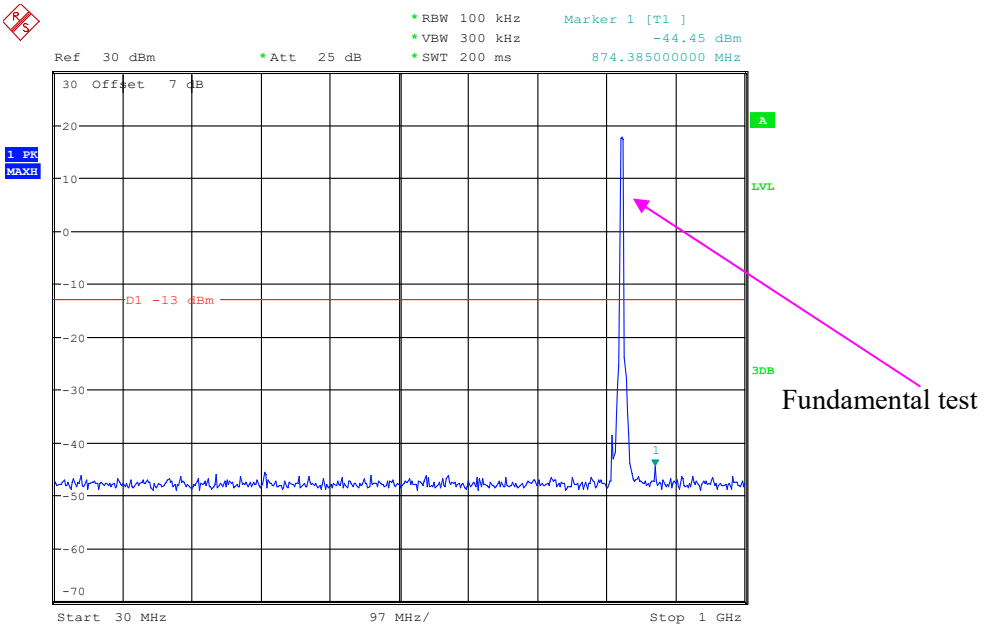
Date: 14.JAN.2022 09:52:17

1 GHz – 10 GHz (GSM Mode)



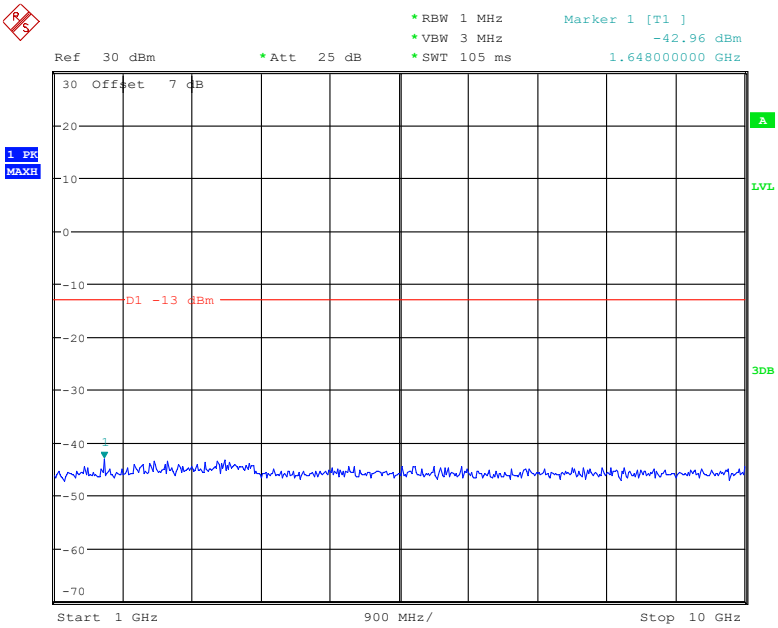
Date: 14.JAN.2022 09:49:25

30 MHz – 1 GHz (WCDMA Mode)



Date: 14.JAN.2022 11:30:43

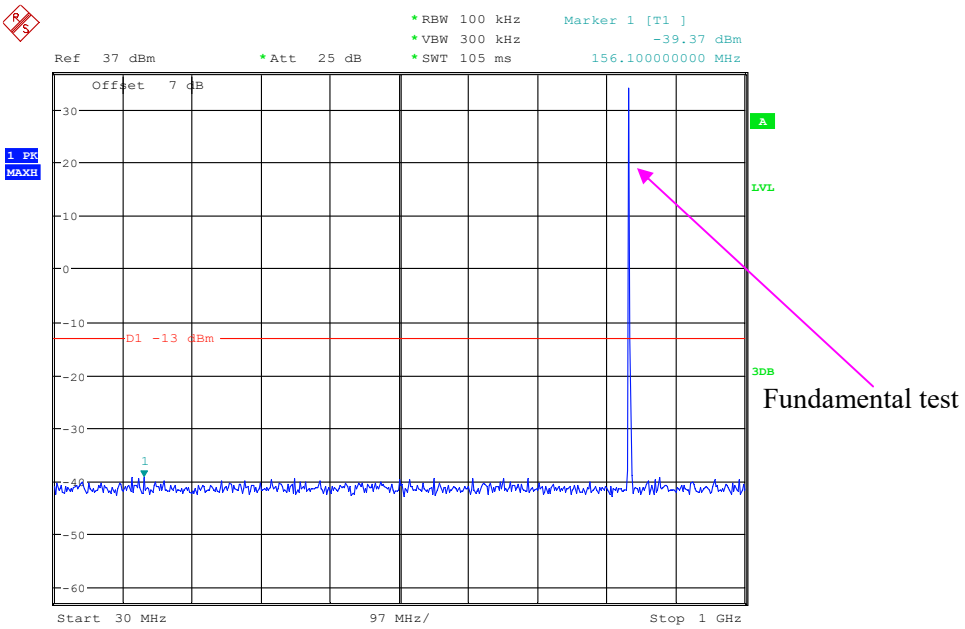
1 GHz – 10 GHz (WCDMA Mode)



Date: 14.JAN.2022 11:37:21

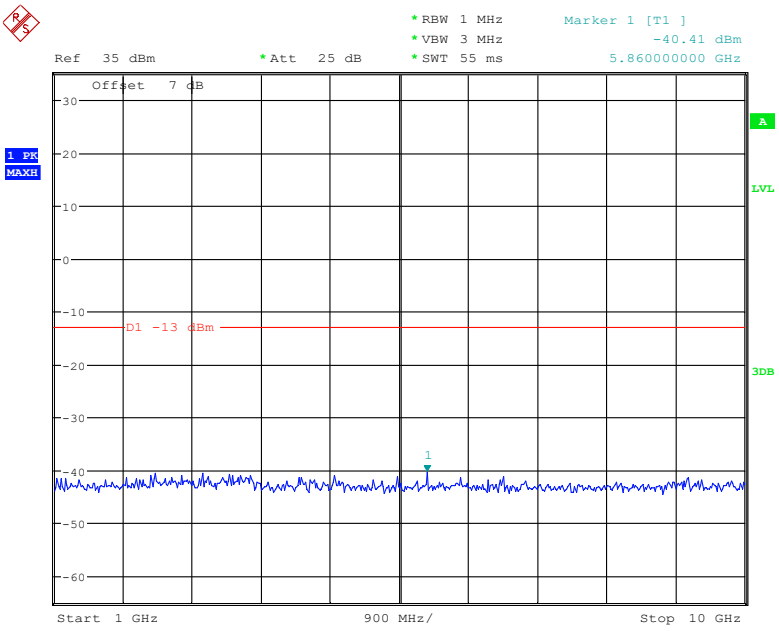
Middle Channel:

30 MHz – 1 GHz (GSM Mode)



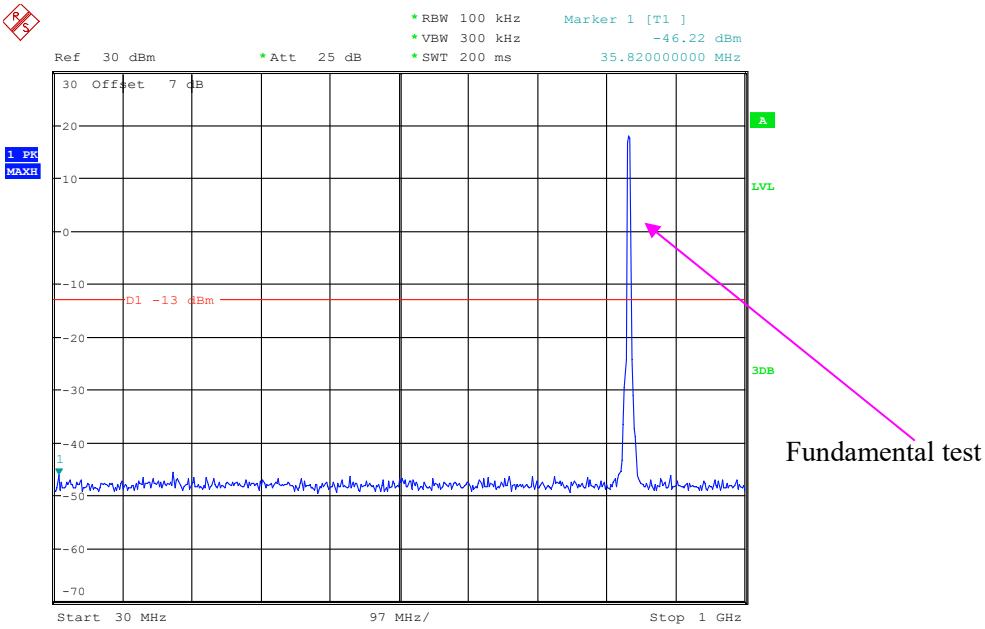
Date: 14.JAN.2022 09:51:56

1 GHz – 10 GHz (GSM Mode)



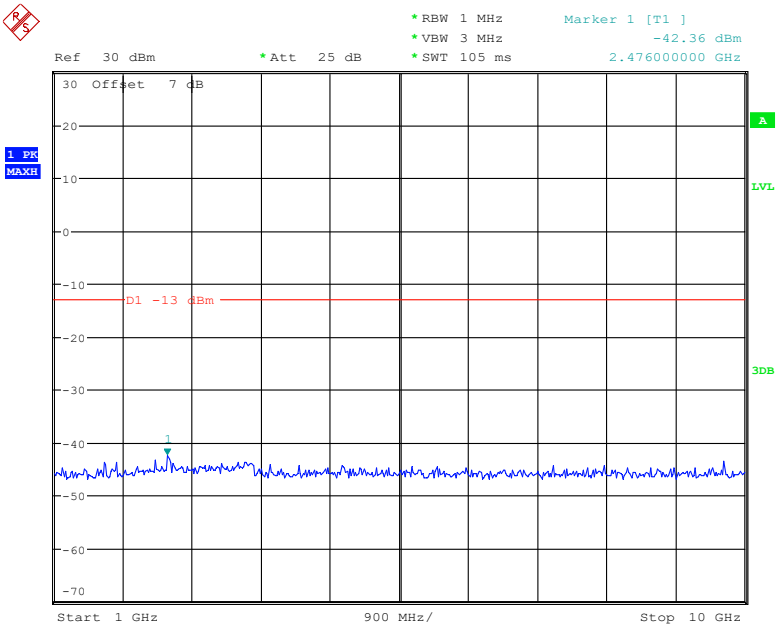
Date: 14.JAN.2022 09:50:05

30 MHz – 1 GHz (WCDMA Mode)



Date: 14.JAN.2022 11:31:10

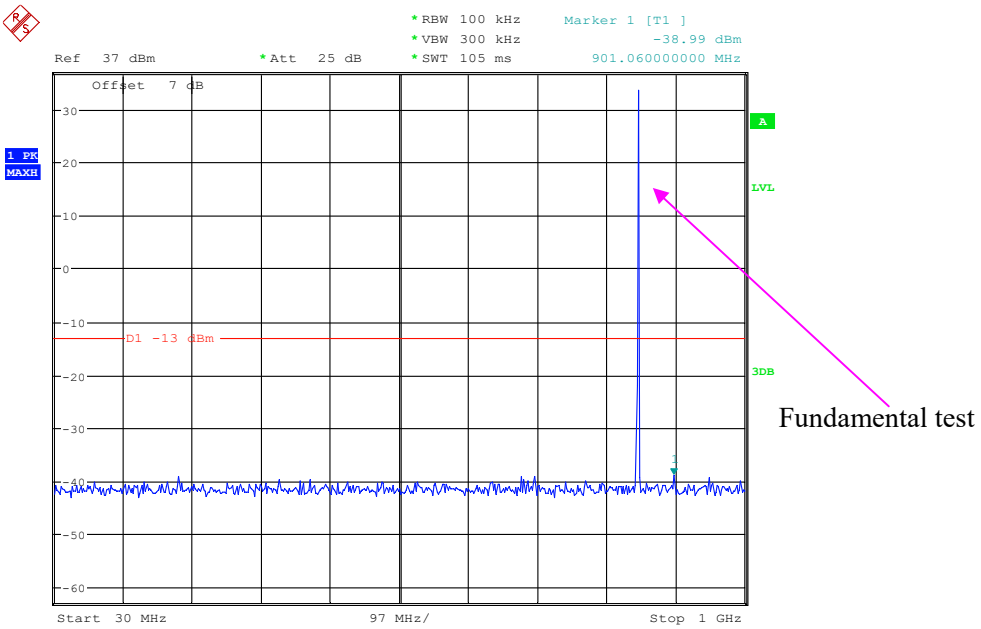
1 GHz – 10 GHz (WCDMA Mode)



Date: 14.JAN.2022 11:37:44

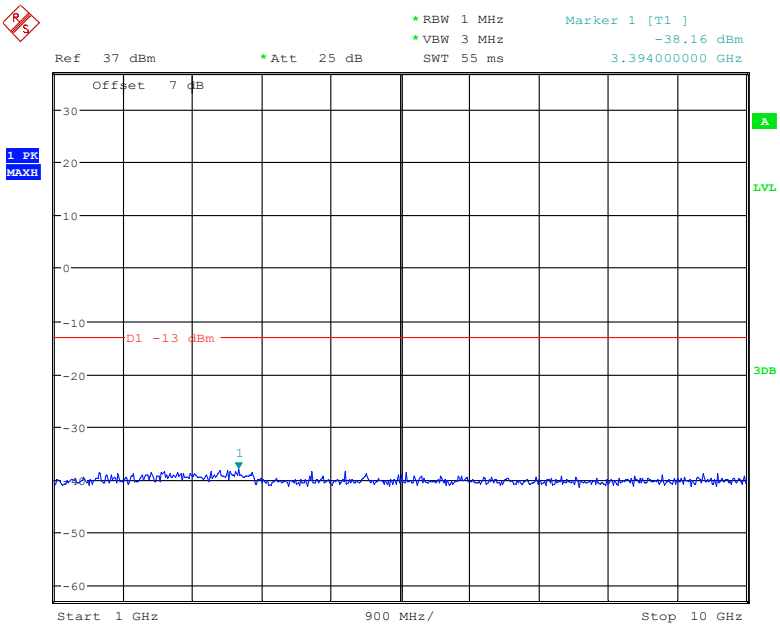
High Channel:

30 MHz – 1 GHz (GSM Mode)



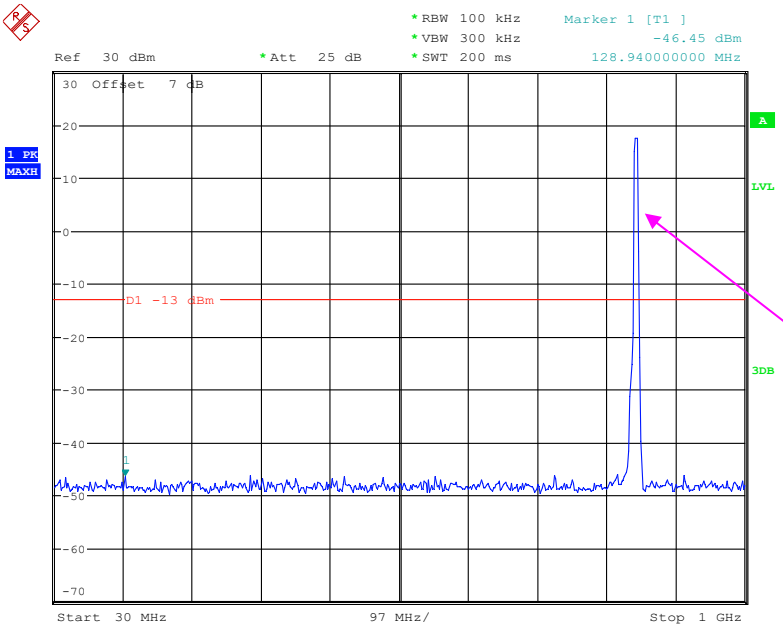
Date: 14.JAN.2022 09:51:19

1 GHz – 10 GHz (GSM Mode)



Date: 21.FEB.2022 14:48:35

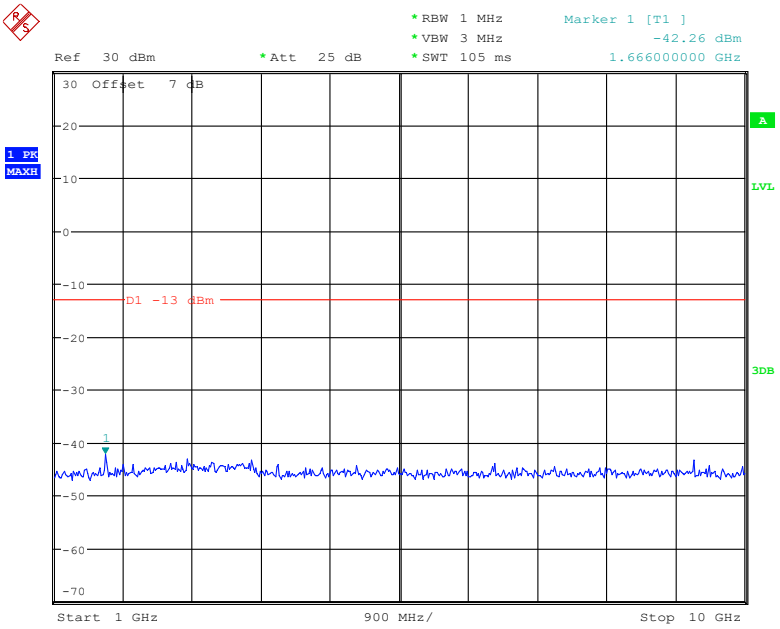
30 MHz – 1 GHz (WCDMA Mode)



Fundamental test

Date: 14.JAN.2022 11:31:28

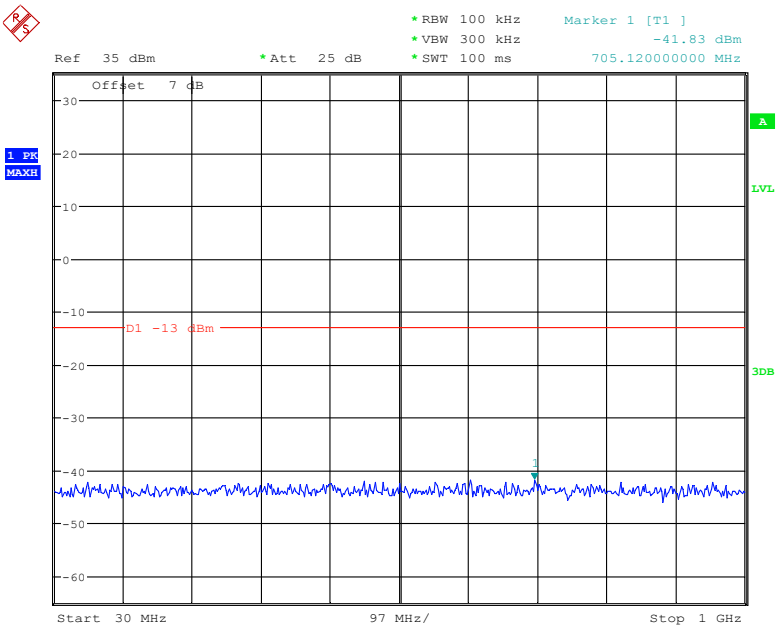
1 GHz – 10 GHz (WCDMA Mode)



Date: 14.JAN.2022 11:37:57

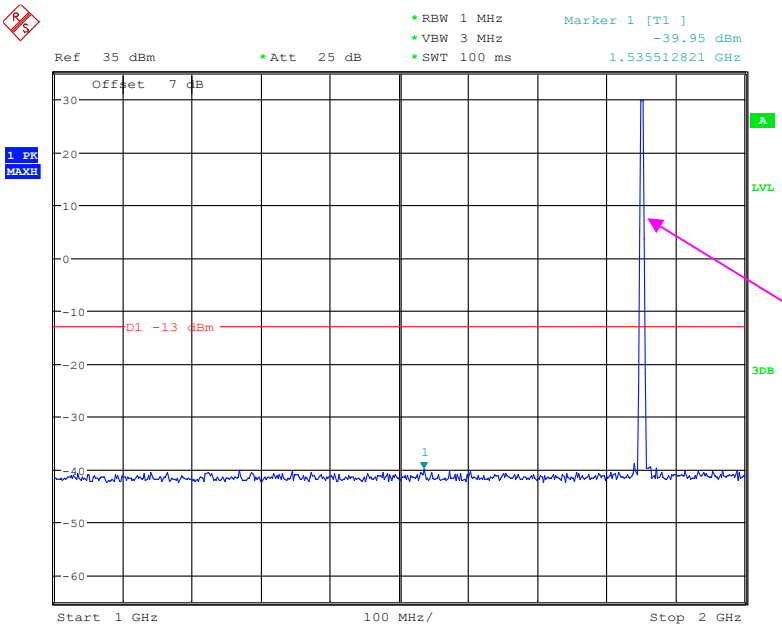
PCS Band (Part24E)
Low Channel:

30 MHz – 1 GHz (GSM Mode)



Date: 14.JAN.2022 09:35:02

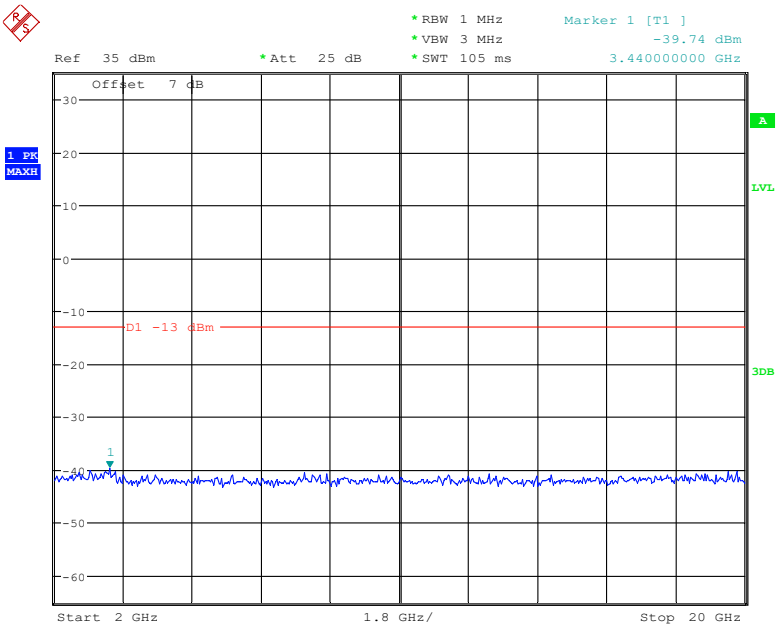
1 GHz – 2 GHz (GSM Mode)



Fundamental test

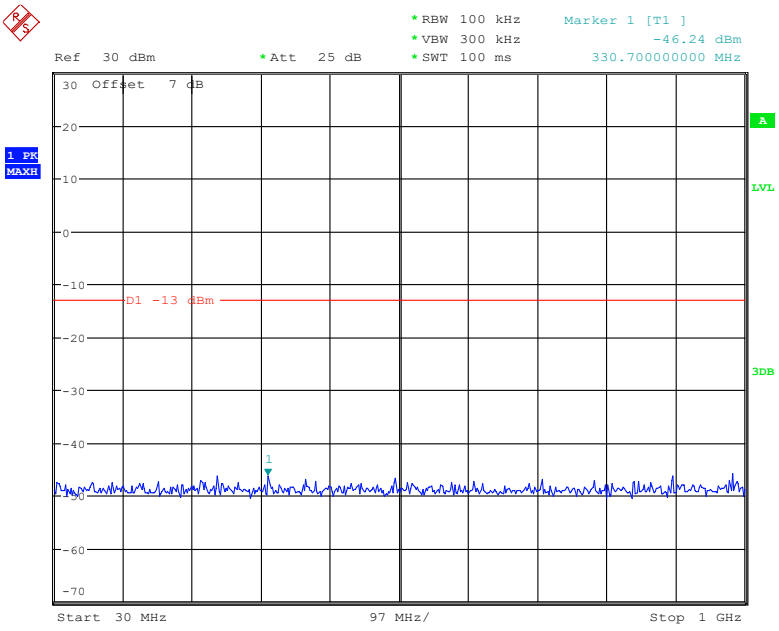
Date: 14.JAN.2022 09:44:23

2 GHz – 20 GHz (GSM Mode)



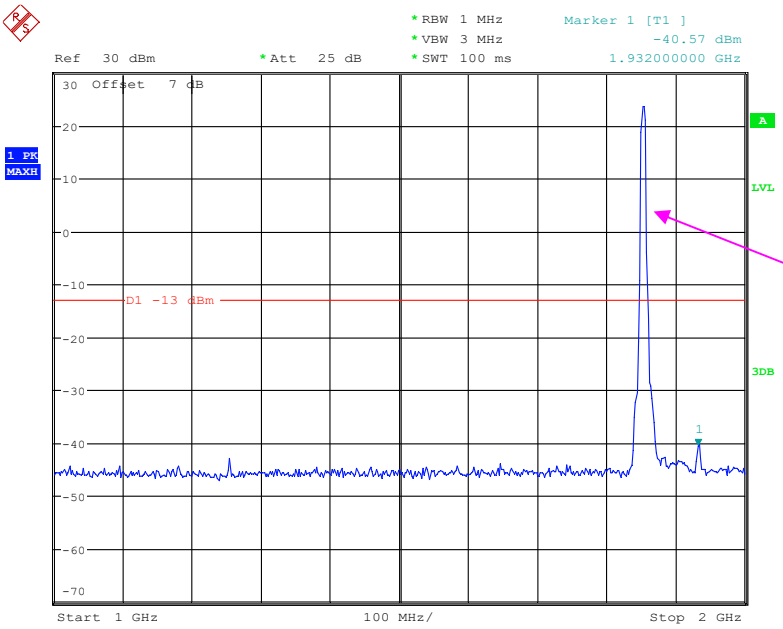
Date: 14.JAN.2022 09:46:09

30 MHz – 1 GHz (WCDMA Mode)



Date: 14.JAN.2022 11:31:51

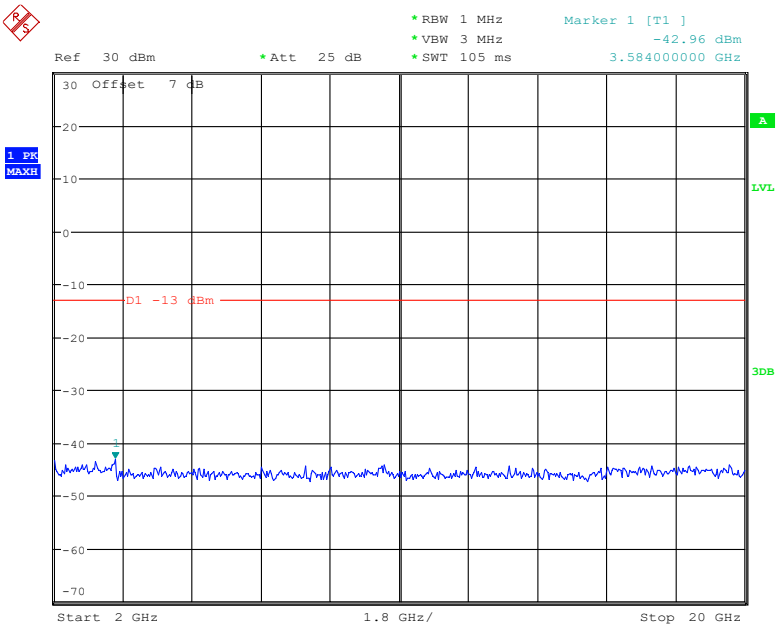
1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 14.JAN.2022 11:34:29

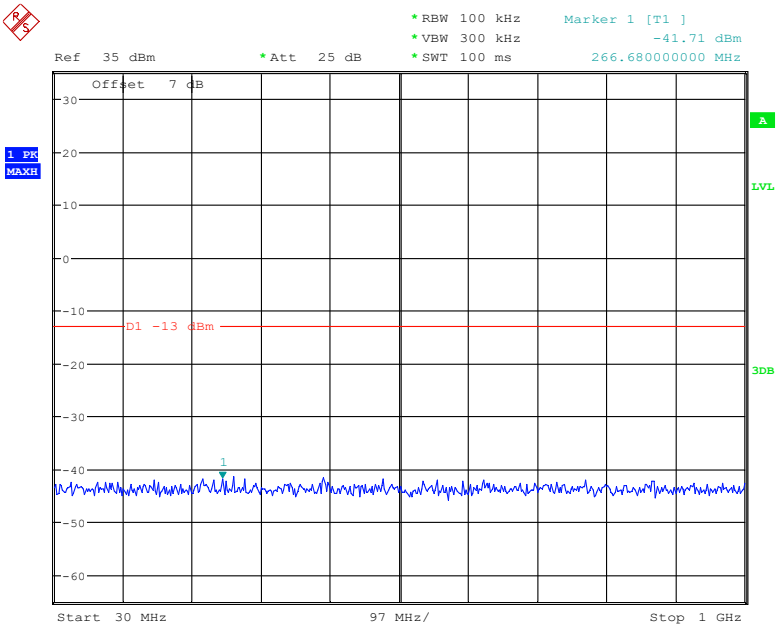
2 GHz – 20 GHz (WCDMA Mode)



Date: 14.JAN.2022 11:36:17

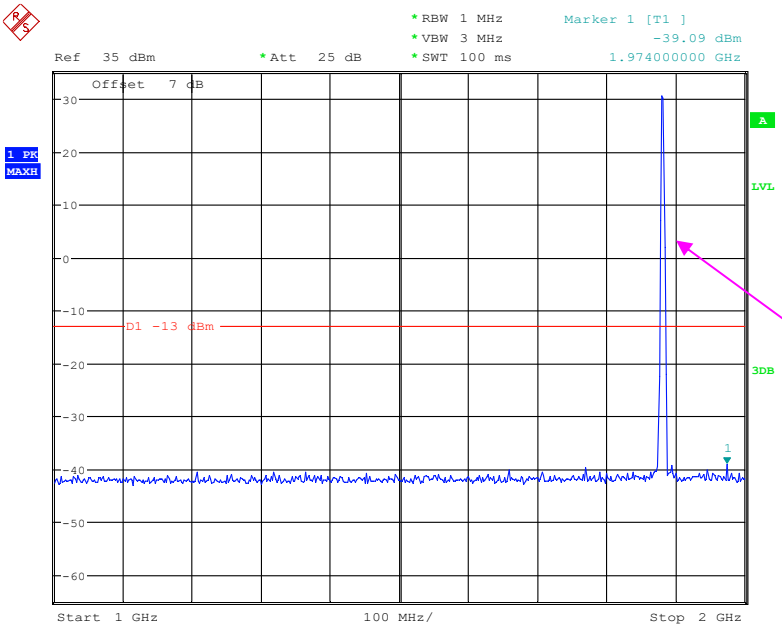
Middle Channel:

30 MHz – 1 GHz (GSM Mode)



Date: 14.JAN.2022 09:35:30

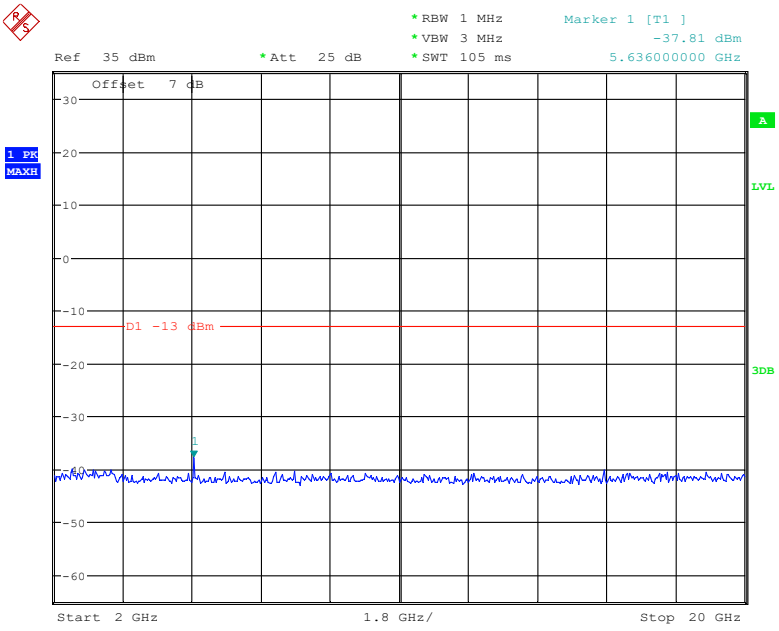
1 GHz – 2 GHz (GSM Mode)



Fundamental test

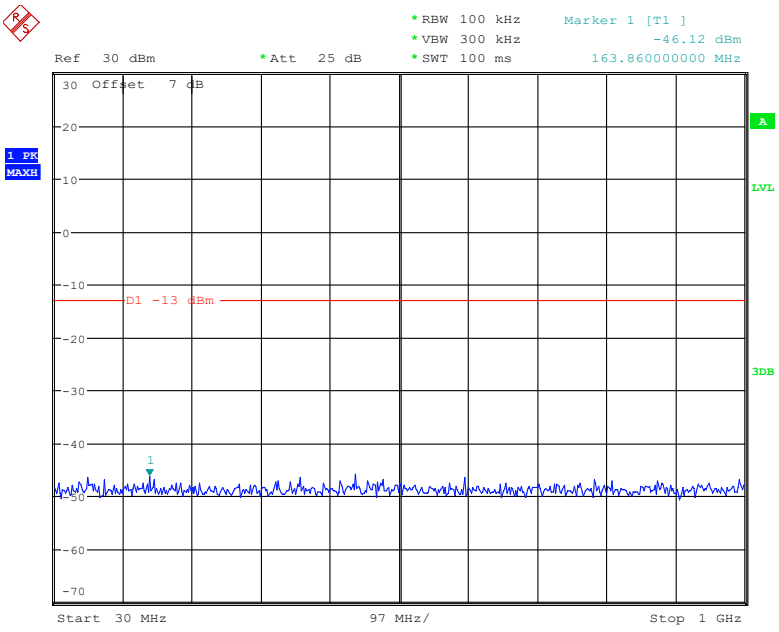
Date: 14.JAN.2022 09:44:44

2 GHz– 20 GHz (GSMMode)



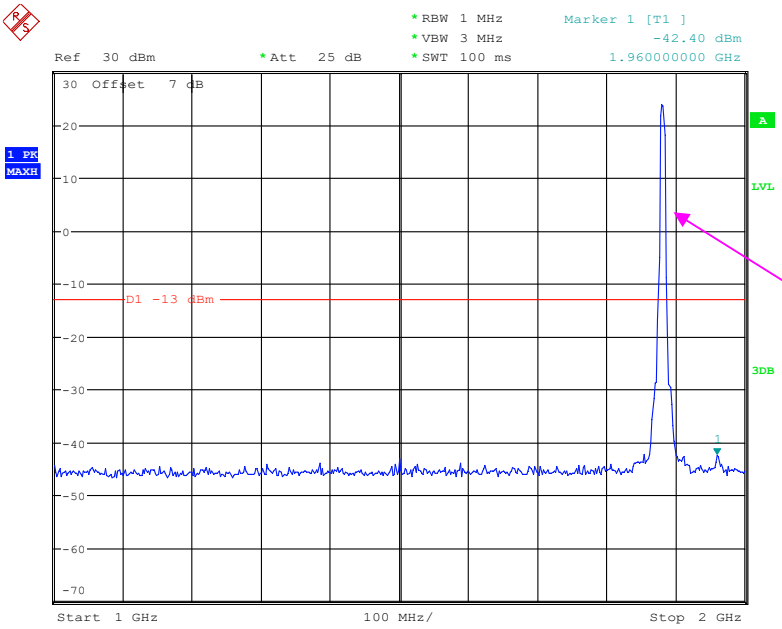
Date: 14.JAN.2022 09:45:52

30 MHz – 1 GHz (WCDMA Mode)



Date: 14.JAN.2022 11:32:02

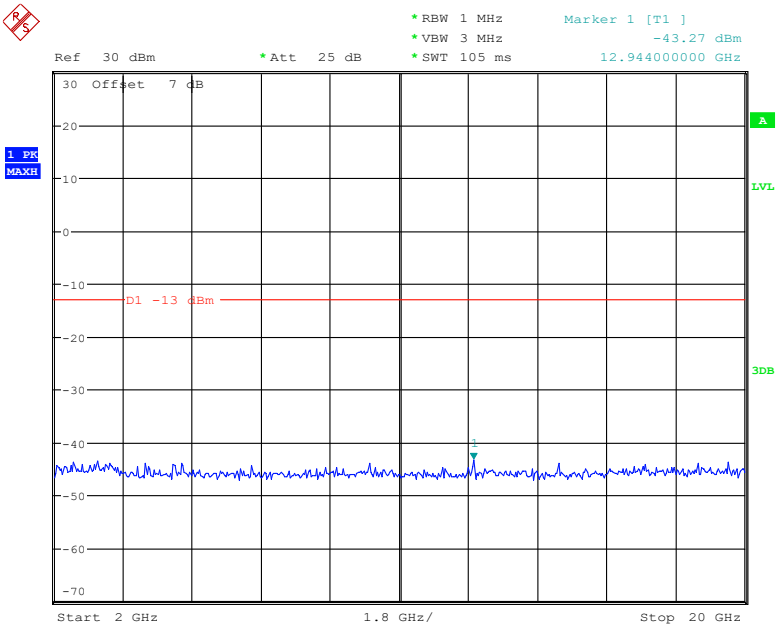
1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 14.JAN.2022 11:35:24

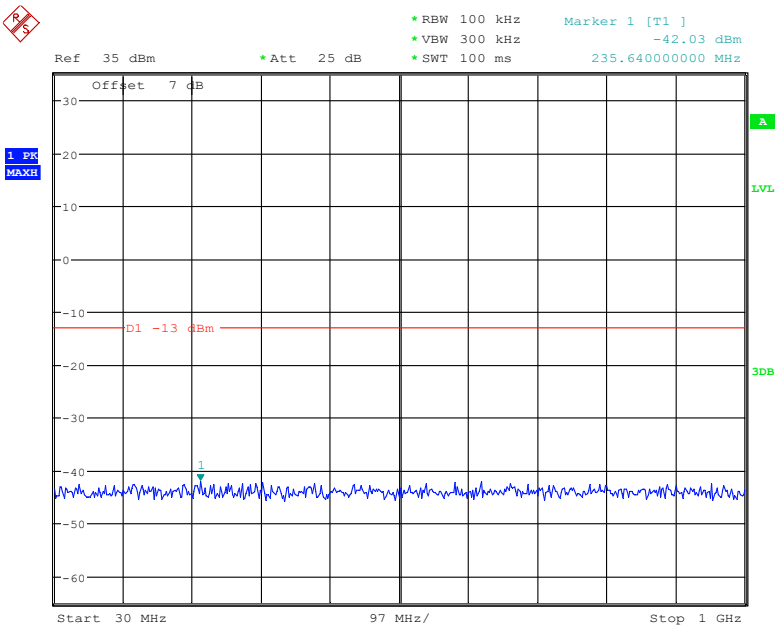
2 GHz – 20 GHz (WCDMA Mode)



Date: 14.JAN.2022 11:36:30

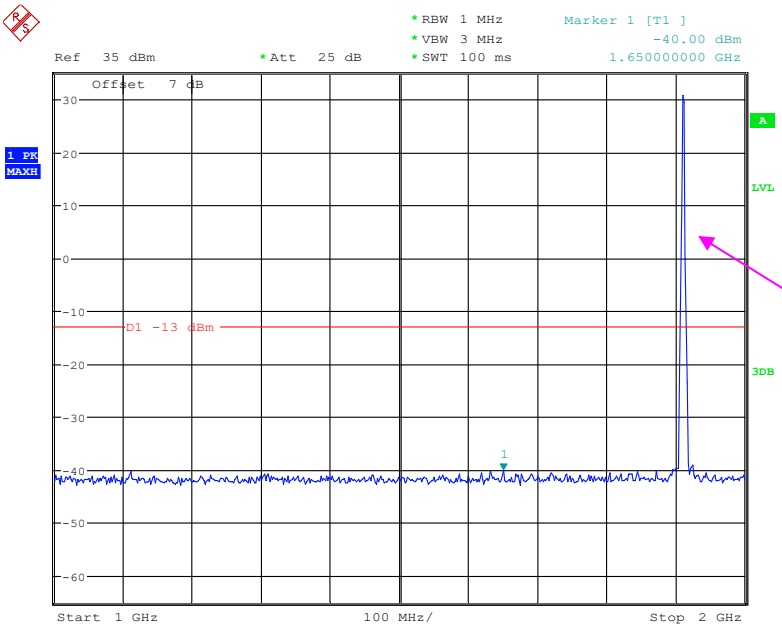
High Channel:

30 MHz – 1 GHz (GSM Mode)



Date: 14.JAN.2022 09:35:40

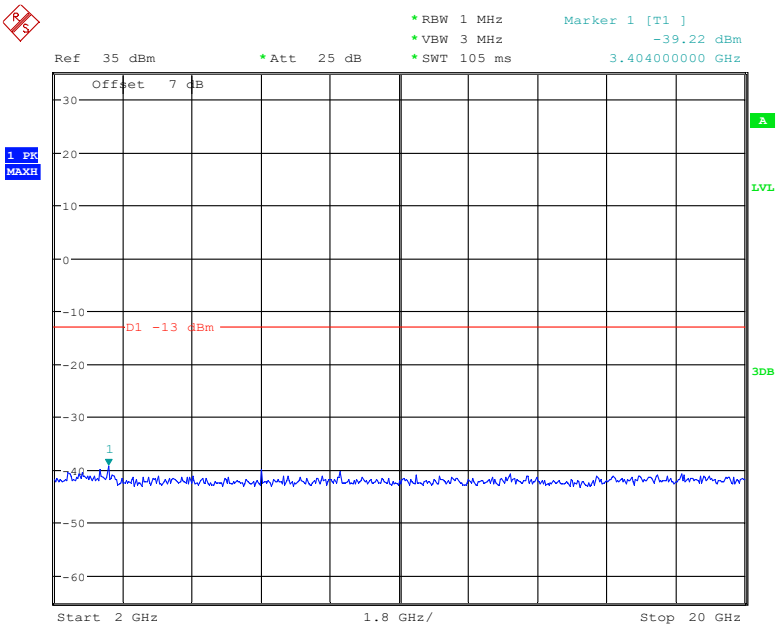
1 GHz– 2 GHz (GSM Mode)



Fundamental test

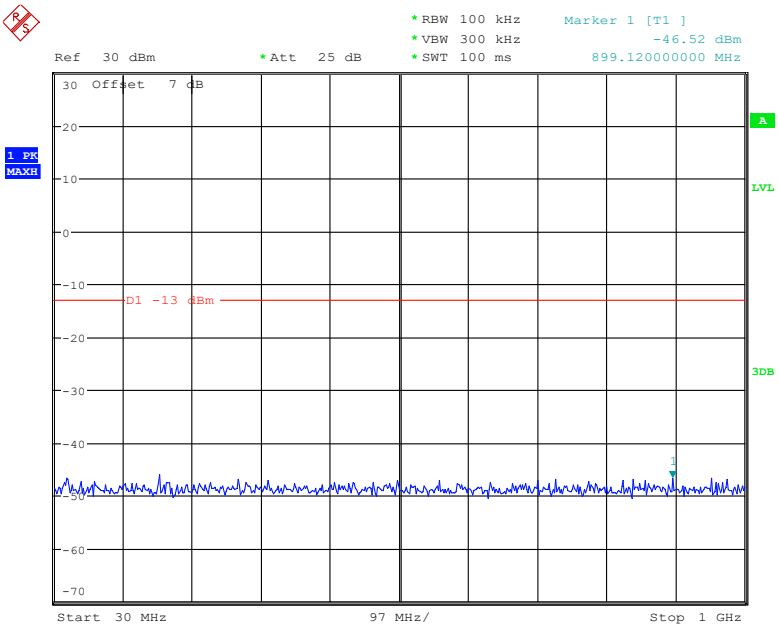
Date: 14.JAN.2022 09:45:05

2 GHz– 20 GHz (GSM Mode)



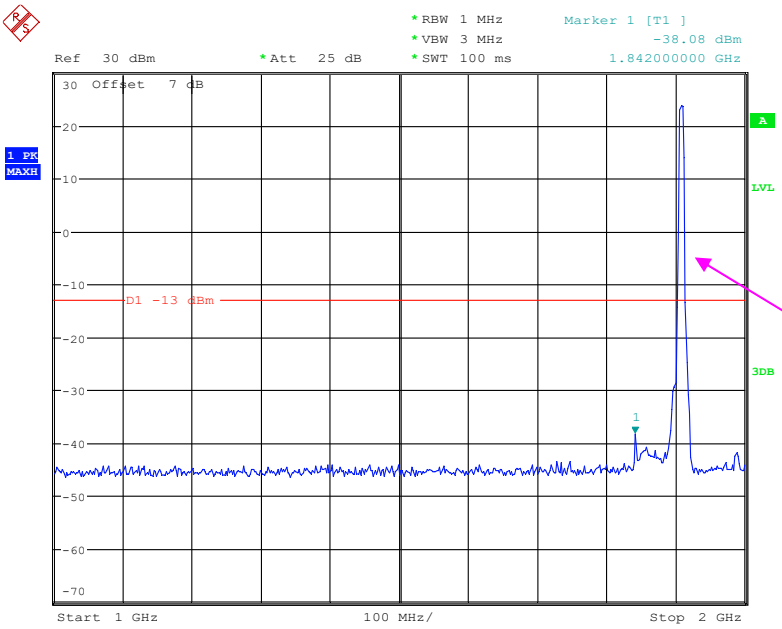
Date: 14.JAN.2022 09:45:30

30 MHz – 1 GHz (WCDMA Mode)



Date: 14.JAN.2022 11:32:16

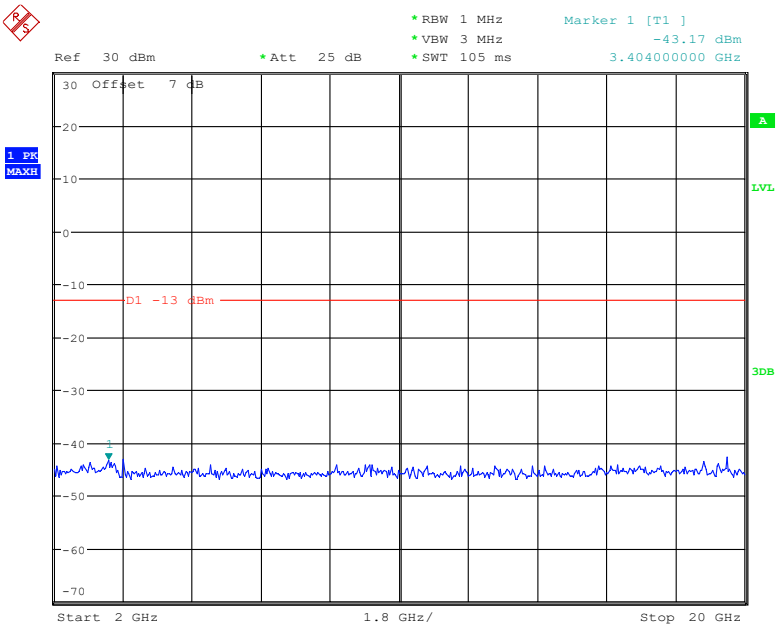
1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 14.JAN.2022 11:33:35

2GHz – 20 GHz (WCDMA Mode)



Date: 14.JAN.2022 11:36:51

The test plots of LTE band please 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:	21~25.5℃
Relative Humidity:	50~62 %
ATM Pressure:	101.0~101.2 kPa

The testing was performed byBinDeng on 2022-01-25 for below 1GHz, on 2022-01-13 and 2022-01-18and 2022-01-19 for above 1GHz.

EUT operation mode: Transmitting(Pre-scan in the X,Y and Z axes of orientation, the worst case Y-axes of orientation was recorded)

The worst case is as below:

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
GSM850								
Test frequency range: 30MHz-10GHz								
Low channel								
45.134	-75.23	88	1.9	H	6.58	-68.65	-13	-55.65
40.356	-60.67	347	2.1	V	2.06	-58.61	-13	-45.61
1648.4	-52.53	59	1.6	H	3.5	-49.03	-13	-36.03
1648.4	-51.91	234	1.8	V	3.1	-48.81	-13	-35.81
2472.6	-41.22	11	1.6	H	6.6	-34.62	-13	-21.62
2472.6	-38.86	118	1.9	V	5.8	-33.06	-13	-20.06
Middle channel								
45.134	-75.82	267	1.9	H	6.58	-69.24	-13	-56.24
40.356	-61.33	38	1.7	V	2.06	-59.27	-13	-46.27
1673.2	-53.55	248	2.0	H	3.8	-49.75	-13	-36.75
1673.2	-51.37	82	1.6	V	3.1	-48.27	-13	-35.27
2509.8	-40.83	218	1.8	H	6.2	-34.63	-13	-21.63
2509.8	-39.33	321	1.7	V	5.6	-33.73	-13	-20.73
High channel								
45.134	-75.39	311	1.8	H	6.58	-68.81	-13	-55.81
40.356	-60.56	284	2.0	V	2.06	-58.5	-13	-45.50
1697.6	-53.22	142	1.7	H	4.1	-49.12	-13	-36.12
1697.6	-51.2	233	1.5	V	3.1	-48.10	-13	-35.10
2546.4	-40.6	139	1.7	H	6.1	-34.50	-13	-21.50
2546.4	-39.64	9	1.7	V	5.8	-33.84	-13	-20.84

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
GSM1900								
Test frequency range: 30MHz-20GHz								
Low channel								
45.134	-75.79	51	2.0	H	6.58	-69.21	-13	-56.21
40.356	-61.2	180	2.0	V	2.06	-59.14	-13	-46.14
3700.4	-57.1	185	2.0	H	8.1	-49.00	-13	-36.00
3700.4	-56.88	99	1.8	V	7.6	-49.28	-13	-36.28
5550.6	-47.38	354	2.0	H	9.6	-37.78	-13	-24.78
5550.6	-44.64	266	1.8	V	9.1	-35.54	-13	-22.54
Middle channel								
45.134	-75.78	140	2.0	H	6.58	-69.2	-13	-56.2
40.356	-61.1	248	1.8	V	2.06	-59.04	-13	-46.04
3760	-57.09	345	1.6	H	8.8	-48.29	-13	-35.29
3760	-57.87	292	1.8	V	8	-49.87	-13	-36.87
5640	-47.38	239	2.1	H	10.2	-37.18	-13	-24.18
5640	-45.22	204	1.8	V	9.4	-35.82	-13	-22.82
High channel								
45.134	-75.55	223	2.0	H	6.58	-68.97	-13	-55.97
40.356	-61.29	256	1.9	V	2.06	-59.23	-13	-46.23
3819.6	-56.73	339	2.0	H	8.7	-48.03	-13	-35.03
3819.6	-57.13	103	1.7	V	8	-49.13	-13	-36.13
5729.4	-47.86	46	1.9	H	10.6	-37.26	-13	-24.26
5729.4	-45.21	84	1.7	V	10.2	-35.01	-13	-22.01

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
WCDMA Band2								
Test frequency range: 30MHz-20GHz								
Low channel								
45.134	-75.77	143	1.6	H	6.58	-69.19	-13	-56.19
40.356	-60.88	1	2.0	V	2.06	-58.82	-13	-45.82
3704.8	-55.3	1	1.5	H	8.2	-47.1	-13	-34.1
3704.8	-53.3	216	1.8	V	7.6	-45.7	-13	-32.7
Middle channel								
45.134	-75.77	143	1.6	H	6.58	-69.19	-13	-56.19
40.356	-60.88	1	2.0	V	2.06	-58.82	-13	-45.82
3760	-54.2	134	2.1	H	8.8	-45.4	-13	-32.4
3760	-51	343	1.7	V	8.0	-43.0	-13	-30.0
High channel								
45.134	-75.44	81	1.6	H	6.58	-68.86	-13	-55.86
40.356	-60.78	349	2.1	V	2.06	-58.72	-13	-45.72
3815.2	-53.1	128	1.7	H	8.7	-44.4	-13	-31.4
3815.2	-49.9	149	1.7	V	7.9	-42.0	-13	-29.0

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
WCDMA Band5								
Test frequency range: 30MHz-10GHz								
Low channel								
45.134	-75.43	107	1.6	H	6.58	-68.85	-13	-55.85
40.356	-61.55	312	2.1	V	2.06	-59.49	-13	-46.49
1652.8	-54.4	283	1.6	H	3.5	-50.9	-13	-37.9
1652.8	-52.5	81	1.7	V	3.1	-49.4	-13	-36.4
2479.2	-44.4	290	1.8	H	6.5	-37.9	-13	-24.9
2479.2	-40.9	140	1.8	V	5.7	-35.2	-13	-22.2
Middle channel								
45.134	-75.52	306	1.9	H	6.58	-68.94	-13	-55.94
40.356	-61.47	345	1.6	V	2.06	-59.41	-13	-46.41
1673.2	-51.8	321	1.9	H	3.8	-48	-13	-35
1673.2	-49.7	356	2.0	V	3.1	-46.6	-13	-33.6
2509.8	-50.6	187	1.8	H	6.2	-44.4	-13	-31.4
2509.8	-48.2	23	1.9	V	5.7	-42.5	-13	-29.5
High channel								
1693.2	-75.5	220	2.0	H	6.58	-68.92	-13	-55.92
1693.2	-60.61	18	1.8	V	2.06	-58.55	-13	-45.55
2539.8	-56.4	113	1.9	H	4.0	-52.4	-13	-39.4
2539.8	-53.3	266	1.7	V	3.1	-50.2	-13	-37.2
1693.2	-51.6	256	1.7	H	6.1	-45.5	-13	-32.5
1693.2	-49.5	241	1.6	V	5.7	-43.8	-13	-30.8

LTE Bands: (pre-scan all bandwidths, the worst case as below)

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band2								
Test frequency range: 30MHz-20GHz								
1.4MHz, Low channel								
45.134	-76.05	356	1.9	H	6.58	-69.47	-13	-56.47
40.356	-60.96	147	1.6	V	2.06	-58.9	-13	-45.9
3701.4	-8.1	128	1.9	H	8.1	-47.3	-13	-34.3
3701.4	-7.6	49	1.9	V	7.6	-46.6	-13	-33.6
5552.1	-9.6	324	2.0	H	9.6	-44	-13	-31
5552.1	-9.1	207	2.1	V	9.1	-44.2	-13	-31.2
1.4MHz, Middle channel								
45.134	-75.71	127	1.5	H	6.58	-69.13	-13	-56.13
40.356	-61.51	258	1.6	V	2.06	-59.45	-13	-46.45
3760	-8.8	205	1.9	H	8.8	-47.5	-13	-34.5
3760	-80	54	1.6	V	80	-46.9	-13	-33.9
5640	-10.2	48	2.1	H	10.2	-44.9	-13	-31.9
5640	-9.4	303	1.7	V	9.4	-43.8	-13	-30.8
1.4MHz, High channel								
45.134	-75.38	158	1.6	H	6.58	-68.8	-13	-55.8
40.356	-61.07	188	2.1	V	2.06	-59.01	-13	-46.01
3818.6	-8.7	307	1.9	H	8.7	-47.5	-13	-34.5
3818.6	-8	26	1.6	V	8	-46.9	-13	-33.9
5727.9	-10.6	100	1.5	H	10.6	-44.9	-13	-31.9
5727.9	-10.2	315	2.0	V	10.2	-43.9	-13	-30.9

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band 5								
Test frequency range: 30MHz-10GHz								
1.4MHz, Low channel								
45.134	-75.47	26	2.1	H	6.58	-68.89	-13	-55.89
40.356	-60.94	224	1.6	V	2.06	-58.88	-13	-45.88
1649.4	-3.2	193	1.5	H	3.2	-43.3	-13	-30.3
1649.4	-3.1	122	1.9	V	3.1	-44.5	-13	-31.5
2474.1	-6.6	82	1.7	H	6.6	-51.1	-13	-38.1
2474.1	-5.8	127	1.8	V	5.8	-50.4	-13	-37.4
1.4MHz, Middle channel								
45.134	-75.89	348	1.5	H	6.58	-69.31	-13	-56.31
40.356	-60.71	65	1.7	V	2.06	-58.65	-13	-45.65
1673	-3.8	35	1.5	H	3.8	-42.8	-13	-29.8
1673	-3.1	174	2.1	V	3.1	-40.9	-13	-27.9
2509.5	-6.2	283	1.8	H	6.2	-51.5	-13	-38.5
2509.5	-5.6	66	1.9	V	5.6	-51	-13	-38
1.4MHz, High channel								
45.134	-75.52	105	1.6	H	6.58	-68.94	-13	-55.94
40.356	-61.09	26	1.6	V	2.06	-59.03	-13	-46.03
1696.6	-4.1	265	1.7	H	4.1	-41.8	-13	-28.8
1696.6	-3.1	330	1.6	V	3.1	-41.1	-13	-28.1
2544.9	-6.1	329	1.5	H	6.1	-51.3	-13	-38.3
2544.9	-5.8	3	1.6	V	5.8	-50.8	-13	-37.8

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band12								
Test frequency range: 30MHz-10GHz								
1.4MHz, Low channel								
45.134	-75.17	179	1.9	H	6.58	-68.59	-13	-55.59
40.356	-61.29	225	1.6	V	2.06	-59.23	-13	-46.23
1399.4	-5.9	342	2.0	H	5.9	-51.8	-13	-38.8
1399.4	-5.9	103	2.1	V	5.9	-49.1	-13	-36.1
2099.1	-6.3	285	1.5	H	6.3	-48.5	-13	-35.5
2099.1	-5.1	209	1.8	V	5.1	-48.7	-13	-35.7
1.4MHz, Middle channel								
45.134	-75.7	161	2.0	H	6.58	-69.12	-13	-56.12
40.356	-60.59	107	1.8	V	2.06	-58.53	-13	-45.53
1415	-5.7	267	2.0	H	5.7	-54.9	-13	-41.9
1415	-5.4	89	1.9	V	5.4	-54.5	-13	-41.5
2122.5	-6.7	10	2.1	H	6.7	-48.4	-13	-35.4
2122.5	-5.8	3	2.0	V	5.8	-48.3	-13	-35.3
1.4MHz, High channel								
45.134	-76.07	262	1.6	H	6.58	-69.49	-13	-56.49
40.356	-61.22	117	2.1	V	2.06	-59.16	-13	-46.16
1430.6	-5.4	112	1.8	H	5.4	-52.5	-13	-39.5
1430.6	-4.8	187	1.6	V	4.8	-54.8	-13	-41.8
2145.9	-7	159	1.7	H	7	-48.4	-13	-35.4
2145.9	-6.6	240	1.8	V	6.6	-48.7	-13	-35.7

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band41								
Test frequency range: 30MHz-26.5GHz								
5MHz, Low channel								
45.134	-75.94	119	1.5	H	6.58	-69.36	-25	-44.36
40.356	-61.04	44	2.0	V	2.06	-58.98	-25	-33.98
5115	-11.3	215	1.6	H	11.3	-36.3	-25	-11.3
5115	-10.8	173	1.6	V	10.8	-36	-25	-11.0
5MHz, Middle channel								
45.134	-75.59	302	2.0	H	6.58	-69.01	-25	-44.01
40.356	-60.75	156	1.6	V	2.06	-58.69	-25	-33.69
5210	-10.1	165	1.6	H	10.1	-35.2	-25	-10.2
5210	-9.6	74	1.9	V	9.6	-35.3	-25	-10.3
5MHz, High channel								
45.134	-75.66	115	1.7	H	6.58	-69.08	-25	-44.08
40.356	-61.14	328	2.0	V	2.06	-59.08	-25	-34.08
5305	-9.6	319	2.0	H	9.6	-35.6	-25	-10.6
5305	-8.8	9	1.7	V	8.8	-34.9	-25	-9.9

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

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.

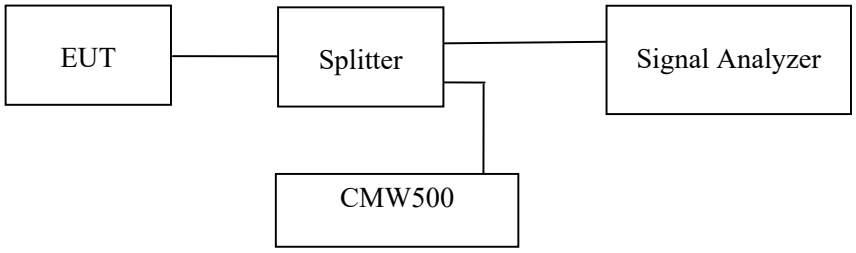
According to FCC §27.53 (c), For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance 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:	27 ℃
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

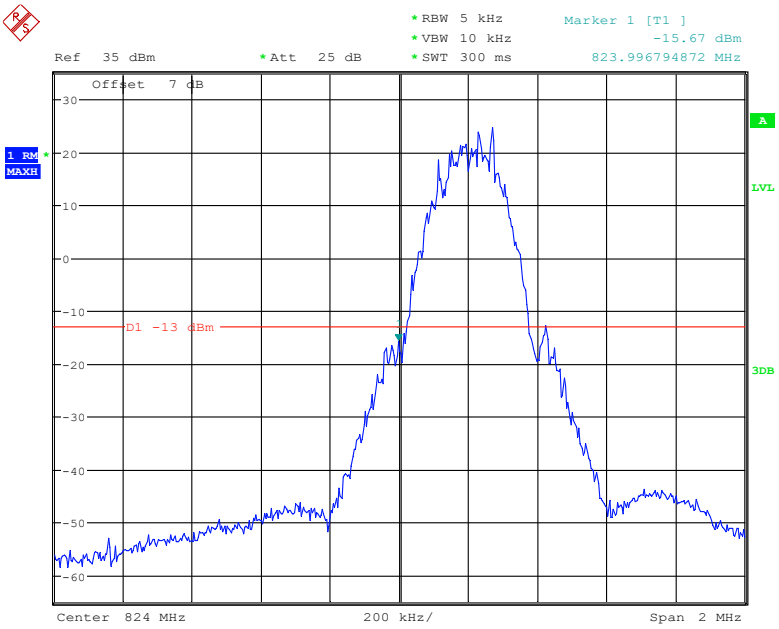
The testing was performed by Gala Liu from 2022-01-13 to 2022-02-18.

EUT operation mode: Transmitting (Worst case)

Test Result: Pass

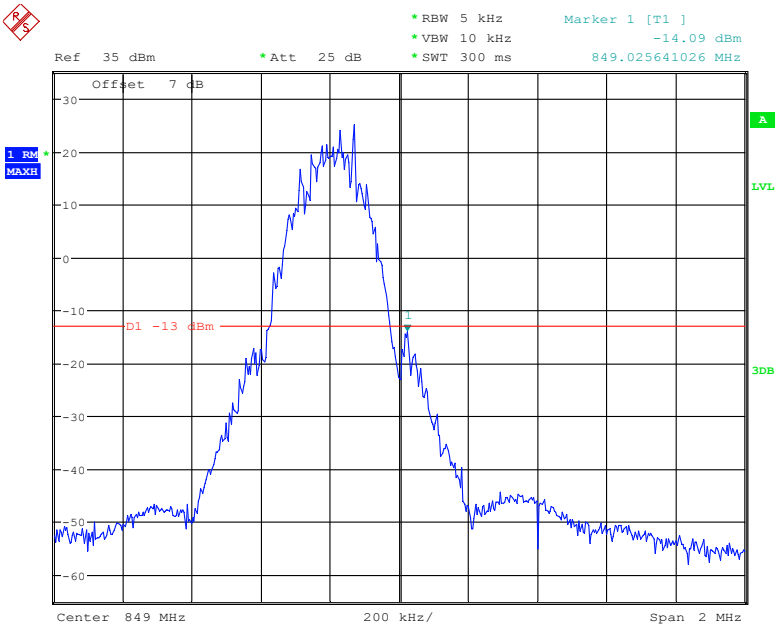
Please refer to the following plots.

Cellular Band, Left Band Edge for GSM (GMSK) Mode



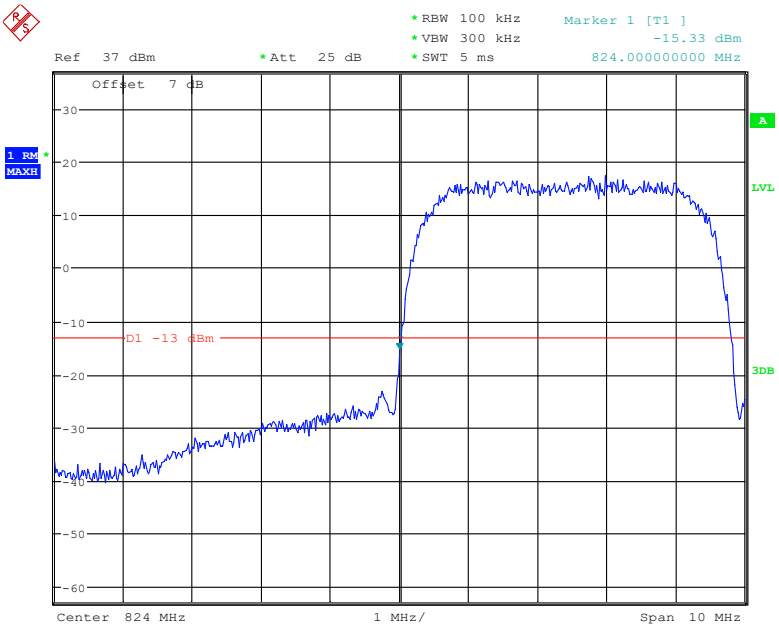
Date: 14.JAN.2022 09:04:59

Cellular Band, Right Band Edge for GSM (GMSK) Mode



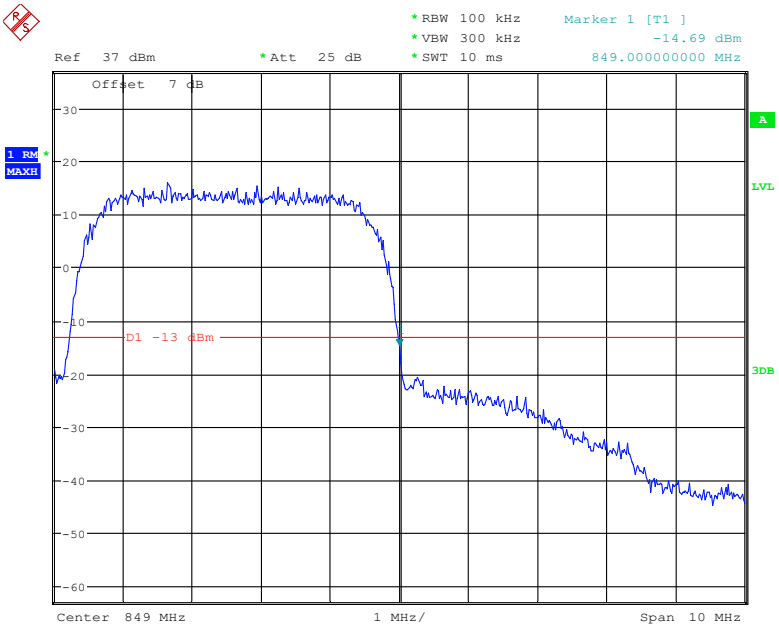
Date: 14.JAN.2022 09:06:20

Cellular Band, Left Band Edge for RMC (BPSK) Mode



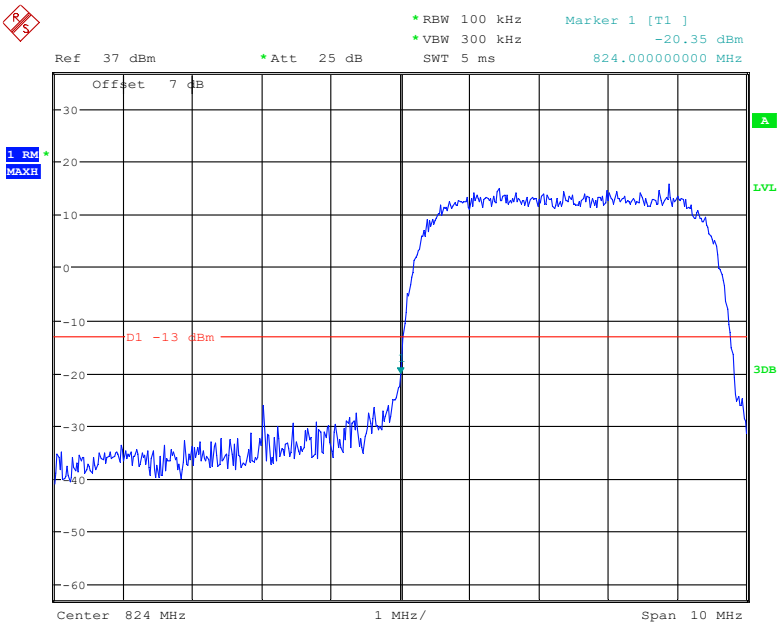
Date: 14.JAN.2022 11:01:42

Cellular Band, Right Band Edge for RMC (BPSK) Mode



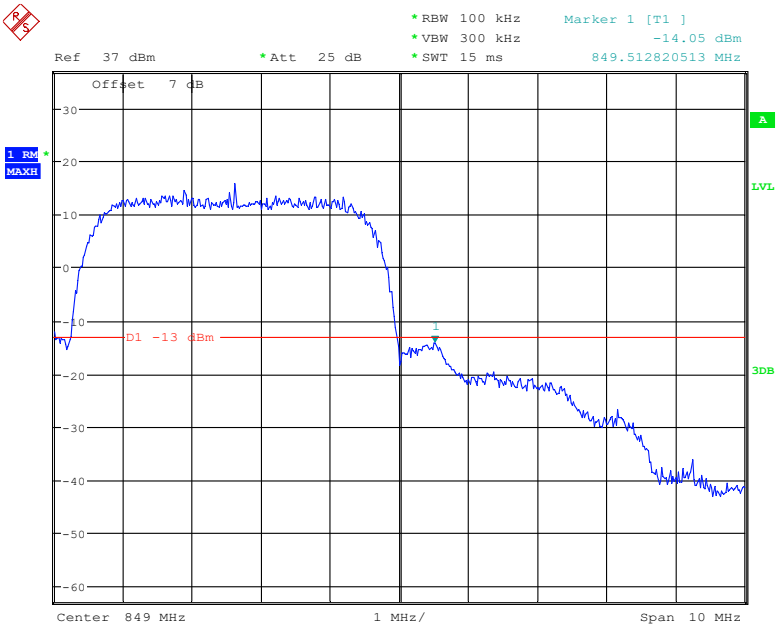
Date: 14.JAN.2022 11:01:12

Cellular Band, Left Band Edge for HSDPA(16QAM) Mode



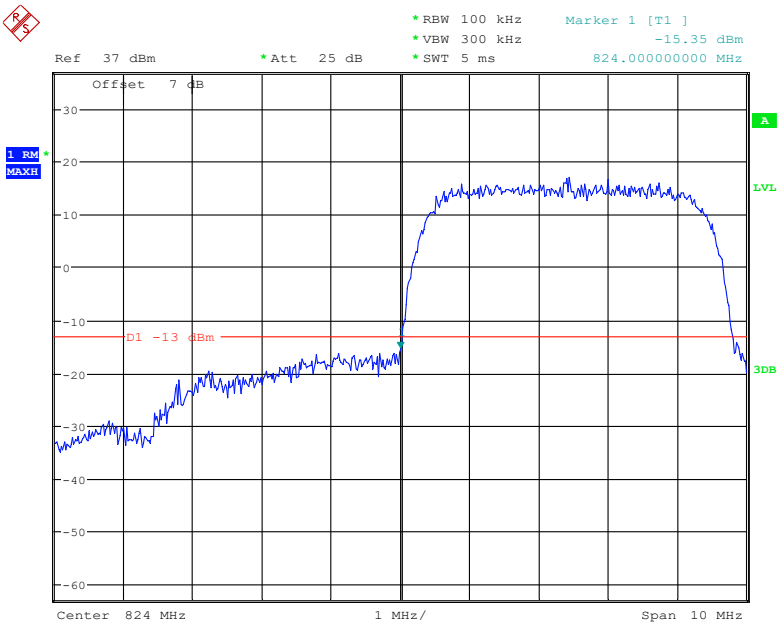
Date: 18.FEB.2022 14:30:11

Cellular Band, Right Band Edge for HSDPA (16QAM) Mode



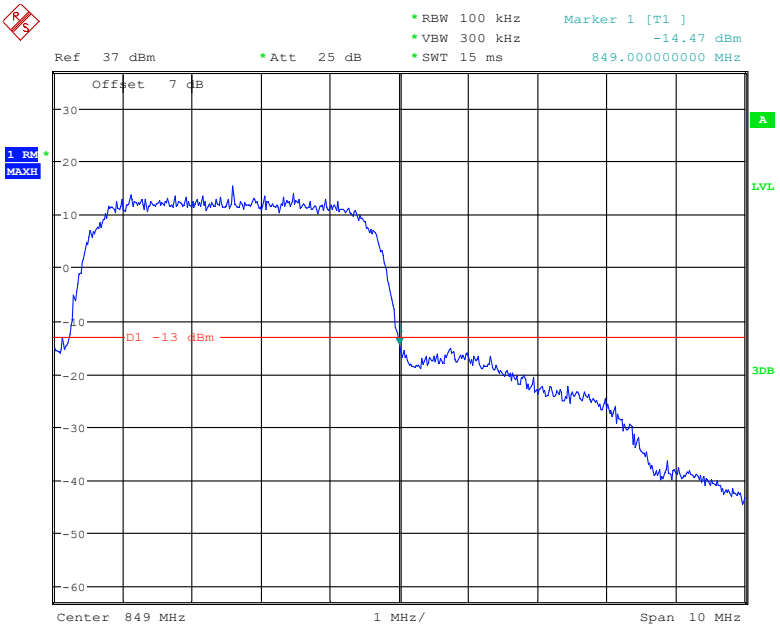
Date: 14.JAN.2022 11:25:11

Cellular Band, Left Band Edge for HSUPA (BPSK) Mode



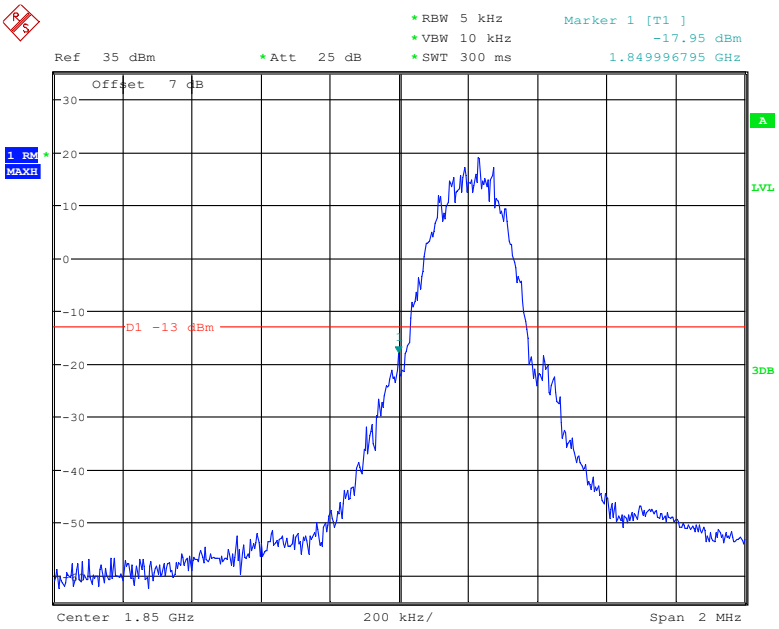
Date: 14.JAN.2022 11:02:44

Cellular Band, Right Band Edge for HSUPA (BPSK) Mode



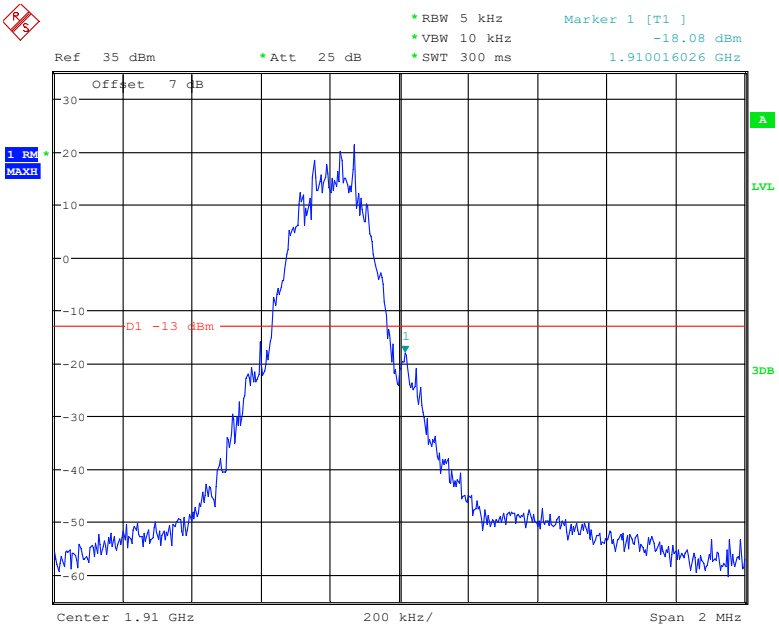
Date: 14.JAN.2022 11:04:28

PCS Band, Left Band Edge for GSM (GMSK) Mode



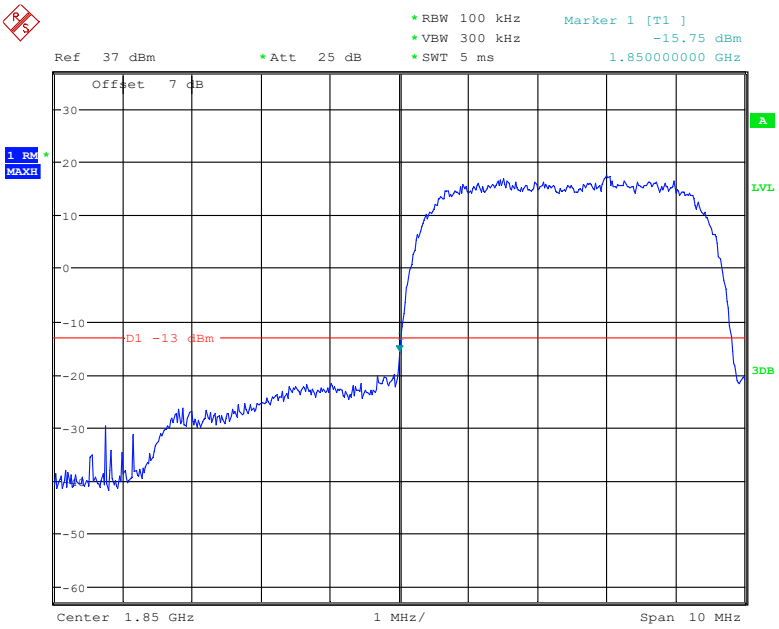
Date: 14.JAN.2022 09:21:58

PCS Band, Right Band Edge for GSM (GMSK) Mode



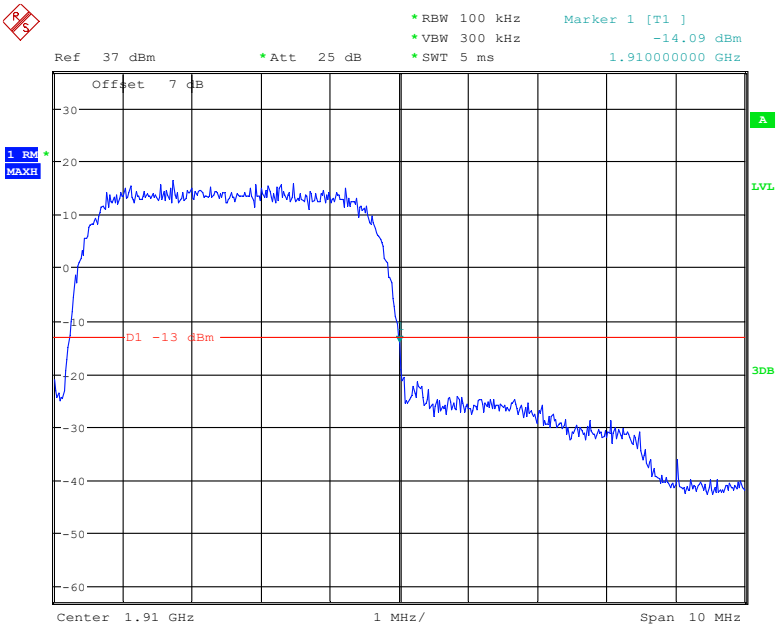
Date: 14.JAN.2022 09:22:40

PCS Band, Left Band Edge for RMC (BPSK) Mode



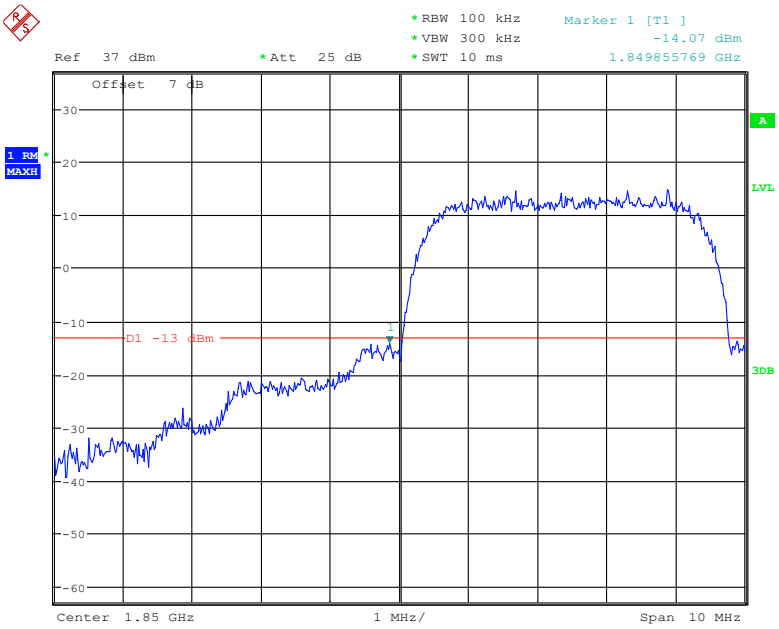
Date: 14.JAN.2022 10:51:37

PCS Band, Right Band Edge for RMC (BPSK) Mode



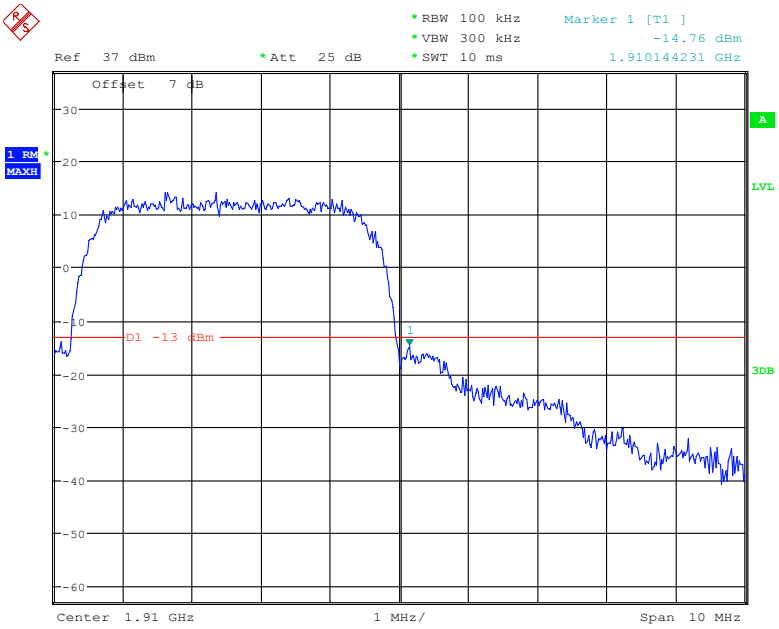
Date: 14.JAN.2022 10:52:23

PCS Band, Left Band Edge for HSDPA(16QAM) Mode



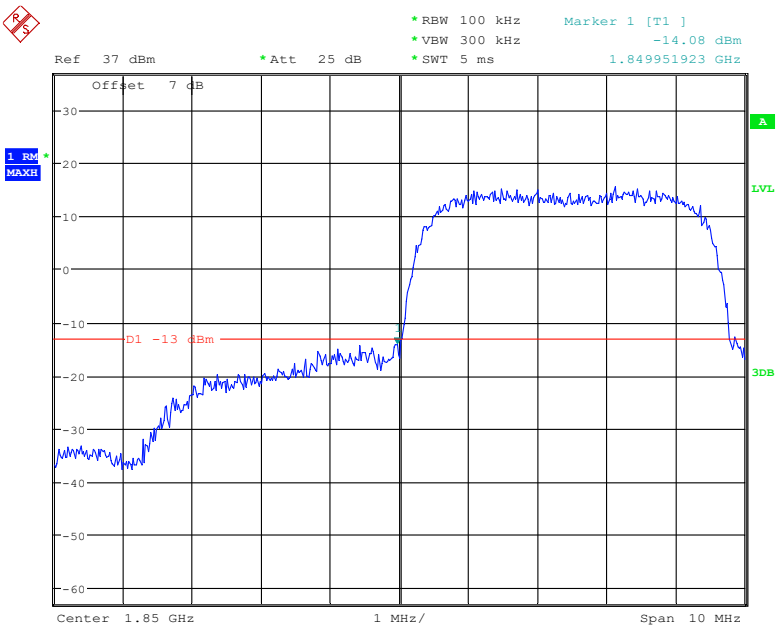
Date: 14.JAN.2022 11:22:47

PCS Band, Right Band Edge for HSDPA (16QAM) Mode

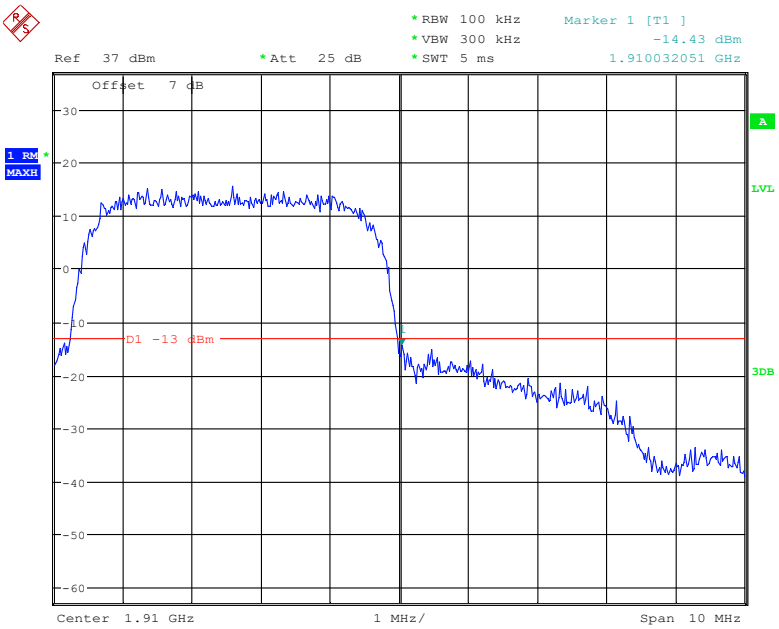


Date: 14.JAN.2022 11:20:59

PCS Band, Left Band Edge for HSUPA (BPSK) Mode



PCS Band, Right Band Edge for HSUPA (BPSK) Mode



The test plots of LTE bands please 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

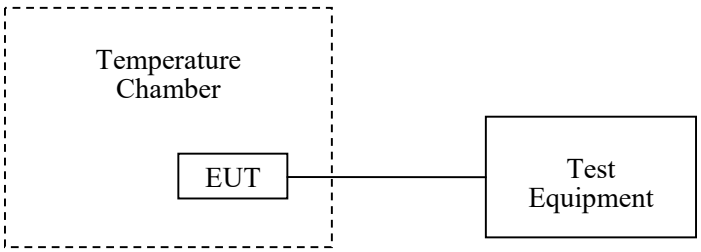
According to §24.235&§27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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:	27 ℃
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by Gala Liu from 2022-01-13 to 2022-01-14.

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	N.V.	5	0.0060	2.5
-20		5	0.0060	2.5
-10		7	0.0084	2.5
0		4	0.0048	2.5
10		7	0.0084	2.5
20		7	0.0084	2.5
30		7	0.0084	2.5
40		-6	-0.0072	2.5
50		8	0.0096	2.5
20	L.V.	-4	-0.0048	2.5
	H.V.	6	0.0072	2.5

WCDMA Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	N.V.	0.51	0.0006	2.5
-20		0.44	0.0005	2.5
-10		0.72	0.0009	2.5
0		0.56	0.0007	2.5
10		0.28	0.0003	2.5
20		0.43	0.0005	2.5
30		0.46	0.0005	2.5
40		0.48	0.0006	2.5
50		0.53	0.0006	2.5
20	L.V.	0.47	0.0006	2.5
	H.V.	0.61	0.0007	2.5

PCS Band (Part 24E)

GSM Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	N.V.	-3	-0.0016	pass
-20		4	0.0021	pass
-10		3	0.0016	pass
0		2	0.0011	pass
10		-1	-0.0005	pass
20		-1	-0.0005	pass
30		-3	-0.0016	pass
40		-6	-0.0032	pass
50		-4	-0.0021	pass
20	L.V.	-3	-0.0016	pass
	H.V.	-2	-0.0011	pass

WCDMA Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	N.V.	1.23	0.0007	pass
-20		1.32	0.0007	pass
-10		1.35	0.0007	pass
0		1.25	0.0007	pass
10		1.24	0.0007	pass
20		1.06	0.0006	pass
30		1.39	0.0007	pass
40		1.45	0.0008	pass
50		1.52	0.0008	pass
20	L.V.	1.62	0.0009	pass
	H.V.	1.72	0.0009	pass

LTE:
QPSK:
Band 2:

10.0 MHz Middle Channel, f_o =1880MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	N.V.	-7.30	-0.0039	pass
-20		-9.97	-0.0053	pass
-10		-6.13	-0.0033	pass
0		6.17	0.0033	pass
10		7.92	0.0042	pass
20		6.46	0.0034	pass
30		-6.52	-0.0035	pass
40		7.18	0.0038	pass
50		-9.69	-0.0052	pass
20	V min.= L.V.	-8.17	-0.0043	pass
	V max.= H.V.	-7.05	-0.0038	pass

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	N.V.	-9.18	-0.0110	2.5
-20		9.11	0.0109	2.5
-10		8.51	0.0102	2.5
0		-7.15	-0.0085	2.5
10		-5.29	-0.0063	2.5
20		7.24	0.0087	2.5
30		-5.81	-0.0069	2.5
40		5.59	0.0067	2.5
50		6.87	0.0082	2.5
20	L.V.	9.94	0.0119	2.5
	H.V.	9.99	0.0119	2.5

Band 12:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	N.V.	699.9635	715.8874	699	716
-20		699.9647	715.7727	699	716
-10		699.4524	715.7456	699	716
0		699.4423	715.7633	699	716
10		699.3231	715.5415	699	716
20		699.4427	715.5282	699	716
30		699.2285	715.6324	699	716
40		699.3342	715.6315	699	716
50		699.4247	715.5453	699	716
20	L.V.	699.3374	715.5675	699	716
	H.V.	699.3373	715.5677	699	716

Band 41:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	N.V.	2555.9752	2654.9872	2555	2655
-20		2555.8673	2654.8857	2555	2655
-10		2555.7564	2654.7765	2555	2655
0		2555.6425	2654.6654	2555	2655
10		2555.5326	2654.5555	2555	2655
20		2555.4227	2654.4434	2555	2655
30		2555.3158	2654.3359	2555	2655
40		2555.2155	2654.2236	2555	2655
50		2555.2934	2654.1064	2555	2655
20	L.V.	2555.8624	2654.0036	2555	2655
	H.V.	2555.8522	2654.0014	2555	2655

Note: the manufacturer declared the operational frequency range is 2555-2655MHz.

16QAM:

Band 2:

10.0 MHz Middle Channel, f_o=1880MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	N.V.	-4.32	-0.0023	pass
-20		-6.68	-0.0036	pass
-10		9.77	0.0052	pass
0		-7.62	-0.0041	pass
10		-9.91	-0.0053	pass
20		-9.82	-0.0052	pass
30		-6.68	-0.0036	pass
40		-8.85	-0.0047	pass
50		5.67	0.0030	pass
20	L.V.	6.05	0.0032	pass
	H.V.	7.52	0.0040	pass

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	N.V.	-7.57	-0.0090	2.5
-20		6.80	0.0081	2.5
-10		-9.52	-0.0114	2.5
0		-8.15	-0.0097	2.5
10		-8.88	-0.0106	2.5
20		-9.82	-0.0117	2.5
30		8.38	0.0100	2.5
40		6.75	0.0081	2.5
50		-5.89	-0.0070	2.5
20	L.V.	8.98	0.0107	2.5
	H.V.	-7.83	-0.0094	2.5

Band 12:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	N.V.	699.3122	715.7365	699	716
-20		699.3131	715.6224	699	716
-10		699.3014	715.5952	699	716
0		699.2914	715.6125	699	716
10		699.1723	715.3911	699	716
20		699.2915	715.3774	699	716
30		699.0782	715.4813	699	716
40		699.1835	715.4804	699	716
50		699.2736	715.3942	699	716
20	L.V.	699.1865	715.4163	699	716
	H.V.	699.1862	715.4175	699	716

Band 41:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	N.V.	2555.9452	2654.9638	2555	2655
-20		2555.8443	2654.8581	2555	2655
-10		2555.7374	2654.7455	2555	2655
0		2555.6267	2654.6372	2535	2655
10		2555.5135	2654.5282	2555	2655
20		2555.4174	2654.4181	2555	2655
30		2555.2986	2654.3574	2555	2655
40		2555.1887	2654.1985	2555	2655
50		2555.1825	2654.1880	2555	2655
20	L.V.	2555.1614	2654.0763	2555	2655
	H.V.	2555.0575	2654.0348	2555	2655

Note: the manufacturer declared the operational frequency range is 2555-2655MHz.

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