



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

For

Vanstone Electronic (Beijing) Co., Ltd.

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Beijing, China 100195

FCC ID: OWLV39

Report Type: Original Report	Product Type: Mobile POS
Report Number: SZXX1210513-17047E-RF-00C	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Mobile POS
Tested Model	V39
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)
Modulation Technique	2G: GMSK 3G: BPSK, QPSK, 16QAM 4G: QPSK, 16QAM
Antenna Specification*	EGSM850/WCDMA Band 5/LTE Band 5: 0.5dBi PCS1900/WCDMA Band 2/ LTE Band 2: 0.8dBi LTE Band 4: 0.8dBi LTE Band 7: 0.8dBi (provided by the applicant)
Voltage Range	DC3.8V from battery or DC 5V From Adapter
Date of Test	2021-06-03 to 2021-06-16
Sample number	SZXX1210513-17047E-RF-S_5RA (Assigned by BAACL, Shenzhen)
Received date	2021-05-13
Sample/EUT Status	Good condition
Normal/Extreme Condition	L.V.: Low Voltage 3.5V _{DC} N.V.: Normal Voltage 3.8V _{DC} H.V.: High Voltage 4.35V _{DC} The extreme condition was declared by the applicant
Adapter information	Model: SW-0018C Input: 100-240V 50/60Hz Output: 5.0V 1.0A

Objective

This test report is in accordance with Part 2-Subpart J, Part 22-Subpart H and Part 24-Subpart E and Subpart 27 of the Federal Communication Commissions 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 Bay Area Compliance Laboratories Corp. (Shenzhen). 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 output power, conducted		±0.73dB
Unwanted Emission, conducted		±1.6dB
Emissions, Radiated	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		±1°C
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 Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) ,6F,7F,the 3rd Phase of Wan Li Industrial Building D,Shihua Rd, FuTian Free Trade Zone, Shenzhen, 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.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

Test was performed as below table:

Frequency band	Bandwidth (MHz)	Test Frequency(MHz)		
		Low	Middle	High
EGSM850	0.25	824.2	836.6	848.8
DCS1900	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 B4	1.4	1710.7	1732.5	1754.3
	3	1711.5	1732.5	1753.5
	5	1712.5	1732.5	1752.5
	10	1715	1732.5	1750
	15	1717.5	1732.5	1747.5
	20	1720	1732.5	1745
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 B7	5	2502.5	2535	2567.5
	10	2505	2535	2565
	15	2507.5	2535	2562.5
	20	2510	2535	2560

Equipment Modifications

No modification was made to the EUT.

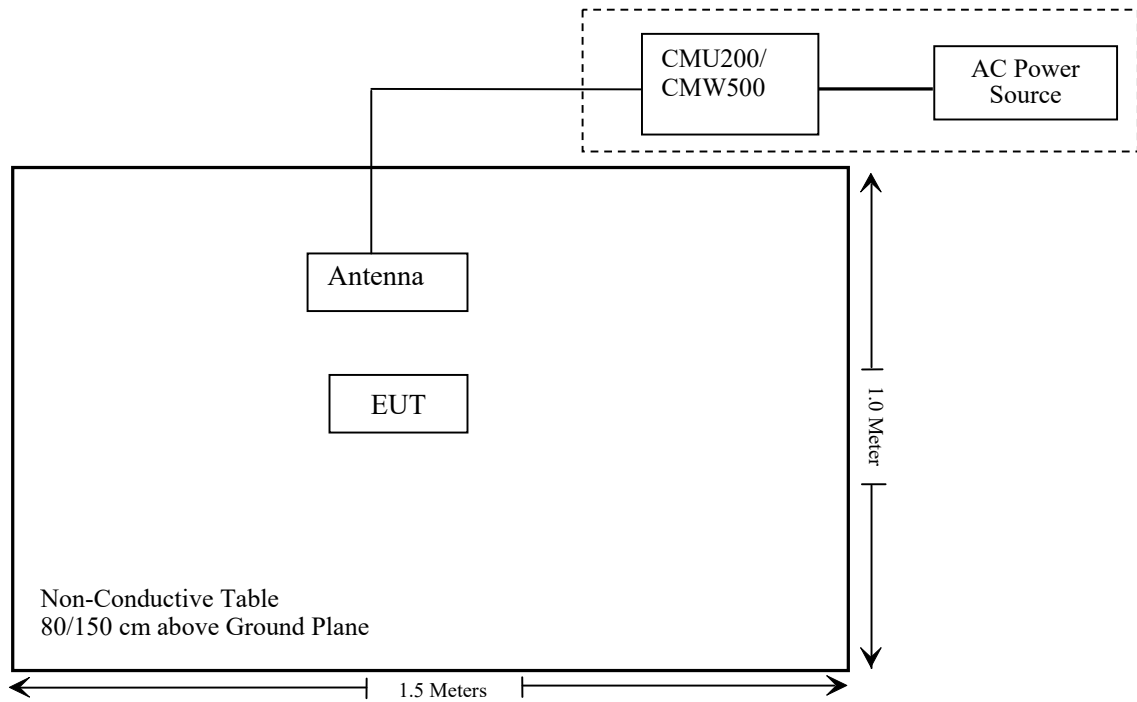
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh

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)	Compliant*
§2.1046; § 22.913 (a); § 24.232 (c); §27.50 (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

Note: * Please refer to SAR report released by BACL, report number: SZXX1210513-17047E-20B.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
R&S	EMI Test Receiver	ESR3	102455	2020/08/04	2021/08/03
Sonoma instrument	Pre-amplifier	310 N	186238	2020/08/04	2021/08/03
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2020/12/22	2023/12/21
COM-POWER	Dipole Antenna	AD-100	721027	NCR	NCR
Unknown	Cable 2	RF Cable 2	F-03-EM197	2020/11/29	2021/11/28
Unknown	Cable	Chamber Cable 4	EC-007	2020/11/29	2021/11/28
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2020/08/04	2021/08/03
COM-POWER	Pre-amplifier	PA-122	181919	2020/11/29	2021/11/28
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2020/11/28	2021/11/27
Sunol Sciences	Horn Antenna	3115	9107-3694	2021/01/15	2024/01/14
A.H.System	Horn Antenna	SAS-200/571	135	2018/09/01	2021/08/31
Insulted Wire Inc.	RF Cable	SPS-2503-3150	02222010	2020/11/29	2021/11/28
Unknown	RF Cable	W1101-EQ1 OUT	F-19-EM005	2020/11/29	2021/11/28
Unknown	Signal Cable	RG-214	2	2020/11/29	2021/11/28
MICRO-TRONICS	Passband filter	HPM50111	F-19-EM006	2021/04/20	2022/04/20
Unknown	High Pass filter	1.3GHz	101120	2021/04/20	2022/04/20
Ducommun Technologies	Horn antenna	ARH-4223-02	1007726-02 1304	2020/12/06	2023/12/05
Ducommun Technologies	Horn antenna	ARH-4223-02	1007726-01 1304	2020/12/06	2023/12/05
Agilent	Signal Generator	N5183A	MY51040755	2020/12/29	2021/12/28

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2021/04/02	2022/04/01
Unknown	RF Cable	Unknown	0501 067	2020/11/29	2021/11/28
Weinschel	Power divider	1515	RH386	2021/04/20	2022/04/20
ESPEC	Temperature & Humidity Chamber	EL-10KA	9107726	2021/02/23	2022/02/22
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	115500	2020/07/31	2021/07/30
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh	2020/08/04	2021/08/03

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) 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: SZXX1210513-17047E-20B.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to 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) (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(c), 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.

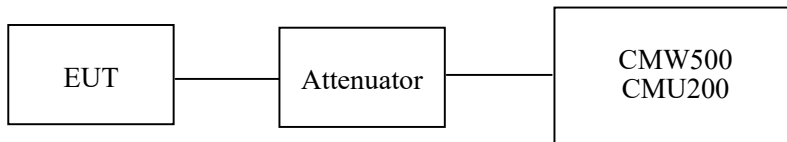
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1780MHz.

According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2500-2570MHz & 2496-2690MHz.

Test Procedure

Conducted method:

The RF output of the transmitter was connected to the CMW500/CMU200 through sufficient attenuation.



Test Data

Environmental Conditions

Temperature:	27~28 °C
Relative Humidity:	51~58 %
ATM Pressure:	101.0 kPa

The testing was performed by Carl Yang on 2021-06-03 and 2021-06-07.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables and plots.

Conducted Power

Cellular Band 850

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	33.67	31.88	30.22	28.80	31.52	29.73	28.07	26.65	38.45
	190	836.6	33.63	31.79	30.14	28.76	31.48	29.64	27.99	26.61	38.45
	251	848.8	33.54	31.72	30.19	28.61	31.39	29.57	28.04	26.46	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		22.94	22.99	22.98	20.79	20.84	20.83
	HSDPA	1	22.44	22.76	22.66	20.29	20.61	20.51
		2	22.89	22.90	22.83	20.74	20.75	20.68
		3	22.56	22.83	22.75	20.41	20.68	20.60
		4	22.37	22.66	22.56	20.22	20.51	20.41
	HSUPA	1	22.41	22.44	22.37	20.26	20.29	20.22
		2	22.89	22.90	22.83	20.74	20.75	20.68
		3	22.45	22.53	22.47	20.30	20.38	20.32
		4	22.33	22.35	22.24	20.18	20.20	20.09
		5	22.46	22.51	22.46	20.31	20.36	20.31
	HSPA+	1	22.21	22.15	22.16	20.06	20.00	20.01

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) –Cable Loss
 Antenna Gain = 0.5dBi = -1.65 dBd (0dBd=2.15dBi)
 Cable Loss=0.5dBi
 Limit: ERP≤38.45dBm

PCS Band 1900

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	30.01	28.59	27.47	25.87	30.01	28.59	27.47	25.87	33
	661	1880.0	29.91	28.47	27.36	25.63	29.91	28.47	27.36	25.63	33
	810	1909.8	29.85	28.43	27.16	25.59	29.85	28.43	27.16	25.59	33

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 2)	RMC12.2k		22.40	22.42	22.47	22.40	22.42	22.47
	HSDPA	1	21.06	21.11	21.44	21.06	21.11	21.44
		2	22.89	22.90	22.83	22.89	22.90	22.83
		3	21.11	21.15	21.52	21.11	21.15	21.52
		4	20.96	21.07	21.35	20.96	21.07	21.35
	HSUPA	1	21.22	21.21	21.31	21.22	21.21	21.31
		2	22.89	22.90	22.83	22.89	22.90	22.83
		3	21.32	21.26	21.40	21.32	21.26	21.40
		4	21.15	21.12	21.24	21.15	21.12	21.24
		5	21.26	21.29	21.41	21.26	21.29	21.41
	HSPA+	1	21.05	21.10	21.13	21.05	21.10	21.13

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) –Cable Loss
 Antenna Gain =0.8dBi
 Cable Loss=0.8dBi
 Limit: EIRP≤33dBm

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
GPRS	Low	3.22	13
	Middle	3.34	13
	High	3.44	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.21	13
	Middle	3.24	13
	High	3.44	13
HSDPA (16QAM)	Low	3.25	13
	Middle	3.45	13
	High	3.64	13
HSUPA (BPSK)	Low	3.25	13
	Middle	3.25	13
	High	3.44	13
HSPA+	Low	3.43	13
	Middle	3.20	13
	High	3.35	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GPRS	Low	3.32	13
	Middle	3.15	13
	High	3.34	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.63	13
	Middle	3.25	13
	High	3.54	13
HSDPA (16QAM)	Low	3.41	13
	Middle	3.32	13
	High	3.62	13
HSUPA (BPSK)	Low	3.01	13
	Middle	3.31	13
	High	3.74	13
HSPA+	Low	3.63	13
	Middle	3.41	13
	High	3.22	13

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	23.46	23.11	22.95	23.46	23.11	22.95
		RB1#3	23.35	23.18	22.90	23.35	23.18	22.90
		RB1#5	22.95	23.04	22.60	22.95	23.04	22.60
		RB3#0	22.98	22.95	22.94	22.98	22.95	22.94
		RB3#3	23.05	22.83	22.73	23.05	22.83	22.73
		RB6#0	22.03	21.91	21.72	22.03	21.91	21.72
	16QAM	RB1#0	22.13	22.10	22.16	22.13	22.10	22.16
		RB1#3	21.96	22.13	22.28	21.96	22.13	22.28
		RB1#5	21.78	21.92	22.19	21.78	21.92	22.19
		RB3#0	22.15	21.96	22.02	22.15	21.96	22.02
		RB3#3	22.14	21.84	21.98	22.14	21.84	21.98
		RB6#0	21.18	20.84	20.92	21.18	20.84	20.92
3.0	QPSK	RB1#0	22.82	22.84	22.68	22.82	22.84	22.68
		RB1#8	22.74	22.63	22.54	22.74	22.63	22.54
		RB1#14	22.70	22.92	22.46	22.70	22.92	22.46
		RB6#0	21.72	21.85	21.72	21.72	21.85	21.72
		RB6#9	21.75	21.83	21.58	21.75	21.83	21.58
		RB15#0	21.80	21.73	21.64	21.80	21.73	21.64
	16QAM	RB1#0	21.91	22.49	21.39	21.91	22.49	21.39
		RB1#8	21.94	22.52	21.16	21.94	22.52	21.16
		RB1#14	21.93	22.52	21.23	21.93	22.52	21.23
		RB6#0	20.71	20.53	20.61	20.71	20.53	20.61
		RB6#9	20.65	20.55	20.56	20.65	20.55	20.56
		RB15#0	20.88	20.69	20.54	20.88	20.69	20.54

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	22.50	22.75	22.75	22.50	22.75	22.75
		RB1#13	22.72	22.63	22.62	22.72	22.63	22.62
		RB1#24	22.62	22.83	22.38	22.62	22.83	22.38
		RB15#0	21.76	21.69	21.70	21.76	21.69	21.70
		RB15#10	21.76	21.77	21.54	21.76	21.77	21.54
		RB25#0	21.73	21.74	21.66	21.73	21.74	21.66
	16QAM	RB1#0	21.16	21.89	21.56	21.16	21.89	21.56
		RB1#13	21.19	22.17	20.78	21.19	22.17	20.78
		RB1#24	21.30	22.22	21.19	21.30	22.22	21.19
		RB15#0	20.65	20.39	20.56	20.65	20.39	20.56
		RB15#10	20.63	20.46	20.51	20.63	20.46	20.51
		RB25#0	20.83	20.55	20.63	20.83	20.55	20.63
10.0	QPSK	RB1#0	22.67	22.64	22.64	22.67	22.64	22.64
		RB1#25	22.69	22.59	22.59	22.69	22.59	22.59
		RB1#49	22.49	22.68	22.34	22.49	22.68	22.34
		RB25#0	21.64	21.63	21.56	21.64	21.63	21.56
		RB25#25	21.61	21.60	21.59	21.61	21.60	21.59
		RB50#0	21.61	21.66	21.56	21.61	21.66	21.56
	16QAM	RB1#0	21.93	22.19	21.66	21.93	22.19	21.66
		RB1#25	22.18	22.20	21.48	22.18	22.20	21.48
		RB1#49	21.89	22.13	21.13	21.89	22.13	21.13
		RB25#0	20.80	20.54	20.81	20.80	20.54	20.81
		RB25#25	20.70	20.42	20.60	20.70	20.42	20.60
		RB50#0	20.65	20.57	20.50	20.65	20.57	20.50

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	22.53	22.49	22.34	22.53	22.49	22.34
		RB1#38	22.65	22.55	22.45	22.65	22.55	22.45
		RB1#74	22.46	22.56	22.27	22.46	22.56	22.27
		RB36#0	21.60	21.44	21.51	21.60	21.44	21.51
		RB36#39	21.57	21.58	21.50	21.57	21.58	21.50
		RB75#0	21.61	21.43	21.55	21.61	21.43	21.55
	16QAM	RB1#0	21.90	22.04	21.56	21.90	22.04	21.56
		RB1#38	21.78	22.45	21.57	21.78	22.45	21.57
		RB1#74	21.74	22.72	21.21	21.74	22.72	21.21
		RB36#0	20.44	20.32	20.49	20.44	20.32	20.49
		RB36#39	20.44	20.75	20.36	20.44	20.75	20.36
		RB75#0	20.48	20.45	20.65	20.48	20.45	20.65
20.0	QPSK	RB1#0	22.35	22.74	22.50	22.35	22.74	22.50
		RB1#50	22.23	22.57	22.43	22.23	22.57	22.43
		RB1#99	22.32	22.67	22.28	22.32	22.67	22.28
		RB50#0	21.51	21.41	21.43	21.51	21.41	21.43
		RB50#50	21.35	21.41	21.37	21.35	21.41	21.37
		RB100#0	21.45	21.47	21.48	21.45	21.47	21.48
	16QAM	RB1#0	21.73	21.37	22.11	21.73	21.37	22.11
		RB1#50	21.98	21.47	22.65	21.98	21.47	22.65
		RB1#99	21.84	21.40	21.95	21.84	21.40	21.95
		RB50#0	20.43	20.41	20.50	20.43	20.41	20.50
		RB50#50	20.50	20.40	20.38	20.50	20.40	20.38
		RB100#0	20.43	20.33	20.59	20.43	20.33	20.59

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) –Cable Loss

Antenna Gain =0.8dBi

Cable Loss=0.8dBi

Limit: EIRP≤33dBm

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	22.76	22.77	22.77	22.76	22.77	22.77
		RB1#3	22.82	22.92	22.92	22.82	22.92	22.92
		RB1#5	22.72	22.85	22.51	22.72	22.85	22.51
		RB3#0	22.69	22.83	22.44	22.69	22.83	22.44
		RB3#3	22.71	22.95	22.83	22.71	22.95	22.83
		RB6#0	21.69	21.89	21.69	21.69	21.89	21.69
	16QAM	RB1#0	21.88	22.16	21.34	21.88	22.16	21.34
		RB1#3	22.07	22.47	21.48	22.07	22.47	21.48
		RB1#5	21.88	22.29	21.34	21.88	22.29	21.34
		RB3#0	21.78	22.13	22.24	21.78	22.13	22.24
		RB3#3	21.87	22.18	21.98	21.87	22.18	21.98
		RB6#0	20.64	21.23	20.76	20.64	21.23	20.76
3.0	QPSK	RB1#0	22.87	22.85	22.77	22.87	22.85	22.77
		RB1#8	22.47	22.87	22.62	22.47	22.87	22.62
		RB1#14	22.59	22.76	22.67	22.59	22.76	22.67
		RB6#0	21.74	21.90	21.58	21.74	21.90	21.58
		RB6#9	21.64	21.93	21.62	21.64	21.93	21.62
		RB15#0	21.80	21.94	21.65	21.80	21.94	21.65
	16QAM	RB1#0	21.95	22.42	21.33	21.95	22.42	21.33
		RB1#8	21.85	22.50	21.10	21.85	22.50	21.10
		RB1#14	21.93	22.10	21.23	21.93	22.10	21.23
		RB6#0	20.73	20.71	20.60	20.73	20.71	20.60
		RB6#9	20.63	20.71	20.78	20.63	20.71	20.78
		RB15#0	20.67	20.93	20.60	20.67	20.93	20.60

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	22.58	22.83	22.72	22.58	22.83	22.72
		RB1#13	22.76	22.83	22.69	22.76	22.83	22.69
		RB1#24	22.85	22.95	22.77	22.85	22.95	22.77
		RB15#0	21.80	21.91	21.75	21.80	21.91	21.75
		RB15#10	21.69	21.87	21.78	21.69	21.87	21.78
		RB25#0	21.74	21.84	21.74	21.74	21.84	21.74
	16QAM	RB1#0	21.01	22.07	21.71	21.01	22.07	21.71
		RB1#13	20.95	22.12	21.17	20.95	22.12	21.17
		RB1#24	20.99	22.38	21.28	20.99	22.38	21.28
		RB15#0	20.47	20.80	20.86	20.47	20.80	20.86
		RB15#10	20.65	20.97	20.69	20.65	20.97	20.69
		RB25#0	20.93	20.92	20.75	20.93	20.92	20.75
10.0	QPSK	RB1#0	22.71	22.90	22.72	22.71	22.90	22.72
		RB1#25	22.77	23.03	22.69	22.77	23.03	22.69
		RB1#49	22.96	22.73	23.03	22.96	22.73	23.03
		RB25#0	21.68	21.81	21.59	21.68	21.81	21.59
		RB25#25	21.84	21.94	21.76	21.84	21.94	21.76
		RB50#0	21.78	21.86	21.75	21.78	21.86	21.75
	16QAM	RB1#0	21.88	22.32	21.49	21.88	22.32	21.49
		RB1#25	22.16	22.38	21.67	22.16	22.38	21.67
		RB1#49	21.76	22.27	21.44	21.76	22.27	21.44
		RB25#0	20.66	20.66	20.81	20.66	20.66	20.81
		RB25#25	21.01	20.86	20.74	21.01	20.86	20.74
		RB50#0	20.90	20.82	20.84	20.90	20.82	20.84

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	22.98	23.02	22.89	22.98	23.02	22.89
		RB1#38	22.87	22.86	22.48	22.87	22.86	22.48
		RB1#74	23.11	22.78	22.50	23.11	22.78	22.50
		RB36#0	21.70	21.80	21.83	21.70	21.80	21.83
		RB36#39	21.86	21.87	21.63	21.86	21.87	21.63
		RB75#0	21.79	21.78	21.75	21.79	21.78	21.75
	16QAM	RB1#0	21.84	22.31	22.06	21.84	22.31	22.06
		RB1#38	22.27	22.30	21.76	22.27	22.30	21.76
		RB1#74	21.60	22.51	21.18	21.60	22.51	21.18
		RB36#0	20.71	20.72	20.82	20.71	20.72	20.82
		RB36#39	20.80	20.70	20.63	20.80	20.70	20.63
		RB75#0	20.82	20.93	20.65	20.82	20.93	20.65
20.0	QPSK	RB1#0	22.49	22.95	22.60	22.49	22.95	22.60
		RB1#50	22.65	23.32	22.52	22.65	23.32	22.52
		RB1#99	22.81	23.05	22.31	22.81	23.05	22.31
		RB50#0	21.67	21.71	21.84	21.67	21.71	21.84
		RB50#50	21.82	21.82	21.53	21.82	21.82	21.53
		RB100#0	21.86	21.71	21.71	21.86	21.71	21.71
	16QAM	RB1#0	22.12	21.64	22.40	22.12	21.64	22.40
		RB1#50	22.45	21.70	22.50	22.45	21.70	22.50
		RB1#99	22.07	21.86	22.90	22.07	21.86	22.90
		RB50#0	20.74	20.58	20.69	20.74	20.58	20.69
		RB50#50	20.92	20.76	20.51	20.92	20.76	20.51
		RB100#0	20.72	20.77	20.66	20.72	20.77	20.66

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) –Cable Loss

Antenna Gain =0.8dBi

Cable Loss=0.8dBi

Limit: EIRP≤30dBm

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	23.34	23.23	23.08	21.19	21.08	20.93
		RB1#3	23.32	23.25	23.15	21.17	21.10	21.00
		RB1#5	23.34	23.15	23.07	21.19	21.00	20.92
		RB3#0	23.14	23.13	23.12	20.99	20.98	20.97
		RB3#3	23.21	23.25	23.17	21.06	21.10	21.02
		RB6#0	22.23	22.21	22.30	20.08	20.06	20.15
	16QAM	RB1#0	22.59	22.53	22.20	20.44	20.38	20.05
		RB1#3	22.52	22.70	22.03	20.37	20.55	19.88
		RB1#5	22.37	22.56	21.90	20.22	20.41	19.75
		RB3#0	22.35	22.28	22.20	20.20	20.13	20.05
		RB3#3	22.34	22.36	22.23	20.19	20.21	20.08
		RB6#0	21.21	21.24	21.19	19.06	19.09	19.04
3.0	QPSK	RB1#0	23.27	23.21	23.09	21.12	21.06	20.94
		RB1#8	23.10	23.18	23.00	20.95	21.03	20.85
		RB1#14	23.19	23.43	23.36	21.04	21.28	21.21
		RB6#0	22.18	22.28	22.10	20.03	20.13	19.95
		RB6#9	22.24	22.38	22.16	20.09	20.23	20.01
		RB15#0	22.36	22.31	22.19	20.21	20.16	20.04
	16QAM	RB1#0	22.42	22.60	21.97	20.27	20.45	19.82
		RB1#8	22.21	22.72	22.03	20.06	20.57	19.88
		RB1#14	22.11	22.65	21.83	19.96	20.50	19.68
		RB6#0	21.18	21.53	21.05	19.03	19.38	18.90
		RB6#9	21.21	21.58	21.05	19.06	19.43	18.90
		RB15#0	21.51	21.25	21.15	19.36	19.10	19.00

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	23.25	23.22	23.27	21.10	21.07	21.12
		RB1#13	23.16	23.21	23.19	21.01	21.06	21.04
		RB1#24	23.28	23.16	23.22	21.13	21.01	21.07
		RB15#0	22.30	22.31	22.20	20.15	20.16	20.05
		RB15#10	22.40	22.35	22.12	20.25	20.20	19.97
		RB25#0	22.32	22.32	22.12	20.17	20.17	19.97
	16QAM	RB1#0	21.67	22.60	21.92	19.52	20.45	19.77
		RB1#13	21.59	22.69	21.80	19.44	20.54	19.65
		RB1#24	21.68	22.52	21.81	19.53	20.37	19.66
		RB15#0	21.24	21.25	21.20	19.09	19.10	19.05
		RB15#10	21.41	21.13	21.16	19.26	18.98	19.01
		RB25#0	21.36	21.15	21.18	19.21	19.00	19.03
10.0	QPSK	RB1#0	23.19	23.24	23.26	21.04	21.09	21.11
		RB1#25	23.22	23.39	23.35	21.07	21.24	21.20
		RB1#49	23.33	23.24	23.29	21.18	21.09	21.14
		RB25#0	22.32	22.22	22.26	20.17	20.07	20.11
		RB25#25	22.35	22.40	22.25	20.20	20.25	20.10
		RB50#0	22.38	22.32	22.28	20.23	20.17	20.13
	16QAM	RB1#0	22.48	22.76	22.05	20.33	20.61	19.90
		RB1#25	22.79	22.84	21.90	20.64	20.69	19.75
		RB1#49	22.50	22.95	21.68	20.35	20.80	19.53
		RB25#0	21.29	21.25	21.16	19.14	19.10	19.01
		RB25#25	21.26	21.43	21.22	19.11	19.28	19.07
		RB50#0	21.29	21.38	21.21	19.14	19.23	19.06

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) –Cable Loss

Antenna Gain = 0.5dBi = -1.65 dBd (0dBd=2.15dBi)

Cable Loss=0.5dBi

Limit: ERP<=38.45dBm

LTE Band 7

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	22.30	22.03	22.05	22.30	22.03	22.05
		RB1#13	21.91	22.06	21.92	21.91	22.06	21.92
		RB1#24	21.71	21.92	21.85	21.71	21.92	21.85
		RB15#0	20.90	21.05	20.90	20.90	21.05	20.90
		RB15#10	20.86	21.01	20.83	20.86	21.01	20.83
		RB25#0	20.87	21.06	20.88	20.87	21.06	20.88
	16QAM	RB1#0	21.28	21.46	20.41	21.28	21.46	20.41
		RB1#13	20.99	21.30	20.80	20.99	21.30	20.80
		RB1#24	20.94	21.25	20.56	20.94	21.25	20.56
		RB15#0	19.96	19.95	19.92	19.96	19.95	19.92
		RB15#10	19.82	19.97	19.78	19.82	19.97	19.78
		RB25#0	20.06	20.04	19.79	20.06	20.04	19.79
10.0	QPSK	RB1#0	22.00	22.03	22.22	22.00	22.03	22.22
		RB1#25	21.62	22.16	22.16	21.62	22.16	22.16
		RB1#49	21.85	22.00	22.10	21.85	22.00	22.10
		RB25#0	20.80	21.08	21.08	20.80	21.08	21.08
		RB25#25	20.86	21.05	20.88	20.86	21.05	20.88
		RB50#0	20.88	21.12	20.95	20.88	21.12	20.95
	16QAM	RB1#0	21.29	21.36	20.85	21.29	21.36	20.85
		RB1#25	21.17	21.46	20.90	21.17	21.46	20.90
		RB1#49	21.08	21.82	20.55	21.08	21.82	20.55
		RB25#0	19.85	20.16	20.24	19.85	20.16	20.24
		RB25#25	20.04	20.10	19.98	20.04	20.10	19.98
		RB50#0	19.86	20.08	19.98	19.86	20.08	19.98

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	22.08	22.03	21.88	22.08	22.03	21.88
		RB1#38	21.68	21.74	21.99	21.68	21.74	21.99
		RB1#74	22.16	21.92	21.62	22.16	21.92	21.62
		RB36#0	20.73	21.10	21.05	20.73	21.10	21.05
		RB36#39	20.84	20.93	20.87	20.84	20.93	20.87
		RB75#0	20.79	21.04	21.02	20.79	21.04	21.02
	16QAM	RB1#0	21.30	21.58	20.93	21.30	21.58	20.93
		RB1#38	21.10	21.42	20.32	21.10	21.42	20.32
		RB1#74	21.08	21.59	19.97	21.08	21.59	19.97
		RB36#0	19.81	19.97	20.03	19.81	19.97	20.03
		RB36#39	19.89	19.83	19.95	19.89	19.83	19.95
		RB75#0	19.86	20.00	19.86	19.86	20.00	19.86
20.0	QPSK	RB1#0	21.81	21.89	21.64	21.81	21.89	21.64
		RB1#50	21.79	22.04	21.75	21.79	22.04	21.75
		RB1#99	21.52	21.92	21.42	21.52	21.92	21.42
		RB50#0	20.71	20.99	20.87	20.71	20.99	20.87
		RB50#50	20.91	20.87	20.80	20.91	20.87	20.80
		RB100#0	20.70	20.98	20.84	20.70	20.98	20.84
	16QAM	RB1#0	21.20	20.91	21.43	21.20	20.91	21.43
		RB1#50	21.40	21.03	21.86	21.40	21.03	21.86
		RB1#99	21.44	20.82	20.93	21.44	20.82	20.93
		RB50#0	19.83	20.04	19.83	19.83	20.04	19.83
		RB50#50	19.86	19.97	19.89	19.86	19.97	19.89
		RB100#0	19.85	20.05	19.86	19.85	20.05	19.86

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) –Cable Loss
 Antenna Gain =0.8dBi
 Cable Loss=0.8dBi
 Limit: EIRP≤33dBm

Peak-to-average ratio (PAR)

LTE Band 2 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.74	4.74	4.71	13	Pass
QPSK (100RB Size)	5.29	5.48	5.38	13	Pass
16QAM (1RB Size)	5.64	5.67	5.71	13	Pass
16QAM (100RB Size)	6.25	6.35	6.31	13	Pass

LTE Band 4 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.78	4.74	4.71	13	Pass
QPSK (100RB Size)	5.45	5.38	5.32	13	Pass
16QAM (1RB Size)	5.87	5.74	5.74	13	Pass
16QAM (100RB Size)	6.38	6.35	6.31	13	Pass

LTE Band 5 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.49	4.65	4.65	13	Pass
QPSK (50RB Size)	5.26	5.45	5.26	13	Pass
16QAM (1RB Size)	5.45	5.54	5.61	13	Pass
16QAM (50RB Size)	6.09	6.31	6.12	13	Pass

LTE Band 7 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.04	4.20	4.33	13	Pass
QPSK (100RB Size)	5.26	5.10	5.29	13	Pass
16QAM (1RB Size)	4.81	5.10	5.16	13	Pass
16QAM (100RB Size)	6.19	5.99	6.22	13	Pass

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

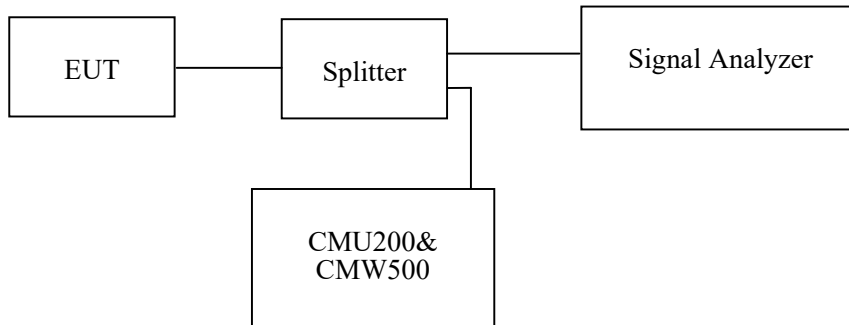
Applicable Standard

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:	27~28 °C
Relative Humidity:	51~58 %
ATM Pressure:	101.0 kPa

The testing was performed by Carl Yang on 2021-06-03 and 2021-06-07.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables and plots.

Cellular Band (Part 22H)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GPRS	824.2	248.00	318.47
	836.6	246.00	314.51
	848.8	246.00	312.10

	Frequency (MHz)	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	826.4	4.15	4.74
	836.6	4.14	4.74
	846.6	4.14	4.74
HSDPA	826.4	4.16	4.73
	836.6	4.14	4.74
	846.6	4.14	4.74
HSUPA	826.4	4.15	4.78
	836.6	4.13	4.71
	846.6	4.15	4.74

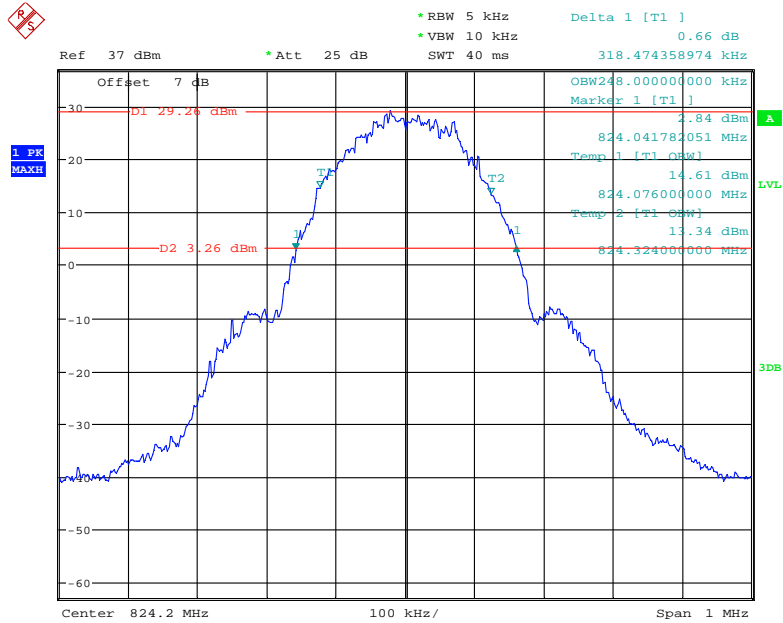
PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GPRS	1850.2	246.00	322.97
	1880.0	246.00	316.47
	1909.8	246.00	318.88

	Frequency (MHz)	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	1852.4	4.13	4.76
	1880.0	4.13	4.74
	1907.6	4.13	4.74
HSDPA	1852.4	4.15	4.79
	1880.0	4.13	4.74
	1907.6	4.13	4.71
HSUPA	1852.4	4.13	4.73
	1880.0	4.15	4.76
	1907.6	4.13	4.73

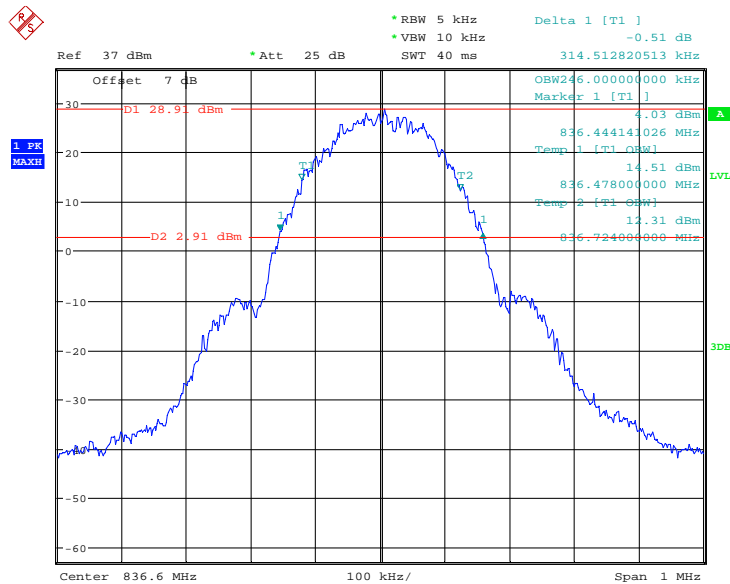
Cellular Band (Part 22H)

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



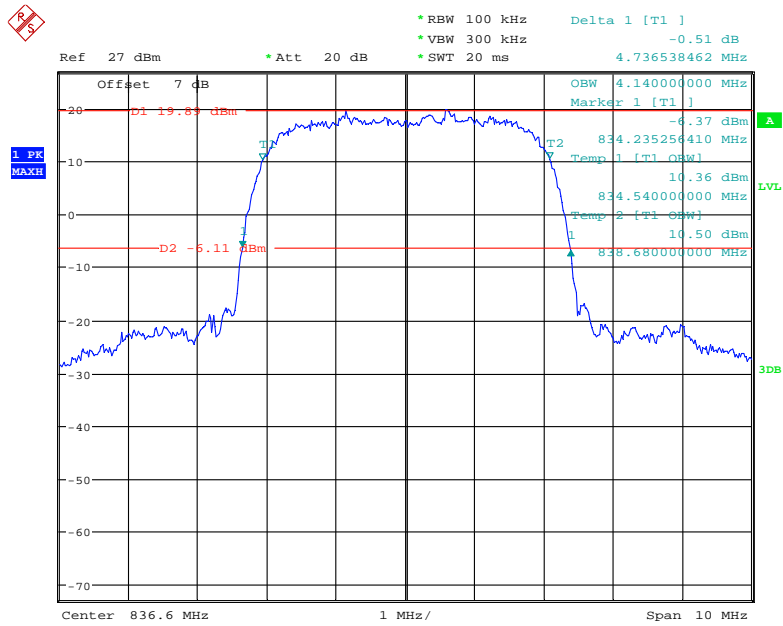
Date: 7.JUN.2021 11:22:06

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



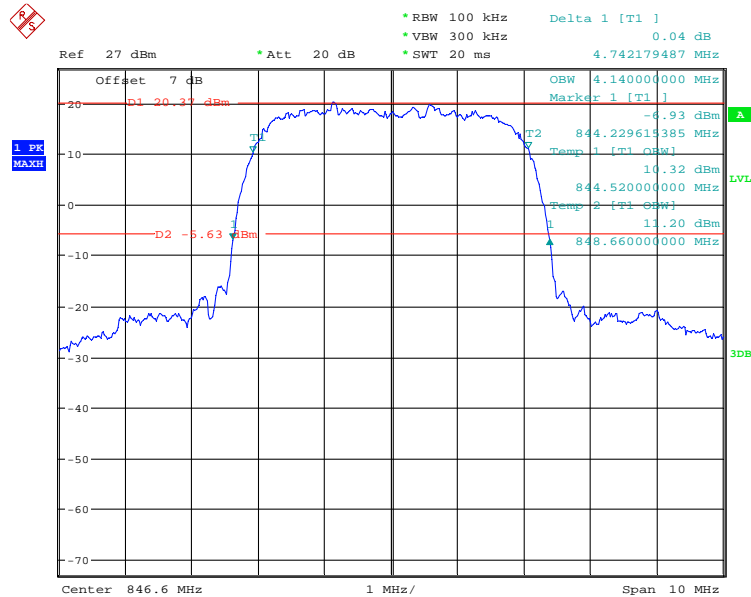
Date: 7.JUN.2021 11:23:18

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



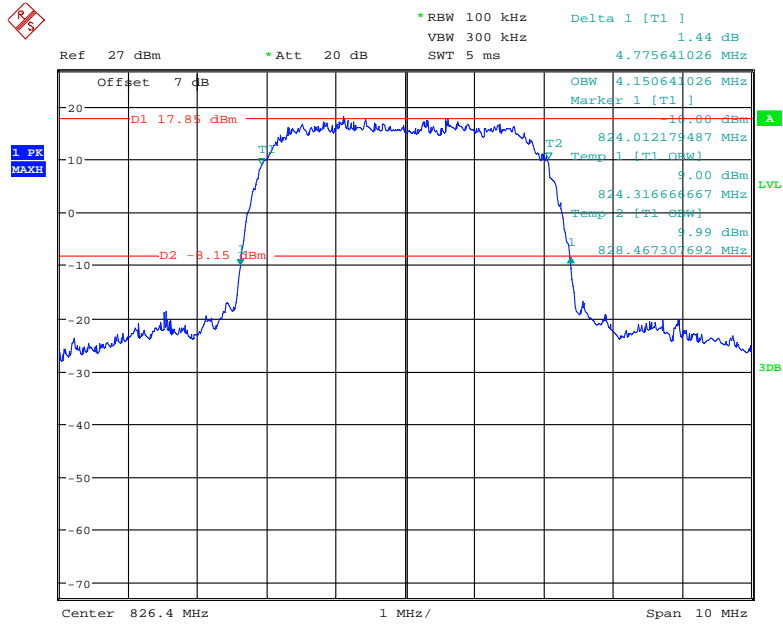
Date: 7.JUN.2021 13:24:18

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



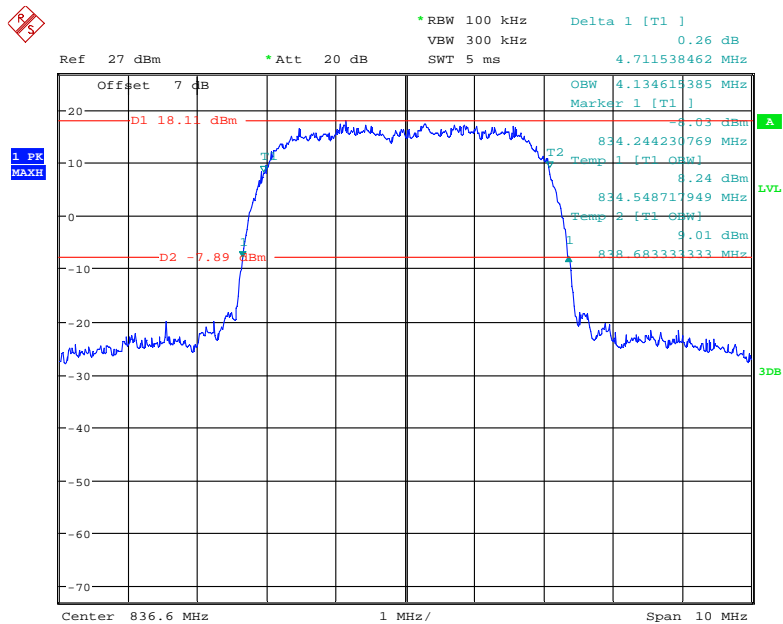
Date: 7.JUN.2021 13:23:04

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



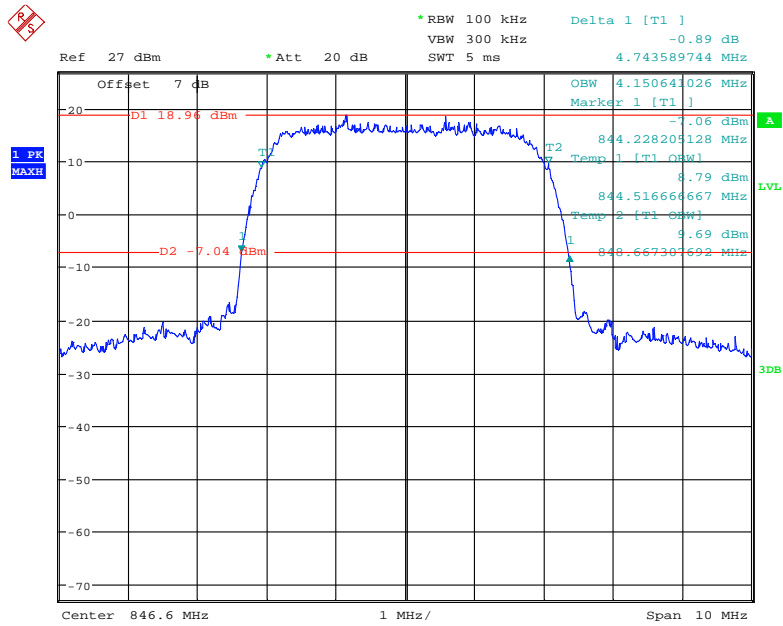
Date: 7.JUN.2021 13:32:05

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



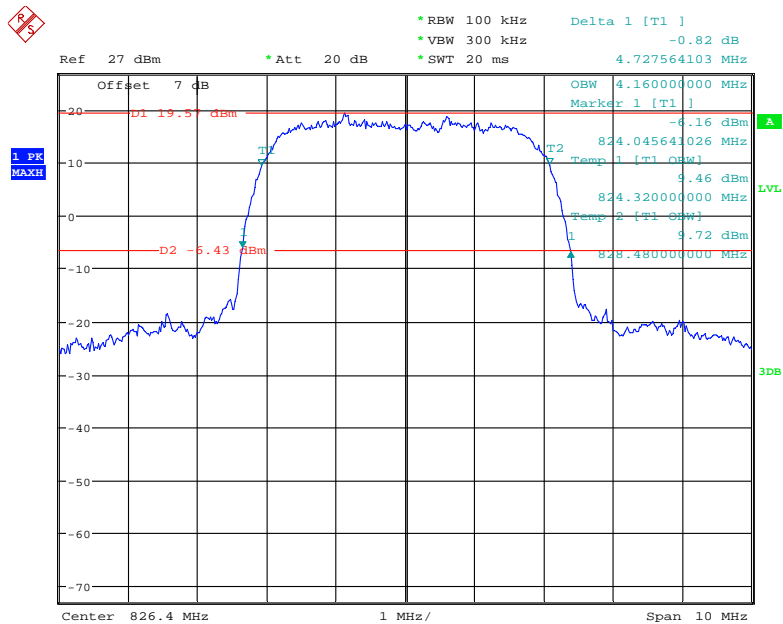
Date: 7.JUN.2021 13:33:10

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



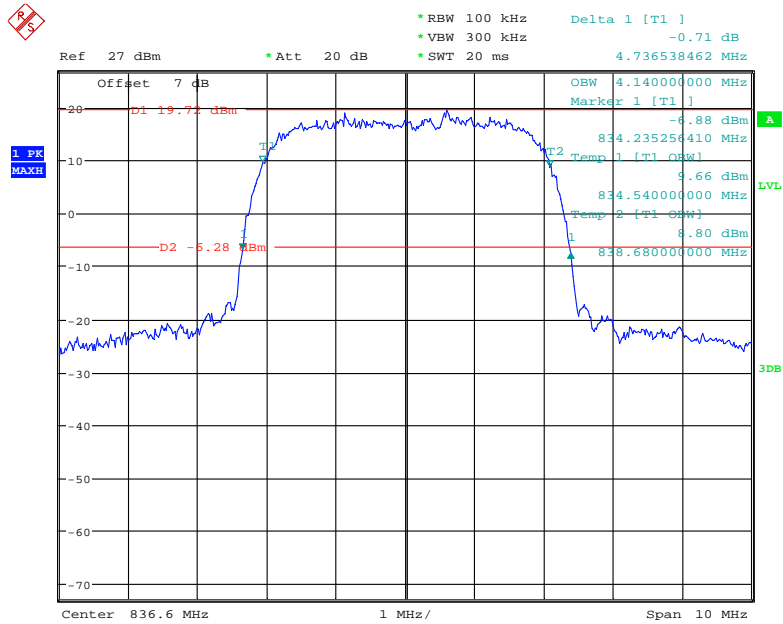
Date: 7.JUN.2021 13:34:13

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



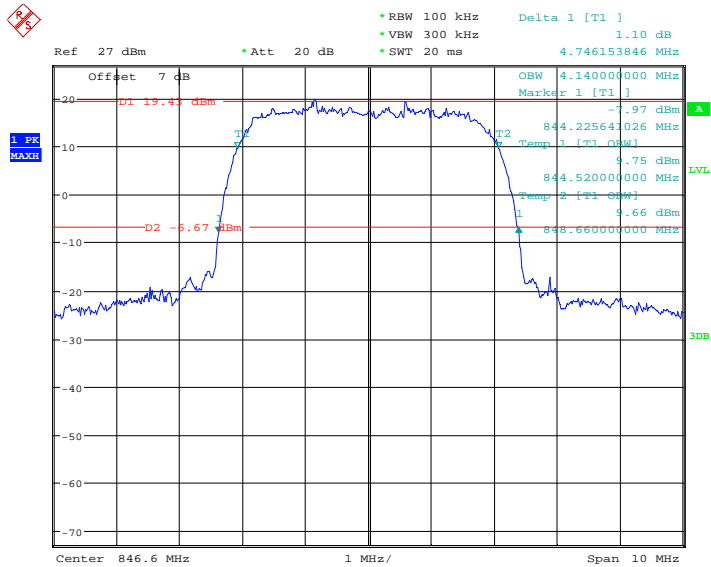
Date: 7.JUN.2021 13:16:19

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



Date: 7.JUN.2021 13:17:36

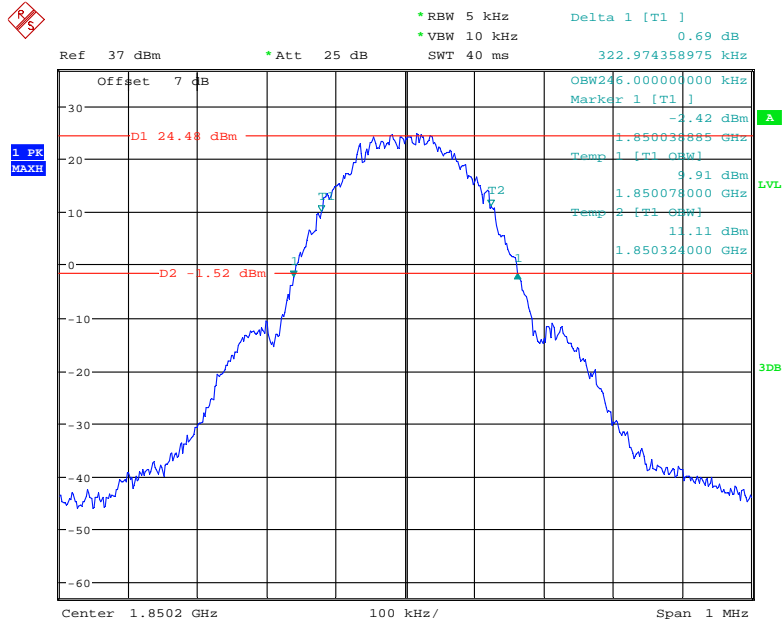
26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel



Date: 7.JUN.2021 13:18:49

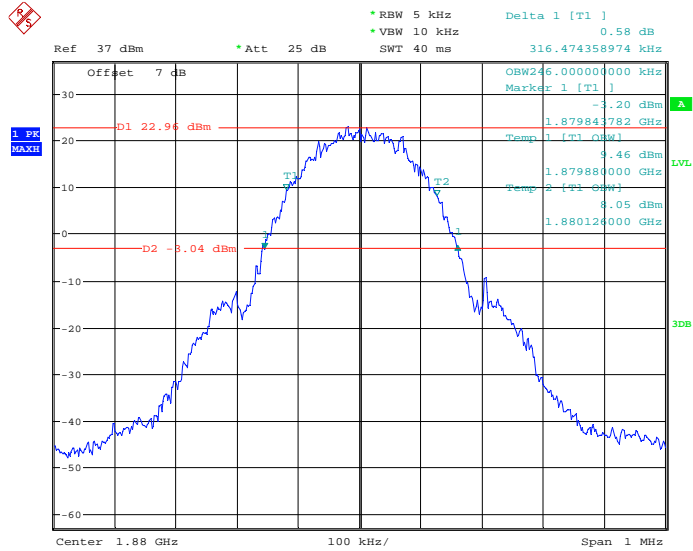
PCS Band (Part 24E)

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



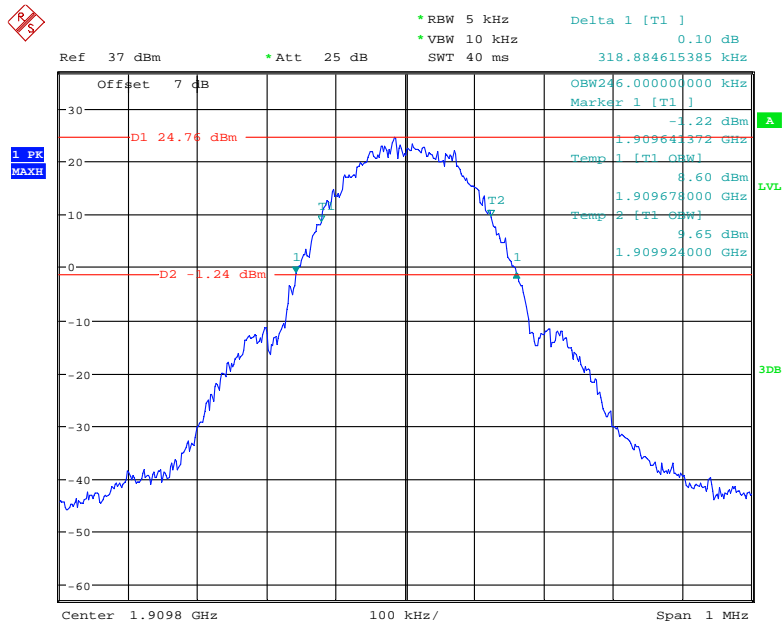
Date: 7.JUN.2021 11:25:40

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



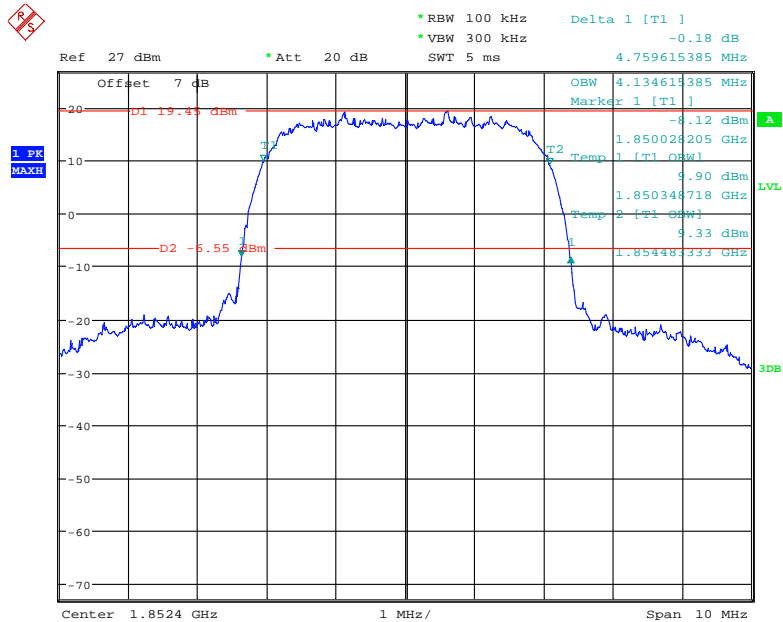
Date: 7.JUN.2021 11:26:51

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



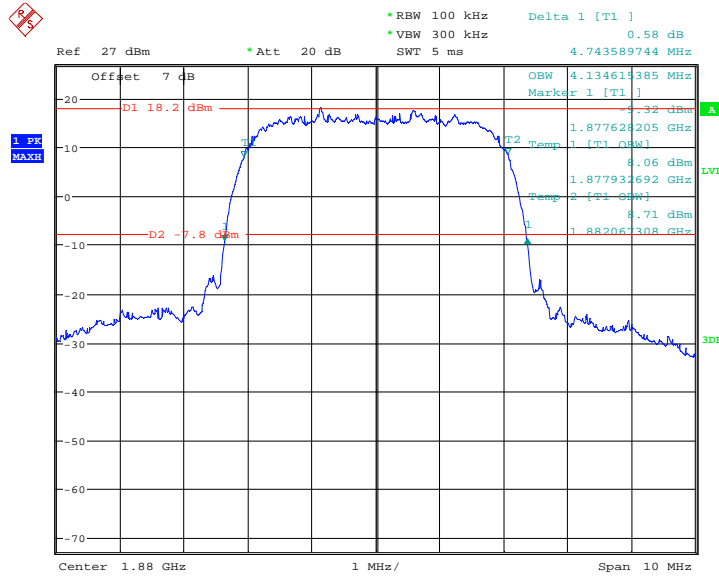
Date: 7.JUN.2021 11:28:08

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



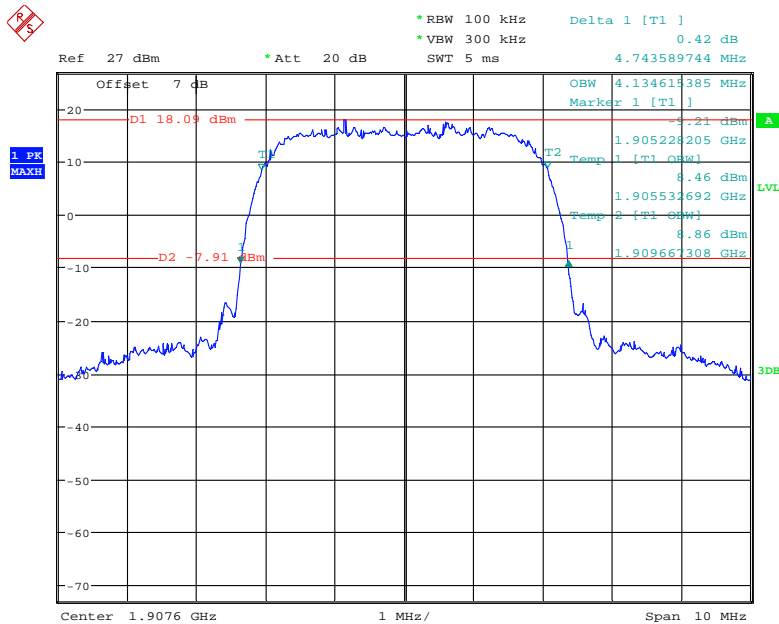
Date: 7.JUN.2021 13:51:15

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



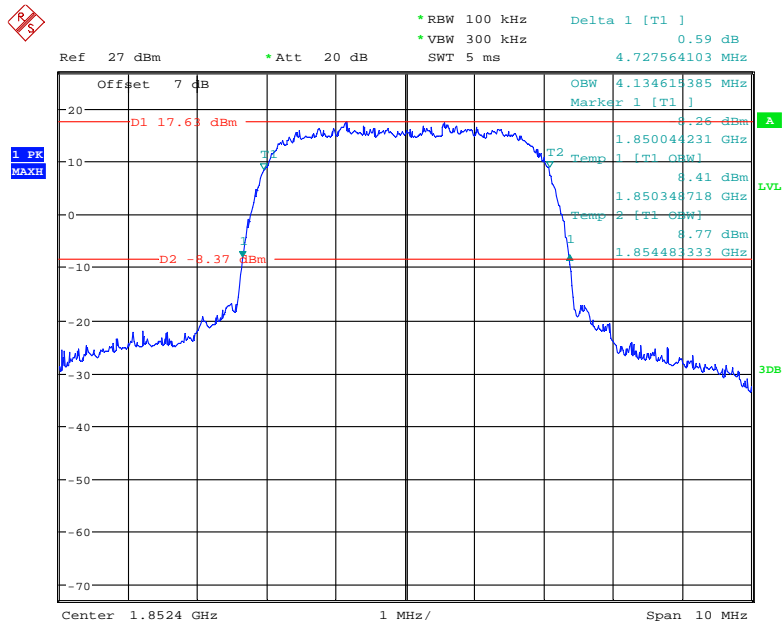
Date: 7.JUN.2021 13:52:53

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



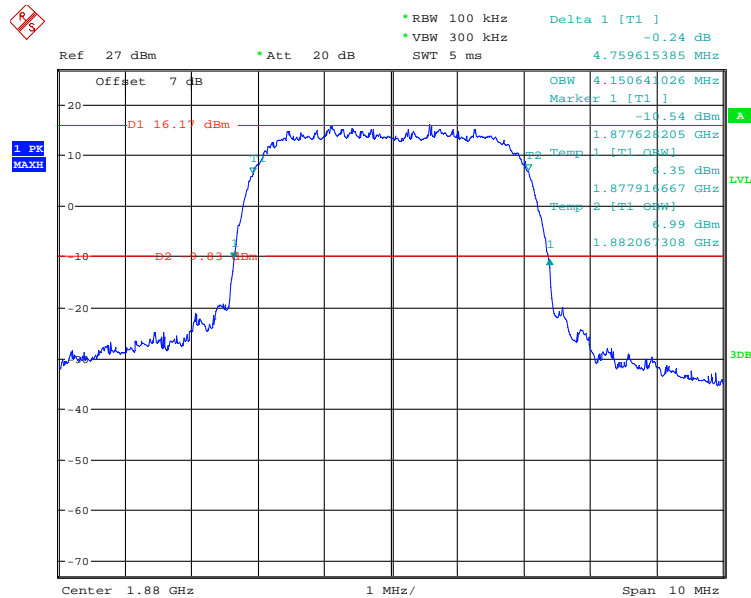
Date: 7.JUN.2021 13:55:02

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



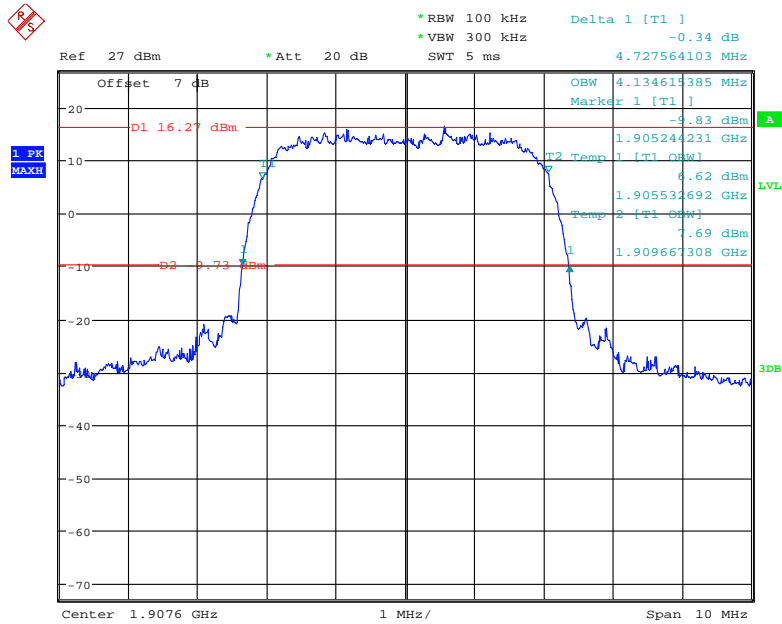
Date: 7.JUN.2021 13:40:03

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



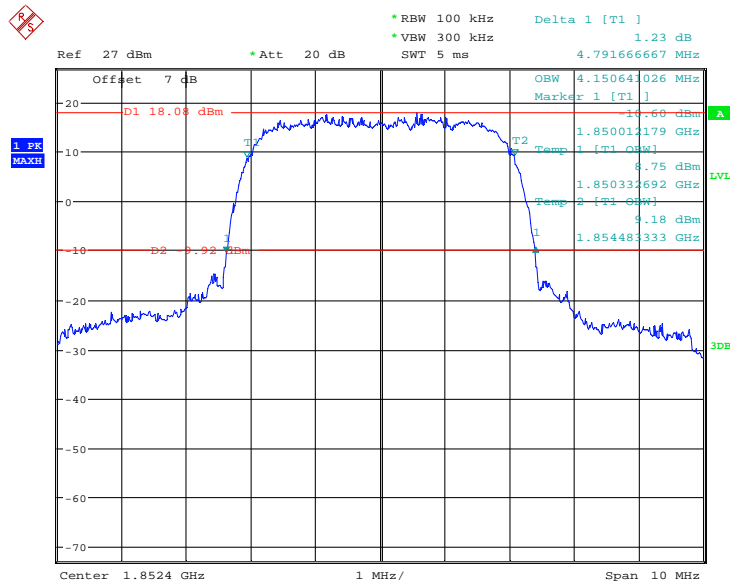
Date: 7.JUN.2021 13:42:13

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



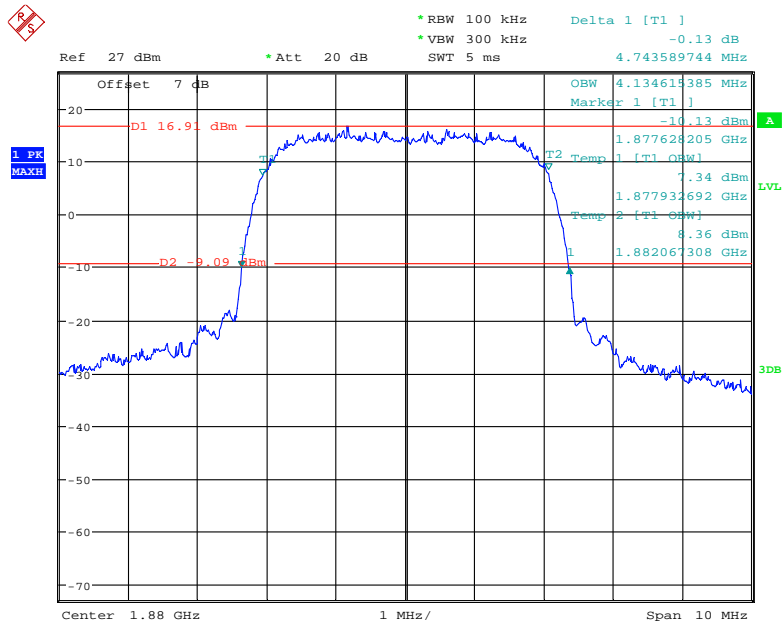
Date: 7.JUN.2021 13:44:18

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



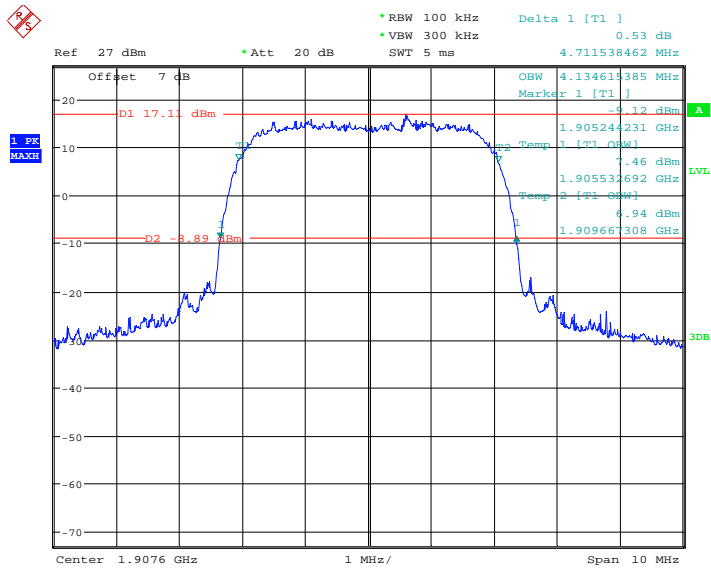
Date: 7.JUN.2021 13:49:46

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



Date: 7.JUN.2021 13:47:56

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



Date: 7.JUN.2021 13:46:16

LTE Band 2:

Bandwidth (MHz)	Modulation	Channel	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	Low	1.104	1.320
		Middle	1.104	1.326
		High	1.104	1.302
	16QAM	Low	1.110	1.338
		Middle	1.092	1.308
		High	1.104	1.308
3	QPSK	Low	2.700	2.928
		Middle	2.700	2.940
		High	2.688	2.952
	16QAM	Low	2.700	2.976
		Middle	2.688	2.952
		High	2.688	2.952
5	QPSK	Low	4.540	5.020
		Middle	4.520	5.000
		High	4.520	5.100
	16QAM	Low	4.520	5.020
		Middle	4.540	5.040
		High	4.540	5.040
10	QPSK	Low	8.960	9.760
		Middle	8.960	9.720
		High	8.960	9.680
	16QAM	Low	8.960	9.680
		Middle	8.960	9.720
		High	8.920	9.680
15	QPSK	Low	13.500	14.820
		Middle	13.500	14.880
		High	13.500	14.820
	16QAM	Low	13.500	14.880
		Middle	13.560	14.880
		High	13.500	14.760
20	QPSK	Low	17.840	19.280
		Middle	18.000	19.440
		High	17.920	19.360
	16QAM	Low	18.000	19.360
		Middle	17.920	19.440
		High	17.920	19.360

LTE Band 4:

Bandwidth (MHz)	Modulation	Channel	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	Low	1.104	1.308
		Middle	1.104	1.332
		High	1.110	1.296
	16QAM	Low	1.110	1.320
		Middle	1.104	1.290
		High	1.104	1.308
3	QPSK	Low	2.700	2.928
		Middle	2.700	2.940
		High	2.700	2.964
	16QAM	Low	2.700	2.964
		Middle	2.700	2.952
		High	2.688	2.952
5	QPSK	Low	4.540	5.020
		Middle	4.520	5.000
		High	4.520	5.040
	16QAM	Low	4.500	5.020
		Middle	4.540	5.040
		High	4.520	5.040
10	QPSK	Low	8.920	9.800
		Middle	8.960	9.720
		High	8.920	9.680
	16QAM	Low	8.960	9.680
		Middle	8.960	9.640
		High	8.960	9.720
15	QPSK	Low	13.500	14.820
		Middle	13.500	14.760
		High	13.440	14.820
	16QAM	Low	13.560	14.820
		Middle	13.500	14.940
		High	13.440	14.820
20	QPSK	Low	17.920	19.440
		Middle	17.920	19.440
		High	17.920	19.360
	16QAM	Low	17.920	19.440
		Middle	17.920	19.440
		High	17.840	19.280

LTE Band 5:

Bandwidth (MHz)	Modulation	Channel	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	Low	1.104	1.314
		Middle	1.098	1.320
		High	1.110	1.302
	16QAM	Low	1.110	1.314
		Middle	1.098	1.308
		High	1.104	1.308
3	QPSK	Low	2.688	2.952
		Middle	2.688	2.940
		High	2.700	2.976
	16QAM	Low	2.688	2.976
		Middle	2.688	2.952
		High	2.688	2.964
5	QPSK	Low	4.520	5.020
		Middle	4.520	5.040
		High	4.520	5.000
	16QAM	Low	4.520	4.980
		Middle	4.540	5.020
		High	4.520	5.040
10	QPSK	Low	8.960	9.840
		Middle	8.960	9.680
		High	8.920	9.640
	16QAM	Low	8.960	9.720
		Middle	9.000	9.720
		High	8.920	9.560

LTE Band 7:

Bandwidth (MHz)	Modulation	Channel	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5	QPSK	Low	4.540	5.000
		Middle	4.520	5.060
		High	4.520	4.980
	16QAM	Low	4.520	5.020
		Middle	4.520	5.040
		High	4.520	5.000
10	QPSK	Low	8.960	9.800
		Middle	8.960	9.680
		High	8.960	9.760
	16QAM	Low	8.960	9.680
		Middle	8.960	9.680
		High	8.960	9.760
15	QPSK	Low	13.560	14.880
		Middle	13.440	14.880
		High	13.500	14.880
	16QAM	Low	13.560	14.940
		Middle	13.500	14.760
		High	13.500	14.760
20	QPSK	Low	17.920	19.520
		Middle	17.840	19.280
		High	17.920	19.440
	16QAM	Low	17.920	19.600
		Middle	17.920	19.360
		High	17.920	19.440

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

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

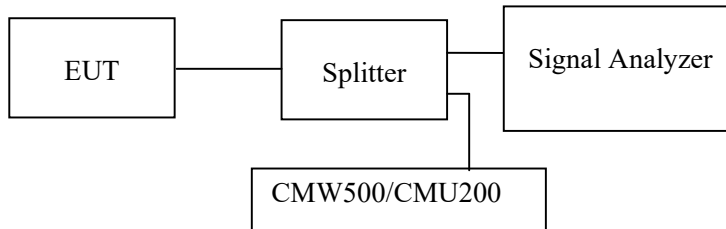
Applicable Standard

FCC §2.1051, §22.917(a) and §24.238(a) and §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:	27~28 °C
Relative Humidity:	51~58 %
ATM Pressure:	101.0 kPa

The testing was performed by Carl Yang from 2021-06-03 to 2021-06-07.

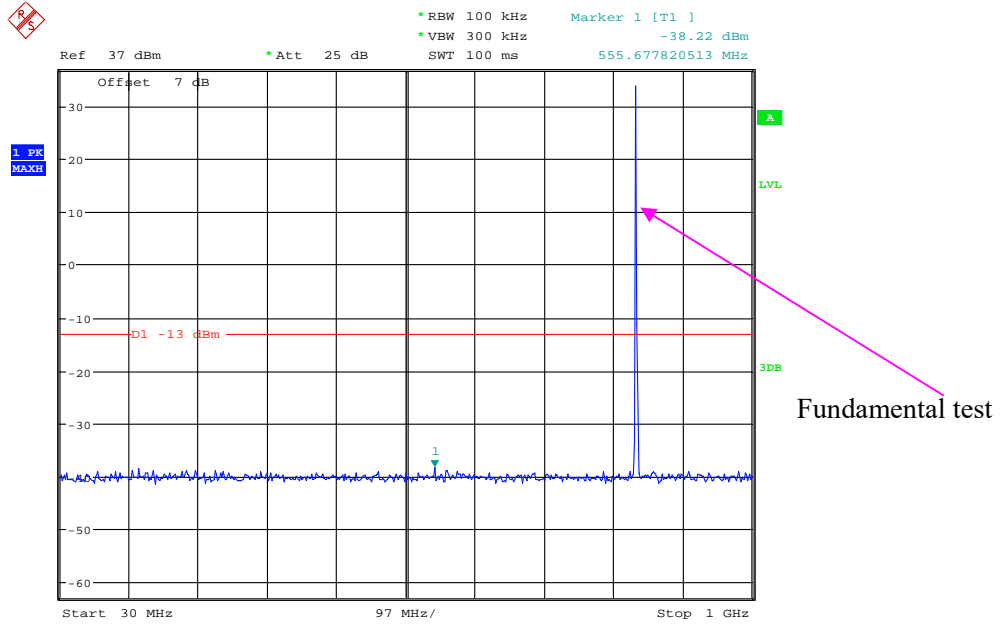
EUT operation mode: Transmitting

Test result: Pass

Please refer to the following plots.

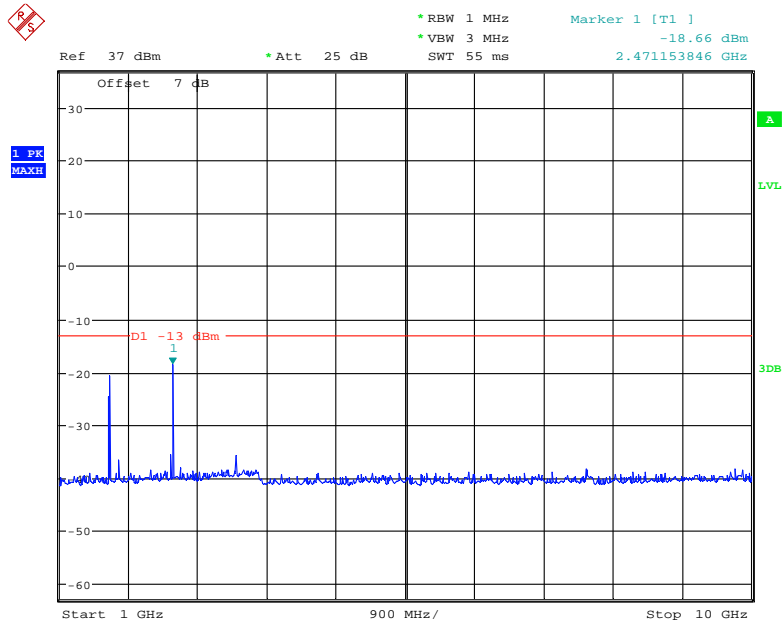
Cellular Band (Part 22H)
Low Channel:

30 MHz – 1 GHz (GSM Mode)



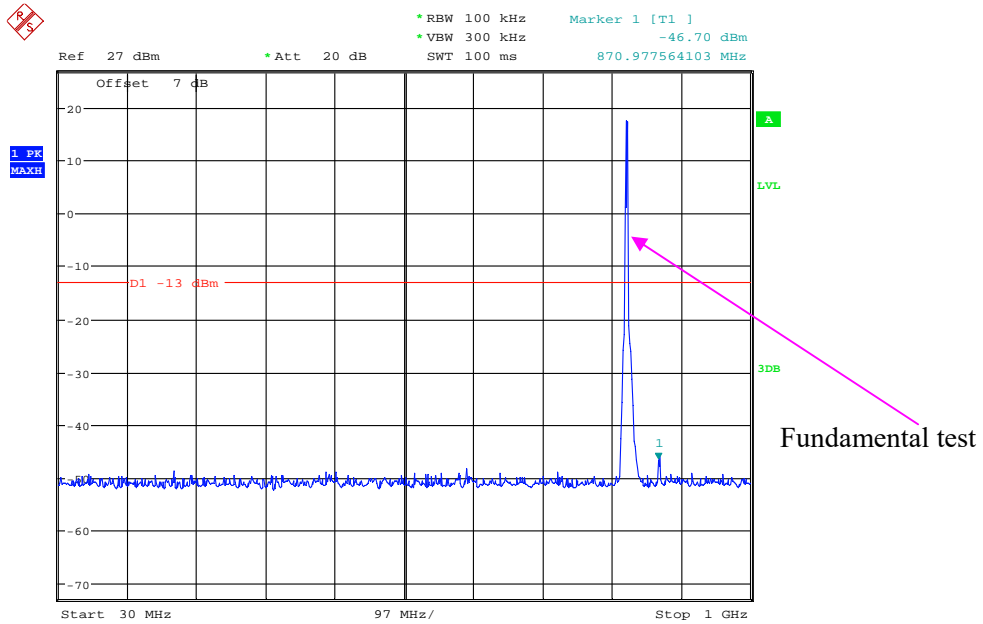
Date: 7.JUN.2021 11:35:14

1 GHz – 10 GHz (GSM Mode)



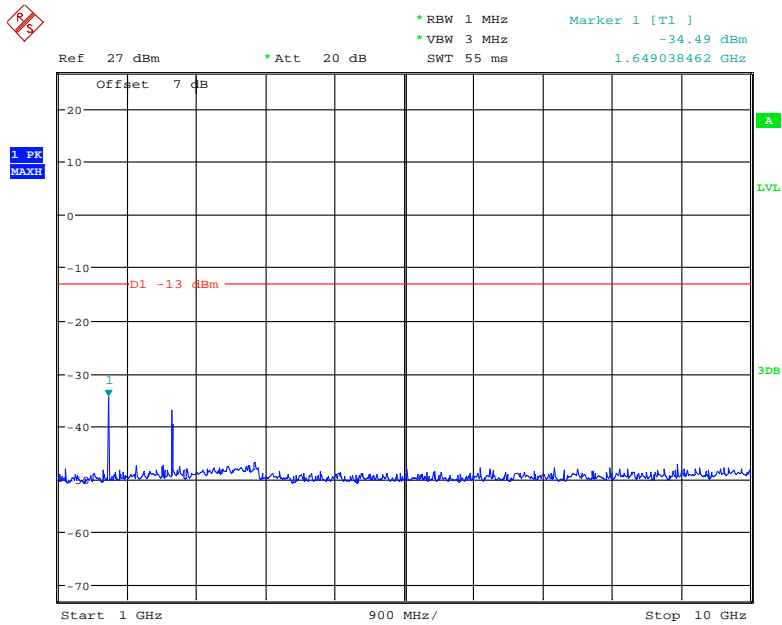
Date: 11.JUN.2021 13:11:23

30 MHz – 1 GHz (WCDMA Mode)



Date: 7.JUN.2021 14:01:02

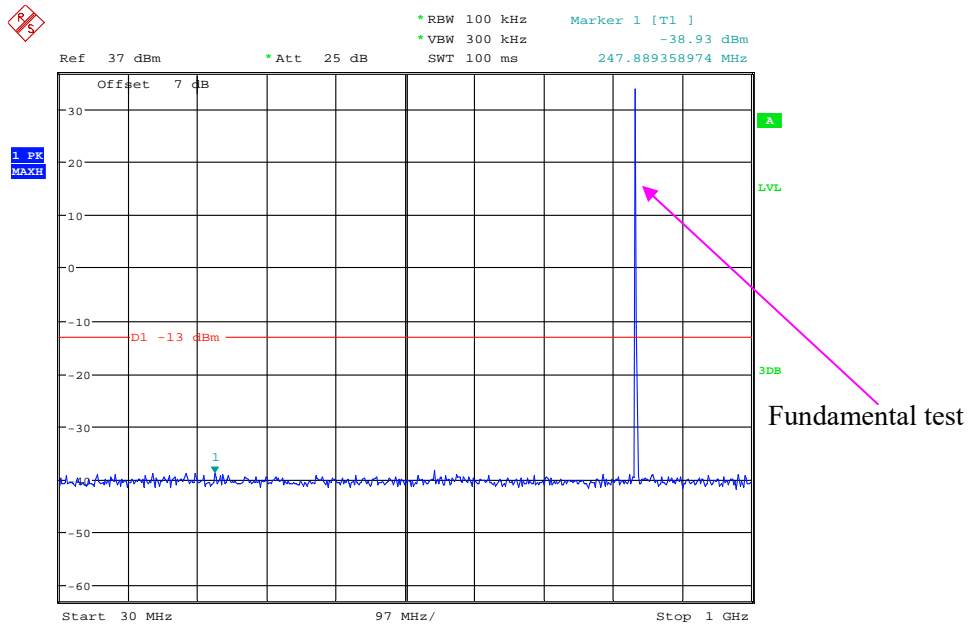
1 GHz – 10 GHz (WCDMA Mode)



Date: 7.JUN.2021 14:01:30

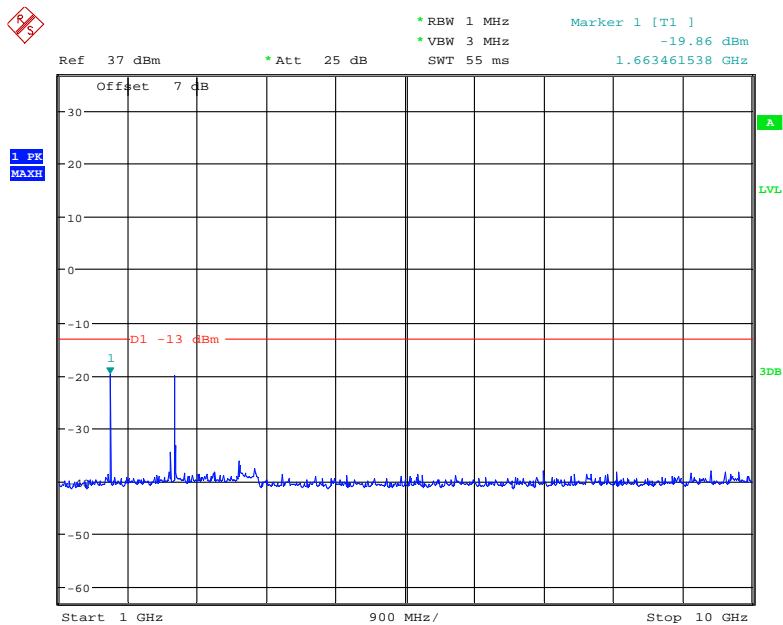
Middle Channel:

30 MHz – 1 GHz (GSM Mode)



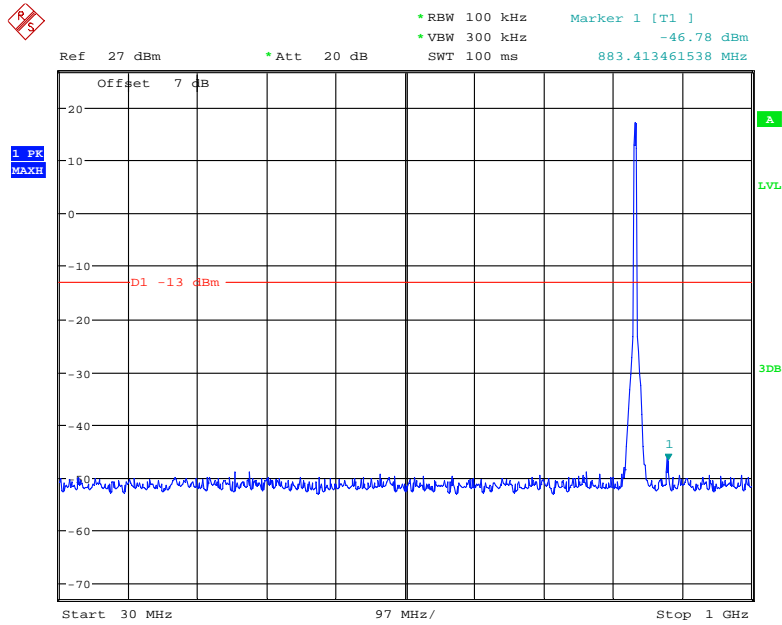
Date: 7.JUN.2021 11:35:00

1 GHz – 10 GHz (GSM Mode)



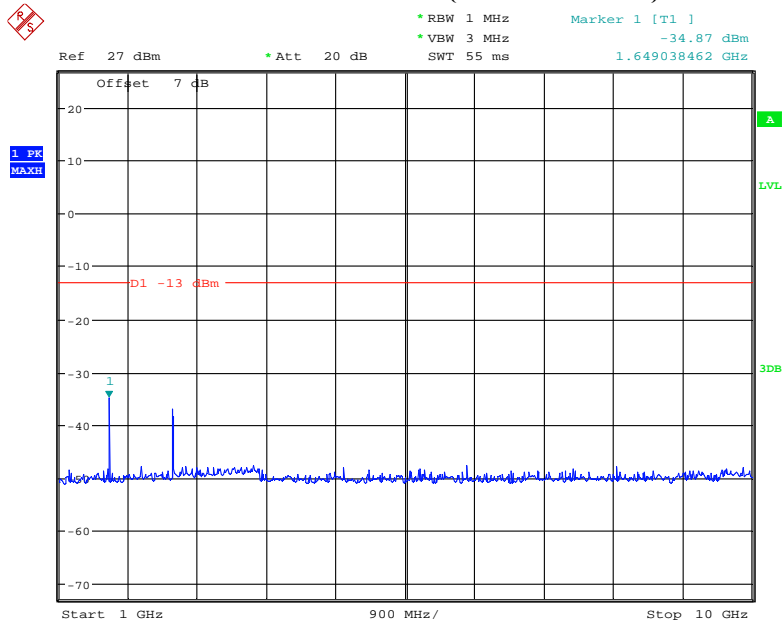
Date: 11.JUN.2021 13:11:05

30 MHz – 1 GHz (WCDMA Mode)



Date: 7.JUN.2021 14:00:35

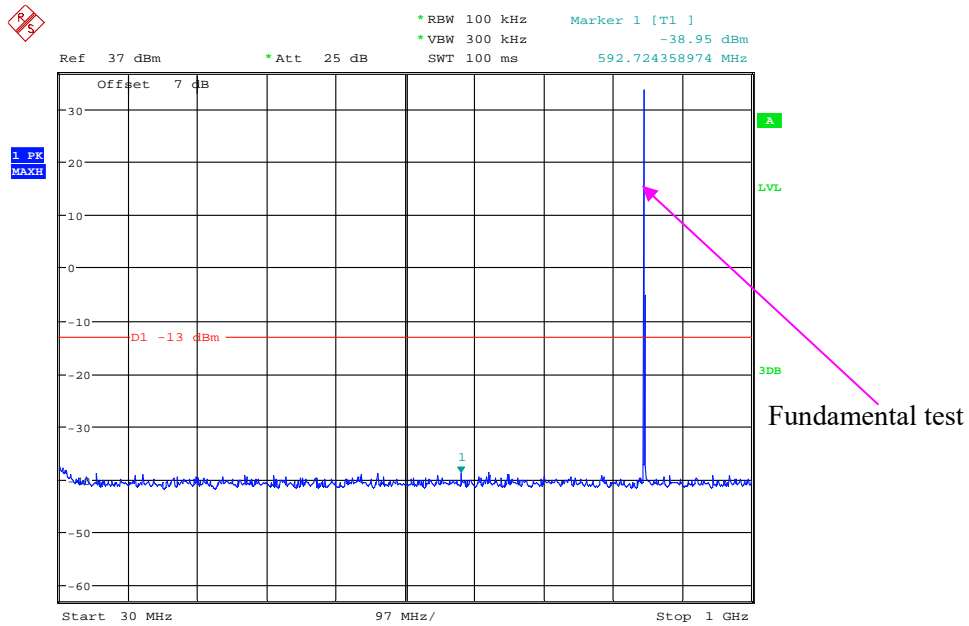
1 GHz – 10 GHz (WCDMA Mode)



Date: 7.JUN.2021 14:01:56

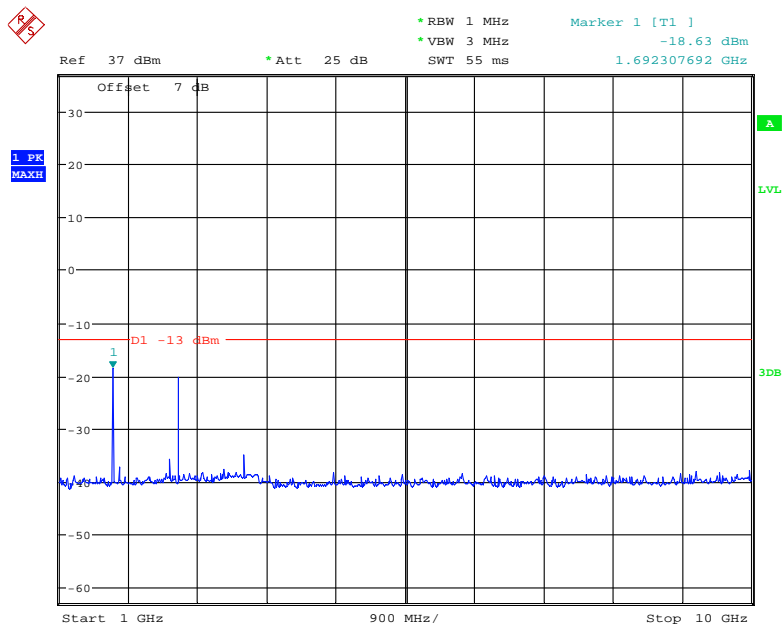
High Channel:

30 MHz – 1 GHz (GSM Mode)



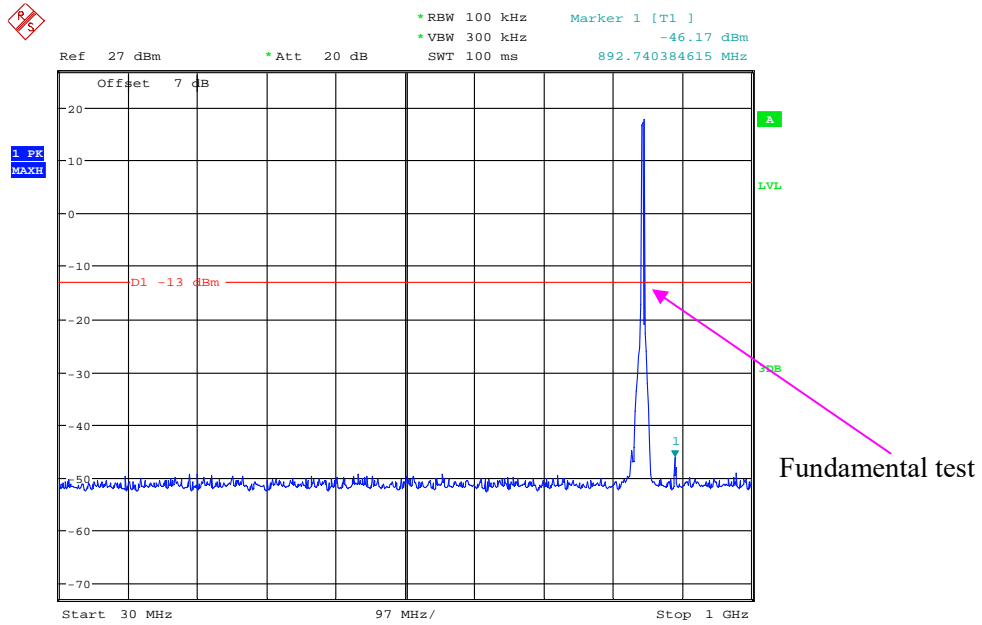
Date: 11.JUN.2021 13:09:59

1 GHz – 10 GHz (GSM Mode)



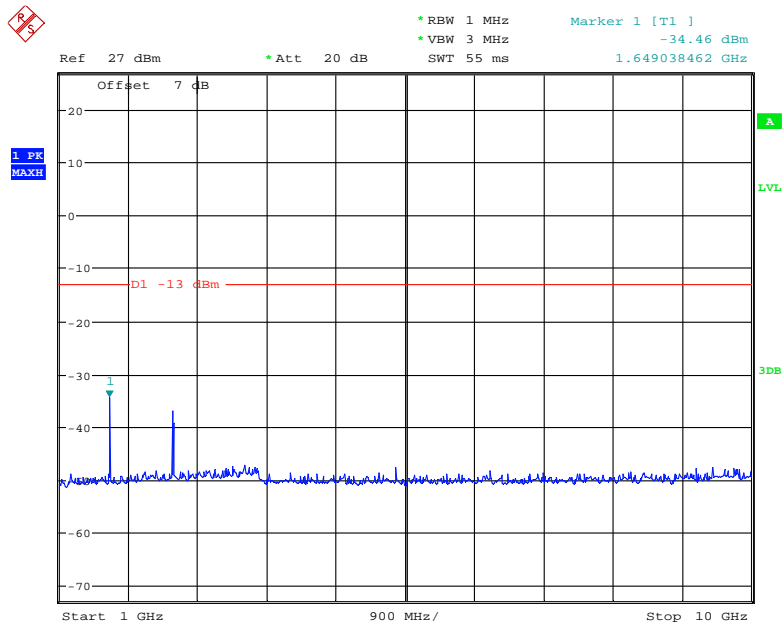
Date: 11.JUN.2021 13:10:36

30 MHz – 1 GHz (WCDMA Mode)



Date: 7.JUN.2021 14:00:02

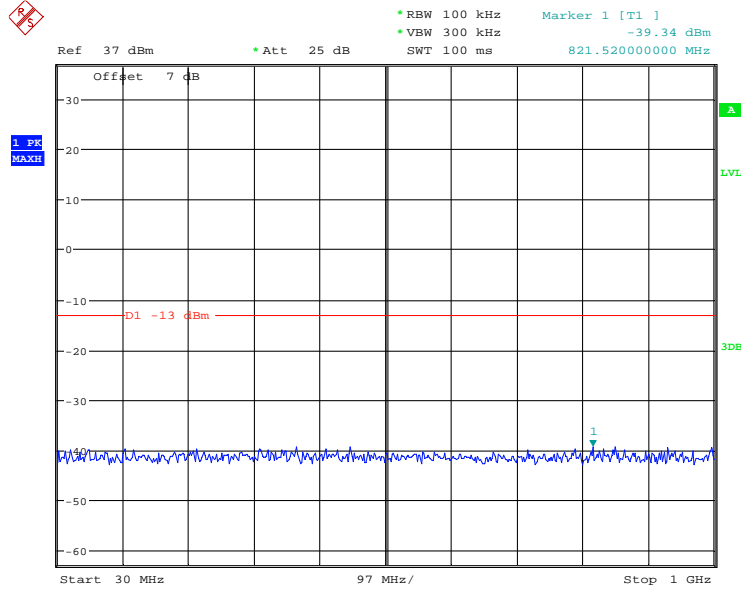
1 GHz – 10 GHz (WCDMA Mode)



Date: 7.JUN.2021 14:02:08

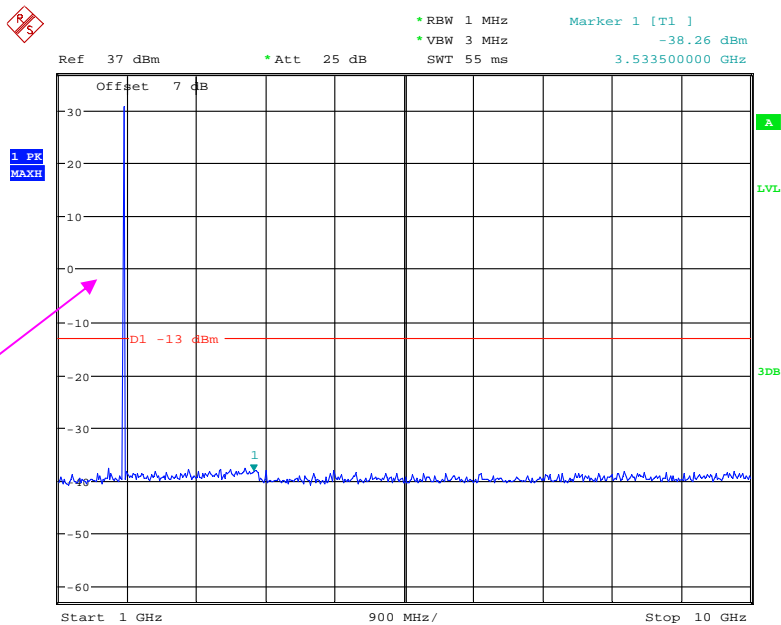
**PCS Band (Part 24E)
Low Channel:**

30 MHz – 1 GHz (GSM Mode)



Date: 7.JUN.2021 11:30:36

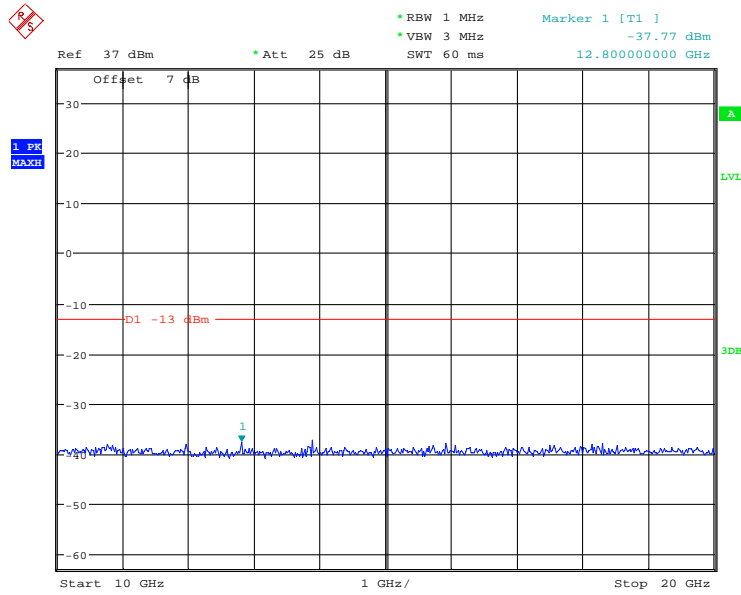
1 GHz – 10 GHz (GSM Mode)



Fundamental test

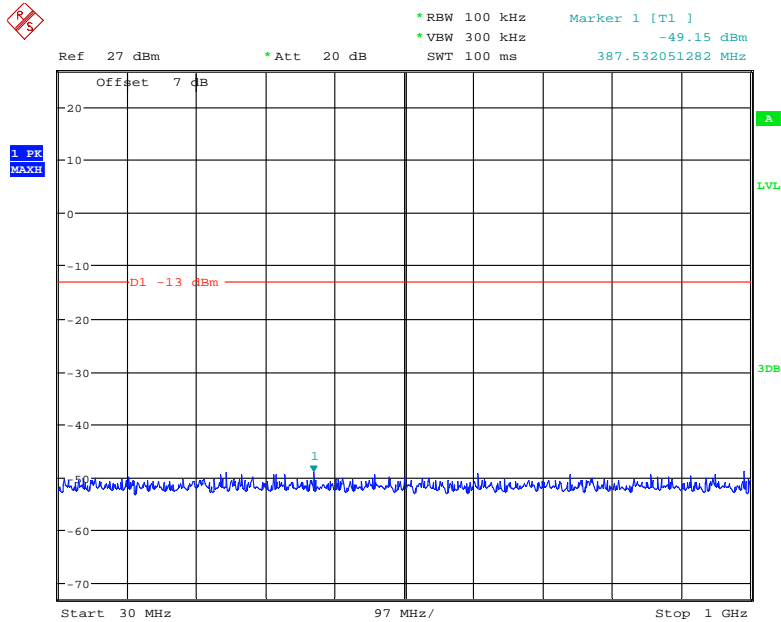
Date: 7.JUN.2021 11:31:25

10 MHz – 20 GHz (GSM Mode)



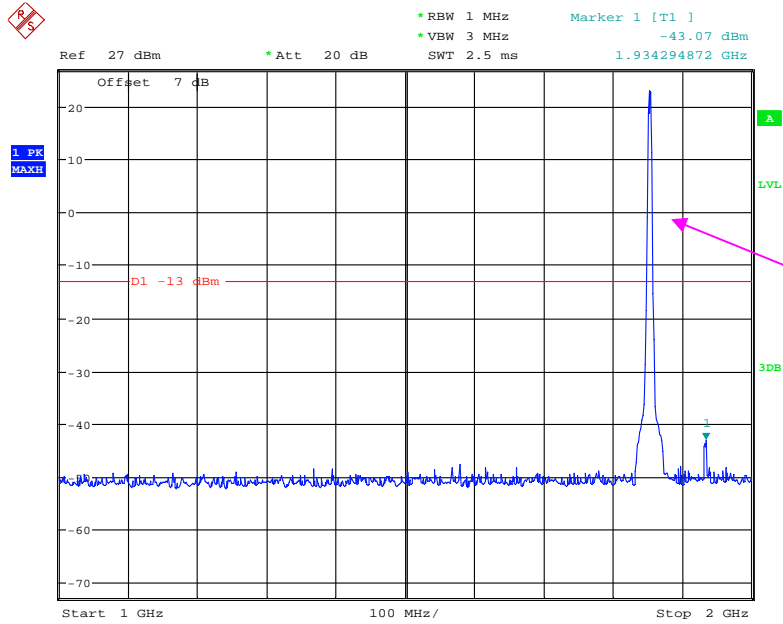
Date: 7.JUN.2021 11:32:51

30 MHz – 1 GHz (WCDMA Mode)



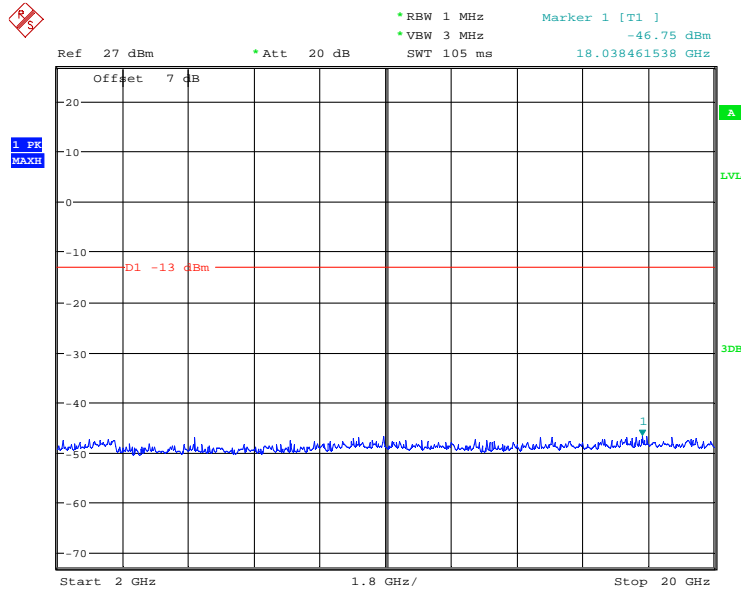
Date: 7.JUN.2021 13:56:35

1 GHz – 2 GHz (WCDMA Mode)



Date: 7.JUN.2021 13:58:02

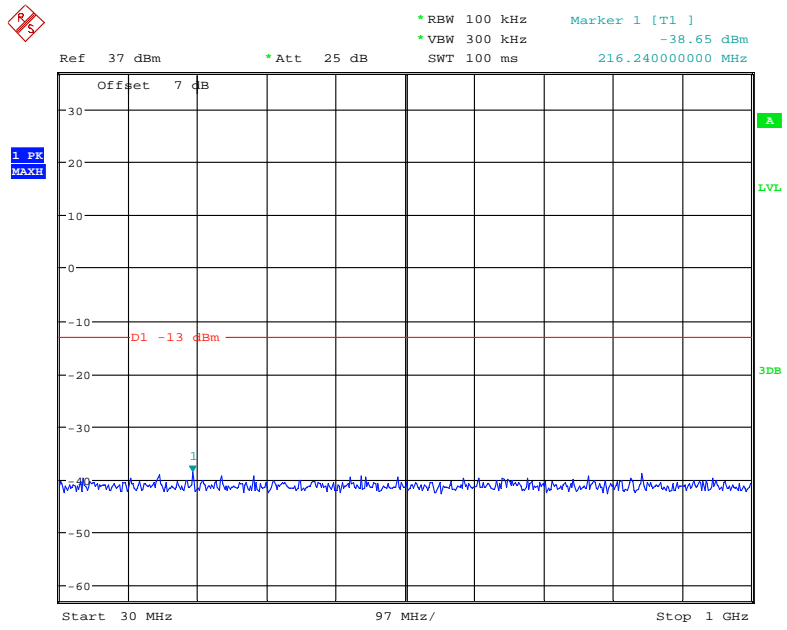
2GHz – 20GHz (WCDMA Mode)



Date: 7.JUN.2021 13:58:39

Middle Channel:

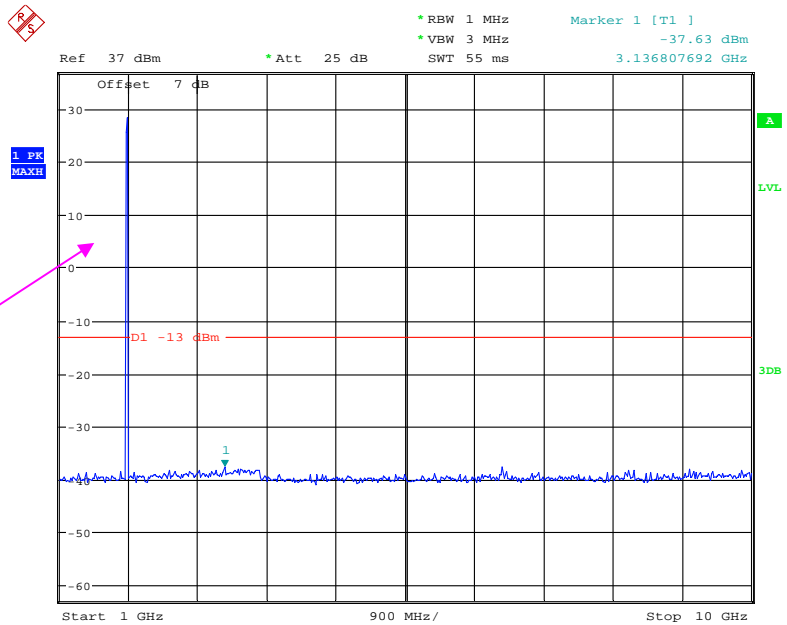
30 MHz – 1 GHz (GSM Mode)



Date: 7.JUN.2021 11:30:21

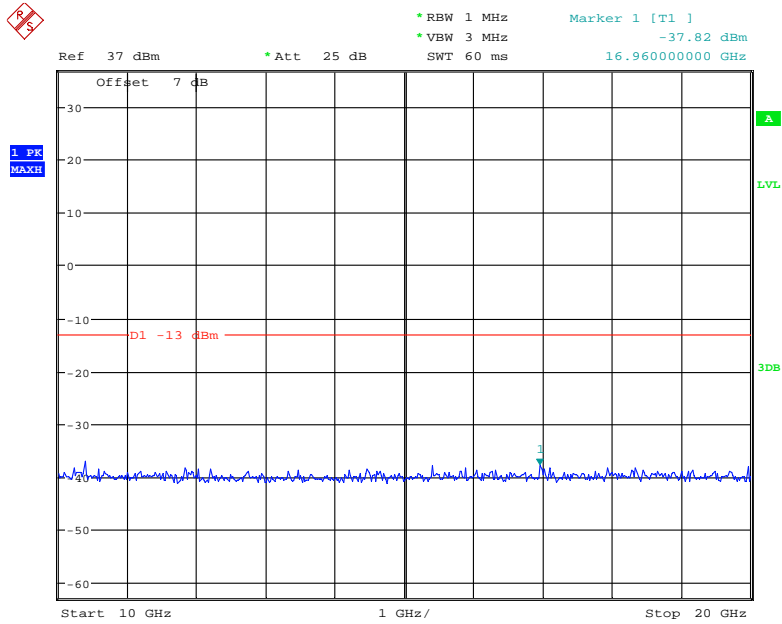
1 GHz – 10 GHz (GSM Mode)

Fundamental test



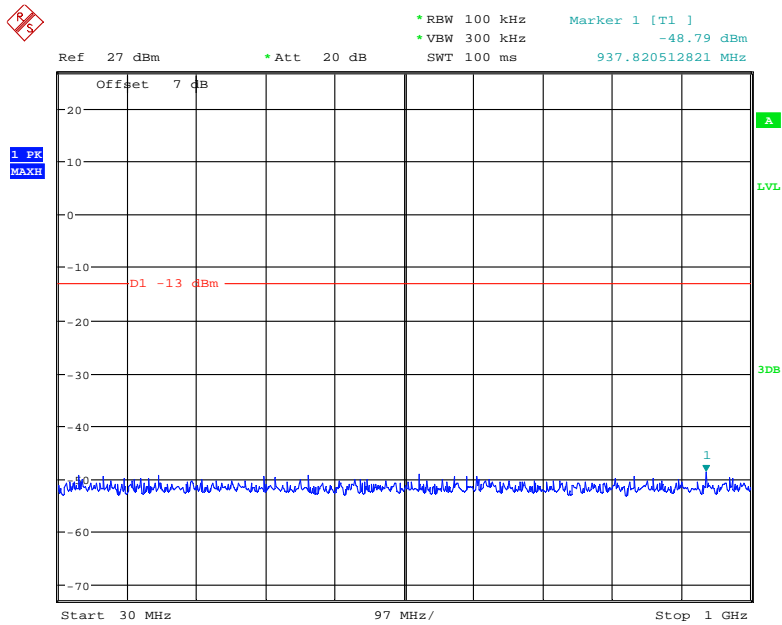
Date: 7.JUN.2021 11:32:02

10 GHz – 20 GHz (GSM Mode)



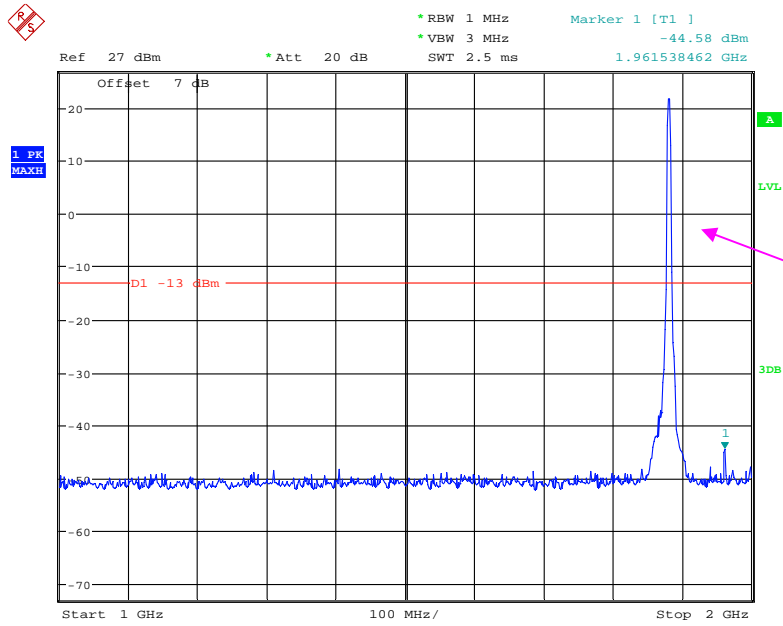
Date: 7.JUN.2021 11:33:12

30 MHz – 1 GHz (WCDMA Mode)



Date: 7.JUN.2021 13:56:16

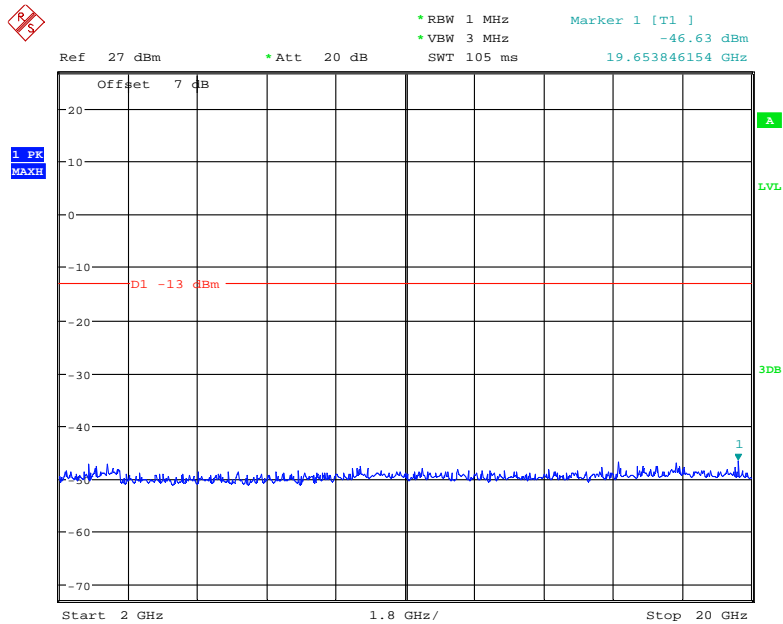
1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 7.JUN.2021 13:57:42

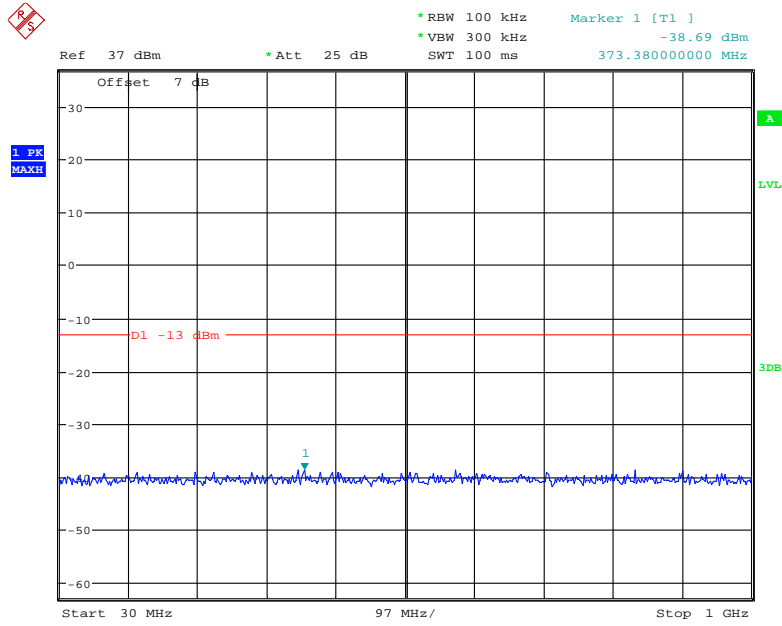
2 GHz – 20 GHz (WCDMA Mode)



Date: 7.JUN.2021 13:59:00

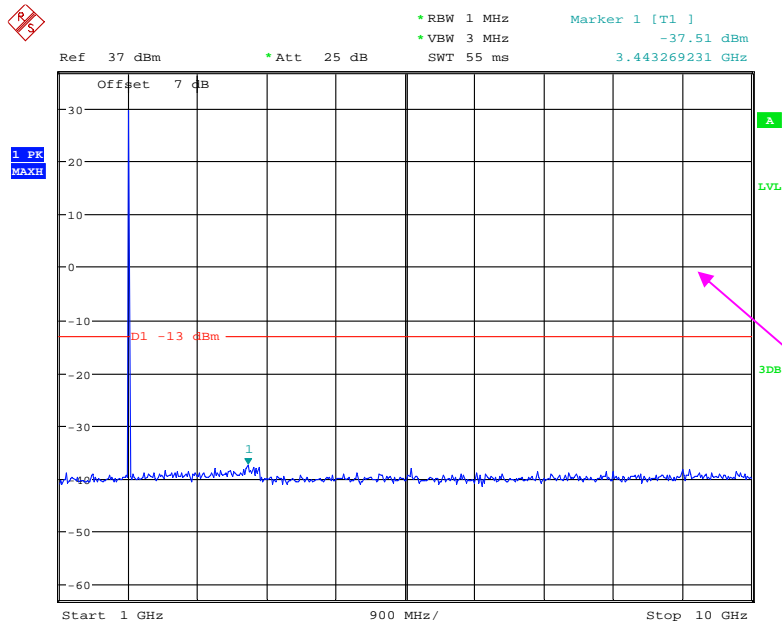
High Channel:

30 MHz – 1 GHz (GSM Mode)



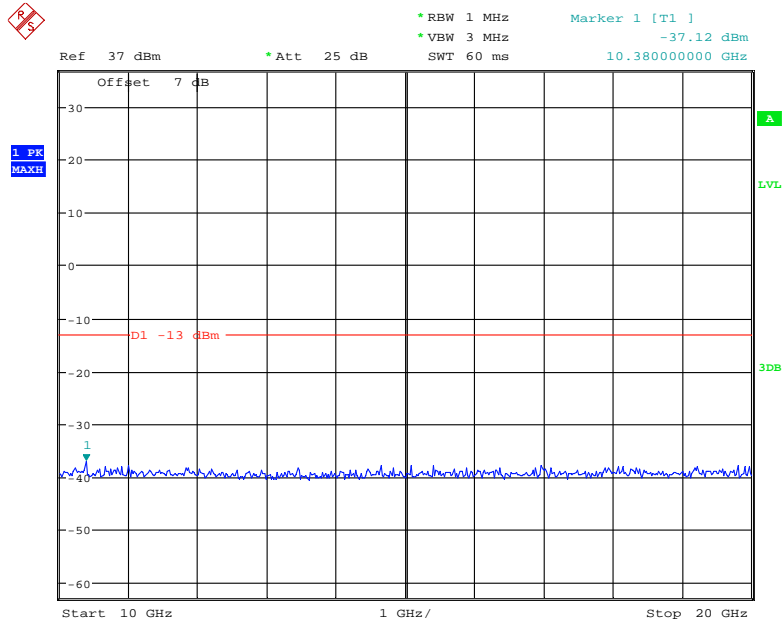
Date: 7.JUN.2021 11:29:45

1 GHz – 10 GHz (GSM Mode)



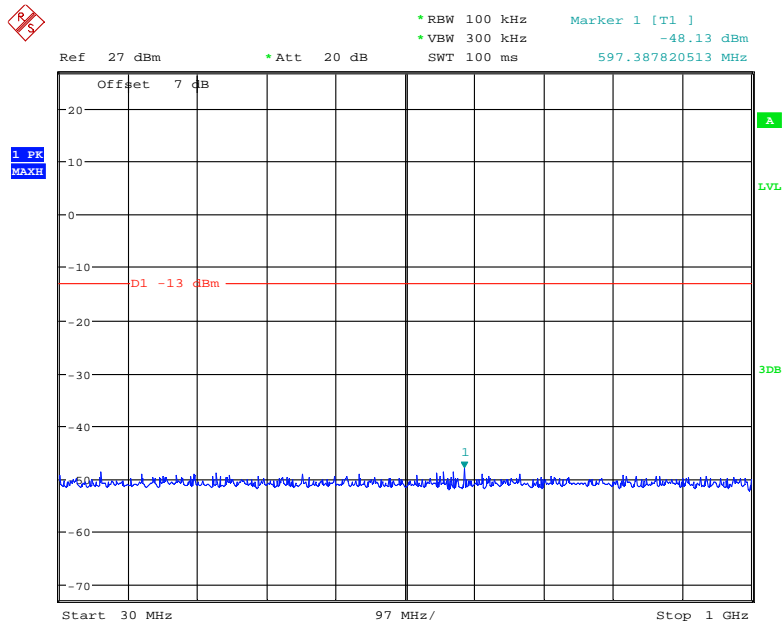
Date: 7.JUN.2021 11:32:24

10 GHz – 20 GHz (GSM Mode)



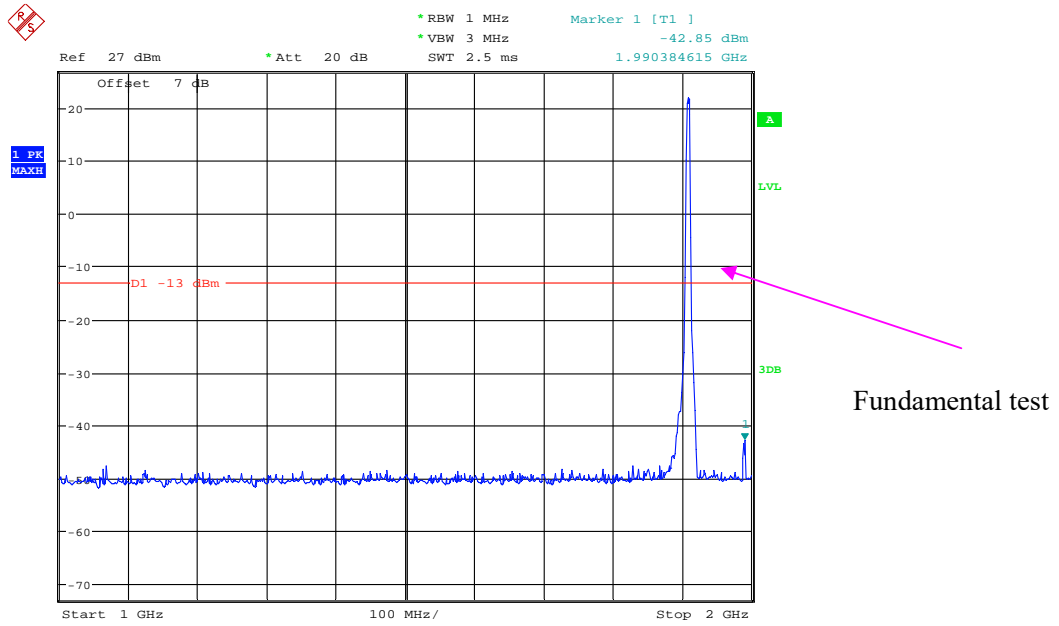
Date: 7.JUN.2021 11:33:21

30 MHz – 1 GHz (WCDMA Mode)



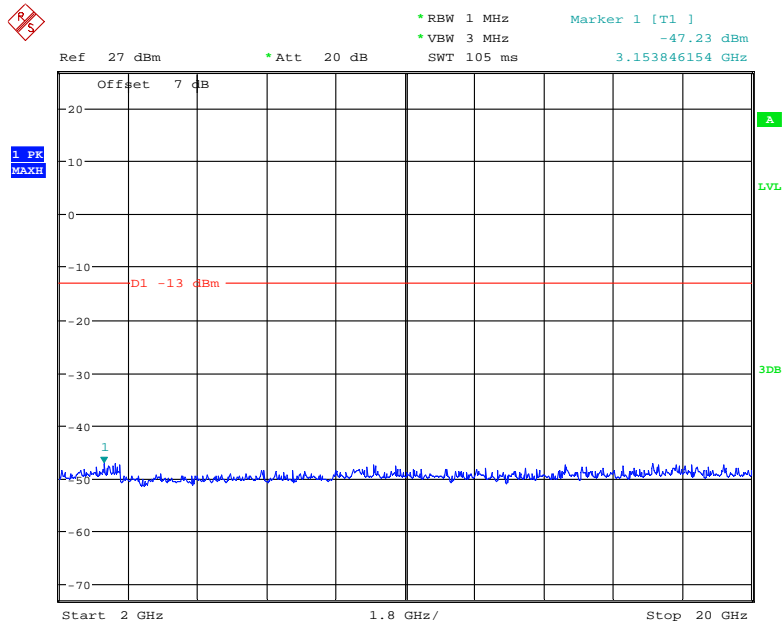
Date: 7.JUN.2021 13:55:54

1 GHz – 2 GHz (WCDMA Mode)



Date: 7.JUN.2021 13:57:11

2 GHz – 20 GHz (WCDMA Mode)



Date: 7.JUN.2021 13:59:10

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) and § 24.238(a) and § 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:	27.2~28 °C
Relative Humidity:	46~58 %
ATM Pressure:	101~101.1 kPa

The testing was performed by Zero Yan on 2021-06-05 for below 1GHz, and Alan He on 2021-06-08 for above 1GHz.

EUT operation mode: Transmitting

30 MHz ~ 10 GHz:

Cellular Band (Part 22H)

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
GSM Mode, Low channel										
958.3	32.42	210	1.1	H	-64.1	1.36	0.0	-65.46	-13	52.46
958.3	33.28	314	2.2	V	-60.8	1.36	0.0	-62.16	-13	49.16
1648.40	48.19	87	1.3	H	-59.9	1.40	8.70	-52.60	-13	39.60
1648.40	47.03	152	1.9	V	-60.8	1.40	8.70	-53.50	-13	40.50
2472.60	49.11	313	2.4	H	-54.2	2.60	10.20	-46.60	-13	33.60
2472.60	48.65	155	1.8	V	-54.1	2.60	10.20	-46.50	-13	33.50
GSM Mode, Middle channel										
957.8	32.48	62	1.4	H	-64.0	1.36	0.0	-65.36	-13	52.36
957.8	33.62	117	2.5	V	-60.4	1.36	0.0	-61.76	-13	48.76
1673.20	47.9	256	2.3	H	-58.4	1.30	8.90	-50.80	-13	37.80
1673.20	47.21	176	1.8	V	-58.5	1.30	8.90	-50.90	-13	37.90
2509.80	49.13	233	1.9	H	-54.2	2.60	10.20	-46.60	-13	33.60
2509.80	48.74	48	1.7	V	-54.0	2.60	10.20	-46.40	-13	33.40
GSM Mode, High channel										
962.4	32.47	346	1.9	H	-64.0	1.36	0.0	-65.36	-13	52.36
962.4	33.58	48	2.0	V	-60.5	1.36	0.0	-61.86	-13	48.86
1697.60	49.1	161	2.3	H	-57.2	1.30	8.90	-49.60	-13	36.60
1697.60	47.69	227	2.2	V	-58.0	1.30	8.90	-50.40	-13	37.40
2546.40	49.35	5	2.1	H	-54.0	2.60	10.20	-46.40	-13	33.40
2546.40	47.99	178	1.4	V	-54.8	2.60	10.20	-47.20	-13	34.20

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
WCDMA Mode, Low channel										
958.2	32.42	215	2.2	H	-64.1	1.36	0.0	-65.46	-13	52.46
958.2	33.48	181	2.0	V	-60.6	1.36	0.0	-61.96	-13	48.96
1652.80	45.89	43	2.0	H	-60.4	1.30	8.90	-52.80	-13	39.80
1652.80	44.2	17	1.5	V	-61.5	1.30	8.90	-53.90	-13	40.90
2479.20	48.71	150	1.5	H	-54.6	2.60	10.20	-47.00	-13	34.00
2479.20	49.66	242	1.5	V	-53.1	2.60	10.20	-45.50	-13	32.50
WCDMA Mode, Middle channel										
956.8	32.34	19	2.0	H	-64.2	1.36	0.0	-65.56	-13	52.56
956.8	33.19	28	1.2	V	-60.9	1.36	0.0	-62.26	-13	49.26
1673.20	45.78	64	2.2	H	-60.6	1.30	8.90	-53.00	-13	40.00
1673.20	44.27	203	2.4	V	-61.5	1.30	8.90	-53.90	-13	40.90
2509.80	49.09	118	1.1	H	-54.3	2.60	10.20	-46.70	-13	33.70
2509.80	49.36	24	1.5	V	-53.4	2.60	10.20	-45.80	-13	32.80
WCDMA Mode, High channel										
962.4	32.47	111	1.3	H	-64.0	1.36	0.0	-65.36	-13	52.36
962.4	33.62	301	1.0	V	-60.4	1.36	0.0	-61.76	-13	48.76
1693.20	45.25	110	1.7	H	-61.1	1.30	8.90	-53.50	-13	40.50
1693.20	44.61	253	1.6	V	-61.1	1.30	8.90	-53.50	-13	40.50
2539.80	49.33	75	1.2	H	-54.0	2.60	10.20	-46.40	-13	33.40
2539.80	48.66	155	1.3	V	-54.1	2.60	10.20	-46.50	-13	33.50

30 MHz ~ 20 GHz:

PCS Band (Part 24E)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
GSM Mode, Low channel										
958.6	32.52	179	1.6	H	-64.0	1.36	0.0	-65.36	-13	52.36
958.6	33.37	319	1.8	V	-60.7	1.36	0.0	-62.06	-13	49.06
3700.40	43.79	137	1.1	H	-58.0	1.60	11.90	-47.70	-13	34.70
3700.40	44.55	354	1.4	V	-56.7	1.60	11.90	-46.40	-13	33.40
GSM Mode, Middle channel										
961.7	32.33	270	1.6	H	-64.2	1.36	0.0	-65.56	-13	52.56
961.7	33.49	256	1.7	V	-60.6	1.36	0.0	-61.96	-13	48.96
3760.00	44.01	285	1.0	H	-58.0	1.50	11.80	-47.70	-13	34.70
3760.00	44.68	48	1.8	V	-56.9	1.50	11.80	-46.60	-13	33.60
GSM Mode, High channel										
948.6	32.16	297	1.2	H	-64.3	1.36	0.0	-65.66	-13	52.66
948.6	33.28	231	2.0	V	-60.8	1.36	0.0	-62.16	-13	49.16
3819.60	44.21	19	1.5	H	-57.8	1.50	11.80	-47.50	-13	34.50
3819.60	44.07	272	2.4	V	-57.5	1.50	11.80	-47.20	-13	34.20
WCDMA Mode, Low channel										
966.8	31.63	158	2.3	H	-64.9	1.36	0.0	-66.26	-13	53.26
966.8	32.85	224	2.2	V	-61.2	1.36	0.0	-62.56	-13	49.56
3704.80	45.01	242	2.2	H	-56.8	1.60	11.90	-46.50	-13	33.50
3704.80	45.89	266	1.0	V	-55.3	1.60	11.90	-45.00	-13	32.00
5557.20	52.19	238	1.1	H	-47.5	1.70	12.40	-36.80	-13	23.80
5557.20	51.92	224	1.7	V	-47.4	1.70	12.40	-36.70	-13	23.70
WCDMA Mode, Middle channel										
964.7	31.55	247	1.7	H	-65.0	1.36	0.0	-66.36	-13	53.36
964.7	32.78	161	1.7	V	-61.3	1.36	0.0	-62.66	-13	49.66
3760.00	44.97	301	1.0	H	-57.1	1.50	11.80	-46.80	-13	33.80
3760.00	46.21	62	1.9	V	-55.4	1.50	11.80	-45.10	-13	32.10
5640.00	52.44	224	1.3	H	-47.2	1.70	12.40	-36.50	-13	23.50
5640.00	52.14	286	1.8	V	-47.2	1.70	12.40	-36.50	-13	23.50
WCDMA Mode, High channel										
961.9	31.51	249	1.8	H	-65.0	1.36	0.0	-66.36	-13	53.36
961.9	32.69	6	2.2	V	-61.4	1.36	0.0	-62.76	-13	49.76
3815.20	44.76	245	1.1	H	-57.3	1.50	11.80	-47.00	-13	34.00
3815.20	45.59	187	1.1	V	-56.0	1.50	11.80	-45.70	-13	32.70
5722.80	52.02	266	1.5	H	-47.8	1.60	12.10	-37.30	-13	24.30
5722.80	50.68	161	1.9	V	-48.6	1.60	12.10	-38.10	-13	25.10

Note:

- 1) Absolute Level = Substituted Level - Cable loss + Antenna Gain
- 2) Margin = Limit- Absolute Level
- 3) The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.

LTE Band: (Pre-scan with all the bandwidth, and worst case as below)

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Band 2										
Test frequency range: 30 MHz ~ 20 GHz										
1850.7 MHz, Low channel										
961.4	32.25	256	2.0	H	-64.3	1.36	0.0	-65.66	-13	52.66
961.4	33.18	254	2.3	V	-60.9	1.36	0.0	-62.26	-13	49.26
3701.40	46.67	113	1.3	H	-55.1	1.60	11.90	-44.80	-13	31.80
3701.40	46.09	149	2.3	V	-55.1	1.60	11.90	-44.80	-13	31.80
5552.10	57.68	184	2.1	H	-42.0	1.70	12.40	-31.30	-13	18.30
5552.10	56.88	298	1.4	V	-42.5	1.70	12.40	-31.80	-13	18.80
1880 MHz, Middle channel										
954.8	32.15	354	1.6	H	-64.4	1.36	0.0	-65.76	-13	52.76
954.8	33.27	293	1.4	V	-60.8	1.36	0.0	-62.16	-13	49.16
3760.00	47.06	102	1.4	H	-55.0	1.50	11.80	-44.70	-13	31.70
3760.00	46.64	185	2.1	V	-54.9	1.50	11.80	-44.60	-13	31.60
5640.00	57.5	31	1.3	H	-42.2	1.70	12.40	-31.50	-13	18.50
5640.00	57.15	16	1.1	V	-42.2	1.70	12.40	-31.50	-13	18.50
1909.3 MHz, High channel										
953.2	32.26	120	1.8	H	-64.2	1.36	0.0	-65.56	-13	52.56
953.2	33.41	302	1.7	V	-60.6	1.36	0.0	-61.96	-13	48.96
3818.60	47.61	25	2.3	H	-54.4	1.50	11.80	-44.10	-13	31.10
3818.60	46.22	191	1.9	V	-55.4	1.50	11.80	-45.10	-13	32.10
5727.90	57.09	130	2.3	H	-42.8	1.60	12.10	-32.30	-13	19.30
5727.90	56.73	193	1.6	V	-42.5	1.60	12.10	-32.00	-13	19.00
Band 4										
Test frequency range:30 MHz ~ 20 GHz										
1710.7 MHz, Low channel										
954.5	32.28	269	1.8	H	-64.2	1.36	0.0	-65.56	-13	52.56
954.5	33.34	343	1.0	V	-60.7	1.36	0.0	-62.06	-13	49.06
3421.40	47.57	334	1.3	H	-53.2	1.40	11.80	-42.80	-13	29.80
3421.40	46.26	106	2.3	V	-54.3	1.40	11.80	-43.90	-13	30.90
5132.10	70.01	37	2.0	H	-30.0	1.60	12.10	-19.50	-13	6.50
5132.10	64.14	191	1.8	V	-35.9	1.60	12.10	-25.40	-13	12.40
1732.5 MHz, Middle channel										
958.3	32.38	333	2.4	H	-64.1	1.36	0.0	-65.46	-13	52.46
958.3	33.42	308	1.3	V	-60.6	1.36	0.0	-61.96	-13	48.96
3465.00	47.78	284	1.1	H	-53.0	1.50	12.00	-42.50	-13	29.50
3465.00	46.49	325	1.7	V	-55.0	1.50	12.00	-44.50	-13	31.50
5197.50	69.46	298	1.4	H	-30.6	1.60	12.10	-20.10	-13	7.10
5197.50	63.68	174	1.9	V	-35.9	1.60	12.10	-25.40	-13	12.40
1754.3 MHz, High channel										
952.4	32.27	162	1.5	H	-64.2	1.36	0.0	-65.56	-13	52.56
952.4	33.14	80	1.1	V	-60.9	1.36	0.0	-62.26	-13	49.26
3508.60	47.51	18	1.3	H	-53.2	1.50	12.00	-42.70	-13	29.70
3508.60	45.75	178	1.9	V	-55.8	1.50	12.00	-45.30	-13	32.30
5262.90	68.99	273	1.2	H	-30.8	1.60	12.20	-20.20	-13	7.20
5262.90	64.01	255	2.5	V	-35.2	1.60	12.20	-24.60	-13	11.60

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Band 5										
Test frequency range:30 MHz ~ 10 GHz										
824.7 MHz, Low channel										
959.3	32.47	228	1.8	H	-64.0	1.36	0.0	-65.36	-13	52.36
959.3	33.51	173	2.0	V	-60.5	1.36	0.0	-61.86	-13	48.86
1649.40	47.99	122	1.1	H	-60.1	1.40	8.70	-52.80	-13	39.80
1649.40	47.2	193	1.3	V	-60.7	1.40	8.70	-53.40	-13	40.40
2474.10	50.97	346	1.4	H	-52.4	2.60	10.20	-44.80	-13	31.80
2474.10	48.11	109	2.0	V	-54.6	2.60	10.20	-47.00	-13	34.00
836.5 MHz, Middle channel										
962.4	32.28	263	1.2	H	-64.2	1.36	0.0	-65.56	-13	52.56
962.4	33.54	223	1.4	V	-60.5	1.36	0.0	-61.86	-13	48.86
1673.00	48.16	121	1.3	H	-58.2	1.30	8.90	-50.60	-13	37.60
1673.00	47.08	187	2.1	V	-58.7	1.30	8.90	-51.10	-13	38.10
2509.50	50.05	305	1.1	H	-53.3	2.60	10.20	-45.70	-13	32.70
2509.50	47.8	215	1.2	V	-54.9	2.60	10.20	-47.30	-13	34.30
848.3 MHz, High channel										
954.8	32.29	283	2.0	H	-64.2	1.36	0.0	-65.56	-13	52.56
954.8	33.35	323	2.2	V	-60.7	1.36	0.0	-62.06	-13	49.06
1696.60	48.69	307	2.4	H	-57.6	1.30	8.90	-50.00	-13	37.00
1696.60	46.73	270	1.2	V	-59.0	1.30	8.90	-51.40	-13	38.40
2544.90	49.68	69	2.4	H	-53.7	2.60	10.20	-46.10	-13	33.10
2544.90	47.22	345	1.3	V	-55.5	2.60	10.20	-47.90	-13	34.90
Band 7										
Test frequency range: 30 MHz ~ 26.5 GHz										
2502.5MHz, Low channel										
957.2	32.42	353	1.5	H	-64.1	1.36	0.0	-65.46	-25	40.46
957.2	33.29	4	1.3	V	-60.8	1.36	0.0	-62.16	-25	37.16
5005.00	51.02	164	1.3	H	-49.6	1.70	12.00	-39.30	-25	14.30
5005.00	52.62	175	2.2	V	-47.4	1.70	12.00	-37.10	-25	12.10
7507.50	45.89	184	1.3	H	-50.0	1.90	10.70	-41.20	-25	16.20
7507.50	44.61	277	1.6	V	-50.9	1.90	10.70	-42.10	-25	17.10
2535 MHz, Middle channel										
962.7	32.36	349	2.0	H	-64.1	1.36	0.0	-65.46	-25	40.46
962.7	33.45	139	2.1	V	-60.6	1.36	0.0	-61.96	-25	36.96
5070.00	50.28	199	1.1	H	-49.7	1.60	12.10	-39.20	-25	14.20
5070.00	52.4	223	1.7	V	-47.6	1.60	12.10	-37.10	-25	12.10
7605.00	45.51	44	1.9	H	-52.0	2.10	10.50	-43.60	-25	18.60
7605.00	45.07	102	2.4	V	-52.2	2.10	10.50	-43.80	-25	18.80
2567.5 MHz, High channel										
958.3	32.52	188	1.2	H	-64.0	1.36	0.0	-65.36	-25	40.36
958.3	33.47	275	1.2	V	-60.6	1.36	0.0	-61.96	-25	36.96
5135.00	49.23	77	1.1	H	-50.8	1.60	12.10	-40.30	-25	15.30
5135.00	51.68	41	2.1	V	-48.3	1.60	12.10	-37.80	-25	12.80
7702.50	44.91	91	1.2	H	-52.6	2.10	10.50	-44.20	-25	19.20
7702.50	44.55	233	2.3	V	-52.7	2.10	10.50	-44.30	-25	19.30

Note:

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

dBd is for the ERP, dBi is for EIRP.

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.

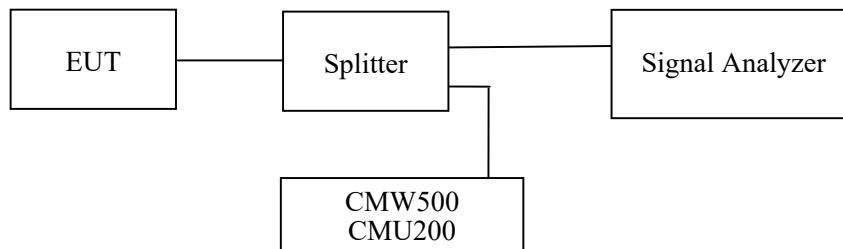
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to FCC §27.53 (c)(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

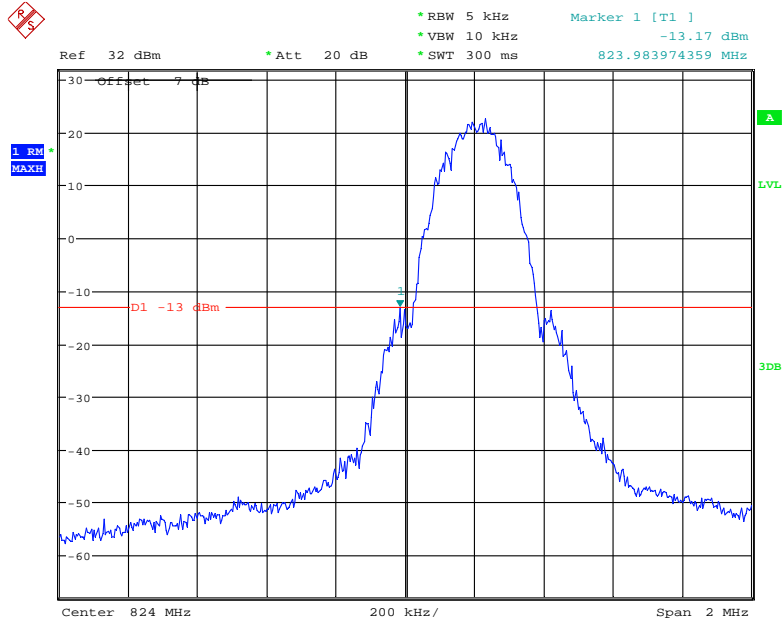
Temperature:	27~28 °C
Relative Humidity:	51~58 %
ATM Pressure:	101.0 kPa

The testing was performed by Carl Yang from 2021-06-07 to 2021-06-16.

Test Result: Pass

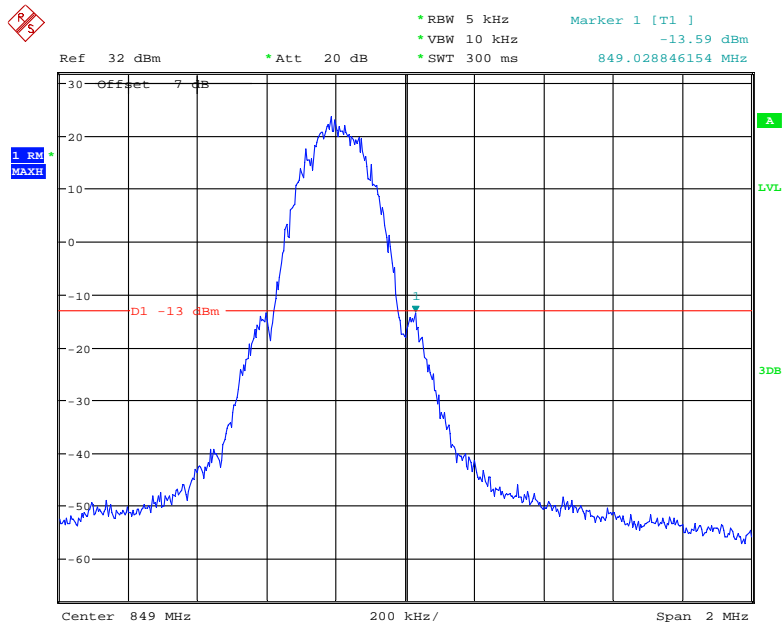
Please refer to the following plots.

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



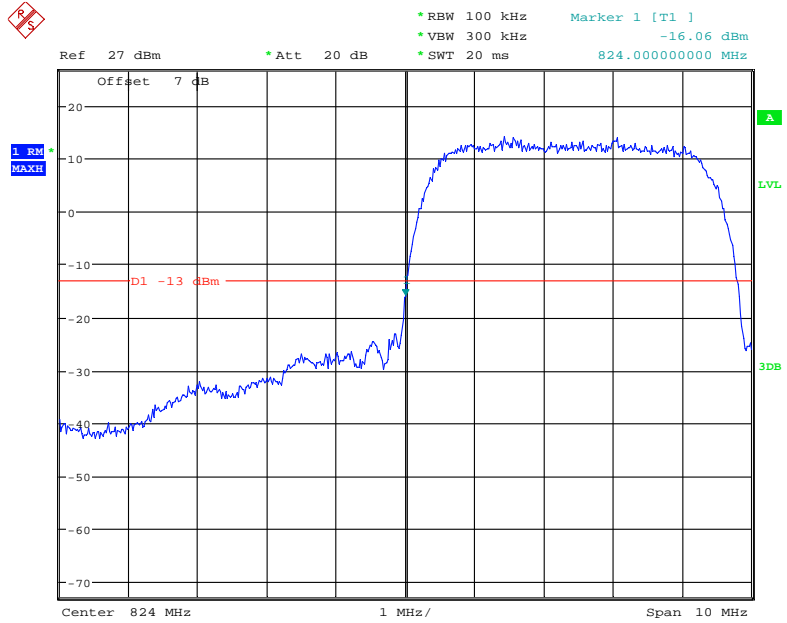
Date: 7.JUN.2021 10:56:03

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



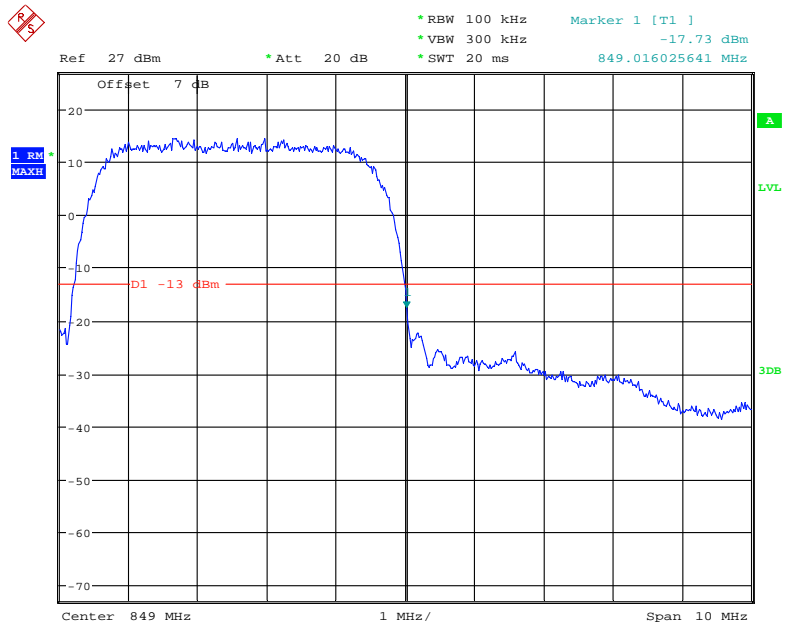
Date: 7.JUN.2021 10:58:20

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



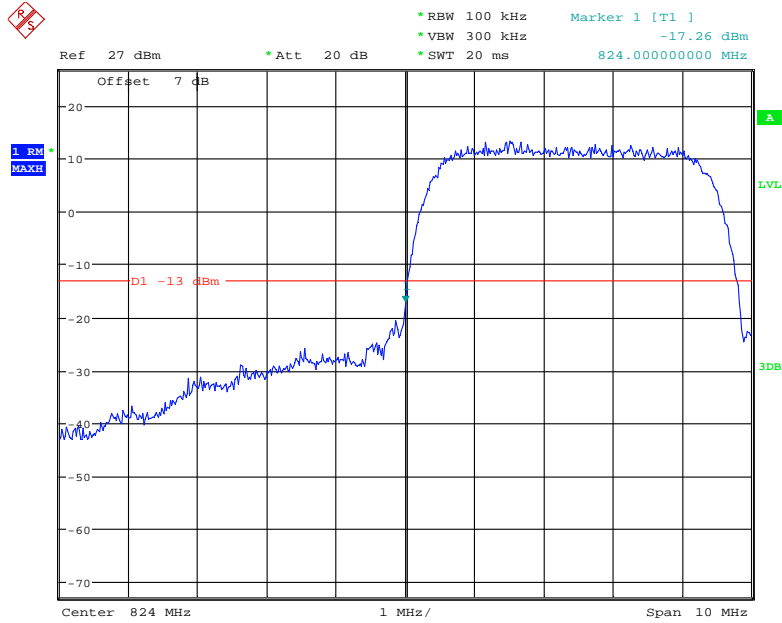
Date: 7.JUN.2021 11:48:00

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



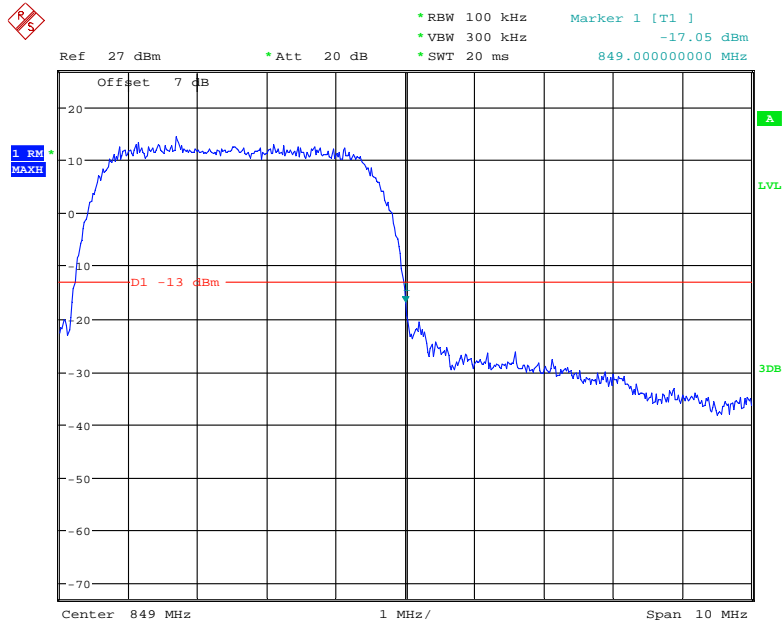
Date: 7.JUN.2021 11:49:00

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



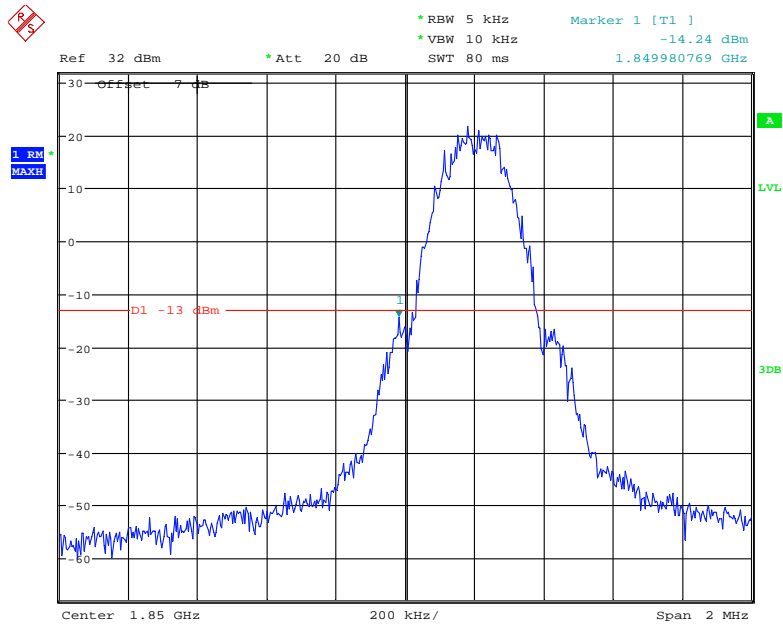
Date: 7.JUN.2021 13:13:01

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



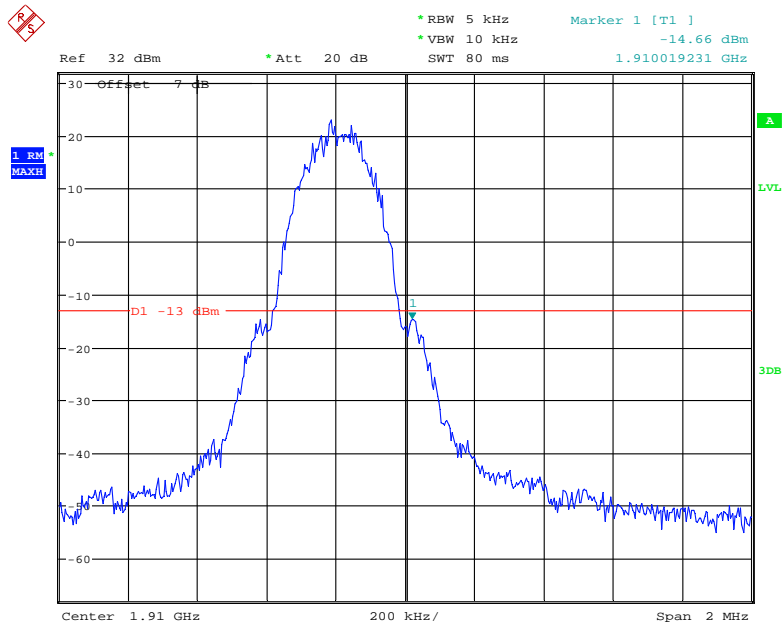
Date: 7.JUN.2021 13:13:33

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



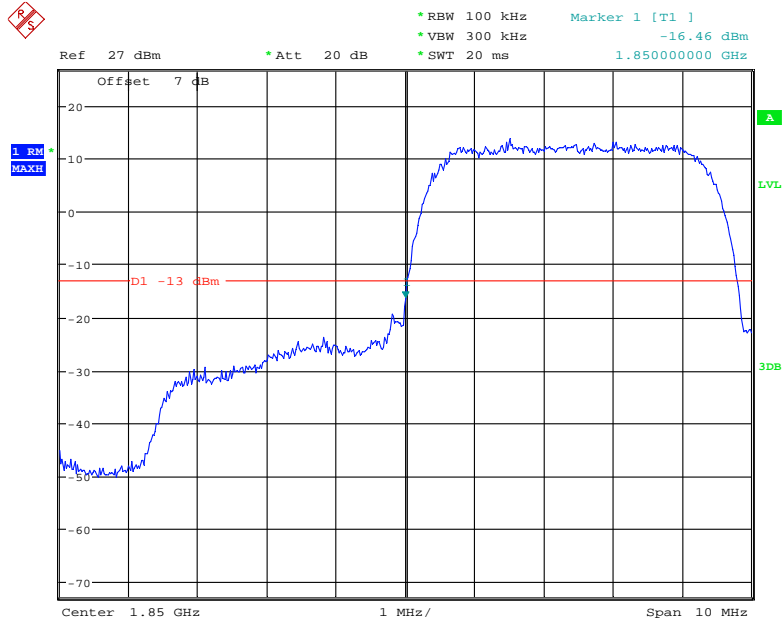
Date: 7.JUN.2021 11:05:59

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



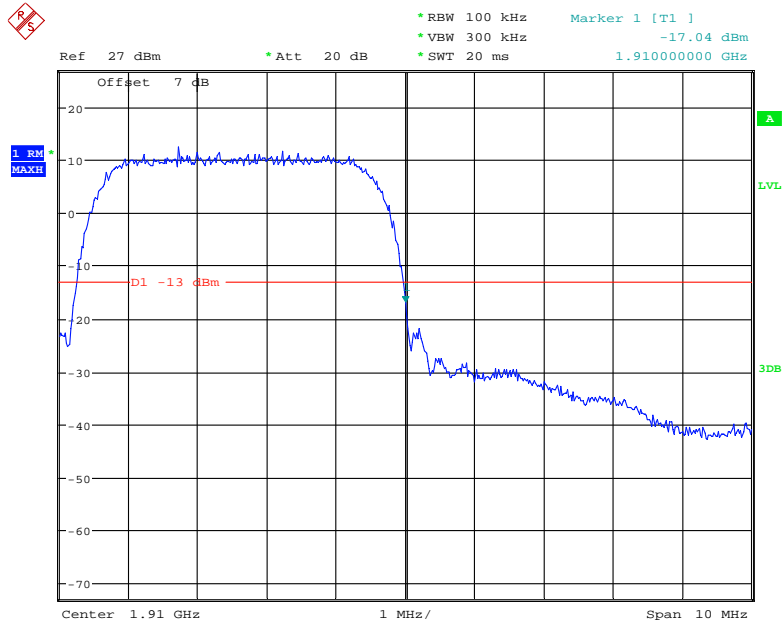
Date: 7.JUN.2021 11:04:58

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



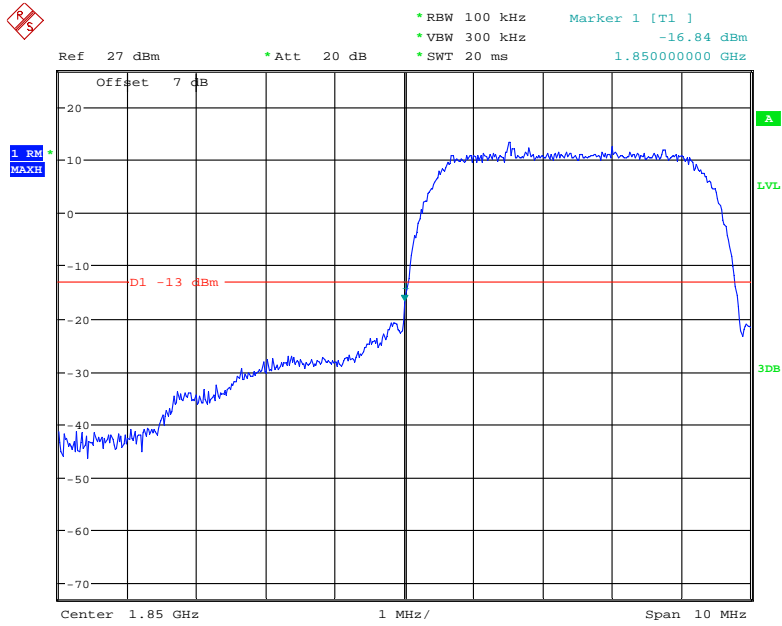
Date: 7.JUN.2021 13:02:45

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



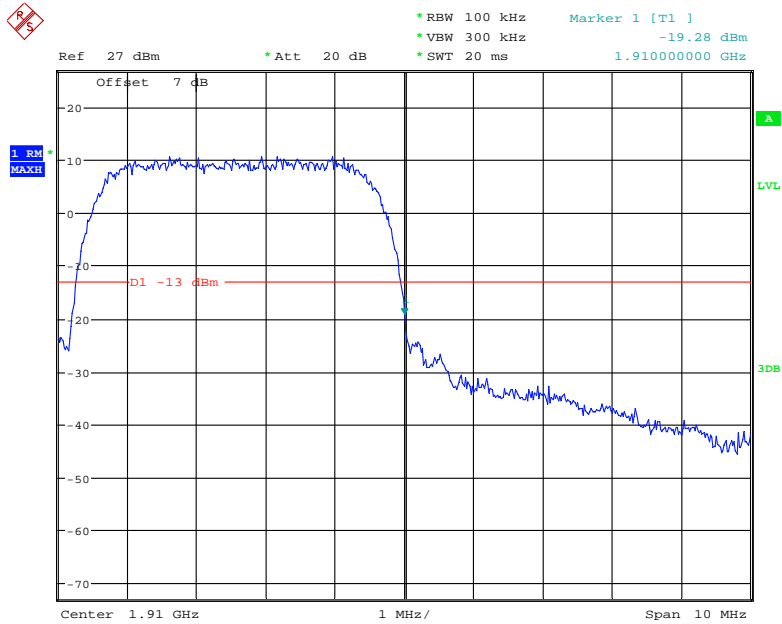
Date: 7.JUN.2021 13:01:59

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



Date: 7.JUN.2021 13:03:48

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



Date: 7.JUN.2021 13:04:32

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

Applicable Standard

FCC § 2.1055, §22.355, §24.235 and & §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

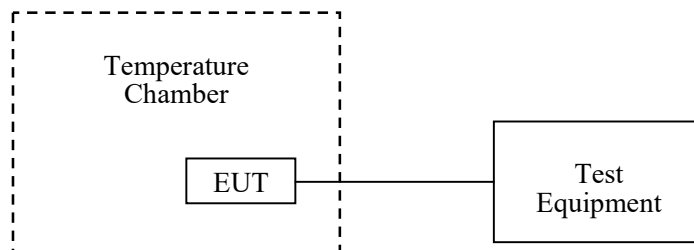
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC 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 DC 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:	27~28 °C
Relative Humidity:	51~58 %
ATM Pressure:	101.0 kPa

The testing was performed by Carl Yang on 2021-06-04 and 2021-06-07.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

Cellular Band (Part 22H)

GPRS Mode

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	NV	3	0.0036	2.5
-20		5	0.0060	2.5
-10		-4	-0.0048	2.5
0		6	0.0072	2.5
10		7	0.0084	2.5
20		2	0.0024	2.5
30		3	0.0036	2.5
40		-1	-0.0012	2.5
50		-5	-0.0060	2.5
20		LV	-4	-0.0048
	HV	3	0.0036	2.5

WCDMA Mode

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	NV	-1	-0.0012	2.5
-20		1	0.0012	2.5
-10		-3	-0.0036	2.5
0		1	0.0012	2.5
10		2	0.0024	2.5
20		2	0.0024	2.5
30		6	0.0072	2.5
40		1	0.0012	2.5
50		-1	-0.0012	2.5
20		LV	-4	-0.0048
	HV	-2	-0.0024	2.5

PCS Band (Part 24E)

GPRS Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	NV	6	0.0032	pass
-20		4	0.0021	pass
-10		2	0.0011	pass
0		1	0.0005	pass
10		5	0.0027	pass
20		11	0.0059	pass
30		4	0.0021	pass
40		6	0.0032	pass
50		6	0.0032	pass
20	LV	4	0.0021	pass
	HV	5	0.0027	pass

WCDMA Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	NV	2	0.0011	pass
-20		2	0.0011	pass
-10		-1	-0.0005	pass
0		4	0.0021	pass
10		-6	-0.0032	pass
20		-5	-0.0027	pass
30		1	0.0005	pass
40		4	0.0021	pass
50		2	0.0011	pass
20	LV	5	0.0027	pass
	HV	5	0.0027	pass

LTE:
QPSK:

Band 2:

10.0 MHz Middle Channel, $f_0=1880\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	NV	7	0.0037	pass
-20		8	0.0043	pass
-10		-6	-0.0032	pass
0		4	0.0021	pass
10		-5	-0.0027	pass
20		3	0.0016	pass
30		2	0.0011	pass
40		5	0.0027	pass
50		4	0.0021	pass
20		LV	-8	-0.0043
	HV	9	0.0048	pass

Band 4:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	NV	1710.4408	1754.4423	1710	1755
-20		1710.4033	1754.7581	1710	1755
-10		1710.6324	1754.5103	1710	1755
0		1710.4947	1754.5507	1710	1755
10		1710.6419	1754.6410	1710	1755
20		1710.6969	1754.6532	1710	1755
30		1710.5266	1754.4988	1710	1755
40		1710.4994	1754.6593	1710	1755
50		1710.2498	1754.6346	1710	1755
20		LV	1710.5266	1754.7562	1710
	HV	1710.6414	1754.5216	1710	1755

Band 5:

10.0 MHz Middle Channel, $f_0 = 836.5\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	NV	8	0.0096	2.5
-20		12	0.0143	2.5
-10		6	0.0072	2.5
0		-4	-0.0048	2.5
10		5	0.0060	2.5
20		8	0.0096	2.5
30		6	0.0072	2.5
40		5	0.0060	2.5
50		4	0.0048	2.5
20		LV	7	0.0084
	HV	6	0.0072	2.5

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	NV	2500.7199	2569.4529	2500	2570
-20		2500.4443	2569.4644	2500	2570
-10		2500.3767	2569.6618	2500	2570
0		2500.2907	2569.8204	2500	2570
10		2500.6945	2569.2091	2500	2570
20		2500.7148	2569.7694	2500	2570
30		2500.5626	2569.8142	2500	2570
40		2500.5393	2569.6665	2500	2570
50		2500.5699	2569.7555	2500	2570
20		LV	2500.5617	2569.2381	2500
	HV	2500.6131	2569.3887	2500	2570

16QAM:

Band 2:

10.0 MHz Middle Channel, $f_0 = 1880\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	NV	-7	-0.0037	pass
-20		3	0.0016	pass
-10		6	0.0032	pass
0		-6	-0.0032	pass
10		8	0.0043	pass
20		-9	-0.0048	pass
30		-5	-0.0027	pass
40		5	0.0027	pass
50		10	0.0053	pass
20		LV	9	0.0048
	HV	9	0.0048	pass

Band 4:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	NV	1710.5091	1754.8421	1710	1755
-20		1710.5406	1754.7628	1710	1755
-10		1710.5529	1754.7923	1710	1755
0		1710.5882	1754.6732	1710	1755
10		1710.4876	1754.7709	1710	1755
20		1710.6880	1754.8876	1710	1755
30		1710.5611	1754.6920	1710	1755
40		1710.6886	1754.8374	1710	1755
50		1710.4923	1754.7574	1710	1755
20		LV	1710.5164	1754.7589	1710
	HV	1710.4754	1754.7902	1710	1755

Band 5:

10.0 MHz Middle Channel, $f_0=836.5\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	NV	6	0.0072	2.5
-20		5	0.0060	2.5
-10		-9	-0.0108	2.5
0		-5	-0.0060	2.5
10		9	0.0108	2.5
20		8	0.0096	2.5
30		-3	-0.0036	2.5
40		6	0.0072	2.5
50		4	0.0048	2.5
20		LV	8	0.0096
	HV	-5	-0.0060	2.5

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	NV	2500.6267	2569.4120	2500	2570
-20		2500.5025	2569.4532	2500	2570
-10		2500.5627	2569.4416	2500	2570
0		2500.5325	2569.4317	2500	2570
10		2500.5689	2569.3145	2500	2570
20		2500.4991	2569.5040	2500	2570
30		2500.5358	2569.4037	2500	2570
40		2500.4544	2569.4372	2500	2570
50		2500.5957	2569.4375	2500	2570
20		LV	2500.3513	2569.3927	2500
	HV	2500.5996	2569.5141	2500	2570

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