Bluetooth Test Report

Test Report Number: WR-1124.103

Terminal device: FCC ID: QMNRM-155 Model: 2365i Type: RM-155 HW: B3.0 SW: PR100_05w21_46.nbp (Detailed information is listed in section 4).

Originator:	Cindy Trinh
Function:	TCC - Dallas – EMC
Version/Status:	Approved
Location:	TCC Directories
Date:	15-Jun-06

Change History:

Version	*Date*	*Status*	*Handled By*	*Comments*
0.1	9-Jun-06	Draft	Cindy Trinh	
0.2	15-Jun-06	Proposal	Cindy Trinh	
0.3	15-Jun-06	Reviewed	Hai To	
1.0	15Jun-06	Approved	Hai To	

Testing laboratory:

Test & Certification Center (TCC) Dallas
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Date and signatures: **15-Jun-06**

For the contents:

Cindy Trinh
Digitally signed by Cindy Trinh
DN: cn=Cindy Trinh, c=US, email=cindy.n.trinh@nokia.com
Date: 2006.06.15 10:00:52 -05'00'

Cindy Trinh
Test Engineer

Hai To
Technical Review

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1. GENERAL

1.1 Quality System

The quality system in place for TCC-Dallas conforms to ISO/IEC 17025 and has been audited to the standard by A2LA (American Association of Laboratory Accreditation). TCC - Dallas has also been audited using the ISO 9000 Quality System, as part of Nokia Mobile Phones, Inc., by ABS (American Bureau of Shipping) Quality Evaluations Inc.

TCC-Dallas is a recognized laboratory with the Federal Communications Commission in filing applications for Certification under Parts 15 and 18, Registration Number 100060, and Industry Canada, Registration Number IC 661N.

1.2 Objective

All tests and measurement data shown was performed to determine whether the selected handset was in compliance as specified in FCC: CFR47 Parts 15.207 and 15.247.

1.3 Test Summary

Test Results: *The test result relates only to those tested devices mentioned in Section 4 of this test report.*

Test Performed	CFR 47	RSS-210	Section of Report	Complies / Does not comply / Not Tested
Radiated Emissions	15.247 (c)	6.2.2 (o), e1	7	Complies
AC Conducted Emissions	15.247	6.6	8	Complies

2. STANDARDS BASIS

Testing has been carried out in accordance with:

REF.	Code of the standard	Name of the standard
1	ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz.
2	FCC: CFR 47 Part 15	Code of Federal Regulations (CFR) Title 47, Part 15 – Radio Frequency Devices: Subpart B – Unintentional Radiators and Subpart C – Intentional Radiators
3	CISPR 22 / EN55022	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.
4	ICES-003	Digital Apparatus, Industry Canada
5	RSS-210	Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands)
6	RSS-212	Test Facilities and Test Methods for Radio Equipment, Industry Canada (Provisional)
7	RSP-100	Radio Equipment Certification Procedure

Note: Unless otherwise stated, (by reference to a version number and a publication date), the latest version of the above documents applies.

Deviations:

Not Applicable.

3. LIST OF ABBREVIATIONS, ACRONYMS AND TERMS

3.1 Abbreviations

dB - decibel

dBm - decibels per milliwatt (absolute measurement)

dBµV - decibel per microvolt

dBµV/m - decibel of microvolt per meter

GHz - gigahertz or 1000000000 hertz

kHz - kilohertz or 1000 hertz

MHz - megahertz or 1000000 hertz

ms - millisecond or 0.001 second

µs - microsecond or 0.000001 second

3.2 Acronyms

BT - Bluetooth

EMC - Electromagnetic Compatibility

EMI - Electromagnetic Interference

EUT - Equipment under Test

PRBS - Pseudo Random Bit Sequence

RF - Radio Frequency

3.3 Terms

Base Station Simulator (BSS) - simulates all the necessary signals that a phone would experience while on a live network. There are many types of base station simulators catering for all current protocols, i.e., GSM, AMPS, TDMA, and CDMA.

4. EQUIPMENT-UNDER-TEST (EUT)

The results in this report relate only to the items listed below:

4.1 Description of Tested Device(s):

Test Performed	Mode of Operation	Date of Receipt	Condition of Sample	Item	Identifying Information
FCC Part 15.247(c) FCC Part 15.247	BT	31-May-06	Functional	Phone	ESN: 02601180561 FCC ID: QMNRM-155 Type: RM-155 HW: B3.0 SW: PR100_05w21_46.nbp
FCC Part 15.247(c) FCC Part 15.247	BT	31-May-06	N/A	Battery	Type: BL-5B Other: 3.7 Vdc
FCC Part 15.247(c) FCC Part 15.247	BT	31-May-06	N/A	Charger	Type: AC-3U
FCC Part 15.247(c) FCC Part 15.247	BT	31-May-06	N/A	Headset	Type: HS-9

5. TEST EQUIPMENT LIST

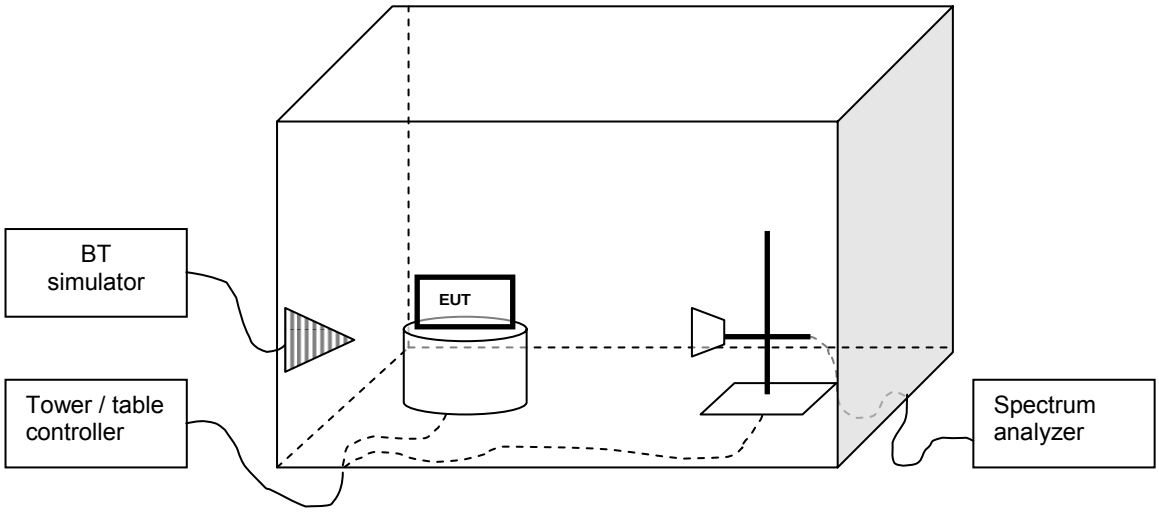
The listing below indicates the test equipment utilized for the test (s). Calibration interval on all items listed can be obtained from the Engineering Services Group within NMP, Product Creation - Dallas. Where relevant, measuring equipment is subjected to in-service checks between testing. TCC - Dallas shall notify clients promptly, in writing, of identification of defective measuring equipment that casts doubt on the validity of results given in this report.

Section of Report	NMP#	Test Equipment	Mfr. #	Model #	Calibration Due Date	Calibration Interval
7,8	04073	EMI Receiver	R&S	ESIB 26	03-Aug-06	12 months
7,8	02625	Base Station	R&S	CMU-200	30-Aug-06	12 months
7	02871	Biconilog Antenna	EMC Automation	3003C	08-July-06	12 months
7	04076	Horn Antenna	ETS	3117	18-Aug-06	12 months
7	02836	Turntable and Tower Controller	Sunol	FM2022 & 2846	N/A	N/A
7,8	00658	LISN	R&S	ESH-S5	07-July-06	12 months
7,8	02880	Biconilog Antenna	EMC Automation	3003C	23-Sep-06	12 months

6. EUT TEST SETUPS

For each test the EUT was exercised to find out the worst case of operation modes and device configuration.

6.1 EUT test set-up (radiated measurement)



7. RADIATED EMISSIONS

Specification: FCC Part 15.247(c)(1); RSS-210 6.2.2(o), e1

7.1 Setup

Testing was performed in accordance with ANSI C63.4, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz.

The measurement is made according to FCC rules part 15.247 and IC standard RSS-210 as follows:

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed in the Semi-Anechoic Chamber with conducting metal floor, if the Preliminary Measurement results are closer than 20 dB to the permissible value.

The EUT is placed at nonconductive plate at the turntable center.

For each suspected frequency, the turntable is rotated 360 degrees and antenna is scanned from 1 to 4 m. This is repeated for both horizontal and vertical receive antenna polarizations.

The emissions less than 20 dB below the permissible value are reported.

The measurement results are obtained as described below:

$$E\ [\mu V/m] = U_{RX} + A_{TOT}$$

Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable loss, antenna factor and preamplifier gain ($A_{TOT} = L_{CABLES} + AF - G_{PREAMP}$).

7.2 Test Results

Test Operator	Cindy Trinh
Date of Measurement	5-Jun-06
Temperature	23 to 24 °C
Humidity	45 to 53 %RH
Test Result	Complies

7.3 EUT operation mode

EUT operation mode	Connected, DH5, Static PRBS GFSK, π/4-DQPSK, 8DPSK
EUT channel	0 (2402 MHz), 40 (2442 MHz), 78 (2480 MHz)
EUT TX power level	Nominal

7.4 Pass/Fail Criteria

Band	Frequency Range (MHz)	FCC Class B Limit (dBµV/m at 3m)	Detector
BT	30 – 88	40	QP
BT	88 – 216	43.5	QP
BT	216 – 960	46	QP
BT	960 – 1000	54	QP
BT	> 1000	74.0/ 54.0	PK/ AV

7.5 Results

GFSK

Peak (RBW/VBW: 1 MHz) Channel 0

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4804.00	47.60	239.88	36.80	10.80	VERTICAL	Passed
7206.00	50.60	338.84	35.50	15.10	VERTICAL	Passed

Average (RBW/VBW: 1 MHz) Channel 0

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4804.00	35.30	58.21	24.50	10.80	VERTICAL	Passed
7206.00	37.80	77.62	22.70	15.10	VERTICAL	Passed

Quasi peak (RBW/VBW: 120 kHz) Channel 40

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
33.17	27.10	22.65	45.00	-17.90	VERTICAL	Passed
37.64	15.40	5.89	34.80	-19.40	VERTICAL	Passed
74.37	3.80	1.55	24.70	-20.90	VERTICAL	Passed
187.17	25.60	19.05	40.80	-15.20	VERTICAL	Passed

Peak (RBW/VBW: 1 MHz) Channel 40

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
1691.00	49.19	287.73	38.49	10.70	VERTICAL	Passed
2188.00	51.82	389.48	37.52	14.30	VERTICAL	Passed
2521.00	47.97	250.02	32.77	15.20	VERTICAL	Passed
2321.84	51.00	354.81	38.00	13.00	VERTICAL	Passed
2866.27	53.30	462.38	37.70	15.60	HORIZONTAL	Passed
7221.45	51.10	358.92	35.80	15.30	VERTICAL	Passed

Peak (RBW/VBW: 1 MHz) Channel 78

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4960.00	48.10	254.10	37.00	11.10	VERTICAL	Passed
7440.00	50.90	350.75	35.40	15.50	HORIZONTAL	Passed

Average (RBW/VBW: 1 MHz) Channel 78

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4960.00	35.10	56.89	24.00	11.10	VERTICAL	Passed
7440.00	38.40	83.18	22.90	15.50	VERTICAL	Passed

π/4-DQPSK

Quasi peak (RBW/VBW: 120 kHz) Channel 0

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
33.23	27.00	22.39	44.90	-17.90	VERTICAL	Passed
38.20	18.30	8.22	37.90	-19.60	VERTICAL	Passed
77.05	16.20	6.46	36.70	-20.50	VERTICAL	Passed

Peak (RBW/VBW: 1 MHz) Channel 0

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
2317.23	51.50	375.84	38.90	12.60	VERTICAL	Passed
2852.35	53.30	462.38	37.30	16.00	HORIZONTAL	Passed
6485.98	48.30	260.02	33.80	14.50	VERTICAL	Passed
7225.45	45.40	186.21	30.10	15.30	VERTICAL	Passed
7269.04	44.60	169.82	29.30	15.30	HORIZONTAL	Passed
7599.69	45.10	179.89	29.40	15.70	VERTICAL	Passed

Quasi peak (RBW/VBW: 120 kHz) Channel 40

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
34.81	24.30	16.41	42.60	-18.30	VERTICAL	Passed
38.14	19.20	9.12	38.80	-19.60	VERTICAL	Passed

Peak (RBW/VBW: 1 MHz) Channel 40

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
2110.00	50.99	353.99	37.89	13.10	VERTICAL	Passed
2141.00	51.94	394.90	38.54	13.40	VERTICAL	Passed
2292.00	51.11	358.91	37.31	13.80	VERTICAL	Passed
2314.24	51.50	375.84	39.10	12.40	HORIZONTAL	Passed
2872.46	53.50	473.15	37.90	15.60	VERTICAL	Passed
7221.95	51.10	358.92	35.80	15.30	VERTICAL	Passed

Quasi peak (RBW/VBW: 120 kHz) Channel 78

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
38.04	15.40	5.89	34.90	-19.50	VERTICAL	Passed
46.31	15.50	5.96	37.40	-21.90	VERTICAL	Passed

Peak (RBW/VBW: 1 MHz) Channel 78

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
1970.44	66.30	2,065.38	56.60	9.70	HORIZONTAL	Passed
1970.45	67.10	2,264.64	57.40	9.70	VERTICAL	Passed
1973.96	72.50	4,216.97	63.00	9.50	VERTICAL	Passed
2321.14	51.80	389.05	38.90	12.90	HORIZONTAL	Passed
7224.95	44.90	175.79	29.60	15.30	VERTICAL	Passed

Average (RBW/VBW: 1 MHz) Channel 78

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
1970.45	37.30	73.28	27.60	9.70	VERTICAL	Passed
1970.94	41.40	117.49	31.70	9.70	HORIZONTAL	Passed
1974.46	50.40	331.13	40.90	9.50	VERTICAL	Passed

8DPSK

Quasi peak (RBW/VBW: 120 kHz) Channel 0

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
37.80	17.70	7.67	37.10	-19.40	VERTICAL	Passed
73.83	19.80	9.77	40.70	-20.90	VERTICAL	Passed
74.57	20.80	10.96	41.70	-20.90	VERTICAL	Passed

Peak (RBW/VBW: 1 MHz) Channel 0

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
2328.96	51.50	375.84	38.40	13.10	HORIZONTAL	Passed
7228.45	51.40	371.54	36.10	15.30	VERTICAL	Passed

Quasi peak (RBW/VBW: 120 kHz) Channel 40

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
38.18	17.80	7.76	37.40	-19.60	VERTICAL	Passed

Peak (RBW/VBW: 1 MHz) Channel 40

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
1863.00	48.75	273.52	37.55	11.20	VERTICAL	Passed
2217.00	51.60	379.74	37.80	13.80	VERTICAL	Passed
2324.44	51.30	367.28	38.20	13.10	HORIZONTAL	Passed
2837.56	53.70	484.17	38.10	15.60	HORIZONTAL	Passed
2957.00	50.83	347.52	33.83	17.00	VERTICAL	Passed
7227.45	51.20	363.08	35.90	15.30	VERTICAL	Passed

Quasi peak (RBW/VBW: 120 kHz) Channel 78

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
38.18	16.10	6.38	35.70	-19.60	VERTICAL	Passed

Peak (RBW/VBW: 1 MHz) Channel 78

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
2326.85	51.50	375.84	38.40	13.10	VERTICAL	Passed
2856.64	53.20	457.09	37.40	15.80	HORIZONTAL	Passed
7227.45	50.70	342.77	35.40	15.30	VERTICAL	Passed

8. AC CONDUCTED EMISSIONS

Specification: FCC Part 15.207; RSS-210 6.6

8.1 Setup

The measurement is made according to FCC rules part 15.247 and IC standard RSS-210 as follows:

The EUT is placed on a wooden table 80 cm above the reference groundplane.

The EUT is connected via LISN to a test power supply.

The measurement results are obtained as described below:

$U\ [dB\mu V] = U_{RX} + A_{TOT}$

Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

8.2 Test Results

Test Operator	Cindy Trinh
Date of Measurement	5-Jun-06
Temperature	23 to 24 °C
Humidity	45 to 53 %RH
Test Result	Complies

8.3 EUT operation mode

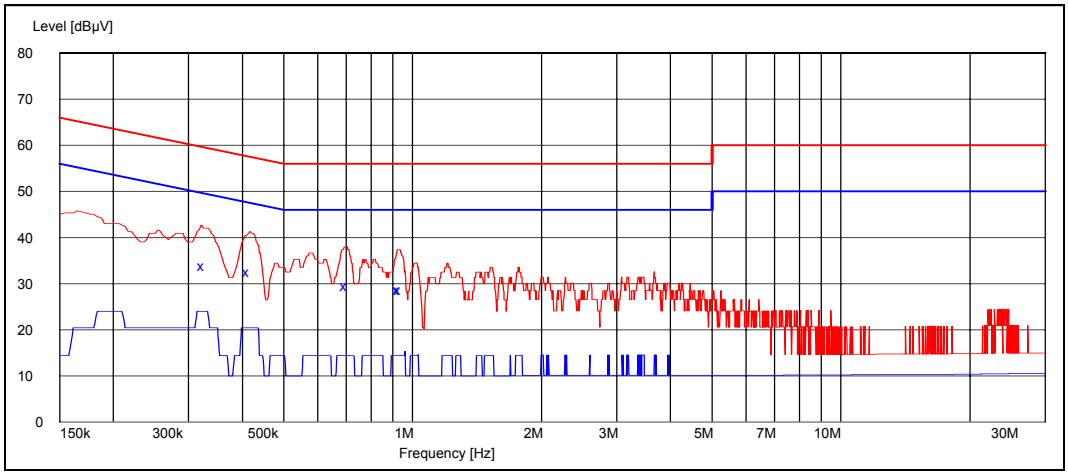
EUT operation mode	Connected, DH5, Static PRBS GFSK, π/4-DQPSK, 8DPSK
EUT channel	0 (2402 MHz), 40 (2442 MHz), 78 (2480 MHz)
EUT TX power level	Nominal

8.4 Pass/Fail Criteria

Frequency Range	**AC Conducted Emission Limits (CISPR 22)**	
	Quasi-peak (dBµV)	**Average (dBµV)**
0.15MHz - 0.5MHz	66 - 56	56 - 46
0.5MHz - 5MHz -	56	46
5MHz - 30MHz	60	50

8.5 Results

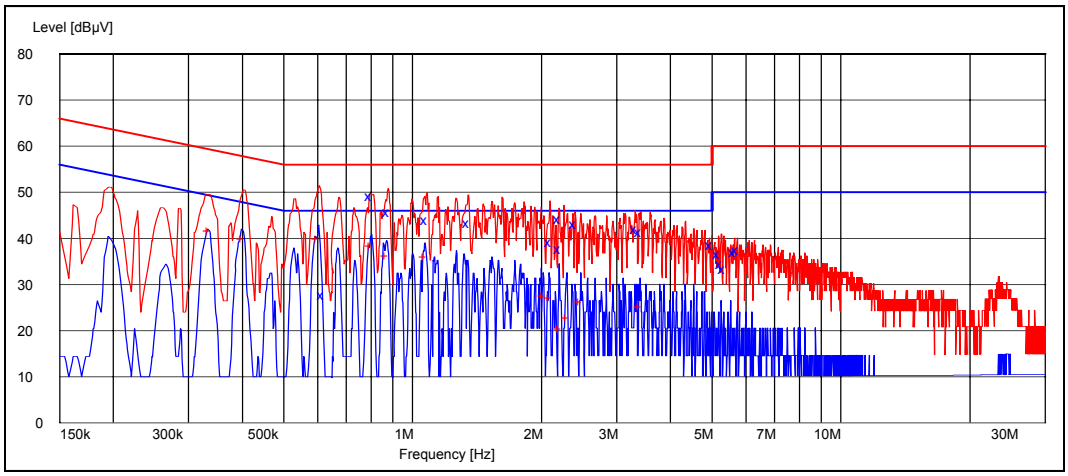
AC Conducted Emissions, GFSK



Quasi peak (RBW/VBW: 9 kHz), GFSK

Frequency [MHz]	U [dBµV]	Line	Result
0.325000	33.80	L1	Passed
0.415000	32.50	L1	Passed
0.700000	29.50	L1	Passed
0.930000	28.70	L1	Passed
0.935000	28.60	L1	Passed

AC Conducted Emissions, π/4-DQPSK



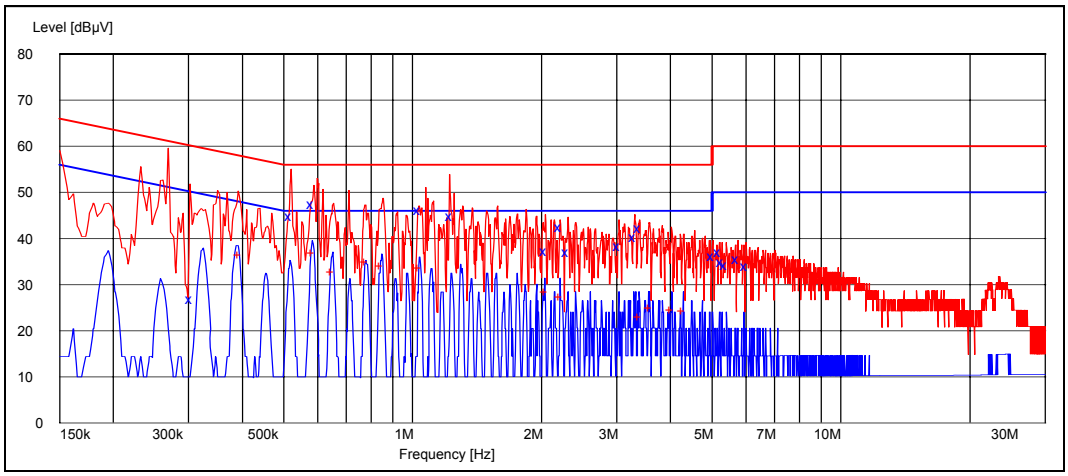
Quasi peak (RBW/VBW: 9 kHz), π/4-DQPSK

Frequency [MHz]	U [dBµV]	Line	Result
0.620000	27.60	L1	Passed
0.800000	49.10	L1	Passed
0.880000	45.60	L1	Passed
1.080000	43.90	L1	Passed
1.350000	43.30	L1	Passed
2.100000	39.20	N	Passed
2.205000	44.20	L1	Passed
2.210000	37.70	L1	Passed
2.400000	43.10	L1	Passed
3.335000	42.10	L1	Passed
3.410000	41.40	L1	Passed
4.990000	38.50	L1	Passed
5.195000	36.70	L1	Passed
5.270000	34.40	N	Passed
5.340000	33.40	L1	Passed
5.650000	37.10	L1	Passed
5.735000	37.40	L1	Passed

Average (RBW/VBW: 9 kHz), π/4-DQPSK

Frequency [MHz]	U [dBµV]	Line	Result
0.335000	41.50	L1	Passed
0.400000	40.00	L1	Passed
0.600000	39.90	L1	Passed
0.800000	38.30	L1	Passed
0.870000	36.30	L1	Passed
1.070000	36.00	L1	Passed
2.025000	27.50	N	Passed
2.095000	27.00	L1	Passed
2.205000	20.30	N	Passed
2.300000	22.80	L1	Passed
2.465000	26.20	L1	Passed
3.400000	25.20	L1	Passed

AC Conducted Emissions, 8DPSK



Quasi peak (RBW/VBW: 9 kHz), 8DPSK

Frequency [MHz]	U [dBµV]	Line	Result
0.305000	26.80	L1	Passed
0.520000	44.90	L1	Passed
0.585000	47.40	L1	Passed
1.040000	46.10	L1	Passed
1.235000	44.90	L1	Passed
2.045000	37.30	L1	Passed
2.220000	42.50	L1	Passed
2.310000	37.00	L1	Passed
3.040000	38.40	L1	Passed
3.305000	40.40	L1	Passed
3.395000	42.20	L1	Passed
5.030000	36.20	L1	Passed
5.230000	37.00	L1	Passed
5.295000	34.80	L1	Passed
5.410000	34.20	L1	Passed
5.760000	35.60	L1	Passed
6.025000	33.90	L1	Passed

Average (RBW/VBW: 9 kHz), 8DPSK

Frequency [MHz]	U [dBµV]	Line	Result
0.395000	36.50	L1	Passed
0.585000	36.90	L1	Passed
0.650000	32.80	L1	Passed
0.780000	35.00	L1	Passed
0.845000	33.90	L1	Passed
1.040000	33.50	L1	Passed
2.045000	28.30	N	Passed
2.220000	27.30	L1	Passed
3.385000	23.00	L1	Passed
3.585000	25.00	L1	Passed
4.035000	24.50	L1	Passed
4.295000	24.20	L1	Passed